Northern Lite 600/900AH Lithium Package

The electrical system your Northern Lite truck camper has been thoughtfully designed to be as user-friendly and efficient as possible while supporting a wide range of off-grid and on-grid power needs. Whether you're plugged into shore power, driving, or relying on solar energy, the system works to ensure your batteries stay charged and your appliances operate smoothly.

WARNING

It is important to note that this system can handle upwards of 150 amps of 12VDC current, during charging or during heavy power usage. While the system includes built-in protections, improper handling or unauthorized modifications can pose serious risks of electric shock, fire, or equipment damage. Always follow safety procedures and consult a qualified technician if unsure about any electrical work.

This RV electrical system has been designed and configured for safe, reliable, and efficient operation. Do not alter settings, wiring, or configurations unless you are fully qualified and understand the consequences of such changes.

Modifying system settings (such as charge profiles, voltage limits, or device parameters) without proper knowledge may result in battery damage, equipment failure, electrical fire, or personal injury. Always follow manufacturer instructions and consult a certified technician before making any adjustments. System components may carry high current, extreme caution is required during inspection or service. By changing system settings, the user assumes full responsibility for any resulting damage, performance issues, or safety risks. Manufacturer warranties may be voided by unauthorized changes or modifications.

The 600/900AH lithium system uses integrated lithium batteries that are not designed for routine removal. This package is not recommended for prolonged winter storage in ambient temperatures below −20 °C (−4 °F) unless the unit remains connected to shore power with the Truma Combi furnace operating on electric mode to maintain interior heat.

If the truck battery becomes discharged and requires a jump start, disconnect the 7-way power cord and the DC-DC charger cord from the RV prior to connecting the jumper cables to the truck. Failure to disconnect the RV's electrical system may result in damage to the RV's electrical components.

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1.0 System Overview

Your Northern Lite is equipped with a multi-source power system designed to maintain battery health and deliver reliable electricity for onboard use. The six key components in this system are:

1. Main Battery Switch
2. 3000W Inverter/Charger
3. 40A DC to DC Charger
4. 40A MPPT Solar Charge Controller
5. 600/900AH 12VDC Lithium Battery Bank
6. AC/DC Distribution Panel

For more detailed specifications, settings, and troubleshooting information, please consult the device's manufacturer manual. Northern Lite Manuals | Northern Lite 4-Season Truck Campers

1.1 Main Battery Switch

Function:

- The main battery switch controls whether 12VDC power is fed from the battery bank to the camper's main distribution panel and the inverter.
- Turn the main battery switch ON to enable power for all 12VDC components (lights, water pump, jacks, fans) and to allow DC power to the inverter for AC loads.
- Turn the main battery switch OFF when the camper is not in use or in storage to help avoid draining the batteries due to small or parasitic loads.
- The main battery switch does not interrupt solar charging, allowing the batteries to continue charging even when the switch is turned to OFF (if stored outside).

1.2 Inverter Charger

Function:

- Inverter Mode: Converts 12VDC battery power into 120VAC to power household-style outlets and appliances when you're not connected to shore power or running a generator (if equipped).
- Charger Mode: When connected to shore power or a generator, it converts incoming 120VAC to 12VDC to charge the batteries.

- AC Passthrough: When connected to shore power or a generator the device will allow 120VAC power to passthrough the inverter to the distribution panel.

Key Features:

- Automatically switches between inverter and charger mode depending on whether the camper is connected to shore power or generator power.
- Protects batteries from overcharging with multi-stage charging (Bulk, Absorption, Float and Equalization).

1.3 DC/DC Charger

Function:

- When connected to the truck via the charge port, with the truck running, the DC/DC charger will automatically turn on and provide power to the battery bank

Special Note:

Your Northern Lite camper comes installed with a 40A DC/DC charger wired to a female connector on the driver's side of the camper. The male connector and insulated cover is supplied loose. No cable, fuses or battery connections are supplied. It is the responsibility of the purchaser to ensure that the connection is made from the truck to the camper following the service bulletin on our website. Northern Lite Manuals | Northern Lite 4-Season Truck Campers

1.4 MPPT Solar Charge Controller

Function:

- Regulates the power coming from your 660W solar array to charge the battery bank efficiently and safely.
- MPPT (Maximum Power Point Tracking) technology optimizes voltage and current from the solar panels to deliver maximum charge output, even in varying sun conditions.

1.5 Battery Bank

Configuration:

- Your RV is equipped with a 12V lithium battery bank, consisting of two (or three) 12V 300AH lithium ($LiFePO_4$) batteries wired in parallel, creating a total usable capacity of 600 or 900AH at 12V.

Function:

- The battery bank stores energy from all power sources, shore power, vehicle, generator (if equipped), and solar panels to supply consistent 12V power to your camper's electrical system.
- The batteries come with an internal heater to maintain battery temperature in cold environments, allow charging even in temperatures as low as -20C.
- RVC terminal connectors for inter-battery communication via the RV-C protocol for parallel batteries, it connects to the GoPower Connect App.

Benefits of Lithium Batteries:

- High energy density: Delivers more usable capacity in less space compared to lead-acid batteries.
- Fast charging: Accepts higher charge currents for quicker recovery.
- Deep discharge capable: Up to 80–100% depth of discharge without damaging battery health.
- Long lifespan: Typically, 3000–5000 charge cycles.
- Built-in BMS (Battery Management System): Each battery includes protection against overcharging, over-discharging, temperature extremes, and short circuits.

Safety Notes:

- **Though lithium batteries are safer and more stable than older chemistries, the battery bank is capable of delivering over 1000 amps of instantaneous current if short-circuited. Treat all wiring and terminals with extreme caution. The battery compartment has been designed for Lithium batteries only.**

1.6 AC/DC Distribution Panel

Function:

- The AC/DC distribution panel is the central hub for distributing both 120VAC and 12VDC power throughout the camper.
- Houses all fuses and breakers, protecting individual circuits and allowing for organized routing of electrical power to lights, appliances, outlets, pump, and more.

Safety Notes:

- **Always turn the battery switch OFF prior to replacing any AC breaker or DC fuse.**
- **Use only correctly rated fuses and breakers as specified in the panel labeling.**

- **For issues beyond fuse replacement, consult Northern Lite or a qualified RV technician.**

Special Note:

Aside from the AC and DC breakers in the distribution panel, the camper is also equipped with electrical disconnects for the solar array (40A), DC/DC charger (40A), 7-way charging (30A), electric jacks (40A) and the distribution panel (30A). These breakers are located under the forward dinette seat. They are in place to isolate and protect each device when needed. If any work is being done on the solar, DC charger or 7-way, these breakers must be switched to OFF. The distribution panel can be isolated through its breaker or the main battery switch.

7-Way Connector Charging (Truck Charge Line)

Each camper is equipped with a 30A breaker on the charging line connected to the 7-way trailer plug. Campers are shipped with this breaker in the OFF position to prevent the camper from drawing power from the tow vehicle when parked or not running. If the operator chooses to enable the 30A breaker and allow charging from the truck:

- Be aware that this may draw power from the vehicle's battery system, especially if the engine is off.
- The 7-way charge line is not a smart charging system and does not provide ideal charging voltage for lithium batteries.
- This method is not intended to provide meaningful charging for the 600/900AH lithium system and should not be relied upon as a primary charging source.

2.0 Electrical Schematic

Wiring diagrams can be found on our website. [Northern Lite Manuals | Northern Lite 4-Season Truck Campers]

System overview below:

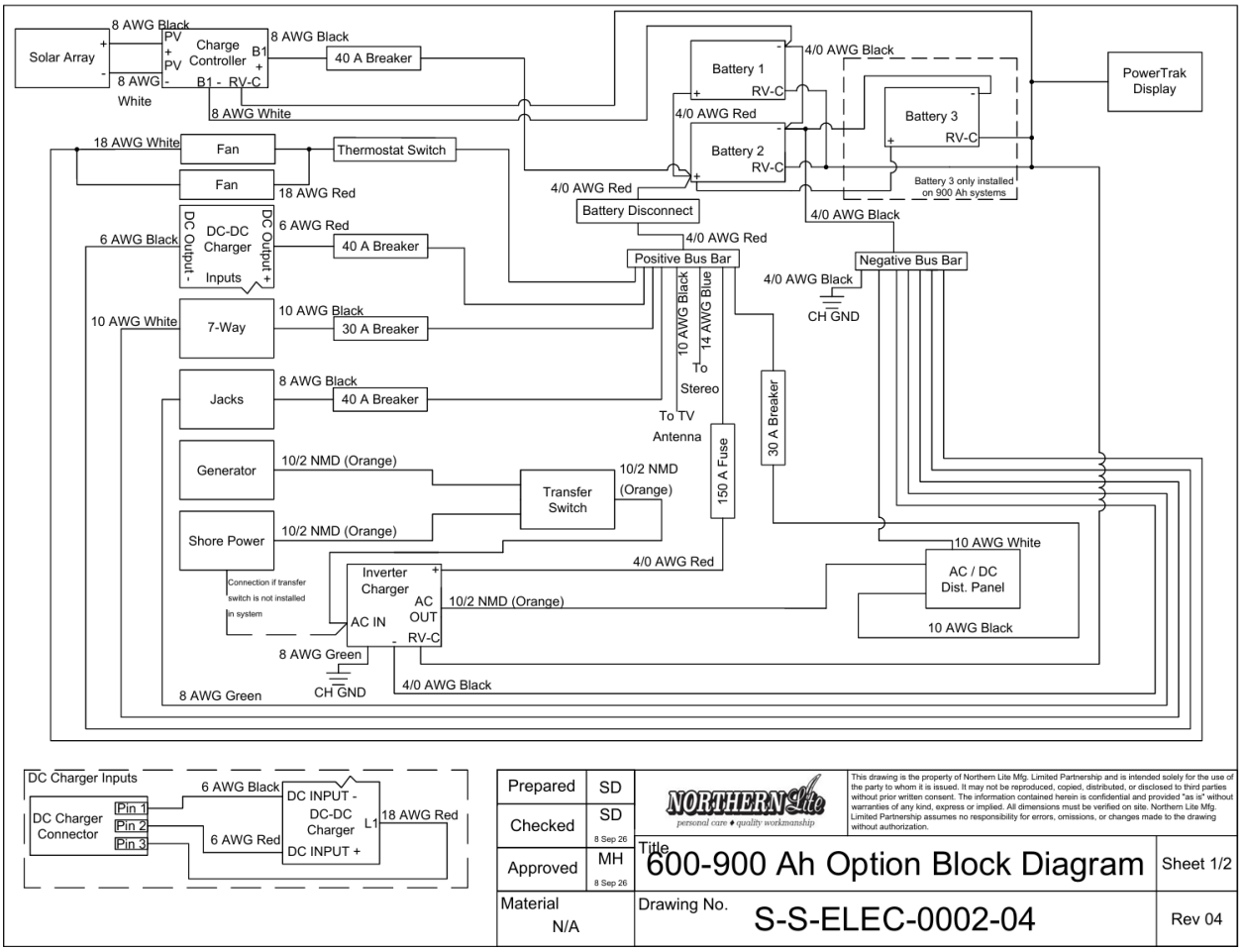
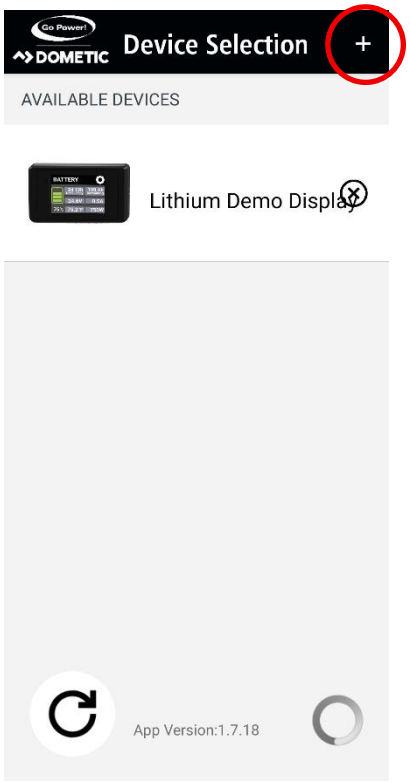


Figure 1 - Electrical Schematic

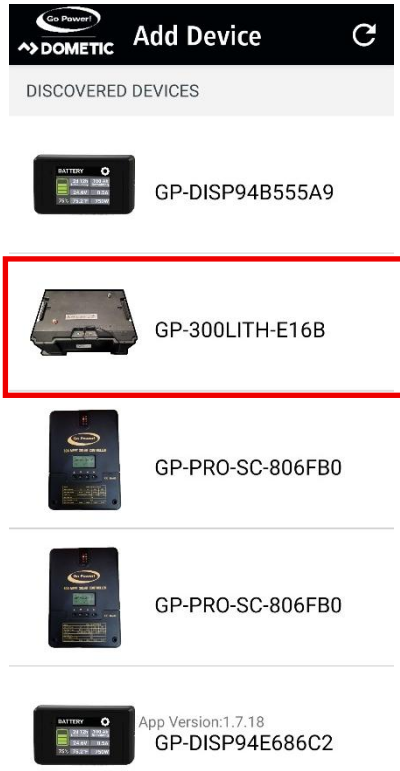
3.0 Bluetooth Connection (OPTIONAL)

1. Install the “Go Power Connect” app on your smartphone. And open the app.
2. Click “+” at the top right of the device selection screen.

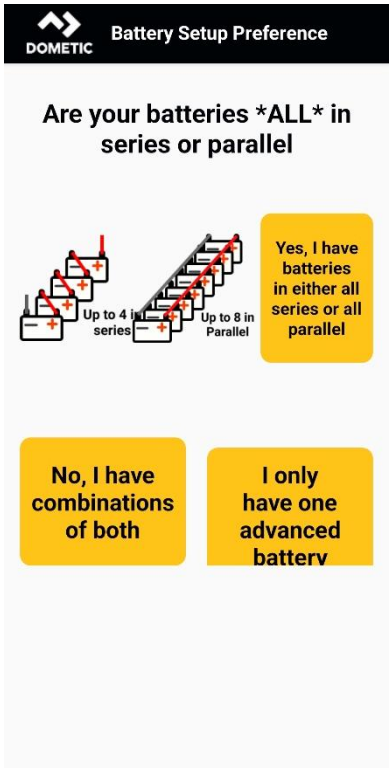


3. Once all devices are loaded select one of the 300 Ah batteries.
4. Press the blinking light on the battery selected to authenticate the connection.
5. When prompted, provide a name for the device.

If the device being paired is a battery bank, follow steps 6 to 8. If the device is not a battery bank skip to step 9.

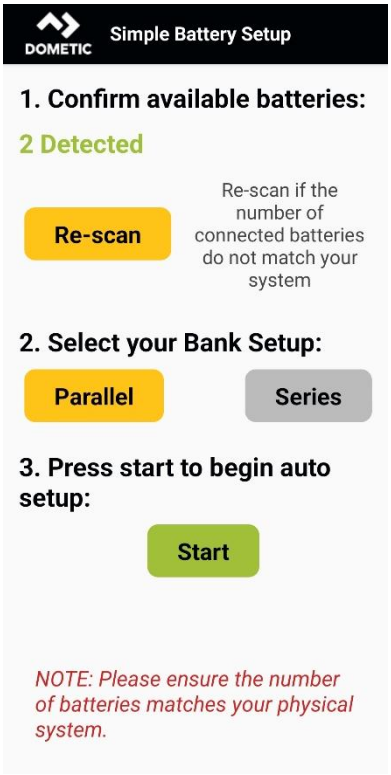


6. Select, “Yes, I have batteries in either all series or all parallel”

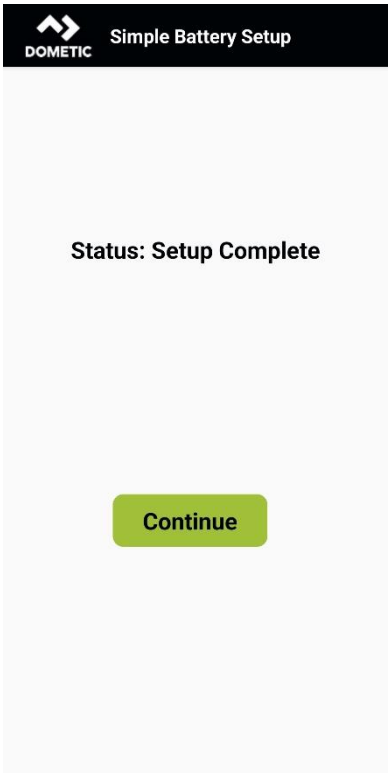


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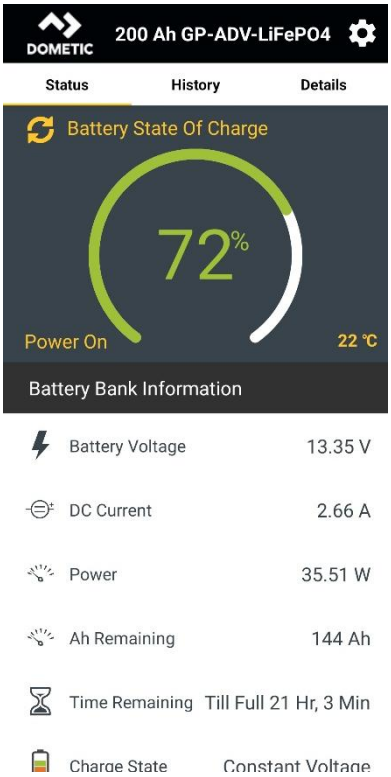
7. On the next screen, verify 2 batteries are detected. If not, ensure both batteries are powered on an have a steady or blinking green light.
8. Select parallel under step 2, bank setup
9. Press start to begin automated battery setup procedure.



10. Press continue on screen reading "Status: setup complete"



11. Verify procedure by selecting the newly named device in the device selection screen. After loading the battery bank device the screen should read out all battery stats.



12. Repeat these steps to connect the solar charge controller, inverter charger and PowerTrak display.

4.0 System Operation

1. Ensure the battery switch is in the ON position.
2. Use the battery monitor to check the status of the batteries, solar system and the inverter charger by swiping the Powertrak display.

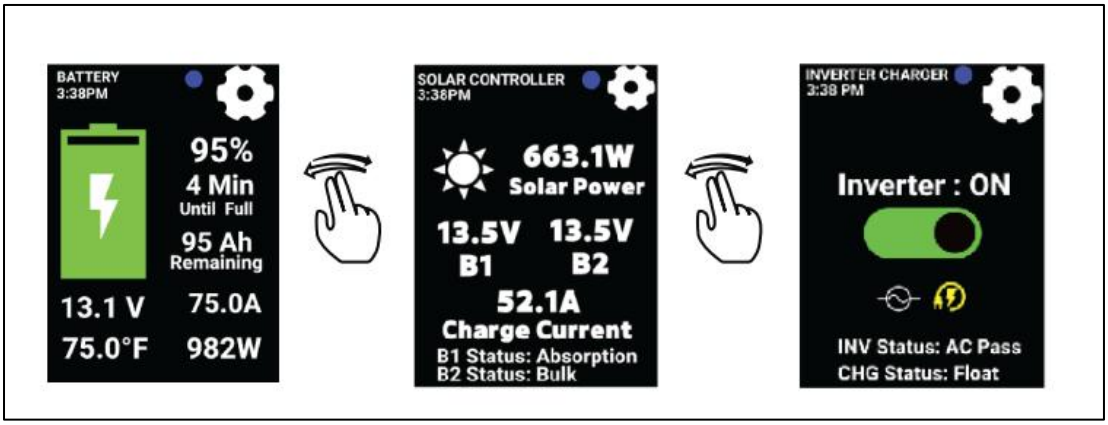


Figure 2 - Excerpt from GoPower Manual

Battery Screen: Displays current capacity, voltage and the net power (watts) and current (amperage) flowing to (charging, positive) or flowing from (discharging, negative). It will also estimate time to empty or time to full based on the current electrical loads.

Solar Screen: Displays the battery voltage, solar array voltage and power (watts), charging current and the current charging cycle profile.

Inverter Screen: Displays the status of the inverter charger.

3. Check operation of AC and DC systems:
    a. Ensure camper is NOT plugged into shore power.
    b. Ensure the battery switch is ON.
    c. Verify all breakers in the distribution panel are ON.
    d. Verify AC power by checking small green light is present on GFCI outlets, or that the microwave display is illuminated.
    e. Verify DC power by confirming operation of any dome light.
    f. Once power is verified for both sources, the camper is ready for use.

5.0 Camper Storage

If you will be leaving your camper for a prolonged period, ensure that the batteries are fully charged and the battery switch is in the OFF position. The batteries will still be able to receive charge through the solar array if stored outside.

The camper should be checked regularly to monitor the battery bank. This can be done through the Powertrak display or the GoPower Connect app (optional). If the battery bank gets lower than 20% (120AH remaining) the unit should be plugged into shore power and the battery switch turned back to ON. If the battery switch is not turned to ON the batteries will not be charged.

5.1 Cold Weather Storage

The campers' batteries are rated for operation in ambient temperatures down to -20°C (-4°F). When storing your camper in cold temperatures, the following procedures must be followed to protect the batteries and ensure they remain within their operating temperature range.

Storage Temperatures Between 0°C and -20°C (32°F and -4°F)

When storing the camper in this temperature range:

1. Plug the camper into shore power.
2. Turn the battery switch to the ON position.
3. Ensure the battery heaters on both batteries are turned to AUTO (through the GoPower Connect App or the PowerTrak display)
4. Ensure the battery charger is enabled and that both batteries are being charged.
5. Monitor the PowerTrak display for the HEAT ON indicator. This indicator will appear automatically when the battery temperature approaches 0°C (32°F) and the battery heaters activate.

Regularly check the camper to verify that shore power remains connected and energized, the batteries are charging, and the battery temperature displayed on the PowerTrak screen remains above 0°C (32°F).

Storage Temperatures of -20°C (-14°F) and Colder

When storing the camper in temperatures of -25°C (-13°F) or colder, supplemental interior heating is required to help protect the batteries.

In addition to completing all steps outlined in Section 1:

1. Plug the camper into shore power.
2. Turn the battery switch to the ON position.
3. Ensure the battery heaters on both batteries are turned to AUTO (through the GoPower Connect App or the PowerTrak display)
4. Ensure the battery charger and inverter is enabled and that both batteries are charged.
5. Turn on the Truma furnace.
6. Set the Truma to Electric 1 mode.
7. Set the temperature to the lowest available setting (5°C / 40°F).

The supplemental heat will help maintain the interior temperature above freezing and provide additional protection for the batteries during extreme cold weather.

Regularly check the camper to verify that shore power remains connected and energized, the battery charger and heaters are operating, the Truma remains on, and the battery temperatures displayed on the PowerTrak screen remain above 0°C (32°F).

Important: Do not rely solely on the battery heaters for protection during extended periods of extreme cold. Regular monitoring of the battery temperatures and all charging and heating systems is essential.

6.0 Software Updates

Dometic periodically will release software updates to improve the performances of their devices. Software updates can be done through the GoPower App. Instructions can be found on Northern Lite's website under Manuals, Guides and Schematics.

7.0 Troubleshooting

A device (batteries, solar or inverter) is not showing up on the battery monitor.

1. Verify that all the devices are powered on (note: the DC charger does not have a dedicated screen).
2. Locate SCREEN SETTINGS in the Powertrak display.
3. Select RESET SETTINGS.
4. Select RESTART DEVICE.
5. Once the device has repowered, confirm the batteries, solar and inverter charger are detected at the loading screen.
6. Select LOAD.
7. If the problem persists, contact your dealer for technical assistance.

The camper is plugged into shore power, but the batteries are not charging.

1. On the inverter screen of the Powertrak display confirm the charge status states NO CHARGE.
2. In the charger settings, select DISABLE. Once disabled, select ENABLE.
3. Go to the inverter screen to confirm that the charge status reads BULK, FLOAT, ABSORPTION OR EQUALIZATION.
4. If the problem persists, contact your dealer for technical assistance.

The solar system is not charging the batteries.

1. Remove the forward bench seat lid to reveal the MPPT Charge Controller.
2. Verify the 40A solar breaker is in the ON position.
3. The lights should be steady green or a fast-flashing green, if a slow flashing green is present reboot the solar charge controller through the Powertrak display.
4. If the problem persists, contact your dealer for technical assistance.

That batteries are not charging off the truck (DC Charger)

1. With the truck running, remove the forward bench seat lid to expose the DC Charger.
2. Verify that the power indicator light (blue) is illuminated. <insert photo>
3. If light is not illuminated, remove the male connector from the camper. With a multimeter measure the voltage from pins 1 to 3 and 2 to 3, both readings should be approximately 12VDC. If not, contact your dealer.

The inverter charger is not inverting, AC power is not available:

8. Remove the forward facing dinette cushions to access the compartment where the inverter charger and TRUMA (hot water heater/ furnace combination) are located.
9. Looking at the top of the inverter, flip the switch located on the bottom left side, OFF and then back to ON.



Figure 3 - Inverter Switch

8.0 Factory Reset

Your PowerTrak display comes from the factory configured to a 600/900AH Lithium battery bank (where the batteries are connected in parallel) and charging limited to a 15A AC source (most common electrical outlet).

In the event that a factory reset is performed on the PowerTrak display the following must occur:

1. Re-configure the battery bank size to 600/900AH, ensure “parallel” is selected on the PowerTrak display.
2. In the Solar Charge controller page settings, ensure that the Battery 1 type is selected to Lithium. Note, while in your camper there are two batteries, the battery bank is recognized as B1. The B2 battery is an optional secondary battery bank that is not used in your Northern Lite camper.
3. In the Charger page settings change breaker size from 30A to 15A. Set the max charge current to 100A.

9.0 Battery Health

Lithium batteries have two important measurements that help indicate their current condition: State of Charge (SoC) and State of Health (SoH).

State of Charge (SoC): Indicates how much energy is currently stored in the battery, expressed as a percentage. A reading of 100% means the battery is fully charged relative to its current available capacity.

State of Health (SoH) / Relative Capacity: Indicates the battery's remaining capacity compared to its original rated capacity when new. This value may gradually decrease as the battery ages and experiences normal use.

Lithium batteries naturally lose a small amount of capacity over time, even with relatively light use. This is known as capacity degradation and occurs through normal chemical aging of the battery cells.

The rate of capacity loss depends on several factors, including:

- Battery age and usage.
- Number of charge and discharge cycles.
- Operating and storage temperatures.
- Charging and storage practices.

A reduction in Relative Capacity does not necessarily indicate a battery problem. Customers should expect some gradual capacity loss over the service life of their batteries.

Customers can periodically monitor their battery's State of Charge and Relative Capacity through their battery monitoring system.

A battery displaying 100% State of Charge but less than 100% Relative Capacity is not necessarily experiencing a problem. These measurements represent different aspects of battery performance.

If the battery displays unusual behaviour, experiences a significant or sudden reduction in capacity, or does not charge or discharge normally, contact your battery manufacturer or an authorized Northern Lite service representative for assistance.