



Revolutionary Solar Racking Systems



BallastRack Install Instructions

(IR-15,30,45,35A & IR-40FSAB)

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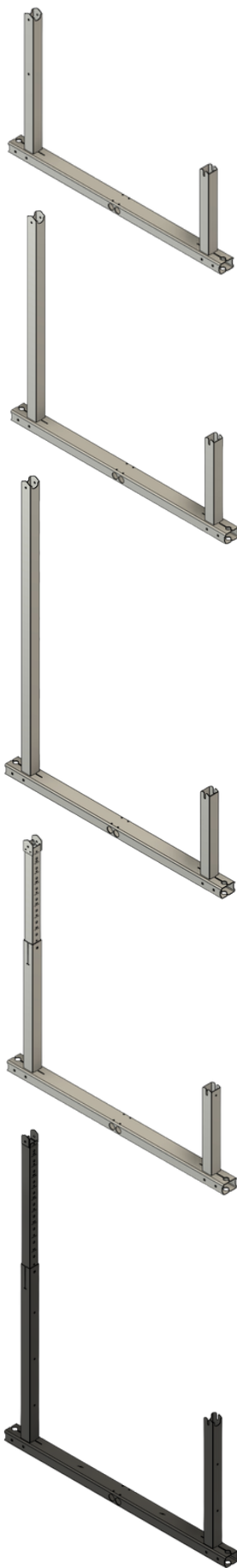
IntegraRack® backs all of its products with a 25 year limited product warranty. We fully stand by the quality and guarantee that they will hold up under the harshest conditions when properly installed.

Disclaimer

The instructions detailed in this manual will provide the knowledge and requirements necessary for proper installation of the given product. Be sure to read them thoroughly and make sure that you fully understand them before proceeding with installation. Any improper use or installation of these products will void any and all warranty coverage, and may cause failure, property damage or personal injury. IntegraRack is not responsible for any damages caused by improper use.

IT IS THE RESPONSIBILITY OF THE INSTALLER TO:

- Comply with any and all applicable local or national codes and regulations.
- Ensure all products are appropriate for the installation according to the environmental and loading conditions.
- The installation methods shown in this manual are tested and approved for use by IntegraRack. Any other method for mounting will void the manufacturer warranty.
- Ensure ground at installation site is level and suitable for the desired mounting.
- Disconnect AC power before servicing or removing modules, micro-inverters or power optimizers.
- Review manufacturer's documentation for compatibility and compliance for solar modules and 3rd party systems.
- If loose components or loose fasteners are found during periodic inspection, re-tighten immediately. Any components showing signs of corrosion or damage that compromise safety shall be replaced immediately.
- Provide an appropriate method of direct-to-earth grounding according to the latest edition of the National Electrical Code, including NEC 250: Grounding and Bonding, and NEC 690: Solar Photovoltaic Systems.
- Ensure safe installation of all electrical aspects of the solar system (All electrical installation and procedures should be conducted by a licensed and bonded electrician or solar contractor). Regular maintenance of a module or panel shall not involve breaking or disturbing the bonding path of the system. All work must comply with national, state and local installation procedures, product and safety standards.
- Ensure bare copper grounding wire does not contact aluminum and zinc-plated steel components, to prevent risk of galvanic corrosion.
- Ensure provided information is accurate. Issues resulting from inaccurate information are the installer's responsibility.



IR-15 BallastRack™ Solar Racking System

The IR-15 offers a fixed 15° sun angle for optimal year-round energy production in equatorial regions such as Florida, Southern Texas and most tropical islands. This system can be adjusted to 0° in the case of an impending hurricane.

See page 19 for angle adjustment

IR-30 BallastRack™ Solar Racking System

The IR-30 offers a fixed 30° sun angle for optimal year-round energy production throughout most of the continental United States.

IR-45 BallastRack™ Solar Racking System

The IR-45 offers a fixed 45° sun angle for optimal year-round energy production throughout most of the northern United States and Canada with a great angle for snow shedding.

IR-35A BallastRack™ Solar Racking System

The IR-35A can be adjusted from 15-35° in 2.5° increments to achieve the optimal year-round sun angle in almost any region.

**Not intended for seasonal adjustment*

See page 20 for angle adjustment

IR-40FSAB BallastRack™ Solar Racking System

The IR-40FSAB is constructed from high-strength steel and electroplated with black zinc for maximum corrosion resistance. This system can be adjusted from 15-40° in 2.5° increments to achieve the optimal year-round sun angle in almost any region with an extra 8 inches of ground clearance.

**Not intended for seasonal adjustment*

See page 20 for angle adjustment

See our [Stamped Engineering & Datasheets](#) for product specific wind and snow load ratings

Base Ballast Mounting

Each BallastRack frame can be mounted using water tote tanks or concrete curb stops for temporary or permanent mounting of solar modules.

Water tote tank not provided (minimum weight and dimensions listed on Page 18).

Concrete curb stops can be sourced locally (minimum weight and dimensions listed on Page 18).

3/4 x 12" concrete forming steel stakes recommended

IR EarthBallast™ System

Our IR EarthBallast™ Kit comes with pre-cut rolls of strong Geotextile made for retaining walls and a high-strength fast setting epoxy to hold the Geotextile to the frames. This creates a large surface area to hold the dirt mound. See [Stamped Engineering & Datasheets](#) for your specific frame model to determine how much weight is needed per module section.

3/4 x 12" concrete forming steel stakes required

IR AnchorSpike™ System

Our IR AnchorSpike™ Kit comes with our specially designed 30" barbed aluminum spikes, which have a hollow structure to allow our super strong two-part epoxy to flow deep into the soil and create a solid anchor in the soil rated for up to 1,000 pounds of uplift per spike in most soil types. Each frame has clamps at each end to clamp onto the (2) IR AnchorSpikes which allows for fast and easy leveling of the system. IR-AnchorSpikes must be tested in soil at installation site to ensure they can withstand a minimum of 1,000 pounds of uplift.

Concrete Slab/Footing Anchor Bolt Mounting

Our IR Concrete Anchor Bolt Mounting Kit provides (22) Concrete Anchor Bolts and (44) washers for the strongest possible mounting, and allows for easy installation of up to 10 solar modules. The frames can be direct bolted to pre-cast concrete footings or most existing concrete surfaces, such as patios and driveways (local site specific engineering required).

Included Components

IR-15 Included Components (Per Frame)

- (1) IR-15 Base Tube
- (1) IR-15 Short Leg
- (1) IR-15 Long Leg
- (4) IR-F2 Flange Clamp Bonding Brackets
- (4) Bolt As
- (4) Nut As
- (4) Bolt Bs

IR-30 Included Components (Per Frame)

- (1) IR-30 Base Tube
- (1) IR-30 Short Leg
- (1) IR-30 Long Leg
- (4) IR-F2 Flange Clamp Bonding Brackets
- (4) Bolt As
- (4) Nut As
- (4) Bolt Bs

IR-45 Included Components (Per Frame)

- (1) IR-45 Base Tube
- (1) IR-45 Short Leg
- (1) IR-45 Long Leg
- (4) IR-F2 Flange Clamp Bonding Brackets
- (4) Bolt As
- (4) Nut As
- (4) Bolt Bs

IR-35A Included Components (Per Frame)

- (1) IR-35A Base Tube
- (1) IR-35A Short Leg
- (1) IR-35A Adjustable Long Leg
- (4) IR-F2 Flange Clamp Bonding Brackets
- (4) Bolt As
- (4) Nut As
- (4) Bolt Bs

IR-40FSAB Included Components (Per Frame)

- (1) IR-40FSAB Base Tube
- (1) IR-40FSAB Short Leg
- (1) IR-40FSAB Adjustable Long Leg
- (4) IR-F2 Flange Clamp Bonding Brackets
- (4) Bolt As
- (4) Nut As
- (4) Bolt Bs



IR-F2 Solar Module Flange
Clamp Bonding Bracket



Bolt B



Bolt A



Nut A

Required Tools

- Screw Gun with 1/2" Socket (**DO NOT USE AN IMPACT GUN**)
- Small 1/2" / 13mm Wrench (**INCLUDED WITH ALL MOUNTING KITS**)
- 4' Level
- Tape Measure
- String Line
- 18" x 3/8" Concrete Forming Stakes (**OPTIONAL**)

Required Additional Materials

- 1" EMT (Electrical Metal Tubing) / Conduit Pipe

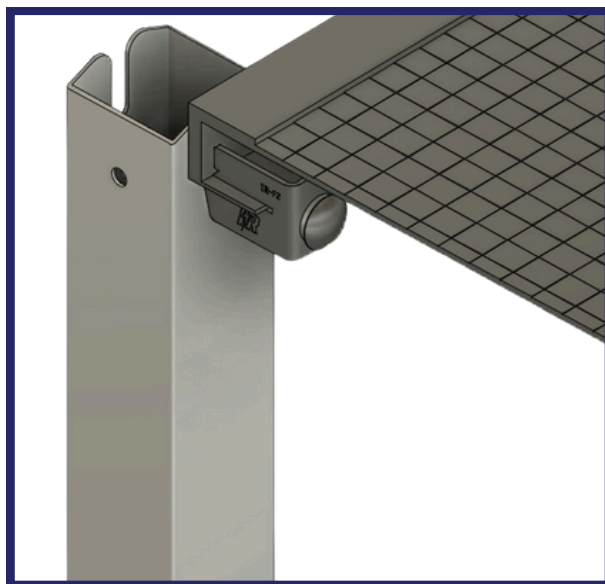
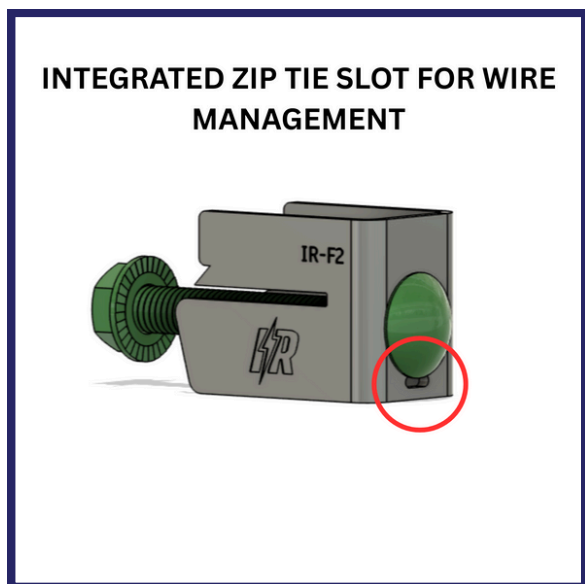
*Can be sourced at most local hardware stores

***NOT REQUIRED FOR CONCRETE MOUNTING**

IR-F2 Bracket

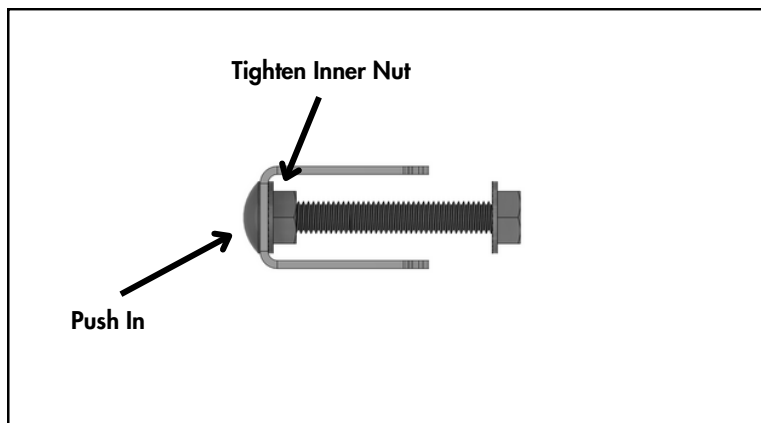
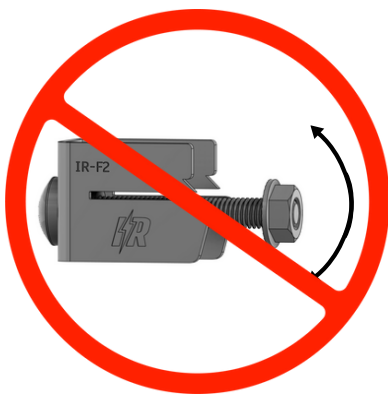
IR-F2 Solar Module Flange Clamp Bonding Bracket

The IR-F2 is the key to the BallastRack's incredible wind ratings and is designed to hold your solar modules firmly in place while bonding them together.



IMPORTANT

It is important to make sure that the bolt in each IR-F2 is NOT loose. If you find any that are loose follow the instructions below to make sure that it is firmly in place.



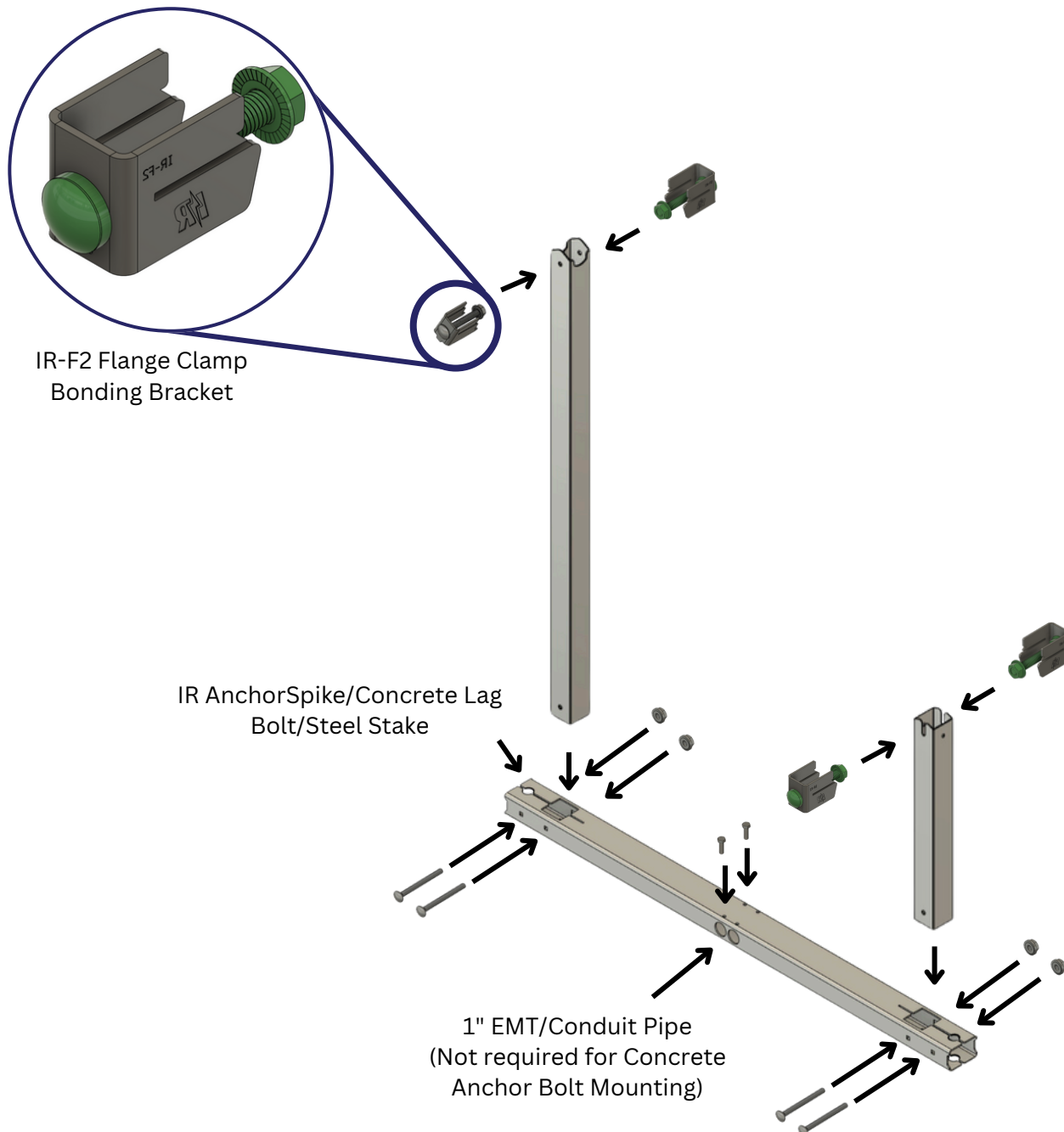
1. Checking For Loose Clamps

As you take the IR-F2 Clamps out of the hardware box check each one by holding the main body of the clamp in one hand and shake the bolt with the other. If it doesn't feel firm, it must be tightened.

2. Tightening The Inner Nut

First, push the head of the bolt in (make sure that the square shoulders of the bolt fit into the square opening of the main body) and tighten the inner nut by hand. Make sure the bolt no longer moves up and down. If possible, use a socket wrench with a deep 1/2" or 13mm socket to tighten the inner nut.

Assembly & Fastener Locations

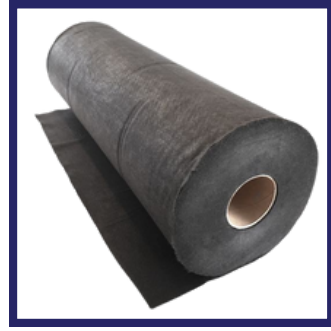


***IR-30 Model Shown**

Mounting Kit Components

IR EarthBallast Kit

- Quick Cure 15 Epoxy Resin
- Extra Mixing Nozzle
- 3' x 50' Roll of Geotextile Material
- Alcohol Wipes
- Scuff Sponge
- 13mm Ratchet Wrench



IR AnchorSpike Kit

- (10/22) IR AnchorSpikes
- Epoxy Resin A
- Epoxy Resin B
- Mixing Cup
- 3oz Measuring Cups
- Stirring Stick
- Funnel
- Gloves
- 13mm Ratchet Wrench



Concrete Anchor Bolt Kit

- (22) Concrete Anchor Bolts
- (44) Washers
- (2) 3/8" Concrete Drill Bits
- 13mm Ratchet Wrench



Additional Tools Required For Mounting Kits

IR Earth Ballast Kit

- Caulk Gun
- Shovel
- Skid-Steer Loader (Optional)
- 3/4 x 12" Concrete Forming Steel Stakes

IR Earth Spike Kit

- Small Sledge Hammer
- Claw Hammer (for frame height adjustment)
- SDS Plus Hammer Drill
- 3/4" x 30" SDS Concrete Drill Bit

Concrete Slab/Footing Kit

- SDS Plus Hammer Drill
- Line Chalk

IMPORTANT

- The following instructions can be used for assembly and installation of the IR-15, IR-30, IR-45 and IR-35A. Please see **Page 19** for angle adjustment of the IR-15 and **Page 20** for angle adjustment of the IR-35A. All of these systems will simply be referred to as “frames”.
- We recommend installing the IR-15 long leg with the opening facing the rear of the frame for easier access. See **Page 19** for more details.

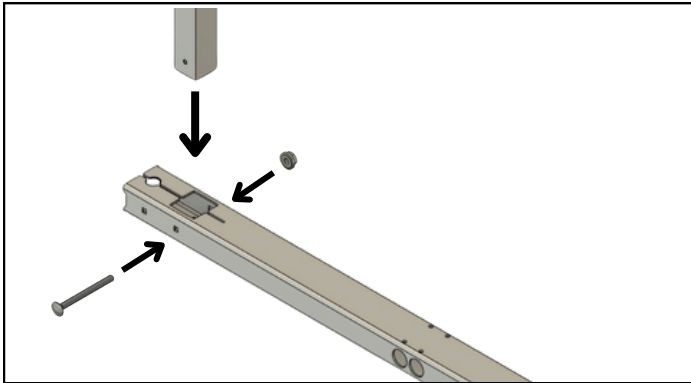


Figure 1

1. Install The Long Leg

Insert the long leg into the square opening at the back of the base tube and make sure the bottom of the adjustable arm is pointed towards the front of the base tube. Use a single Bolt A and Nut A to lock it in place.

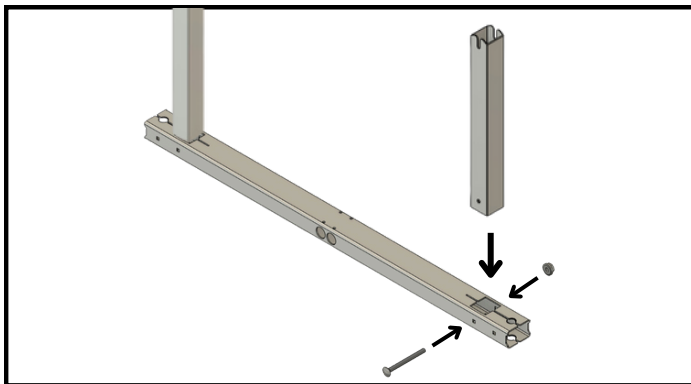


Figure 2

2. Install The Short Leg

Use the same process to install the short leg, making sure that the holes for the solar panel clamps are facing the sides of the base tube.

Repeat Steps 1 & 2 until all frames are assembled.

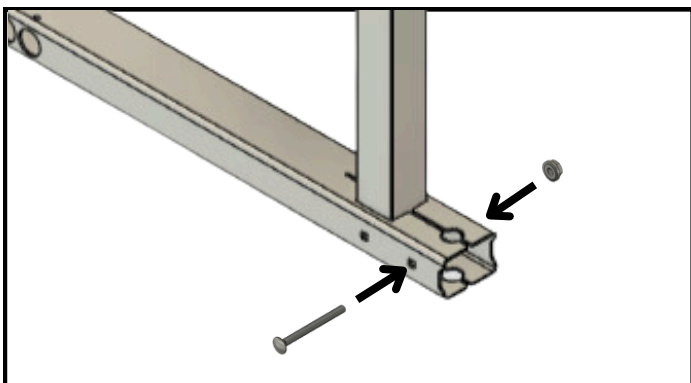


Figure 3

FOR DIRECT BOLTED INSTALL ONLY

If you are direct bolting your system to concrete, use the remaining Bolt As to clamp the ends of each base tube (See **Figure 3**) and skip to **Page 16** for installation.

⚠ IMPORTANT

- If direct bolting this system to a concrete surface or otherwise, skip to **Page 17**.
- Make sure to measure the space in between the base tubes and not in between the legs for frame spacing. Always measure along the conduit pipe for accurate spacing.
- Screw gun is required for self threading Bolt Bs. Be careful not to strip the bolts and only loosen them again if necessary.

SPACE BETWEEN FRAMES

IR-15,30,45,35A

(Solar Panel Width) minus 1"

IR-40FSAB

(Solar Panel Width) minus 3/4"

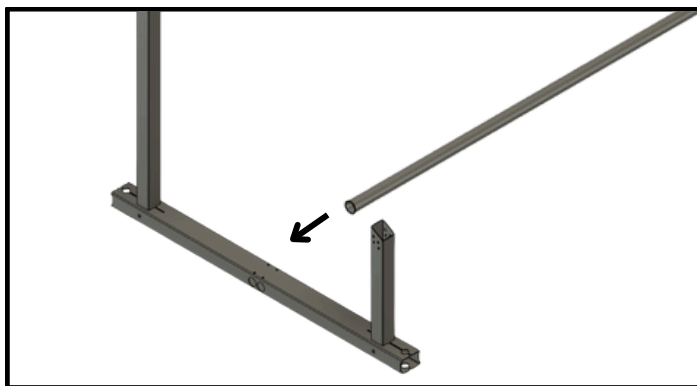


Figure 4

3. Insert 1" EMT/Conduit Pipe

Once all frames are assembled, place one at the start of the row and insert the conduit pipe into one of the openings in the side of the base tube (See Figure 4). Slide the pipe all the way through, but leave at least 2" extra on each end of the system.

1" conduit pipe NOT required for Concrete Anchor Bolt Mounting

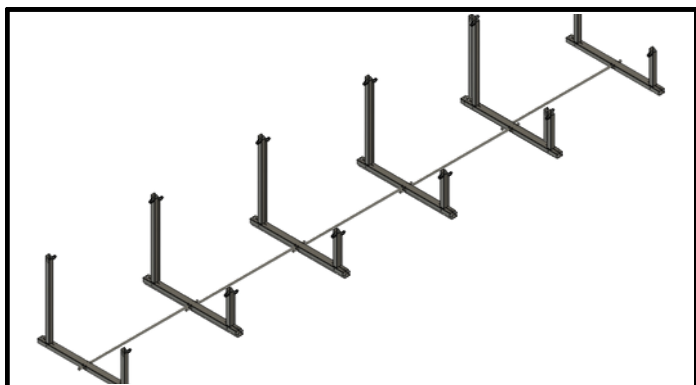


Figure 5

4. Spacing Frames Apart

Slide the next frame along the conduit pipe and space them roughly where they will need to be according to your solar module's width (make sure the conduit pipe goes through the same opening on each frame). Once the end of the first conduit pipe is reached, insert the next conduit pipe through the other opening on the last frame (See Figure 6). Repeat this until all frames are connect by the conduit pipes and are spaced roughly to your solar module's width.

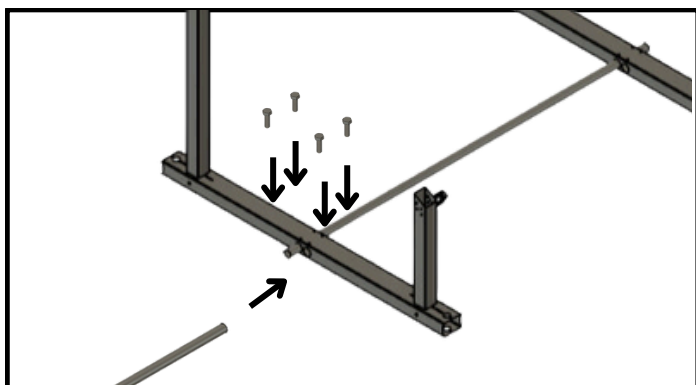


Figure 6

5. Lock Frames In Place

The frames must be spaced the width of your solar panel minus 1" (IR-40FSAB: solar panel width minus 3/4"). Be sure to measure in between the base tubes along the conduit pipe for most accurate spacing. Slide the frames along the conduit pipe and use a screw gun to insert all Bolt Bs into the top of base tubes to lock frames in position. Only two bolts are required per frame except for frames that are connected to two conduit pipes, which require four Bolt Bs (See Figure 6). *No cutting or coupling of the conduit pipe is required.*

Leveling Frames

⚠ IMPORTANT

- Even when placing frames on pre-leveled ground, there can still be some irregularities in the frame system. Before leveling the system, it is important to make sure that all frames are lined up in straight rows using a string line.
- After lining up the frames, stakes can be hammered in place at the front and back of each frame. Stakes are optional, but recommended to keep system in line and for assisting with leveling the frames.

BALLAST WEIGHT REQUIREMENTS

To see the specific weight requirements for your chosen BallastRack Model, view our [Stamped Engineering & Datasheets](#)

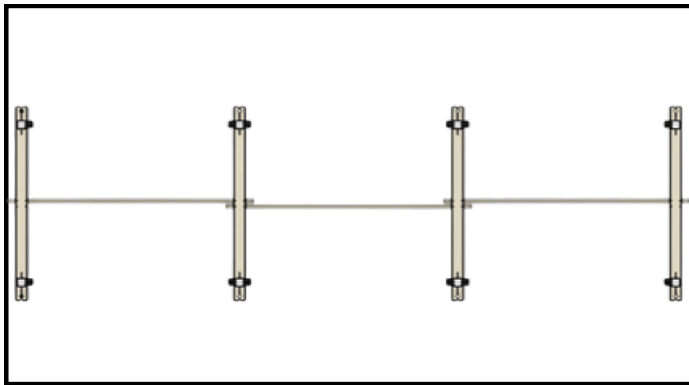


Figure 7

1. Line Up The Frames

Run a string line from the long leg of the first frame, stretch it along the frame system to the long leg of the last frame. Adjust the system as necessary until all frames are aligned with the stringline.

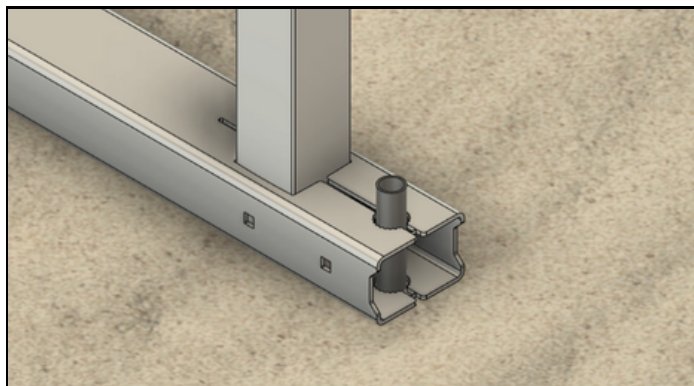


Figure 8

2. Place Steel Stakes

Concrete forming steel stakes provide fast and easy leveling as well as added racking strength to the entire system while keeping all of the frames in line. Use a small mallet to hammer steel stakes into the ground at the end of each base tube.

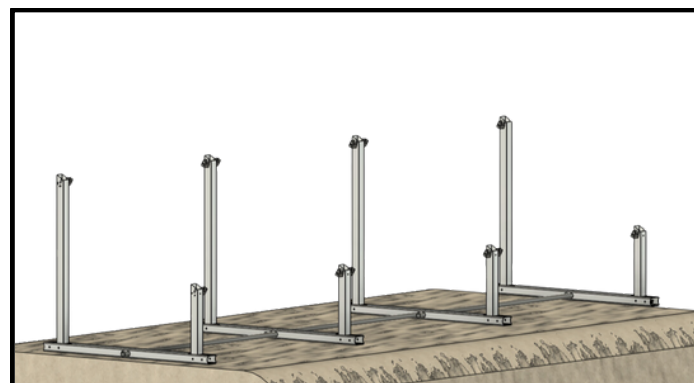


Figure 9

3. Leveling The Frames

Run a string line across the entire system along the top of the base tubes. Raise the end frames until they are level with each other and higher than all other frames. If there is a high point in the middle of the row, remove dirt from under that frame so it is below the end frames. Raise all frames up to the string line and clamp them to the stakes to keep them level. Use a shovel to pack dirt underneath the frames to support them at this new height.

Attaching Geotextile

⚠️ IMPORTANT

- It is important to properly prep the top surface of each base tube using the scuff pads and alcohol wipes included with the IR EarthBallast Kit before applying the epoxy adhesive.
- Keep in mind that the epoxy will set up in 15 minutes, so be sure to roll the geotextile along the way as the epoxy is applied.

System Three Technical Specs



Minimum Application Temp.: 40°F (4°C)

Minimum Storage Temp.: 40°F (4°C)

Cure Time: 12 Minutes at 70°F (21°C)

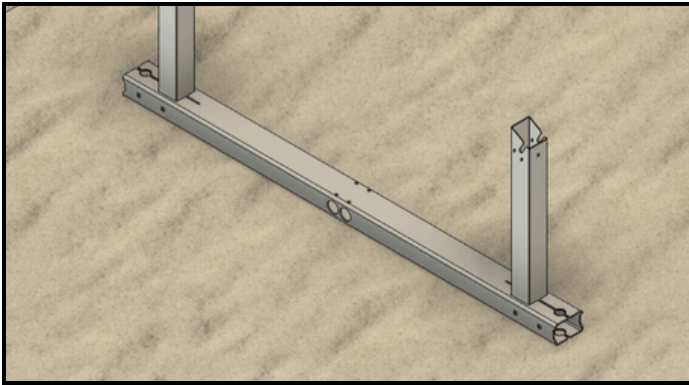


Figure 10

4. Prep Adhesive Surface

Use the included scuff pad to scuff the top of each base tube to remove the surface layer of oxidization and to promote better adhesion. Just before applying the epoxy, clean the surface using the provided alcohol wipes.

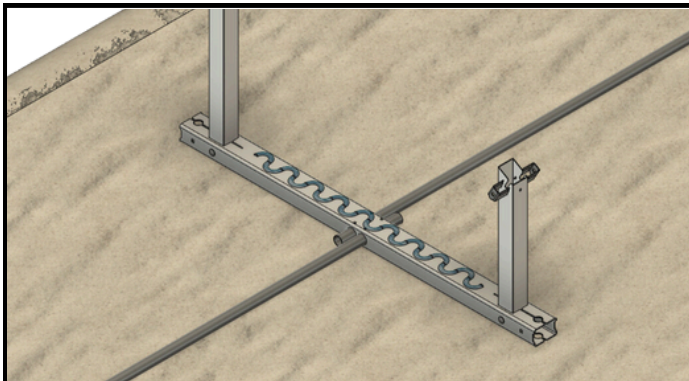


Figure 11

5. Apply Adhesive

Remove the twist cap and pull the sealing plug from the included epoxy and attach the mixing nozzle. Using a caulk gun, apply the epoxy in a zig zag pattern along the top of each base tube in between the two upright legs (See Figure 11).

It is important to note that epoxy only requires 15 minutes to set up, so larger installations may require rolling the Geotextile Material after every 10-12 frames have had the epoxy applied to them.

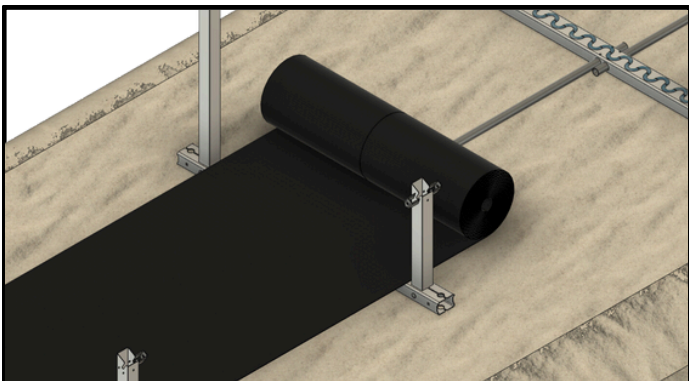


Figure 12

6. Roll Out The Geotextile Material

Secure the first foot of the geotextile roll with weights or rocks ahead of the first frame and pull lightly while unrolling it across the top of the wet epoxy. Keep light tension between each frame section before pulling the material down onto each frame. Before epoxy sets up, use rubber gloves to lightly rub the geotextile material into the wet epoxy before the 15 minutes has lapsed.

Earth Filling Frames

⚠️ IMPORTANT

- It is recommended to determine the weight of the soil being used for ballasting. Please see our [Stamped Engineering & Datasheets](#) for specific weight requirements for your selected model.
- It is best to use compactable soil for ballast system as loose soil or sand may be displaced by high winds.
- Earth mound should be uniform in shape and size across the entire system to ensure even ballasting.
- Ensure highest point of the earth mound is slightly closer to the long legs for better weight distribution.



Figure 13

7. Earth Fill Frames

Using a shovel or a skid-steer, dump a pile of material onto the geotextile fabric in between each frame. The center of the earth mound should favor the rear of the system and no more than 12" away from the tall leg. *Repeat this step until every frame is covered.*



Figure 14

8. Pack The Earth Mound

Use a shovel to pack the earth mound down and form it with a shovel/rake into a uniform shape. Make sure the center of the mound is closer to long legs for better weight distribution.



Figure 15

Proceed To Page 21 For Module Installation

Drilling Holes For IR AnchorSpike

⚠ IMPORTANT

- Ensure that soil is compacted otherwise IR AnchorSpike will not be as effective.
- It is recommended to test a single IR AnchorSpike in the soil at installation site to ensure at least 1,000 pounds of uplift.
- Make sure to drill holes as straight as possible.

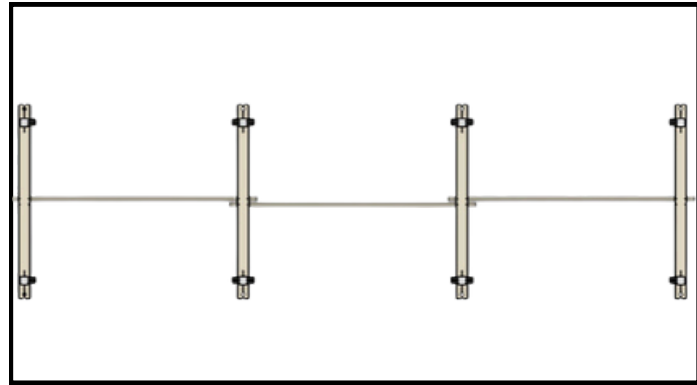


Figure 16

2.Line Up The Frames

Run a string line from the long leg of the first frame, stretch it along the frame system to the long leg of the last frame. Adjust the system as necessary until all frames are aligned with the stringline.

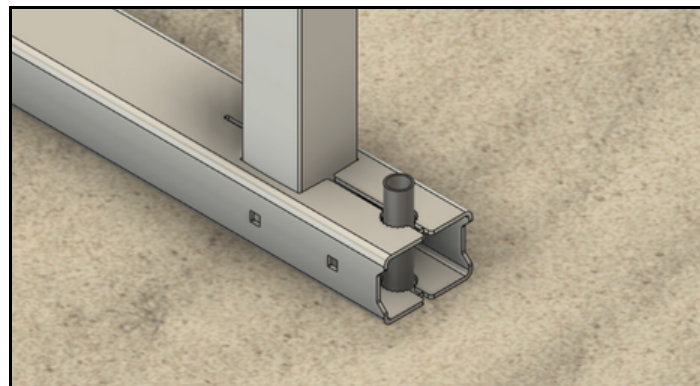


Figure 17

3.Mark Drilling Locations

Hammer one of the AnchorSpike 1-2" into the ground through the open holes at each end of the base tube to mark the ground for the AnchorSpike pre-drilling locations.

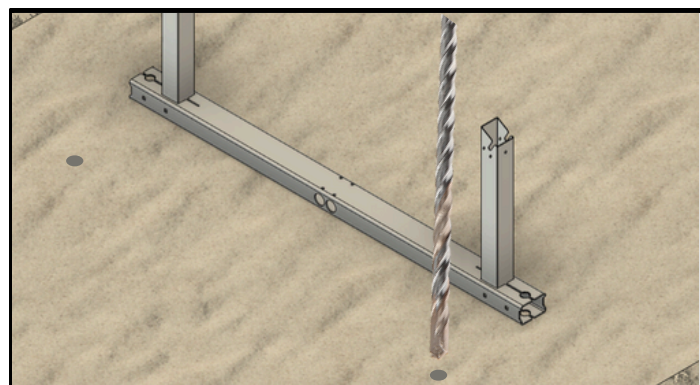


Figure 18

4.Drill Holes For IR AnchorSpike

Move the entire system 2-3" left or right so the holes can be drilled with the frames out of the way for drilling. Using an SDS Hammer Drill and a 3/4" x 30" SDS Concrete Drill Bit to drill a hole at least 26" deep at each of the marked locations. Then move the system back into place and line up the frame hole openings with the pre-drilled holes.

Installing IR AnchorSpikes

⚠ IMPORTANT

- Make sure to thoroughly mix the two part epoxy for the recommended time to ensure proper wind load capabilities.
- Epoxy takes approximately 8 hours to set up.
- Wear the provided rubber gloves to avoid getting epoxy on skin.

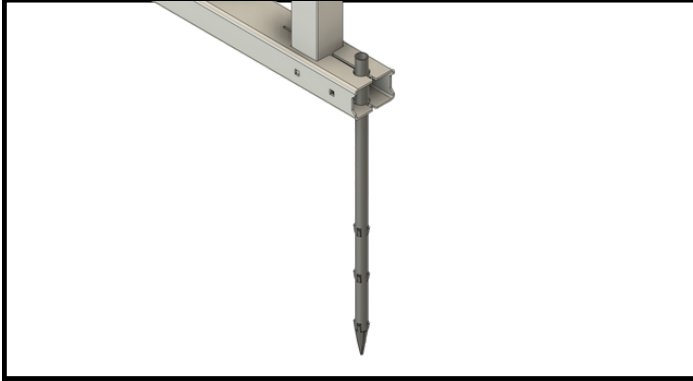


Figure 19

5.Placing IR AnchorSpikes

Using a small sledge hammer, tap the IR Anchor Spikes into the pre-drilled holes through the clamp ends of each frame and leave approximately 2-4" above the base tube. This extra height will allow for leveling of the frames.



Figure 20

6.Mixing The Epoxy

Pour the A and B Epoxy components into the provided mixing container and stir for 2-3 minutes with the included stirring stick.

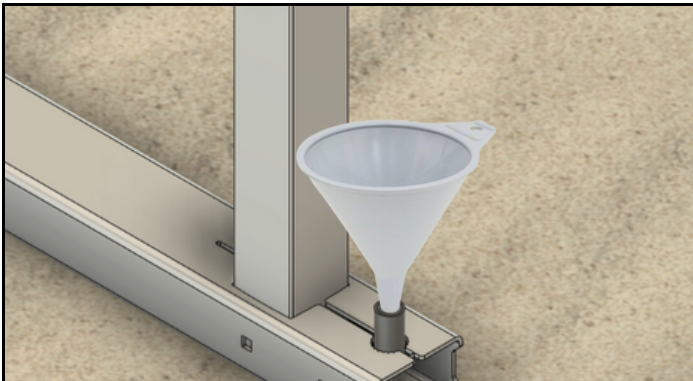


Figure 21

7.Pour The Epoxy Into The IR AnchorSpikes

Now pour the epoxy into one of the small 3oz cups to 1/4" down from the top of the cup and use the included funnel to pour this measured amount through the top of each IR Anchor Spike. Allow 8-10 hours for the epoxy to set up.

Leveling Frames

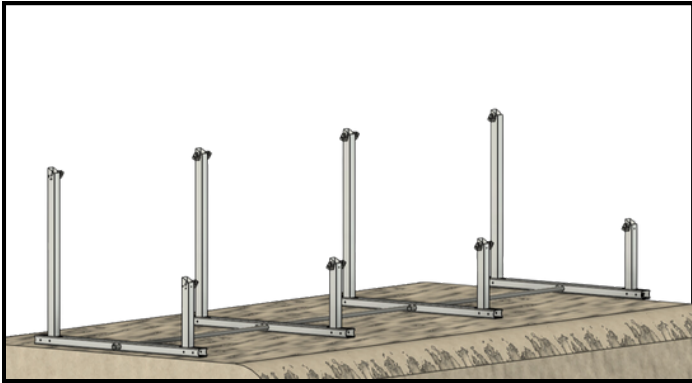


Figure 22

8.Leveling Frames

The easiest way to level the system is to run a string line along the tops of the base tubes and bring them all up to the string line. Level each frame one at a time and clamp the base tubes to the AnchorSpike to keep them level. Once level, proceed to the next step.

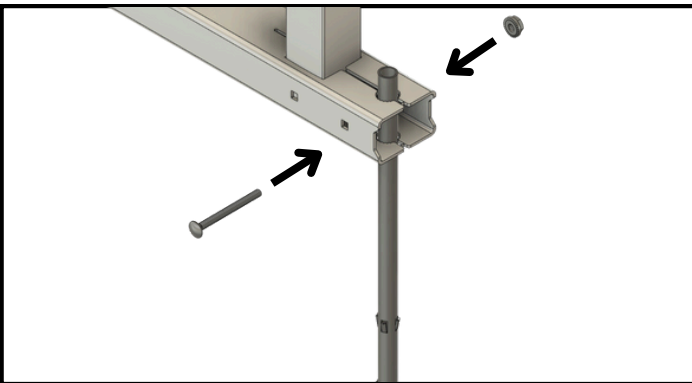


Figure 23

9.Clamp AnchorSpike

Use the remaining Bolt As to clamp the ends and lock the base tube in a level position by clamping it onto the AnchorSpike (See Figure 23).



Figure 24

Proceed To Page 21 For Module Installation

Measuring & Installation

⚠ IMPORTANT

- Make sure to measure the space in between the base tubes and not in between the legs for frame spacing.

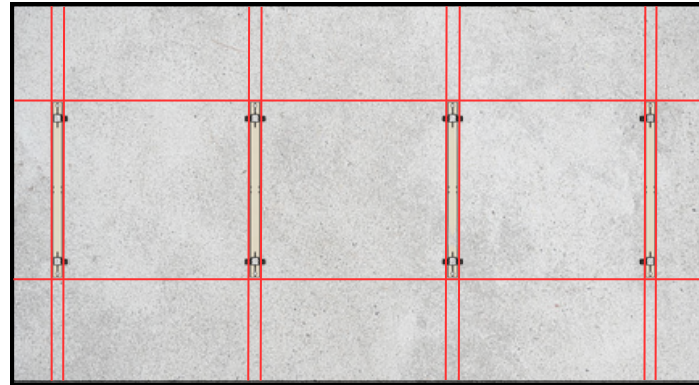


Figure 25

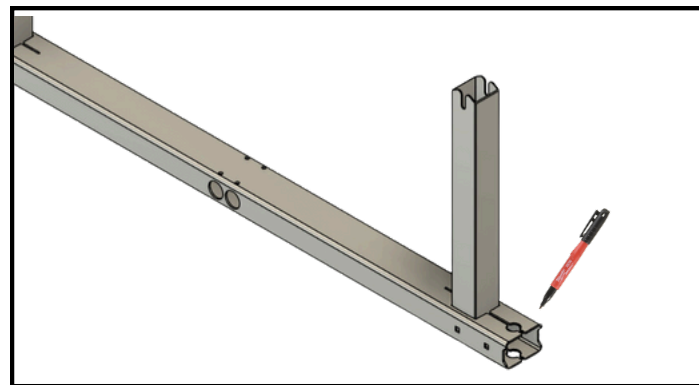


Figure 26



Figure 27

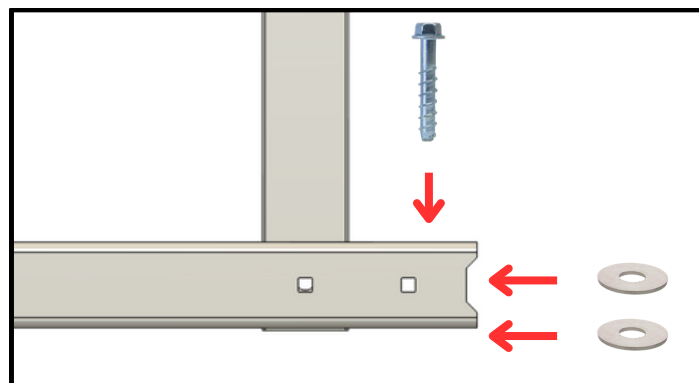


Figure 28

1. Measure & Chalkline Frame Placement

The frames must be spaced (width of your solar panel) minus 1". Place all frames at the exact spacing and mark both sides of each base tube. Make sure the frames at each end of the row are lined up straight and mark from the first frame to the last frame and chalk a line in between (See Figure 25).

Always double check spacing between frames

2. Mark The Drilling Locations

Move each frame into their marked positions and use a permanent marker to outline the opening at the end of each base tube where the concrete anchor bolts will go into the concrete.

3. Drill Pilot Holes

Move all frames out of the way and use an SDS Hammer Drill and the included 3/8" Concrete Drill Bits to drill a 3" deep hole in the middle each of the marked locations.

4. Bolt The Frames To The Concrete

Move all frames back into their marked locations, and bolt them in place using the provided concrete anchor bolts and washers. Make sure to place one washer under the base tube and one under directly under the head of the bolt (See Figure 28).

Placing Ballast

⚠️ IMPORTANT

- Steel stakes are recommended for this mounting option to prevent movement of system.
- For Water Tank Ballast, treated lumber or another weather resistant material may be needed as a platform to hold the water tank above the bolt heads on the base tube.

Flat Water Tank Ballast



Figure 29

Recommended Water Tank

For water tank ballasting, we recommend using RecPro's 100 gallon tank or a similar water tank with the dimensions outlines below. This water tank can be used to ballast up to three solar modules.

Water Tank Dimensions

- Minimum Length: Width of Solar Panel + 6"
- Maximum Width: 34"
- Maximum Height: 12"

Placing Water Tank

Place water tank inside of the "U" shaped frames and up against the long legs to properly distribute the weight for uplift.

Concrete Curb Stop Ballast



Figure 30

Concrete Curb Stop Weight

- Minimum Weight: See [Engineering & Datasheets](#)

Placing Concrete Curb Stop

Place concrete curb stop across at least two of the BallastRack base tubes. Multiple curb stops can be used per module as long as the minimum weight is met.

Placing Ballast

⚠ IMPORTANT

- 0° setting is intended for use in case of an impending hurricane, but will lower the output of your system.
- We recommend installing the tall leg with the opening facing the back of the frame (See Figure 31).

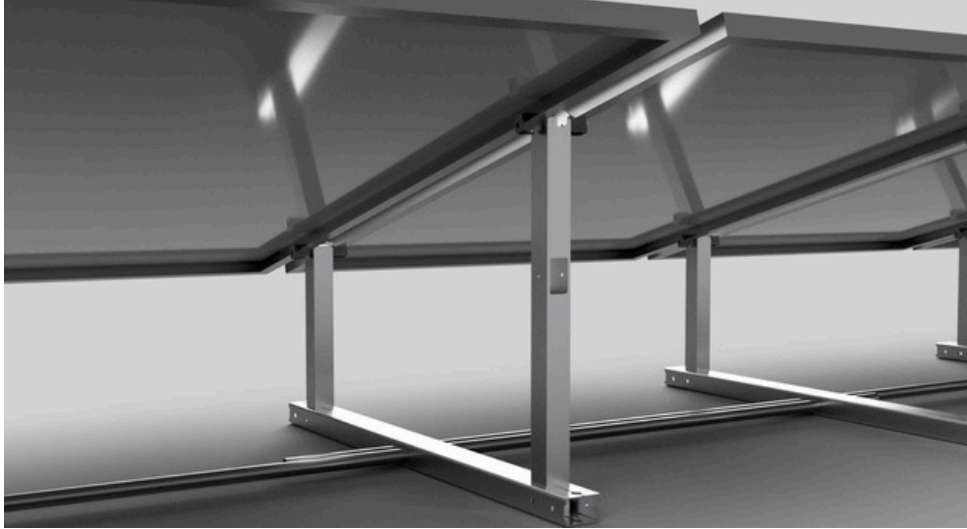


Figure 31

1.Assembly

We recommend assembling the IR-15 with the opening on the tall leg facing the back of the frame. This allows for much easier access and faster adjustment from 15°-0° (See Figure 31).

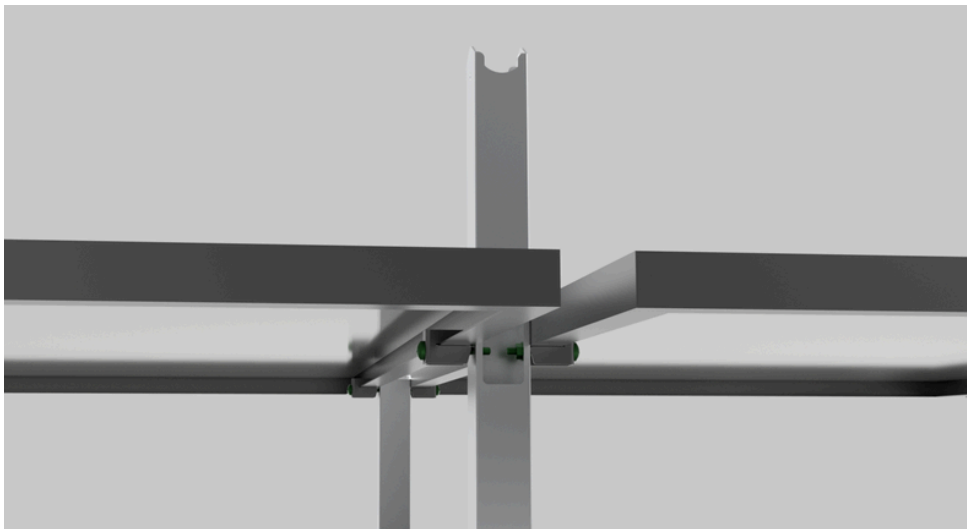


Figure 32

2.Setting 0° Sun Angle

Loosen the serrated nuts on the lower IR-F2 clamps and remove the serrated nuts from the upper IR-F2 clamps. Holding the top of the panel up with one hand, remove the upper IR-F2 clamps and lower the top of the panel to the 0° position so the panel is level with the short legs. Now the upper IR-F2 clamps can be inserted into the lower holes and the serrated nuts can be fastened through the opening at the back of the tall leg (See Figure 32). Make sure to tighten all serrated nuts again before adjusting the remaining panels.

IMPORTANT

- This system is NOT intended for seasonal angle adjustment.
- Always ensure that the adjustable leg is locked firmly in place to maintain maximum wind and snow ratings.
- The numbers on the front and back of the adjustable legs marks the set sun angle.
- Make sure that all frames are set to the same angle for each row.

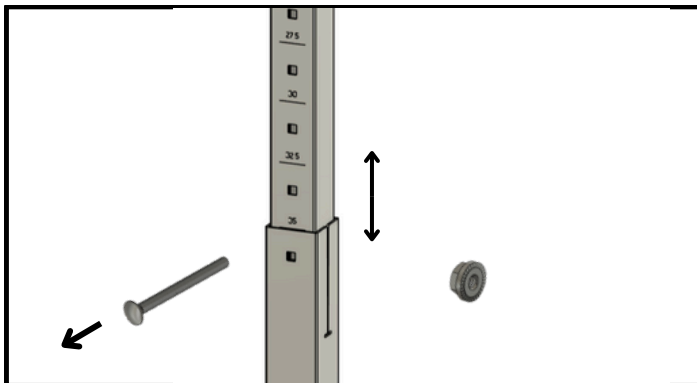


Figure 33

1.Remove The Locking Bolt

The adjustable leg of each IR-35A should be set at 30° when you receive it. To change the angle, simply remove the locking bolt from the side of the leg by loosening the serrated nut with a 1/2" / 13mm wrench. Be careful not to lose the washer inside (some frames may not have washers).

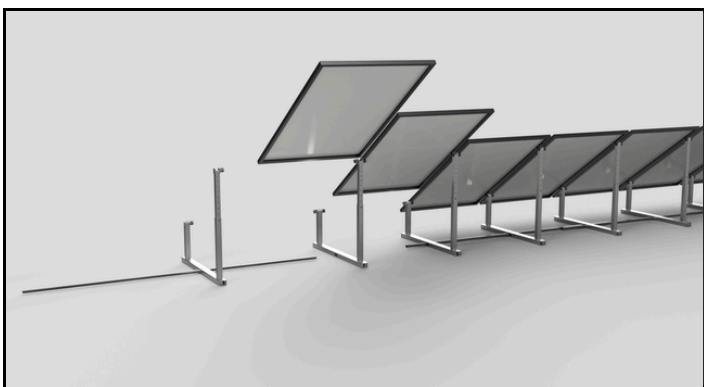


Figure 34

2.Set The Sun Angle

Slide the adjustable leg to the desired sun angle by using the numbers in the front and back of each leg. Each number represents the angle of the system when the line below that number is lined up with the base of the leg.

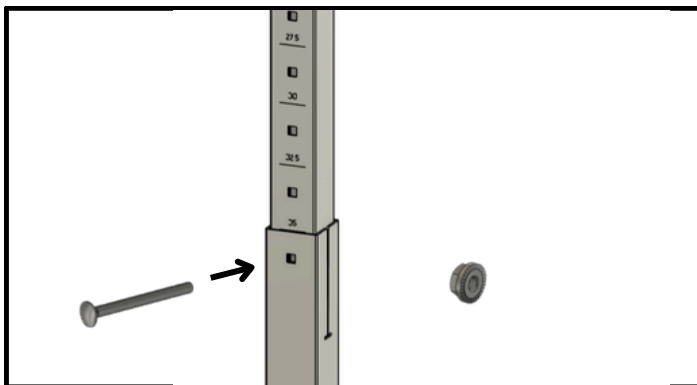


Figure 35

3.Lock The Sun Angle

Once at the desired angle, insert the locking bolt through the base and adjustable leg and tighten the serrated nut. Make sure that the adjustable leg is firmly locked in place to maintain maximum wind and snow ratings (If your frame has a washer, do not forget to put the washer back during assembly).

IMPORTANT

- Solar module height can be adjusted after mounting by sliding them along the flange clamps before tightening serrated nuts.
- Have IR-F2 Flange Clamp Bonding Brackets readily available before placing modules for fast mounting.
- The flange of the module will fit into the slot cut into the side of the IR-F2 and the pointed barbs should be inside the flange for bonding of the modules.

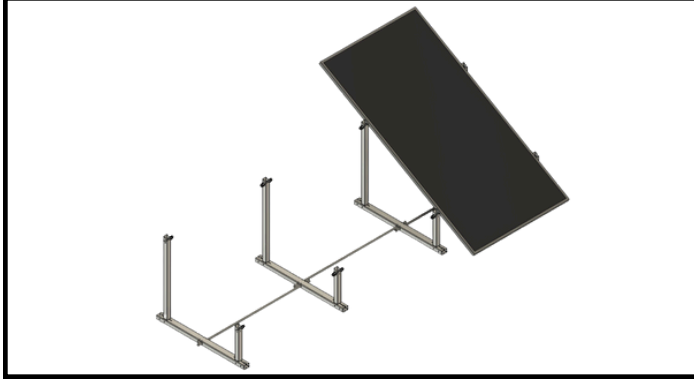


Figure 36

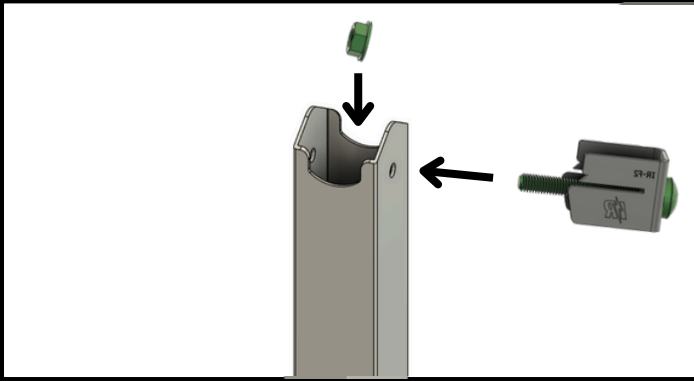


Figure 37



Figure 38

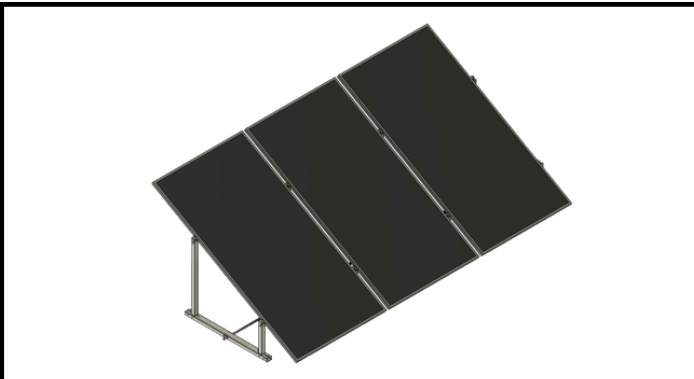


Figure 39

1.Position The First Solar Module

Remove the serrated nut from the end of each IR-F2 Clamp and keep them readily available for mounting. Carry solar module and place it into position between the the first two frames. Set the module roughly where it will be mounted.

2.Mount Upper IR-F2 Brackets

Lift the top of the solar module to the top of the long legs of the frames and get ready to place the IR-F2 Clamp on one side of the module. Slide the clamp onto the flange of the panel and insert the bolt through the opening at the top of the leg. repeat this process on the other side. Fasten the serrated nuts back onto the ends of the bolts and tighten by hand for now.

3.Mount Lower IR-F2 Brackets

Now lift up the bottom of the solar module to the top of the short legs and attach the IR-F2 Clamps in similar fashion.

4.Adjust Solar Module Height

Once all solar modules are in place, they can be slid up and down to ensure that they are all the same height for a clean looking system. The serrated nuts may need to be loosened before doing so. Simply slide the modules to the desired position and use the ratchet wrench included with your base mounting kit to tighten all of the serrated nuts and lock the modules in place. If you did not purchase a mounting kit most 1/2" or 13mm wrenches will work provided they are small enough to fit. Make sure not to over-tighten.



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