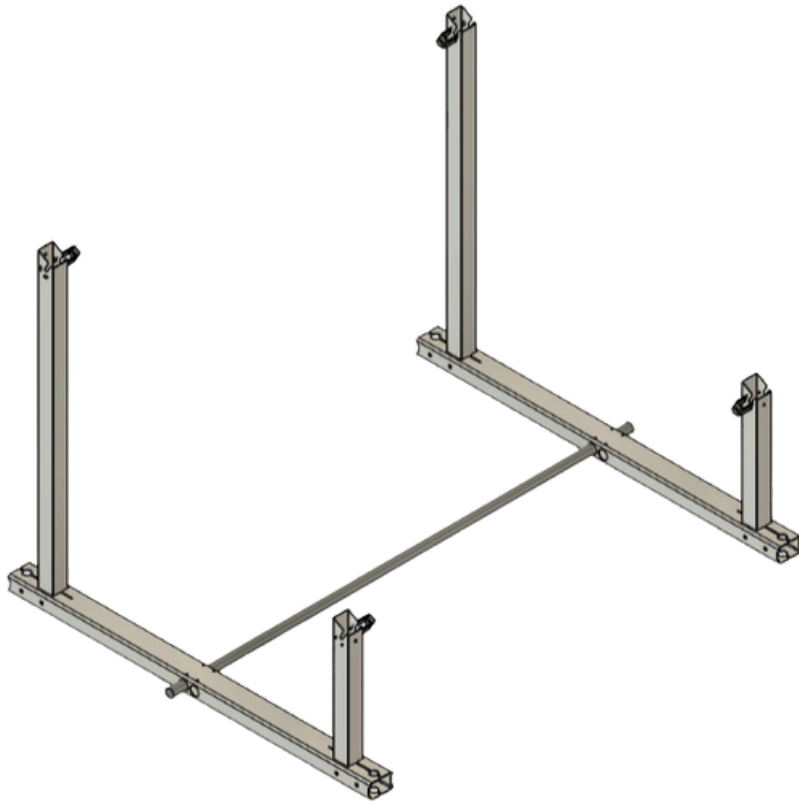


INTEGRARACK®

Revolutionary Solar Racking Systems



IR-30

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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

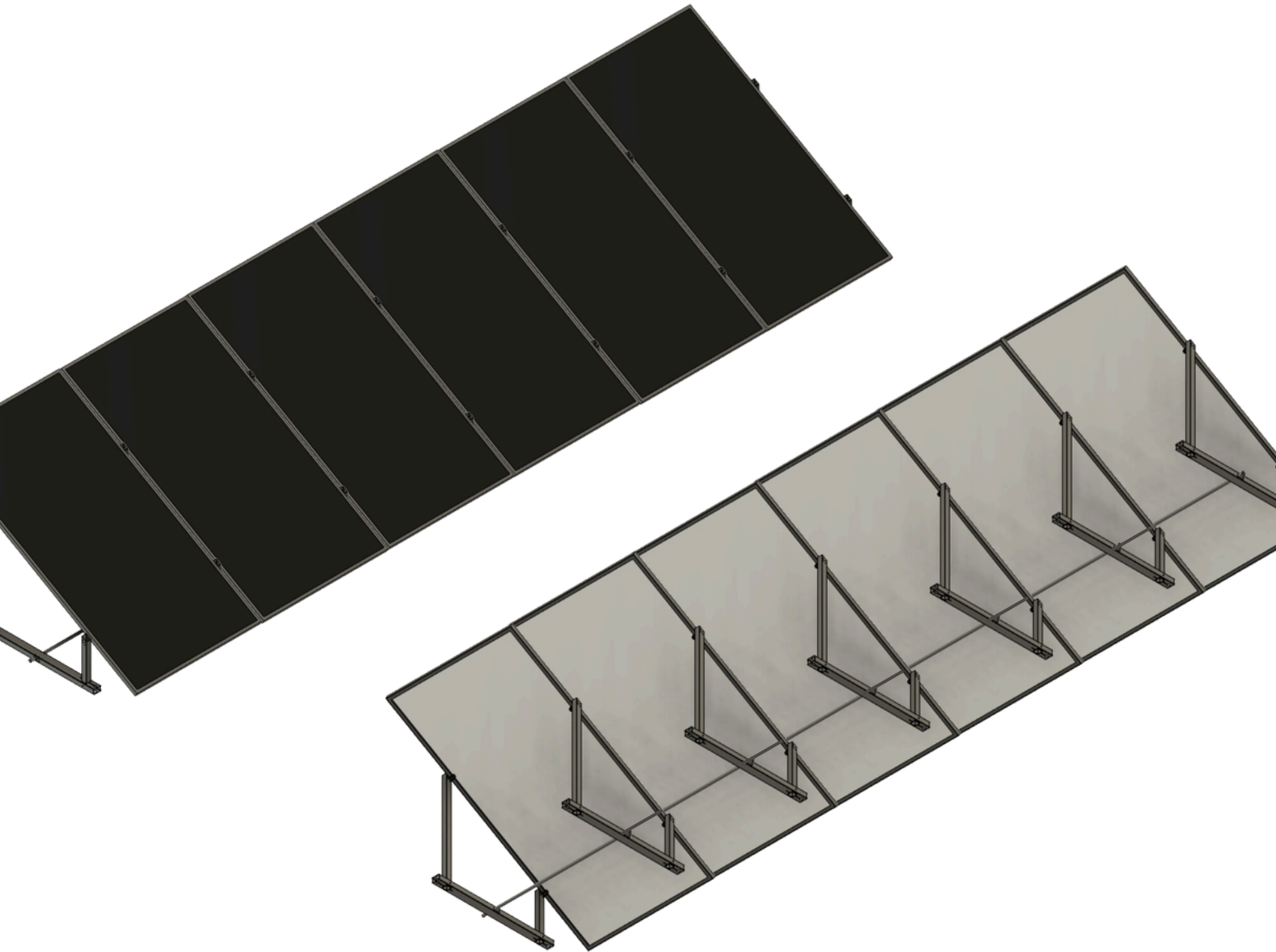
The instructions detailed in this manual will provide the knowledge and requirements necessary for proper installation of the given product. Be sure to read them thoroughly and make sure that you fully understand them before proceeding with installation. Any improper use or installation of these products 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.

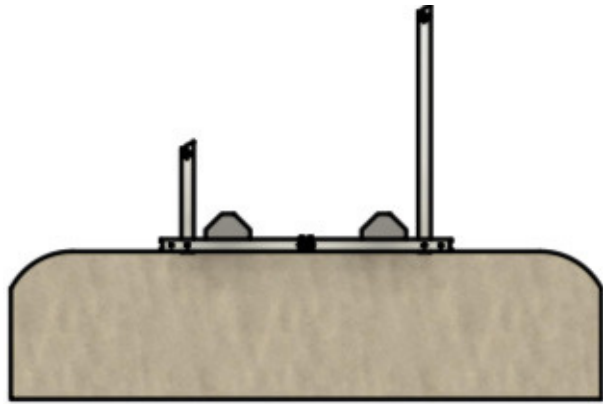
IT IS THE RESPONSIBILITY OF THE INSTALLER TO:

- 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.
- 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.

Example Layout

In the example given below, you can see a twelve solar module system laid out in two rows. With this layout, (14) IR-30 Brackets and (48) IR-F2 Solar Module Flange Clamp Bonding Brackets were used. Only a single IR-30 is required for every solar module, with one extra being required to start each row. This system is capable of racking modules of any size, as the spacing of the IR-30 Brackets can be adjusted to the width of the solar module. There is no limit to the number of modules that can be placed in a row, and the more modules in a row, the stronger the system will be. Approximately 6 feet between rows of IR-30 Brackets is recommended to avoid shading, but actual row spacing is determined by the set height of the solar modules.



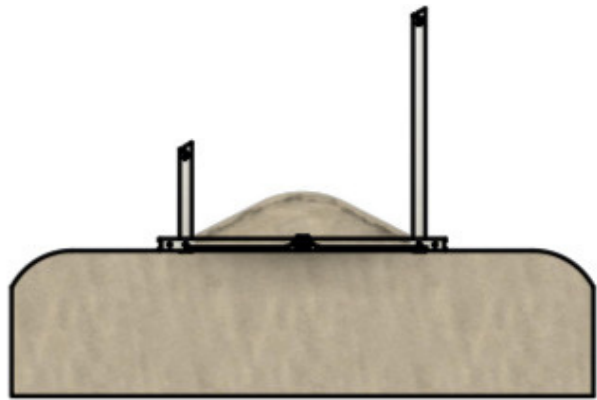


Base Ballast Mounting

Each IR-30 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 19).

Concrete curb stops can be sourced locally minimum weight and dimensions listed on Page 19).

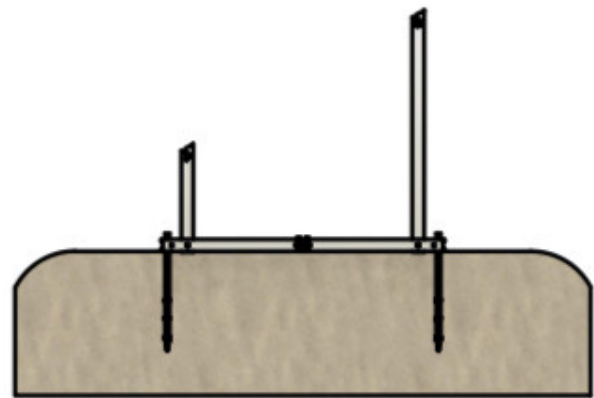
Stakes required



IR EarthBallast™ System

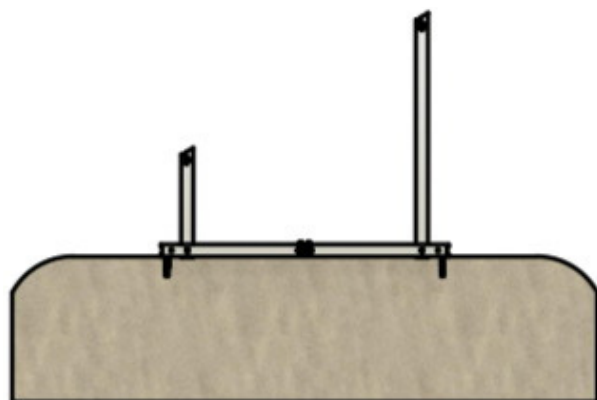
Our IR EarthBallast™ Kit comes with pre-cut rolls of strong Geotextile made for retaining walls and a high-strength tested 5 minute epoxy to hold the Geotextile to the frames. This creates a large surface area to hold the dirt mound. Each module section requires a mound of dirt, road base, or gravel that is approximately 15 inches high or 700 pounds. A shovel or skid-steer can be used to cover the frames with earth fill.

Stakes not required, but are recommended



IR AnchorSpike™ System

Our IR AnchorSpike™ Kit comes with our specially designed 19.5 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 IR-30 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 400 pounds of uplift.



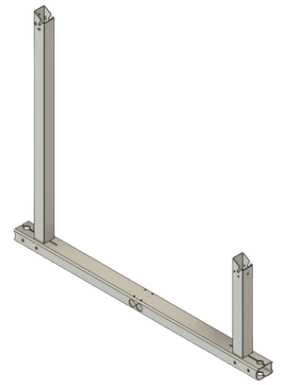
Concrete Slab/Footing Anchor Bolt Mounting

Our IR Concrete Anchor Bolt Mounting Kit provides (22) Concrete Anchor Bolts for the strongest possible mounting, and allows for easy installation of up to 10 solar modules. The IR-30 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).

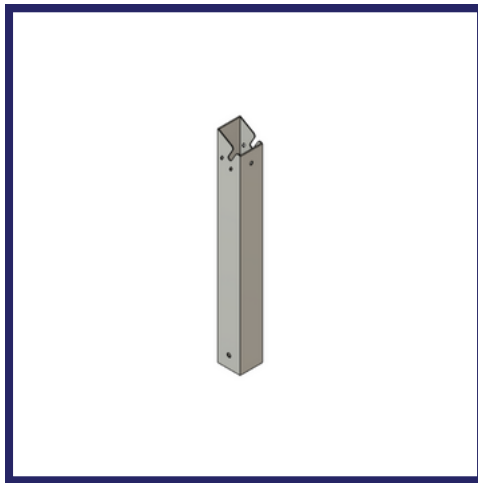
Components

Included Components

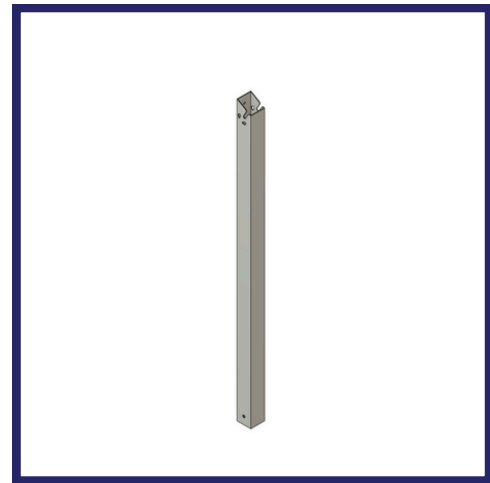
- (1) Base Tube
- (1) Short Leg
- (1) Long Leg
- (4) IR-F2 Flange Clamp Bonding Brackets
- (4) M8-1.25 x 90mm Carriage Bolts
- (4) M8-1.25 Serrated Nuts
- (4) M8-1.25 x 16mm Thread Cutting Bolts



Base Tube



Short Leg



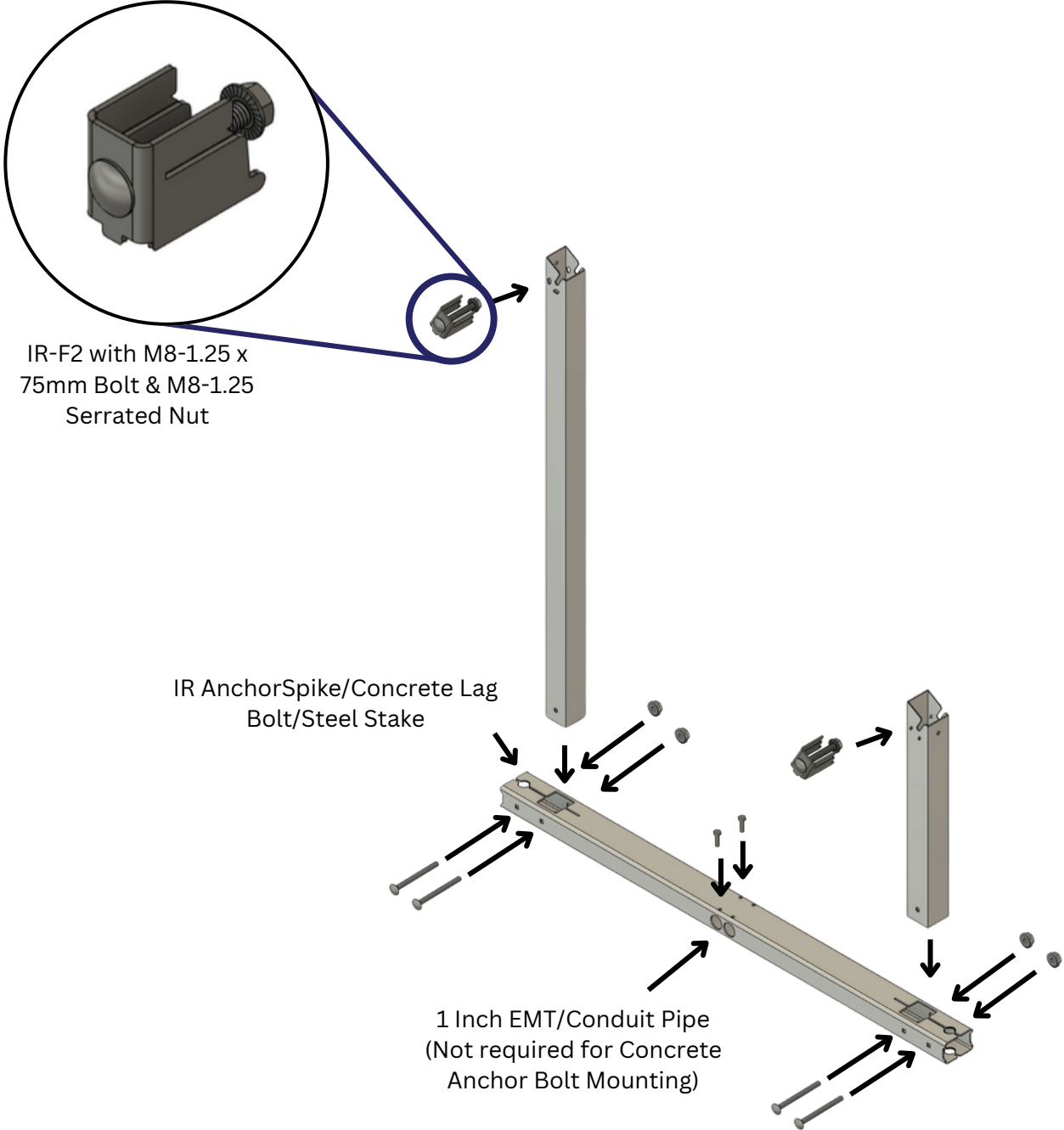
Long Leg

Required Tools

Tools Needed

- Screw Gun with 1/2" Socket (**DO NOT USE AN IMPACT GUN**)
- 4' Level
- Tape Measure
- String Line

Assembly & Fastener Locations



Mounting Kit Components



Geotextile Material



Quick Cure 5 Min. Epoxy



IR AnchorSpike



Concrete Anchor Bolt

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 Ratchet Wrench

IR AnchorSpike Kit

- IR Earth Spikes
- IR Epoxy Resin A
- IR Epoxy Resin B
- Mixing Cup
- Stirring Stick
- Funnel
- Gloves
- 1/2" Open-Ended Ratchet Wrench

Concrete Anchor Bolt Kit

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

Assembling IR-30 Frames

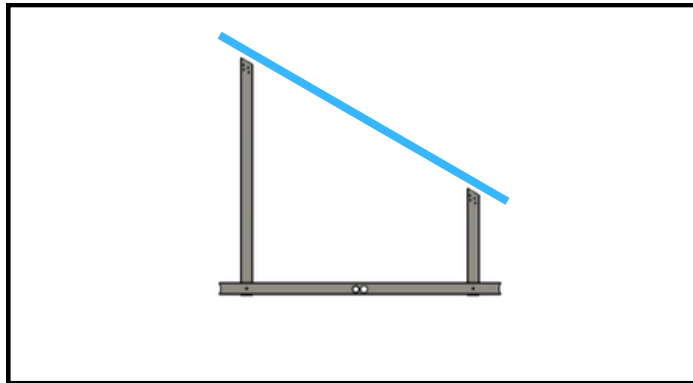


Figure 1

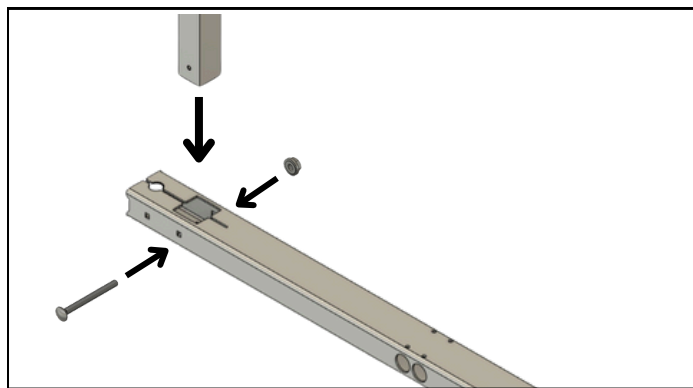


Figure 2

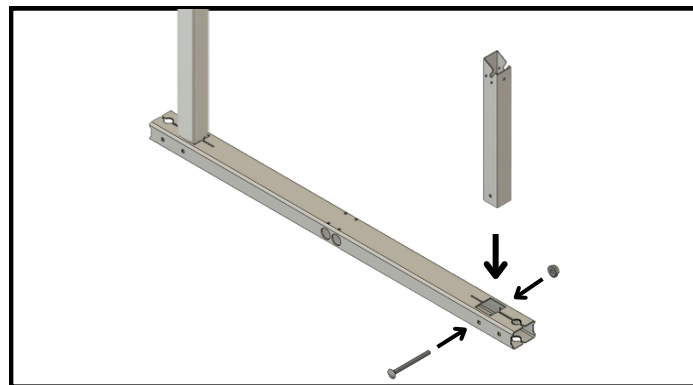


Figure 3

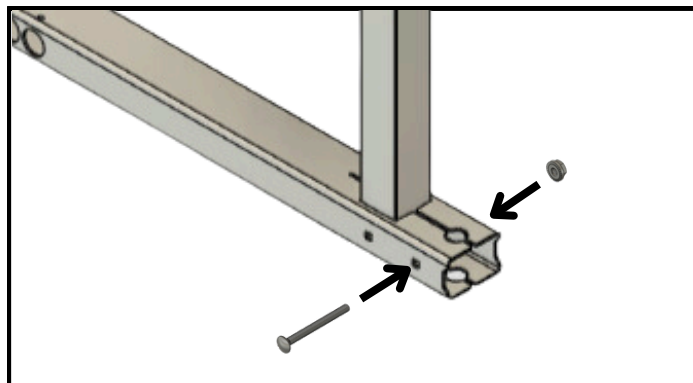


Figure 4

Pre-Assembly

Before assembly, make sure that the installation site is as flat and level as possible for easier installation and leveling of the system. When installing the legs, make sure that they are both sloped towards the ground in the same direction (See *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 top is angled towards the front of the Base Tube. Line up the round holes at the bottom of the Long Leg with the corresponding hole in the side of the Base Tube and insert (1) M8-1.25 x 90mm Carriage Bolt all the way through. Tighten the Long Leg in place using (1) M8-1.25 Serrated Nut.

2. Install The Short Leg

Insert the Short Leg into the square opening at the front of the Base Tube and make sure the top is angled towards the front of the Base Tube in line with the Long Leg. Line up the round holes at the bottom of the Short Leg with the corresponding hole in the side of the Base Tube and insert (1) M8-1.25 x 90mm Carriage Bolt all the way through. Tighten the Long Leg in place using (1) M8-1.25 Serrated Nut.

Repeat Steps 1 & 2 until all IR-30 Frames are assembled.

OPTIONAL

If not installing the IR-30 with Stakes or IR AnchorSpikes, the remaining (2) M8-1.25 x 90mm Carriage Bolts can be used to clamp the ends of the Base Tube (See *Figure 4*).

IR-30 Frame Spacing

Important Disclaimers

- This step is not required if you are mounting IR-30 Frames with Concrete Anchor Bolts.
- Use the following formula to determine the exact spacing between IR-30 Frames: **Module Width Minus 1 Inch = Space Between Base Tube Frames** (Example: 42.58 Inch Solar Module = 41.58 Inch Spacing Between Each Base Tube).
- Be sure to measure between the 2x3" lower Base Tubes and not between the 2x2" leg tubes.
- It is recommended to verify your measurements by placing a solar module in between the two frame legs to confirm spacing measurements are correct before final positioning and mounting.
- 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.

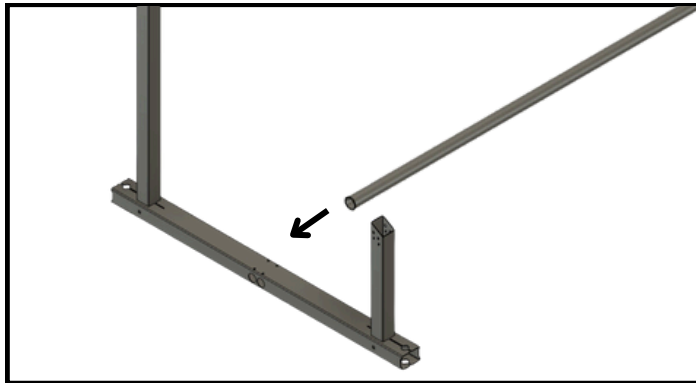


Figure 5

3. Insert 1 Inch EMT/Conduit Pipe

Once all IR-30 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 5). Slide the pipe all the way through, but leave at least 2 inches hanging out on one side.

1 Inch Conduit Not required for Concrete Anchor Bolt Mounting

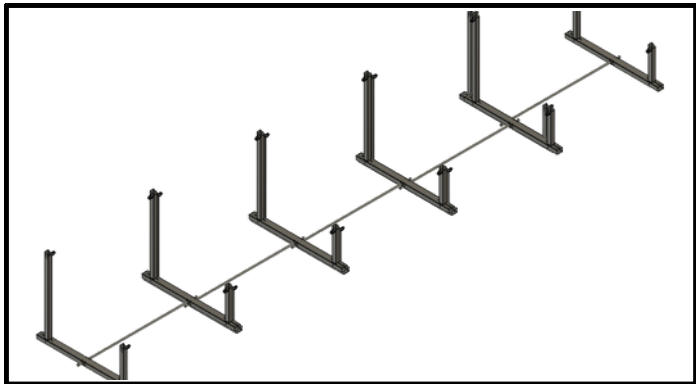


Figure 6

4. Lay Out IR-30 Frames

Slide the next IR-30s 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 IR-30). Once the end of the first conduit pipe is reached, insert the next conduit pipe through the other opening on the last IR-30 Frame (See Figure 7). Repeat this until all IR-30 Frames are connected by the conduit pipes and are spaced roughly to your solar module's width.

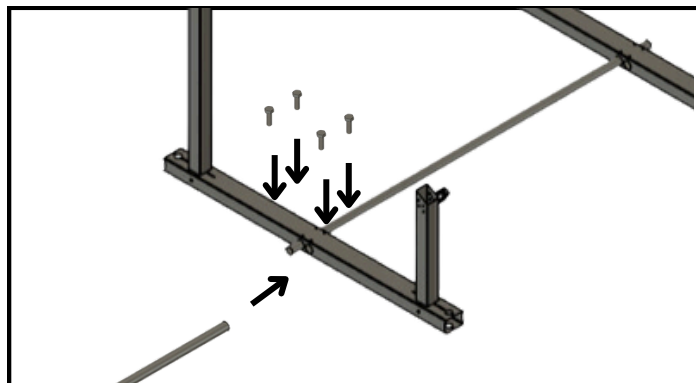


Figure 7

5. Lock IR-30 Frames In Place

Once all IR-30 Frames are in place, start bolting the frames directly to the conduit pipe. Use a tape measure to confirm distance between frames is correct before bolting each one to the conduit pipe. Each IR-30 Frame will require (2) M8-1.25 x 16mm Thread Cutting Bolts to lock it in place on the conduit pipe. IR-30 Frames connected to two conduit pipes will require all (4) M8-1.25 x 16mm Thread Cutting Bolts (See Figure 7).

Repeat Steps 1 through 3 until all IR-30 Frames are properly spaced.

Leveling IR-30 Frames

Important Disclaimers

- Even when placing IR-30 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 IR-30 Frames are lined up in a straight line using a string line.
- After lining up the IR-30 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.

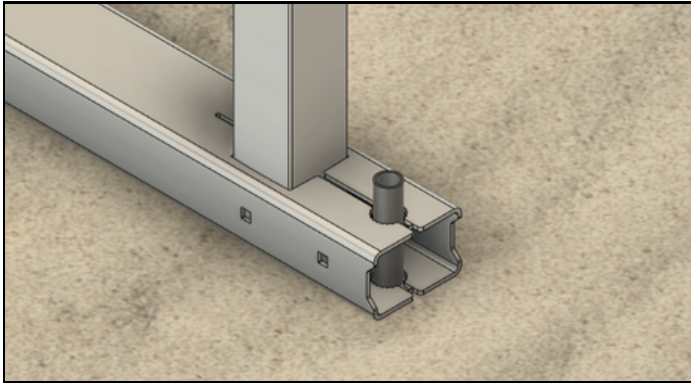


Figure 8

OPTIONAL

Stakes can be used for fast and easy leveling. Use a small mallet to hammer concrete stakes into the ground through the stake openings at the end of each base tube. Each base tube can now be leveled using a level/stringline and clamped to the stakes by tightening the bolts at the end of each Base Tube.

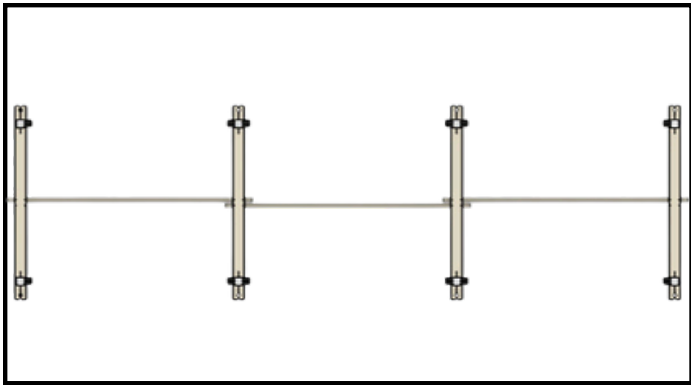


Figure 9

1. Line Up The IR-30 Frames

Run a string line from the Long Leg of the first IR-30 Frame, stretch it along the frame system to the Long Leg of the last IR-30 Frame. Adjust the system as necessary until all IR-30 Frames are aligned with the stringline.

OPTIONAL: Stakes can be used to keep system in line during alignment and assist with leveling of the frames.

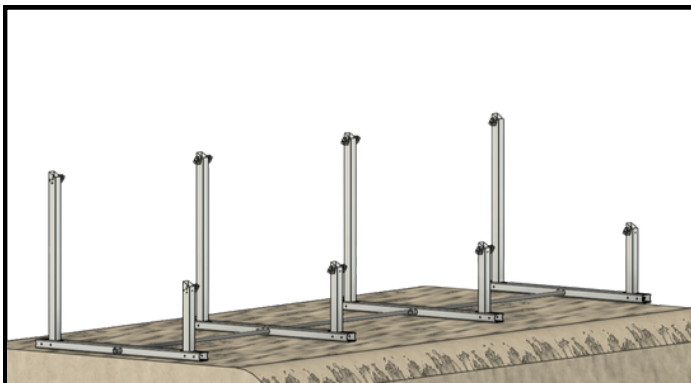


Figure 10

2. Leveling The IR-30 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. Using a shovel, dirt can then be added or removed from under the IR-30 Frames to level the system.

Attaching Geotextile

Important Disclaimers

- It is important to use the provided Scotch-Brite scuff pads and alcohol wipes to prep the application surface of each IR-30 before epoxy is applied.
- 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.

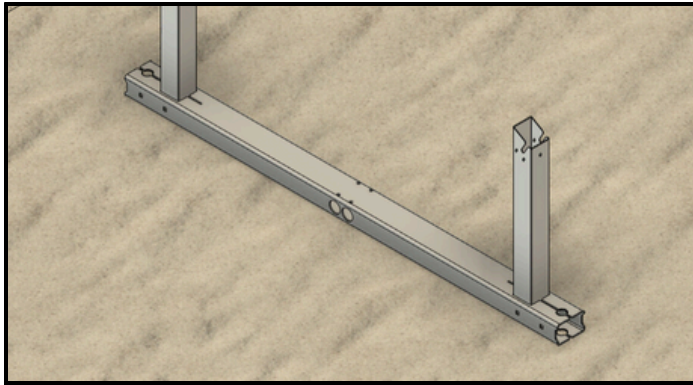


Figure 11

3. Prep Adhesive Surface

Use the included Scotch-Brite 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.

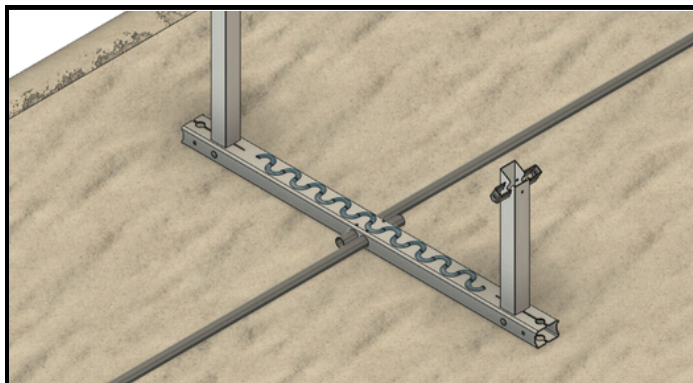


Figure 12

4. Apply Adhesive

Remove the twist cap and pull the sealing plug from the Quick Cure-5 Epoxy and attach the mixing nozzle. Using a caulk gun, apply the epoxy in a zig zag pattern along the top of each IR-30 Base Tube in between the two upright legs (See Figure 12).

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.

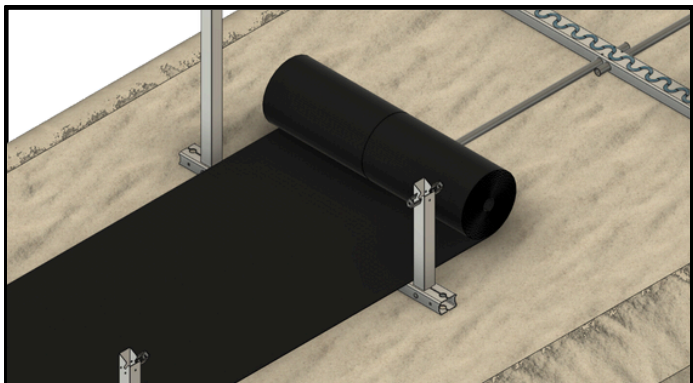


Figure 13

5. 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 IR-30 Frames

Important Disclaimers

- 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 14

6. Earth Fill IR-30 Frames

Using a shovel or a skid-steer, dump a pile of material onto the Geotextile in between each IR-30 Frame. The highest point of the earth mound should be approximately 15 inches high or 700 pounds per solar module section.

Repeat this step until every frame is covered.



Figure 15

7. Pack The Earth Mound

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



Figure 16

Proceed To Page 18 For Module Installation

Drilling Holes For IR AnchorSpikes

Important Disclaimers

- Ensure that soil is compacted otherwise IR AnchorSpikes will not be as effective.
- It is recommended to test (1) 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.

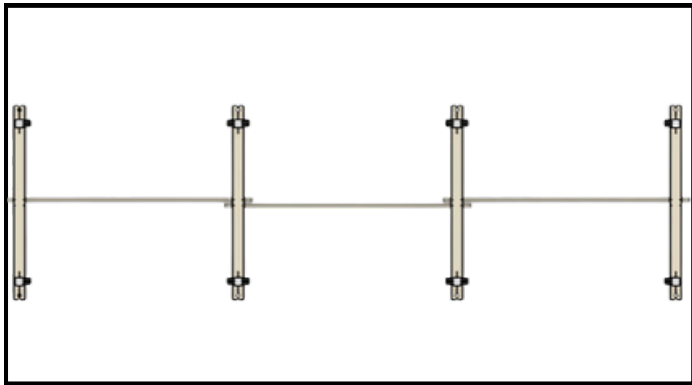


Figure 17

1. Line Up The IR-30 Frames

Run a string line from the Long Leg of the first IR-30 Frame, stretch it along the frame system to the Long Leg of the last IR-30 Frame. Adjust the system as necessary until all IR-30 Frames are aligned with the stringline.

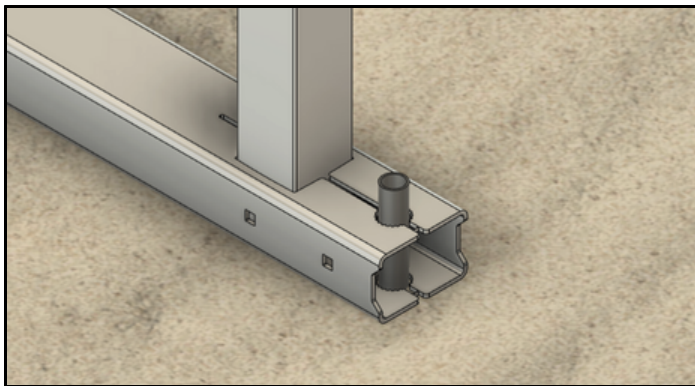


Figure 18

2. Mark Drilling Locations

Hammer a concrete stake or one of the AnchorSpikes 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.

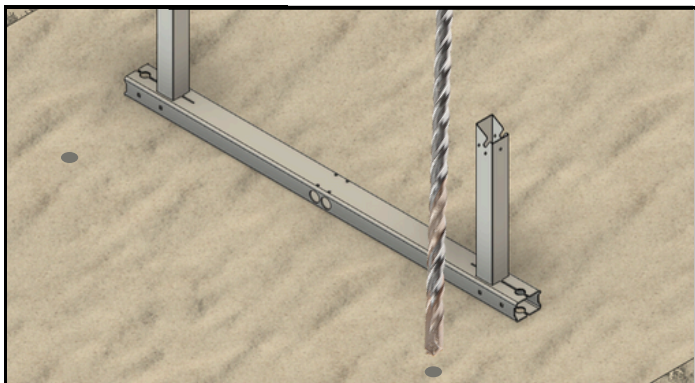


Figure 19

3. Drill Holes For IR AnchorSpikes

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 AnchorSpikes

Important Disclaimers

- 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.

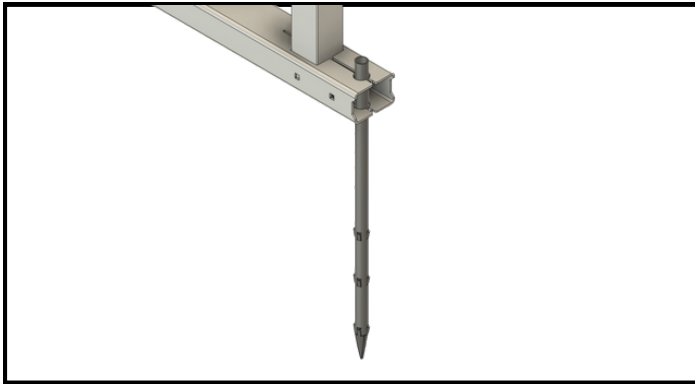


Figure 20

4.Placing IR AnchorSpikes

Using a small sledge hammer, tap the IR Anchor Spikes into the pre-drilled holes through the clamp ends of each IR-30 Frame and leave approximately 2 inches above the Base Tube. This extra 2 inches will allow for leveling of the IR-30 Frames.



Figure 21

5.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.

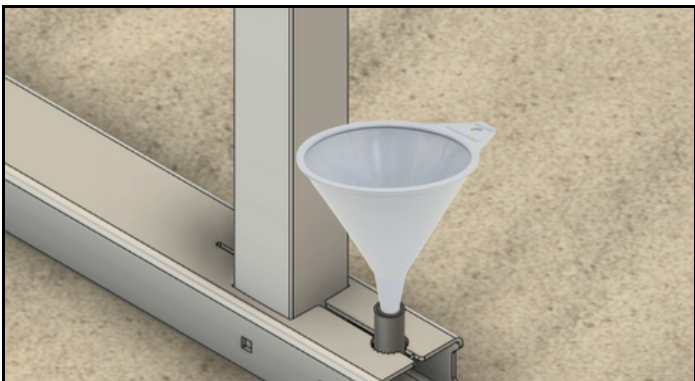


Figure 22

6.Pour The Epoxy Into The IR AnchorSpikes

Now pour the epoxy into the small measuring cup 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 IR-30 Frames

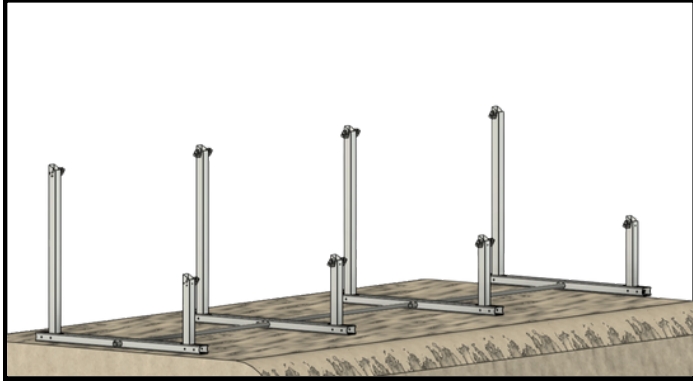


Figure 23

7. Leveling IR-30 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. Once level, tighten the clamp ends of the Base Tubes to the AnchorSpikes to firmly lock them in place.

Repeat this step until all IR-30 Frames are leveled.



Figure 24

Proceed To Page 18 For Module Installation

Measuring & Installation

Important Disclaimers

- Make sure that all IR-30 Frames are straight in line before mounting to ensure proper module mounting.

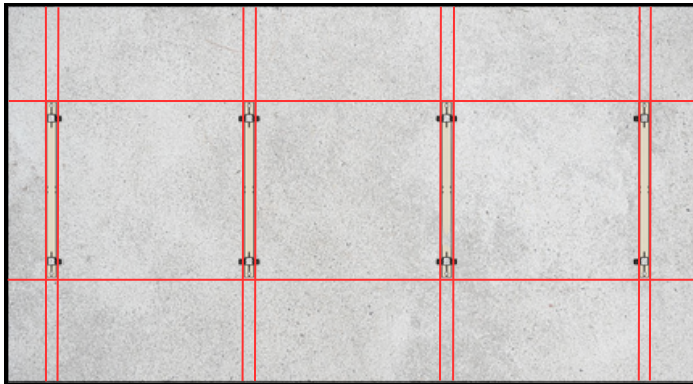


Figure 25

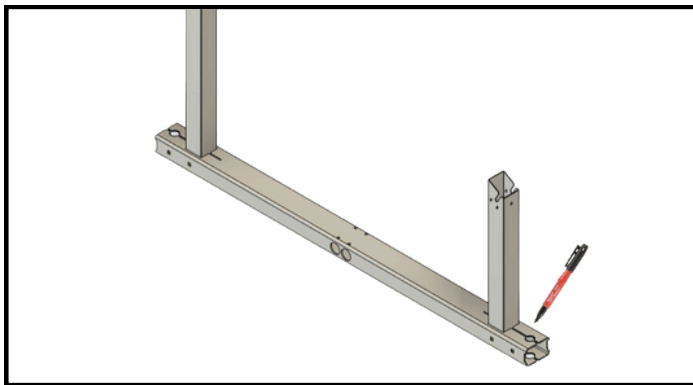


Figure 26



Figure 27

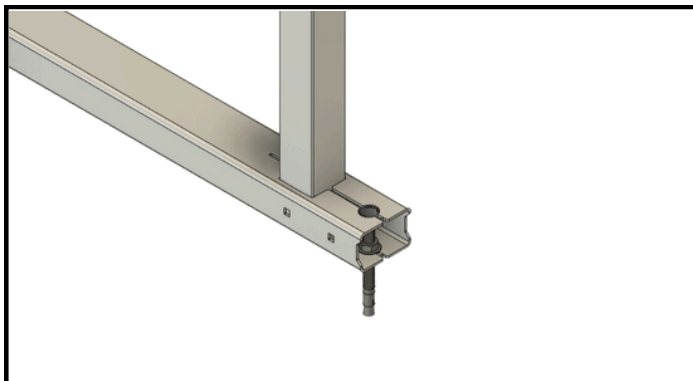


Figure 28

1.Measure & Chalkline IR-30 Placement

Use the formula provided on page 9 to calculate the distance needed between IR-30 Frames. Place all IR-30 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 IR-30 Frames

2.Mark The Drilling Locations

Move each IR-30 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 IR-30 Frames out of the way and use an SDS Hammer Drill and the included 3/8" Concrete Drill Bit to drill a 3 inch deep hole in the middle each of the marked locations on the concrete.

4.Bolt The IR-30 Frames To The Concrete

Move all IR-30 Frames back into their marked locations, and bolt them in place using the provided IR Concrete Anchor Bolts and washers.

Placing Ballast

Important Disclaimers

- Steel stakes are recommended for this mounting option to prevent movement of system.

Flat Water Tank Ballast



Figure 29

Recommended Water Tank

For water tank ballasting, we recommend using a 100 gallon tank with the dimensions outlines below. This water tank can be placed across up to (3) IR-30 Frames.

Water Tank Dimensions

- Minimum Length: 160"
- 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: 350 Pounds Per Module

Placing Concrete Curb Stop

Place concrete curb stop across at least (2) of the IR-30 Base Tubes. Multiple curb stops can be used per module as long as the minimum weight is met.

Installing Solar Modules

Important Disclaimers

- 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.
- Loosen serrated nut as much as possible before dropping the IR-F2s carriage bolt into the slot on the Legs.

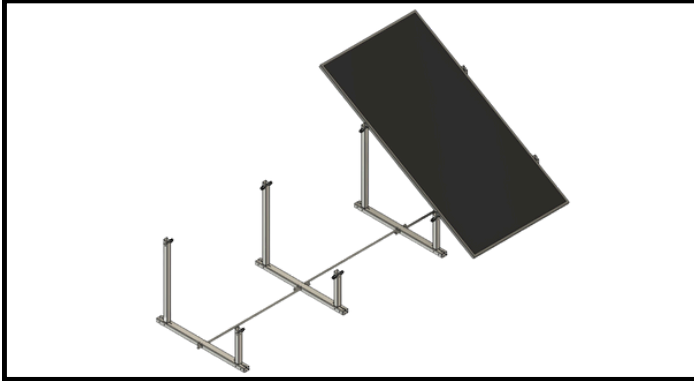


Figure 31

1. Position The First Solar Module

Carry solar module and place it into position between the the first two IR-30 Frames. Set the module roughly where it will be mounted.

2. Mount Upper IR-F2 Brackets

Lift the top of the solar module above the Long Legs of the IR-30 Frames and slide the first IR-F2 onto the flange of the module. Slide it along the flange until the bolt is lined up with the open slot at the top of the Long Leg and drop it into place. Repeat this on the other side of the solar module.



Figure 32

3. Mount Lower IR-F2 Brackets

Lift the bottom of the solar module above the Short Legs of the IR-30 Frames, slide it up to approximately the desired height (this can be further adjusted later), and slide the first IR-F2 onto the flange of the module. Slide it along the flange until the bolt is lined up with the open slot at the top of Short Leg and drop it into place. Repeat this on the other side of the solar module.

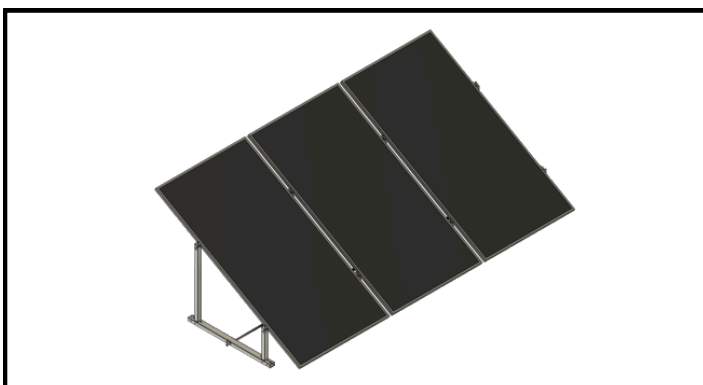


Figure 33

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. 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.



More IR-30 Info



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