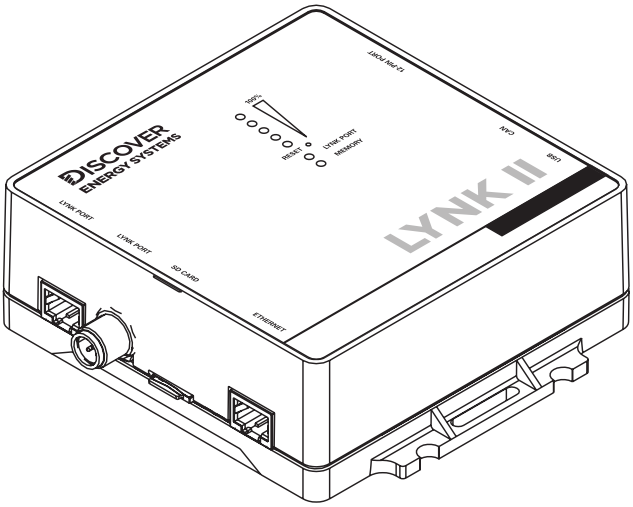
DISCOVER
ENERGY SYSTEMS



LYNK II

(950-0025)

SELECTRONIC SP-PRO MANAGED (CLOSED LOOP) MANUAL

READ AND SAVE THESE INSTRUCTIONS

INTRODUCTION

This document describes how to set up Selectronic inverter-chargers to create a managed (closed-loop) charge configuration with Discover Lithium batteries.

1. AUDIENCE, WARNINGS, MESSAGES, GENERAL SAFETY, PERSONAL PROTECTIVE EQUIPMENT

1.1 Audience

Configuration, installations, service, and operating tasks should only be performed by qualified personnel in consultation with local authorities having jurisdiction and authorized dealers. Qualified personnel should have training, knowledge, and experience in the:

- Installation of electrical equipment
- Application of electrical codes, safety, and installation standards
- Analysis and reduction of hazards involved in performing electrical work
- Installation and configuration of batteries
- Installation and configuration of systems activated by relays

1.2 Warning, Caution, Notice, and Note Messages

Messages in this manual are formatted according to this structure.

Additional information concerning important procedures and features of the product. Read all the instructions before installation, operation, and maintenance.

Important information regarding hazardous conditions.

⚠ WARNING

Important information regarding hazardous conditions that may result in personal injury or death.

⚠ CAUTION

Important information regarding hazardous conditions that may result in personal injury.

NOTICE

Important information regarding conditions that may damage the equipment but not result in personal injury.

NOTE

Ad hoc information concerning important procedures and features unrelated to personal injury or equipment damage.

1.3 General Warnings

⚠ WARNING

ELECTRIC SHOCK AND FIRE HAZARD

- This equipment must only be installed as specified.
- Do not disassemble or modify the battery.
- If the battery case has been damaged, do not touch exposed contents.
- There are no user-serviceable parts inside.

Failure to follow these instructions may result in death or serious injury.

⚠ WARNING

ELECTRIC SHOCK AND FIRE HAZARD

Do not lay tools or other metal parts on the battery or across the terminals.

Failure to follow these instructions may result in death or serious injury.

⚠ CAUTION

ELECTRIC SHOCK

- Do not touch the energized surfaces of any electrical component in the battery system.
- Before servicing the battery, follow all procedures to fully de-energize the battery system.
- Follow the "Safe Handling Procedures" below when working with the battery.

Failure to follow these instructions may result in injury.

1.4 Safe Handling Procedures

Before using the battery and any power electronics, read all instructions and cautionary markings on all components and appropriate sections of their manuals.

- Use personal protective equipment when working with batteries.
- Do not dispose of the battery in a fire.
- Promptly dispose of or recycle used batteries following local regulations.
- Do not disassemble, open, crush, bend, deform, puncture, or shred.
- Do not modify, re-manufacture, or attempt to insert foreign objects into the battery, immerse or expose the battery to water or other liquids, fire, explosion, or other hazards. If the user suspects damage to the battery due to water, heat, or other reason, take it to a service center for inspection.
- Only use the battery for the system for which it is specified.
- Do not lift or carry the battery while in operation.
- When lifting a heavy battery, follow the appropriate standards.
- Only lift, move, or mount following local regulations.
- Take care when handling battery terminals and cabling.
- Only use the battery with a charging system that meets specifications. Using a battery or charger that does not meet specifications may present a risk of fire, explosion, leakage, or other hazards.
- Do not short-circuit a battery or allow metallic conductive objects to contact battery terminals.

- Replace the battery only with another battery that has been qualified for the system. Using an unqualified battery may present a risk of fire, explosion, leakage, or other hazards.
- Do not drop the device or battery. If the device or battery is dropped, especially on a hard surface, and the user suspects damage, take it to a service center for inspection.

1.5 Personal Protective Equipment

When handling or working near a battery:

- Use Personal Protective Equipment, including clothing, glasses, insulated gloves, and boots.
- Do not wear rings, watches, bracelets, or necklaces.

2. DOCUMENTATION

This Application Note provides information about integrating LYNK network-enabled Discover Lithium Batteries using the LYNK II Communication Gateway with Selectronic power conversion devices in a managed (closed-loop) configuration.

Before installation and configuration, consult the relevant product documentation, including Manuals, Application Notes, Installation and Configuration Guides.

Selectronic Documentation

- SP PRO 2i Instruction Manual
- SP PRO Series 2i datasheet
- Instruction Manual for SP LINK - Configuration and monitoring for SP PRO Series 2i

Visit www.selectronic.com.au for the most recent version of published documents.

Discover Energy Systems Documentation

- AES RACKMOUNT Installation and Operation Manual (805-0043)
- AES RACKMOUNT datasheet (808-0039)
- LYNK II Installation and Operation Manual (805-0033)

Visit discoverenergysys.com for the most recent version of published documents.

3. OVERVIEW

This manual provides general settings and is not a comprehensive guide to the programming and configuration of a specific installation. An installation may have unique conditions or use cases that require modification or adaptations of values. Installers must be capable of reviewing and adapting to the specifics of an installation and its specific use case and optimizing settings where needed.

The key steps required to install and configure the LYNK II Communication Gateway with compatible Discover Lithium batteries and power conversion equipment are as follows:

- Review and confirm equipment compatibility and correct sizing.
- Configure the LYNK II CAN out pins to match the CAN in pins of the power conversion equipment.
- Mount the LYNK II, connect the Discover battery communication network to either the LYNK Port or AEbus Port, and then connect the CAN Out Port to the power conversion equipment's communication network.
- Terminate all networks correctly.
- Using LYNK ACCESS software, set the LYNK II to the correct protocol for managed (closed-loop) communication between the Discover batteries and the power conversion equipment.
- Set up the managed (closed-loop) configuration parameters on the power conversion equipment.
- Set up user preferences and enable the use case using the power conversion control system.

3.1 System Overview

The LYNK II Communication Gateway unlocks the full potential of a Discover Lithium battery by enabling the internal Battery Management System (BMS) to provide real-time data in a managed (closed-loop) configuration to other devices. Closed-loop communication allows inverter-chargers and solar charge controller systems to optimize their control over the charging process in solar applications. LYNK II also enables LYNK CLOUD, a web-based platform for remotely monitoring the state of charge, battery current, voltage, and temperature of all your Discover batteries.

Discover Lithium batteries must be set up to work with power conversion and monitoring devices in either a self-managed (open-loop) or managed (closed-loop) configuration.

Discover Lithium battery charge and discharge settings in a self-managed (open-loop) configuration are set up manually through the controller for the power conversion device at installation time. Refer to Selectronic Self-Managed (Open Loop) Configuration with Discover Lithium Batteries (805-0074).

In a managed (closed-loop) configuration, the BMS of the Discover Lithium battery sends the battery status over a network data connection with the power conversion device. Power conversion devices use the Discover Lithium battery BMS data to fine tune the output of their charger and deliver other functional controls based on battery voltage, temperature, and percent State-of-Charge.

If communication is interrupted for more than 10 seconds between the BMS and Selectronic inverter-charger, the Selectronic inverter-charger stops and enters an alarm state, until communication is re-established.

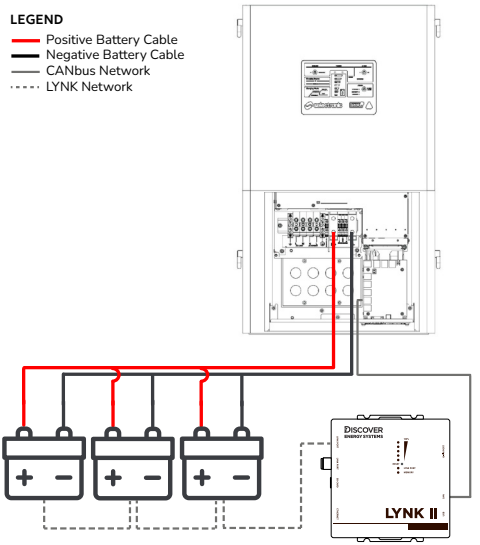


Figure 1. System Overview

3.2 Compatibility

Discover Lithium Batteries

A Discover battery must have a compatible network port, such as a LYNK Port, for communicating with a LYNK II device.

- AES RACKMOUNT: 48-48-5120, 48-48-5120-H

The LYNK II Communication Gateway is compatible with the following Selectronic devices:

Selectronic Inverters

- SPMC480-AU
- SPMC481-AU
- SPMC482-AU

NOTE
Selectronic SP PRO 2i Instruction Manual • Follow installation instructions outlined in the SP PRO 2i Instruction Manual, especially content about pre-charge wiring and requirements on DC coupling.

3.3 Minimum Battery System Capacity

The Discover Lithium Battery and Selectronic device automatically manage the battery charge and discharge rates. Using large solar arrays with battery banks that are too small can exceed the operating limits of the battery to charge and possibly lead to the BMS triggering over-current protection. Battery capacity must accept the maximum charge current of the system, or charging must be curtailed below the operating limit of the installed batteries. Derive this value by adding together the charge capacities of all inverter-chargers and solar charge controllers in the system. Additionally, battery peak capacity must support the surge requirements demanded by the load attached to the inverter-charger. Match all inverter-charger peak power values with the sum of all battery peak battery current values.

Inverter Peak = (Inverter Surge Value) / (Inverter Efficiency) / (48V: Low Battery Cut-Off)

Single-Phase Models	Inverter Peak (20 seconds)	Max Continuous Charge	Max Continuous Discharge	AES RACKMOUNT 48-48-5120/ 48-48-5120-H Minimum per inverter [2]
SPMC480-AU	184 A [1]	73 ADC	83 ADC	2
SPMC481-AU	262 A [1]	104 ADC	119 ADC	2
SPMC482-AU	391 A [1]	156 ADC	179 ADC	3

[1] Calculated based on the surge power and efficiency CEC as published in Selectronic SP PRO Series 2i Instruction Manual (Doc OI0003 Part 004122 Rev 42 - Feb 2023).

[2] Discover AES RACKMOUNT 48-48-5120/48-48-5120-H Battery, Peak Power: 218 A RMS (3 seconds), 95 A DC Continuous Charge/Discharge (reduced to 65 A to compensate for noise), as published in Discover AES RACKMOUNT Installation and Operation Manual (805-0043 Rev J).

4. LYNK II CAN HARDWARE TERMINATION AND CAN OUT PIN CONFIGURATION

4.1 LYNK II CAN Termination

NOTE
Disconnect power and all connections to LYNK II before attempting to configure header jumpers.

Jumpers are used to configure termination for the LYNK Network, and the CAN Out pin assignments. Follow the LYNK II Installation and Operation Manual (805-0033) to learn how to access and configure the header board with jumpers.

Detailed pin configurations are included in the LYNK II User Manual but are repeated here for convenience.

NOTE
LYNK II terminates the AEbus and LYNK Network by default. Do not remove the termination jumper inside LYNK II unless instructed to do so by Discover Energy Systems.

4.2 LYNK II CAN Out - RJ45 PIN Assignments for Selectronic Inverters

CAN signals (CAN H, CAN L, CAN GND) can be assigned to any pin of the RJ45 connector on the LYNK II by adjusting the jumpers on the header board.

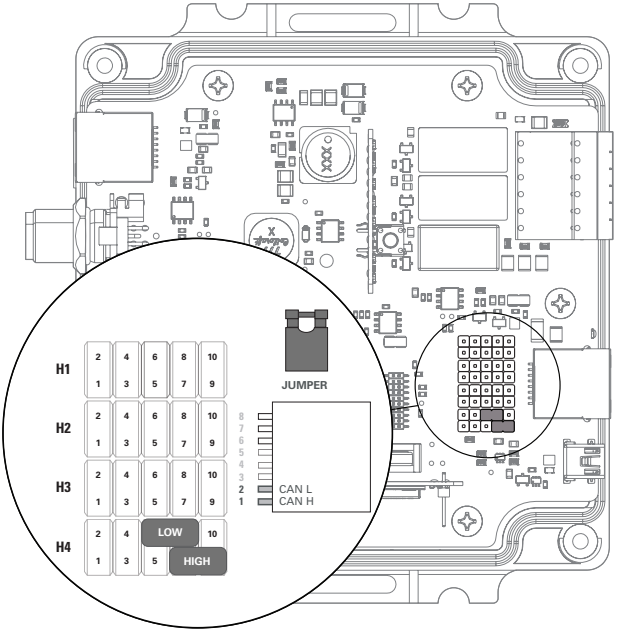


Figure 2. CAN pin assignments for Selectronic communication

CAN Out	Header Jumper	RJ45 Pin
CAN L	H4 - 6 - 8	2
CAN H	H4 - 7 - 9	1
CAN GND	N/A	N/A

5. INSTALLING AND CONNECTING LYNK II TO THE SELECTRONIC NETWORK

5.1 Networking Discover Lithium Batteries with LYNK II

NOTE

- Turn OFF all devices before connecting cables.
- Do not plug an AEbus RJ45 network cable or terminator into the 10/100 Ethernet port of the LYNK II.
- Do not connect a CAT5 or higher cable from the LYNK port of the LYNK II to a WAN or MODEM port of a network router.
- Mixing the LYNK Network with other networks may result in equipment malfunction and damage.

NOTE

Unless specified by Discover Energy Systems, power electronics must not be connected directly to the LYNK network.

Refer to the LYNK II Installation and Operation Manual (805-0033) for detailed instructions on network layouts, connections, and terminations for compatible Discover Lithium battery models. Some key reminders are provided in this manual.

- At least one battery must be connected to the LYNK Port on LYNK II.
- A network of batteries will communicate as one battery.
- No more than one network of batteries may be connected to LYNK II.
- LYNK II requires power. There are three possible sources: a 13-90 Vdc power supply, LYNK Port-enabled Discover Lithium battery, or a USB device.
- Discover Lithium batteries must be set to ON to supply power and communicate data with LYNK II.

AES RACKMOUNT

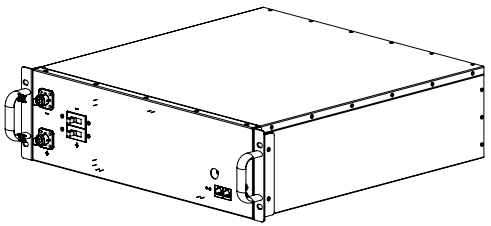


Figure 3. AES RACKMOUNT Battery Module

Both LYNK II and AES RACKMOUNT Battery Modules are internally terminated. No extra termination is required.

5.2 Connecting LYNK II to the Selectronic Canbus Network

Before connecting LYNK II to the Selectronic network, confirm that the CAN out pins on the LYNK II are configured correctly. Refer to 4.0 CAN Hardware Termination and CAN Out Pin Configuration.

Insert one end of a CAT5e or higher communication cable into the LYNK II CAN out port and the other end into the J12 CAN port of the Selectronic inverter-charger.

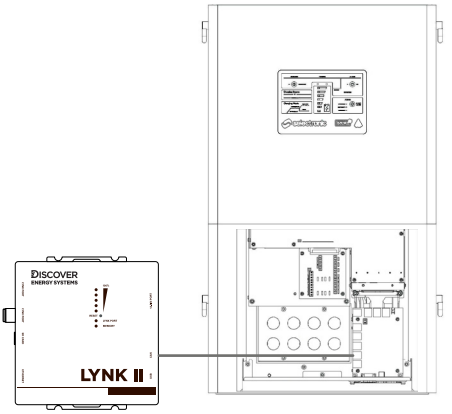


Figure 4. Selectronic CANopen Connection

6. ENABLING LYNK II TO COMMUNICATE WITH SELECTRONIC DEVICES

When properly connected to a managed (closed-loop) network and set to use the Selectronic protocol, LYNK II will transmit real-time parameters from the Discover Lithium battery, including voltage, current, temperature, state of charge, and fault conditions to a Selectronic inverter-charger. LYNK II will also transmit charge voltage and current requests from the Discover Lithium battery to a Selectronic inverter-charger.

LYNK ACCESS software for 64-bit Windows 10 / 11 is required to configure LYNK II settings for managed (closed-loop) CAN communication with Selectronic inverter-chargers.

If there is a break in communication between the LYNK II and inverter-charger for more than ten seconds, the inverter-charger will enter an alarm state and safely stop operation. If communication is restored, the Selectronic inverter-charger will turn itself back on and resume managed (closed-loop) operation. However, if communication cannot be reestablished, you may have to manually convert the Selectronic inverter-charger to an self-managed (open-loop) configuration to resume operation. Refer to Selectronic Self-Managed (Open Loop) Configuration with Discover Lithium Batteries (805-0074).

NOTE
Neither Discover Lithium batteries nor LYNK II directly control Selectronic relay functions, generator starting or other grid-interactive features. These functions are controlled through the programming of the Selectronic inverter-charger.

6.1 Setting Selectronic Managed (Closed-loop) Configuration

6.1.1 Setting the LYNK II Communication Protocol for Selectronic

Set the LYNK II communication protocol and configure managed (closed loop) on the Selectronic inverter-charger.

LYNK II Protocol

1. Download the current version of LYNK ACCESS software from the Discover Energy Systems website to obtain the most up-to-date suite of available protocol configurations.
2. Using a USB cable with a Type-B mini-plug, connect the 64-bit Windows 10 / 11 device running LYNK ACCESS software to the USB port on LYNK II. Ensure LYNK II is powered and connected to the correct Selectronic COM port. Refer to Figure 4. Selectronic CANopen Connection.

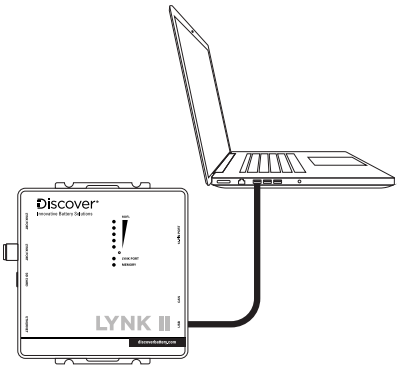


Figure 5. Configuring LYNK II with LYNK ACCESS software

3. Open LYNK ACCESS. Options for configuration and settings are found by selecting the LYNK tab.
4. Connect the LYNK II and open LYNK ACCESS. Ensure that you only have one LYNK device connected to the computer.
5. In LYNK ACCESS, select the **LYNK** tab. Select the blue gear icon in the upper right area of the **CAN Settings** tile.
6. Select the pre-configured Selectronic protocol to complete the managed (closed-loop) configuration for LYNK II. Click **SAVE** to confirm the configuration.

NOTE
Saving configuration changes using LYNK ACCESS will automatically cause LYNK II to shut down and restart.

6.1.2 Setting Managed (Closed-loop) Configuration on the Selectronic Inverter-Charger

After selecting the Selectronic communication protocol for the LYNK II, complete the managed (closed-loop) configuration settings on the Selectronic inverter-charger. Ensure the Discover Lithium Batteries are networked with LYNK II and that the LYNK II is connected to the Selectronic CAN port.

Managed (Closed-loop) Configuration

Refer to the latest Discover Energy Systems documentation for battery values and the latest Selectronic documentation for menu navigation and details on the setup procedure.

All values and parameters assume an operating temperature of 25 °C.

1. Set the Discover Lithium batteries to ON and set the inverter-charger to ON.
2. Install and then start the latest version of the SP LINK application.
3. From the **File** menu, select **Site Information** > **New (Easy Start Guide)**.

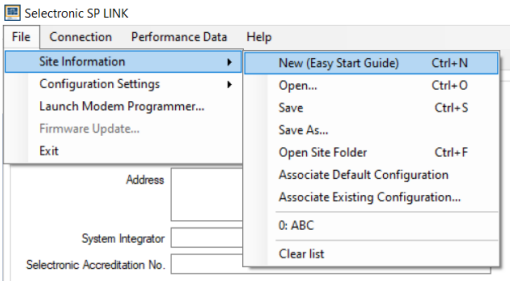


Figure 6. File > Site Information > New (Easy Start Guide)

4. In the **Easy Start Guide**, click **Site Configuration Wizard**.
5. In the **New Site Connection Details** page, enter the site name and specify the inverter-charger.

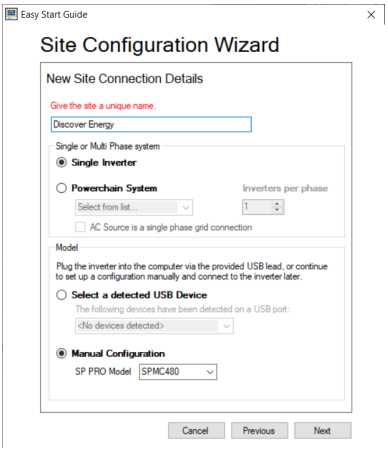


Figure 7. New Site Connection Details page

6. In the **Select Battery Configuration** page, select the **Standard Battery Configurations and myGrid kits** option.

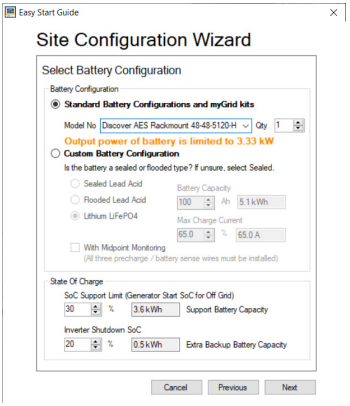


Figure 8. Select Battery Configuration

7. For the battery **Model No**, select **Discover AES Rackmount 48-48-5120-H** and accept the defaults.
8. In the **Source of Renewables** page, define the solar panels for the system.
9. In the **Select Unit Application** page, define how to use the energy stored in the batteries.
10. In the **AS/NZS 4777.2 Compliance** page, identify the region of the installation.
11. In the **Extra Options** page, select other options used by the solar and energy storage system.
12. In the **Summary of settings**, review the configuration and click **Finish**.

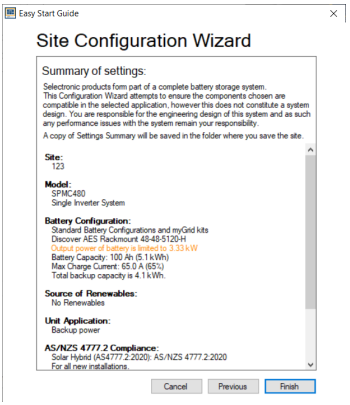


Figure 9. Summary of settings

13. Follow the wizard's instructions to complete the setup.

Configuration Settings

1. Click the **Configuration Settings** tab and review all the settings in the **Inverter**, **Battery**, and **Charger** sub tabs.

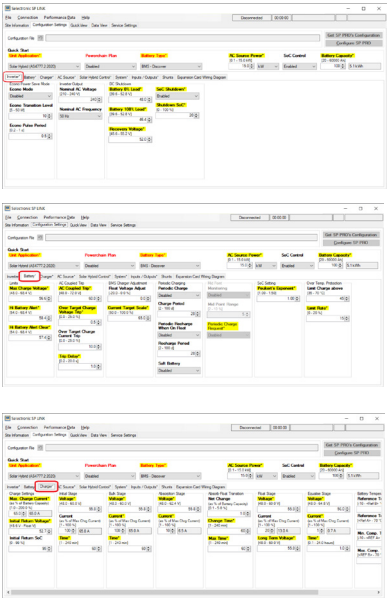


Figure 10. Inverter, Battery, and Charger sub-tabs

2. In the battery settings, confirm the **Battery Capacity** and **Maximum Charge Voltage**.
3. In the charger settings, confirm the **Max Charge Current** and **Voltage** at the various charge stages.

NOTICE
• Do not use the maximum electrical specifications of the battery as listed in the battery manual. Trying to achieve maximum performance will cause the Selectronic inverter to shutdown without notice. • The Discover Lithium battery will communicate battery information to optimize charging performance.

4. Review all the other settings.
5. Once the configuration is complete, from the **File** menu, click **Configuration Settings > Configure SP Pro** to send the project to all assigned SP PRO inverter-chargers.

NOTE

- If a DC Solar Charge Controller is used with a SP PRO, there can be some conflicts when charging due to cable impedances. In some instances the displayed SoC on the SP PRO may not reach 100%. If the DC Solar Charge Controller is the main charging source, you may need to set the DC Solar Charge Controller 0.3 V greater than the SP PRO.
- The SP PRO inverter may default the SOC to 85% if the DC power supply is suddenly interrupted (e.g. BMS protection). Either reset the SOC via the Service setting or charge the batteries all the way to float mode prior to discharge.
- Set at least a 10% difference between the DC Shutdown 0% Load and Generator Start SoC.

  Example:

  - DC Shutdown 0% Load = 50.2V (20% SoC)
  - SoC Start = 30% SoC