



Installation Manual

BOSS.12

12 Battery Only Storage System

SimpliPhi Your Energy Security and Independence

and gain control of your own power.

SimpliPhi Power helps you manage your power as a personal resource. Anytime. Anywhere. SimpliPhi energy storage optimizes integration of any power generation source – solar, wind, generator – on or off grid, and protects your home and mission-critical business functions from power outages and intermittency. SimpliPhi storage technology reduces operating temperature constraints, toxic coolants and the risk of thermal runaway. Safe lithium ferrous phosphate (LFP). No cobalt. No toxic hazards.

SimpliPhi's battery technology utilizes the industry's most environmentally benign chemistry (LFP) combined with proprietary architecture and power electronics (BMS) to create a portfolio of high performance, scalable and enduring energy storage solutions that provide power security, resilience and daily cycling for savings on your utility bill – all with a 98% efficiency rate.

SimpliPhi Power offers proprietary, commercially available energy storage and management systems that are safe, non-toxic, reliable, durable, efficient, highly scalable, and economical over the lifetime of the PHI Battery.

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1.0 – IMPORTANT SAFETY INFORMATION



CAUTION: DO NOT VOID YOUR WARRANTY- FOLLOW THESE INSTRUCTIONS CAREFULLY AND REVIEW WARRANTY DOCUMENT PRIOR TO INSTALLATION

1.1 – Safety Instructions

1. Before assembling or using the SimpliPhi Battery Only Storage System for 12 Batteries (BOSS.12), read all instructions and cautionary markings included in this manual.
2. Perform all electrical work on the BOSS.12 Enclosure in accordance with local, state and federal electrical codes.
3. The BOSS.12 Enclosure is NEMA 3R-rated for a degree of protection against debris, as well as rain, sleet and ice. The Enclosure is NOT watertight and should therefore be protected against excessive exposure to liquids. For extreme weather protection, Rain Hoods are available (RH-1010) and can be ordered with the BOSS.12 Enclosure.
4. To reduce the chance of short-circuits and/or electrical shock, always use insulated tools when installing or working with this equipment. For the same reason, remove all jewelry such as rings, watches, bracelets, etc., and wear insulated rubber electrical gloves when installing or performing maintenance on the BOSS.12 Enclosure or the PHI battery modules contained within.
5. Do not use the BOSS.12 Enclosure if there are indications that it has been damaged during shipping or otherwise.
6. Immediately inspect the BOSS.12 Enclosure upon its arrival to the site. Inspect the packaging as well as the BOSS.12 Enclosure itself for signs of rough handling or damage. If there is any evidence of damage, record the damage on the receiving document before signing for receipt of the equipment. Damage claims should be filed directly with the carrier. Not doing so can limit your ability to claim damage of equipment with the carrier.
7. The BOSS.12 Enclosure is designed for the housing and wiring of up to 12 SimpliPhi PHI 3.8 kWh batteries (measuring ~13.5" wide x 15.5" high with terminals x 8.1" deep). Check with SimpliPhi Technical Support (techsupport@simpliphipower.com) prior to using the BOSS.12 Enclosure with any other PHI battery models.
8. Prior to installing or performing maintenance on the BOSS.12 Enclosure, turn all included PHI Battery module built-in circuit breakers' "ON/OFF" switches to the "OFF" position, and disconnect all wiring leading from the batteries to the AccESS fully integrated unit or other Balance of System equipment. Doing so will minimize the risk of shock or sparks during the batteries' installation.
9. Before commissioning the AccESS or BOSS.12 Enclosure with Batteries, PHI batteries MUST be fully charged. Failure to do so will Void the batteries' Warranty.
10. In addition to the instructions outlined in this BOSS.12 Enclosure manual, adhere to all installation and commissioning protocols outlined in the [PHI Battery Installation Manual](#). **Failure to do so will Void the batteries' Warranty.**
11. Verify polarity at all battery module connections with a standard voltmeter before:
 - A. Energizing the system and,
 - B. Turning the PHI Battery's circuit breaker "ON/OFF" switch to the "ON" position. Reverse polarity at the PHI Battery terminals will Void the Warranty and destroy the PHI Batteries.
12. Do not operate if the PHI Battery has been damaged in any way during shipping or otherwise.

1.2 - Limitations of Use

The BOSS.6, ExprESS unit and PHI battery modules are not intended for use in connection with life support systems or other medical equipment or devices.

2.0 - Product Description

2.1 - Introduction

This installation guide covers the recommended installation of the BOSS.12 Enclosure. More information on SimpliPhi products, including the SimpliPhi batteries that the BOSS.12 Enclosure is designed to house, can be found on our website: <http://simpliphipower.com/>.

2.2 - Overview

The BOSS.12 Enclosure is intended for the housing and wiring of up to twelve (12) PHI 3.8 kWh deep-cycle Lithium Ferro Phosphate (LFP) batteries. The Enclosure may be used with the AccESS – Sol-Ark-12K fully integrated units, or as a PHI Battery enclosure for any other installation with SimpliPhi-compatible equipment.

When the BOSS.12 Enclosure is used with the AccESS fully integrated unit, the Enclosure containing the additional PHI batteries allows for an increased amount of available energy storage capacity, beyond the three or six PHI Batteries already included in the fully integrated AccESS unit.

Note that the instantaneous power rating (kW) of the AccESS fully integrated unit is still limited by the included inverter's power rating and/or the 5-point terminal blocks and wiring included with the BOSS.12 Enclosure. Standard wiring typically sold with the BOSS.12 limits the contained battery bank's output to a maximum potential 440 Amps DC continuous. When powering loads, consider the power ratings of all equipment included in the system, not just the batteries. Also, while the full instantaneous power from the battery bank may not always be accessible, the battery bank's full energy storage capacity (kWh) is always accessible.



As outlined in the PHI Battery Installation Manual, batteries must always be connected in parallel (Positive to Positive / Negative to Negative). Any bussing used within the BOSS.12 Enclosure must be used to parallel the batteries only; no series connections are permitted. Wiring the PHI batteries in series will destroy the batteries and VOID the Warranty. More detailed connection instructions are included in later sections of this manual.

2.3 - Specifications

Review Table 1.0 below for BOSS.12 Enclosure specifications, including physical dimensions, Warranty period and technical data. See Table 2.0 for abbreviated specifications on the PHI 3.8 kWh batteries included in the BOSS.12 Enclosure; refer to the "Specification Sheets" section of [SimpliPhi's Product Documentation web page](#) for additional details.

Table 1.0 – BOSS.12 Enclosure Specifications

BOSS.12 Enclosure	
WEIGHT	428 lbs. (194.138 kg.) Without Batteries
DIMENSIONS	29.5" W x 76"H (w/feet) x 20" D / 75 cm W x 193 cm H (w/feet) x 51 cm D
MOUNTING	Free Standing or Pad Mounted
WARRANTY PERIOD	5 Years
INTERCONNECTING BUSBARS' AMPACITY	500 - 599 Amps DC
DC CONNECTIONS	2 X 5-Point Terminal Blocks, 3/8" lugs, 650 Amps DC

Table 2.0 – PHI 3.8 Battery Specifications (NOT included with BOSS.12 Enclosure)

PHI 3.8	48V
WEIGHT	86 lbs. (39 kg.)
DIMENSIONS	13.5" W x 14" H (15.5" w/terminals) x 8" D / 0.88 ft ³ (34.3 cm x 35.6 cm x 20.3 cm / 0.025 m ³)
DC VOLTAGE - NOMINAL	51.2 VDC
AMP HOURS	75 Ah
RATED kWh CAPACITY @ C/2	3.8 kWh at 100% DOD 3.04 kWh at 80% DOD
MAX Discharge Rate (10 minutes)	80 Amps DC (3.07 kW DC)
MAX Continuous Charge & Discharge Rate	37.5 Amps DC (1.92 kW DC)
OPERATING TEMPERATURE	-4°F to 140°F (-20°C to 60°C)
CHARGING TEMPERATURE	32°F to 120°F (0°C to 49°C)
WARRANTY PERIOD	10 Years

3.0 - Installation

3.1 - Inspection

Immediately inspect the BOSS.12 Enclosure upon its arrival to the site. Inspect the packaging as well as the BOSS.12 Enclosure itself for signs of rough handling or damage. If there is any evidence of damage, record the damage on the receiving document before signing for receipt of the equipment. Damage claims should be filed directly with the carrier. Not doing so can limit your ability to claim damage of equipment with the carrier.

3.2 - Unpacking

After the shipment's inspection is completed, perform the following steps to unpack the equipment:

1. Open all cartons.
2. Compare the items received against the packing list to see if any items are missing. If an item is missing or damaged, contact SimpliPhi Power (805-640-6700).
3. Remove all packing materials, envelopes, and boxes from the cartons. Keep all packing materials and cartons in case you need to transport or ship the unit at a later date.

The BOSS.12 Enclosure shipment includes the following items, listed in Table 3.0 on the following page.

Refer to Figure 1 on the follow page for a visual depiction of the BOSS.12 Enclosure's assembled internal layout with the maximum number of additional PHI 3.8, 3.5, or 3.4 kWh batteries included – 12.

Figure 1 – Assembled AccESS Enclosure with 12 PHI Batteries (Refer to Tables 3 & 4 for Key)

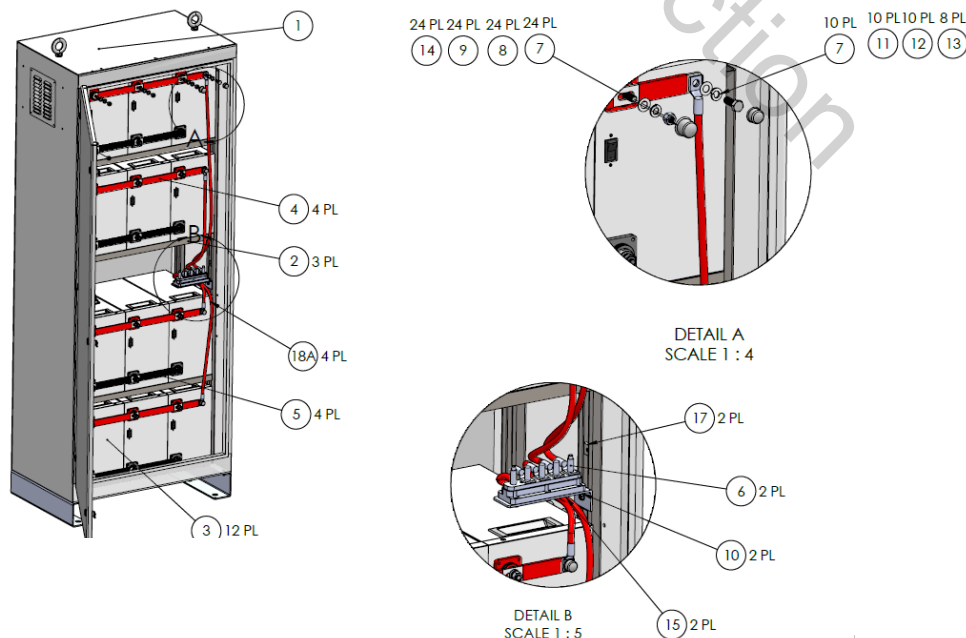


Table 3 – Items Included in the BOSS.12 Shipment

Item Number	Description	Quantity
1	BOSS.12 Carbon Steel Enclosure with Built-In Fan and Thermal Sensor	1
2	Built-In 0.125" Carbon Steel Shelves	3
6	5-Point Terminal Block, 3/8" lugs, 650 Amps DC	2
7	3/8" Brass Washer (not included with the BOSS.12 enclosure; included with busbars)	up to 32 (4 per busbar)
10	¼"-20½"-long Steel Hex Head Screw	2
15	Marinco Busbar Bracket	2
16	3" Wide Pre-Installed Polypropylene Bar	2
17	¼"-20 Threaded Strut Channel Nut with Spring	2
NP	96"-long 4/0 cables with 3/8" lugs (one negative, one positive)	2

Not Included

The BOSS.12 Enclosure shipment does not include interconnecting battery busbars, battery cables, or conduit. Busbar Kits can be ordered from SimpliPhi or any SimpliPhi Distributor based on the guidance provided in Table 5.

The following list of items are recommended for complete BOSS.12 assembly but are not included with the BOSS.12 original purchase.

Table 4 – Items Not Included in the BOSS.12 Original Purchase

Item Number	Description	Quantity
3	PHI 3.8 kWh Battery (Sold and Shipped Separately)	up to 12
4	21.5"-long Positive Copper Busbar (Sold Separately)	up to 4 (1 per 3-battery set)
5	19.5"-long Negative Copper Busbar (Sold Separately)	up to 4 (1 per 3-battery set)
7	3/8" Brass Washer	up to 32 (4 per busbar)
8	3/8" Stainless Steel Lock Washer	up to 24 (2 per battery)
9	11/16" Stainless Steel Nut	up to 24 (2 per battery)
11	3/8" Brass Lock Washer	up to 8 (1 per busbar)
12	3/8"-16½"-long Brass Hex Head Screw	up to 8 (1 per busbar)
13	Hex Nut Cap for 35/64" Wide Nut	up to 8 (1 per busbar)
14	Hex Nut Cap for 43/64" Wide Nut	up to 24 (3 per busbar)

Interconnecting busbars for paralleling two or three PHI batteries (SKU numbers BB-2-12 and BB-3-12, respectively) may be purchased from any SimpliPhi distributor: <https://simpliphipower.com/distributors/>. All batteries contained within the PHI battery bank must be identically grouped (i.e. do not use both the BB-2-12 and BB-3-12 products within the same PHI battery bank). This presents limitations when wiring fewer than 12 PHI batteries in the BOSS.12 enclosure:

Table 5 – Recommended Battery Bussing and Cabling within the BOSS.12

Number of PHI Batteries	Recommendation
12	Order 4 x BB-3-12 busbar sets (4 positive, 4 negative) and 8 total 45"-long 2/0 Arctic Ultraflex Blue® cables with 3/8" lugs included (4 positive, 4 negative).
11	Not supported, consider purchasing additional battery.
10	Not supported, consider purchasing additional batteries.
9	Order 3 x BB-3-12 busbar sets (3 positive, 3 negative) and 6 total 45"-long 2/0 Arctic Ultraflex Blue® cables with 3/8" lugs included (3 positive, 3 negative).
8	Order 4 x BB-2-12 busbar sets (4 positive, 4 negative) and 8 total 45"-long 2/0 Arctic Ultraflex Blue® cables with 3/8" lugs included (4 positive, 4 negative).
7	Not supported, consider purchasing additional battery.
6 or fewer	Use the BOSS.6 or follow BOSS.6 wiring guidance if considering expansion beyond 6 batteries in the future.

Terminal block-to-inverter cables are included with the BOSS.12 purchase. SimpliPhi typically uses two (one positive, one negative), 96"-long 4/0 Arctic Ultraflex Blue® cables with 3/8" lugs included (one lug on each end of the cable), for connecting between the terminal block and the inverter's DC busbars or plates.

Note: Arctic Ultraflex Blue® cables are rated according to the specifications listed at this link:

<http://www.polarwire.com/properties-specs.pdf>.

- Arctic Ultraflex Blue® 2/0 AWG cable has a 325 Ampacity rating at 86°F (30°C)
- Arctic Ultraflex Blue® 4/0 AWG cable has a 440 Ampacity rating at 86°F (30°C)



CAUTION: The two (one positive, one negative) 4/0 AWG Arctic Ultraflex Blue cables (each rated at 440A) typically sold with the BOSS.12 will not suffice when taking advantage of the FULL instantaneous continuous current output of all 12 PHI batteries (450ADC combined).

3.3 - Required Tools for Installation

The following tools are required to assemble the BOSS.12 Enclosure:

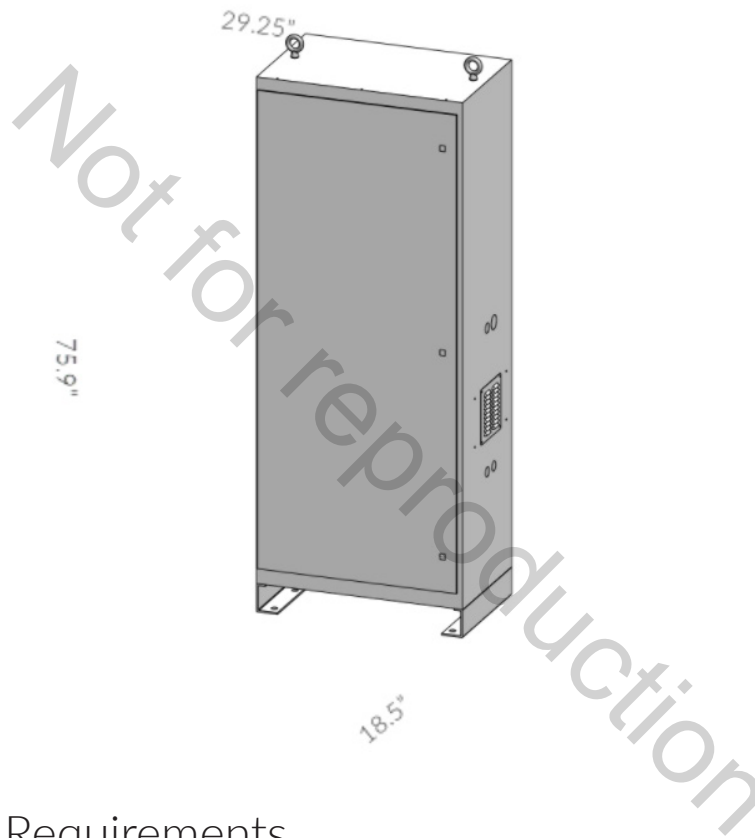
- Torque Wrench
- 9/16" Socket
- 11/16" Socket
- 17mm Socket
- Protective Wear

3.4 - Installation Site Location

The BOSS.12 Enclosure may be installed indoors or outdoors mounted onto a concrete pad. The cabinet is rated for NEMA-3R use: moisture-resistant, but should be kept away from excessive moisture, mist, rain or wetness. For extreme weather protection, Rain Hoods are available (RH-1010) and can be ordered with the BOSS.12 Enclosure.

Keep the BOSS.12 Enclosure isolated from flammable materials or vapors.

Figure 2 - BOSS.12 Enclosure dimensions



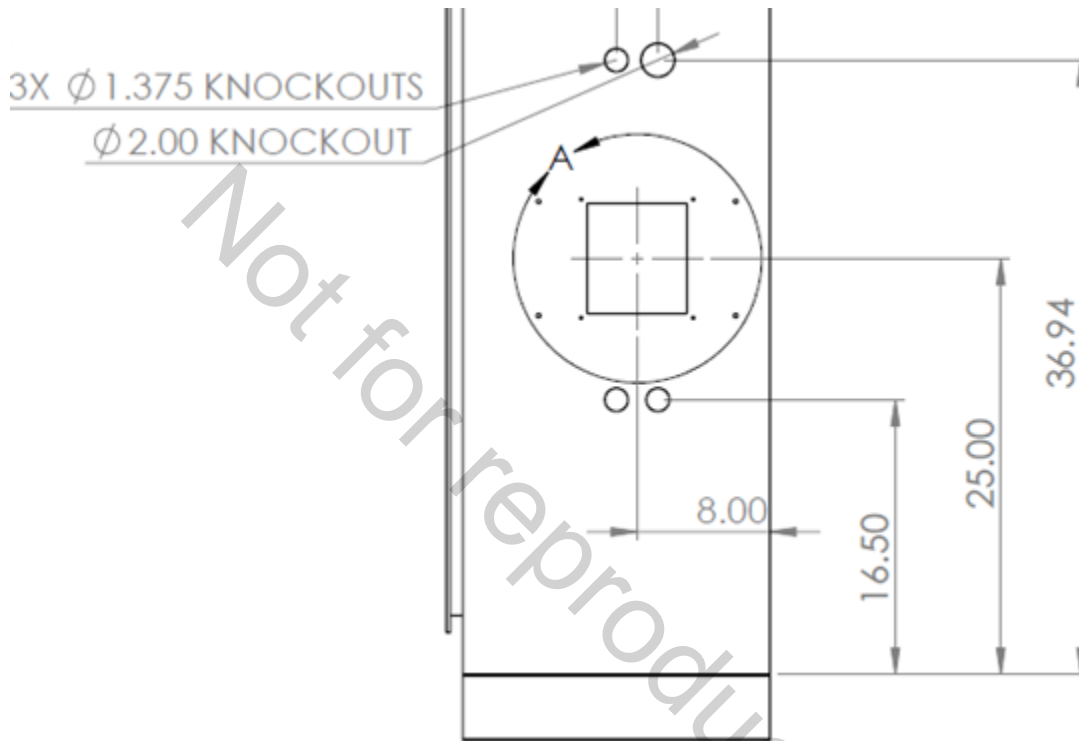
3.5 - Clearance Requirements

The BOSS.12 Enclosure can be installed directly adjacent to the AccESS fully integrated unit. No clearance is required between the two units. However, allow 3 feet of clearance in front of the BOSS.12 Enclosure and/or AccESS unit, and 3 inches of clearance on the external sides of the BOSS.12 Enclosure and AccESS.

3.6 - Knock-Out Location

Three, 1.375-inch OD knockouts and one, 2-inch OD knockout are located on both sides of the BOSS.12 Enclosure. They can be used for routing the two 4/0 battery cables from the enclosure to the inverter's power panel (explained in greater detail on page 12, #18 of this manual). Not all knockouts must be used.

Figure 3 – BOSS.12 Enclosure Knockouts (sides)



3.7 - Pad Mounting

The BOSS.12 Enclosure must be installed and secured on level concrete. For a pre-cast concrete pad, a 4" minimum thickness is required.

The AccESS fully integrated unit and BOSS.12 Enclosures are not suited for wall mounting. Any attempt to wall-mount the unit will Void the Warranty.

Six 1-inch knockouts are located in the base of the BOSS.12 Enclosure for tool accessibility when mounting the BOSS.12 Enclosure to the concrete pad. Cover knockout holes with sealing tape after pad mount installation, and prior to installing the PHI Batteries into the base of the cabinet.

Secure the BOSS.12 Enclosure to the concrete with concrete anchors, such as threaded rods, masonry bolts, or carriage bolts, minimum $\frac{1}{2}$ " diameter. See Figure 4 and Figure 5 for details.

Figure 4 – BOSS.12 Enclosure Knockouts (bottom)

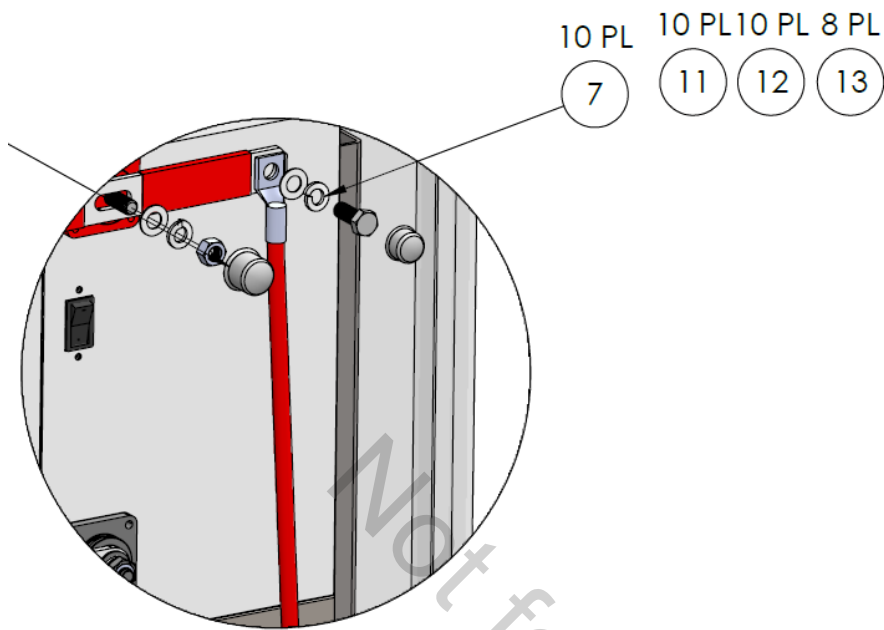
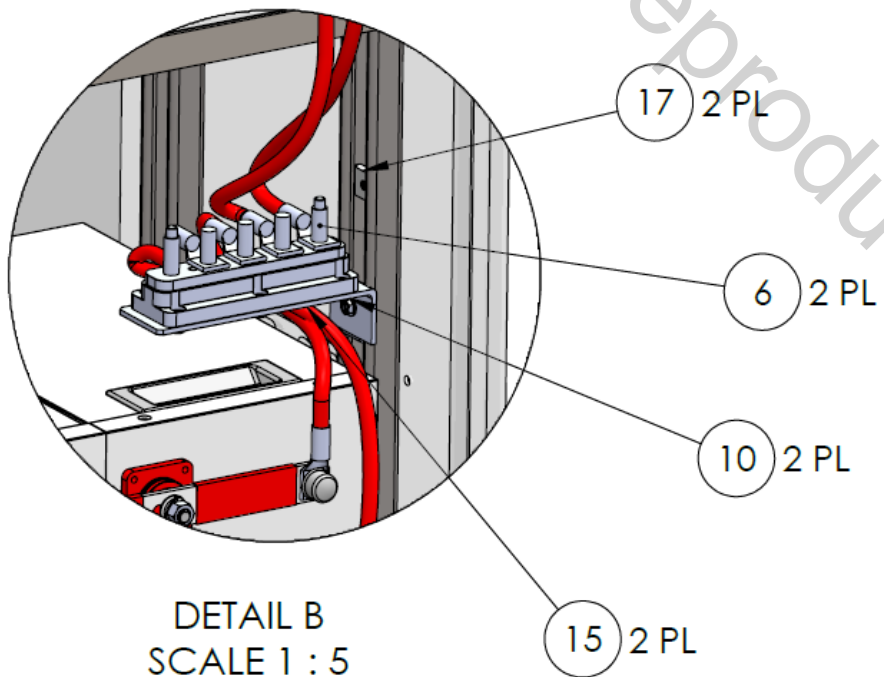


Figure 5 – BOSS.12 Enclosure Knockouts (bottom)



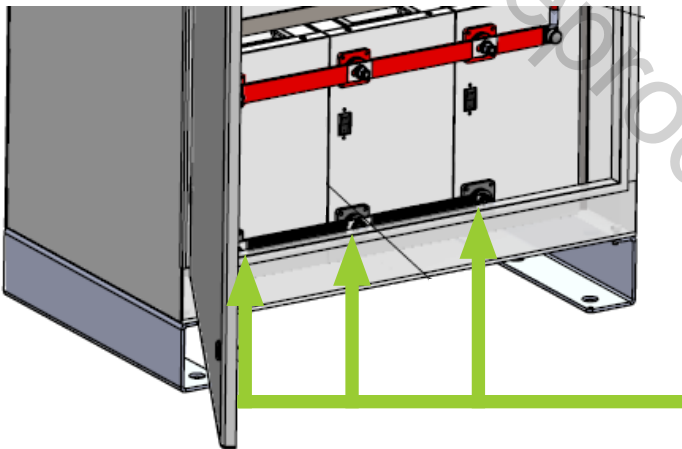
3.8 - Assembling the BOSS.12 Enclosure

4. The shelf mounting heights in the BOSS.12 Enclosure are pre-configured to accommodate the PHI batteries. Adjusting the shelves' locations is not necessary.
5. Make sure all PHI Battery module circuit breakers are in the "OFF" position. Prepare the battery modules for installation by removing all plastic terminal covers, 11/16" stainless steel hex nuts and 3/8" lock washers from the batteries' terminals and set aside.
6. Confirm that the polypropylene bars pre-assembled in the BOSS.12 enclosure are secure.
7. Install the PHI Battery modules in the enclosure starting at the bottom of the enclosure.
8. Arrange up to three PHI Battery modules on each shelf. Orient the modules so that the battery terminals point forward toward the door, with the negative posts nearest the bottom of the enclosure (see Figure 5 on page 12).



CAUTION: Do not attempt to loosen the large brass nut at the base of the battery terminals. Doing so will Void the Warranty

Figure 6 – PHI Battery Module Arrangement in the BOSS.12 Enclosure



Negative battery terminals are nearest the bottom of the enclosure. Posts point towards the enclosure's door.

9. Continue arranging the PHI Battery modules on the remaining shelves.
10. After securely placing all the PHI Battery modules in the BOSS.12 Enclosure, **confirm that all the module circuit breakers are still in the "OFF" position.**
11. Arrange the horizontal negative (black) interconnecting copper busbars onto the batteries' negative terminals. Secure the busbars to the batteries using the 3/8" flat washers (included with the busbars), 3/8" stainless steel lock washers and 11/16" stainless steel hex nuts (originally included on the batteries) to secure the busbars directly to the batteries' terminals, and tighten to 160 in-lbs.



12. Attach the horizontal positive (red) interconnecting copper busbars onto the batteries' positive terminals. Use the 3/8" flat washers (included with the busbars), 3/8" lock washers and 11/16" stainless steel hex nuts (originally included on the batteries) to secure the busbars directly to the batteries' terminals, tightening the nuts to 160 in-lbs. (see Figure 6 on page 13)

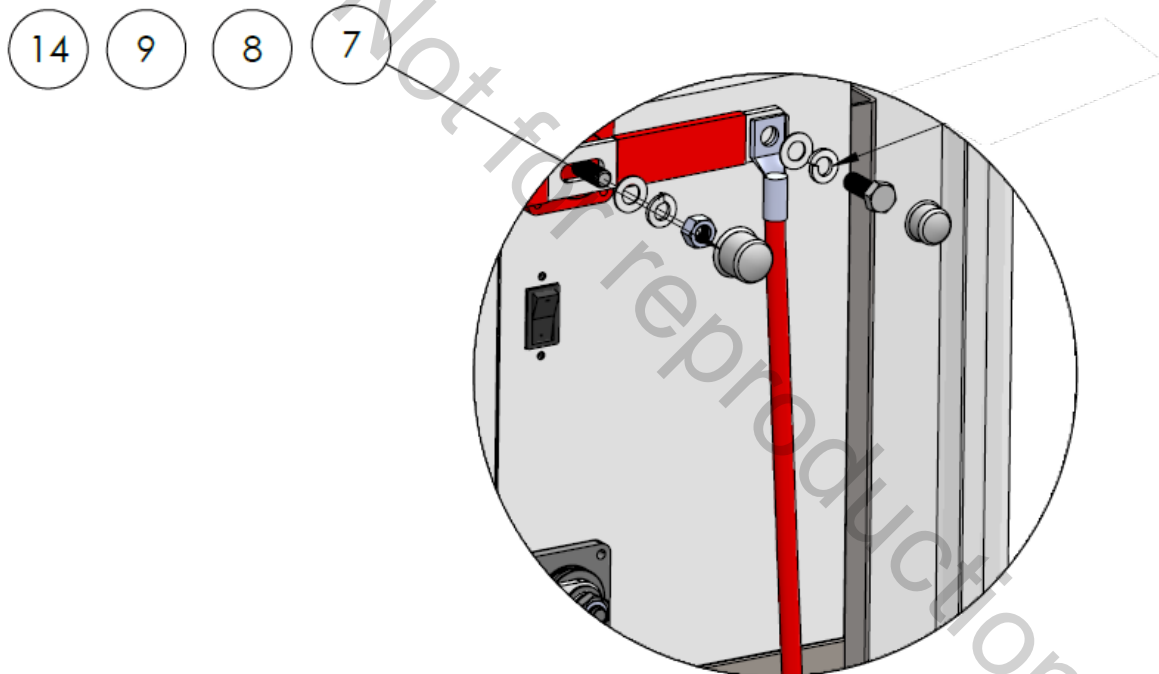


CAUTION: Do not place any material (such as a washer) between the large brass nut at the base of the battery terminal and the interconnect.

(Refer to the [Connecting a busbar to terminals on a SimpliPhi battery video](#).)

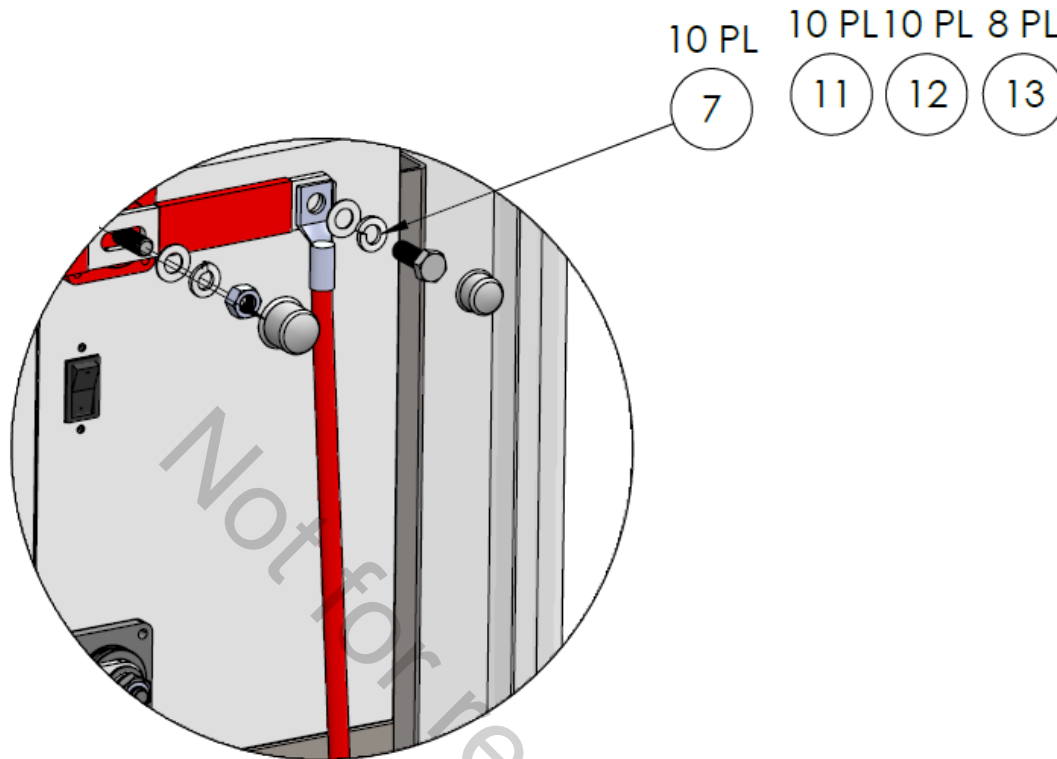
Figure 7 – Interconnecting Busbars Attach Directly to PHI Battery Terminals

24 PL 24 PL 24 PL 24 PL



13. Wire each of the four (4) 45"-long 2/0 Arctic Ultraflex Blue® negative cables to the connection points located on each of the ends of the four (4) negative busbars. Use the 3/8" flat washers, 3/8" brass lock washers and 3/8"-16½"-long brass hex head screws (included with the busbars) to secure the 2/0 cables to each of the busbars, and tighten to 120 in-lbs.
14. Wire each of the four (4) 45"-long 2/0 Arctic Ultraflex Blue® positive cables to the connection points located on each of the ends of the four (4) positive busbars. Use the 3/8" flat washers, 3/8" brass lock washers and 3/8"-16½"-long brass hex head screws (included with the busbars) to secure the 2/0 cables to each of the busbars, and tighten to 120 in-lbs.

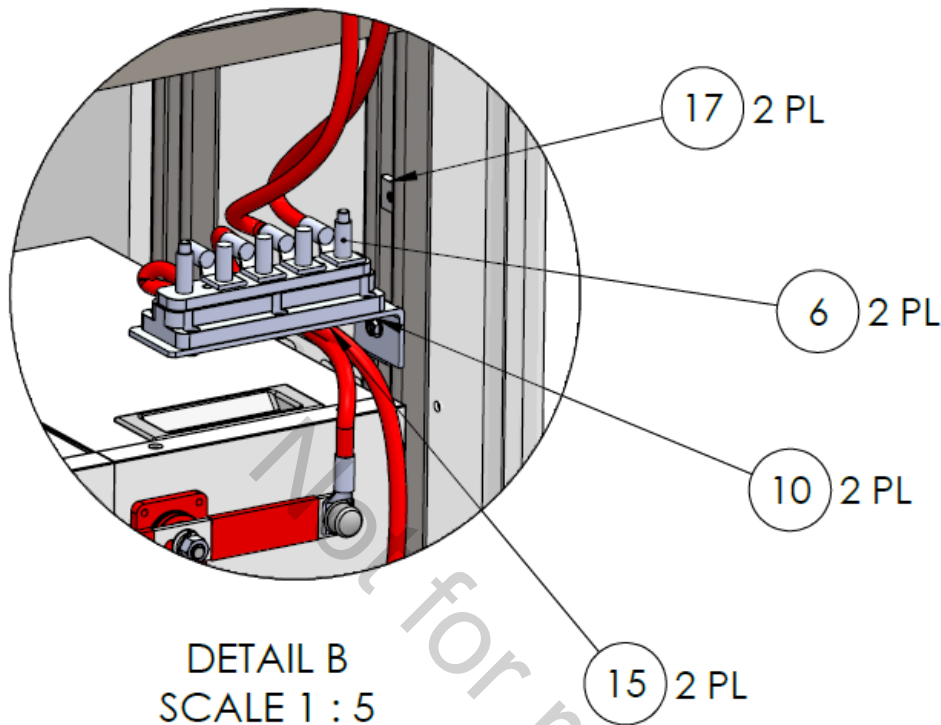
Figure 8 – 2/0 Cables Attach to ends of the Interconnecting Busbars



15. Land the four (4) 2/0 negative cables on four connection points on the negative 5-point terminal block (located on the installer's left, when facing the enclosure*) using a 17mm wrench socket to tighten the ¼"-20 nuts. Tighten to a torque value of 120 in-lbs.
16. Land the four (4) 2/0 positive cables on four connection points on the positive 5-point terminal block (located on the installer's right, when facing the enclosure*) using a 17mm wrench socket to tighten the ¼"-20 nuts.* Tighten to a torque value of 120 in-lbs.

**It is important to maintain the block on the installer's left, when facing the enclosure, as the negative terminal block, and maintain the block on the installer's right, when facing the enclosure, as the positive terminal block, due to the BOSS.12's fan coming pre-wired to the terminal blocks within the unit.*

Figure 9 – 2/0 Cables Wiring from Busbars to Terminal Blocks



17. Wire the PHI battery bank contained in the BOSS.12 to the inverter or inverter's power panel

- Connect the 8-ft negative (black) 4/0 cable to the negative 5-point terminal busbar. Tighten to a torque value of 120 in-lbs.
- Connect the 8-ft positive (red) 4/0 cable to the positive 5-point terminal busbar. Tighten to a torque value of 120 in-lbs.
- Route the two 4/0 cables (included with the BOSS.12) conduit, using the desired knockouts on the side of the BOSS.12 enclosure to the inverter or inverter's distribution panel in the adjacent equipment or AccESS fully integrated unit.
- To access the DC negative and DC positive busbars or plates in the accompanying inverter's distribution panel, remove the distribution panel cover.
- Land the 8-ft negative (black) 4/0 cable on the DC negative bus or plate and the positive (red) 4/0 cable on the DC positive bus or plate (see Figure 9 below).
- Re-attach the inverter's distribution panel cover.

18. Set the circuit breakers for all PHI battery modules to the ON position.



CAUTION: Turn the inverter's main DC Disconnect on only AFTER ALL the built-in circuit breakers in the PHI Battery bank are turned on. (Refer to the [System Commissioning SimpliPhi battery video](#).)

This completes the installation procedure for the BOSS.12 Enclosure.



Remember, all Balance of System equipment must be programmed to SimpliPhi's specified settings and PHI batteries must be fully charged before commissioning the system (i.e. before connecting the batteries to any loads).

4.0 - Care and Maintenance

The BOSS.12 Enclosure is designed to deliver many years of reliable service in a wide variety of environments. The BOSS.12 Enclosure is resistant to most environmental elements, but should be isolated from excessive water or moisture, extreme heat, solvents, flammable materials, and environmental hazards.

If the BOSS.12 Enclosure becomes dirty or grimy, wipe it as you would any kitchen cabinet. Do not use a pressure washer or hose to clean the BOSS.12 Enclosure.

5.0 - Technical Support

For technical support related to your BOSS.12 Enclosure, please contact us as at:

805-640-6700

techsupport@simpliphipower.com