NUANCE ENERGY
Revolutionary Solar Racking Structures

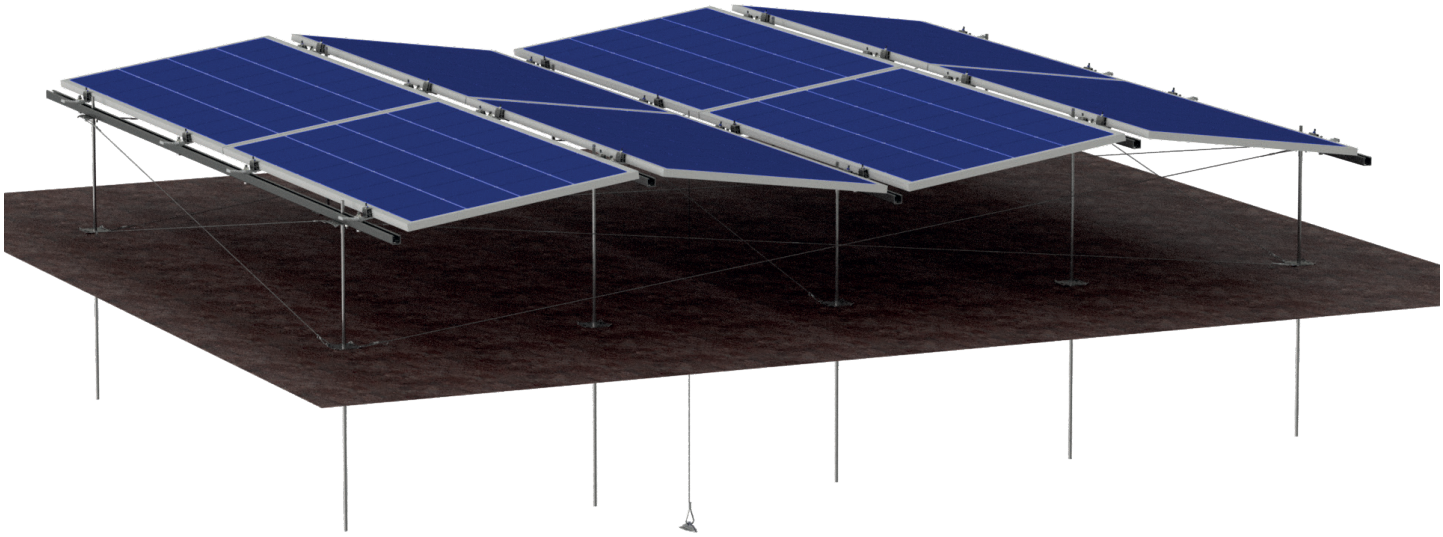
INSTALLATION MANUAL FOR OSPREY POWERNEST™

ETL CLASSIFIED

CONFORMS TO UL2703*

Intertek

PAT # US 10,622,938 and
PAT # US11,271,520



- Certified to UL2703
- Custom Engineered to Exceed Applicable ASCE, IBC, and UL Standards
- Electrically Bonded System
- 35 Amp Maximum Fuse Rating
- Full Module Compatibility
- East West Orientation
- Maximum Capacity of PV Modules:
  - Modular 4 or 2 panel arrays
- Expandable in both the North/South and East/West Direction

INSTALLATION MANUAL FOR OSPREY POWERNEST™

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Introduction

This manual is an installation guide for the Osprey PowerNEST™, rather than a comprehensive technical engineering manual. It focuses on the assembly and installation of the Osprey PowerNEST™ system.

The Osprey PowerNEST™ offers an alternative approach to ground-mounted solar system engineering, design, and construction, revolutionizing the way these systems are engineered and installed. The Osprey PowerNEST™ employs patented earth anchor foundations to secure the system to the ground beneath each table. Earth anchors have a proven track record of over 100 years in various applications such as slope stabilization, retention walls, marine tethering, and municipal drainage systems, among others.

By utilizing ground anchors, the construction team can securely fasten Osprey tables to the soil, enabling real-time tension testing, which often eliminates the need for geotechnical reports or impact studies. For special cases, please contact a Nuance representative.

Product Summary and Intellectual Property

The Osprey PowerNEST™ is engineered to these standards and certifications.

- Meets or Exceeds 2019 California Building Code.
- Meets or Exceeds 2018 International Building Code (IBC).
- Certified for grounding and bonding per UL2703*.
- Osprey tables can be engineered to sustain wind loads up to 180 MPH and Snow Loads up to 20 PSF.
- Structural Packets are provided and engineered and signed by 3rd party structural engineer.
- Site Specific Memos are available for every project.
- Our product names and product designs have been protected in the United States Patent and Trademark office and utility and methodology patents have been granted under (PAT # US 10,622,938 and PAT # US11,271,520), as well as multiple international patents.

Certification Notes

- UL2703* to be used only in combination with the modules that include this specific rack system in the module manufacturers installation manual.
- UL2703* classified for ground and bonding only.

Safety

The safety of individuals and property must always be prioritized. All installation personnel should be required to wear personal protective eyewear, clothing, footwear, and any other protective gear that complies with the Contractor's Injury and Illness Protection Plan (IIPP) and meets OSHA requirements for the given site.

The majority of the components that make up the Osprey PowerNEST™ are made of steel. These components are heavy and may have sharp edges, posing a risk of injury if not handled properly. Personnel should exercise caution during the assembly of the unit, as components can create pinching hazards. It is the responsibility of each individual to work with care and attentiveness

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Tools and Equipment

The Osprey PowerNEST™ is designed to be easy to assemble, therefore no special equipment is required to assemble the tables. The following list demostrates the recommended tools that are used for the assembly of the Osprey PowerNEST™. The list below is merely a guide; individual installers may find alternative tools and methods that fit their needs.

Training Videos

Coming soon. Contact a Nuance Energy representative for latest installation videos.

Hand Tools

Deburr Tool		Crimping Tool		SAE and Metric Socket Set	
SAE and Metric Wrench Set		Torque Wrench		Tape Measure	
Digital Angle Level		Shovel/Pick		String Line	
Cable Tension Tod		4ft Bubble Level		SDS Max Drill Bit*	

Equipment

Portable Generator		Osprey TALON Load Testing Tool		Anchor Installation Drive Rod*		1/8" Aligment Punch		Portable Bandsaw for Metal	

*For testing Anchors please check manual supplied with the Nuance Energy Anchor Testing Device.
*Load test device, drive rod and drill bit can be purchased through Nuance Energy.

Approved Module List (TBD)

The following solar modules have been evaluated and tested to Standard UL2703*.

	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
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 Sola	D6MxxxH4A
16	Yingli	YL xxxP-29b, YL xxxP-35b
17	Phono Solar	PS-xxxMH-24/TH, PS-xxx-60, PS-xxx-72
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	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, LR6-72HVxxxM, 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/HIBDxxxM, 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)

*Classified to UL2703 bonding and grounding only.

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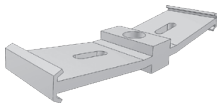
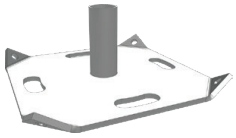
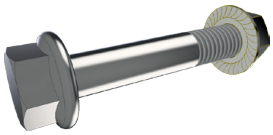
General Component List

ITEM	DESCRIPTION	SPECIFICATION (IN)	PART NUMBER	PREVIEW
STRUCTURAL COMPONENTS				
1	Steel Strut Purlin	U 1-5/8"x1-5/8" - 11GA	OPN-01-S158-180	
2	Aluminum Strut Purlin	U 1-5/8"x1-5/8" - 2mm	OPN-01-A158-180	
3	Rebar Rod Steel	SRR - 60" - 5/8"	OPN-01-SR58-060	
	Rebar Rod FRP	FRR - 60" - 5/8"	OPN-01-FR58-060	
4	OPN Tilt Bracket	T - Bracket	OPN-02-10-006	
5	OPN Tilt Top Clamp	Combo Clamp	OPN-02-05-002	
6	OPN Base Plate	PL 5 x 5 x 1/8"	OPN-01-005-005	
7	Cable Bracing	CL 18ft - 3mm	OPN-01-240-003	

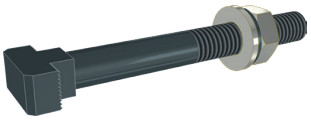
Hardware

ITEM	DESCRIPTION	SPECIFICATION (IN)	PART NUMBER
8	1/2-3" Serrated Flange Bolt	1/2"-13- 3" Carriage Bolt	OPN-01-050-012-B3
9	1/2" Serrated Nut	1/2"-13 Nut	OPR-831-050-012-N12
10	3/8-1" Flange Bolt	3/8"-13- 1" Carriage Bolt	OPN-831-050-38-B01
11	3/8" Nut	3/8"-13 Nut	OPN-831-050-038-N38
12	T-Slot Bolt	M8 - 76mm Bolt	OPN-831-001-076-B76



1/2" Bolt - Torque 64 ft-lbs

3/8" Bolt - Torque 32 ft-lbs



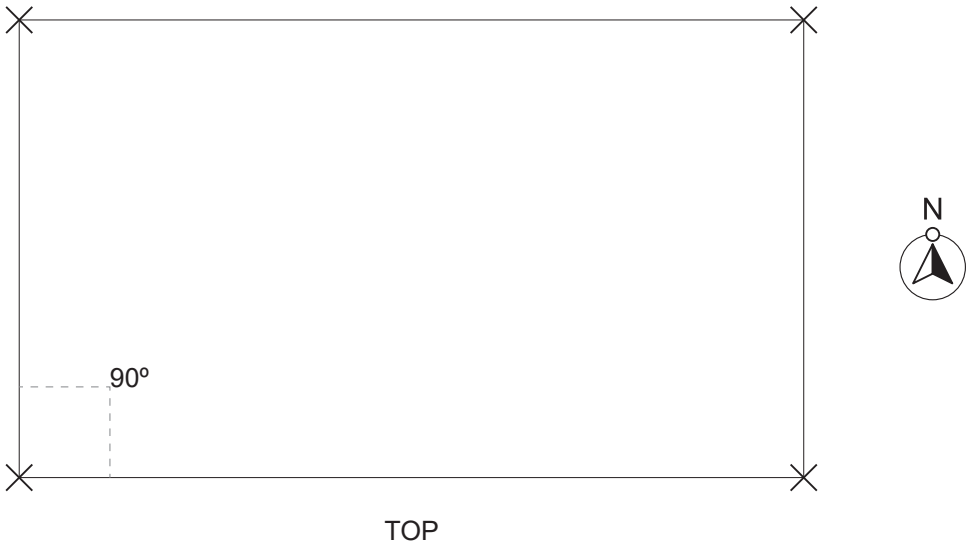
M8 Bolt - Torque 11 ft-lbs

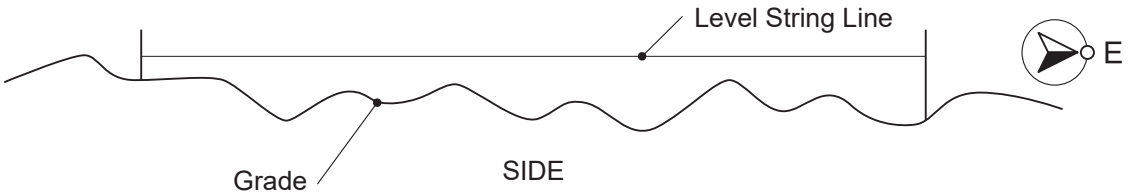
Brace Cable - Tension 50 lbs

Tension based on Engineering

Pre-Installation Surveying

1. Site preparation
   - Create envelope survey
   - Mark exterior positions considering slopes
   - Ensure stake points are level in reference to grade





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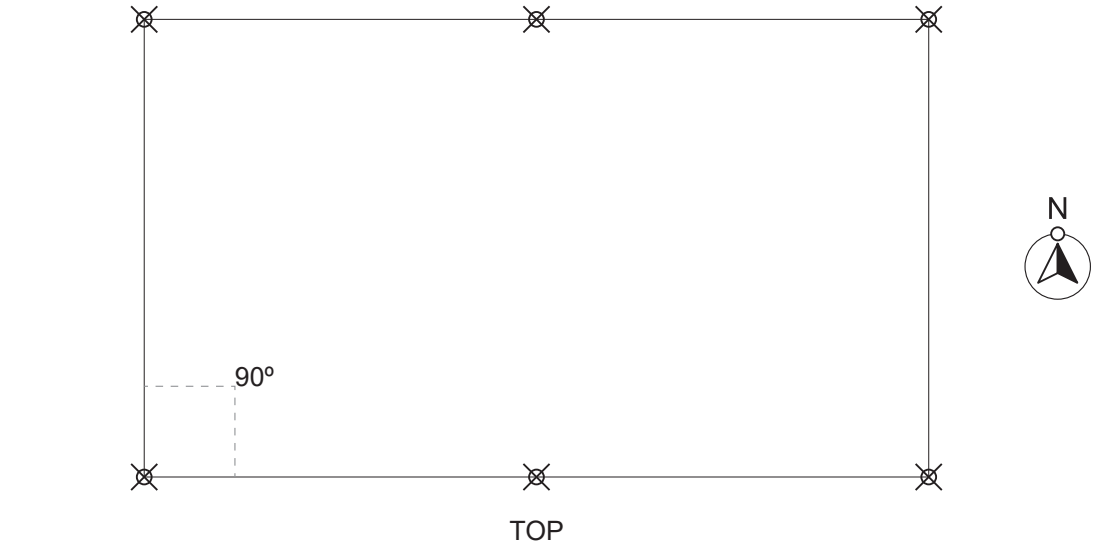

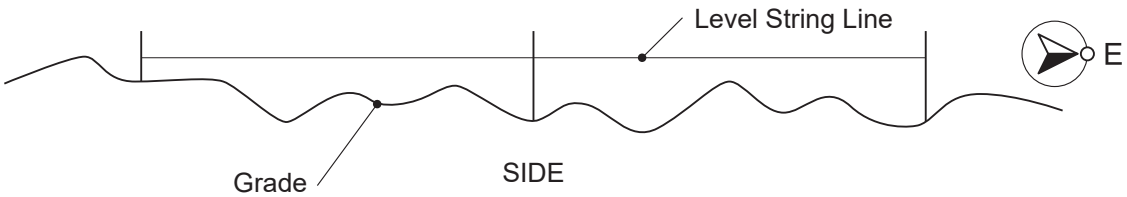

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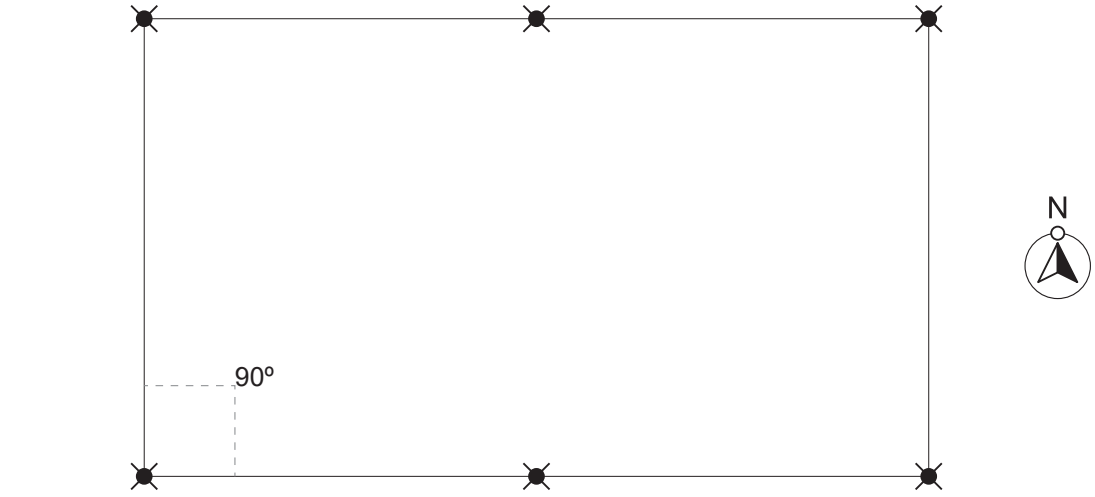

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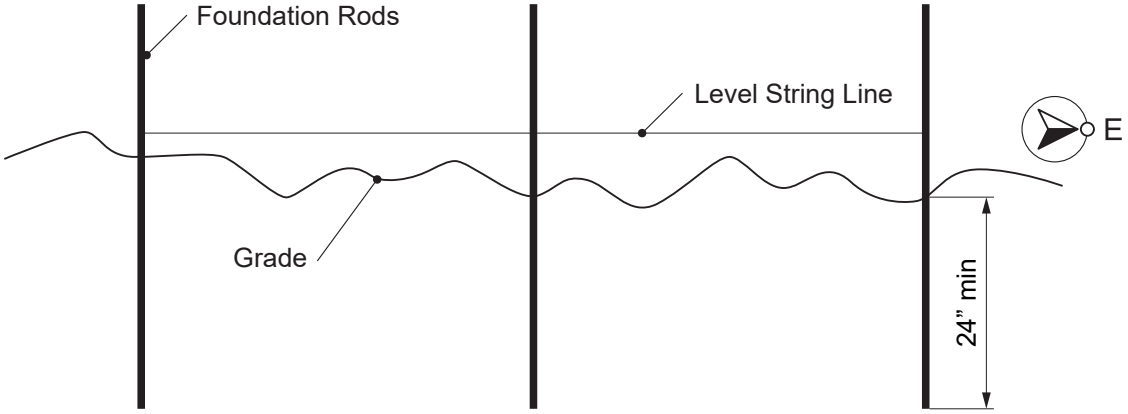

SIDE

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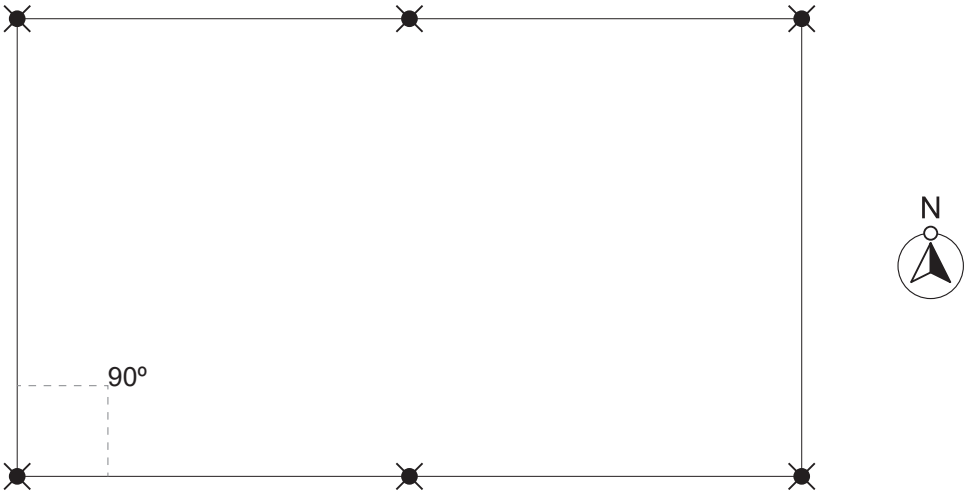

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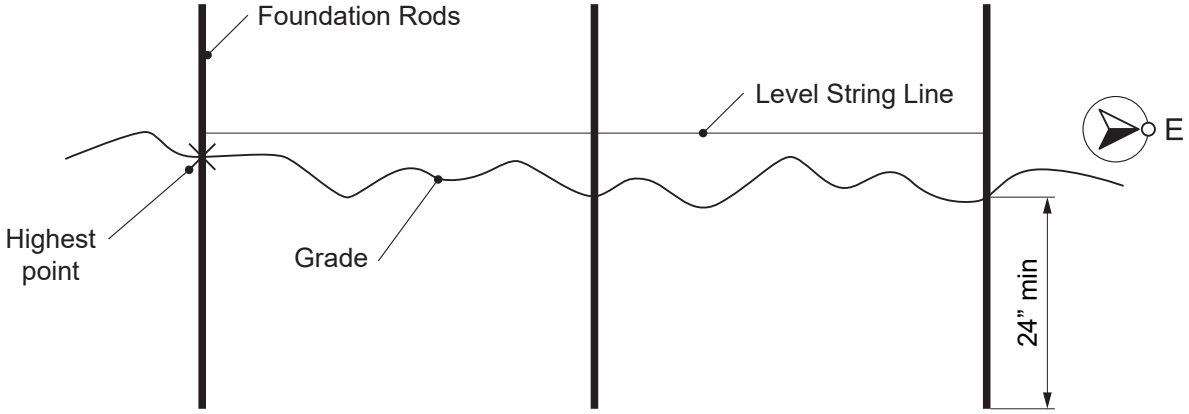
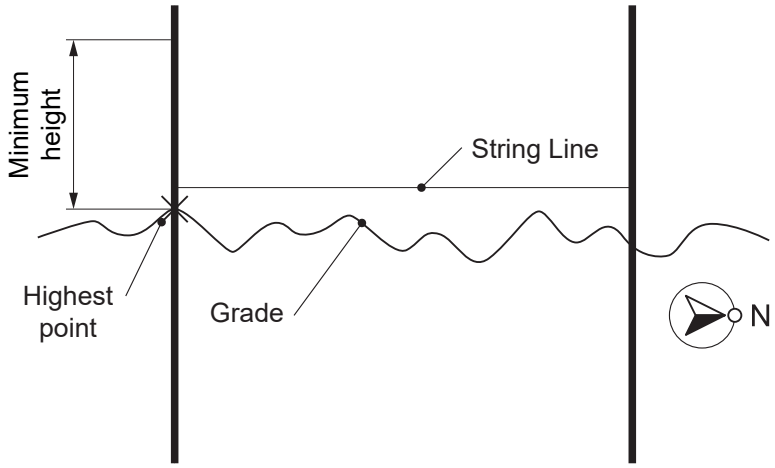
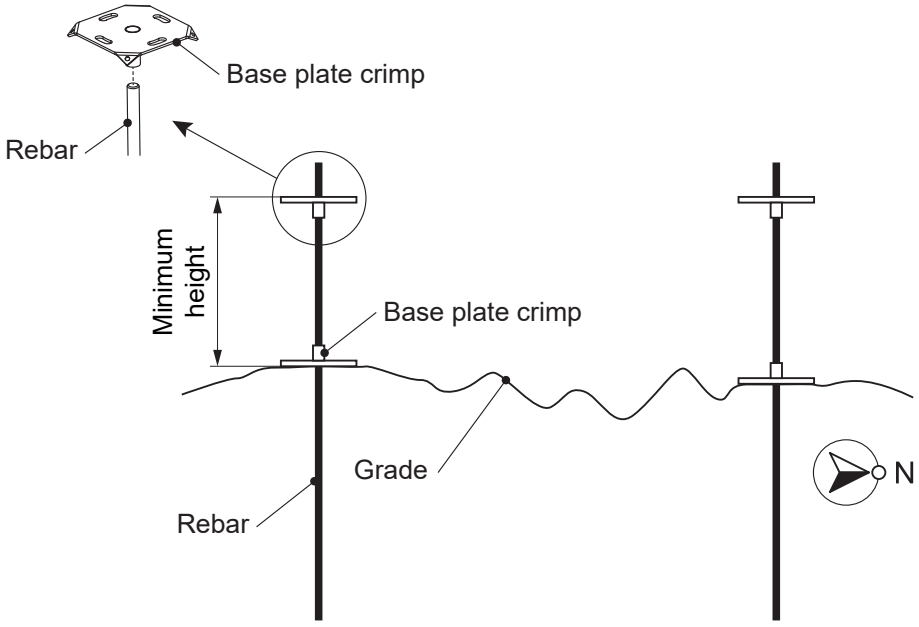


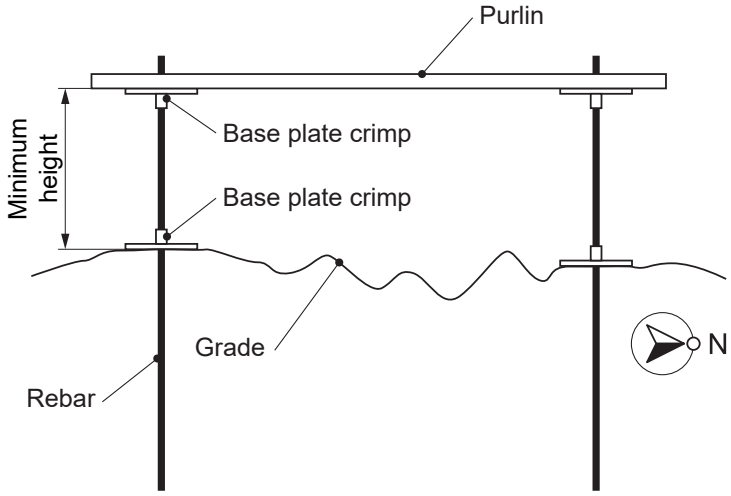
SIDE


Minimum height
String Line
Highest point
Grade
N

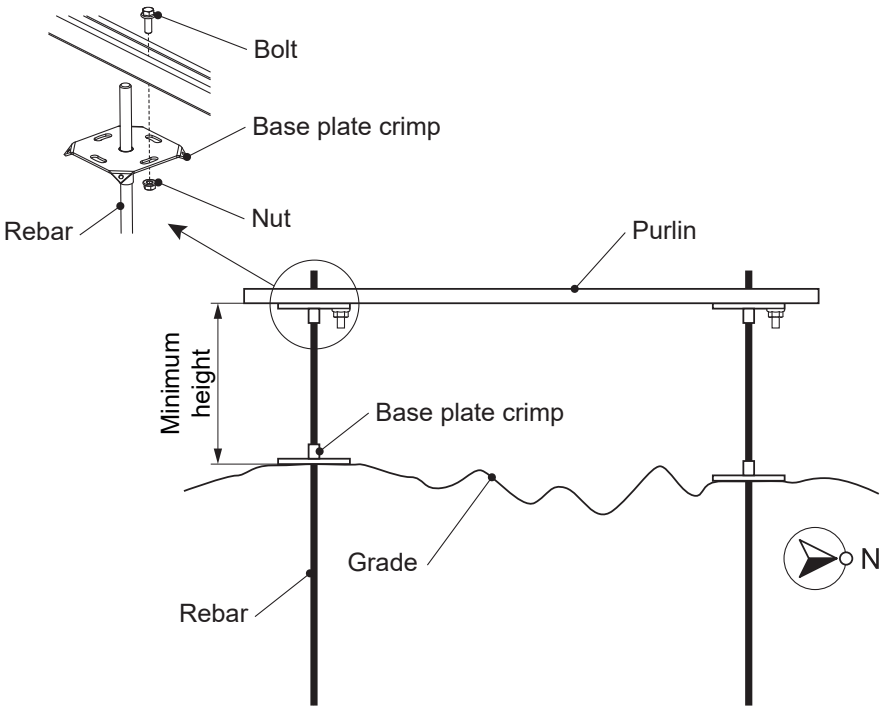
LEFT


Base plate crimp
Rebar
Minimum height
Base plate crimp
Grade
N
Rebar

LEFT


Purlin
Base plate crimp
Minimum height
Base plate crimp
Grade
N
Rebar

LEFT

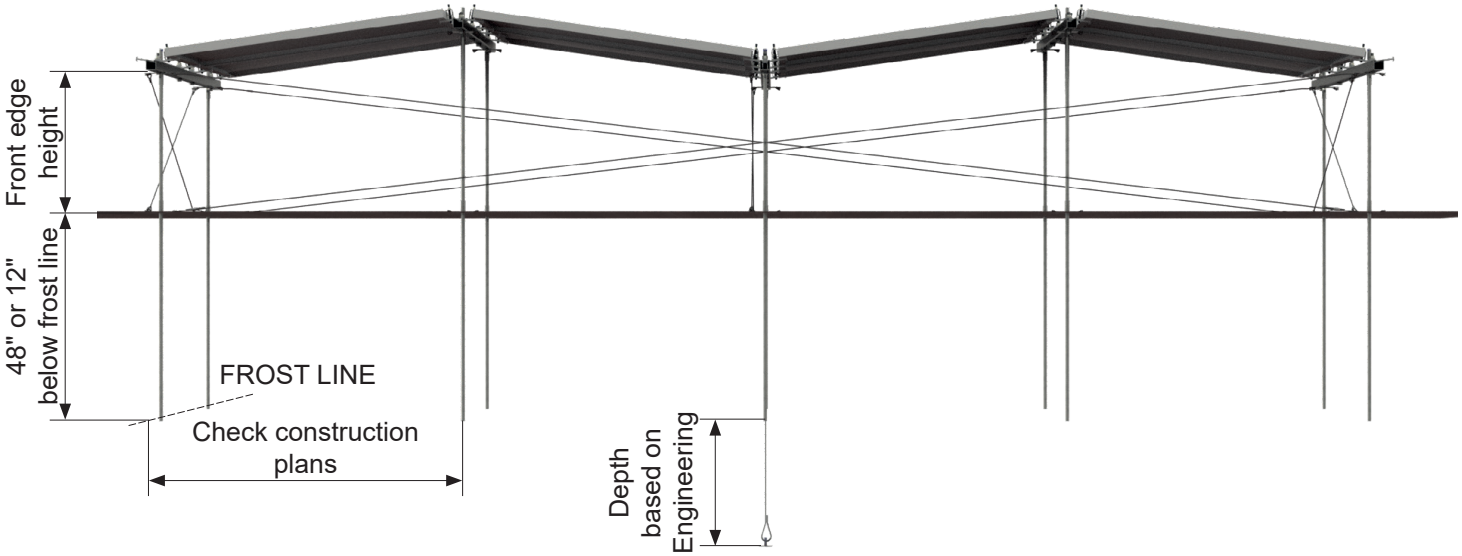

Bolt
Base plate crimp
Nut
Rebar
Purlin
Minimum height
Base plate crimp
Grade
N
Rebar

LEFT

Base Structure Inspection

After completing the installation, conduct a final inspection to ensure all components are correctly installed and aligned according to the site-specific plans.

Check the stability of the rebar rods, anchors, purlins, and brackets, making any necessary adjustments.



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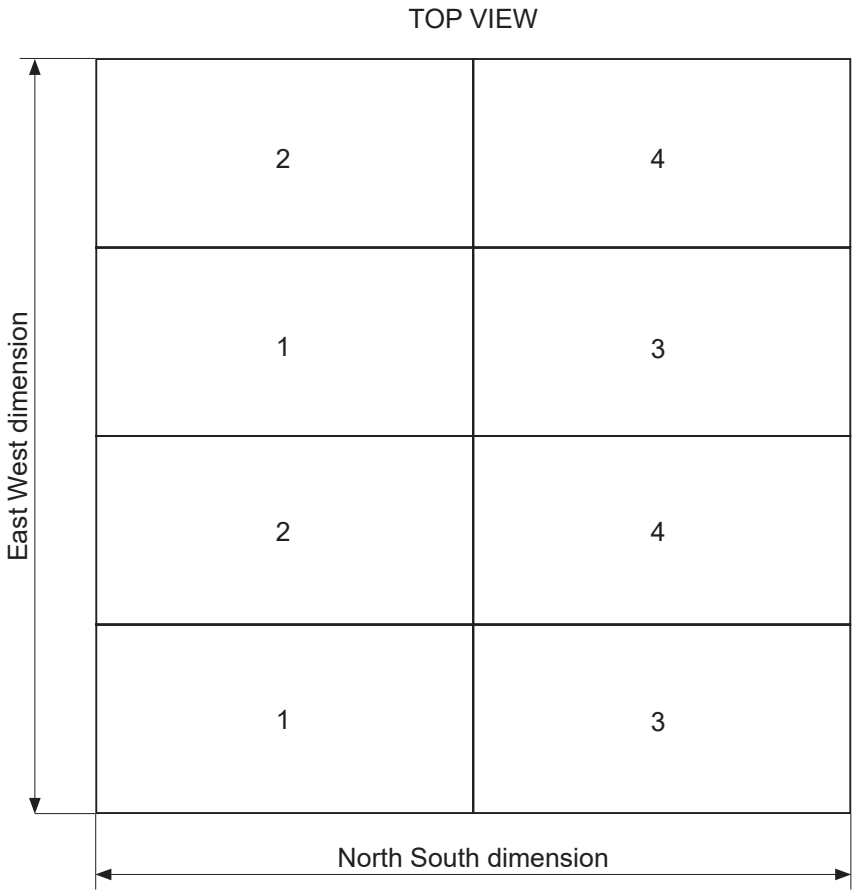

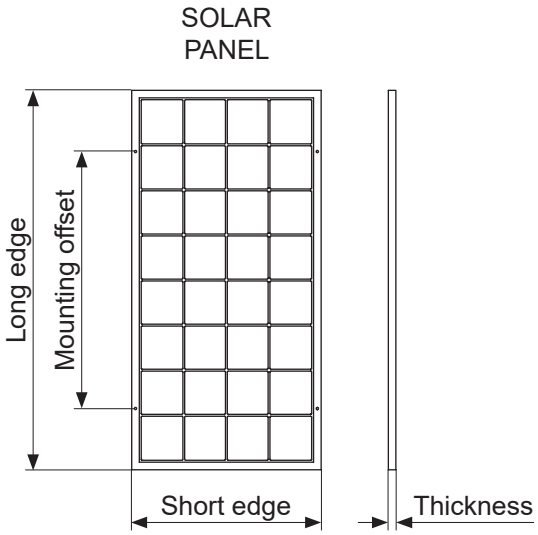

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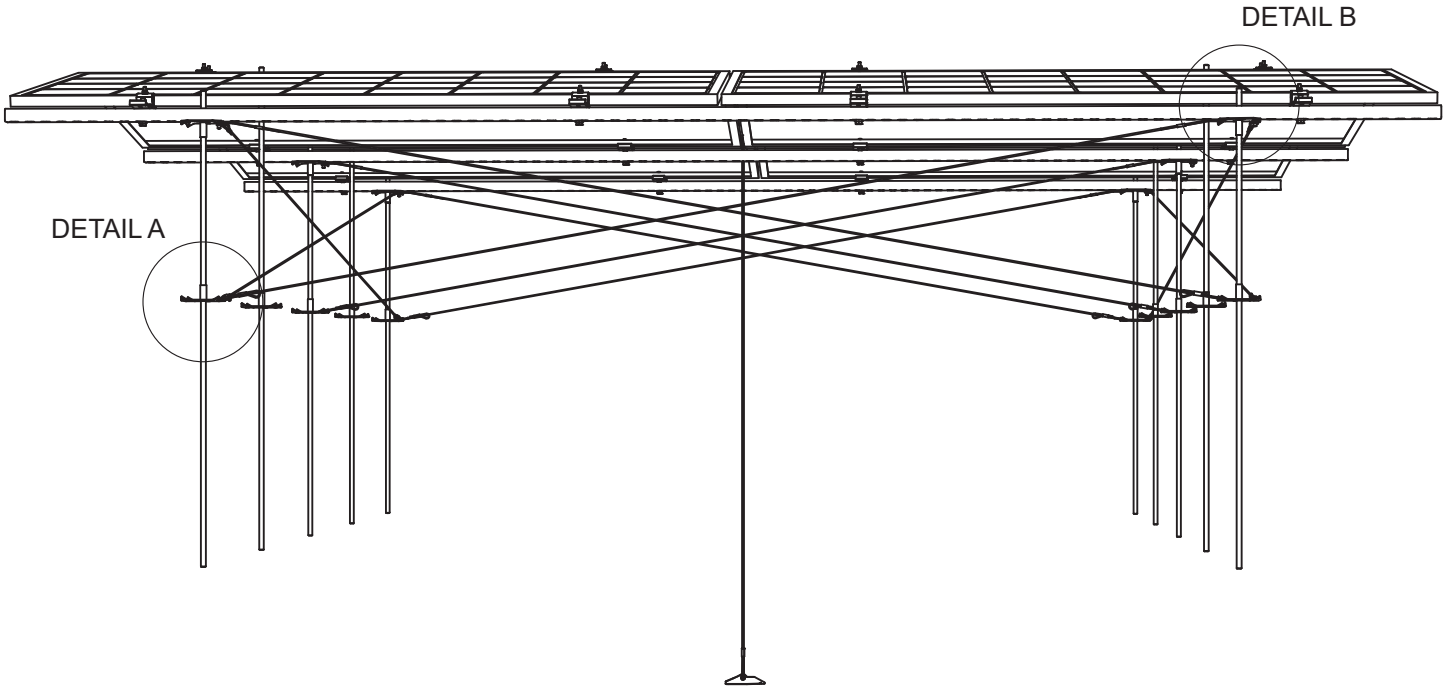
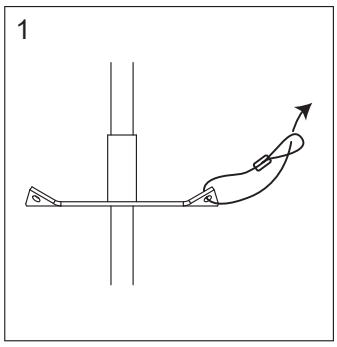
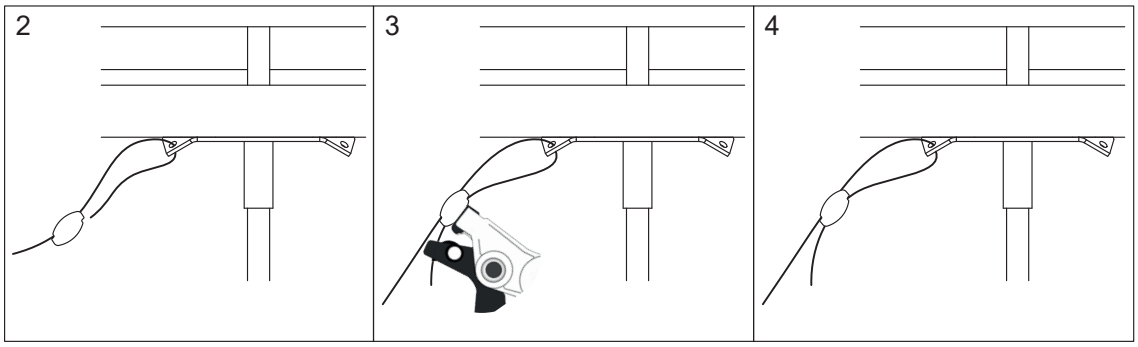
Cable Brace Installation



DETAIL A



DETAIL B



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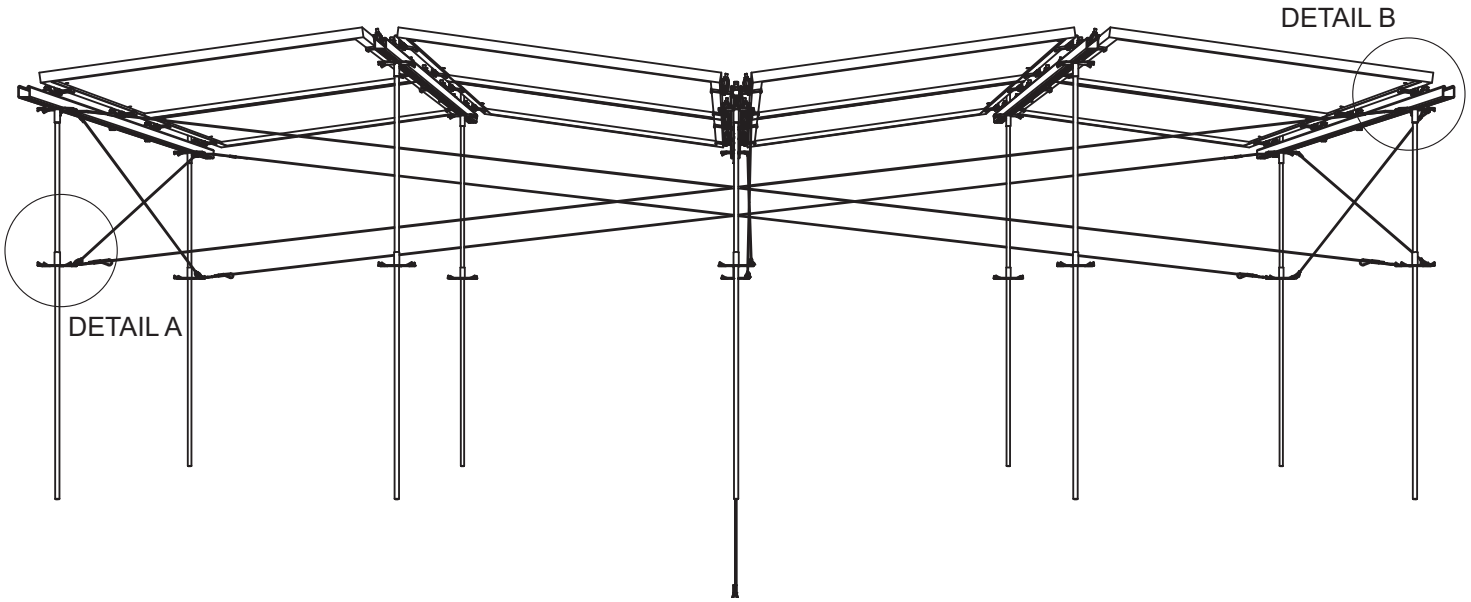
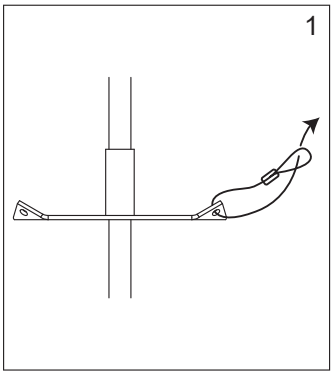
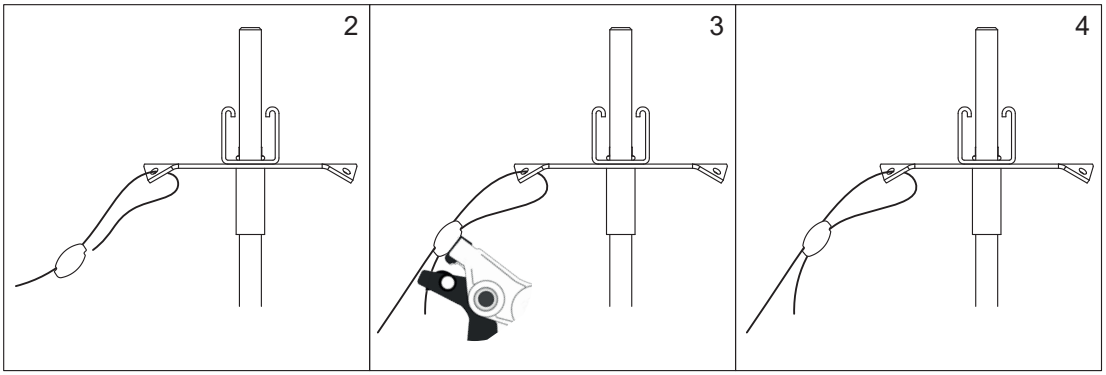


DETAIL A



DETAIL B



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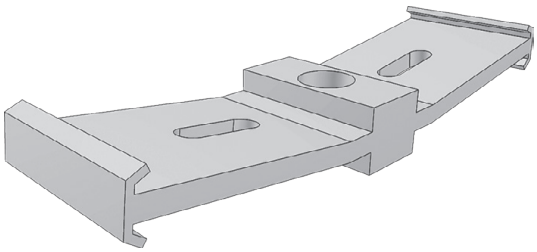
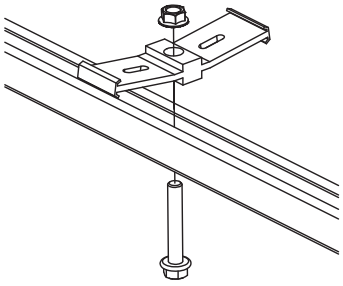
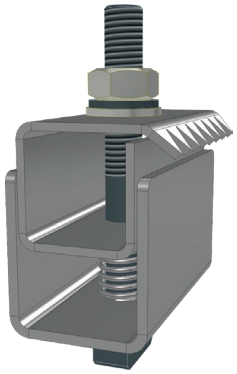
Tilt Bracket Installation

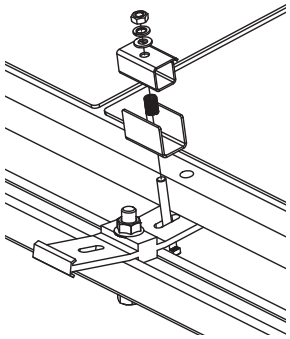




ITEM	DESCRIPTION
3	OPN Tilt Bracket

Tilt Top Clamp Installation



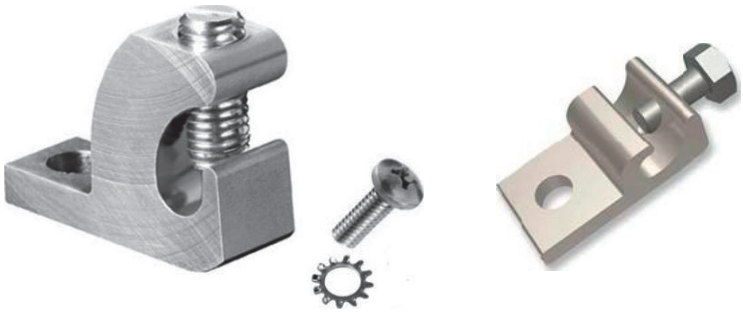


ITEM	DESCRIPTION
4	OPN Tilt Top Clamp

INSTALLATION MANUAL FOR OSPREY POWERNEST™

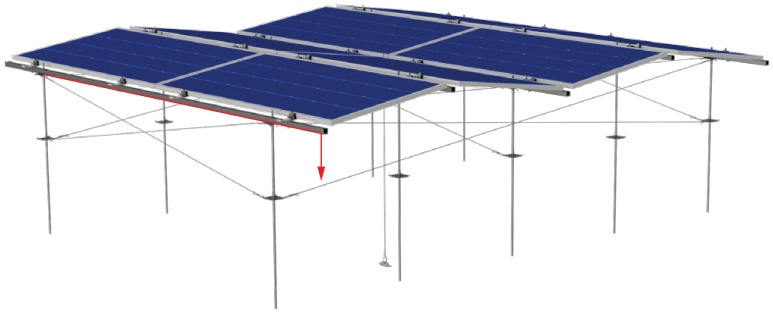
Grounding and Bonding

Once the solar panels have been installed connect each solar panel using a UL Listed bonding lug and attach this lug to a copper wire. This assembly is then connected to the ground rod. Please note that Nuance does not provide any electrical components.



Bonding Path

1. Place the lug over the hole, positioning the star washer between the bottom of the grounding lug and the purlin. Insert the bolt and torque the grounding assembly.
2. Insert a #4 to #10 AWG copper wire into the lug and tighten the lug set screw onto the copper wire. Torque to 35 in-lbs for #4-6 AWG wire and to 30 in-lbs for #8-10 AWG. The minimum grounding conductor to be used is #10 AWG copper.
3. Connect the grounding electrode conductor to a ground rod or equivalent ground according to the National Electric Code.



4. For multiple rows of Osprey PowerNEST™ units, connect each row's strut rail with an appropriately sized grounding conductor and run it in conduit with string wires to the 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 15A DC, then 13 strings can be connected to a single ground rod. If the string has a 20A DC rating, then 10 strings of Power
5. Tables can connect to the single ground rod.
6. For large solar arrays, multiple ground rods will be required.
7. Nuance Energy does not supply any electrical components.

INSTALLATION MANUAL FOR OSPREY POWERNEST™

Installer Warning and Notice

It is crucial to carefully read and comprehend the installation manual provided before installing, wiring or operating our product in your PV system. Failure to comply with all instructions and procedures could result in product damage, and most importantly, cause severe injury or even death. It is essential to ensure that all PV systems and Osprey PowerNEST™ installations meet the National Electric Code standards. Installers hold the sole responsibility of complying with code and safety regulations, and the consequences thereof.

WARNING!	
	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 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 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 injures by preventing the accidental or unintentional release of hazardous energy. 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 ~

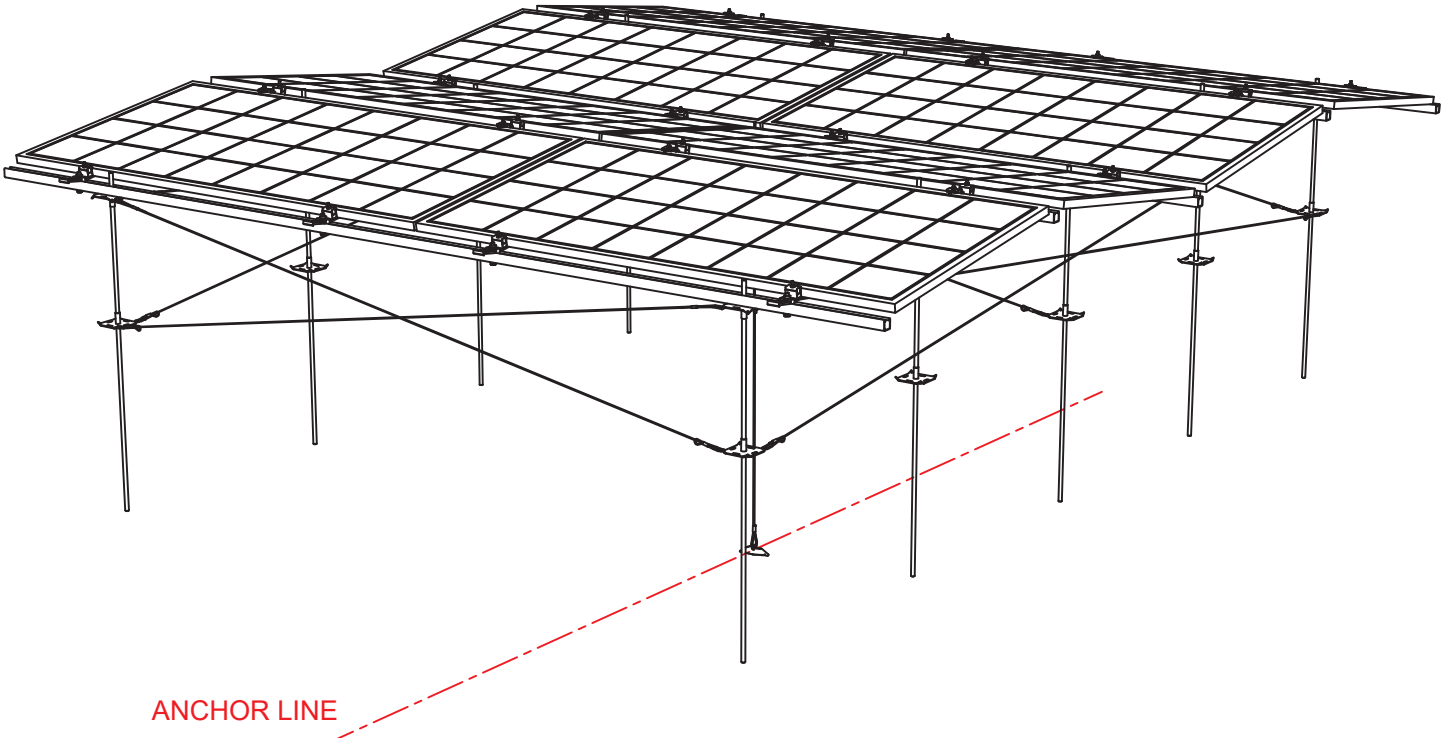
INSTALLATION MANUAL FOR OSPREY POWERNEST™

Installation and Testing of Earth Anchors

After completing the Osprey PowerNEST™ Table assembly, ensuring proper alignment, squaring, leveling, and splicing to the next Table, the installers must commence the installation of Earth Anchors. All anchors must be tested. In certain cases of severe frost or extremely hard soil, our Drillbit as specified on page 5 may be required to create pilot holes for the anchors. It's important to note that these pilot holes are not wide enough to accommodate the anchor's passage through solid rock. In such cases, we use epoxy spin-in Chemical capsule methods, HDG AllThread with a 3/4" Drillbit purchased from a source other than Nuance Energy, or our NEW Galvanized Expansion Rock Anchors that utilize our current 1-3/8" dia. drill bits. For more details, see the Supplementary Earth Anchor Instructions.

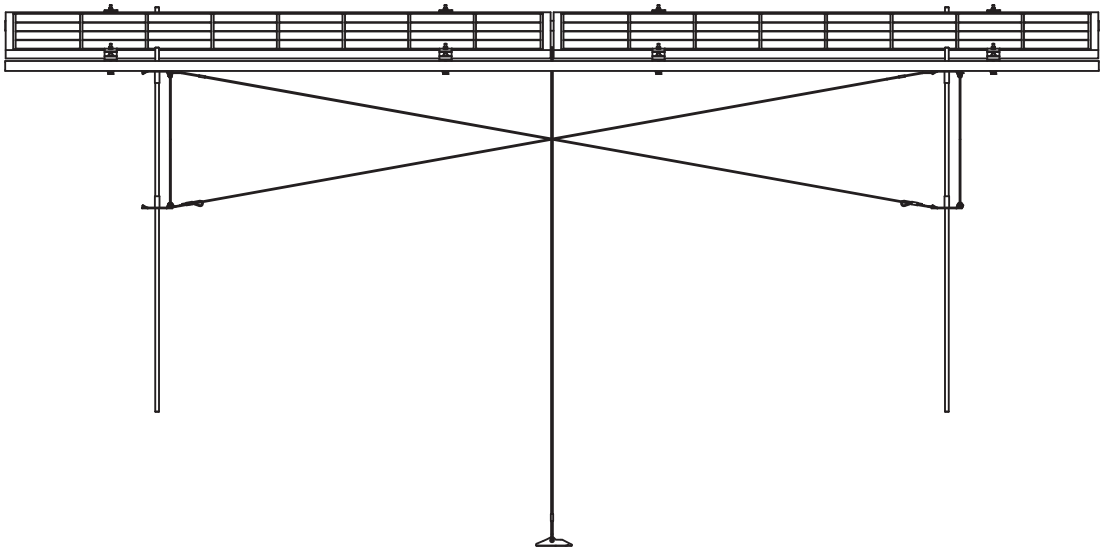
To comply with safety regulations, installers must request Structural Calculations packets directly from Nuance. Installers are responsible for selecting the appropriate design values and anchor quantity based on live Load Testing results or via SSM request. It is recommended to purchase additional anchors to account for unforeseen circumstances.

Nuance Energy's website offers Site-Specific Memo's (SSM) upon RFQ request, which provides project site-specific parameters and stamps.



NUANCE ENERGY
Revolutionary Solar Racking Structures

INSTALLATION MANUAL FOR OSPREY POWERNEST™



Disclosure Statement

The Installer, responsible for the installation and assembly of Nuance Energy's Osprey PowerNEST™ Product, acknowledges and agrees to the following terms:

- The Installer has read the Manufacturer's Installation Manual version 2 or newer and is aware of the section on Anchor Installation and requirements.
- The Installer shall assemble and install the Product and Anchors to Nuance Energy's specifications as required in this Manual.
- Nuance Energy reserves the right to void its Manufacturer's warranty of the Product if the Installer or the Buyer's representative fails to sign this Disclosure Statement before installing the Product.

Buyer: _____ Date: _____
NAME OF CONTRACTOR

Buyer's Rep: _____ Date: _____
NAME OF CONTRACTOR