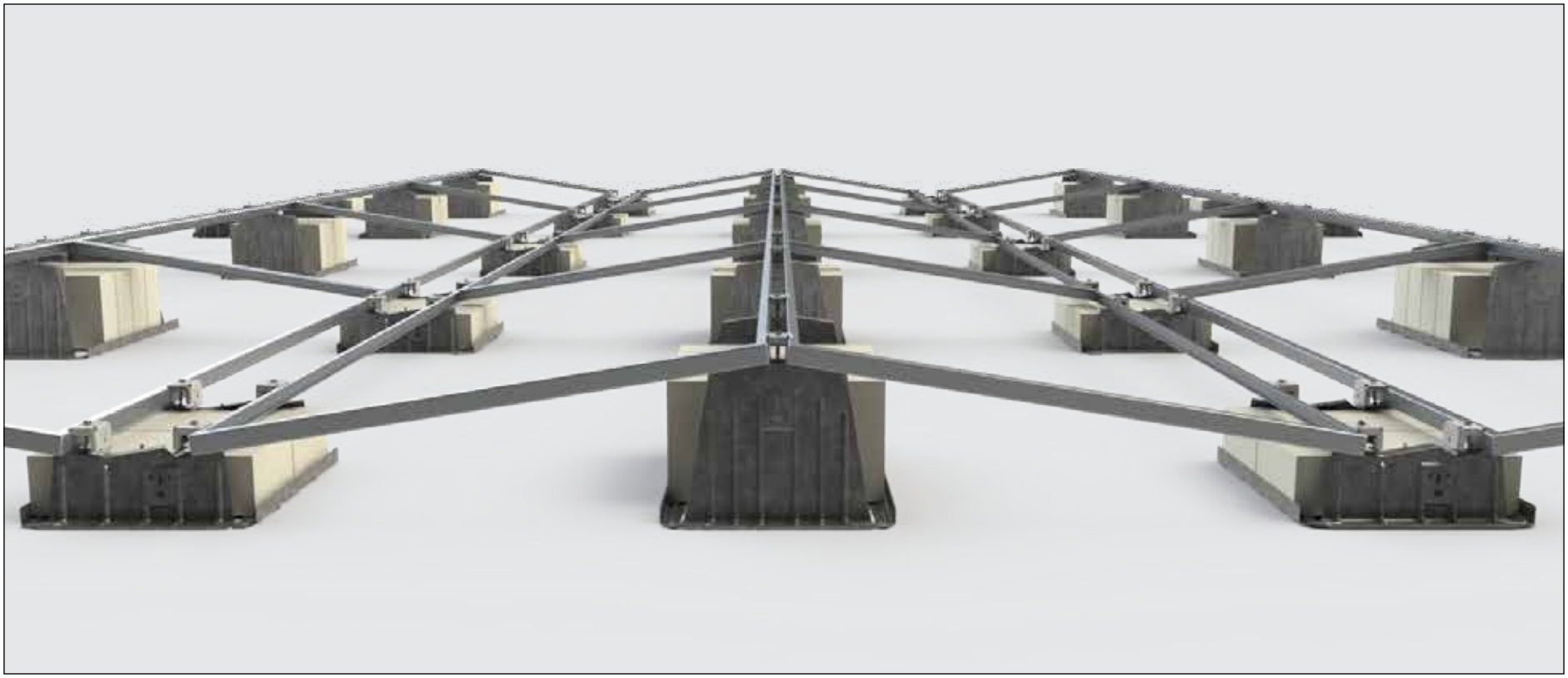
RMDT INSTALLATION GUIDE



GENERAL NOTES:

If provided refer to construction drawings for project specific details. Construction drawings have precedence over these installation guidelines.

PUB2022APR18

RMDT

TOOLS & SPECIFICATIONS

TECHNICAL DATA SHEET | PAGE 1

TECHNICAL SPECIFICATIONS:

Material Types: 16G ASTM A653 GR50 Steel

Coating(s): G235 Galvanization, G180 Galvanization, G40 Galvinization + InterCoat® ChemGuard, G60 Galvinization + InterCoat® ChemGuard or G80 Galvinization + InterCoat® ChemGuard

Hardware: Stainless Steel

Bonding and Grounding: UL2703 Listed Continuous Bonding Path.

TOOLS REQUIRED OR RECOMMENDED FOR LAYOUT, ATTACHMENTS & INSTALLATION:

- Drill **(Do Not Use An Impact Driver)**
- 7/16" Socket
- Torque Wrench
- Tape Measure
- Chalk Reel
- Optional Spacers (See Diagram - Page Right)

GENERAL HARDWARE:

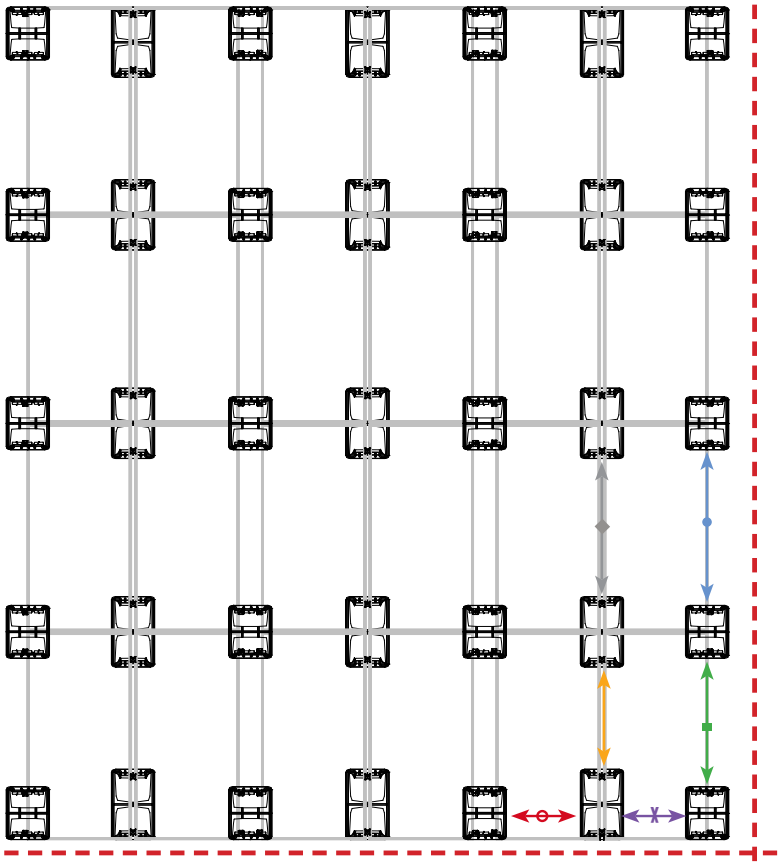
- ¼-20 X 2 ½" Hex Head Bolt - Module Clamps
- ¼-20 Stainless Steel U-Nuts

SAFETY:

All applicable OSHA safety guidelines should be observed when working on a PV installation job site. The installation and handling of PV solar modules, electrical installation and PV racking systems involves handling components with potentially sharp metal edges. Rules regarding the use of gloves and other personal protective equipment should be observed.

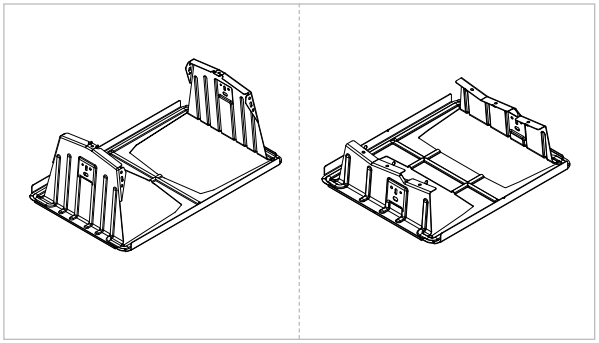
LAYOUT ASSISTANCE TOOL:

Module Dimensions:		RMDT	Module location:	Spacing Equations (in Inches):
Module Length **(ML) =**		1	Valley N/S Column Spacing =	ML+G-19.70"
Module Width **(MW) =**		2	Edge Valley N/S Column Spacing =	ML+G/2-29.55"
Prefered module gap? (1/4" - 1" is permissible)		3	Edge E/W Row Spacing =	(MW x 0.990) - 15.69"
		4	E/W Row Spacing =	(MW x 0.990) - 11.20"
East/West Module Gap **(G) =**		5	Ridge N/S Column Spacing =	ML+G-26.20"
		6	Edge Ridge N/S Column Spacing =	ML+G/2-39.30"

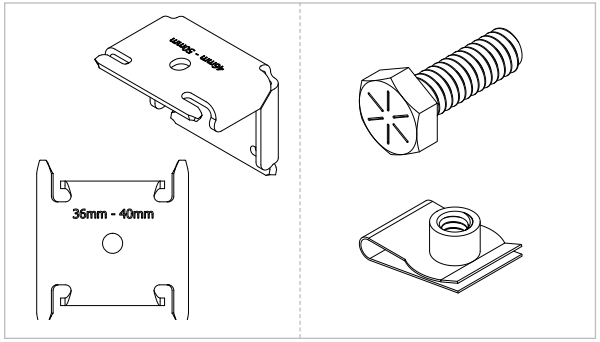


SPACERS - OPTIONAL

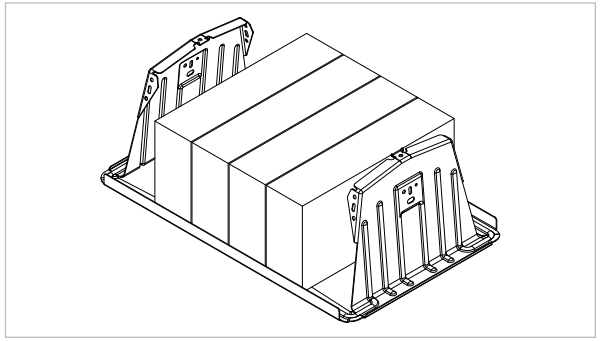
- VALLEY COLUMN SPACING
- EDGE VALLEY COLUMN SPACING
- EDGE E/W ROW SPACING
- E/W ROW SPACING
- RIDGE N/S COLUMN SPACING
- EDGE RIDGE N/S COLUMN SPACING



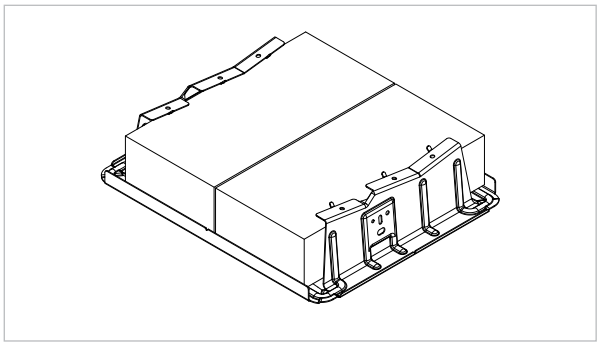
BALLAST BAY: The Ballast Bay is constructed of a high strength low alloy steel with a coating to protect against corrosion. This system has a modular design that allows for easy installation around roof obstructions and accommodates roof undulations. The Ballast Bays are designed to nest within each other to optimize shipping logistics. **NOTE: Systems installed on PVC roofs require ballast bays with pre-installed Santoprene pads.**



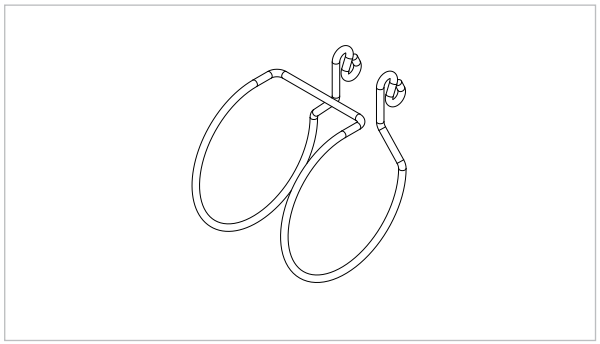
CLAMP & HARDWARE: The Module Clamp is made of Stainless Steel and can be used with module frame heights indicated on the clamp. The clamps are a portion of the UL2703 Listed system when installed according to this installation guide. A ¼-20 stainless steel bolt and u-nut are the associated hardware for installing clamps.



RIDGE BALLAST BLOCK: The Ridge ballast bay can fit up to 5 standard 4”x8”x16” solid concrete cap blocks. Block weight can range from 26 – 38 lbs and shall meet ASTM C1491 requirements for freeze thaw durability. Verify your block weights before using the Unirac U-builder online design tool

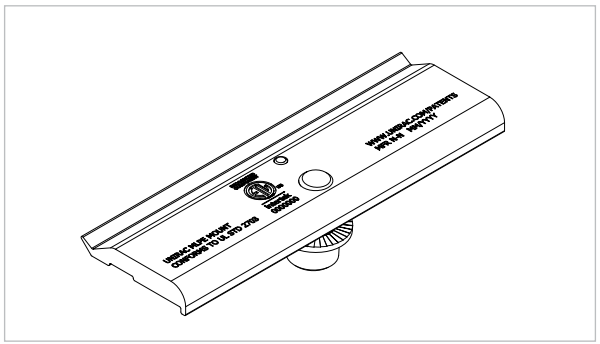


VALLEY BALLAST BLOCK: The Valley ballast bay can fit up to 2 standard 4”x8”x16” solid concrete cap blocks. Block weight can range from 26 – 38 lbs and shall meet ASTM C1491 requirements for freeze thaw durability. Verify your block weights before using the Unirac U-builder online design tool.



OPTIONAL WIRE MANAGEMENT: Custom Unirac wire clip along with mounting options for various off the shelf wire management clips.

NOTE: All conduit and wire ways should be grounded & bonded per the (NEC) National Electric Code.



OPTIONAL MICROINVERTER MOUNTING: Microinverter / Power optimizer bracket, see page B for additional instructions.

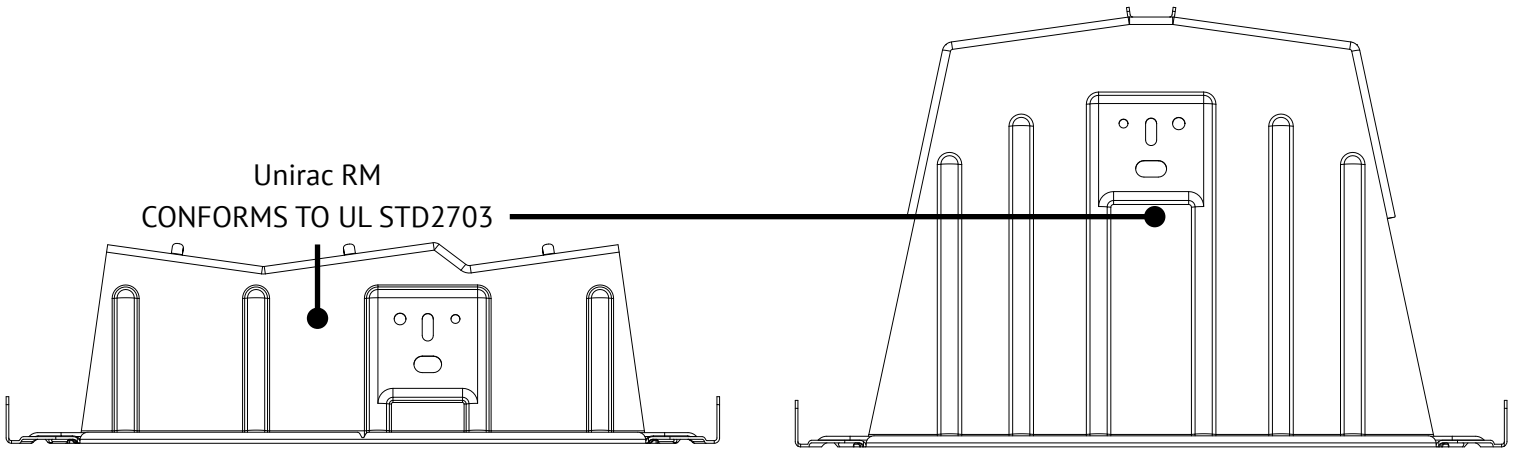
SYSTEM LEVEL FIRE CLASSIFICATION: The system fire class rating is only valid when the installation is conducted in accordance with the assembly instructions contained in this manual. RM ROOFMOUNT has been classified to the system level fire portion of UL2703. It has achieved Class A performance for low sloped roofs when used in conjunction with type 1 and type 2 module constructions. Please see the specific conditions below for mounting details required to maintain the Class A fire rating. Minimum and maximum roof slopes are restricted through the system design and layout rules. The fire classification rating is only valid on roof pitches less than 2:12 (slopes < 2 inches per foot, or 9.5 degrees).

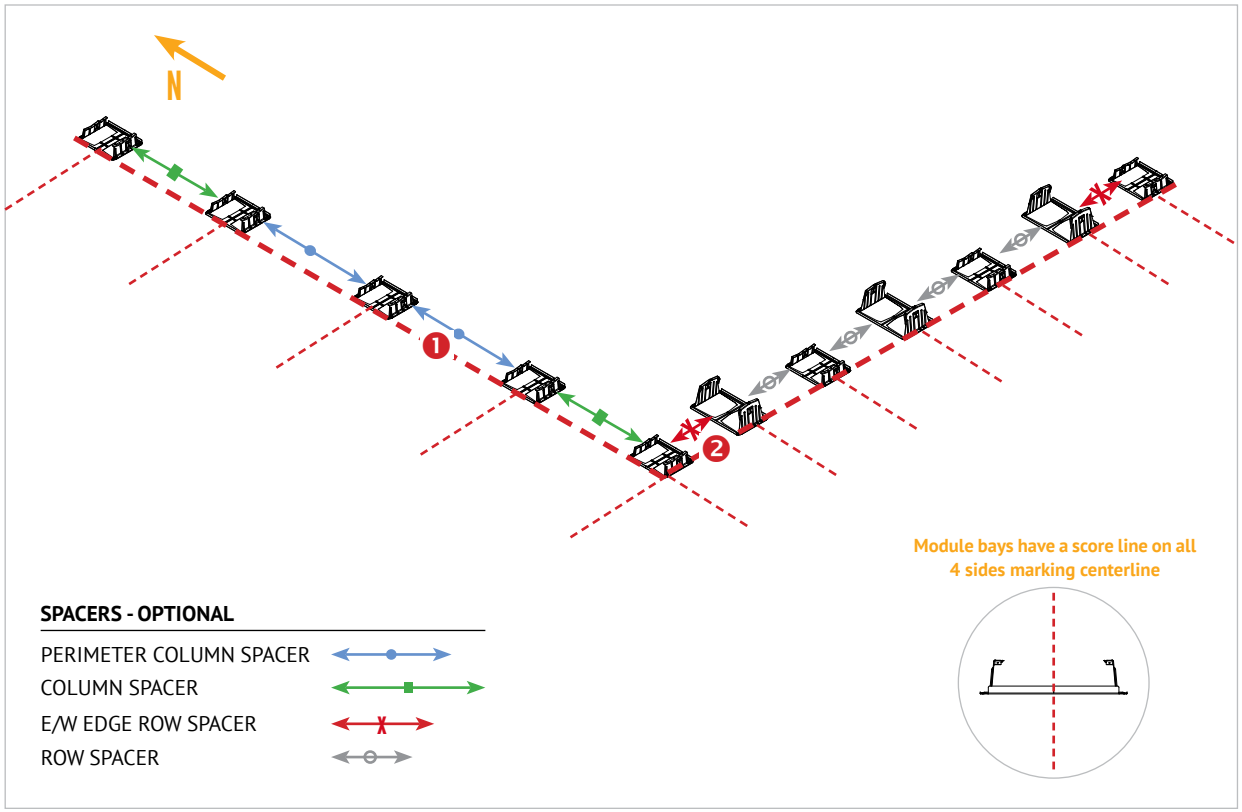
NOTE: Type I or Type II information is generally located on back of modules or through manufacturers documentation. Some building codes and fire codes require minimum clearances around such installations, and the installer should check local building code requirements for compliance.

Module Type	System level Fire Rating	Mitigation
Type 1	Class A	None Required / No Limitations
Type 2	Class A	None Required / No Limitations

TYPE 1 / TYPE 2 CLASS A FIRE RATING MOUNTING ORIENTATION

Unirac RM Dual tilt has achieved Class A system level fire performance for type 1 and type 2 module constructions. There are no provisions necessary in order to meet Class A requirements for this product.

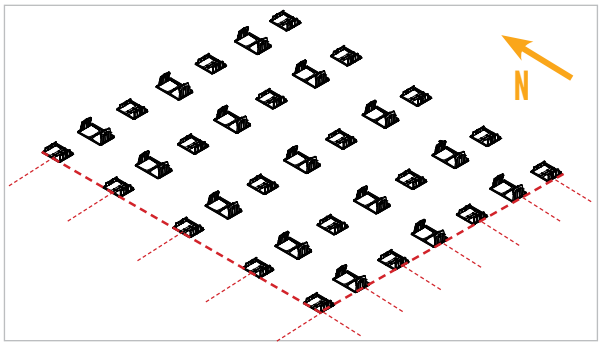




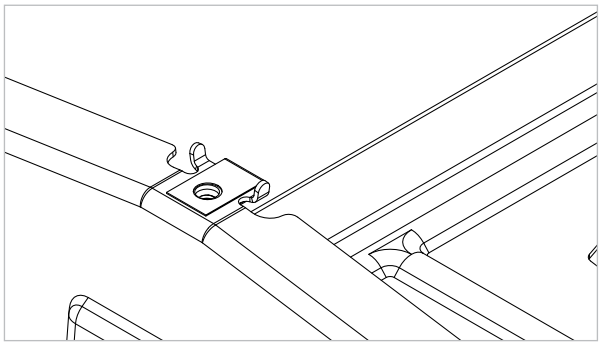
❶❷ **SNAP WEST PERIMETER CHALK LINE, THEN NORTH OR SOUTH PERIMETER CHALK LINE.** As best practice, mark lines on perimeter chalk lines to locate center of bays

PLACE WEST PERIMETER BAYS FIRST, THEN NORTH OR SOUTH PERIMETER BAYS. If slip sheets are required, place per manufacturer recommendations.

NOTE: Custom spacers can be made to aid in the placement of bays on the roof. See page 1.



FILL IN BAYS



INSTALL U-NUT It is recommended to install u-nuts prior to placing ballast blocks & modules on the bays.

NOTE: U-NUT - Single Use Only - Do not re-torque once fully seated

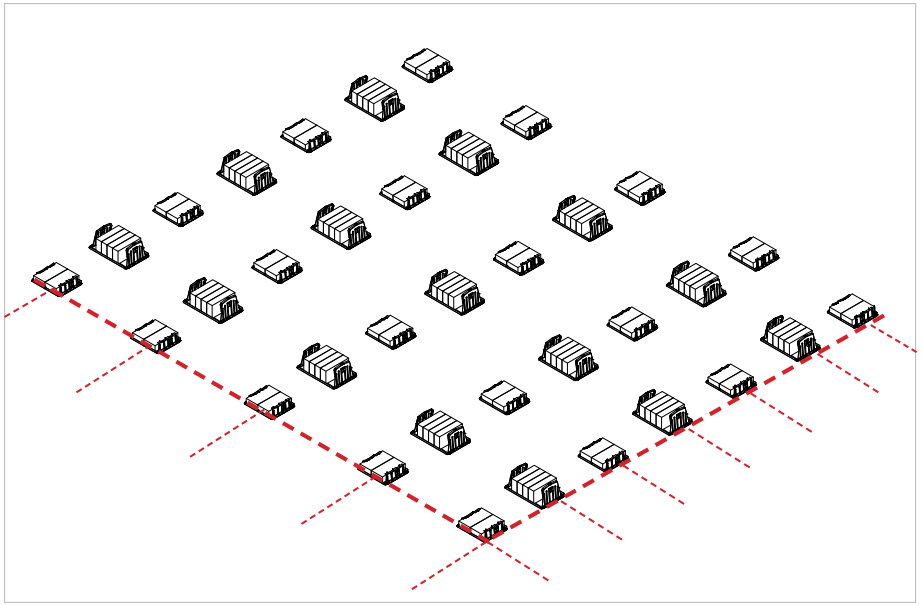
NOTE: If mechanical attachment is required, place prior to installation of modules.

RMDT

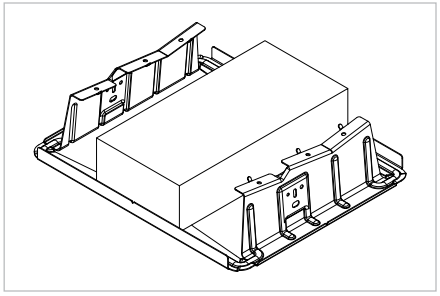
PLACE BALLAST

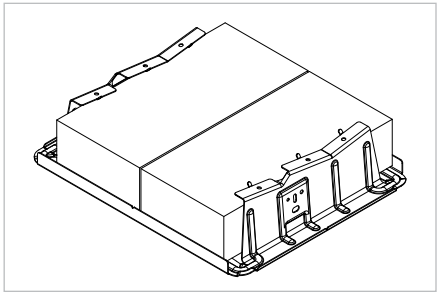
INSTALLATION GUIDE

PLACE ALL BALLAST: A maximum of 2 ballasts can be placed in valley bay, and up to 5 ballasts can be placed in the ridge. Site specific ballast calculations should be created for each individual project in accordance with the U-Builder design software. This system has been rated for the mechanical load provisions of UL2703. In addition, it has been designed and tested to comply with the more rigorous requirements of SEAOC PV1, PV2 and ASCE 7.

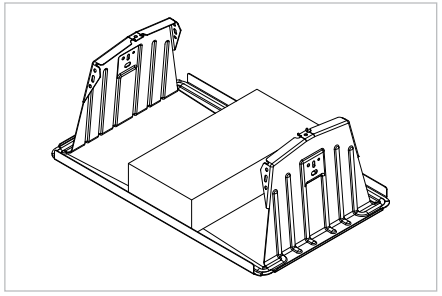


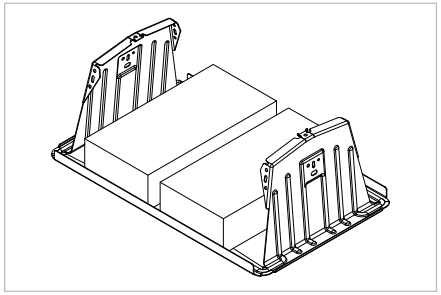
VALLEY BALLAST BLOCK OPTIONS:

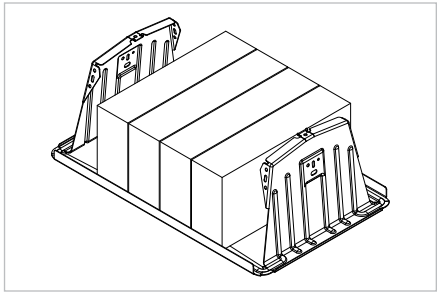


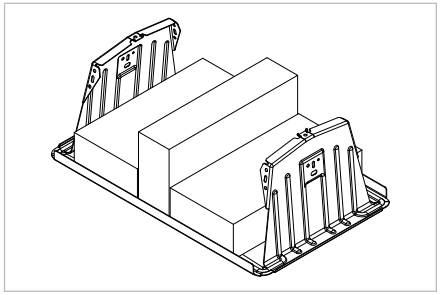


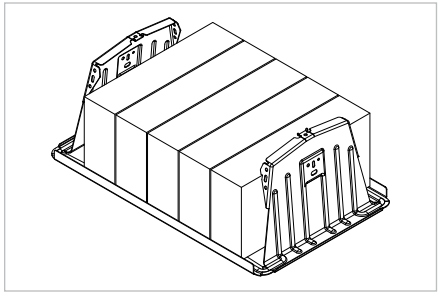
RIDGE BALLAST BLOCK OPTIONS:

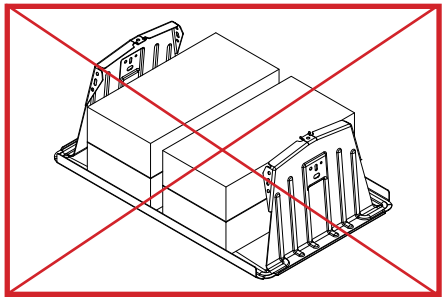


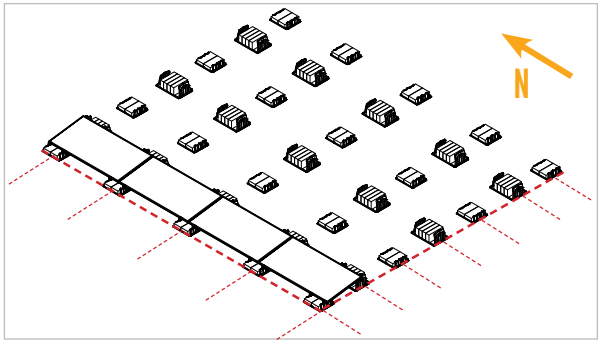






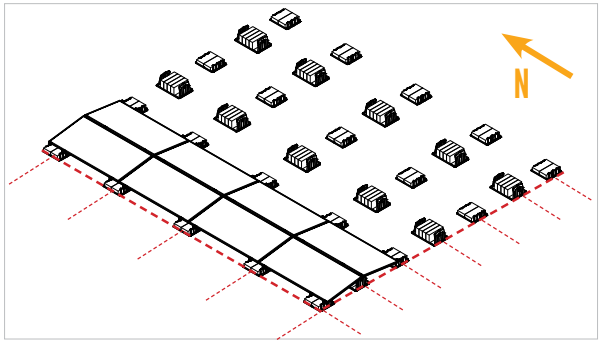






WESTERN EDGE MODULE PLACEMENT. Tabs on valley and ridge bay provide mechanical stop and aid in proper spacing at ridge. Rows of modules must be wired together at this time. See page 8 for wire management options.

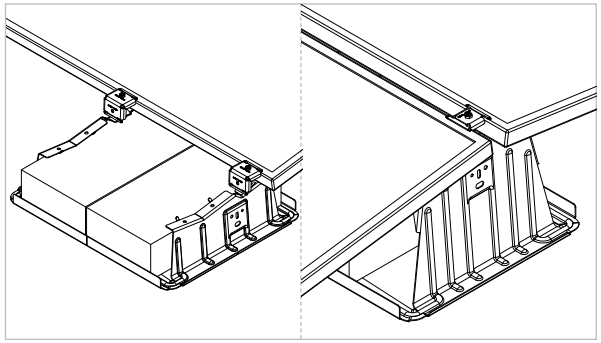
NOTE: Modules may be placed on bays without immediate installation of clamps. Column Spacing: 1 inch maximum gap between modules / ¼ inch minimum gap between modules.



EAST OR WEST EDGE MODULE PLACEMENT. Rows of modules must be wired together at this time. See page 8 for wire management options.

NOTE: Clamps should be installed for each East/West pair of rows after wiring has been completed.

NOTE: Wiring, wire management, and electrical QC should be done as each row is built.

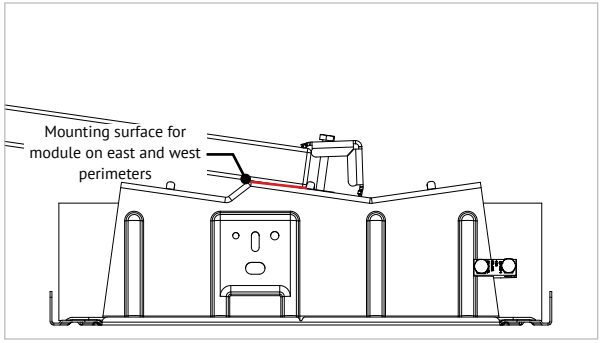


INSTALL CLAMPS

NOTE: U-NUT - Single Use Only - Do not re-torque once fully seated

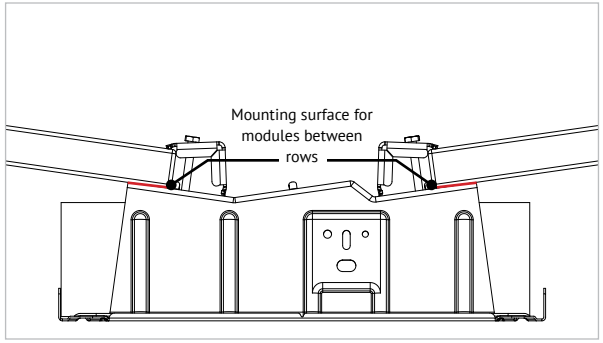
NOTE: CLAMP AND BOLT - Single Use Only - Do not re-torque once fully seated

TORQUE VALUE: 7FT-LBS to achieve UL2703 required clamp load



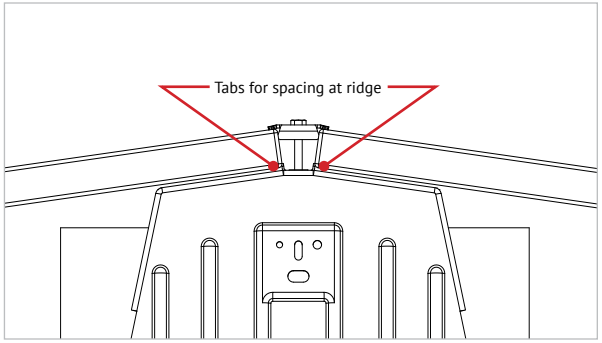
PROPER VALLEY BAY ORIENTATION AT EAST AND WEST PERIMETERS:

- Valley bays are designed to tuck up underneath the modules for east and west perimeters
- Bent tabs on all mounting surfaces act as a mechanical stop for the modules



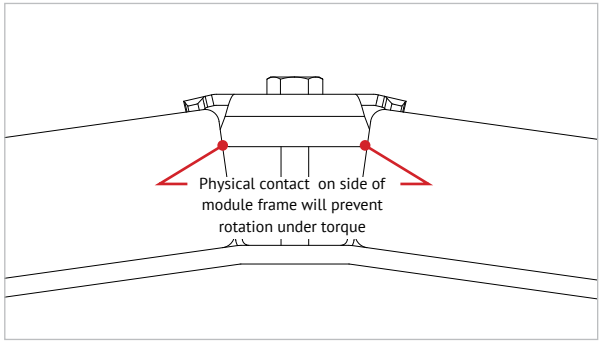
PROPER INTER-ROW SPACING:

- Inter row spacing at the valley is designed to provide an 8" space for walkways
- Bent tabs on all mounting surfaces act as a mechanical stop for the modules



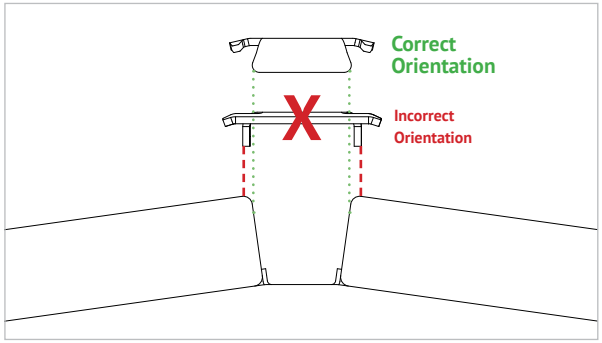
CLOSE UP MOUNTING AT RIDGE:

- Bent tabs on the mounting surfaces aid in setting the correct gap between modules at the ridge

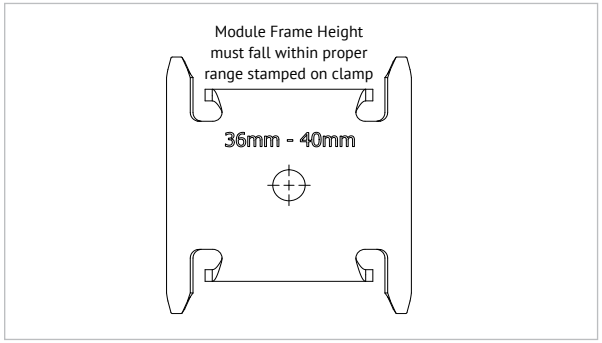


PROPER MID CLAMP INSTALLATION

- The top of the clamp is stamped for module frame height.
- Clamp should be firmly held against module frame while being torqued

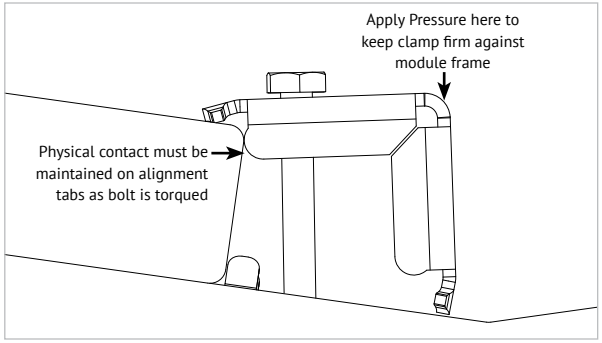


PROBLEM – CLAMP NOT ORIENTED CORRECTLY



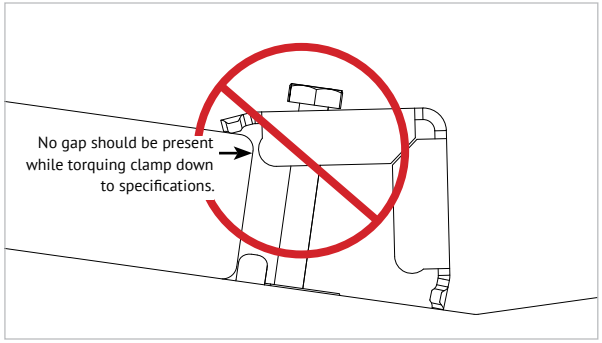
PROBLEM – NOT USING PROPER SIZE OF CLAMP FOR MODULE FRAME HEIGHT

- Double check the stamping on clamp to use the correct leg of clamp for module frame height
- The module height shall fall within the range shown on the top of the clamp



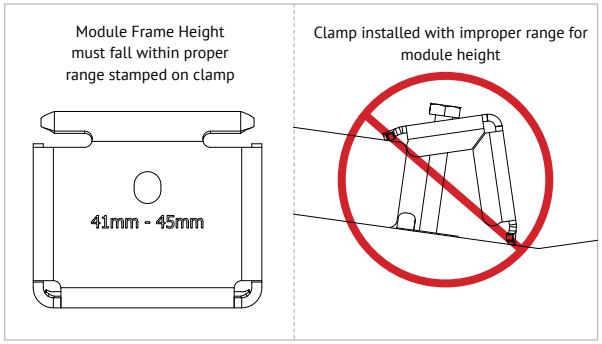
PROPER CLAMP INSTALLATION:

- Clamp is stamped for module frame height on each leg
- Clamp should be firmly held against module frame while being torqued



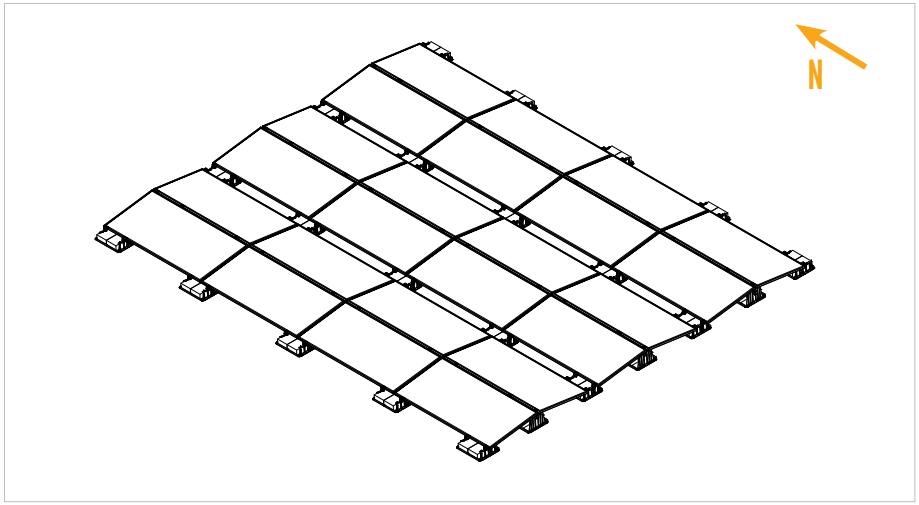
PROBLEM – CLAMP NOT SEATED AGAINST MODULE DURING TORQUING

- Clamp needs to be held securely against the module frame during torquing for proper installation

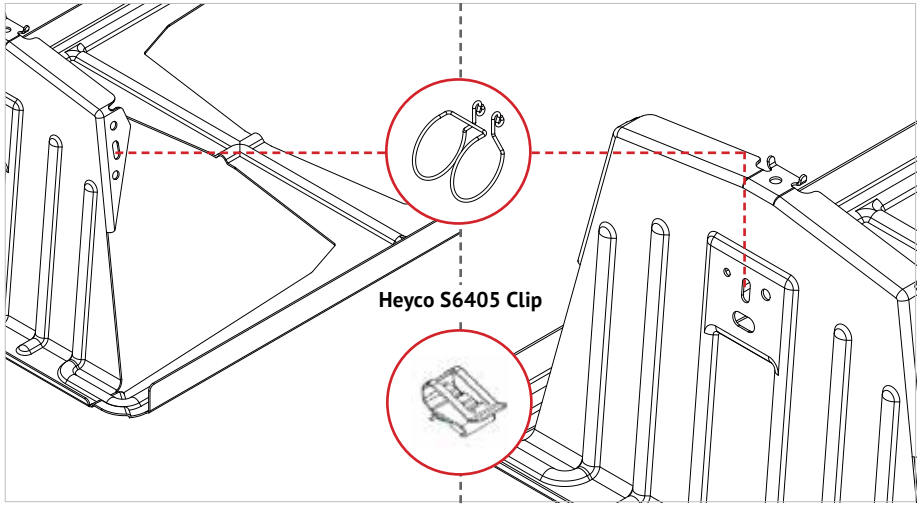


PROBLEM – NOT USING PROPER SIZE OF CLAMP FOR MODULE FRAME HEIGHT

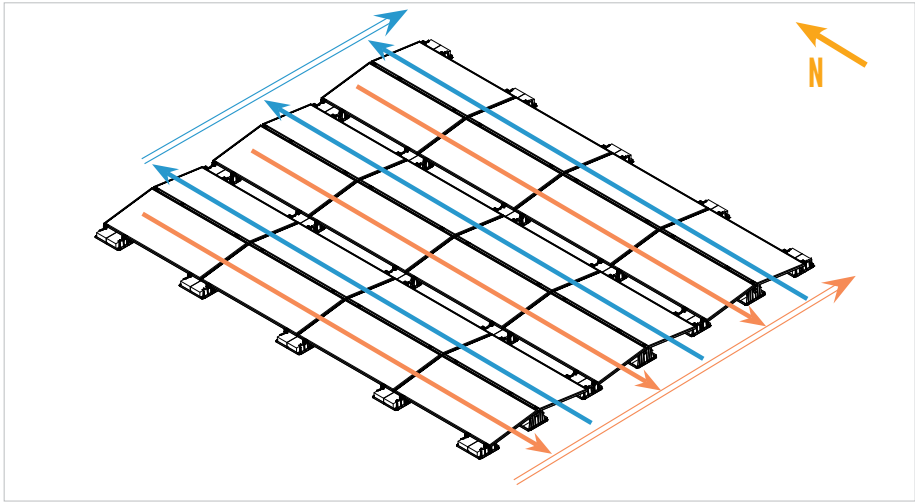
- Double check the stamping on clamp to use the correct leg of clamp for module frame height
- The module height shall fall within the range shown on the top of the clamp
- Excessive angle on clamp will inhibit required clamp load on module



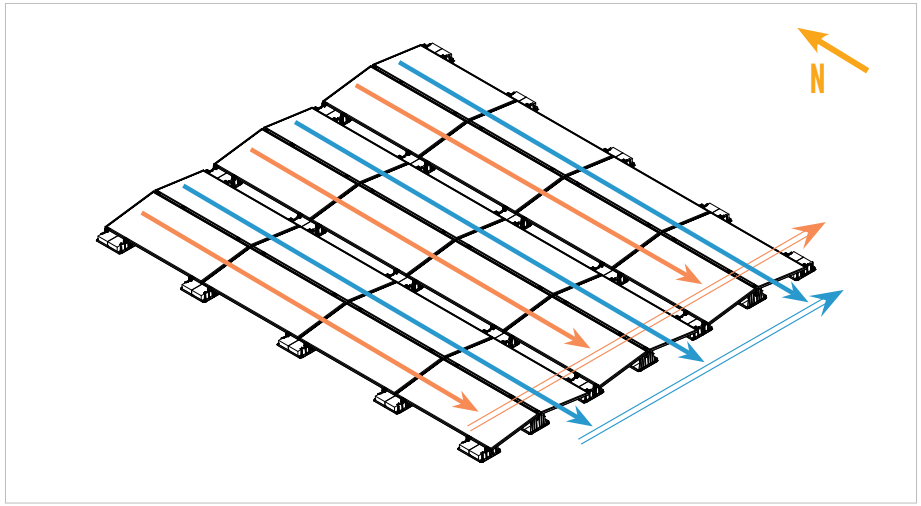
FILL IN ALL MODULES. Wire each row as modules are installed, and secure the modules in place after each east/west row pair is complete.



WIRE MANAGEMENT: Unirac provides a custom clip for wire management. Additional holes are included in the bay to accommodate other off the shelf wire management clips.



WIRE MANAGEMENT OPTION 1: Wire and bundle all east facing modules, run east facing bundle down north perimeter (or south perimeter) and vice versa for all west facing modules



WIRE MANAGEMENT OPTION 2: Wire and bundle all east facing modules, wire and bundle all west facing modules. Run bundles along north or south perimeter

GROUNDING LUG MOUNTING DETAILS AS REQUIRED BY CODE & ENGINEER OF RECORD: The Ilsco lug has a green colored set screw for grounding indication purposes. One lug is recommended per continuous array, not to exceed 150ft X 150ft.

Unirac ROOFMOUNT is intended to be used with PV modules that have a system voltage less than or equal to that allowable by the National Electric Code (NEC). It is the installer's responsibility to check adherence to local codes.

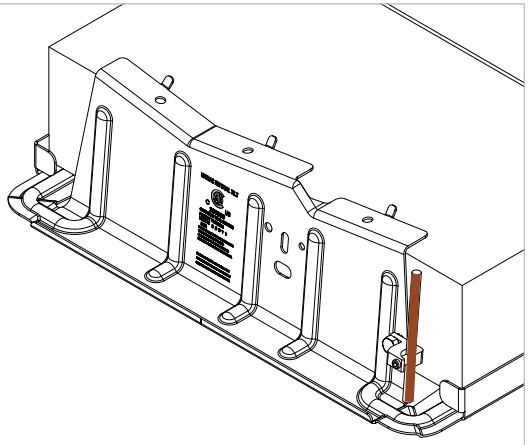
NOTE: The installation must be conducted in accordance with the National Electric Code ANSI / NFPA 70.

Ground Lug	Bolt Size	Torque Value
Ilsco Lug SGB-4	1/4"-20	6.5 ft-lbs (75 in-lbs)
Ilsco Lug GBL-4	#10-32	2.9 ft-lbs (35 in-lbs)
Wiley 6.7	1/4"-20	10 ft-lbs (120 in-lbs)

NOTE: In order to prevent corrosion induced by dissimilar metals, it is important to verify that the bare copper wire does not come into contact with aluminum or galvanized steel. These materials must be kept separate.

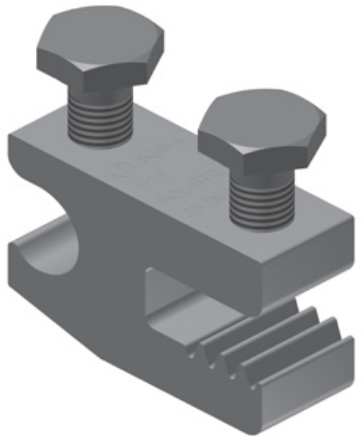
Although conformance with UL2703 was demonstrated without the use of oxide inhibitor material, it is recommended by Ilsco to provide an optimized bonding solution for their lay-in lug.

Ilsco GBL-4 Solar Grounding & Bonding



GROUNDING NOTE:
Can be installed on any location with a flat surface on the bay in order to ground the system.

Ilsco SGB-4 Solar Grounding & Bonding

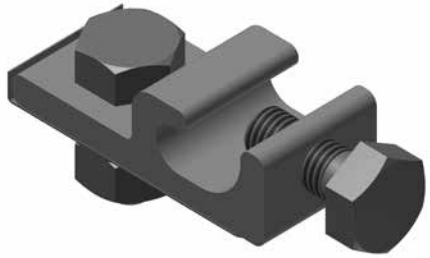


TERMINAL TORQUE:
Install conductor and torque to the following: 4-14 AWG: 35 in-lbs

Ilsco GBL-4 Solar Grounding & Bonding

TERMINAL TORQUE:
Install Conductor and torque to the following: 4-6 AWG: 35 in-lbs, 8AWG: 25 in-lbs

Wiley WEEB-Lug 6.7 Solar Grounding & Bonding



TERMINAL TORQUE:
Install Conductor and torque to the following: 4-6 AWG: 10 ft-lbs, 6-14 AWG: 7 ft-lbs

MECHANICAL LOAD TEST QUALIFICATION

The Unirac RM system has been tested to the mechanical load provisions of UL2703 and covers the following basic parameter(s):

- Tested loads: 25.87 psf up, 54.3 psf down, 7.5 psf down-slope
- Certification Loads: 17.24 psf up, 36.2 psf down, 5 psf down-slope
- PV modules may have a reduced load rating, independent of the RMDT load rating. Please consult the PV module manufacturer's installation guide for more information.

TESTED MODULE

Module Manufacturer	Module Area	Model / Series
Jinko	27.76 sq ft	JKMxxxM-72HL4-V

ELECTRICAL BONDING & GROUNDING TEST MODULES: This racking system may be used to ground and/or mount a PV module complying with UL1703 or UL61730 only when the specific module has been evaluated for grounding and/or mounting in compliance with the included instructions.

VERIFIED COMPATIBLE MODULES:

Manufacture	Module Model / Series
Aionrise	AION60G1, AION72G1
Aleo	P18 & P19 S18, S19, S59, & S79
Aptos	DNA-120-MF10 DNA-120-(MF/BF)26 DNA-144-(MF/BF)26
Astronergy	CHSM6610(P/M)/HV CHSM6612(P/M)/HV CHSM72(P/M)-HC CHSM72M(DG)/F-BH
AU Optronics	PM Series
Auxin	AXN6M610T, AXN6P610T AXN6M612T, AXN6P612T
Axitec	AC-xxx(M/P)/(60/72)(S/V) AC-xxxP/156-60S AXIpremium X HC: AC-xxxMH/(120/144)(S/V) AXIblackpremium X HC: AC-xxxMH/(120/144)(SB/VB) AXIpremium XL HC: AC-xxxMH/120(S/V) AXIblackpremium XL HC: AC-xxxMH/120(SB/VB)
Boviet	BVM6610 & BVM6612
BYD	P6K Series, MHK
Canadian Solar	CS1(K/H/U/Y)-MS CS3(U/K)-MB-AG CS3K-(MB/MS/P/PB) CS3L-(P/MS) CS3N-MS CS3U-(MB/MS/P/PB/PB-AG) CS3W-(P/P-PB-AG) CS5A-M CS6K-(M/MS/P) CS6P-(M/P)

Manufacture	Module Model / Series
Canadian Solar (cont.)	CS6U-(M/P) CS6V-M CS6X-P ELPS CS6(P/A)-MM
Centrosolar America	C-Series & E-Series
CertainTeed	CTxxxMxx-(01/02/03/04) CTxxxPxx-01
ET Solar	ETAC & ET Modules ET-M672BHxxxTW
Eco Solargy	Orion 1000 & Apollo 1000
Flextronics	FXS
FreeVolt	PVGraf
GCL	GCL-P6 & GCL-M6 Series
Hansol	TD-AN3, TD-AN4, UD-AN1 & UB-AN1
Hanwha SolarOne	HSL 60 & HSL 72
Heliene	36M, 60M, 60P, 72M & 72P Series 144HC M6
HT-Solar	HT72-156(M/P), HT72-156P-C, HT72-156P(V)-C HT60-156M-C, HT60-156M(V)-C
Hyundai Heavy Industries	MG, TG, RG, KG, MI, RI, KI, HI & TI Series HiA-SxxxHG, HiD-SxxxRG(BK), HiS-S400PI
ITEK	iT, iT-HE & iT-SE Series
Japan Solar	JPS-60 & JPS-72 Series
JA Solar	JAP6-60, JAM6-60 JAP6-72, JAM6-72 JAP6(k)-60-xxx/4BB, JAP60S##-xxx/** JAM6(k)-60-xxx/**, JAM60S##-xxx/**

Manufacture	Module Model / Series
JA Solar (cont.)	JAP6(k)-72-xxx/4BB, JAP72S##-xxx/** JAM6(k)-72-xxx/**, JAM72S##-xxx/** i. ##: 01, 02, 03, 09, 10 ii. **: SC, PR, BP, HiT, IB, MW, MR ** = Backsheet, ## Cell technology
Jinko	JKMxxx(P/PP)-60, JKMxxxPP-60(Plus) JKMxxxPP-60B, JKMxxxM-60 JKMxxxM-60(B/L/HL/BL/LV) JKMxxxM-60-V, JKMxxxPP-60B-J4 JKMSxxxM-60 JK07(A/B) JKMSxxx(P/PP)-60, JKMSxxxPP-60B-J4 JKMxxx(M/P/PP)-72, JKMxxx-72L-V JKMxxxM-72L-V, JKMxxxM-72HL(4)-V JKMxxx(M/PP)-72-V, JKMxxxPP-72(Plus) JKMxxx(P/PP)-72B JKMSxxx-72, JKMSxxx(P/PP)-72 JKMxxxM-7RL3-V
Kyocera	KD-F Series
LA Solar	LSxxxHC
LG Electronics	LGxxx(E1C/E1K/N1C/N1K/N2T/N2W/S1C/S2W/Q1C/Q1K)-A5 LGxxx(A1C/M1C/M1K/N1C/N1K/Q1C/Q1K/QAC/QAK)-A6 LGxxxN2T-B5 LGxxxN1K-B6 LGxxx(N1C/N1K/N2T/N2W)-E6 LGxxxN2T-J5 LGxxx(N1K/N1W/N2T/N2W)-L5 LGxxx(M1C/N1C/Q1C/Q1K)-N5 LGxxx(N1C/N1K/N2W/Q1C/Q1K)-V5 LGxxxN3K-V6

- Unless otherwise noted, all modules listed above include all wattages and specific models within that series. Variable wattages are represented as "xxx"
- Items in parenthesis are those that may or may not be present in a compatible module's model ID
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ELECTRICAL BONDING & GROUNDING TEST MODULES: This racking system may be used to ground and/or mount a PV module complying with UL1703 or UL61730 only when the specific module has been evaluated for grounding and/or mounting in compliance with the included instructions.

VERIFIED COMPATIBLE MODULES (CONTINUED):

Manufacture	Module Model / Series
LONGi	LR6-60, LR6-60(BK/PE/PB/PH/HPB/HIB/HPH/HIH) LR6-72, LR6-72(BK/HV/PE/PB/PH/HPH/HIH) LR4-60(HPB/HIB/HPH/HIH) LR4-72(HPH/HIH)
Mission Solar Energy	MSE MONO & MSE PERC
Mitsubishi	MJE & MLE Series
Neo Solar Power Co.	D6M Series
Phono Solar Tech.	Standard Modules
Panasonic	VBHNxxxSA(15/16) VBHNxxxKA(01/02) VBHNxxxSA17(G/E) & SA18(E) VBHNxxxKA(03/04) EVPVxxx EVPVxxx(H/K/PK)
Peimar	SGxxxM (FB/BF), SMxxxM
Prism Solar	P72 Series
Q.Cells	Q.PRO L-G2 Q.PEAK (BLK) (G3/G3.1) Q. PLUS/PRO G3, Q.PLUS BFR G3.1 Q.PRO/PLUS G4 Q.PLUS/PEAK/PRO - L G4.x B.LINE PLUS/PRO - L G4.x Q.PRO BFR G4x Q.PEAK (BLK) G4.1 (TAA/MAX) Q.PLUS BFR G4.1(TAA/MAX) B.LINE (PLUS/PRO) BFR G4.1 Q.PLUS L-G4.2/TAA Q.PRO EC-G4.4 Q.PEAK DUO (BLK) G5 Q.PEAK DUO L-(G5/G5.1/G5.2/G5.3) B.LINE PEAK DUO L-(G5/G5.1/G5.2/G5.3)

Manufacture	Module Model / Series
Q.Cells	Q.PEAK DUO (BLK)-G6+ Q.PEAK DUO BLK-G6+/TS Q.PEAK DUO L-(G6/6.2/6.3) Q.PEAK DUO (G7/G7.2) Q.PEAK DUO (BLK)-G7 Q.PEAK DUO L-(G7/G7.1/G7.2/G7.3/G7.7) B.LINE PEAK DUO (G7/G7.2) B.LINE PEAK DUO L-(G7/G7.1/G7.2/G7.3) Q.PEAK DUO (BLK) G8(+) Q.PEAK DUO L-(G8/G8.1/G8.2/G8.3/G8.3 BFF) Q.PEAK DUO (BLK) ML G9(+) Q.PEAK DUO XL (G9/G9.2/G9.3) Q.PEAK DUO BLK-G10(+) Q.PEAK DUO G10+ Q.PEAK DUO (BLK) ML-G10(.a)(+) Q.PEAK DUO BLK G10+ /AC Q.PEAK DUO XL-(G10/G10.2/G10.3/G10.c/G10.d) Q.PEAK DUO XL-(G11.2/G11.3)
REC	PEAK & ECO RECxxxAA (BLK/Pure) RECxxxNP (N-PEAK) RECxxxNP2 (Black) RECxxxPE, RECxxxPE72 RECxxxTP RECxxxTP2(BLK2) RECxxxTP2S(B)(XV) RECxxxTP3M (Black) RECxxxTP4 (Black)
Renesola	60 Cell Modules & Vitrus2
Risen	RSM60-6, RSM72-6, RSM144-6
SEG Solar	SEG-xxx-BMD-HV

Manufacture	Module Model / Series
Seraphim	SEG-(6PA/6PB/6MA/6MA-HV/6MB/E01/E11) SRP-(6QA/6QB) SRP-xxx-6MB-HV, SRP-320-375-BMB-HV, SRP-xxx-BMC-HV, SRP-390-415-BMA-HV, SRP-390-405-BMD-HV
Sharp	ND-24CQCJ, ND-25CQCS ND-Q235F4, ND-F4Q300 NU-SA, NU-SC
Silfab	SLA-M/P, SLG-M/P SILxxx(BL/NL/NT/HL/ML/BK/NX/NU/HC)
Solaria	PowerXTxxxR-PD/BD/AC PowerXTxxxC PowerXT-xxxR-PM (AC)
SolarTech	STU HJT & STU PERC
SolarWorld	Sunmodule Protect/Plus
Suniva	Optimus Series, MV Series
SunPower	X-Series 72 & E-Series 72 X-Series 96 & E-Series 96 P-Series, Sig Black SPR E20 435 COM (G4 Frame) Axxx-BLK-G-AC, SPR-Mxxx-H-AC
SunTech	STP XXX, STPXXXS - B60/Wnhb
Sun Edison/Flex-tronics	F-Series / FLEX FXS, R-Series / FLEX FXS
S-Energy	SN72, SN60 Series
Talesun	TP572, TP596, TP654, TP660 TP672, Hipor M, Smart
Tesla	TxxxS, TxxxH
Trina	PA05, PD05, DD05, DD06, DE06, DE09.05 PD14, PE14, DD14, DE14, DE15, DE15V(II) DE18M(II), DE19

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VERIFIED COMPATIBLE MODULES (CONTINUED):

Manufacture	Module Model / Series
Upsolar	UP-Mxxx
URE	D7K_H8A, D7M_(H7A/H8A) FAKxxx(C8G/E8G), FAMxxxE7G-BB FAMxxxE8G(-BB), FBKxxxM8G
Vikram	Eldorado, Solivo & Somera PREXOS VSMDHT.60.AAA.05 PREXOS VSMDHT.72.AAA.05
VSUN	VSUNxxx-60M-BB, VSUNxxx-72MH VSUN400-415-144BMH
Winaico	WST & WSP Series
Yingli	YGE 60 Cell YGE 60 Cell Series 2 YLM 60 YLM 72 YLM-VG
ZNShine Solar	ZXM6-72 Series, ZXM6-NH144

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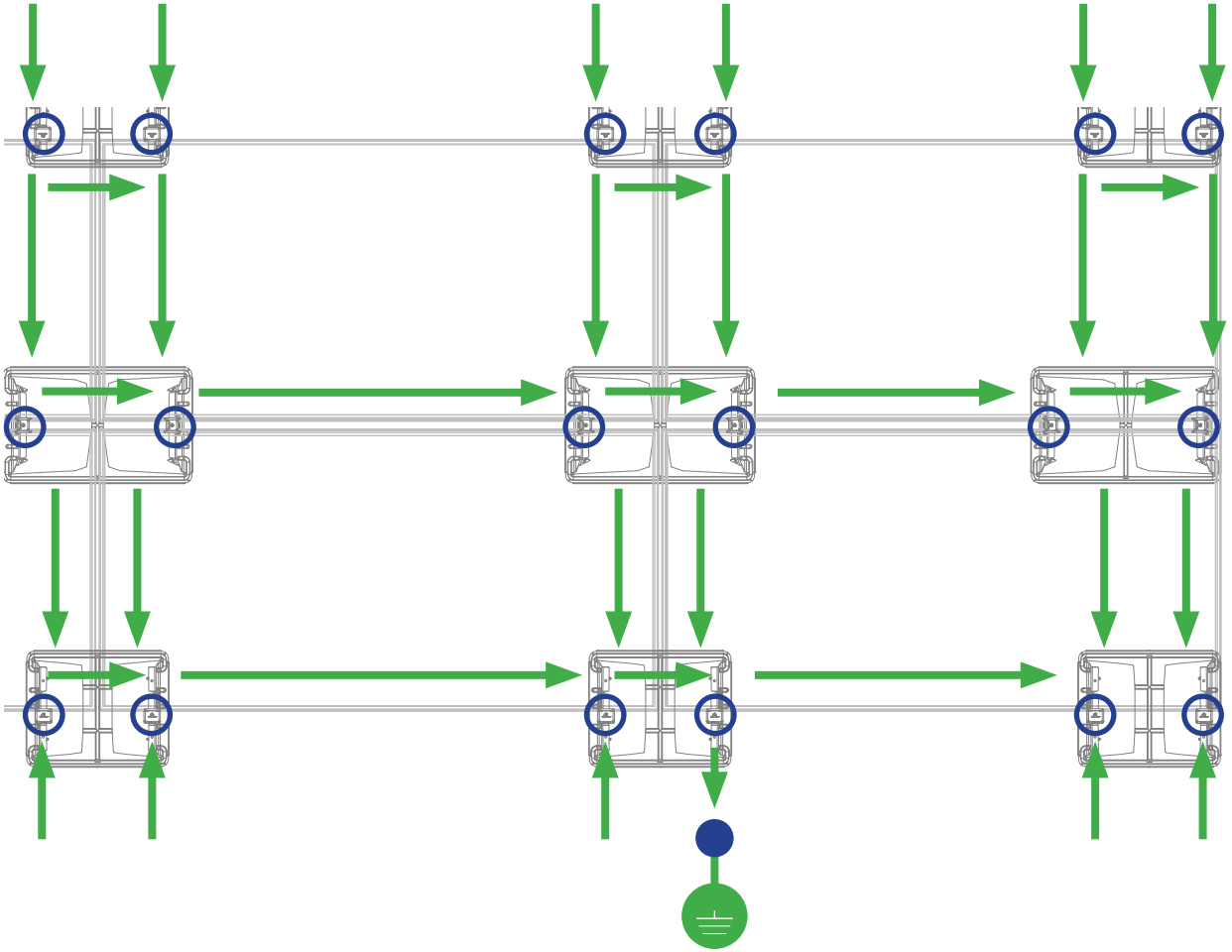
Note:

In order to avoid the need for utilizing bonding jumpers during maintenance or module removal do not attach the groung lug to a:

1. **valley bay with less than two modules**
2. **ridge bay with less than three modules**



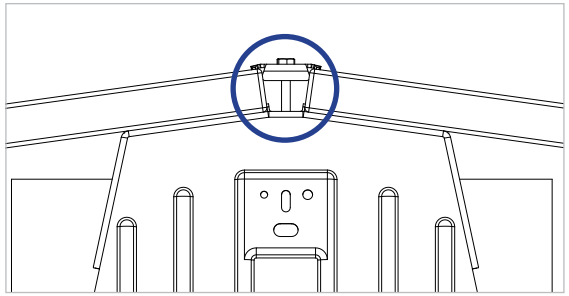
Fault Current Ground Path

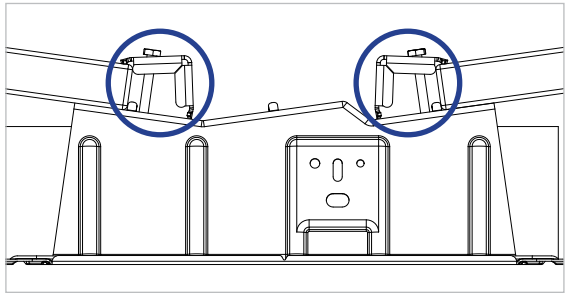
Ground Lug

Grounding Clip & Bolt

Min. 10 AWG Copper Wire

Module Frame
Module Bay w/ Grounding Clips





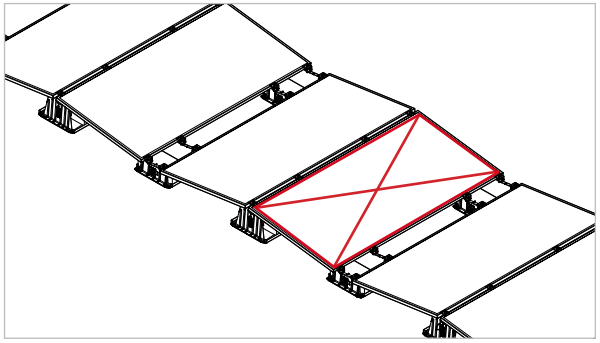
TEMPORARY GROUNDING & BONDING PROCEDURE: Periodic inspections should be conducted on the PV array to ensure there are not loose components, loose fasteners or corrosion. If any of the above items are found, the affected components are to be immediately replaced.

NOTE: If a module must be removed or replaced, a temporary bonding jumper must be used to ensure safety of the personnel and PV system.

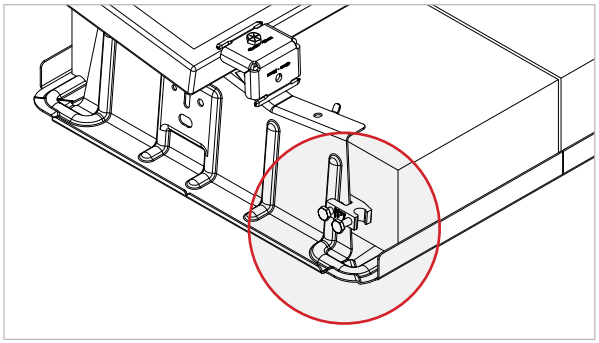
NOTE: Removing a PV module from a system is not considered to be routine maintenance. This type of activity should only be performed by trained and qualified installers.

NOTE: In order to prevent corrosion induced by dissimilar metals, it is important to verify that the bare copper wire does not come into contact with aluminum or galvanized steel. These materials must be kept separate.

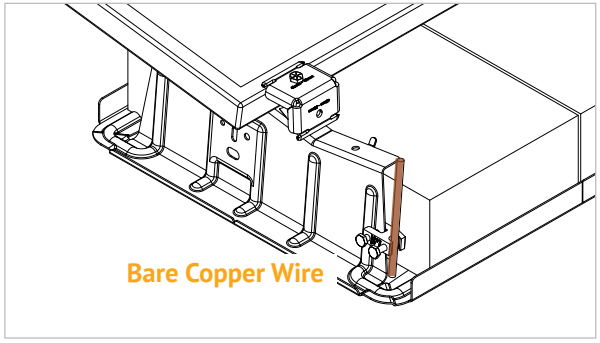
APPROVED LUGS and Terminal Torque see Page 9



BONDING JUMPER REQUIRED: One example of a module removal that will require the use of a bonding jumper

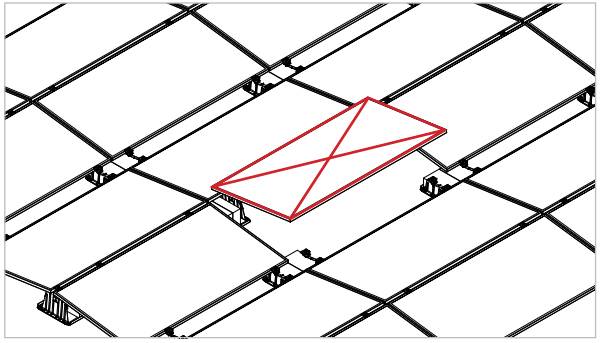


ATTACH LUGS: Use approved lug(s) to install on adjacent bays where the module is being removed.



INSERT COPPER WIRE: Insert bare copper wire into each lug, providing a bonding jumper across the missing module location.

Remove module & reverse the operation after maintenance is complete



BONDING JUMPER NOT REQUIRED, due to integrated bonding/grounding path throughout module frames/ bays around this location.

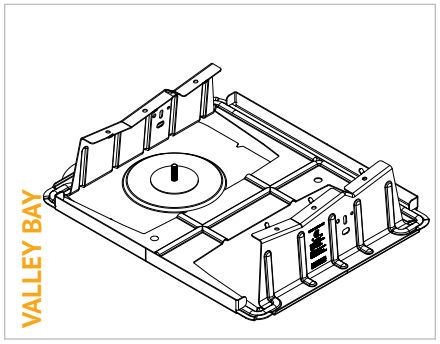
NOTE: CLAMP AND BOLT - Single Use Only - Use new clamps after any module replacements or system maintenance.

RMDT

BALLAST BAY ROOF ATTACHMENT

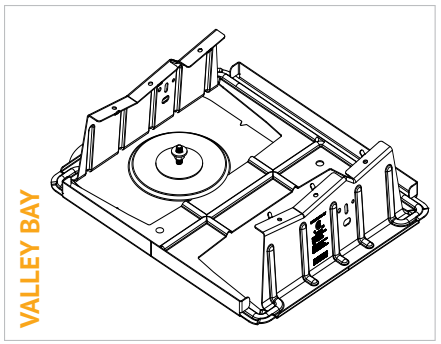
INSTALLATION GUIDE - SUPPLEMENT

A PAGE

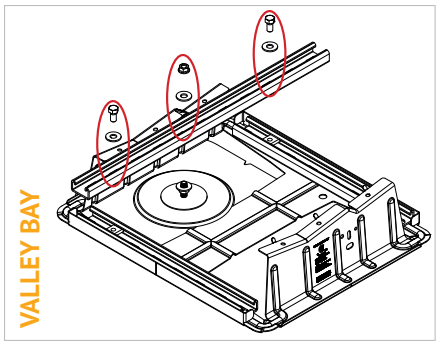


STEP 1 - POSITION U-ANCHOR: Position U-Anchor under bay requiring attachment and install according to manufacturer installation instructions.

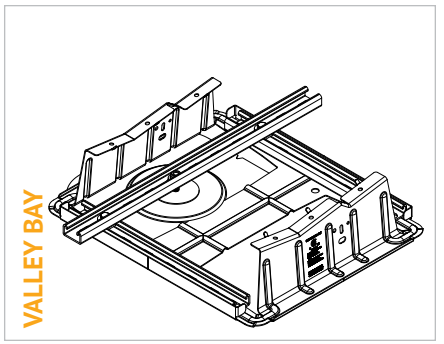
NOTE: Position attachment so that it is close to center of the bay as possible.



PLACE NUT AND WASHER: Include the nut and washer on the anchor stud prior to placing the stud through the strut.



STEP - 3 PLACE H-STRUT: Position H-strut sections on bay as pictured above. Align the cross-strut with the anchor's stud. Connect side strut sections to cross strut using a strutnut, bolt, and washer as pictured.



STEP 4 - SECURE H-STRUT TO U-ANCHOR: Place 3/8" washer and 3/8-16 serrated flange nut on anchor stud, serrations facing down and tighten to 30 ft-lb.

TORQUE VALUE: 30FT-LBS

PRE-INSTALL MICROINVERTERS: Install MLPE in a location on the module that will not interfere with ballast bays or grounding lugs. To use trunk cable most efficiently, install MLPE components in the same locations on all modules in the same row.
TORQUE VALUE: 20FT-LBS