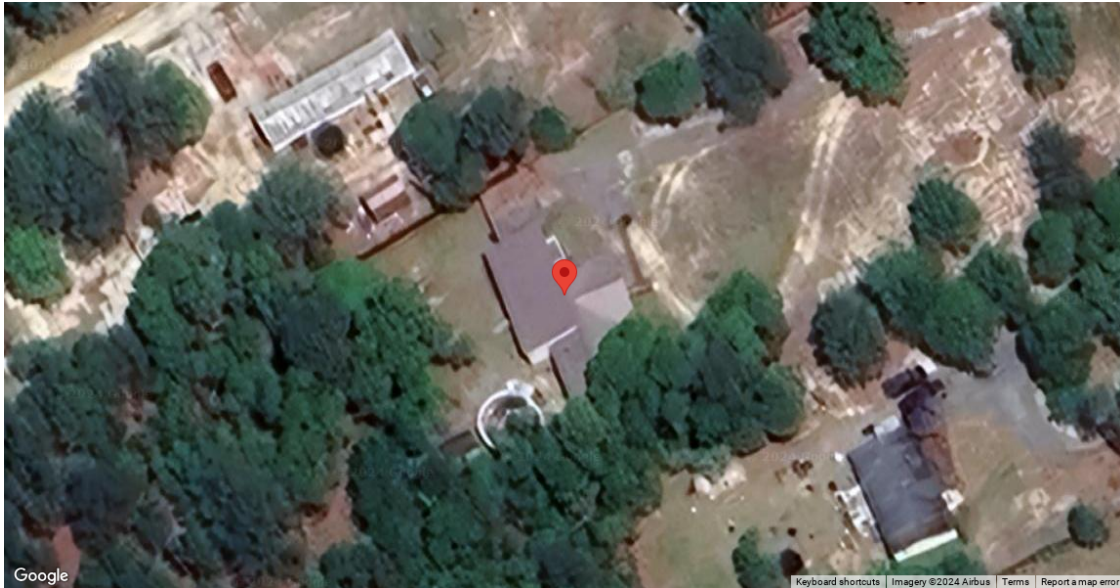


**Project Details**

|                   |  |                      |            |
|-------------------|--|----------------------|------------|
| <b>Name</b>       | Elizabeth Moore  | <b>Date</b>          | 02/19/2024 |
| <b>Location</b>   | 2474 Docs Road, Spring Lake, NC 28390                              | <b>Total modules</b> | 11         |
| <b>Module</b>     | Jinko: JKM395M-72HBL-V (40mm)                                      | <b>Total watts</b>   | 4,345      |
| <b>Dimensions</b> | Dimensions: 79.06" x 39.45" x 1.57" (2008.0mm x 1002.0mm x 40.0mm) | <b>Attachments</b>   | 24         |
| <b>ASCE</b>       | 7-10   | <b>Rails per row</b> | 2          |



| System Weight              |           |
|----------------------------|-----------|
| <b>Total system weight</b> | 587.5 lbs |
| <b>Weight/attachment</b>   | 24.5 lbs  |
| <b>Racking weight</b>      | 41.9 lbs  |
| <b>Distributed weight</b>  | 2.4 psf   |

| Load Assumptions                   |         |
|------------------------------------|---------|
| <b>Wind exposure</b>               | B       |
| <b>Wind speed</b>                  | 120 mph |
| <b>Ground snow load</b>            | 15 psf  |
| <b>Attachment spacing portrait</b> | 3.75'   |

| Roof Information            |        |                              |               |
|-----------------------------|--------|------------------------------|---------------|
| <b>Roof Material Family</b> | Metal  | <b>Roof material</b>         | Standing Seam |
| <b>Risk category</b>        | II     | <b>Roof attachment</b>       | None          |
|                             |        | <b>Staggered attachments</b> | Yes           |
| <b>Attachment hardware</b>  | Square |                              |               |

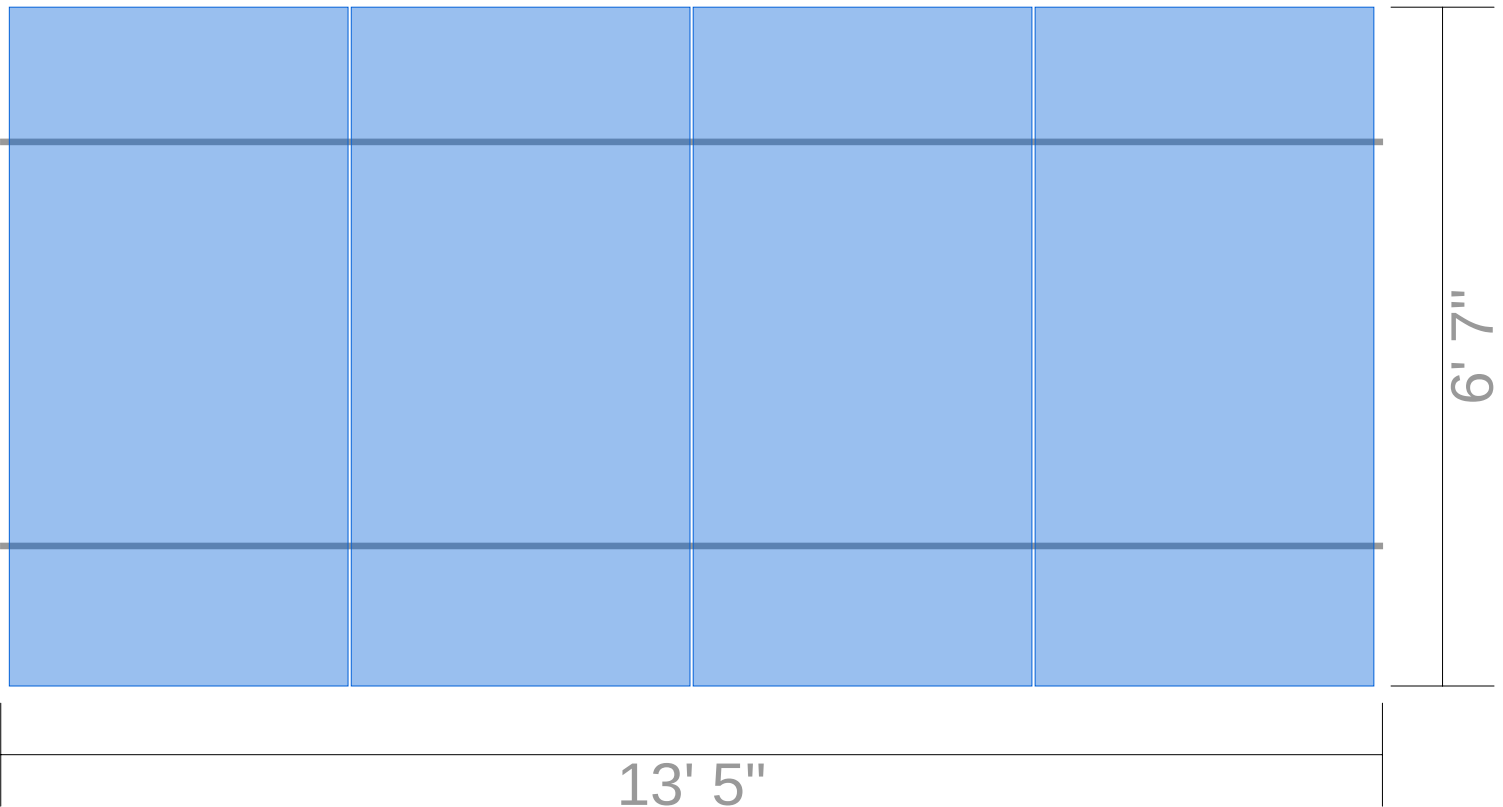
**Roof Plane A**

|               |       |              |      |                       |       |
|---------------|-------|--------------|------|-----------------------|-------|
| <b>Height</b> | 15 ft | <b>Slope</b> | 20 ° | <b>Rafter spacing</b> | 12 in |
|---------------|-------|--------------|------|-----------------------|-------|

**Roof Plane A: Roof Section 1**

| Details                     |                               | Weights                     |
|-----------------------------|-------------------------------|-----------------------------|
| Panels: 4                   | Provided rail: 28' [2 x 168"] | Total weight: 212.4 lbs     |
| Rail orientation: East-West | Attachments: 9                | Weight/attachment: 23.6 lbs |
| Panel orientation: Portrait | Splices: 0                    | Total Area: 88.4 sq ft      |
| Entry type: Graphical       | Clamps: 10                    | Distributed weight: 2.4 psf |

**Diagram**



**Segments**

| Identifier | Columns | Row length | Rail length | Cantilever | Rail           | Attachments | Splices | Clamps |
|------------|---------|------------|-------------|------------|----------------|-------------|---------|--------|
| A          | 4       | 13' 5"     | 13' 5"      | 1' 1"      | 28' [2 x 168"] | 9           | 0       | 10     |

**Span Details XR10 - Portrait**

| Zone | Max span | Max cantilever |
|------|----------|----------------|
| 1    | 5' 6"    | 2' 2"          |
| 2    | 5' 6"    | 2' 2"          |
| 3    | 4' 8"    | 1' 10"         |

**Reaction Forces XR10 - Portrait**

| Zone | Uplift (PSF) | Down (lbs) | Uplift (lbs) | Lateral Par (lbs) | Lateral Perp (lbs) |
|------|--------------|------------|--------------|-------------------|--------------------|
| 1    | 11.7         | 221        | 123          | 59                | 4                  |
| 2    | 21.5         | 221        | 251          | 59                | 4                  |
| 3    | 33.2         | 221        | 397          | 59                | 4                  |

**Roof Plane B**

**Height**

15 ft

**Slope**

22 °

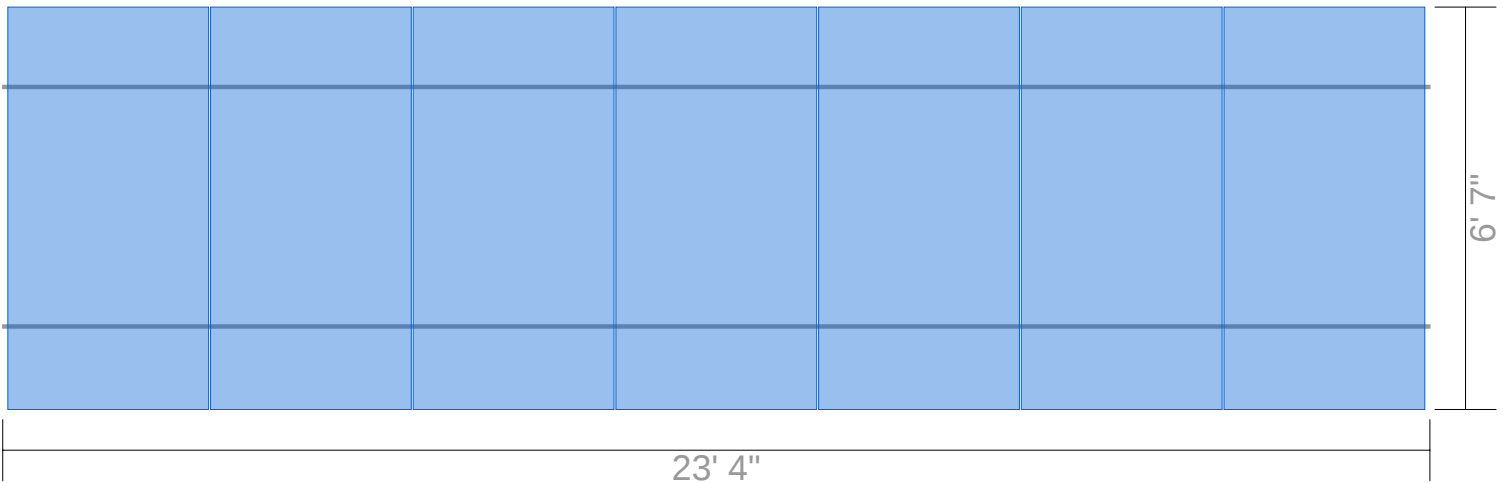
**Rafter spacing**

12 in

**Roof Plane B: Roof Section 1**

| Details                     |                               | Weights                     |
|-----------------------------|-------------------------------|-----------------------------|
| Panels: 7                   | Provided rail: 56' [4 x 168"] | Total weight: 375.1 lbs     |
| Rail orientation: East-West | Attachments: 15               | Weight/attachment: 25.0 lbs |
| Panel orientation: Portrait | Splices: 2                    | Total Area: 153.9 sq ft     |
| Entry type: Graphical       | Clamps: 16                    | Distributed weight: 2.4 psf |

**Diagram**



**Segments**

| Identifier | Columns | Row length | Rail length | Cantilever | Rail           | Attachments | Splices | Clamps |
|------------|---------|------------|-------------|------------|----------------|-------------|---------|--------|
| A          | 7       | 23' 4"     | 23' 4"      | 5"         | 56' [4 x 168"] | 15          | 2       | 16     |

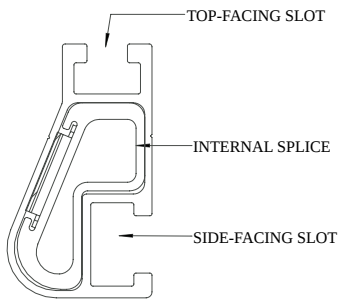
**Span Details XR10 - Portrait**

| Zone | Max span | Max cantilever |
|------|----------|----------------|
| 1    | 5' 7"    | 2' 3"          |
| 2    | 5' 7"    | 2' 3"          |
| 3    | 4' 8"    | 1' 10"         |

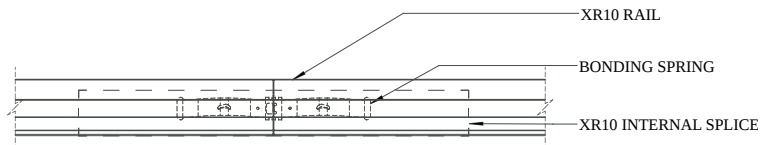
**Reaction Forces XR10 - Portrait**

| Zone | Uplift (PSF) | Down (lbs) | Uplift (lbs) | Lateral Par (lbs) | Lateral Perp (lbs) |
|------|--------------|------------|--------------|-------------------|--------------------|
| 1    | 11.7         | 214        | 123          | 62                | 4                  |
| 2    | 21.5         | 214        | 251          | 62                | 4                  |
| 3    | 33.2         | 214        | 397          | 62                | 4                  |

**Splice Details**

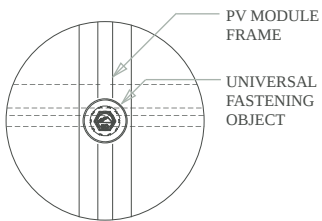


XR10

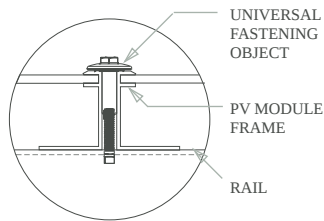


Splice Connection

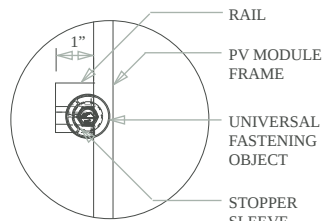
**Clamp Detail**



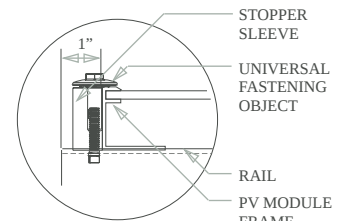
Mid Clamp, Plan



Mid Clamp, Front

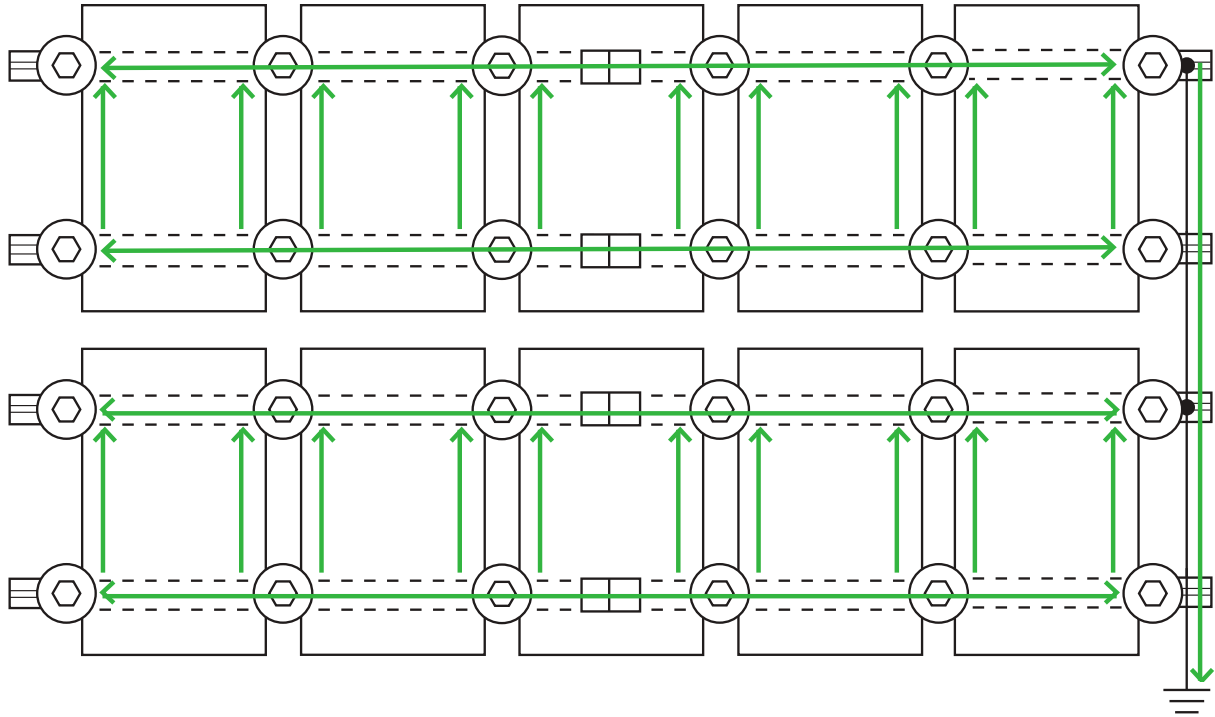


End Clamp, Plan





End Clamp, Front

### Grounding Diagram



 UFO Clamp

 Fault Current Ground Path

 Grounding Lug \*

 Min 10 AWG Copper Wire \*

 Bonded Splice (Rail Connection)

\* Grounding Lugs and Wire are not required in systems using Enphase microinverters.

**Bill of Materials**

| <b>Part</b> | <b>Spares</b> | <b>Total Qty</b> |
|-------------|---------------|------------------|
|-------------|---------------|------------------|

**Rails & Splices**

|                                     |   |   |
|-------------------------------------|---|---|
| XR-10-168A<br>XR10, Rail 168" Clear | 0 | 6 |
|-------------------------------------|---|---|

|  |   |   |
|--|---|---|
| XR10-BOSS-01-M1<br>Bonded Splice, XR10 | 0 | 2 |
|--|---|---|

**Clamps & Grounding**

|   |   |    |
|---|---|----|
| UFO-CL-01-A1<br>Universal Module Clamp, Clear | 0 | 26 |
|---|---|----|

|   |   |   |
|---|---|---|
| UFO-STP-40MM-M1<br>Stopper Sleeve, 40MM, Mill | 0 | 8 |
|---|---|---|

|  |   |   |
|--|---|---|
| XR-LUG-03-A1<br>Grounding Lug, Low Profile | 0 | 2 |
|--|---|---|

**Attachments**

|  |   |    |
|--|---|----|
| BHW-SQ-02-A1<br>Square-Bolt Bonding Hardware | 0 | 24 |
|--|---|----|



# ATTACHMENTS

## PRE-INSTALLATION

- Verify module compatibility. See [Page 21](#) for info.

## TOOLS REQUIRED

- |                                 |                       |
|---------------------------------|-----------------------|
| □ Cordless Drill (non-impact)   | □ 3/8" Socket         |
| □ Impact Driver (for lag bolts) | □ 1/8" Drill Bit      |
| □ Torque Wrench (0-250 in-lbs)  | □ 1/4" Drill Bit      |
| □ 7/16" Socket                  | □ T30 Bit             |
| □ 1/2" Socket                   | □ Channel Lock Pliers |
| □ 9/16" Socket                  | □ #3 Phillips Bit     |
| □ 7/32" Drill Bit               | □ 3/16" Hex Bit       |

## BONDING HARDWARE TORQUE VALUES

Please refer to each attachment's individual section for full details on all torque values and instructions.

- 3/8" Bonding Hardware Nuts (7/16" Socket): 250 in-lbs
- All Tile Hook Carriage Bolts (7/16" Socket): 132 in-lbs
- Flat Roof Attachment Nuts (9/16" Socket): 250 in-lbs
- Lynx Set Screw (3/16" Hex Drive): 150 in-lbs
- Lynx Flange Nut (1/2" Socket): 150 in-lbs

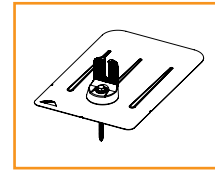
➤ If using previous version of Integrated Grounding Mid Clamps, End Clamps, Expansion Joints and for a list of approved 3rd party components please refer to Alternate Components Addendum (Version 1.9)

## ATTACHMENTS

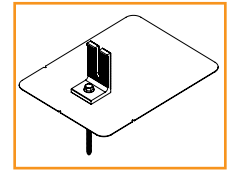
### COMPOSITION SHINGLE



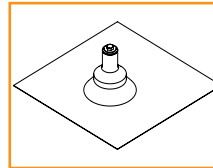
FlashFoot2



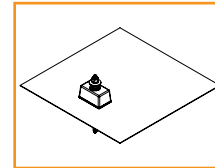
FlashVue



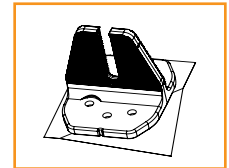
QM L-Mount



QM QBase

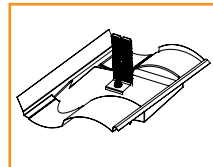


QM Classic Comp Mount

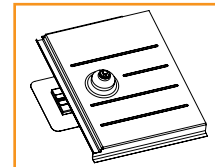


HUG (Halo UltraGrip)

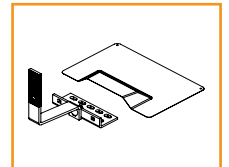
### TILE



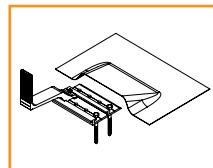
Knockout Tile



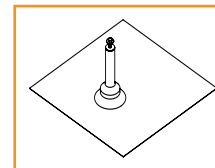
QM Tile Replacement



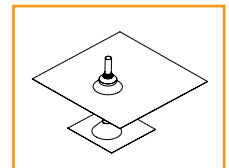
All Tile Hook and Flashing (optional)



QM Quick Hook and Flashing (optional)

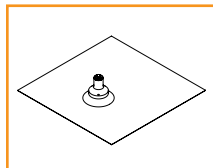


QM QBase Tile

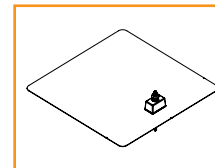


QM Tile Conduit Penetration

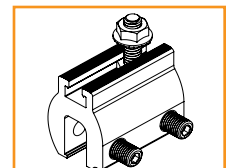
### ADDITIONAL ROOF TYPES



QM Qbase Shake - Slate - Metal Shingle

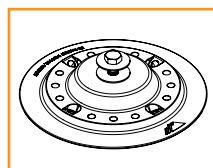


QM Classic Mount Shake

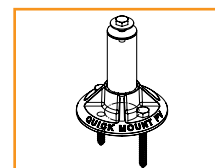


QM Lynx Metal Roof Attachment

### LOW SLOPE ROOF



Flat Roof Attachment



QM QBase Mount

# COMPONENTS

## PRE-INSTALLATION

- Verify module compatibility. See [Page 21](#) for info.

## TOOLS REQUIRED

- Cordless Drill (non-impact)
- Impact Driver (for lag bolts)
- Torque Wrench (0-250 in-lbs)
- 7/16" Socket
- 1/2" Socket
- 9/16" Socket
- 7/32" Drill bit
- 1/8" Drill bit
- 1/4" Drill bit
- T30 Torx Bit
- Channel Lock Pliers
- #3 Phillips Bit
- Paddle Bit

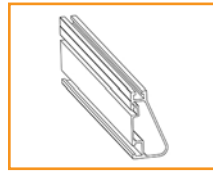
## BONDING HARDWARE TORQUE VALUES

Please refer to each attachment's individual section for full details on all torque values and instructions.

- Universal Fastening Object (7/16" Socket): 80 in-lbs
- Rail Grounding Lug Nut (7/16" Socket): 80 in-lbs
- Module Grounding Lug
  - Grounding Nut (7/16" Socket): 60 in-lbs
  - Grounding Lug Terminal Screws (7/16" Socket): 20 in-lbs
- Microinverter Kit Nuts (7/16" Socket): 80 in-lbs
- Frameless Module Kit Nuts (7/16" Socket): 80 in-lbs
- 3/8" Bonding Hardware Nuts (7/16" Socket): 250 in-lbs
- Contour Clamp (T-30 Torx Bit): 80 in-lbs

➤ Unless otherwise noted, all components have been evaluated for multiple use. They can be uninstalled and reinstalled in the same or new location.

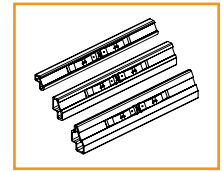
## COMPONENTS



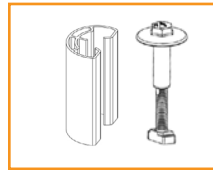
XR Rail



Wire Clip



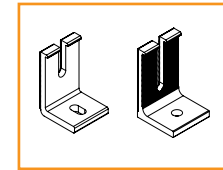
BOSS



UFO and Stopper Sleeve (30-46MM)



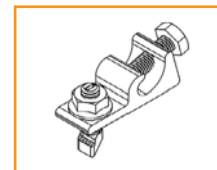
CAMO



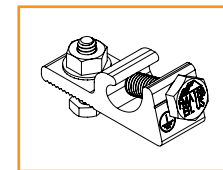
Ironridge L-Foot and QM L-Foot



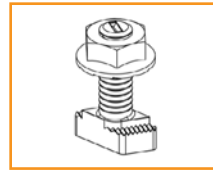
End Cap



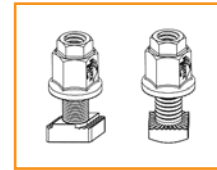
Rail Grounding Lug



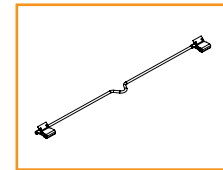
Module Grounding Lug



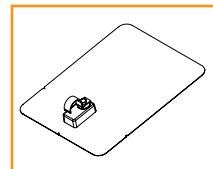
Microinverter Kit



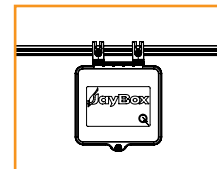
3/8" Bonding Hardware



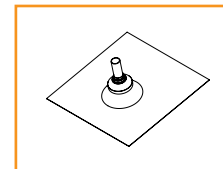
8" Bonding Jumper Single Use Only



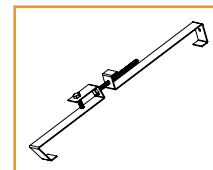
QM Classic Conduit Comp Mount



JAYBOX



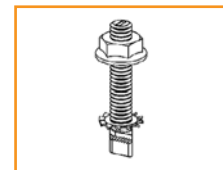
QM Composition Conduit Penetration



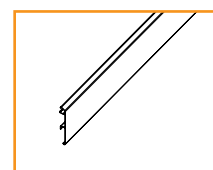
QM Tile Conduit Mount



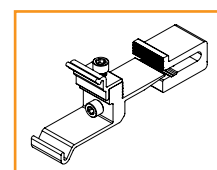
Frameless End/Mid Clamp



Frameless Module Kit



Contour Trim



Contour Clamp

**Rail: XR10** Flush Mount System Span Table (inches) - Portrait or Landscape Installation  
 Max Module Length: 86", Max Module SF: 24.5 SF  
 Exposure B

| Wind Speed (mph) | Roof Slope (deg.) | Ground Snow: 0 psf |        |        | 10 psf |        |        | 20 psf |        |        | 30 psf |        |        | 40 psf |        |        | 50 psf |        |        | 60 psf |        |        | 70 psf* |        |        | 80 psf* |        |        | 90 psf* |        |        | 100 psf* |        |        | 110 psf* |        |        | 120 psf* |    |    |
|------------------|-------------------|--------------------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|--------|---------|--------|--------|---------|--------|--------|---------|--------|--------|----------|--------|--------|----------|--------|--------|----------|----|----|
|                  |                   | Zone 1             | Zone 2 | Zone 3 | Zone 1 | Zone 2 | Zone 3 | Zone 1 | Zone 2 | Zone 3 | Zone 1 | Zone 2 | Zone 3 | Zone 1 | Zone 2 | Zone 3 | Zone 1 | Zone 2 | Zone 3 | Zone 1 | Zone 2 | Zone 3 | Zone 1  | Zone 2 | Zone 3 | Zone 1  | Zone 2 | Zone 3 | Zone 1  | Zone 2 | Zone 3 | Zone 1   | Zone 2 | Zone 3 | Zone 1   | Zone 2 | Zone 3 |          |    |    |
| 110 mph          | 8-27              | 81                 | 72     | 58     | 72     | 72     | 58     | 58     | 58     | 57     | 57     | 57     | 52     | 52     | 52     | 48     | 48     | 48     | 43     | 43     | 43     | 40     | 40      | 40     | 38     | 38      | 38     | 36     | 36      | 36     | 34     | 34       | 34     | 33     | 33       | 33     | 32     | 32       | 32 |    |
|                  | 28-45             | 79                 | 79     | 79     | 69     | 69     | 69     | 58     | 58     | 58     | 58     | 58     | 58     | 53     | 53     | 53     | 50     | 50     | 50     | 48     | 48     | 48     | 44      | 44     | 44     | 41      | 41     | 41     | 39      | 39     | 39     | 37       | 37     | 37     | 36       | 36     | 36     | 34       | 34 | 34 |
| 115 mph          | 8-27              | 81                 | 69     | 55     | 72     | 69     | 55     | 58     | 58     | 55     | 57     | 57     | 52     | 52     | 52     | 48     | 48     | 48     | 43     | 43     | 43     | 40     | 40      | 40     | 38     | 38      | 38     | 36     | 36      | 36     | 34     | 34       | 34     | 33     | 33       | 33     | 32     | 32       | 32 |    |
|                  | 28-45             | 76                 | 76     | 76     | 69     | 69     | 69     | 58     | 58     | 58     | 58     | 58     | 58     | 53     | 53     | 53     | 50     | 50     | 50     | 48     | 48     | 48     | 44      | 44     | 44     | 41      | 41     | 41     | 39      | 39     | 39     | 37       | 37     | 37     | 36       | 36     | 36     | 34       | 34 | 34 |
| 120 mph          | 8-27              | 81                 | 66     | 53     | 72     | 66     | 53     | 58     | 58     | 53     | 57     | 57     | 53     | 52     | 52     | 52     | 48     | 48     | 48     | 43     | 43     | 43     | 40      | 40     | 40     | 38      | 38     | 38     | 36      | 36     | 36     | 34       | 34     | 34     | 33       | 33     | 33     | 32       | 32 | 32 |
|                  | 28-45             | 74                 | 74     | 74     | 68     | 68     | 68     | 58     | 58     | 58     | 58     | 58     | 58     | 53     | 53     | 53     | 50     | 50     | 50     | 48     | 48     | 48     | 44      | 44     | 44     | 41      | 41     | 41     | 39      | 39     | 39     | 37       | 37     | 37     | 36       | 36     | 36     | 34       | 34 | 34 |
| 130 mph          | 8-27              | 81                 | 61     | 49     | 72     | 61     | 49     | 58     | 58     | 49     | 57     | 57     | 49     | 52     | 52     | 49     | 48     | 48     | 48     | 43     | 43     | 43     | 40      | 40     | 40     | 38      | 38     | 38     | 36      | 36     | 36     | 34       | 34     | 34     | 33       | 33     | 33     | 32       | 32 | 32 |
|                  | 28-45             | 72                 | 69     | 69     | 66     | 66     | 66     | 57     | 57     | 57     | 57     | 57     | 57     | 52     | 52     | 52     | 49     | 49     | 49     | 48     | 48     | 48     | 44      | 44     | 44     | 41      | 41     | 41     | 39      | 39     | 39     | 37       | 37     | 37     | 36       | 36     | 36     | 34       | 34 | 34 |
| 140 mph          | 8-27              | 77                 | 56     | 45     | 72     | 56     | 45     | 58     | 56     | 45     | 57     | 56     | 45     | 52     | 52     | 45     | 48     | 48     | 45     | 43     | 43     | 43     | 40      | 40     | 40     | 38      | 38     | 38     | 36      | 36     | 36     | 34       | 34     | 34     | 33       | 33     | 33     | 32       | 32 | 32 |
|                  | 28-45             | 67                 | 64     | 64     | 64     | 64     | 64     | 56     | 56     | 56     | 55     | 55     | 55     | 51     | 51     | 51     | 48     | 48     | 48     | 48     | 48     | 48     | 43      | 43     | 43     | 41      | 41     | 41     | 39      | 39     | 39     | 37       | 37     | 37     | 36       | 36     | 36     | 34       | 34 | 34 |
| 150 mph          | 8-27              | 72                 | 53     | 42     | 72     | 53     | 42     | 58     | 53     | 42     | 57     | 53     | 42     | 52     | 52     | 42     | 48     | 48     | 42     | 43     | 43     | 42     | 40      | 40     | 40     | 38      | 38     | 38     | 36      | 36     | 36     | 34       | 34     | 34     | 33       | 33     | 33     | 32       | 32 | 32 |
|                  | 28-45             | 64                 | 60     | 60     | 64     | 60     | 60     | 54     | 54     | 54     | 54     | 54     | 54     | 50     | 50     | 50     | 48     | 48     | 48     | 45     | 45     | 45     | 43      | 43     | 43     | 41      | 41     | 41     | 39      | 39     | 39     | 37       | 37     | 37     | 36       | 36     | 36     | 34       | 34 | 34 |
| 160 mph          | 8-27              | 67                 | 49     | 40     | 67     | 49     | 40     | 57     | 49     | 40     | 56     | 49     | 40     | 51     | 49     | 40     | 48     | 48     | 40     | 43     | 43     | 40     | 40      | 40     | 40     | 38      | 38     | 38     | 36      | 36     | 36     | 34       | 34     | 34     | 33       | 33     | 33     | 32       | 32 | 32 |
|                  | 28-45             | 60                 | 57     | 57     | 59     | 57     | 57     | 53     | 53     | 53     | 52     | 52     | 52     | 49     | 49     | 49     | 48     | 48     | 48     | 44     | 44     | 44     | 42      | 42     | 42     | 40      | 40     | 40     | 39      | 39     | 39     | 37       | 37     | 37     | 36       | 36     | 36     | 34       | 34 | 34 |
| 170 mph          | 8-27              | 64                 | 48     | 38     | 64     | 48     | 38     | 56     | 48     | 38     | 55     | 48     | 38     | 50     | 48     | 38     | 48     | 48     | 38     | 43     | 43     | 38     | 40      | 40     | 38     | 38      | 38     | 36     | 36      | 36     | 34     | 34       | 34     | 33     | 33       | 33     | 32     | 32       | 32 |    |
|                  | 28-45             | 57                 | 54     | 54     | 57     | 54     | 54     | 51     | 51     | 51     | 51     | 51     | 51     | 48     | 48     | 48     | 45     | 45     | 45     | 43     | 43     | 43     | 41      | 41     | 41     | 40      | 40     | 40     | 38      | 38     | 38     | 37       | 37     | 37     | 36       | 36     | 36     | 34       | 34 | 34 |
| 180 mph          | 8-27              | 60                 | 44     | 35     | 60     | 44     | 35     | 55     | 44     | 35     | 54     | 44     | 35     | 50     | 44     | 35     | 48     | 44     | 35     | 43     | 43     | 35     | 40      | 40     | 35     | 38      | 38     | 35     | 36      | 36     | 35     | 34       | 34     | 34     | 33       | 33     | 33     | 32       | 32 | 32 |
|                  | 28-45             | 55                 | 51     | 51     | 55     | 51     | 51     | 50     | 50     | 50     | 49     | 49     | 49     | 48     | 48     | 48     | 44     | 44     | 44     | 42     | 42     | 42     | 40      | 40     | 40     | 39      | 39     | 39     | 38      | 38     | 38     | 36       | 36     | 36     | 35       | 35     | 35     | 34       | 34 | 34 |

= min 72" span    
  = min 64" span    
  = min 48" span    
 \* = Note: additional installation requirement for CAMO module clamp. See Note 12 on Page 3 for details.    
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 = Shaded cells indicate conditions in which UFO Mid Clamp connection capacity is exceeded. See Note 10 on page 2 for details.