

Eaton® Top Wiring Kit for Type S Battery Cabinet

Installation Instructions



p/n: P-164000742
Revision 04

IMPORTANT SAFETY INSTRUCTIONS SAVE THESE INSTRUCTIONS

This manual contains important instructions that should be followed during installation and maintenance of the UPS system and batteries. Read all instructions before operating the equipment and save this manual for future reference.

CONSIGNES DE SÉCURITÉ IMPORTANTES – CONSERVER CES INSTRUCTIONS

Ce manuel comporte des instructions importantes que vous êtes invité à suivre lors de toute procédure d'installation et de maintenance des batteries et de l'onduleur. Veuillez consulter entièrement ces instructions avant de faire fonctionner l'équipement et conserver ce manuel afin de pouvoir vous y reporter ultérieurement.

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Eaton® Top Wiring Kit for Type S Battery Cabinet Installation Instructions

Introduction

- NOTE** Startup and operational checks must be performed by an authorized Eaton Customer Service Engineer, or the warranty terms specified in UPS installation and operation manual become void. This service is offered as part of the sales contract for the UPS. Contact an Eaton service representative in advance (a minimum two-week notice is required) to reserve a preferred startup date.

The Eaton® top wiring kit (see [Figure 1](#)) provides an interface between an Eaton® UPS and a Samsung® Type S lithium-ion battery cabinet.

The top wiring kit bolts to the top of the Samsung battery cabinet and provides customer landing terminals for DC power, an AC power terminal block for the battery cabinet battery monitoring system (BMS), and a terminal block for dry-contact wiring from the UPS (see [Figure 2](#)). The 208/220V version also includes two transformers.

Figure 1. Top Wiring Kit

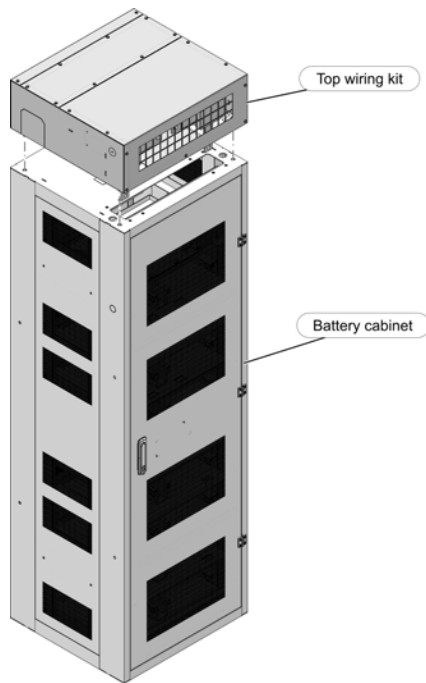
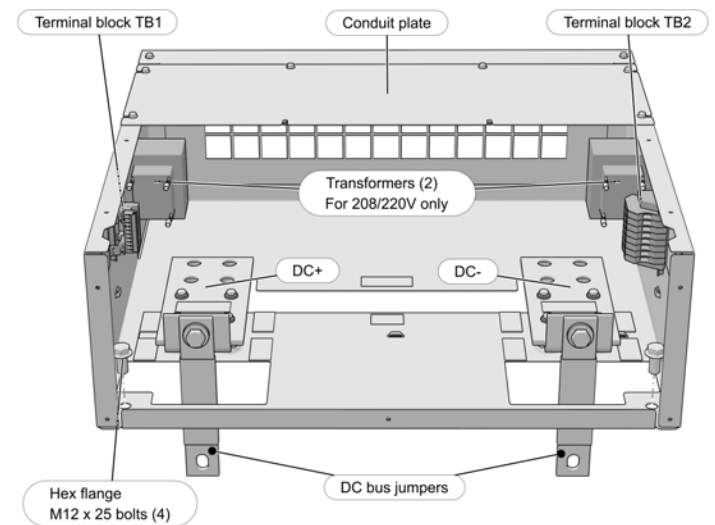


Figure 2. Top Wiring Kit Features



Reference Documents

The following documents are required to complete the installation of the Eaton UPS, Samsung battery cabinet, and top wiring kit:

- *Eaton UPS Installation and Operation Manual* – Installation and operation instructions for the Eaton UPS, including site preparation, installation planning, wiring and safety information, and detailed illustrations of the UPS with dimensional and connection point drawings

- For Samsung 128S battery cabinets:
 - Part Number P-164000729 — *LIB System for UPS, Installation Manual (128S3P – Samsung Document ET003193694)* – Installation instructions for the battery cabinet, including site preparation, installation planning, wiring and safety information, and detailed illustrations with dimensional and connection point drawings
 - Part number P-164000730 — *LIB System for UPS, Operation and Maintenance Manual (Samsung Document ET003193693)* – Operation and maintenance instruction for the battery cabinet
- For Samsung 136S battery cabinets:
 - Part Number P-164000814 — *Lithium Ion Battery System for UPS, Installation Manual (136S – Samsung Document ET003222373)* – Installation instructions for the battery cabinet, including site preparation, installation planning, wiring and safety information, and detailed illustrations with dimensional and connection point drawings
 - Part number P-164000815 — *LIB System for UPS, Operation and Maintenance Manual* – Operation and maintenance instruction for the battery cabinet

Visit www.eaton.com/powerquality or contact an Eaton service representative for information on how to obtain copies of these manuals.

Using This Manual

This manual describes how to install the top wiring kit. Read and understand the procedures described in this manual, as well as those listed in [Reference Documents](#) to ensure trouble-free installation and operation.

Read through each procedure before beginning the procedure. Perform only those procedures that apply to the UPS system being installed or operated.

Conventions Used in This Manual

This manual uses these type conventions:

- **Bold type** highlights important concepts in discussions, key terms in procedures, and menu options, or represents a command or option that you type or enter at a prompt.
- *Italic type* highlights notes and new terms where they are defined.

Icon	Description
Note	Information notes call attention to important features or instructions.
[Keys]	Brackets are used when referring to a specific key, such as [Enter] or [Ctrl].

In this manual, the term UPS refers only to the UPS cabinet and its internal elements. The term UPS system refers to the entire power protection system – the UPS cabinet, an external battery system, and options or accessories installed.

Symbols, Controls, and Indicators

The following are examples of symbols used on the UPS or accessories to alert you to important information:



RISK OF ELECTRIC SHOCK - Observe the warning associated with the risk of electric shock symbol.



CAUTION: REFER TO OPERATOR'S MANUAL - Refer to your operator's manual for additional information, such as important operating and maintenance instructions.



This symbol indicates that you should not discard waste electrical or electronic equipment (WEEE) in the trash. For proper disposal, contact your local recycling/reuse or hazardous waste center.

Getting Help

If help is needed with any of the following:

- Scheduling initial startup
- Regional locations and telephone numbers
- A question about any of the information in this manual
- A question this manual does not answer

Please call the Customer Reliability Center at:

United States:	1-800-843-9433
Canada:	1-800-461-9166 ext 260
All other countries:	Call your local service representative

Please use the following e-mail address for manual comments, suggestions, or to report an error in this manual: E-ESSDocumentation@eaton.com

Safety Warnings



WARNING

The manuals listed in the [Reference Documents](#) section contain important instructions that should be followed during installation and maintenance of the UPS system, top wiring kit, and Type S lithium-ion battery cabinet. Read all instructions before installing or operating the equipment and save the manuals for future reference.

The UPS system is designed for industrial or computer room applications, and contains safety shields behind the door and front panels. However, the UPS system is a sophisticated power system and should be handled with appropriate care.



DANGER

This UPS and battery systems contain LETHAL VOLTAGES. All repairs and service should be performed by AUTHORIZED SERVICE PERSONNEL ONLY. There are NO USER SERVICEABLE PARTS inside the UPS or battery cabinet.

Installation

Installation Plan

Refer to the manuals listed in the [Reference Documents](#) section for information on preparing an installation plan for the Eaton UPS and Samsung battery cabinet. In addition to the external wiring recommendations listed in those manuals, see [Table 1](#) for recommendations specific to the top wiring kit installation.

Table 1. Customer Wiring Recommendations, Top Wiring Kit

Connections	Recommended Minimum Wire Size for 75°C Copper Stranded Wire	Recommended Torque
Battery Wires	3/0 AWG (2x per pole)	519 in-lb
Ground Wires	3/0 AWG	519 in-lb
Control Wires (TB1)	18 AWG	5 in-lb
AC Auxiliary Power (TB2) – See note below	14 AWG	10 in-lb

NOTE Each Type S battery system requires a minimum of one 400–500 Vac three-phase circuit to provide auxiliary power to the system BMS. For 480 Vac UPS applications, the battery cabinet is wired directly to a 480 Vac source. For 208/220 Vac UPS applications, the top wiring kit includes transformers to step up to 480 Vac. These circuits must be provided from the customer’s electrical distribution and should be protected by a listed 15A device (circuit breaker or fuse), with a recommended wire size of 14 AWG. Source 1 (required) shall be provided from the UPS output distribution; Source 2 (optional) shall be provided from the UPS bypass input. For parallel battery cabinets, the AC sources can be provided to only the "master" cabinet top wiring kit and from there to the parallel cabinets using the supplied interconnect harnessing.

Preliminary Installation Information



WARNING

Installation should be performed only by qualified personnel knowledgeable of batteries and the required precautions.

Observe these precautions while installing the top wiring kit:

- Wear the proper electrical and arc flash personal protective equipment (PPE) when voltages of 50V or greater are present.
- Remove watches, rings, or other metal objects
- Use tools with insulated handles
- Wear rubber gloves and boots
- Do not lay tools or metal parts on top of batteries or battery cabinets
- Refer to the manuals listed in the [Reference Documents](#) section for cabinet dimensions and weight, wiring and terminal data, and installation notes

Inspecting and Unpacking the Top Wiring Kit

The top wiring kit is packed in a shipping carton.

1. Carefully inspect the outer packaging for evidence of damage during transit.

 **CAUTION**

Do not install a damaged assembly. Report any damage to the carrier and contact your Eaton service representative immediately.

2. Open the shipping carton and examine the contents. The carton should contain the items listed in [Table 2](#). If not, contact your Eaton service representative immediately.
3. Remove the top wiring kit, hardware kit, and pack kit from the carton.
4. Remove all packaging materials and discard or recycle them in a responsible manner.

Table 2. Top Wiring Kit Contents

Part Number and Description	Qty
P-103003275 – ASSEMBLY, TOP HAT INTERFACE BOX	1
P-152001882 – HARNESS, LI-ION TOP WIRING AC POWER	1
P-152001883 – HARNESS, LI-ION TOP WIRING AC INTERCONNECT	1
P-152001884 – HARNESS, LI-ION BREAKER AUX INTERCONNECT	1
P-103003276 – KIT, TOP HAT HARDWARE KIT, CONTAINING:	1
180190078-110 – BOLT HEX HEAD M12 X 35	8
180190109-057 – BOLT HEX FL M12 X 25	4
180500036-120 – WASHER FLAT M12 HD	8
180500037-120 – WASHER LK M12 CONICAL SPRNG	8
FOR SAMSUNG 128S CABINETS ONLY	1
P-103003277 – KIT, TOP HAT PACK KIT, CONTAINING:	1
152201081 – TIE WRAP 0.19 W X 7.4 LG	15
152104034-037 – BUSHING,1.0 I.D.	1
P-164000742 – Top Wiring Kit Installation Manual (this manual)	1
P-164000729 – SAMSUNG UPS Install Manual 128S3P R6	1
P-164000730 – SAMSUNG SDI UPS Ops&Maint Manual R6	1
FOR SAMSUNG 136S CABINETS ONLY	1
P-103003511 – KIT, TOP HAT PACK KIT, 136S, CONTAINING:	1
152201081 – TIE WRAP 0.19 W X 7.4 LG	15
152104034-037 – BUSHING,1.0 I.D.	1
P-164000742 – Top Wiring Kit Installation Manual (this manual)	1
P-164000814 – SAMSUNG Lithium Ion Battery System 136S Installation Manual	1
P-164000815 – SAMSUNG Lithium Ion Battery System 136S Operation and Maintenance Manual	1
FOR 208 VAC AUXILIARY INPUT ONLY	1
P-152002119 – HARNESS, LI-ION TOP WIRING AC POWER 208V	1

Installation

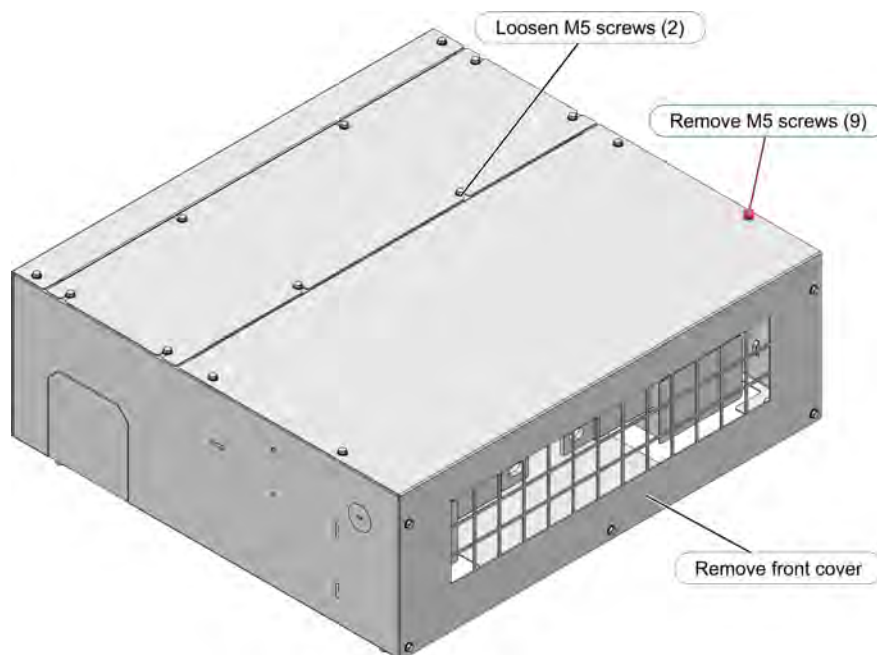
1. Install the Eaton UPS as directed in its *Installation and Operation Manual*.
2. Install the Samsung battery cabinet as directed through *Section 3.9.1, Switchgear and SMPS Assembly Installation*, of its *Installation Manual*. Do not continue to *Section 3.9.2, Battery Module Installation*.

 **WARNING**

DO NOT install the battery modules until directed by this procedure.

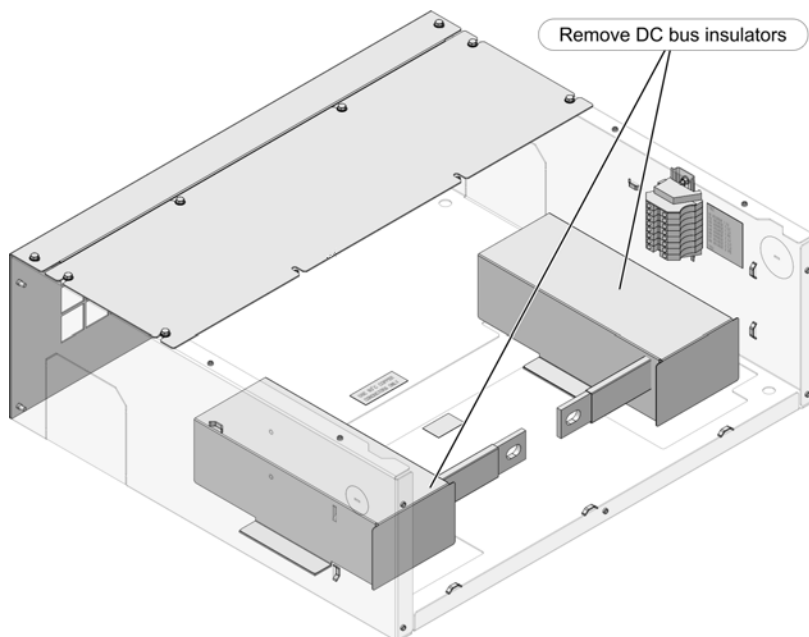
3. **For a parallel system**, repeat [Step 2](#) for each battery cabinet in the system.
4. Remove the nine M5 screws along the front and sides of the top wiring kit front cover and loosen the two M5 screws along the back edge. Remove the front cover (see [Figure 3](#)).

Figure 3. Remove the Top Wiring Kit Front Cover



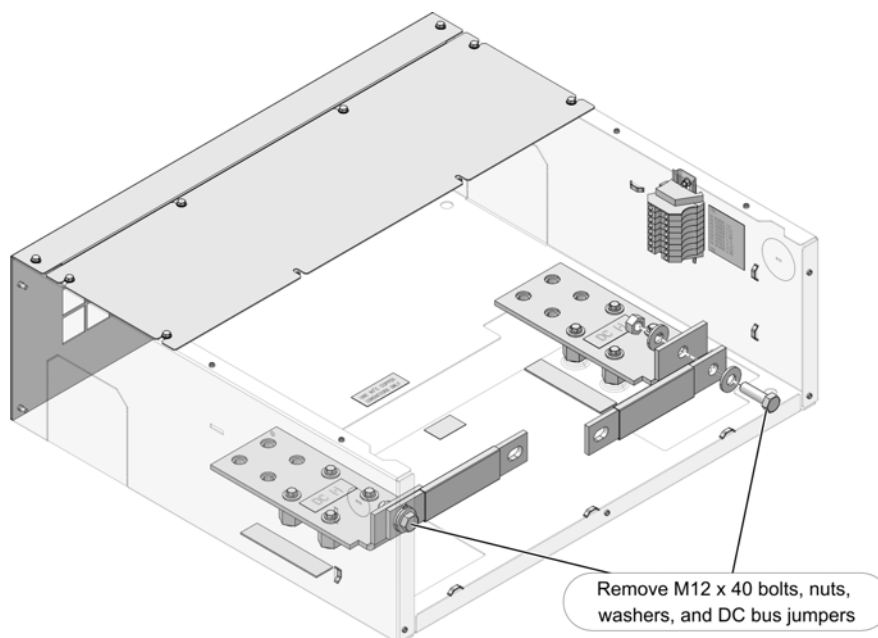
5. Remove the two DC bus insulators, which are held in place using Velcro® fasteners (see [Figure 4](#)).

Figure 4. Remove the DC Bus Insulators



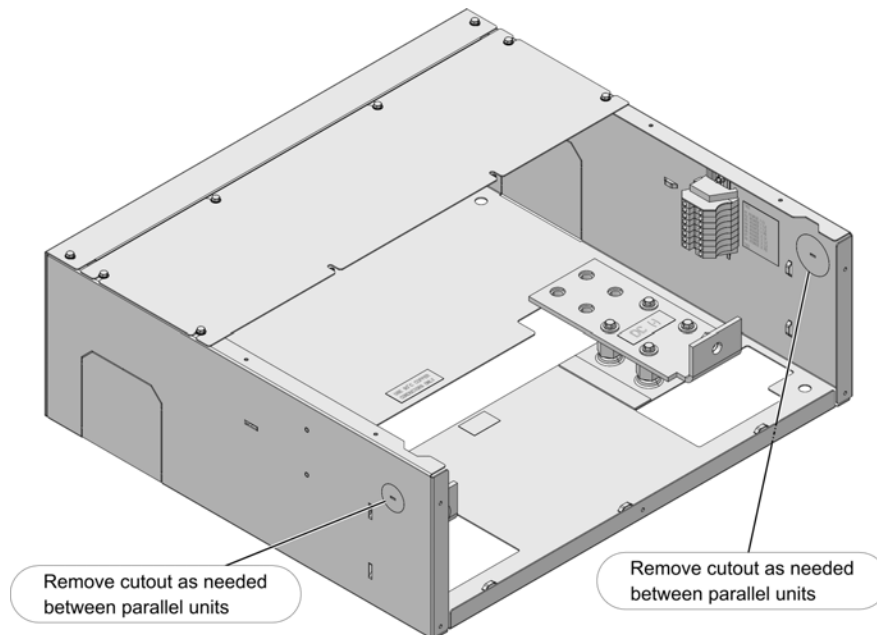
6. Remove the M12 x 40 bolts, nuts, and washers that secure the two DC bus bar jumpers and remove the jumpers (see [Figure 5](#)).

Figure 5. Remove the DC Bus Bar Jumpers



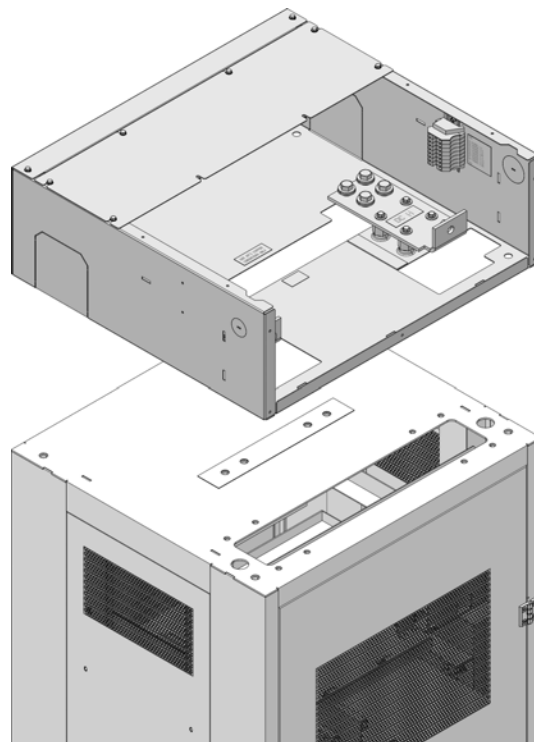
7. **For a parallel system**, remove the circular side cutouts as needed to route control cabling between adjacent parallel units. (see [Figure 6](#)).

Figure 6. Remove Cutouts as Needed Between Parallel Units



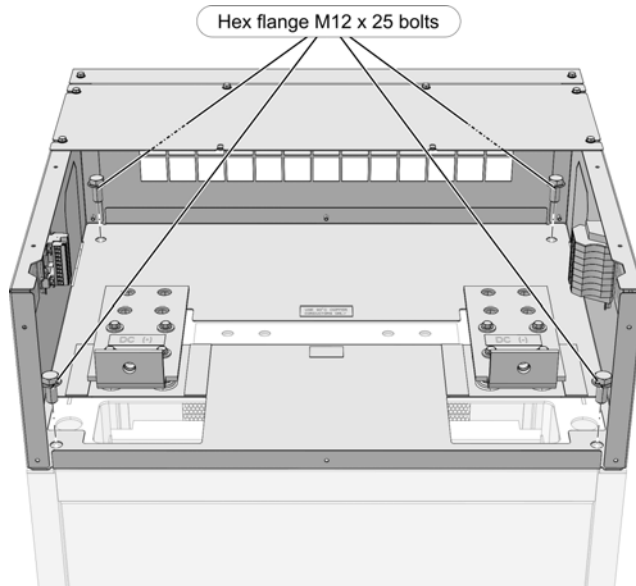
8. Place the top wiring kit on the battery cabinet (see [Figure 7](#)).

Figure 7. Place the Top Wiring Kit on the Samsung Battery Cabinet



9. Install a hex flange M12 x 25 bolt in each corner of the top wiring kit to secure it to the battery cabinet (see [Figure 8](#)).

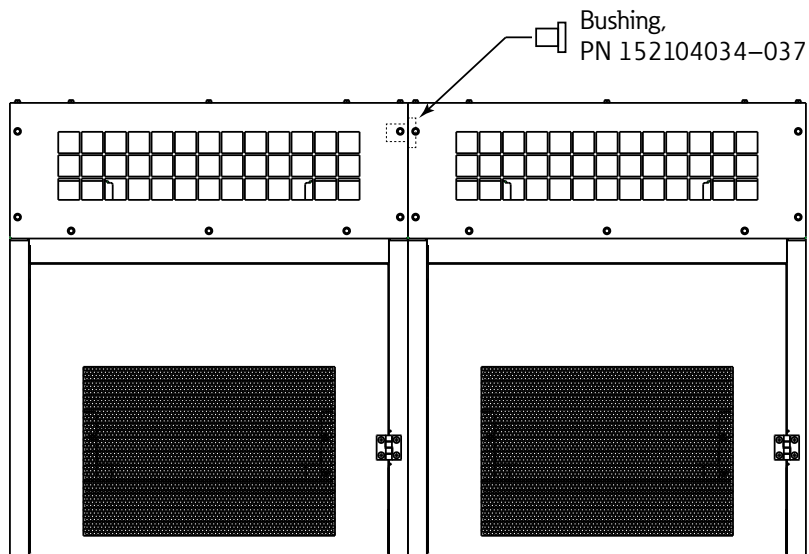
Figure 8. Install Mounting Bolts



10. **For a parallel system:**

- a. Repeat [Step 4](#) through [Step 9](#) for each top wiring kit in the installation.
- b. Install a bushing (part number 152104034-037) between adjacent top wiring kits (see [Figure 9](#)). The bushing can be installed from either side.

Figure 9. Install a Bushing between Adjacent Top Wiring Kits in a Parallel System

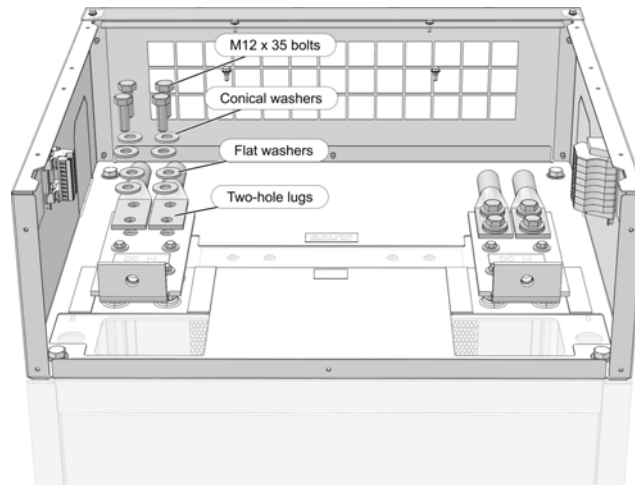


11. Install all power supply and signal connections from the top wiring kit to the battery cabinet.
 - See [Figure 12](#) for wiring between an Eaton 93PM UPS, Samsung battery cabinet, and the top wiring kit.
 - See [Figure 13](#) for wiring between an Eaton 9395 or 9395P UPS, Samsung battery cabinet, and the top wiring kit.
 - [Table 3](#) defines the connections for terminal blocks TB1 and TB2.

NOTE For terminal block TB1 connections to the battery cabinet, use the wire harness provided in the Samsung battery cabinet accessory kit; for terminal block TB2 connections to the battery cabinet, use wire harness part number P-152001882 provided in the top wiring kit pack kit.

12. Install DC link connections from the UPS cabinet to the DC bus bars in the top wiring kit. Secure the two-hole lugs to the DC bus bars using M12 x 35 bolts, conical washers, and flat washers as shown in [Figure 10](#).

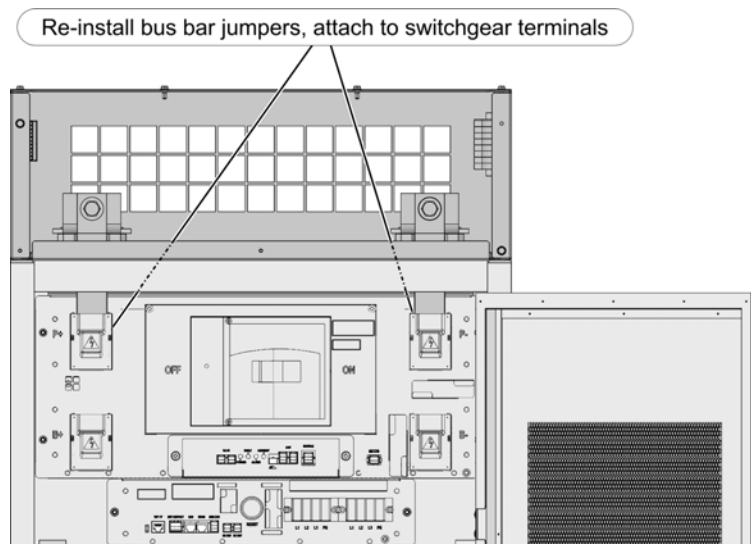
Figure 10. Connect UPS DC Link to DC Bus Bars



13. **For a parallel system:**
 - a. Repeat [Step 11](#) and [Step 12](#) for each top wiring kit and battery cabinet.
 - b. Install all connections between parallel top wiring kits. Route cable harnesses through the inter-cabinet bushing(s) installed in [Step 10](#).

NOTE For inter-cabinet connections to terminal blocks TB1 and TB2, use the wire harnesses provided in the top wiring kit pack kit. For TB1 connections, use wire harness part number P-152001884; for TB2 connections, use wire harness part number P-152001883.

14. Refer to the battery cabinet *Installation Manual* and complete *Section 3.9.2, Battery Module Installation*, and *Section 3.9.3, Busbar Installation*. **For a parallel system, repeat for each battery cabinet in the installation.**
15. Re-install the DC bus bar jumpers as shown in [Figure 11](#) using the M12 bolts, nuts, and washers removed in [Step 6](#). Attach the DC bus bar jumpers to the battery cabinet switchgear terminals using hardware provided in the Samsung battery cabinet accessory kit.

Figure 11. Re-install the DC Bus Bar Jumpers

16. Install the DC bus insulators removed in [Step 6](#).
17. **For a parallel system**, repeat [Step 15](#) and [Step 16](#) for each top wiring kit.
18. Refer to the battery cabinet *Installation Manual* and complete the installation starting at *Section 3.9.4, Module and Switchgear Signal Cable Connection*. **For a parallel system, repeat for each battery cabinet in the installation.**
19. Install all customer connections to the top wiring kit.
 - See [Figure 12](#) for wiring between an Eaton 93PM UPS, Samsung battery cabinet, and the top wiring kit.
 - See [Figure 13](#) for wiring between an Eaton 9395 or 9395P UPS, Samsung battery cabinet, and the top wiring kit.
 - [Table 3](#) defines the connections for terminal blocks TB1 and TB2.

**NOTE**

When making connections to terminal block TB1, there are six wires from the MCCB and dry contact plugs that are not used. Leave the additional wires disconnected, as they are not required for unit operation.

20. Re-install the front cover using the M5 screws removed in step [Step 4](#). **For a parallel system, repeat for each top wiring kit in the installation.**

Initial Startup

Startup and operational checks must be performed by an authorized Eaton Customer Service Engineer, or the warranty terms specified in the UPS *Installation and Operation Manual* become void. This service is offered as part of the sales contract for the UPS. Contact an Eaton service representative in advance (a minimum two-week notice is required) to reserve a preferred startup date.

Refer to the manuals listed in [Reference Documents](#) for instructions on performing initial startup and operational checks of the UPS and battery cabinet.

Wiring Diagrams

Figure 12. Wiring Diagram, 93PM UPS

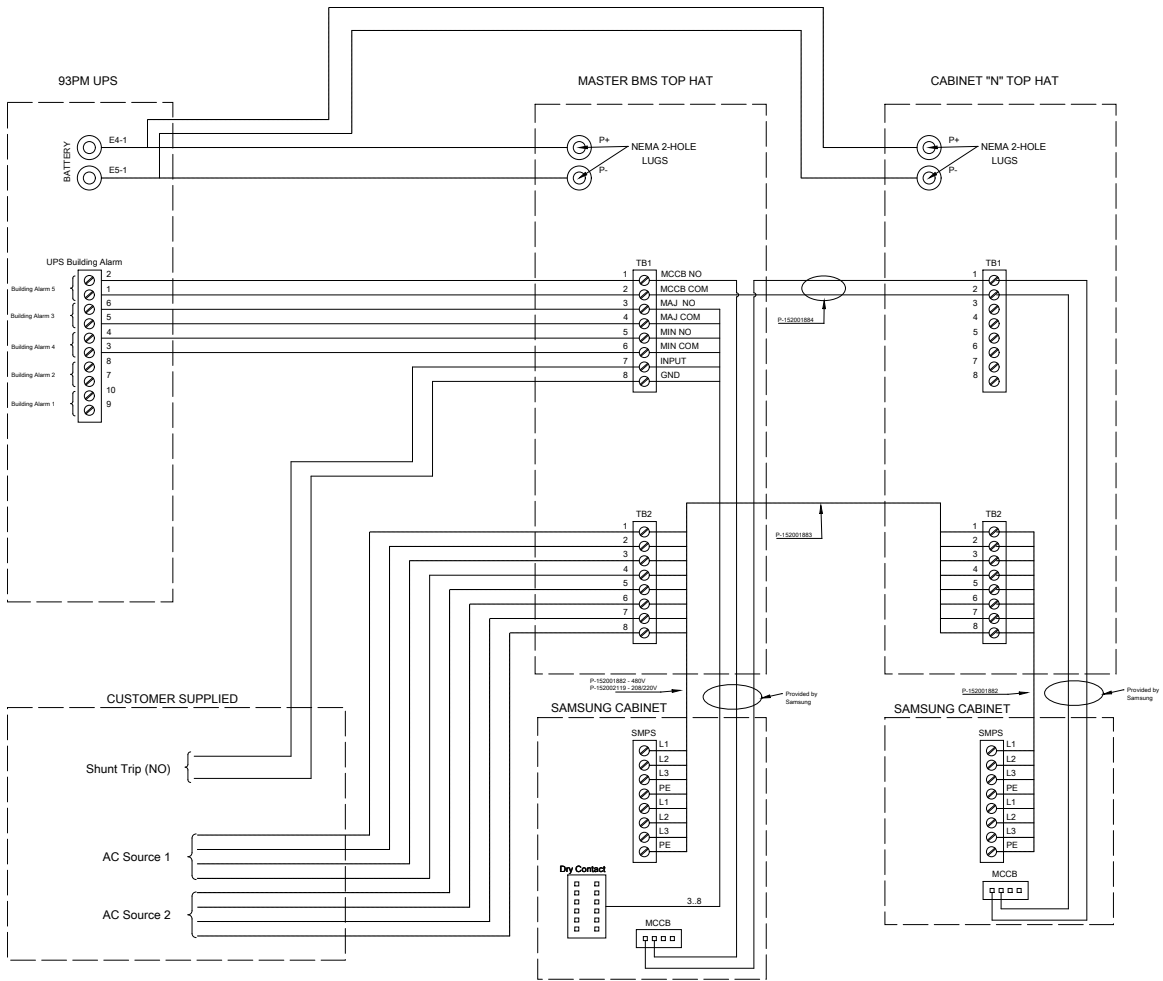


Figure 13. Wiring Diagram, 9395 or 9395P UPS

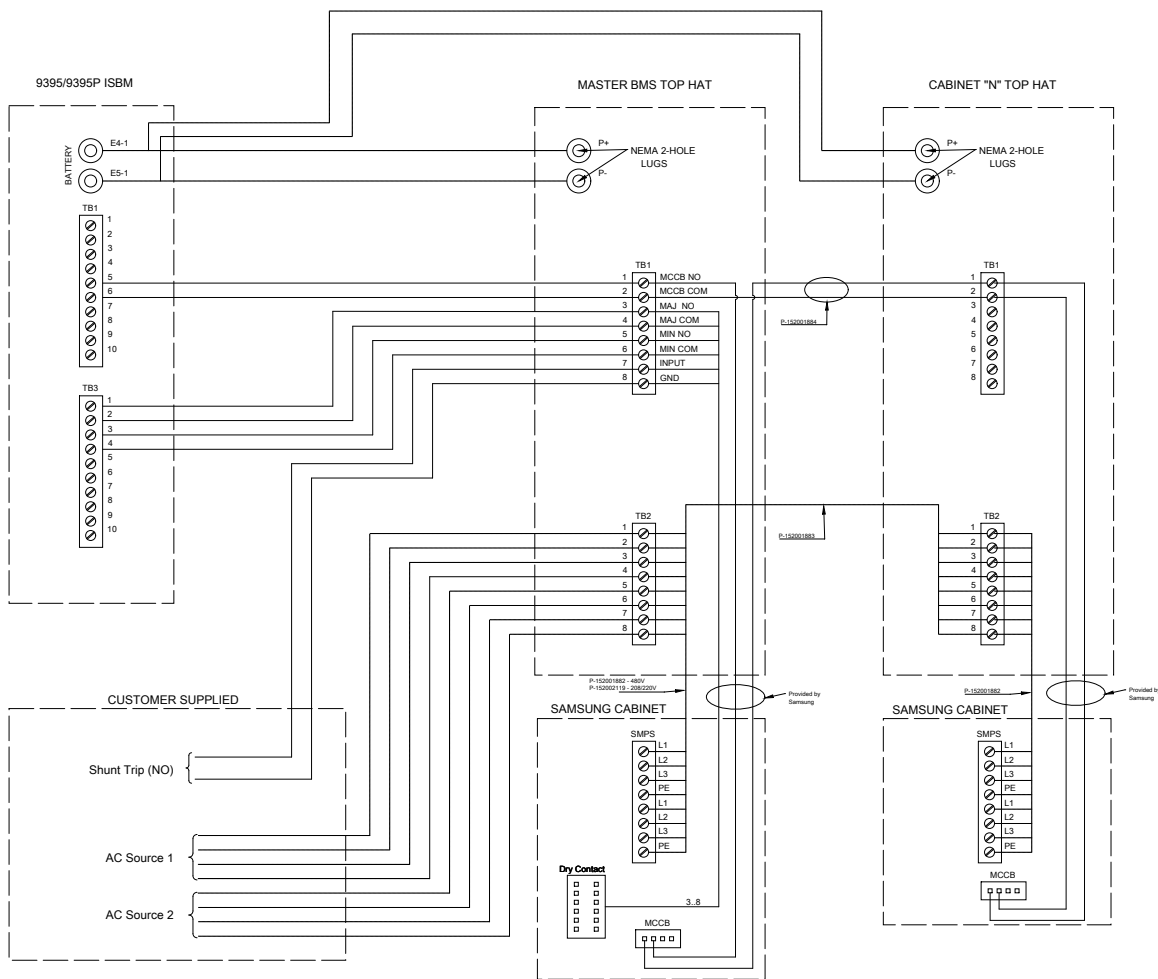


Table 3. Terminal Blocks TB1 and TB2 Connections

Terminal Block TB1 — Control Wiring to UPS		Terminal Block TB2 — AC Auxiliary Power*	
Terminal	Connection	Terminal	Connection
TB1-1	MCCB Normally Open	TB2-1	Source 1 L1
TB1-2	MCCB Common	TB2-2	Source 1 L2
TB1-3	Major Alarm Normally Open	TB2-3	Source 1 L3
TB1-4	Major Common	TB2-4	Source 1 PE
TB1-5	Minor Alarm Normally Open	TB2-5	Source 2 L1
TB1-6	Minor Common	TB2-6	Source 2 L2
TB1-7	Input (Shunt Trip)	TB2-7	Source 2 L3
TB1-8	Gnd (Shunt Trip)	TB2-8	Source 2 PE

*14 AWG AC auxiliary power should be protected by a listed 15A breaker or fuse.



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