Mina Makar

Engineer-PE

Pro Custom Solar LLC
3096B Hamilton Blvd
South Plainfield, NJ 07080

732-902-6224

November 20, 2022

Re: Proposed Photovoltaic Solar Panel Installation
Roy Roos
24 S BUCKHOUT ST
IRVINGTON, NY 10533

Dear Plan Reviewer:

Certification: I have reviewed the engineering testing reports for the racking and attachments to be used on this project and I certify that the products are capable of supporting the code required loads and are suitable for this installation when installed in strict compliance with the manufacturers printed instructions.

Regarding the solar panel array installation on the above referenced project please note that an inspection was performed by a representative of the Architect/Engineer of Record, and analysis of the existing structure was conducted. There is adequate structural capacity for the installation of the array with the following recommendations:

1. The array will be installed on the existing roof. The roof framing is constructed of 2"x6" wood rafters @22" o.c. spanning 9'4" with 1/2" plywood sheathing. The new array (See Site map by contractor) will add 2.63 Lb. / Sf. overall to the roof. The existing structure is sufficient to support the new loads associated with the additional weight & wind resistance. No additional structural support is required for the roof structure.

2. The attachment system shall be secured to the roof and shall be in strict compliance with manufacturers printed instructions. The attachment system shall be UL 1703 approved tested. Provide 6 mil. vapor barrier between dissimilar metals. Provide water tight gasket and sealant at all penetrations. Attachments shall follow panel rows as specified by the system manufacturer's installation manual. The panel angle shall match the roof slope. Reference summary table below:

Roof Type:	Shingle	Fastener Max Spacing (in.)		
Attachment System:	"Ecofasten Solar" "Rock-IT" ®	Wind Zone 1	Wind Zone 2	Wind Zone 3
Fastener Info:	min. 5/16" x 4" long stainless-steel lags with a min. embedment of 3" into the rafters	48	32	32

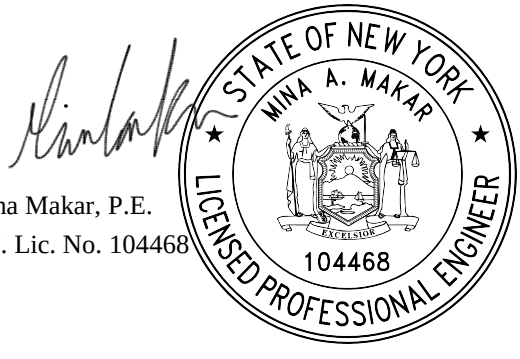
3. Solar Modules shall be UL-1703 rated. Refer to manufacturers specifications sheets.

4. Positive drainage of the system shall be so as not to void the existing roof warranty.

5. All aspects of the installation shall comply with the 2020 Residential Code of New York State, ASCE-7-16, 2017 National Electric Code, All Local Governing County and Municipal Ordinances adopted by reference or enacted by law.

6. Please refer to the attached structural calculations.

If you have any questions relating to this matter, please contact me at your earliest convenience. Thank you.



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Gravity Load Calculation Criteria

Structural Design Loads per ASCE 7-16

Dead Loads = 10 psf + 2.6 psf (new solar panels) = 12.6 psf
Roof Live Load = 20 psf
Ground Snow Load/Live Load = 30 psf

Wind Load Calculation Criteria

Wind Loads per ASCE 7-16, Ch. 30.4
Design wind pressure determined by Eq. 29.4-7:

Zone 1 = -24.6 psf	Roof Slope = 10 degrees	Roof Mean Height = 15 ft
Zone 2 = -32 psf	Basic Wind Speed = 115 mph	
Zone 3 = -36.9 psf	Exposure = B	

Per section 2.4.1, ASD combo = D + 0.6W:
Zone 1 = 2.6 psf + 0.6(-24.6 psf) = -12.2 psf
Zone 2 = 2.6 psf + 0.6(-32 psf) = -16.6 psf
Zone 3 = 2.6 psf + 0.6(-36.9 psf) = -19.5 psf

Check Attachment to Wood Rafter

Use 5/16 dia. Lag screw w/ 3" embedment into 2 in. wide roof rafter

Lag Screw Spacing:	Lag Screw Tributary Area:
Zone 1 = 48" o.c. max	Zone 1 = (48" o.c. max)^2 / 144 = 16 SF
Zone 2 = 32" o.c. max	Zone 2 = (32" o.c. max)^2 / 144 = 7.11 SF
Zone 3 = 32" o.c. max	Zone 3 = (32" o.c. max)^2 / 144 = 7.11 SF

Lag Screw Forces:		
Zone 1 = 12.2 psf x 16 SF = 195 lb	< W', OK	W = 266lb/in (Table 12.2A, 2015 NDS)
Zone 2 = 16.6 psf x 7.11 SF = 118 lb	< W', OK	Cd = 1.6 (Table 2.3.2, 2015 NDS)
Zone 3 = 19.5 psf x 7.11 SF = 139 lb	< W', OK	Ct = 1 (Table 2.3.3, 2015 NDS)
		W' = W x embed x Cd x Ct
		W' = 266 lb/in x 3 in. x1.6 x 1 = 1276.8 lb

PLAN KEY	
PV-1	COVER PAGE
PV-1(2)	COVER PAGE CONT.
PV-2	PANEL LAYOUT
PV-3	ELECTRICAL
PV-4	EQUIPMENT LABELS

SYSTEM INFORMATION	
MODULE	HANWHA Q.PEAK DUO BLK-G10+ 365
INVERTER	ENPHASE IQ8PLUS-72-2-US
RACKING	ECOFASTEN ROCK-IT
SYSTEM SIZE (DC)	3.285 KW
LOCATION	41.0387613,-73.8722976

GENERAL NOTES:

THIS PV SYSTEM HAS BEEN DESIGNED TO MEET THE MINIMUM DESIGN STANDARDS FOR BUILDING AND OTHER STRUCTURES OF THE ASCE 7-16, 2020 NYS BUILDING CODE AND 2020 NYS RESIDENTIAL CODE, NEC 2017 AND ALL LOCAL CODES & ORDINANCES.

AN 18" WIDE (FREE OF SOLAR EQUIPMENT) SHALL BE PROVIDED ON BOTH SIDES OF THE ROOF. NOT FEWER THAN TWO PATHWAYS, ON SEPARATE ROOF PLANES FROM LOWEST ROOF EDGE TO RIDGE AND NOT LESS THAN 36 INCHES (914 MM) WIDE, SHALL BE PROVIDED ON ALL BUILDINGS. NOT FEWER THAN ONE PATHWAY SHALL BE PROVIDED ON THE STREET OR DRIVEWAY SIDE OF THE ROOF. FOR EACH ROOF PLANE WITH A PHOTOVOLTAIC ARRAY, A PATHWAY NOT LESS THAN 36 INCHES WIDE (914 MM) SHALL BE PROVIDED FROM THE LOWEST ROOF EDGE TO RIDGE ON THE SAME ROOF PLANE AS THE PHOTOVOLTAIC ARRAY, ON AN ADJACENT ROOF PLANE, OR STRADDLING THE SAME AND ADJACENT ROOF PLANES.

ROOF SHALL HAVE NO MORE THAN TWO LAYERS OF COVERING IN ADDITION TO THE SOLAR EQUIPMENT.

INSTALLATION OF SOLAR EQUIPMENT SHALL BE FLUSH MOUNTED, PARALLEL TO AND NO MORE THAN 6-INCHES ABOVE THE SURFACE OF THE ROOF.

WEIGHT OF THE INSTALLED SYSTEM SHALL NOT EXCEED MORE THAN 5-PSF FOR PHOTOVOLTAIC AND NO MORE THAN 6-PSF FOR RESIDENTIAL SOLAR HOT WATER SYSTEMS.

ANY PLUMBING VENTS ARE NOT TO BE CUT OR COVERED FOR SOLAR EQUIPMENT INSTALLATION. ANY RELOCATION OR MODIFICATION OF THE VENT REQUIRES A PLUMBING PERMIT AND INSPECTION.

INVERTER PLACEMENT:

SYSTEM UTILIZES "ENPHASE" MICRO-INVERTERS WITH RAPID SHUTDOWN CONTROL LOCATED ON THE BACK SIDE OF EACH MODULE.

BUILDING REVIEW NOTE:

TOWN BUILDING PLANS EXAMINER HAS RECEIVED THE ENCLOSED DOCUMENT FOR MINIMUM ACCEPTABLE PLAN SUBMITTAL REQUIREMENTS OF THE TOWN AS SPECIFIED IN THE BUILDING AND/OR RESIDENTIAL CODE OF THE STATE OF NEW YORK. THISREVIEW DOES NOT GUARANTEE COMPLIANCE OF THAT CODE. THAT RESPONSIBILITY IS GUARANTEED UNDER THE SEAL AND SIGNATURE OF THE NEW YORK LICENSED DESIGN PROFESSIONAL OF RECORD. THAT SEAL AND SIGNATURE HAS BEEN INTERPRETED AS AN ATTESTATION THAT, TO THE BEST OF THE LICENSEE'S BELIEF AND INFORMATION, THE WORK IN DOCUMENT IS:

1. ACCURATE
2. CONFORMS WITH GOVERNING CODES APPLICABLE AT THE TIME OF THE SUBMISSION.
3. CONFORMS WITH REASONABLE STANDARDS OF PRACTICE AND WITH VIEW TO THE SAFEGUARDING OF LIFE, HEALTH, PROPERTY AND PUBLIC WELFARE IS THE RESPONSIBILITY OF THE LICENSEE.

THE RESPONSIBLE LICENSED DESIGN PROFESSIONAL SHALL PROVIDE A SIGNED AND SEALED LETTER CERTIFYING THE INSTALLATION WAS INSPECTED AND CONFORMS TO THE PLANS AND REQUIREMENTS OF THE 2020 NYS BUILDING CODE AND 2020 NYS RESIDENTIAL CODE. THIS INSPECTION AND CERTIFICATION LETTER SHALL BE PERFORMED AFTER INSTALLATIONS ARE COMPLETED AND SHALL BE SUBMITTED TO THE BUILDING DEPARTMENT PRIOR TO SCHEDULING OF FINAL INSPECTION.

THE UL CERTIFICATE OF ELECTRICAL INSPECTIONS SHALL BE SUBMITTED TO THE BUILDING DEPARTMENT PRIOR TO SCHEDULING OF FINAL INSPECTION.

BILL OF MATERIALS	
MODULES	9
INVERTERS	9
CLAMP ASSEMBLY	28
COUPLING ASSEMBLY	15
BONDING CLIP	7
ENPHASE COMBINER BOX	1
20A OCPD	1
SOLAR AC DISCONNECT	1
125A LINE TAPS	2

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CUSTOMER INFORMATION

ROY ROOS - MS113457

24 SOUTH BUCKHOUT STREET
IRVINGTON, NY 10533
9145234547

JURISTICTION: WESTCHESTER
UTILITY: CONED
UTILITY ACCT #:
UTILITY METER #:

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SYSTEM SIZE (AC): 2.61 KVA
9 MODULES: HANWHA Q.PEAK DUO BLK-G10+ 365
(SAFE HARBOR MODULES: 0)
9 INVERTERS: ENPHASE IQ8PLUS-72-2-US

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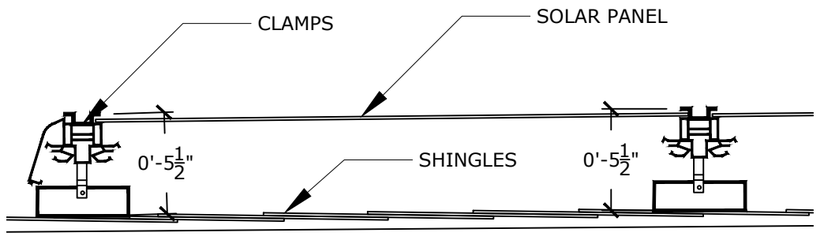
COVER PAGE

PV-1

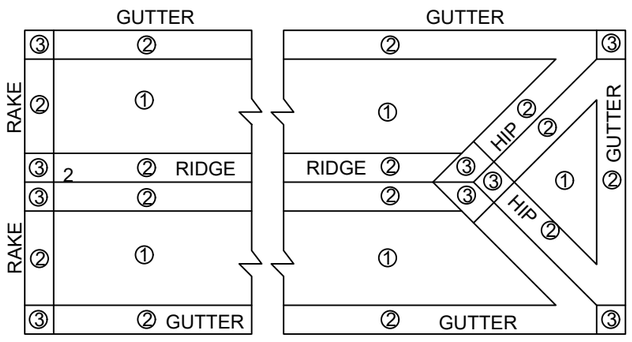
1. ALL WIND DESIGN CRITERIA ARE FOR LOW SLOPE ROOFS, GABLE AND HIP ROOFS CONSIDERED FROM AN ANGLE OF MIN. 9.5 ° ($\frac{2}{12}$) TO MAX. 45° ($\frac{12}{12}$) NOT TO EXCEED 30' MEAN ROOF HEIGHT ATTACHED WITH FASTENERS AS SPECIFIED BY THE MANUFACTURER.
2. SPAN TABLES ARE DERIVED FROM MECHANICAL LOAD TESTS PERFORMED BY THE MANUFACTURERS INDEPENDENT TESTING AGENCIES ON BEHALF OF THE MANUFACTURER.
3. ROOF SEALANTS SHALL CONFORM TO ASTMC920 AND ASTM 6511
4. ALL ATTACHMENTS SHALL BE INSTALLED IN STRICT COMPLIANCE WITH MANUFACTURERS PRINTED INSTRUCTIONS.



CROSS SECTION OF ROOF SHOWING ATTACHMENT DETAILS

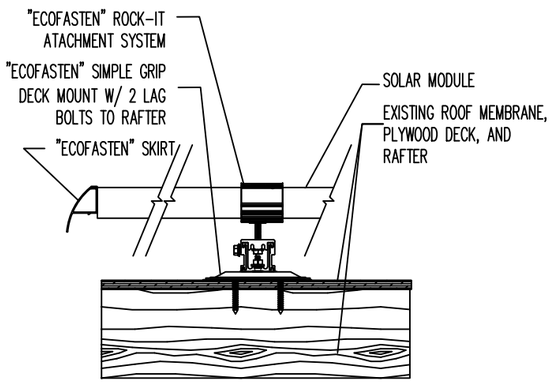
SCALE: 1-1/2" = 1"

ATTACHMENT SPACING EXCEED MANUFACTURERS SPECIFICATIONS FOR WIND LOADS AS PER ASCE 07-16. RISK CATEGORY II TOPOGRAPHIC EFFECTS B,C, & D AND ROOF WIND ZONES 1,2,& 3. ROOF ZONES 2 & 3 ARE WITHIN 48" OF ANY OUTER EDGE, HIP, RIDGE, OR GUTTER LINE FOR STRUCTURES 30'- 0" OR LESS MEAN ROOF HEIGHT.

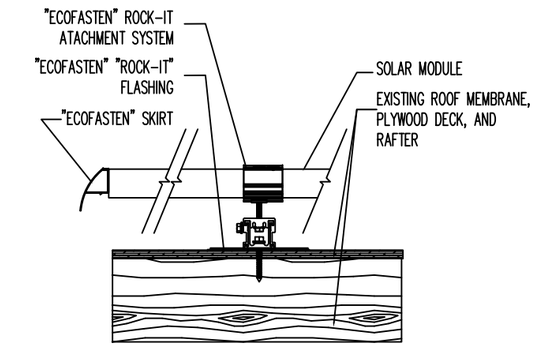


ROOF WIND ZONES AS PER IRC R301.2(7)
ROOF ZONES 2 & 3 ARE 48" FROM OUTTER ROOF EDGES, RIDGES, HIPS, RAKES, AND GUTTER EDGES FOR STRUCTURES BELOW 30'-0" MEAN ROOF HT.

TOTAL WEIGHT OF PV MODULES AND RAILS	376.65 LBS
TOTAL NUMBER OF ATTACHMENT POINTS	28
WEIGHT PER ATTACHMENT POINT	13.4517857142857 LBS
TOTAL SURFACE AREA OF PV MODULES	163.26 SQFT
DISTRIBUTED WEIGHT OF PV MODULE ON ROOF	2.31 LBS./SQFT



ALL COMPONENTS SHALL BE AS MANUFACTURED BY "ECOFASTEN SOLAR" AND INSTALLED IN STRICT COMPLIANCE WITH MANUFACTURERS PRINTED SPECIFICATIONS.



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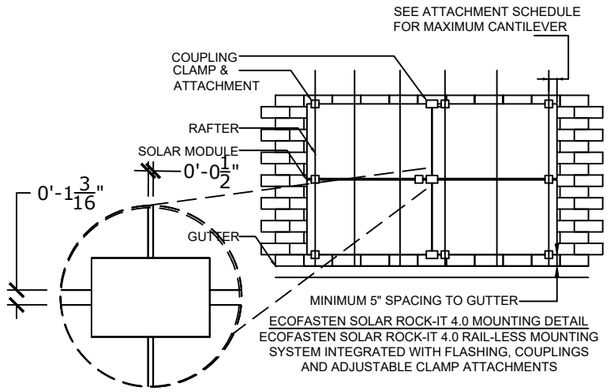
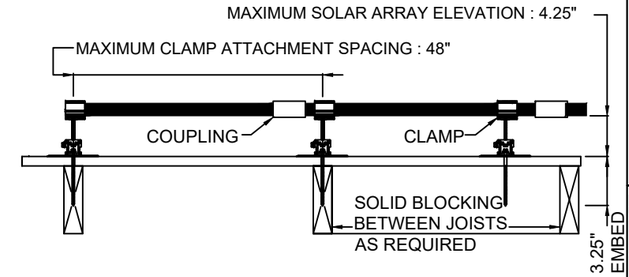
CLIMATIC & GEOGRAPHIC DESIGN CRITERIA TABLE R301.2(1)	
GROUND SNOW LOAD(LBS/SF)	30
SPEED (MPH)	120
TOPOGRAPHIC EFFECTS	B
SPECIAL WIND REGION	NO
WIND BORNE DEBRIS ZONE	2
SEISMIC DESIGN CATEGORY	C
CLIMATE ZONE	4A
WIND EXPOSURE CATEGORY	B



ECOFASTEN SOLAR ROCK-IT 4.0 MOUNTING DETAIL
ECOFASTEN SOLAR ROCK-IT 4.0 RAIL-LESS MOUNTING SYSTEM INTEGRATED WITH FLASHING, COUPLINGS AND ADJUSTABLE CLAMP ATTACHMENTS



STRUCTURAL STATEMENT:

THE EXISTING STRUCTURE IS ADEQUATE TO SUPPORT THE NEW LOADS IMPOSED BY THE PHOTOVOLTAIC MODULE SYSTEM INCLUDING UPLIFT & SHEAR.EXISTING RAFTER SIZES & DIMENSIONS CONFIRM TO 2020 NYS BUILDING CODE AND RESIDENTIAL CODE TABLE R802.5(1)-JOIST SPANS.

MOUNTING BRACKETS AND HARDWARE MEET OR EXCEED NEW YORK STATE CODE REQUIREMENTS FOR THE DESIGN CRITERIA OF THE TOWN.

HANWHA Q.PEAK DUO BLK-G10+ 365
365 WATT MODULE
67.6'' X 41.1'' X 1.26''
(SEE DATASHEET)

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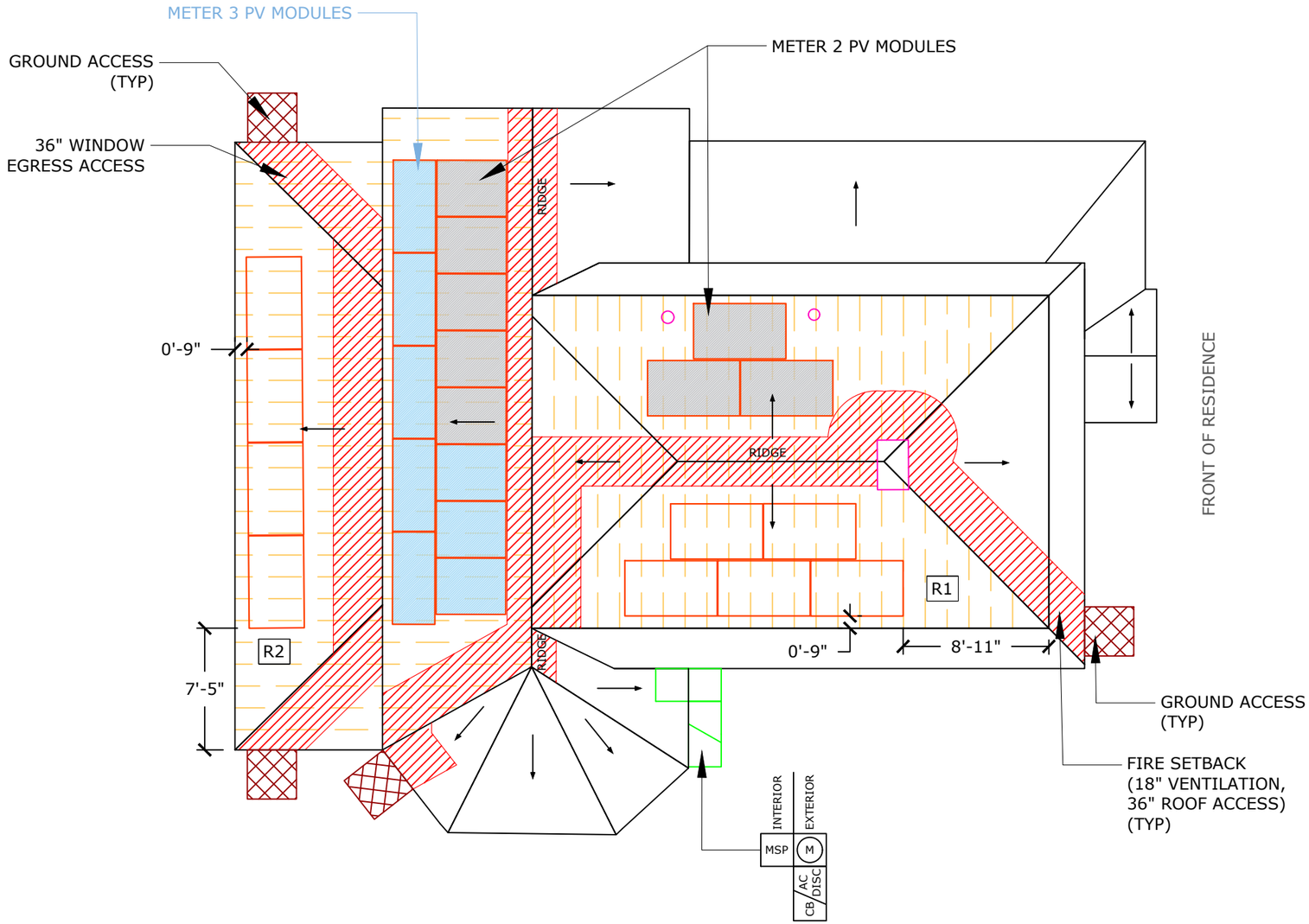
ATTACHMENT DETAIL

PV-1(2)

SCALE: 1/8" = 1'-0"

ROOF	MODULE COUNT	TILT	AZIMUTH	SHADING	LANDSCAPE MAX SPAN (ROOF AREA 1/2/3)	PORTRAIT MAX SPAN (ROOF AREA 1/2/3)
R1	5	10°	189°	96%	48 /32 /32	48 /32 /32
R2	4	11°	278°	76%	48 /32 /32	48 /32 /32



SYMBOL LEGEND

MSP	MAIN SERVICE PANEL		CHIMNEY
SP	SUB-PANEL		SKYLIGHT
M	UTILITY METER		VENT
CB / AC DISC	COMBINER BOX/AC DISCONNECT		PIPE VENT
UDC	UTILITY DISCONNECT		FAN
LC	LOAD CENTER		SATELLITE DISH
N3R	NEMA 3R BOX W/ ENVOY-S		FIRE SETBACKS
CB	COMBINER BOX		GROUND ACCESS
PF	PERFORMANCE METER		PITCH DIRECTION
	MODULE		

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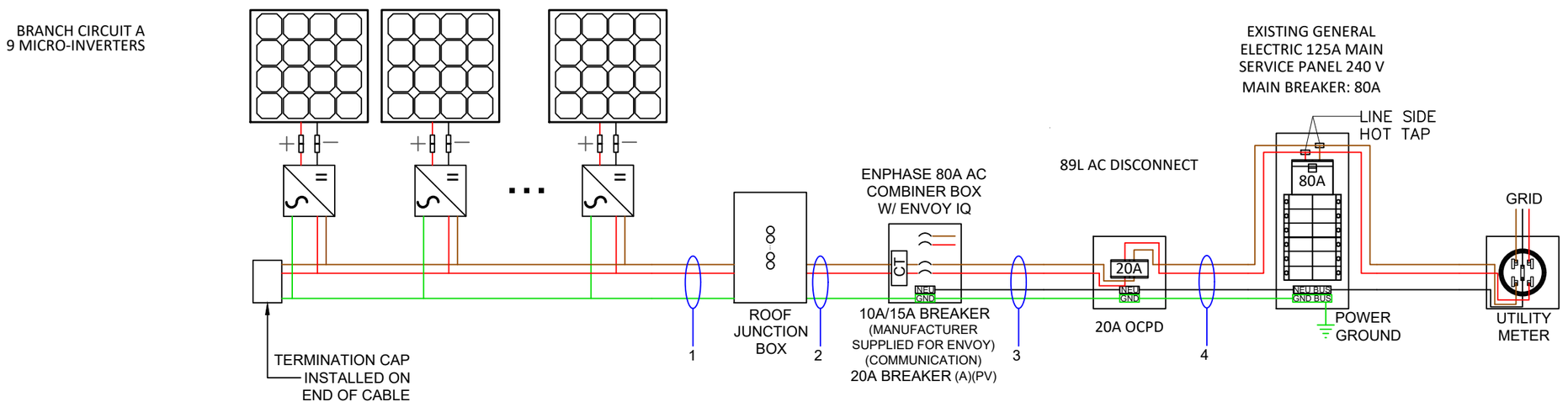
PANEL LAYOUT

PV-2

9 HANWHA Q.PEAK DUO BLK-G10+ 365 365W MODULES PAIRED WITH

9 ENPHASE IQ8PLUS-72-2-US MICRO-INVERTERS



ELECTRICAL NOTES:

1. ALL CALCULATIONS FOR VOC, VMAX, IMP AND ISC HAVE BEEN CALCULATED USING THE MANUFACTURED STRING CALCULATOR BASED ON ASHRAE 2% HIGH AND EXTREME MINIMUM TEMPERATURE COEFICIENTS.
2. THE ENTIRE ARRAY IS BONDED ACCORDING TO (NEC 690.46 - 250.120 PARAGRAPH C).
3. BRANCH CIRCUIT CALCULATION FOR WIRE TAG 1 DISPLAYS THE LARGEST BRANCH CIRCUIT IN SYSTEM. OTHER BRANCH CIRCUITS WILL HAVE LOWER DESIGN CURRENT THAN THE ONE SHOWN.
4. THIS SYSTEM COMPLIES WITH NEC 2017

89L LESS THAN 10FT TO THE MAIN BREAKER/METER.

5. ALL CONDUCTORS ARE SIZED BASED ON NEC 2017 ARTICLE 310
6. ALL EQUIPMENT INSTALLED IS RATED AT 75°C UNLESS NOTED
7. INVERTER NOC (NOMINAL OPEN CURRENT) OBTAINED FROM EQUIPMENT DATA SHEET
8. GROUNDING CONDUCTOR RUN WITH PHASE CONDUCTOR IN THE SAME CONDUIT.
9. SYSTEM IS CONSIDERED AN AC MODULE SYSTEM. NO DC CONDUCTORS ARE PRESENT IN CONDUIT, COMBINER, JUNCTION BOX, DISCONNECT. AND COMPILES WITH 690.6- NO DC. DISCONNECT AND ASSOCIATED DC CABLING ARE REQUIRED.

10. SYSTEM COMPLIES WITH 690.12 RAPID SHUTDOWN AND ASSOCIATED LABELING AS PER 690.56(C)(3). AC VOLTAGE AND SYSTEM OPERATING CURRENT SHALL BE PROVIDED AS PER 690.52.
11. CONDUCTORS IN CONDUIT ARE AC CONDUCTORS - BRANCH CIRCUITS AND NOT PV SOURCE CIRCUITS 690.6.
12. ALL GROUNDING SHALL COMPLY WITH 690.47(A) IN THAT THE AC MODULES SHALL COMPLY WITH 250.64.
13.NO TERMINALS WILL BE ENERGIZED IN THE OPEN POSITION IN THIS AC MODULE SYSTEM 690.6, 690.17.
14. WHERE APPLICABLE, INTERCONNECTION SHALL COMPLY WITH 705.12(A) OR 705.12(B) AS PERMITTED BY 230.82(6)

Wire Tag	Conduit	Wire Qty	Wire Gauge	Wire Type	Temp. Rating	Wire Ampacity (A)	Temp. Derate	Conduit Fill Derate	Derated Ampacity (A)	Inverter Qty	NOC (A)	NEC Correction	Design Current (A)	Ground Size	Ground Wire Type
1	OPEN AIR	2	12 AWG	Trunk Cable	90°C	30	0.96	1	28.80	9	1.21	1.25	13.61	12 AWG	Trunk Cable
2	3/4" PVC	2	10 AWG	THWN-2	90°C	40	0.96	1	38.40	9	1.21	1.25	13.61	08 AWG	THWN-2
3	3/4" PVC	3	10 AWG	THWN-2	75°C	35	0.96	1	33.60	9	1.21	1.25	13.61	08 AWG	THWN-2
4	3/4" PVC	3	06 AWG	THWN-2	75°C	65	0.96	1	62.40	9	1.21	1.25	13.61	08 AWG	THWN-2

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ELECTRICIAN

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JEFFREY MARINELLO, (732) 902-6224
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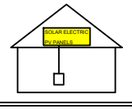
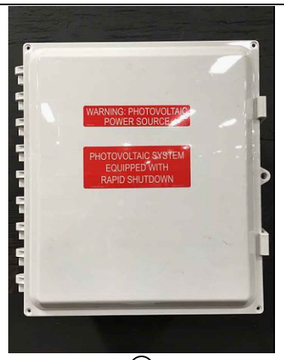
ELECTRICAL

PV-3

TAG	LABEL	QUANTITY	LOCATION	NOTE
Ⓐ	CAUTION: AC SOLAR VOLTAGE	12	AC CONDUITS	1 AT EVERY SEPARATION BY ENCLOSURES / WALLS / PARTITIONS / CEILINGS / FLOORS OR NO MORE THAN 10'
Ⓑ	! WARNING PHOTOVOLTAIC POWER SOURCE PHOTOVOLTAIC SYSTEM EQUIPPED WITH RAPID SHUTDOWN	1	COMBINER BOX	1 AT ANY COMBINER BOX
Ⓒ	⚠ WARNING ELECTRICAL SHOCK HAZARD TERMINALS ON BOTH LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION	1	JUNCTION BOX	1 AT ANY JUNCTION BOX
Ⓓ	PV SYSTEM AC DISCONNECT RATED AC OUTPUT CURRENT A NOMINAL OPERATING AC VOLTAGE 240 V ⚠ CAUTION POWER TO THIS SERVICE IS ALSO SUPPLIED FROM ON-SITE SOLAR GENERATION AC SYSTEM DISCONNECT ⚠ WARNING ELECTRICAL SHOCK HAZARD TERMINALS ON BOTH LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM	1	AC DISCONNECT	1 OF EACH AT FUSED AC DISCONNECT COMPLETE VOLTAGE AND CURRENT VALUES ON DISCONNECT LABEL
Ⓔ	PV METER	1	PV METER SOCKET	1 AT PV METER SOCKET AND ONE DIRECTORY PLACARD
Ⓕ	⚠ WARNING DUAL POWER SOURCE SECOND SOURCE IS PHOTOVOLTAIC SYSTEM REVENUE METER	1	UTILITY METER	1 AT UTILITY METER AND ONE DIRECTORY PLACARD
Ⓖ	SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION TO SHUTDOWN PV SYSTEM AND REDUCE SHOCK HAZARD IN ARRAY  ⚠ WARNING DUAL POWER SOURCE SECOND SOURCE IS PHOTOVOLTAIC SYSTEM	1	INTERCONNECTION POINT	1 OF EACH AT BUILDING INTERCONNECTION POINT AND ONE DIRECTORY PLACARD
	WARNING: INVERTER OUTPUT CONNECTION DO NOT RELOCATE THIS OVERCURRENT DEVICE	1	BACKFEED PANEL	
Ⓗ	NOMINAL OPERATING AC VOLTAGE : 240V NOMINAL OPERATING AC FREQUENCY : 60HZ MAXIMUM AC POWER : 230VA MAXIMUM AC CURRENT : A MAXIMUM OVERCURRENT DEVICE RATING FOR AC MODULE PROTECTION : 20A	1	AC CURRENT PV MODULES	

EXAMPLES

Ⓐ



Ⓑ

Ⓒ

Ⓓ

Ⓕ

Ⓖ BACKFEED

momentum SOLAR

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(732) 902-6224, MOMENTUMSOLAR.COM

PROFESSIONAL ENGINEERING

STATE OF NEW YORK · MINA A. MAKAR · EXCELSIOR · 104468 · LICENSED PROFESSIONAL ENGINEER

MINA A. MAKAR, P.E. NY LICENSE # 104468 (732)-902-6224
3096B HAMILTON BLVDSOUTH PLAINFIELD, NJ 07080
ENGINEERING LETTER ATTACHED HAS SPECIFICATIONS FOR WIND AND LOAD CALCULATIONS FOR SOLAR INSTALLATION SPANS & ATTACHMENTS TO MEET LOCAL AND STATE BUILDING CODE COMPLIANCE. WARNING THAT IT IS A VIOLATION OF THE LAW FOR ANY PERSON, UNLESS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL, TO ALTER AN ITEM IN ANY WAY.

CUSTOMER INFORMATION

ROY ROOS - MS113457
24 SOUTH BUCKHOUT STREET
IRVINGTON, NY 10533
9145234547

JURISTICTION: WESTCHESTER
UTILITY: CONED
UTILITY ACCT #:
UTILITY METER #:

PV SYSTEM INFORMATION

SYSTEM SIZE (DC): 3.285 KW
SYSTEM SIZE (AC): 2.61 KVA
9 MODULES: HANWHA Q.PEAK DUO BLK-G10+ 365
(SAFE HARBOR MODULES: 0)
9 INVERTERS: ENPHASE IQ8PLUS-72-2-US

PROJECT INFORMATION

INITIAL	DATE: 11/18/2022	DESIGNER: WM
REV:	DATE:	DESIGNER:
REV:	DATE:	DESIGNER:

EQUIPMENT LABELS

PV-4

PLAN KEY	
PV-1	COVER PAGE
PV-1(2)	COVER PAGE CONT.
PV-2	PANEL LAYOUT
PV-3	ELECTRICAL
PV-4	EQUIPMENT LABELS

SYSTEM INFORMATION	
MODULE	HANWHA Q.PEAK DUO BLK-G10+ 365
INVERTER	ENPHASE IQ8PLUS-72-2-US
RACKING	ECOFASTEN ROCK-IT
SYSTEM SIZE (DC)	2.92 KW
LOCATION	41.0387613,-73.8722976

GENERAL NOTES:

THIS PV SYSTEM HAS BEEN DESIGNED TO MEET THE MINIMUM DESIGN STANDARDS FOR BUILDING AND OTHER STRUCTURES OF THE ASCE 7-16, 2020 NYS BUILDING CODE AND 2020 NYS RESIDENTIAL CODE, NEC 2017 AND ALL LOCAL CODES & ORDINANCES.

AN 18" WIDE (FREE OF SOLAR EQUIPMENT) SHALL BE PROVIDED ON BOTH SIDES OF THE ROOF. NOT FEWER THAN TWO PATHWAYS, ON SEPARATE ROOF PLANES FROM LOWEST ROOF EDGE TO RIDGE AND NOT LESS THAN 36 INCHES (914 MM) WIDE, SHALL BE PROVIDED ON ALL BUILDINGS. NOT FEWER THAN ONE PATHWAY SHALL BE PROVIDED ON THE STREET OR DRIVEWAY SIDE OF THE ROOF. FOR EACH ROOF PLANE WITH A PHOTOVOLTAIC ARRAY, A PATHWAY NOT LESS THAN 36 INCHES WIDE (914 MM) SHALL BE PROVIDED FROM THE LOWEST ROOF EDGE TO RIDGE ON THE SAME ROOF PLANE AS THE PHOTOVOLTAIC ARRAY, ON AN ADJACENT ROOF PLANE, OR STRADDLING THE SAME AND ADJACENT ROOF PLANES.

ROOF SHALL HAVE NO MORE THAN TWO LAYERS OF COVERING IN ADDITION TO THE SOLAR EQUIPMENT.

INSTALLATION OF SOLAR EQUIPMENT SHALL BE FLUSH MOUNTED, PARALLEL TO AND NO MORE THAN 6-INCHES ABOVE THE SURFACE OF THE ROOF.

WEIGHT OF THE INSTALLED SYSTEM SHALL NOT EXCEED MORE THAN 5-PSF FOR PHOTOVOLTAIC AND NO MORE THAN 6-PSF FOR RESIDENTIAL SOLAR HOT WATER SYSTEMS.

ANY PLUMBING VENTS ARE NOT TO BE CUT OR COVERED FOR SOLAR EQUIPMENT INSTALLATION. ANY RELOCATION OR MODIFICATION OF THE VENT REQUIRES A PLUMBING PERMIT AND INSPECTION.

INVERTER PLACEMENT:

SYSTEM UTILIZES "ENPHASE" MICRO-INVERTERS WITH RAPID SHUTDOWN CONTROL LOCATED ON THE BACK SIDE OF EACH MODULE.

BUILDING REVIEW NOTE:

TOWN BUILDING PLANS EXAMINER HAS RECEIVED THE ENCLOSED DOCUMENT FOR MINIMUM ACCEPTABLE PLAN SUBMITTAL REQUIREMENTS OF THE TOWN AS SPECIFIED IN THE BUILDING AND/OR RESIDENTIAL CODE OF THE STATE OF NEW YORK. THISREVIEW DOES NOT GUARANTEE COMPLIANCE OF THAT CODE. THAT RESPONSIBILITY IS GUARANTEED UNDER THE SEAL AND SIGNATURE OF THE NEW YORK LICENSED DESIGN PROFESSIONAL OF RECORD. THAT SEAL AND SIGNATURE HAS BEEN INTERPRETED AS AN ATTESTATION THAT, TO THE BEST OF THE LICENSEE'S BELIEF AND INFORMATION, THE WORK IN DOCUMENT IS:

1. ACCURATE
2. CONFORMS WITH GOVERNING CODES APPLICABLE AT THE TIME OF THE SUBMISSION.
3. CONFORMS WITH REASONABLE STANDARDS OF PRACTICE AND WITH VIEW TO THE SAFEGUARDING OF LIFE, HEALTH, PROPERTY AND PUBLIC WELFARE IS THE RESPONSIBILITY OF THE LICENSEE.

THE RESPONSIBLE LICENSED DESIGN PROFESSIONAL SHALL PROVIDE A SIGNED AND SEALED LETTER CERTIFYING THE INSTALLATION WAS INSPECTED AND CONFORMS TO THE PLANS AND REQUIREMENTS OF THE 2020 NYS BUILDING CODE AND 2020 NYS RESIDENTIAL CODE. THIS INSPECTION AND CERTIFICATION LETTER SHALL BE PERFORMED AFTER INSTALLATIONS ARE COMPLETED AND SHALL BE SUBMITTED TO THE BUILDING DEPARTMENT PRIOR TO SCHEDULING OF FINAL INSPECTION.

THE UL CERTIFICATE OF ELECTRICAL INSPECTIONS SHALL BE SUBMITTED TO THE BUILDING DEPARTMENT PRIOR TO SCHEDULING OF FINAL INSPECTION.

BILL OF MATERIALS	
MODULES	8
INVERTERS	8
CLAMP ASSEMBLY	25
COUPLING ASSEMBLY	12
BONDING CLIP	2
ENPHASE COMBINER BOX	1
20A OCPD	1
SOLAR AC DISCONNECT	1
125A LINE TAPS	2

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CUSTOMER INFORMATION

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IRVINGTON, NY 10533
9145234547

JURISTICTION: WESTCHESTER
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UTILITY ACCT #:
UTILITY METER #:

PV SYSTEM INFORMATION

SYSTEM SIZE (DC): 2.92 KW
SYSTEM SIZE (AC): 2.32 KVA
8 MODULES: HANWHA Q.PEAK DUO BLK-G10+ 365
(SAFE HARBOR MODULES: 0)
8 INVERTERS: ENPHASE IQ8PLUS-72-2-US

PROJECT INFORMATION

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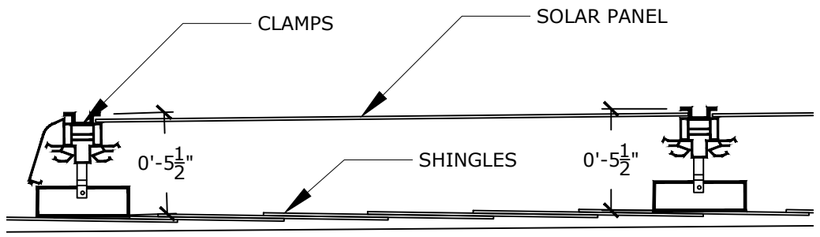
COVER PAGE

PV-1

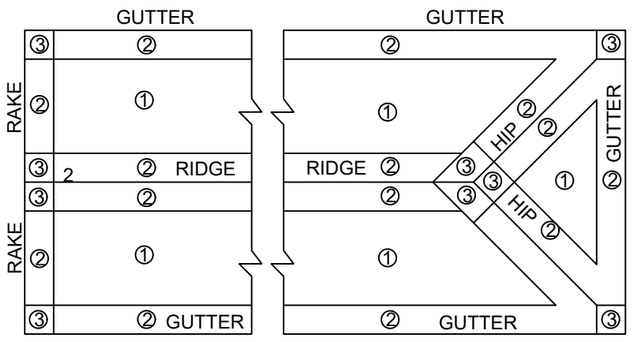
1. ALL WIND DESIGN CRITERIA ARE FOR LOW SLOPE ROOFS, GABLE AND HIP ROOFS CONSIDERED FROM AN ANGLE OF MIN. 9.5 ° ($\frac{2}{12}$) TO MAX. 45° ($\frac{12}{12}$) NOT TO EXCEED 30' MEAN ROOF HEIGHT ATTACHED WITH FASTENERS AS SPECIFIED BY THE MANUFACTURER.
2. SPAN TABLES ARE DERIVED FROM MECHANICAL LOAD TESTS PERFORMED BY THE MANUFACTURERS INDEPENDENT TESTING AGENCIES ON BEHALF OF THE MANUFACTURER.
3. ROOF SEALANTS SHALL CONFORM TO ASTMC920 AND ASTM 6511
4. ALL ATTACHMENTS SHALL BE INSTALLED IN STRICT COMPLIANCE WITH MANUFACTURERS PRINTED INSTRUCTIONS.



CROSS SECTION OF ROOF SHOWING ATTACHMENT DETAILS

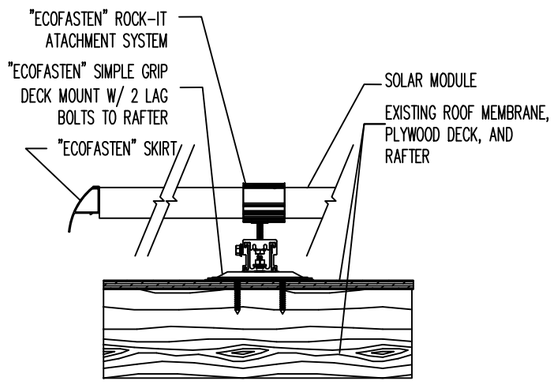
SCALE: 1-1/2" = 1"

ATTACHMENT SPACING EXCEED MANUFACTURERS SPECIFICATIONS FOR WIND LOADS AS PER ASCE 07-16. RISK CATEGORY II TOPOGRAPHIC EFFECTS B,C, & D AND ROOF WIND ZONES 1,2,& 3. ROOF ZONES 2 & 3 ARE WITHIN 48" OF ANY OUTER EDGE, HIP, RIDGE, OR GUTTER LINE FOR STRUCTURES 30'- 0" OR LESS MEAN ROOF HEIGHT.

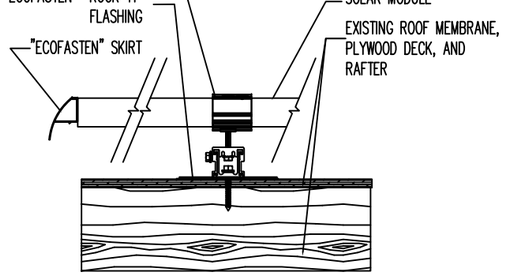


ROOF WIND ZONES AS PER IRC R301.2(7)
ROOF ZONES 2 & 3 ARE 48" FROM OUTTER ROOF EDGES, RIDGES, HIPS, RAKES, AND GUTTER EDGES FOR STRUCTURES BELOW 30'-0" MEAN ROOF HT.

TOTAL WEIGHT OF PV MODULES AND RAILS	334.8 LBS
TOTAL NUMBER OF ATTACHMENT POINTS	25
WEIGHT PER ATTACHMENT POINT	13.392 LBS
TOTAL SURFACE AREA OF PV MODULES	145.12 SQFT
DISTRIBUTED WEIGHT OF PV MODULE ON ROOF	2.31 LBS./SQFT

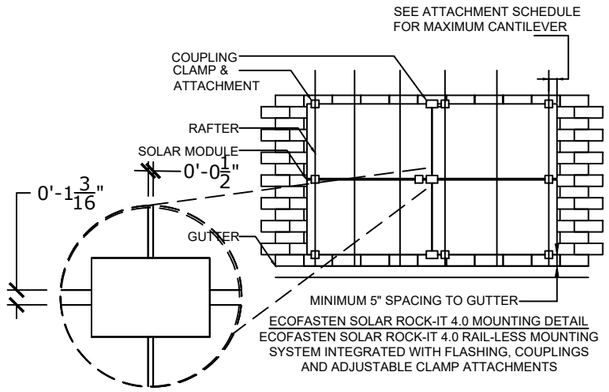


ALL COMPONENTS SHALL BE AS MANUFACTURED BY "ECOFASTEN SOLAR" AND INSTALLED IN STRICT COMPLIANCE WITH MANUFACTURERS PRINTED SPECIFICATIONS.

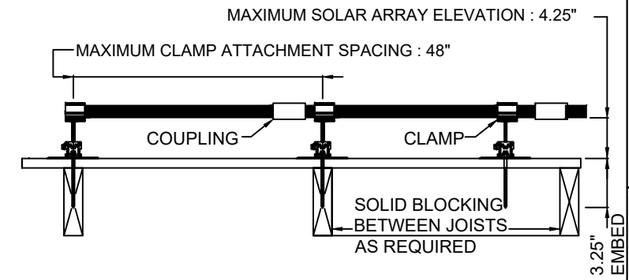


ALL COMPONENTS SHALL BE AS MANUFACTURED BY "ECOFASTEN SOLAR" AND INSTALLED IN STRICT COMPLIANCE WITH MANUFACTURERS PRINTED SPECIFICATIONS.

CLIMATIC & GEOGRAPHIC DESIGN CRITERIA TABLE R301.2(1)	
GROUND SNOW LOAD(LBS/SF)	30
SPEED (MPH)	120
TOPOGRAPHIC EFFECTS	B
SPECIAL WIND REGION	NO
WIND BORNE DEBRIS ZONE	2
SEISMIC DESIGN CATEGORY	C
CLIMATE ZONE	4A
WIND EXPOSURE CATEGORY	B



ECOFASTEN SOLAR ROCK-IT 4.0 MOUNTING DETAIL
ECOFASTEN SOLAR ROCK-IT 4.0 RAIL-LESS MOUNTING SYSTEM INTEGRATED WITH FLASHING, COUPLINGS AND ADJUSTABLE CLAMP ATTACHMENTS



STRUCTURAL STATEMENT:

THE EXISTING STRUCTURE IS ADEQUATE TO SUPPORT THE NEW LOADS IMPOSED BY THE PHOTOVOLTAIC MODULE SYSTEM INCLUDING UPLIFT & SHEAR.EXISTING RAFTER SIZES & DIMENSIONS CONFIRM TO 2020 NYS BUILDING CODE AND RESIDENTIAL CODE TABLE R802.5(1)-JOIST SPANS.

MOUNTING BRACKETS AND HARDWARE MEET OR EXCEED NEW YORK STATE CODE REQUIREMENTS FOR THE DESIGN CRITERIA OF THE TOWN.

HANWHA Q.PEAK DUO BLK-G10+ 365
365 WATT MODULE
67.6'' X 41.1'' X 1.26''
(SEE DATASHEET)

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PROFESSIONAL ENGINEERING

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CUSTOMER INFORMATION

ROY ROOS - MS113461

24 SOUTH BUCKHOUT STREET
IRVINGTON, NY 10533
9145234547

JURISTICTION: WESTCHESTER
UTILITY: CONED
UTILITY ACCT #:
UTILITY METER #:

PV SYSTEM INFORMATION

SYSTEM SIZE (DC): 2.92 KW
SYSTEM SIZE (AC): 2.32 KVA
8 MODULES: HANWHA Q.PEAK DUO BLK-G10+ 365
(SAFE HARBOR MODULES: 0)
8 INVERTERS: ENPHASE IQ8PLUS-72-2-US

PROJECT INFORMATION

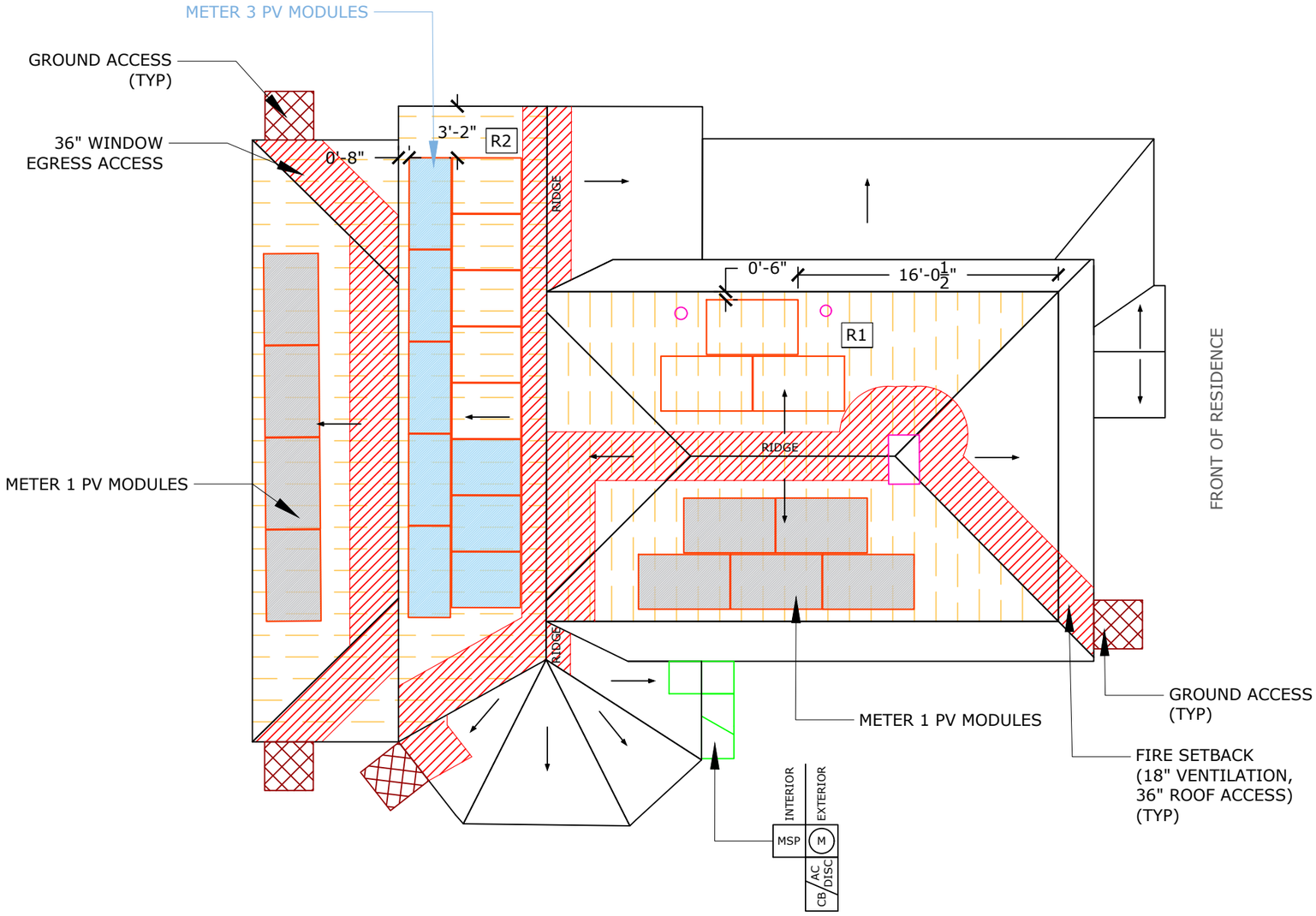
INITIAL	DATE: 11/18/2022	DESIGNER: WM
REV:	DATE:	DESIGNER:
REV:	DATE:	DESIGNER:

ATTACHMENT DETAIL

PV-1(2)

SCALE: 1/8" = 1'-0"

ROOF	MODULE COUNT	TILT	AZIMUTH	SHADING	LANDSCAPE MAX SPAN (ROOF AREA 1/2/3)	PORTRAIT MAX SPAN (ROOF AREA 1/2/3)
R1	3	10°	9°	96%	48 /32 /32	48 /32 /32
R2	5	41°	279°	93%	48 /32 /32	48 /32 /32



SYMBOL LEGEND

MSP	MAIN SERVICE PANEL		CHIMNEY
SP	SUB-PANEL		SKYLIGHT
M	UTILITY METER		VENT
CB / AC DISC	COMBINER BOX/AC DISCONNECT		PIPE VENT
UDC	UTILITY DISCONNECT		FAN
LC	LOAD CENTER		SATELLITE DISH
N3R	NEMA 3R BOX W/ ENVOY-S		FIRE SETBACKS
CB	COMBINER BOX		GROUND ACCESS
PF	PERFORMANCE METER	→	PITCH DIRECTION
	MODULE		

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PROJECT INFORMATION

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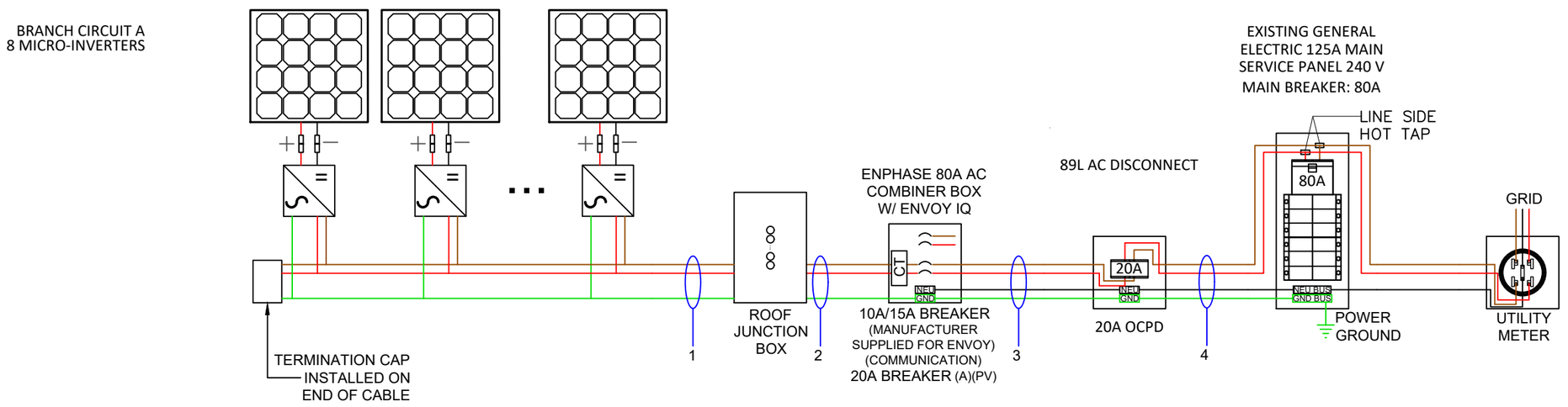
PANEL LAYOUT

PV-2

8 HANWHA Q.PEAK DUO BLK-G10+ 365 365W MODULES PAIRED WITH

8 ENPHASE IQ8PLUS-72-2-US MICRO-INVERTERS



ELECTRICAL NOTES:

1. ALL CALCULATIONS FOR VOC, VMAX, IMP AND ISC HAVE BEEN CALCULATED USING THE MANUFACTURED STRING CALCULATOR BASED ON ASHRAE 2% HIGH AND EXTREME MINIMUM TEMPERATURE COEFICIENTS.
2. THE ENTIRE ARRAY IS BONDED ACCORDING TO (NEC 690.46 - 250.120 PARAGRAPH C).
3. BRANCH CIRCUIT CALCULATION FOR WIRE TAG 1 DISPLAYS THE LARGEST BRANCH CIRCUIT IN SYSTEM. OTHER BRANCH CIRCUITS WILL HAVE LOWER DESIGN CURRENT THAN THE ONE SHOWN.
4. THIS SYSTEM COMPLIES WITH NEC 2017

89L LESS THAN 10FT TO THE MAIN BREAKER/METER.

5. ALL CONDUCTORS ARE SIZED BASED ON NEC 2017 ARTICLE 310
6. ALL EQUIPMENT INSTALLED IS RATED AT 75°C UNLESS NOTED
7. INVERTER NOC (NOMINAL OPEN CURRENT) OBTAINED FROM EQUIPMENT DATA SHEET
8. GROUNDING CONDUCTOR RUN WITH PHASE CONDUCTOR IN THE SAME CONDUIT.
9. SYSTEM IS CONSIDERED AN AC MODULE SYSTEM. NO DC CONDUCTORS ARE PRESENT IN CONDUIT, COMBINER, JUNCTION BOX, DISCONNECT. AND COMPILES WITH 690.6- NO DC. DISCONNECT AND ASSOCIATED DC CABLING ARE REQUIRED.

10. SYSTEM COMPLIES WITH 690.12 RAPID SHUTDOWN AND ASSOCIATED LABELING AS PER 690.56(C)(3). AC VOLTAGE AND SYSTEM OPERATING CURRENT SHALL BE PROVIDED AS PER 690.52.
11. CONDUCTORS IN CONDUIT ARE AC CONDUCTORS - BRANCH CIRCUITS AND NOT PV SOURCE CIRCUITS 690.6.
12. ALL GROUNDING SHALL COMPLY WITH 690.47(A) IN THAT THE AC MODULES SHALL COMPLY WITH 250.64.
13.NO TERMINALS WILL BE ENERGIZED IN THE OPEN POSITION IN THIS AC MODULE SYSTEM 690.6, 690.17.
14. WHERE APPLICABLE, INTERCONNECTION SHALL COMPLY WITH 705.12(A) OR 705.12(B) AS PERMITTED BY 230.82(6)

Wire Tag	Conduit	Wire Qty	Wire Gauge	Wire Type	Temp. Rating	Wire Ampacity (A)	Temp. Derate	Conduit Fill Derate	Derated Ampacity (A)	Inverter Qty	NOC (A)	NEC Correction	Design Current (A)	Ground Size	Ground Wire Type
1	OPEN AIR	2	12 AWG	Trunk Cable	90°C	30	0.96	1	28.80	8	1.21	1.25	12.10	12 AWG	Trunk Cable
2	3/4" PVC	2	10 AWG	THWN-2	90°C	40	0.96	1	38.40	8	1.21	1.25	12.10	08 AWG	THWN-2
3	3/4" PVC	3	10 AWG	THWN-2	75°C	35	0.96	1	33.60	8	1.21	1.25	12.10	08 AWG	THWN-2
4	3/4" PVC	3	06 AWG	THWN-2	75°C	65	0.96	1	62.40	8	1.21	1.25	12.10	08 AWG	THWN-2

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ELECTRICIAN

PRO CUSTOM SOLAR DBA MOMENTUM SOLAR
JEFFREY MARINELLO, (732) 902-6224
3096 HAMILTON BLVD. BUILDING B, SOUTH PLAINFIELD, NJ 07080

CUSTOMER INFORMATION

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REV:	DATE:	DESIGNER:

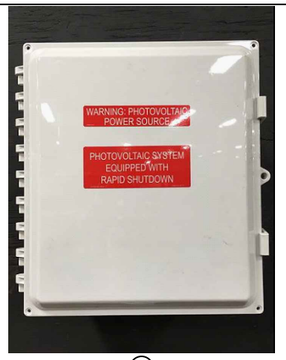
ELECTRICAL

PV-3

TAG	LABEL	QUANTITY	LOCATION	NOTE
Ⓐ	CAUTION: AC SOLAR VOLTAGE	12	AC CONDUITS	1 AT EVERY SEPARATION BY ENCLOSURES / WALLS / PARTITIONS / CEILINGS / FLOORS OR NO MORE THAN 10'
Ⓑ	! WARNING PHOTOVOLTAIC POWER SOURCE PHOTOVOLTAIC SYSTEM EQUIPPED WITH RAPID SHUTDOWN	1	COMBINER BOX	1 AT ANY COMBINER BOX
Ⓒ	⚠ WARNING ELECTRICAL SHOCK HAZARD TERMINALS ON BOTH LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION	1	JUNCTION BOX	1 AT ANY JUNCTION BOX
Ⓓ	PV SYSTEM AC DISCONNECT RATED AC OUTPUT CURRENT A NOMINAL OPERATING AC VOLTAGE 240 V ⚠ CAUTION POWER TO THIS SERVICE IS ALSO SUPPLIED FROM ON-SITE SOLAR GENERATION AC SYSTEM DISCONNECT ⚠ WARNING ELECTRICAL SHOCK HAZARD TERMINALS ON BOTH LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM	1	AC DISCONNECT	1 OF EACH AT FUSED AC DISCONNECT COMPLETE VOLTAGE AND CURRENT VALUES ON DISCONNECT LABEL
Ⓔ	PV METER	1	PV METER SOCKET	1 AT PV METER SOCKET AND ONE DIRECTORY PLACARD
Ⓕ	⚠ WARNING DUAL POWER SOURCE SECOND SOURCE IS PHOTOVOLTAIC SYSTEM REVENUE METER	1	UTILITY METER	1 AT UTILITY METER AND ONE DIRECTORY PLACARD
Ⓖ	SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION TO SHUTDOWN PV SYSTEM AND REDUCE SHOCK HAZARD IN ARRAY ⚠ WARNING DUAL POWER SOURCE SECOND SOURCE IS PHOTOVOLTAIC SYSTEM	1	INTERCONNECTION POINT	1 OF EACH AT BUILDING INTERCONNECTION POINT AND ONE DIRECTORY PLACARD
	WARNING: INVERTER OUTPUT CONNECTION DO NOT RELOCATE THIS OVERCURRENT DEVICE	1	BACKFEED PANEL	
Ⓗ	NOMINAL OPERATING AC VOLTAGE : 240V NOMINAL OPERATING AC FREQUENCY : 60HZ MAXIMUM AC POWER : 230VA MAXIMUM AC CURRENT : A MAXIMUM OVERCURRENT DEVICE RATING FOR AC MODULE PROTECTION : 20A	1	AC CURRENT PV MODULES	

EXAMPLES

Ⓐ



Ⓑ

Ⓒ

Ⓓ

Ⓕ

Ⓖ BACKFEED

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PROFESSIONAL ENGINEERING

STATE OF NEW YORK
MINA A. MAKAR
EXCELSIOR
104468
LICENSED PROFESSIONAL ENGINEER

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ENGINEERING LETTER ATTACHED HAS SPECIFICATIONS FOR WIND AND LOAD CALCULATIONS FOR SOLAR INSTALLATION SPANS & ATTACHMENTS TO MEET LOCAL AND STATE BUILDING CODE COMPLIANCE. WARNING THAT IT IS A VIOLATION OF THE LAW FOR ANY PERSON, UNLESS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL, TO ALTER AN ITEM IN ANY WAY.

CUSTOMER INFORMATION

ROY ROOS - MS113461
24 SOUTH BUCKHOUT STREET
IRVINGTON, NY 10533
9145234547

JURISTICTION: WESTCHESTER
UTILITY: CONED
UTILITY ACCT #:
UTILITY METER #:

PV SYSTEM INFORMATION

SYSTEM SIZE (DC): 2.92 KW
SYSTEM SIZE (AC): 2.32 KVA
8 MODULES: HANWHA Q.PEAK DUO BLK-G10+ 365
(SAFE HARBOR MODULES: 0)
8 INVERTERS: ENPHASE IQ8PLUS-72-2-US

PROJECT INFORMATION

INITIAL	DATE: 11/18/2022	DESIGNER: WM
REV:	DATE:	DESIGNER:
REV:	DATE:	DESIGNER:

EQUIPMENT LABELS

PV-4

PLAN KEY	
PV-1	COVER PAGE
PV-1(2)	COVER PAGE CONT.
PV-2	PANEL LAYOUT
PV-3	ELECTRICAL
PV-4	EQUIPMENT LABELS

SYSTEM INFORMATION	
MODULE	HANWHA Q.PEAK DUO BLK-G10+ 365
INVERTER	ENPHASE IQ8PLUS-72-2-US
RACKING	ECOFASTEN ROCK-IT
SYSTEM SIZE (DC)	2.92 KW
LOCATION	41.0387613,-73.8722976

GENERAL NOTES:

THIS PV SYSTEM HAS BEEN DESIGNED TO MEET THE MINIMUM DESIGN STANDARDS FOR BUILDING AND OTHER STRUCTURES OF THE ASCE 7-16, 2020 NYS BUILDING CODE AND 2020 NYS RESIDENTIAL CODE, NEC 2017 AND ALL LOCAL CODES & ORDINANCES.

AN 18" WIDE (FREE OF SOLAR EQUIPMENT) SHALL BE PROVIDED ON BOTH SIDES OF THE ROOF. NOT FEWER THAN TWO PATHWAYS, ON SEPARATE ROOF PLANES FROM LOWEST ROOF EDGE TO RIDGE AND NOT LESS THAN 36 INCHES (914 MM) WIDE, SHALL BE PROVIDED ON ALL BUILDINGS. NOT FEWER THAN ONE PATHWAY SHALL BE PROVIDED ON THE STREET OR DRIVEWAY SIDE OF THE ROOF. FOR EACH ROOF PLANE WITH A PHOTOVOLTAIC ARRAY, A PATHWAY NOT LESS THAN 36 INCHES WIDE (914 MM) SHALL BE PROVIDED FROM THE LOWEST ROOF EDGE TO RIDGE ON THE SAME ROOF PLANE AS THE PHOTOVOLTAIC ARRAY, ON AN ADJACENT ROOF PLANE, OR STRADDLING THE SAME AND ADJACENT ROOF PLANES.

ROOF SHALL HAVE NO MORE THAN TWO LAYERS OF COVERING IN ADDITION TO THE SOLAR EQUIPMENT.

INSTALLATION OF SOLAR EQUIPMENT SHALL BE FLUSH MOUNTED, PARALLEL TO AND NO MORE THAN 6-INCHES ABOVE THE SURFACE OF THE ROOF.

WEIGHT OF THE INSTALLED SYSTEM SHALL NOT EXCEED MORE THAN 5-PSF FOR PHOTOVOLTAIC AND NO MORE THAN 6-PSF FOR RESIDENTIAL SOLAR HOT WATER SYSTEMS.

ANY PLUMBING VENTS ARE NOT TO BE CUT OR COVERED FOR SOLAR EQUIPMENT INSTALLATION. ANY RELOCATION OR MODIFICATION OF THE VENT REQUIRES A PLUMBING PERMIT AND INSPECTION.

INVERTER PLACEMENT:

SYSTEM UTILIZES "ENPHASE" MICRO-INVERTERS WITH RAPID SHUTDOWN CONTROL LOCATED ON THE BACK SIDE OF EACH MODULE.

BUILDING REVIEW NOTE:

TOWN BUILDING PLANS EXAMINER HAS RECEIVED THE ENCLOSED DOCUMENT FOR MINIMUM ACCEPTABLE PLAN SUBMITTAL REQUIREMENTS OF THE TOWN AS SPECIFIED IN THE BUILDING AND/OR RESIDENTIAL CODE OF THE STATE OF NEW YORK. THISREVIEW DOES NOT GUARANTEE COMPLIANCE OF THAT CODE. THAT RESPONSIBILITY IS GUARANTEED UNDER THE SEAL AND SIGNATURE OF THE NEW YORK LICENSED DESIGN PROFESSIONAL OF RECORD. THAT SEAL AND SIGNATURE HAS BEEN INTERPRETED AS AN ATTESTATION THAT, TO THE BEST OF THE LICENSEE'S BELIEF AND INFORMATION, THE WORK IN DOCUMENT IS:

1. ACCURATE
2. CONFORMS WITH GOVERNING CODES APPLICABLE AT THE TIME OF THE SUBMISSION.
3. CONFORMS WITH REASONABLE STANDARDS OF PRACTICE AND WITH VIEW TO THE SAFEGUARDING OF LIFE, HEALTH, PROPERTY AND PUBLIC WELFARE IS THE RESPONSIBILITY OF THE LICENSEE.

THE RESPONSIBLE LICENSED DESIGN PROFESSIONAL SHALL PROVIDE A SIGNED AND SEALED LETTER CERTIFYING THE INSTALLATION WAS INSPECTED AND CONFORMS TO THE PLANS AND REQUIREMENTS OF THE 2020 NYS BUILDING CODE AND 2020 NYS RESIDENTIAL CODE. THIS INSPECTION AND CERTIFICATION LETTER SHALL BE PERFORMED AFTER INSTALLATIONS ARE COMPLETED AND SHALL BE SUBMITTED TO THE BUILDING DEPARTMENT PRIOR TO SCHEDULING OF FINAL INSPECTION.

THE UL CERTIFICATE OF ELECTRICAL INSPECTIONS SHALL BE SUBMITTED TO THE BUILDING DEPARTMENT PRIOR TO SCHEDULING OF FINAL INSPECTION.

BILL OF MATERIALS	
MODULES	8
INVERTERS	8
CLAMP ASSEMBLY	25
COUPLING ASSEMBLY	10
BONDING CLIP	5
ENPHASE COMBINER BOX	1
20A OCPD	1
SOLAR AC DISCONNECT	1
125A LINE TAPS	2

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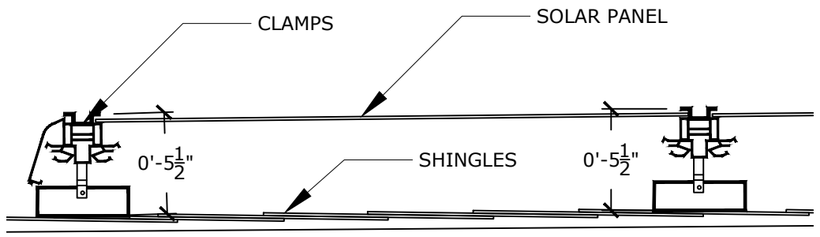
COVER PAGE

PV-1

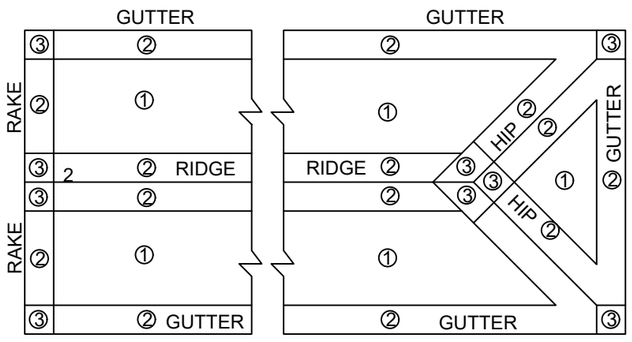
1. ALL WIND DESIGN CRITERIA ARE FOR LOW SLOPE ROOFS, GABLE AND HIP ROOFS CONSIDERED FROM AN ANGLE OF MIN. 9.5 ° ($\frac{2}{12}$) TO MAX. 45° ($\frac{12}{12}$) NOT TO EXCEED 30' MEAN ROOF HEIGHT ATTACHED WITH FASTENERS AS SPECIFIED BY THE MANUFACTURER.
2. SPAN TABLES ARE DERIVED FROM MECHANICAL LOAD TESTS PERFORMED BY THE MANUFACTURERS INDEPENDENT TESTING AGENCIES ON BEHALF OF THE MANUFACTURER.
3. ROOF SEALANTS SHALL CONFORM TO ASTMC920 AND ASTM 6511
4. ALL ATTACHMENTS SHALL BE INSTALLED IN STRICT COMPLIANCE WITH MANUFACTURERS PRINTED INSTRUCTIONS.



CROSS SECTION OF ROOF SHOWING ATTACHMENT DETAILS

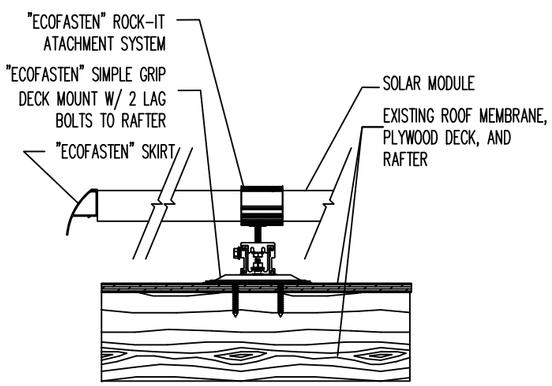
SCALE: 1-1/2" = 1"

ATTACHMENT SPACING EXCEED MANUFACTURERS SPECIFICATIONS FOR WIND LOADS AS PER ASCE 07-16. RISK CATEGORY II TOPOGRAPHIC EFFECTS B,C, & D AND ROOF WIND ZONES 1,2,& 3. ROOF ZONES 2 & 3 ARE WITHIN 48" OF ANY OUTER EDGE, HIP, RIDGE, OR GUTTER LINE FOR STRUCTURES 30'- 0" OR LESS MEAN ROOF HEIGHT.

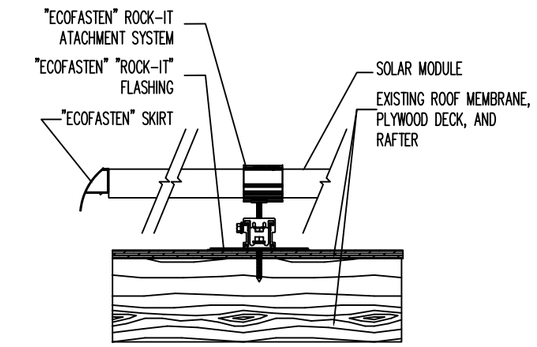


ROOF WIND ZONES AS PER IRC R301.2(7)
ROOF ZONES 2 & 3 ARE 48" FROM OUTTER ROOF EDGES, RIDGES, HIPS, RAKES, AND GUTTER EDGES FOR STRUCTURES BELOW 30'-0" MEAN ROOF HT.

TOTAL WEIGHT OF PV MODULES AND RAILS	334.8 LBS
TOTAL NUMBER OF ATTACHMENT POINTS	25
WEIGHT PER ATTACHMENT POINT	13.392 LBS
TOTAL SURFACE AREA OF PV MODULES	145.12 SQFT
DISTRIBUTED WEIGHT OF PV MODULE ON ROOF	2.31 LBS./SQFT



ALL COMPONENTS SHALL BE AS MANUFACTURED BY "ECOFASTEN SOLAR" AND INSTALLED IN STRICT COMPLIANCE WITH MANUFACTURERS PRINTED SPECIFICATIONS.



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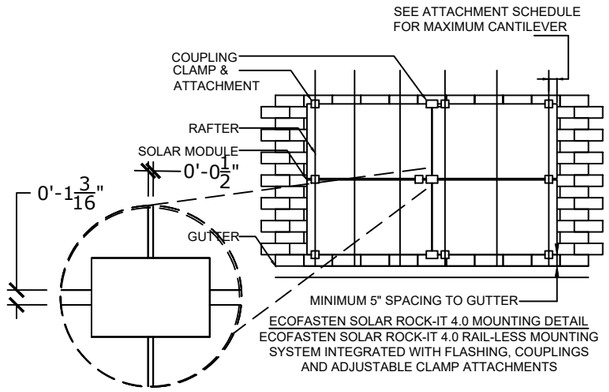
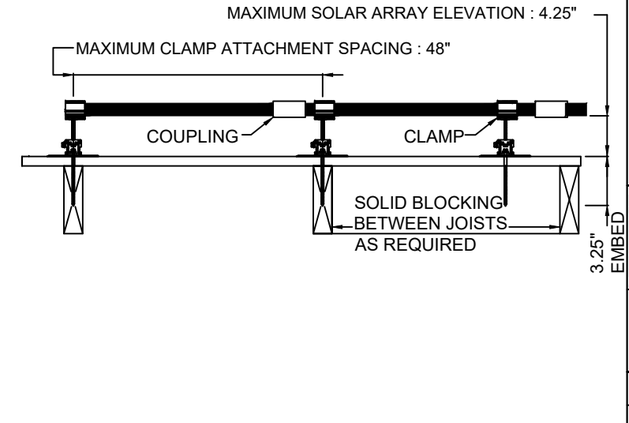
CLIMATIC & GEOGRAPHIC DESIGN CRITERIA TABLE R301.2(1)	
GROUND SNOW LOAD(LBS/SF)	30
SPEED (MPH)	120
TOPOGRAPHIC EFFECTS	B
SPECIAL WIND REGION	NO
WIND BORNE DEBRIS ZONE	2
SEISMIC DESIGN CATEGORY	C
CLIMATE ZONE	4A
WIND EXPOSURE CATEGORY	B



ECOFASTEN SOLAR ROCK-IT 4.0 MOUNTING DETAIL
ECOFASTEN SOLAR ROCK-IT 4.0 RAIL-LESS MOUNTING SYSTEM INTEGRATED WITH FLASHING, COUPLINGS AND ADJUSTABLE CLAMP ATTACHMENTS



STRUCTURAL STATEMENT:

THE EXISTING STRUCTURE IS ADEQUATE TO SUPPORT THE NEW LOADS IMPOSED BY THE PHOTOVOLTAIC MODULE SYSTEM INCLUDING UPLIFT & SHEAR.EXISTING RAFTER SIZES & DIMENSIONS CONFIRM TO 2020 NYS BUILDING CODE AND RESIDENTIAL CODE TABLE R802.5(1)-JOIST SPANS.

MOUNTING BRACKETS AND HARDWARE MEET OR EXCEED NEW YORK STATE CODE REQUIREMENTS FOR THE DESIGN CRITERIA OF THE TOWN.

HANWHA Q.PEAK DUO BLK-G10+ 365
365 WATT MODULE
67.6'' X 41.1'' X 1.26''
(SEE DATASHEET)

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9145234547

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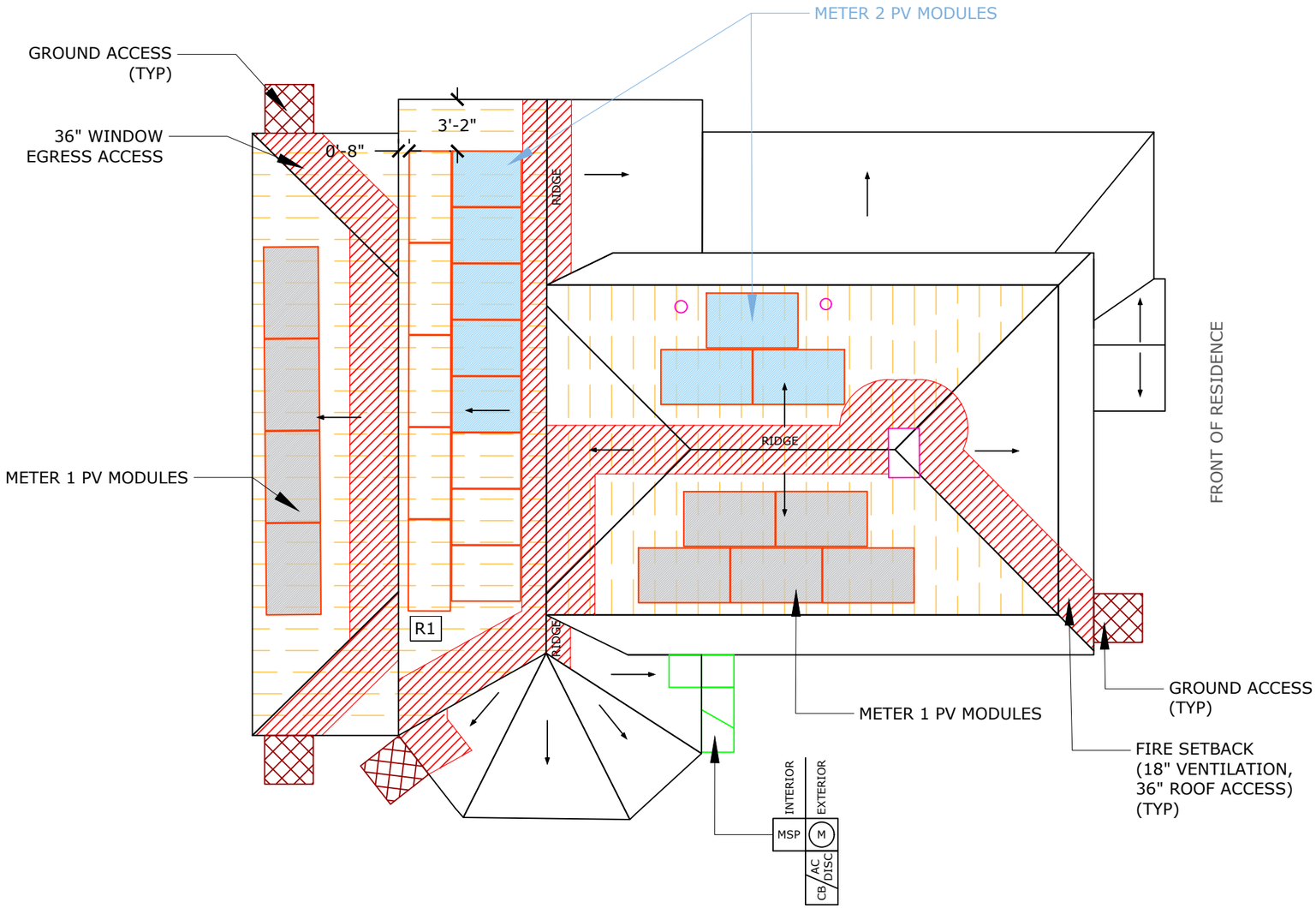
ATTACHMENT DETAIL

PV-1(2)

SCALE: 1/8" = 1'-0"

ROOF	MODULE COUNT	TILT	AZIMUTH	SHADING	LANDSCAPE MAX SPAN (ROOF AREA 1/2/3)	PORTRAIT MAX SPAN (ROOF AREA 1/2/3)
R1	8	41°	279°	94%	48 /32 /32	48 /32 /32



SYMBOL LEGEND

MSP	MAIN SERVICE PANEL		CHIMNEY
SP	SUB-PANEL		SKYLIGHT
M	UTILITY METER		VENT
CB / AC DISC	COMBINER BOX/AC DISCONNECT		PIPE VENT
UDC	UTILITY DISCONNECT		FAN
LC	LOAD CENTER		SATELLITE DISH
N3R	NEMA 3R BOX W/ ENVOY-S		FIRE SETBACKS
CB	COMBINER BOX		GROUND ACCESS
PF	PERFORMANCE METER	→	PITCH DIRECTION
	MODULE		

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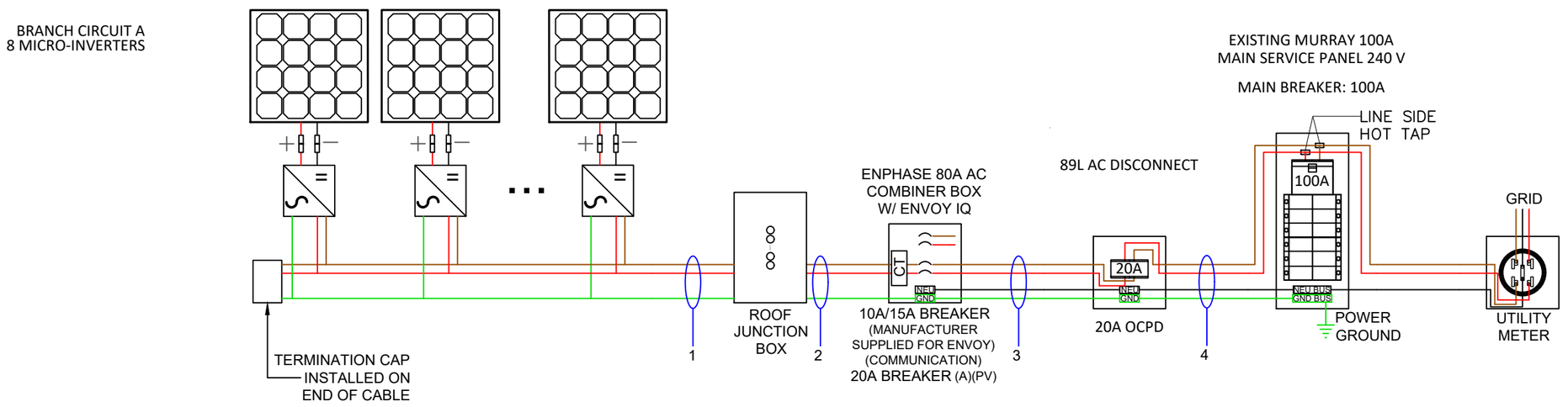
PANEL LAYOUT

PV-2

8 HANWHA Q.PEAK DUO BLK-G10+ 365 365W MODULES PAIRED WITH

8 ENPHASE IQ8PLUS-72-2-US MICRO-INVERTERS



ELECTRICAL NOTES:

1. ALL CALCULATIONS FOR VOC, VMAX, IMP AND ISC HAVE BEEN CALCULATED USING THE MANUFACTURED STRING CALCULATOR BASED ON ASHRAE 2% HIGH AND EXTREME MINIMUM TEMPERATURE COEFICIENTS.
2. THE ENTIRE ARRAY IS BONDED ACCORDING TO (NEC 690.46 - 250.120 PARAGRAPH C).
3. BRANCH CIRCUIT CALCULATION FOR WIRE TAG 1 DISPLAYS THE LARGEST BRANCH CIRCUIT IN SYSTEM. OTHER BRANCH CIRCUITS WILL HAVE LOWER DESIGN CURRENT THAN THE ONE SHOWN.
4. THIS SYSTEM COMPLIES WITH NEC 2017
89L LESS THAN 10FT TO THE MAIN BREAKER/METER.
5. ALL CONDUCTORS ARE SIZED BASED ON NEC 2017 ARTICLE 310
6. ALL EQUIPMENT INSTALLED IS RATED AT 75°C UNLESS NOTED
7. INVERTER NOC (NOMINAL OPEN CURRENT) OBTAINED FROM EQUIPMENT DATA SHEET
8. GROUNDING CONDUCTOR RUN WITH PHASE CONDUCTOR IN THE SAME CONDUIT.
9. SYSTEM IS CONSIDERED AN AC MODULE SYSTEM. NO DC CONDUCTORS ARE PRESENT IN CONDUIT, COMBINER, JUNCTION BOX, DISCONNECT. AND COMPILES WITH 690.6- NO DC. DISCONNECT AND ASSOCIATED DC CABLING ARE REQUIRED.
10. SYSTEM COMPLIES WITH 690.12 RAPID SHUTDOWN AND ASSOCIATED LABELING AS PER 690.56(C)(3). AC VOLTAGE AND SYSTEM OPERATING CURRENT SHALL BE PROVIDED AS PER 690.52.
11. CONDUCTORS IN CONDUIT ARE AC CONDUCTORS - BRANCH CIRCUITS AND NOT PV SOURCE CIRCUITS 690.6.
12. ALL GROUNDING SHALL COMPLY WITH 690.47(A) IN THAT THE AC MODULES SHALL COMPLY WITH 250.64.
13.NO TERMINALS WILL BE ENERGIZED IN THE OPEN POSITION IN THIS AC MODULE SYSTEM 690.6, 690.17.
14. WHERE APPLICABLE, INTERCONNECTION SHALL COMPLY WITH 705.12(A) OR 705.12(B) AS PERMITTED BY 230.82(6)

Wire Tag	Conduit	Wire Qty	Wire Gauge	Wire Type	Temp. Rating	Wire Ampacity (A)	Temp. Derate	Conduit Fill Derate	Derated Ampacity (A)	Inverter Qty	NOC (A)	NEC Correction	Design Current (A)	Ground Size	Ground Wire Type
1	OPEN AIR	2	12 AWG	Trunk Cable	90°C	30	0.96	1	28.80	8	1.21	1.25	12.10	12 AWG	Trunk Cable
2	3/4" PVC	2	10 AWG	THWN-2	90°C	40	0.96	1	38.40	8	1.21	1.25	12.10	08 AWG	THWN-2
3	3/4" PVC	3	10 AWG	THWN-2	75°C	35	0.96	1	33.60	8	1.21	1.25	12.10	08 AWG	THWN-2
4	3/4" PVC	3	06 AWG	THWN-2	75°C	65	0.96	1	62.40	8	1.21	1.25	12.10	08 AWG	THWN-2

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ELECTRICIAN

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JEFFREY MARINELLO, (732) 902-6224
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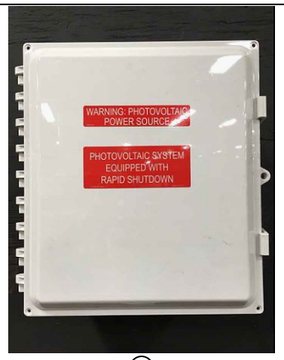
ELECTRICAL

PV-3

TAG	LABEL	QUANTITY	LOCATION	NOTE
Ⓐ	CAUTION: AC SOLAR VOLTAGE	12	AC CONDUITS	1 AT EVERY SEPARATION BY ENCLOSURES / WALLS / PARTITIONS / CEILINGS / FLOORS OR NO MORE THAN 10'
Ⓑ	! WARNING PHOTOVOLTAIC POWER SOURCE PHOTOVOLTAIC SYSTEM EQUIPPED WITH RAPID SHUTDOWN	1	COMBINER BOX	1 AT ANY COMBINER BOX
Ⓒ	⚠ WARNING ELECTRICAL SHOCK HAZARD TERMINALS ON BOTH LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION	1	JUNCTION BOX	1 AT ANY JUNCTION BOX
Ⓓ	PV SYSTEM AC DISCONNECT RATED AC OUTPUT CURRENT A NOMINAL OPERATING AC VOLTAGE 240 V ⚠ CAUTION POWER TO THIS SERVICE IS ALSO SUPPLIED FROM ON-SITE SOLAR GENERATION AC SYSTEM DISCONNECT ⚠ WARNING ELECTRICAL SHOCK HAZARD TERMINALS ON BOTH LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM	1	AC DISCONNECT	1 OF EACH AT FUSED AC DISCONNECT COMPLETE VOLTAGE AND CURRENT VALUES ON DISCONNECT LABEL
Ⓔ	PV METER	1	PV METER SOCKET	1 AT PV METER SOCKET AND ONE DIRECTORY PLACARD
Ⓕ	⚠ WARNING DUAL POWER SOURCE SECOND SOURCE IS PHOTOVOLTAIC SYSTEM REVENUE METER	1	UTILITY METER	1 AT UTILITY METER AND ONE DIRECTORY PLACARD
Ⓖ	SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN TURN RAPID SHUTDOWN SWITCH TO THE "OFF" POSITION TO SHUTDOWN PV SYSTEM AND REDUCE SHOCK HAZARD IN ARRAY ⚠ WARNING DUAL POWER SOURCE SECOND SOURCE IS PHOTOVOLTAIC SYSTEM	1	INTERCONNECTION POINT	1 OF EACH AT BUILDING INTERCONNECTION POINT AND ONE DIRECTORY PLACARD
	WARNING: INVERTER OUTPUT CONNECTION DO NOT RELOCATE THIS OVERCURRENT DEVICE	1	BACKFEED PANEL	
Ⓗ	NOMINAL OPERATING AC VOLTAGE : 240V NOMINAL OPERATING AC FREQUENCY : 60HZ MAXIMUM AC POWER : 230VA MAXIMUM AC CURRENT : A MAXIMUM OVERCURRENT DEVICE RATING FOR AC MODULE PROTECTION : 20A	1	AC CURRENT PV MODULES	

EXAMPLES

Ⓐ



Ⓑ

Ⓒ

Ⓓ

Ⓕ

Ⓖ BACKFEED

momentum SOLAR

PRO CUSTOM SOLAR LLC D.B.A. MOMENTUM SOLAR
3096 HAMILTON BLVD. BUILDING B, S.PLAINFIELD, NJ
(732) 902-6224, MOMENTUMSOLAR.COM

PROFESSIONAL ENGINEERING

STATE OF NEW YORK
MINA A. MAKAR
EXCELSIOR
104468
LICENSED PROFESSIONAL ENGINEER

MINA A. MAKAR, P.E. NY LICENSE # 104468 (732)-902-6224
3096B HAMILTON BLVDSOUTH PLAINFIELD, NJ 07080
ENGINEERING LETTER ATTACHED HAS SPECIFICATIONS FOR WIND AND LOAD CALCULATIONS FOR SOLAR INSTALLATION SPANS & ATTACHMENTS TO MEET LOCAL AND STATE BUILDING CODE COMPLIANCE. WARNING THAT IT IS A VIOLATION OF THE LAW FOR ANY PERSON, UNLESS ACTING UNDER THE DIRECTION OF A LICENSED PROFESSIONAL, TO ALTER AN ITEM IN ANY WAY.

CUSTOMER INFORMATION

ROY ROOS - MS113463
24 SOUTH BUCKHOUT STREET
IRVINGTON, NY 10533
9145234547

JURISTICTION: WESTCHESTER
UTILITY: CONED
UTILITY ACCT #:
UTILITY METER #:

PV SYSTEM INFORMATION

SYSTEM SIZE (DC): 2.92 KW
SYSTEM SIZE (AC): 2.32 KVA
8 MODULES: HANWHA Q.PEAK DUO BLK-G10+ 365
(SAFE HARBOR MODULES: 0)
8 INVERTERS: ENPHASE IQ8PLUS-72-2-US

PROJECT INFORMATION

INITIAL	DATE: 11/18/2022	DESIGNER: WM
REV:	DATE:	DESIGNER:
REV:	DATE:	DESIGNER:

EQUIPMENT LABELS

PV-4

ROCK-IT SYSTEM™

RAIL FREE SOLAR ROOF MOUNT

UTILIZES ECOFASTEN SOLAR'S PATENTED TECHNOLOGY

INTERTEK ETL LISTED US

EcoFasten Solar®

ROCK-IT SYSTEM

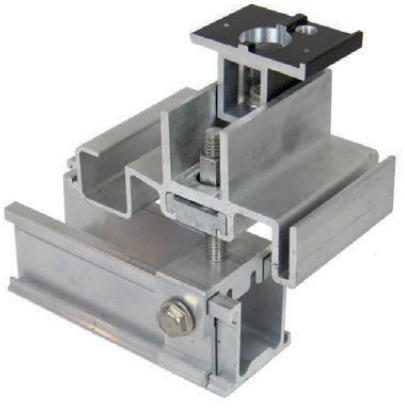
Designed with the installer in mind.

EcoFasten Solar specializes in solar roof attachments that are the easiest to install, most secure and cost-effective solutions for installers. EcoFasten offers a wide variety of standard products as well as custom solutions, for a one-stop source for all of your rooftop anchoring needs. Products are rigorously tested and approved above and beyond industry standards in-house and by third party agencies. EcoFasten's patented conical sealing system has been in service in the snow guard and solar industry for two decades.

Features

- Fastest, easiest to level system on the market
- ETL listed to UL SUB 2703
- Class A Fire rating with Type 1 modules
- Integrated electrical bonding
- SIMPLE- only 3 components
- Fixed wire management tray
- North-South adjustability of up to 4"
- Only one tool required (1/2" deep well socket)

System Components



ROCK-IT MOUNT

ROCK-IT COUPLING

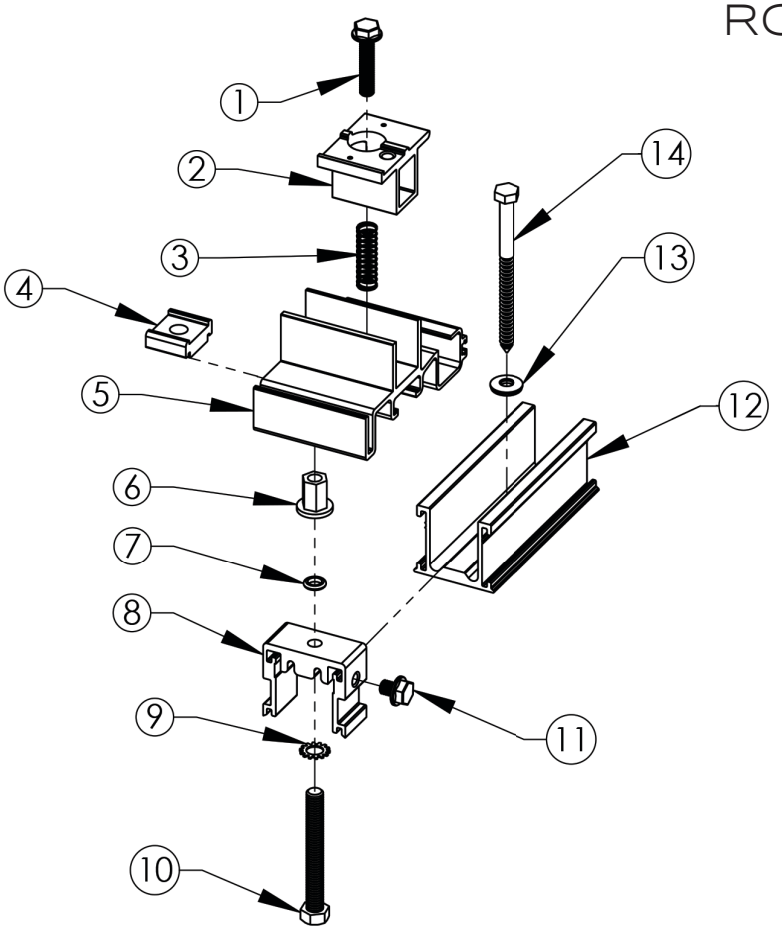
Array Skirt

EcoFasten Solar®

EcoFasten Solar products are protected by the following U.S. Patents:

8,151,522 B2 8,153,700 B2 8,181,398 B2
8,166,713 B2 8,146,299 B2 8,209,914 B2
8,245,454 B2 8,272,174 B2 8,225,557 B2

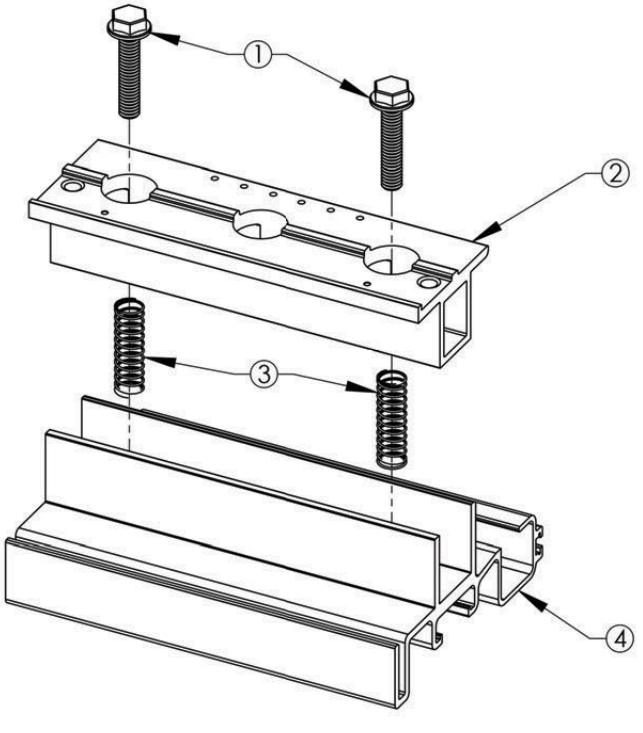
ROCK-IT MOUNT ASSEMBLY



NOTE: ITEMS 1-11 SHIP ASSEMBLED

1. 5/16″-18 x 1.5″ Hex Flange Bolt 300 Series SS
2. Rock-It Mid-Clamp 6005A-T5
3. Compression Spring 300 Series SS
4. Tie Plate 6005A-T5 AL
5. Rock-It Shelf 6005A-T5 AL
6. Flange Level Nut 300 Series SS
7. Packaging O-Ring (Remove Prior to Installation)
8. Rock-It Pedestal 6005A-T5 AL
9. 3/8″ ID Star Lock Washer 300 Series SS
10. 3/8″-16 Hex Tap Bolt 300 Series SS
11. 5/16″-18 x .375″ Hex Flange Bolt 300 Series SS
12. Rock-It-Slide 6005A-T5 AL
13. 5/16″ ID EPDM Bonded Washer 300 Series SS
14. 5/16″ x 4″ Hex Lag Screw or 5/16″-18 X 1.50″ Hex Bolt 300 Series SS

ROCK-IT COUPLING ASSEMBLY

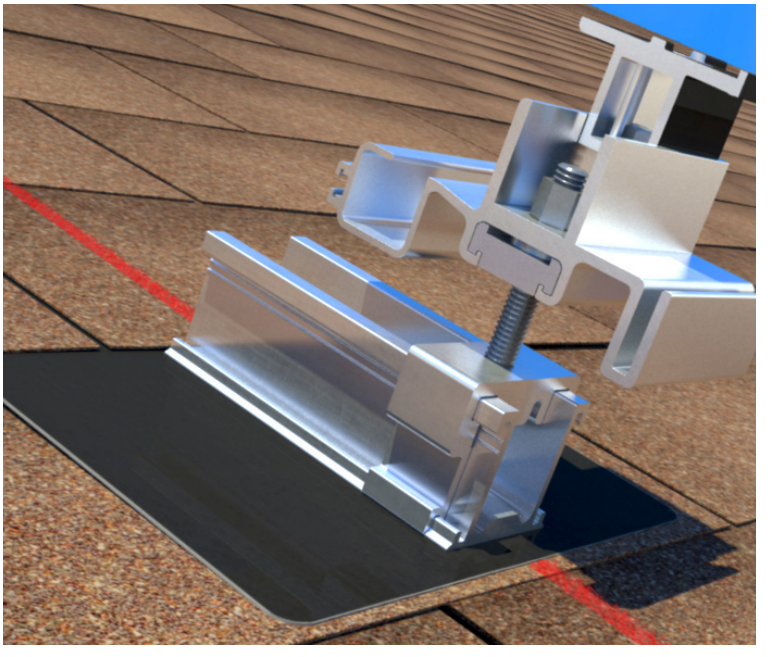


NOTE: ITEMS 1-4 SHIP ASSEMBLED

1. 5/16″-18 x 1.5″ Hex Flange Bolt 300 Series SS
2. Rock-It Coupling Mid Clamp 6005A-T5 AL
3. Compression Spring 300 Series SS
4. Rock-It Coupling Shelf 6005A-T5 AL

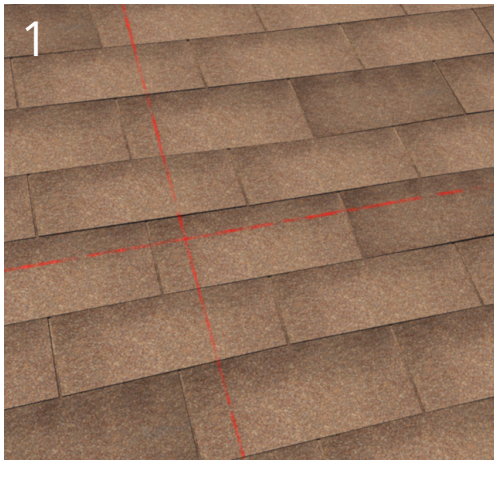
Array Layout

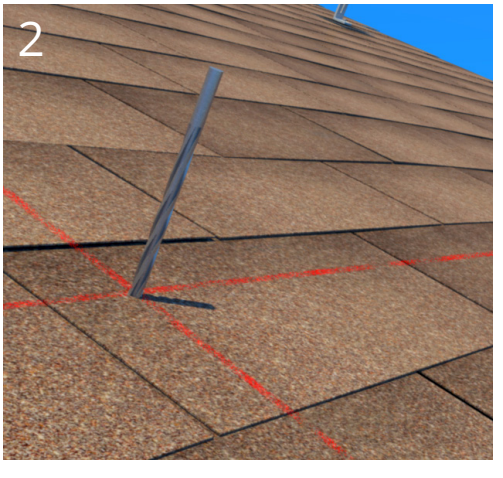
- Find the required structural attachment points. Mark these using a vertical (N-S) chalk line on the center of the rafters.
- Spacing may vary depending upon project specific structural requirements; i.e. high snow and wind load areas may require lesser bracket spacing in the E-W axis vs. the maximum spacing. Max spacing is 48" for portrait orientation and 72" for landscape orientation. Consult project layout diagram for project specific bracket spacing on the roof.
- Install Rock-It Mounts to predetermined mount spacing.
- The array skirt sections are the width of a typical 60 cell module – use the array skirt as a guide to lay out module placement.

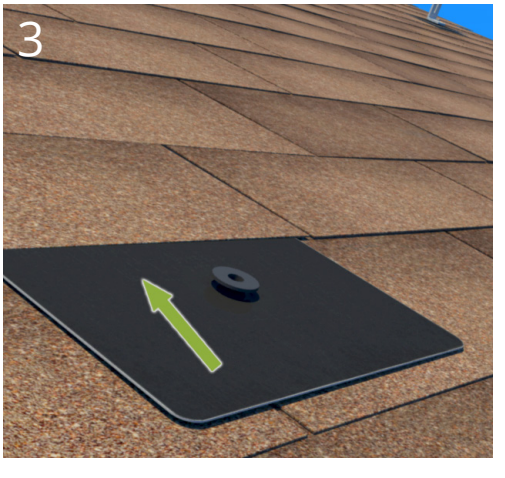


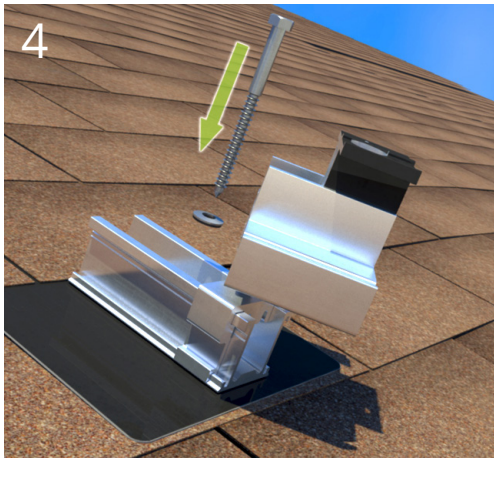
Note: The distance between the rows of mounts is calculated by the module dimension N-S plus 1 3/8" (35mm). Lag screw should be installed as close to center of exposed shingle as possible.

GreenFasten Flashing Install









1 Locate the rafters and snap horizontal and vertical lines to mark the installation position for each GreenFasten flashing.

2 Drill a pilot hole (1/4" diameter) for the lag bolt. Backfill with sealant. EcoFasten Solar recommends an EPDM mastic.

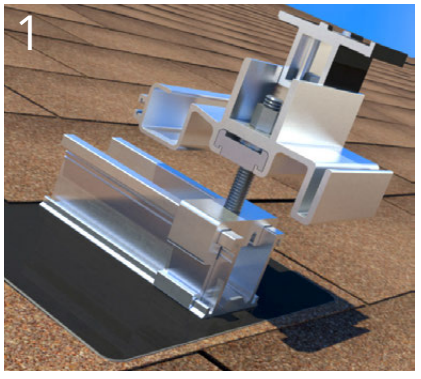
3 Insert the flashing so the top part is under the next row of shingles and pushed far enough up slope to prevent water infiltration through vertical joint in shingles. The leading edge of flashing must butt against upper row of nails to prevent turning when torqued.

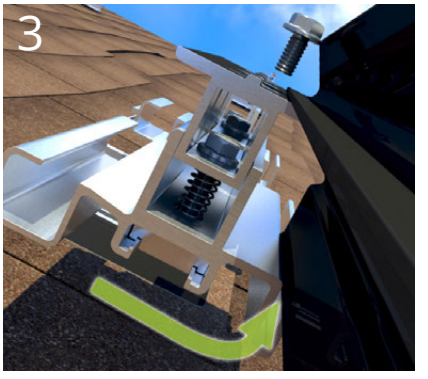
4 Line up pilot hole with GreenFasten flashing hole.

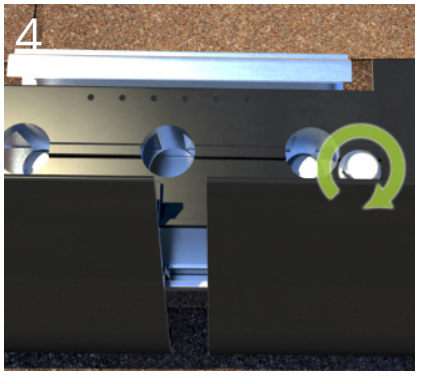
Insert the lag bolt through the EPDM bonded washer, the Rock-It slide, the gasketed hole in the flashing and into the rafter.

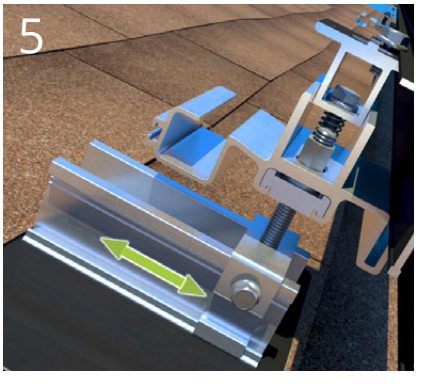
Torque: The range is between 100-140 torque inch-pounds depending on the type of wood and time of year. The visual indicator for proper torque is when the EPDM on the underside of the bonded washer begins to push out the sides as the washer compresses. If using an impact wrench to install the fasteners be careful not to over torque the fastener. You may need to stop and use a ratchet to finish the install.

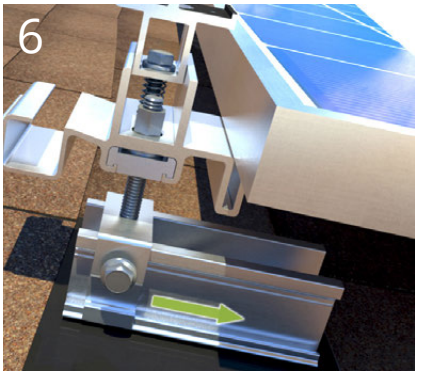
ROCK-IT SYSTEM INSTALL

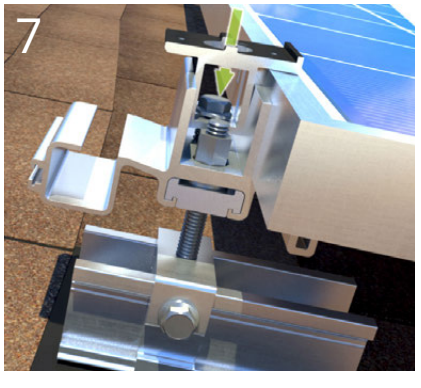


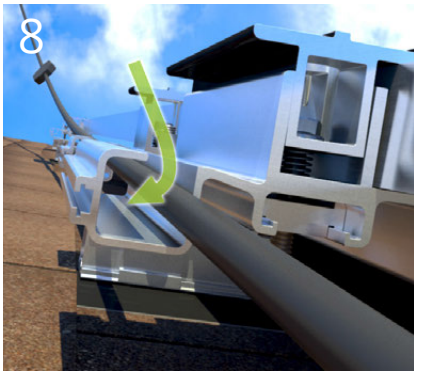


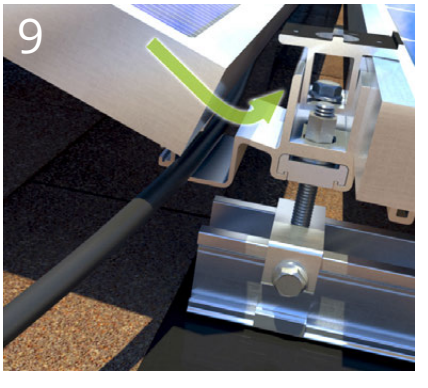


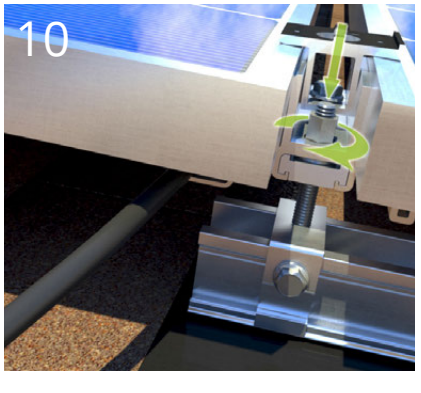












1 Install EcoFasten Solar Flashing with Rock-It Mounts
- Follow GreenFasten Install instructions for flashing and bracket install on composition shingle roofs.
- Optimum vertical distance between lag bolts is 1 3/8" plus module dimension.
- Set mounts on eave most row so that the Rock-It Pedestal is on the South end of Rock-It Slide. (ex. image 1)
- Set mounts on all upper rows so that the Rock-It Pedestal is on the North end of Rock-It Slide. (ex. image 6)

2 Install Array Skirt to Eave Mounts
- Install array skirt starting on west side of array and move east.

3-4 Attach Couplings to Array Skirt
- Tighten the west most array skirt bolt on coupling first.
- When tightening the east bolt the array skirt sections will be drawn together.

5 Align and Straighten First Row of the Rock-It System with Array Skirt
- Use North-South adjustment of the Rock-It pedestal to straighten array skirt.
- Tighten screw on side of Rock-It Pedestal to secure it to the Rock-It Slide.
- Adjust Flange Level Nut to level the system (optional – can be leveled during or after installation)

6-7 Install 1st Row of PV Modules
- Slide Rock-It Mounts that are upslope down to engage top of first module.
  Note: Make sure cable tray is facing upslope.
- Torque 1st and 2nd row of mid-clamps on Rock-It Mounts and Rock-It Couplings to 150 in-lbs.
  Note: Torque setting may vary according to module manufacturer.

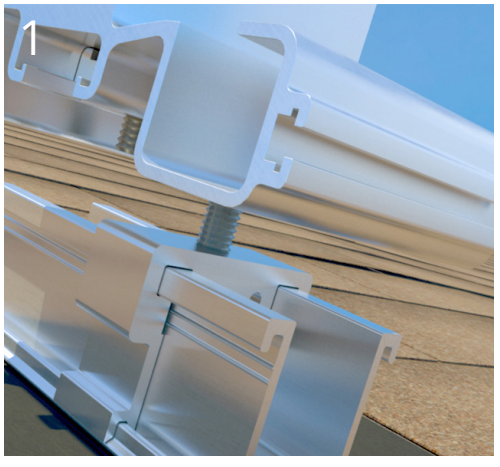
8-9 Install Balance of PV Modules
- Secure wire and electrical components in built in wire tray on Rock-It Mounts and Couplings.
- Install next row of panels and torque mid-clamps to secure modules.
- Repeat install for all remaining rows of modules.

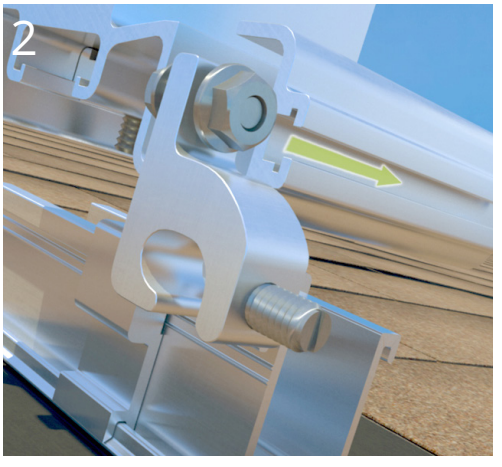
10 Level the Rock-It System
- When assembly is complete, level the entire system by adjusting Flange Level Nuts.

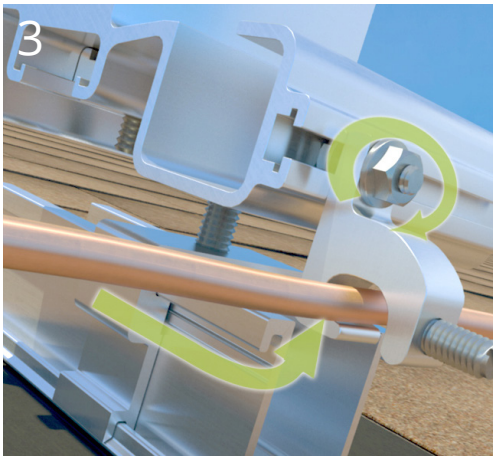
ROCK-IT SYSTEM

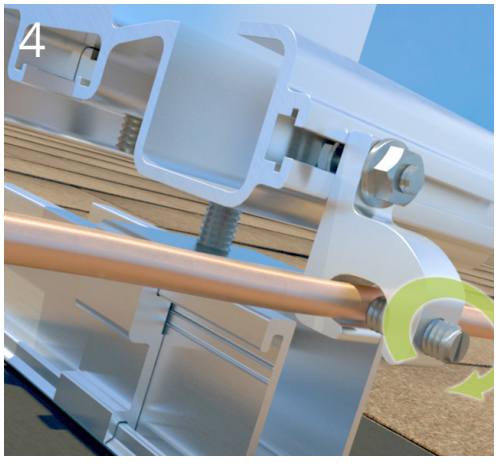
www.ecofastensolar.com info@ecofastensolar.com 877-859-3947

Grounding Lug Install









Necessary Components:

- Burndy CL50-1TN Ground Lug (UL Listing #KDER.E9999)
- 14 AWG - 4 AWG Copper Ground Wire
- 8-32 x 0.5" Serrated Flange Head Bolt (300 Series SS)
- 8-32 Serrated Flange Nut (300 Series SS)
- 11/32" and 1/4" wrenches or ratchets/sockets

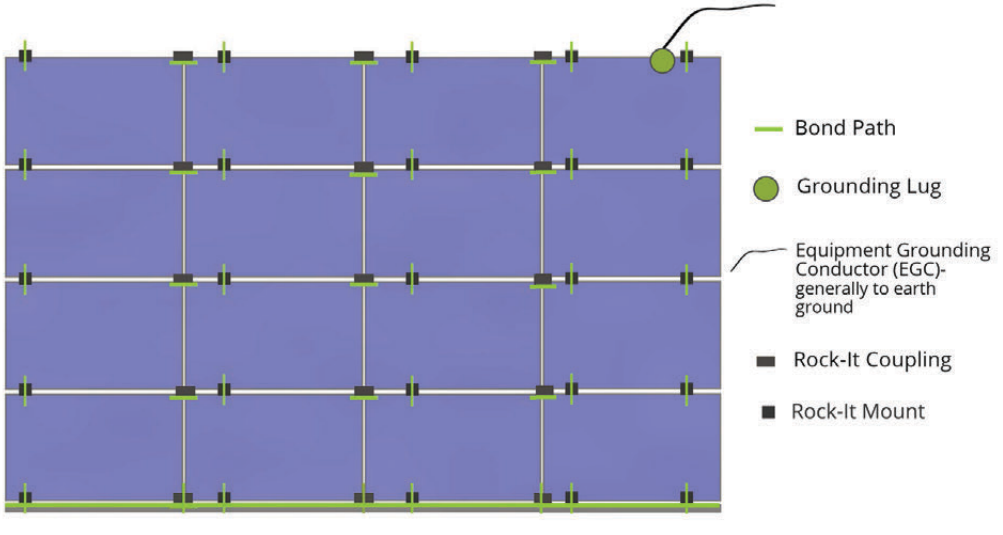
1 The Ground Lug is installed into the T slot on the Rock-It Mount.

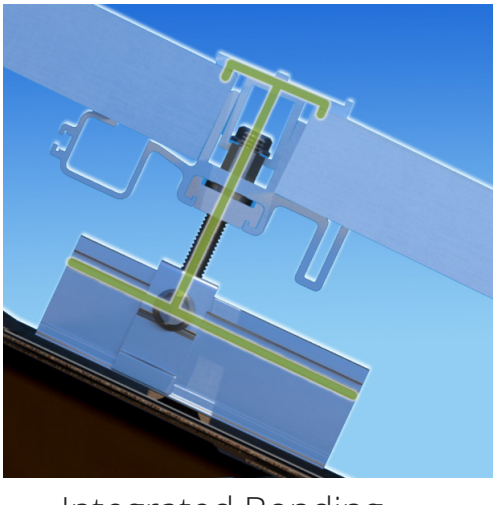
2 Slide the Flange Head Bolt on the Ground Lug into T slot on Rock-It Mount.

3 Tighten Flange Nut/Bolt.

4 Place wire in Ground Lug channel and tighten set screw to complete assembly.

Bonding Assembly and Bonding Path



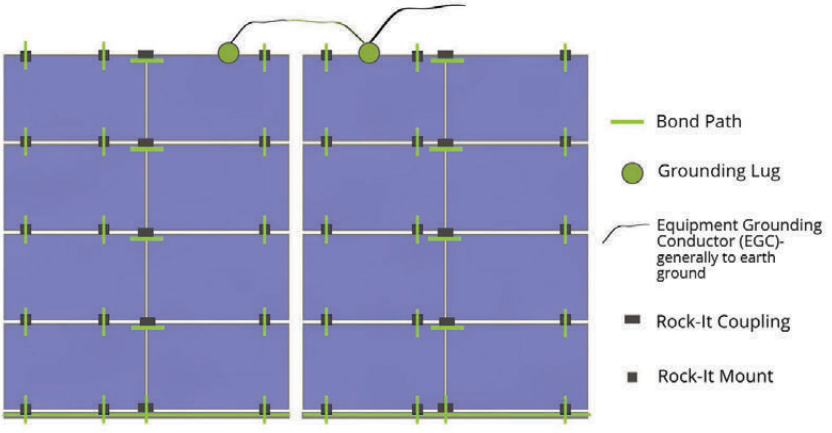


Integrated Bonding

Thermal Expansion and Bonding

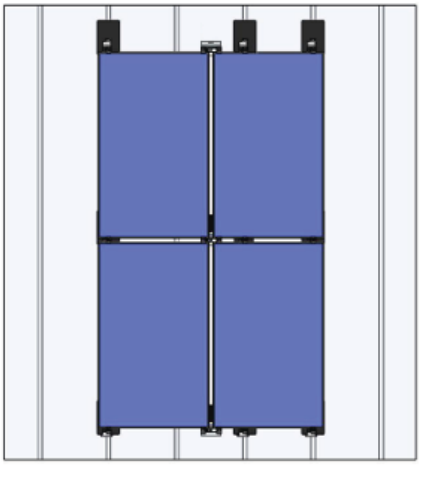
A thermal expansion gap is required per each continuous 100′ length of modules.

Omit a coupling and leave a 2″ gap in the array skirt and also between the modules at that point.



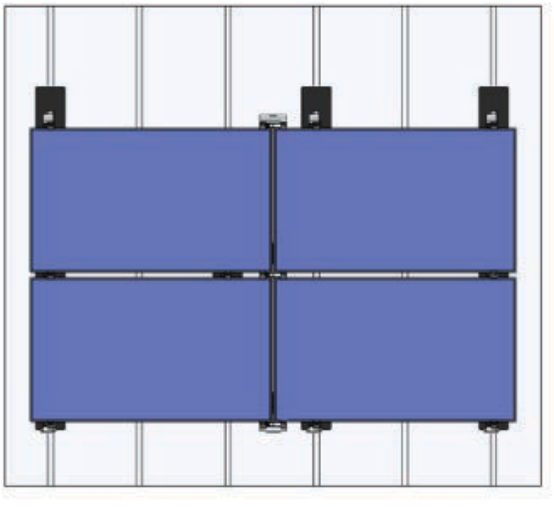
Bracket Spacing

Portrait Orientation



Maximum bracket spacing in portrait orientation is 48″ OC.

Landscape Orientation

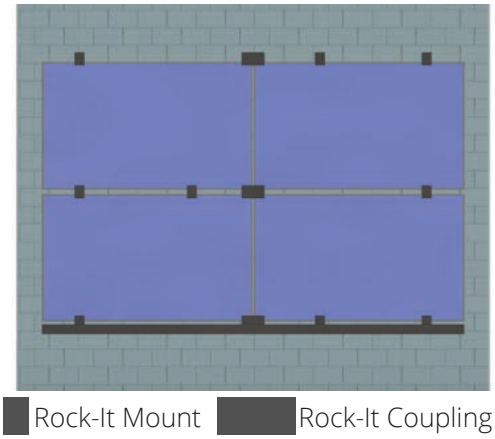


Maximum bracket spacing in landscape orientation is 72″ OC.

Spacing may vary depending upon project specific structural requirements; i.e. high snow and wind load areas may require lesser spacing E-W than the maximum.

Staggered Layout

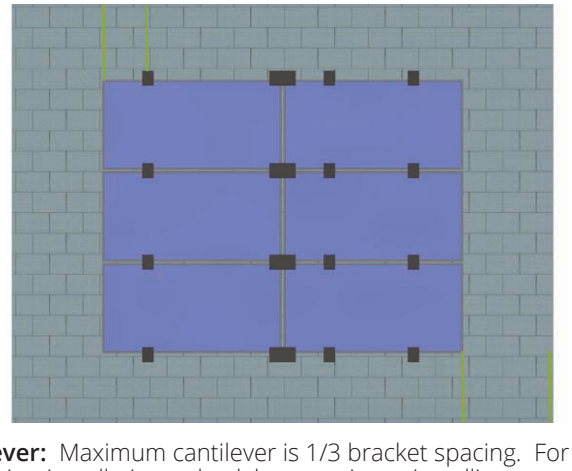
Staggered Mounting Points



Rock-It Mount Rock-It Coupling

The array layout instructions in this installation manual offer a general overview of layout. Periodically, due to a variety of factors (roof obstacles, shading, etc.) other layouts are required.

Cantilever and Offset



Cantilever: Maximum cantilever is 1/3 bracket spacing. For portrait orientation installations, check layout prior to installing.

Offset: Offset from all roof edges depends on wind speed, snow loads, local fire and building codes per location

ROCK-IT SYSTEM

- Fastest, easiest to level system on the market
- ETL listed to UL SUB 2703
- Class A Fire rating with Type 1 modules
- Integrated electrical bonding
- SIMPLE- only 3 components
- Fixed wire management tray
- North-South adjustability of up to 4″
- Only one tool required (1/2″ deep well socket)

Max No. of Panels	300 Modules per ground lug	**Materials**	300 Series Stainless, 6000 Series Aluminum
Max System Voltage	1000VDC	**Coating**	Black Andodization/Mill Finish
Class A Fire Rating	With UL1703 Type 1 Rated Modules	**Lug Specifications**	Burndy CL50-1TN Ground Lug (UL Listing #KDER E9999)
Leveling Range	3-4″	**Ground Wire Per above Lug spec.**	14 AWG- 4 AWG Copper Ground Wire
Rock-It Slide Range	4″	**Max Module Size**	64.96″(1650mm) x 39.05″(992mm) x 2″(50mm)
Min/Max Roof Slope	1/2:12/12:12	**Max Downforce/Uplift Rating**	45 PSF
Max Anchor Spacing	72″	**Rock-It Mount Load Rating**	547lbs with Single 5/16″ Lag 3.0 Safety Factor
Skirt Box QTY	6 units	**Slide Fastening Hole**	5/16″ diameter
Mount Box QTY	12 units	**Module Cantilever**	Lesser of 25% Width, or Module Installation Manual
Rock-It Slide Box QTY	50 units		
Coupling Box QTY	12 units	**Warranty**	10 Year Material and Workmanship

Codes: National Electric Code, ANSI/NFPA 70, NEC 250, NEC 690, IRC, IBC
Standards: UL 2703, UL 1703

EcoFasten Solar®

www.ecofastensolar.com info@ecofastensolar.com 877-859-3947

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PRELIMINARY

Q.PEAK DUO BLK-G10+
350-370

ENDURING HIGH PERFORMANCE

TÜVRheinland CERTIFIED
Quality Controlled PV
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ID 1111232615

ntv GERMANY'S MOST POPULAR PROVIDER Life & Living Award 2021 1st Place Solar Technology Customer rating from 11 brands www.disq.de DEUTSCHES INSTITUT FÜR SERVICE-QUALITÄT GmbH & Co. KG

25 YR Warranty Product & Performance

EUPD RESEARCH TOP BRAND PV MODULES EUROPE 2021

Q CELLS Yield Security

BREAKING THE 20 % EFFICIENCY BARRIER
Q.ANTUM DUO Z Technology with zero gap cell layout boosts module efficiency up to 20.9 %.

THE MOST THOROUGH TESTING PROGRAMME IN THE INDUSTRY
Q CELLS is the first solar module manufacturer to pass the most comprehensive quality programme in the industry: The new "Quality Controlled PV" of the independent certification institute TÜV Rheinland.

INNOVATIVE ALL-WEATHER TECHNOLOGY
Optimal yields, whatever the weather with excellent low-light and temperature behaviour.

ENDURING HIGH PERFORMANCE
Long-term yield security with Anti LID Technology, Anti PID Technology[1], Hot-Spot Protect and Traceable Quality Tra.Q™.

EXTREME WEATHER RATING
High-tech aluminium alloy frame, certified for high snow (5400 Pa) and wind loads (4000 Pa).

A RELIABLE INVESTMENT
Inclusive 25-year product warranty and 25-year linear performance warranty[2].

[1] APT test conditions according to IEC / TS 62804-1:2015, method A (–1500 V, 96 h)
[2] See data sheet on rear for further information.

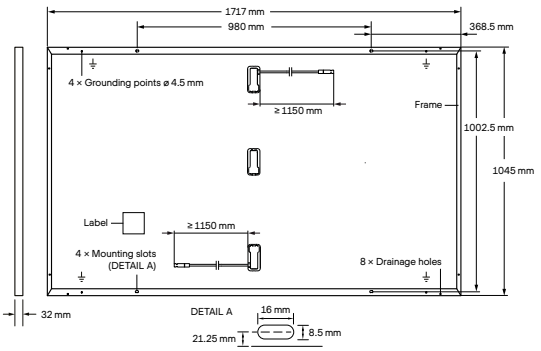
THE IDEAL SOLUTION FOR:
Rooftop arrays on residential buildings

Engineered in Germany

Q CELLS

MECHANICAL SPECIFICATION

Format	1717 mm × 1045 mm × 32 mm (including frame)
Weight	19.9 kg
Front Cover	3.2 mm thermally pre-stressed glass with anti-reflection technology
Back Cover	Composite film
Frame	Black anodised aluminium
Cell	6 × 20 monocrystalline Q.ANTUM solar half cells
Junction box	53-101 mm × 32-60 mm × 15-18 mm Protection class IP67, with bypass diodes
Cable	4 mm² Solar cable; (+) ≥1150 mm, (–) ≥1150 mm
Connector	Stäubli MC4; IP68

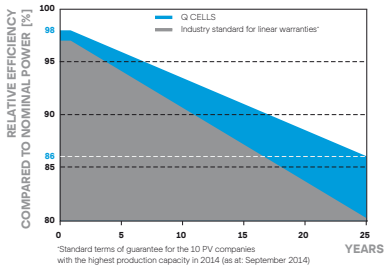


ELECTRICAL CHARACTERISTICS

POWER CLASS				350	355	360	365	370
MINIMUM PERFORMANCE AT STANDARD TEST CONDITIONS, STC[1] (POWER TOLERANCE +5 W / –0 W)								
Minimum	Power at MPP[1]	P_{MPP}	[W]	350	355	360	365	370
	Short Circuit Current[1]	I_{SC}	[A]	10.97	11.00	11.04	11.07	11.10
	Open Circuit Voltage[1]	V_{OC}	[V]	41.11	41.14	41.18	41.21	41.24
	Current at MPP	I_{MPP}	[A]	10.37	10.43	10.49	10.56	10.62
	Voltage at MPP	V_{MPP}	[V]	33.76	34.03	34.31	34.58	34.84
	Efficiency[1]	η	[%]	≥19.5	≥19.8	≥20.1	≥20.3	≥20.6
MINIMUM PERFORMANCE AT NORMAL OPERATING CONDITIONS, NMOT[2]								
Minimum	Power at MPP	P_{MPP}	[W]	262.6	266.3	270.1	273.8	277.6
	Short Circuit Current	I_{SC}	[A]	8.84	8.87	8.89	8.92	8.95
	Open Circuit Voltage	V_{OC}	[V]	38.77	38.80	38.83	38.86	38.90
	Current at MPP	I_{MPP}	[A]	8.14	8.20	8.26	8.31	8.37
	Voltage at MPP	V_{MPP}	[V]	32.24	32.48	32.71	32.94	33.17

[1]Measurement tolerances P_{MPP} ±3%; I_{SC}; V_{OC} ±5% at STC: 1000 W/m², 25±2 °C, AM 1.5 according to IEC 60904-3 • [2]800 W/m², NMOT, spectrum AM 1.5

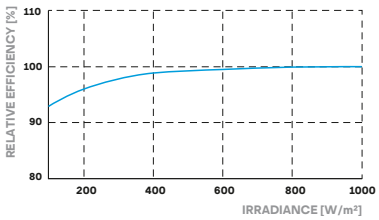
Q CELLS PERFORMANCE WARRANTY



At least 98 % of nominal power during first year. Thereafter max. 0.5 % degradation per year. At least 93.5 % of nominal power up to 10 years. At least 86 % of nominal power up to 25 years.

All data within measurement tolerances. Full warranties in accordance with the warranty terms of the Q CELLS sales organisation of your respective country.

PERFORMANCE AT LOW IRRADIANCE



Typical module performance under low irradiance conditions in comparison to STC conditions (25 °C, 1000 W/m²).

TEMPERATURE COEFFICIENTS							
Temperature Coefficient of I_{SC}	α	[%/K]	+0.04	Temperature Coefficient of V_{OC}	β	[%/K]	–0.27
Temperature Coefficient of P_{MPP}	γ	[%/K]	–0.34	Nominal Module Operating Temperature	NMOT	[°C]	43±3

PROPERTIES FOR SYSTEM DESIGN

Maximum System Voltage	V_{SYS}	[V]	1000	PV module classification	Class II
Maximum Reverse Current	I_R	[A]	20	Fire Rating based on ANSI / UL 61730	C / TYPE 2
Max. Design Load, Push / Pull		[Pa]	3600 / 2660	Permitted Module Temperature on Continuous Duty	–40 °C - +85 °C
Max. Test Load, Push / Pull		[Pa]	5400 / 4000		

QUALIFICATIONS AND CERTIFICATES

Quality Controlled PV - TÜV Rheinland;
IEC 61215:2016; IEC 61730:2016.
This data sheet complies
with DIN EN 50380.
QCPV Certification ongoing.

TÜVRheinland CERTIFIED
www.tuv.com
ID 1111220277

CE

Note: Installation instructions must be followed. See the installation and operating manual or contact our technical service department for further information on approved installation and use of this product.

Hanwha Q CELLS GmbH
Sonnenallee 17-21, 06766 Bitterfeld-Wolfen, Germany | **TEL** +49 (0)3494 66 99-23444 | **FAX** +49 (0)3494 66 99-23000 | **EMAIL** sales@q-cells.com | **WEB** www.q-cells.com

Engineered in Germany

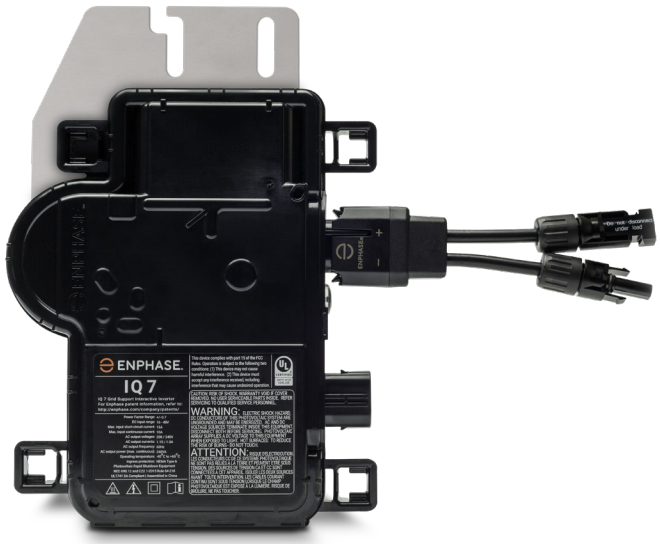
Q CELLS

Enphase IQ 7 and IQ 7+ Microinverters

The high-powered smart grid-ready **Enphase IQ 7 Micro™** and **Enphase IQ 7+ Micro™** dramatically simplify the installation process while achieving the highest system efficiency.

Part of the Enphase IQ System, the IQ 7 and IQ 7+ Microinverters integrate with the Enphase IQ Envoy™, Enphase IQ Battery™, and the Enphase Enlighten™ monitoring and analysis software.

IQ Series Microinverters extend the reliability standards set forth by previous generations and undergo over a million hours of power-on testing, enabling Enphase to provide an industry-leading warranty of up to 25 years.



Easy to Install

- Lightweight and simple
- Faster installation with improved, lighter two-wire cabling
- Built-in rapid shutdown compliant (NEC 2014 & 2017)

Productive and Reliable

- Optimized for high powered 60-cell and 72-cell* modules
- More than a million hours of testing
- Class II double-insulated enclosure
- UL listed

Smart Grid Ready

- Complies with advanced grid support, voltage and frequency ride-through requirements
- Remotely updates to respond to changing grid requirements
- Configurable for varying grid profiles
- Meets CA Rule 21 (UL 1741-SA)

* The IQ 7+ Micro is required to support 72-cell modules.

UL CERTIFIED
SAFETY US-CA E341165

To learn more about Enphase offerings, visit **enphase.com**

ENPHASE.

Enphase IQ 7 and IQ 7+ Microinverters

INPUT DATA (DC)	IQ7-60-2-US		IQ7PLUS-72-2-US	
Commonly used module pairings[1]	235 W - 350 W +		235 W - 440 W +	
Module compatibility	60-cell PV modules only		60-cell and 72-cell PV modules	
Maximum input DC voltage	48 V		60 V	
Peak power tracking voltage	27 V - 37 V		27 V - 45 V	
Operating range	16 V - 48 V		16 V - 60 V	
Min/Max start voltage	22 V / 48 V		22 V / 60 V	
Max DC short circuit current (module Isc)	15 A		15 A	
Overvoltage class DC port	II		II	
DC port backfeed current	0 A		0 A	
PV array configuration	1 x 1 ungrounded array; No additional DC side protection required; AC side protection requires max 20A per branch circuit			
OUTPUT DATA (AC)	**IQ 7 Microinverter**		**IQ 7+ Microinverter**	
Peak output power	250 VA		295 VA	
Maximum continuous output power	240 VA		290 VA	
Nominal (L-L) voltage/range[2]	240 V / 211-264 V	208 V / 183-229 V	240 V / 211-264 V	208 V / 183-229 V
Maximum continuous output current	1.0 A (240 V)	1.15 A (208 V)	1.21 A (240 V)	1.39 A (208 V)
Nominal frequency	60 Hz		60 Hz	
Extended frequency range	47 - 68 Hz		47 - 68 Hz	
AC short circuit fault current over 3 cycles	5.8 Arms		5.8 Arms	
Maximum units per 20 A (L-L) branch circuit[3]	16 (240 VAC)	13 (208 VAC)	13 (240 VAC)	11 (208 VAC)
Overvoltage class AC port	III		III	
AC port backfeed current	0 A		0 A	
Power factor setting	1.0		1.0	
Power factor (adjustable)	0.85 leading ... 0.85 lagging		0.85 leading ... 0.85 lagging	
EFFICIENCY	**@240 V**	**@208 V**	**@240 V**	**@208 V**
Peak efficiency	97.6 %	97.6 %	97.5 %	97.3 %
CEC weighted efficiency	97.0 %	97.0 %	97.0 %	97.0 %
MECHANICAL DATA				
Ambient temperature range	-40°C to +65°C			
Relative humidity range	4% to 100% (condensing)			
Connector type (IQ7-60-2-US & IQ7PLUS-72-2-US)	MC4 (or Amphenol H4 UTX with additional Q-DCC-5 adapter)			
Dimensions (WxHxD)	212 mm x 175 mm x 30.2 mm (without bracket)			
Weight	1.08 kg (2.38 lbs)			
Cooling	Natural convection - No fans			
Approved for wet locations	Yes			
Pollution degree	PD3			
Enclosure	Class II double-insulated, corrosion resistant polymeric enclosure			
Environmental category / UV exposure rating	NEMA Type 6 / outdoor			
FEATURES				
Communication	Power Line Communication (PLC)			
Monitoring	Enlighten Manager and MyEnlighten monitoring options. Both options require installation of an Enphase IQ Envoy.			
Disconnecting means	The AC and DC connectors have been evaluated and approved by UL for use as the load-break disconnect required by NEC 690.			
Compliance	CA Rule 21 (UL 1741-SA) UL 62109-1, UL1741/IEEE1547, FCC Part 15 Class B, ICES-0003 Class B, CAN/CSA-C22.2 NO. 107.1-01 This product is UL Listed as PV Rapid Shut Down Equipment and conforms with NEC-2014 and NEC-2017 section 690.12 and C22.1-2015 Rule 64-218 Rapid Shutdown of PV Systems, for AC and DC conductors, when installed according manufacturer's instructions.			

1. No enforced DC/AC ratio. See the compatibility calculator at https://enphase.com/en-us/support/module-compatibility.
2. Nominal voltage range can be extended beyond nominal if required by the utility.
3. Limits may vary. Refer to local requirements to define the number of microinverters per branch in your area.

To learn more about Enphase offerings, visit **enphase.com**

ENPHASE.

2019-3-26

NOTICE OF APPLICATION AND HEARING

Board of Architectural Review
Clerk's Office
Village of Irvington
Westchester County, New York

CERTIFIED MAIL

Date of Mailing 2/13/2023

NOTICE:
Pursuant to 9-12 of the code of the Village of Irvington notice to adjacent neighbors (as defined below) is required 10 days prior a meeting where an application for Solar Panels to the Village of Irvington Architectural Board is asking to be heard.

Date of Meeting: February 27th
Time of Meeting: Meeting starts at 8pm
Location of Meeting: Trustees Meeting Room
85 Main St. Irvington, NY 10533

Applicant Name	Cameron Christensen	Owners Name	ROY ROOS
Applicant Mailing Address	45 Fairchild Avenue Plainview NY 11803	Owner Mailing Address	24 SOUTH BUCKHOUT ST IRVIGNTON, NY 10533
Applicant Phone Number	516-218-5824	Owners Phone Number	914-523-4547
Applicant Email Address	permitsLI@momentumsolar.com	Owners Email Address	reroos1964@gmail.com

Address of Proposed Solar Panels:
Street Address 24 South Buckhout Street
Irvington NY 10533

To Adjacent Neighbors of: 17 South Buckhout Street
Irvington NY 10533

Please take notice that the applicant named above is requesting the Board of Architectural Review of the Village of Irvington to grant a permit for the installation of **Solar Energy Equipment** to the address listed above.
Plans of the proposed work are available in the office of the Irvington Building Department for public inspection during regular business hours 5 days prior to the scheduled meeting.

9-12. Solar Energy Equipment.
For any application for a building permit for solar energy equipment, written notice of the application and the date, time and place of the meeting at which it will be considered must be given to all adjacent property owners not less than 10 days prior to the meeting date. Notice shall be by a method of mail or a delivery service company providing proof of mailing or delivery or by personal service of such notice on the property owners, evidenced by their signature as acknowledgment of receipt of such notice on a form supplied or similar to one supplied by the Village Clerk. Proof of service of the notice shall be filed prior to or at the meeting at which the application is considered.*
("Adjacent property" refers to any neighbor that shares a property line with the subject property as well as neighbors across any street from the subject property.)

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Applicant Email Address	permitsLI@momentumsolar.com	Owners Email Address	reroos1964@gmail.com

Address of Proposed Solar Panels:
Street Address 24 South Buckhout Street
Irvington NY 10533

To Adjacent Neighbors of: 20 South Buckhout Street
Irvington NY 10533

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Irvington NY 10533

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Irvington NY 10533

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Irvington NY 10533

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Irvington NY 10533

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Irvington NY 10533

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PM Express 1-Day 1 $28.75
Flat Rate Env
Irvington, NY 10533
Flat Rate
Signature Requested
Scheduled Delivery Date
Tue 02/14/2023 06:00 PM
Money Back Guarantee
Tracking #:
EI351055426US
Insurance $0.00
Up to $100.00 included
Return Receipt $3.35
Tracking #:
9590 9402 7537 2098 9313 47
Total $32.10

PM Express 1-Day 1 $28.75
Flat Rate Env
Irvington, NY 10533
Flat Rate
Signature Requested
Scheduled Delivery Date
Tue 02/14/2023 06:00 PM
Money Back Guarantee
Tracking #:
EI351055412US
Insurance $0.00
Up to $100.00 included
Return Receipt $3.35
Tracking #:
9590 9402 7552 2098 1554 90
Total $32.10

PM Express 1-Day 1 $28.75
Flat Rate Env
Irvington, NY 10533
Flat Rate
Signature Requested
Scheduled Delivery Date
Tue 02/14/2023 06:00 PM
Money Back Guarantee
Tracking #:
EI351055409US
Insurance $0.00
Up to $100.00 included
Return Receipt $3.35
Tracking #:
9590 9402 7552 2098 1554 83
Total $32.10

PM Express 1-Day 1 $28.75
Flat Rate Env
Irvington, NY 10533
Flat Rate
Signature Requested
Scheduled Delivery Date
Tue 02/14/2023 06:00 PM
Money Back Guarantee
Tracking #:
EI351055390US
Insurance $0.00
Up to $100.00 included
Return Receipt $3.35
Tracking #:
9590 9402 7552 2098 1554 76
Total $32.10

PM Express 1-Day 1 $28.75
Flat Rate Env
Irvington, NY 10533
Flat Rate
Signature Requested
Scheduled Delivery Date
Tue 02/14/2023 06:00 PM
Money Back Guarantee
Tracking #:
EI351055386US
Insurance $0.00
Up to $100.00 included
Return Receipt $3.35
Tracking #:
9590 9402 7552 2098 1554 69
Total $32.10

SENDER: *COMPLETE THIS SECTION*

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

20 South Buckhout St

Irvington, NY 10533

9590 9402 7552 2098 1554 90

EI 351 055 412 US

COMPLETE THIS SECTION ON DELIVERY

A. Signature

X

☐ Agent
☐ Addressee

B. Received by (Printed Name)

C. Date of Delivery

IRVINGTON POST OFFICE IRVINGTON NY 10533 FEB 14 2023

D. Is delivery address different from item 1?
If YES, enter delivery address below:

☐ Yes
☐ No

3. Service Type

- ☐ Adult Signature
- ☐ Adult Signature Restricted Delivery
- ☐ Certified Mail®
- ☐ Certified Mail Restricted Delivery
- ☐ Collect on Delivery
- ☐ Collect on Delivery Restricted Delivery
- ☑ Insured Mail
- ☑ Insured Mail Restricted Delivery (over $500)
- ☐ Priority Mail Express®
- ☐ Registered Mail™
- ☐ Registered Mail Restricted Delivery
- ☐ Signature Confirmation™
- ☐ Signature Confirmation Restricted Delivery

PS Form 3811, July 2020 PSN 7530-02-000-9053 Domestic Return Receipt

ENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

23 South Buckhout St
Irvington, NY 10533

9590 9402 7552 2098 1554 76

EI 351 055 390 US

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X
☐ Agent
☐ Addressee

B. Received by (Printed Name) | C. Date of Delivery

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Insured Mail
☐ Insured Mail Restricted Delivery (over $500)
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

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1. Article Addressed to:

21 South Buckhout St
Irvington, NY 10533

9590 9402 7552 2098 1554 83

EI 351 055 409 US

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X
☐ Agent
☐ Addressee

B. Received by (Printed Name) | C. Date of Delivery

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Insured Mail
☐ Insured Mail Restricted Delivery (over $500)
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

PS Form 3811, July 2020 PSN 7530-02-000-9053 Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
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- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

29 South Buckhout St
Irvington, NY 10533

9590 9402 7552 2098 1554 69

EI 351 055 386 US

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X
☐ Agent
☐ Addressee

B. Received by (Printed Name) | C. Date of Delivery

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Insured Mail
☐ Insured Mail Restricted Delivery (over $500)
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

PS Form 3811, July 2020 PSN 7530-02-000-9053 Domestic Return Receipt

SENDER: COMPLETE THIS SECTION

- Complete items 1, 2, and 3.
- Print your name and address on the reverse so that we can return the card to you.
- Attach this card to the back of the mailpiece, or on the front if space permits.

1. Article Addressed to:

20 South Buckhout St
Irvington, NY 10533

9590 9402 7552 2098 1554 90

EI 351 055 412 US

COMPLETE THIS SECTION ON DELIVERY

A. Signature
X
☐ Agent
☐ Addressee

B. Received by (Printed Name) | C. Date of Delivery

IRVINGTON POST OFFICE IRVINGTON NY 10533 FEB 14 2022

D. Is delivery address different from item 1? ☐ Yes
If YES, enter delivery address below: ☐ No

3. Service Type
☐ Adult Signature
☐ Adult Signature Restricted Delivery
☐ Certified Mail®
☐ Certified Mail Restricted Delivery
☐ Collect on Delivery
☐ Collect on Delivery Restricted Delivery
☐ Insured Mail
☐ Insured Mail Restricted Delivery (over $500)
☐ Priority Mail Express®
☐ Registered Mail™
☐ Registered Mail Restricted Delivery
☐ Signature Confirmation™
☐ Signature Confirmation Restricted Delivery

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