

Preliminary Decommissioning Plan

OZ1 BESS Project



Date: January 15, 2026



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1. INTRODUCTION

Purpose

The purpose of this document is to provide a comprehensive overview of activities that will occur during the decommissioning phase of SolarBank's OZ1 Battery Energy Storage System (BESS), located at 157 7th Street SW, Chesley, Ontario. The plan outlines procedures to ensure safe, environmentally responsible, and compliant dismantling, removal, and restoration efforts at the project site. Activities include:

- Equipment dismantling and removal
- Removal of battery energy storage modules
- Removal of ancillary electrical equipment
- Removal of equipment pads, supporting structures, gravel, and fencing
- Site restoration
- Environmental protection measures
- Stakeholder and authority notification
- Contingency decommissioning in the case of emergency events

This plan reflects current best practices and will be updated based on new standards, regulations, and emergent best practices at the time of decommissioning. All required permits will be obtained, and stakeholders will be notified prior to any decommissioning work.

BESS Facilities Description

The OZ1 BESS project has a nameplate capacity of **4.99 MW / 19.9 MWh**, comprised of:

- Nine (9) energy storage containers
- Five (5) inverters
- Two (2) transformers
- Overhead poles connecting to the Hydro One 44kV distribution system
- Auxiliary electrical equipment

The equipment is mounted on concrete pads, with subsurface collection cabling installed approximately 1 meter deep. A detailed site plan and layout of the facility is included as Appendix A.

Note: For additional details on the site's environmental and land characteristics, please refer to Appendix B – Environmental Site Assessment (ESA), which contains comprehensive information on soil conditions, topography, groundwater, and surrounding land use.

Key Stakeholders

- Government and Regulatory Authorities
 - Municipality of Arran Elderslie
 - Hydro One Networks Inc.
- Environmental and Emergency Stakeholders
 - Local Fire Department - Arran-Elderslie Fire Services
- Technical Stakeholders
 - Battery Manufacturer (EVLO) / OEMs
- Community Stakeholders
 - Local Landowner
 - Nearby Residents

2. DECOMMISSIONING ACTIVITIES

Compliance with Fire Safety and Risk Standards

All decommissioning activities, particularly those involving the removal, handling, and transport of Battery Energy Storage System (BESS) components, will be conducted in accordance with the National Fire Protection Association (NFPA) Standard 855 – Standard for the Installation of Stationary Energy Storage Systems, and any other relevant sections applicable at the time of decommissioning.

NFPA 855 outlines fire safety standards, including requirements for thermal event risk mitigation, system disconnection, and hazard communication, which will guide the safe removal and disposal of energy storage components.

Compliance to these standards ensures that risks associated with thermal runaway, fire, and hazardous material exposure are minimized during decommissioning operations. The project owner and decommissioning contractor will consult with the local fire department and qualified professionals to implement all NFPA protocols and safety measures throughout the decommissioning process.

Electrical hazards associated with battery modules will be managed in accordance with applicable fire safety standards, manufacturer requirements, and supplier procedures. Prior to off-site transportation, battery modules will be conditioned to an SOC of 30% or lower, in accordance with transportation and safety requirements.

Timeline

Decommissioning is expected to begin within **6 months** following the permanent cease of operations and disconnection from the grid. The overall duration of decommissioning activities is estimated to be **3 to 6 months**, contingent on weather, permitting, and third-party coordination.

If decommissioning is required during winter conditions, the project owner will proceed with safe system shutdown, battery discharge, and removal of above-grade equipment, with appropriate safety measures in place to address cold weather, snow, ice, and reduced daylight including safe access controls, weather-appropriate handling procedures, and schedule adjustments as required. Certain activities that are constrained by frozen ground or weather conditions - such as soil disturbance, foundation removal, underground infrastructure removal, and final site grading and restoration - may be deferred until suitable weather conditions in the spring.

General Approach

All equipment will be de-energized and disconnected from the grid in coordination with Hydro One and relevant authorities. Decommissioning will be performed following manufacturer guidance, applicable standards, and all required environmental and safety protocols. Equipment and materials will be repurposed where feasible, and the site will be restored to a condition similar to pre-construction.

Safety and Lockout Procedures

Electrical isolation, lockout, and disconnection activities associated with the decommissioning of the BESS containers, PCS units, transformers, and electrical cabinets will be carried out in accordance with EVLO's approved lockout and isolation procedures.

Detailed lockout, isolation, and verification procedures are provided in Appendix D and will be followed by qualified personnel prior to equipment disconnection, cable removal, or material handling.

Battery Energy Storage Modules

The following steps will be taken to remove the BESS containers:

- Safely disconnect the BESS from the grid.
- Disconnect all collection cables from each battery container.
- Transport containers off site.

Battery modules are integrated within the BESS containers and if they need be removed, they will only be removed after electrical isolation at the string and module level has been completed in accordance with EVLO's approved procedures. Series string interconnections will be disconnected prior to individual module removal.

Once the BESS containers are disconnected, options for reuse, recycling, return to vendor, or safe disposal will be evaluated in accordance with manufacturer guidance and applicable regulations.

Where technically and commercially feasible, battery modules may be considered for second-life or reuse applications. If reuse is proposed, a testing and evaluation campaign will be done to confirm suitability, safety, and performance.

EVLO has identified qualified third-party service providers that can support battery recycling and disposal activities, including:

- Call2Recycle / Battery Stewardship Council
 - (<https://batterystewardship.com/>)
- Bluewater Battery Logistics
 - (<https://www.bluewaterbattery.com/>)

Final selection of recycling or disposal providers will be subject to project-specific requirements, regulatory compliance, and availability at the time of decommissioning.

Battery module handling, staging, packaging, transport, recycling, or disposal will be performed in accordance with supplier and manufacturer requirements.

Battery modules shall be treated as energized at all times. Even if a battery indicates 0% state of charge (SOC), residual energy remains within the cells.

Prior to dismantling and off-site transportation, battery modules will be managed to ensure compliance with applicable hazardous materials transportation requirements. Battery modules will be discharged to an SOC of approximately 30% or lower, with a target SOC of approximately 25-30%, in accordance with manufacturer guidance and transportation safety considerations.

SOC may be verified using recent operational records from the BESS where available. Where required, battery self-discharge behavior and cell voltage information may be reviewed to confirm that SOC levels remain within acceptable limits prior to dismantling and transport.

Heavy Equipment Removal and Lifting

Heavy electrical equipment will be removed using cranes with appropriate lifting capacity, in accordance with a lifting plan. Craning and rigging activities will follow the manufacturer's installation and handling requirements, as outlined in the applicable manual included as Appendix E.

Removal will be coordinated with flat-bed carriers as needed prior to transport to approved recycling or disposal facilities.

Ancillary Electrical Equipment

- Disconnect inverters, transformers, and auxiliary panels.
- Assess equipment for potential repurposing.
- Excavate and remove underground cables; backfill trenches with native soil.
- Repurpose of components according to Electrical Safety Authority (ESA) standards and applicable laws.

Cable Disconnection and Removal

Following confirmation that the site has been fully de-energized in accordance with approved lockout and isolation procedures, electrical cables will be disconnected and removed as part of the decommissioning activities. All power and auxiliary electrical interconnections between the BESS containers, PCS units, and transformers are routed within conduits.

During decommissioning, conduits will be excavated as required and cables will be pulled out and removed in a controlled manner. Cable cutting may occur only where necessary and safe to do so to facilitate removal, and only after verification that the cables are fully de-energized.

Removal of Foundations, Gravel, and Fence

- Excavate and remove concrete pads, support structures, gravel, and perimeter fencing.
- Transport material to appropriate facilities, ensuring dust suppression and noise mitigation measures during demolition.

Site Restoration

- Stabilize the site to prevent erosion or other environmental degradation.
- Reseed disturbed areas with native vegetation or vegetation specified by the landowner or as per Ministry of the Environment, Conservation and Parks (MECP) guidance.
- Restore the site in accordance with landowner agreements and municipal by-laws to a condition consistent with pre-construction.
- Excess materials generated during decommissioning will be managed to prevent environmental impacts and removed from site or reused where feasible, in accordance with applicable regulations and landlord requirements.
- Waste materials will be segregated into recyclable, non-hazardous, and hazardous material streams, with off-site transport and disposal completed at licensed and approved facilities.
- Hazardous materials, if encountered during site restoration activities, will be properly contained, labeled, and managed in accordance with applicable environmental regulations, manufacturer guidance, and disposal requirements.
- All waste handling, transport, and disposal activities will be conducted by qualified contractors and documented as part of the site restoration process to confirm compliance.

3. ENVIRONMENTAL PROTECTION

General environmental protection measures and site safety protocols will be observed throughout decommissioning, including:

- Erosion and sediment control measures as per **MECP's Erosion and Sediment Control Guidelines**.
- Dust suppression techniques during excavation and removal.
- Hazardous materials handling and disposal in compliance with **Ontario Regulation 347 (General - Waste Management)**.
- Spill response plans and designated Environmental Coordinator on-site during critical phases.

In addition to the measures outlined above spill prevention, spill response, cleanup procedures, and any required follow-up monitoring in the event of a spill or potential soil contamination will be carried out in accordance with the EVLOFLEX Emergency Intervention Plan, provided in Appendix C.

Environmental and safety protections related to battery module handling, including response to damaged or leaking modules, will be implemented in accordance with the EVLOFLEX Emergency Intervention Plan Appendix C.

4. EMERGENCY RESPONSE AND STAKEHOLDER NOTIFICATION

The Emergency response actions and communications associated with decommissioning activities or emergency events will be conducted in accordance with the project Emergency Response Plan (ERP) and applicable manufacturer guidance.

The ERP outlines procedures for immediate response, site control, coordination with emergency services, and communication protocols.

The following stakeholders will be notified, as applicable, prior to decommissioning activities and in the event of an emergency or incident:

- Municipality of Arran-Elderslie
- Hydro One Networks Inc.
- Local Fire Department - Arran-Elderslie Fire Services
- Battery Manufacturer / System Integrator (EVLO)
- Landowner
- Nearby residents

Any other authorities or stakeholders as required based on the nature of the event needed.

5. DECOMMISSIONING IN CASE OF AN EVENT

In the event of a fire, thermal runaway, or other emergency requiring partial or full decommissioning, the following protocol will apply:

- Immediate coordination with Hydro One and emergency services to de-energize the site.
- Decommissioning and equipment removal will be undertaken in accordance with:
 - Battery manufacturer-specific protocols
- Removal, containment, and transportation of damaged components will follow hazardous material handling laws under the Transportation of Dangerous Goods Act.
- Post-event site assessment will determine restoration scope and required remediation.

In addition to the steps outlined above:

- Emergency Response Plan Reference - Immediate actions following an event will be carried out in accordance with the project Emergency Response Plan (ERP). The ERP outlines procedures for initial response, safety, site isolation, communication protocols, and coordination with emergency services and utilities immediately following an incident.
- Post-Event Condition and Hazard Assessment - Once the site has been stabilized and safely de-energized, a post-event condition and hazard assessment will be completed by qualified personnel prior to commencing any decommissioning activities. This assessment will:
 - Evaluate the condition of BESS containers, electrical equipment, foundations, and surrounding infrastructure.
 - Identify any new or residual hazards resulting from the event and
 - Inform the scope, sequencing, and safety controls required for partial or full decommissioning activities.

6. COST OF DECOMMISSIONING

Activity	Unit	Quantity	Cost per Unit (2025 CAD\$)	Total (CAD\$)
Mobilization / Demobilization	project	1	\$10,000	\$10,000

Battery Container & Module Removal	each	9	\$2,800	\$25,200
Inverter / Transformer Removal	project	1	\$5,500	\$5,500
Foundation Removal	project	1	\$6,000	\$6,000
Auxiliary Electrical Equipment Removal	project	1	\$17,000	\$17,000
Fence Removal	project	1	\$1,200	\$1,200
Site Restoration (grading, reseeding)	project	1	\$9,500	\$9,500
Trucking Off Site	project	1	\$11,000	\$11,000
			Total	\$85,400

Basis of Estimate

All costs are expressed in 2025 Canadian dollars. This estimate is based on the following:

- Benchmarking data from publicly available information on comparable utility-scale energy storage projects in Ontario;
- Current market rates from contractors and service providers specializing in Battery Energy Storage System (BESS) decommissioning;
- North American industry research and planning guidelines for BESS lifecycle management, including technical studies and decommissioning best practices [1], [2].

The cost intensity for this project is estimated at CAD \$4,291 per MWh, which reflects the expected effort and resource requirements for battery container removal, electrical equipment dismantling, site logistics, and restoration activities. This value falls within the typical range observed in similar utility-scale BESS decommissioning efforts across North America.

7. Decommissioning Timeline

Decommissioning of the OZ1 BESS facility will commence following the cessation of commercial operations, subject to applicable regulatory approvals and stakeholder notifications. The timeline outlined below provides an estimated schedule for key decommissioning activities:

Activity	Estimated Duration	Timing (Post-Operations)

Stakeholder notifications and permitting	2–4 weeks	Immediately post-operations
Site preparation and safety checks	1 week	After stakeholder notification
Grid disconnection and de-energization	1 week	After permitting
Battery module and container removal	2–3 weeks	Following disconnection
Removal of ancillary electrical equipment	2 weeks	Concurrent with battery removal
Removal of pads, structures, gravel, and fence	2–3 weeks	Post equipment removal
Site restoration (grading, seeding, etc.)	3–4 weeks	Final step
Total Estimated Duration	~3 months (12 weeks)	After cessation of operations

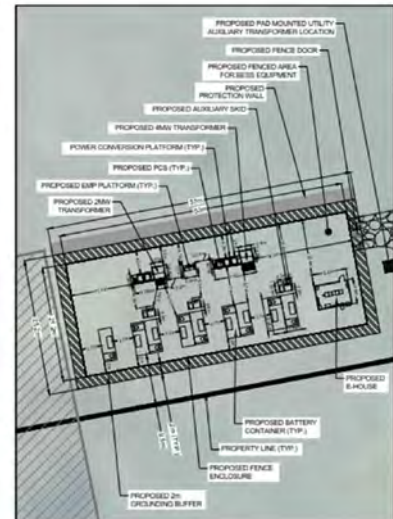
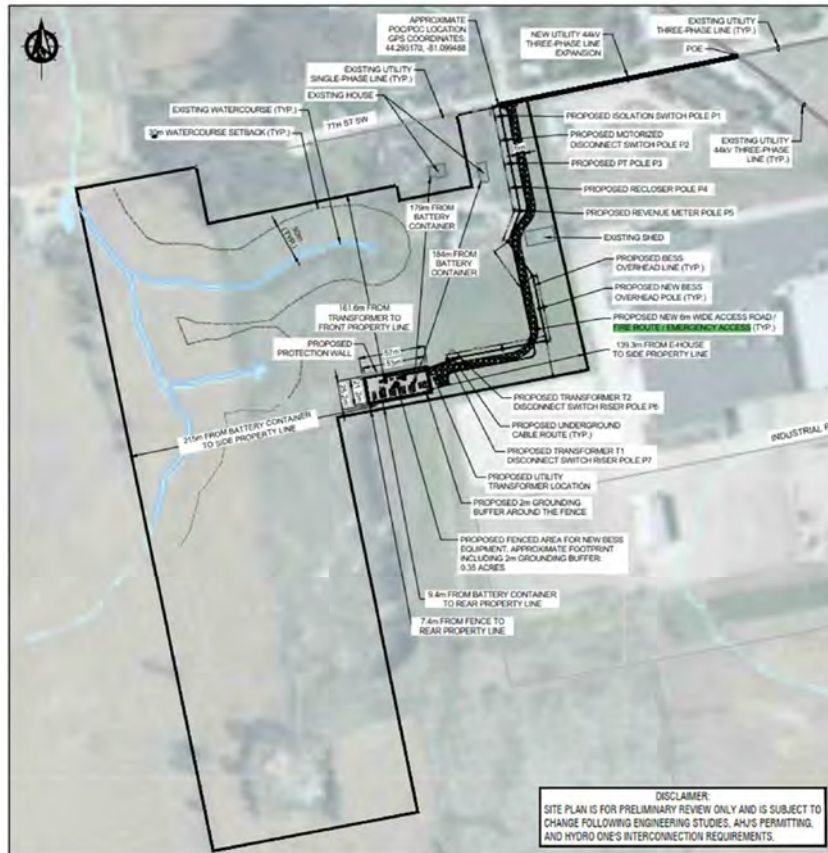
These durations are estimates and will be refined prior to decommissioning based on site conditions, regulatory input, weather constraints, and contractor availability. Any changes to the schedule will be communicated to stakeholders throughout the process.

8. References

- [1] S. Sterlace, “Battery Energy Storage System Decommissioning and End-of-Life Planning,” *IEEE Electrification Magazine*, vol. 11, no. 2, pp. 56–63, Jun. 2023.
- [2] DNV, *Begin at the End: The Cost of Decommissioning Renewable Energy Projects*, DNV Energy Systems, Technical Report, 2023.

9. APPENDICES

Appendix A – Site Plan and Layout



2 EQUIPMENT LAYOUT
E-1 SCALE: 1:300



PROTECTION WALL

Appendix B – ESA Section 2.1: Site Information

Municipal Address(es)	Part of 157 7 th Street SW, Chesley
Current Land Use	Residential and Agricultural
Proposed Land Use	Industrial
Legal Description	PT LT 29 CON 1 ELDERSLIE; PT PARKLT T PL 217 PT 1, 3R7328 AND PART 2 PLAN 3R7748, EXCEPT PT 1 & 2, 3R7744, PT 4, 5, 6, 3R7734 AND PT 1, 3R7748; S/T INTEREST IN R374792, RELEASED AS TO PTS 6 & 7 3R7734 BY BR60650; MUNICIPALITY OF ARRAN-ELDERSLIE
Property Identification Number (PIN)	33183-0173 (LT)
Approximate Universal Transverse Mercator (UTM) coordinates	NAD83 17T 492067 m E 4904304 m N
Accuracy Estimate of UTM	10-15 m
Measurement Method	GPS
Site Area	2.72 hectares (6.71 acres)
Property Owner	Amos K. Kuepfer
Client Contact and Address	Mr. Matt McGregor Solarbank Corp. 505 Consumers Road, Suite 803 North York, ON M2J 4V8

Appendix C – EVLOFLEX Emergency Intervention Plan



EVLOFLEX Intervention Plan

CXL2-DOC-SST-001



Revision 00
2024-02-27

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Revision Description

This section details the updates that have taken place on this document between each release.

Revision	Date	Change(s)
00	2024-02-27	Original publication

Legal Information

This section describes some important concepts related to the content in this document.

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Some of the views shown represent typical views that may vary depending on the configuration. The information presented is used only to illustrate the concept and/or principle.

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1 Definitions

This section provides information on terminology, standards, conventions, and specific considerations that are important to understand before reading this document. This section should be used as a reference before reading and while using this document to ensure proper understanding by the reader.

1.1 Acronyms, Definitions and Abbreviations

°C: Celsius

Auxiliary Energy: The energy used to power all the BESS equipment. The auxiliary energy includes the 460VAC and 240/208-120VAC energy of the site.

Battery Container: Enclosure containing a battery compartment, a main energy distribution section and a control and distribution section.

Battery Module: Element storing the energy. The battery modules are in a 4P8S configuration. Each tray includes six battery modules.

BESS (Battery Energy Storage System): Refers to all the EVLO equipment of the installation (battery container, distribution panels, UPS, EMP, SPPC/EMS)

BMS (Battery Management System): Combination of hardware and software used to manage the battery activity.

Control and Distribution Compartment: Battery container equipment responsible for distributing auxiliary energy to power the various electrical and electronic equipment of the battery container. Also includes a control panel.

EMP (Energy Management Panel): Communication and control hub of up to 3 groups.

EVLOFLEX: Commercial name of the BESS applicable to this document.

F-STOP: Fast-stop/Fast-stop loop

HVAC (Heating, Ventilation and Air Conditioning): Unit used to maintain a preset temperature in an enclosure.

LFP (Lithium Iron Phosphate): Cell Chemistry used in the battery container.

Main Energy Compartment: 1500VDC bus connecting the site's main energy and the strings.

Main Energy: The energy charged into and discharged from the batteries. The Main energy includes the 1500VDC of the container, 1500VDC/690VAC (or 600VAC depending on the configuration) of the PCS and the energy of the main step-up transformer.

PCS (Power Conversion System): Converts AC/DC and DC/AC to charge or discharge the battery enclosure.

PPE (Personal Protective Equipment): Refer to the site's safety program to learn which PPE must be used.

Site: Refers to physical project installed or to be installed.

SPPC/EMS (Smart Power Plant Controller/Energy Management System): Main control cabinet of the BESS.

String: Electrical assembly of eight trays and one half-tray connected in series. The battery container contains up to 6 strings.

Tray: Contains 6 battery modules, 2 cell interfaces and a tray fuse.

UPS (Uninterrupted Power Supply): Battery used to keep the vital operations of the system operational of in case of a power failure.

VAC/AC: Volts, in alternating current

VDC/DC: Volts, in direct current

XFMR or XFO: Electrical transformer

1.2 Conventions

This section defines standards used in the document to ensure that the user understands the exact meaning.

DANGER



A "DANGER" NOTICE WARNS THAT THE SITUATION COULD CAUSE SEVERE INJURIES OR DEATH.

WARNING



A "WARNING" NOTICE WARNS THAT THE SITUATION COULD CAUSE SERIOUS INJURIES.

CAUTION



A "CAUTION" NOTICE WARNS THAT THE SITUATION MAY DAMAGE THE EQUIPMENT.

NOTE *A note adds information to the text.*

" " A word in quotation marks indicates that this word is written as is on the equipment.

Unless otherwise specified, the metric measurement system is used in this document.

2 Introduction

This intervention plan serves as a resource to those responsible for the safety of the EVLOFLEX product and those working around it, as well as a resource for first responders, both during normal operations and in case of an emergency.

This intervention plan presents common and specific hazards and hazardous situations that may occur in or around the EVLOFLEX product components, the measures implemented to detect, delay and/or counteract those hazards and hazardous situations as well as procedures to follow and important information to know in case of emergency.

This document, along with the site specific safety plan and overall layout shall be consulted by the emergency fire team.

3 General Information

3.1 Emergency Contact Information

To be determined at a later date.

3.2 Safety Data Sheets (SDS)

It is required that Safety Data Sheets for BESS hazardous materials be always available on-site.

Contact EVLO for more information on Safety Data Sheets available for materials contained within EVLO products.

3.3 EVLOFLEX Product Description

3.3.1 EVLOFLEX Battery Container

The EVLOFLEX battery container is the main component of the EVLOFLEX system. It is separated into three main compartments:

- Battery Compartment,
- Main Power Compartment,
- Control and Distribution Compartment.

These three compartments are easily accessible from the periphery of the battery container. Additionally, the EVLOFLEX battery container includes an HVAC unit located at the top of the structure.

Battery Compartment

The battery compartment of the container contains the battery strings, which can be further divided into individual battery trays.

Main Power Compartment

The main power compartment of the container contains all the equipment of the 1500 VDC main energy circuit, except for the battery trays. This section interconnects and distributes the 1500 VDC main energy between the site and the battery strings.

Control and Distribution Compartment

The control and distribution compartment of the container contains the up to 460 VAC auxiliary energy distribution components along with the control components and sensors.

For more detailed information regarding the EVLOFLEX battery container, see [CXL2-DOC-MMA-001](#).

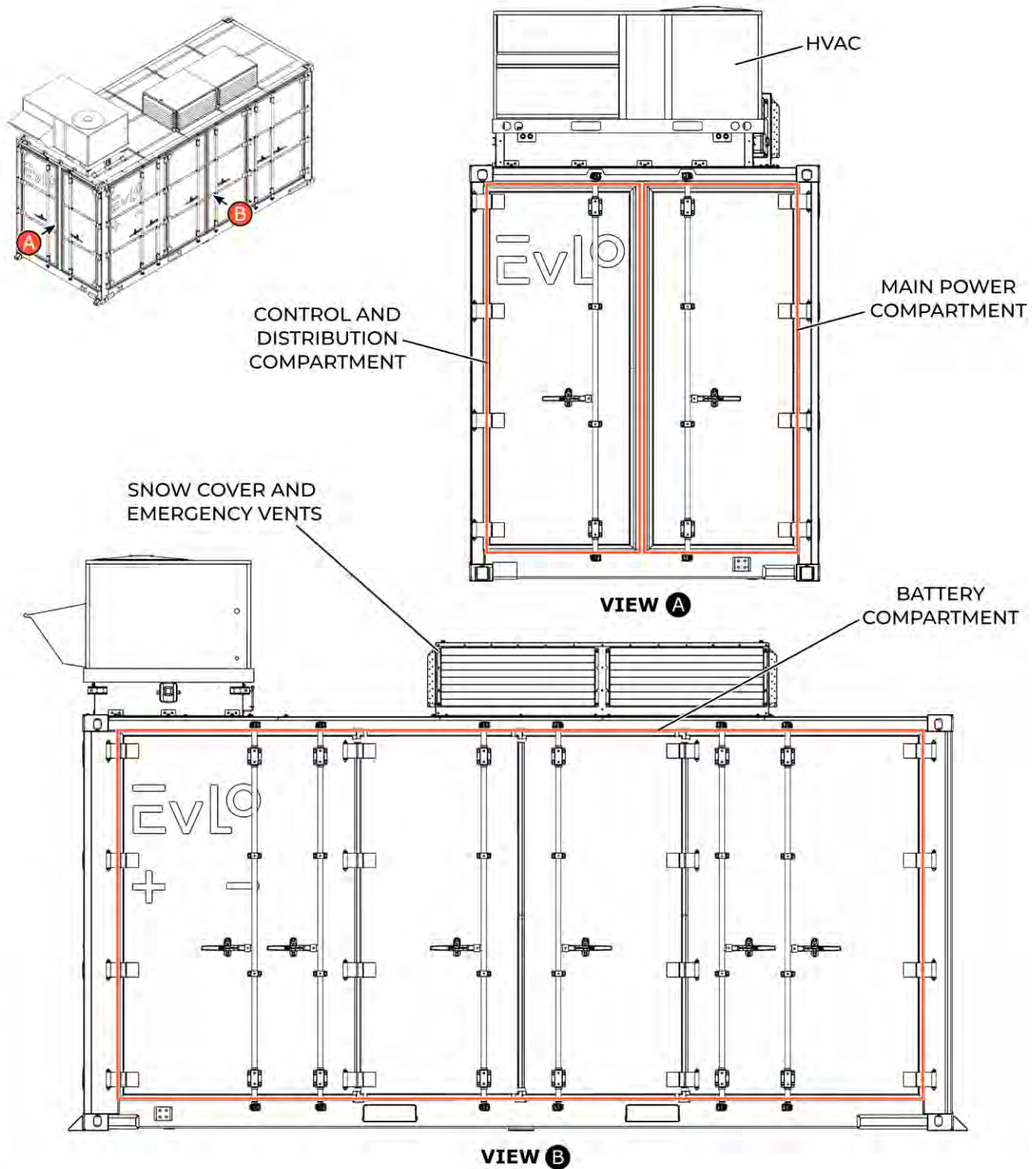


Figure 1 - EVLOFLEX Battery Container

3.3.2 Energy Management Panel (EMP)

The EMP panel is generally mounted on a rack (as shown in **FIGURE 2**) is separated into two main sections:

- Power Supply Panel
- Control Panel

Power Supply Panel

See section **3.3.3** for the summarized description of the power supply panel.

Control Panel

The control panel receive 24 VDC power from the power supply panels and distributes it to various low voltage components within the EMP control panel and the rest of the EVLOFLEX system.

For more detailed information regarding the Energy Management Panel, see **CXL2-DOC-MMA-010**.

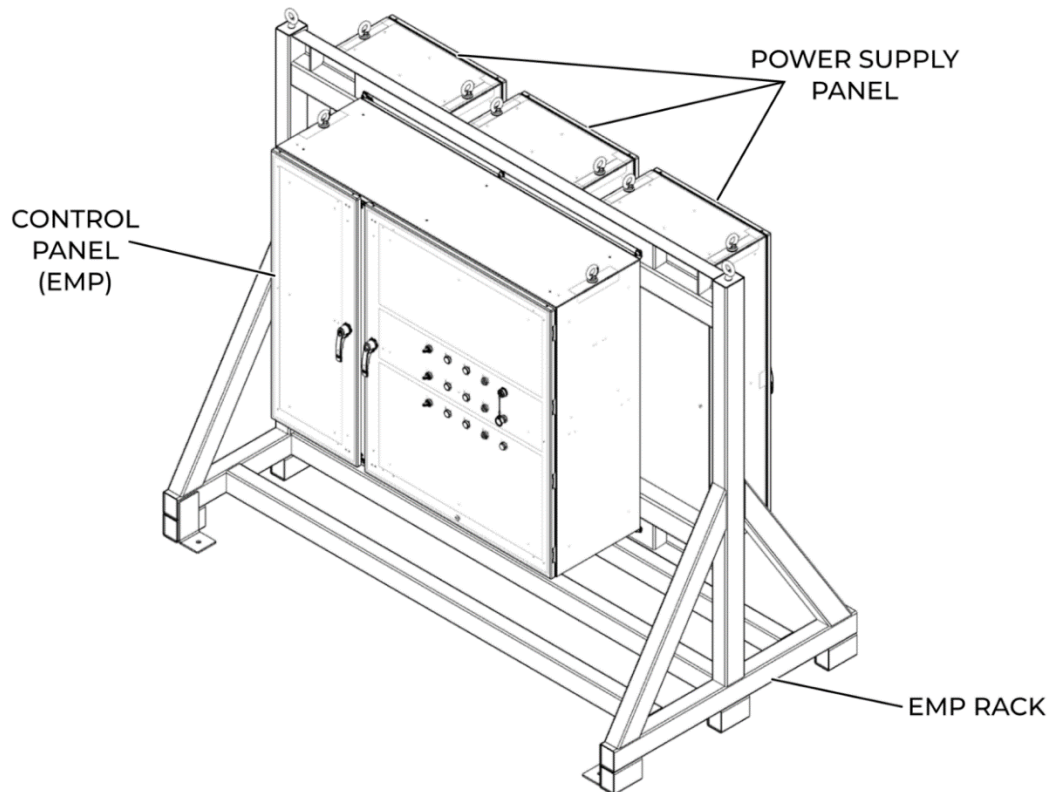


Figure 2 – EMP Panel (Rack Mounted)

3.3.3 Power Supply Panel

The power supply panel is generally mounted on the EMP rack (as shown in **FIGURE 3**) alongside the Control Panel component of the EMP panel.

It converts 1500 VDC power supplied by the battery enclosures and 460 VAC power supplied by the site auxiliary energy source into 24 VDC power for powering the EMP control panel, XFO monitoring panel, 460 VAC distribution panel and UPS panel.

Three tension sources powers each Power Supply Panel, they must all be isolated (open) before opening the door or beginning any maintenance task.

For more detailed information on the Power Supply Panel, see **CXL2-DOC-MMA-030**.

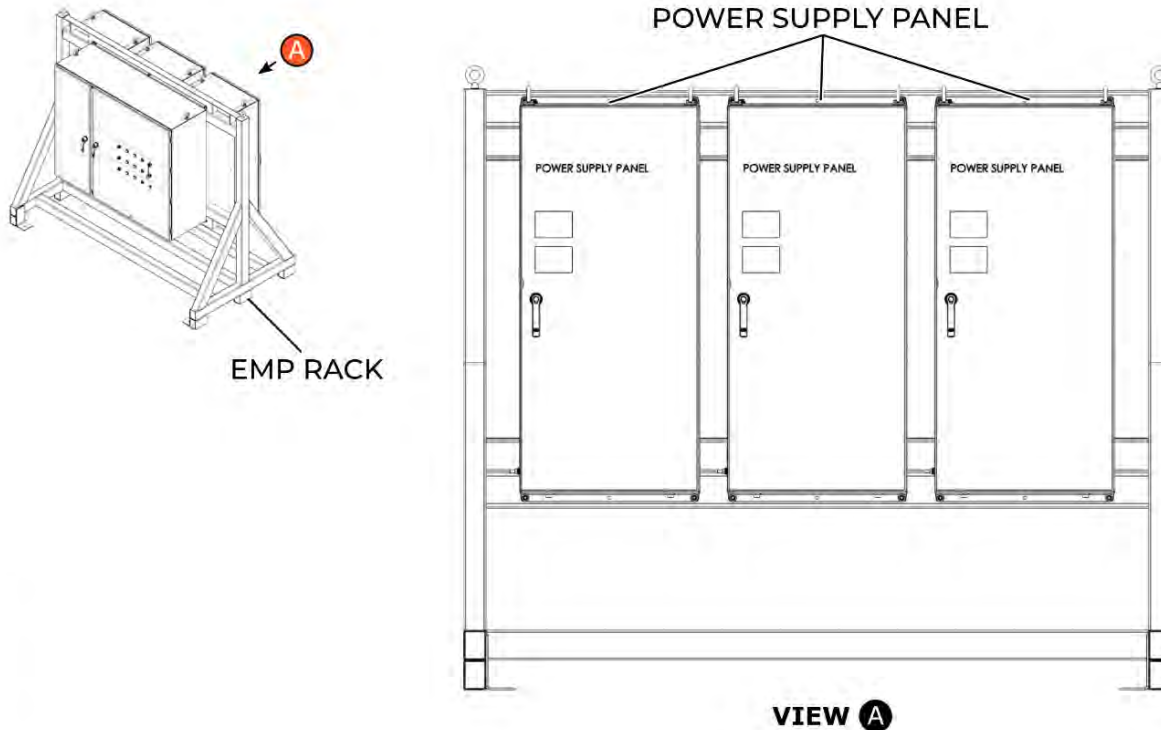


Figure 3 - Power Supply Panels (Rack Mounted)

3.3.4 Smart Power Plant Controller (SPPC)

The SPPC is the component of the EVLOFLEX system responsible for the management of the entire BESS. It can be installed outdoors, or in a control building, which will change the configuration of the SPPC panel.

Be aware that the BESS Auxiliary Power Supply Supervision component contains an energy circuit with a minimum tension of 600 VAC.

The SPPC Power Supply receives up to 240 VAC energy.

For clarity, this document only contains an abridged summary of the SPPC's functions and components. For a detailed description of the SPPC, see **CXL2-DOC-MMA-020**.

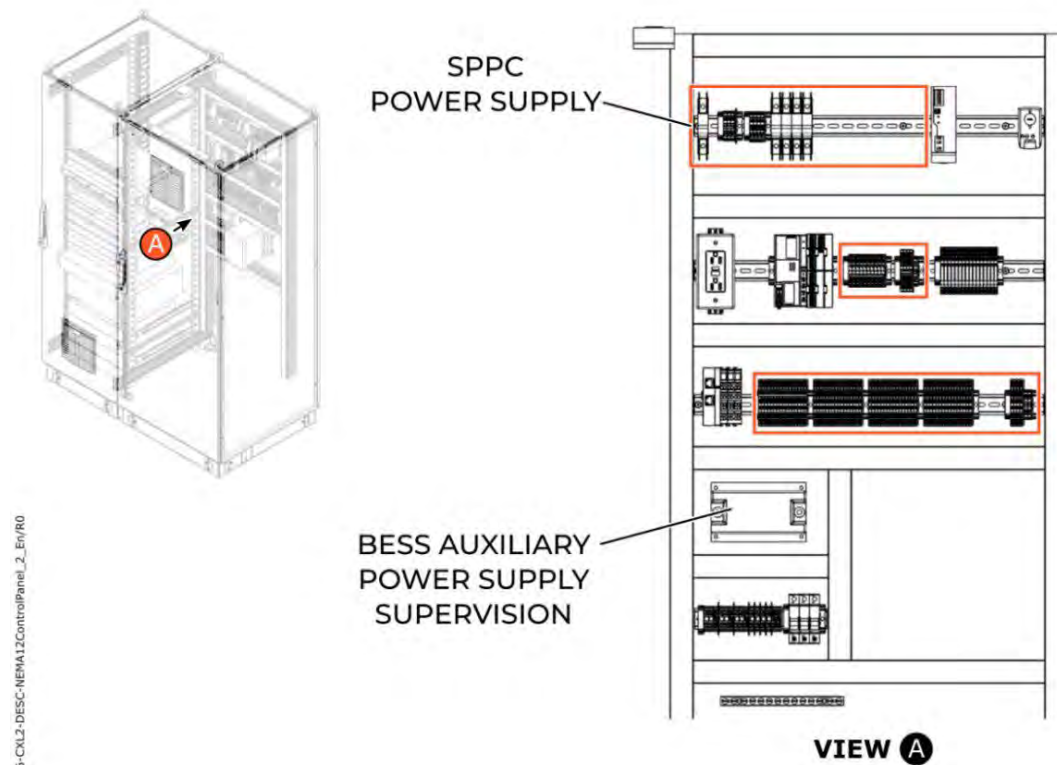


Figure 4 – SPPC Panel (Indoor Configuration)

3.3.5 Power Conversion System (PCS)

The PCS is the component of the EVLOFLEX system which converts 1500 VDC energy into VAC energy usable by the transformer, and vice-versa. It contains tensions up to 1500 VDC.

Each PCS is connected to two sources of tension. One from the battery container (1500 VCC) and the other from the main transformer (up to 690 VAC). Each of those need to be isolated (open) before opening the PCS door.

For clarity, this document only contains an abridged summary of the SPPC's functions. For a detailed description of the SPPC, consult the **EPC POWER CAB1000 OPERATION AND MAINTENANCE MANUAL**.

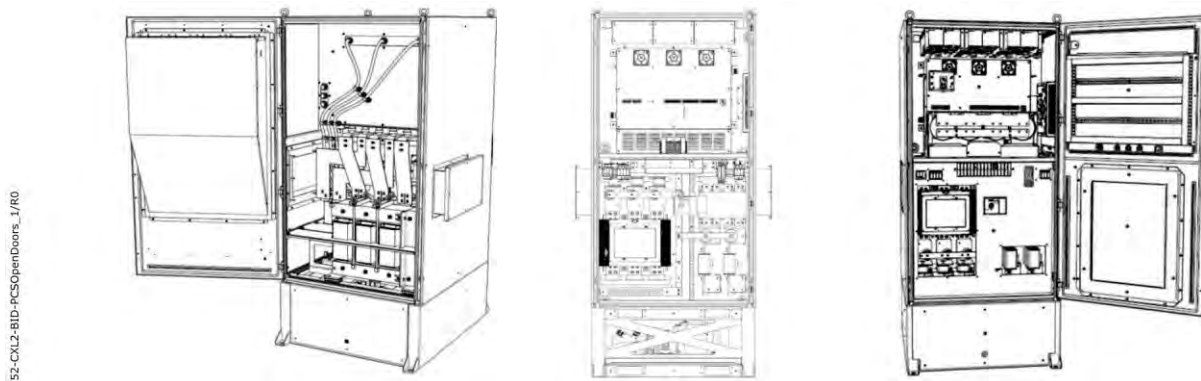


Figure 5 - PCS Overview

3.3.6 460V Panel

The 460V Panel is the component of the EVLOFLEX system which distributes the auxiliary energy, which will either be 480 VAC, 600 VAC or 690 VAC, (received either through the main transformer or directly from the customer source) to the equipment installed on site as 460 VAC energy.

The energy source providing the panel must be isolated (open) before opening the doors.

NOTE: Depending on the option installed, two sources can energize the panel. They both need to be isolated.

For more detailed information on the 460V Panel, see **CXL2-DOC-MMA-060**.

3.3.7 208V Panel

The 208V Panel is the component of the EVLOFLEX system which distributes the 460 VAC energy received from the 460V distribution panel as 208 VAC energy to the heating units of the various equipment of the EVLOFLEX system.

The energy source providing the panel must be isolated (open) before opening the doors.

Since heating units are an optional component for the equipment, it is possible for an EVLOFLEX system to have no 208V Panel.

For more detailed information on the 208V Panel, see [CXL2-DOC-MMA-070](#).

3.3.8 ASSC/UPS Panel

In the event of a power loss, the UPS panel ensures an orderly shutdown and subsequent restart of the system.

The UPS panel is a cabinet, which may be installed on an outdoor support or inside a building.

The UPS panel contains the following components:

- One or three UPS (208 VAC, 3 kW each) depending on the option chosen,
- One or three battery modules (48 Vdc, 50 Ah or 100 Ah each) depending on the option chosen,
- A 460 V/380 V power transformer,
- A 460 V/208 V power transformer,

The energy source providing the panel must be isolated (open) before opening the doors.

For a detailed description of the ASSC/UPS panel, see [CXL2-DOC-MMA-040](#).

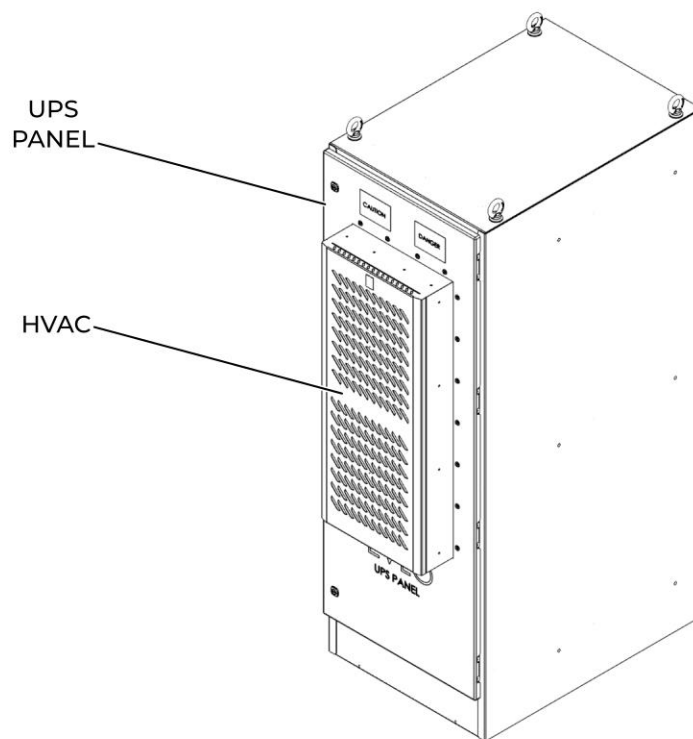


Figure 6 - UPS Panel

74-CXL2-DESC-UPSCVAC_1_En/R0

3.4 LFP Cells Overview

Energized LFP batteries are located within the battery containers. Batteries contain a corrosive hazard and are not de-energized when the unit is disconnected from the power grid. It is extremely unlikely that the system will be fully de-energized during an event and should be assumed to always contain hazardous energy levels. Manual firefighting operations should be limited to individual protection and personnel evacuation.

Distinguish a thermal runaway and a fire. A thermal runaway is a chemical reaction spreading gases that might explode (hydrogen) but is not a fire because there are no flames.

Lithium-ion battery fires are extremely difficult to extinguish due to the self-sustaining reaction and large quantity of energy. The system design requires attaching a fire hose from a water source to a provided Fire Department Connection (FDC). Sprinklers are closed head and will activate only if internal temperature conditions allow it. This system might not be installed as it is optional.

The battery enclosures are equipped with smoke and hydrogen gas detection. Upon a gas detection signal, the gas evacuation system will activate, and the evacuation vents will open to maintain gas concentration below 25% LEL by allowing them to escape. This, however, does not nullify the risk of explosion. No attempt should be made to approach a battery container by the on-site personnel during an emergency situation.

WARNING



THIS INTERVENTION PLAN IS GENERIC. A SITE-SPECIFIC INTERVENTION PLAN IS REQUIRED FOR EACH PROJECT. THE FAILURE TO COMPLY WITH THIS RULE MIGHT CAUSE DAMAGES AND INJURIES.

4 General Hazard Precautions

4.1 Electrical Hazard

Energized electrical equipment is present throughout the site. This includes the battery containers. (Additional hazards relative to these containers are detailed in [SECTION 4.2](#))

Non-Conductive firefighting agents, such as Carbon Dioxide extinguishers, should be considered first when fighting electrical fires. Water should only be used as a last resort to extinguish an electrical fire. If water is used, it should be applied in accordance with the safe distances referenced in [SECTION 6.1](#).

4.1.1 DC Power Electrical Hazard

The EVLOFLEX system incorporates both AC and DC circuits. Although specific AC equipment and circuits may be de-energized, DC power will still be present and represents a significant electrical hazard. Care should be used when working with any equipment of the EVLOFLEX system.

Battery energy storage systems isolated from power supplies are not truly de-energized at the battery module level and up to 1500 VDC power will always be present.

Do not assume equipment is de-energized.

Electrical isolation, voltage verification and bus grounding to be performed by qualified personnel prior to accessing any cubicle.

4.1.2 Electrical Cable Insulation Material Fire

Any cable insulation fire should be treated as a deep-seated fire. Water can be applied when the circuit has been isolated / de-energized by qualified personnel on site. Combustible cable insulation will produce dense, toxic, black smoke. Wear SCBA.

4.2 Thermal Runaway Hazard

A thermal runaway event is the uncontrolled build-up of heat within the Li-Ion cell. Battery damage, exposure to heat, electrical malfunction or defects can cause heat generation and/or an increase in the energy transfer rate within the cell. This can create a self-sustaining reaction.

Although there are measures in place to mitigate the propagation and limit the scale of a thermal runaway event, the possibility of a chain reaction leading to a large-scale thermal runaway event cannot be completely excluded.

Thermal runaway does not always result in a fire (see results UL9540A).

Thermal runaway can result in a Class D fire condition. It is recommended to let the fire burn until the end. Do not use water unless lives are in danger.

Smoke from thermal runaway is extremely toxic and should be avoided. Hydrogen off-gassing will also occur (See [SECTION 4.4](#)).

4.3 Battery Contents Leak Hazard

Due to the design of the battery cells, modules, and trays, there is a possibility of an electrolyte leak from the battery cells.

Each battery cell is individually sealed, thus the low volume of a leak caused by the rupturing of a single battery cell's external envelope render any leak of a singular cell negligible.

Additionally, cells are assembled into modules, and modules are assembled into trays from which on-site personnel are separated during normal operation and most maintenance procedures.

As such, the risk of exposition to leaked battery cell contents at any given time except during a battery tray replacement procedure, is considered low but remains possible.

Refer to the [SAFETY DATA SHEET](#) to obtain information about necessary protection for the manipulation of electrolytes.

4.4 Explosion Potential Hazard

Within and around the EVLOFLEX system, there are three different explosion potentials.

4.4.1 Hydrogen Gas Explosion

Hydrogen gas and other combustible gases will be released from Li-Ion batteries in the event of a thermal runaway. This hydrogen may build up within a battery container. Without proper ventilation, this creates an explosive gas composition within the container. The EVLOFLEX was specifically design to mitigate that risk with a passive ventilation system, see [SECTION 3.4](#) for more details.

4.4.2 Electrical Arc Explosion

Electrical equipment are susceptible to electrical arc explosion / shorting. An electrical short in a cubicle will cause a violent discharge of energy, potentially causing the cubicle to be blown apart. Stay clear of any cubicle that is involved in a fire, unless qualified personnel indicates that it is de-energized. The EVLOFLEX system was designed to limit arc flash levels at class 2.

Also stay clear of neighboring electrical equipment if the potential exists for the fire or firefighting agent (water) to cause that switchgear to suffer a risk of failure or electrical shorting.

Oil-filled transformer failures are usually caused by an internal electrical fault / short which heats the oil inside, causing a rapid over pressurization of the transformer casing, resulting in a violent rupture and the possibility of spreading ignited oil.

4.5 Oil Hazard

Combustible insulating oil is used in transformers, circuit breakers, and capacitors. This insulating oil has a minimum flash point of 145°C and will generate temperatures in excess of 1010°C in the immediate fire zone. Leaking oil will seek low points. Care should be taken with oil entering cable trenches, cable tunnels, manholes, and drainage facilities as it could travel to other locations within the facility. Heat from oil hazards can cause steel superstructures to weaken and collapse.

5 Safety Measures

5.1 Fire System

5.1.1 Hydrogen Detection

Each EVLOFLEX container is equipped with a hydrogen detector connected to the container's fire system and monitored by the SPPC/EMS.

5.1.2 Smoke Detection

Each EVLOFLEX container is equipped with 2 smoke detectors connected to the container's fire system and monitored by the SPPC/EMS.

5.1.3 Temperature Monitoring

As a part of the EVLOFLEX system's normal operation functions, battery cell temperatures are constantly monitored by the battery container's fire system and the SPPC/EMS.

Depending on the temperature readings, the fire system may automatically activate the Level 1 or Level 2 response Protocol for the EVLOFLEX battery container.

5.1.4 Gas Evacuation

The gas evacuation flaps (located on the top of the container) and the ventilation flap (located at the bottom of the control and distribution compartment) open automatically in case of a thermal event or detection of high hydrogen concentration.

The purpose of the gas evacuation system is to prevent the accumulation of hydrogen gas within the battery container and introduce fresh air in the enclosure. It does not guarantee the absence of flammable gas within the container nor does it eliminate the risk of explosion. Always maintain a safe distance from the battery containers in emergency situations.

5.1.5 Dry-Pipe System (Optional)

In case were flame or black smoke are released from the container during thermal runaway, the dry-pipe system shall be pressurized with water. The internal sprinkler will distribute water internally to minimize enclosure temperature and minimise risk of BES to BES propagation.

5.2 Fast-Stop

The F-Stop system will activate automatically in a multitude of scenarios including, most prominently, hydrogen gas detection, smoke detection and thermal events outside of normal operational parameters. It can also be activated manually using the operator web interface or an F-Stop button present on certain major components of the EVLOFLEX system.

EVLO does not consider the activation of the F-Stop system to be a guarantee of any system component being in a de-energized or safe state. The purpose of the F-Stop system is to protect the equipment first and foremost, it is not a safety measure meant to protect the energy storage site personnel and emergency response personnel from electrical hazards.

6 Emergency Procedures

NOTE: *Anyone near electrical tension must be protected properly against electric arc flash.*

6.1 Firefighting guidelines

Firefighter accountability within the BESS facility is the responsibility of the Fire Department. Anyone who is not properly trained for lithium-ion battery intervention must remain away from the site.

1. Consider all equipment energized until confirmed de-energized, grounded and safe by qualified on-site personnel.

The batteries in a BESS are never fully discharged. Even when a BESS is shut down, the batteries still contain stored energy.

Let the thermal reaction stop by itself unless visible flame or continuous black smoke, then use water.

Water is the preferred method of suppression due to its cooling properties, however, it should be noted that water will only control, and not stop the heat generation within the battery.

Be aware of any standing water that may accumulate.

2. The BESS site is provided with multiple layers of safety. Access requires action from authorized on-site personnel. When responding to a fire at a BESS site, do not cut gate locks or force entry into secure areas or buildings or enclosure. Wait outside until on-site personnel arrive on scene to provide assistance. If qualified personnel are not present, call the emergency contact number listed in **SECTION 3.1** of this plan.
3. For your safety, while you are on the premises, ensure qualified personnel are present and remain with the incident commander.
4. Use SCBA when entering a smoke environment. Fires inside a BESS facility may involve PVC cable insulation or battery casings as fuel. The combustion gases given off are extremely toxic and corrosive.
5. Prior to any Fire Department activity, qualified personnel has to de-energize required equipment and circuits.
6. Based on NFPA 855, a perimeter of 30 meters from an enclosure must be respected in the event of a fire. This perimeter will protect personnel from hazardous conditions, including exposure to toxic gas.

7. Water should only be used on energized or potentially energized equipment in extreme situations. Only with proper training and approval by EVLO should firefighters consider using water on electrical equipment other than the batteries. Equipment and application factors affecting the safe use of water on potentially energized electrical components:
- Proper nozzle and proper nozzle pressure,
 - Proper patterns (never a straight or solid stream),
 - Proper distance from the component.

Other factors that affect safety are:

- Amounts of solids, irons & salts in the water supply,
- Impact of overspray on energized electrical components,
- Water runoff or pooling that may become energized,
- Impact of water runoff and pooling on other components in the area,
- Weather conditions: wind, rain and humidity.

Follow your Fire Department's SOPs and refer to the site intervention plan.

6.2 First Aid Procedures

For any contact with hazardous materials or emergency such as exposition to battery electrolyte, gases, or other dangerous materials, refer to the applicable safety data sheets. All data sheets for hazardous materials within the BESS are required to be available on-site.

Consult a health professional after being in contact with an electrical current.

7 Product Storage and Transportation

For transportation and storage instructions, refer to the following EVLO documentation:

- **INST-APR-018** (EVLOFLEX Container)
- **INST-APR-023** (EVLOFLEX Panels)

8 Decommissioning and Disposal

The BESS is composed of many different components that need to be appropriately disposed of following local regulations.

HVAC shall be disposed of following local regulations including correct removal and disposal of the refrigerant.

UPS shall be disposed of following UPS manufacturer instructions, including the battery.

Batteries shall be removed from the container following EVLO procedures provided at time of commissioning. The modules can then be disposed of following local regulations.

EVLO can assist to decommission the BESS.

Once all equipment has been removed, recycle all materials according to the applicable regulation. EVLO battery modules do not include heavy metals.

For further instructions about the disposal of BESS equipment, refer to an EVLO representative.



Appendix D – Lockout Procedure

Verified by

Date

Approved by

Date

Project Name				
Number of groups			Qty. by group	Qty. site total
Number of containers per group		460 VAC panel		
Number of PCS per group		208 VAC panel		
Number of EMP		UPS panel		
Number of SPPC panels		PS panel		
Number of EXT. panels BAT.		Mon. panel XFMR:		
Number of fire alarm panels at the site				
Arctic option				

If the groups differ in quantity, detail below:

MAIN POWER SUPPLY

		Main transformer #	Cut off point #	Location
Group #				
Group #				
Group #				
Group #				
Group #				
Group #				
Group #				
Group #				
Group #				
Group #				

NOTE: If the project has more than 10 groups, complete a second form.

SPPC PANEL POWER SUPPLY

				Cut-Off Point	Location
Power Supply Voltage	120/240 V	120 V	208Y/120VAC		
SPPC Panel Location					

SITE FIRE ALARM PANEL POWER SUPPLY

		Cut-Off Point	Location
Power Supply Voltage	120 V		
Location of the site fire alarm panel			

460 VAC POWER SUPPLY (AUX SYSTEMS)

Specify the installation of the 460 VAC distribution panel on site by completing the table below:

460 VAC panel main power supply:		
600 VAC	460 VAC	Other:
Identification of the source equipment	Equipment #	
Generator presence ("ATS" option):	YES	NO
If applicable, generator identification:	Cut-off point:	

OPTION 1	OPTION 2
AUX feed from local source 460V AUX. PANEL TO LOCAL 460Vac AUXILIARY SOURCE TO AUXILIARY LOADS XFMR 3,1 MVA 690V/25kV PCS 1,5MW 47-CXL2-81D-AuxSingleLine_1_En/FR	AUX feed from two local sources 460V AUX. PANEL TO LOCAL 460Vac NORMAL AUXILIARY SOURCE TO LOCAL 460Vac EMERGENCY AUXILIARY SOURCE TO AUXILIARY LOADS XFMR 3,1 MVA 690V/25kV PCS 1,5MW MTS 47-CXL2-81D-AuxSingleLine_2_En/FR
OPTION 3	OPTION 4
AUX power from the main transformer 460V AUX. PANEL TO LOCAL 460Vac AUXILIARY SOURCE TO AUXILIARY LOADS XFMR 3,1 MVA 600V/25kV PCS 1,2MW XFMR 600V / 460V 47-CXL2-81D-AuxSingleLine_3_En/FR	AUX power from the main transformer and a local source 460V AUX. PANEL TO LOCAL 600Vac EMERGENCY AUXILIARY SOURCE TO AUXILIARY LOADS XFMR 3,1 MVA 600V/25kV PCS 1,2MW XFMR 600V / 460V MTS 47-CXL2-81D-AuxSingleLine_4_En/FR

If options 3 and 4:

600 V distribution bar	Location

SYSTEM ENERGY LEVEL

NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the site specificities.

		Energy level (cal/cm ²)	PPE (Category)
	460 VAC distribution panel		
	208 VAC distribution panel		
	UPS panel		
	Power Supply (PS) Panel		
	XFMR Monitoring Panel		
	Energy Management Panel (EMP)		
	SPPC/EMS		
	EXT. BAT. panel		
	PCS		
	Container: Power Compartment		
	Container: Control and Distribution Compartment		
	Container: Battery compartment		
	Site fire alarm panel		

Category of PPE1. Category 0 (≤ 1.2 Cal/cm²)

- Long sleeve shirt and natural fiber trousers
- Safety footwear
- Safety helmet
- Safety glasses
- Leather glove

2. Category 2 (≤ 8 Cal/cm²)

- Anti-arc suit of 8 Cal/cm²
- Safety footwear
- Safety helmet
- Safety glasses
- Face shield
- Balaclava
- Noise protection
- Leather glove with insulating rubber glove (Class 0 – 1000 VAC/1500 VDC)



NOTE: The prevention program takes precedence for PPE material.

GENERAL INFORMATION

Document Name Battery Container Lockout Procedure (Distribution Control Compartment)
EVLOFLEX

Translated by Lia Raykhlin
EVLO, Technical translator

Date 2024-12-01

NOTE: *This document has been translated from the original French version. Refer to the French version of the document for the review and approval information. If any discrepancy is found between this translation and the original document, the information in the French document shall prevail.*

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REVISIONS DESCRIPTION

Revision	Author	Date	Changes
00			Original Publication
01	T. Bredillet	2024-10-17	Added 120 V power supply and fire panel lockout steps

DOCUMENT PURPOSE

This document details the operations to be performed in order to apply lockout in the following work location:

- Battery container → Distribution control compartment

WARNING



THIS PROCEDURE WILL LOCKOUT ONLY THE WORK LOCATION DEFINED ABOVE. NEVER USE THIS PROCEDURE TO SECURE ANOTHER WORK LOCATION. ALWAYS USE THE APPLICABLE LOCKOUT PROCEDURE AND WEAR PERSONAL PROTECTIVE EQUIPMENT IN ACCORDANCE WITH APPLICABLE STANDARDS, LAWS AND REGULATIONS. FAILURE TO FOLLOW THESE SAFETY INSTRUCTIONS CAN CAUSE SERIOUS INJURIES OR EQUIPMENT DAMAGE.

SAFETY CONSIDERATIONS**DANGER**

VOLTAGES UP TO 690 VAC AND 1500 VDC CAN BE PRESENT AT ANY TIME. ALWAYS WEAR SAFETY EQUIPMENT AND FOLLOW ALL APPLICABLE INSTRUCTIONS, LAWS, AND REGULATIONS WHEN PERFORMING THE MANIPULATIONS DESCRIBED IN THIS PROCEDURE. FAILURE TO FOLLOW THIS PROCEDURE WILL CAUSE SERIOUS INJURIES AND DEATH.

WARNING

PRIOR TO CARRYING OUT WORK ON THE SITE, AUTHORIZATION MUST BE OBTAINED FROM THE OPERATOR AND/OR SITE MANAGER. FAILURE TO FOLLOW THESE SAFETY INSTRUCTIONS CAN CAUSE SERIOUS INJURIES OR EQUIPMENT DAMAGE.

WARNING

PROCEDURE IS READ IN ITS ENTIRETY BEFORE BEGINNING THE MANIPULATIONS. FOLLOW AND EXECUTE THE MANIPULATIONS IN THE ORDER SHOWN. IF YOU HAVE ANY QUESTIONS, CONTACT YOUR SUPERVISOR. FAILURE TO FOLLOW THESE SAFETY INSTRUCTIONS CAN CAUSE SERIOUS INJURIES OR EQUIPMENT DAMAGE.

WARNING

AT LEAST TWO PEOPLE ARE REQUIRED TO PERFORM THE OPERATIONS DESCRIBED IN THIS PROCEDURE. A PERSON WHO PERFORMS THE STEPS AND A PERSON WHO VERIFIES THE EXECUTION. FAILURE TO FOLLOW THESE SAFETY INSTRUCTIONS CAN CAUSE SERIOUS INJURIES OR EQUIPMENT DAMAGE.

DEFINITIONS

- BESS: Battery Energy Storage System (includes the site and the installed equipment)
- cm: Centimeter
- EMS: Energy Management System (or SPPC/EMS)
- EVLOFLEX: All BESS equipment (container, panel boards, UPS, EMP)
- GND: Grounding
- N/A: Not Applicable
- PCS: Power Conversion System
- PPE: Personal Protective Equipment
- SSG: Stack Switchgear
- VAC/VDC: Volt Alternating Current/Volt Direct Current

TOOLS AND EQUIPMENT

NOTE: *The quantity of lockout devices shown is for one container. It is to be multiplied by the number of containers to be locked out.*

- 1x – Standard toolbox
- 1x – Lockout box with series padlock
- 1x – ABB circuit breaker lockout device (Masterlock 491B)
- 1x – Phoenix Contact circuit breaker lockout device (Brady 90844)
- 1x – Lockout device for Schneider circuit breaker
- 1x – Pole with 1500 VDC Multimeter
- 2x – Grounding cable
- 1x – Grounding pole
- 1x – Multimeter
- 1x – Hasp
- 1x – Computer

REFERENCES

NOTE: *Make sure to use the latest revision of the document. If a newer revision is available, use that revision. Inform the person in charge if there is a difference between the information found in this procedure and in the engineering drawings.*

- 71300000 – 460 VAC Electrical Distribution Panel
- 71600200 – Battery Container Control Panel
- 75100011 – EVLOFLEX With Fire Panel Container Control Panel
- 75100019 – EVLOFLEX With Fire Panel Fire Alarm System
- STD-DOC-SST-003 Lockout Program
- Annex: Site engineering documentation
- CXL2-DOC-CAD-000 – Site specifics

Step 1 – Site Fire Alarm Panel

CAUTION



A LOCKOUT/MAINTENANCE OPERATION CAN START UP THE SITE FIRE ALARM SYSTEM. TAKE THE NECESSARY MEASURES TO PREVENT THIS FROM OCCURRING DURING THE LOCKOUT OPERATION.

Location

- Site installation/Site fire alarm panel

Instructions

- Ensure that the site fire alarm system will not be affected by the applicable container lockout:
 - o Local authorities will not receive a false alarm during the lockout operation.
 - o The operation of the site will not be affected by the lockout operation.
- If applicable, place the system in Service Mode (or equivalent) for the container to be locked out.

Equipment

- Not Applicable

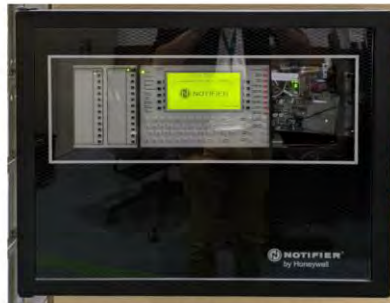
Energy level

- 0 cal/cm²

PPE

- Not Applicable

Photo



SITE FIRE ALARM PANEL
(TYPICAL)

Validation

STEP	PROCEDURE	INITIALS
0	The site fire alarm system is adequately bypassed.	

Notes/Comments:

Step 2 – Confirm that the system is not in operation

Location

- Installation of the EVLOGIX website/web interface

Instructions

- Verify that the system is not in operation on the operator interface.
- If the system is running, confirm with the site manager that the system can be shut down.

Equipment

- 1x – Computer

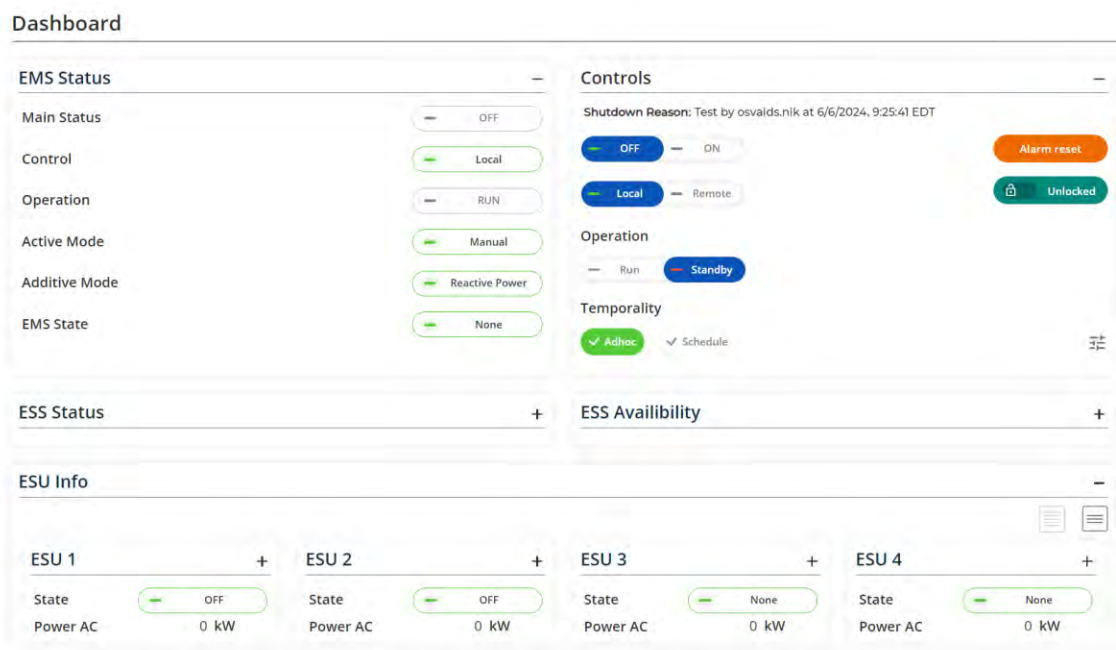
Energy level

- 0 cal/cm²

PPE

- Not Applicable

Photo



TYPICAL EVLOGIX INTERFACE, FOR REFERENCE ONLY

Validation

STEP	PROCEDURE	INITIALS
2	The system is off.	

Notes/Comments:

Step 3 – Isolate the Main Transformer

NOTE: Isolation of the main transformer must be performed by the customer's authorized personnel and according to the procedures provided by the customer.

Location

- Main transformer

Instructions

- Have the customer open and lockout the main transformer.
- Have the customer check the absence of voltage on the main transformer.
- Have the customer install a GND on the main transformer.

NOTE: The electrician or contractor is responsible for following the indications in place before carrying out any manipulations. EVLO staff should be informed of these measures and follow the instructions.

Equipment

- Follow the instructions of the site manager.

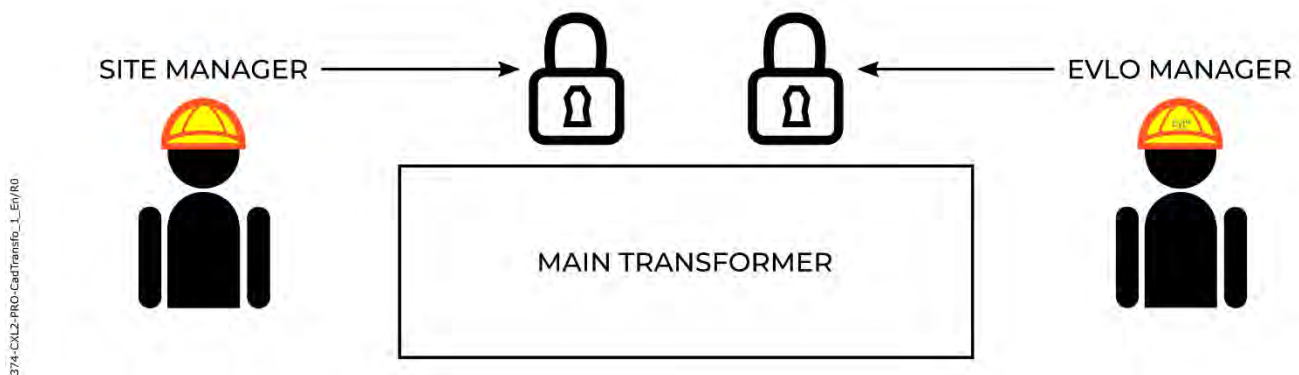
Energy level

- Follow the instructions of the site manager.

PPE

- Follow the instructions of the site manager.

Photo



Validation

STEP	PROCEDURE	INITIALS
3	Main transformer open and locked out	
3	Validated absence of voltage	
3	Main transformer grounded	

Notes/Comments:

Step 4 – Shut down the 1500 VDC SSGs

DANGER



SEVERAL OTHER CONTAINERS CAN BE CONNECTED TO THE SAME MAIN ENERGY CIRCUIT (1500 VDC) VIA THE PCS. PERFORM THIS STEP FOR EACH CONTAINER IN THE SAME GROUP BEFORE PERFORMING THE FOLLOWING STEPS. FAILURE TO FOLLOW THIS INSTRUCTION WILL CAUSE SERIOUS INJURIES AND DEATH.

Location

NOTE: Refer to the site engineering documents to identify the container(s) to be isolated.

- Battery container/control compartment

Instructions

- Open and lockout the CB4 circuit breaker of all containers connected in parallel.

Equipment

NOTE: A hasp must be used to lockout the Phoenix Contact circuit breaker lockout device because it is too small to accommodate a padlock.

- 1x – Hasp
- 1x – Series padlock
- 1x – Phoenix Contact circuit breaker lockout device (Brady 90844)

Energy level

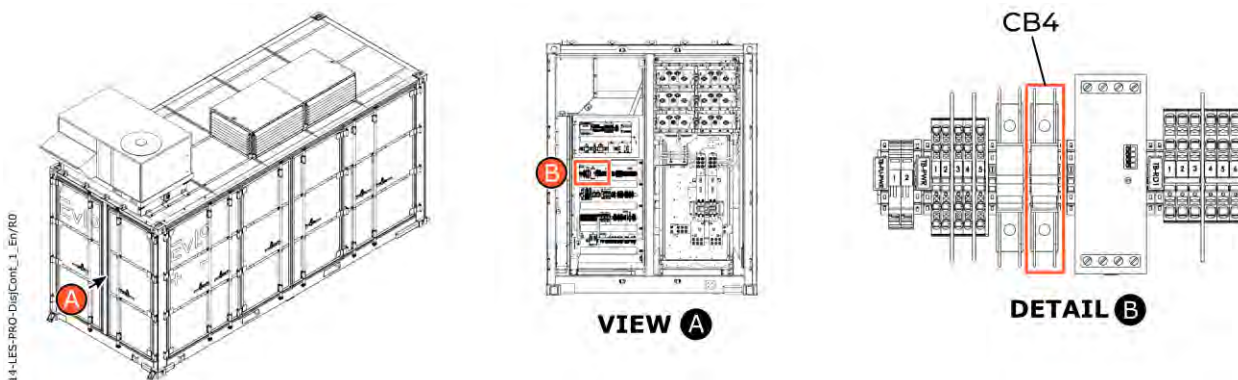
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the specifics of the site. Refer to the **CXL2-DOC-CAD-000 – SITE SPECIFICS** document. The values shown below are for reference only.

- $\leq 1.2 \text{ cal/cm}^2$ to 0.46 meters (typical)

PPE

- Class 0 protective equipment (typical)

Photo



Validation

STEP	PROCEDURE	INITIALS
Battery container #1		
4	Series padlock installed	
Battery container #2 (if applicable)		
4	Series padlock installed	
Battery container #3 (if applicable)		
4	Series padlock installed	
Battery container #4 (if applicable)		
4	Series padlock installed	

Step 5 – Verify the Absence of 1500 VDC Voltage (All Affected Containers)

NOTE: Several containers can be connected to the same main energy circuit. Refer to the site engineering documents to identify the container(s) to be isolated. Repeat steps **4** through **6** for each applicable container.

Location

NOTE: Refer to the site engineering documents to identify the container(s) to be isolated.

- Battery container/1500 VDC compartment.

Instructions

- Validate the absence of voltage on the positive and negative buses on both sides of the 1500 VDC disconnect switch.

Equipment

- 1x – Pole with 1500 VDC Multimeter

Energy level

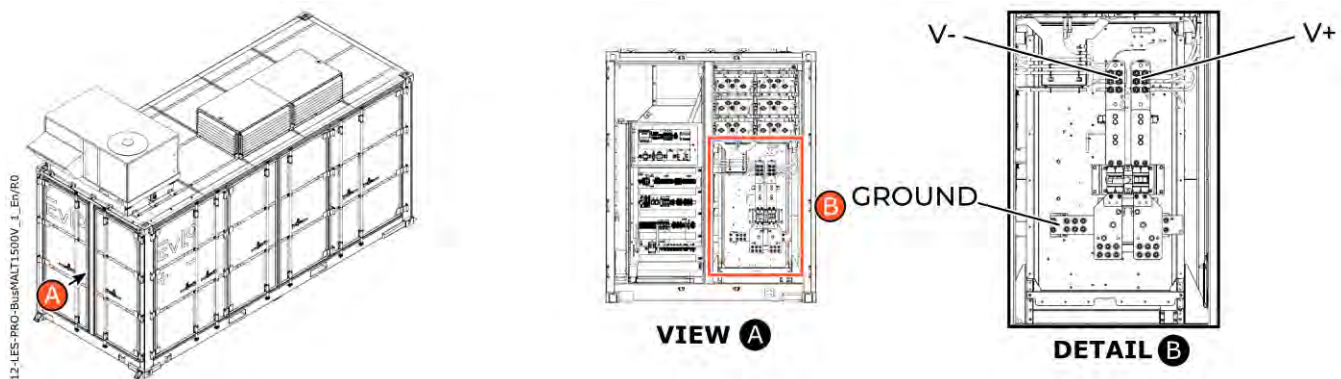
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the specifics of the site. Refer to the **CXL2-DOC-CAD-000 – SITE SPECIFICS** document. The values shown below are for reference only.

- 3.92 cal/cm² to 0.46 meters (typical)

PPE

- Class 2 protective equipment (typical)

Photo



Validation

NOTE: Battery container #1 is considered to be the one which is being worked on.

STEP	PROCEDURE	MEASUREMENT
Battery container #1		
5	Upper bus measures between V+ and V-.	
	Upper bus measures between V+ and GND.	
	Upper bus measures between V- and GND.	
	Lower bus measures between V+ and V-.	
	Lower bus measures between V+ and GND.	
	Lower bus measures between V- and GND.	
Battery container #2 (if applicable)		
5	Upper bus measures between V+ and V-.	
	Upper bus measures between V+ and GND.	
	Upper bus measures between V- and GND.	
	Lower bus measures between V+ and V-.	
	Lower bus measures between V+ and GND.	
	Lower bus measures between V- and GND.	
Battery container #3 (if applicable)		
5	Upper bus measures between V+ and V-.	
	Upper bus measures between V+ and GND.	
	Upper bus measures between V- and GND.	
	Lower bus measures between V+ and V-.	
	Lower bus measures between V+ and GND.	
	Lower bus measures between V- and GND.	

STEP	PROCEDURE	MEASUREMENT
Battery container #4 (if applicable)		
5	Upper bus measures between V+ and V-.	
	Upper bus measures between V+ and GND.	
	Upper bus measures between V- and GND.	
	Lower bus measures between V+ and V-.	
	Lower bus measures between V+ and GND.	
	Lower bus measures between V- and GND.	

Notes/Comments:

Step 6 – Apply GND (All Affected Containers)

NOTE: Several containers can be connected to the same main energy circuit. Refer to the site engineering documents to identify the container(s) to be isolated. Repeat steps **4** through **6** for each applicable container.

Location

NOTE: Refer to the site engineering documents to identify the container(s) to be isolated.

- Battery container/1500 VDC compartment

Instructions

- Apply grounding under the 1500 VDC disconnect switch.

Equipment

- 1x – Pole
- 2x – Grounding cable

Energy level

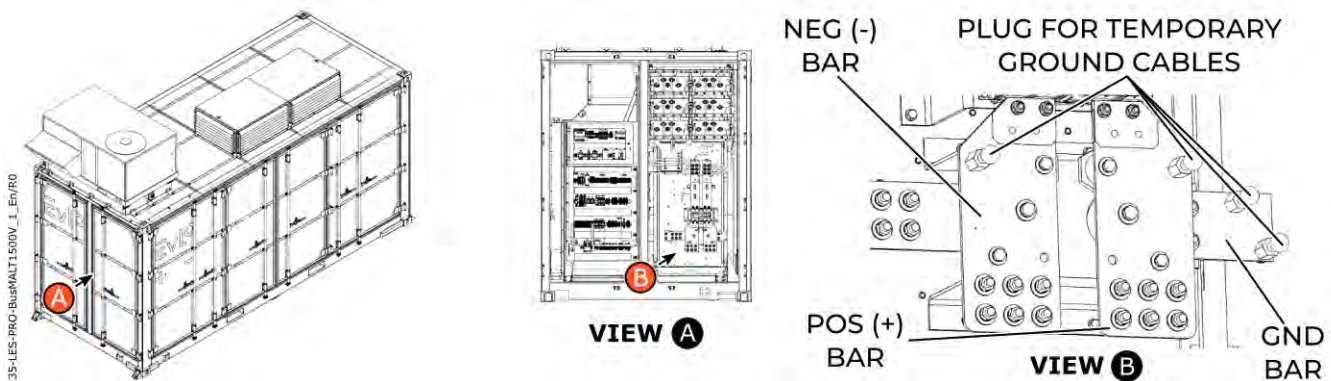
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the specifics of the site. Refer to the **CXL2-DOC-CAD-000 – SITE SPECIFICS** document. The values shown below are for reference only.

- 3.92 cal/cm² to 0.46 meters

PPE

- Class 2 protective equipment

Photo



Validation

STEP	PROCEDURE	INITIALS
Battery container #1		
6	Positive bus grounded	
6	Negative bus grounded	
Battery container #2 (if applicable)		
6	Positive bus grounded	
6	Negative bus grounded	
Battery container #3 (if applicable)		
6	Positive bus grounded	
6	Negative bus grounded	
Battery container #4 (if applicable)		
6	Positive bus grounded	
6	Negative bus grounded	

Notes/Comments:

Step 7 – Open and Lockout the 1500 VDC Disconnect Switch (All Affected Containers)

NOTE: Several containers can be connected to the same main energy circuit. Refer to the site engineering documents to identify the container(s) to be isolated. Repeat steps 4 through 6 for each applicable container.

Location

NOTE: Refer to the site engineering documents to identify the container(s) to be isolated.

- Battery container/1500 VDC compartment

Instructions

- Open and lockout the 1500 VDC disconnect switch.

Equipment

- 1x – Series padlock

Energy level

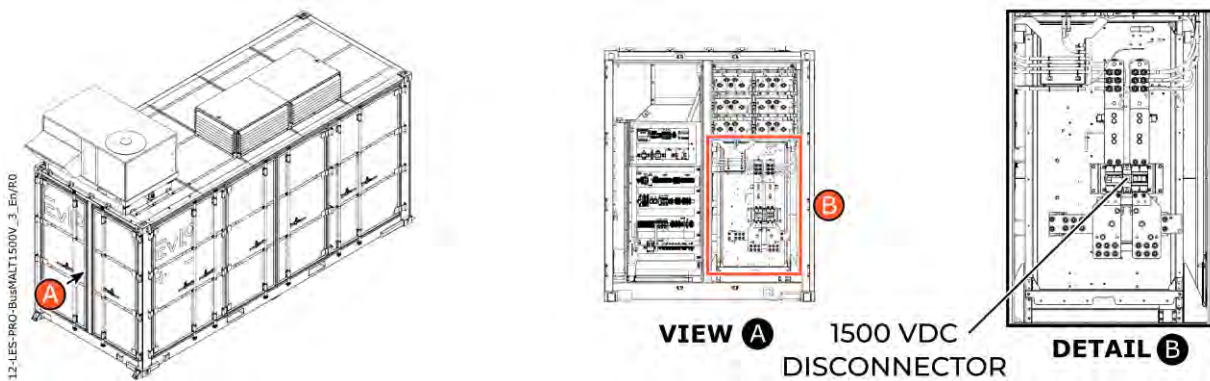
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the specifics of the site. Refer to the **CXL2-DOC-CAD-000 – SITE SPECIFICS** document. The values shown below are for reference only.

- 3.92 cal/cm² to 0.46 meters

PPE

- Class 2 protective equipment

Photo



Validation

STEP	PROCEDURE	MEASUREMENT
Battery container #1		
7	Series padlock installed	
Battery container #2 (if applicable)		
7	Series padlock installed	
Battery container #3 (if applicable)		
7	Series padlock installed	
Battery container #4 (if applicable)		
7	Series padlock installed	

Notes/Comments:

Step 8 – Restart the 1500 VDC SSGs (Containers not Affected by the Lockout)

DANGER



THE PRIMARY ENERGY CIRCUIT (1500 VDC) OF THE SSG CAN CLOSE AUTOMATICALLY WHEN THE SSG IS REPOWERED. ENSURE THAT NO PERSONNEL IS NEAR THE SSG AND 1500 VDC BUSBARS WHEN REFUELING. FAILURE TO FOLLOW THIS PROCEDURE WILL CAUSE SERIOUS INJURIES AND DEATH.

NOTE: This step is applicable only if the group contains more than one container. It is intended to keep the fire system active on battery containers not locked out.

Location

DANGER



THIS STEP SHOULD ONLY BE PERFORMED ON CONTAINERS WHERE 460 VAC IS NOT LOCKED OUT. DO NOT REMOVE LOCKOUT FROM CB4 CIRCUIT BREAKER OF THE CONTAINER WHICH IS BEING WORKED ON. FAILURE TO FOLLOW THIS PROCEDURE WILL CAUSE SERIOUS INJURIES AND DEATH.

NOTE: Refer to site engineering documents to identify which containers can be turned back on.

- Battery container → Control compartment → CB4 circuit breaker

Instructions

- Remove lockout from CB4 circuit breaker and close it.

Equipment

- Not Applicable

Energy level

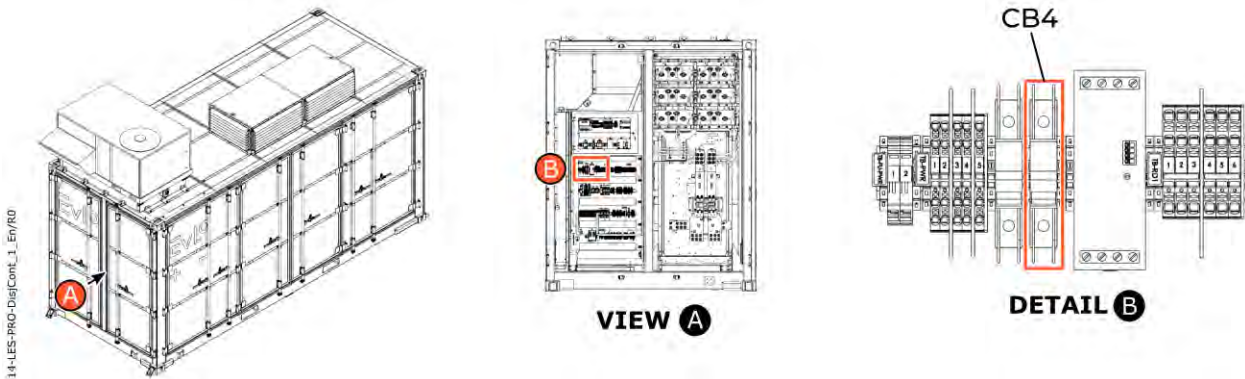
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the specifics of the site. Refer to the **CXL2-DOC-CAD-000 – SITE SPECIFICS** document. The values shown below are for reference only.

- $\leq 1.2 \text{ cal/cm}^2$ to 0.46 meters (typical)

PPE

- Class 0 protective equipment (typical)

Photo



Validation

NOTE: Battery container #1 is considered to be the one which is being worked on.

STEP	PROCEDURE	INITIALS
Battery container #2 (if applicable)		
8	Personal lock removed	
Battery container #3 (if applicable)		
8	Personal lock removed	
Battery container #4 (if applicable)		
8	Personal lock removed	

Notes/Comments:

Step 9 – Validate Activation of the SSGs (Containers not Affected by the Work)

NOTE: *This step is applicable only if the group contains more than one container. It is intended to keep the fire system active on battery containers that are not locked out.*

Location

- Installation of the EVLOGIX website/web interface

Instructions

- Click on the  icon to the left of EMPC1 (or other EMPC).
- Select Devices → Batteries → String Data.
- Put the "Measurements" filter in "Contactor" on the "String Data" page.
- Verify contactors are closed (meaning the SSGs are active and energizing the container control circuit).

Equipment

- 1x – Computer

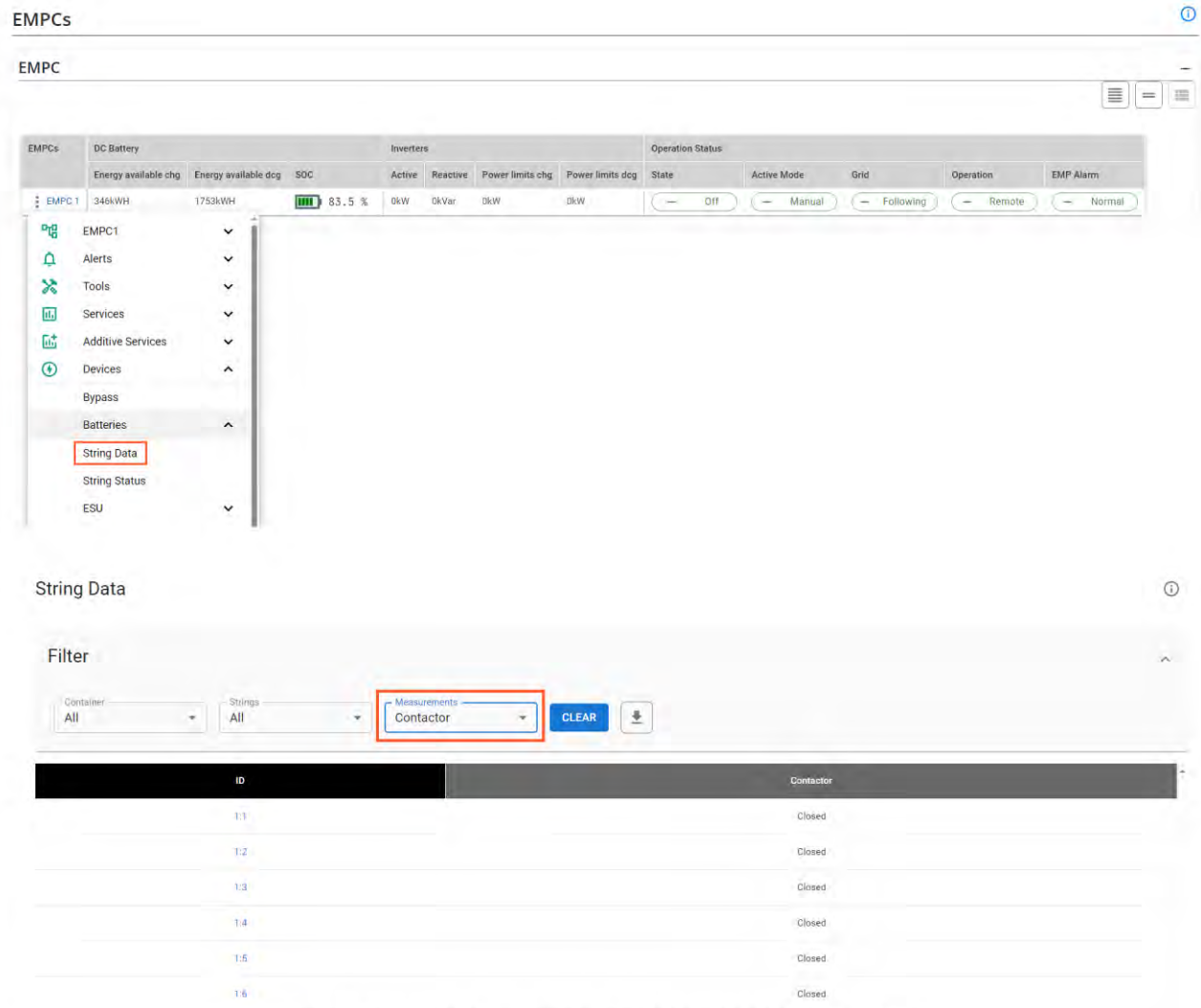
Energy level

- 0 cal/cm²

PPE

- Not Applicable

Photo



(TYPICAL EVLOGIX INTERFACE, FOR REFERENCE ONLY)

Validation

STEP	PROCEDURE	INITIALS
9	The SSGs in the following container are functional:	
9	The SSGs in the following container are functional:	
9	The SSGs in the following container are functional:	

Notes/Comments:

Step 10 – Check for the Presence of 460 VAC

Location

- Battery Container/Control Compartment/DSC1 Disconnectable Fuse Holder

Instructions

- Check for the presence of voltage on the DSC1 disconnectable fuse holder input terminals.

Equipment

- 1x – Multimeter

Energy level

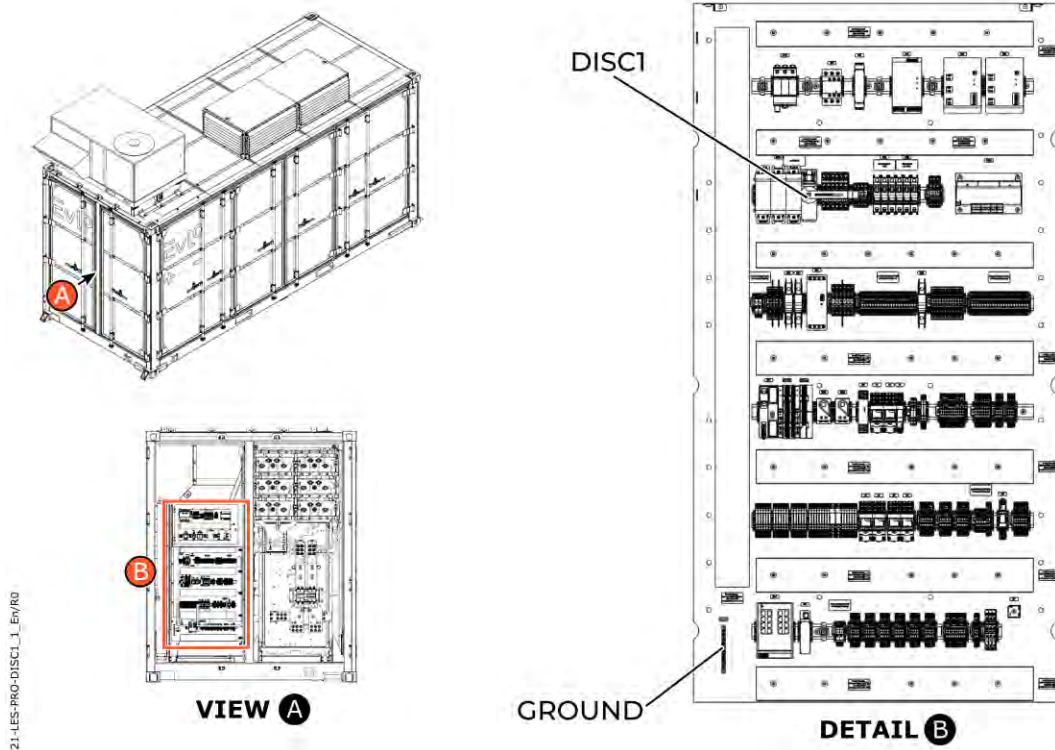
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the specifics of the site. Refer to the **CXL2-DOC-CAD-000 – SITE SPECIFICS** document. The values shown below are for reference only.

- $\leq 1.2 \text{ cal/cm}^2$ to 0.46 meters (typical)

PPE

- Class 0 protective equipment (typical)

Photo



Validation

STEP	PROCEDURE	MEASUREMENT
10	Voltage measurement between terminal L1 and terminal L2	
	Voltage measurement between terminal L2 and terminal L3	
	Voltage measurement between terminal L1 and terminal L3	
	Voltage measurement between terminal L1 and GND	
	Voltage measurement between terminal L2 and GND	
	Voltage measurement between terminal L3 and GND	

Notes/Comments:

Step 11 – Open and Lockout the 460 VAC Power Supply

IMPORTANT NOTE: Depending on the site configuration, the 460 VAC power source for the containers may come from a variety of locations. Refer to **CXL2-DOC-CAD-000 – SITE SPECIFICS** document to identify energy sources.

Location

- 460 VAC power source of the container

Instructions

NOTE: In order to keep the auxiliary systems of the containers active, it is not necessary to lockout the other circuit breakers unless otherwise specified.

- Open and lockout the circuit breakers for the container to be locked out:
 - o CB-3.1 → BATT 1.11
 - o CB-3.2 → BATT 1.12
 - o CB-8.1 → BATT 1.23
 - o CB-8.2 → BATT 1.22

NOTE: Refer to the site engineering documents to identify the circuit breakers that have to be isolated.

Equipment

- 1x – ABB XT1 circuit breaker lockout device (Masterlock 491B)
- 1x – Series padlock

NOTE: The quantity given is for one circuit breaker. Multiply by the number of circuit breakers of each type.

Energy level

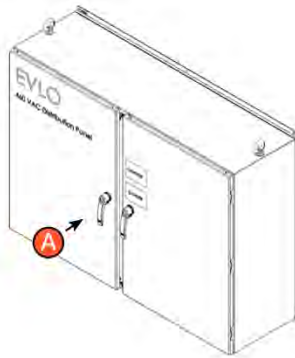
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the specifics of the site. Refer to the **CXL2-DOC-CAD-000 – SITE SPECIFICS** document. The values shown below are for reference only.

- $\leq 8 \text{ cal/cm}^2$ to 0.46 meters (typical)

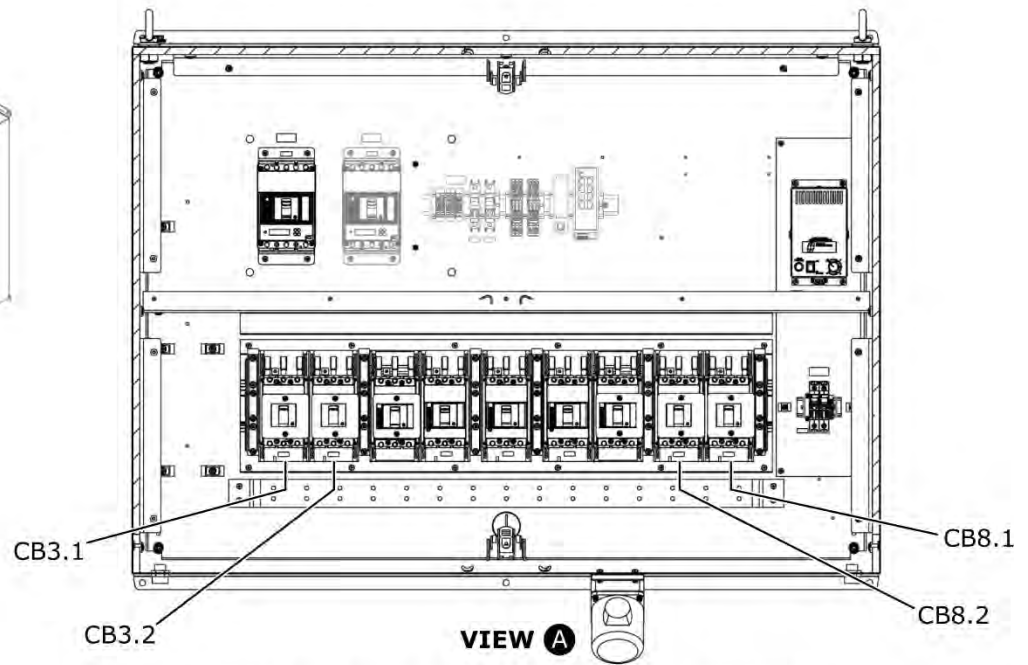
PPE

- Class 2 protective equipment (typical)

Photo



185-CXL2-PRO-460Electrical_1_En/R1

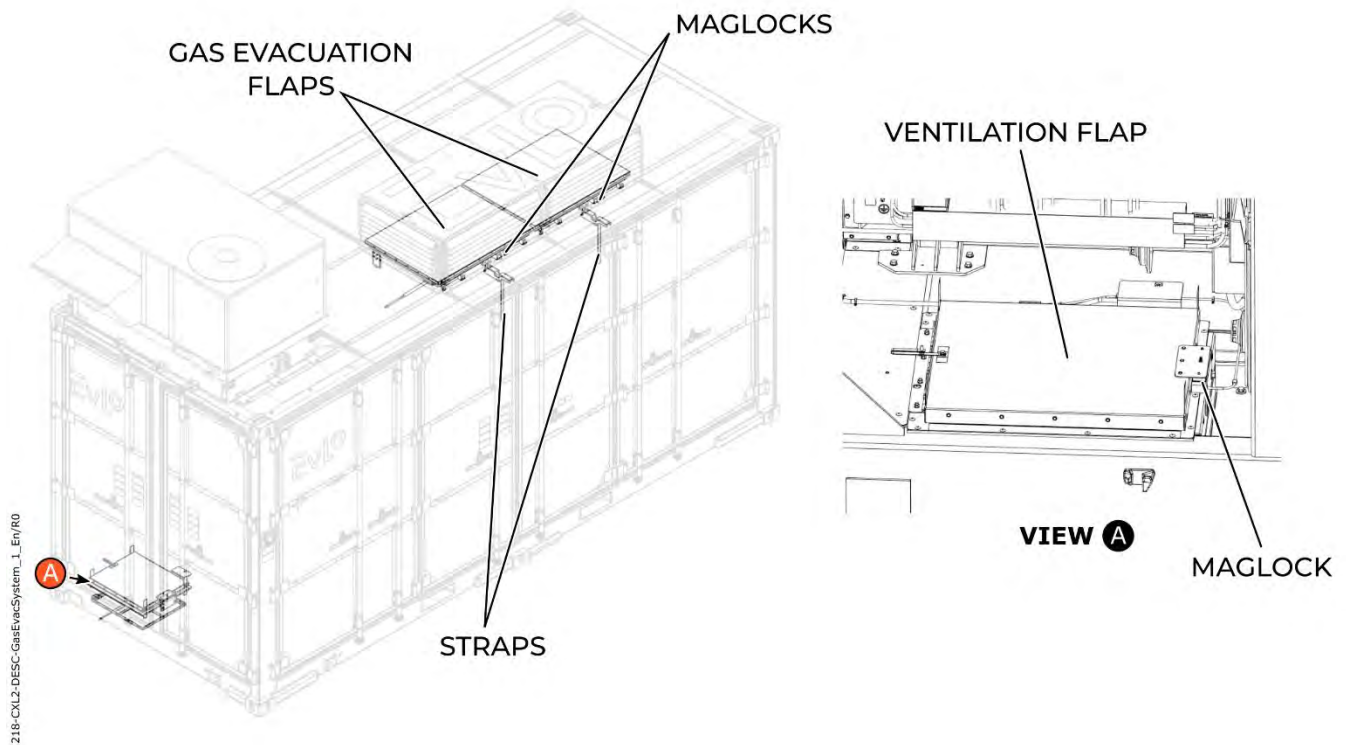


TYPICAL 460 VAC DISTRIBUTION PANEL INTERIOR

Validation

STEP	PROCEDURE	NUMBER
11	Installed padlock number (if applicable) (CB-3.1):	
11	Installed padlock number (if applicable) (CB-3.2):	
11	Installed padlock number (if applicable) (CB-8.1):	
11	Installed padlock number (if applicable) (CB-8.2):	

NOTE: At this point, the container control system will be deactivated, triggering the opening of the exhaust flaps and the ventilation flap. When the auxiliary energy of the container is restored, these three flaps will have to be closed manually. Use the yellow straps to close the gas evacuation flaps.



Notes/Comments:

Step 12 – Check for the Absence of 460 VAC

Location

- Battery Container/Control Compartment/DSC1 Disconnectable Fuse Holder

Instructions

- Validate the absence of voltage on the DSC1 disconnectable fuse holder terminals.

Equipment

- 1x – Multimeter

Energy level

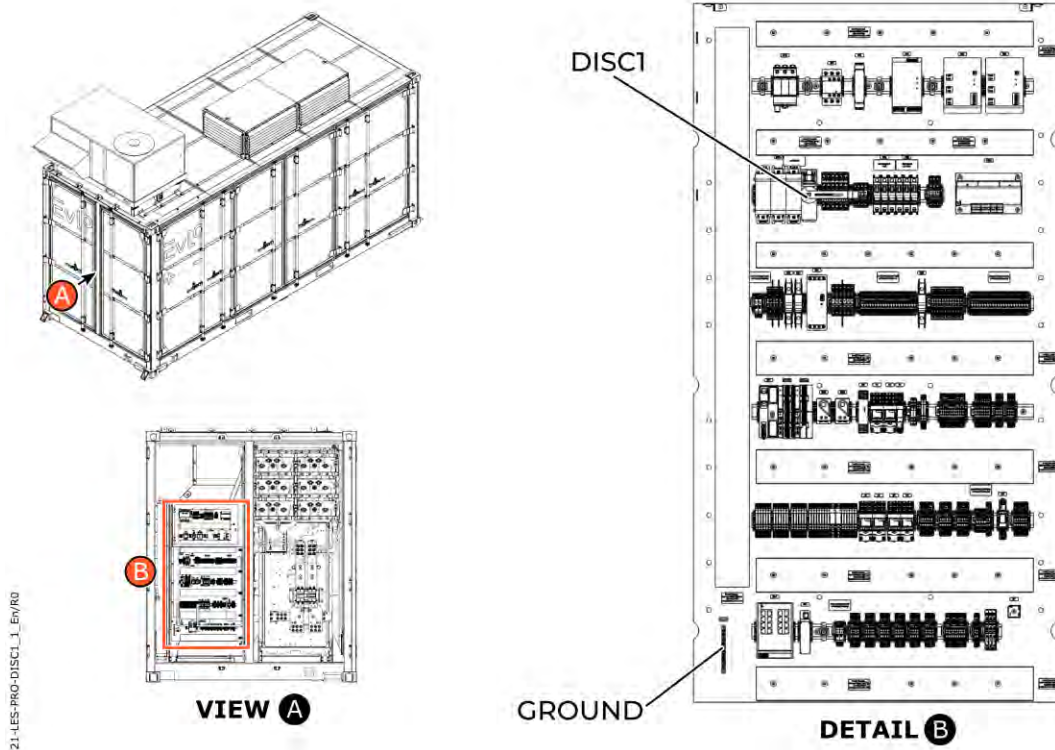
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the specifics of the site. Refer to the **CXL2-DOC-CAD-000 – SITE SPECIFICS** document. The values shown below are for reference only.

- $\leq 1.2 \text{ cal/cm}^2$ to 0.46 meters (typical)

PPE

- Class 0 protective equipment (typical)

Photo



Validation

STEP	PROCEDURE	MEASUREMENT
12	Voltage measurement between terminal L1 and terminal L2	
	Voltage measurement between L2 terminal and L3 terminal.	
	Voltage measurement between L1 terminal and L3 terminal.	
	Voltage measurement between terminal L1 and GND	
	Voltage measurement between terminal L2 and GND	
	Voltage measurement between terminal L3 and GND	

Notes/Comments:

Step 13 – Check for the Presence of 120 VAC (Fire Panel Option)

NOTE: Steps 13 to 16 are applicable only if the container is equipped with the fire panel option. Otherwise, proceed directly to step 17.

Location

- Battery Container/Control Compartment/FU3 Disconnectable Fuse Holder

Instructions

- Validate the presence of voltage on the FU3 disconnectable fuse holder input terminals.

Equipment

- 1x – Multimeter

Energy level

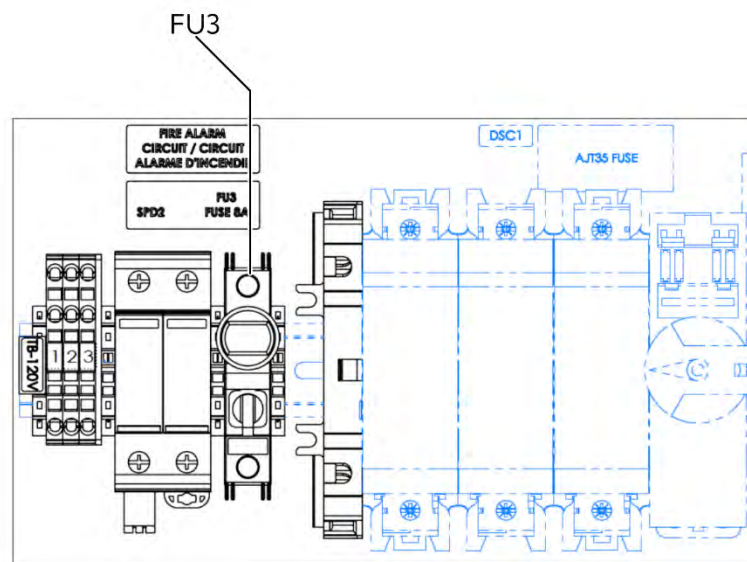
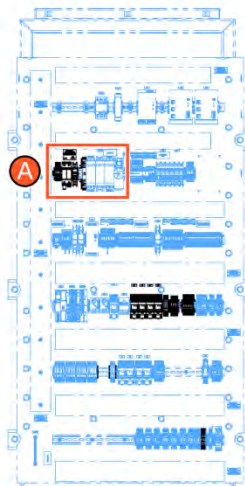
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the specifics of the site. Refer to the **CXL2-DOC-CAD-000 – SITE SPECIFICS** document. The values shown below are for reference only.

- $\leq 1.2 \text{ cal/cm}^2$ to 0.46 meters (typical)

PPE

- Class 0 protective equipment (typical)

Photo



DETAIL A

544-CXL2-PRO-DSCPanelContFU3_3_En/RO

Validation

STEP	PROCEDURE	MEASUREMENT
13	Voltage measurement downstream of disconnectable fuse holder FU3	

Notes/Comments:

Step 14 – Open and Lockout the 120 VAC Power Supply from the 208 VAC Panel (Fire Panel Option)

NOTE: Steps 13 to 16 are applicable only if the container is equipped with the fire panel option. Otherwise, proceed directly to step 17.

Location

- 208 VAC Panel/CB-2.5 to CB-2.8 Circuit Breaker

Instructions

NOTE: In order to keep the panel heating systems active, it is not necessary to lockout the other circuit breakers unless otherwise specified.

- Open and lockout the circuit breakers for the container that has to be locked out:
 - o CB-2.5 → BSU-A
 - o CB-2.6 → BSU-B
 - o CB-2.7 → BSU-C
 - o CB-2.8 → BSU-D

NOTE: Refer to the site engineering documents to identify the circuit breakers to be isolated.

Equipment

- 1x – Lockout device for Schneider circuit breaker
- 1x – Series padlock

Energy level

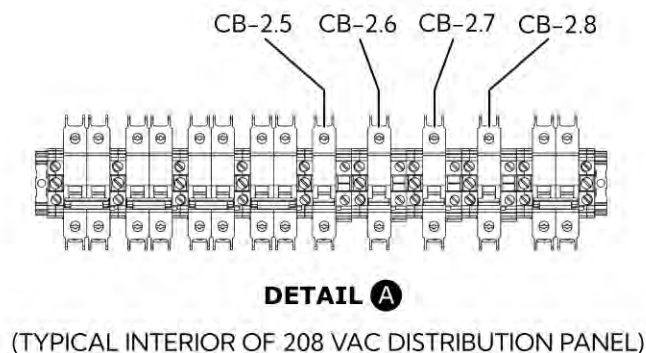
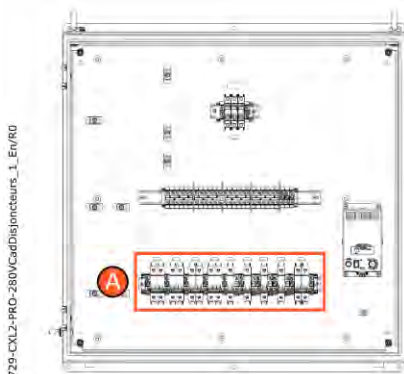
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the specifics of the site. Refer to the **CXL2-DOC-CAD-000 – SITE SPECIFICS** document. The values shown below are for reference only.

- $\leq 1.2 \text{ cal/cm}^2$ to 0.46 meters (typical)

PPE

- Class 0 protective equipment (typical)

Photo



Validation

STEP	PROCEDURE	NUMBER
14	Installed padlock number (if applicable) (CB-2.5):	
	Installed padlock number (if applicable) (CB-2.6):	
	Installed padlock number (if applicable) (CB-2.7):	
	Installed padlock number (if applicable) (CB-2.8):	

Notes/Comments:

Step 15 – Check for the Absence of 120 VAC at the Fire Panel in the Battery Container (Fire Panel Option)

NOTE: Steps 13 to 16 are applicable only if the container is equipped with the fire panel option. Otherwise, proceed directly to step 17.

Location

- Battery Container/Control Compartment/FU3 Disconnectable Fuse Holder

Instructions

- Validate the absence of voltage on the FU3 disconnectable fuse holder terminals.

Equipment

- 1x – Multimeter

Energy level

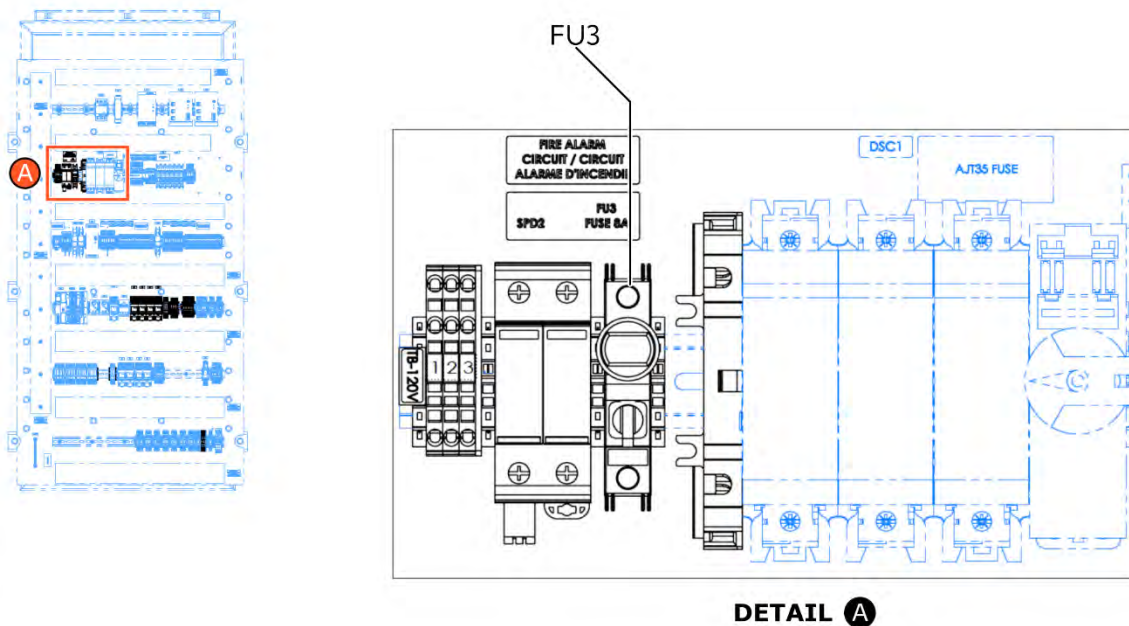
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the specifics of the site. Refer to the **CXL2-DOC-CAD-000 – SITE SPECIFICS** document. The values shown below are for reference only.

- $\leq 1.2 \text{ cal/cm}^2$ to 0.46 meters (typical)

PPE

- Class 0 protective equipment (typical)

Photo



544-CXL2-PRO-DSCPanelContFU3_3_En/RO

Validation

STEP	PROCEDURE	MEASUREMENT
15	Voltage measurement downstream of disconnectable fuse holder FU3	

Notes/Comments:

Step 16 – Open and Lockout the 24 VDC Secondary Power Supply of the Fire Panel (Fire Panel option)

NOTE: Steps 13 to 16 are applicable only if the container is equipped with the fire panel option. Otherwise, proceed directly to step 17.

WARNING



BATTERIES CONTAIN SULPHURIC ACID WHICH CAN CAUSE SEVERE BURNS TO THE SKIN AND EYES AND DAMAGE FABRIC. IN CASE OF CONTACT WITH SULPHURIC ACID, IMMEDIATELY FLUSH SKIN OR EYES WITH WATER FOR 15 MINUTES AND SEEK IMMEDIATE MEDICAL ATTENTION.

CAUTION



WHEN REMOVING LOCKOUT, BEFORE CONNECTING THE POSITIVE (+) BATTERY TERMINAL WIRE, ENSURE THAT THE FIRE PANEL IS POWERED BY 120 VAC FROM THE 208 VAC PANEL. FAILURE TO FOLLOW THIS SAFETY INSTRUCTION CAN RESULT IN DAMAGE TO EQUIPMENT.

Location

- Battery Container/Control Compartment/Fire Panel

Instructions

- Open the secondary power supply circuit of the Honeywell Notifier AMPS-24 PS4 card for the fire panel of the container to be locked out:
 - o Remove the battery protective plate from the fire panel. Set aside the protective plate and its hardware.
 - o Disconnect the wire from the positive (+) terminal of the left battery. **Electrically isolate** the cable until it is reconnected to avoid a short circuit,
 - o Visually validate that the fire panel of the container is off.
 - o Put back the battery protective plate with its hardware.

Equipment

- Standard tools

Energy level

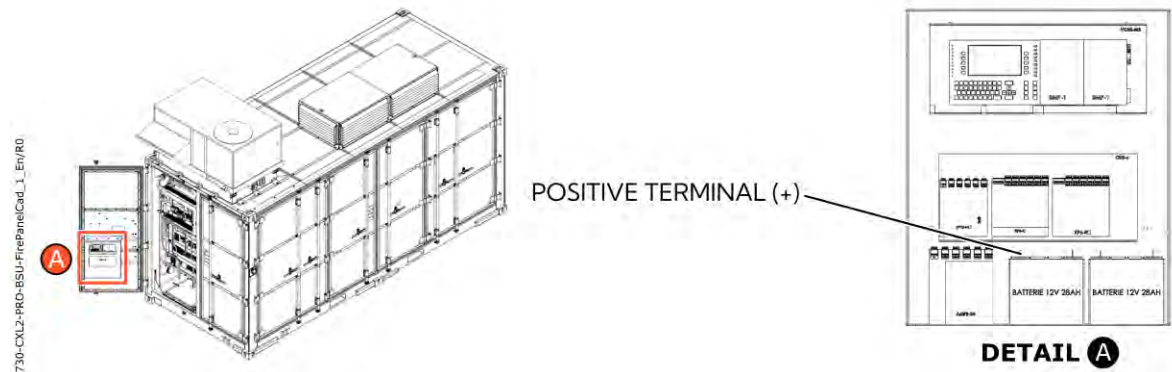
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the specifics of the site. Refer to the **CXL2-DOC-CAD-000 – SITE SPECIFICS** document. The values shown below are for reference only.

- $\leq 1.2 \text{ cal/cm}^2$ to 0.46 meters (typical)

PPE

- Class 0 protective equipment (typical)

Photo



Validation

STEP	PROCEDURE	INITIALS
16	The positive (+) battery terminal wire is disconnected and electrically isolated.	
	The container’s fire panel is off.	

Notes/Comments:

Step 17 – Completed Isolation of the 120 VAC (Fire Panel Option)/460 VAC/1500 VDC Power Supply

At this stage, the 120 VAC, 460 VAC, and 1500 VDC power supplies in the control and distribution compartment of the battery container are isolated.

GENERAL INFORMATION

Document name Battery Container Lockout Procedure (Power Compartment)
EVLOFLEX

Written by _____ **Date** _____

Verified by: _____ **Date** _____

Approved by: _____ **Date** _____

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REVISIONS DESCRIPTION

Revision	Author	Date	Changes
00			Original publication

DOCUMENT PURPOSE

This document details the operations to be performed in order to apply lockout in the following work location:

- Battery Container → Power Compartment

For repair or replacement of SSG or main fuses

WARNING



THIS PROCEDURE WILL LOCK ONLY THE WORK LOCATION DEFINED ABOVE. NEVER USE THIS PROCEDURE TO SECURE ANOTHER WORK LOCATION. ALWAYS USE THE APPLICABLE LOCKOUT PROCEDURE AND WEAR PERSONAL PROTECTIVE EQUIPMENT IN ACCORDANCE WITH APPLICABLE STANDARDS, LAWS AND REGULATIONS. FAILURE TO DO SO CAN CAUSE SERIOUS INJURIES OR EQUIPMENT DAMAGE.

SAFETY CONSIDERATIONS

DANGER

VOLTAGES UP TO 1500 VDC CAN BE PRESENT AT ANY TIME. ALWAYS WEAR SAFETY EQUIPMENT AND FOLLOW ALL APPLICABLE INSTRUCTIONS, LAWS AND REGULATIONS WHEN HANDLING THIS PROCEDURE. FAILURE TO FOLLOW THIS SAFETY INSTRUCTION MAY RESULT IN PERSONAL INJURY AND DEATH.

DANGER

THE PRIMARY ENERGY CIRCUIT (1500 VDC) OF THE SSG CAN CLOSE AUTOMATICALLY WHEN THE SSG ARE REPOWERED. ENSURE THAT NO PERSONEL IS NEAR THE ESG AND 1500 VDC BUSBARS WHEN REPOWERING. FAILURE TO FOLLOW THIS SAFETY INSTRUCTION MAY RESULT IN PERSONAL INJURY AND DEATH.

WARNING

PRIOR TO CARRYING OUT WORK ON THE SITE, AUTHORIZATION MUST BE OBTAINED FROM THE OPERATOR AND/OR SITE MANAGER. FAILURE TO DO SO CAN CAUSE SERIOUS INJURIES OR EQUIPMENT DAMAGE.

WARNING

READ THE ENTIRE PROCEDURE BEFORE STARTING THE WORK. FOLLOW AND EXECUTE THE STEPS IN THE ORDER SHOWN. IF YOU HAVE ANY QUESTIONS, CONTACT THE SUPERVISOR. FAILURE TO DO SO CAN CAUSE SERIOUS INJURIES OR EQUIPMENT DAMAGE.

WARNING

AT LEAST TWO PEOPLE ARE REQUIRED TO PERFORM THE OPERATIONS DESCRIBED IN THIS PROCEDURE, ONE PERSON WHO PERFORMS THE STEPS AND ONE PERSON WHO VERIFIES THE EXECUTION. FAILURE TO DO SO CAN CAUSE SERIOUS INJURIES OR EQUIPMENT DAMAGE.

DEFINITIONS

- BESS: Battery Energy Storage System (includes the site and the installed equipment)
- cm: Centimeter
- EMS: Energy Management System (or SPPC/EMS)
- EVLOFLEX: All BESS equipment (container, panel boards, UPS, EMP)
- N/A: Not Applicable
- PCS: Power Conversion System
- PPE: Personal Protective Equipment
- SSG: Stack Switchgear
- VAC/VDC: Volt Alternating Current/Volt Direct Current

TOOLS AND EQUIPMENT

NOTE: *The quantities of tools and equipment given below are applicable for a battery container.*

- 1x – Padlock box with serial padlock
- 1x – Phoenix Contact circuit breaker lockout device (Brady 90844)
- 1x – Boom with multimeter 1500 VDC
- 1x – Grounding cable
- 1x – Grounding plate
- 1x – Hasp
- 1x – Multimeter
- 1x – Computer
- 12x – Protective box for DC cable end cap (Hubbell HLD)

REFERENCES

NOTE: *Make sure to use the latest revision of the document. If a newer revision is available, use that revision. Inform the person in charge if there is a difference between the information found in this procedure and in the engineering drawings.*

- 71600200 – Battery Container Control Panel
- STD-DOC-SST-003 – Lockout Program
- CXL2-DOC-CAD-000 – Site specificities
- Annex – Site engineering documentation

Step 1 – Confirm that the system is not in operation

Location

- EVLOGIX website/web interface for this installation

Instructions

- Verify on the operator interface that the system is not in operation.
- If the system is running, confirm with the site manager that the system can be shut down.

Equipment

- 1x– Computer

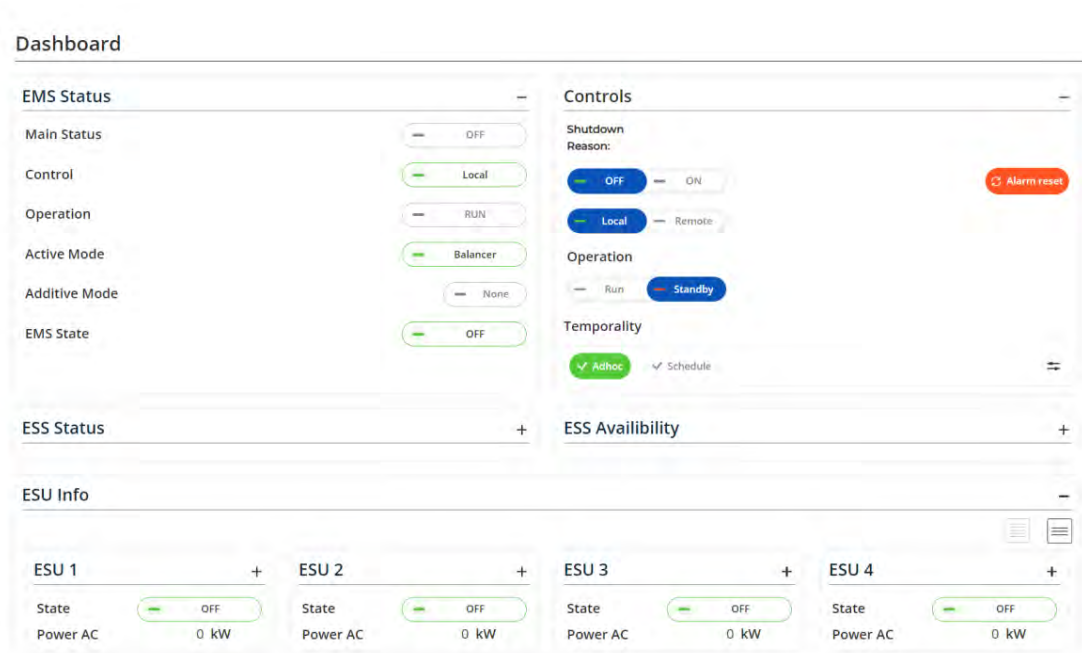
Energy level

- Not Applicable

PPE

- Not Applicable

Photo



TYPICAL EVLOGIX INTERFACE, FOR REFERENCE ONLY

Validation

STEP	PROCEDURE	INITIALS
1	The system is off.	

Notes/Comments:

Step 2 – Isolating the Main Transformer

NOTE: Isolation of the main transformer must be performed by the customer's authorized personnel and according to the procedures provided by the customer.

Location

- Main transformer of the group

Instructions

- Have the customer open and lock the main transformer.
- Have the customer verify the absence of voltage on the main transformer.
- Have the customer install a GND on the main transformer.

NOTE: The electrician or contractor is responsible for following the indications in place before carrying out any procedures.. EVLO staff should be informed of these measures and follow the instructions.

Equipment

- Follow the instructions of the site manager.

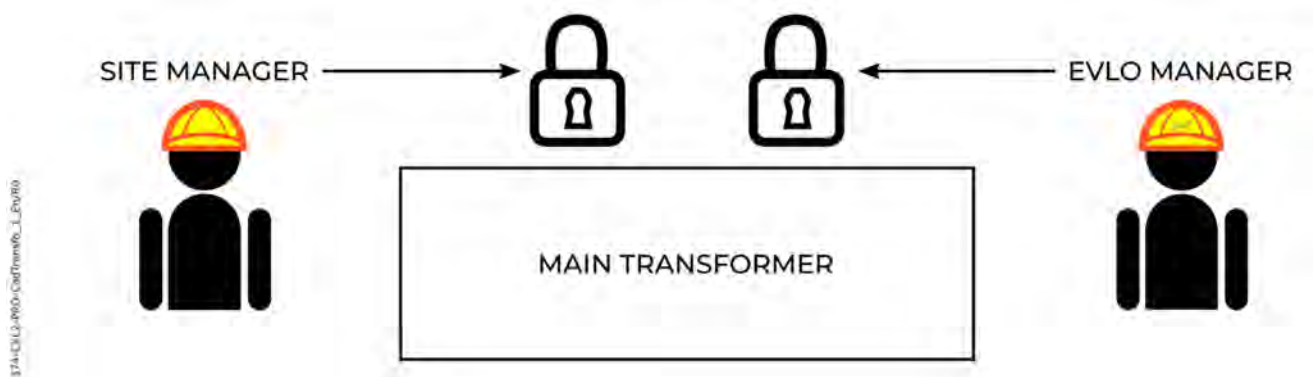
Energy level

- Follow the instructions of the site manager.

PPE

- Follow the instructions of the site manager.

Photo



Validation

STEP	PROCEDURE	INITIALS
2	Main transformer open and padlocked	
2	Validated that there is no voltage	
2	Main transformer grounded	

Notes/Comments:

Step 3 – 1500 VDC SSG Off

DANGER



SEVERAL OTHER CONTAINERS CAN BE CONNECTED TO THE SAME MAIN POWER CIRCUIT (1500 VDC) VIA THE PCS. PERFORM THIS STEP FOR EACH CONTAINER IN THE SAME GROUP BEFORE PERFORMING THE FOLLOWING STEPS. FAILURE TO FOLLOW THIS SAFETY INSTRUCTION MAY RESULT IN PERSONAL INJURY AND DEATH.

Location

NOTE: Refer to the site engineering documents to identify the container(s) to be isolated.

- Battery container → Control compartment → CB4 circuit breaker

Instructions

- Opening and locking the CB4 breaker of all containers connected in parallel.

Equipment

NOTE: A hasp must be used to padlock the Phoenix Contact breaker lockout device because it is too small to accommodate a padlock.

- 1x – Hasp
- 1x – Personal lock
- 1x – Phoenix Contact circuit breaker lockout device (Brady 90844)

Energy level

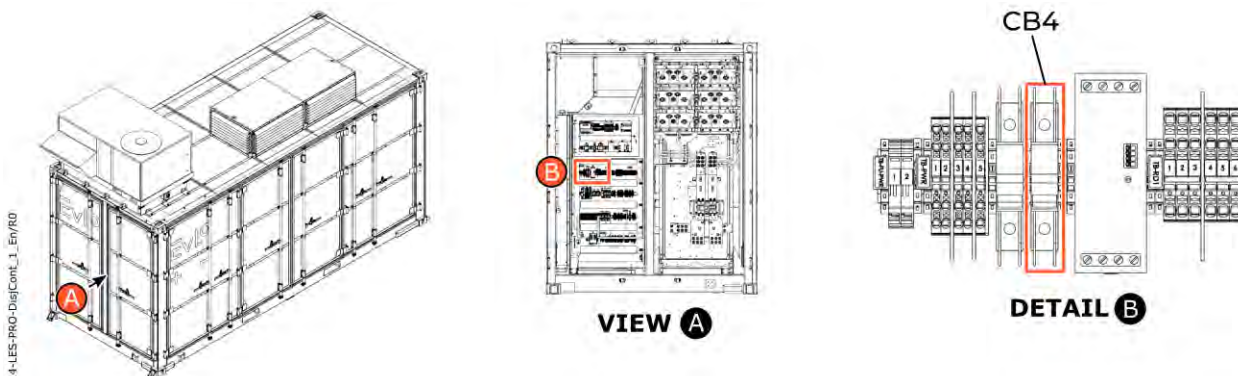
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the site specificities. Refer to the document [CXL2-DOC-CAD-000 – SITE SPECIFICITIES](#). The values shown below are for reference only.

- <1.2 cal/cm² to 0.46 meters (typical)

PPE

- Class 0 protective equipment (typical)

Photo



Validation

Notes/Comments:

STEP	PROCEDURE	MEASUREMENT
Battery container #1		
3	Serial lock installed	
Battery container #2 (if applicable)		
3	Serial lock installed	
Battery container #3 (if applicable)		
3	Serial lock installed	
Battery container #4 (if applicable)		
3	Serial lock installed	

Step 4 – Verification of the Absence of 1500 VDC (All Affected Containers)

NOTE: Several containers can be connected to the same main power circuit. Refer to the site engineering documents to identify the container(s) to be isolated. Repeat steps 4 through 6 for each container that requires isolation.

Location

- Battery container → 1500 VDC compartment

Instructions

- Validation of the absence of voltage on the positive and negative buses on both sides of the 1500 VDC disconnect switch.

Equipment

- 1x – Boom with multimeter 1500 VDC

Energy level

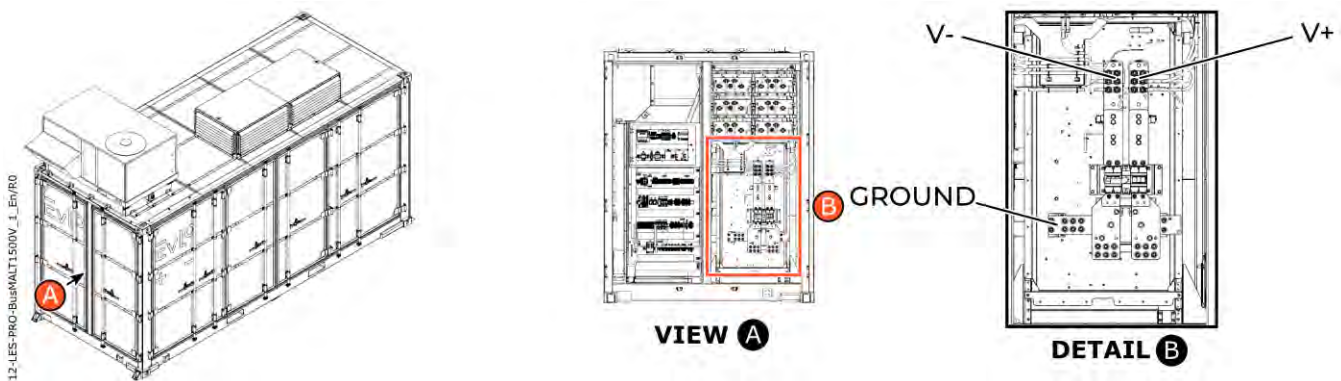
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the site specificities. Refer to the document [CXL2-DOC-CAD-000 – SITE SPECIFICITIES](#). The values shown below are for reference only.

- 3.92 cal/cm² to 0.46 meters (typical)

PPE

- Class 2 protective equipment (typical)

Photo



Validation

STEP	PROCEDURE	MEASUREMENT
Battery container #1		
4	Upper bus voltage between V+ and V-.	
	Top bus voltage between V+ and GND.	
	Top bus voltage between V- and GND.	
	Lower bus voltage between V+ and V-.	
	Lower bus voltage between V+ and GND.	
	Lower bus voltage between V- and GND.	
Battery container #2 (if applicable)		
4	Upper bus voltage between V+ and V-.	
	Top bus voltage between V+ and GND.	
	Top bus voltage between V- and GND.	
	Lower bus voltage between V+ and V-.	
	Lower bus voltage between V+ and GND.	
	Lower bus voltage between V- and GND.	
Battery container #3 (if applicable)		
4	Upper bus voltage between V+ and V-.	
	Top bus voltage between V+ and GND.	
	Top bus voltage between V- and GND.	
	Lower bus voltage between V+ and V-.	
	Lower bus voltage between V+ and GND.	
	Lower bus voltage between V- and GND.	

STEP	PROCEDURE	MEASUREMENT
Battery container #4 (if applicable)		
4	Upper bus voltage between V+ and V-.	
	Top bus voltage between V+ and GND.	
	Top bus voltage between V- and GND.	
	Lower bus voltage between V+ and V-.	
	Lower bus voltage between V+ and GND.	
	Lower bus voltage between V- and GND.	

Notes/Comments:

Step 5 – GND Application (All Affected Containers)

NOTE: Several containers can be connected to the same main power circuit. Refer to the site engineering documents to identify the container(s) to be isolated. Repeat steps 4 through 6 for each container that requires isolation.

Location

- Battery container → 1500 VDC compartment

Instructions

- Grounding application under the 1500 VDC disconnect switch

Equipment

- 1x – Boom
- 1x – Grounding cable

Energy level

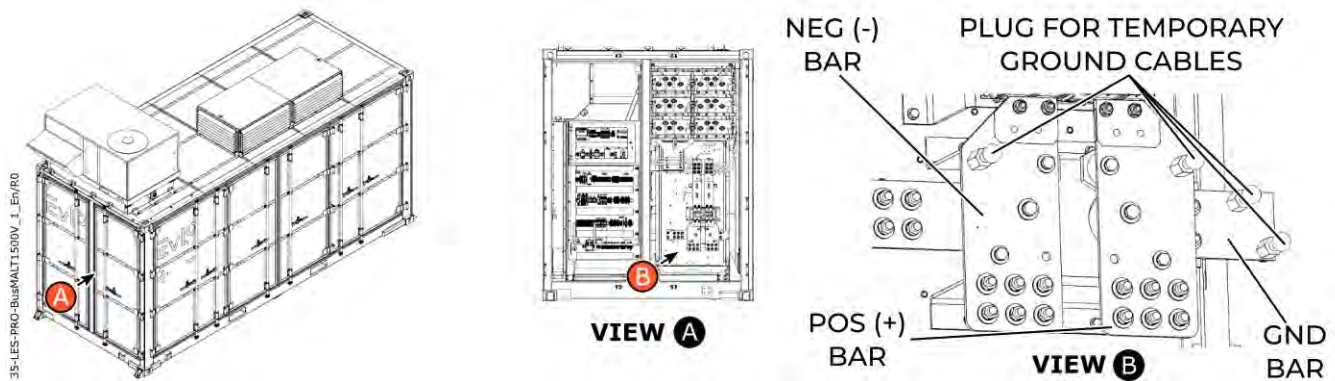
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the site specificities. Refer to the document **CXL2-DOC-CAD-000 – SITE SPECIFICITIES**. The values shown below are for reference only.

- 3.92 cal/cm² to 0.46 meters (typical)

PPE

- Class 2 protective equipment (typical)

Photo



Validation

STEP	PROCEDURE	INITIALS
Battery container #1		
5	Positive bus grounded	
5	Negative bus grounded	
Battery container #2 (if applicable)		
5	Positive bus grounded	
5	Negative bus grounded	
Battery container #3 (if applicable)		
5	Positive bus grounded	
5	Negative bus grounded	
Battery container #4 (if applicable)		
5	Positive bus grounded	
5	Negative bus grounded	

Notes/Comments:

Step 6 – Open and Lockout the 1500 VDC Disconnect Switch (All Affected Containers)

NOTE: Several containers can be connected to the same main power circuit. Refer to the site engineering documents to identify the container(s) to be isolated. Repeat steps 4 through 6 for each container that requires isolation.

Location

- Battery container → 1500 VDC compartment

Instructions

- Opening and padlocking the 1500 VDC disconnect switch

Equipment

- 1x – Serial lock

Energy level

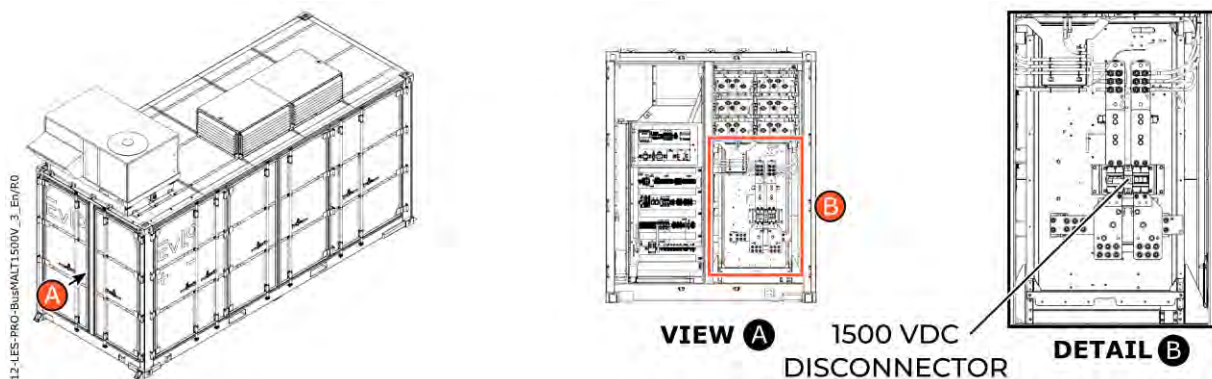
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the site specificities. Refer to the document [CXL2-DOC-CAD-000 – SITE SPECIFICITIES](#). The values shown below are for reference only.

- 3.92 cal/cm² to 0.46 meters (typical)

PPE

- Class 2 protective equipment (typical)

Photo



Validation

STEP	PROCEDURE	MEASUREMENT
Battery container #1		
6	Serial lock installed	
Battery container #2 (if applicable)		
6	Serial lock installed	
Battery container #3 (if applicable)		
6	Serial lock installed	
Battery container #4 (if applicable)		
6	Serial lock installed	

Notes/Comments:

Step 7 – Battery Isolating 1500 VDC

Location

- Battery Container → Battery Compartment

Instructions

- Disconnect the negative terminal of tray 1 at the beginning of each battery row.
- Disconnect the positive terminal of tray 9 at the end of each battery row.
- Install terminal protectors.
- Padlock the 1500 VDC battery compartment handles.

Equipment

- 2x – Serial lock
- 12x – Protective box for DC cable end cap

Energy level

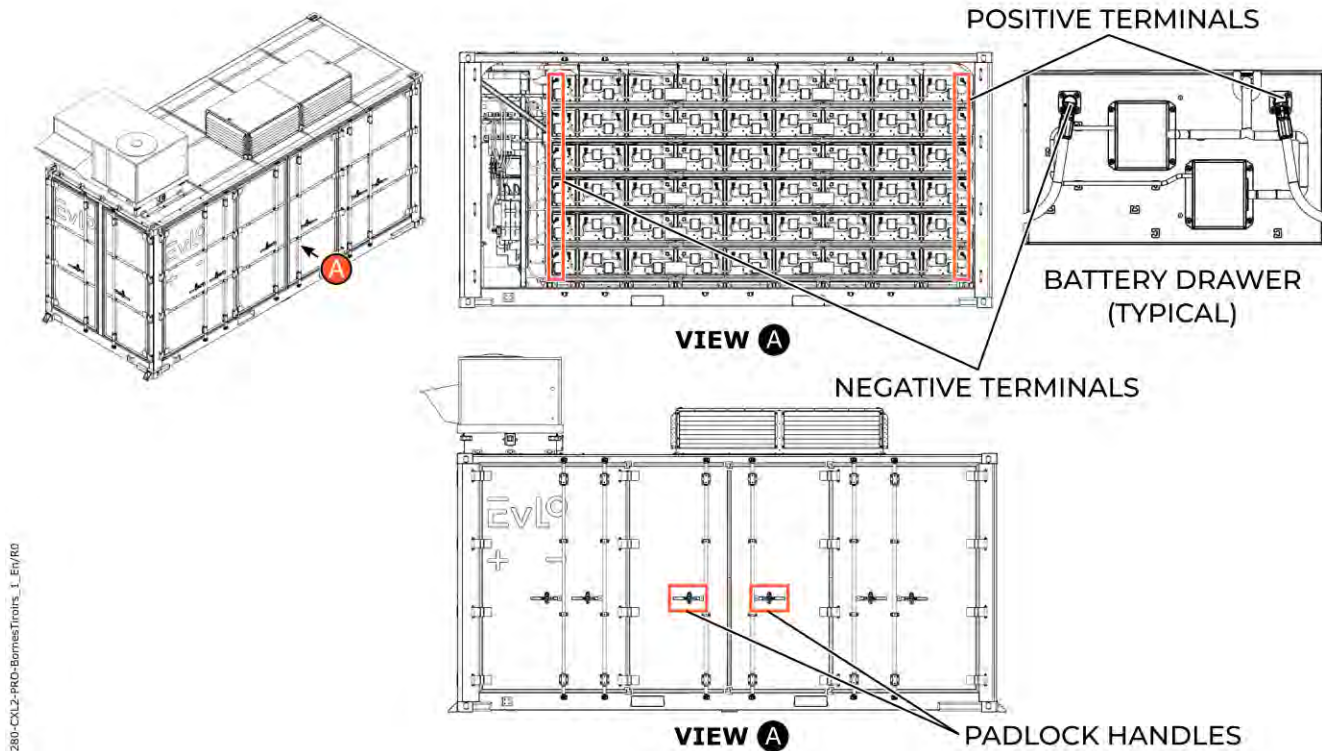
NOTE: *The protections should follow the recommendations of the Arc Flash study made by the customer according to the site specificities. Refer to the document [CXL2-DOC-CAD-000 – SITE SPECIFICITIES](#). The values shown below are for reference only.*

- 1.34 cal/cm² to 0.46 meters (typical)

PPE

- Class 2 protective equipment (typical)

Photo



Validation

STEP	PROCEDURE	INITIALS
7	Row 1 – (Tray 1 – negative)/(Tray 9 – positive) disconnected	
7	Row 2 – (Tray 1 – negative)/(Tray 9 – positive) disconnected	
7	Row 3 – (Tray 1 – negative)/(Tray 9 – positive) disconnected	
7	Row 4 – (Tray 1 – negative)/(Tray 9 – positive) disconnected	
7	Row 5 – (Tray 1 – negative)/(Tray 9 – positive) disconnected	
7	Row 6 – (Tray 1 – negative)/(Tray 9 – positive) disconnected	

STEP	PROCEDURE	NO.
7	Padlock handles #1 and #2 Serial padlock number installed	

Notes/Comments:

Step 8 – SSG 1500 VDC Start Up (Containers Not Locked for Work)

DANGER



THE PRIMARY ENERGY CIRCUIT (1500 VDC) OF THE SSG CAN CLOSE AUTOMATICALLY WHEN THE SSG ARE REPOWERED. ENSURE THAT NO PERSONEL IS NEAR THE SSG AND 1500 VDC BUSBARS WHEN REPOWERING. FAILURE TO FOLLOW THIS SAFETY INSTRUCTION MAY RESULT IN PERSONAL INJURY AND DEATH.

NOTE: This step is applicable only if the group contains more than one container. It is intended to keep the fire system active on unlocked battery containers.

Location

NOTE: Refer to site engineering documents to identify the SSG of the container(s) to be restored.

- Battery Container → Compartment Control → Circuit Breaker CB4

Instructions

- Unlocking and closing of CB4 breaker

Equipment

- Not Applicable

Energy level

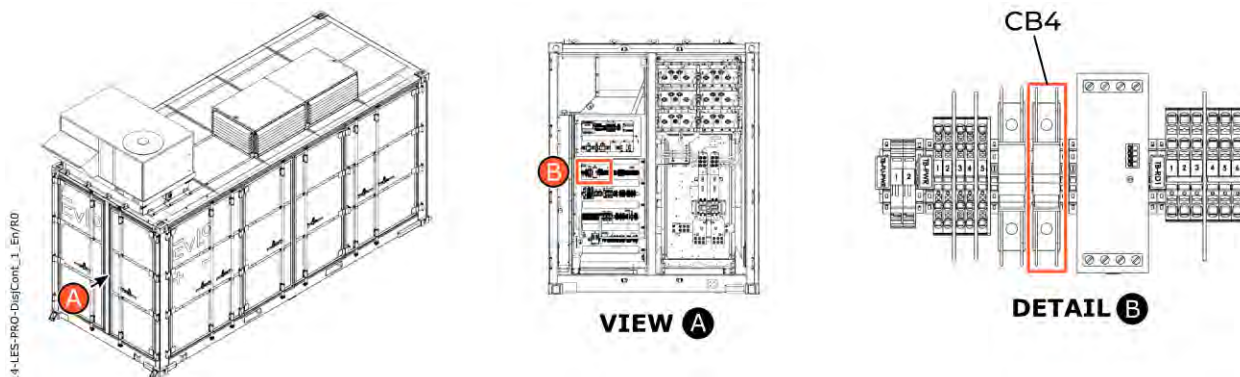
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the site specificities. Refer to the document [CXL2-DOC-CAD-000 – SITE SPECIFICITIES](#). The values shown below are for reference only.

- <1.2 cal/cm² to 0.46 meters (typical)

PPE

- Class 0 protective equipment (typical)

Photo



Validation

STEP	PROCEDURE	INITIALS
Battery container #2 (if applicable)		
8	Personal lock removed	
Battery container #3 (if applicable)		
8	Personal lock removed	
Battery container #4 (if applicable)		
8	Personal lock removed	

Notes/Comments:

Step 9 – Validation of SSG Activation (Containers not Locked)

NOTE: *This step is applicable only if the group contains more than one container. It is intended to keep the fire system active on unlocked battery containers.*

Location

- EVLOGIX → Project tab → EMPC → EMPCs

Instructions

- Click on the  icon to the left of EMPC1 (or other EMPC)
- Select Devices → Batteries → String Data
- Put the "Measurements" filter in "Contactor" on the "String Data" page
- Verify contactors are closed (meaning the SSG are active and energizing the container control circuit)

Equipment

- 1x– Computer

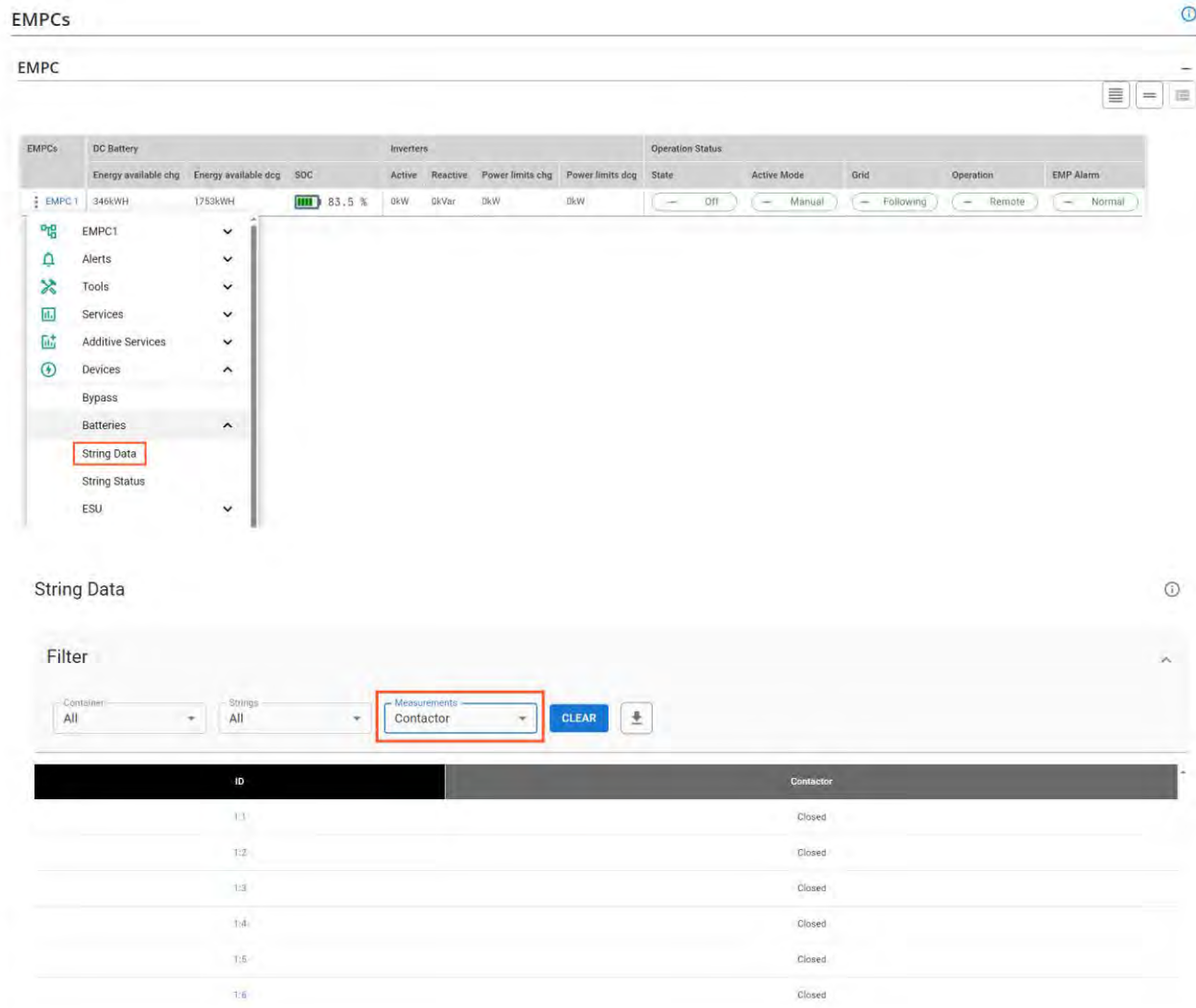
Energy level

- Not Applicable

PPE

- Not Applicable

Photo



281-CXL2-PRO-StringData_1/R1

(TYPICAL EVLOGIX INTERFACE, FOR REFERENCE ONLY)

Validation

STEP	PROCEDURE	CONTAINER	INITIALS
9	The SSG in this container is functional		
9	The SSG in this container is functional		
9	The SSG in this container is functional		

Notes/Comments:

Step 10 – Complete Isolation of the 1500 VDC Power Supply and Batteries

At this stage the 1500 VDC power supply and batteries in the battery container are isolated.

GENERAL INFORMATION

Document name Battery Container Lockout Procedure (Battery Compartment)
EVLOFLEX

Written by _____ **Date** _____

Verified by: _____ **Date** _____

Approved by: _____ **Date** _____

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REVISIONS DESCRIPTION

Revision	Author	Date	Changes
00			Original publication

DOCUMENT PURPOSE

This document details the operations to be performed in order to apply lockout in the following work location:

- Battery Container → Battery Compartment

For repair or replacement of trays or battery modules

WARNING



THIS PROCEDURE WILL LOCK ONLY THE WORK LOCATION DEFINED ABOVE. NEVER USE THIS PROCEDURE TO SECURE ANOTHER WORK LOCATION. ALWAYS USE THE APPLICABLE LOCKOUT PROCEDURE AND WEAR PERSONAL PROTECTIVE EQUIPMENT IN ACCORDANCE WITH APPLICABLE STANDARDS, LAWS AND REGULATIONS. FAILURE TO DO SO CAN CAUSE SERIOUS INJURIES OR EQUIPMENT DAMAGE.

SAFETY CONSIDERATIONS**DANGER**

VOLTAGES UP TO 1500 VDC CAN BE PRESENT AT ANY TIME. ALWAYS WEAR SAFETY EQUIPMENT AND FOLLOW ALL APPLICABLE INSTRUCTIONS, LAWS AND REGULATIONS WHEN HANDLING THIS PROCEDURE. FAILURE TO FOLLOW THIS SAFETY INSTRUCTION MAY RESULT IN PERSONAL INJURY AND DEATH.

DANGER

THE PRIMARY ENERGY CIRCUIT (1500 VDC) OF THE SSG CAN CLOSE AUTOMATICALLY WHEN THE SSG ARE REPOWERED. ENSURE THAT NO PERSONEL IS NEAR THE SSG AND 1500 VDC BUSBARS WHEN REFUELING. FAILURE TO FOLLOW THIS SAFETY INSTRUCTION MAY RESULT IN PERSONAL INJURY AND DEATH.

WARNING

PRIOR TO CARRYING OUT WORK ON THE SITE, AUTHORIZATION MUST BE OBTAINED FROM THE OPERATOR AND/OR SITE MANAGER. FAILURE TO DO SO CAN CAUSE SERIOUS INJURIES OR EQUIPMENT DAMAGE.

WARNING

READ THIS PROCEDURE IN ITS ENTIRETY BEFORE BEGINNING WORK. FOLLOW AND EXECUTE THE STEPS IN THE ORDER SHOWN. IF YOU HAVE ANY QUESTIONS, CONTACT YOUR SUPERVISOR. FAILURE TO DO SO CAN CAUSE SERIOUS INJURIES OR EQUIPMENT DAMAGE.

WARNING

AT LEAST TWO PEOPLE ARE REQUIRED TO PERFORM THE OPERATIONS DESCRIBED IN THIS PROCEDURE, ONE PERSON WHO PERFORMS THE STEPS AND ONE PERSON WHO VERIFIES THE EXECUTION. FAILURE TO DO SO CAN CAUSE SERIOUS INJURIES OR EQUIPMENT DAMAGE.

DEFINITIONS

- BESS: Battery Energy Storage System (includes the site and the installed equipment)
- cm: Centimeter
- EMS: Energy Management System (or SPPC/EMS)
- EVLOFLEX: All BESS equipment (container, panel boards, UPS, EMP)
- GND: Grounding
- N/A: Not Applicable
- PCS: Power Conversion System
- PPE: Personal Protective Equipment
- SSG: Stack Switchgear
- VAC/VDC: Volt Alternating Current/Volt Direct Current

TOOLS AND EQUIPMENT

- 1x – Padlock box with serial padlock
- 1x – Phoenix Contact circuit breaker lockout device (Brady 90844)
- 4x – Padlockable nylon cable (Masterlock S866)
- 12x – Protective box for DC cable end cap (Hubbell HLD)
- 1x – Boom with multimeter 1500 VDC
- 2x – Grounding Cable (1500 VDC)
- 1x – Multimeter
- 1x – Computer

REFERENCES

- 71600200 – Battery Container Control Panel
- STD-DOC-SST-003– Lockout Program
- CXL2-DOC-CAD-000– Site specificities
- Annex – Site engineering documentation

Step 1 – Confirm that the system is not in operation

Location

- EVLOGIX website/web interface for this installation

Instructions

- Verify on the operator interface that the system is not in operation.
- If the system is running, confirm with the site manager that the system can be shut down.

Equipment

- 1x– Computer

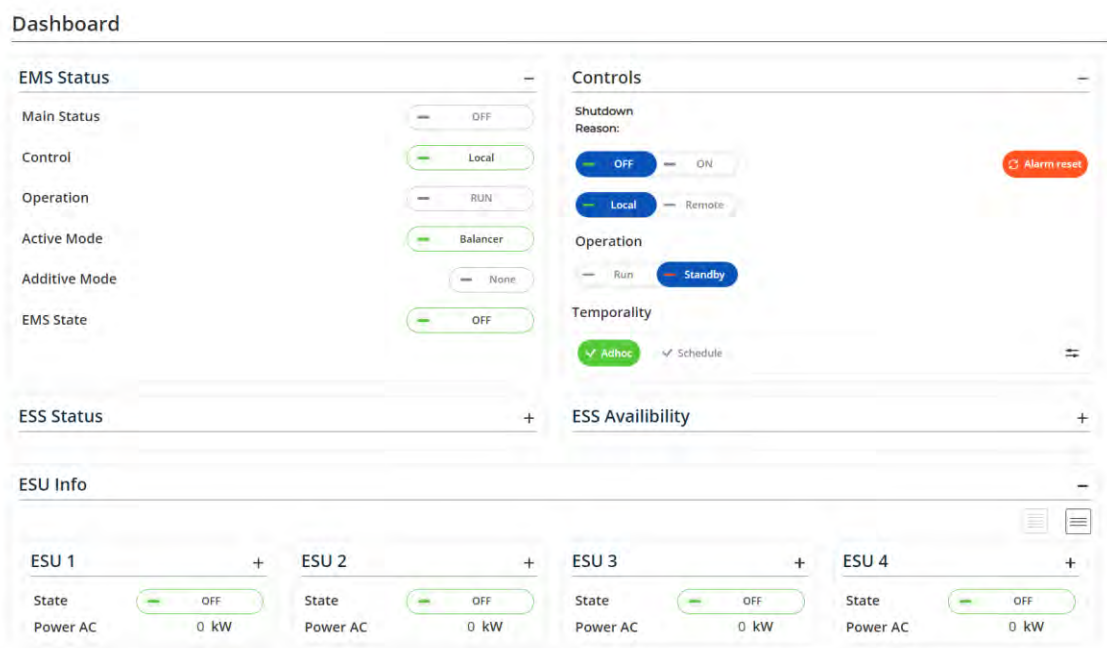
Energy level

- Not Applicable

PPE

- Not Applicable

Photo



TYPICAL EVLOGIX INTERFACE, FOR REFERENCE ONLY

Validation

STEP	PROCEDURE	INITIALS
1	The system is off.	

Notes/Comments:

Step 2 – Isolating the Main Transformer

NOTE: Isolation of the main transformer must be performed by the customer's authorized personnel and according to the procedures provided by the customer.

Location

- Main transformer to which the XFMR monitoring panel is connected

Instructions

- Have the customer open and lock the main transformer.
- Have the customer check the absence of voltage on the main transformer.
- Have the customer install a GND on the main transformer.

NOTE: The electrician or contractor is responsible for following the indications in place before carrying out any manipulations. EVLO staff should be informed of these measures and follow the instructions.

Equipment

- Follow the instructions of the site manager.

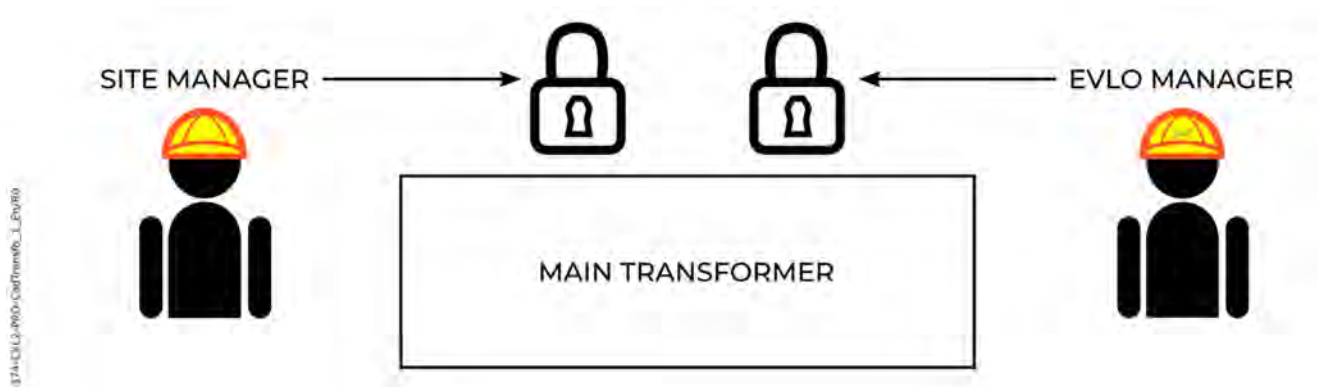
Energy level

- Follow the instructions of the site manager.

PPE

- Follow the instructions of the site manager.

Photo



Validation

STEP	PROCEDURE	INITIALS
2	Main transformer open and padlocked	
2	Validated that there is no voltage	
2	Main transformer grounded	

Notes/Comments:

Step 3 – 1500 VDC SSG Off

DANGER



SEVERAL OTHER CONTAINERS CAN BE CONNECTED TO THE SAME MAIN POWER CIRCUIT (1500 VDC) VIA THE PCS. PERFORM THIS STEP FOR EACH CONTAINER IN THE SAME GROUP BEFORE PERFORMING THE FOLLOWING STEPS. FAILURE TO FOLLOW THIS SAFETY INSTRUCTION MAY RESULT IN PERSONAL INJURY AND DEATH.

Location

NOTE: Refer to the site engineering documents to identify the container(s) to be isolated.

- Battery Container → Compartment Control → Circuit Breaker CB4

Instructions

- Opening and locking the CB4 breaker of all containers connected in parallel.

Equipment

NOTE: A hasp must be used to padlock the Phoenix Contact breaker lockout device because it is too small to accommodate a padlock.

- 1x – Hasp
- 1x – Personal lock
- 1x – Phoenix Contact Circuit Breaker Lockout Device (Brady 90844)

Energy level

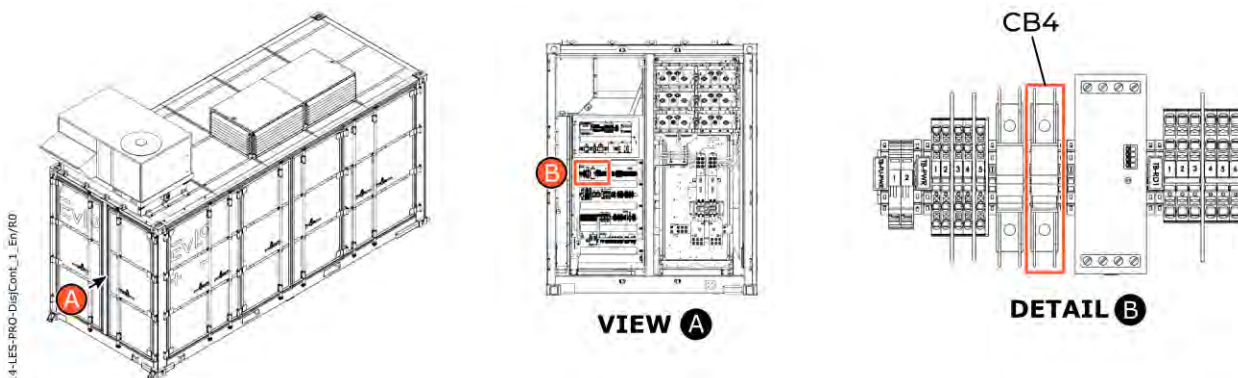
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the site specificities. Refer to the document [CXL2-DOC-CAD-000 – SITE SPECIFICITIES](#). The values shown below are for reference only.

- $\leq 1.2 \text{ cal/cm}^2$ to 0.46 meters (typical)

PPE

- Class 0 protective equipment (typical)

Photo



Validation

STEP	PROCEDURE	INITIALS
Battery container #1		
3	Serial lock installed	
Battery container #2 (if applicable)		
3	Serial lock installed	
Battery container #3 (if applicable)		
3	Serial lock installed	
Battery container #4 (if applicable)		
3	Serial lock installed	

Notes/Comments:

Step 4 – Verification of the Absence of 1500 VDC (All Affected Containers)

NOTE: Several containers can be connected to the same main power circuit. Refer to the site engineering documents to identify the container(s) to be isolated. Repeat steps 3 through 5 for each container that requires isolation.

Location

- Battery container → 1500 VDC compartment

Instructions

- Validation of the absence of voltage on the positive and negative buses on both sides of the 1500 VDC disconnect switch.

Equipment

- 1x – Boom with multimeter 1500 VDC

Energy level

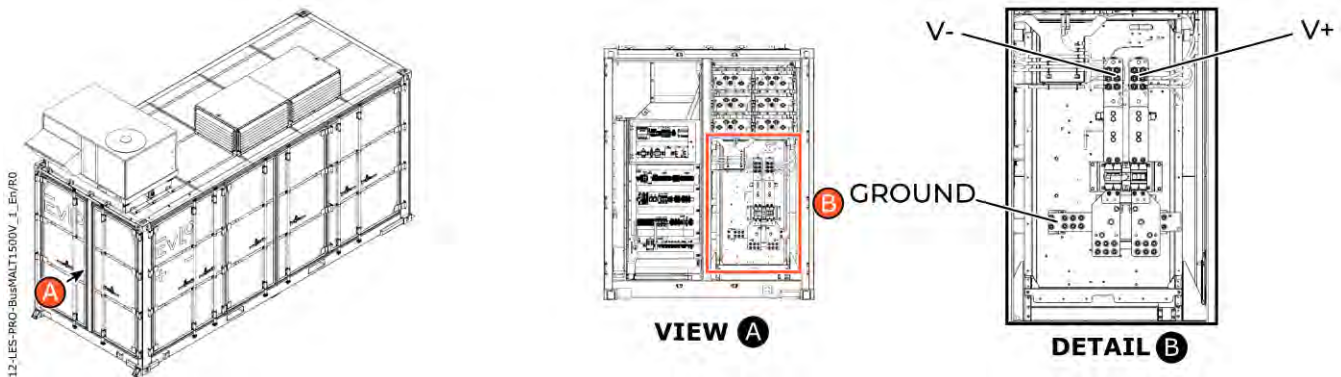
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the site specificities. Refer to the document [CXL2-DOC-CAD-000 – SITE SPECIFICITIES](#). The values shown below are for reference only.

- 3.92 cal/cm² to 0.46 meters (typical)

PPE

- Class 2 protective equipment (typical)

Photo



Validation

STEP	PROCEDURE	MEASUREMENT
Battery container #1		
4	Upper bus voltage between V+ and V-.	
	Top bus voltage between V+ and GND.	
	Top bus voltage between V- and GND.	
	Lower bus voltage between V+ and V-.	
	Lower bus voltage between V+ and GND.	
	Lower bus voltage between V- and GND.	
Battery container #2 (if applicable)		
4	Upper bus voltage between V+ and V-.	
	Top bus voltage between V+ and GND.	
	Top bus voltage between V- and GND.	
	Lower bus voltage between V+ and V-.	
	Lower bus voltage between V+ and GND.	
	Lower bus voltage between V- and GND.	
Battery container #3 (if applicable)		
4	Upper bus voltage between V+ and V-.	
	Top bus voltage between V+ and GND.	
	Top bus voltage between V- and GND.	
	Lower bus voltage between V+ and V-.	
	Lower bus voltage between V+ and GND.	
	Lower bus voltage between V- and GND.	

STEP	PROCEDURE	MEASUREMENT
Battery container #4 (if applicable)		
4	Upper bus voltage between V+ and V-.	
	Top bus voltage between V+ and GND.	
	Top bus voltage between V- and GND.	
	Lower bus voltage between V+ and V-.	
	Lower bus voltage between V+ and GND.	
	Lower bus voltage between V- and GND.	

Notes/Comments:

Step 5 – GND Application (All Affected Containers)

NOTE: Several containers can be connected to the same main power circuit. Refer to the site engineering documents to identify the container(s) to be isolated. Repeat steps 3 through 5 for each container that requires isolation.

Location

- Battery container → 1500 VDC compartment

Instructions

- Grounding application under the 1500 VDC disconnect switch

Equipment

- 1x – Boom
- 1x – Grounding cable

Energy level

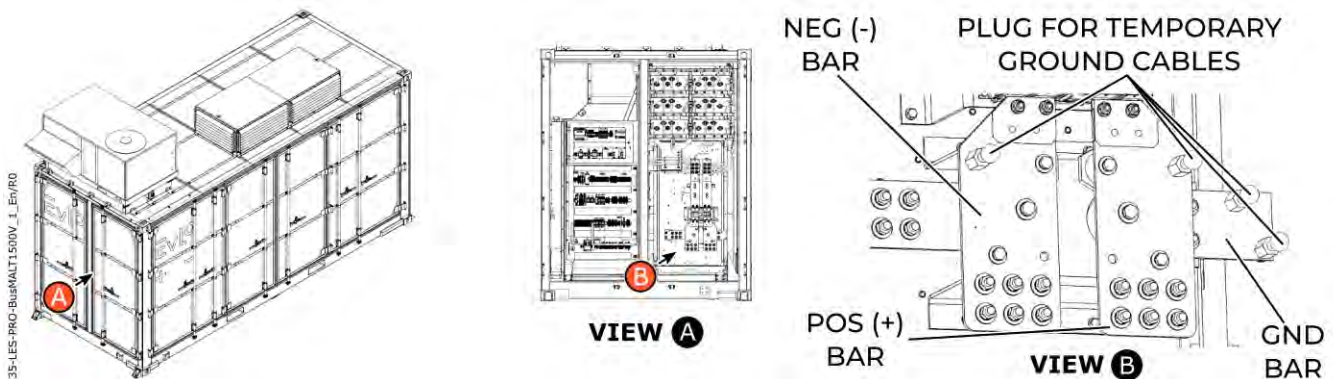
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the site specificities. Refer to the document [CXL2-DOC-CAD-000 – SITE SPECIFICITIES](#). The values shown below are for reference only.

- 3.92 cal/cm² to 0.46 meters (typical)

PPE

- Class 2 protective equipment (typical)

Photo



Validation

NOTE: Battery container #1 is considered to be the one on which the work is being done.

STEP	PROCEDURE	INITIALS
Battery container #1		
5	Positive bus grounded	
5	Negative bus grounded	
Battery container #2 (if applicable)		
5	Positive bus grounded	
5	Negative bus grounded	
Battery container #3 (if applicable)		
5	Positive bus grounded	
5	Negative bus grounded	
Battery container #4 (if applicable)		
5	Positive bus grounded	
5	Negative bus grounded	

Notes/Comments:

Step 6 – Open and Lockout the 1500 VDC Disconnect Switch (All Affected Containers)

NOTE: Several containers can be connected to the same main power circuit. Refer to the site engineering documents to identify the container(s) to be isolated. Repeat steps 3 through 5 for each container that requires isolation.

Location

- Battery container → 1500 VDC compartment

Instructions

- Opening and padlocking the 1500 VDC disconnect switch.

Equipment

- 1x – Serial lock

Energy level

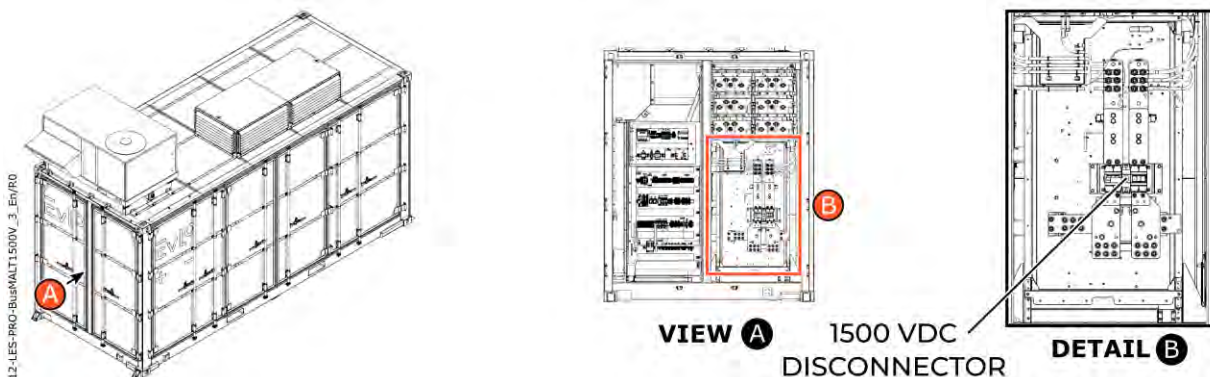
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the site specificities. Refer to the document [CXL2-DOC-CAD-000 – SITE SPECIFICITIES](#). The values shown below are for reference only.

- 3.92 cal/cm² to 0.46 meters (typical)

PPE

- Class 2 protective equipment (typical)

Photo



Validation

NOTE: Battery container #1 is considered to be the one on which the work is performed.

STEP	PROCEDURE	MEASUREMENT
Battery container #1		
6	Serial lock installed	
Battery container #2 (if applicable)		
6	Serial lock installed	
Battery container #3 (if applicable)		
6	Serial lock installed	
Battery container #4 (if applicable)		
6	Serial lock installed	

Notes/Comments:

Step 7 – Battery Isolating 1500 VDC

Location

- Battery container → 1500 VDC compartment and 1500 VDC battery compartment

Instructions

- Disconnection of negative terminal of tray 1 at the beginning of each battery row
- Install terminal protectors
- Use 1 padlockable nylon cable and 1 serial padlock to lock all terminals initially
- Disconnect the positive terminal of tray 9 at the end of each battery row
- Install terminal protectors
- Use 1 padlockable nylon cable and 1 serial padlock to padlock all terminals at the end.

Equipment

- 2x – Serial lock
- 2x – Padlockable nylon cable (15ft)
- 12x – Protective box for DC cable end cap

Energy level

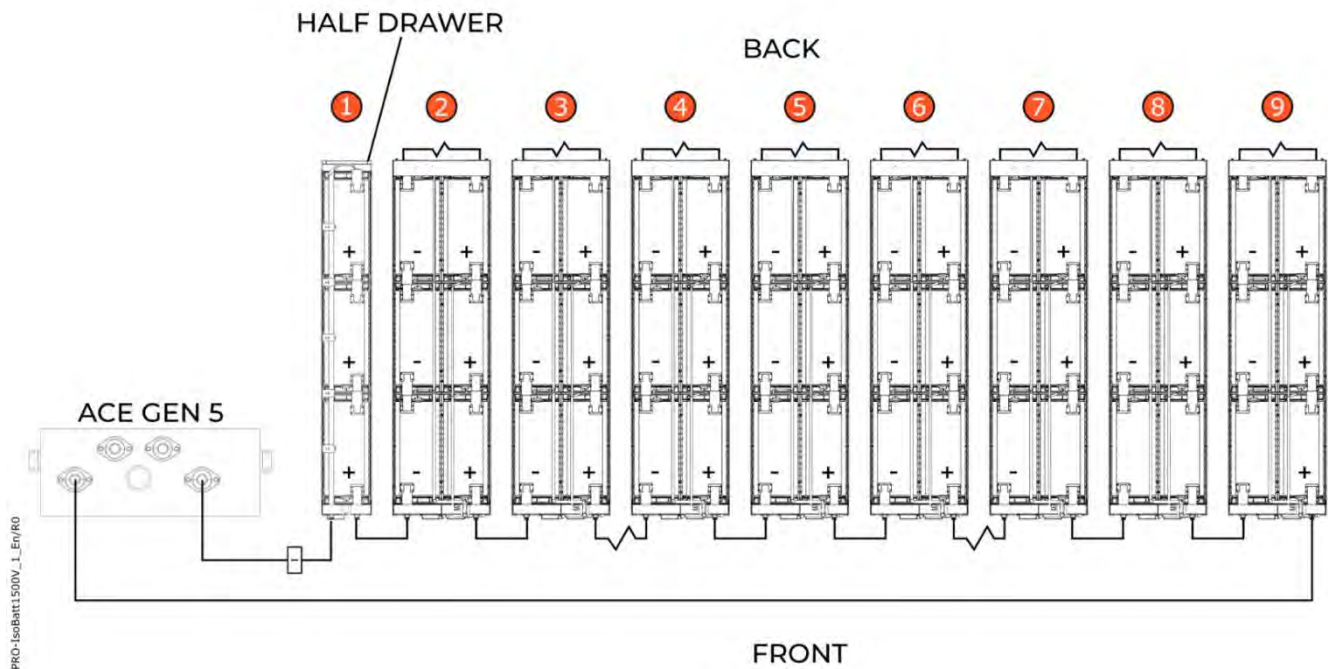
NOTE: *The protections should follow the recommendations of the Arc Flash study made by the customer according to the site specificities. Refer to the document [CXL2-DOC-CAD-000 – SITE SPECIFICITIES](#). The values shown below are for reference only.*

- 1.34 cal/cm² to 0.46 meters (typical)

PPE

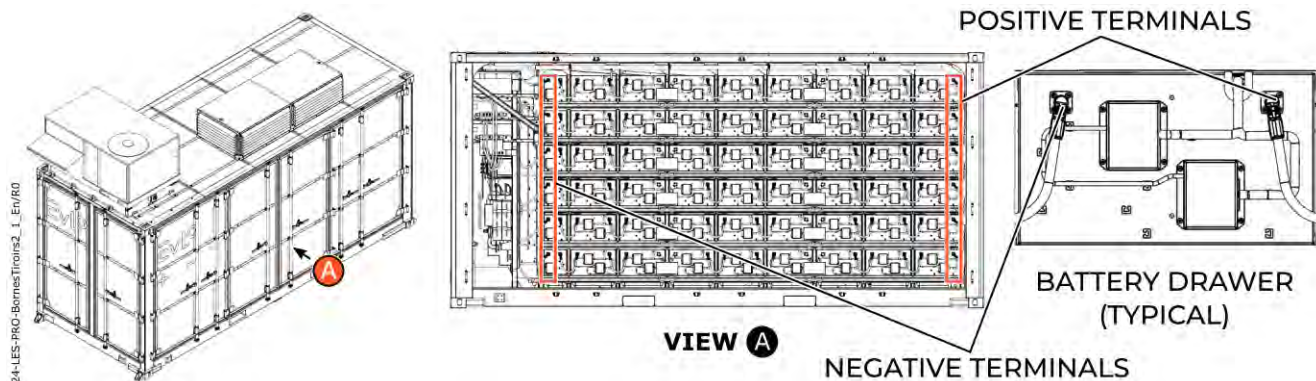
- Class 2 protective equipment (typical)

Electrical diagrams



(TOP VIEW OF A BATTERY CHAIN IN THE CONTAINER)

Photo



Validation

STEP	PROCEDURE	INITIALS
7	Row 1 – (Tray 1 – negative)/(Tray 9 – positive) disconnected	
	Row 2 – (Tray 1 – negative)/(Tray 9 – positive) disconnected	
	Row 3 – (Tray 1 – negative)/(Tray 9 – positive) disconnected	
	Row 4 – (Tray 1 – negative)/(Tray 9 – positive) disconnected	
	Row 5 – (Tray 1 – negative)/(Tray 9 – positive) disconnected	
	Row 6 – (Tray 1 – negative)/(Tray 9 – positive) disconnected	

STEP	PROCEDURE	MEASUREMENT
7	Serial padlock installed at the beginning	
7	Serial padlock installed at the end.	

Notes/Comments:

Step 8 – SSG 1500 VDC Start Up (Containers Not Locked for Work)

DANGER



THE PRIMARY ENERGY CIRCUIT (1500 VDC) OF THE SSG CAN CLOSE AUTOMATICALLY WHEN THE SSG ARE REPOWERED. ENSURE THAT NO PERSONNEL IS NEAR THE SSG AND 1500 VDC BUSBARS WHEN REPOWERING. FAILURE TO FOLLOW THIS SAFETY INSTRUCTION MAY RESULT IN PERSONAL INJURY AND DEATH.

NOTE: This step is applicable only if the group contains more than one container. It is intended to keep the fire system active on unlocked battery containers.

Location

NOTE: Refer to site engineering documents to identify the SSG of the container(s) to be restored.

- Battery container → Control compartment

Instructions

- Unlocking and closing of CB4 breaker.

Equipment

- Not Applicable

Energy level

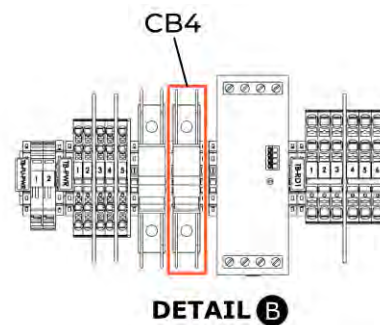
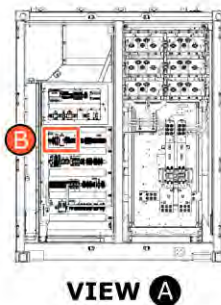
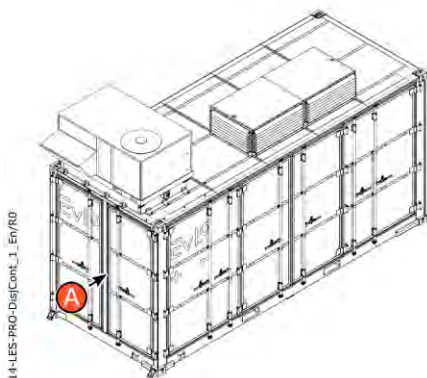
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the site specificities. Refer to the document *CXL2-DOC-CAD-000 – SITE SPECIFICITIES*. The values shown below are for reference only.

- $\leq 1.2 \text{ cal/cm}^2$ to 0.46 meters (typical)

PPE

- Class 0 protective equipment (typical)

Photo



Validation

NOTE: Battery container #1 is considered to be the one on which the work is being done.

STEP	PROCEDURE	INITIALS
Battery container #2 (if applicable)		
8	Personal lock removed	
Battery container #3 (if applicable)		
8	Personal lock removed	
Battery container #4 (if applicable)		
8	Personal lock removed	

Notes/Comments:

Step 8 – Validation of SSG Activation (Containers Not Locked)

NOTE: *This step is applicable only if the group contains more than one container. It is intended to keep the fire system active on unlocked battery containers.*

Location

- EVLOGIX → Project tab → EMPC → EMPCs

Instructions

- Click on the  icon to the left of EMPC1 (or other EMPC)
- Select Devices → Batteries → String Data
- Put the "Measurements" filter in "Contactor" on the "String Data" page
- Verify contactors are closed (meaning the SSG are active and energizing the container control circuit)

Equipment

- 1x– Computer

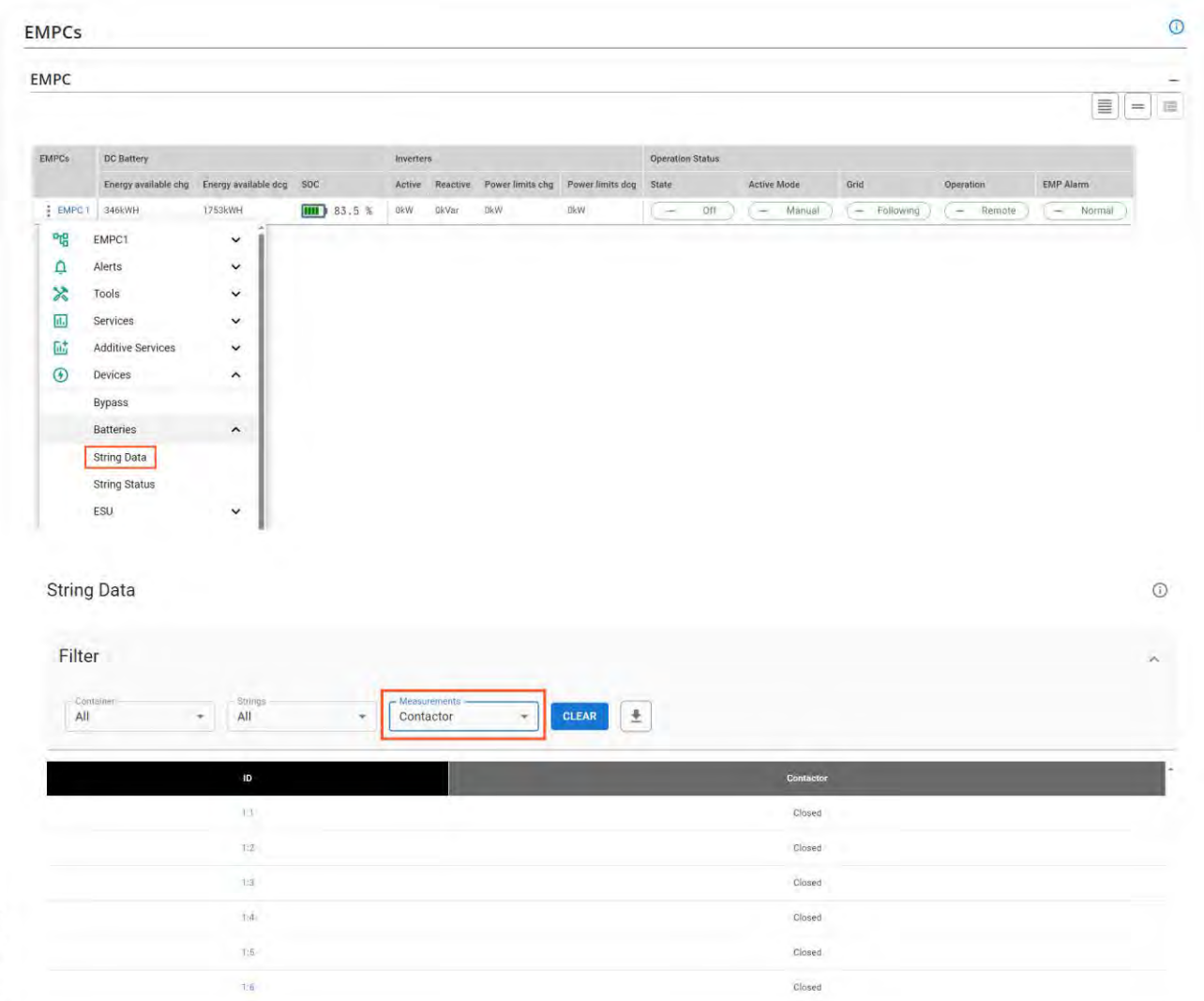
Energy level

- Not Applicable

PPE

- Not Applicable

Photo



281-CXL2-PRO-StringData_1/R1

(TYPICAL EVLOGIX INTERFACE, FOR REFERENCE ONLY)

Validation

STEP	PROCEDURE	CONTAINER	INITIALS
9	The SSG in this container is functional		
9	The SSG in this container is functional		
9	The SSG in this container is functional		

Notes/Comments:

Step 10 – Complete Isolation of the 1500 VDC Power Supply and Batteries

At this stage the 1500 VDC power supply and batteries in the battery container are isolated.

GENERAL INFORMATION

Document Name 460 VAC Distribution Panel Lockout Procedure
EVLOFLEX

Translated by Lia Raykhlin
EVLO, Technical Translator

Date 2024-12-01

NOTE: *This document has been translated from the original French version. Refer to the French version of the document for the review and approval information. If any discrepancy is found between this translation and the original document, the information in the French document shall prevail.*

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REVISIONS DESCRIPTION

Revision	Author	Date	Changes
00			Original publication
01	T. Bredillet	2024-10-15	Integration of engineering comments

DOCUMENT PURPOSE

This document details the operations to be performed in order to apply lockout in the following work location:

- 460 VAC distribution panel

IMPORTANT NOTE: *If the work to be performed is only on the heater and its circuit breaker CB10.1, only steps **15** to **18** must be performed to isolate this circuit.*

WARNING



THIS PROCEDURE WILL ONLY LOCKOUT THE WORK LOCATION DEFINED ABOVE. NEVER USE THIS PROCEDURE TO SECURE ANOTHER WORK LOCATION. ALWAYS USE THE APPLICABLE LOCKOUT PROCEDURE AND WEAR PERSONAL PROTECTIVE EQUIPMENT IN ACCORDANCE WITH APPLICABLE STANDARDS, LAWS AND REGULATIONS. FAILURE TO FOLLOW THESE SAFETY INSTRUCTIONS CAN CAUSE SERIOUS INJURIES OR EQUIPMENT DAMAGE.

SAFETY CONSIDERATIONS

DANGER

VOLTAGES UP TO 690 VAC/1500 VDC CAN BE PRESENT AT ANY TIME. ALWAYS WEAR SAFETY EQUIPMENT AND FOLLOW ALL APPLICABLE INSTRUCTIONS, LAWS, AND REGULATIONS WHEN PERFORMING THE MANIPULATIONS DESCRIBED IN THIS PROCEDURE. FAILURE TO FOLLOW THIS INSTRUCTION WILL CAUSE SERIOUS INJURIES AND DEATH.

DANGER

THE PRIMARY ENERGY CIRCUIT (1500 VDC) OF THE SSG CAN CLOSE AUTOMATICALLY WHEN THE SSG IS REPOWERED. ENSURE THAT NO PERSONNEL IS NEAR THE SSG AND 1500 VDC BUSBARS WHEN REFUELING. FAILURE TO FOLLOW THIS INSTRUCTION WILL CAUSE SERIOUS INJURIES AND DEATH.

WARNING

PRIOR TO CARRYING OUT WORK ON THE SITE, AUTHORIZATION MUST BE OBTAINED FROM THE OPERATOR AND/OR SITE MANAGER. FAILURE TO FOLLOW THESE SAFETY INSTRUCTIONS CAN CAUSE SERIOUS INJURIES OR EQUIPMENT DAMAGE.

WARNING

PROCEDURE IS READ IN ITS ENTIRETY BEFORE BEGINNING THE MANIPULATIONS. FOLLOW AND EXECUTE THE MANIPULATIONS IN THE ORDER SHOWN. IF YOU HAVE ANY QUESTIONS, CONTACT YOUR SUPERVISOR. FAILURE TO FOLLOW THESE SAFETY INSTRUCTIONS CAN CAUSE SERIOUS INJURIES OR EQUIPMENT DAMAGE.

WARNING

AT LEAST TWO PEOPLE ARE REQUIRED TO PERFORM THE OPERATIONS DESCRIBED IN THIS PROCEDURE. A PERSON WHO PERFORMS THE STEPS AND A PERSON WHO VERIFIES THE EXECUTION. FAILURE TO FOLLOW THESE SAFETY INSTRUCTIONS CAN CAUSE SERIOUS INJURIES OR EQUIPMENT DAMAGE.

DEFINITIONS

- BESS: Battery Energy Storage System
- cm: Centimeter
- EVLOFLEX: All BESS equipment (container, panel boards, UPS, EMP)
- GFM: Ground Fault Coupling Module
- GND: Grounding
- PCS: Power Conversion System
- PPE: Personal Protective Equipment
- SSG: Stack Switchgear
- UPS: Uninterrupted Power Supply
- VAC/Vac: Volts Alternating Current
- VDC/Vdc: Volts Direct Current

TOOLS AND EQUIPMENT

- 1x – Lockout box with series padlock
- 1x – Phoenix Contact circuit breaker lockout device (Brady 90844)
- 1x – Grounding pole
- 1x – Pole with 1500 VDC Multimeter
- 2x – Grounding Cable (1500 VDC)
- 1x – Hasp
- 1x – Lockout tags
- 1x – Multimeter
- 1x – Computer

REFERENCES

- 71100000 – XFMR Monitoring Panel
- 71200000 – Power Supply Panel
- 71300000 – 460 Vac Distribution Panel
- 71600200 – Battery Container Control Panel
- STD-DOC-SST-003 – Lockout Program
- Annex: Site engineering documentation
- CXL2-DOC-CAD-000 – Site specifics

Step 1 – Confirm that the system is not in operation

Location

- Installation of the EVLOGIX website/web interface

Instructions

- Verify that the system is not in operation on the operator interface.
- If the system is running, confirm with the site manager that the system can be shut down.

Equipment

- 1x– Computer

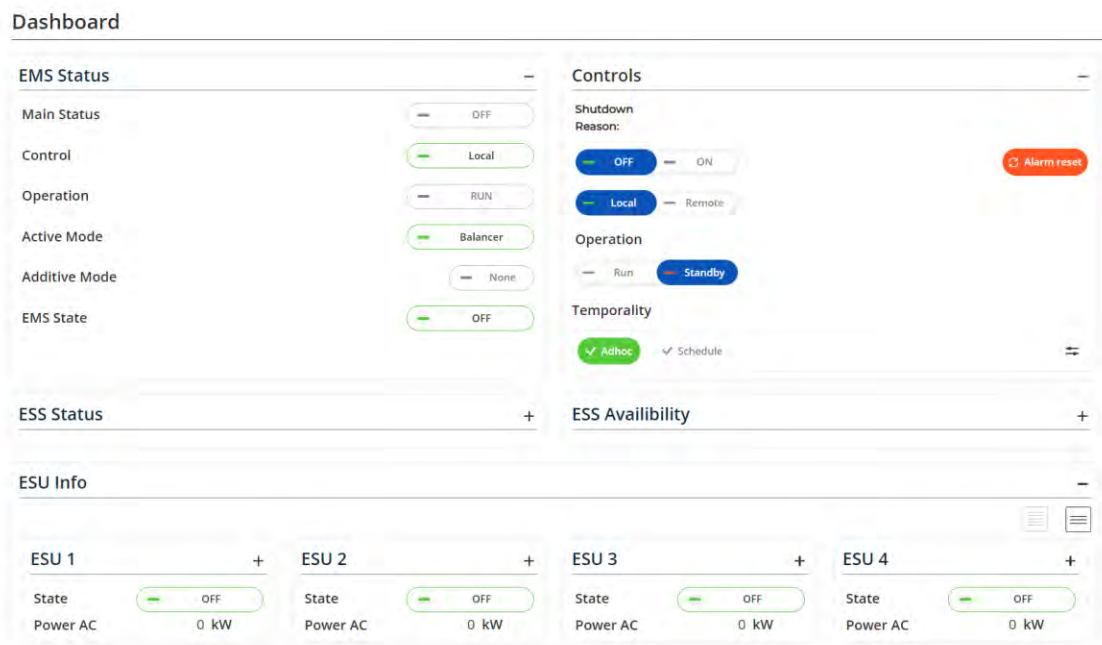
Energy level

- Not Applicable

PPE

- Not Applicable

Photo



36-LES-PRO-Dashboard_1_En/R0

TYPICAL EVLOGIX INTERFACE, FOR REFERENCE ONLY

Validation

STEP	PROCEDURE	INITIALS
1	The system is off.	

Notes/Comments:

Step 2 – Isolate the Main Transformer

NOTE: Steps 2 to 8 are only applicable to power supply options 3 or 4 defined in the *CXL2-DOC-CAD - SITE SPECIFICS* document.

NOTE: Isolation of the main transformer must be performed by the customer's authorized personnel and according to the procedures provided by the customer.

Location

- Main transformer

Instructions

- Have the customer open and lockout the main transformer
- Have the customer check the absence of voltage on the main transformer
- Have the customer install a GND on the main transformer

NOTE: The electrician or contractor is responsible for following the indications in place before carrying out any manipulations. EVLO staff should be informed of these measures and follow the instructions.

Equipment

- Follow the instructions of the site manager.

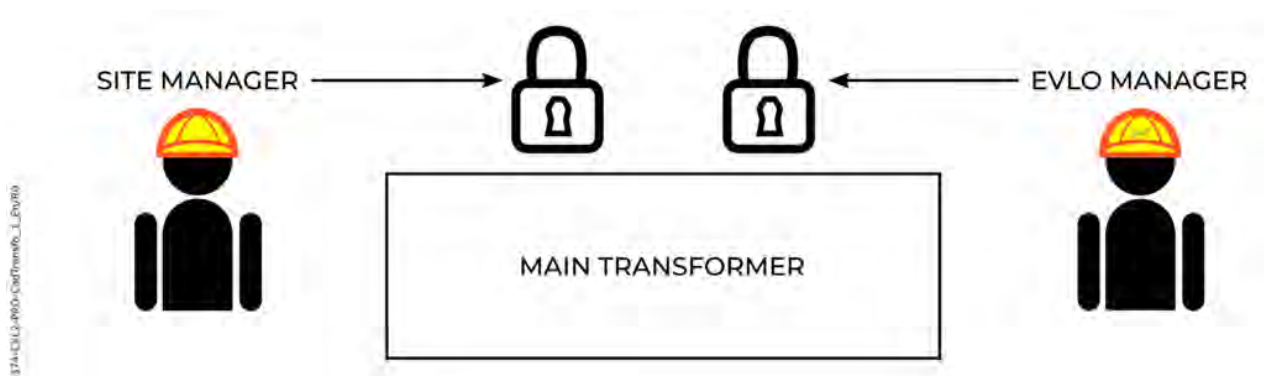
Energy level

- Follow the instructions of the site manager.

PPE

- Follow the instructions of the site manager.

Photo



Validation

STEP	PROCEDURE	INITIALS
2	Main transformer open and locked	
2	Validated no voltage	
2	Main transformer grounded	

Notes/Comments:

Step 3 – Shut down the 1500 VDC SSGs

DANGER



SEVERAL OTHER CONTAINERS CAN BE CONNECTED TO THE SAME MAIN ENERGY CIRCUIT (1500 VDC) VIA THE PCS. PERFORM THIS STEP FOR EACH CONTAINER IN THE SAME GROUP BEFORE PERFORMING THE FOLLOWING STEPS. FAILURE TO FOLLOW THIS INSTRUCTION WILL CAUSE SERIOUS INJURIES AND DEATH.

Location

NOTE: Refer to the site engineering documents to identify the container(s) to be isolated.

- Battery container → Control compartment → CB4 circuit breaker

Instructions

- Open and lockout the CB4 circuit breaker of all containers connected in parallel.

Equipment

NOTE: A hasp must be used to lockout the Phoenix Contact circuit breaker lockout device because it is too small to accommodate a padlock.

- 1x – Hasp
- 1x – Personal lock
- 1x – Phoenix Contact circuit breaker lockout device (Brady 90844)

Energy level

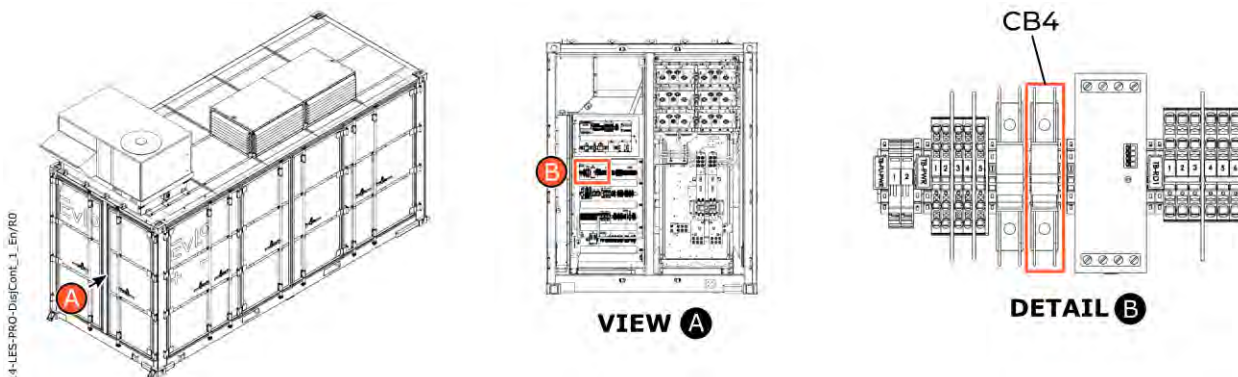
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the specifics of the site. Refer to the [CXL2-DOC-CAD-000 – SITE SPECIFICS](#) document. The values shown below are for reference only.

- $\leq 1.2 \text{ cal/cm}^2$ to 0.46 meters (typical)

PPE

- Class 0 protective equipment (typical)

Photo



Validation

STEP	PROCEDURE	INITIALS
Battery container #1		
3	Series padlock installed	
Battery container #2 (if applicable)		
3	Series padlock installed	
Battery container #3 (if applicable)		
3	Series padlock installed	
Battery container #4 (if applicable)		
3	Series padlock installed	

Notes/Comments:

Step 4 - Check for the Absence of 1500 VDC Voltage

NOTE: Multiple containers can be connected to the 460 VAC distribution panel. Refer to the site engineering documents to identify the container(s) to be isolated. Repeat steps 4 through 8 for each container that needs it.

Location

- Battery Container → 1500 VDC compartment

Instructions

- Validate the absence of voltage on the positive and negative buses on both sides of the 1500 VDC disconnect switch.

Equipment

- 1x – Pole with 1500 VDC Multimeter

Energy level

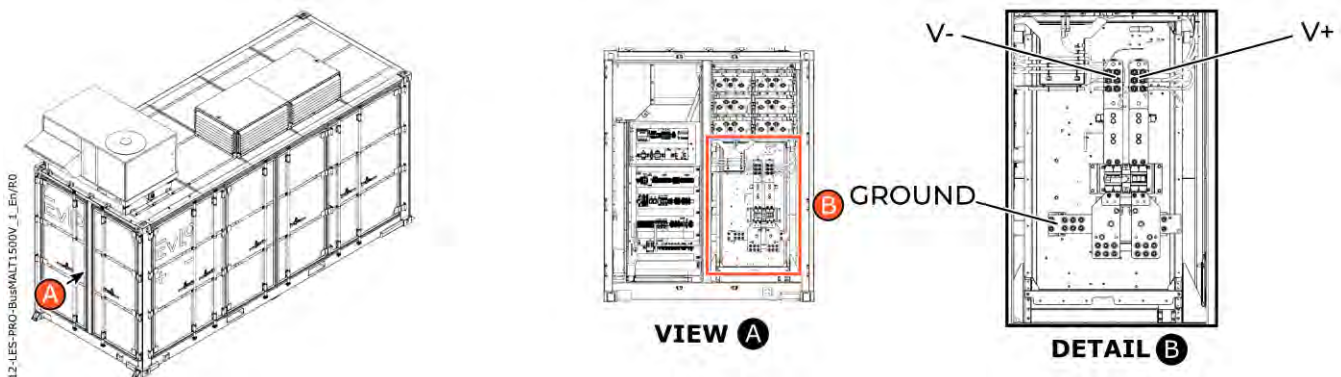
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the specifics of the site. Refer to the [CXL2-DOC-CAD-000 – SITE SPECIFICS](#) document. The values shown below are for reference only.

- 3.92 cal/cm² to 0.46 meters (typical)

PPE

- Class 2 protective equipment (typical)

Photo



Validation

STEP	PROCEDURE	MEASUREMENT
Battery container #1		
4	Upper bus measures between V+ and V-.	
	Upper bus measures between V+ and GND.	
	Upper bus measures between V- and GND.	
	Lower bus measures between V+ and V-.	
	Lower bus measures between V+ and GND.	
	Lower bus measures between V- and GND.	
Battery container #2 (if applicable)		
4	Upper bus measures between V+ and V-.	
	Upper bus measures between V+ and GND.	
	Upper bus measures between V- and GND.	
	Lower bus measures between V+ and V-.	
	Lower bus measures between V+ and GND.	
	Lower bus measures between V- and GND.	
Battery container #3 (if applicable)		
4	Upper bus measures between V+ and V-.	
	Upper bus measures between V+ and GND.	
	Upper bus measures between V- and GND.	
	Lower bus measures between V+ and V-.	
	Lower bus measures between V+ and GND.	
	Lower bus measures between V- and GND.	

STEP	PROCEDURE	MEASUREMENT
Battery container #4 (if applicable)		
4	Upper bus measures between V+ and V-.	
	Upper bus measures between V+ and GND.	
	Upper bus measures between V- and GND.	
	Lower bus measures between V+ and V-.	
	Lower bus measures between V+ and GND.	
	Lower bus measures between V- and GND.	

Notes/Comments:

Step 5 – Apply Grounding

NOTE: Multiple containers can be connected to the 460 VAC distribution panel. Refer to the site engineering documents to identify the container(s) that have to be isolated. Repeat steps 4 through 8 for each container that needs it.

Location

- Battery Container → 1500 VDC compartment

Instructions

- Apply grounding under the 1500 VDC disconnect switch.

Equipment

- 1x – Pole
- 2x – Grounding cable

Energy level

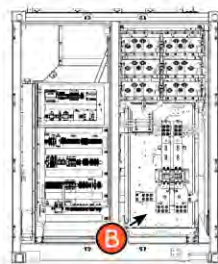
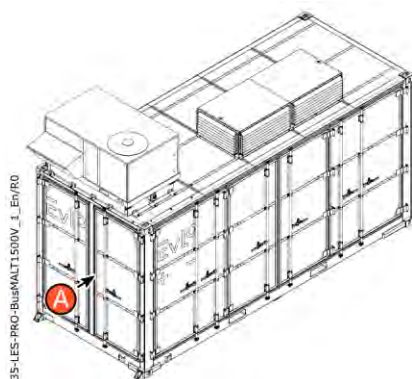
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the specifics of the site. Refer to the [CXL2-DOC-CAD-000 – SITE SPECIFICS](#) document. The values shown below are for reference only.

- 3.92 cal/cm² to 0.46 meters (typical)

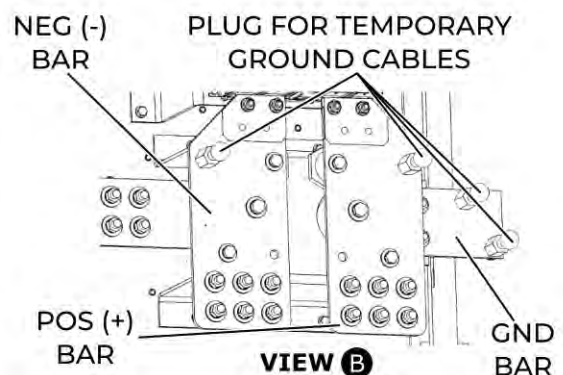
PPE

- Class 2 protective equipment (typical)

Photo



VIEW A



VIEW B

Validation

STEP	PROCEDURE	INITIALS
Battery container #1		
5	Positive and negative bus grounded	
Battery container #2 (if applicable)		
5	Positive and negative bus grounded	
Battery container #3 (if applicable)		
5	Positive and negative bus grounded	
Battery container #4 (if applicable)		
5	Positive and negative bus grounded	

Notes/Comments:

Step 6 – Open and Lockout the 1500 VDC Disconnect Switch

NOTE: Multiple containers can be connected to the 460 VAC distribution panel. Refer to the site engineering documents to identify the container(s) to be isolated. Repeat steps 4 through 8 for each container that needs it.

Location

- Battery Container → 1500 VDC compartment

Instructions

- Open and lockout the 1500 VDC disconnect switch.

Equipment

- 1x – Series padlock

Energy level

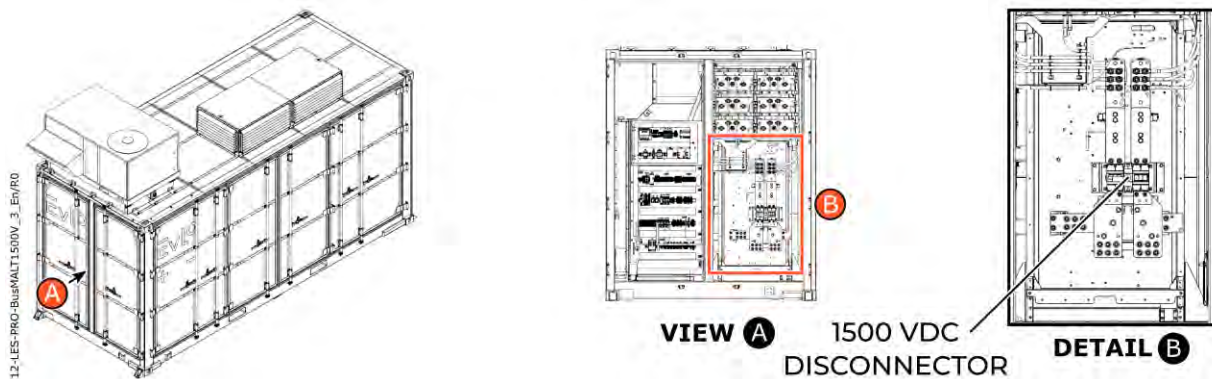
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the specifics of the site. Refer to the [CXL2-DOC-CAD-000 – SITE SPECIFICS](#) document. The values shown below are for reference only.

- 3.92 cal/cm² to 0.46 meters (typical)

PPE

- Class 2 protective equipment (typical)

Photo



Validity

STEP	PROCEDURE	INITIALS
Battery container #1		
6	Installed padlock number	
Battery container #2 (if applicable)		
6	Installed padlock number	
Battery container #3 (if applicable)		
6	Installed padlock number	
Battery container #4 (if applicable)		
6	Installed padlock number	

Notes/Comments:

Step 7 – Restart the 1500 VDC SSGs

DANGER



THE PRIMARY ENERGY CIRCUIT (1500 VDC) OF THE SSG CAN CLOSE AUTOMATICALLY WHEN THE SSG IS REPOWERED. ENSURE THAT NO PERSONNEL IS NEAR THE SSG AND 1500 VDC BUSBARS WHEN REFUELING. FAILURE TO FOLLOW THIS INSTRUCTION WILL CAUSE SERIOUS INJURIES AND DEATH.

NOTE: Multiple containers can be connected to the 460 VAC distribution panel. Refer to the site engineering documents to identify the container(s) to be isolated. Repeat steps 4 through 8 for each container that needs it.

NOTE: The purpose of this step is to keep the battery container fire system active.

Location

- Battery container → Control compartment → CB4 circuit breaker

Instructions

- Unlock and close the CB4 circuit breaker.

Equipment

- Not Applicable

Energy level

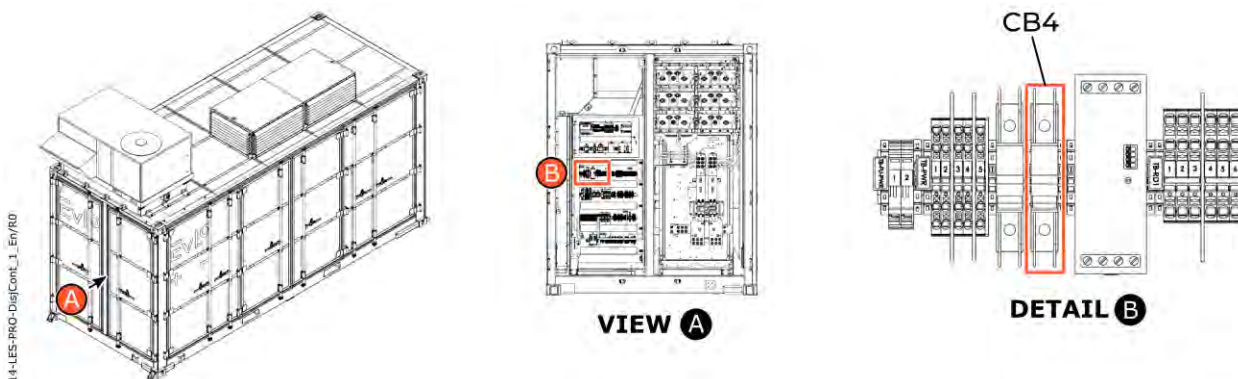
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the specifics of the site. Refer to the [CXL2-DOC-CAD-000 – SITE SPECIFICS](#) document. The values shown below are for reference only.

- $\leq 1.2 \text{ cal/cm}^2$ to 0.46 meters (typical)

PPE

- Class 0 protective equipment (typical)

Photo



Validation

STEP	PROCEDURE	INITIALS
Battery container #1		
7	Personal lockout removed	
Battery container #2 (if applicable)		
7	Personal lockout removed	
Battery container #3 (if applicable)		
7	Personal lockout removed	
Battery container #4 (if applicable)		
7	Personal lockout removed	

Notes/Comments:

Step 8 – Validate SSG Implementation

NOTE: Multiple containers can be connected to the 460 VAC distribution panel. Refer to the site engineering documents to identify the container(s) to be isolated. Repeat steps **4** through **8** for each container that needs it.

Location

- Installation of the EVLOGIX website/web interface

Instructions

- Click on the  icon to the left of EMPC1 (or other EMPC).
- Select Devices → Batteries → String Data.
- Put the "Measurements" filter in "Contactor" on the "String Data" page.
- Verify contactors are closed (meaning the SSGs are active and energizing the container control circuit).

Equipment

- 1x – Computer

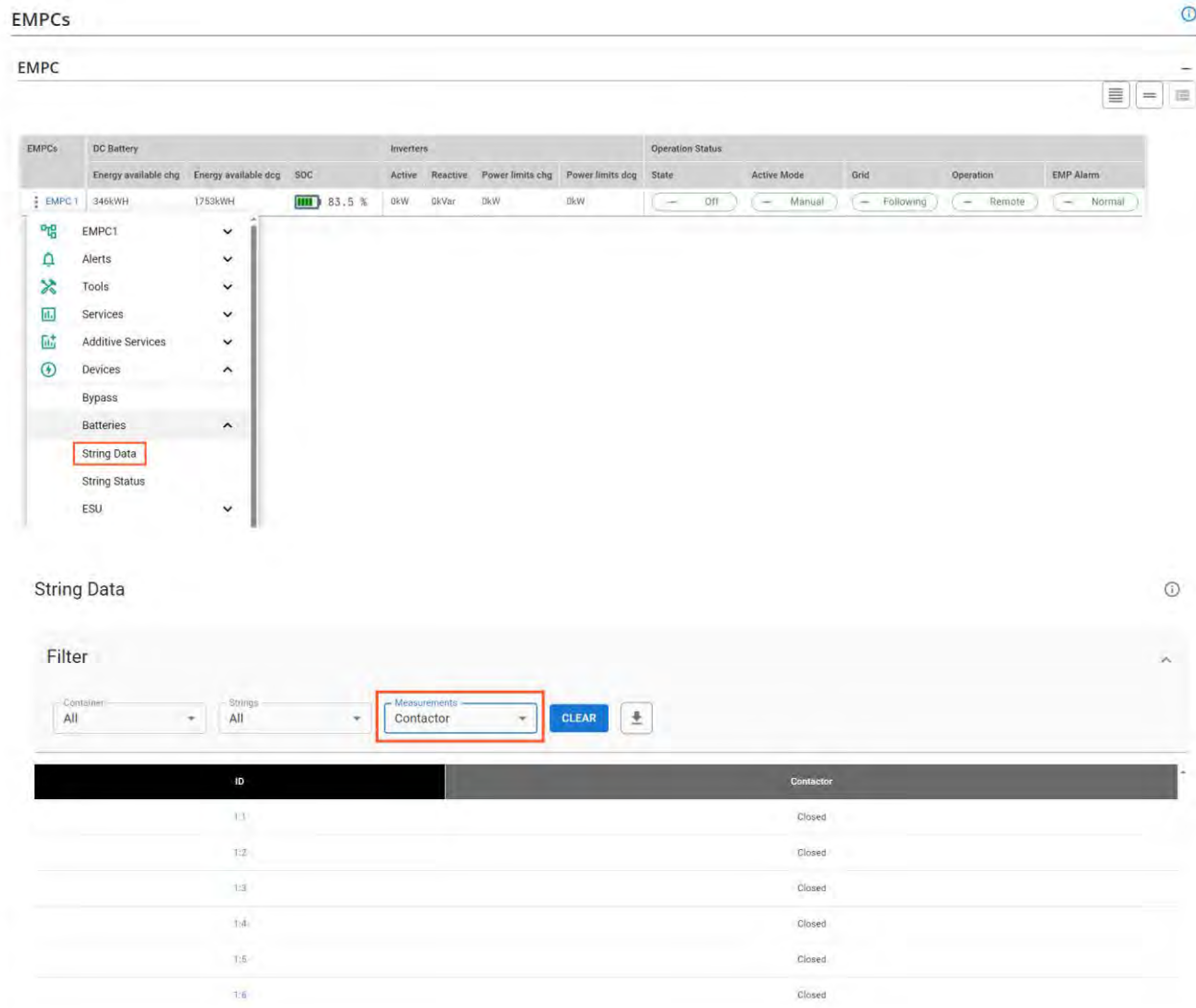
Energy level

- Not Applicable

PPE

- Not Applicable

Photo



(TYPICAL EVLOGIX INTERFACE, FOR REFERENCE ONLY)

Validation

STEP	PROCEDURE	INITIALS
8	The SSGs in the following container are functional:	
8	The SSGs in the following container are functional:	
8	The SSGs in the following container are functional:	
8	The SSGs in the following container are functional:	

Notes/Comments:

Step 9 – Auxiliary Power Lockout

NOTE: This step is not applicable if the site is configured with options 3 and 4 of the **CXL2-DOC-CAD-000 – SITE SPECIFICS** document. It must be coordinated between the EVLO manager and the site manager to identify and isolate the voltage source (600 or 460 VAC) according to the same document.

Location

- 460 VAC distribution panel supply sources

Instructions

- Coordinate, with the site manager, isolation of the 460 VAC distribution panel power supply source.
- Verify that the 460 VAC distribution panel power supply source is locked by the site manager.
- Lockout the 460 VAC distribution panel power supply source.

Equipment

- 1x – Series padlock

NOTE: The number of padlocks depends on the presence of the “ATS” option or not.

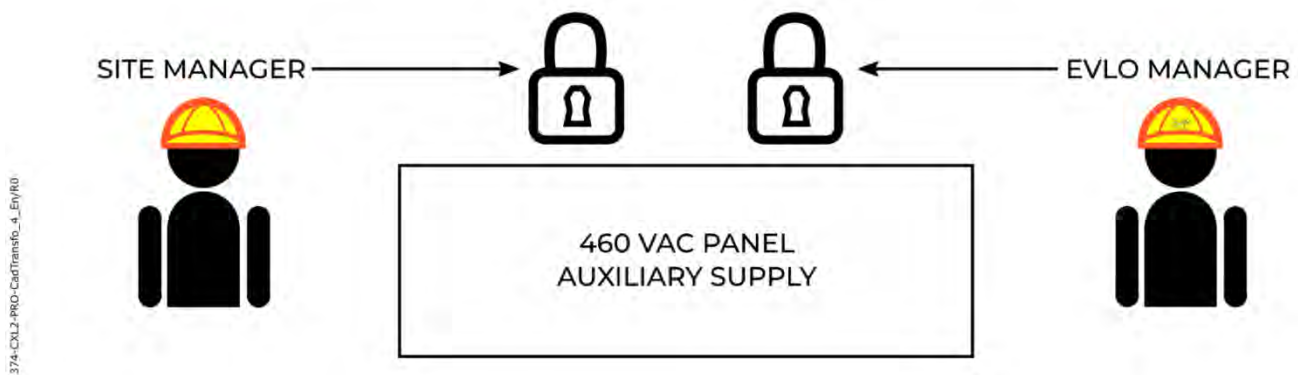
Energy level

- $\leq 8 \text{ cal/cm}^2$ to 0.46 meters (typical)

PPE

- Follow the instructions of the site manager.

Photo



Validation

STEP	PROCEDURE	NUMBER
9	Installed padlock number	

Notes/Comments:

Step 10 – Check for the Absence of Voltage According to Site Specifics

Location

- 460 VAC distribution panel

Instructions

- Validate the absence of voltage on the terminals of the following circuit breakers:
 - o CB-1.1
 - o CB-1.2 (if applicable)

Equipment

- 1x – Multimeter

Energy level

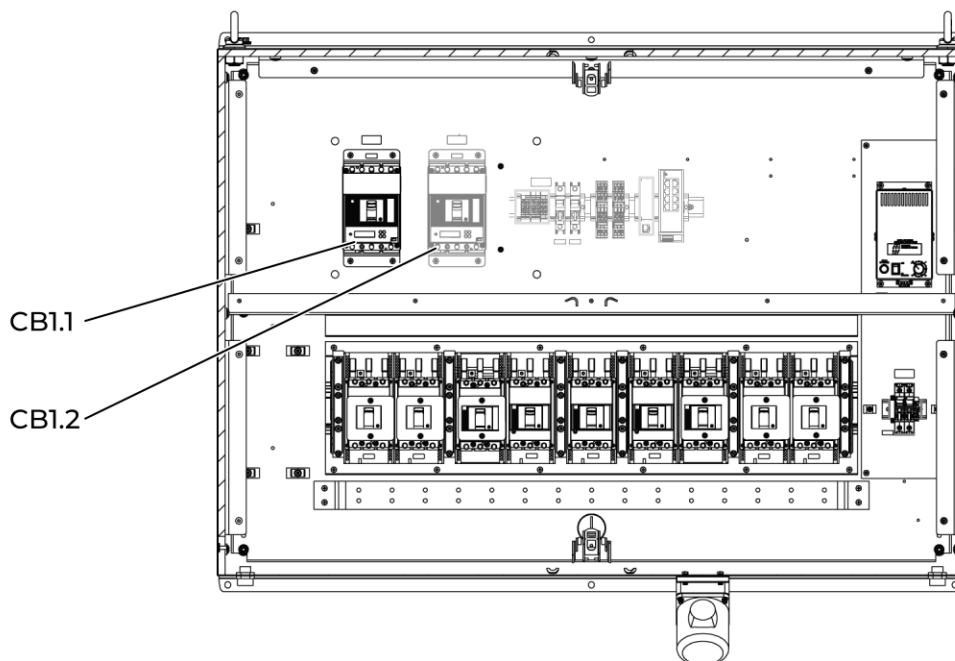
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the specifics of the site. Refer to the [CXL2-DOC-CAD-000 – SITE SPECIFICS](#) document. The values shown below are for reference only.

- $\leq 8 \text{ cal/cm}^2$ to 0.46 meters (typical)

PPE

- Class 2 protective equipment (typical)

Photo



(TYPICAL 460 VAC PANEL INTERIOR)

278-CXL2-PRO-460V-Cadn_1_En/R0

Validation

STEP	PROCEDURE	MEASUREMENT
10	Voltage at the top of circuit breaker CB-1.1	
	Voltage at the top of circuit breaker CB-1.2 (if applicable)	

Notes/Comments:

Step 11 – Validate 24 VDC Voltage (if ATS or POWER METER Option)

Location

- Distribution panel 460 VAC → Disconnectable fuse holder CB-9.1

Instructions

NOTE: If the site is configured with option 3 or 4 of the *CXL2-DOC-CAD-000 – SITE SPECIAL* document, voltage may not be present at this time. It is recommended that you still lockout the CB-3.3 circuit breaker as a precaution.

- Validate the presence of voltage on the CB-9.1 disconnectable fuse holder terminals.

Equipment

- 1x – Series padlock

Energy level

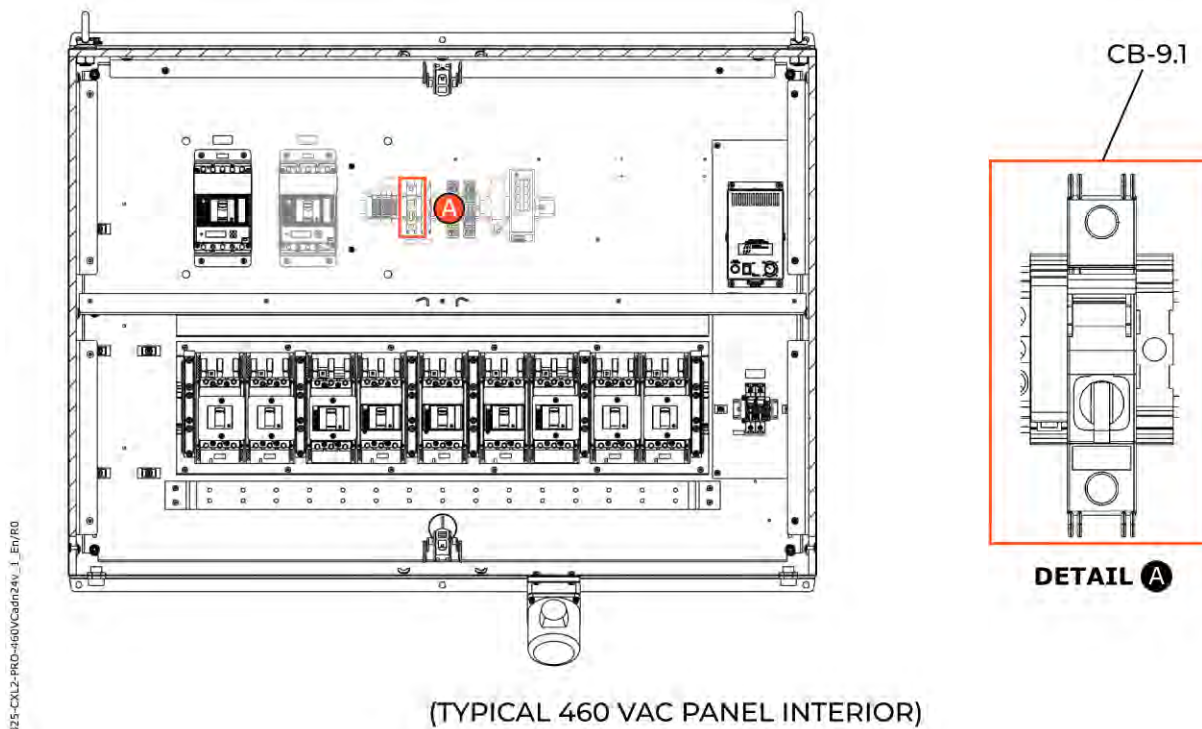
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the specifics of the site. Refer to the *CXL2-DOC-CAD-000 – SITE SPECIFICS* document. The values shown below are for reference only.

- $\leq 1.2 \text{ cal/cm}^2$ to 0.46 meters (typical)

PPE

- Class 2 protective equipment (typical)

Photo



Validation

STEP	PROCEDURE	MEASUREMENT
11	Voltage measurement between TB-24VDC-input and GND	

Notes/Comments:

Step 12 – 24 VDC Power Supply Lockout (if ATS or POWER METER Option)

NOTE: This step applies to the PS panel on which is connected the 460 VAC distribution panel to be locked. Refer to the site engineering document for which PS panel to lockout.

Location

- Applicable PS panel

Instructions

- Open and lockout CB-3.3 circuit breaker.

Equipment

- 1x – Series padlock

Energy level

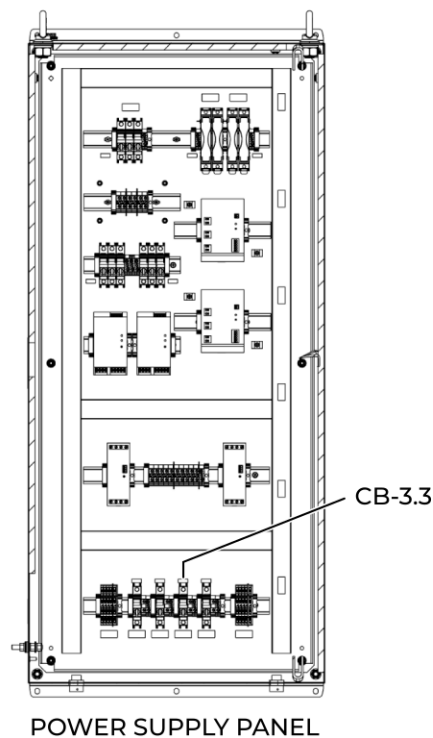
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the specifics of the site. Refer to the [CXL2-DOC-CAD-000 – SITE SPECIFICS](#) document. The values shown below are for reference only.

- $\leq 1.2 \text{ cal/cm}^2$ to 0.46 meters (typical)

PPE

- Class 2 protective equipment (typical)

Photo



189-CXL2-PRO-EMPowerConn_2_En/RO

Validation

STEP	PROCEDURE	NUMBER
12	Installed padlock number #1	
12	(If applicable) installed padlock number #2	
12	(If applicable) installed padlock number #3	

Notes/Comments:

Step 13 – Validate the Absence of 24 VAC Voltage

Location

- 460 VAC distribution panel → CB-9.1 disconnectable fuse holder

Instructions

- Validate the absence of voltage on the CB-9.1 disconnectable fuse holder terminals.

Equipment

- 1x – Multimeter

Energy level

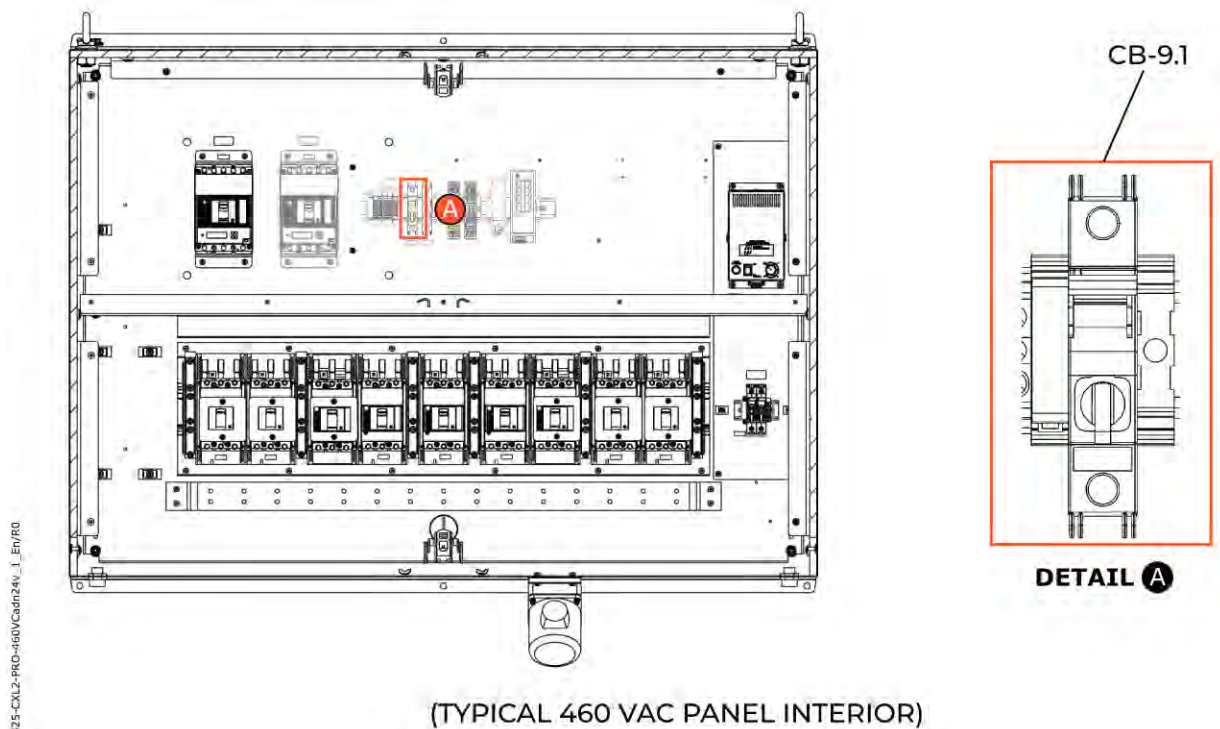
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the specifics of the site. Refer to the [CXL2-DOC-CAD-000 – SITE SPECIFICS](#) document. The values shown below are for reference only.

- $\leq 1.2 \text{ cal/cm}^2$ to 0.46 meters (typical)

PPE

- Class 0 protective equipment (typical)

Photo



Validation

STEP	PROCEDURE	MEASUREMENT
13	Voltage measurement between TB-24VDC-input and GND	

Notes/Comments:

Step 14 – Completed Isolation of the 460 VAC Distribution Panel Power Supply

At this stage, the power supply to the 460 VAC distribution panel is isolated.

Step 15 – Validate the Presence of 208 VAC Voltage

NOTE: It is not necessary to perform steps 15 to 18 if steps 1 to 14 have been completed because the 208 VAC power supply from the HVAC originated from the 460 VAC distribution panel.

NOTE: Steps 15 to 18 are only for the heater lockout that is in the 460 VAC distribution panel.

Location

- 460 VAC distribution panel → CB-10.1 disconnectable fuse holder

Instructions

- Validate the presence of voltage on the CB-10.1 disconnectable fuse holder terminals.

Equipment

- 1x – Multimeter

Energy level

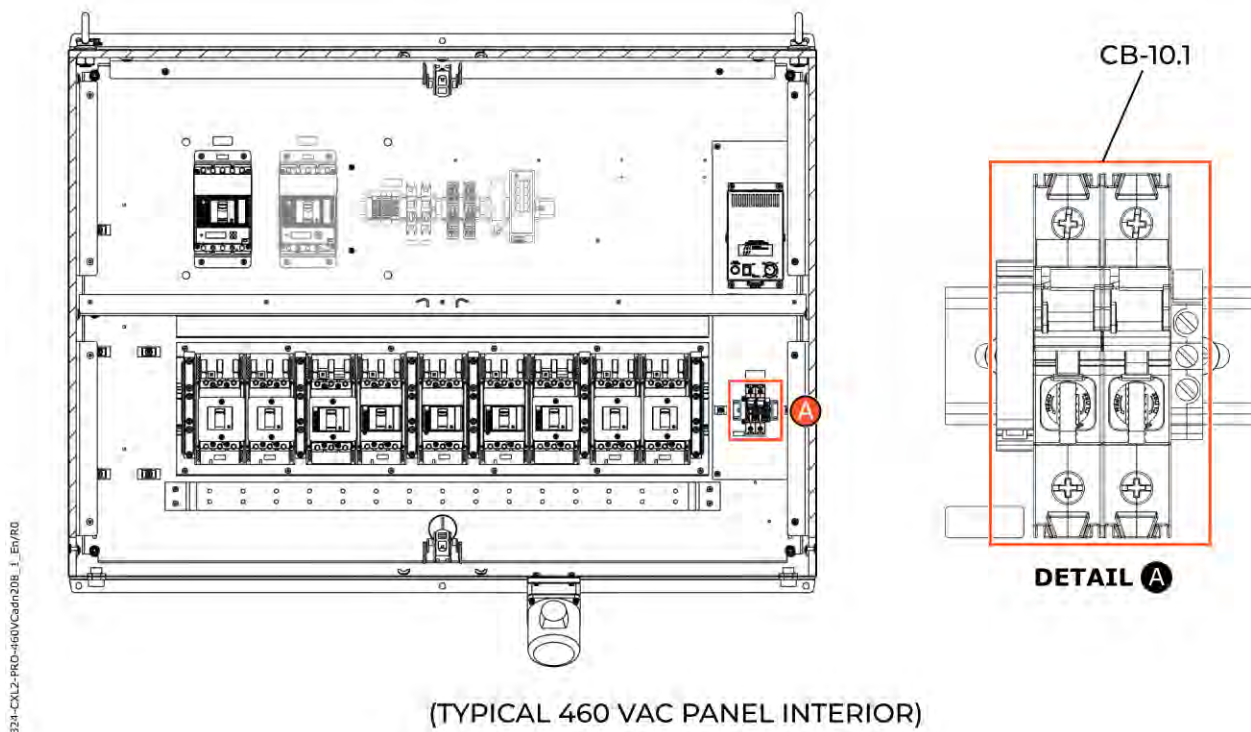
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the specifics of the site. Refer to the [CXL2-DOC-CAD-000 – SITE SPECIFICS](#) document. The values shown below are for reference only.

- $\leq 1.2 \text{ cal/cm}^2$ to 0.46 meters (typical)

PPE

- Class 0 protective equipment (typical)

Photo



Validation

STEP	PROCEDURE	MEASUREMENT
15	Voltage measurement between terminal L1 and terminal L2	
	Voltage measurement between terminal L1 and GND	
	Voltage measurement between terminal L2 and GND	

Notes/Comments:

Step 16 – Open and Lockout the 208 VAC Power Supply

NOTE: Steps 15 to 18 are only for the heater (option) lockout that is in the 460 VAC distribution panel.

Location

- 208 VAC distribution panel → CB-2.2 circuit breaker

Instructions

- Open and lockout the CB-2.2 circuit breaker.

Equipment

- 1x – Lockout device for Schneider circuit breaker
- 1x – Series padlock

Energy level

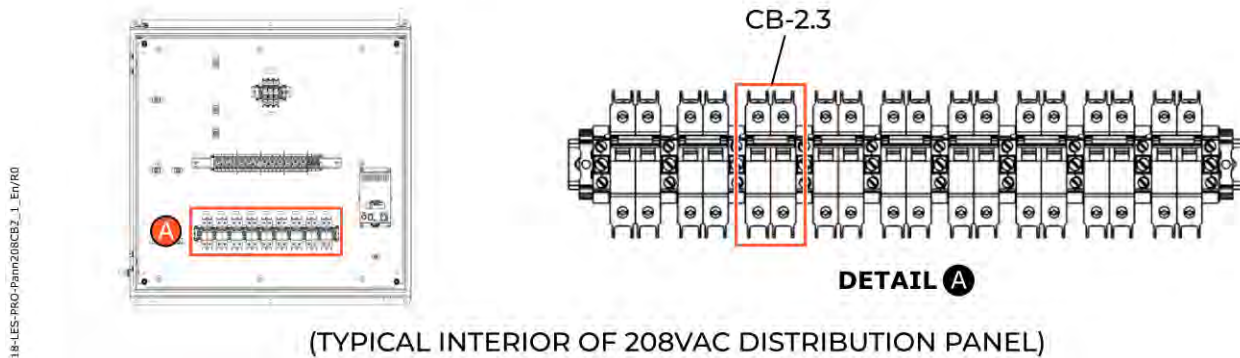
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the specifics of the site. Refer to the [CXL2-DOC-CAD-000 – SITE SPECIFICS](#) document. The values shown below are for reference only.

- $\leq 1.2 \text{ cal/cm}^2$ to 0.46 meters (typical)

PPE

- Class 0 protective equipment (typical)

Photo



Validation

STEP	PROCEDURE	NUMBER
16	Installed padlock number	

Notes/Comments:

Step 17 – Validate the Absence of 208 VAC Voltage

NOTE: Steps 15 to 18 are only for the heater lockout that is in the 460 VAC distribution panel.

Location

- 460 VAC distribution panel → CB-10.1 disconnectable fuse holder

Instructions

- Validate the absence of voltage on the CB-10.1 disconnectable fuse holder terminals.

Equipment

- 1x – Multimeter

Energy level

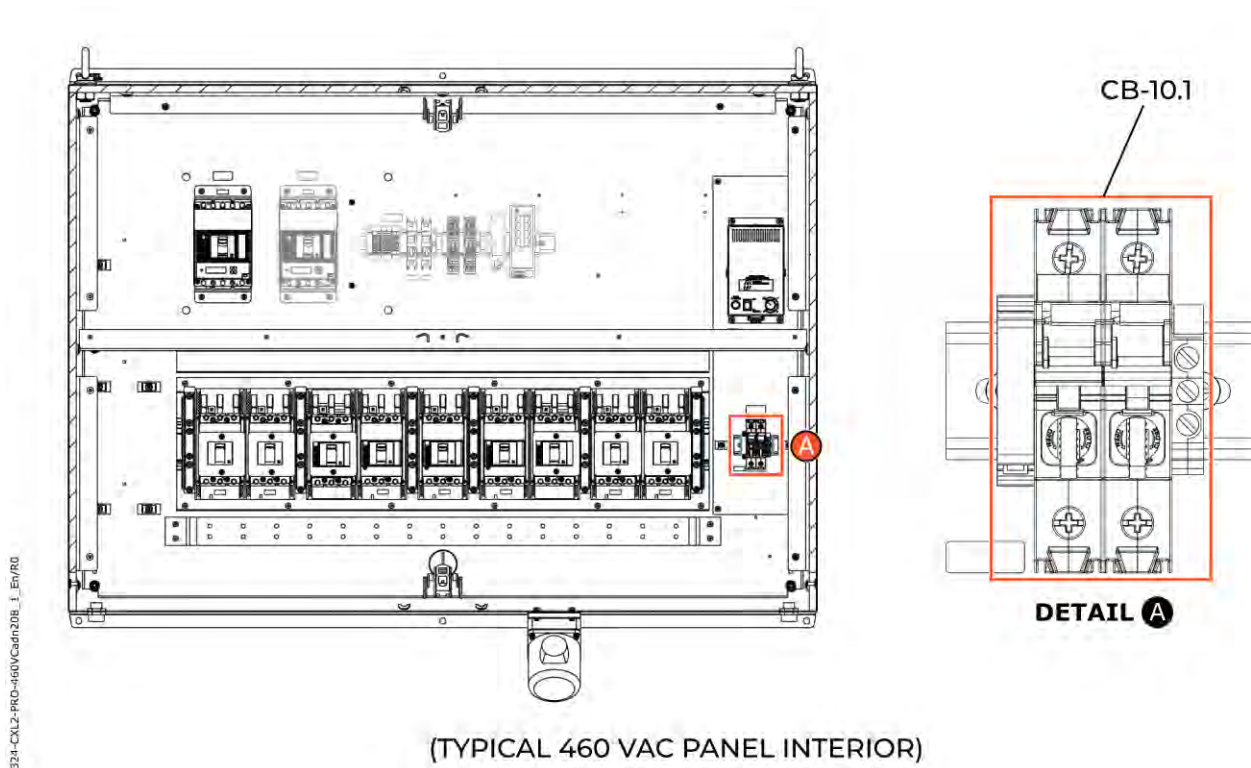
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the specifics of the site. Refer to the [CXL2-DOC-CAD-000 – SITE SPECIFICS](#) document. The values shown below are for reference only.

- $\leq 1.2 \text{ cal/cm}^2$ to 0.46 meters (typical)

PPE

- Class 0 protective equipment (typical)

Photo



Validation

STEP	PROCEDURE	MEASUREMENT
17	Voltage measurement between terminal L1 and terminal L2	
	Voltage measurement between terminal L1 and GND	
	Voltage measurement between terminal L2 and GND	

Notes/Comments:

Step 18 – Completed Isolation of the 208 VAC Power Supply of the 460 VAC Distribution Panel

At this stage, the 208 VAC power supply of the 460 VAC distribution panel is isolated.

GENERAL INFORMATION

Document name Battery Container’s HVAC Lockout Procedure
EVLOFLEX

Written by _____ **Date** _____

Verified by: _____ **Date** _____

Approved by: _____ **Date** _____

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REVISIONS DESCRIPTION

Revision	Author	Date	Changes
00			Original publication

DOCUMENT PURPOSE

This document details the operations to be performed in order to apply lockout in the following work location:

- Battery Container – HVAC Compartment

WARNING



THIS PROCEDURE WILL LOCK ONLY THE WORK LOCATION DEFINED ABOVE. NEVER USE THIS PROCEDURE TO SECURE ANOTHER WORK LOCATION. ALWAYS USE THE APPLICABLE LOCKOUT PROCEDURE AND WEAR PERSONAL PROTECTIVE EQUIPMENT IN ACCORDANCE WITH APPLICABLE STANDARDS, LAWS AND REGULATIONS. FAILURE TO DO SO CAN CAUSE SERIOUS INJURIES OR EQUIPMENT DAMAGE.

SAFETY CONSIDERATIONS

DANGER

VOLTAGES UP TO 460 VAC AND 1500 VDC CAN BE PRESENT AT ANY TIME. ALWAYS WEAR SAFETY EQUIPMENT AND FOLLOW ALL APPLICABLE INSTRUCTIONS, LAWS AND REGULATIONS WHEN HANDLING THIS PROCEDURE. FAILURE TO FOLLOW THIS SAFETY INSTRUCTION MAY RESULT IN PERSONAL INJURY AND DEATH.

WARNING

PRIOR TO CARRYING OUT WORK ON THE SITE, AUTHORIZATION MUST BE OBTAINED FROM THE OPERATOR AND/OR SITE MANAGER. FAILURE TO DO SO CAN CAUSE SERIOUS INJURIES OR EQUIPMENT DAMAGE.

WARNING

READ THIS PROCEDURE IN ITS ENTIRETY BEFORE BEGINNING WORK. FOLLOW AND EXECUTE THE STEPS IN THE ORDER SHOWN. IF YOU HAVE ANY QUESTIONS, CONTACT YOUR SUPERVISOR. FAILURE TO DO SO CAN CAUSE SERIOUS INJURIES OR EQUIPMENT DAMAGE.

WARNING

AT LEAST TWO PEOPLE ARE REQUIRED TO PERFORM THE OPERATIONS DESCRIBED IN THIS PROCEDURE, ONE PERSON WHO PERFORMS THE STEPS AND ONE PERSON WHO VERIFIES THE EXECUTION. FAILURE TO DO SO CAN CAUSE SERIOUS INJURIES OR EQUIPMENT DAMAGE.

DEFINITIONS

- EMP: Energy Management System
- EVLOFLEX: All BESS equipment (container, panel boards, UPS, EMP)
- HVAC: Heating, Ventilation, Air Conditioning
- PPE: Personal Protective Equipment
- VAC/VDC: Volt Alternating Current/Volt Direct Current

TOOLS AND EQUIPMENT

- 1x – Padlock box with serial padlock
- 1x – Disconnectable fuse holder padlock ¼" without rotation mechanism and long enough to cover all sockets (52.5 mm [2.1 in])
- 1x – Multimeter
- 1x – Computer

REFERENCES

NOTE: Make sure to use the latest revision of the document. If a newer revision is available, use that revision. Inform the person in charge if there is a difference between the information found in this procedure and in the engineering drawings.

- 71600200 – Battery Container Control Panel
- STD-DOC-SST- 003 Lockout Program
- CXL2-DOC-CAD-000- Site specificities
- Annex – Site engineering documentation

Step 1 – Confirm that the system is not in operation

Location

- EVLOGIX website/web interface for this installation

Instructions

- Verify on the operator interface that the system is not in operation.
- If the system is running, confirm with the site manager that the system can be shut down.

Equipment

- 1x– Computer

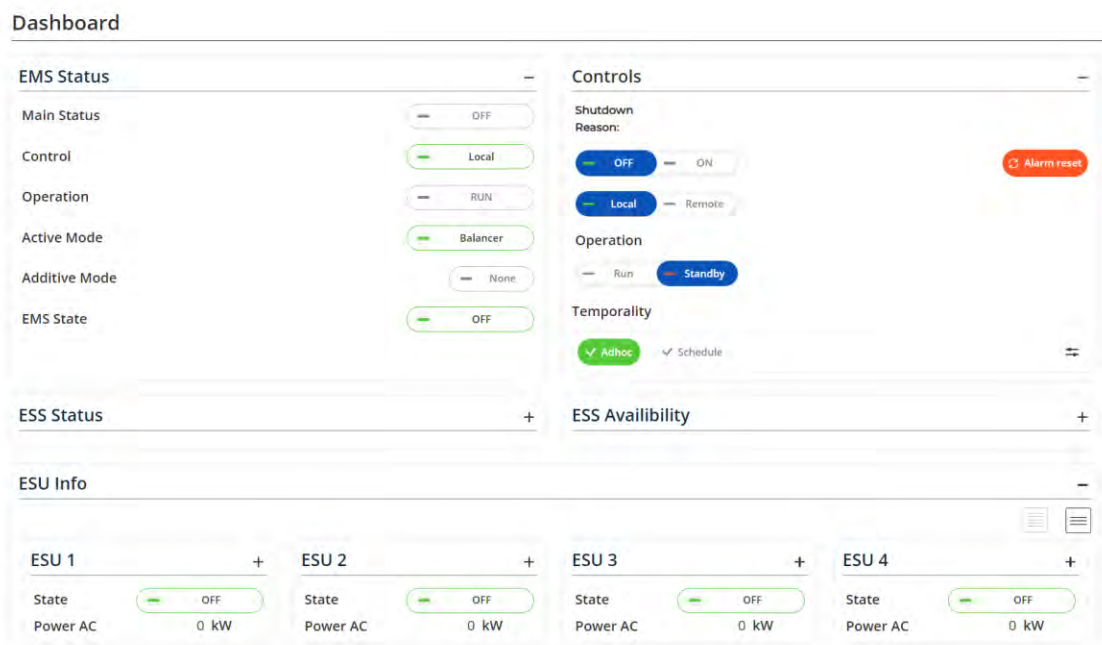
Energy level

- Not Applicable

PPE

- Not Applicable

Photo



TYPICAL EVLOGIX INTERFACE, FOR REFERENCE ONLY

Validation

STEP	PROCEDURE	INITIALS
1	The system is off.	

Notes/Comments:

Step 2 – Verification of the Presence of 460 VAC

Location

- Battery container/Terminal block TB-HVAC-PWR

Instructions

- Check for voltage between TB-HVAC-PWR terminal block terminals and GND.

Equipment

- 1x – Multimeter

Energy level

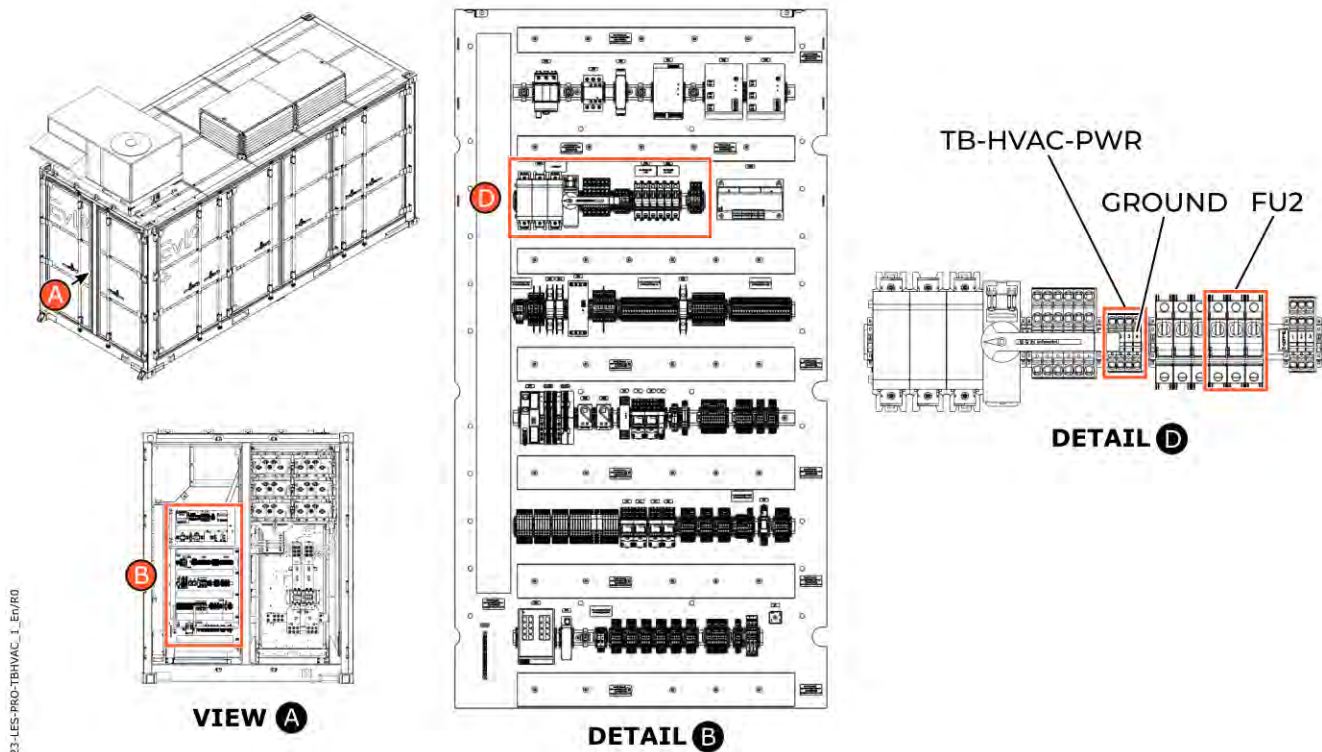
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the site specificities. Refer to the document [CXL2-DOC-CAD-000 – SITE SPECIFICITIES](#). The values shown below are for reference only.

- <1.2 cal/cm² to 0.46 meters (typical)

PPE

- Class 0 protective equipment (typical)

Photo



Validation

STEP	PROCEDURE	MEASUREMENT
2	Voltage between L1 terminal and L2 terminal.	
	Voltage between L2 terminal and L3 terminal.	
	Voltage between L1 terminal and L3 terminal.	
	Voltage between terminal L1 and GND (terminal 4).	
	Voltage between terminal L2 and GND (terminal 4).	
	Voltage between terminal L3 and GND (terminal 4).	

Notes/Comments:

Step 3 – Opening and Padlocking the 460 VAC Power Supply

Location

- Battery container/disconnectable fuse holder FU2

Instructions

- Opening and padlocking the FU2 disconnectable fuse holder

Equipment

- 1x – Disconnectable fuse holder padlock ¼" without rotation mechanism and long enough to cover all sockets (52.5 mm)
- 1x – Serial lock

Energy level

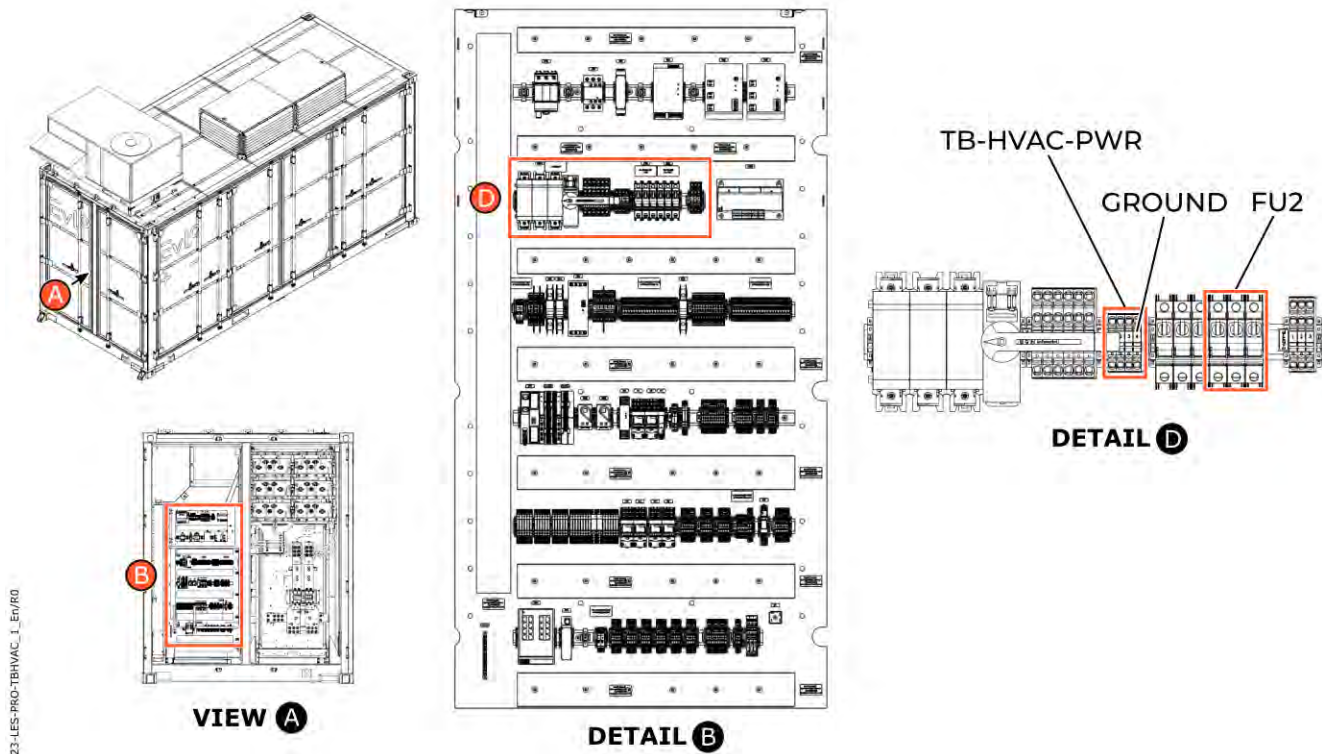
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the site specificities. Refer to the document *CXL2-DOC-CAD-000 – SITE SPECIFICITIES*. The values shown below are for reference only.

- <1.2 cal/cm² to 0.46 meters (typical)

PPE

- Class 0 protective equipment (typical)

Photo



Validation

STEP	PROCEDURE	NO.
3	Installed padlock number	

Notes/Comments:

Step 4 – Verification of the Absence of 460 VAC

Location

- Battery container/Terminal block TB-HVAC-PWR

Instructions

- Validate the absence of voltage on terminal block TB- TB-PWR.

Equipment

- 1x – Multimeter

Energy level

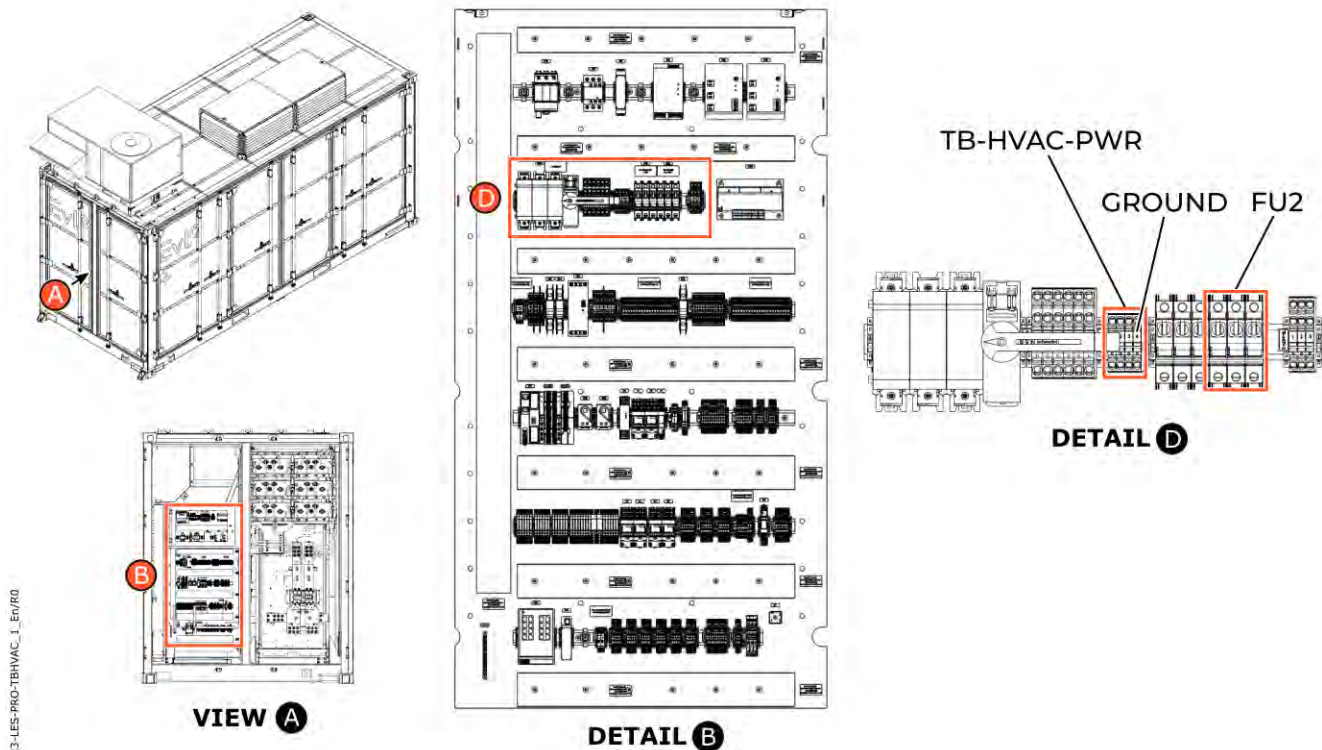
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the site specificities. Refer to the document [CXL2-DOC-CAD-000 – SITE SPECIFICITIES](#). The values shown below are for reference only.

- <1.2 cal/cm² to 0.46 meters (typical)

PPE

- Class 0 protective equipment (typical)

Photo



Validation

STEP	PROCEDURE	MEASUREMENT
4	Voltage between L1 terminal and L2 terminal.	
	Voltage between L2 terminal and L3 terminal.	
	Voltage between L1 terminal and L3 terminal.	
	Voltage between terminal L1 and GND (terminal 4).	
	Voltage between terminal L2 and GND (terminal 4).	
	Voltage between terminal L3 and GND (terminal 4).	

Notes/Comments:

Step 5 – Complete Isolation of the 460 VAC Power Supply

At this point, the 460 VAC power supply for the HVAC system is isolated.

GENERAL INFORMATION

Document name XFMR Monitoring Panel Lockout Procedure
EVLOFLEX

Written by _____ **Date** _____

Verified by: _____ **Date** _____

Approved by: _____ **Date** _____

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REVISIONS DESCRIPTION

Revision	Author	Date	Changes
00			Original publication

DOCUMENT PURPOSE

This document details the operations to be performed in order to apply lockout in the following work location:

- XFMR Monitoring Panel

IMPORTANT NOTE: *If the work to be performed is only on the heater and its circuit breaker CB10.1, only steps 11 to 13 must be performed to isolate this circuit.*

WARNING



THIS PROCEDURE WILL LOCK ONLY THE WORK LOCATION DEFINED ABOVE. NEVER USE THIS PROCEDURE TO SECURE ANOTHER WORK LOCATION. ALWAYS USE THE APPLICABLE LOCKOUT PROCEDURE AND WEAR PERSONAL PROTECTIVE EQUIPMENT IN ACCORDANCE WITH APPLICABLE STANDARDS, LAWS AND REGULATIONS. FAILURE TO DO SO CAN CAUSE SERIOUS INJURIES OR EQUIPMENT DAMAGE.

SAFETY CONSIDERATIONS

DANGER

VOLTAGES UP TO 690 VDC/1500 VAC CAN BE PRESENT AT ANY TIME. ALWAYS WEAR SAFETY EQUIPMENT AND FOLLOW ALL APPLICABLE INSTRUCTIONS, LAWS AND REGULATIONS WHEN HANDLING THIS PROCEDURE. FAILURE TO FOLLOW THIS SAFETY INSTRUCTION MAY RESULT IN PERSONAL INJURY AND DEATH.

DANGER

THE PRIMARY ENERGY CIRCUIT (1500 VDC) OF THE SSG CAN CLOSE AUTOMATICALLY WHEN THE SSG ARE REPOWERED. ENSURE THAT NO PERSONEL IS NEAR THE SSG AND 1500 VDC BUSBARS WHEN REFUELING. FAILURE TO FOLLOW THIS SAFETY INSTRUCTION MAY RESULT IN PERSONAL INJURY AND DEATH.

WARNING

PRIOR TO CARRYING OUT WORK ON THE SITE, AUTHORIZATION MUST BE OBTAINED FROM THE OPERATOR AND/OR SITE MANAGER. FAILURE TO DO SO CAN CAUSE SERIOUS INJURIES OR EQUIPMENT DAMAGE.

WARNING

READ THE ENTIRE PROCEDURE BEFORE STARTING THE WORK. FOLLOW AND EXECUTE THE STEPS IN THE ORDER SHOWN. IF YOU HAVE ANY QUESTIONS, CONTACT THE SUPERVISOR. FAILURE TO DO SO CAN CAUSE SERIOUS INJURIES OR EQUIPMENT DAMAGE.

WARNING

AT LEAST TWO PEOPLE ARE REQUIRED TO PERFORM THE OPERATIONS DESCRIBED IN THIS PROCEDURE, ONE PERSON WHO PERFORMS THE STEPS AND ONE PERSON WHO VERIFIES THE EXECUTION. FAILURE TO DO SO CAN CAUSE SERIOUS INJURIES OR EQUIPMENT DAMAGE.

DEFINITIONS

- cm: Centimeter
- EVLOFLEX: All BESS equipment (container, panel boards, UPS, EMP)
- GND: Grounding
- N/A: Not Applicable
- PPE: Personal Protective Equipment
- SSG: Stack Switchgear
- UPS: Uninterrupted Power Supply
- VAC/VDC: Volt Alternating Current/Volt Direct Current

TOOLS AND EQUIPMENT

- 1x – Padlock box with serial padlock
- 2x – Circuit breaker lockout device (Brady 90844)
- 1x – Padlocking device for Bussmann disconnectable fuse holder
- 1x – Disconnectable fuse holder padlock ¼" without rotation mechanism and long enough to cover all sockets (35 mm)
- 1x – Hasp
- 1x – Lockout tags
- 1x – Grounding plate
- 1x – Boom with multimeter 1500 VDC
- 2x – Grounding cable (1500 VDC)
- 1x – Multimeter
- 1x – Computer

REFERENCES

NOTE: *Make sure to use the latest revision of the document. If a newer revision is available, use that revision. Inform the person in charge if there is a difference between the information found in this procedure and in the engineering drawings.*

- 71100000 – XFMR Monitoring Panel
- 71200000 – Power Supply Panel
- 71300000 – 460 Vac Distribution Panel
- 71800000 – 208 Vac Distribution Panel
- 71600200 – Battery Container Control Panel
- STD-DOC-SST-003 Lockout Program
- CXL2-DOC-CAD-000-Site specificities
- Annex – Site engineering documentation

Step 1 – Confirm that the system is not in operation

Location

- EVLOGIX website/web interface for this installation

Instructions

- Verify on the operator interface that the system is not in operation.
- If the system is running, confirm with the site manager that the system can be shut down.

Equipment

- 1x– Computer

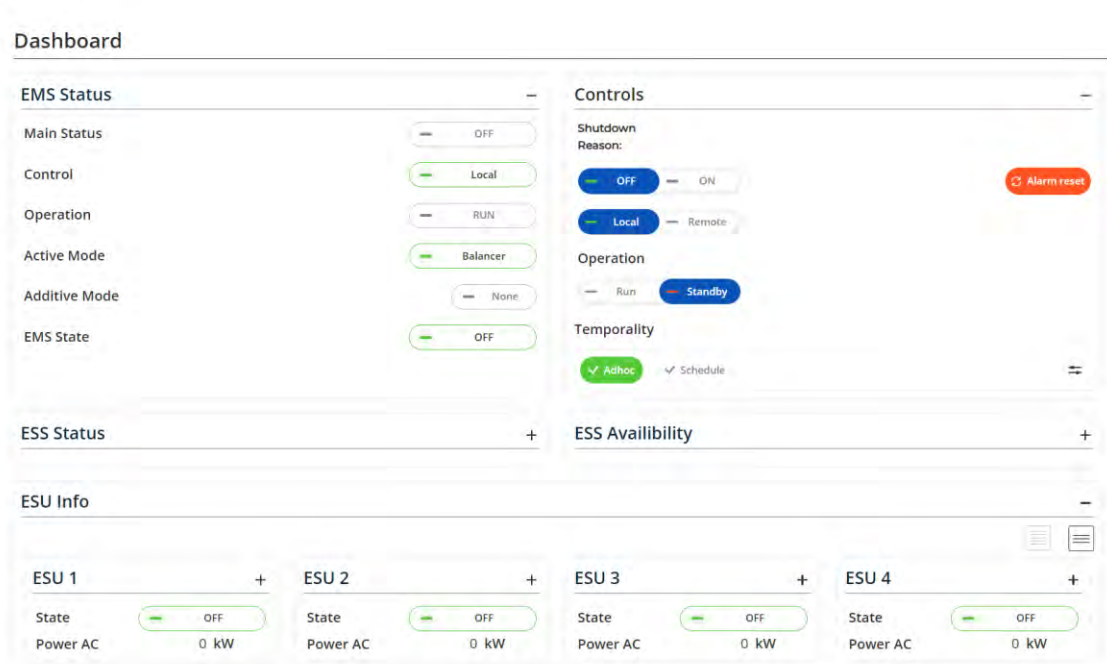
Energy level

- Not Applicable

PPE

- Not Applicable

Photo



TYPICAL EVLOGIX INTERFACE, FOR REFERENCE ONLY

Validation

STEP	PROCEDURE	INITIALS
1	The system is off.	

Notes/Comments:

Step 2 – Isolating the Emergency Auxiliary Energy Source

DANGER



VOLTAGES UP TO 600 VAC CAN BE PRESENT AT ANY TIME. ALWAYS WEAR SAFETY EQUIPMENT AND FOLLOW ALL APPLICABLE INSTRUCTIONS, LAWS AND REGULATIONS WHEN HANDLING THIS PROCEDURE. FAILURE TO FOLLOW THIS SAFETY INSTRUCTION MAY RESULT IN PERSONAL INJURY AND DEATH.

NOTE: *This step is only applicable if the site is configured with option 4 of [CXL2-DOC-CAD-000 – SITE SPECIFICITIES](#).*

Location

- Site's emergency auxiliary power sources

Instructions

- Have the customer open and lock the emergency auxiliary power source

NOTE: *The electrician or contractor is responsible for following the indications in place before carrying out any procedures. EVLO staff should be informed of these measures and follow the instructions.*

Equipment

- Follow the instructions of the site manager.

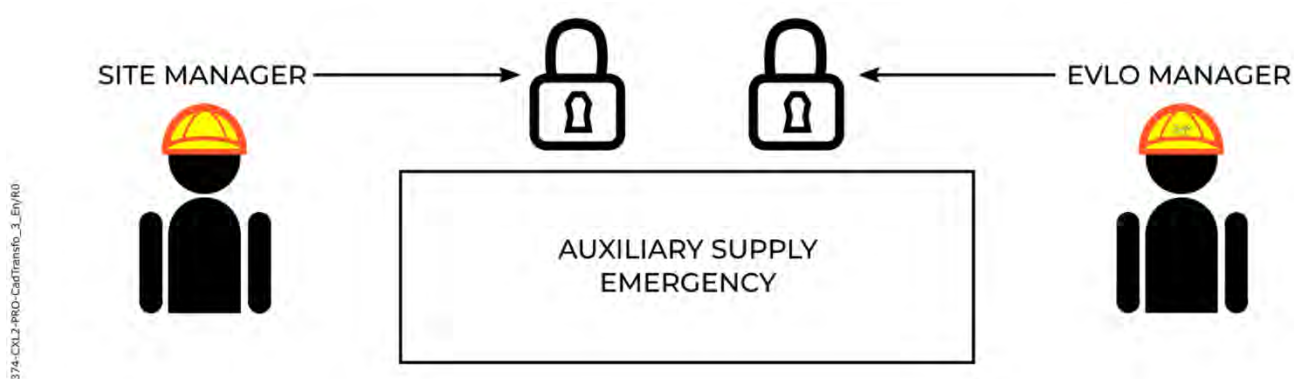
Energy level

- Follow the instructions of the site manager.

PPE

- Follow the instructions of the site manager.

Photo



Validation

STEP	PROCEDURE	INITIALS
2	Padlocked emergency auxiliary power source	

Notes/Comments:

Step 3 – Isolating the Main Transformer

NOTE: Isolation of the main transformer must be performed by the customer's authorized personnel and according to the procedures provided by the customer.

Location

- Main transformer to which the XFMR monitoring panel is connected

Instructions

- Have the customer open and lock the main transformer
- Have the customer check the absence of voltage on the main transformer
- Have the customer install a GND on the main transformer

NOTE: The electrician or contractor is responsible for following the indications in place before carrying out any manipulations. EVLO staff should be informed of these measures and follow the instructions.

DANGER



PCS CAN REMAIN ENERGIZED FOR UP TO FIVE MINUTES AFTER THEY ARE TURNED OFF. MAKE SURE THAT THE STORED ENERGY IS DISSIPATED BEFORE PROCEEDING WITH THE OPERATIONS. FAILURE TO FOLLOW THIS SAFETY INSTRUCTION MAY RESULT IN PERSONAL INJURY AND DEATH.

Equipment

- Follow the instructions of the site manager.

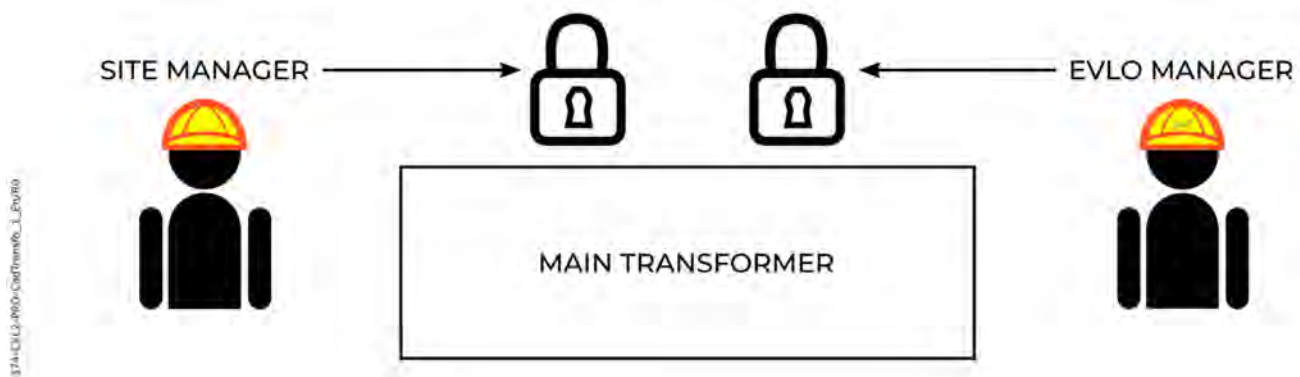
Energy level

- Follow the instructions of the site manager.

PPE

- Follow the instructions of the site manager.

Photo



Validation

STEP	PROCEDURE	INITIALS
3	Main transformer open and padlocked	
3	Validated that there is no voltage	
3	Main transformer grounded	

Notes/Comments:

Step 4 – 1500 VDC SSG Off

DANGER



SEVERAL OTHER CONTAINERS CAN BE CONNECTED TO THE SAME MAIN POWER CIRCUIT (1500 VDC) VIA THE PCS. PERFORM THIS STEP FOR EACH CONTAINER IN THE SAME GROUP BEFORE PERFORMING THE FOLLOWING STEPS. FAILURE TO FOLLOW THIS SAFETY INSTRUCTION MAY RESULT IN PERSONAL INJURY AND DEATH.

Location

NOTE: Refer to the site engineering documents to identify the container(s) to be isolated.

- Battery container → Control compartment → CB4 circuit breaker

Instructions

- Opening and locking the CB4 breaker of all containers connected in parallel.

Equipment

NOTE: A hasp must be used to padlock the Phoenix Contact breaker lockout device because it is too small to accommodate a padlock.

- 1x – Hasp
- 1x – Personal lock
- 1x – Phoenix Contact circuit breaker lockout device (Brady 90844)

Energy level

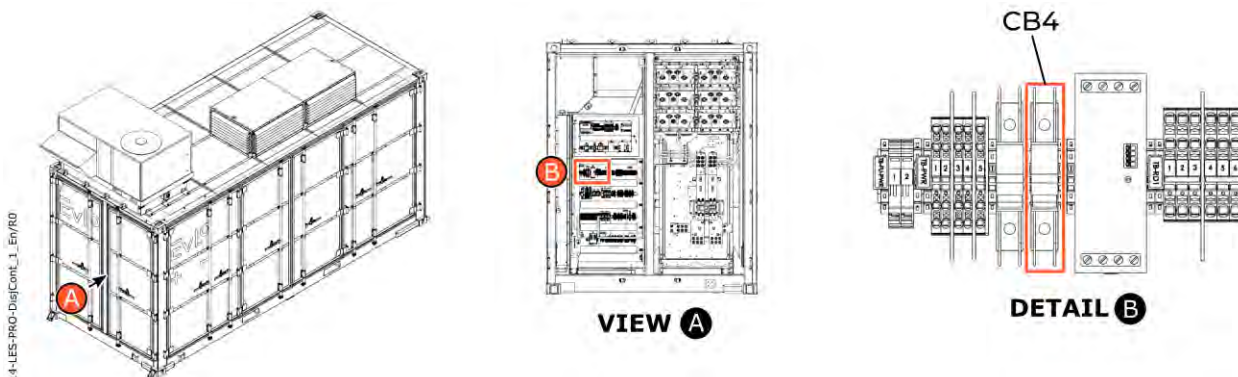
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the site specificities. Refer to the document [CXL2-DOC-CAD-000 – SITE SPECIFICITIES](#). The values shown below are for reference only.

- <1.2 cal/cm² at 0.46 meters

PPE

- Class 0 protective equipment

Photo



Validation

STEP	PROCEDURE	INITIALS
Battery container #1		
4	Serial lock installed	
Battery container #2 (if applicable)		
4	Serial lock installed	
Battery container #3 (if applicable)		
4	Serial lock installed	
Battery container #4 (if applicable)		
4	Serial lock installed	

Notes/Comments:

Step 5 - Verification of the Absence of 1500 VDC

NOTE: Multiple containers can be connected to the XFMR monitoring panel. Refer to the site engineering documents to identify the container(s) to be isolated. Repeat steps 5 through 9 for each container that requires isolation.

Location

- Battery Container → 1500 VDC compartment

Instructions

- Validation of the absence of voltage on the positive and negative buses on both sides of the 1500 VDC disconnect switch.

Equipment

- 1x – Boom with multimeter 1500 VDC

Energy level

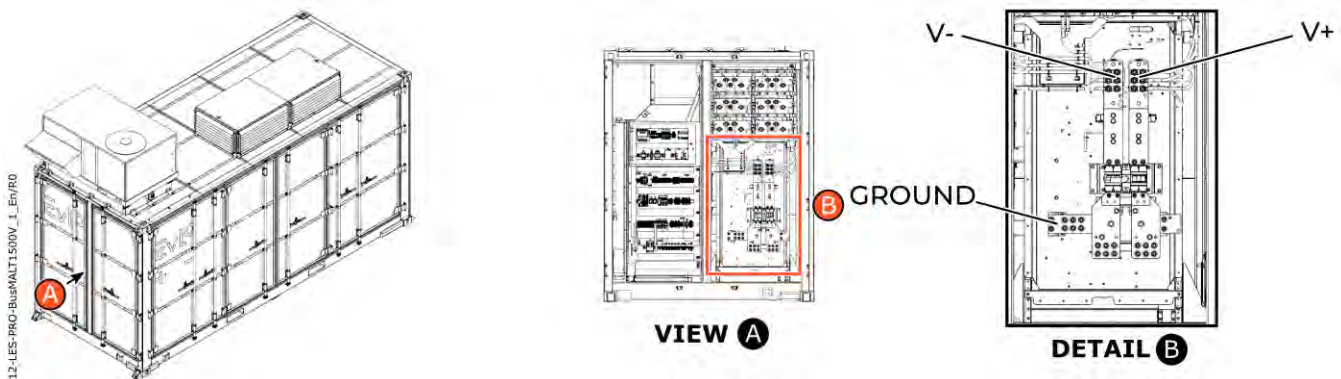
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the site specificities. Refer to the document [CXL2-DOC-CAD-000 – SITE SPECIFICITIES](#). The values shown below are for reference only.

- 3.92 cal/cm² to 0.46 meters (typical)

PPE

- Class 2 protective equipment (typical)

Photo



Validation

STEP	PROCEDURE	MEASUREMENT
Battery container #1		
5	Upper bus voltage between V+ and V-.	
	Top bus voltage between V+ and GND.	
	Top bus voltage between V- and GND.	
	Lower bus voltage between V+ and V-.	
	Lower bus voltage between V+ and GND.	
	Lower bus voltage between V- and GND.	
Battery container #2 (if applicable)		
5	Upper bus voltage between V+ and V-.	
	Top bus voltage between V+ and GND.	
	Top bus voltage between V- and GND.	
	Lower bus voltage between V+ and V-.	
	Lower bus voltage between V+ and GND.	
	Lower bus voltage between V- and GND.	
Battery container #3 (if applicable)		
5	Upper bus voltage between V+ and V-.	
	Top bus voltage between V+ and GND.	
	Top bus voltage between V- and GND.	
	Lower bus voltage between V+ and V-.	
	Lower bus voltage between V+ and GND.	
	Lower bus voltage between V- and GND.	

STEP	PROCEDURE	MEASUREMENT
Battery container #4 (if applicable)		
5	Upper bus voltage between V+ and V-.	
	Top bus voltage between V+ and GND.	
	Top bus voltage between V- and GND.	
	Lower bus voltage between V+ and V-.	
	Lower bus voltage between V+ and GND.	
	Lower bus voltage between V- and GND.	

Notes/Comments:

Step 6 - Grounding

NOTE: Multiple containers can be connected to the XFMR monitoring panel. Refer to the site engineering documents to identify the container(s) to be isolated. Repeat steps 5 through 9 for each container that requires isolation.

Location

- Battery Container → 1500 VDC compartment

Instructions

- Grounding application under the 1500 VDC disconnect switch

Equipment

- 1x – Boom
- 1x – Grounding cable

Energy level

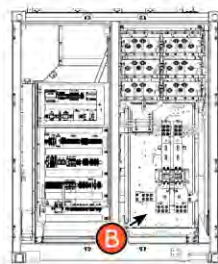
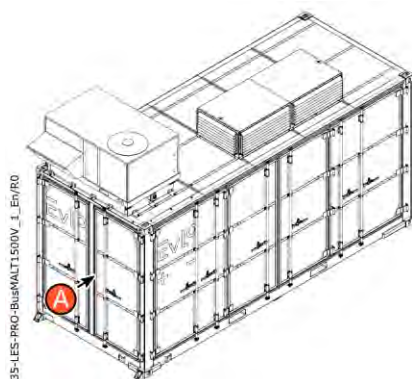
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the site specificities. Refer to the document **CXL2-DOC-CAD-000 – SITE SPECIFICITIES**. The values shown below are for reference only.

- 3.92 cal/cm² to 0.46 meters (typical)

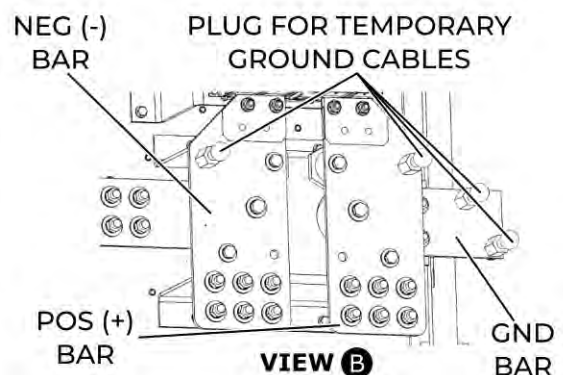
PPE

- Class 2 protective equipment (typical)

Photo



VIEW A



Validation

STEP	PROCEDURE	INITIALS
Battery container #1		
6	Positive and negative bus grounded	
Battery container #2 (if applicable)		
6	Positive and negative bus grounded	
Battery container #3 (if applicable)		
6	Positive and negative bus grounded	
Battery container #4 (if applicable)		
6	Positive and negative bus grounded	

Notes/Comments:

Step 7 – Opening and Padlocking the 1500 VDC Disconnect Switch

NOTE: Multiple containers can be connected to the XFMR monitoring panel. Refer to the site engineering documents to identify the container(s) to be isolated. Repeat steps 5 through 9 for each container that requires isolation.

Location

- Battery Container → 1500 VDC compartment

Instructions

- Opening and padlocking the 1500 VDC disconnect switch

Equipment

- 1x – Serial lock

Energy level

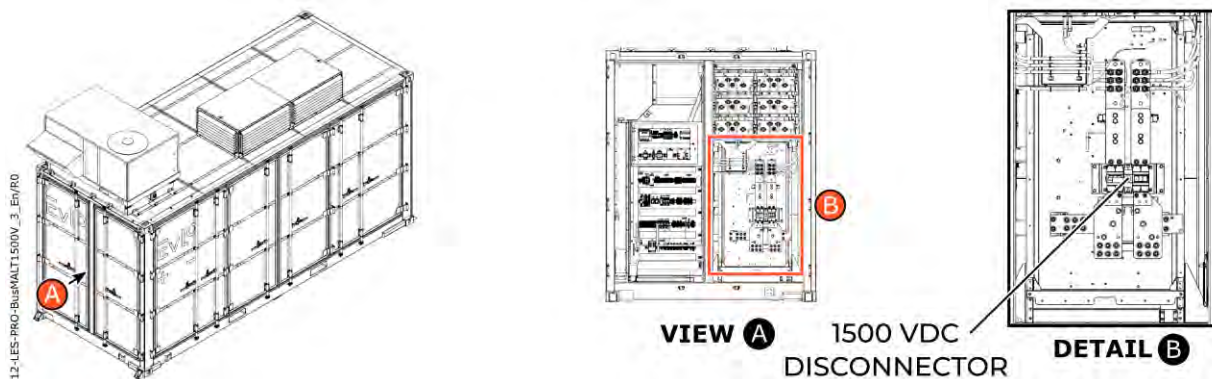
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the site specificities. Refer to the document [CXL2-DOC-CAD-000 – SITE SPECIFICITIES](#). The values shown below are for reference only.

- 3.92 cal/cm² to 0.46 meters (typical)

PPE

- Class 2 protective equipment (typical)

Photo



Validation

STEP	PROCEDURE	INITIALS
Battery container #1		
7	Installed padlock number	
Battery container #2 (if applicable)		
7	Installed padlock number	
Battery container #3 (if applicable)		
7	Installed padlock number	
Battery container #4 (if applicable)		
7	Installed padlock number	

Notes/Comments:

Step 8 –1500 VDC SSG Start Up

DANGER



THE PRIMARY ENERGY CIRCUIT (1500 VDC) OF THE SSG CAN CLOSE AUTOMATICALLY WHEN THE SSG ARE REPOWERED. ENSURE THAT NO PERSONEL IS NEAR THE SSG AND 1500 VDC BUSBARS WHEN REPOWERING. FAILURE TO FOLLOW THIS SAFETY INSTRUCTION MAY RESULT IN PERSONAL INJURY AND DEATH.

NOTE: Multiple containers can be connected to the XFMR monitoring panel. Refer to the site engineering documents to identify the container(s) to be isolated. Repeat steps 5 through 9 for each container that requires isolation.

NOTE: The purpose of this step is to keep the battery container fire system active.

Location

- Battery container → Control compartment → CB4 circuit breaker

Instructions

- Unlocking and closing of CB4 breaker

Equipment

- Not Applicable

Energy level

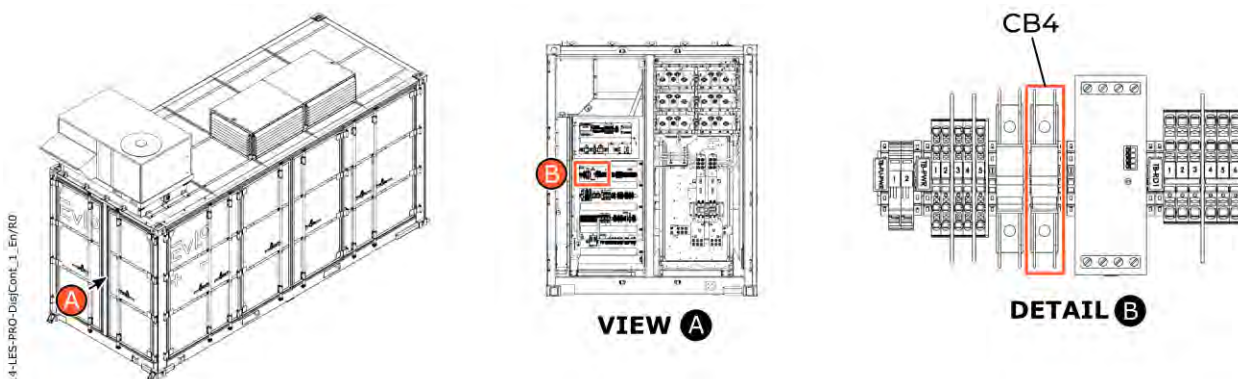
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the site specificities. Refer to the document **CXL2-DOC-CAD-000 – SITE SPECIFICITIES**. The values shown below are for reference only.

- <1.2 cal/cm² to 0.46 meters (typical)

PPE

- Class 0 protective equipment (typical)

Photo



Validation

STEP	PROCEDURE	INITIALS
Battery container #1		
8	Personal lock removed	
Battery container #2 (if applicable)		
8	Personal lock removed	
Battery container #3 (if applicable)		
8	Personal lock removed	
Battery container #4 (if applicable)		
8	Personal lock removed	

Notes/Comments:

Step 9 – Validate SSG Activation

NOTE: Multiple containers can be connected to the XFMR monitoring panel. Refer to the site engineering documents to identify the container(s) to be isolated. Repeat steps 5 through 9 for each container that requires isolation.

Location

- EVLOGIX → Project tab → EMPC → EMPCs

Instructions

- Click on the  icon to the left of EMPC1 (or other EMPC)
- Select Devices → Batteries → String Data
- Put the "Measurements" filter in "Contactor" on the "String Data" page
- Verify contactors are closed (meaning the SSG are active and energizing the container control circuit)

Equipment

- 1x– Computer

Energy level

- Not Applicable

PPE

- Not Applicable

Photo

EMPCs

EMPC

EMPCs	DC Battery		Inverters					Operation Status				
	Energy available chg	Energy available dchg	SOC	Active	Reactive	Power limits chg	Power limits dchg	State	Active Mode	Grid	Operation	EMP Alarm
EMPC 1	346kWH	1753kWH	83.5 %	0kW	0kVar	0kW	0kW	Off	Manual	Following	Remote	Normal

EMPC1

Alerts

Tools

Services

Additive Services

Devices

Bypass

Batteries

String Data

String Status

ESU

String Data

Filter

Container: All Strings: All Measurements: Contactor CLEAR

ID	Contactor
1:1	Closed
1:2	Closed
1:3	Closed
1:4	Closed
1:5	Closed
1:6	Closed

Validation

STEP	PROCEDURE	CONTAINER	INITIALS
9	The SSG in this container is functional		
9	The SSG in this container is functional		
9	The SSG in this container is functional		
9	The SSG in this container is functional		

Notes/Comments:

Step 10 - Validation of the Absence of 600 VDC or 690 VAC

Location

- XFMR Monitoring Panel → Ground Fault Coupling Module GFM-1.1

Instructions

- Validation of the absence of voltage on the GFM-1.1 disconnectable fuse holder terminals

Equipment

- Multimeter

Energy level

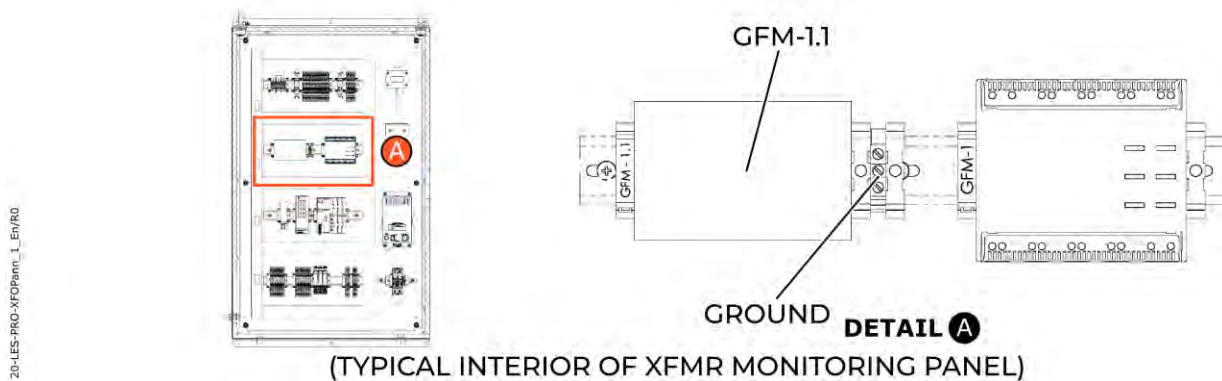
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the site specificities. Refer to the document [CXL2-DOC-CAD-000 – SITE SPECIFICITIES](#). The values shown below are for reference only.

- $\leq 1.2 \text{ cal/cm}^2$ to 0.46 meters (typical)

PPE

- Class 0 protective equipment (typical)

Photo



Validation

STEP	PROCEDURE	MEASUREMENT
10	Voltage between U3 and V3	
	Voltage between V3 and W3	
	Voltage between U3 and W3	
	Voltage between U3 and GND	
	Voltage between V3 and GND	
	Voltage between U3 and GND	

Notes/Comments:

Step 11 – Verification of the Presence of 208 VAC

NOTE: Perform this step in any case, even if no voltage should be present if the site is configured with option 4 of *CXL2-DOC-CAD-000 – SITE SPECIFICITIES*.

Location

- XFMR Monitoring Panel → Disconnectable fuse holder CB-10.1

Instructions

- Validation of the presence of voltage on the CB-10.1 disconnectable fuse holder terminals

Equipment

- 1x – Multimeter

Energy level

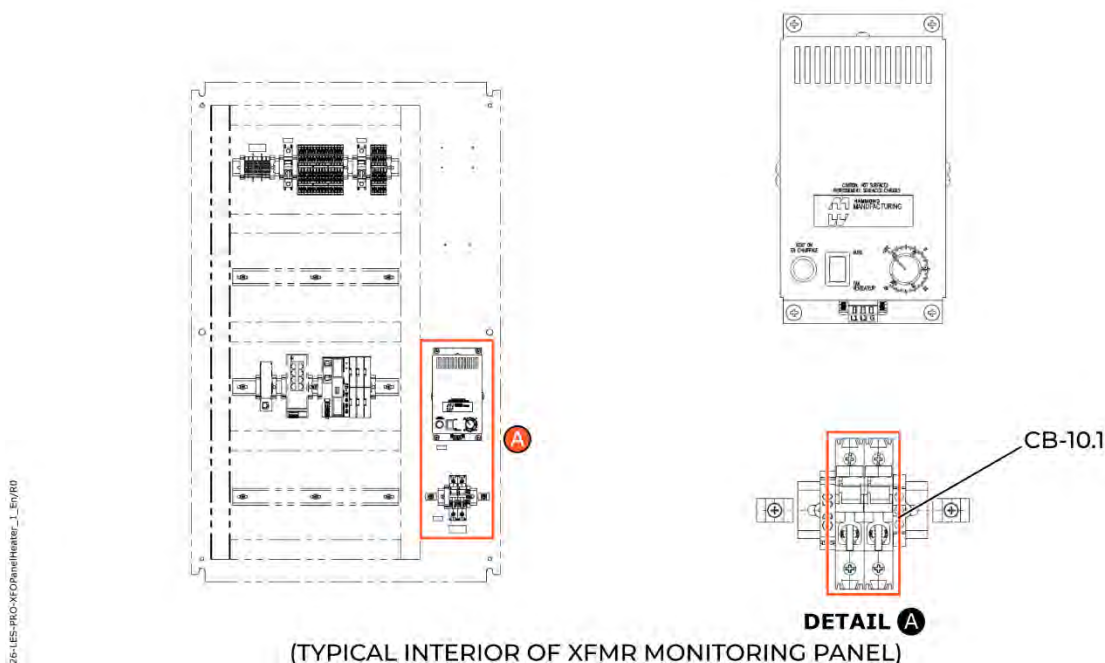
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the site specificities. Refer to the document *CXL2-DOC-CAD-000 – SITE SPECIFICITIES*. The values shown below are for reference only.

- <1.2 cal/cm² to 0.46 meters (typical)

PPE

- Class 0 protective equipment (typical)

Photo



Validation

STEP	PROCEDURE	MEASUREMENT
11	Voltage between TB-24 VDC-input and GND	
	Voltage between terminal L1 and GND.	
	Voltage between terminal L2 and GND.	

Notes/Comments:

Step 12 – Opening and Padlocking the 208 VAC Power Supply

Location

NOTE: Refer to site engineering documents, to identify the 208 VAC distribution panel attached to the XFMR monitoring panel to be isolated.

- Distribution panel 208 VAC → CB-2.3 circuit breaker

Instructions

- CB-2.3 Circuit breaker open and lockout.

Equipment

- 1x – Disconnectable fuse holder padlock ¼" without rotation mechanism and long enough to cover all sockets (35 mm)
- 1x – Serial lock

Energy level

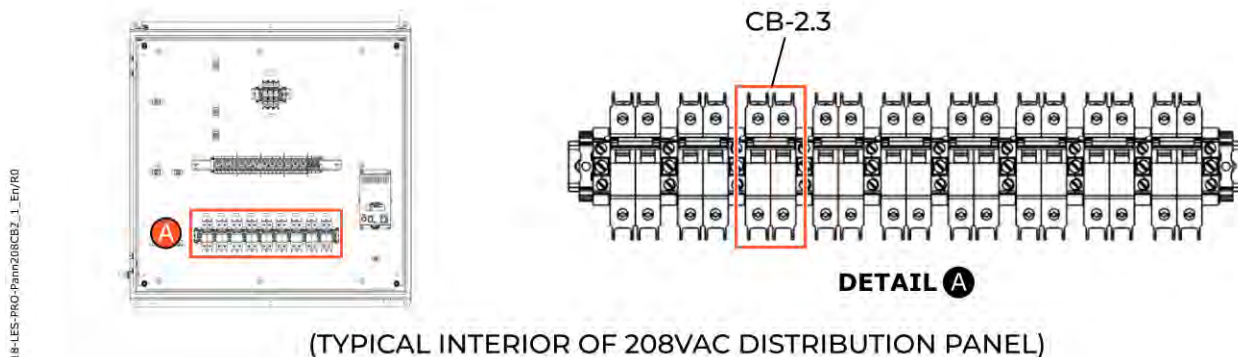
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the site specificities. Refer to the document *CXL2-DOC-CAD-000 – SITE SPECIFICITIES*. The values shown below are for reference only.

- <1.2 cal/cm² to 0.46 meters (typical)

PPE

- Class 0 protective equipment (typical)

Photo



Validation

STEP	PROCEDURE	NO.
12	Installed padlock number	

Notes/Comments:

Step 13 – Verification of the Absence of 208 VAC

Location

- XFMR Monitoring Panel → Disconnectable fuse holder CB-10.1

Instructions

- Validation of the absence of voltage on the CB-10.1 disconnectable fuse holder terminals

Equipment

- 1x – Multimeter

Energy level

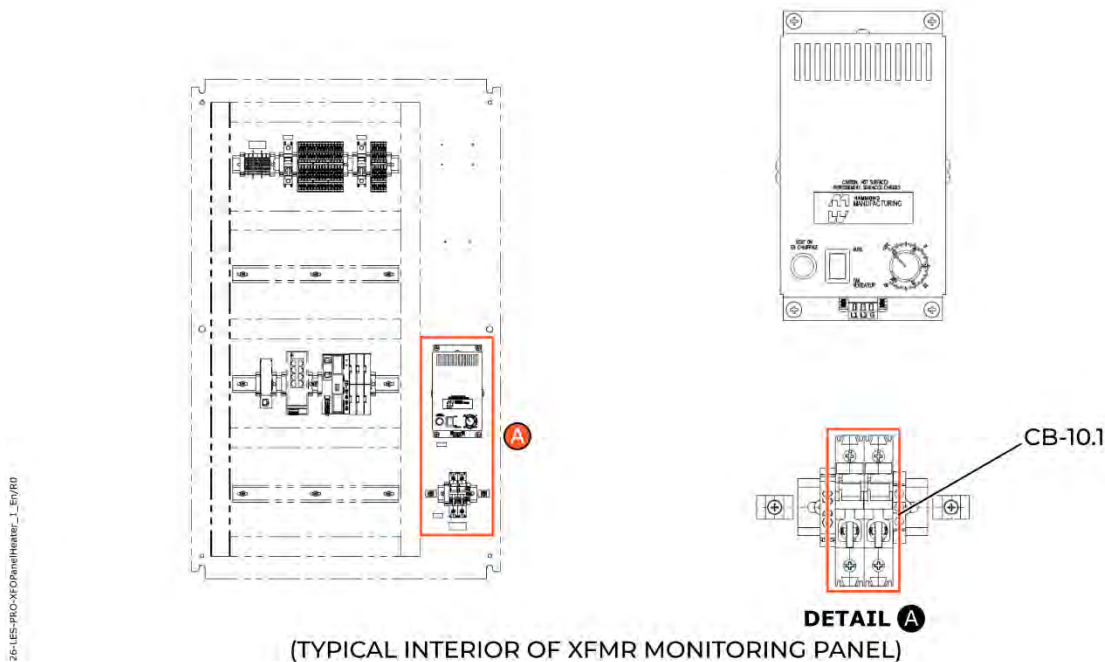
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the site specificities. Refer to the document [CXL2-DOC-CAD-000 – SITE SPECIFICITIES](#). The values shown below are for reference only.

- <1.2 cal/cm² to 0.46 meters (typical)

PPE

- Class 0 protective equipment (typical)

Photo



Validation

STEP	PROCEDURE	MEASUREMENT
13	Voltage between TB-24 VDC-input and GND	
	Voltage between terminal L1 and GND.	
	Voltage between terminal L2 and GND.	

Notes/Comments:

Step 14 - Verification of the Presence of 24 VDC

Location

- XFMR monitoring panel → terminal TB-24 VDC-Input

Instructions

- Validating the presence of voltage on the 24 VDC input terminals (TB-24 VDC-Input)

Equipment

- 1x – Multimeter (typical)

Energy level

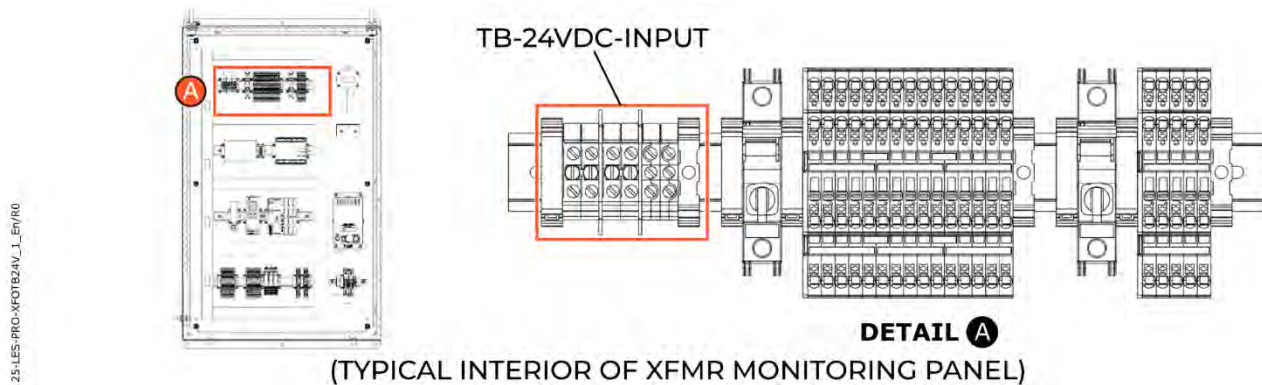
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the site specificities. Refer to the document [CXL2-DOC-CAD-000 – SITE SPECIFICITIES](#). The values shown below are for reference only.

- <1.2 cal/cm² to 0.46 meters (typical)

PPE

- Class 0 protective equipment (typical)

Photo



Validation

STEP	PROCEDURE	MEASUREMENT
14	Measure the voltage between the positive and negative terminal	

Notes/Comments:

Step 15 – Opening and Padlocking the 24 VDC Power Supply

Location

NOTE: Refer to site engineering documents, to identify the 24 VDC power supply panel attached to the XFMR monitoring panel to be isolated.

- Power supply panel (PS) → Disconnectable fuse holder CB-3.2

Instructions

- Opening and padlocking the CB-3.2 Disconnectable fuse holder

Equipment

- 1x – Padlocking device for Bussmann disconnectable fuse holder
- 1x – Serial lock

Energy level

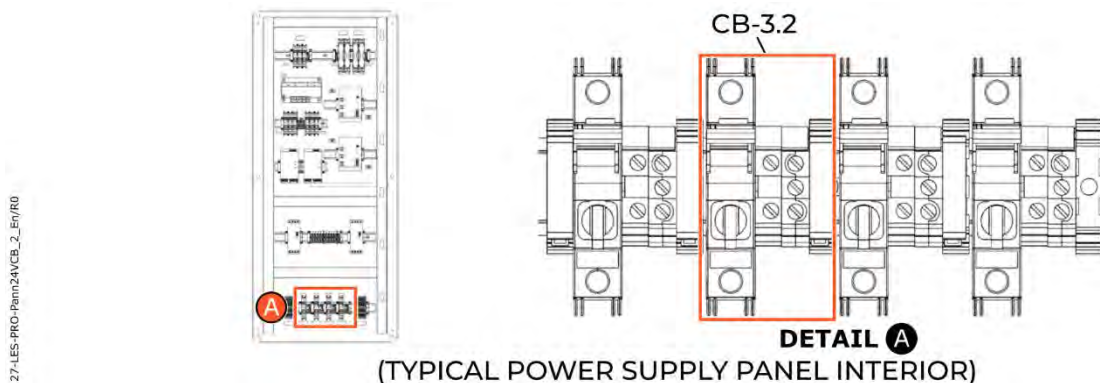
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the site specificities. Refer to the document *CXL2-DOC-CAD-000 – SITE SPECIFICITIES*. The values shown below are for reference only.

- <1.2 cal/cm² to 0.46 meters (typical)

PPE

- Class 0 protective equipment (typical)

Photo



Validation

STEP	PROCEDURE	NO.
15	Installed padlock number	

Notes/Comments:

Step 16 – Verification of the Absence of 24 VDC

Location

- XFMR monitoring panel → terminal TB-24 VDC-Input

Instructions

- Validating the absence of voltage on the 24 VDC input terminals (TB-24 VDC-Input)

Equipment

- 1x – Multimeter

Energy level

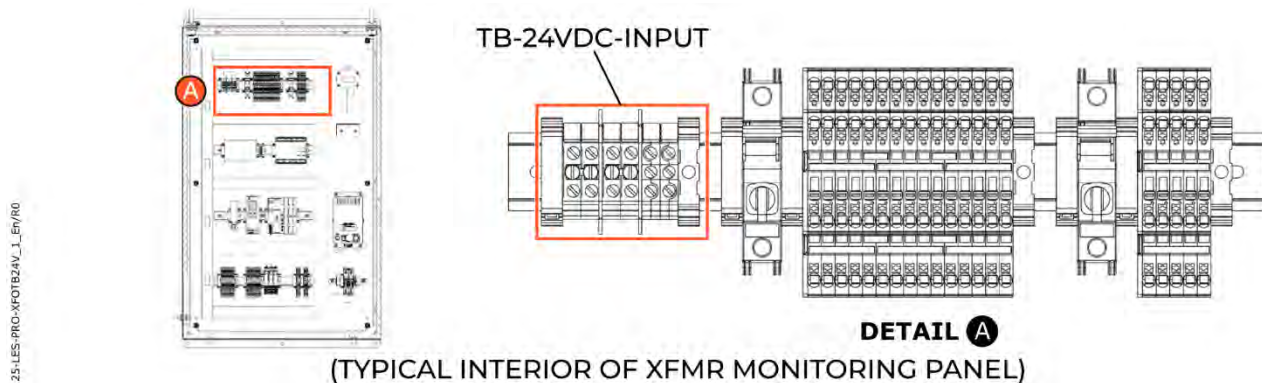
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the site specificities. Refer to the document [CXL2-DOC-CAD-000 – SITE SPECIFICITIES](#). The values shown below are for reference only.

- <1.2 cal/cm² to 0.46 meters (typical)

PPE

- Class 0 protective equipment (typical)

Photo



Validation

STEP	PROCEDURE	MEASUREMENT
16	Voltage between the positive and negative terminals	

Notes/Comments:

Step 17 – Complete Isolation of the 690 VAC, 600 VAC, 208 VAC and 24 VDC Power Supply

At this stage the 690 VAC, 208 VAC and 24 VDC power supply to the XFMR monitoring panel is isolated.

GENERAL INFORMATION

Document name Power Supply Panel Lockout Procedure
EVLOFLEX

Written by _____ **Date** _____

Verified by: _____ **Date** _____

Approved by: _____ **Date** _____

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REVISIONS DESCRIPTION

Revision	Author	Date	Changes
00			Original publication

DOCUMENT PURPOSE

This document details the operations to be performed in order to apply lockout in the following work location:

- Power Supply Panel (PS)

WARNING



THIS PROCEDURE WILL LOCK ONLY THE WORK LOCATION DEFINED ABOVE. NEVER USE THIS PROCEDURE TO SECURE ANOTHER WORK LOCATION. ALWAYS USE THE APPLICABLE LOCKOUT PROCEDURE AND WEAR PERSONAL PROTECTIVE EQUIPMENT IN ACCORDANCE WITH APPLICABLE STANDARDS, LAWS AND REGULATIONS. FAILURE TO DO SO CAN CAUSE SERIOUS INJURIES OR EQUIPMENT DAMAGE.

SAFETY CONSIDERATIONS

DANGER

VOLTAGES UP TO 690 VDC/1500 VAC CAN BE PRESENT AT ANY TIME. ALWAYS WEAR SAFETY EQUIPMENT AND FOLLOW ALL APPLICABLE INSTRUCTIONS, LAWS AND REGULATIONS WHEN HANDLING THIS PROCEDURE. FAILURE TO FOLLOW THIS SAFETY INSTRUCTION MAY RESULT IN PERSONAL INJURY AND DEATH.

DANGER

THE PRIMARY ENERGY CIRCUIT (1500 VDC) OF THE SSG CAN CLOSE AUTOMATICALLY WHEN THE SSG ARE REPOWERED. ENSURE THAT NO PERSONNEL IS NEAR THE SSG AND 1500 VDC BUSBARS WHEN REFUELING. FAILURE TO FOLLOW THIS SAFETY INSTRUCTION MAY RESULT IN PERSONAL INJURY AND DEATH.

WARNING

PRIOR TO CARRYING OUT WORK ON THE SITE, AUTHORIZATION MUST BE OBTAINED FROM THE OPERATOR AND/OR SITE MANAGER. FAILURE TO DO SO CAN CAUSE SERIOUS INJURIES OR EQUIPMENT DAMAGE.

WARNING

READ THIS PROCEDURE IN ITS ENTIRETY BEFORE BEGINNING WORK. FOLLOW AND EXECUTE THE STEPS IN THE ORDER SHOWN. IF YOU HAVE ANY QUESTIONS, CONTACT YOUR SUPERVISOR. FAILURE TO DO SO CAN CAUSE SERIOUS INJURIES OR EQUIPMENT DAMAGE.

WARNING

AT LEAST TWO PEOPLE ARE REQUIRED TO PERFORM THE OPERATIONS DESCRIBED IN THIS PROCEDURE, ONE PERSON WHO PERFORMS THE STEPS AND ONE PERSON WHO VERIFIES THE EXECUTION. FAILURE TO DO SO CAN CAUSE SERIOUS INJURIES OR EQUIPMENT DAMAGE.

DEFINITIONS

- cm: Centimeter
- EVLOFLEX: All BESS equipment (container, panel boards, UPS, EMP)
- GND: Grounding
- N/A: Not Applicable
- PCS: Power conversion system converts AC/DC (load) or DC/AC (discharge) into battery containers
- PPE: Personal Protective Equipment
- SSG: Stack Switchgear
- UPS: Uninterrupted Power Supply
- VAC/VDC: Volt Alternating Current/Volt Direct Current

TOOLS AND EQUIPMENT

- 1x – Padlock box with serial padlock
- 1x – Phoenix Contact circuit breaker lockout device (Brady 90844)
- 1x – ABB XT1 Circuit breaker lockout device (Masterlock 491B)
- 1x – Grounding plate
- 1x – Boom with multimeter 1500 VDC
- 2x – Grounding cable (1500 VDC)
- 1x – Multimeter
- 1x – Hasp
- 1x – Computer

REFERENCES

NOTE: *Make sure to use the latest revision of the document. If a newer revision is available, use that revision. Inform the person in charge if there is a difference between the information found in this procedure and in the engineering drawings.*

- 71200000 – Power Supply Panel
- 71300000 – 460 Vac Distribution Panel
- 71600200 – Battery Container Control Panel
- STD-DOC-SST-003 Lockout Program
- CXL2-DOC-CAD-000– Site specificities
- Annex – Site engineering documentation

Step 1 – Confirm that the system is not in operation

Location

- EVLOGIX website/web interface for this installation

Instructions

- Verify on the operator interface that the system is not in operation.
- If the system is running, confirm with the site manager that the system can be shut down.

Equipment

- 1x– Computer

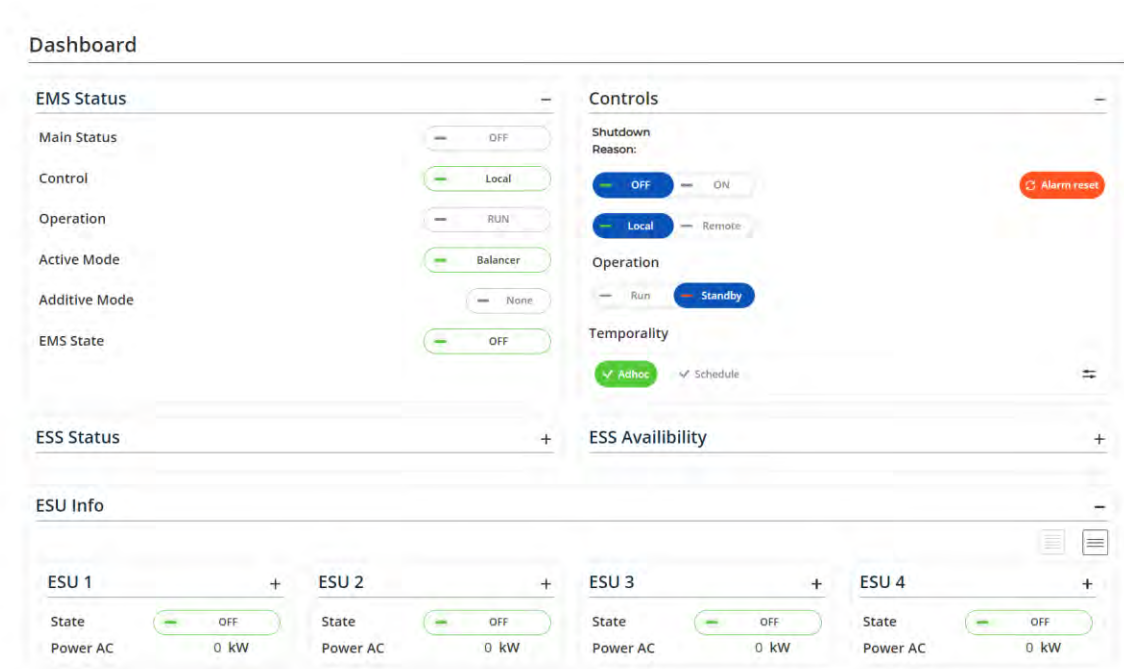
Energy level

- Not Applicable

PPE

- Not Applicable

Photo



TYPICAL EVLOGIX INTERFACE, FOR REFERENCE ONLY

Validation

STEP	PROCEDURE	INITIALS
1	The system is off.	

Notes/Comments:

Step 2 – Isolating the Main Transformer

NOTE: Isolation of the main transformer must be performed by the customer's authorized personnel and according to the procedures provided by the customer.

Location

- Main transformer of the same group as the PS panel

Instructions

- Have the customer open and lock the main transformer.
- Have the customer check the absence of voltage on the main transformer.
- Have the customer install a GND on the main transformer.

NOTE: The electrician or contractor is responsible for following the indications in place before carrying out any manipulations. EVLO staff should be informed of these measures and follow the instructions.

Equipment

- Follow the instructions of the site manager.

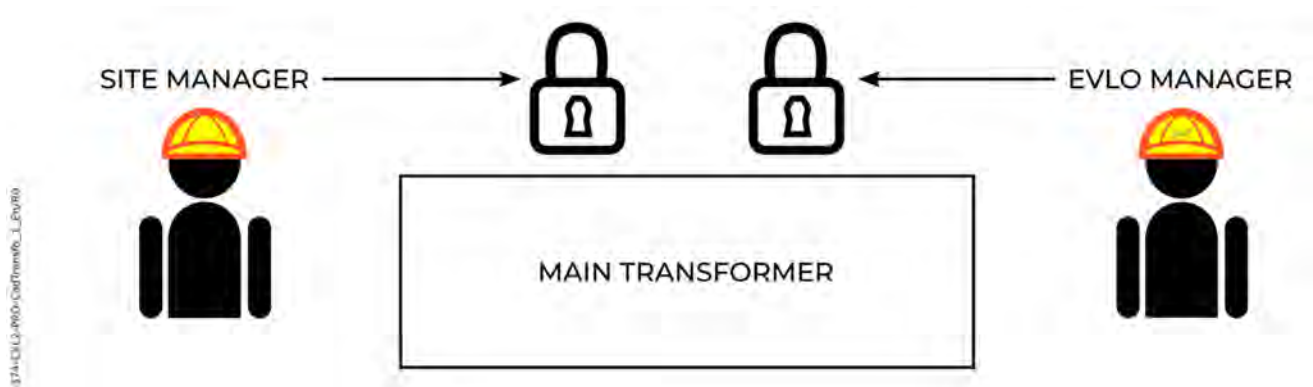
Energy level

- Follow the instructions of the site manager.

PPE

- Follow the instructions of the site manager.

Photo



Validation

STEP	PROCEDURE	INITIALS
2	Main transformer open and padlocked	
2	Validated that there is no voltage	
2	Main transformer grounded	

Notes/Comments:

Step 3 – 1500 VDC SSG Off

DANGER



SEVERAL OTHER CONTAINERS CAN BE CONNECTED TO THE SAME MAIN POWER CIRCUIT (1500 VDC) VIA THE PCS. PERFORM THIS STEP FOR EACH CONTAINER IN THE SAME GROUP BEFORE PERFORMING THE FOLLOWING STEPS. FAILURE TO FOLLOW THIS SAFETY INSTRUCTION MAY RESULT IN PERSONAL INJURY AND DEATH.

Location

NOTE: Refer to the site engineering documents to identify the container(s) to be isolated.

- Battery container → Control compartment → CB4 circuit breaker

Instructions

- Opening and locking the CB4 breaker of all containers connected in parallel.

Equipment

NOTE: A hasp must be used to padlock the Phoenix Contact breaker lockout device because it is too small to accommodate a padlock.

- 1x – Hasp
- 1x – Personal lock
- 1x – Phoenix Contact Circuit Breaker Lockout Device (Brady 90844)

Energy level

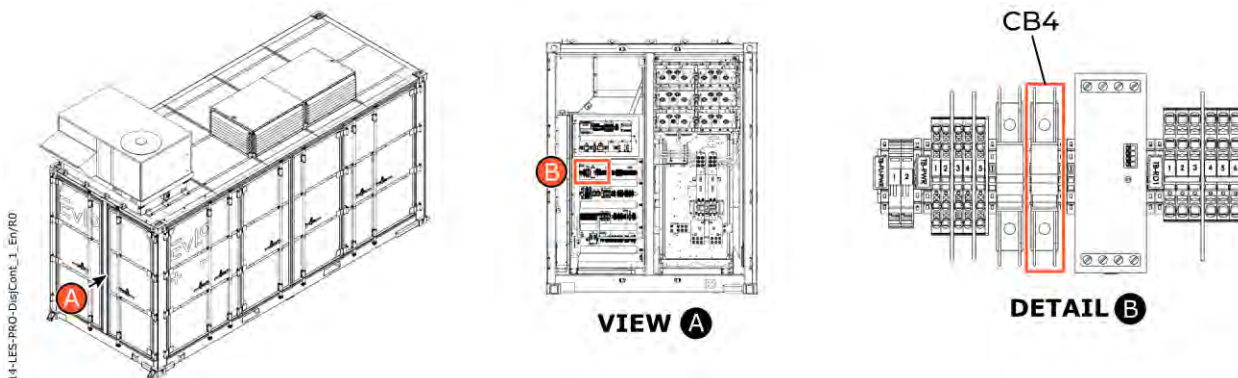
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the site specificities. Refer to the document [CXL2-DOC-CAD-000 – SITE SPECIFICITIES](#). The values shown below are for reference only.

- <1.2 cal/cm² to 0.46 meters (typical)

PPE

- Class 0 protective equipment (typical)

Photo



Validation

STEP	PROCEDURE	INITIALS
Battery container #1		
3	Serial lock installed	
Battery container #2 (if applicable)		
3	Serial lock installed	
Battery container #3 (if applicable)		
3	Serial lock installed	
Battery container #4 (if applicable)		
3	Serial lock installed	

Notes/Comments:

Step 4 – Verification of the Absence of 1500 VDC

NOTE: Several containers can be connected to the PS panel. Refer to the site engineering documents to identify the container(s) to be isolated. Repeat steps 4 through 7 for each container that requires isolation.

Location

- Battery Container → 1500 VDC compartment

Instructions

- Validation of the absence of voltage on the positive and negative buses on both sides of the 1500 VDC disconnect switch.

Equipment

- 1x – Boom with multimeter 1500 VDC

Energy level

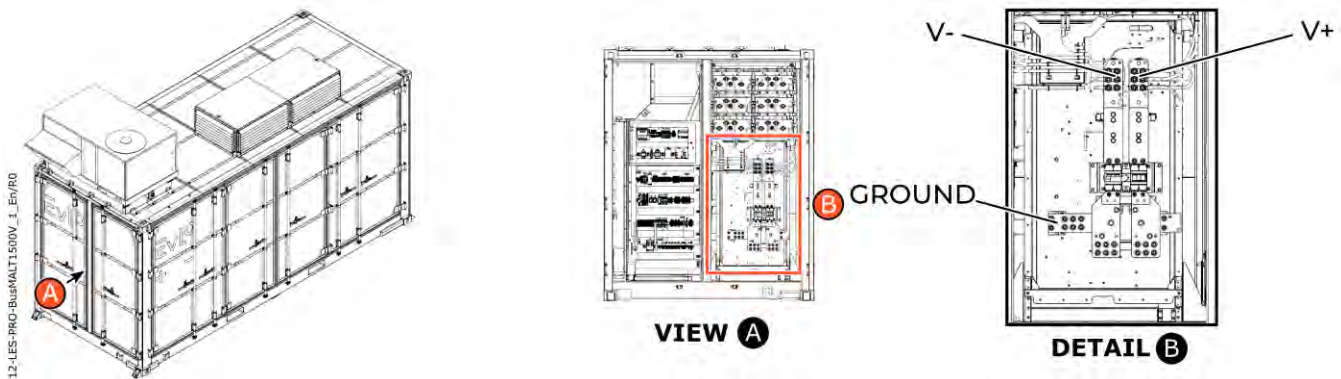
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the site specificities. Refer to the document [CXL2-DOC-CAD-000 – SITE SPECIFICITIES](#). The values shown below are for reference only.

- 3.92 cal/cm² to 0.46 meters (typical)

PPE

- Class 2 protective equipment (typical)

Photo



Validation

STEP	PROCEDURE	MEASUREMENT
Battery container #1		
4	Upper bus voltage between V+ and V-.	
	Top bus voltage between V+ and GND.	
	Top bus voltage between V- and GND.	
	Lower bus voltage between V+ and V-.	
	Lower bus voltage between V+ and GND.	
	Lower bus voltage between V- and GND.	
Battery container #2 (if applicable)		
4	Upper bus voltage between V+ and V-.	
	Top bus voltage between V+ and GND.	
	Top bus voltage between V- and GND.	
	Lower bus voltage between V+ and V-.	
	Lower bus voltage between V+ and GND.	
	Lower bus voltage between V- and GND.	
Battery container #3 (if applicable)		
4	Upper bus voltage between V+ and V-.	
	Top bus voltage between V+ and GND.	
	Top bus voltage between V- and GND.	
	Lower bus voltage between V+ and V-.	
	Lower bus voltage between V+ and GND.	
	Lower bus voltage between V- and GND.	

STEP	PROCEDURE	MEASUREMENT
Battery container #4 (if applicable)		
4	Upper bus voltage between V+ and V-.	
	Top bus voltage between V+ and GND.	
	Top bus voltage between V- and GND.	
	Lower bus voltage between V+ and V-.	
	Lower bus voltage between V+ and GND.	
	Lower bus voltage between V- and GND.	

Notes/Comments:

Step 5 - Grounding

NOTE: Several containers can be connected to the PS panel. Refer to the site engineering documents to identify the container(s) to be isolated. Repeat steps 4 through 7 for each container that requires isolation.

Location

- Battery Container → 1500 VDC compartment

Instructions

- Grounding application under the 1500 VDC disconnect switch

Equipment

- 1x - Boom
- 1x - Grounding cable

Energy level

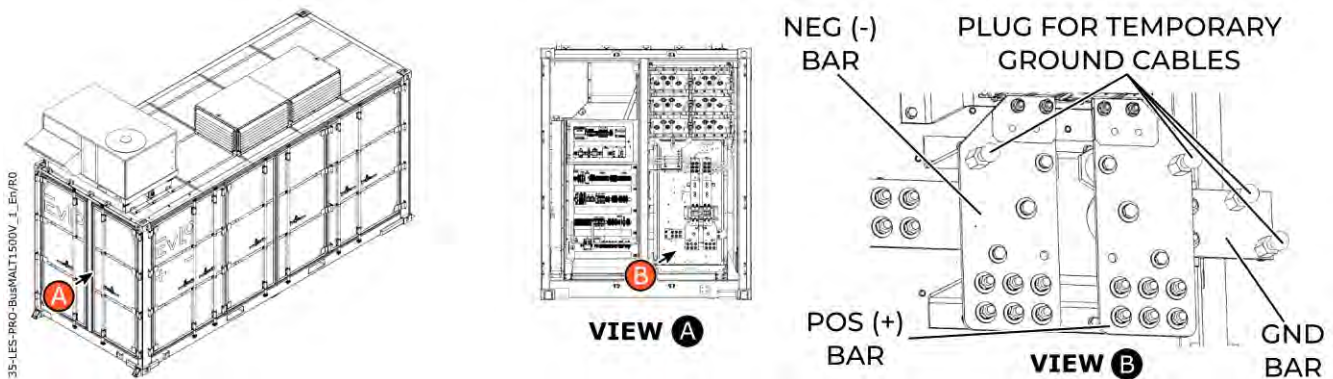
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the site specificities. Refer to the document **CXL2-DOC-CAD-000 – SITE SPECIFICITIES**. The values shown below are for reference only.

- 3.92 cal/cm² to 0.46 meters (typical)

PPE

- Class 2 protective equipment (typical)

Photo



Validation

STEP	PROCEDURE	INITIALS
Battery container #1		
5	Positive and negative bus grounded	
Battery container #2 (if applicable)		
5	Positive and negative bus grounded	
Battery container #3 (if applicable)		
5	Positive and negative bus grounded	
Battery container #4 (if applicable)		
5	Positive and negative bus grounded	

Notes/Comments:

Step 6 – Opening and Padlocking the 1500 VDC Disconnect Switch

NOTE: Several containers can be connected to the PS panel. Refer to the site engineering documents to identify the container(s) to be isolated. Repeat steps 4 through 7 for each container that requires isolation.

Location

- Battery Container → 1500 VDC compartment

Instructions

- Opening and padlocking the 1500 VDC disconnect switch

Equipment

- 1x – Serial lock

Energy level

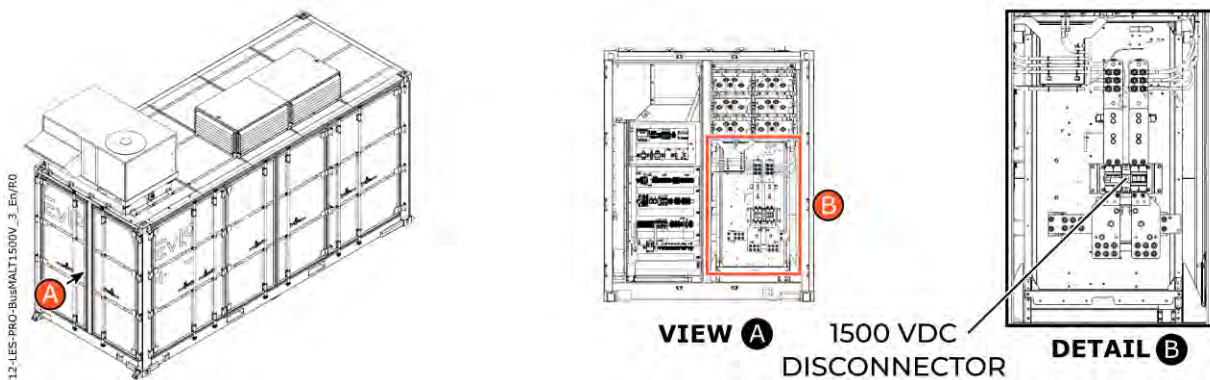
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the site specificities. Refer to the document [CXL2-DOC-CAD-000 – SITE SPECIFICITIES](#). The values shown below are for reference only.

- 3.92 cal/cm² to 0.46 meters (typical)

PPE

- Class 2 protective equipment (typical)

Photo



Validation

STEP	PROCEDURE	INITIALS
Battery container #1		
6	Installed padlock number	
Battery container #2 (if applicable)		
6	Installed padlock number	
Battery container #3 (if applicable)		
6	Installed padlock number	
Battery container #4 (if applicable)		
6	Installed padlock number	

Notes/Comments:

Step 7 –1500 VDC SSG Start Up

DANGER



THE PRIMARY ENERGY CIRCUIT (1500 VDC) OF THE SSG CAN CLOSE AUTOMATICALLY WHEN THE SSG ARE REPOWERED. ENSURE THAT NO PERSONNEL IS NEAR THE SSG AND 1500 VDC BUSBARS WHEN REPOWERING. FAILURE TO FOLLOW THIS SAFETY INSTRUCTION MAY RESULT IN PERSONAL INJURY AND DEATH.

NOTE: Several containers can be connected to the PS panel. Refer to the site engineering documents to identify the container(s) to be isolated. Repeat steps 4 through 7 for each container that requires isolation.

NOTE: The purpose of this step is to keep the battery container fire system active.

Location

- Battery container → Control compartment → CB4 circuit breaker

Instructions

- Unlocking and closing of CB4 breaker

Equipment

- Not Applicable

Energy level

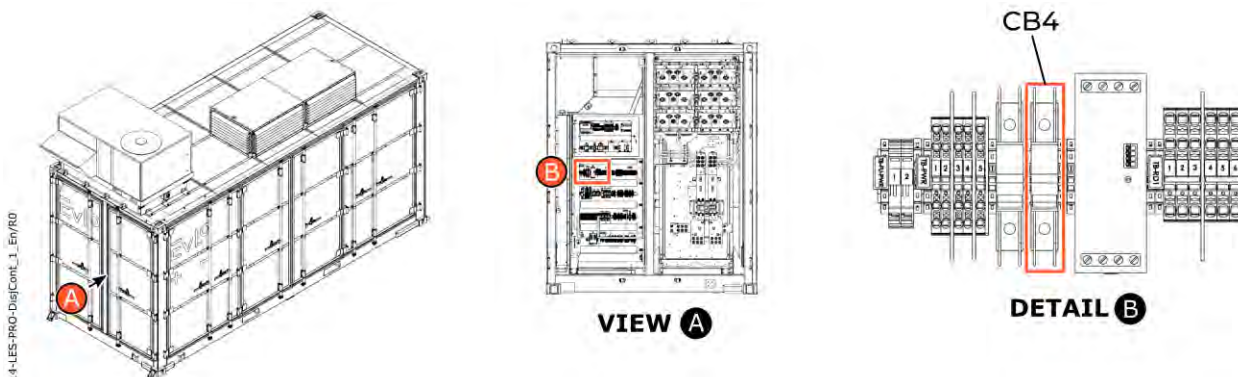
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the site specificities. Refer to the document *CXL2-DOC-CAD-000 – SITE SPECIFICITIES*. The values shown below are for reference only.

- <1.2 cal/cm² to 0.46 meters (typical)

PPE

- Class 0 protective equipment (typical)

Photo



Validation

STEP	PROCEDURE	INITIALS
Battery container #1		
7	Personal lock removed	
Battery container #2 (if applicable)		
7	Personal lock removed	
Battery container #3 (if applicable)		
7	Personal lock removed	
Battery container #4 (if applicable)		
7	Personal lock removed	

Notes/Comments:

Step 8 – Validate SSG Activation

Location

- EVLOGIX → Project tab → EMPC → EMPCs

Instructions

- Click on the  icon to the left of EMPC1 (or other EMPC)
- Select Devices → Batteries → String Data
- Put the "Measurements" filter in "Contactor" on the "String Data" page
- Verify contactors are closed (meaning the SSG are active and energizing the container control circuit)

Equipment

- 1x– Computer

Energy level

- Not Applicable

PPE

- Not Applicable

Photo

EMPCs

EMPC

EMPCs	DC Battery		Inverters				Operation Status					
	Energy available chg	Energy available dchg	SOC	Active	Reactive	Power limits chg	Power limits dchg	State	Active Mode	Grid	Operation	EMP Alarm
EMPC1	346kWH	1753kWH	83.5 %	OKW	OKVar	OKW	OKW	Off	Manual	Following	Remote	Normal

EMPC1

Alerts

Tools

Services

Additive Services

Devices

Bypass

Batteries

String Data

String Status

ESU

String Data

Filter

Container: All

Strings: All

Measurements: Contactor

CLEAR

ID

Contactor

1:1	Closed
1:2	Closed
1:3	Closed
1:4	Closed
1:5	Closed
1:6	Closed

281-CXL2-PRO-StringData_1/R1

Validation

STEP	PROCEDURE	CONTAINER	INITIALS
9	The SSG in this container is functional		
9	The SSG in this container is functional		
9	The SSG in this container is functional		
9	The SSG in this container is functional		

Notes/Comments:

Step 9 - Verification of the Presence of 460 VAC

Location

- PS Panel/Disconnectable fuse holder CB-1

Instructions

- Validation of the presence of voltage on the CB-1.1 disconnectable fuse holder upper terminals

Equipment

- 1x – Multimeter

Energy level

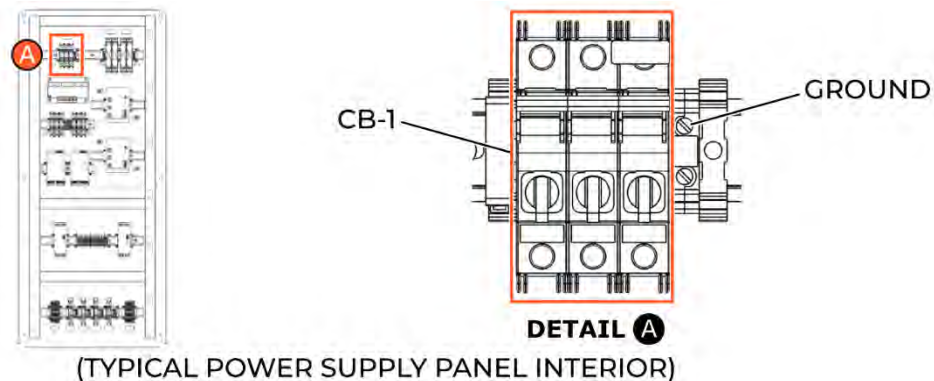
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the site specificities. Refer to the document [CXL2-DOC-CAD-000 – SITE SPECIFICITIES](#). The values shown below are for reference only.

- <1.2 cal/cm² to 0.46 meters (typical)

PPE

- Class 0 protective equipment (typical)

Photo



28-LES-PRO-Panm24VWALT_I_En/R0

Validation

STEP	PROCEDURE	MEASUREMENT
9	Voltage between upper terminal 1 and upper terminal 3.	
	Voltage between upper terminal 3 and upper terminal 5.	
	Voltage between upper terminal 1 and upper terminal 5.	
	Voltage between upper terminal 1 and GND.	
	Voltage between upper terminal 3 and GND.	
	Voltage between upper terminal 5 and GND.	

Notes/Comments:

Step 10 – Opening and Padlocking the 460 VAC Power Supply

Location

- Distribution panel 460 VAC/CB5.1 circuit breaker

Instructions

- CB-5.1 Circuit breaker open and lockout.

Equipment

- 1x – ABB XT1 Circuit breaker lockout device (Masterlock 491B)
- 1x – Serial lock

Energy level

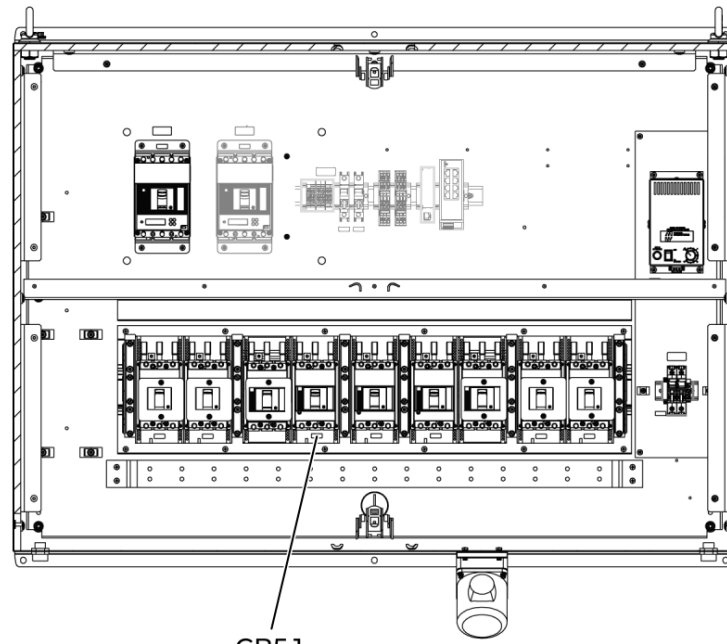
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the site specificities. Refer to the document [CXL2-DOC-CAD-000 – SITE SPECIFICITIES](#). The values shown below are for reference only.

- <8 cal/cm² to 0.46 meters (typical)

PPE

- Class 2 protective equipment (typical)

Photo



CB5.1

(TYPICAL INTERIOR OF 460 VAC DISTRIBUTION PANEL)

282-CXL2-PRO-PanH460VCB_1_EnVRO

Validation

STEP	PROCEDURE	NO.
10	Installed padlock number	

Notes/Comments:

Step 11 – Verification of the Absence of 460 VAC

Location

- PS Panel/Disconnectable fuse holder CB-1

Instructions

- Validation of absence of voltage upstream of disconnectable fuse holder CB-1.

Equipment

- 1x – Multimeter

Energy level

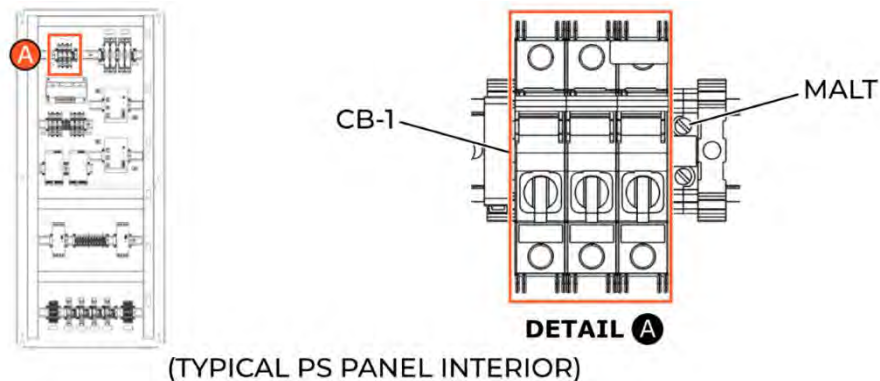
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the site specificities. Refer to the document [CXL2-DOC-CAD-000 – SITE SPECIFICITIES](#). The values shown below are for reference only.

- <1.2 cal/cm² to 0.46 meters (typical)

PPE

- Class 0 protective equipment (typical)

Photo



Validation

STEP	PROCEDURE	MEASUREMENT
11	Voltage between upper terminal 1 and upper terminal 3.	
	Voltage between upper terminal 3 and upper terminal 5.	
	Voltage between upper terminal 1 and upper terminal 5.	
	Voltage between upper terminal 1 and GND.	
	Voltage between upper terminal 3 and GND.	
	Voltage between upper terminal 5 and GND.	

Notes/Comments:

Step 12 - Verification of the Absence of 1500 VDC

Location

- PS panel/fuse holder FU-2.1 and FU-2.2

Instructions

- Validate that there is no voltage downstream of fuse holder FU-2.1 and FU-2.2.

Equipment

- 1x – Multimeter

Energy level

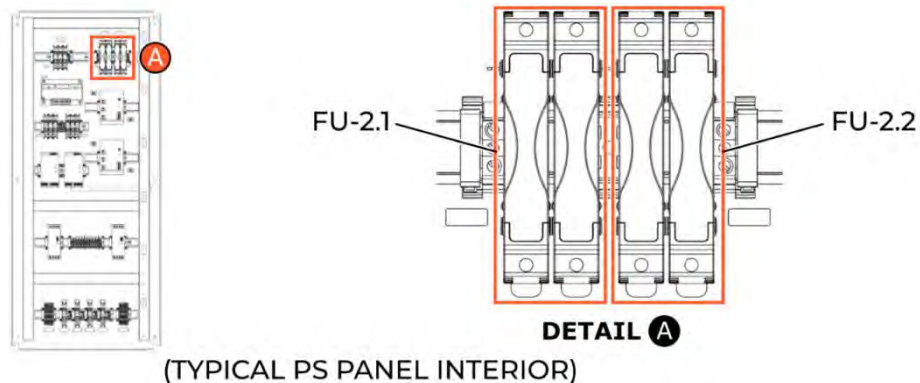
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the site specificities. Refer to the document [CXL2-DOC-CAD-000 – SITE SPECIFICITIES](#). The values shown below are for reference only.

- <1.2 cal/cm² to 0.46 meters (typical)

PPE

- Class 0 protective equipment (typical)

Photo



Validation

STEP	PROCEDURE	MEASUREMENT
12	FU-2. 1: Voltage between V+ and V-.	
	FU-2. 1: Voltage between V+ and GND.	
	FU-2. 1: Voltage between V- and GND.	
	FU-2. 2: Voltage between V+ and V-.	
	FU-2. 2: Voltage between V+ and GND.	
	FU-2. 2: Voltage between V- and GND.	

Notes/Comments:

Step 13 – Complete Isolation of the 460 VAC and 1500 VDC Power Supply

At this stage the 460 VAC, and 1500 VDC power supply of the PS panel are isolated.

GENERAL INFORMATION

Document name Lockout of the PCS power compartment
EVLOFLEX

Written by _____ **Date** _____

Verified by: _____ **Date** _____

Approved by: _____ **Date** _____

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REVISIONS DESCRIPTION

Revision	Author	Date	Changes
00			Original publication

DOCUMENT PURPOSE

This document details the operations to be performed in order to apply lockout in the following work location:

- Power Converter (PCS)

WARNING



THIS PROCEDURE WILL LOCK ONLY THE WORK LOCATION DEFINED ABOVE. NEVER USE THIS PROCEDURE TO SECURE ANOTHER WORK LOCATION. ALWAYS USE THE APPLICABLE LOCKOUT PROCEDURE AND WEAR PERSONAL PROTECTIVE EQUIPMENT IN ACCORDANCE WITH APPLICABLE STANDARDS, LAWS AND REGULATIONS. FAILURE TO DO SO CAN CAUSE SERIOUS INJURIES OR EQUIPMENT DAMAGE.

SAFETY CONSIDERATIONS

DANGER



VOLTAGES UP TO 690 VDC/1500 VAC CAN BE PRESENT AT ANY TIME. ALWAYS WEAR SAFETY EQUIPMENT AND FOLLOW ALL APPLICABLE INSTRUCTIONS, LAWS AND REGULATIONS WHEN HANDLING THIS PROCEDURE. FAILURE TO FOLLOW THIS SAFETY INSTRUCTION MAY RESULT IN PERSONAL INJURY AND DEATH.

DANGER



RESIDUAL ENERGY MAY BE PRESENT IN THE POWER CONVERTER. ENSURE THAT THE POWER CONVERTER IS DISCONNECTED FROM ANY POWER SOURCE FOR A MINIMUM OF 5 MINUTES BEFORE THE LOCKOUT. FAILURE TO FOLLOW THE SAID PROCEDURES CAN CAUSE SEVERE INJURIES OR DEATH.

DANGER



THE PRIMARY ENERGY CIRCUIT (1500 VDC) OF THE SSG CAN CLOSE AUTOMATICALLY WHEN THE SSG ARE REPOWERED. ENSURE THAT NO PERSONEL IS NEAR THE SSG AND 1500 VDC BUSBARS WHEN REFUELING. FAILURE TO FOLLOW THIS SAFETY INSTRUCTION MAY RESULT IN PERSONAL INJURY AND DEATH.

WARNING



PRIOR TO CARRYING OUT WORK ON THE SITE, AUTHORIZATION MUST BE OBTAINED FROM THE OPERATOR AND/OR SITE MANAGER. FAILURE TO DO SO CAN CAUSE SERIOUS INJURIES OR EQUIPMENT DAMAGE.

WARNING



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DEFINITIONS

- cm: Centimeter
- EVLOFLEX: All BESS equipment (container, panel boards, UPS, EMP)
- GND: Grounding
- N/A: Not Applicable
- PPE: Personal Protective Equipment
- SSG: Stack Switchgear
- UPS: Uninterrupted Power Supply
- VAC/VDC: Volt Alternating Current/Volt Direct Current

TOOLS AND EQUIPMENT

- 1x – Padlock box with serial padlock
- 3x – Circuit breaker lockout device (Brady 90844)
- 1x – Lockout tags
- 1x – Hasp
- 1x – Grounding plate
- 1x – Boom with multimeter 1500 VDC
- 2x – Grounding cable (1500 VDC)
- 1x – Multimeter
- 1x – Computer

REFERENCES

NOTE: *Make sure to use the latest revision of the document. If a newer revision is available, use that revision. Inform the person in charge if there is a difference between the information found in this procedure and in the engineering drawings.*

- 71100000 – XFMR Monitoring Panel
- 71300000 – 460 Vac Distribution Panel
- 71400000 – Power Inverter
- 71600200 – Battery Container Control Panel
- STD-DOC-SST-003 – Lockout Program
- CXL2-DOC-CAD-000 – Site specificities
- Annex – Site engineering documentation

Step 1 – Confirm that the system is not in operation

Location

- EVLOGIX website/web interface for this installation

Instructions

- Verify on the operator interface that the system is not in operation.
- If the system is running, confirm with the site manager that the system can be shut down.

Equipment

- N/A

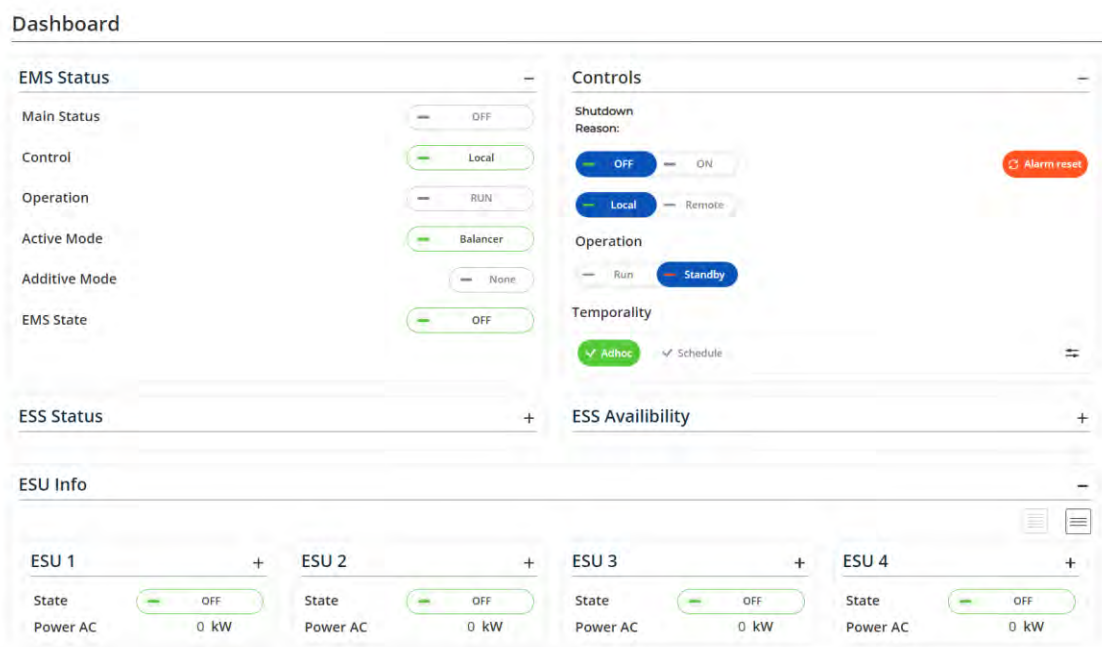
Energy level

- 0 cal/cm²

PPE

- Not Applicable

Photo



TYPICAL EVLOGIX INTERFACE, FOR REFERENCE ONLY

Validation

STEP	PROCEDURE	INITIALS
1	The system is off.	

Notes/Comments:

Step 2 – Isolating the Main Transformer

NOTE: Isolation of the main transformer must be performed by the customer's authorized personnel and according to the procedures provided by the customer.

Location

- Primary transformer to which the PCS is connected

Instructions

- Have the customer open and lock the main transformer.
- Have the customer check the absence of voltage on the main transformer.
- Have the customer install a GND on the main transformer.

NOTE: The electrician or contractor is responsible for following the indications in place before carrying out any manipulations. EVLO staff should be informed of these measures and follow the instructions.

DANGER



PCS CAN REMAIN ENERGIZED FOR UP TO FIVE MINUTES AFTER THEY ARE TURNED OFF. MAKE SURE THAT THE STORED ENERGY IS DISSIPATED BEFORE PROCEEDING WITH THE OPERATIONS. FAILURE TO FOLLOW THIS SAFETY INSTRUCTION MAY RESULT IN PERSONAL INJURY AND DEATH.

Equipment

- Follow the instructions of the site manager.

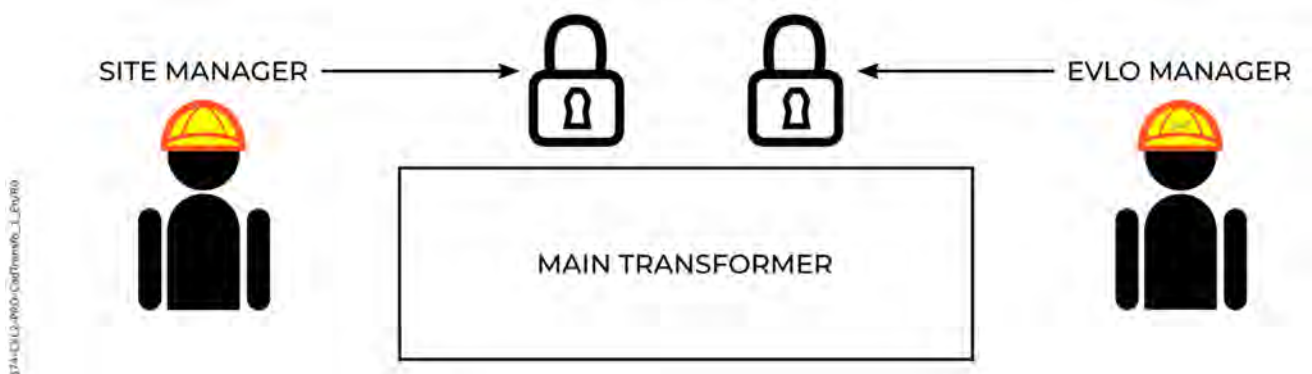
Energy level

- Follow the instructions of the site manager.

PPE

- Follow the instructions of the site manager.

Photo



Validation

STEP	PROCEDURE	INITIALS
2	Main transformer open and padlocked	
2	Validated that there is no voltage	
2	Main transformer grounded	

Notes/Comments:

Step 3 – 1500 VDC SSG Off

DANGER



SEVERAL OTHER CONTAINERS CAN BE CONNECTED TO THE SAME MAIN POWER CIRCUIT (1500 VDC) VIA THE PCS. PERFORM THIS STEP FOR EACH CONTAINER IN THE SAME GROUP BEFORE PERFORMING THE FOLLOWING STEPS. FAILURE TO FOLLOW THIS SAFETY INSTRUCTION MAY RESULT IN PERSONAL INJURY AND DEATH.

Location

NOTE: PCS are connected in parallel when more than one PCS is connected to the same main transformer. When two or more PCS are connected in parallel, the containers connected to each PCS must be locked. Refer to the site engineering documents to identify the container(s) to be isolated.

- Battery container → Control compartment → CB4 circuit breaker

Instructions

- Opening and locking the CB4 breaker of all containers connected in parallel.

Equipment

NOTE: A hasp must be used to padlock the circuit breaker because it is too small to accommodate a padlock.

- 1x – Hasp
- 1x – Personal lock
- 1x – Phoenix Contact circuit breaker lockout device (Brady 90844)

Energy level

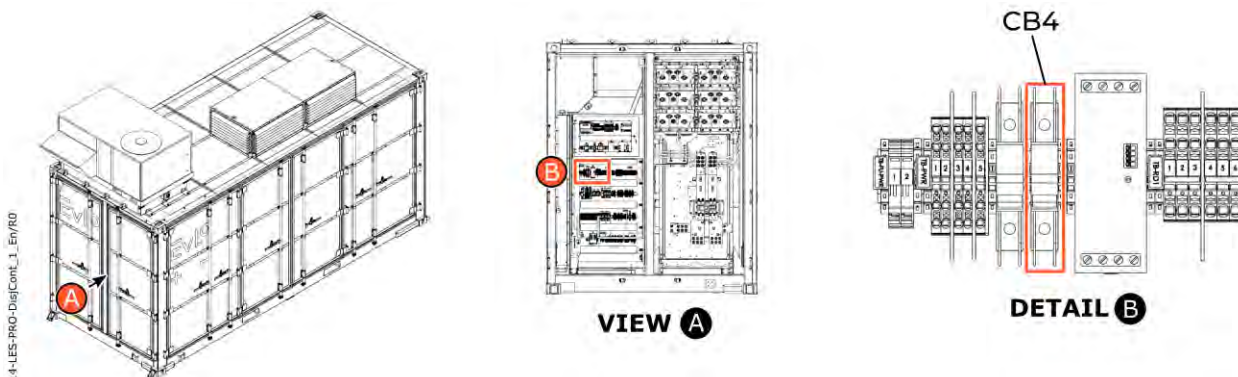
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the site specificities. Refer to the document [CXL2-DOC-CAD-000 – SITE SPECIFICITIES](#). The values shown below are for reference only.

- <1.2 cal/cm² to 0.46 meters (typical)

PPE

- Class 0 protective equipment (typical)

Photo



Validation

STEP	PROCEDURE	INITIALS
Battery container #1		
3	Serial lock installed	
Battery container #2 (if applicable)		
3	Serial lock installed	
Battery container #3 (if applicable)		
3	Serial lock installed	
Battery container #4 (if applicable)		
3	Serial lock installed	

Notes/Comments:

Step 4 – Verification of the Absence of 1500 VDC

NOTE: Refer to the site engineering documents to identify the container(s) to be isolated. Repeat steps 4 through 8 for each container that requires isolation.

Location

- Battery Container → 1500 VDC compartment

Instructions

- Validation of the absence of voltage on the positive and negative buses on both sides of the 1500 VDC disconnect switch.

Equipment

- 1x – Boom with multimeter 1500 VDC

Energy level

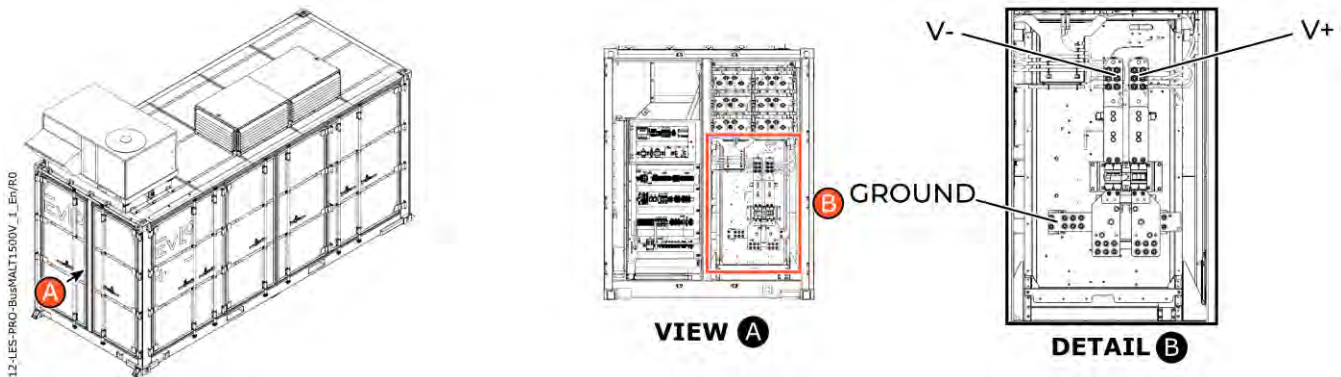
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the site specificities. Refer to the document [CXL2-DOC-CAD-000 – SITE SPECIFICITIES](#). The values shown below are for reference only.

- 3.92 cal/cm² to 0.46 meters (typical)

PPE

- Class 2 protective equipment (typical)

Photo



Validation

STEP	PROCEDURE	MEASUREMENT
Battery container #1		
4	Upper bus voltage between V+ and V-.	
	Top bus voltage between V+ and GND.	
	Top bus voltage between V- and GND.	
	Lower bus voltage between V+ and V-.	
	Lower bus voltage between V+ and GND.	
	Lower bus voltage between V- and GND.	
Battery container #2 (if applicable)		
4	Upper bus voltage between V+ and V-.	
	Top bus voltage between V+ and GND.	
	Top bus voltage between V- and GND.	
	Lower bus voltage between V+ and V-.	
	Lower bus voltage between V+ and GND.	
	Lower bus voltage between V- and GND.	
Battery container #3 (if applicable)		
4	Upper bus voltage between V+ and V-.	
	Top bus voltage between V+ and GND.	
	Top bus voltage between V- and GND.	
	Lower bus voltage between V+ and V-.	
	Lower bus voltage between V+ and GND.	
	Lower bus voltage between V- and GND.	

STEP	PROCEDURE	MEASUREMENT
Battery container #4 (if applicable)		
4	Upper bus voltage between V+ and V-.	
	Top bus voltage between V+ and GND.	
	Top bus voltage between V- and GND.	
	Lower bus voltage between V+ and V-.	
	Lower bus voltage between V+ and GND.	
	Lower bus voltage between V- and GND.	

Notes/Comments:

Step 5 - Grounding

NOTE: Refer to the site engineering documents to identify the container(s) to be isolated. Repeat steps 4 through 8 for each container that requires isolation.

Location

- Battery Container → 1500 VDC compartment

Instructions

- Grounding application under the 1500 VDC disconnect switch

Equipment

- 1x - Boom
- 1x - Grounding cable

Energy level

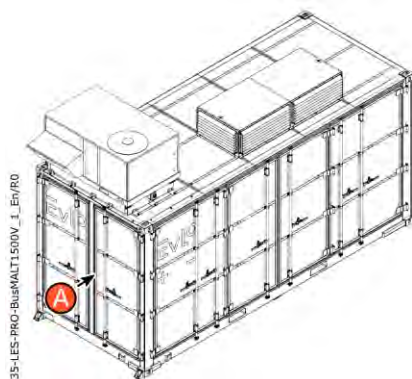
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the site specificities. Refer to the document **CXL2-DOC-CAD-000 – SITE SPECIFICITIES**. The values shown below are for reference only.

- 3.92 cal/cm² to 0.46 meters (typical)

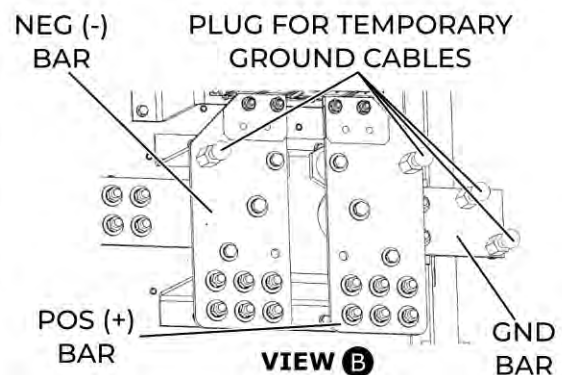
PPE

- Class 2 protective equipment (typical)

Photo



VIEW A



Validation

STEP	PROCEDURE	INITIALS
Battery container #1		
5	Positive and negative bus grounded	
Battery container #2 (if applicable)		
5	Positive and negative bus grounded	
Battery container #3 (if applicable)		
5	Positive and negative bus grounded	
Battery container #4 (if applicable)		
5	Positive and negative bus grounded	

Notes/Comments:

Step 6 – Opening and Padlocking the 1500 VDC Disconnect Switch

NOTE: Refer to the site engineering documents to identify the container(s) to be isolated. Repeat steps 4 through 8 for each container that requires isolation.

Location

- Battery Container → 1500 VDC compartment

Instructions

- Opening and padlocking the 1500 VDC disconnect switch

Equipment

- 1x – Serial lock

Energy level

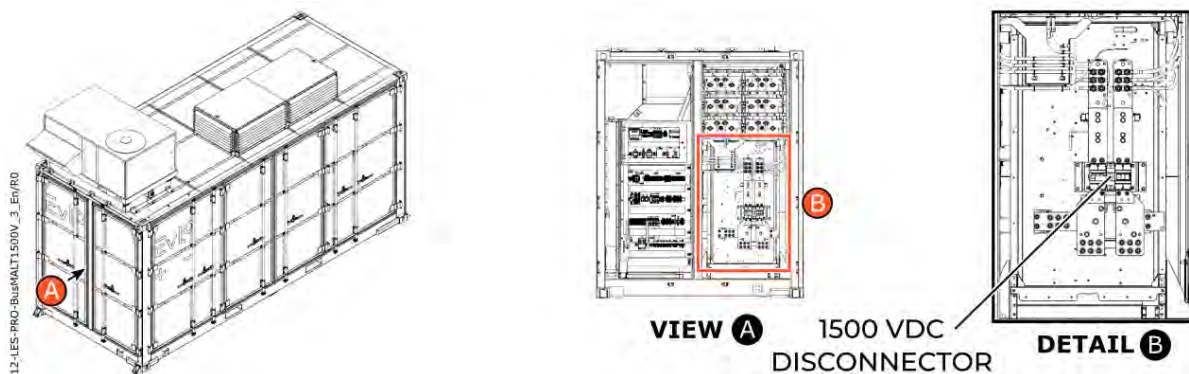
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the site specificities. Refer to the document [CXL2-DOC-CAD-000 – SITE SPECIFICITIES](#). The values shown below are for reference only.

- 3.92 cal/cm² to 0.46 meters (typical)

PPE

- Class 2 protective equipment

Photo



Validation

STEP	PROCEDURE	INITIALS
Battery container #1		
6	Installed padlock number	
Battery container #2 (if applicable)		
6	Installed padlock number	
Battery container #3 (if applicable)		
6	Installed padlock number	
Battery container #4 (if applicable)		
6	Installed padlock number	

Notes/Comments:

Step 7 – SSG Start Up (1500 VDC)

DANGER



THE PRIMARY ENERGY CIRCUIT (1500 VDC) OF THE SSG CAN CLOSE AUTOMATICALLY WHEN THE SSG ARE REPOWERED. ENSURE THAT NO PERSONEL IS NEAR THE SSG AND 1500 VDC BUSBARS WHEN REPOWERING. FAILURE TO FOLLOW THIS SAFETY INSTRUCTION MAY RESULT IN PERSONAL INJURY AND DEATH.

NOTE: Refer to the site engineering documents to identify the container(s) to be isolated. Repeat steps 4 through 8 for each container that needs it.

NOTE: The purpose of this step is to keep the battery container fire system active.

Location

- Battery container → Control compartment → CB4 circuit breaker

Instructions

- Unlocking and closing of CB4 breaker

Equipment

- Not Applicable

Energy level

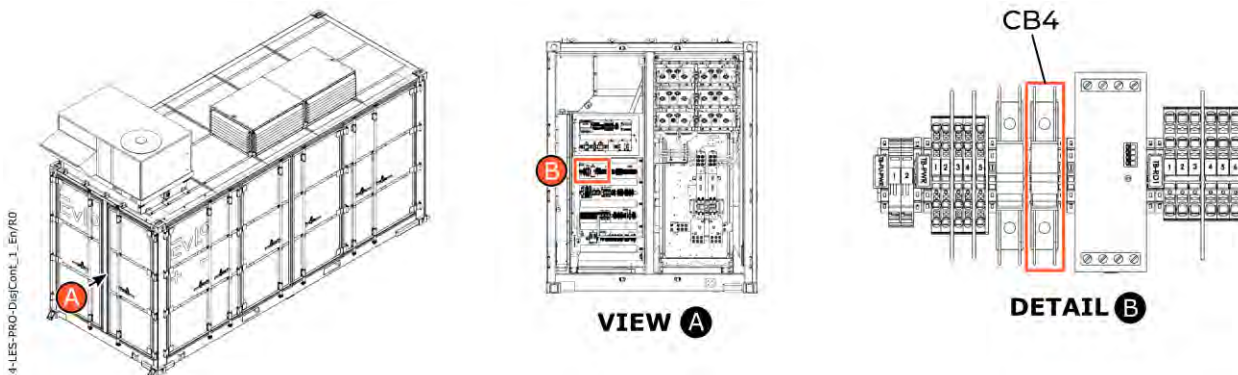
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the site specificities. Refer to the document **CXL2-DOC-CAD-000 – SITE SPECIFICITIES**. The values shown below are for reference only.

- <1.2 cal/cm² to 0.46 meters (typical)

PPE

- Class 0 protective equipment (typical)

Photo



Validation

STEP	PROCEDURE	INITIALS
Battery container #1		
7	Personal lock removed	
Battery container #2 (if applicable)		
7	Personal lock removed	
Battery container #3 (if applicable)		
7	Personal lock removed	
Battery container #4 (if applicable)		
7	Personal lock removed	

Notes/Comments:

Step 8 – Validation of SSG Activation

NOTE: *This step is applicable only if the group contains more than one container. It is intended to keep the fire system active on unlocked battery containers.*

Location

- EVLOGIX website/web interface for this installation

Instructions

- Click on the  icon to the left of EMPC1 (or other EMPC)
- Select Devices → Batteries → String Data
- Put the "Measurements" filter in "Contactor" on the "String Data" page
- Verify contactors are closed (meaning the SSG are active and energizing the container control circuit)

Equipment

- 1x– Computer

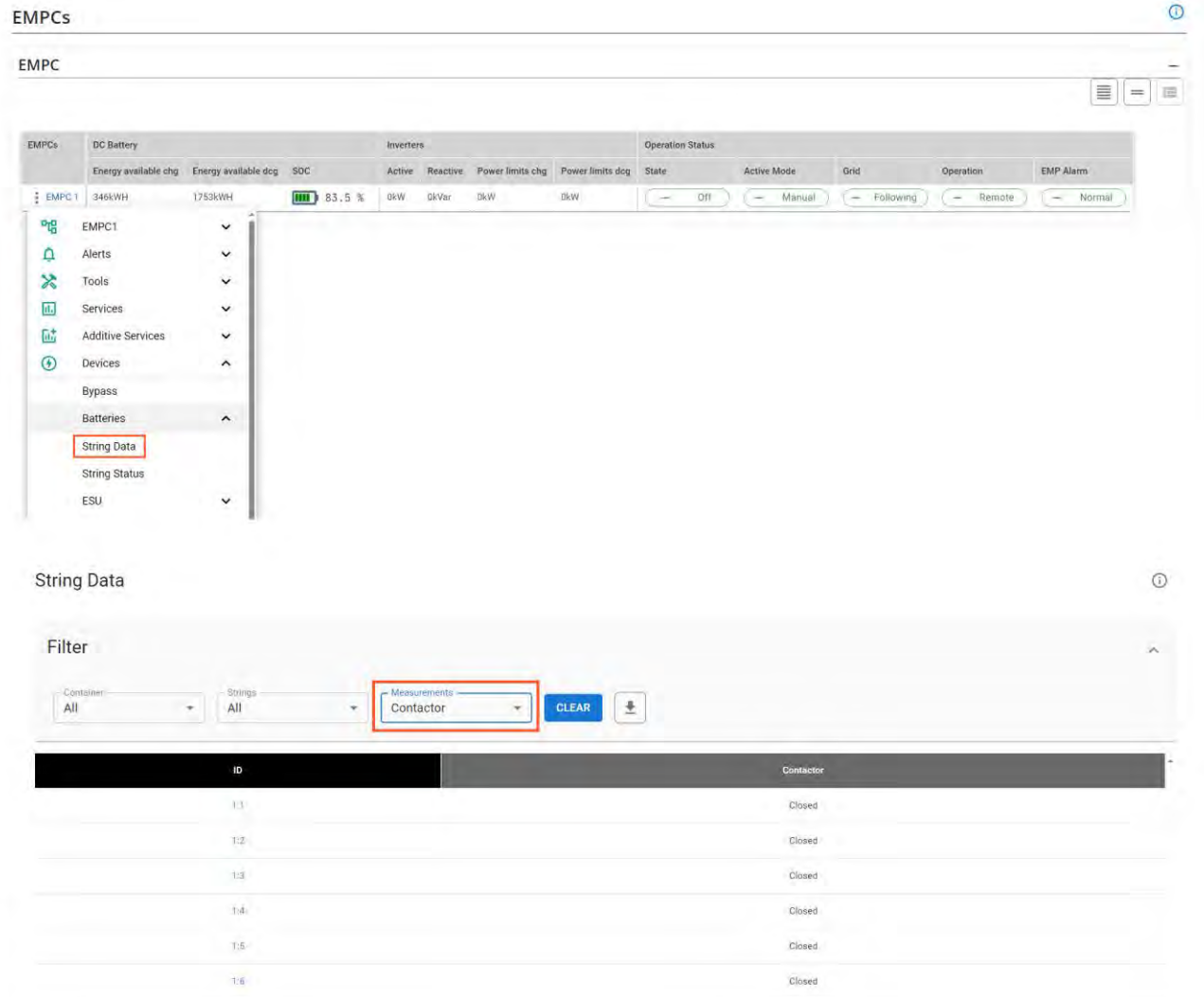
Energy level

- 0 cal/cm²

PPE

- Not Applicable

Photo



281-CXL2-PRO-StringData_1/R1

(TYPICAL EVLOGIX INTERFACE, FOR REFERENCE ONLY)

Validation

STEP	PROCEDURE	CONTAINER	INITIALS
8	The SSG in this container is functional		
8	The SSG in this container is functional		
8	The SSG in this container is functional		
8	The SSG in this container is functional		

Notes/Comments:

Step 9 - Verification of the Presence of 208 VAC

Location

- PCS → Terminal XD17: 1 / 2
- PCS → Terminal XD17: 4 / 5

Instructions

- Validation of the presence of voltage on the terminals
 - o XD17: 1 / 2
 - o XD17: 4 / 5

Equipment

- 1x – Multimeter

Energy level

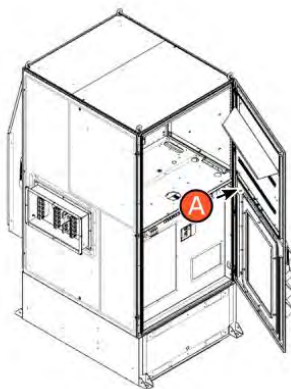
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the site specificities. Refer to the document **CXL2-DOC-CAD-000 – SITE SPECIFICITIES**. The values shown below are for reference only.

- <1.2 cal/cm² to 0.46 meters (typical)

PPE

- Class 0 protective equipment (typical)

Photo



VIEW A

29-LES-PRO-PCSXD_1_En/R0

Validation

STEP	PROCEDURE	MEASUREMENT
9	Voltage between XD17:1 and XD17:2	
	Voltage between XD17:1 and XD17:3	
	Voltage between XD17:2 and XD17:3	
	Voltage between XD17:4 and XD17:5	
	Voltage between XD17:4 and XD17:6	
	Voltage between XD17:5 and XD17:6	

Notes/Comments:

Step 10 – Opening and Padlocking the 208 VAC Power Supply

Location

- UPS panel → circuit breakers CB-3A1 and CB-3B or/and CB-3A2 and CB-3C.

Instructions

NOTE: Refer to site engineering documents to identify circuit breakers applicable to the PCS to be padlocked.

- Applicable Circuit Breaker Open and Lockout:
 - o PCS #1 → CB-3A1 AND CB-3B.
 - o PCS#2 (if applicable) → CB-3A2 and CB-3C.

Equipment

- 2x – Schneider circuit breaker door padlock
- 2x – Serial lock

Energy level

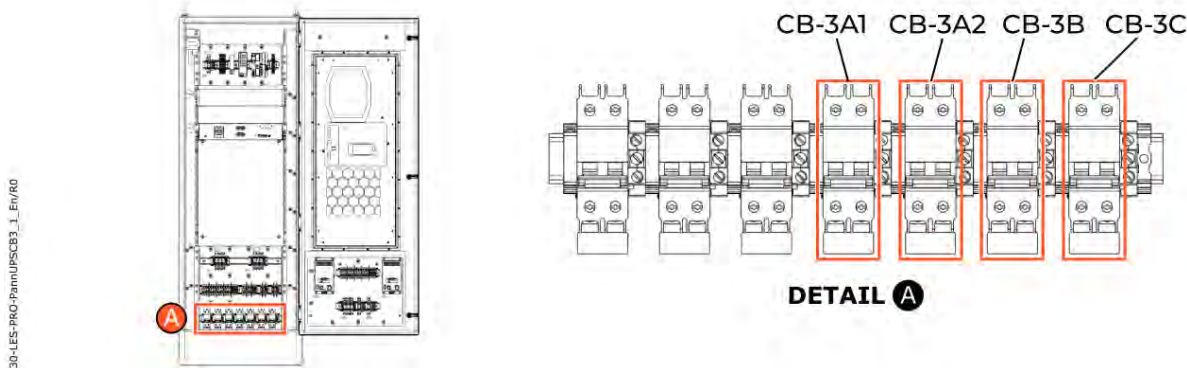
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the site specificities. Refer to the document [CXL2-DOC-CAD-000 – SITE SPECIFICITIES](#). The values shown below are for reference only.

- <1.2 cal/cm² to 0.46 meters (typical)

PPE

- Class 0 protective equipment (typical)

Photo



Validation

STEP	PROCEDURE	NO.
10	Installed padlock number (CB-3A1)	
10	Installed padlock number (CB-3B)	
10	Installed padlock number (CB-3A2) if applicable	
10	Installed padlock number (CB-3C) if applicable	

Notes/Comments:

Step 11 – Verification of the Absence of 208 VAC

Location

- PCS → Terminal XD17: 1 / 2
- PCS → Terminal XD17: 4 / 5

Instructions

- Validation of the absence of voltage on the terminals
 - o XD17: 1 / 2
 - o XD17: 4 / 5

Equipment

- 1x – Multimeter

Energy level

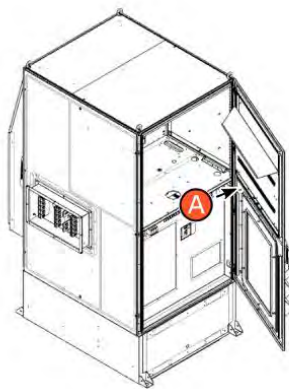
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the site specificities. Refer to the document *CXL2-DOC-CAD-000 – SITE SPECIFICITIES*. The values shown below are for reference only.

- <1.2 cal/cm² to 0.46 meters (typical)

PPE

- Class 0 protective equipment (typical)

Photo



XD17



VIEW A

29-LES-PRO-PCSXD_1_En/R0

Validation

STEP	PROCEDURE	MEASUREMENT
11	Voltage between XD17:1 and XD17:2	
	Voltage between XD17:1 and XD17:3	
	Voltage between XD17:2 and XD17:3	
	Voltage between XD17:4 and XD17:5	
	Voltage between XD17:4 and XD17:6	
	Voltage between XD17:5 and XD17:6	

Notes/Comments:

Step 12 – Complete Isolation of the 1500 VDC, 600 VAC, 690 VAC and 208 VDC Power Supply

At this stage the 1500 VDC, 600/690 VAC and 208 VAC power supplies to the PCS are isolated.

GENERAL INFORMATION

Document name UPS Panel Lockout Procedure
EVLOFLEX

Written by Date

Verified by: Date

Approved by: Date

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REVISIONS DESCRIPTION

Revision	Author	Date	Changes
00			Original publication

DOCUMENT PURPOSE

This document details the operations to be performed in order to apply lockout in the following work location:

- UPS panel

IMPORTANT NOTE: *If the work to be performed is only on the heater and its circuit breaker CB-1, only steps 2 to 5 must be performed to isolate this circuit.*

WARNING



THIS PROCEDURE WILL LOCK ONLY THE WORK LOCATION DEFINED ABOVE. NEVER USE THIS PROCEDURE TO SECURE ANOTHER WORK LOCATION. ALWAYS USE THE APPLICABLE LOCKOUT PROCEDURE AND WEAR PERSONAL PROTECTIVE EQUIPMENT IN ACCORDANCE WITH APPLICABLE STANDARDS, LAWS AND REGULATIONS. FAILURE TO DO SO CAN CAUSE SERIOUS INJURIES OR EQUIPMENT DAMAGE.

SAFETY CONSIDERATIONS

DANGER

VOLTAGES UP TO 690 VAC AND 1500 VDC CAN BE PRESENT AT ANY TIME. ALWAYS WEAR SAFETY EQUIPMENT AND FOLLOW ALL APPLICABLE INSTRUCTIONS, LAWS AND REGULATIONS WHEN HANDLING THIS PROCEDURE. FAILURE TO FOLLOW THIS SAFETY INSTRUCTION MAY RESULT IN PERSONAL INJURY AND DEATH.

WARNING

PRIOR TO CARRYING OUT WORK ON THE SITE, AUTHORIZATION MUST BE OBTAINED FROM THE OPERATOR AND/OR SITE MANAGER. FAILURE TO DO SO CAN CAUSE SERIOUS INJURIES OR EQUIPMENT DAMAGE.

WARNING

READ THIS PROCEDURE IN ITS ENTIRETY BEFORE BEGINNING WORK. FOLLOW AND EXECUTE THE STEPS IN THE ORDER SHOWN. IF YOU HAVE ANY QUESTIONS, CONTACT YOUR SUPERVISOR. FAILURE TO DO SO CAN CAUSE SERIOUS INJURIES OR EQUIPMENT DAMAGE.

WARNING

AT LEAST TWO PEOPLE ARE REQUIRED TO PERFORM THE OPERATIONS DESCRIBED IN THIS PROCEDURE, ONE PERSON WHO PERFORMS THE STEPS AND ONE PERSON WHO VERIFIES THE EXECUTION. FAILURE TO DO SO CAN CAUSE SERIOUS INJURIES OR EQUIPMENT DAMAGE.

DEFINITIONS

- cm: Centimeter
- EVLOFLEX: All BESS equipment (container, panel boards, UPS, EMP)
- HVAC: Heating, Ventilation, Air Conditioning
- PPE: Personal Protective Equipment
- SSG: Stack Switchgear
- UPS: Uninterrupted Power Supply
- VAC/VDC: Volt Alternating Current/Volt Direct Current

TOOLS AND EQUIPMENT

- 1x – Padlock box with serial padlock
- 1x – Lockout tag
- 1x – ABB XT1 circuit breaker lockout device (Masterlock 491B)
- 1x – Padlocking device for Bussmann disconnectable fuse holder (Brady 90850)
- 1x – Multimeter
- 1x – Computer

REFERENCES

NOTE: *Make sure to use the latest revision of the document. If a newer revision is available, use that revision. Inform the person in charge if there is a difference between the information found in this procedure and in the engineering drawings.*

- 71200000 – Power Supply Panel
- 71300000 – 460 Vac Distribution Panel
- 71500000 – UPS Panel
- STD-DOC-SST-003– Lockout Program
- CXL2-DOC-CAD-000– Site specificities
- Annex – Site engineering documentation

Step 1 – Confirm that the system is not in operation

Location

- EVLOGIX website/web interface for this installation

Instructions

- Verify on the operator interface that the system is not in operation.
- If the system is running, confirm with the site manager that the system can be shut down.

Equipment

- 1x– Computer

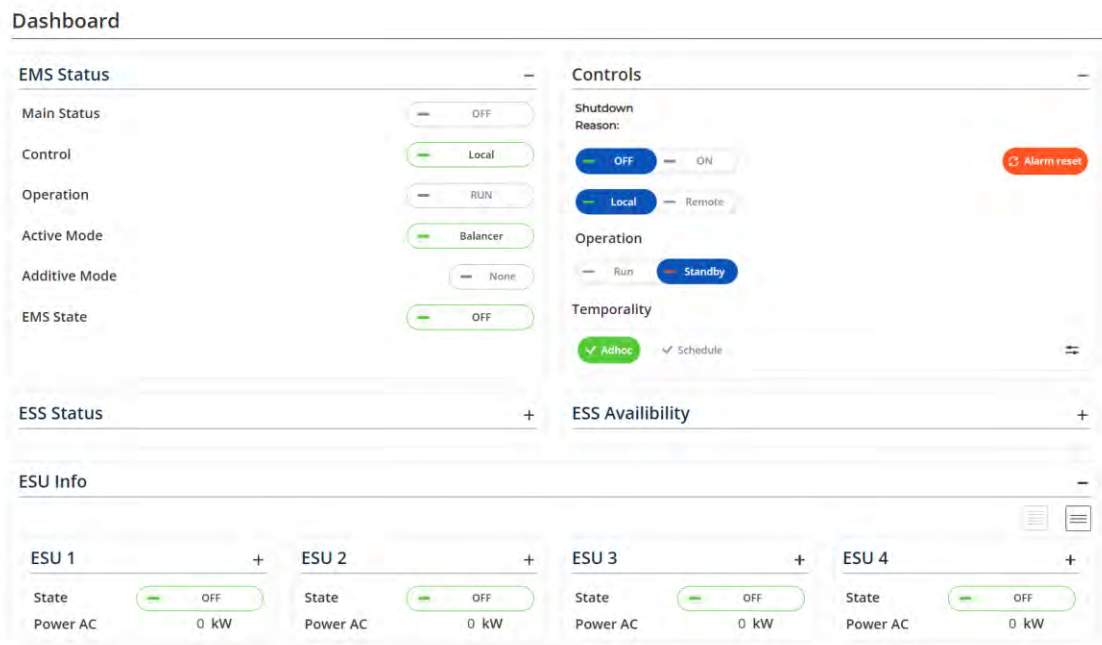
Energy level

- Not Applicable

PPE

- Not Applicable

Photo



TYPICAL EVLOGIX INTERFACE, FOR REFERENCE ONLY

Validation

STEP	PROCEDURE	INITIALS
1	The system is off.	

Notes/Comments:

Step 2 - Verification of the Presence of 460 VAC

Location

- UPS Panel → Disconnectable fuse holder CB-1.1
- UPS Panel → Disconnectable fuse holder CB-1.2
-

Instructions

- Validation of the presence of voltage on the CB-1.1 disconnectable fuse holder upper terminals
- Validation of the presence of voltage on the CB-1.2 disconnectable fuse holder upper terminals
-

Equipment

- 1x – Multimeter

Energy level

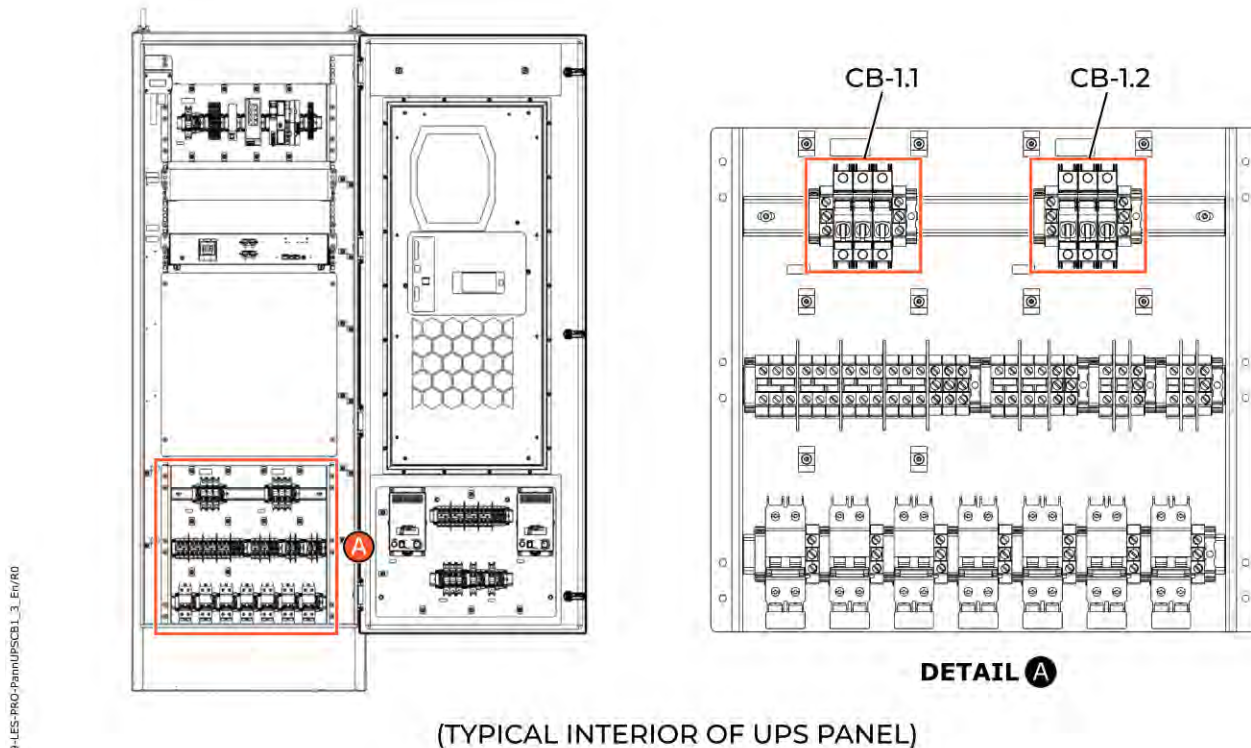
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the site specificities. Refer to the document [CXL2-DOC-CAD-000 – SITE SPECIFICITIES](#). The values shown below are for reference only.

- <1.2 cal/cm² to 0.46 meters (typical)

PPE

- Class 0 protective equipment (typical)

Photo



Validation

STEP	PROCEDURE	MEASUREMENT
CB-1.1		
2	Voltage between upper terminal 1 and upper terminal 3.	
	Voltage between upper terminal 3 and upper terminal 5.	
	Voltage between upper terminal 1 and upper terminal 5.	
	Voltage between upper terminal 1 and GND.	
	Voltage between upper terminal 3 and GND.	
	Voltage between upper terminal 5 and GND.	
CB-1.2		
2	Voltage between upper terminal 1 and upper terminal 3.	
	Voltage between upper terminal 3 and upper terminal 5.	
	Voltage between upper terminal 1 and upper terminal 5.	
	Voltage between upper terminal 1 and GND.	
	Voltage between upper terminal 3 and GND.	
	Voltage between upper terminal 5 and GND.	

Notes/Comments:

Step 3 – Opening and Padlocking the 460 VAC Power Supply

Location

- Distribution panel 460 VAC → CB-6.1 circuit breaker

Instructions

- CB-6.1 Circuit breaker open and lockout.

Equipment

- 1x – ABB XT1 circuit breaker lockout device (Masterlock 491B)
- 1x – Serial lock

Energy level

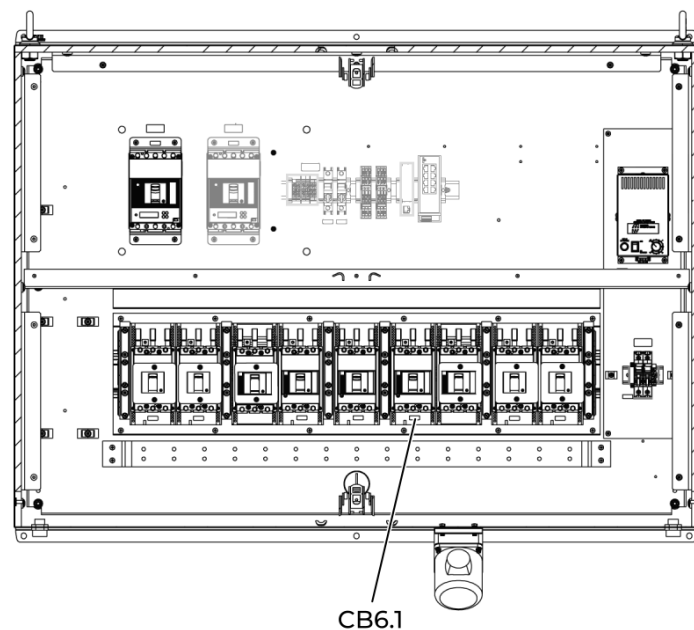
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the site specificities. Refer to the document **CXL2-DOC-CAD-000 – SITE SPECIFICITIES**. The values shown below are for reference only.

- <8 cal/cm² to 0.46 meters (typical)

PPE

- Class 2 protective equipment (typical)

Photo



(TYPICAL INTERIOR OF 460 VAC DISTRIBUTION PANEL)

282-CXL2-PRO-Param460VCE_2_Env/RO

Validation

STEP	PROCEDURE	NO.
3	Installed padlock number	

Notes/Comments:

Step 4 – Opening and Padlocking the 460 VAC Power Supply

Location

- UPS Panel → Disconnectable fuse holder CB-1.2

Instructions

- CB-1.2 Circuit breaker open and lockout.

Equipment

- 1x – Padlocking device for Bussmann disconnectable fuse holder (Brady 90850)
- 1x – Serial lock

Energy level

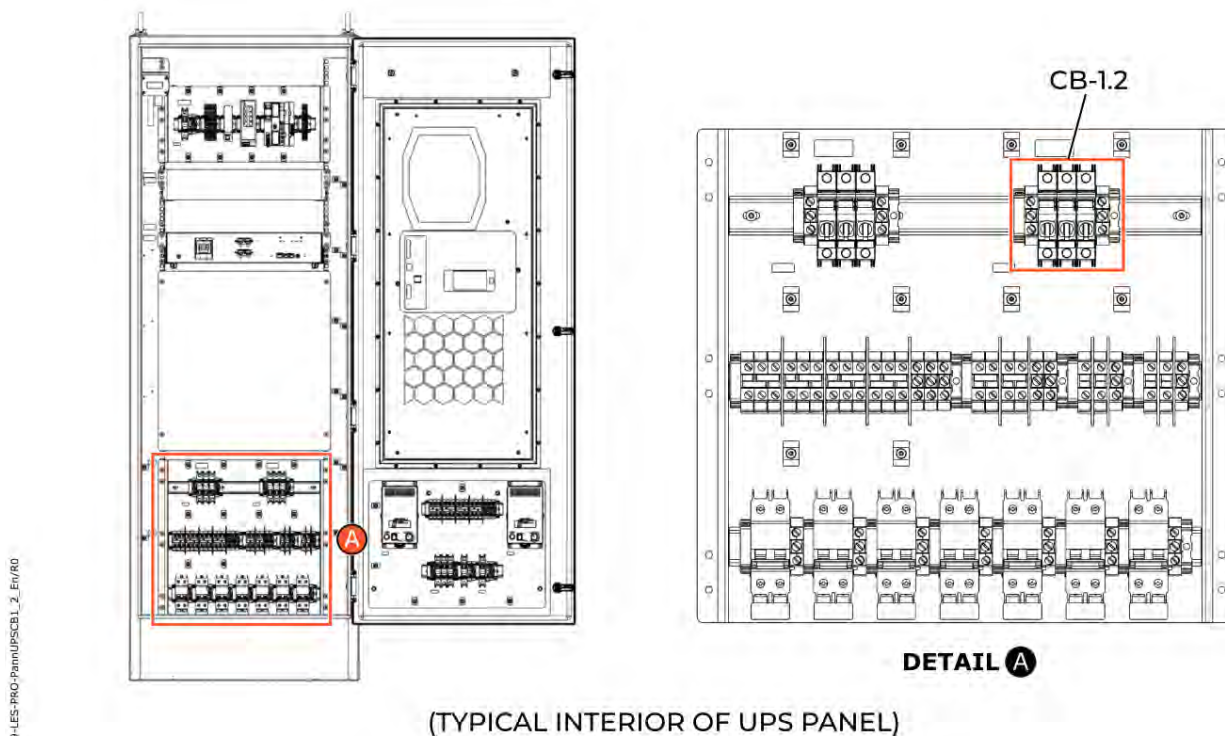
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the site specificities. Refer to the document [CXL2-DOC-CAD-000 – SITE SPECIFICITIES](#). The values shown below are for reference only.

- <1.2 cal/cm² to 0.46 meters (typical)

PPE

- Class 0 protective equipment (typical)

Photo



Validation

STEP	PROCEDURE	NO.
4	Installed padlock number	

Notes/Comments:

Step 5 - Verification of the Absence of 460 VAC

Location

- UPS Panel → Disconnectable fuse holder CB-1.1
- UPS Panel → Disconnectable fuse holder CB-1.2

Instructions

- Take voltage measurements on the CB-1.1 disconnectable fuse holder upper terminals
- Take voltage measurements on the CB-1.2 disconnectable fuse holder upper terminals

Equipment

- 1x – Multimeter

Energy level

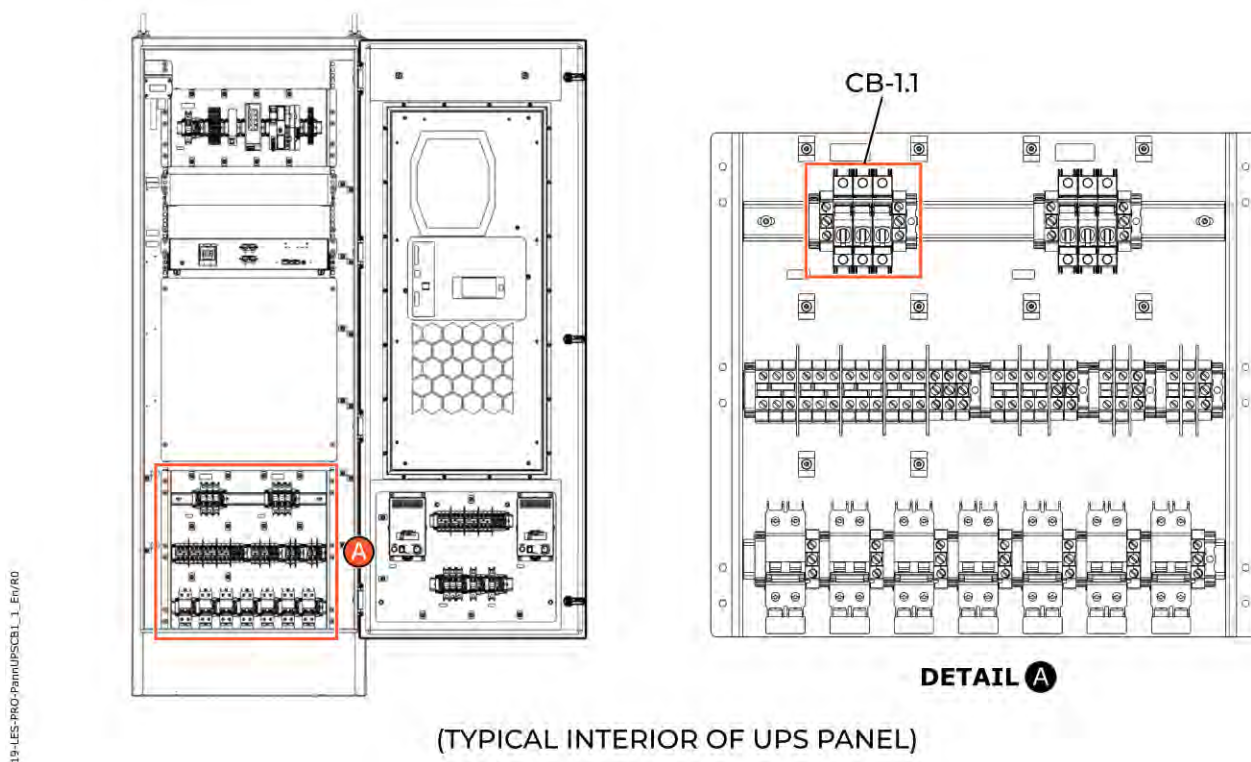
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the site specificities. Refer to the document [CXL2-DOC-CAD-000 – SITE SPECIFICITIES](#). The values shown below are for reference only.

- <1.2 cal/cm² to 0.46 meters (typical)

PPE

- Class 0 protective equipment (typical)

Photo



Validation

STEP	PROCEDURE	MEASUREMENT
CB-1.1		
5	Voltage between upper terminal 1 and upper terminal 3.	
	Voltage between upper terminal 3 and upper terminal 5.	
	Voltage between upper terminal 1 and upper terminal 5.	
	Voltage between upper terminal 1 and GND.	
	Voltage between upper terminal 3 and GND.	
	Voltage between upper terminal 5 and GND.	
CB-1.2		
5	Voltage between upper terminal 1 and upper terminal 3.	
	Voltage between upper terminal 3 and upper terminal 5.	
	Voltage between upper terminal 1 and upper terminal 5.	
	Voltage between upper terminal 1 and GND.	
	Voltage between upper terminal 3 and GND.	
	Voltage between upper terminal 5 and GND.	

Notes/Comments:

Step 6 – De-energizing the UPS (A/B/C)

NOTE: Depending on the configuration, up to three UPS can be present. Refer to the site document to clearly identify the panel layout.

Location

- APPLICABLE UPS → UPS A/B/C PANELS

Instructions

- Shutting down the applicable UPS/UPS A/B/C by pressing the OFF button

Equipment

- Not Applicable

Energy level

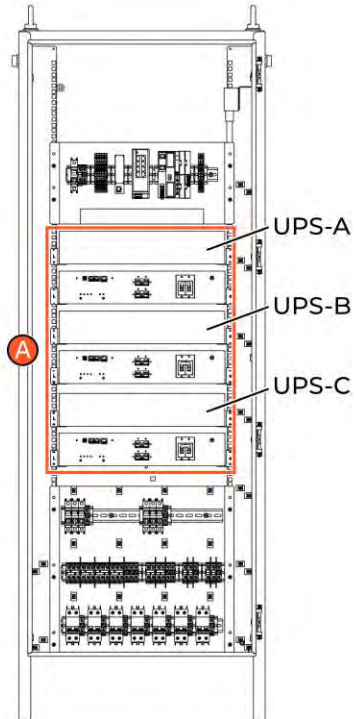
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the site specificities. Refer to the document *CXL2-DOC-CAD-000 – SITE SPECIFICITIES*. The values shown below are for reference only.

- <1.2 cal/cm² to 0.46 meters (typical)

PPE

- Class 0 protective equipment (typical)

Photo



DETAIL A

(TYPICAL UPS PANEL INTERIOR)

32-LES-PRO-Pann-UPS-012_1_En/R0

Validation

STEP	PROCEDURE	INITIALS
6	Visual validation that UPS A is off	
6	Visual validation that UPS B is off (if applicable)	
6	Visual validation that UPS C is off (if applicable)	

Notes/Comments:

Step 7 – Isolating the UPS (A/B/C) Batteries

NOTE: Depending on the configuration, up to three UPS batteries may be present. Refer to the site document to clearly identify the panel layout.

Location

- APPLICABLE UPS → UPS (A/B/C) PANELS

Instructions

- Shutting down the batteries of applicable UPS/UPS A/B/C by opening the battery circuit breakers (OFF position)
- Install a lockout label on the UPS circuit breaker

Equipment

- 3x – Lockout tags

Energy level

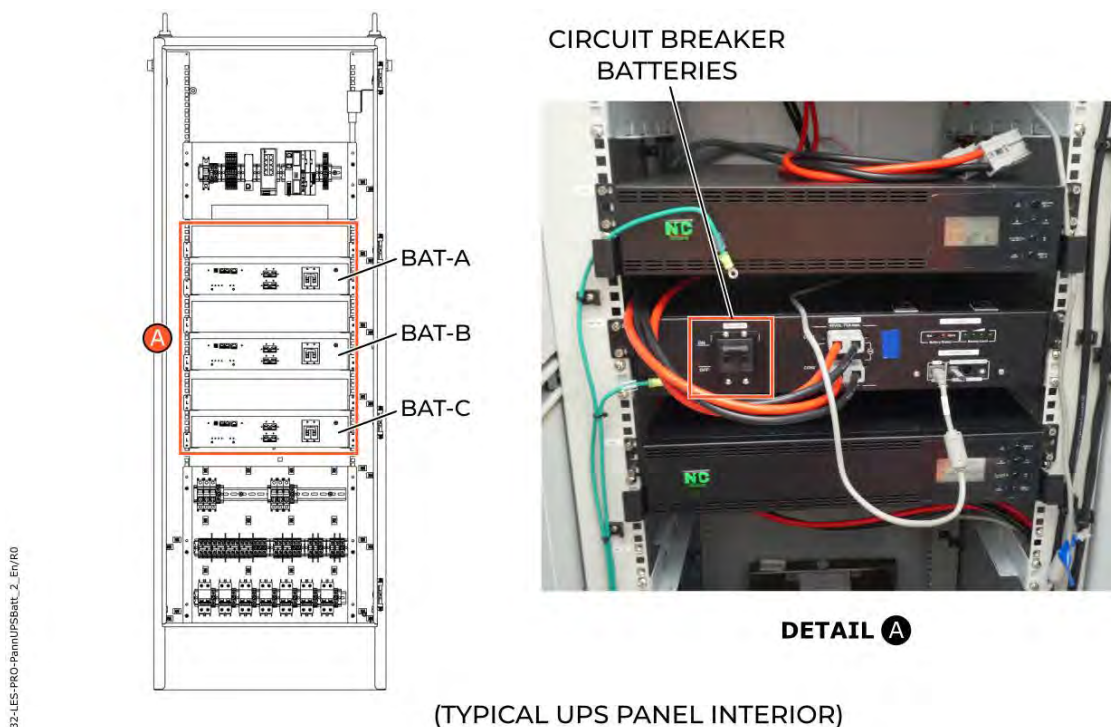
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the site specificities. Refer to the document *CXL2-DOC-CAD-000 – SITE SPECIFICITIES*. The values shown below are for reference only.

- <1.2 cal/cm² to 0.46 meters (typical)

PPE

- Class 0 protective equipment (typical)

Photo



Validation

STEP	PROCEDURE	INITIALS
7	Install Lockout Labels (UPS-A)	
7	Install Lockout Labels (UPS-B) if applicable	
7	Install Lockout Labels (UPS-C) if applicable	

Notes/Comments:

Step 8 - Verification of the Presence of 24 VDC

Location

- UPS Panel → Disconnectable fuse holder CB-9.1

Instructions

- Validation of the presence of voltage on the CB-9.1 disconnectable fuse holder terminals

Equipment

- 1x – Multimeter

Energy level

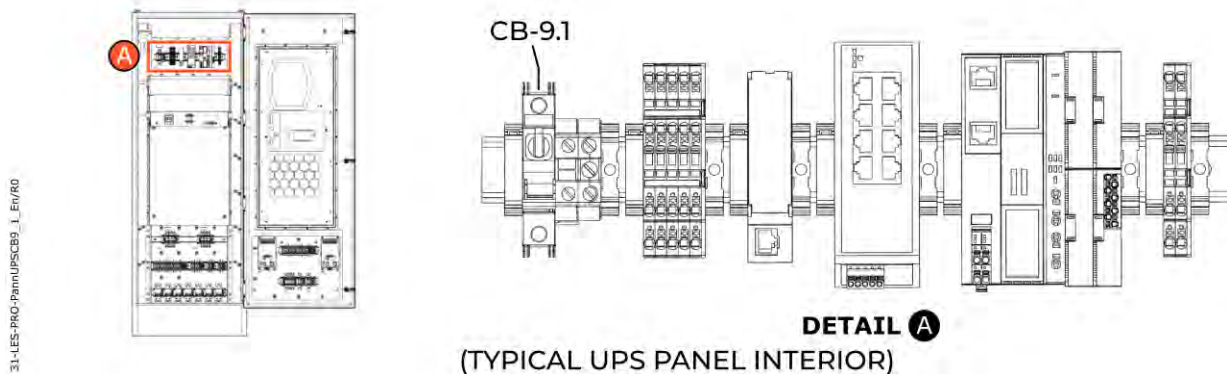
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the site specificities. Refer to the document [CXL2-DOC-CAD-000 – SITE SPECIFICITIES](#). The values shown below are for reference only.

- <1.2 cal/cm² to 0.46 meters (typical)

PPE

- Class 0 protective equipment (typical)

Photo



Validation

STEP	PROCEDURE	MEASUREMENT
8	Measure the voltage between the positive and negative terminals	

Notes/Comments:

Step 9 – Opening and Padlocking the 24 VDC Power Supply

Location

- PS Panel → Disconnectable Fuse Holder CB-3.4
 - o Validate that the PS panel corresponds to the group in which the work is performed. Refer to the site documents

Instructions

- Opening and padlocking the CB-3.4 disconnectable fuse holder

Equipment

- 1x – Padlocking device for Bussmann disconnectable fuse holder (Brady 90850)
- 1x – Serial lock

Energy level

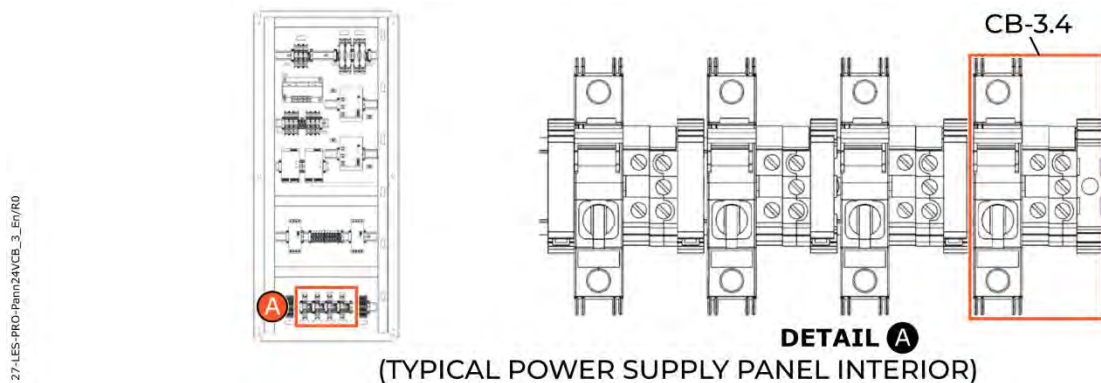
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the site specificities. Refer to the document [CXL2-DOC-CAD-000 – SITE SPECIFICITIES](#). The values shown below are for reference only.

- <1.2 cal/cm² to 0.46 meters (typical)

PPE

- Class 0 protective equipment (typical)

Photo



Validation

STEP	PROCEDURE	NO.
9	PS panel mapping to the group where padlock is performed	
9	Installed padlock number	

Notes/Comments:

Step 10 – Verification of the Absence of 24 VDC

Location

- UPS Panel → Disconnectable fuse holder CB-9.1

Instructions

- Validation of the absence of voltage on the CB-9.1 disconnectable fuse holder upper terminals

Equipment

- 1x – Multimeter

Energy level

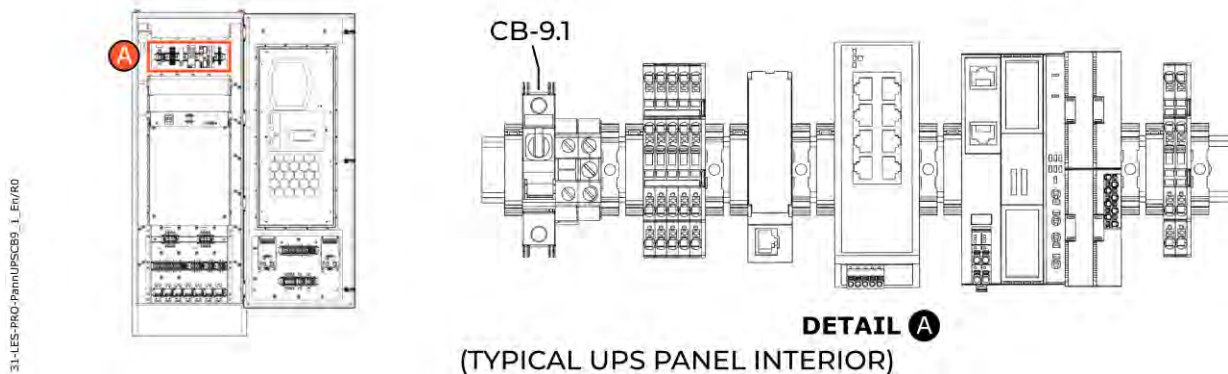
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the site specificities. Refer to the document [CXL2-DOC-CAD-000 – SITE SPECIFICITIES](#). The values shown below are for reference only.

- <1.2 cal/cm² to 0.46 meters (typical)

PPE

- Class 0 protective equipment (typical)

Photo



Validation

STEP	PROCEDURE	MEASUREMENT
10	Voltage between the positive and negative terminals	

Notes/Comments:

Step 11 – Complete Isolation of the 460 VAC and 24 VDC Power Supply

At this stage the 460 VAC, and 24 VDC power supply of the UPS panel is isolated.

GENERAL INFORMATION

Document name EMS Lockout Procedure
EVLOFLEX

Written by _____ **Date** _____

Verified by: _____ **Date** _____

Approved by: _____ **Date** _____

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REVISIONS DESCRIPTION

Revision	Author	Date	Changes

DOCUMENT PURPOSE

This document details the operations to be performed in order to apply lockout in the following work location:

- EMP

IMPORTANT NOTE: *If the work to be performed is only on the heater and its circuit breaker CB10.1, only steps 2 to 4 must be performed to isolate this circuit.*

WARNING



THIS PROCEDURE WILL LOCK ONLY THE WORK LOCATION DEFINED ABOVE. NEVER USE THIS PROCEDURE TO SECURE ANOTHER WORK LOCATION. ALWAYS USE THE APPLICABLE LOCKOUT PROCEDURE AND WEAR PERSONAL PROTECTIVE EQUIPMENT IN ACCORDANCE WITH APPLICABLE STANDARDS, LAWS AND REGULATIONS. FAILURE TO DO SO CAN CAUSE SERIOUS INJURIES OR EQUIPMENT DAMAGE.

SAFETY CONSIDERATIONS

DANGER

VOLTAGES UP TO 208 VAC CAN BE PRESENT AT ANY TIME. ALWAYS WEAR SAFETY EQUIPMENT AND FOLLOW ALL APPLICABLE INSTRUCTIONS, LAWS AND REGULATIONS WHEN HANDLING THIS PROCEDURE. FAILURE TO FOLLOW THIS SAFETY INSTRUCTION MAY RESULT IN PERSONAL INJURY AND DEATH.

WARNING

PRIOR TO CARRYING OUT WORK ON THE SITE, AUTHORIZATION MUST BE OBTAINED FROM THE OPERATOR AND/OR SITE MANAGER. FAILURE TO DO SO CAN CAUSE SERIOUS INJURIES OR EQUIPMENT DAMAGE.

WARNING

READ THE ENTIRE PROCEDURE BEFORE STARTING THE WORK. FOLLOW AND EXECUTE THE STEPS IN THE ORDER SHOWN. IF YOU HAVE ANY QUESTIONS, CONTACT THE SUPERVISOR. FAILURE TO DO SO CAN CAUSE SERIOUS INJURIES OR EQUIPMENT DAMAGE.

WARNING

AT LEAST TWO PEOPLE ARE REQUIRED TO PERFORM THE OPERATIONS DESCRIBED IN THIS PROCEDURE. ONE PERSON WHO PERFORMS THE STEPS AND ONE PERSON WHO VERIFIES THE EXECUTION. FAILURE TO DO SO CAN CAUSE SERIOUS INJURIES OR EQUIPMENT DAMAGE.

DEFINITIONS

- cm: Centimeter
- EMP: Energy Management Panel
- EVLOFLEX: All BESS equipment (container, panel boards, UPS, EMP)
- GND: Grounding
- PPE: Personal Protective Equipment
- SSG: Stack Switchgear
- VAC/VDC: Volt Alternating Current/Volt Direct Current

TOOLS AND EQUIPMENT

- 1x – padlock box with serial padlock
- 1x – Schneider circuit breaker lockout device (Brady 90844)
- 1x – Padlocking device for Bussmann disconnectable fuse holder (Brady 90850)
- 1x – Multimeter
- 1x – Computer

REFERENCES

NOTE: *Make sure to use the latest revision of the document. If a newer revision is available, use that revision. Inform the person in charge if there is a difference between the information found in this procedure and in the engineering drawings.*

- 71200000 – Power Supply Panel
- 71800000 – 208 Vac Distribution Panel
- STD-DOC-SST-003– Lockout Program
- CXL2-DOC-CAD-000–Site specificities
- Annex – Engineering Documentation

Step 1 – Confirm that the system is not in operation

Location

- EVLOGIX website/web interface for this installation

Instructions

- Verify on the operator interface that the system is not in operation.
- If the system is running, confirm with the site manager that the system can be shut down.

Equipment

- 1x– Computer

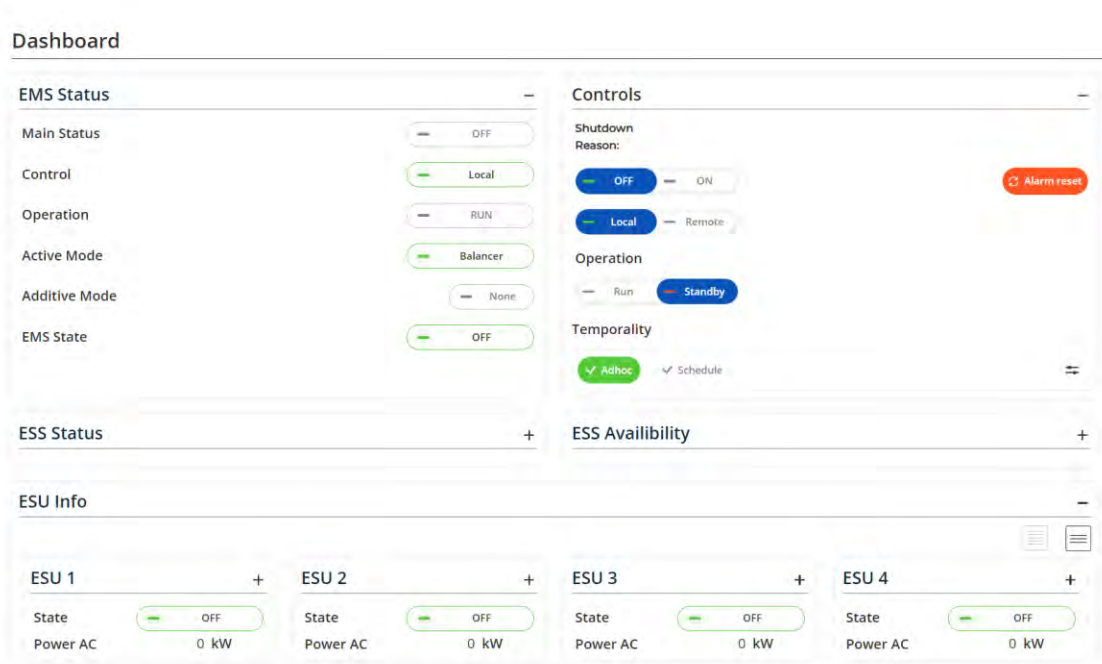
Energy level

- 0 cal/cm²

PPE

- Not Applicable

Photo



TYPICAL EVLOGIX INTERFACE, FOR REFERENCE ONLY

Validation

STEP	PROCEDURE	INITIALS
1	The system is off.	

Notes/Comments:

Step 2 - Validation of the presence of 208 VAC

NOTE: Steps 2 through 4 are applicable only if the EMP has the Arctic option. Otherwise, proceed directly to step 5.

Location

- EMP → CB-10.1 Disconnectable fuse holder

Instructions

- Validation of the presence of voltage on the CB-10.1 disconnectable fuse holder terminals

Equipment

- 1x – Multimeter

Energy level

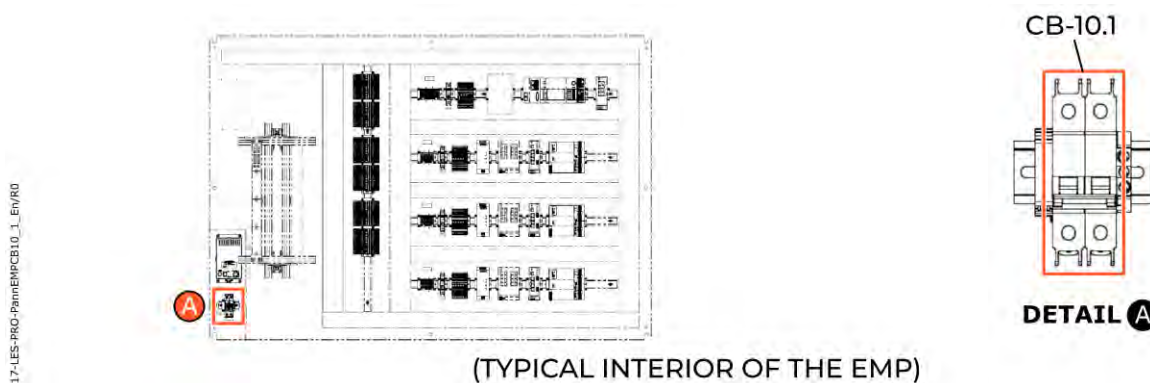
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the site specificities. Refer to the document **CXL2-DOC-CAD-000 – SITE SPECIFICITIES**. The values shown below are for reference only.

- <1.2 cal/cm² to 0.46 meters (typical)

PPE

- Class 0 protective equipment (typical)

Photo



Validation

STEP	PROCEDURE	MEASUREMENT
2	Voltage between L1 terminal and L2 terminal.	
	Voltage between terminal L1 and GND.	
	Voltage between terminal L2 and GND.	

Notes/Comments:

Step 3 – Opening and Padlocking the 208 VAC Power Supply

NOTE: Steps 2 through 4 are applicable only if the EMP has the Arctic option. Otherwise, proceed directly to step 5.

Location

- Distribution panel 208 VAC → CB-2.1 circuit breaker

Instructions

- CB-2.1 Circuit Breaker open and lockout.

Equipment

- 1x – Lockout device for Schneider circuit breaker
- 1x – Serial lock

Energy level

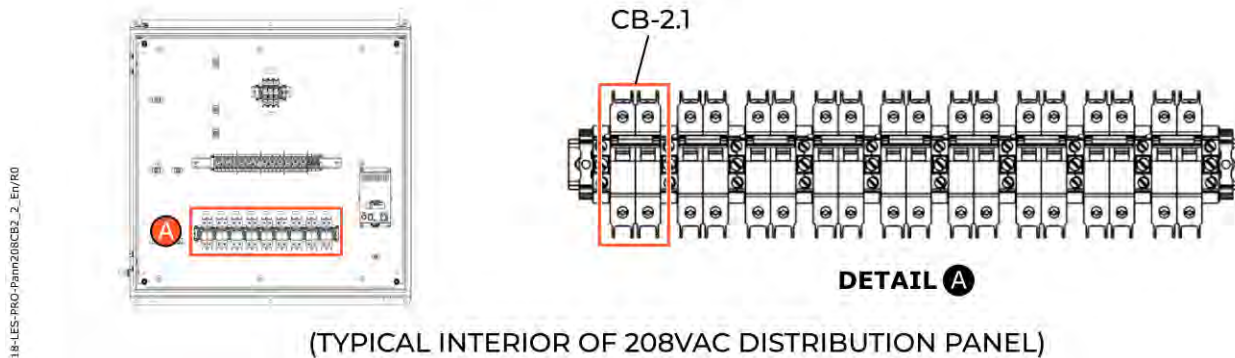
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the site specificities. Refer to the document *CXL2-DOC-CAD-000 – SITE SPECIFICITIES*. The values shown below are for reference only.

- <1.2 cal/cm² to 0.46 meters (typical)

PPE

- Class 0 protective equipment (typical)

Photo



Validation

STEP	PROCEDURE	NO.
3	Installed padlock number	

Notes/Comments:

Step 4 – Validation of the Absence of 208 VAC

NOTE: Steps 2 through 4 are applicable only if the EMP has the Arctic option. Otherwise, proceed directly to step 5.

Location

- EMP → CB-10.1 Disconnectable fuse holder

Instructions

- Validation of the absence of voltage on the CB-10.1 disconnectable fuse holder terminals

Equipment

- 1x – Multimeter

Energy level

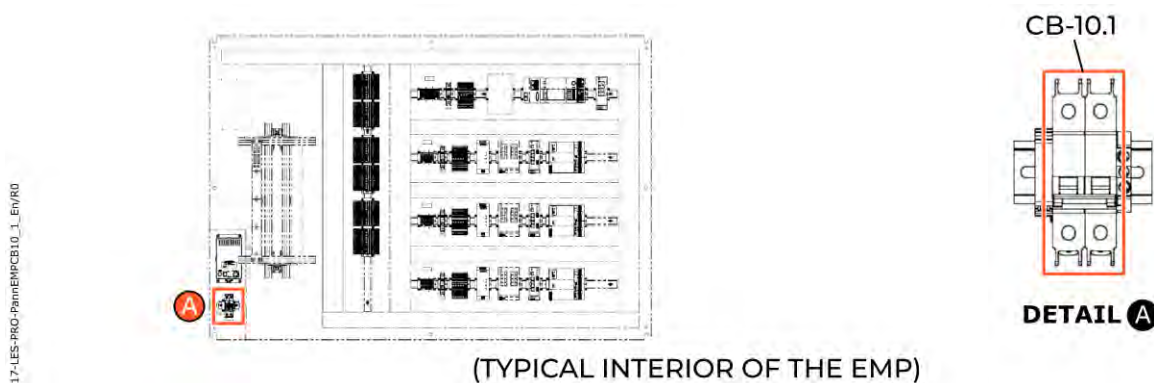
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the site specificities. Refer to the document **CXL2-DOC-CAD-000 – SITE SPECIFICITIES**. The values shown below are for reference only.

- <1.2 cal/cm² to 0.46 meters (typical)

PPE

- Class 0 protective equipment (typical)

Photo



Validation

STEP	PROCEDURE	MEASUREMENT
4	Voltage between L1 terminal and L2 terminal.	
	Voltage between terminal L1 and GND.	
	Voltage between terminal L2 and GND.	

Notes/Comments:

Step 5 - Verification of the Presence of 24 VDC

Location

- EMP → Terminal TB-24VDC-1.1

Instructions

- Validating the presence of voltage on the 24 VDC input terminals (TB-24 VDC-1.1)
- Validating the presence of voltage on the 24 VDC input terminals (TB-24 VDC-2.1) if applicable.
- Validating the presence of voltage on the 24 VDC input terminals (TB-24 VDC-3.1) if applicable

Equipment

- 1x – Multimeter

Energy level

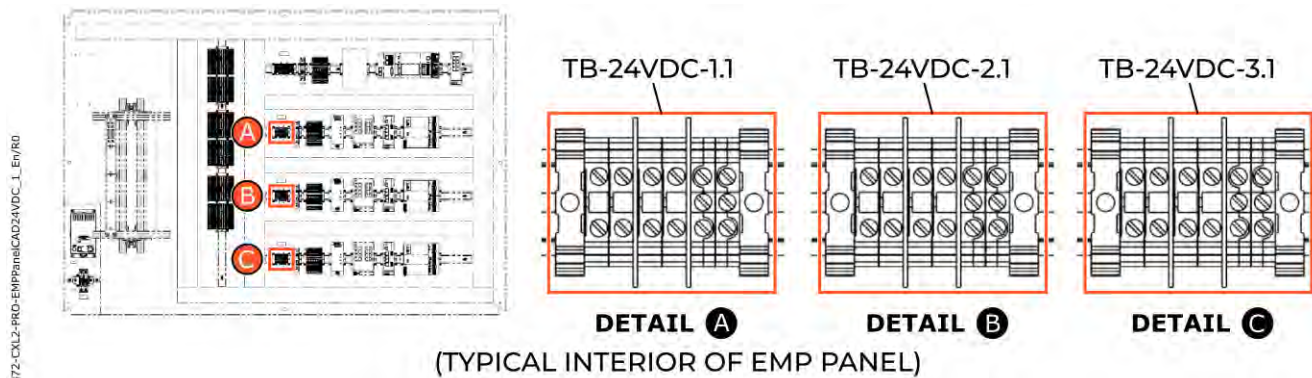
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the site specificities. Refer to the document [CXL2-DOC-CAD-000 – SITE SPECIFICITIES](#). The values shown below are for reference only.

- <1.2 cal/cm² to 0.46 meters (typical)

PPE

- Class 0 protective equipment (typical)

Photo



Validation

STEP	PROCEDURE	MEASUREMENT
5	Voltage between the positive and TB-24VDC-1.1. negative terminals	
5	Voltage between positive and TB-24VDC-2.1 negative terminal (if applicable).	
5	Voltage between positive and TB-24VDC-3.1 negative terminal (if applicable).	

Notes/Comments:

Step 6 – Opening and Padlocking the 24 VDC Power Supply

IMPORTANT NOTE: Up to three PS panels can be present for one EMP depending on the number of groups, padlock circuit breaker CB3.1 of each PS panel present in the group.

Location

- Power supply panel (PS) → Disconnectable fuse holder CB–3.1

Instructions

- Opening and padlocking the CB–3.1 Disconnectable fuse holder

Equipment

- 1x – Padlocking device for Bussmann disconnectable fuse holder
- 1x – Serial lock

Energy level

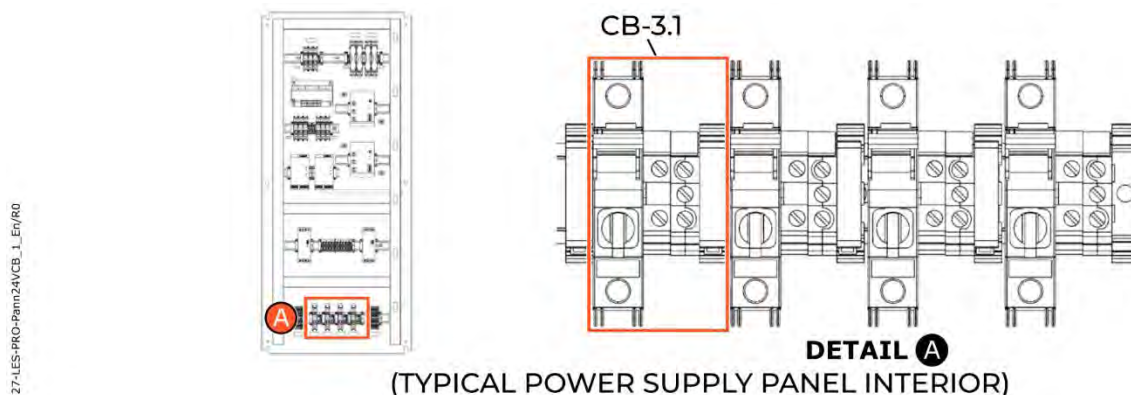
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the site specificities. Refer to the document [CXL2-DOC-CAD-000 – SITE SPECIFICITIES](#). The values shown below are for reference only.

- <1.2 cal/cm² to 0.46 meters (typical)

PPE

- Class 0 protective equipment (typical)

Photo



Validation

STEP	PROCEDURE	NO.
6	PS panel of 1 st group: Installed padlock number	
6	PS panel of 2 nd group: Installed padlock number	
6	PS panel of 3 rd group: Installed padlock number	

Notes/Comments:

Step 7 - Verification of the Absence of 24 VDC

Location

- EMP → Terminal TB-24VDC-1.1

Instructions

- Measure voltage on the 24 VDC input terminals (TB-24 VDC-1.1)
- Measure voltage on the 24 VDC input terminals (TB-24 VDC-2.1), if applicable.
- Measure voltage on the 24 VDC input terminals (TB-24 VDC-3.1), if applicable

Equipment

- 1x – Multimeter

Energy level

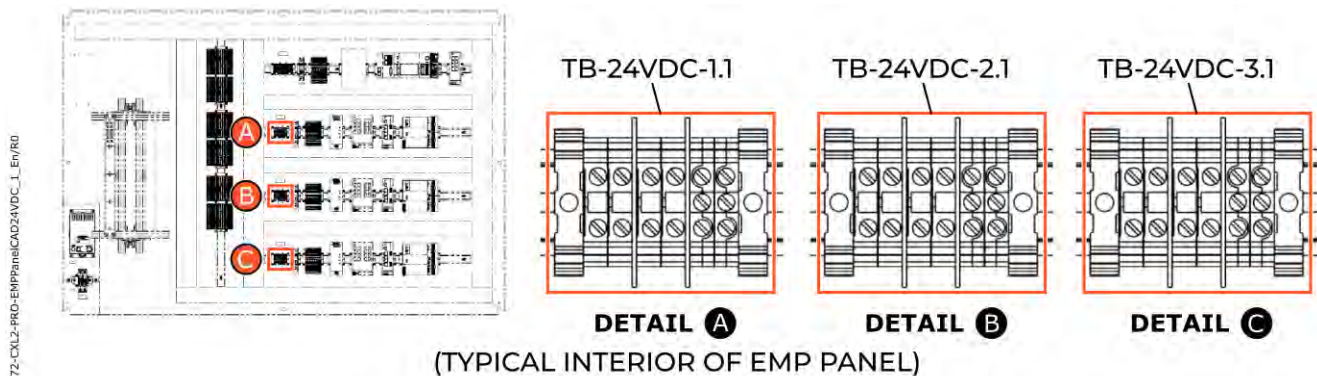
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the site specificities. Refer to the document [CXL2-DOC-CAD-000 – SITE SPECIFICITIES](#). The values shown below are for reference only.

- <1.2 cal/cm² to 0.46 meters (typical)

PPE

- Class 0 protective equipment (typical)

Photo



Validation

STEP	PROCEDURE	MEASUREMENT
7	Voltage between the positive and TB-24VDC-1.1. negative terminals	
7	Voltage between positive and TB-24VDC-2.1 negative terminal (if applicable).	
7	Voltage between positive and TB-24VDC-3.1 negative terminal (if applicable).	

Notes/Comments:

Step 8 – Complete Isolation of the 208 VAC and 24 VDC Power Supply

At this stage the 208 VAC and 24 VDC power supply to the EMP is isolated.

GENERAL INFORMATION

Document Name SPPC/EMS Lockout Procedure
EVLOFLEX

Translated by Lia Raykhlin
EVLO, Technical translator

Date 2025-02-11

NOTE: *This document has been translated from the original French version. Refer to the French version of the document for the review and approval information. If any discrepancy is found between this translation and the original document, the information in the French document shall prevail.*

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REVISIONS DESCRIPTION

Revision	Author	Date	Changes
00			Original Publication
01	T. Bredillet	2024-10-23	Integration of engineering comments

DOCUMENT PURPOSE

This document details the operations to be performed in order to apply lockout in the following work location:

- SPPC/EMS

WARNING



THIS PROCEDURE WILL LOCKOUT ONLY THE WORK LOCATION DEFINED ABOVE. NEVER USE THIS PROCEDURE TO SECURE ANOTHER WORK LOCATION. ALWAYS USE THE APPLICABLE LOCKOUT PROCEDURE AND WEAR PERSONAL PROTECTIVE EQUIPMENT IN ACCORDANCE WITH APPLICABLE STANDARDS, LAWS AND REGULATIONS. FAILURE TO FOLLOW THESE SAFETY INSTRUCTIONS CAN CAUSE SERIOUS INJURIES OR EQUIPMENT DAMAGE.

SAFETY CONSIDERATIONS

DANGER

VOLTAGES UP TO 240 VAC CAN BE PRESENT AT ANY TIME. ALWAYS WEAR SAFETY EQUIPMENT AND FOLLOW ALL APPLICABLE INSTRUCTIONS, LAWS, AND REGULATIONS WHEN PERFORMING THE MANIPULATIONS DESCRIBED IN THIS PROCEDURE. FAILURE TO FOLLOW THIS INSTRUCTION WILL CAUSE SERIOUS INJURIES AND DEATH.

WARNING

PRIOR TO CARRYING OUT WORK ON THE SITE, AUTHORIZATION MUST BE OBTAINED FROM THE OPERATOR AND/OR SITE MANAGER. FAILURE TO FOLLOW THESE SAFETY INSTRUCTIONS CAN CAUSE SERIOUS INJURIES OR DAMAGE TO EQUIPMENT.

WARNING

READ THE ENTIRE PROCEDURE BEFORE STARTING THE WORK. FOLLOW AND EXECUTE THE MANIPULATIONS IN THE ORDER SHOWN. IF YOU HAVE ANY QUESTIONS, CONTACT THE SUPERVISOR. FAILURE TO FOLLOW THESE SAFETY INSTRUCTIONS CAN CAUSE SERIOUS INJURIES OR DAMAGE TO EQUIPMENT.

WARNING

AT LEAST TWO PEOPLE ARE REQUIRED TO PERFORM THE OPERATIONS DESCRIBED IN THIS PROCEDURE. A PERSON WHO PERFORMS THE STEPS AND A PERSON WHO VERIFIES THE EXECUTION. FAILURE TO FOLLOW THESE SAFETY INSTRUCTIONS CAN CAUSE SERIOUS INJURIES OR EQUIPMENT DAMAGE.

DEFINITIONS

- cm: Centimeter
- EMP: Energy Management Panel
- EVLOFLEX: All BESS equipment (container, panel boards, UPS, EMP)
- GND: Grounding
- HVAC: Heating, Ventilation, Air Conditioning
- PPE: Personal Protective Equipment
- SPPC/EMS: Smart Power Plant Controller
- SSG: Stack Switchgear
- VAC/VDC: Volt Alternating Current/Volt Direct Current

TOOLS AND EQUIPMENT

- 1x – Lockout box with series padlock
- 1x – Multimeter
- 1x – Computer
- 4x – Lockout tags
- 1x – Phoenix Contact circuit breaker lockout device (Brady 90844)
- 1x – Series padlock
- 1x – Hasp

REFERENCES

- STD-DOC-SST-003– Lockout Program
- CXL2-DOC-CAD-000 – Site Specifics
- Annex: Site engineering documentation

Step 1 – Confirm that the System is not in Operation

Location

- Installation of the EVLOGIX website/web interface

Instructions

- Verify that the system is not in operation on the operator interface.
- If the system is running, confirm with the site manager that the system can be shut down.

Equipment

- 1x – Computer

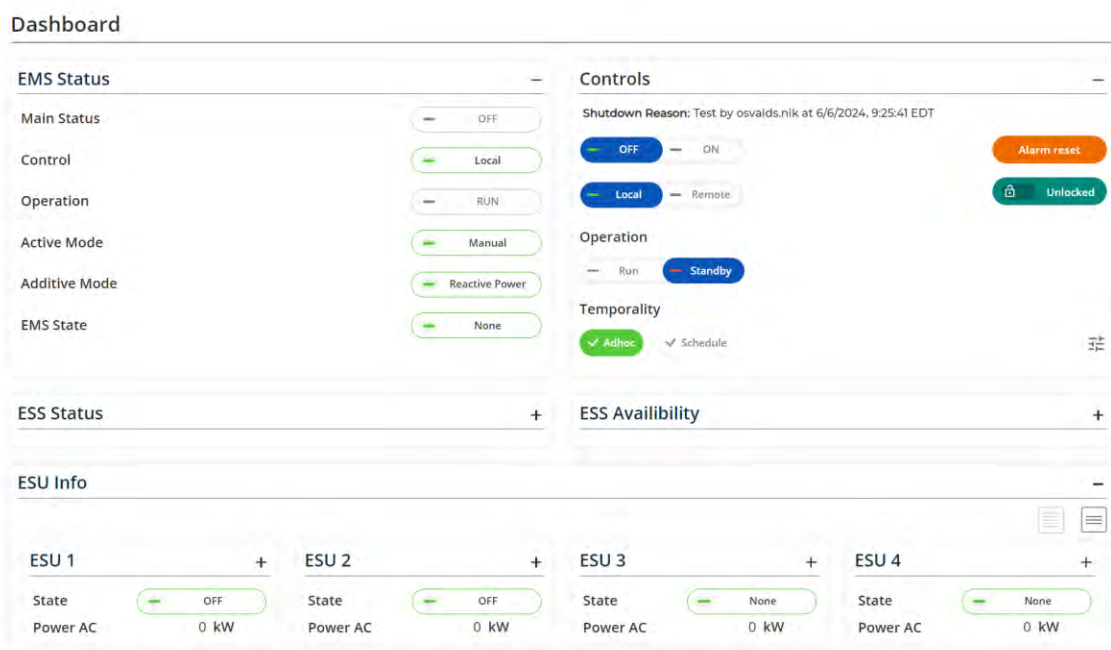
Energy level

- Not Applicable

PPE

- Not Applicable

Photo



TYPICAL EVLOGIX INTERFACE, FOR REFERENCE ONLY

Validation

STEP	PROCEDURE	INITIALS
1	The system is off.	

Notes/Comments:

Step 2 – Disable the Equipment

Location

- SPPC/EMS → equipment

Instructions

- Shut down the Beckhoff server by pressing the ATX button.
- Shut down the Dell server by pressing the power button.
- Disable switches and firewalls using the manufacturer's management software.
- Disable other equipment (if applicable) depending on site configuration.

Equipment

- Not Applicable

Energy level

NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the specifics of the site. Refer to the **CXL2-DOC-CAD-000 – SITE SPECIFICS** document. The values shown below are for reference only.

- $\leq 1.2 \text{ cal/cm}^2$ to 0.46 meters (typical)

PPE

- Class 0 protective equipment (typical)

Validation

STEP	PROCEDURE	INITIALS
2	Visually confirm that the Beckhoff server is down.	
2	Visually confirm that the Dell server is down.	
2	Visually confirm that the switches and firewalls are off.	
2	Visually confirm that other equipment (if applicable) is off.	

Notes/Comments:

Step 3 – Disable the UPS (A/B)

Location

NOTE: Depending on the system configuration, up to two UPSs can be present. Refer to the site document to clearly identify the layout.

- SPPC/EMS → UPS (A/B)

Instructions

- Shut down the applicable UPS (A/B) by pressing the OFF button.

Equipment

- Not Applicable

Energy level

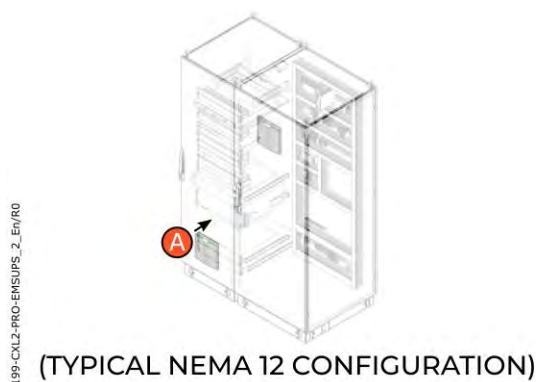
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the specifics of the site. Refer to the **CXL2-DOC-CAD-000 – SITE SPECIFICS** document. The values shown below are for reference only.

- $\leq 1.2 \text{ cal/cm}^2$ to 0.46 meters (typical)

PPE

- Class 0 protective equipment (typical)

Photo



Validation

STEP	PROCEDURE	INITIALS
3	Visually confirm that UPS A is off.	
3	Visually confirm that UPS B is off (if applicable).	

Notes/Comments:

Step 4 – Disable the UPS (A/B) Batteries

Location

NOTE: Depending on the system configuration, up to four UPS batteries (two per UPS) may be present. Refer to the site document to clearly identify the layout.

- Applicable SPPC/EMS → BAT (A/B)

Instructions

- Shut down the batteries of applicable UPS A/B by opening the battery circuit breakers (OFF position).
- Install a lockout tag on the circuit breaker of the batteries.

Equipment

- 4x – Lockout tags

Energy level

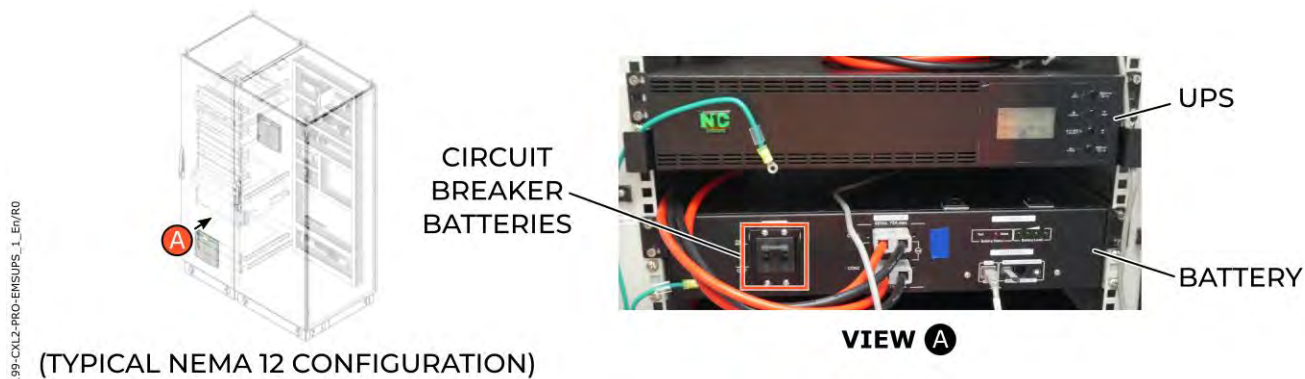
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the specifics of the site. Refer to the [CXL2-DOC-CAD-000 – SITE SPECIFICS](#) document. The values shown below are for reference only.

- $\leq 1.2 \text{ cal/cm}^2$ to 0.46 meters (typical)

PPE

- Class 0 protective equipment (typical)

Photo



Validation

STEP	PROCEDURE	INITIALS
4	Install UPS-A lockout tags.	
4	Install UPS-B lockout tags (if applicable).	

Notes/Comments:

Step 5 – Validate the Absence of Voltage at Power Bars

Location

- SPPC/EMS → PDU1 and PDU2 power bars

Instructions

- Validate the absence of voltage in a free socket of the PDU1 and PDU2 power bars.

Equipment

- 1x – Multimeter

Energy level

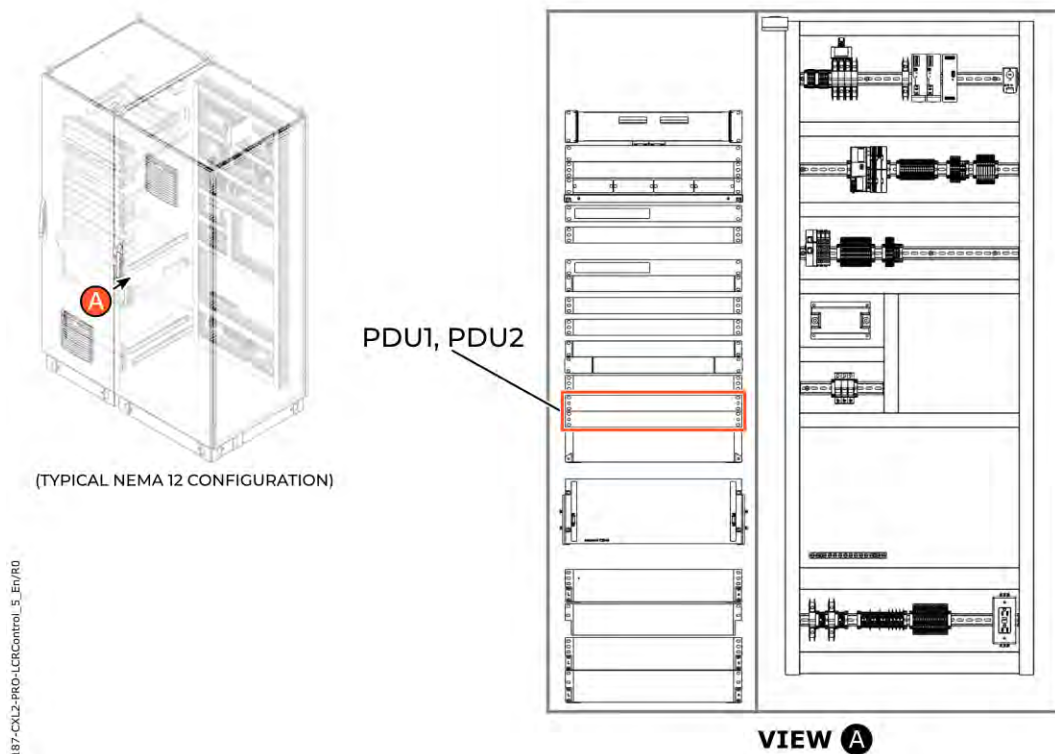
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the specifics of the site. Refer to the **CXL2-DOC-CAD-000 – SITE SPECIFICS** document. The values shown below are for reference only.

- $\leq 1.2 \text{ cal/cm}^2$ to 0.46 meters (typical)

PPE

- Class 0 protective equipment (typical)

Photo



Validation

STEP	PROCEDURE	INITIALS
5	PDU1 voltage Measurement	
5	PDU2 voltage Measurement	

Notes/Comments:

Step 6 – Validate the Presence of 208Y/120 VAC or 120/240 VAC Voltage at CB1

Location

NOTE: Only the NEMA 4X configuration has a two-phase CB1 circuit breaker, rated at 240 VAC. Refer to the site document to clearly identify the circuit breaker layout.

- SPPC/EMS → CB1 circuit breaker

Instructions

- Validate the presence of voltage upstream of the CB1 circuit breaker.

Equipment

- 1x – Multimeter

Energy level

NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the specifics of the site. Refer to the **CXL2-DOC-CAD-000 – SITE SPECIFICS** document. The values shown below are for reference only.

- $\leq 1.2 \text{ cal/cm}^2$ to 0.46 meters (typical)

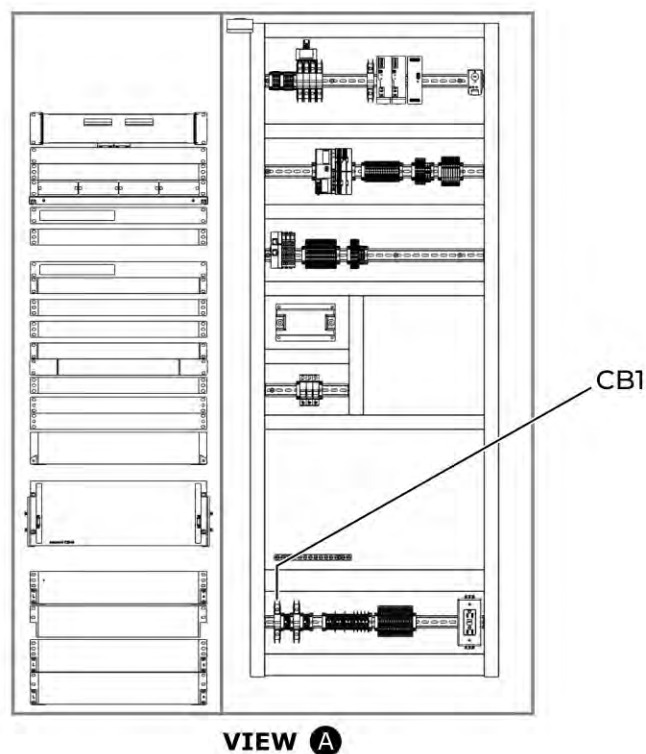
PPE

- Class 0 protective equipment (typical)

Photo



(TYPICAL NEMA 12 CONFIGURATION)



187-CXL2-PRO-LCRControl_6_En/RO

Validation

STEP	PROCEDURE	MEASUREMENT
6	Voltage measurement between upper terminal 1 and GND.	
	Voltage measurement between upper terminal 1 and upper terminal 3 (if applicable).	
	Voltage measurement between upper terminal 3 and GND (if applicable).	

Notes/Comments:

Step 7 – SPPC/EMS Auxiliary Energy Source Isolation

NOTE: Isolation of the auxiliary energy source must be performed by the customer's authorized personnel and according to the procedures provided by the customer.

Location

- Customer's auxiliary energy distribution panel.

Instructions

- Have the 208Y/120 VAC or 120/240 VAC power supply source for the SPPC/EMS panel locked out by authorized customer personnel.

Equipment

- N/A

NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the specifics of the site. Refer to the **CXL2-DOC-CAD-000 – SITE SPECIFICS** document. The values shown below are for reference only.

Equipment

- Follow the instructions of the site manager.

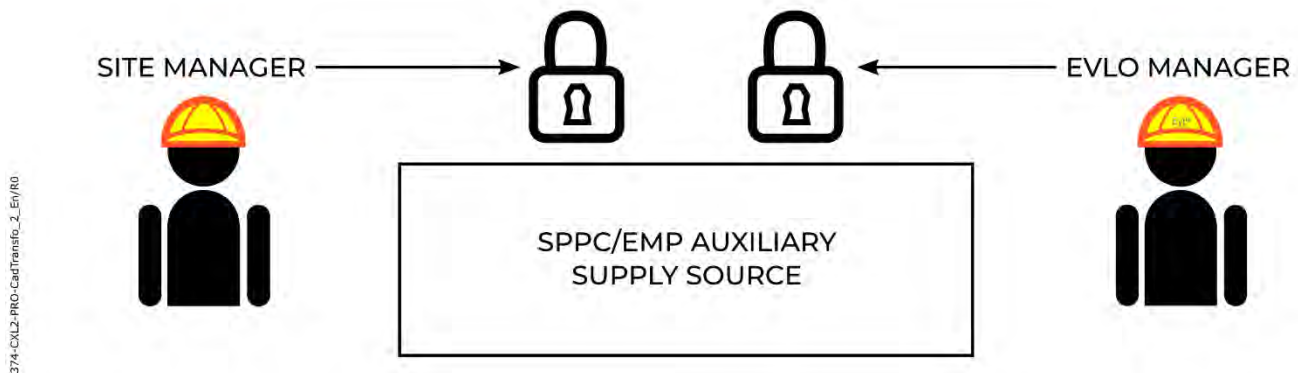
Energy level

- Follow the instructions of the site manager.

PPE

- Follow the instructions of the site manager.

Photo



Validation

STEP	PROCEDURE	MEASUREMENT
7	Locked auxiliary energy source.	

Notes/Comments:

Step 8 – Validate the Absence of 208Y/120 VAC or 120/240 VAC Voltage at CB1

Location

NOTE: Only the NEMA 4X configuration has a two-phase CB1 circuit breaker, rated at 240 VAC. Refer to the site document to clearly identify the circuit breaker layout.

- SPPC/EMS → CB1 circuit breaker

Instructions

- Validate the absence of voltage upstream of the CB1 circuit breaker.

Equipment

- 1x – Multimeter

NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the specifics of the site. Refer to the **CXL2-DOC-CAD-000 – SITE SPECIFICS** document. The values shown below are for reference only.

Energy level

- $\leq 1.2 \text{ cal/cm}^2$ to 0.46 meters (typical)

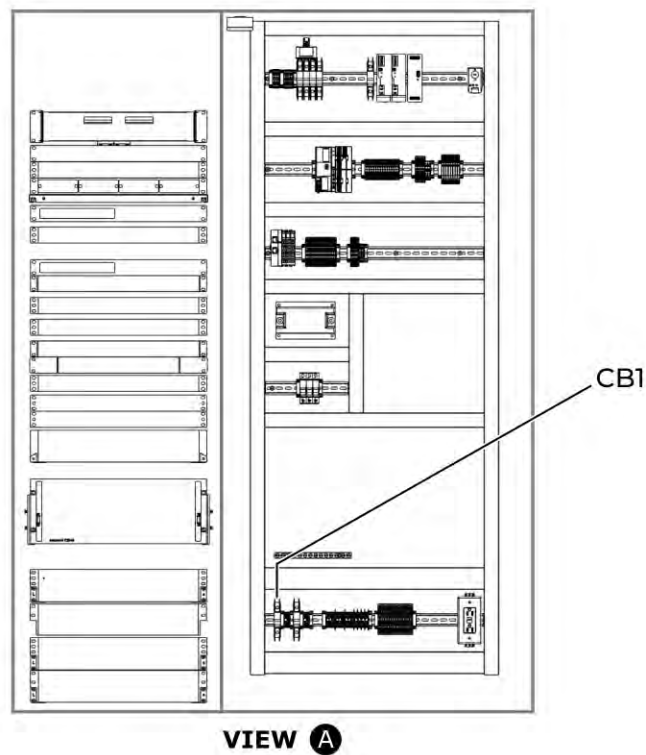
PPE

- Class 0 protective equipment (typical)

Photo



(TYPICAL NEMA 12 CONFIGURATION)



187-CXL2-PRO-LCRControl_6_EnvRO

Validation

STEP	PROCEDURE	MEASUREMENT
8	Voltage measurement between upper terminal 1 and GND.	
	Voltage measurement between upper terminal 1 and upper terminal 3 (if applicable).	
	Voltage measurement between upper terminal 3 and GND (if applicable).	

Notes/Comments:

Step 9 – Completed Isolation of the SPPC/EMS Power Supply

At this stage, the 208Y/120 VAC or 120/240 VAC power supply of the SPPC/EMS panel is isolated.

Step 10 – Validate the Presence of 120/240 VAC Voltage at CB4

NOTE: If the work to be performed is only on the HVAC or the fan, only steps **10** to **13** must be performed to isolate this circuit.

Location

- SPPC/EMS → CB4 circuit breaker

Instructions

- Validate the presence of voltage downstream of the CB4 circuit breaker.

Equipment

- 1x – Multimeter

Energy level

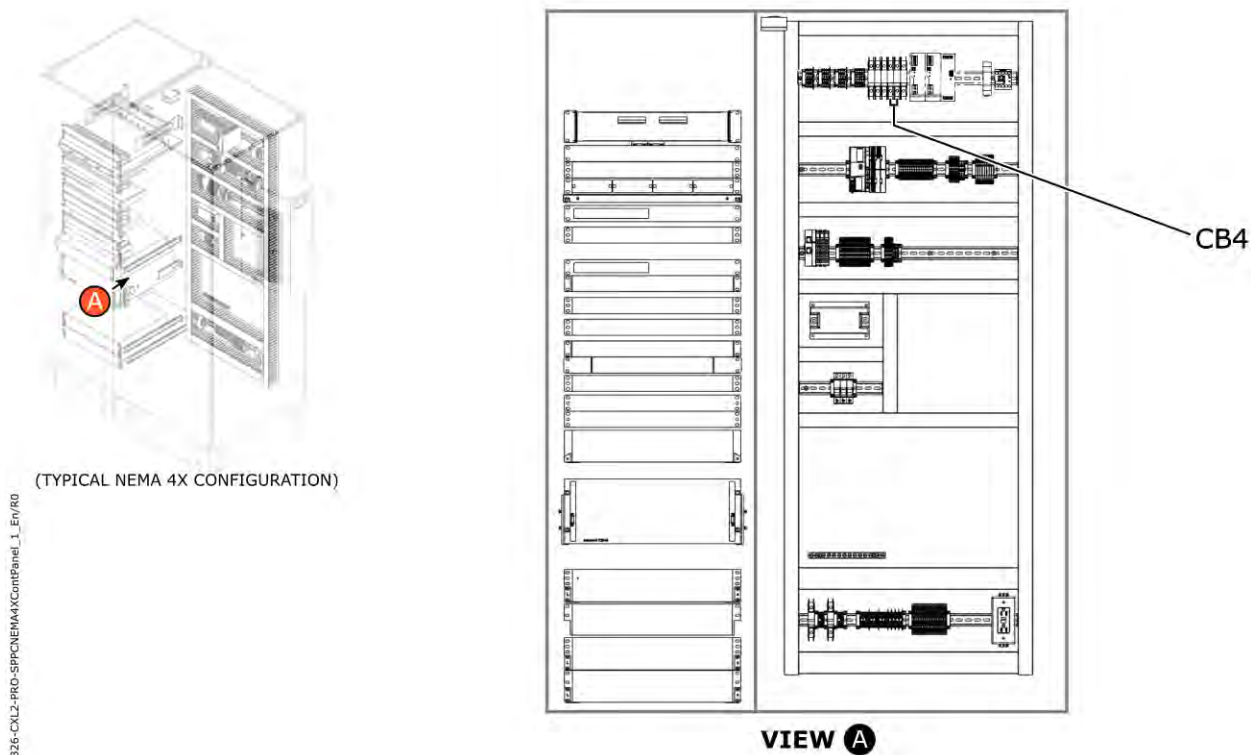
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the specifics of the site. Refer to the **CXL2-DOC-CAD-000 – SITE SPECIFICS** document. The values shown below are for reference only.

- $\leq 1.2 \text{ cal/cm}^2$ to 0.46 meters (typical)

PPE

- Class 0 protective equipment (typical)

Photo



Validation

STEP	PROCEDURE	MEASUREMENT
10	Voltage measurement between lower terminal 2 and GND.	
	Voltage measurement between lower terminal 2 and lower terminal 4 (if applicable).	
	Voltage measurement between lower terminal 4 and GND (if applicable).	

Notes/Comments:

Step 11 – Open and Lockout the CB4 Circuit Breaker

NOTE: If the work to be performed is only on the HVAC or the fan, only steps **10** to **13** must be performed to isolate this circuit.

Location

- SPPC/EMS → CB4 circuit breaker

Instructions

- Open and lockout the CB4 circuit breaker.

Equipment

- 1x – Phoenix Contact circuit breaker lockout device (Brady 90844)
- 1x – Series padlock
- 1x – Hasp

Energy level

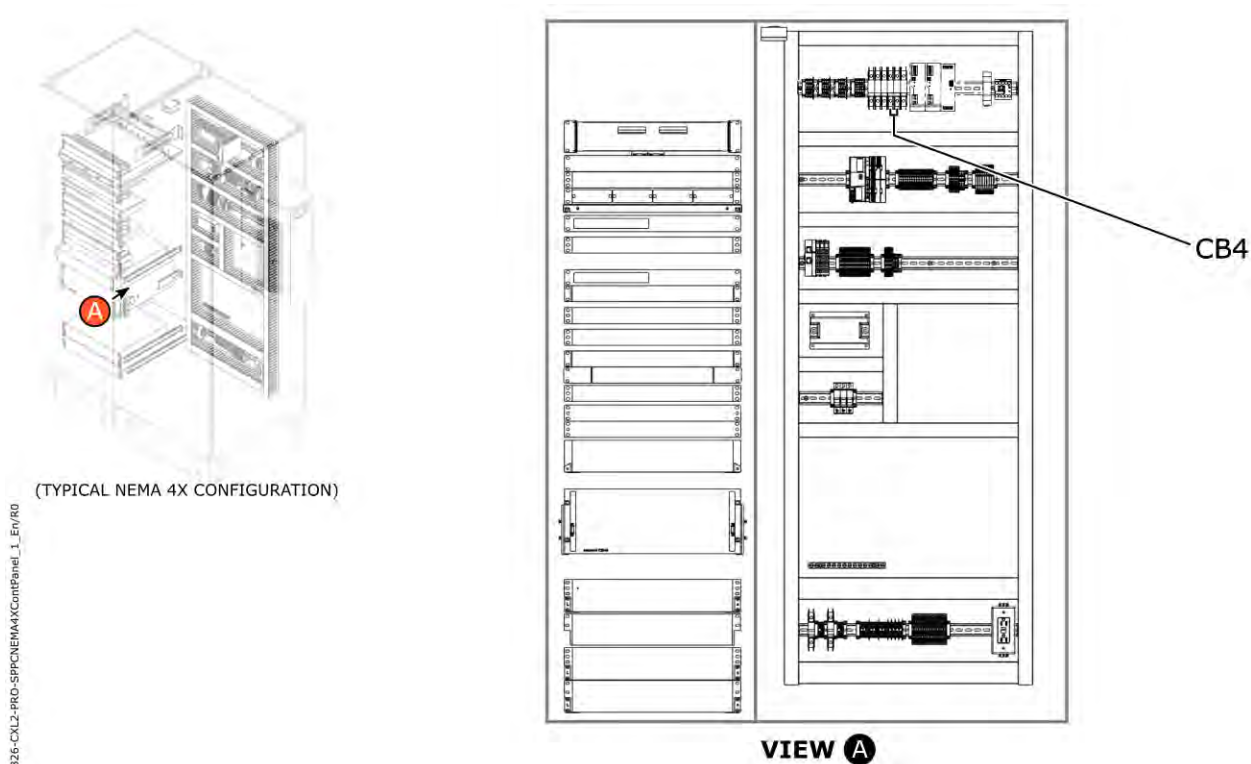
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the specifics of the site. Refer to the **CXL2-DOC-CAD-000 – SITE SPECIFICS** document. The values shown below are for reference only.

- $\leq 1.2 \text{ cal/cm}^2$ to 0.46 meters (typical)

PPE

- Class 0 protective equipment (typical)

Photo



Validation

STEP	PROCEDURE	NUMBER
11	Installed padlock number	

Notes/Comments:

Step 12 – Validate the Absence of 120/240 VAC Voltage at CB4

NOTE: If the work to be performed is only on the HVAC or the fan, only steps **10** to **13** must be performed to isolate this circuit.

Location

- SPPC/EMS → CB4 circuit breaker

Instructions

- Validate the absence of voltage downstream of the CB4 circuit breaker.

Equipment

- 1x – Multimeter

Energy level

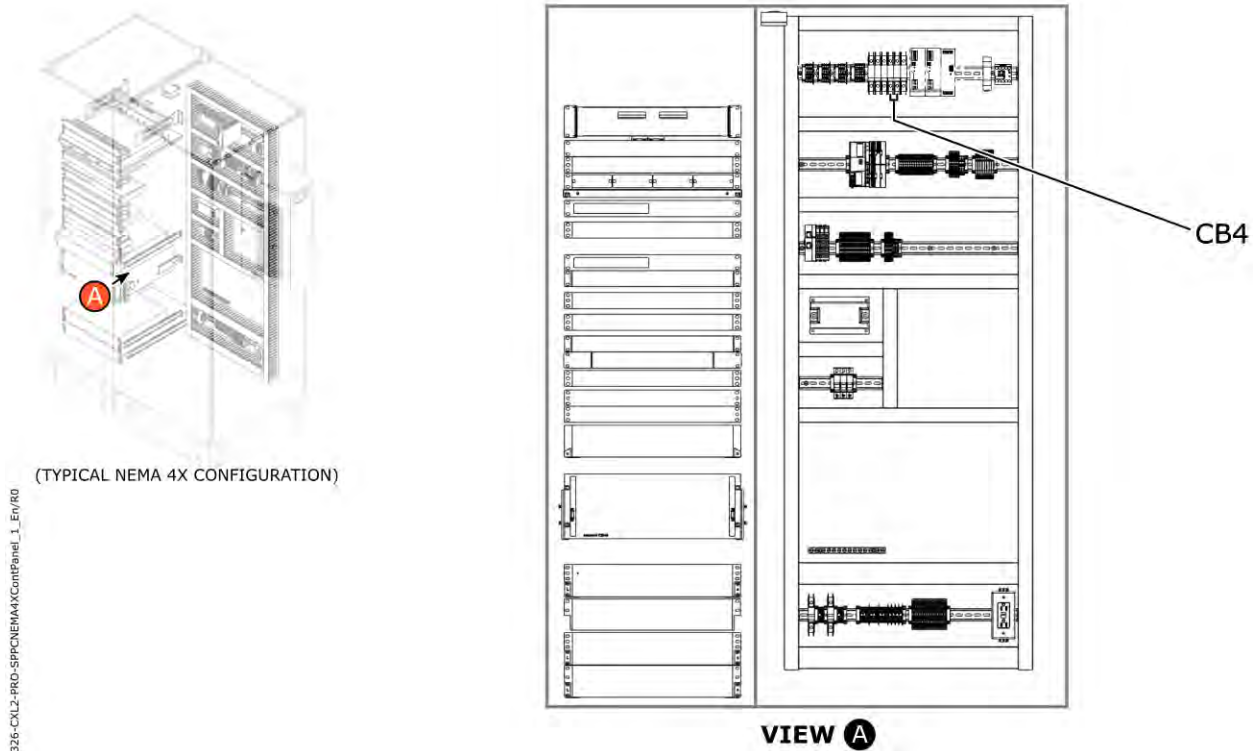
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the specifics of the site. Refer to the **CXL2-DOC-CAD-000 – SITE SPECIFICS** document. The values shown below are for reference only.

- $\leq 1.2 \text{ cal/cm}^2$ to 0.46 meters (typical)

PPE

- Class 0 protective equipment (typical)

Photo



Validation

STEP	PROCEDURE	MEASUREMENT
12	Voltage measurement between lower terminal 2 and GND.	
	Voltage measurement between lower terminal 2 and lower terminal 4 (if applicable).	
	Voltage measurement between lower terminal 4 and GND (if applicable).	

Notes/Comments:

Step 13 – Completed Isolation of SPPC/EMS's Fan/HVAC Power Supply

At this stage, the 120/240 VAC power supply to the SPPC/EMS's HVAC is isolated.

GENERAL INFORMATION

Document Name 208 VAC Distribution Panel Lockout Procedure
EVLOFLEX

Translated by Lia Raykhlin
EVLO, Technical Translator

Date 2024-12-01

NOTE: *This document has been translated from the original French version. Refer to the French version of the document for the review and approval information. If any discrepancy is found between this translation and the original document, the information in the French document shall prevail.*

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REVISIONS DESCRIPTION

Revision	Author	Date	Changes
00			Original publication
01	T. Bredillet	2024-10-15	Integration of engineering comments

DOCUMENT PURPOSE

This document details the operations to be performed in order to apply lockout in the following work location:

- 208 VAC distribution panel.

WARNING



THIS PROCEDURE WILL ONLY LOCKOUT THE WORK LOCATION DEFINED ABOVE. NEVER USE THIS PROCEDURE TO SECURE ANOTHER WORK LOCATION. ALWAYS USE THE APPLICABLE LOCKOUT PROCEDURE AND WEAR PERSONAL PROTECTIVE EQUIPMENT IN ACCORDANCE WITH APPLICABLE STANDARDS, LAWS AND REGULATIONS. FAILURE TO FOLLOW THESE SAFETY INSTRUCTIONS CAN CAUSE SERIOUS INJURIES OR EQUIPMENT DAMAGE.

SAFETY CONSIDERATIONS

DANGER

VOLTAGES UP TO 460 VAC CAN BE PRESENT AT ANY TIME. ALWAYS WEAR SAFETY EQUIPMENT AND FOLLOW ALL APPLICABLE INSTRUCTIONS, LAWS, AND REGULATIONS WHEN PERFORMING THE MANIPULATIONS DESCRIBED IN THIS PROCEDURE. FAILURE TO FOLLOW THIS INSTRUCTION WILL CAUSE SERIOUS INJURIES AND DEATH.

WARNING

PRIOR TO CARRYING OUT WORK ON THE SITE, AUTHORIZATION MUST BE OBTAINED FROM THE OPERATOR AND/OR SITE MANAGER. FAILURE TO FOLLOW THESE SAFETY INSTRUCTIONS CAN CAUSE SERIOUS INJURIES OR EQUIPMENT DAMAGE.

WARNING

READ THE ENTIRE PROCEDURE BEFORE STARTING THE WORK. FOLLOW AND EXECUTE THE MANIPULATIONS IN THE ORDER SHOWN. IF YOU HAVE ANY QUESTIONS, CONTACT THE SUPERVISOR. FAILURE TO FOLLOW THESE SAFETY INSTRUCTIONS CAN CAUSE SERIOUS INJURIES OR EQUIPMENT DAMAGE.

WARNING

AT LEAST TWO PEOPLE ARE REQUIRED TO PERFORM THE OPERATIONS DESCRIBED IN THIS PROCEDURE. A PERSON WHO PERFORMS THE STEPS AND A PERSON WHO VERIFIES THE EXECUTION. FAILURE TO FOLLOW THESE SAFETY INSTRUCTIONS CAN CAUSE SERIOUS INJURIES OR EQUIPMENT DAMAGE.

DEFINITIONS

- cm: Centimeter
- EVLOFLEX: All BESS equipment (container, panel boards, UPS, EMP)
- N/A: Not Applicable
- PPE: Personal Protective Equipment
- SSG: Stack Switchgear
- UPS: Uninterrupted Power Supply
- VAC/VDC: Volt Alternating Current/Volt Direct Current

TOOLS AND EQUIPMENT

- 1x – Lockout box with series padlock
- 1x – ABB XT1 circuit breaker lockout device (Masterlock 491B)
- 1x – Multimeter
- 1x – Computer

REFERENCES

- 71300000 – 460 Vac Distribution Panel
- 71300000 – 460 Vac Distribution Panel
- STD-DOC-SST-003– Lockout Program
- CXL2-DOC-CAD-000– Site specifics
- Annex: Site engineering documentation

Step 1 – Confirm that the System is not in Operation

Location

- Installation of the EVLOGIX website/web interface

Instructions

- Verify that the system is not in operation on the operator interface.
- If the system is running, confirm with the site manager that the system can be shut down.

Equipment

- 1x – Computer

Energy level

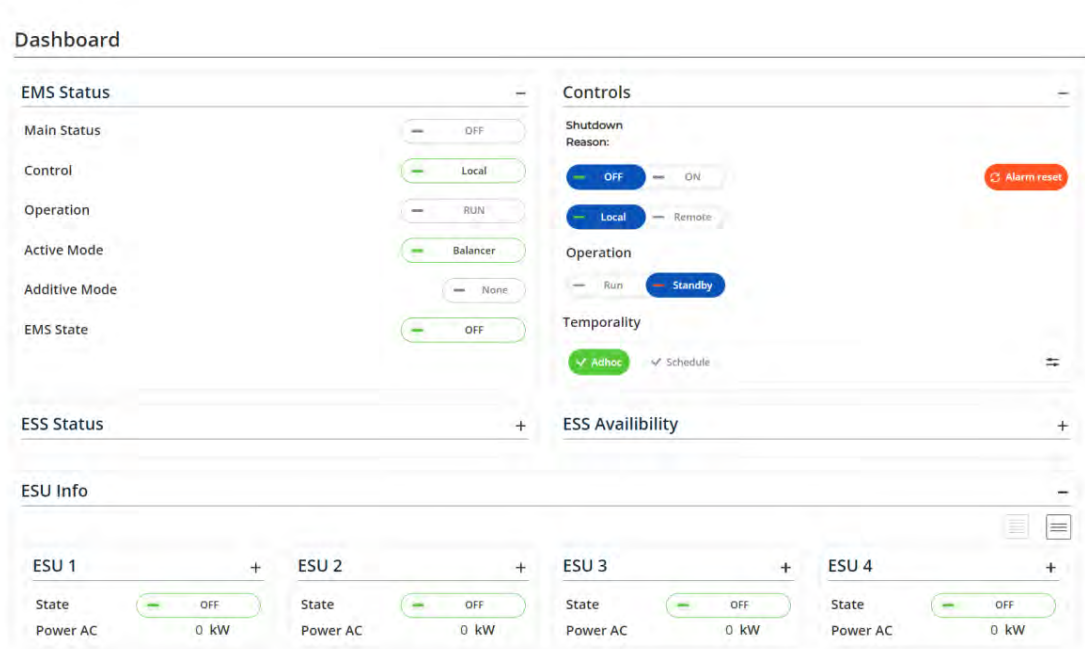
- Not Applicable

PPE

- Not Applicable

Photo

36-LES-PRO-Dashboard_1_Enj/RO



TYPICAL EVLOGIX INTERFACE, FOR REFERENCE ONLY

Validation

STEP	PROCEDURE	INITIALS
1	The system is off.	

Notes/Comments:

Step 2 – Check for the Presence of 460 VAC Voltage

Location

- 208 VAC distribution panel → CB-1 disconnectable fuse holder

Instructions

- Check for the presence of voltage on the CB-1.1 disconnectable fuse holder upper terminals.

Equipment

- 1x – Multimeter

Energy level

NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the specifics of the site. Refer to the [CXL2-DOC-CAD-000 – SITE SPECIFICS](#) document. The values shown below are for reference only.

- $\leq 1.2 \text{ cal/cm}^2$ to 0.46 meters (typical)

PPE

- Class 0 protective equipment (typical)

Photo



116-LES-PRO-Pann208CB1_1_Erv/RO

Validation

STEP	PROCEDURE	MEASUREMENT
2	Voltage measurement between upper terminal 1 and upper terminal 3.	
	Voltage measurement between upper terminal 3 and upper terminal 5.	
	Voltage measurement between upper terminal 1 and upper terminal 5.	
	Voltage measurement between upper terminal 1 and GND.	
	Voltage measurement between upper terminal 3 and GND.	
	Voltage measurement between upper terminal 5 and GND.	

Notes/Comments:

Step 3 – Open and Lockout the 460 VAC Power Supply

Location

- 460 VAC distribution panel → CB-4.1 circuit breaker

Instructions

- Open and lockout the CB-4.1 circuit breaker.

Equipment

- 1x – ABB XT1 circuit breaker lockout device (Masterlock 491B)
- 1x – Series padlock

Energy level

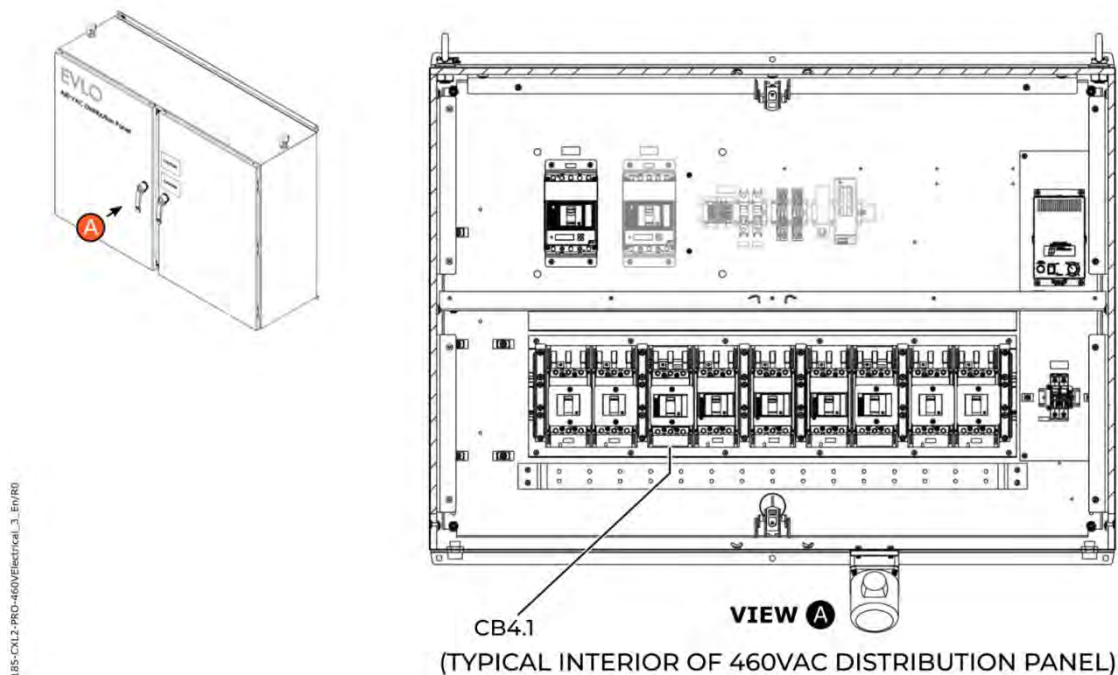
NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the specifics of the site. Refer to the [CXL2-DOC-CAD-000 – SITE SPECIFICS](#) document. The values shown below are for reference only.

- $\leq 8 \text{ cal/cm}^2$ to 0.46 meters (typical)

PPE

- Class 2 protective equipment (typical)

Photo



Validation

STEP	PROCEDURE	NUMBER
3	Installed padlock number	

Notes/Comments:

Step 4 – Check for the Absence of 460 VAC Voltage

Location

- 208 VAC distribution panel/CB-1 Disconnectable fuse holder

Instructions

- Validate the absence of voltage on the CB-1 disconnectable fuse holder upper terminals.

Equipment

- 1x – Multimeter

Energy level

NOTE: The protections should follow the recommendations of the Arc Flash study made by the customer according to the specifics of the site. Refer to the [CXL2-DOC-CAD-000 – SITE SPECIFICS](#) document. The values shown below are for reference only.

- $\leq 1.2 \text{ cal/cm}^2$ to 0.46 meters (typical)

PPE

- Class 0 protective equipment (typical)

Photo



116-LES-PRO-Pann208CB1_1_Erv/RO

Validation

STEP	PROCEDURE	MEASUREMENT
4	Voltage measurement between upper terminal 1 and upper terminal 3.	
	Voltage measurement between upper terminal 3 and upper terminal 5.	
	Voltage measurement between upper terminal 1 and upper terminal 5.	
	Voltage measurement between upper terminal 1 and GND.	
	Voltage measurement between upper terminal 3 and GND.	
	Voltage measurement between upper terminal 5 and GND.	

Notes/Comments:

Step 5 – Completed Isolation of the 460 VAC Power Supply

At this stage, the 460 VAC power supply of the 208 VAC distribution panel is isolated.

Appendix E – Lifting Manual



Installation Manual

CXL2-DOC-INST-001

EVLOFLEX – Battery Container

Applicable to Model Numbers: CXL2-BES



Revision 01

2024-05-08

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Revision Description

This section details the updates that have taken place on this document between each release.

Revision	Date	Change(s)
00	2024-01-18	Original publication
01	2024-05-08	Corrections based on NOC-441, NOC-643, NOC-711, NOC-771 Minor correction/addition throughout the document

Legal Information

This section describes some important concepts related to the content in this document.

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Some of the views shown represent typical views that may vary depending on the configuration. The information presented is used only to illustrate the concept and/or principle.

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1 Definitions

This section provides information on terminology, standards, conventions, and specific considerations that are important to understand before reading this manual. This section should be used as a reference before reading and while using this manual to ensure proper understanding by the reader.

1.1 Acronyms, Definitions and Abbreviations

°C: Celsius

°K: Kelvin

208VAC Distribution Panel: 208V auxiliary energy distribution panel (Arctic package).

460VAC Distribution Panel: 460V auxiliary energy distribution panel.

A: Ampere

Ah: Amp-hour

Arctic Package: Option adding heater units, 208VAC distribution panel and isolation to panels if installed.

ATS (Automatic Transfer Switch): Automatic switch used to transfer from main power source to the emergency one in the event of a main power failure (option for the 460VAC distribution panel).

Auxiliary Energy: The energy used to power all the BESS equipment. The auxiliary energy includes the 460VAC and 240/208-120VAC energy of the site.

Battery Container: Enclosure containing a battery compartment, a main energy distribution section and a control and distribution section.

Battery Module: Element storing the energy. The battery modules are in a 4P8S configuration. Each tray includes six battery modules.

BESS (Battery Energy Storage System): Refers to all the EVLO equipment of the installation (battery container, distribution panels, UPS, EMP, SPPE/EMS)

BMS (Battery Management System): Combination of hardware and software used to manage the battery activity.

C Rate: Charge and discharge rate of the batteries

cal: Calories

CB (Circuit Braker): Protects the circuit from overcurrent, allows to open the circuit as needed.

Chemical anchor: Technique used to fasten equipment to concrete, using a resin and a hardening agent to hold an anchor (usually a threaded rod).

CI (Cell Interface): Connected to 3 battery modules, the cell interface relays the voltage and temperatures readings to the SWG.

cm: Centimeter

Control and Distribution Compartment: Battery container equipment responsible for distributing auxiliary energy to power the various electrical and electronic equipment of the battery container. Also includes a control panel.

Definitions

EMP (Energy Management Panel): Communication and control hub of up to 3 groups.

EVLOFLEX: Commercial name of the BESS applicable to this document.

EVLOGIX: The name of the EVLO software suite, including the operator interface.

F-STOP: Fast-stop/Fast-stop loop

Fuse Box: Contains a fuse connected to battery trays allowing to open the circuit in case of an overcurrent.

GND: Ground, also known as protective earth.

Group: Used to refer to a set of equipment. One group contains 4 battery container, 2 PCS, a 460 VAC distribution panel, a UPS panel, a PS panel and a 208VAC distribution panel (Artic package only).

h: Hour

Half Tray: Contains 3 battery modules and 1 cell interface. The half tray is the first tray of a string.

HVAC (Heating, Ventilation and Air Conditioning): Unit used to maintain a preset temperature in an enclosure.

Hz: Hertz

I/O: Input/Output, used to define some control signals.

in: Inch

IPC (Industrial PC): Computer processing the BESS data, located in the SPPC/EMS.

kg : Kilogram

lb: Pound (weight)

lbf: Pound-force

LCR: Inductance (L), Capacitance (C), and Resistance (R).

LED: Light Emitting Diode

LFP (Lithium Iron Phosphate): Cell Chemistry used in the battery container.

m: Meter

Main Energy Compartment: 1500VDC bus connecting the site's main energy and the strings.

Main Energy: The energy charged into and discharged from the batteries. The Main energy includes the 1500VDC of the container, 1500VDC/690VAC (or 600VAC depending on the configuration) of the PCS and the energy of the main step-up transformer.

OVRT: Over Voltage Ride Through

PCS (Power Conversion System): Converts AC/DC and DC/AC to charge or discharge the battery enclosure.

PLC (Programmable Logic Controller): Used to send control commands between the BMS equipment.

Power Disconnect: Switch used to isolate all the strings from the site and vice versa. Can be manual or motorized depending on configuration.

PPE (Personal Protective Equipment): Refer to the site's safety program to learn which PPE must be used.

PS Panel (Power Supply Panel): Provides low-voltage auxiliary energy to a group.

Qty: Quantity

Site: Refers to physical project installed or to be installed.

SOC (State of Charge): Indicates the charge of a battery cell, string, or container.

SOH (State of Health): Indicates the health of a battery cell.

SPPC/EMS (Smart Power Plant Controller/Energy Management System): Main control cabinet of the BESS.

String: Electrical assembly of eight trays and one half-tray connected in series. The battery container contains up to 6 strings.

SWG (Electrical Switchgear): Equipment that interface the battery module to the main disconnect switch of the main energy compartment.

Tray Fuse: Fuse that opens the circuit of a tray in case of an overcurrent.

Tray: Contains 6 battery modules, 2 cell interfaces and a tray fuse.

UPS (Uninterrupted Power Supply): Battery used to keep the vital operations of the system operational of in case of a power failure.

VAC/AC: Volts, in alternating current

VDC/DC: Volts, in direct current

W: Watt

XFMR or XFO: Electrical transformer

1.2 Conventions

This section is used to define any standard used in the document, to ensure that the user understands the exact meaning.



DANGER

A "DANGER" NOTICE WARNS THAT THE SITUATION COULD CAUSE SEVERE INJURIES OR DEATH.



WARNING

A "WARNING" NOTICE WARNS THAT THE SITUATION COULD CAUSE SEVERE INJURIES.



CAUTION

A "CAUTION" NOTICE WARNS THAT THE SITUATION MAY DAMAGE THE EQUIPMENT.

NOTE

A note adds additional information to the text.

()

A number in parentheses refers to a specific point in an illustration.

" "

A word in quotation marks indicates that this word is written as is on the equipment.

Stainless steel hardware should always have an anti-seize compound applied prior to being threaded.

It is expected for the technician to possess a toolbox that includes the basic tools and a set of sockets to carry out the work.

2 Safety Considerations

This section is used to define the general hazards and warnings that are found in the items covered in this manual. Note that this section is not an exhaustive list and that other more specific hazards and warnings can be found throughout the manual.

DANGER



VOLTAGES UP TO 1500 VDC/460 VAC CAN BE PRESENT AT ANY TIME. RESPECT THE ESTABLISHED SAFETY PROCEDURES BEFORE WORKING ON OR AROUND THE BATTERY CONTAINER. FAILURE TO FOLLOW THIS SAFETY INSTRUCTION MAY RESULT IN SEVERE INJURIES OR DEATH.

DANGER



ALWAYS FOLLOW THE SAFETY PROCEDURES ESTABLISHED BY THE SITE MANAGER BEFORE WORKING ON OR AROUND THE BATTERY CONTAINER. FAILURE TO FOLLOW THIS SAFETY INSTRUCTION MAY RESULT IN SEVERE INJURIES OR DEATH.

WARNING



THE BATTERY CONTAINER CAN WEIGH BETWEEN 20,000 AND 27,200 KG (BETWEEN 44,092 AND 60,000 LB) DEPENDING ON ITS CONFIGURATION. ALWAYS FOLLOW THE APPLICABLE SAFETY PROCEDURES BEFORE LIFTING. FAILURE TO FOLLOW THIS SAFETY INSTRUCTION MAY RESULT IN SEVERE INJURIES OR DEATH.

CAUTION



DO NOT OPEN BATTERY CONTAINERS. FAILURE TO DO SO MAY CAUSE EQUIPMENT DAMAGE AND MAJOR FIRES.

NOTE: *The system must be installed in accordance with local fire prevention, electrical, building codes and other and utility requirements applicable to the installation and equipment, by qualified service personnel in accordance with the installation instructions and appropriate practices.*

NOTE: *If the NFPA 72 option is not selected, the Fire System Protection has not been evaluated as part of the system, it must meet requirements of local AHJ.*

3 How To Use This Manual

The purpose of the installation manual is to indicate the procedure to be followed to install a battery container for an EVLOFLEX site following its receipt. All battery container configurations are included in this manual, so some of the sections will not apply. If you have any question, validate with the managers of the installation site before proceeding.

For details about the model number, refer to document **CXL2-DOC-MISC-006 – PRODUCT MATRIX – NAMING CONVENTION**.

The software for the battery container components must be configured at the end of its installation, before energizing.

It is important to read the entire manual before beginning the installation process to understand how it works. This manual should be kept after installation for reference purposes.

This procedure should be used with the **CXL2-DOC-INST-002** installation report. The manipulations carried out during the installation must be recorded in said document. This report must be presented to EVLO as proof of pre-operational verification (POV) before proceeding with the start-up (MER) and commissioning (MES) of the battery container.

In addition, the reference manual **CXL2-DOC-INST-003** contains all the documents referred to in this manual, as well as some additional documents.

INFORMATION TO BE AWARE OF BEFORE STARTING THE INSTALLATION

Depending on the customer's request, the system to be installed may consist of one or more groups.

One group consists of 4 battery containers installed back to back, 2 PCS, a 460 VAC auxiliary energy distribution panel, a UPS panel, a Power Supply panel and a 208-120 V panel if the arctic package option is included.

An EMP panel is also installed and can manage up to 3 groups. Depending on the number of groups present on the site, several EMP panels will have to be installed.

One SPPC/EMS is installed per site. It manages all EMPs (25 EMPs max per SPPC/EMS).

Example:

The example below is a typical site configuration and does not represent the actual configuration of the site applicable to this document.

For example, if the EVLOFLEX system has 3 groups, the equipment to be installed on site will consist of:

- 12x battery containers,
- 6x PCSs
- 3x 460 VAC auxiliary energy distribution panels,
- 3x UPS panels,
- 3x power supply panels,
- 1x EMP,
- 1x SPPC.

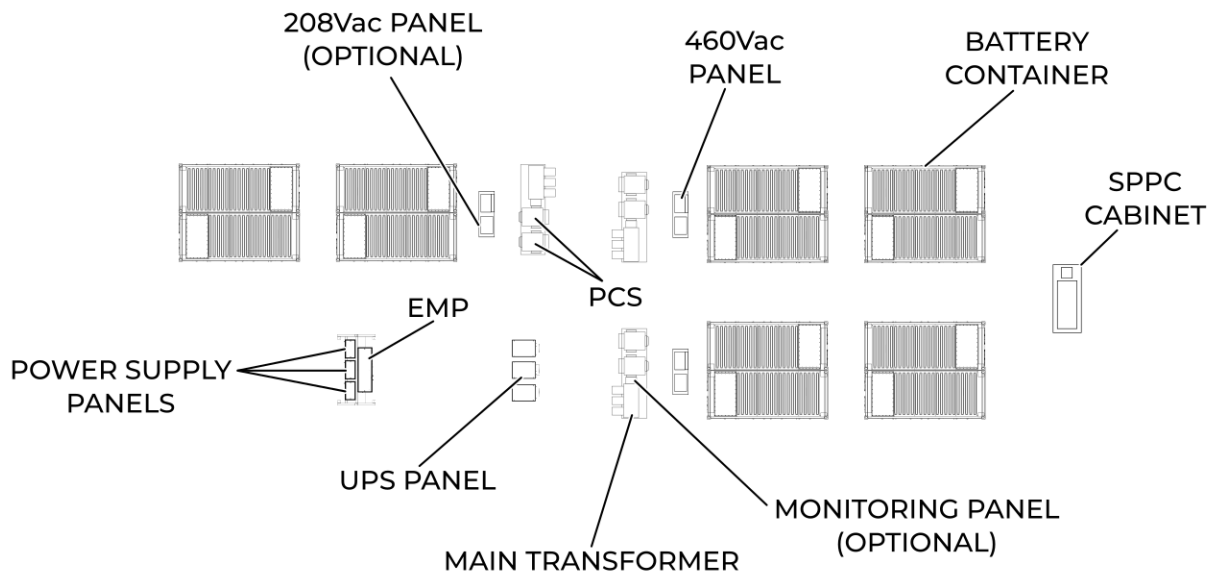


Figure 1 – On-site Installation (Typical)

Additional installation information:

- The battery containers may be installed in a back-to-back configuration (only for the 1/4C configuration).
- The maximum number of PCS is 2 per main transformer for the EVLOFLEX product standard.
- The maximum storage capacity per battery-converter unit must be confirmed by the installer based on local network limitations.
- EVLO's offer is limited to the nomenclature provided in our quotation.
- All BESS equipment that is not the responsibility of EVLO must be preconfigured.
- The installer can modify the typical layout to optimize cabling or other local requirements.
- EVLO products are not stackable.

Throughout this document, the main compartments of the EVLOFLEX battery containers are referenced as follows:

- Battery Compartment,
- Main Power Compartment,
- Control and Distribution Compartment,
- HVAC unit.

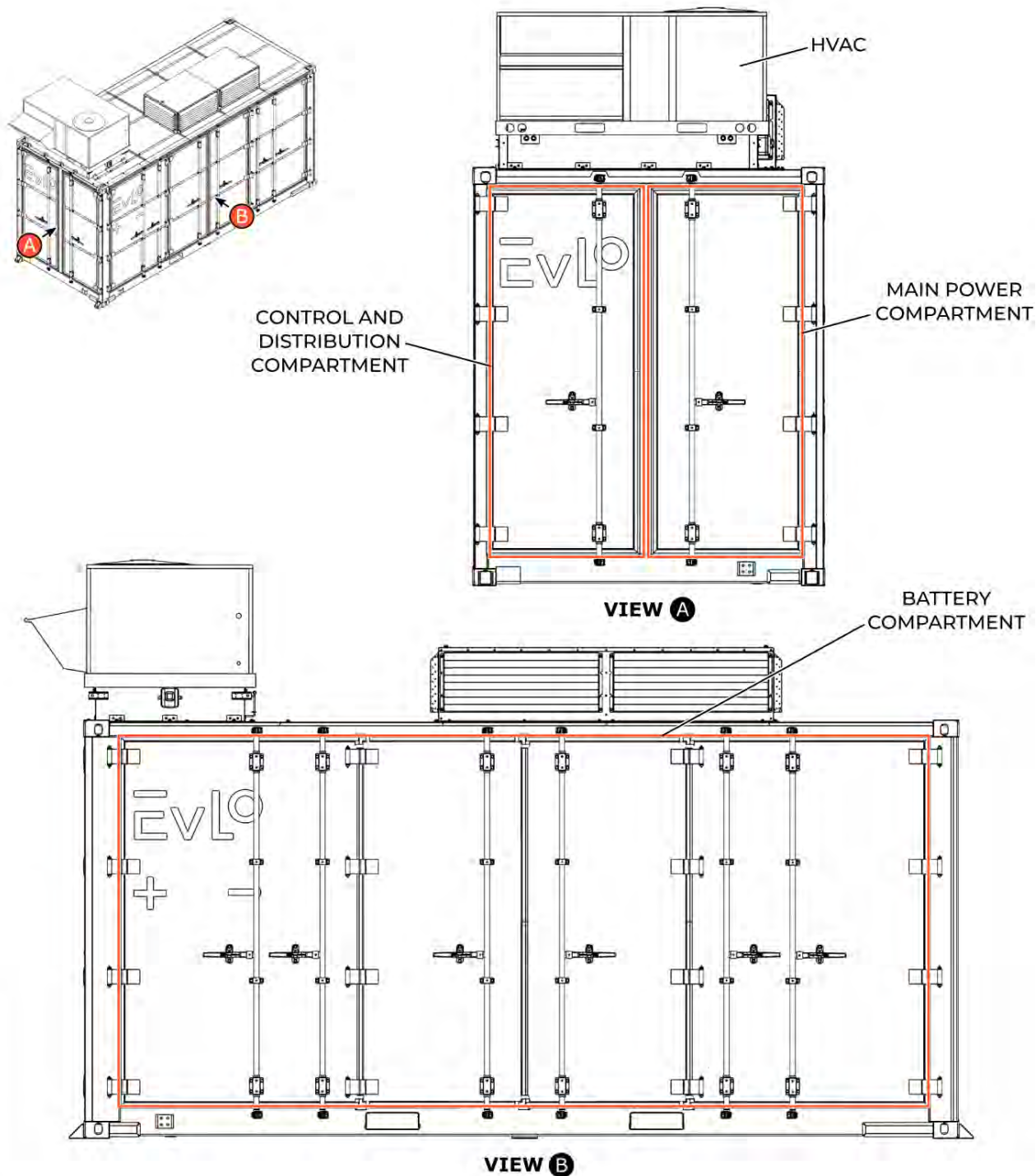


Figure 2 – Battery Container Compartments

4 Prerequisites

This section explains in detail all the concepts, the equipment, the warnings and other important elements to have, and know, in order to perform the installation properly.

4.1 Receiving the Battery Container

The battery container is delivered in four main parts:

- A main cube,
- One HVAC unit, with two electrical harnesses:
 - o A power harness (81000321),
 - o A control harness (81000331).
- An HVAC curb including:
 - o A strobe alarm and its electrical harness (81000341),
 - o Hardware.
- A gas evacuation grille.

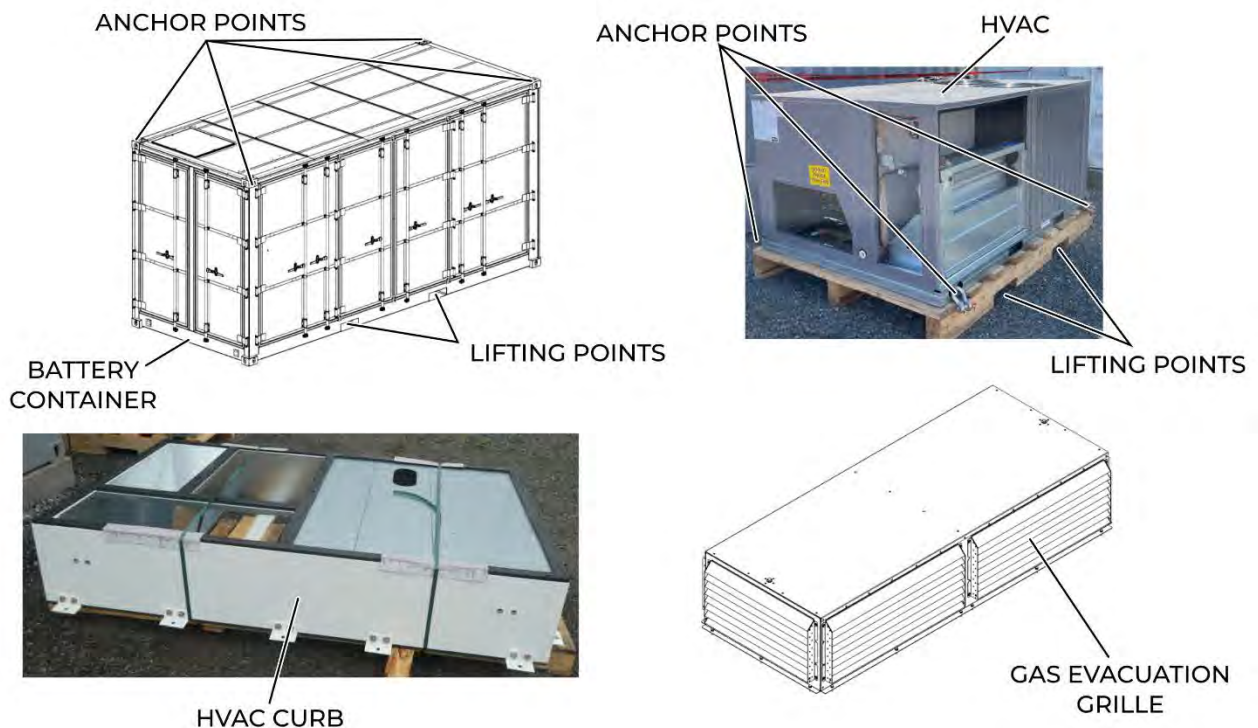


Figure 3 – Reception Upon Delivery

Some items to be installed are delivered separately, inside the battery container, and must be installed (for example, fuses must be installed in their holders), such as:

- A strobe alarm on the curb,
- 3 fuses for fuse holder DSC1 of the control and distribution compartment,
- 3 fuses for fuse holder FU1 of the control and distribution compartment,
- 3 fuses for the FU2 fuse holder in the power compartment,

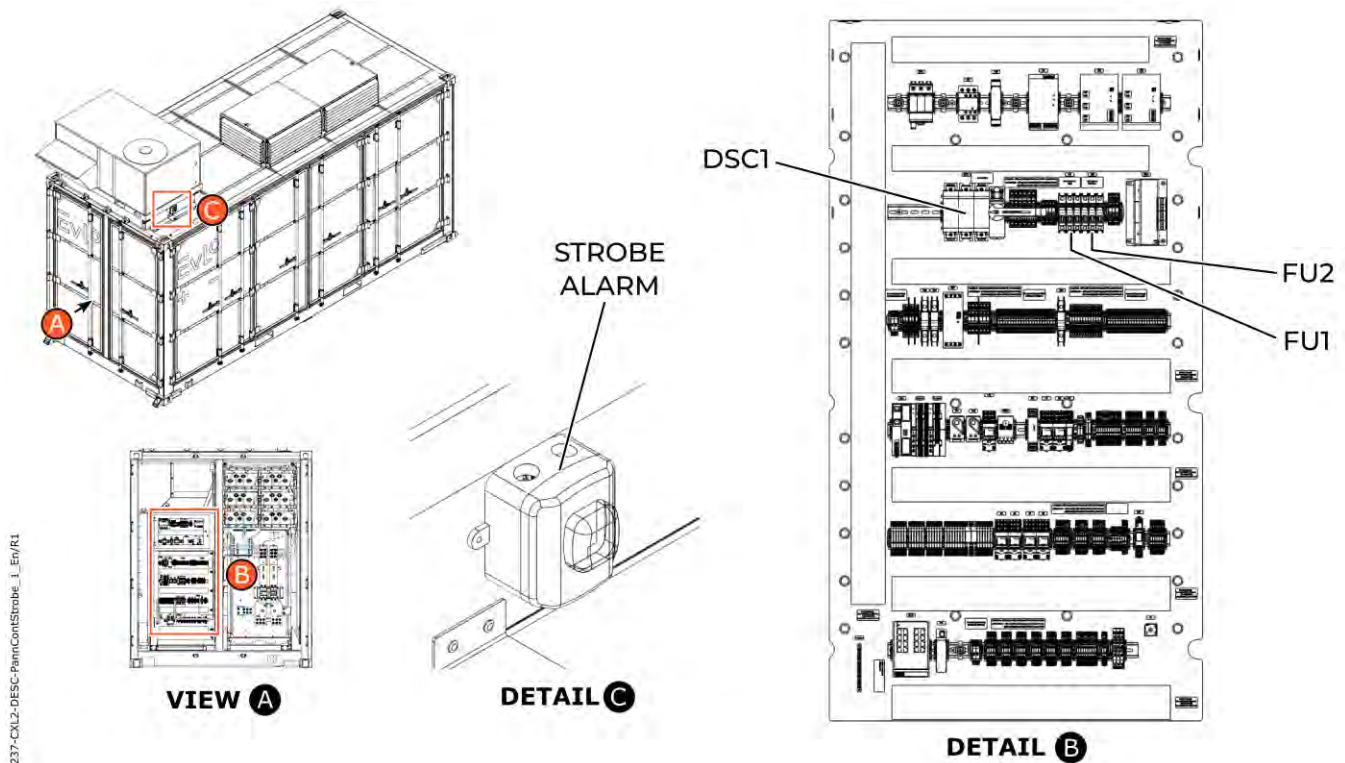


Figure 4 – Control and Distribution Compartment Fuses

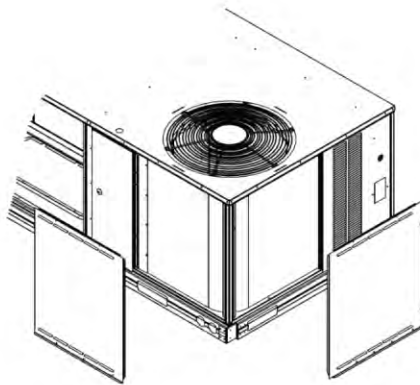
- The battery tray power cables,
- The hardware for the connections and fasteners in the power compartment,
- (If applicable) A flexible hose for the connection of the dry pipe system of the battery container.

Additional hardware may be required to secure the battery container to its installation location. Refer to the document **CXL2-DOC-MISC-009 – HARDWARE LIST** document for supplies and consumables required for installation.

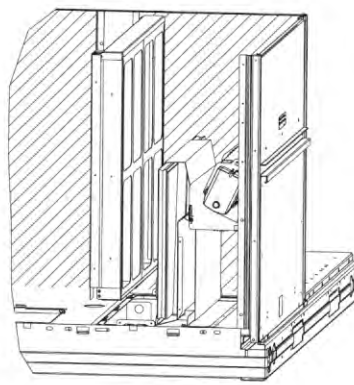
Prerequisites

The HVAC requires the installation of accessories for its on-site operation. Upon reception of the HVAC, validate that the following accessories are shipped with the HVAC.

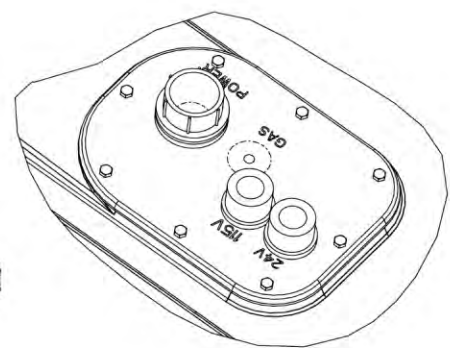
- A heater,
- Hail guards,
- A thru-the-bottom service connection kit,
- A phase monitor,
- An economizer flap kit, delivered inside the HVAC unit (see [SECTION 5.4.3](#)).



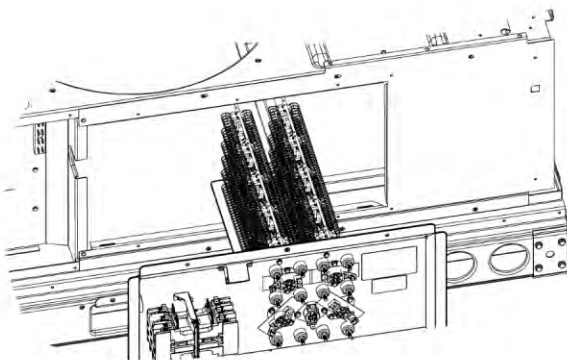
HAIL GUARDS



ECONOMIZER FLAP KIT



THRU-THE-BOTTOM
SERVICE CONNECTION KIT



HEATER



PHASE MONITOR

Figure 5 – HVAC Accessories

4.2 Tools and Equipment

This list presents all the tools that may be required during installation. The specific tools for each portion of the installation will be noted at the beginning of the specific sections.

- A basic toolbox, including a socket set
- Cable bending machine
- Cable labelling machine
- Caulking gun
- Drill
- Drill bit or hole saw, depending on the size of the holes, and appropriate cable glands
- Hydraulic cylinder, 60,000 lb (27,200 kg) minimum capacity
- Ladder or step stool
- Laser level with an accuracy of 0.125 at 50 ft (0.313 cm at 15 m)
- Lifting equipment (e.g., forklift, crane, etc.). The lifting capacity of the equipment must be determined by a specialized lifting team
- MEGGER DLRO 600 Contact resistance test device (or authorized equivalent)
- Metric and imperial socket sets
- Multimeter (with one set of poles)
- Personal Protective Equipment (PPE), according to the applicable class
- Scissor or articulated arm lifting platform, meeting local standards for working at height.
- Torque wrench(s) for the following torques:

NOTE: *The torques below are applicable for the typical hardware used in this manual. If different hardware is used, adjust the recommended tightening torques mentioned in this manual.*

- o 6.3 N·m (59 lbf in)
 - o 58 N·m (43 lbf ft)
 - o 240 N·m (177 lbf ft)
- Vacuum cleaner
- Wire stripper

4.3 Supplies and Consumables

This list represents all supplies and consumables related to the installation of EVLO components that may be required during installation. Supplies related to the equipment are listed in the document **CXL2-DOC-MISC-009 – HARDWARE LIST**. Specific supplies and consumables for each portion of the installation will be noted at the beginning of the specific sections.

NOTE: *The supplies mentioned are those used for a typical installation. Actual supplies used for installation may differ on site. Always refer to the documentation applicable to the site for the specifics of the installation.*

Attaching the HVAC to the Battery Container

- M10 hex head screw, stainless steel (Qty dependent on installed model)
- Hardware kit to fix the curb
- Hardware kit for the heater
- Wiring kit for the heater
- Hardware kit for HVAC protection panels
- Hardware kit for the phase controller
- Wiring kit for the phase controller
- 2x – 4x4 in. wood beams, minimum length 4 ft. 6 in. (1,37 m)

Additional Supplies and Consumables

- 8x ABLOY high security padlocks (or equivalent), provided by the customer
- Cable ties
- Anti-seize compound
- Dielectric compound, KOPR-SHIELD
- Heat-shrink crimp connectors for cable identification
- Torque marker
- Cable glands, depending on the size of the cables at the site

Installing and connecting the dry pipe

NOTE: *Different fittings may be required at the installation site depending on the size of the dry pipe at the site. The parts shown below are for a typical 2.5 inch dry pipe installation.*

- Concentric Reducer, No. 50, 2.5" x 2.0", IPS, Victaulic

4.4 Reference Documents

NOTE: *All reference documents for the installation of the battery container are documented in **CXL2-DOC-INST-003**. Some additional reference documents may be required for on-site installation details. Refer to the site-specific installation manual.*

- CXL2-DOC-ASSY-003 – On-Site 1500VDC String Assembly
- CXL2-DOC-MISC-009 – Hardware Requirements
- Rigging Plan:
 - o The container,
 - o The HVAC curb,
 - o The HVAC,
 - o The gas evacuation grille.
- RAV036-072 – HVAC Installation Instructions
- 20001360 – HVAC Drain Extension
- CRBTMPWR004A01 –Thru-the-Bottom Service Connection Kit Installation Instruction.

4.5 Technical Specifications

Battery trays make up the power strings of the battery container. Each power string has eight battery trays and one demi-tray. Each battery tray contains six battery modules, two cell interfaces, and a tray fuse. The demi-tray has three modules and a single cell interface.

The battery trays have a voltage of 175.2VDC each and 76.8VDC for each half of the tray. The capacity is 320Ah.

The table below shows the mechanical, electrical, and communication specifications of the container.

Subject	Value
Ambient humidity in operation	0% to 100%
Altitude in operation	< 1,000 m ASL with no derating (for other altitudes, contact EVLO)
Ambient temperature in operation	–40 to +55°C (–40 to 131°F)
Ambient temperature in static storage	–30 to +55°C (–22 to 131°F)
Ambient transport temperature	–30 to +55°C (–22 to 131°F)
Length of the container	6.1 m (20 ft)
Width of the container	2.44 m (8 ft)
Height of the container	2.9 m (9.5 ft)
Heating/air conditioning system	HVAC (forced Convection)
Total weight (4/5/6 power strings)	22,500 kg (49,500 lb) 26,000 kg (57,250 lb) 29,500 kg (65,000 lb)
Battery cell chemistry	Cobalt-free Lithium Iron Phosphate (LiFePO ₄)
Power string configuration	51 modules in series per string, 4P8S battery modules
Calendar life	20 years
Cyclic life endurance	7,300+ cycles (depending on application)
Recommended SOC range at 25°C (77°F)	9 to 98% in 1C use 3 to 98% in 1/4C use

Subject	Value
Shock and vibration	Meets IEEE 693 seismic requirements (0.5G)
Nominal energy of a power string	417.8 kWh
Nominal energy of the battery container (4/5/6 power strings)	1,671 kWh (1.67 MWh) 2,088 kWh (2.09 MWh) 2,506 kWh (2.5 MWh)
Power string tension of the battery container DC voltage (minimum/nominal/maximum)	1,188 VDC/1,306 VDC/1,491 VDC
Battery cell voltage (nominal)	3.2 VDC
Cell balancing	Controlled by BMS
Maximum power (1C/0.25C)	1500 kW (nominal) 594 kW (nominal)
Monthly self-discharge	Less than 1%
Auxiliary power consumption (standby)	1 kW
Auxiliary energy consumption (active, without HVAC)	7 kW
Auxiliary energy consumption (active, with heating)	35 kW
Auxiliary power consumption (active, with air conditioning)	30 kW
Cyclic energy efficiency (CC)	98.4%
Communication protocol	MESA-ESS on Modbus/TCP or DNP3 (optional)
Connectivity	Ethernet (copper or fiber)
Shielding	Yes
Communication rate	10/100 Mb/s
AC input 1C configuration	460 VAC/35A/60Hz/3 phases
AC input 1/4C configuration	460 VAC/20A/60Hz/3 phases
DC input	1489 VDC

Subject	Value
Maximum DC current	1300 A

Table 1 – Technical Specifications

The table below shows the specifications applicable to the named component or system.

Component or system	Specification/Standard
Battery cells	UL 1973
Battery module	UL 1973
Battery container	IPX4, NEMA 3R
Battery container	NEMA 250 TYPE 3R
Battery container	NFPA 69
Battery container	NFPA 855
Battery container	UL 9540 and UL9540A
Battery container	IEEE 693
Battery container	UL 9540–41.1.1 marine environment (if applicable)
Battery Management System (BMS)	UL 1973

Table 2 – Certifications and Standards

4.6 Clearances and Support Points

NOTE: *Clearances are needed for maintenance, access to personnel, equipment and machinery.*

The battery container requires minimal clearance around its final installation location. The main clearances required are:

- 2 meters (6.56 ft) minimum at the rear (opposite to HVAC),
- 1.22 meters (4 ft) minimum at the front (HVAC side),
- 3 meters (9.84 ft) minimum (tray access side),
- 10.16 centimeters (4 inches) minimum between the ground and the container.

This clearance does not take into account possible site-specific restrictions. Additional clearance may be required depending on the presence of other equipment nearby, or the space required for the lifting equipment.

If the site has multiple containers, an installation sequence must be planned and validated by site managers before starting.

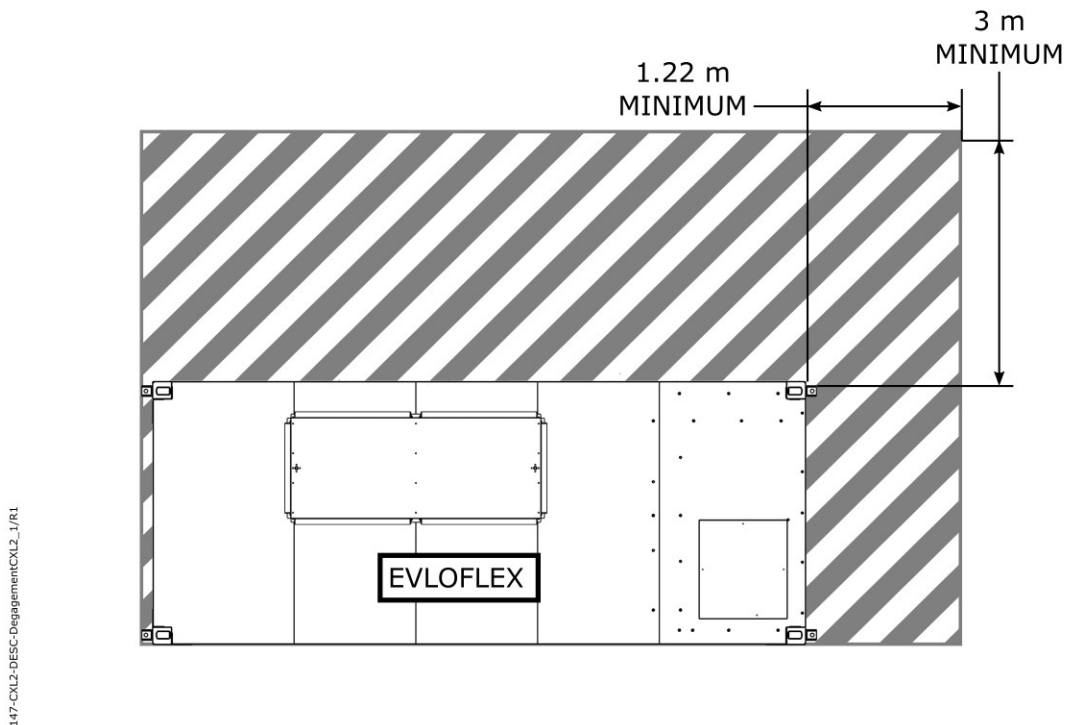


Figure 6 – Clearance Around the Battery Container (Typical)

The battery container has five support points (ISO blocks) that must be in contact with the foundation.

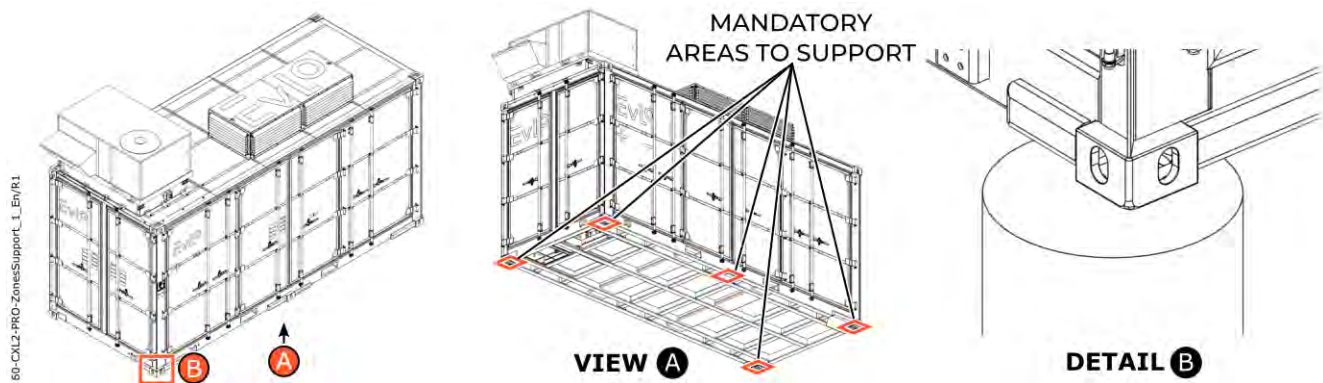


Figure 7 – Battery Container Support Points

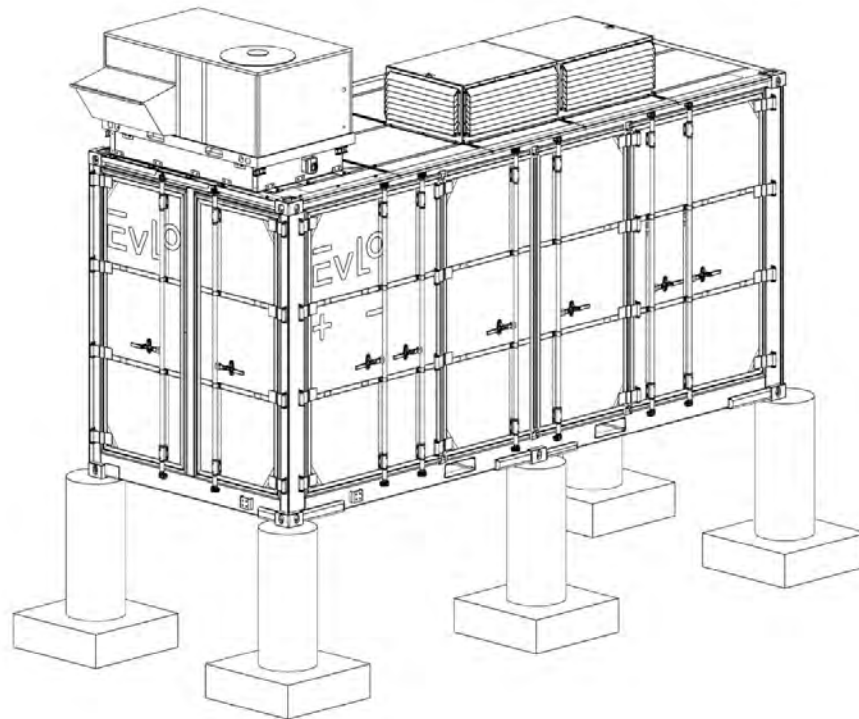


Figure 8 – Footing of the Battery Container (Typical)

4.7 Site Cable Insertion Areas

The power, control, and communication cables that will be connected to the battery container must be routed in the areas defined in **FIGURE 9**.

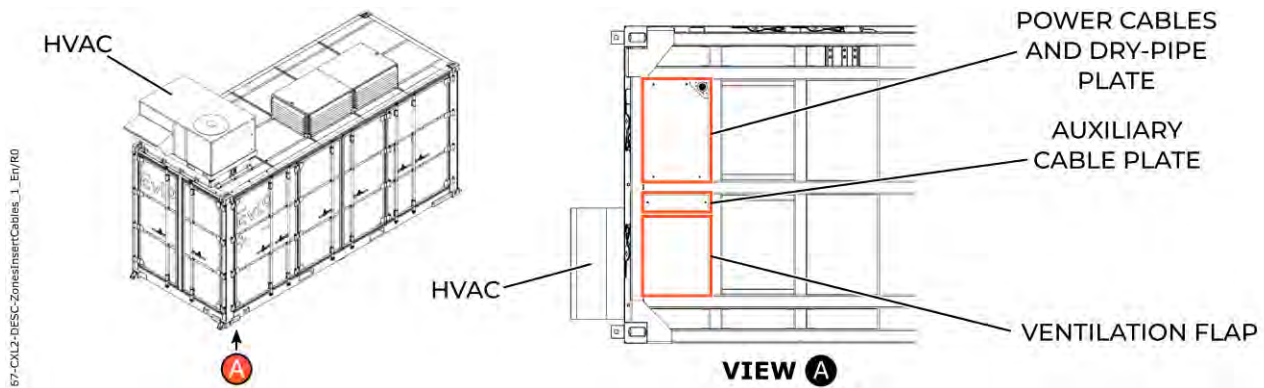


Figure 9 – Inserting the Cables

4.8 Notes for Lifting and Handling

WARNING



COMPLY AT ALL TIMES WITH THE EQUIPMENT OPERATING MANUALS, THE SAFETY CODE FOR CONSTRUCTION WORK, THE STANDARDS, THE REGULATIONS AND OTHER APPLICABLE DOCUMENTATION CONCERNING THE LIFTING WORK AND SAFETY PROCEDURES. NEVER PROCEED WITHOUT HAVING READ THE CONTENTS OF THESE DOCUMENTS. FAILURE TO COMPLY WITH THIS INSTRUCTION MAY CAUSE EQUIPMENT DAMAGES, SEVERE INJURIES OR DEATH.

IMPORTANT NOTE: *The lifting operation and any necessary safety measures resulting from it are the responsibility of the specialized lifting team.*

Lifting and handling of the container (and its equipment) by crane must be carried out by a specialist lifting team in accordance with the standards and regulations in force. It is strongly recommended to use guide ropes to ensure controlled lifting.

Crane lifting of the EVLOFLEX equipment must be carried out according to the **RIGGING PLAN** provided by the customer.

4.8.1 Lifting the Container

CRANE LIFTING

To lift the battery container and its equipment, it is important to validate that the lifting equipment used is adequate to lift the weight of the battery container, which can weigh up to 27 metric tons depending on its configuration.

WARNING



THE BATTERY CONTAINER WEIGHS APPROXIMATELY 27 TONNES (27,000 KG, 59525 LB). ALWAYS FOLLOW THE APPLICABLE SAFETY PROCEDURES BEFORE LIFTING. FAILURE TO FOLLOW THIS SAFETY INSTRUCTION MAY RESULT IN SEVERE INJURIES OR DEATH.

(See **FIGURE 10** and **FIGURE 11**)

Lifting straps and space beams are required to handle the product properly. The anchor points at the top of each corner (**FIGURE 10**) are the places required for installing the lifting equipment.

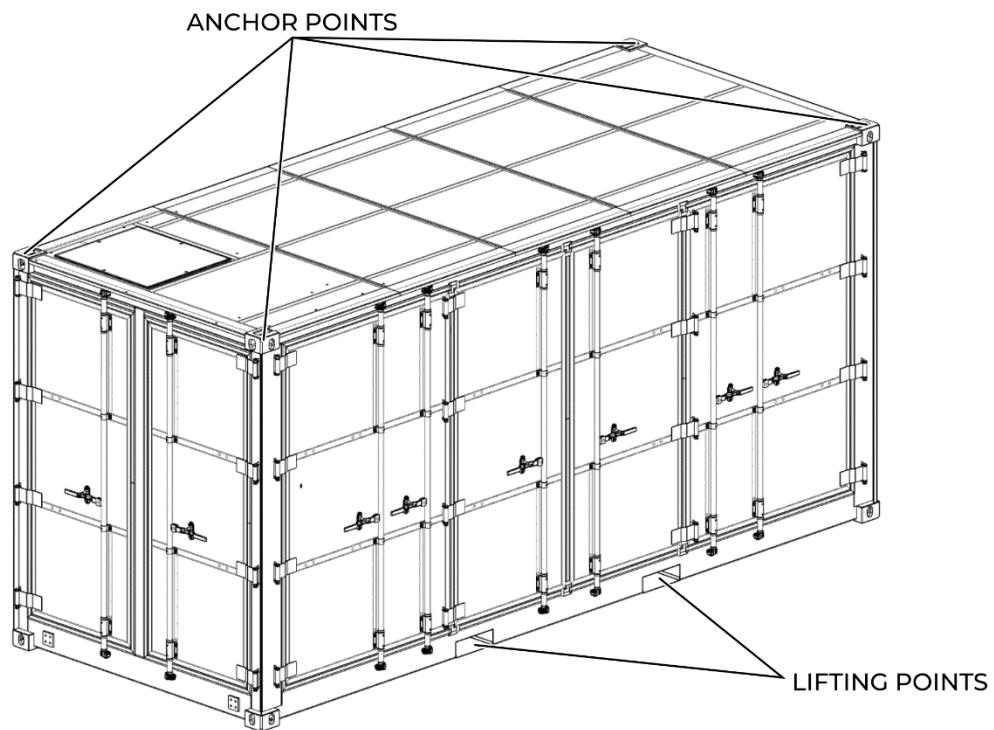


Figure 10 – Lifting and Anchoring Points of the Battery Container



DETAIL A
(TYPICAL)

Figure 11 – Crane Lift Assembly (Typical)

WARNING

VERTICAL LOADING ONLY, WHEN LIFTING.



Crane Lifting Equipment:

For a list of equipment required for handling the battery container, refer to the **RIGGING PLAN** provided by the customer.

Notes and Adjustments for Crane Lifting:

- Lift the load slightly and adjust the length of the chains, if necessary, to ensure that the load lifts horizontally.
- When moving the load, proceed slowly and avoid abrupt maneuvers to avoid destabilizing the load.
- If adjustable spacer beams are used, ensure that there is sufficient capacity for the length indicated on the **RIGGING PLAN** written by the customer.

LIFT BY FORKLIFT

(See **FIGURE 10**)

ISO container forks of 10 feet are required to handle the product properly. The lifting points at the center of the battery container (**FIGURE 10**) are the places of choice for handling the product.

4.8.2 HVAC Lifting

HVAC CURB LIFT

WARNING



THE HEAVIEST CURB WEIGHS APPROXIMATELY 118 KG (260 LB). ALWAYS FOLLOW THE APPLICABLE SAFETY PROCEDURES BEFORE LIFTING. FAILURE TO FOLLOW THIS SAFETY INSTRUCTION MAY RESULT IN SEVERE INJURIES OR DEATH.

The HVAC comes with a custom-made base. The HVAC curb has four lifting brackets on which the lifting equipment must be installed.

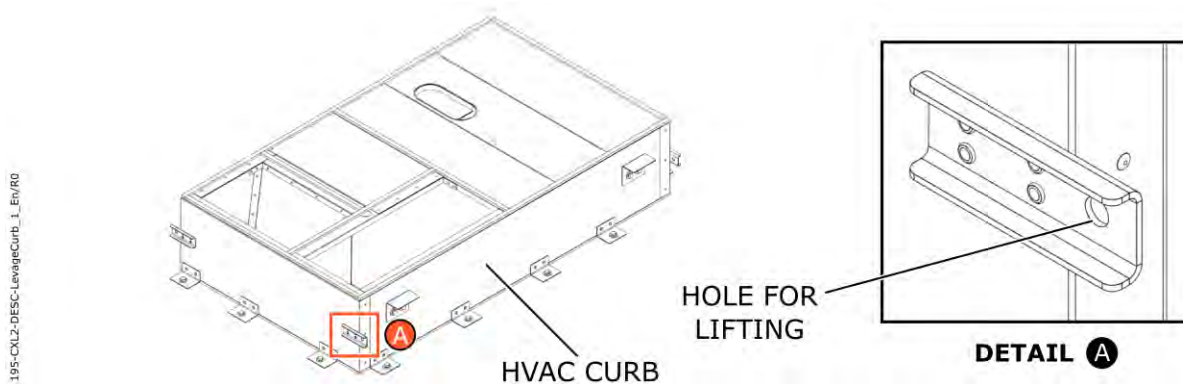


Figure 12 – HVAC Curb Lifting

NOTE: *The diameter of the hole in the lifting brackets of the HVAC Curb is 15 mm (19/32 in).*

HVAC LIFT

WARNING



THE HEAVIEST HVAC WEIGHS APPROXIMATELY 375 KG (827 LB). ALWAYS FOLLOW THE APPLICABLE SAFETY PROCEDURES BEFORE LIFTING. FAILURE TO FOLLOW THIS SAFETY INSTRUCTION MAY RESULT IN SEVERE INJURIES OR DEATH.

Rigging shackles, lifting straps and spreader bars are required to handle the product properly. The HVAC must be lifted according to the instructions detailed in [RAV036-072 – HVAC INSTALLATION INSTRUCTIONS](#).

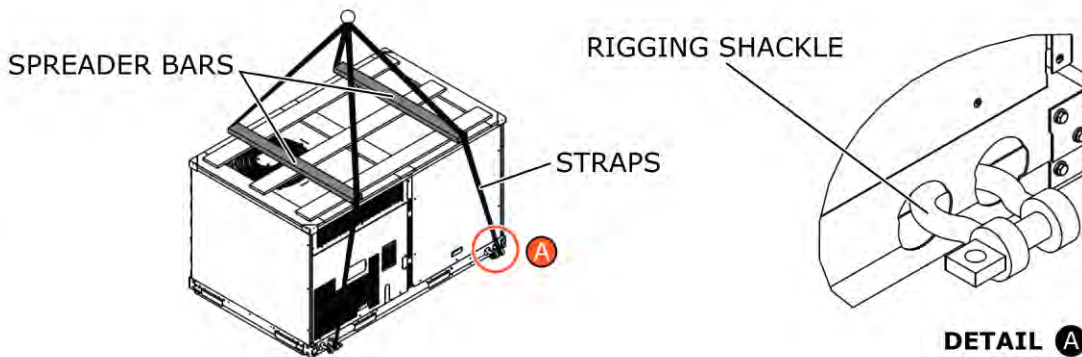


Figure 13 – HVAC Lifting

4.8.3 Gas Evacuation Grille Lifting

WARNING



THE GAS EVACUATION GRILLE WEIGHS APPROXIMATELY 145 KG (319 LB). ALWAYS FOLLOW THE APPLICABLE SAFETY PROCEDURES BEFORE LIFTING. FAILURE TO FOLLOW THIS SAFETY INSTRUCTION MAY RESULT IN SEVERE INJURIES OR DEATH.

CAUTION



THE GAS EVACUATION GRILLE'S UNDERSIDE HAS FOUR EXPOSED ADHESIVE FOAM STRIPS ON ITS CONTOUR, CARE MUST BE TAKEN DURING THE TRANSPORT, LIFTING AND INSTALLATION OF THE EQUIPMENT TO ENSURE THEY ARE NOT DAMAGED. FAILURE TO DO SO MAY CAUSE EQUIPMENT DAMAGE AND MAJOR FIRES.

Lifting straps and spreader bars are required to handle the product properly. The gas evacuation grille does not have lifting eyes. Proper lifting of the gas evacuation grille is the responsibility of the lifting team.

Care must be taken when handling the gas evacuation grille to prevent damage to the four exposed adhesive foam strips on its base.

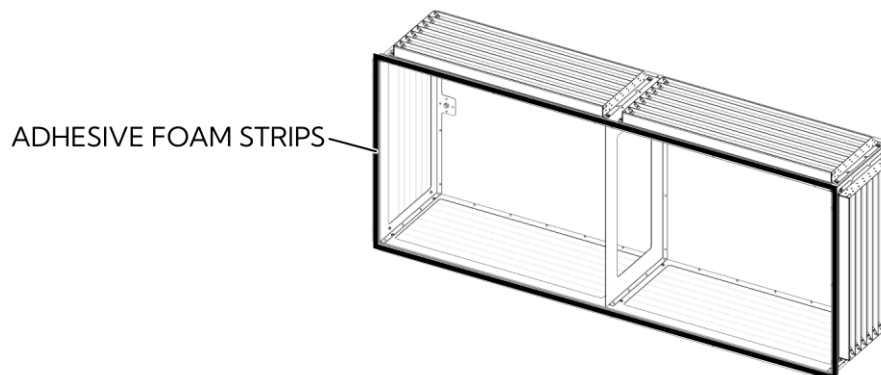


Figure 14 – Gas Evacuation Grille's Foam Strips

4.9 Initial Conditions and Inspections

The steps below describe the manipulations and checks required before starting the installation of the battery container.

NOTE: *All tests and verification in this section should be noted in installation report **CXL2-DOC-INST-002**.*

1. The manual has been read in its entirety before the manipulations are carried out.
2. The weather is favorable to the execution of the installation (no rain, strong wind, snow, etc.)
3. If applicable, the platform is installed on the foundation.
4. The foundation is level, with a tolerance of ± 2 mm.
5. The site cables that will be connected to the battery container are installed at the site, ready to be connected, and are not powered.
6. If applicable, the site's dry-pipe system is installed and ready to be connected.
7. Site specific labelling shall be provided on the panels indicating where the disconnect devices are located.

5 Mechanical Installation

Follow the following steps to perform the mechanical installation of the battery container on site. The handling for this procedure should be documented in **CXL2-DOC-INST-002** installation report.

NOTE: *Some access doors may be blocked if the battery container is not level*

NOTE: *Before opening any door on the container, if welding is the anchoring method to be used to fix the container on the ground, the following guidelines shall be respected:*

- *Any welding work on the container must be done while the container is in storage/transportation mode (all door and trap shall remain closed).*
- *Steel welding shall be done accordingly to CSA w59 (or AWS d1.1).*
- *Welding ground must be put on the container grounding NEMA pad.*
- *To prevent premature corrosion, paint touch-ups should be done on every welds.*

DANGER



THE BATTERY CONTAINER INCLUDES BATTERIES WITH STORED ENERGY. ALWAYS CONFIRM THE ABSENCE OF VOLTAGE BEFORE INSTALLING THE BATTERY CONTAINER. FAILURE TO DO SO CAN LEAD TO SEVERE INJURIES AND DEATH.

DANGER



SEVERAL HAZARDS, INCLUDING INDUCTION, CAN BE FOUND ON THE OPERATING SITE. ALWAYS FOLLOW THE PROCEDURES AND INSTRUCTIONS IN FORCE ON THE OPERATING SITE. FAILURE TO FOLLOW THIS SAFETY INSTRUCTION MAY RESULT IN PERSONAL INJURY OR DEATH.

CAUTION



DO NOT OPEN BATTERY CONTAINERS. FAILURE TO DO SO MAY CAUSE EQUIPMENT DAMAGE AND MAJOR FIRES.

5.1 Equipment Preparation

NOTE: *All tests and verification in this section should be noted in installation report **CXL2-DOC-INST-002**.*

8. When the battery container and its equipment arrive, remove the protective covers/tarpaulins used for transport.
9. If applicable, remove protective films from the gas evacuation grilles and HVAC.
10. Validate the absence of aesthetic defects on all equipment (dents, marks on the paint, gradients, rust, etc.) If a non-compliance is found, both EVLO and the carrier should immediately be informed.
11. On the HVAC, validate that there are no traces of refrigerant gas leaks.
12. Remove the HVAC panels and validate that there is no water infiltration in its electronic compartments.
13. Validate that all equipment of the options applicable to the project is delivered. Refer to **SECTION 4.1** and project documentation.

5.2 Battery Container Installation

NOTE: Refer to **FIGURE 7** for areas that must be supported by a foundation.

14. Install lifting equipment in the appropriate locations in the container depending on the type of lifting equipment used. Refer to **SECTION 4.8**.



GUIDE ROPES

Figure 15 – Guide Ropes

15. Install a guide rope on each side of the container (See **FIGURE 15**).
16. Using the lifting equipment, lift and transport the container to its place of installation. Keep the lifting equipment close to make adjustments as necessary to install the exhaust system, the curb and the HVAC.
17. Gently lower the container to its place of installation, aligning the opening of the control and distribution compartment bottom plates with the cables and the site dry pipe (if applicable),
18. Validate that the container is level to an accuracy of 0.167 in. By 66 ft (0.417 cm by 20 m) and that all doors can be opened without friction on the frame. If not:
 - 18.1. Lift the container slightly using a hydraulic cylinder placed under the container structure.
 - 18.2. Install stainless steel shims between foundation and container as needed.
 - 18.3. Lower the container back onto the platform.
 - 18.4. Check that all doors open without obstruction.
 - 18.5. Repeat step 18 until the container is leveled.
19. Validate that the container is centered and supported evenly on the foundation.

NOTE: Before opening any door on the container, if welding is the anchoring method used to fix the container on the ground, the following guidelines shall be respected:

- Any welding work on the container must be done while the container is in storage/transportation mode (all door and trap shall remain closed).
- Steel welding shall be done accordingly to CSA w59 (or AWS d1.1).
- Welding ground must be put on the container grounding NEMA pad.
- To prevent premature corrosion, paint touch-ups should be done on every welds.

20. Open the access door to the control and distribution compartment.
21. Install the mountings at the five support points of the container (see **FIGURE 7**).

NOTE: *It is the responsibility of the customer, or the installer, to determine the means of securing the container at its place of installation, depending on site seismic requirements, other methods to anchor the container to its foundation may be required. The EVLOFLEX container is equipped with standard anchorage points for ISO containers. ISO twist locks can be used to secure the container to its foundation.*

DANGER



VOLTAGES UP TO 1500 VDC/460 VAC CAN BE PRESENT AT ANY TIME. WEAR THE PPE ACCORDING TO THE REQUIRED CLASS. FAILURE TO FOLLOW THIS SAFETY INSTRUCTION MAY RESULT IN SEVERE INJURIES OR DEATH.

22. Confirm that there is no voltage between all the bus bars **(1)** using a multimeter mounted on poles.

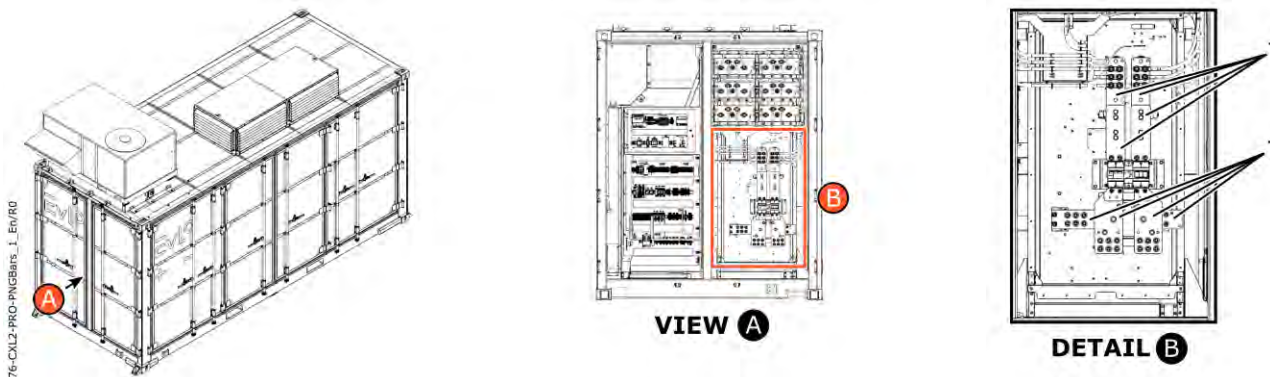


Figure 16 – Bus Bars

23. Record the maximum temperature reading of the labels or temperature recorder and the maximum humidity reading of the humidity indicators.

NOTE: *These indicators take the form of papers changing color as the humidity increases; the color indicated is that reached when the humidity was highest.*

5.3 Installation of the Gas Evacuation Grille

WARNING



THE INSTALLATION OF THE GAS EVACUATION GRILLE REQUIRES WORKING AT HEIGHT. FOLLOW LOCAL REGULATIONS IN FORCE ON THE SITE. FAILURE TO RESPECT THIS SAFETY INSTRUCTION MAY LEAD TO SEVERE INJURIES.

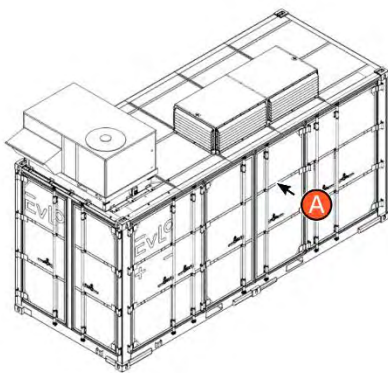
WARNING



THE BATTERY CONTAINER CANNOT BE PROTECTED BY A MARQUEE WHEN INSTALLING THE GAS EVACUATION GRILLE. NEVER INSTALL THE GAS EVACUATION GRILLE IN RAINY WEATHER. FAILURE TO RESPECT THIS SAFETY INSTRUCTION MAY LEAD TO SEVERE INJURIES AND MATERIAL FAILURES.

(See [SECTION 4.3](#) for hardware information)

24. Using locking pliers, retain the straps **(7)** of the gas evacuation flaps **(9)** on themselves to prevent the cylinders from extending when step 25 is completed.

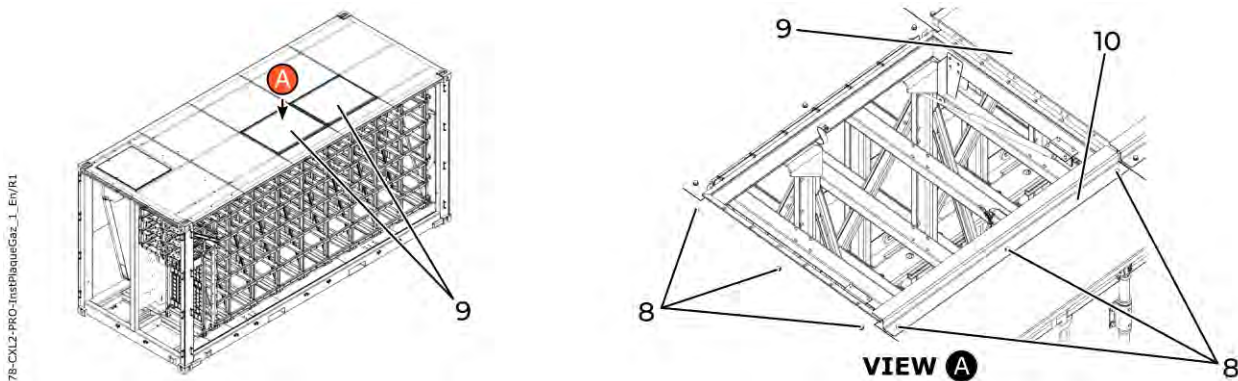


VIEW **A**

Figure 17 – Gas Evacuation Flaps' Straps

NOTE: If the gas evacuation flaps (9) open when performing step 25, pull the straps (7) and lock them to close the flaps again.

25. For the two gas evacuation flaps (9), remove the three screws (8) and the two retaining brackets (10).
26. Validate that the two gas evacuation flaps (9) stay shut.
If a gas evacuation flap (9) opens, leaving a small gap, retighten the strap (7) and make sure the fixation used in step 24 keeps the gas evacuation flap (9) shut.



(LEFT GAS EVACUATION FLAP HIDDEN FOR CLARITY)

Figure 18 – Gas Evacuation Flap Retaining Brackets

27. Validate that the contact surface between the gas evacuation grille (11) and the container is clean and dry. Clean as necessary.
28. Confirm that the insulation below the gas evacuation grille (11) is in good condition. Repair or seal as required.
29. Lift and position the gas evacuation grille (11) on the battery container.
30. Install the 18 screws (8) (removed in previous steps) securing the gas evacuation grille (11) to the battery container.

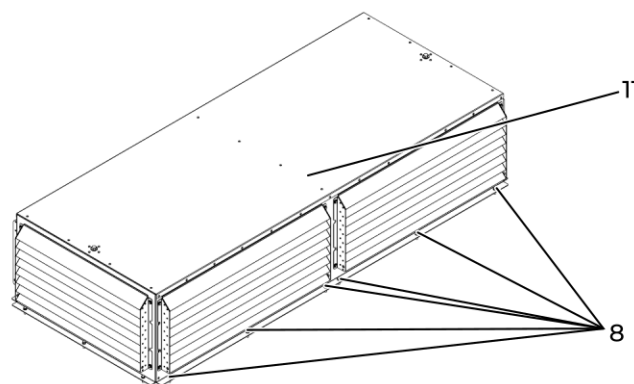


Figure 19 – Gas Evacuation Grille

5.4 HVAC Installation

WARNING



THE HEAVIEST HVAC WEIGHS APPROXIMATELY 375 KG (827 LB). ALWAYS FOLLOW THE APPLICABLE SAFETY PROCEDURES BEFORE LIFTING. FAILURE TO FOLLOW THIS SAFETY INSTRUCTION MAY RESULT IN SEVERE INJURIES OR DEATH.

WARNING



THE INSTALLATION OF THE HVAC REQUIRES WORKING AT HEIGHT. FOLLOW LOCAL REGULATIONS IN FORCE ON THE SITE. FAILURE TO RESPECT THIS SAFETY INSTRUCTION MAY LEAD TO SEVERE INJURIES.

WARNING



NEVER INSTALL THE HVAC IN RAINY WEATHER. THE BATTERY CONTAINER CANNOT BE PROTECTED BY A MARQUEE WHEN INSTALLING THE HVAC. FAILURE TO RESPECT THIS SAFETY INSTRUCTION MAY LEAD TO SEVERE INJURIES AND MATERIAL FAILURES.

IMPORTANT NOTE: *A refrigeration technician should be contacted in the case of unexpected events and issues during the HVAC installation and startup.*

(See [SECTION 4.3](#) for hardware information)

5.4.1 Steps Prior to Installation

NOTE: It is strongly recommended to perform the steps in this section on the ground to limit overhead manipulations.

HVAC CURB PREPARATION

CAUTION



TRANSPORTATION CAN CREATE SMALL DEFECTS ON THE INSULATING FOAM. ADD A STRIP OF FOAM INSULATION PARALLEL TO THE DEFECT, EXTENDING 2.54 CM (1 IN) FROM EACH END OF THE DEFECT. FAILURE TO FOLLOW THIS SAFETY INSTRUCTION MAY RESULT IN MATERIAL FAILURES.

NOTE: The installation of the strobe alarm as well as the horn must be carried out by qualified fire alarm personnel when it is required to do so by local regulations.

31. Install harness 81000341 (15) on the strobe alarm (13) according to the diagram below.

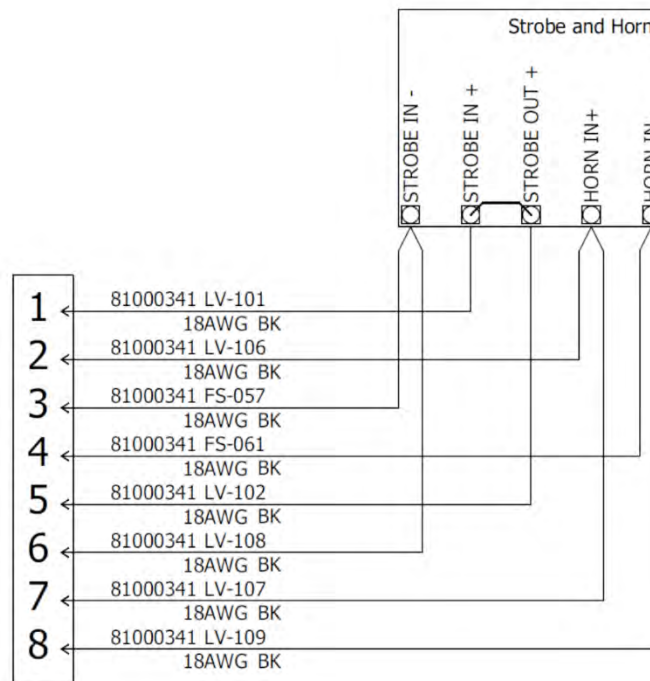


Figure 20 – Strobe Alarm Connection

32. Remove the four 90° brackets (**36**) and their hardware. Set aside.
33. On the exterior panel, remove the protective filter from the strobe alarm (**13**) cutout.
34. Taking care not to damage the seal (**16**), turn the HVAC curb (**28**) upside down so that you can access the bottom of the HVAC curb (**28**).
35. On the exterior facade, install the strobe alarm (**13**) with the hardware provided.
36. Using tie wraps (**14**), attach harness 81000341 (**15**) to the tie-wrap brackets (**14**).
37. Validate that the lower and upper seal (**16**) of the HVAC curb (**28**) is in good condition. Seal or repair as necessary.

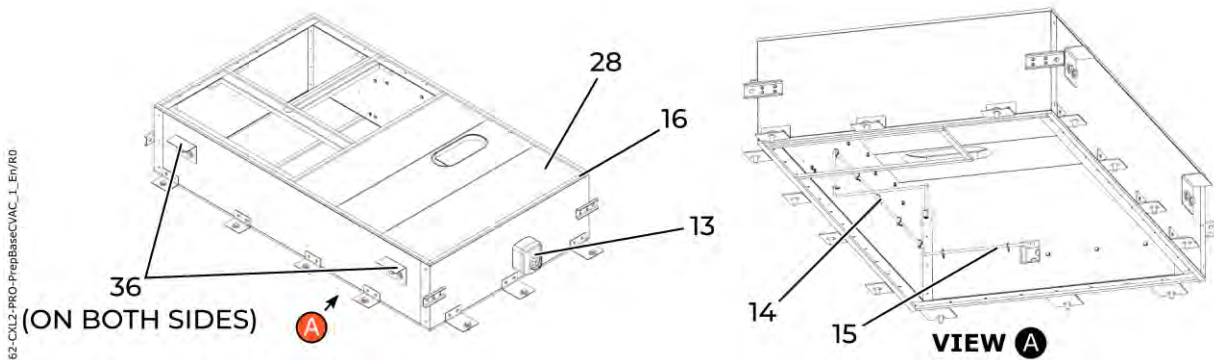


Figure 21 – Upper Panels (HVAC Curb)

HVAC PREPARATION

NOTE: For details on routing cables in the HVAC, refer to [RAV036-072 – HVAC INSTALLATION INSTRUCTIONS](#).

CAUTION



THE POWER HARNESS AND CONTROL HARNESS SHEATHS MUST BE IN ONE PIECE AND INTACT UP TO THE INSIDE OF THE CONTROL PANEL OF THE HVAC. A CUT SHEATH ON THE OUTSIDE OF THE CONTROL PANEL CAUSES WATER TO FLOW INTO THE CONTAINER. FAILURE TO FOLLOW THIS SAFETY INSTRUCTION CAN LEAD TO EQUIPMENT DAMAGES.

38. Remove and set aside the following access panels and their hardware.

- The upper control panel (21),
- The lower control panel (22).

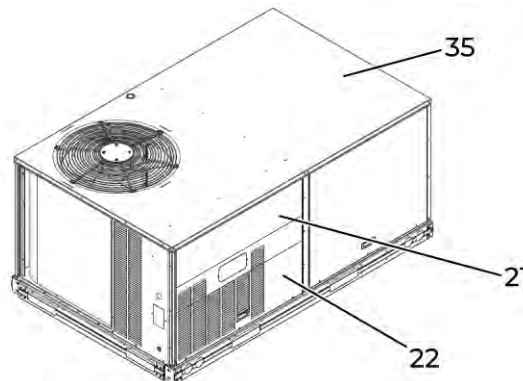
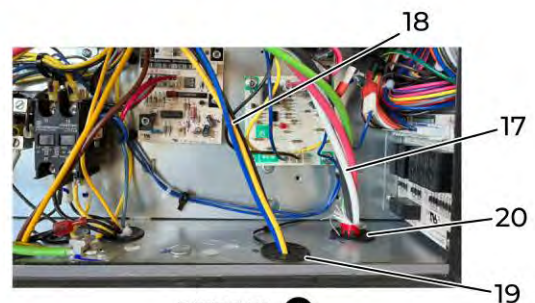


Figure 22 – HVAC Access Panels

39. Route the power harness 81000321 (17) and control harness 81000331 (18) through the holes (19) and (20) in the upper control panel (21) of the HVAC (35).



DETAIL A
(CONTROL CABLE NOT SHOWN)

Figure 23 – Connections in the HVAC

IMPORTANT NOTE: For details on connections to make for phase rotation, refer to the site documentation.

40. Install the 4 wires (3 phases + neutral) of the power harness 81000321 (**17**) on the power terminal block (**23**) according to the following diagram.

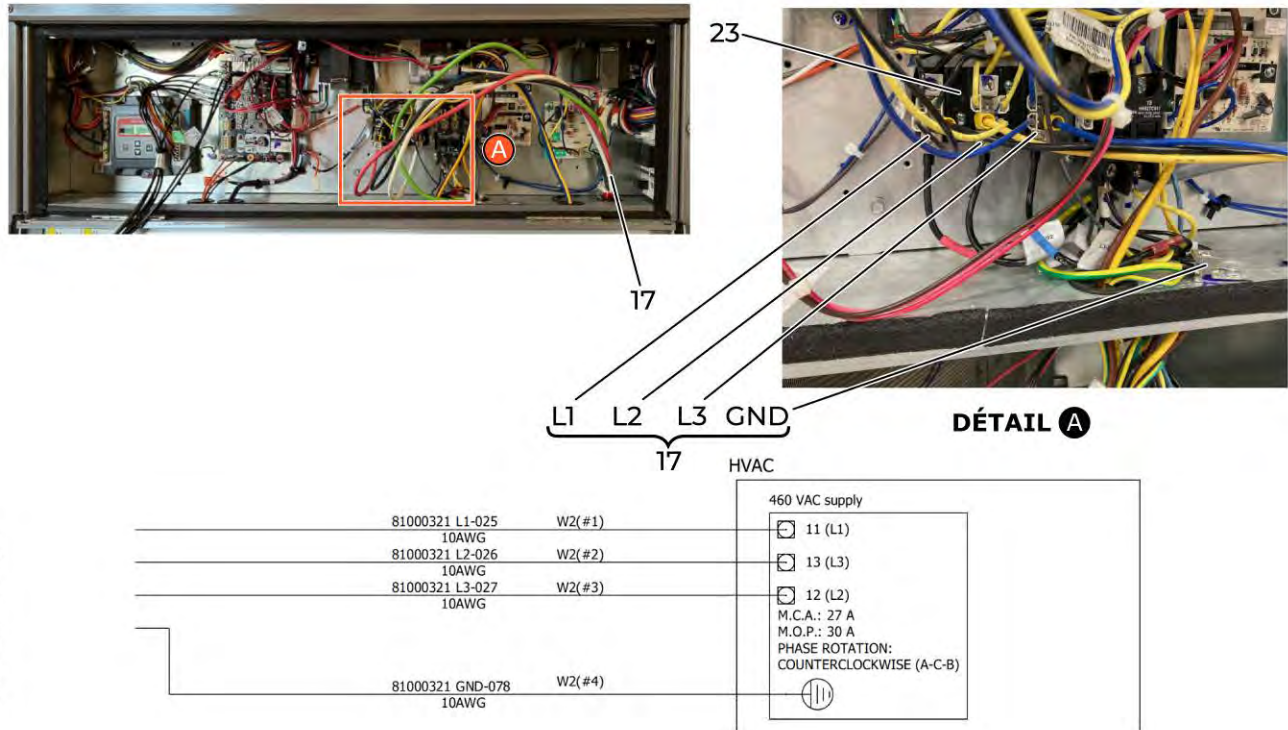
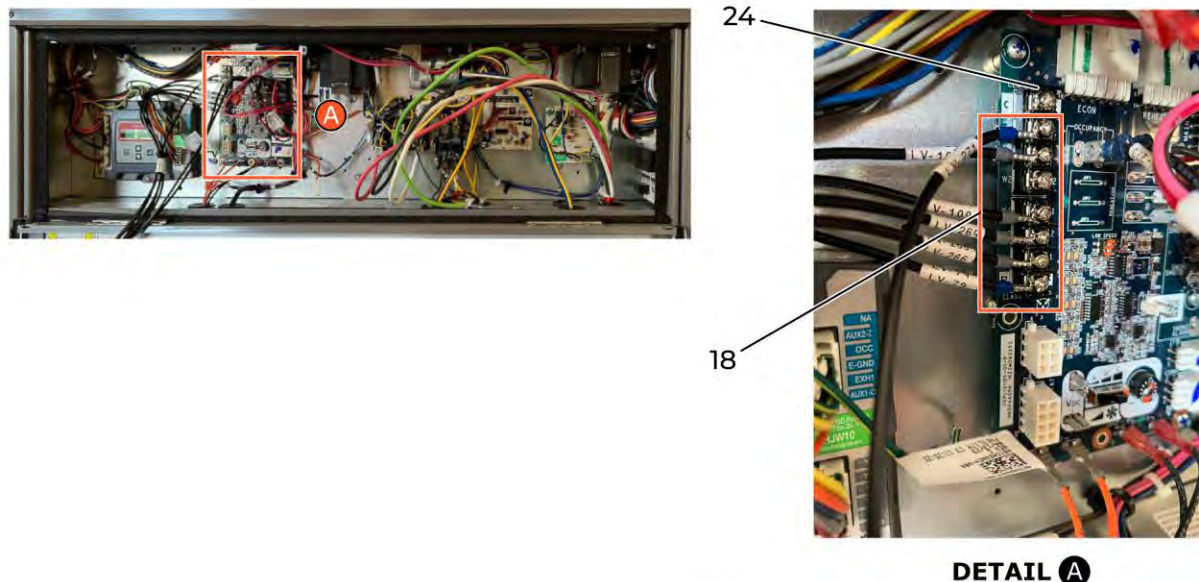


Figure 24 – HVAC Power Supply Connections

41. Install the wires of the control harness 81000331 **(18)** on the control terminal block of the circuit board **(24)**.



			A.C. Control	
81000331 LV-79	18AWG	W49(Black)	☐ R	24VAC output
81000331 LV-108	18AWG	W49(Black)	☐ G	Fan
81000331 LV-109	18AWG	W49(Black)	☐ W1	Heat
81000331 LV-266	18AWG	W49(Black)	☐ Y1	Cool 1
81000331 LV-269	18AWG	W49(Black)	☐ Y2	Cool 2
81000331 LV-271	18AWG	W49(Black)	☐ HUM	Dehumidify
81000331 0V-044	18AWG	W49(Black)	☐ C	0VAC output
			Economizer Control	
81000331 LV-273	18AWG	W49(Black)	☐ A	Occupancy
81000331 LV-275	18AWG	W49(Black)	☐ B	Occupancy
81000331 LV-277	18AWG	W49(Black)	Alarm outputs	
81000331 LV-282	18AWG	W49(Black)		
			☐ 1	Filter Status
			☐ 2	Filter Status

Figure 25 – HVAC Control Connections

42. Validate that the thru-the-bottom service connection kit **(30)** is installed. If not:
 - 42.1. Confirm that the cable glands of the thru-the-bottom service connection kit **(30)** (delivered with the HVAC unit) correspond to the size of the control harness 81000331 **(18)** and the power harness 81000321 **(17)**.
 - 42.2. Install the thru-the-bottom service connection kit **(30)** on the extrusion shown in **FIGURE 26**.

NOTE: Only the installation of cable glands for the control harness 81000331 **(18)** and the power harness 81000321 **(17)** is required. For more information on installing the thru-the-bottom service connection kit **(30)**, refer to **CRBTMPWR004A01 – THRU-THE-BOTTOM SERVICE CONNECTION KIT INSTALLATION INSTRUCTION**.

43. Route the power harness 81000321 **(17)** through the power cable gland **(31)**, allowing the entire length of the harness remaining to come out under the HVAC.
44. Route the control harness 81000331 **(18)** through the control cable gland **(32)**, allowing the entire length of the harness remaining to come out under the HVAC.

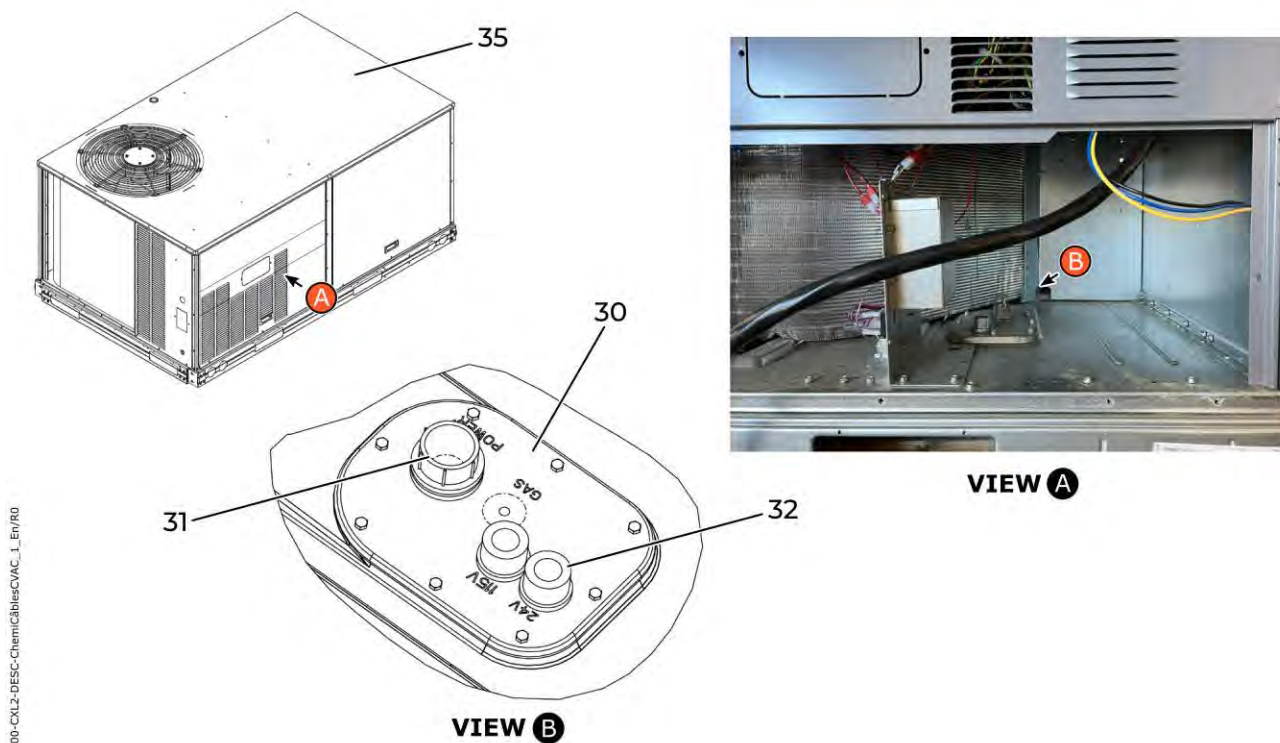


Figure 26 – Routing Harnesses in HVAC

HAIL GUARDS INSTALLATION

CAUTION



DO NOT DRILL HOLES IF THE EXISTING HOLES ARE NOT ALIGNED PROPERLY. ANY DRILLING WILL RESULT IN THE POSSIBILITY OF DRILLING THE CONDENSER. FAILURE TO FOLLOW THIS SAFETY INSTRUCTION CAN LEAD TO EQUIPMENT DAMAGES.

NOTE: *The steps below are taken from the vendor manual. For more information, refer to [CRLVHLGD014A00 – PROTECTIVE GUARD INSTALLATION INSTRUCTIONS](#).*

Verify that the correct part number of the hail guard **(33)** is provided. (See [CRLVHLGD014A00 – PROTECTIVE GUARD INSTALLATION INSTRUCTIONS](#) for the part number appropriate for HVAC model.)

45. Remove the screws in the top panel above the condenser coil. Set the screws aside.
46. Remove the screws at the base of the outdoor coil where the hail guard **(33)** will be installed. Set the screws aside.
47. Align the hail guard **(33)** with the respective section of the outdoor coil and insert the top edge of the panel under the lip of the top panel.
48. Reinsert the upper and lower screws from the previous steps to hold the hail guard **(33)** in place.
49. Insert side bolts from the kit through the holes in the side(s) of the hail guard **(33)**. The supplied self-tapping screws may be required.

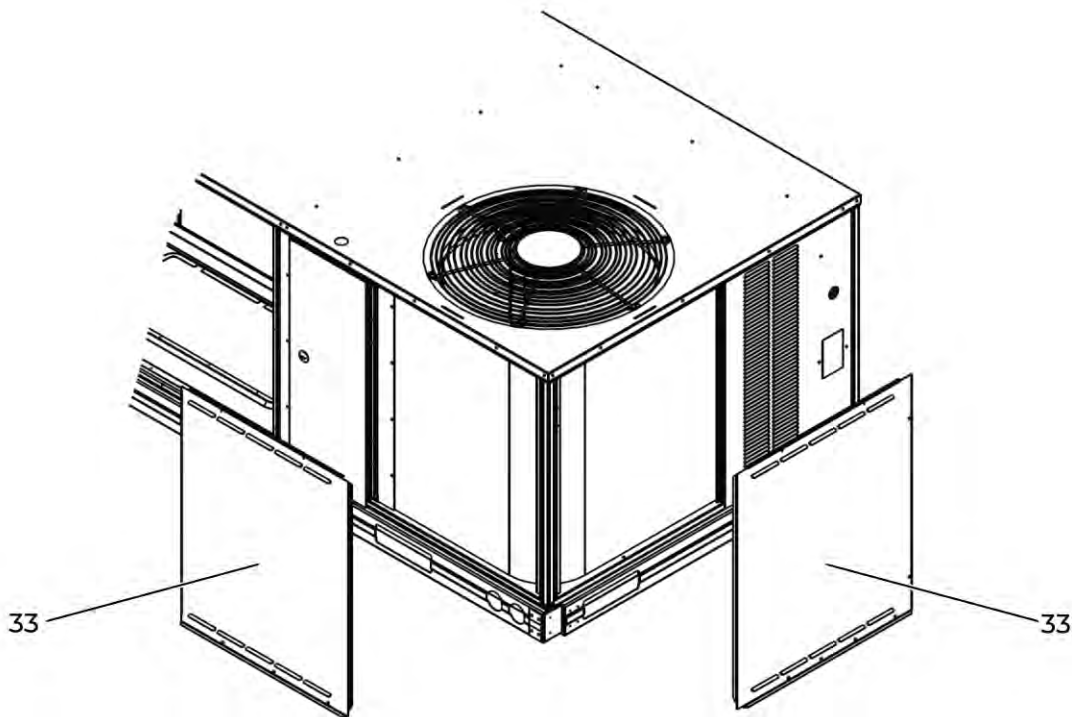


Figure 27 – Protective Guards Installation

HEATER INSTALLATION

NOTE: For more information on the heater installation, refer to **CRHEATER420A00 – HEATER INSTALLATION INSTRUCTIONS**.

50. Remove the fan access panel **(61)**. Set the fan access panel **(61)** and its hardware aside.
51. Remove the heater panel **(62)**. Save the hardware and discard the heater panel **(62)** according to local standards and regulations.

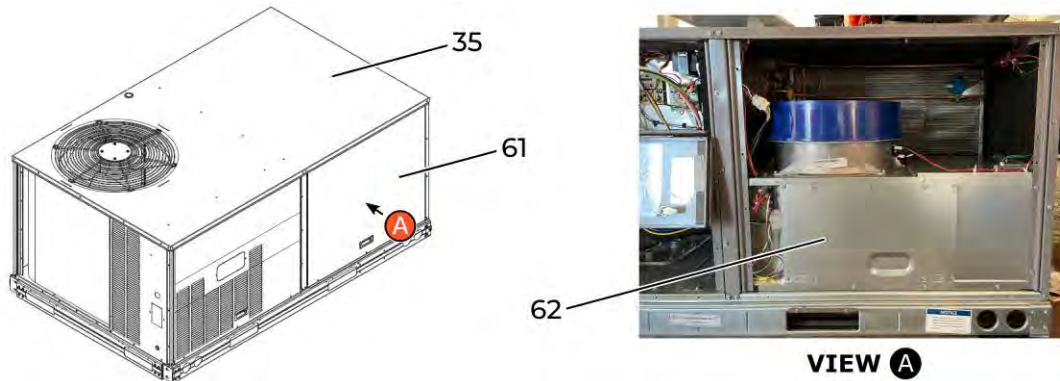


Figure 28 – Access to the HVAC's Heater

52. Place the heater on its mount **(63)**.
53. Secure the heater **(63)** using the hardware set aside in step 51.
54. Hand tighten the hardware.

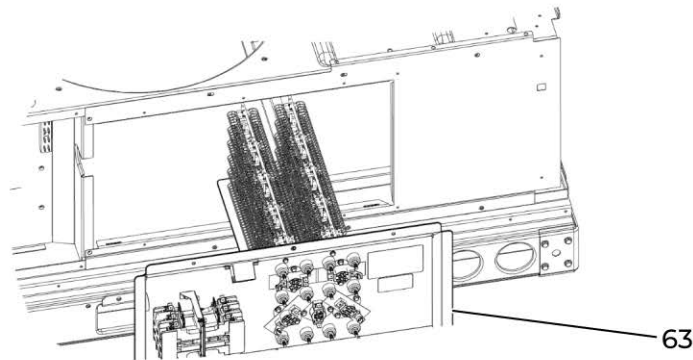


Figure 29 – HVAC Heater Installation (Typical)

55. Route the three wires (black, yellow and blue) of the between the controller **(64)** of the heater **(63)** and the terminal block **(23)** of the upper control panel.
56. On the controller **(64)**:
 - 56.1. Connect the black wire to terminal L1 **(65)**,
 - 56.2. Connect the yellow wire to terminal L2 **(66)**,
 - 56.3. Connect the blue wire to terminal L3 **(67)**.
57. On the terminal block **(23)**:
 - 57.1. Connect the black wire to terminal 11 **(68)**,
 - 57.2. Connect the yellow wire to terminal 12 **(69)**,
 - 57.3. Connect the blue wire to terminal 13 **(70)**.

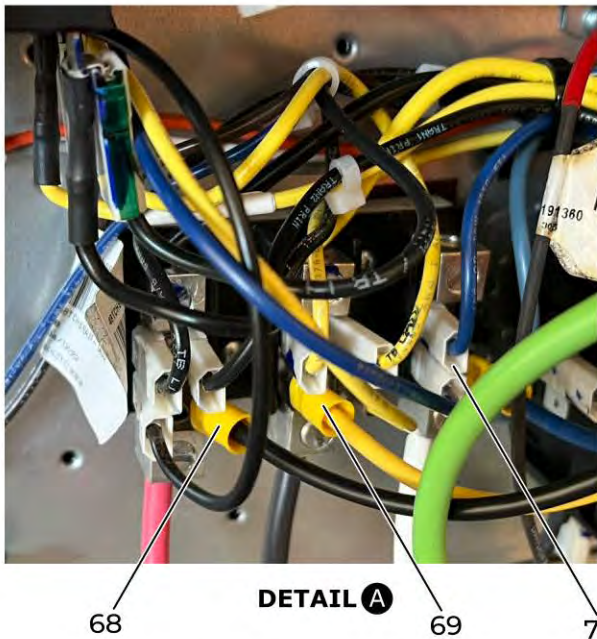
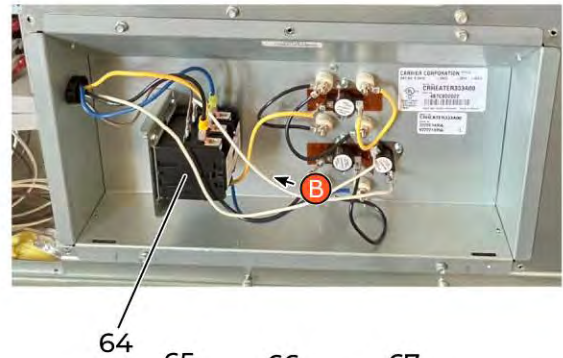
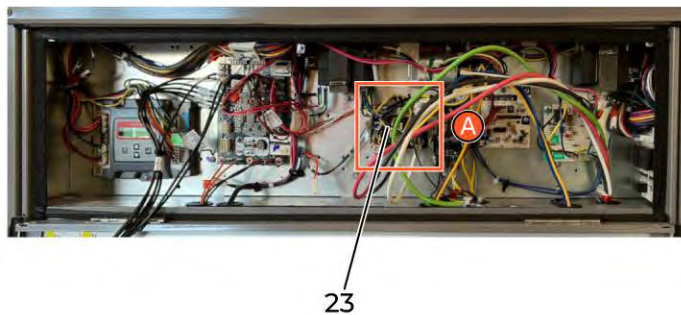


Figure 30 – Supply Connection of the HVAC Heater

58. Route the two wires (white and brown) between the heater (63) and the control terminal (71).
59. On the control terminal (71):
 - 59.1. Connect the white wire to terminal (72).
 - 59.2. Connect the brown wire to terminal (73).
60. On the heater (63):
 - 60.1. Connect the white wire to terminal (74) of the heating element.
 - 60.2. Connect the brown wire to terminal X (75) of the controller (64).

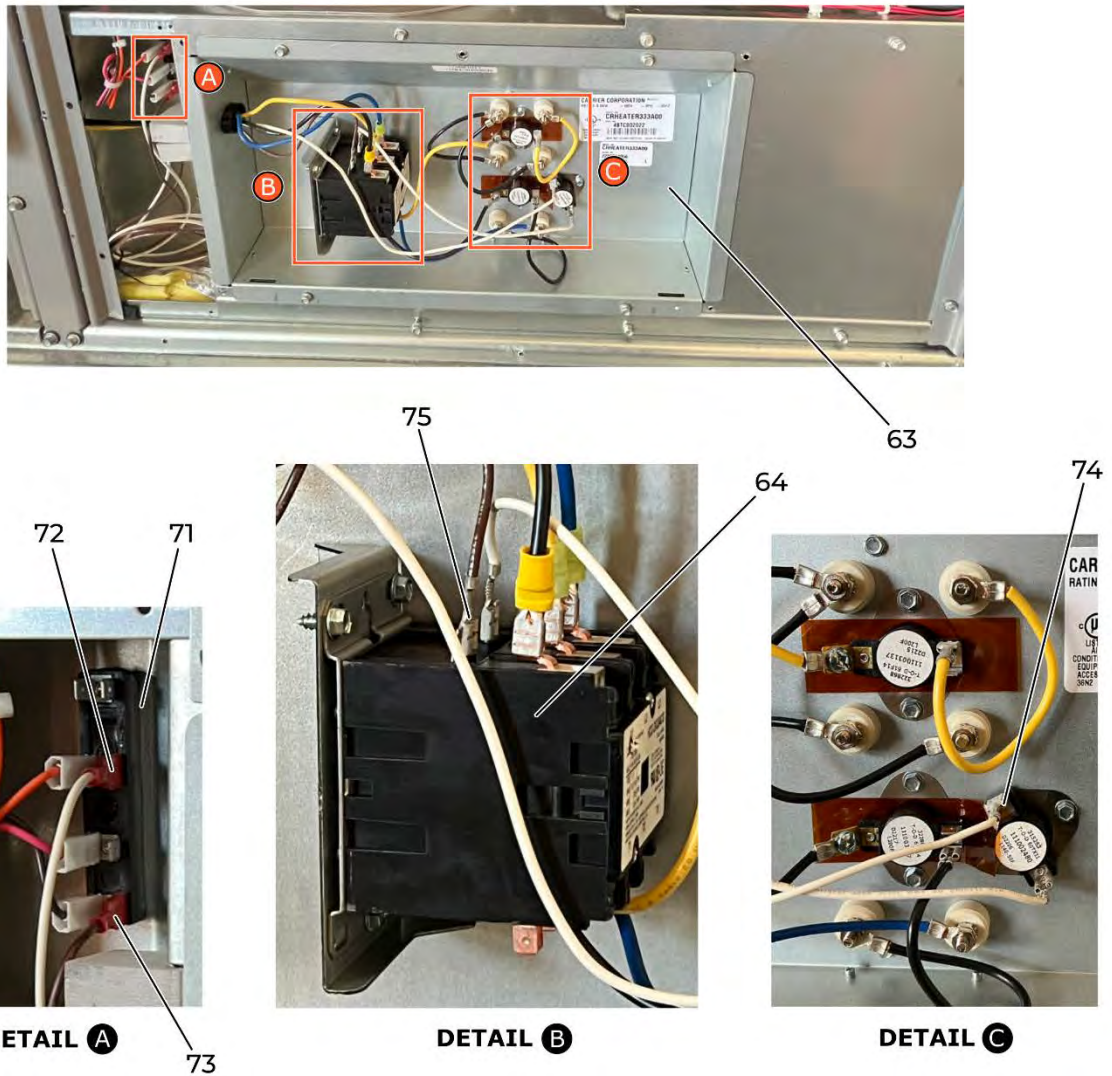


Figure 31 – Control Connections of the HVAC Heater

61. Reinstall the fan access panel (61) on the HVAC (35) (see **FIGURE 28**).

NOTE: Functional tests will be performed during startup.

PHASE MONITOR INSTALLATION

NOTE: For more information on the phase monitor and its installation, refer to **CRPHASE3001A03 – ELECTRONIC PHASE MONITOR INSTALLATION INSTRUCTIONS**.

CAUTION



DO NOT DRILL HOLES IF THE EXISTING HOLES ARE NOT ALIGNED PROPERLY. FAILURE TO FOLLOW THIS SAFETY INSTRUCTION CAN LEAD TO EQUIPMENT DAMAGES.

62. Install the phase monitor **(76)** to the right of the control panel using the two screws provided.
63. Route the supplied black wire, yellow wire and blue wire between the phase monitor **(76)** and terminal block **(23)**.
64. On the phase monitor **(76)**:
 - 64.1. Connect the black wire to terminal L1 **(77)**,
 - 64.2. Connect the yellow wire to terminal L2 **(78)**,
 - 64.3. Connect the blue wire to terminal L3 **(79)**.
65. On the terminal block **(23)**:
 - 65.1. Connect the black wire to terminal 11 **(68)**,
 - 65.2. Connect the yellow wire to terminal 12 **(69)**,
 - 65.3. Connect the blue wire to terminal 13 **(70)**.

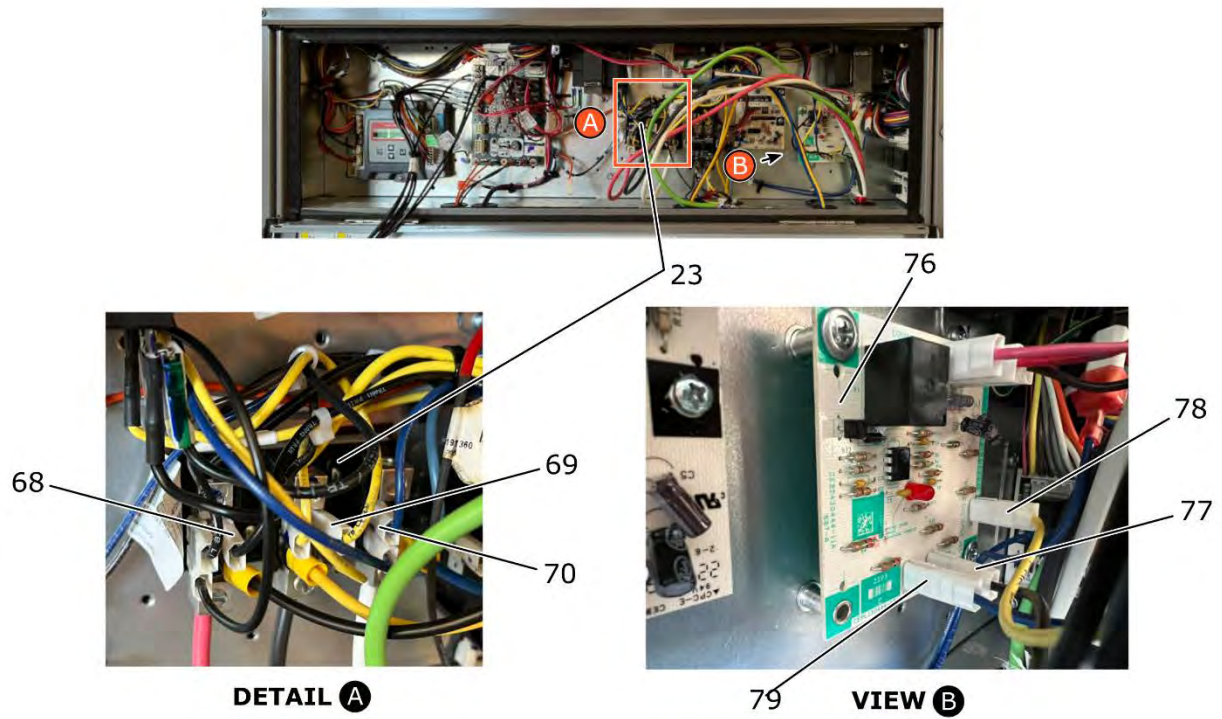


Figure 32 – Phase Monitor Phase Cable Connections

66. Route the supplied red wire, pink wire, and brown wire between the phase monitor **(76)** and the circuit board **(24)**.
67. On the phase monitor **(76)**:
 - 67.1. Connect the red wire to terminal 24VAC **(80)**,
 - 67.2. Connect the pink wire to CONTACTOR terminal **(81)**,
 - 67.3. Connect the brown wire to COM terminal **(82)**.
68. On unit control board (UCB) **(24)**:
 - 68.1. Connect the red wire to terminal A **(83)**,
 - 68.2. Connect the pink wire to terminal B **(84)**,
 - 68.3. Connect the brown wire to terminal C **(85)**.

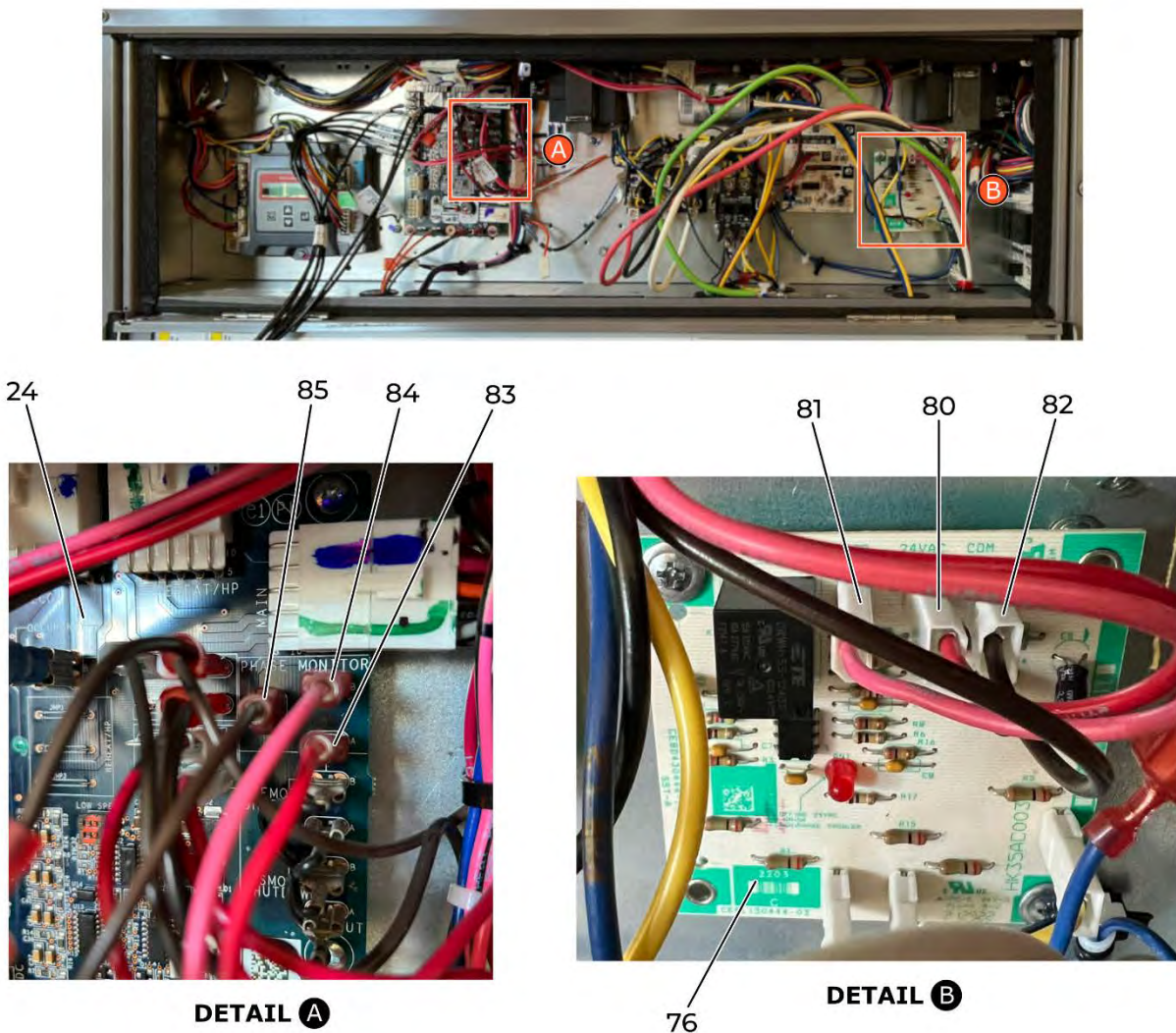


Figure 33 – Control Connections of the Phase Monitor

69. Reinstall the following access panels (see **FIGURE 22**):

- The upper control panel **(21)**,
- The lower control panel **(22)**.

ECONOMIZER ASSEMBLY REMOVAL

NOTE: The steps below are taken from the vendor manual. For more details, refer to **RAV036-072 – HVAC INSTALLATION INSTRUCTIONS**.

70. Remove the filter access panel **(86)** and its hardware. Set aside.
71. Locate and remove the two screws **(87)** that secure the metal plate of the economizer flap assembly **(88)** to the base.
72. Locate and cut the two tie wraps **(89)** securing the economizer flap assembly **(88)** to the shock absorber. Do not damage the wiring or cut the tie wraps securing any other wiring.
73. Carefully lift the flap assembly (with metal tray) through the filter access opening.
74. Set the economizer flap assembly **(88)** aside. It will be installed when the HVAC is in place on the container.
75. Reinstall the filter access panel **(86)**.

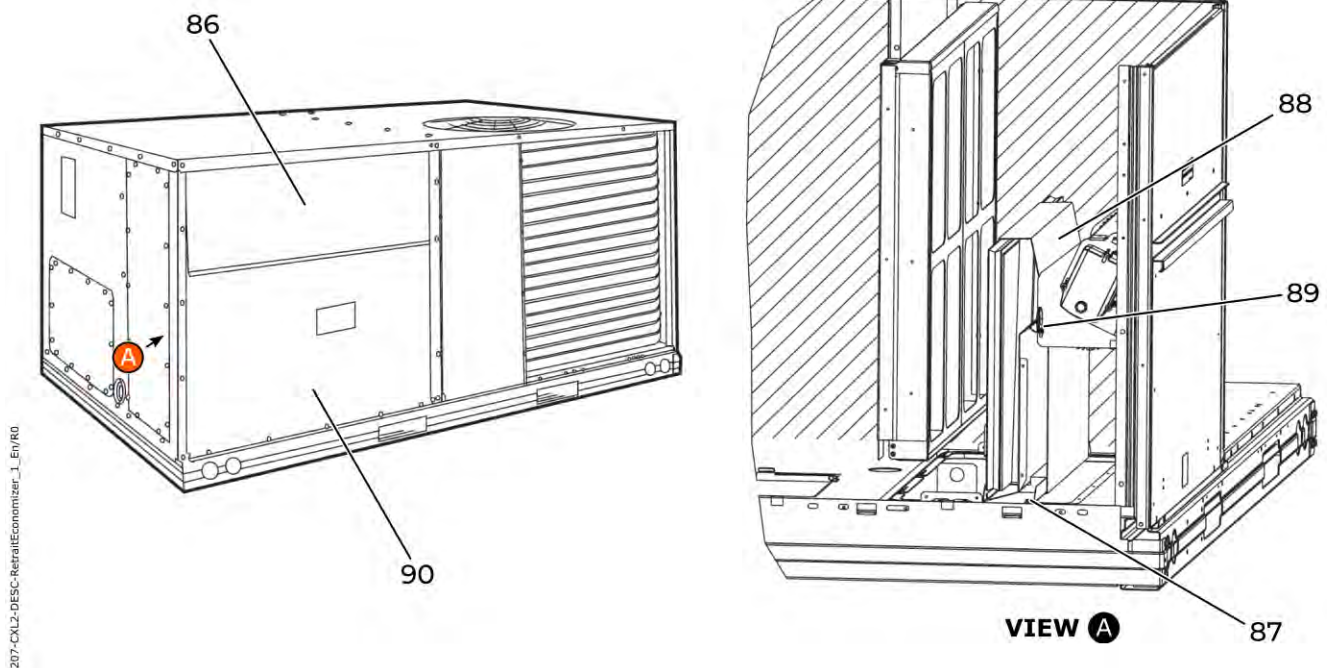


Figure 34 – Economizer Removal

5.4.2 HVAC Curb Installation

WARNING



NEVER INSTALL THE HVAC IN RAINY WEATHER. THE BATTERY CONTAINER CANNOT BE PROTECTED BY A MARQUEE WHEN INSTALLING THE HVAC. FAILURE TO RESPECT THIS SAFETY INSTRUCTION MAY LEAD TO SEVERE INJURIES AND MATERIAL FAILURES.

WARNING



THE INSTALLATION OF THE HVAC CURB REQUIRES WORKING AT HEIGHT. FOLLOW LOCAL REGULATIONS IN FORCE ON THE SITE. FAILURE TO RESPECT THIS SAFETY INSTRUCTION MAY LEAD TO SEVERE INJURIES.

WARNING



THE SKID PLATE IS HEAVY AND DIFFICULT TO HANDLE. AT LEAST TWO PEOPLE ARE REQUIRED TO HANDLE THE PLATE PROPERLY. FAILURE TO FOLLOW THIS SAFETY INSTRUCTION MAY RESULT IN SEVERE INJURIES.

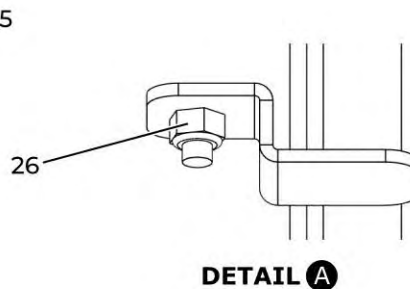
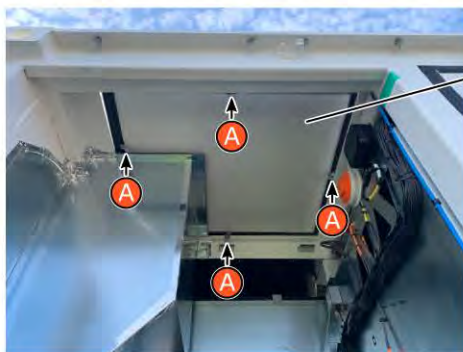


Figure 35 – Transport Skid Plate

76. Open the access door to the control and distribution compartment and mark the protective plate **(25)**.
77. Using a step stool, remove the four brackets **(26)** and their hardware located on the ceiling of the control and distribution compartment.
78. Remove the protective plate **(25)** from the opening provided for the junction of the HVAC **(35)** and dispose of it according to the regulations in force.

NOTE: One or more lifting platforms (or equivalent) must be used for the proper completion of these steps. A minimum of 3 qualified persons is required for the installation of the HVAC curb.

79. Validate that the contact surface between HVAC curb (28) and the container is clean and dry. Clean as necessary.
80. Install the lifting equipment on the lifting support (29) of the HVAC curb (28).
81. Lift the HVAC curb (28) and move it over the battery container.
82. Rotate the HVAC curb (28) so that it is in final alignment.
83. Route the harness 81000341 (15) of the strobe alarm (13), prepared in step 31, through the hole where the protective plate (25) was installed (see step 1).
84. Lower the HVAC curb (28) gently to about 3 cm from the point of contact.
85. While aligning the splice holes, place the HVAC curb (28) on the top of the battery container.
86. Partially install the **M12 x 1.75 mm, 25 mm long** for the 14 angle brackets (27) securing the HVAC curb (28) to the battery container. Do not tighten the fasteners – they will be tightened after installing the HVAC (35).

NOTE: Two sets of screws with different lengths are used to installed the curb; one set for the curb/container installation and one set for the curb/HVAC installtion. Install the mentionned length.

87. Remove the lifting equipment from the HVAC curb (28).

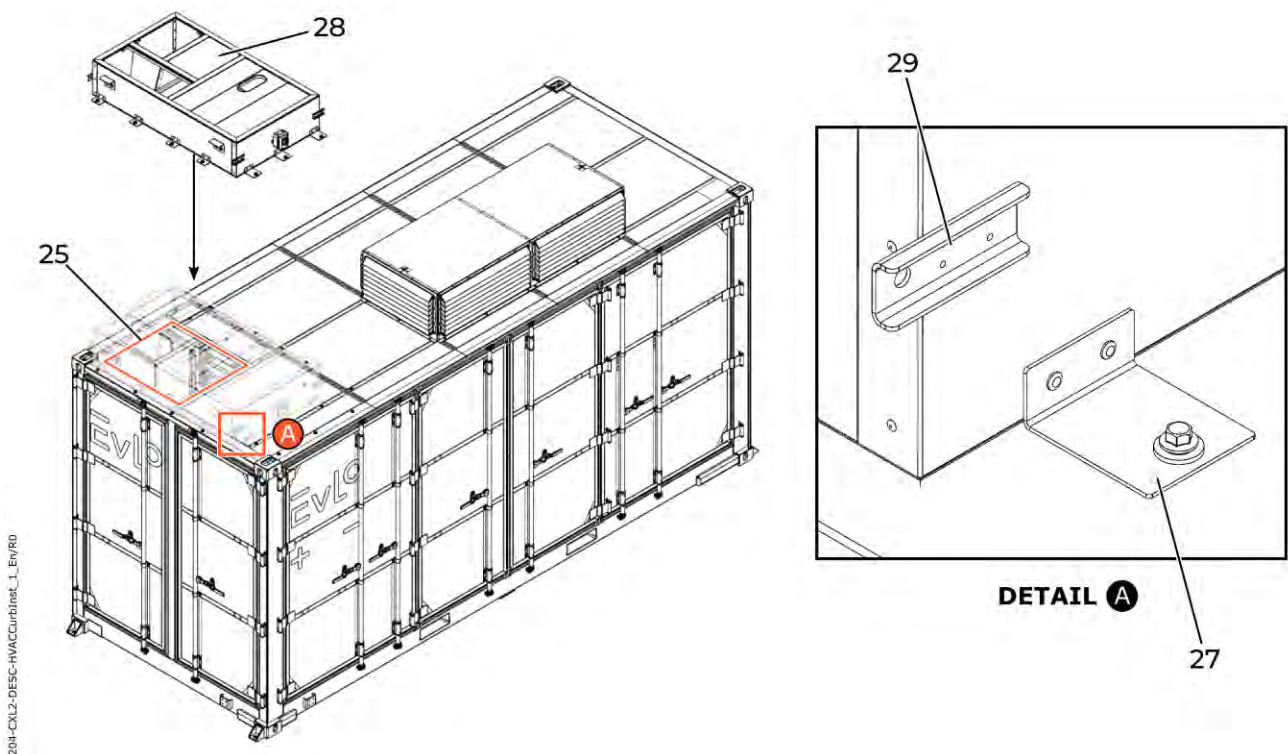


Figure 36 – HVAC curb Installation

5.4.3 HVAC Installation

WARNING



THE INSTALLATION OF THE HVAC REQUIRES WORKING AT HEIGHT. FOLLOW LOCAL REGULATIONS IN FORCE ON THE SITE. FAILURE TO RESPECT THIS SAFETY INSTRUCTION MAY LEAD TO SEVERE INJURIES.

WARNING



THE HEAVIEST HVAC WEIGHS APPROXIMATELY 375 KG (827 LB). ALWAYS FOLLOW THE APPLICABLE SAFETY PROCEDURES BEFORE LIFTING. FAILURE TO FOLLOW THIS SAFETY INSTRUCTION MAY RESULT IN SEVERE INJURIES OR DEATH.

NOTE: One or more lifting platforms (or equivalent) must be used for the proper completion of these steps. A minimum of 3 qualified persons is required for the installation of the HVAC.

NOTE: The installation of the HVAC must be performed by a certified HVAC technician.

88. Install the two 4x4" beams (34) on the HVAC curb (28) as shown.

NOTE: The oblong hole (38) must remain clear for the insertion of the harnesses (17) and (18).

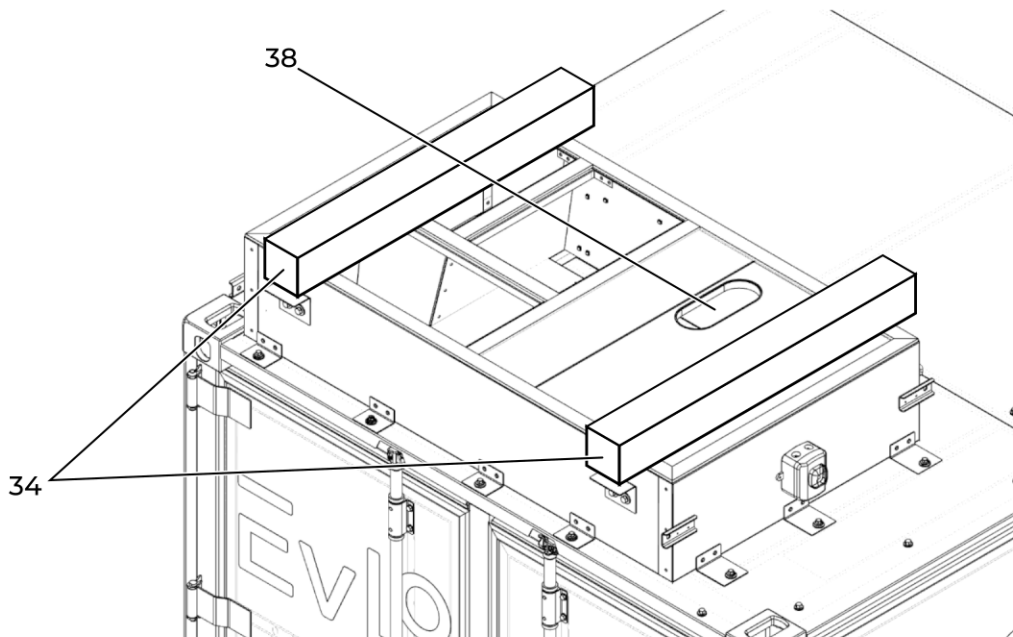


Figure 37 – 4x4 Beams

89. Install lifting equipment on HVAC (35). Refer to **SECTION 4.8.2**.
90. Install a guide rope on each side of the HVAC (35).

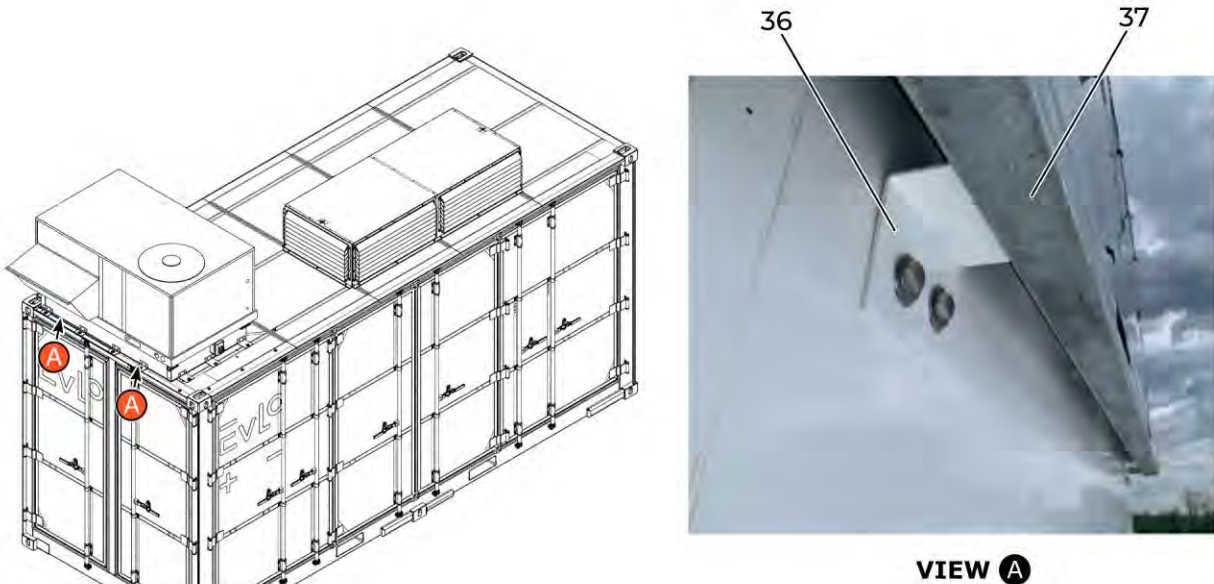


Figure 38 – HVAC Installation

91. Lift the HVAC (35) and move it over the HVAC curb (28).
92. Rotate the HVAC (35) so that it is in final alignment.
93. Lower the HVAC (35) gently to about 10 cm from the point of contact of the HVAC curb (28).
94. Pass the power harness 81000321 (17) and the control harness 81000331 (18) through the oblong hole (38) in the HVAC curb (28), then route them towards the inside of the distribution control compartment of the container.
95. Remove the two 4x4" beams (34) from the HVAC curb (28).
96. Place the HVAC (35) on the base.
97. Tilt the 90° brackets (36), and pass them under the HVAC (35) frame (37).
98. Confirm that all the fasteners in the 90° brackets (36) line up with the holes on HVAC curb (28).
99. Install the hardware removed in step 32 on the 90° brackets (36).

NOTE: *Two sets of screws with different lengths are used to installed the curb; one set for the curb/container installation and one set for the curb/HVAC installtion. Install the mentionned length.*

100. Torque the 90° bracket (36) hardware and apply torque marks.
101. Tighten the angle bracket (27) hardware and apply a torque mark (see **FIGURE 36**).

ECONOMIZER INSTALLATION

NOTE: The steps below are taken from the vendor manual. For more details, refer to **RAV036-072 – HVAC INSTALLATION INSTRUCTIONS**.

102. Obtain the economizer flap assembly (88) removed from the HVAC (35) in step 74.
103. Remove the screws along the sides and bottom of the economizer panel (90). Retain the hardware.
104. Swing the economizer panel (90) and insert the two brackets (91) under the economizer panel (90).
Use the screws set aside and the screws provided to secure the two brackets (91) to the economizer panel (90) and HVAC (35).
105. Remove the shipping tape that holds the economizer barometric relief damper in place (see **FIGURE 40**).
106. Insert the divider (92) between the brackets (91).
107. Secure the divider (92) with the two supplied bolts on each bracket (91).
108. Apply sealant to the joint between the top panel (97) and the economizer panel (90).

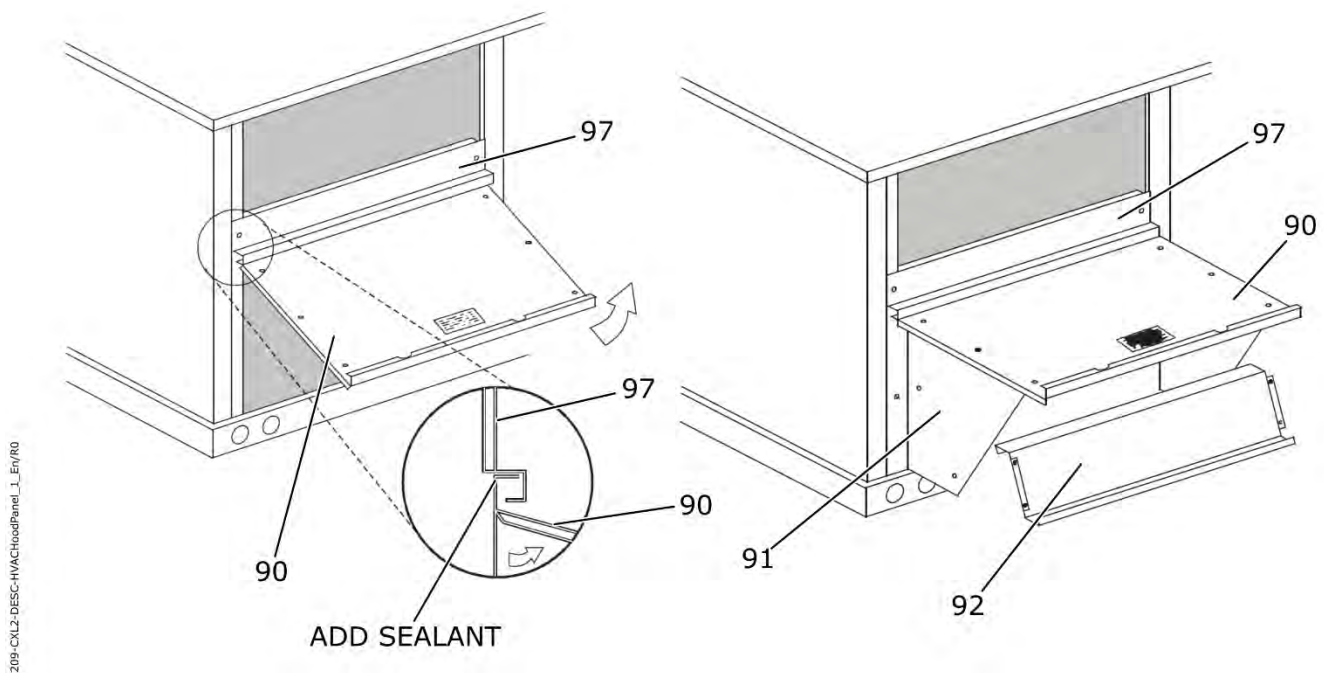


Figure 39 – Economizer Installation

109. Open the filter clips **(93)** under the top of the economizer panel **(90)**.
110. Insert the aluminum filter **(94)** into the slot in the divider **(92)** and push the filter into position past the filter clips **(93)**.
111. Close the filter clips **(93)** to lock the aluminum filter **(94)** in place.

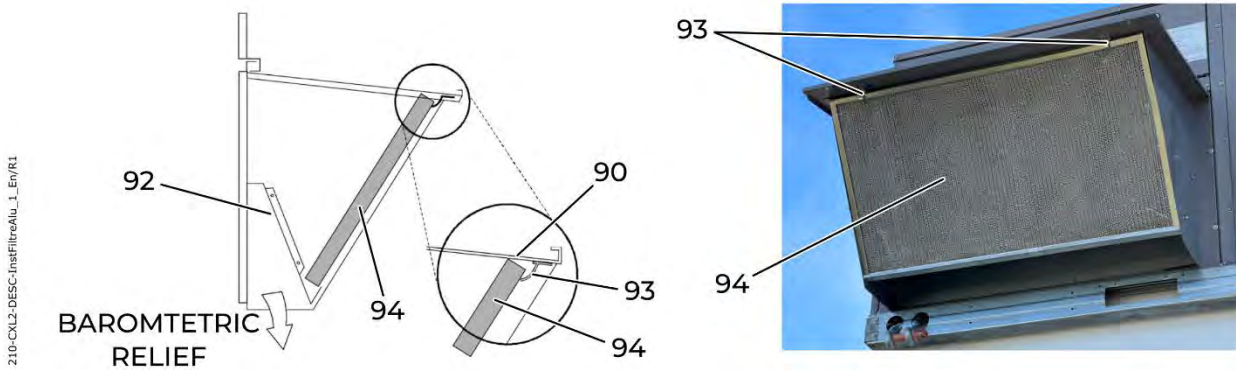


Figure 40 – Aluminum Filter Installation

DRAIN INSTALLATION

NOTE: EVLO will provide the drain as a complete assembly.

112. Make sure that the drain **(95)** is correctly assembled according to the **HVAC DRAIN EXTENSION** drawing.
113. Install the drain **(95)** on the side of the HVAC **(35)** opposite the battery compartment.

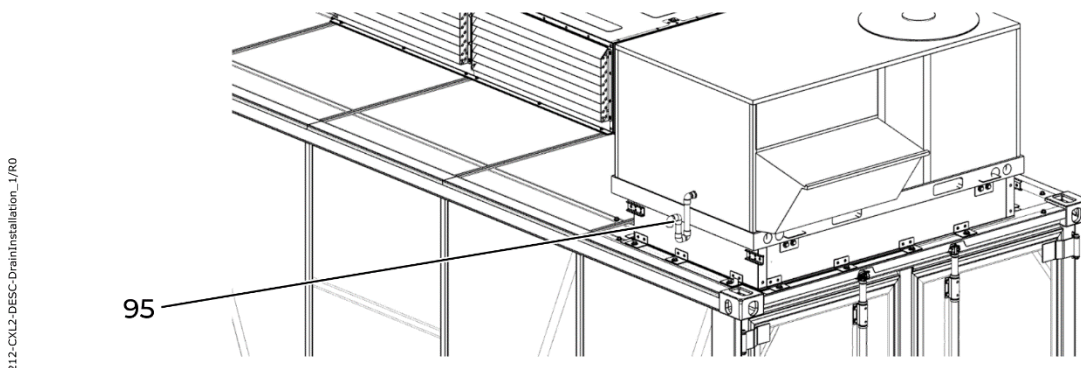


Figure 41 – HVAC Drain Installation

CONNECTING ELECTRICAL HARNESSES

114. In the control and distribution compartment of the container, connect harness 81000341 **(15)** of the strobe alarm **(13)** to harness 81000571 **(43)**.
115. Connect the control harness 81000331 **(18)** from the HVAC to harness 81000591 **(44)**.
116. Connect the power harness 81000321 **(17)** from the HVAC to harness 81000521 **(45)**.
117. Ensure that the harnesses from the HVAC are properly routed and attached to the inside of the HVAC curb **(28)**.

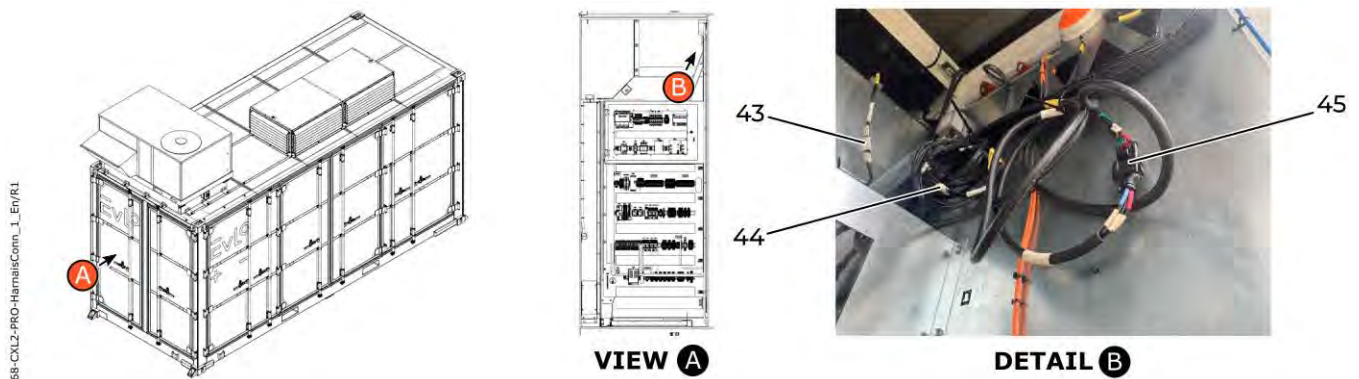


Figure 42 – HVAC Cables in Control and Distribution Compartment

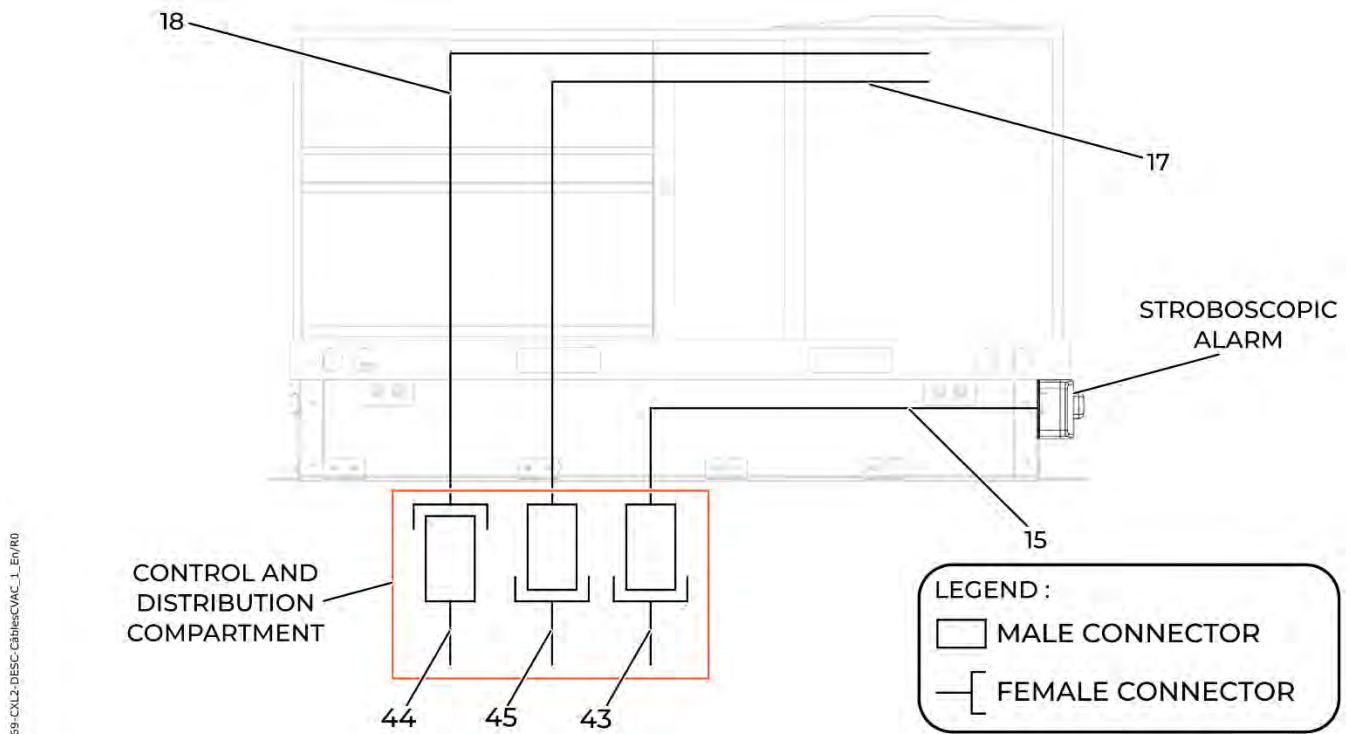


Figure 43 – Cables From the HVAC

5.5 Floor Panel Preparation

CAUTION



THE BATTERY CONTAINER MUST BE KEPT FREE OF DEBRIS, METAL FILINGS, DUST AND HEAT SOURCES. NEVER CARRY OUT HOT WORK (DRILLING, WELDING) OR THAT CAN LEAVE DEBRIS IN THE CONTAINER. ALWAYS CARRY OUT WORK OF THIS TYPE OUTSIDE THE CONTAINER. FAILURE TO DO SO MAY CAUSE EQUIPMENT DAMAGE AND MAJOR FIRES.

118. Remove the floor panel **(2)** located on the floor of the control and distribution compartment and the power compartment.

NOTE: *The removal and drilling of the dry pipe plate is only applicable if a dry pipe is to be installed.*

119. Measure the size and position of the necessary holes on the floor panel **(2)** to allow passage for the site cables and the dry pipe (if applicable).

120. If applicable, measure the size and position of the necessary holes in the floor panel **(2)** to allow the passage for the site cables and the dry pipe (if applicable).

NOTE: *The sizes of the holes and cable glands to be used are to be defined on site according to the cables present at the place where the container is installed.*

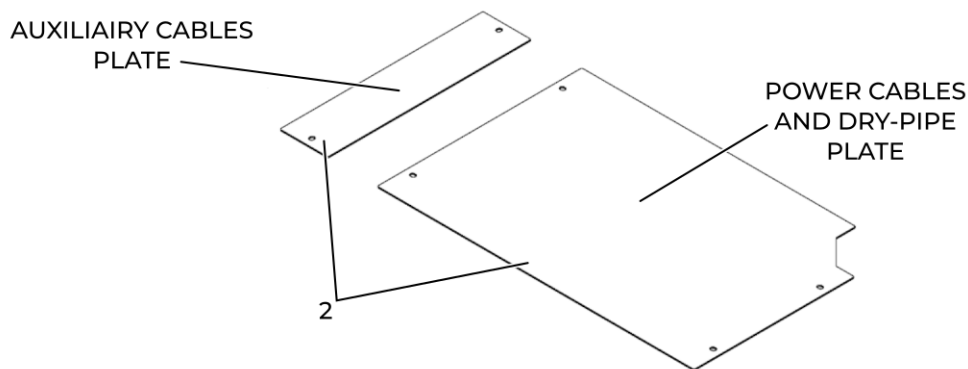


Figure 44 – Drilling the Floor Panels

121. Outside the battery container, drill the necessary holes on the floor panel **(2)**, including:

- The holes for the positive and negative main energy cables, and the main GND cables,
- The hole(s) for the auxiliary energy cable(s),
- The hole(s) for the communication/control cable(s),
- If applicable, the hole for the dry pipe.

122. Check that the holes are of the correct size and position.

123. Install the floor panel **(2)** on the floor of the control and distribution compartment by passing the external cables through their applicable cable glands.

5.6 Dry Pipe Connection (Optional)

124. Install the end of the flexible pipe **(39)** supplied with the container on the dry pipe **(41)**.

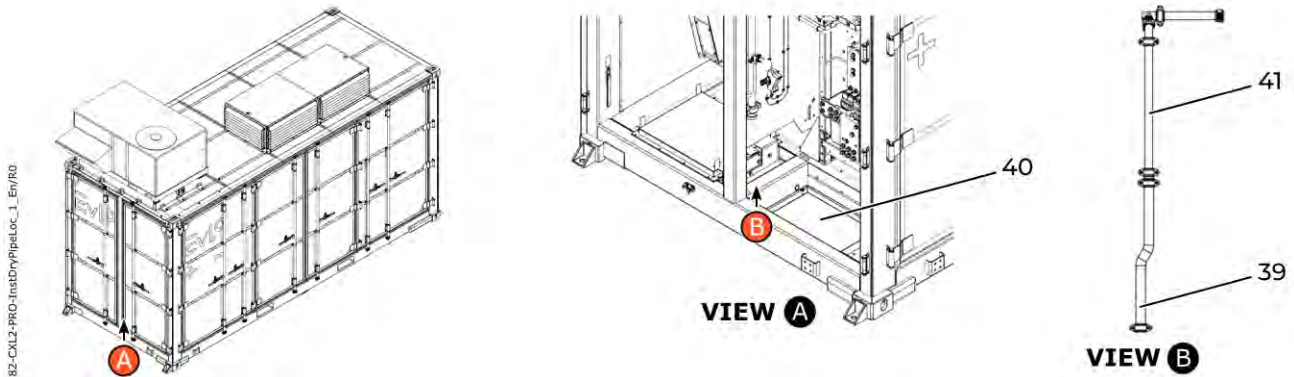


Figure 45 – Dry Pipe Connection

125. Put the bottom plate **(40)** in position in the power compartment by passing the previously drilled hole over the flexible pipe **(39)**.

126. Connect the site dry pipe to the battery container flexible pipe **(39)** using a rigid coupling of the applicable size.

127. Remove the guards **(42)** on the sprinklers.

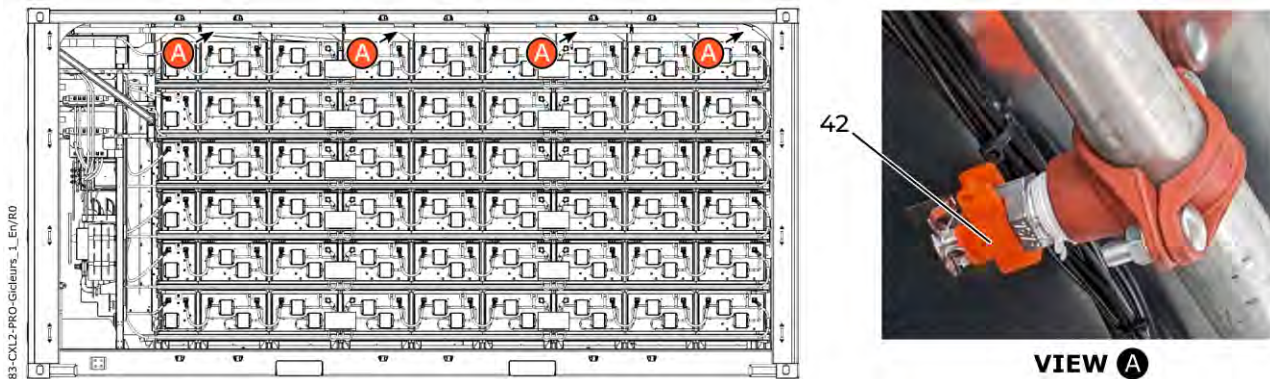


Figure 46 – Sprinklers

5.7 Inspections and Pre-Operational Verification (Mechanical)

This section details the inspections that must be carried out following the mechanical installation of the battery container. All the results, anomalies and comments linked to the steps in this section should be documented in **CXL2-DOC-INST-002** installation report.

128. Validate the absence of aesthetic defects on and in the battery container (no marks, scratches, dents, rust, etc.).
129. Validate that all the torque marks on the visible hardware in the container are correctly aligned.
130. All internal panels are properly secured in the battery container.
131. The power disconnect switches are in the open position (OFF).
132. If applicable, pressure test the dry pipes.

NOTE: *A technician trained for this test must be present when it is run. Depending on the installation of the site, it is possible to have to test the dry pipes of several containers simultaneously.*

6 Electrical Installation

DANGER



SEVERAL HAZARDS, INCLUDING ELECTRICAL INDUCTION, CAN BE FOUND ON THE OPERATING SITE. ALWAYS FOLLOW THE PROCEDURES AND INSTRUCTIONS IN EFFECT ON THE OPERATING SITE. FAILURE TO FOLLOW THIS SAFETY INSTRUCTION MAY RESULT IN PERSONAL INJURY OR DEATH.

DANGER



VOLTAGES UP TO 1500 VDC/460VAC CAN BE PRESENT AT ANY TIME. RESPECT THE ESTABLISHED SAFETY PROCEDURES BEFORE WORKING ON OR AROUND THE BATTERY CONTAINER. FAILURE TO FOLLOW THIS SAFETY INSTRUCTION MAY RESULT IN SEVERE INJURIES OR DEATH.

DANGER



THE BATTERY CONTAINER INCLUDES BATTERIES WITH STORED ENERGY. ALWAYS CONFIRM THE ABSENCE OF VOLTAGE BEFORE MAKING POWER CONNECTIONS. FAILURE TO DO SO CAN LEAD TO SEVERE INJURIES AND DEATH.

CAUTION



DO NOT ROUTE POWER CABLES WITH COMMUNICATION/CONTROL CABLES. POWER CABLES CAN CAUSE INTERFERENCE IN NEARBY CONTROL/COMMUNICATION CABLES. FAILURE TO FOLLOW THIS SAFETY INSTRUCTION CAN LEAD TO EQUIPMENT DAMAGES.

NOTE: *The right moment to tighten the cable glands is to be determined by the technician and is not mentioned in the steps in this section. It is the responsibility of the technician to ensure that the cable glands are properly installed and tightened once the electrical connections are completed.*

NOTE: *Refer to the project interconnection drawings for the quantity, location, and identification of cables to be installed.*

NOTE: *All stainless steel hardware must be installed with anti-seize compound applied on threads.*

Before proceeding with the electrical installation, it is the responsibility of the customer, or the electrical installer, to provide proof that the following tests have been completed for the wiring of the site:

- Verification of cable identification and marking
- Megger test
- Continuity test

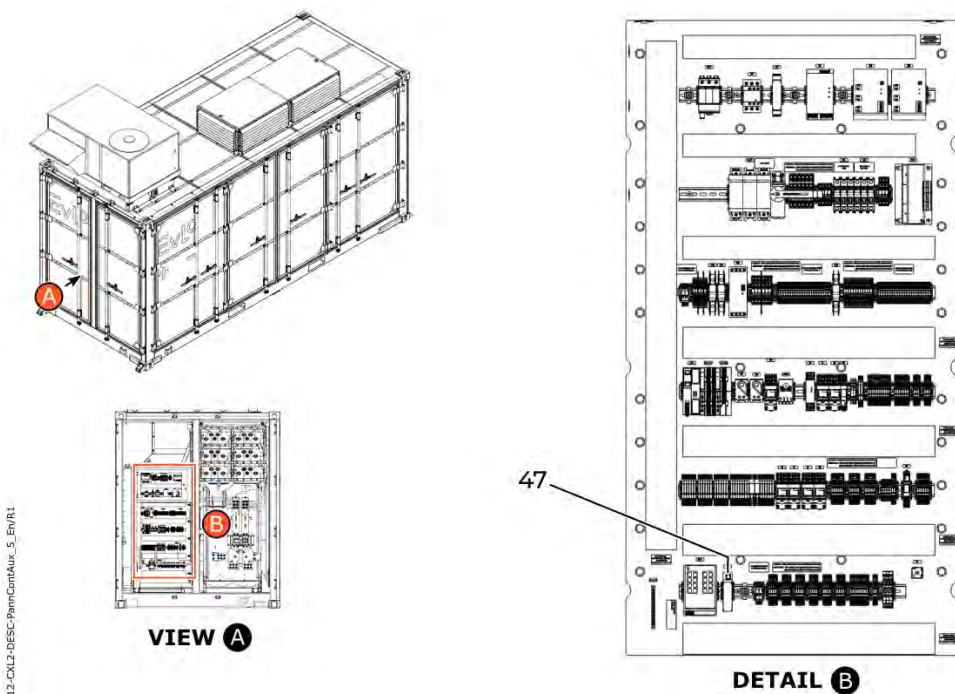
Follow the following steps to perform the electrical installation of the battery container on site. The results of this procedure should be documented in **CXL2-DOC-INST-002** installation report.

PREREQUISITES

It is the responsibility of the technician to ensure that it is safe to perform the electrical installation. Several hazards not listed in this manual may be present depending on site configuration. Read and follow procedures and instructions for on-site installation.

Before starting any electrical connection, validate the following:

- The conductors that will be connected are in an electrically safe condition.
- The FU1 and FU2 fuse holders are open (OFF position).
- The 1500Vdc main energy disconnect switch is open (OFF position).
- All cables are identified and marked according to site engineering documents.
- The cable installation follows the defined routing according to the type of signal. The physical separation of the high-current and low-current wiring must be guaranteed.



6.1 Connecting the External Cables to the Battery Container

This section details the electrical connections between the container and the conductors installed at the start of work.

6.1.1 Grounding of the Container

Hardware required

133. Apply anti-seize compound to the threads of cable/ground braid hardware.
134. Apply Kopr-Shield dielectric compound to the contact area between the GND cable/braid and the ground bar **(46)**.
135. Position the ground wire/braid on an external ground bar **(46)** at the corner of the container.
136. Using applicable hardware, attach the ground wire/braid to the outer ground bar **(46)** of the container.

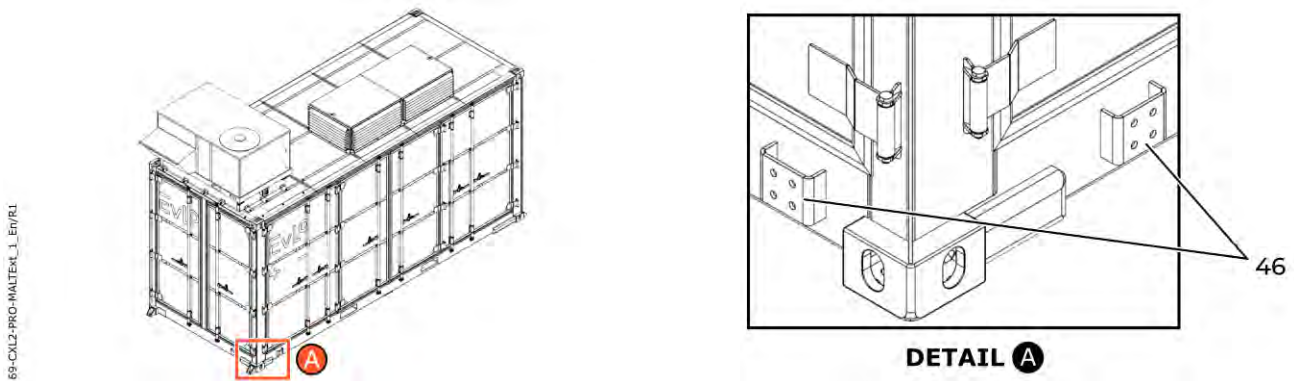


Figure 48 – Site Ground Connection

NOTE: The torque shown below is applicable to typical hardware. If different hardware is used for installation, use the torque applicable to that hardware.

137. Using a torque wrench, apply a torque of 58 N·m (43 lbf ft) to the ground cable braid hardware.
138. Apply a torque mark to the cable/ground braid hardware.
139. If applicable, repeat steps 133 to 138 to install additional ground cables/braids.

6.1.2 Communication Cables

CAUTION



DO NOT ROUTE POWER CABLES WITH COMMUNICATION/CONTROL CABLES. POWER CABLES CAN CAUSE INTERFERENCE IN NEARBY CONTROL/COMMUNICATION CABLES. FAILURE TO FOLLOW THIS SAFETY INSTRUCTION CAN LEAD TO EQUIPMENT DAMAGES.

140. On patch panel PP1 (**47**), connect the cable from the EMP to the terminals.

NOTE: Refer to the project interconnection drawings for the quantity, location, and identification of cables to be installed.

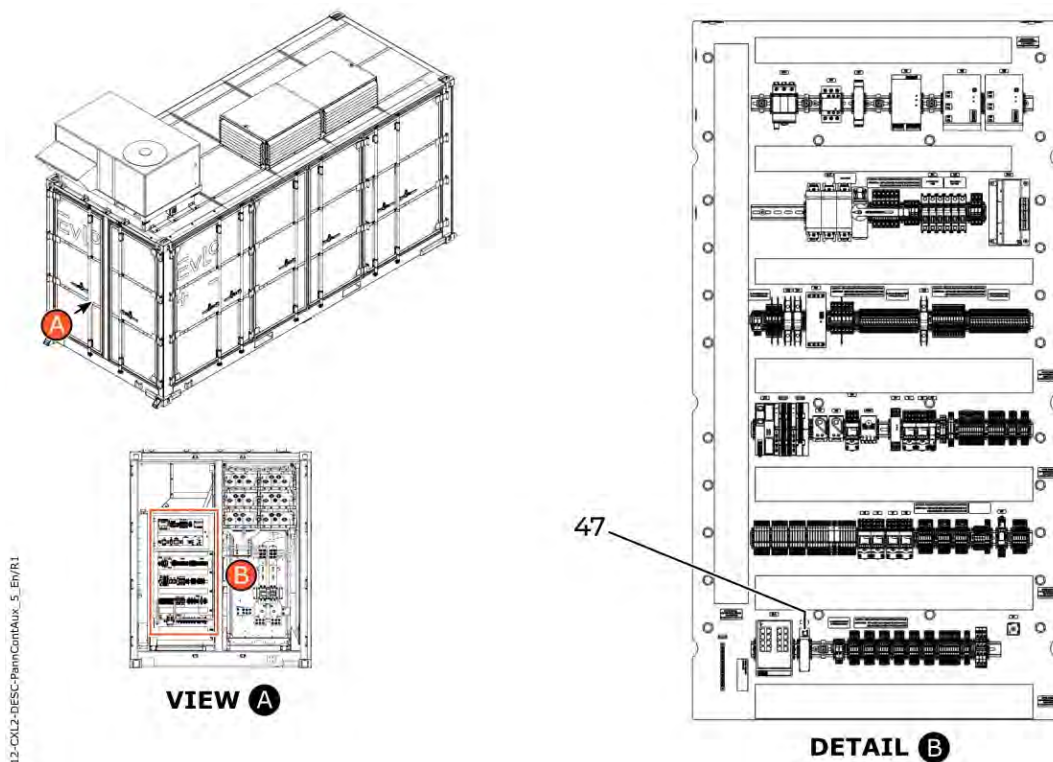


Figure 49 – Communication Cable Connection

6.1.3 Auxiliary Power Cables 460VAC

DANGER



VOLTAGES UP TO 460 VAC CAN BE PRESENT AT ANY TIME. RESPECT THE ESTABLISHED SAFETY PROCEDURES BEFORE WORKING ON OR AROUND THE BATTERY CONTAINER. FAILURE TO FOLLOW THIS SAFETY INSTRUCTION MAY RESULT IN SEVERE INJURIES OR DEATH.

NOTE: Balancing the load to the auxiliary energy panel must be considered when routing the phase cable to the 460V connection point. Step 142 must account for phase rotation when connecting to the first container in a group of cascaded containers (daisy-chain).

A balancing load is required when many containers are connected to the same auxiliary source to assure each phase has the same load. To perform a balancing load, some phases must be rotated between the original phases of the site and the phases on the EVLOFLEX container (see **FIGURE 50**).

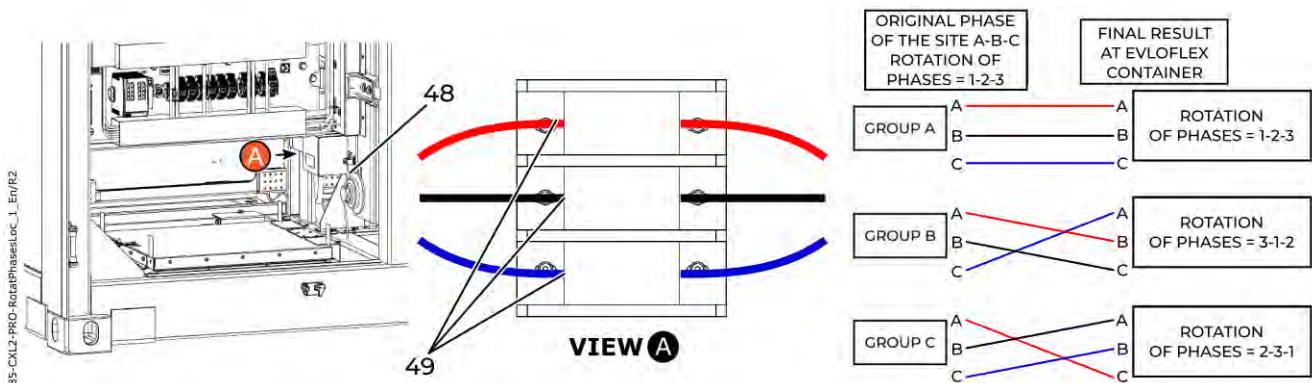


Figure 50 – Phase Rotation (Phase Balance)

141. Connect the ground cable **(48)** to the terminal block.
142. Taking into account the phase rotation, connect the three auxiliary power cables **(49)** to the terminal block of the control and distribution compartment of the battery container.

6.1.4 Power Cables 1500VDC

(See **SECTION 4.3** for specific hardware information)

143. Ensure that the 1500 Vdc disconnect switch **(50)** is open (OFF).
144. Install GND to the main GND bar **(53)** using the appropriate screws, flat washers, lock washers and nuts with the applicable tightening torque.
145. Apply a torque mark to the fasteners.
146. Install the cables to the 1500V positive power bar **(51)** using the appropriate screws, flat washers, lock washers and nuts with the applicable tightening torque.
147. Apply a torque mark to the fasteners.
148. Install the cables to the 1500V negative power bar **(52)** using the appropriate screws, flat washers, lock washers and nuts with the applicable tightening torque.
149. Apply a torque mark to the fasteners.
150. Apply labels to identify the cables. Refer to the site's installation manual.

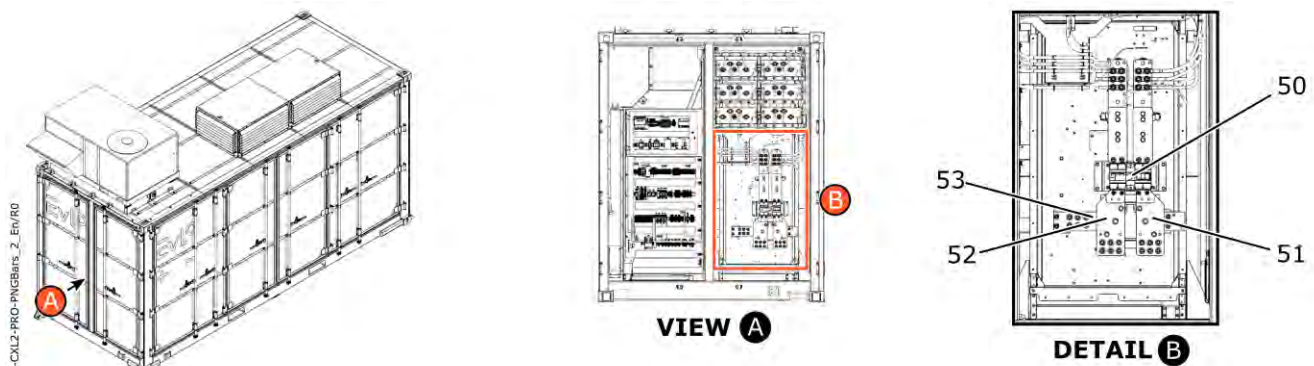


Figure 51 – 1500VDC Main Power Cables

6.2 Connecting the Cables in the Battery Trays

DANGER



CONNECTING THE BATTERIES INCREASES THE VOLTAGE FROM 175 VDC TO 1500 VDC. ALWAYS WEAR PROTECTIVE EQUIPMENT. FOLLOW PROCEDURES AND MAKE SURE YOU HAVE ATTENDED APPLICABLE TRAINING TO CONNECT BATTERY MODULES. FAILURE TO FOLLOW THIS SAFETY INSTRUCTION MAY RESULT IN SEVERE INJURIES AND DEATH.

DANGER



THERE IS A RISK OF A SHORT CIRCUIT AT EACH CONNECTION ON THE BATTERY TRAYS. ALWAYS FOLLOW THE ASSEMBLY SEQUENCE PRESENT IN THE POWER CABLE INSTALLATION PROCEDURE. PERFORM THE TWO-PERSON PROCEDURE TO VALIDATE ALL CONNECTIONS THAT ARE TO BE MADE. FAILURE TO DO SO CAN LEAD TO SEVERE INJURIES AND DEATH.

DANGER



DO NOT CONNECT THE 1,500 VAC CABLES TO THE SSG IN THE POWER COMPARTMENT. THESE CONNECTIONS WILL BE MADE DURING STARTUP PROCEDURES. FAILURE TO FOLLOW THIS SAFETY INSTRUCTION MAY RESULT IN SEVERE INJURIES OR DEATH, AS WELL AS DAMAGE TO THE EQUIPMENT.

To connect the cables in the battery trays, perform the steps in [CXL2-DOC-ASSY-003](#).

6.3 Pre-Operational Inspections and Checks (Electrical)

(See **FIGURE 52** to **FIGURE 56**)

NOTE: All tests and verification in this section should be noted in installation report **CXL2-DOC-INST-002**.

NOTE: The contact resistance test is used as a reference for comparison during maintenance. However, the contact resistance must be less than 0.1Ω to comply with the UL 1973 and UL 9540 norms.

151. Using a contact resistance tester, perform a contact resistance test on all connections on the GND bars:

- Between the site ground cable and the external ground bar **(46)**,

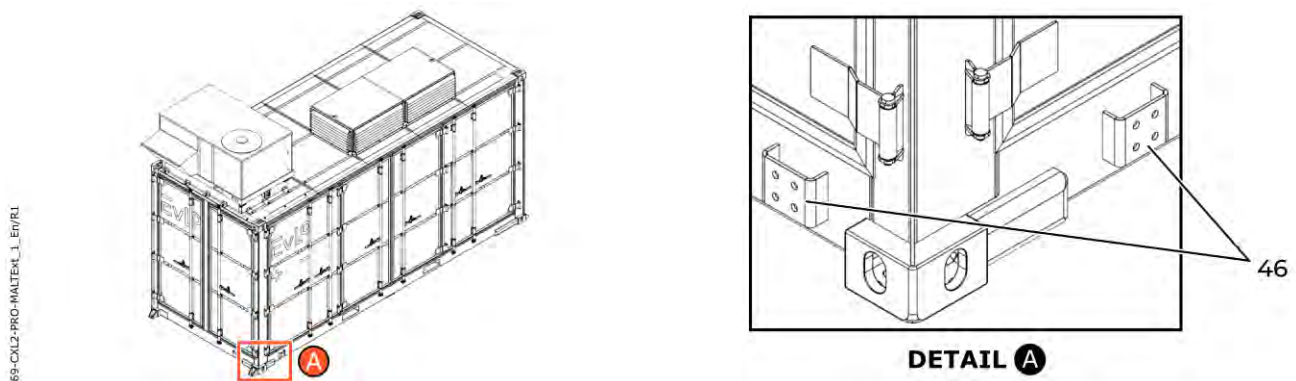


Figure 52 – External GND Contact Resistance

- Between the main GND bar **(53)** and each cable **(54)** connected to it.

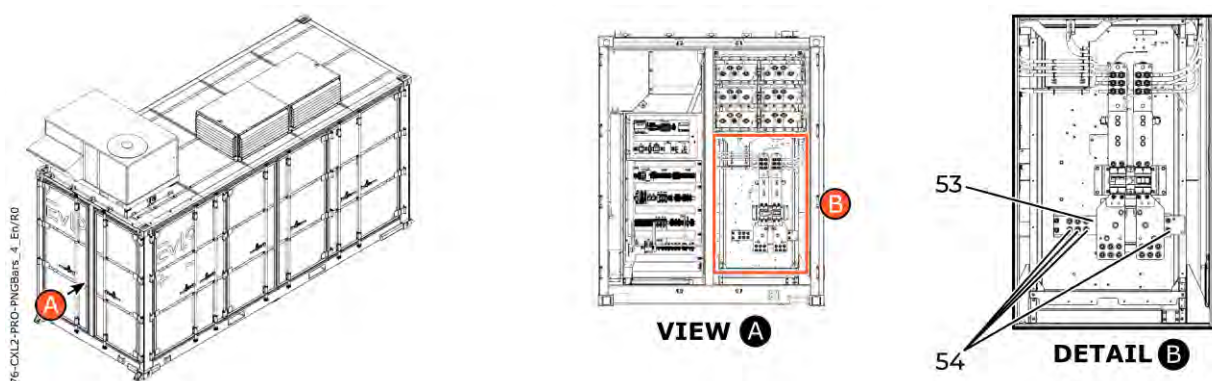


Figure 53 – Ground Bar Contact Resistance

- Between the GND bar of the auxiliary power terminal block **(55)** and the site cable **(56)** connected to it.

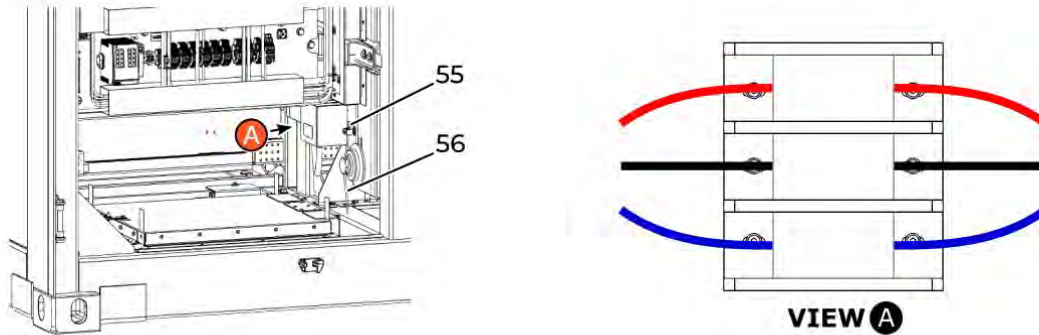


Figure 54 – Auxiliary Ground Contact Resistance

CAUTION



WHEN PERFORMING THE LIGHT PULL TEST, DO NOT PULL WITH EXCESSIVE FORCE ON THE WIRE. AN EXCESSIVE FORCE CAN CAUSE DAMAGES TO THE EQUIPEMENT.

NOTE: The light pull test involves pulling on the cables to ensure that they have not slipped out of their connectors. Refer to the NETA MTS standard for more information on pull tests.

152. In the Control and Distribution compartment, perform a light pull test on all panel cables and wires, including:

- The auxiliary energy panel **(57)**
- The elements **(58)** of the automation compartment

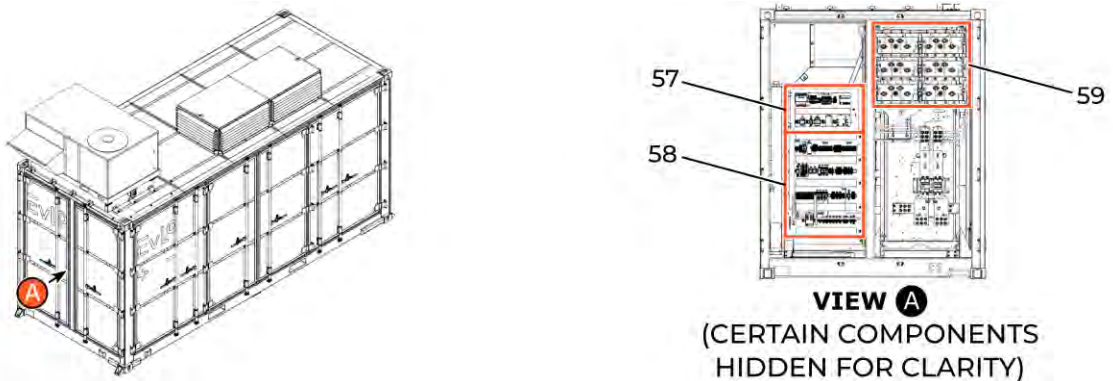


Figure 55 – Light Pull Test

153. Install padlocks on the handles **(60)** of the battery container access doors.

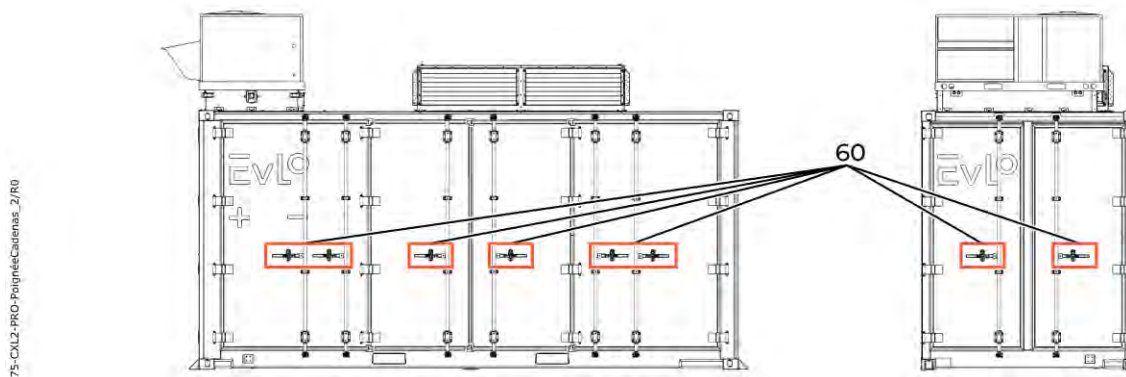
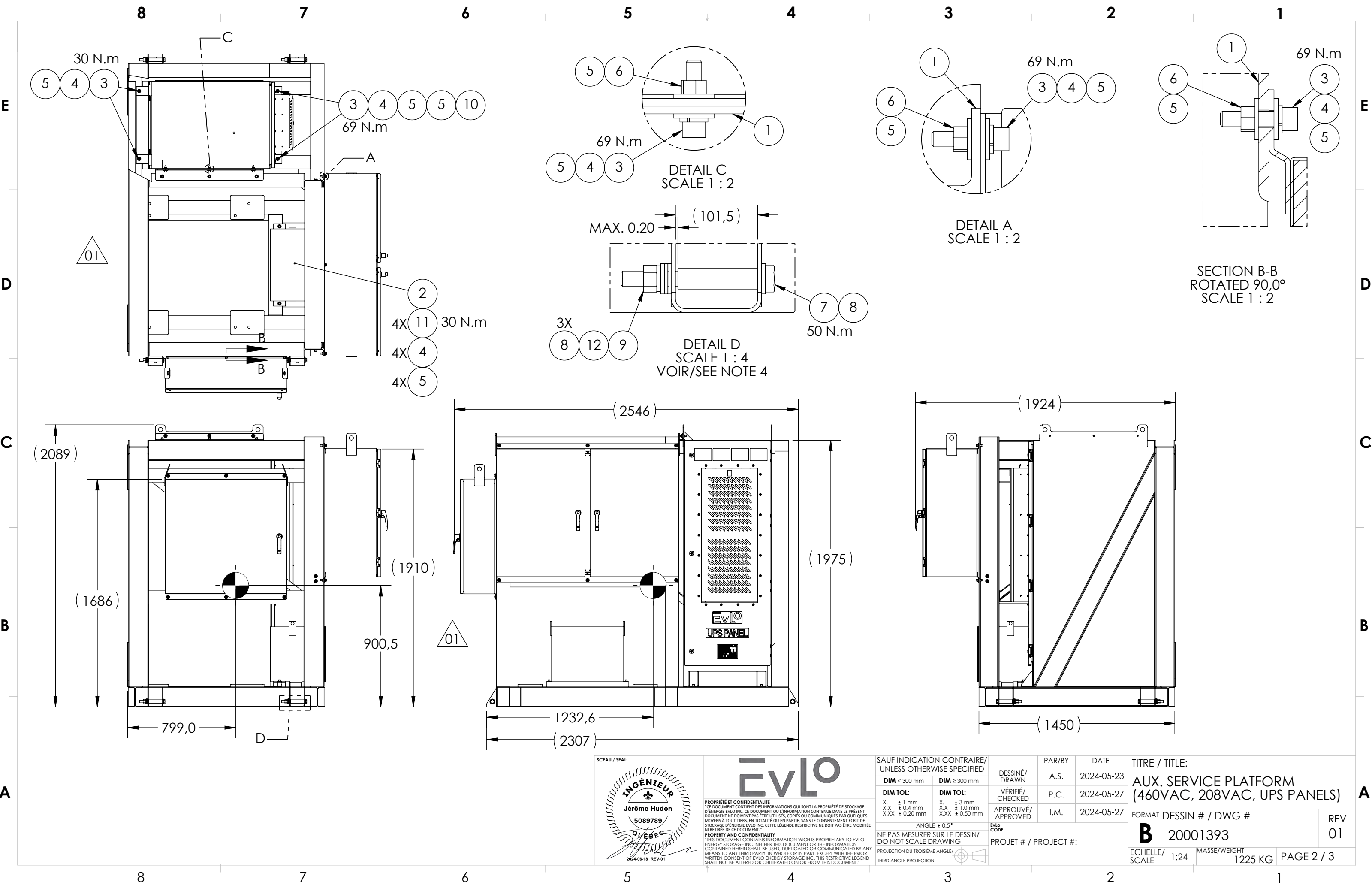


Figure 56 – Installing Padlocks

From this point on, the battery container is fully installed and connected. However, it must be energized and put into service before being operated. Refer to the battery tray connection, energizing, startup, and commissioning procedures applicable to your site.

EVLOTM

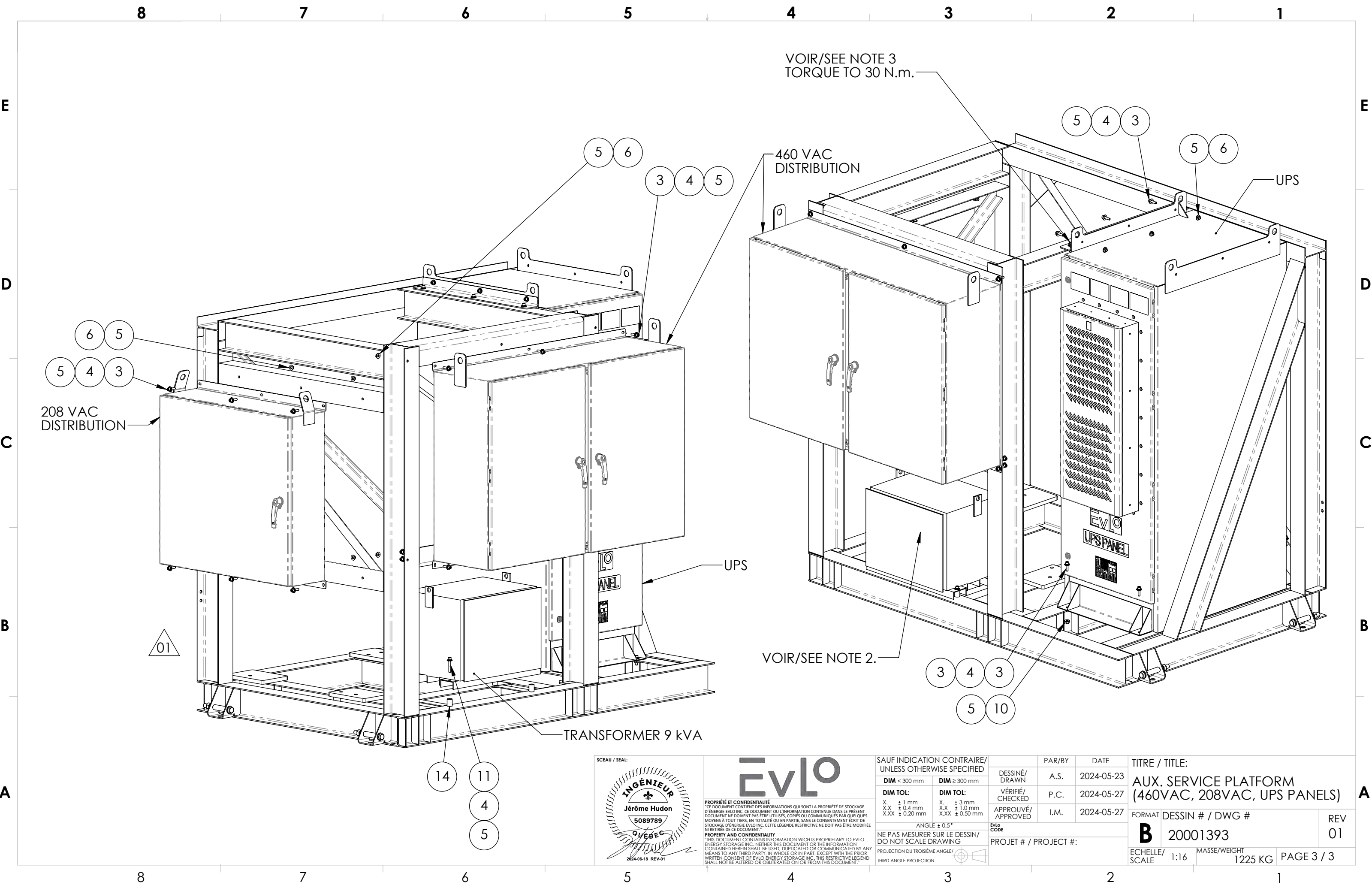
by Hydro-Québec



SAUF INDICATION CONTRAIRE/ UNLESS OTHERWISE SPECIFIED	
DIM < 300 mm	DIM ≥ 300 mm
DIM TOL:	DIM TOL:
X. ± 1 mm	X. ± 3 mm
X.X ± 0.4 mm	X.X ± 1.0 mm
X.XX ± 0.20 mm	X.XX ± 0.50 mm
ANGLE ± 0.5°	
NE PAS MESURER SUR LE DESSIN/ DO NOT SCALE DRAWING	
PROJECTION DU TROISIÈME ANGLE/ THIRD ANGLE PROJECTION	

DESSINÉ/ DRAWN	PAR/BY	DATE
VÉRIFIÉ/ CHECKED	A.S.	2024-05-23
APPROUVÉ/ APPROVED	P.C.	2024-05-27
I.M.		2024-05-27
PROJET # / PROJECT #:		

TITRE / TITLE:		
AUX. SERVICE PLATFORM (460VAC, 208VAC, UPS PANELS)		
FORMAT	DESSIN # / DWG #	REV
B	20001393	01
ECHELLE/ SCALE	1:24	MASSE/WEIGHT 1225 KG
PAGE 2 / 3		



SCEAU / SEAL:

EvLO

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2024-06-18 REV-01

SAUF INDICATION CONTRAIRE/
UNLESS OTHERWISE SPECIFIED

DIM < 300 mm	DIM ≥ 300 mm
DIM TOL: X. ± 1 mm X.X ± 0.4 mm X.XX ± 0.20 mm	DIM TOL: X. ± 3 mm X.X ± 1.0 mm X.XX ± 0.50 mm
ANGLE ± 0.5°	
NE PAS MESURER SUR LE DESSIN/ DO NOT SCALE DRAWING	
PROJECTION DU TROISIÈME ANGLE/ THIRD ANGLE PROJECTION	

DESSINÉ/ DRAWN	PAR/BY	DATE
	A.S.	2024-05-23
VÉRIFIÉ/ CHECKED	P.C.	2024-05-27
APPROUVÉ/ APPROVED	I.M.	2024-05-27

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CODE

PROJET # / PROJECT #:

TITRE / TITLE:		
AUX. SERVICE PLATFORM (460VAC, 208VAC, UPS PANELS)		
FORMAT	DESSIN # / DWG #	REV
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ECHELLE/ SCALE	1:16	MASSE/WEIGHT 1225 KG
		PAGE 3 / 3



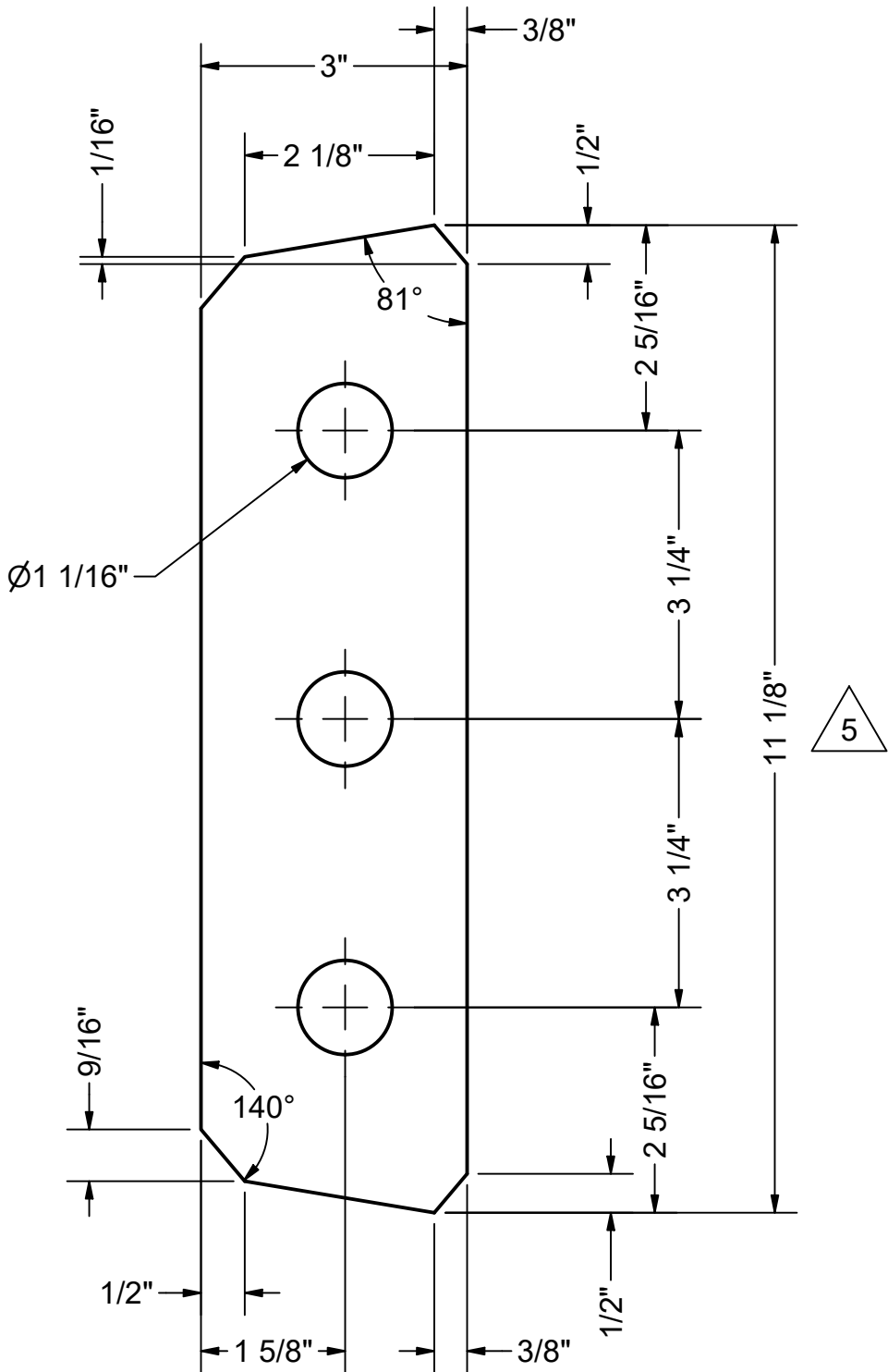
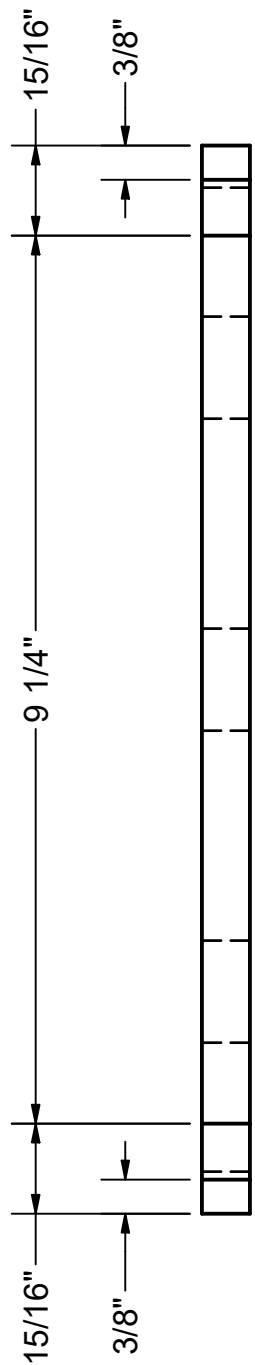
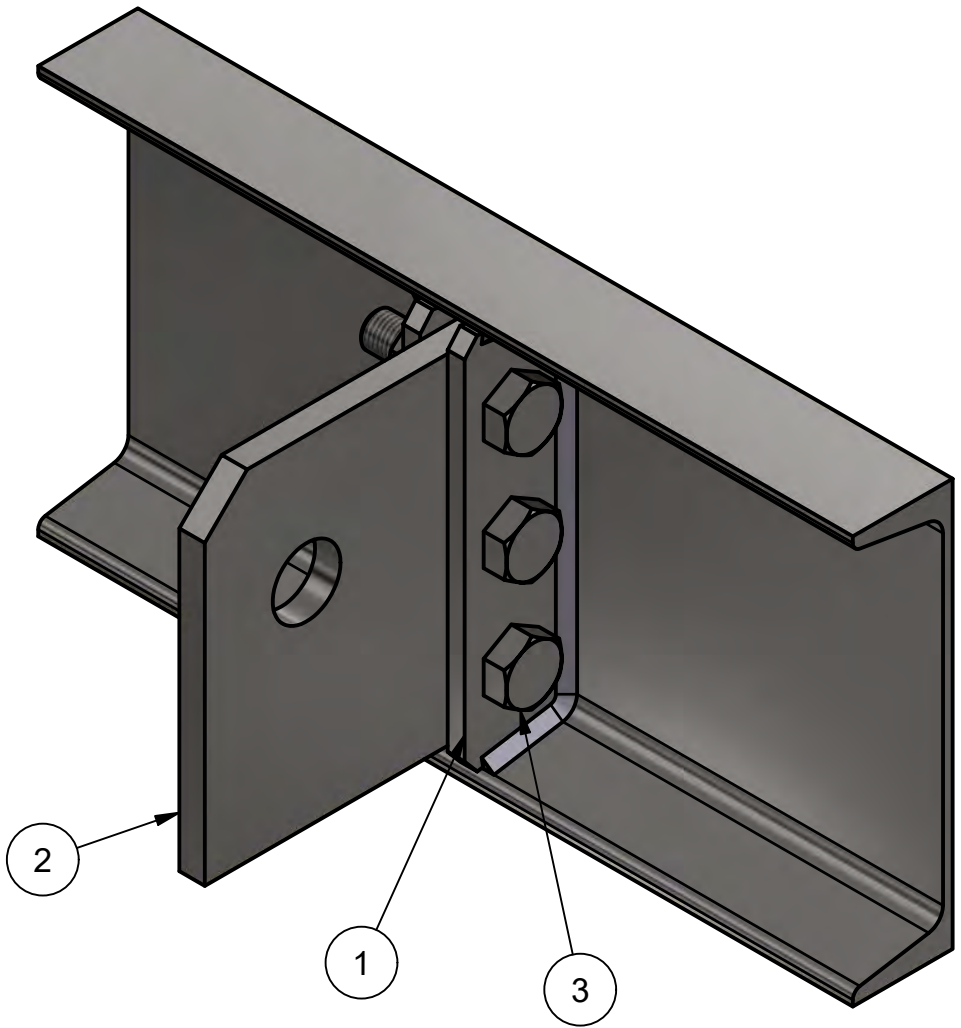
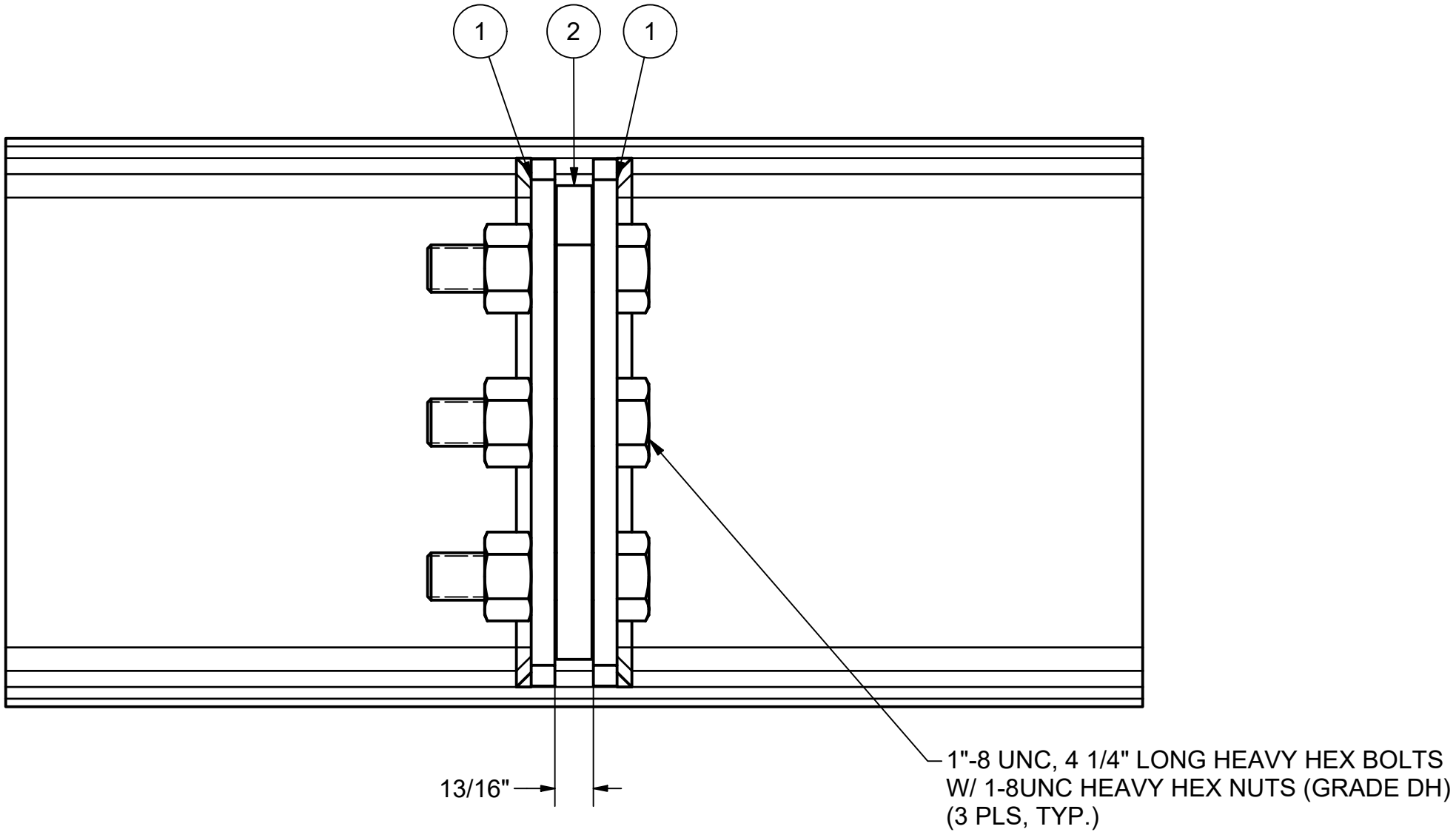
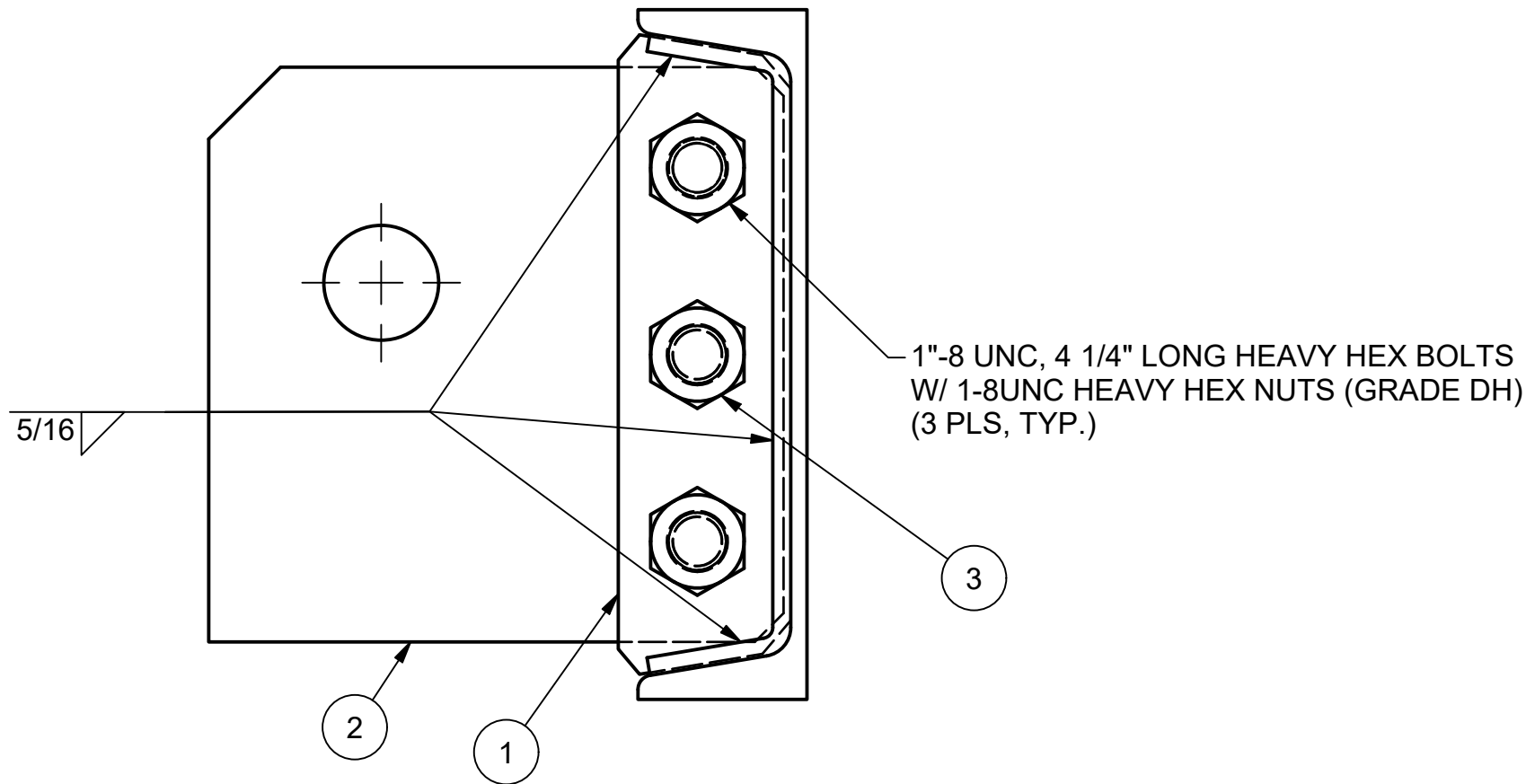
AMSI Inc
Bill Of Materials

E-HOUSE-B-E-CABLE-BOM

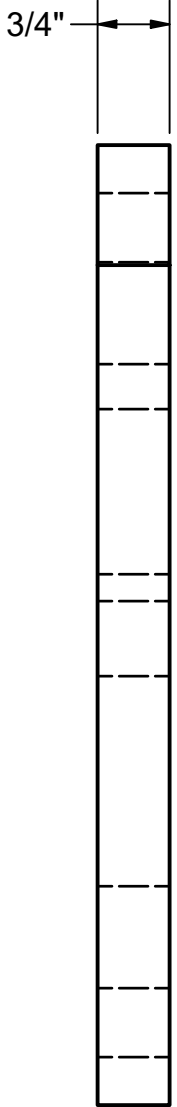
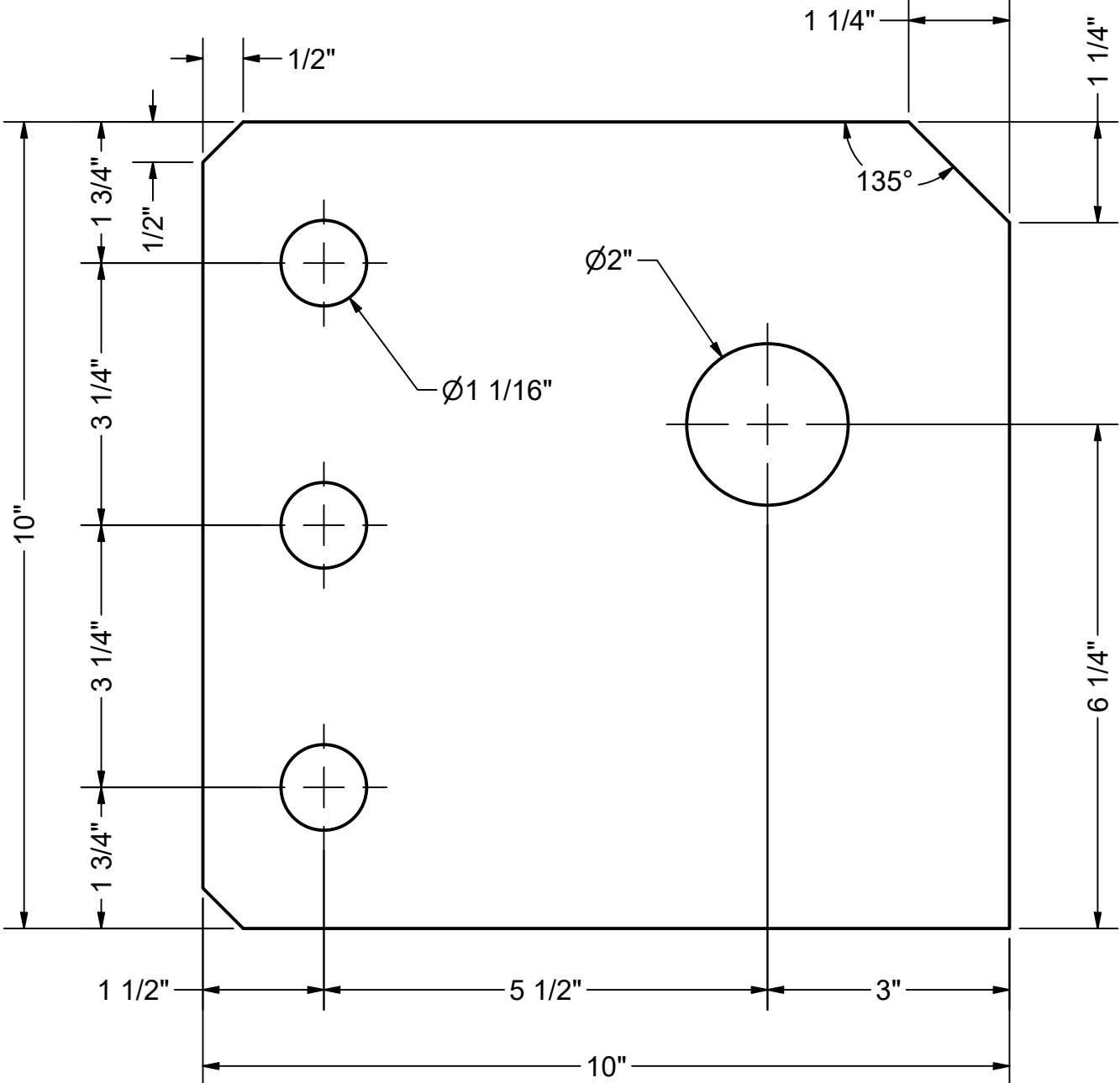
Date: 09/13/24
Time: 2:39:22 pm

Part No: E-HOUSE-B-E-CABLE Description: 24015- E-HOUSE ELECTRICAL ASSEMBLY - CABLES & ACCESSORIES	Quantity: 1 Revision: 0

<u>No.</u>	<u>Part Number</u>	<u>Description</u>	<u>Quantity</u>	<u>Unit</u>
1	CBL-TRAY-18GA-600V-(18+1)C-BK	CABLE, TRAY, 6 AWG, 600V, 19 CONDUCTOR (INCLUDE THE GROUND WIRE IN HEL62913 THE CONDUCTOR COUNT AND ARE TC-ER), BLACK	85	METER
2	TC-075A079	CONNECTOR, TRAY CABLE, ALUMINUM,3/4" THREAD SIZE, CABLE JACKET SIZE 0.47" - 0.79"	12	EA
3	HFBR-RUS100Z	CABLE, FIBER OPTIC CABLE POF SIMPLEX	120	METER
4	HFBR-4513Z	PLUG, FIBER OPTIC PLUG CONNECTOR SIMPLEX 1000µm (FOR HFBR-RUS100Z FO CABLE POF SIMPLEX)	15	EA
5	HFBR-4503Z	PLUG, FIBER OPTIC PLUG CONNECTOR SIMPLEX 1000µm (FOR HFBR-RUS100Z FO CABLE POF SIMPLEX)	15	METER
6	SWD210A1304	FLEXIBLE BRAID CONNECTOR, SWG XFORM LINK TNCU 2100A 4H 304MM Tinned Copper, Standard Flexible Braid Connector, SWD Series, 4 Hole Pads with NEMA Standard 9/16 inch (14.3 mm) Holes and 1-3/4 inch (44.4 mm) Spacing Center to Center. 12 inch (304 mm) long, 4 inch (101.6 mm) wide, 3/8 inch (9.5 mm) thick. Pad 4 inch x 4 inch. 30 AWG Individual Strand	27	EA



BOLTING PLATE
LL-BP-C12-44W
(1/2" x 3" FLATBAR - ITEM 1)
SCALE 1/2



LIFTING PLATE
LL-LP-10-44W
(3/4" x 10" FLATBAR - ITEM 2)
SCALE 1/2

6	ADDED FRONT VIEW SHOWING DISTANCE BETWEEN PLATES	7/12/2024	MA
5	INCREASED BOLTING PLATE DIMENSION FROM 11 1/8" TO 11 5/16"	5/9/2022	MA
4	3/8 CHAMFER ADDED ON BOLTING PLATE	5/11/2021	SB
3	UPDATED PART NUMBERS	10/1/2020	PK
2	ADDED PLATE PART NUMBERS	6/7/2019	MS
1	REVISED BOLT SIZE AND GRADE	4/1/2019	MS
No.	REVISIONS	DATE	BY

- NOTES:
- LUG TO BE USED FOR VERTICAL LIFT ONLY.
 - ALL LIFTING LUG PLATES TO BE GRADE 44W STEEL
 - ALL BOLTS TO BE 1-8UNC A490 HEAVY HEX BOLT, 4" LONG
 - ALL NUTS TO BE 1-8UNC HEAVY HEX NUTS
 - ALL BOLTS TO BE SNUG-TIGHT

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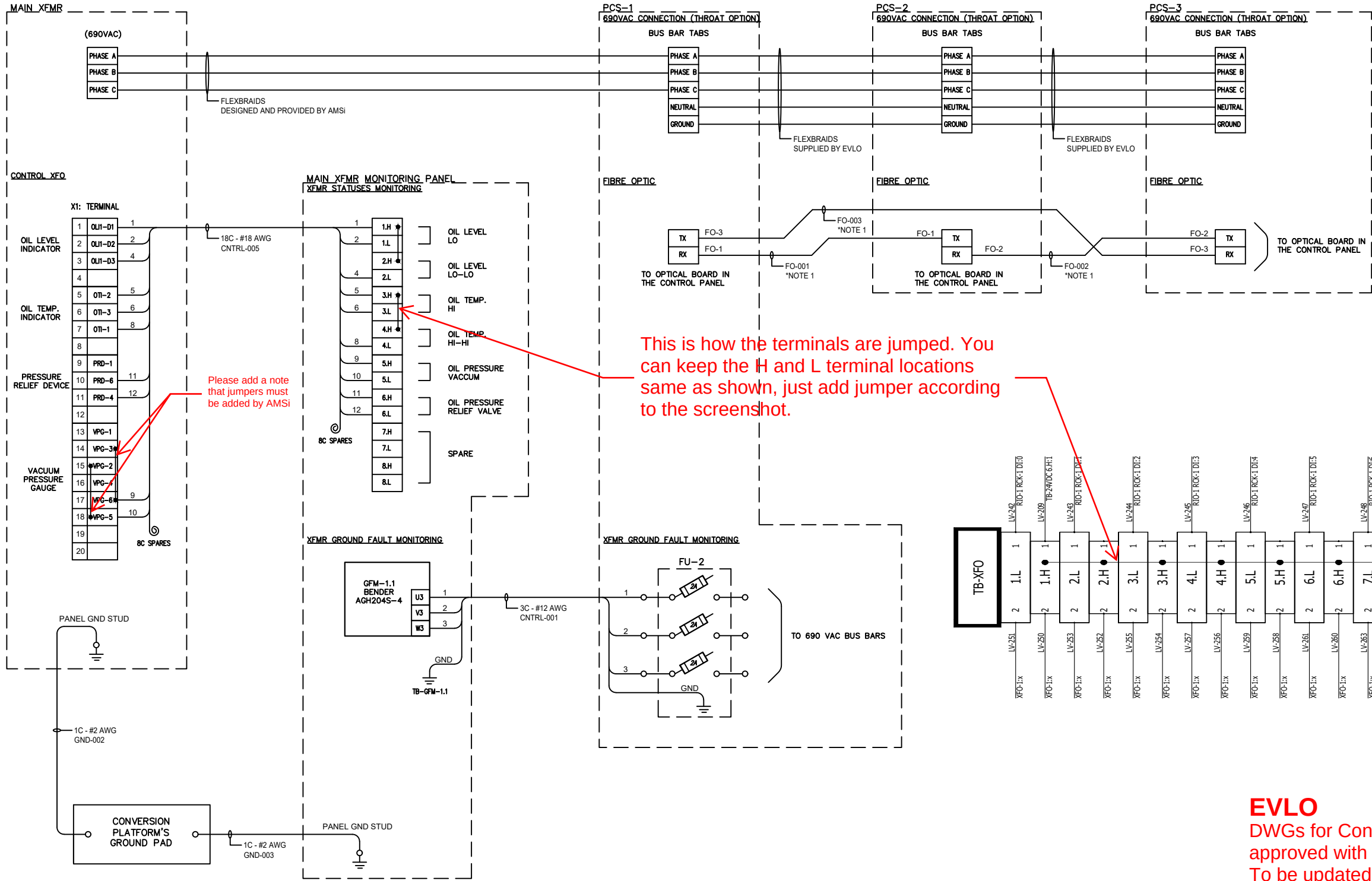
AMSi Inc.
40 NEILSON AVE
ST. CATHARINES, ON, L2M 7M9
(905) 988-5921

APPLIED MODERN
SYSTEM INTEGRATION

ISSUE STAMP
AMSi
ISSUED FOR
CONSTRUCTION

CUSTOMER			P.O. #		DESCRIPTION STANDARD LIFTING LUG FOR 12" CHANNELS (LL-ASSY-C12)		
PROJECT STANDARD LIFTING LUG DETAILS			PROJECT LOCATION				
DRAWN BY	CHECKED BY	APPROVED BY	UNITS	DRAWING NUMBER		SHEET	REV
MS 03/18/19	MU 03/18/19	MU 03/18/19	FT-IN	AMSI-LL-C12		1 OF 1	6

AMSI-LL-C12



NOTES

- EPC POWER RECOMMENDS TO USE BROADCOM LIMITED HFBR-RUS100Z FIBER OPTIC CABLE WITH HFBR-4513Z AND HFBR-4503Z CONNECTORS. ONE CONNECTOR IS FOR TRANSMIT AND THE OTHER IS FOR RECEIVE. REFER TO EPC POWER DOCUMENT # 70-100061 - SOFT PARALLEL APPLICATION GUIDE.
- QTY OF 3 PLATFORMS REQUIRED.

EVLO
DWGs for Construction approved with minors comments. To be updated in the As-built copies.

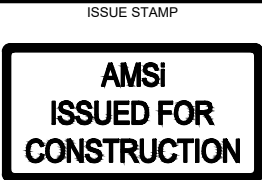
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1	ISSUED FOR CONSTRUCTION	07/31/24	ML
0	INITIAL RELEASE	06/17/24	ML
No.	REVISIONS	DATE	BY

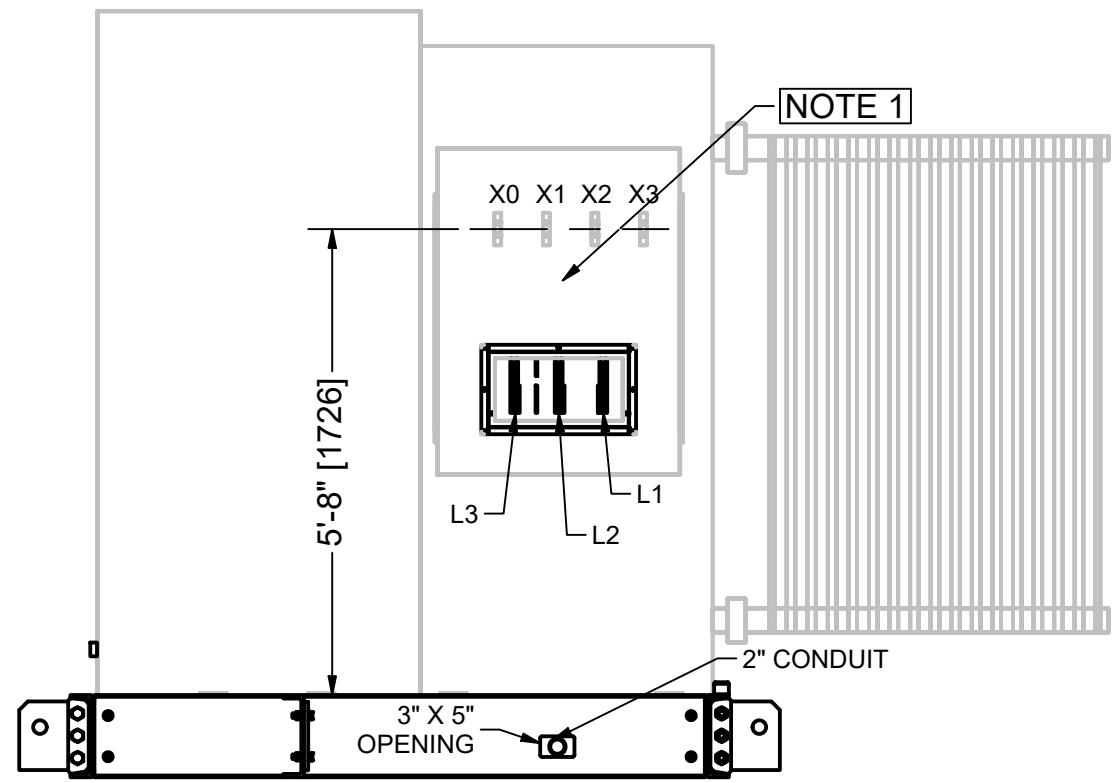
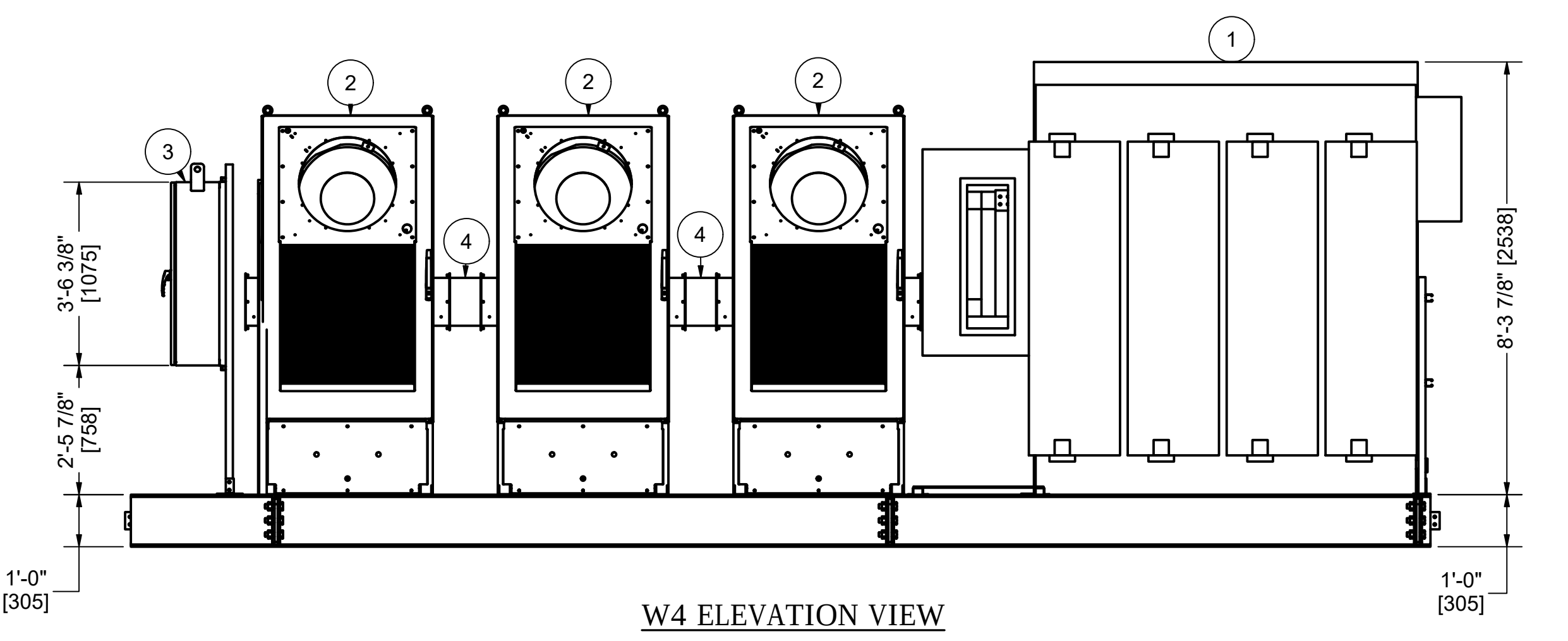
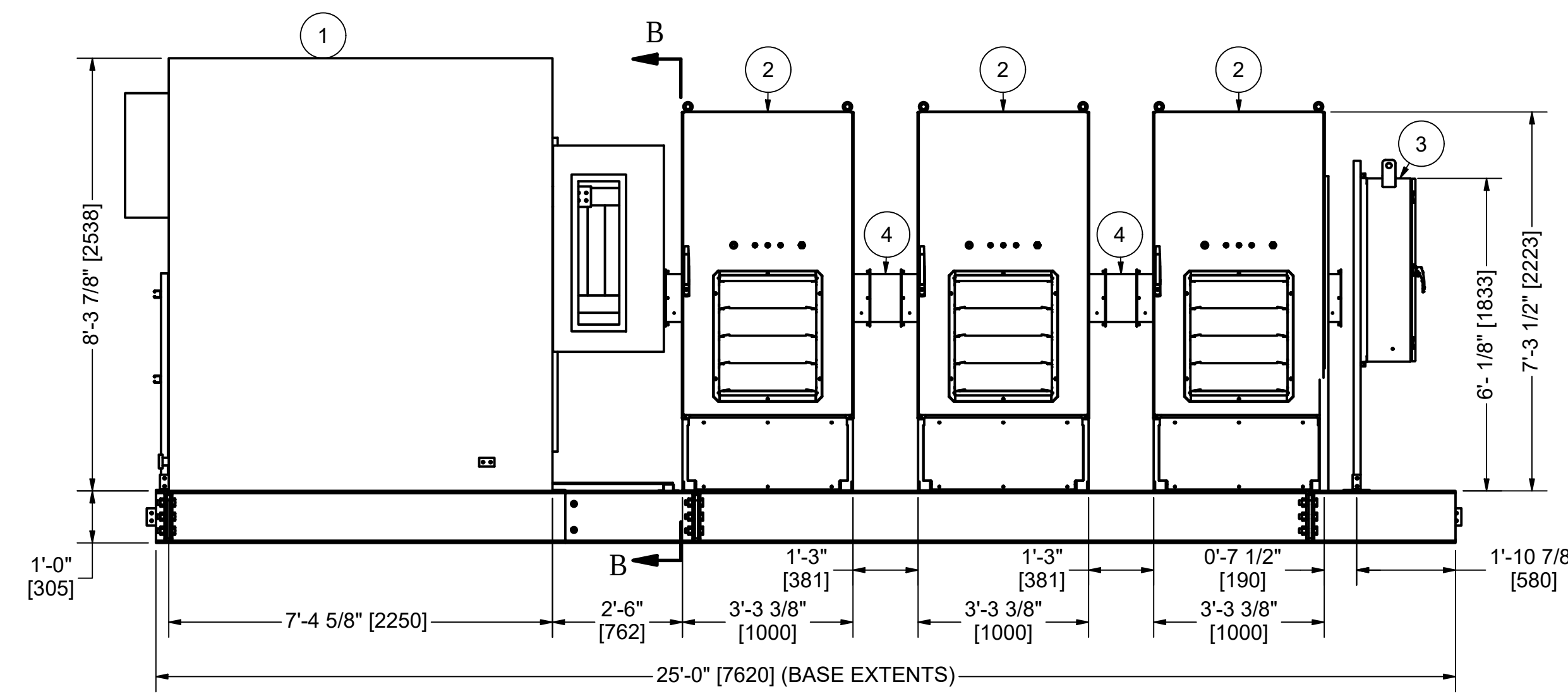
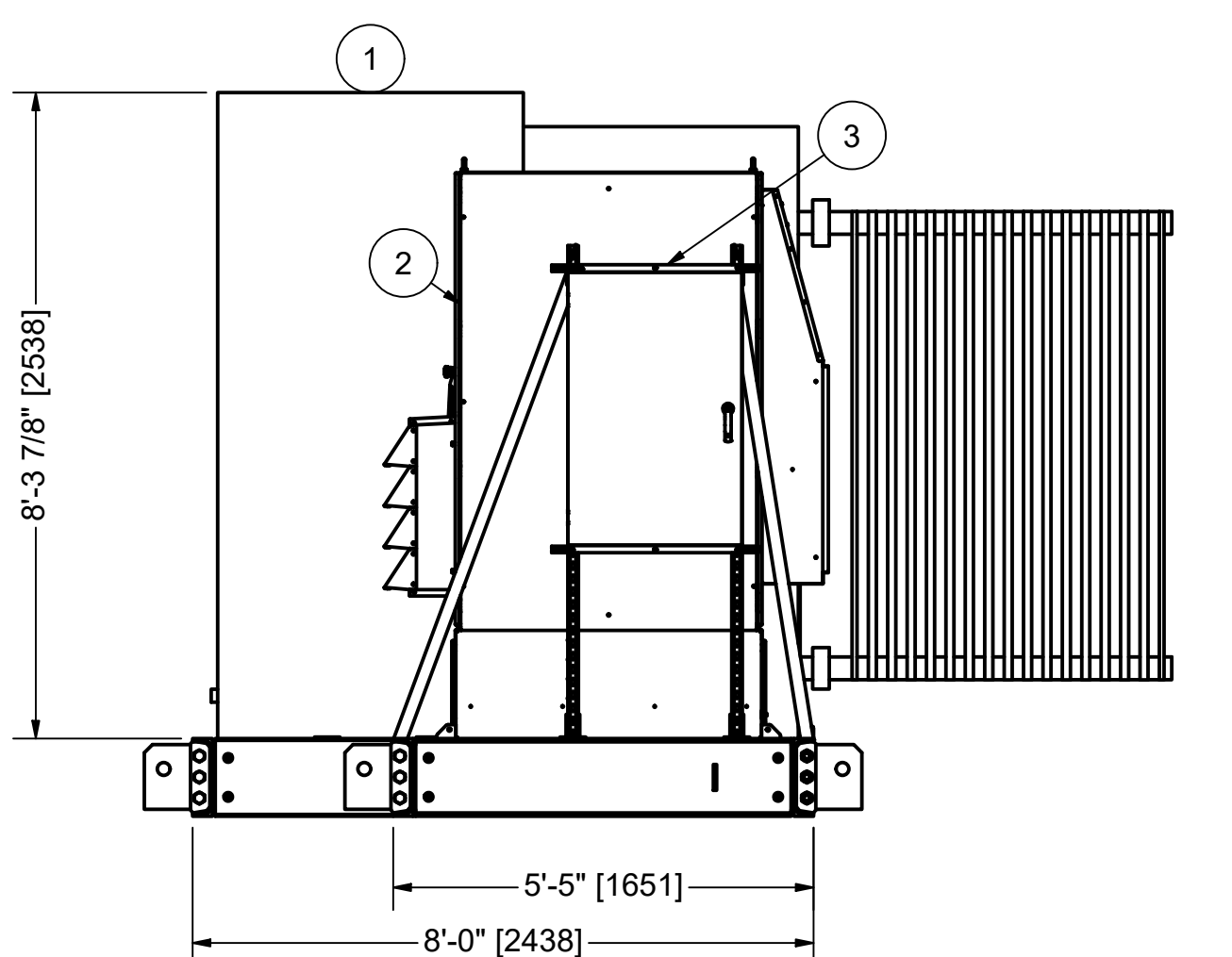
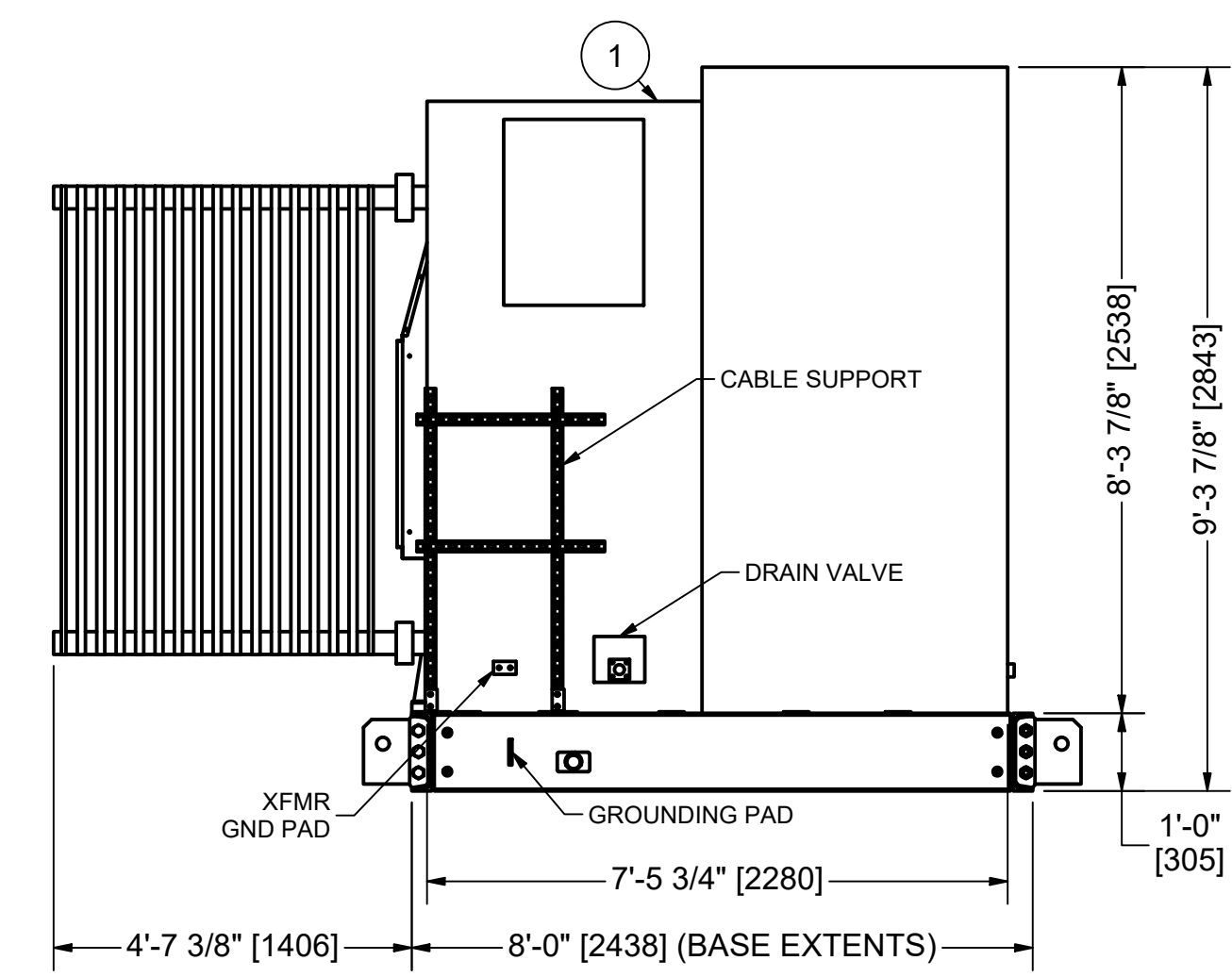
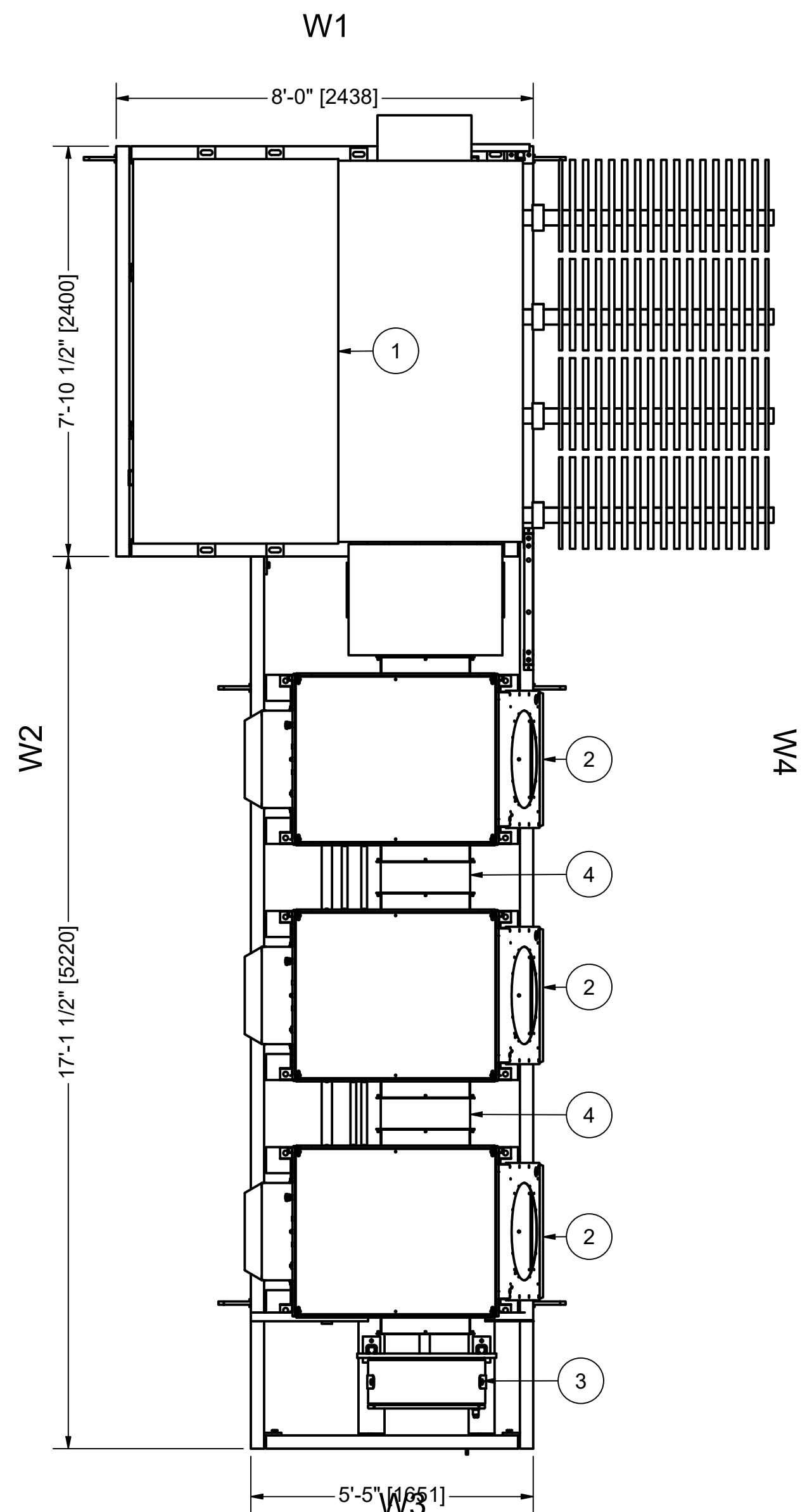


AMSi Inc.
4715 BARTLETT ROAD
BEAMSVILLE, ON, L3J 0Z2
905 988-5921

APPLIED MODERN
SYSTEM INTEGRATION



CUSTOMER EVLO INC.				P.O. # 112585		DESCRIPTION 3PCS CONVERSION PLATFORM INTERCONNECTION DIAGRAM		
PROJECT SOLAR BANKS-CONVERSION PLATFORM				PROJECT LOCATION CRAMAHE, CHESLEY, ARMOUR				
DRAWN BY	CHECKED BY	APPROVED BY	UNITS	DRAWING NUMBER			SHEET	REV
ML 06/17/24	IA 06/17/24	MA 06/17/24	N/A	24015-2-B-E-ICD			1 OF 1	1



NOTES:

1. AMSI TO SUPPLY CLOSE COUPLING CONNECTION BETWEEN MAIN TRANSFORMER AND FIRST PCS.

3	AS PER CUSTOMER COMMENTS	8/29/2024	RIYAD A.
2	REVISED BASE FRAME HEIGHT	7/17/2024	RIYAD A.
1	AS PER CUSTOMER COMMENTS & ISSUED FOR CONSTRUCTION	7/4/2024	RIYAD A.
0	ISSUED FOR APPROVAL	6/14/2024	RIYAD A.
No.	REVISIONS	DATE	BY

EQUIPMENT LIST PER PLATFORM				
ITEM	DESCRIPTION	SUPPLIED BY	INSTALLED BY	QTY
1	4 MVA MEDIUM VOLTAGE TRANSFORMER	EVLO	AMSI	1
2	CAB 1000 INVERTER	EVLO	AMSI	3
3	TRANSFORMER MONITORING PANEL	EVLO	AMSI	1
4	PCS THROAT KIT AND BUS CONNECTIONS	EVLO	AMSI	2

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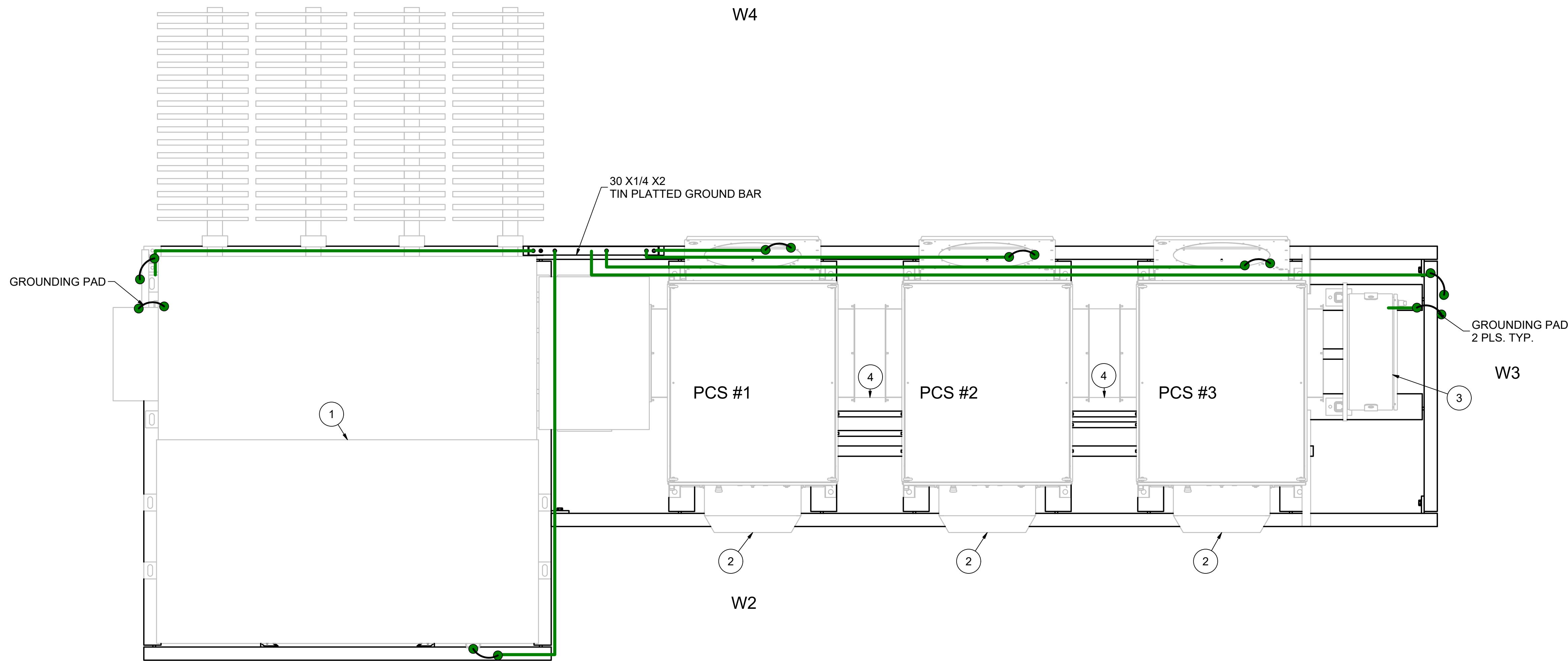
**APPLIED MODERN
SYSTEM INTEGRATION**

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BEAMSVILLE, ON, L3J 0Z2
(905) 988-5921

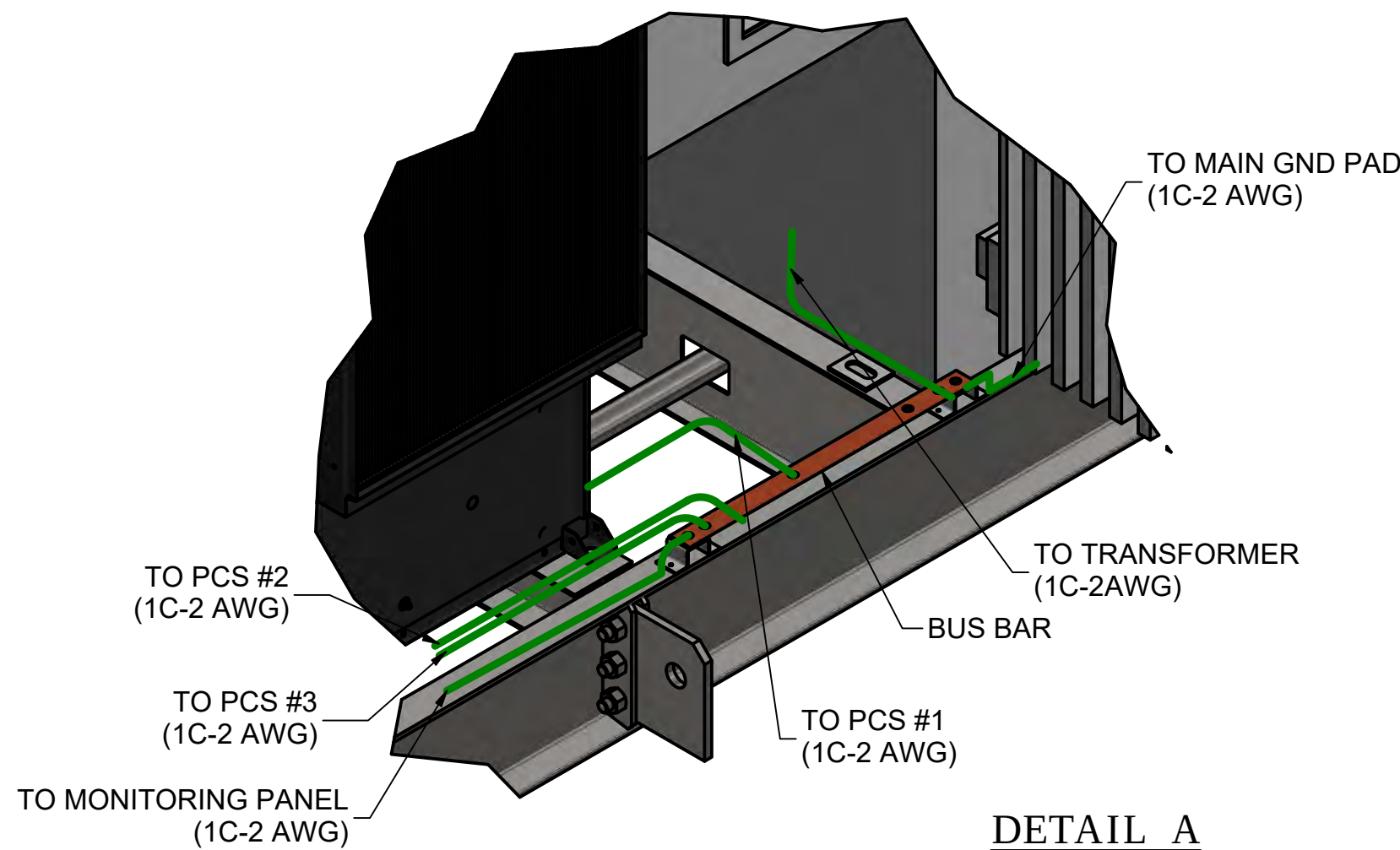
ISSUE STAMP

**AMSi
ISSUED FOR
CONSTRUCTION**

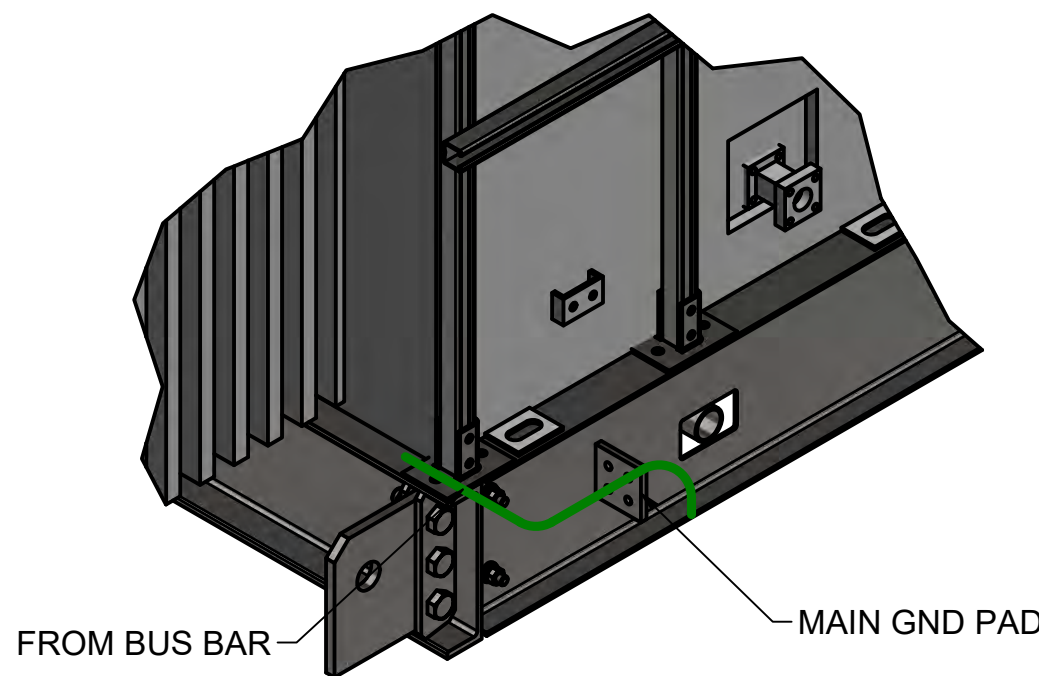
CUSTOMER EVLO INC.		P.O. # 112585		DESCRIPTION PRE-FABRICATED 3PCS CONVERSION PLATFORM EXTERIOR ELEVATIONS	
PROJECT SOLAR BANKS-CONVERSION PLATFORM		PROJECT LOCATION CRAMAHE, CHESLEY, ARMOUR			
DRAWN BY RIYAD A. 6/7/2024	CHECKED BY L. A. 6/7/2024	APPROVED BY M. A. 6/7/2024	UNITS ft-in [mm]	DRAWING NUMBER 24015-2-B-M-EE	SHEET 1 OF 1
				REV 3	



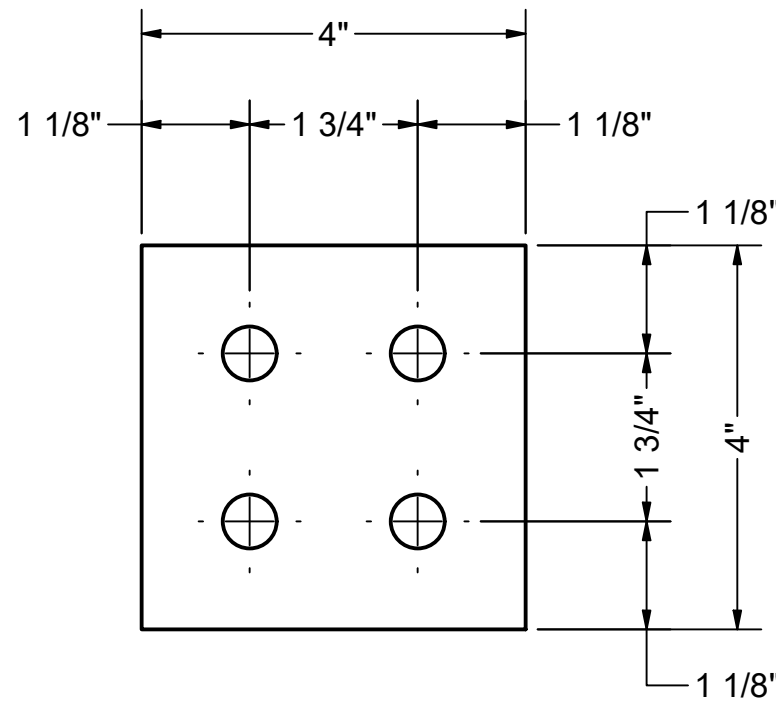
3PCS PLATFORM GROUNDING PLAN



DETAIL A
(TYP. GROUNDING CONNECTION)



DETAIL B
(TYP. GROUNDING CONNECTION)



TYP. GND PAD
(NEMA 4-HOLE)

2	AS PER CUSTOMER COMMENTS	8/29/2024	RIYAD A.
1	AS PER CUSTOMER COMMENTS & ISSUED FOR CONSTRUCTION	7/4/2024	RIYAD A.
0	ISSUED FOR APPROVAL	6/14/2024	RIYAD A.
No.	REVISIONS	DATE	BY

EQUIPMENT LIST PER PLATFORM				
ITEM	DESCRIPTION	SUPPLIED BY	INSTALLED BY	QTY
1	4 MVA MEDIUM VOLTAGE TRANSFORMER	EVLO	AMSi	1
2	CAB 1000 INVERTER	EVLO	AMSi	3
3	TRANSFORMER MONITORING PANEL	EVLO	AMSi	1
4	PCS THROAT KIT AND BUS CONNECTIONS	EVLO	AMSi	2

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APPLIED MODERN
SYSTEM INTEGRATION

AMSi Inc.
4715 BARTLETT RD
BEAMSVILLE, ON, L3J 0Z2
(905) 988-5921

ISSUE STAMP

AMSi
ISSUED FOR
CONSTRUCTION

CUSTOMER
EVLO INC.

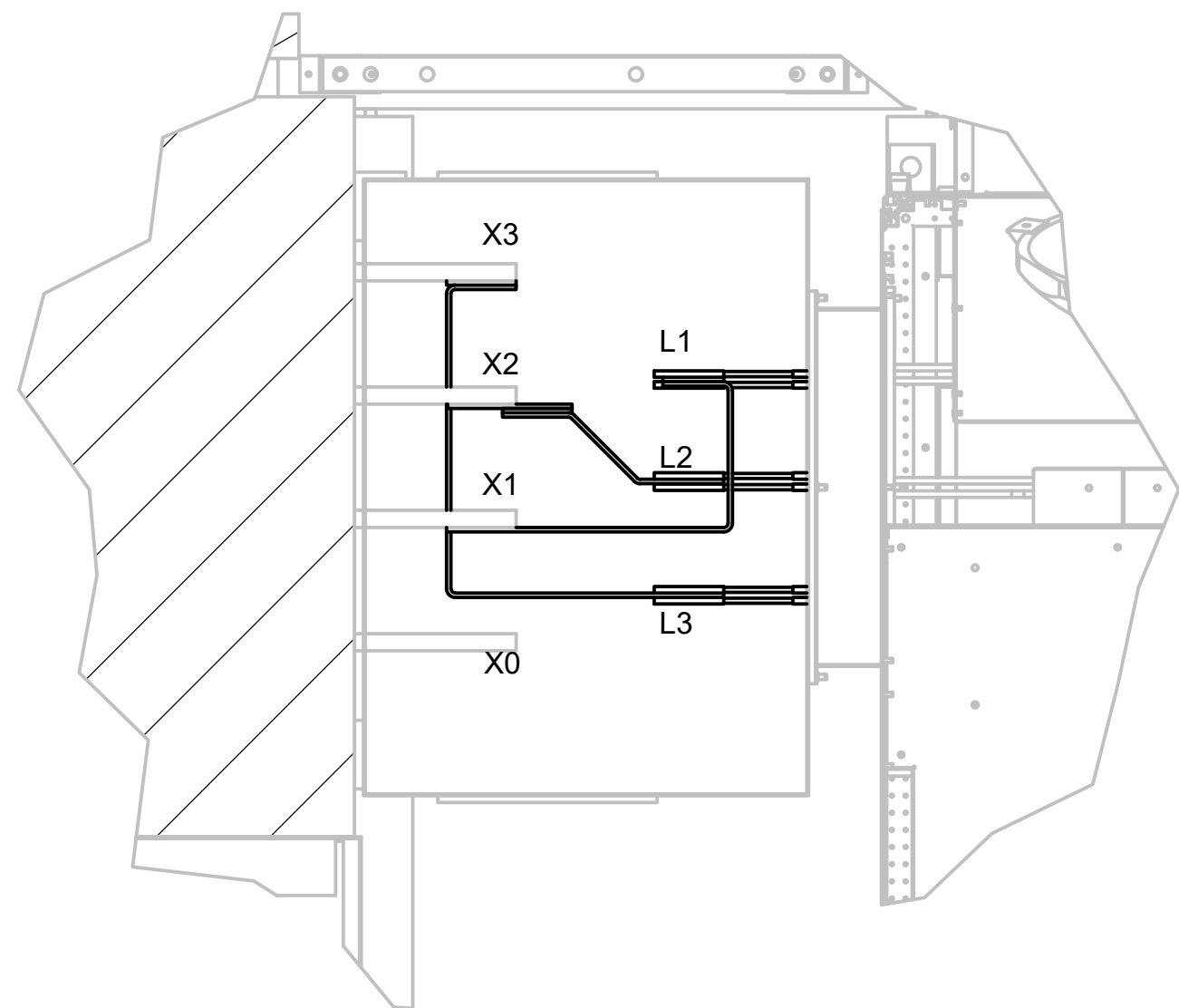
P.O. #
112585

PROJECT
SOLAR BANKS-CONVERSION PLATFORM

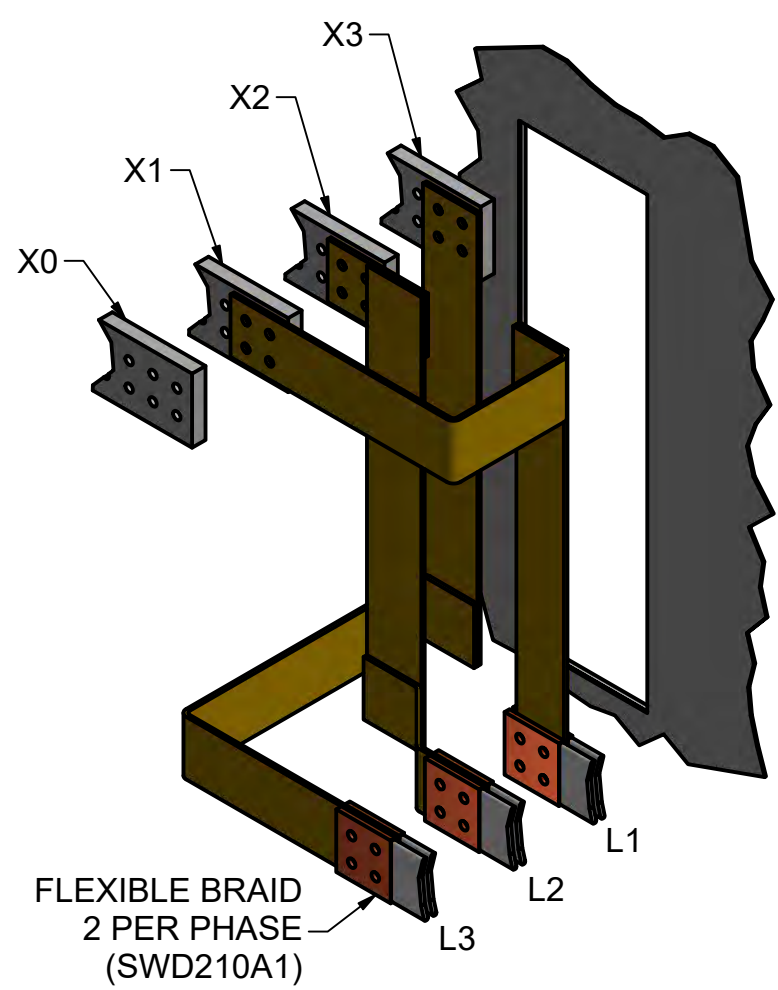
PROJECT LOCATION
CRAMAHE, CHESLEY, ARMOUR

DESCRIPTION
PRE-FABRICATED 3PCS
CONVERSION PLATFORM
GROUNDING PLAN

DRAWN BY	CHECKED BY	APPROVED BY	UNITS	DRAWING NUMBER	SHEET	REV
RIYAD A. 6/7/2024	L. A. 6/7/2024	M. A. 6/7/2024	ft-in [mm]	24015-2-B-M-GR	1 OF 1	2



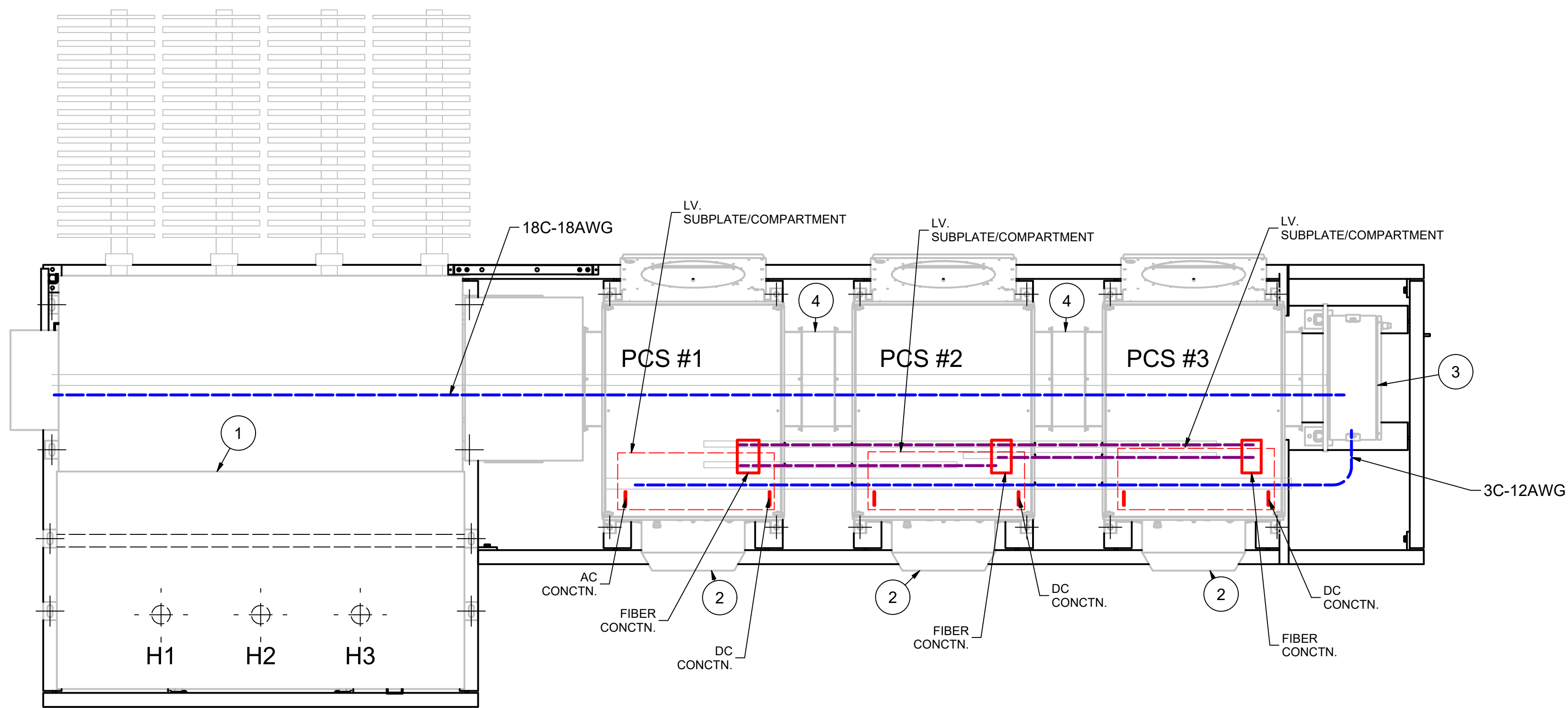
BUS COUPLING DETAIL
TOP VIEW



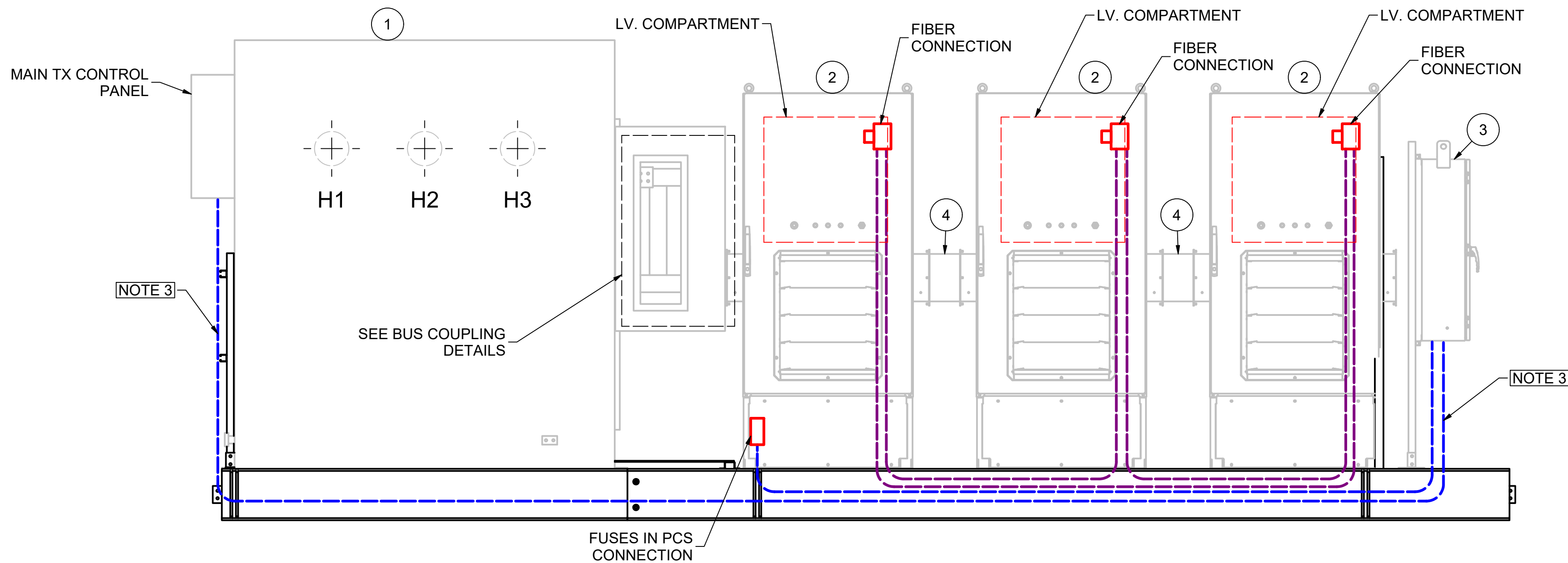
BUS COUPLING DETAIL
(ISOMETRIC VIEW)

LEGEND

- FIBER CABLE
- CONTROL CABLE



3PCS PLATFORM OUTLINE PLAN



W2 ELEVATION VIEW

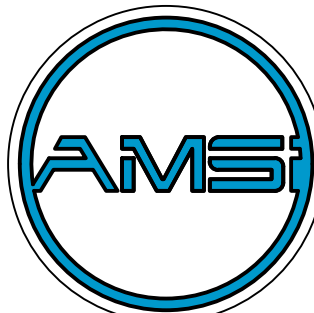
NOTES:

- USE THROAT CONNECTION KIT TO CONNECT PCS#1, PCS#2 AND PCS#3 IN PARALLEL.
- USE BROADCOM LIMITED HFBR-RUS100Z FIBER OPTIC CABLE WITH HFBR-4513Z AND HFBR-4503Z CONNECTORS. ONE CONNECTOR IS FOR TRANSMIT AND THE OTHER IS FOR RECEIVE.
- AMSI WILL PROVIDE ALL MECHANICAL SUPPORTS FOR POWER AND COMMUNICATION ALL CABLES AS PER CANADIAN CODE.

2	AS PER CUSTOMER COMMENTS	8/29/2024	RIYAD A.
1	AS PER CUSTOMER COMMENTS & ISSUED FOR CONSTRUCTION	7/4/2024	RIYAD A.
0	ISSUED FOR APPROVAL	6/14/2024	RIYAD A.
No.	REVISIONS	DATE	BY

EQUIPMENT LIST PER PLATFORM				
ITEM	DESCRIPTION	SUPPLIED BY	INSTALLED BY	QTY
1	4 MVA MEDIUM VOLTAGE TRANSFORMER	EVLO	AMSI	1
2	CAB 1000 INVERTER	EVLO	AMSI	3
3	TRANSFORMER MONITORING PANEL	EVLO	AMSI	1
4	PCS THROAT KIT AND BUS CONNECTIONS	EVLO	AMSI	2

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**APPLIED MODERN
SYSTEM INTEGRATION**

AMSi Inc.
4715 BARTLETT RD
BEAMSVILLE, ON, L3J 0Z2
(905) 988-5921

ISSUE STAMP

**AMSi
ISSUED FOR
CONSTRUCTION**

CUSTOMER EVLO INC.		P.O. # 112585	
PROJECT SOLAR BANKS-CONVERSION PLATFORM		PROJECT LOCATION CRAMAHE, CHESLEY, ARMOUR	
DRAWN BY RIYAD A. 6/14/2024	CHECKED BY L. A. 6/14/2024	APPROVED BY M. A. 6/14/2024	UNITS ft-in [mm]
DRAWING NUMBER 24015-2-B-M-IC			

DESCRIPTION PRE-FABRICATED 3PCS CONVERSION PLATFORM INTERCONNECTION LAYOUT			
SHEET 1 OF 1	REV 2		

F

E

D

C

B

A

8

7

6

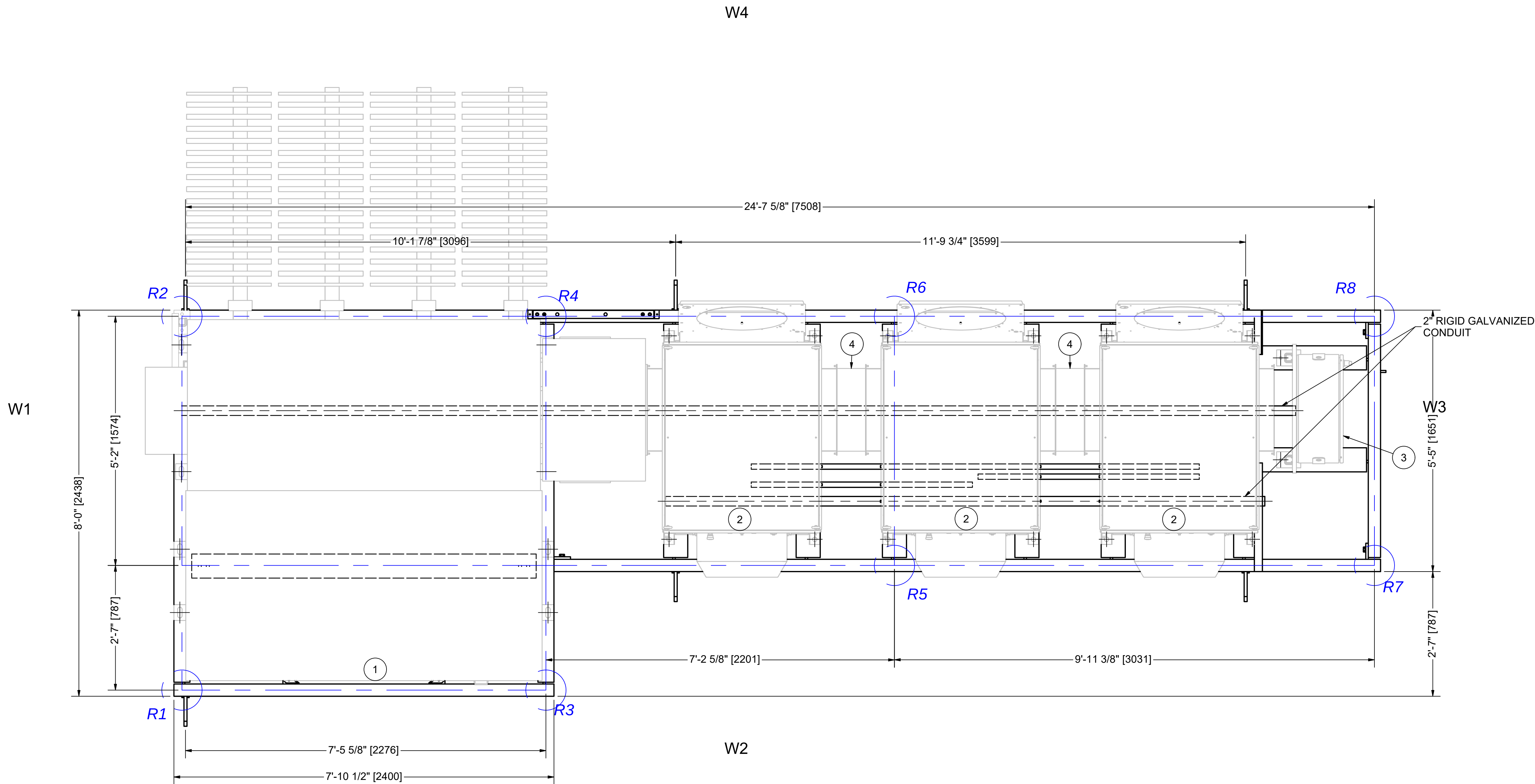
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4

3

2

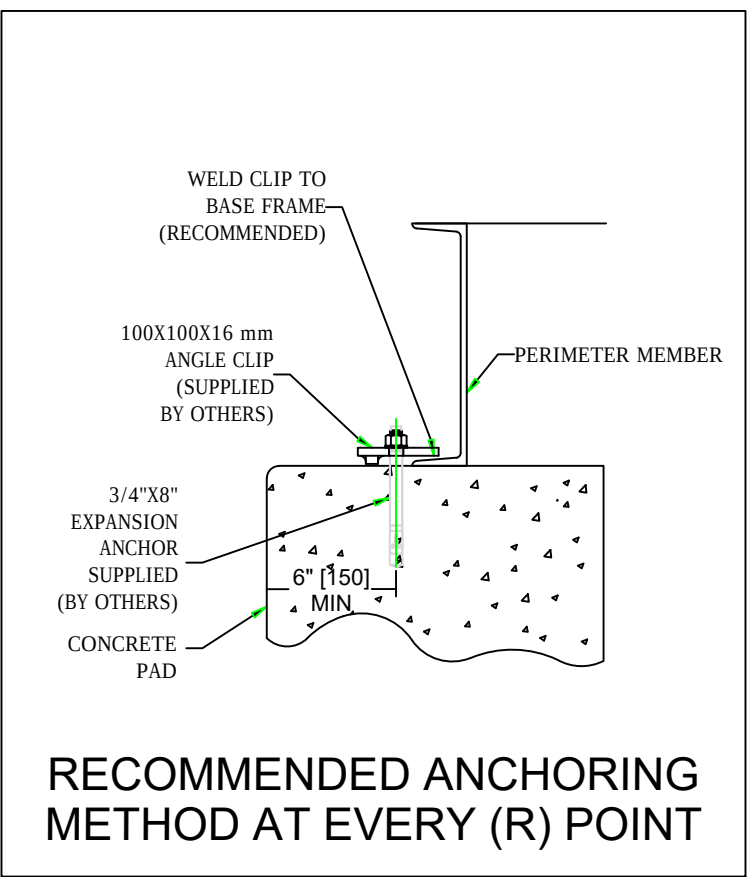
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3PCS PLATFORM LOADING PLAN

NOTES:

1. CUSTOMER TO CONFIRM ALL EQUIPMENT WEIGHTS.
2. REFER TO REACTION CALCULATION FOR LOADING DETAILS.



RECOMMENDED ANCHORING METHOD AT EVERY (R) POINT

1	AS PER CUSTOMER COMMENTS & ISSUED FOR CONSTRUCTION	7/17/2024	RIYAD A.
0	ISSUED FOR APPROVAL	6/14/2024	RIYAD A.
No.	REVISIONS	DATE	BY

EQUIPMENT LIST			
ITEM	DESCRIPTION	WEIGHTS (KG)	QTY
1	4 MVA MEDIUM VOLTAGE TRANSFORMER	12700	1
2	CAB 1000 INVERTER	1568	3
3	TRANSFORMER MONITORING PANEL	83	1
4	PCS THROAT KIT AND BUS CONNECTIONS	12	2

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**APPLIED MODERN
SYSTEM INTEGRATION**

AMSi Inc.
4715 BARTLETT RD
BEAMSVILLE, ON, L3J 0Z2
(905) 988-5921

ISSUE STAMP

**AMSi
ISSUED FOR
CONSTRUCTION**

CUSTOMER EVLO INC.			P.O. # 112585	
PROJECT SOLAR BANKS-CONVERSION PLATFORM			PROJECT LOCATION CRAMAHE, CHESLEY, ARMOUR	
DRAWN BY	CHECKED BY	APPROVED BY	UNITS	DRAWING NUMBER
RIYAD A. 6/7/2024	L. A. 6/7/2024	M. A. 6/7/2024	ft-in [mm]	24015-2-B-M-LD

DESCRIPTION PRE-FABRICATED 3PCS CONVERSION PLATFORM LOADING PLAN			
SHEET		REV	
1 OF 1		1	

8

7

6

5

4

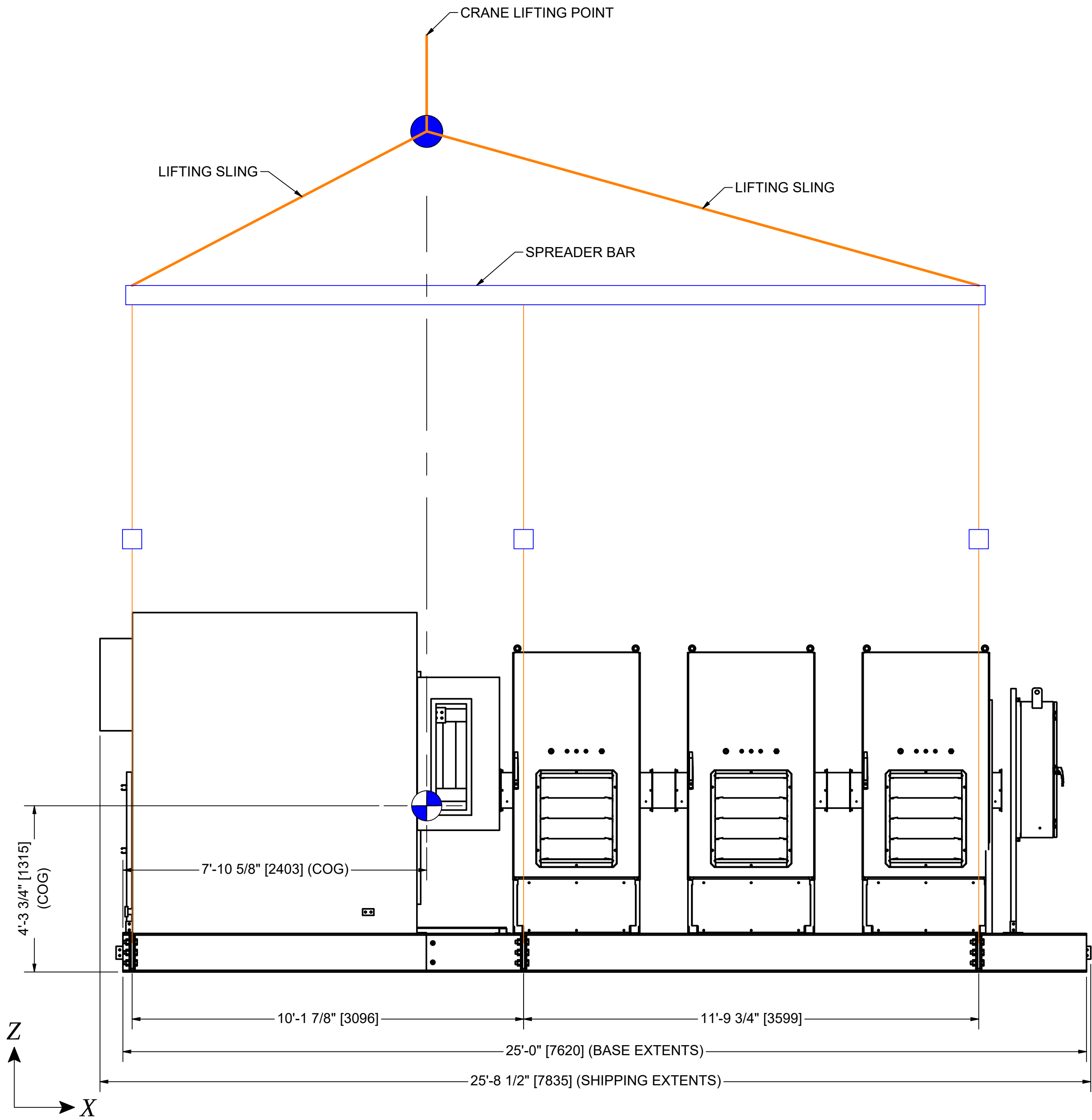
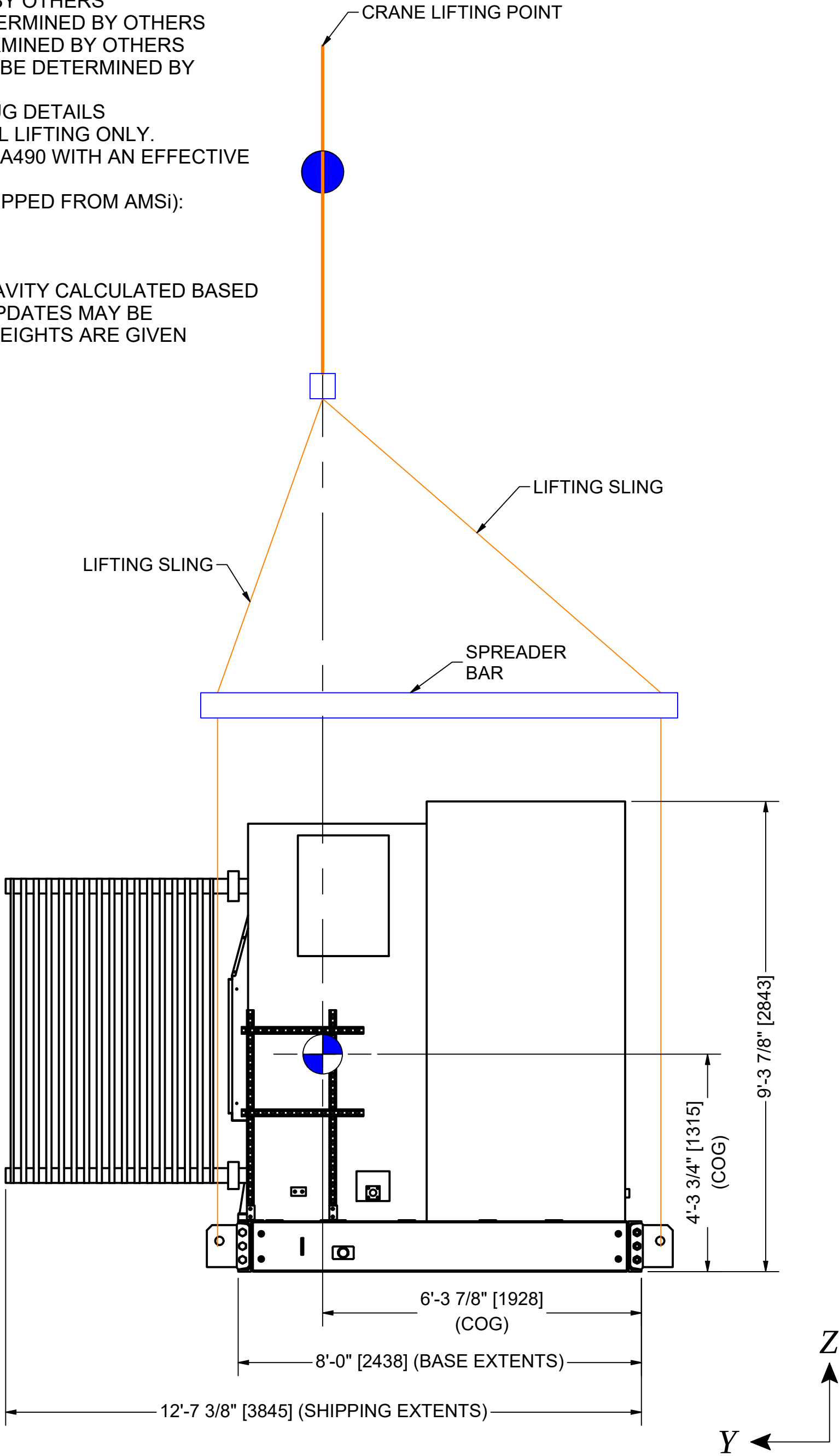
3

2

1

GENERAL NOTES:

- TOTAL SKID WEIGHT FOR LIFTING (AS SHIPPED FROM AMSi) IS ESTIMATED TO BE APROX. **42598 LBS [19322 KG]**.
- THIS IS A RECOMMENDED LIFTING PLAN. ACTUAL VERTICAL LIFT PLAN IS THE RESPONSIBILITY OF SITE/OFFLOADING PERSONNEL
- MIN Ø1-1/2" SLING TO BE USED WITH CRANE
- LENGTH OF SLINGS TO BE DETERMINED BY OTHERS TO BALANCE CENTER OF GRAVITY DURING LIFT
- SPREADER BAR DESIGNED & SUPPLIED BY OTHERS
- CRANE LOADING & TONNAGE TO BE DETERMINED BY OTHERS
- MAXIMUM CRANE LOADING TO BE DETERMINED BY OTHERS
- MAXIMUM LOADING FOR EACH SLING TO BE DETERMINED BY OTHERS
- SEE DRAWING (AMSI-LL-C12) FOR LIFT LUG DETAILS
- LIFTING LUGS TO BE USED FOR VERTICAL LIFTING ONLY.
- BOLTS USED FOR LIFTING TO BE 1-8UNC A490 WITH AN EFFECTIVE GRIP OF NOT LESS THAN 1.88"
- ESTIMATED CENTER OF GRAVITY (AS SHIPPED FROM AMSi):
X: 7'-11" [2412]
Y: 6'-3 7/8" [1928]
Z: 4'-3 3/48" [1314]
- BUILDING WEIGHTS AND CENTRE OF GRAVITY CALCULATED BASED ON ESTIMATED EQUIPMENT WEIGHTS, UPDATES MAY BE REQUIRED WHEN ACTUAL EQUIPMENT WEIGHTS ARE GIVEN



NOTES:

*AMSi DOES NOT TAKE RESPONSIBILITY FOR ANY LIFTING AND/OR RIGGING PROCEDURES. ALL SLINGS, CABLES, SPREADER BARS AND HOOKS (ALL LIFTING/RIGGING APPARATUS) TO BE THE RESPONSIBILITY OF AND DETERMINED BY SITE CONTRACTOR/OFFLOADER/SHIPPING CO.

THIS DRAWING IS TO SERVE SOLELY AS A PICTORIAL REPRESENTATION OF A TYPICAL LIFTING PROCEDURE. IT IS NOT MEANT TO SERVE AS A PROCEDURAL OR INSTRUCTIONAL DOCUMENT. AS SUCH, NO DIMENSIONS SHALL BE GIVEN FOR LENGTHS OR SIZES OF ANY LIFTING APPARATUS.*

3	AS PER CUSTOMER COMMENTS	8/29/2024	RIYAD A.
2	REVISED COG	7/17/2024	RIYAD A.
1	AS PER CUSTOMER COMMENTS & ISSUED FOR CONSTRUCTION	7/4/2024	RIYAD A.
0	ISSUED FOR APPROVAL	6/14/2024	RIYAD A.
No.	REVISIONS	DATE	BY

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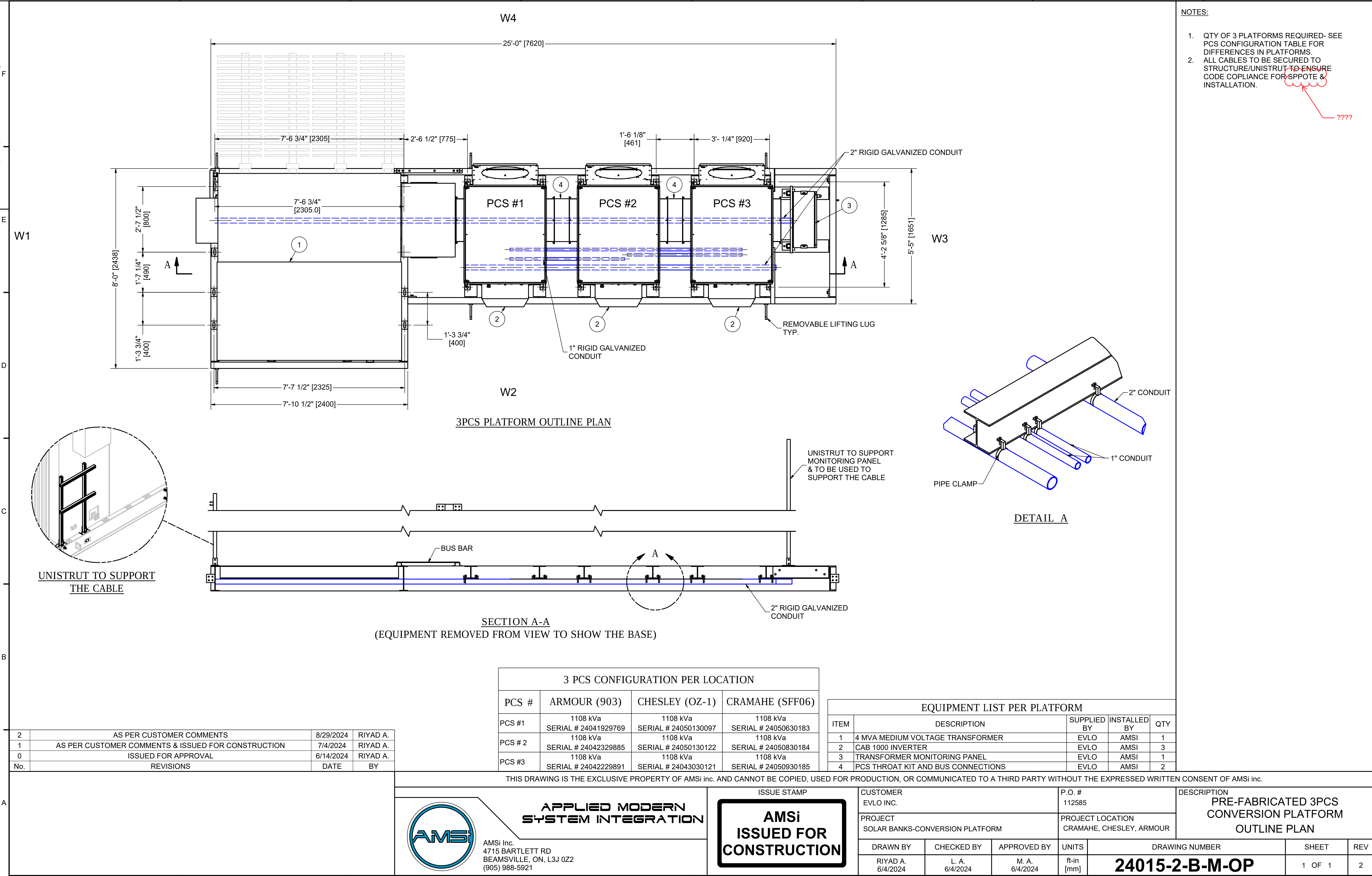
**APPLIED MODERN
SYSTEM INTEGRATION**

AMSi Inc.
4715 BARTLETT RD
BEAMSVILLE, ON, L3J 0Z2
(905) 988-5921

ISSUE STAMP

**AMSi
ISSUED FOR
CONSTRUCTION**

CUSTOMER EVLO INC.			P.O. # 112585		DESCRIPTION PRE-FABRICATED 3PCS CONVERSION PLATFORM LIFTING & RIGGING PLAN		
PROJECT SOLAR BANKS-CONVERSION PLATFORM			PROJECT LOCATION CRAMAHE, CHESLEY, ARMOUR				
DRAWN BY	CHECKED BY	APPROVED BY	UNITS	DRAWING NUMBER		SHEET	REV
RIYAD A. 6/7/2024	L. A. 6/7/2024	M. A. 6/7/2024	ft-in [mm]	24015-2-B-M-LR		1 OF 1	3



NOTES:

- QTY OF 3 PLATFORMS REQUIRED- SEE PCS CONFIGURATION TABLE FOR DIFFERENCES IN PLATFORMS.
- ALL CABLES TO BE SECURED TO STRUCTURE/UNISTRUT TO ENSURE CODE COMPLIANCE FOR SPPOTE & INSTALLATION.

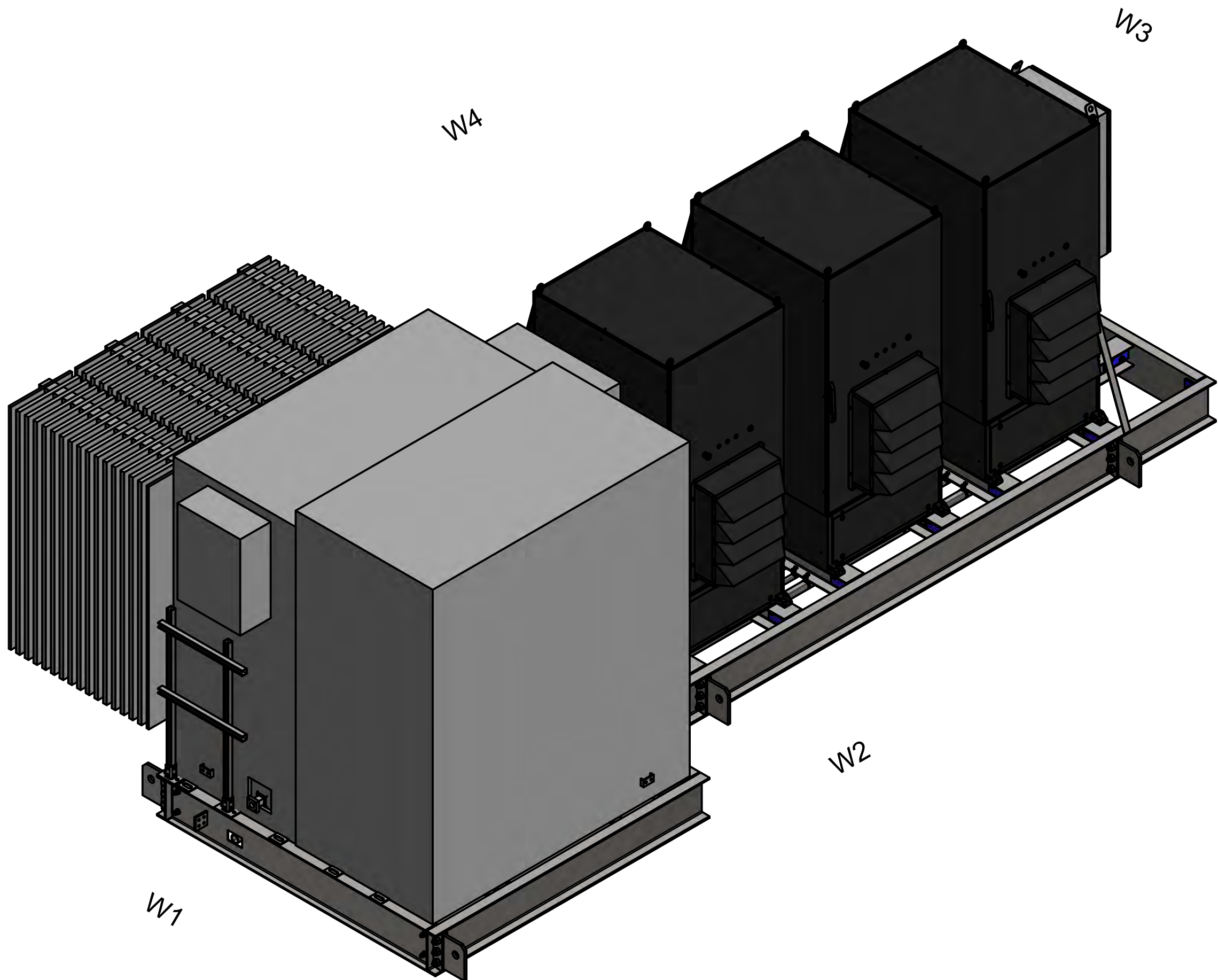
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PROJECT:
3PCS SOLAR BANK CONVERSION PLATFORM

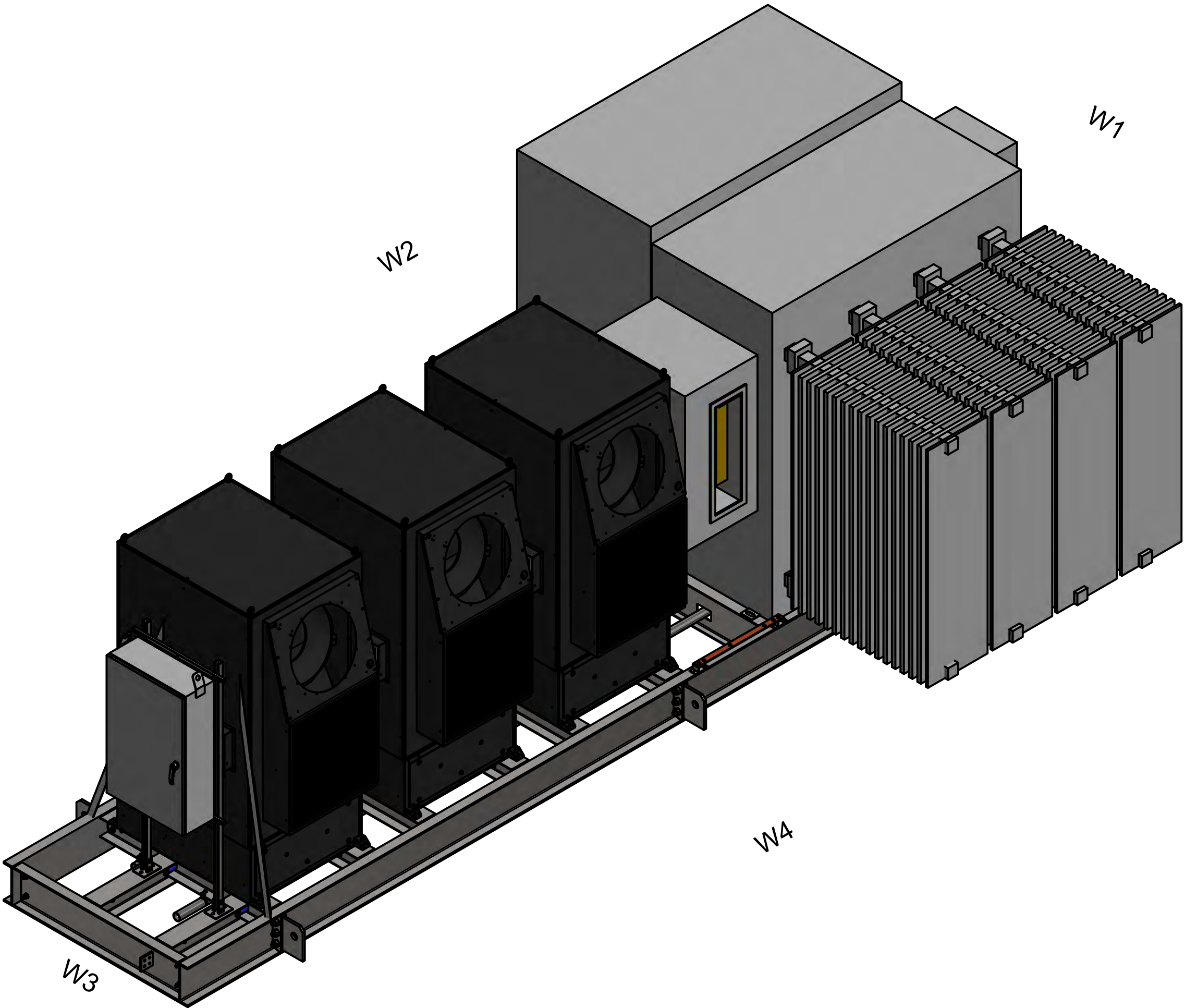
AMSI INC. MECHANICAL DRAWING PACKAGE INCLUSIONS:

- 1. 24015-2-B-M-TP: TITLE PAGE
- 2. 24015-2-B-M-OP: OUTLINE PLAN
- 3. 24015-2-B-M-EE: EXTERIOR ELEVATIONS
- 4. 24015-2-B-M-LD: LOADING PLAN
- 5. 24015-2-B-M-GR: GROUNDING PLAN
- 6. 24015-2-B-M-LR: LIFTING & RIGGING
- 7. 24015-2-B-M-IC: INTERCONNECTION LAYOUT

- NOTES:
- 1. FABRICATION AND ERECTION OF STRUCTURAL STEEL SHALL BE IN ACCORDANCE WITH CSA STD.S16 AND NBC REQUIREMENTS
 - 2. ALL STRUCTURAL STEEL SHALL CONFORM TO CSA STD G40.21 (OR EQUIVALENT), 50W FOR MAIN FRAMING MEMBERS, 50W FOR SECONDARY FRAMING MEMBERS, AND 50W FOR CFS.
 - 3. ALL WELDING SHALL BE DONE IN ACCORDANCE WITH CSA STD W59, BY AN ORGANIZATION FULLY APPROVED BY THE CANADIAN WELDING BUREAU UNDER CURRENT CSA STD W47.1. ELECTRODES SHALL CONFORM TO CSA STD W48.1
 - 4. ALL FRAME MEMBERS TO BE HOT DIPPED GALVANIZED CONFORMING TO CSA GA164.



FRONT VIEW



REAR VIEW

2	AS PER CUSTOMER COMMENTS	8/29/2024	RIYAD A.
1	AS PER CUSTOMER COMMENTS & ISSUED FOR CONSTRUCTION	7/4/2024	RIYAD A.
0	ISSUED FOR APPROVAL	6/14/2024	RIYAD A.
No.	REVISIONS	DATE	BY

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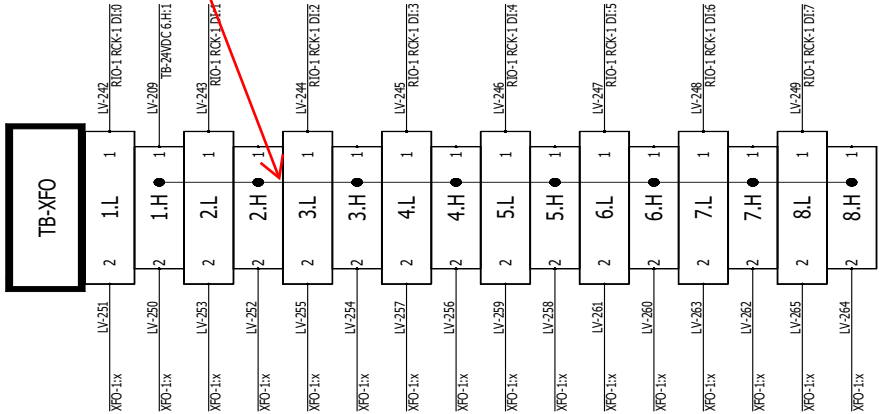
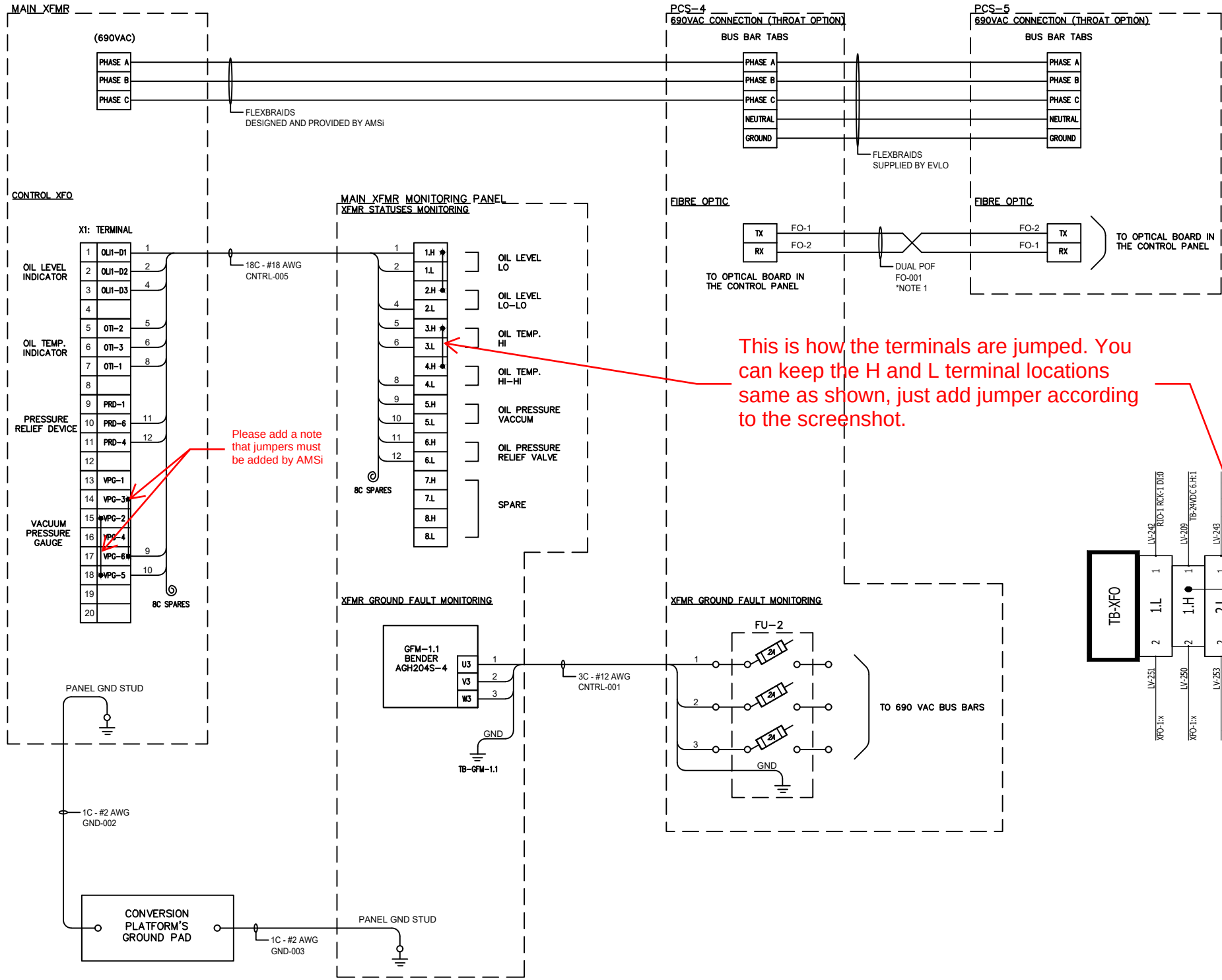
**APPLIED MODERN
SYSTEM INTEGRATION**

AMSi Inc.
4715 BARTLETT RD
BEAMSVILLE, ON, L3J 0Z2
(905) 988-5921

ISSUE STAMP

**AMSi
ISSUED FOR
CONSTRUCTION**

CUSTOMER EVLO INC.			P.O. # 112585		DESCRIPTION PRE-FABRICATED 3PCS CONVERSION PLATFORM TITLE PAGE		
PROJECT SOLAR BANKS-CONVERSION PLATFORM			PROJECT LOCATION CRAMAHE, CHESLEY, ARMOUR				
DRAWN BY	CHECKED BY	APPROVED BY	UNITS	DRAWING NUMBER		SHEET	REV
RIYAD A. 6/7/2024	L. A. 6/7/2024	M. A. 6/7/2024	ft-in [mm]	24015-2-B-M-TP		1 OF 1	2



EVLO
DWGs for Construction
approved with minors comments.
To be updated in the As-built
copies.

NOTES

- EPC POWER RECOMMENDS TO USE BROADCOM LIMITED HFBR-RUS100Z FIBER OPTIC CABLE WITH HFBR-4513Z AND HFBR-4503Z CONNECTORS. ONE CONNECTOR IS FOR TRANSMIT AND THE OTHER IS FOR RECEIVE. REFER TO EPC POWER DOCUMENT # 70-100061 - SOFT PARALLEL APPLICATION GUIDE.
- QTY OF 3 PLATFORMS REQUIRED.

1	ISSUED FOR CONSTRUCTION	07/31/24	ML
0	INITIAL RELEASE	06/17/24	ML
No.	REVISIONS	DATE	BY

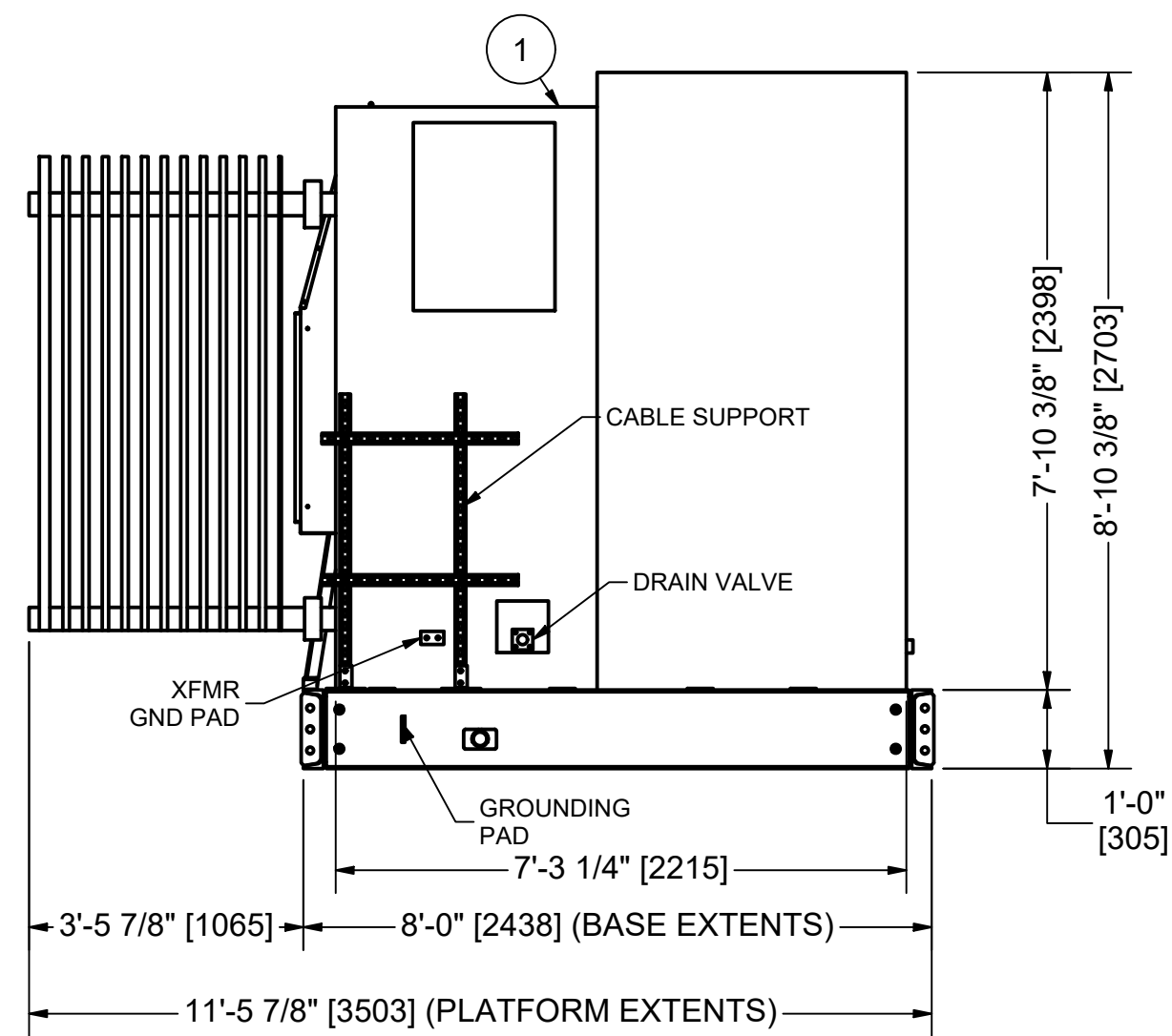


AMSi Inc.
4715 BARTLETT ROAD
BEAMSVILLE, ON, L3J 0Z2
905 988-5921

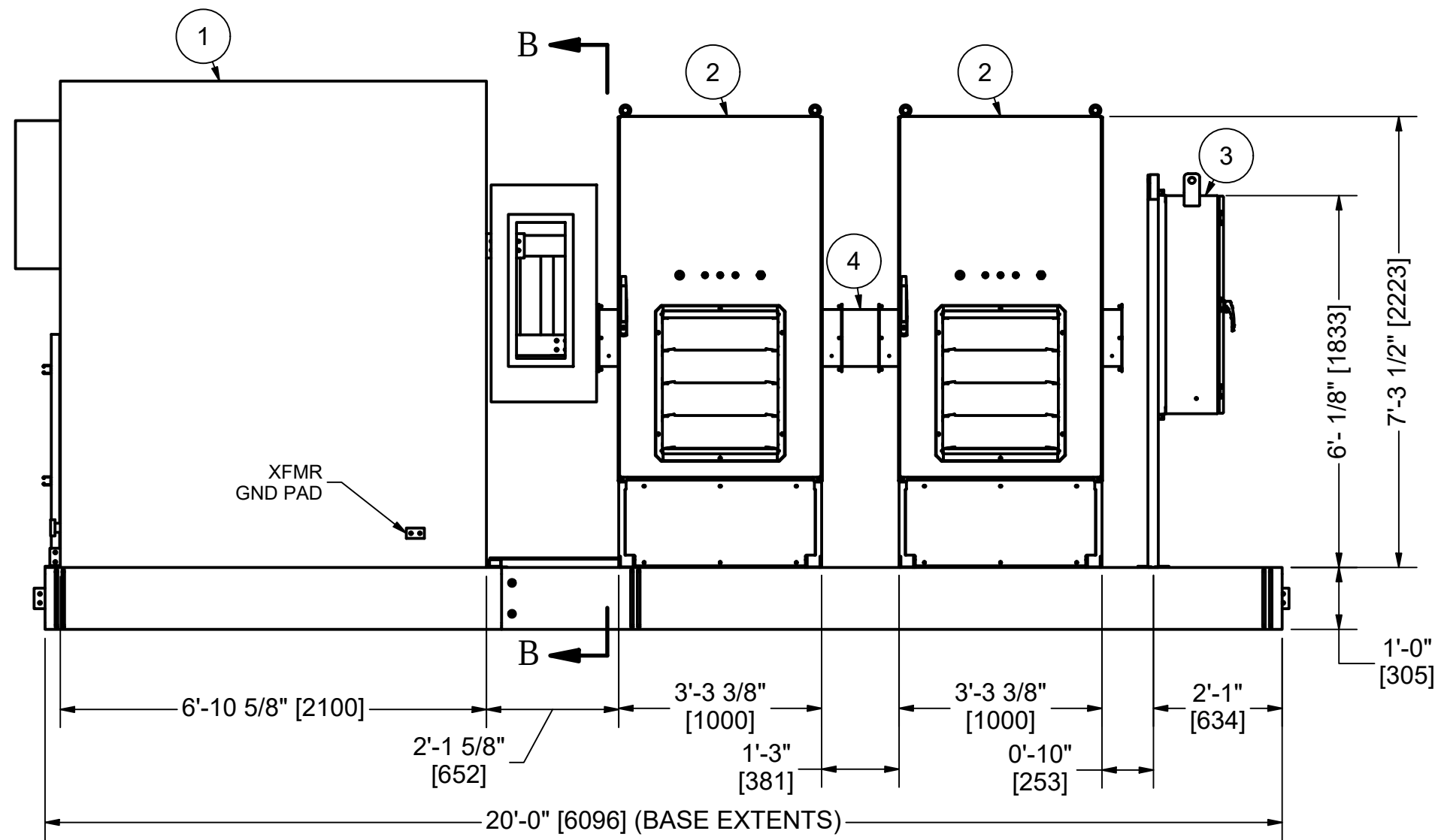
APPLIED MODERN
SYSTEM INTEGRATION

AMSi
ISSUED FOR
CONSTRUCTION

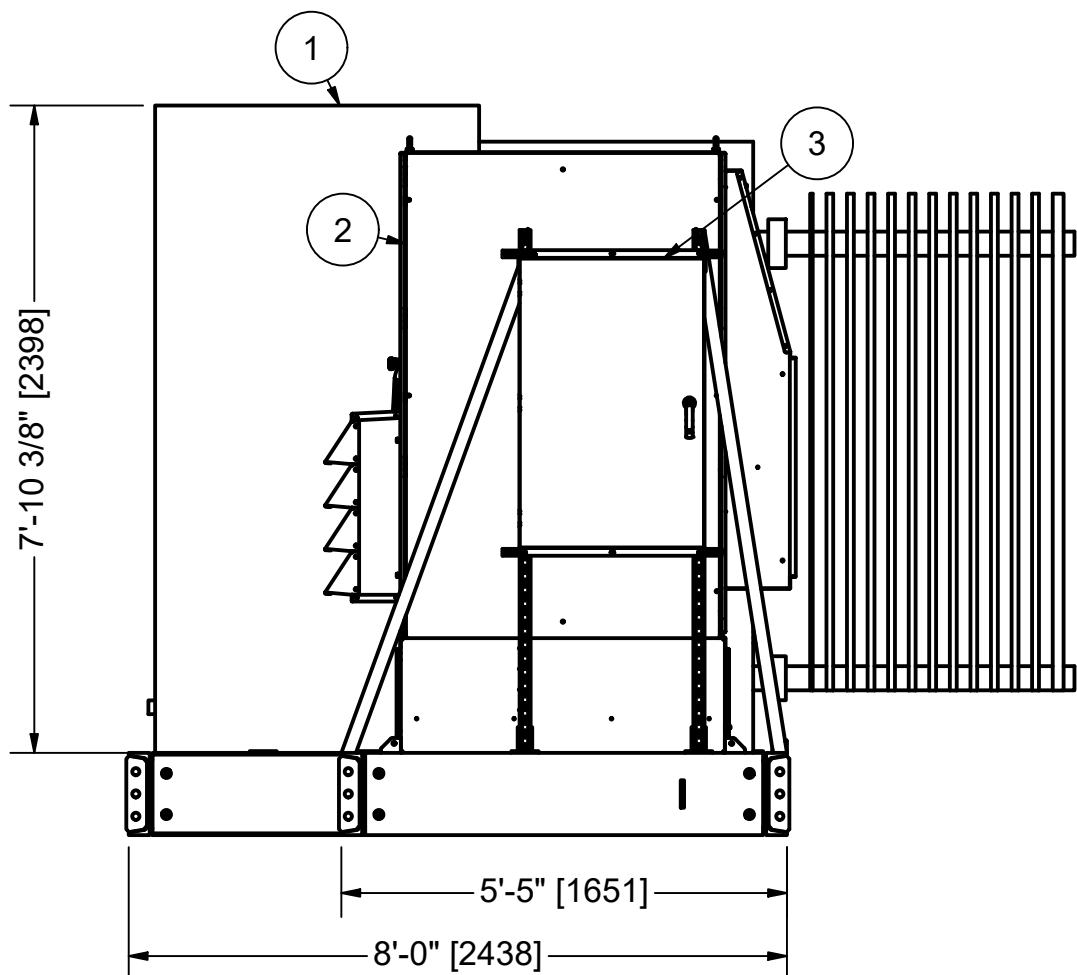
CUSTOMER EVLO INC.				P.O. # 112585		DESCRIPTION 2PCS CONVERSION PLATFORM INTERCONNECTION DIAGRAM		
PROJECT SOLAR BANKS-CONVERSION PLATFORM				PROJECT LOCATION CRAMAHE, CHESLEY, ARMOUR				
DRAWN BY	CHECKED BY	APPROVED BY	UNITS	DRAWING NUMBER			SHEET	REV
ML 06/17/24	IA 06/17/24	MA 06/17/24	N/A	24015-1-B-E-ICD			1 OF 1	1



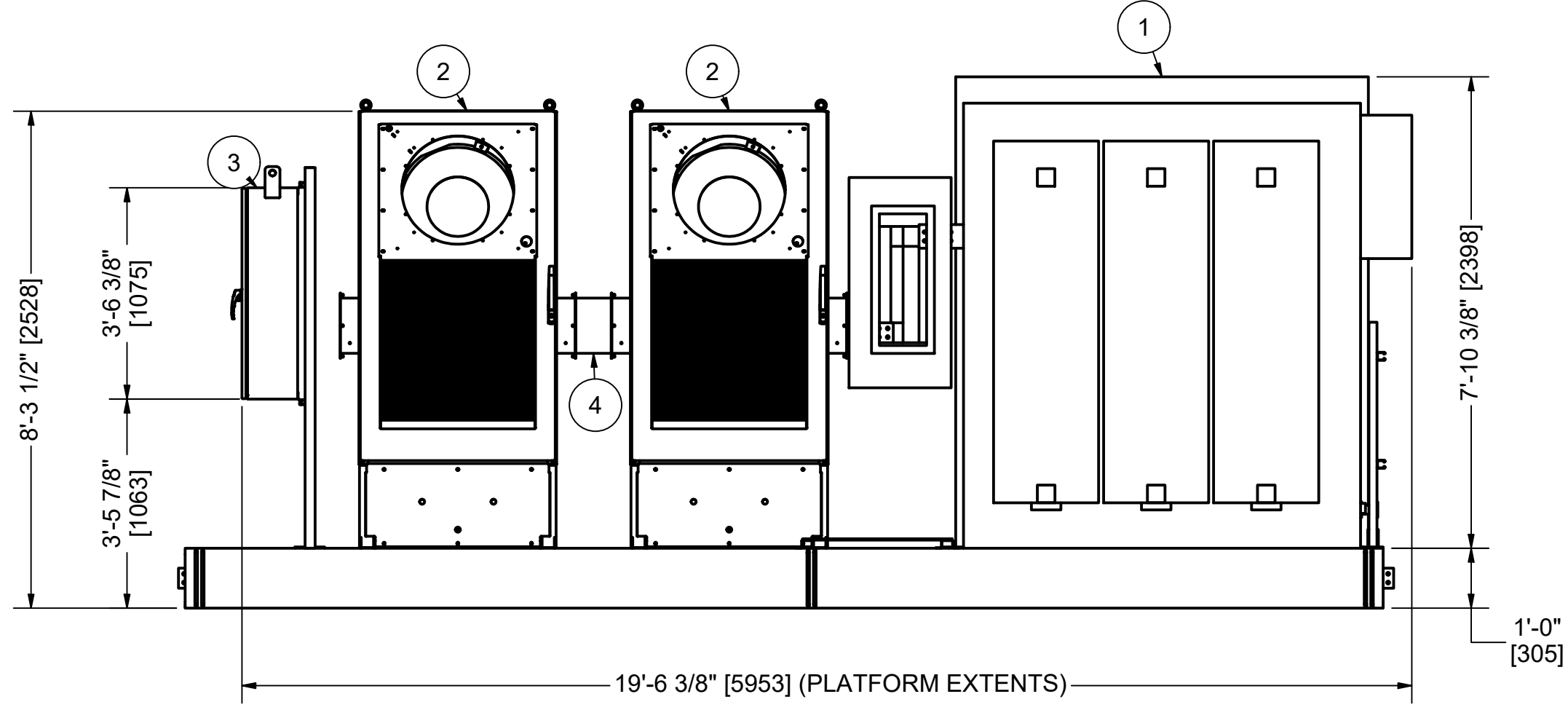
W1 ELEVATION VIEW



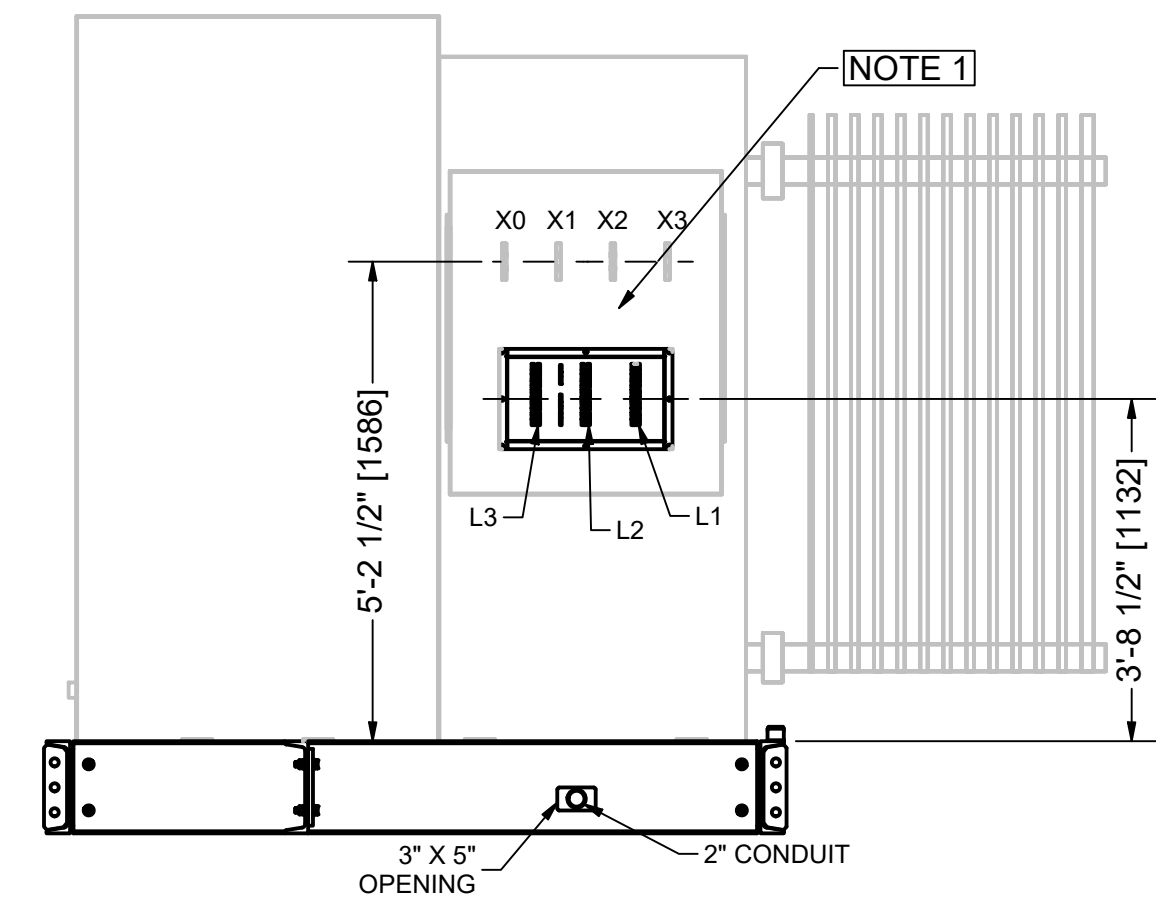
W2 ELEVATION VIEW



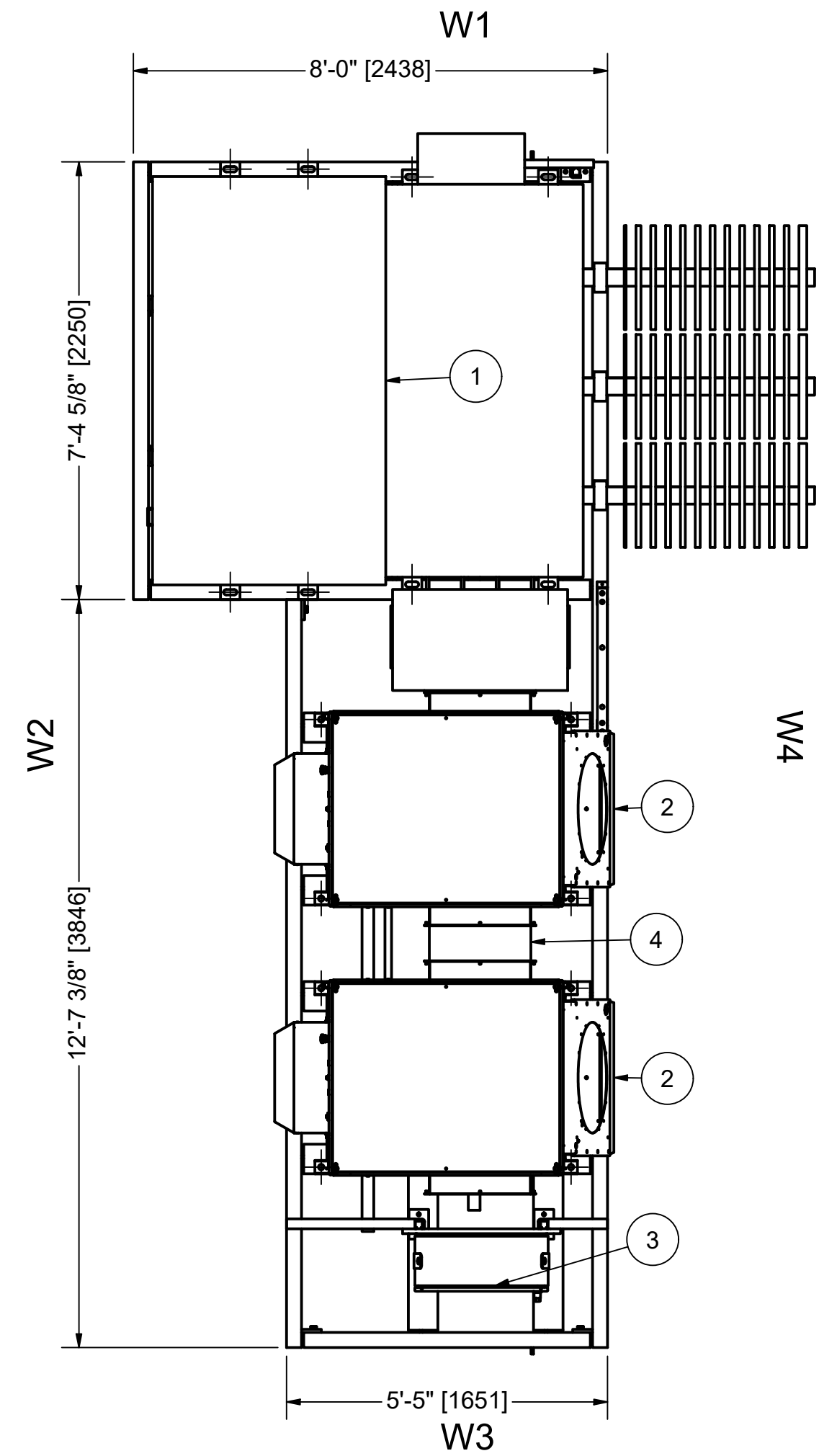
W4 ELEVATION VIEW



W4 ELEVATION VIEW



SECTION B-B



PLAN VIEW

NOTES:

1. AMSI TO SUPPLY CLOSE COUPLING CONNECTION BETWEEN MAIN TRANSFORMER AND FIRST PCS.

3	AS PER CUSTOMER COMMENTS	8/29/2024	RIYAD A.
2	REVISED BASE FRAME HEIGHTH	7/17/2024	RIYAD A.
1	AS PER CUSTOMER COMMENTS & ISSUED FOR CONSTRUCTION	7/4/2024	RIYAD A.
0	ISSUED FOR APPROVAL	6/14/2024	RIYAD A.
No.	REVISIONS	DATE	BY

EQUIPMENT LIST PER PLATFORM					
ITEM	DESCRIPTION	SUPPLIED BY	INSALLED BY	QTY	
1	2 MVA MEDIUM VOLTAGE TRANSFORMER	EVLO	AMSi	1	
2	CAB 1000 INVERTER	EVLO	AMSi	2	
3	TRANSFORMER MONITORING PANEL	EVLO	AMSi	1	
4	PCS THROAT KIT AND BUS CONNECTIONS	EVLO	AMSi	1	

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AMSi Inc.
4715 BARTLETT RD
BEAMSVILLE, ON, L3J 0Z2
(905) 988-5921

APPLIED MODERN
SYSTEM INTEGRATION

ISSUE STAMP

AMSi
ISSUED FOR
CONSTRUCTION

CUSTOMER
EVLO INC.

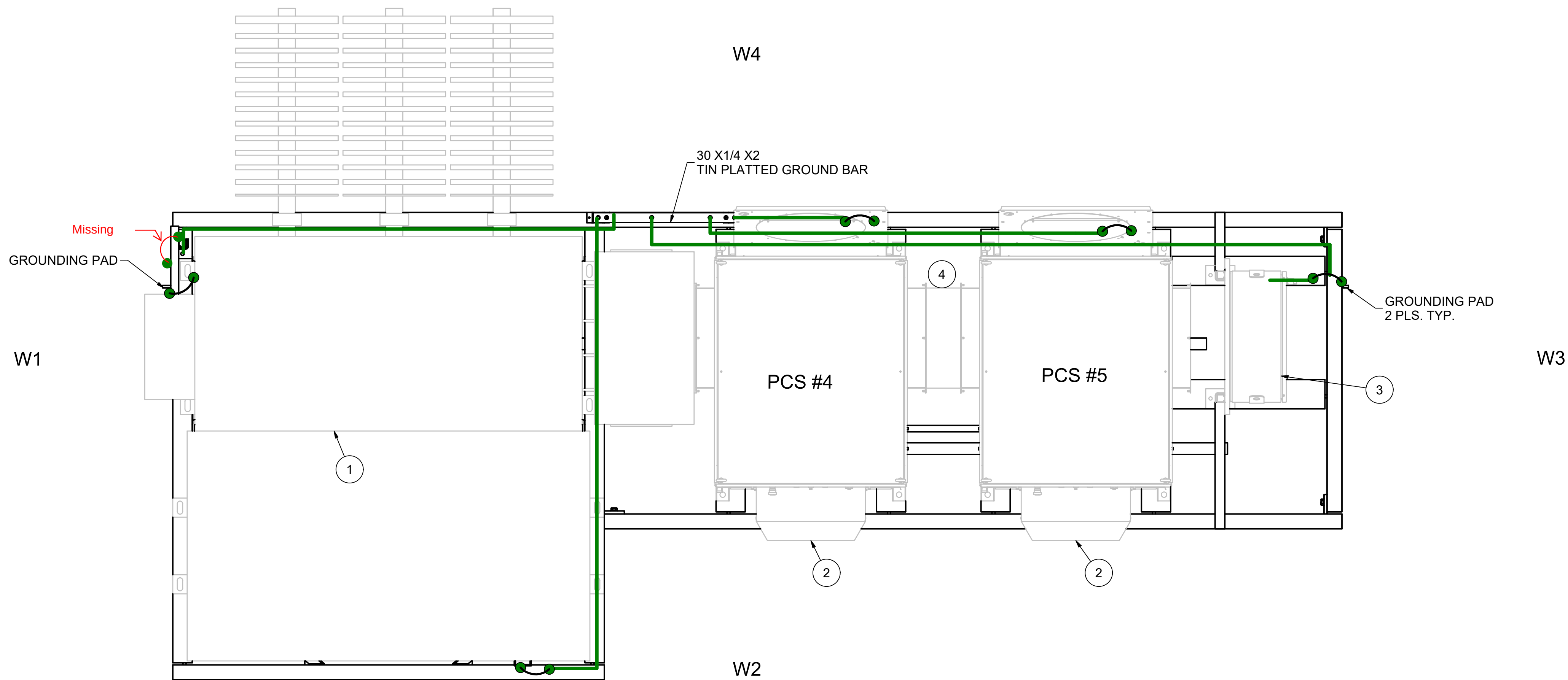
P.O. #
112585

PROJECT
SOLAR BANKS-CONVERSION PLATFORM

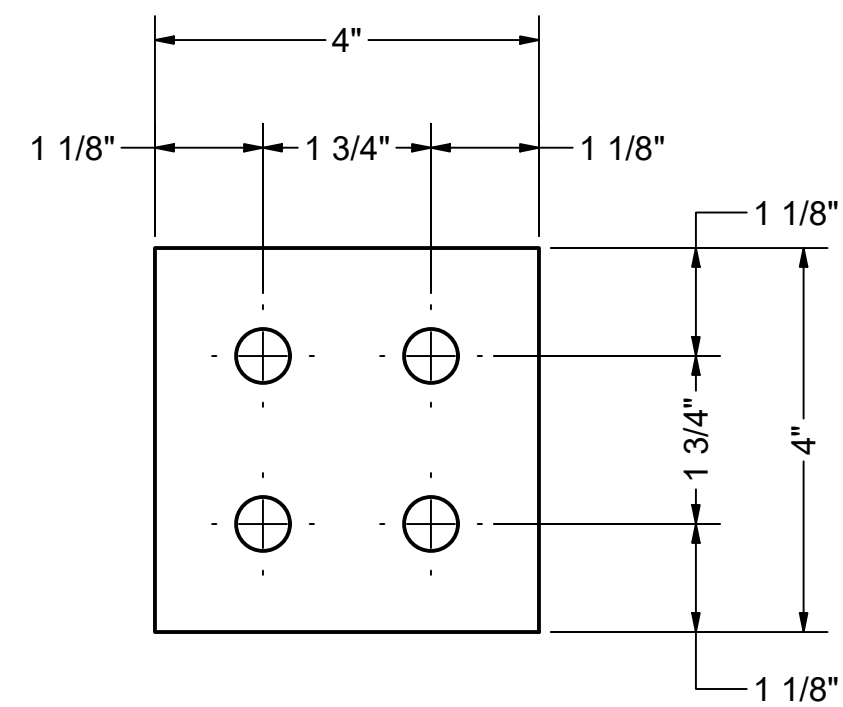
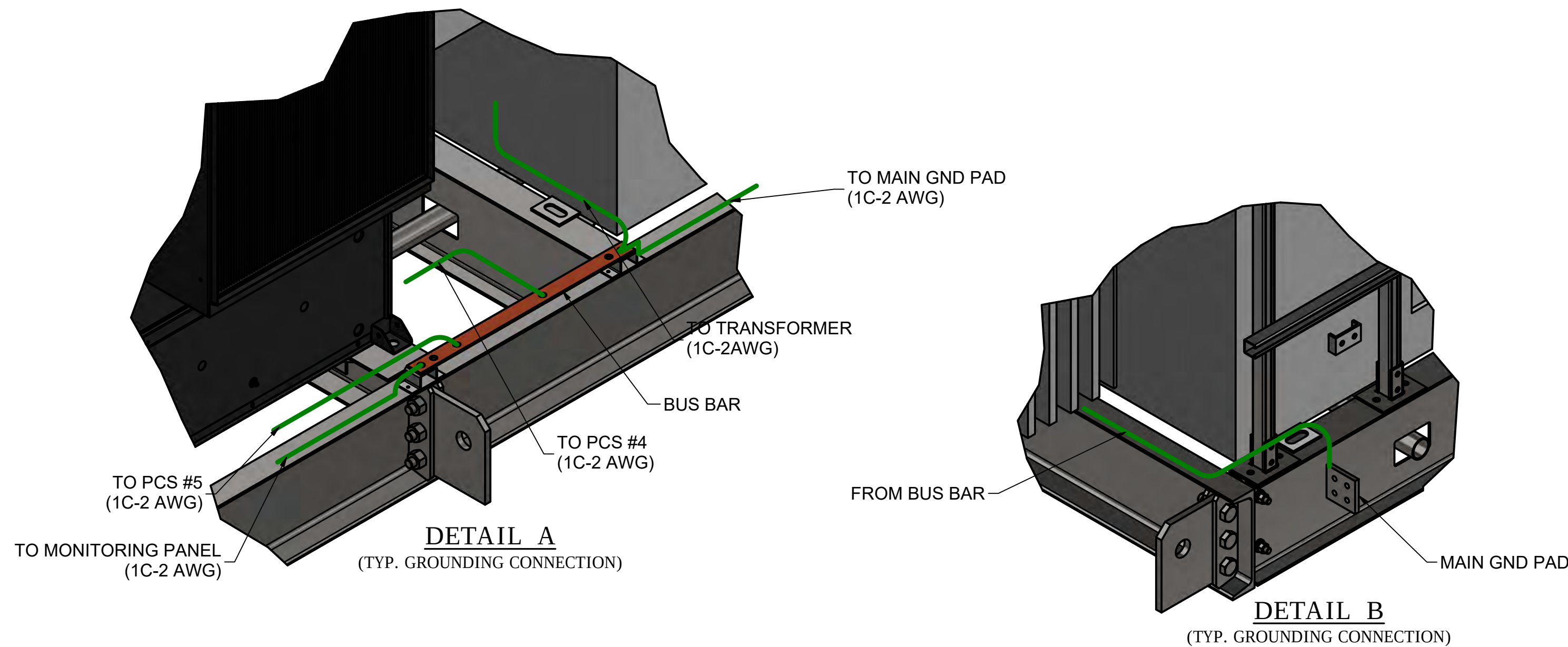
PROJECT LOCATION
CRAMAHE, CHESLEY, ARMOUR

DESCRIPTION
PRE-FABRICATED 2PCS
CONVERSION PLATFORM
EXTERIOR ELEVATIONS

DRAWN BY	CHECKED BY	APPROVED BY	UNITS	DRAWING NUMBER	SHEET	REV
RIYAD A. 6/6/2024	M. A. 6/6/2024	L. A. 6/6/2024	ft-in [mm]	24015-1-B-M-EE	1 OF 1	3



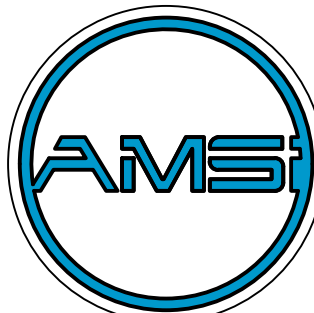
2PCS PLATFORM GROUNDING PLAN



2	AS PER CUSTOMER COMMENTS	8/29/2024	RIYAD A.
1	AS PER CUSTOMER COMMENTS & ISSUED FOR CONSTRUCTION	7/4/2024	RIYAD A.
0	ISSUED FOR APPROVAL	6/14/2024	RIYAD A.
No.	REVISIONS	DATE	BY

EQUIPMENT LIST PER PLATFORM				
ITEM	DESCRIPTION	SUPPLIED BY	INSALLED BY	QTY
1	2 MVA MEDIUM VOLTAGE TRANSFORMER	EVLO	AMSI	1
2	CAB 1000 INVERTER	EVLO	AMSI	2
3	TRANSFORMER MONITORING PANEL	EVLO	AMSI	1
4	PCS THROAT KIT AND BUS CONNECTIONS	EVLO	AMSI	1

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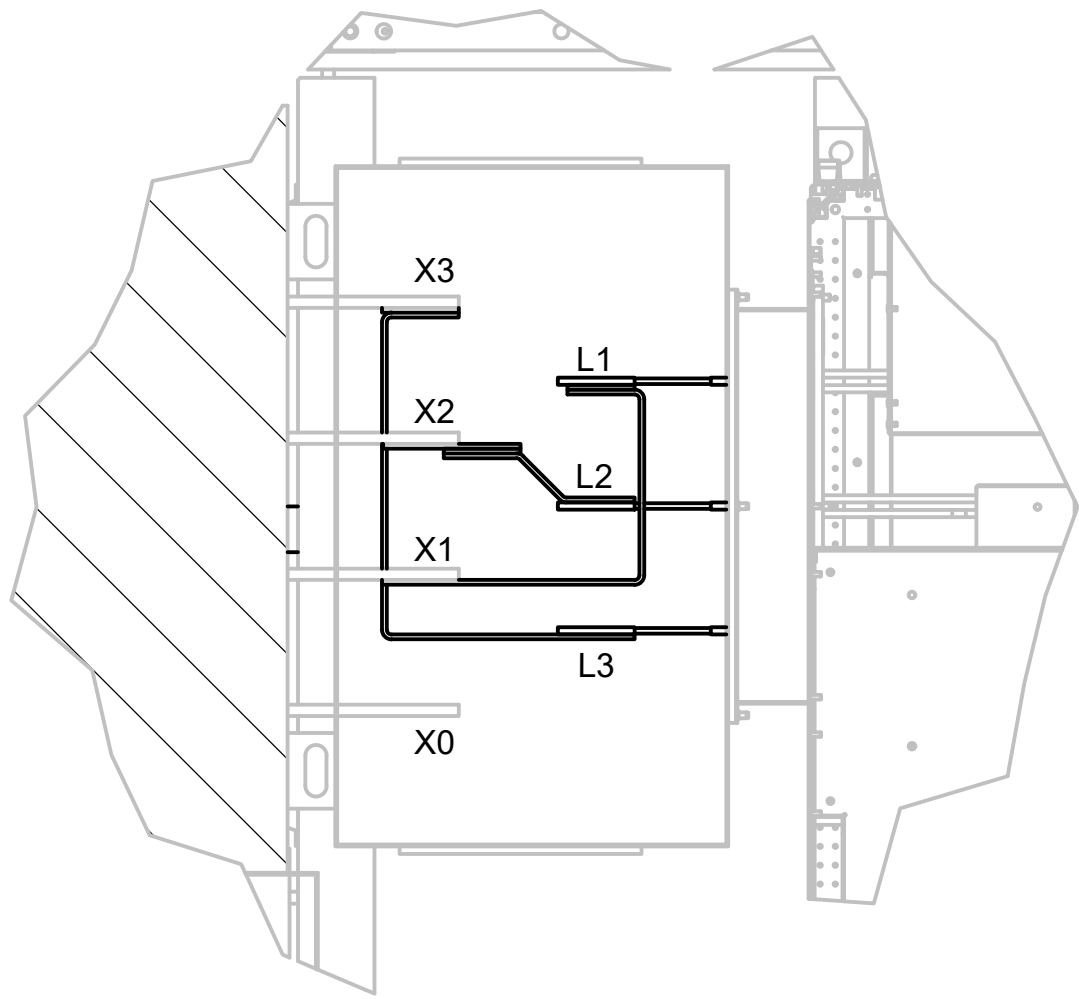
AMSi Inc.
4715 BARTLETT RD
BEAMSVILLE, ON, L3J 0Z2
(905) 988-5921

APPLIED MODERN
SYSTEM INTEGRATION

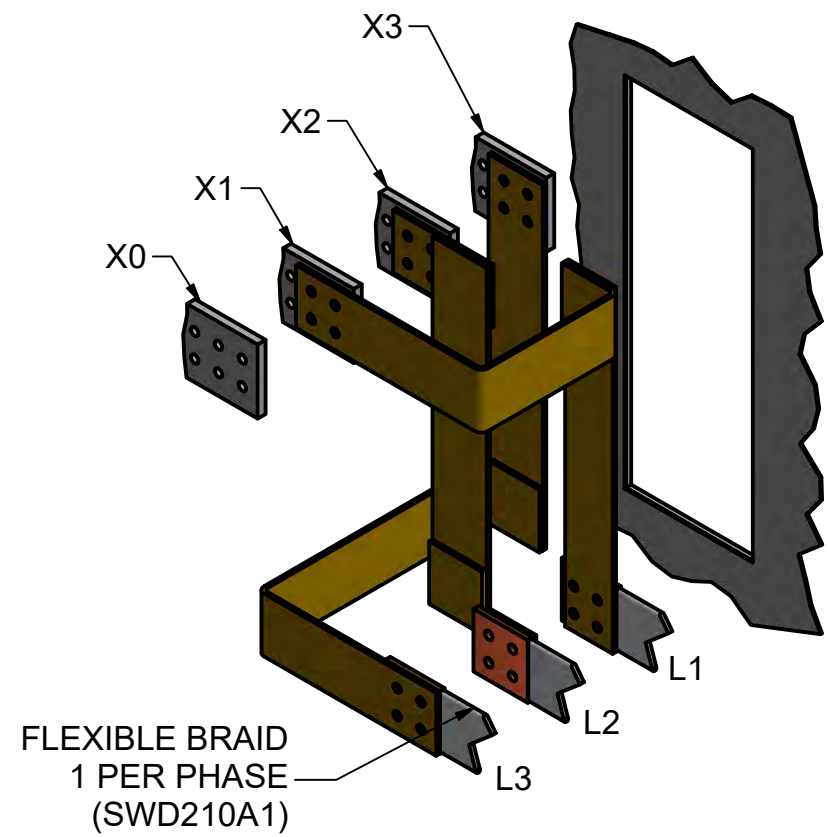
ISSUE STAMP
**AMSi
ISSUED FOR
CONSTRUCTION**

CUSTOMER EVLO INC.			P.O. # 112585	
PROJECT SOLAR BANKS-CONVERSION PLATFORM			PROJECT LOCATION CRAMAHE, CHESLEY, ARMOUR	
DRAWN BY RIYAD A. 6/4/2024	CHECKED BY L. A. 6/4/2024	APPROVED BY M. A. 6/4/2024	UNITS ft-in [mm]	DRAWING NUMBER 24015-1-B-M-GR

DESCRIPTION PRE-FABRICATED 2PCS CONVERSION PLATFORM GROUNDING PLAN			
SHEET 1 OF 1	REV 2		



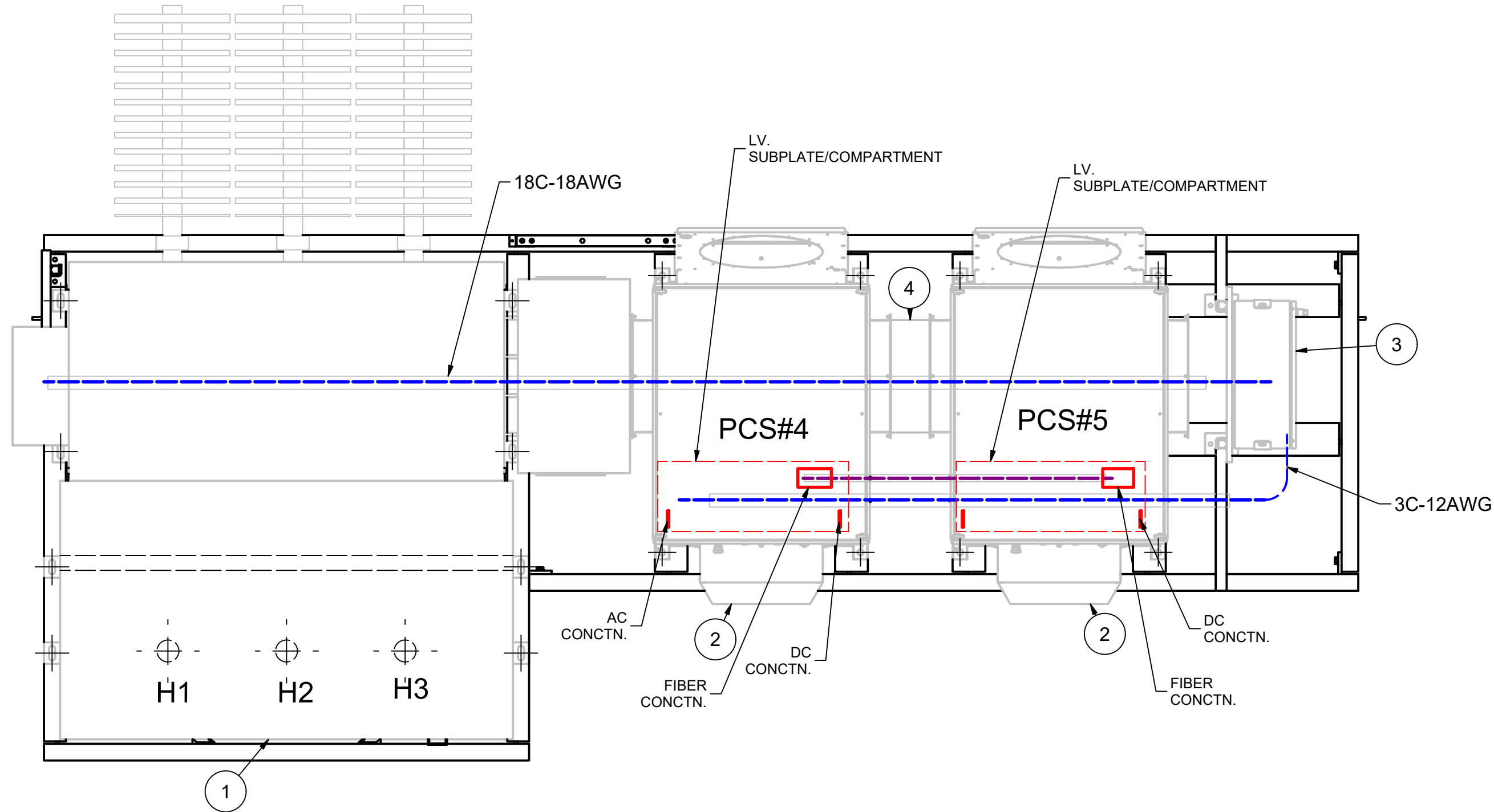
BUS COUPLING DETAIL
(TOP VIEW)



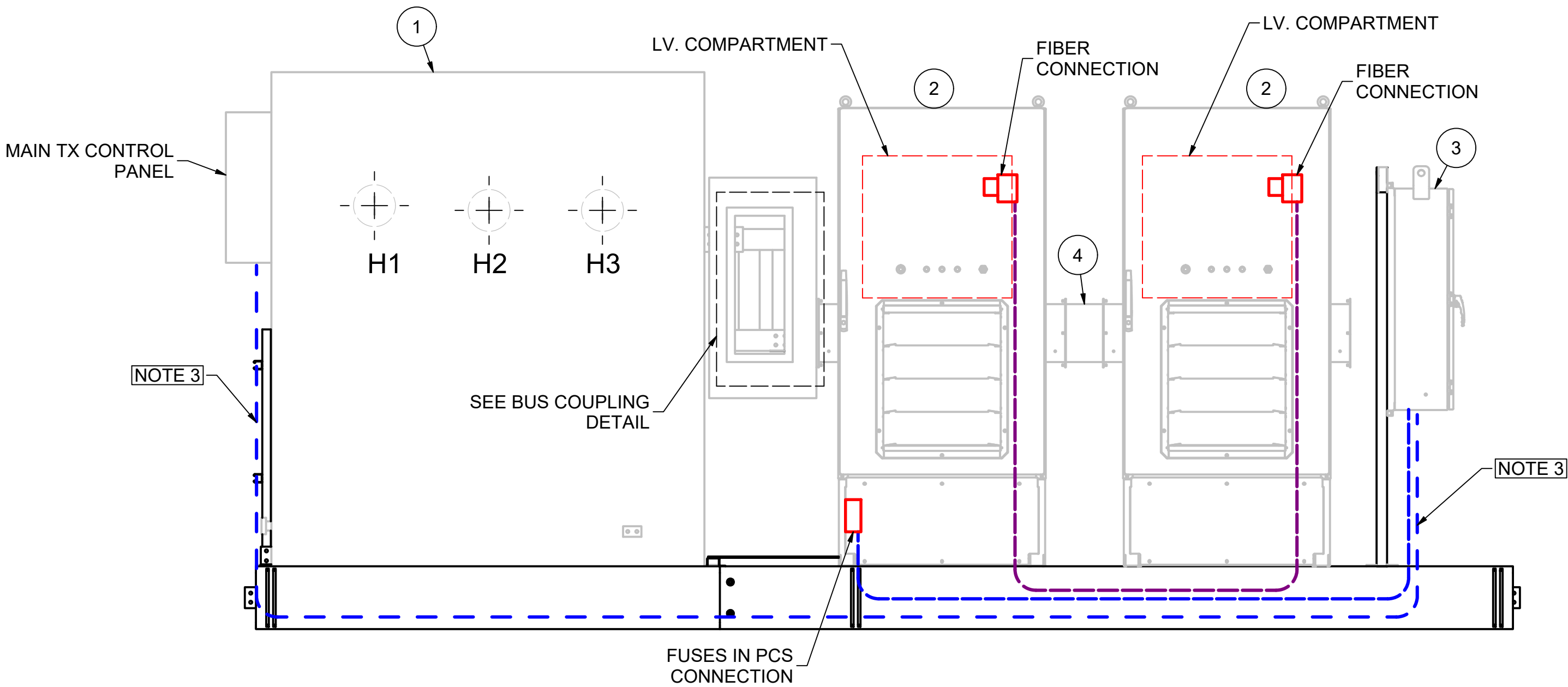
BUS COUPLING DETAIL
(ISOMETRIC VIEW)

LEGEND

- FIBER CABLE
- CONTROL CABLE



2PCS PLATFORM OUTLINE PLAN



W2 ELEVATION VIEW

- NOTES:
- USE THROAT CONNECTION KIT TO CONNECT TWO PCS IN PARALLEL.
 - USE BROADCOM LIMITED HFBR-RUS100Z FIBER OPTIC CABLE WITH HFBR-4513Z AND HFBR-4503Z CONNECTORS. ONE CONNECTOR IS FOR TRANSMIT AND THE OTHER IS FOR RECEIVE.
 - AMSI WILL PROVIDE ALL MECHANICAL SUPPORTS FOR POWER AND COMMUNICATION ALL CABLES AS PER CANADIAN CODE.

2	AS PER CUSTOMER COMMENTS	8/29/2024	RIYAD A.
1	AS PER CUSTOMER COMMENTS & ISSUED FOR CONSTRUCTION	7/4/2024	RIYAD A.
0	ISSUED FOR APPROVAL	6/14/2024	RIYAD A.
No.	REVISIONS	DATE	BY

EQUIPMENT LIST PER PLATFORM				
ITEM	DESCRIPTION	SUPPLIED BY	INSALLED BY	QTY
1	2 MVA MEDIUM VOLTAGE TRANSFORMER	EVLO	AMSI	1
2	CAB 1000 INVERTER	EVLO	AMSI	2
3	TRANSFORMER MONITORING PANEL	EVLO	AMSI	1
4	PCS THROAT KIT AND BUS CONNECTIONS	EVLO	AMSI	1

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APPLIED MODERN
SYSTEM INTEGRATION

AMSi Inc.
4715 BARTLETT RD
BEAMSVILLE, ON, L3J 0Z2
(905) 988-5921

ISSUE STAMP

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ISSUED FOR
CONSTRUCTION

CUSTOMER
EVLO INC.

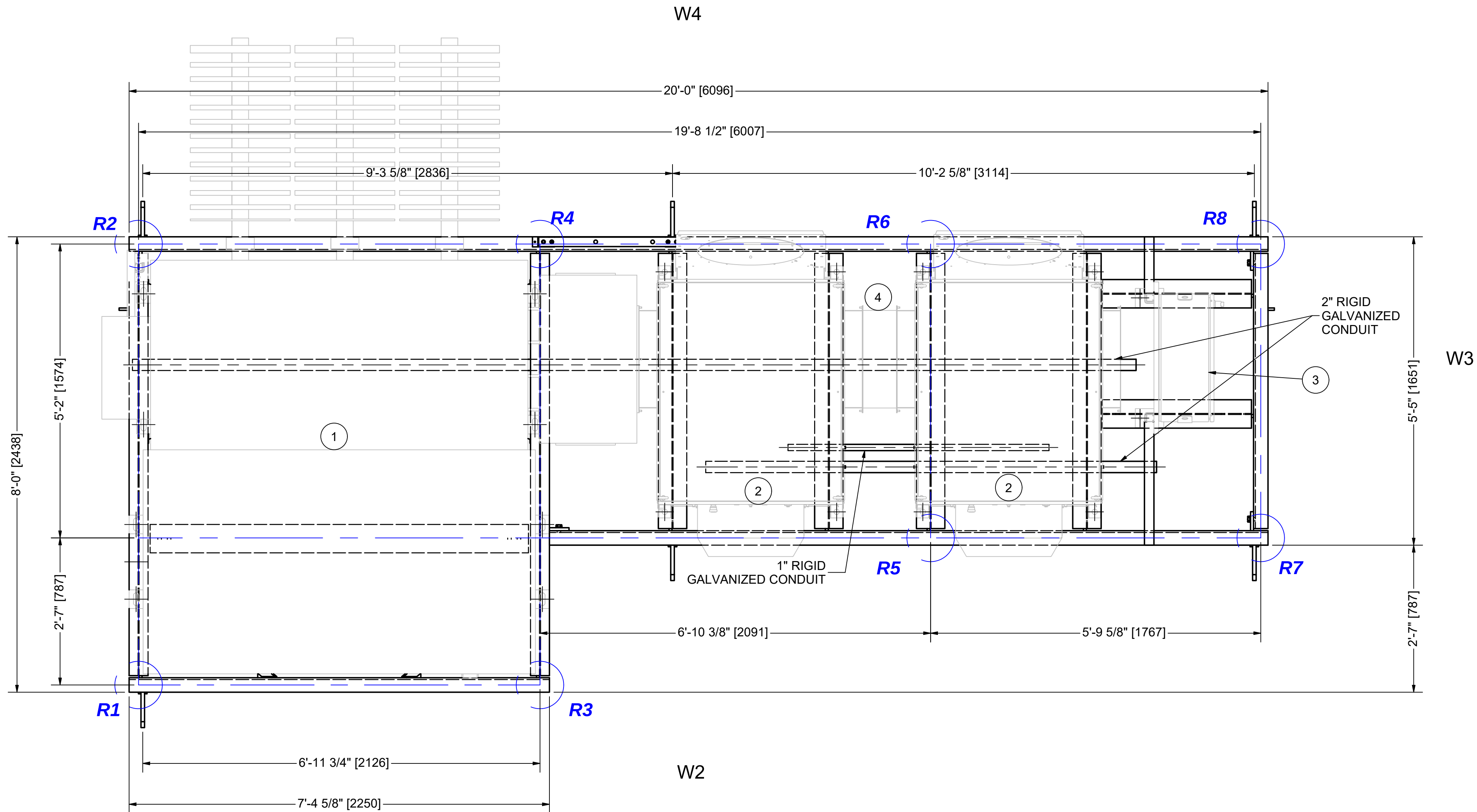
P.O. #
112585

PROJECT
SOLAR BANKS-CONVERSION PLATFORM

PROJECT LOCATION
CRAMAHE, CHESLEY, ARMOUR

DESCRIPTION
PRE-FABRICATED 2PCS
CONVERSION PLATFORM
INTERCONNECTION LAYOUT

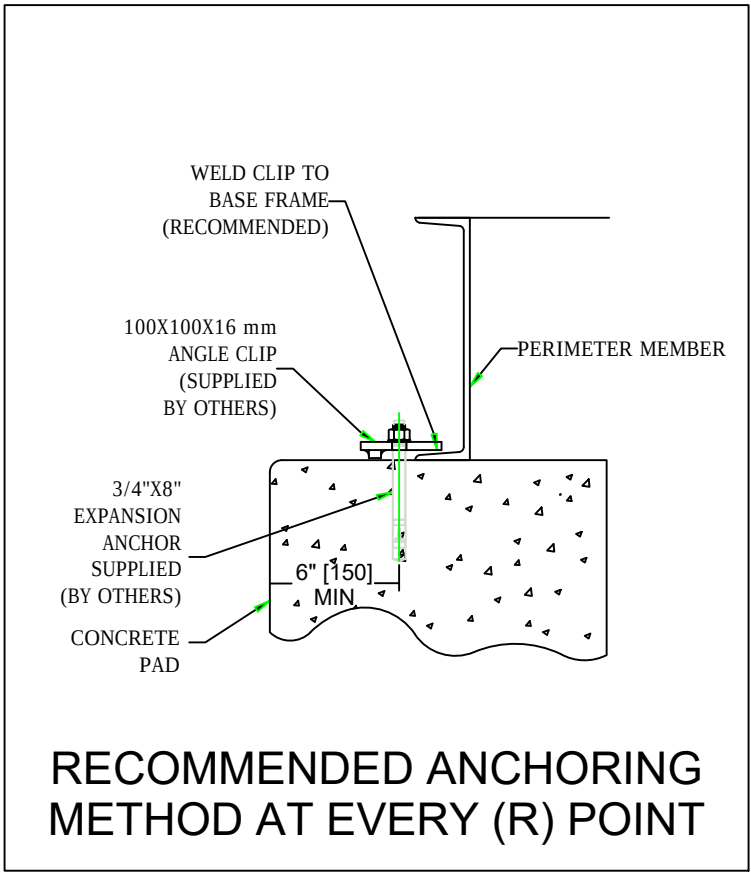
DRAWN BY	CHECKED BY	APPROVED BY	UNITS	DRAWING NUMBER	SHEET	REV
RIYAD A. 6/14/2024	L. A. 6/14/2024	M. A. 6/14/2024	ft-in [mm]	24015-1-B-M-IC	1 OF 1	2



2PCS PLATFORM LOADING PLAN

NOTES:

1. CUSTOMER TO CONFIRM ALL EQUIPMENT WEIGHTS.
2. REFER TO REACTION CALCULATION FOR LOADING DETAILS.



RECOMMENDED ANCHORING METHOD AT EVERY (R) POINT

1	AS PER CUSTOMER COMMENTS & ISSUED FOR CONSTRUCTION	7/17/2024	RIYAD A.
0	ISSUED FOR APPROVAL	6/14/2024	RIYAD A.
No.	REVISIONS	DATE	BY

EQUIPMENT LIST			
ITEM	DESCRIPTION	WEIGHTS (KG)	QTY
1	2 MVA MEDIUM VOLTAGE TRANSFORMER	8430	1
2	CAB 1000 INVERTER	1568	2
3	TRANSFORMER MONITORING PANEL	83	1
4	PCS THROAT KIT AND BUS CONNECTIONS	12	1

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CONSTRUCTION**

CUSTOMER EVLO INC.			P.O. # 112585	
PROJECT SOLAR BANKS-CONVERSION PLATFORM			PROJECT LOCATION CRAMAHE, CHESLEY, ARMOUR	
DRAWN BY	CHECKED BY	APPROVED BY	UNITS	DRAWING NUMBER
RIYAD A. 6/6/2024	L. A. 6/6/2024	M. A. 6/6/2024	ft-in [mm]	24015-1-B-M-LD

DESCRIPTION
**PRE-FABRICATED 2PCS
CONVERSION PLATFORM
LOADING PLAN**

SHEET	REV
1 OF 1	1

GENERAL NOTES:

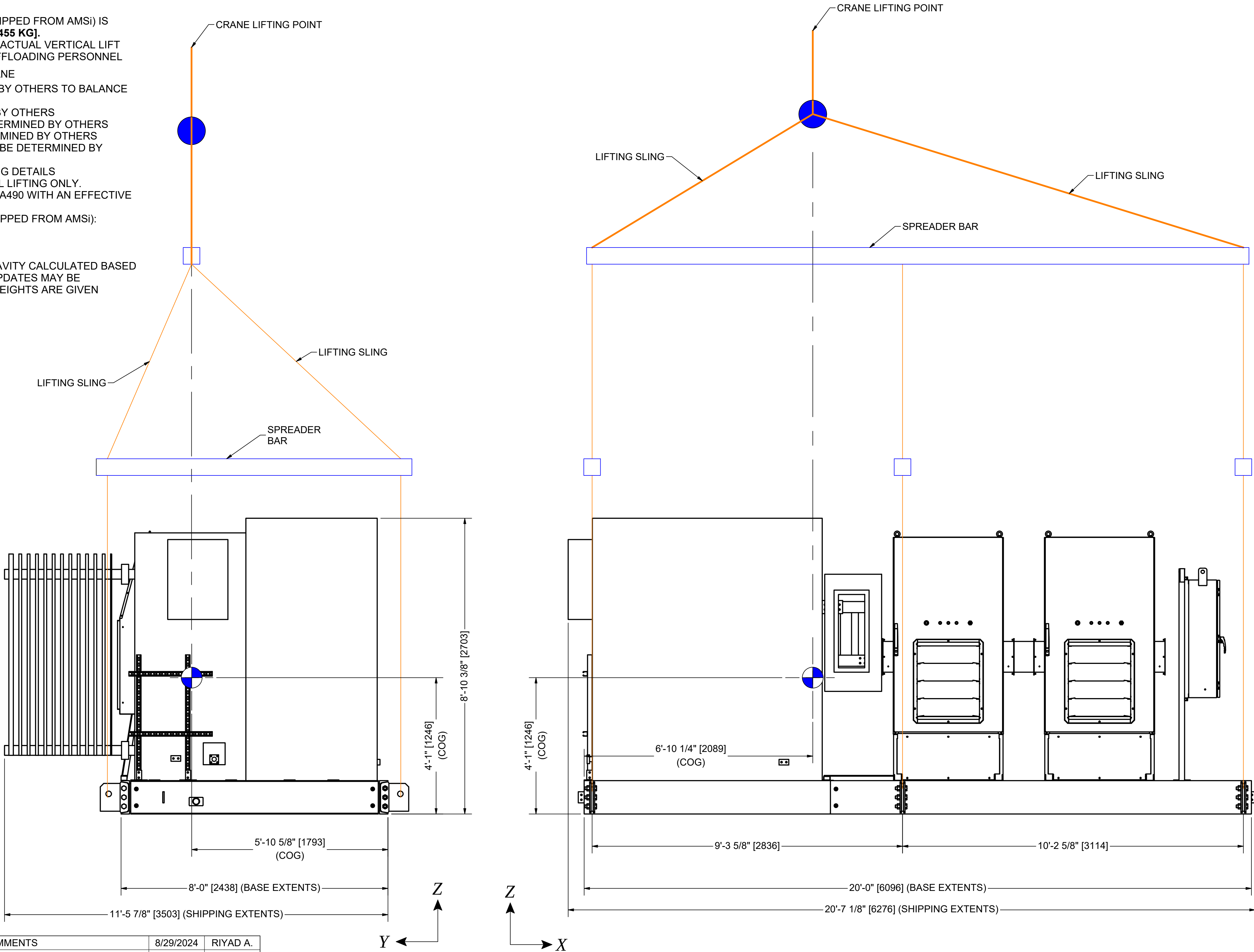
1. TOTAL SKID WEIGHT FOR LIFTING (AS SHIPPED FROM AMSi) IS ESTIMATED TO BE APROX. **29663 LBS [13455 KG]**.
2. THIS IS A RECOMMENDED LIFTING PLAN. ACTUAL VERTICAL LIFT PLAN IS THE RESPONSIBILITY OF SITE/OFFLOADING PERSONNEL
3. MIN Ø1-1/2" SLING TO BE USED WITH CRANE
4. LENGTH OF SLINGS TO BE DETERMINED BY OTHERS TO BALANCE CENTER OF GRAVITY DURING LIFT
5. SPREADER BAR DESIGNED & SUPPLIED BY OTHERS
6. CRANE LOADING & TONNAGE TO BE DETERMINED BY OTHERS
7. MAXIMUM CRANE LOADING TO BE DETERMINED BY OTHERS
8. MAXIMUM LOADING FOR EACH SLING TO BE DETERMINED BY OTHERS
9. SEE DRAWING (AMSi-LL-C12) FOR LIFT LUG DETAILS
10. LIFTING LUGS TO BE USED FOR VERTICAL LIFTING ONLY.
11. BOLTS USED FOR LIFTING TO BE 1-8UNC A490 WITH AN EFFECTIVE GRIP OF NOT LESS THAN 1.88"
12. ESTIMATED CENTER OF GRAVITY (AS SHIPPED FROM AMSi):

X: 6'-10 1/4" [2088]
Y: 5'-10 5/8" [1793]
Z: 4'-1" [1245]
13. BUILDING WEIGHTS AND CENTRE OF GRAVITY CALCULATED BASED ON ESTIMATED EQUIPMENT WEIGHTS, UPDATES MAY BE REQUIRED WHEN ACTUAL EQUIPMENT WEIGHTS ARE GIVEN

NOTES:

*AMSi DOES NOT TAKE RESPONSIBILITY FOR ANY LIFTING AND/OR RIGGING PROCEDURES. ALL SLINGS, CABLES, SPREADER BARS AND HOOKS (ALL LIFTING/RIGGING APPARATUS) TO BE THE RESPONSIBILITY OF AND DETERMINED BY SITE CONTRACTOR/OFFLOADER/SHIPPING CO.

THIS DRAWING IS TO SERVE SOLELY AS A PICTORIAL REPRESENTATION OF A TYPICAL LIFTING PROCEDURE. IT IS NOT MEANT TO SERVE AS A PROCEDURAL OR INSTRUCTIONAL DOCUMENT. AS SUCH, NO DIMENSIONS SHALL BE GIVEN FOR LENGTHS OR SIZES OF ANY LIFTING APPARATUS.*



3	AS PER CUSTOMER COMMENTS	8/29/2024	RIYAD A.
2	REVISED COG	7/17/2024	RIYAD A.
1	AS PER CUSTOMER COMMENTS & ISSUED FOR CONSTRUCTION	7/4/2024	RIYAD A.
0	ISSUED FOR APPROVAL	6/14/2024	RIYAD A.
No.	REVISIONS	DATE	BY

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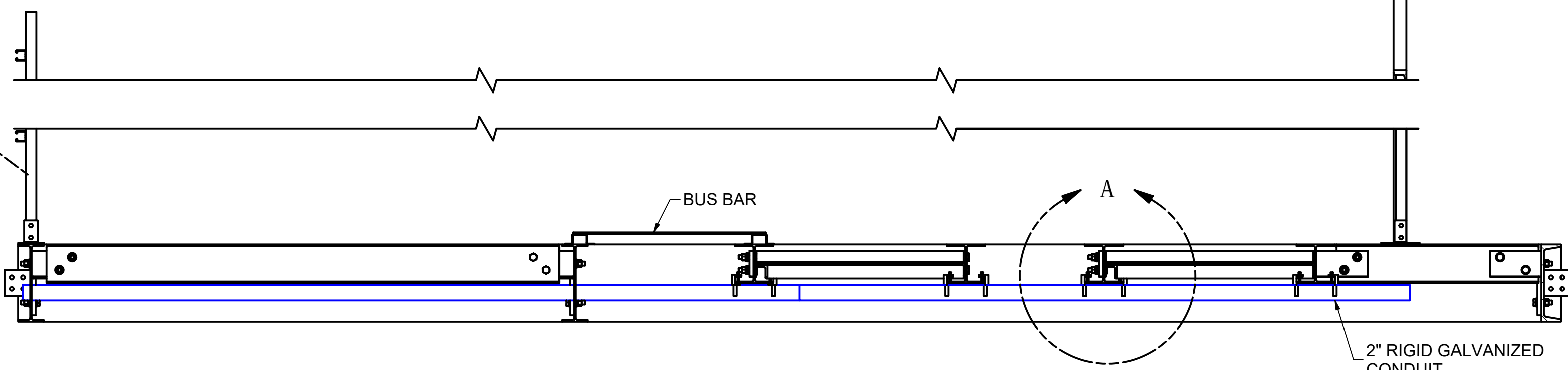
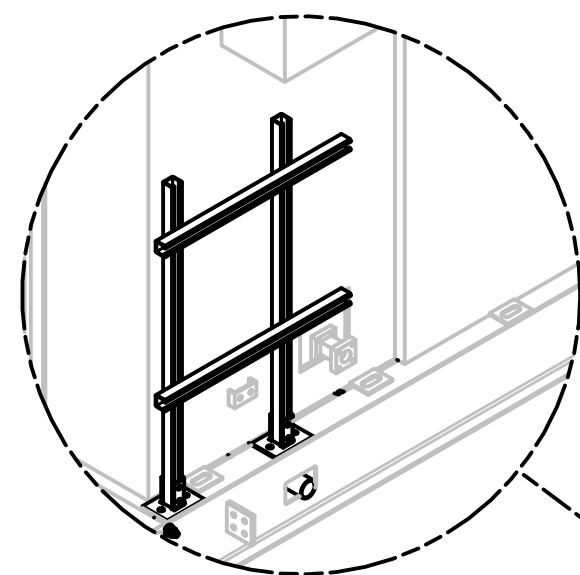
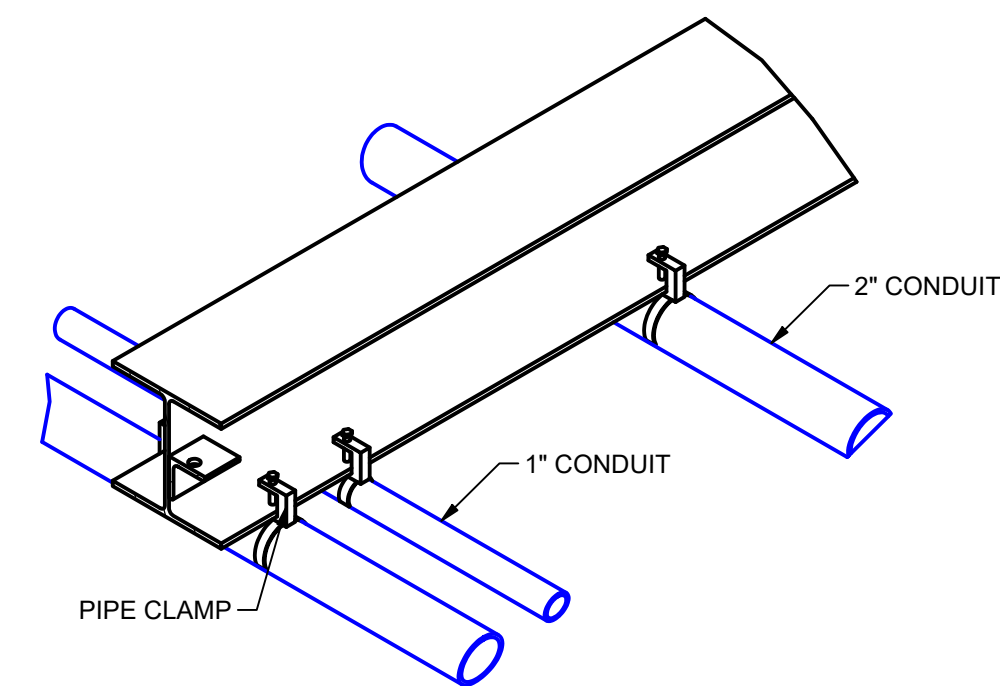
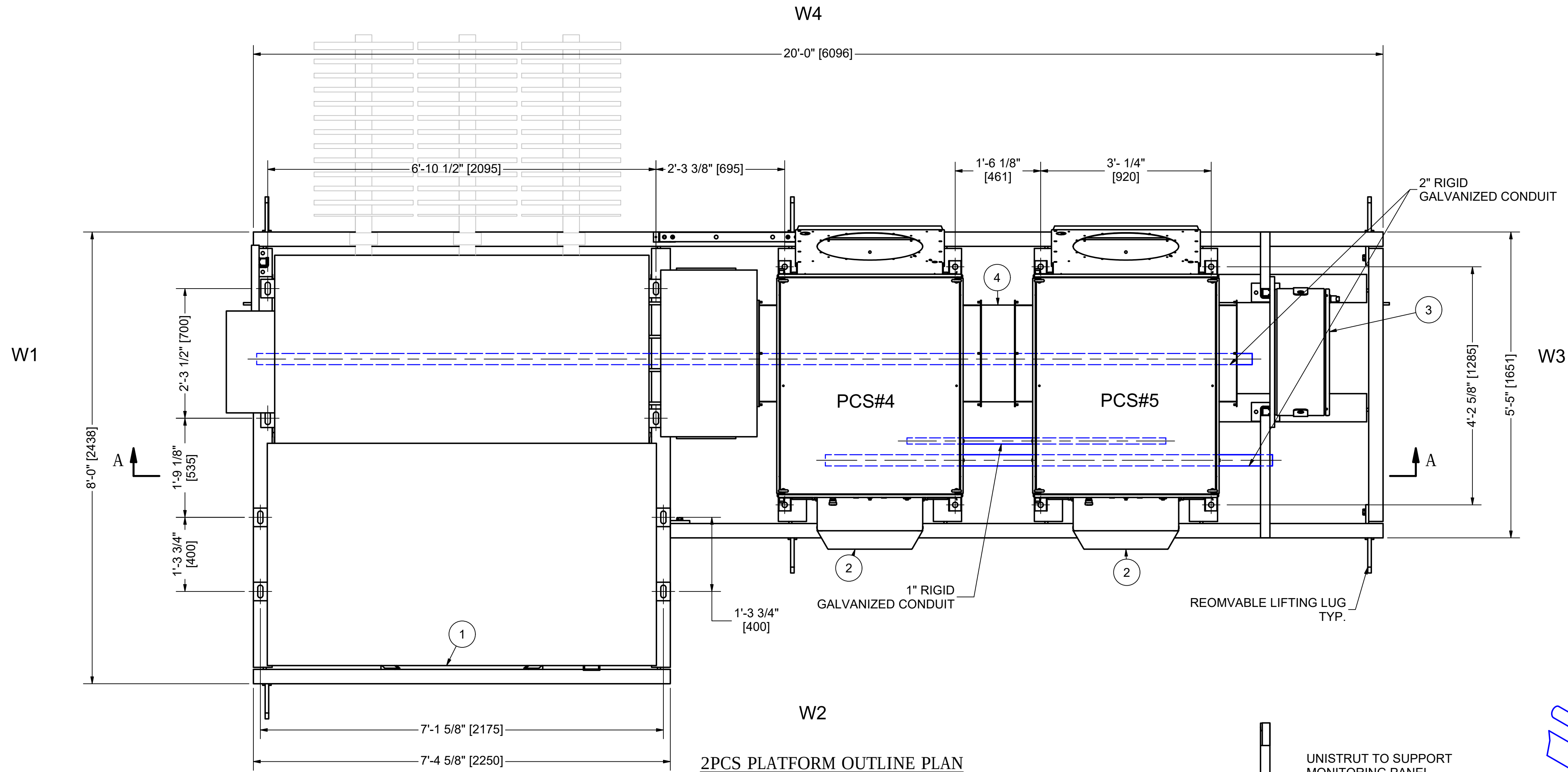
APPLIED MODERN
SYSTEM INTEGRATION

AMSi Inc.
4715 BARTLETT RD
BEAMSVILLE, ON, L3J 0Z2
(905) 988-5921

ISSUE STAMP

AMSi
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CONSTRUCTION

CUSTOMER EVLO INC.			P.O. # 112585		DESCRIPTION PRE-FABRICATED 2PCS CONVERSION PLATFORM LIFTING & RIGGING PLAN		
PROJECT SOLAR BANKS-CONVERSION PLATFORM			PROJECT LOCATION CRAMAHE, CHESLEY, ARMOUR				
DRAWN BY	CHECKED BY	APPROVED BY	UNITS	DRAWING NUMBER		SHEET	REV
RIYAD A. 6/6/2024	L. A. 6/6/2024	M. A. 6/6/2024	ft-in [mm]	24015-1-B-M-LR		1 OF 1	3



2 PCS CONFIGURATION PER LOCATION			
PCS #	ARMOUR (903)	CHESLEY (OZ-1)	CRAMAHE (SFF06)
PCS #4	558 kVa SERIAL # 24042429890	558 kVa SERIAL # 24050330124	1108 kVa SERIAL # 24051030186
PCS # 5	1108 kVa SERIAL # 24042329889	1108 kVa SERIAL # 24050230123	558 kVa SERIAL # 24051331927

EQUIPMENT LIST PER PLATFORM				
ITEM	DESCRIPTION	SUPPLIED BY	INSALLED BY	QTY
1	2 MVA MEDIUM VOLTAGE TRANSFORMER	EVLO	AMSi	1
2	CAB 1000 INVERTER	EVLO	AMSi	2
3	TRANSFORMER MONITORING PANEL	EVLO	AMSi	1
4	PCS THROAT KIT AND BUS CONNECTIONS	EVLO	AMSi	1

- NOTES:
- QTY OF 3 PLATFORMS REQUIRED- SEE PCS CONFIGURATION TABLE FOR DIFFERENCES IN PLATFORMS.
 - ALL CABLES TO BE SECURED TO STRUCTURE/UNISTRUT TO ENSURE CODE COPLIANCE FOR SPPOTE & INSTALLATION.

2	AS PER CUSTOMER COMMENTS	8/29/2024	RIYAD A.
1	AS PER CUSTOMER COMMENTS & ISSUED FOR CONSTRUCTION	7/4/2024	RIYAD A.
0	ISSUED FOR APPROVAL	6/14/2024	RIYAD A.
No.	REVISIONS	DATE	BY

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SYSTEM INTEGRATION

ISSUE STAMP

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ISSUED FOR
CONSTRUCTION**

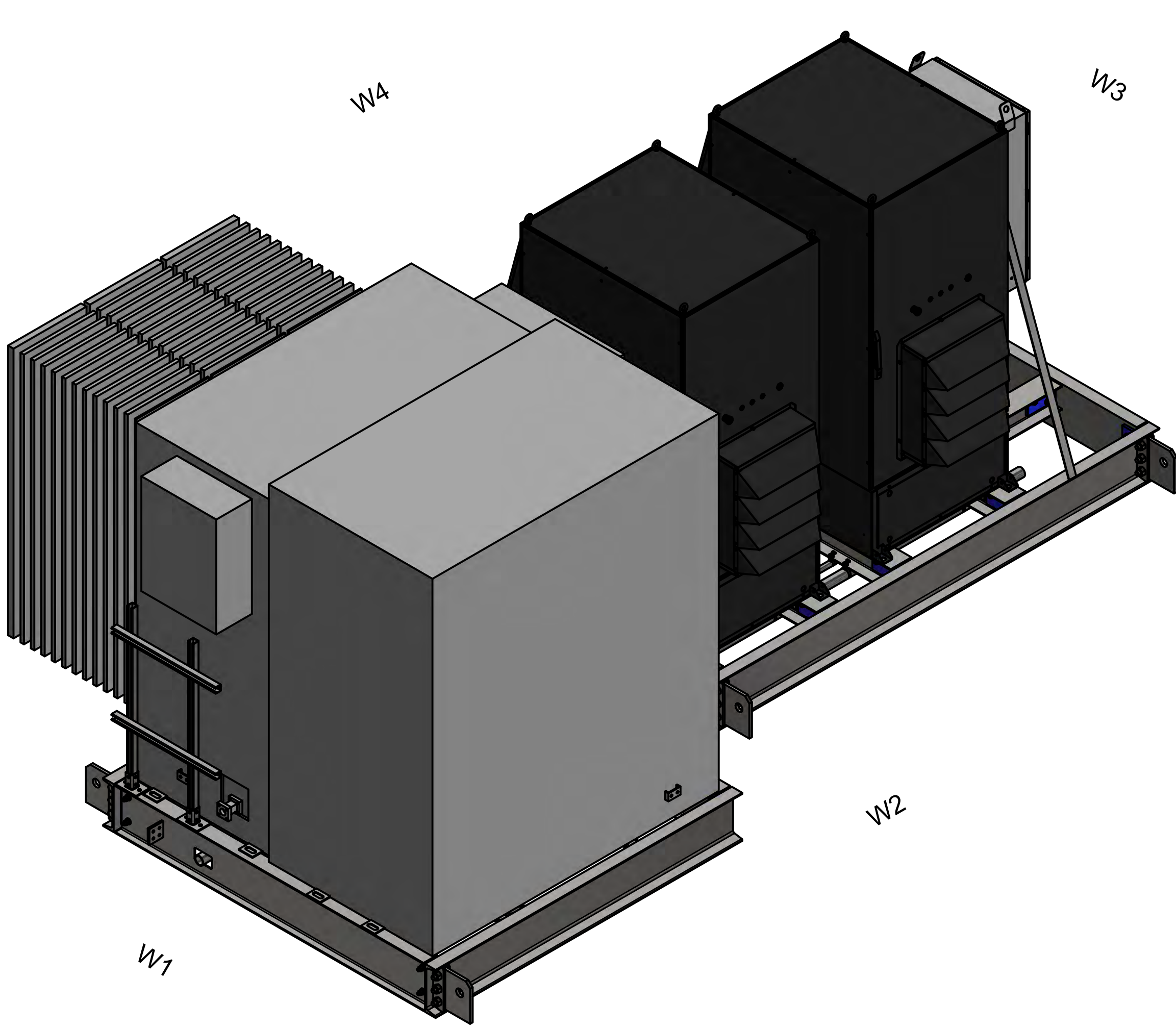
CUSTOMER EVLO INC.		P.O. # 112585		DESCRIPTION PRE-FABRICATED 2PCS CONVERSION PLATFORM OUTLINE PLAN	
PROJECT SOLAR BANKS-CONVERSION PLATFORM		PROJECT LOCATION CRAMAHE, CHESLEY, ARMOUR			
DRAWN BY RIYAD A. 6/4/2024	CHECKED BY L. A. 6/4/2024	APPROVED BY M. A. 6/4/2024	UNITS ft-in [mm]	DRAWING NUMBER 24015-1-B-M-OP	SHEET 1 OF 1
				REV 2	

PROJECT:
2PCS SOLAR BANK CONVERSION PLATFORM

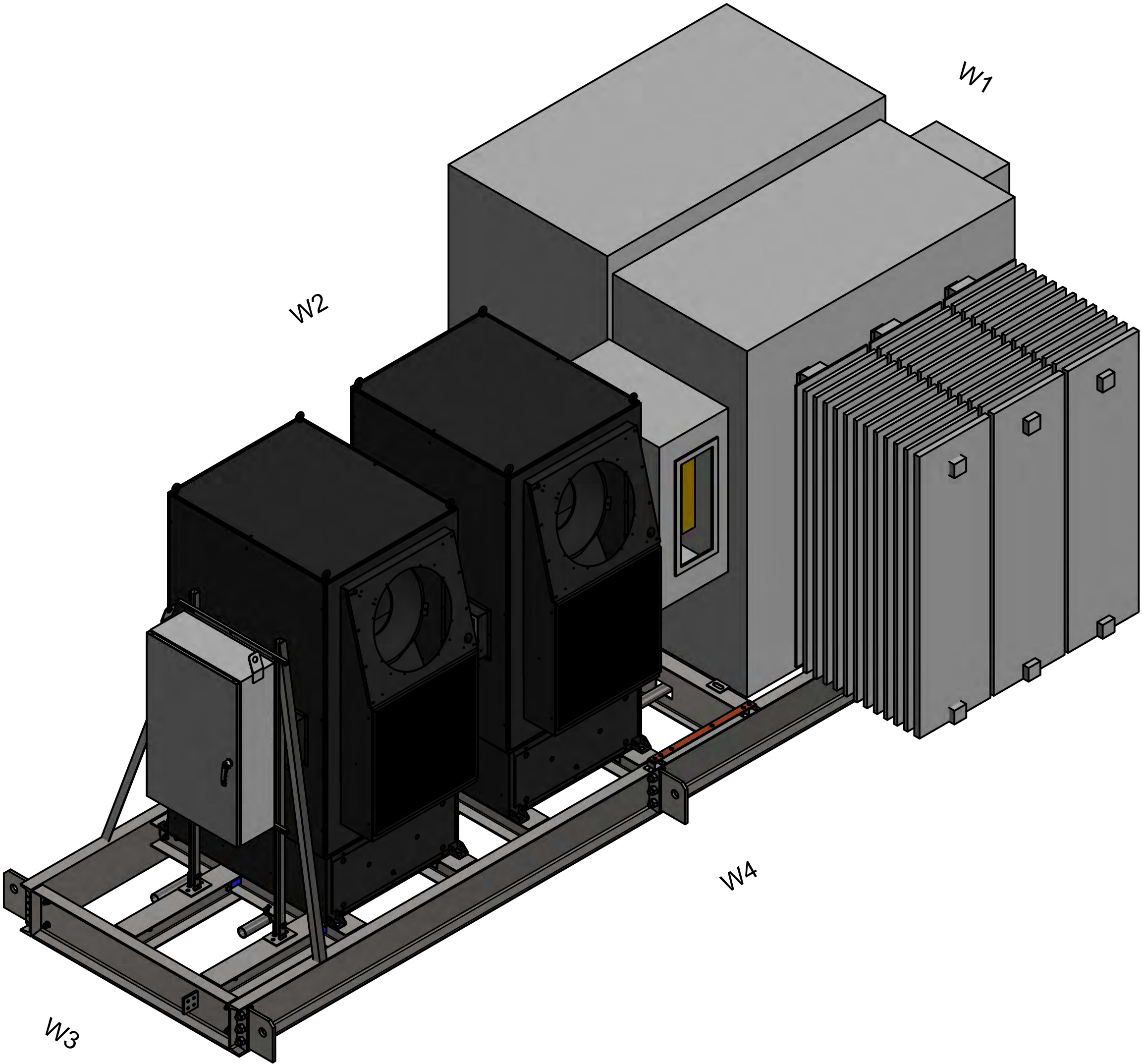
AMSI INC. MECHANICAL DRAWING PACKAGE INCLUSIONS:

- 1. 24015-1-B-M-TP: TITLE PAGE
- 2. 24015-1-B-M-OP: OUTLINE PLAN
- 3. 24015-1-B-M-EE: EXTERIOR ELEVATIONS
- 4. 24015-1-B-M-LD: LOADING PLAN
- 5. 24015-1-B-M-GR: GROUNDING PLAN
- 6. 24015-1-B-M-LR: LIFTING & RIGGING
- 7. 24015-1-B-M-IC: INTERCONNECTION LAYOUT

- NOTES:
- 1. FABRICATION AND ERECTION OF STRUCTURAL STEEL SHALL BE IN ACCORDANCE WITH CSA STD.S16 AND NBC REQUIREMENTS
 - 2. ALL STRUCTURAL STEEL SHALL CONFORM TO CSA STD G40.21 (OR EQUIVALENT), 50W FOR MAIN FRAMING MEMBERS, 50W FOR SECONDARY FRAMING MEMBERS, AND 50W FOR CFS.
 - 3. ALL WELDING SHALL BE DONE IN ACCORDANCE WITH CSA STD W59, BY AN ORGANIZATION FULLY APPROVED BY THE CANADIAN WELDING BUREAU UNDER CURRENT CSA STD W47.1. ELECTRODES SHALL CONFORM TO CSA STD W48.1
 - 4. ALL FRAME MEMBERS TO BE HOT DIPPED GALVANIZED CONFORMING TO CSA GA164.



FRONT VIEW



REAR VIEW

2	AS PER CUSTOMER COMMENTS	8/29/2024	RIYAD A.
1	AS PER CUSTOMER COMMENTS & ISSUED FOR CONSTRUCTION	7/4/2024	RIYAD A.
0	ISSUED FOR APPROVAL	6/14/2024	RIYAD A.
No.	REVISIONS	DATE	BY

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CONSTRUCTION**

CUSTOMER EVLO INC.			P.O. # 112585		DESCRIPTION PRE-FABRICATED 2PCS CONVERSION PLATFORM TITLE PAGE		
PROJECT SOLAR BANKS-CONVERSION PLATFORM			PROJECT LOCATION CRAMAHE, CHESLEY, ARMOUR				
DRAWN BY	CHECKED BY	APPROVED BY	UNITS	DRAWING NUMBER		SHEET	REV
RIAYD A. 6/6/2024	L. A. 6/6/2024	M. A. 6/6/2024	ft-in [mm]	24015-1-B-M-TP		1 OF 1	2