simpliphi POWER

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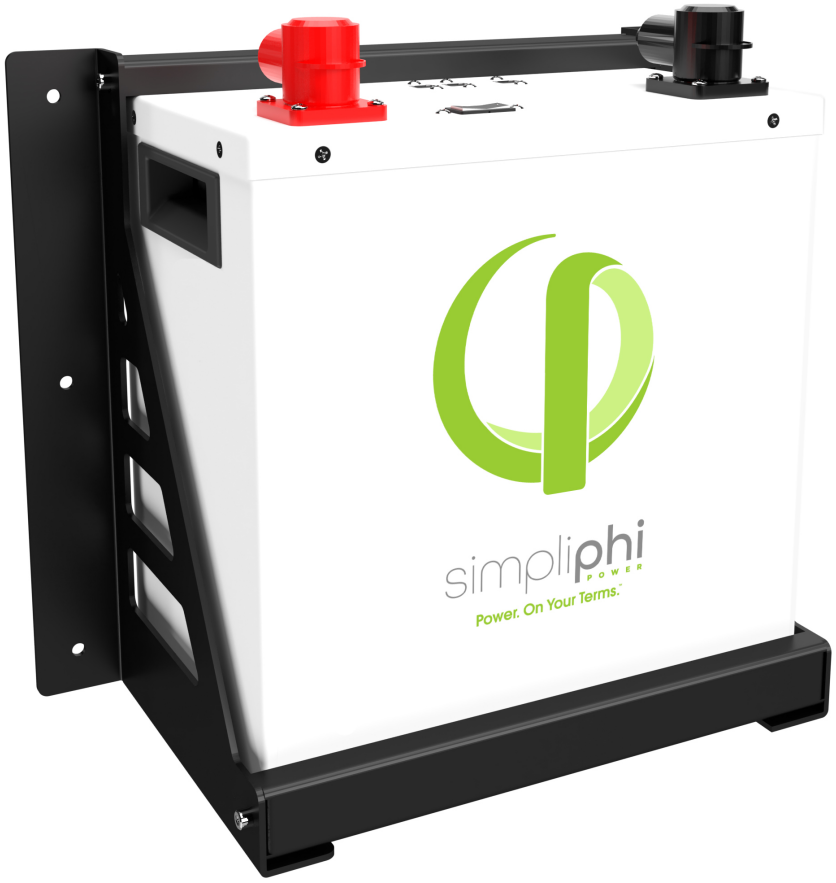

SMA SUNNY ISLAND INTEGRATION GUIDE

SIMPLIPHI POWER AmpliPHI BATTERIES

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1. INTRODUCTION

This Integration Guide covers the recommended set up and configuration of SMA Sunny Island equipment for optimizing performance with SimpliPhi's AmpliPHI 3.8-48V model batteries.

CAUTION: THIS INTEGRATION GUIDE IS RELEVANT TO AMPLIPHI 3.8-48V BATTERIES ONLY. PHI BATTERIES PAIRED WITH SUNNY ISLAND EQUIPMENT WILL NOT BE SUPPORTED OR WARRANTIED, IF INSTALLED AFTER SEPTEMBER 1, 2021.

More information on SimpliPhi products can be found on our website: http://simpliphipower.com/. All SimpliPhi Product Documentation can be found at https://simpliphipower.com/product-documentation/. More information regarding SMA's Sunny Island products can be found at https://www.sma-america.com/products/battery-inverters/sunny-island-4548-us-6048-us.html and at https://www.sma.de/en/products/battery-inverters/sunny-island-44m-60h-80h.html.

The SMA products covered in this guide are the Sunny Island (SI) 4548-US, 5048-US, 6048-US. Please check with our tech support team for additional supported units.

All electrical wiring must be in accordance with instructions outlined in the AmpliPHI Installation Manual: https://simpliphipower.com/wp-content/uploads/documentation/ampliphi-series/simpliphi-power-ampliphi-3-8-installation-manual.pdf.

Contact SimpliPhi Power Technical Support (805-640-6700 x 1; techsupport@simpliphipower.com) regarding any compatibility questions for products not listed in this guide.

2. COMMUNICATIONS WIRING

AmpliPHI batteries are networked together using CAT5 or greater cabling with RJ45 plugs (one 3' CAT5 cable is included per AmpliPHI battery). Daisy chain the AmpliPHI battery bank by utilizing the two ports on the battery labeled "BATTERY" (refer to Figure 1 below). A maximum **131feet** (40 meters) of total networking cable length is permitted from the first AmpliPHI battery module to the last AmpliPHI battery module in the daisy chain.

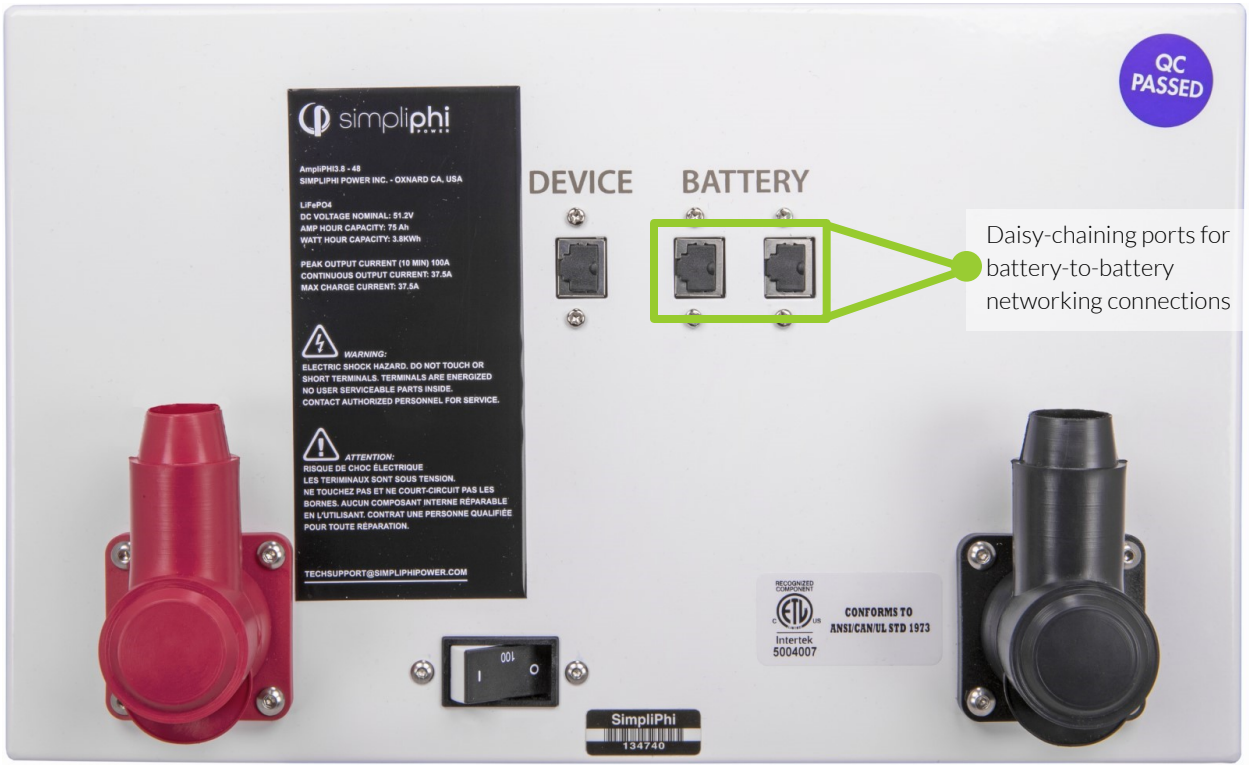


Figure 1 – BATTERY Networking Communication Ports

In a string of batteries, the two batteries at the ends of the communication chain will have one of their RJ45 "BATTERY" ports remaining un-utilized. On each of these two batteries, the "BATTERY" communication port that is not occupied by a cable will have a 120 Ohm terminator plug installed in the open port (see Figure 2 below).

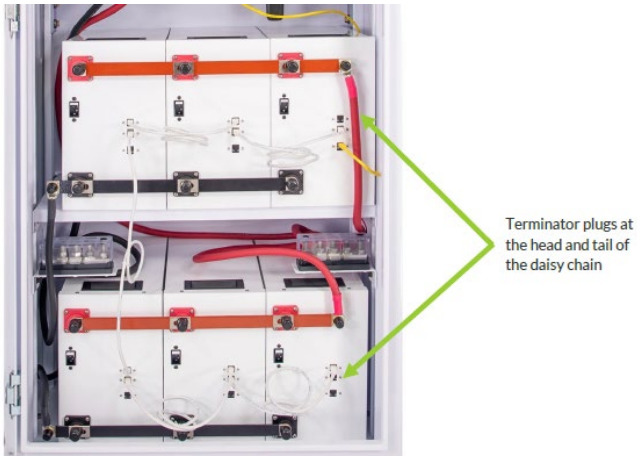


Figure 2 – Terminator Plugs at Either End of the AmpliPHI Daisy Chain

Use CAT5 or greater cable with RJ45 plugs (*not* included with the AmpliPHI product) to connect between the "DEVICE" port on either one of the batteries at either end of the daisy chain, and the "ComSyncIn" port on the Sunny Island (pictured in Figure 3 below). This connection creates the closed loop communications bridge between the AmpliPHI battery bank and the Sunny Island. The cable length from the AmpliPHI battery to the inverter cannot exceed 98 feet (30 meters).

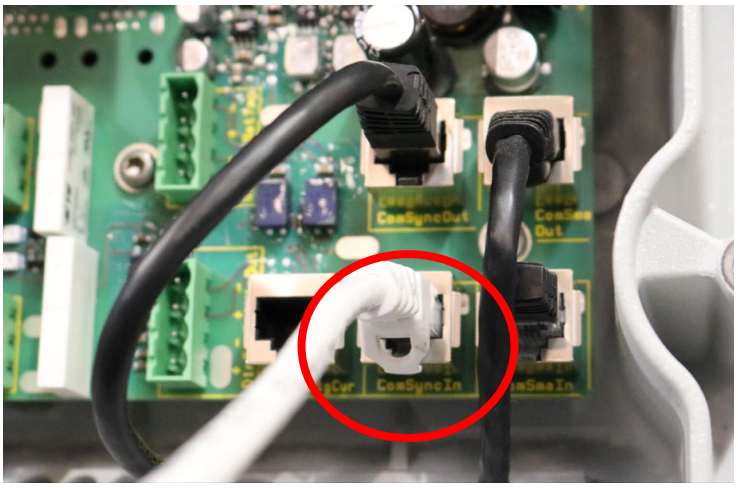
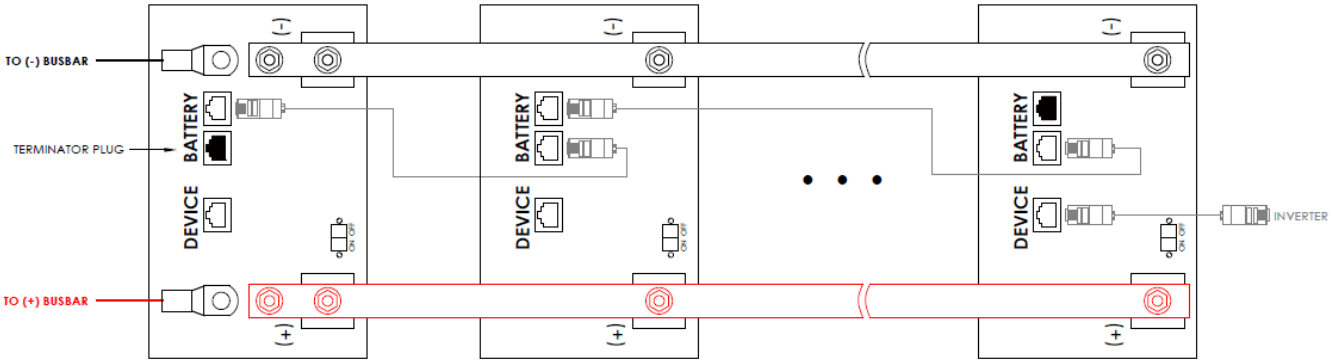


Figure 3 – Sunny Island's ComSyncIn Port

The overall AmpliPHI networking communications scheme should resemble that pictured in Figure 4 below.



3. BATTERY BANK SIZING

AmpliPHI batteries should be sized according to the connected loads' energy (kWh) and power (kW) requirements. While as few as one (1) AmpliPHI battery may be paired with Sunny Island equipment without voiding the battery warranty, consider that the AmpliPHI battery is rated according to the specifications in the table below, and that without a backup AC power source, loads that exceed the battery bank's total capacity or power rating will result in the entire system shutting down.

AmpliPHI 3.8 -48V Battery	
Rated kWh Capacity per Battery	3.8 kWh DC @ 100% DoD 3.04 kWh DC @ 80% DoD (recommended)
MAX Continuous Charge & Discharge Rate	37.5 Amps DC (1.9 kW DC)

**Multiply by the number of AmpliPHI batteries in the bank for total capacity and power ratings (these values scale linearly).*

4. PROGRAM SETTINGS FOR AMPLIPHI 3.8 BATTERIES

The AmpliPHI Battery automatically communicates many but not all the battery's operating parameters to the Sunny Island over the communications connection. Parameters that must be manually programmed into the Sunny Island are in red in Table 1 on the following page. In order to maintain the SimpliPhi Battery Warranty, it is critical to confirm that the appropriate settings for the desired Warranty have been auto populated and/or

programmed in the Sunny Island equipment. If these settings are adhered to, SimpliPhi approves and warranties the AmpliPHI battery product for use with SMA's Sunny Island.

The AmpliPHI battery is in the approval process with SMA for use with the Sunny Island. The PHI Battery product, however, is not covered under SMA's warranty. SimpliPhi only warranties PHI Batteries used with Sunny Islands if the PHI Battery was installed in conjunction with the Sunny Island prior to October 1st, 2021.

Depth of Discharge

To optimize the AmpliPHI batteries' performance as well as the life of the system, SimpliPhi recommends programming the equipment settings for an 80% maximum Depth of Discharge (DoD). Maintaining the AmpliPHI battery at this DoD ensures the greatest level of SimpliPhi battery health. This affects the Battery Protection settings in the Sunny Island (principally #223.07 BatPro3Soc).

CAUTION: If a firmware update is executed on SMA equipment, ALL the settings must be reverified. The programmed settings shown in the following table must be applied based on desired Warranty/cycle life. The recommended is 80% Depth of Discharge.

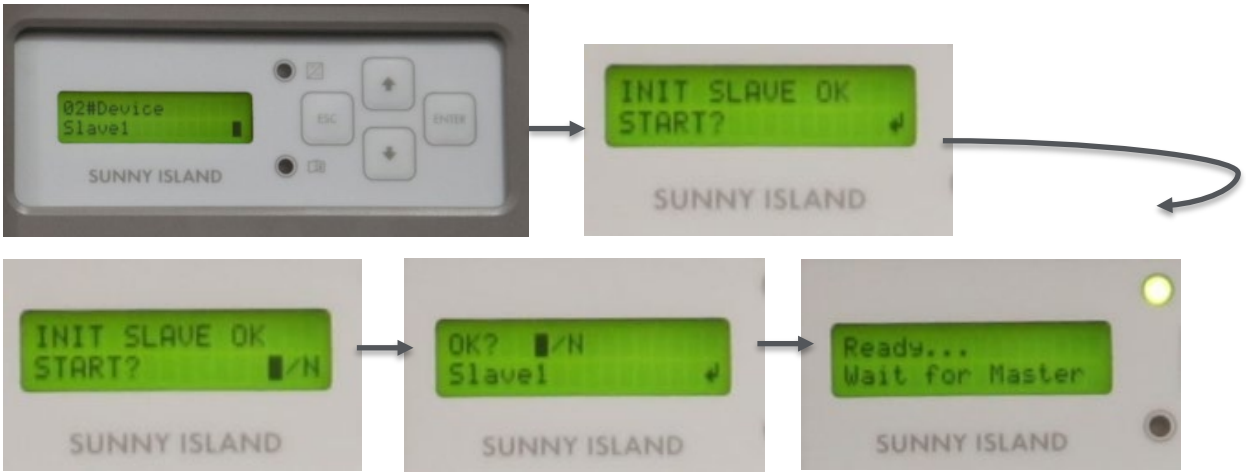
Inverter/Charger Settings

Except for initial commissioning, inverter programming may be achieved either directly on the Sunny Island inverter devices or online. The SMA Data Manager (https://www.sma-america.com/products/monitoring-control/data-manager-m.html) allows for remote programmingand requires an internet connection.

CAUTION: Initial inverter programming when first commissioning the system should be done directly on the Sunny Island devices.

For first time commissioning on Slave, 01 #StartMenu, select "New System", select "Y" & select "Y" again.

For AmpliPHI / Sunny Island installations that include more than one Sunny Island, configure the "Slave" Sunny Island devices first and the "Master" unit last. The Sunny Island screen that displays "INIT MASTER OK START?" should **only be programmed after the Slave units are configured**. Start with the configuration of the Slave unit displaying "INIT SLAVE OK START?" select "Y," and then press "Y" again to confirm the Slave device (refer to the images below).



Follow instructions starting on page 69 of the Sunny Island 4548-6048-US Manual or on page 70 of the Sunny Island 4.4M-6.0H-8.0H Manual to begin commissioning using the Quick Configuration Guide (QCG).

- Assign BatTyp (Battery Type) as LiIon_Ext-BMS
- Program BatCpyNom (Battery Capacity Nominal) as 75Ah per AmpliPHI 3.8 Battery.

Then continue with the settings outlined in Table 1 below. Parameters that must be manually programmed into the Sunny Island are in red. Note that many of the battery-related parameters will appear as the Sunny Island's default value and should be left as the default value. Although these settings may appear to have incorrect values, the AmpliPHI BMS is overriding the Sunny Island's programming in the background.

Table 1 – Settings for AmpliPHI 3.8 Battery with Sunny Island 48V Inverter/Charger

SUNNY ISLAND	80% DoD
19.2.2 Battery Settings > #221 Battery Property	
221.01 BatTyp	LiIon_Ext-BMS
221.02 BatCpyNom (Ah)[2]	75Ah per AmpliPHI 3.8-48V battery
221.03 BatVtgNom	*Leave as default (48 V)*
221.04 BatTmpMax (°C)	*Leave as default (45°C)*
221.05 BatTmpStr	*Leave as default (40°C)*
> #222 Battery Charge Mode	
222.01 BatChrgCurMax (A) *This parameter should auto-populate but verify this parameter's value and manually adjust it if incorrect. Allow for a value up to 10% greater than the 37.5A-per-battry value (i.e. A 2-battery bank may charge at a current up to 82.5A).* *Changing this parameter manually may require a Sunny Island password (refer to page 88 of the Sunny Island Manual for additional password information).*	37.5A per AmpliPHI 3.8-48V battery
222.02 AptTmBoost (Minutes)	*Leave as default (120 min)*
222.03 AptTmFul (Hours)	*Leave as default (5 hr.)*
222.04 AptTmEqu (Hours)	*Leave as default (10 hr.)*
222.05 CycTmFul (Days)	*Leave as default (14 days)*
222.06 CycTmEqu (Days)	*Leave as default (Auto EQ Disabled)*
222.07 ChrgVtgBoost (V)	*Leave as default (2.4 V)*
222.08 ChrgVtgFul (V)	*Leave as default (2.4 V)*
222.09 ChrgVtgEqu (V)	*Leave as default (2.4 V)*
222.10 ChrgVtgFlo	*Leave as default (2.25 V)*
222.11 BatTmpCps (mV/°C)	*Leave as default (4 mv/°C)*
222.12 AutoEquChrgEna	Disable
> #223 Battery Protection	80% DoD
223.05 BatPro1Soc (standby mode) *This parameter's default value must be manually adjusted.* *Changing this parameter manually may require a Sunny Island password (refer to page 88 of the Sunny Island Manual for additional password information).*	25
223.06 BatPro2Soc (PV charging is available) *This parameter's default value must be manually adjusted.*	20
223.07 BatPro3Soc (SI turns OFF) *This parameter's default value must be manually adjusted.*	3 (or any other value below 20)
Refer to Section 13.6 on page 115-116 of the Sunny Island 4548-6048-US Manual for more detailed explanations on the three levels of Battery Preservation Mode.	

> #224 Battery Silent Mode	
The use of Battery Silent Mode is optional. Refer to Section 13.5.5 on page 114-115 of the Sunny Island 4548-6048-US Manual for more information on using Silent Mode.	
> #225 Battery Current Sensor	
The use of a battery current sensor is optional. Refer to Section 8.3 on page 73-74 of the Sunny Island 4548-6048-US Manual for more information on using a battery current sensor.	

#233 Grid Start and #235 Generator Start parameters may be used in certain applications to control the integration of these power sources according to the AmpliPHI battery bank's State of Charge (SoC) level.

Notes:

- Levels are typical @ 25°C and may need adjusting at temperature extremes.
- Always refer to the SimpliPhi Power Manual and Warranty for the specific PHI battery model.

CAUTION: When AmpliPHI battery quantities change, the capacity & charge/discharge current settings should automatically update but must be reverified. Failure to do so will Void the Warranty.

5. SPECIFICATIONS & WARRANTY

For your reference:

- See AmpliPHI 3.8 kWh-48V Specification sheet.
- See PHI Battery 10-Year Warranty; Failure to adhere to installation protocol will Void Warranty.

6. SIMPLIPHI TECHNICAL SUPPORT

For technical support related to your AmpliPHI Battery (or other SimpliPhi Power products), please contact us directly at: 805.640.6700 x 1, techsupport@simpliphipower.com.