

# **Eaton® Top Wiring Kit for UL9540a Battery Cabinet**

## Installation Instructions



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## **IMPORTANT SAFETY INSTRUCTIONS SAVE THESE INSTRUCTIONS**

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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.

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## **CONSIGNES DE SÉCURITÉ IMPORTANTES – CONSERVER CES INSTRUCTIONS**

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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 UL9540A Battery Cabinet Installation Instructions

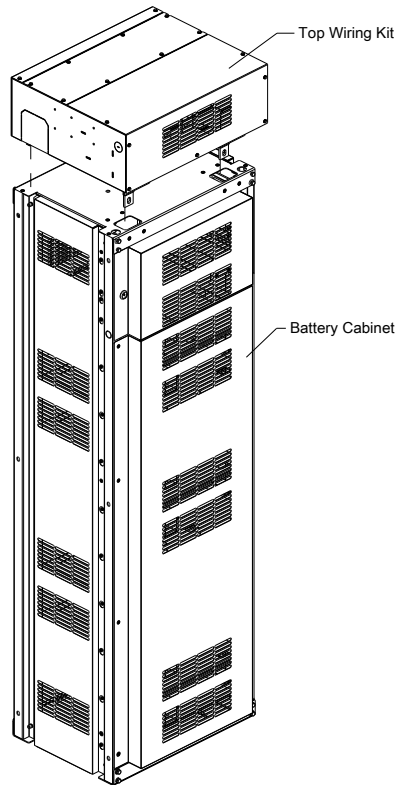
## Introduction

**NOTE**  Startup and operational checks must be performed by an authorized Eaton Customer Service Engineer, or the warranty terms specified in the uninterruptible power supply (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.

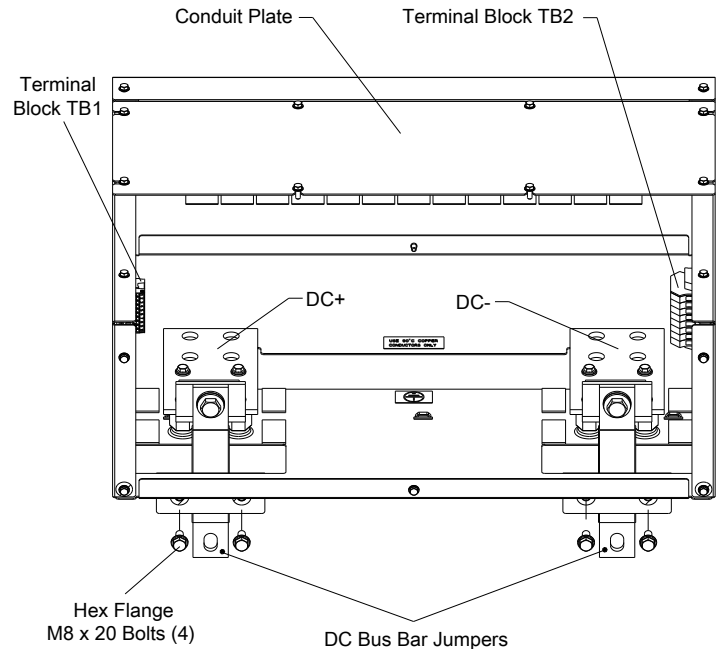
The Eaton top wiring kit provides an interface between an Eaton UPS and a Samsung® Type S lithium-ion battery cabinet (see [Figure 1](#)).

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](#)).

**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
- Part Number P-164000928 — *LIB System for UPS, Installation Manual* – Installation instructions for the battery cabinet, including site preparation, installation planning, wiring and safety information, and detailed illustrations of the battery cabinet with dimensional and connection point drawings
- Part number P-164000929 — *LIB System for UPS, Operation and Maintenance Manual* – Operation and maintenance instructions for the battery cabinet

Visit [www.eaton.com/powerquality](http://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:	<b>1-800-843-9433</b>
Canada:	<b>1-800-461-9166 ext 260</b>
All other countries:	<b>Call your local service representative</b>

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

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## 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 the following note	14 AWG	10 in-lb

**NOTE**



Each Type S battery system requires a minimum of one three-phase circuit to provide auxiliary power to the battery cabinet BMS. Battery cabinets are configured for 400–500 Vac or 208–220 Vac input at the time of order. 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) is provided from the UPS output distribution; Source 2 (optional) is provided from the UPS bypass input. For parallel battery cabinets, the AC sources can be provided to 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 anything is missing, 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-103003825 – 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-174000344 – EDGE PROTECTOR, TOP HAT ASSY	1
P-103003868 – KIT, TOP HAT HARDWARE, CONTAINING:	1
180190078-107 – BOLT HEX HEAD M12 X 25	4
180190078-110 – BOLT HEX HEAD M12 X 35	8
180190109-030 – BOLT HEX FL M8 X 20	4
180500036-120 – WASHER FLAT M12 HD	12
180500037-120 – WASHER LK M12 CONICAL SPRNG	12
P-103003579 – KIT, UL9540a TOP HAT PACK, CONTAINING:	1
152201081 – TIE WRAP 0.19 W X 7.4 LG	15
152104034-037 – BUSHING, 1.0 I.D.	1
152104034-044 – BUSHING, 0.750 I.D.	1
P-164000934 – Top Wiring Kit Installation Manual (this manual)	1
P-164000928 – SAMSUNG Lithium Ion Battery System UL9540a Configuration Installation Manual	1
P-164000929 – SAMSUNG Lithium Ion Battery System UL9540a Configuration Operation and Maintenance Manual	1

**Installation**

1. Install the Eaton UPS as directed in the applicable installation and operation manual.
2. Install the Samsung battery cabinet as directed up through *Section 3.9.1, Switchgear and SMPS Assembly Installation*, of the Samsung battery cabinet 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.

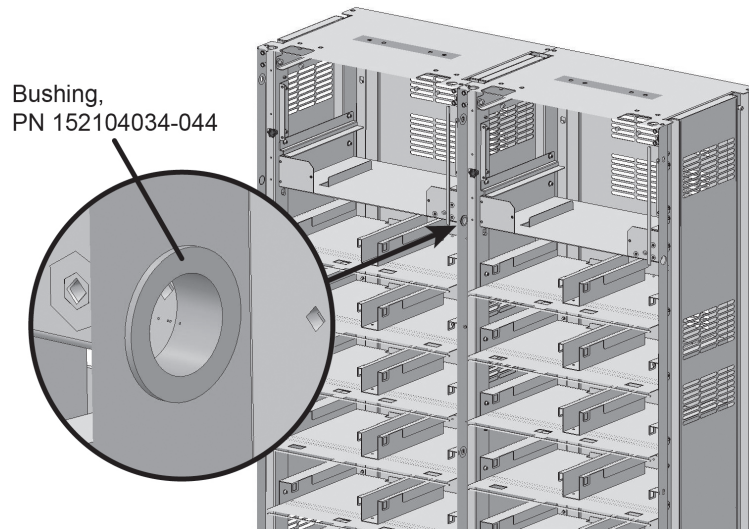
**NOTE**

The Samsung battery cabinet door may need to be removed to install the switchgear assembly in the top of the cabinet. The door must be opened more than 90 degrees for assembly.



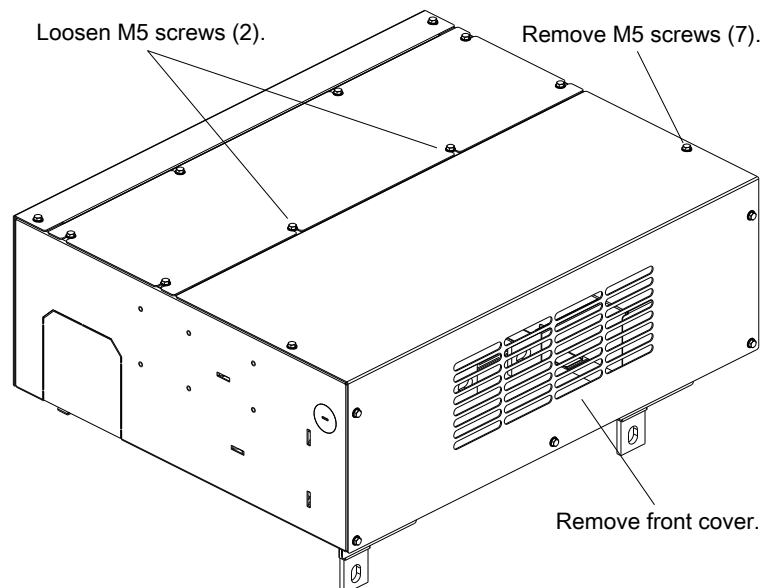
3. **For a parallel system**, repeat [Step 2](#) for each battery cabinet in the system.
  - Install a bushing (part number 152104034-044) between adjacent battery cabinets and route inter-cabinet connections through the bushing (see [Figure 3](#))

**Figure 3. Install a Bushing Between Adjacent Battery Cabinets in a Parallel System**



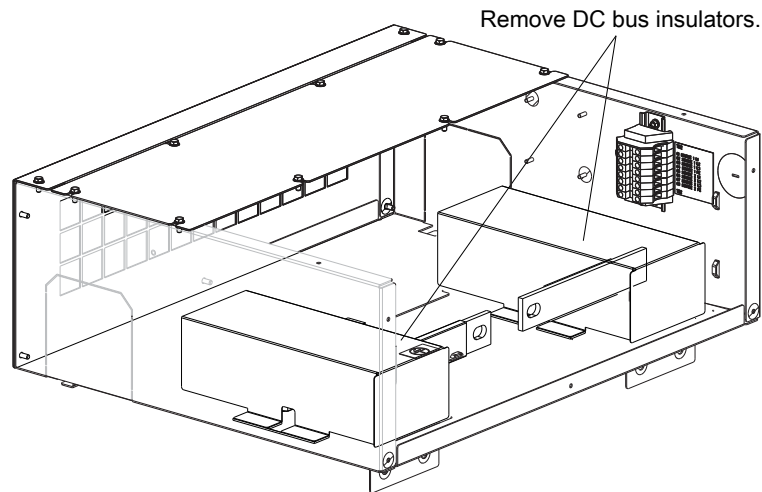
4. Remove the seven M5 screws along the front and sides of the top wiring kit front cover and loosen the two M5 screws along the back edge. Remove the front cover (see [Figure 4](#)).

**Figure 4. Remove the Top Wiring Kit Front Cover**

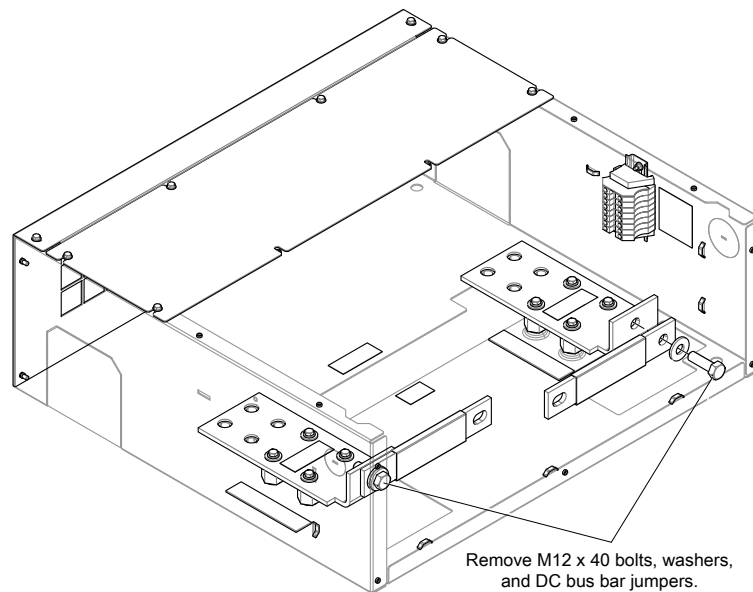


5. Remove the two DC bus insulators, which are held in place using Velcro® brand fasteners (see [Figure 5](#)).



**Figure 5. Remove the DC Bus Insulators**

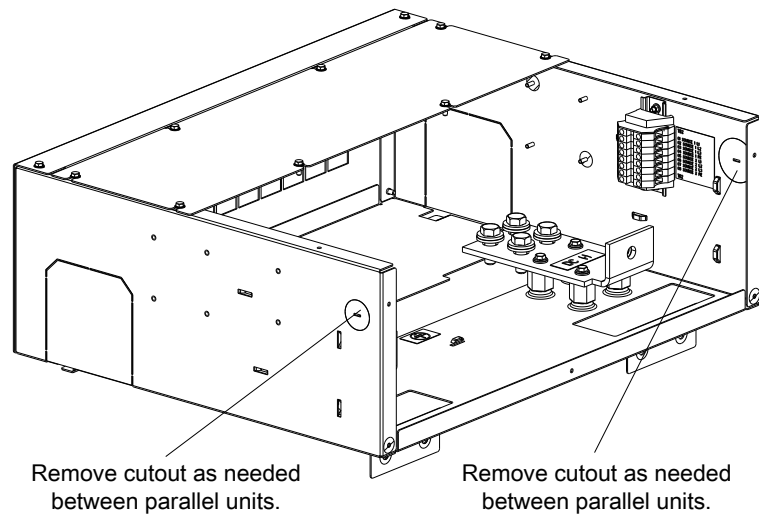
6. Remove the M12 x 40 bolts, nuts, and washers that secure the two DC bus bar jumpers, then remove the jumpers (see [Figure 6](#)).

**Figure 6. 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 7](#)).

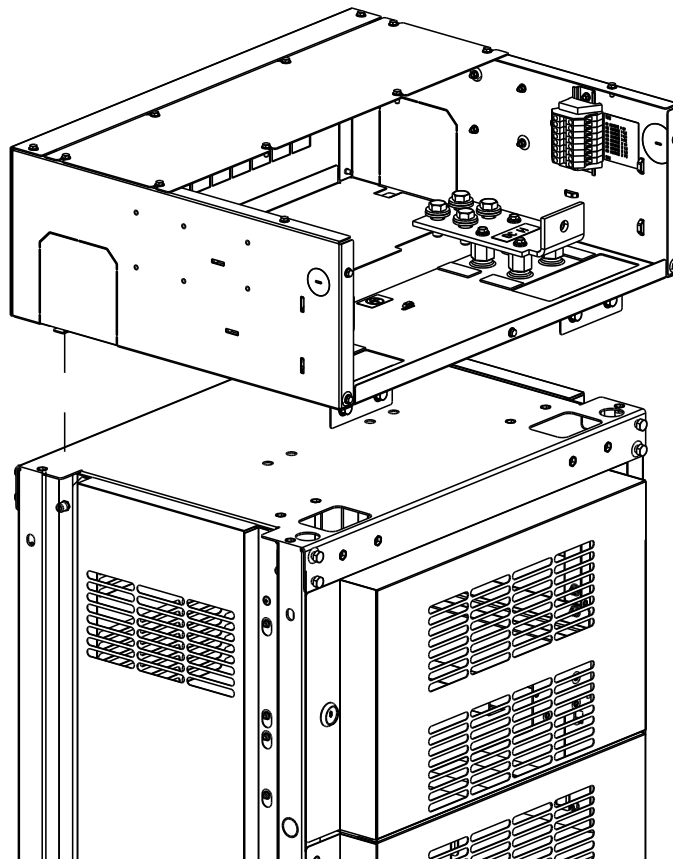


**Figure 7. Remove Cutouts as Needed Between Parallel Units**



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

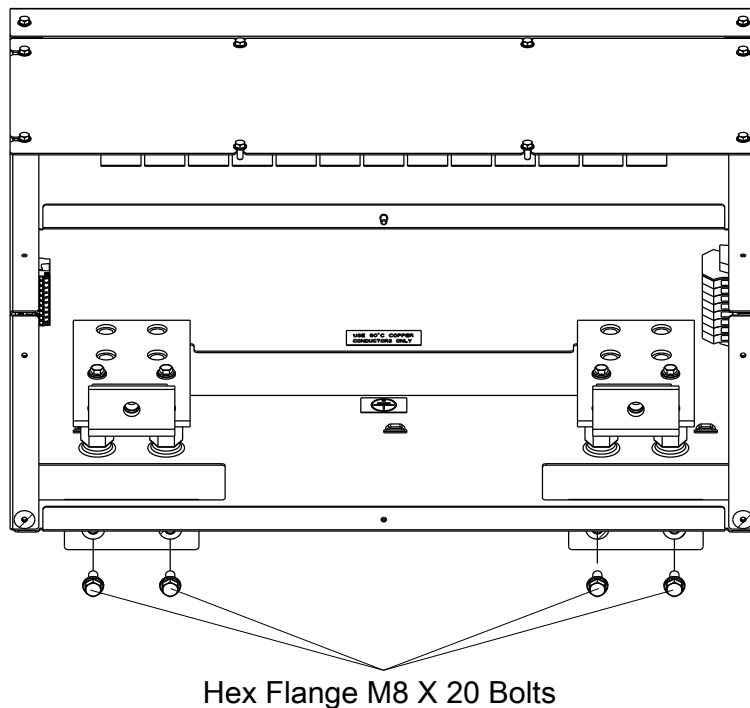
**Figure 8. Place the Top Wiring Kit on the Samsung Battery Cabinet**





9. Install two hex flange M12 x 20 bolts in each mounting tab of the top wiring kit to secure it to the battery cabinet (see [Figure 9](#)).

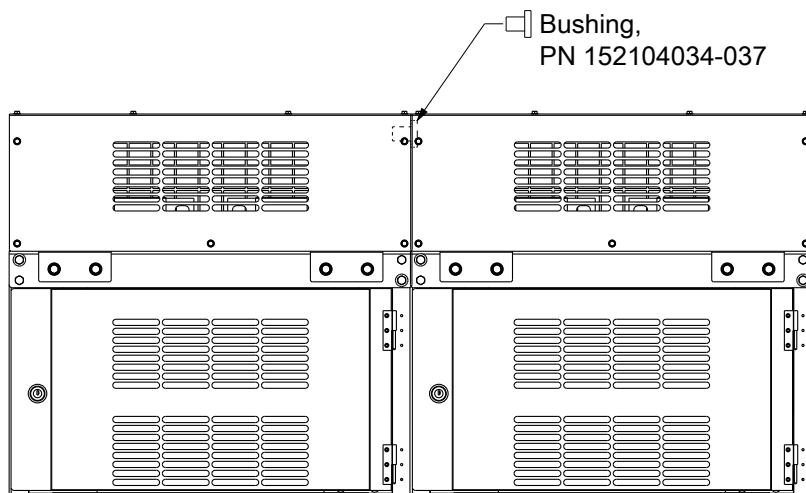
**Figure 9. Install Mounting Bolts**



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 10](#)). The bushing can be installed from either side.

**Figure 10. Install a Bushing between Adjacent Top Wiring Kits in a Parallel System**





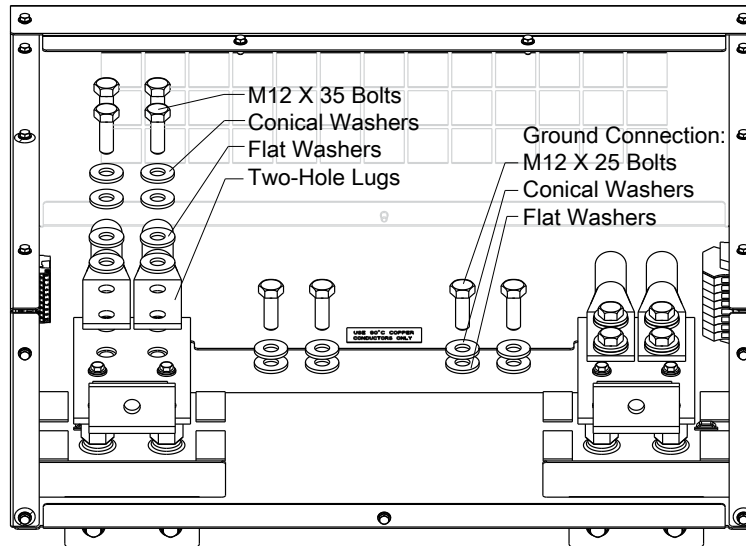
11. Install all power supply and signal connections from the top wiring kit to the battery cabinet.
  - See [Figure 13](#) for wiring between an Eaton 93PM UPS, Samsung battery cabinet, and the top wiring kit.
  - See [Figure 14](#) for wiring between an Eaton 9395 or 9395P UPS, Samsung battery cabinet, 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 11](#).

**Figure 11. 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](#).



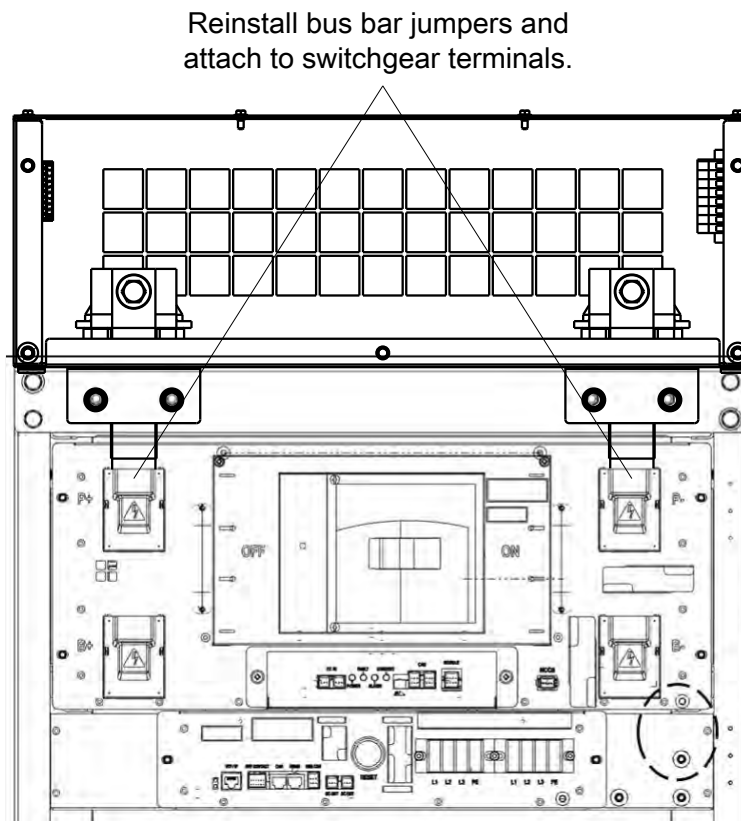
**NOTE** For inter-cabinet connections to terminal blocks TB1 and TB2, use the wire harnesses provided in the top wiring kit pack kit. For TB1 connections, use wire harness part number P-152001884; for TB2 connections, use wire harness part number P-152001883.

14. Refer to the Samsung 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. Reinstall the DC bus bar jumpers as shown in [Figure 12](#) 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 12. Reinstall the DC Bus Bar Jumpers**



16. Install the DC bus insulators removed in [Step 5](#).
17. **For a parallel system**, repeat [Step 15](#) and [Step 16](#) for each top wiring kit.
18. Refer to the Samsung 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 13](#) for wiring between an Eaton 93PM UPS, Samsung battery cabinet, and the top wiring kit.
  - See [Figure 14](#) 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 molded case circuit breaker (MCCB) and dry contact plugs that are not used. Leave the additional wires disconnected, as they are not required for unit operation.



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

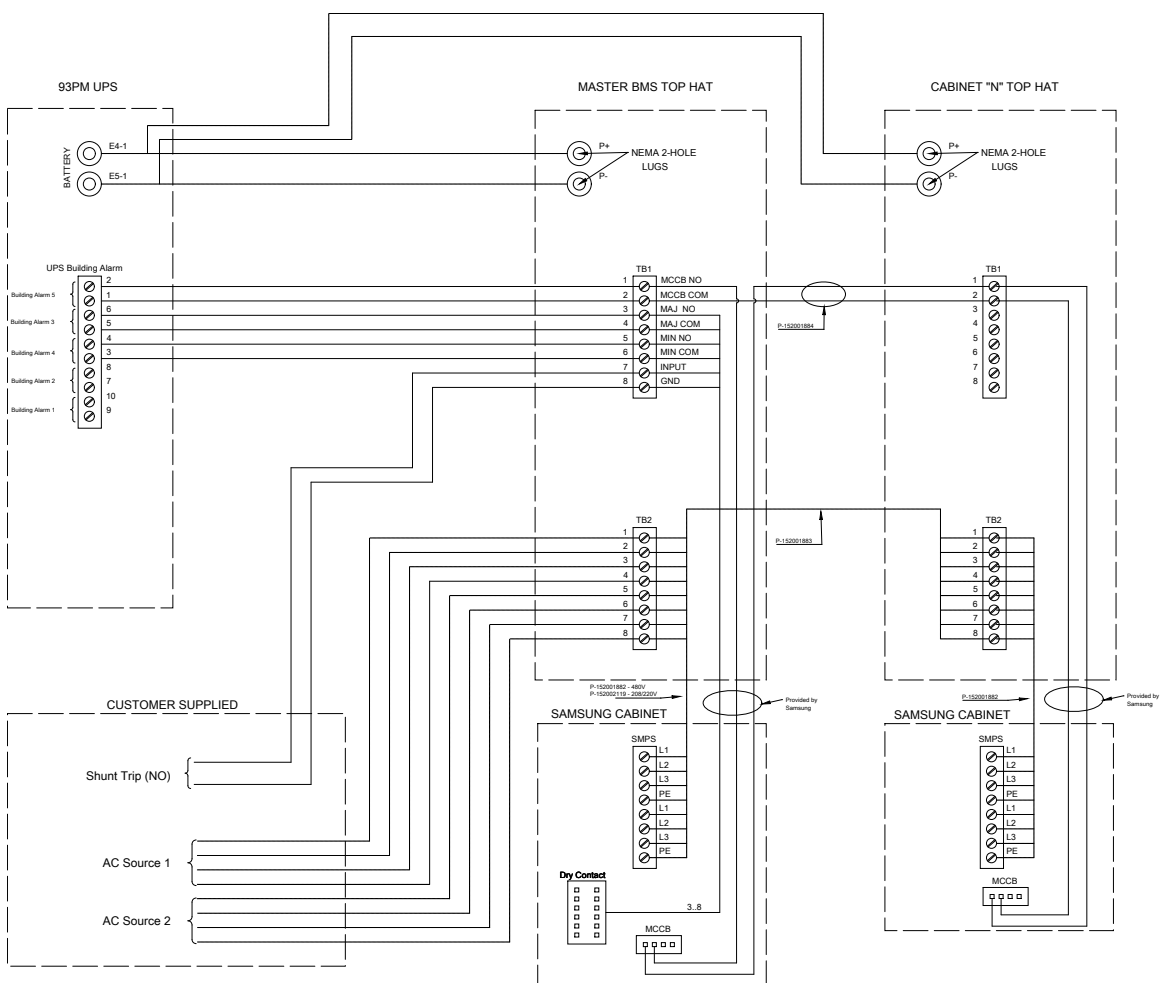
## Initial Startup

Startup and operational checks must be performed by an authorized Eaton Customer Service Engineer, or the warranty terms specified in the applicable 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.

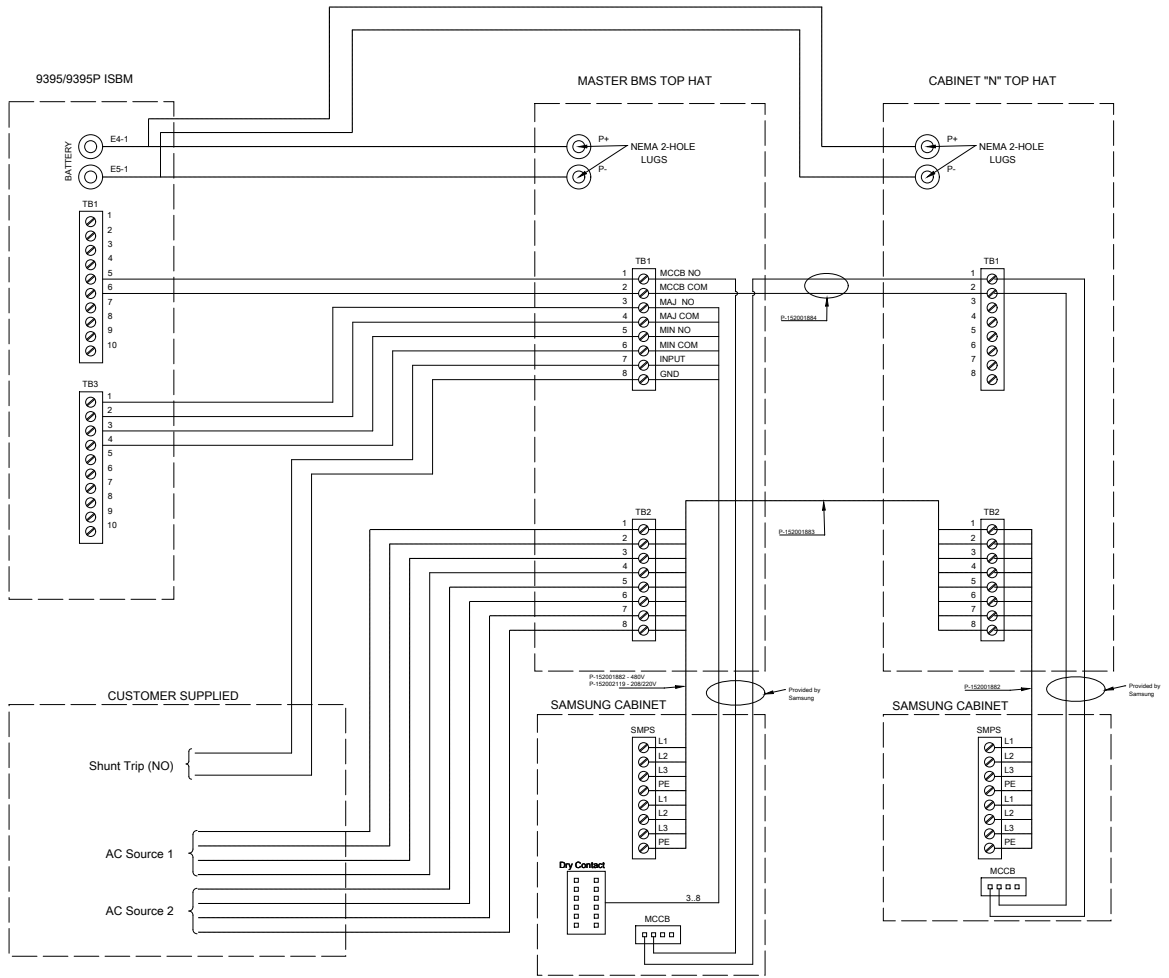
## Wiring Diagrams

**Figure 13. Wiring Diagram, 93PM UPS**





**Figure 14. 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 21 PE
		*14 AWG AC auxiliary power should be protected by a listed 15A breaker or fuse.	





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