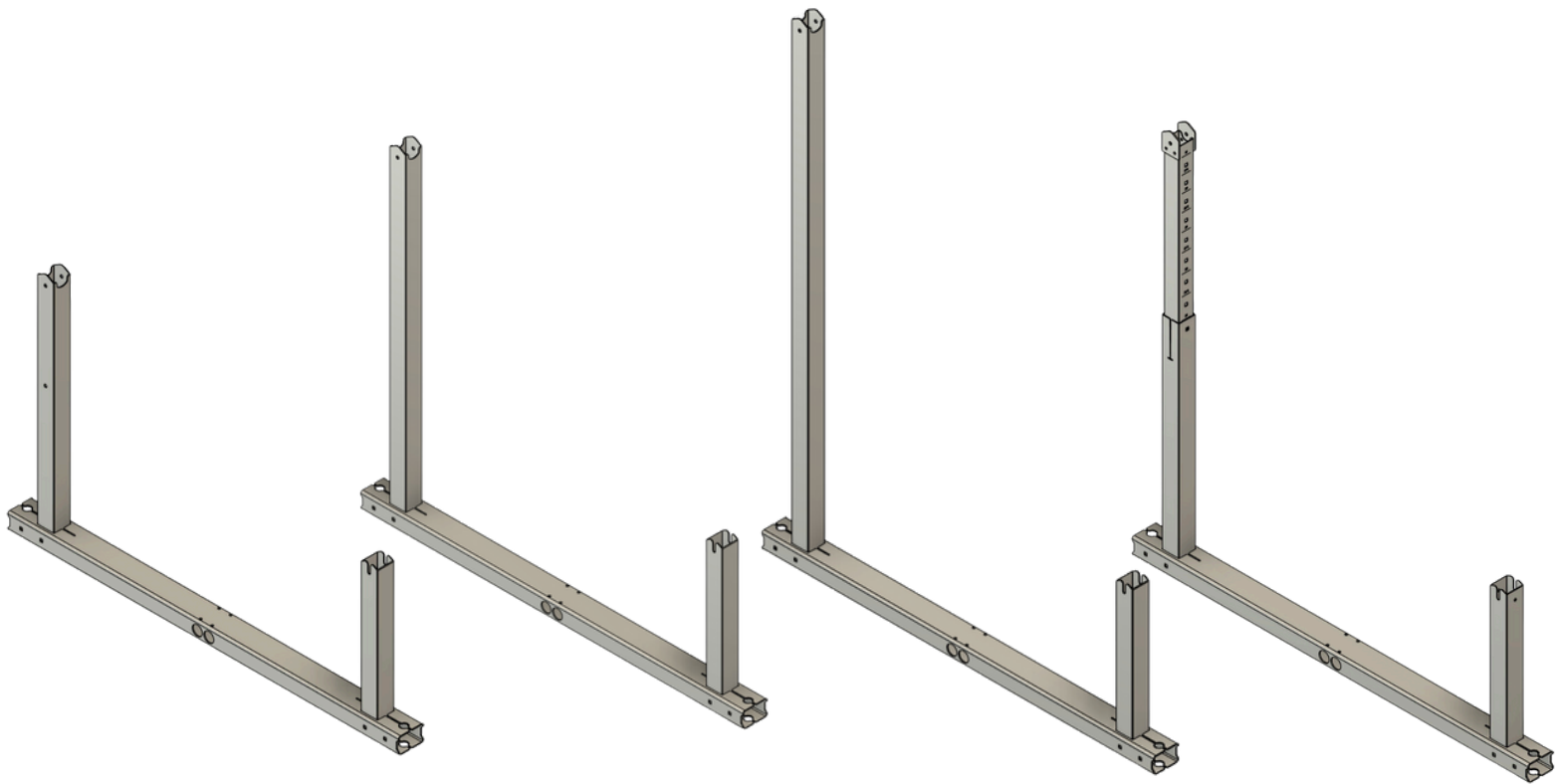




Revolutionary Solar Racking Systems



IR-15,30,45,35A INSTALL INSTRUCTIONS

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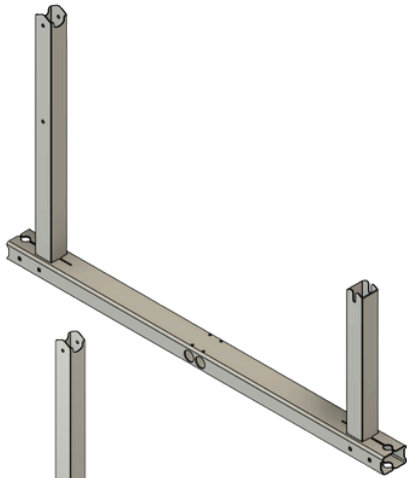
IntegraRack® backs all of its products with a 25 year limited product warranty. We fully stand by the quality and guarantee that they will hold up under the harshest conditions when properly installed.

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:

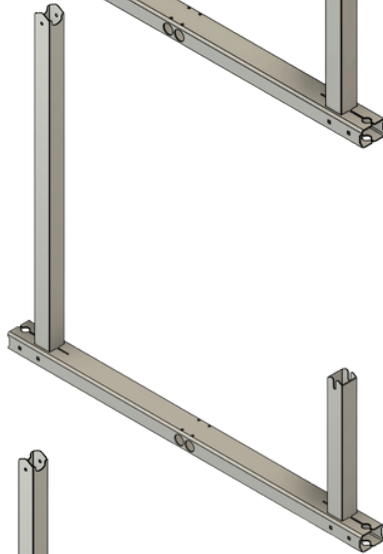
- Comply with any and all applicable local or national codes and regulations.
- Ensure all products are appropriate for the installation according to the environmental and loading conditions.
- The installation methods shown in this manual are tested and approved for use by IntegraRack. Any other method 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

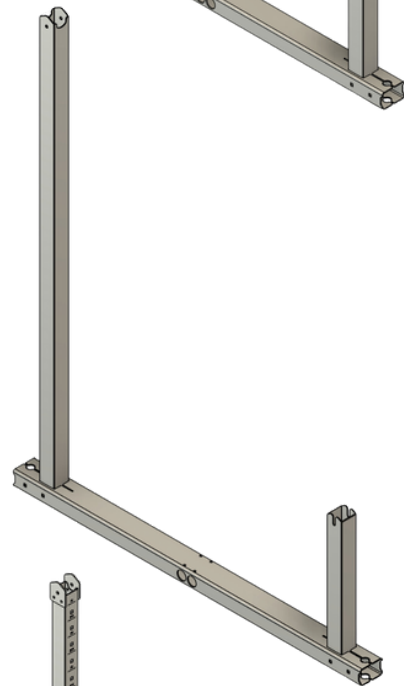
The IR-15 is designed to rack solar panels at a fixed 15° sun angle for optimal year-round energy production in equatorial regions such as Florida, Southern Texas and most tropical islands. This system also boasts up to 200mph wind load ratings and can be adjusted to 0° in the case of an impending hurricane.

See page 19 for angle adjustment



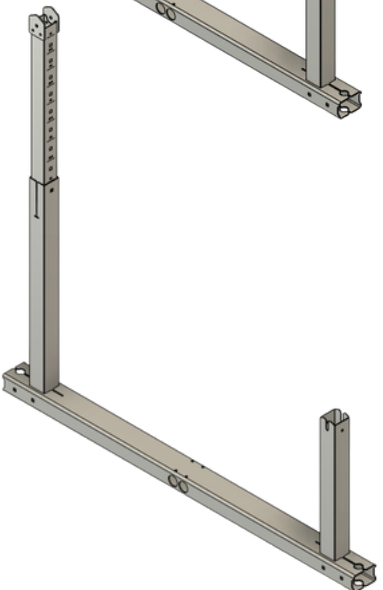
IR-30 BallastRack™ Solar Racking System

The IR-30 is designed to rack solar panels at a fixed 30° sun angle for optimal year-round energy production throughout most of the United States. This system can withstand up to 150mph wind load ratings and up to 100lbs per sq. ft. snow load ratings with a great angle for snow shedding.



IR-45 BallastRack™ Solar Racking System

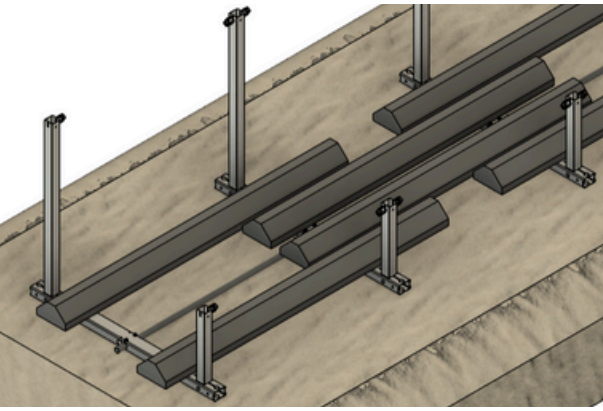
The IR-45 is designed to rack solar panels at a fixed 45° sun angle for optimal year-round energy production throughout most of the northern United States and Canada. This system can withstand up to 120mph wind load ratings and up to 100lbs per sq. ft. snow load ratings with a perfect angle for snow shedding.



IR-35A Adjustable BallastRack™ Solar Racking System

The IR-35A offers the flexibility to choose the optimal sun angle for your situation with its adjustable leg. This system can be set anywhere from 15°-35° in 2.5° increments using a single carriage bolt for each frame. Not intended for seasonal adjustment.

See page 20 for angle adjustment



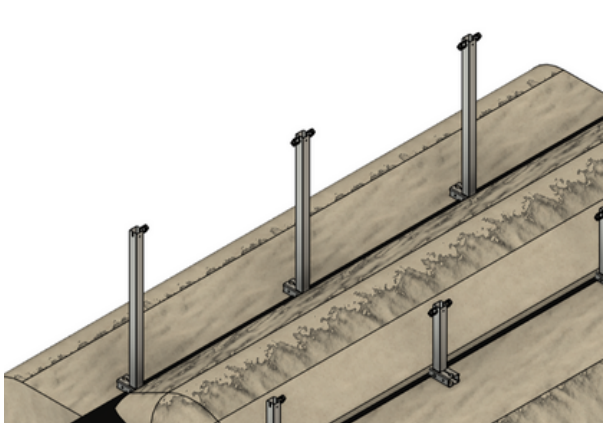
Base Ballast Mounting

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).

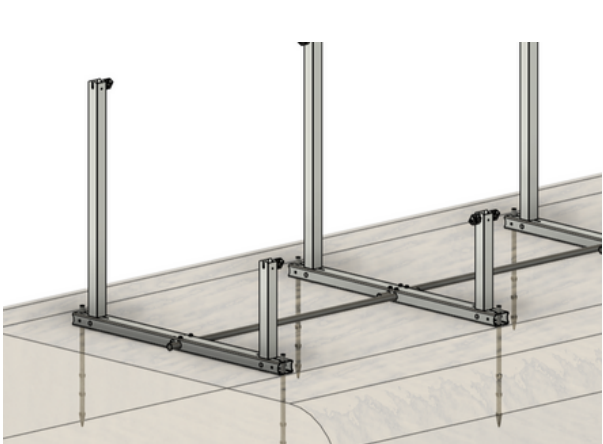
3/4 x 12 inch concrete forming steel stakes recommended



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 Datasheets for your specific frame model to determine how much weight is needed per module section.

3/4 x 12 inch concrete forming steel stakes required



IR AnchorSpike™ System

Our IR AnchorSpike™ Kit comes with our specially designed 23.5 inch 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 600 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 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)

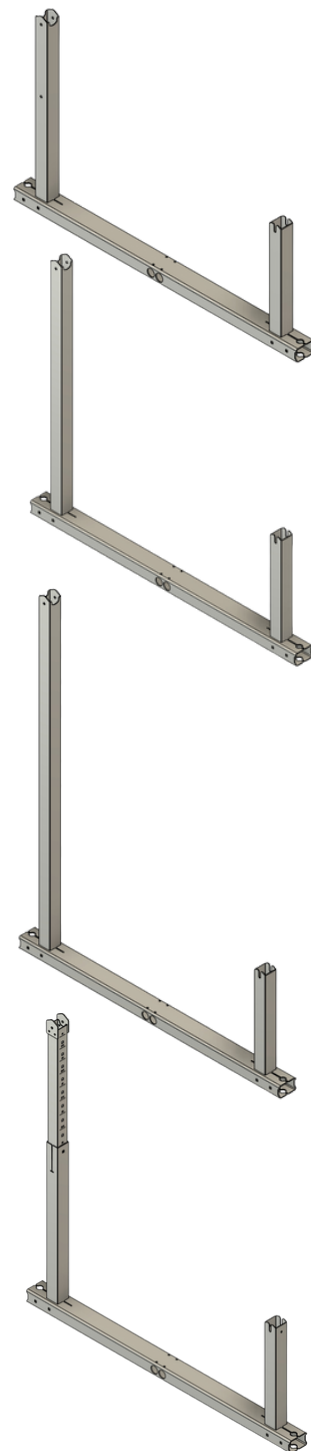
- (1) IR-30 Base Tube
- (1) IR-30 Short Leg
- (1) IR-30 Long Leg
- (4) IR-F2 Flange Clamp Bonding Brackets
- (4) Bolt As
- (4) Nut As
- (4) Bolt Bs

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-F2 Solar Module Flange
Clamp Bonding Bracket



Bolt A



Bolt B

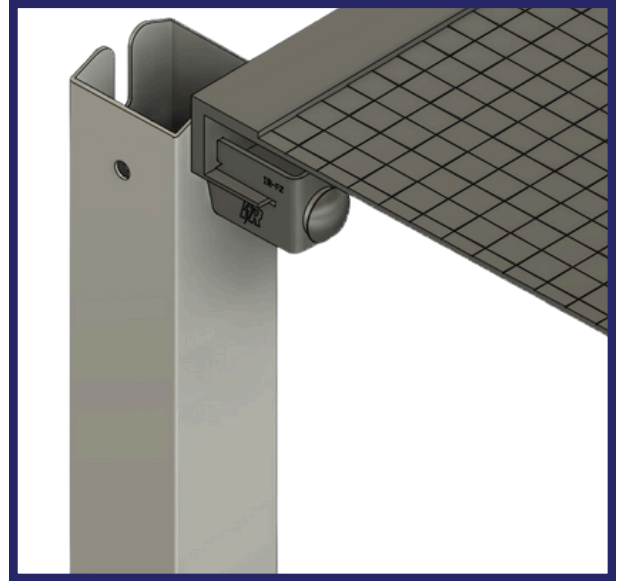


Nut A

Included Components

IR-F2 Solar Module Flange Clamp Bonding Bracket

The IR-F2 is designed to hold your solar modules firmly in place while bonding them together.



Required Tools

- Screw Gun with 1/2" Socket (**DO NOT USE AN IMPACT GUN**)
- 4' Level
- Tape Measure
- String Line
- 18" x 3/4" Concrete Forming Stakes (**OPTIONAL**)

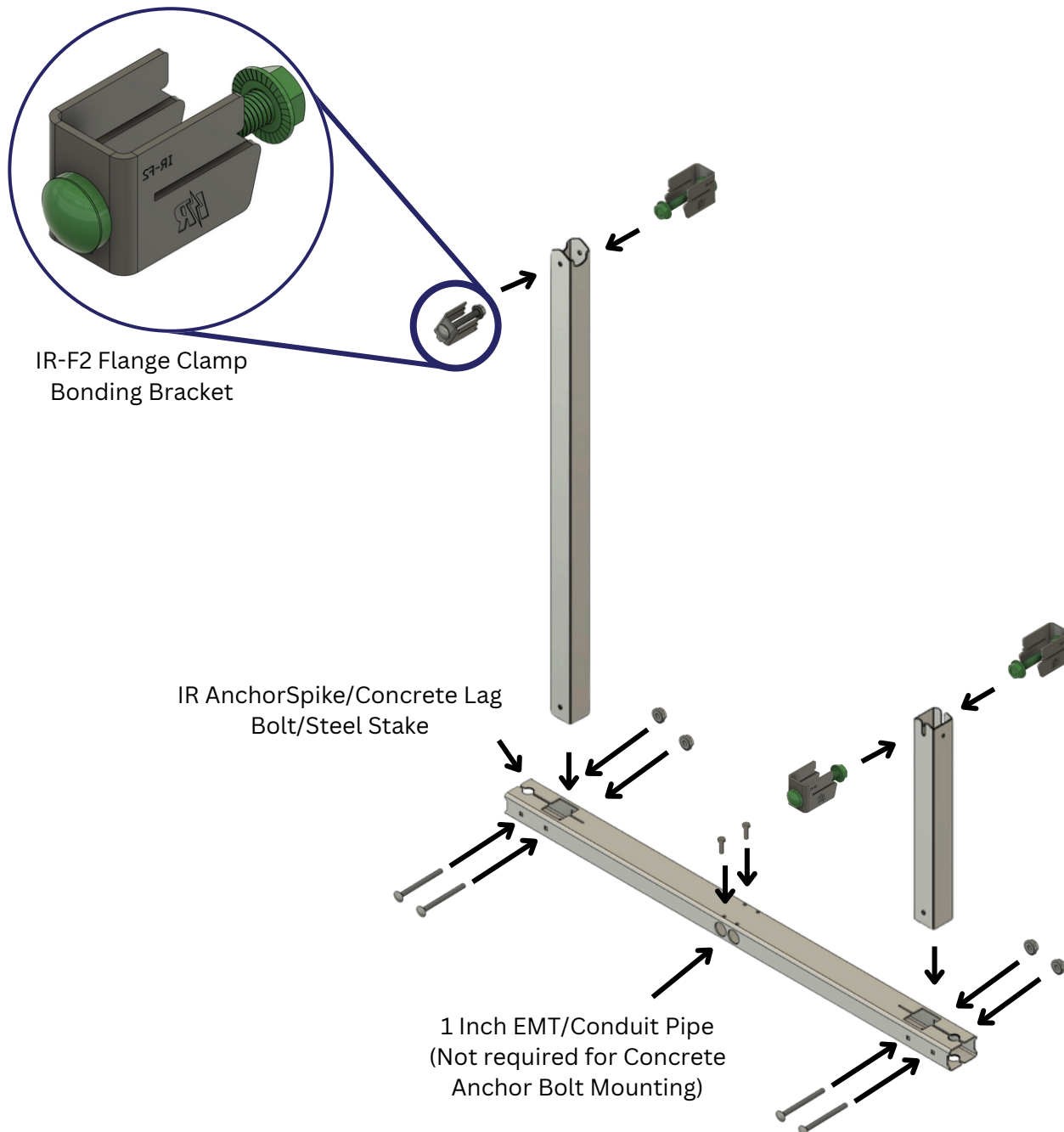
Required Additional Materials

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

*Can be sourced at most local hardware stores

***NOT REQUIRED FOR CONCRETE MOUNTING**

Assembly & Fastener Locations



***IR-30 Model Shown**

Mounting Kit Components

IR EarthBallast Kit

- Quick Cure 5 Min. Epoxy Resin
- Extra Mixing Nozzle
- 3' x 50' Roll of Geotextile Material
- Alcohol Wipes
- Scotch-Brite Pad
- 1/2" Open-Ended Ratcheting Wrench



IR AnchorSpike Kit

- (10/22) IR AnchorSpikes
- Epoxy Resin A
- Epoxy Resin B
- Mixing Cup
- 3oz Measuring Cups
- Stirring Stick
- Funnel
- Gloves
- 1/2" Open-Ended Ratcheting Wrench



Concrete Anchor Bolt Kit

- (22) 3/8" x 2.5" Titen HD Anchor Bolts
- (22) Washers
- (2) 3/8" Concrete Drill Bits
- 1/2" Open-Ended Ratcheting Wrench



Additional Tools Required For Mounting Kits

IR Earth Ballast Kit

- Caulk Gun
- Shovel
- Skid-Steer Loader (Optional)

IR Earth Spike Kit

- Small Sledge Hammer
- Claw Hammer (for frame height adjustment)
- SDS Plus Hammer Drill
- 3/4" x 18" SDS Concrete Drill Bit

Concrete Slab/Footing Kit

- SDS Plus Hammer Drill
- Chalk Line

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.

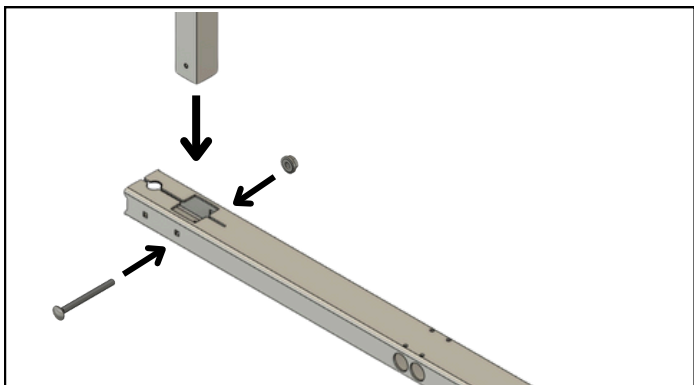


Figure 1

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.

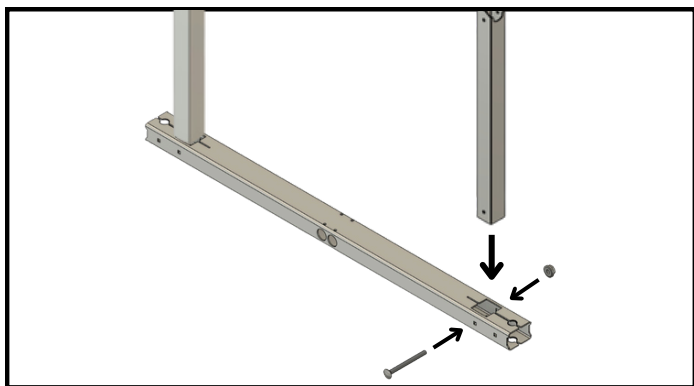


Figure 2

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.

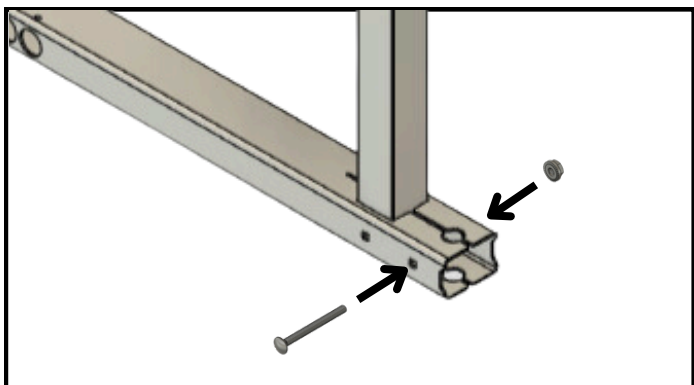


Figure 3

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 verify measurements by mounting the first solar panel after the first two frames are in their marked position before proceeding. Be careful not to strip the Thread Cutting Bolts with screw gun and try to avoid the need to remove them after tightening. If frames need to be adjusted, only loosen bolts as much as needed to adjust spacing.

FRAME SPACING FORMULA

(Solar Panel Width) - 1 Inch =
Space Between Base Tubes

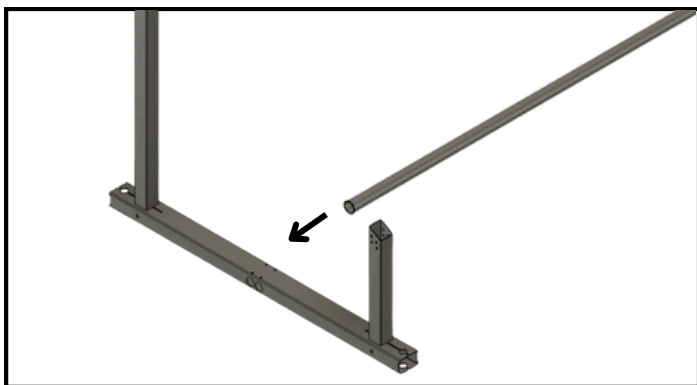


Figure 4

3. Insert 1 Inch 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 inches hanging out on one side.

1 Inch conduit pipe NOT required for Concrete Anchor Bolt Mounting

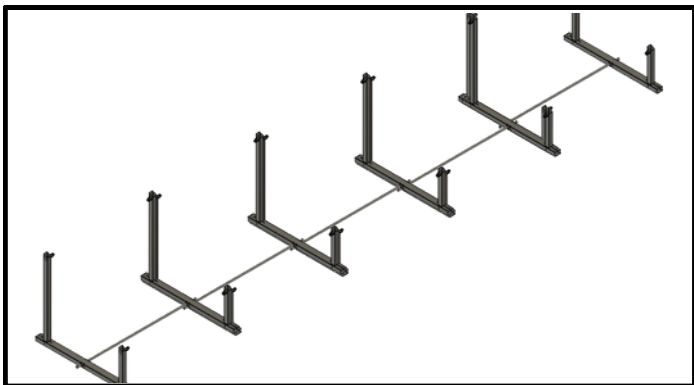


Figure 5

4. Lay Out Frames

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.

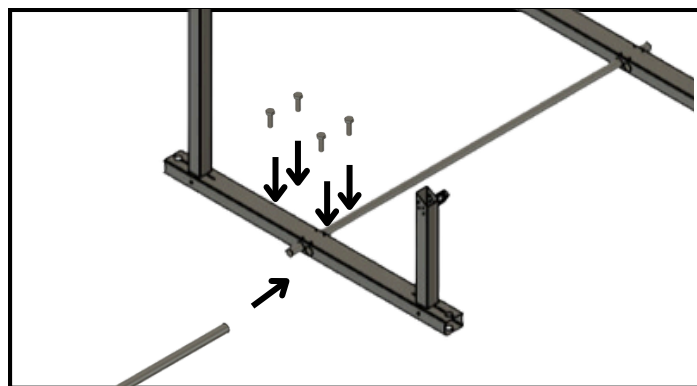


Figure 6

5. Lock Frames In Place

Use the Frame Spacing Formula above to determine exact spacing. Slide the frames along the conduit pipe until proper spacing is achieved. Now use Bolt B to lock frames in place. 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.

EarthBallast Weight Requirements

Per Solar Panel Section

- IR-15:** 700lbs of earth (15 in. tall mound)
- IR-30:** 700lbs of earth (15 in. tall mound)
- IR-45:** 1,000lbs of earth (22 in. tall mound)
- IR-35A:** 700lbs of earth (15 in. tall mound)

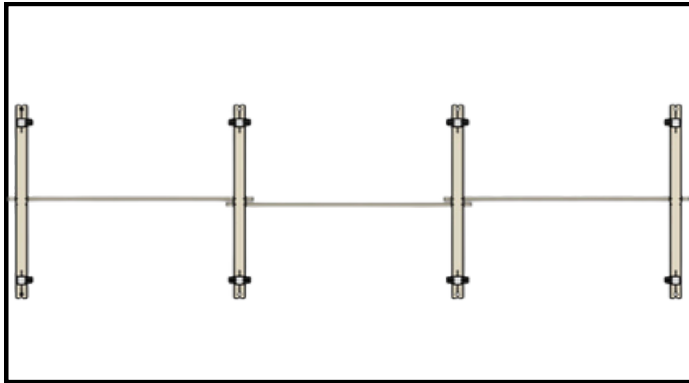


Figure 7

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.

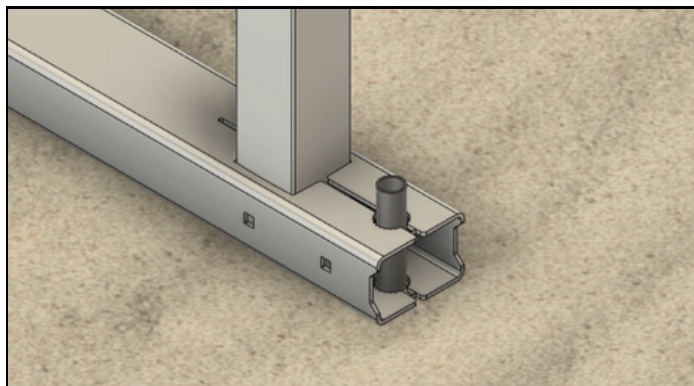


Figure 8

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.

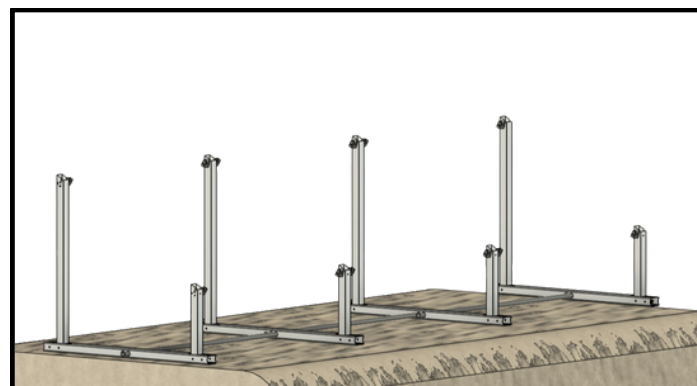


Figure 9

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 5 minutes, so be sure to roll the geotextile along the way as the epoxy is applied.

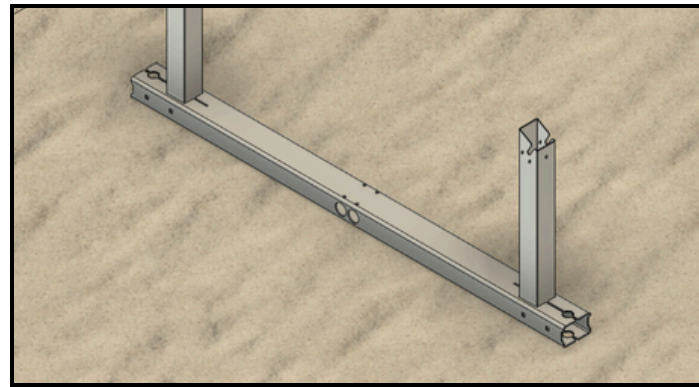


Figure 10

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.

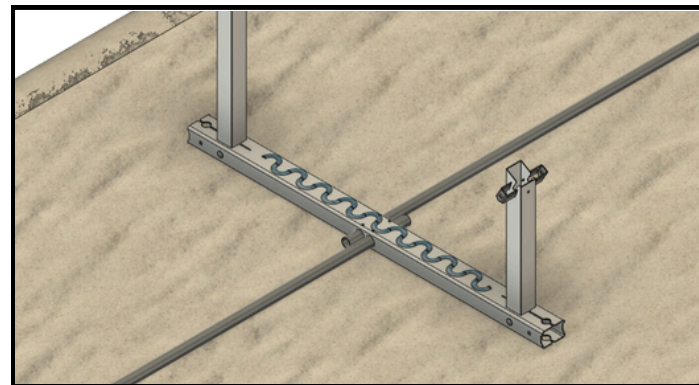


Figure 11

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 5 minutes to set up, so larger installations may require rolling the Geotextile Material after every 3 or 4 frames have had the epoxy applied to them.

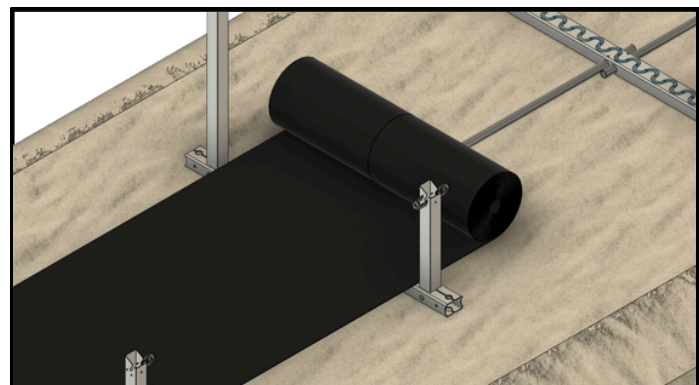


Figure 12

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 5 minutes has lapsed.

Earth Filling Frames

⚠️ IMPORTANT

- It is recommended to determine the weight of the soil being used for ballasting, to determine how much is needed. Each module will require at least 700 pounds of soil (approximately a 15 inch high earth mound).
- 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 inches 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 22 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 400 pounds of uplift.
- Make sure to drill holes as straight as possible.

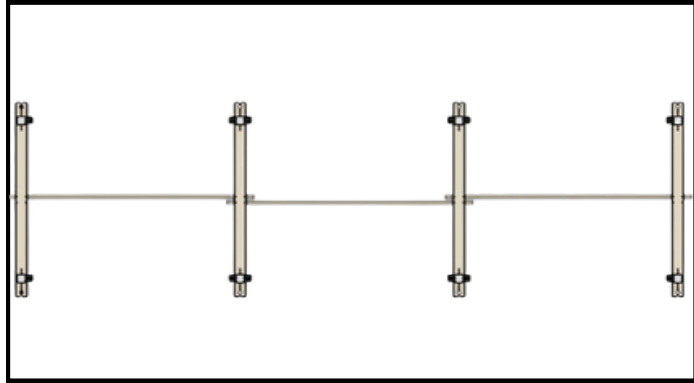


Figure 16

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.

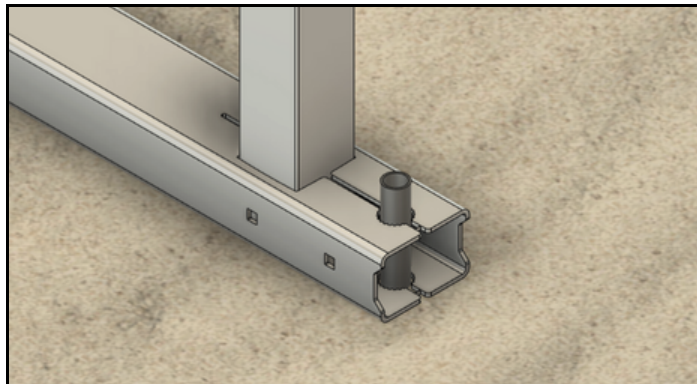


Figure 17

3.Mark Drilling Locations

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

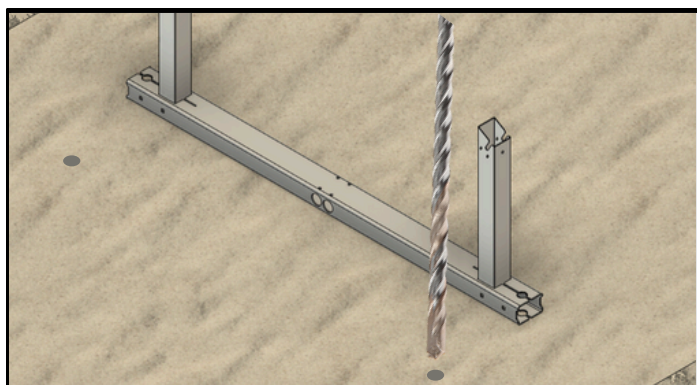


Figure 18

4.Drill Holes For IR AnchorSpike

Move the entire system 2-3 inches 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 18" SDS Concrete Drill Bit to drill a 16 inch deep hole 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 AnchorSpike

⚠ 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 AnchorSpike

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 inches above the base tube. This extra 2 inches 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.

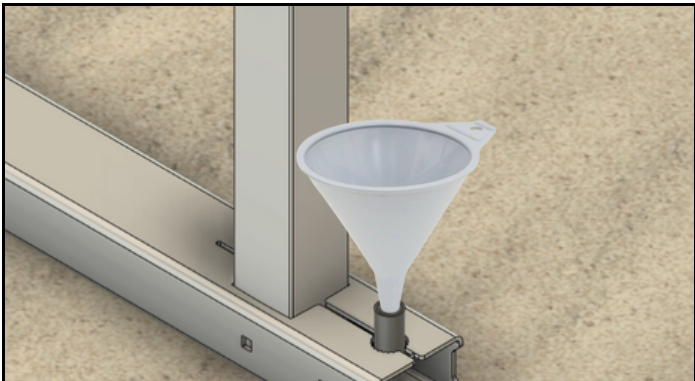


Figure 21

7.Pour The Epoxy Into The IR AnchorSpike

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

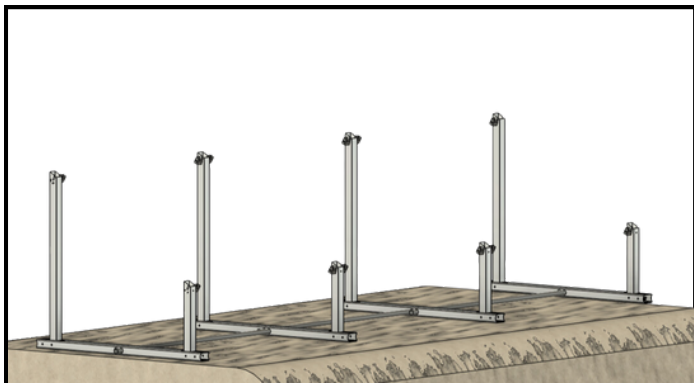


Figure 22

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.

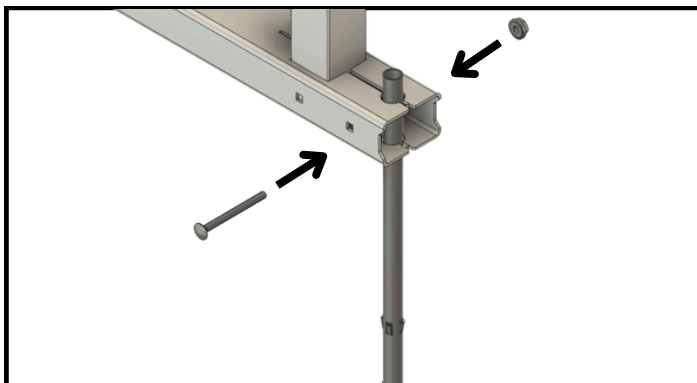


Figure 23

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 22 For Module Installation

Measuring & Installation

⚠ IMPORTANT

- Make sure that all frames are straight in line before mounting to ensure proper module mounting.

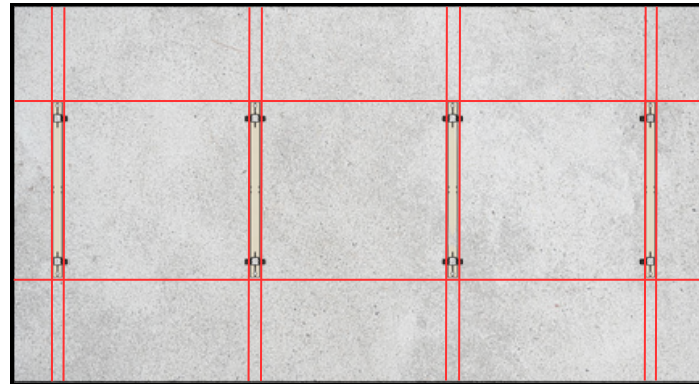


Figure 25

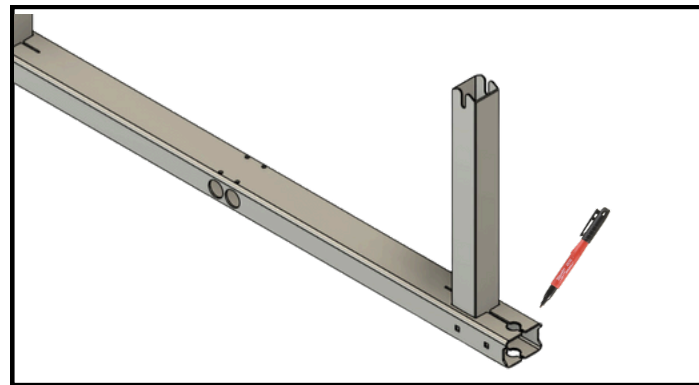


Figure 26



Figure 27

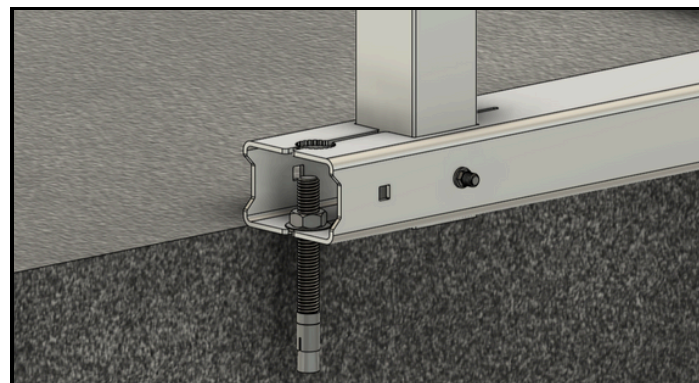


Figure 28

1. Measure & Chalkline Frame Placement

Use the Frame Spacing Formula provided on page 10 to calculate the distance needed between frames. 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).

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 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 inch deep hole in the middle each of the marked locations on the concrete.

4. Bolt The Frames To The Concrete

Move all frames back into their marked locations, and bolt them in place using the provided IR Concrete Anchor Bolts and washers.

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 Inches
- Maximum Width: 34 Inches
- Maximum Height: 12 Inches

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: 350 Pounds Per Module

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).

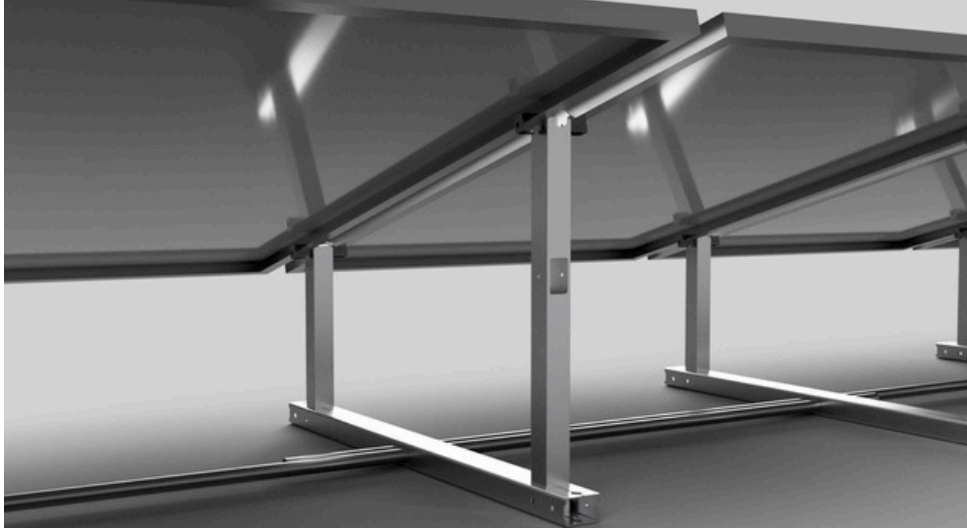


Figure 31

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).

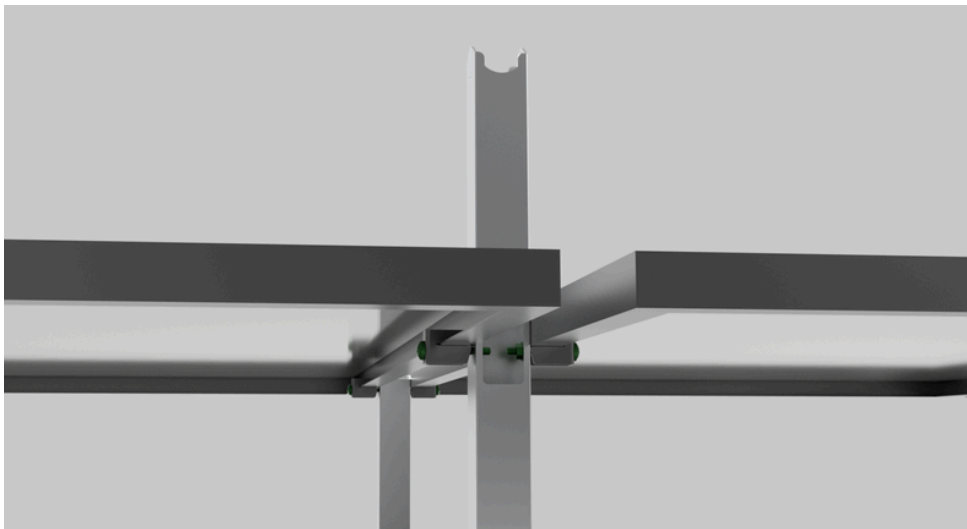


Figure 32

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.

IR-35A - Adjusting The Sun Angle

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.

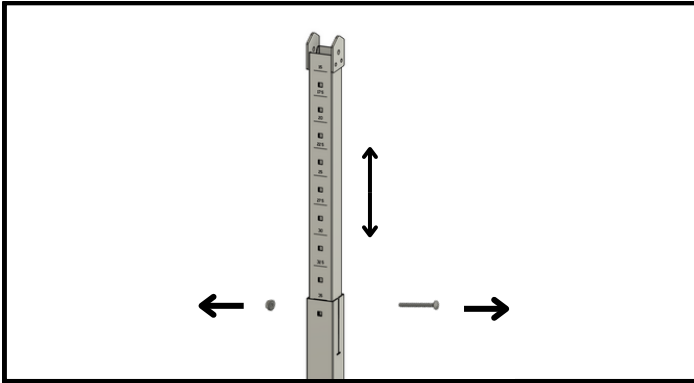


Figure 33

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 inch wrench. Be careful not to lose the washer inside (some frames may not have washers).

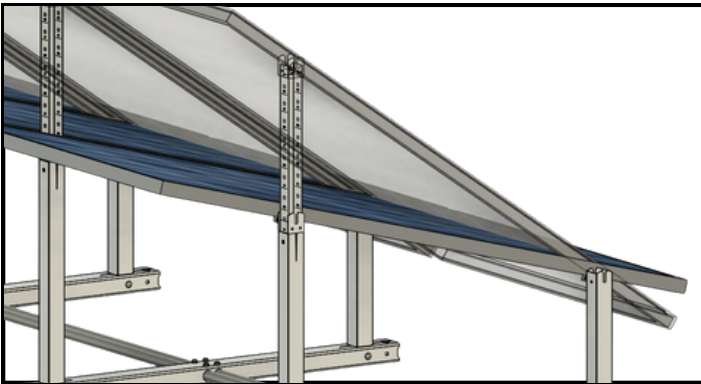


Figure 34

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.

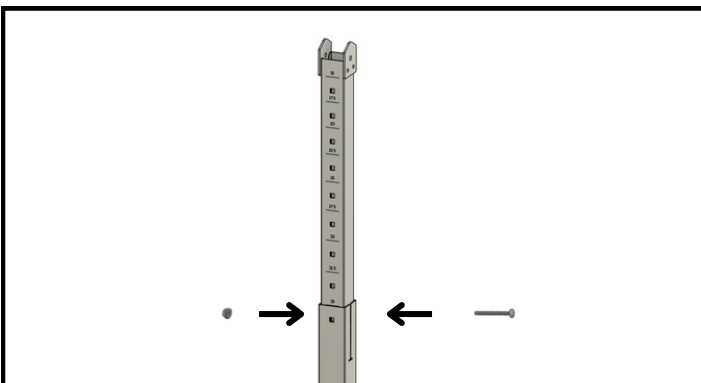


Figure 35

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

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.

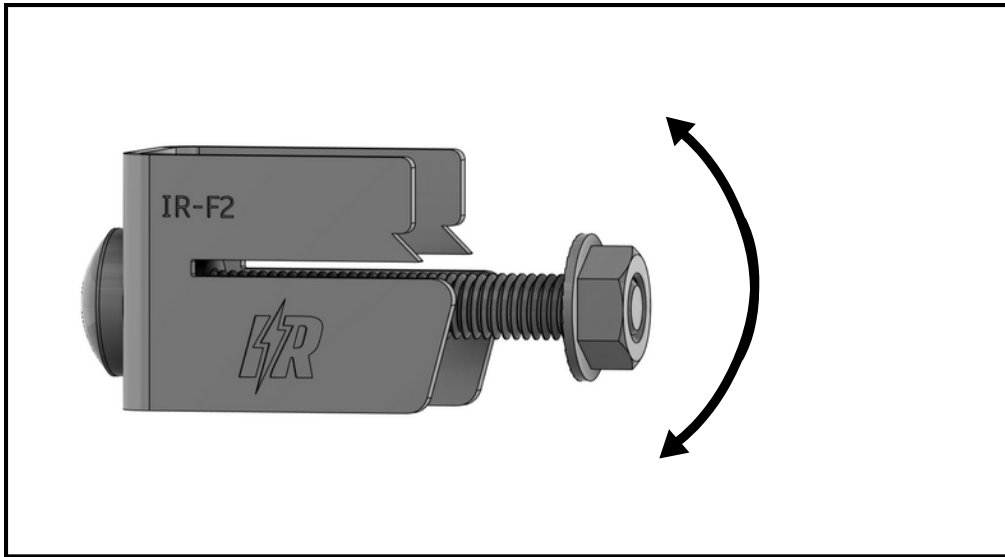


Figure 36

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 will need to be tightened.

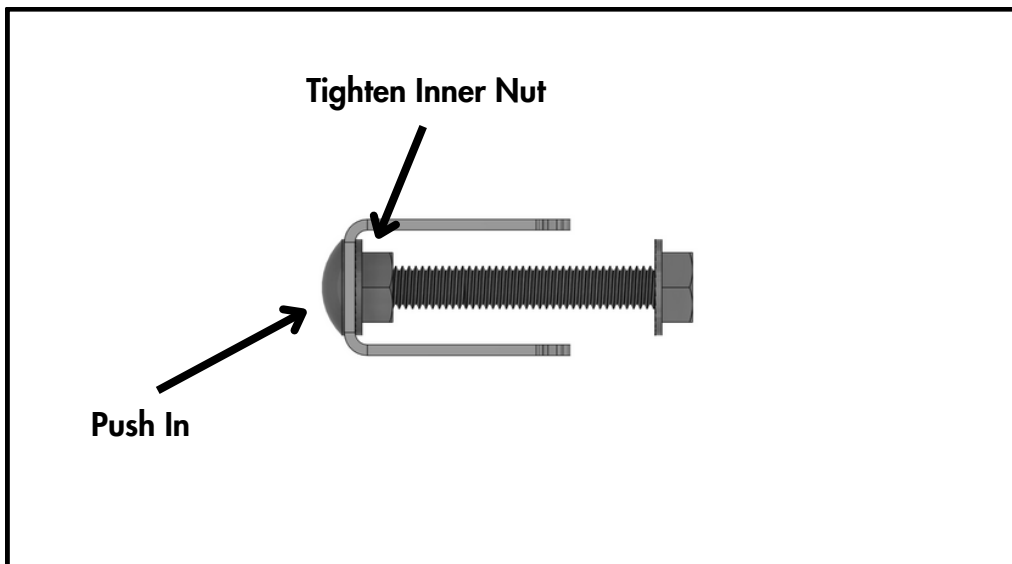


Figure 37

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 with your fingers. Make sure the bolt no longer moves up and down. If possible, use a socket wrench with a deep 1/2 inch or 13mm socket to tighten the inner nut.

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.

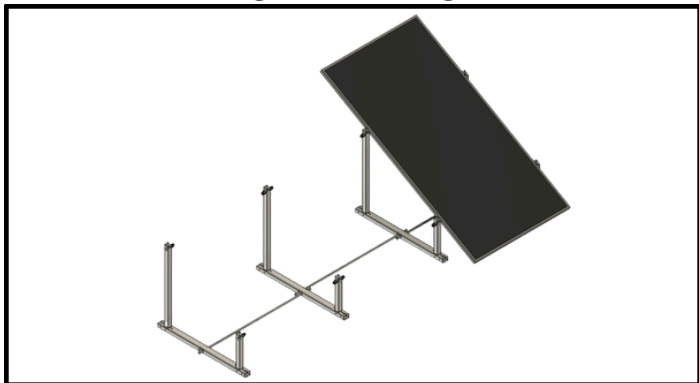


Figure 38

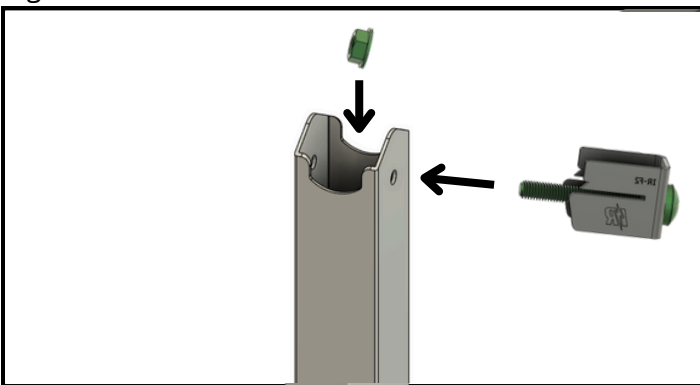


Figure 39



Figure 40

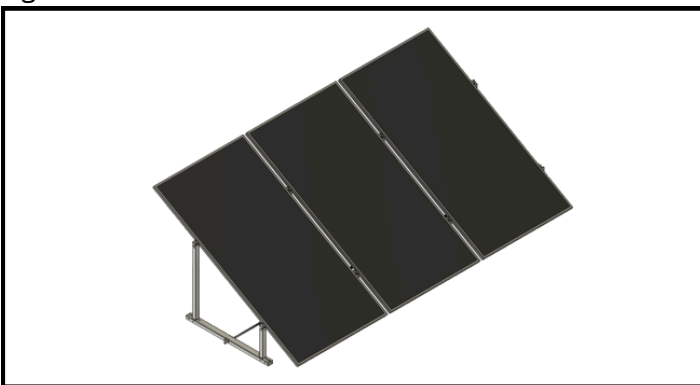


Figure 41

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 the same way you did the top ones.

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 in between the bolts. Make sure not to over-tighten.



More IR-15,30,45,35A Info



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