



# MPL Battery Cabinet System

**User Manual**

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### **Technical Support Site**

If you encounter any installation or operational issues with your product, check the pertinent section of this manual to see if the issue can be resolved by following outlined procedures.

Visit <https://www.vertiv.com/en-us/support/> for additional assistance.

# 1 Important Safety Instructions

**IMPORTANT!** This manual contains important safety instructions that must be followed during the installation and maintenance of the UPS and batteries. Read this manual thoroughly and the safety and regulatory information, available at <https://www.vertiv.com/ComplianceRegulatoryInfo>, before attempting to install, connect to supply, or operate this UPS System.

Refer to the table below for the Safety Symbols that are used in this manual and on the Lithium EBC.

	<p><b>DANGER</b></p> <p>This symbol indicates a hazardous situation which will result in death or serious injury if not avoided.</p>
	<p><b>WARNING</b></p> <p>This symbol indicates a hazardous situation which could result in death or serious injury if not avoided.</p>
	<p><b>CAUTION</b></p> <p>This symbol indicates a hazardous situation which could result in minor or moderate injury if not avoided.</p>
	<p><b>NOTICE</b></p> <p>This symbol indicates a hazardous situation that can led to minor or moderate injury if not avoided.</p>
	<p><b>Energy storage device</b></p> <p>To help avoid burns or electric shock:</p> <ol style="list-style-type: none"> <li>1. Service by qualified personnel only</li> <li>2. Disconnect main power before maintenance</li> <li>3. Turn off the Battery System before maintenance</li> </ol>
	<p><b>Electric shock hazard</b></p> <p>Do not remove cover or disassemble the equipment.</p>
	<p><b>Explosive gas</b></p> <p>Do not expose the equipment to flame, incinerate, puncture, or impact.</p>
	<p><b>Shield eyes</b></p> <p>Wear safety goggles while performing installation, maintenance and/or service of the equipment.</p>
	<p><b>Electrolyte hazard</b></p> <p>Keep the electrolyte away from eyes, skin or clothing.</p> <p>If exposed to the electrolyte, Flush with water and seek medical aid immediately.</p>
	<p><b>Do not dispose the equipment in trash</b></p> <p>Transport legally. Follow manufacture's instructions for disposal of the equipment.</p>

	Please recycle Lithium-ion battery. Do not discard.
	Qualified technicians use this manual for service and replacement.
	<p>Read the user manual before operating the battery!</p> <p>Consultez le manuel de l'utilisateur avant d'utiliser cette batterie!</p>

**Save these instructions**

This manual contains important instructions that should be followed during installation of your Vertiv™ Liebert® ITA2 UPS and Vertiv™ MPL Lithium Battery EBC System. Read this manual thoroughly, paying special attention to the sections that applies to the installation of MPL, before installation or working with the UPS. Retain this manual for the use of installation personnel.

 **WARNING! Risk of electrical shock. Can cause property damage, injury and death. This UPS has several circuits that are energized with high DC and AC voltages. Check for the voltage with both AC and DC voltmeters before working within the UPS. Check for voltage with both AC and DC voltmeters before making contact. Only properly trained and qualified personnel wearing appropriate safety headgear, gloves, shoes and glasses should be involved in installing the UPS or preparing the UPS for installation. When performing maintenance with any part of the equipment under power, service personnel and test equipment should be standing on rubber mats. In case of fire involving electrical equipment, use only carbon dioxide fire extinguishers or those approved for use in fighting electrical fires. Extreme caution is required when performing installation and maintenance. Special safety precautions are required for procedures involving handling, installation and maintenance of the UPS system. Observe all safety precautions in this manual before handling or installing the UPS system. Observe all precautions before as well as during performance of all maintenance procedures. Observe all DC safety precautions before working on or near the DC system.**

 **AVERTISSEMENT! Risque de décharge électrique pouvant causer des dommages matériels, des blessures, et même la mort. Ce système ASC comporte plusieurs circuits à haute tension c.a et c.c. Vérifiez les tensions au moyen de voltmètres c.a. et c.c. avant d'utiliser le système ASC. Vérifiez les tensions avec des voltmètres c.a. et c.c. avant d'établir tout contact. Seuls des employés qualifiés et dûment formés portant un casque, des gants, des chaussures et des lunettes de sécurité adéquats doivent se charger d'installer le système ASC ou de le préparer pour l'installation. Les responsables de l'entretien et l'équipement d'essai doivent reposer sur des tapis de caoutchouc lors de toute intervention sur une pièce d'équipement sous tension. En cas d'incendie associé à du matériel électrique, n'utilisez que des extincteurs à dioxyde de carbone ou homologués pour la lutte contre les incendies d'origine électrique. Les opérations d'installation et d'entretien requièrent une extrême prudence. Des précautions de sécurité spéciales sont requises pour les procédures associées à la manutention, à l'installation et à l'entretien du système ASC. Observez toutes les précautions de sécurité décrites dans le présent manuel avant de manipuler ou d'installer le système ASC. Observez également toutes les précautions avant et pendant toutes les procédures d'entretien. Observez toutes les précautions de sécurité appropriées lorsque vous travaillez sur à proximité d'une source c.c. de sécurité appropriées dès que vous vous trouvez à proximité d'une source c.c.**

**NOTE:** This product uses components that are dangerous for the environment, such as electronic cards and other electronic components. Any component that is removed must be taken to specialized collection and disposal centers. The dismantling must be done by a specialized centre for collection and disposal of electric and electrical appliances or other dangerous substances. This product has been supplied from an environmentally aware manufacturer that complies with the Waste Electrical and Electronic Equipment (WEEE) Directive 2012/19/EU. Be environmentally responsible and recycle this product through the recycling facility at the end of life stage. Do not dispose of this product as unsorted municipal waste. Follow local municipal waste ordinances for proper disposal provisions to reduce the environmental impact of WEEE. The recycle and crossed-out wheelie bin symbols, at right, is placed on this product to encourage recycling.



**WARNING!** This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.



**WARNING!** This is a category C2 product. In a residential environment, this product may cause radio interference, in which case the user may be required to take additional measures.

**NOTE:** There are no user serviceable parts inside the Lithium Battery Cabinet system. Please contact your local Vertiv authorized sales or service representative for replacement and/or disposal of any components in the system.

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## 2 Introduction

Thank you for the purchase of the Vertiv™ MPL Lithium External Battery Cabinet System (Lithium EBC). The electronic version of this user manual is available at Vertiv's Website, <https://www.vertiv.com/en-us/products-catalog/critical-power/uninterruptible-power-supplies-ups/liebert-ita2-ups-3-phase-208v/>

This manual is applicable to the below types of Lithium EBCs.

Model	Description
ITA2-BCI0020KL1	384V 6Ah (192V 6Ah per cabinet, 1U height)
ITA-BLI0020KL1	192V 6Ah,1U height
ITA2-BCI0020KL2	384V 12Ah (192V 12Ah per cabinet, 2U height)
ITA-BLI0020KL2	192V 12Ah,2U height

**NOTE: 192V 6Ah Lithium EBC is referred to as 1U Lithium EBC.**

**NOTE: 192V 12Ah Lithium EBC is referred to as 2U Lithium EBC.**

### Appearance and Port

Figure 2.1 1U Lithium EBC Front View



Figure 2.2 2U Lithium EBC Front View



Figure 2.3 1U Lithium EBC Front Panel



Figure 2.4 2U Lithium EBC Front Panel



Item	Description
1	Battery Energy Indicators
2	Alarm Indicators
3	Status Indicators

Figure 2.5 1U Lithium EBC Rear Panel

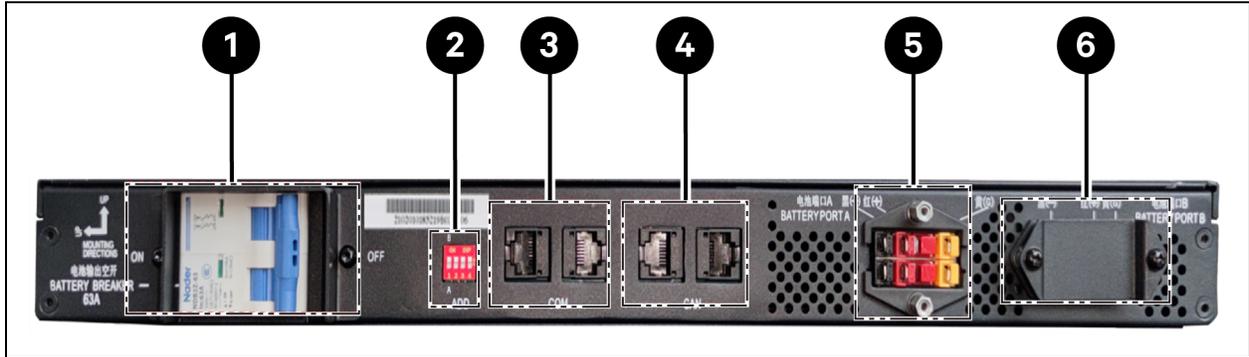
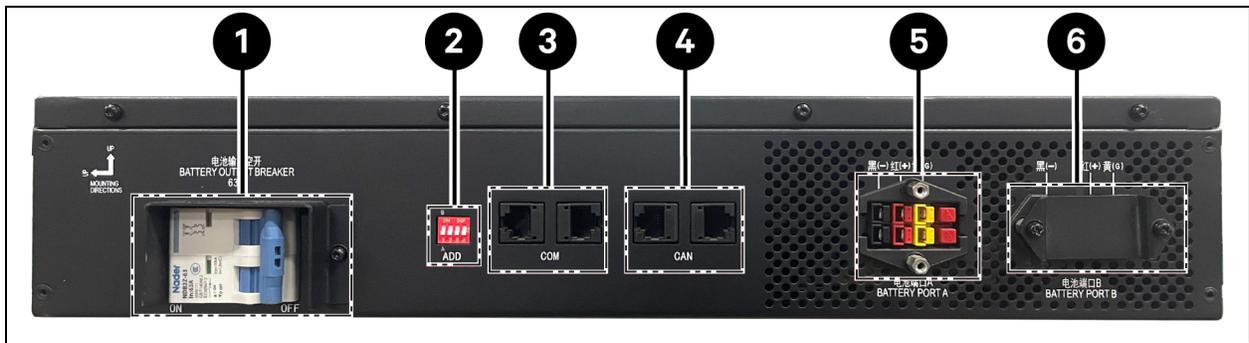


Figure 2.6 2U Lithium EBC Rear Panel



Item	Description
1	Battery Circuit Breaker
2	DIP Switch (BMS Addressing)
3	UPS Communication Ports
4	CAN Communication Ports
5	Battery Connector Port A
6	Battery Connector Port B

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## 3 UPS Installation and Commissioning

### 3.1 Unpacking and Inspection

Inspect the Vertiv™ MPL Lithium EBC for damage. If any problem is found, file a damage claim with Vertiv immediately and send a copy to Vertiv at:

#### United States

Vertiv Headquarters  
1050 Dearborn Drive  
P.O. Box 29186  
Columbus, Ohio 43085 USA  
Attn: Traffic Department

#### Europe

Via Leonardo Da Vinci 8  
Zona Industriale Tognana  
35028 Piove Di Sacco (PD) Italy  
+39 049 9719 111  
Fax: +39 049 5841 257

#### Asia

29/F, The Orient Square Building  
F. Ortigas Jr. Road, Ortigas Center  
Pasig City 1605  
Philippines  
+63 2 687 6615  
Fax: +63 2 730 9572

Check the accessories and model numbers against the delivery list. If any problem is found, notify your local Vertiv representative immediately.

### 3.2 Installation Tools

The following tools are required to properly install your Vertiv™ MPL Lithium EBC:

- Utility knife
- #1 and #2 Phillips-head screwdrivers
- #1 Flat -blade screwdriver

### 3.3 Storage Environment

**NOTE: If the Vertiv™ MPL Lithium EBC is not installed immediately, it should be stored indoors and protected from excessive moisture, heat and other harsh conditions.**

State of Charge (SOC)	Temperature	Recharge Time	Relative Humidity
25% ~ 50%	-20°C ~ 25°C	< 12 Months	Max. 90% RH
	25°C ~ 35°C	< 6 Months	
	35°C ~ 45°C	< 3 Months	
	45°C ~ 60°C	< 1 Months	

It is recommended to control temperature between -20°C ~ 25°C, and humidity is below 90% RH. Charge and discharge the battery once in every 6 months to keep the battery in working condition.

### 3.4 Installation Environment

To provide optimal performance and life of the Vertiv™ MPL Lithium EBC system, install it in the below environment conditions:

- In an area that is well ventilated with minimal dust.
- In an area that avoids direct sunlight.
- Located far away from water and external heat sources.
- Located far away from flammable, combustible, or explosive substances.
- Located in an area free of volatile gas, corrosive materials, and excessive salt.
- Should not located in any seismic areas.

### 3.5 Equipment Installation

**NOTE:** For the correct installation orientation of the Vertiv™ MPL Lithium EBC, there is an icon on the rear of each battery cabinet like the icon shown below. Make sure that the mounting directions are correct at the time of installation.

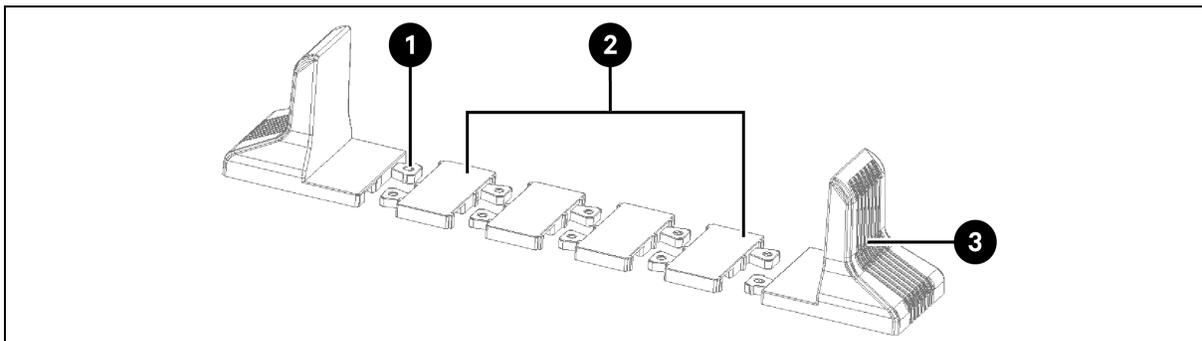


#### 3.5.1 Tower Installation

If the Vertiv™ MPL system is to be installed in the tower orientation, the support base ends are included with the UPS and the support base extensions are included with the Lithium EBCs.

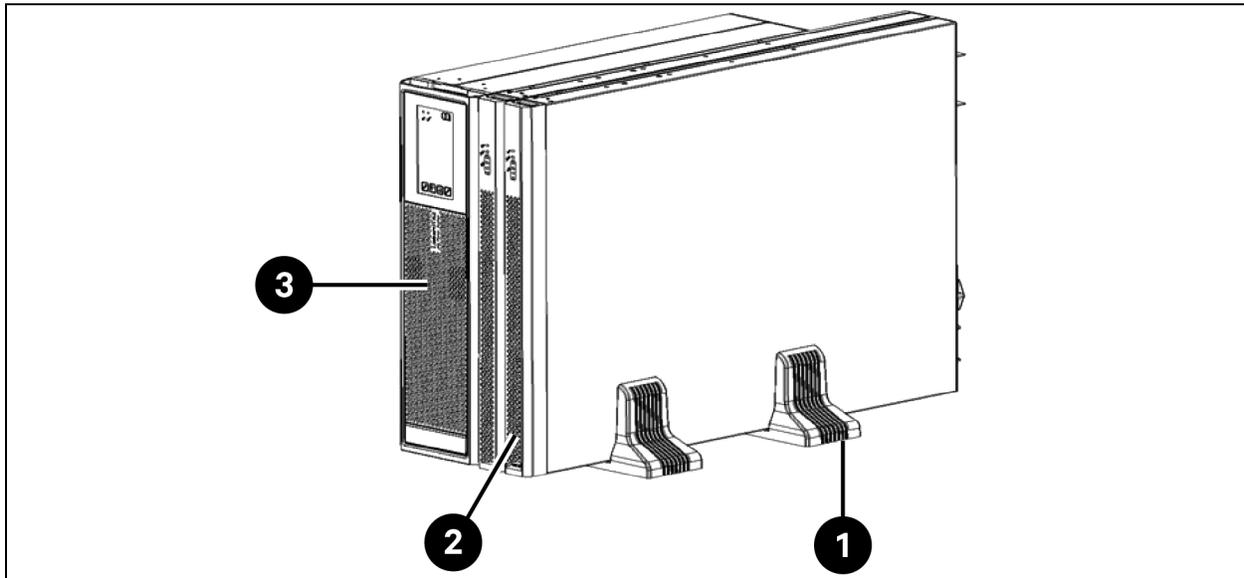
Snap together the extensions and the support base ends, as in **Figure 3.1** below . Place the UPS and all Lithium EBCs upright as shown in **Figure 3.2** on the facing page .

**Figure 3.1 Tower Support Base Assembly**



Item	Description
1	Fastening
2	Support Base Extension
3	Support Base

**Figure 3.2 Tower Orientation**



Item	Description
1	Support Base
2	Lithium Battery Module
3	UPS

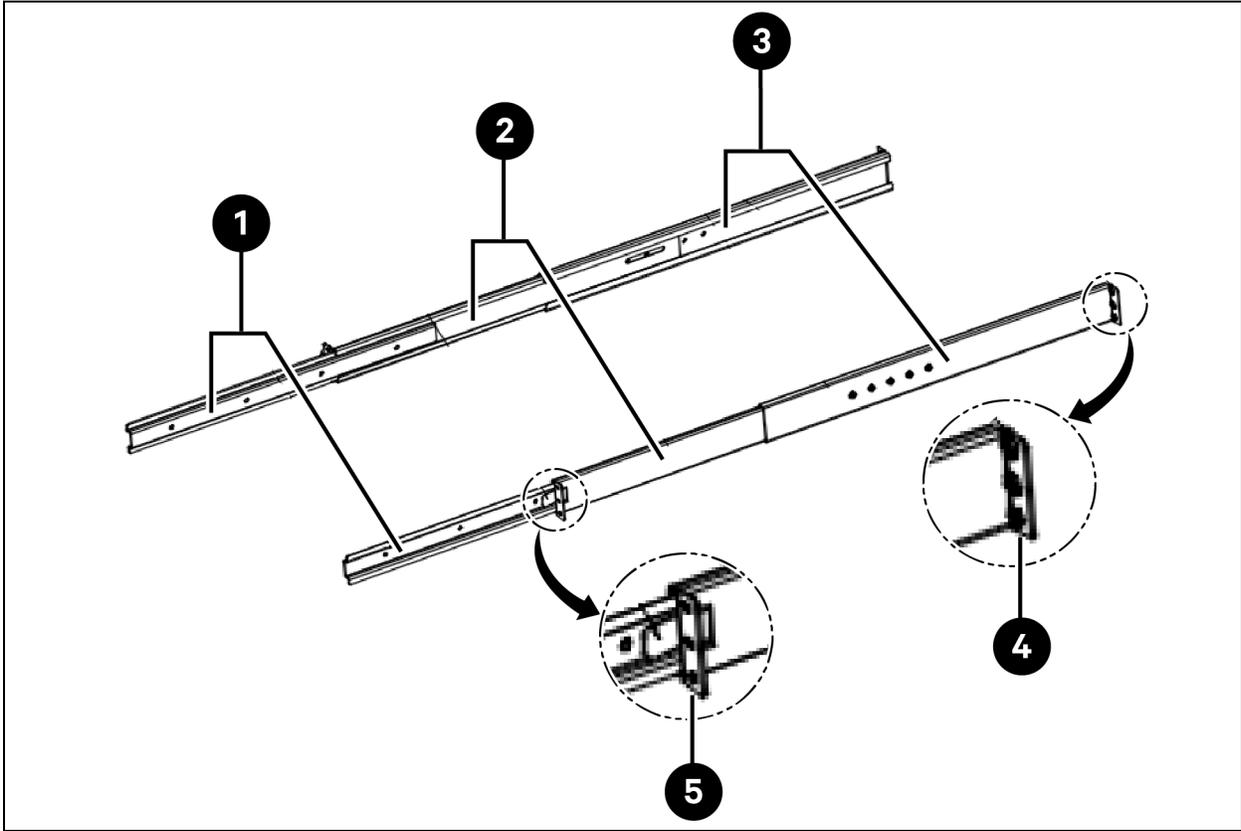
### 3.5.2 Rack Installation

If the Vertiv™ MPL system is to be installed in the rackmount orientation, the rackmount kits are included with each piece of equipment. Each piece must have its own rack mount kit to properly support the weight. The rack mount kits supplied as standard are designed for 4 post racks. For 2 post racks, Vertiv provides optional 2 post kits or shelves. Instructions below are for the standard 4 post rack mount kits.

#### Sliding Guide Mounting

Assemblies are interchangeable between left hand and right hand placement. Remove the inner member of each bracket assembly as shown in **Figure 3.3** on the next page by extending it to its outermost position, pressing the retaining latch and then pulling inner member from bracket assembly.

Figure 3.3 Rack Slide Kit



Item	Description
1	Inner Members
2	Front Members
3	Rear Members
4	Return Flanges
5	Retraining Latch

Decide the installation height inside the Rack Enclosure where you want to mount the UPS and Battery Cabinet System.



**CAUTION:** To reduce risk of tripping the rack enclosure place the ups and battery cabinets in the lowest possible rack position.

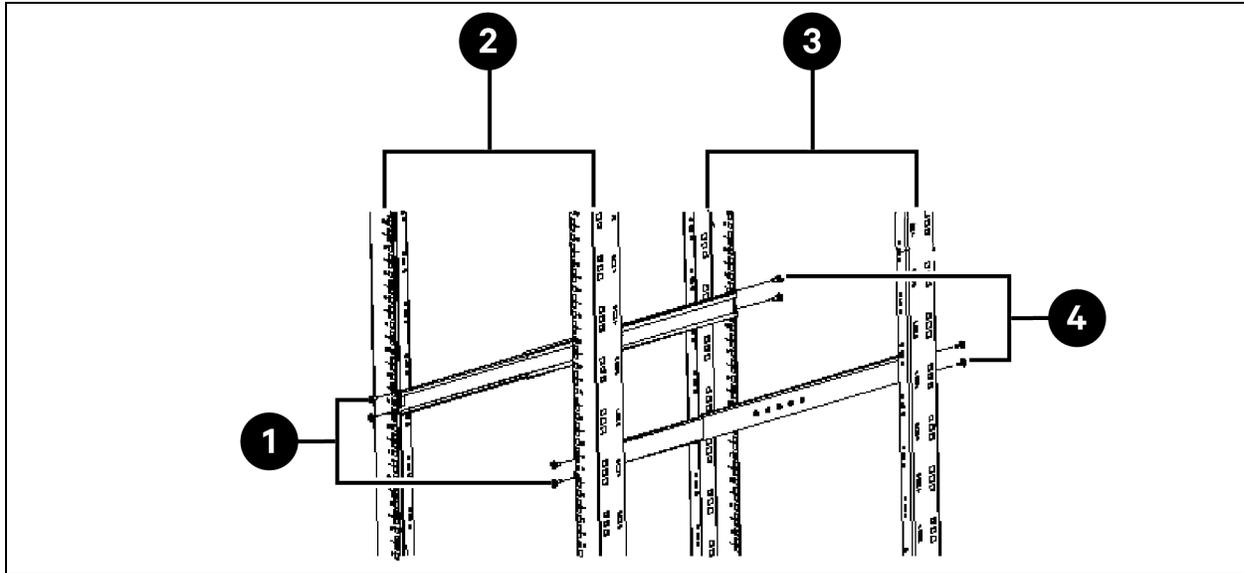


**CAUTION:** Pour réduire le risque d'inclinaison du boîtier du rack, placez l'onduleur et les armoires de batterie dans la position de rack la plus basse possible.

1. Install rear member of each bracket assembly into the rack with two M5 screws provided in the kit, as in **Figure 3.4** on the facing page . The return flanges on the bracket assemblies fit to the inside of rack posts.
2. Insert screws loosely (finger-tight) into top and bottom holes of return flange on rear member.
3. Extend bracket assembly by sliding front member forward until it touches the front rack post.

4. Insert two M5 screws finger-tight into the top and bottom holes of the return flange on each front member. Make sure bracket assemblies are at the same mounting height on four rack mounting posts.
5. Tighten the screws (finger-tight).

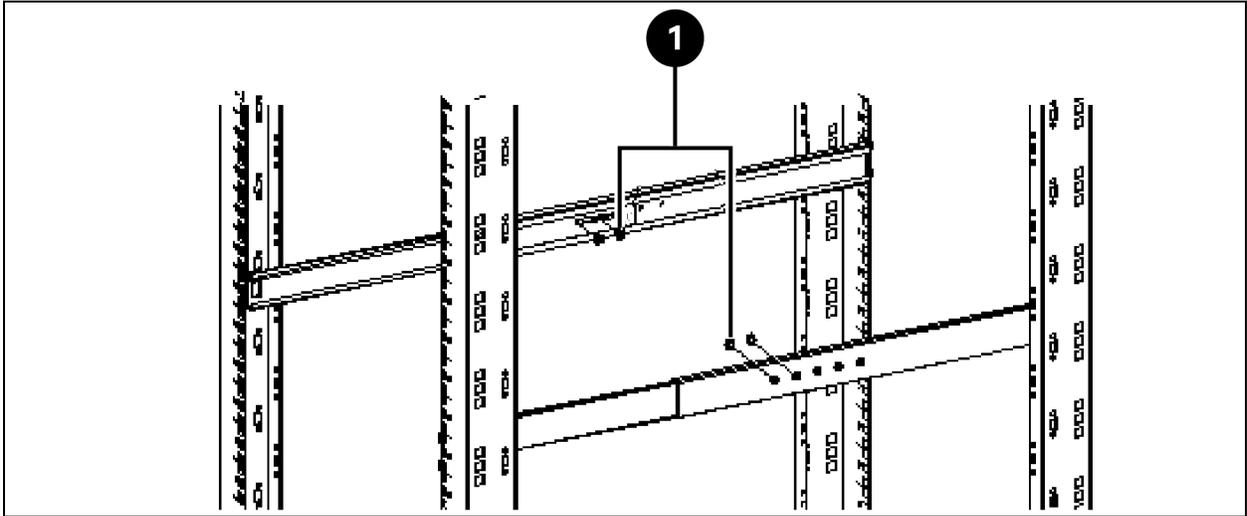
**Figure 3.4 Fastening the Front and Rear Mounting Rails**



Item	Description	Qty.
1	M5 Screws (4pcs)	4
2	Front Rack Mounting Rails	1
3	Rear Rack Mounting Rails	1
4	M5 Screws (4pcs)	4

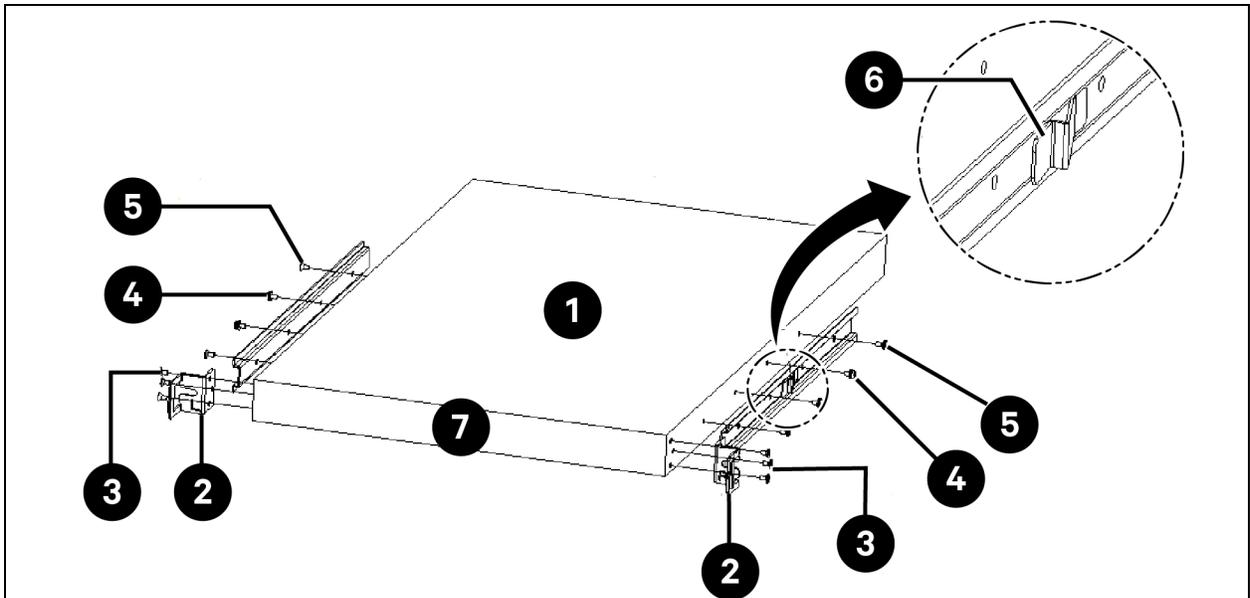
6. Locate four M4 screws and six black countersunk head screws from the hardware pack in this kit.
7. Fasten the rear member and front member together by tightening the left and right side screws per bracket assembly as shown in **Figure 3.5** on the next page .

Figure 3.5 Fastening the Inner Members



- 8. Fasten the rack mount kit Inner members to the equipment on both sides as shown in **Figure 3.6** below , using six M4 Screws (1) provided in this kit. Pay attention to the orientation of the Retaining Latch.
- 9. Fasten rack ears (handles) to the equipment on both sides with the six black countersunk head screws provided in this kit. Make sure that the handle marked “L” is on the equipment’s left side and that the handle marked “R” is on the right side as shown in **Figure 3.6** below .

Figure 3.6 Fastening the Rack Ears to the Equipment



Item	Description
1	Equipment
2	Rear Ear
3	Countersunk Head Screws (3Pcs/black)
4	M4 Screws (2pcs)
5	Countersunk Head Screws (2Pcs/white)
6	Retaining Latch
7	Front side of the Equipment

10. Insert the equipment, with inner members attached into bracket assemblies by inserting top and bottom edges of inner members into the top and bottom tracks of front members and sliding the equipment into Rack, as in **Figure 3.7** below .
11. Secure the equipment with *M5 Screws* as shown in **Figure 3.8** on the next page .

**Figure 3.7 Equipment Installation**

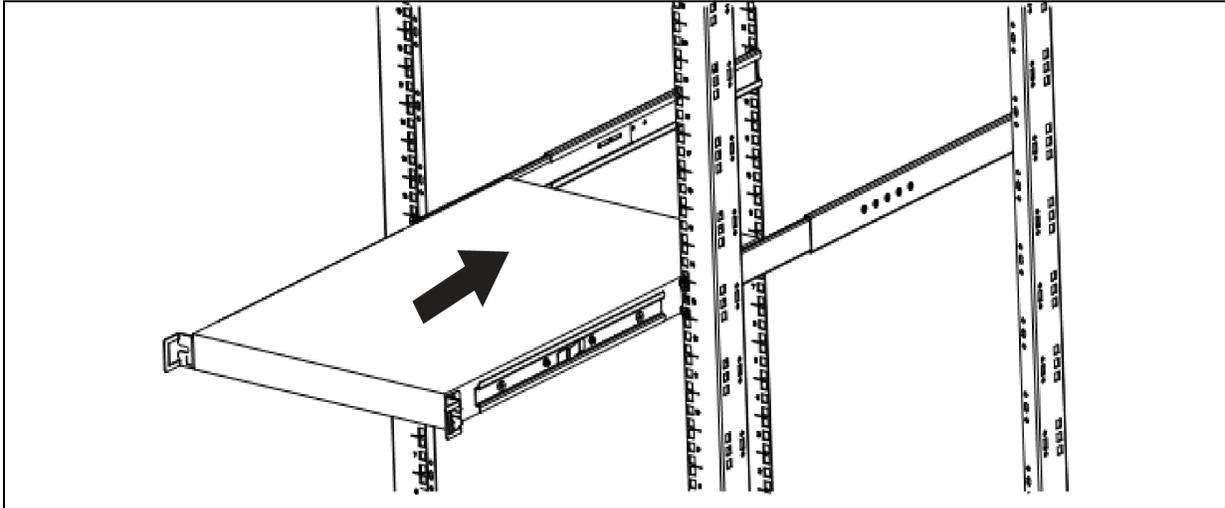
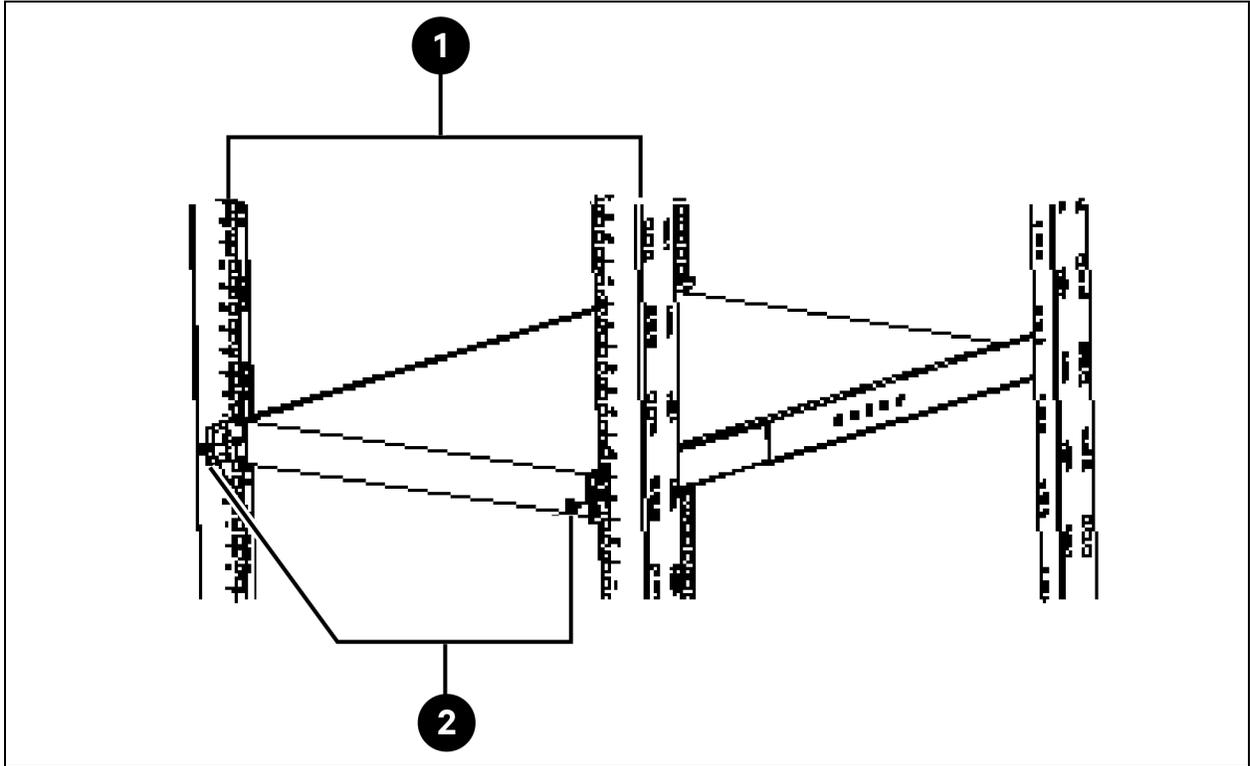


Figure 3.8 Securing Equipment in Place

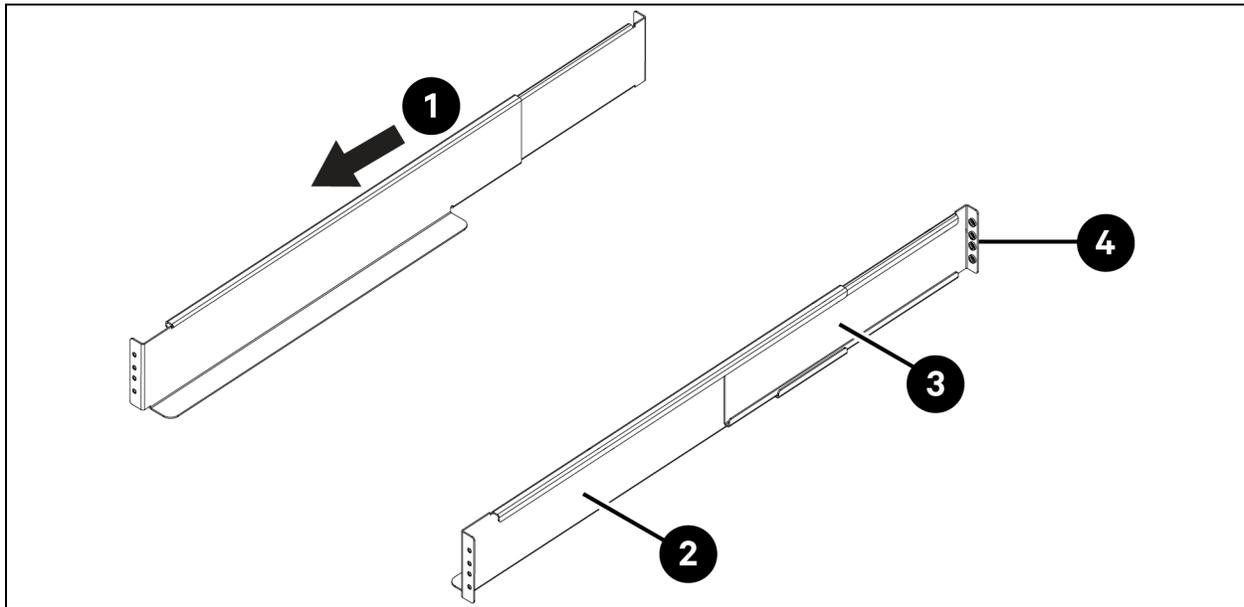


Item	Description
1	Front Rack Mounting Rails
2	M5 Screws

### Tray Rail Mounting

1. Unpack two rack mounting bracket assemblies and mounting hardware from this kit as shown in **Figure 3.9** on the facing page .

Figure 3.9 Rack Tray Kit



Item	Description
1	Pull out Direction
2	Front Member
3	Rear Member
4	Return Flange

- Determine the height position inside the Rack Enclosure where you want to mount the UPS and Battery Cabinet System.



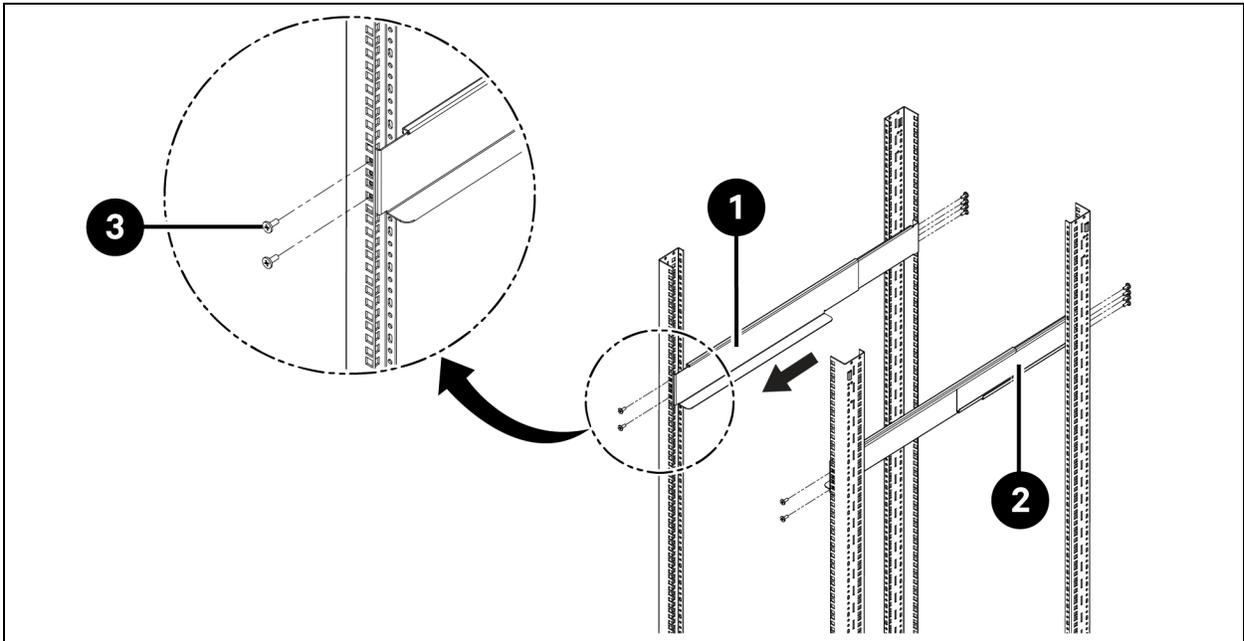
**CAUTION:** To reduce risk of tripping the rack enclosure place the UPS and battery cabinets in the lowest possible rack position.



**CAUTION:** pour réduire le risque d'inclinaison du boîtier du rack, placez l'onduleur et les armoires de batterie dans la position de rack la plus basse possible.

- Install Rear Member of each Bracket Assembly into the Rack Enclosure with eight M5 screws provided in this kit, as shown in **Figure 3.10** on the next page. The Return flanges on the Bracket Assemblies fit to the inside of Rack Posts.
- Insert the screws loosely (finger tight) into top and bottom holes of return flange on Rear Member.
- Extend Bracket Assembly by sliding Front Member forward until it touches the Front Rack Post.
- Insert two M5 screws loosely (finger tight) into top and bottom holes of return flange on each Front Member.
- Make sure Bracket Assemblies are at the same mounting height on four Rack Mounting posts, then tighten the screws.

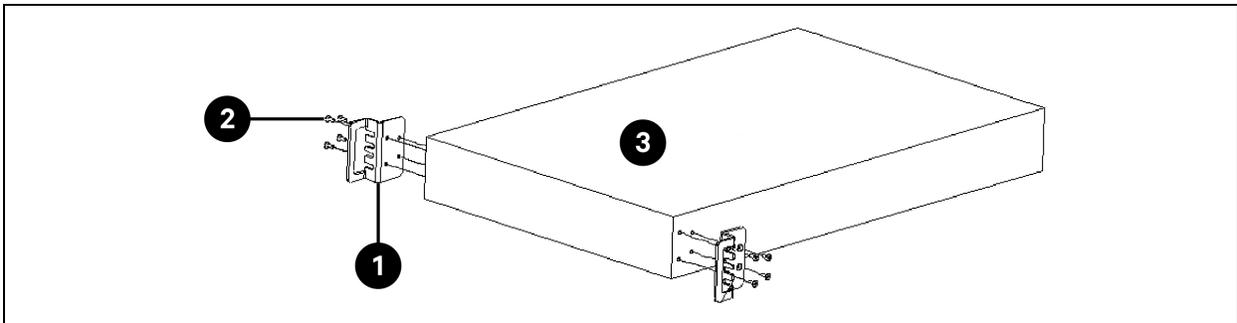
Figure 3.10 Rack Tray Installation



Item	Description
1	Front Member
2	Rear Member
3	M5 Screws (12 Pcs)

8. Fasten the rack ears on both sides of the equipment with (8) M4 countersunk from hardware pack in this kit.
9. Ensure that the rack ears are installed as shown in **Figure 3.11** below .

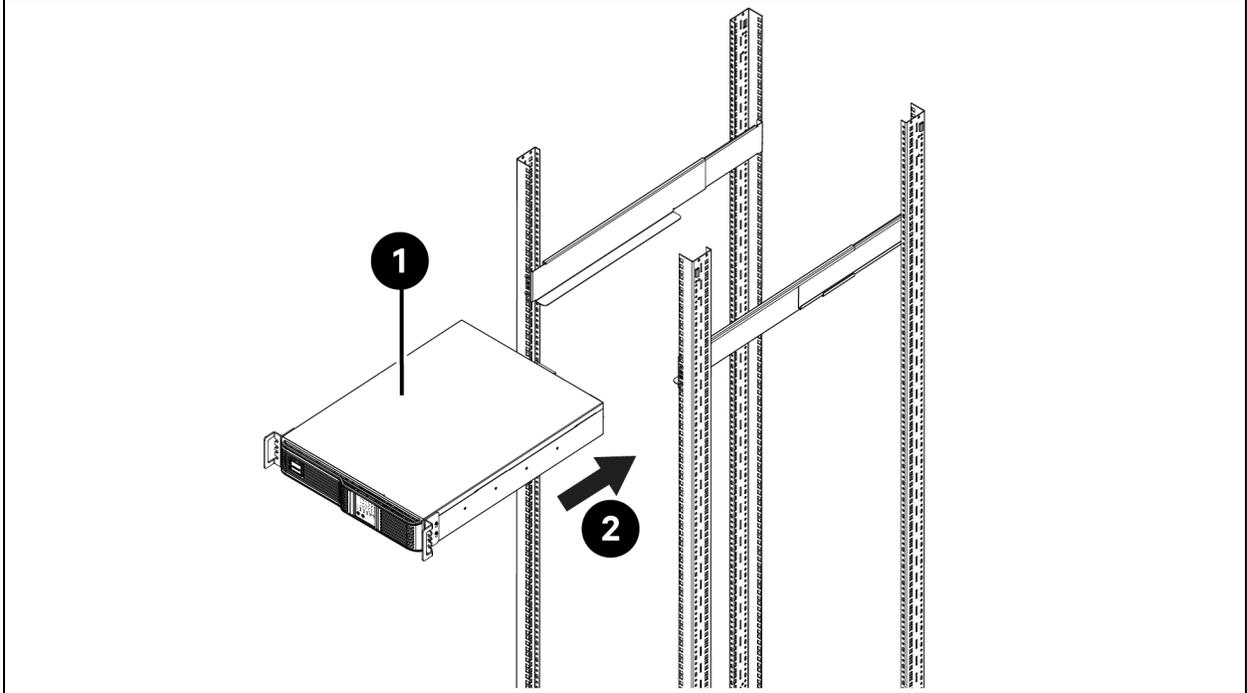
Figure 3.11 Rack Ear Installation



Item	Description
1	Rack Ear
2	Countersunk Head Screws (4 Pcs)
3	Equipment

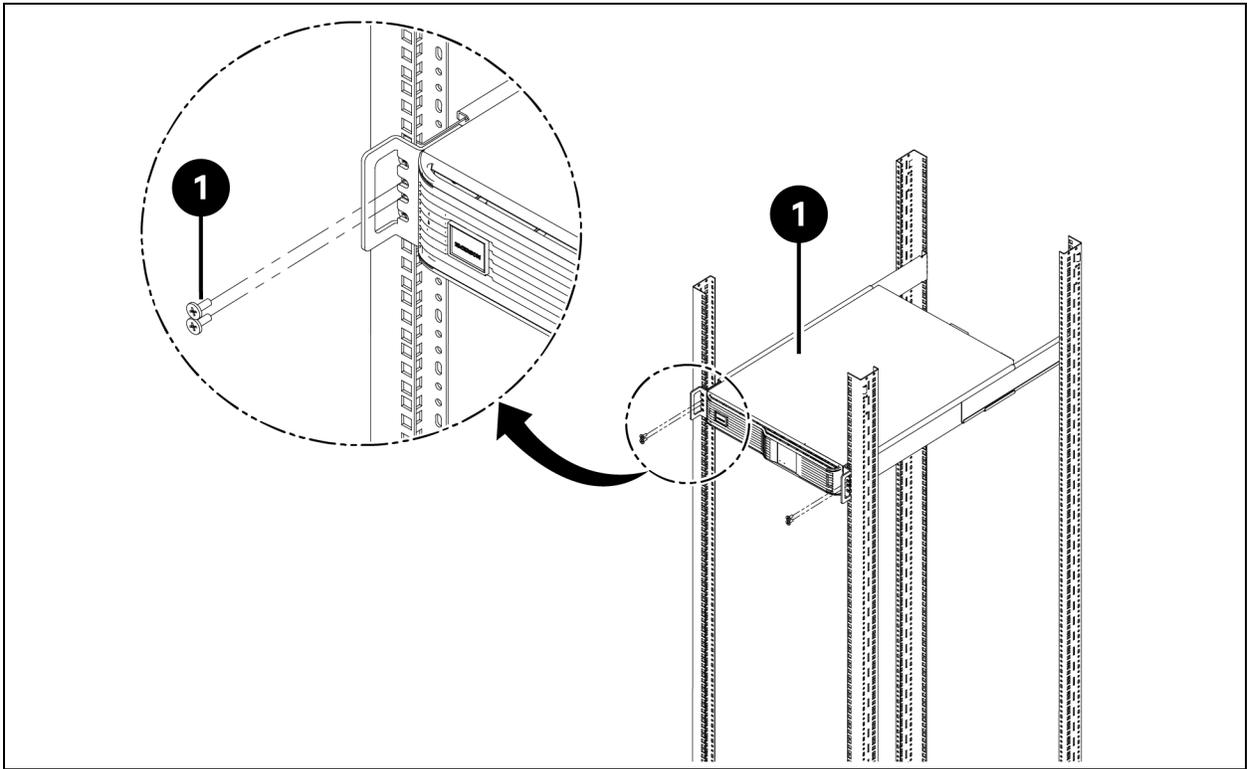
10. As shown in **Figure 3.12** below , Insert the equipment into Bracket Assemblies by setting it on top of the shelf bends on each bracket and sliding the equipment into Rack. The equipment should move smoothly into Bracket Assemblies. If not, please recheck whether the rail is aligned according to **Figure 3.10** on the previous page . Use the M5 screws to fasten the ears and the rack.

**Figure 3.12 Equipment Installation**



11. As shown in **Figure 3.13** on the next page , secure front of the equipment to Rack Mounting Rails to prevent the equipment from sliding out of position. If securing holes are provided on front of the equipment that align with the center holes on return flange of Front Members, you can use the extra four M5 Screws provided in this kit to secure the equipment. Otherwise, the equipment should be secured to front of Rack Mounting Rails with four customer supplied fasteners.

Figure 3.13 Securing Equipment in place

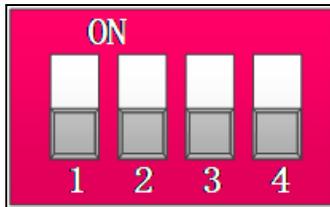


### 3.6 Setting the Lithium EBC Communication Address

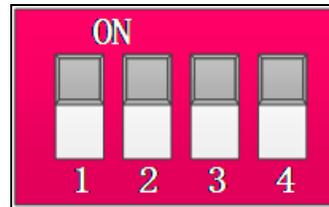
Each Vertiv™ MPL Lithium EBC contains a 4-pin DIP switch for setting the communication address, see the **Figure 3.14** below . Each cabinet in the system must have a unique address for proper communication from each internal Battery Management System (BMS) to the UPS unit.

Note that in **Figure 3.14** below the illustration on the left shows all switches in the OFF position and the illustration on the right shows all switches in the ON position.

Figure 3.14 DIP Switch



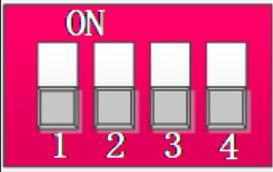
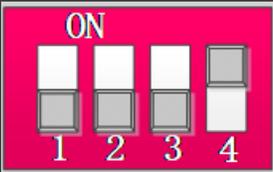
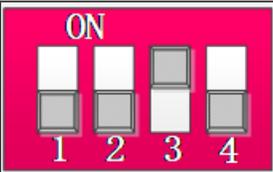
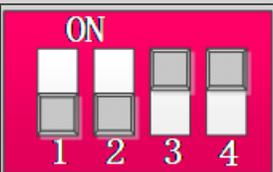
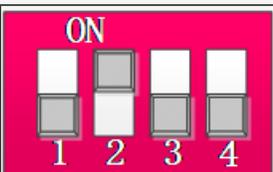
Battery Cabinet 1A



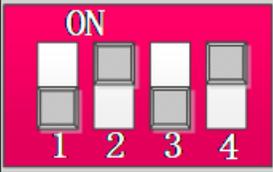
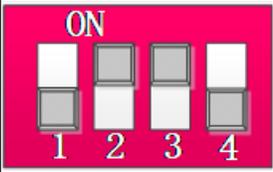
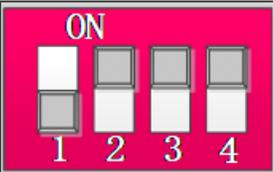
Battery Cabinet 8B

**Table 3.1** on the facing page applies to the Lithium EBC DIP switch settings that match the ITA2 5kVA/6kVA/10kVA 230V single phase UPS. **Table 3.2** on page 19 applies to the Lithium EBC DIP switch settings that match with the ITA2 08kVA,10kVA,15kVA,16kVA,20kVA,30kVA three phase UPS.

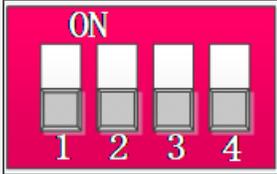
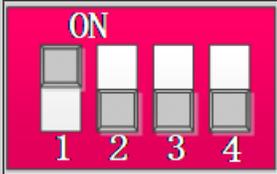
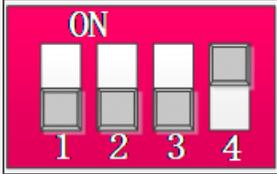
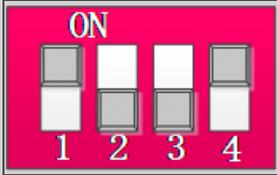
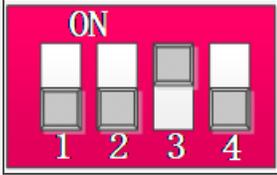
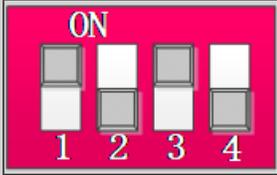
Table 3.1 DIP Switch Settings for Vertiv™ Liebert® ITA2 5kVA/6kVA/10kVA 230V Single Phase UPS

String Battery Cabinets	PCS Battery Cabinets	DIP Switch Position				Address #	Example
		1	2	3	4		
1	A	OFF	OFF	OFF	OFF	#1	
2	A	OFF	OFF	OFF	ON	#2	
3	A	OFF	OFF	ON	OFF	#3	
4	A	OFF	OFF	ON	ON	#4	
5	A	OFF	ON	OFF	OFF	#5	

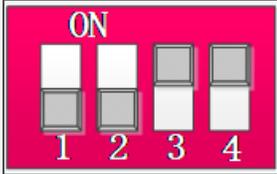
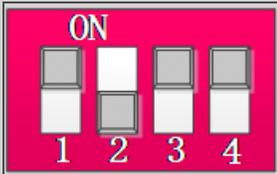
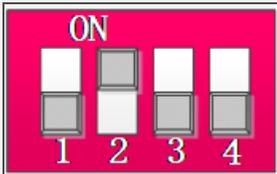
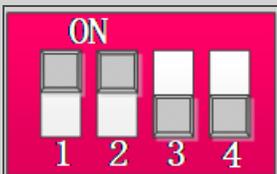
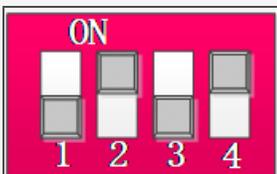
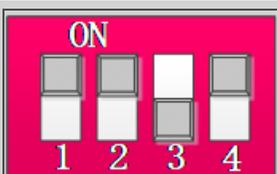
**Table 3.1 DIP Switch Settings for Vertiv™ Liebert® ITA2 5kVA/6kVA/10kVA 230V Single Phase UPS (continued)**

String Battery Cabinets	PCS Battery Cabinets	DIP Switch Position				Address #	Example
		1	2	3	4		
6	A	OFF	ON	OFF	ON	#6	
7	A	OFF	ON	ON	OFF	#7	
8	A	OFF	ON	ON	ON	#8	

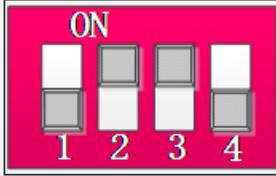
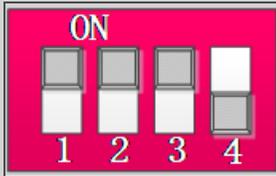
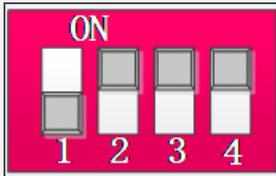
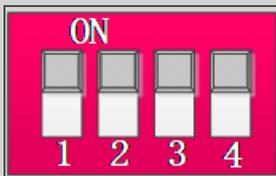
**Table 3.2 Lithium EBC DIP switch settings for the Vertiv™ Liebert® ITA2 08kVA,10kVA,15kVA,16kVA,20kVA,30kVA Three Phase UPS**

String #	Cabinet #	DIP Switch Position				Address #	Example
		1	2	3	4		
1	A	OFF	OFF	OFF	OFF	#1	
	B	ON	OFF	OFF	OFF	#9	
2	A	OFF	OFF	OFF	ON	#2	
	B	ON	OFF	OFF	ON	#10	
3	A	OFF	OFF	ON	OFF	#3	
	B	ON	OFF	ON	OFF	#11	

**Table 3.2 Lithium EBC DIP switch settings for the Vertiv™ Liebert® ITA2 08kVA,10kVA,15kVA,16kVA,20kVA,30kVA Three Phase UPS (continued)**

String #	Cabinet #	DIP Switch Position				Address #	Example
		1	2	3	4		
4	A	OFF	OFF	ON	ON	#4	
	B	ON	OFF	ON	ON	#12	
5	A	OFF	ON	OFF	OFF	#5	
	B	ON	ON	OFF	OFF	#13	
6	A	OFF	ON	OFF	ON	#6	
	B	ON	ON	OFF	ON	#14	

**Table 3.2 Lithium EBC DIP switch settings for the Vertiv™ Liebert® ITA2 08kVA,10kVA,15kVA,16kVA,20kVA,30kVA Three Phase UPS (continued)**

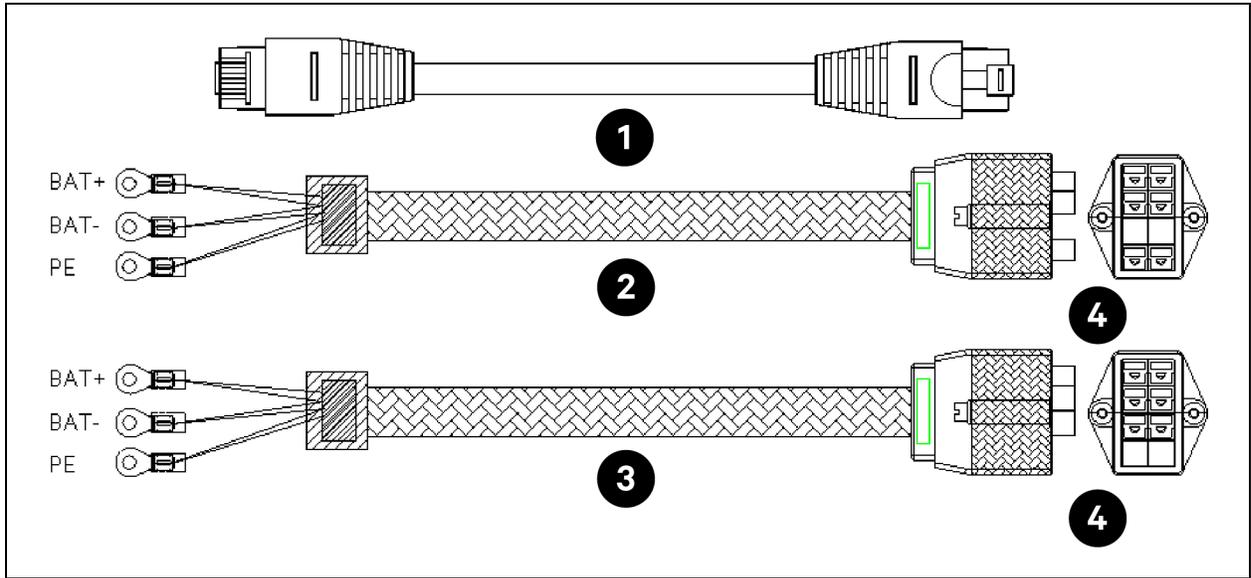
String #	Cabinet #	DIP Switch Position				Address #	Example
		1	2	3	4		
7	A	OFF	ON	ON	OFF	#7	
	B	ON	ON	ON	OFF	#15	
8	A	OFF	ON	ON	ON	#8	
	B	ON	ON	ON	ON	#16	

## 3.7 Connect the Power and Communication Cables

### 3.7.1 Connection between Vertiv™ MPL Lithium EBC and the Vertiv™ Liebert® ITA2 5kVA/6kVA/10kVA 230V Single Phase UPS

The Vertiv™ Liebert® ITA2 5kVA/6kVA/10kVA 230V single phase UPS can be configured with up to 8 Lithium EBCs. As shown in **Figure 3.15** on the next page, the power cable is used for the power connection between the UPS and the Lithium EBC, and the communication cable is used for the communication between the UPS and the Lithium EBC.

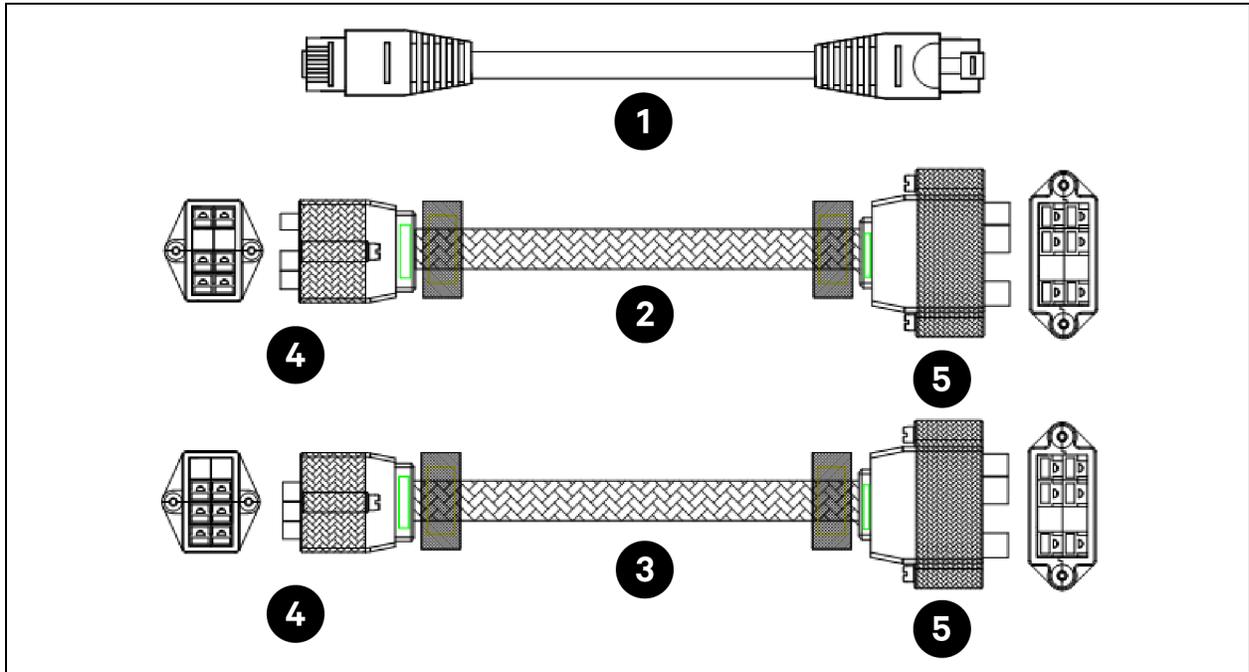
**Figure 3.15 Cables between UPS and Lithium EBC**



Item	Description
1	Communication Cable
2	Cable between 192V 6Ah MPL Lithium EBC and the ITA2 5kVA/6kVA/10kVA 230V Single phase UPS
3	Cable between 192V 12Ah MPL Lithium EBC and the ITA2 5kVA/6kVA/10kVA 230V Single phase UPS
4	Port A

When several Lithium EBCs are connected, select the parallel cables as shown in **Figure 3.16** on the facing page

Figure 3.16 Parallel Cables between Lithium EBCs



Item	Description
1	Communication cable
2	6Ah LIB parallel cable
3	12Ah LIB parallel cable
4	Port A
5	Port B

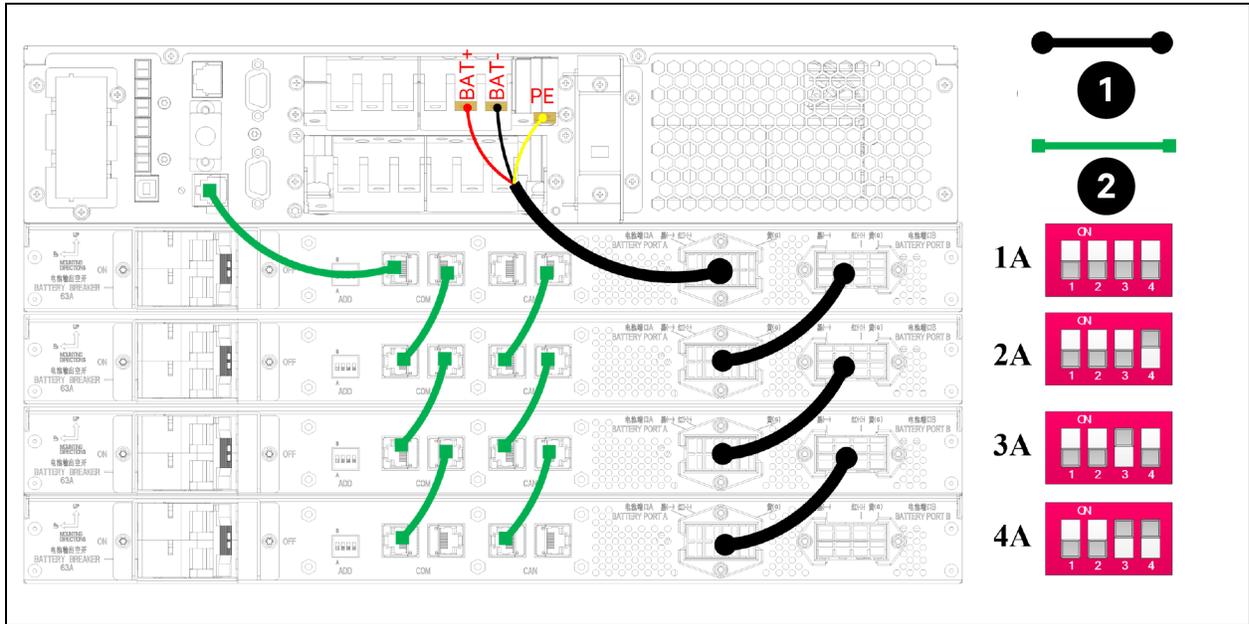
1. After installing the UPS and Lithium EBCs, see **Table 3.1** on page 17 setting the DIP switch .

**NOTE: The DIP switch addresses of Lithium EBC in the system cannot be repeated and the Address No. is up to 8.**

2. Connect the OT terminal to the battery port on the rear of the UPS according to the silk screen on the cable and connect the PP45 Port (labeled Port A) on the other end to Port A on the Lithium EBC. Then tighten the screws on the PP45 port.
3. Connect the RJ45 connector at both ends of the cable to multi function control port on the rear panel of the UPS and one of the COM ports in the Lithium EBC.
4. Use the parallel power cable as shown in **3.7.1** on page 21 to connect the Port B port of the Lithium EBC “1A” to the Port A port of the Lithium EBC “2A”. The parallel connection method of Lithium EBC “3A” and Lithium EBC “2A” is similar to the connection method of connecting “1A” and “2A”.
5. Connect the remaining COM port of the Lithium EBC “1A” to the one of two COM ports of the Lithium EBC “2A” using the communication cable. And connect the remaining COM port of the Lithium EBC “2A” to the one of two COM ports of the Lithium EBC “3A” using the communication cable. For connecting communication cables of CAN, please refer to connection of COM.

The cable connections between the Lithium EBC and Vertiv™ Liebert® ITA2 10kVA 230V single phase UPS shown in **Figure 3.17** on the next page , are similar to the Vertiv™ Liebert® ITA2 5kVA/6kVA UPS cable connections.

Figure 3.17 Cable Connections between the Lithium EBC and ITA2 10kVA 230V Single Phase UPS



Item	Description
1	Power cable
2	Communication cable

**NOTE:** Keeping the marks on the cable and the silkscreen on the UPS are connected correctly.

**NOTE:** There are two types of ground signs for the system, PE&G, sign PE appears on the UPS, sign G appears on the EBCs, both are equivalent.



**CAUTION:** To avoid serious problems, be sure to connect the cables according to the above requirements.

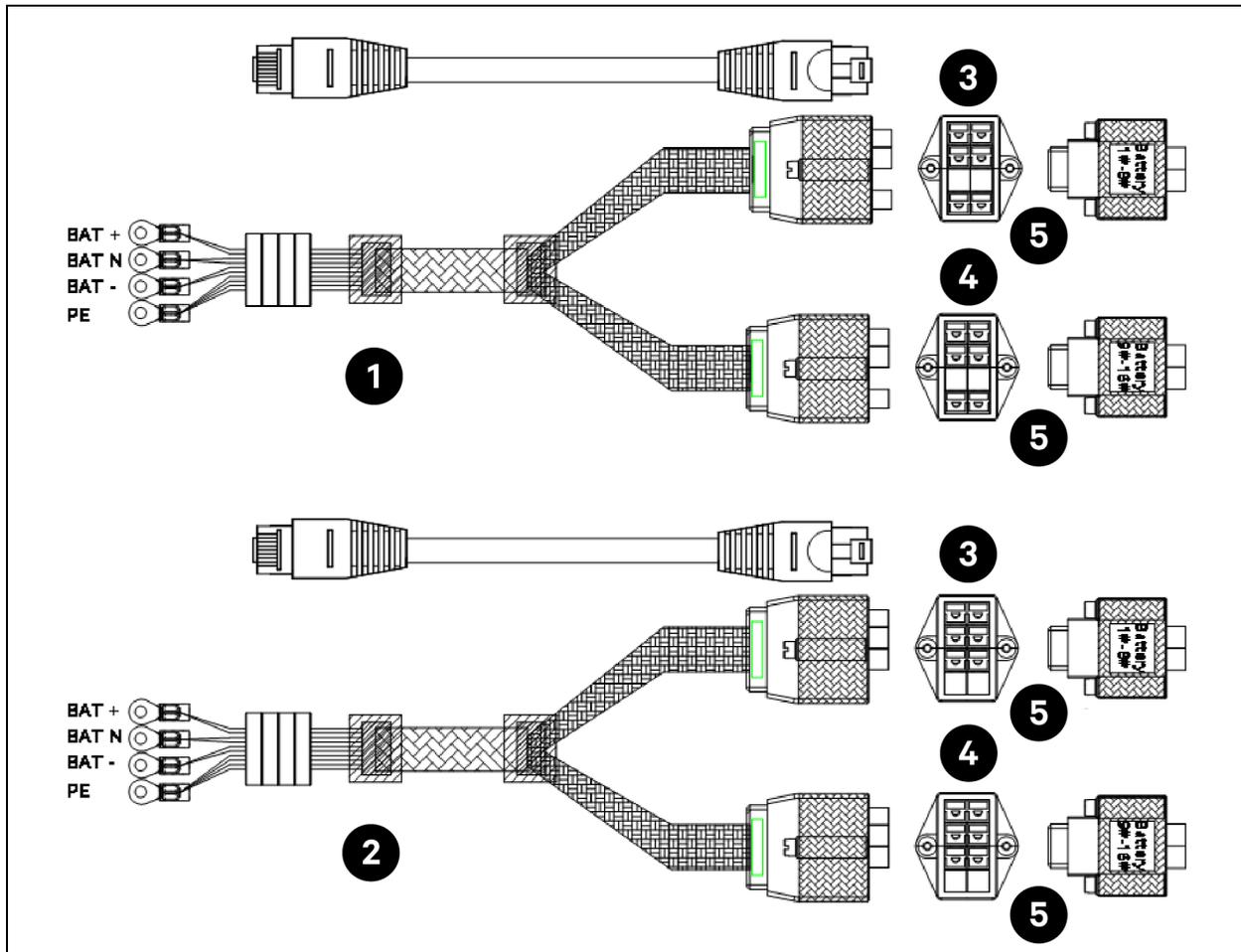


**CAUTION:** Afin d'éviter des problèmes anormaux, assurez-vous de brancher les câbles selon les exigences ci-dessus.

### 3.7.2 Connection between Vertiv™ MPL Lithium EBC and the Vertiv™ Liebert® ITA2 Three Phase UPS

The Vertiv™ Liebert® ITA2 Three phase UPS can be configured with up to 8 strings of Lithium EBCs. Use the power cables and communication cables connected to the UPS as shown in **Figure 3.18** on the facing page .

Figure 3.18 Cables between UPS and Lithium EBC



Item	Description
1	Cable between 192V 6Ah Lithium EBC and 10kVA/15kVA/16kVA/20kVA Three phase UPS
2	Cable between 192V 12Ah Lithium EBC and 10kVA/15kVA/16kVA/20kVA Three phase UPS
3	Group A Lithium EBC
4	Group B Lithium EBC
5	Port A

1. After installing the UPS and Lithium EBCs, see the **Table 3.2** on page 19 for setting the DIP switch.

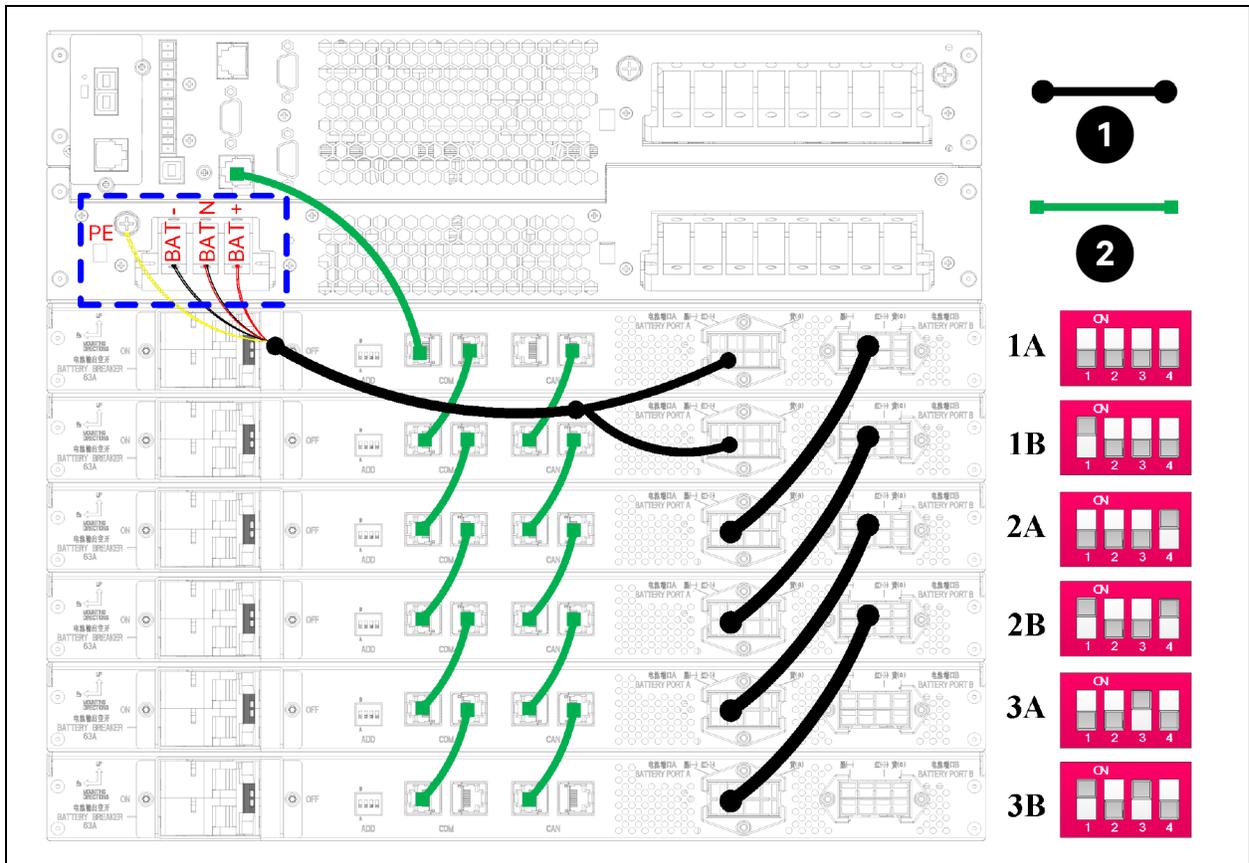
**NOTE: The DIP switch addresses of Lithium EBC in the system cannot be repeated and the Address No. is up to 16.**

2. Connect the OT terminal to the Battery ports on the rear of the UPS according to the silk screen on the cables. Connect the terminals marked "Battery 1#~8# Port A" to Port A of the Lithium EBC "1A". Connect the terminals labeled "Battery 9#~16# Port A" to Port A of the "1B" Lithium EBC. Then tighten the screws to secure the cable connection.
3. When several Lithium EBC are connected, please choose the parallel cable as shown in **Figure 3.16** on page 23. Use a parallel cable to connect Port B of Lithium EBC "1A" to Port A of Lithium EBC "2A", and then connect Port B of Lithium EBC "1B" to Port A of Lithium EBC "2B". Connect Port B of Lithium EBC "2A" to Port A of Lithium EBC "3A", and then connect Port B of Lithium EBC "2B" to Port A of Lithium EBC "3B".

4. For communication cable connection, connect the RJ45 connector on both ends of the cable to the multifunctional control port on the UPS and one of the COM ports on the Lithium EBC “1A”. Use another cable to connect the remaining COM ports of the Lithium EBC “1A” to one of the two COM ports of the Lithium EBC “1B”. And so on until the last Lithium EBC.
5. Refer to COM connection for CAN communication cable connection.
6. For CAN communication cable connection, use RJ45 connector of cable to connect the one of CAN ports of the Lithium EBC “1A” to one of the two CAN ports of the Lithium EBC “1B”.
7. Use another cable to connect the remaining CAN ports of the Lithium EBC “1B” to one of the two CAN ports of the Lithium EBC “2A”.
8. And so on until the last Lithium EBC.

The cable connections between the Lithium EBCs and the Vertiv™ Liebert® ITA2 Three phase UPS are shown in **Figure 3.19** below .

**Figure 3.19 Cable Connections between the Lithium EBCs and Three Phase UPS**



Item	Description
1	Power Cable
2	Communication Cable

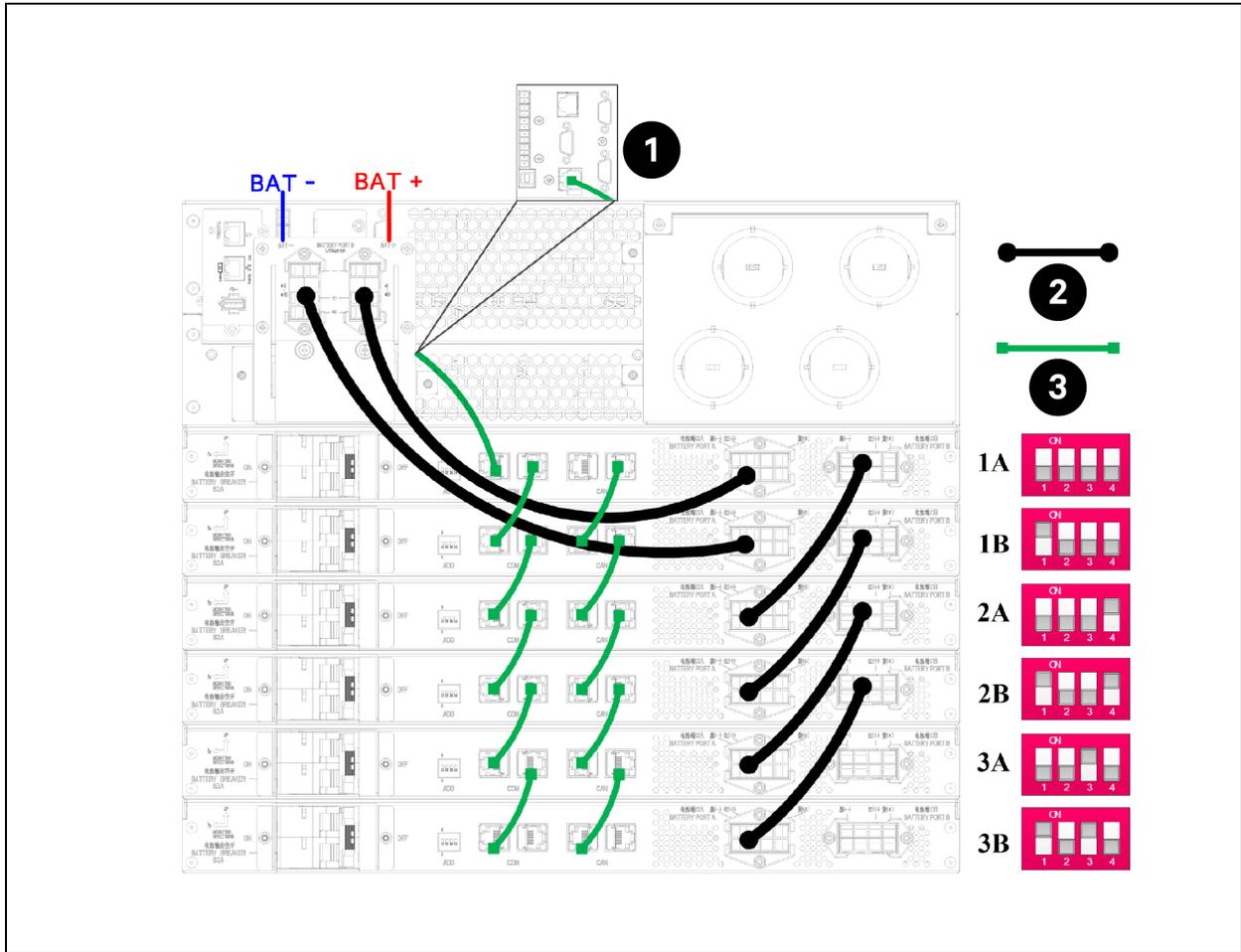
If the UPS is equipped with a battery junction box, a parallel cable can be used to connect the UPS to the Lithium EBCs, as shown in **Figure 3.20** on the next page. Should be notice the power cables connection between EBCs and UPS. The Lithium EBC "1A" should be connected to 'BAT+' and the Lithium EBC "1B" should be connected to 'BAT-' on the junction box. The remaining steps are as follows:

1. After installing the UPS and Lithium EBCs, see the Table 3.2 on page 19 for setting the DIP switch.

**NOTE: The DIP switch addresses of Lithium EBC in the system cannot be repeated and the Address No. is up to 16.**

2. Should be notice the power cables connection between EBCs and UPS. The Lithium EBC "1A" should be connected to 'BAT+' and the Lithium EBC "1B" should be connected to 'BAT-' on the junction box.
3. When several Lithium EBC are connected, please choose the parallel cable as shown in **Figure 3.16** on page 23. Use a parallel cable to connect Port B of Lithium EBC "1A" to Port A of Lithium EBC "2A", and then connect Port B of Lithium EBC "1B" to Port A of Lithium EBC "2B". Connect Port B of Lithium EBC "2A" to Port A of Lithium EBC "3A", and then connect Port B of Lithium EBC "2B" to Port A of Lithium EBC "3B".
4. For communication cable connection, connect the RJ45 connector on both ends of the cable to the multi-functional control port on the UPS and one of the COM ports on the Lithium EBC "1A". Use another cable to connect the remaining COM ports of the Lithium EBC "1A" to one of the two COM ports of the Lithium EBC "1B".
5. For CAN communication cable connection, use RJ45 connector of cable to connect the one of CAN ports of the Lithium EBC "1A" to one of the two CAN ports of the Lithium EBC "1B". Use another cable to connect the remaining CAN ports of the Lithium EBC "1B" to one of the two CAN ports of the Lithium EBC "2A". And so on until the last Lithium EBC.

Figure 3.20 Cable Connections between the Lithium EBC and Three Phase UPS with Battery junction box



Item	Description
1	The Communication Port of the UPS
2	Power Cable
3	Communication Cable

**NOTE:** Keeping the marks on the cable and the silkscreen on the UPS are connected correctly.

**NOTE:** There are two types of ground signs for the system, PE&G, sign PE appears on the UPS, sign G appears on the EBCs, both are equivalent.



**CAUTION:** Afin d'éviter des problèmes anormaux, assurez-vous de brancher les câbles selon les exigences ci-dessus.

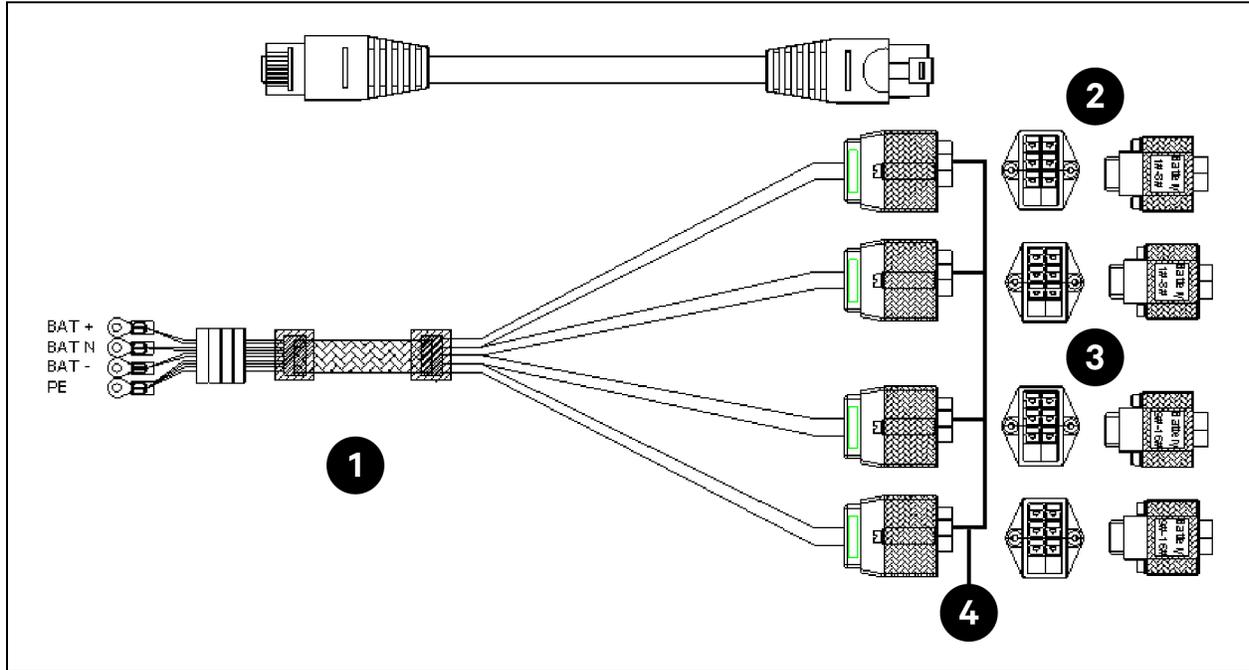


**CAUTION:** To avoid serious problems like device failure, be sure to connect the cables according to the above requirements.

### 3.7.3 Connection between 192V 12Ah Lithium EBC and the Vertiv™ Liebert® ITA2 30kVA Three Phase UPS

The Liebert® ITA2 30kVA Three phase UPS can be configured with up to 8 strings (16) of Lithium EBCs and at least 2 strings (4) Lithium EBCs to make the UPS work properly. **Figure 3.21** below shows the power cables and communication cables connected to the UPS.

**Figure 3.21 Cables between ITA2 30kVA UPS and Lithium EBCs**



Item	Description
1	Cables between the 192V 12Ah Lithium EBC and the 30kVA three-phase UPS
2	Group A Lithium EBC
3	Group B Lithium EBC
3	Port A

1. After installing the UPS and Lithium EBCs, see the **Table 3.2** on page 19 for setting the DIP switch.

**NOTE: The DIP switch addresses of Lithium EBC in the system cannot be repeated and the Address No. is up to 16.**

2. Connect the OT terminal to the battery port on the rear of the UPS according to the silk screen on the cable.
3. Connect one of two the terminals labeled "Battery 1#~8# Port A" to Port A of Lithium EBC "1A", and connect another terminal labeled "Battery 1#~8# Port A" to Port A of Lithium EBC "2A". Tighten the screws to secure the cable connection.
4. Connect one of the terminals labeled "Battery 9#~16# Port A" to Port A of Lithium EBC "1B" and another terminal labeled "Battery 9#~16# Port A" to Port A of Lithium EBC "2B". Tighten the screws to secure the cable connection.

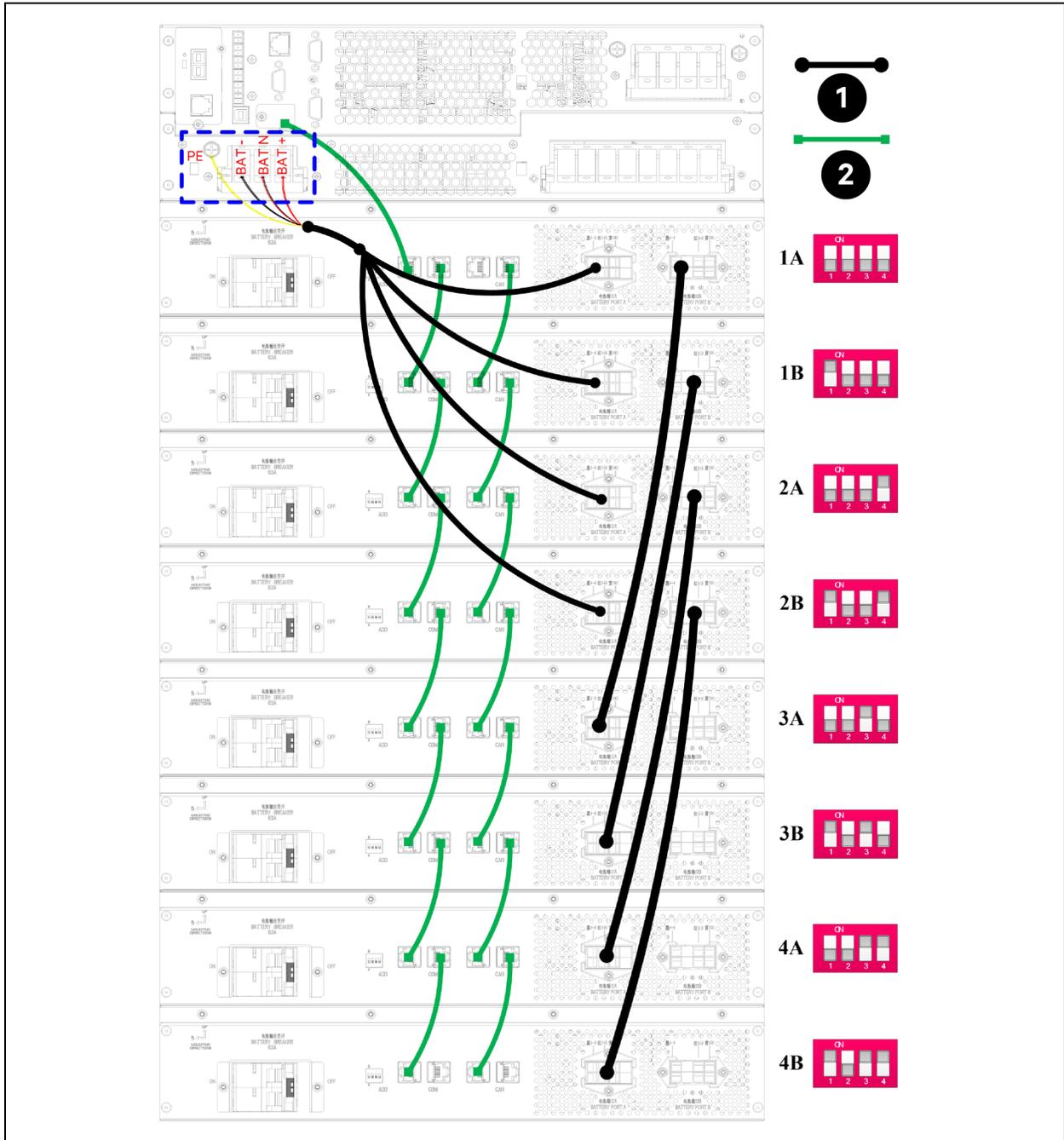
When several Lithium EBC are connected, choose the parallel cable as shown in **3.7.1** on page 21.

5. Use a parallel cable to connect Port B of Lithium EBC "1A" to Port A of Lithium EBC "3A", and then connect Port B of Lithium EBC "2A" to Port A of Lithium EBC "4A".

6. Use a parallel cable to connect Port B of Lithium EBC "1B" to Port A of Lithium EBC "3B", and then connect Port B of Lithium EBC "2B" to Port A of Lithium EBC "4B".
7. Connect the RJ45 connectors on both ends of the cable to one of the multifunctional control ports on the ITA2 30kVA UPS and the COM ports on the Lithium EBC "1A". Then use another communication cable to connect the remaining COM port of the Lithium EBC "1A" to one of the two COM ports of the Lithium EBC "1B" and so on until the last Lithium EBC.
8. Refer to COM connection for CAN communication cable connection.

The cable connections between the 192V 12Ah Lithium EBCs and ITA2 30kVA Three phase UPS are shown in **Figure 3.22** on the facing page .

Figure 3.22 The Cable Connections between the 192V 12Ah Lithium EBC and 30kVA Three Phase UPS



Item	Description
1	Power cable
2	Communication cable

**NOTE:** Keeping the marks on the cable and the silkscreen on the UPS are connected correctly.

**NOTE:** There are two types of ground signs for the system, PE&G, sign PE appears on the UPS, sign G appears on the EBCs, both are equivalent.



**CAUTION:** To avoid serious problems like device failure, be sure to connect the cables according to the above requirements.



**CAUTION:** Afin d'éviter des problèmes anormaux, assurez-vous de brancher les câbles selon les exigences ci-dessus.

### 3.8 Configuring the UPS for MPL Lithium EBCs and Startup of the System

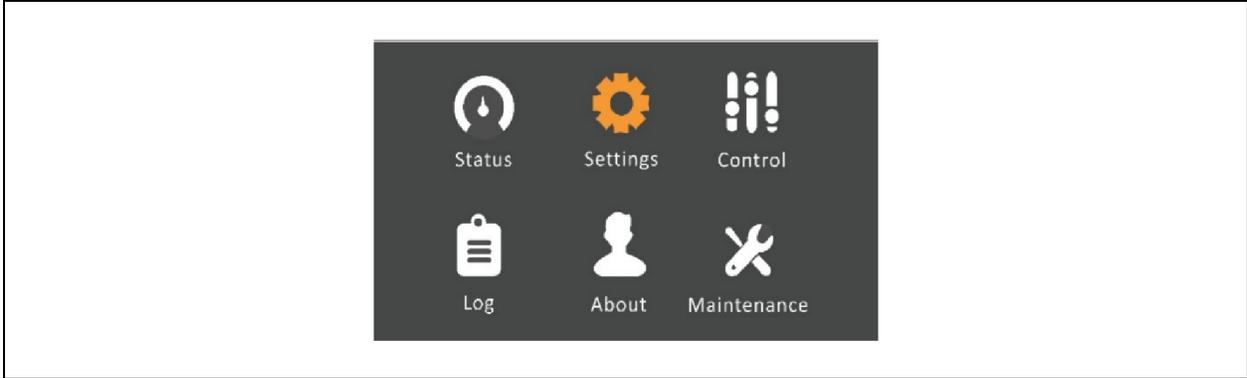
After completing the above steps for the cable connections and setting the Lithium EBC communication address, the UPS needs to be set up for operating with the Lithium battery system. The Vertiv™ Liebert® ITA2 UPS is compatible with lead acid batteries and Lithium batteries, and the factory default setting for the battery type is lead acid battery. Follow the steps below to configure the UPS for Lithium EBCs and Startup of the system.

**NOTE:** The Liebert® ITA2 UPS does not support cold start function when used with the Lithium EBC.

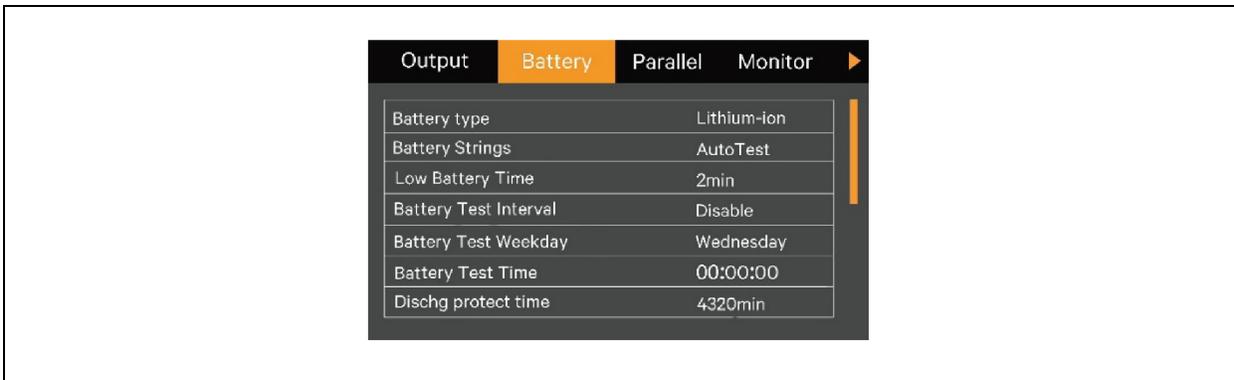
1. Ensure that the battery breakers on each of the Vertiv™ MPL Lithium EBCs is closed (ON).
2. Begin the startup of the UPS by closing the rectifier input breaker. This is RIB if you are using the ITA2 MBC in the system.
3. Change the "Battery type" from lead acid battery to lithium battery by one of two ways:
  - a. One way is to set 'Battery type' on the Start Up Guidance screen. When the UPS is powered on for the first time, set the 'Battery type' to lithium battery Start Up Guidance (3/5).



- b. Another way of setting "Battery type" is on Setting icon: Select the "Battery type" to "Lithium-ion" in the "Battery" of the main menu "Settings".



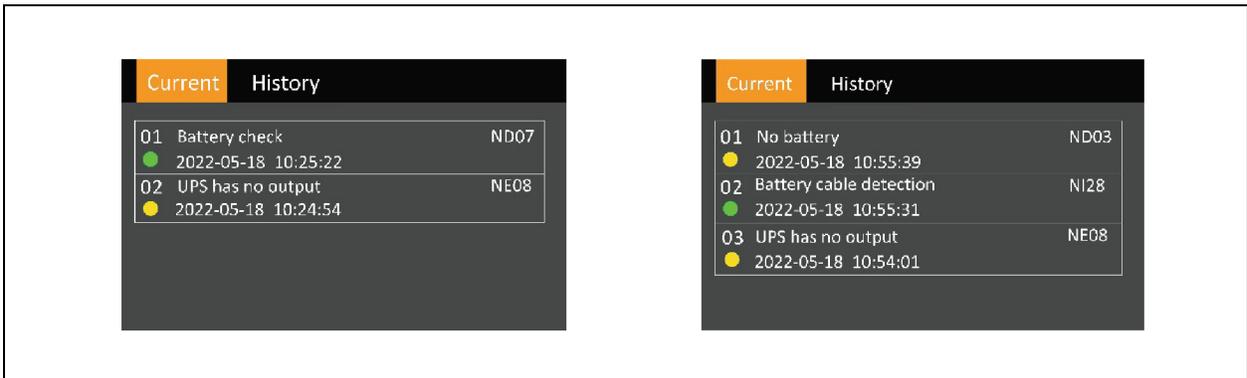
- c. This should highlight the Battery Type item in the list. Press **Enter**, then press either the **Up** or **Down** pushbutton to change to Lithium-ion, then press **Enter** to confirm.



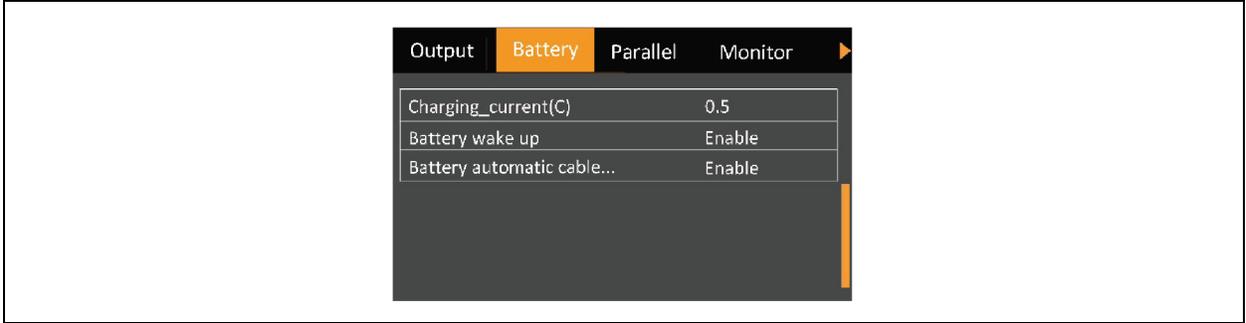
- 4. Confirm that battery cables is connected correctly by software detection.

**NOTE: Components in the Lithium EBC will automatically open and close during cable detection. Ensure that the UPS input is normal to avoid device power failure.**

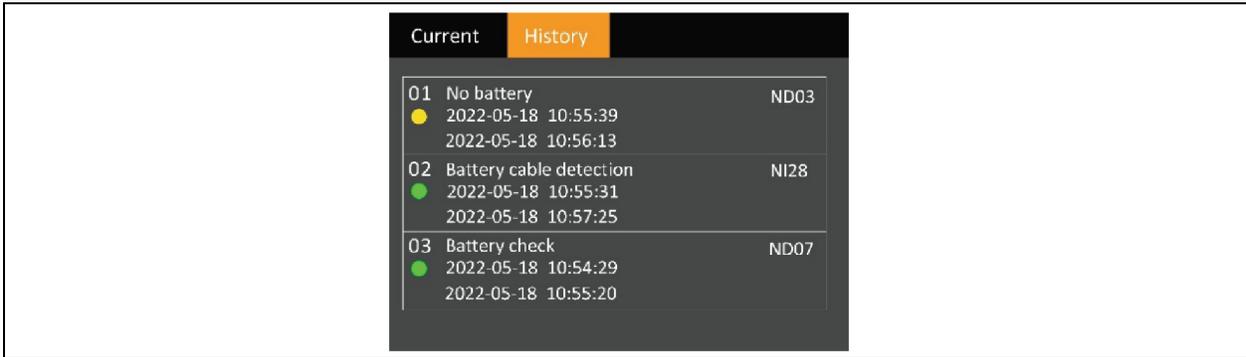
After the UPS is turned on, the UPS will start battery check, and will automatically perform battery cable detection after the battery check is complete.



The automatic cable detection function can be set to "Enable" or "Disable" on the battery icon of the settings icon, and the default mode is "Enable".



If the battery cables are connected correctly. The operation of "Battery cable detection" will be displayed in History of the main menu "Log" after completing detection.

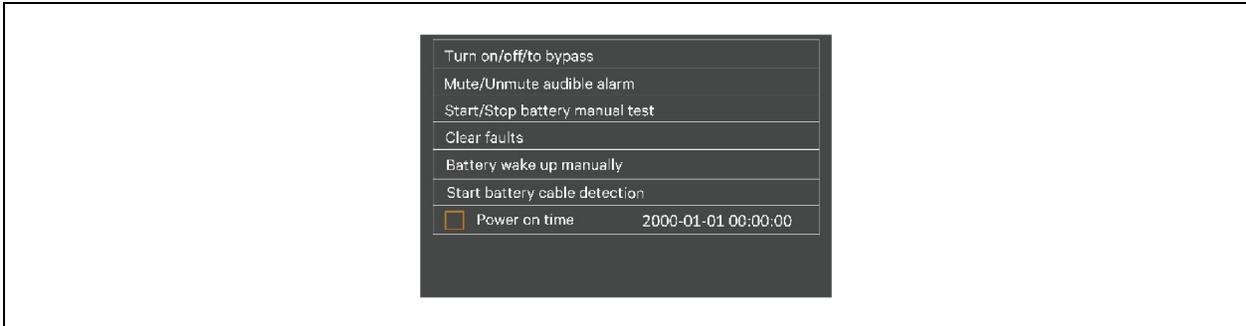


**NOTE: The system will automatically perform battery automatic cable detection if one of the following conditions is met.**

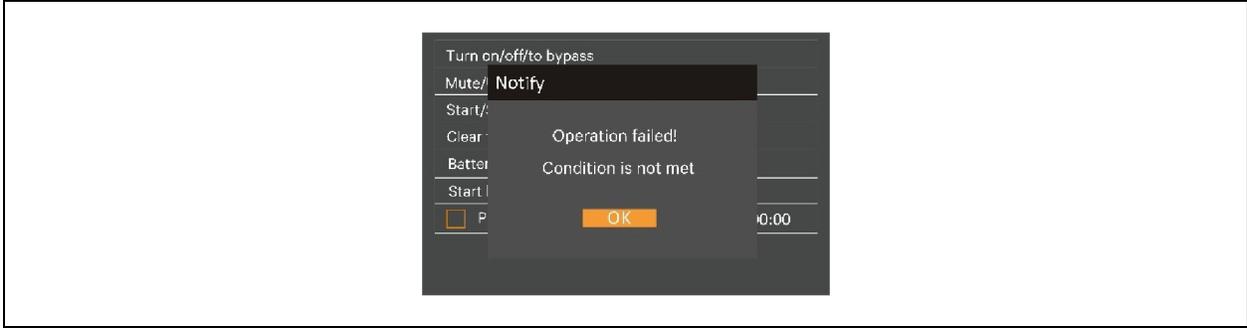
- 1) The battery type is set to "Lithium-ion".
- 2) The battery performs the wake up function.
- 3) UPS reboots.

In addition to automatic cable detection, the cable detection function can be performed manually, steps are as followings.

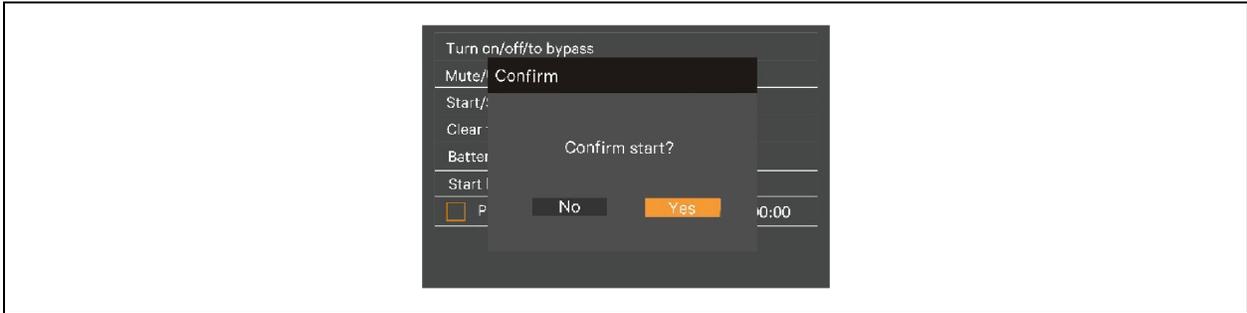
- a. Select "Start battery cable detection" in the Control icon and press **Enter**.



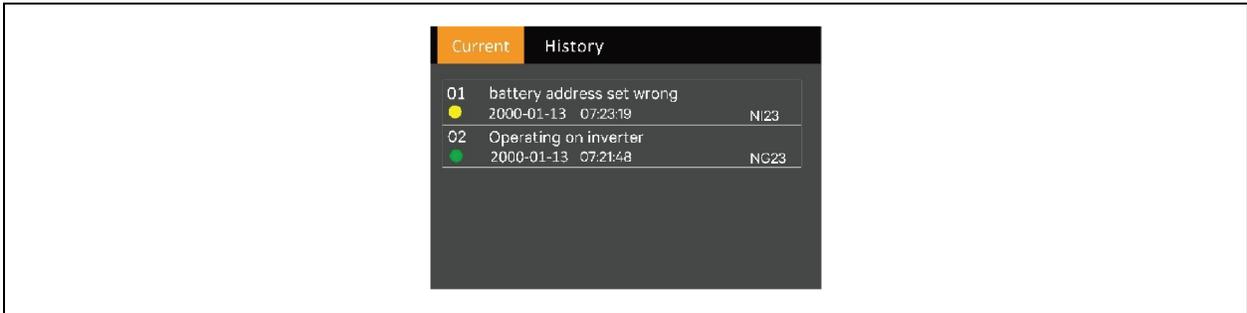
- b. If the UPS have abnormal alarm(s), LCD will pop-up "Operation failed! Condition is not met" during the detection. Try again after eliminating the abnormal alarm(s).



c. If the UPS have no abnormal alarm(s), please select "Yes" to start the cables detection.



d. If the battery cables are connected incorrectly, LCD will display alarm and record the detail alarm in "Current" of the main menu "Log". Referring to **Table 3.1** on page 17 or **Table 3.2** on page 19 and alarm to check battery cables connection and DIP switch setting. After reconnecting the cable or setting the DIP switch, return to Step 1.



**CAUTION:** To avoid dangerous accidents, be sure to power off the ups and battery and open all breakers.



**CAUTION:** Afin d'éviter des accidents dangereux, assurez-vous de mettre l'ups et la batterie hors tension et d'ouvrir tous les disjoncteurs.

e. If the battery cables are connected correctly, there is no alarm of "battery address set wrong". The operation of "Battery cable detection" will be displayed in History of the main menu "Log" after completing detection.

5. Under Lithium-ion Item and referring to table below, setting the parameter according to actual requirements.

Setting	Parameter range	Default setting
Battery Strings	AutoTest, 1, 2, 3, 4, 5, 6, 7, 8	AutoTest
Low Battery Time	2 – 30 minutes	2
Battery Test Interval	Disable, 8, 12, 16, 20, 26 weeks	Disable
Battery Test Weekday	Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, Saturday	Wednesday
Battery Test Time	HH: MM: SS	00:00:00
Dischg Protect Time	1 - 4320min	4320
Charging current (C)	0.1 - 0.5 (C)	0.5
Battery wake up	Enable, Disable	Enable
Battery automatic cable detection	Enable, Disable	Enable

6. Lithium battery configuration is completed, and you can press ESC multiple times to get back to the one-line diagram screen and move to Step 7.
7. Finish the startup of the UPS system by closing the bypass input breaker (BIB) and output breaker (MIB) and pressing the ON/OFF pushbutton to Turn ON UPS.

**NOTE:** When the UPS is on, close the battery breaker of Lithium EBCs, and then the user may need to manually wake up the EBCs. Manual wake-up steps are as follows:

**Step 1:** Confirm the breakers on the rear of the EBC’s are in the ON state and there are no lights illuminated on the front.

**Step 2:** On the LCD of the UPS go to the ‘Controls’ menu, select ‘Battery wake up manually’.

**Step 3:** Press ‘Enter’ to manually wake up the batteries.

**Step 4:** Wait for about 30 seconds for the UPS to start up and initialize the batteries. The lights at the front of the EBC should turn on.



**WARNING!** When the Lithium EBCs and UPS are working, do not unplug the battery power cable before opening battery breakers.

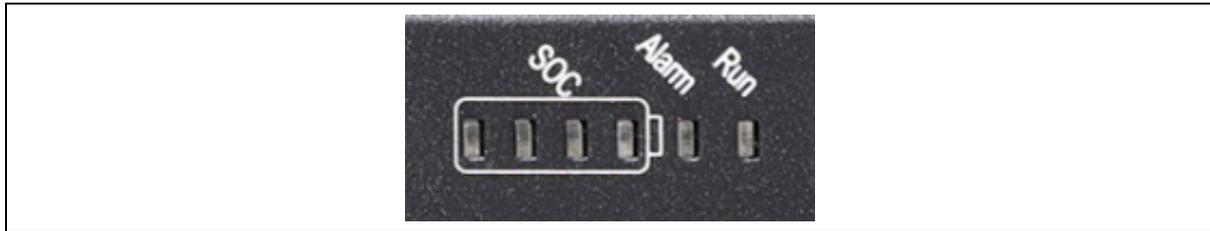
## 4 Battery Status and Alarms

This section provides the status and alarm information for the Vertiv™ MPL Lithium EBC.

### 4.1 Vertiv™ MPL Lithium EBC Indicators

The Lithium EBC contains six LED indicators. Four LEDs indicate the state of charge (SOC) of the batteries in 25% increments. The remaining two LEDs provide alarm and operational status indication as shown below **Figure 4.1** below .

**Figure 4.1** Lithium EBC Indicators



**Table 4.1** SOC LED Indicator Status

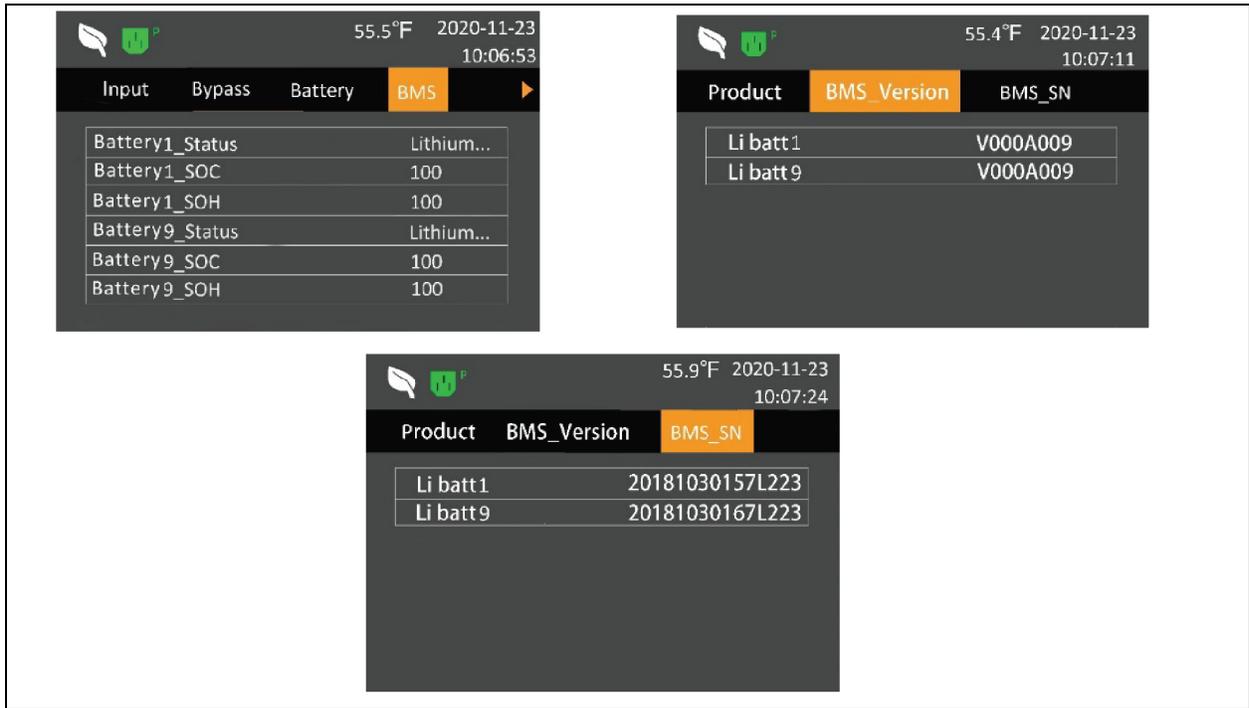
Battery capacity Indicators Status								
SOC	Charge				Discharge / Idle			
	LED1	LED 2	LED 3	LED 4	LED 1	LED 2	LED 3	LED 4
0%	Off	Off	Off	Off	Off	Off	Off	Off
1-25%	Blinking	Off	Off	Off	On	Off	Off	Off
26-50%	On	Blinking	Off	Off	On	On	Off	Off
51-75%	On	On	Blinking	Off	On	On	On	Off
76-100%	On	On	On	Blinking/On	On	On	On	On

**NOTE:** The LED numbering in the above table is from left to right when the EBC is in rack mount orientation and from bottom to top when in tower orientation.

### 4.2 UPS Display Screens

When the UPS is configured for Lithium batteries, additional screens will appear under the Status menu icon and the About menu icon to display status information for each battery cabinet (half string) that is in the battery system. The **Figure 4.2** on the next page shows the information that will be available.

Figure 4.2 UPS Display Screens



**NOTE:** The number in the submenu corresponds to the address value set by the DIP switch settings.

### 4.3 Vertiv™ MPL Lithium EBC Alarm List

There are no user serviceable parts in the Lithium EBC. The following are the alarms that may appear in the LOG menu on the UPS display.

**NOTE:** The number in the alarm column in **Table 4.2** below , such as # 1, corresponds to the address value set on the DIP switch on the rear of the Lithium EBC.

Table 4.2 Alarm List

Alarm	Explanation / Action
Battery communication fail	The communication cable between the UPS and the Lithium EBC is not connected. The Lithium EBC's breaker may be open. If this fault still exists, please contact customer service.
Battery model not qualified	The UPS detects different model of Lithium battery cabinets for parallel operation. Please check that all the Lithium EBCs are of the same model number; Or the capacity of the connected Lithium battery module is not supported. Confirm that the battery module is supported by Vertiv™ UPS. If this fault still exists, please contact customer service.
Battery SN abnormal	The UPS detects that the uploaded serial number of the Lithium battery cabinet is not correct. Please check the serial number on the UPS display matches the barcode label on the Lithium EBC. If they match and if this fault still exists, please contact customer service.
Battery cabinet connect abnormal	The number of Lithium EBC in two groups is inconsistent. Confirm that the number of Lithium EBCs connected to the system is even. Please refer to <b>Setting the Lithium EBC Communication Address</b> to modify the DIP switch address and check the communication cable connected. Or the actual number of battery cabinets is inconsistent with the setting. If this fault still exists, please contact customer service.
Battery CAN connect abnormal	Please refer to <b>Figure 3.19</b> on page 26 and <b>Table 3.2</b> on page 19 to confirm control wires are properly installed and DIP switches are properly set. If the problem persists, please contact customer service.

**Table 4.2 Alarm List (continued)**

Alarm	Explanation / Action
Battery check	The process of activating the Lithium EBC will show that the "battery check".
# 1 Battery high cell volt	The cell voltage of the No. 1 Lithium EBC is too high. If the parameters match the requirements, please open the breaker on the rear Lithium EBC, and leave it open for two hours. Then close the output breaker of the Lithium EBC, if this fault still reports, please contact customer service.
# 1 Battery Capacity low	The capacity of the No. 1 Lithium EBC is too low. Please check the breakers on the Lithium EBC to make sure they are closed and if necessary, charge the battery. If this fault still exists, please contact customer service.
# 1 Battery discharge high cell temp	The cell temperature of the No. 1 Lithium EBC is too high during discharging. Please ensure that the Lithium EBC is in an environment that meets the recommend operating ambient temperature range specified in Table 5 If this fault still exists, please contact customer service.
# 1 Battery discharge low cell temp	The cell temperature of the No. 1 Lithium EBC is too low during discharging. Please ensure that the Lithium EBC is in an environment that meets the recommend operating ambient temperature range specified in Table 5 If this fault still exists, please contact customer service.
# 1 Battery charge high cell temp	The cell temperature of the No. 1 Lithium EBC is too high during charging. Please ensure that the Lithium EBC is in an environment that meets the recommend operating ambient temperature range specified in Table 5 If this fault still exists, please contact customer service.
# 1 Battery charge low cell temp	The cell temperature of the No. 1 Lithium EBC is too low during charging. Please ensure that the Lithium EBC is in an environment that meets the recommend operating ambient temperature range specified in Table 5 If this fault still exists, please contact customer service.
# 1 Battery charge overcurrent	The charge current of the No. 1 Lithium EBC is too large during charging. Please check the UPS indicates a charger fault. If there is no charger fault, please contact customer service.
# 1 Battery discharge overcurrent	The discharge current of the No. 1 Lithium EBC is too large during discharging. Please check the UPS indicates a discharger fault. If there is no discharger fault, please contact customer service.
# 1 Battery internal communication abnormal	The abnormal communication exists between the host MCU and the slave MCUs in the Lithium EBC. If this fault still exists, please contact customer service.
# 1 Battery address conflict	The DIP switch address setting of the No. 1 Lithium EBC is the same as another module. Refer to <b>Table 3.2</b> on page 19 for proper settings, if this fault still exists, please contact customer service.
# 1 Battery address set wrong	The DIP switch address setting of the No. 1 Lithium EBC does not match <b>Table 3.2</b> on page 19 for proper settings. Check the settings and if this fault still exists, please contact customer service.
# 1 Battery port reverse	The port of the No. 1 Lithium EBC is reversed, please contact customer service.
# 1 BMS relay invalid	No. 1 Lithium EBC BMS relay is invalid, please contact customer service.
# 1 safety under voltage	The cell voltage of the No. 1 Lithium EBC is too low. The battery cell is damaged, please contact customer service.
# 1 Battery parallel charge high temp	The cell temperature of the No. 1 Lithium EBC is too high during parallel. Please ensure that the Lithium EBC is in an environment that meets the ambient temperature range specified in <b>Table 5.1</b> on page 41. If this fault still exists please contact customer service.
Battery cable detection	The process of battery cable detection displays "Battery cable detection".
Ambient temperature low record	The ambient temperature is lower than the lower limit of the recommended temperature. UPS recording Low temperature retention time. Please ensure that the Lithium EBC is in an environment that meets the recommend operating ambient temperature range specified in <b>Table 5.1</b> on page 41. If this fault still exists, please contact customer service.
Ambient temperature high record	The ambient temperature is higher than the upper limit of the recommended temperature. UPS recording high temperature retention time. Please ensure that the Lithium EBC is in an environment that meets the recommend operating ambient temperature range specified in <b>Table 5.1</b> on page 41. If this fault still exists, please contact customer service.

**Table 4.2 Alarm List (continued)**

Alarm	Explanation / Action
Ambient temperature low pre-alarm	The Warning is triggered when the ambient temperature is close to the lower limit of the Lithium battery operating temperature. Please ensure that the Lithium EBC is in an environment that meets the recommend operating ambient temperature range specified in <b>Table 5.1</b> on page 41. If this fault still exists, please contact customer service.
Ambient temperature high pre-alarm	The Warning is triggered when the ambient temperature is close to the upper limit of the Lithium battery operating temperature. Please ensure that the Lithium EBC is in an environment that meets the recommend operating ambient temperature range specified in <b>Table 5.1</b> on page 41. If this fault still exists, please contact customer service.
# 1 Incompatible BMS version	The BMS software version is incompatible, and the Lithium EBC cannot be paralleled. please contact customer service.
# 1 EOL	Lithium battery is at the end of its life and cannot be charged or discharge, please contact customer service to replace the new Lithium EBC.
# 1 Sampling failure	Lithium battery has sampling circuit failure, please contact customer service.
# 1 Hardware protection	Lithium battery has hardware circuit protection, please contact customer service.
Charger On	The UPS displays "Charger On" during maintenance charging.
Charger Off	When the UPS is in maintenance and the charger is off, the UPS displays "Charger Off".
Battery upgrade	The UPS displays "Battery upgrade" during the battery upgrade process.
Battery wake up manually	UPS displays "Battery wake up manually" when performing battery wake up manually
Battery upgrade MCUS fail	When the MCUS upgrade fails, the UPS displays "Battery upgrade MCUS fail". Please try to upgrade again, if the upgrade still fails, please contact customer service.
Battery upgrade MCUS successfully	When the MCUS upgrade successfully, the UPS displays "Battery upgrade MCUS successfully".
Battery upgrade file transfer	The UPS displays "Battery upgrade file transfer" during battery upgrade file transfer.
Battery upgrade MCUP fail	When the MCUP upgrade fails, the UPS displays "Battery upgrade MCUP fail". Please try to upgrade again, if the upgrade still fails, please contact customer service.
Battery upgrade MCUP successfully	When the MCUP upgrade successfully, the UPS displays "Battery upgrade MCUP successfully".
Battery group less, Forbid discharge	The ITA2 30kVA UPS detects that the number of online batteries is less than the minimum number of discharged batteries required by the UPS. Please increase the number of Lithium batteries and check whether the connection is correct. If there is still an alarm after no problem, please wait for 30 minutes before confirming. If the fault cannot be eliminated, please contact customer service.
Battery unmatched the UPS	The battery unmatched the UPS model, please confirm that the correct type of battery is used. If the fault cannot be eliminated, please contact customer service.

When SOH < 60%, the battery replacement warning will occur, please contact customer service to change the EBC. When SOH < 50%, the Lithium EBC cannot be used.

## 5 Specifications

**Table 5.1 Specifications**

Model Number	6Ah Lithium EBC	12Ah Lithium EBC
Voltage Rating	384 VDC per string (192 VDC per cabinet)	
Lithium Chemistry	Lithium-Ion (LFP)	
Design Life	10 years	
Recharge Time	2 hours to 90% capacity (Under the Standard Charge Current condition, based on 1 string of batteries)	
Charging Method	Constant current	
Standard Charge Current	3A per Lithium cabinet (default)	6A per Lithium cabinet (default)
Rated Discharge Current	58A	
<b>Environmental / Agency</b>		
Safety	Battery cell: UL1642 Battery Cabinet: UL 1973	
EMC	IEC/EN/AS 62040-2 2nd Ed (Cat 2 UPS); FCC Part 15 (Class A)	
Protection Level	NEMA 1 / IP20	
Recommended Operating Temperature	15 to +35 degC (+59 to +95 degF) (Continuous operation outside Recommended Operating Temperature range will void the warranty)	
Maximum Operating Temperature	0 to +50 degC (+32 to +122 degF) (UPS output rating will automatically be derated to 80% when operated at 50 degC)	
Operating Relative Humidity	0-95% Non-condensing	
Operating Altitude	Sea level to 3000 m /9842 ft, without derating	
Storage Temperature	-20 to +45 degC (-4 to +113 degF)	
Transportation Temperature	-20 to +45 degC (-4 to +113 degF)	
Transit	UN38.3; ISTA 3E	
<b>Dimensions W x D x H inches (mm)</b>		
Unit	16.9 x 29.5 x 1.7 (430 x 750 x 43)	16.9 x 26.8 x 3.4 (430 x 680 x 86)
Shipping	39.4 x 31.5 x 11.2 (1000 x 800 x 285)	23.6x 31.5 x 12.8 (600x 800 x 327)
<b>Weight lbs (kg)</b>		
Unit	50.7 (23)	77 (35)
Shipping	110 (50)	114.6 (52)
Color	Black-Gray (RAL 7021)	

# Appendices

## Appendix A: Backup Time Tables

**NOTE:** Backup times in **Table 5.2** below to **Table 5.18** on page 49 have approximate values. They are based on new, fully charged batteries at a temperature of 77°F (25°C) with 100% resistive UPS loading. Different loading will change the actual backup times. Backup times listed may vary by ±5% due to manufacturing variances of the batteries.

**NOTE:** 6AH and 12 AH EBC's cannot be mixed.

192V 6Ah Backup Time Tables to different UPS

**Table 5.2 MPL 192V 6Ah Lithium EBC with ITA2 5kVA Single Phase UPS Models**

Battery Qty.	Load Level									
	100%	90%	80%	70%	60%	50%	40%	30%	20%	10%
	5kW	4.5kW	4kW	3.5kW	3kW	2.5kW	2kW	1.5kW	1kW	0.5kW
1	10	12	14	16	19	22	28	37	53	96
2	22	25	28	32	38	45	57	74	111	210
3	34	38	43	50	58	70	86	112	166	318
4	46	51	58	67	78	94	115	149	219	426
5	58	64	73	84	98	117	145	188	275	537
6	71	78	89	101	119	142	175	225	332	640
7	83	92	103	117	139	165	204	265	388	750
8	94	105	117	135	158	188	234	305	445	850

**Table 5.3 MPL 192V 6Ah Lithium EBC with ITA2 6kVA Single Phase UPS Models**

Battery Qty	Load Level									
	100%	90%	80%	70%	60%	50%	40%	30%	20%	10%
	6kW	5.4kW	4.8kW	4.2kW	3.6kW	3kW	2.4kW	1.8kW	1.2kW	0.6kW
1	8	9	11	13	15	18	23	30	43	79
2	18	20	23	26	31	37	47	61	92	174
3	28	31	35	41	48	58	71	92	137	263
4	38	42	48	55	64	78	95	123	181	353
5	48	53	60	69	81	97	120	156	228	445
6	58	64	73	83	98	117	145	186	275	531
7	68	76	85	97	115	136	169	219	322	622
8	78	87	97	112	131	156	194	253	369	705

**NOTE: 1.** When the UPS is operating in an ambient temperature below 15°C and above 0°C with a single 1U (6AH) EBC, the maximum allowable load is 5kW.

**NOTE: 2.** A minimum of two strings are required to support the full kW load of the UPS (More than 5kW) when operating in an ambient temperature below 15°C and above 0°C.

**NOTE: 3.** An alternative option for cost effectiveness is to use a single 2U (12AH) EBC unit in lieu of 2 x 1U (6AH) EBC units.

**Table 5.4 MPL 192V 6Ah Lithium EBC with ITA2 10kVA Single Phase UPS Models**

Battery Qty	Load Level									
	100%	90%	80%	70%	60%	50%	40%	30%	20%	10%
	10kW	9kW	8kW	7kW	6kW	5kW	4kW	3kW	2kW	1kW
2	10	11	13	15	18	22	28	38	57	111
3	16	18	20	23	28	34	43	58	86	166
4	22	25	28	35	38	46	58	78	115	219
5	28	31	35	41	48	58	73	98	145	275
6	34	38	43	50	58	71	89	119	175	332
7	40	45	51	58	68	83	103	139	204	388
8	47	52	58	67	78	94	117	158	234	445

**NOTE: 1.** When the UPS is operating in an ambient temperature below 15°C and above 0°C at least 4 1U (6AH) EBC units of Lithium EBCs need to be configured to support UPS full load operation.

**NOTE: 2.** For cost effectiveness 2 2U (12AH) EBC units of Lithium EBCs for UPS can be used and the UPS load must be reduced to 6kVA.

**Table 5.5 MPL 192V 6Ah Lithium EBC with ITA2 8kVA Three Phase UPS Models**

Battery String Qty	Load Level									
	100%	90%	80%	70%	60%	50%	40%	30%	20%	10%
	8kW	7.2kW	6.4kW	5.6kW	4.8kW	4kW	3.2kW	2.4kW	1.6kW	0.8kW
1	14	15	17	19	23	28	35	43	66	113
2	28	31	35	38	47	57	71	92	138	246
3	43	48	53	58	72	86	107	137	207	373
4	58	64	72	78	97	115	143	181	273	499
5	73	81	91	98	122	145	181	228	343	629
6	89	98	111	119	148	175	218	275	415	749
7	103	115	128	139	173	204	255	322	485	878
8	117	131	146	158	197	234	292	369	556	995

**Table 5.6 MPL 192V 6Ah Lithium EBC with ITA2 10kVA Three Phase UPS Models**

Battery String Qty	Load Level									
	100%	90%	80%	70%	60%	50%	40%	30%	20%	10%
	10kW	9kW	8kW	7kW	6kW	5kW	4kW	3kW	2kW	1kW
1	10	12	14	16	19	22	28	37	53	96
2	22	25	28	32	38	45	57	74	111	210
3	34	38	43	50	58	70	86	112	166	318
4	46	51	58	67	78	94	115	149	219	426
5	58	64	73	84	98	117	145	188	275	537
6	71	78	89	101	119	142	175	225	332	640
7	83	92	103	117	139	165	204	265	388	750
8	94	105	117	135	158	188	234	305	445	850

**Table 5.7 MPL 192V 6Ah Lithium EBC with ITA2 15kVA Three Phase UPS Models**

Battery String Qty	Load Level									
	100%	90%	80%	70%	60%	50%	40%	30%	20%	10%
	15kW	13.5kW	12kW	10.5kW	9kW	7.5kW	6kW	4.5kW	3kW	1.5kW
1 <sup>⓪</sup>	5	6	8	10	11	14	19	24	37	70
2	14	16	18	23	24	29	38	50	75	148
3	21	25	28	35	37	45	58	76	114	221
4	31	36	38	48	51	61	78	102	153	291
5	38	44	48	60	64	77	98	128	193	366
6	46	54	58	74	78	94	119	155	233	442
7	54	63	68	87	92	109	139	181	271	517
8	62	73	78	98	104	124	158	208	311	593

**Table 5.8 MPL 192V 6Ah Lithium EBC with ITA2 16kVA Three Phase UPS Models**

Battery String Qty	Load Level									
	100%	90%	80%	70%	60%	50%	40%	30%	20%	10%
	16kW	14.4kW	12.8kW	11.2kW	9.6kW	8kW	6.4kW	4.8kW	3.2kW	1.6kW
1 <sup>⓪</sup>	4.0	5.8	7.5	8.6	10.4	14.0	17.8	23.3	35.0	66.3
2	13.0	14.6	16.9	19.3	22.9	28.0	35.6	47.5	71.3	138.8
3	20.0	22.4	26.3	30.0	35.4	43.0	54.4	71.7	107.5	207.5
4	28.0	34.0	35.6	40.7	47.9	58.0	73.1	95.8	143.8	273.8
5	35.0	39.9	45.0	51.4	60.4	73.0	91.9	120.8	181.3	343.8

Table 5.8 MPL 192V 6Ah Lithium EBC with ITA2 16kVA Three Phase UPS Models (continued)

Battery String Qty	Load Level									
	100%	90%	80%	70%	60%	50%	40%	30%	20%	10%
	16kW	14.4kW	12.8kW	11.2kW	9.6kW	8kW	6.4kW	4.8kW	3.2kW	1.6kW
6	43.0	48.6	54.4	62.1	74.0	89.0	111.6	145.8	218.8	415.0
7	51.0	56.4	63.8	72.9	86.5	103.0	130.3	170.0	255.0	485.0
8	58.0	65.1	73.1	83.6	97.9	117.0	148.1	195.0	292.5	556.3

Table 5.9 MPL 192V 6Ah Lithium EBC with ITA2 20kVA Three Phase UPS Models

Battery String Qty	Load Level									
	100%	90%	80%	70%	60%	50%	40%	30%	20%	10%
	20kW	18kW	16kW	14kW	12kW	10kW	8kW	6kW	4kW	2kW
1 <sup>Ⓢ</sup>	2	3	4	6	8	10	14	19	28	53
2	10	11	13	15	18	22	28	38	57	111
3	16	18	20	23	28	34	43	58	86	166
4	22	25	28	35	38	46	58	78	115	219
5	28	31	35	41	48	58	73	98	145	275
6	34	38	43	50	58	71	89	119	175	332
7	40	45	51	58	68	83	103	139	204	388
8	47	52	58	67	78	94	117	158	234	445

**NOTE:** <sup>Ⓢ</sup> When the ambient temperature is 15°C (59°F) or below, one string 192V 6Ah Lithium battery cabinets cannot support full load operation of this UPS model.

**NOTE:** It requires reduced full load operation (ambient temperature 15°C to 0°C, power linear derating normal load to 10kVA) or at least two strings (2 x 1U (6AH)) battery cabinets to ensure full load work, or use one string 192V 2U (12AH) Lithium battery cabinet.

192V 12Ah Backup Time Table to different UPS

Table 5.10 MPL 192V 12Ah Lithium EBC with ITA2 5kVA Single Phase UPS Models

Battery Qty	Load Level									
	100%	90%	80%	70%	60%	50%	40%	30%	20%	10%
	5kW	4.5kW	4kW	3.5kW	3kW	2.5kW	2kW	1.5kW	1kW	0.5kW
1	20	22	28	32	36	46	56	76	118	222
2	44	50	56	64	78	92	116	156	242	448
3	68	76	88	100	118	144	178	240	364	674
4	94	104	116	134	158	194	240	322	484	894
5	118	132	144	168	198	244	302	404	604	1114
6	142	160	172	202	238	294	364	486	724	1334
7	166	188	200	236	278	344	426	568	844	1554
8	190	216	228	270	318	394	488	650	964	1774

Table 5.11 MPL 192V 12Ah Lithium EBC with ITA2 6kVA Single Phase UPS Models

Battery Qty	Load Level									
	100%	90%	80%	70%	60%	50%	40%	30%	20%	10%
	6kW	5.4kW	4.8kW	4.2kW	3.6kW	3kW	2.4kW	1.8kW	1.2kW	0.6kW
1	16.0	18.0	20.6	26.0	30.0	36.0	47.9	63.0	98.3	185.0
2	36.0	41.0	46.9	53.0	60.0	78.0	95.8	129.0	201.7	373.3
3	56.0	63.0	71.3	83.0	96.0	118.0	147.8	199.0	303.3	561.7
4	78.0	86.0	97.5	111.0	130.0	158.0	197.8	267.0	403.3	745.0
5	97.0	109.0	123.8	139.0	164.0	198.0	247.8	335.0	503.3	928.3
6	117.0	132.0	150.0	167.0	198.0	238.0	297.8	403.0	603.3	1111.7
7	137.0	156.0	176.3	195.0	232.0	278.0	347.8	471.0	703.3	1295.0
8	157.0	179.0	202.5	224.0	266.0	318.0	397.8	539.0	803.3	1478.3

Table 5.12 MPL 192V 12Ah Lithium EBC with ITA2 10kVA Single Phase UPS Models

Battery Qty	Load Level									
	100%	90%	80%	70%	60%	50%	40%	30%	20%	10%
	10kW	9kW	8kW	7kW	6kW	5kW	4kW	3kW	2kW	1kW
1	10	11	14	16	18	23	28	38	59	111
2	22	25	28	32	39	46	58	78	121	224
3	34	38	44	50	59	72	89	120	182	337
4	47	52	58	67	79	97	120	161	242	447

Table 5.12 MPL 192V 12Ah Lithium EBC with ITA2 10kVA Single Phase UPS Models (continued)

Battery Qty	Load Level									
	100%	90%	80%	70%	60%	50%	40%	30%	20%	10%
	10kW	9kW	8kW	7kW	6kW	5kW	4kW	3kW	2kW	1kW
5	59	66	72	84	99	122	151	202	302	557
6	71	80	86	101	119	147	182	243	362	667
7	83	94	100	118	139	172	213	284	422	777
8	95	108	114	135	159	197	244	325	482	887

NOTE: 1. When the UPS is operating in an ambient temperature below 15°C and above 0°C, at least 2 units (2 x 2U (12AH) EBC units) need to be configured to support UPS full load operation.

NOTE: 2. An alternative option for cost effectiveness is to use a single 2U (12AH) EBC units and the UPS load must be reduced to 6kVA.

Table 5.13 MPL 192V 12Ah Lithium EBC with ITA2 8kVA Three Phase UPS Models

Battery String Qty	Load Level									
	100%	90%	80%	70%	60%	50%	40%	30%	20%	10%
	8kW	7.2kW	6.4kW	5.6kW	4.8kW	4kW	3.2kW	2.4kW	1.6kW	0.8kW
1	28	29	35	38	47	56	73	97	138	260
2	56	61	72	76	97	116	151	200	280	525
3	88	97	111	119	150	178	227	302	421	789
4	116	131	150	161	201	240	302	401	558	1046
5	144	164	188	202	252	302	377	501	696	1304
6	172	197	227	244	303	364	452	600	833	1561
7	200	230	266	285	355	426	527	700	971	1819
8	228	263	305	327	406	488	602	800	1108	2076

Table 5.14 MPL 192V 12Ah Lithium EBC with ITA2 10kVA Three Phase UPS Models

Battery String Qty	Load Level									
	100%	90%	80%	70%	60%	50%	40%	30%	20%	10%
	10kW	9kW	8kW	7kW	6kW	5kW	4kW	3kW	2kW	1kW
1	20	22	28	32	36	46	56	76	118	222
2	44	50	56	64	78	92	116	156	242	448
3	68	76	88	100	118	144	178	240	364	674
4	94	104	116	134	158	194	240	322	484	894
5	118	132	144	168	198	244	302	404	604	1114

**Table 5.14 MPL 192V 12Ah Lithium EBC with ITA2 10kVA Three Phase UPS Models (continued)**

Battery String Qty	Load Level									
	100%	90%	80%	70%	60%	50%	40%	30%	20%	10%
	10kW	9kW	8kW	7kW	6kW	5kW	4kW	3kW	2kW	1kW
6	142	160	172	202	238	294	364	486	724	1334
7	166	188	200	236	278	344	426	568	844	1554
8	190	216	228	270	318	394	488	650	964	1774

**Table 5.15 MPL 192V 12Ah Lithium EBC with ITA2 15kVA Three Phase UPS Models**

Battery String Qty	Load Level									
	100%	90%	80%	70%	60%	50%	40%	30%	20%	10%
	15kW	13.5kW	12kW	10.5kW	9kW	7.5kW	6kW	4.5kW	3kW	1.5kW
1	14.9	16.6	18.0	21.9	25.6	29.9	38.0	52.4	78.7	148.0
2	29.9	33.2	39.0	43.8	51.1	61.9	78.0	107.6	161.3	298.7
3	46.9	51.9	59.0	68.6	80.0	94.9	120.0	161.8	242.7	449.3
4	61.9	69.5	79.0	92.4	107.8	128.0	161.0	215.1	322.7	596.0
5	76.8	87.1	99.0	116.2	135.6	161.1	202.0	268.4	402.7	742.7
6	91.7	104.7	119.0	140.0	163.3	194.1	243.0	321.8	482.7	889.3
7	106.7	122.4	139.0	163.8	191.1	227.2	284.0	375.1	562.7	1036.0
8	121.6	140.0	159.0	187.6	218.9	260.3	325.0	428.4	642.7	1182.7

**Table 5.16 MPL 192V 12Ah Lithium EBC with ITA2 16kVA Three Phase UPS Models**

Battery String Qty	Load Level									
	100%	90%	80%	70%	60%	50%	40%	30%	20%	10%
	16kW	14.4kW	12.8kW	11.2kW	9.6kW	8kW	6.4kW	4.8kW	3.2kW	1.6kW
1	14.0	15.6	16.9	19.3	24.0	28.0	35.6	49.2	73.8	138.8
2	28.0	31.1	36.6	41.8	47.9	58.0	73.1	100.8	151.3	280.0
3	44.0	48.6	55.3	63.2	75.0	89.0	112.5	151.7	227.5	421.3
4	58.0	65.1	74.1	84.6	101.0	120.0	150.9	201.7	302.5	558.8
5	72.0	81.7	92.8	106.1	127.1	151.0	189.4	251.7	377.5	696.3
6	86.0	98.2	111.6	127.5	153.1	182.0	227.8	301.7	452.5	833.8
7	100.0	114.7	130.3	148.9	179.2	213.0	266.3	351.7	527.5	971.3
8	114.0	131.3	149.1	170.4	205.2	244.0	304.7	401.7	602.5	1108.8

**Table 5.17 MPL 192V 12Ah Lithium EBC with ITA2 20kVA Three Phase UPS Models**

Battery String Qty	Load Level									
	100%	90%	80%	70%	60%	50%	40%	30%	20%	10%
	20kW	18kW	16kW	14kW	12kW	10kW	8kW	6kW	4kW	2kW
1	10	11	14	16	18	23	28	38	59	111
2	22	25	28	32	39	46	58	78	121	224
3	34	38	44	50	59	72	89	120	182	337
4	47	52	58	67	79	97	120	161	242	447
5	59	66	72	84	99	122	151	202	302	557
6	71	80	86	101	119	147	182	243	362	667
7	83	94	100	118	139	172	213	284	422	777
8	95	108	114	135	159	197	244	325	482	887

**Table 5.18 MPL 192V 12Ah Lithium EBC with ITA2 30kVA Three Phase UPS Models**

Battery String Qty	Load Level									
	100%	90%	80%	70%	60%	50%	40%	30%	20%	10%
	30kW	27kW	24kW	21kW	18kW	15kW	12kW	9kW	6kW	3kW
2	15	16	18	21	25	30	39	52	78	173
3	22	25	28	32	38	47	59	81	120	260
4	30	34	38	43	52	63	79	109	161	345
5	38	43	48	55	66	78	99	137	202	430
6	47	52	59	67	80	93	119	165	243	515
7	56	62	70	79	94	109	139	193	284	600
8	65	72	80	91	108	125	159	221	325	685

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## **Appendix B: Technical Support and Contacts**

### **B.1 Technical Support/Service**

Vertiv Group Corporation

24x7 dispatch of technicians for all products.

1-800-543-2378

**Liebert® Thermal Management Products**

1-800-543-2778

**Liebert® Channel Products**

1-800-222-5877

**Liebert® AC and DC Power Products**

1-800-543-2378

**Website**

[www.vertiv.com](http://www.vertiv.com)

**Monitoring**

[liebert.monitoring@vertiv.com](mailto:liebert.monitoring@vertiv.com)

800-222-5877

Outside North America: +00800 1155 4499

**Three-Phase UPS & Power Systems**

800-543-2378

Outside North America: 614-841-6598

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