ALDER CLUBHOUSE PV INSTALL PROJECT

PROJECT #: 26-15091
15091 BELFORD AVE, PARKER, CO 80134
AHJ: PARKER UTILITY: CORE

PARKER COLORADO
RFCC
APPROVED DATE: 04/22/2026
Planning Approval By: C. Liston Thye

Condition: Applicant shall paint mechanical/utility additions to match the building.

PROJECT CONTACTS

OWNER(S):
MARK DONOHOE
PH: 617-407-6676
EMAIL: MDONOHOE@ECOSMARTSOLUTION.COM

CONTRACTOR / INSTALLATION AFFILIATE:
SOLAR POWER PROS INC.
PROJECT MANAGER
LAUREN KAZUN PH: 303-245-2163
EMAIL: LAUREN@SOLARPOWERPROS.COM

DESIGNER
MAC GILLINGHAM PH: 303-797-6527
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SALES LEAD:
ALEX STUTT PH: 303-818-4724
EMAIL: ALEX@SOLARPOWERPROS.COM

REVISIONS:
RevA1: CORRECTIONS TO PG. E1
ADDED PV AC DISCO 2. PG. S1 & E1
RevA2: ADDED EQUIPMENT LAYOUT PAGE. PG. S5
RevA3: CONDUIT DETAIL ADDED TO PG. S1 & S5

PROJECT DESCRIPTION

INSTALL 29.040 KW GRID-TIED, ROOF FLUSH, MOUNTED PV.

SYSTEM SPECIFICATIONS

PV SYSTEM SIZE (DC): 29.04 kW

MODULE MFG: SEG SOLAR	MODEL #: SEG-440-BTD-BG	QTY: 66
INVERTER MFG: SMA	MODEL #: STP X 13-US (208V)	QTY: 2

ARRAY(S)

ARRAY 1:	SIZE: 17600W	TILT: 26˚	AZIMUTH: 147˚	PRODUCTION: 28880 KWH/YR
ARRAY 2:	SIZE: 11440W	TILT: 26˚	AZIMUTH: 237˚	PRODUCTION: 17468 KWH/YR

46,348 KWH/YR

GENERAL NOTES

1. ALL WORK TO BE DONE IAW LOCAL AHJ BUILDING CODES, IBC/ICC 2021 AND NEC 2023.
2. SYSTEM MUST FOLLOW ALL FIRE SETBACKS PER AHJ.
3. ALL PHOTOVOLTAIC MODULES SHALL BE TESTED AND LISTED BY RECOGNIZED LAB.
4. ALL SIGNAGE SHALL BE PLACED IAW AHJ CODE AND SHALL BE OF SUFFICIENT DURABILITY TO WITHSTAND THE ENVIRONMENT.
5. SPACE REQUIREMENTS FOR ELECTRICAL EQUIPMENT SHALL COMPLY WITH NEC ARTICLE 110.
6. ESTIMATED ANNUAL PRODUCTION BASED ON PV WATTS.

SOLAR POWER PROS

DESIGN CONTENTS

System Descripton:

Modules: 29.04 kW DC
# of Modules: 66
Manufacturer: SEG Solar
Model: SEG-440-BTD-BG

Inverter(s): 25 kW AC
# of Inverters: 2
Manufacturer: SMA
Model: STP X 13-US (208)

SITE PLAN (SCALE:1" = 15'-0")

PARKING

PARKING

PARKING

APPROX 400' TO BELFORD AVENUE

N

Total Roof Area: 10720 ft²
Total Coverage: 13.50%

FENCE

48" ACCESS PATHWAY

48" RIDGE SETBACK

48" RIDGE SETBACK

48" ACCESS PATHWAY

48" ACCESS PATHWAY

EXTERIOR CONDUIT BETWEEN ARRAYS

48" RIDGE SETBACK

48" RIDGE SETBACK

RevA3

EXTERIOR CONDUIT OFF ROOF AND DOWN EXTERIOR SIDE OF BUILDING

EXTERIOR CONDUIT TO ROOF MOUNTED EQUIPMENT

Billing Meter

CT Cabinet

MSD

Subpanel

Subpanel

Utility PV AC Disconnect 2

PV Production Meter

Utility PV AC Disconnect 1

PV AC Combiner (Roof)

Inverter 1 & 2 (Roof)

48" ACCESS PATHWAY

RevA1

GATE

SOLAR MODULES

NOTE: INVERTERS 1 & 2 AND PV AC COMBINER MOUNTED ON ROOF TOP WITH FACTORY SUPPLIED ROOF TOP MOUNTING KIT

NOTE: EXTERIOR CONDUIT BETWEEN ARRAYS AND INVERTERS. EXTERIOR CODUIT FROM ROOF TO EXTERIOR WALL AND TO ELECTRICAL BOXES

NOTE: NO FENCING BETWEEN AC DISCONNECT & PRODUCTION METER

POOL

FENCE

FENCE

FENCE

GATE

FENCE

Pad Mounted Transformer

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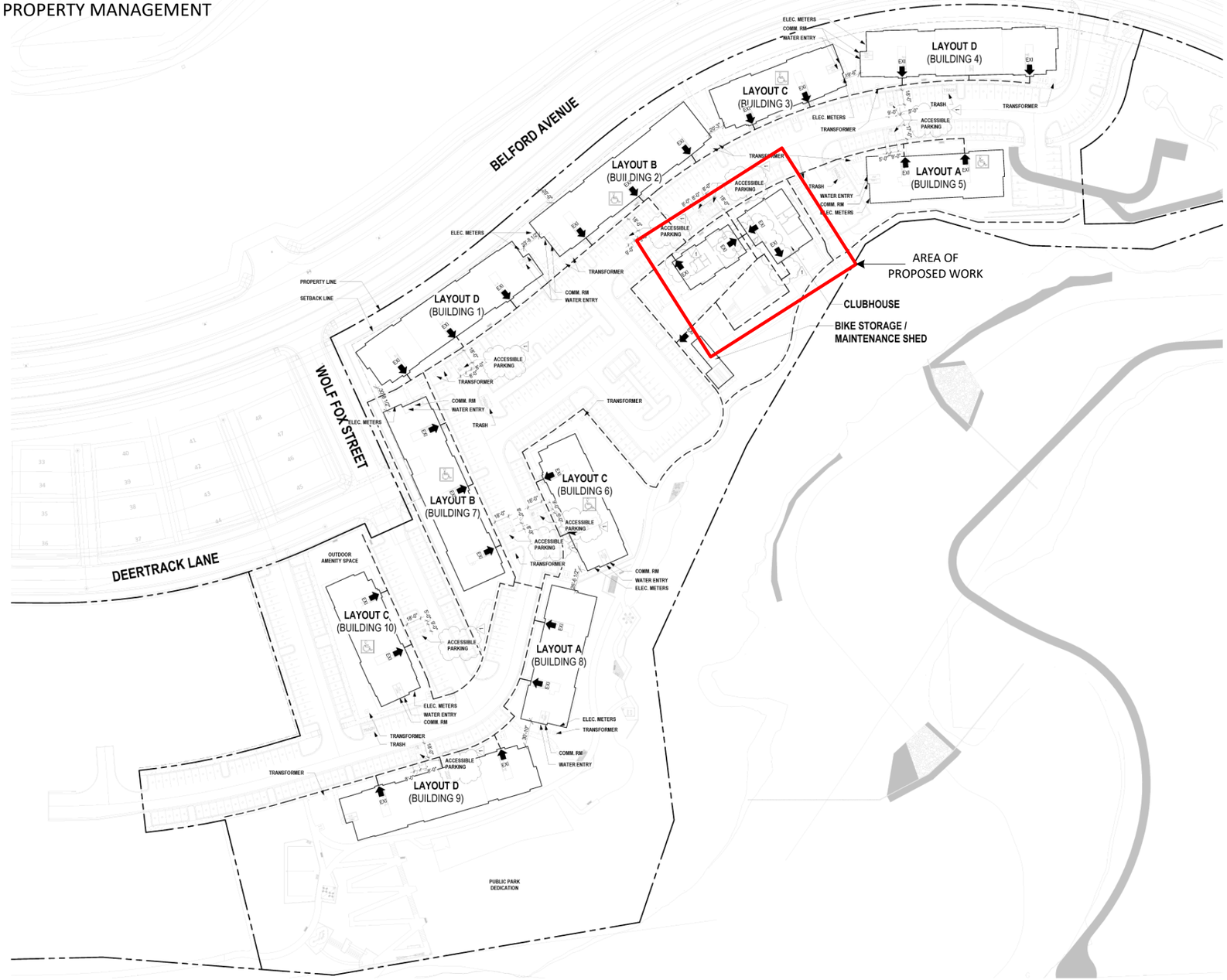
Project #:
15091

CONTEXT PLAN (NO SCALE)

NOTE: BUILDING PLANS PROVIDED
BY PROPERTY MANAGEMENT



SITE PLAN NOTES

1. CONTRACTOR SHALL VERIFY ALL DIMENSIONS & CONDITIONS OF THE JOB SITE. IF ANY DISCREPANCIES OCCUR THE CONTRACTOR SHALL NOTIFY THE ARCHITECT BEFORE PROCEEDING WITH THE WORK.
2. DISCONNECT & REMOVE EXISTING UTILITY LINES IN THE CONSTRUCTION AREA WHICH ARE NO LONGER IN SERVICE. REPAIR ANY DAMAGE TO EXISTING UTILITY LINES STILL IN SERVICE CAUSED BY CONSTRUCTION OPERATIONS.
3. SEE LANDSCAPE PLAN FOR LOCATIONS OF TREES, GRASS AREAS, GROUNDCOVER AND LANDSCAPE FEATURES.
4. SEE CIVIL GRADING AND DRAINAGE PLANS FOR EXISTING AND PROPOSED CONTOURS, DRAINAGE VOLUMES, INVERTS AND UNDER-DRAIN SYSTEM LOCATIONS.
5. SLOPE GRADING FROM BUILDING PER SOILS REPORT RECOMMENDATIONS UNLESS NOTED OTHERWISE - RE: CIVIL DRAWINGS.
6. RE: CIVIL DRAWINGS FOR EASEMENT LOCATIONS.
7. RE: SOILS REPORT AND CIVIL DRAWINGS FOR FOUNDATION DRAIN REQUIREMENTS.
8. RE: CIVIL DRAWINGS FOR RAMP LOCATIONS. RE: A9-50 SERIES SHEETS FOR HANDRAIL DETAILS FOR ALL STAIRS & RAMPS.
9. RE: A9-01 FOR ABBREVIATIONS AND GRAPHIC SYMBOLS.
10. RE: A9-02 FOR GENERAL NOTES APPLICABLE TO THE ENTIRE PROJECT.
11. PROVIDE SIGNAGE PER IBC SECTION 1111 AT ACCESSIBLE PARKING AND BUILDING ENTRANCES.

SITE PLAN SYMBOLS LEGEND

- ACCESSIBLE ROUTE
- 2-HR RATED FIRE WALL
- 200' FIRE HOSE LIMIT
- EXIT → ACCESSIBLE EXIT & ENTRANCE
- INDICATES ACCESSIBLE UNIT, GARAGE, OR PARKING STALL
- FIRE DEPARTMENT ACCESS DRIVE
- TRUCK — FIRE DEPARTMENT TRUCK
- (3RD FLR) 301 / (2ND FLR) 201 / (1ST FLR) 101 — UNIT ADDRESS NUMBERS; VISUAL DEVICES UNIT PER IFC TABLE 907.6.2.3.3; ACCESSIBLE TYPE A UNIT

ktgy
Architecture + Planning
820 16th Street, Suite 500
Denver, CO 80202
ktgy.com
303.825.6400

KTGY Project No: 210512

PROJECT CONTACT: Daniela Gomez
EMAIL: dgomez@ktgy.com
PRINCIPAL: / PROJECT DESIGNER: Nathan Sciarra, Project Designer

Developer

CENTURY LIVING, LLC
8390 E Crescent Parkway
Suite 650
Greenwood Village, CO. 80223
303-551-8426

COMPARK VILLAGE SOUTH
15091 BELFORD AVE

No	Date	Description
	07/14/22	PERMIT SET
1	09/16/22	PERMIT RESUBMITTAL

It is the client's responsibility, prior to or during construction to notify the architect in writing of any perceived errors or omissions in the plans and specifications of which a contractor thoroughly knowledgeable with the building codes and methods of construction should reasonably be aware. If/then met unless addressing such perceived errors or omissions shall be resolved from the architect prior to the client or client's subcontractors proceeding with the item in question. The client will be responsible for any defects in construction if these procedures are not followed.

STATE OF COLORADO — NATHAN DAMON SCIARRA — 36008 — LICENSED ARCHITECT
SEPTEMBER 16, 2020

ARCHITECTURAL & ACCESSIBILITY SITE PLAN

A1-10

Reviewed for code compliance
10/13/2022
PARKER

ARCHITECTURAL SITE PLAN | 1

SOLAR POWER PROS

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Model: SEG-440-BTD-BG

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# of Inverters: 2
Manufacturer: SMA
Model: STP X 13-US (208)

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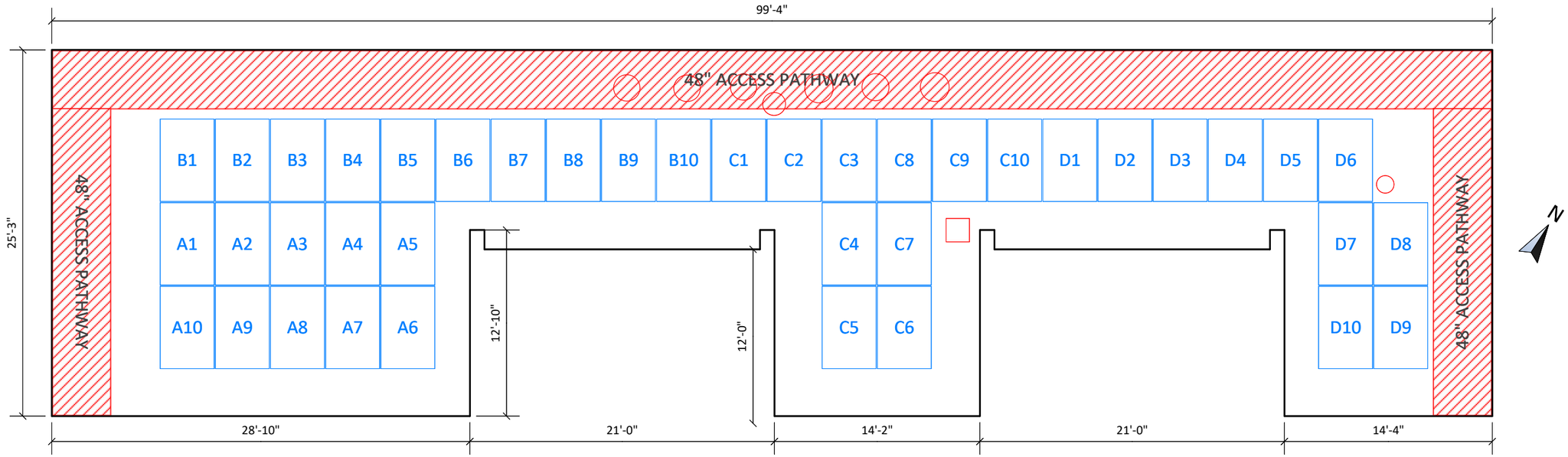
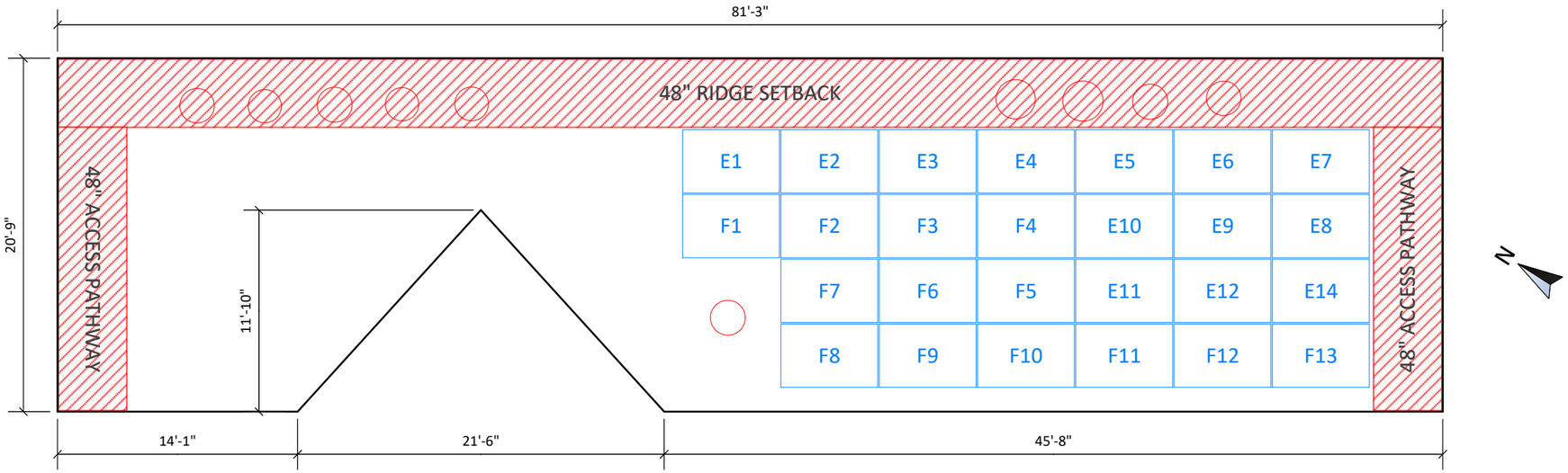
ARRAY LAYOUT (SCALE: 1/8" = 1'-0")

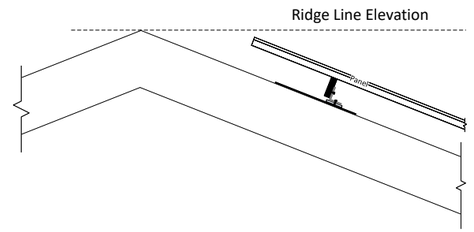




ARRAY LAYOUT NOTES:

1. The modules shall be installed below the roof ridgeline elevation.
2. The modules shall be installed in accordance with manufacturer installation instructions.
3. All measurements shown on this drawing are on the roof plane.

RIDGE LINE DETAIL:



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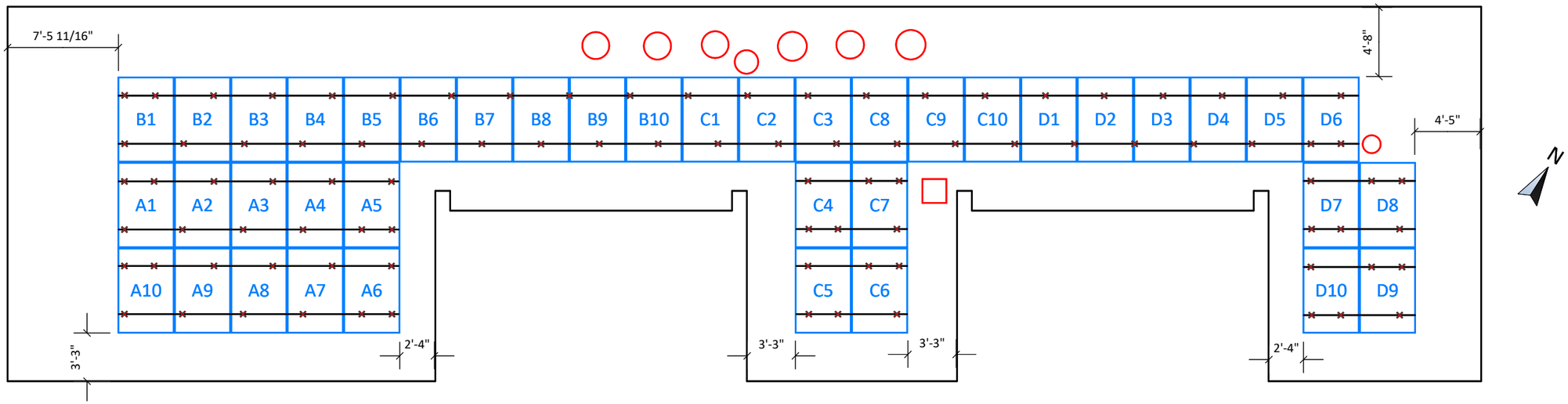
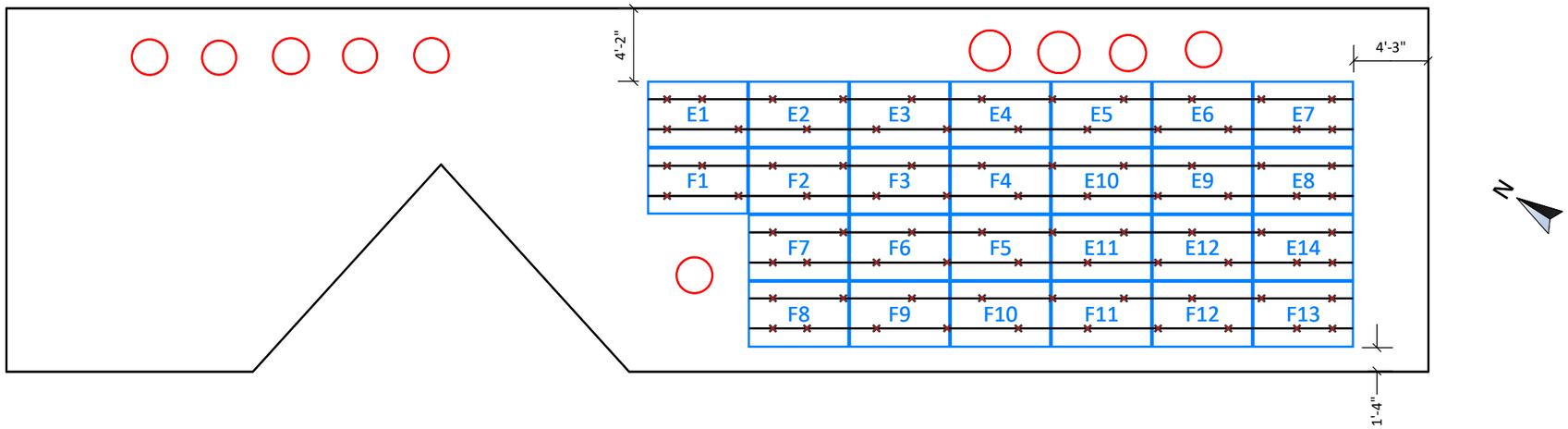
RACKING LAYOUT (SCALE: 3/16" = 1'-0")





RACKING LAYOUT NOTES:

1. Attachment location and trusses on this drawing are approximate. Final adjustments may be necessary in the field.
2. All splices shall have integrated bonding.
3. Each module shall be connected with (4) integrated bonding clamps between the module frame and rail.
4. Footer attachments shall be spaced IAW Engineered Roof Evaluation.
5. All racking components shall be installed IAW with manufacturer installation instructions.
6. All measurements shown on this drawing are on the roof plane.
7. Embedment depth shall be IAW engineered roof evaluation.
8. See datasheets for details drawing of racking equipment.

Drawing Key:

- Roof attachment hardware
- Trim piece
- rail
- truss
- Edges of solar modules
- Roof Pass Through JBox
- Conduit flashing
- Oatey
- L-Body
- Junction Box (2Gang)

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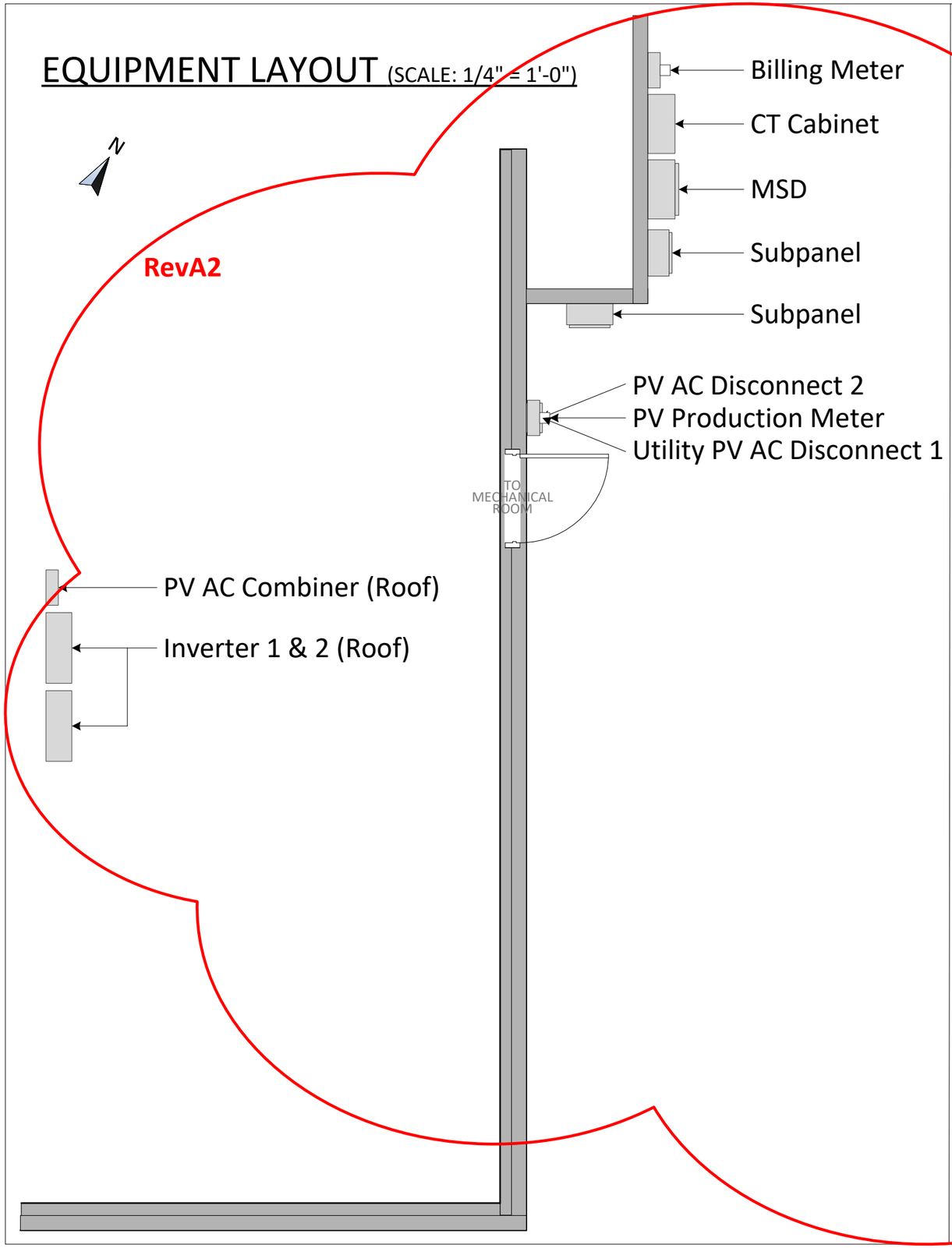
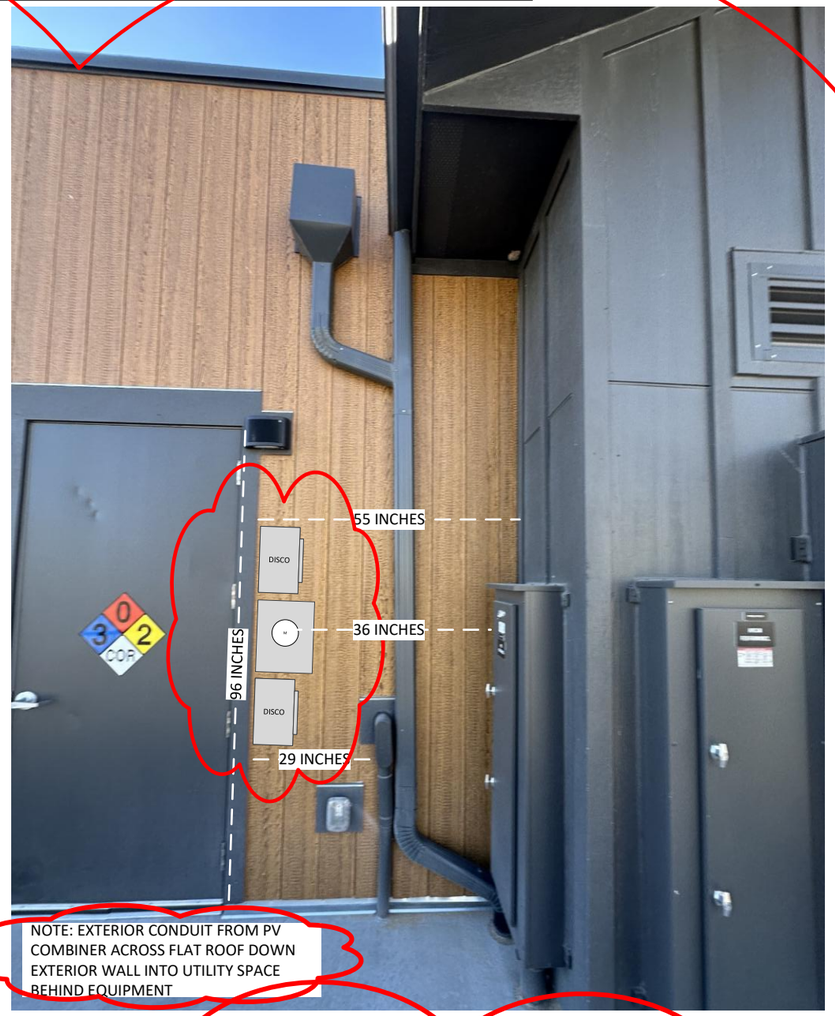
EQUIPMENT LAYOUT (SCALE: 1/4" = 1'-0")

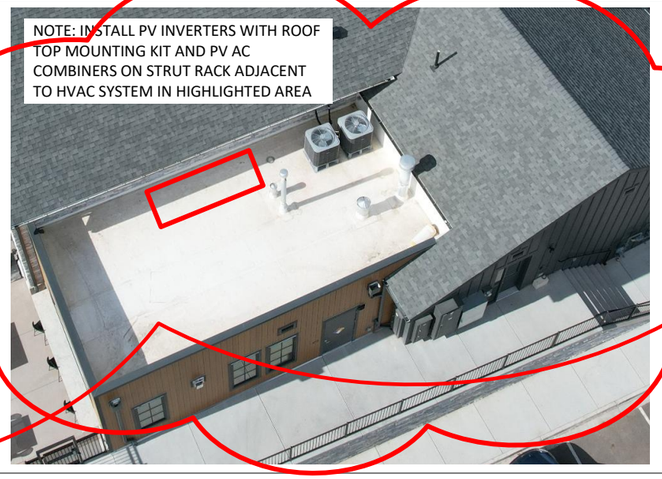
RevA2



AREA OF PROPOSED WORK



NOTE: EXTERIOR CONDUIT FROM PV COMBINER ACROSS FLAT ROOF DOWN EXTERIOR WALL INTO UTILITY SPACE BEHIND EQUIPMENT



NOTE: INSTALL PV INVERTERS WITH ROOF TOP MOUNTING KIT AND PV AC COMBINERS ON STRUT RACK ADJACENT TO HVAC SYSTEM IN HIGHLIGHTED AREA

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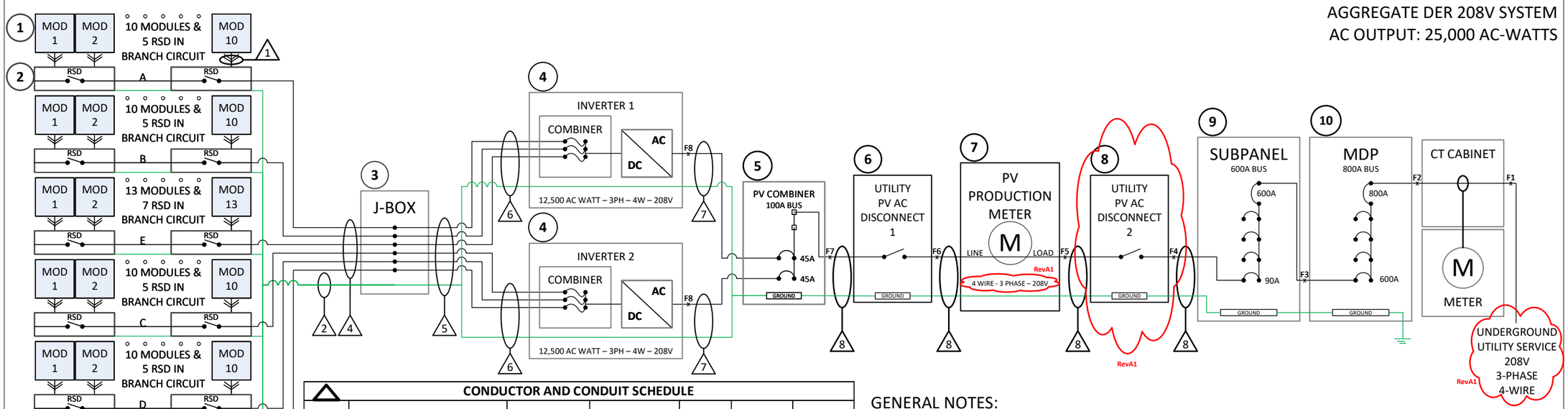
ONE LINE DIAGRAM

EQUIPMENT SCHEDULE

TAG	DESCRIPTION	MANUFACTURER	PART NUMBER	NOTES
1	SOLAR PV MODULE	SEG SOLAR	SEG-440-BTD-BG	66 SEG SOLAR 440W MODULES (SEE NOTES SHEET FOR DETAILS)
2	RSD	SMA	1879359-00-B	34 SMA 1879359-00-B RAPID SHUTDOWN DEVICES. 6 STRINGS, FOUR STRINGS WITH 10 MODULES AND TWO STRINGS WITH 13 MODULES IN SERIES.
3	J-BOX			OUTDOOR JUNCTION BOX
4	STRING INVERTER 1 & 2	SMA	STP X 13-US (208)	TWO SMA STP X 13-US (208) STRING INVERTERS. 208V, 13.0 kW AC, 3PH, 4W. LABELED IAW NEC LABELING STANDARDS. LOCK EXPORT LIMIT ON BOTH INVERTER 1 & 2 TO 12.5 kW AC. INVERTERS MOUNTED ON ROOF ON TOP USING SMA ROOF MOUNT KIT. SEE DATASHEET FOR STRING INVERTER 1 & 2 DETAILS.
5	PV COMBINER	SQUARE D	TBD	208V, 100A MLO, 3PH, 4W, OUTDOOR LOAD CENTER. TWO 45A THREE POLE BREAKERS, ONE FOR EACH INVERTER. MOUNTED ON ROOF ADJACENT TO INVERTERS. VISIBLE, ACCESSIBLE, LOCKABLE AND LABELED IAW NEC LABELING STANDARDS.
6	UTILITY PV AC DISCONNECT 1	SQUARE D	TBD	208V, 100A NEMA 3R, 3PH, 4W, VISIBLE-OPEN TYPE DISCONNECT. VISIBLE, READILY ACCESSIBLE, LOCKABLE AND LABELED IAW NEC LABELING STANDARDS. ENCLOSURE IS LOCATED WITHIN 15' OF UTILITY BILING METER. YELLOW WEATHERPROOF PLASTIC PLACARD LABELED “UTILITY PV AC DISCONNECT” IN BLACK ARIAL BOLD LETTERING PERMANENTLY ATTACHED VIA SCREWS OR RIVETS. 1-½” X 3" IN DIMENSIONS.
7	PV PRODUCTION METER	MILBANK	TBD	208V, 200A, 3PH, 4W, RINGLESS LEVER BYPASS METER HOUSING. INSTALLED IAW NEC STANDARDS. LOCATED WITHIN 15' OF BILLING METER. METER HAS THE PV GENERATION WIRED TO THE LINE SIDE TERMINALS (TOP OF METER BLOCK). METER SOCKET MARKED WITH A STAMPED ALUMINUM TAG MARKED "PV PROD".
8 RevA1	UTILITY PV AC DISCONNECT 2	SQUARE D	TBD	208V, 100A NEMA 3R, 3PH, 4W, VISIBLE-OPEN TYPE DISCONNECT. VISIBLE, READILY ACCESSIBLE, LOCKABLE AND LABELED IAW NEC LABELING STANDARDS. ENCLOSURE IS LOCATED WITHIN 15' OF UTILITY BILING METER. YELLOW WEATHERPROOF PLASTIC PLACARD LABELED “UTILITY PV AC DISCONNECT” IN BLACK ARIAL BOLD LETTERING PERMANENTLY ATTACHED VIA SCREWS OR RIVETS. 1-½” X 3" IN DIMENSIONS.
9	SUBPANEL	SIEMENS	P2C54ML600ABS	EXISTING SUBPANEL, 600A BUS MLO. 208Y/120V, 3PH, 4W. LOCATE A 90A BACKFEED BREAKER IN BOTTOM OF PANEL.
10	MSD	SIEMENS	P5C75VN800ABS	EXISTING MSD, 800A BUS, 800A MAIN BREAKER. 208Y/120V, 3PH, 4W. 600A BREAKER FEEDS SUBPANEL



CONDUCTOR AND CONDUIT SCHEDULE

TAG	DESCRIPTION OR CONDUCTOR TYPE	CONDUCTOR GAUGE	NUMBER OF CONDUCTORS	EGC GAUGE	CONDUIT TYPE	CONDUIT SIZE
1	USE-2	12	2	N/A	N/A	N/A
2	BARE COPPER EGC	6	1	N/A	N/A	N/A
3	N/A	N/A	N/A	N/A	N/A	N/A
4	THWN-2 INVERTER CABLE	12	12	N/A	N/A	N/A
5	THWN-2 / NM-B	8	12	8	EMT	1-1/4"
6	THWN-2	10	6	10	EMT	3/4"
7	THWN-2	8	4	10	EMT	3/4"
8	THWN-2	3	4	8	EMT	1-1/4"

GENERAL NOTES:

- EQUIPMENT SHALL BE INSTALLED AND LABELED IN ACCORDANCE WITH NEC 690 AND ALL APPLICABLE UTILITY AND LOCAL AUTHORITY HAVING JURISDICTION REQUIREMENTS.
- SYSTEM IS COMPLIANT WITH RAPID SHUTDOWN REQUIREMENTS SPECIFIED IN NEC 690.12.
- YELLOW WEATHERPROOF PLACARD LABELED “PHOTOVOLTAIC SYSTEM CONNECTED” IN BLACK ARIAL BOLD LETTERING PERMENATELY ATTACHED VIA SCREWS OR RIVETS AT THE UTILITY BILLING METER. 1-½” X 3" IN DIMENSIONS.

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Page: E1

ELECTRICAL CALCULATIONS

SITE ADDRESS:	15091 Belford Ave		
CITY:	Parker	ZIP:	80134

SYSTEM COMPONENTS

PV MODULES

MODULE MFR	SEG Solar
MODEL	SEG-440-BTD-BG
Imp (A)	13.46
Vmp (V)	32.7
Voc (V)	39.3
Isc (A)	14.15
Pmax (W)	440
Voc Temp Coeff (%V/C)	-0.25%

MICROINVERTER

MFR	SMA
MODEL	STP X 13-US (208)
MAX DC VOLT RATING	800
MIN DC VOLT RATING (V)	150
MAX INPUT CURRENT Isc (A)	3 X 37.5
AC VOLTAGE (V)	208
MAX AC CURRENT (A)	36
MAX PER BRANCH	#N/A

STRING CALCULATIONS

String	# of Mods	I_{sc} (A)	125% of I_{sc} (A)
1	10	14.15	17.6875
2	10	14.15	17.6875
3	10	14.15	17.6875
4	10	14.15	17.6875
5	13	14.15	17.6875
6	13	14.15	17.6875
Combined	**66**	**84.9**	**106.125**

TEMPERATURE CALCULATIONS

	Temp (F)	Temp Corrected Max Voc (V)[3]
TEMP MAX[1]	103	378.81
TEMP MIN[1]	-38	455.77
ADJ MAX[2]	143	356.98

NEC 2023 REFERENCES & NOTES

[1] Per historical weather for site

[2] 310.15(B)(2), Temp Adj for Cable Exposed above Rooftops. Not applicable. Conduit and conductors > 7/8" above roof.

[3] 690.7, Maximum Voltage in a dc PV circuit

$V_{max} = V_{oc} * ((T_{low} - T_{ref}) * \text{temp coefficient})$

[4] Tables C.1 & C.3, Maximum Number of Conductors in Electrical Metallic Tubing & Flexible Metal Conduit

5 Table 310.16, Allowable Ampacities of Insulated Conductors. 90°C Conductor Temp Rating, Values for Copper:

	THWN-2 & USE-2	
AWG	75°C	90°C
12	25	30
10	35	40
8	50	55
6	65	75
4	85	95
3	100	115
1	130	145
1/0	150	170
2/0	175	195

6 Table 310.15(C)(1) Adjustment Factors for More than Three Current-Carrying Conductors

7 Table 310.15(B)(1) Temperature Correction Factors. Temperature rating of conductor = 90°C.

[8] Max Current defined as 1.56 x I_{SC} for DC conductors and 1.25 * I_{SC} for AC conductors. When DC optimizers used, Max Current is defined as 1.25 x I_{SC} of optimizer.

CONDUCTOR SIZING

	AWG	EGC	Type[9]	Material	Length (ft)	# of Conductors (Lines, Neutral, Ground)	# of Current Carrying Conductors	Conduit Size (in)[4]	Voltage	90°C Ampacity[5]	Fill Derate[6]	Temp Derate[7]	Derated Ampacity	75°C Ampacity	Max Current[8]
MODULE TO RSD	10	6	USE-2	CU	3	2	2	n/a	456	40	1	0.71	28.4	35	22.07
RSDs TO JBOX	12	6	USE-2	CU	10	13	12	n/a	327	30	1	0.71	21.3	25	17.6875
JBOX TO INVERTER	10	10	THWN-2	CU	40	5	4	3/4"	327	40	0.8	0.71	22.72	35	17.6875
JBOX TO INVERTER	10	10	THWN-2	CU	40	7	6	3/4"	327	40	0.8	0.71	22.72	35	17.6875
JBOX TO INVERTER	10	10	THWN-2	CU	40	9	8	3/4"	456	40	0.7	0.71	19.88	35	17.6875
JBOX TO INVERTER	8	8	THWN-2	CU	40	13	12	1-1/4"	456	55	0.5	0.71	19.525	50	17.6875
INVERTER TO PV AC COMBINER	8	10	THWN-2	CU	5	5	3	3/4''	208	115	1	0.91	104.65	50	45
PV AC COMBINER TO PV DISCO	3	8	THWN-2	CU	5	5	3	1-1/4"	208	115	1	0.91	104.65	100	90
PV DISCO TO PV PROD METER	3	8	THWN-2	CU	5	5	3	1-1/4"	208	115	1	0.91	104.65	100	90
PV PROD METER TO MDP	3	8	THWN-2	CU	5	5	3	1-1/4"	208	115	1	0.91	104.65	100	90

[9] THWN-2 CONDUCTORS MAY BE SUBSTITUTED WITH XHHW-2 AL CONDUCTORS SIZED IAW NEC TABLE 310.16

LOAD CENTER CALCULATIONS

Max Inverter Output Current @ 125% (A)	Backfeed Breaker Size (A)	Panel Bus Bar Rating (A)	Panel Breaker Size (A)	Total Source Over Current Protection (A)	% of Bus Bar Rating
90	90	600	600	690	115%

FULLY RATED SHORT CIRCUIT CALCULATIONS SUMMARY

POINT	EQUIPMENT	LENGTH	VOLTAGE	WIRE SIZE	CONDUCTOR MATERIAL	CONDUIT	CONDUCTOR VOLTAGE CLASS (V)	THREE SINGLE CONDUCTORS OR THREE-	C VALUE	# OF PARALLEL RUNS	Isc AVAILABLE UPSTREAM	f	M	Isc (FAULT)
F0	UTILITY XFMR	15												63,800
F1	CT CAB & METER	50	208	500	AL	NON-MAG	600	SINGLE	21,319	4	63,800	0.45	0.69	44,020
F2	MSD	25	208	500	AL	STEEL	600	SINGLE	18,756	4	44,020	0.12	0.89	39,230
F3	SUBPANEL	25	208	500	AL	STEEL	600	SINGLE	18,756	2	39,230	0.22	0.82	32,220
F4	PV AC DISCO	5	208	3	CU	STEEL	600	SINGLE	4,760	1	39,230	0.34	0.74	29,210
F5	PV PROD METER	5	208	3	CU	STEEL	600	SINGLE	4,760	1	32,220	0.28	0.78	25,140
F6	PV AC DISCO	5	208	3	CU	STEEL	600	SINGLE	4,760	1	25,140	0.22	0.82	20,610
F7	PV AC COMBINER	40	208	3	CU	STEEL	600	SINGLE	4,760	1	20,610	1.44	0.41	8,440
F8	INVERTER 1 & 2	5	208	8	CU	STEEL	600	SINGLE	1,557	1	8,440	0.23	0.82	6,890
	UTILITY TRANFORMER SIZE:				**300 KVA**			**%Z TRANSFORMER:**	**3.48%**		**TRANSFORMER I FLA:**		**833 A**	
	MAX AVAILABLE (SYMMETRICAL) FAULT AT THE SECONDARY:				**26,590 AMPS**									

SOLAR POWER PROS

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Alder PV Install

Project Contact:
Lauren Kazun
303-245-2163

Customer Contact:
Mark Donohoe
617-407-6676

Site Address:
15091 Belford Ave
Parker, CO 80134

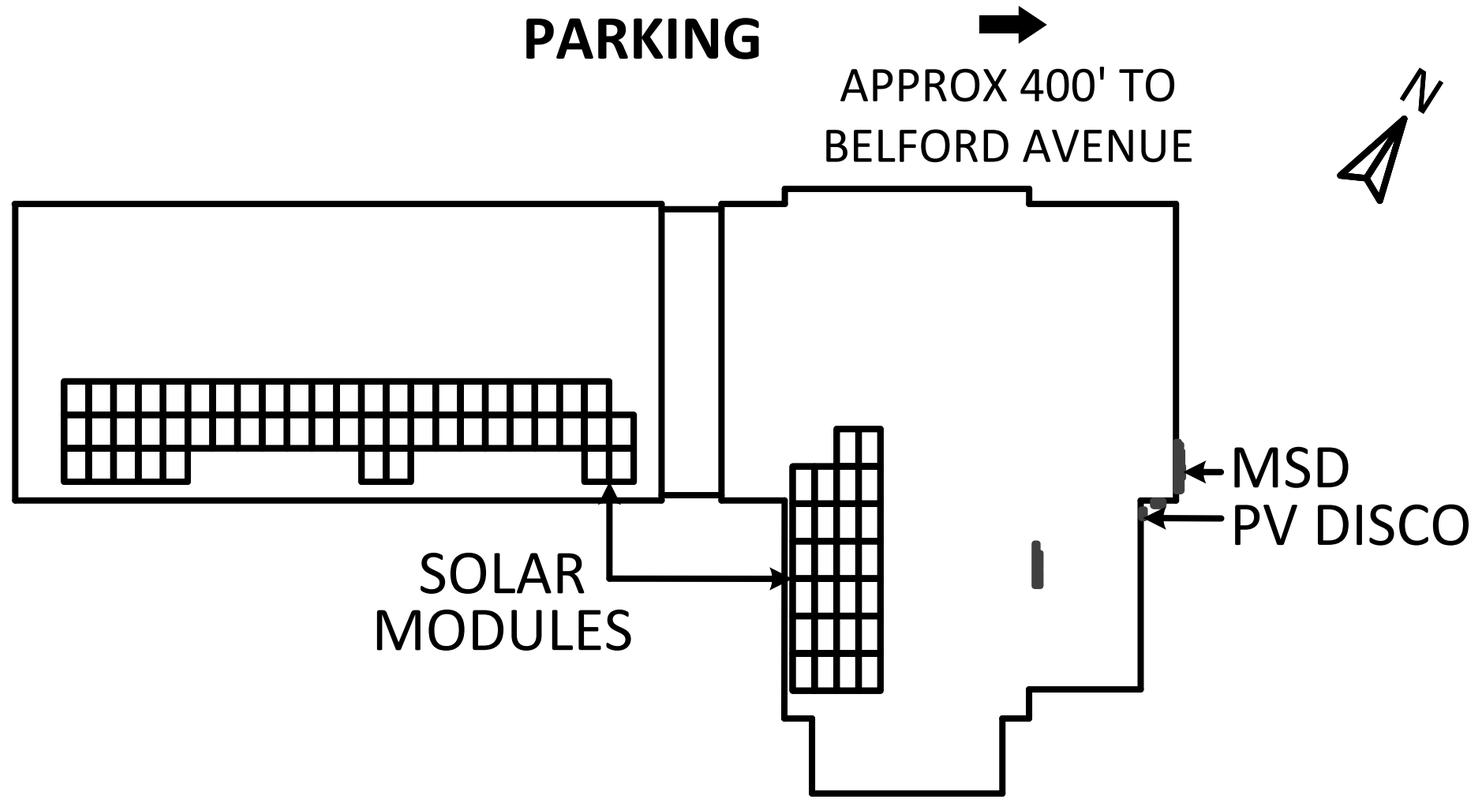
System Descripton:

Modules: 29.04 kW DC
# of Modules: 66
Manufacturer: SEG Solar
Model: SEG-440-BTD-BG

Inverter(s): 25 kW AC
# of Inverters: 2
Manufacturer: SMA
Model: STP X 13-US (208)

Project #: 15091

CAUTION: POWER TO THIS BUILDING IS SUPPLIED FROM MULTIPLE SOURCES WITH DISCONNECTS LOCATED AS SHOWN



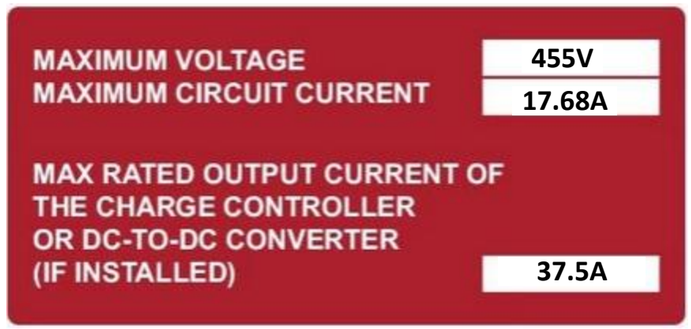
SOLAR POWER PROS 303-797-6527

PV SYSTEM LABELS

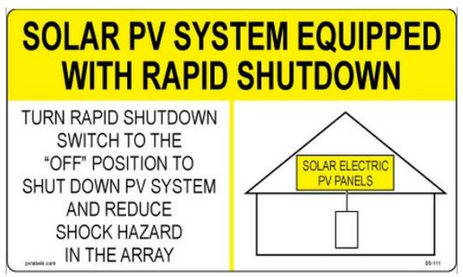
DC DISCONNECT NEC 690.13(B)

DC DISCONNECT NEC 690.13(B)

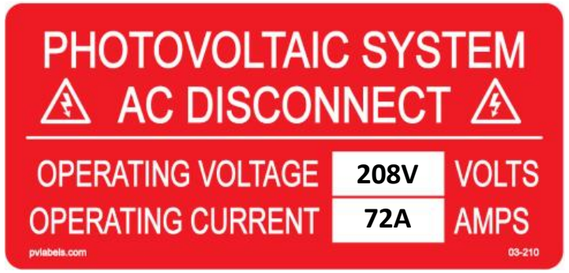
DC DISCONNECT NEC 690.53



DC DISCONNECT NEC 690.56(C)



AC DISCONNECT NEC 690.13(B)
AC DISCONNECT NEC 690.54



GUARDING OF LIVE PARTS
NEC 110.27(C)

BACK-FED BREAKER
NEC 705.12(B)(2)(3)(b)

EXPOSED CONDUIT WITH DC CIRCUITS
NEC 690.31(G)(3)

BILLING METER IDENTIFICATION

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Page: E3

MANUFACTURER SPECIFICATIONS - MODULES

SEG SOLAR

www.segsolar.com

YUKON N Series

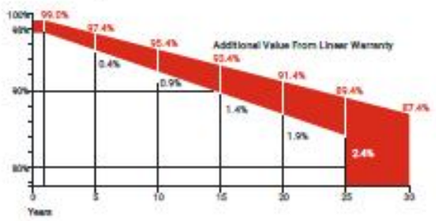
Half-Cell N-Type Bifacial Module

430-445Wp Module Power Output | **22.79%** Max Efficiency

Key Features

- High module conversion efficiency
- Better temperature coefficient
- Super multi busbar technology
- Low attenuation long warranty
- Superior load capacity
- Higher bifaciality
- USA based liability insurance
- Houston, Texas based company

Warranty



30 Years Guarantee on product material and workmanship

30 Years Linear power output warranty

Product Certification

IEC61215; IEC61730; UL61215; UL61730	
IEC62804	PID
IEC61701	Salt Mist
IEC62716	Ammonia Resistance
IEC60068	Dust and Sand
IEC61215	Hailstone
Fire Type (UL61730): Type 29	
ISO14001:2015; ISO9001:2015; ISO45001:2018	

About SEG Solar

Founded in 2016, SEG is a leading vertically integrated PV manufacturer headquartered in Houston, Texas, U.S., and is dedicated to delivering reliable and cost-effective solar modules to the utility, commercial, and residential markets. By the end of 2024, SEG had shipped over 6 GW of solar modules worldwide and have achieved a module production capacity of 6 GW.

Download Datasheet

SEG SOLAR

YUKON N Series SEG-XXX-BTD-BG-108Cells

Electrical Characteristics

Module Type	SEG-430-BTD-BG			SEG-435-BTD-BG			SEG-440-BTD-BG			SEG-445-BTD-BG		
	Front STC	Front NOCT	Back STC	Front STC	Front NOCT	Back STC	Front STC	Front NOCT	Back STC	Front STC	Front NOCT	Back STC
Maximum Power -Pmp(Wp)*	430	324	344	435	328	348	440	332	352	445	336	356
Open Circuit Voltage -Voc(V)	38.90	36.96	38.88	39.10	37.19	39.08	39.30	37.41	39.28	39.50	37.63	39.48
Short Circuit Current -Isc(A)	13.99	11.19	11.19	14.07	11.26	11.26	14.15	11.33	11.33	14.24	11.40	11.40
Maximum Power Voltage -Vmp(V)	32.30	30.41	32.28	32.50	30.63	32.48	32.70	30.83	32.68	32.90	31.02	32.88
Maximum Power Current -Imp(A)	13.32	10.66	10.66	13.39	10.71	10.71	13.46	10.77	10.77	13.53	10.83	10.83
Module Efficiency(%)		22.02			22.28			22.53			22.79	
Power Tolerance(W)	(0, +4.99)											
Maximum System Voltage	1500V DC											
Maximum Series Fuse Rating	30 A											
Bifaciality	80±10%											

STC: Irradiance 1000 W/m² module temperature 25°C AM=1.5 NOCT: Irradiance 800W/m² ambient temperature 20°C module temperature 45°C wind speed: 1m/s

*Measuring tolerance: ±3%

Mechanical Specifications

External Dimension	1722 x 1134 x 30 mm
Weight	24.0 kg
Solar Cells	N-Type Mono 108 pcs(54 x 2)
Front Glass	2.0 mm AR coating semi-tempered glass
Back Glass	2.0 mm Semi-tempered glass
Frame	Black anodized aluminium alloy
Junction Box	IP68 / 3 diodes
Connector Type	MC4
Cable Type Cable Length	12 AWG PV Wire(UL) Portrait: 400 mm(+) / 200 mm(-) Landscape: 1200 mm(+) / 1200 mm(-) or customized length
Mechanical Load(Front)	5400 Pa / 113 psf*
Mechanical Load(Rear)	2400 Pa / 50 psf*

*Refer to SEG installation manual for details

Temperature Characteristics

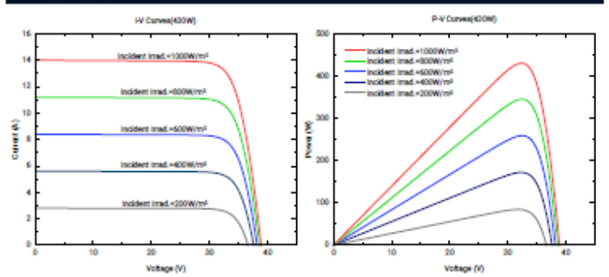
Pmax Temperature Coefficient	-0.30 %/°C
Voc Temperature Coefficient	-0.25 %/°C
Isc Temperature Coefficient	+0.046 %/°C
Operating Temperature	-40~+85 °C
Nominal Operating Cell Temperature (NOCT)	45±2 °C

Packing Configuration

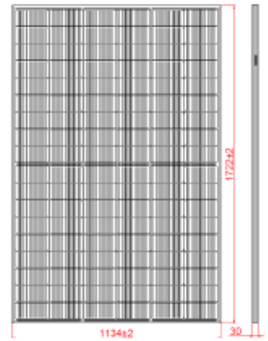
Container*	20'GP	40'HQ	40'HQ (for USA)
Pieces per Pallet	36	36	36
Pallets per Container	6	24	22
Pieces per Container	216	864	792

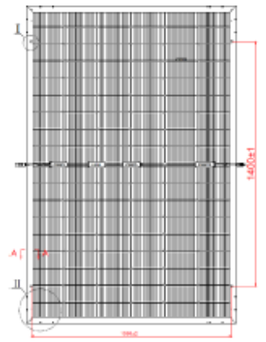
*Refer to the SEG container technical documentation for 53' box trailer or other trucks loading quantity

Curves of PV Module



Technical Drawing





*Refer to SEG installation manual for details

www.segsolar.com

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Manufacturer: SMA
Model: STP X 13-US (208)

Project #: 15091

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MANUFACTURER SPECIFICATIONS - INVERTER

STP 13-US-50

Sunny Tripower X 13-US (208V)

Integrated intelligence for future-proof system design.

Now suitable for 120/208V grids.

powered by ennexOS

SMA Smart Connected | SMA ShadeFix | UL 3741 LISTED PV Hazard Control | Rapid Shutdown CERTIFIED

Integrated System Manager
- Monitoring and control for up to 5 inverters (max. 150 kVA)
- Remote access with Sunny Portal powered by ennexOS
- SMA Dynamic Power Control

Enhanced safety
- Integrated SunSpec PLC signal for module-level shutdown
- Advanced DC AFCI arc-fault protection
- Optional AC disconnect
- Optional DC type 2 and type 1+2 surge protection

Maximum yields
- Three MPP trackers for flexible array design
- SMA ShadeFix string level optimization
- Integrated I-V curve diagnostics
- Supports 200% DC:AC design capability

Smart monitoring, control and service
- SMA Smart Connected proactive monitoring and service solution
- SMA ennexOS cross-sector energy management platform

Sunny Tripower X is the new innovative inverter solution for commercial PV systems.

Specially designed for the 120 V/208 V grid in the US and Canada. Providing three MPP trackers with SMA ShadeFix string optimization technology for optimal PV array design flexibility and maximum energy yields. SMA's proven integrated rapid shutdown support and reliable DC AFCI arc-fault protection ensure enhanced system safety. And now with the new integrated System Manager, powered by SMA's ennexOS cross-sector energy management platform, Sunny Tripower X becomes the centerpiece of the SMA Commercial Energy Solution for comprehensive commercial energy systems now and in the future.

Technical Data	Sunny Tripower X 13-US
Input (DC)	
Maximum array power	26000 Wp
Maximum system voltage	800 V
Rated MPP voltage range	230 V ... 720 V
MPPT operating voltage range	150 V ... 800 V
Minimum DC voltage / start voltage	150 V / 188 V
MPP trackers / strings per MPP input	3 / 2
Maximum usable operating input current / Maximum short circuit current per MPPT	24 A / 37.5 A
Output (AC)	
Nominal output power	13000 W
Maximum apparent power	13000 VA
Output phases / line connection	3 / 3-(N)-PE
Nominal AC voltage	208 V / 120 V
AC voltage range	108 V ... 132 V
Maximum output current	36 A
Rated grid frequency / range	60 Hz / 54 Hz ... 66 Hz
Power factor at rated power / adjustable displacement	1 / 0.8 overexcited to 0.8 underexcited
Harmonics (THD)	< 3 %
Efficiency	
CEC efficiency	97%
Protection and safety features	
Load rated DC disconnect	●
Load rated AC disconnect	○
Ground fault monitoring / grid monitoring	● / ●
DC reverse polarity protection / AC short-circuit protection	● / ●
All-pole sensitive residual-current monitoring unit	●
DC AFCI arc-fault protection	●
SunSpec PLC signal for rapid shutdown	●
DC surge protection: Type 2 / Type 1+2	○ / ○
Protection class / overvoltage category as per UL 840	I / III
General data	
Dimensions (W/H/D)	728 mm / 762 mm / 266 mm (28.7 in / 30.0 in / 10.5 in)
Device weight	35 kg (77 lbs)
Operating temperature range	–25°C to +60°C (–13°F to +140°F)
Audible noise emission (full power @ 1m and 25°C)	59 dB(A)
Topology / cooling concept	Transformerless / OptiCool (forced convection, variable speed fans)
Enclosure protection rating	Type 4X (as per UL 50E)
Corrosivity classification according to IEC 61701	C5
Maximum permissible relative humidity (non-condensing)	100 %
Features / functions / accessories	
Mounting type	Vertical rack / wall mount to 15° from horizontal
DC connection / AC connection	Amphenol H4 Plus / spring-cage terminal
LED indicators (status / fault / communication)	●
Network interfaces: Ethernet / WLAN	● (2 ports) / ●
Data protocols: SMA Modbus / SunSpec Modbus / Speedwire	● / ● / ●
Multi-function relay / Extension module slot / Digital inputs	● / ● / ● (6 ports)
ShadeFix technology for string level optimization	●
I-V curve diagnostic function	●
Integrated Plant Control / Q on Demand 24/7	● / ●
SMA Smart Connected (proactive monitoring and service support)	●
Standard warranty	10 years
Optional warranty extensions (total warranty coverage cannot exceed 20 years)	+5 years, +10 years
Certificates and approvals	
Certificates and approvals	UL 62109-1, UL 1699B Ed. 1, CAN/CSA 22.2 No. 62109-1:16 / 62109-2:16, PV Rapid Shutdown System Equipment in accordance with UL1741:2021, UL 3741, UL 1998
FCC compliance	FCC Part 15 Class A
Grid interconnection standards	UL 1741 SB, IEEE 1547:2018, compliance to SRDs: CA Rule 21, HECO Rule 14H, ISO-NE, CSA C22.2 No. 107. 1-16 section 14
Integrated System Manager	
Maximum number of supported inverters / energy meters	5 / 1
Maximum system power PV inverters (nominal AC power)	150 kVA
Centralized commissioning of all devices in the system	●
Remote parameterization of SMA devices	● (via Sunny Portal powered by ennexOS)
SMA Dynamic Power Control (e.g. zero export / Volt-VAr)	●
Type designation	STP 13-US-50

● Standard features ○ Optional – Not available Data in nominal conditions Last revision: 08/2025

Accessories

SMA Data Manager M EDMM-20	DC Terminal Cover DC-TERM-COVER	SMA Sensor Module MD.SEN-US-40	DC Surge Protection Kits T2: DC_SPD_KIT6-10 T1+2: DC_SPD_KIT7_T1T2	Roof Mount Kit 210462-00.01	AC Disconnect Kit 210841-00.01

Toll Free +1 888 4 SMA USA
www.SMA-America.com

SMA America, LLC

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MANUFACTURER SPECIFICATIONS - RSDs

APsmart

Raising the bar in innovative DC **MLPE** solar power systems

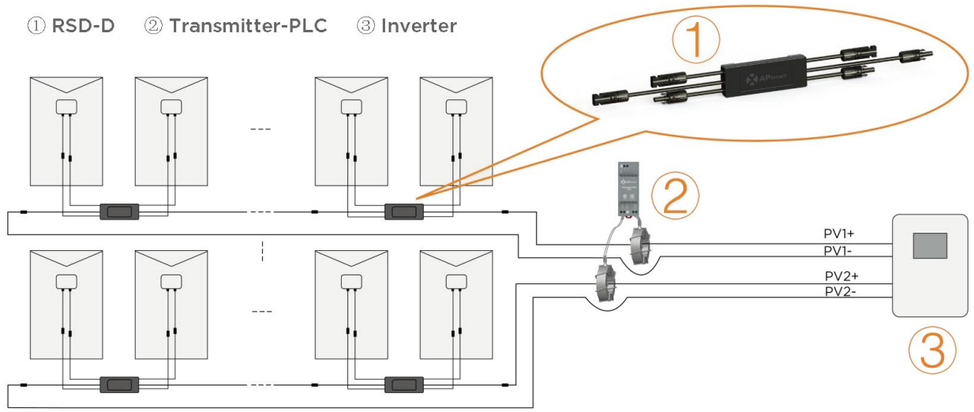
RSD-D

RAPID SHUTDOWN DEVICE

- ✓ Meets NEC 2017, 2020&2023 (690.12) requirements
- ✓ Executes rapid shutdown of system when Transmitter signal is absent
- ✓ Meets SunSpec requirements
- ✓ Dual-input channel

WIRING DIAGRAM

① RSD-D ② Transmitter-PLC ③ Inverter



*Homerun only PV+ cable through core.
*If the inverter includes an integrated SunSpec-certified Rapid Shutdown Transmitter, remove the external transmitter-PLC in the wiring diagram.

RSD-D meets SunSpec requirements, maintaining normal function by continually receiving a heartbeat signal from the APsmart Transmitter. The RSD-D executes rapid system shutdown when the Transmitter signal is absent. Users can manually execute rapid shutdown using Transmitter breaker switch.*(1)(2)

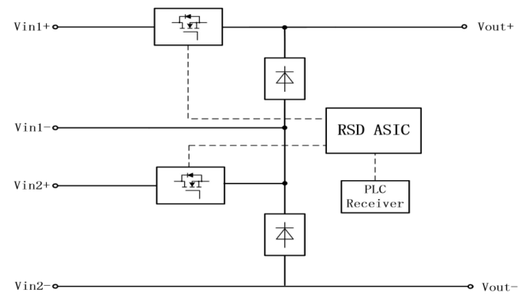
*(1) RSD-D does not have automatic shutdown function for arc detection. When the system is abnormal, the transmitter signal is cut off by pulling the gate, which triggers shutdown.
*(2) RSD-D is designed to reduce the risk of fire suppression but does not solve the risk of a arc fire.

REV2.4 2025-01-23

TECHNICAL DATA

MODEL	RSD-D-20
INPUT DATA (DC)	
Range of Input Operating Voltage	8-65V Per Channel
Maximum Cont. Input Current (Imax)	20A Per Channel
Maximum Short Circuit Current (Isc)	25A
OUTPUT DATA (DC)	
Range of Output Operating Voltage	16-130V
Maximum Cont. Output Current	20A
Maximum System Voltage	1000V/1500V
Maximum Series Fuse Rating	30A
MECHANICAL DATA	
Operating Ambient Temperature Range	-40 oF to +167 oF (-40 °C to + 75 °C)
Dimensions (without cable & connectors)	5.5" x 2" x 0.8"(140 mm x 50.6 mm x 20 mm)
Cable Length	Input 500mm/Output 2400mm
Cable Cross Section Size	TUV:4mm²/UL:12AWG
Connector	Input: Stäubli MC4 PV-KBT4&KST4 or Customize Output: APsystems specified or Customized
Enclosure Rating	NEMA Type 6P/IP68
Protection Temperature	100°C
FEATURES & COMPLIANCE	
Communication Compliance	PLC
Safety Compliance	NEC 2017, 2020&2023 (690.12); UL1741; CSA C22.2 No. 330-17; IEC/EN62109-1
EMC Compliance	FCC Part15; ICES-003

WORKING SCHEMATIC DIAGRAM



Rapid Shutdown CERTIFIED

ORDERING INFORMATION

446101	1500V UL/1000V TUV, 20A, 2.4m cable, Stäubli MC4 PV-KBT4&KST4
4461xx*	20A, 2.4m cable, Customize connector

please see the RSD Series Ordering Information

APsmart
8627 N Mopac Expy, Suite 150, Austin, TX 78759 | +1-737-218-8486 | +1-866-374-8538 | support@APsmartGlobal.com | APsmartGlobal.com

REV2.4 2025-01-23

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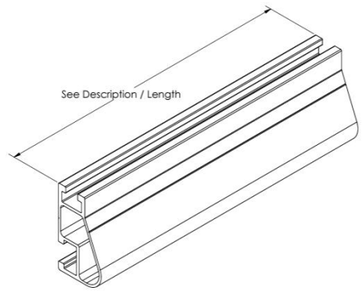
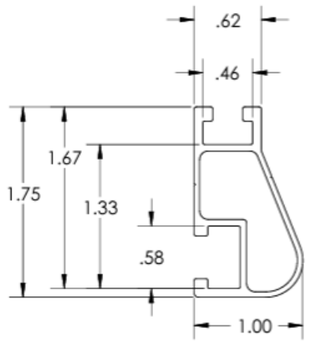
RACKING DETAIL

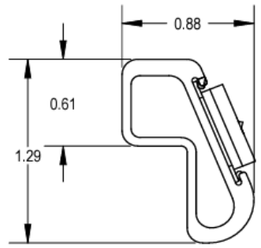
IRONRIDGE XR10 & HUG RACKING SYSTEM

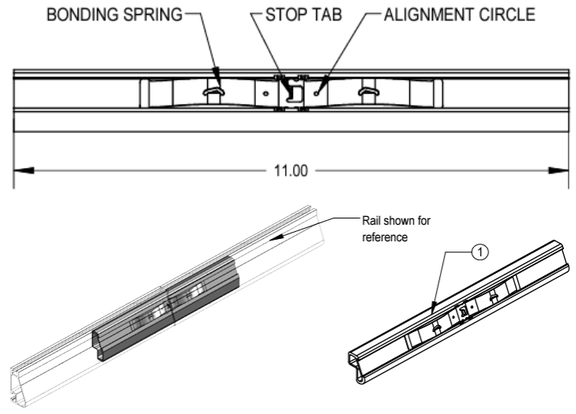
XR10 RAIL



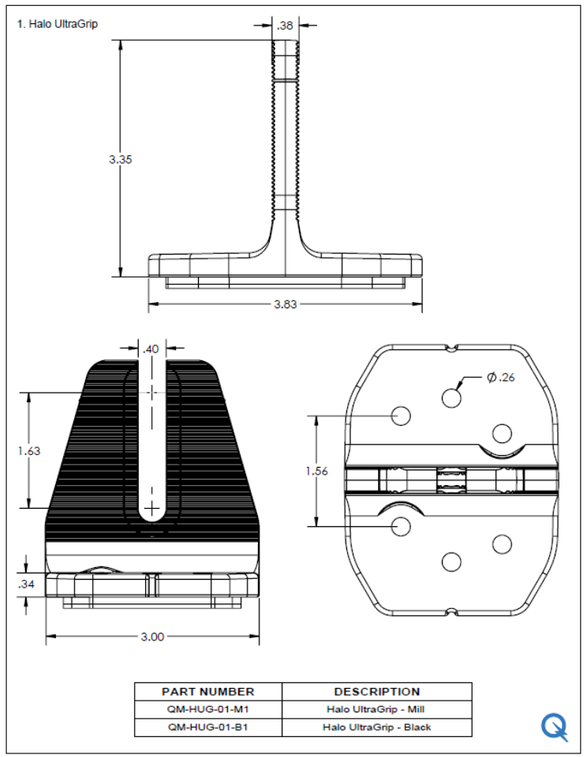


BONDED SPLICE XR10



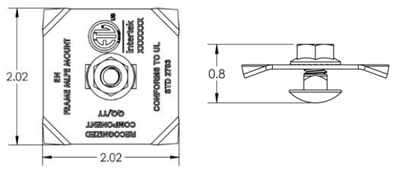


HALO ULTRAGRIP (HUG) FOOTER

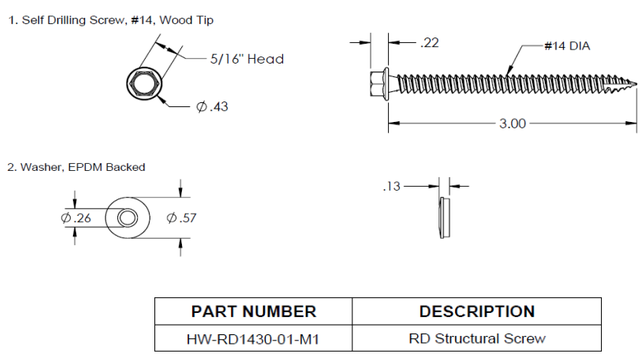


PART NUMBER	DESCRIPTION
QM-HUG-01-M1	Halo UltraGrip - Mill
QM-HUG-01-B1	Halo UltraGrip - Black

MLPE FRAME MOUNT

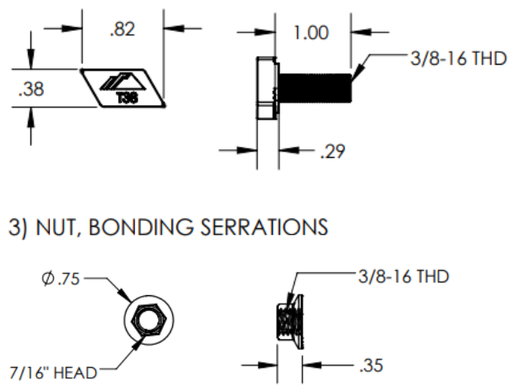


RD STRUCTURAL SCREW

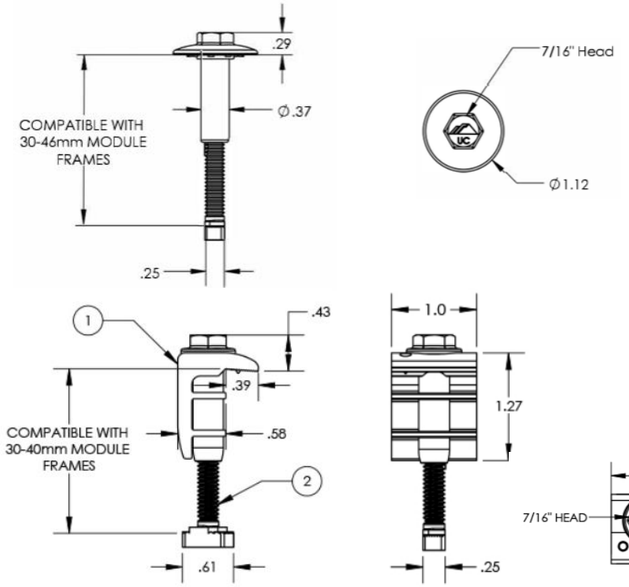


PART NUMBER	DESCRIPTION
HW-RD1430-01-M1	RD Structural Screw

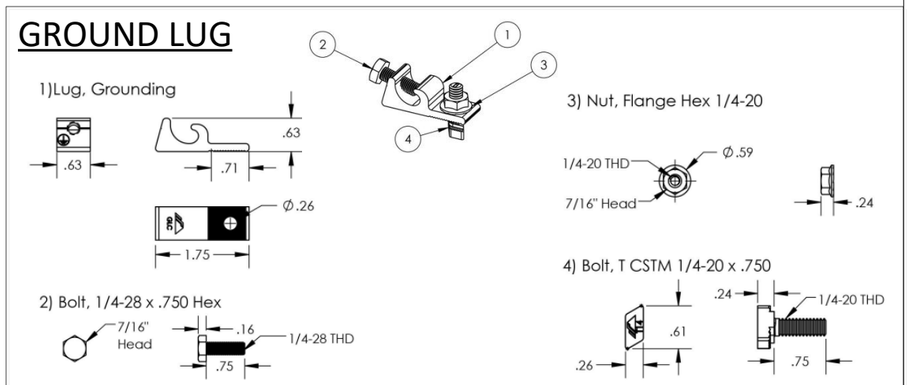
XR10 T-BOLT BONDING HARDWARE



MID & END CLAMPS



GROUND LUG



SOLAR POWER PROS

Project:
Alder PV Install

Project Contact:
Lauren Kazun
303-245-2163

Customer Contact:
Mark Donohoe
617-407-6676

Site Address:
15091 Belford Ave
Parker, CO 80134

System Descripton:

Modules: 29.04 kW DC
# of Modules: 66
Manufacturer: SEG Solar
Model: SEG-440-BTD-BG

Inverter(s): 25 kW AC
# of Inverters: 2
Manufacturer: SMA
Model: STP X 13-US (208)

Project #:
15091

Page:
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MANUFACTURER SPECIFICATIONS –

MODULE, MICROINVERTER & RAIL GROUNDING

IRONRIDGE

3. SECURE LUGS

Grounding Lugs

Only one Grounding Lug (Rail or Module) required per continuous subarray, regardless of subarray size (Unless frameless modules are used, see Page 20).

- **Grounding Lugs are intended to for use with one solid or stranded copper wire, conductor size 10-4 AWG.**

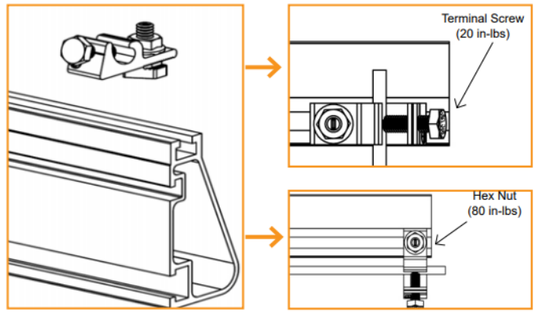
Rail Grounding Lug
Insert T-bolt in Top Rail slot and torque Hex Nut to **80 in-lbs**. Install a minimum 10 AWG solid copper or stranded grounding wire. Torque terminal screw to **20 in-lbs**.

- **Module Grounding Lugs can be installed anywhere along the Rail and in either orientation shown.**

Module Grounding Lug
Insert Bolt through Manufacturer approved grounding location and torque Hex nut to **60 in-lbs.** One Module Grounding Lug may be installed to one module per row. Install a minimum 10 AWG solid copper or stranded grounding wire. Torque terminal screw to **20 in-lbs**.

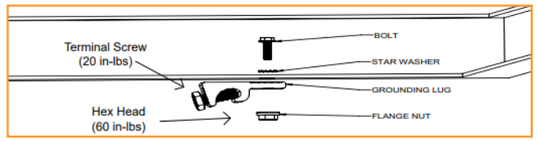
- **If using Enphase microinverters or Sunpower AC modules, Grounding Lugs may not be needed. See Page 19 for more info.**
- **Refer to module manufactuer for mounting location and instructions.**

Rail Grounding Lug



Use with one solid or stranded copper wire, conductor size 10-4AWG.

Module Grounding Lug



8" BONDING JUMPER

8" Bonding Jumper is an electrical bonding jumper that can be used on the Flush Mount System for row to row bonding; making the module frames the medium for the equipment ground path.

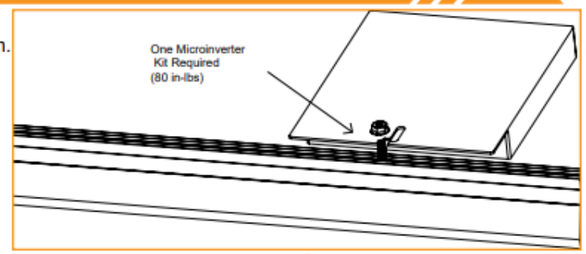
- **Bonding jumper is pushed onto the bottom flange of the module.**
- **New jumpers should be used if re-installation of jumper is required.**
- **Supports bottom flange thicknesses from 1.2mm to 3.1mm.**

MICROINVERTER KITS

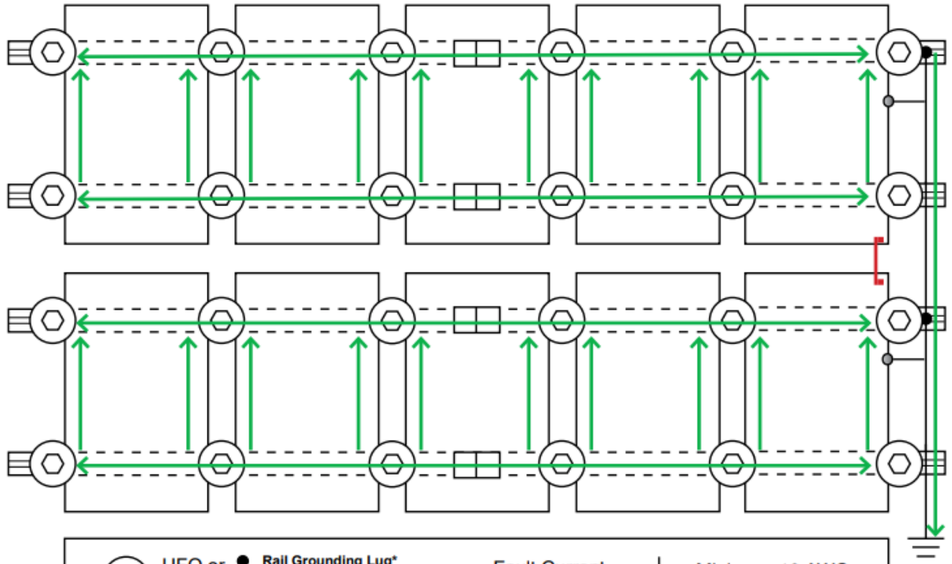
Use IronRidge's Microinverter Kit to bond compatible microinverters and power optimizers to the racking system. Insert Microinverter Kit T-bolt into top rail slot. Place compatible microinverter or power optimizer into position and tighten hex nut to **80 in-lbs**.

- **MLPE devices shall be installed near modules frames whenever possible.**

COMPATIBLE PRODUCTS



ELECTRICAL DIAGRAM



*One Module Grounding Lug or Rail Grounding lug is required per row of a system.

** The use of the 8" Bonding Jumper eliminates the need for row to row bonding. A minimum of one grounding lug per continuous array is required for earth ground.

Grounding Lugs and wire are not required in systems using certain Enphase microinverters or certain Sunpower modules. Equipment grounding is achieved with the Engage cable for Enphase or the AC module cable system for Sunpower via their integrated EGC.

SOLAR POWER PROS

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