ANCHORRACK®

by KB RACKING®

INSTALLATION MANUAL

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Revision NW-07 | Nov 2016

BEFORE YOU BEGIN

Read all instructions carefully and completely.

IMPORTANT

Always observe all governing codes and ordinances.

For Reference Only – Images and diagrams used in this manual are for reference only. Your project will have specific documents and dimensions (provided separately).

Secure & Dry Storage – Store parts in a secure, dry location during installation. Wet storage stains are prevented by sufficient ventilation and protection from moisture.

Roof Flooding – Ensure proper rooftop drainage. Constant submersion of PV supports in water may damage parts. Consult with a KB Racking® Project Manager if this is the case.

Check Parts – Ensure the correct type and quantities of parts have been delivered.

Damaged Parts – If you have received damaged parts, immediately notify your KB Racking® Project Manager.

Fire Rating - Racking system is to be mounted over a fire resistant roof covering rated for the application

Grounding - Racking system may be used to ground and/or mount a PV module complying with UL1703

FOR YOUR SAFETY

⚠ CAUTION/ATTENTION

KB Racking® components may have shifted during shipping. Take extra care when moving and unpacking components.

Les composants de KB Racking® peuvent ont déplacé au cours du transport. Prendre des précautions supplémentaires lorsque vous déplacez et déballage les composants.

⚠ DANGER

Only qualified professionals should install solar panels, DC cabling, and any anti-lightning safety devices.

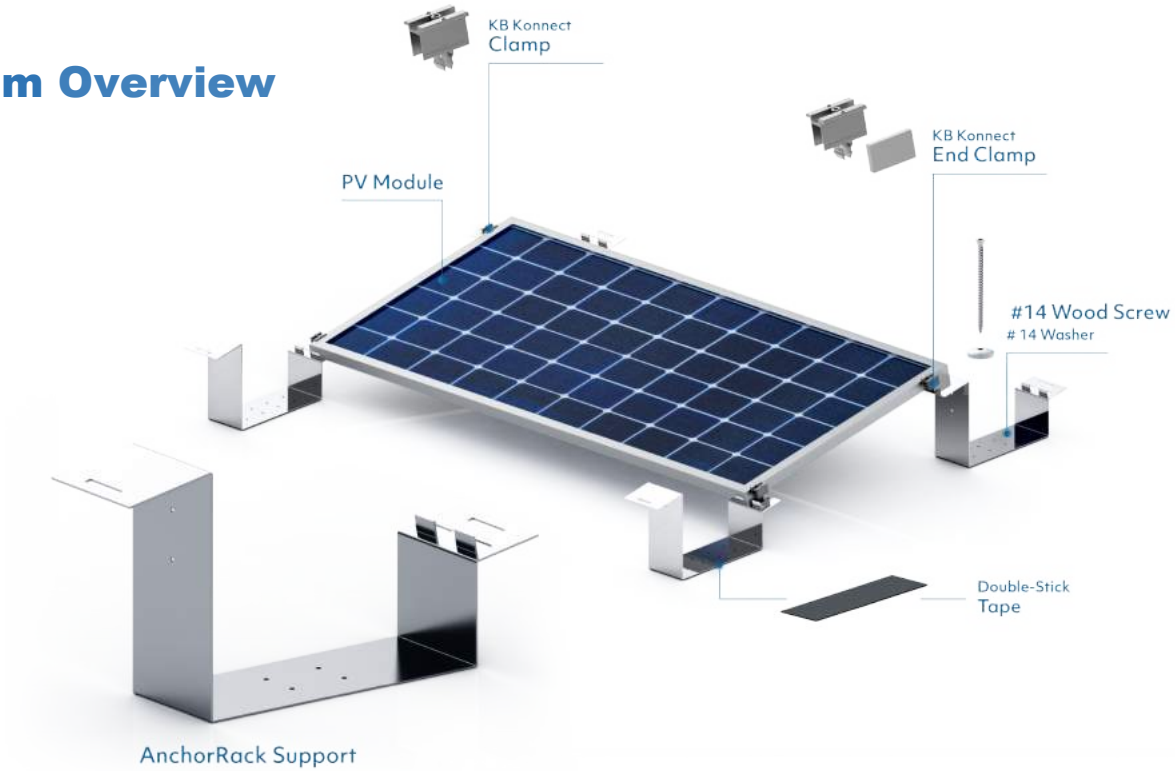
Seulment les professionels qualifié devrait installer les panneaux solaires, les fils CC, et les dispositifs de sécurité contre la foudre.

While installing the PV system, proper safety equipment should be worn.

KB RACKING® IS NOT RESPONSIBLE FOR ANY DAMAGES INCURRED ONCE SHIPMENT HAS BEEN SIGNED FOR AND RECEIVED.

Table of Contents

System Overview



Parts Supplied by KB Racking®

☐	ARxx-01B	AnchorRack Support
☐	C02-xxE	KB Konnect Grounding Middle Clamp
☐	C02-xxE	KB Konnect Grounding End Clamp
☐	C00-01E-xx	KB Konnect Integrated Grounding End Clamp
☐	C01-xxE	End Clamp Block

- ☐ EternaBond (Pre-attached under AnchorRack support)
- ☐ LPS and HER Sealant
- ☐ #14 Square Pan-Head Wood Screw
- ☐ #14 Washer

Tools and Equipment Required for Installation

- ☐ 3/16” Allen Bit
- ☐ 5/16” Hex Socket
- ☐ #3 Square Bit
- ☐ Spacer Sticks*
- ☐ Brush
- ☐ Safety Gloves
- ☐ Safety Glasses
- ☐ Power Drill
- ☐ Torque Wrench

*Use pre-cut wooden spacers to consistently space panel supports (not supplied).

KB Racking® Wire Management

☐	WM00-01R-30-v5	WM Rail	☐	M6x25 SS Hex Head	M6 Bolts
☐	WM00-09B-60-v3	WM Cover	☐	M6 Serrated Flange Nut SS	M6 Nuts
☐	TRIM-LOK 75-B-3 0.063	Rail Trim	☐	M6 Serrated Washers	M6 Washers
			☐	10mm socket, wrench	

⚠ PLEASE READ THE FOLLOWING ⚠

If roof/building edge has a fall distance of 10ft (3m) or greater,

Appropriate safety measures must be taken (i.e. harnesses) for installation of panels closer than 6.5ft (2m) to roof edges or skylights.

Distance from gas lines and electrical equipment

Solar panels should be a minimum of 3ft (0.9m) away, unless otherwise stated. Failure to comply could result in an inspection failure requiring the system to be dismantled.

Distance from rooftop hatches and/or doorways

Solar panels should be a minimum of 5ft (1.5m) away, unless otherwise stated.

Distance between arrays

Unless otherwise stated, solar arrays should be spaced a minimum of 4ft (1.2m) from each other, E/W, with a minimum 1ft (0.3m) gap ever 15 to 16 modules to allow emergency crews easy access between arrays.

NOTE: Please note that KB Racking® Inc. requires all arrays to be no closer than 3ft (0.9m), unless otherwise stated, from a building's roof edge to validate wind load calculations and ensure the system is safely ballasted.

Preparing for Installation

IMPORTANT

Inspect roof for damage prior to installation and record any existing damage with a digital camera.

1 Clean roof surface accordingly.

- **General** - Substrate should be clean, dry and free of dew, frost, oil, salt, dust and rust. Allow it to dry completely.
- **TPO / EPDM** - Clean with rags and acetone to remove any oil or grime.
- **Silicone** - Do not apply over silicone coatings or sealants
- **PVC / Plastic** - Remove chalking with light sanding or scouring prior to application. Course sand paper or steel wool can be used.
- **BUR & MB** - Use wire brush to remove loose granules on cap sheets.
- **Gravel** - Spud all embedded gravel on Gravel BUR before applying.
- **Metal** - Remove all rust with wire brush.

2 Ensure proper drainage on the roof. Water accumulations may lower the load reserve of the rooftop and decrease lifespan.

3 Ensure the correct type and quantities of parts have been delivered.

⚠ **PLEASE READ THE FOLLOWING** ⚠

TO SPEED UP INSTALLATION PROCESS

Install the system on a per array basis, partially ballasting the AnchorRack supports to keep them in position, installing the panels, before anchoring the supports down.

NOTE

Never leave an array installed without anchoring the supports. If leaving an unfinished array overnight, or for an extended length of time, the system MUST be fully anchored.

How to Use Your Layout Diagram

1

Note the following items on your project specific *Layout Diagram*:

NORTH ARROW **DIMENSIONS** **LEGEND**

ARRAY NUMBERS **ROOF STRUCTURES**

2

From the layout, use the N/S and E/W dimensions at a corner of your roof as the ORIGIN (i.e. the beginning) of your installation.

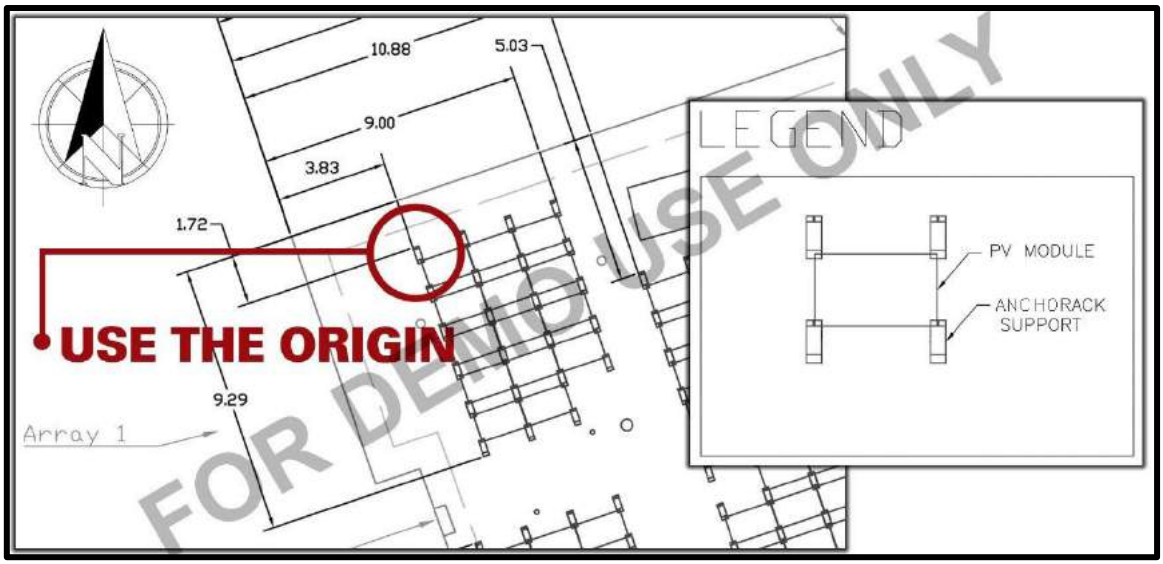


Figure 1- Sample Layout Diagram

How to Use Your Spacing Diagram

1 Your *Spacing Diagram* will indicate the following important dimensions:

N/S SUPPORT SPACING (N/S distance between supports)

E/W SUPPORT SPACING (E/W distance between supports)

ROW SPACING (N/S distance between support rows)

Record these numbers and do not confuse them.

2 Create spacer sticks for each *support spacing* dimension.

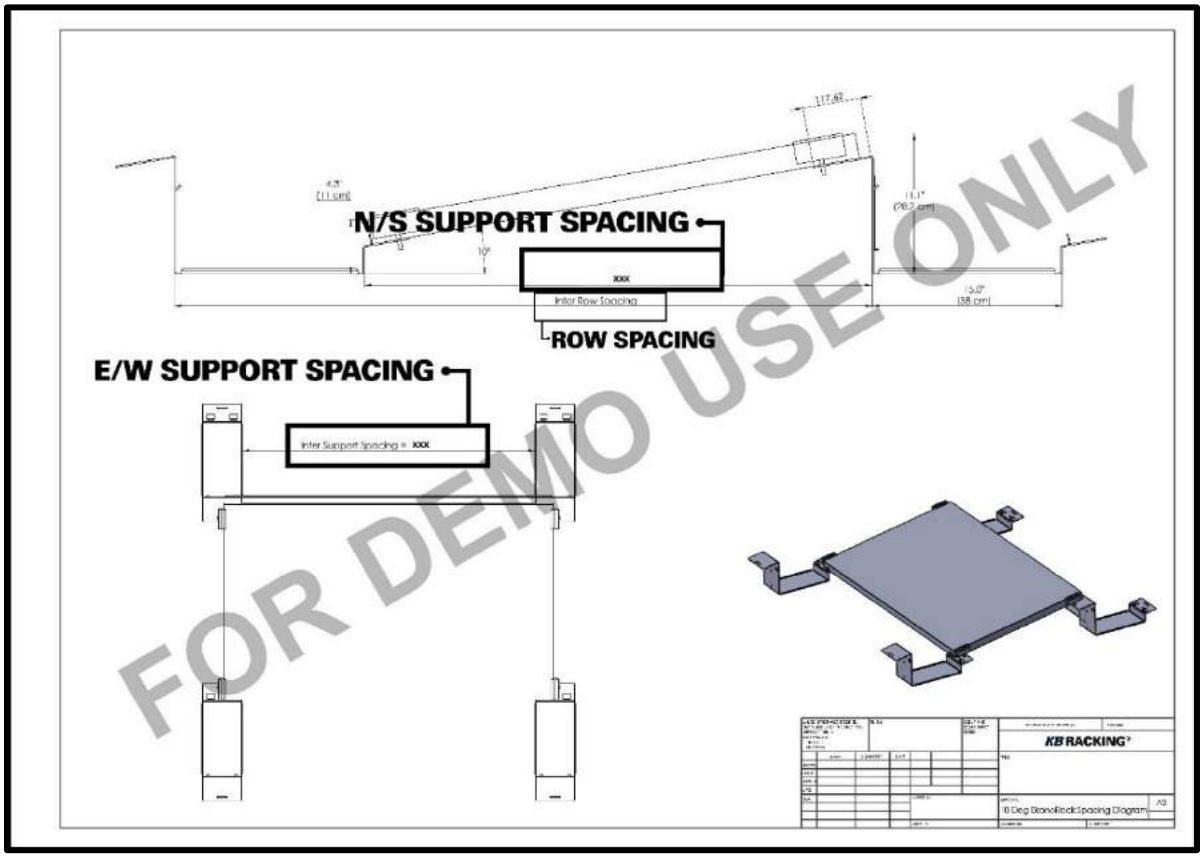


Figure 2 - Sample Spacing Diagram

How to Use Your Screw Layout

IMPORTANT

Anchor supports immediately if panels are installed.

1. Use your project specific *Screw Layout* OR *Sealed Engineering Report* to place the correct number of anchor screws for each support.

   Note: Your system will require between 4 and 8 screws per support. However, your support may feature all 8 pre-drilled holes. YOU MUST FOLLOW YOUR *SCREW LAYOUT* OR *ENGINEERING REPORT* to install the correct number of screws. You are only supplied enough screws for the minimum design requirements of the system.

   Regardless of the number of screws, all pre-drilled holes must be flashed.

2. Make sure you have the right array number and the support location.

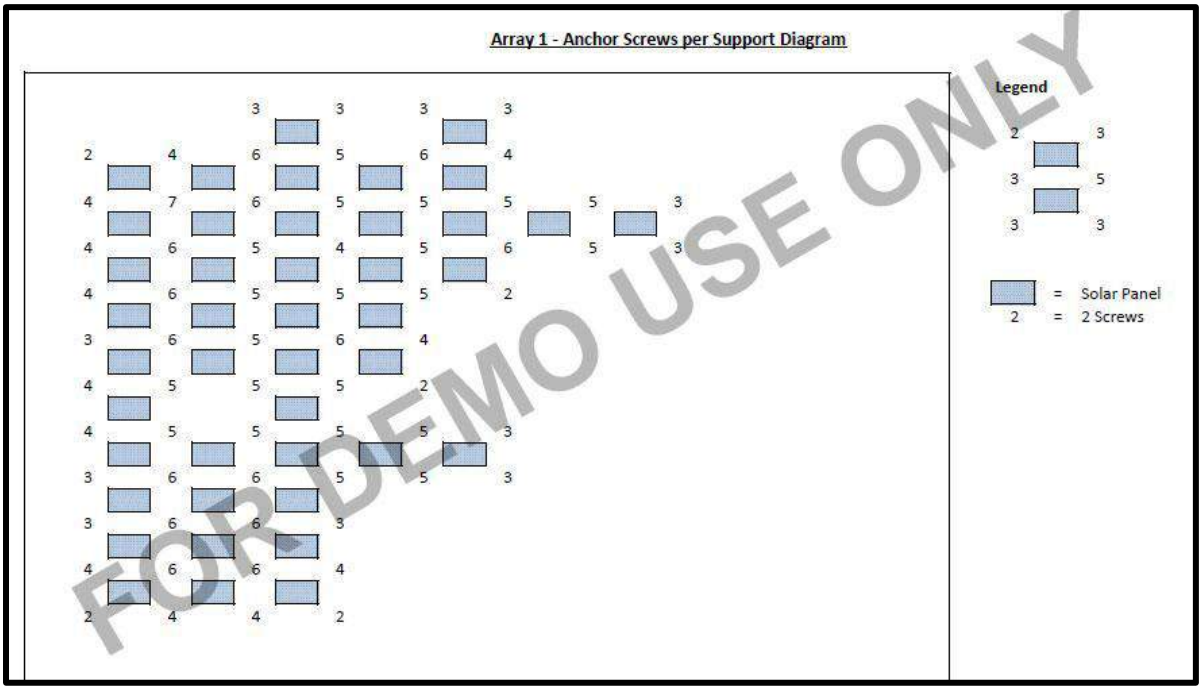


Figure 3 - Sample Screw Layout Diagram

3. Use a string/chalk line on the roof to align the AnchorRack supports in the E/W and N/S directions

Placing AnchorRack Supports

1. Place your first corner support for an array. Refer to your project specific *Layout Diagram* for dimensions (see Figure 1).

> **⚠ IMPORTANT**
>
> Wear safety gloves when handling parts. Newly fabricated parts may have sharp edges.

2. Use your project specific *Spacing Diagram* to obtain the distance between two module supports in the N/S and E/W directions. Complete the first row of the array (see example, Figure 2).

3. Begin the next row of the array. Use chalk lines or pre-cut wooden spacer sticks to consistently align supports (Figure 4).

4. Place all supports on the roof (without attaching) to ensure that layout matches roof contours and avoids all obstructions

Figure 4 - Use of Spacer Sticks to Aid Placement

Attaching AnchorRack Supports

1. Begin at an array corner. Clamping and securing four solar panels onto the supports (ARxx-01B) in a 2x2 matrix, make sure the spacing between supports is correct.

2. Once the spacing is checked, take off all panels from the supports right away. Double check the rest of the supports are aligned perfectly with the correct spacing.

3. Mark the location of the supports before securing them.

4. Peel the underside of the release liner of the pre-attached double-stick tape under a support.

5. Bond the support to the roof surface applying pressure to activate bonding process of the tape. Mind the alignment of the supports.

   Note: Tape has high adhesive ability. Care required once release liner is peeled. Double check support placement and orientation before application.

6. Apply the LPS sealant on/in predrilled holes on the support using a ½" bead size in an area of 1cm x 1cm.

7. Assemble a washer with every screw. Drill Screws through the LPS sealant and into the predrilled holes in the support and through the roof. Screws should be installed as uniformly as possible.

Figure 5 - Step 6: Apply LPS sealant on/in predrilled holes

8 Once the screws are drilled in and secured, paint the head of the screw sufficiently with H.E.R. UV resistant sealant to ensure its covered well, using a brush (Use a coarse, short bristle brush)

Any unused pre drilled holes, must be flashed and water sealed by painting them also with the H.E.R. UV resistant sealant.

> ⚠ **CAUTION**
>
> When drill screw(s) in, ensure the support is firmly secured (by ballast or human weight).
>
> Failure to do so may result in damage to the support or the misaligned array.

9 Using a brush – paint the H.E.R. UV resistant sealant around the perimeter of the AnchorRack support to create a watertight seal by overlapping the roof surface and the AnchorRack edges.

For applications on granule surfaced modified bitumen membranes, remove all loose granules from the surface of the membrane prior to installation.

> ⚠ **IMPORTANT**
>
> For best results, allow curing time of 3 days for all fully flashed supports. Do not allow contact with water or frost.

Diagrams and Photos of Flashing Method

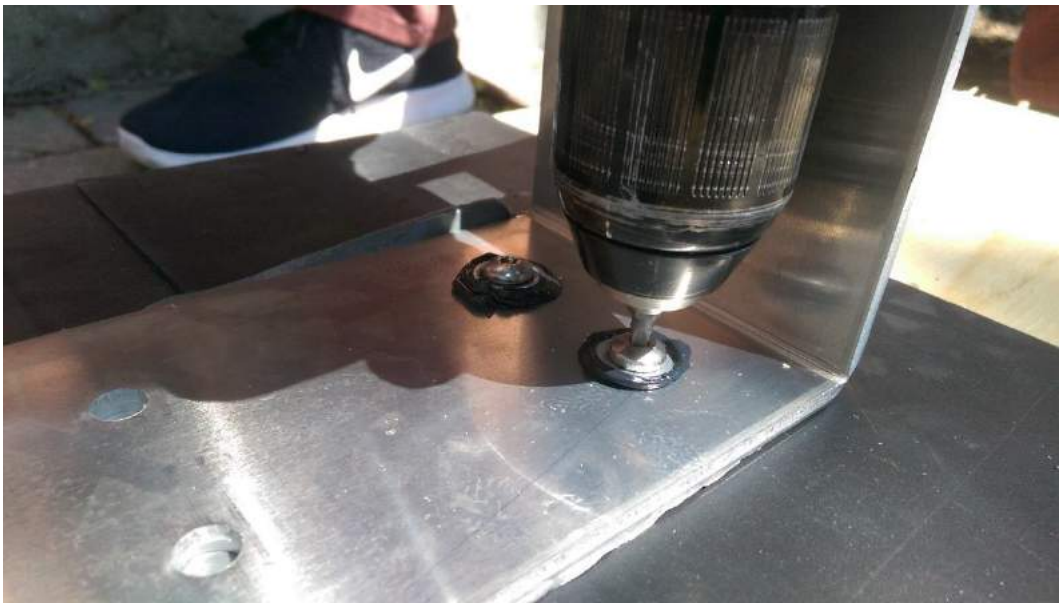


Figure 6 – Step 7: Screws and Washers drilled through applied LPS Sealant

Figure 7 - Step 8: H.E.R Sealant painted on screw heads

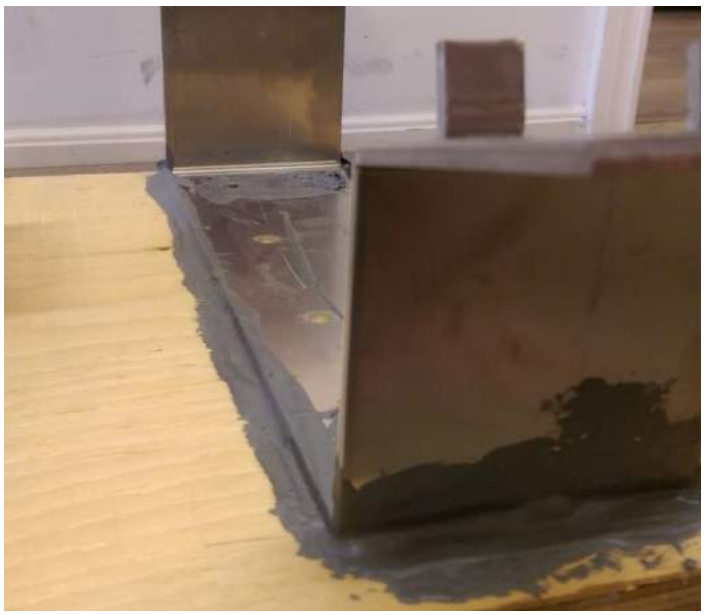


Figure 8 - Step 9: paint the H.E.R. UV resistant sealant around the perimeter of the AnchorRack

Installing Solar Panels - with/without Integrated End Clamp

1 Begin at an array edge. Place a solar panel onto the module support (Exx-01B-PF).

IMPORTANT

KB Racking® will provide either regular end clamps (C02-xxE) with end clamp blocks (C01-xxE) or Integrated end clamps (C00-01E-xx) without blocks.

Integrated end clamps are designed for specific panel thickness only.

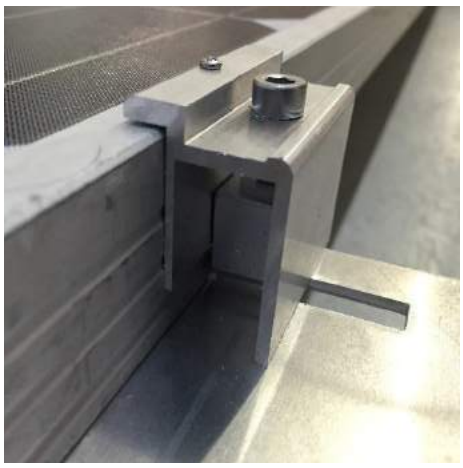


Fig. 9– Integrated End Clamp

2 Along the array edge, click end clamps into top and bottom mounting slots of module supports:

a) For regular end clamps (C02-xxE), insert end clamp blocks (C01-xxE) to balance clamp in place.

b) For Integrated end clamps (C00-01E-xx), click clamp in place aligned with panel.

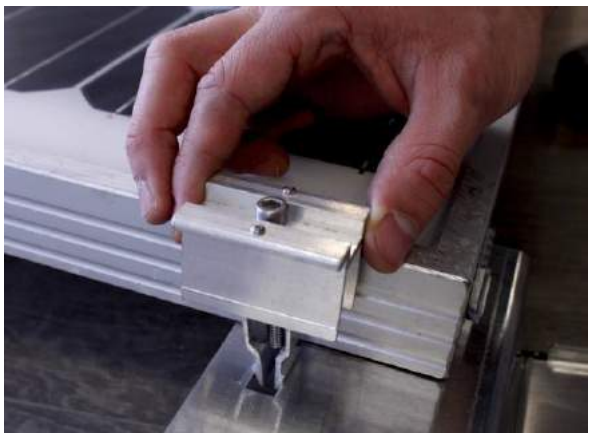


Fig. 10- Click-in KB Konnect Clamp

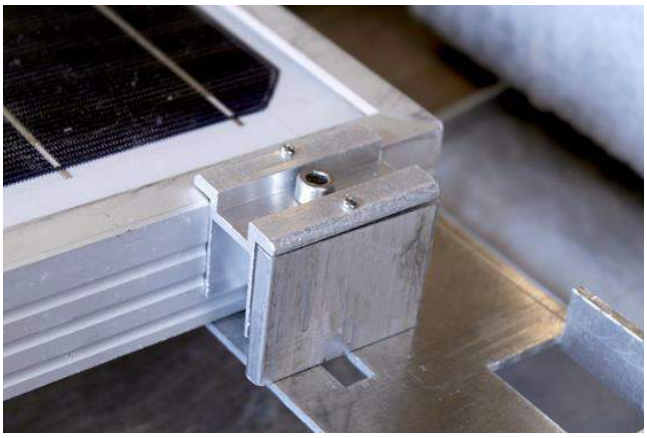


Fig. 11 – Insert End Block for End Clamps

IMPORTANT

Each solar panel requires FOUR (4) clamp.

3 Place the next solar panel in the row. Click middle clamps (C02-xxE) into mounting slots on the modules supports.

> **IMPORTANT**
> End clamp blocks and integrated end clamps provided by KB Racking® are designed to match your solar module thickness. This ensures the clamp sits flat. If end clamps do not sit flat, please notify your builder immediately.

4 Secure the first panel in the row. Tighten the end clamps and middle clamps with a standard drill or torque wrench.

Torque to 8.3Nm (73.2 in-lb).

Fig. 12 - Use Standard Drill

Fig. 13 - Use Torque Wrench

IMPORTANT

To prevent damage to solar panel and clamp, do not exceed recommended torque setting above.

Do not use hammer drills, impact drivers, or long allen keys.

IMPORTANT

When securing clamps, ensure AnchorRack support is firmly secured (by ballast or human weight).

Failure to do so may result in damage to the support and/or clamp.

5 Continue placing panels for your first row. Tighten the middle clamps as panels are installed.

6 At the end of the row, secure the panel with the associated end clamp (Integrated or Regular), similar to Step 2

7 Begin the next row. Repeat steps 1-7 until all panels are installed.

IMPORTANT

Strong winds can lift panels. Once installed, solar panels should not be left unsupervised without windshields (Exx-0xB-PF) installed.

IMPORTANT

KB Konnect *clips* are designed for single use only.

If clips are removed for maintenance purposes, please re-install using new KB Konnect clip. Rest of clamp (Body and Bolt) are multiple use.

Installing Cable Systems

1. Place string cables between circular notches of the top end of module support (ARxx-01B). Secure with cable/zip ties (not supplied).

2. Cable trays are required for wire management of the system (additional component, not provided).

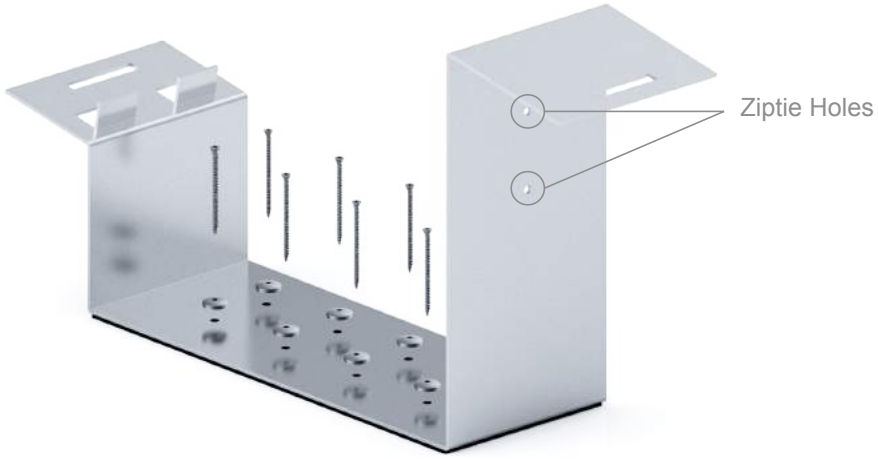
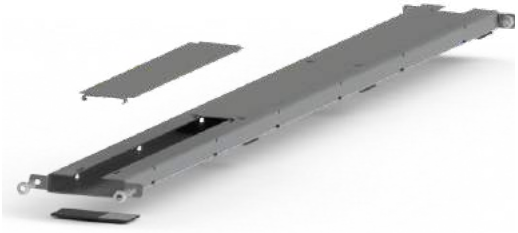


Figure 14 -- Zip ties Used to Hold Cables

Wire Management

KB Racking® offers an optional wire management solution designed specifically for easy installation. **See Appendix A for installation instructions.**



Installing ETL Certified Grounding Lugs

Tyco Grounding Lug

1 Screw threaded post of grounding lugs (not provided) into any one support. Tighten the hex washer nut.
Torque to: 2.82Nm (2.1ft-lb).

2 Insert uninsulated copped ground wire into wire slot. Tighten hex nut.
Torque to: 5.08Nm (3.75ft-lb).

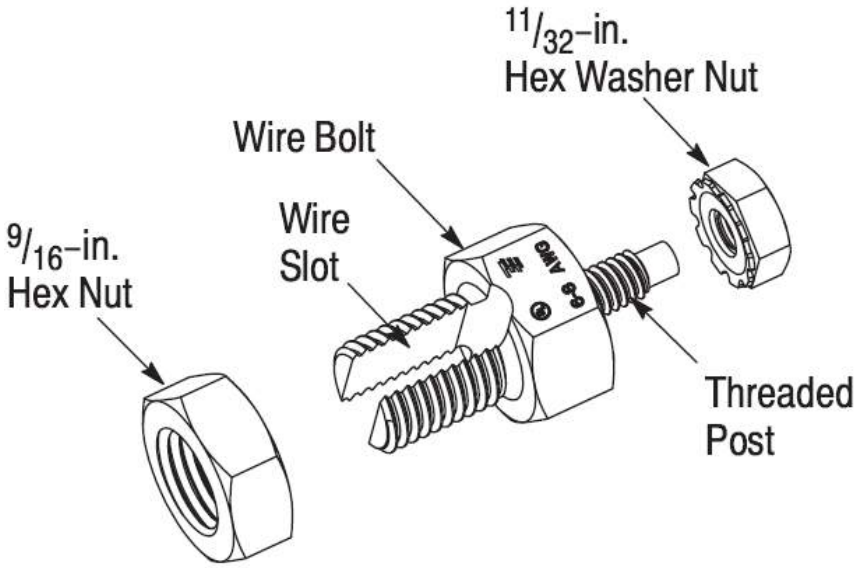


Figure 15 - Grounding Lug Schematic (Tyco model shown as an example)

IMPORTANT

For the purpose of electrical bonding, only one grounding lug is required per array, when array size does not exceed 20x25 panels in the E/WxN/S directions, respectively. Panels may be installed in landscape or portrait orientation

Maximum Series Fuse Rating: 30 Amps

Ilsco Grounding Lug

1. Fasten grounding lugs (not provided) onto any one support. Tighten the bolt.
Torque to: 5Nm (3.69ft-lb).

2. Insert #6 AWG – RW75 uninsulated copped ground wire into wire slot. Tighten the bolt. **Torque to: 5.08Nm (3.75ft-lb).**

Figure 16 - Grounding Lug Schematic (Ilsco model, SGB-4, shown as an example)

IMPORTANT

For the purpose of electrical bonding, only one grounding lug is required per array, when array size does not exceed 20x25 panels in the E/WxN/S directions, respectively. Panels may be installed in landscape or portrait orientation

Maximum Series Fuse Rating: 30 Amps

PLEASE READ THE FOLLOWING

Installer is responsible for and shall provide an appropriate method of direct-to-earth grounding in accordance with the latest edition of the National Building Code, including NEC 250: Grounding and Bonding, and NEC 690: Solar Photovoltaic Systems. Please refer to your local Building and Electrical Codes.

PLEASE READ THE FOLLOWING

Keep Copper away from Aluminum components in a fashion that maintains a minimum of ¼" separation.

PLEASE READ THE FOLLOWING

The bonding path for grounding is a result of the interconnection of all components in the array; Modules, Clamps and Supports.

During scheduled maintenance, the removal of modules, or other components must be carefully and methodically considered. By removing an entire row of modules, you may disrupt the bonding path in the North-South direction. Similarly, by removing a column of modules, you may be disrupting the bonding path in the East-West direction.

At all times, the array must be interconnected to the grounding lug (as well as during maintenance).

Note:

The UL Certified module clamps contain protruding screws that pierce the panel frame to provide an electrical bonding connection between the panel and support. The grounding continues through the adjacent racking to where the system is connected to a grounding wire through grounding lugs.

Therefore, only one AnchorRack support needs to be grounded per Array.

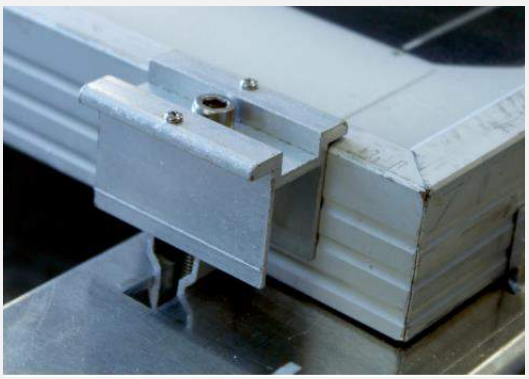


Figure 17 - Module Clamp

Basic Wiring Diagram

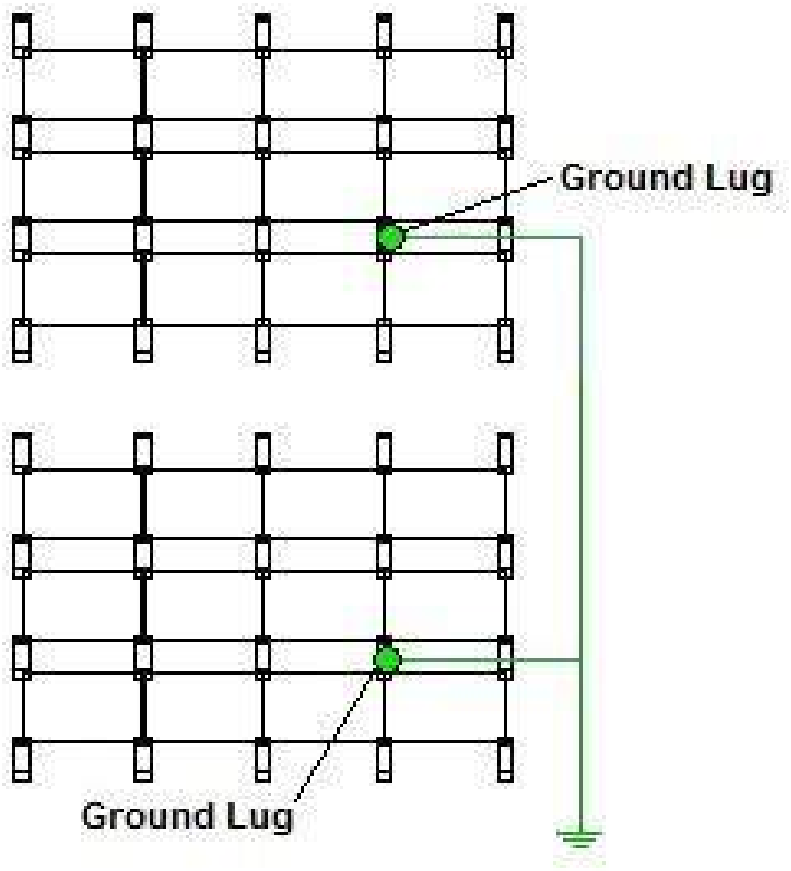


Figure 18 - Basic Wiring Diagram, Use as Example Only

Completing the Installation

1. For each array, ensure the following items are correctly installed and torqued.

    i. Module clamps
    ii. Grounding lugs

Product Maintenance Information

To maximize life span and ensure peak performance, KB Racking® recommends routine maintenance checks. The following checks should be completed every 6 months to maintain the system's integrity.

- □ Remove debris from rooftop that can damage panels or stop solar absorption.
- □ Clean solar panels and remove bird waste.
- □ Check clamps and hardware to ensure intended connections are secured.
- □ Check components for damage (warping, bent).

A P P E N D I X

APPENDIX A | Installing KB Racking® Wire Management

1 Align WM Rails per your electrical layout (electrical layout not provided by KB Racking®).

IMPORTANT

Rails should be placed under windshields, within array field. If placed outside the array, the outside edge of rails must be within 1m of an array edge.

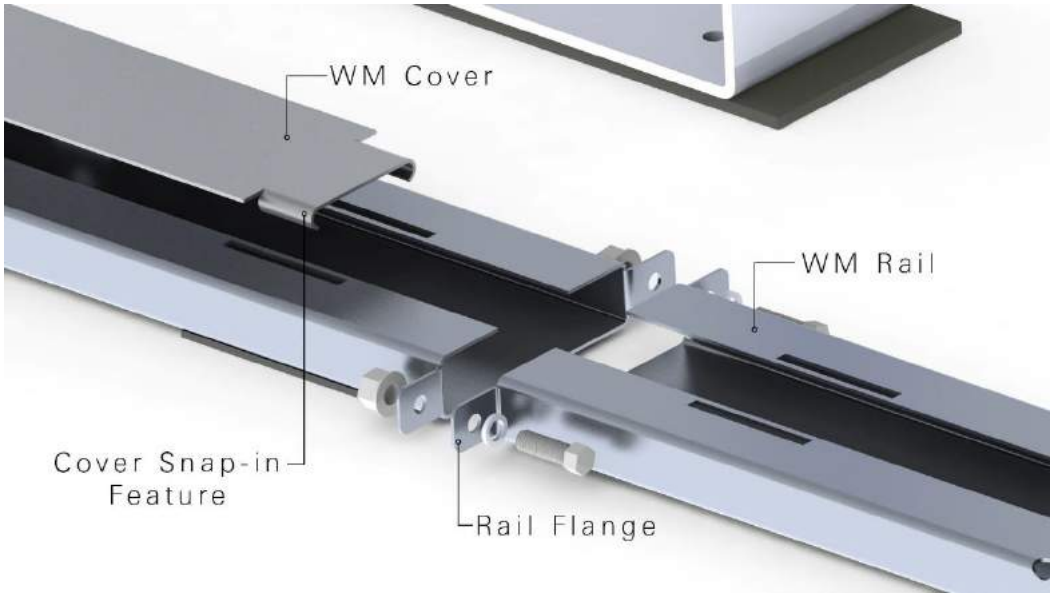


Fig. A1 – KB Racking® WM Assembly

2 Rails connect at flanges with M6 bolts. Assemble bolt with washer through flanges, then M6 nut. Snug-tighten with 10mm socket and wrench.

3 Place cables within tray. At exit/entry points for cables, cut Trim-Lock strip to length and adhere to WM Rail edges. This will protect cables from damage.

4 Rail covers can be snapped in to WM rail snap-in features. A full length of WM rail will require five covers.