



# SolBank3.0 Installation Manual

V1.8.4

e-Storage Energy Storage Technologies Co., Ltd.

This manual is verified to be accurate at the date of publication identified within Section 1.3.

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# 1 Preface

## 1.1 Document Purpose and Scope

The purpose of this document is to provide an overview of the processes and procedures required to install the SolBank3.0 series (referring to all application models mentioned in Section 1.2, unless specifically stated otherwise, this will not be reiterated in the following text.) Energy Storage System (ESS) (1500V models only). The scope of this manual is limited to only those tasks applicable to installation of this product. Topics covered, pre- installation inspections and checks; equipment receiving, unloading, and inspections; equipment mechanical and electrical installation; and equipment cleaning and installation inspections.

This manual should be made available to all field personnel participating in the design and installation of the DC SolBank3.0 series energy storage system.

This manual is to be considered supplemental to project specific design and safety documentation. Please read and understand all aspects of this document prior to initiating SolBank3.0 series installation.

Should any questions arise, please contact e-STORAGE support:

- By telephone at +1-519-837-1881

## 1.2 Applicable Models

This manual covers the following models:

- CSI-SolBank-S-5016-2h-NA
- CSI-SolBank-S-5016-4h-NA
- CSI-SolBank-S-5016-2h-EU
- CSI-SolBank-S-5016-4h-EU
- CSI-SolBank-S-PL-5016-2h-NA
- CSI-SolBank-S-PL-5016-4h-NA
- CSI-SolBank-S-PL-5016-2h-EU
- CSI-SolBank-S-PL-5016-4h-EU
- CSI-SolBank-S-5016-2h-NA-LH
- CSI-SolBank-S-5016-4h-NA-LH
- CSI-SolBank-S-5016-2h-EU-LH
- CSI-SolBank-S-5016-4h-EU-LH
- CSI-SolBank-S-PL-5016-2h-EU-LH
- CSI-SolBank-S-PL-5016-4h-EU-LH

## 1.3 Reference Documents

The SolBank3.0 series Installation Manual exists as part of library of product specific documents. Please consult the following documents to ensure a comprehensive understanding of SolBank3.0

series attributes.

- *SolBank3.0 Installation Manual*
- *SolBank3.0 User Manual*
- *SolBank3.0 Safety Manual*
- *SolBank3.0 Maintenance Manual*
- *SolBank3.0 Commissioning Manual*
- *SolBank3.0 Decommissioning Manual*
- *SolBank3.0 Transportation Instruction Document*

## 1.4 Version Control

This is the initial release of the DC SolBank3.0 series Installation manual. As part of e-STORAGE's continuous improvement process, e-STORAGE reserves the right to make technology and document changes. Please contact e-STORAGE support to verify this manual reflects the most recent release or to report omissions or inaccuracies.

| Version                             | Description                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    | Date of Issuance |
|-------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------|
| SolBank3.0 Installation Manual_V1.0 | Initial publication date                                                                                                                                                                                                                                                                                                                                                                                                                                                                       | 2024.2.2         |
| SolBank3.0 Installation Manual_V1.1 | 1. Add String PCS Version related content;<br>2. Updated requirements of DC cables in table 11 at item 5.4.5                                                                                                                                                                                                                                                                                                                                                                                   | 2024.8.9         |
| SolBank3.0 Installation Manual_V1.2 | 1. Add a table "list of Fire Safety System equipment" at item 3.2;<br>2. Updated the foundation height requirements;<br>3. Updated installation order at item 5.1.1;<br>4. Add installation order requirement of DC cables for string PCS version;<br>5. Updated the maximum wire diameter of the DC cable from 187.5kcmil (95mm <sup>2</sup> ) to 237kcmil (120mm <sup>2</sup> ) for the 0.25P centralized PCS version at table 12, item 5.4.5.                                               | 2024.10.16       |
| SolBank3.0 Installation Manual_V1.3 | 1. Updated the foundation height in the relevant drawings and change from 190~400mm to 150~400mm;<br>2. Updated the torque for Bridge locks at item 5.1.5;<br>3. Updated the location of the Shockaction indicator and Tilt sensor at item 5.5.3;<br>4. Updated wiring instructions at item 5.5.4. Updated the step of rack level power cable connection. Added the MSD installation instruction.                                                                                              | 2024.11.12       |
| SolBank3.0 Installation Manual_V1.4 | 1. Updated the size of the left side wall of the cabinet is changed from 1700 to 1500mm at item 3.3.2;<br>2. Update Figure 10 to show the height of clamp at item 5.1.4;<br>3. Update the provider of twist lock in figure 11 at item 5.1.5;<br>4. Added the procedure description for removing the desiccants at item 5.2.3;<br>5. Delete the embedded ground bar at item 5.4.4;<br>6. The reasonable opening time of the exposure is added at item 5.2.1, 5.3.3, 5.4.5, 5.4.6, 5.5.4, 6.1.1; | 2024.12.5        |

|                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |           |
|---------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
|                                       | <ul style="list-style-type: none"> <li>7. Added a chapter 7 to show the difference of String Solution;</li> <li>8. Added description of black start solution at item 4.5.2;</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |           |
| SolBank3.0 Installation Manual_V1.5   | <ul style="list-style-type: none"> <li>1. Revise the typo in figure 3 at item 3.3.1;</li> <li>2. Updated the aux power consumption table at item 4.5.2;</li> <li>3. Accessories such as MSD, bridge lock, e.t are added in the box description at item 5.1.4;</li> <li>4. Added the description of fire reserve power cable installation at item 5.3.3;</li> <li>5. Change the grounding detail in figure 20 at item 5.4.4;</li> <li>6. Added UPS battery wiring description at item 5.4.6;</li> <li>7. Updated wiring instructions at item 5.5.4;</li> <li>8. Added some spare parts in Installation Components List at item 8.1;</li> <li>9. Add a reminder to reference to other documents "Transportation Instruction" and "SolBank Transportation &amp; Storage SOP" when transporting at item 3.3.1.</li> <li>10. Add fast stop input/output control logic in figure 26 at item 5.4.6</li> </ul> | 2025.1.22 |
| SolBank3.0 Installation Manual_V1.5.1 | <ul style="list-style-type: none"> <li>1. Change fast stop input/output control logic in figure 26 at item 5.4.6</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 2025.2.7  |
| SolBank3.0 Installation Manual_V1.5.2 | <ul style="list-style-type: none"> <li>1. Update Figure 10 to cancel the recommended value of the DC cable diameter at item 5.1.4;</li> <li>2. Change the description of DC cable at item 5.4.5;</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            | 2025.2.26 |
| SolBank3.0 Installation Manual_V1.6   | <ul style="list-style-type: none"> <li>1. Update Figure 33 by removing the DC cable recommended values, change DMC copper busbar layout, and descriptions related to DC cable recommended values in the solution section and update Figure 34 at item 7;</li> <li>2. Update Figures 2, 4-1 and 13, to remove the frame reserved for the ventilation fan in the figures;</li> <li>3. Update Figure 11 to show the spare parts may be placed at item 5.1.4;</li> <li>4. Update Figure 18 to show the fire reserve power cable installation at item 5.3.3;</li> <li>5. Added SolBank3.0 series description.</li> <li>6. Add certification description and reference document information to Section 3.3.2</li> <li>7. Adjust the ordering of Figure 19</li> </ul>                                                                                                                                         | 2025.4.24 |

|                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |           |
|---------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
|                                       | (Process Flow Chart) in Section 5.4.1.<br>8. Three signs have been added in Section 1.5.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |           |
| SolBank3.0 Installation Manual_V1.7   | <ol style="list-style-type: none"> <li>1. In Section 5.4.5, add an explanation of the number of cables clamped by the cable clamp on the DC side of the DMC Busbar Cabinet.</li> <li>2. Revise Section 5.1.4, Replace the label in Figure 10 to indicate the number of DC cables clamped by the cable clamp.</li> </ol>                                                                                                                                                                                                                                                                                                                                                                                                                                  | 2025.6.12 |
| SolBank3.0 Installation Manual_V1.8   | <ol style="list-style-type: none"> <li>1. Update the flowchart content in Figure 7 of Chapter 5.</li> <li>2. Update the content of the process flow diagram in Section 5.4.1.</li> <li>3. Update the description in section 5.5.5.</li> <li>4. Update Appendix 4 of Chapter 8 by adding IR test record items.</li> <li>5. Update the flow chart in Section 5.</li> <li>6. Update the flow chart in Section 5.4.1.</li> <li>7. Section 5.5.4: Delete Figure 29-2 and remove the cable connection procedure.</li> <li>8. Section 5.5.5: Delete the description of cable insertion</li> <li>9. Section 5.1.4: Add notes for single and double busbar to Figure 10.</li> <li>10. Section 3.3.1: Add a description of the cabinet drainage design.</li> </ol> | 2025.7.29 |
| SolBank3.0 Installation Manual_V1.8.1 | <ol style="list-style-type: none"> <li>1. In Chapter 7, change Position D in Figure 34 to Double-hole wiring lugs.</li> <li>2. Update to Section 5.5.3 Description.</li> <li>3. Update the description in section 5.5.4.</li> <li>4. Update the flowchart content in Figure 7 of Chapter 5.</li> <li>5. Update Figure 16 in Section 5.2.3 by adding instructions for removing desiccants from the DMC cabinet.</li> <li>6. Section 5.2.1, Change of PPE Level.</li> <li>7. Change the capacity and power values for 0.25/0.5P string-type configurations in Chapter 7.</li> </ol>                                                                                                                                                                        | 2025.9.1  |
| SolBank3.0 Installation Manual_V1.8.2 | <ol style="list-style-type: none"> <li>1. Section 5.3 shall be supplemented with instructions for aerosol control wiring connection.</li> <li>2. In Chapter Seven, change the value of "DC Cables-0.5P" in the "String PCS Solution" table to <b>2473A</b>.</li> <li>3. In Chapter Eight, Appendix 2, delete the "Water Machine Protection Board Operation" item from the checklist.</li> <li>4. Delete the AUS model from Section</li> </ol>                                                                                                                                                                                                                                                                                                            | 2025.12.1 |

|                                       |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |           |
|---------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------|
|                                       | <p>1.2, as this model is undefined, and add the 3.0 Mirror Model and 3.0 PL Mirror Model.</p> <p>5. Section 5.5.3 has been updated to include display specifications for the Mircom and Fusion fire safety systems.</p> <p>6. In Chapter 3.2, Table 2 is revised to indicate that the smoke + temperature detectors inside the DMC cabinet are optional.</p> <p>7. In Section 5.1.5, replace Figure 12 and add the welding fixation method.</p>                                                            |           |
| SolBank3.0 Installation Manual_V1.8.3 | <p>1. In Chapter 7, replace Figure 33 and modify the quantity of auxiliary materials.</p> <p>2. Modify the grounding bolt specifications in Section 5.4.4.</p>                                                                                                                                                                                                                                                                                                                                             | 2026.1.26 |
| SolBank3.0 Installation Manual_V1.8.4 | <p>1. Modify Section 5.4.5 and Section 7, remove the cable selection calculation coefficient of 1.2, and recalculate.</p> <p>2. In Chapter 5.1.5, replace Figure 12, Display the distance details between the bottom steel plate and corner fittings.</p> <p>3. In the preventive measures, revise the description of the fire standby power supply in Section 5.3.2.</p> <p>4. Chapter 7: Update the description of hole quantities for string cables and copper busbars, Modify bolt specifications.</p> | 2026.6.17 |

## 1.5 Document Safety Notices

Throughout this manual the below indicated Danger, Warning, and Caution labels are used to convey hazards associated with specific tasks and procedures. These safety notices do not represent all hazards present when performing a given task. Installers and operators of the SolBank3.0 series should adhere to industry safety best practices; site specific Environment, Health and Safety plans; and local safety requirements and regulations. *Only properly trained and qualified personnel should be permitted to complete the installation procedures identified in this manual.*



“DANGER” indicates a hazardous situation which, if not avoided, will result in death or serious injury. The signal word "DANGER" is limited to the most extreme situations. DANGER indicators are not used for property damage hazards unless personal injury risk appropriate to these levels is also involved.



“WARNING” indicates a hazardous situation which, if not avoided, could result in death or serious injury. WARNING indicators are not used for property damage hazards unless personal injury risk appropriate to this level is also involved.



“CAUTION” indicates a hazardous situation which, if not avoided, could result in minor or moderate injury. CAUTION indicators without a safety alert symbol may be used to alert against unsafe practices that can result in property damage only.



Consult instructions for use.



Noise source



cTUVus certification

## 1.6 Risk of Electric Shock



The primary risk associated with the installation of the SolBank3.0 series is electrical shock. *Installation and operational personnel will be exposed to voltages up to 1500 VDC from the SolBank3.0 series' battery packs.* Battery packs cannot be de-energized. 1500 voltage AC is also present - exposure levels will depend on site specific conditions. Risk of arc flash and electrocution is omnipresent at an ESS site. e-STORAGE encourages full compliance with the practices and procedures indicated in NFPA 70E including use of Personal Protective Equipment (PPE) sufficient to mitigate any hazards identified in a site-specific arc flash study.

Please refer to the remainder of this manual, the documents identified in Section 1.3, and a project/site specific EH&S plan for additional safety hazards.

## 1.7 Product Certification and Compliance

SolBank3.0 series is compliant or have referenced following standards, regulations, and requirements identified in Table 1.

Table 1: SolBank3.0 series Standards Compliance

| Classification             |                       | Regions | Standards                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
|----------------------------|-----------------------|---------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| System                     | Design regulations    | ALL     | NEC – National Electrical Code®<br>IEEE C84.1 – Standard Preferred Voltage Ratings for Alternating-Current Electrical Systems<br>IEEE 693 – Recommended Practice for Seismic Design of Substations<br>IEEE 1584-2018 – Guide for Performing Arc-Flash Hazard Calculations<br>NFPA 855 – Installation of Energy Storage Systems<br>NFPA 70E® – Standard for Electrical Safety in the Workplace®<br>NFPA 72 – National Fire Alarm and Signaling Code<br>IEC62933-5-2 – Safety requirements for grid-integrated EES systems - Electrochemical-based systems<br>AS3000 - Electrical installations “Wiring Rules”                                                                                 |
|                            | Product certification | NA      | IEC 60529 – Degrees of protection provided by enclosure<br>UL 60730-1 – Standard for safety: Automatic Electrical Controls – Part 1: General Requirements<br>NFPA 69® – Standard on Explosion Prevention Systems<br>NFPA 68® – Standard on Explosion Protection by Deflagration Venting<br>UL9540A – Standard for Test Method for Evaluating Thermal Runaway Fire Propagation in Battery Energy Storage Systems<br>UL1973 – Standard for safety: Batteries For Use In Stationary And Motive Auxiliary Power Applications<br>UL9540 – Standard For safety: Energy Storage Systems And equipment<br>UN38.3 – Recommendations on the Transport of Dangerous Goods: Manual of Tests and Criteria |
|                            | Product certification | EU      | IEC62619 – Secondary cells and batteries containing alkaline or other non-acid electrolytes - Safety requirements for secondary lithium cells and batteries, for use in industrial applications<br>IEC63056 – Secondary cells and batteries containing alkaline or other non-acid electrolytes - Safety requirements for secondary lithium cells and batteries for use in electrical energy storage systems<br>IEC/EN 62477-1 – Safety requirements for power electronic converter systems and equipment - Part 1: General<br>IEC/EN 61000 – Electromagnetic compatibility (EMC)                                                                                                             |
| Fire Protection and Safety | Design regulation     | NA      | NFPA 2001 – Standard on Clean Agent Fire Extinguishing Systems<br>NFPA 15 – Standard for Water Spray Fixed System for Fire Protection<br>NFPA 2-2023 – Hydrogen technologies code                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
|                            |                       | EU      | BS 5839-1 – Fire detection and fire alarm systems for buildings<br>BS 7273 -1 – Code of practice for the operation of fire protection measures                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |

|  |  |            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|--|--|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|  |  |            | <p><b>BS EN 54 Pt1- 21 – series for equipment</b></p> <p><b>BS EN 15004-1:-2019 – Fixed firefighting systems. Gas extinguishing systems. Design, installation and maintenance.</b></p> <p><b>BS EN 15004-2:2020 – Fixed Firefighting Systems-Gas Extinguishing Systems FK-5-1-12</b></p> <p><b>BS 6266:2011 – Fire protection for electronic equipment installations– Code of practice</b></p> <p><b>BS EN 12094-1:2003 – Fixed firefighting systems. Components for gas extinguishing systems Requirements and test methods for electrical automatic control and delay devices</b></p> |
|  |  | <b>AUS</b> | <p><b>AS 4487-2013 – Condensed aerosol fire extinguishing systems – Requirements for system design, installation and commissioning and test methods for components</b></p> <p><b>AS 7240– Fire Detection and Alarm Systems</b></p> <p><b>AS1670 – Fire detection, warning, control and intercom systems – System design, installation and commissioning</b></p> <p><b>AS 1851-2012 – Routine service of fire protection systems and equipment</b></p>                                                                                                                                   |

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## 2 Acronyms and Abbreviations

AC - Alternating Current

AHJ - Authority Having Jurisdiction

BMS - Battery Management System

BOL - Beginning of Life

COG - Center of Gravity

DC - Direct Current

DMC - Distribution Management Cabinet

EMS - Energy Management System as the communication system that controls and monitors the SolBank3.0 series

EOR - Engineer of Record

ESS - Energy Storage System

EPC - Engineering, Procurement, and Construction contractor

HVAC - Heating Ventilation Air Conditioning

IFC - Issued for Construction

Installer - Installer of the SolBank3.0 series

LFP - Lithium Iron Phosphate

LOTO - Lock-Out-Tag-Out

NFPA - National Fire Protection Association

PCS - Power Conversion System (Inverter)

PPE - Personnel Protective Equipment

SPD - Surge Protection Device

SolBank3.0 series Controller - Local controller of the SolBank3.0 series BMS that communicates with the EMS

UPS - Uninterruptible Power Supply

MSD- Manual Service Disconnect

## 3 Introduction

### 3.1 Acknowledgement

Thank you for purchasing the containerized SolBank3.0 series system supplied by e-STORAGE. The SolBank3.0 series is an advanced modular battery energy storage system incorporating industry leading capabilities enabled by cutting-edge technologies and innovative design. High energy density, liquid cooled battery and power electronics, extended service life, and advanced safety features are just a few of the attributes that set the SolBank3.0 series apart from other ESS products.

The SolBank3.0 series is fully factory integrated and tested at e-STORAGE's facility, arriving on site with battery racks populated and sub systems installed. This high level of pre-integration results in rapid installation, reduced EPC CapEx, and improved system performance and reliability.

The following document provides an overview of the SolBank3.0 series system and the installation steps required for successful integration with other system equipment and controls.

### 3.2 System Overview

The SolBank3.0 series system integrates all power electronics, controls, and safety features required to support the DC side of a battery energy storage system. An overview of the DC Pro layout and key features is shown in Figure 1-1 and further described in Table 3.

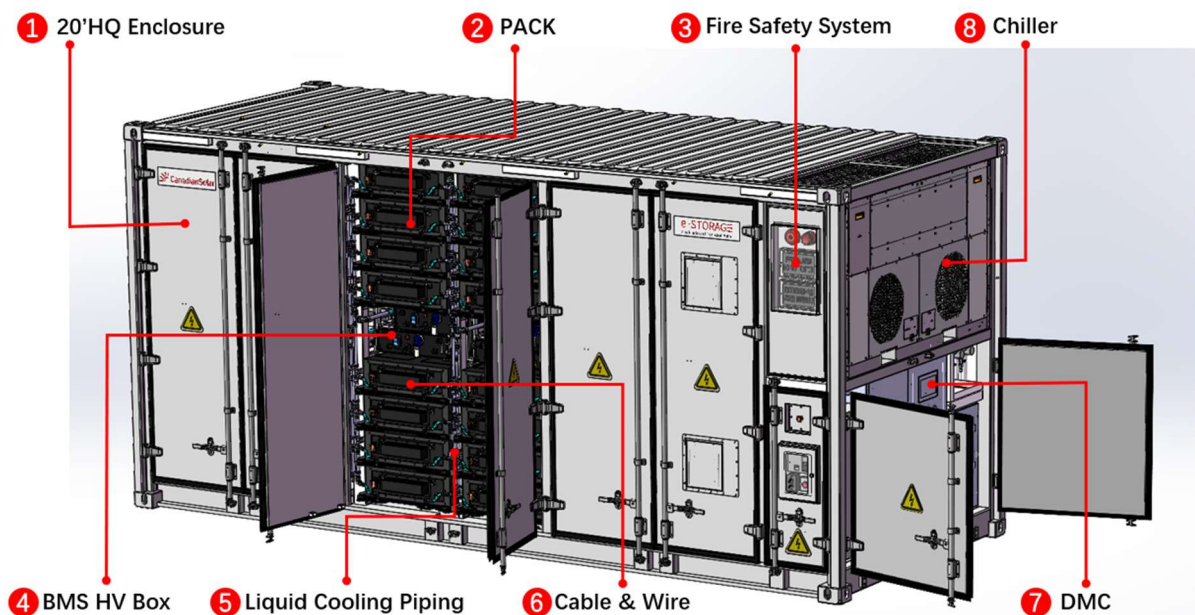


Figure 1-1: Layout and features of the SolBank3.0 series

## Introduction to Fire Protection System Diagram

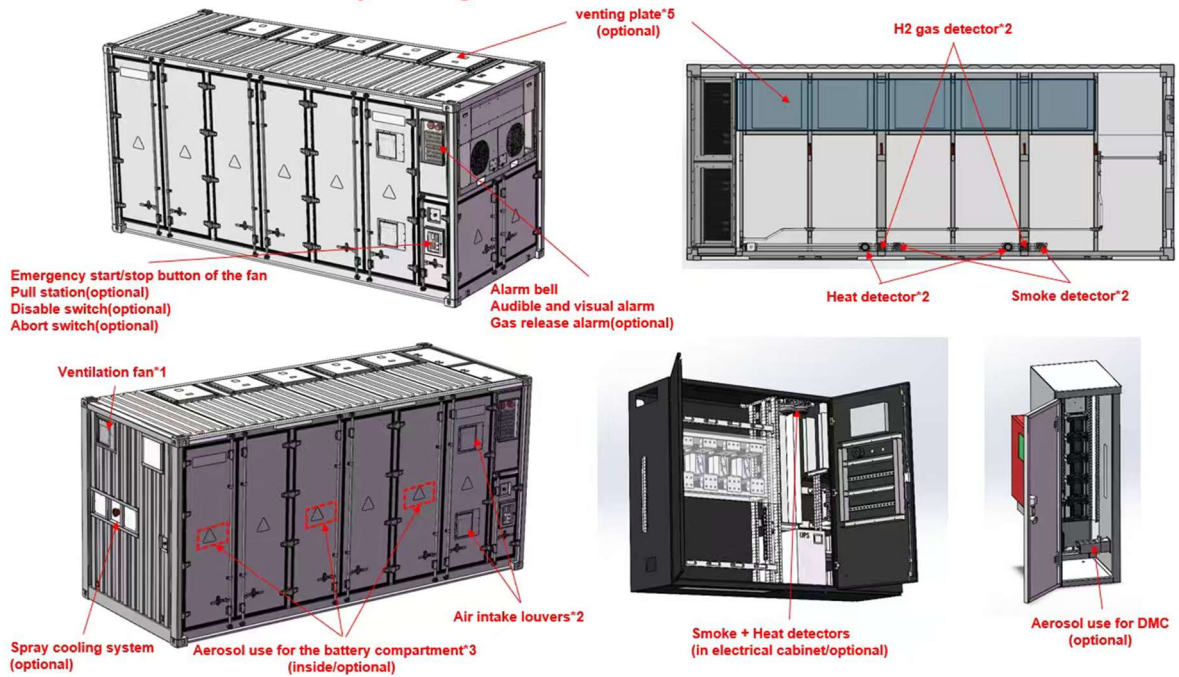


Figure 1-2: Layout and features of the SolBank3.0 series

Table 2: List of Fire Safety System equipment

|    | Name                                    | Quantity | Remark   |
|----|-----------------------------------------|----------|----------|
| 1  | Fire Alarm Control Panel                | 1        | Standard |
| 2  | Smoke detector                          | 2        | Standard |
| 3  | Heat detector                           | 2        | Standard |
| 4  | Audible and visual alarm                | 2        | Standard |
| 5  | Alarm bell                              | 1        | Standard |
| 6  | H2 detector                             | 2        | Standard |
| 7  | Air intake louver                       | 2        | Standard |
| 8  | Ventilation fan                         | 1        | Standard |
| 9  | Emergency start/stop button of the fan  | 1        | Standard |
| 10 | Aerosol use for the battery compartment | 3        | Optional |
| 11 | Aerosol use for DMC                     | 1        | Optional |
| 12 | Disable switch                          | 1        | Optional |
| 13 | Pull station                            | 1        | Optional |
| 14 | Abort switch                            | 1        | Optional |
| 15 | Gas release alarm                       | 1        | Optional |
| 16 | Venting plate                           | 5        | Optional |
| 17 | Spray cooling system                    | 1        | Optional |
| 18 | Smoke detector use for DMC              | 1        | Optional |
| 19 | Heat detector use for DMC               | 1        | Optional |

Table 3: Key System Features

| NO. | Name                        | Remarks                                                                                                                                                                                                                                                                                                                                                             |
|-----|-----------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| 1   | Standard Enclosure and Rack | All models of the SolBank3.0 series utilize a standard IP55 rated 20'ft HC container and battery rack design allowing for enhanced system modularity.                                                                                                                                                                                                               |
| 2   | Pack                        | The SolBank3.0 series contains 48 Lithium Iron Phosphate (LFP) battery packs, each consisting of 104 series wired battery cells.                                                                                                                                                                                                                                    |
| 3   | Fire Safety System          | The SolBank3.0 series combines FACP, heat, smoke and gas detection with an explosion-proof ventilation system.                                                                                                                                                                                                                                                      |
| 4   | BMS HV Box                  | The SolBank3.0 series contains 12 BMS HV boxes. These are easily accessed for installation and maintenance within the middle line of the container. The BMS ensure optimal battery functionality and safety.                                                                                                                                                        |
| 5   | Liquid Cooling piping       | The liquid-cooled piping connecting the chiller to the packs.                                                                                                                                                                                                                                                                                                       |
| 6   | Cable & Wire                | High-voltage connection and low-voltage communication power cable.                                                                                                                                                                                                                                                                                                  |
| 7   | DMC                         | The Distribution and Control Cabinet houses all aux power distribution equipment including 2-hour backup UPS; system communication, control, and monitoring hardware including network switch, and Local EMS, and all required customer communication, signal, and aux power interfaces.                                                                            |
|     | Junction Box                | The SolBank3.0 series' DC Junction box contains all primary DC busbar, fusing, Surge Protection Devices (SPD), and power monitoring required to safely exchanged power between the SolBank3.0 series and PCS.                                                                                                                                                       |
| 8   | Chiller                     | The SolBank3.0 series' liquid cooling/heating system facilitates improved battery temperature management efficiency relative to traditional forced air systems. Each battery pack is liquid cooled, allowing for greater heat dissipation and uniform cell temperature management. During charge and discharge, cell temperature is maintained between 20°C - 35°C. |

### 3.3 System Specifications

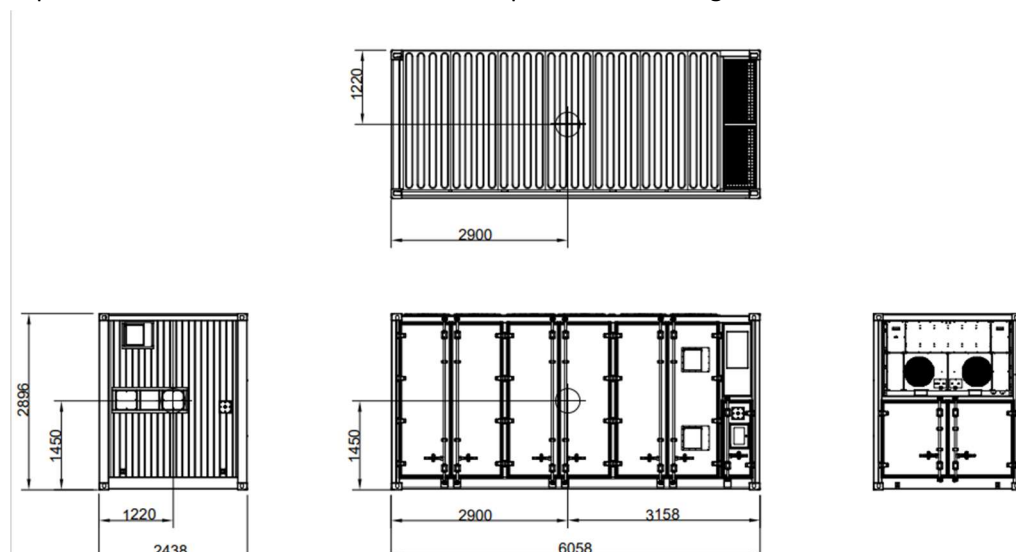
The SolBank3.0 series system includes two following different P-rate products, as shown in Table 4 below.

*Table 4: SolBank3.0 series Specifications.*

| Item                             | Parameters                          |                           |
|----------------------------------|-------------------------------------|---------------------------|
| Discharge Duration               | 2-hour                              | 4-hour                    |
| Charge/Discharge P-rate          | 0.5P                                | 0.25P                     |
| Nominal Capacity (kWh)           | 5016                                | 5016                      |
| Rated DC Capacity (kWh)          | 4700(For Centralized PCS)           | 4800(For Centralized PCS) |
| Operating DC Voltage Range (VDC) | 1164.8 ~ 1497.6                     |                           |
| Recommended Discharge Power (kW) | 2350(For Centralized PCS)           | 1200(For Centralized PCS) |
| # of LFP Battery Packs           | 48                                  | 48                        |
| # of BMS HV Boxes                | 12                                  | 12                        |
| Operating temperature            | -30°C to 55°C (Ambient temperature) |                           |

#### 3.3.1 Dimension and Weight

The dimension and weight of SolBank3.0 series are presenting in the following figures. The weight may vary slightly with tolerance. Be sure to verify the approximate gross weight and center of gravity (COG), as shown in the Figure 2. For lifting procedure may refer to description of Section 5.1 and transportation cautions are clarified in other CSI e-STORAGE documents "Transportation Instruction" and "SolBank Transportation & Storage SOP"



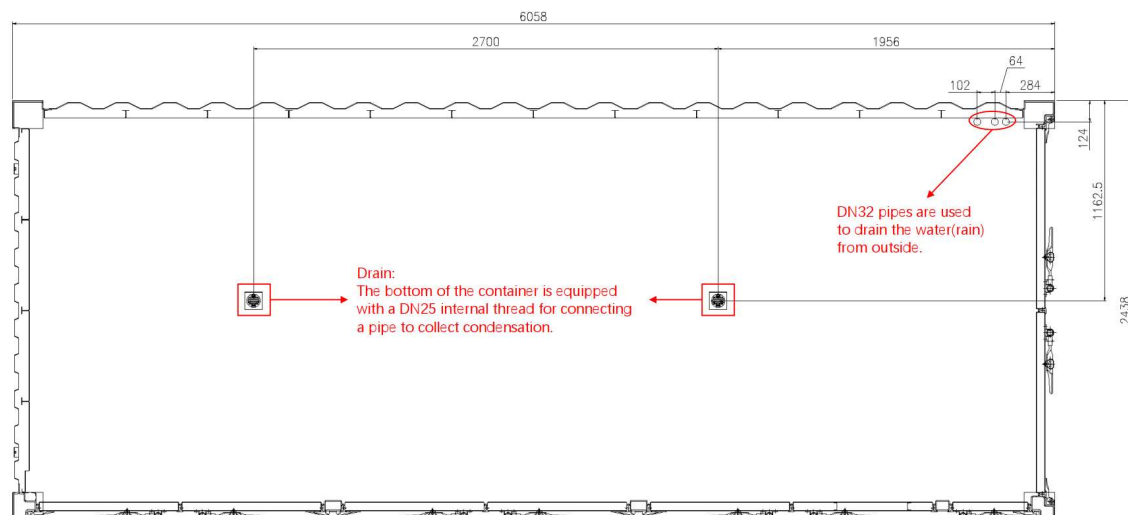
*Figure 2 The Center of gravity of SolBank3.0 series (refer to Dwg NO. M170)*



Figure 3 The dimension of SolBank3.0 series

| Product Version               | Length (mm) | Depth (mm) | Height (mm) | Approximate Standard Weight (kg) |
|-------------------------------|-------------|------------|-------------|----------------------------------|
| 0.25P, 0.5P SolBank3.0 series | 6058        | 2438       | 2896        | 43,000                           |

The bottom of SolBank3.0 series containers is equipped with two floor drains use for connecting a pipe to collect condensation and three DN32 pipes use for drain the water from outside. When there is water inside SolBank, the water will go straight through the floor drain.



Top Section View of SolBank3.0

Figure 3-1: Drain design of SolBank3.0 series

### 3.3.2 Site Layout and Clearances

The following sections provide guidance on the minimum equipment clearances and displacements required for maintenance and ventilation. Site designers and installers should always consult with the local agency having jurisdiction (AHJ) and fire department personnel regarding applicable codes and regulations, project-specific interpretations of NFPA 855, and other site safety and access considerations. Such project specific restrictions and requirements may increase required clearances beyond those noted below.

The SolBank3.0 series can be installed as a stand-alone unit or back-to-back with another SolBank3.0 series, as shown in Figure 4-1. The left side of SolBank3.0 series should keep no less than 1500mm (50.06") for air exhaust distance, maintenance of the liquid cooling piping and safety channel distance. The right side of SolBank3.0 series should keep no less than 2500mm (98.43") for maintenance of the chiller. If the top is covered, the top clearance should be greater than 3000mm to ensure that the chiller has enough space to dissipate heat.

When mounted back-to-back, the clearance between adjacent SolBank3.0 series surfaces must not exceed 250 mm (9.8"). This dimension is limited by the SolBank3.0 series attachment hardware ("Bridge lock") used for back-to-back mounting. However, a clearance of from 20(0.79") to 150 mm (5.91") between SolBank3.0 series is recommended. When SolBank3.0 series are installed back-to-back with the bridge lock, then only four anchor brackets are required, one bracket in each corner and bridge locks fitted linking the back-to-back SolBank3.0 series.

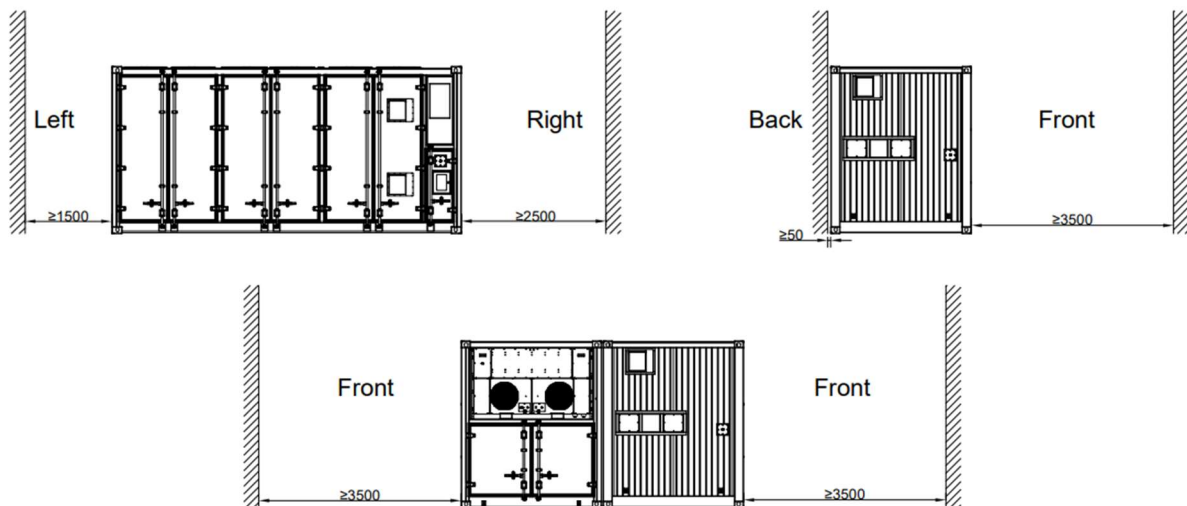


Figure 4-1: SolBank3.0 series recommended clearances (refer to Dwg NO. M110)

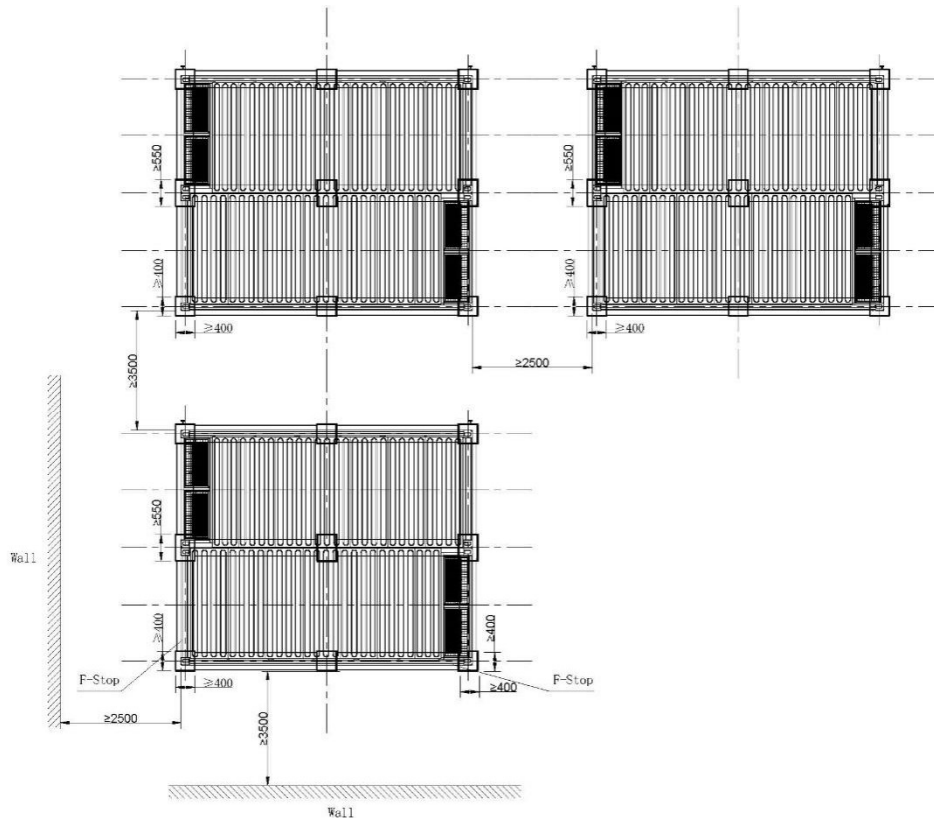


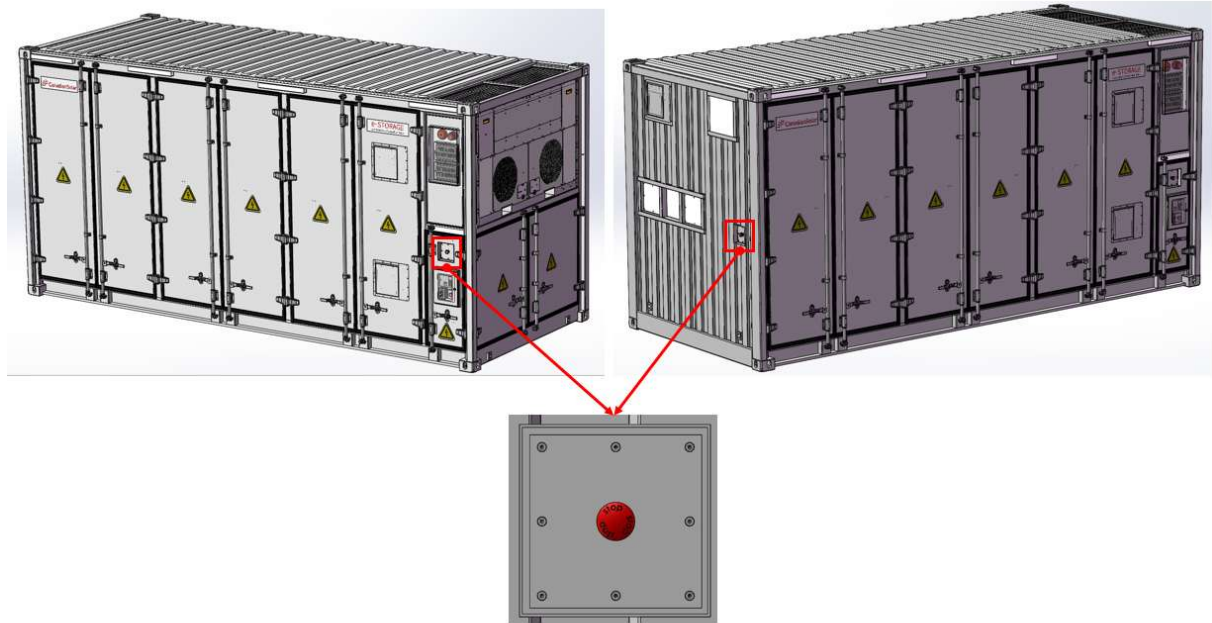
Figure 4-2: SolBank3.0 series recommended clearances for side by side (refer to Dwg NO. M140)

The “front” side of the SolBank3.0 series housing the access doors must always have a clear 3500mm (138”) between the SolBank3.0 series’ surface and all obstructions. This clearance is required to ensure sufficient space for door swing(811mm/31.93”), replacement of battery packs, and movement of equipment and personnel(3180mm/125.25”).

When SolBank3.0 series units are placed side by side, they must maintain a minimum clearance of over 2500mm (98.43”) between them to accommodate fast stop buttons and maintenance and operating procedures. This distance should be confirmed by the figures from different projects.

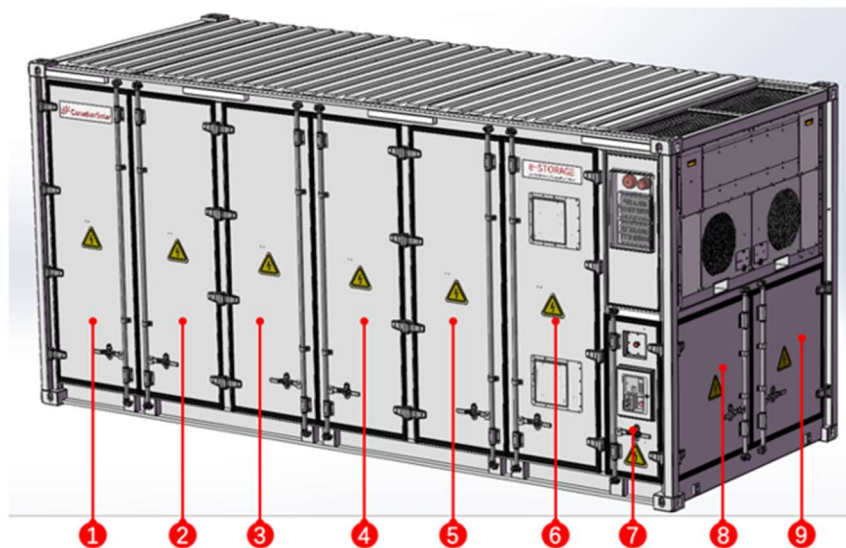
Note:

1. Spacing of SolBank3.0 series units to be revised due to specific project required. We will not make spacing changes in this standard drawing.
2. The 9540A certification has been completed. Please refer to the relevant documentation (TR No. CN24M32L 001, Organization: TÜV Rheinland (Shanghai) Co., Ltd., Date: 2024/06/28).



**F-Stop Bottom**

*Figure 5: The location of F-stop button*



SolBank3.0 series includes a total of 9 openings, each can be opened up to 180°

*Figure 6: Description of container door opening angle*

## 4 Pre-Installation Procedures

### 4.1 Engineered System Design

The SolBank3.0 series design has been fully evaluated and optimized by e-STORAGE's engineers to ensure safety and performance. Likewise, the integration of SolBank3.0 series with other key ESS components (PCS, switchgear, transformers, grounding systems, auxiliary power, etc.) required project specific engineering review.

An engineering design package should be completed by an Engineer of Record (EOR) in the state where the project is located prior to the equipment being shipped to the site and installed. This design package should include the complete set of civil, structural and electrical drawings and studies required for a safe, reliable and code compliant ESS installation. All installers should have access to the drawings issued for construction.

All applicable SolBank3.0 series design documents shall be provided to the EOR prior to the start of the ESS design phase.

Note: If the directions and contents in this manual differ from project specific design documentation, please contact e-STORAGE for support and advisement.

### 4.2 Pre-installation Checklist

Before starting the installation of SolBank3.0 series, please make sure to review, check and complete the following items. Please note that the pre-installation checklist below may not represent a complete list of all items that need to be checked or completed prior to installing SolBank3.0 series. The following is provided as general advice only.

#### 4.2.1 Safety

- ☐ All personnel have proper PPE as dictated by the project specific EH&S plan and safety guidance.

### 4.3 Tools, Equipment and Material Preparation

The following section provides an overview of key equipment and materials that may be required for installation of the SolBank3.0 series and integration with other ESS equipment at the project site. The items indicated in Table 5 are not included within the SolBank3.0 series or accompanying Installation Parts and must be procured or obtained separately. Further details regarding equipment and materials are provided in Section 5.5.

Note, Table 5 is provided for planning purposes only and does not reflect all tools, equipment, and construction commodities necessary for a complete installation. Always refer to project specific design documentation for specific details regarding integration of the SolBank3.0 series with other ESS equipment and the project specific EH&S plan regarding required PPE.

- ☐ Codes and regulations
- ☐ A safety briefing is held for the specific installation procedures being undertaken
- ☐ All personnel are properly qualified and licensed to perform the installation procedures being undertaken
- ☐ A lifting plan has been completed for offloading and placement of SolBank3.0 series containers and other heavy equipment
- ☐ The site is clean, orderly and all hazards have been mitigated to the extent possible and required by law
- ☐ All lock-out-tag-out (LOTO) is complete if required
- ☐ Working areas have been properly isolated using marking tape, fencing, and signage as appropriate

#### 4.3.1 Site Civil

- ☐ Foundations have properly cured
- ☐ Foundation dimensions reflect SolBank3.0 series dimensional requirements and those indicated in the site IFC civil documentation
- ☐ Foundation levelness is within required tolerances, The flatness after leveling does not exceed 0.002L
- ☐ Power, communication, and signal cable conduit stub-ups are located within required tolerances and properly labeled
- ☐ Grounding grid stingers are installed and located within required tolerances and ground grid has been properly tested

#### 4.3.2 Other

- ☐ Weather is appropriate for installation procedures
- ☐ All required permits and approvals have been obtained
- ☐ Equipment siting and clearance requirements identified in Section 4.3.2 are maintained
- ☐ Site Auxiliary power distribution equipment has been installed and is energized, or ready to be energized in support of SolBank3.0 series safety and temperature management systems

*Table 5: Recommended installation PPE, tools, equipment, and materials*

| Item                 | Remarks                                                                 |
|----------------------|-------------------------------------------------------------------------|
| Basic PPE            |                                                                         |
| Hard hat             | To protect head from impacts from falling objects and other hazards     |
| Safety gloves        | To protect hands against cuts, abrasion, and other hazards              |
| Safety glasses       | To protect eyes from contact with foreign objects and airborne debris   |
| Safety toe boots     | To protect feet from heavy objects and equipment                        |
| Hearing protection   | To protect ears from loud noises generated by machinery and other tools |
| High visibility vest | To ensure all personnel are seen by equipment operators                 |

|                                            |                                                                                                                                                                                   |
|--------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Specialty PPE                              | Arc flash PPE, fall prevention harnesses, and other hazard specific PPE as required by the site conditions and the site EH&S manager or local laws and regulations                |
| First-aid Kit                              | Basic first-aid kit. To include eye wash station.                                                                                                                                 |
| Equipment and Tools                        |                                                                                                                                                                                   |
| Crane                                      | Crane (and support personnel) meeting capacity and reach requirements as identified in the project specific lifting plan                                                          |
| Forklift                                   | Required for pallet receiving and the movement of equipment and materials around the site.                                                                                        |
| Roto hammer                                | Used for drilling anchor bolt holes in foundations                                                                                                                                |
| Impact driver & drills                     | Used for fastener installation and equipment mounting and installation                                                                                                            |
| Wrenches                                   | To include torque wrench. Used for installation of DC cable copper lugs and other equipment.<br>Torque wrench should be calibrated before use.<br>Insulated tools should be used. |
| Wire crimpers                              | To include appropriate die for all lugs used.<br>Should be calibrated before use.<br>Insulated tools should be used.                                                              |
| Screwdrivers                               | Used for installation of auxiliary power supply cable and signal wire terminals and other equipment.<br>Insulated tools should be used.                                           |
| Multimeter                                 | To include long leads and high DC voltage capability.<br>Recommend specification: FLUKE-15B.<br>Should be calibrated before use.                                                  |
| Unpacking equipment                        | Knives, scissors, crowbar, hammer, etc.                                                                                                                                           |
| Ladder                                     | Used to access the roof of the SolBank3.0 series. Minimum length should be 5M (16.4ft). Ladder should meet OSHA and EH&S plan requirements                                        |
| Pallet jack                                | Used for equipment receiving                                                                                                                                                      |
| Portable generator                         | Used to operate equipment while aux/temp power supply is de-energized.                                                                                                            |
| Key Installation and Integration Materials |                                                                                                                                                                                   |
| DC Cable                                   | DC conductors connecting the SolBank3.0 series to the DC side of the ESS's PCS. To include required lugs.                                                                         |
| Auxiliary Power Supply Cable               | Conductors connecting the site aux power supply to the aux power terminals of the SolBank3.0 series. To include required lugs                                                     |
| Communication Cable                        | Cable facilitating communication between the SolBank3.0 series, other SolBank3.0 series, and the customers EMS (Energy Management System). To include terminations                |
| Signal Wire                                | Cable transmitting contactor and relay signals between the SolBank3.0 series, other SolBank3.0 series, and the customers EMS. To include terminations                             |
| Grounding Cable                            | Cable connecting a dedicated site grounding grid stinger to the SolBank3.0 series' ground bus. To include required lugs                                                           |
| Misc items                                 | Shims, cable ties, conduit fittings, duct seal, caulking, labels, and other construction commodities.                                                                             |

|             |                                                                                                                               |
|-------------|-------------------------------------------------------------------------------------------------------------------------------|
| Twist Lock  | Used for anchoring SolBank3.0 series to the foundation.<br>Recommended for all regions, but necessary for high seismic zones. |
| Bridge Lock | Used for connecting adjacent SolBank3.0 series' when installed back-to-back.                                                  |

## 4.4 SolBank3.0 series Receiving and Inspection

This section details initial receiving and inspection processes that must be completed prior to initiation of installation procedures. The SolBank3.0 series will arrive on site as two separate deliveries. One delivery will consist of the SolBank3.0 series container itself, and all components within that are factory installed. The other delivery will consist of Installation Parts as identified in Annex 2. Contact the shipping company to confirm shipping weights prior to equipment arrival and offloading.

### 4.4.1 Precautions



The SolBank3.0 series will arrive on site with batteries installed and partially charged. Risk of electrocution exists. Exercise extreme caution.



Equipment may shift during transport and may be unstable. Use caution when approaching and inspecting.



PPE is required when removing equipment packaging. Refer to EH&S plan for task specific requirements.



Forklifts and other heavy equipment should only be operated by qualified personnel with support from spotters and other required support personnel.

### 4.4.2 Installation Parts Receiving

The Installation Parts inventory consists of equipment, parts, and materials, supplied by e-STORAGE, that must be field installed as part of the SolBank3.0 series installation process. Installation Parts will arrive on site within a wooden crate. This crate should be inspected for signs of damage prior to being opened. After opening the wooden crate, inspect contents and confirm all items identified in Annex 1 are included within.

If damage is observed, take photos and note specific damage on shipping company's documentation prior to delivery driver leaving the site. e-STORAGE is not responsible for shipping damage unless the above steps are completed.

### 4.4.3 SolBank3.0 series Receiving

The SolBank3.0 series will arrive on-site on a flatbed trailer. Upon arrival, remove the protective

wrapping to facilitate inspection of the SolBank3.0 series. Note, Installer may opt to leave other protective elements in place to protect the SolBank3.0 series during lifting procedures. Proceed with a detailed inspection of the SolBank3.0 series' exterior, looking for signs of impact with other devices, or other damage resulting from transport stresses.

Under the advisement of the site safety manager, open the SolBank3.0 series' doors with the key placed at the fast stop button. And inspect internal systems for signs of damage. Examine for indications of leaks in the coolant distribution system, damage to racks or other equipment, or shifting of secured items within. Ensure that all doors open and close freely and are fully secured prior to offloading.

If evidence of damage is found do not proceed with offloading the SolBank3.0 series until first contacting a e-STORAGE representative and documenting such damage.

## 4.5 Other Key ESS Equipment

Operation of the SolBank3.0 series is enabled via the installation of several other pieces of customer provided key equipment. The spec of such equipment is outside the scope of this manual and should be developed in collaboration with the project EOR and other design personnel to ensure compliance with project requirements.

Provided below is a list of key ESS equipment typically included in traditional ESS architecture and notable requirements for integration with the SolBank3.0 series. Prior to integrating the SolBank3.0 series with such equipment, Installer should verify appropriateness of specification.

### 4.5.1 Power Conversion System (PCS)

A bi-directional PCS (Inverter) is required to facilitate charging and discharging of the SolBank3.0 series' battery bank. The PCS converts AC power to DC power during charge mode; and DC power to AC power during discharge mode. The PCS should be sized per the model of SolBank3.0 series installed and the power requirements of the project including any point of interconnection constraints.

Specific SolBank3.0 series PCS requirements:

- 1) The DC input voltage range must be wider than that of the SolBank3.0 series. See Table 4 for further details.
- 2) The common mode voltage of the PCS DC side should be less than 1500V.
- 3) The charging current ripple of PCS DC output should be less than 5%, and the charging voltage ripple should be less than 3%.
- 4) The PCS should be capable of responding to BMS charge/discharge current limiting signals.
- 5) The PCS must have a capacitor pre-charge circuit.

### 4.5.2 Auxiliary Power Distribution

A dedicated auxiliary power feed must be obtained in support of ESS aux loads such as HVAC equipment, controls and communication devices, and other SolBank3.0 series internal components.

Typically, auxiliary power equipment includes a dedicated transformer, metering, power distribution bus bar and circuit protection.

Black start solution, please refer to User Manual at section 6.3.6 Black Start Mode (Optional Function).

Specific SolBank3.0 series auxiliary power requirements:

| Energy Consumption @ °C of 0.25P SolBank3.0 |                                           |                                 |                  |                                 |
|---------------------------------------------|-------------------------------------------|---------------------------------|------------------|---------------------------------|
|                                             | Rated DC load full charge discharge cycle |                                 | Idle load        |                                 |
| Temperature (°C)                            | Peak Power (kVA)                          | Average Energy Consumption (kW) | Peak Power (kVA) | Average Energy Consumption (kW) |
| -30                                         | 22.66                                     | 3.00                            | 22.66            | 3.35                            |
| -15                                         | 22.66                                     | 4.55                            | 22.66            | 2.64                            |
| 0.00                                        | 22.66                                     | 6.70                            | 22.66            | 1.94                            |
| 25.00                                       | 22.66                                     | 8.01                            | 22.66            | 0.76                            |
| 45.00                                       | 22.66                                     | 13.42                           | 22.66            | 1.21                            |
| 55.00                                       | 22.66                                     | 15.08                           | 22.66            | 1.72                            |

| Energy Consumption @ °C of 0.5P SolBank3.0 |                                           |                                 |                  |                                 |
|--------------------------------------------|-------------------------------------------|---------------------------------|------------------|---------------------------------|
|                                            | Rated DC load full charge discharge cycle |                                 | Idle load        |                                 |
| Temperature (°C)                           | Peak Power (kVA)                          | Average Energy Consumption (kW) | Peak Power (kVA) | Average Energy Consumption (kW) |
| -30                                        | 39.33                                     | 6.83                            | 39.33            | 3.83                            |
| -15                                        | 39.33                                     | 8.82                            | 39.33            | 3.01                            |
| 0.00                                       | 39.33                                     | 18.24                           | 39.33            | 2.18                            |
| 25.00                                      | 39.33                                     | 29.93                           | 39.33            | 0.80                            |
| 45.00                                      | 39.33                                     | 31.62                           | 39.33            | 1.25                            |
| 55.00                                      | 39.33                                     | 30.56                           | 39.33            | 1.60                            |

The table above is the energy consumption containing 1 chiller, 1 DMC AC, 2 dehumidifiers. If a specific project needs to add the third dehumidifier, please refer to the aux consumption shown in the table below.

| Dehumidifier     |                                           |                                 |                  |                                 |
|------------------|-------------------------------------------|---------------------------------|------------------|---------------------------------|
|                  | Rated DC load full charge discharge cycle |                                 | Idle load        |                                 |
| Temperature (°C) | Peak Power (kVA)                          | Average Energy Consumption (kW) | Peak Power (kVA) | Average Energy Consumption (kW) |
| -30              | 0.26                                      | 0.00                            | 0.26             | 0.00                            |
| -15              | 0.26                                      | 0.00                            | 0.26             | 0.00                            |
| 0.00             | 0.26                                      | 0.00                            | 0.26             | 0.00                            |
| 25.00            | 0.26                                      | 0.15                            | 0.26             | 0.00                            |
| 45.00            | 0.26                                      | 0.23                            | 0.26             | 0.00                            |
| 55.00            | 0.26                                      | 0.23                            | 0.26             | 0.00                            |

| Critical Loads – SolBank 3.0, 0.25P & 0.5P |         |       |       |           |             |
|--------------------------------------------|---------|-------|-------|-----------|-------------|
| Item                                       | DMC Fan | FSS   | BMS   | 24V power | DMC Control |
| Max continuous active power(kW)            | 0.175   | 0.865 | 1.285 | 0.1       | 0.1         |

|                                     |      |      |      |      |      |
|-------------------------------------|------|------|------|------|------|
| Max continuous apparent power(kVA)  | 0.22 | 1.02 | 1.29 | 0.11 | 0.11 |
| Max continuous aux load rating(kVA) | 2.75 |      |      |      |      |

## 5 Installation

The following sections outline the installation procedures required to fully install and integrate the SolBank3.0 series into the ESS project site. Figure 7 below provides an overview of the SolBank3.0 series installation process. These steps must be followed sequentially and be performed by qualified personnel.

During each step of the installation, safety is of paramount importance. Please note all safety hazards described in this section and adhere to the project specific EHS plan.

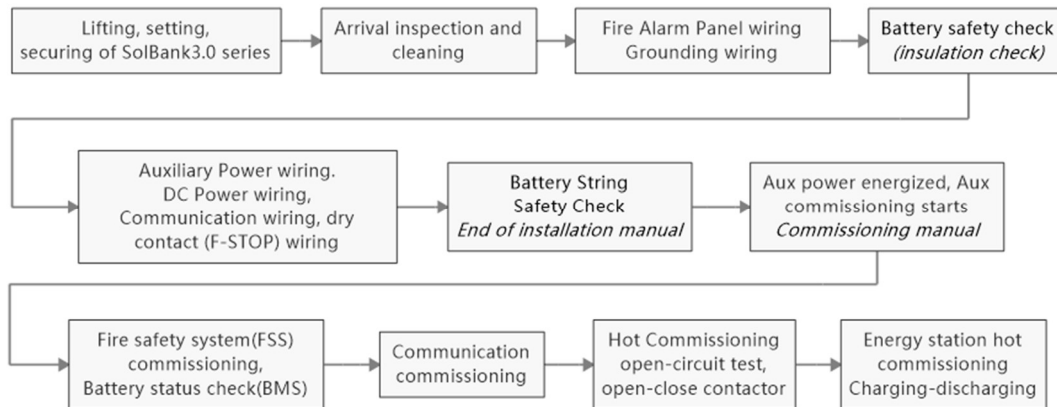


Figure 7: SolBank3.0 series Installation Process Overview

Note: Battery safety check refers to the testing conducted when Shockaction indicators or Tilt sensor are active. Battery String Safety Check refers to the testing performed on the entire battery cluster after inserting the MSD.

### 5.1 Lifting, Setting, and Securing the SolBank3.0 series

This section details the procedures and tasks required to set and secure the SolBank3.0 series on site foundations.

#### 5.1.1 Workflow

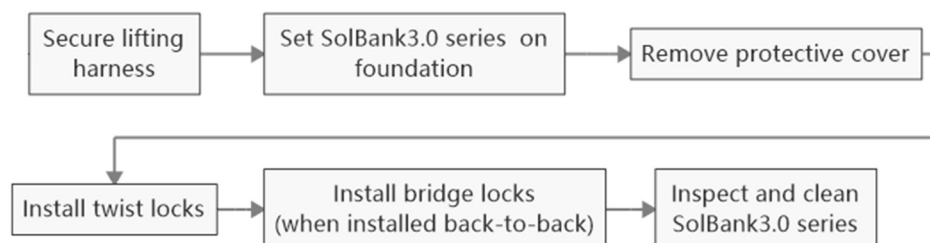


Figure 8: SolBank3.0 series lifting and placement.

Note: Bridge wares indicated in step 5 above is only required in back-to-back installations. See Section 5.1.5 below for more details.

### 5.1.2 Recommended Tools and Equipment

Table 6: Recommended tools and equipment

| Name                              | Purpose                                                                                                                    | Remark                                                                                                                                                                                       |
|-----------------------------------|----------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Bridge lock                       | Used for connecting adjacent SolBank3.0 series' when installed back-to-back.                                               | 2 pieces per back-to- back installation.<br>Provided by e-Storage                                                                                                                            |
| High-Capacity Crane               | Used for lifting the SolBank3.0 series system from delivery truck to foundations                                           | Size to be determined by lifting plan.<br>Dependent on required reach of arm and other site specifics.<br>Provided by Installer                                                              |
| Concrete expansion bolts and nuts | Used for anchoring SolBank3.0 series to foundations                                                                        | 8 pieces per two SolBank3.0 series for back-to-back installation.<br>4 pieces per SolBank3.0 series for Stand-alone installation;<br>Specification per EOR design;<br>Provided by Installer. |
| Twist lock                        | Used for anchoring SolBank3.0 series to the foundation. Recommended for all regions, but necessary for high seismic zones. | 8 pieces per two SolBank3.0 series for back-to-back installation<br>4 pieces per SolBank3.0 series for Stand-alone installation;<br>Provided by e-Storage.                                   |
| Roto Hammer                       | For drilling holes in foundation                                                                                           | Provided by Installer.                                                                                                                                                                       |
| Torque Wrench                     | For securing expansion bolts and Bridge lock                                                                               | Provided by Installer.                                                                                                                                                                       |
| Ladder                            | For SolBank3.0 series roof access                                                                                          | Provided by Installer.                                                                                                                                                                       |
| PPE                               | Basic PPE and proper fall protection                                                                                       | Provided by Installer.                                                                                                                                                                       |
| Misc. items                       | Other tools and equipment that might be needed for this process                                                            | Provided by Installer.<br>Shims, cable ties, conduit fittings, duct seal, caulking, labels, and other construction commodities.                                                              |

### 5.1.3 Precautions



The SolBank3.0 series will arrive on site with batteries installed and partially charged. Risk of electrocution exists. Exercise extreme caution.



All tasks described in this Section must be performed by appropriately qualified personnel.



A task-specific lifting plan must be developed by qualified personnel and reviewed with

all participating individuals prior to removing SolBank3.0 series from the flatbed trailer and setting on foundations. Shipping weight should be used to verify design weight and crane selection.



PPE is required during all stages of this process. Refer to EH&S plan for task-specific requirements.



Forklifts and other heavy equipment should only be operated by qualified personnel with support from spotters and other required support personnel.



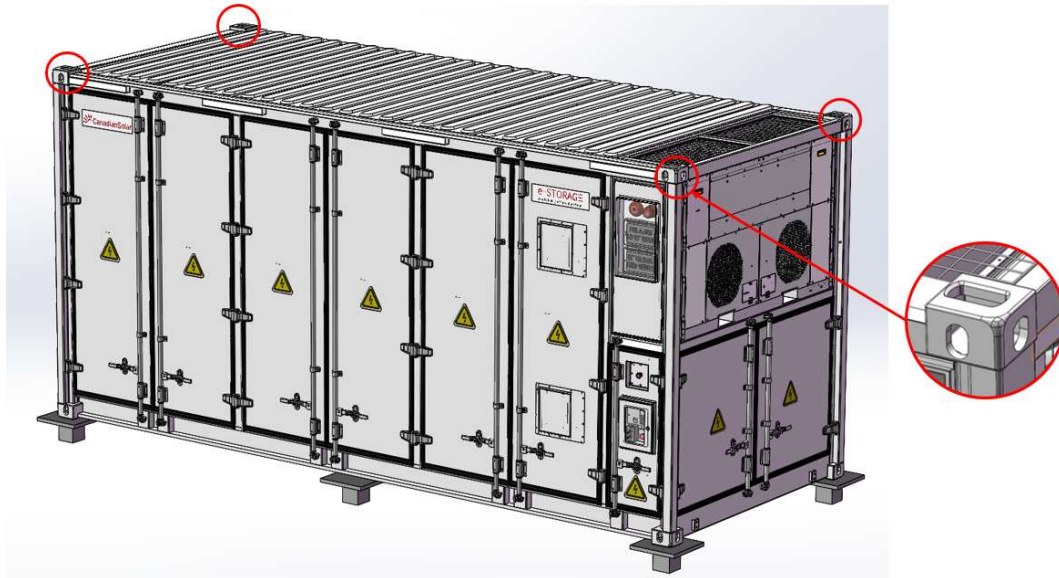
When working on top of the SolBank3.0 series, or other elevated locations, personnel should be equipped with appropriate fall protection.



When working on top of the SolBank3.0 series, personnel should refrain from stepping on air vents and other sensitive components.

#### 5.1.4 Lifting and Setting Procedure

- ✓ Step 1: Clearly mark the foundations where the SolBank3.0 series shall be located. Special care should be taken to confirm the precise location of conduit stubs and grounding stinger.
- ✓ Step 2: Identify the “front” side of the SolBank3.0 series (the side with the logo and all access doors) and ensure lift equipment is setup such that the front of the SolBank3.0 series can be placed in accordance with site design documentation.
- ✓ Step 3: Identify the SolBank3.0 series identification number and ensure that each SolBank3.0 series is placed on the appropriate foundation in accordance with site design documentation.
- ✓ Step 4: Attach lifting harness with equipment on the 4 lifting points identified in Figure 9 as per the task-specific lifting plan. This lifting plan is to be developed by qualified personnel in collaboration with site safety personnel and crane operators.
- ✓ Step 5: Remove from trailer and set on foundation were indicated by location markings. Take special care to ensure conduit stubs enter the SolBank3.0 series in the correct location. See Figure 10. Conduits will penetrate special glands in the SolBank3.0 series which prevent ingress of animals, insects and external debris. Add shim as required until level.
- ✓ Step 6: After removing the lifting harness, remove all remaining protective packaging and recycle.
- ✓ Step 7: Open the door of DMC AUX cabinet and the FACP cabinet, as shown in Figure 11. You will find out packing boxes, with a total of 48 MSD, bridge lock, self-painting and other parts.



*Figure 9-1: Location of SolBank3.0 series lifting points*

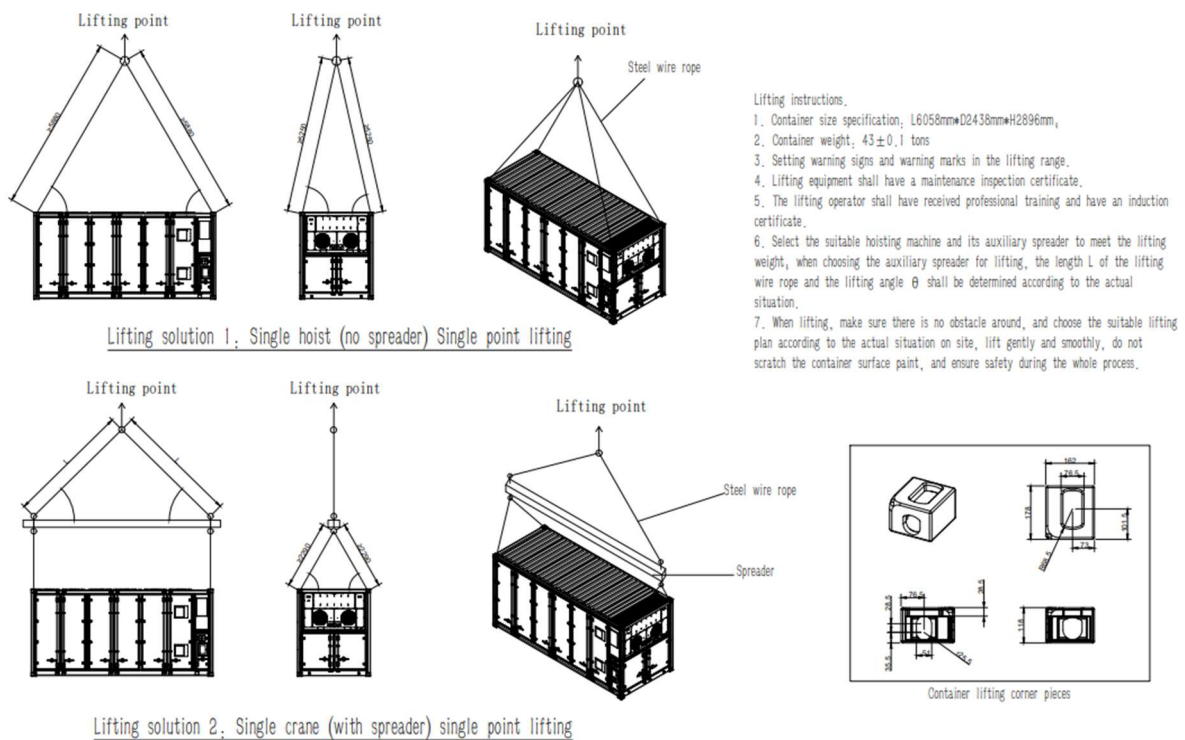


Figure 9-2: SolBank3.0 series Container Lifting Program (refer to Dwg NO. M180)

( Before lifting, 15mm steel plate should be placed in advance at the location shown to fill the support gap. )

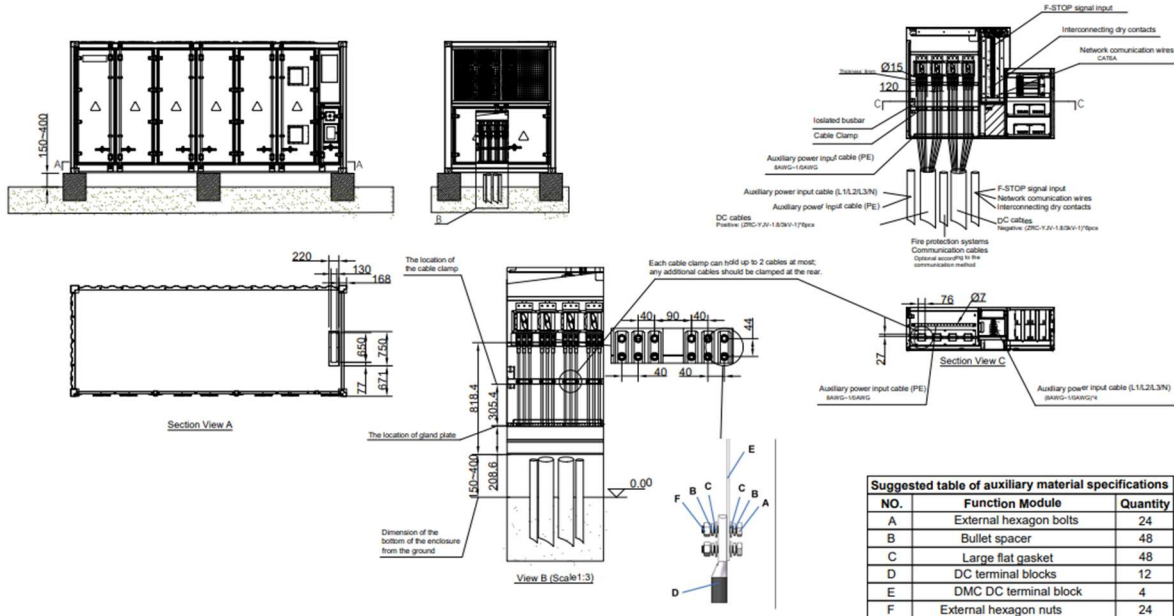


Figure 10: Foundation Conduit Stub-ups (Centralized PCS)  
(refer to Dwg NO. M310-SolBank3.0 -SolBank external interface diagram-Single Bus  
Or M310-SolBank3.0 -SolBank external interface diagram-Split Bus)



Figure 11: The red boxes in the picture indicate the possible positions where the spare parts may be placed.

### 5.1.5 Anchoring and Securing Procedure

- ✓ Step 1: Secure base of SolBank to foundation using concrete expansion bolts and twist locks as shown in Figure 12 and Figure 13. For back-to-back installation, 8 twist locks are recommended (4 per SolBank) but four is also acceptable in low seismic areas, one per corner with bridge locks. For a stand-alone installation, it is recommended that 4 twist locks also be installed. The EOR shall perform an engineering review of anchoring design to ensure compliance with local AHJ requirements and regional seismic activity. The base of the steel frame structure can also be used for welding and fixing, which needs to be treated with rustproof paint after welding.

Note: Expansion bolts shall be provided and installed by the Installer on site according to the design by the EOR.

- ✓ Step 2: For back-to-back installations, the top back edge of adjacent SolBank3.0 series must be connected at the 2 locations shown in Figure 14 using the Bridge lock shown in Figure 15.

Note: The bridge lock is designed to accommodate gap between SolBank3.0 series units that are installed back-to-back for <250mm (9.8"). Bridge locks should be tightened to a torque of 300 NM. During this step, the installer must not step on top of the roof. Rooftop maximum weight (less than 500 kg per m<sup>2</sup>).

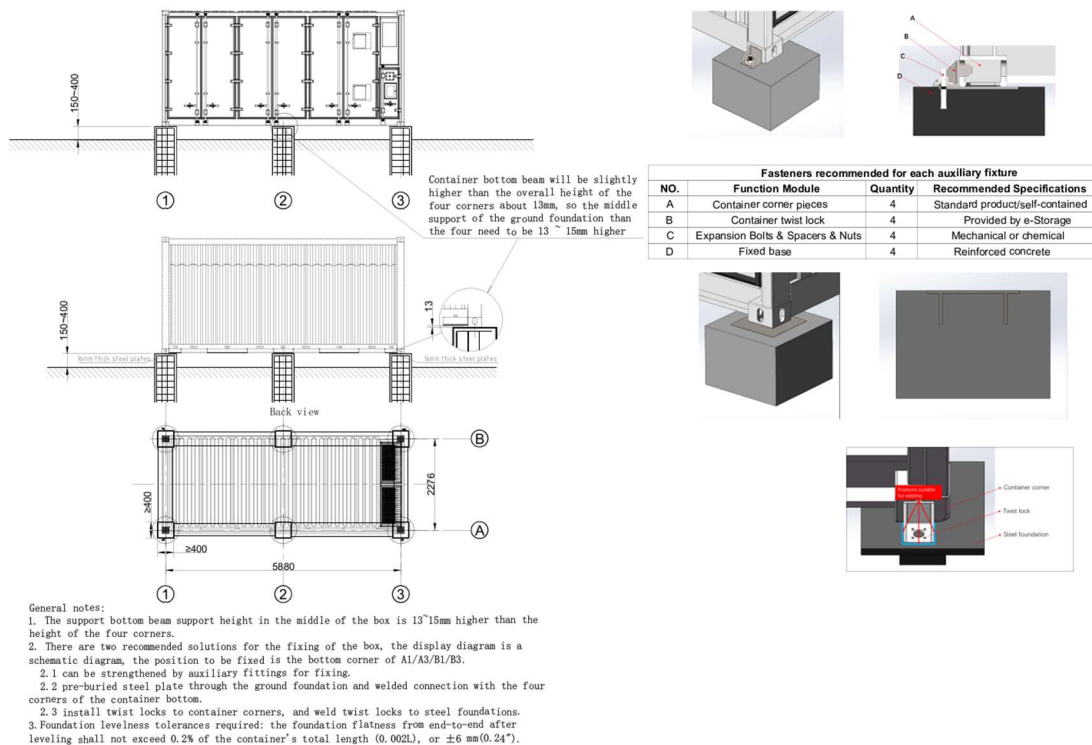


Figure 12: SolBank3.0 series anchoring in corner position. Refer to details for site specific design by EOR. (refer to Dwg NO. M150)

(Depending on the PACK removal tooling and the height of F-stop, the support height should be 150mm to 400mm, which needs to be confirmed with e-STORAGE.)

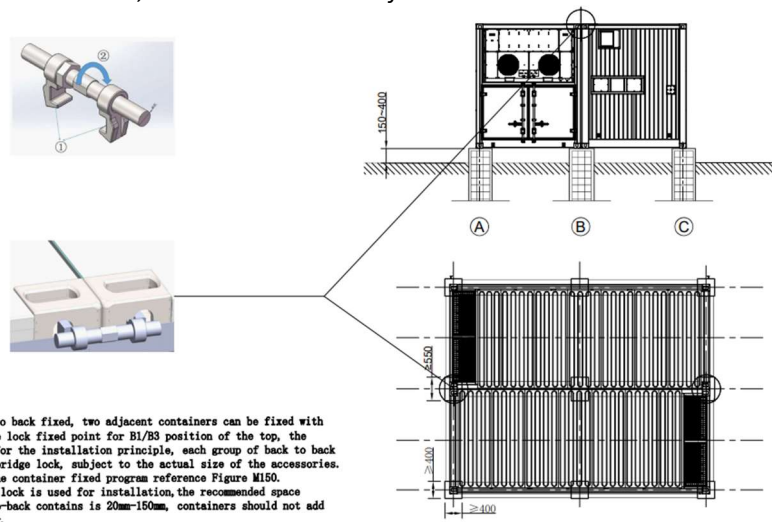


Figure 13: Location of anchoring hardware and Bridge Lock for back-to-back SolBank3.0 series installation. Refer to details for site specific design by EOR. (refer to Dwg NO. M160)

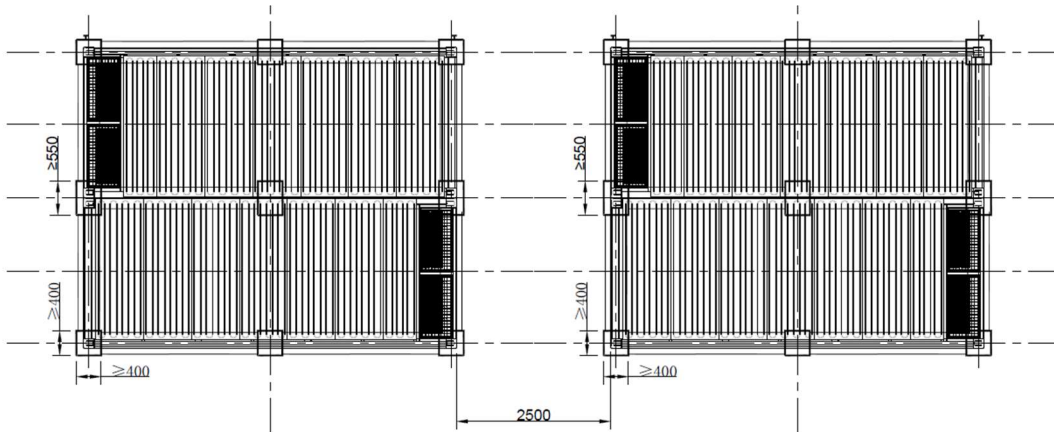


Figure 14: Space between SolBank3.0 series Installation. Refer to details for site specific design by EOR.

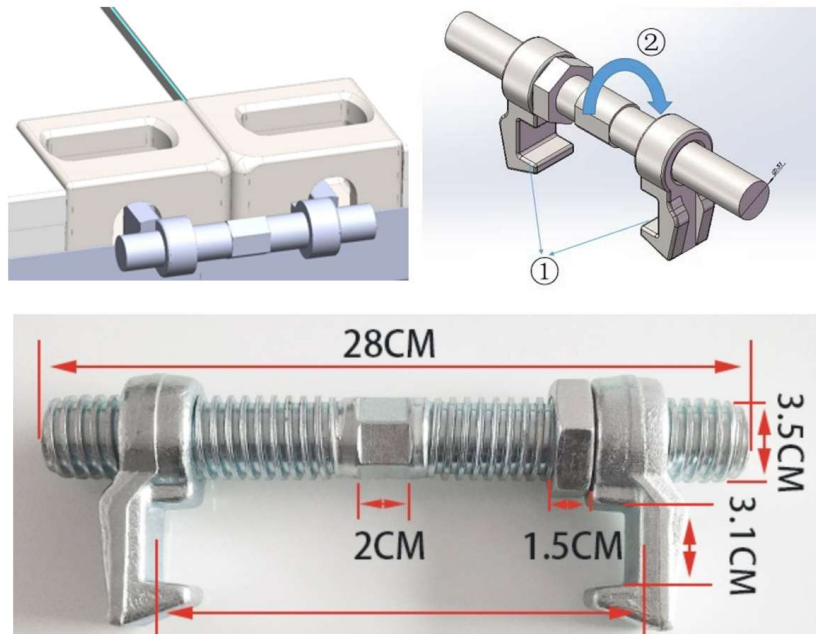


Figure 15: Installation effect of Bridge Lock. Refer to details for site specific design by EOR.

## 5.2 Arrival Inspection and Cleaning

### 5.2.1 Inspection and Cleaning

After completing the above steps, SolBank3.0 series should be thoroughly inspected again to ensure that no damage occurred during transportation and unloading. In addition, dust and debris accumulated during transportation should be removed, especially from areas of the SolBank3.0 series that are unsafe to handle during operation, if it is safe to do so. Please note that and the recommended minimum protection level is PPE-2. The battery is energized. Use it with special care.

**Important note:** During installation period, in order to avoid water vapor from entering the SolBank3.0 series enclosure leading to unfavorable results such as corrosion, the door and the cable entry opening should not remain opening for more than 1 day. The cable entry opening can

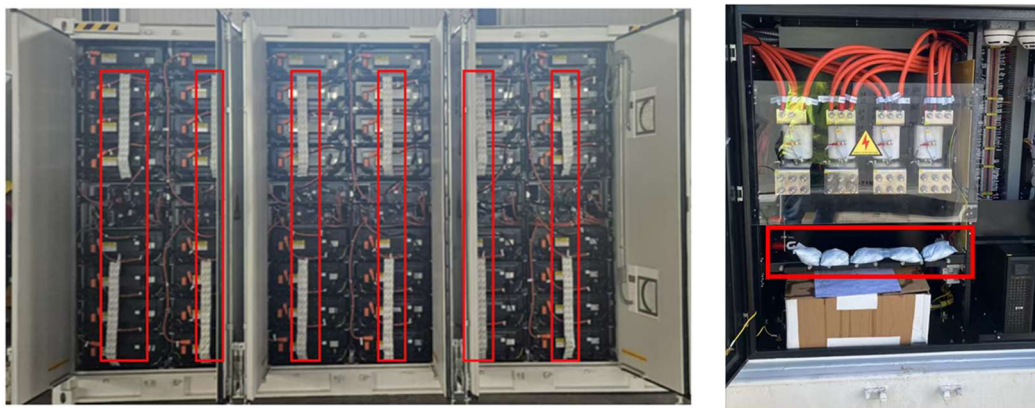
use an interim cover.

### 5.2.2 Coolant Pipelines Inspection

Special care should be taken during this inspection to ensure no damage to the coolant distribution lines was incurred during transport. The cabinet floor should be inspected for standing liquid or other signs of leaks. Additionally, transport lines should be visibly inspected for the presence of accumulated droplets, kinking, or other damage. Please refer to the SolBank3.0 series Maintenance Manual for further details regarding the location and routing of the distribution lines and system pressure gauge.

### 5.2.3 Desiccants removal

When the above is completed, desiccants should be removed by EPC. The installation location of desiccants is shown in the figure 16. A ladder maybe necessary to be helpful to remove desiccants.



Desiccants installation location

#### Removal instructions:

The number of desiccants is 13 items .All desiccants installation location is visible to the naked eye, easy to remove and replace the place.

Figure 16: The installation location of desiccants

## 5.3 Fire Alarm Panel Wiring

This section details the fire system panel wiring and networking of different versions of SolBank3.0 series.

### 5.3.1 Recommended and Equipment

Table 8: Recommended and equipment

| Name                                                        | Purpose                                                        | Remarks                                                              |
|-------------------------------------------------------------|----------------------------------------------------------------|----------------------------------------------------------------------|
| Screwdriver                                                 | Electrician flat head screwdriver, Phillips screwdriver        | Provided by Installer                                                |
| PPE                                                         | Basic PPE                                                      | Provided by Installer                                                |
| SFP Modules and Fiber optic cable                           | For NCF-1000 NIC networking (for Potter Control Host solution) | Provided by Installer<br>(Select according to the networking method) |
| Network cable and super category 6 network cable connectors | For NCE-1000 NIC networking (for Potter Control Host solution) | Provided by Installer<br>(Select according to the networking method) |
| VM100 Input and output modules                              | For ADVANCED monitoring host networking                        | Provided by Installer<br>(Select according to the networking method) |

### 5.3.2 Precautions



The SolBank3.0 series will arrive on site with batteries installed and partially charged. Risk of electrocution exists. Exercise extreme caution.



All tasks described in this Section must be performed by appropriately qualified personnel.



PPE is required during all stages of this process. Refer to EH&S plant for task-specific requirements.



To eliminate potential hazards during transportation, the negative terminal of the backup power supply inside the fire cabinet has been disconnected and fully insulated prior to delivery. After the equipment is in place, please follow the steps below for wiring.

### 5.3.3 Procedure

**Important note:** During installation period, in order to avoid water vapor from entering the SolBank3.0 series enclosure leading to unfavorable results such as corrosion, the door and the cable entry opening should not remain opening for more than 1 day. The cable entry opening can use an interim cover.

Wiring and connection of communication cables:

- ✓ Step 1: According to the different communication methods of the fire alarm system, different communication cables and connectors are configured, which can be referred to Figure 17-1 、 Figure 17-2、 Figure 17-3 and Figure 17-4.
- ✓ Step 2: Refer to Figure 17-5 for the communication cable path to show the wiring

connection.

Wiring and connection of communication cables:

Battery backup wiring:

- ✓ Step 1: Complete AUX power
- ✓ Step 2: Prepare the negative power terminal connection in the fire cabinet Figure 18-1.
- ✓ Step 3: On the fire alarm control panel side, connect the two wires of the aerosol to the panel, as shown in Figure 18-2.
- ✓ Step 4: After completing the wiring for power supply, the fire control panel will enter the charged state and can be connected to the utility power supply after confirming that no other detectors have alarm signals.

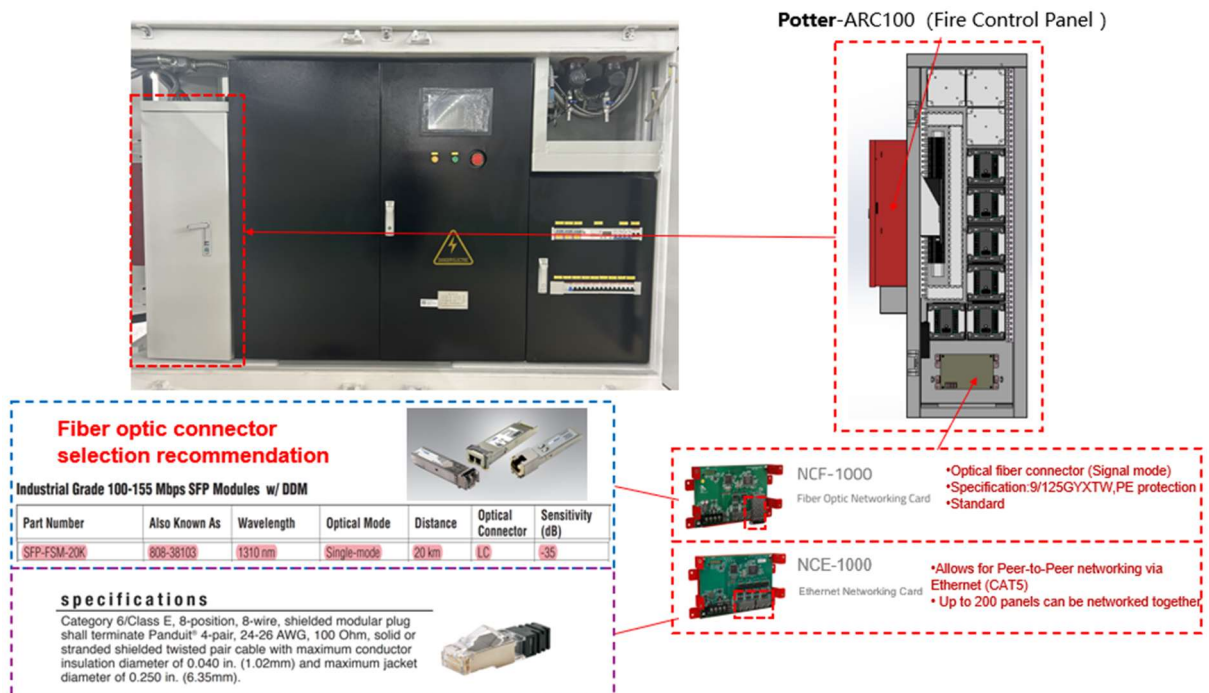


Figure 17-1: **Potter** Fire Control Panel Communication Wiring Position

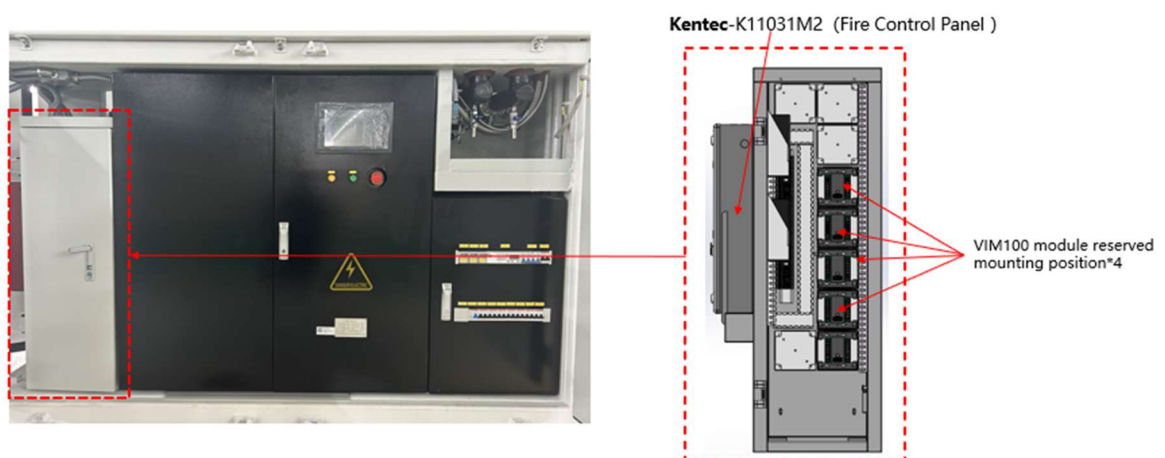


Figure 17-2: **Kentec** Fire Control Panel Communication Wiring Position

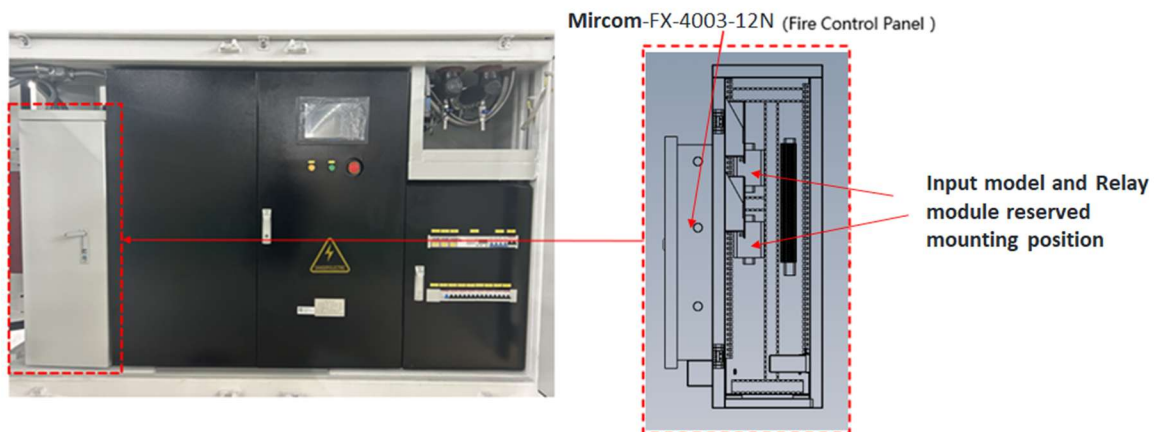
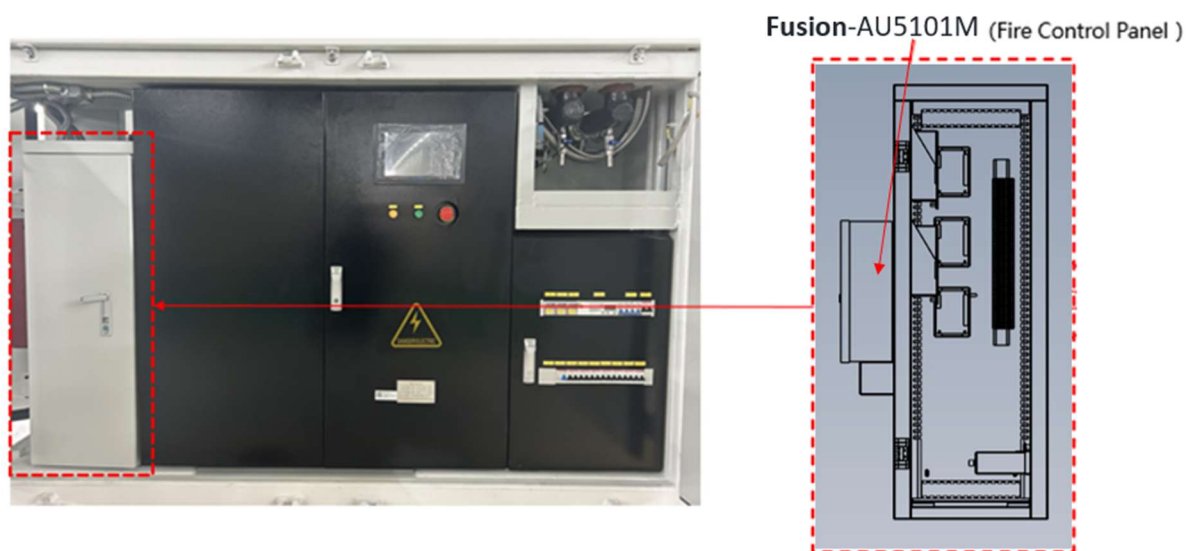
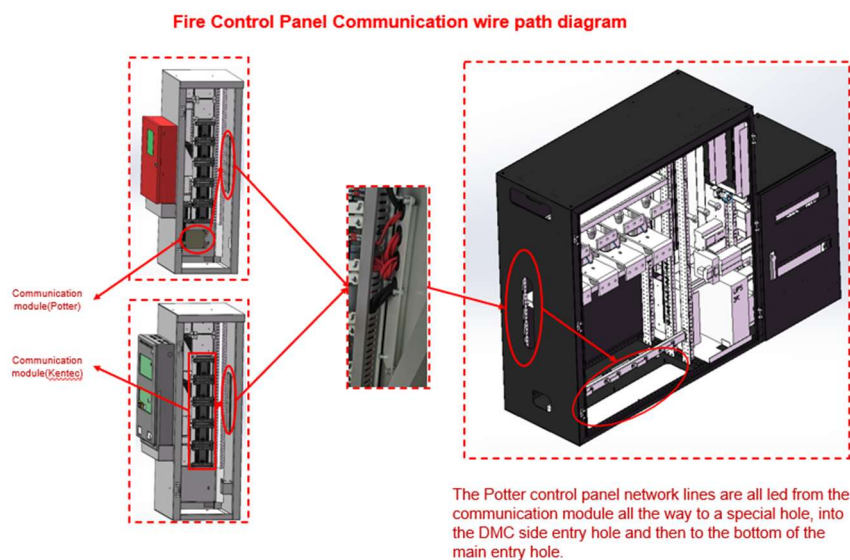
Figure 17-3: **Mircom** Fire Control Panel Communication Wiring PositionFigure 17-4: **Fusion** Fire Control Panel Communication Wiring Position

Figure 17-5: Fire Control Panel Communication wire path diagram

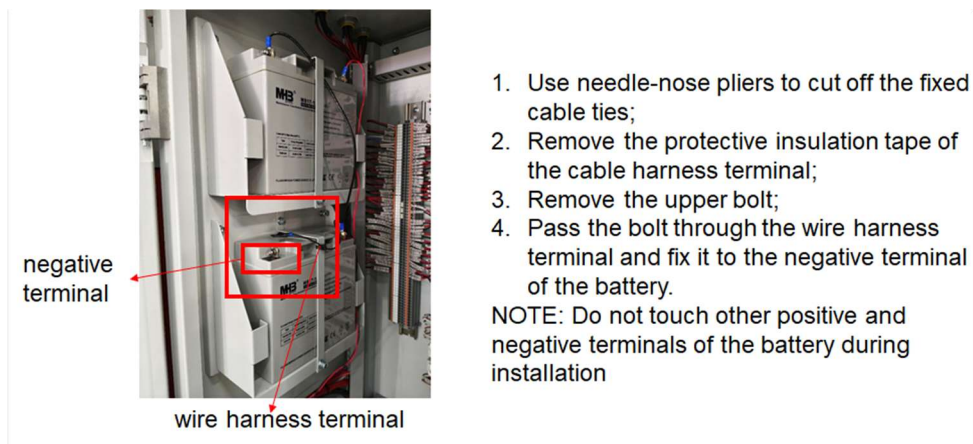


Figure 18-1: Wiring for FACP battery

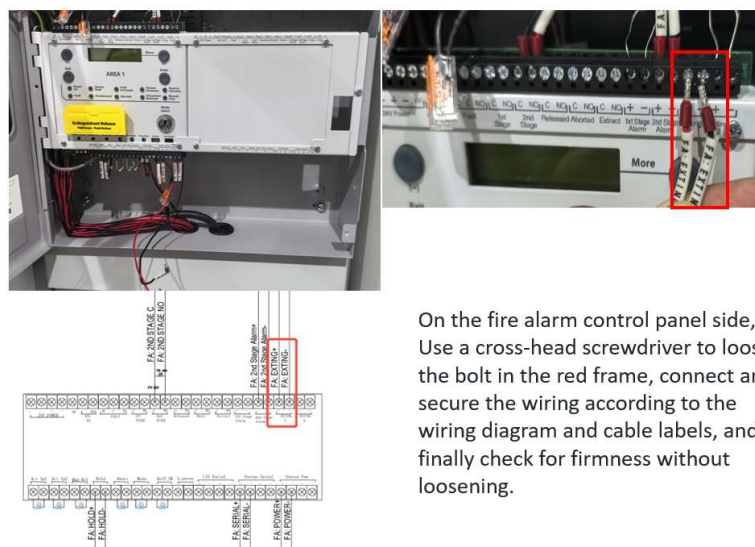
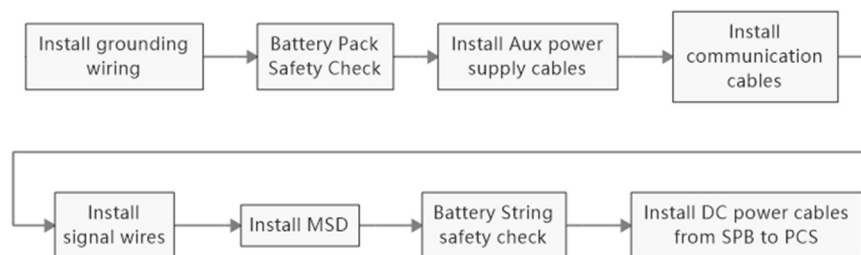


Figure 18-2: Connect the two wires of the aerosol to the panel

## 5.4 SolBank3.0 series System Wiring

The following section details the field wiring procedures required to electrically integrate the SolBank3.0 series.

### 5.4.1 Workflow



✓ Figure 19: SolBank3.0 series System Wiring (Suggested installation order)

### 5.4.2 Recommended Tools and Equipment

Table 9: Recommended tools and equipment

| Tool Name                      | Quantity | Remarks                                                              |
|--------------------------------|----------|----------------------------------------------------------------------|
| Cable pulling equipment        | --       | Used to pull cable through underground conduit                       |
| Crimpers and proper dies       | --       | Used for crimping lugs                                               |
| Wrenches                       | --       | Used to install lugs onto busbar                                     |
| Torque wrench                  | --       | Used to tighten terminations to required torque                      |
| Basic electrical tools         | --       | Required for wire prep and installation                              |
| Power and communication cable  | --       | As specified in each subsequent section                              |
| Termination lugs and hardware  | --       | As specified in each subsequent section                              |
| Threading board                | 1        | Placed inside container                                              |
| Misc. construction commodities |          | Electrical tape, wire labels, duct seal, cable ties, etc.            |
| PPE                            | --       | Basic PPE and specialized electrical PPE per site specific EH&S plan |

### 5.4.3 Precautions



The SolBank3.0 series will arrive on site with batteries installed and partially charged. Batteries cannot be deenergized. Although the battery packs will not be interconnected, risk of electrocution exists. Exercise extreme caution.



High DC voltage present. Properly rated insulated gloves, insulated footwear, insulated tools, arc flash clothing, and face shields are recommended when working around batteries and energized circuits.



Ensure DC Disconnects are open and battery strings are isolated from PCS when working on system.



Always employ proper lock-out-tag-out (LOTO) procedures as applies when on circuits or equipment that have the ability to be energized.



All tasks described in this Section must be performed by appropriately qualified personnel.



Always ensure correct polarity and prevent shorts against rack frames and other grounded devices.



PPE is required during all stages of this process. Refer to EH&S plan for site-specific requirements.



Always label conduits, cables and circuits according to polarity and project labeling requirements.



Do not modify the outer enclosure of the SolBank3.0 series. All cables must enter the SolBank3.0 series as specified and not through custom knockouts. Modification of SolBank3.0 series without prior e-STORAGE approval may result in loss of warranty and certification.



Communication cables shall not be placed in the same conduit as power cables unless shielded. Non-shielded communication cable must be separated from power cable by greater than 0.5m (1.64').



Upon completion of wiring, all conduits and points of cable entry must be closed off with duct seal other preventative measure to prevent ingress of animals and insects.

#### 5.4.4 SolBank3.0 series Grounding Procedure

Table 10: Required Materials

| Item                       | Requirements                         | Remarks               |
|----------------------------|--------------------------------------|-----------------------|
| Grounding lug and hardware | Double-hole copper lug and hardware. | Provided by Installer |
|                            | M12 bolt nut and washers.            | Provided by e-STORAGE |

- ✓ Step 1: Ensure a safe working environment by consulting with the site safety manager.
- ✓ Step 2: SolBank3.0 series grounding auxiliary material size needs to be configured according to the box stainless steel grounding bus and fixing bolt size, as shown in Figure 20.
- ✓ Step 3: Each SolBank3.0 series is equipped with 4 grounding points, and at least one pair of diagonal grounding points (set 1 or set 2) is required for installation, as shown in Figure 21 below.

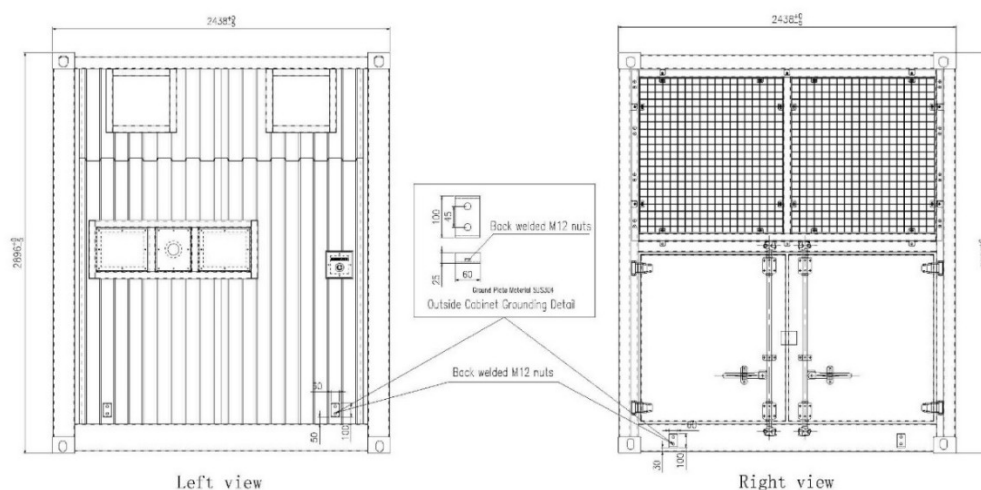


Figure 20: SolBank3.0 series grounding detail

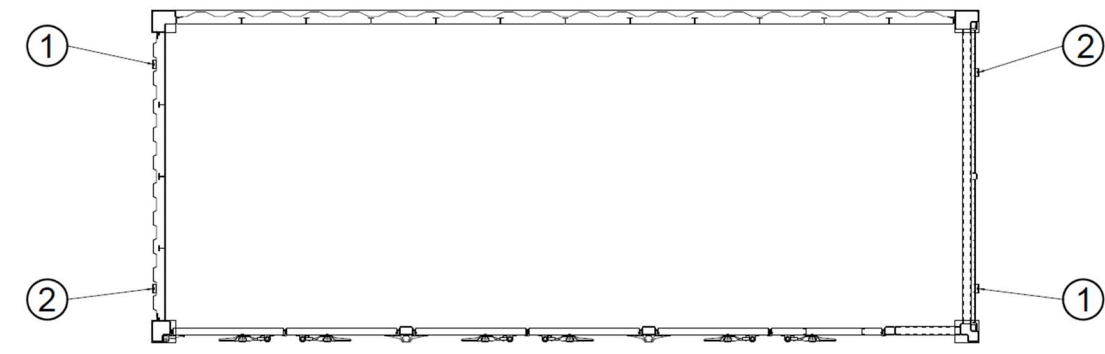


Figure 21: SolBank3.0 series grounding locations.

#### 5.4.5 SolBank3.0 series DC Cable Installation Procedure

Table 11: Required Materials

| Centralized PCS Solution |                                                                                                                                                                                                                                                                                                                                                                                        |                       |
|--------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| Item                     | Requirements                                                                                                                                                                                                                                                                                                                                                                           | Remarks               |
| DC Cables-0.5P           | <p>Cable size, type, length, and count to be specified by the EOR.</p> <p>Current Calculation:<br/> The rated charge and discharge power of the 0.5P system is 2350kW.<br/> Maximum current of the system:<br/> <math>2350\text{kW} \times 1000 / 416 / 2.8 = 2017.5\text{A}</math>,<br/> Average current to each cable is:<br/> <math>2017.5\text{A} / 6 = 336.25\text{A}</math>.</p> | Provided by Installer |
| DC Cables-0.25P          | <p>Cable size, type, length, and count to be specified by the EOR.</p> <p>Current Calculation:<br/> The rated charge and discharge power of the 0.25P system is 1200kW.<br/> Maximum current of the system:<br/> <math>1200\text{kW} \times 1000 / 416 / 2.8 = 1030.2\text{A}</math>,<br/> Average current to each cable is:<br/> <math>1030.3\text{A} / 6 = 171.7\text{A}</math>.</p> | Provided by Installer |
| Cable lugs and hardware  | Double-hole copper lug.                                                                                                                                                                                                                                                                                                                                                                | Provided by Installer |
|                          | M14 bolt, nut and washers.                                                                                                                                                                                                                                                                                                                                                             | Provided by e-STORAGE |

**Important note:** During installation period, in order to avoid water vapor from entering the SolBank3.0 series enclosure leading to unfavorable results such as corrosion, the door and the cable entry opening should not remain opening for more than 1 day. The cable entry opening can use an interim cover.

- ✓ Step 1: Ensure a safe working environment via consultation with site safety manager.

- ✓ Step 2: If not pre-installed prior to SolBank3.0 series placement, then pull DC power cables from PCS cable termination compartment to SolBank3.0 series through pre-installed conduits. Cables should enter SolBank3.0 series at the locations shown in Figure 23.
- ✓ Step 3: Route cables to termination bus shown in Figure 22. Take special care to ensure correct polarity. Label cable as required.
- ✓ Step 4: Cut to length, install lugs, and terminate to bus. The DC cable installation must comply with the UL 486A-486B. Please refer to Figure 24 for hardware assembly.
- ✓ Step 5: Use the provided clips to secure the cables to the cable support bracket. Fix a maximum of two cables at the front, and secure any excess cables at the rear, ensuring that the copper busbars remain tension-free when suspending the cables.
- ✓ Step 6: Secure power cables.

Caution: In the case that SolBank3.0 series units are connected in parallel (i.e. connected to the same DC bus of the PCS), a maximum 1.0V voltage drop imbalance on the same DC input needs to be maintained between the SolBank3.0 series units.

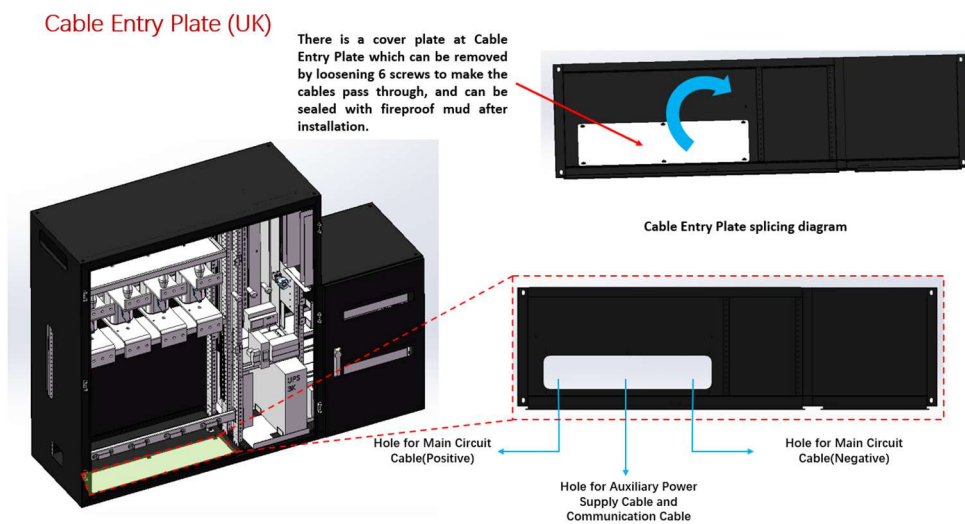


Figure22: Cable entries of the SolBank3.0 series with the “Cable Entry Plate”

(Note: Figure22 provided recommended cable arrangement, the actual panel provided will be blank and could be drilled per cable entry onsite)

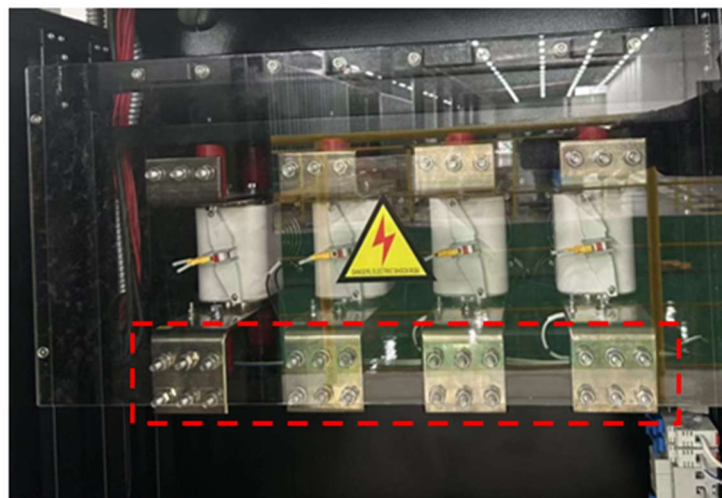
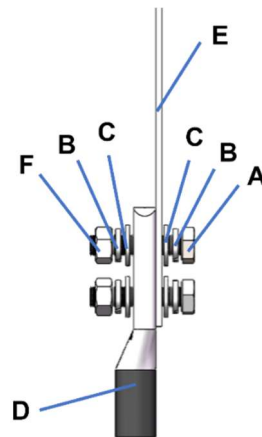


Figure 23: Cable termination



| Position | Designation             | Remarks               |
|----------|-------------------------|-----------------------|
| A        | M14 Bolt                | Provided by e-STORAGE |
| B        | Split washer            | Provided by e-STORAGE |
| C        | Baffle washer           | Provided by e-STORAGE |
| D        | Double-hole wiring lugs | Provided by EPC       |
| E        | Wiring copper bar       | Provided by e-STORAGE |
| F        | M14 Nut                 | Provided by e-STORAGE |

Figure 24: Cable lug hardware assembly reference diagram for centralized PCS

#### 5.4.6 Auxiliary Power Cable, Signal Wires and Communication Cable Installation Procedures

Table 12: Required Materials

| Item                   | Requirements                                                                                                                                                                                                           | Remarks               |
|------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| Auxiliary Power Cables | Cable size, type, and length to be specified by the EOR. Each DC SolBank3.0 series requires a 5-wire circuit.<br>(Please refer to DWG. M310 for recommended cable size.)                                               | Provided by Installer |
| Communication Cables   | Cable length and count to be specified by the EOR. BMS-EMS communication CAT6A with RJ45 terminations required.<br>Communication rate should not be less than 8Mbps. Shield wire required if adjacent to power cables. | Provided by Installer |

|                                                                 |                                                                                                                                                                                                                                                                                                                                   |                       |
|-----------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| Signal Wires<br><br>(If designed for the specific project/site) | Cable size, type, and length to be specified by the EOR. Each DC SolBank3.0 series requires four (4) signal wires.<br>1. X4:14, X4:15 (Interconnecting dry contacts)+/- with two (2) 1mm <sup>2</sup> communication wires<br>2. X3:27, X3:37 (External F-stop Signal Input) +/- with two (2) 1mm <sup>2</sup> communication wires | Provided by Installer |
|-----------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|

**Important note:** During installation period, in order to avoid water vapor from entering the SolBank3.0 series enclosure leading to unfavorable results such as corrosion, the door and the cable entry opening should not remain opening for more than 1 day. The cable entry opening can use an interim cover.

- ✓ Step 1: Ensure a safe working environment via consultation with site safety manager.
- ✓ Step 2: Identify location of SolBank3.0 series auxiliary power supply terminations, as shown in Figure 25.
- ✓ Step 3: Pull auxiliary power cables from auxiliary power supply to SolBank3.0 series via the location identified in Figure 22.
- ✓ Step 4: Route cables, cut, and terminate within the U-style compression fittings.
- ✓ Step 5: Identify location of SolBank3.0 series communication terminations.
- ✓ Step 6: Pull communication cables from the project EMS (or other devices) to the SolBank3.0 series via the location identified in Figure 24. Refer to the project specific network diagram, developed by the EOR, for interconnected devices and point-to-point wiring instructions.
- ✓ Step 7: Identify location of SolBank3.0 series signal wire supply terminations, as shown in Figure 26.
- ✓ Step 8: Pull signal wires from the project EMS (and other devices) to the SolBank3.0 series. Refer to the project specific network diagram, developed by the EOR, for interconnected devices and point-to-point wiring instructions.
- ✓ Step 9: Install the UPS battery.
- ✓ Step 10: Referring to Figure 27, connect the wire of UPS battery terminal.
- ✓ Step 11: Secure all cabling with cable ties. Ensure all cables and conduits are properly labeled.
- ✓ Step 12: Close off all conduits and wire penetrations with duct seal or foam.

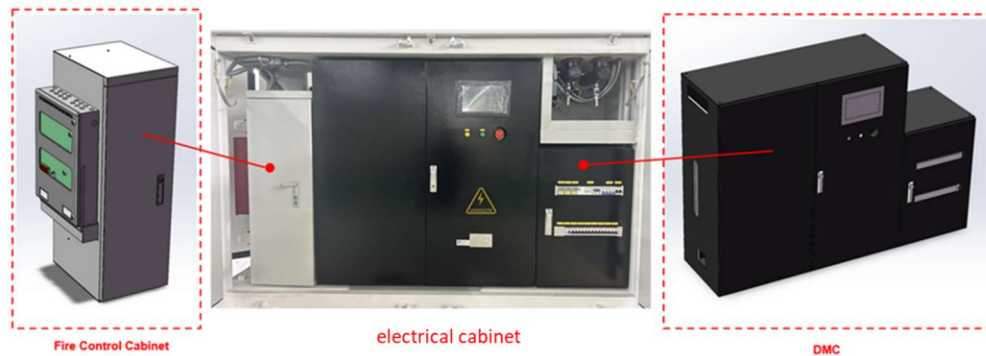


Figure 25: Description of Solbank Electrical Cabinet Layout

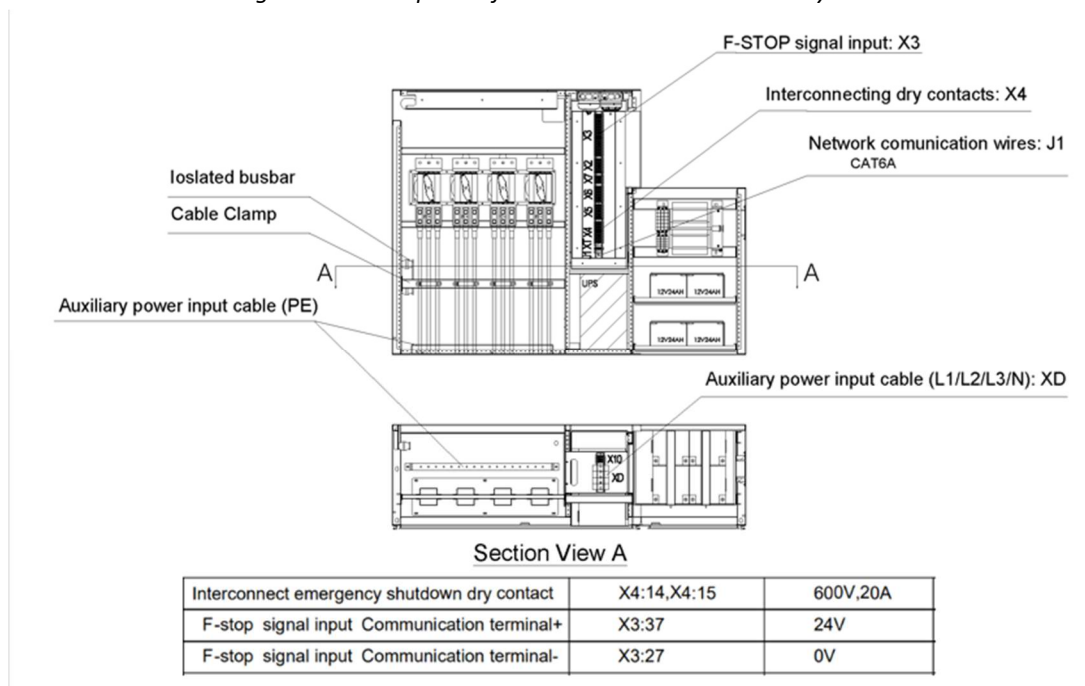


Figure 26: Description of busbar layout and dry contact

X4:14, X4:15 (Interconnect emergency shutdown dry contact): When the SolBank3.0 series is normal, this terminal is normally close signal, when the SolBank3.0 series has local F-stop or fire secondary or combustible gas secondary signal, it outputs open conduction signal.

X3:27, X3:37 (F-stop signal input). When this signal is normally close, SolBank3.0 series operates normally. when this signal changes to an open pilot signal, SolBank3.0 series will control the AC auxiliary power supply to be disconnected and the DC contactor of the BMS Box to be disconnected, and the system will stop operating.

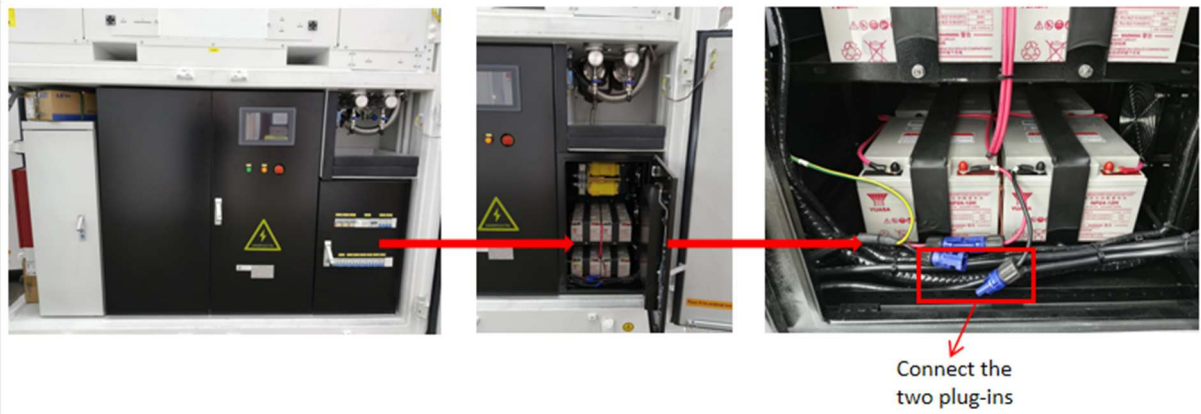


Figure 27: UPS battery wiring description

## 5.5 SolBank3.0 series Battery Power Cable Connection

The following sections detail the tasks required to electrically integrate the SolBank3.0 series' battery packs.

### 5.5.1 Recommended and Equipment

Table 13: Required Materials

| Tool Name                      | Quantity | Remarks                                                                                            |
|--------------------------------|----------|----------------------------------------------------------------------------------------------------|
| Basic electrical tools         | --       | Required for cable and wire management                                                             |
| Misc. construction commodities |          | Electrical tape, wire labels, cable ties, etc.                                                     |
| PPE                            | --       | Basic PPE and specialized electrical PPE suitable for high DC voltages per site specific EH&S plan |

### 5.5.2 Precautions



The SolBank3.0 series will arrive on site with batteries installed and partially charged. Batteries cannot be deenergized. Risk of electrocution exists. Exercise extreme caution.



High DC voltage present. Properly rated insulated gloves, insulated footwear, insulated tools, arc flash clothing, and face shields are recommended when working around batteries and energized circuits.



Ensure DC Disconnects are open and battery strings are isolated from PCS when working on system.



Always employ proper lock-out-tag-out (LOTO) procedures when on circuits or equipment that have the ability to be energized.



All tasks described in this Section must be performed by appropriately qualified personnel.



Always ensure correct polarity and prevent shorts against rack frames and other grounded devices.



PPE is required during all stages of this process. Refer to EH&S plan for task-specific requirements.



Always label conduits, cables and circuits according to polarity and project labeling requirements.



Always confirm polarity and handle energized cables with care. Improper wiring or accidental shorting against battery rack frames or other grounded devices will void warranty on all battery packs in the impacted string.

### 5.5.3 SolBank3.0 series Battery Pack Safety Check

To ensure safe transport of the SolBank3.0 series, the battery packs have been electrically isolated by disconnecting MSD. Before connecting the MSD, if the Shockaction indicators or Tilt sensor on the container shown in the following Figure 28 turned to red, Insulation Resistance testing needs to be performed on each battery pack. The results of the test are recorded in the “Insulation Resistance Test – Battery Packs” chart, Addendum 1.

#### Test 1: Positive to Ground

Red Test Lead = Battery Positive Terminal

Black Test Lead = Container Ground

Test Voltage = 500Vdc

Test Time = 1 minute

Passing Score = > 20MΩ

#### Test 2: Negative to Ground

Red Test Lead = Battery Negative Terminal

Black Test Lead = Container Ground

Test Voltage = 500Vdc

Test Time = 1 minute

Passing Score = > 20MΩ

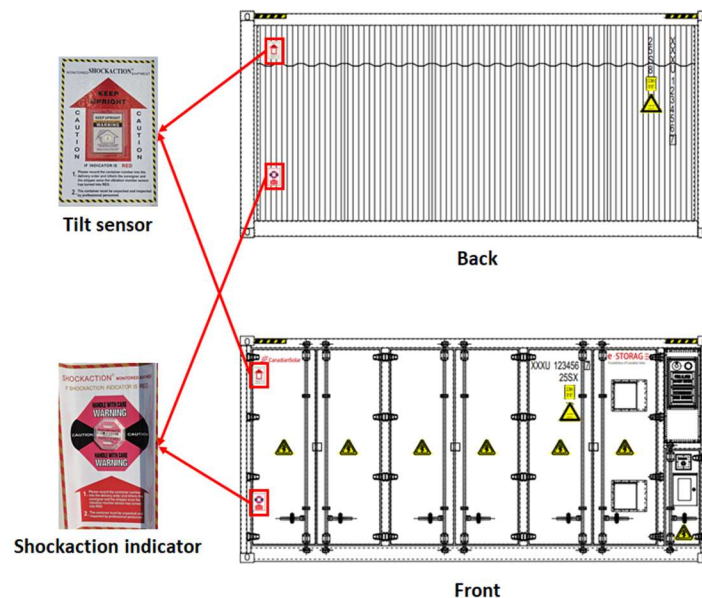


Figure 28: Location of the Shockaction indicator and Tilt sensor

### 5.5.4 SolBank3.0 series Wiring Instructions

The SolBank3.0 series contains (48) 1P104S battery packs and twelve (12) BMS boxes. A typical battery string consists of four (4) 1P104S battery packs wired in series and connected to a single

BMS as shown in Figure 29-1. Twelve (12) such strings exist within each SolBank3.0 series. For the electrical schematic diagram of each cable cluster connection, refer to Figure 29-1.

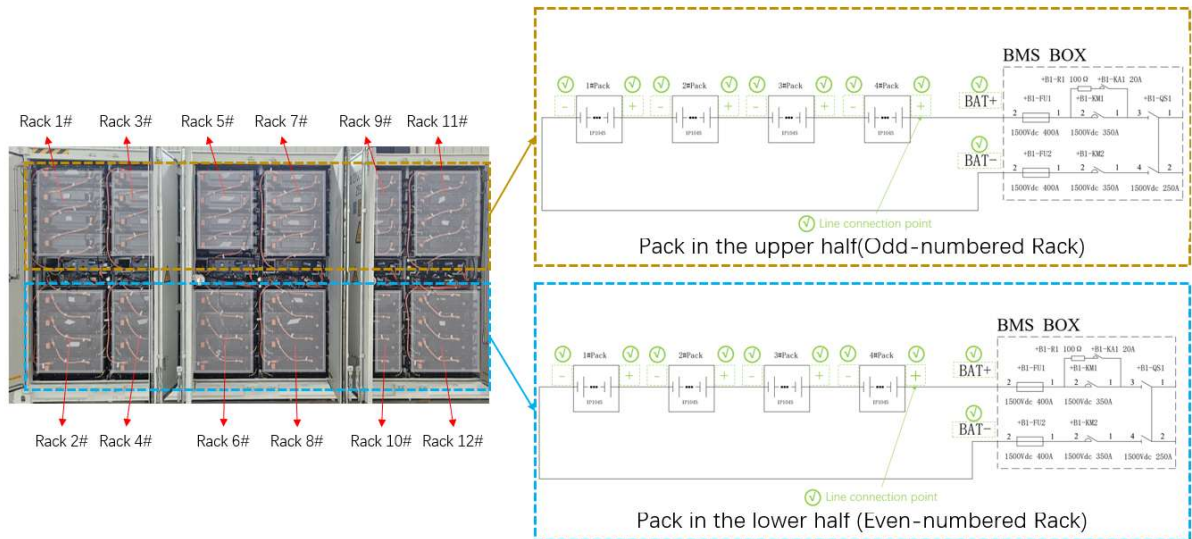


Figure 29-1: Description of busbar layout



Figure 29-2: MSD Installation

- 
1. Make sure that the red boxed portion of the picture above is perpendicular to the MSD before installed.
  2. Plug in the MSD in the direction of the red arrow, the mating of the MSD is fool proof design.
  3. Make sure the red CPA is open before locking, press together the area marked with "1", and when hear the "click" sound, the MSD is completely locked.
  4. After the MSD is completely locked, push in the MSD CPA to the position shown above to achieve the MSD CPA double lock effect.

Figure 29-3: MSD Installation Instruction

As noted in the precautions section above, these batteries are charged and therefore personnel will be handling and terminating energized cables. Extreme caution and proper PPE are required.

**Important note:** During installation period, in order to avoid water vapor from entering the

SolBank3.0 series enclosure leading to unfavorable results such as corrosion, the door and the cable entry opening should not remain opening for more than 1 day. The cable entry opening can use an interim cover.

- ✓ Step 1: Consult with the site safety manager to ensure a safe working environment.
- ✓ Step 2: Visually verify the connection path of all cables in the workflow.
- ✓ Step 3: Install MSD on each battery pack. Refer to the Figure 29-2 and Figure 29-3 for MSD installation instruction, The MSD is placed in three cartons as shown in Figure 11.

### 5.5.5 SolBank3.0 series Battery String Safety Check

After installing all MSDs onto the battery packs, perform insulation testing on each battery string. The results of the test are recorded in the “Insulation Resistance Test – Battery Strings” chart, Addendum 1.

#### Test 1: Positive to Ground

Red Test Lead = Battery Positive Cable

Black Test Lead = Container Ground

Test Voltage = 1500Vdc

Test Time = 1 minute

Passing Score = > 20MΩ

As the cables pass the insulation resistance test, they can be connected to the corresponding BMS terminal.

#### Test 2: Negative to Ground

Red Test Lead = Battery Negative Cable

Black Test Lead = Container Ground

Test Voltage = 1500Vdc

Test Time = 1 minute

Passing Score = > 20MΩ



Figure 30: SolBank3.0 series C15-1P104S Battery Pack. Battery negative terminal is shown above.



Figure 31: BMS plug&stock and termination locations. Battery string positive termination(lower) and negative termination (upper) are shown above.



Figure 32: Battery cable quick connect. To install, push into receptacle/terminal until a notable click is heard. To release, press the side button and remove.

## 6 Inspection and Equipment Cleaning

### 6.1 Inspection

This section details post installation cleaning and inspection procedures required to be performed prior to system energizing and testing.

#### 6.1.1 Precautions



When cleaning and inspecting the SolBank3.0 series, always de-energize the system and use LOTO procedures. If de-energizing is not possible, utilize proper PPE and safety procedures.



All tasks described in this Section must be performed by appropriately qualified personnel.

**Important note:** During installation period, in order to avoid water vapor from entering the SolBank3.0 series enclosure leading to unfavorable results such as corrosion, the door and the cable entry opening should not remain opening for more than 1 day. The cable entry opening can use an interim cover.

#### 6.1.2 Cleaning Tasks

- ✓ Step 1: Ensure a safe working environment via consultation with site safety manager.
- ✓ Step 2: Remove all installation debris from inside the SolBank3.0 series. Vacuum and clean surfaces where safe to do so.
- ✓ Step 3: Wipe down all interior and exterior surfaces and remove foreign contaminants and debris.

#### 6.1.3 Inspection Tasks

The following are visual inspections:

- ✓ Verify correct operation of doors, latches and seals.
- ✓ Verify all conduits and points of entry are properly sealed.
- ✓ Verify all cables are secured with wire ties and professional wire management techniques were used.
- ✓ Verify all bolts and equipment fasteners are in place and terminated to the proper torque values specified in this manual. Special attention should be paid to primary DC electrical terminations and ground terminations.
- ✓ Verify all conduits and cables are properly labeled.
- ✓ Visually confirm installation is performed per site documentation and all cables and wires are terminated at their proper locations.
- ✓ Visually inspect cables or signs of damage to insulation.

### 6.2 Commissioning

Commissioning procedures and steps will be provided only by SolBank3.0 series Commissioners. Please contact e-STORAGE 6 weeks in advance of planned commissioning to schedule e-STORAGE Installation support.

## 7 String Solution

The SolBank3.0 series system for string solution includes two following different P-rate products, as shown in Table 4 below.

Table 14: SolBank3.0 series Specifications for String PCS Solution

| Item                             | Parameters                          |                             |
|----------------------------------|-------------------------------------|-----------------------------|
| Discharge Duration               | 2-hour                              | 4-hour                      |
| Charge/Discharge P-rate          | 0.5P                                | 0.25P                       |
| Nominal Capacity (kWh)           | 5016                                | 5016                        |
| Rated DC Capacity (kWh)          | <b>4800(For String PCS)</b>         | <b>4800(For String PCS)</b> |
| Operating DC Voltage Range (VDC) | 1164.8 ~ 1497.6                     |                             |
| Recommended Discharge Power (kW) | <b>2400(For String PCS)</b>         | <b>1200(For String PCS)</b> |
| # of LFP Battery Packs           | 48                                  | 48                          |
| # of BMS HV Boxes                | 12                                  | 12                          |
| Operating temperature            | -30°C to 55°C (Ambient temperature) |                             |

Wiring and cable specifications for string solution are shown in the figures and table below.

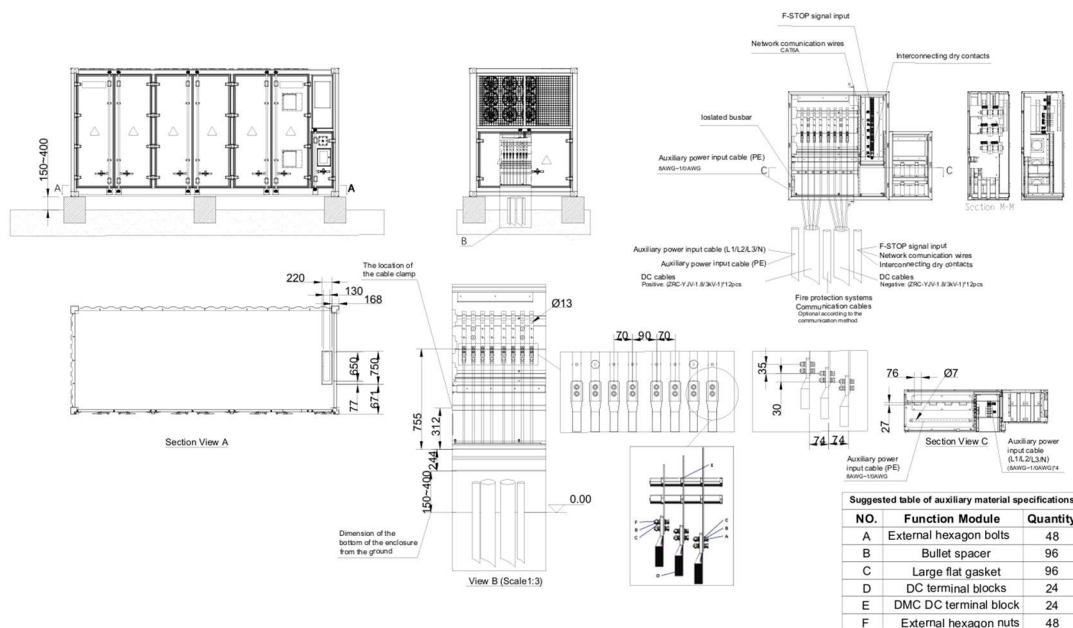
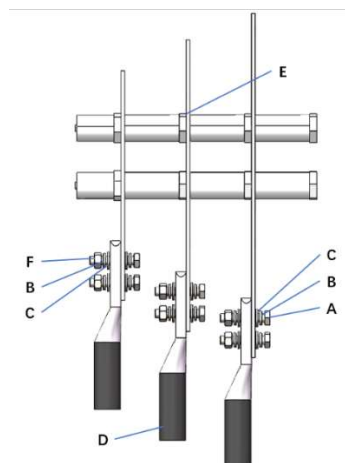


Figure 33: Foundation Conduit Stub-ups (String PCS) (refer to Dwg NO. M310)

| String PCS Solution     |                                                                                                                                                                                                                                                                                                                                                                                                                                      |                       |
|-------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------|
| Item                    | Requirements                                                                                                                                                                                                                                                                                                                                                                                                                         | Remarks               |
| DC Cables-0.5P          | <p>Cable size, type, length, and count to be specified by the EOR.</p> <p>Current Calculation:<br/>           The rated charge and discharge power of the 0.5P(For String PCS) system is 2400kW.<br/>           Maximum current of the system:<br/> <math>2400\text{kw} \times 1000 / 416 / 2.8 = 2060.4\text{A},</math><br/>           Average current to each cable is:<br/> <math>2060.4\text{A} / 12 = 171.7\text{A}.</math></p> | Provided by Installer |
| DC Cables-0.25P         | <p>Cable size, type, length, and count to be specified by the EOR.</p> <p>Current Calculation:<br/>           The rated charge and discharge power of the 0.25P(For String PCS) system is 1250kW.<br/>           Maximum current of the system:<br/> <math>1250\text{kw} \times 1000 / 416 / 2.8 = 1073.1\text{A},</math><br/>           Average current to each cable is:<br/> <math>1073.1\text{A} / 12 = 89.4\text{A}.</math></p> |                       |
| Cable lugs and hardware | 3 Racks to 2 PCS uses single hole lugs.<br>2 Racks to 1 PCS uses single hole lugs.<br>1 Rack to 1 PCS uses double hole lugs.<br>Centralized PCS uses double hole lugs.                                                                                                                                                                                                                                                               | Provided by Installer |
|                         | M12 bolt, nut and washers.                                                                                                                                                                                                                                                                                                                                                                                                           | Provided by e-STORAGE |



| Position | Designation  | Remarks               |
|----------|--------------|-----------------------|
| A        | M12 Bolt     | Provided by e-STORAGE |
| B        | Split washer | Provided by e-STORAGE |

|   |                         |                       |
|---|-------------------------|-----------------------|
| C | Baffle washer           | Provided by e-STORAGE |
| D | Double-hole wiring lugs | Provided by EPC       |
| E | Wiring copper bar       | Provided by e-STORAGE |
| F | M12 Nut                 | Provided by e-STORAGE |

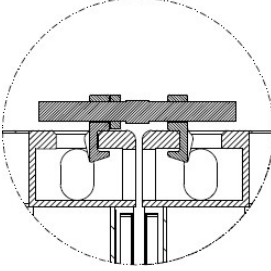
*Figure34: Cable lug hardware assembly reference diagram for string PCS (refer to Dwg NO. M320)*

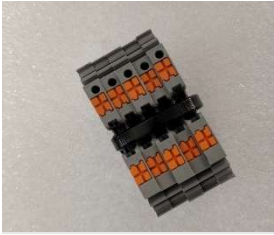
*Note: For string PCS version, DC cables should be installed in order from inside to outside.*

## 8 Annexes

### 8.1 Annex 1: Installation Components List

The following components are supplied by e-STORAGE and shipped with the SolBank product delivery.

| Name                                                                        | Quantity                                                                                                       | Picture                                                                             | Remarks                                                                    |
|-----------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|----------------------------------------------------------------------------|
| Bridge lock                                                                 | Project<br>Specific up to 2 pcs<br>per pair of<br>SolBank3.0 series (for<br>back-to-back<br>installation only) |   | Fixed back-to-back on top<br>(Field installation)                          |
| Twist lock                                                                  | Used for four bottom<br>corners of the<br>container fixed, each<br>container installation<br>of 4 pieces       |  | Installation of containers<br>(Field installation)<br>Transport separately |
| MSD                                                                         | MSD connectors, 48<br>in total                                                                                 |  | Installed in the front of the<br><u>Battery</u> Pack                       |
| Paint-spray<br><a href="#">9003</a><br>Paint-spray_<br><a href="#">7035</a> | 2 bottles                                                                                                      |  | Spray to prevent rust                                                      |

|                                                                                    |       |                                                                                    |                         |
|------------------------------------------------------------------------------------|-------|------------------------------------------------------------------------------------|-------------------------|
| Pin terminal box                                                                   | 5 PCS |  |                         |
| Hexagon socket bolt/M14*45<br>Hexagon nut/M14<br>Flat washer/D14<br>Spring-pad/D14 | 1 PCS |   | Spare part in addition. |
| Neutral silicone weather-resistant adhesive                                        | 1PCS  |   |                         |

## 8.2 Annex 2: Installation point checklist

| Pre-Installation Inspection  |                                            |                                                                                                                                                        |                     |         |
|------------------------------|--------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------|---------|
| No.                          | Check items                                |                                                                                                                                                        | Check records       | Remarks |
| 1                            | Transportation arrival inspection          | Upon arrival, remove the protective cover, and check the exterior for bumps, paint damage                                                              |                     |         |
| 2                            |                                            | Check the status of the anti-tipping label for proper condition                                                                                        |                     |         |
| 3                            |                                            | Check door locks for loss, vandalism                                                                                                                   |                     |         |
| 4                            |                                            | Check that the lamination of openings for air conditioners, fans, pressure equalizers, etc. is intact and undamaged                                    |                     |         |
| 5                            | Unpacking material inspection              | Whether the fixing corners are configured                                                                                                              |                     |         |
| 6                            |                                            | Fire control panel batteries are configured or damaged                                                                                                 |                     |         |
| 7                            |                                            | Whether overage spare parts are complete in the storage box under chiller on the door. Refer to the paper-based "overage spare parts list" in the box. |                     |         |
| 8                            | SolBank3.0 series installation base check  | Whether the support points are implemented according to the design support requirements                                                                |                     |         |
| 9                            |                                            | Whether the leveling level of the support surface meets the flatness requirement                                                                       |                     |         |
| Signature of inspector:      |                                            |                                                                                                                                                        | Date of inspection: |         |
| Post-Installation Inspection |                                            |                                                                                                                                                        |                     |         |
| No.                          | Check items                                |                                                                                                                                                        | Check records       | Remarks |
| 1                            | Structural installation inspection         | SOLBANK3.0 SERIES bridge locks or twist locks are in place and torque is confirmed.                                                                    |                     |         |
| 2                            | Electrical connection check                | Ground wire is firmly installed without loosening, and connected to any two diagonally opposite ground pads.                                           |                     |         |
| 3                            |                                            | All DC cable plugs are in place                                                                                                                        |                     |         |
| 4                            |                                            | Is the communication cable loose                                                                                                                       |                     |         |
| 5                            |                                            | DC output power cable is connected in place and not loose                                                                                              |                     |         |
| 6                            | Functional check of fire protection system | Lead-acid batteries in the fire panel were installed well.                                                                                             |                     |         |
| 7                            |                                            | Whether all fire detectors operate normally, and the host computer has no abnormal alarms                                                              |                     |         |
| 8                            |                                            | Whether the fan can be started and stopped normally (fan-specific start/stop switch)                                                                   |                     |         |
| 9                            |                                            | Appearance of all detectors in good condition                                                                                                          |                     |         |
| Signature of inspector:      |                                            |                                                                                                                                                        | Date of inspection: |         |

### 8.3 Annex 3: Bolt torque reference table

*Table 15: Bolt Torque Reference Table for Structural Fasteners*

| Metric Thread Size | Recommended metric bolt tightening torque |      |
|--------------------|-------------------------------------------|------|
|                    | ft lbs                                    | Nm   |
| M4                 | 2.1                                       | 2.8  |
| M5                 | 4.1                                       | 5.6  |
| M6                 | 7.2                                       | 9.8  |
| M7                 | 11.6                                      | 15.7 |
| M8                 | 18.1                                      | 24.5 |
| M10                | 32.5                                      | 44.1 |
| M12                | 57.9                                      | 78.5 |
| M14                | 94.4                                      | 128  |
| M16                | 144.6                                     | 196  |
| M18                | 191.8                                     | 260  |
| M20                | 275.1                                     | 373  |

*Table 16: Bolt Torque Reference Table for Electrical Wiring*

| Metric Thread Size | Recommended metric bolt tightening torque |     |
|--------------------|-------------------------------------------|-----|
|                    | ft lbs                                    | Nm  |
| M4                 | 1.1                                       | 1.5 |
| M5                 | 2.4                                       | 3.2 |
| M6                 | 4.1                                       | 5.5 |
| M8                 | 7.4                                       | 10  |
| M10                | 14.8                                      | 20  |
| M12                | 25.8                                      | 35  |
| M14                | 44.3                                      | 60  |
| M16                | 59                                        | 80  |
| M18                | 88.5                                      | 120 |
| M20                | 125.4                                     | 170 |

## 8.4 Annex 4: Insulation Resistance Test

Project Name:

Battery Number:

Serial Number:

Name of the tester:

Company :

Signature :

Date:

Serial number the testing equipment :

Calibration certificate number:

Note: Calibration certificate to be supplied by the tester

| Insulation Resistance Test – Battery Packs |          |          |         |          |          |         |          |          |         |          |          |
|--------------------------------------------|----------|----------|---------|----------|----------|---------|----------|----------|---------|----------|----------|
| Rack 1                                     |          |          | Rack 2  |          |          | Rack 3  |          |          | Rack 4  |          |          |
| Bat                                        | + to gnd | - to gnd | Bat     | + to gnd | - to gnd | Bat     | + to gnd | - to gnd | Bat     | + to gnd | - to gnd |
| 1                                          |          |          | 1       |          |          | 1       |          |          | 1       |          |          |
| 2                                          |          |          | 2       |          |          | 2       |          |          | 2       |          |          |
| 3                                          |          |          | 3       |          |          | 3       |          |          | 3       |          |          |
| 4                                          |          |          | 4       |          |          | 4       |          |          | 4       |          |          |
| Rack 5                                     |          |          | Rack 6  |          |          | Rack 7  |          |          | Rack 8  |          |          |
| Bat                                        | + to gnd | - to gnd | Bat     | + to gnd | - to gnd | Bat     | + to gnd | - to gnd | Bat     | + to gnd | - to gnd |
| 1                                          |          |          | 1       |          |          | 1       |          |          | 1       |          |          |
| 2                                          |          |          | 2       |          |          | 2       |          |          | 2       |          |          |
| 3                                          |          |          | 3       |          |          | 3       |          |          | 3       |          |          |
| 4                                          |          |          | 4       |          |          | 4       |          |          | 4       |          |          |
| Rack 9                                     |          |          | Rack 10 |          |          | Rack 11 |          |          | Rack 12 |          |          |
| Bat                                        | + to gnd | - to gnd | Bat     | + to gnd | - to gnd | Bat     | + to gnd | - to gnd | Bat     | + to gnd | - to gnd |
| 1                                          |          |          | 1       |          |          | 1       |          |          | 1       |          |          |
| 2                                          |          |          | 2       |          |          | 2       |          |          | 2       |          |          |
| 3                                          |          |          | 3       |          |          | 3       |          |          | 3       |          |          |
| 4                                          |          |          | 4       |          |          | 4       |          |          | 4       |          |          |

| Insulation Resistance Test – Battery Strings |          |          |          |          |          |          |          |
|----------------------------------------------|----------|----------|----------|----------|----------|----------|----------|
| BMS 1                                        |          | BMS 2    |          | BMS 3    |          | BMS 4    |          |
| + to gnd                                     | - to gnd | + to gnd | - to gnd | + to gnd | - to gnd | + to gnd | - to gnd |
|                                              |          |          |          |          |          |          |          |
| BMS 5                                        |          | BMS 6    |          | BMS 7    |          | BMS 8    |          |
| + to gnd                                     | - to gnd | + to gnd | - to gnd | + to gnd | - to gnd | + to gnd | - to gnd |
|                                              |          |          |          |          |          |          |          |
| BMS 9                                        |          | BMS 10   |          | BMS 11   |          | BMS 12   |          |
| + to gnd                                     | - to gnd | + to gnd | - to gnd | + to gnd | - to gnd | + to gnd | - to gnd |
|                                              |          |          |          |          |          |          |          |