FORTRESS POWER
Secure your energy

DuraRack & FlexTower

Battery and ESS Outdoor Cabinet Installation Manual

***Important**: Verify the system configuration before installing.*
A proper system design is required for warranty purposes.
Improper system configuration will void the warranty.
Information subject to change without notice.

1. Introduction

1.1. About Fortress Power

Our mission is to provide compact, user-friendly, and affordable energy storage solutions using the latest technology for all homes and businesses. Fortress solar energy storage batteries can easily integrate with new and existing PV systems and work with a wide range of existing inverter and charge controller manufacturers for ease in system Integration.

1.2. About FlexTower All-In-One Cabinet

The FlexTower All-In-One cabinet is designed to hold up to a 15kW inverter in the upper cabinet with up to four eFlex 5.4 KWH lithium batteries in the lower cabinet, in an indoor or outdoor setting. The cabinet is NEMA3R rated, and the battery compartment was made part of the eFlex and eFlex Max UL9540 large-scale fire testing.

The cabinet includes a combining busbar, battery cables to the busbar, inverter cabinet cooling fan control which is powered from the batteries directly. It also includes multiple side knockouts for flexible expansion, including paralleling two FlexTower cabinets, or adding multiple sources of power (grid, generator, EV charger, communication lines etc.). The cabinet must be installed on a level and stable foundation. Anchor bolts are included to secure the DuraRack to a concrete pad.

Battery conductors and combiners are included to provide ease of installation using Anderson connectors Specifically, power cables between the combining busbar and batteries with ease of connection and disconnection using Anderson connectors. Additionally, battery heaters are not included but can be added to the lower battery cabinet through included din-rail mounting discussed later in this manual.

2. General Safety Precautions and Instructions

All types of damage to the product may lead to a leakage of electrolyte or flammable gas. During installation of the battery, the utility grid and solar input must be disconnected from the Battery Pack wiring. Wiring must be carried out by qualified personnel. The battery pack contains no user serviceable parts. High voltage or current is present in the device. The electronics inside the Battery Pack are vulnerable to electrostatic discharge.

Observe the following precautions:

Risks of explosion

- Do not subject the battery pack to strong impacts.
- Do not crush or puncture the battery pack.
- Do not dispose of the battery pack in a fire.

Risks of fire

- Do not expose the battery pack to temperatures more than 122°F (50°C).
- Do not place the battery pack near a heat source such as a fireplace or furnace.
- Do not expose the battery pack to direct sunlight.
- Do not allow the battery connectors to touch electrically conductive objects.

Risks of electric shock

- Do not disassemble the battery pack.
- Do not touch the battery pack with wet hands.
- Do not expose the battery pack to moisture or liquids.
- Keep the battery pack away from children and animals.

Risks of damage to the battery pack

- Do not allow the battery pack to encounter liquids.
- Do not subject the battery pack to high pressures.

- Do not place objects on top of the battery pack.

IMPORTANT NOTE: Circuit Breakers, Disconnects and Fuses should be employed throughout the energy storage and generation installation to isolate effectively and protect all components of the system against faults, short circuits, polarity reversals or failure of any component in the overall system.

Fuses, breakers, wiring ratings and values should be determined by established standards and evaluated by certified electricians, licensed installers, and regional code authorities. The FlexTower must always be installed and commissioned with settings to protect the batteries from open PV voltage and other high voltage charging sources. The Battery Management System (BMS) alone will not protect the batteries from these extreme electrical events. Failure to adhere to installation protocol will void the warranty.

CAUTION! Verify polarity at all connections with a digital voltmeter before energizing the system. Reverse polarity at the battery terminals will void the warranty and damage the batteries. Do not short circuit the batteries.

Most batteries pose some risk of shock or sparking during the installation and initial wiring and connection process. Wearing insulated gloves, clothing and footwear and using electrically insulated tools are required when working with batteries. Cover or remove jewelry or conductive objects (metal bracelets, rings, belt buckles, metal snaps, zippers, etc.) when working with any electrical or mechanical device. Cover or restrain long hair and loose clothing when working with any electrical or mechanical device.

CAUTION! Do not disassemble or modify the battery. If the battery housing is damaged, do not touch the exposed components.

2.1. TRANSPORTATION AND HANDLING

- Do not knock, drop, puncture, or crush the battery.
- Do not expose battery to flames, incinerate or direct sunlight.
- Do not open the battery case or disassemble the battery.
- Do not lift battery by the terminal cables.
- Do not vibrate the battery.
- Do not expose the battery to water or other fluids.
- Do not place the product nearby highly flammable materials, it may lead to fire or explosion in case of accident, Store in cool or dry place.
- Do not store in greenhouses and storage areas for hay, straw, chaff, animal feed, fertilizers, vegetables or fruit products.
- Store the product on a flat surface; A ventilated area is strongly recommended for handling the product.
- Store the product out of reach of children and animals.
- Do not transport battery upside down.

2.2. RESPONSE TO EMERGENCY SITUATIONS

The battery pack consists of multiple batteries and a sophisticated Battery Management System that are designed to prevent hazards resulting from failures. However, Fortress Power cannot guarantee their absolute safety.

Leaking Batteries

- If the battery pack leaks electrolyte, avoid contact with the leaking liquid or gas. If a person is exposed to the leaked substance, they immediately perform the actions described

below.

- Inhalation: Evacuate the contaminated area and seek medical attention.
- Contact with eyes: Rinse eyes with flowing water for 15 minutes and seek medical attention.
- Contact with skin: Wash the affected area thoroughly with soap and water, and seek medical attention
- Ingestion: Induce vomiting, and seek medical attention

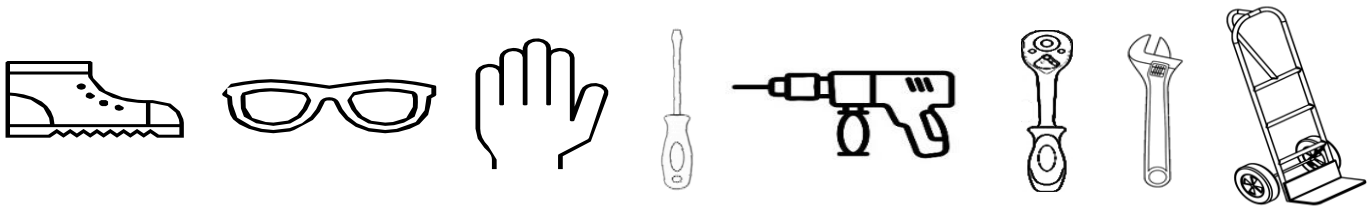
Fire

- In case of external fire, make sure that an extinguisher is available near the battery pack. If possible, move the battery pack to a safe area before it catches fire.
- Water, carbon dioxide, dry chemical powder and foam are the most effective means to extinguish a Lithium battery
- Ferrous Phosphate (LFP) battery fire
- Use ABC Fire extinguisher, if the fire is not from battery and has not spread to it yet.

3. Required Tools & Materials

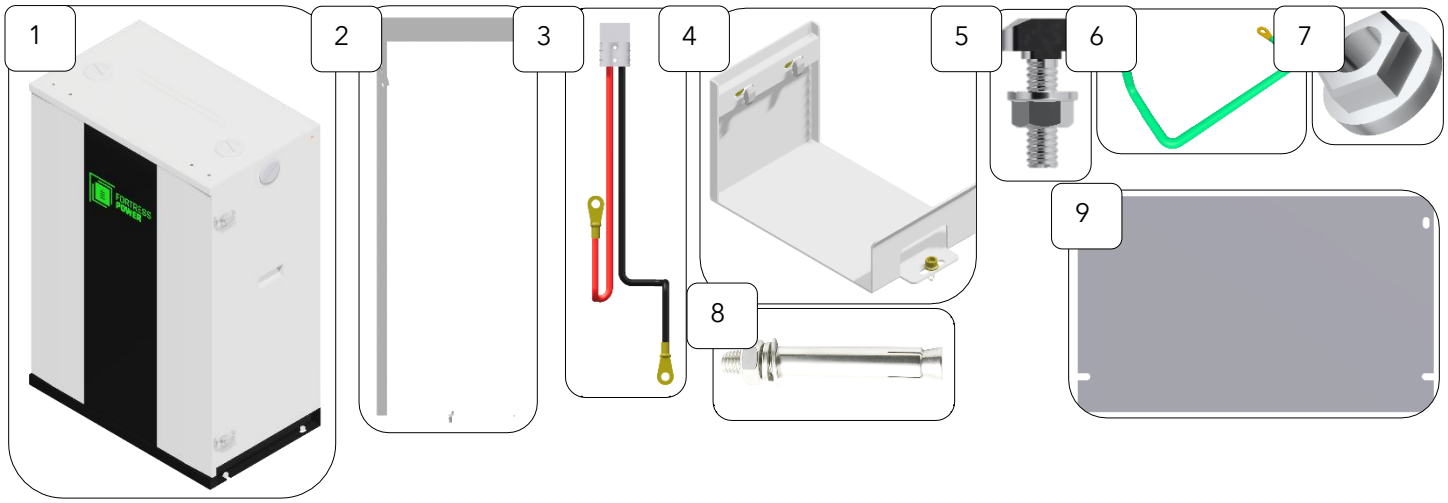
The following tools and materials are required:

- Positive battery-combiner-to-inverter cable – 22.5" flexible 2/0-3/0 AWG
- Negative battery-combiner-to-inverter cable – 24" flexible 2/0-3/0 AWG
- 2/0-3/0 Crimp Terminal lugs for above cables with ring size of 3/8ths or larger
- Wire Stripper and Crimper (Up to 4/0)
- Metric hex socket set
- Metric wrench set
- Hand Truck (optional)
- Phillip and Flat Head Screwdriver Set.
- Power Drill and wood or and concrete drill bit set
- Snap in knockout bushing for inverter knockouts (various sizes – depends on application)
- Three ¾" washers with ¼" holes
- Utility knife
- Conduit connectors
- Guardian monitoring hub (optional)
- Din-rail 120V AC thermostat heater (optional)
- OSHA approved personal protective equipment, Safety Shoes, Safety Glasses, Insulated Gloves, and Weightlifting Belt.

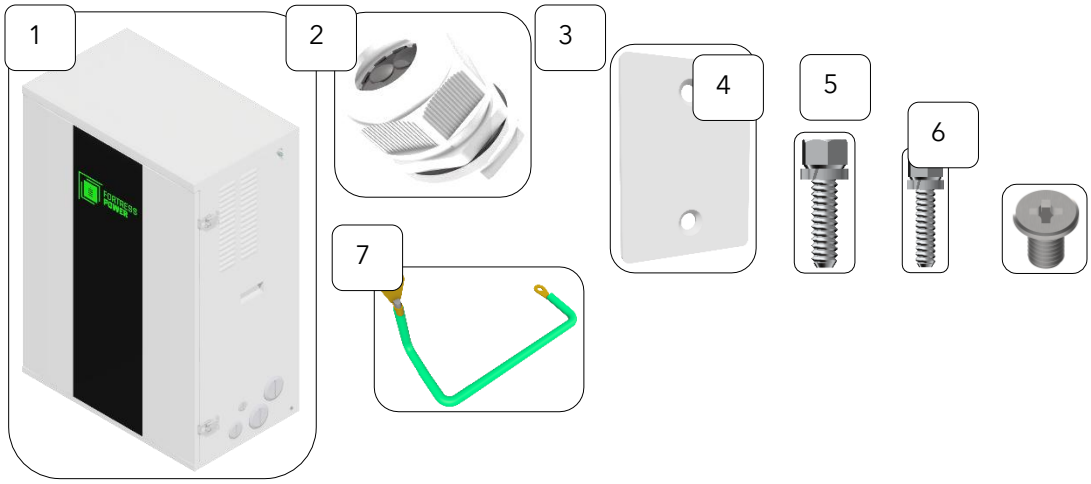


4. UNBOXING

4.1 DURARACK



4.1. FLEXTOWER



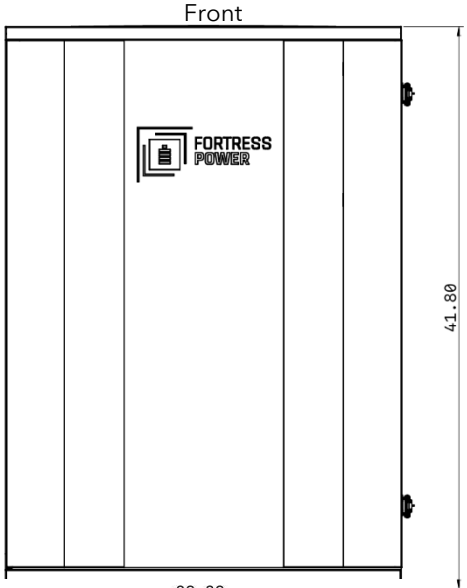
PART	DESCRIPTION	QTY.
DURARACK		
1	DuraRack	1
2	Cable Protecting Plate	1
3	Anderson Connectors with Cable	4
4	eFlex Stabilizing Brace	4
5	M6-16mm T-bolts	8
6	Ground Cable	1
7	M16mm Hex flange nut	8
8	Concrete Anchors	4
9	Template	1
FLEXTOWER		
1	FlexTower Top	1
2	Waterproof Bushing	2
3	Side Brackets	2
4	M6*16 Hex socket bolt	5
5	M8*15 Hex socket bolt	2
6	M6*15 Side Bracket Screws	4
7	Ground Cable	1

5. FLEXTOWER SPECIFICATIONS

5.1 DIMENSIONS AND DEFINITIONS

5.1.1. DuraRack

Front



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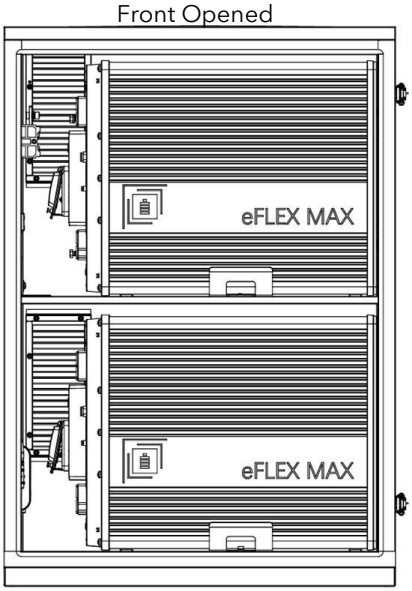

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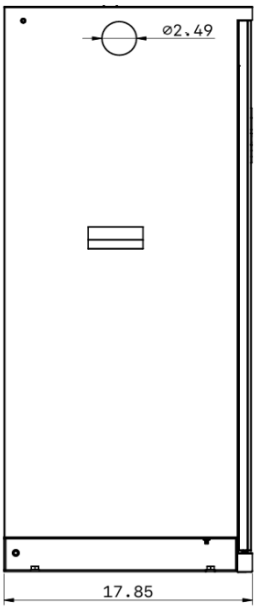
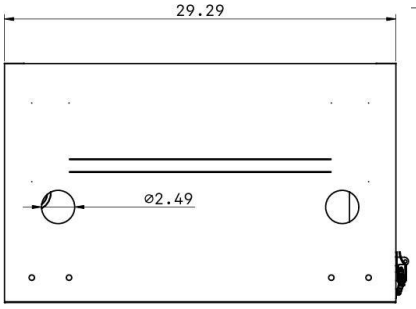
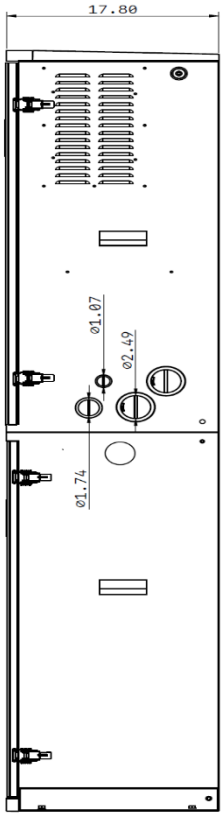




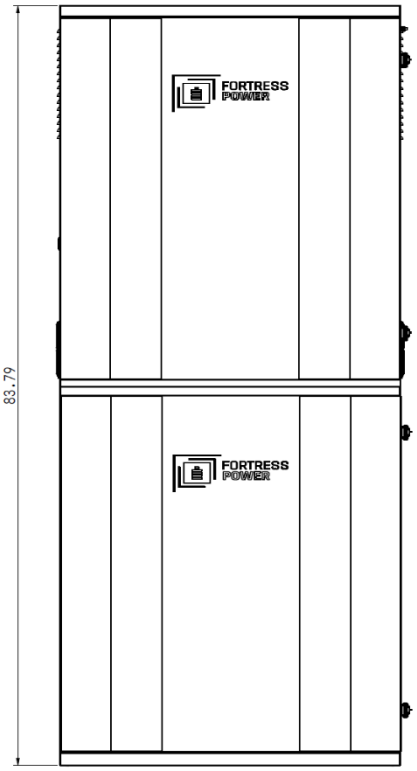
Top

5.1.2. FlexTower



Right

Front



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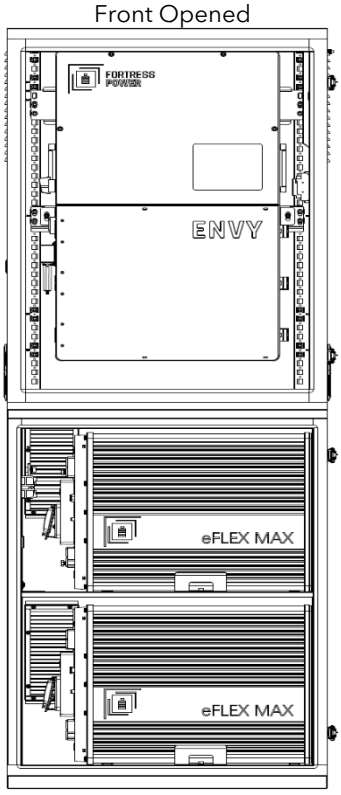

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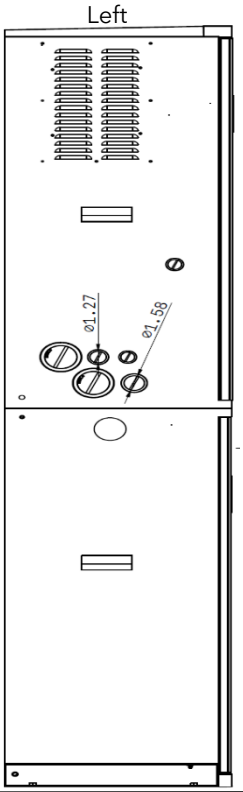
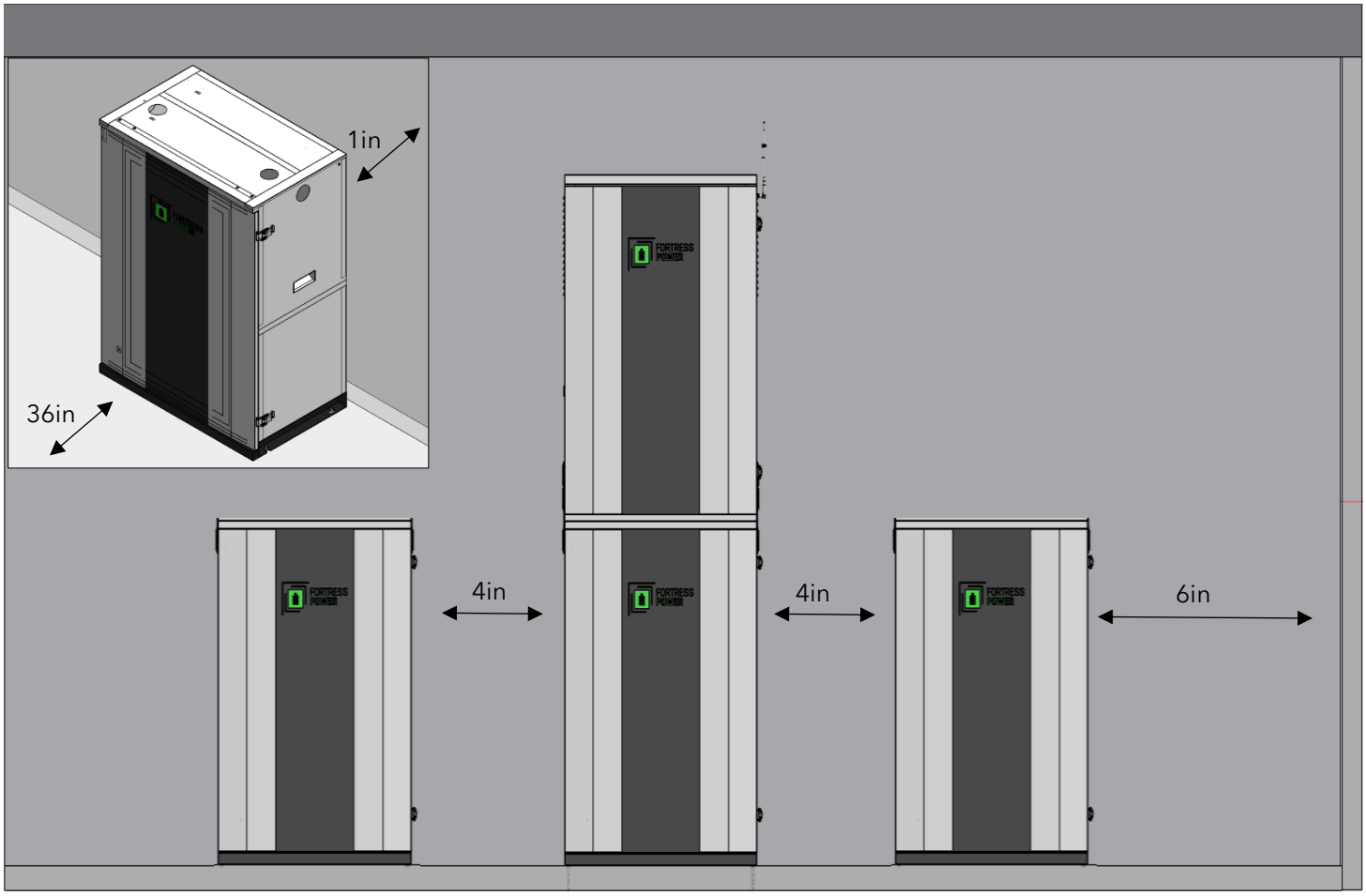


6. Spacing Requirements

Please follow the spacing requirements as indicated below. The distance between the Durarack/FlexTower and surrounding adhere to the UL9540/A Certifications.



7. Installation

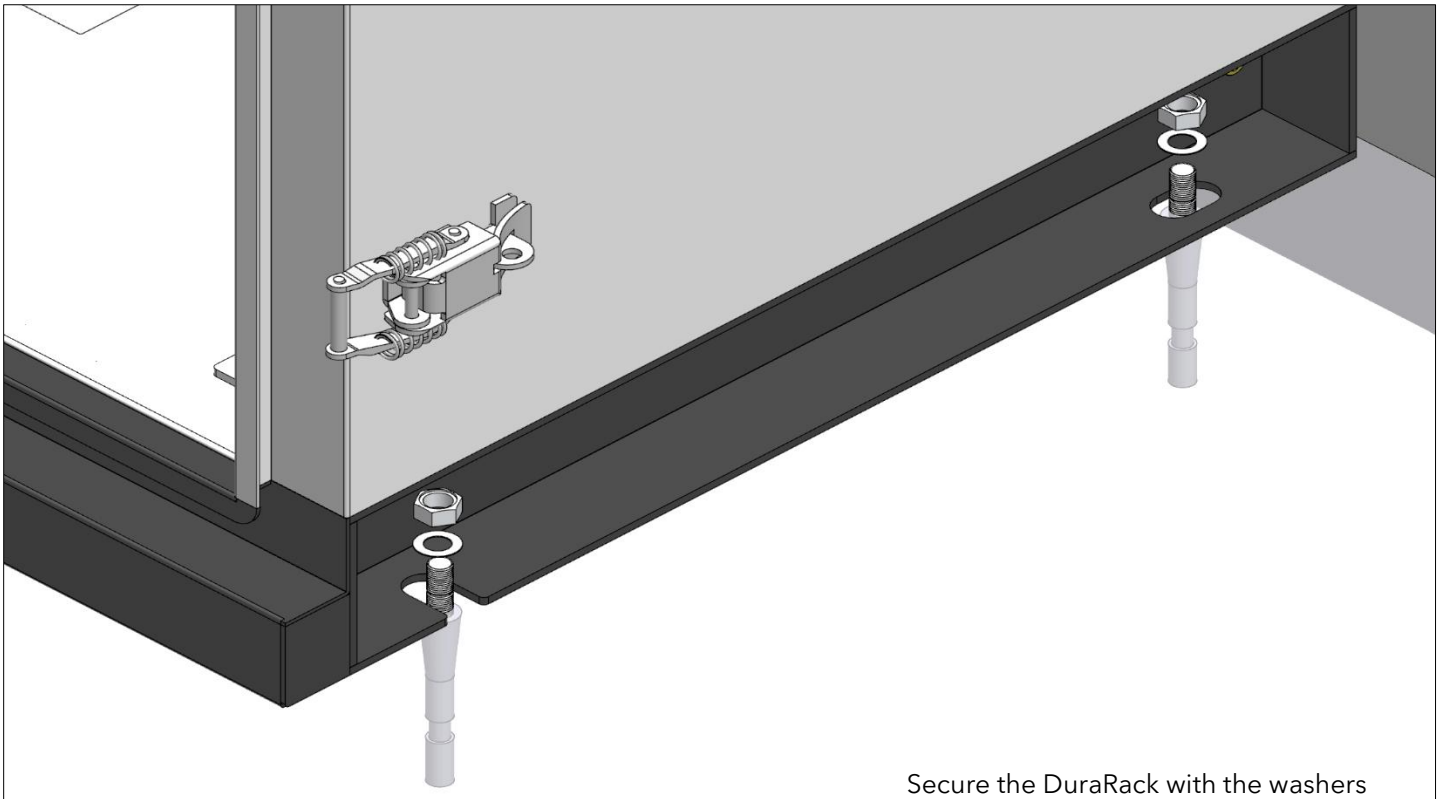
7.1 Pre-installation

Checklist before installation:

1. Surface of installation is flat, and free of debris and can support the weight of the systems being installed. _____
2. Check that all components are in the box_____
3. Turn on eFlex or eFlex Max batteries individually without connecting to each other.
   Batteries are within 0.5V of each other _____
   If batteries are not within 0.5v of each other, please charge individually with an external trickle charger of 54V.

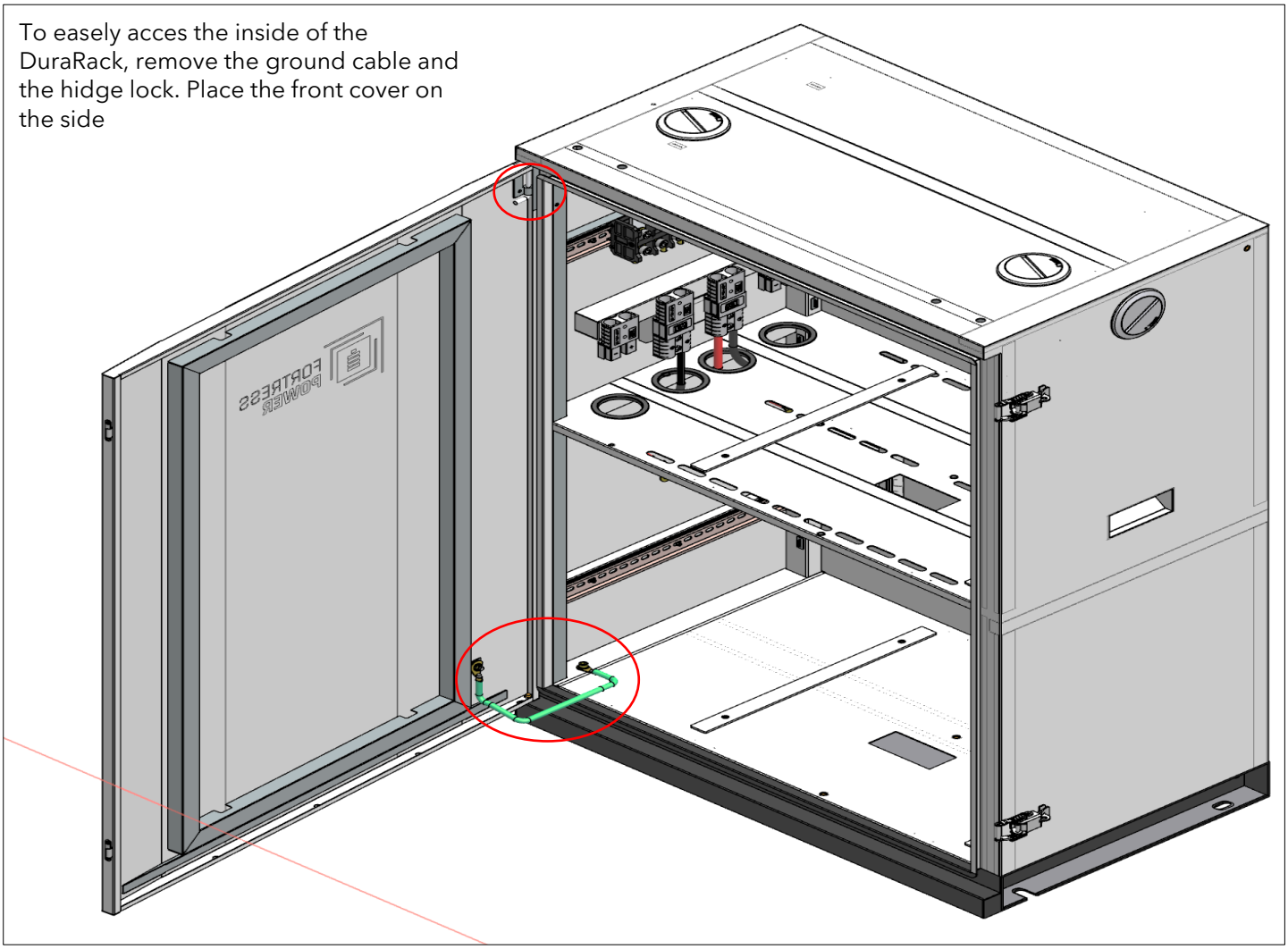
7.2 DURARACK INSTALLATION

Mark the holes indicated by the template included with the Durarack. A 3" concrete pad or greater is recommended but strength of pad is dependent on sub-base / location. Drill approximately ½" deeper than the intended depth of the sleave anchor bolt, at least 1.5" deep, and use a hammer drill to drive the anchors into place, positioning the nut on the bolt as to protect the threads when driving into place.



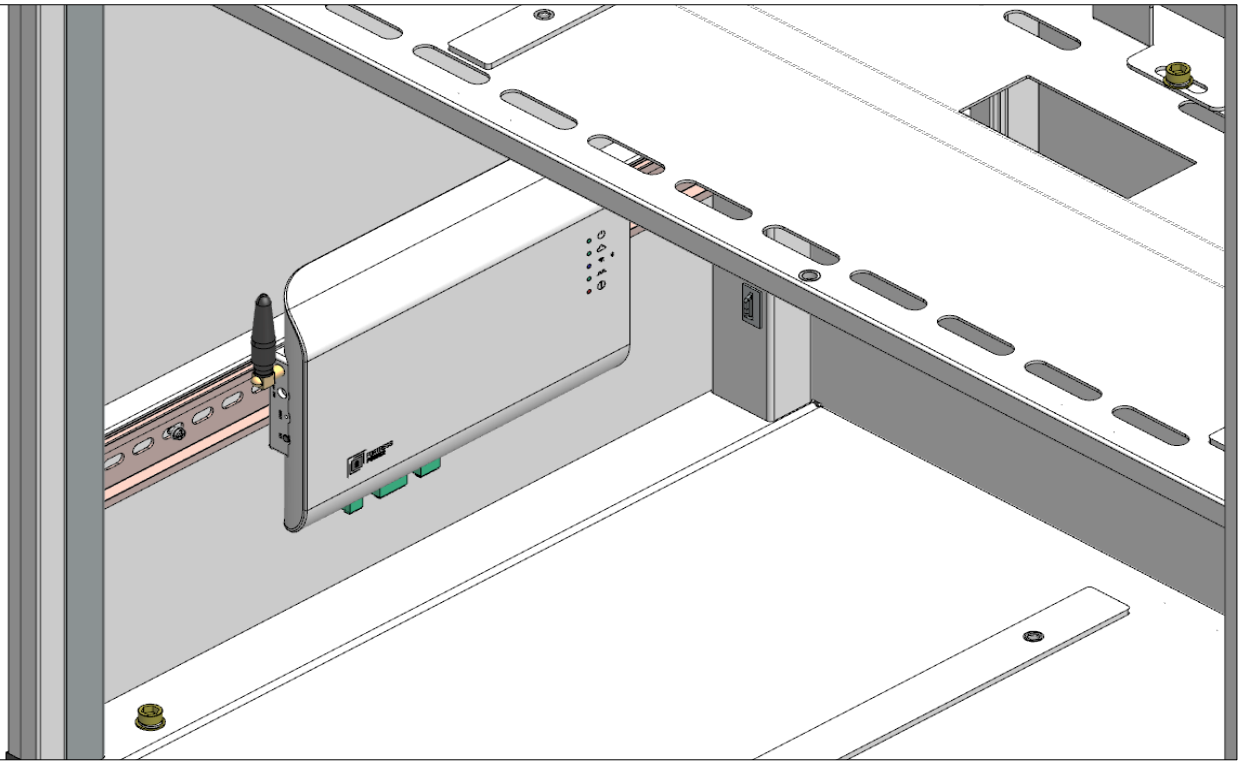
Secure the DuraRack with the washers and flange nuts.

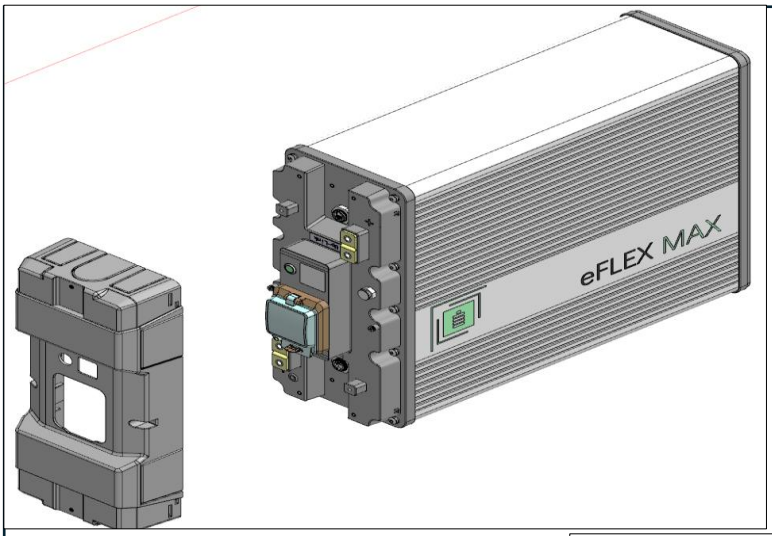
To easely acces the inside of the DuraRack, remove the ground cable and the hidge lock. Place the front cover on the side



Install the Guardian preferebly inside the Flextower. Otherwise install in the included Din-Rail in the DuraRack and along with the included cable harnesses.

Please Follow the Guardian manual for complete installation and set-up

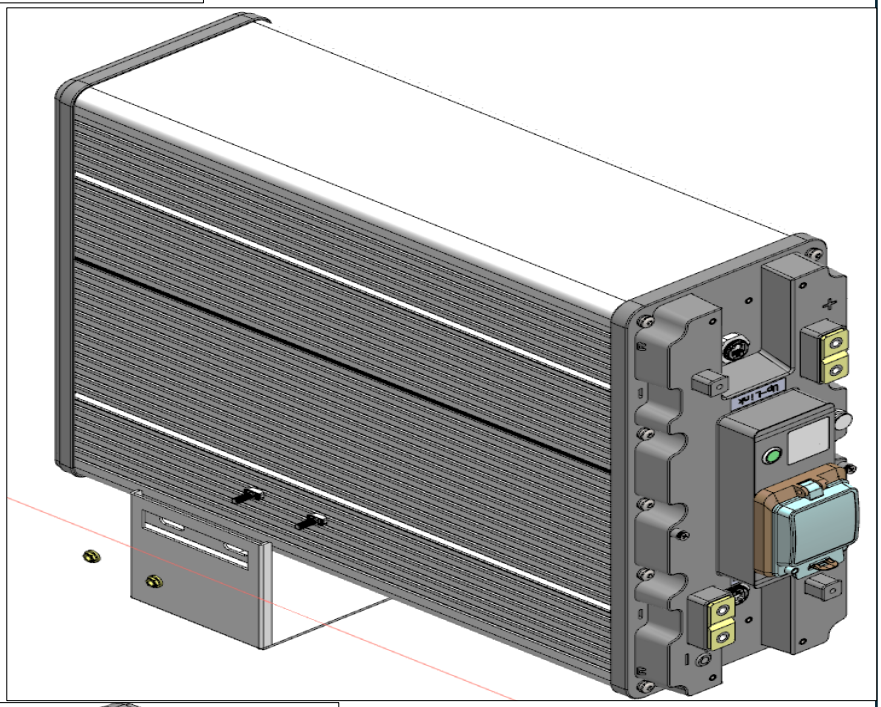


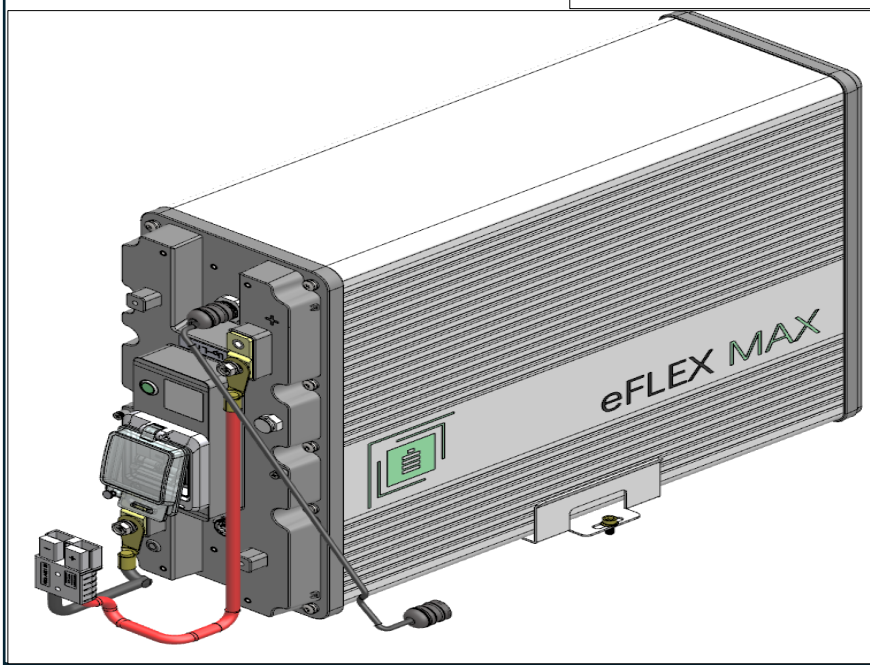


Remove the eFlex Max top cover. You may keep or recycle this component since it will no longer be used during the installation.

Unlock the breaker protective cap and keep opened.

Install the stabilizing brace using the t-bolts and flange nuts.





Install the Uplink-Downlink cables on all the eFlex Max being installed to facilitate connection once inside the DuraRack. Only connect to the Uplink Port.
Install the Anderson connectors to the battery terminal.

Make sure that you do not reverse the Polarity.

Red=positive+
Black=negative-

Mount the Eflex Max inside the batteries. Follow the minimum sizing guide for the amount of batteries per inverter. Begin connecting the other end of the rj45 cable to the Downlink port in a sequencial order. For more information, use the eFlex Max manual.

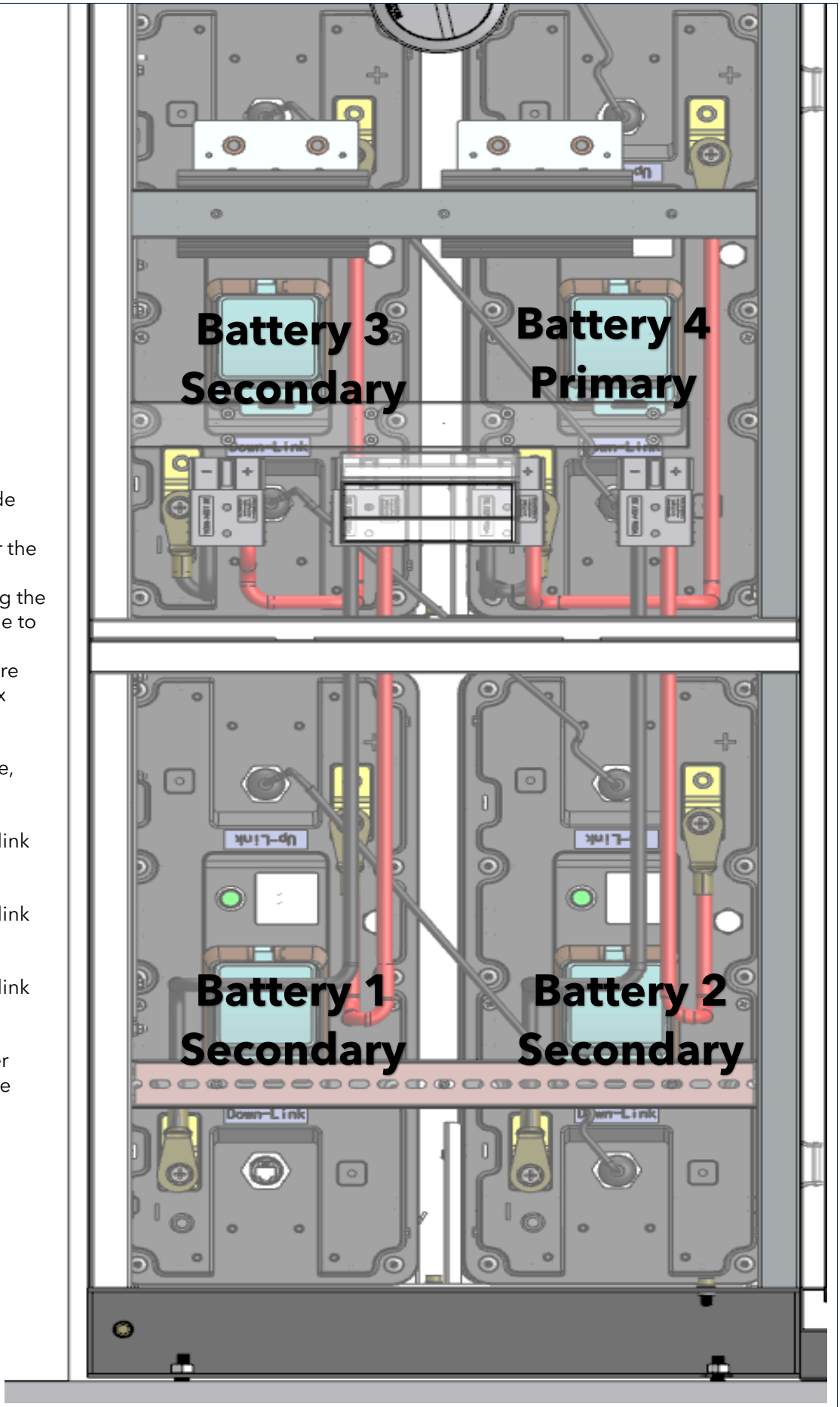
Using the following image, the sequence is as such:

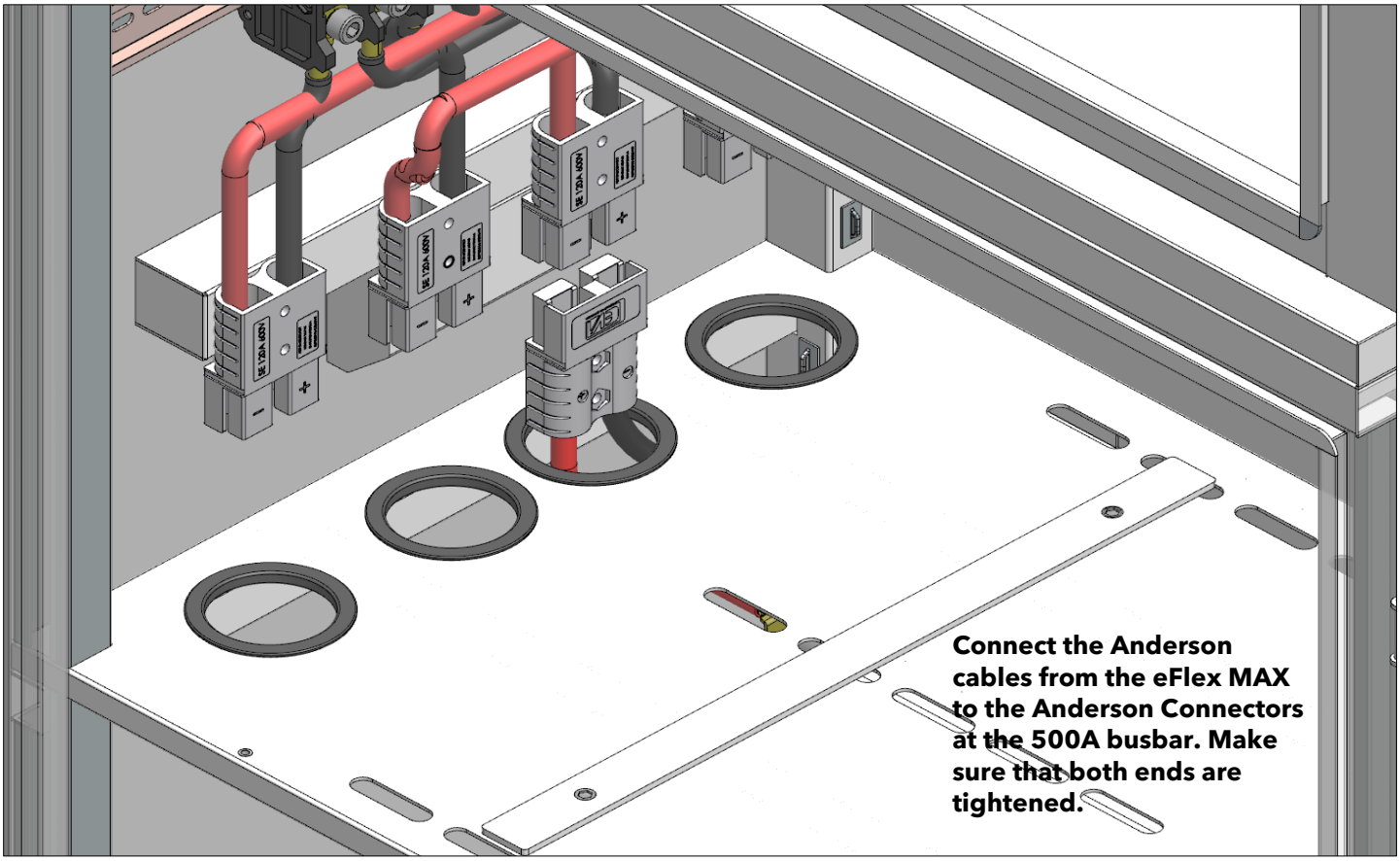
Battery 1 Uplink to Downlink of Battery 2

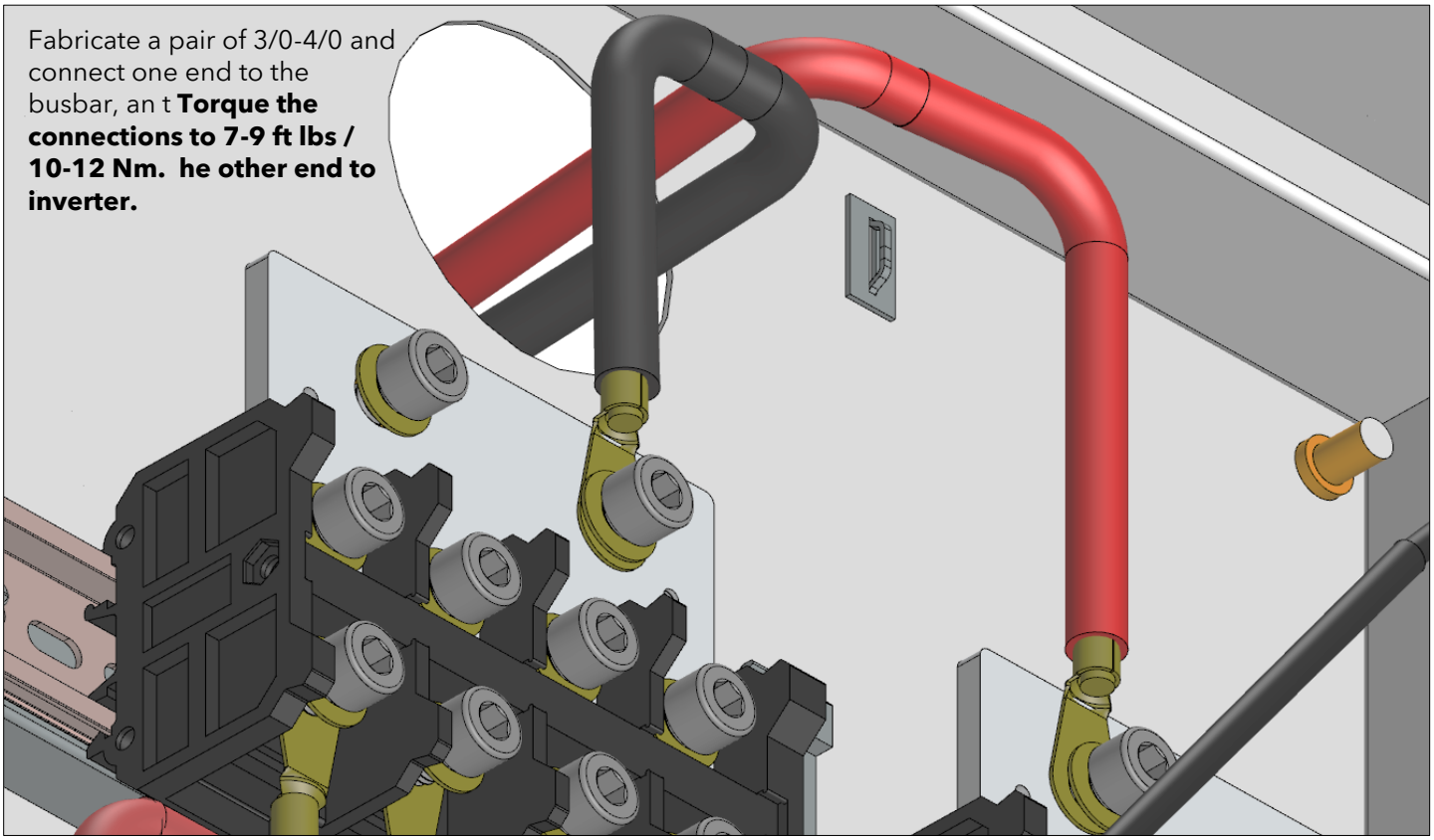
Battery 2 Uplink to Downlink of Battery 3

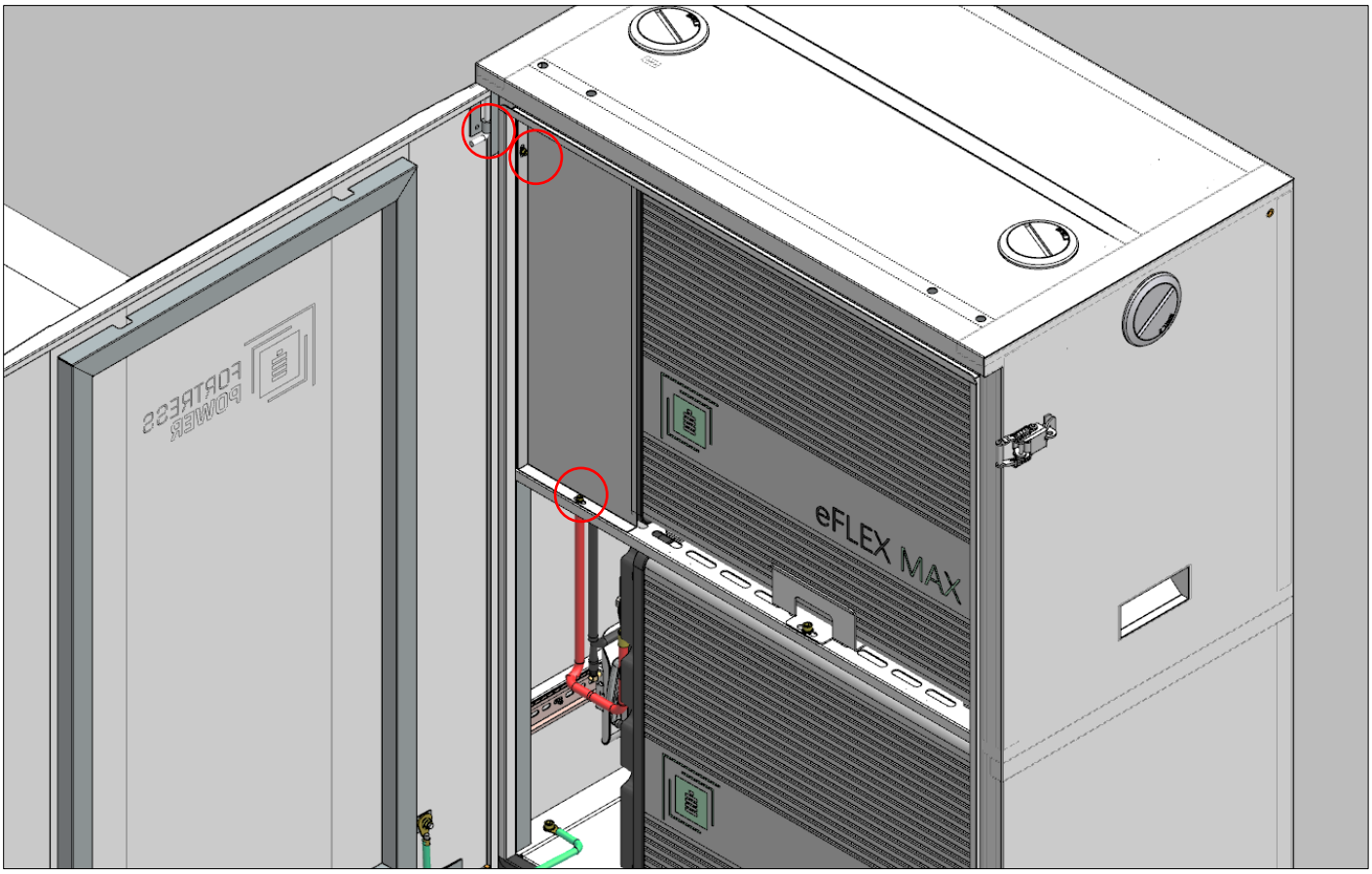
Battery 3 Uplink to Downlink of Battery 4

Battery 4 Uplink to Splitter Splitter to ENVY (using the Sol-Ark CAN cable).




Connect the Anderson cables from the eFlex MAX to the Anderson Connectors at the 500A busbar. Make sure that both ends are tightened.


Fabricate a pair of 3/0-4/0 and connect one end to the busbar, an t **Torque the connections to 7-9 ft lbs / 10-12 Nm. he other end to inverter.**



Reconnect and torque the ground cable 9.8~12 NM.

Make sure to properly ground the DuraRack with the rest of other subpanels

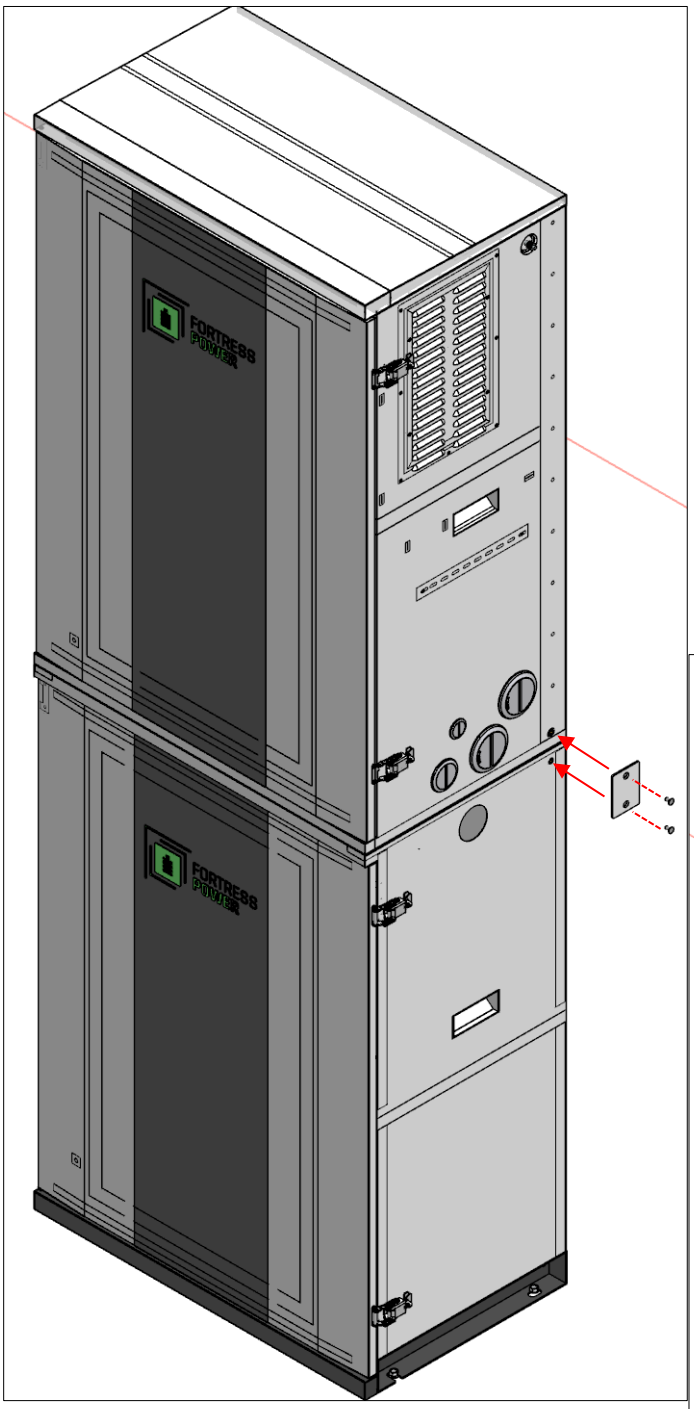
Connect the Communication Cable from the Primary battery to the inverters Communication Port.

Connect the DC cables from the battery. to the battery port of the 48V inverter.

Follow the commisioning procedure listed in the eFlex, eFLex Max and inverter manual.

Mount the front cover, lock with hindge.

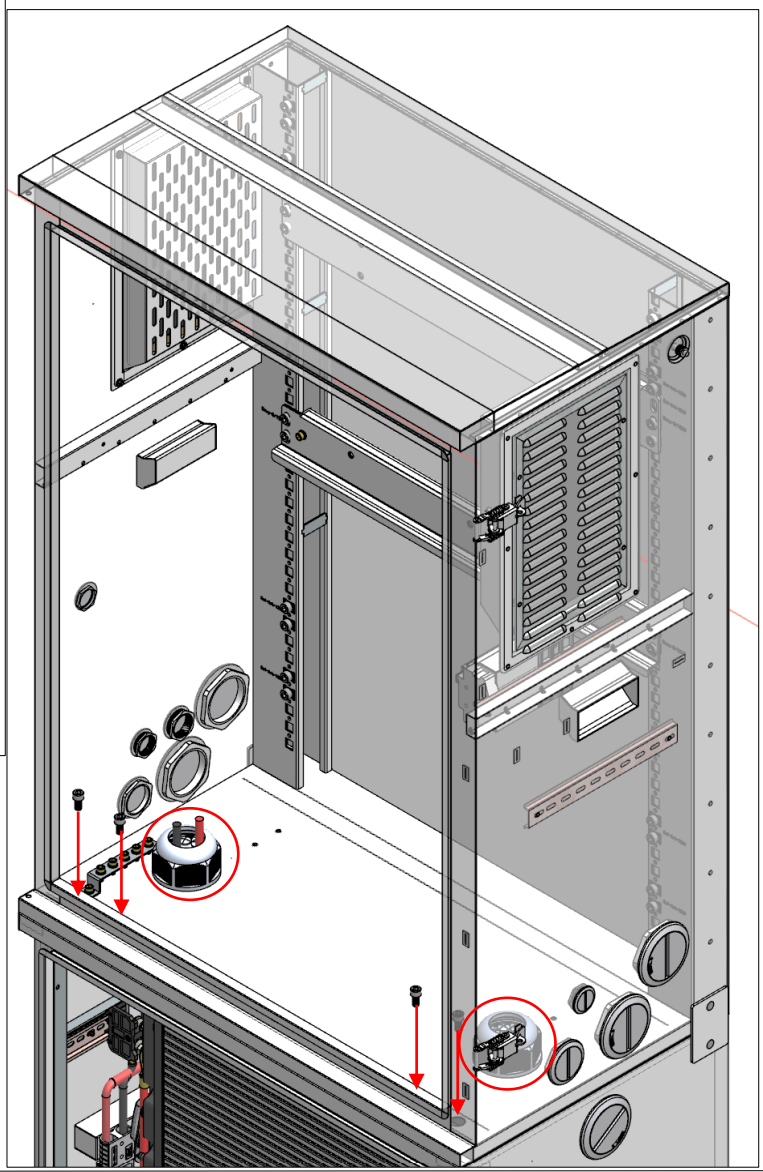
7.3 FLEXTOWER INSTALLATION



Make sure to remove the top knockout caps of the DuraRack.

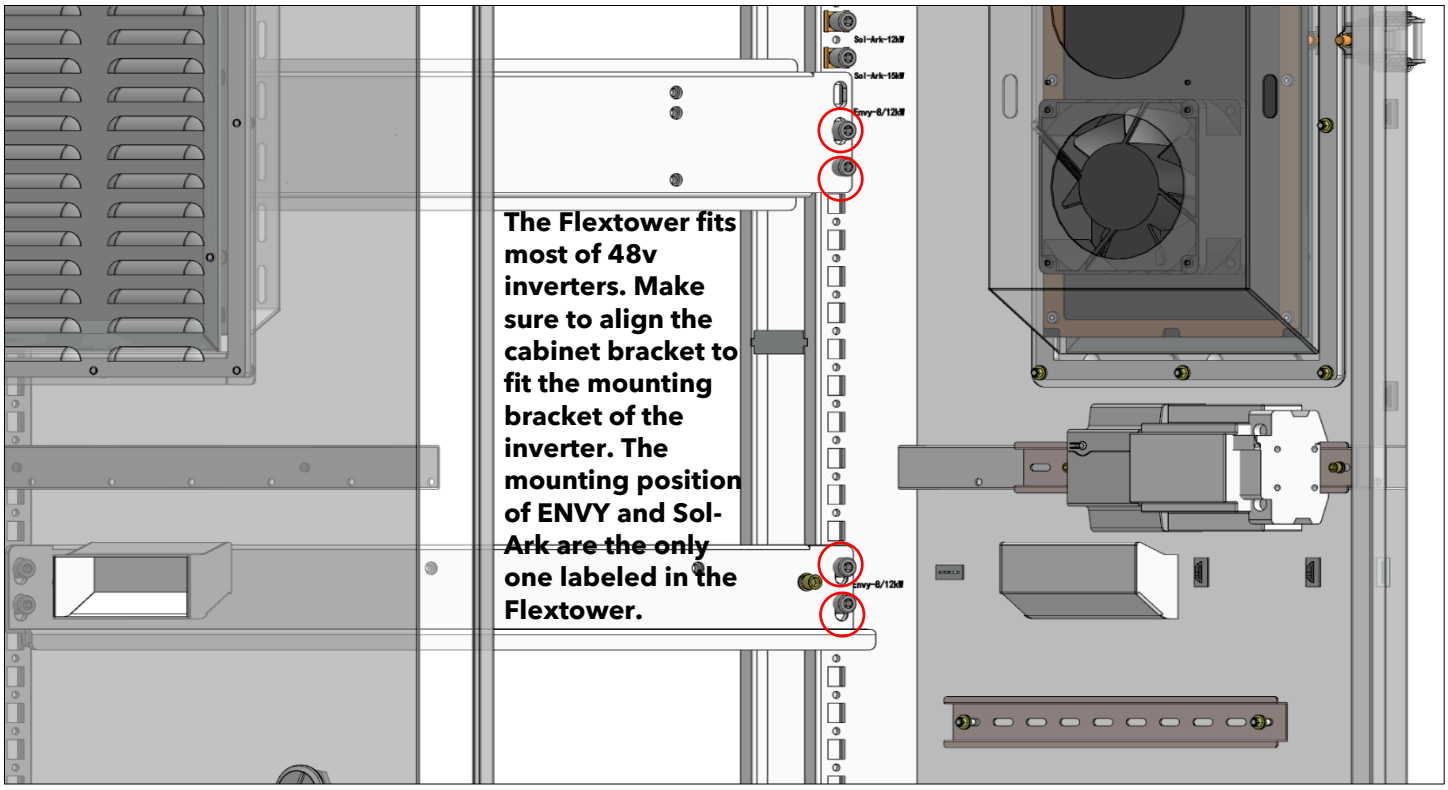
Unbox the Flextower and place on top of the DuraRack.

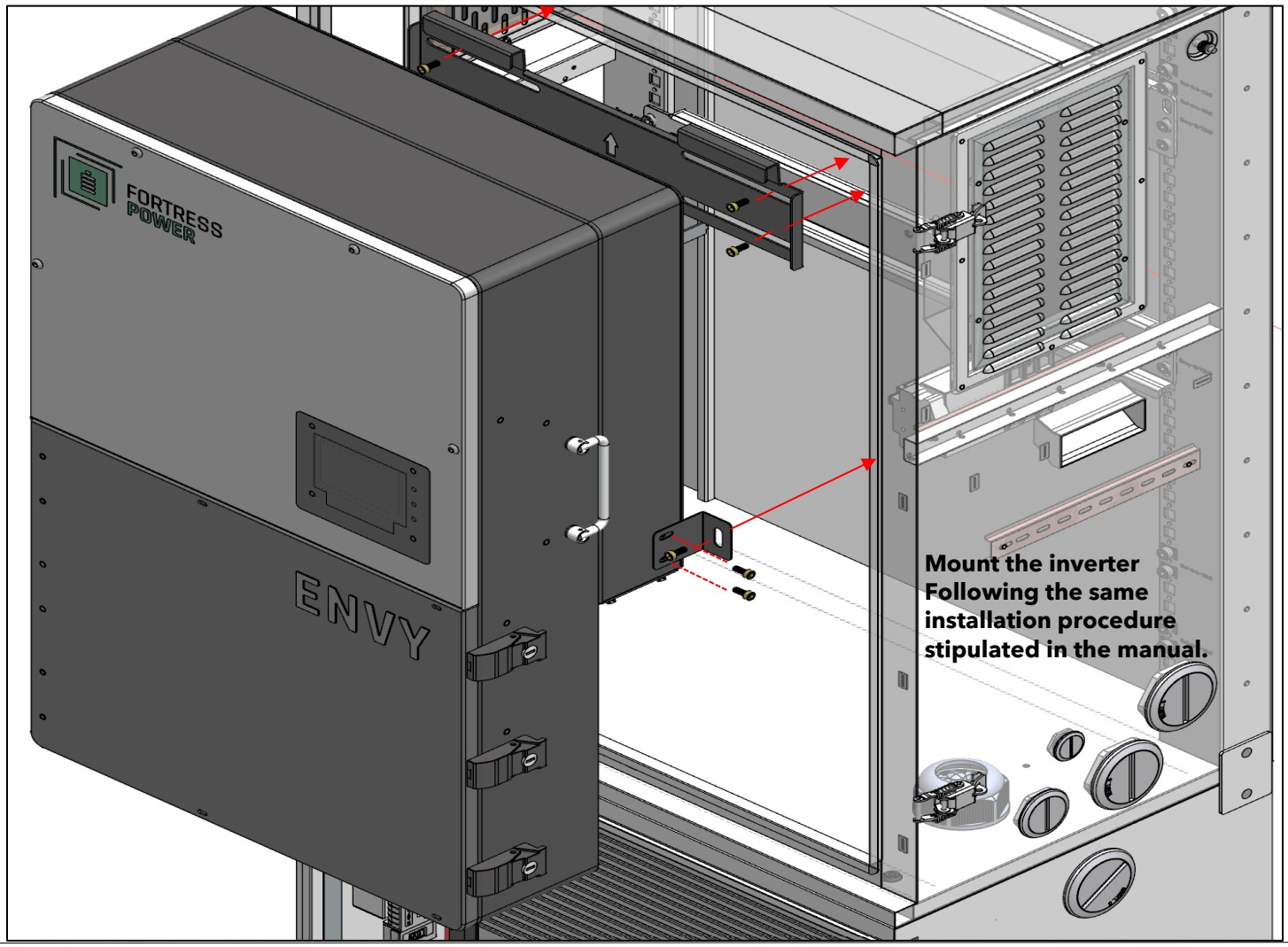
Screw the side brackets to secure the top cabinet with the bottom cabinet.



Secure the inside of the top cabinet to the bottom cabinet.

Install the waterproof Firewall bushing between the cabinet while introducing the pait of cables coming from the busbar.

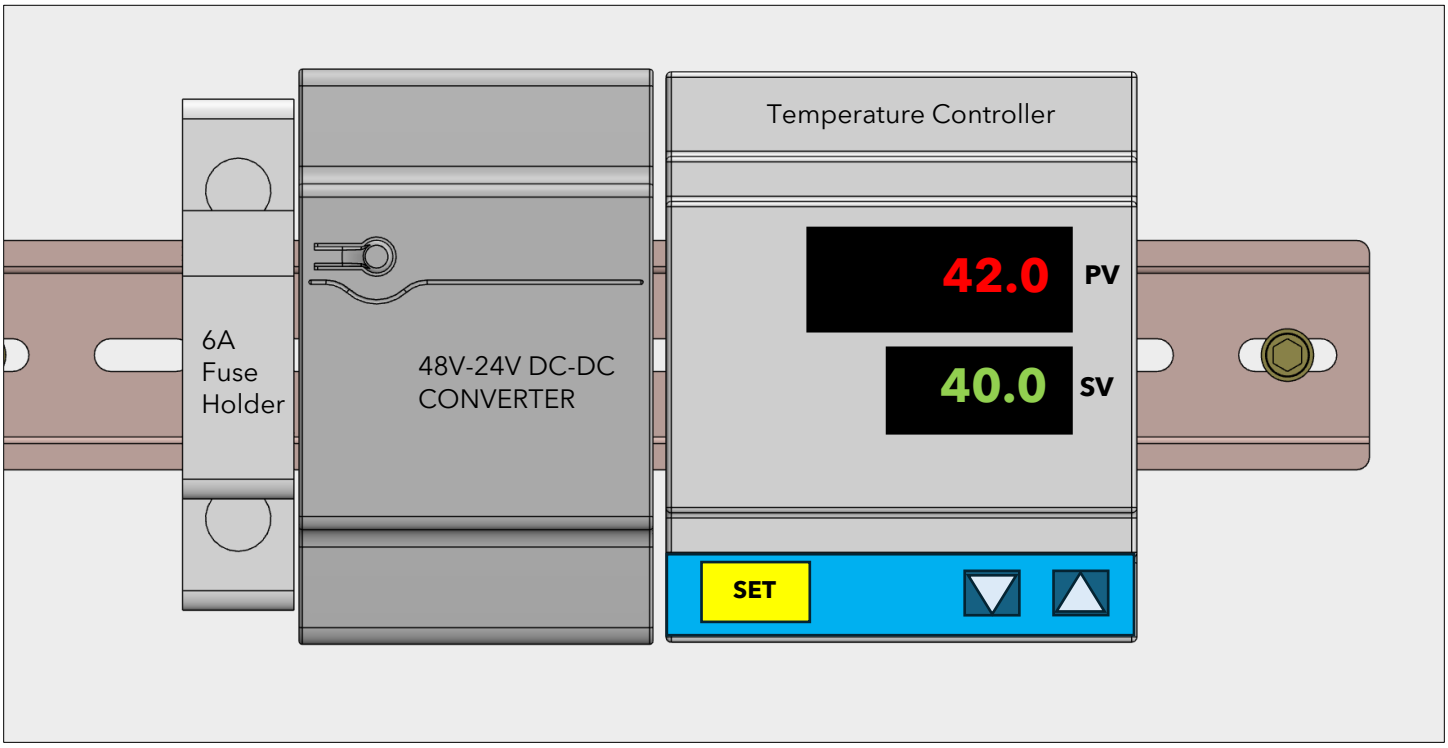

The Flextower fits most of 48v inverters. Make sure to align the cabinet bracket to fit the mounting bracket of the inverter. The mounting position of ENVY and Sol-Ark are the only one labeled in the Flextower.


FORTRESS POWER
ENVY
Mount the inverter Following the same installation procedure stipulated in the manual.

8. Temperature Control

8.1 Cooling

The FlewTower comes equipped with exhaust fans that are temperature adjustable. The temperature of the FlexTower is monitored by a Thermocouple that is attached to the inner top of the cabinet. The 48V DC power is provided by Black and Red wires to be connected to the dura rack bus bar. The fans in the FlexTower consume approximately



600mA 48V from the batteries.

FlexTower Fan Controller

Important Settings

CODE	Explanation	Recommended Value
PV	The actual, measured temperature value, as measured by the thermocouple	n/a
SV, or SP	The Set Value, or set point to which the enclosure temperature will be cooled	40.0
Hy	Differential Gap – the number of °C higher than the SV that the fans will turn ON.	5.0
P	Set this value to **0.0** for ON/OFF control	0.0

Programming the temperature controller:

1. Set the "Set Value" (SV), which is the target temperature.
2. Press and hold the "SET" key for approx. 1 second until the upper display changes to "SP"
3. Use the Up and Down buttons to set the SV to the desired temperature in °C, then press "SET" to return to the main display.

NOTE: The SV should be set higher than the ambient temperature to ensure the fans don't run all the time.

4. Press and hold the "SET" key for 3 seconds until the upper display changes to "AL-1"
5. Press the "SET" key THREE times to reach the "Hy" setting
6. Adjust this value to the number of °C above the SV you want the fans to turn ON
7. Press the "SET" key ONE time to reach the "P" setting.
8. Set this to 0.0 for ON/OFF control

Example: SV = 40.0, Hy = 5.0, P = 0.0

When PV (measured value) reaches 45°C, the fans will turn ON until the temperature is lowered to 39.9°C, then the fans will turn OFF.

8.2 HEATING

The DuraRack does not include a heater. Please include a Din rail heater to mitigate for cold weather conditions.

Step 1: Identify Heater needed based on cold season temperatures

This table establishes the required heater wattage for a specific temperature in an outdoor setting. Indoor temperatures can be higher and thus needing a lower wattage heater. Always be conservative when choosing a heater. Choose the heater based on peak low temperature day extracted from weather data. If unsure, research the state where the batteries will be installed and search for recorded lower temperatures, especially in an outdoor scenario. This will ensure that the batteries inside the Durarack do not drop below 45 degrees Fahrenheit.

WINTER TEMPERATURE (°F)	HEATER WATTAGE (W) REQUIRED
-35	1200
-30	1125
-25	1000
-20	950
-15	850
-10	800
-5	750
0	650
5	550
10	500
15	450
20	375
25	300
30	215
35	150
40	100

Step 2: Select your heater and thermostat

Note: Fortress Power has selected heaters and thermostats that will work and fit into the DuraRack. They are all Din-Rail mounted configurations

Reminder: Use the conservative approach

STEGO HEATERS AND THERMOSTATS

MODEL	Part Number	Operating Voltage (V)	Heater Wattage (W)	Inrush Current (A)	Thermostat Options
CSL 028	02810.9-00	120AC	400	9	KTO 111, STO 011
	02811.9-00	120AC	250	6	
CR 130	130590.9-00	120AC	950	n/a	Included (Variable Setting)
CS 028	02800.9-00	120AC	150	6	KTO 111, STO 011
CR 027	02700.9-00	120AC	650	14	Included (Variable Settings)
	02701.9-00	120AC	550	15	
CS 130	13060.9-00	120AC	1200	16	Included (Variable Settings)
HVL 031	03102.9-00	120AC	100	n/a	STO 011, KTO 111
	03113.9-00	120AC	200	n/a	
	03114.9-00	120AC	300W	n/a	
CSF 032	03202.9-00	120AC	1000W	18	Included Switch off at 59 °F)
HVI 030	03082.9-00	120AC	700W	10A	KTO 111, STO 011