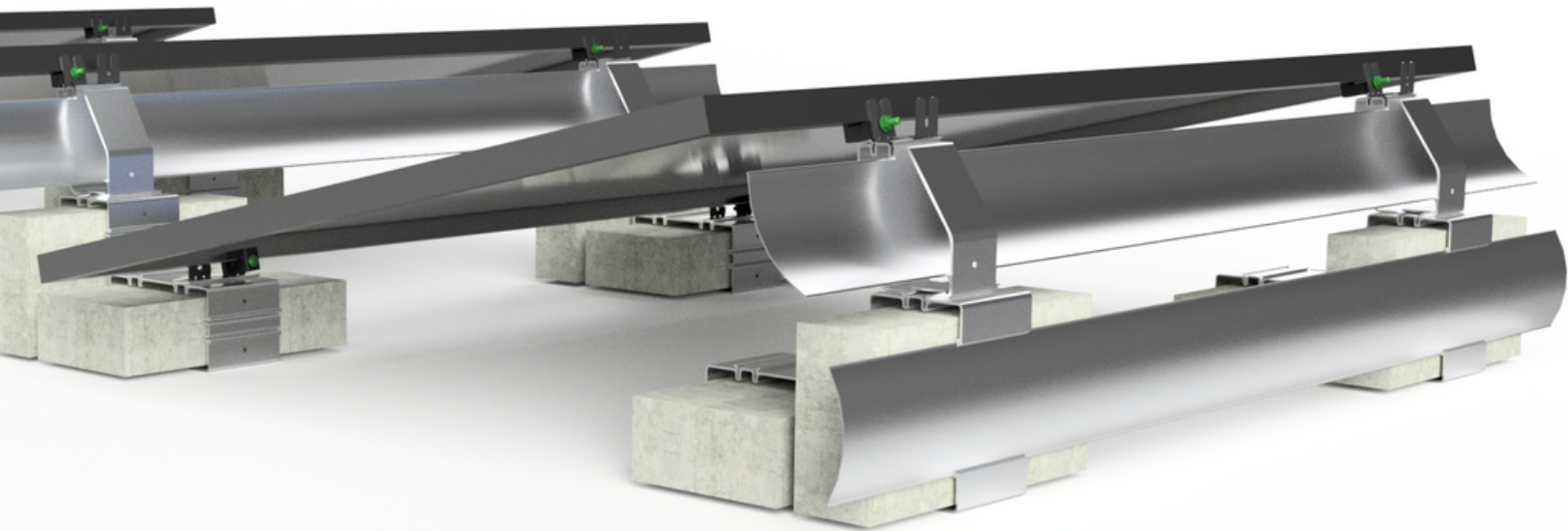




Revolutionary Solar Racking Systems



# IR MultiBallast 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

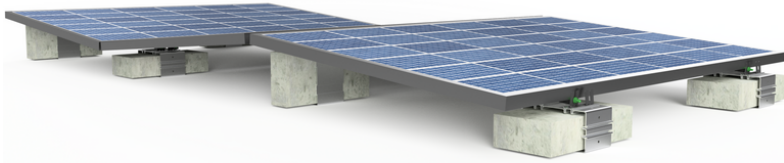
The instructions detailed in this manual will provide the knowledge and requirements necessary for proper installation of the given product. Be sure to read them thoroughly and make sure that you fully understand them before proceeding with installation. Any improper use or installation of these products 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.
- Ensure roof structure is in good condition prior to installation
- Disconnect AC power before servicing or removing panels, micro-inverters or power optimizers.
- Review manufacturer's documentation for compatibility and compliance for solar panels 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 panel 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.

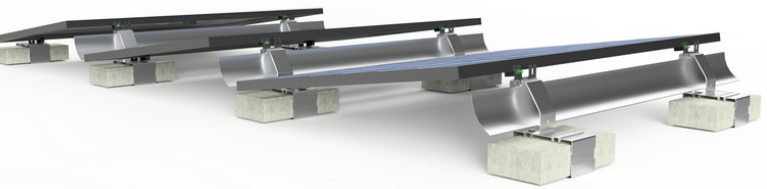
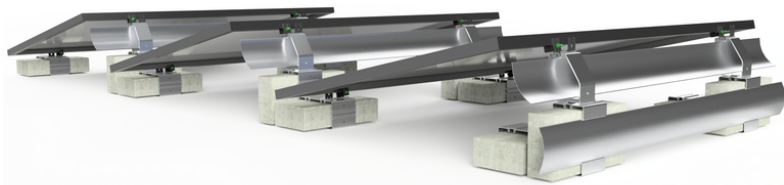
# Included Components & Required Tools

## Included Components



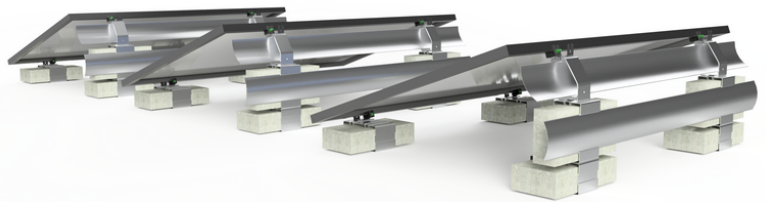
### IR-W5MBCB

- (2) Base Mounts
- (2) H Module Mounting Brackets
- (4) IR-F2 Flange Clamp Bonding Brackets
- (2) Bolt Bs



### IR-08MBCB

- (2) Base Mounts
- (2) Riser Brackets
- (4) H Module Mounting Brackets
- (4) IR-F2 Flange Clamp Bonding Brackets
- (2) Bolt As
- (4) Bolt Bs

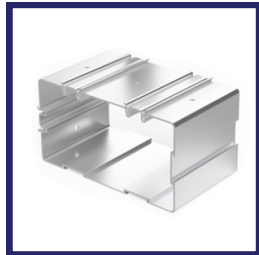


### IR-13MBCB

- (4) Base Mounts
- (2) Riser Brackets
- (4) H Module Mounting Brackets
- (4) IR-F2 Flange Clamp Bonding Brackets
- (2) Bolt As
- (6) Bolt Bs

### IR-20MBCB

- (6) Base Mounts
- (2) Riser Brackets
- (4) H Module Mounting Brackets
- (4) IR-F2 Flange Clamp Bonding Brackets
- (2) Bolt As
- (8) Bolt Bs



Base Mount



Riser Bracket



H Module Mounting Bracket



IR-F2 Solar Panel Flange Clamp Bonding Bracket



Bolt A



Bolt B

## Ballasting - Required Materials (Not Included)

### IR-W5MBCB

- (2) CMU Blocks Per Kit

### IR-08MBCB

- (2) CMU Blocks Per Kit
- (1) Wind Spoiler Per Solar Panel

### IR-13MBCB

- (4) CMU Blocks Per Kit
- (1) Wind Spoiler Per Solar Panel
- (1) Wind Spoiler Per Row

### IR-20MBCB

- (6) CMU Blocks Per Kit
- (2) Wind Spoiler Per Solar Panel

## Adhesive Bonding - Required Materials (Not Included)

### IR-W5MBCB

- (1) Tube of Sikaflex Polyurethane Sealant for every ten mounts

### IR-08MBCB

- (1) Tube of Sikaflex Polyurethane Sealant for every ten mounts

### IR-13MBCB

- (1) Tube of Sikaflex Polyurethane Sealant for every ten mounts

### IR-20MBCB

- (1) Tube of Sikaflex Polyurethane Sealant for every ten mounts

## Required Tools

- 1/2" (13mm) Ratchet Wrench
- Line Chalk
- Tape Measure
- Hammer

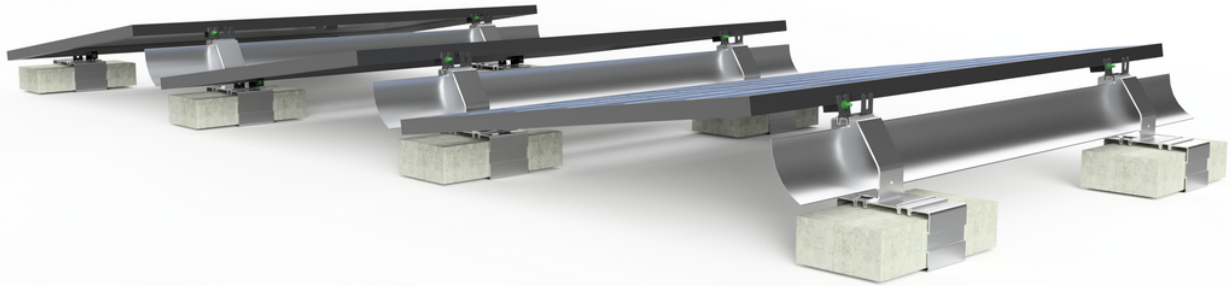
# MultiBallast Configurations

## Configurations

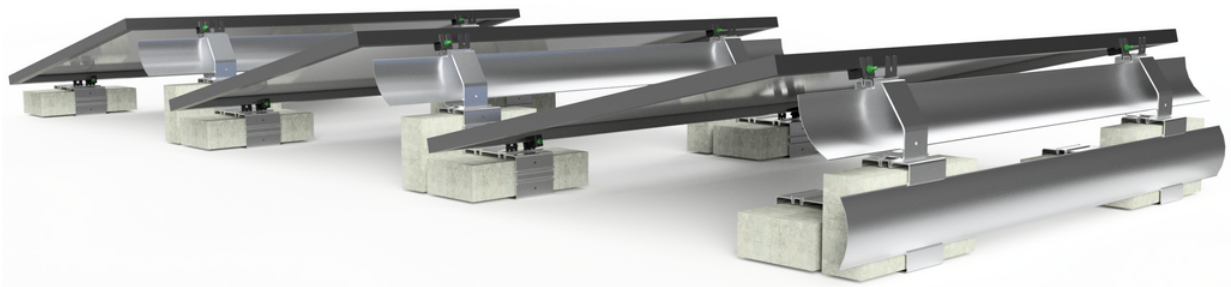
**IR-W5MBCB MultiBallast** - 5° East/West 'W' Configuration / 0° Flat Configuration



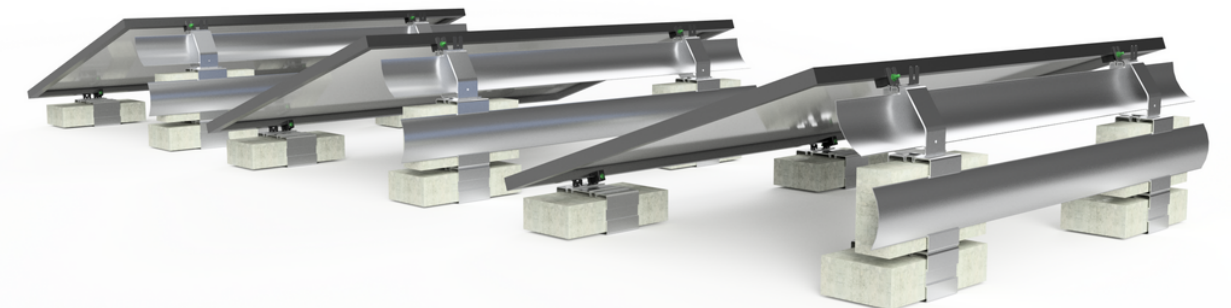
**IR-08MBCB MultiBallast** - 8° North/South Configuration



**IR-13MBCB MultiBallast** - 13° North/South Configuration



**IR-20MBCB MultiBallast** - 20 to 30° North/South Configuration



## Determining the Number of MultiBallast Kits Needed

### IntegraRack MultiBallast Kits

All IntegraRack MultiBallast mounts are sold in "Per Solar Panel Kits". For most MultiBallast configuration you will need one kit for each installed solar panel plus one additional kit to start each row of solar panels. The MultiBallast system is meant to be ballasted using a standard solid CMU block (Dimensions: 4x8x16"), but can also be directly bonded to the roof using our recommended polyurethane adhesive. A certain number of Wind Spoilers is required for each configuration, as seen on Page 3 under "Required Materials" (Wind Spoiler sold separately).

### How Many Kits Will I Need?

Using the calculations in the chart below, you can determine how many kits you will need for the desired configuration of your array.

#### IR-W5MBCB MultiBallast

- (1) IR-W5MBCB Kit per solar panel
- (1) IR-W5MBCB Kit to start each row

#### IR-08MBCB MultiBallast

- (1) IR-08MBCB Kit per solar panel
- (1) IR-W5MBCB Kit to start each row

#### IR-13MBCB MultiBallast

- (1) IR-13MBCB Kit per solar panel
- (1) IR-W5MBCB Kit to start each row

#### IR-20MBCB MultiBallast

- (1) IR-20MBCB Kit per solar panel

## Planning the Layout of the Solar Array

### MultiBallast Pair Spacing

This system is designed to fit solar panels of any size in landscape orientation. The spacing measurement is the spacing between the pair of MultiBallast mounts in front of each panel and will be determined by the length of your panel and the manufacturer recommended mounting points (see Mounting Restrictions on page 8). The typical mounting points are going to be around  $\frac{1}{4}$  of the length of your solar panel measuring from the nearest end (see Figure A). For easier calculations in later steps, place the center of the MultiBallast at the recommended mounting points.

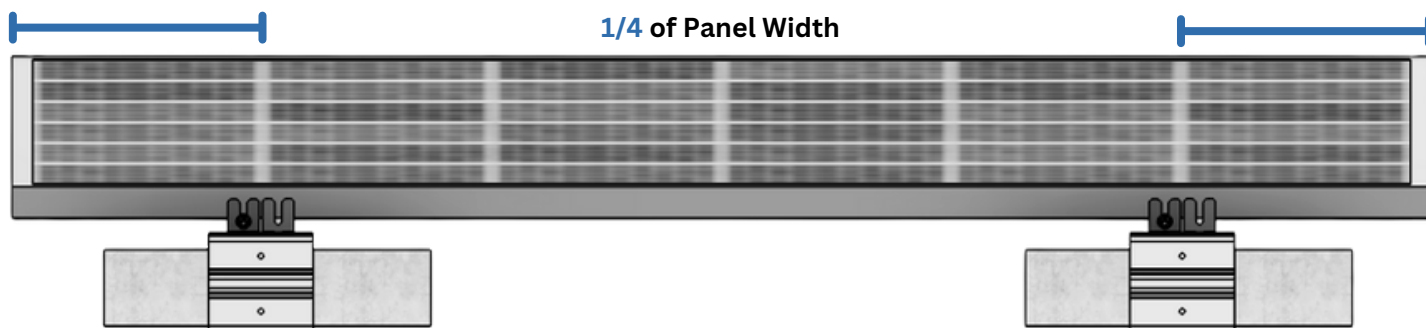


Figure A

### Spacing Between MultiBallast Pairs

The required spacing in between rows of panels is  $\frac{1}{4}$ " minimum, so you can determine the spacing between each pair of MultiBallast mounts by using the panel spacing measurement and adding the  $\frac{1}{4}$ " gap in between (see Figure B). Make sure to measure from center to center of the MultiBallast mounts.

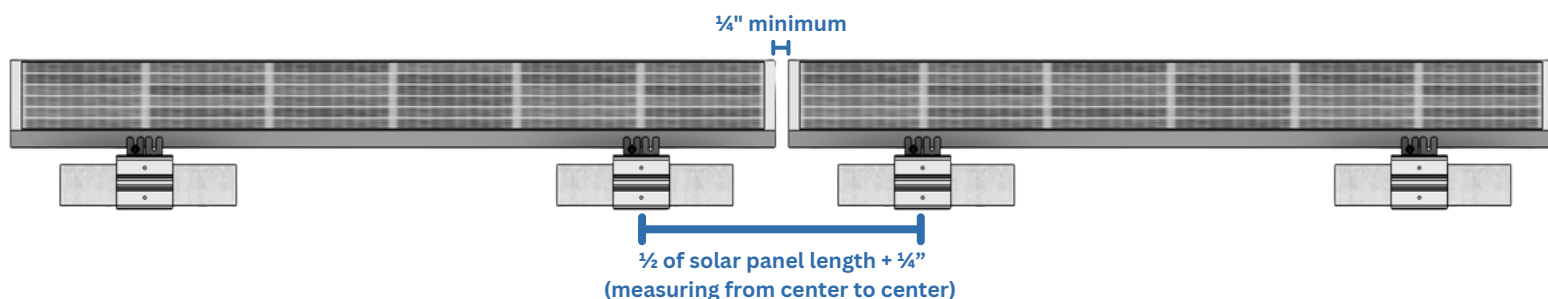


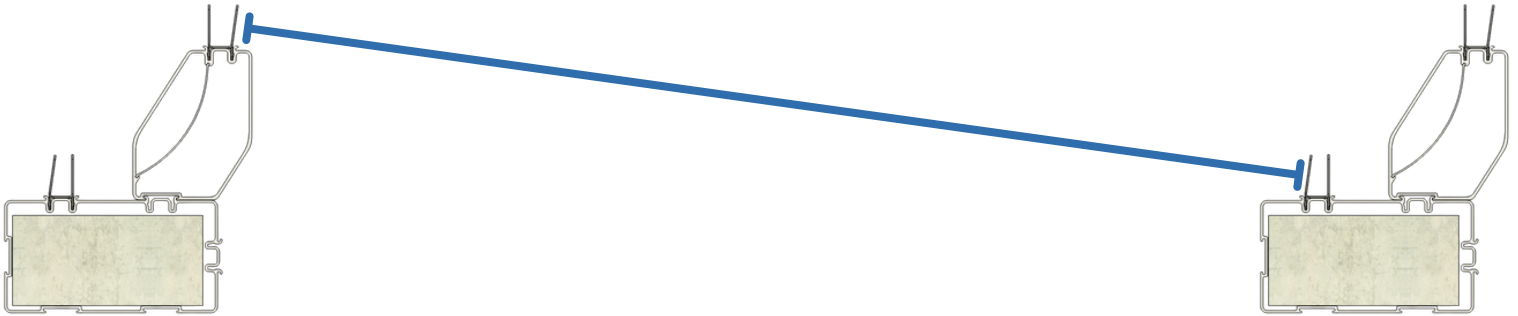
Figure B

# Solar Panel Spacing

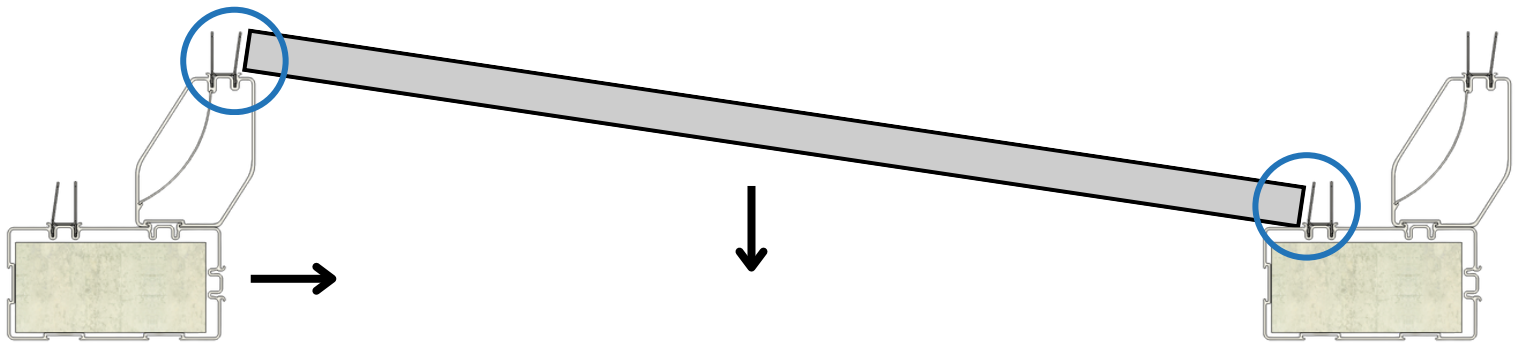
## Determining Spacing For Your Panels

### Return to this step after completing assembly

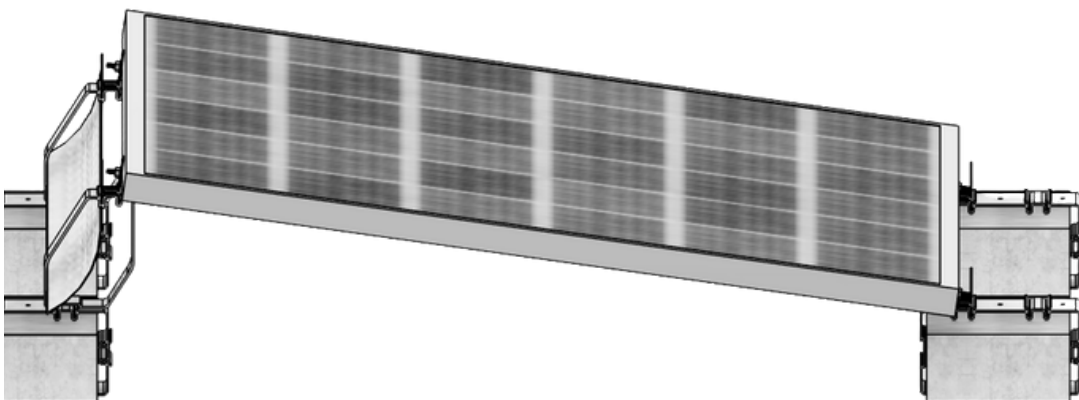
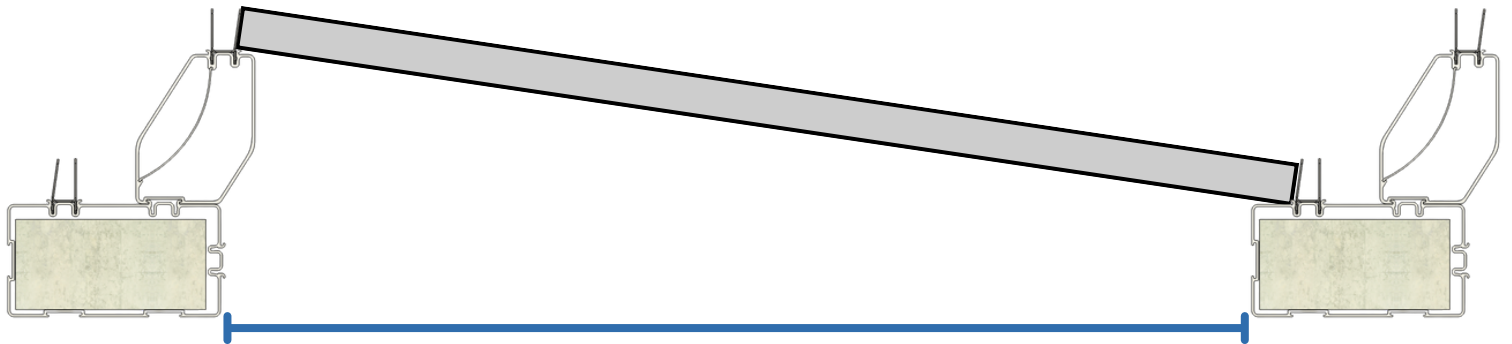
Lay out four assembled mounts in order to test mount a single solar panel. Measure the width of your solar panel and space each pair of mounts apart that width, plus about  $\frac{1}{8}$ " from H Bracket to H Bracket



Rest your solar panel onto the mounts and push the rear mounts forward until the panel is firmly fitted in between the closest H Brackets

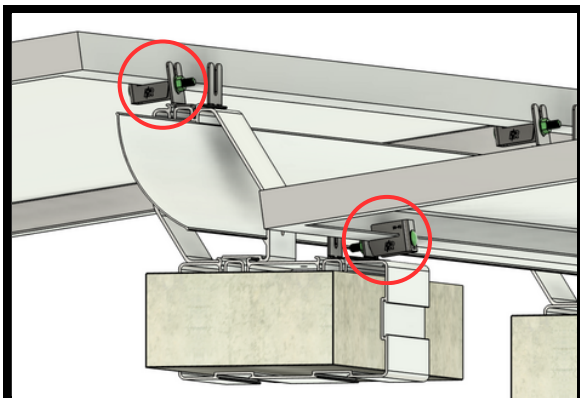


Measure the space in between the Base Mounts to determine your spacing for the entire system



# Electrical Bonding

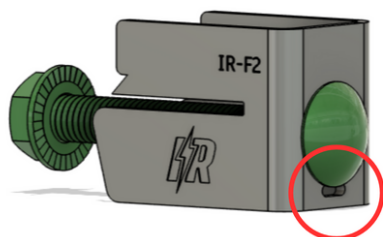
## Electrical Bonding Between Panels / IR-F2 Clamps



### Solar Module Mounting

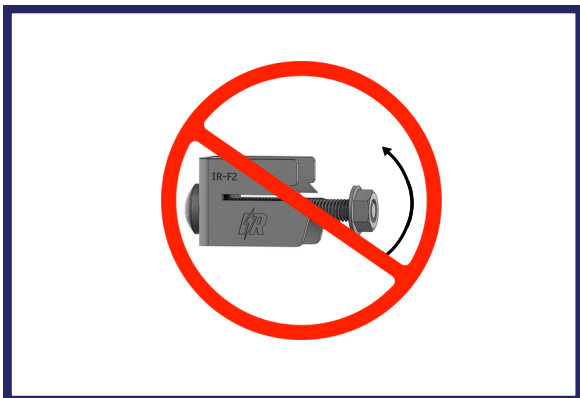
The IR-F2 is designed to clamp the solar module firmly to the racking system, while also bonding the solar panels together. The two sharp piercing barbs are designed to penetrate the anodized aluminum solar panel frame for proper bonding / grounding from solar panel to solar panel.

### INTEGRATED ZIP TIE SLOT FOR WIRE MANAGEMENT



### Integrated Wire Management

When using the integrated wire management with the IR BallastRack system, it is best to run your wires near the front legs with enough slack for the panels to move freely during seasonal adjustment.

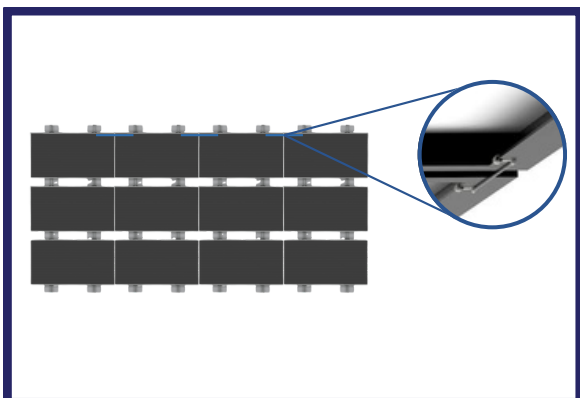


### Pre-Inspection of IR-F2 Clamps

Before or during any installation or re-installation of this component, it is important to ensure that all fasteners are clean and free of damage or signs of corrosion. It is also important to make sure that the bolt is tightened properly. If the bolt is able to move in any way, the inner nut must be tightened.

**Torque Specs: 10 ft-lbs (120 in-lbs)**

## Electrical Bonding Between Rows / IR-B1 Jumpers



### IR-B1 Bonding Jumpers

For bonding between rows of panels, we offer our 8" and 12" IR-B1 Bonding Jumpers that are UL 2703 recognized. The bonding jumpers have small internal bonding barbs and they clamp to the bottom inner flange of the solar panels to provide bonding from row to row.

# UL 2703 & Mounting Restrictions

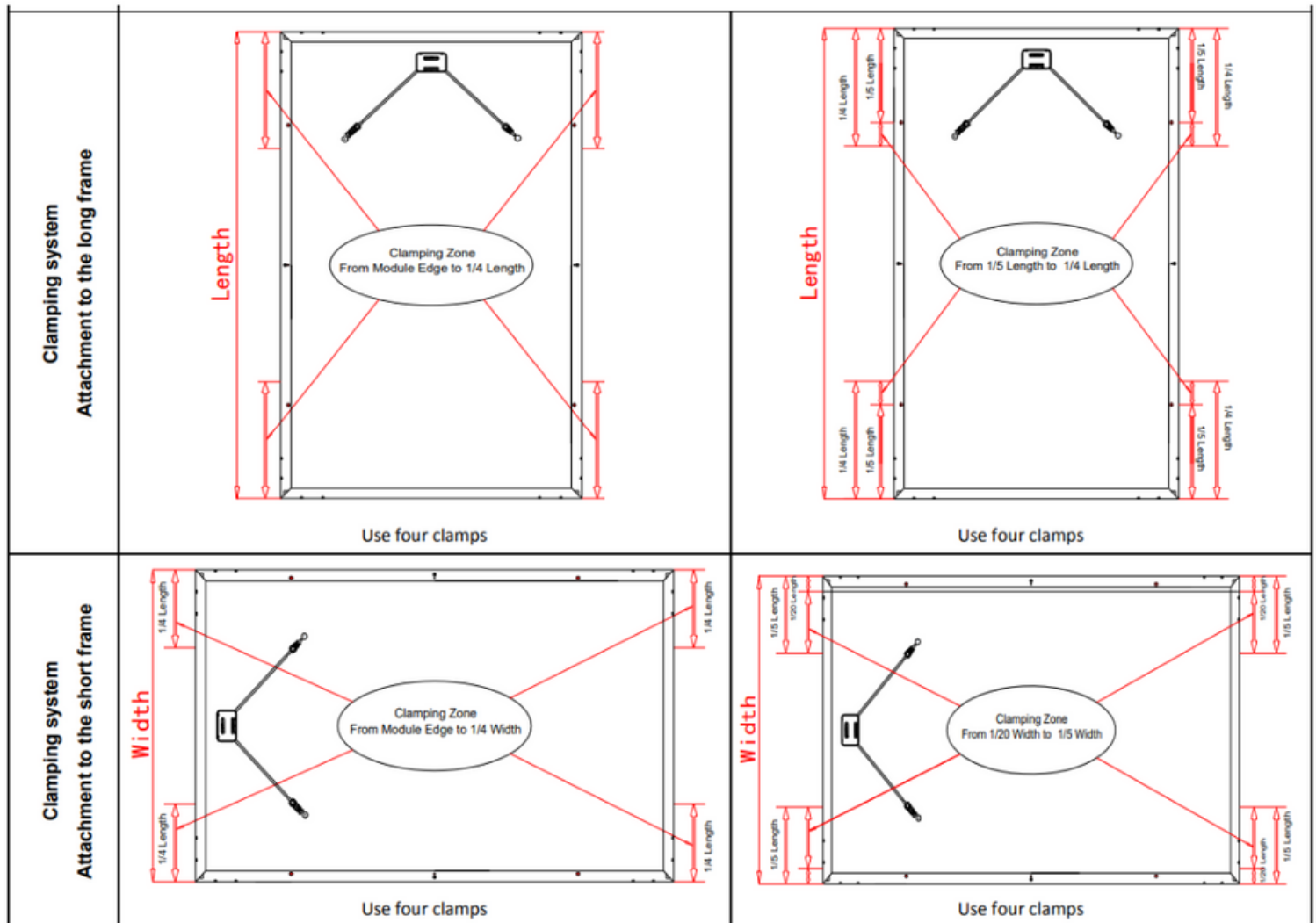
## UL 2703 Compliance

The IR-F2 Flange Clamp Bonding Bracket has been evaluated by UL to ensure compliance with the bonding and grounding requirements has been met. As specified in UL 61730-1 5.2.3DV, PV modules are considered to be in compliance with the mechanical loading and bonding and grounding requirements of UL 61730-1 when mounted, bonded and grounded in the manner specified by either the PV module mounting instructions, or the mounting system manufacturer's instructions when the mounting, bonding, and grounding means have been evaluated with the PV module to UL 2703.

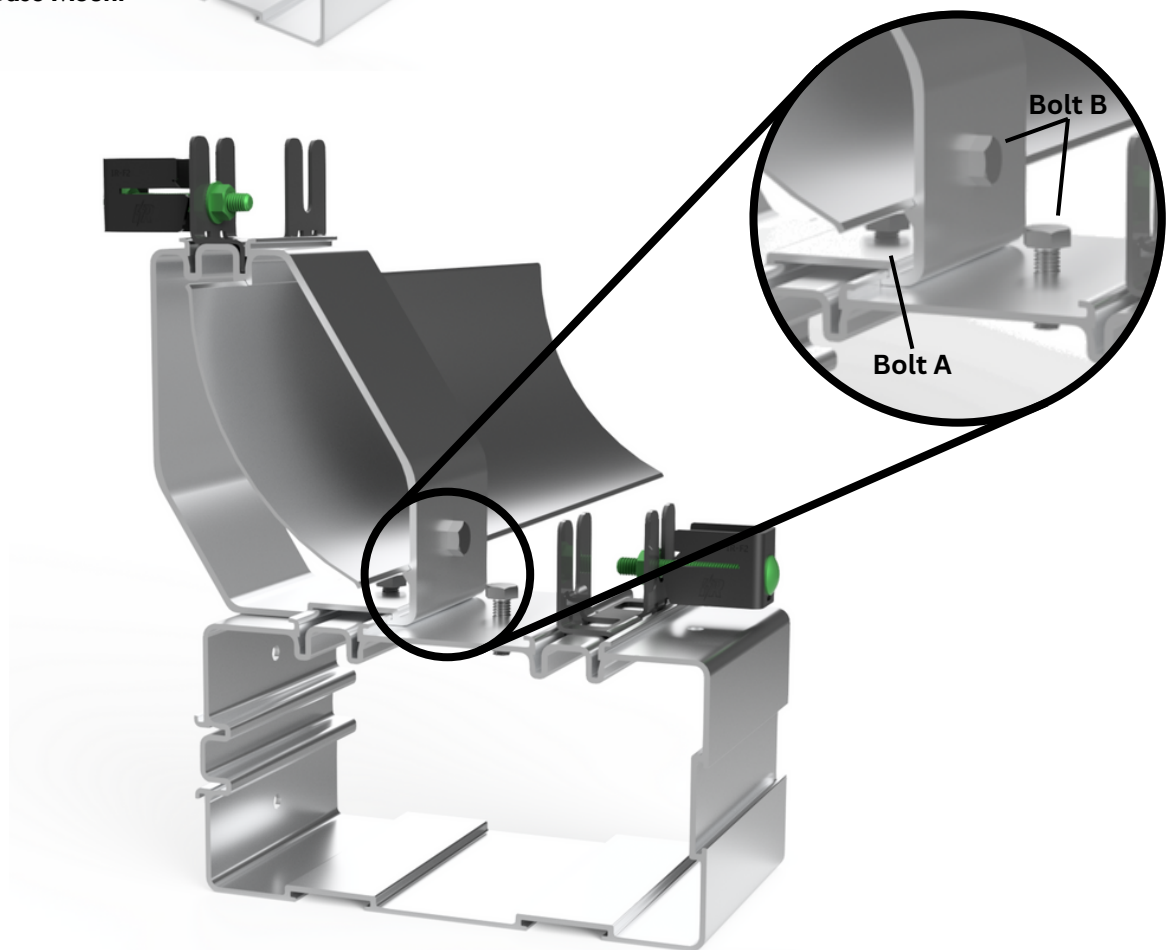
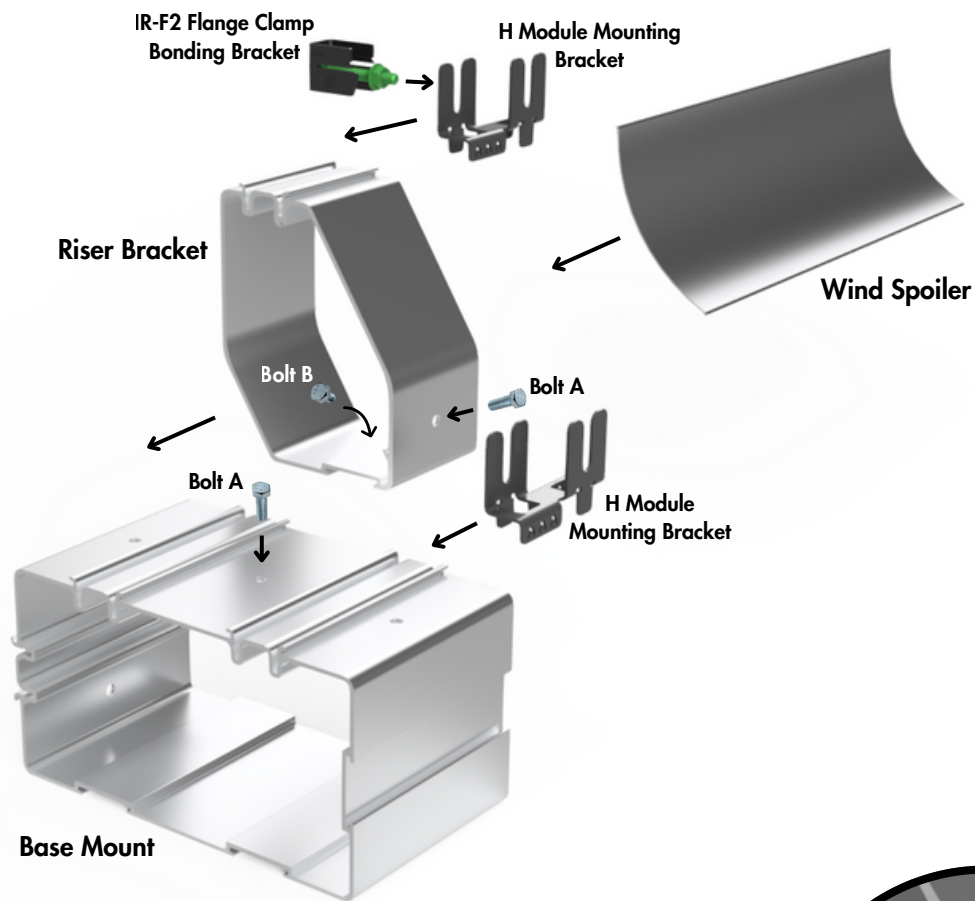
**Bonding Overcurrent Protection Rating: 25A**

## Mounting Restrictions

The IR-F2 can be mounted anywhere along the flange of the solar panel, but it is important to install this bracket in accordance with the solar panel manufacturer's recommended clamping zones, typically found in the installation instructions provided by the solar panel manufacturer. For most solar panels, the ideal clamping zone is  $\frac{1}{4}$  of the solar panels length in from each end, leaving  $\frac{1}{2}$  of the solar panels length between two of the clamps (see example below)



# Assembly & Fastener Locations



# Interlocking Components

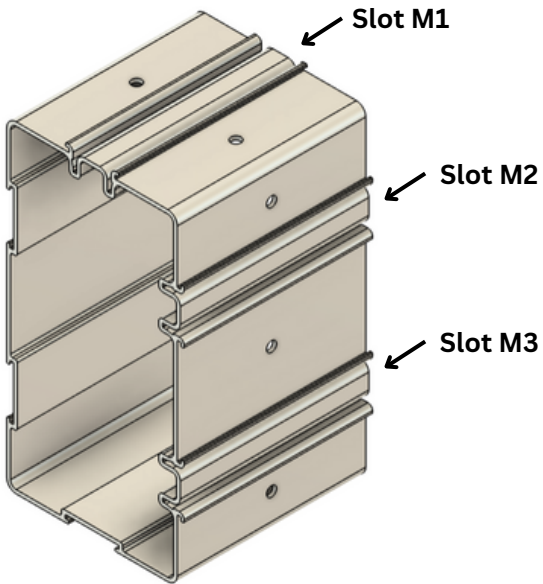


## IMPORTANT

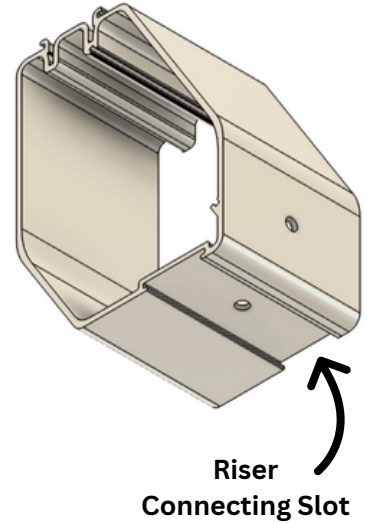
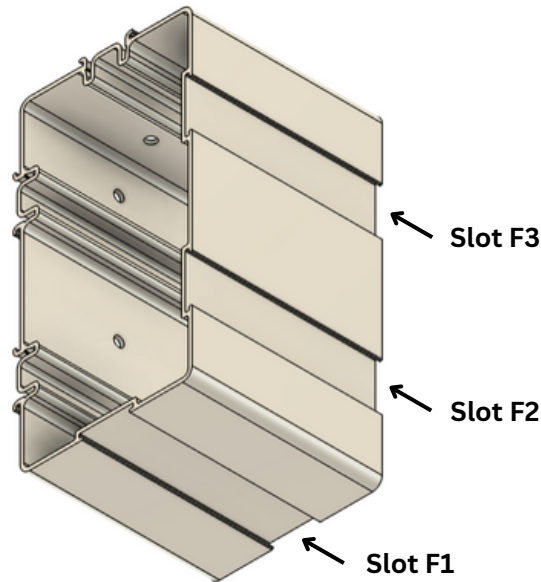
### Male to Female Extrusions

Note that all Base Mounts and Riser Brackets have both male and female extrusions for interlocking the parts together to form the configurations. Pay attention to the orientation of each component as you read the instructions. The male extrusion also doubles as the H Module Bracket slot.

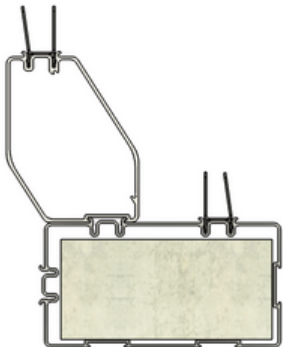
#### MALE



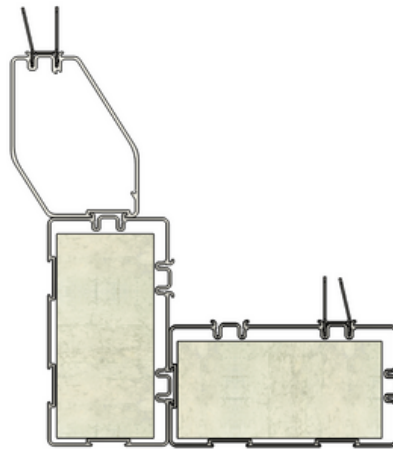
#### FEMALE



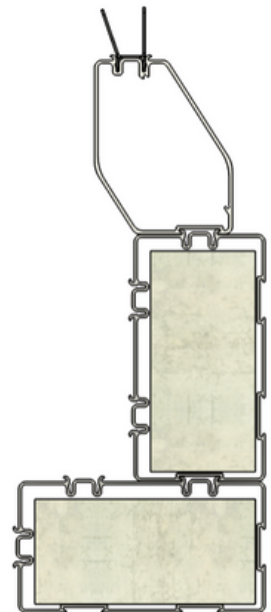
### Interlocking Configurations



IR-08MBCB



IR-13MBCB



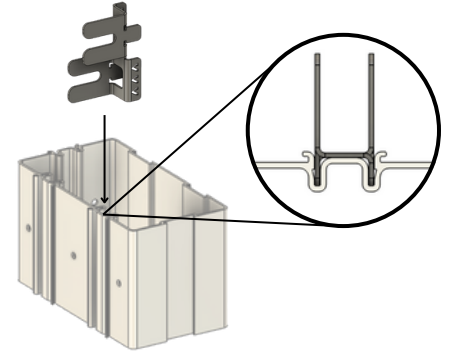
IR-20MBCB

# H Brackets & Mounting Options

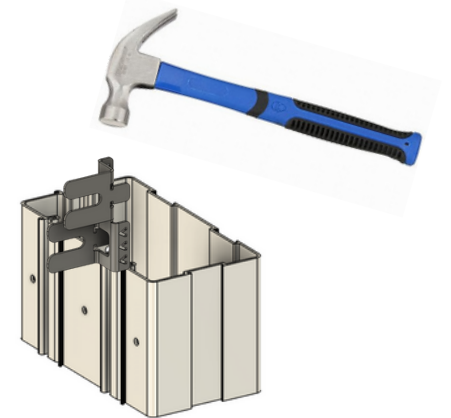
## Installing H Brackets

The MultiBallast Riser Brackets already have the H Module Mounting Brackets installed, but you will need to install the H Module Brackets on your Base Mounts. The position of the H Module Mounting Brackets are dependent on your chosen configuration (see assembly instructions for exact mounting location of the H Brackets).

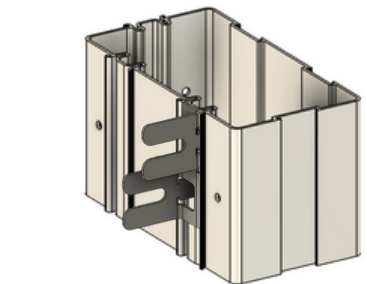
1. Slide the H Module Mounting Bracket into the slot as far as you can by hand



2. Use a hammer to tap the H Module Mounting Bracket all the way into the slot until it is flush with the side of the Base Mount (The H Module Mounting Bracket does not need to be centered on the Base Mount)



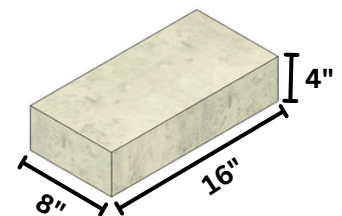
3. The specific mounting locations for the H Module Mounting Brackets can be found in the assembly instructions for your chosen configuration



## Placing the Ballast Block

Skip to the page below to see assembly instructions for your chosen configuration for steps on how to lock the CMU blocks in position

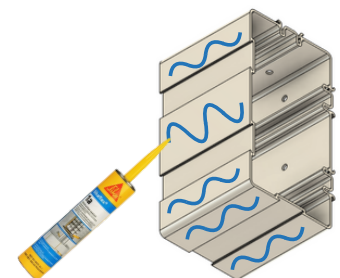
- IR-W5MBCB - Page 12
- IR-08MBCB - Page 15
- IR-13MBCB - Page 17
- IR-20MBCB - Page 20



CMU Block Dimensions

## Adhesive Bonding (Optional)

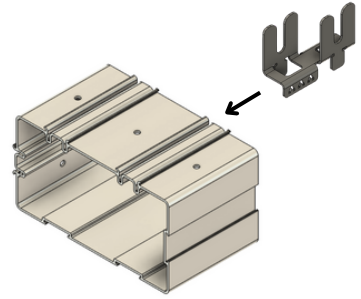
If ballasting is not an option for your install, up to ten Base Mounts can be directly bonded to the roof surface using one tube of Sikaflex 1A Polyurethane Sealant. Apply a bead to each of the roof-touching-surfaces of the Base Mounts in a zig-zag pattern.



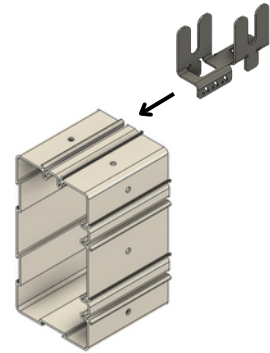
# IR-W5MBCB Assembly & Install

## IR-W5MBCB Assembly - East/West 'W' Conf.

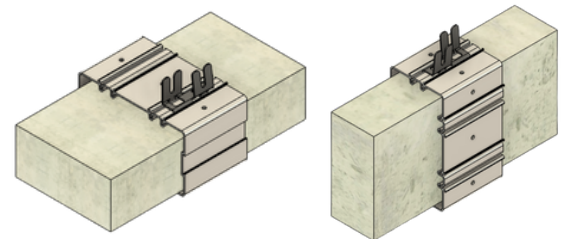
1. Install an H Module Mounting Bracket into Slot M3 of each row-starting Base Mount and half of the other Base Mounts



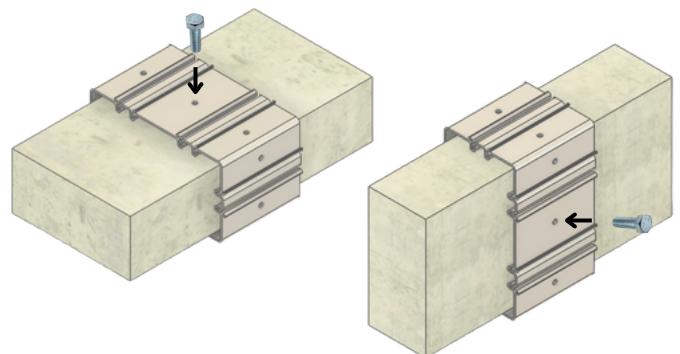
2. Install an H Module Mounting Bracket into Slot M1 of each of the remaining Base Mounts



3. Place the CMU blocks in all Base Mounts



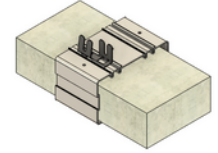
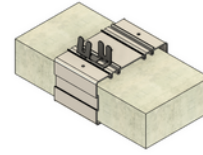
4. Lock the CMU block in place by inserting 1x Bolt B into the center hole on each Base Mount and use a ½" (13mm) wrench to tighten the bolt until it starts to dig into the CMU block



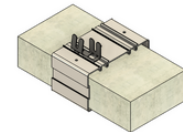
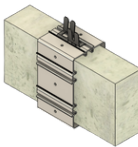
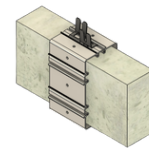
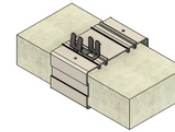
# IR-W5MBCB Assembly & Install

## IR-W5MBCB Layout - East/West 'W' Conf.

**5.** Place the row-starting Base Mounts



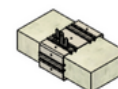
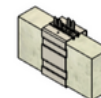
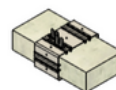
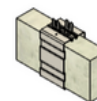
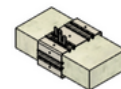
**6.** Place the upright Base Mounts next



**7.** Repeat this formation for the rest of the row



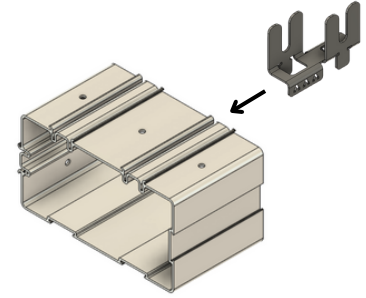
**Skip to page 22 for solar panel mounting**



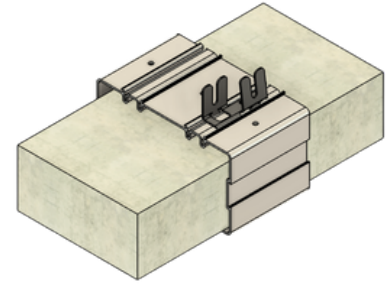
# IR-W5MBCB Assembly & Install

## IR-W5MBCB Assembly - 0° Flat Conf.

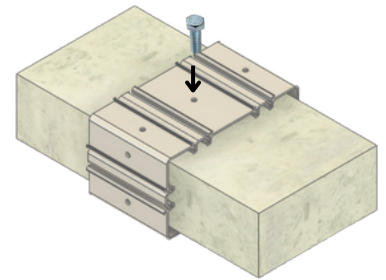
1. Install an H Module Mounting Bracket into Slot M3 on all Base Mounts



2. Place the CMU blocks in all Base Mounts

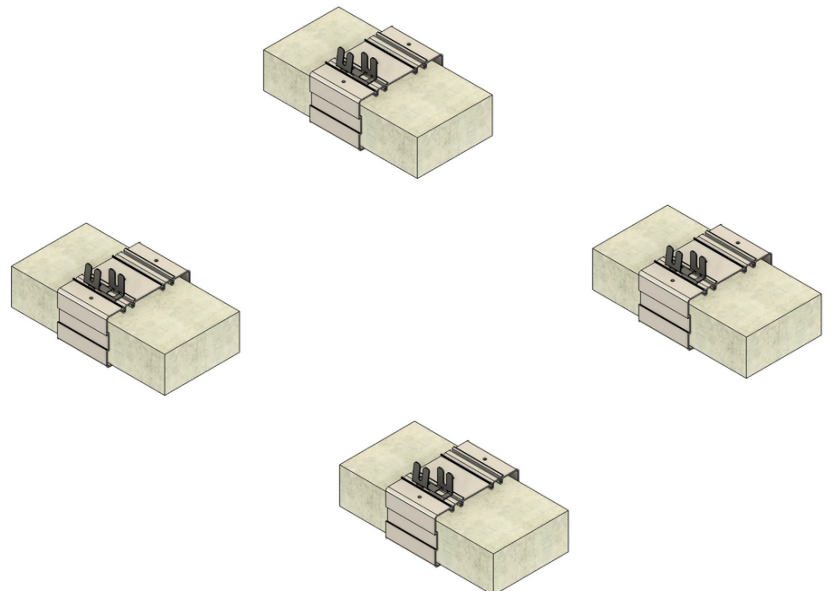


3. Lock the CMU block in place by inserting 1x Bolt B into the center hole on each Base Mount and use a ½" (13mm) wrench to tighten the bolt until it starts to dig into the CMU block



## IR-W5MBCB Layout - 0° Flat Conf.

4. Place all Base Mounts in position on the roof

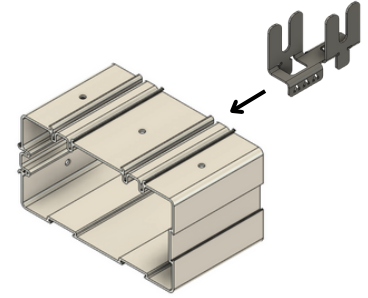


Skip to page 22 for solar panel mounting

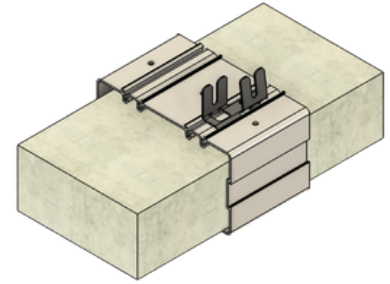
# IR-08MBCB Assembly & Install

## IR-08MBCB Assembly

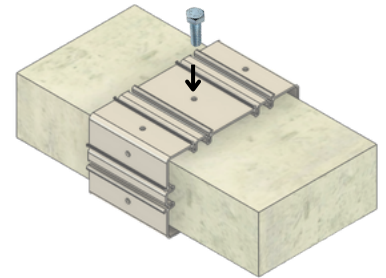
1. Install an H Module Mounting Bracket into Slot M3 on all Base Mounts (including all row-starters)



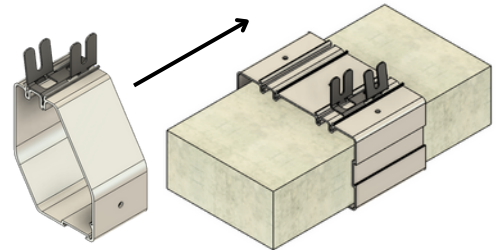
2. Place the CMU blocks in all Base Mounts



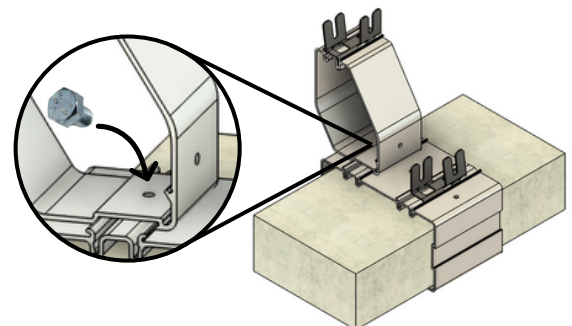
3. Lock the CMU block in place by inserting 1x Bolt B into the center hole on each Base Mount and use a ½" (13mm) wrench to tighten the bolt until it starts to dig into the CMU block



4. Slide the Riser Bracket onto Slot M2 on all Base Mounts



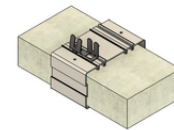
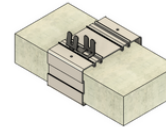
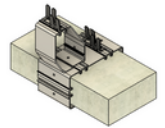
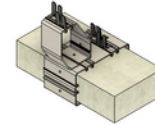
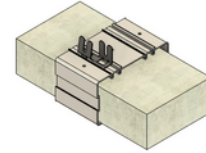
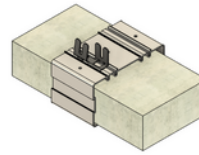
5. Insert 1x Bolt A into the hole at the bottom of the Riser Bracket and use a ½" (13mm) wrench to lock the Riser Bracket in place



# IR-08MBCB Assembly & Install

## IR-08MBCB Layout

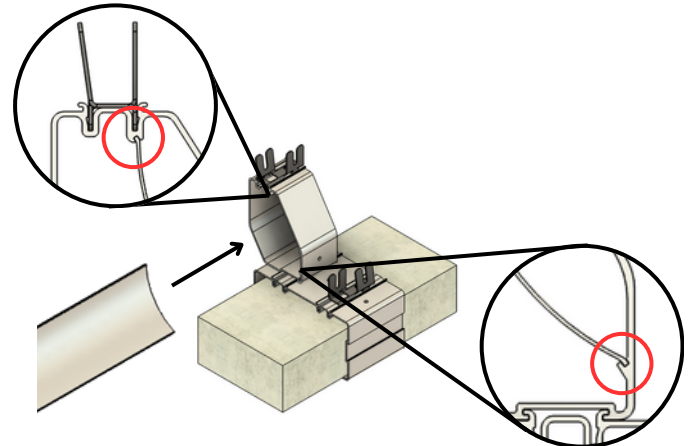
**6.** Place the row-starting Base Mounts



**7.** Place all remaining IR-08MBCB mounts to the end of the row

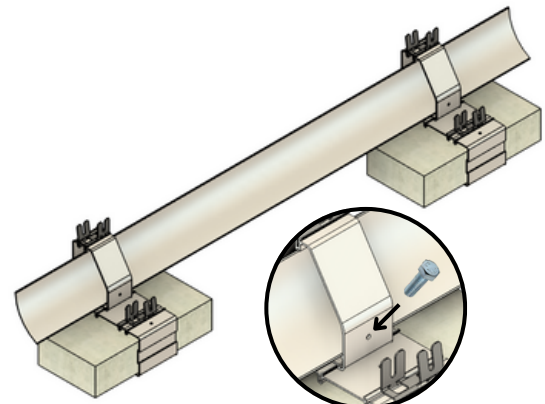
## IR-08MBCB Wind Spoiler

**8.** Slide the Wind Spoiler into the cutouts on each Riser Bracket



**9.** Insert 1x Bolt B into the front of each Riser Bracket and tighten it until it is tight against the Wind Spoiler (DO NOT overtighten)

**10.** Install 1x Wind Spoiler behind each panel

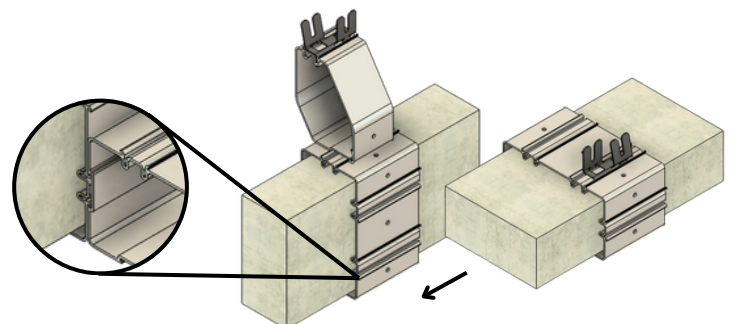
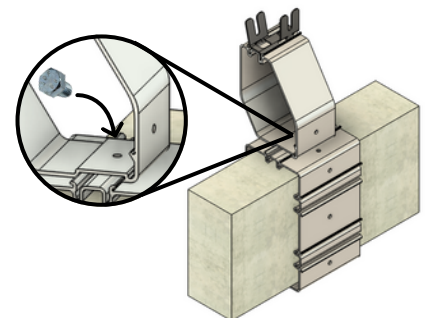
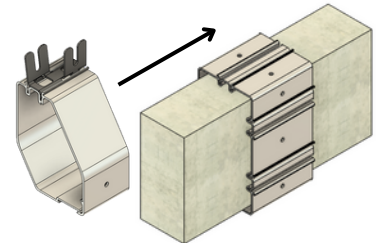
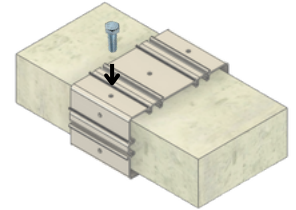
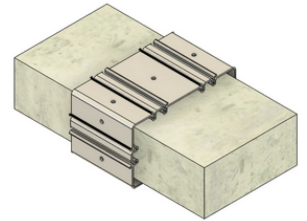
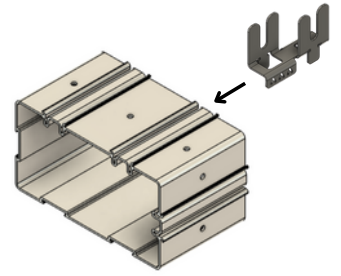


Skip to page 22 for solar panel mounting

# IR-13MBCB Assembly & Install

## IR-13MBCB Assembly

1. Install an H Module Mounting Bracket into Slot M2 on all row-starting Base Mounts and half of the remaining Base Mounts
2. Place the CMU blocks in all Base Mounts
3. Lock the CMU block in place by inserting 1x Bolt B into the indicated hole on each Base Mount and use a  $\frac{1}{2}$ " (13mm) wrench to tighten the bolt until it starts to dig into the CMU block
4. Slide the Riser Bracket onto Slot M1 of the first Base Mount
5. Insert 1x Bolt A into the hole at the bottom of the Riser Bracket and use a  $\frac{1}{2}$ " (13mm) wrench to lock the Riser Bracket in place
6. Slide Slot F1 of the second Base Mount onto Slot M3 on the front of the first Base Mount interlocking the two components together

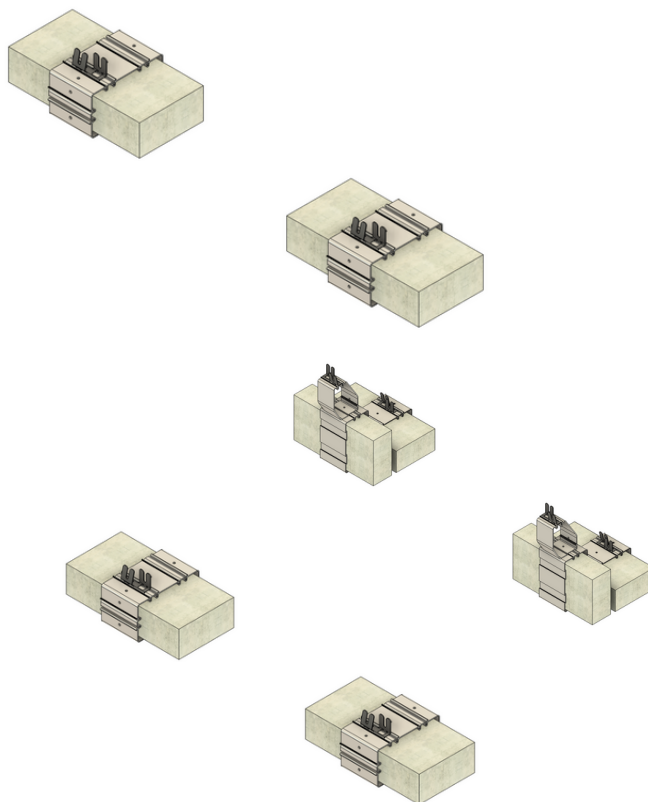


# IR-13MBCB Assembly & Install

## IR-13MBCB Layout

**7.** Place the row-starting Base Mounts

**8.** Place all remaining IR-13MBCB mounts to the end of the row

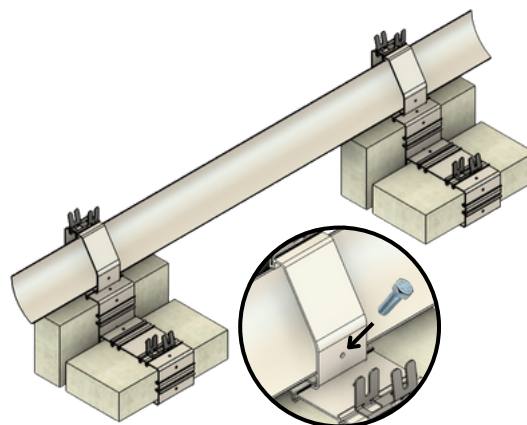
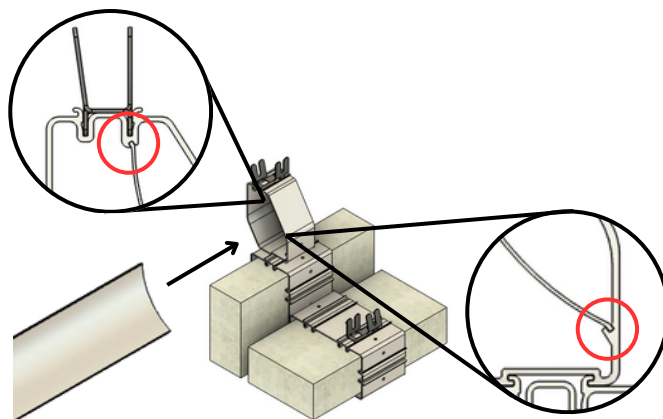


## IR-13MBCB Wind Spoilers

**8.** Slide the Wind Spoiler into the cutouts on each Riser Bracket

**9.** Insert 1x Bolt B into the front of each Riser Bracket and tighten it until it is tight against the Wind Spoiler (DO NOT overtighten)

**10.** Install 1x Wind Spoiler behind each panel



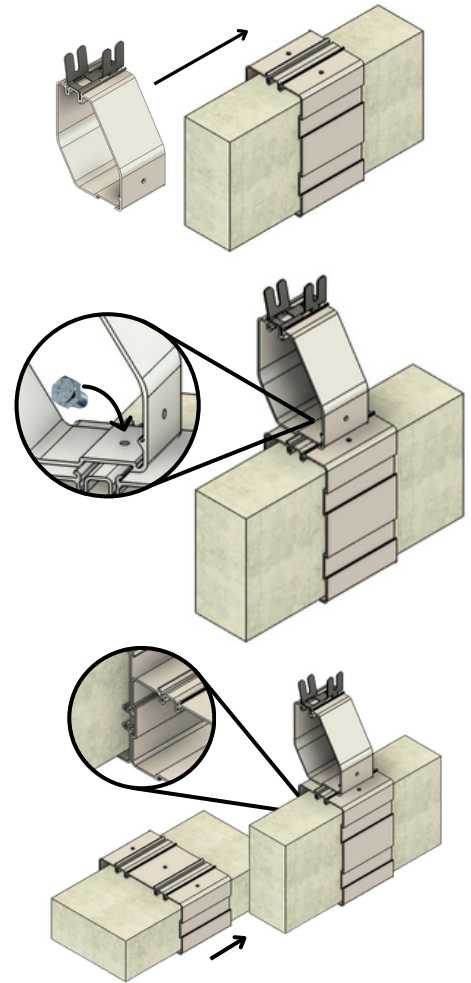
See next page for Back of Row Instructions

# IR-13MBCB Assembly & Install

## IR-13MBCB Assembly - Back of Row

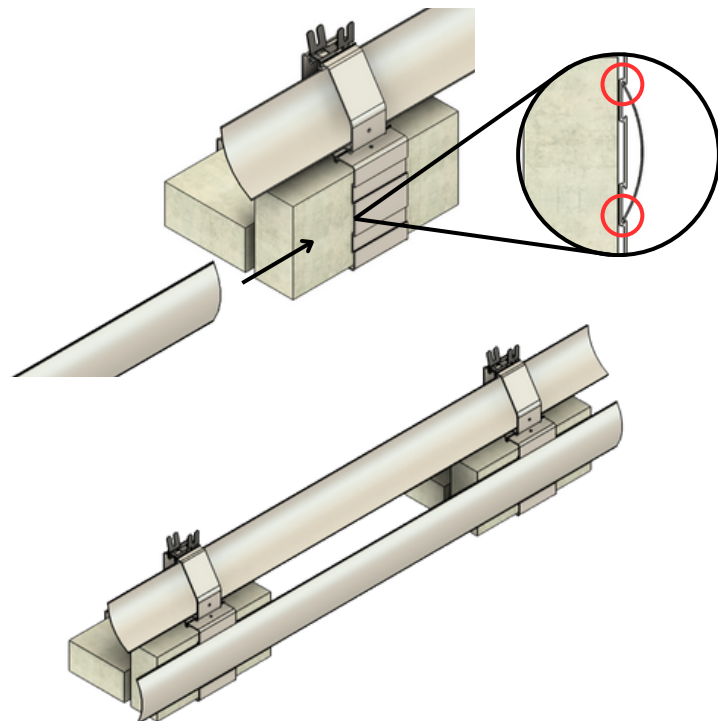
*The mounts at the end of the row are assembled in a different configuration, so 2x Wind Spoilers can be installed at the back of the row.*

1. Slide the Riser Bracket onto Slot M1 of the first Base Mount (notice that the Riser Bracket is mounted backwards on this Base Mount)
2. Insert 1x Bolt A into the hole at the bottom of the Riser Bracket and use a ½" (13mm) wrench to lock the Riser Bracket in place
3. Slide Slot F1 of the second Base Mount onto Slot M3 on the front of the first Base Mount interlocking the two components together



## IR-13MBCB Wind Spoiler - Back of Row

4. Slide the Wind Spoiler into Slot F2 and F3 on the back of the Base Mount
5. Install the extra Wind Spoiler on the back of each row



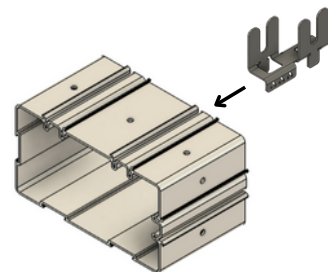
**Skip to page 22 for solar panel mounting**

# IR-20MBCB Assembly & Install

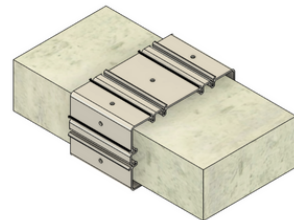
## IR-20MBCB Assembly & Layout

*This system is built to mount solar panels individually instead of in rows, so the steps below will need to be repeated for each panel in the system.*

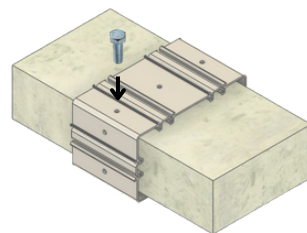
1. Install an H Module Mounting Bracket into Slot M2 on 2x Base Mounts



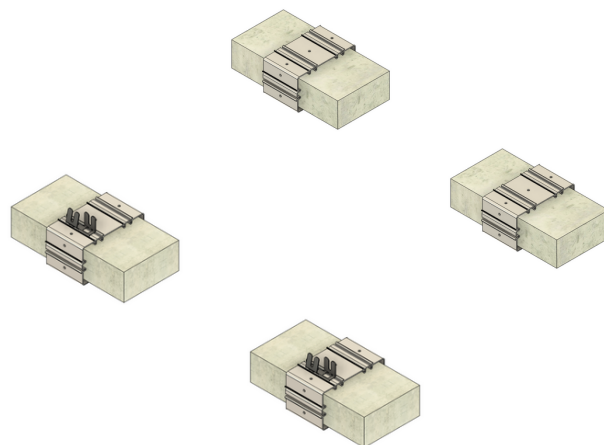
2. Place the CMU blocks in all Base Mounts



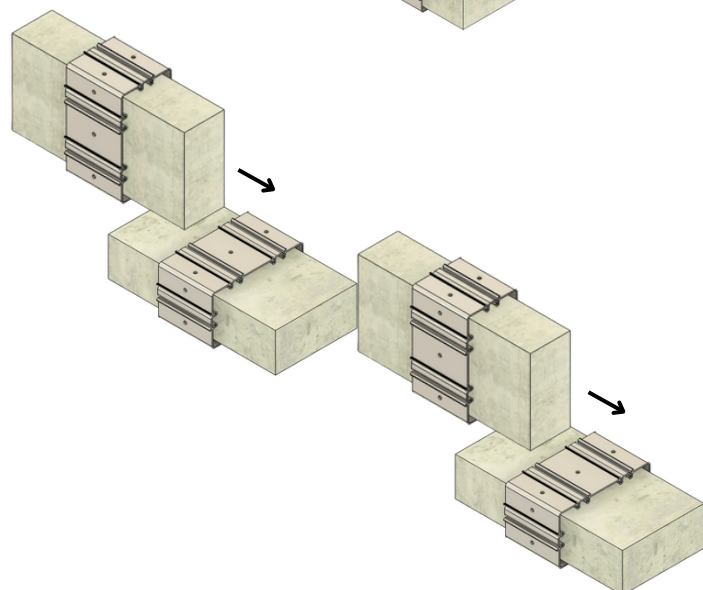
3. Lock the CMU block in place by inserting 1x Bolt B into the indicated hole on each Base Mount and use a ½" (13mm) wrench to tighten the bolt until it starts to dig into the CMU block



4. Place the front Base Mounts with the H Module Mounting Brackets in position and 2x Base Mounts behind them at the required spacing

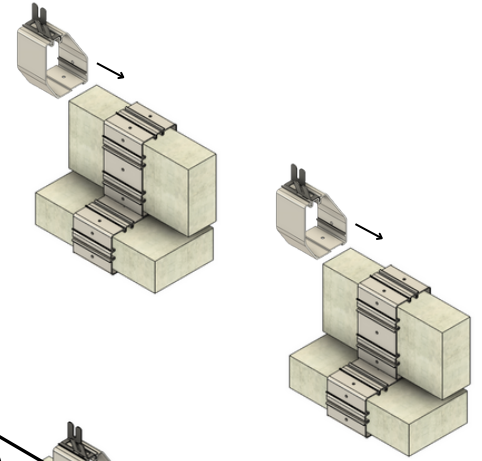


5. Slide Slot F1 of the remaining Base Mounts onto Slot M3 of the rear Base Mounts (notice the orientation of the Base Mounts)

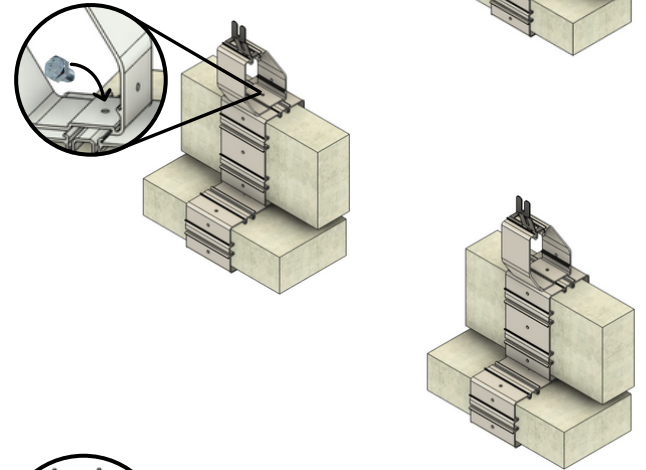


# IR-20MBCB Assembly & Install

- 5.** Slide the Riser Brackets onto Slot M1 of the upper Base Mounts

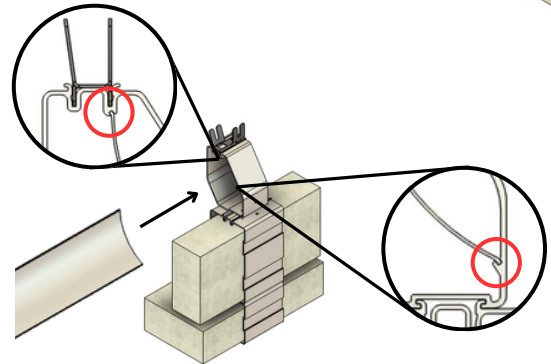


- 6.** Insert 1x Bolt A into the hole at the bottom of each Riser Bracket and use a ½" (13mm) wrench to lock the Riser Brackets in place

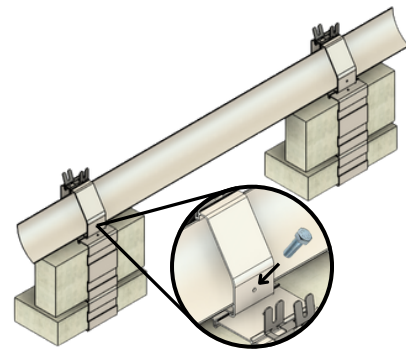


## IR-20MBCB Wind Spoilers

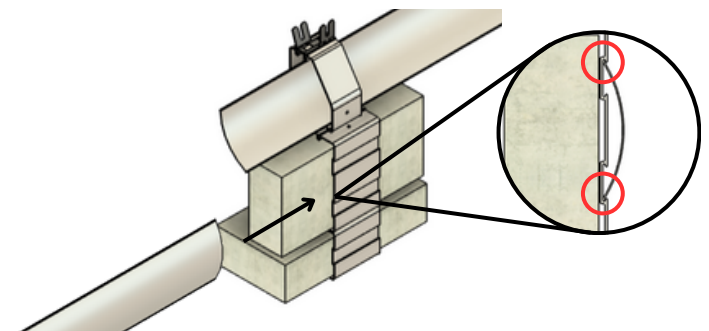
- 7.** Slide the Wind Spoiler into the cutouts on each Riser Bracket



- 9.** Insert 1x Bolt B into the front of each Riser Bracket and tighten it until it is tight against the Wind Spoiler (DO NOT overtighten)



- 10.** Slide the second Wind Spoiler into Slot F2 and F3 on the back of the Base Mount

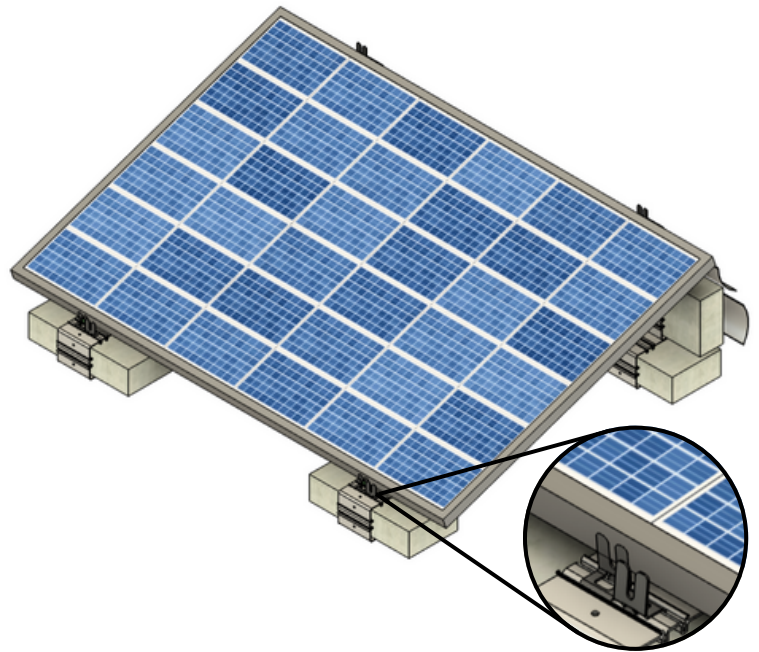


See the next page for solar panel mounting

# Solar Panel Mounting

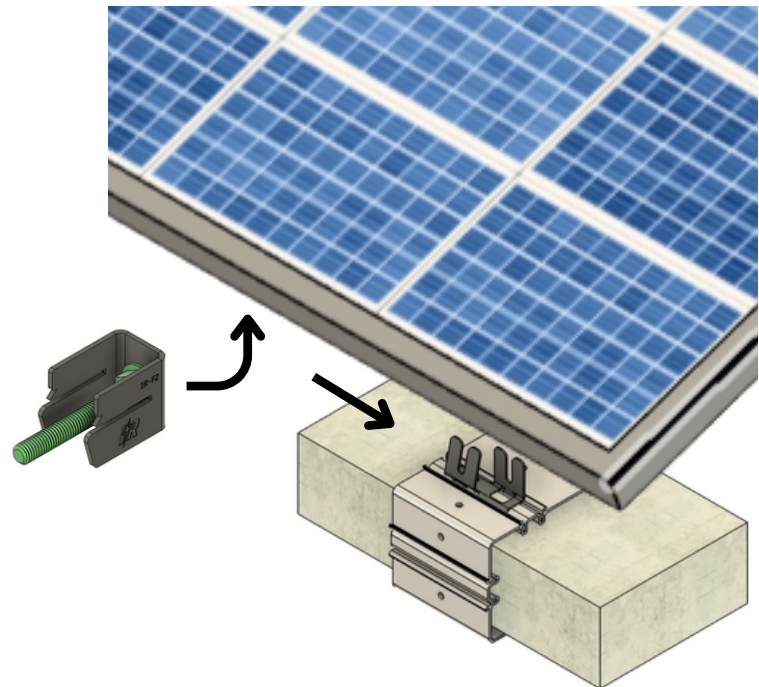
*The solar panel mounting steps below are for all MultiBallast configurations*

- 11.** Set the solar panel onto the mounts and make sure it fits snug in between the H Module Mounting Brackets



- 12.** Remove the serrated nut from the end of each IR-F2 Solar Module Flange Clamp Bonding Bracket

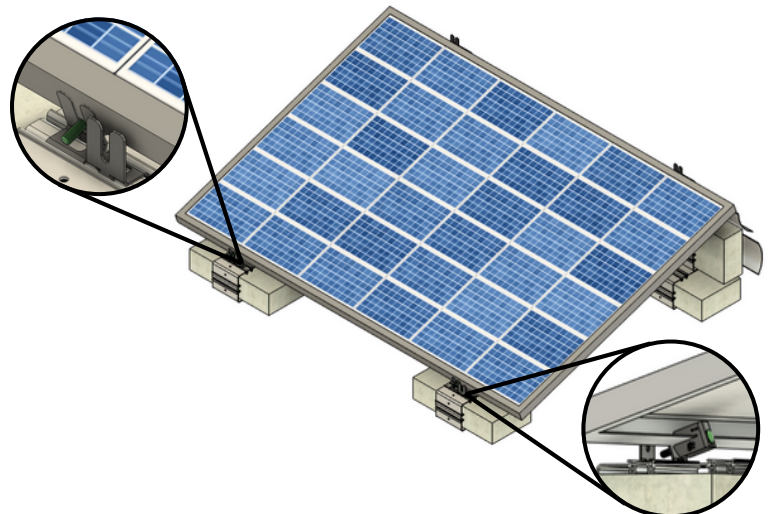
- 13.** Lift up the solar panel and slide the open slot on the sides of the IR-F2 onto the inner flange of the panel



- 14.** Drop the bolt of the IR-F2 into the open slot of the H Module Mounting Bracket

- 15.** Fasten the serrated nut onto the end of the IR-F2 bolt and tighten by hand for now

- 16.** Install the remaining IR-F2s and tighten all of the serrated nuts with a ½" (13mm) wrench





**More MultiBallast Info**



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