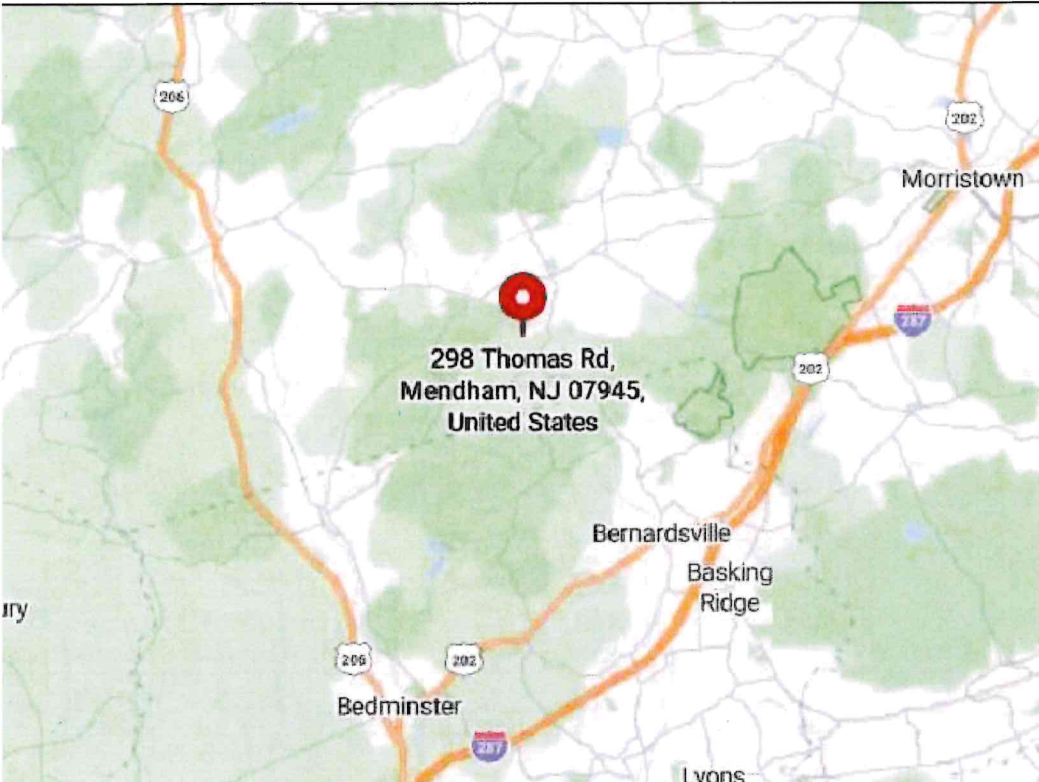


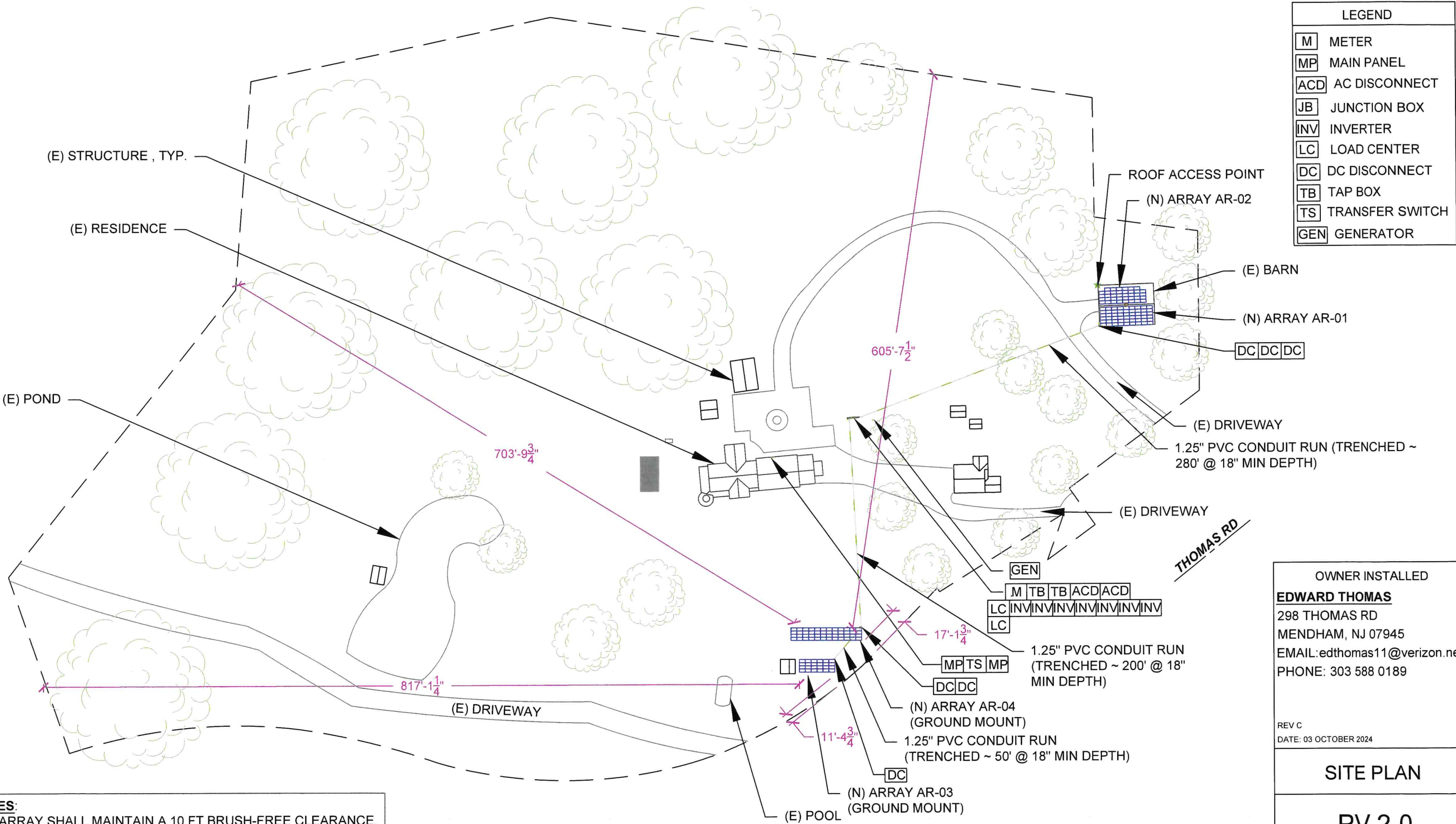


SCOPE OF WORK		GENERAL NOTES		TABLE OF CONTENTS																	
<p>SYSTEM SIZE: 67240W DC, 53200W AC MODULES: (164) HYUNDAI ENERGY SOLUTIONS CO., LTD. HiS-S410YH(BK) (410W) INVERTER(S): (7) TESLA INVERTER 7.6 KW RSD UNIT(S): (62) TESLA MCI RACKING: IRONRIDGE XR100 & IRONRIDGE XR1000 ATTACHMENT: S-5! SOLARFOOT & IRONRIDGE (GROUND MOUNT)</p> <p>OCCUPANCY: PRIMARY RESIDENCE CONSTRUCTION TYPE: RESIDENTIAL</p> <p>2023 NEC, 2022 IRC, 2022 IBC</p> <ul style="list-style-type: none">INSTALLATION OF A PV SYSTEM MOUNTED ON RESIDENTIAL BUILDING.INSTALLATION OF A GROUND MOUNT PV SYSTEM. <p>This approval is for compliance to the current adopted building codes for the proposed Solar System only. It is the owner's/applicant's responsibility to ensure that the proposed installation of solar systems and associated equipment is on legally permitted structures. If determined by inspection staff the proposed solar system is installed on non-permitted structures, any required modifications needed for code compliance will be at the owner's/applicant's expense</p>		<ul style="list-style-type: none">LOCAL UTILITY PROVIDER SHALL BE NOTIFIED PRIOR TO USE AND ACTIVATION OF ANY SOLAR PHOTOVOLTAIC INSTALLATIONTHIS PROJECT SHALL COMPLY WITH LOCAL ORDINANCESPROPER ACCESS AND WORKING CLEARANCE WILL BE PROVIDEDALL ELECTRICAL WORK SHOWN ON THESE PLANS WILL BE COMPLETED BY THE UNDERSIGNEDALL APPLICABLE PV EQUIPMENT LISTED AND COMPLIANT WITH UL2703, UL1741 AND UL1703 / UL61730THE SYSTEM WILL NOT BE INTERCONNECTED UNTIL APPROVAL FROM THE LOCAL JURISDICTION AND THE UTILITY IS OBTAINEDTHE SOLAR PHOTOVOLTAIC INSTALLATION SHALL NOT OBSTRUCT ANY PLUMBING, MECHANICAL, OR BUILDING ROOF VENTSIF THE EXISTING MAIN PANEL DOES NOT HAVE VERIFIABLE GROUNDING ELECTRODE, IT IS NECESSARY TO INSTALL A SUPPLEMENTAL GROUNDING ELECTRODEEACH MODULE WILL BE GROUNDED AS PER UL 2703 OR UL 1703 / UL61730 APPROVED METHOD USING THE SUPPLIED CONNECTION POINTS IDENTIFIED ON THE MODULE AND THE MANUFACTURER'S INSTALLATION INSTRUCTIONSA LADDER SHALL BE IN PLACE FOR THE INSPECTION IN COMPLIANCE WITH OSHA REGULATIONSALL WORK SHALL COMPLY WITH 2023 NEC, 2022 IRC, 2022 IBC MUNICIPAL CODE, AND ALL MANUFACTURERS' LISTINGS AND INSTALLATION INSTRUCTIONS.PHOTOVOLTAIC SYSTEM WILL COMPLY WITH 2023 NEC.PHOTOVOLTAIC SYSTEM INVERTER IS UNGROUNDED. NO CONDUCTORS ARE SOLIDLY GROUNDED IN THE INVERTER.MODULES CONFORM TO AND ARE LISTED UNDER UL 1703 / UL61730.INVERTER CONFORMS TO AND IS LISTED UNDER UL 1741.ELECTRICAL EQUIPMENT AND MATERIAL TO BE LISTED, LABELED, AND INSTALLED PER THE NEC, THE INSTALLATION STANDARDS/MANUFACTURER'S RECOMMENDATIONS AND IF REQUIRED A RECOGNIZED ELECTRICAL TESTING LABORATORY.CONDUITS EXPOSED TO SUNLIGHT ON ROOF SHALL BE LOCATED NOT LESS THAN 7/8" ABOVE ROOF SURFACE.		<table><tr><th>PAGE #</th><th>DESCRIPTION</th></tr><tr><td>PV 1.0</td><td>COVER SHEET</td></tr><tr><td>PV 2.0-2.1</td><td>SITE PLAN</td></tr><tr><td>PV 3.0</td><td>LAYOUT DETAIL</td></tr><tr><td>PV 3.1</td><td>ATTACHMENT DETAIL</td></tr><tr><td>PV 3.2-3.4</td><td>GROUND MOUNT DETAIL</td></tr><tr><td>PV 4.0-4.1</td><td>ELECTRICAL DIAGRAM</td></tr><tr><td>PV 5.0</td><td>WARNING LABELS</td></tr></table>		PAGE #	DESCRIPTION	PV 1.0	COVER SHEET	PV 2.0-2.1	SITE PLAN	PV 3.0	LAYOUT DETAIL	PV 3.1	ATTACHMENT DETAIL	PV 3.2-3.4	GROUND MOUNT DETAIL	PV 4.0-4.1	ELECTRICAL DIAGRAM	PV 5.0	WARNING LABELS
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PV 3.2-3.4	GROUND MOUNT DETAIL																				
PV 4.0-4.1	ELECTRICAL DIAGRAM																				
PV 5.0	WARNING LABELS																				
<h3>VICINITY MAP</h3> 				<div><div><p>Jacob S. Proctor, P.E. NJ License No. - 24 GE 05571900 Firm License: COA - 24 GA 28120600 VSE Project Number: U2557.1178.241</p><p>10/07/2024</p></div><div><p>OWNER INSTALLED EDWARD THOMAS 298 THOMAS RD MENDHAM, NJ 07945 EMAIL:edthomas11@verizon.net PHONE: 303 588 0189</p><p>REV C DATE: 03 OCTOBER 2024</p><p>COVER SHEET</p><p>PV 1.0</p></div></div>																	

SITE PLAN: 1" = 100'



	ARRAY SLOPE	AZIMUTH	SOLAR AREA (SQ FT)	SOLAR AREA (LBS)	# MODULES
AR-01	26.5°	178°	1161	2511	54
AR-02	26.5°	358°	817	1767	38
AR-03	30°	180°	516	1116	24
AR-04	30°	180°	1032	2232	48



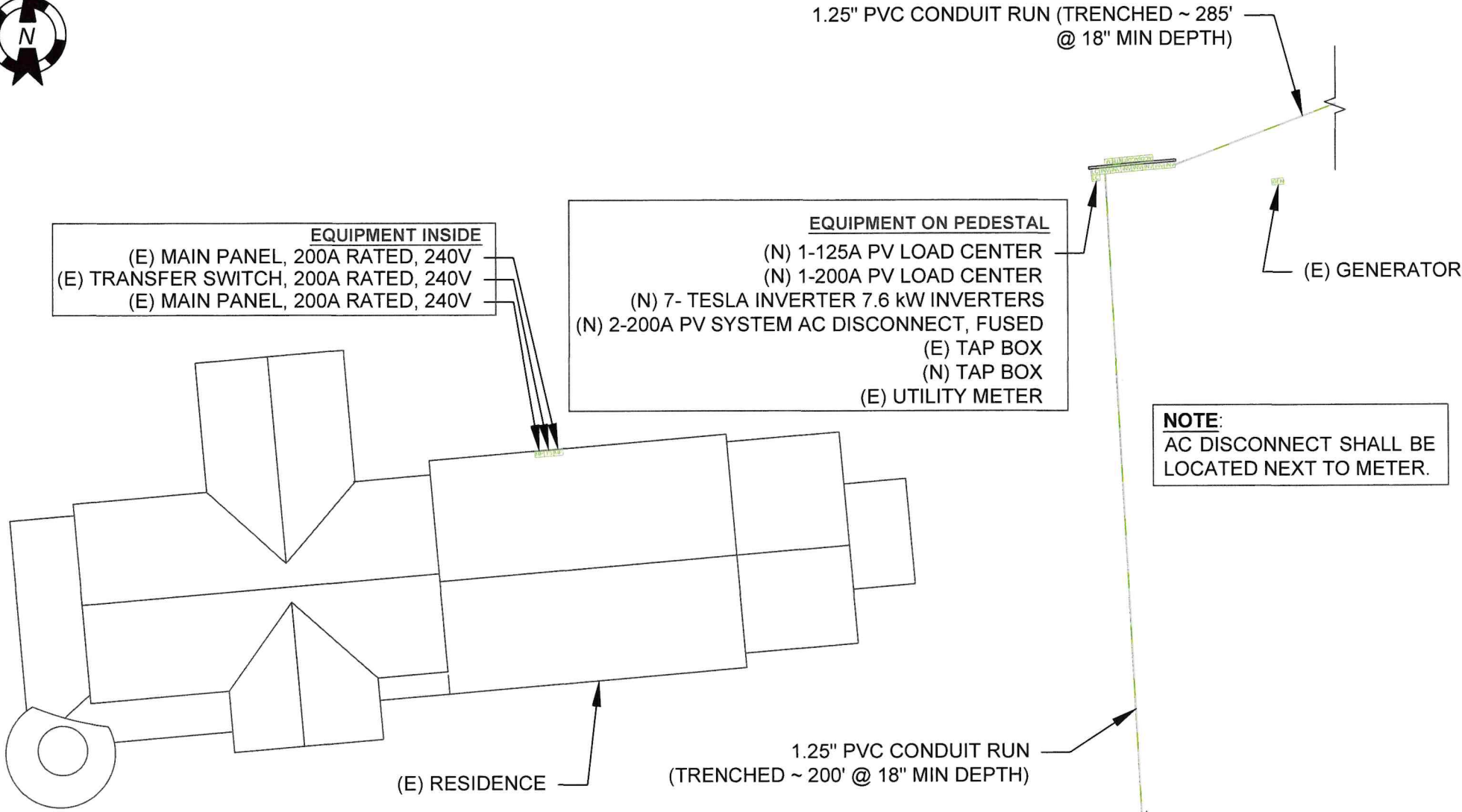
- NOTES:**
- ARRAY SHALL MAINTAIN A 10 FT BRUSH-FREE CLEARANCE.
 - AC DISCONNECT SHALL BE LOCATED NEXT TO METER.

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SITE PLAN

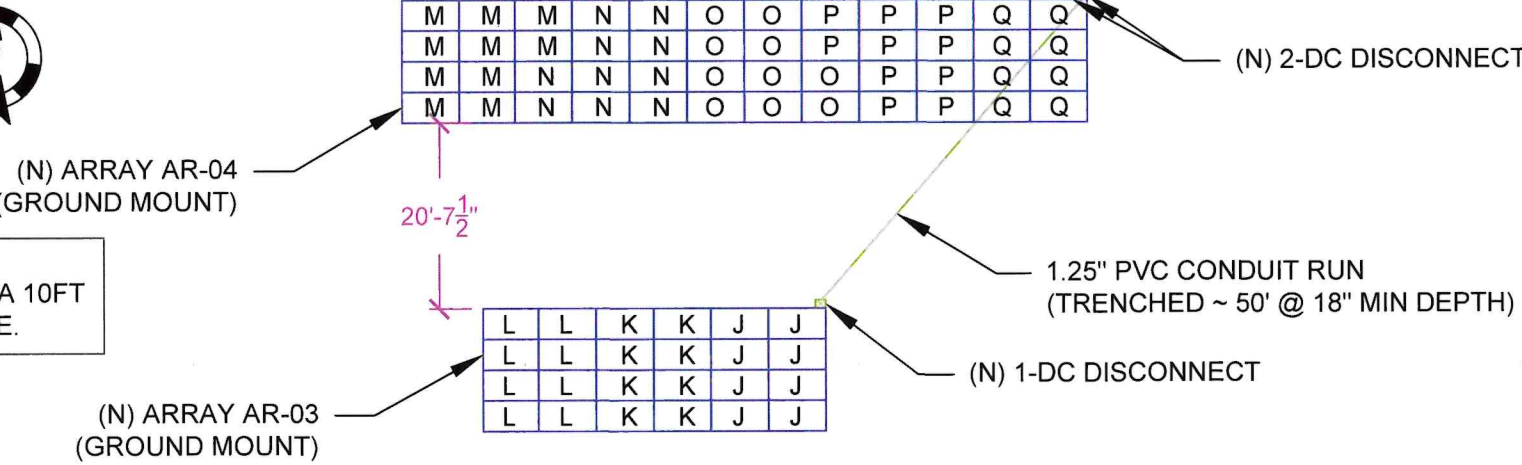
PV 2.0



SITE PLAN DETAIL #3:1" = 21.33333'



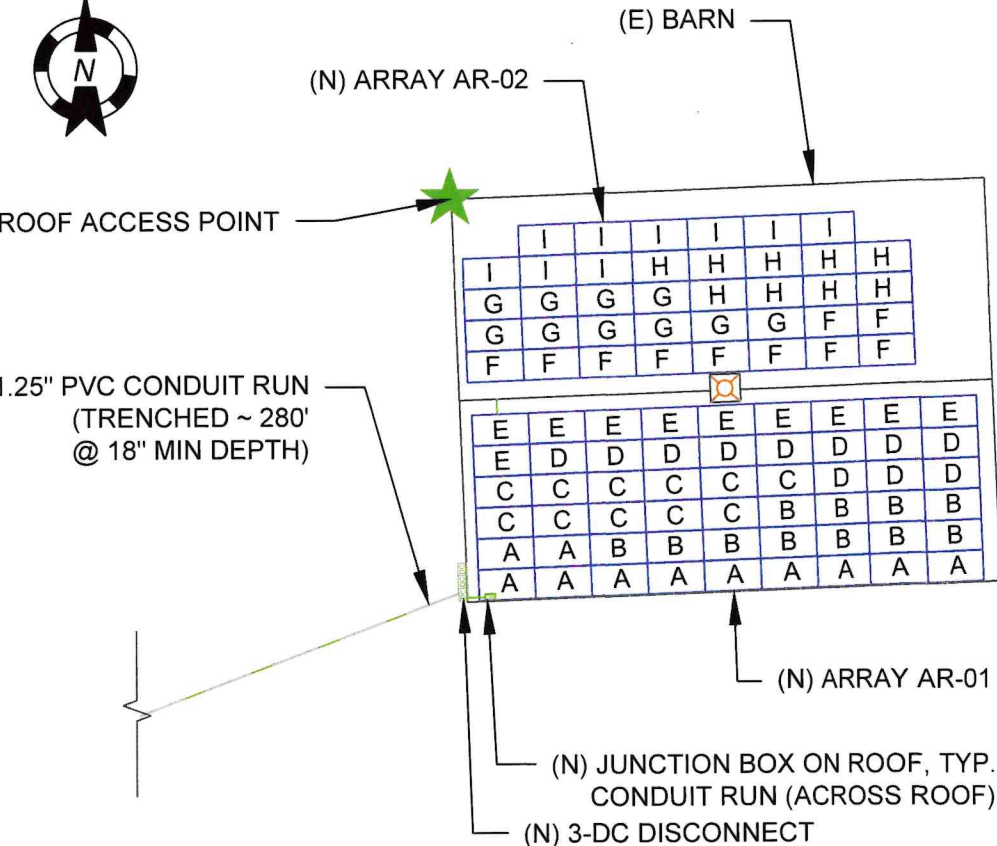
NOTE:
ARRAY SHALL MAINTAIN A 10FT BRUSH-FREE CLEARANCE.



GROUND MOUNTED MODULES					
	ARRAY TILT	AZIMUTH	SOLAR AREA (SQFT)	SOLAR WEIGHT (LBS)	# MODULES
AR-03	30°	180°	516	1116	24
AR-04	30°	180°	1032	2232	48

ROOF MOUNTED MODULES AT BARN					
	ROOF SLOPE	AZIMUTH	SOLAR AREA (SQFT)	SOLAR WEIGHT (LBS)	# MODULES
AR-01	26.5°	178°	1161	2511	54
AR-02	26.5°	358°	817	1767	38

SITE PLAN DETAIL #2:1" = 21.33333'



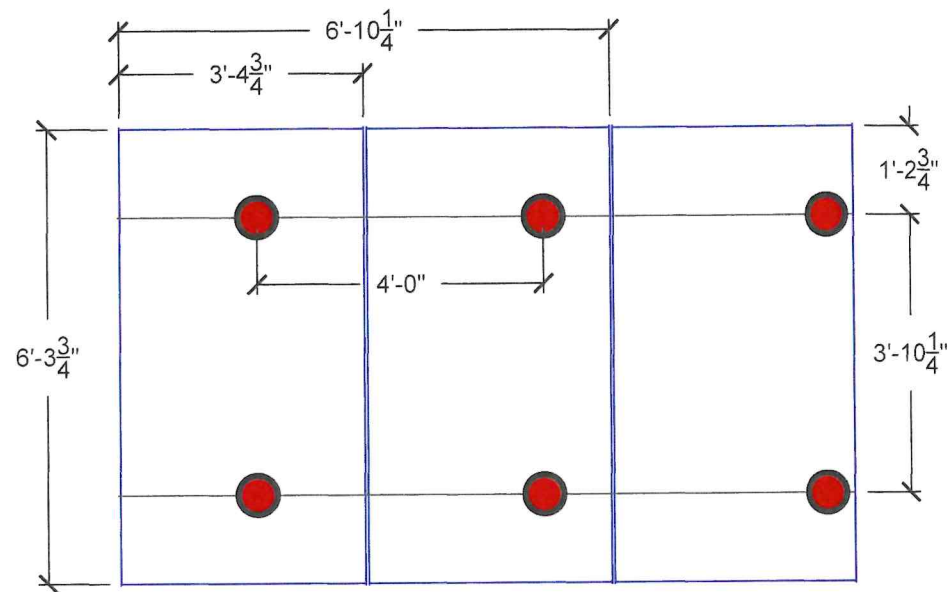
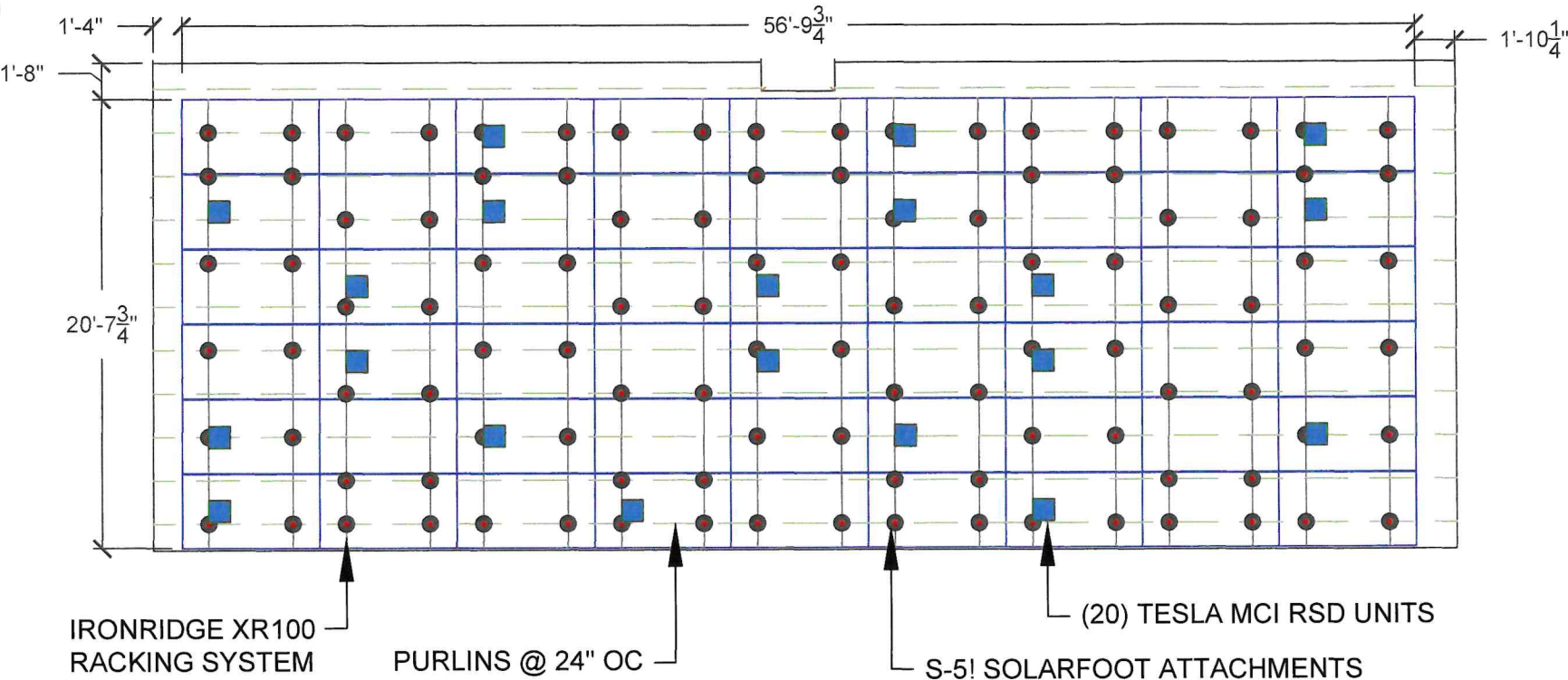
LEGEND	
[M]	METER
[MP]	MAIN PANEL
[ACD]	AC DISCONNECT
[JB]	JUNCTION BOX
[INV]	INVERTER
[LC]	LOAD CENTER
[DC]	DC DISCONNECT
[TB]	TAP BOX
[TS]	TRANSFER SWITCH
[GEN]	GENERATOR

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	# MODULES PER ARRAY	ROOF TYPE	ATTACHMENT	ROOF HEIGHT	FRAME MATERIAL	FRAME TYPE	FRAME SIZE	OC SPACING
AR-01	54	TRAPEZOIDAL METAL PANEL ROOF	S-5! SOLARFOOT	ONE STORY	WOOD	PURLINS	1.5"x 3 7/16"	24" O.C.
AR-02	38	TRAPEZOIDAL METAL PANEL ROOF	S-5! SOLARFOOT	ONE STORY	WOOD	PURLINS	1.5"x 3 7/16"	24" O.C.

AR-01 - SCALE: 1" = 8'
ROOF SLOPE: 26.5°
AZIMUTH: 178°

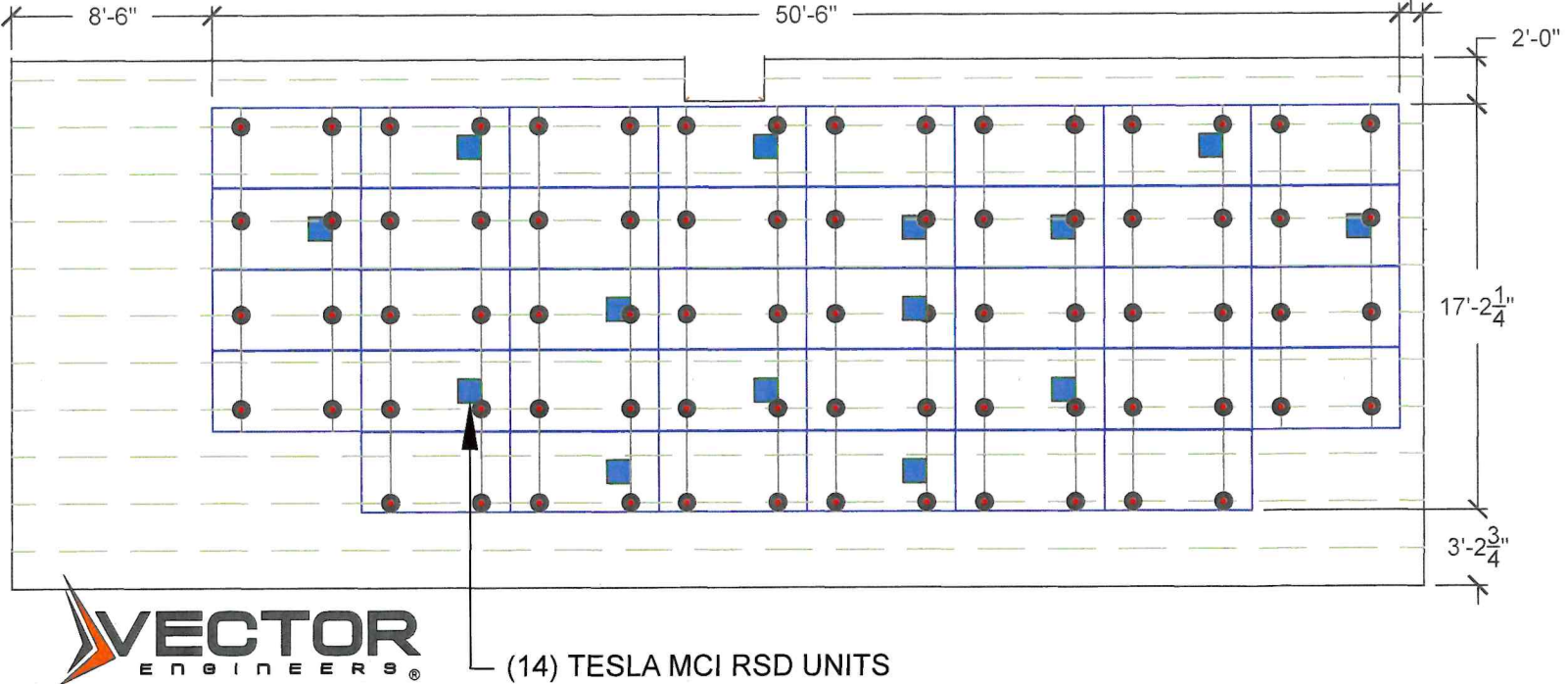


POINT LOAD CALCULATION			
ITEM	#OR LIN FT	WEIGHT PER (lbs)	TOTAL WEIGHT (lbs)
MODULES	92	46.5	7626.00
RAILS	1119.37	0.4	488.0
ATTACHMENTS	184	0.65	96.20
TILT LEGS	0	3.5	0
RSD UNITS	37	0.8	28.49
TOTAL WEIGHT			8231.8 lbs
MODULE DIMENSION (LxW) 75.7" x 40.9" = 21.5 sq.ft			
WEIGHT PER MOUNT	1951.2 / 72 =	44.7 lbs/Mount	
WEIGHT PER SQ FT	1951.2 / 735.42 sq.ft. =	2.3 lbs/sq.ft.	

AR-02 - SCALE: 1" = 8'
ROOF SLOPE: 26.5°
AZIMUTH: 358°



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DESIGN CRITERIA

MODULES:
164
MAX DISTRIBUTED LOAD: 3 PSF
SNOW LOAD: 20 PSF
WIND SPEED:
105 MPH 3-SEC GUST.
LAG SCREWS:
5/16"x 2.5" MIN EMBEDMENT
NOTE:
INSTALLERS TO VERIFY RAFTER SIZE, SPACING AND SLOPED SPANS, AND NOTIFY E.O.R. OF ANY DISCREPANCIES BEFORE PROCEEDING.

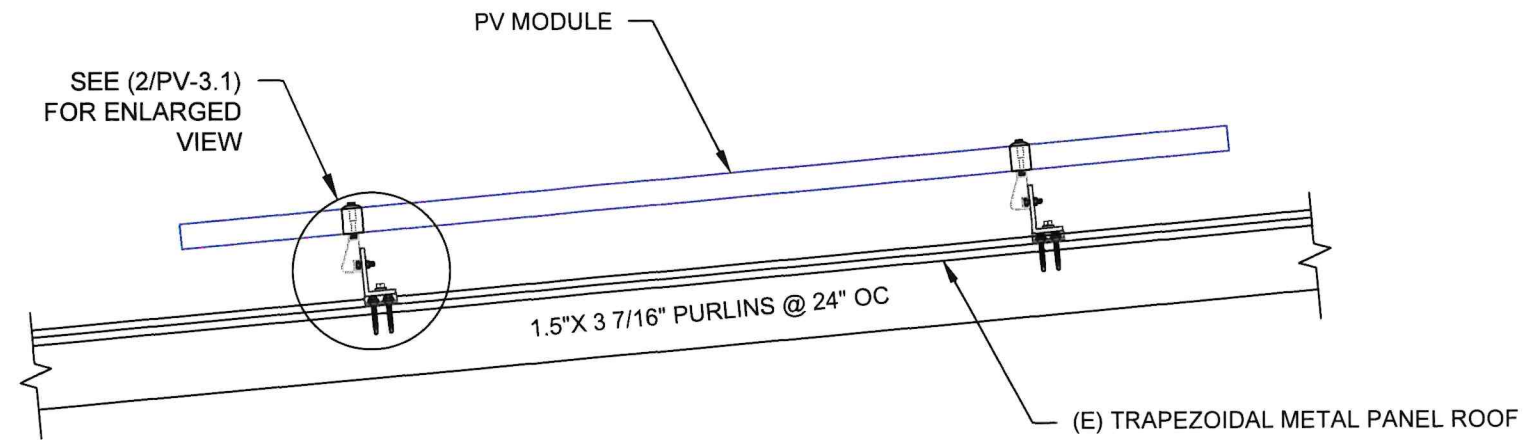
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LAYOUT DETAIL

PV 3.0

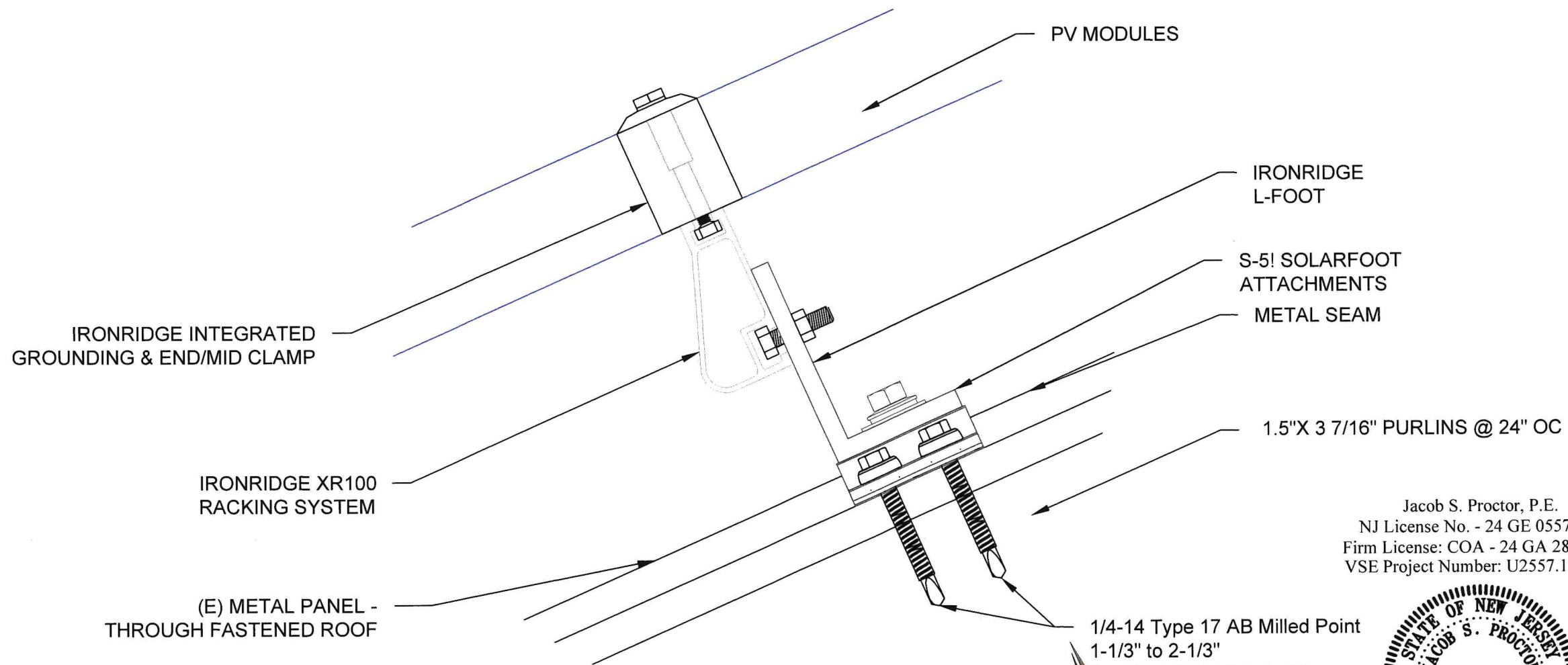




1 ATTACHMENT DETAIL

PV-3.1

SCALE: 1"=1'



2 ATTACHMENT DETAIL (section view)

PV-3.1

SCALE: NTS

1/4-14 Type 17 AB Milled Point
1-1/3" to 2-1/3"

VECTOR
ENGINEERS®

651 W. GALENA PARK BLVD. STE. 101 DRAPER, UTAH 84020 PHONE (801) 990-1775 WWW.VECTORSE.COM

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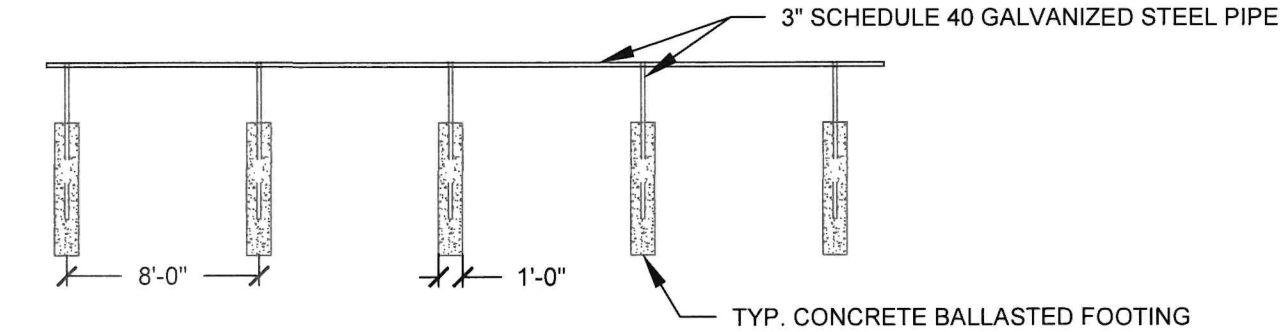
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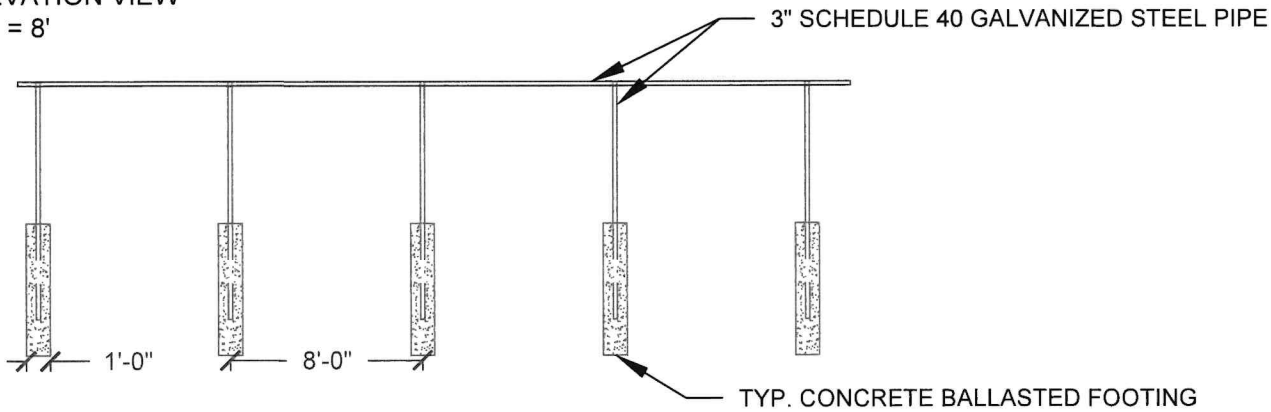
PV 3.1

10/07/2024

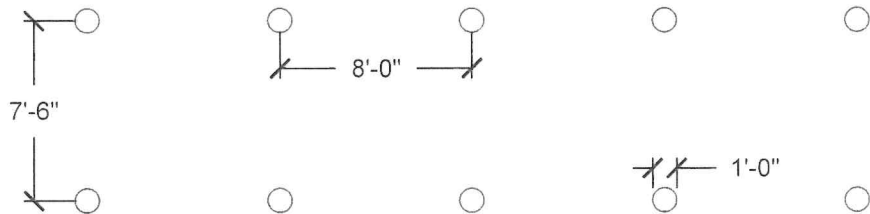
GROUND MOUNTED ARRAY 3
FRONT ELEVATION VIEW
SCALE: 1" = 8'



GROUND MOUNTED ARRAY 3
BACK ELEVATION VIEW
SCALE: 1" = 8'



GROUND MOUNTED CONCRETE BALLASTED POUR
PLAN VIEW
SCALE: 1" = 8'



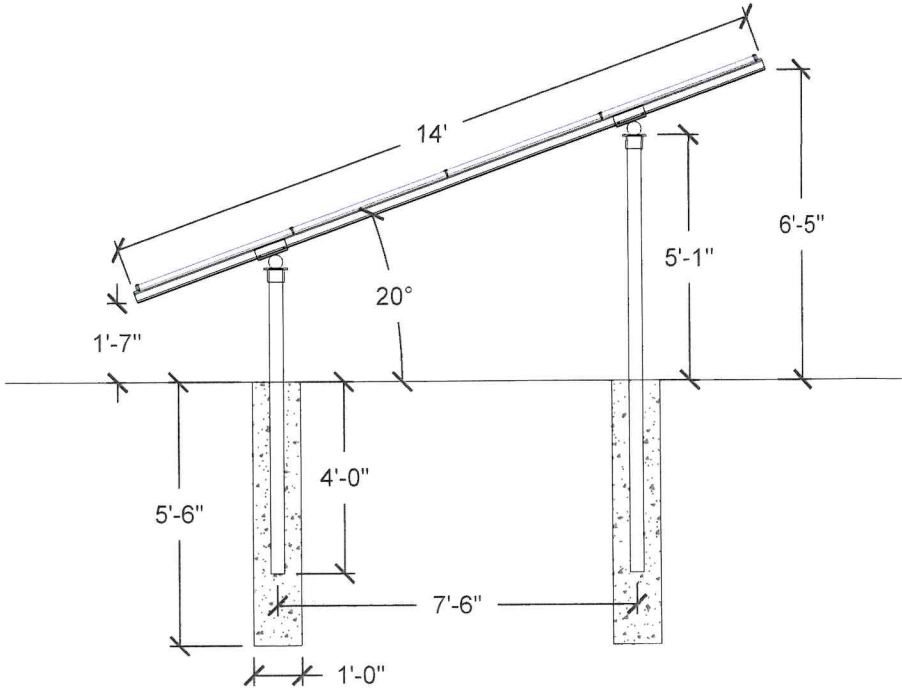
AR-03 - SCALE: 1" = 8'
PITCH: 30°
AZIMUTH: 180°



L	L	K	K	J	J
L	L	K	K	J	J
L	L	K	K	J	J
L	L	K	K	J	J

(9) TESLA MCI RSD UNITS

GROUND MOUNTED ARRAY 3
SIDE ELEVATION VIEW
SCALE: 1/4" = 1'-0"



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VSE Project Number: U2557.1178.241



10/07/2024

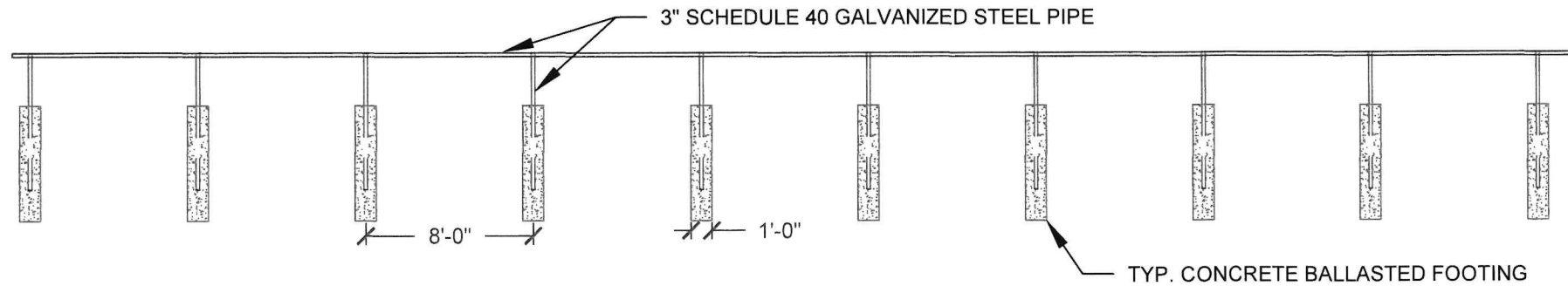
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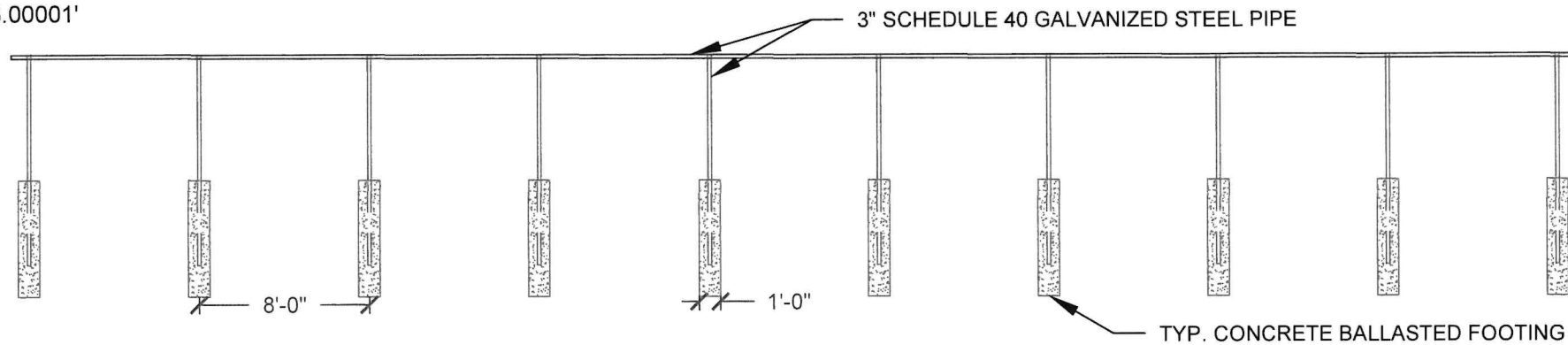
GROUND MOUNT
DETAIL

PV 3.2

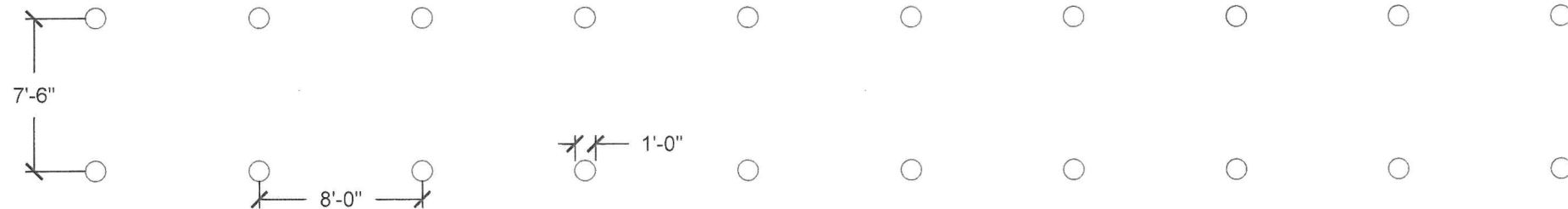
GROUND MOUNTED ARRAY 4
FRONT ELEVATION VIEW
SCALE: 1" = 8'



GROUND MOUNTED ARRAY 4
BACK ELEVATION VIEW
SCALE: 1" = 8.00001'



GROUND MOUNTED CONCRETE BALLASTED POUR
PLAN VIEW
SCALE: 1" = 8'



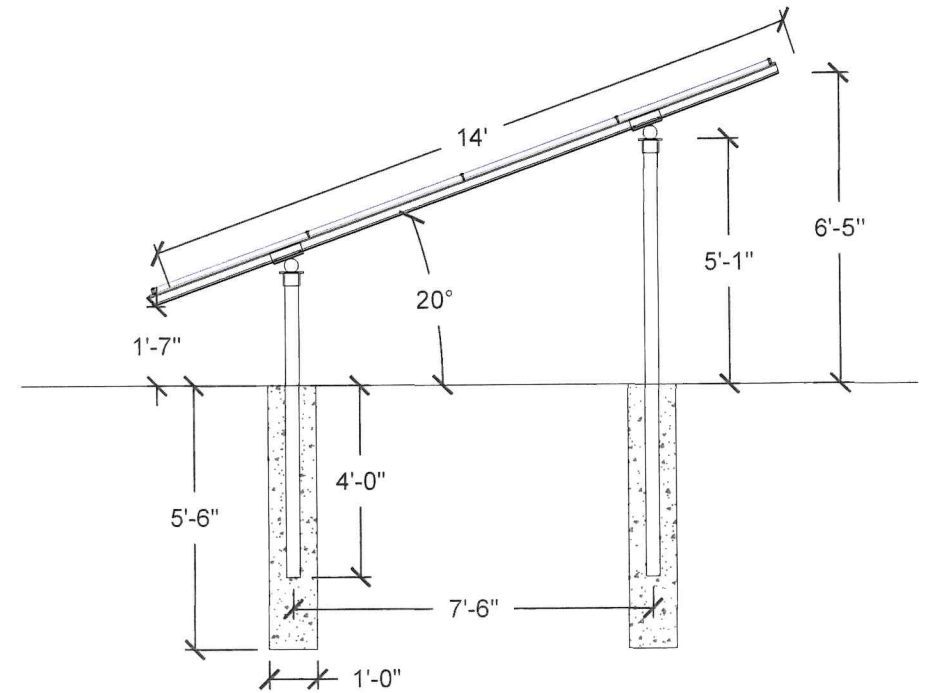
AR-04 - SCALE: 1" = 8'
PITCH: 30°
AZIMUTH: 180°



M	M	N	N	N	O	O	O	P	P	Q	Q
M	M	N	N	N	O	O	O	P	P	Q	Q
M	M	M	N	N	O	O	P	P	P	Q	Q
M	M	M	N	N	O	O	P	P	P	Q	Q

(19) TESLA MCI RSD UNITS

GROUND MOUNTED ARRAY 4
SIDE ELEVATION VIEW
SCALE: 1/4" = 1'-0"



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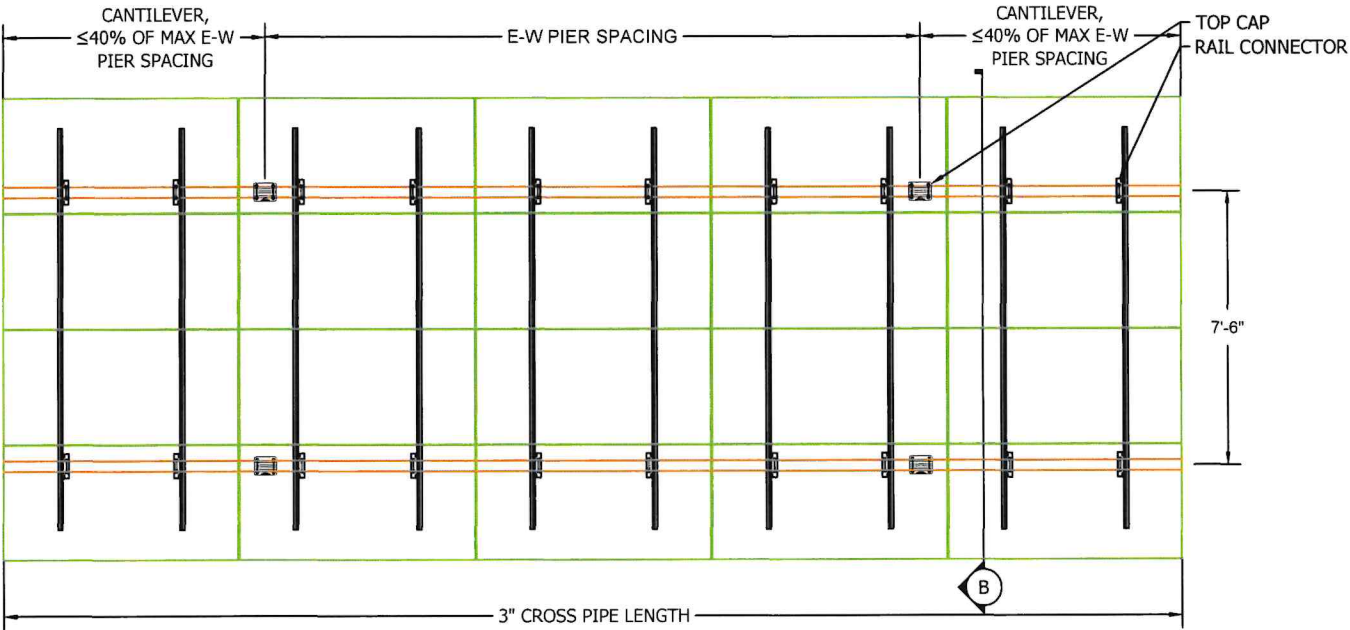
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GROUND MOUNT
DETAIL

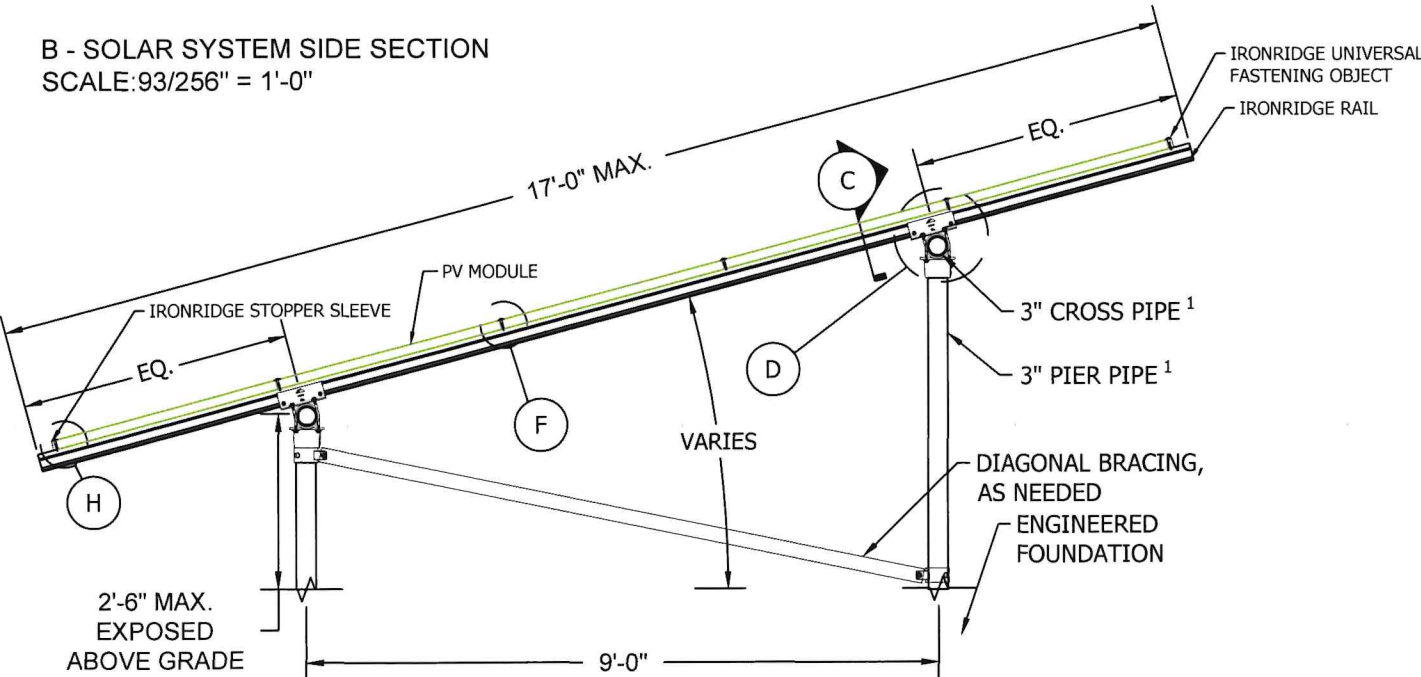
PV 3.3

A - SOLAR SYSTEM PLAN DETAIL
SCALE:49/256" = 1'-0"



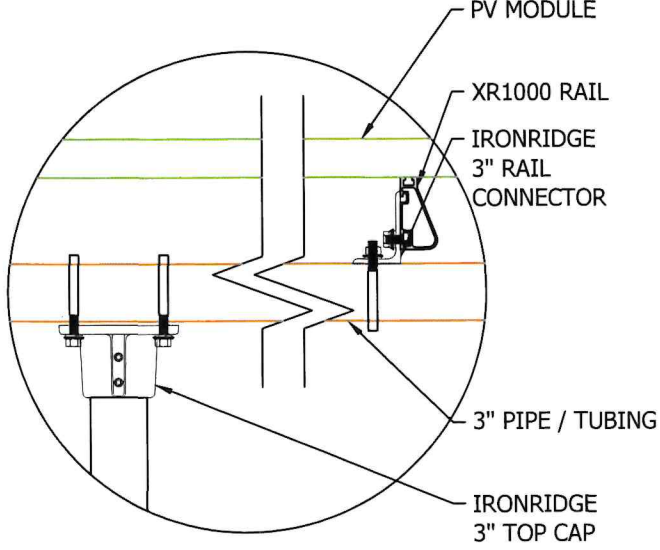
NOTE: TOP VIEW ASSEMBLY GUIDELINES AS PER MANUFACTURER, NOT SITE SPECIFIC

B - SOLAR SYSTEM SIDE SECTION
SCALE:93/256" = 1'-0"

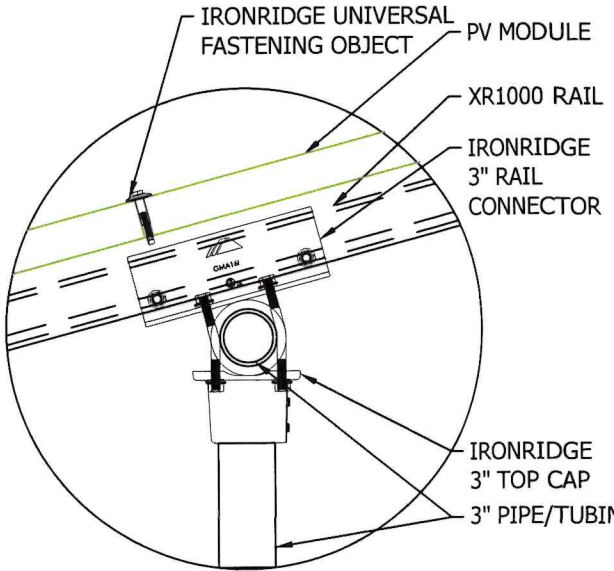


1. SCHEDULE 40 PIPE

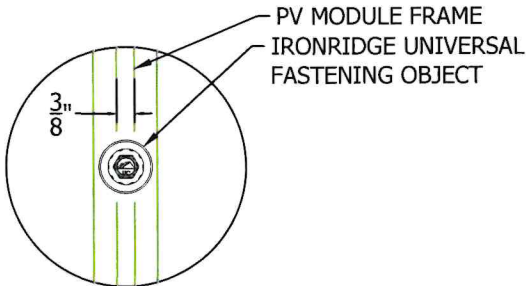
C - PIPE FITTINGS DETAIL
SCALE:1 1/2" = 1'-0"



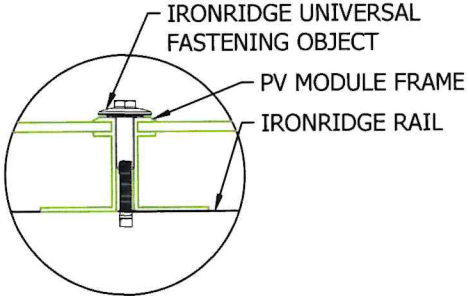
D - PIPE FITTINGS DETAIL
SCALE:1 1/2" = 1'-0"



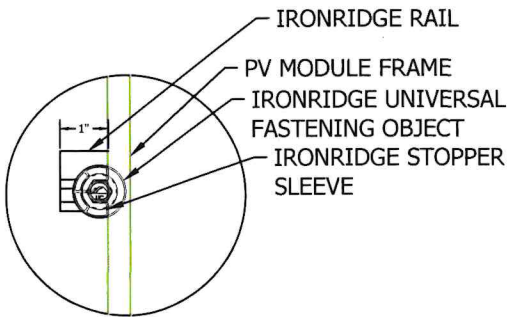
E - MID CLAMP PLAN
SCALE:3" = 1'-0"



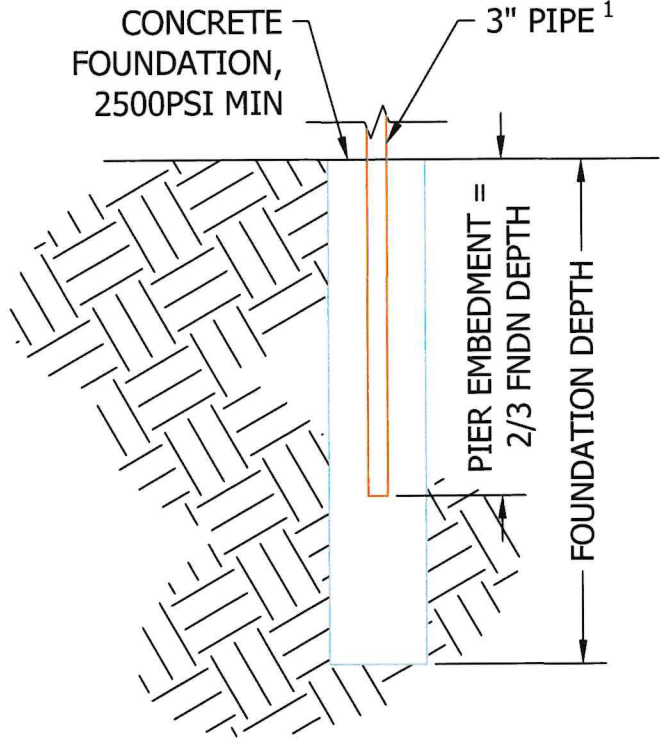
F - MID CLAMP FRONT
SCALE:3" = 1'-0"



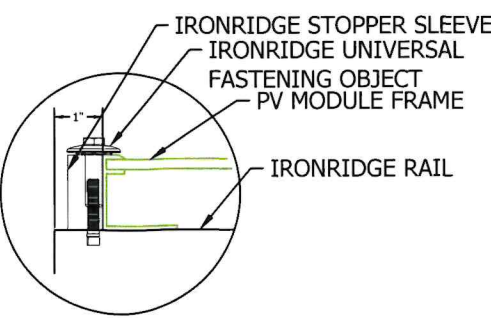
G - END CLAMP PLAN
SCALE:3" = 1'-0"



J - DRILL POUR FOUNDATION
SCALE:1/2" = 1'-0"



H - END CLAMP FRONT
SCALE:3" = 1'-0"



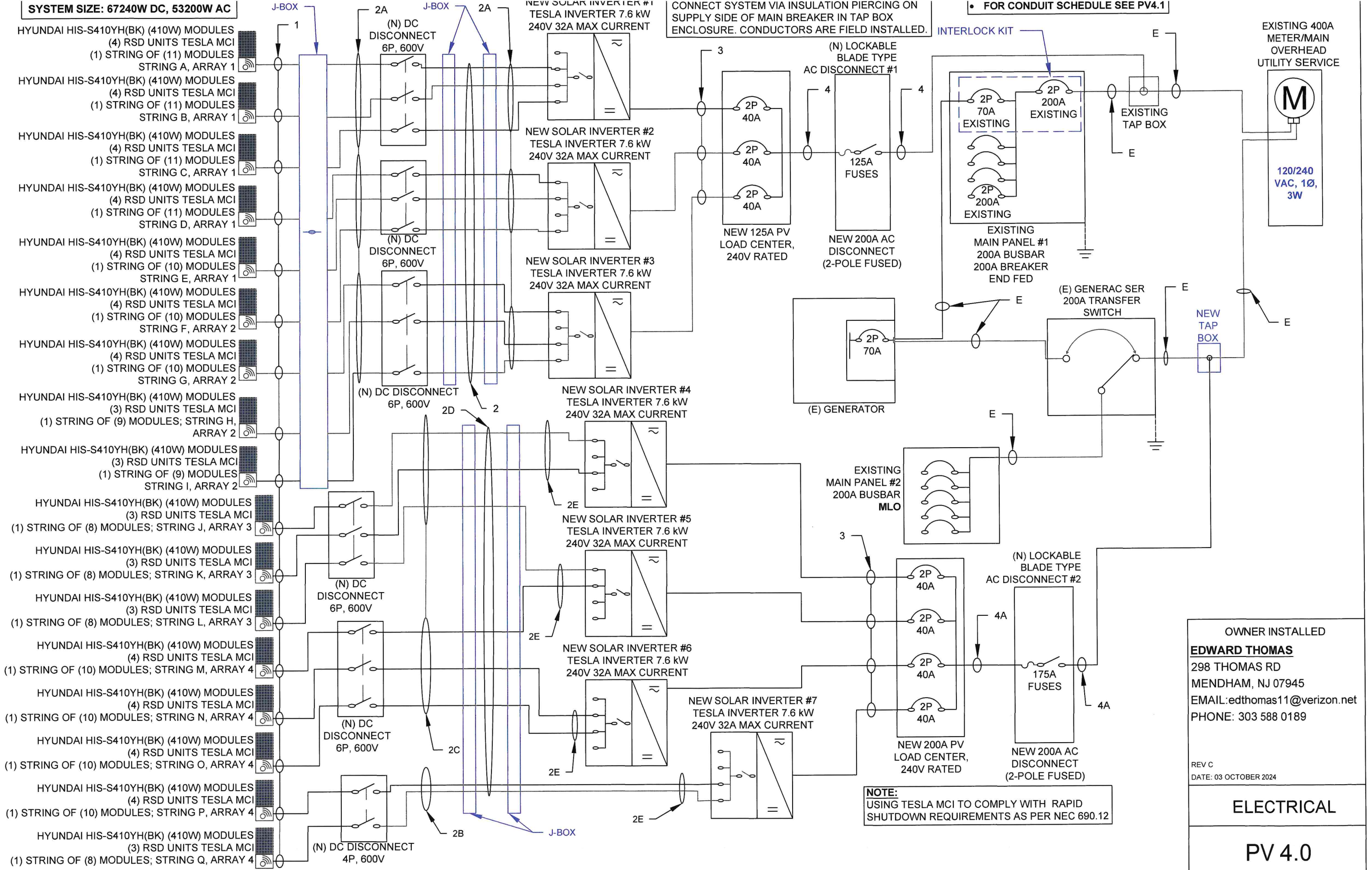
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DATE: 03 OCTOBER 2024

GROUND MOUNT
DETAIL

PV 3.4

SYSTEM SIZE: 67240W DC, 53200W AC

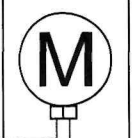


CONNECT SYSTEM VIA INSULATION PIERCING ON SUPPLY SIDE OF MAIN BREAKER IN TAP BOX ENCLOSURE. CONDUCTORS ARE FIELD INSTALLED.

FOR CONDUIT SCHEDULE SEE PV4.1

INTERLOCK KIT

EXISTING 400A METER/MAIN OVERHEAD UTILITY SERVICE



120/240 VAC, 1Ø, 3W

EXISTING TAP BOX

(E) GENERAC SER 200A TRANSFER SWITCH

NEW TAP BOX

(E) GENERATOR

EXISTING MAIN PANEL #2 200A BUSBAR MLO

(N) LOCKABLE BLADE TYPE AC DISCONNECT #2

175A FUSES

NEW 200A AC DISCONNECT (2-POLE FUSED)

NOTE: USING TESLA MCI TO COMPLY WITH RAPID SHUTDOWN REQUIREMENTS AS PER NEC 690.12

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ELECTRICAL

PV 4.0

MODULE AND ARRAY RATINGS: (164) MODULES)																			
SOLAR MODULE RATINGS (STC)			STRING A	STRING B	STRING C	STRING D	STRING E	STRING F	STRING G	STRING H	STRING I	STRING J	STRING K	STRING L	STRING M	STRING N	STRING O	STRING P	STRING Q
MAKE	HYUNDAI ENERGY SOLUTIONS CO., LTD.	SERIES	11	11	11	11	10	10	10	9	9	8	8	8	10	10	10	10	8
MODEL	HiS-S410YH(BK)	PARALLEL	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Imp	10.76A	Imp	10.76A	10.76A	10.76A	10.76A	10.76A	10.76A	10.76A	10.76A	10.76A	10.76A	10.76A	10.76A	10.76A	10.76A	10.76A	10.76A	10.76A
Vmp	38.1V	Vmp	419.10V	419.10V	419.10V	419.10V	381.00V	381.00V	381.00V	342.90V	342.90V	304.80V	304.80V	304.80V	381.00V	381.00V	381.00V	381.00V	304.80V
Isc	11.40A	Isc	11.40A	11.40A	11.40A	11.40A	11.40A	11.40A	11.40A	11.40A	11.40A	11.40A	11.40A	11.40A	11.40A	11.40A	11.40A	11.40A	11.40A
Voc	45.9V	Voc	504.90V	504.90V	504.90V	504.90V	459.00V	459.00V	459.00V	413.10V	413.10V	367.20V	367.20V	367.20V	459.00V	459.00V	459.00V	459.00V	367.20V
Pmax	410W	Pmax	4510W	4510W	4510W	4510W	4100W	4100W	4100W	3690W	3690W	3280W	3280W	3280W	4100W	4100W	4100W	4100W	3280W
%Voc/C	-0.268%%	Voc @ extreme min. temp	585.68V	585.68V	585.68V	585.68V	532.44V	532.44V	532.44V	479.20V	479.20V	425.95V	425.95V	425.95V	532.44V	532.44V	532.44V	532.44V	425.95V

INVERTERS RATINGS	
MAKE	TESLA INVERTER
MODEL	7.6 kW
MAX INPUT CURRENT	15A
MAX POWER (AC)	7600W
NOM. AC VOLTAGE	240V
MAX AC CURRENT	32A
CEC EFFICIENCY	97.5%

CONDUCTOR SIZING CALCULATIONS								
CIRCUIT DESCRIPTION	CURRENT	I _{max} (690.8(A))	I _{cont} (690.8(B)(1)) calc	SPECIFIED CONDUCTOR	AMPACITY @ 90c	AMBIENT TEMP c	CURRENT CARRYING COND.	COND. OF USE APPLIED (690.8(B)(2)(b)) calc
PV SOURCE CIRCUIT STRING A-I (MOUNTED ON ROOF)	11.40A	11.40A x 1.25 = 14.25A	14.25A x 1.25 = 17.81A	#10 THWN-2	40A	31-35	10-20	40A x 0.96 (am b. temp) x 0.5 (raceway fill) = 19.2A
PV SOURCE CIRCUIT STRING J-Q (MOUNTED ON GROUND)	11.40A	11.40A x 1.25 = 14.25A	14.25A x 1.25 = 17.81A	#10 THWN-2	40A	31-35	10-20	40A x 0.96 (am b. temp) x 0.5 (raceway fill) = 19.2A
INVERTERS AC OUTPUT	32A	32A	32A I _{max} x 1.25 = 40.00A	#8 THWN-2	55A	31-35	1-3	55A x 0.96 (am b. temp) x 1.0 (raceway fill) = 52.8A
125A PV LOAD CENTER OUTPUT	96.00A	96.00A	96.00A I _{max} x 1.25 = 120.00A	#1 THWN-2	145A	31-35	1-3	145A x 0.96 (am b. temp) x 1.0 (raceway fill) = 139.2A
200A PV LOAD CENTER OUTPUT	128.00A	128.00A	128.00A I _{max} x 1.25 = 160.00A	#2/0 THWN-2	195A	31-35	1-3	195A x 0.96 (am b. temp) x 1.0 (raceway fill) = 187.2A

CONDUIT SCHEDULE					
				GROUND	
#	CONDUIT	CONDUCTOR (RED/BLACK)	NEUTRAL (WHITE)	(GREEN)	(BARE COPPER)
1	NONE	(2) 10 AWG PV WIRE	NONE	NONE	(1) #6
2	1.25" PVC	(18) 10 AWG THHN/THWN-2	NONE	(1) 6 AWG THHN/THWN-2	NONE
2A	3/4" EMT	(6) 10 AWG THHN/THWN-2	NONE	(1) 6 AWG THHN/THWN-2	NONE
2B	1.25" PVC	(6) 10 AWG THHN/THWN-2	NONE	(1) 6 AWG THHN/THWN-2	NONE
2C	1.25" PVC	(6) 10 AWG THHN/THWN-2	NONE	(1) 6 AWG THHN/THWN-2	NONE
2D	1.25" PVC	(16) 10 AWG THHN/THWN-2	NONE	(1) 6 AWG THHN/THWN-2	NONE
2E	3/4" EMT	(4) 10 AWG THHN/THWN-2	NONE	(1) 6 AWG THHN/THWN-2	NONE
3	3/4" EMT	(2) 8 AWG THHN/THWN-2	(1) 8 AWG THHN/THWN-2	(1) 6 AWG THHN/THWN-2	NONE
4	1.25" EMT	(2) 1 AWG THHN/THWN-2	(1) 1 AWG THHN/THWN-2	(1) 6 AWG THHN/THWN-2	NONE
4A	1.5" EMT	(2) 2/0 AWG THHN/THWN-2	(1) 2/0 AWG THHN/THWN-2	(1) 6 AWG THHN/THWN-2	NONE
E	EXISTING WIRING				
(*ALL WIRE ASSUMED TO BE CU UNLESS OTHERWISE SPECIFIED)					

TERMINAL TEMPERATURE RATING CONSIDERATIONS					
CIRCUIT DESCRIPTION	CURRENT	I _{cont}	TERMINAL TEMP RATING	SPECIFIED CONDUCTOR	AMPACITY @ TERMINAL TEMP. RATING
PV SOURCE CIRCUIT STRING A-I (MOUNTED ON ROOF)	11.40A	14.25A x 1.25 = 17.81A	75C	#10	35A
PV SOURCE CIRCUIT STRING J-Q (MOUNTED ON GROUND)	11.40A	14.25A x 1.25 = 17.81A	75C	#10	35A
INVERTERS AC OUTPUT	32A	32A I _{max} x 1.25 = 40.00A	75C	#8	50A
125A PV LOAD CENTER OUTPUT	96.00A	96.00A I _{max} x 1.25 = 120.00A	75C	#1	130A
200A PV LOAD CENTER OUTPUT	128.00A	128.00A I _{max} x 1.25 = 160.00A	75C	#2/0	175A

VOLTAGE DROP CALCULATIONS						
	LENGTH	I	Ohms/kFt	V	CALC	Vdrop
PV SOURCE CIRCUIT STRING A-D	290Ft	11.40A	0.9989	419.10V	290' x 11.40A x 2 x 0.9989/1000'/419.10V=	1.58%
PV SOURCE CIRCUIT STRING E-G	290Ft	11.40A	0.9989	381.00V	290' x 11.40A x 2 x 0.9989/1000'/381.00V=	1.73%
PV SOURCE CIRCUIT STRING H-I	290Ft	11.40A	0.9989	342.90V	290' x 11.40A x 2 x 0.9989/1000'/342.90V=	1.58%
PV SOURCE CIRCUIT STRING J-L	260Ft	11.40A	0.9989	304.80V	260' x 11.40A x 2 x 0.9989/1000'/304.80V=	1.94%
PV SOURCE CIRCUIT STRING M-P	210Ft	11.40A	0.9989	381.00V	210' x 11.40A x 2 x 0.9989/1000'/381.00V=	1.26%
PV SOURCE CIRCUIT STRING Q	210Ft	11.40A	0.9989	304.80V	230' x 11.40A x 2 x 0.9989/1000'/304.80V=	1.57%
INVERTERS AC OUTPUT	30Ft	32A	0.6282	240V	30' x 32A x 2 x 0.6282/1000'/240V=	0.50%
125A PV LOAD CENTER OUTPUT	30Ft	96.00A	0.1239	240V	30' x 96.00A x 2 x 0.1239/1000'/240V=	0.30%
200A PV LOAD CENTER OUTPUT	30Ft	128.00A	0.07793	240V	30' x 128.00A x 2 x 0.07793/1000'/240V=	0.25%

OWNER INSTALLED
EDWARD THOMAS
298 THOMAS RD
MENDHAM, NJ 07945
EMAIL:edthomas11@verizon.net
PHONE: 303 588 0189

REV C
DATE: 03 OCTOBER 2024

ELECTRICAL

PV 4.1

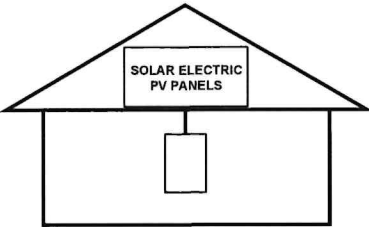
INSTALL ON THE UTILITY METER

⚠ WARNING

THIS SERVICE METER
IS ALSO SERVED BY A
PHOTOVOLTAIC SYSTEM

INSTALL ON THE MAIN BREAKER PANEL

**SOLAR PV SYSTEM
EQUIPPED WITH
RAPID SHUTDOWN**



TURN RAPID SHUTDOWN SWITCH TO
THE "OFF" POSITION TO SHUT DOWN
PV SYSTEM AND REDUCE
SHOCK HAZARD IN THE ARRAY

INSTALL INSIDE THE MAIN BREAKER
PANEL, NEXT TO THE SOLAR BREAKER

PHOTOVOLTAIC
SOLAR BREAKER

DO NOT RELOCATE THIS
OVERCURRENT DEVICE

INSTALL ON THE AC DISCONNECT #1

**PHOTOVOLTAIC SYSTEM
⚠ AC DISCONNECT ⚠**

RATED AC OUTPUT CURRENT: 96.00A
NOMINAL OPERATING AC VOLTAGE: 240V

INSTALL ON THE AC DISCONNECT #2

**PHOTOVOLTAIC SYSTEM
⚠ AC DISCONNECT ⚠**

RATED AC OUTPUT CURRENT: 128.00A
NOMINAL OPERATING AC VOLTAGE: 240V

INSTALL ON THE AC DISCONNECTS

⚠ WARNING

ELECTRIC SHOCK HAZARD

TERMINALS ON THE LINE AND
LOAD SIDES MAY BE ENERGIZED
IN THE OPEN POSITION

INSTALL ON THE PV COMBINER

⚠ WARNING

PHOTOVOLTAIC SYSTEM
COMBINER PANEL

DO NOT ADD LOADS

INSTALL ON THE INVERTERS

DC DISCONNECT

⚠ WARNING

ELECTRIC SHOCK HAZARD

IF GROUND FAULT IS INDICATED
ALL NORMALLY GROUNDED
CONDUCTORS MAY BE
UNGROUND AND ENERGIZED

**DIRECT CURRENT
PHOTOVOLTAIC
POWER SOURCE**

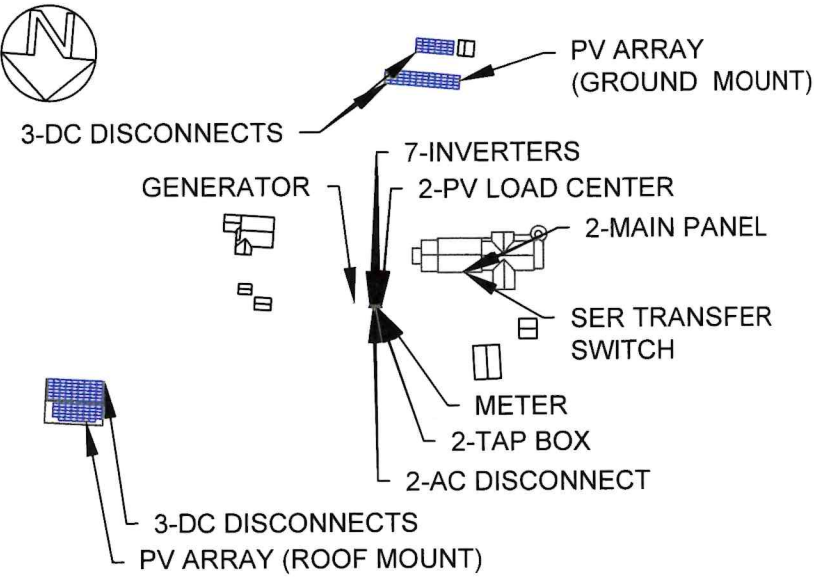
MAXIMUM VOLTAGE: 600 VOLTS
MAX CIRCUIT CURRENT: 30 AMPS

INSTALL EVERY 10 FEET ON EXTERIOR CONDUIT.

**WARNING: PHOTOVOLTAIC
POWER SOURCE**

CAUTION:

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



298 THOMAS RD, MENDHAM, NJ 07945

OWNER INSTALLED
EDWARD THOMAS
298 THOMAS RD
MENDHAM, NJ 07945
EMAIL: edthomas11@verizon.net
PHONE: 303 588 0189

REV C
DATE: 03 OCTOBER 2024

WARNING LABELS

PV 5.0

HD HYUNDAI SOLAR MODULE

YH

SERIES

Dual Black Max

HIS-S400YH(BK)

HIS-S405YH(BK)

HIS-S410YH(BK)

Higher Bifacial Cells

More Power Generation In Low Light

All black Module For Sleek Design (Black Meshed T-Backsheet)

Hyundai Cell

Product & Performance Warranty

Maximized Power Generation

Half-Cut & Multi-Wire Technology

Anti-LID / PID

Mechanical Strength

Certified Test Labs

Reliable Warranty

25 YEARS

• 25-Year Product Warranty
• Materials and workmanship

25 YEARS

• 25-Year Performance Warranty
• Initial year : 98.0%
• Linear warranty after initial year : with 0.54%p annual degradation, 85.0% is guaranteed up to 25years

Certification

UL61730 certified by UL, Type II(for Fire Class A)

Increased total power output through capturing light from both the front and back of Bifacial solar modules. Back side power gain up to 25% of the front output depending on PV system design.

Improved current flow with half-cut technology and multi thin wiring technology allows high module efficiency. It also reduces power generation loss due to micro-cracks.

Both LID(Light Induced Degradation) and PID(Potential Induced Degradation) are significantly reduced to ensure higher actual yield during lifetime.

Tempered glass and reinforced frame design withstand rigorous weather conditions such as heavy snow(5,400Pa) and strong wind(5,400Pa).

HD Hyundai's R&D center is an accredited test laboratory of UL, international certification institutions, and guarantees the best quality in the world through rigorous product testing.

HD Hyundai Energy Solutions, Global brand with powerful financial strength, offers a 25-year warranty and comprehensive customer after-sales service.

HD Hyundai's Warranty Provisions

About HD Hyundai Energy Solutions

Established in 1972, HD Hyundai Group is one of the most trusted names in the heavy industries sector and is a Fortune 500 company. As a global leader and innovator, HD Hyundai is committed to building a future growth engine by developing and investing heavily in the field of renewable energy.

As a core energy business entity of HD, HD Hyundai Energy Solutions has strong pride in providing high-quality PV products to more than 3,000 customers worldwide.

www.hd-hyundais.us

HD HYUNDAI ENERGY SOLUTIONS

Electrical Characteristics

Power Class of YH(BK) Series		400	405	410
Nominal Output (Pmpp)	W	400	405	410
Open Circuit Voltage (Voc)	V	45.3	45.6	45.9
Short Circuit Current (Isc)	A	11.25	11.33	11.40
Voltage at Pmax (Vmp)	V	37.7	37.9	38.1
Current at Pmax (Impp)	A	10.61	10.69	10.76
Module Efficiency	%	20.0	20.3	20.5
Cell Type	-	Mono crystalline, 9busbar		
Maximum System Voltage	V	1,500		
Temperature Coefficient of Pmax	%/K	-0.347		
Temperature Coefficient of Voc	%/K	-0.268		
Temperature Coefficient of Isc	%/K	+0.032		

*All data at STC (Standard Test Conditions). Above data may be changed without prior notice.

Additional Power Gain from rear side		400	405	410
5%	W	415	425	431
15%	W	454	466	472
25%	W	494	506	513

Mechanical Characteristics

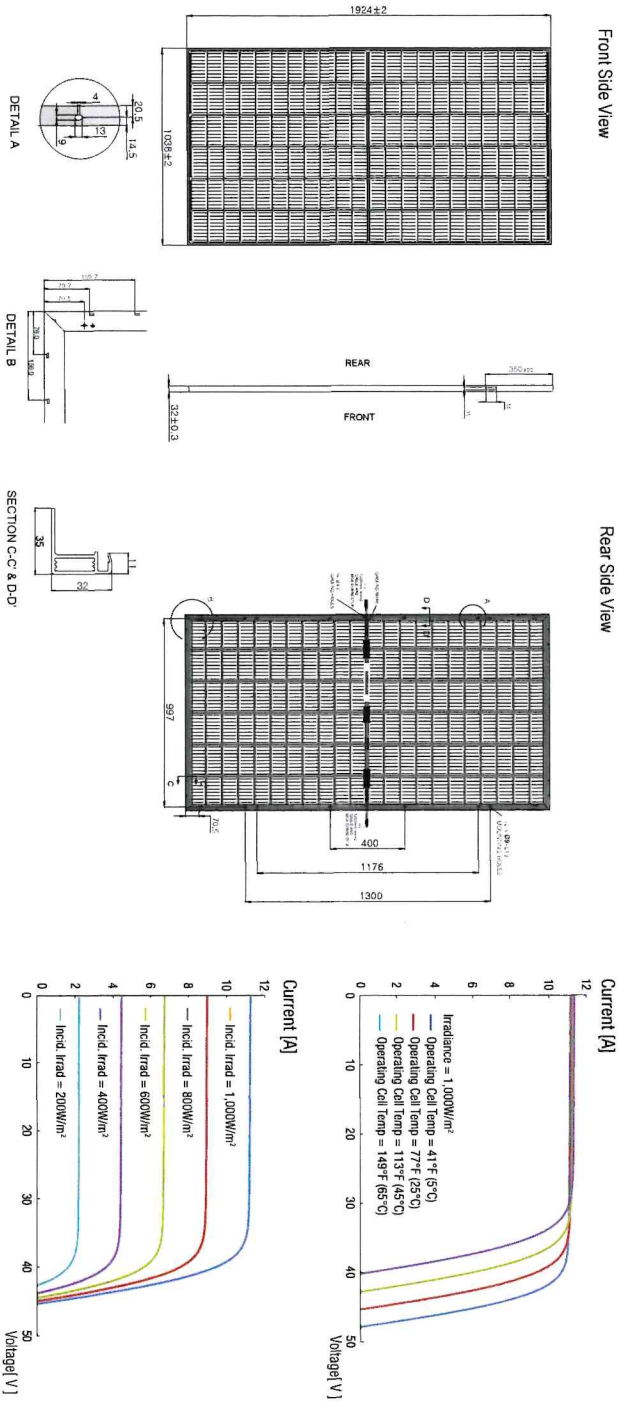
Dimensions	75.7 in (L) x 40.9 in (W) x 1.3 in (H) (1,924mm x 1,038mm x 32mm)
Weight	Approx. 46.5 lbs (21.1 kg)
Solar Cells	132 half cut bifacial cells (2 parallel x 66 half cells in series)
Output Cables	Cable : 47.2 in (1,200mm) / 4mm ² Connector : MC4 genuine connector
Junction Box	IP68, weatherproof, IEC certified (UL listed)
Bypass Diodes	3 bypass diodes to prevent power decrease by partial shade
Construction	Front : 3.2mm, High Transmission, AR Coated Tempered Glass Encapsulant : EVA Back Sheet : Black Meshed Transparent Backsheet
Frame	Anodized aluminum alloy type 6063

Installation Safety Guide

- Only qualified personnel should install or perform maintenance.
- Be aware of dangerous high DC voltage.
- Do not damage or scratch the rear surface of the module.
- Do not handle or install modules when they are wet.

Nominal Operating Cell Temperature	113.9°F ± 3.6°F (45.5°C ± 2°C)
Operating Temperature	-40°F ~ +185°F (-40°C ~ + 85°C)
Maximum System Voltage	DC 1,500V
Maximum Reverse Current	20A
Maximum Test Load	Front 5,400 Pa (113 psf) Rear 5,400 Pa (113 psf)

Module Diagram (unit : mm)

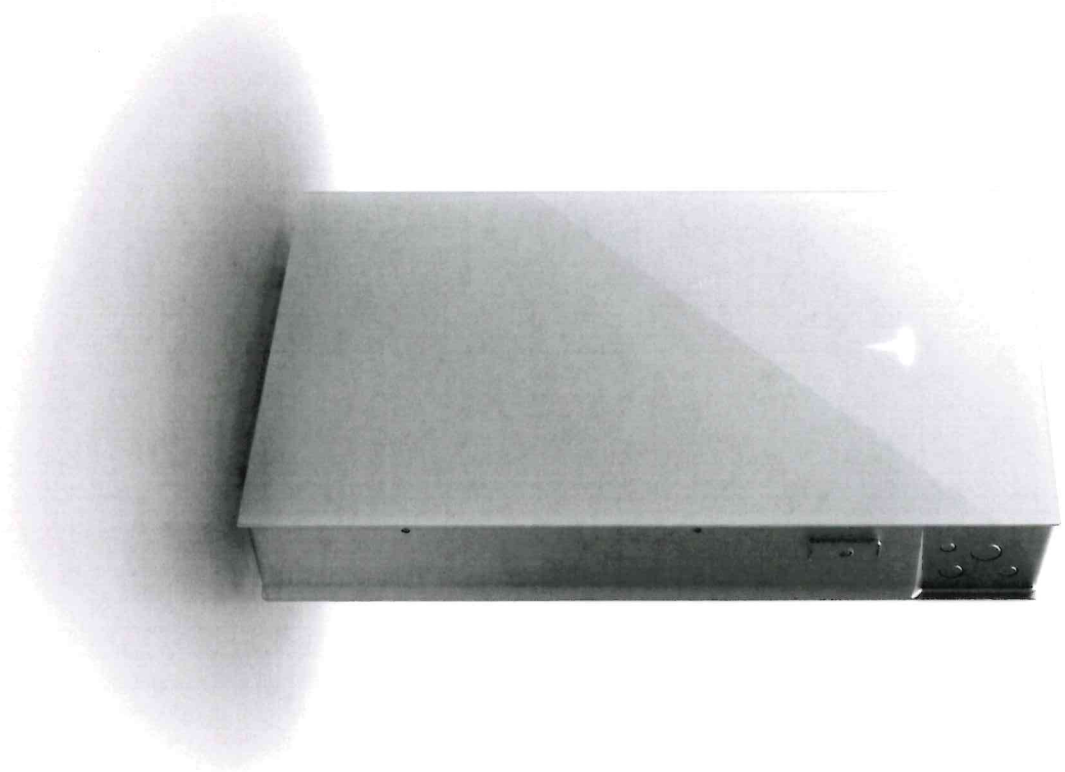


Powerwall 3

Power Everything

Powerwall 3 is a fully integrated solar and battery system, designed to accelerate the transition to sustainable energy. Customers can receive whole home backup, cost savings, and energy independence by producing and consuming their own energy while participating in grid services. Once installed, customers can manage their system using the Tesla App to customize system behavior to meet their energy goals.

Powerwall 3 achieves this by supporting up to 20 kW DC of solar and providing 11.5 kW AC of continuous power per unit. It has the ability to start heavy loads up to 185 A LRA, meaning a single unit can support the power needs of most homes. Powerwall 3 is designed for mass production, fast and efficient installations, easy system expansion, and simple connection to any electrical service.



Powerwall 3 Technical Specifications

System Technical Specifications

Model Number	1707000-xx-y
Nominal Grid Voltage (Input & Output)	120/240 VAC
Grid Type	Split phase
Frequency	60 Hz
Overcurrent Protection Device	Configurable up to 60 A
Solar to Battery to Home/Grid Efficiency	89% ^{1,2}
Solar to Home/Grid Efficiency	97.5% ³
Supported Islanding Devices	Backup Gateway 2, Backup Switch
Connectivity	Wi-Fi (2.4 and 5 GHz), Dual-port switched Ethernet, Cellular (LTE/4G ⁴)
Hardware Interface	Dry contact relay, Rapid Shutdown (RSD) certified switch and 2-pin connector, RS-485 for meters
AC Metering	Revenue Grade (+/- 0.5%)
Protections	Integrated arc fault circuit interrupter (AFCI), Isolation Monitor Interrupter (IMI), PV Rapid Shutdown (RSD) using Tesla Mid-Circuit Interrupters
Customer Interface	Tesla Mobile App
Warranty	10 years

Solar Technical Specifications

Maximum Solar STC Input	20 kW
Withstand Voltage	600 V DC
PV DC Input Voltage Range	60 – 550 V DC
PV DC MPPT Voltage Range	150 – 480 V DC
MPPTs	6
Maximum Current per MPPT (I_{mp})	13 A ⁵
Maximum Short Circuit Current per MPPT (I_{sc})	15 A ⁵

Battery Technical Specifications

Nominal Battery Energy	13.5 kWh AC ²
Maximum Continuous Discharge Power	11.5 kW AC
Maximum Continuous Charge Power	5 kW AC
Output Power Factor Rating	0 - 1 (Grid Code configurable)
Maximum Continuous Current	48 A
Maximum Output Fault Current	10 kA
Load Start Capability (1 s)	185 A LRA
Power Scalability	Up to 4 Powerwall 3 units supported

¹ Typical solar shifting use case.
² Values provided for 25°C (77°F), at beginning of life. 3.3 kW charge/discharge power.
³ Tested using CEC weighted efficiency methodology.
⁴ Cellular connectivity subject to network service coverage and signal strength.
⁵ Where the DC input current exceeds the MPPT rating, a jumper can be used to combine two MPPTs into a single input to intake DC current up to 26 A I_{mp} / 30 A I_{sc} .

Powerwall 3 Technical Specifications

Environmental Specifications

Operating Temperature	-20°C to 50°C (-4°F to 122°F) ⁶
Operating Humidity (RH)	Up to 100%, condensing
Storage Temperature	-20°C to 30°C (-4°F to 86°F), up to 95% RH, non-condensing, State of Energy (SOE): 25% initial
Maximum Elevation	3000 m (9843 ft)
Environment	Indoor and outdoor rated
Enclosure Rating	NEMA 3R
Ingress Rating	IPX7 (Battery & Power Electronics) IPX5 (Wiring Compartment)
Pollution Rating	PD3
Operating Noise @ 1 m	< 50 db(A) typical < 62 db(A) maximum

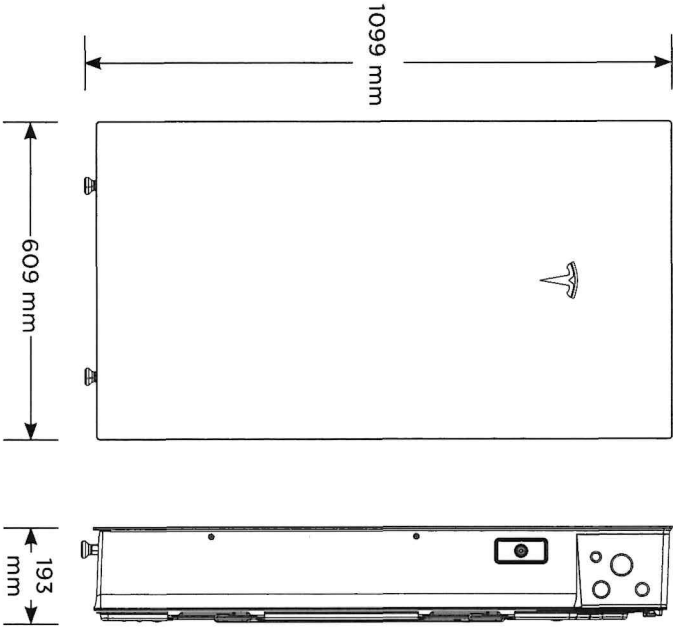
⁶ Performance may be de-rated at operating temperatures above 40°C (104°F).

Compliance Information

Certifications	UL 1642, UL 1699B, UL 1741, UL 1741 SA, UL 1741 SB, UL 3741, UL 1973, UL 1998, UL 9540, IEEE 1547-2018, IEEE 1547.1, UN 38.3
Grid Connection	United States
Emissions	FCC Part 15 Class B
Environmental	RoHS Directive 2011/65/EU
Seismic	AC156, IEEE 693-2005 (high)
Fire Testing	Meets the unit level performance criteria of UL 9540A

Mechanical Specifications

Dimensions	1099 x 609 x 193 mm (43.25 x 24 x 7.6 in)
Weight	130 kg (287 lb)
Mounting Options	Floor or wall mount



Solar Shutdown Device Technical Specifications

The Solar Shutdown Device is a Mid-Circuit Interrupter (MCI) and is part of the PV system rapid shutdown (RSD) function in accordance with Article 690 of the applicable NEC. When paired with Powerwall 3, solar array shutdown is initiated by any loss of AC power.

Electrical Specifications	Model	MCI-1	MCI-2
	Nominal Input DC Current Rating (I_{mp})	12 A	13 A
	Maximum Input Short Circuit Current (I_{sc})	19 A	17 A
	Maximum System Voltage (PVHCS)	600 V DC	1000 V DC ⁷
	⁷ Maximum System Voltage is limited by Powerwall to 600 V DC.		

RSD Module Performance	Maximum Number of Devices per String	5	5
	Control	Power Line Excitation	Power Line Excitation
	Passive State	Normally Open	Normally Open
	Maximum Power Consumption	7 W	7 W
	Warranty	25 years	25 years

Environmental Specifications	Operating Temperature	-40°C to 50°C (-40°F to 122°F)	-45°C to 70°C (-49°F to 158°F)
	Storage Temperature	-30°C to 70°C (-22°F to 158°F)	-30°C to 70°C (-22°F to 158°F)
	Enclosure Rating	NEMA 4X / IP65	NEMA 4X / IP65

Mechanical Specifications	Electrical Connections	MC4 Connector	MC4 Connector
	Housing	Plastic	Plastic
	Dimensions	125 x 150 x 22 mm (5 x 6 x 1 in)	173 x 45 x 22 mm (6.8 x 1.8 x 1 in)
	Weight	350 g (0.77 lb)	120 g (0.26 lb)
	Mounting Options	ZEP Home Run Clip M4 Screw (#10) M8 Bolt (5/16") Nail / Wood screw	Wire Clip

Compliance Information	Certifications	UL 1741 PVRSE, UL 3741, PVRSA (Photovoltaic Rapid Shutdown Array)
	RSD Initiation Method	External System Shutdown Switch or Powerwall 3 Enable Switch

UL 3741 PV Hazard Control (and PVRSA) Compatibility

The following categories of solar module meet the UL 3741 PVHCS listing when installed with Powerwall 3 and Solar Shutdown Devices.

Tesla Solar Roof	PV Hazard Control System: BIPV compliance document
Tesla or Hanwha (Q.Peak Duo BLK or BLK-G6+)	PV Hazard Control System: ZS PVHCS compliance document
Modules certified for use with ZEP racking	
Other module and racking combinations	PV Hazard Control System: Generic PV Array compliance document

Backup Gateway 2

Backup Gateway 2 controls connection to the grid when paired with Powerwall 3, automatically detecting outages and providing seamless transition to backup power. Backup Gateway 2 also provides energy metering for solar self-consumption, time-based control, and backup operation.

In this system configuration, Powerwall 3 acts as the Site Controller, with the Backup Gateway 2 Site Controller disabled.

Performance Specifications		Model Number	1232100-xx-y	User Interface	Tesla App
AC Voltage (Nominal)		120/240 V	Operating Modes	Support for solar self-consumption, time-based control, and backup	
Feed-in Type		Split phase	Backup Transition	Automatic disconnect for seamless backup	
Grid Frequency		60 Hz	Modularity	Supports up to 10 AC-coupled Powerwalls	
Current Rating		200 A	Optional Internal Panelboard	200 A 6-space / 12 circuit breakers Siemens QP or Square D HOM breakers rated 10 - 80A or Eaton BR breakers rated 10 - 125A	
Maximum Supply Short Circuit Current		10 kA ⁹			
Overcurrent Protection Device		100 - 200 A, Service entrance rated ⁹			
Overvoltage Category		Category IV	Warranty		
Internal Primary AC Meter		Revenue accurate (+/- 0.2%)	10 years		
Internal Auxiliary AC Meter		Revenue accurate (+/- 2%)	¹⁰ When protected by Class J fuses, Backup Gateway 2 is suitable for use in circuits capable of delivering not more than 22kA symmetrical amperes.		
Primary Connectivity		Ethernet, Wi-Fi	¹¹ The customer is expected to provide internet connectivity for Backup Gateway 2; cellular should not be used as the primary mode of connectivity. Cellular		
Secondary Connectivity		Cellular (3G, LTE/4G) ¹⁰			

¹⁰ When protected by Class J fuses, Backup Gateway 2 is suitable for use in circuits capable of delivering not more than 22kA symmetrical amperes.

¹¹ The customer is expected to provide internet connectivity for Backup Gateway 2; cellular should not be used as the primary mode of connectivity. Cellular connectivity subject to network operator service coverage and signal strength.

Environmental Specifications

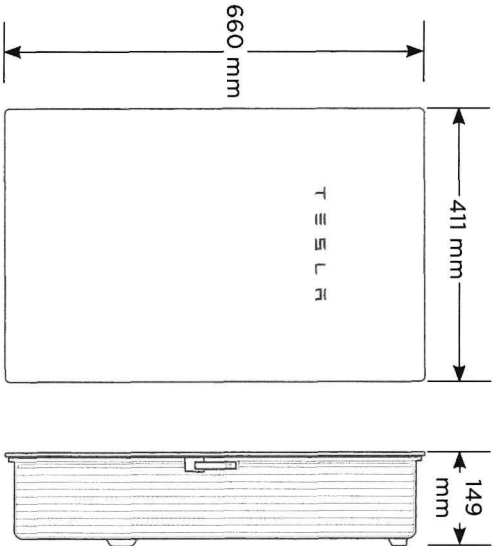
Operating Temperature	-20°C to 50°C (-4°F to 122°F)
Operating Humidity (RH)	Up to 100%, condensing
Maximum Elevation	3000 m (9843 ft)
Environment	Indoor and outdoor rated
Enclosure Type	NEMA 3R

Compliance Information

Certifications	UL 67, UL 869A, UL 916, UL 1741 PCS, CSA 22.2 0.19, CSA 22.2 205
Emissions	FCC Part 15, ICES 003

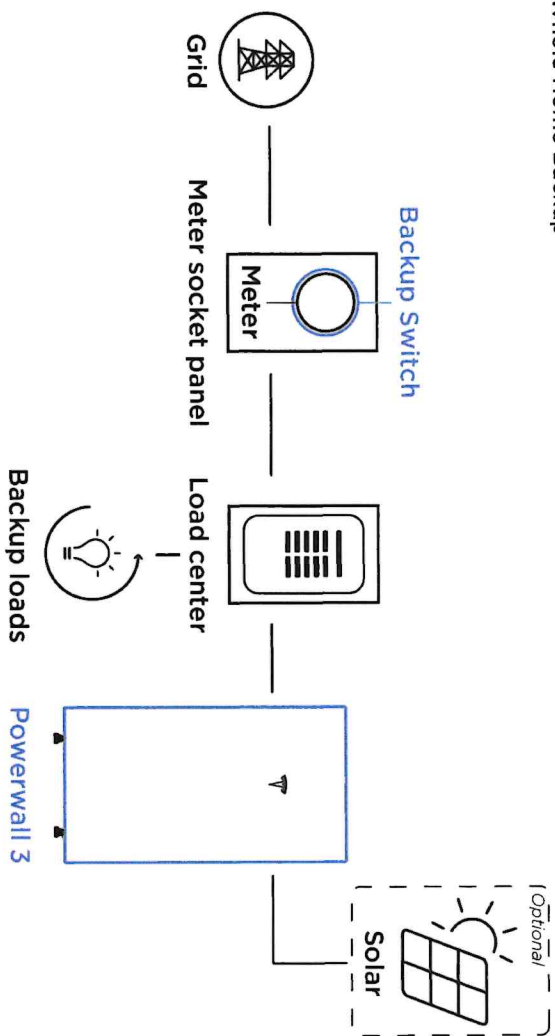
Mechanical Specifications

Dimensions	660 x 411 x 149 mm (26 x 16 x 6 in)
Weight	20.4 kg (45 lb)
Mounting options	Wall mount, Semi-flush mount

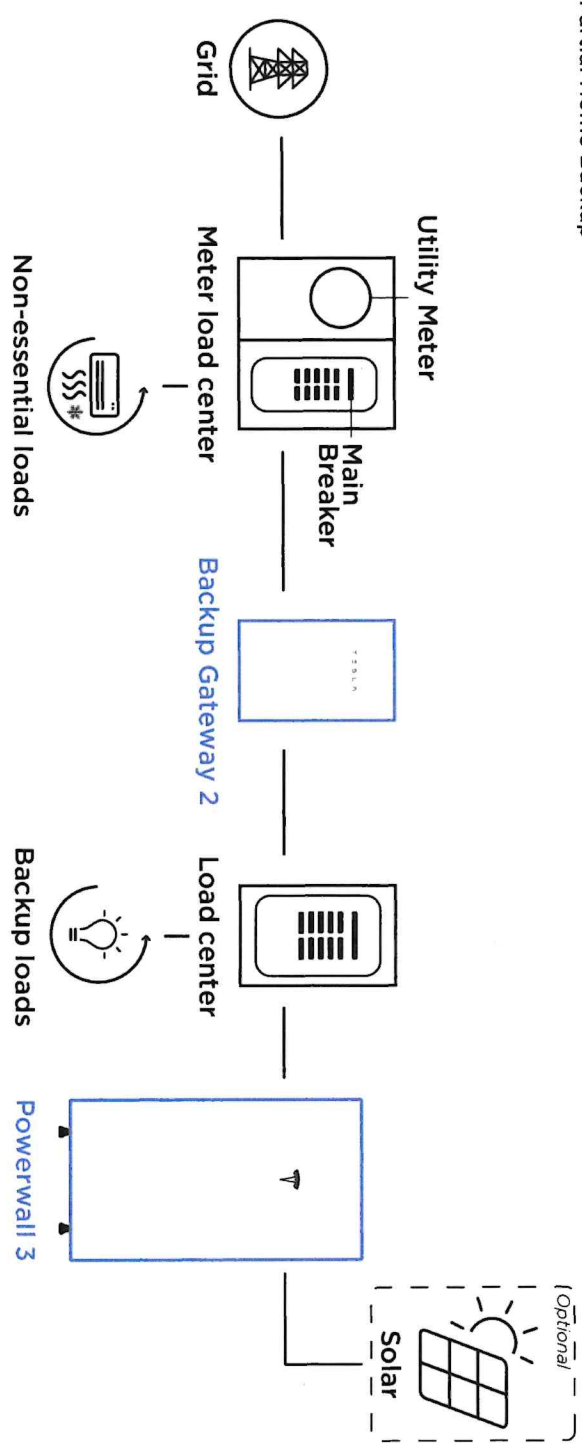


Powerwall 3 Example System Configurations

Powerwall 3 with Backup Switch
Whole Home Backup



Powerwall 3 with Backup Gateway 2
Partial Home Backup



S-5![®]

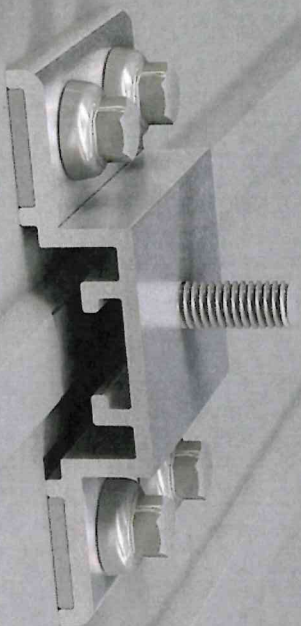
The Right Way![®]

Introducing the new SolarFoot[™] for exposed fastener metal roofing with the strength, testing, quality, and time-proven integrity you expect from S-5!. The SolarFoot provides an ideal mounting platform to attach the L-Foot (not included) of a rail-mounted PV system to the roof. This solution is The Right Way to secure rail-mounted solar systems to exposed fastener metal such as AG-Panel or R-Panel.

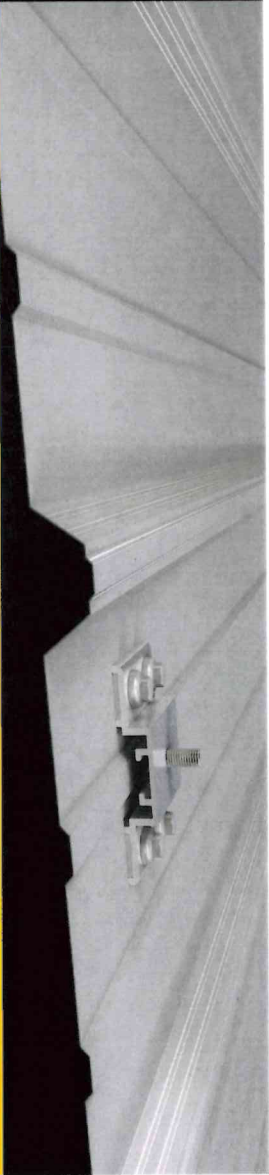
SolarFoot Features:

- Manufactured in the U.S.A. from certified raw material
- Fabricated in our own ISO 9002 certified factory
- All aluminum and stainless components
- Lifetime limited warranty
- Compatible with all commercial L-Foot products on the market
- Factory applied 40-year isobutylene/isoprene crosslink polymer sealant for reliable weathertightness
- Sealant reservoir to prevent over compression of sealant
- Load-to-failure tested Normal to Seam by a nationally accredited laboratory on thousands of metal roof manufacturers, profiles and materials
- Four points of attachment into structure or deck with tested holding strength for engineered applications
- Integrated with M8-1.25x17mm stud and M8-1.25 stainless steel hex flange nut included

The right way to attach almost anything to metal roofs!

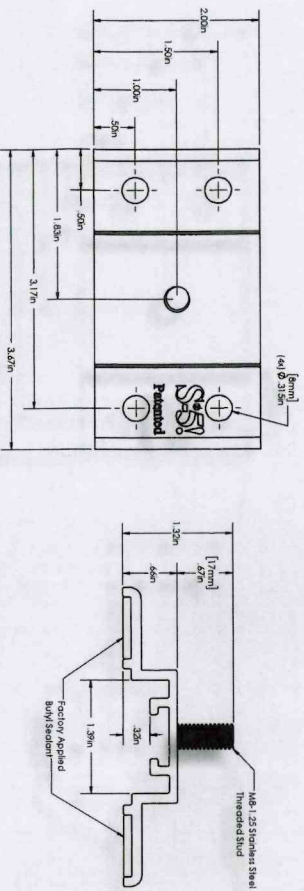


888-825-3432 | www.S-5.com | 



SolarFoot™: Mounting for Exposed Fastener Roofing

The SolarFoot is a simple, cost-effective pedestal for L-Foot (not included) attachment of rail-mounted solar PV. The unique design is compatible with all rail producer L-Foot components. The new SolarFoot assembly ensures a durable weathertight solution for the life of the roof. Special factory applied butyl co-polymeric sealant contained in a reservoir is The Right Way, allowing a water-tested seal. Stainless integrated stud and hex flange lock-nut secure the L-Foot into position. A low center of gravity reduces the moment arm commonly associated with L-Foot attachments. Direct attachment of the SolarFoot to the structural member or deck provides unparalleled holding strength.



**Fasteners sold separately. Fastener type varies with substrate. Contact S-5! on how to purchase fasteners and obtain our test results. L-Foot also sold separately.*

Fastener Selection

Metal to Metal:
1/4-14 Self Drilling Screw
1-1/2" to 2-1/2"

Metal to Wood:
1/4-14 Type 17 AB Milled Point
1-1/2" to 2-1/2"

To source fasteners for your projects, contact S-5!

When other brands claim to be "just as good as S-5!", tell them to PROVE IT.

SolarFoot Advantages:

Exposed fasten mounting platform for solar arrays attached via L-Foot and Rails

Weatherproof attachment to exposed fastener roofing

Butyl sealant reservoir provides long-term waterproof seal

M8-1.25x17mm stud with M8 hex flange nut for attachment of all popular L-Foot/rail combinations

Tool: 13 mm Hex Socket or 1/2" Hex Socket

Electric screw gun with hex drive socket for self tapping screws

Low Center of Gravity reduces moment arm commonly associated with L-Foot/Rail solar mounting scenarios

Attaches directly to structure or deck for optimal holding strength

S-5! Recommended substrate-specific (e.g., steel purlin, wood 2x4, OSB, etc.) fasteners provide excellent waterproofing and pull out strength

Fastener through-hole locations comply with NDS (National Design Specification) for Wood Construction

S-5!® Warning! Please use this product responsibly!

Distributed by:

The independent lab test data found at www.S-5.com can be used for load-critical designs and applications.

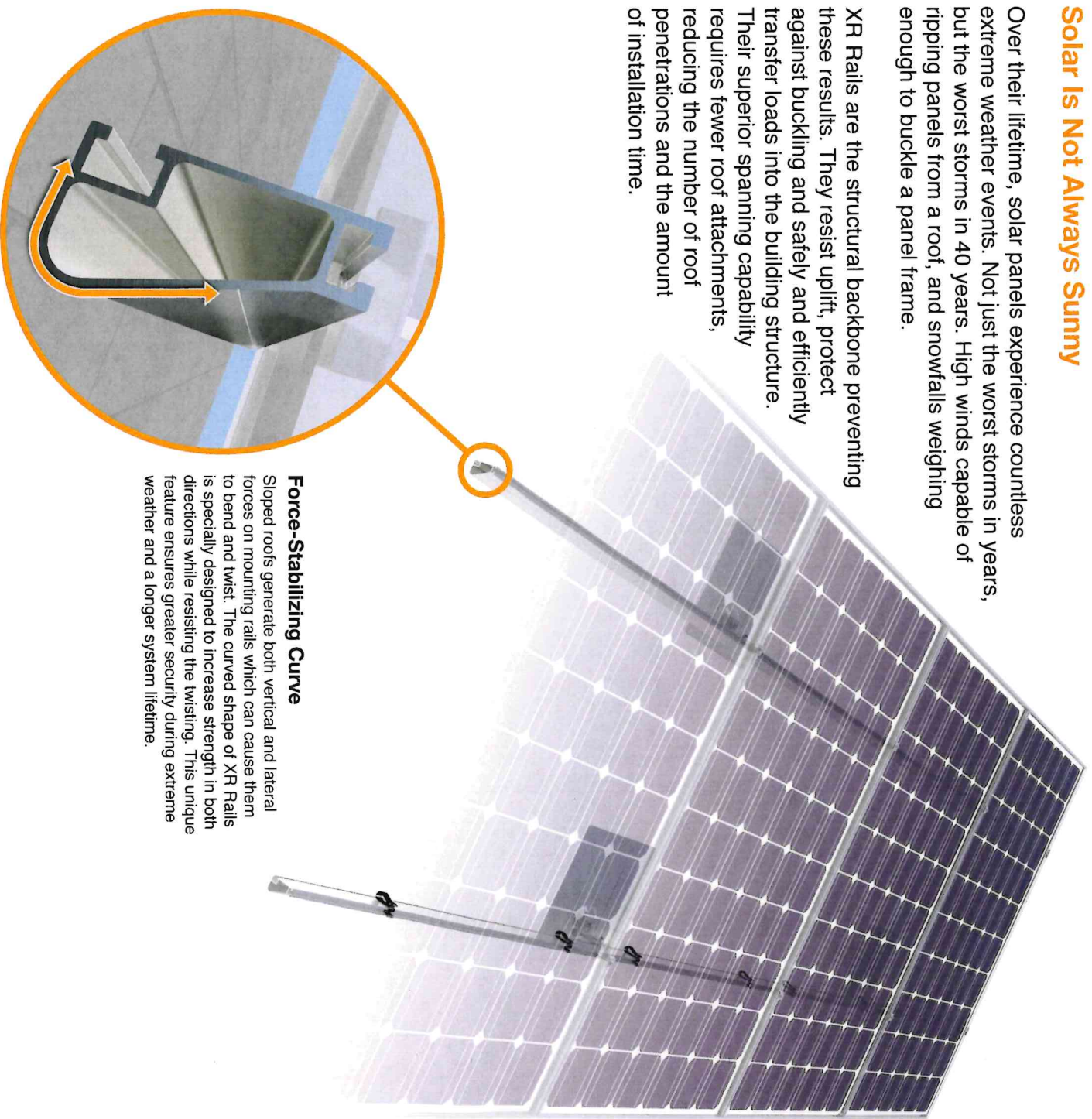
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Solar Is Not Always Sunny

Over their lifetime, solar panels experience countless extreme weather events. Not just the worst storms in years, but the worst storms in 40 years. High winds capable of ripping panels from a roof, and snowfalls weighing enough to buckle a panel frame.

XR Rails are the structural backbone preventing these results. They resist uplift, protect against buckling and safely and efficiently transfer loads into the building structure. Their superior spanning capability requires fewer roof attachments, reducing the number of roof penetrations and the amount of installation time.



Force-Stabilizing Curve

Sloped roofs generate both vertical and lateral forces on mounting rails which can cause them to bend and twist. The curved shape of XR Rails is specially designed to increase strength in both directions while resisting the twisting. This unique feature ensures greater security during extreme weather and a longer system lifetime.

Compatible with Flat & Pitched Roofs



XR Rails are compatible with FlashFoot and other pitched roof attachments.



IronRidge offers a range of tilt leg options for flat roof mounting applications.

Corrosion-Resistant Materials

All XR Rails are made of marine-grade aluminum alloy, then protected with an anodized finish. Anodizing prevents surface and structural corrosion, while also providing a more attractive appearance.



XR Rail Family

The XR Rail Family offers the strength of a curved rail in three targeted sizes. Each size supports specific design loads, while minimizing material costs. Depending on your location, there is an XR Rail to match.



XR10

XR10 is a sleek, low-profile mounting rail, designed for regions with light or no snow. It achieves 6 foot spans, while remaining light and economical.

- 6' spanning capability
- Moderate load capability
- Clear anodized finish
- Internal splices available



XR100

XR100 is the ultimate residential mounting rail. It supports a range of wind and snow conditions, while also maximizing spans up to 8 feet.

- 8' spanning capability
- Heavy load capability
- Clear & black anodized finish
- Internal splices available



XR1000

XR1000 is a heavyweight among solar mounting rails. It's built to handle extreme climates and spans 12 feet or more for commercial applications.

- 12' spanning capability
- Extreme load capability
- Clear anodized finish
- Internal splices available

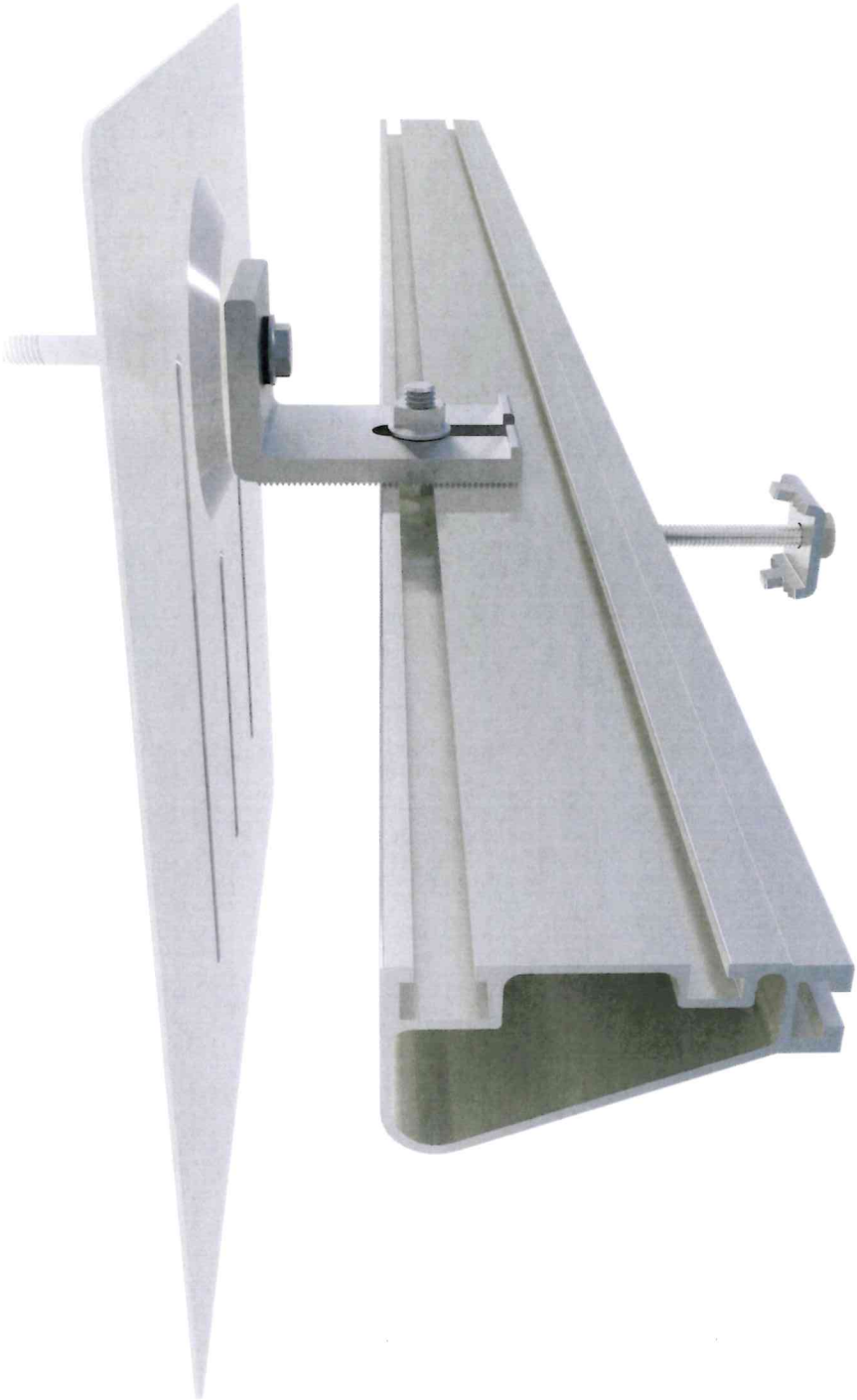
Rail Selection

The following table was prepared in compliance with applicable engineering codes and standards. Values are based on the following criteria: ASCE 7-10, Roof Zone 1, Exposure B, Roof Slope of 7 to 27 degrees and Mean Building Height of 30 ft. Visit IronRidge.com for detailed span tables and certifications.

Load		Rail Span					
Snow (PSF)	Wind (MPH)	4'	5' 4"	6'	8'	10'	12'
None	100	XR10				XR1000	
	120						
	140						
	160						
10-20	100						
	120						
	140						
	160						
30	100						
	160						
40	100						
	160						
50-70	160						
80-90	160						



Roof Mount System



Built for solar's toughest roofs.

IronRidge builds the strongest roof mounting system in solar. Every component has been tested to the limit and proven in extreme environments.

Our rigorous approach has led to unique structural features, such as curved rails and reinforced flashings, and is also why our products are fully certified, code compliant and backed by a 20-year warranty.



Strength Tested

All components evaluated for superior structural performance.



Class A Fire Rating

Certified to maintain the fire resistance rating of the existing roof.



PE Certified

Pre-stamped engineering letters available in most states.



Design Software

Online tool generates a complete bill of materials in minutes.



Integrated Grounding

UL 2703 system eliminates separate module grounding components.







20 Year Warranty


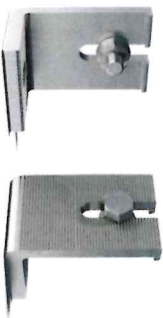


Twice the protection offered by competitors.



XR Rails

XR10 Rail	XR100 Rail	XR1000 Rail	Internal Splices
			
<p>A low-profile mounting rail for regions with light snow.</p> <ul style="list-style-type: none">• 6' spanning capability• Moderate load capability• Clear & black anod. finish	<p>The ultimate residential solar mounting rail.</p> <ul style="list-style-type: none">• 8' spanning capability• Heavy load capability• Clear & black anod. finish	<p>A heavyweight mounting rail for commercial projects.</p> <ul style="list-style-type: none">• 12' spanning capability• Extreme load capability• Clear anodized finish	<p>All rails use internal splices for seamless connections.</p> <ul style="list-style-type: none">• Self-tapping screws• Varying versions for rails• Grounding Straps offered

Attachments

FlashFoot	Slotted L-Feet	Standoffs	Tilt Legs
			
<p>Anchor, flash, and mount with all-in-one attachments.</p> <ul style="list-style-type: none">• Ships with all hardware• IBC & IRC compliant• Certified with XR Rails	<p>Drop-in design for rapid rail attachment.</p> <ul style="list-style-type: none">• High-friction serrated face• Heavy-duty profile shape• Clear & black anod. finish	<p>Raise flush or tilted systems to various heights.</p> <ul style="list-style-type: none">• Works with vent flashing• Ships pre-assembled• 4" and 7" Lengths	<p>Tilt assembly to desired angle, up to 45 degrees.</p> <ul style="list-style-type: none">• Attaches directly to rail• Ships with all hardware• Fixed and adjustable

Clamps & Grounding

End Clamps	Grounding Mid Clamps	T-Bolt Grounding Lugs	Accessories
			
<p>Slide in clamps and secure modules at ends of rails.</p> <ul style="list-style-type: none">• Mill finish & black anod.• Sizes from 1.22" to 2.3"• Optional Under Clamps	<p>Attach and ground modules in the middle of the rail.</p> <ul style="list-style-type: none">• Parallel bonding T-bolt• Reusable up to 10 times• Mill & black stainless	<p>Ground system using the rail's top slot.</p> <ul style="list-style-type: none">• Easy top-slot mounting• Eliminates pre-drilling• Swivels in any direction	<p>Provide a finished and organized look for rails.</p> <ul style="list-style-type: none">• Snap-in Wire Clips• Perfected End Caps• UV-protected polymer

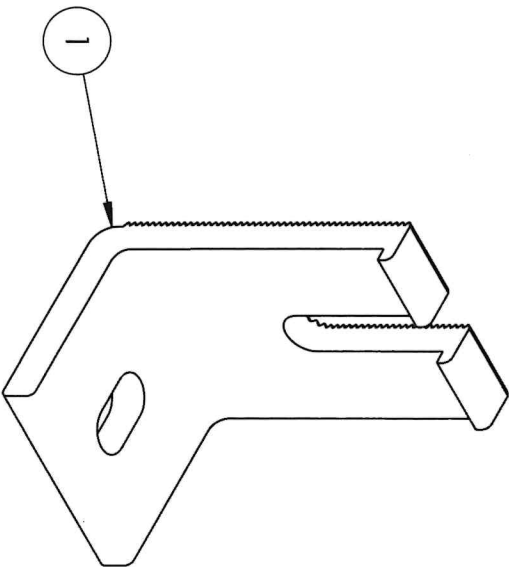
Free Resources



Design Assistant
Go from rough layout to fully engineered system. For free.
Go to IronRidge.com/rm



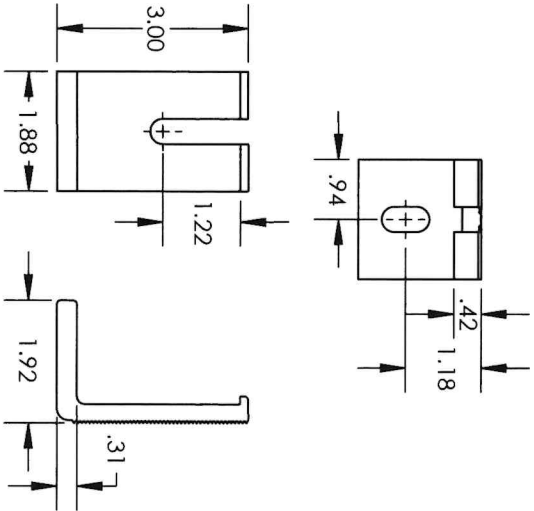
NABCEP Certified Training
Earn free continuing education credits, while learning more about our systems.
Go to IronRidge.com/training



Item Number	Component
1	FOOT, EXTRUDED L - SLOTTED

Part Number	Description
LFT-03-M1	SLOTTED L-FOOT, MILL
LFT-03-B1	SLOTTED L-FOOT, BLACK

1) Foot, Extruded L - Slotted



Property	Value
Material	Aluminum
Finish	Mill / Black

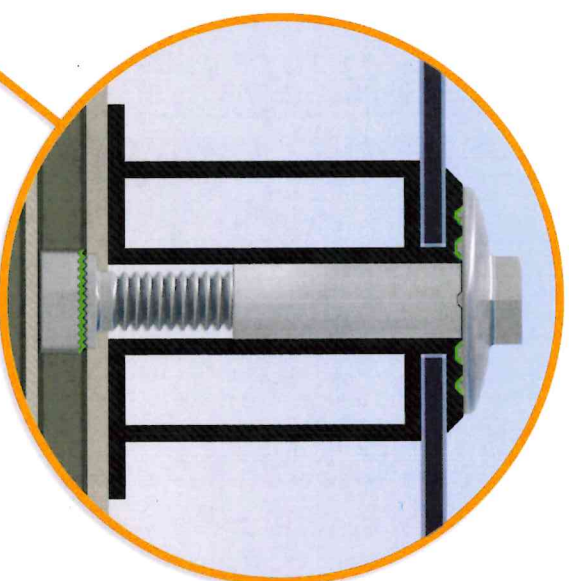


UFO Family of Components

Simplified Grounding for Every Application

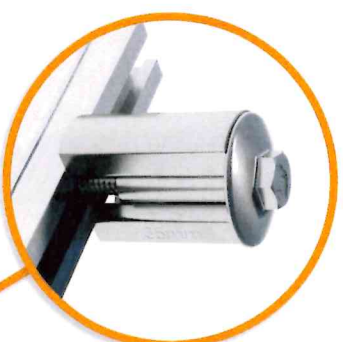
The UFO family of components eliminates the need for separate grounding hardware by bonding solar modules directly to IronRidge XR Rails. All system types that feature the UFO family—Flush Mount, Tilt Mount and Ground Mount—are fully listed to the UL 2703 standard.

UFO hardware forms secure electrical bonds with both the module and the rail, resulting in many parallel grounding paths throughout the system. This leads to safer and more reliable installations.



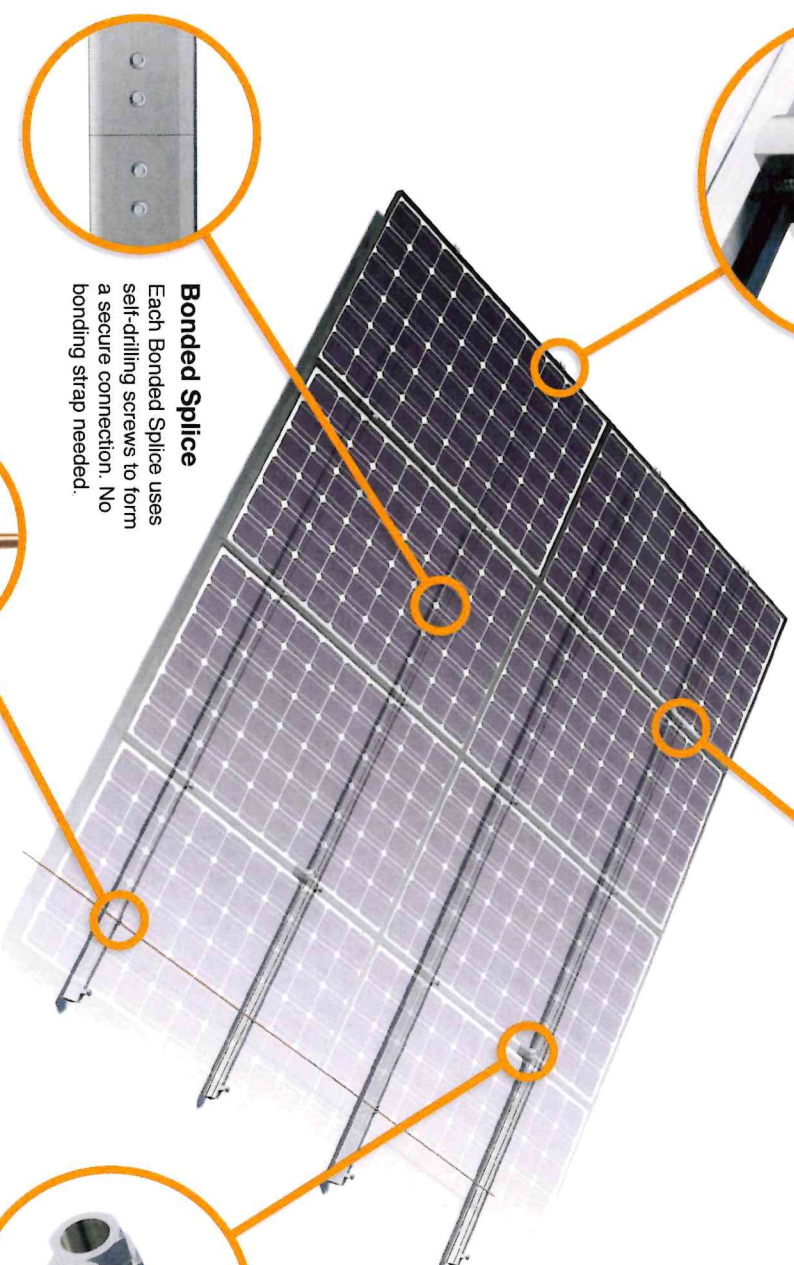
Universal Fastening Object (UFO)

The UFO securely bonds solar modules to XR Rails. It comes assembled and lubricated, and can fit a wide range of module heights.



Stopper Sleeve

The Stopper Sleeve snaps onto the UFO, converting it into a bonded end clamp.



Bonded Splice

Each Bonded Splice uses self-drilling screws to form a secure connection. No bonding strap needed.



Grounding Lug

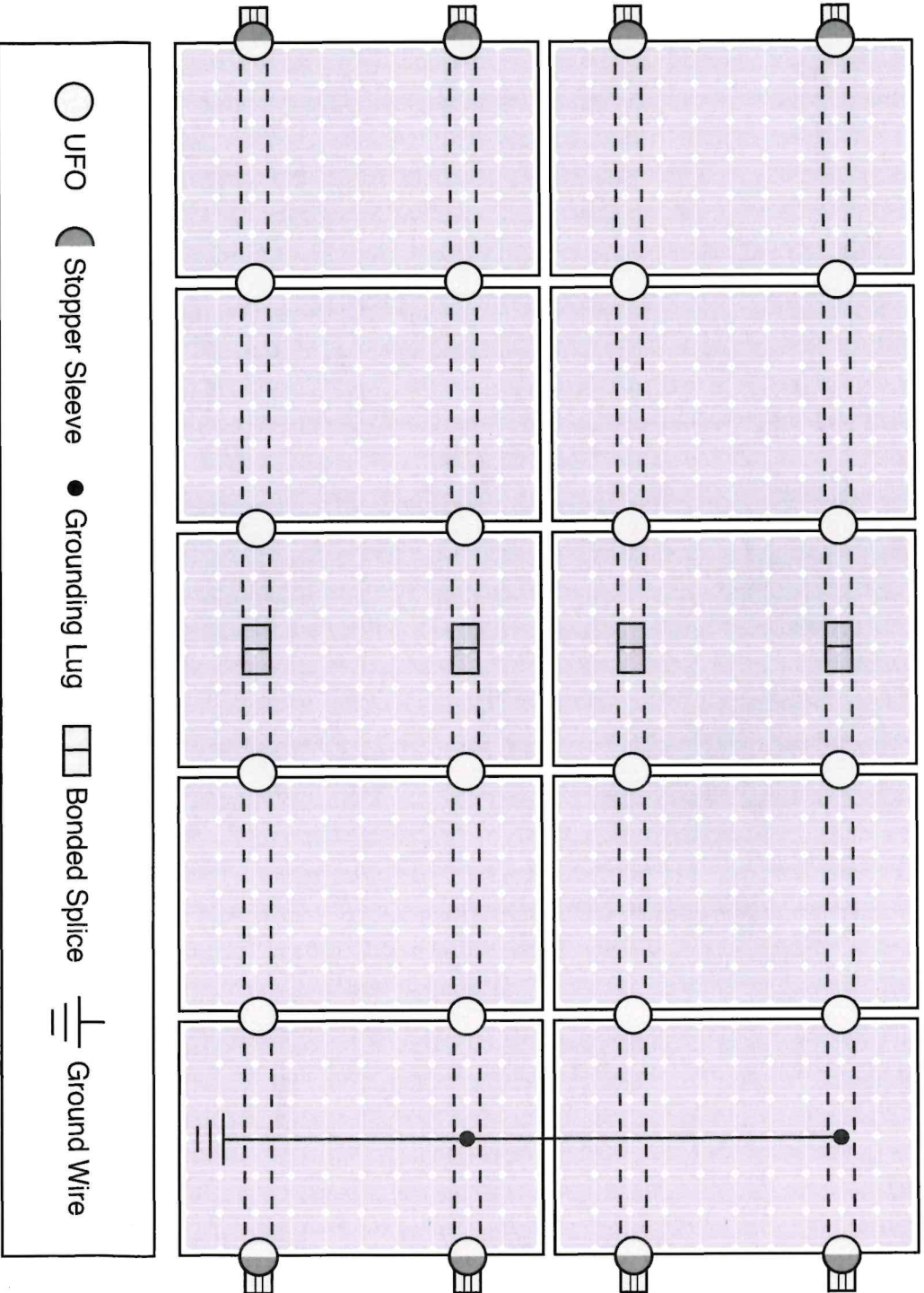
A single Grounding Lug connects an entire row of PV modules to the grounding conductor.



Bonded Attachments

The bonding bolt attaches and bonds the L-foot to the rail. It is installed with the same socket as the rest of the system.

System Diagram



Approved Enphase microinverters can provide equipment grounding of IronRidge systems, eliminating the need for grounding lugs and field installed equipment ground conductors (EGC). A minimum of two microinverters mounted to the same rail and connected to the same Engage cable is required. Refer to installation manuals for additional details.

UL Certification

The IronRidge Flush Mount, Tilt Mount, and Ground Mount Systems have been listed to UL 2703 by Intertek Group plc.

UL 2703 is the standard for evaluating solar mounting systems. It ensures these devices will maintain strong electrical and mechanical connections over an extended period of time in extreme outdoor environments.

 [Go to IronRidge.com/UFO](https://www.IronRidge.com/UFO)

Cross-System Compatibility			
Feature	Flush Mount	Tilt Mount	Ground Mount
XR Rails	✓	✓	XR1000 Only
UFO/Stopper	✓	✓	✓
Bonded Splice	✓	✓	N/A
Grounding Lugs	1 per Row	1 per Row	1 per Array
Microinverters & Power Optimizers	Enphase - M250-72, M250-60, M215-60, C250-72 Darton - MIG240, MIG300, G320, G640 SolarEdge - P300, P320, P400, P405, P600, P700, P730		
Fire Rating	Class A	Class A	N/A
Modules	Tested or Evaluated with over 400 Framed Modules Refer to installation manuals for a detailed list.		



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Test Verification of Conformity

In the basis of the tests undertaken, the sample(s) of the below product have been found to comply with the requirements of the referenced specifications at the time the tests were carried out.

Applicant Name & Address:	IronRidge, Inc. 28357 Industrial Blvd Hayward, CA 94545 USA
Product Description: Ratings & Principle Characteristics:	Flush Mount System with XR Rails. <u>Fire Class Resistance Rating:</u> -Flush Mount (Symmetrical). Class A Fire Rated for Low Slope applications when using Type 1, 2, 3, 13, 19, 25 and 29 listed photovoltaic modules. Class A Fire Rated for Steep Slope applications with Type1, 2 and 3, listed photovoltaic modules. Tested with a 5" gap (distance between the bottom of the module frame and the roof covering), per the standard this system can be installed at any gap allowed by the manufacturers installation instructions. No perimeter guarding is required. This rating is applicable with any IronRidge or 3rd party roof anchor.
Models:	IronRidge Flush Mount with XR Rails
Brand Name:	IronRidge Flush Mount
Relevant Standards:	UL 2703 (Section 15.2 and 15.3) Standard for Safety Mounting Systems, Mounting Devices, Clamping/Retention Devices, and Ground Lugs for Use with Flat-Plate Photovoltaic Modules and Panels, First Edition dated Jan. 28, 2015 Referencing UL1703 Third Edition dated Nov. 18, 2014, (Section 31.2) Standard for Safety for Flat-Plate Photovoltaic Modules and Panels. Intertek Testing Services NA, Inc.
Verification Issuing Office:	8431 Murphy Drive Middleton, WI 53562
Date of Tests: Test Report Number(s):	08/27/2014 to 03/17/2015 101769343MID-001r1, 101769343MID-001a, 101915978MID-001 & 101999492MID-001ar1-cr1, 104428358MID-001 EEV
Revision Summary	8/27/2020 Added type 13, 19, 25 and 29 to system, update address.
This verification is part of the full test report(s) and should be read in conjunction with them. This report does not automatically imply product certification.	
Completed by: Title:	Chris Zimbrich Technician I, Fire Resistance
Signature: Date:	Reviewed by: Title: Signature: Date:
	Chad Naggs Technical Team Lead, Fire Resistance 08/27/2020

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