

Quick Rack™

Installation Manual

Rail-Free Mounting System for Composition/Asphalt Shingle Roofs



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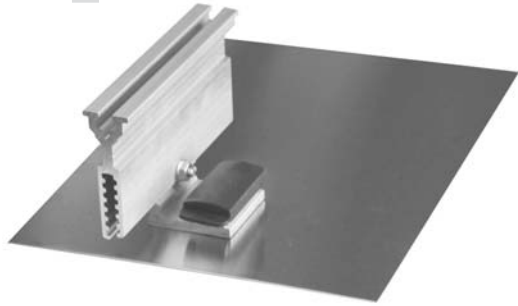
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I. Quick Rack Components

Quick Rack rail-free mounting system features Q Rack™ technology. With only 3 main components, the system works with standard module frames and features Quick Mount PV's high-quality, patented Elevated Water Seal to ensure a long, watertight life on the roof.

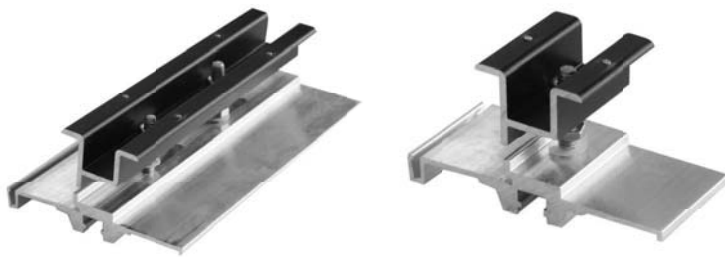
1



Base Mount

Featuring Quick Mount PV's patented Elevated Water Seal.

2



Panel Clamp

Available in two sizes (2" & 8") for both mid- and end-clamping that works with standard module frames.

3



Skirt

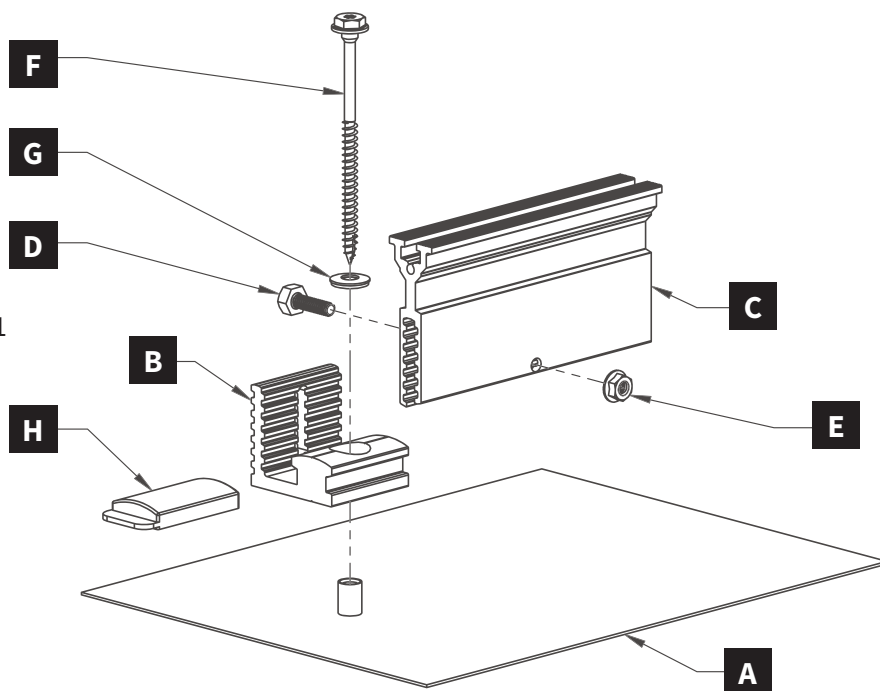
Snaps right into place for an elegant, streamlined finish.

II. Quick Rack Assemblies

NOTE: Part quantities are per assembly. For part measurements see pages Ref-9 - Ref-13 for engineering drawings.

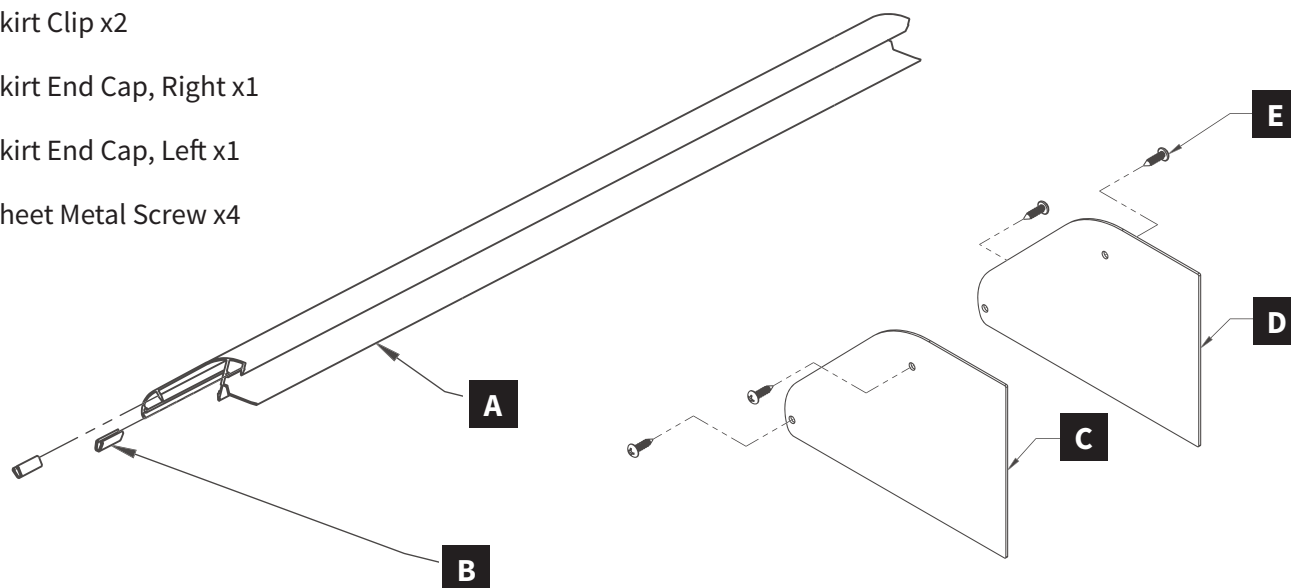
Base Mount Assembly Parts

- A** Flashing x1
- B** QBlock Slider x1
- C** Top Slider x1
- D** Custom Hex Head Cap Screw x1
- E** Serrated Flange Hex Nut x1
- F** T-30/Hex Head Structural Screw, 5/16" x1
- G** EPDM/SS Sealing Washer x1
- H** EPDM Screw Cover x1



Skirt Assembly Parts

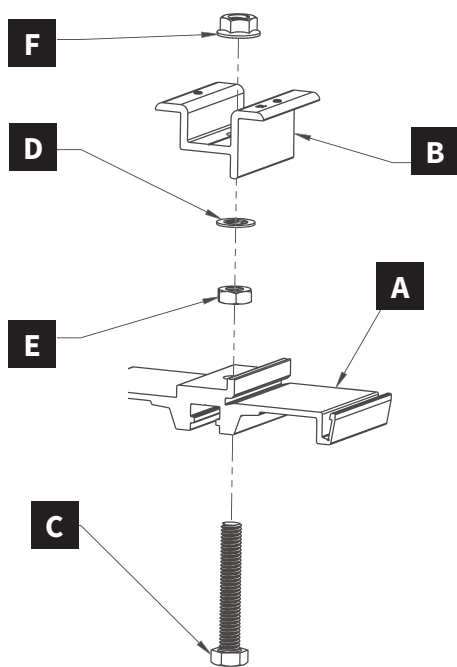
- A** Skirt x1
- B** Skirt Clip x2
- C** Skirt End Cap, Right x1
- D** Skirt End Cap, Left x1
- E** Sheet Metal Screw x4



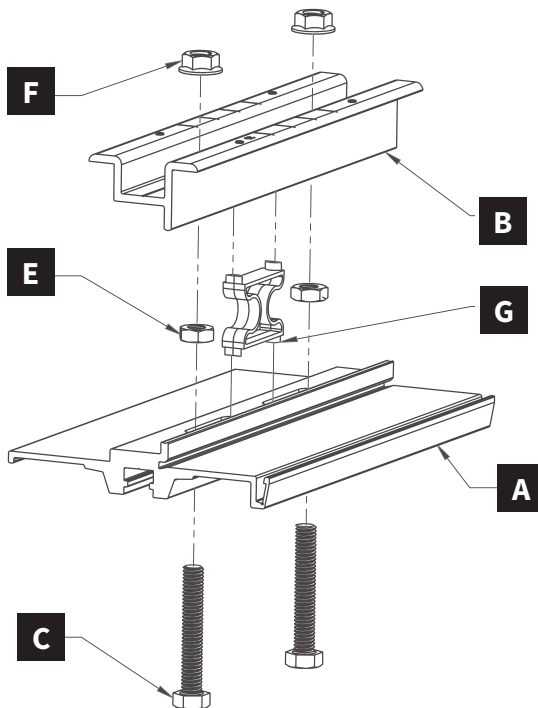
Panel Clamp Assembly Parts

- A** Clamp Base x1
- B** Panel Clamp (2" or 8") x1
- C** Hex Head Cap Screw x1 (x2 for 8")
- D** Plastic Retainer Ring x1 (2" clamp only)
- E** Hex Nut x1 (x2 for 8")
- F** Serrated Flange Hex Nut x1 (x2 for 8")
- G** Clamp Spring (8" clamp only)

2" Panel Clamp Assembly

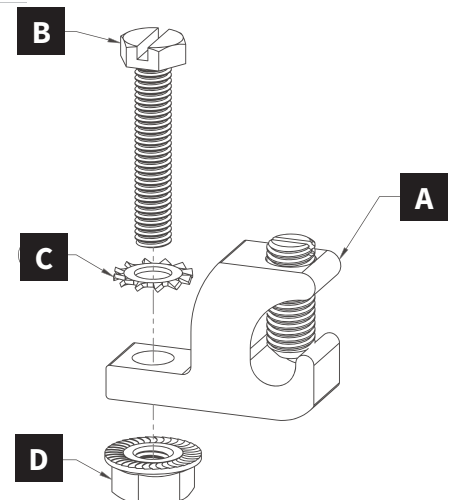


8" Panel Clamp Assembly



Grounding Lug Assembly Parts

- A** Grounding Lug with Set Screw x1
- B** Slotted Hex Head Cap Screw x1
- C** Star Washer x1
- D** Serrated Flange Hex Nut x1



III. Array Layout



Using your engineered design, locate array layout on the roof, and determine mount locations. See pages Ref-2 - Ref-8 for span tables, wind exposure categories and engineering rules.

Locate rafters/trusses that will receive a mount and snap a chalk line centered over each rafter/truss.



Determine mount row locations by choosing shingle courses nearest to multiples of module dimensions plus 1". Snap a horizontal chalk line for each row of mounts at the penetration points (bolt location) approximately 3 1/4" above the butt edge of the first row of shingles.

Mark hole locations with chalk or crayon.

Key

- Chalk line
- Mount penetration locations

IV. Installing the Mounts

Tool Specs: Drill with T-30 Torx bit or impact gun with 1/2" socket



1 Use roofing bar to break seals between 1st and 2nd, and 2nd and 3rd shingle courses. Be sure to remove all nails to allow correct placement of flashing. See page 6 for proper flashing placement.



2 Holding the drill square to the rafter, drill 3" deep pilot hole into center of rafter using 1/8" aircraft extension bit.



3 Fill pilot hole with appropriate sealant.



4 **Optional:** Apply an upside down U-shaped bead of sealant to the underside of the flashing before insertion. Do not use excessive sealant.



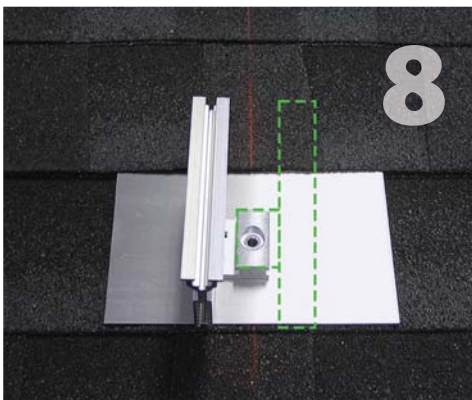
5 Slide the base mount up underneath the second course of shingles, so that the bottom edge of the flashing does not overhang the butt edge of shingles.



6 Swivel the base mount to gauge proper torque when driving the lag bolt. Tighten until mounting block stops swiveling easily. (In 65 degree weather, this would equal 13 ft-lbs.)



7 Cap the mounting block with the EPDM rubber cover.



8 Be sure to orient the top slider to either the left or right according to your design



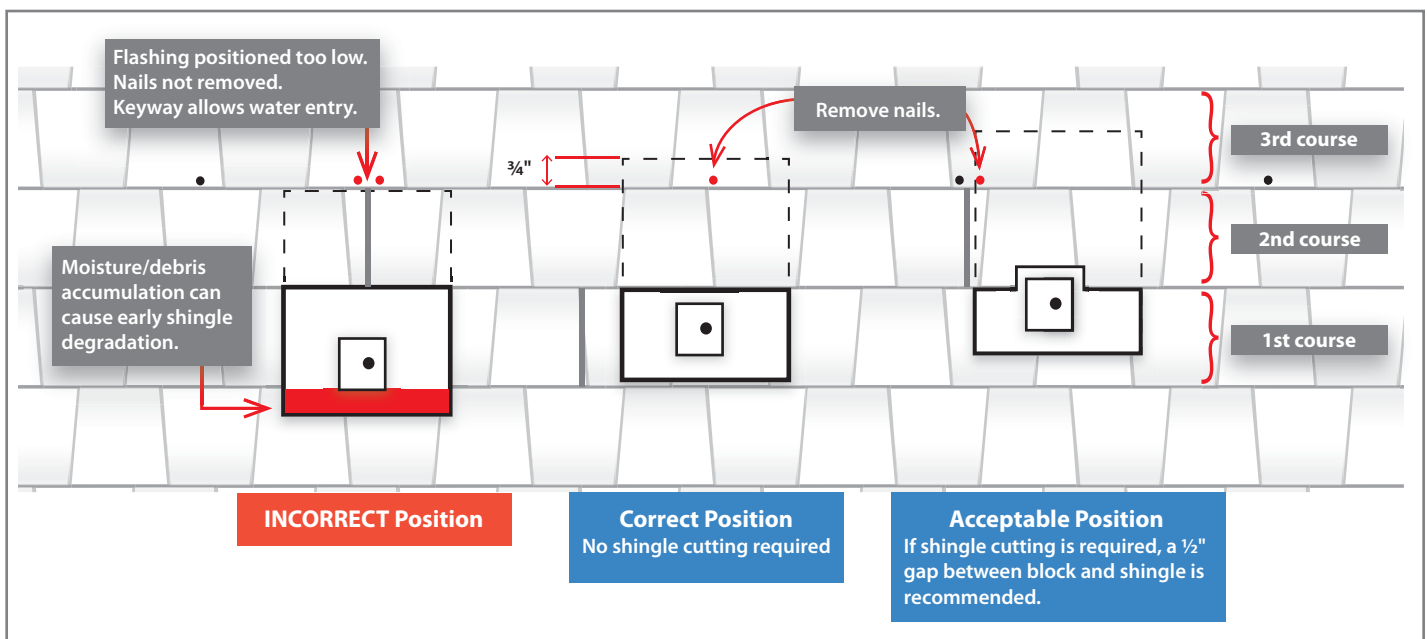
9 Repeat steps 1-8 to install all mounts

WARNING: These products are NOT designed for and should NOT be used to anchor fall protection equipment.

Additional Tips and Information

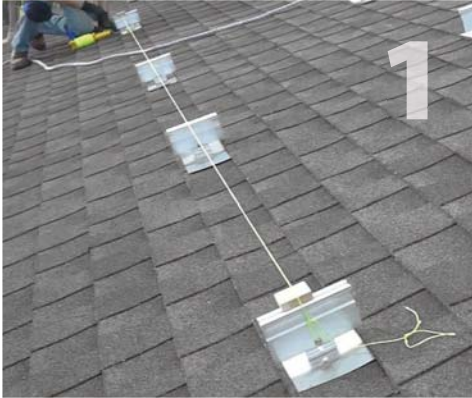
- It is not necessary or advisable to use nails or other fasteners to secure the perimeter of the flashing.
- The Base Mount is made to work with standard and high-definition composition/asphalt and wood shingle roofs with 5" to 5-5/8" courses.
- Depending on the season and climate, size and location of seal tabs, and quality of the shingles, the seal tabs that adhere the shingle courses together may not effectively seal the shingles to the flashings. If this is the case, simply add several quarter-sized dabs of manufacturer accepted sealant or asphalt roofing cement, meeting ASTM D 4586 Type II, between the flashing and the shingle above.
- Mounts should not be installed in areas of the roof susceptible to ice damming. Ponding water can travel upward under shingles and reach the bolt penetration.
- Take care not to damage the roofing material while working on the roof. Removing stone granules and deforming the shingles in any way can shorten the lifespan of the roofing. The value of the solar array is directly affected by the condition of the roof it is attached to.

Proper Flashing Placement



V. Leveling the Mounts

Tool Specs: 1/2" socket and wrench



Run a string line between the first and last mounts in the first row.



The string acts as a guide for aligning the top slider positions of all the mounts in the row.



To adjust top slider height, remove machine bolt, separate top slider from QBlock slider and reinsert at proper location. To adjust in increments of 0.11", rotate the top slider 180 degrees. Repeat for the other mounts until top slider elevations are uniform across the row.



After aligning the first row horizontally, follow the same string alignment process vertically on far right and far left columns. Then align each remaining row of the array (in any order).

VI. Installing the Clamps

Tool Specs: 1/2" box wrench



Install all clamp assemblies. Push down on clamp bolt to extend bolt head below clamp. Orient clamp parallel to top slider to easily get bolt head started in track.

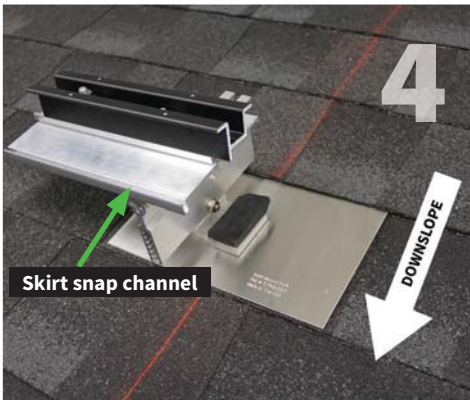


Slide bolt into channel in top slider.



Rotate clamp to correct orientation. Repeat steps 1-3 with all clamps.

First Row



For the first row, clamp must be oriented with skirt snap channel in downslope position.



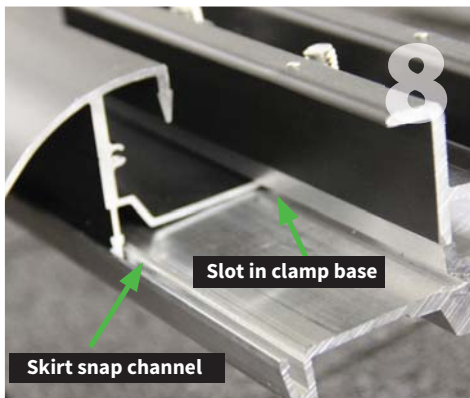
Use 1/2" box wrench on mid-clamp assembly nut to tighten clamps to first and last (far left and right) top sliders.



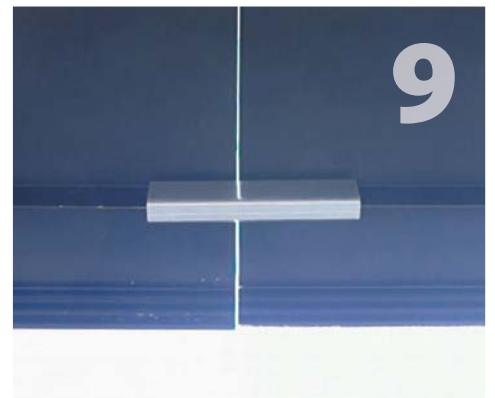
Align bottom row of clamps using string run along outer (downslope) face of base clamps. (Do not run string in skirt snap channel.)



Tighten all first row clamps so they are even with string line.



Insert horizontal leg of the skirt into slot in clamp base, then snap the skirt down in skirt snap channel.



Install remaining skirt sections. Use snap-on skirt clips to maintain alignment at skirt junctions.

VII. Installing the Modules

Tool Specs: 1/2" socket and wrench



Place the first module on the clamp bases and tighten the lower clamps. Install the rest of first row modules. See below for proper module gap and clamp placement.



Only tighten bridge clamps after all the adjoining modules have been placed.



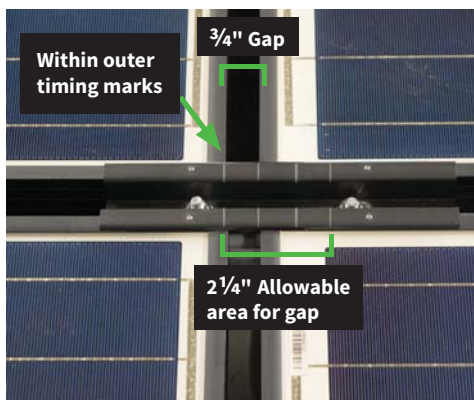
Do not tighten upper clamps until modules of the row above have been placed. Maintain proper spacing between modules while tightening clamps to 13 ft-lbs.



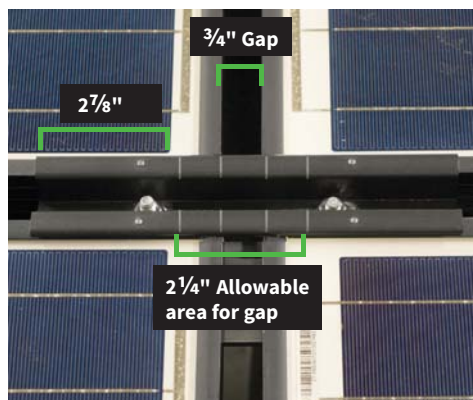
Continue installing modules in all rows until array is complete.

Module Gap and Clamp Placement

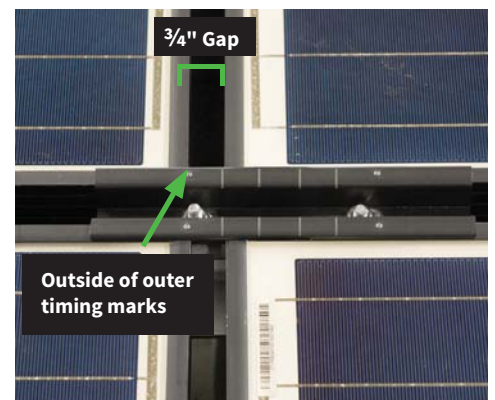
Acceptable



Acceptable

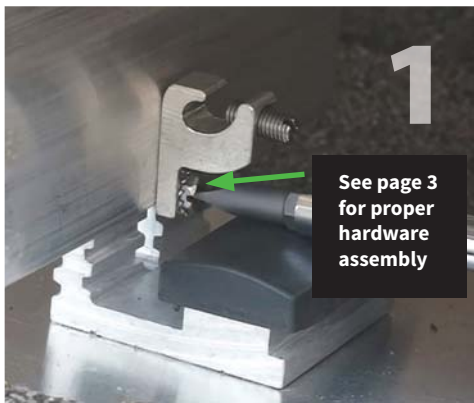


Unacceptable



The edge of the module frames must not sit outside the 2 1/4" allowable range indicated by the outer timing marks. The inner set of timing marks show the 3/4" gap centered in the allowable space.

Installing the Grounding Lug



Quick Rack's integrated grounding requires only one grounding lug for up to 300 contiguous modules. Simply replace the cap screw in the base mount's top slider with the grounding lug hardware, per the diagram on page 3.

Secure your wire to the lug by tightening the set screw.

For questions contact us at tech@quickmountpv.com or call (925) 478-8269.

Reference

A. General Requirements

The Span Tables, Wind Exposure Category Table, and Rafter Attachment Pattern Sketches beginning on page Ref-2 are subject to the requirements shown in the table footnotes and to the following criteria:

Region and Site

- The roof is not in a special topographic region subject to wind speed-up effects, such as near or at the crest of a tall ridge or hill (*i.e.*, ASCE 7 topographic factor of 1.00). Refer to ASCE 7-05 Sec. 6.5.7 or ASCE 7-10 Sec. 26.8 for determining if a roof is in a special wind speed-up zone.
- The building is not a special occupancy structure such as a public school, public safety building or assembly building (*i.e.*, ASCE 7-05 importance factor for wind, snow and seismic loads of 1.00, or Risk Category II building for ASCE 7-10).
- In general, Quick Rack base mount capacity exceeds seismic lateral demands in almost all areas of the United States. The tables list minor limitations in unusual regions where combined high snow and seismic loads may occur.

Roof Characteristics

- The installation is on wood-framed roofs with composition shingle, wood sawn shingle, built-up roofing, or membrane roofs, underlain by plywood, oriented strand board or solid 1x sheathing.
- The existing roof structure should be generally code-compliant, and should not show signs of decay, fire damage, significant added dead loads, structural modifications (such as removal of web members from carpenter trusses) or any other condition that may weaken its load-carrying capacity. If there is doubt about the suitability of the roof to carry the new PV array, a qualified licensed engineer should be retained to inspect and analyze the existing roof structure.
- The PV array is installed on the roof of an enclosed building with a mean roof height less than or equal to 35 feet. The mean roof height is defined as the average height of the roof eave and the highest point on the roof, except for roofs with slopes less than 10 degrees (~2:12 pitch) in which the mean roof height is defined as the eave height.
- The roof pitch is between flat (0 degrees) and 12:12 (45 degrees).
- Rafters have a minimum nominal width of 2" (1.5" actual width) and have a specific gravity of 0.42 or greater, allowing lumber species groups that range from relatively lightweight, such as Spruce-Pine-Fir, Hem-Fir and Close Grain Redwood, to denser woods such as Douglas Fir and Southern Pine.
- In existing construction, rafters are dry and seasoned. In new construction, rafters are either Kiln-Dried (KD) or Surfaced Dry (S-DRY), or, if Surfaced Green (S-GRN), have an in-field measured moisture content of 19% or less.

Installation Specifics

- The PV modules shall be clamped to the Quick Rack track using the provided two-part clamp (clamp base and panel clamp) and a 5/16" stainless steel (grade 18/8) machine bolt, torqued to 13 ft-lbs. The center of the machine bolt into the track shall be installed no more than 1.5" upslope or downslope from the center of the track. Machine bolts may be installed in any position along the slots in the clamp.

Installation Specifics, cont'd

- The maximum PV module cantilever from the edge-most Quick Rack base mount is noted on each table for its respective PV module orientation and mount spacing.
- Per the intent of AC-428, the edge of the PV array shall be no closer to any edge or ridge of the roof than two times the gap between the roof and underside of the PV modules.
- To prevent excessive snow build-up, where the ground snow load exceeds 10 psf, the top edge of the PV array shall be set no farther than 5 feet from the roof ridge, measured perpendicular to the ridge. Note that local fire jurisdictions sometimes require that the top edge of the array be set no closer than a certain distance (often 3 feet) to the ridge.
- If a skirt is installed along the bottom and/or top edge of an array, it shall have an average gap below it to the roof of 1-1/2", and a minimum gap of 1/2". Nominal left and right edges of the array shall remain open.
- This code compliance report is limited to base mount performance. The modules installed in combination with Quick Rack shall also have UL 1703/2703 rated load capacities appropriate for the site's wind and snow loads.

B. Span Tables, Wind Exposure Category Table, and Rafter Attachment Pattern Sketches

Use the tables and sketches on the following pages to determine mount spacing for your array layout design.

Quick Rack Base Mount Maximum Spacings, Modules in Portrait Orientation

| Wind Speed | | Roof Pitch | Ground Snow Load | | | | | | | | |
|------------------------------|-------------------------------|---------------|------------------------|-------|-------|-------------|-----|-------|-------------|-----|-----|
| | | | 0 - 15 psf | | | 16 - 30 psf | | | 31 - 45 psf | | |
| ASCE 7-05 (Service Level) | ASCE 7-10 (Strength Level) | | Wind Exposure Category | | | | | | | | |
| | | | B | C | D | B | C | D | B | C | D |
| 85 mph | 110 mph | Flat to 6:12 | 48" | 48" | 48" | 32" | 32" | 32" | 24" | 24" | 24" |
| | | 7:12 to 12:12 | 48" | 48" | 48" | 32" | 32" | 32" | 24" | 24" | 24" |
| 90 mph | 115 mph | Flat to 6:12 | 48" | 48" | 48" | 32" | 32" | 32" | 24" | 24" | 24" |
| | | 7:12 to 12:12 | 48" | 48" | 48" | 32" | 32" | 32" | 24" | 24" | 24" |
| 100 mph | 125 mph | Flat to 6:12 | 48" | 48" | 48" * | 32" | 32" | 32" | 24" | 24" | 24" |
| | | 7:12 to 12:12 | 48" | 48" | 48" | 32" | 32" | 32" | 24" | 24" | 24" |
| 110 mph | 140 mph | Flat to 6:12 | 48" | 48" * | 48" * | 32" | 32" | 32" | 24" | 24" | 24" |
| | | 7:12 to 12:12 | 48" | 48" | 32" | 32" | 32" | 32" | 24" | 24" | 24" |
| 120 mph | 150 mph | Flat to 6:12 | 48" | 48" * | 32" * | 32" | 32" | 32" * | 24" | 24" | 24" |
| | | 7:12 to 12:12 | 48" | 32" | 32" | 32" | 32" | 32" | 24" | 24" | 24" |

Table Notes:

1. Quick Rack base mount maximum allowable spacings are between Quick Rack base mounts in the cross-slope direction.
2. Maximum long edge PV module length is 65".
3. Where spacing is followed by an asterisk (*), the PV array must be set back at least 3'-0" from all roof edges.
4. The PV module cantilever is defined as the distance from the nominal east or west array edge to the center of the structural screw. The maximum module cantilever is 9" for all mount spacings.
5. Seismic: Acceptable in high seismic zones ($S_{DS} \leq 1.5g$) for ground snow loads less than or equal to 10 psf, and moderate seismic zones ($S_{SD} \leq 1.0g$) for ground snow loads greater than 10 psf.
6. This table is subject to the conditions stated in the attached Code Compliance Letter, and shown in the attached sketches.
7. This table is based on ASCE 7-05 and ASCE 7-10. ASCE 7-10 wind speeds are back-calculated from ASCE 7-05 wind speeds to produce the same wind pressures on a Risk Category II building.
8. See Table 3 for regions of high wind or snow load where a staggered mount layout is recommended.

Quick Rack Base Mount Maximum Spacings, Modules in Landscape Orientation

| Wind Speed | | Ground Snow Load | | | | | | | | | | | | | | | | | | | | | | | |
|------------------------------|-------------------------------|------------------------|-----|-----|-----|-------------|-----|-----|-----|-------------|-----|-----|-----|-------------|-----|-----|-----|-------------|-----|-----|-----|-------------|-----|-----|-----|
| | | 0 - 10 psf | | | | 11 - 20 psf | | | | 21 - 30 psf | | | | 31 - 40 psf | | | | 41 - 50 psf | | | | 51 - 60 psf | | | |
| | | Wind Exposure Category | | | | | | | | | | | | | | | | | | | | | | | |
| ASCE 7-05 (Service Level) | ASCE 7-10 (Strength Level) | Roof Pitch | B | C | D | B | C | D | B | C | D | B | C | D | B | C | D | B | C | D | B | C | D | | |
| 85 mph | 110 mph | Flat to 6:12 | 72" | 72" | 72" | 72" | 72" | 72" | 64" | 64" | 48" | 48" | 48" | 48" | 48" | 32" | 32" | 32" | 32" | 32" | 32" | 32" | 32" | 32" | |
| | | | 72" | 72" | 72" | 72" | 72" | 72" | 72" | 48" | 48" | 48" | 48" | 48" | 48" | 48" | 32" | 32" | 32" | 32" | 32" | 32" | 32" | 32" | 32" |
| 90 mph | 115 mph | Flat to 6:12 | 72" | 72" | 72" | 72" | 72" | 72" | 72" | 72" | 72" | 72" | 72" | 72" | 72" | 32" | 32" | 32" | 32" | 32" | 32" | 32" | 32" | 32" | 32" |
| | | | 72" | 72" | 72" | 72" | 72" | 72" | 72" | 48" | 48" | 48" | 48" | 48" | 48" | 48" | 32" | 32" | 32" | 32" | 32" | 32" | 32" | 32" | 32" |
| 100 mph | 125 mph | Flat to 6:12 | 72" | 72" | 72" | 72" | 72" | 72" | 72" | 72" | 72" | 72" | 72" | 72" | 72" | 32" | 32" | 32" | 32" | 32" | 32" | 32" | 32" | 32" | 32" |
| | | | 72" | 72" | 72" | 72" | 72" | 72" | 72" | 48" | 48" | 48" | 48" | 48" | 48" | 48" | 32" | 32" | 32" | 32" | 32" | 32" | 32" | 32" | 32" |
| 110 mph | 140 mph | Flat to 6:12 | 72" | 72" | 72" | 72" | 72" | 72" | 72" | 72" | 72" | 72" | 72" | 72" | 72" | 32" | 32" | 32" | 32" | 32" | 32" | 32" | 32" | 32" | 32" |
| | | | 72" | 72" | 72" | 72" | 72" | 72" | 72" | 48" | 48" | 48" | 48" | 48" | 48" | 48" | 32" | 32" | 32" | 32" | 32" | 32" | 32" | 32" | 32" |
| 120 mph | 150 mph | Flat to 6:12 | 72" | 72" | 72" | 72" | 72" | 72" | 72" | 72" | 72" | 72" | 72" | 72" | 72" | 32" | 32" | 32" | 32" | 32" | 32" | 32" | 32" | 32" | 32" |
| | | | 72" | 72" | 72" | 72" | 72" | 72" | 72" | 48" | 48" | 48" | 48" | 48" | 48" | 48" | 32" | 32" | 32" | 32" | 32" | 32" | 32" | 32" | 32" |

Table Notes:

- Quick Rack base mount maximum allowable spacings are between Quick Rack base mounts in the cross-slope direction.
- Maximum short edge PV module width is 40".
- Where spacing is followed by an asterisk (*), the PV array must be set back at least 3'-0" from all roof edges.
- Where two numbers are shown, such as 72"/64", the first number is the maximum allowable spacing when the PV array is set back at least 3'-0" from all roof edges, and the second number is the maximum allowable spacing otherwise.
- The PV module cantilever is defined as the distance from the nominal east or west array edge to the center of the structural screw. The maximum cantilever is 18" for spacings greater than or equal to 48", and 9" for spacings less than 48". For spacings greater than or equal to 48", the maximum cantilever is permitted to be extended to 24" if the array is set back at least 3'-0" from all roof edges, and the entry in the table does not have an asterisk (*).
- Seismic: Maximum are spacings subject to the following limitations on S_{DS} :
 72" : high seismic zones ($S_{DS} \leq 1.5g$)
 64" : high seismic zones ($S_{DS} \leq 1.5g$ for ground snow load greater than 20 psf, otherwise $S_{DS} \leq 1.75g$)
 48" and smaller : high seismic zones ($S_{DS} \leq 2.0g$)
- This table is subject to the conditions stated in the attached Code Compliance Letter, and shown in the attached sketches.
- This table is based on ASCE 7-05 and ASCE 7-10. ASCE 7-10 wind speeds are back-calculated from ASCE 7-05 wind speeds to produce the same wind pressures on a Risk Category II building.
- See Table 3 for regions of high wind or snow load where a staggered base mount layout is recommended.

Existing Roof Rafter Capacity Assessment

| Ground Snow Load | Wind Speed ASCE 7-05 (Service Level) | | ASCE 7-10 (Strength Level) | Roof Pitch | Wind Exposure Category | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
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| | | | | | n = 1 | n = 2 | n = 3 | n = 4 | n = 1 | n = 2 | n = 3 | n = 4 | n = 1 | n = 2 | n = 3 | n = 4 | n = 1 | n = 2 | n = 3 | n = 4 | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
| 0 psf | 85 mph | 110 mph | Flat to 6:12 7:12 to 12:12 | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK 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| OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK | OK |

Table Notes:

- OK

= If the existing roof is code compliant, it is likely to have sufficient strength to support a PV array without staggering base mounts.
- SA

= **S**tagger **A**nchor**s**, or **S**tructurally **A**ssess and **S**trengthen as **A**ppropriate. See Sketches 7 - 10 for acceptable staggered base mount layouts.
- *

The staggered pattern shown in Sketch 8 is **NOT** acceptable. Instead, reduce the base mount spacing and use the staggered pattern shown in Sketch 9.
- **

The staggered pattern shown in Sketch 7 is **NOT** acceptable. Instead, reduce the base mount spacing and use the staggered pattern shown in Sketch 9.
1.

This table provides general guidelines for when a base mount layout that is anchored to every second, third or fourth rafter is likely to be acceptable, and when a staggered base mount layout or structural engineering assessment is recommended instead.
2.

The installer and/or building owner is responsible for verifying that the existing roof can support code-required roof loads.
3.

Concentrated loads on a rafter from Quick Rack base mounts are assumed to be partially shared with adjacent rafters as described in the Technical Appendix of the East Bay Green Corridor's Streamlined Structural Permitting for Residential Photovoltaic Installations.
4.

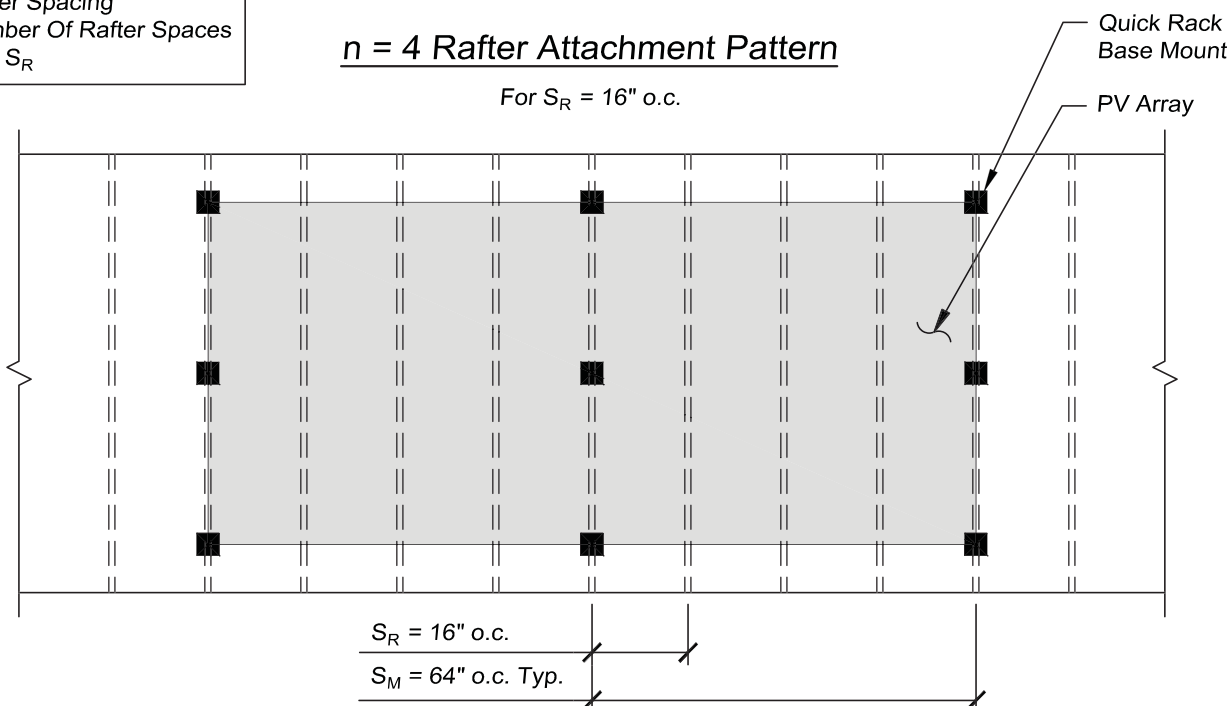
Table based on ASCE 7-05 and ASCE 7-10. ASCE 7-10 wind speeds are back-calculated from ASCE 7-05 wind speeds to produce the same wind pressures on a Risk Category II building.

Rafter Attachment Pattern Sketch 7

S_M = Base Mount Spacing
 S_R = Rafter Spacing
 n = Number Of Rafter Spaces
 $= S_M / S_R$

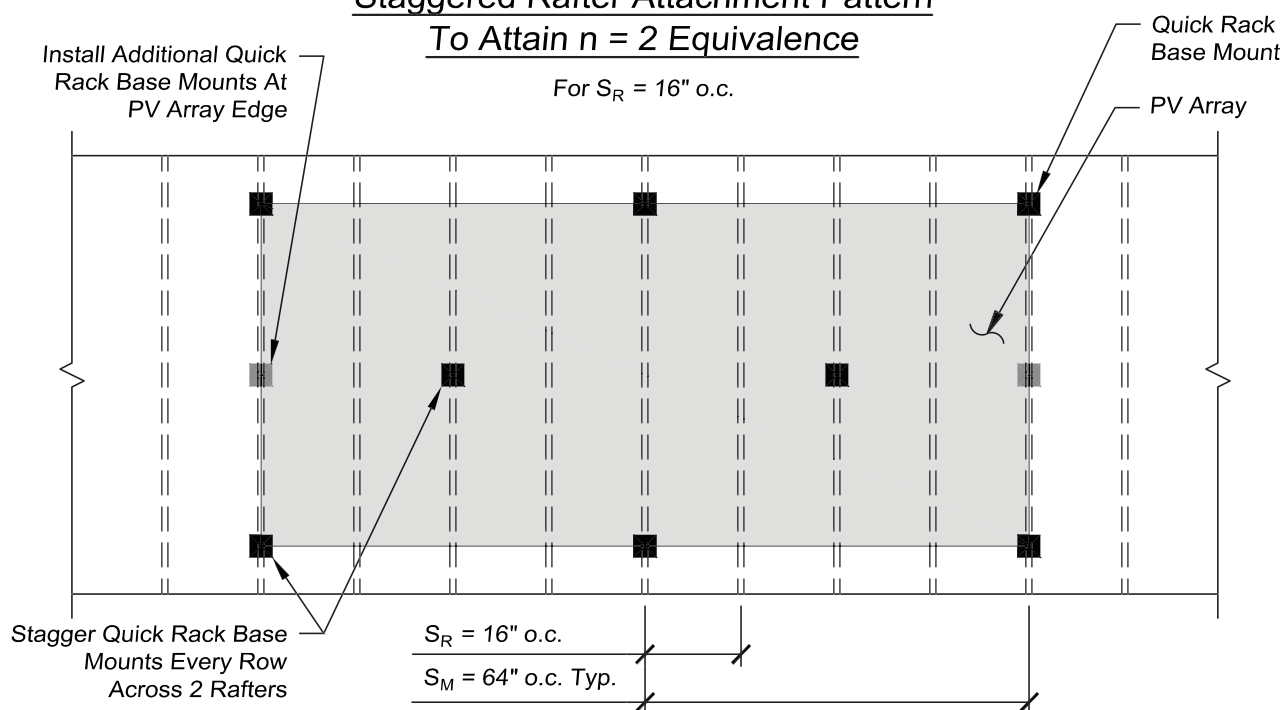
$n = 4$ Rafter Attachment Pattern

For $S_R = 16"$ o.c.



Staggered Rafter Attachment Pattern To Attain $n = 2$ Equivalence

For $S_R = 16"$ o.c.



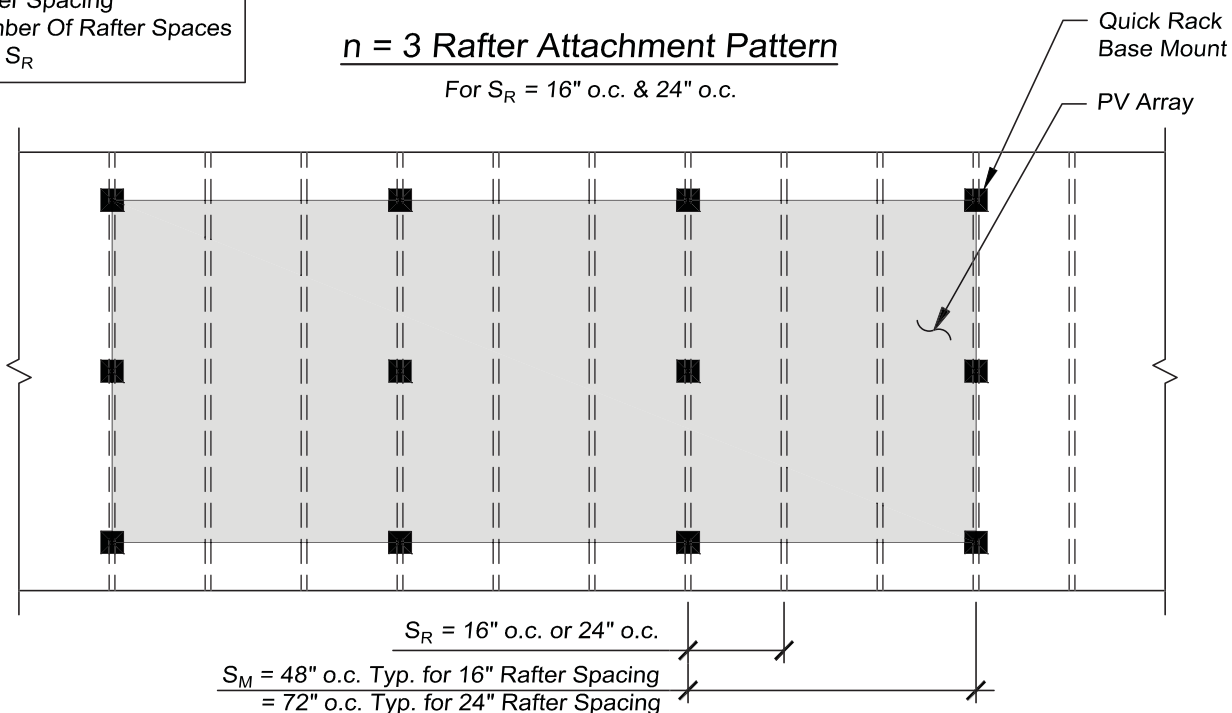
Note: This staggered pattern is NOT acceptable where SA^{**} is indicated for $n=4$ in Table 3. Instead, reduce the base mount spacing to 32" and stagger per Sketch 9.

Rafter Attachment Pattern Sketch 8

S_M = Base Mount Spacing
 S_R = Rafter Spacing
 n = Number Of Rafter Spaces
 $= S_M / S_R$

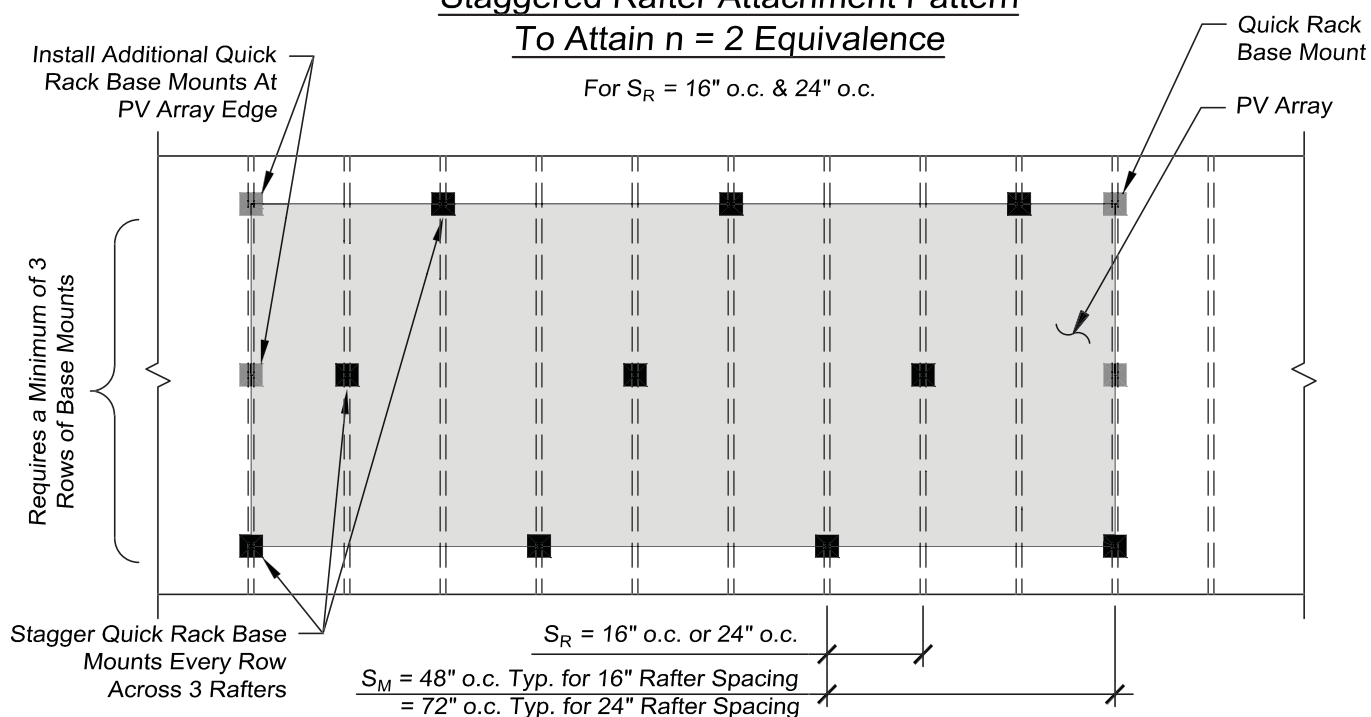
$n = 3$ Rafter Attachment Pattern

For $S_R = 16"$ o.c. & $24"$ o.c.



Staggered Rafter Attachment Pattern To Attain $n = 2$ Equivalence

For $S_R = 16"$ o.c. & $24"$ o.c.



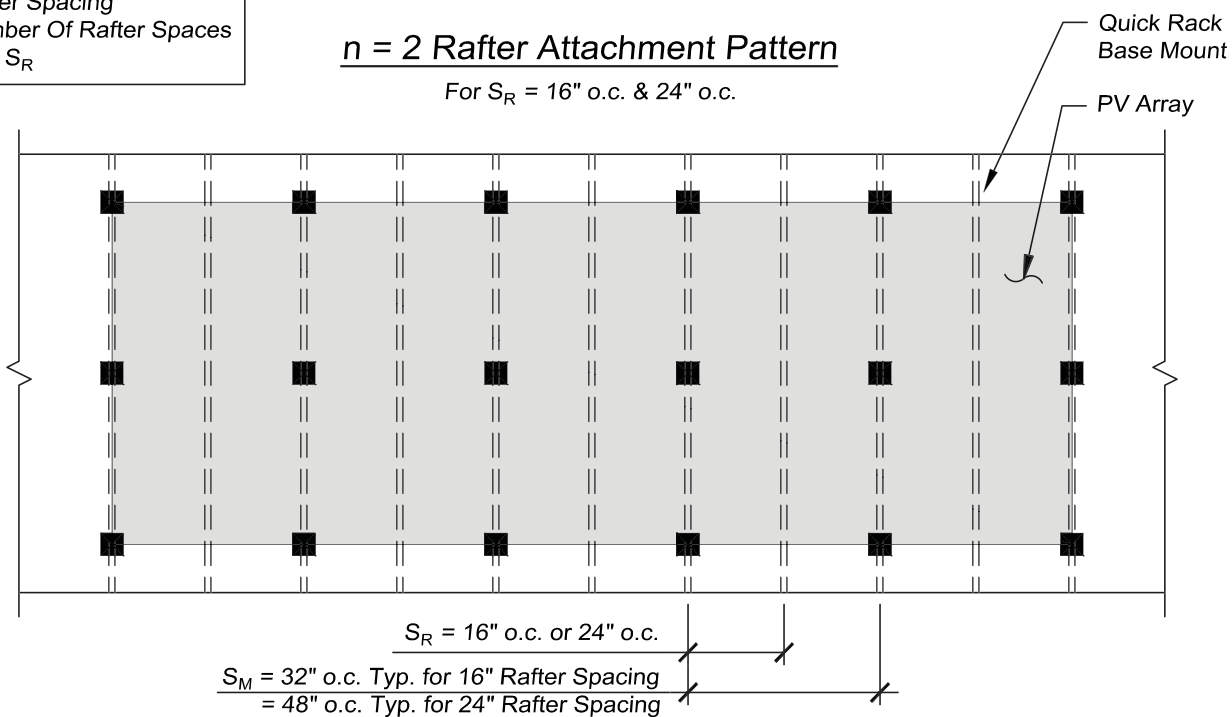
Note: This staggered pattern is NOT acceptable where SA* is indicated for $n=3$ or SA** is indicated for $n=4$ in Table 3. Instead, reduce the base mount spacing and stagger per Sketch 9.

Rafter Attachment Pattern Sketch 9

S_M = Base Mount Spacing
 S_R = Rafter Spacing
 n = Number Of Rafter Spaces
 $= S_M / S_R$

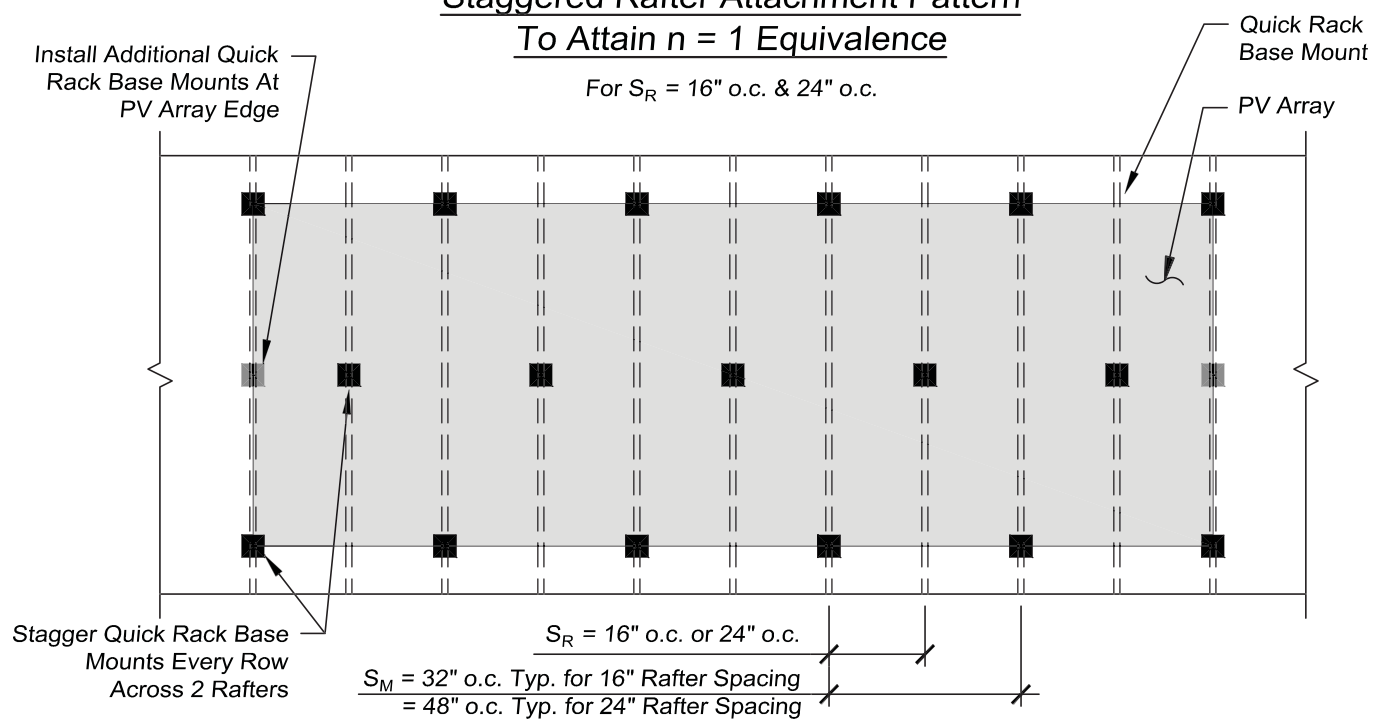
$n = 2$ Rafter Attachment Pattern

For $S_R = 16"$ o.c. & $24"$ o.c.



Staggered Rafter Attachment Pattern To Attain $n = 1$ Equivalence

For $S_R = 16"$ o.c. & $24"$ o.c.

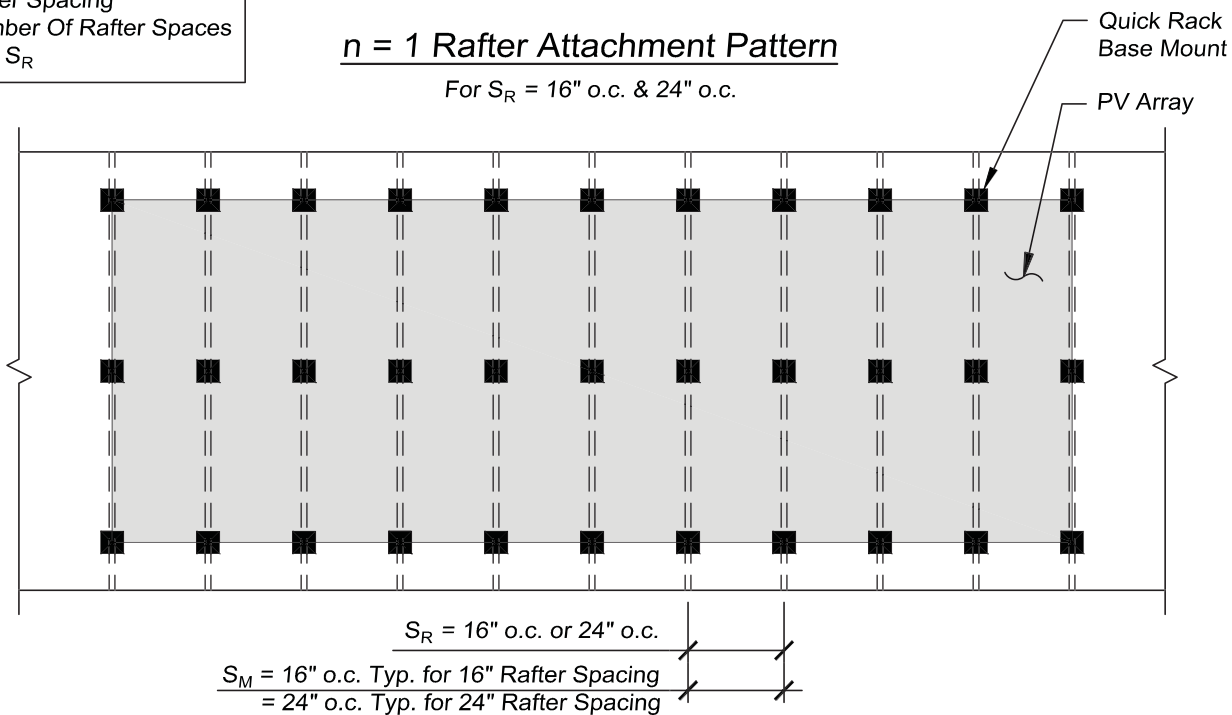


Rafter Attachment Pattern Sketch 10

S_M = Base Mount Spacing
 S_R = Rafter Spacing
 n = Number Of Rafter Spaces
 $= S_M / S_R$

$n = 1$ Rafter Attachment Pattern

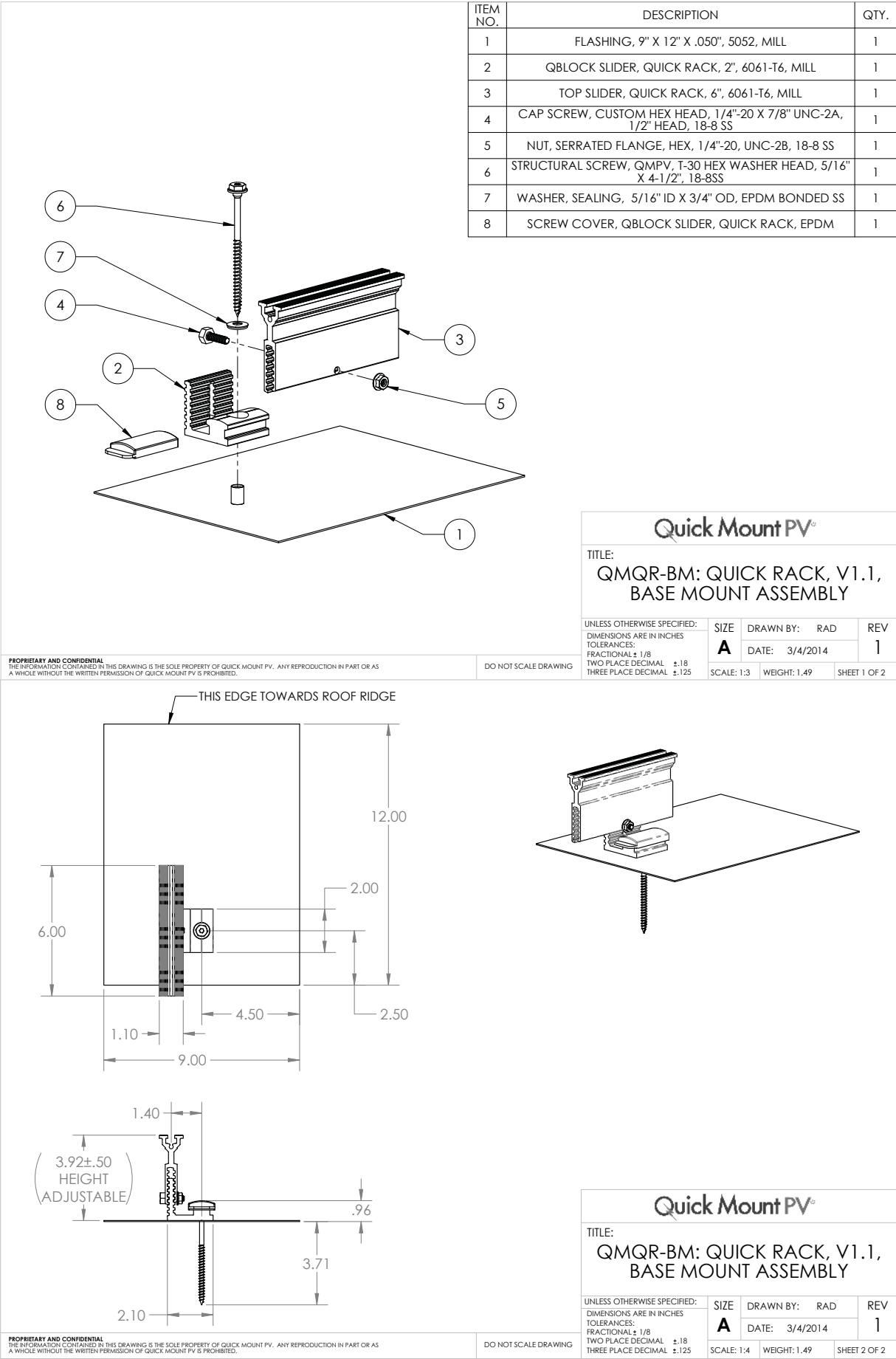
For $S_R = 16"$ o.c. & $24"$ o.c.

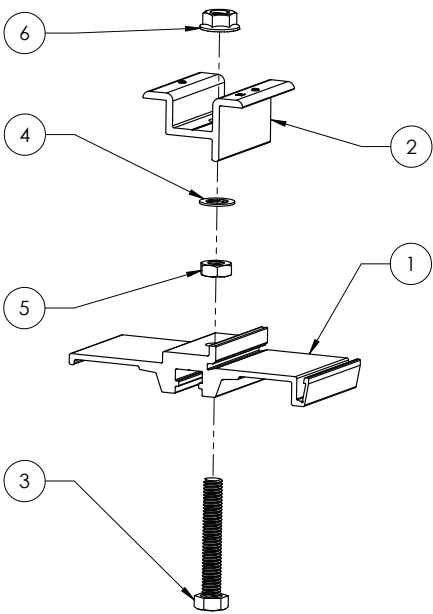


C. Code Compliance

- 2009 International Building Code compliant
- 2013 California Building Code compliant
- ASCE 7-05 Minimum Design Loads for Buildings and Other Structures compliant
- ASCE 7-10 Minimum Design Loads for Buildings and Other Structures compliant
- Conforms to UL SUB 2703, ETL listed by Intertek

D. Engineering Drawings





| ITEM NO. | DESCRIPTION | QTY. |
|----------|---|------|
| 1 | CLAMP BASE, QUICK RACK V1.1, 2", 6005A-T5/6061-T6, MILL | 1 |
| 2 | PANEL CLAMP, 35MM, QUICK RACK, V1.1, 2", 6005A-T5/6005A-T61/6061-T6, BRONZE | 1 |
| 3 | CAP SCREW, HEX HEAD, 5/16"-18 X 2" UNC-2A, 18-8 SS | 1 |
| 4 | RETAINER RING, EXTERNAL PUSH-ON, 5/16", CIRCULAR, PLASTIC | 1 |
| 5 | NUT, JAM, HEX, 5/16-18, UNC-2B, 18-8 SS | 1 |
| 6 | NUT, SERRATED FLANGE, HEX, 5/16"-18, UNC-2B, 18-8 SS | 1 |

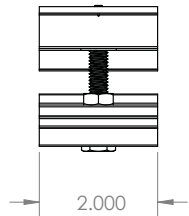
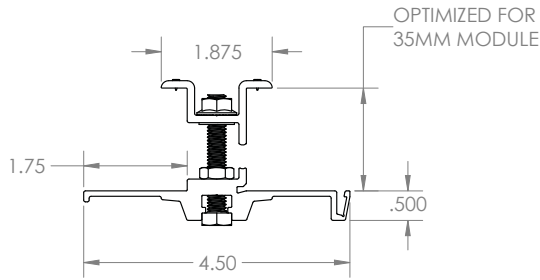
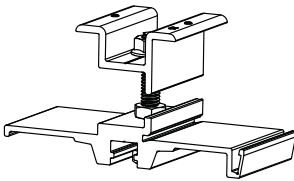
Quick Mount PV®

TITLE:
QMQR-CP35.2: QUICK RACK V1.1,
35MM CLAMP ASSEMBLY, 2 INCH

| | | | |
|---|------------------|----------------------------------|-----------------|
| UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/8$ TWO PLACE DECIMAL $\pm .18$ THREE PLACE DECIMAL $\pm .125$ | SIZE A | DRAWN BY: DFM DATE: 5/22/2014 | REV 3 |
| SCALE: 1:2 | WEIGHT: 0.34 | SHEET 1 OF 2 | |

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DO NOT SCALE DRAWING



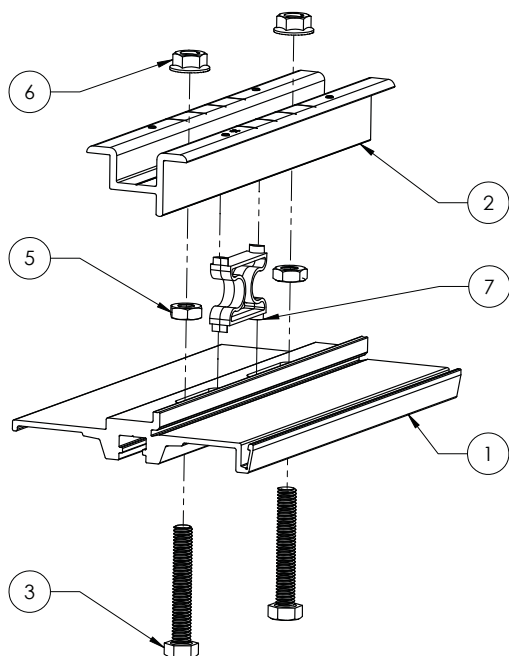
Quick Mount PV®

TITLE:
QMQR-CP35.2: QUICK RACK V1.1,
35MM CLAMP ASSEMBLY, 2 INCH

| | | | |
|---|------------------|----------------------------------|-----------------|
| UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/8$ TWO PLACE DECIMAL $\pm .18$ THREE PLACE DECIMAL $\pm .125$ | SIZE A | DRAWN BY: DFM DATE: 5/22/2014 | REV 3 |
| SCALE: 1:2 | WEIGHT: 0.34 | SHEET 2 OF 2 | |

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DO NOT SCALE DRAWING



| ITEM NO. | DESCRIPTION | QTY. |
|----------|---|------|
| 1 | CLAMP BASE, QUICK RACK V1.1, 8", 6005A-T5/6061-T6, MILL | 1 |
| 2 | PANEL CLAMP, 35MM, QUICK RACK, V1.1, 8", 6005A-T5/6005A-T61/6061-T6, BRONZE | 1 |
| 3 | CAP SCREW, HEX HEAD, 5/16"-18 X 2" UNC-2A, 18-8 SS | 2 |
| 5 | NUT, JAM, HEX, 5/16-18, UNC-2B, 18-8 SS | 2 |
| 6 | NUT, SERRATED FLANGE, HEX, 5/16"-18, UNC-2B, 18-8 SS | 2 |
| 7 | CLAMP SPRING, 8 INCH, QUICK RACK, V1.1, NYLON 66, BLACK | 1 |

Quick Mount PV®

TITLE:
QMQR-CP35.8: QUICK RACK V1.1,
35MM CLAMP ASSEMBLY, 8 INCH

UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL $\pm 1/8$
TWO PLACE DECIMAL $\pm .18$
THREE PLACE DECIMAL $\pm .125$

SIZE
A

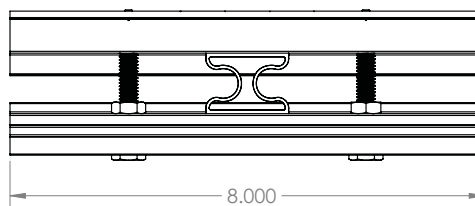
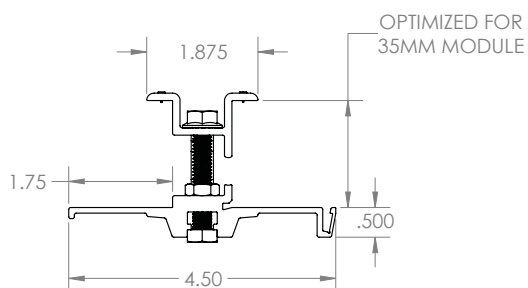
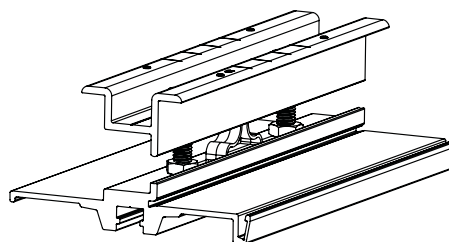
DRAWN BY: DFM
DATE: 5/22/2014

REV
3

SCALE: 1:2 WEIGHT: 1.21 SHEET 1 OF 2

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Quick Mount PV®

TITLE:
QMQR-CP35.8: QUICK RACK V1.1,
35MM CLAMP ASSEMBLY, 8 INCH

UNLESS OTHERWISE SPECIFIED:

DIMENSIONS ARE IN INCHES
TOLERANCES:
FRACTIONAL $\pm 1/8$
TWO PLACE DECIMAL $\pm .18$
THREE PLACE DECIMAL $\pm .125$

SIZE
A

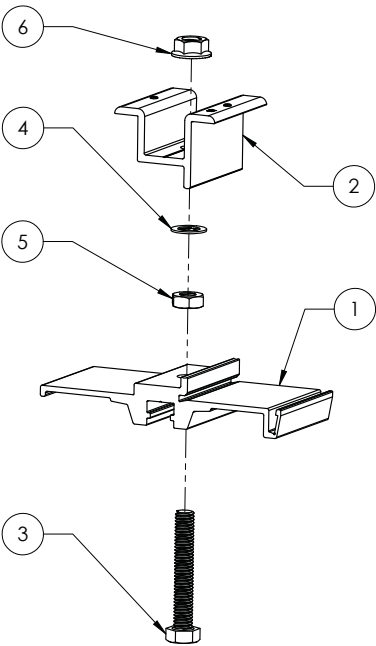
DRAWN BY: DFM
DATE: 5/22/2014

REV
3

SCALE: 1:2 WEIGHT: 1.21 SHEET 2 OF 2

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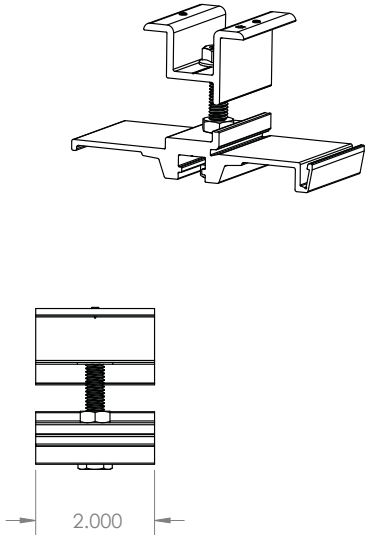
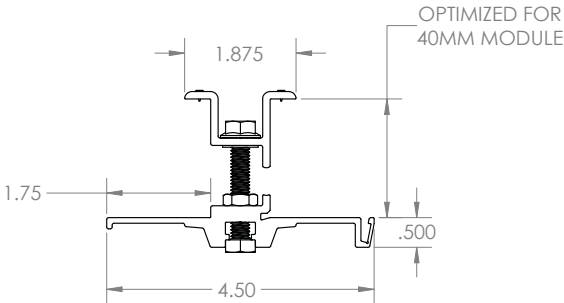


| ITEM NO. | DESCRIPTION | QTY. |
|----------|---|------|
| 1 | CLAMP BASE, QUICK RACK V1.1, 2", 6005A-T5/6061-T6, MILL | 1 |
| 2 | PANEL CLAMP, 40MM, QUICK RACK, V1.1, 2", 6005A-T5/6005A-T61/6061-T6, BRONZE | 1 |
| 3 | CAP SCREW, HEX HEAD, 5/16"-18 X 2" UNC-2A, 18-8 SS | 1 |
| 4 | RETAINER RING, EXTERNAL PUSH-ON, 5/16", CIRCULAR, PLASTIC | 1 |
| 5 | NUT, JAM, HEX, 5/16-18, UNC-2B, 18-8 SS | 1 |
| 6 | NUT, SERRATED FLANGE, HEX, 5/16"-18, UNC-2B, 18-8 SS | 1 |

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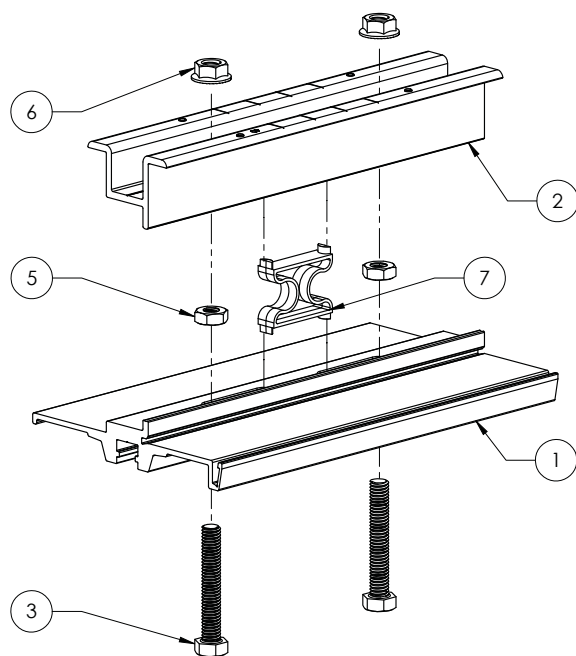
| | | | |
|---|------------|-----------------|--------------|
| Quick Mount PV® | | | |
| TITLE: QMQR-CP40.2: QUICK RACK V1.1, 40MM CLAMP ASSEMBLY, 2 INCH | | | |
| UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL ± 1/8 TWO PLACE DECIMAL ± .18 THREE PLACE DECIMAL ± .125 | SIZE | DRAWN BY: DFM | REV |
| | A | DATE: 5/22/2014 | 2 |
| | SCALE: 1/2 | WEIGHT: 0.35 | SHEET 1 OF 2 |
| | | | |



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| | | | |
|---|------------|-----------------|--------------|
| Quick Mount PV® | | | |
| TITLE: QMQR-CP40.2: QUICK RACK V1.1, 40MM CLAMP ASSEMBLY, 2 INCH | | | |
| UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL ± 1/8 TWO PLACE DECIMAL ± .18 THREE PLACE DECIMAL ± .125 | SIZE | DRAWN BY: DFM | REV |
| | A | DATE: 5/22/2014 | 2 |
| | SCALE: 1/2 | WEIGHT: 0.35 | SHEET 2 OF 2 |
| | | | |



| ITEM NO. | DESCRIPTION | QTY. |
|----------|---|------|
| 1 | CLAMP BASE, QUICK RACK V1.1, 8", 6005A-T5/6061-T6, MILL | 1 |
| 2 | PANEL CLAMP, 40MM, QUICK RACK, V1.1, 8", 6005A-T5/6005A-T61/6061-T6, BRONZE | 1 |
| 3 | CAP SCREW, HEX HEAD, 5/16"-18 X 2" UNC-2A, 18-8 SS | 2 |
| 5 | NUT, JAM, HEX, 5/16-18, UNC-2B, 18-8 SS | 2 |
| 6 | NUT, SERRATED FLANGE, HEX, 5/16"-18, UNC-2B, 18-8 SS | 2 |
| 7 | CLAMP SPRING, 8 INCH, QUICK RACK, V1.1, NYLON 66, BLACK | 1 |

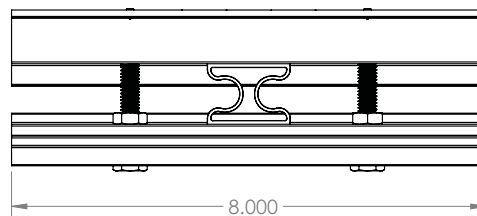
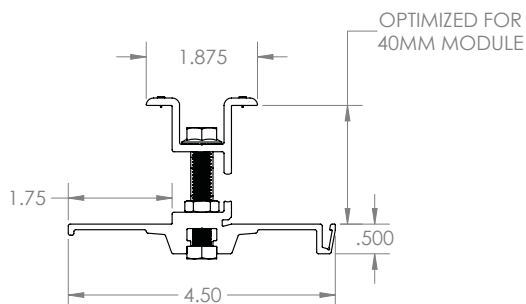
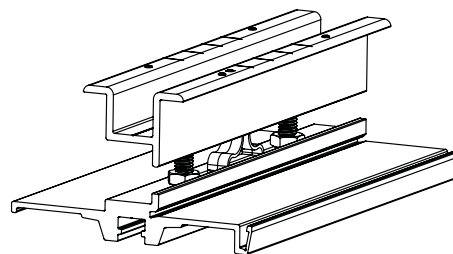
Quick Mount PV®

TITLE:
QMQR-CP40.8: QUICK RACK V1.1,
40MM CLAMP ASSEMBLY, 8 INCH

| | | | |
|---|------------|-----------------|--------------|
| UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/8$ TWO PLACE DECIMAL $\pm .18$ THREE PLACE DECIMAL $\pm .125$ | SIZE | DRAWN BY: DFM | REV |
| | A | DATE: 5/22/2014 | 2 |
| | SCALE: 1:2 | WEIGHT: 1.25 | SHEET 1 OF 2 |
| | | | |

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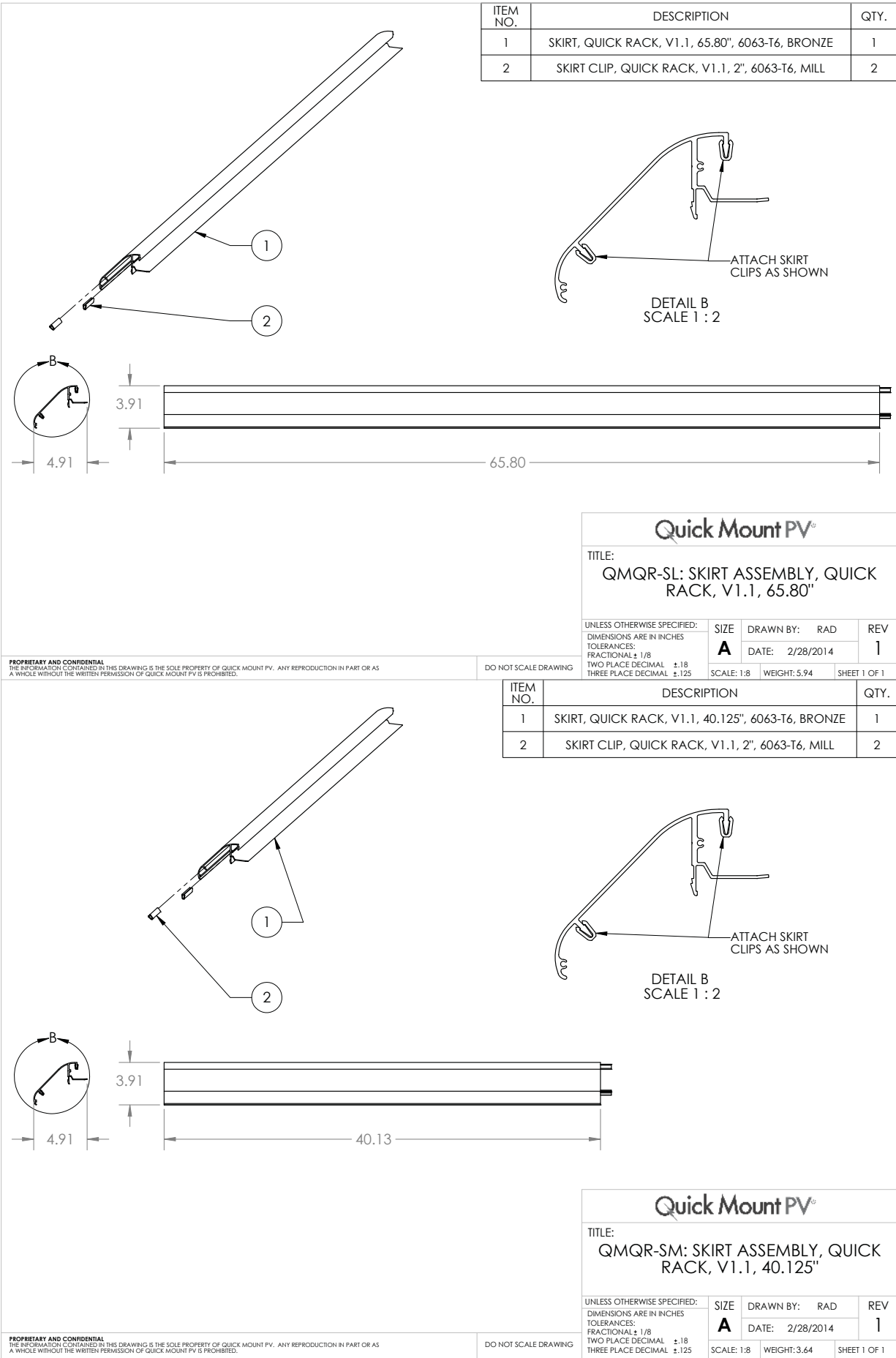
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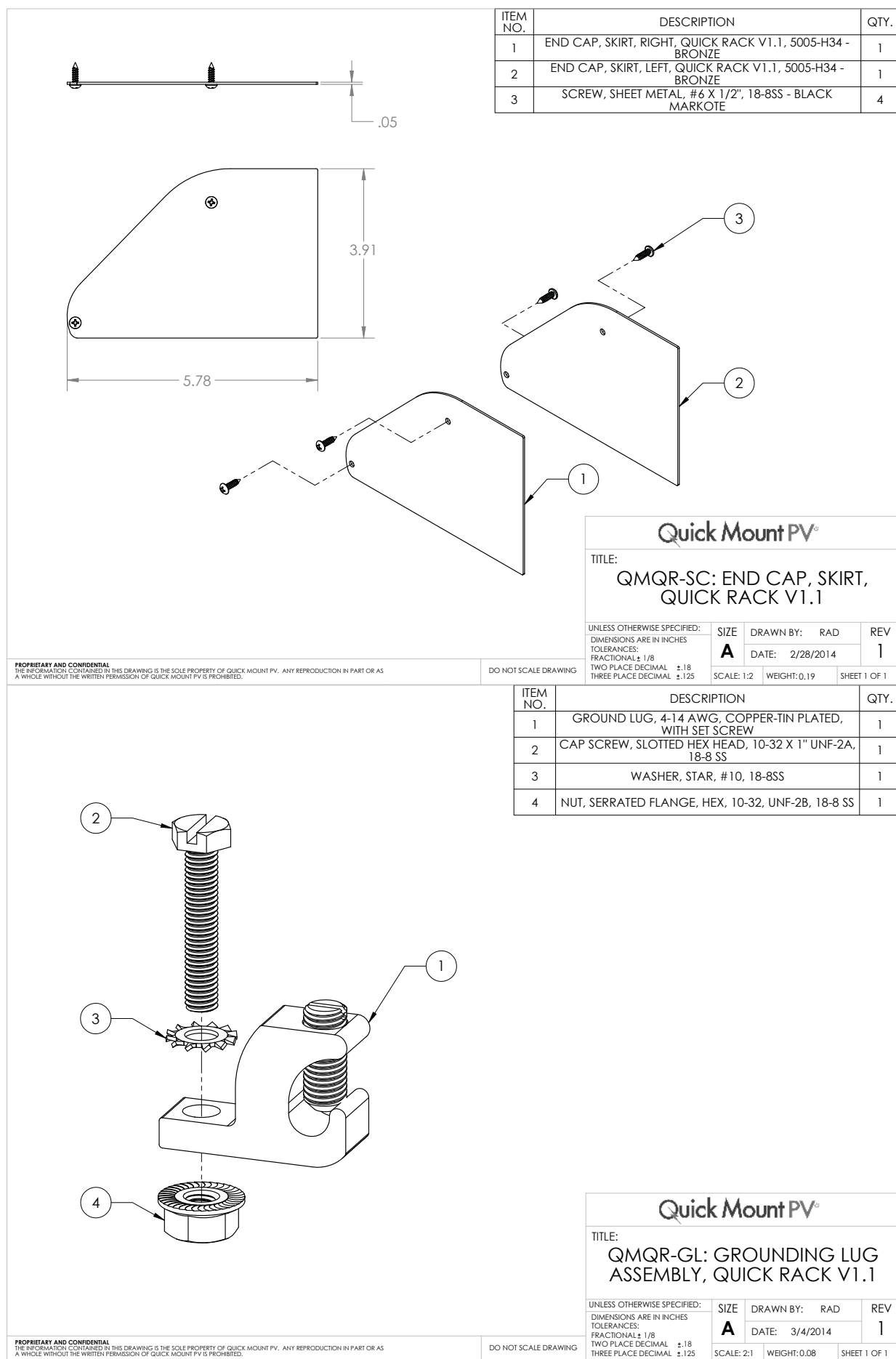
TITLE:
QMQR-CP40.8: QUICK RACK V1.1,
40MM CLAMP ASSEMBLY, 8 INCH

| | | | |
|---|------------|-----------------|--------------|
| UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES TOLERANCES: FRACTIONAL $\pm 1/8$ TWO PLACE DECIMAL $\pm .18$ THREE PLACE DECIMAL $\pm .125$ | SIZE | DRAWN BY: DFM | REV |
| | A | DATE: 5/22/2014 | 2 |
| | SCALE: 1:2 | WEIGHT: 1.25 | SHEET 2 OF 2 |
| | | | |

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