TALESUN **Suzhou Talesun Solar Technologies Co., Ltd**

Statement

To KB Racking Inc.,

We, SuZhou Talesun Solar Technologies Co., Ltd. (“TALESUN”), is hereby pleased to approve that the TALESUN PV modules which type is TD6I72M are compatible with short side clamping of KB Racking, and the installation method is as attached. Meanwhile, the mechanical test load test was carried out on the module, which was approved. The test load values are +1600Pa (front side), -800Pa (back side).

However, TALESUN warranty will not be valid if TALESUN module deforms, falls down, slides down or damages due to the materials, designations or other problems of this clamping mounting structure.Any other defects, which are not specifically related to TALESUN product quality criteria and specification, will invalidate TALESUN warranty as well.

Best regards,

Product Management Department

苏州腾晖光伏技术有限公司
SUZHOU TALESUN SOLAR TECHNOLOGIES CO.,LTD

2th.April.2022

Annex 1

AERORACK 2.0

by KB RACKING®

INSTALLATION MANUAL

KB Racking Inc.
One Atlantic Ave., Suite 210, Toronto ON M6K 3E7
5657 Wilshire Boulevard #310, Los Angeles, CA 90036.
Phone: 1-888-661-3204
Fax: 647-933-5375
info@kbracking.com
www.kbracking.com

V1-05/17

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.

Modules – Racking system to be used with modules where compatibility from manufacturer has been approved.

Grounding – Racking system may be used to ground and/or mount a PV module complying with UL1703 only when the specific module has been evaluated for grounding and/or mounting in compliance with the included instructions. This system was evaluated using a Canadian Solar Model: CS6X.

FOR YOUR SAFETY

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

⚠ 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

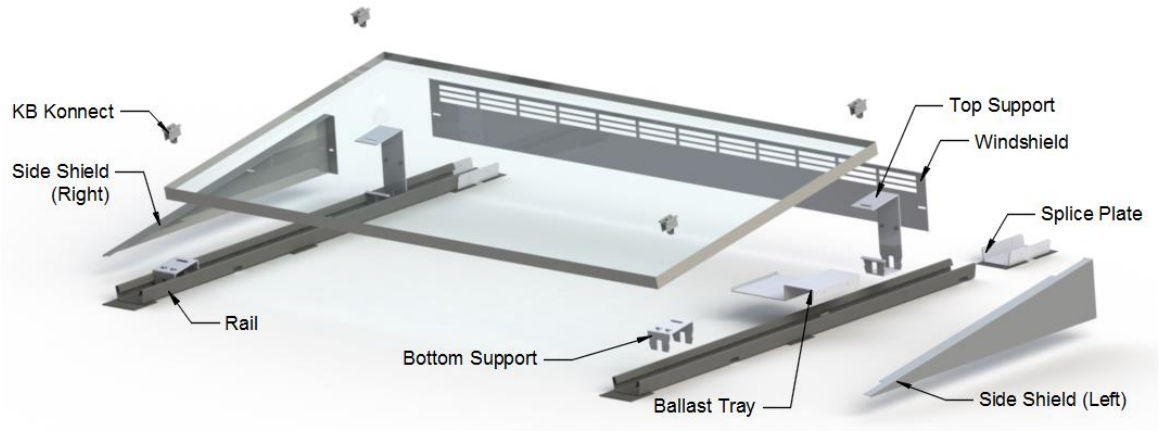
Only qualified professionals should install solar panels, DC cabling, and any anti-lightning safety devices.

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

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®

☐	AXXX-04B-XX	Module Top Support
☐	AXX-03B	Module Bottom Support
☐	A00-01B-XX	Rail *(multiple lengths possible)*
☐	A00-02B-TEK	Rail Splice
☐	A00-13B-TEK	Ballast Tray *(optional)*
☐	AXXX-0XB	Windshield
☐	AXX-0XB-TEK	Side Shield *(Left or Right, optional)*
☐	C02-XXE	KB Konnect Grounding Middle Clamp
☐	C02-XXE	KB Konnect Grounding End Clamp
☐	C00-01E-40	End Clamp Block
☐	F04100 RC 4"x5"	Roof Protection Mat *(un-attached)**
☐	FISTE0840035	TEK Screw 410SS 8X5/8 HWH
☐	M6x25mm SS Hex	M6 Bolts

**Pre-attached Roof Protection Mats are included on the following components: Rail, Rail Splice, and Ballast Tray. Unattached mats are placed under exposed Rail edges, per "Installing the Rails" section of this manual.*

Tools and Equipment Required for Installation

☐	3/16" Allen Bit	☐	Spacer Sticks (Pre-cut wooden spacers to consistently space supports – not supplied)
☐	10mm Hex Socket	☐	Torque Wrench
☐	¼" Hex Socket	☐	Safety Glasses
☐	Power Drill	☐	Safety Gloves

Preparing for Installation

1 Clean roof surface and remove all dirt and debris.

IMPORTANT

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

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.

If you have received damaged or missing parts, immediately notify your KB Racking® Project Manager.

⚠ CAUTION

Wear safety gloves when handling parts. Newly fabricated parts may have sharp edges.

⚠ 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.

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.

Installing the Rails

1 Before you begin, ensure you have the following documents **provided separately**: *Layout Diagram, Rail Table,* and *Spacing Diagram*.

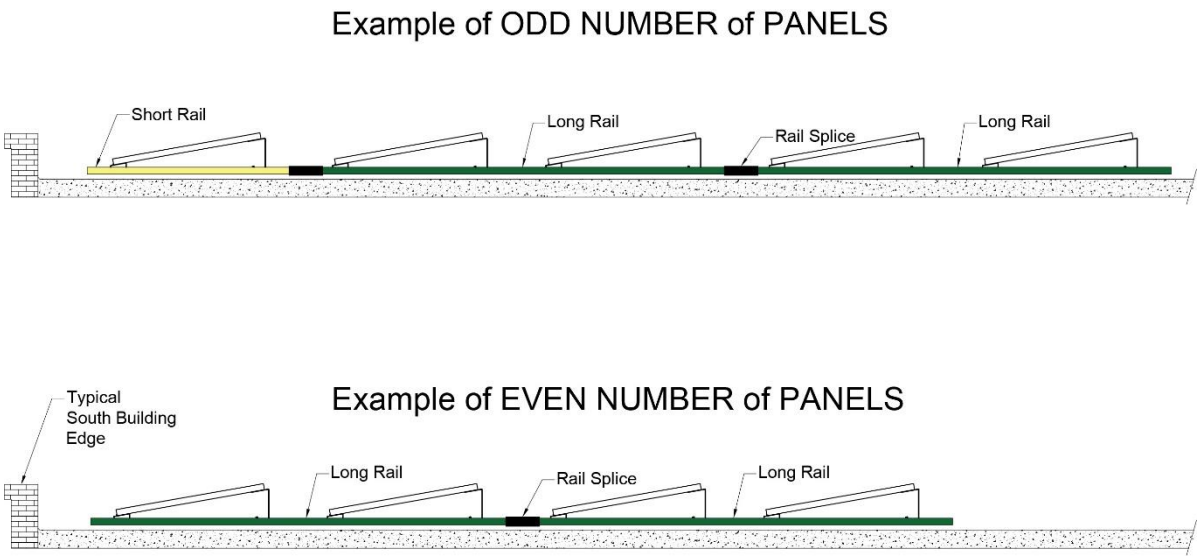


Fig. 1 – Use your Rail Table to determine which size of Rail to use.

2 Place your first Rail for an array. Refer to your *Rail Table* and *Layout Diagram* (Figure 8). The *Rail Table* provides the Rail size (short or long). The *Layout Diagram* provides the system location relative to the roof edge.

Tip: Your first Rail for a column of panels may be SHORT or LONG, depending on the number of panels in a column. Use your *Rail Table* to determine which combination of Rails to use, per Figure 1.

SHORT Rails are only used:

1. At the end of a N/S column, AND
2. Where there are an odd number of panels in a N/S column.

3 Use your *Spacing Diagram* to obtain the E/W Rail Spacing (see example, Figure 9).

4 Complete the first row of rails of the array. Lay Rails adjacent to each other. Use chalk lines or spacer sticks to consistently align Rails and ensure Rails remain parallel to each other (Figure 2-3).

5 Continue installing rows of Rails as required. Use your *Rail Table* and *Layout Diagram* to determine specific quantities and combinations of Rails.

6 Install Rail Splices to connect Rails. Equally space two Rails within a splice. Use the pre-punched holes on the splice to align and install 4x TEK Screws (Figure 4-5). **Torque to 7.5 Nm (5.5 ft-lbs)**

7 Complete the Rail installation by placing Roof Protection Mats at the ends of Rails as needed. Peel the mask off the double-sided tape and adhere the mat to the underside of a Rail to cover the Rail edge (Figure 6-7).

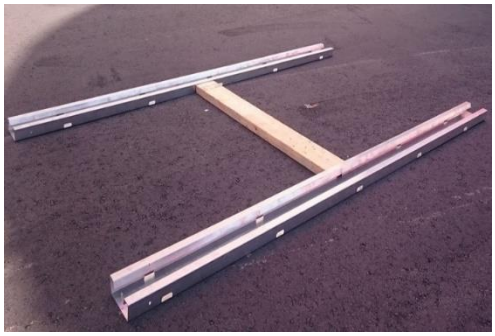


Fig. 2 – Use spacer sticks to aid placement

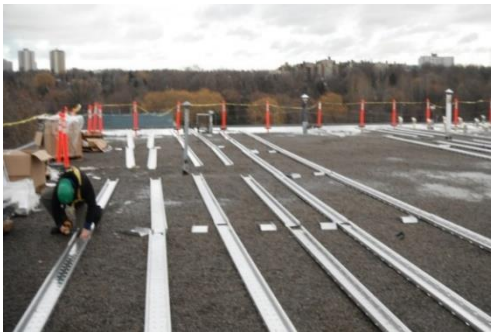


Fig. 3 – Align Rails

Fig. 4 – Assemble Rail and Splice Plate

Fig. 5 – Connect two (2) Rails with Splice Plate

Fig. 6 – Peel mask off tape

Fig. 7 – Mat covers exposed Rail edge

How to Use Your Layout Diagram

1 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.

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

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

ARRAY NUMBERS **ROOF STRUCTURES**

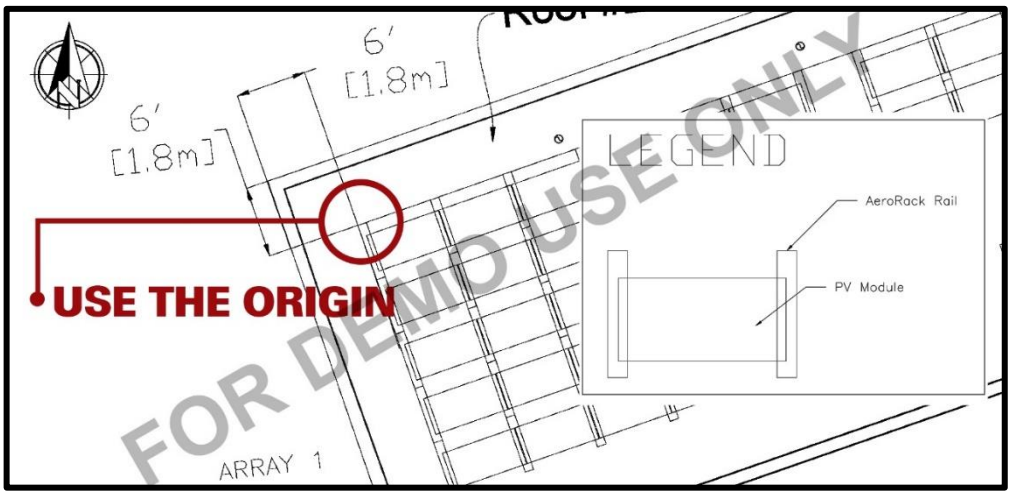


Fig. 8 – Sample Layout Diagram

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)

INTER-SUPPORT SPACING (inter-row distance between Supports)

E/W RAIL SPACING (E/W distance between Rails)

ROW SPACING (N/S distance between similar points)

Record these numbers and do not confuse them.

2 *Recommended:* Create spacer sticks for the first three dimensions above.

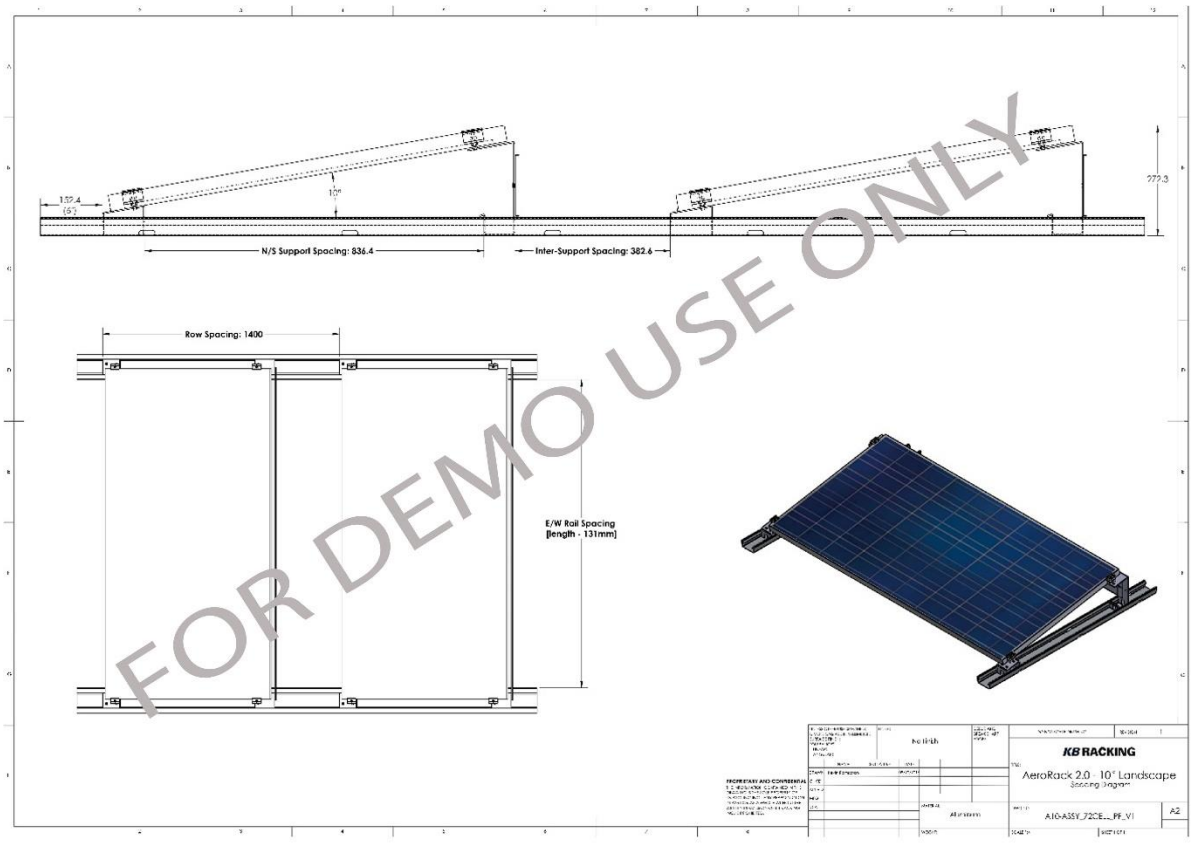


Fig. 9 - Sample Spacing Diagram

Installing Module Supports

1 Mark 15cm (6”) from the South edge of a Rail (Figure 10).

2 Click-in the first Bottom Support by aligning the front of the support at the 6” mark. Apply downward pressure by stepping on the support (Figure 11). All four (4) click-in features of the support must be engaged with the rail.

3 Use the *Spacing Diagram* to obtain the N/S Support Spacing.

4 Click-in the Module Top Support at the distance obtained in Step 3, with your spacing stick (see example, Figure 12-13).

Tip: Hold the support at the top flange with both hands. Centre the support within the Rail channel and apply pressure by stepping on the bottom flange of the support. Applying pressure at the bottom flange first will click-in this flange alone. To completely click-in the Top Support, apply pressure with hands on the top flange.

IMPORTANT

Complete the first row before installing additional rows to fix the distances between the module supports.

5 Click-in all supports using the methods outlined above.

Fig.10 – Measure the first Bottom Support of the row

Fig. 11 – Click in the Module Bottom Support

Fig. 12 – Use pre-cut wood spacers to evenly space supports

Fig. 13 – Click-in the Module Top Support

⚠ PLEASE READ THE FOLLOWING ⚠

Following the installation of the module supports, ensure that the surface of the roof is well protected at the N/S ends of each column of rails. Any rail excess that may pose a threat of damage to the roof structure should have some roof protections pads placed underneath. Alternatively, these excess sections could be cut off with a Circular Saw.

NOTE

The system requires at least 15cm (6in) of rail extending beyond supports at each end of a column of rails.

Installing Ballast

1. Place Ballast under panels according to your project specific *Ballast Layout* and *Shading Diagram* (see example, Figure 16-19).

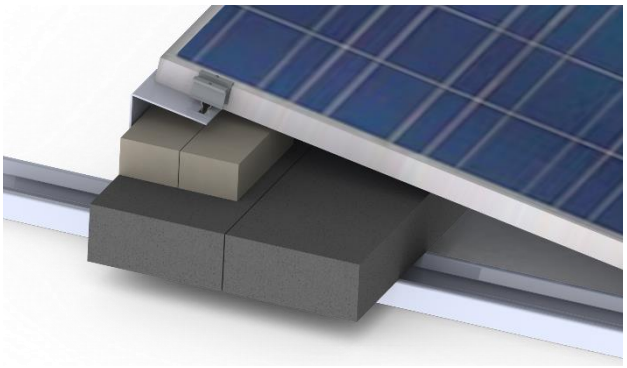


Fig. 16 – Example of ballast on rail

Fig. 17 – Example of ballast on rail

How to Use Your Ballast Layout

1 Ensure you have the *Ballast Layout* and *Shading Diagram* documents, both provided separately.

The *Ballast Layout* shows the combinations of stones required <u>at each rail</u>, to ballast the adjacent panels.

The *Shading Diagram* shows sample arrangements of stones (Figure 14).

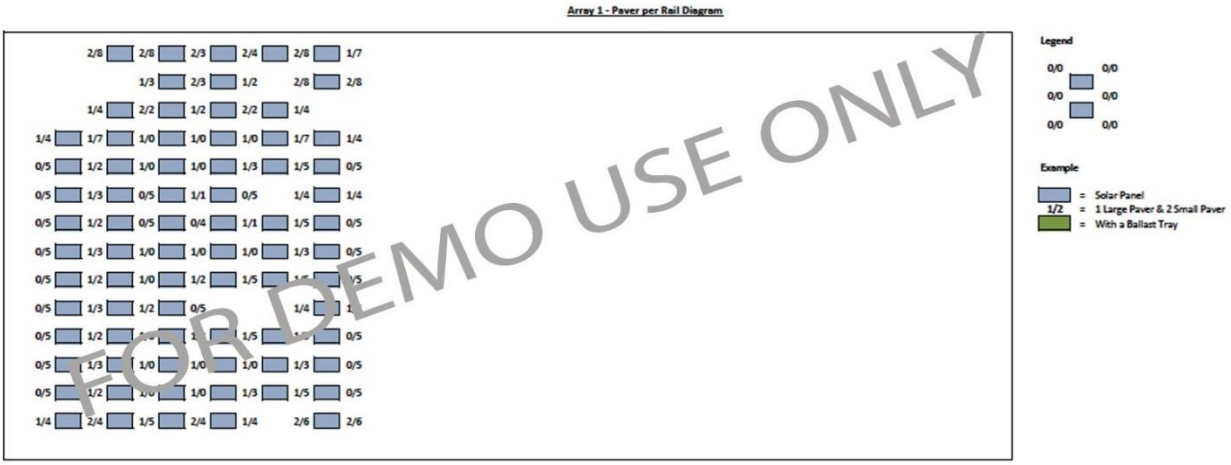


Fig. 13 – Sample Ballast/Paver Layout

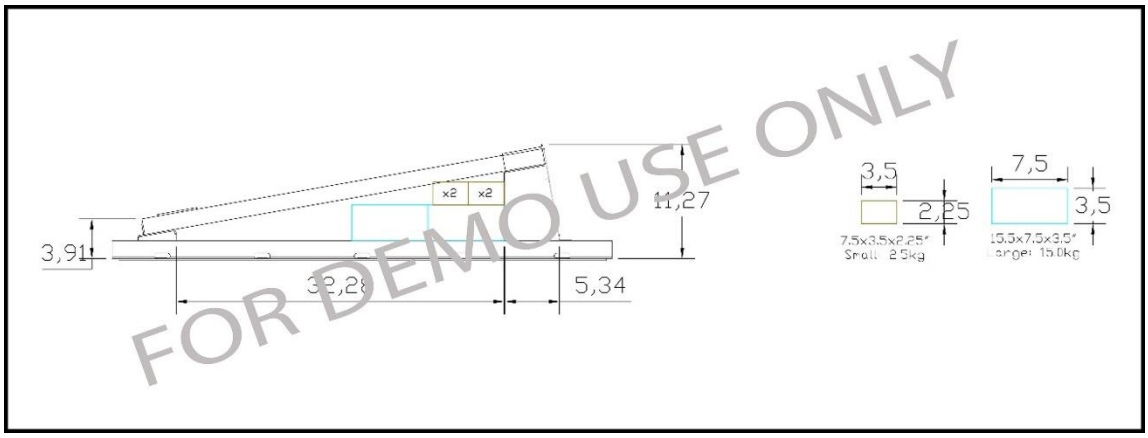


Fig. 14 – Sample Ballast/Paver Shading Diagram

Installing PV Modules

1. Begin at an array edge. Place a PV module across two Bottom Supports.

2. Lay down the PV module onto the Top Supports.

3. Align the module. Each support features an etching. The edge of a PV module must be on this etching to ensure the panel is centered across all four supports (E/W).

> **IMPORTANT**
>
> Strong winds can lift panels. Once installed, PV Modules should not be left unsupervised without windshields installed.

4. Continue placing PV modules for an entire row.

5. Secure PV modules beginning at the start of a row. Clamps at module edges require End Blocks, OR Integrated End Clamps. Click clamps into slots on the support and use a 3/16 allen-key to secure the clamp (Figures 20-22).

> **IMPORTANT**
>
> End Blocks provided by KB Racking® are designed to match your PV Module thickness. This ensures the clamp sits flat. If end clamps do not sit flat, you have the incorrect block. Notify your builder immediately.

> **IMPORTANT**
>
> Each solar panel requires FOUR (4) clamps.

IMPORTANT

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

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

6 Continue installing adjacent PV modules. To ensure proper clamping, pull panels firmly together while installing (see example, Figure 23-24).

7 **Torque KB Konnect to 8.3Nm (6.1 ft-lb)**. Clamps must sit flush to each panel being clamped. This ensures the panel frames are pierced.

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

IMPORTANT

KB Konnect clips are designed for single use only.

If clips are removed for maintenance purposes, new KB Konnect clips must be re-installed. Clamp body and bolt are multi-use.

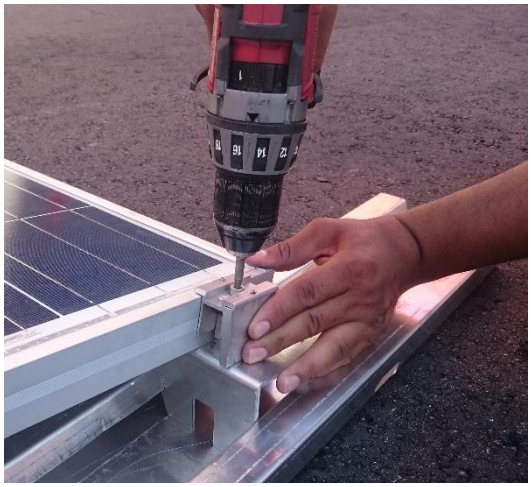


Fig. 20 – Fasten KB Konnect End Clamp, with End Block

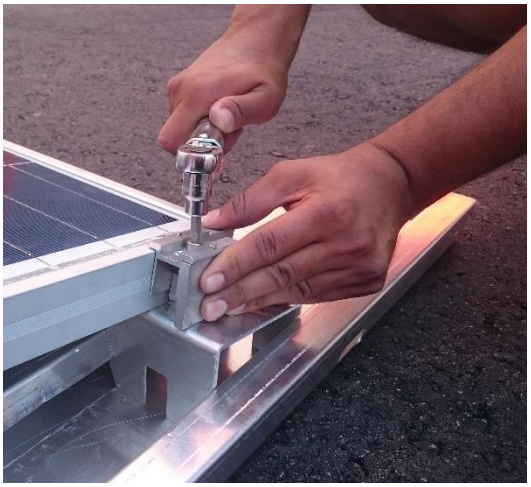


Fig. 21 – Torque KB Konnect End Clamp, with End Block

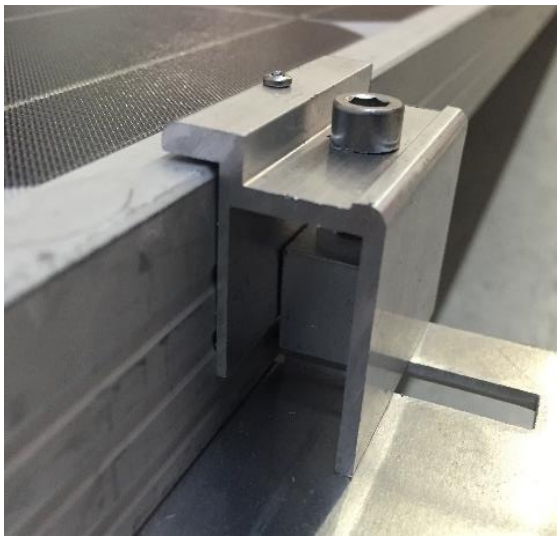


Fig. 22 – Integrated End Clamp

Fig. 23 – Two adjacent modules pulled together prior to securing clamp.

Fig. 24 – Two adjacent modules pulled together while securing clamp.

Installing Cable Systems

1 After all modules are in place, string cables can be put into the middle notch of the Module Top Supports and Bottom Supports

Tip: Rails can be used as cabling channels either under or to the side of the supports, within the rail channel.

Fig. 25 – Rail cabling through supports

IMPORTANT

In case there are any anti-lightning safety devices on the roof, a qualified professional should integrate them into the solar installation.

Installing Windshields

LANDSCAPE

1. Start at the end of a row. Place the windshield flat against the Top Support. ***Flanges face away from supports.***

2. Align slots on the shield to the press-fit nuts on the Top Supports. ***Slide the shield as far to the outside edge of the array as permitted by the slots.***

3. Use two M6 bolts to secure the shield to two supports. **Torque to: 11.8 Nm (8.7 ft-lbs)**

4. Install remaining shields. Continue sliding shields to fit.

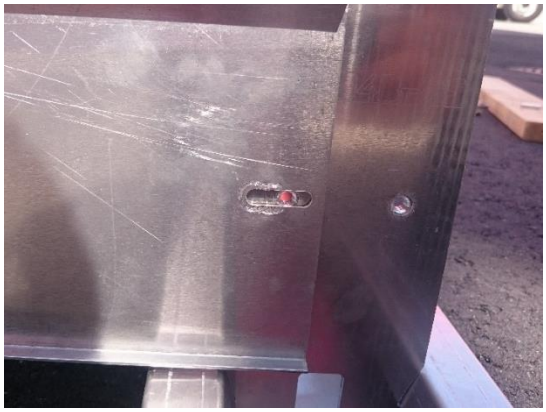


Fig. 26 – Align shield with inner press-fit nut

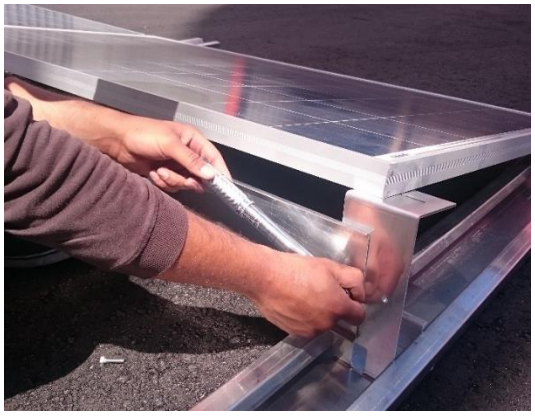


Fig. 27 – Torque shield to the Module Top Support

IMPORTANT

Windshields are designed to accommodate various lengths of panels. For smaller 60 Cell panels, it may be necessary to overlap and/or flip windshields.

Windshields must be mounted through the provided slot, and may slide along this slot to fit the system.

60 CELL WINDSHIELDS CAN OVERLAP/FLIP

PORTRAIT

1. Place the Portrait Windshield flange across two rails, aligning the shield with the back edge of a PV module (Figure 28).

2. Hold the shield in place, parallel to the back edge of the PV module. Drill through both the shield and rail with a #11 drill.

3. Insert a 3/16” Rivet in each hole. Rivet the shield to the rail.

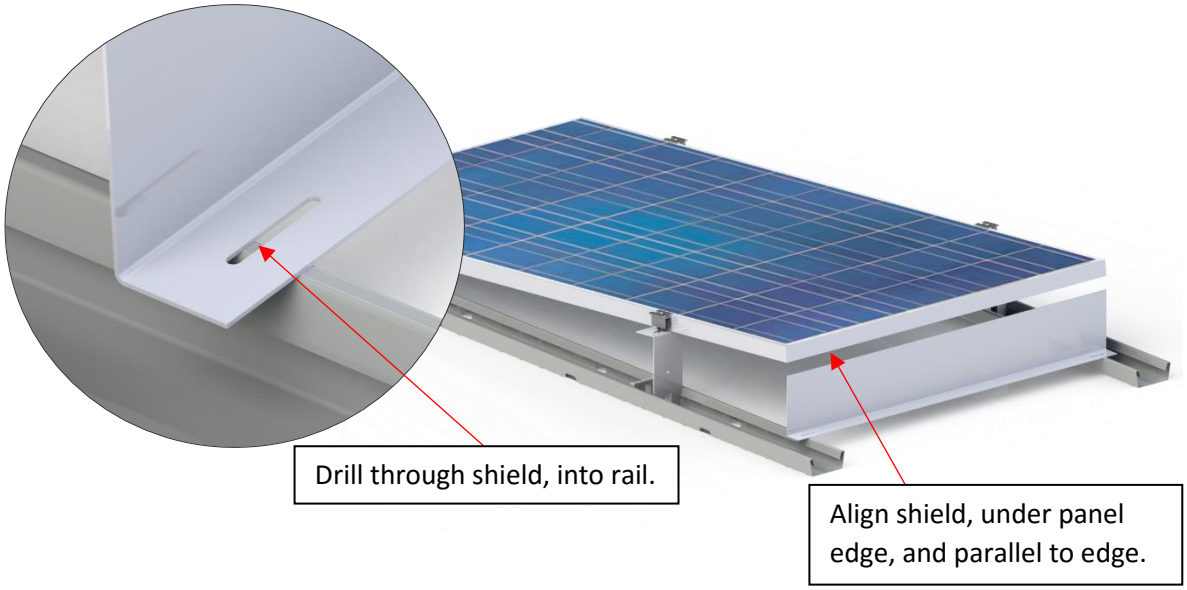


Fig. 28 – Installation of Portrait Shield

Installing Side Shields (optional)

1. Install Side Shields at the end of rows (Figure 29). Left and/or Right-hand shields can be installed depending on your project requirements.

2. Place Side Shield by aligning the rear slot with the outer press-fit nut on a Top Support. Use an M6 bolt to hand-tighten the rear of the shield.

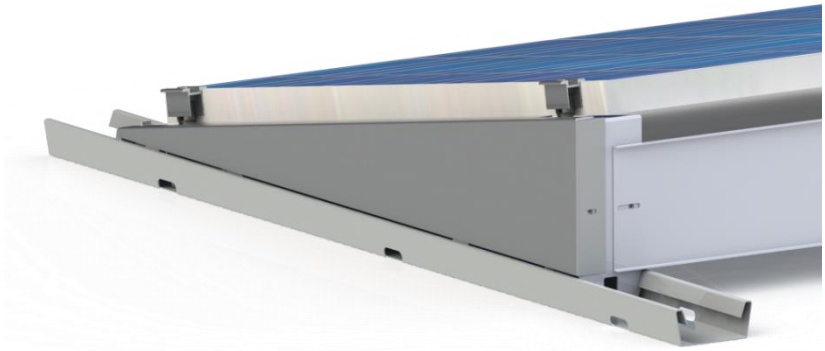


Fig. 29 – Side Shield aligned with outer press-fit nut

Figure 30 – Side Shield alignment and securement

3. Using the pre-punched hole at the front of the side shield to locate and install a TEK Screw (Figure 30).
Torque to 7.5 Nm (5.5 ft-lb).

4. Torque the M6 bolt at the rear of the shield to **11.8 Nm (8.7 ft-lb)**.

Installing ETL Certified Grounding Lugs

Tyco Grounding Lug

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

2. Insert grounding lug wires. Insert #6 AWG – RW75 uninsulated copper ground wire into wire slot. Tighten hex nut.
Torque to: 5.08Nm (3.75ft-lb).

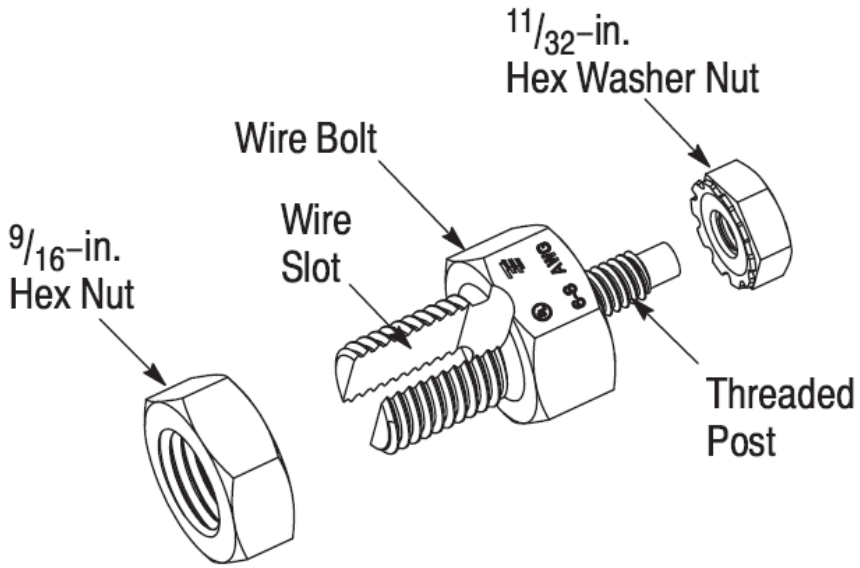


Fig. 31 - Grounding Lug Schematic (Tyco model, 2058729-1 shown as an example)

IMPORTANT

For the purpose of electrical bonding, only one grounding lug is required per array per 20x25 panels in the E/WxN/S directions, respectively. Panels may be installed in landscape or portrait orientation. If array area exceeds 20x25 panels, then additional grounding lugs are required, per each additional area.

Maximum Series Fuse Rating: 30 Amps

Ilsco Grounding Lug

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

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

Fig. 32 - 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 per 20x25 panels in the E/WxN/S directions, respectively. Panels may be installed in landscape or portrait orientation. If array area exceeds 20x25 panels, then additional grounding lugs are required, per each additional area.

Maximum Series Fuse Rating: 30 Amps

⚠ PLEASE READ THE FOLLOWING ⚠

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

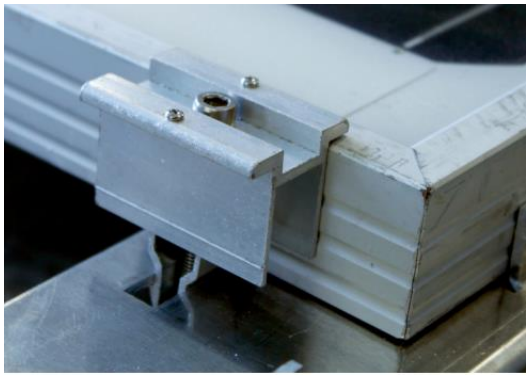
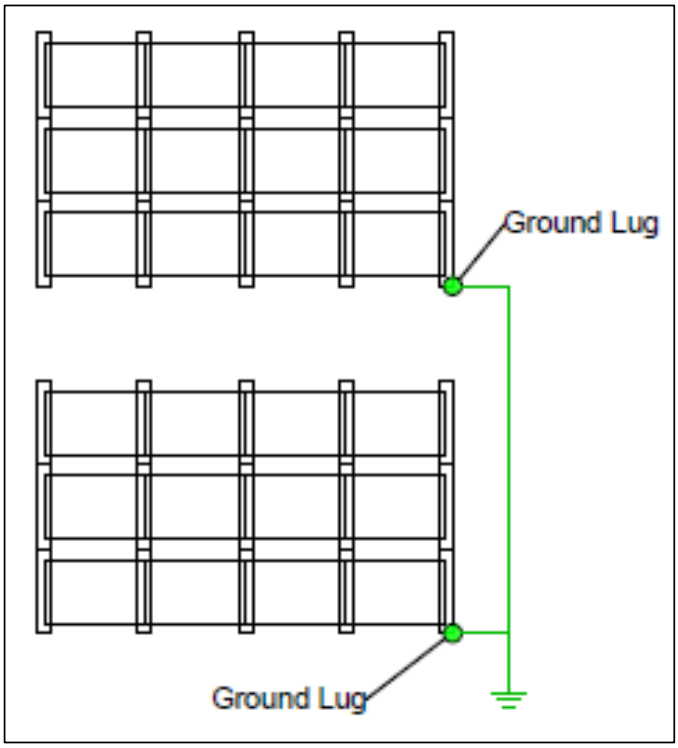


Figure 33 – Module Clamp with pierce screws

For the purpose of electrical bonding, only one grounding lug is required per array per 20x25 panels in the E/WxN/S directions, respectively. Panels may be installed in landscape or portrait orientation. If array area exceeds 20x25 panels, then additional grounding lugs are required, per each additional area.



Basic Wiring Diagram, Use as Example Only

⚠ 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 Canadian Electrical Code Part 1, CSA 22.1 Safety Standard for Electrical Installations or 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;

During scheduled maintenance, the removal of modules, windshields or other components must be carefully and methodically considered. By removing a column of modules and windshields, 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).

Completing the Installation

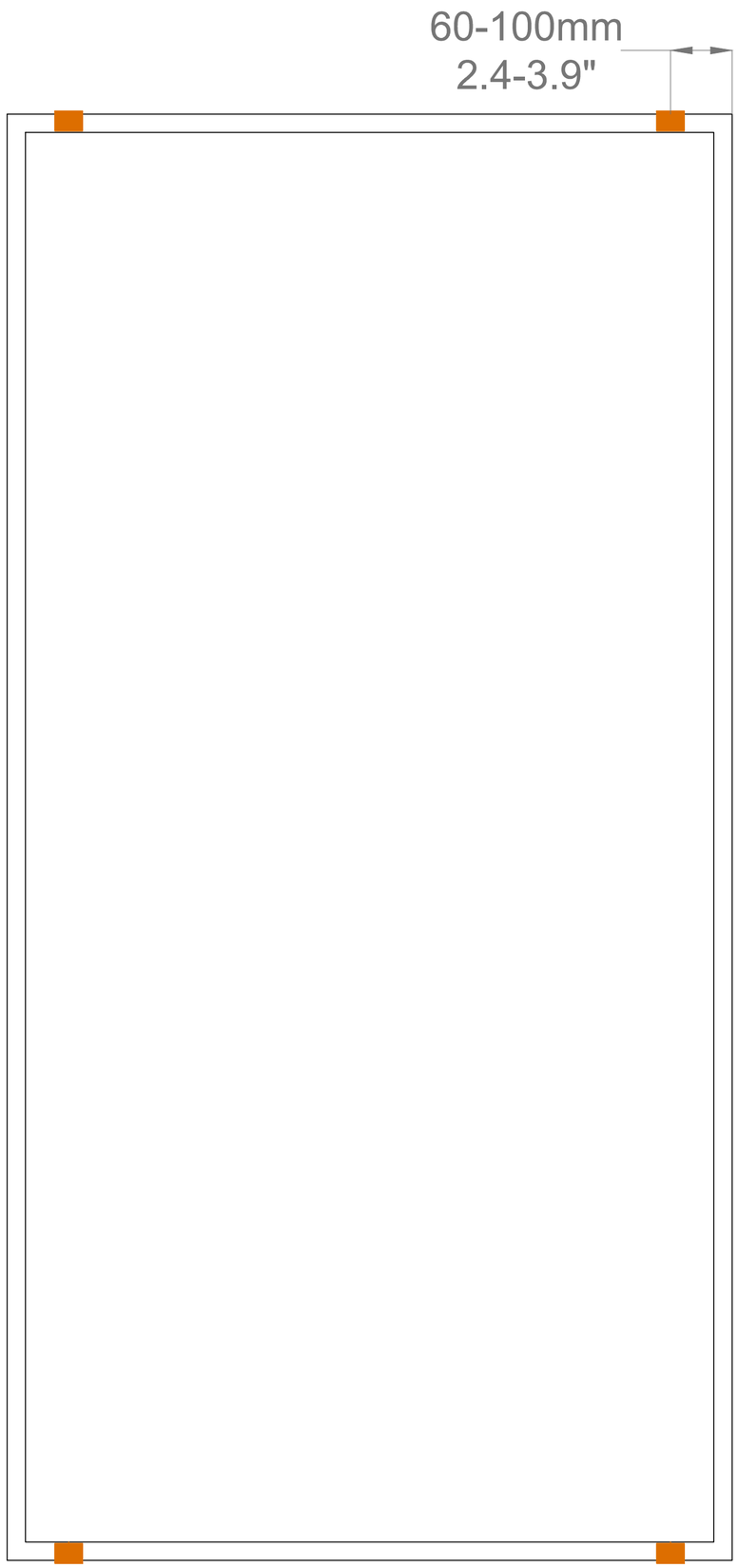
1. For each array, ensure the following items are correctly installed and torqued:

    i. Module clamps
    ii. Grounding lugs
    iii. Windshields

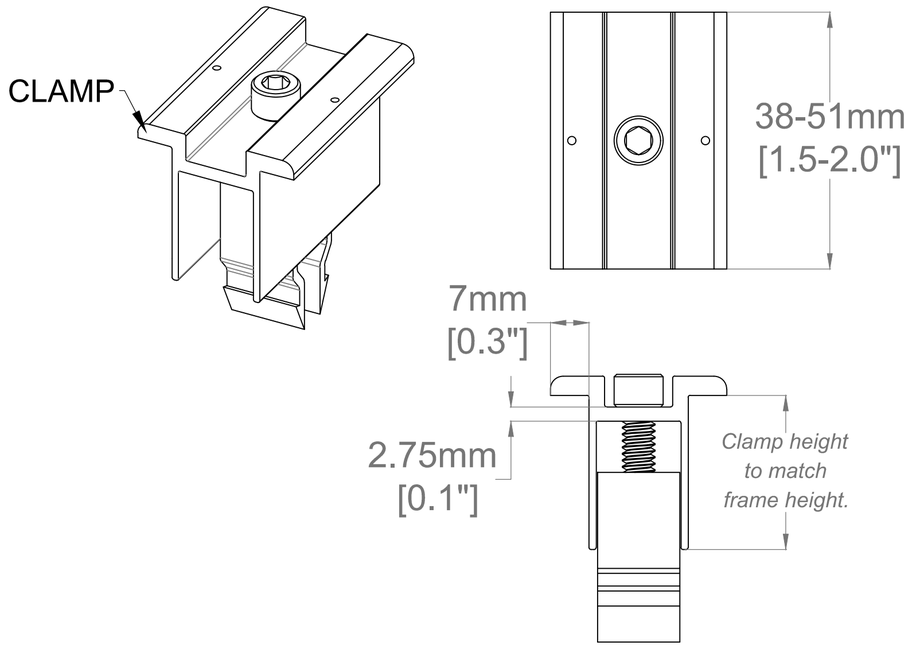
Product Maintenance Information

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).
- □ Check that windshields are in place and secured.



CLAMP METRICS



CLAMP

Clamping Diagram for Short Side Clamping

CLAMP

SHORT SIDE CLAMPING OPTION

DRAWING TITLE:

PROJECT:

CLIENT:

PROVIDER

KB RACKING®

1 ATLANTIC AVENUE, SUITE 210
TORONTO, ONTARIO M6K 3E7

TEL: 1.888.661.3204
FAX: 647.933.5373

WWW.KBRACKING.COM

DRAWN BY:	CHECKED BY:	VERSION:
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PROJECT NO.: N/A	DRAWING NO. 1
DATE: 2018-NOV-29	
SHEET: 1 OF 1	