# SOLAR MOUNTS, LLC.
# BALLASTED ROOF MOUNT INSTALLATION MANUAL

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# SOLAR MOUNTS LLLC BALLASTED ROOF MOUNT SYSTEM INSTALLATION OVERVIEW

The Solar Mounts Ballasted Roof Mount System provides a secure, non-penetrating solution for installing photovoltaic (PV) arrays on flat commercial rooftops. Designed with a lightweight *skeleton* structure and common ballast blocks for stability. Fast, reliable.

**Key Features & Benefits**

- **Minimal Components & Hardware** – Engineered for efficiency, the system features the fewest components and hardware connections per watt in the solar roof market, streamlining installation.
- **Optimized Packaging & Deployment** – The versatile "*skeleton*" design allows components to be packed onto fewer pallets, reducing transportation costs and enabling fast, efficient placement on the roof.
- **Durability & Warranty** – Backed by a **25-year warranty**, ensuring long-term reliability and performance.

## Ballasted Roof Mount System Ratings

| | |
|---|---|
| Wind Load | 180 mph |
| Snow Load | 60 lbs. |
| Fire Rating | Class C (tilt 5-7°) |
| Maximum Size (trio of ballasted roof pans) repeated across the roof | 1-High, 2-modules in landscape, 3.75" height above the flat roof surface |
| PV Module Orientation | South |

**UL 2703-Certified Components**

Solar Mounts LLC Ballasted Roof solutions incorporate UL 2703 galvanized top clamps, designed to reduce PV module installation time and solid ground/bonding path. The UL 2703 scope of evaluation was for grounding / bonding. NOTE: Not fire rated.

| | |
|---|---|
| Grounding/Bonding Rating | UL 2703, UL 467 |

# SAFETY INFORMATION

## General Safety Guidelines

- Only trained personnel should perform installations.
- Always follow OSHA guidelines for fall protection and workplace safety.
- Wear appropriate PPE, including hard hats, safety glasses, gloves, steel-toed boots, and harnesses where applicable.

## Equipment Safety


- Inspect tools and equipment before use.
- Use caution when operating heavy machinery like Telehandlers and Boom Lifts
- Use licensed operators to ensure skilled operation of equipment
- Use passive fall protection, e.g., roof guard rails

## Hazard Warnings

- Be mindful of overhead power lines when lifting materials.
- Secure all materials properly to prevent tipping or falling.
- Be mindful of excessive wind at the corners of roofs and roof edges.

# TOOLS & EQUIPMENT REQUIRED

## Hand Tools


- Impact Driver
- Torque Wrench
- 1/2” Socket for 5/16” Bolt

## Equipment

- Scissor lift
- Telehandler
- Boom Lift

# PRE-INSTALLATION GUIDANCE

## Roof Compatibility and Installation Considerations

The Solar Mounts LLC Ballasted Roof Mount System is designed for flat roofs with single-ply roofing, including:

- EPDM
- TPO
- PVC
- Modified Bitumen
- Built-up Roofs

For installations on metal roofs, please contact Solar Mounts LLC to discuss compatibility and additional considerations.

***Pre-Installation Roof Evaluation***

Before installation, contractors must thoroughly assess the roof structure and roofing cover to ensure suitability for the ballasted system.

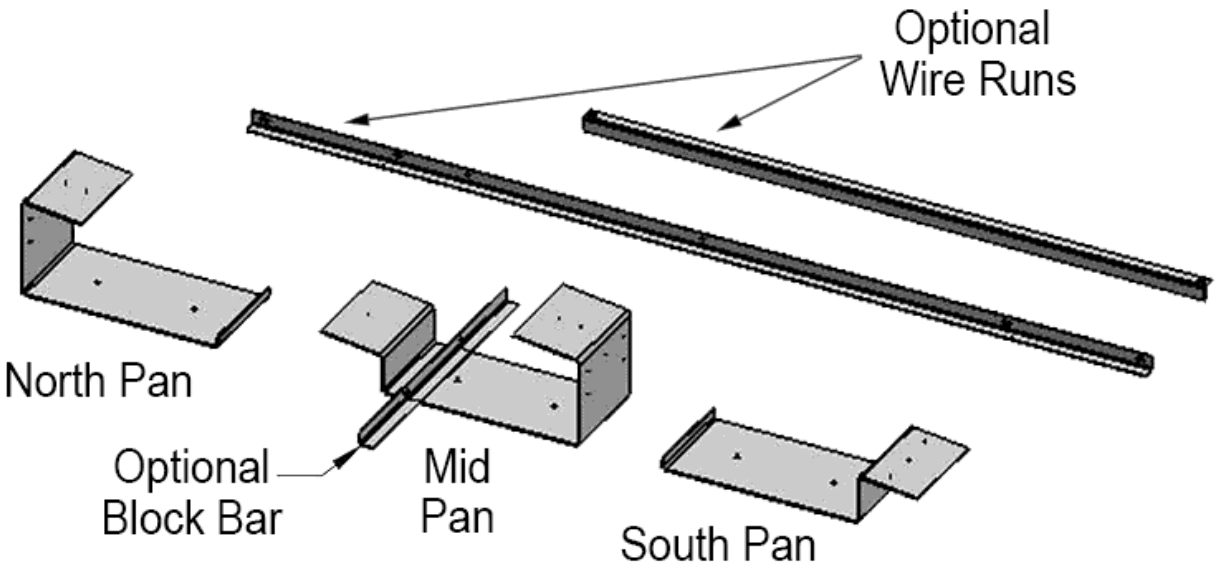
1. Dead Load Capacity Assessment
    - Contractors must determine the maximum allowable dead load weight per square foot ($ft^2$) that the roof can support.
    - The Solar Mounts LLC Ballasted Roof Mount System weight varies between 5–14 pounds per $ft^2$, depending on ballast requirements.
    - Additional ballast stones may be required to increase the system's wind resistance.
    - Note: More ballast stones may be necessary at roof edges and corners, where wind speeds are typically higher than in central areas.
2. Roofing Cover Condition Assessment
    - If the roof has an existing built-up ballast stone layer, stones may need to be relocated to allow direct placement of ballast pans on the roofing cover.
    - If the single-ply roofing material is nearing the end of its lifespan, contractors may recommend roof replacement before PV system installation.
3. Protective Measures & Accessibility Considerations
    - To prevent abrasion, contractors may recommend placing a sacrificial layer of roofing material beneath each ballast pan.
    - For safe roof access, walking path material may be installed between arrays to facilitate movement and protect the roof surface, especially for access to HVAC units and other rooftop equipment.

# BALLASTED ROOF MOUNT: MAIN COMPONENTS

The Solar Mounts Ballasted Roof Mount solution is made up of three (3) lightweight 50 KSI, G90, 11-gauge steel ballast pans (North, South and Mid Pan) that can be positioned, north to south, to accommodate any size PV module. Each Ballast pan has a pre-welded RIV nut for the Solar Mounts End-clamps and Mid-clamps. The PV array will have a slope of 5° (standard) or 7° degrees with 11.2" of spacing between rows.

Ballast blocks are placed in the Ballast Pans to hold the PV array to the roof. An optional Block Bar can be used to increase the amount of weight at each ballast pan. Optional wire runs (galvanized metallic angle iron) connect ballast pans together using self-drilling galvanized screws. The system features a standard wind deflector.

After PV modules are placed on the Ballasted Roof mounting structure, there will be 3.75" of clearance on the low side and 8.75" of clearance on the high side. The structure can handle 0-60 PSF of snow load and 0-180 MPH wind load.




| North Pan | Wire Way | South Pan |
|---|---|---|
| SLR-ROOF-NPAN | SLR-ROOF-WIREWAY | SLR-ROOF-SPAN |

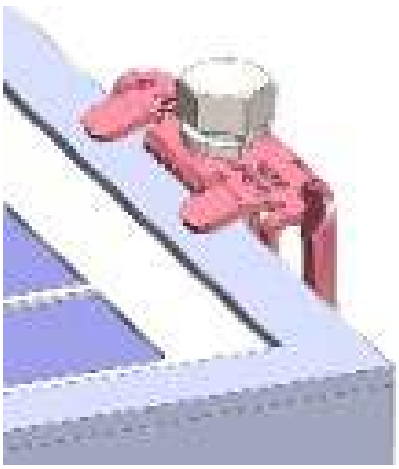
# BALLASTED GROUND MOUNT: MAIN COMPONENTS

## Mid-Clamp

**(SLR-CLMP-HW-MID)**

## End Clamp

**(SLR-CLMP-HW-AKS-END)**



# INSTALLATION STEPS

## Roofing Evaluation, Ballast Pans and Ballast Blocks Installation

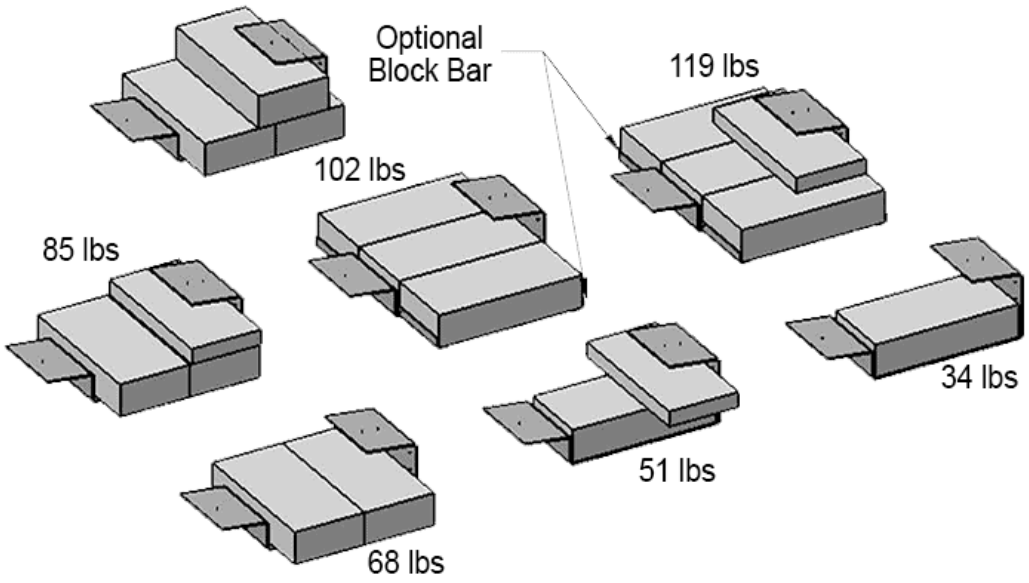
### Step #1

The first step is a roof evaluation. The maximum deadload rating of the roof must be determined. This evaluation will determine how much weight can be added to the roof (per square foot). NOTE: the maximum weight that can be added to the roof includes the dead load (e.g., Solar Mounts LLC Ballasted Roof solar system) plus the maximum wind speed and/or snow load (i.e., live load).

The condition of the existing roof material must be determined. This evaluation will determine whether a new roof cover should be installed before the installation of the PV system. The roof cover may be in good condition and the contractor might only need to install a sacrificial piece of roofing material below the ballast pans to reduce abrasion on the existing roof cover. NOTE: Solar Mounts LLC ballast pans can be ordered with felt slip sheets adhered to the ballast pans in advance

### Step #2

The second step is determining the wind speed rating required for the PV array and the associated weight of ballast that will be required to hold the PV array in place. Ballast pans can accommodate a single ballast block (34 lbs.) or, with the addition of the optional Block Bar, a single ballast pan can accommodate up to 119 pounds of ballast blocks.



## Step #3

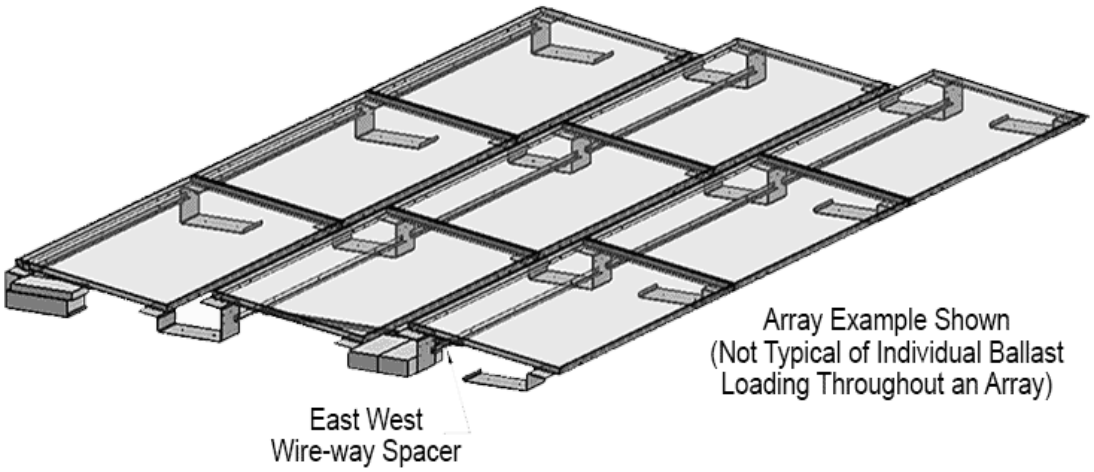
The third step is to place the Ballast Pans in position for a PV array in landscape, where the ballast pans are spaced, north to south to accommodate a 60-cell, 72-cell or 96-cell PV modules. Ballast pans are spaced center to center (PV module length + 4"). East-West Wire Ways are used to connect the Ballast Pans together into the Solar Mounts LLC "skeletonized" support system and to align the layout.

Ballast blocks are added to the pans to meet the wind speed rating for the middle of the roof (and for edges of the roof that may have higher wind speeds). As general guidance, contractors can expect most ballasted roof-mounted PV arrays will require ~5 to 6 lbs. / $ft^2$ of ballast block and PV modules (typically 2.25 lbs. / $ft^2$) to meet the wind load requirements of most buildings.

## PV Module ("PV Panel") Placement and Installation

The final step is to place the PV modules, in landscape, on the skeletonized ballast pan / wire way system. The system is compact and space-efficient to achieve high power density, with minimal racking outside of the PV module coverage

The PV modules will be UL 467 / UL 2703 grounded and fastened to the ballasted support structure using Solar Mounts LLC End-Clamps and Mid-Clamps. Top clamps ground the system, panel to panel (per UL 2703). . PV module interconnect wires are placed in wire ways to keep the positive and negative connectors off the roof surface and dry.



# ELECTRICAL GROUNDING OF THE BALLASTED ROOF MOUNT PV SUPPORT STRUCTURE

- Solar electric contractors must electrically ground the structure to a single premises ground. If more than one Ground Lug is attached to the structure, all these ground points and EGC's must be properly bonded together.
- Please see NEC Article 690.41, 690.47(C)(3), 250.52 and 250.53(A) for guidance.
    - Using a separate DC grounding electrode for the PV array and Solar Mounts ballasted roof mount PV support structure will enhance protection against lightning and transient voltage. For lightning protection associated with grounding systems, refer to NEC 250.106.
- Attach the Ground Lug (e.g., Ilsco GBL Grounding Lugs, Part #18-GBL-4DBT or equivalent) to the skeletonized ballast pan structure (e.g., at the Mid Pan) using a #10 self-drilling screw (zinc or stainless steel, e.g., 1 ¼" ) so that the lug is flush with the pan surface.
- Tighten to 5 ft. lbs.
- CAUTION: PV module removal may disrupt the bonding path and could introduce the risk of electric shock. Additional steps may be required to maintain the bonding path. A ground path can be extended 2 feet (between PV modules) within the PV array boundary using Solar Mounts LLC wire ways. PV modules ("panels") should only be removed by qualified persons in compliance with the instructions in this manual

# FINAL INSPECTION & MAINTENANCE

- Check the final position of Ballast Pans (and optional Block Bars) to ensure they are aligned within the PV array boundary and are centered on any sacrificial roofing material underneath them. Check for roof damage and/or abrasion.
- Check all Ballast Pan and Wire way self-drilling screws for tightness.
- Any loose components or fasteners shall be re-tightened in accordance with these instructions
- Any components showing signs of damage that compromise safety that be replaced immediately.
- Check the PV array to ensure all PV modules are clean and unbroken.
- Ensure all PV module mid-clamps and end clamps are tightened to specification.
- Check wires in wire way to ensure the wires are still held tight to the wire way and are not touching the roof surface. Look for abrasion at joints in the wire way. Look for abrasion at any 90 degree turns in the dc wire bundle

# CONTACT INFORMATION

For general questions or for SMLLC designated sales rep, please contact:
Solar Mounts LLC
Website: https://solarmounts.com
Phone: (844) 757-7225

## Warranty

To obtain the Solar Mounts LLC warranty, please fill out the SMLLC Commissioning Form for each project site and return to Solar Mounts, LLC.

(NOTE: The SMLLC warranty starts at delivery of materials to customer site.)

## List of Approved PV Modules ("Panels") for UL 2703 listed Solar Mounts, LLC Solar Support Structures*

Solar Mounts, LLC. roof mount support structures are certified to UL 2703 for electrical grounding/bonding. Solar Mounts, LLC. system owners retain this certification when support structures are used only in combination with PV modules listed in the chart below.

*Please contact Solar Mounts, LLC for the latest list of approved PV modules

| Module Manufacturer | PV Module Model Number |
|---|---|
| Aptos | DNA-120-BF10-xxxW |
| Boviet Solar | BVM6612M-XXXS-H-HC-BF-DG |
| Canadian Solar | CS6W-xxxMS |
| Canadian Solar | CS7N-XXXTB-AG |
| Canadian Solar | CS6W-xxxMB-AG |
| Canadian Solar | CS6.1-54TM-xxxH |
| HT Solar (HT-SAAE) | HT72-18X (ND)-F |
| Imperial Star | ISM7-SHSB156-xxxM |
| JA Solar | JAM72D40-xxx/LB |
| JA Solar | JAM72D42-xxx/LB |
| JA Solar | JAM72D30-xxx/MB |
| Jinko | JKMXXXM-72HL4-TV |
| Jinko | JKMXXXN-72HL4-BDX |
| Jinko | JKMXXXN-72HL4-BDV |
| Jinko | JKMXXXN-78HL4-BDV |
| Longi | LR7-72HGD-XXXM |
| Longi | LR8-66HYD-XXXM |
| Longi | LR7-72HYD-XXXM |
| Maxeon | SPR-P6-XXX-UPP |
| Mission Solar Energy | MSN10xxxHN4G |
| Mission Solar Energy | MSN10xxxHT4T |
| Panasonic | EVPVxxxHK2 |
| Peimer USA | DR10HxxxMB |
| Peimer USA | SFxxxM |
| Philadelphia Solar | PS-MNB108(HCBF)-xxxW |
| Phono Solar | PSxxxM8GF-24/TNH |
| Phono Solar | PSxxxM8GFH-24/TNH |
| Q Cells | Q.PEAK DUO ML-G12S |
| Q Cells | Q.PEAK DUO XL-G11S |
| REC | RECXXXAA PRO M |
| REC | RECxxxAA Pure |
| REC | RECXXXAA PURE-RX |

| | |
|---|---|
| SEG | SEG-xxx-BTC-BG |
| SEG | SEG-xxx-BTC-BG |
| SEG | SEG-495-BTD-BG |
| Silfab | SIL-620/630/640 XL |
| Silfab | SIL-520 QM |
| Silfab | SIL-420/430 QD |
| Trina | TSM-DEG19RC.20 |
| Trina | TSM-NEG21C.20 |
| Trina | TSM-DEG21C.20 |
| Trina | TSM-NE09RC.05 |
| Trina | TSM-NEG19RC.2 |
| Waree | BiN-08-xxx |
| Waree | Bi-62-xxx |
| Waree | Bi-55-xxx |
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