
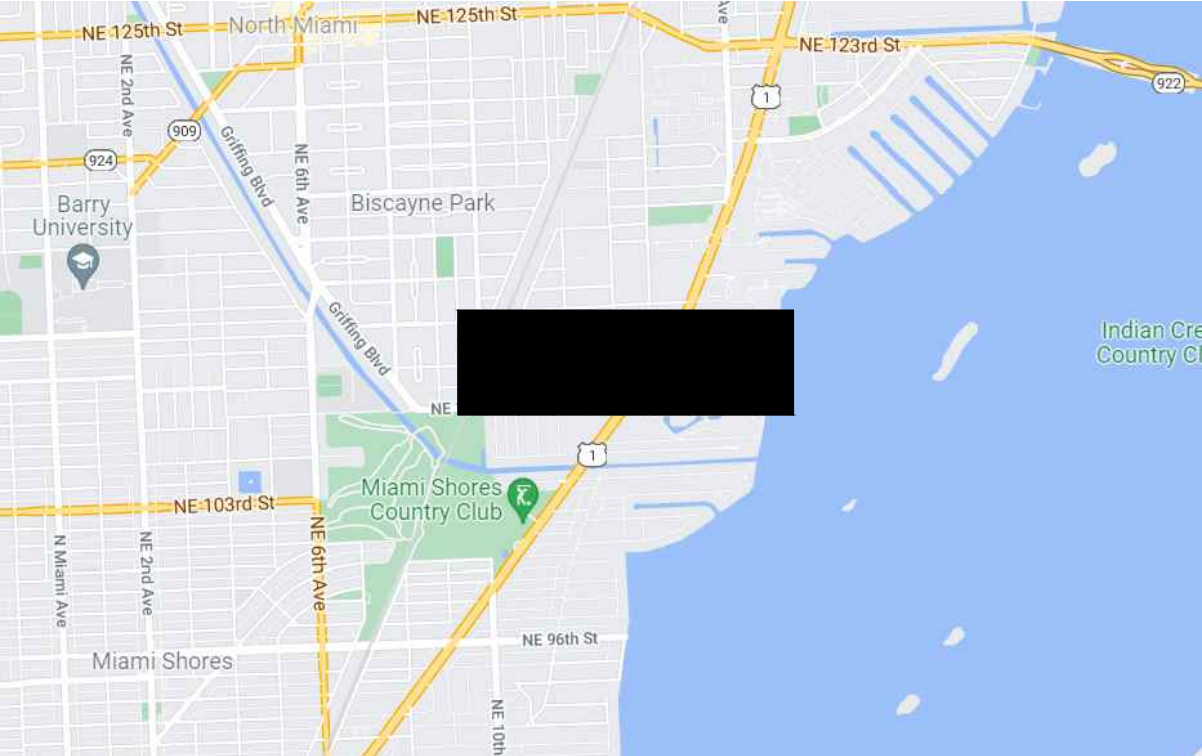








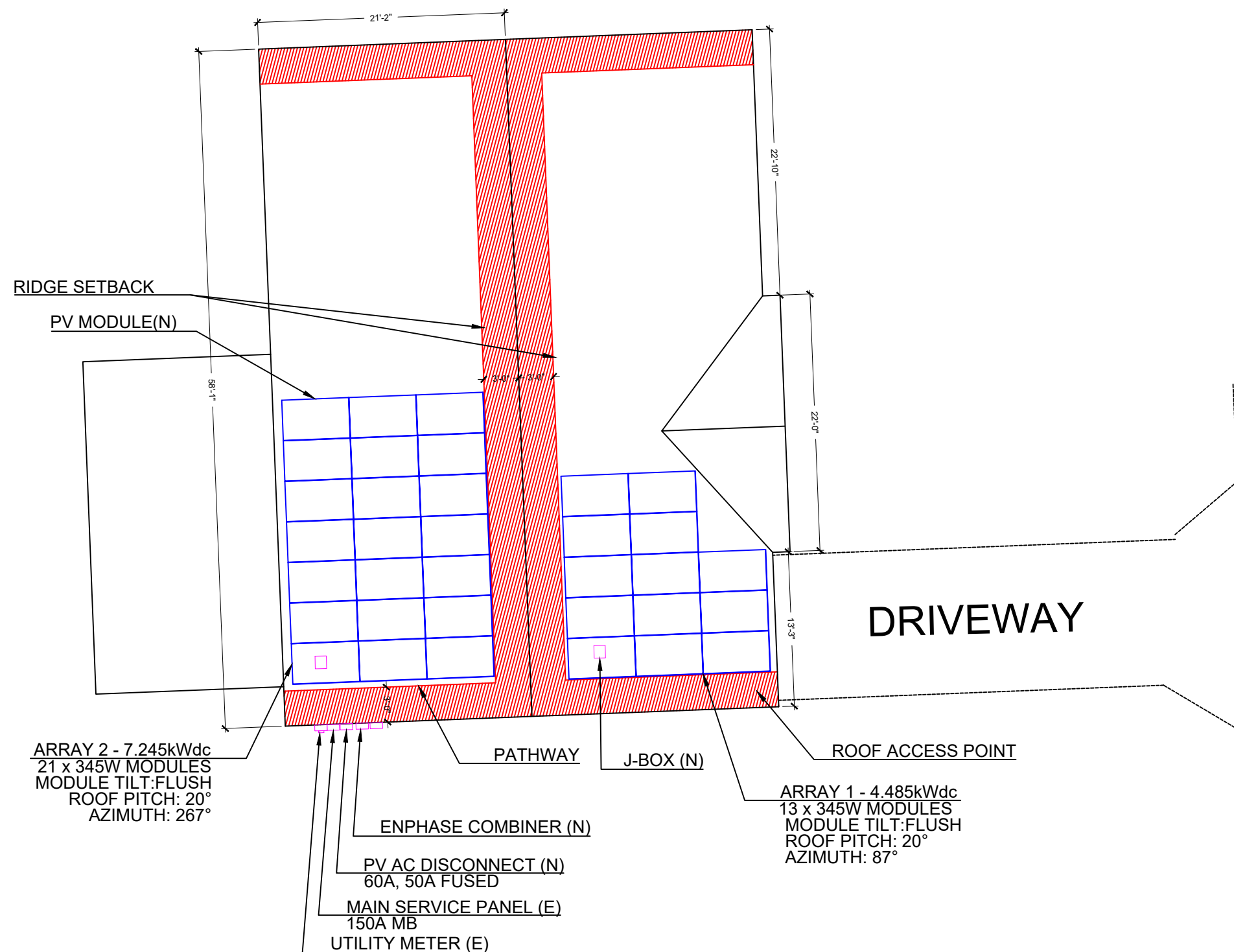


	1	2	3	4	5	6	7	8	9	10	11																						
A	<div>PV PROJECT - 11.73kWdc</div>										<div>Contractor Info</div> <div>-</div> <div>-</div> <div>-</div> <div>----</div>																						
B	<div><div></div><div></div></div>										<div>Project Type - Photovoltaic</div>																						
C	<div><div>1</div><div>PROPERTY ASSESSOR MAP - PROJECT LOCATION</div><div>NTS</div></div>										<div>Project Location:</div> <div>-</div> <div>-</div> <div>-</div> <div>-</div> <div>Parcel Number: -</div> <div>Assessor Phone # (305) 375-4712</div> <div>PV SYSTEM SPECIFICATIONS</div> <div>1. PV MODULE: 34 x MSE345SX5T; 11.73kWdc</div> <div>2. INVERTER: IQ7-60-2-US</div> <div>3. RACKING: Unirac</div> <div>4. ROOF TYPE:SHINGLE</div> <div>5. AZIMUTH:87° 267°</div> <div>6. ROOF SLOPE:20°</div>																						
D	<div><div>2</div><div>AERIAL MAP - PROJECT LOCATION</div><div>NTS</div></div>										<div>File Name:</div> <div>01__SMITH_COVER(1).DWG</div>																						
E	<div>SCOPE OF WORK</div> <div>THESE PLANS ARE FOR THE INSTALLATION OF A ROOF MOUNTED PHOTOVOLTAIC (PV) SYSTEM. THE PV SYSTEM WILL BE INTERCONNECTED WITH THE - UTILITY GRID THROUGH EXISTING ELECTRICAL EQUIPMENT AND WILL OPERATE IN PARALLEL VIA SUPPLY (LST) SIDE CONNECTION WITH NET ENERGY METER.</div>										<div>Sheet Number and Title:</div> <div>PV01 - COVER</div>																						
F	<div>GOVERNING BUILDING CODES</div> <div>1. 2020 FLORIDA BUILDING CODE, 7TH EDITION</div> <div>2. 2020 FLORIDA RESIDENTIAL CODE,7TH EDITION</div> <div>3. 2017 NATIONAL ELECTRICAL CODE, NEC</div> <div>4. 2020 FLORIDA FIRE PREVENTION CODE 7TH EDITION.</div> <div>5. UL STANDARDS</div> <div>5.1. RACKING - UL 2703</div> <div>5.2. PV MODULE - UL 1703</div> <div>5.3. INVERTER - UL 1741</div>										<div>Sheet Size:</div> <div>ANSI full bleed B (17.00 x 11.00 Inches)</div>																						
G	<div>PV SYSTEM SPECIFICATIONS</div> <div>1. PV MODULE: 34 x MSE345SX5T; 11.73kWdc</div> <div>2. INVERTER: IQ7-60-2-US</div> <div>3. RACKING: Unirac</div> <div>4. ROOF TYPE:SHINGLE</div> <div>5. AZIMUTH:87° 267°</div> <div>PV INSTALLATION OVERVIEW</div> <div>ELECTRICAL</div> <div>a. POINT OF CONNECTION: SUPPLY (LST)</div> <div>b. MAX INV OUTPUT CURRENT: 1A Ea</div> <div>c. PV AC DEDICATED OCP DEVICE RATING: 34 * 1A * 125% = 42.5A 50A OCP</div> <div>d. UTILITY AC DISCONNECT REQ'D: YES</div> <div>STRUCTURAL</div> <div>a. MAX ALLOWABLE SPACING BETWEEN ATTACH POINTS: 4FT</div> <div>b. MIN. NUMBER OF ATTACHMENT POINTS: 75</div> <div>c. WEIGHT PER ATTACHMENT POINT: 25.3LBS/ATTACH</div> <div>d. PV DEAD LOAD: 2.82PSF</div> <div>e. LENGTH OF RAIL REQUIRED: 240FT</div>										<div>Sheet List Table</div> <table><tr><th>Sheet Number</th><th>Sheet Title</th></tr><tr><td>PV01</td><td>COVER</td></tr><tr><td>PV02</td><td>NOTES</td></tr><tr><td>PV03</td><td>E_PV SITE PLAN</td></tr><tr><td>PV04</td><td>ELEVATION</td></tr><tr><td>PV05</td><td>LINE DIAGRAM</td></tr><tr><td>PV06</td><td>S_PV SITE PLAN</td></tr><tr><td>PV07</td><td>PV ATTACH PLAN</td></tr><tr><td>R01</td><td>MODULE DATASHEET</td></tr><tr><td>R02</td><td>INVERTER DATASHEET</td></tr><tr><td>R03</td><td>RACKING DATASHEET</td></tr></table>	Sheet Number	Sheet Title	PV01	COVER	PV02	NOTES	PV03	E_PV SITE PLAN	PV04	ELEVATION	PV05	LINE DIAGRAM	PV06	S_PV SITE PLAN	PV07	PV ATTACH PLAN	R01	MODULE DATASHEET	R02	INVERTER DATASHEET	R03	RACKING DATASHEET
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<div>DESIGN SPECIFICATIONS</div> <div>1. AHJ - COUNTY OF MIAMI-DADE CODE</div> <div>2. UTILITY - -</div> <div>3. BUILDING RISK CATEGORY II</div> <div>4. DESIGN WIND SPEED (ULT) - 180MPH</div> <div>5. DESIGN SNOW LOAD - 0 PSF</div> <div>6. EXPOSURE CATEGORY - C</div> <div>7. MEAN ROOF HEIGHT - 15FT</div> <div>8. ROOF SLOPE - 20°</div>											<div>Drawing history</div> <table><tr><th>no.</th><th>drawn by</th><th>revision</th><th>date</th></tr><tr><td>01</td><td>DCG</td><td>----</td><td>9/23/21</td></tr></table> <div>Design</div> <div>-</div> <div>-</div> <div>-</div> <div>-</div> <div>-</div>	no.	drawn by	revision	date	01	DCG	----	9/23/21														
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01	DCG	----	9/23/21																														
<div>© 2020 GODWIN ENGINEERING AND DESIGN, LLC</div> <div>PV01</div>																																	

	1	2	3	4	5	6	7	8	9	10	11																
A	INSTALLATION NOTES			ELECTRICAL NOTES			STRUCTURAL NOTES			<div>Contractor Info</div> <div>-</div> <div>-</div> <div>-</div> <div>----</div>																	
	1. THE EQUIPMENT SHALL BE INSTALLED IN ACCORDANCE WITH THE MANUFACTURES INSTALLATION INSTRUCTIONS.			1. INSTALLATION TO BE COMPLIANT WITH NFPA 1 & NFPA70 (NATIONAL ELECTRICAL CODE)			1. PV SYSTEM CONSIST OF THE PV MODULES, RAILING, AND CONNECTION HARDWARE			<div>Project Type - Photovoltaic</div>																	
	2. THE ACTUAL LOCATION OF THE ARRAY AND PLACEMENT OF THE MECHANICAL ANCHORS ARE SUBJECT TO VARIANCES DEPENDING ON SITE CONDITIONS AND/OR ROOF OBSTRUCTIONS. THE CONTRACTOR SHALL VERIFY ALL DIMENSIONS AND SPECIFICATIONS BEFORE COMMENCING.			2. THE PV SYSTEM IS AN UNGROUNDED PV ARRAY AND HAS A GROUND-FAULT PROTECTION DEVICE THAT MEETS THE REQUIREMENTS OF 690.41(B)(1) AND (2)			2. RACKING SYSTEM & PV ARRAY SHALL BE INSTALLED ACCORDING TO CODE-COMPLIANT INSTALLATION MANUAL																				
B	3. ALL OUTDOOR EQUIPMENT SHALL BE RAIN TIGHT WITH MINIMUM NEMA3-R RATING.			3. THE EXACT LOCATION OF NEW ELECTRICAL EQUIPMENT AND CONDUIT RUN RELATING TO THIS PROJECT IS SUBJECT TO CHANGE AND WILL BE DETERMINED ON SITE BY THE CONTRACTOR.			3. MAXIMUM SPACING BETWEEN CONNECTION POINTS 4FT.			<div>Project Location:</div> <div>-</div> <div>-</div> <div>-</div> <div>-</div> <div>Parcel Number: -</div> <div>Assessor Phone # (305) 375-4712</div> <div>PV SYSTEM SPECIFICATIONS</div> <div>1. PV MODULE: 34 x MSE345SX5T; 11.73kWdc</div> <div>2. INVERTER: IQ7-60-2-US</div> <div>3. RACKING: Unirac</div> <div>4. ROOF TYPE:SHINGLE</div> <div>5. AZIMUTH:87° 267°</div> <div>6. ROOF SLOPE:20°</div>																	
	4. ALL LOCATIONS ARE APPROXIMATE AND REQUIRE FIELD VERIFICATION.			4. ALL CLEARANCES AND WORK SPACE AS REQUIRED PER NEC 110.26 SHALL BE FOLLOWED			8. THE ATTACHMENTS SHOULD BE STAGGERED, WHERE POSSIBLE, TO ALLOW DISTRIBUTION OF THE DESIGN LOADS EVENLY TO THE STRUCTURE.																				
	5. ALL WORK SHALL COMPLY WITH THE BUILDING CODES SET FORTH BY THE GOVERNING JURISDICTION.			5. THE INVERTER(S) SHALL MEET ALL CURRENT CODE REQUIREMENTS FOR RAPID SHUTDOWN AS DEFINED IN NEC 690.12.			9. ALL ROOF PENETRATIONS SHALL BE FLASHED AND SEALED BY APPROVED METHOD PER ROOF TYPE MANUFACTURE.																				
C	6. ALL EQUIPMENT SHALL MEET MINIMUM SETBACKS AS REQUIRED BY THE NATIONAL FIRE CODE, NFC AND THE NATIONAL ELECTRICAL CODE, NEC.			6. ALL EQUIPMENT TO BE LISTED OR LABELED FOR ITS APPLICATION(UL OR OTHER APPROVED LISTINGS)			10. TYP. ROOF SUPPORT STRUCTURE; 2" X 4", 24"O.C.			<div>File Name:</div> <div>Sheet Number and Title: PV02 - NOTES</div> <div>Sheet Size: ANSI full bleed B (17.00 x 11.00 Inches)</div> <div>Drawing history</div> <table><tr><th>no.</th><th>drawn by</th><th>revision</th><th>date</th></tr><tr><td>01</td><td>DCG</td><td>----</td><td>9/25/21</td></tr><tr><td></td><td></td><td></td><td></td></tr><tr><td></td><td></td><td></td><td></td></tr></table> <div>Design</div> <div>-</div> <div>-</div> <div>-</div> <div>-</div> <div>-</div>		no.	drawn by	revision	date	01	DCG	----	9/25/21								
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	01	DCG	----	9/25/21																							
GENERAL PV SITE NOTES			7. GROUNDING			LOAD INFORMATION			<div>© 2020 GODWIN ENGINEERING AND DESIGN, LLC</div> <div>PV02</div>																		
1. PV ARRAY NOT TO DIRUPT ATTIC VENTS OR PLUMBING VENTS. ARRAY TO SPAN OR EXTEND TERMINATION PLUMBING VENTS WITHOUT ANY IMPACT ON THEIR FUNCTIONALITY.			7.1. ALL EQUIPMENT SHALL BE PROPERLY GROUNDED PER THE REQUIREMENTS OF NEC ARTICLES 250 & 690			1. THE COMBINED LOADS WITH THE PV ROOF EQUIPMENT INSTALLED ARE NOT LARGER THAN THE COMBINED LOADS AS REQUIRED BY THE BUILDING CODE FOR THE ROOF WITHOUT PANELS.																					
2. PANELS WILL NOT EXCEED THE OVERALL HEIGHT OR ROOF PITCH OF THE EXISTING STRUCTURE.			7.2. MODULE BONDING METHOD SHALL BE INTEGRATED GROUNDING MID CLAPS. REFER TO MANUFACTURES SPECIFIC INSTRUCTIONS FOR PROPER BONDING TECHNIQUES.			2. NUMBER OF ATTACHMENT POINTS: 75																					
D	ABBREVIATIONS			7.3. GROUNDING SYSTEM COMPONENTS SHALL BE LISTED FOR THEIR PURPOSE, AND GROUNDING DEVICES SHALL BE RATED FOR DIRECT BURIAL			3. WEIGHT PER ATTACHMENT POINT: 25.3LBS/ATTACH			<div>no.</div> <div>01</div>																	
	(E) - EXISTING			7.4. EGC SHALL BE SIZED IN ACCORDACE WITH 250.122 AND ARRAY EGC'S SMALLER THAN 6AWG SHALL COMPLY WITH 250.120(C)			4. PV DEAD LOAD: 2.82PSF																				
	(N) - NEW			8. ALL CONDUCTORS ARE COPPER, UNLESS SPECIFIED OTHERWISE			5. DESIGN SNOW LOAD																				
E	TYP - TYPICAL			9. ALL CONDUIT, RACEWAYS, AND JUNCTION BOXES SHALL BE SIZED ACCORDING TO THE APPLICABLE CODE IF THE SIZE IS NOT SPECIFIED.			5.1. GROUND SNOW LOAD - 0 PSF			<div>Design</div> <div>-</div> <div>-</div> <div>-</div> <div>-</div> <div>-</div>																	
	NTS - NOT TO SCALE			10. SIGNAGE SHALL BE APPLIED ACCORDING TO GOVERNING BUILDING CODES AND LOCAL JURISDICTIONS SPECIFIC REQUIREMENTS.			6. ALLOWABLE DESIGN LOADS FOR PV MODULE:																				
	MIN - MINIMUM			11. EQUIPMENT INSTALLED IN DIRECT SUNLIGHT MUST BE RATED FOR EXPECTED OPERATING TEMPERATURE AS SPECIFIED BY NEC.			6.1. WIND = 62PSF																				
F	MAX - MAXIMUM			12. CALCULATION OF MAXIMUM CIRCUIT CURRENT FOR THE SPECIFIC CIRCUIT SHALL BE CALCULATED IN ACCORDANCE WITH 690.8(A)(1) THROUGH (A)(6). CONDUCTOR AMPACITY SHALL BE SIZED TO NOT CARRY LESS THAN THE LARGER OF 690.8(B)(1) OR (2)			6.2. SNOW = 125PSF																				
	AC - ALTERNATING CURRENT			13. DC PV SOURCE AND DC OUTPUT CURRENT CIRCUITS ON OR INSIDE A BUILDING SHALL BE CONTAINED IN METAL RACEWAYS, TYPE MC METAL-CLAD CABLE THAT COMPLIES WITH 250.118(10), OR METAL ENCLOSURES FROM THE POINT OF PENETRATION OF THE SURFACE OF THE BUILDING OR STRUCTURE TO THE FIRST READILY ACCESSIBLE DISCONNECTING MEANS.(690.31(G))																							
	DC - DIRECT CURRENT			14. ACCESS TO BOXES; JUNCTION, PULL, AND OUTLET BOXES LOCATED BEHIND MODULES OR PANELS SHALL BE SO INSTALLED THAT THE WIRING CONTAINED IN THEM CAN BE RENDERED ACCESSIBLE DIRECTLY OR BY DISPLACEMENT OF A MODULE(S) SECURED BY REMOVABLE FASTENERS AND CONNECTED BY FLEXIBLE WIRING SYSTEM.(690.34)																							
G	PV - PHOTOVOLTAIC			15. PV POINT OF CONNECTION. THE OUTPUT OF AN INTERCONNECTED ELECTRIC POWER SOURCE SHALL BE CONNECTED AS SPECIFIED IN 705.12(A) or (B).																							
	MOD - PV MODULE			FIRE OFFSETS - SYSTEM WILL BE INSTALLED PER 2018 NFPA 1, CH 11.12																							
	INV - DC/AC PV INVERTER			NFPA 11.12.2.2.2.1 - PATHWAYS																							
POC - POINT OF CONNECTION(PV)			NOT LESS THAN TWO 36IN WIDE PATHWAYSON SEPARATE ROOF PLANES, FROM GUTTER TO RIDGE, SHALL BE PROVIDED ON ALL BUILDINGS. ONE PATHWAY SHALL BE PROVIDED ON THE STREET OR DRIVEWAY SIDE OF THE ROOF. FOR EACH ROOF PLANS WITH A PV ARRAY, A 36IN WIDE PATHWAY FROM GUTTER TO RIDGE SHALL BE PROVIDED ON THE SAME PLAN AS THE PV ARRAY, ON AN ADJACENT ROOF PLANE OR STRADDLING THE SAME AND ADJACENT ROOF PLANES. PATHWAYS SHALL BE LOCATED IN AREAS WITH MINIMAL OBSTRUCTIONS SUCH AS VENT PIPES, CONDUIT, OR MECHANICAL EQUIPMENT.			11.12.2.2.2.2																					
RSB - RAPID SHUTDOWN BOX			FOR PV ARRAYS OCCUPYING UP TO 33 PERCENT OF THE PLAN VIEW ROOF AREA, A MIN. 18IN PATHWAY SHALL BE PROVIDED ON EITHER SIDE OF A HORIZONTAL RIDGE, FOR PV ARRAYS OCCUPYING MORE THAN 33 PERCENT OF THE PLAN VIEW ROOF AREA, A MIN 36IN PATHWAY SHALL BE PROVIDED ON EITHER SIDE OF A HORIZONTAL RIDGE.																								
CB - CIRCUIT BREAKER (EX. 20A/2P CB - 20AMP 2-POLE CIRCUIT BREAKER)			THE ACCESS PATHWAY SHALL BE LOCATED AT A STRUCTURALLY STRONG LOCATION OF THE BUILDING, SUCH AS A BEARING WALL.																								
C - CONDUIT																											
OCP - OVERCURRENT PROTECTION																											
OCPD- OVERCURRENT PROTECTION DEVICE																											
MSD - MAIN SERVICE DISCONNECT																											
DISC - DISCONNECT																											
MSP - MAIN SERVICE PANEL																											
SP - SUB PANEL																											
PLP - PROTECTED LOADS PANEL																											
MLO - MAIN LUG ONLY																											
MB - MAIN BREAKER																											
EGC - EQUIPMENT GROUNDING CONDUCTOR																											
GEC - GROUNDING ELECTRODE CODUCTOR																											
GES - GROUNDING ELECTRODE SYSTEM																											
SYMBOLS																											
 UTILITY METER																											
 PV MODULE																											
 DC/AC UTILITY INTERACTIVE INVERTER																											
 DISCONNECT																											
 CB DOUBLE POLE																											
 CB SINGLE POLE																											
 FUSE																											
 FUSED DISCONNECT																											



### Contractor Info

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## Project Type - Photovoltaic

## Project Location:

Parcel Number: -  
Assessor Phone # (305) 375-4712

### PV SYSTEM SPECIFICATIONS

- PV SYSTEM SPECIFICATIONS**
1. PV MODULE: 34 x MSE345SX5T:  
11.73kWdc
  2. INVERTER: IQ7-60-2-US
  3. RACKING: Unirac
  4. ROOF TYPE: SHINGLE
  5. AZIMUTH: 87° 267°
  6. ROOF SLOPE: 20°

File Name:

Sheet Number and Title:  
PV03 - E\_PV SITE PLAN

Sheet Size:  
ANSI full bleed B (17.00 x 11.00 Inches)

## Drawing history

no.	drawn by	revision	date
01	DCG	----	9/25/21

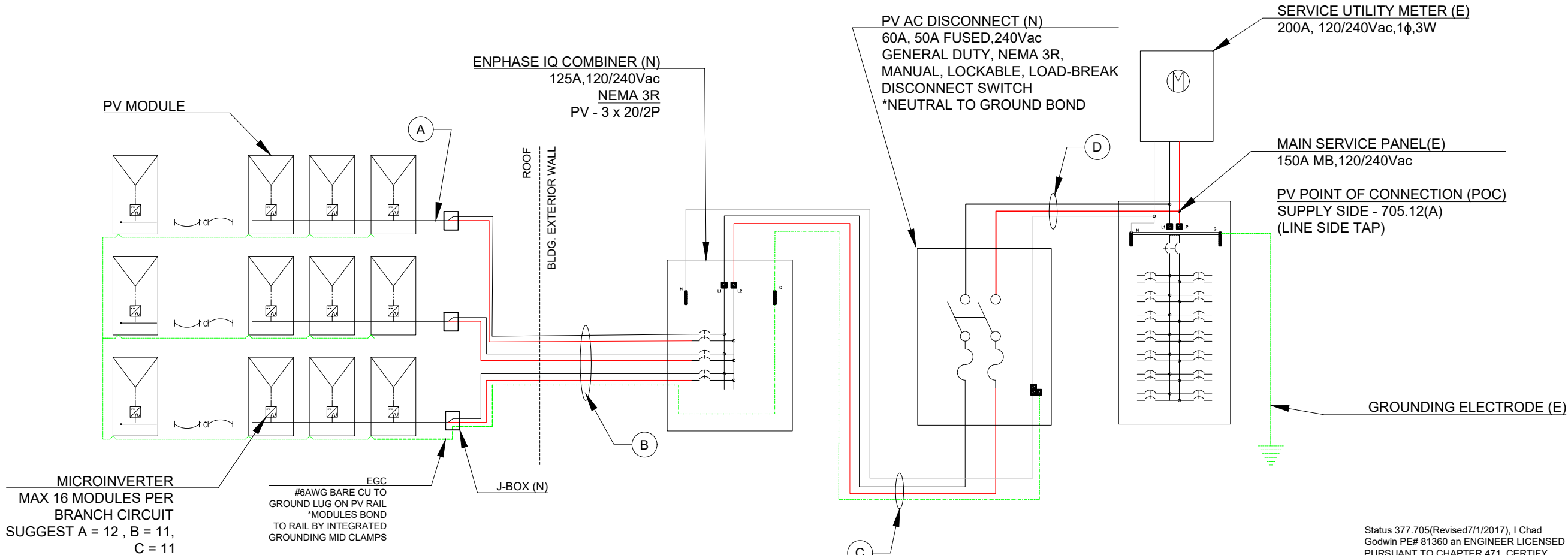
## Design





A  
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1	2	3	4	5	6	7	8				
Project Details				Microinverter		PV Module		Branch Circuit Summary			
Project Name				Model Number		Model Number		PV Combiner A			
Project Location				IQ7-60-2-US		MSE345SX5T					
Module -	34	Mission	MSE345SX5T	Max input PV Power	350	Wdc	Nominal Output @ STC, Pmp	345	Wdc	# of Microinverters	34
Inverter -	34	Enphase	IQ7-60-2-US	DC Max Voltage	48		Open Circuit Voltage, Voc	41	Vdc	Max Continuous Load (A)	43
Utility -	240	Vac		Nominal Output Current	1	A	Max Power Point, Vmp	33.37	Vdc	# of branch Circuits	3
DC Rating	11.73	kW		Nominal Voltage	240	Vac	Short Circuit Current, Isc	10.92	A		
AC Rating	8.5	kW		AC Max Output Power	250	Wac	Max Power Point Current, Imp	10.34	A	Busbar Calculation = 150 * 120%	180
Min. Ambient Temp, °C	-24	-11.2 °F		Max Continuous output Power	240	Wac	VOC Temp Coeff	-0.262	%/°C	Sum of OCP supplying bus	193
Max. Ambient Temp, °C	35	95 °F		CEC Weighted Efficiency	97	%	Dimensions, LxWxH (in)	68.82 x 41.5 x 1.57		705.12(D)(2) NOT Satisfied; Must utilize supply side connection	
				Max Units per 20A Branch Circuit	16		Weight	44.8	lbs		
Branch Circuit Sizing											
Inputs		Branch Circuit Combiner A									
# of Branch Circuits		3									
Individual Branch Circuits		A	B	C							
Microinverters per Branch Circuit		12	11	11							
Output current per string (A)		12.00	11.00	11.00							
125% of Output for min. OCP (A)		15.00	13.75	13.75							
Min. Breaker Size (A)		20	20	20							



Conduit and Conductor Schedule						
Tag	Description and Conductor Type	Min. Conductor Gauge	Number of Conductors	Typical Conduit Type	Min. Conduit Size	Max one way length (ft)
A	Enphase Q Cable	12AWG	(L <sub>1</sub> , L <sub>2</sub> ) (G)	FREE AIR	MFG CABLE	20
B	j-box to Combiner., THWN-2	10AWG	3 x (L <sub>1</sub> , L <sub>2</sub> ) ,G	PVC, EMT, or FMC	3/4"	40
C	Comb. to Disco., THWN-2	6AWG	L <sub>1</sub> , L <sub>2</sub> , N, (#8G)	PVC, EMT, or FMC	3/4"	5
D	Disco. to POC., THWN-2	6AWG	L <sub>1</sub> , L <sub>2</sub> , N	PVC, EMT, or FMC	3/4"	5
Notes: LFMC or LFNC can be used as necessary, if "uses permitted" of the current version of the NEC are met.(G) can be #8AWG THWN-2 For Conduit sizing refer to Chapter 9 Tables, NEC					NEC 690.45-46, Table 250.66, Table 250.122	

Inverter output CKT			Combiner output ckts		
Distance above roof			PV Combiner A		
1/2 in.-3 1/2 in.			Design temperature (°F)		
Amb. Temp. Adder for Rooftops (°F)			94		
Design temperature (°F)			Max Ambient Temp. Range (°F)		
135			87-95		
Adjusted Temp. Range for Roof			Temp. Rating of Conductor		
132-140			75°C		
Temp. Rating of Conductor			No. of Current Carrying Cond.		
75°C			<4		
No. of Current Carrying Cond.			Max Continuous Load (A)		
<4			43		
Overcurrent Protection (A)					
20			Overcurrent Protection (A)		
125% of Output for Min. OCP(A)			50		
15.0			Amb. Temp Correction Factor		
0.58			0.94		
Raceway Fill Adjustment Factor			Raceway Fill Adjustment Factor		
100%			100%		
Wire Size (AWG or MCM)			Wire Size (AWG or MCM)		
10			6		
Allowable Ampacity (Amps)			Allowable Ampacity (Amps)		
35			65		
Adjusted Ampacity (Amps)			Adjusted Ampacity (Amps)		
20			61		

**Contractor Info**  
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**Project Type - Photovoltaic**

**Project Location:**  
-  
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-  
-  
  
Parcel Number: -  
Assessor Phone # (305) 375-4712

**PV SYSTEM SPECIFICATIONS**  
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4. ROOF TYPE:SHINGLE  
5. AZIMUTH:87° 267°  
6. ROOF SLOPE:20°

**File Name:**

**Sheet Number and Title:**  
PV05 - LINE DIAGRAM

**Sheet Size:**  
ANSI full bleed B (17.00 x 11.00 Inches)

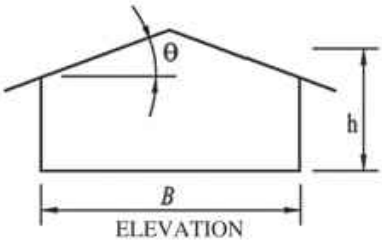
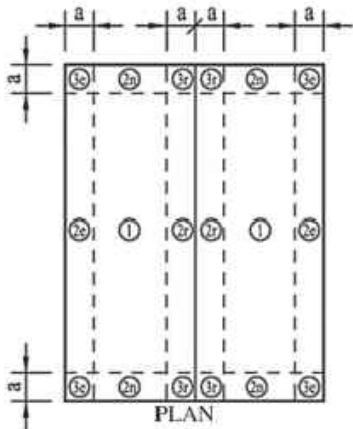
**Drawing history**

no.	drawn by	revision	date
01	DCG	----	1/24/20

**Design**  
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PV05



- MATERIALS**
- a. MAX ALLOWABLE SPACING BETWEEN ATTACH POINTS: 4FT
  - b. MIN. NUMBER OF ATTACHMENT POINTS: 75
  - c. LENGTH OF RAIL REQUIRED: 240FT
  - d. SPLICE BAR:10
  - e. MID CLAMPS:56
  - f. ENDS: 24
  - g. GROUND LUGS: 6

Contractor Info

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-  
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Project Type - Photovoltaic

Project Location:

-  
-  
-  
-

Parcel Number: -  
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- 3. RACKING: Unirac
- 4. ROOF TYPE:SHINGLE
- 5. AZIMUTH:87° 267°
- 6. ROOF SLOPE:20°

File Name:

Sheet Number and Title:  
PV06 - S\_PV SITE PLAN

Sheet Size:  
ANSI full bleed B (17.00 x 11.00 Inches)

Drawing history

no.	drawn by	revision	date
01	DCG	----	9/25/21

Design

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A

PV Dead Load				Module and Racking Specs			
# of Modules		34		Module Model Number	MSE345SX5T		
Module	$W_{mod}$	45	lbs	Dimensions, LxWxH (in)	68.82 x 41.5 x 1.57		
Array	$W_{mods}$	1523	lbs	Width	41.5	in	
Micro/optimizer	$W_{mic}$	136	lbs	Height	68.82	in	
PV Rail	$W_{PV\ rail}$	240	lbs	Module Area	19.83	ft <sup>2</sup>	
Total Weight	$W_{total}$	1900	lbs	PV Racking	UNIRAC		
Total Area	$A_T$	674.34	ft <sup>2</sup>	Rail, Clamps, Mounts	1	plf	
Dead Load	$D_{PV}$	2.82	psf	Total Rail Length, L	240	ft	
				Micro/opt, W	4	lbs per	
PV Attachment Summary							
Max Allowable Spacing		4	ft				
# of attachment points		75					
Weight/attachment		25.3	lbs				

C

ASCE 7-16 CHAPTER 29 WIND LOADS - Rooftop Solar Panels Minimum Design Loads - Part 1: Enclosed(gable, h<60ft, 20°<θ<27°)									
Risk Category	II	Table 1.5-1				Load Types		Load, PSF	
Basic Wind Speed (Ult)	180	mph	Figure 26.5-1B			Dead Load, D		2.82	
Wind Speed (asd)	139	mph	IBC 1609.3.1			Weight of Ice, D <sub>i</sub>		0	
Roof Angle	20	°				Earthquake, E		0	
Effective Wind Area	19.83	ft <sup>2</sup>	26.20			Fluid, F		n/a	
<u>Wind Load Parameters</u>									
Wind Directionality	K <sub>d</sub>	0.85	Table 26.6-1			Flood Load, F <sub>s</sub>		n/a	
Exposure Cat.	B,C, or D	c	Section 26.7			Lateral Earth psi, H		n/a	
Topographic factor	K <sub>zt</sub>	1.00	26.8 or 26.8.2			Live Load, L		n/a	
Ground Elevation Factor	K <sub>e</sub>	1.00	Table 26.9-1			Roof Live, L <sub>r</sub>		n/a	
Velocity Exposure Coefficient	K <sub>z</sub>	0.85	Table 26.10-1			Rain, R		n/a	
Array Edge Factor	γ <sub>e</sub>	1.50	29.4.4			Snow, S		0	
			*Modules are considered Exposed						
Solar Panel Equalization Factor	γ <sub>a</sub>	0.68	Fig. 29.4-8			Self-Straining, T		n/a	
Velocity Pressure	q <sub>p</sub>	35.96	psf	q <sub>p</sub> =0.00256 K <sub>z</sub> K <sub>zt</sub> K <sub>e</sub> K <sub>z</sub> V <sup>2</sup>			Wind, W		see calc
Mean Roof Height	h	15.00	ft	h <sub>2</sub>	5	in	Not > 10in(height above roof)		
	0.4h	6.00	ft	2h <sub>2</sub>	10	in	*min distance array shall be from the roof edge, Gable Ridge, or hip ridge		
least horizontal dim		697	in		0.25	in	min gap between all panels but not > 6.7ft		
10% of least horizontal dim		5.81	ft	d1	1.00	ft	Horizontal distance orthogonal to panel edge		
Roof Zone Set Back	a	5.81	ft	d2	0.25	ft	Horizontal distance from edge of one panel to the nearest edge in the next row		

D

Figure 30.3-2C (Gable roof, h<60ft, 20°<θ<27°)									
Zone									
	1	2e	2n	2r	3e	3r			
GC <sub>p</sub>	-1.50	-1.50	-2.10	-2.10	-2.10	-2.30	uplift		
GC <sub>p</sub>	0.50	0.50	0.50	0.50	0.50	0.50	downward		
p = q <sub>h</sub> (GC <sub>p</sub> )(γ <sub>e</sub> )(γ <sub>a</sub> )	-55.10	-55.10	-77.14	-77.14	-77.14	-84.48	psf	uplift	
p = q <sub>h</sub> (GC <sub>p</sub> )(γ <sub>e</sub> )(γ <sub>a</sub> )	18.37	18.37	18.37	18.37	18.37	18.37	psf	downward	
Design Calculations for the Use of Attachment to Roof Truss/Rafter									
Module Length	C(L <sub>p</sub> )	5.74					ft		
Module Width	B	3.46					ft		
Module Area	A	19.83					ft <sup>2</sup>		
Total Design Load (Uplift)	P <sub>design</sub>	-52.28	-52.28	-74.32	-74.32	-74.32	-81.66	psf	
Total Design Load (Downforce)	P <sub>design</sub>	21.19	21.19	21.19	21.19	21.19	21.19	psf	
Design Load per Module	T <sub>up</sub>	-1036.84	-1036.84	-1473.95	-1473.95	-1473.95	-1619.65	lbs	T <sub>up</sub> = A * P <sub>design</sub>
Design Load per Module	T <sub>down</sub>	420.19	420.19	420.19	420.19	420.19	420.19	lbs	T <sub>dn</sub> = A * P <sub>design</sub>
Distributed Load (Uplift)	P <sub>dist. Up</sub>	-149.90	-149.90	-213.10	-213.10	-213.10	-234.17	plf	T <sub>up</sub> / B * 2
Distributed Load (Down)	P <sub>dist. Down</sub>	60.75	60.75	60.75	60.75	60.75	60.75	plf	T <sub>dn</sub> / B * 2
Railspan Between Anchor Points	L	4	4	2	2	2	2	ft	
Point Load per Mount (Uplift)	R	-599.62	-599.62	-426.20	-426.20	-426.20	-468.33	lbs	
Point Load per Mount (Down)	R	121.50	121.50	60.75	60.75	60.75	60.75	lbs	

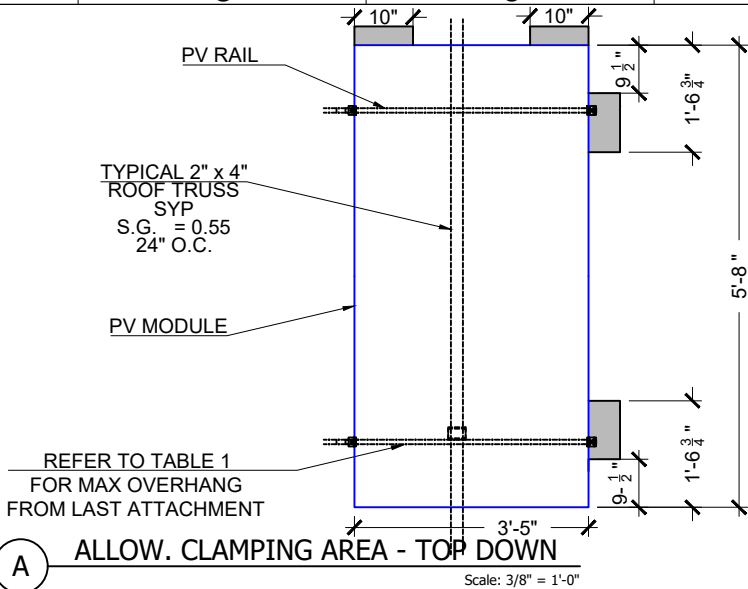
E

Table 1.1 - Pullout Value, Max Span, Max Cantilever - RT Mini									
Specific Gravity	G	0.55	0.55	0.55	0.55	0.55	0.55		Table 11.2A, NDS 2005, page 68 (SYP)
Diameter of Lag Screw	D	5	5	5	5	5	5	mm	
Ultimate Pullout Value	W	1839	1839	1839	1839	1839	1839	lbs	RT mini Test report
# of wood screws		2	2	2	2	2	2		
Screw Length	$T_d$	90	90	90	90	90	90	mm	
Design Pullout Value per Mount	$W_d$	613	613	613	613	613	613		SF = 3.0
Design Check	SF	1.02	1.02	1.44	1.44	1.44	1.31		Calculation: SF= $W_d/R$ (Uplift)
Maximum Cantilever from Last attachment									
Max Cantilever	M	16	16	8	8	8	8	in	Max rail span * 33%

F

Installation is in compliance with 15.14.2.5.2 and RAS111  
Installation meets all requirements of sections 1512 through 1525  
Penetrations will be sealed to Miami Standards using GAF Flexseal sealant.

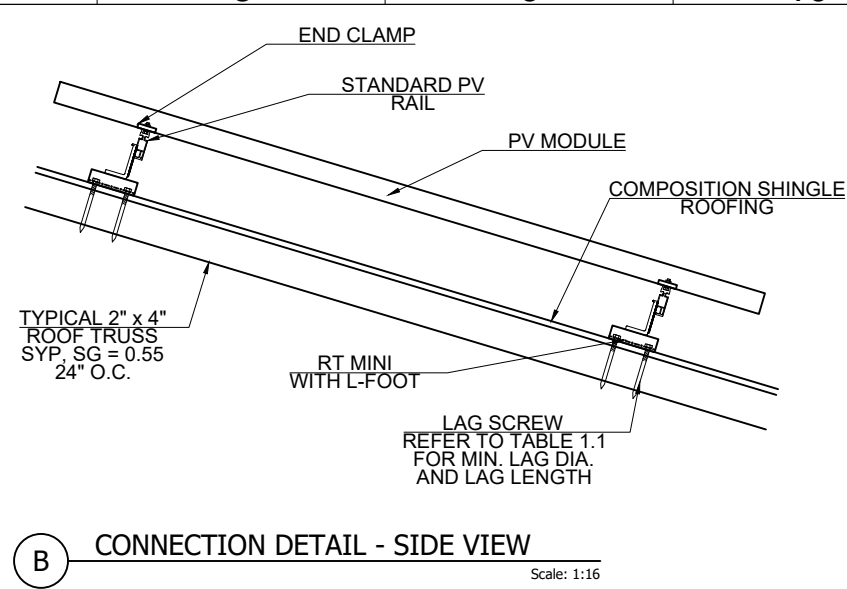
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A

ALLOW. CLAMPING AREA - TOP DOWN

Scale: 3/8" = 1'-0"



B

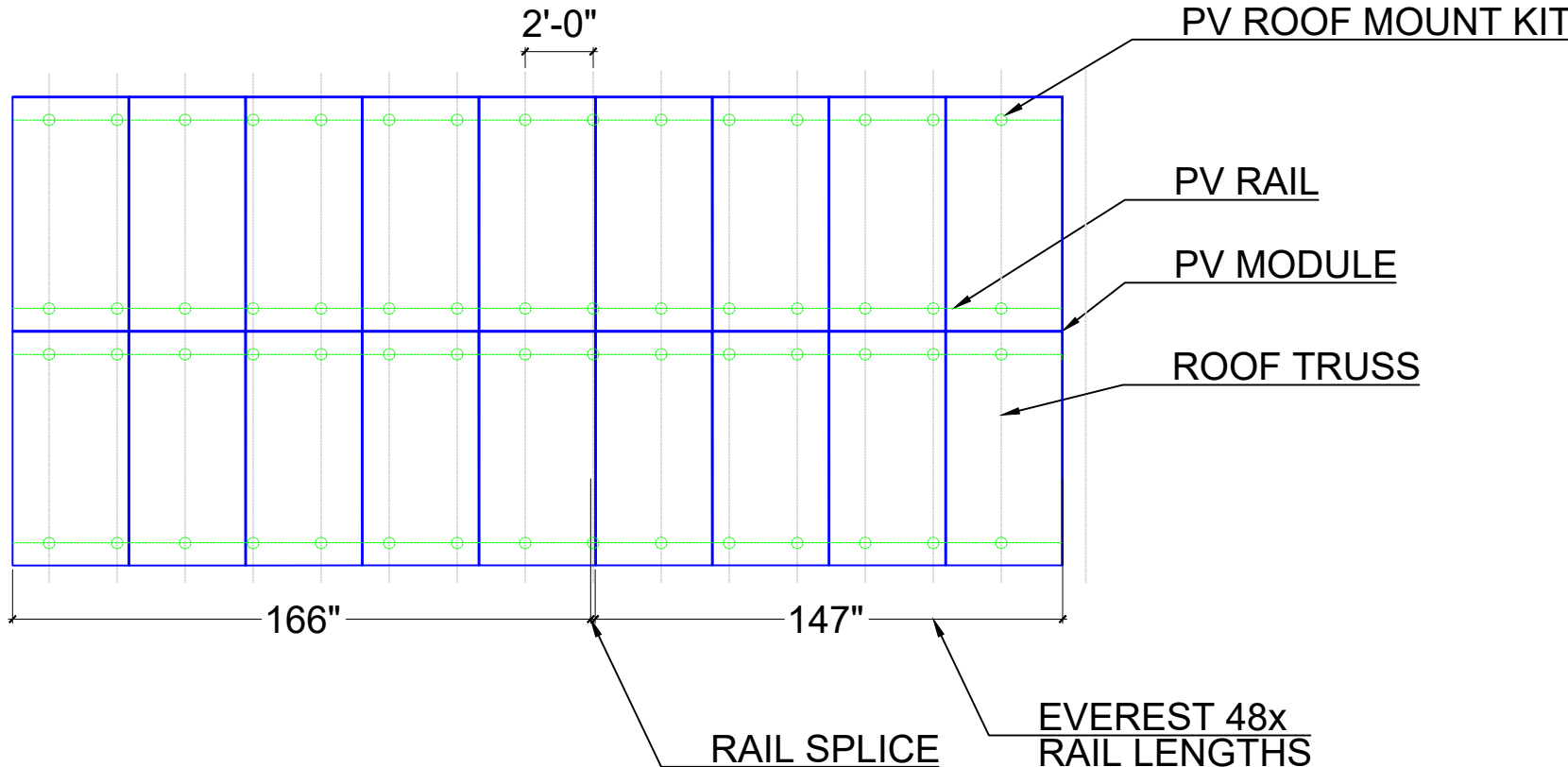
CONNECTION DETAIL - SIDE VIEW

Scale: 1:16

C

PV SITE PLAN W/ MODULE LAYOUT

Scale: 97/128" = 1'



D

EXAMPLE MODULE ATTACHMENT PLAN W/ RAIL LENGTHS

Scale: 3/16" = 1'-0"

## Contractor Info

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## Project Type - Photovoltaic

## Project Location:

-  
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-  
-  
-Parcel Number: -  
Assessor Phone # (305) 375-4712

## PV SYSTEM SPECIFICATIONS

1. PV MODULE: 34 x MSE345SX5T; 11.73kWdc
2. INVERTER: IQ7-60-2-US
3. RACKING: Unirac
4. ROOF TYPE: SHINGLE
5. AZIMUTH: 87° 267°
6. ROOF SLOPE: 20°

File Name:

Sheet Number and Title:

PV07 - PV ATTACH PLAN

Sheet Size:

ANSI full bleed B (17.00 x 11.00 Inches)

## Drawing history

no.	drawn by	revision	date
01	DCG	----	9/25/21

## Design

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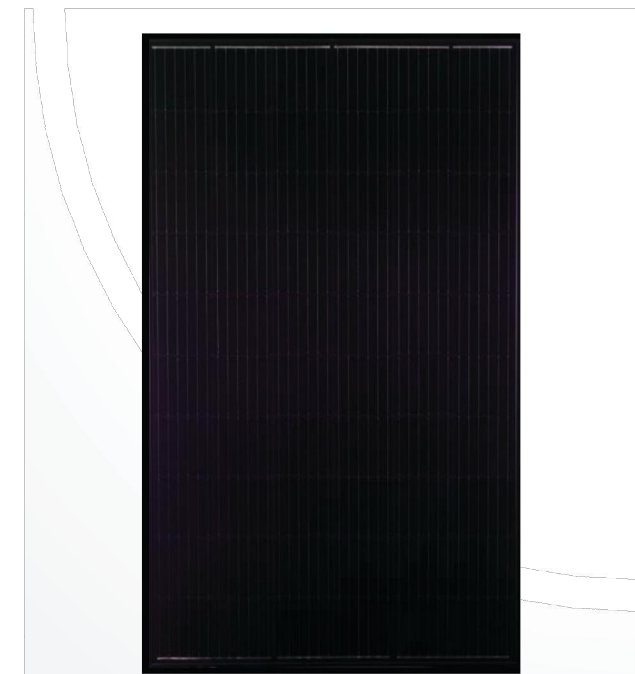
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1234567891011

AMERICA'S MODULE COMPANY™

MISSION SOLAR ENERGY

MSE PERC 60



CLASS LEADING POWER OUTPUT

**345 W**

POSITIVE POWER TOLERANCE

**-0 to +3 %**

### The True American Brand

Mission Solar Energy is headquartered in San Antonio, Texas, where we manufacture our modules. We produce American, high quality solar modules ensuring the highest in class power output and best in-class reliability. Our product line is tailored for residential, commercial and utility applications. Every Mission Solar Energy solar module is certified and surpasses industry standard regulations, proving excellent performance over the long-term. Demand the best, demand Mission Solar Energy.

C-SA2-MKTG-0025 REV 2 3/5/2021

### FRAME-TO-FRAME WARRANTY

Degradation guaranteed not to exceed 2% in year one and 0.7% annually from years two to 30 with 81.2% guaranteed in year 25.

### CERTIFICATIONS

UL 61730  
IEC 61215 - IEC 61730  
IEC 61701



Please contact Mission Solar Energy if you have questions or concerns about certification of our products in your area.

\*Standard 12-year product warranty extendable to 25 years with registration:  
[www.missionsolar.com/warranty/](http://www.missionsolar.com/warranty/)

[www.missionsolar.com](http://www.missionsolar.com) | [info@missionsolar.com](mailto:info@missionsolar.com)

PERC 60

CLASS-LEADING 330-345 W

### ELECTRICAL SPECIFICATION

Product Type	MSExxxSX5T (xxx=P <sub>max</sub> )					
Power Output	P <sub>max</sub>	W <sub>p</sub>	330	335	340	345
Module Efficiency		%	17.9	18.2	18.5	18.7
Tolerance		%	0/+3	0/+3	0/+3	0/+3
Short Circuit Current	I <sub>sc</sub>	V	10.72	10.78	10.86	10.92
Open Circuit Voltage	V <sub>oc</sub>	A	40.40	40.58	40.82	41.00
Rated Current	I <sub>mp</sub>	V	10.05	10.14	10.24	10.34
Rated Voltage	V <sub>mp</sub>	V	32.85	33.03	33.20	33.37
Fuse Rating		A	20	20	20	20
System Voltage		V	1000	1000	1000	1000

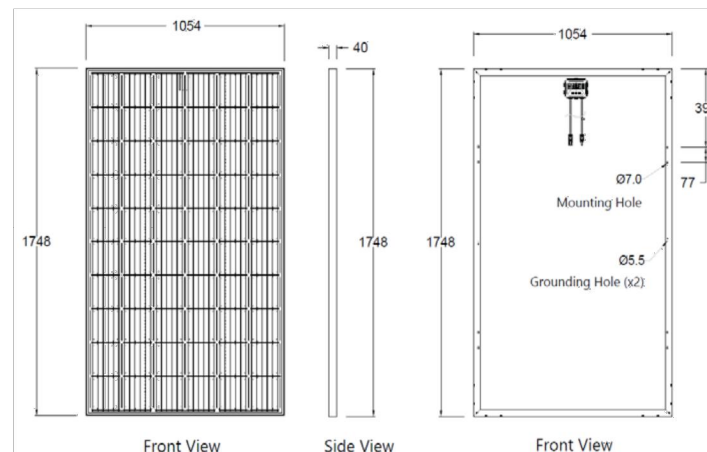
### TEMPERATURE COEFFICIENTS

Normal Operating Cell Temperature (NOCT)	44.43°C (±3.7%)
Temperature Coefficient of P <sub>max</sub>	-0.361%/°C
Temperature Coefficient of V <sub>oc</sub>	-0.262%/°C
Temperature Coefficient of I <sub>sc</sub>	0.039%/°C

### OPERATING CONDITIONS

Maximum System Voltage	1,000Vdc
Operating Temperature Range	-40°C (-40°F) to +85°C (185°F)
Maximum Series Fuse Rating	20A
Fire Safety Classification	Type 1
Front & Back Load (UL Standard)	5600 Pa front and 4800 Pa back load Tested to UL 61730
Hail Safety Impact Velocity	25mm at 23 m/s

### BASIC DIMENSIONS (UNITS: mm)

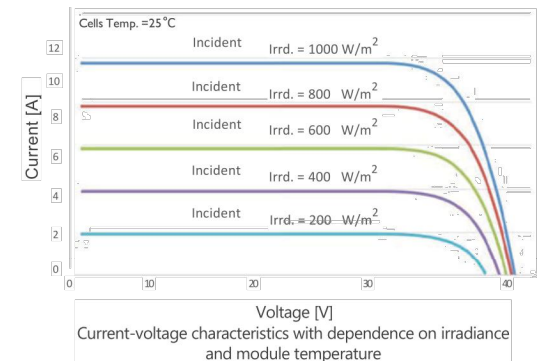


Mission Solar Energy reserves the right to make specification changes without notice

### MECHANICAL DATA

Solar Cells	P-type mono-crystalline silicon
Cell Orientation	60 cells (6x10)
Module Dimension	1748mm x 1054mm x 40mm
Weight	20.3 kg (44.8 lbs.)
Front Glass	3.2mm, tempered, low-iron, anti-reflective
Frame	Anodized
Encapsulant	Ethylene vinyl acetate (EVA)
Junction Box	Protection class IP67 with 3 bypass-diodes
Cable	1.0m, Wire 4mm <sup>2</sup> (12AWG)
Connector	Staubli PV-KBT4/6II-UR and PV-KST4/6II-UR, MC4, Renhe 05-8

### MSE345SX5T: 345WP, 60 CELL SOLAR MODULE CURRENT - VOLTAGE CURVE



### CERTIFICATIONS & TESTS

IEC	61215, 61730, 61701
UL	61730



### SHIPPING INFORMATION

Container FT	Ship To	Pallet	Panels	345 W Bin
53'	Most states	34	884	304.98 kW
Double Stack	California	28	728	251.16 kW
Pallet [26 Panels]				
Weight	Height	Width	Length	
1263 lbs. (573 kg)	47.5 in (120.65 cm)	46 in (116.84 cm)	70.25 in (178.43 cm)	

Mission Solar Energy | 8303 S. New Braunfels Ave., San Antonio, Texas 78235  
[www.missionsolar.com](http://www.missionsolar.com) | [info@missionsolar.com](mailto:info@missionsolar.com)

### Contractor Info

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### Project Type - Photovoltaic

### Project Location:

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-  
-  
-

Parcel Number: -  
Assessor Phone # (305) 375-4712

### PV SYSTEM SPECIFICATIONS

1. PV MODULE: 34 x MSE345SX5T; 11.73kWdc
2. INVERTER: IQ7-60-2-US
3. RACKING: Unirac
4. ROOF TYPE:SHINGLE
5. AZIMUTH:87° 267°
6. ROOF SLOPE:20°

File Name:  
R01\_MODULE\_LONGI(1).DWG

Sheet Number and Title:  
R01 - MODULE DATASHEET

Sheet Size:  
ANSI full bleed B (17.00 x 11.00 Inches)

### Drawing history

no.	drawn by	revision	date
01	DCG	----	----

### Design

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Data Sheet  
Enphase Microinverters  
Region: AMERICAS

## 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.



To learn more about Enphase offerings, visit [enphase.com](https://enphase.com)



## Enphase IQ 7 and IQ 7+ Microinverters

INPUT DATA (DC)	IQ7-60-2-US		IQ7PLUS-72-2-US	
Commonly used module pairings <sup>1</sup>	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 <sup>2</sup>	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 <sup>3</sup>	16 (240 VAC)	13 (208 VAC)	13 (240 VAC)	11 (208 VAC)
Overvoltage class AC port	III		III	
AC port backfeed current	18 mA		18 mA	
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	MC4 (or Amphenol H4 UTX with additional Q-DCC-5 adapter)			
Dimensions (HxWxD)	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](https://enphase.com)

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### Contractor Info

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### Project Type - Photovoltaic

### Project Location:

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Parcel Number: -  
Assessor Phone # (305) 375-4712

### PV SYSTEM SPECIFICATIONS

1. PV MODULE: 34 x MSE345SX5T;  
11.73kWdc
2. INVERTER: IQ7-60-2-US
3. RACKING: Unirac
4. ROOF TYPE:SHINGLE
5. AZIMUTH:87° 267°
6. ROOF SLOPE:20°

File Name:  
R02a\_INVERTER\_SE-H.DWG

Sheet Number and Title:  
R02 - INVERTER DATASHEET

Sheet Size:  
ANSI full bleed B (17.00 x 11.00 Inches)

### Drawing history

no.	drawn by	revision	date
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### Design

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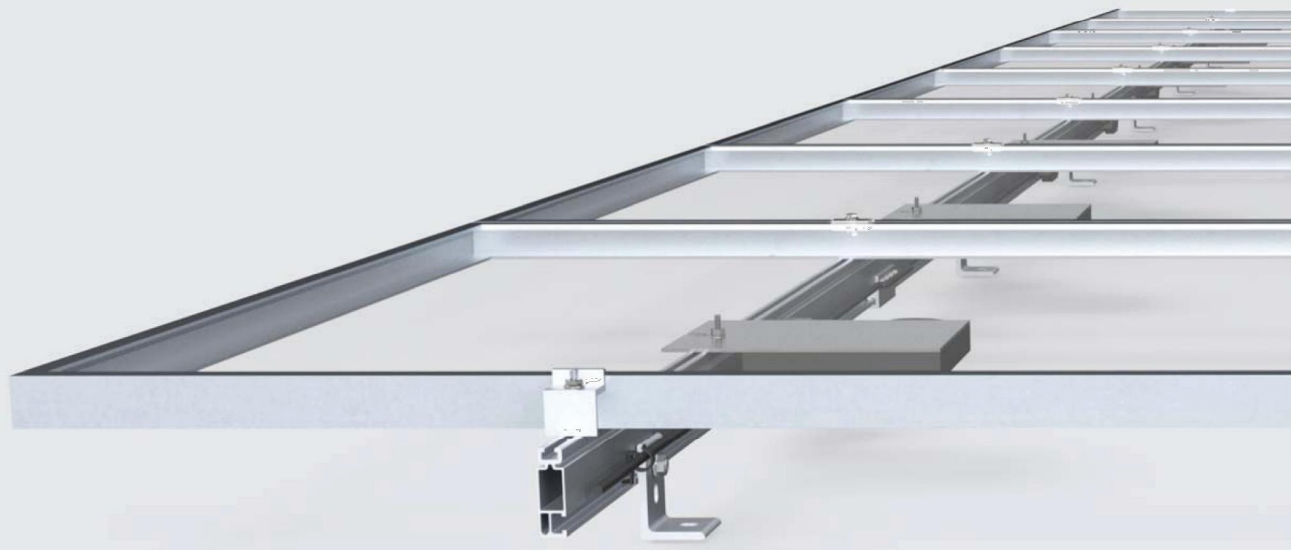
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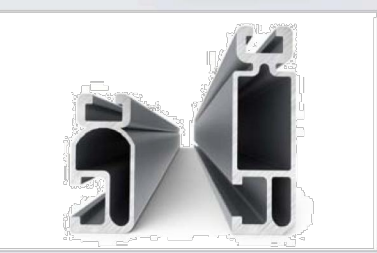
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**SOLARMOUNT** defined the standard in solar racking. New enhancements are designed to get installers off the roof faster than ever before. Components are pre-assembled and optimized to reduce installation steps and save labor time. Our new grounding & bonding process eliminates copper wire and grounding straps to reduce costs. Utilize the microinverter mount with a wire management clip for an easier installation.



**LOSE ALL OF THE COPPER & LUGS**  
System grounding through Enphase microinverters and trunk cables



**SMALL IS THE NEXT NEW BIG THING**  
Light Rail is Fully Compatibility with all SM Components



**ENHANCED DESIGN & LAYOUT TOOLS**  
Now Featuring Google Map Capabilities within U-Builder

**GET OFF THE ROOF FASTER THAN EVER BEFORE**  
OPTIMIZED COMPONENTS • VERSATILITY • DESIGN TOOLS • QUALITY PROVIDER



### OPTIMIZED COMPONENTS

**INTEGRATED BONDING & PRE-ASSEMBLED PARTS**  
Components are pre-assembled and optimized to reduce installation steps and save labor time. Our new grounding & bonding process eliminates copper wire and grounding straps or bonding jumpers to reduce costs. Utilize the microinverter mount with a wire management clip for an easier installation.

### VERSATILITY

**ONE PRODUCT - MANY APPLICATIONS**  
Quickly set modules flush to the roof or at a desired tilt angle. Change module orientation to portrait or landscape while securing a large variety of framed modules on flat, low sloped or steep pitched roofs. Available in mill, clear and dark anodized finishes to outperform your projects financial and aesthetic aspirations.

### AUTOMATED DESIGN TOOL

**DESIGN PLATFORM AT YOUR SERVICE**  
Creating a bill of materials is just a few clicks away with U-Builder, a powerful online tool that streamlines the process of designing a code compliant solar mounting system. Save time by creating a user profile, and recall preferences and projects automatically when you log in. You will enjoy the ability to share projects with customers; there's no need to print results and send to a distributor, just click and share.



### UNIRAC CUSTOMER SERVICE MEANS THE HIGHEST LEVEL OF PRODUCT SUPPORT

UNMATCHED EXPERIENCE

CERTIFIED QUALITY

ENGINEERING EXCELLENCE

BANKABLE WARRANTY

DESIGN TOOLS

PERMIT DOCUMENTATION

#### TECHNICAL SUPPORT

Unirac's technical support team is dedicated to answering questions & addressing issues in real time. An online library of documents including engineering reports, stamped letters and technical data sheets greatly simplifies your permitting and project planning process.

#### CERTIFIED QUALITY PROVIDER

Unirac is the only PV mounting vendor with ISO certifications for 9001:2008, 14001:2004 and OHSAS 18001:2007, which means we deliver the highest standards for fit, form, and function. These certifications demonstrate our excellence and commitment to first class business practices.

#### BANKABLE WARRANTY

As a Hilti Group Company, Unirac has the financial strength to back our products and reduce your risk. Have peace of mind knowing you are receiving products of exceptional quality. SOLARMOUNT is covered by a 10 year limited product warranty and a 5 year limited finish warranty.

PROTECT YOUR REPUTATION WITH QUALITY RACKING SOLUTIONS BACKED BY ENGINEERING EXCELLENCE AND A SUPERIOR SUPPLY CHAIN

PUB 16JAN04 - DIGITAL UPDATES

#### Contractor Info

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#### Project Type - Photovoltaic

#### Project Location:

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-

Parcel Number: -  
Assessor Phone # (305) 375-4712

#### PV SYSTEM SPECIFICATIONS

1. PV MODULE: 34 x MSE345SX5T; 11.73kWdc
2. INVERTER: IQ7-60-2-US
3. RACKING: Unirac
4. ROOF TYPE:SHINGLE
5. AZIMUTH:87° 267°
6. ROOF SLOPE:20°

File Name:  
R04\_EVEREST\_CROSSRAIL(1).DWG

Sheet Number and Title:  
R04 - RACKING DATASHEET

Sheet Size:  
ANSI full bleed B (17.00 x 11.00 Inches)

Drawing history			
no.	drawn by	revision	date
01	DCG	----	----

#### Design

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