2.2 QRail System Components

Components	Product Rendering	Torque Value
QRail options: Heavy in various lengths Standard in various lengths Light in various lengths Mill or Black finish		
Internal QSplice: For Heavy, Standard & Light QRail sizes		
External QSplice: For Heavy or Standard QRail sizes		10 - 12ft-lbf/ 14-16N-m
Fixed Size End Clamps w/ QClick Technology®: For modules from 31-50mm thick Available with optional WEEB bonding clip Mill or Black finish		8ft-lbf/11N-m
Universal End Clamps w/ QClick Technology®: 2 clamps for modules from 30-45mm or 38-50mm thick Available with optional WEEB bonding clip Mill or Black finish		8ft-lbf/11N-m
Hidden End Clamps		9ft-lbf/12N-m
Universal Bonding Mid Clamps w/ QClick Technology®: 2 clamps for modules from 30-45mm or 38-50mm thick Mill or Black finish		12ft-lbf/16N-m
End Cap options: For Heavy, Standard & Light QRail sizes Black finish		

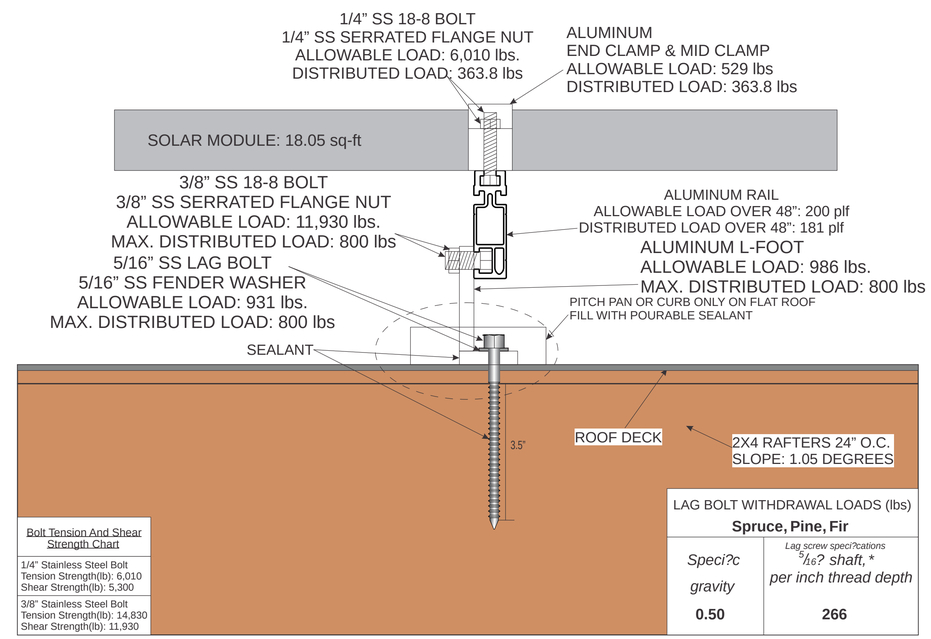
2.3 Technical Data

Application	Low and Steep Slope Roofs
Roofing type	Suitable for most types of roofing
Roof slope	Up to - 45°(upto 12:12)
Building height	Up to 60 ft / 18.25[1]m
PV modules	Framed
Module orientation	Landscape or portrait
Size of module array	Any size possible
Position of the module array	No special requirements
Distance between roof attachment points	Up to 10 ft / 3 m
Maximum Rail Cantilever	1/3 maximum allowable span for project
Codes & Standards	IBC/IRC 2015 IBC/IRC 2012 ICC-AC428 2012 ASCE 7-05 ASCE 7-10 CBC/CRC 2016 ANSI/ UL 2703 Ed. 1 FBC/FRC 2017 Aluminum Design Manual 2010, 2015 SEAOC PV2
Supporting profiles	Extruded Aluminum
Small parts	Stainless steel
Color	Mill or Black finish
Warranty	25 years[3]

[1] Different maximum values may apply, depending on site, building, choice of roof attachment and module type.
[2] The Quick Mount PV QDesign can be used to verify the structural adequacy of each specific project quickly and easily.
[3] Limited product warranty. Download full warranty on www.quickmountpv.com.

ATTACHMENT DIAGRAM
2 ROWS OF RAILS PER MODULE

USE QUICKMOUNT STANDARD QRAIL

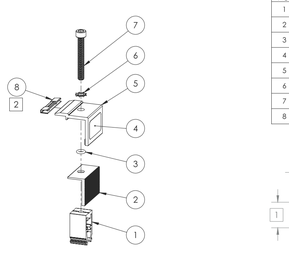


Bolt Tension And Shear Strength Chart
1/4" Stainless Steel Bolt Tension Strength(lb): 6,010 Shear Strength(lb): 5,300
3/8" Stainless Steel Bolt Tension Strength(lb): 14,830 Shear Strength(lb): 11,930

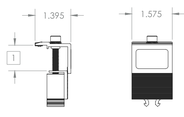
LAG BOLT WITHDRAWAL LOADS (lbs) Spruce, Pine, Fir	
Speci?c gravity	*Lag screw speci?cations* *5/16? shaft,* per inch thread depth*
0.50	**266**

* Rails, L-Foot, Mid-clamps & End-clamps are extruded using one of the following aluminum alloys: 6005-T5, 6105-T5, 6061-T6

Sources: American Wood Council, NDS 2005, Table 11.2A, 11.3.2A.



ITEM NO.	DESCRIPTION	QTY.
1	QCLICK, 17MM, AL, MILL	1
2	UNIVERSAL END CLAMP, QRAIL, LOWER, 40MM, AL, MILL	1
3	RUBBER O-RING, 5MM ID X 2MM THK, BUNA-N	1
4	STICKER, ETL, QRAIL, END CLAMP	1
5	UNIVERSAL END CLAMP, QRAIL, UPPER, 40MM, AL, MILL	1
6	WASHER, STAR, M6, 18-8 SS	1
7	CAP SCREW, SOCKET HEAD, M6 X 1.0 X 45MM, DIN 912, A2-70 SS	1
8	WEEB BMC, 304 SS	1



NOTES:
1. AVAILABLE IN TWO SIZE RANGES: 30-45MM and 38-50MM
2. AVAILABLE IN BONDING AND NON-BONDING VERSIONS (PART #'S INCLUDED WITH BONDING VERSION ONLY)
3. ALL VERSIONS AVAILABLE IN MILL FINISH, AND BLACK FINISH

Quick Mount PV

TITLE: QMR-UEC: UNIVERSAL END CLAMP, QRAIL

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES; TOLERANCES: FRACTIONAL ± 1/8, TWO PLACE DECIMAL ± .01, THREE PLACE DECIMAL ± .014 | SIZE A | DRAWN BY: RAD | DATE: 12/18/2018 | SCALE: 1:2 | WEIGHT: 0.12 | SHEET 1 OF 1 | REV 3

DO NOT SCALE DRAWING

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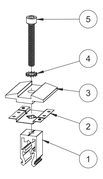
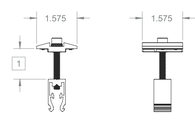
ITEM NO.	DESCRIPTION	QTY.
1	QCLICK, 17MM, AL, MILL	1
2	BONDING PLATE, MID CLAMP, V1.2, QRAIL, SS	1
3	UNIVERSAL MID CLAMP, QRAIL, 40MM, AL, MILL	1
4	WASHER, STAR, TIGHT-GRIP, M6, 18-8 SS	1
5	CAP SCREW, SOCKET HEAD, M6 X 1.0 X 45MM, DIN 912, A2-70 SS	1





"Controlled Document Do Not Copy"

NOTES:
1. AVAILABLE IN TWO SIZE RANGES: 30-45MM AND 38-50MM
2. ALL VERSIONS AVAILABLE IN MILL FINISH AND BLACK FINISH

Quick Mount PV

TITLE: QMR-UMC: UNIVERSAL MID CLAMP, V1.2, QRAIL

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES; TOLERANCES: FRACTIONAL ± 1/8, TWO PLACE DECIMAL ± .01, THREE PLACE DECIMAL ± .004 | SIZE A | DRAWN BY: RAD | DATE: 5/10/2018 | SCALE: 1:2 | WEIGHT: 0.10 | SHEET 1 OF 1 | REV 2

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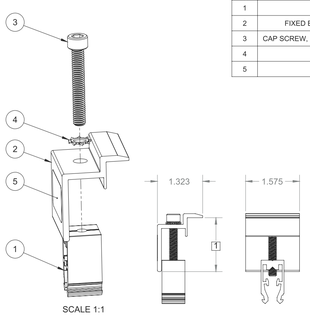
ITEM NO.	DESCRIPTION	QTY.
1	QCLICK, 17MM, AL, MILL	1
2	FIXED END CLAMP, QRAIL, 40MM, X 40MM, AL, MILL	1
3	CAP SCREW, SOCKET HEAD, M6 X 1.0 X 40MM, DIN 912, A2-70 SS	1
4	WASHER, STAR, M6, 18-8 SS	1
5	STICKER, ETL, QRAIL, END CLAMP	1



SCALE 1:1

TABLE A		
MILL PART #	BLACK PART #	MODULE SIZE
QMR-FEC31	QMR-FEC31 B	31MM
QMR-FEC32	QMR-FEC32 B	32MM
QMR-FEC33	QMR-FEC33 B	33MM
QMR-FEC35	QMR-FEC35 B	35MM
QMR-FEC38	QMR-FEC38 B	38MM
QMR-FEC40	QMR-FEC40 B	40MM
QMR-FEC42	QMR-FEC42 B	42MM
QMR-FEC45	QMR-FEC45 B	45MM
QMR-FEC46	QMR-FEC46 B	46MM
QMR-FEC50	QMR-FEC50 B	50MM

NOTES:
1. SEE TABLE A FOR AVAILABLE SIZES
2. ALL VERSIONS AVAILABLE IN MILL FINISH, AND BLACK FINISH

Quick Mount PV

TITLE: QMR-FEC: FIXED END CLAMP, QRAIL

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES; TOLERANCES: FRACTIONAL ± 1/8, TWO PLACE DECIMAL ± .01, THREE PLACE DECIMAL ± .004 | SIZE A | DRAWN BY: RAD | DATE: 12/18/2018 | SCALE 2: 3 | WEIGHT: 0.10 | SHEET 1 OF 1 | REV 3

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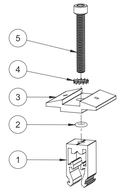
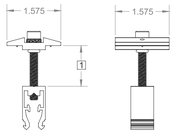
ITEM NO.	DESCRIPTION	QTY.
1	QCLICK, 17MM, AL, MILL	1
2	RUBBER O-RING, 5MM ID X 2MM THK, BUNA-N	1
3	UNIVERSAL MID CLAMP, QRAIL, 40MM, 2 PINS, AL, MILL	1
4	WASHER, STAR, TIGHT-GRIP, M6, 18-8 SS	1
5	CAP SCREW, SOCKET HEAD, M6 X 1.0 X 45MM, DIN 912, A2-70 SS	1





NOTES:
1. AVAILABLE IN TWO SIZE RANGES: 30-45 MM AND 38-50 MM
2. ALL VERSIONS AVAILABLE IN MILL FINISH AND BLACK FINISH

Quick Mount PV

TITLE: QMR-UMC-P2: UNIVERSAL MID CLAMP, 2 PIN, QRAIL, W/ BONDING

UNLESS OTHERWISE SPECIFIED: DIMENSIONS ARE IN INCHES; TOLERANCES: FRACTIONAL ± 1/8, TWO PLACE DECIMAL ± .01, THREE PLACE DECIMAL ± .004 | SIZE A | DRAWN BY: RAD | DATE: 4/26/2018 | SCALE: 1:1.5 | WEIGHT: 0.09 | SHEET 1 OF 1 | REV 1

DO NOT SCALE DRAWING

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TRIBUTARY AREAS WIND LOAD CALCULATIONS

WIND PRESSURE ZONES	ZONE 1 INTERIOR	ZONE 2 EDGE	ZONE 3 CORNER
MAX Area per ZONE (ft^2)	13.33	13.33	0
MAX UPLIFT per ZONE (lbs.)	523	800	0

LAG BOLT PULL OUT CALCULATIONS

Spruce, Pine,	per inch Thread Depth	266 lbs.
SS Lag Bolt 5/16"x4.5	Min. Thread Depth	3.5"
Wood Strength x Thread Depth = Pull Out Strength		
266 lbs. x 3.5 in = 931lbs.		
Allowable Pull Out Strength per Lag Bolt		931 lbs.
Max. Pull Out Strength Required per Lag Bolt		-769.0
Lag Bolt Pull Out Strength Safety Factor		1.2

ASCE 7-10 Velocity Pressure

$qz10 = 0.00256 Kz\ Kzt\ Kd\ V2$

where:
$qz10$ = *ASCE 7-10* velocity pressure evaluated at mean roof height (psf)
Kz = velocity pressure exposure coefficient
Kzt = topographic factor
Kd = wind directionality factor
V = basic wind speed (mph) from *ASCE 7-10* maps referred to as ultimate wind speed maps in *2012 IBC.*

As an example, for an array having an area of 158.04 sq.-ft., the total uplifting (resultant) force acting on the array would be -39.1 psf x 158.04 sq. ft. = -6,179.364 lb. Knowing this resultant force, the design engineer can now determine the number of attachment points and the size of the mounting hardware necessary to safely carry this load.

Live Loads:

Live loads associated with photovoltaic systems are usually assumed to be distributed uniformly and are small, on the order of 4 psf or less.

Lag Screw Installation Guidelines

1. Determine location for the Mount on roof by drilling through the center of truss from bottom with 5/32" drill bit.
2. Mark mounting holes for Mount on underlayment. Mounting holes should be centered on the trusses.
3. Drill 15/64" pilot hole.
4. Apply sealant to bottom of Mount
5. Place Mount over roof underlayment with holes in roof.
6. Apply sealant to bottom of Mount apply sealant to lag screws, and fasten Mount securely to trusses.
7. Apply additional sealant to top assembly to be sure all penetrations are sealed.

Step 1
Remove all previously applied caulk, mastic, cement, asphalt, and other contaminants from penetrations with a wire brush. Clean all smooth substrates with isopropyl or denatured alcohol. Brush away all ravel or loose ranules. Seal the base of each penetration with **M-1**. Coat penetrations with **M-1** to 3 above the roof line.

Step 2
Hold a section of **E-Curb**, flat side up, and apply a 1/4 bead of **M-1** to the entire bottom perimeter. Apply 1 additional 1/4 bead of **M-1** down the center of the section. o not tool the beads flat. Place the **E-Curb** section on the roof surface to form a half circle around the penetration(s). Press down firmly until **M-1** extrudes from the outside ed es.

Step 3
Apply **M-1** to the second section of **E-Curb** as described above. Place the second section of curb on the roof surface to form a circle with the first section. Press firmly in place until excess adhesive extrudes from the outside ed es. Apply a bead of **M-1** around the outside base of the installed **E-Curb**, and tool to form a smooth fillet. For non **E-Curb** penetrations seals, add **M-1** to scarf joint surfaces and tool smooth.

Step 4
Cut tip off **1-Part** cartrid e at widest point on plastic nozzle and pierce the foil seal. Insert into caulkin un and pump **E-Curb** full. When usin a **1-Part** pouch, remove cap, pour, squeeze out excess air, and reseal. **Note:** To provide an adequate rubber seal, maintain a 1 distance between penetrations and inside ed e of the **E-Curb.**

All properties described in this document are derived from testin conducted in laboratory conditions. Properties and performance will vary dependin on environmental conditions and application technique. Test and evaluate to determine appropriate usa e. isit www.chemlink.com for the Safety ata Sheet, Technical ata uides and full warranty for this product.

LIMITE WARRANT : *C L* warrants this product's performance, provided it is properly stored and applied within 1 year. If this *C L* material is proved to be defective, return remainin product and purchase receipt for refund or replacement of product exclusive of labor or cost of labor. This is the sole and exclusive remedy for defects or failure of this product. User must read and follow the direction of the current Technical ata uide and S S prior to product use. User determines suitability of product for intended use and assumes all risks. Manufacturer shall not be liable for dama es (includin consequential or incidental dama es) in excess of the purchase price, except where such exclusion or limitation is prohibited by state law. THIS WARRANT IS IN LIEU OF ALL OTHER WARRANTIES, WRITTEN OR ORAL, STATUTOR , E PRESS OR IMPLIE INCLU IN AN WARRANT OF MERCHANTABILIT OR FITNESS FOR A PARTICULAR PURPOSE; except for the above express warranty iven by manufacturer, the product is sold with all faults. *C L* SHALL NOT BE RESPONSIBLE FOR THE USE OF THIS PRO UCT IN A MANNER TO INFRIN E ON AN PATENT OR AN OTHER INTELLECTUAL PROPERT RI HTS HEL B OTHERS. This warranty ives you specific le al ri hts, and you may also have other ri hts in the U.S. which vary from state to state. For warranty claim information, call 800-826-1681.

CHEMLINK POLYMER INNOVATION

DESIGN WIND PRESSURE CALCULATIONS
FOR SOLAR MODULES INSTALLED ON ROOFS

ABOUT THS TOOL:
This tool is based on the C&C Wind Loads for Low Rise buildings. Design wind pressures are calculated using ASCE 7-10equation 30.6-1.All notes in Figures 30.4-1 and 30.4-2(A,B and C) have been incorporated. Mean roof height must be less than 60 feet

SITE INFORMATION			
FBC VERSION		RISK CATEGORY	II
MEAN ROOF HEIGHT (ft)	14	ESPOSURE CATEGORY	C
LENGTH (ft)	63	ROOF SLOPE (°)	1.05
WIDTH (ft)	85	ROOF TYPE	FLAT
PARAPET HEIGHT (ft)	0	ULTIMATE WIND SPEED	175 mph
MODULE LENGTH (in)	65	NOMINAL WIND SPEED	136 mph
MODULE WIDTH (in)	39.38	K_D	0.85
# OF MODULES IN ROW	1	K_{ZT}	1.0
EFFECTIVE WIND AREA (ft^2)	18.0	K_z	0.85

DESIGN CALCULATIONS

VELOCITY PRESSURE (q) = $.00256*K_zK_{zT}K_dV^2$

VELOCITY PRESSURE(ASD) 33.9

WIDTH OF PRESSURE COEFFICIENT	63' * 10%	=	6.3'	WIDTH	5' 8"
	14' * 40%	=	5.6'		

EXTERNAL PRESSURE COEFFICIENT	ZONE 1	0.9	-1.0
	ZONE 2	0.9	-1.6
	ZONE 3	0.9	-2.2

INTERNAL PRESSURE COEFFICIENT (+/-) 0.18

DESIGN PRESSURES

ROOF ZONE	DOWN	UP	
1	35.8	-39.2	psf
2	35.8	-60.0	psf
3	35.8	-81.0	psf

REVISIONS:

Project: SONNIA & FERNANDO MONDRAGON
1526 71st St,
Miami Beach, FL 33141
STRUCTURAL DIAGRAM & CALCULATION

2001 W Sample Road, Suite 320
Deerfield Beach, Florida 33064
(818) 929-7125
Lic: #CVC057052 & #CGC058270
SMARTENERGY INC.

SEAL: RYAN D. GOOLABSINGH LICENSE No. 82345 STATE OF FLORIDA PROFESSIONAL ENGINEER 12/02/2020

Digitally signed by Ryan Goolabsingh
Date: 2020.12.02 23:19:16-05'00'

RYAN GOOLABSINGH
FL P.E. 82345

RDG ENGINEERING, INC.
FLORIDA C.A. NO. 32850
RYAN GOOLABSINGH - FLORIDA P.E. NO. 82345
951 BRICKELL AVENUE, #3605
MIAMI, FLORIDA 33131
(786) 422-2331
I CERTIFY THAT THIS PV SYSTEM FULLY COMPLIES WITH THE REQUIREMENTS OF NEC 690.

DATE: 10/30/2020

SCALE: NTS

DRAWN BY: J.B

PAGE:
S-2