

Project Details			
<b>Name</b>	Ellis Davis	<b>Date</b>	02/29/2024
<b>Location</b>	18 Thunder Valley Court, Lillington, NC 27546	<b>Total modules</b>	10
<b>Module</b>	Jinko: JKM395M-72HBL-V (40mm)	<b>Total watts</b>	3,950
<b>Dimensions</b>	Dimensions: 79.06" x 39.45" x 1.57" (2008.0mm x 1002.0mm x 40.0mm)	<b>Attachments</b>	22
<b>ASCE</b>	7-10	<b>Rails per row</b>	2



System Weight	
<b>Total system weight</b>	576.7 lbs
<b>Weight/attachment</b>	26.2 lbs
<b>Racking weight</b>	80.7 lbs
<b>Distributed weight</b>	2.6 psf

Load Assumptions	
<b>Wind exposure</b>	B
<b>Wind speed</b>	118 mph
<b>Ground snow load</b>	10 psf
<b>Attachment spacing portrait</b>	6.0'

Roof Information			
<b>Roof Material Family</b>	Comp Shingle	<b>Roof material</b>	Comp Shingle
<b>Risk category</b>	II	<b>Roof attachment</b>	Halo UltraGrip (Rafter attached)
		<b>Staggered attachments</b>	Yes
<b>Attachment hardware</b>	Square		
<b>Specific gravity</b>	0.42		

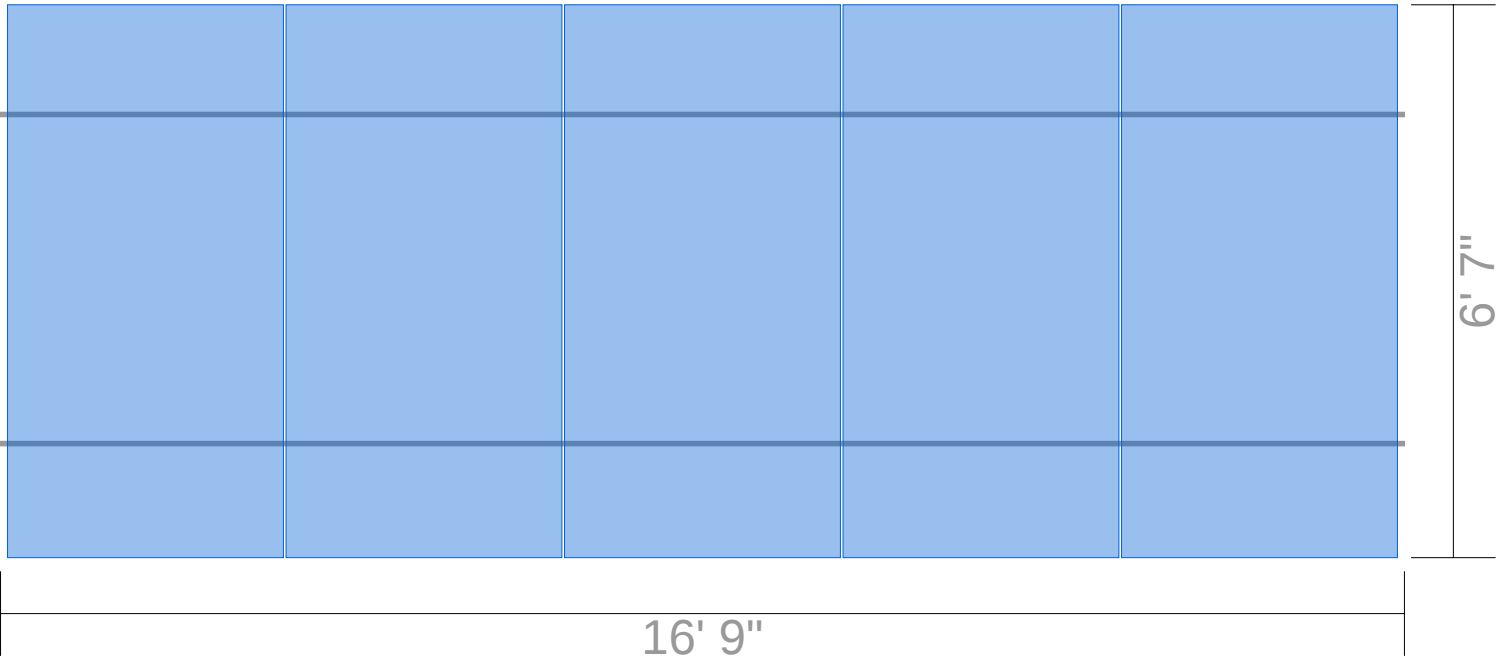
**Roof Plane A**

<b>Height</b>	15 ft	<b>Slope</b>	38 °	<b>Rafter spacing</b>	24 in
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**Roof Plane A: Roof Section 1**

Details		Weights
Panels: 5	Provided rail: 56' [4 x 168"]	Total weight: 279.3 lbs
Rail orientation: East-West	Attachments: 7	Weight/attachment: 39.9 lbs
Panel orientation: Portrait	Splices: 2	Total Area: 110.2 sq ft
Entry type: Graphical	Clamps: 12	Distributed weight: 2.5 psf

**Diagram**



**Segments**

Identifier	Columns	Row length	Rail length	Cantilever	Rail	Attachments	Splices	Clamps
A	5	16' 9"	16' 9"	2' 4"	56' [4 x 168"]	7	2	12

**Span Details XR10 - Portrait**

Zone	Max span	Max cantilever
1	6' 2"	2' 6"
2	6' 2"	2' 6"
3	6' 2"	2' 6"

**Reaction Forces XR10 - Portrait**

Zone	Uplift (PSF)	Down (lbs)	Uplift (lbs)	Lateral Par (lbs)	Lateral Perp (lbs)
1	12.4	274	215	86	5
2	14.9	274	265	86	5
3	14.9	274	265	86	5

**Attachment Span Details Halo UltraGrip (Rafter attached) - Portrait**

Zone	Max attachment span
1	6' 2"
2	6' 2"
3	6' 2"

**\*Optional - Attachment Span Details Halo UltraGrip (Deck attached) - Portrait**

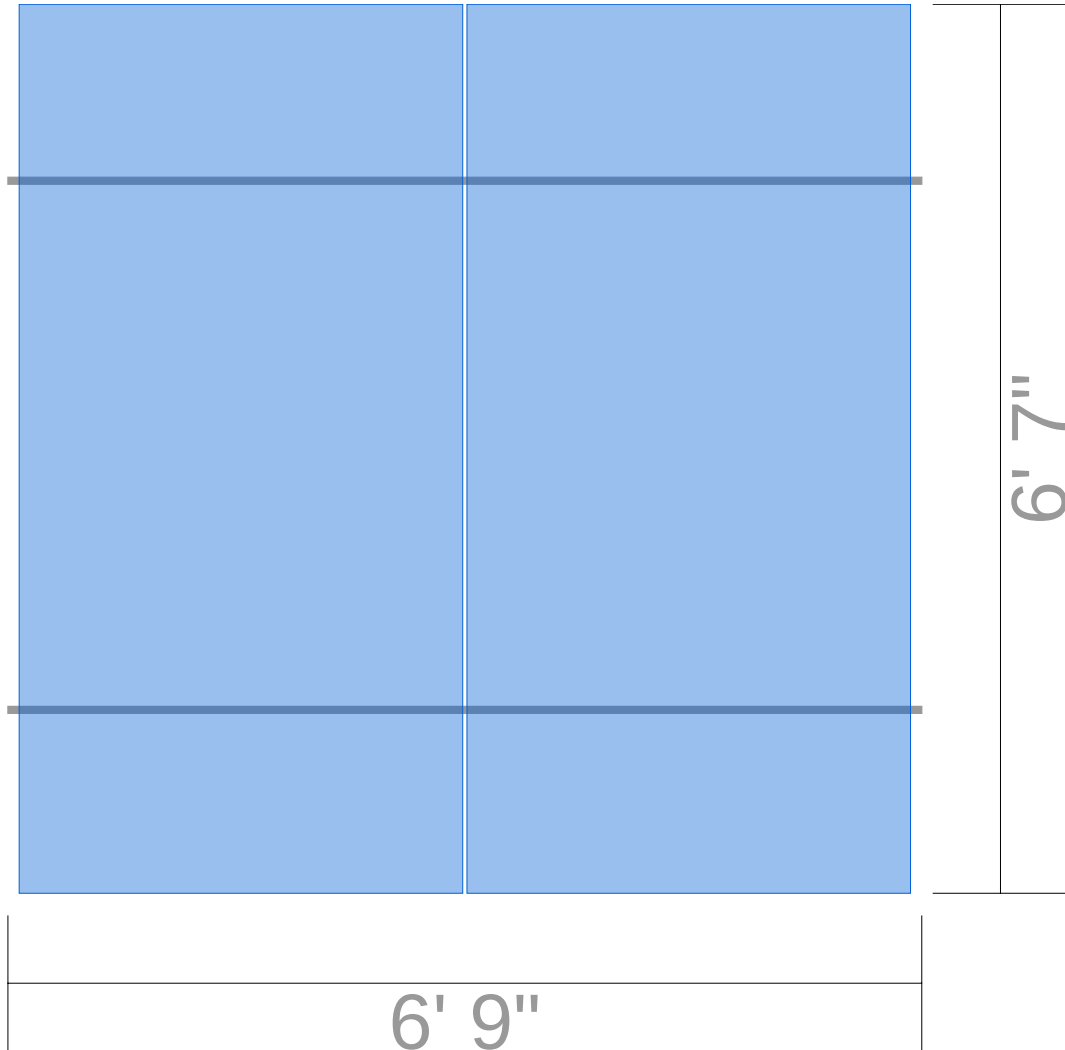
Zone	Max attachment span
1	5'
2	4' 3"
3	4' 3"

\* Based on minimum 7/16" sheathing thickness

**Roof Plane A: Roof Section 2**

Details		Weights
Panels: 2	Provided rail: 28' [2 x 168"]	Total weight: 115.7 lbs
Rail orientation: East-West	Attachments: 5	Weight/attachment: 23.1 lbs
Panel orientation: Portrait	Splices: 0	Total Area: 44.6 sq ft
Entry type: Graphical	Clamps: 6	Distributed weight: 2.6 psf

**Diagram**



**Segments**

Identifier	Columns	Row length	Rail length	Cantilever	Rail	Attachments	Splices	Clamps
A	2	6' 9"	6' 9"	5"	28' [2 x 168"]	5	0	6

**Span Details XR10 - Portrait**

Zone	Max span	Max cantilever
1	6' 2"	2' 6"
2	6' 2"	2' 6"
3	6' 2"	2' 6"

**Reaction Forces XR10 - Portrait**

Zone	Uplift (PSF)	Down (lbs)	Uplift (lbs)	Lateral Par (lbs)	Lateral Perp (lbs)
1	12.4	274	215	86	5
2	14.9	274	265	86	5
3	14.9	274	265	86	5

**Attachment Span Details Halo UltraGrip (Rafter attached) - Portrait**

Zone	Max attachment span
1	6' 2"
2	6' 2"
3	6' 2"

**\*Optional - Attachment Span Details Halo UltraGrip (Deck attached) - Portrait**

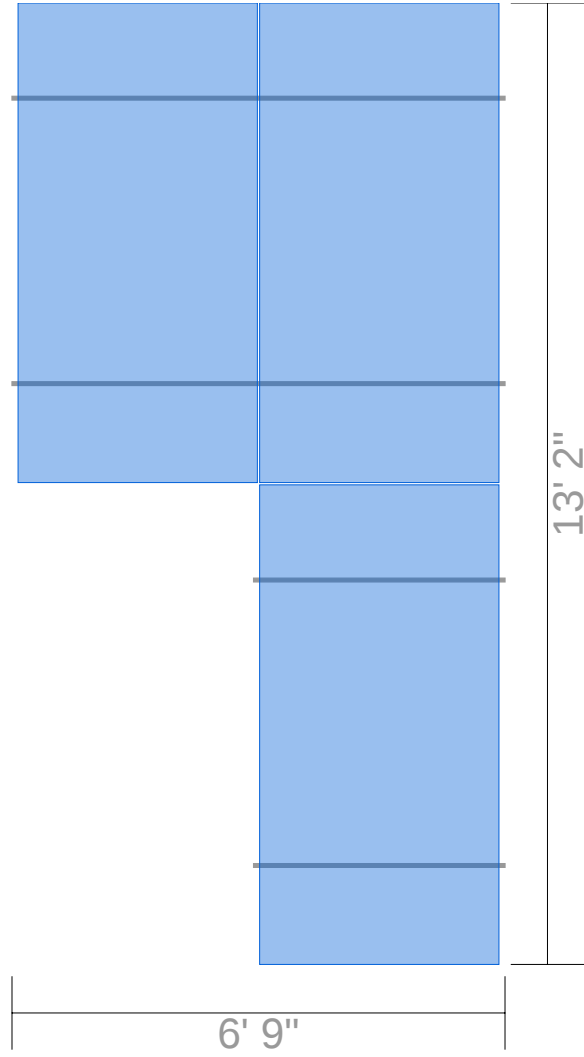
Zone	Max attachment span
1	5'
2	4' 3"
3	4' 3"

\* Based on minimum 7/16" sheathing thickness

### Roof Plane A: Roof Section 3

Details		Weights
Panels: 3	Provided rail: 56' [4 x 168"]	Total weight: 181.7 lbs
Rail orientation: East-West	Attachments: 10	Weight/attachment: 18.2 lbs
Panel orientation: Portrait	Splices: 0	Total Area: 67.4 sq ft
Entry type: Graphical	Clamps: 10	Distributed weight: 2.7 psf

## Diagram



**Segments**

Identifier	Columns	Row length	Rail length	Cantilever	Rail	Attachments	Splices	Clamps
A	2	6' 9"	6' 9"	5"	28' [2 x 168"]	5	0	6
B	1	3' 5"	3' 5"	0"	28' [2 x 168"]	5	0	4

**Span Details XR10 - Portrait**

Zone	Max span	Max cantilever
1	6' 2"	2' 6"
2	6' 2"	2' 6"
3	6' 2"	2' 6"

**Reaction Forces XR10 - Portrait**

Zone	Uplift (PSF)	Down (lbs)	Uplift (lbs)	Lateral Par (lbs)	Lateral Perp (lbs)
1	12.4	274	215	86	5
2	14.9	274	265	86	5
3	14.9	274	265	86	5



**Attachment Span Details Halo UltraGrip (Rafter attached) - Portrait**

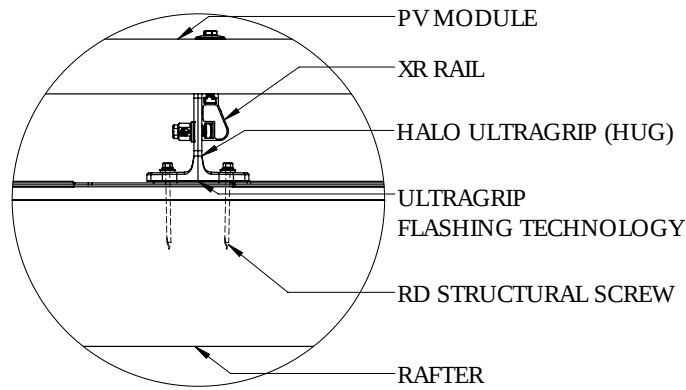
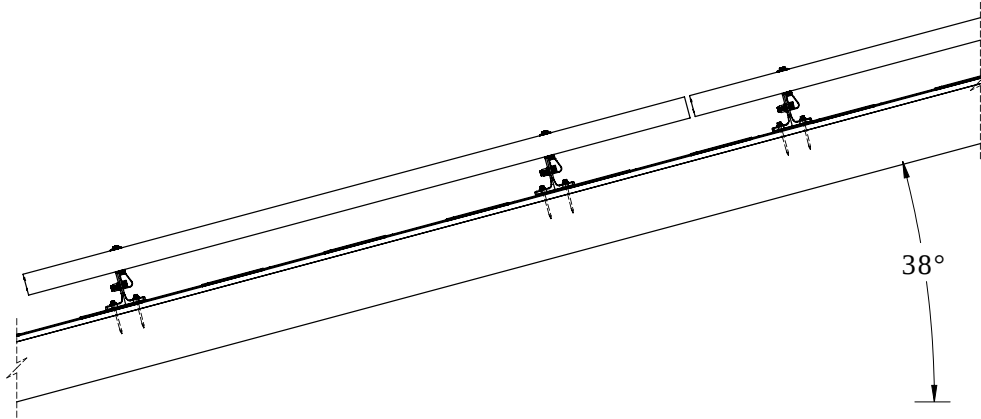
Zone	Max attachment span
1	6' 2"
2	6' 2"
3	6' 2"

**\*Optional - Attachment Span Details Halo UltraGrip (Deck attached) - Portrait**

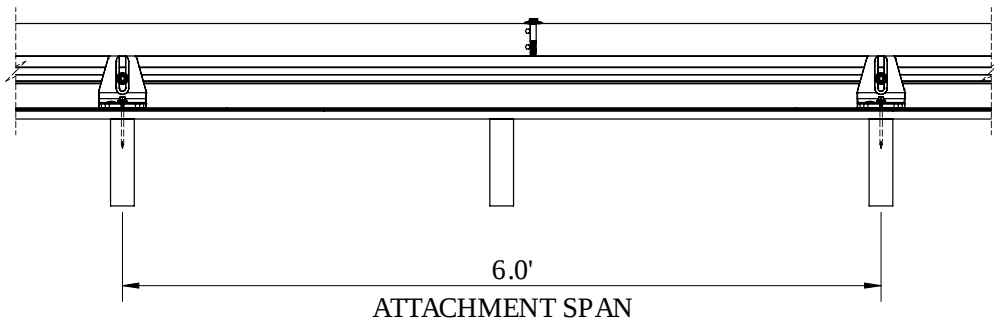
Zone	Max attachment span
1	5'
2	4' 3"
3	4' 3"

*\* Based on minimum 7/16" sheathing thickness*

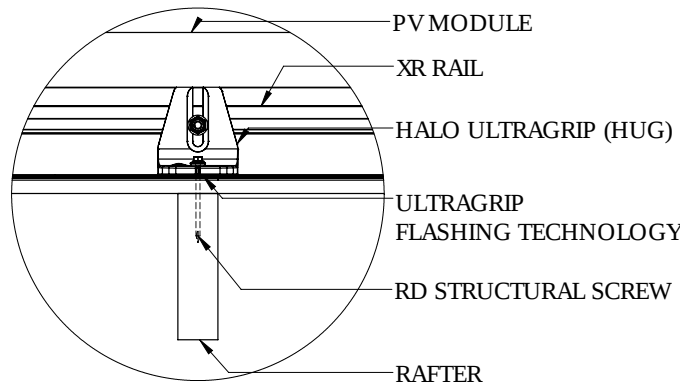
Side View (portrait)



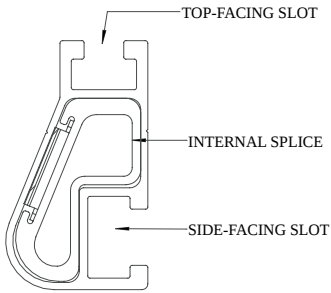
Front View (portrait)



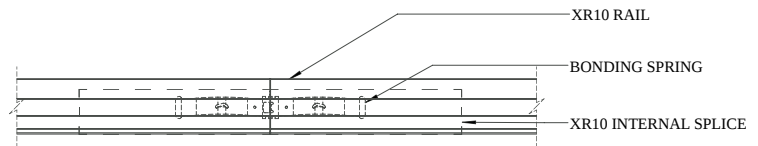
**Front View (portrait)**



**Splice Details**

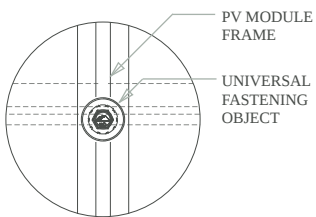


**XR10**

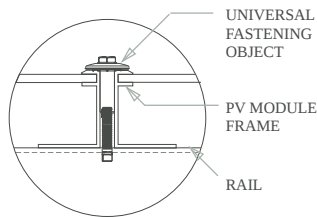


**Splice Connection**

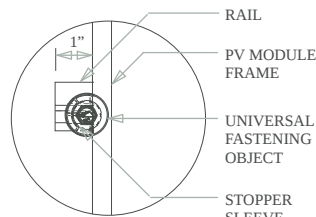
**Clamp Detail**



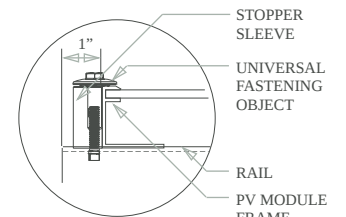
**Mid Clamp, Plan**



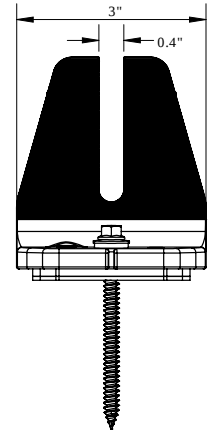
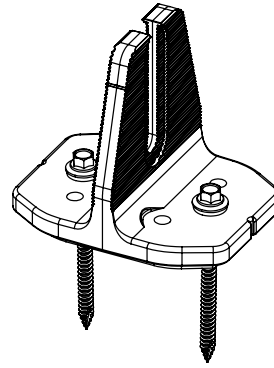
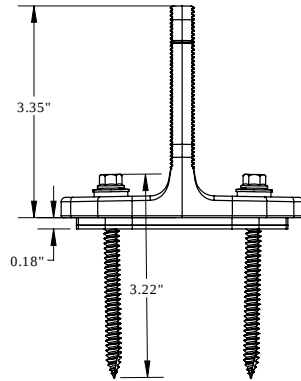
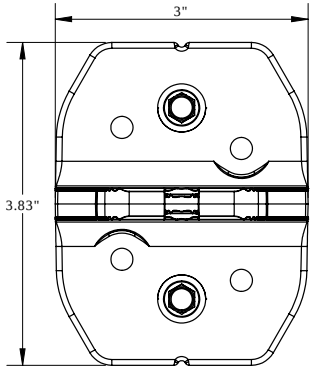
**Mid Clamp, Front**



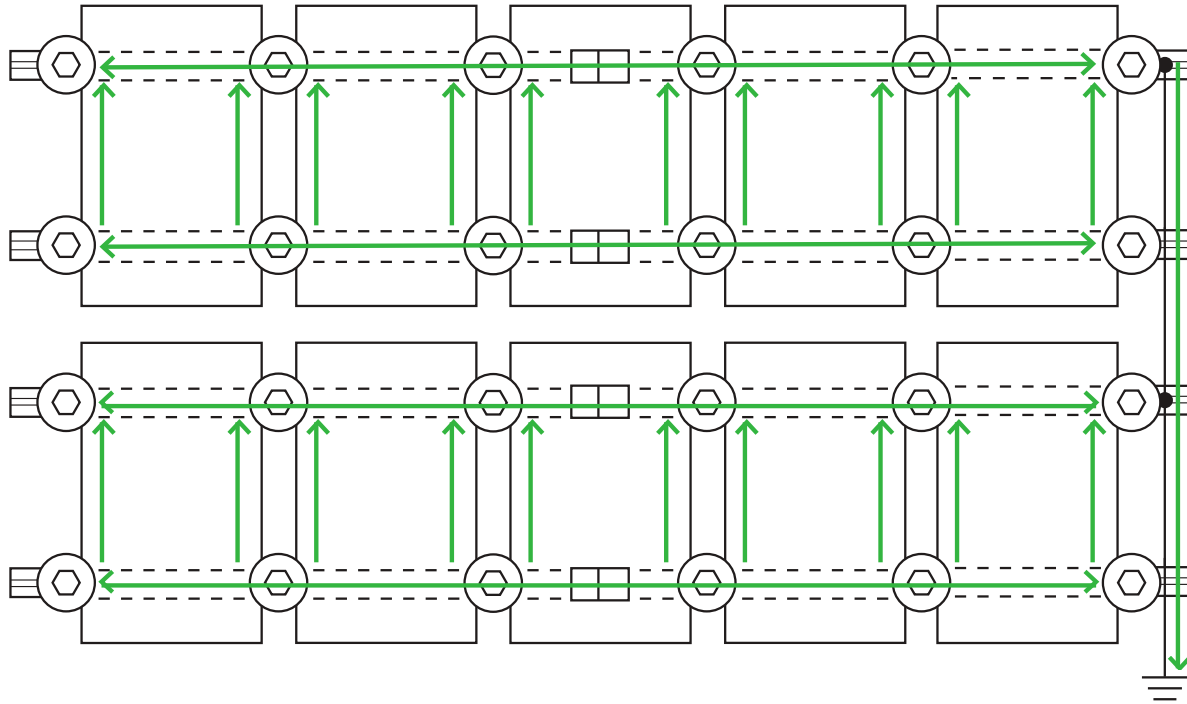
**End Clamp, Plan**




**End Clamp, Front**




### Grounding Diagram



 UFO Clamp

 Grounding Lug \*

 Fault Current Ground Path

 Min 10 AWG Copper Wire \*

 Bonded Splice (Rail Connection)

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

**Bill of Materials**

Part	Spares	Total Qty
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**Rails & Splices**

XR-10-168A XR10, Rail 168" Clear	0	10
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XR10-BOSS-01-M1 Bonded Splice, XR10	0	2
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**Clamps & Grounding**

UFO-CL-01-A1 Universal Module Clamp, Clear	0	28
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UFO-STP-40MM-M1 Stopper Sleeve, 40MM, Mill	0	16
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XR-LUG-03-A1 Grounding Lug, Low Profile	0	4
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**Attachments**

QM-HUG-01-M1 Halo UltraGrip, Mill	0	22
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HW-RD1430-01-M1 RD Structural Screw, 3.0L <b>* Add desired additional screws by adjusting spares column.</b>	0	44
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BHW-SQ-02-A1 Square-Bolt Bonding Hardware	0	22
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# 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

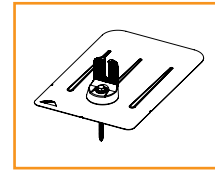
➤ If using previous version of Integrated Grounding Mid Clamps, End Clamps, Expansion Joints and for a list of approved 3rd party components please refer to Alternate Components Addendum (Version 1.9)

## ATTACHMENTS

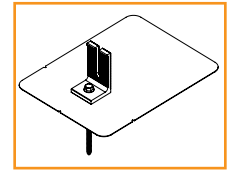
### COMPOSITION SHINGLE



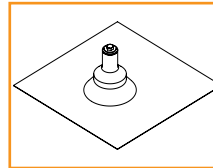
FlashFoot2



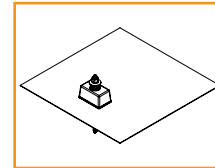
FlashVue



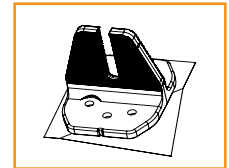
QM L-Mount



QM QBase

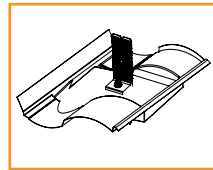


QM Classic Comp Mount

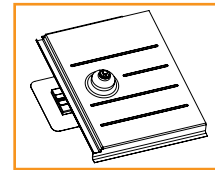


HUG (Halo UltraGrip)

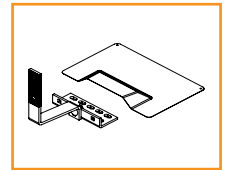
### TILE



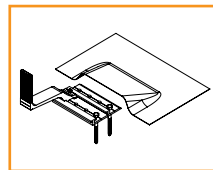
Knockout Tile



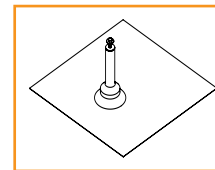
QM Tile Replacement



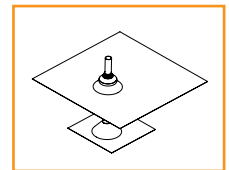
All Tile Hook and Flashing (optional)



QM Quick Hook and Flashing (optional)

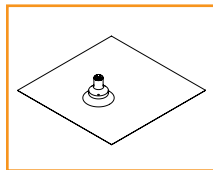


QM QBase Tile

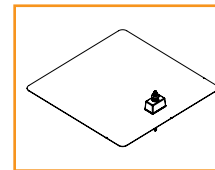


QM Tile Conduit Penetration

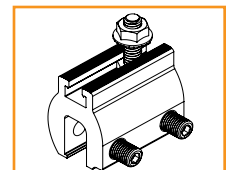
### ADDITIONAL ROOF TYPES



QM Qbase Shake - Slate - Metal Shingle

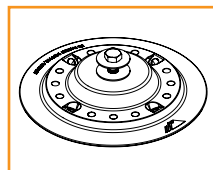


QM Classic Mount Shake

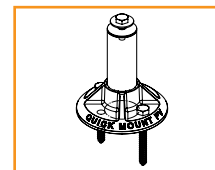


QM Lynx Metal Roof Attachment

### 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.

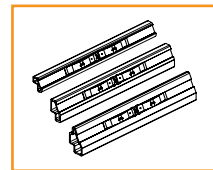
## COMPONENTS



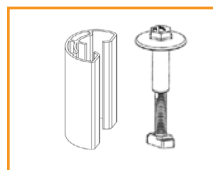
XR Rail



Wire Clip



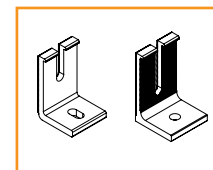
BOSS



UFO and Stopper Sleeve (30-46MM)



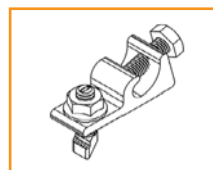
CAMO



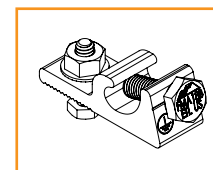
Ironridge L-Foot and QM L-Foot



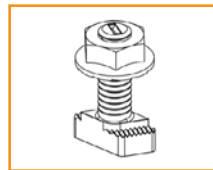
End Cap



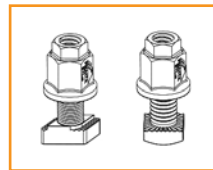
Rail Grounding Lug



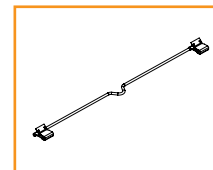
Module Grounding Lug



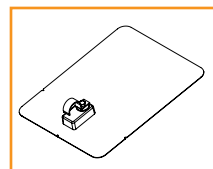
Microinverter Kit



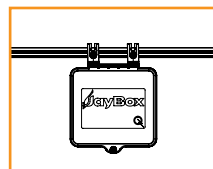
3/8" Bonding Hardware



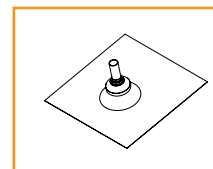
8" Bonding Jumper Single Use Only



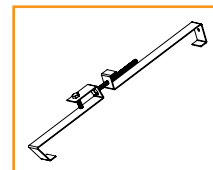
QM Classic Conduit Comp Mount



JAYBOX



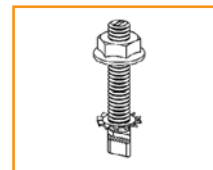
QM Composition Conduit Penetration



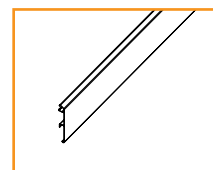
QM Tile Conduit Mount



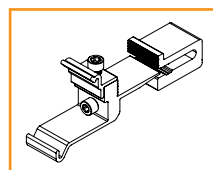
Frameless End/Mid Clamp



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	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	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	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	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	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	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	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.