NUANCE ENERGY
Revolutionary Solar Racking Structures

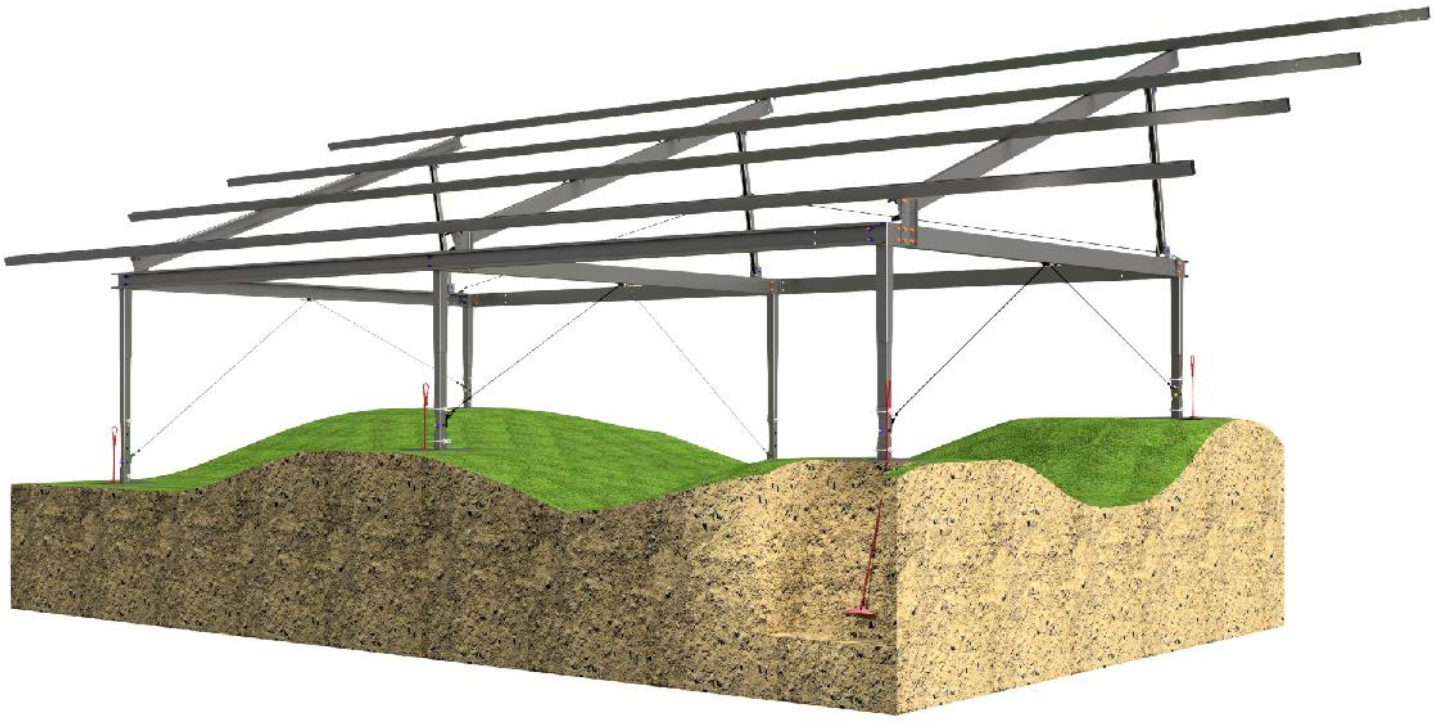
ETL CLASSIFIED

CONFORMS TO
UL STD 2703
CERTIFIED TO
CSA LTR AE-001

Intertek
5020709

PATENTED

PAT # US 10,622,938 B2



OSPREY
POWERPLATFORM

OSPREY POWERPLATFORM INSTALLATION MANUAL (Rev. 8.4)

Table of Contents

Disclosure Statement. Page 27 needs to be filled out and sent back to your Nuance Energy Sales Representative. Failure to do so may result in loss of warranty coverage.

Introduction

The manual is an installation guide and not meant to be a comprehensive technical engineering manual. It is for the assembly and installation of Osprey PowerPlatform®. Nuance Energy requires each Osprey unit to be built to Nuance Energy specifications. However, installers may find alternative means and methods that work better for their situation, logistics, facilities and personnel, etc.

Product Summary

The Osprey PowerPlatform® is a proprietary and utility patented ground mount solar racking structure. The modular Osprey unit assembles rapidly on site and can be built with a non-skilled labor force. No concrete or pile driving equipment is required and only common hand-held tools need to be used.

- **Design and Engineered to 2019 (CBC) California Building Code**
- **Compatible with the 2018, 2015, 2012, and 2009 versions of the IBC**
- **CPP Wind Tunnel Tested**
- **Certified to UL2703 and cETL Standards**
- **Each Osprey PowerPlatform® is technology neutral and can host any current size solar panel on the market**
- **Osprey PowerPlatform® units have power adjustable legs that work independent of each other**
- **Ospreys can be installed on uneven terrain with little if any site preparation or grading**
- **Ospreys are engineered up to 185 MPH (ASCE 7-16) wind loads and snow loads up to 70 PSF**
- **Refer to engineering and structural calculation packet for complete details**

Each Osprey PowerPlatform® utilizes earth penetrating anchor foundation technology. Earth anchors have been proven and tested in a variety of applications, including electric utility poles, civil engineering, retention walls, marine tethering, and municipal drainage systems. Using earth anchor technology enables the install team to secure Osprey units to the ground and test for resistance to wind uploads in real time soil conditions eliminating the need for geotechnical soil reports or impact studies. AHJ's prefer real time soil conditions as opposed to testing done in months in advance of the installation.

Ospreys are also a portable and modular solar ground mount system meaning the capital asset can be moved, as needed. When combined with other Ospreys, they scale to thousands.

The Osprey PowerPlatform® is a modular, systematic approach to ground mount design and construction that is revolutionizing how ground mount solar systems are installed. Osprey units are currently being used in the design and development of solar energy systems for commercial projects, community solar farms, landfills, remediation clean up sites, off-grid, agriculture and residential solar projects throughout North America, Canada and other foreign markets.

Trademark and Patent

The product brand name and product engineering have been protected and granted utility patent claims status in the United States Patent and Trademark office and International Patent Office. **PAT # US 10,622,938 B2**

Safety

All personnel should be required to wear personal protective eye wear, clothing, footwear, and any other protective gear that complies with Contractor's Injury and Illness Protective Plan (IIPP).

Many of the components that are fabricated and assembled to complete an Osprey PowerPlatform® are made of steel, which is heavy and may have sharp edges and can cause injury if not handled properly and with care.

Additionally, as components get assembled, there are pinch points in the assembly that can compromise fingers and limbs, and therefore should be avoided.

Tools and Equipment

No specialized or unusual tools or equipment are required for the assembly and installation of the Osprey PowerPlatform®.

The following list shows the standard tools that are generally used for the assembly and production of the Ospreys. Installers may find alternatives or additions that are better suited for their situation.

Training Videos

Go to Nuance Energy's YouTube Channel and Type: **Osprey PowerPlatform Training Video 2021 (7:54min)** in the search bar.

Link Address: **https://youtu.be/ns3-n4VJf74**

Hand Tools

- Combination Rotary Hammer Drill for driving anchors with drive rods and drilling through frozen ground and Hard *or* rocky soils.
- Bosch RH1255VC SDS-Max Rotary Hammer
- Milwaukee 5342-21 2" SDS-Max Rotary Hammer
- Recommended for use with drill bit listed below for installs taking place during severe frost conditions

- Gas Powered Post Pounder can be used when pilot hole drilling is not needed. In other words when not drilling into bedrock or frozen ground.

- The use of the **Patent Pending Osprey PowerJack™** Load Test construction tool below **(Instructions on page 7)** is required to pull test Earth anchors and remove Drive Rods if needed using the 2 holed puller plate shown on the side of the tool below in Figure 3.0

Figure 1.0

Figure 2.0

Figure 3.0

Hand Tools Continued...

- 5' Anchor Drive Rod (available for sale through Nuance Energy Group)
- 9' Anchor Drive Rod (available for sale through Nuance Energy Group)
- 66" *or 42"'* x 1 3/8" fluted SDS MAX Drill bit for pilot holes
- Impact Drivers with 3/8" drive Socket Adapter for each worker- 3/4" Impact Sockets for 'Power Adjustable Leg' leveling
- 9/16" Thin Wall Impact Sockets for Osprey PowerPlatform® bolt and nut connections
- 9/16" Thin wall, Deep Well Impact Sockets for Strut Rail bolt and nut connections
- *1/2*" Impact Sockets for Mid Clamps
- 6mm Hex Bit Socket for End Clamps
- ***Torque Wrench with inch lbs capability for setting the Panel Clamps to 200 inch lbs of torque. (Not recommended to use impact drills for Clamp installation)***
- *T*ape Measures-String Line and Stakes
- 4 Foot Level
- Flat blade Shovel
- Tool Pouch for nuts and bolts
- High torque 1/2" drive drill for use with the Osprey PowerJack™ Load Test Tool
- Torque Tension Tool for Cable Brace tensioning

Optional Equipment

- 3k Portable Generator (if 120VAC power unavailable) for use with the Electric Drills
- 100' Extension Cord (Heavy Duty)
- Sting Bubble Level attachment for string line use

Osprey PowerJack™ Instructional Guide

Nuance Energy's patent pending Osprey PowerJack™ is a multi-purpose construction tool and powerful jack used to pull and measure in real time soil conditions, the "uplift load test" capacity of earth anchors, which are the foundations that secure the patented Osprey PowerPlatform® ground mount racking system to the ground during installation. The Osprey PowerJack™ may also be used to pull earth anchor drive rods from tough soil conditions before anchor testing is performed.

Included Parts

- Osprey PowerJack™, Swivel Shoe Plate, Drive Rod Pull Plate, Pivot Bolt with 3/4" Head and Pivot Bolt Nut 3/4",
- (2) 1/4" 20 Bolts with Wing Nuts for Mounting Scale,
- 1/2 Drive Deep Impact Socket supplied.
- 5,000lbs Pre-calibrated S-Beam Load Cell with Eye Bolts
- LCD Display with (3) AA Batteries (batteries included)

Recommended

- Follow OSHA requirements and wear a Hard Hat,
- Gloves, Safety Glass Wear and Work Boots

Recommended Tools

- High Torque Drill with 1/2" Drive
- (300-600lbs) of torque

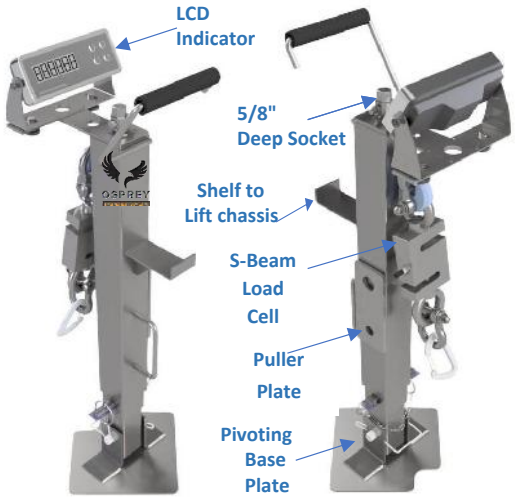


Figure 1.

Figure 2.

Figure 3.

Recommended Best Practices

- Use High Torque Drill w/ 1/2" Drive *(Figure 3)*
- Use pivot action of Osprey PowerJack™ Swivel Shoe Plate to match outward angle in which Anchor was driven into ground
- Use Osprey PowerJack™ Pull Plate with Magnet (face down) to remove an Anchor Drive Rod. Pull Plate will shape after first use
- Once the first Anchor pull test is achieved release tension on Cable by reversing the torque setting on the Impact Drill, then slide the Wedge Grip and Washer down Cable on the Osprey PowerPlatform® Shoe Plate. Repeat on all Anchor tests
- Place the Osprey PowerJack™ steel shelf under an Osprey PowerPlatform® C-Channel member to raise the front or rear chassis Stud or End Stud if you need to level any soil under an Osprey PowerPlatform® Shoe Plate
- Calibrate S-Beam annually

Assembly Required

Step 1: Insert (3) AA batteries (included) and mount the LCD Display Indicator (optional) to top Bracket *(Figure 1)*.
Step 2: Remove Pivot Pin from Swivel Shoe Plate. Insert PowerJack™ drop leg. Insert Pivot Bolt and tighten with 3/4" Socket.
Step 3: Connect Two Turn Buckles (included) to I Bolts on S-Beam Load Cell *(Figure 2)*.
Step 4: Slide top turn buckle into Hook on Osprey PowerJack™ *(Figure 2)*.
Step 5: Connect cord to back of LCD Display. Turn on LCD Display and zero out Scale before use.
Warranty: One (1) Year Warranty from date of purchase.

Solar Modules

The following solar modules have been evaluated and tested to Standard UL2703 and cETL using Self-Bonding Module Strut Mid Clamp Assembly M8-1.25x75mm Hex Bolt - 13mm Hex [Torque to 200 in-lbs or 23 Nm]. Our rails are designed to fit a panel 81" tall x 41.3" wide.

-	Manufacturer	Model Numbers
1	Canadian Solar	CS6X-310|315|320P, CS6X-P-FG, CS6K-P-FG, CS6K-M, CS6K-M AB, CS6P-P, CS6P-P-SD, CS6V-M
2	Certainteed Corp.	CTxxxM00-03, CTxxxM10-03, CTxxxM11-03
3	CSUN	CSUNxxx-72MH (xxx can be 355 – 375 with 5 watt interval) QSAR 255-60M, QSAR 260-60M, QSAR 265-60M, QSAR 270-60M, CSUN310-60MH-BB
4	GCL	P6/72-330, M6/72H 365-400
5	Hansol	HSxxx-UD-AN1, HSxxx-UB-AN1
6	Hanwha Q Cells	Q.PRO BFR G4|G4.1|G4.3, Q.PLUS BFR G4.1, Q.PRO G4, Q.PLUS G4, Q.PRO L G4.1,Q.PLUS L G4.1|G4.2, Q.PEAK-G4.1|G4.1/MAX, Q.PEAK BLK G4.1, Q.PEAK L G4.2, HSL72P6-PC-3-xxxT (xxx = power class), Q.Peak Duo L-G5.2 380-395, Q.Peak Duo L-G8.2
7	JA Solar	JAM6(K)-72-xxx/PR
8	Jinko	JKM xxx P-60, JKM xxx PP-60, JKM xxx M-60, JKM xxx M-60B, JKMS xxx PP-60, JKMS xxx P-60, JKMSxxx-72, JKMxxxP-72, JKMSxxxP-72, JKMxxxM-72, JK07A (JKMSxxxPP-60 & JKMSxxxPP-72), JK07B (JKMSxxxPP-60), JKMxxx PP-60(Plus), JKM xxx PP-60B, JKM xxx M-60B, JKMSxxxM-60, JKMSxxxM-60-EP, JKM xxx P- 72B, JKMxxxPP-72, JKMxxxPP-72B, JKMxxxPP-72(Plus), JKMSxxxPP-72, JKMxxxM-72-V, JKMxxxPP-72-V, JKMxxx-72L-V, JKMxxx-72HL-V, JKMxxxM-60L, JKMxxxM-60BL, JKMxxxM-60HL
9	LG	LGxxxN1C-G4, LGxxxN1W-G4, LGxxxS1C-G4, LGxxxS1W-G4, LGxxxN1K-G4, LGxxxN2C-B3, LGxxxN2W-B3, LGxxxN1C-A5, LGxxxS1C-A5, LGxxxN2W-A5, LGxxxS2W-A5, NeON 2 Bifacial LGxxxN2T-A5
10	Mission	MSExxxSQ5T
11	Seraphim	SEG-6MA-xxx WW
12	Sunpower	SPR-X21-xxx, SPR-E20-xxx, SPR-P17
13	Talesun	TP572, TP596, TP654, TP660 (35mm/40mm), TP672, Hipor M350+ (40mm), Talesun Smart (35mm) M = Mono P = Poly B = Black T = Transparent (H) = 1500V without (H) is 1000V, TP6H72M / TP6H72(H)
14	Trina	TSM-PD14, TSM-PD05, TSM-PD05.08, TSM-PD05.05, TSM-PEG5, TSM-PEG5.07, TSM-PEG14, TSM-PEG40.07, TSM-DD14A(II), TSM-330-DD14A(II), TSM-335- DD14A(II), TSM-340-DD14A(II), TSM-345-DD14A(II), TSM-350-DD14A(II), TSM- 355-DD14A(II), TSM-DD06M.05, TSM-DE15H(II)
15	URE Solar	D6MxxxH4A
16	Yingli	YL xxxP-29b, YL xxxP-35b
17	Phono Solar	PS-xxxMH-24/TH, PS-xxx-60, PS-xxx-72 6
18	HT Solar	HT72-156M-V, HT60-156(M) (NDV) (-F), HT72-156(M/P)
19	Renesola	JCxxxM-24/Abw, Virus II 250-260W with 5 watt Interval, 156 Series 270-275W 20 Longi
20	Longi	LR6-72BP 355-375M 72 CELL, LR6-60 (40mm), LR6-72 (40mm), LR6-60 HV (40mm), LR6-72 HV (40mm), LR6-60 PH (40mm), LR6-72 PH (40mm), LR6-60 PE (40mm), LR6-72 PE (45mm), LR6-60 BK (40mm Black frame), LR6-72 BK (40mm Black frame), LR6-60 PB (40mm Black frame), LR6-72 PB (45mm Black frame) Number in paranthesis signifies frame profile height, LR6-72-xxxM, LR6-72HV-xxxM, LR6-72BK- xxxM, LR6-72PE-xxxM, LR6-72PHxxxM, LR6-72PB-xxxM, LR6-60-xxxM, LR6-60BK- xxxM, LR6-60PE-xxxM, LR4-60HPB/HIBxxxM, LR4-60HPH/HIH-xxxM, LR4-72HPH/HIH-xxxM, LR6-72BP-xxxM, LR672HBD/HIBD-xxxM, LR6-60BP-xxxM, LR6-60HBD/HIBD-xxxM
21	REC	REC-320TP2M, PEAK Energy Series, PEAK Energy BLK2 Series, PEAK Energy 72 Series, TWINPEAK 2 SERIES, TWINPEAK 2 BLK2 SERIES, TWINPEAK SERIES
22	Risen	RSM72-6-xxxM/5BB, RSM72-6 (MDG) (M), RSM60-6
23	Heliene	72M, 36M, 60M, 60P, 72P
24	Axitec	AC-xxxMH/120S (AXIblackpremium HCSeries), AXIblackpremium 60 (35mm), AXIpower 60 (35mm), AXIpower 72 (40mm), AXIpremium 60 (35mm), AXIpremium 72 (40mm)

Solar Modules

The following solar modules have been evaluated and tested to Standard UL2703 and cETL using Everest Cross Rail EC Silver Mid Clamp, SS UL2703 35-50mm [120 in-lbs (16 Nm)]. Our rails are designed to fit a panel 81" tall x 41.3" wide

-	Manufacturer	Model Numbers
1	Canadian Solar	CS6X-310|315|320P, CS6X-P-FG, CS6K-P-FG, CS6K-M, CS6K-M AB, CS6P-P, CS6P-P-SD, CS6V-M
2	Certainteed Corp.	CTxxxM00-03, CTxxxM10-03, and CTxxxM11-03
3	CSUN	CSUNxxx-72MH (xxx can be 355 - 375 with 5watt interval), QSAR 255-60M, QSAR 260-60M, QSAR 265-60M, QSAR 270-60M
4	GCL	P6/72-330, M6/72H 365-400.
5	Jinko	JKM xxx P-60, JKM xxx PP-60, JKM xxx M-60, JKM xxx M-60B, JKMS xxx PP-60, JKMS xxx P-60, JKMSxxx-72, JKMxxxP-72, JKMSxxxP-72, JKMxxxM-72, JK07A (JKMSxxxPP-60 & JKMSxxxPP-72), JK07B (JKMSxxxPP-60), JKM xxx PP-60(Plus), JKM xxx PP-60B, JKM xxx M-60B, JKMSxxxM-60, JKMSxxxM-60-EP, JKM xxx P-72B, JKMxxxPP-72, JKMxxxPP-72B, JKMxxxPP-72(Plus), JKMSxxxPP-72, JKMxxxM-72-V, JKMxxxPP-72-V, JKMxxx-72L-V, JKMxxx-72HL-V, JKMxxxM-60L, JKMxxxM-60BL, JKMxxxM-60HL
6	Seraphim	SEG-6MA-xxx WW
7	Sunpower	SPR-X21-XXX, SPR-E20-xxx, SPR-P17.
8	Talesun	TP572, TP596, TP654, TP660 (35mm/40mm), TP672, Hipor M350+ (40mm), Talesun Smart (35mm) (M = Mono, P = Poly, B = Black, T = Transparent, (H) = 1500V without (H) is 1000V).
9	Trina	TSM-PD14, TSM-PD05, TSM-PD05.08, TSM-PD05.05, TSMPEG5, TSM-PEG5.07, TSM-PEG14, TSM-PEG40.07, TSM-DD14A(II), TSM-330-DD14A(II), TSM-335-DD14A(II), TSM-340-DD14A(II), TSM-345-DD14A(II), TSM-350-DD14A(II), TSM-355-DD14A(II), TSM-DD06M.05, TSM-DE15H(II)
10	URE Solar	D6MxxxH4A
11	Yingli	YL xxxP-29b, YL xxxP-35b

On Site Assembly

The Osprey Powerplatform® can be assembled at any outdoor location. The Osprey Powerplatform® is designed to be built first and then oriented on job site then spliced together at the strut rails which will work out your spacing between *Osp*rey units. Once the Osprey is leveled, aligned, and oriented commence with driving the anchors through the base plates. The Osprey Powerplatform® is available in Standard Duty [STD], Heavy Duty [HD], and Extra Heavy Duty [XHD] models.

Components and Hardware

All components and hardware required for the final assembly and installation of an Osprey PowerPlatform® are shipped with sales order. A comprehensive Bill of Materials [BOM] is provided with every delivery. Contractors should thoroughly check the Bill of Material (BOM) and visually inspect inventory on every shipment. Any discrepancies need to be reported to Nuance Energy within 5 days of receipt of product and BOM. Per the terms of the Warranty, damaged goods should be reported directly to *a* Nuance Energy Representative.

Components *Continued...*

- Front & Rear Chassis, *(2 per Osprey)*
- Chassis Stud, 3 per unit *(2 per for 2x5)*
- Strong Back, 3 per unit *(2 per for 2x5)*
- Strut Rails, 8 per unit *(4 per for 2x5)*
- Power Adjustable Leg, *6 per for 2x8, 2x7 and 2x6 (4 per for 2x5)*
- Chevron Cable Brace, *6 per STD/HD/XHD for 2x8, 2x7 and 2x6 (4 per for 2x5)* w/ hardware
- Rack Mounting Bracket - *STD, 3 per (2 per unit for 2x5) [4 Hole]*
- Rack Mounting Bracket - *HD/XHD, 3 per (2 per for 2x5) [8 Hole]*
- Back Brace, 3 per unit *(2 per for 2x5)*
- Back Brace Bracket, *6 per unit (4 per for 2x5)*
- Splice Plates, 8 *per (4 to connect to next Osprey) (4 required for 2x5 to connect to next Osprey)*
- Universal Cable Braces, *2 per Osprey*
- Dynamic Cable Grip Locks, *4 per Osprey for use with Chevron Cable Brace Leg Brace and Universal Cable Braces*
- Adjustable End Clamps, *8 per stand-alone Osprey now included in BOM*
- Self-Bonding Mid Clamps, *(32)* per 2x8, *(28)* per 2x7, *(24)* per 2x6, *(20)* per 2x5, these quantities reflect 4 additional mid clamps for connecting Ospreys together at the rail now included in BOM
- Earth Anchors *(Refer to Engineering report for quantity and required test loads)*
- Nuance offers 3 anchor options for length and 2 anchor sizes for hard / soft soil conditions
- 1 type for Hard Rocky Soil and 1 type for Soft/Sandy Soils
- Lengths available are 48", 65" driven depth and 96" driven depth. Please specify on your order which depth you would like to receive
- The 96" Anchor length requires a 9' drive rod

Hardware

- Serrated Flange Bolt - 9/16" Hex 3/8"-16 x 1" **[Torque to 33 ft-lbs]**
- Serrated Flange Bolt -9/16" Hex3/8"-16 x 2.5" **[Torque to 33 ft-lbs]**
- Serrated Flange Nut - 9/16" Hex 3/8"-16
- Self-Bonding Module Strut Mid Clamp Assembly M8-1.25x75mm Hex Bolt - 1/2" Hex **[Torque to 200 in-lbs or 23 Nm]** Tested to 3,000 lbs of pull force by Third Party Lab.
- Adjustable Module Strut End Clamp AssemblyM8-1.25x25mm Socket Head Cap Screw -6 mm Allen **[Torque to 200 in-lbs or 23 Nm]** Tested to 500 lbs of pull force by Third Party Lab.
- Everest Cross Rail EC Silver Mid Clamp, SS UL2703 30-- 50mm **[Torque to 120 in-lbs (16 Nm)]**

Assembly Osprey Chassis

Two Installers ~ Duration: 10 minutes

The Osprey Chassis is easily assembled on site. Complete each chassis build as a stand alone unit first then if splicing multiple units together splicing each unit together at the strut rail. Using a simple string line and impact drill align each Osprey unit even using the Power Adjustable Leg. Once each Osprey Powerplatform® is aligned, leveled, straightened you can then install the Earth Anchors. Once all anchors have been driven and tested, proceed to mounting the panels. The use of a string line for aligning panels is preferred as the strut rails may not always be 100% straight like they are on an extruded aluminum rail. **The Chevron Cable Braces are the very last component to get installed before solar panels.**

This assembly example is for a (6) leg Osprey Powerplatform® which is very similar to a four leg Osprey Powerplatform® for the 2x5 (10 Panel Osprey Model). Measuring corner to corner will help square up the chassis and should be done before proceeding to the next step. Refer to Figure 1(a) below the STD version and Figure 1(b) on next page for HD/XHD version.

2x8/2x7 Osprey Units use a common Hybrid or Universal F/R chassis member. Use the outer set of holes for the 2x8 frame and the inner set of holes for the 2x7 frames. The middle set of holes are the same for both type Osprey units.

2x6/2x5 Units use a common Hybrid or Universal F/R chassis member. Use the outer holes for the 2x6 Frame along with the middle holes. The 2x5 Frame uses the inner holes (not the middle holes) along with the 2x5 Rail.

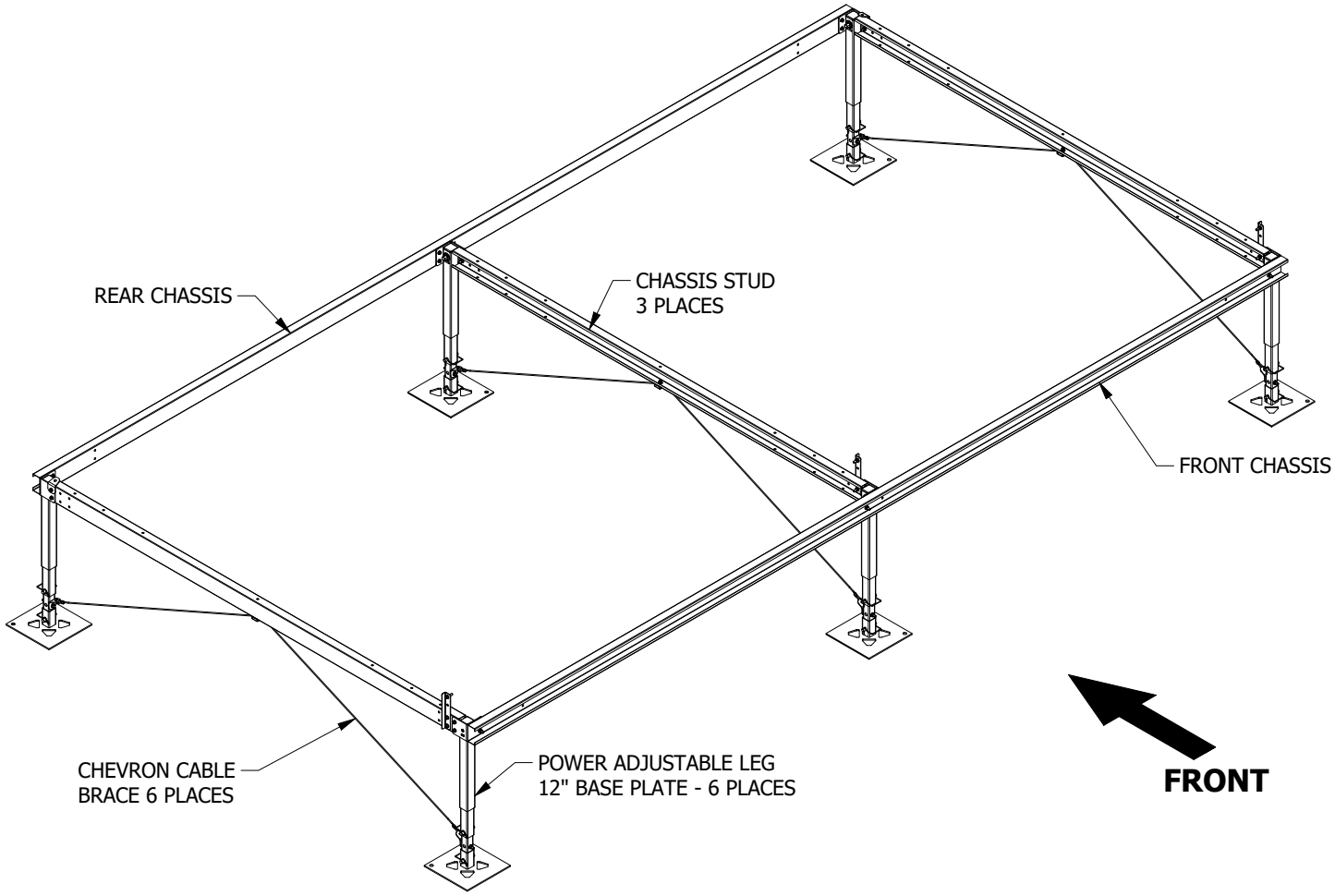


FIGURE 1(a): Osprey Chassis - STD

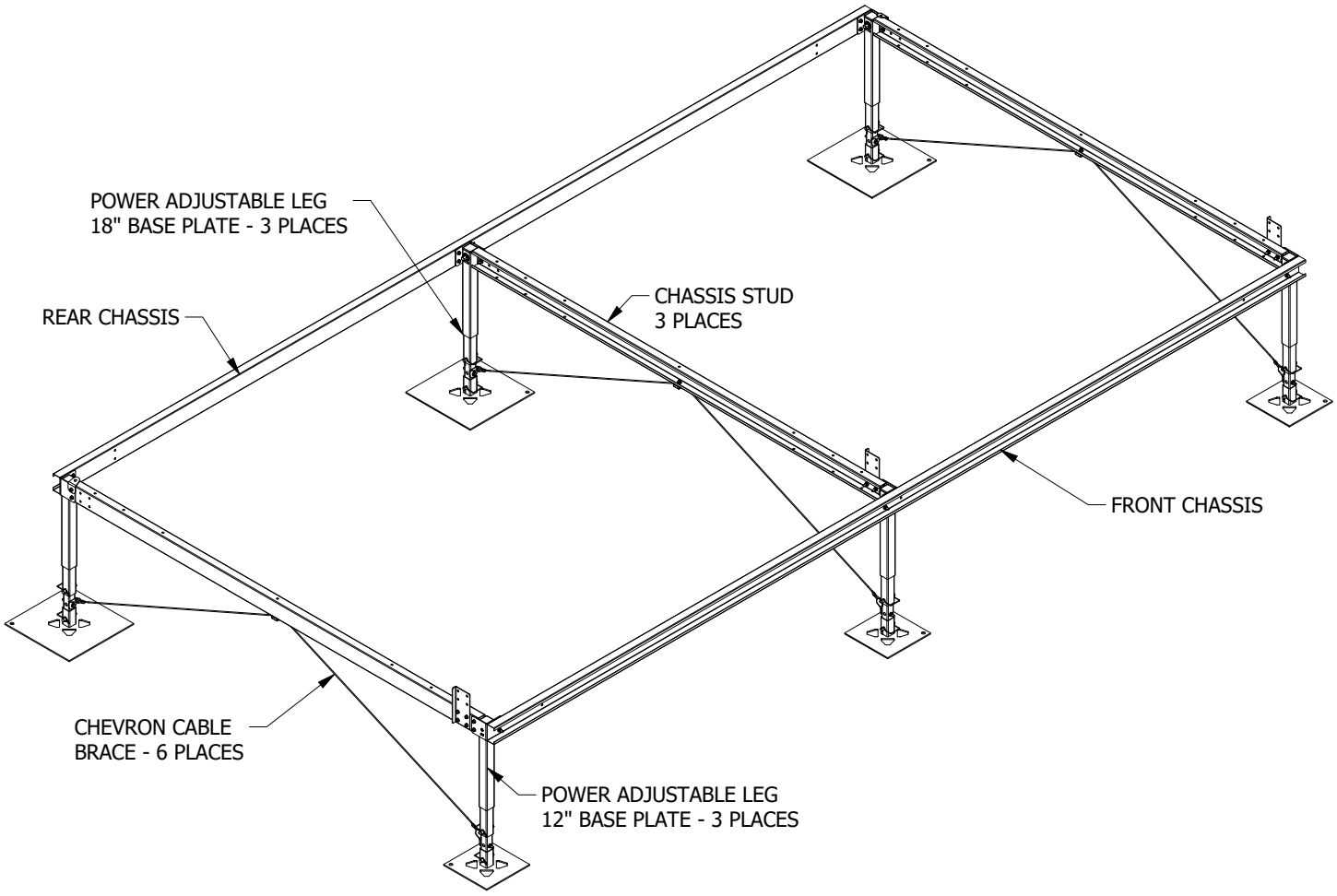


FIGURE 1(b): Osprey Chassis - STD/HD/XHD

1. Begin Chassis assembly by having the Assemblers unpack (6) Power Adjustable Legs. Insert the bottom tube of the leg into the base plate and secure with pin assembly. See Figure 2 on next page and make sure to expose the four lower holes on the bottom tube.

In the STD Version, only Power Adjustable Legs with 12 "Base Plate need be installed. In HD and XHD versions the Power Adjustable Legs with 12" Base Plate will be installed in the front and Power Adjustable Legs with 18 "Base Plate in the rear.

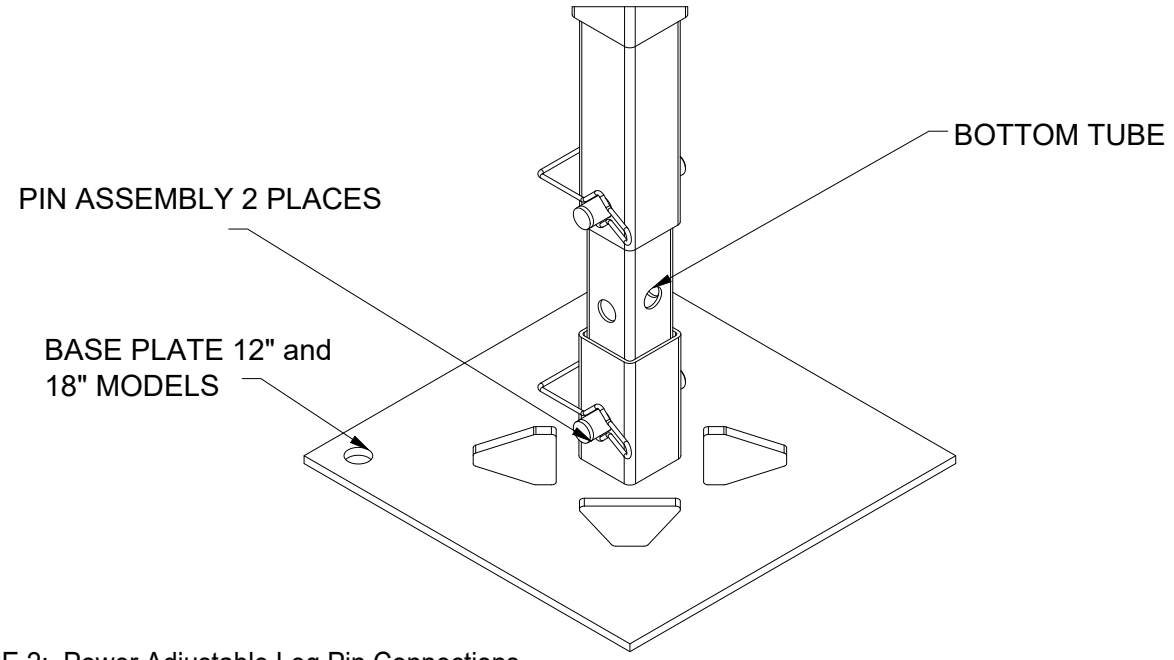


FIGURE 2: Power Adjustable Leg Pin Connections

2. Next place the Front & Rear Chassis lengthwise at the location of the first Osprey PowerPlatform®. Attach to the Angle Bracket of the Power Adjustable Leg with (2) 3/8"-16 x 1" serrated flange bolts and nuts making sure to align the Leg as seen below for the outside corners. See Figure 3 below:

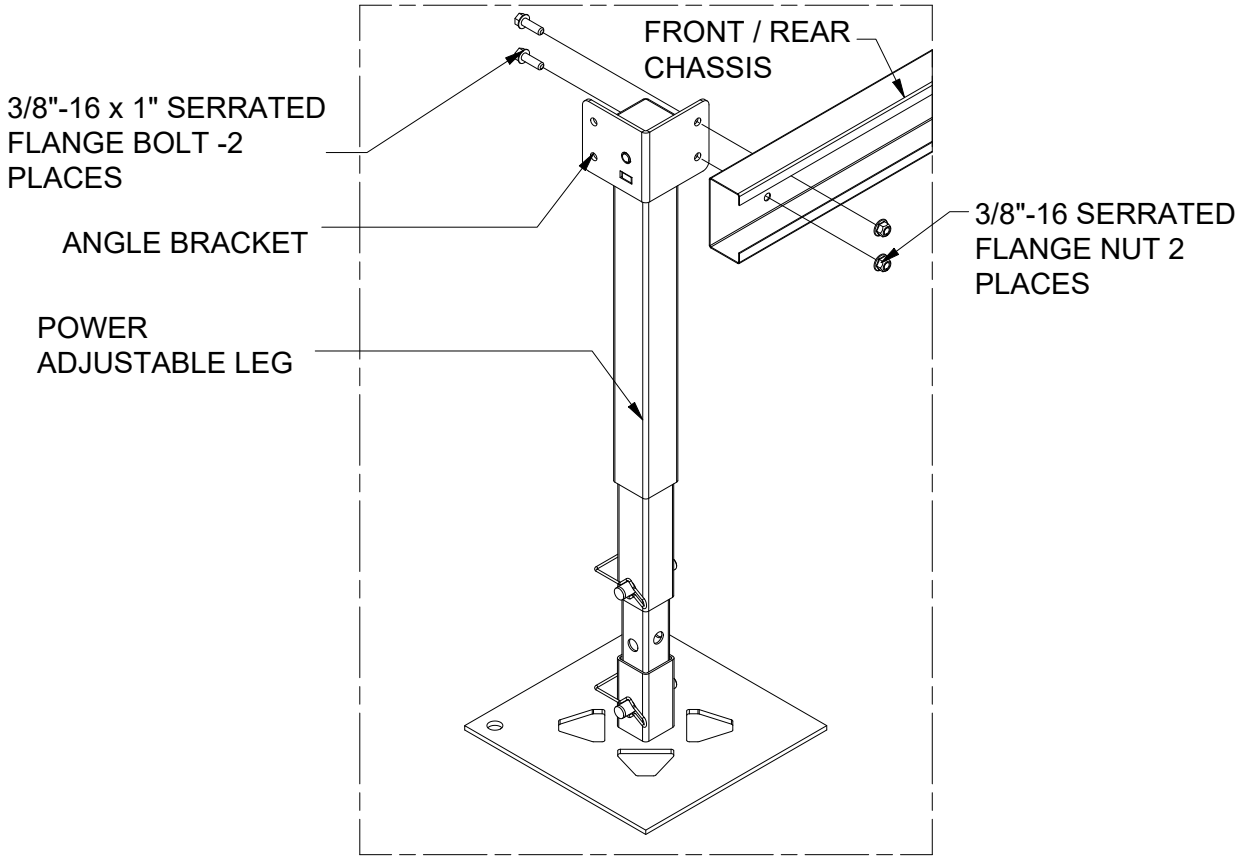


FIGURE 3: Front/Rear Chassis to Angle Bracket on Power Adjustable Leg

3. Place *(3)* Power Adjustable Legs just inside the Front Chassis and the other *(3)* Power Adjustable Legs just inside the Rear Chassis. The legs will create the corners of the Osprey PowerPlatform®. Note that there are *(4)* pre-punched holes in the center of the chassis. It doesn't matter which set of holes are used as long as they mirror each other front to back and the tube of the leg lines up between both sets of holes. Refer to Figure 4 below. Figure 5 shows similar detail for the HD/ XHD versions of the Osprey PowerPlatform®.

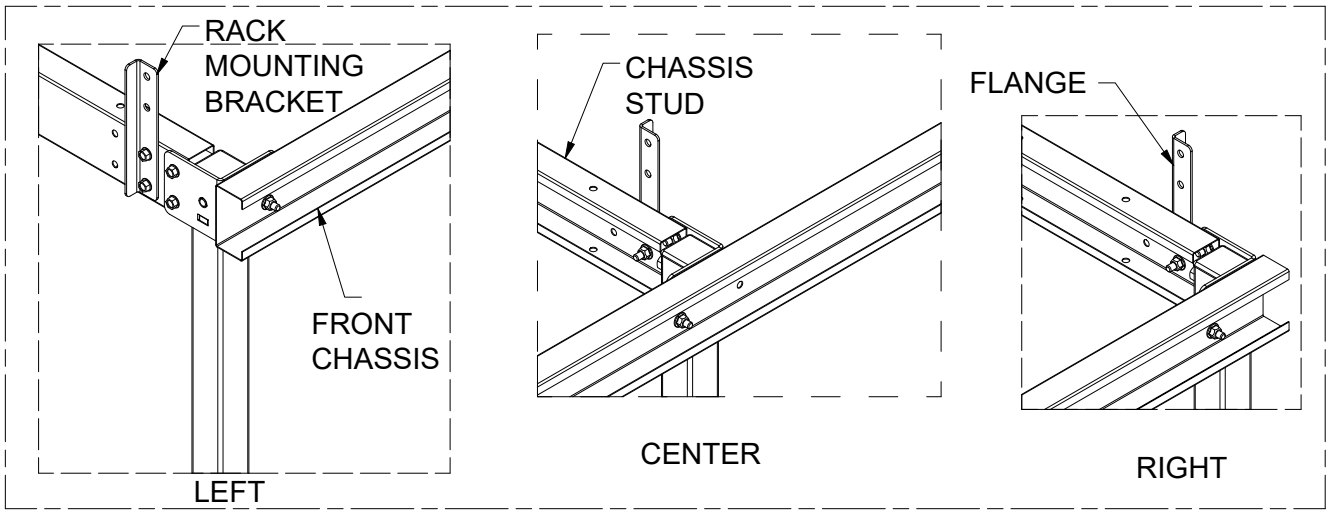


FIGURE 4: Chassis Assembly - STD

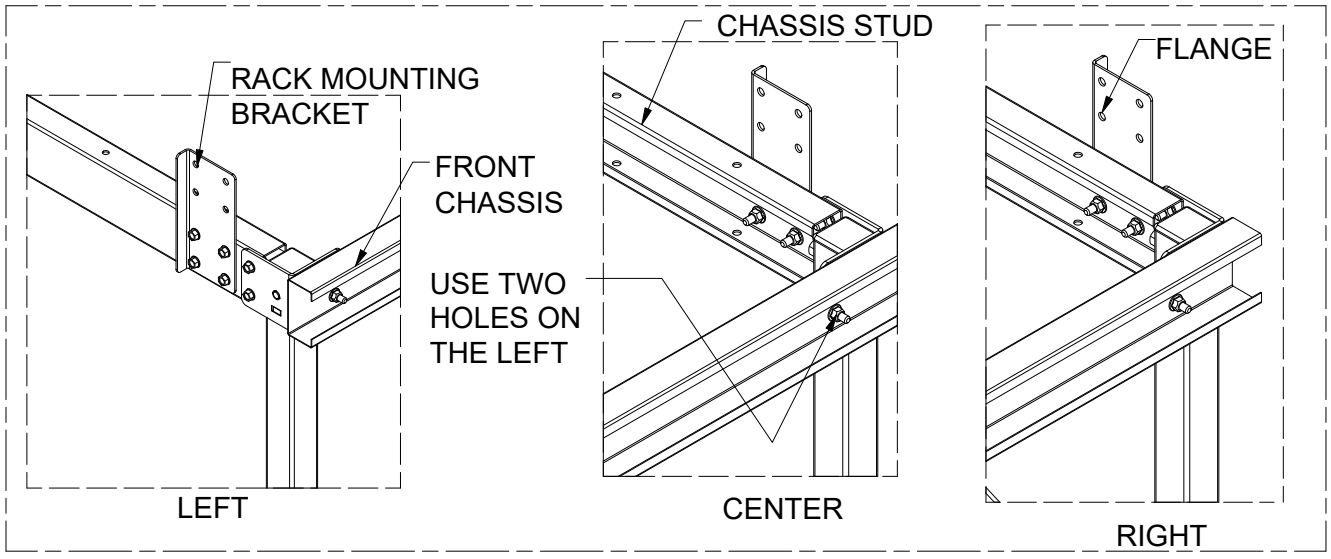


FIGURE 5: Chassis Assembly - HD / XHD

4. Place three Chassis Studs perpendicular to the Front & Rear Chassis aligned with the Power Adjustable Legs near the corresponding pre-punched bolt holes. Note how Chassis Studs are oriented in Figure 4 & 5 above and Figure 6a below. Place the two Eye Brackets on outer Rear Power Leg as Figure 6b below.

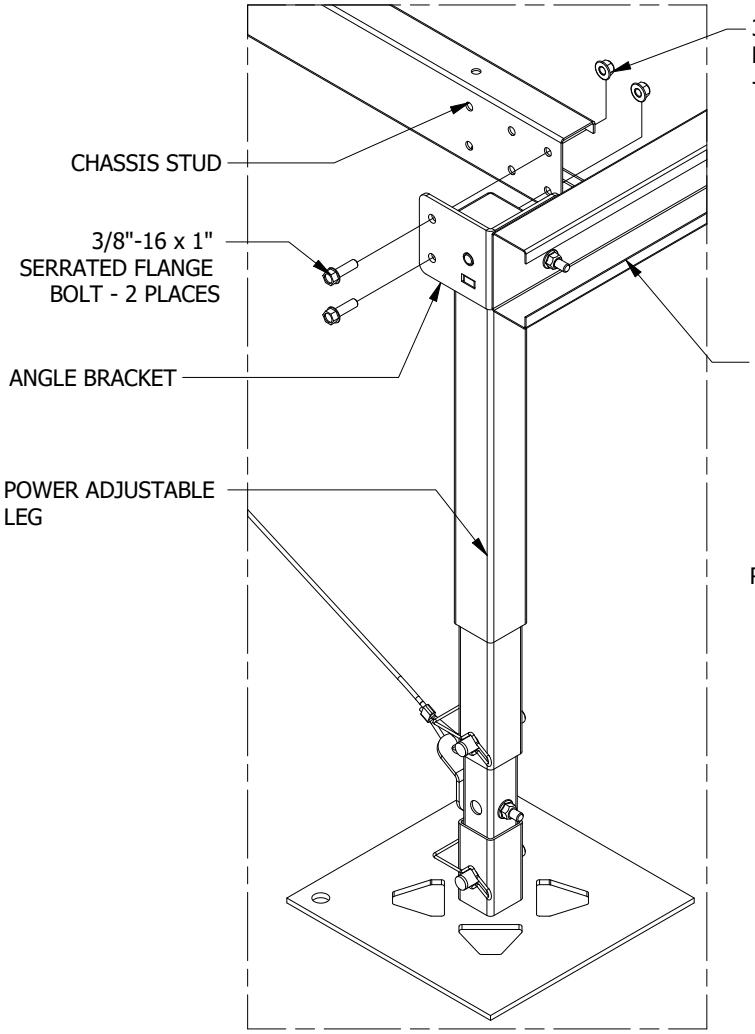


Figure 6a: Chassis Stud to Angle Bracket on Power Adjustable Leg

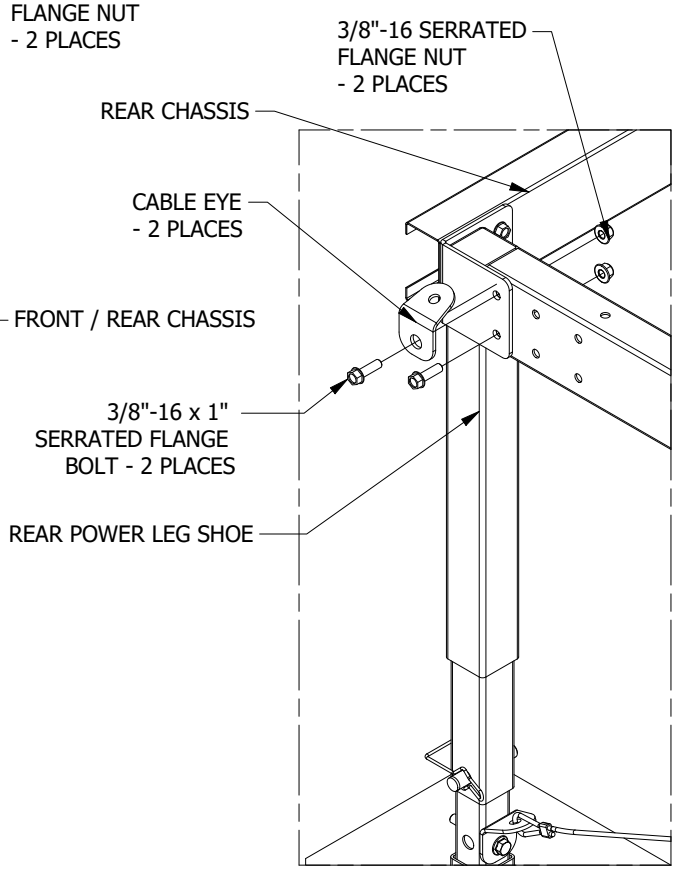


Figure 6b: Cable Eyes for Universal Cable Brace Install

5. Install the Rack Mounting Brackets with the Flange facing away from the Front Chassis. Attach with 3/8"-16 x 1" serrated bolts and nuts. Using a tape measure,verify the Chassis is square by measuring from corner to corner and adjusting as necessary.

6. Verify that nut and bolts are properly installed and torqued using an impact driver.

7. Assemble the Chevron cable Brace with D4 Dynamics. Install the D4 Dynamic on center hole of Chassis Stud as figure 7(a). Install the Cable Eye on Power Legs (6x) as Figure 7(b).
See Figure 7 and 8 on next page.

8. Install the Cable Eyes as shown in figure 8(a). Go through the D4 Dynamic Holes as shown in figure 8(b) **but do not tighten the cables until all earth anchors have been tested and installed.**

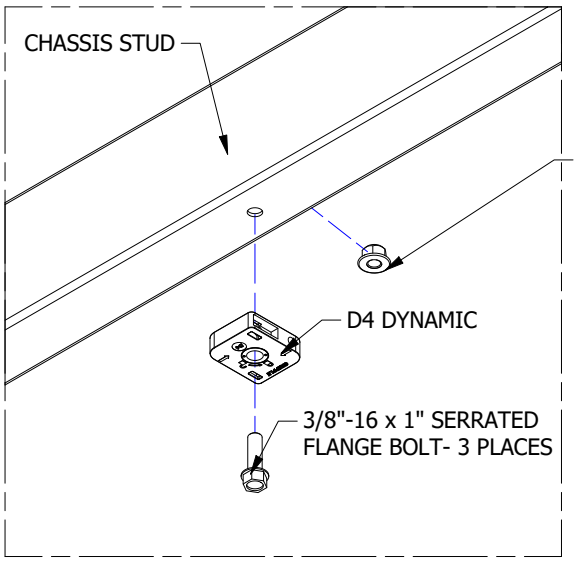


Figure 7(a) - D4 Dynamic Installation Procedure

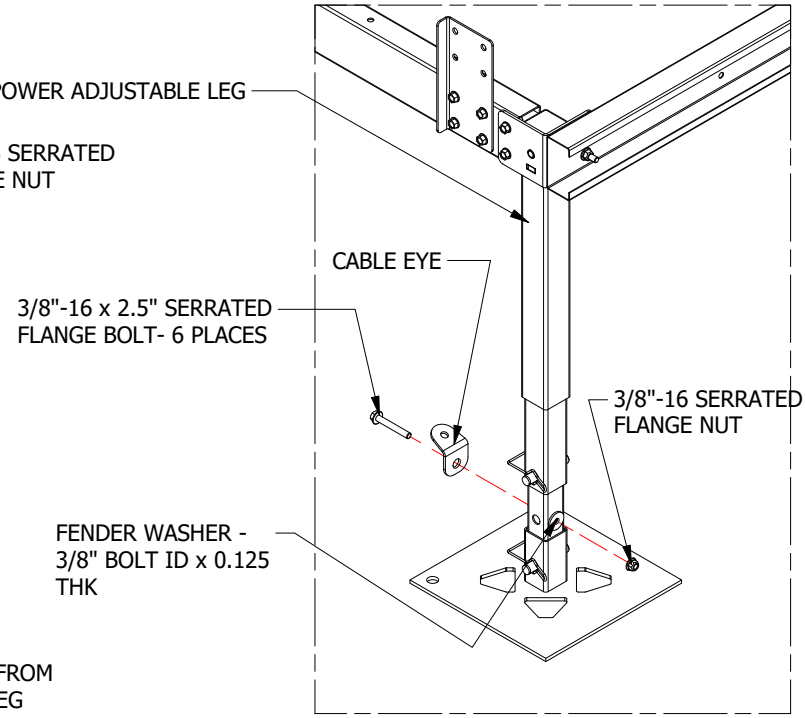


Figure 7(b) - Cable Eye Installation on Leg Shoe

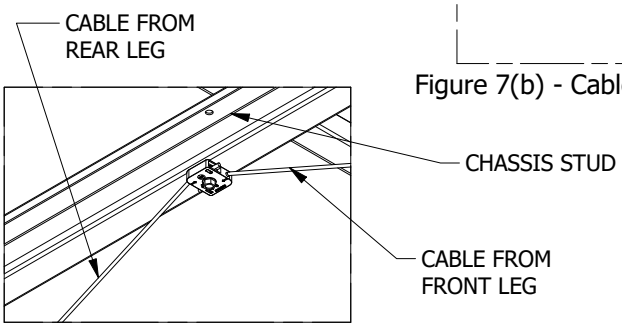


Figure 8(b) - Cable Routing Through the D4 Dynamic

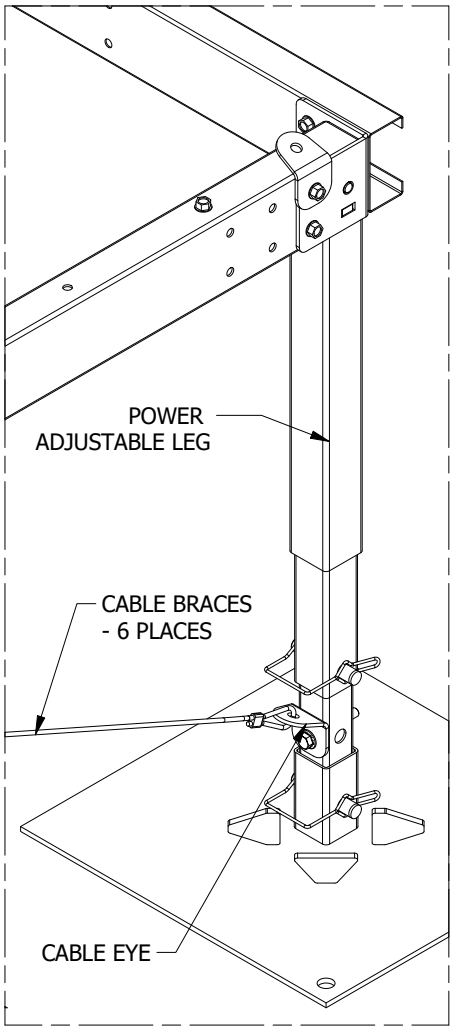


Figure 8(a) - Cable Loop and pressing

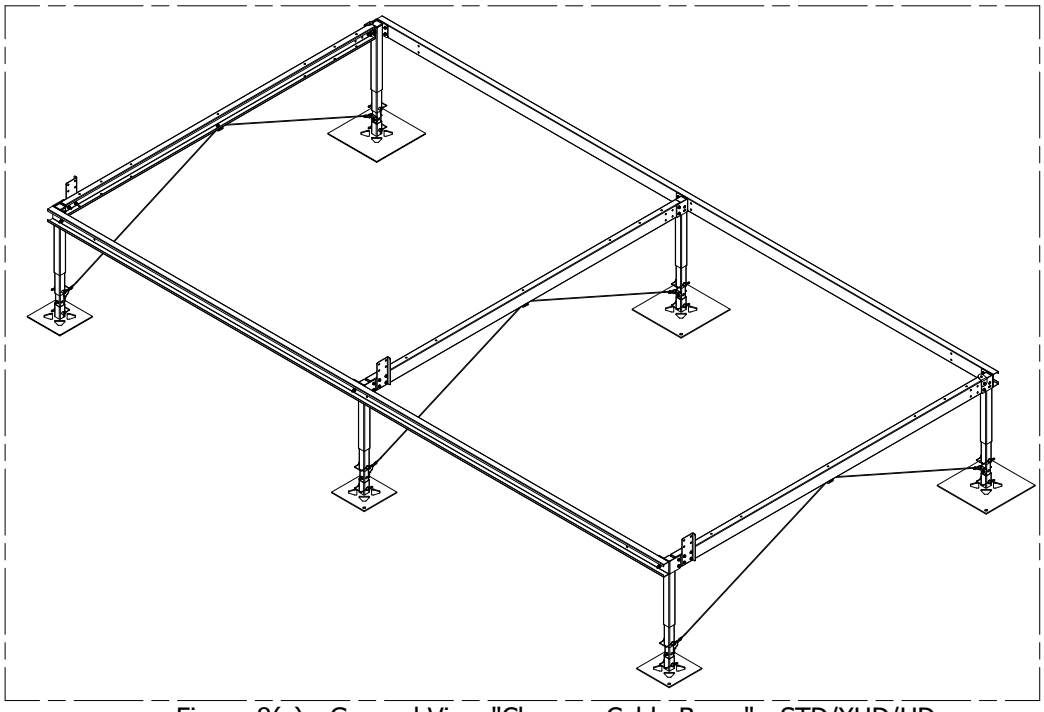


Figure 8(c) - General View "Chevron Cable Brace" - STD/XHD/HD

Strong Backs and Back Braces

Two Installers ~ Duration: 8-10 minutes

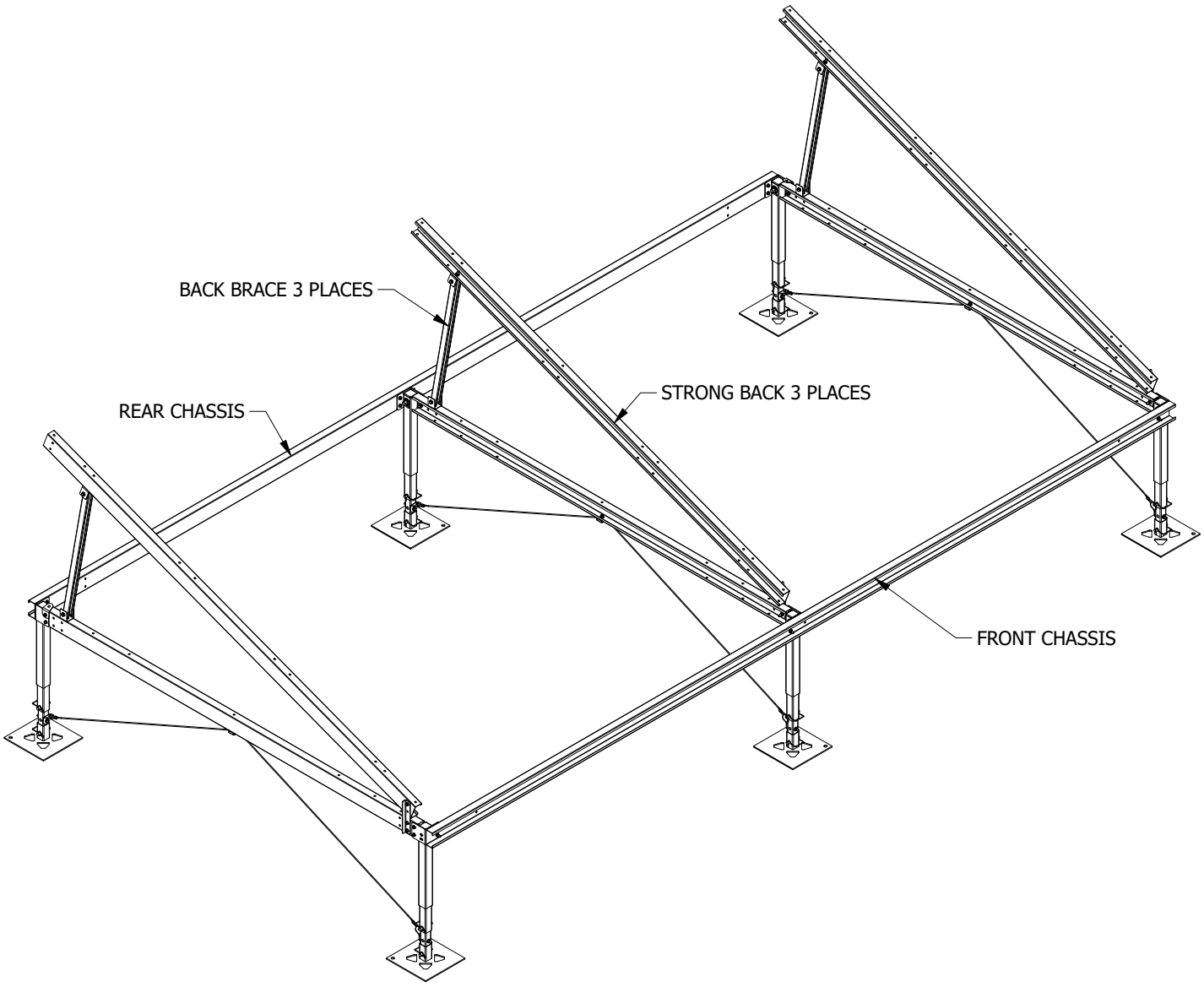


Figure 9: Strong Backs and Back Braces [STD Version shown above]

1. Attach a Back Brace Bracket without the Back Brace on the top rear hole of each of the Chassis Studs with 3/8"-16 x 1" serrated bolts and nuts. (Tighten before inserting back brace.)

2. Also, attach a Back Brace Bracket without the Back Brace to the second hole on the underside of the Strong Back with 3/8"-16 x 1" serrated bolts and nuts. (Tightenbefore inserting back brace.)

3. Place the Strongback in line with the Chassis Stud and bolt the Strong Back to the upper hole of the Rack Mounting Bracket. Refer to Figure 10 and Figure 11 below.

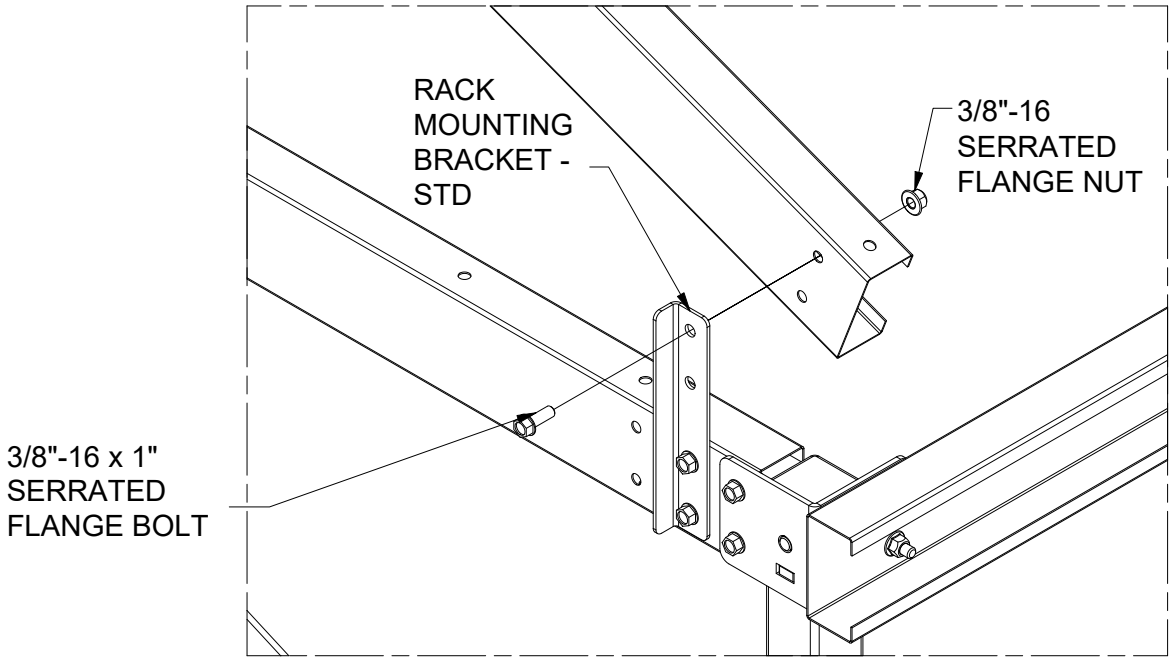


Figure 10: Strong Back to Rack Mounting Bracket - STD

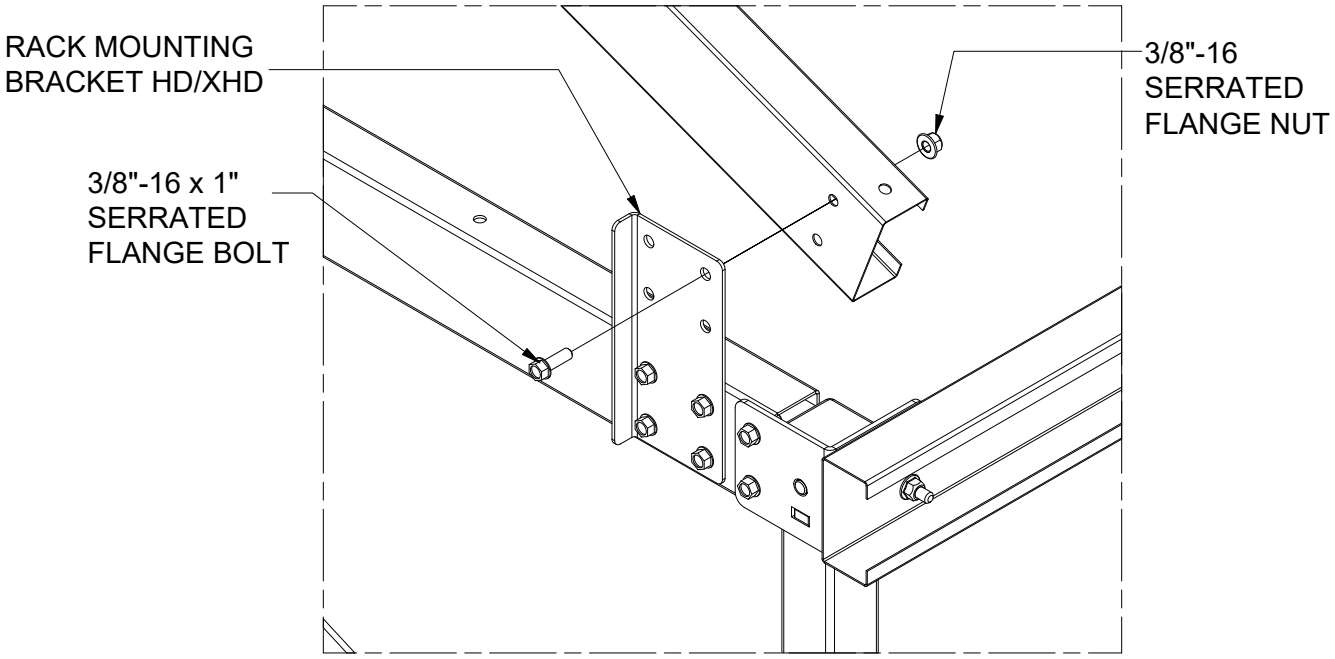


Figure 11: Strong Back to Rack Mounting Bracket – HD/XHD

4. Insert the Back Brace into the Back Brace Bracket on top of the Chassis Stud and insert 3/8"-16 x 2.5" serrated bolts through both pieces. Leave the nut and bolt hand tight. Refer to Figure 12 below.

5. Tighten the Back Brace Bracket to the Strong Back and Chassis Stud before inserting back brace.

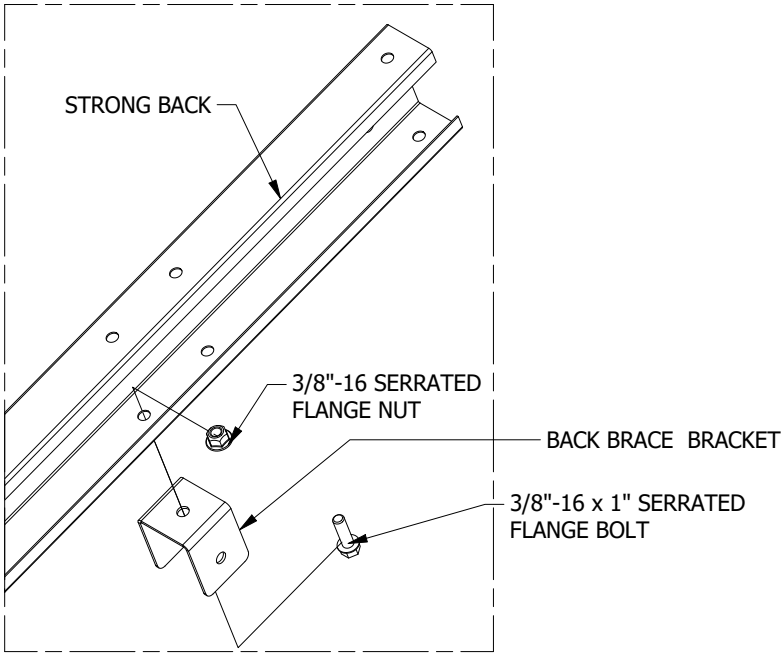


Figure 12: Back Brace Assembly (a)

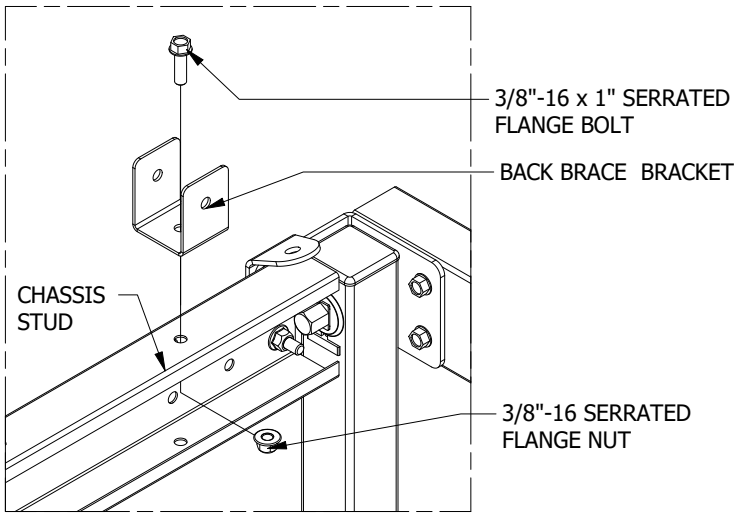


Figure 12: Back Brace Assembly (b)

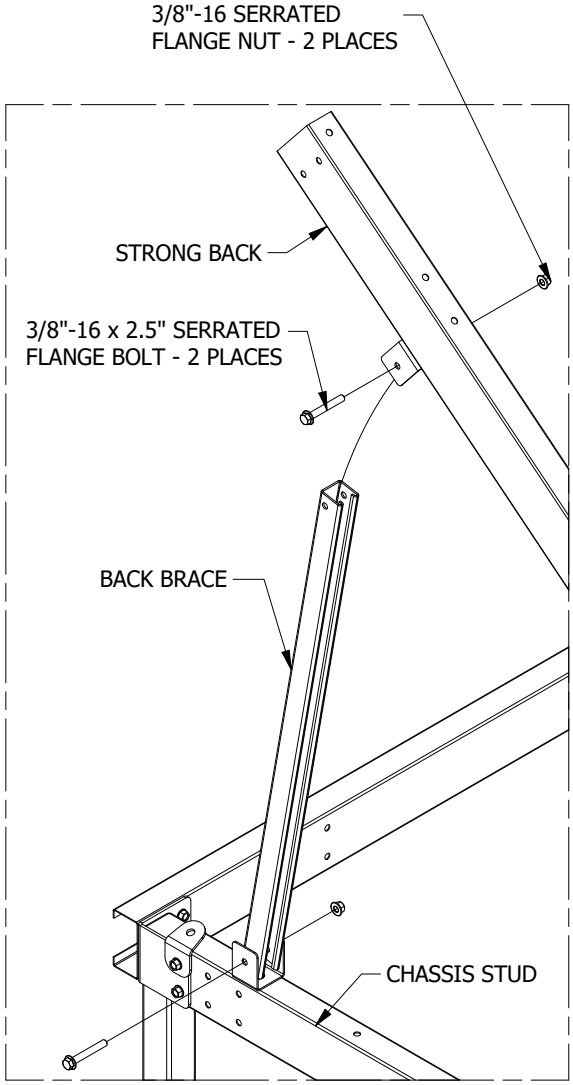


Figure 12: Back Brace Assembly (c)

6. Lift the rear end of the Strong Back and rotate the Back Brace upwards to meet with the Back *Brace Bracket on the underside of the Strong Back. Make sure the Back Brace is oriented with the lower hole near the Chassis Stud for proper cable brace assembly. Refer to Figure 13 on next page.*

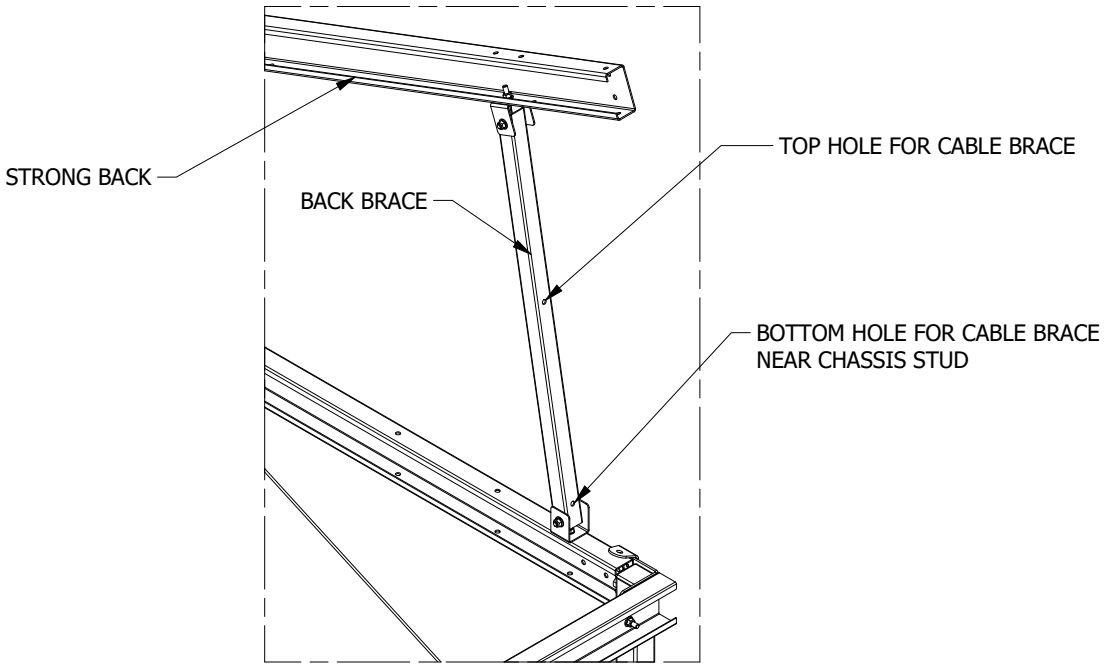


Figure 13: Back Brace Orientation for Cable Brace Attachment.
Note All Back Braces Should Be installed With The Same Orientation.

7. Insert 3/8"-16 x 2.5" serrated bolts and nuts through both pieces and tighten all connections with an impact driver.

8. Continue with the remaining two Back Brace Assemblies and tighten all connections between Strong Back and Rack Mounting Bracket.

9. Alternate method: The installers can install the back brace flat on the chassis pointing outward toward the rear of the platform prior to installing the rails which will allow for the rails to be installed flat on the chassis for easier fastening. Note: install the top of the Back Brace first and use as a pivot joint when lifting the upper section into place. Requires 3 installers. See Figure 14 on next page.

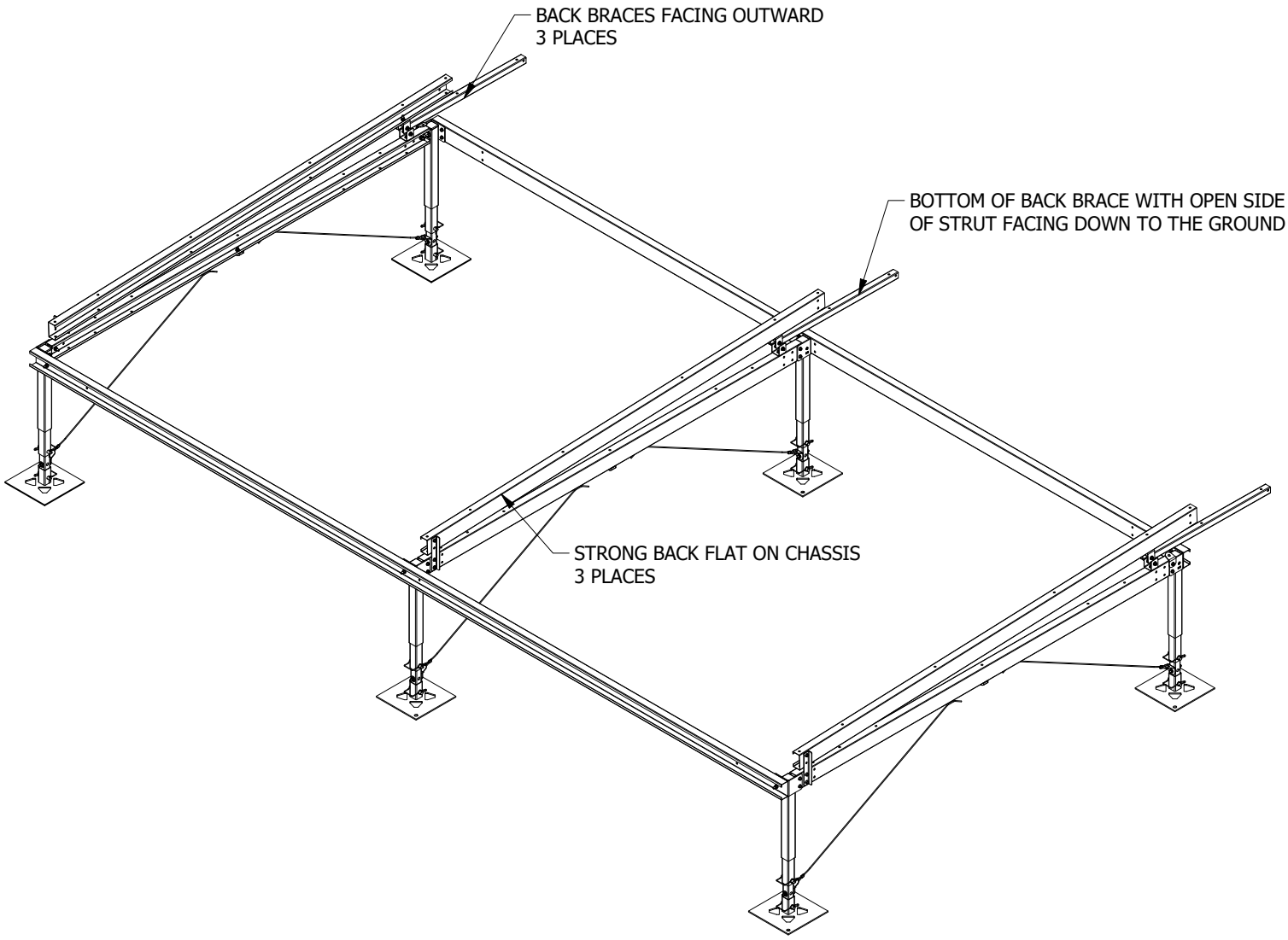


Figure 14: Alternate Back Brace Installation prior to installing Strut Rails.

Osprey Strut Rails

Two Installers ~ Duration: 10 minutes

The Osprey Strut Rails have symmetrical pre-punched holes so they can be installed in either direction. The rails connect with a splice place at the center of the Osprey PowerPlatform® for the 2x8, 2x7 and 2x6 Ospreys, while a continuous rail is used for the 2x5 version so splice plates are not required. Three (3) assemblers are required to lift assembly into place (the 2x5 Osprey can be done with 2 people) and insert the bottom bolts in the back brace which is already secured to the Chassis Stud. Our Universal Strongbacks can now receive both a 60 and 72 cell standard panel with added rail locator holes pre-punched in what used to be a 72 cell strong back only component.

The top rails on a 60 panel use the holes 10" in from either end of the strong backs. The inside rails for 60 cell use the holes 47" in from both ends of the Strongbacks. For the top rails on a 72 panel use the outside set of holes on the strong backs and the holes 42" in from each end of the Strongbacks.

Note: The 2x8 Strut Rail comes with the 2x7 Strut Rail holes pre-punched on one side on your next table. When installing a 2x7 Osprey PowerPlatform® you will need to cut down the center of the hole 20" in from one end. The strut rail length for a 2x7 Strut Rail is 149" x 2.

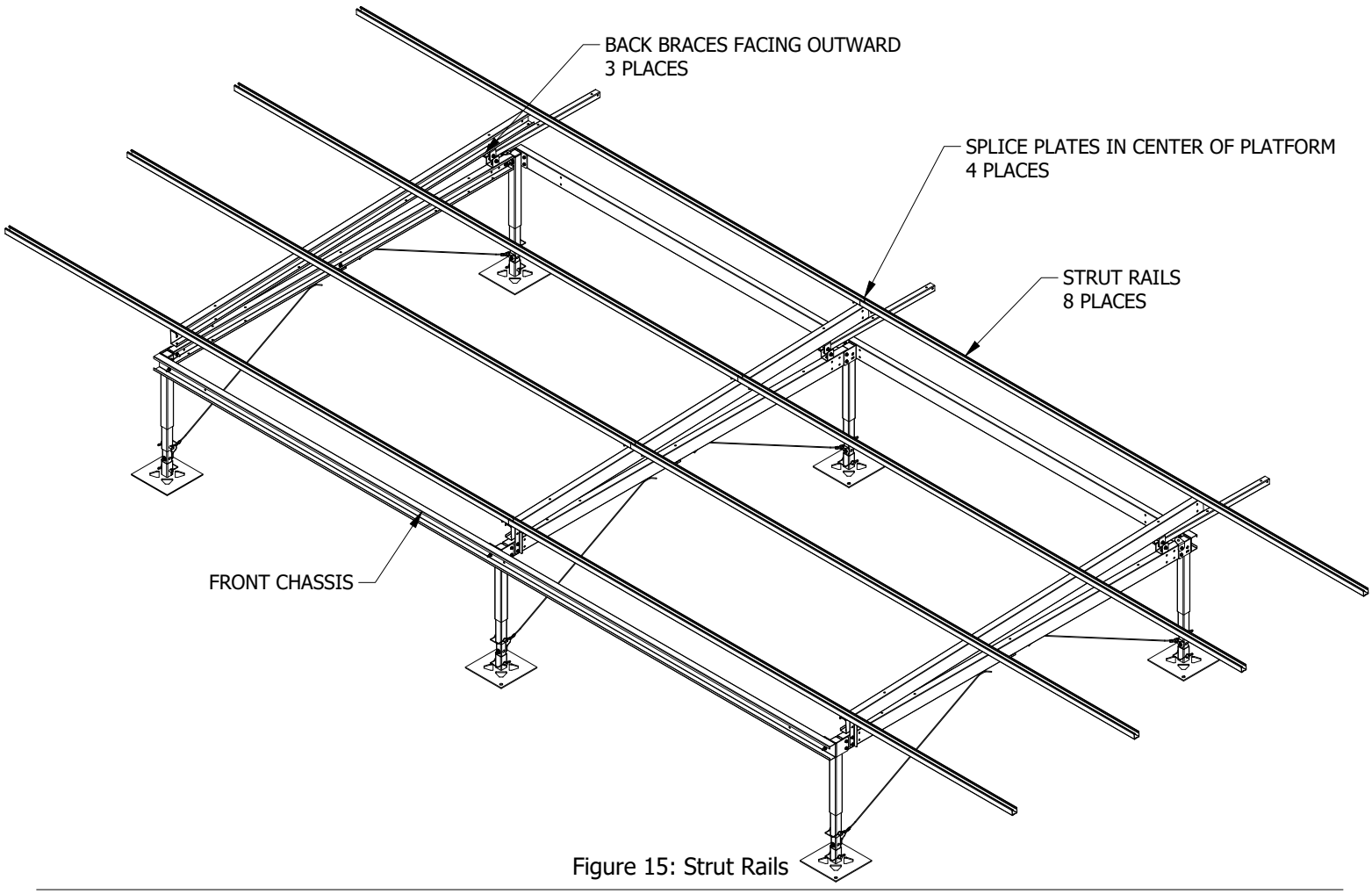


Figure 15: Strut Rails

1. Insert a Splice Plate halfway into one end of the Strut Rail, center the Chassis hole and bolt it with *a single 3/8"-16 x 1" serrated bolt and Figure 16 below.*

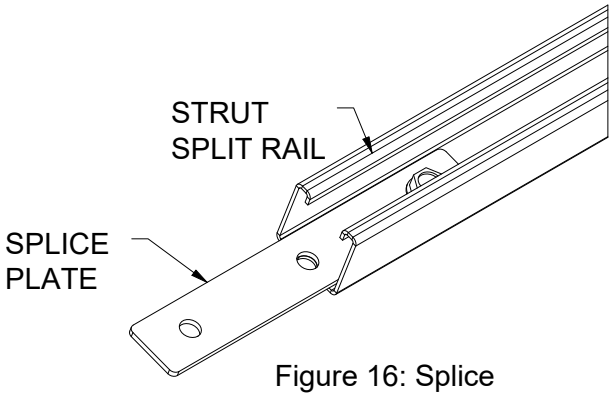


Figure 16: Splice Plate

2. Place the Strut Rail on the lower end of the Strong Backs with the Splice Plate centered on the center Strong Back.

3. Take another Strut Rail and insert one end into the loosely connected Splice Plate at the center Strong Back. Push the two rails together so they are flush. See Figure17 below.

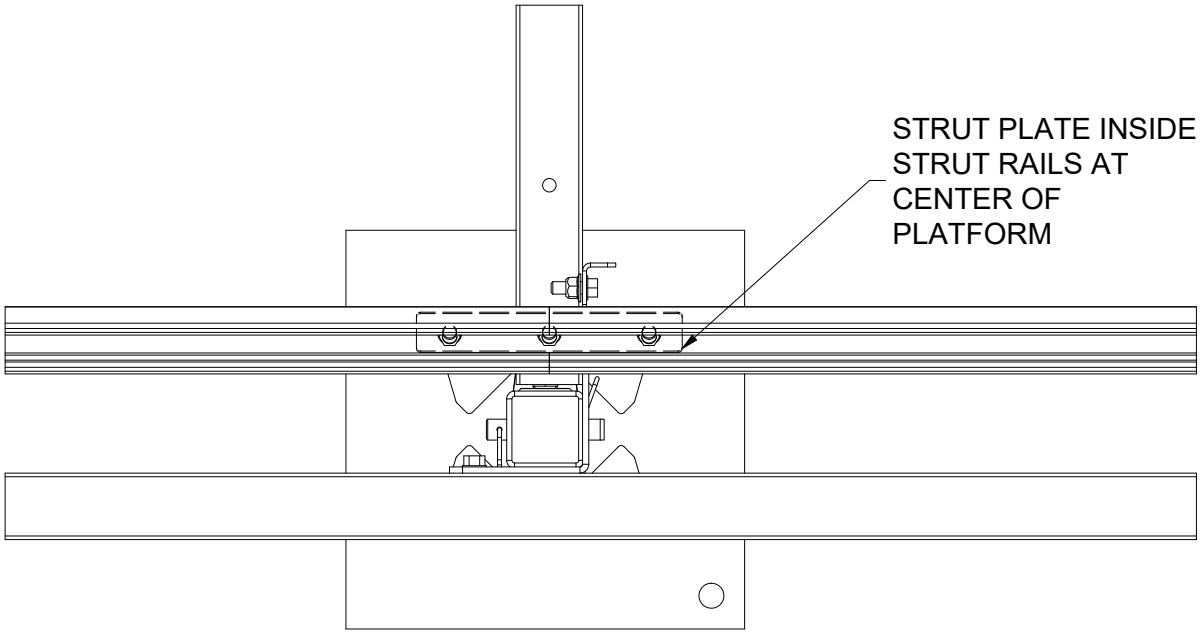


Figure 17: Strut Rail Assembly at Center of Platform

4. Complete the assembly by connecting the other two bolts and nuts. Confirm the Strut Rails are flush together and then tighten all connections with an impact driver.

5. Then bolt the other end of the Strut Rail to the end Strong Back with bolts and nuts. Refer to Figure 18 below.

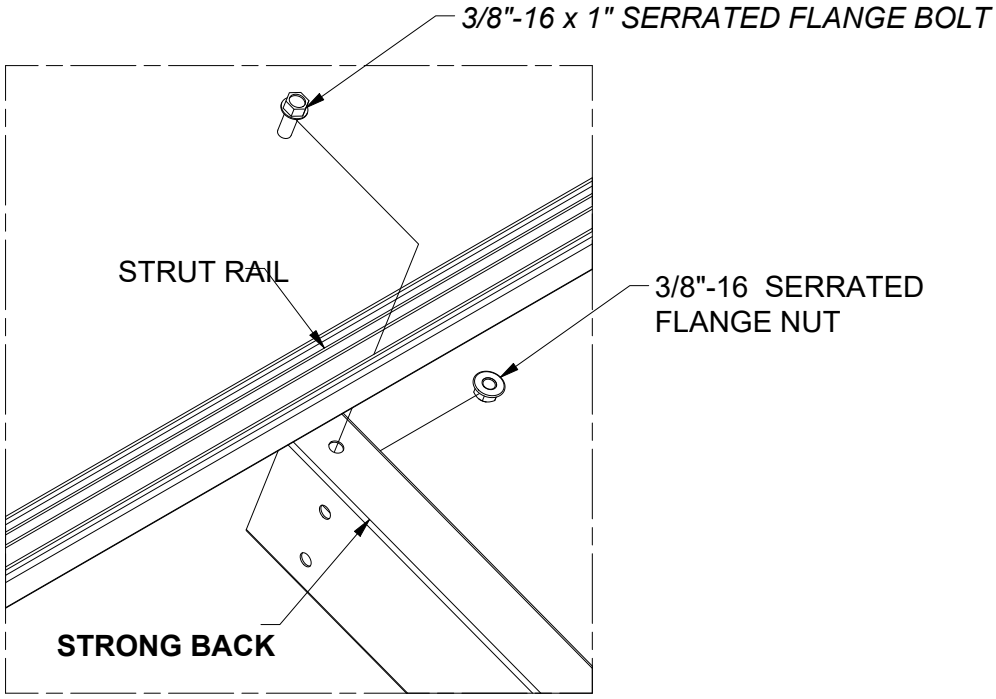


Figure 18: Strut Rail to Outer Strong Back

6. Repeat for the remaining three sets of Strut Rails.

7. Make certain that the bottom Back Brace Bracket has been securely tightened before raising completed rail assembly into position.

8. Then lift the completed assembly and connect to the back braces to bottom back brace brackets and insert the 3/8"-16 x 2.5" long bolts and nuts. The assembly is ready for cable braces to be attached. In order for the cable braces to be installed the bottom chassis must be squared up by measuring from corner to corner on the chassis or using the 3-4-5 method.

Universal Cable Braces

Two Installers ~ Duration: 5 minutes

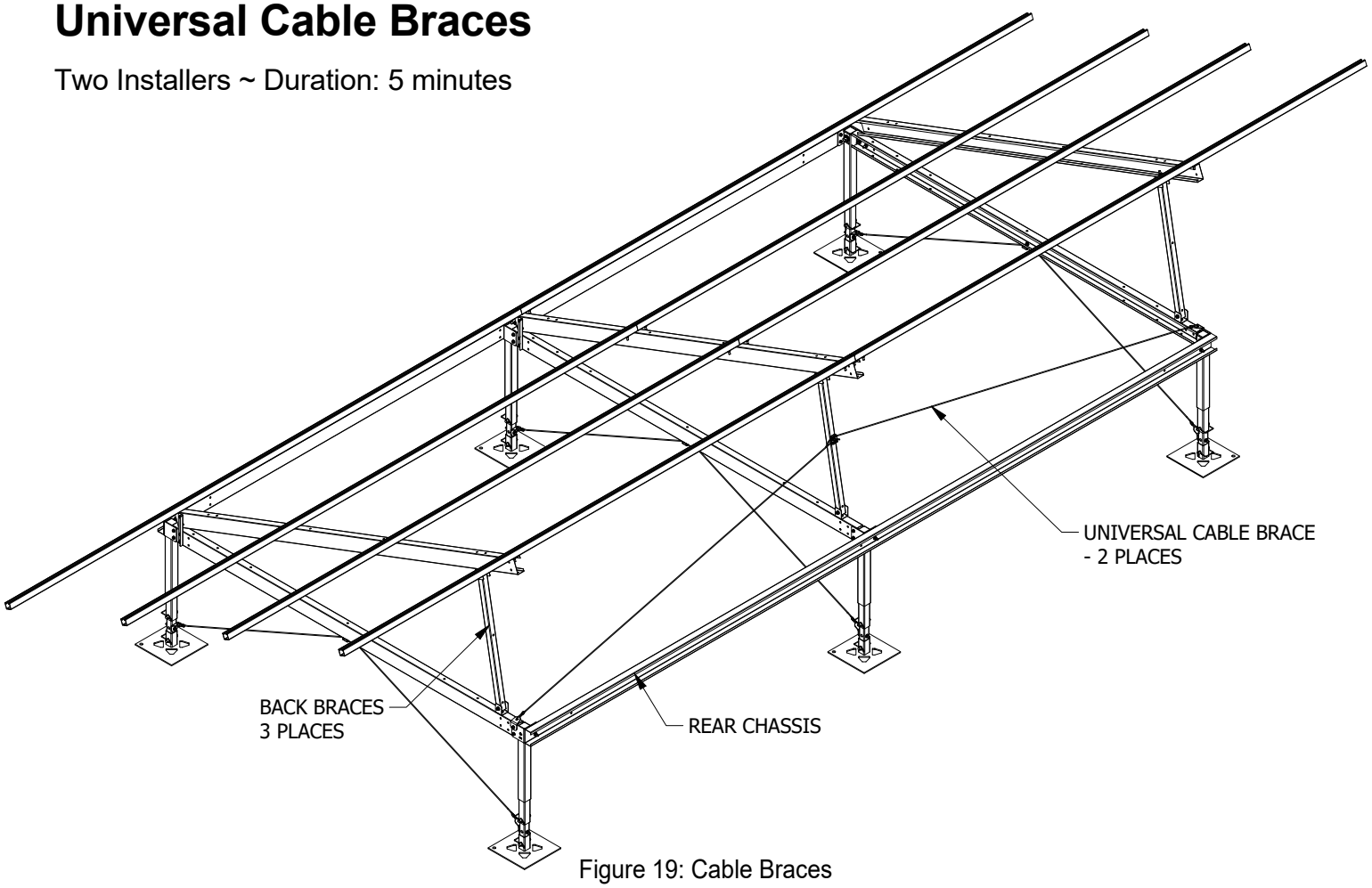


Figure 19: Cable Braces

1. Install the cables on Cable Eyes and make a loop with the cable and lock with the clamp as figure 20(a). Go through the D4 Dynamic Holes and tighten to adjust the cable as figure 20(b), left and right side. Leave no slack in cable. **Note: With D4 Dynamic the Universal cable brace its adjusted on site, during installation.**

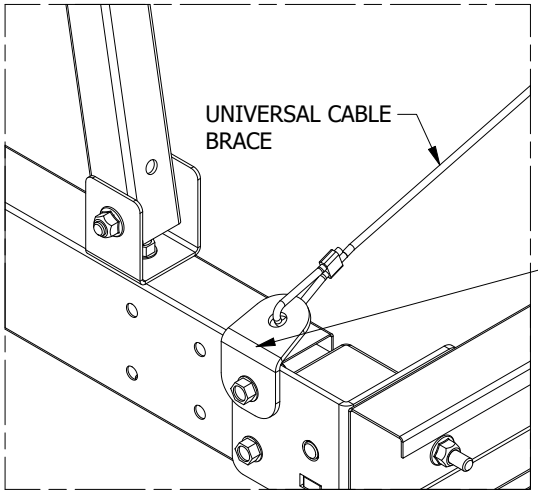


Figure 20: Universal Cable Brace Assembly (a)

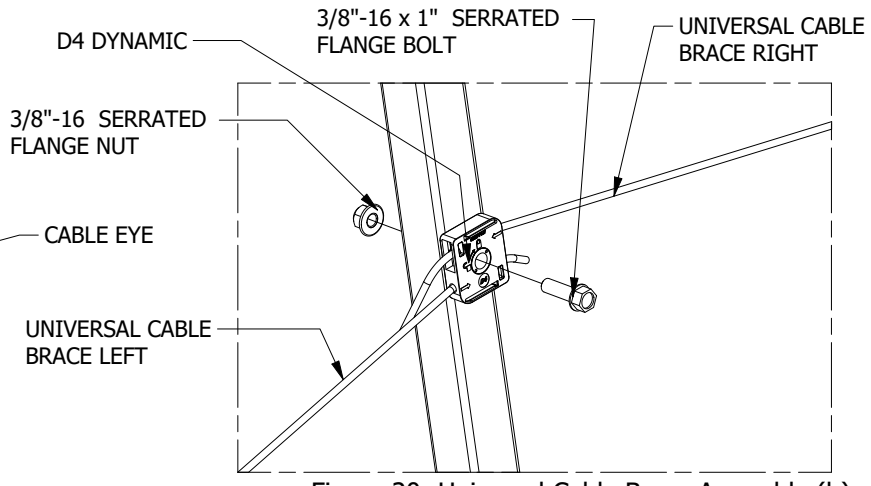


Figure 20: Universal Cable Brace Assembly (b)

Installation and Testing of Earth Anchors

Two Installers ~ Duration: 10-15 minutes

Once the Osprey PowerPlatform® is fully assembled, aligned, squared, leveled, and spliced to the next Osprey unit, the Earth Anchors can be installed. A minimum of one Earth Anchor will be installed in each Base Plate, and every earth anchor must be tested. In severe frost or extremely hard soil the use of our Drill bit listed on page 6 may be needed to create pilot holes for our anchors. These pilot holes are not big enough to allow the anchor to go through solid rock. For that we use an epoxy spin in Chemical capsule method and HDG All Thread with a 3/4" Drill bit purchased outside of Nuance Energy. For more detail see the Supplementary Earth Anchor Instructions below.

Structural Calculations packets available upon request from Nuance Directly or through one of our distributors. Installer is responsible for selecting the appropriate design values and anchor quantity based on live pull testing results or via SSM request. Recommended to purchase extra anchors before heading to install.

Site Specific Memo's (SSM) Available upon RFQ request on Nuance Energy's Web site. This provides project site specific parameters and stamps for an additional fee based on project size.

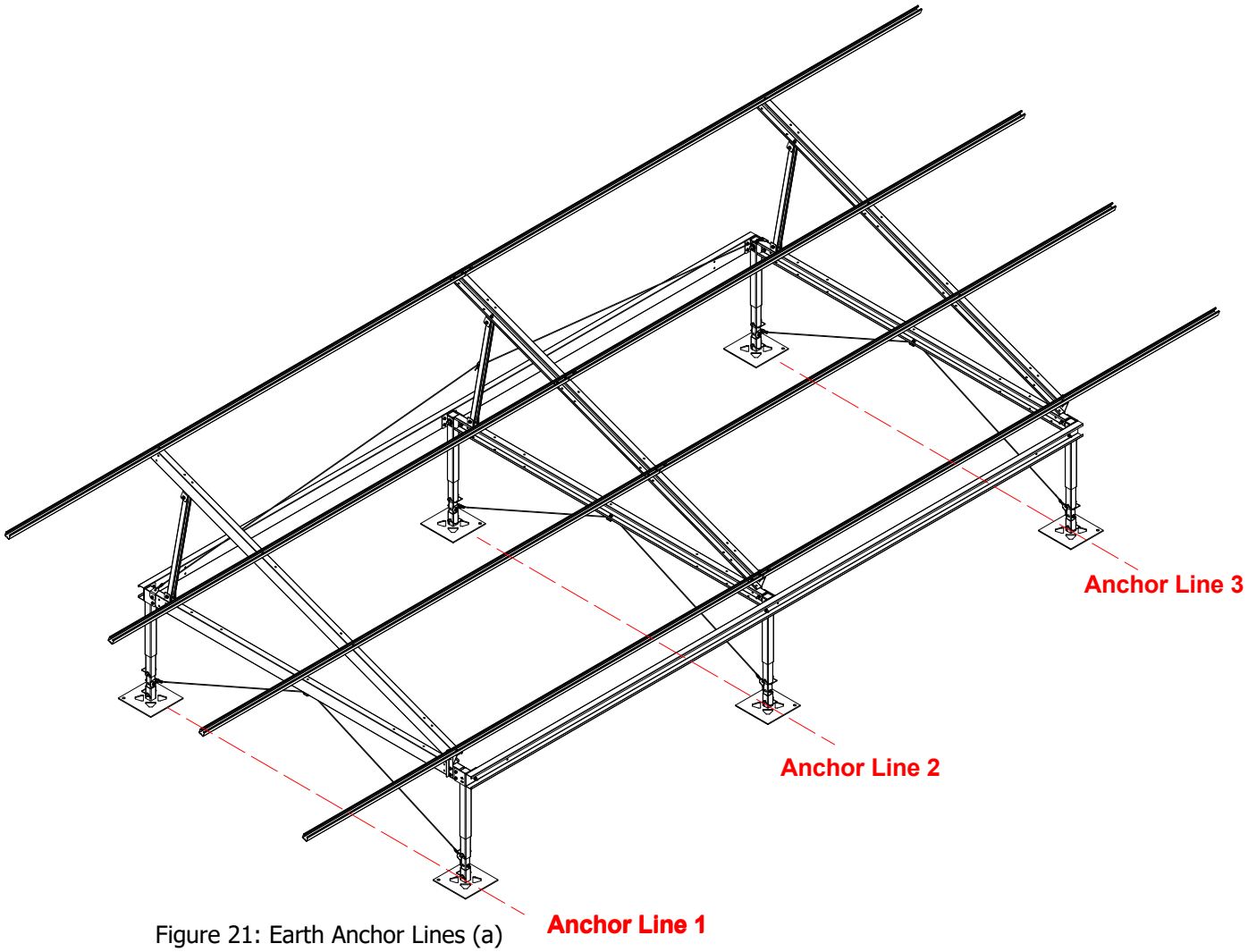
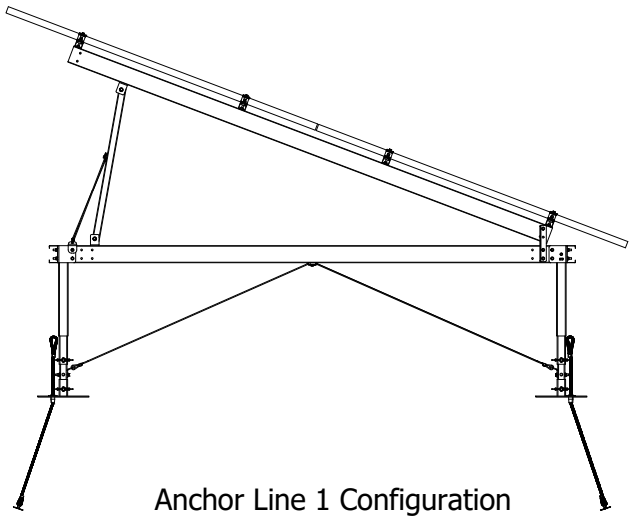
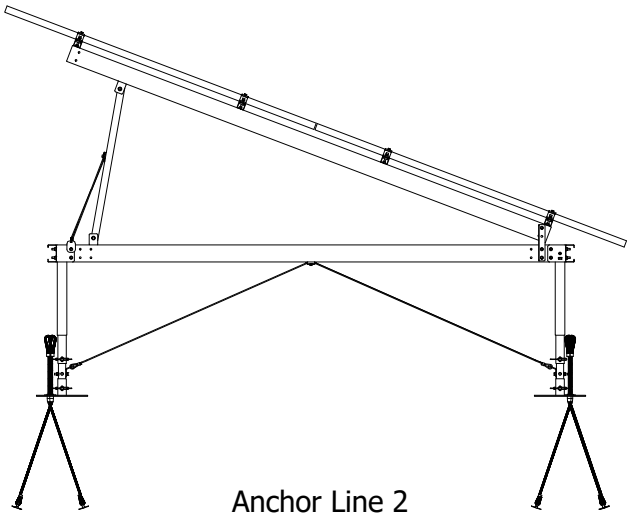


Figure 21: Earth Anchor Lines (a)



Anchor Line 1 Configuration with single anchor must be driven on an outward/ opposite angle only at a 10-15 degree angle.



Anchor Line 2 Configuration Multiple Anchors

Figure 21: Earth Anchor Lines (b)

DISCLOSURE STATEMENT:

The Buyer ("Installer"), who is responsible for the installation and assembly of Nuance Energy's Osprey PowerPlatform® ("Product") acknowledges and agrees to the following terms.

- Installer has read the Manufacturer's Installation Manual version 8.1 or newer and the section on Anchor Installation and requirements
- Installer shall install and assemble Product and Anchors to Manufacturer's specifications
- Installer agrees to install Anchors at no less than 10 degree angle into soil whereas angle is facing outward and the opposite direction of Product leg assemblies (See figure 21 above)
- Manufacturer reserves the right to void any Manufacturer's warranty of Product, if Installer or Buyer's representative does not sign and return this Disclosure Statement before installing Product to Nuance.

Due to potential ground settling it is recommended that the contractor revisit the site 6 months to a year after the install to re cinch the wedge grips on the anchors to the shoe plates and realign the Osprey unit(s) if needed. After the first year ground settling should not occur again, but should be monitored on a regular basis.

Buyer: _____ Date: _____
NAME OF CONTRACTOR

Buyer's Rep: _____
NAME OF REPRESENTATIVE

3. Figure 22 below shows the Earth Anchor used in our installations.

Figure 22: Earth Anchor

4. Drive the anchor to the full depth of the cable. Post pounding attachments are available for bobcats for larger projects but may require a thicker drive rods old separately by Nuance. Refer to Figure 23 below.

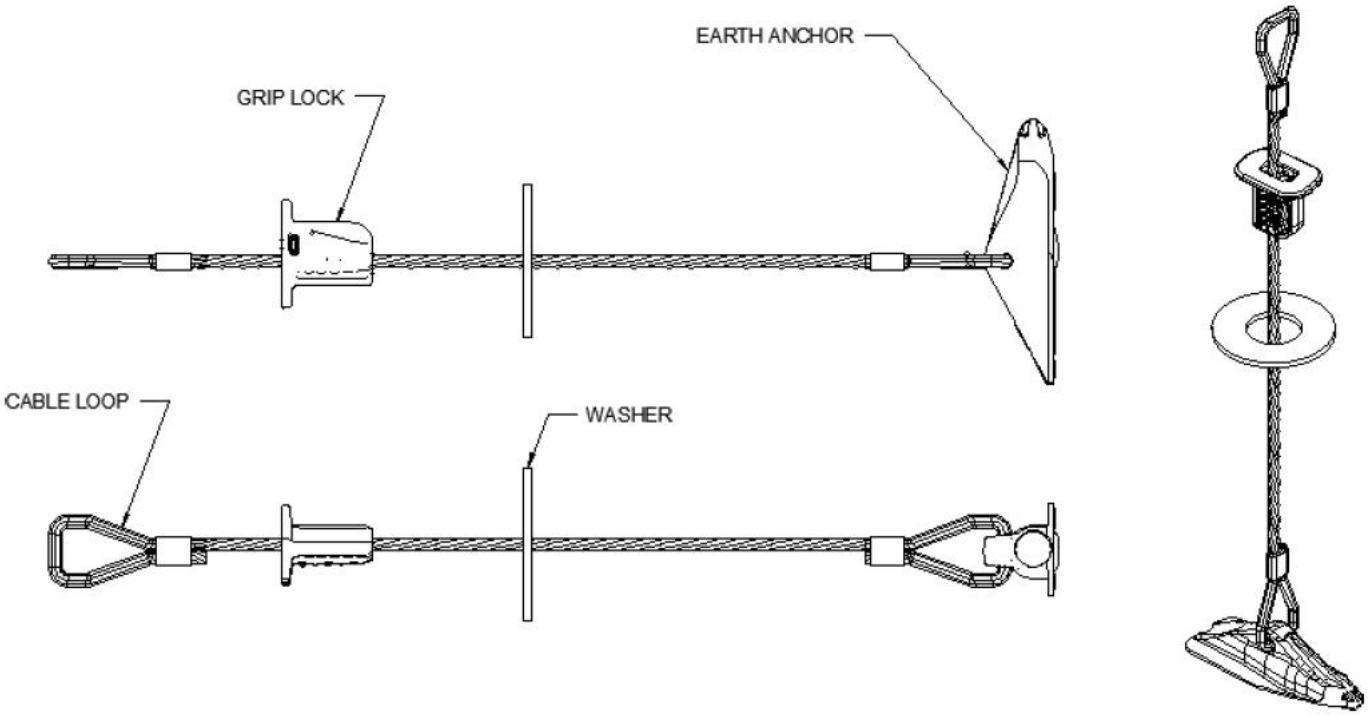


Figure 23: Earth Anchor Assembly

5. Once the anchor is at full depth, retract the steel drive rod from the hole. The minimum depth of the earth anchor is 30" and in all cases must remain below the frost line even after the test on the anchor is performed.

6. Pull back on the anchor cable to engage the lip of the anchor and begin to toggle the anchor into a perpendicular or anchor-locked position.

7. Once the anchor is locked underground, continue to draw up the cable using the load test device until desired test amount flashes on the screen. In cases where the frost depth is 48" you may only get 8-10" of pull to get your required test results.

8. When using the Osprey Powerjack™ you will see the total weight on the screen of the indicator. If using the tripod load testing device you will see the total amount on the screen *as* well. When using the Jackjaw manual load test device you will have to multiply what you see on the screen by 2 as this device only records the load on one of two arms.

9. Load test each anchor according to the specifications in the structural engineering report while keeping the head of the anchor below 30" or your frost depth whichever is greater. When two or more earth anchors are required, multiply the value listed in the report to get the load value per the following guideline:

- **(1) anchor = 100% of listed load**
- **(2) anchors = Test each anchor to 67% of listed load**
- **(3) anchors = Test each anchor to 45% of listed load**
- **(4) anchors = Test each anchor to 34% of listed load**

10. Record the load achieved while testing. Do not try to get the load to stabilize at the required specification.

11. Once you have confirmed the load, the anchor has been tested and reached required capacity.(Note the earth anchor is rated for 3,333 lbs.) The tension needs to be relaxed on the cable, then slide the Grip Lock down the cable keeping it taught and push it flat against the Base Plate into the corder of the base plate hole. It is normal for the Washer and Grip Lock to move minimally, but all slack should be removed from the cable assembly.

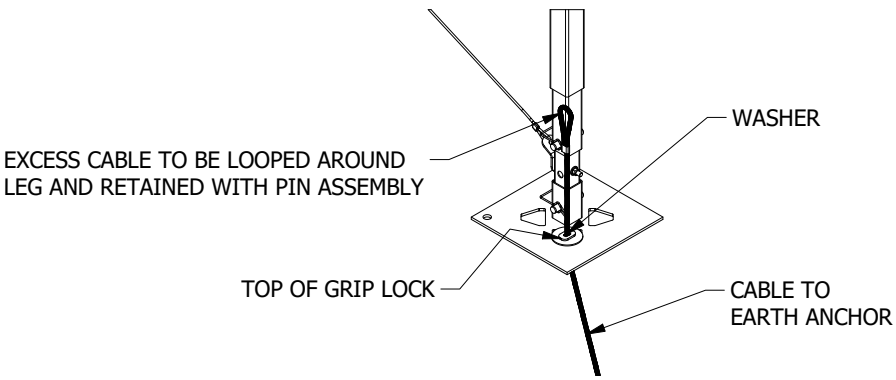


Figure 24: Grip Lock Secured to Base Plate

12. Remove testing device from cable and wrap the excess cable around the leg and secure the loop to one of the retention pins near the bottom of the leg.

13. If a second anchor is required per the engineering report, drive the second anchor at no more than 15 degrees from vertical and pointed away from the other anchor.Record the value achieved.

14. If an earth anchor is not reaching the desired capacity within 10" of pulling distance,stop the tensioning procedure and record the peak value.

15. When multiple anchors are installed in one location, record the sum of the tested loads by using the guideline as described in step 8 above. A total of four earth anchors can be installed on a single base plate.

16. **All test loads must be recorded, documented on our Anchor load test form (See last page of this manual for a generic copy of this form) and submitted to Nuance Energy for review within 60 days of the installation date via www.nuanceenergy.com/warranty. Refer to Figure 25 below.**

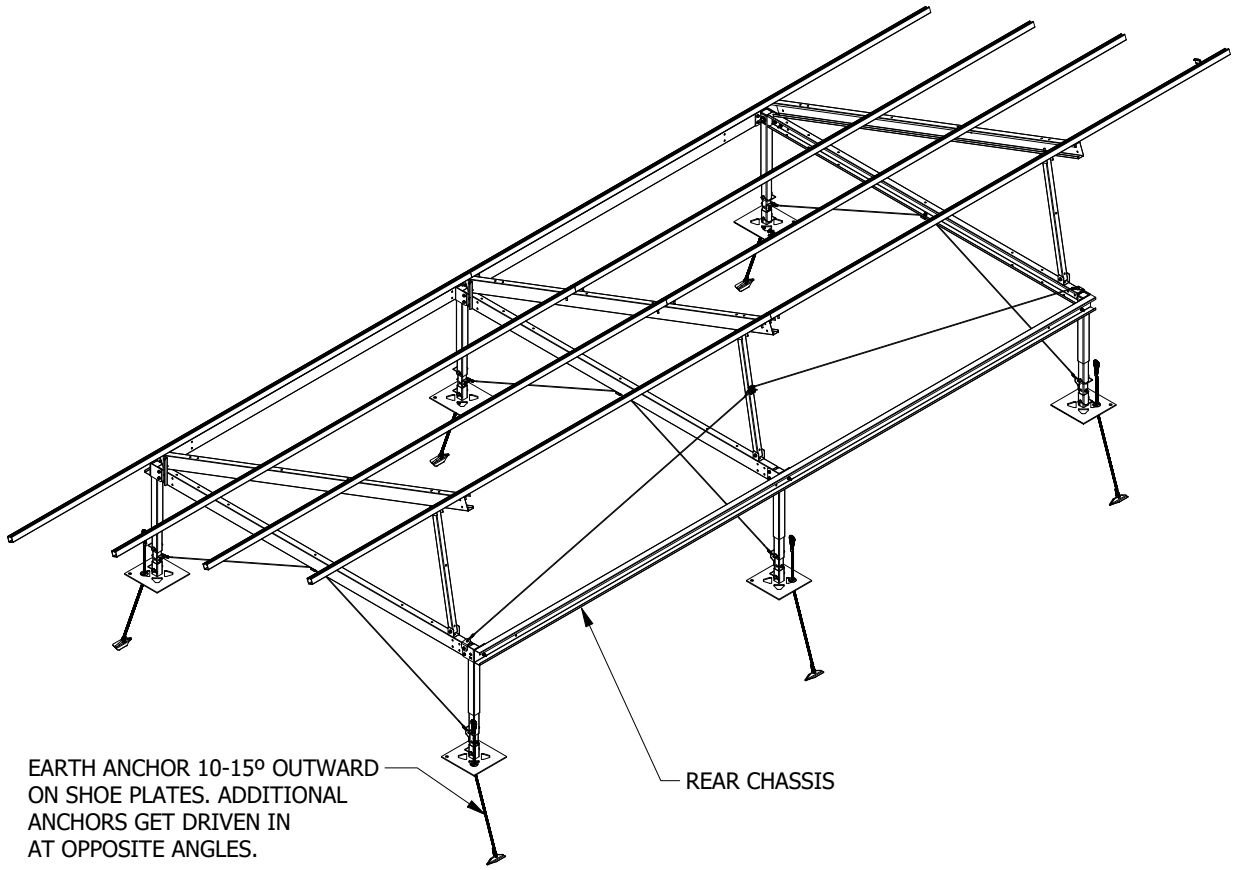


Figure 25: Earth Anchors Installed and Load Tested

Solar Module Mounting

Four Installers ~ Duration: 20 minutes

- Most solar modules commonly used for residential and commercial applications are easily mounted on the Osprey Powerplatform®. ***The use of a Torque Wrench is required in order to tighten the Mid/End Clamps to specified 200 inch pounds of Torque.***

- The Osprey Powerplatform may only be used to ground a solar module complying with UL1703. Specific modules must be tested with the self-bonding Chassis Clamp in order to qualify for UL2703. Refer to the solar manufacturing list on page 7 of all modules approved for UL2703 integrated *g*rounding.

- Self-bonding Strut Mid Clamp and Adjustable Strut End Clamp Assemblies are included with each order. **Note the Adjustable Strut End Clamps are not a bonding clamp nor are they required to be so by Intertek.** See Figure 26C below.

- Note: The Osprey Mid Clamp (Fig 26A) and the Everest CrossRail Mid Clamp (Fig.26 B) are both approved clamps for UL 2703 listing see approved panel list on page7-8.)

STRUT MID CLAMP

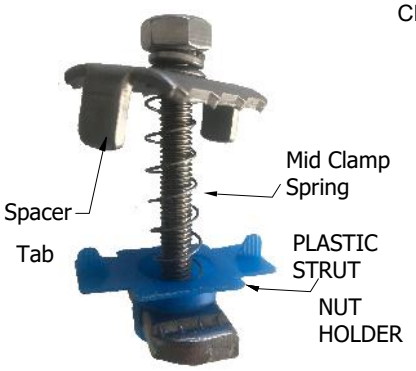


Figure 26A

UL2703 Approved

EVEREST CROSS RAIL MID CLAMP

Figure 26B

ADJUSTABLE STRUT END CLAMP Module Frame Depth Range: 30 - 50mm

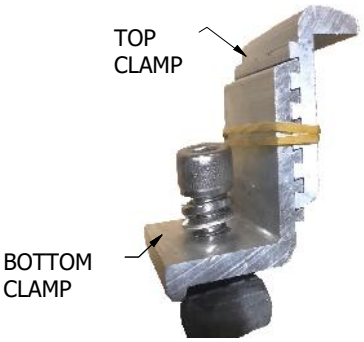


Figure 26C

The Solar Modules on the Osprey PowerPlatform® are mounted in a portrait orientation.

1. Using the center of the array determine the starting point of your panels based on panel width. The mid clamp gap is .44". The end clamps need 1.5" of rail space to function properly.

2. Square the solar module frame to the Strut Rails and center the top edge of the module between the two middle Strut Rails. A gap of 1/2 inch should be left between the top and bottom portrait solar modules.

3. Install two Strut End Clamp assemblies to hold the module in place. A 6mm hex bit socket should be used to tighten the socket head cap screw on the End Clamps using a Torque Wrench set to 200 inch lbs. To find the correct spacing for your panel slide the top section of the End Clamp into the correct slots of the bottom section of the End Clamp to obtain the frame depth of the solar module being installed.

4. Install two Strut Mid Clamps to Strut Rails. **The channel nut gets inserted into the strut and then rotated 90 degrees by hand first then positioned next to the panel.** The Plastic Strut Nut Holder will hold channel nut into the channel. Strut Mid Clamp has a 13mm (1/2") Hex Bolt.

5. Slide the two Strut Clamps tight up to the solar module frame. The integrated spring will hold the Strut Mid Clamp above the solar module.

6. Place a second solar module next to the first and slide it tight up to the two Strut Mid Clamps. Aligned and square the second solar module to the first module. The solar module frame of the second module will need to be lifted slightly to rest above the Plastic Strut Nut Holder.

7. The Tab of Strut Mid Clamp must be flush and tight to the module frames for the teeth of the Strut Mid Clamp to fully engage and penetrate the anodized module frame for proper grounding per UL2703.

8. Once the two modules are aligned and squared, tighten the Strut Mid Clamps to the lower rail until it is snug, but not overtightened.

9. Repeat procedure on the upper pair of Strut Rails and install two more solar modules.

10. Ensure the alignment of the first four modules is parallel with the rails and adjust if necessary to ensure the following modules are installed evenly. It is recommended to run a string line with stakes along the bottom edge of the lower module to ensure proper alignment and the modules are installed evenly as the rail may not always be 100% straight due to the cold rolling process of the steel.

11. **Once the first four portrait modules are installed go back and torque the Mid Clamp bolts and End Clamp bolts all to 200in-lbs (check torque settings for Everest Clamps on page 10). Snug with drill and use a torque wrench to finish off each clamp. Be sure not to over torque the bolts.**

12. Continue placing modules on the rails and repeating steps above for the remaining modules on the lower and upper set of rails.

13. Alternatively, all the lower portrait solar modules can be installed first and then the upper solar modules can be installed last. **Once the Clamps have been properly Torqued it is recommended that torque marks be applied to the head of the bolt and flat surface of the mid clamp itself for visual quality control down the road.**

14. Refer to Figure 27 on next page of the completed Osprey PowerPlatform.

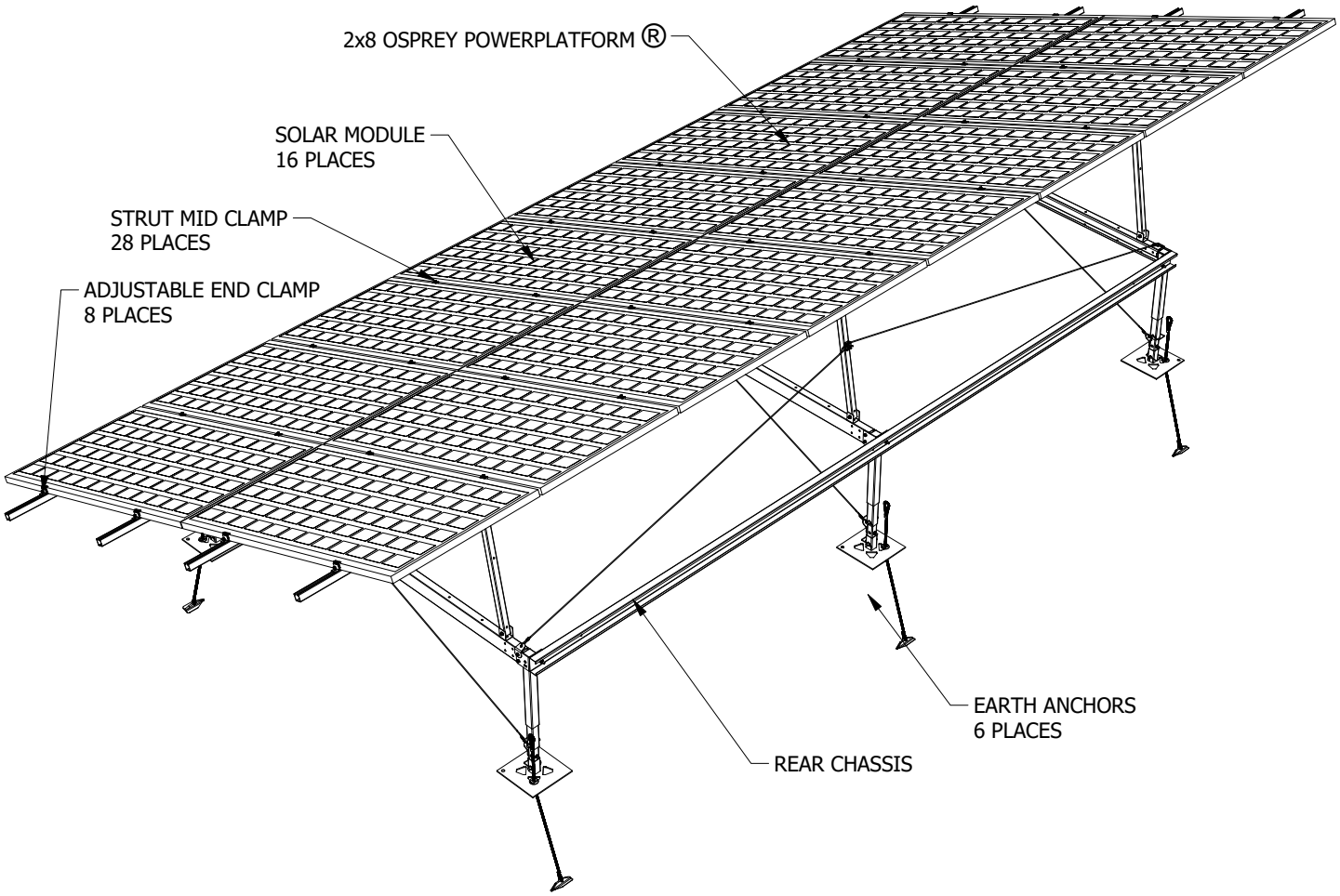


Figure 27: Complete Assembly of the Osprey PowerPlatform®

Splicing Osprey PowerPlatform® (UNITS) Together

Four Installers ~ Duration: 20 minutes

If the Osprey PowerPlatform® is being installed in a long continuous row and not a stand-alone platform, then splicing the Ospreys PowerPlatform® units together is an option. The longest row that can be spliced is 150-180' until a thermal expansion gap of 6 inches must be introduced. Installation of splices on either end of the Ospreys is performed just like the splices installed at the center of the platform. Four Splices will be required to connect the neighboring Strut Rails with 3/8"-16 x 1" serrated bolts and nuts.

Grounding

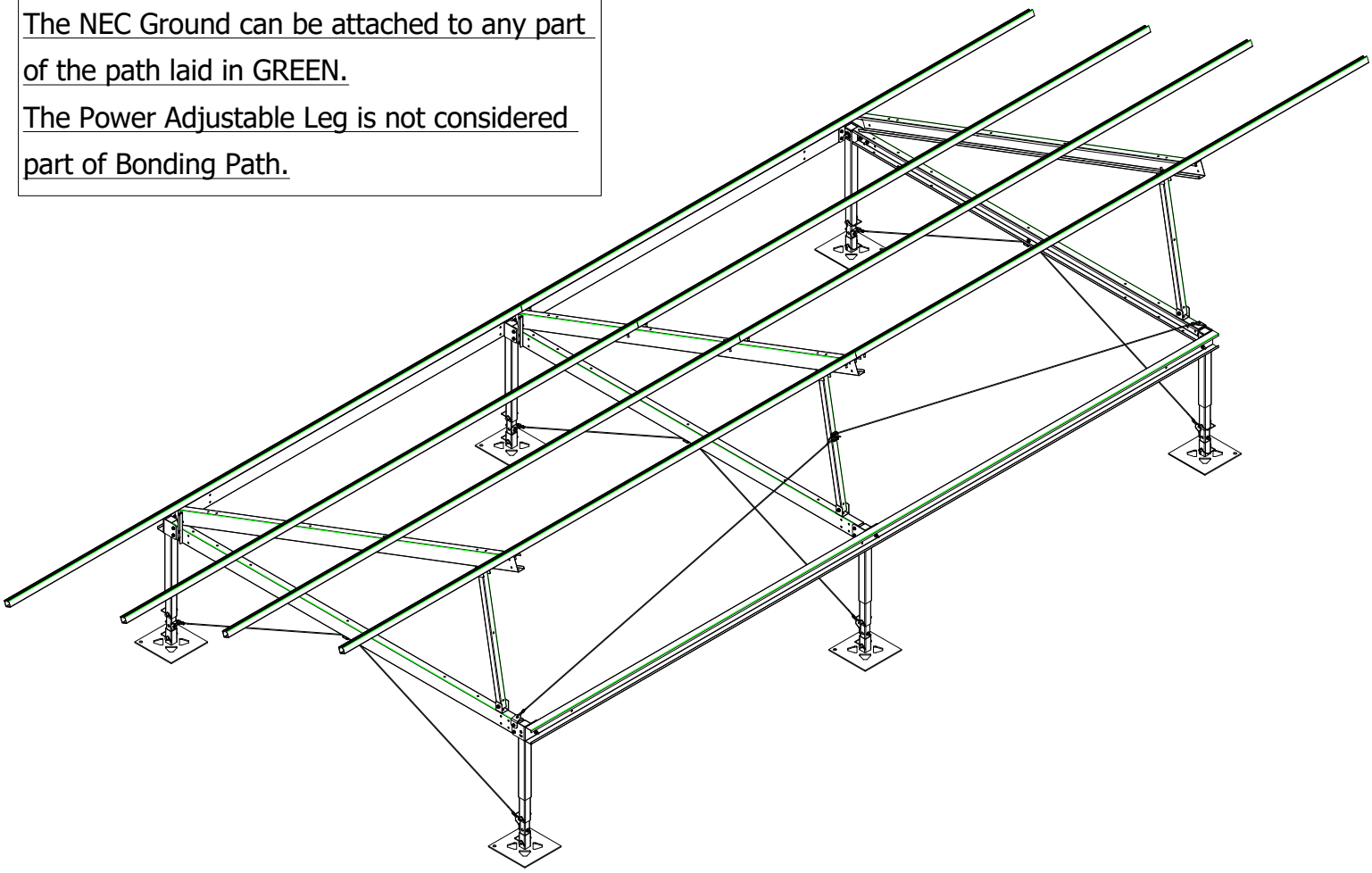
1. Grounding the Osprey PowerPlatform® must be performed per the National Electric Code and any other applicable local codes in accordance with the manufacturer's specification of a UL and cETL listed grounding lug. A grounding lug is not supplied.

2. Select a location on the Chassis Stud near a leg for a grounding lug to be installed. Nuance Energy Does NOT supply Grounding Lugs.

3. Either Drill a hole or use one of the unused holes on the underside of the Chassis Stud and install an ILSCO GBL-4DBT or other UL and cETL listed lay-in grounding lug. **Refer to Figure 21 below.**

Note: The grounding path is from the Self- Bonding Mid Clamp, to solar module frame, to Strut Rail, to Strong Back, to Back Brace, to Chassis Stud and finally to the NEC Ground.

See Bonding Path Diagram below.
The NEC Ground can be attached to any part of the path laid in GREEN.
The Power Adjustable Leg is not considered part of Bonding Path.



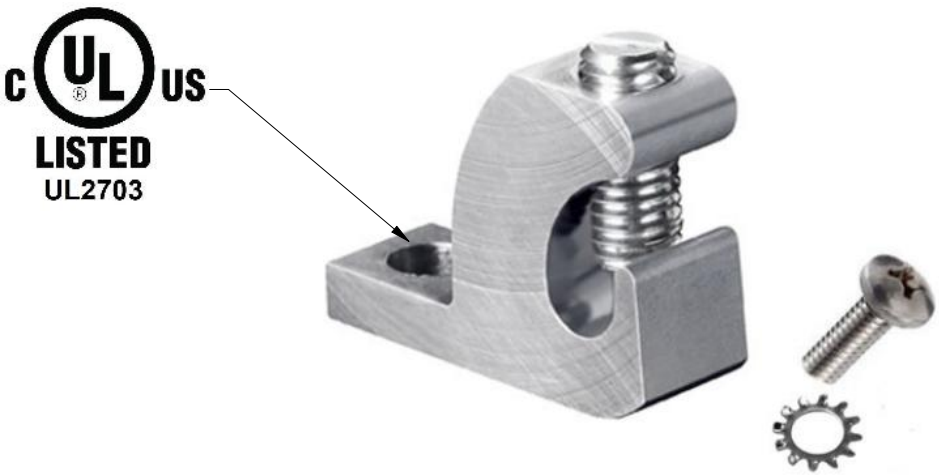


Figure 21: ILSCO GBL-4DBT GROUNDING LUG

Nuance Energy Does Not Supply Grounding Lugs.

3. Place the lug over the hole with the star washer between the bottom of the grounding lug and the Rear Chassis, insert bolt and torque the grounding assembly.

4. Insert a #4 to #10 AWG copper wire into the lug and tighten the lug set screw onto the copper wire. For #4-6 AWG wire torque to 35 in-lbs and for #8-10 AWG torque to 30 in- lbs. Minimum grounding conductor to be used is #10 AWG Copper.

5. Connect the grounding electrode conductor to a ground rod or equivalent ground per the National Electric Code.

6. For multiple rows of Osprey PowerPlatform® units, connect each row strut rail with an appropriately size grounding conductor and run it in conduit with string wires to next row according to the maximum fuse rating of the module string. For example, a bare #6 copper wire is rated for 200A. If this string is rated for 15ADC, then 13 strings can be connected to a single ground rod. If the string has a 20 ADC rating, then 10 strings of Powerplatform® units can connect to the single ground rod.

7. For large solar arrays, multiple ground rods will be required.

8. **Nuance Energy does not supply any electrical components.** Solar components can be added to the strut channel of each rail using Spring Channel Nuts and flanged bolts. Another option is to drill through the back of the rails and or chassis members and tap or use flanged bolts to connect components to the frames. Again Nuance Energy does not supply this material at this time.

Grounding for solar panel is not currently UL listed with the Osprey PowerPlatform.

Disclosure: If the solar panel has already been installed, the customer will need to connect each solar panel via a UL Listed Bonding Lug of customer's choice (not provided by Nuance Energy) and connect this Lug via a copper wire (not provided by Nuance Energy) to the ground rod also (not provided by Nuance Energy) and installed on the Osprey PowerPlatform® ground mount system.

Any other UL Listing Bonding component approved by the inspector would also be approved.

For example: The Lug below would need to be bolted to each solar panel in an unused hole already manufactured into the panel's frame by the solar panel manufacturer.

Wiley Electronics WEEB-Lug-6.7 Grounding Lug

Quality Assurance

After Confirming that all the procedures and specifications listed in this manual have been followed, and all components listed above have been properly installed, then installers should review every connection and verify the assembly. Make sure to check your torque settings and mark each bolt if needed.

It is suggested a re-inspection of the installation be performed annually. Over time, the base plates will settle into the ground due to the weight of the structure resting on top of the soil which is normal and varies based on soil types. Once the system has found a settle point after the first year or so there should not be any significant movement after that initial settle period.

The grip lock may need to be pushed down and reseated flat against the base plate.

The Power Adjustable Legs may need adjusting if certain legs settle more than others.

Installer Warning and Notice

Notice

Please carefully read and understand the provided installation manual before installing, wiring or operating our product in your PV system. Failure to follow all instructions and procedures could possibly damage the product, and above all, lead to serious injury or death. All PV systems and Osprey PowerPlatform® installations must comply with the National Electric Code. Installers are solely responsible for code and safety compliance and consequences.

WARNING!

DANGER
Electric shock risk

PV modules generate electricity when exposed to light and are electrically live when mounted. This DC electricity can pose danger to the installer, user, and/or property. Any contact with electrically active module terminals can result in arcing; leading to shocks, fires, burns, and/or death. Use caution around utility power lines that may be near the work area. Never work in wet or windy conditions. Lighting is a hazard to any work with metal, never work when lighting is present. Insure good earth-bonding as part of a lighting protection system.

DANGER!

Electrical shock potential of PV modules increases with higher parallel currents and series voltage connections. The PV installer must assume all inherent risk of property damage and/or personal injury related to the mishandling of PV modules during installation and maintenance. Skilled, Licensed Electricians must conduct all electrical installation procedures. All work must comply with all national, state and local installation procedures, product and safety standards. These standards include but are not limited to applicable National Electrical Code (NEC®) sections, UL Standards, OSHA Regulations, State or Local Fire Marshall Codes, NFPA 70E. Installation must comply with NEC 250 (Grounding and Bonding), NEC 690 (Solar Photovoltaic Systems), CSA 22.1 (Safety Standard for Electrical Installations), Canadian Electrical Code Part 1, and all other applicable state, provincial, and local electrical code requirements. Dual Rack Solar Racking Systems must be used with UL1703 listed equipment including but not limited to; PV modules, combiners and disconnects.

DANGER!

Avoid electrical injuries by preventing the accidental or unintentional release of hazardous energy. Proper Lockout/Tag out procedures will limit this danger. All Personnel must. Use caution when working in and around PV arrays. Proper PPE worn at all times will also limit this danger. Modules produce electricity when exposed to light. To avoid electric shock and injury, completely cover the front of the module with an opaque material before making any electrical connections. Lock out / tag out and disconnect the PV system from all electrical energy before any maintenance or cleaning. NEVER disconnect or connect modules under load. Never disconnect the earth bond to the array.

~ END OF INSTALLATION MANUAL ~

Nuance Proof Load Test

Please reference your state's Structural Packet or your SSM purchased from Nuance directly for load requirements.

Required Load Test Value Tables are located in section 3.0 of the Structural Packet. Please note special considerations for using multiple anchors per Leg.

Submit this form (within 60 days of install) Online to qualify for 25 Year warranty From Nuance Energy. Nuanceenergy.com/warranty

(Min. 1 anchor/leg required in most cases)

TLA4(Soft Soil) Anchors and Additional TLA3 Anchors are available for purchase if more anchors are required.

Size/Tilt/Cell Count_____
Wind Speed_____
Snow Load_____

Contractor:_____
Project:_____
Address:_____
_____

Anchor Qty Derate Factors

(2) Anchors – 67%
(3) Anchors – 45%
(4) Anchors – 34%

Example
Req Load 3000LB gross, 2 Anchors used per leg 3000LBX.67 = 2010LB PER ANCHOR REQ

		REQ Load Value		Per Anchor(lb)	----------RECORDED TEST VALUES PER ANCHOR---------- LEFT		CENTER		RIGHT	
ARRAY # 1	Back Leg	Gross(lb)			1	3	1	3	1	3
		# ANCHORS used			2	4	2	4	2	4
	Front Leg				1	3	1	3	1	3
		# ANCHORS			2	4	2	4	2	4
ARRAY # 2	Back Leg				1	3	1	3	1	3
		# ANCHORS			2	4	2	4	2	4
	Front Leg				1	3	1	3	1	3
		# ANCHORS			2	4	2	4	2	4
ARRAY # 3	Back Leg				1	3	1	3	1	3
		# ANCHORS			2	4	2	4	2	4
	Front Leg				1	3	1	3	1	3
		# ANCHORS			2	4	2	4	2	4
ARRAY # 4	Back Leg				1	3	1	3	1	3
		# ANCHORS			2	4	2	4	2	4
	Front Leg				1	3	1	3	1	3
		# ANCHORS			2	4	2	4	2	4