

Extended Runtime Thin Plate Pure Lead (XRT-TPPL) Power System Quick Start Guide

Introduction

The Alpha® Extended Runtime Thin Plate Pure Lead (XRT-TPPL) power system offers extended runtime for XM3.1-HP™ cable TV powering applications and solutions based on power supply loading that can be supported using two, four or six battery string configurations. This guide briefly describes the XM3.1-HP power supply and provides procedures with regard to the installation of the power supply, battery connection and initial start-up. The XM3.1-HP power supply requires specific firmware to operate this system. For detailed information, refer to the Extended Runtime Thin Plate Pure Lead (XRT-TPPL) Power System Technical Manual (Alpha p/n 031-00014-B0-001) available at www.alpha.com.

Audience

This guide is intended for experienced, qualified and licensed installation personnel familiar with the mechanical and electrical requirements of enclosure and power supply systems. Review the support documentation on the website to become familiar with the features and functions of the equipment in this system before proceeding.



WARNING! ELECTRICAL & FIRE HAZARD

- Failure to install and/or use this equipment as instructed in the system documents can result in a hazard to personnel or damage to the equipment. This system is only serviceable by qualified personnel.
- Maximum site load must not exceed the values in the table below:

Battery Configurations			
Number of PN-4 Battery Enclosures	Battery Type	Quantity	P/S Output Current
1 or 2	PowerSafe® SBS 190F TPPL	12	1 - 3 A
	AlphaCell® 210FTX TPPL	12	3.1 - 4 A
2	PowerSafe® SBS 190F TPPL	18	4.1 - 5 A
	AlphaCell® 210FTX TPPL	18	5.1 - 6 A

1.0 Overview

Battery string locations for an 18-battery configuration are noted in the image below as well as in Fig. 2-9 and Fig. 2-10. Each string uses three batteries. Note that String D consists of the fourth battery on each row in the PN-4 FTB.

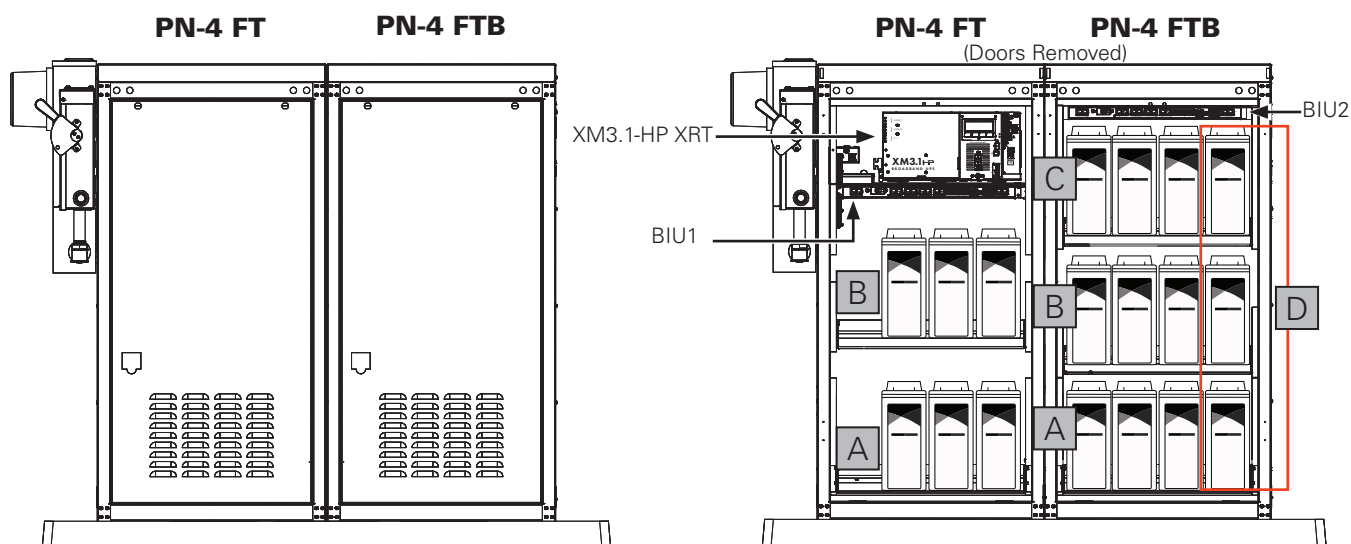


Fig. 1-1, PN-4 FT and PN-4 FTB XRT System

2.0 Battery Installation And Start-Up Procedure



WARNING! ELECTRICAL HAZARD

Installer must wear the correct PPE when installing batteries. Failure to do so may result in injury or death.

Required Tools

- Insulated tools (size and setting based on battery manufacturer torque specification)
- Safety glasses or face shield
- Rubber gloves
- Chest shield
- Box or bag for storing cables and hardware while out in the field
- True RMS voltmeter



NOTICE:

Review Fig. 2-9 and Fig. 2-10 for hardware stack-up and wiring diagram to see the recommended layout and set up, then proceed with the installation procedure below.

Procedure

1. Before installing the batteries, ensure the enclosure(s) are set and bolted to pad. Remove bottom battery tray if necessary.
2. Ensure enclosure grounding is in place.
3. Ensure BIU (Battery Interface Unit) is installed (see Fig. 1-1 for mounting locations) and verify the tamper switch (TPR) is plugged in.

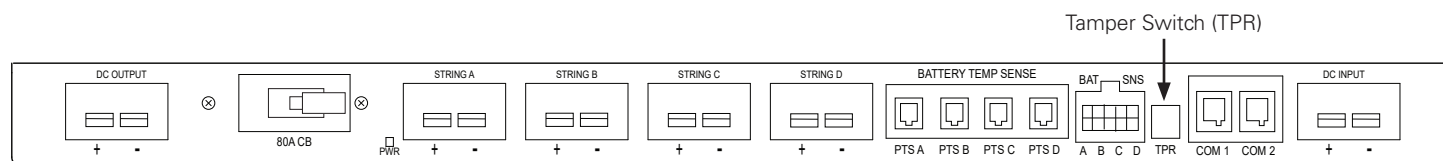


Fig. 2-1, BIU Tamper Switch Location

4. Install conduit pass-through if side by side PN-4 enclosures are used. Use 2" conduit knockout on the side top front of enclosure.

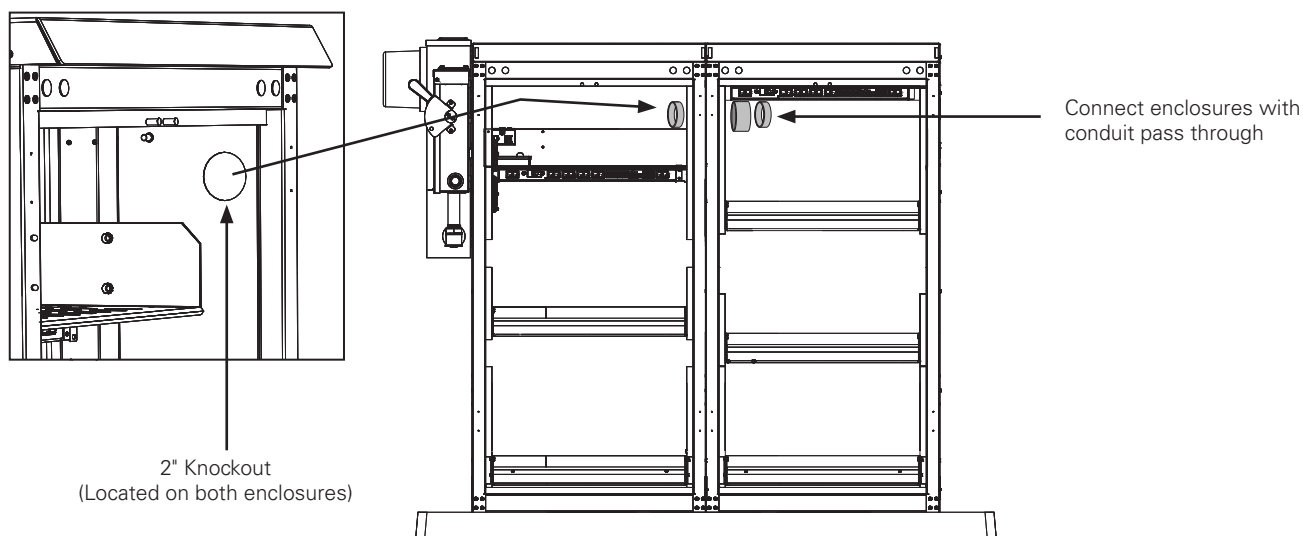


Fig. 2-2, Conduit Pass Through

5. If integrating an existing ground mounted UPE or PWE cabinet, install metallic conduit run from the PN-4 FT to existing enclosure (see figure below). Remove PN-4 bottom battery tray if necessary. Use 2" conduit knockout on front side bottom of PN-4 or 2" knockout in bottom under battery tray to go under the pad. (Metallic conduit must be used above ground to prevent radiated emissions. Metallic conduit must be ground bonded.)
6. If integrating a pole mounted enclosure, remove existing PWE batteries and slide trays so conduit can enter the bottom of the enclosure. BIU Integration wires should be long enough to route to XM3.1-HP™ power supply battery and RS485 COM connectors. Excess wire can be looped in the bottom of the PWE.

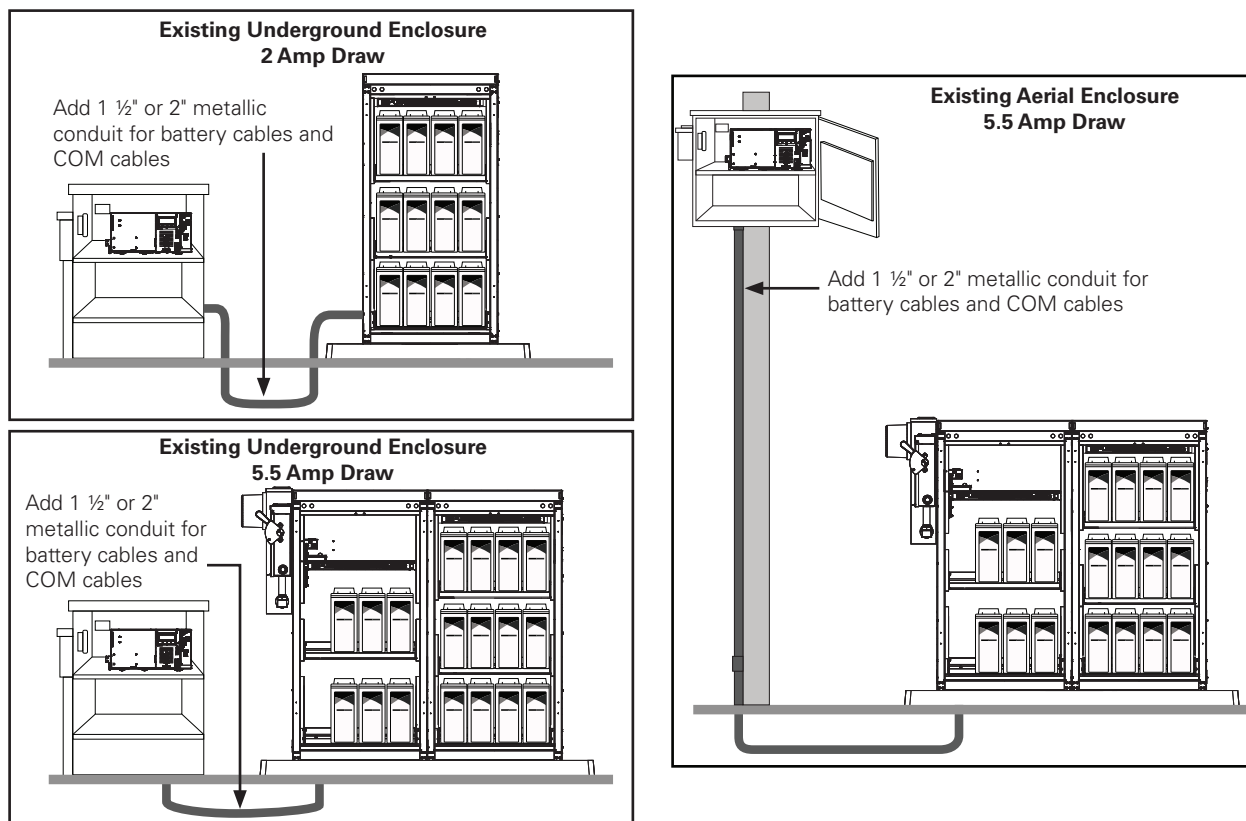


Fig. 2-3, Routing Conduit Underground Examples

7. Install grouped BIU extension, #6 AWG battery and COM cables in conduit run. Remove 75A Anderson™ connector housing on the end to be pulled through the conduit. Use appropriate wire pulling grip techniques to protect Anderson terminals and RS485 COM connector. When in place, BIU extension wires must be long enough to route from XM3.1-HP power supply to BIU1 connectors after batteries are installed. Re-install 75A Anderson connector housing on battery cables.
8. Ensure all PN-4 battery trays are installed correctly.
9. Verify XM3.1-HP power supply battery breaker and BIU circuit breakers are off.
10. With battery covers on, place batteries on shelves using proper lifting procedure. This is a two-person operation. When installing AlphaCell® 210FTX batteries leave the rear handle flipped forward to aid in future removal. Use approximately 1/2" spacing between batteries. On PN-4 FTB leave more space (approximately 3/4") between last battery in the first three string and the D string battery. This will help with wiring the D string batteries.

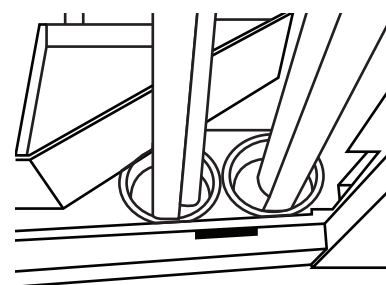


Fig. 2-4, PN-4 FT Conduit Location (Back of Enclosure)

✓ NOTICE:

When installing PowerSafe® SBS 190F batteries, leave approximately 1 1/2" of space behind the batteries on the shelf. Always install batteries with the rear door removed to avoid slamming the batteries into the rear door and causing damage.

11. Remove all battery covers.
12. Remove all hardware from battery terminals and store in a bag or convenient place. (Fig. 2-5)
13. Install 876-00059-20 BAT,INTG,36VDC,2STRG,PN4FT,W/BIU,PTS,BS in the PN-4 FT with two battery trays. (See Fig. 1-1, Fig. 2-9 and *p/n 031-00014-08* System Wire Diagram available on Alpha's website for reference.)

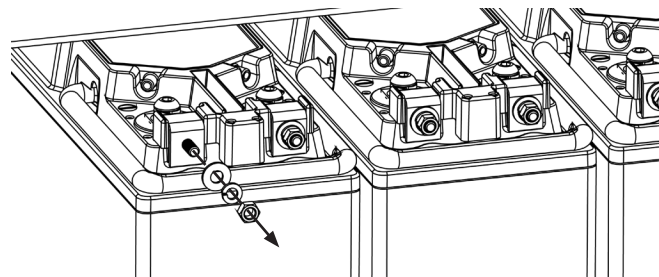


Fig. 2-5, Remove Battery Hardware

- A. Start with A string battery cables on the bottom tray of the PN-4 FT. Route the black wire through the hole in left side of the top tray as seen in Fig. 2-6. Route the red wire along the right side of the enclosure.
- B. Install B string battery cables on middle tray.
- C. Install intercell fuses on batteries 2A and 3A, and 2B and 3B. (On AlphaCell® 210FTX batteries, the fuse can be offset to the back. On PowerSafe® SBS 190F batteries, the fuse must be offset to the front.)
- D. Install interconnect bus bars on batteries 1A and 2A, and 1B and 2B.
- E. Install Precision Temperature Sensors (PTS). Plug in to appropriate BIU1 port (ex: PTS A cable into the PTS A BIU1 port) in turn so they don't get mixed up. Route wires down the right side. Use wire label A & B provided by installer to mark both ends of PTS.
Note: The PTS are 4ft long.
- F. Install battery voltage sense wires. Route wires down the right side.
- G. Torque battery terminals to battery manufacturer's specifications.
- H. Check battery cable connectors for correct polarity and voltage. Verify connector color, orientation and wire labels, then fully insert into BIU1.
Note: The BIU will power up as soon as the batteries are connected, regardless of circuit breaker position.
- I. Before installing covers, use a corrosion inhibitor such as NO-OX® electrical contact grease on battery terminals. Install battery covers. (On PowerSafe SBS 190F batteries, the covers must be trimmed with side cutters to fit around the intercell fuses. See Fig. 2-7. Trim side needed.)

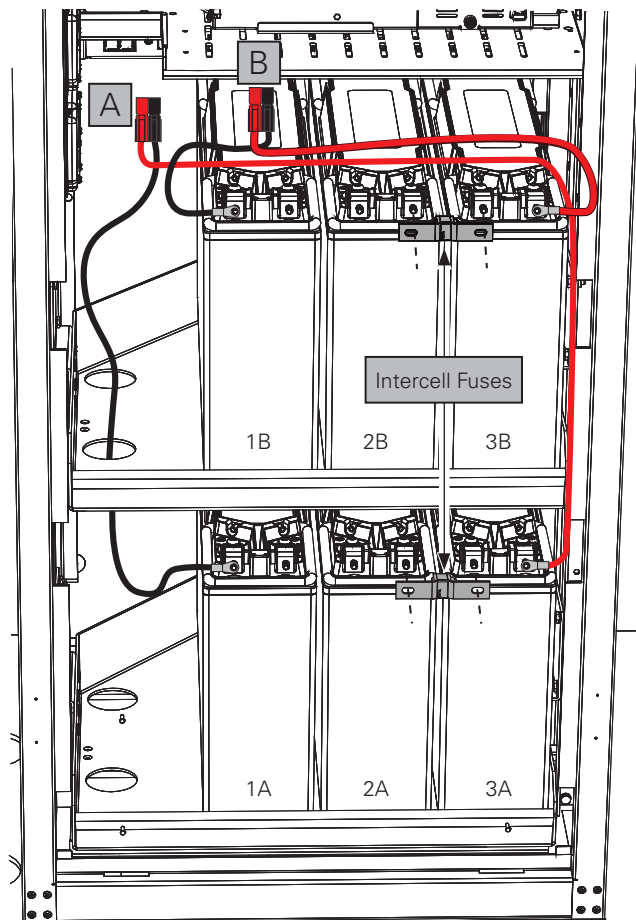


Fig. 2-6, Installing Battery Cables and Intercell Fuses

14. Plug in battery voltage sense connector into BIU1.
15. Connect BIU1 extension cable from BIU DC Output to XM3.1-HP™ power supply Battery Input.
16. Connect RS485 COM cable from BIU1 COM1 to XM3.1-HP power supply BIU connection.

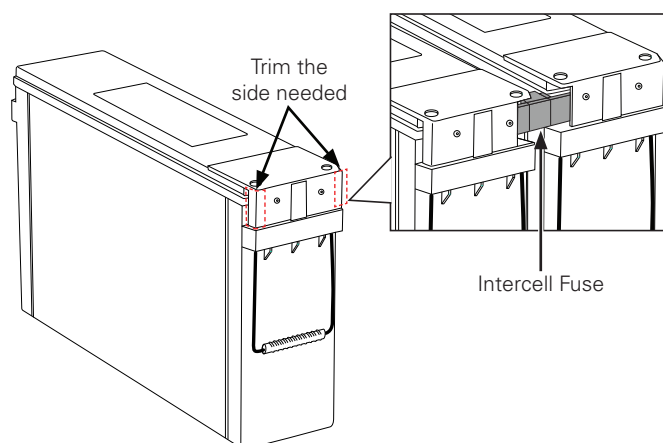


Fig. 2-7, Trimming Battery Cover on PowerSafe® SBS 190F

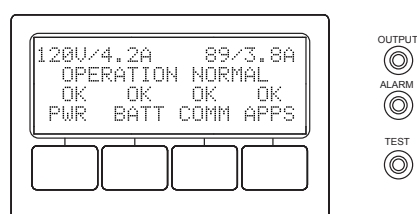
17. Install 876-00059-22 BAT,INTG,36VDC,4STRG,PN4FT,W/BIU,PTS,BS in PN-4 FTB with 3 battery trays. (See Fig. 1-1, Fig. 2-10 and *p/n 031-00014-08* System Wire Diagram available on Alpha's website for reference.)

- A. Start with A string battery cables on the bottom tray.
- B. Install B string battery cables on middle tray.
- C. Install C string battery cables on top tray.
- D. Install D string battery cables.

✓ **NOTICE:**

If only three battery strings are required, don't install the D string wires, F4 fuse wire kit or PTS. D string battery voltage sense wires GRY and WHT ring lugs **must** be taped up and wires coiled with wire tie to prevent shorting.

- E. Install intercell fuses on batteries 2A and 3A, 2B and 3B, and 2C and 3C. (On AlphaCell® 210FTX batteries the fuse can offset to the back. On Powersafe® SBS 190F batteries the fuse must offset to the front.) If installing D string batteries, use the F4 fuse wire kit between batteries 2D and 3D.
 - F. Install interconnect bus bars on batteries 1A and 2A, 1B and 2B and 1C and 2C. If installing D string batteries, install an intercell jumper between batteries 1D and 2D.
 - G. Install Precision Temperature Sensors (PTS). Plug in to appropriate BIU2 port (ex: PTS A cable into the PTS A BIU2 port) in turn so they don't get mixed up. Route wires down the right side. Use wire label A, B, C & D provided by installer to mark both ends of PTS. **Note:** PTS A is 12ft. The rest are 4ft.
 - H. Install battery voltage sense wires. Route wires down the right side.
 - I. Torque battery terminals to battery manufacturer's specifications.
 - J. Check battery cable connectors for correct polarity and voltage. Verify connector color, orientation and wire labels then fully insert into BIU2.
 - K. Before installing covers, use a corrosion inhibitor such as NO-OX® electrical contact grease on battery terminals. Install battery covers. (On PowerSafe SBS 190F batteries the covers must be trimmed with side cutters to fit around the intercell fuses. See Fig. 2-7.)
18. Plug in Battery Voltage Sense connector to BIU2.
19. Connect BIU2 extension cable from BIU2 DC Output to BIU1 DC Input.
20. Connect RS485 COM cable from BIU2 COM1 to BIU1 COM2.
21. Verify communication termination is installed in BIU2 COM2.
22. Turn on BIU breakers one at a time, then turn on XM3.1-HP™ power supply battery breaker.
23. On the XM3.1-HP power supply Smart Display, select **BATT** and choose the battery model that corresponds with the configuration. Check individual battery voltage via the Smart Display.
24. Verify BIU is configured correctly by selecting **BIU INFO** and all menus are "OK". Another way to access this is by pressing the left three buttons on the Smart Display at the same time. If any menus have **ALM** flashing, identify the alarm and fix the problem.
25. Verify proper operation. **Site must be alarm-free after running self-test. This can be accomplished manually or by using Alpha XM360™ software.**



**Fig. 2-8, XM3.1-HP™ Power Supply
Smart Display**

2.1 Battery Installation Layout

PN-4 FT EXTENDED RUNTIME (XRT) SYSTEMS BATTERY ENCLOSURE

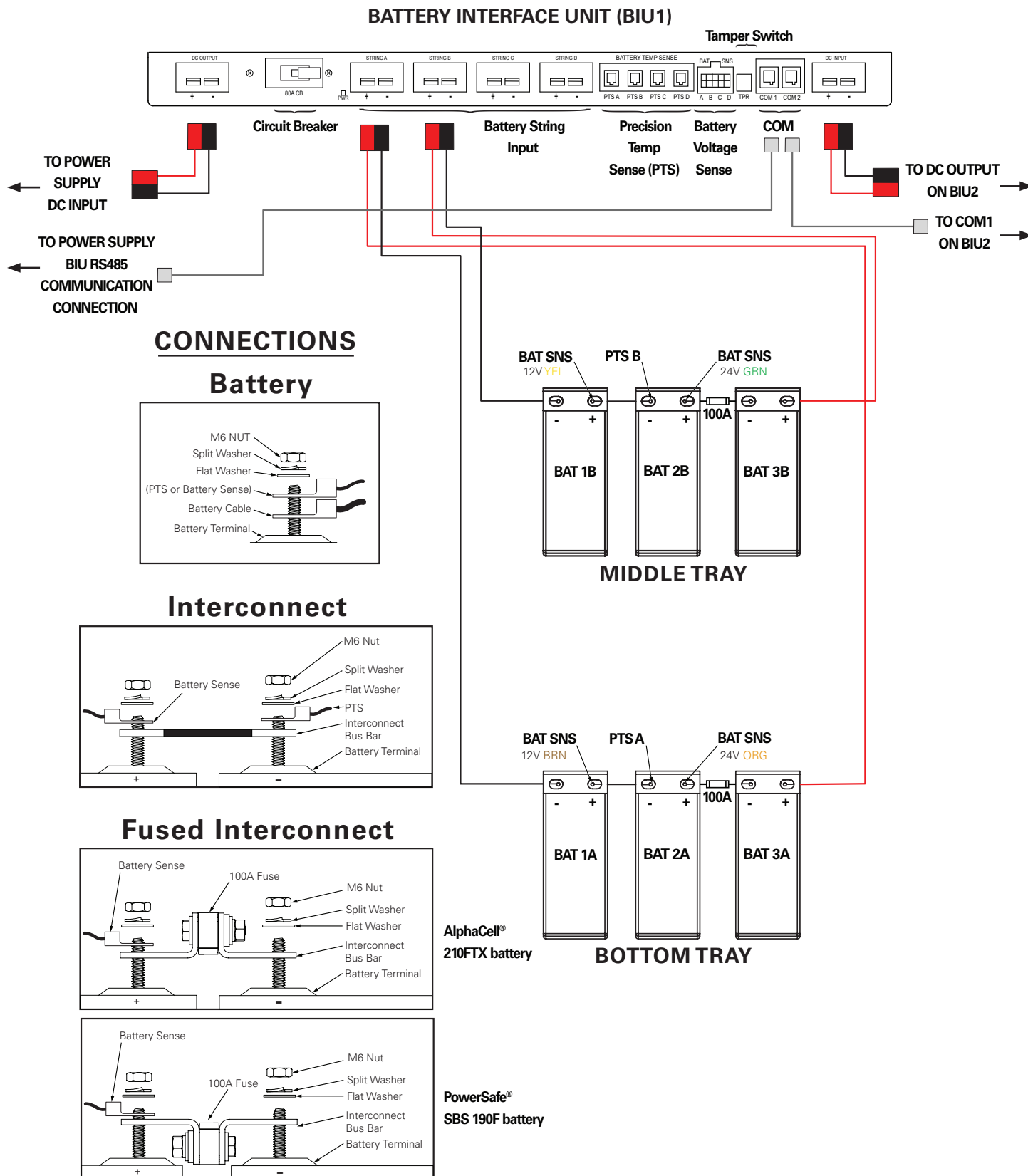


Fig. 2-9, PN-4 FT XRT Battery Installation Arrangement and Wiring Diagram

PN-4 FTB EXTENDED RUNTIME (XRT) SYSTEMS BATTERY ENCLOSURE

BATTERY INTERFACE UNIT (BIU2)

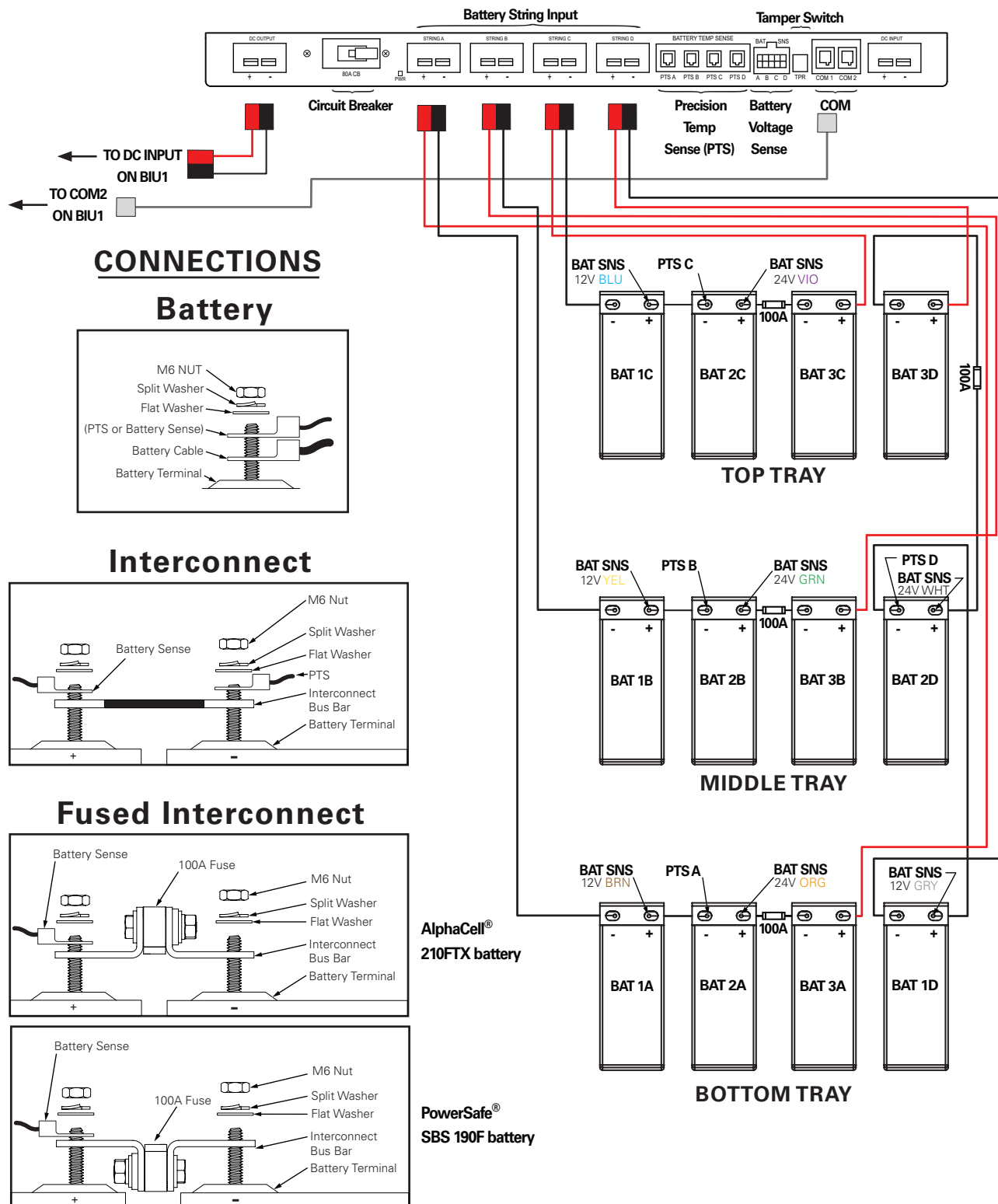


Fig. 2-10, PN-4 FTB XRT Wiring Diagram



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