

PHOTOVOLTAIC ROOF MOUNT SYSTEM

56 MODULES-ROOF MOUNTED - 22.40 kWDC, 16.24 kWAC

5936 E QUARTZ MOUNTAIN RD, PARADISE VALLEY, AZ 85253, USA

SYSTEM SUMMARY:

- (N) 56 - HANWHA SOLAR Q.PEAK DUO BLK ML-G10+ (400W) MODULES
- (N) 56 - ENPHASE ENERGY IQ8PLUS-72-2-US MICRO-INVERTERS
- (N) (02) JUNCTION BOX
- (E) 400A MAIN SERVICE PANEL WITH (E) 100A MAIN BREAKER AND 175A SECOND SLOT MAIN BREAKER
- (N) 100A NON-FUSED VISIBLE LOCKABLE LABELED UTILITY DISCONNECT, 240VAC (EATON DG222URB)
- (N) UNI DIRECTIONAL METER (100A MILBANK U5929-XL-INS OR 125A MILBANK U7490-RI-INS, FORM 2S 120/240V)
- (N) 100A SOLAR LOAD CENTER
- (E) 200A SUB-PANEL



DESIGN CRITERIA:

ROOF TYPE: - TPO/PVC
 STORY: - TWO STORY
 SNOW LOAD : - 0 PSF
 WIND SPEED :- 90 MPH
 WIND EXPOSURE:- C
 RISK CATEGORY:- II

INTERCONNECTION METHOD : BACKFEED BREAKER

GOVERNING CODES:

- 2012 INTERNATIONAL BUILDING CODE
- 2012 INTERNATIONAL RESIDENTIAL CODE
- 2012 INTERNATIONAL MECHANICAL CODE
- 2012 INTERNATIONAL PLUMBING CODE.
- 2011 NATIONAL ELECTRICAL CODE
- 2012 INTERNATIONAL FUEL GAS CODE
- 2012 INTERNATIONAL FIRE CODE
- 2012 INTERNATIONAL PROPERTY MAINTENANCE CODE
- 2012 ENERGY CODE

SHEET INDEX

PV-0	COVER SHEET
PV-1	SITE PLAN WITH ROOF PLAN
PV-2	ROOF PLAN WITH MODULES
PV-3	ATTACHMENT DETAILS
PV-4	ELECTRICAL SINGLE LINE DIAGRAM WITH CALCULATION
PV-5	ELECTRICAL THREE LINE DIAGRAM WITH CALCULATION
PV-6	PLACARD & WARNING LABELS
PV-7+	EQUIPMENT SPEC SHEETS

GENERAL NOTES

1. UTILITY SHALL HAVE 24HR UNRESTRICTED ACCESS TO ALL PHOTOVOLTAIC COMPONENTS LOCATED AT SES EQUIPMENT.
2. NO LOCKED GATES, DOGS, ETC SHALL IMPEDE ACCESS TO SES EQUIPMENT.
3. WORKSPACE IN FRONT OF AC ELECTRICAL SYSTEM COMPONENTS SHALL BE IN ACCORDANCE WITH APS AND NEC REQUIREMENTS. FOR APS REQUIREMENTS, REFERENCE SECTION 300 OF THE APS ESRM 102.20, 301.1, 301.3 AND SECTION 8.2 OF THE APS INTERCONNECTION REQUIREMENTS.
4. REFERENCE SECTION 301.15 OF THE APS ESRM FOR ELECTRIC METER SEPARATION BETWEEN WATER AND GAS.
5. PROJECT SHALL COMPLY WITH 2012 IFC, 2011 NEC, 2012 IBC, 2012 IRC.

ELECTRICAL NOTES

- ALL EQUIPMENT TO BE LISTED BY UL OR OTHER NRTL, AND LABELED FOR ITS APPLICATION.
- ALL CONDUCTORS SHALL BE COPPER, RATED FOR 600 V AND 90 & 75 DEGREE C WET ENVIRONMENT.
- WIRING, CONDUIT, AND RACEWAYS MOUNTED ON ROOFTOPS SHALL BE ROUTED DIRECTLY TO, AND LOCATED AS CLOSE AS POSSIBLE TO THE NEAREST RIDGE, HIP, OR VALLEY.
- WORKING CLEARANCES AROUND ALL NEW AND EXISTING ELECTRICAL EQUIPMENT SHALL COMPLY WITH CEC 110.26.
- DRAWINGS INDICATE THE GENERAL ARRANGEMENT OF SYSTEMS. CONTRACTOR SHALL FURNISH ALL NECESSARY OUTLETS, SUPPORTS, FITTINGS AND ACCESSORIES TO FULFILL APPLICABLE CODES AND STANDARDS.
- WHERE SIZES OF JUNCTION BOXES, RACEWAYS, AND CONDUITS ARE NOT SPECIFIED, THE CONTRACTOR SHALL SIZE THEM ACCORDINGLY.
- ALL WIRE TERMINATIONS SHALL BE APPROPRIATELY LABELED AND READILY VISIBLE.
- MODULE GROUNDING CLIPS TO BE INSTALLED BETWEEN MODULE FRAME AND MODULE SUPPORT RAIL, PER THE GROUNDING CLIP MANUFACTURER'S INSTRUCTION.
- MODULE SUPPORT RAIL TO BE BONDED TO CONTINUOUS COPPER E.G.C. VIA WEEB LUG OR ILSCO GBL-4DBT LAY-IN LUG.
- THE POLARITY OF THE GROUNDED CONDUCTORS IS NEGATIVE



1 | AERIAL PHOTO
 PV-0 | SCALE: NTS



2 | VICINITY MAP
 PV-0 | SCALE: NTS



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VERSION		
DESCRIPTION	DATE	REV
INITIAL RELEASE	08/23/2022	UR
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REVISION	03/25/2023	E

PROJECT NAME
**LUCY HUEREQUE
 5936 E QUARTZ
 MOUNTAIN RD,
 PARADISE VALLEY, AZ
 85253 USA
 UTILITY: APS
 AHJ: PARADISE VALLEY**

SHEET NAME	COVER SHEET
SHEET SIZE	ANSI B 11" X 17"
SHEET NUMBER	PV-0

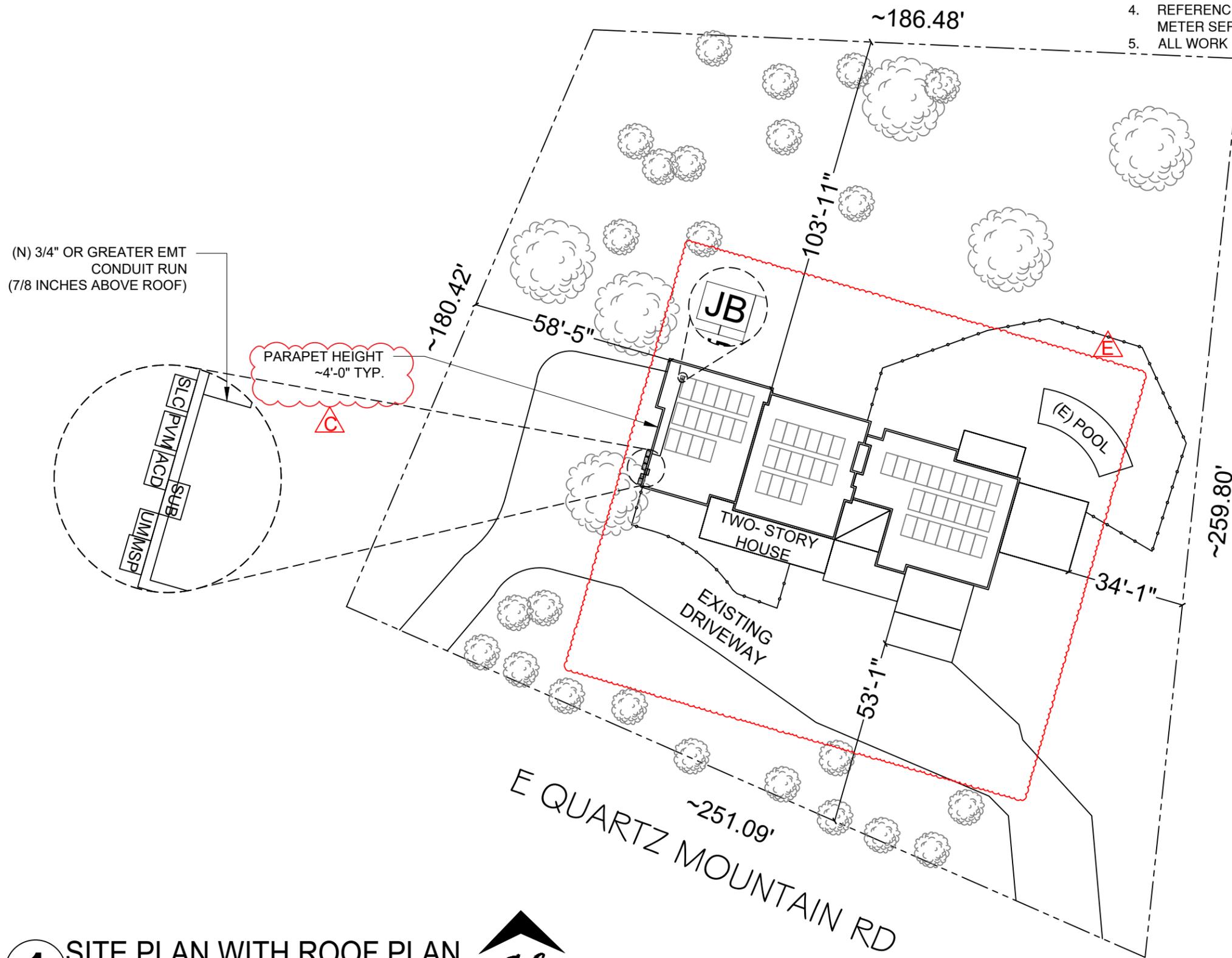
● **ROOF ACCESS POINT** SHALL BE LOCATED IN AREAS THAT DO NOT REQUIRE THE PLACEMENT OF GROUND LADDERS OVER OPENINGS SUCH AS WINDOWS OR DOORS, AND LOCATED AT STRONG POINTS OF BUILDING CONSTRUCTION IN LOCATIONS WHERE THE ACCESS POINT DOES NOT CONFLICT WITH OVERHEAD OBSTRUCTIONS SUCH AS TREE LIMBS, WIRES OR SIGNS.

NOTES:

1. UTILITY SHALL HAVE 24HR UNRESTRICTED ACCESS TO ALL PHOTOVOLTAIC COMPONENTS LOCATED AT SES EQUIPMENT.
2. NO LOCKED GATES, DOGS, ETC SHALL IMPEDE ACCESS TO SES EQUIPMENT.
3. WORKSPACE IN FRONT OF AC ELECTRICAL SYSTEM COMPONENTS SHALL BE IN ACCORDANCE WITH APS AND NEC REQUIREMENTS. FOR APS REQUIREMENTS, REFERENCE SECTION 300 OF THE APS ESRM 102.20, 301.1, 301.3 AND SECTION 8.2 OF THE APS INTERCONNECTION REQUIREMENTS.
4. REFERENCE SECTION 301.15 OF THE APS ESRM FOR ELECTRIC METER SEPARATION BETWEEN WATER AND GAS.
5. ALL WORK MUST COMPLY WITH 2012 IRC, 2011 NEC.

NOTE:

ALL ELECTRICAL EQUIPMENT, SOLAR LOAD CENTER, DISCONNECTS, MAIN SERVICE PANELS, ETC. SHALL NOT BE INSTALLED WITHIN 3' OF THE GAS METERS' SUPPLY OR DEMAND PIPING.



(N) 3/4" OR GREATER EMT CONDUIT RUN (7/8 INCHES ABOVE ROOF)

PARAPET HEIGHT ~4'-0" TYP.

LEGEND

UM	UTILITY METER
MSP	MAIN SERVICE PANEL
ACD	UTILITY DISCONNECT
JB	JUNCTION BOX
SLC	SOLAR LOAD CENTER
PVM	UNI-DIRECTIONAL METER
SUB	SUB PANEL
---	PROPERTY
---	CONDUIT
-x-	GATE
---	FENCE
---	POOL
☁	TREES



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SHEET NAME

SITE PLAN WITH
ROOF PLAN

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

PV-1

1

SITE PLAN WITH ROOF PLAN

SCALE: 1/32" = 1'-0"



● **ROOF ACCESS POINT** SHALL BE LOCATED IN AREAS THAT DO NOT REQUIRE THE PLACEMENT OF GROUND LADDERS OVER OPENINGS SUCH AS WINDOWS OR DOORS, AND LOCATED AT STRONG POINTS OF BUILDING CONSTRUCTION IN LOCATIONS WHERE THE ACCESS POINT DOES NOT CONFLICT WITH OVERHEAD OBSTRUCTIONS SUCH AS TREE LIMBS, WIRES OR SIGNS.

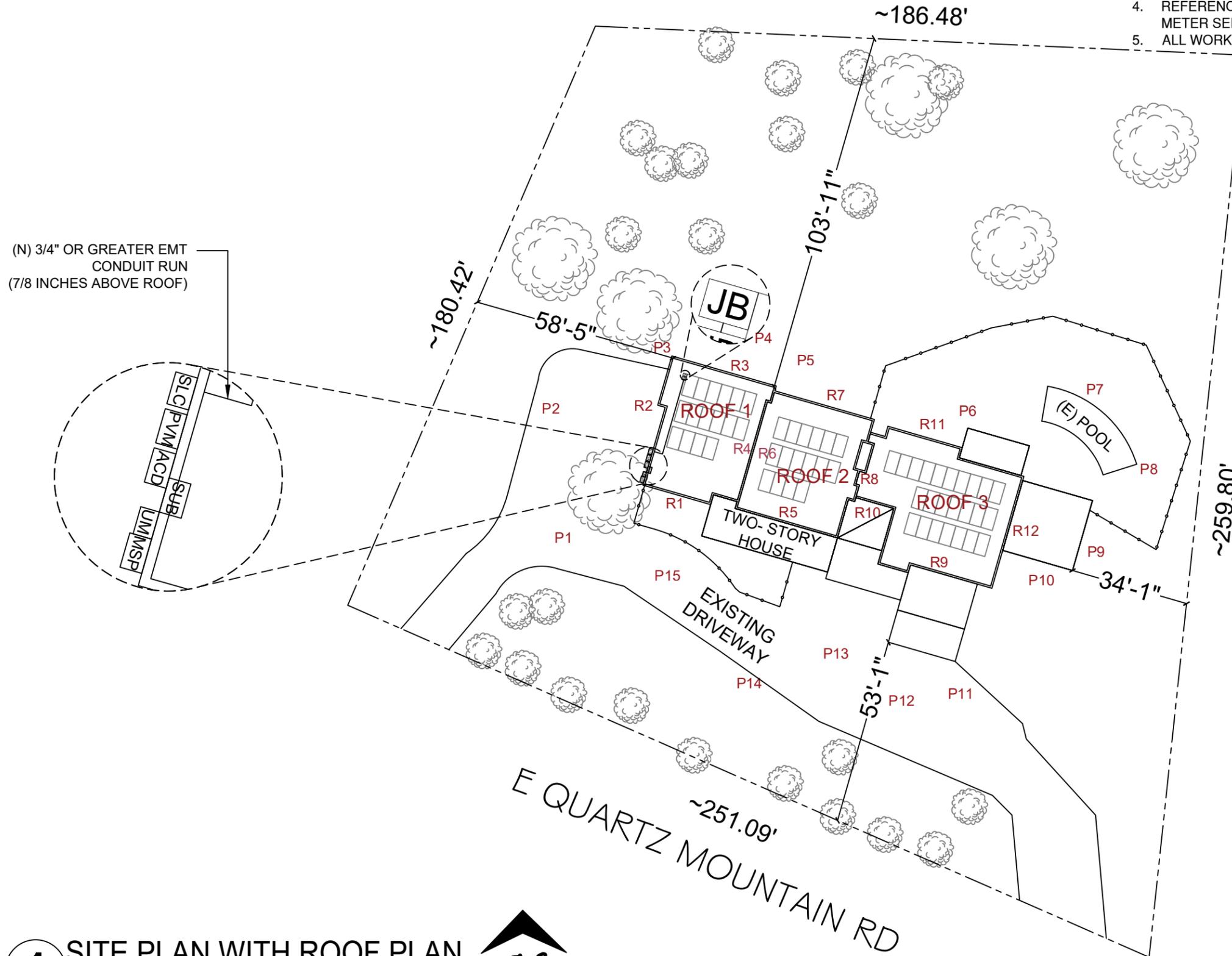
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5. ALL WORK MUST COMPLY WITH 2012 IRC, 2011 NEC.

NOTE:

ALL ELECTRICAL EQUIPMENT, SOLAR LOAD CENTER, DISCONNECTS, MAIN SERVICE PANELS, ETC. SHALL NOT BE INSTALLED WITHIN 3' OF THE GAS METERS' SUPPLY OR DEMAND PIPING.

(N) 3/4" OR GREATER EMT CONDUIT RUN (7/8 INCHES ABOVE ROOF)



PARAPET HEIGHT	
ROOF 1 R1	21"
ROOF 1 R2	27"
ROOF 1 R3	28"
ROOF 1 R4	26"
ROOF 2 R5	63"
ROOF 2 R6	74"
ROOF 2 R7	29"
ROOF 2 R8	220"
ROOF 3 R9	24"
ROOF 3 R10	27"
ROOF 3 R11	32"
ROOF 3 R12	29"

LEGEND	
UM	UTILITY METER
MSP	MAIN SERVICE PANEL
ACD	UTILITY DISCONNECT
JB	JUNCTION BOX
SLC	SOLAR LOAD CENTER
PVM	UNI-DIRECTIONAL METER
SUB	SUB PANEL
---	PROPERTY
---	CONDUIT
-x-	GATE
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85253 USA
UTILITY: APS
AHJ: PARADISE VALLEY

SHEET NAME
SITE PLAN WITH
ROOF PLAN

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-1

1 SITE PLAN WITH ROOF PLAN

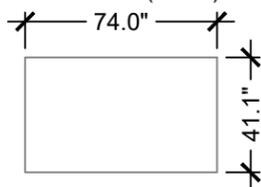
SCALE: 1/32" = 1'-0"



MODULE TYPE, DIMENSIONS & WEIGHT

NUMBER OF MODULES = 56 MODULES
 MODULE TYPE = HANWHA SOLAR Q.PEAK DUO BLK ML-G10+ (400W) MODULES
 MODULE WEIGHT = 48.5 LBS / 22.0 KG.
 MODULE DIMENSIONS = 74.0" X 41.1" = 21.12 SF
 UNIT WEIGHT OF ARRAY = 2.30 PSF

PHOTOVOLTAIC MODULES
 HANWHA SOLAR Q.PEAK DUO BLK
 ML-G10+ (400W)



ARRAY AREA & ROOF AREA CALC'S

AREA OF NEW ARRAY (Sq. Ft.)	AREA OF ROOF (PLAN VIEW) (Sq. Ft.)	TOTAL ROOF AREA COVERED BY ARRAY %
1182.77	5401.69	22%
22% ROOF AREA (ARRAY <33% OF ROOF AREA)		

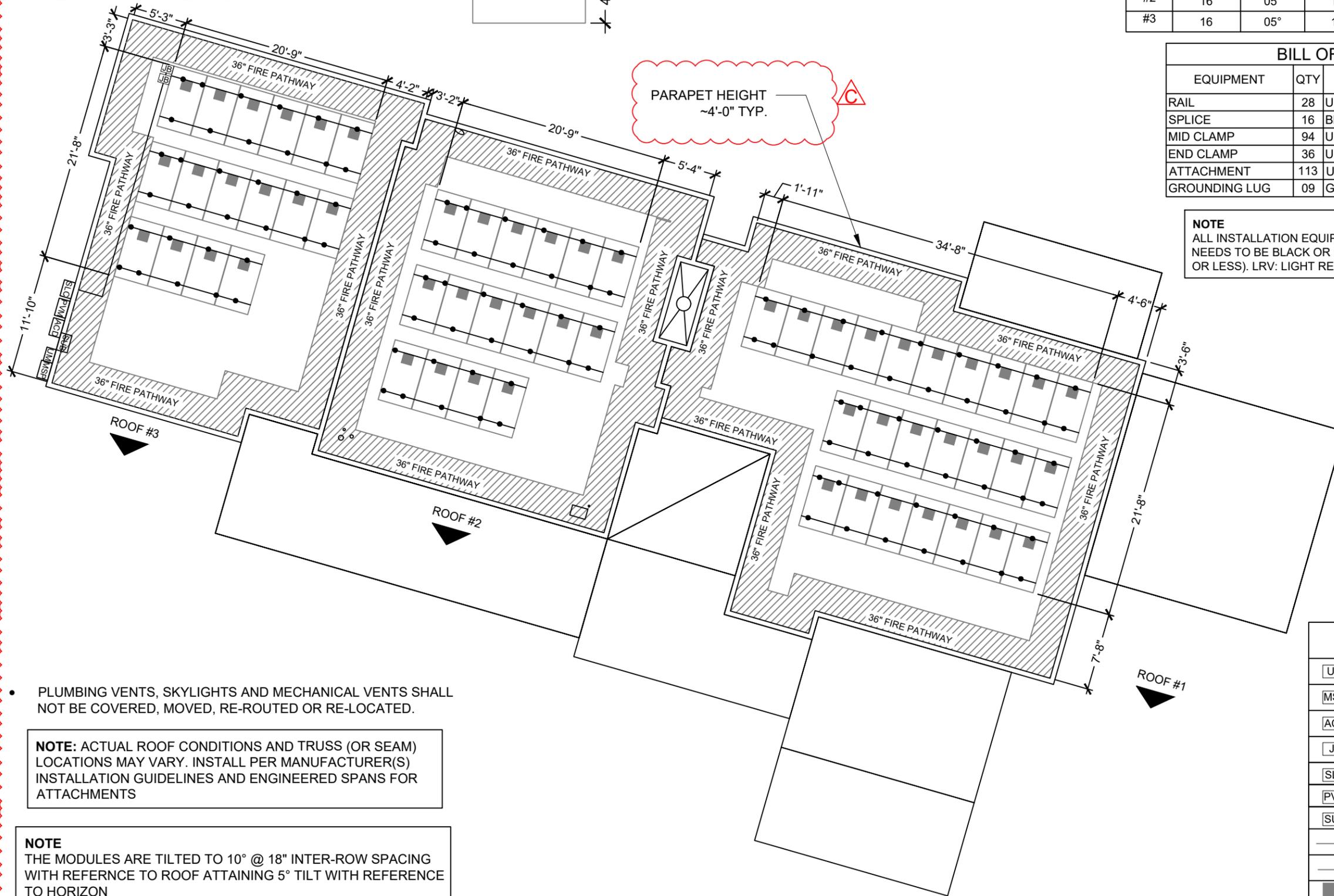
ROOF DESCRIPTION

ROOF TYPE TPO/PVC					
ROOF	# OF MODULES	ROOF SLOPE	AZIMUTH	RACKING TILT TO ROOF	ARRAY TILT TO HORIZON
#1	24	05°	196°	10°	05°
#2	16	05°	196°	10°	05°
#3	16	05°	196°	10°	05°

BILL OF MATERIALS

EQUIPMENT	QTY	DESCRIPTION
RAIL	28	UNIRAC STANDARD RAIL 168" DRK
SPLICE	16	BND SPLICE BAR PRO SERIES DRK
MID CLAMP	94	UNIVERSAL AF SERIES MID CLAMP
END CLAMP	36	UNIVERSAL AF SERIES END CLAMP
ATTACHMENT	113	UNIRAC FLASHLOC RM W/TILT LEG
GROUNDING LUG	09	GROUND LUG

NOTE
 ALL INSTALLATION EQUIPMENT (RACKING AND MOUNTING) NEEDS TO BE BLACK OR PAINTED A DESERT COLOR (LRV 38% OR LESS). LRV: LIGHT REFLECTIVE VALUES



PARAPET HEIGHT
 ~4'-0" TYP.



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 85253 USA
 UTILITY: APS
 AHJ: PARADISE VALLEY

PLUMBING VENTS, SKYLIGHTS AND MECHANICAL VENTS SHALL NOT BE COVERED, MOVED, RE-ROUTED OR RE-LOCATED.

NOTE: ACTUAL ROOF CONDITIONS AND TRUSS (OR SEAM) LOCATIONS MAY VARY. INSTALL PER MANUFACTURER(S) INSTALLATION GUIDELINES AND ENGINEERED SPANS FOR ATTACHMENTS

NOTE
 THE MODULES ARE TILTED TO 10° @ 18" INTER-ROW SPACING WITH REFERENCE TO ROOF ATTAINING 5° TILT WITH REFERENCE TO HORIZON

LEGEND

UM	UTILITY METER
MSP	MAIN SERVICE PANEL
ACD	UTILITY DISCONNECT
JB	JUNCTION BOX
SLC	SOLAR LOAD CENTER
PVM	UNI-DIRECTIONAL METER
SUB	SUB PANEL
—	RAIL
—	CONDUIT
■	MICRO-INVERTER
●	ROOF ATTACHMENT @ 48" O.C.
○ □	VENT, ATTIC FAN (ROOF OBSTRUCTION)
⊞	CHIMNEY

1 ROOF PLAN WITH MODULES
 SCALE: 3/32" = 1'-0"

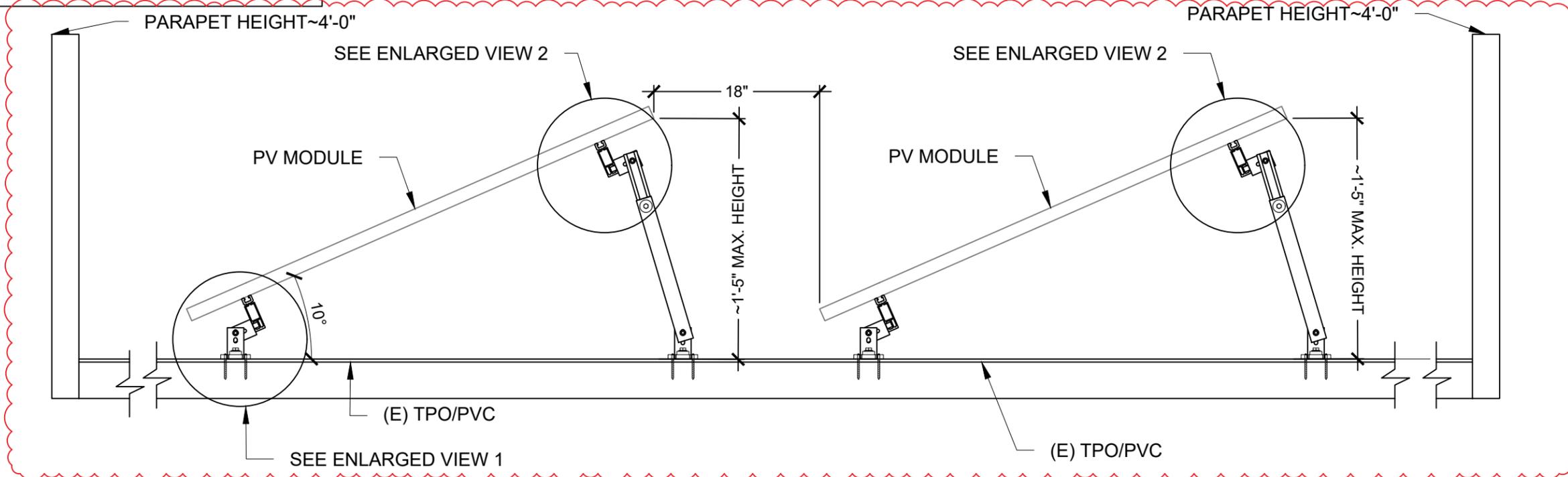


SHEET NAME
 ROOF PLAN WITH MODULES

SHEET SIZE
 ANSI B
 11" X 17"

SHEET NUMBER
 PV-2

NOTE: ACTUAL ROOF CONDITIONS AND TRUSS (OR SEAM) LOCATIONS MAY VARY. INSTALL PER MANUFACTURER(S) INSTALLATION GUIDELINES AND ENGINEERED SPANS FOR ATTACHMENTS



1 ATTACHMENT DETAIL
SCALE: NTS

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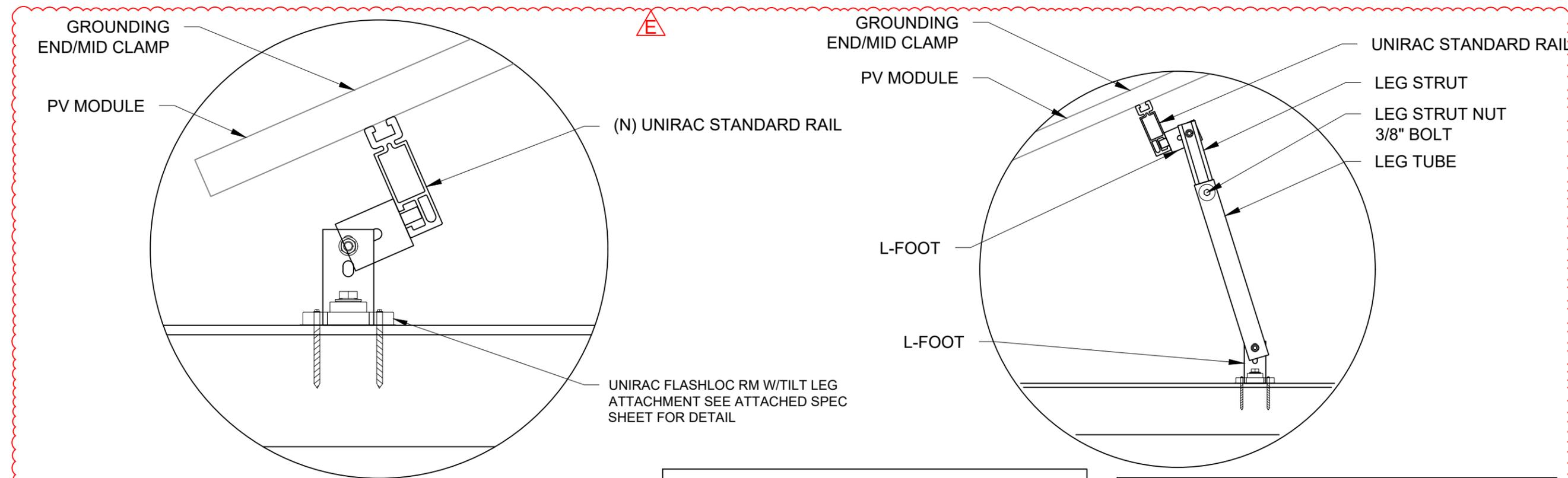
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MOUNTAIN RD,
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85253 USA
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AHJ: PARADISE VALLEY

⚠F



2 ATTACHMENT DETAIL (ENLARGED VIEW)
SCALE: NTS

NOTE
ALL INSTALLATION EQUIPMENT (RACKING AND MOUNTING) NEEDS TO BE BLACK OR PAINTED A DESERT COLOR (LRV 38% OR LESS). LRV: LIGHT REFLECTIVE VALUES

NOTE
THE MODULES ARE TILTED TO 10° @ 18" INTER-ROW SPACING WITH REFERENCE TO ROOF ATTAINING 5° TILT WITH REFERENCE TO HORIZON

SHEET NAME

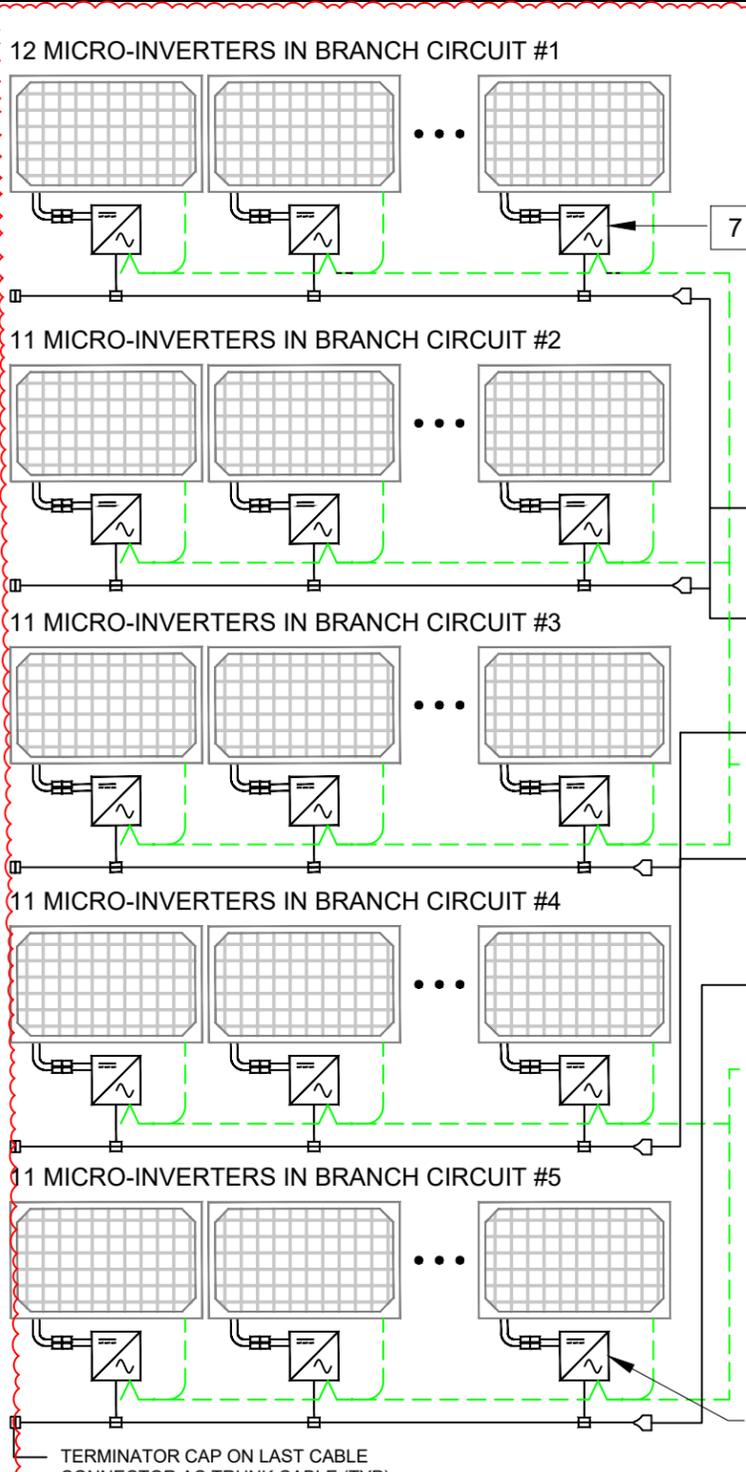
ATTACHMENT
DETAIL

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

PV-3

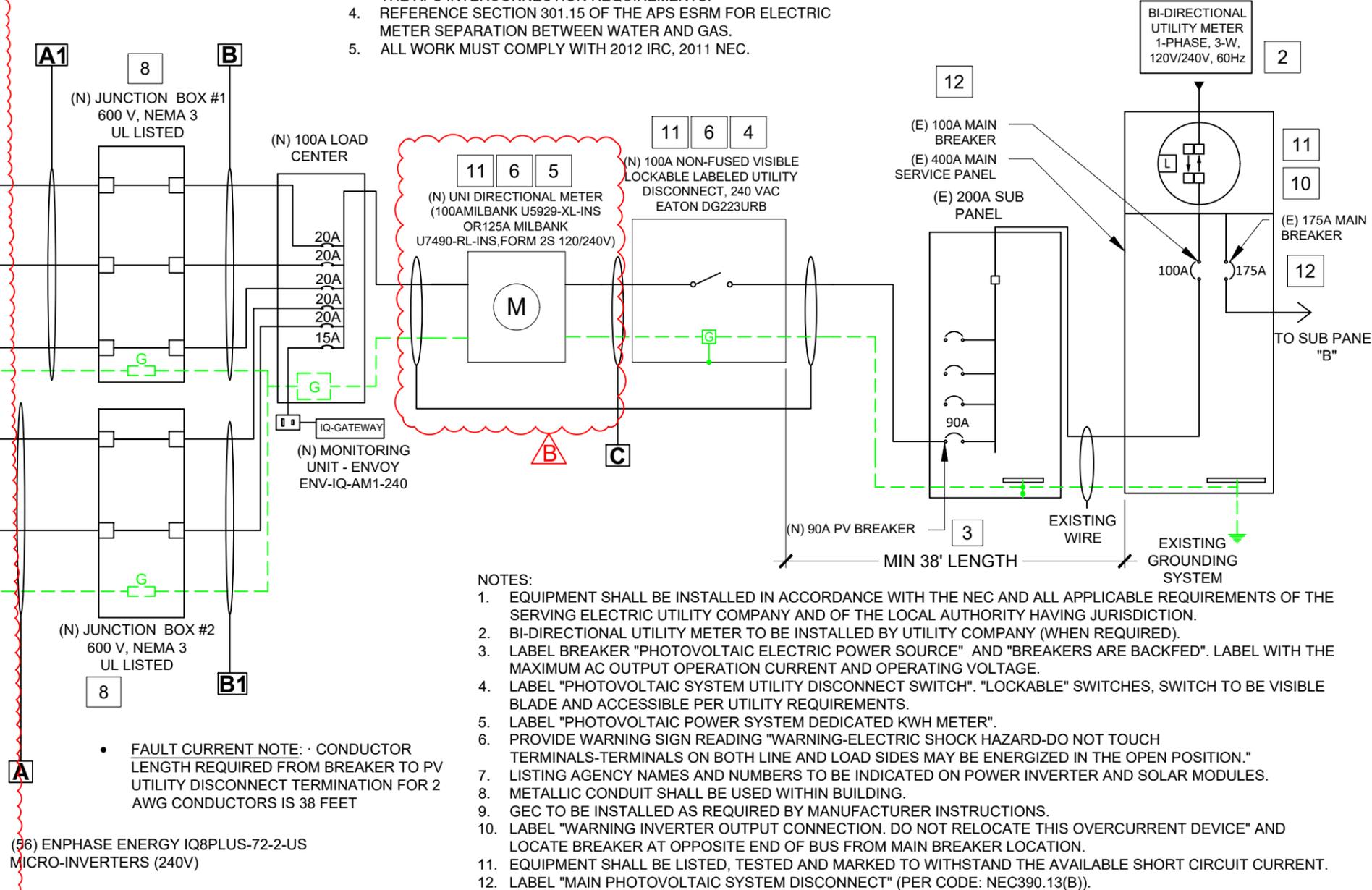


SYSTEM SIZE:- 56 x 400W = 22.40 kWDC
 SYSTEM SIZE:- 56 X 290 = 16.24 kW AC

INTERCONNECTION
 120% RULE - NEC 705.12(D)(2)
 UTILITY FEED + SOLAR BACKFEED
 100A +90A = 190A
 BUSS RATING x 120%
 200A x 120% = 240A

- NOTES:**
- UTILITY SHALL HAVE 24HR UNRESTRICTED ACCESS TO ALL PHOTOVOLTAIC COMPONENTS LOCATED AT SES EQUIPMENT.
 - NO LOCKED GATES, DOGS, ETC SHALL IMPEDE ACCESS TO SES EQUIPMENT.
 - WORKSPACE IN FRONT OF AC ELECTRICAL SYSTEM COMPONENTS SHALL BE IN ACCORDANCE WITH APS AND NEC REQUIREMENTS. FOR APS REQUIREMENTS, REFERENCE SECTION 300 OF THE APS ESRM 102.20, 301.1, 301.3 AND SECTION 8.2 OF THE APS INTERCONNECTION REQUIREMENTS.
 - REFERENCE SECTION 301.15 OF THE APS ESRM FOR ELECTRIC METER SEPARATION BETWEEN WATER AND GAS.
 - ALL WORK MUST COMPLY WITH 2012 IRC, 2011 NEC.

- NOTE TO INSTALLER:**
- ALL EXPOSED PV ROOFTOP CONDUCTORS THAT ARE NOT LOCATED UNDER THE ARRAY MODULES, SHALL BE INSTALLED IN A LISTED RACEWAY, AND SHALL INCLUDE LISTED JUNCTION BOXES AT BOTH ENDS OF THE RACEWAY TO TRANSITION FROM EXPOSED CONDUCTORS TO THE LISTED RACEWAYS AND (B) EXCEPTION.



FAULT CURRENT NOTE: CONDUCTOR LENGTH REQUIRED FROM BREAKER TO PV UTILITY DISCONNECT TERMINATION FOR 2 AWG CONDUCTORS IS 38 FEET

- NOTES:**
- EQUIPMENT SHALL BE INSTALLED IN ACCORDANCE WITH THE NEC AND ALL APPLICABLE REQUIREMENTS OF THE SERVING ELECTRIC UTILITY COMPANY AND OF THE LOCAL AUTHORITY HAVING JURISDICTION.
 - BI-DIRECTIONAL UTILITY METER TO BE INSTALLED BY UTILITY COMPANY (WHEN REQUIRED).
 - LABEL BREAKER "PHOTOVOLTAIC ELECTRIC POWER SOURCE" AND "BREAKERS ARE BACKFED". LABEL WITH THE MAXIMUM AC OUTPUT OPERATION CURRENT AND OPERATING VOLTAGE.
 - LABEL "PHOTOVOLTAIC SYSTEM UTILITY DISCONNECT SWITCH". "LOCKABLE" SWITCHES, SWITCH TO BE VISIBLE BLADE AND ACCESSIBLE PER UTILITY REQUIREMENTS.
 - LABEL "PHOTOVOLTAIC POWER SYSTEM DEDICATED KWH METER".
 - PROVIDE WARNING SIGN READING "WARNING-ELECTRIC SHOCK HAZARD-DO NOT TOUCH TERMINALS-TERMINALS ON BOTH LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION."
 - LISTING AGENCY NAMES AND NUMBERS TO BE INDICATED ON POWER INVERTER AND SOLAR MODULES.
 - METALLIC CONDUIT SHALL BE USED WITHIN BUILDING.
 - GEC TO BE INSTALLED AS REQUIRED BY MANUFACTURER INSTRUCTIONS.
 - LABEL "WARNING INVERTER OUTPUT CONNECTION. DO NOT RELOCATE THIS OVERCURRENT DEVICE" AND LOCATE BREAKER AT OPPOSITE END OF BUS FROM MAIN BREAKER LOCATION.
 - EQUIPMENT SHALL BE LISTED, TESTED AND MARKED TO WITHSTAND THE AVAILABLE SHORT CIRCUIT CURRENT.
 - LABEL "MAIN PHOTOVOLTAIC SYSTEM DISCONNECT" (PER CODE: NEC390.13(B)).

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)	Design Current (A)	Ground Size	Ground Wire Type
A	OPEN AIR	2	12 AWG	Q Cable	90°C	30	0.87	1.0	26.10	12	1.21	14.52	06 AWG	BARE CU
A1	OPEN AIR	3	12 AWG	Q Cable	90°C	30	0.87	1.0	26.10	12	1.21	14.52	06 AWG	BARE CU
B1	3/4" EMT	4/2	10 OR 12 AWG	THWN-2 OR #12 NM-B CABLES WHERE RUN INDOOR	90°C	40	0.87	0.80	27.84	12	1.21	14.52	10 AWG	THWN-2
B	3/4" EMT	6/3	10 OR 12 AWG	THWN-2 OR #12 NM-B CABLES WHERE RUN INDOOR	90°C	40	0.87	0.80	27.84	12	1.21	14.52	10 AWG	THWN-2
C	1-1/4" EMT	3	2 AWG	THWN-2	75°C	115	0.82	1.0	94.30	56	1.21	67.76	8 AWG	THWN-2



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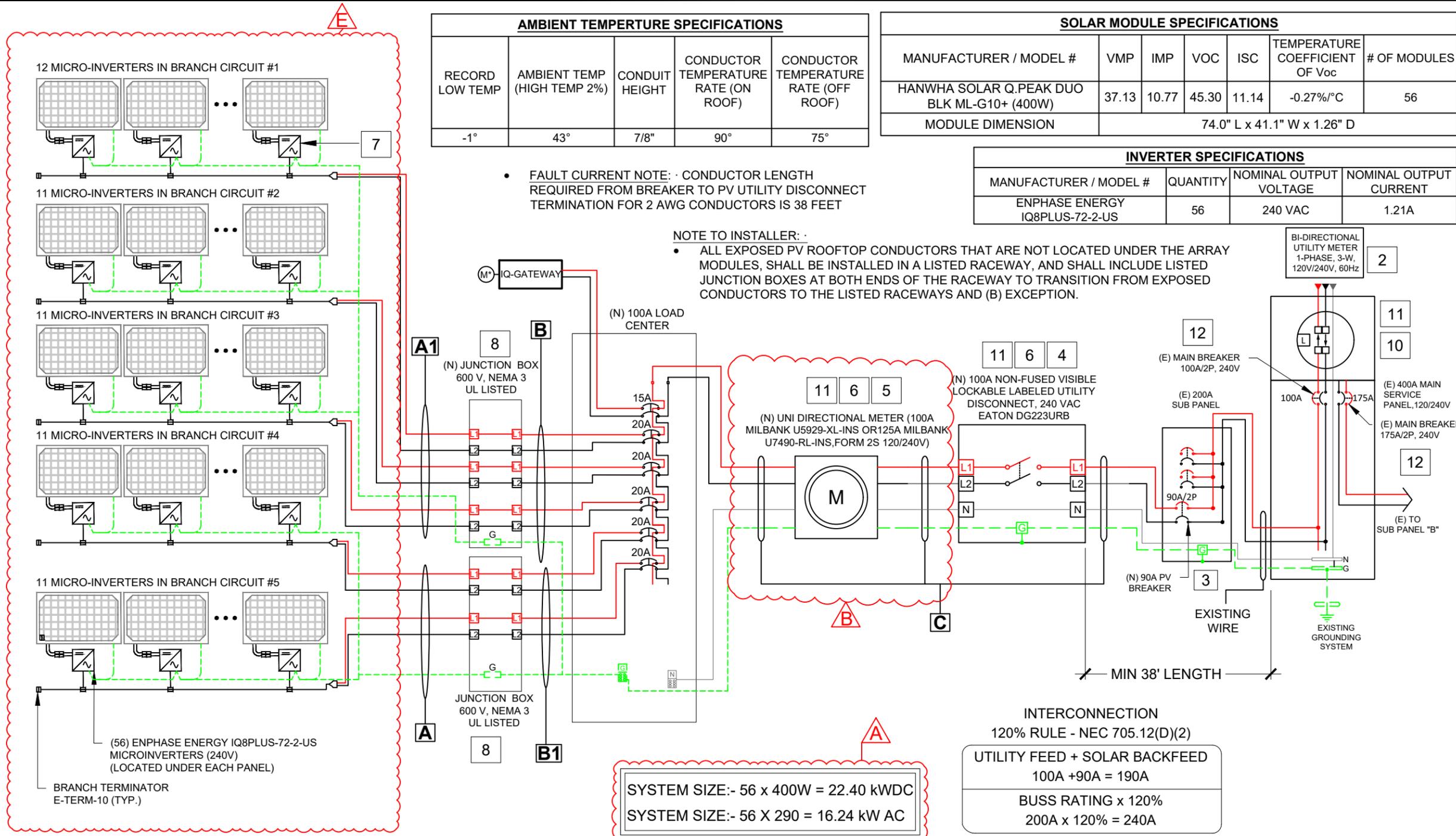
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SHEET NAME
ELECTRICAL SINGLE LINE DIAGRAM WITH CALCULATION

SHEET SIZE
ANSI B
11" X 17"

SHEET NUMBER
PV-4

1 ELECTRICAL SINGLE LINE DIAGRAM WITH CALCULATION
 SCALE: NTS



AMBIENT TEMPERATURE SPECIFICATIONS				
RECORD LOW TEMP	AMBIENT TEMP (HIGH TEMP 2%)	CONDUIT HEIGHT	CONDUCTOR TEMPERATURE RATE (ON ROOF)	CONDUCTOR TEMPERATURE RATE (OFF ROOF)
-1°	43°	7/8"	90°	75°

SOLAR MODULE SPECIFICATIONS						
MANUFACTURER / MODEL #	VMP	IMP	VOC	ISC	TEMPERATURE COEFFICIENT OF Voc	# OF MODULES
HANWHA SOLAR Q.PEAK DUO BLK ML-G10+ (400W)	37.13	10.77	45.30	11.14	-0.27%/°C	56
MODULE DIMENSION		74.0" L x 41.1" W x 1.26" D				

INVERTER SPECIFICATIONS			
MANUFACTURER / MODEL #	QUANTITY	NOMINAL OUTPUT VOLTAGE	NOMINAL OUTPUT CURRENT
ENPHASE ENERGY IQ8PLUS-72-2-US	56	240 VAC	1.21A

- FAULT CURRENT NOTE: CONDUCTOR LENGTH REQUIRED FROM BREAKER TO PV UTILITY DISCONNECT TERMINATION FOR 2 AWG CONDUCTORS IS 38 FEET

NOTE TO INSTALLER: ALL EXPOSED PV ROOFTOP CONDUCTORS THAT ARE NOT LOCATED UNDER THE ARRAY MODULES, SHALL BE INSTALLED IN A LISTED RACEWAY, AND SHALL INCLUDE LISTED JUNCTION BOXES AT BOTH ENDS OF THE RACEWAY TO TRANSITION FROM EXPOSED CONDUCTORS TO THE LISTED RACEWAYS AND (B) EXCEPTION.

SYSTEM SIZE:- 56 x 400W = 22.40 kWDC
 SYSTEM SIZE:- 56 X 290 = 16.24 kW AC

INTERCONNECTION
 120% RULE - NEC 705.12(D)(2)
 UTILITY FEED + SOLAR BACKFEED
 100A +90A = 190A
 BUSS RATING x 120%
 200A x 120% = 240A

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)	Design Current (A)	Ground Size	Ground Wire Type
A	OPEN AIR	2	12 AWG	Q Cable	90°C	30	0.87	1.0	26.10	12	1.21	14.52	06 AWG	BARE CU
A1	OPEN AIR	3	12 AWG	Q Cable	90°C	30	0.87	1.0	26.10	12	1.21	14.52	06 AWG	BARE CU
B1	3/4" EMT	4/2	10 OR 12 AWG	THWN-2 OR #12 NM-B CABLES WHERE RUN INDOOR	90°C	40	0.87	0.80	27.84	12	1.21	14.52	10 AWG	THWN-2
B	3/4" EMT	6/3	10 OR 12 AWG	THWN-2 OR #12 NM-B CABLES WHERE RUN INDOOR	90°C	40	0.87	0.80	27.84	12	1.21	14.52	10 AWG	THWN-2
C	1-1/4" EMT	3	2 AWG	THWN-2	75°C	115	0.82	1.0	94.30	56	1.21	67.76	8 AWG	THWN-2

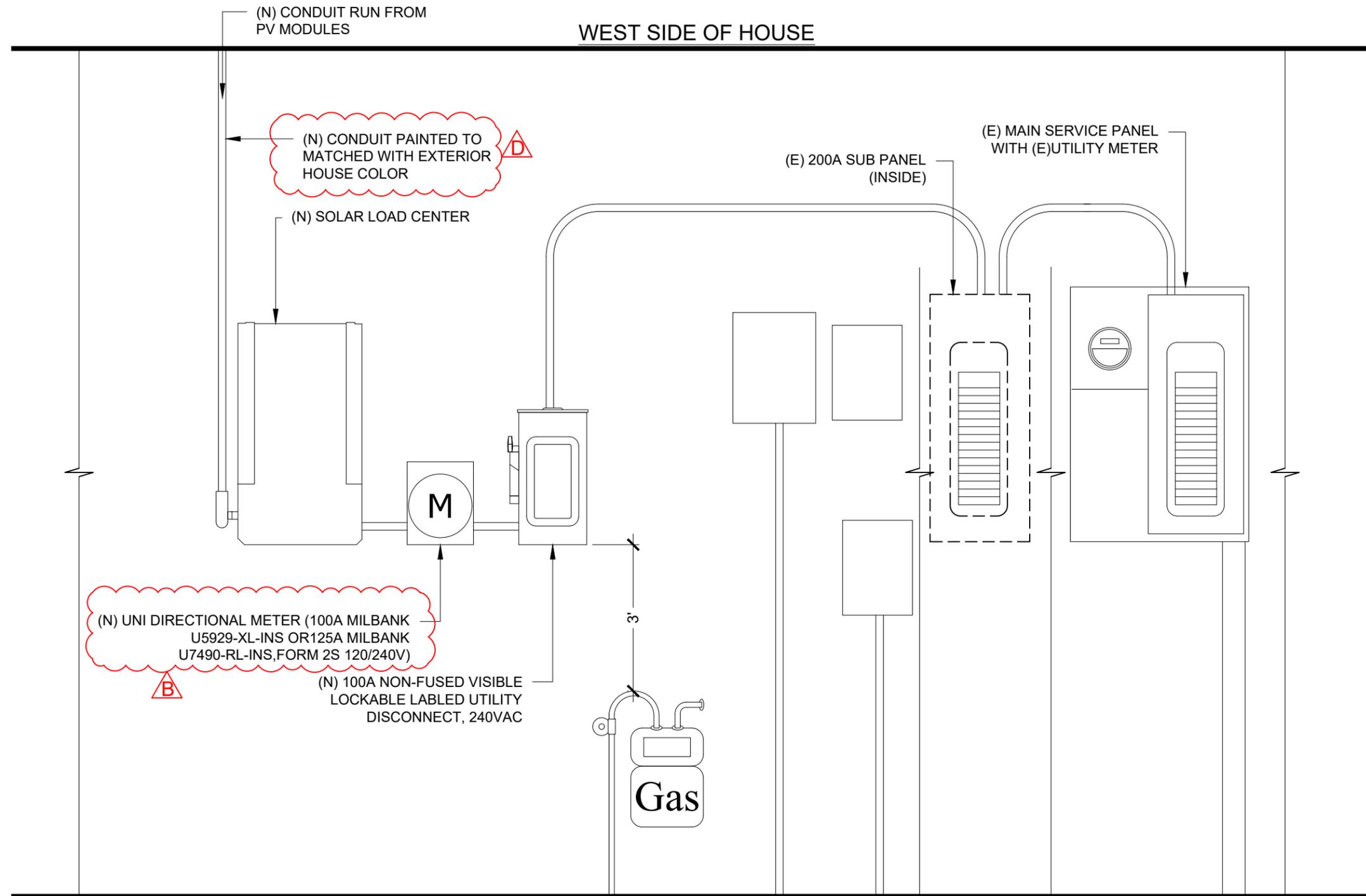
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REVISION	09/02/2022	A
REVISION	09/17/2022	B
REVISION	01/07/2023	C
REVISION	03/14/2023	D
REVISION	03/25/2023	E

PROJECT NAME
LUCY HUEREQUE
5936 E QUARTZ
MOUNTAIN RD,
PARADISE VALLEY, AZ
85253 USA
 UTILITY: APS
AHJ: PARADISE VALLEY

SHEET NAME
ELECTRICAL LINE
DIAGRAM WITH
CALCULATION
 SHEET SIZE
ANSI B
11" X 17"
 SHEET NUMBER
PV-5

1 ELECTRICAL THREE LINE DIAGRAM WITH CALCULATION
 SCALE: NTS



DEL MAR, CA 92014, USA

VERSION		
DESCRIPTION	DATE	REV
INITIAL RELEASE	08/23/2022	UR
REVISION	09/02/2022	Δ
REVISION	09/17/2022	Δ
REVISION	01/07/2023	Δ
REVISION	03/14/2023	Δ
REVISION	03/25/2023	Δ

PROJECT NAME

Δ

LUCY HUEREQUE
 5936 E QUARTZ
 MOUNTAIN RD,
 PARADISE VALLEY, AZ
 85253 USA
 UTILITY: APS
Δ
 AHJ: PARADISE VALLEY

SHEET NAME	EQUIPMENT ELEVATION
SHEET SIZE	ANSI B 11" X 17"
SHEET NUMBER	PV-5.1

1 ELECTRICAL EQUIPMENT ELEVATION
 SCALE: NTS

UNI-DIRECTIONAL METER

LABEL LOCATION: DEDICATED kWh METER

UTILITY DISCONNECT

LABEL LOCATION: UTILITY DISCONNECT

PHOTOVOLTAIC SYSTEM METER (UTILITY SIDE VOLTAGE ON TOP LUGS)

LABEL LOCATION: DEDICATED KWH METER

PHOTOVOLTAIC POWER SOURCE BREAKERS ARE BACKFEEDING

LABEL LOCATION: BACKFED BREAKER
NEC 705.12(B)(4)

BREAKER HAS BEEN
DE-RATED PER
NEC 705.12(B)(2)

MAX 175 AMPS

LABEL LOCATION: MAIN BREAKER
DE-RATE

OPEN ALL ISOLATION DEVICES [UNI-DIRECTION/NORTH]
TO ISOLATE THIS METERING ENCLOSURE FROM ALL
KNOWN SOURCES OF POWER. ENSURE ISOLATION
DEVIGES ARE LOCKED IN THE OPEN POSITION IN
ACCORDANCE WITH OSHA LOCK OUT / TAG OUT
REQUIREMENTS PRIOR TO PERFORMING ANY WORK
WITHIN THIS METERING ENCLOSURE

LABEL LOCATION: DEDICATED kWh METER
PERMANENT PLAQUE OR DIRECTORY

PHOTOVOLTAIC ELECTRIC POWER SOURCE

MAXIMUM AC OPERATING CURRENT: 67.76 AMPS
NOMINAL OPERATING AC VOLTAGE: 240 VAC

LABEL LOCATION: AC PANEL
NEC 690.54

WARNING

ELECTRICAL SHOCK HAZARD
DO NOT TOUCH TERMINALS
TERMINALS ON BOTH LINE AND LOAD
SIDES MAY BE ENERGIZED IN THE OPEN
POSITION

LABEL LOCATION:
UTILITY DISCONNECT
& DEDICATED KWH METER
NEC 690.13(B), 690.15(D)

NOTICE

DEDICATED DER SYSTEM
COMBINER PANEL
DO NOT ADD LOADS TO THIS
PANEL

LABEL LOCATION: COMBINER BOX/PANEL

WARNING

POWER SOURCE OUTPUT
CONNECTION
DO NOT RELOCATE THIS
OVERCURRENT DEVICE

LABEL LOCATION:
BACKFED BREAKER
NEC 705.12(B)(2)(3)(b)

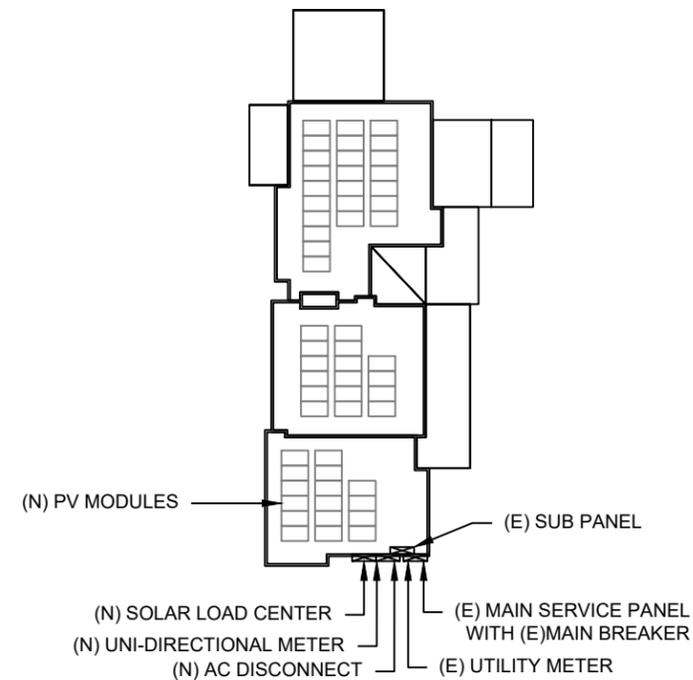
DUAL POWER SOURCES SECOND SOURCE IS PHOTOVOLTAIC SYSTEM

LABEL LOCATION: PANEL BOARD
NEC 705.12(B)(3)



CAUTION !

POWER TO THIS BUILDING IS ALSO SUPPLIED FROM THE
FOLLOWING SOURCES WITH DISCONNECTS LOCATED AS SHOWN



DEL MAR, CA 92014, USA

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PROJECT NAME

LUCY HUEREQUE
5936 E QUARTZ
MOUNTAIN RD,
PARADISE VALLEY, AZ
85253 USA
UTILITY: APS
AHJ: PARADISE VALLEY

SHEET NAME

WARNING LABELS &
PLACARD

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

PV-6

Q.PEAK DUO BLK ML-G10+ SERIES



385-410 Wp | 132 Cells
20.9% Maximum Module Efficiency

MODEL Q.PEAK DUO BLK ML-G10+



6 busbar cell technology

12 busbar cell technology



Breaking the 20% efficiency barrier

Q.ANTUM DUO Z Technology with zero gap cell layout boosts module efficiency up to 20.9%.



A reliable investment

Inclusive 25-year product warranty and 25-year linear performance warranty¹.



Enduring high performance

Long-term yield security with Anti LeTID Technology, Anti PID Technology² and Hot-Spot Protect.



Extreme weather rating

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



Innovative all-weather technology

Optimal yields, whatever the weather with excellent low-light and temperature behaviour.



The most thorough testing programme in the industry

Qcells 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.

¹ See data sheet on rear for further information.

² APT test conditions according to IEC/TS 62804-1:2015, method A (-1500 V, 96h)

The ideal solution for:



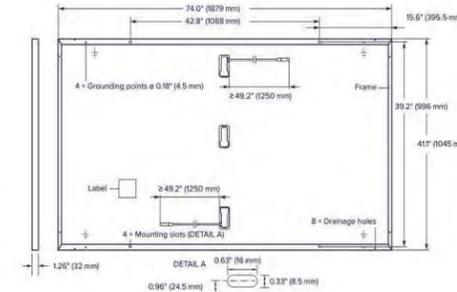
Rooftop arrays on residential buildings



Q.PEAK DUO BLK ML-G10+ SERIES

Mechanical Specification

Format	74.0 in × 41.1 in × 1.26 in (including frame) (1879 mm × 1045 mm × 32 mm)
Weight	48.5 lbs (22.0 kg)
Front Cover	0.13 in (3.2 mm) thermally pre-stressed glass with anti-reflection technology
Back Cover	Composite film
Frame	Black anodised aluminium
Cell	6 × 22 monocrystalline Q.ANTUM solar half cells
Junction box	2.09-3.98 in × 1.26-2.36 in × 0.59-0.71 in (53-101 mm × 32-60 mm × 15-18 mm), IP67, with bypass diodes
Cable	4 mm ² Solar cable; (+) ≥ 49.2 in (1250 mm), (-) ≥ 49.2 in (1250 mm)
Connector	Stäubli MC4; IP68

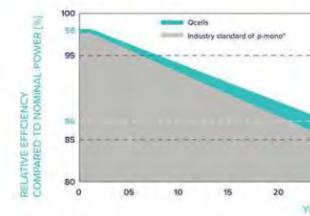


Electrical Characteristics

POWER CLASS		385	390	395	400	405	410	
MINIMUM PERFORMANCE AT STANDARD TEST CONDITIONS, STC ¹ (POWER TOLERANCE +5 W/-0 W)								
Minimum	Power at MPP ¹	P _{MPP} [W]	385	390	395	400	405	410
	Short Circuit Current ¹	I _{SC} [A]	11.04	11.07	11.10	11.14	11.17	11.20
	Open Circuit Voltage ¹	V _{OC} [V]	45.19	45.23	45.27	45.30	45.34	45.37
	Current at MPP	I _{MPP} [A]	10.59	10.65	10.71	10.77	10.83	10.89
	Voltage at MPP	V _{MPP} [V]	36.36	36.62	36.88	37.13	37.39	37.64
	Efficiency ¹	η [%]	≥ 19.6	≥ 19.9	≥ 20.1	≥ 20.4	≥ 20.6	≥ 20.9
MINIMUM PERFORMANCE AT NORMAL OPERATING CONDITIONS, NMOT ²								
Minimum	Power at MPP	P _{MPP} [W]	288.8	292.6	296.3	300.1	303.8	307.6
	Short Circuit Current	I _{SC} [A]	8.90	8.92	8.95	8.97	9.00	9.03
	Open Circuit Voltage	V _{OC} [V]	42.62	42.65	42.69	42.72	42.76	42.79
	Current at MPP	I _{MPP} [A]	8.35	8.41	8.46	8.51	8.57	8.62
	Voltage at MPP	V _{MPP} [V]	34.59	34.81	35.03	35.25	35.46	35.68

¹Measurement 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 • ²800 W/m², NMOT, spectrum AM 1.5

Qcells PERFORMANCE WARRANTY

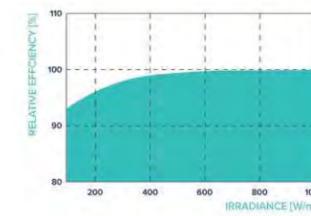


At least 98% of nominal power during first year. Thereafter max. 0.5% degradation per year. At least 93.5% of nominal power up to 10 years. At least 86% of nominal power up to 25 years.

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

¹Standard terms of guarantee for the 5 PV companies with the highest production capacity in 2021 (February 2021)

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 [°F]	109 ± 5.4 (43 ± 3°C)

Properties for System Design

Maximum System Voltage	V _{sys} [V]	1000 (IEC)/1000 (UL)	PV module classification	Class II
Maximum Series Fuse Rating	[A DC]	20	Fire Rating based on ANSI/UL 61730	TYPE 2
Max. Design Load, Push/Pull ³	[lbs/ft ²]	75 (3600 Pa)/55 (2660 Pa)	Permitted Module Temperature on Continuous Duty	-40°F up to +185°F (-40°C up to +85°C)
Max. Test Load, Push/Pull ³	[lbs/ft ²]	113 (5400 Pa)/84 (4000 Pa)		

³ See Installation Manual

Qualifications and Certificates

UL 61730, CE-compliant, Quality Controlled PV - TÜV Rheinland, IEC 61215:2016, IEC 61730:2016, U.S. Patent No. 9,893,215 (solar cells).



Qcells pursues minimizing paper output in consideration of the global environment.

Note: Installation instructions must be followed. Contact our technical service for further information on approved installation of this product.
Hamwha Q CELLS America Inc. 400 Spectrum Center Drive, Suite 1400, Irvine, CA 92618, USA | TEL: +1 949 748 59 96 | EMAIL: hqc-inquiry@qcells.com | WEB: www.qcells.com



DEL MAR, CA 92014, USA

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SHEET NAME

SPEC SHEETS

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

PV-7

Specifications subject to technical changes © Qcells Q.PEAK DUO BLK ML-G10+ series_385-410_2023-01_Rev03_MA





IQ8 Series Microinverters

Our newest IQ8 Microinverters are the industry's first microgrid-forming, software-defined microinverters with split-phase power conversion capability to convert DC power to AC power efficiently. The brain of the semiconductor-based microinverter is our proprietary application-specific integrated circuit (ASIC) which enables the microinverter to operate in grid-tied or off-grid modes. This chip is built in advanced 55nm technology with high speed digital logic and has super-fast response times to changing loads and grid events, alleviating constraints on battery sizing for home energy systems.



Part of the Enphase Energy System, IQ8 Series Microinverters integrate with the Enphase IQ Battery, Enphase IQ Gateway, and the Enphase App monitoring and analysis software.



IQ8 Series Microinverters redefine reliability standards with more than one million cumulative hours of power-on testing, enabling an industry-leading limited warranty of up to 25 years.



Connect PV modules quickly and easily to IQ8 Series Microinverters using the included Q-DCC-2 adapter cable with plug-n-play MC4 connectors.



IQ8 Series Microinverters are UL Listed as PV Rapid Shut Down Equipment and conform with various regulations, when installed according to manufacturer's instructions.

Easy to install

- Lightweight and compact with plug-n-play connectors
- Power Line Communication (PLC) between components
- Faster installation with simple two-wire cabling

High productivity and reliability

- Produce power even when the grid is down*
- More than one million cumulative hours of testing
- Class II double-insulated enclosure
- Optimized for the latest high-powered PV modules

Microgrid-forming

- Complies with the latest advanced grid support**
- Remote automatic updates for the latest grid requirements
- Configurable to support a wide range of grid profiles
- Meets CA Rule 21 (UL 1741-SA) requirements

* Only when installed with IQ System Controller 2, meets UL 1741. IQ8H-208V operates only in grid-tied mode.
 ** IQ8 Series Microinverters supports split phase, 240V. IQ8H-208 supports split phase, 208V only.

IQ8 Series Microinverters

INPUT DATA [DC]		IQ8-60-2-US	IQ8PLUS-72-2-US	IQ8M-72-2-US	IQ8A-72-2-US	IQ8H-240-72-2-US	IQ8H-208-72-2-US ⁽¹⁾
Commonly used module pairings ²	W	235 – 350	235 – 440	260 – 460	295 – 500	320 – 540+	295 – 500+
Module compatibility		60-cell/120 half-cell, 60-cell/120 half-cell, 66-cell/132 half-cell and 72-cell/144 half-cell					
MPPT voltage range	V	27 – 37	29 – 45	33 – 45	36 – 45	38 – 45	38 – 45
Operating range	V	25 – 48		25 – 58			
Min/max start voltage	V	30 / 48		30 / 58			
Max input DC voltage	V	50		60			
Max DC current ³ [module Isc]	A					15	
Overtoltage class DC port						II	
DC port backfeed current	mA					0	
PV array configuration		1x1 Ungrounded array; No additional DC side protection required; AC side protection requires max 20A per branch circuit					
OUTPUT DATA [AC]		IQ8-60-2-US	IQ8PLUS-72-2-US	IQ8M-72-2-US	IQ8A-72-2-US	IQ8H-240-72-2-US	IQ8H-208-72-2-US
Peak output power	VA	245	300	330	366	384	366
Max continuous output power	VA	240	290	325	349	380	360
Nominal (L-L) voltage/range ⁴	V	240 / 211 – 264				208 / 183 – 250	
Max continuous output current	A	1.0	1.21	1.35	1.45	1.58	1.73
Nominal frequency	Hz	60					
Extended frequency range	Hz	50 – 68					
AC short circuit fault current over 3 cycles	Arms	2				4.4	
Max units per 20 A (L-L) branch circuit ⁵		16	13	11	11	10	9
Total harmonic distortion		<5%					
Overtoltage class AC port						III	
AC port backfeed current	mA					30	
Power factor setting						1.0	
Grid-tied power factor (adjustable)						0.85 leading – 0.85 lagging	
Peak efficiency	%	97.5	97.6	97.6	97.6	97.6	97.4
CEC weighted efficiency	%	97	97	97	97.5	97	97
Night-time power consumption	mW	60					
MECHANICAL DATA							
Ambient temperature range		-40°C to +60°C (-40°F to +140°F)					
Relative humidity range		4% to 100% (condensing)					
DC Connector type		MC4					
Dimensions (HxWxD)		212 mm (8.3") x 175 mm (6.9") x 30.2 mm (1.2")					
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					
Environ. category / UV exposure rating		NEMA Type 6 / outdoor					
COMPLIANCE							
Certifications		CA Rule 21 (UL 1741-SA), UL 62109-1, UL1741/IEE1547, 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, NEC 2017, and NEC 2020 section 690.12 and C22.1-2018 Rule 64-218 Rapid Shutdown of PV Systems, for AC and DC conductors, when installed according to manufacturer's instructions.					

(1) The IQ8H-208 variant will be operating in grid-tied mode only at 208V AC. (2) No enforced DC/AC ratio. See the compatibility calculator at <https://link.enphase.com/module-compatibility> (3) Maximum continuous input DC current is 10.6A (4) Nominal voltage range can be extended beyond nominal if required by the utility. (5) Limits may vary. Refer to local requirements to define the number of microinverters per branch in your area.



DEL MAR, CA 92014, USA

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PROJECT NAME

LUCY HUEREQUE
 5936 E QUARTZ
 MOUNTAIN RD,
 PARADISE VALLEY, AZ
 85253 USA
 UTILITY: APS
 AHJ: PARADISE VALLEY

SHEET NAME

SPEC SHEETS

SHEET SIZE

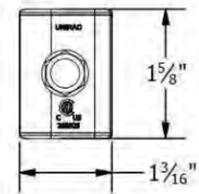
ANSI B
 11" X 17"

SHEET NUMBER

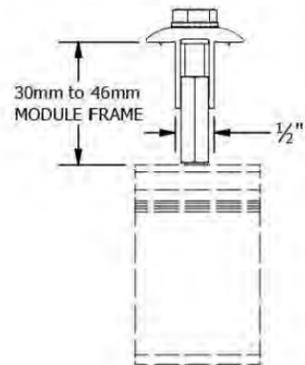
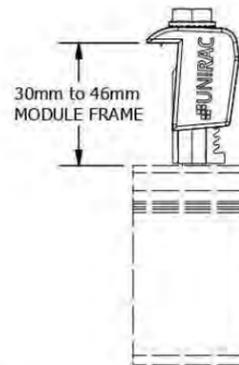
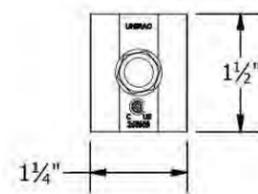
PV-8

PART # TABLE	
P/N	DESCRIPTION
302045M	UNIVERSAL AF MID CLAMP - MILL
302045D	UNIVERSAL AF MID CLAMP - DRK
302050M	UNIVERSAL AF END CLAMP - MILL
302050D	UNIVERSAL AF END CLAMP - DRK

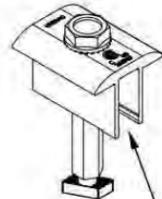
UNIVERSAL AF
END CLAMP



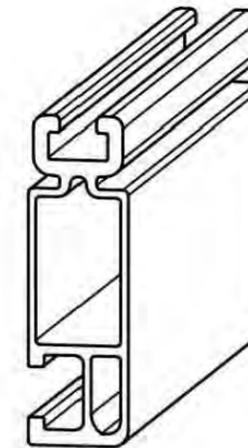
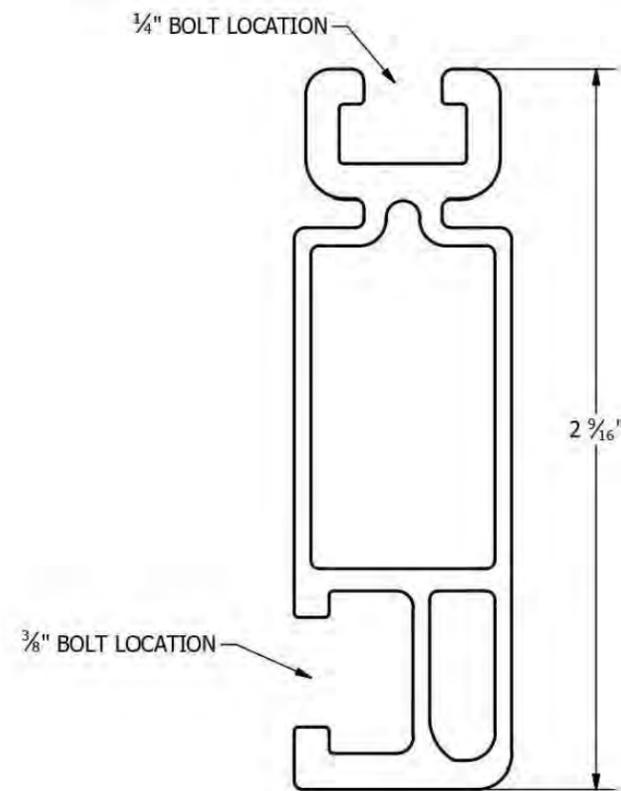
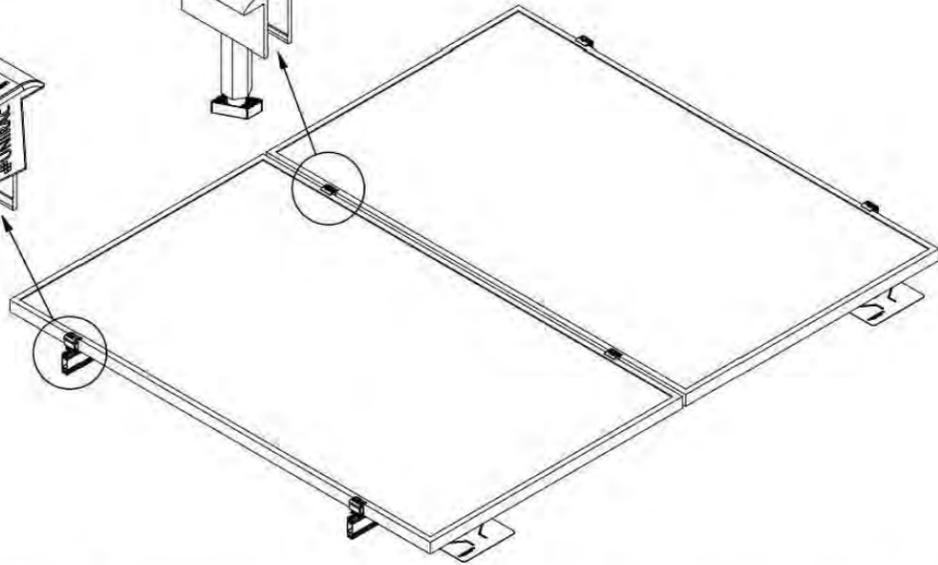
UNIVERSAL AF
MID CLAMP



UNIVERSAL
MID CLAMP



UNIVERSAL
END CLAMP



PART # TABLE		
P/N	DESCRIPTION	LENGTH
320132M	SM RAIL 132" MILL	132"
310132C	SM RAIL 132" CLR	132"
320168M	SM RAIL 168" MILL	168"
310168C	SM RAIL 168" CLR	168"
320168D	SM RAIL 168" DRK	168"
320208M	SM RAIL 208" MILL	208"
310208C	SM RAIL 208" CLR	208"
320240M	SM RAIL 240" MILL	240"
310240C	SM RAIL 240" CLR	240"
310240D	SM RAIL 240" DRK	240"

NOTE
ALL INSTALLATION EQUIPMENT (RACKING AND MOUNTING) NEEDS TO BE BLACK OR PAINTED A DESERT COLOR (LRV 38% OR LESS). LRV: LIGHT REFLECTIVE VALUES



1411 BROADWAY BLVD. NE
ALBUQUERQUE, NM 87102 USA
PHONE: 505.242.6411
WWW.UNIRAC.COM

PRODUCT LINE:	SOLARMOUNT
DRAWING TYPE:	PART & ASSEMBLY
DESCRIPTION:	UNIVERSAL AF CLAMPS
REVISION DATE:	9/28/2020

DRAWING NOT TO SCALE
ALL DIMENSIONS ARE
NOMINAL

PRODUCT PROTECTED BY
ONE OR MORE US PATENTS
LEGAL NOTICE

SM-A01B

SHEET



1411 BROADWAY BLVD. NE
ALBUQUERQUE, NM 87102 USA
PHONE: 505.242.6411
WWW.UNIRAC.COM

PRODUCT LINE:	SOLARMOUNT
DRAWING TYPE:	PART DETAIL
DESCRIPTION:	STANDARD RAIL
REVISION DATE:	9/11/2017

DRAWING NOT TO SCALE
ALL DIMENSIONS ARE
NOMINAL

PRODUCT PROTECTED BY
ONE OR MORE US PATENTS
LEGAL NOTICE

SM-P01

SHEET



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UTILITY: APS

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SHEET NAME

SPEC SHEETS

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

PV-9

FLASHLOC™ RM

THE STRONGEST ATTACHMENT FOR EVERY FLAT ROOF



Unirac's **FLASHLOC™ RM** is a lightweight, durable, powder-coated cast aluminum roof attachment solution that provides fast, easy installation and helps save labor cost. **FLASHLOC™ RM** is compatible with most roofing materials and is applicable for almost all solar racking form factors. Rigorous mechanical, sealing, and ease-of-install testing has been successfully completed for assurance of long-term reliability.

FEATURES

FLASHLOC™ Technology – no more membrane SKUs or heat welding

- Works for all roof types – see Chemlink M-1's compatibility for details
- Labor and attachment savings
- Industry-leading install time
- 6,600-lb. uplift offset (ultimate)
- Includes 8 fastener holes
- Attachment can accommodate roofing screw sizes #12 - #15
- 25-year warranty

PRODUCT SPECIFICATIONS

- 7.5" diameter X 0.94" height
- Included hardware: 1 preassembled bolt and washer
- Chemlink M-1 and 1-Part included in kit

PART NUMBER	DESCRIPTION	LIST PRICE	PACK SIZE
310999	FLASHLOC RM KIT	\$44.00 ea.	10

*Check with your local distributor for finalized pricing.

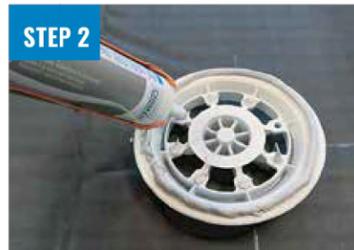


FLASHLOC™ RM

INSTALLATION GUIDE



CLEAN SURFACE & MARK LOCATION



APPLY CHEMLINK M1 SEALANT



SECURE ATTACHMENT



FILL WITH CHEMLINK 1-PART & PLACE CAP

STEP ONE CLEAN SURFACE AND MARK LOCATION

-**IMPORTANT:** Thoroughly clean roof surface with isopropyl alcohol or denatured alcohol. Bonding surfaces should be clean, dry and free of dirt or contamination. Remove all previously applied caulk, mastic or other contaminants with a wire brush. Brush away all gravel or loose granules.

-Mark center point locations on the roof. **NOTE:** We recommend locating Flashloc RM after your equipment has been installed or layout is confirmed.

STEP TWO APPLY M1 SEALANT

-Apply a 5/16" bead of Chemlink M1 sealant to the entire bottom perimeter AND to the bottom of each bolt location to be used. Tool M1 sealant bead to form a smooth surface along the entire bottom perimeter. Refer to Chemlinks application guidelines with temperatures below 40 degrees F.

-**IMPORTANT:** CHEMLINK TPO PRIMER MUST BE USED ON TPO SINGLE-PLY ROOF SUBSTRATES MEMBRANES PRIOR TO INSTALLATION.

STEP THREE SECURE ATTACHMENT

- Align mount using alignment marks on roof and base. Using fasteners specified by your P.E. of record, securely fasten attachment to the roof. Drive screws down until the base is firmly attached to the roof and the M1 sealant expands beyond the outer perimeter of the base.

- Tool M1 sealant bead around entire perimeter to form a smooth fillet. **TIP:** Use caution to avoid over-torquing the screws.

STEP FOUR FILL BASE WITH CHEMLINK 1-PART

-Completely fill base with Chemlink 1-Part sealant. Sealant must completely cover all screw heads. Do NOT overfill.

- Place cap on base and secure racking to mount with Unirac provided 3/8" hardware or other 3/8"-16 threaded hardware as specified by the P.E. of record.

-**IMPORTANT:** To ensure robust sealing over the life of the product, the maximum allowed gap between attachment kit strut and the top surface of the flat roof attachment is 1/16".



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REVISION	01/07/2023	C
REVISION	03/14/2023	D
REVISION	03/25/2023	E

PROJECT NAME

LUCY HUEREQUE
5936 E QUARTZ
MOUNTAIN RD,
PARADISE VALLEY, AZ
85253 USA
UTILITY: APS
AHJ: PARADISE VALLEY

SHEET NAME

SPEC SHEETS

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

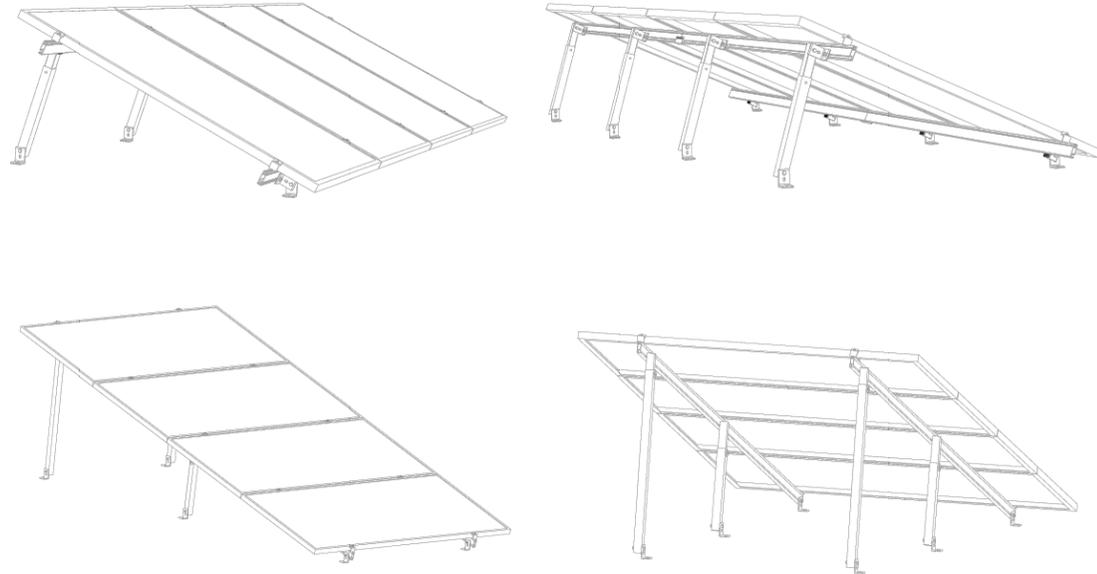
PV-10

FASTER INSTALLATION. 25-YEAR WARRANTY.

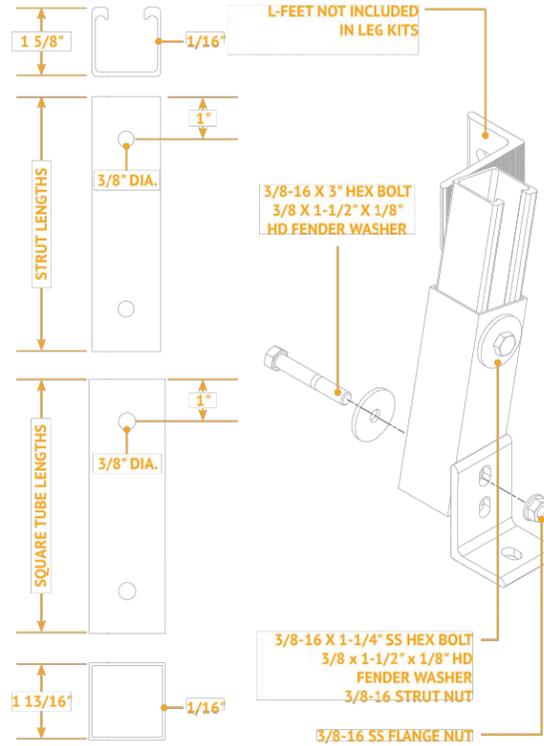
FOR QUESTIONS OR CUSTOMER SERVICE VISIT UNIRAC.COM OR CALL (505) 248-2702

FASTER INSTALLATION. 25-YEAR WARRANTY.

FOR QUESTIONS OR CUSTOMER SERVICE VISIT UNIRAC.COM OR CALL (505) 248-2702



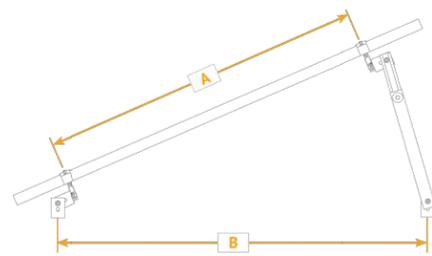
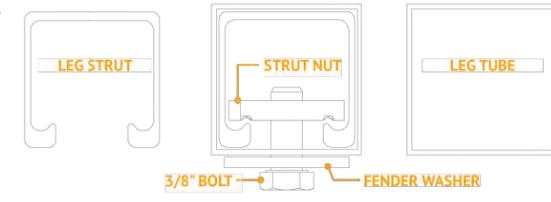
PUB20160CT28



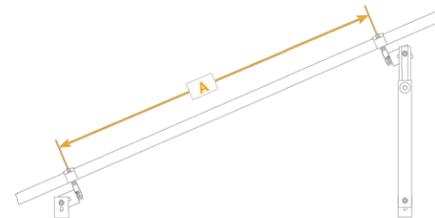
TILT LEG LENGTHS		
Total Adjustable Lengths	Square Tube	Strut
8" to 12"	8"	8"
18" to 30"	18"	18"
26" to 44"	26"	26"
40" to 72"	40"	40"

Properties	Tilt Leg Strut Channel	Square Tilt Leg Tube	Units
Area	0.515	0.4884	in ²
Weight	0.57	0.56	plf
Width	1.625	1.82	in
Height	1.625	1.82	in
Section Modulus (X-axis)	0.236	0.275	in ³
Section Modulus (Y-axis)	0.261	0.275	in ³
Moment of Inertia (X-axis)	0.201	0.2498	in ⁴
Moment of Inertia (Y-axis)	0.213	0.2498	in ⁴
Radius of Gyration (X-axis)	0.625	0.7152	in

Wrenches and Torque	Wrench Size	Recommended Torque (ft-lbs)
3/8" Hardware	9/16"	*30 w/Anti-Seize



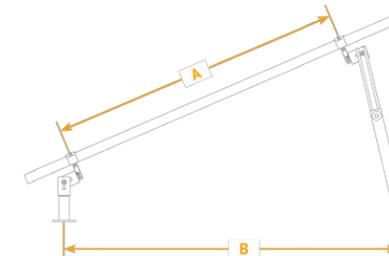
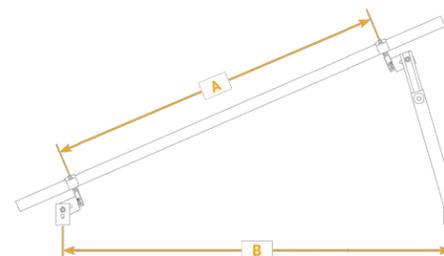
PREFERRED TILT LEG ORIENTATION



ACCEPTABLE TILT LEG ORIENTATION

A vertical leg orientation is acceptable. but DO NOT allow the bottom of the tilt legs for any application to be angled inboard towards the front of the array.

For more information on module placement please refer to the SOLARMOUNT installation guide. Remember to comply with module manufacturer clamping requirements



North/south distance along the attachment surface (B) can be obtained using Unirac's U-Builder design & layout tool: http://design.unirac.com/tool/project_info/solarmount_2/ It is approximately equal to the distance up the module from bottom to the upper rail (A).

NOTE: If you need to install the lower rail further above the bottom edge of the module, add a standoff under the front attachment to increase the height off the surface.

NOTE: Experienced installers have been very successful with SOLARMOUNT Tilt by utilizing an easily made brace during installation. The brace is comprised of a beam (supplied by others such as a piece of strut, but could also be a piece of SOLARMOUNT rail) and four (4) L-feet. The purpose of the brace is to temporarily, but firmly, position rails perpendicular to module frame and parallel to each other at the desired tilt angle. Once modules have been properly fastened to the SOLARMOUNT rail top slot, the braces can be removed. This saves time by keeping rails positioned correctly as module installation begins.

For more information on module placement please refer to the SOLARMOUNT installation guide. Remember to comply with module manufacturer clamping requirements



DEL MAR, CA 92014, USA

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ANSI B
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SHEET NUMBER

PV-11



Descriptive Report and Test Results

MASTER CONTRACT: 266909
REPORT: 70131735
PROJECT: 80128750

Edition 1: September 20, 2017; Project 70131735– Albuquerque
Issued by Michael Hoffnagle

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Prepared By: Michael Hoffnagle
Authorized By: Michael Hoffnagle

Report pages reissued

Contents: Certificate of Compliance - Pages 1 to 6
Supplement to Certificate of Compliance - Pages 1 to 3
Description and Tests - Pages 1 to 27
Att1 Installation Manual SM– Pages 1 to 36
Att2 Schematics SM/ULA– Pages 1 to 72
Att3 Installation Manual ULA– Pages 1 to 22
Att4 RM5 Installation Guide - 1 to 19
Att5 RMDT Installation Guide - 1 to 20
Att6 RM series schematics – 1 to 32
Att7 Installation Manual, GFT Shared Rail – Pages 1 to 40
Att8 Installation Manual, GFT 4-Rail – Pages 1 to 39
Att9 GFT Schematics – Pages 1 to 42
Att10 NXT Horizon Installation Manual – Pages 1 to 22
Att11 Schematics NXT Horizon – Pages 1 to 13

PRODUCTS

CLASS - C531302 - POWER SUPPLIES - PHOTOVOLTAICS-PV Racking and clamping systems
CLASS - C531382 - POWER SUPPLIES - PHOTOVOLTAICS-PV Racking and clamping systems -
Certified to US Standards



APPENDIX A : C System Certification : PAGE

Electrical Bonding and Grounding Test Modules

The list below is not exhaustive of compliant modules but shows those that have been evaluated and found to be electrically compatible with the SOLARMOUNT system.

Manufacture	Module Model / Series	Manufacture	Module Model / Series	Manufacture	Module Model / Series
LG Electronics (cont.)	LGxxxN2T-J5 LGxxx(N1K/N1W/N2T/N2W)-L5 LGxxx(M1C/N1C/Q1C/Q1K)-N5 LGxxx(N1C/N1K/N2W/Q1C/Q1K)-V5 LGxxxN3K-V6	Phono Solar	PSxxxM1-20/U PSxxxM1H-20/U PSxxxM1-20UH PSxxxM1H-20UH	Q.Cells (cont.)	Q.PEAK DUO XL-(G10/G10.2/G10.3/G10.4/ G10.d) Q.PEAK DUO XL-G10.3/BFG Q.PEAK DUO XL-G10.d/BFG Q.PEAK DUO XL-(G11.2/G11.3) Q.PEAK DUO XL-G11.3/BFG
LONGi	LR4-60(HPB/HPH) LR4-72(HPH) LR6-60 LR6-60(BK/HPB/HPH/HV/PB/PE/PH) LR6-72 LR6-72(BK/HV/PB/PE/PH) RealBlack LR4-60HPB RealBlack LR6-60HPB	Phono Solar (cont.)	PSxxxM1-20/UH PSxxxM1H-20/UH PSxxxM-24/T PSxxxMH-24/T PSxxxM-24/TH PSxxxMH-24/TH	REC	RECOxxxAA (BLK/Pure) RECOxxxNP2 (N-PEAK) RECOxxxNP2 (Black) RECOxxxPE, RECOxxxPE72 RECOxxxTR, RECOxxxTP72 RECOxxxTP2(M/BLK2) RECOxxxTP25(M)72 RECOxxxTP3M (Black) RECOxxxTP4 (Black)
Meyer Burger	Meyer Burger Black, Meyer Burger White	Prism Solar	P72 Series	Renesola	All 60-cell modules
Mission Solar Energy	MSE Mono, MSE Perc	Q.Cells	Plus, Pro, Peak, G3, G4, Peak G5(SC), G6(+)(SC)(AC), G7, G8(+), Plus, Pro, Peak L-G2, L-G4, L-G5 Peak L-G5, L-G6, L-G7, L-G8(BFF) Q.PEAK DUO(BLK)-G6+ Q.PEAK DUO BLK-G6+/TS Q.PEAK DUO (BLK)-G7 Q.PEAK DUO L-(G7/G7.1/G7.2/G7.3/G7.7) Q.PEAK DUO (BLK) G8(+) Q.PEAK DUO L-(G8/G8.1/G8.2/G8.3) Q.PEAK DUO L-G8.3 (BFF/BFG/BGT) Q.PEAK DUO (BLK) ML-G9(+) Q.PEAK DUO XL-(G9/G9.2/G9.3) Q.PEAK DUO XL-G9.3/BFG Q.PEAK DUO-G10+ Q.PEAK DUO BLK G10(+) Q.PEAK DUO BLK G10+ /AC Q.PEAK DUO (BLK) ML-G10(a)(+)	Risen	RSM Series
Mitsubishi	MIE & MLE Series			S-Energy	SN72 & SN60 Series
Neo Solar Power Co.	D6M Series			SEG Solar	SEG-xxx-BMD-HV
Panasonic	VBHNxxxSA06/SA06B/SA11/SA11B VBHNxxxSA15/SA15B/SA16/SA16B, VBHNxxxKA, VBHNxxxKA03/04, VBHNxxxSA17/SA17G/SA17E/SA18/SA18E, VBHNxxxZA01/ZA02/ZA03/VBHNxxxZA04 EVPxxx EVPxxx(H/K/PK)			Seraphim	SEG-(6PA/6PB/6MA/6MA-HV/6MB/E01/E11) SRP-(6QA/6QB) SRP-xxx-6MB-HV, SRP-320-375-BMB-HV, SRP-xxx-BMC-HV, SRP-390-450-BMA-HV, SRP-xxx-BMZ-HV, SRP-390-405-BMD-HV
Peimar	SCxxxM (FB/BF) SMxxxM			Sharp	NU-SA & NU-SC Series
				Silfab	SLA-M, SLA-P, SLG-M, SLG-P & BC Series SILxxx(BL/NL/NT/HL/ML/BK/NX/NU/HQ)

- Unless otherwise noted, all modules listed above include all wattages and specific models within that series. Variable wattages are represented as "xxx"
- Items in parenthesis are those that may or may not be present in a compatible module's model ID
- Slashes "/" between one or more items indicates that either of those items may be the one that is present in a module's model ID
- The frame profile must not have any feature that might interfere with the bonding devices that are integrated into the racking system
- Use with a maximum over current protection device OCPD of 30A
- **Listed models can be used to achieve a Class A fire system rating for steep slope applications. See Appendix A, page A**



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SHEET NAME

SPEC SHEETS

SHEET SIZE

ANSI B
11" X 17"

SHEET NUMBER

PV-12

