



## PV SYSTEM SHORT CIRCUIT AND VOLTAGE DROP CALCULATIONS

### FEEDERS

DESIGNATION	FEEDER LENGTH (ft)	PHASE $\phi$	CONDUCTORS			CONDUIT MAG=1 NON=2	L-L VOLTAGE	L-N VOLTAGE	STARTING I <sub>sc</sub>	CONNECTED LOAD AMPACITY	BUS AVAILABLE I <sub>sc</sub> 3 $\phi$	VOLTAGE DROP %
			Al/Cu	SIZE	PARALLEL RUNS							
FEEDER "PV"	130	3	Cu	#10	1	1	480	277	65,000	22	2,026	1.14
PV INVERTER 1 - STRING 1	40	1	Cu	#6	1	1		400 DC		10		0.03
PV INVERTER 1 - STRING 2	50	1	Cu	#6	1	1		400 DC		10		0.11
PV INVERTER 1 - STRING 3	60	1	Cu	#6	1	1		400 DC		10		0.26
PV INVERTER 2 - STRING 4	70	1	Cu	#6	1	1		400 DC		10		0.26
PV INVERTER 2 - STRING 5	60	1	Cu	#6	1	1		400 DC		7		0.21

### PV MODULE SCHEDULE

MANUFACTURER	MODEL	DIMENSIONS	QUANTITY	WEIGHT	POWER (in Wp)	POWER OPTIMIZER	SUPPORTING MEANS
LG	LG440QAC-A6	76" x 41" x 1.6"	44	45 LBS	440	SOLAREEDGE	JNIRAC SOLARMOUNT

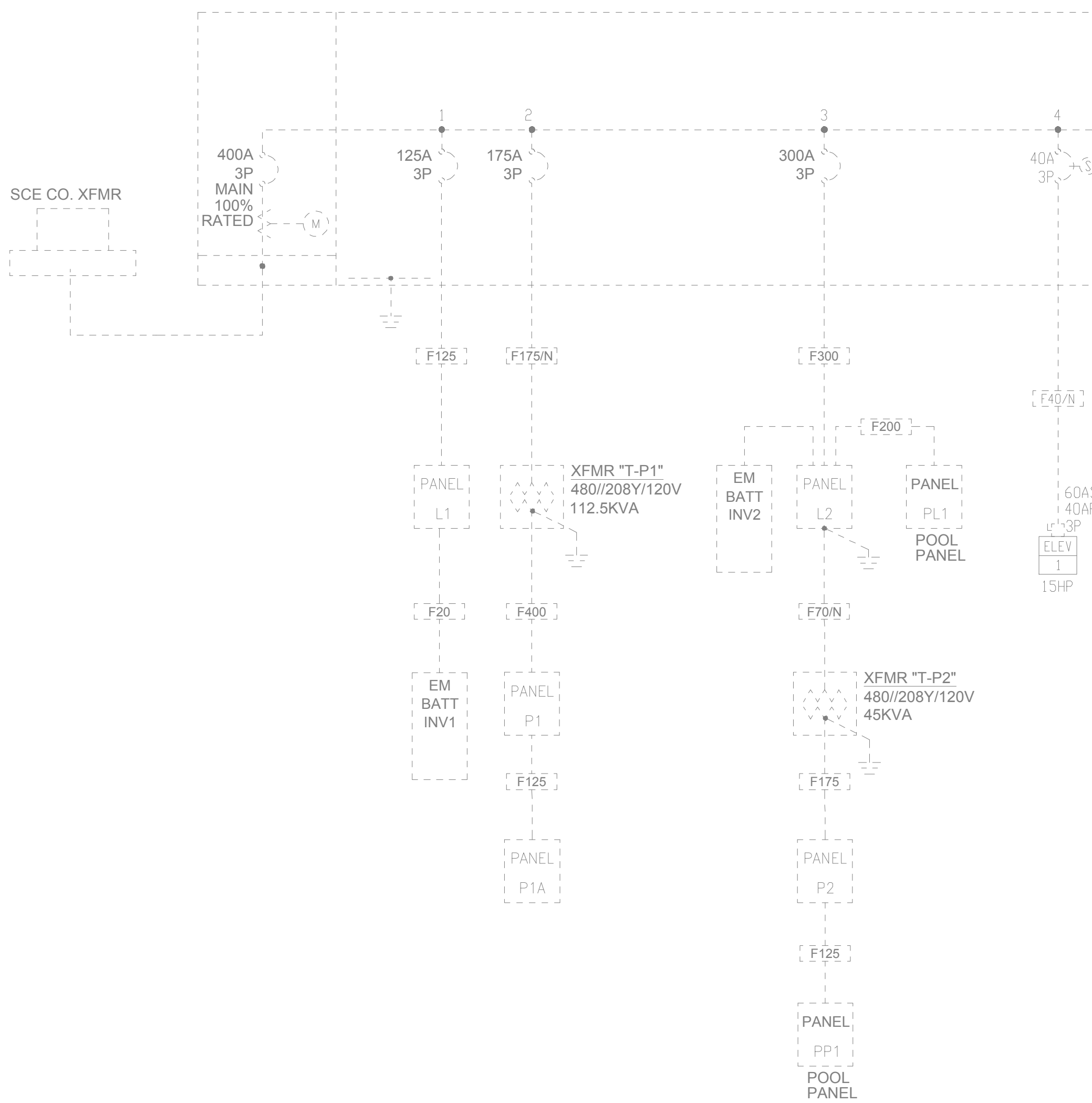
### INVERTER SCHEDULE 1

INVERTER #	MANUFACTURER	MODEL	# OF STRINGS	# PV MODULES	TLT	CEC EFFICIENCY
1	Solar Edge	SE20KUS	5	44	10	98.5
DC VOLTS RANGE						
MAX INPUT VOLT			MAX SHORT CIR.	MAX CURRENT IN	MAX DC INPUT PWR	NOMMAX AC OUTPUT PWR
840-1000 VDC			53 A	26.5 A	27 KW	244 - 305 VAC
MAX OUT CURRENT						
MAX FAULT CURRENT			UL LISTING	FREQUENCY RANGE	THD	OPERATING TEMP RANGE
24 A			92 A	1741/1698B	59.3 - 60.5 Hz	<3% THD
						<40 to +140 F
						30

### BUS CALCULATION PER CEC 705

PV = 20,000W AC / 831 = 24A  
24 AMPS X 1.25 (CEC 705) = 30A  
30A (PV) + 400A (BUS RATING) = 430A  
400A BUS X 1.20 (CEC 705) = 480A.  
"MSB" 400A BUS IS ADEQUATE.

MAIN SWITCHBOARD "MSB" ⑦  
480Y/277V  
400 AMP BUS  
65K A.I.C.



### NOTE:

ALL WORK SHOWN LIGHT AND DASHED IS INSTALLED BY THE ELECTRICAL CONTRACTOR UNDER THE ELECTRICAL PERMIT.

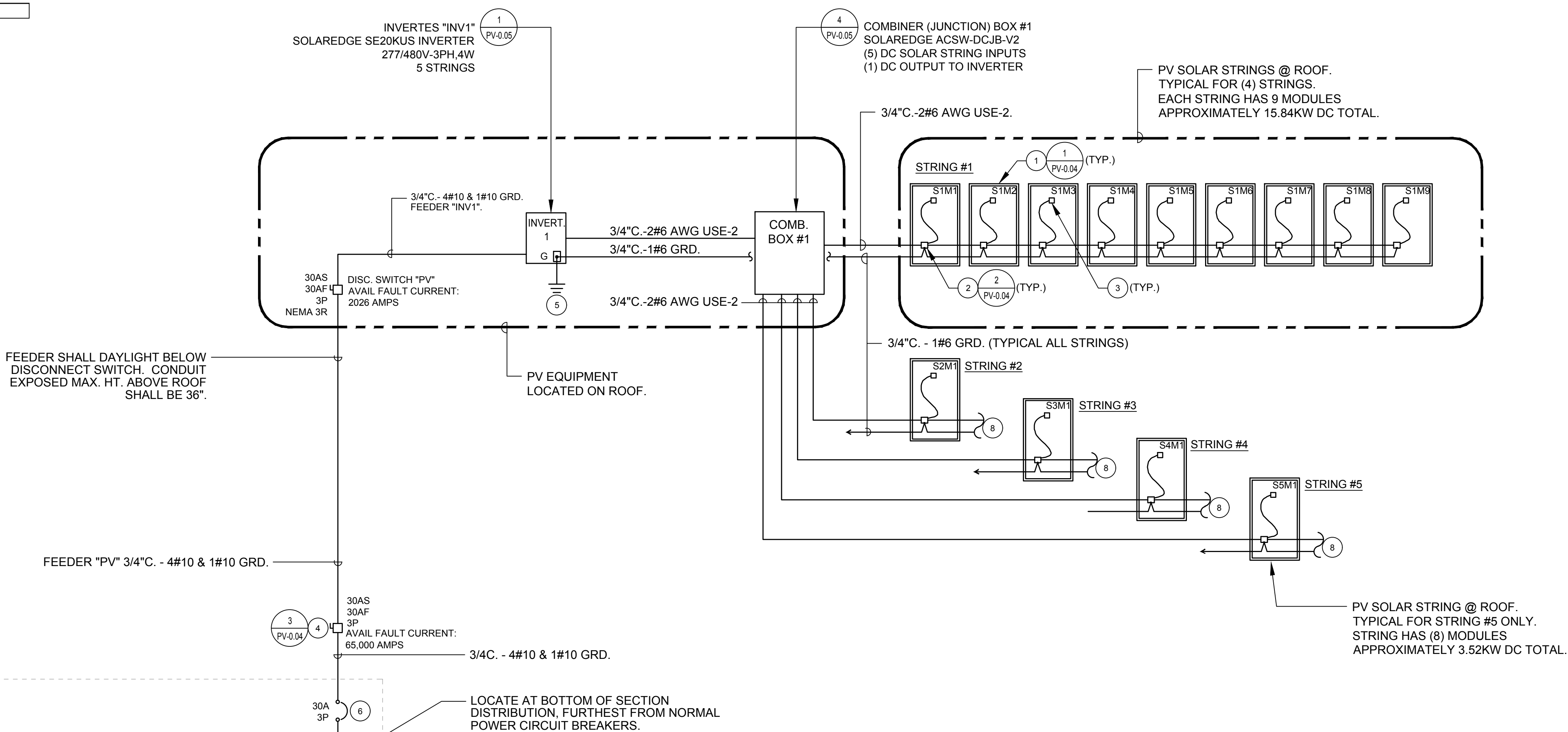
ALL WORK SHOWN SOLID IS FOR THE PV SYSTEM.

### PV SYSTEM SUMMARY

TOTAL # OF PANELS	44
WATTAGE OF PANELS	440
TOTAL DC RATING OF SYSTEM	19,360 W DC
TOTAL # OF INVERTERS	1
INVERTER EFFICIENCY	98.5%

### SINGLE LINE DIAGRAM NOTES

- ROOF MOUNTED PHOTOVOLTAIC MODULE, LG NeON 2 #LG440QAC, 440W, MONOCRYSTALLINE-N-TYPE, 66 CELLS.
- SOLAR EDGE POWER OPTIMIZER (#P401) 1x1 DISTRIBUTION MOUNTED TO RACKING SYSTEM, BONDED TO MODULE AND RACKING SYSTEM WITH 1#6 AWG SOLID CU GROUND CONDUCTOR.
- PHOTOVOLTAIC MODULE LEAD CONNECTION TO POWER OPTIMIZER (+/-)
- "PV" AC DISCONNECT 30A, 3P WITH VIEWING WINDOW. PROVIDE REJECTION TYPE FUSE HOLDERS.
- 3/4" C - 1#6 G TO UFER GROUND BUS IN MAIN ELECTRICAL ROOM.
- CIRCUIT BREAKER SHALL BE RATED FOR BACK FEED APPLICATION.
- ELECTRICAL DISTRIBUTION SYSTEM IS FULLY RATED FOR 65K AIC. SERIES RATING IS NOT ALLOWED.
- TO PV PANEL MODULES 2-9. SEE STRING 1 ABOVE FOR EXAMPLE.



### BASIS OF BEARINGS:

BEARINGS SHOWN HEREON ARE BASED ON THE CENTERLINE OF 162 ND STREET (FORMERLY MARKET STREET) BEING N 89° 55' 30" E SHOWN ON TRACT NO. 10901, M.B. 254/31-32

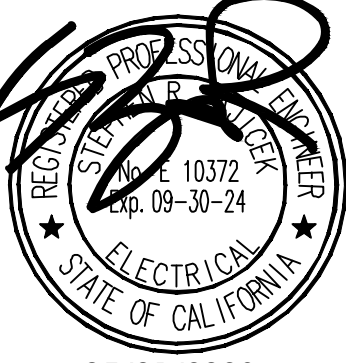
### BENCHMARK:

THE CITY OF GARDENA BENCHMARK NO. 5D-15 ELEV. = 43.508



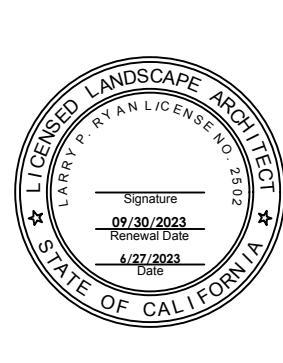
CONSULTANT:

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Consulting Electrical Engineers  
150 Piedra Avenue, Suite A120  
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fbaengr.com FBA Job Number: 535050



PREPARED UNDER THE SUPERVISION OF:

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### REVISIONS

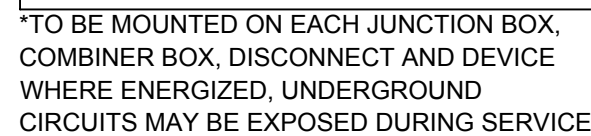
NO.	DESCRIPTION	DATE	APPROVED
1	90% CD SUBMITTAL	12/15/2022	
2	100% CD SUBMITTAL	05/01/2023	
3	FINAL SUBMITTAL	04/30/2023	

**CITY OF GARDENA**  
DEPARTMENT OF PUBLIC WORKS - ENGINEERING  
PV SINGLE LINE DIAGRAM

PV-0.02

DESIGNED BY	SR	DATE	11/14/2022	APPROVED BY:
DRAWN BY	SR	DATE	04/16/2023	
CHECKED BY	RZ	DATE	05/01/2023	
SHT.	2	OF	8	DWG. NO. 5-2606





THE CITY OF GARDENA BENCHMARK NO. 5D-15 ELEV. = 43.508



FBA Job Number: 535050



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R E V I S I O N S			
NO.	DESCRIPTION	DATE	APPROVED
1	90% CD SUBMITTAL	12/15/2022	
2	100% CD SUBMITTAL	05/01/2023	
3	FINAL SUBMITTAL	06/30/2023	

**PV-0.03**

	INITIAL	DATE	APPROVED BY:	
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DRAWN BY	SR	04/18/2023		
CHECKED BY	BZ	05/01/2023		
			DATE	DIRECTOR OF PUBLIC WORKS
			SHT. 3 OF 8	DWG. NO. 5-2606



## Rooftop DC Junction Box for SolarEdge Systems

For commercial & residential SolarEdge systems  
SKU: ACSW-DCJB-V2  
ID: 1416



SPECIFICATION SHEET

### Commercial & residential solar systems made easy

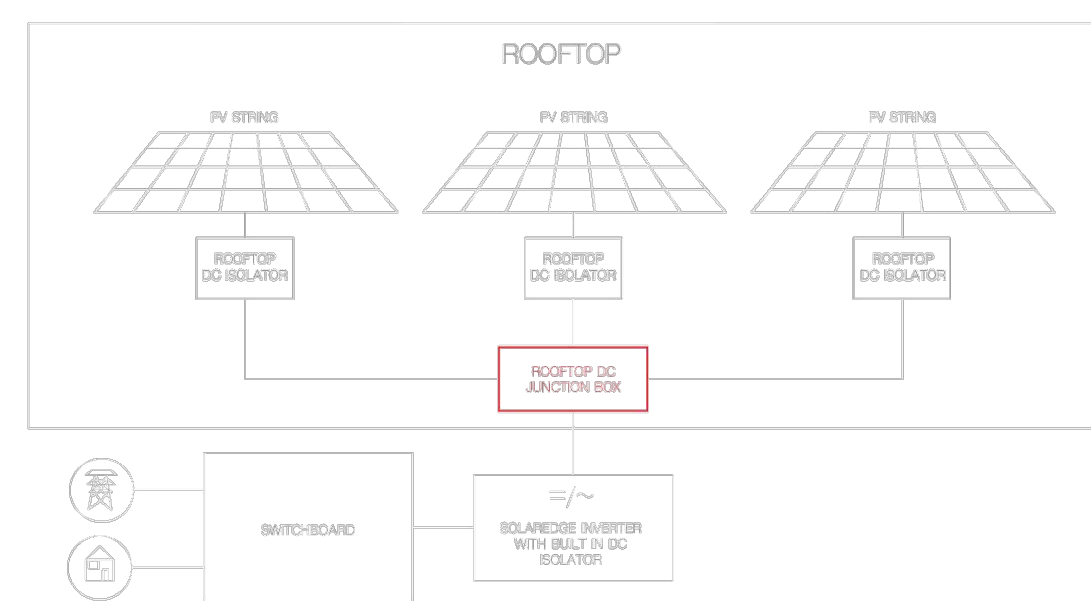
The Rooftop DC Junction box for SolarEdge systems is a pre-assembled weather-proof enclosure used to combine DC circuits on the roof. The Rooftop DC Junction box allows a single DC circuit to be run to the inverter from the roof, reducing DC cabling and the need for additional DC isolators at the inverter.

- ▶ Slim design to allow clearance above the roof
- ▶ Ability to rotate enclosure on the bracket to position cable entry points where required
- ▶ Inbuilt pressure equalization valve
- ▶ Combine up to 5 strings without any additional glands
- ▶ Reduces DC cabling, additional DC isolators adjacent to the inverter and multiple HD conduits through roof spaces
- ▶ Suitable for all SolarEdge inverters
- ▶ IP 66 rated, suitable for mounting outdoors in various weather conditions
- ▶ Includes stainless steel universal bracket, conduits glands and labels and pre-assembled for ease of installation

To be installed in compliance with AS/NZS5033

ACSolar Warehouse

### Typical system installation



### Mechanical specifications

Enclosure dimensions	185 x 185 x 58mm
Conduit gland	1 x 25mm
5 Hole gland - *Suitable for 4-6mm <sup>2</sup>	2 x 25mm with 6 blanking plugs
DC cable	IP 66
IP rating	1kg
Weight	

### Electrical specifications

Dual entry negative terminals	3 x 10mm <sup>2</sup> (MAX)
Dual entry positive terminals	3 x 10mm <sup>2</sup> (MAX)
Terminal max current	57A (10mm <sup>2</sup> cable rated at 54A)
Terminal max voltage with suitable separation	1000V
Max cable size	10mm <sup>2</sup> with boot lace or 16mm <sup>2</sup> bare

This product comes with glands suitable for 5x string inputs and 1x output. There are enough gland entries and terminals to accommodate 5x inputs and 1x output.

\*Some uncommon insulation thicknesses may not be suitable - if larger hole glands are required, contact AC Solar Warehouse to purchase.

ACSolar Warehouse

SIEMENS



### Product Guide

## Type VBII Heavy Duty Switches with Viewing Window



- More visibility, less exposure
- Available in NEMA Type 3R, 12 and 4X stainless steel enclosures
- 30-400 Amp (ampage) vary depending on enclosure
- Type 4X stainless steel switches (30-400 Amp) are provided with stainless steel interior parts
- The widest range of accessories available including 200% neutrals, gold plated PLC auxiliary contacts and isolated ground kits
- Viewing window kit available as a replacement
- Ground lugs provided as standard
- Type 12 enclosures are fabricated from galvanized steel and are also rated for 3000 outdoor applications

usa.siemens.com/switches

### Heavy duty safety switches with viewing window

#### Ordering information<sup>1)</sup>

Series	Rating	Ship wt. (kg)	250V AC 1 phase, 2 wire	480V AC 1 phase, 2 wire	480V AC 3 phase, 3 wire	600V AC 3 phase, 3 wire
<b>3 pole, 3 wire fusible, Type 3R 12</b>						
30	HF3R12W	17	5	7%	15	20
40	HF3R12W	22	10	15	30	50
<b>3 pole, 3 wire non-fusible, Type 3R 12</b>						
30	HN3R12W	14	3	10	20	30
40	HN3R12W	21	10	20	50	60
<b>3 pole, 3 wire fusible, Type 12 4X</b>						
30	HF3R12W	17	5	7%	15	20
40	HF3R12W	22	10	15	30	50
100	HF3R12W	26	15	30	60	75
200	HF3R12W	33	—	60	125	150
400	HF3R12W	166	—	125	250	350
600	HF3R12W	166	—	200	400	500
<b>3 pole, 3 wire non-fusible, Type 12 4X</b>						
30	HN3R12W	14	3	10	20	30
40	HN3R12W	21	10	20	50	60
100	HN3R12W	25	15	40	75	100
200	HN3R12W	31	15	60	125	150
400	HN3R12W	133	15	125	250	350
<b>3 pole, 3 wire fusible, Type 4X Stainless Steel 4X</b>						
30	HF3R12W	17	5	7%	15	20
40	HF3R12W	22	10	15	30	50
100	HF3R12W	26	15	30	60	75
200	HF3R12W	33	—	60	125	150
400	HF3R12W	166	—	125	250	350
<b>3 pole, 3 wire non-fusible, Type 4X Stainless Steel 4X</b>						
30	HN3R12W	15	3	10	20	30
40	HN3R12W	23	10	20	50	60
100	HN3R12W	27	15	40	75	100
200	HN3R12W	34	15	60	125	150
400	HN3R12W	142	15	125	250	350

<sup>1)</sup> 250V switches are also rated 600V DC.  
<sup>2)</sup> Maximum IP ratings listed apply only when time delay fuses are used.  
<sup>3)</sup> Also rated 300V for outdoor use.  
<sup>4)</sup> All switches are suitable for use as service entrance equipment.  
<sup>5)</sup> See note on page 4 for 1 pole switch for 3 pole application.

### Lugs

30-100A switches are suitable for use with 60° or 75° C wire.  
200-600A are suitable for use with 75° C wire.

### Wire ranges (Line, load and standard neutral)

Switch Rating (Amps)	Wire Range (AWG)	Wire Range (mm <sup>2</sup> )
30	#12-2 AWG (AL) or #14-2 AWG (CU)	#12-2 AWG (AL) or #14-2 AWG (CU)
40	#12-2 AWG (AL) or #14-2 AWG (CU)	#12-2 AWG (AL) or #14-2 AWG (CU)
100	#12-2 AWG (AL) or #14-2 AWG (CU)	#12-2 AWG (AL) or #14-2 AWG (CU)
200	#12-2 AWG (AL) or #14-2 AWG (CU)	#12-2 AWG (AL) or #14-2 AWG (CU)
400	#12-2 AWG (AL) or #14-2 AWG (CU)	#12-2 AWG (AL) or #14-2 AWG (CU)

## Power Optimizer

For North America  
P370 / P400 / P401 / P485 / P505

Optimizer model	P370	P400	P401	P485	P505
Optimal module compatibility	(for higher power 60 cell modules)	(for 72 & 96 cell modules)	(for high power 60 cell modules)	(for high voltage modules)	(for higher current modules)
Input					
Rated Input DC Power <sup>1)</sup>	370	400	400	485	505
Maximum Voltage Input Voltage (DC or AC line-to-line)	60	80	80	100	80
MPPT Operating Range	15-100	15-100	15-100	15-100	15-100
Maximum Short Circuit Current (SCC)	5	6.5	6.5	5	6.5
Maximum DC Input Current	3.5	4.5	4.5	3.5	4.5
Maximum Efficiency	98.5	98.5	98.5	98.5	98.5
Input Impedance	0.001	0.001	0.001	0.001	0.001
Overvoltage Protection	Yes	Yes	Yes	Yes	Yes
Output					
Output During Operation (POWER OPTIMIZER CONNECTED TO OPERATING SOLAREDGE INVERTER)	5	6.5	6.5	5	6.5
Maximum Output Current	5	6.5	6.5	5	6.5
Output During Standby (POWER OPTIMIZER DISCONNECTED FROM SOLAREDGE INVERTER OR SOLAREDGE INVERTER OFF)	0	0	0	0	0
Standby Output Current	0	0	0	0	0
Output Voltage per Power Optimizer	1 x 0.1	1 x 0.1	1 x 0.1	1 x 0.1	1 x 0.1

STANDARD COMPLIANCE		IEC Part 2 Class A, IEC61000-6-2, IEC61000-6-3				
Safety		UL 1741 Class A, UL 1741 Class B, UL 1741 Class C, UL 1741 Class D, UL 1741 Class E, UL 1741 Class F, UL 1741 Class G, UL 1741 Class H, UL 1741 Class I, UL 1741 Class J, UL 1741 Class K, UL 1741 Class L, UL 1741 Class M, UL 1741 Class N, UL 1741 Class O, UL 1741 Class P, UL 1741 Class Q, UL 1741 Class R, UL 1741 Class S, UL 1741 Class T, UL 1741 Class U, UL 1741 Class V, UL 1741 Class W, UL 1741 Class X, UL 1741 Class Y, UL 1741 Class Z, UL 1741 Class AA, UL 1741 Class AB, UL 1741 Class AC, UL 1741 Class AD, UL 1741 Class AE, UL 1741 Class AF, UL 1741 Class AG, UL 1741 Class AH, UL 1741 Class AI, UL 1741 Class AJ, UL 1741 Class AK, UL 1741 Class AL, UL 1741 Class AM, UL 1741 Class AN, UL 1741 Class AO, UL 1741 Class AP, UL 1741 Class AQ, UL 1741 Class AR, UL 1741 Class AS, UL 1741 Class AT, UL 1741 Class AU, UL 1741 Class AV, UL 1741 Class AW, UL 1741 Class AX, UL 1741 Class AY, UL 1741 Class AZ, UL 1741 Class BA, UL 1741 Class BB, UL 1741 Class BC, UL 1741 Class BD, UL 1741 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UL 1741 Class UM, UL 1741 Class UN, UL 1741 Class UO, UL 1741 Class UP, UL 1741 Class UQ, UL 1741 Class UR, UL 1741 Class US, UL 1741 Class UT, UL 1741 Class UV, UL 1741 Class UW, UL 1741 Class UX, UL 1741 Class UY, UL 1741 Class UZ, UL 1741 Class VA, UL 1741 Class VB, UL 1741 Class VC, UL 1741 Class VD, UL 1741 Class VE, UL 1741 Class VF, UL 1741 Class VG, UL 1741 Class VH, UL 1741 Class VI, UL 1741 Class VJ, UL 1741 Class VK, UL 1741 Class VL, UL 1741 Class VM, UL 1741 Class VN, UL 1741 Class VO, UL 1741 Class VP, UL 1741 Class VQ, UL 1741 Class VR, UL 1741 Class VS, UL 1741 Class VT, UL 1741 Class VU, UL 1741 Class VV, UL 1741 Class VW, UL 1741 Class VX, UL 1741 Class VY, UL 1741 Class VZ, UL 1741 Class WA, UL 1741 Class WB, UL 1741 Class WC, UL 1741 Class WD, UL 1741 Class WE, UL 1741 Class WF, UL 1741 Class WG, UL 1741 Class WH, UL 1741 Class WI, UL 1741 Class WJ, UL 1741 Class WK, UL 1741 Class WL, UL 1741 Class WM, UL 1741 Class WN, UL 1741 Class WO, UL 1741 Class WP, UL 1741 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UL 1741 Class YV, UL 1741 Class YW, UL 1741 Class YX, UL 1741 Class YZ, UL 1741 Class ZA, UL 1741 Class ZB, UL 1741 Class ZC, UL 1741 Class ZD, UL 1741 Class ZE, UL 1741 Class ZF, UL 1741 Class ZG, UL 1741 Class ZH, UL 1741 Class ZI, UL 1741 Class ZJ, UL 1741 Class ZK, UL 1741 Class ZL, UL 1741 Class ZM, UL 1741 Class ZN, UL 1741 Class ZO, UL 1741 Class ZP, UL 1741 Class ZQ, UL 1741 Class ZR, UL 1741 Class ZS, UL 1741 Class ZT, UL 1741 Class ZU, UL 1741 Class ZV, UL 1741 Class ZW, UL 1741 Class ZX, UL 1741 Class ZY, UL 1741 Class ZZ				
Efficiency		UL 1741 Class A, UL 1741 Class B, UL 1741 Class C, UL 1741 Class D, UL 1741 Class E, UL 1741 Class F, UL 1741 Class G, UL 1741 Class H, UL 1741 Class I, UL 1741 Class J, UL 1741 Class K, UL 1741 Class L, UL 1741 Class M, UL 1741 Class N, UL 1741 Class O, UL 1741 Class P, UL 1741 Class Q, UL 1741 Class R, UL 1741 Class S, UL 1741 Class T, UL 1741 Class U, UL 1741 Class V, UL 1741 Class W, UL 1741 Class X, UL 1741 Class Y, UL 1741 Class Z, UL 1741 Class AA, UL 1741 Class AB, UL 1741 Class AC, UL 1741 Class AD, UL 1741 Class AE, UL 1741 Class AF, UL 1741 Class AG, UL 1741 Class AH, UL 1741 Class AI, UL 1741 Class AJ, UL 1741 Class AK, UL 1741 Class AL, UL 1741 Class AM, UL 1741 Class AN, UL 1741 Class AO, UL 1741 Class AP, UL 1741 Class AQ, UL 1741 Class AR, UL 1741 Class AS, UL 1741 Class AT, UL 1741 Class AU, UL 1741 Class AV, UL 1741 Class AW, UL 1741 Class AX, UL 1741 Class AY, UL 1741 Class AZ, UL 1741 Class BA, UL 1741 Class BB, UL 1741 Class BC, UL 1741 Class BD, UL 1741 Class BE, UL 1741 Class BF, UL 1741 Class BG, UL 1741 Class BH, UL 1741 Class BI, UL 1741 Class BJ, UL 1741 Class BK, UL 1741 Class BL, UL 1741 Class BM, UL 1741 Class BN, UL 1741 Class BO, UL 1741 Class BP, UL 1741 Class BQ, UL 1741 Class BR, UL 1741 Class BS, UL 1741 Class BT, UL 1741 Class BU, UL 1741 Class BV, UL 1741 Class BW, UL 1741 Class BX, UL 1741 Class BY, UL 1741 Class BZ, UL 1741 Class CA, UL 1741 Class CB, UL 1741 Class CC, UL 1741 Class CD, UL 1741 Class CE, UL 1741 Class CF, UL 1741 Class CG, UL 1741 Class CH, UL 1741 Class CI, UL 1741 Class CJ, UL 1741 Class CK, UL 1741 Class CL, UL 1741 Class CM, UL 1741 Class CN, UL 1741 Class CO, UL 1741 Class CP, UL 1741 Class CQ, UL 1741 Class CR, UL 1741 Class CS, UL 1741 Class CT, UL 1741 Class CU, UL 1741 Class CV, UL 1741 Class CW, UL 1741 Class CX, UL 1741 Class CY, UL 1741 Class CZ, UL 1741 Class DA, UL 1741 Class DB, UL 1741 Class DC, UL 1741 Class DD, UL 1741 Class DE, UL 1741 Class DF, UL 1741 Class DG, UL 1741 Class 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1741 Class FL, UL 1741 Class FM, UL 1741 Class FN, UL 1741 Class FO, UL 1741 Class FP, UL 1741 Class FQ, UL 1741 Class FR, UL 1741 Class FS, UL 1741 Class FT, UL 1741 Class FU, UL 1741 Class FV, UL 1741 Class FW, UL 1741 Class FX, UL 1741 Class FY, UL 1741 Class FZ, UL 1741 Class GA, UL 1741 Class GB, UL 1741 Class GC, UL 1741 Class GD, UL 1741 Class GE, UL 1741 Class GF, UL 1741 Class GG, UL 1741 Class GH, UL 1741 Class GI, UL 1741 Class GJ, UL 1741 Class GK, UL 1741 Class GL, UL 1741 Class GM, UL 1741 Class GN, UL 1741 Class GO, UL 1741 Class GP, UL 1741 Class GQ, UL 1741 Class GR, UL 1741 Class GS, UL 1741 Class GT, UL 1741 Class GU, UL 1741 Class GV, UL 1741 Class GW, UL 1741 Class GX, UL 1741 Class GY, UL 1741 Class GZ, UL 1741 Class HA, UL 1741 Class HB, UL 1741 Class HC, UL 1741 Class HD, UL 1741 Class HE, UL 1741 Class HF, UL 1741 Class HG, UL 1741 Class HH, UL 1741 Class HI, UL 1741 Class HJ, UL 1741 Class HK, UL 1741 Class HL, UL 1741 Class HM, UL 1741 Class HN, UL 1741 Class 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LW, UL 1741 Class LX, UL 1741 Class LY, UL 1741 Class LZ, UL 1741 Class MA, UL 1741 Class MB, UL 1741 Class MC, UL 1741 Class MD, UL 1741 Class ME, UL 1741 Class MF, UL 1741 Class MG, UL 1741 Class MH, UL 1741 Class MI, UL 1741 Class MJ, UL 1741 Class MK, UL 1741 Class ML, UL 1741 Class MM, UL 1741 Class MN, UL 1741 Class MO, UL 1741 Class MP, UL 1741 Class MQ, UL 1741 Class MR, UL 1741 Class MS, UL 1741 Class MT, UL 1741 Class MU, UL 1741 Class MV, UL 1741 Class MW, UL 1741 Class MX, UL 1741 Class MY, UL 1741 Class MZ, UL 1741 Class NA, UL 1741 Class NB, UL 1741 Class NC, UL 1741 Class ND, UL 1741 Class NE, UL 1741 Class NF, UL 1741 Class NG, UL 1741 Class NH, UL 1741 Class NI, UL 1741 Class NJ, UL 1741 Class NK, UL 1741 Class NL, UL 1741 Class NM, UL 1741 Class NN, UL 1741 Class NO, UL 1741 Class NP, UL 1741 Class NQ, UL 1741 Class NR, UL 1741 Class NS, UL 1741 Class NT, UL 1741 Class NU, UL 1741 Class NV, UL 1741 Class NW, UL 1741 Class NX, UL 1741 Class NY, UL 1741 Class NZ, UL 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QD, UL 1741 Class QE, UL 1741 Class QF, UL 1741 Class QG, UL 1741 Class QH, UL 1741 Class QI, UL 1741 Class QJ, UL 1741 Class QK, UL 1741 Class QL, UL 1741 Class QM, UL 1741 Class QN, UL 1741 Class QO, UL 1741 Class QP, UL 1741 Class QQ, UL 1741 Class QR, UL 1741 Class QS, UL 1741 Class QT, UL 1741 Class QU, UL 1741 Class QV, UL 1741 Class QW, UL 1741 Class QX, UL 1741 Class QY, UL 1741 Class QZ, UL 1741 Class RA, UL 1741 Class RB, UL 1741 Class RC, UL 1741 Class RD, UL 1741 Class RE, UL 1741 Class RF, UL 1741 Class RG, UL 1741 Class RH, UL 1741 Class RI, UL 1741 Class RJ, UL 1741 Class RK, UL 1741 Class RL, UL 1741 Class RM, UL 1741 Class RN, UL 1741 Class RO, UL 1741 Class RP, UL 1741 Class RQ, UL 1741 Class RR, UL 1741 Class RS, UL 1741 Class RT, UL 1741 Class RU, UL 1741 Class RV, UL 1741 Class RW, UL 1741 Class RX, UL 1741 Class RY, UL 1741 Class RZ, UL 1741 Class SA, UL 1741 Class SB, UL 1741 Class SC, UL 1741 Class SD, UL 1741 Class SE, UL 1741 Class SF, UL 1741 Class SG, UL 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UL, UL 1741 Class UM, UL 1741 Class UN, UL 1741 Class UO, UL 1741 Class UP, UL 1741 Class UQ, UL 1741 Class UR, UL 1741 Class US, UL 1741 Class UT, UL 1741 Class UV, UL 1741 Class UW, UL 1741 Class UX, UL 1741 Class UY, UL 1741 Class UZ, UL 1741 Class VA, UL 1741 Class VB, UL 1741 Class VC, UL 1741 Class VD, UL 1741 Class VE, UL 1741 Class VF, UL 1741 Class VG, UL 1741 Class VH, UL 1741 Class VI, UL 1741 Class VJ, UL 1741 Class VK, UL 1741 Class VL, UL 1741 Class VM, UL 1741 Class VN, UL 1741 Class VO, UL 1741 Class VP, UL 1741 Class VQ, UL 1741 Class VR, UL 1741 Class VS, UL 1741 Class VT, UL 1741 Class VU, UL 1741 Class VV, UL 1741 Class VW, UL 1741 Class VX, UL 1741 Class VY, UL 1741 Class VZ, UL 1741 Class WA, UL 1741 Class WB, UL 1741 Class WC, UL 1741 Class WD, UL 1741 Class WE, UL 1741 Class WF, UL 1741 Class WG, UL 1741 Class WH, UL 1741 Class WI, UL 1741 Class WJ, UL 1741 Class WK, UL 1741 Class WL, UL 1741 Class WM, UL 1741 Class WN, UL 1741 Class WO, UL 1741 Class WP, UL 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FBA Engineering / Plot Date: 6/27/2023 6:43 AM / Plotted by: Steve Roth / Drawing Location: I:\6350\60\PV\A-05\_535000.dwg

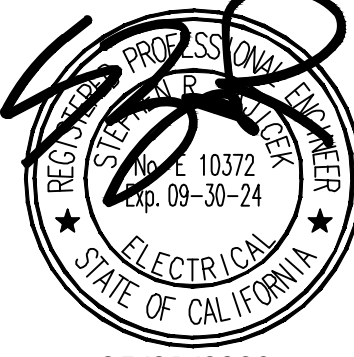
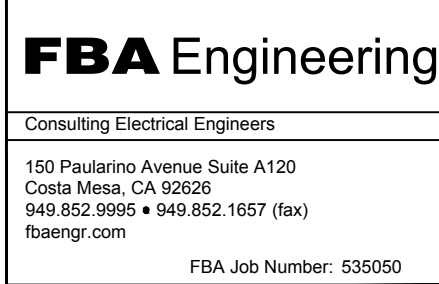


**BASIS OF BEARINGS:**  
BEARINGS SHOWN HEREON ARE BASED ON THE CENTERLINE OF 162 ND STREET (FORMERLY MARKET STREET) BEING N 89° 55' 30" E SHOWN ON TRACT NO. 10901, M.B. 254/31-32

**BENCHMARK:**  
THE CITY OF GARDENA BENCHMARK NO. 5D-15 ELEV. = 43.508



CONSULTANT:



PREPARED UNDER THE SUPERVISION OF:



REVISIONS				CITY OF GARDENA DEPARTMENT OF PUBLIC WORKS - ENGINEERING			
NO.	DESCRIPTION	DATE	APPROVED	PV DETAILS			
1	90% CD SUBMITTAL	12/15/2022					
2	100% CD SUBMITTAL	05/01/2023					
3	FINAL SUBMITTAL	04/30/2023					
				PV-0.05			
				DESIGNED BY: SR INITIAL: SR DATE: 11/14/2022 APPROVED BY:			
				DRAWN BY: SR 04/16/2023 DATE: 04/16/2023 DIRECTOR OF PUBLIC WORKS			
				CHECKED BY: SR 05/01/2023 SHT. 5 OF 8 DWG. NO. 5-2606			

PART # TABLE	
P/N	DESCRIPTION
004300M	3" 2 PIECE STANDOFF MILL
004300D	3" 2 PIECE STANDOFF DARK
004400M	4" 2 PIECE STANDOFF MILL
004400D	4" 2 PIECE STANDOFF DARK
004600M	6" 2 PIECE STANDOFF MILL
004600D	6" 2 PIECE STANDOFF DARK
004700M	7" 2 PIECE STANDOFF MILL
004700D	7" 2 PIECE STANDOFF DARK

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

PRODUCT LINE: SM  
DRAWING TYPE: ASSEMBLY DETAIL  
DESCRIPTION: STANDOFF  
REVISION DATE: 5/19/2020

DRAWING NOT TO SCALE  
ALL DIMENSIONS ARE NOMINAL  
PRODUCT PROTECTED BY ONE OR MORE US PATENTS  
LEGAL NOTICE

SM-A12  
SHEET

TILT LEG TABLE				
P/N	DESCRIPTION	TOTAL ADJUSTABLE LENGTHS	SQUARE TUBE	STRUT
307107M	SM ADJ TILT LEG, 8"-12", W/HOW	8" to 12"	8"	8"
307119M	SM ADJ TILT LEG, 18"-30", W/HOW	18" to 30"	18"	18"
307120M	SM ADJ TILT LEG, 26"-44", W/HOW	26" to 44"	26"	26"
307134M	SM ADJ TILT LEG, 40"-72", W/HOW	40" to 72"	40"	40"

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

PRODUCT LINE: SOLARMOUNT TILT  
DRAWING TYPE: ASSEMBLY  
DESCRIPTION: ADJUSTABLE TILT LEG  
REVISION DATE: 9/27/2017

DRAWING NOT TO SCALE  
ALL DIMENSIONS ARE NOMINAL  
PRODUCT PROTECTED BY ONE OR MORE US PATENTS  
LEGAL NOTICE

SM-A09  
SHEET

NOTES:  
1. SEE SM-T1H INSTALLATION GUIDE FOR ASSEMBLY INSTRUCTIONS.

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

PRODUCT LINE: SOLARMOUNT TILT  
DRAWING TYPE: ASSEMBLY  
DESCRIPTION: HIGH PROFILE TILT  
REVISION DATE: 9/27/2017

DRAWING NOT TO SCALE  
ALL DIMENSIONS ARE NOMINAL  
PRODUCT PROTECTED BY ONE OR MORE US PATENTS  
LEGAL NOTICE

SM-A08  
SHEET

NOTES:  
1. SEE SM-T1H INSTALLATION GUIDE FOR ASSEMBLY INSTRUCTIONS.

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

PRODUCT LINE: SOLARMOUNT TILT  
DRAWING TYPE: ASSEMBLY  
DESCRIPTION: LOW PROFILE TILT  
REVISION DATE: 9/27/2017

DRAWING NOT TO SCALE  
ALL DIMENSIONS ARE NOMINAL  
PRODUCT PROTECTED BY ONE OR MORE US PATENTS  
LEGAL NOTICE

SM-A07  
SHEET

UNIRAC SOLARMOUNT DETAILS

SCALE: NO SCALE

2

## Three Phase Inverters for the 277/480V Grid<sup>(1)</sup> For North America

SE20KUS / SE30KUS / SE33.3KUS / SE40KUS

MODEL NUMBER	SE20KUS SE20K-XXXXXXX	SE30KUS SE30K-XXXXXXX	SE33.3KUS SE33.3K-XXXXXXX	SE40KUS SE40K-XXXXXXX	UNITS
APPLICABLE TO INVERTERS WITH PART NUMBER					
OUTPUT					
Rated AC Power Output	20000	30000	33300	40000	W
Maximum apparent AC output power	20000	30000	33300	40000	VAS
AC Output Line Connections	480 + 1 PE	480 + 1 PE	480 + 1 PE	480 + 1 PE	VOL
AC Output Voltage Minimum Nominal Maximum <sup>(1)</sup> (V)	244 - 277 - 305	244 - 277 - 305	244 - 277 - 305	244 - 277 - 305	VOL
AC Output Voltage Minimum Nominal Maximum <sup>(1)</sup> (V)	400 - 480 - 500	400 - 480 - 500	400 - 480 - 500	400 - 480 - 500	VOL
AC Frequency Min-Max (Hz)	59.3 - 60.3	59.3 - 60.3	59.3 - 60.3	59.3 - 60.3	Hz
Maximum Continuous Output Current (per Phase)	24	36.25	40	48.25	Amps
IP20 Protection	Yes	Yes	Yes	Yes	A
Utility Monitoring, Monitoring Protection, Country Configurable Set Points	Yes	Yes	Yes	Yes	%
Total Harmonic Distortion	≤ 3	≤ 3	≤ 3	≤ 3	%
Power Factor Range	0.95 to 1	0.95 to 1	0.95 to 1	0.95 to 1	
INPUT					
Maximum DC Power (Module ITC)	27000	40000	40000	40000	W
Transformerless, Non-Isolated	Yes	Yes	Yes	Yes	VOL
Maximum Input Voltage (DC) to DC	1000	1000	1000	1000	VOL
Operating Voltage Range	400 - 1000	400 - 1000	400 - 1000	400 - 1000	VOL
Maximum Input Current	26.5	36.25	40	48.25	Amps
Maximum Input Short-Circuit Current	30	30	30	30	Amps
Reverse Polarity Protection	Yes	Yes	Yes	Yes	A
Ground Fault Indication Detection	100% Sensitivity	100% Sensitivity	100% Sensitivity	100% Sensitivity	%
DC Weighted Efficiency	98	98.5	98.5	98.5	%
Light-Load Power Consumption	≤ 3	≤ 4	≤ 4	≤ 4	W
ADDITIONAL FEATURES					
Supports Communication Interfaces	2 x RS485, Ethernet, Cellular (optional)	2 x RS485, Ethernet, Cellular (optional)	2 x RS485, Ethernet, Cellular (optional)	2 x RS485, Ethernet, Cellular (optional)	
Transfer Communication	With the SolarEdge mobile application using built-in access point for local connection	With the SolarEdge mobile application using built-in access point for local connection	With the SolarEdge mobile application using built-in access point for local connection	With the SolarEdge mobile application using built-in access point for local connection	
AC Fault Protection	Energy-Limit, Configurable According to UL 1699B	Energy-Limit, Configurable According to UL 1699B	Energy-Limit, Configurable According to UL 1699B	Energy-Limit, Configurable According to UL 1699B	
Rated Lifetime	100,000 hours	100,000 hours	100,000 hours	100,000 hours	
UL954 Large Protection Plug-In	Yes	Yes	Yes	Yes	
AC Surge Protection	Type I, field replaceable, built-in	Type I, field replaceable, built-in	Type I, field replaceable, built-in	Type I, field replaceable, built-in	
AC Surge Protection	Type I, field replaceable, built-in	Type I, field replaceable, built-in	Type I, field replaceable, built-in	Type I, field replaceable, built-in	
Smart Energy Management	Yes	Yes	Yes	Yes	
Export Limitation	Yes	Yes	Yes	Yes	
DC SAFETY SWITCH					
DC Disconnect	Integrated	Integrated	Integrated	Integrated	
STANDARD COMPLIANCE					
Safety	UL1741, UL1741 SA, UL1741, CSA C22.2, Canadian ATC according to T11, M-07	UL1741, UL1741 SA, UL1741, CSA C22.2, Canadian ATC according to T11, M-07	UL1741, UL1741 SA, UL1741, CSA C22.2, Canadian ATC according to T11, M-07	UL1741, UL1741 SA, UL1741, CSA C22.2, Canadian ATC according to T11, M-07	
Grid Connection Standards	IEEE 1547, Rule 21, Rule 14.05	IEEE 1547, Rule 21, Rule 14.05	IEEE 1547, Rule 21, Rule 14.05	IEEE 1547, Rule 21, Rule 14.05	
INSTALLATION SPECIFICATIONS					
AC output conduit size / AWG range	3/4" minimum / 12-6 AWG	3/4" minimum / 12-6 AWG	3/4" minimum / 12-6 AWG	3/4" minimum / 12-6 AWG	
DC input conduit size / AWG range	3/4" minimum / 12-6 AWG	3/4" minimum / 12-6 AWG	3/4" minimum / 12-6 AWG	3/4" minimum / 12-6 AWG	
Number of DC input ports	2	2	2	2	
Dimensions with Safety Switch (H x W x D)	30.5 x 13.5 x 13.5	30.5 x 13.5 x 13.5	30.5 x 13.5 x 13.5	30.5 x 13.5 x 13.5	in / mm
Dimensions with Safety Switch (H x W x D)	27.5 x 13.5 x 13.5	27.5 x 13.5 x 13.5	27.5 x 13.5 x 13.5	27.5 x 13.5 x 13.5	in / mm
Cooling	Passive	Passive	Passive	Passive	
Operating Temperature Range	-40 to +147	-40 to +147	-40 to +147	-40 to +147	°F / °C
Mounting	Bracket provided	Bracket provided	Bracket provided	Bracket provided	

## Three Phase Inverters for the 277/480V Grid For North America

SE20KUS / SE30KUS / SE33.3KUS / SE40KUS



12-20  
YEAR  
WARRANTY

### The best choice for SolarEdge enabled systems

- Specifically designed to work with power optimizers
- Quick and easy inverter commissioning directly from a smartphone using the SolarEdge SetApp
- Fixed voltage inverter for superior efficiency (98.5%) and longer strings
- Built-in type 2 DC and AC Surge Protection, to better withstand lightning events
- Small, lightest in its class, and easy to install outdoors or indoors on provided bracket
- Integrated arc fault protection and rapid shutdown for NEC 2014 and 2017, per article 690.11 and 690.12
- Built-in module-level monitoring with Ethernet, wireless or cellular communication for full system visibility
- Integrated Safety Switch
- UL1741 SA certified, for CPUC Rule 21 grid compliance

solaredge.com

solar**edge**

INVERTERS

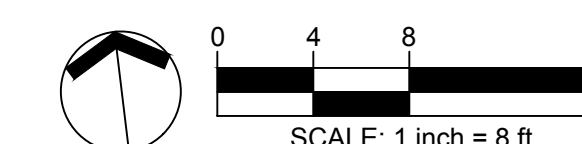
INVERTERS

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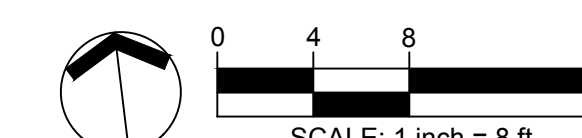
1



- 1 REFER TO PV-0.02 FOR FEEDER REQUIREMENTS.
- 2 FEEDER "PV". RISE UP THROUGH WALL TO ROOF. REFER TO PV-2.01 FOR CONTINUATION



N	SCALE:	2
	1/8"=1'-0"	

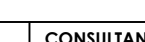


N	SCALE:	A
	1/8"=1'-0"	



BEARINGS SHOWN HEREON ARE BASED ON THE CENTERLINE OF 162 ND STREET (FORMERLY MARKET STREET) BEING N 89° 55' 30" E SHOWN ON TRACT NO. 10901, M.B. 254/31-32

THE CITY OF GARDENA BENCHMARK NO. 5D-15 ELEV. = 43.508

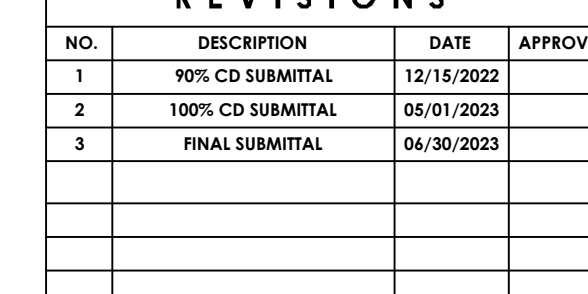


Consulting Electrical Engineers

150 Paularino Avenue Suite A120  
Costa Mesa, CA 92626  
949.852.9995 • 949.852.1657 (fax)  
fbaengr.com



PREPARED UNDER THE SUPERVISION OF



**PV-1.01**

	INITIAL	DATE	APPROVED BY:	
DESIGNED BY	SR	11/14/2022		
DRAWN BY	SR	04/18/2023		
CHECKED BY	BZ	05/01/2023	DATE	DIRECTOR OF PUBLIC WORKS
			SHT 6 OF 8	DWG NO. 5 2606

E:\PATH\1\535\050\FV-1.01\_535050.DWG

FBA Engineering / Plot Date: 6/27/2023 6:43 AM / Plotted by: Steve Roth / Drawing Location: I:\63590500\PV-2.01\_5350500.dwg



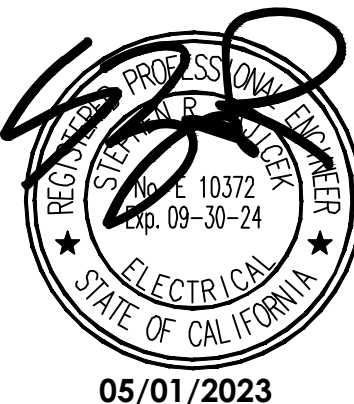
**BASIS OF BEARINGS:**  
BEARINGS SHOWN HEREON ARE BASED ON THE CENTERLINE OF 162 ND STREET (FORMERLY MARKET STREET) BEING N 89° 55' 30" E SHOWN ON TRACT NO. 10901, M.B. 254/31-32

**BENCHMARK:**  
THE CITY OF GARDENA BENCHMARK NO. 5D-15 ELEV. = 43.508



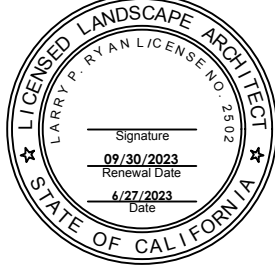
CONSULTANT:

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150 Piedra Blanca Avenue, Suite A120  
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(949) 852-0960 • (949) 852-1657 (fax)  
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FBA Job Number: 535050



PREPARED UNDER THE SUPERVISION OF:

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31591 Camino Capistrano  
San Juan Capistrano, CA 92675  
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(949) 453-2660 fax  
(949) 453-2660 phone

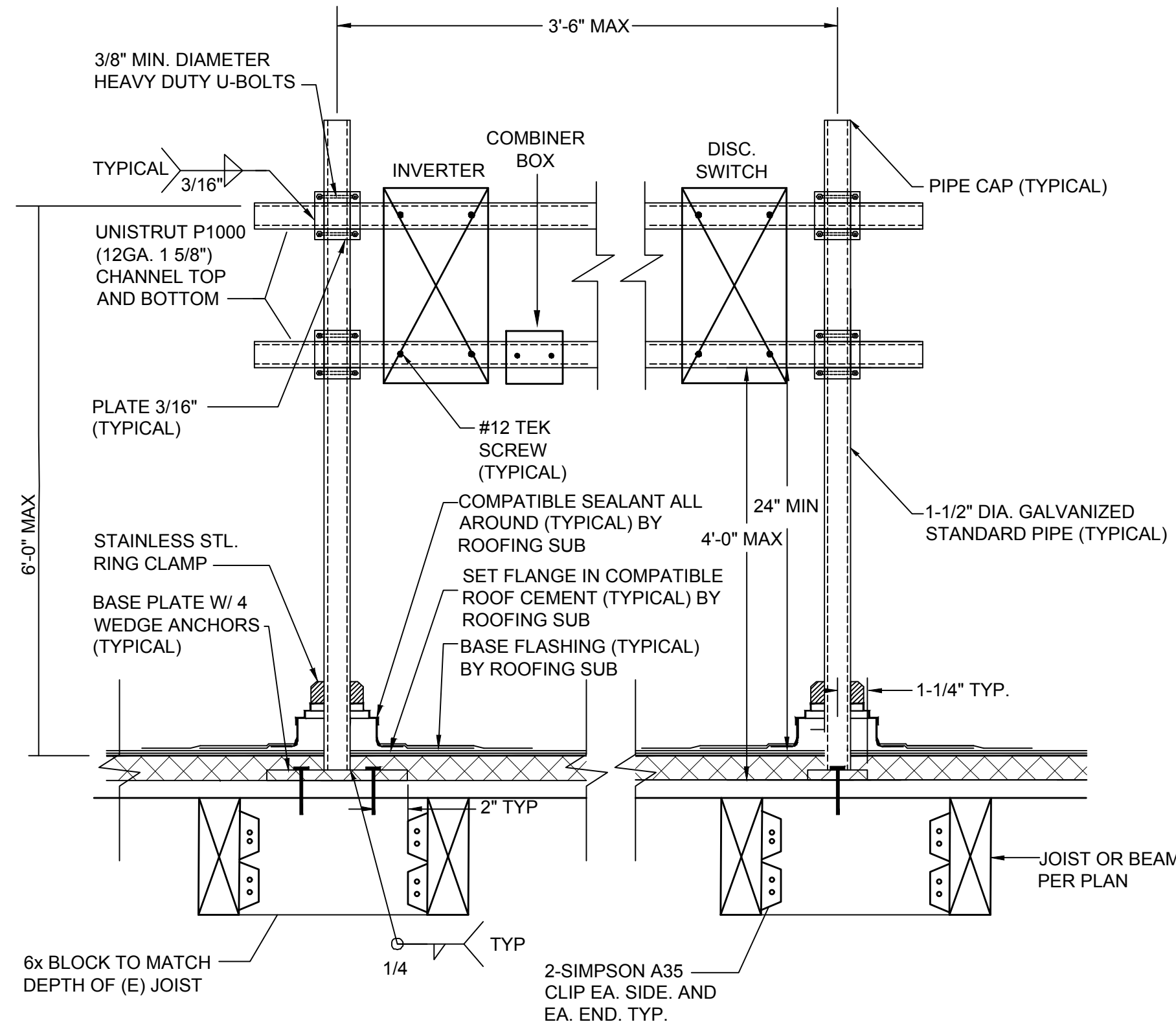


REVISIONS			
NO.	DESCRIPTION	DATE	APPROVED
1	90% CD SUBMITTAL	12/15/2022	
2	100% CD SUBMITTAL	05/01/2023	
3	FINAL SUBMITTAL	04/30/2023	

CITY OF GARDENA			
DEPARTMENT OF PUBLIC WORKS - ENGINEERING			
PHOTOVOLTAIC ROOF ELECTRICAL PLAN			
PV-2.01			
DESIGNED BY: SR DATE: 11/14/2022			
DRAWN BY: SR DATE: 04/16/2023			
CHECKED BY: SR DATE: 05/01/2023			
SHT. 7 OF 8 DWG. NO. 5-2606			

### GENERAL NOTES:

- SOLAR PHOTOVOLTAIC POWER SYSTEMS SHALL BE INSTALLED IN ACCORDANCE WITH SECTIONS 1204.2 THROUGH 1204.5, THE CALIFORNIA BUILDING CODE OR CALIFORNIA RESIDENTIAL CODE, AND CALIFORNIA ELECTRICAL CODE, FIRE CODE 1204.1.
- CONDUIT, WIRING SYSTEMS, AND REACEWAYS FOR PHOTOVOLTAIC CIRCUITS SHALL BE LOCATED AS CLOSE AS POSSIBLE TO THE RIDGE OR HIP OR VALLEY AND FROM THE HIP OR VALLEY AS DIRECTLY AS POSSIBLE TO AN OUTSIDE WALL TO REDUCE TRIP HAZARDS AND MAXIMIZE VENTILATION OPPORTUNITIES. CONDUIT RUNS BETWEEN SUB ARRAYS AND TO DC COMBINER BOXES SHALL BE INSTALLED IN A MANNER THAT MINIMIZES THE TOTAL AMOUNT OF CONDUIT ON THE ROOF BY TAKING THE SHORTEST PATH FROM THE ARRAY TO THE DC COMBINER BOX. THE DC COMBINER BOX SHALL BE LOCATED SUCH THAT CONDUIT RUNS ARE MINIMIZED IN THE PATHWAY BETWEEN ARRAYS. DC WIRING SHALL BE INSTALLED IN METALLIC CONDUIT OR RACEWAYS WHEN LOCATED WITHIN ENCLOSED SPACES IN A BUILDING. CONDUIT SHALL RUN ALONG THE BOTTOM OF LOAD BEARING MEMBERS. FIRE CODE 1204.3.4.

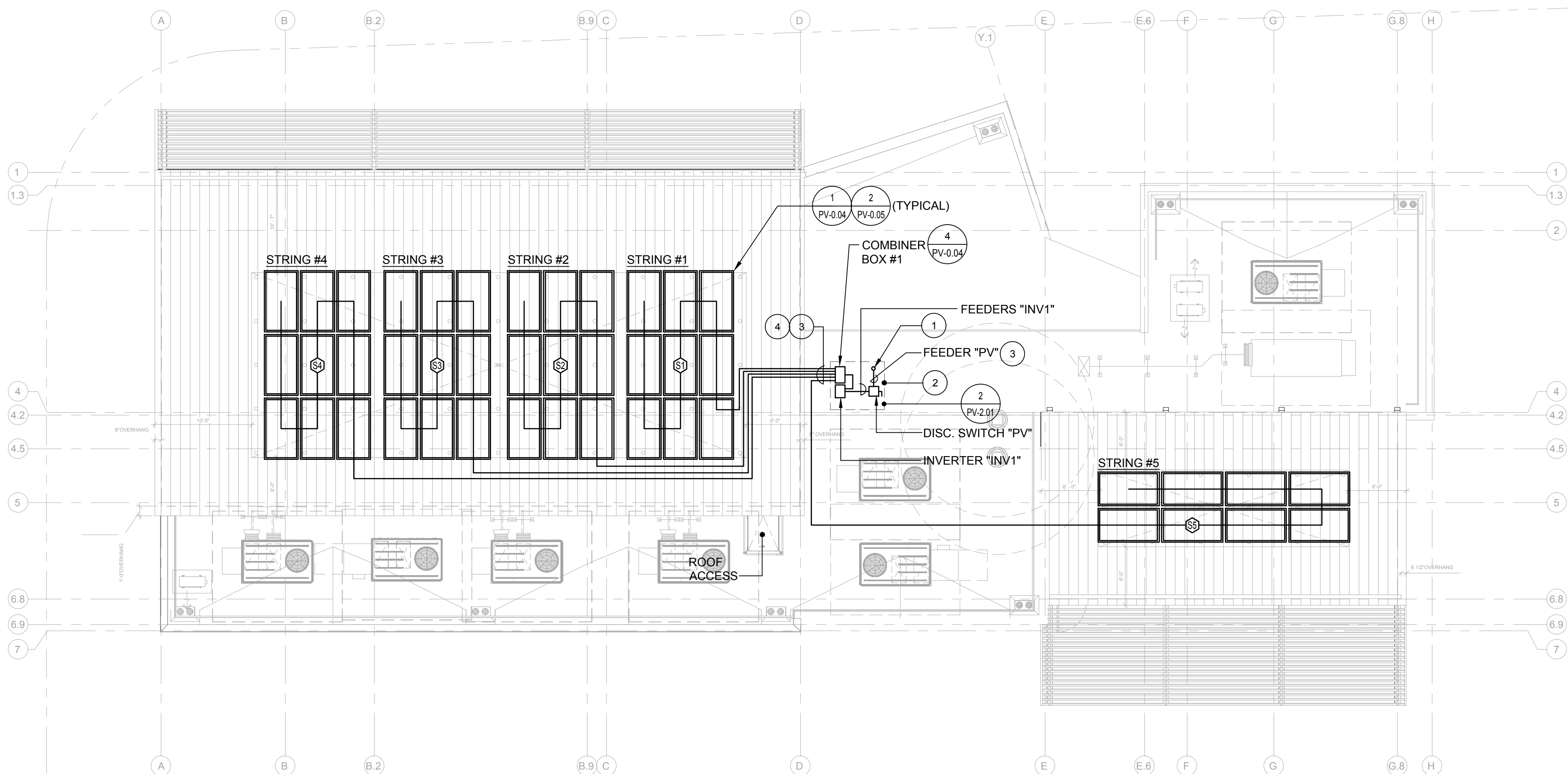


ROOF INVERTER & DISC. SWITCH ANCHORAGE DETAIL

SCALE: N.T.S. 2

### PLAN NOTES

- (1) 3/4" C. FROM FLOOR BELOW. SEE PV-1.01 FOR CONTINUATION.
- PROPOSED LOCATION OF PV DISC. SWITCH AND INVERTER.
- REFER TO PV-0.02 FOR CONDUIT/CONDUCTOR REQUIREMENTS. ROUTE IN CEILING SPACE BELOW.
- DC CONDUIT/CONDUCTORS. REFER TO GENERAL NOTES THIS SHEET FOR ADDITIONAL REQUIREMENTS. ROUTE IN CEILING SPACE BELOW.



PHOTOVOLTAIC ROOF ELECTRICAL PLAN

SCALE: 1/4"=1'-0" 1



SOLAR ROOF FRAMING NOTES:

- FOR GENERAL NOTES, SEE S-00# SERIES OF BLDG PLANS UNO BELOW.
- FOR ROOF FRAMING INFO SEE BLDG PLANS SHEET S-3.2

STRUCTURAL DESIGN CRITERIA:

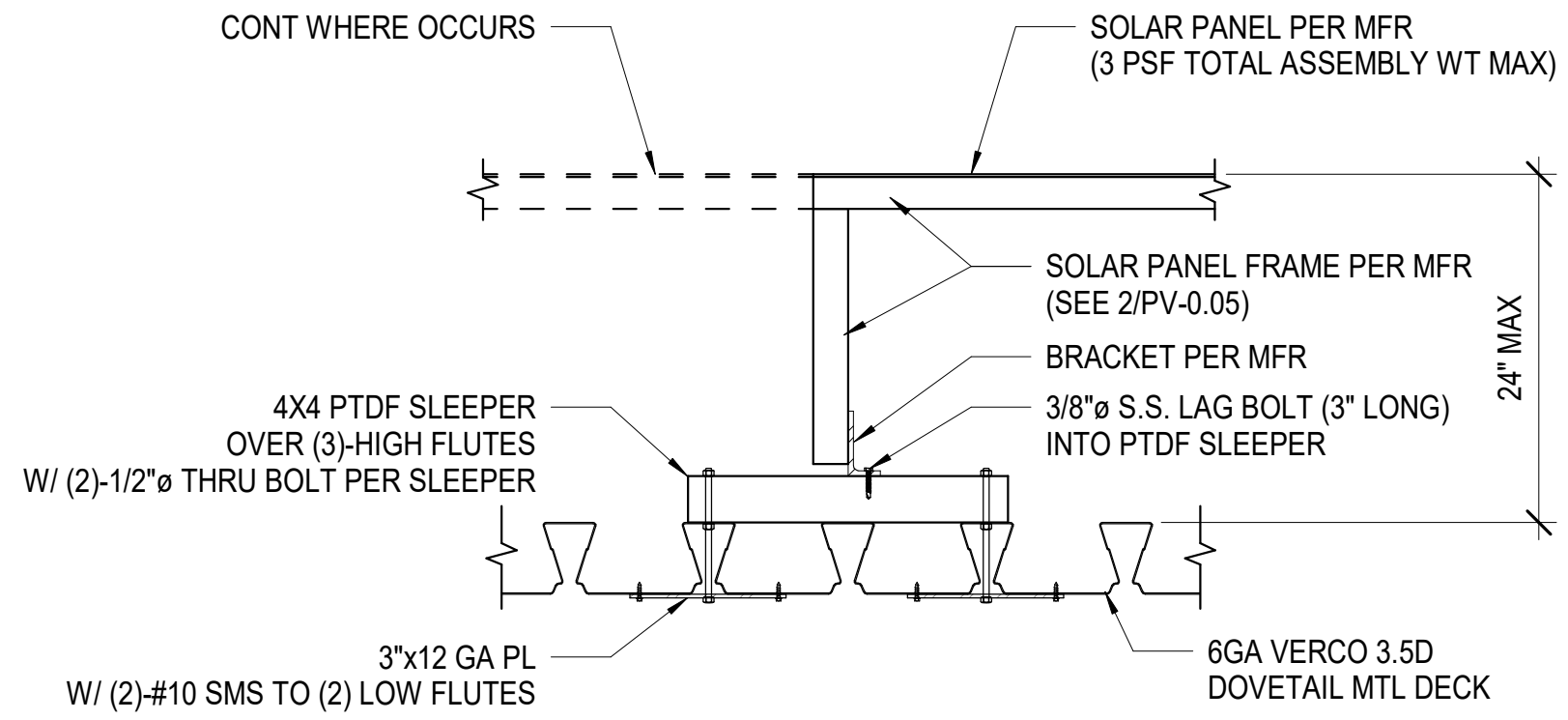
- CODES:**  
ALL WORK SHALL BE IN CONFORMANCE WITH THE CALIFORNIA BUILDING CODE (CBC) 2022 EDITION, INCLUDING ALL AMENDMENTS. ALL STANDARDS USED SHALL BE THE LATEST VERSION APPROVED BY THE CODE ENFORCEMENT AGENCY ON THE DATE OF THE PERMIT ISSUANCE UNLESS SPECIFICALLY NOTED OTHERWISE.
- DESIGN LIVE LOAD**

ROOF	20 PSF
------	--------
- WIND DESIGN INFORMATION**

RISK CATEGORY = III	Kz = 0.98	Kd = 0.85	Kzt = 1.0
BASIC WIND SPEED Vm = 101 MPH (3 SEC GUST) EXPOSURE = C			
INTERNAL PRESSURE COEFF. = +/- 0.18			
- SEISMIC DESIGN INFORMATION**

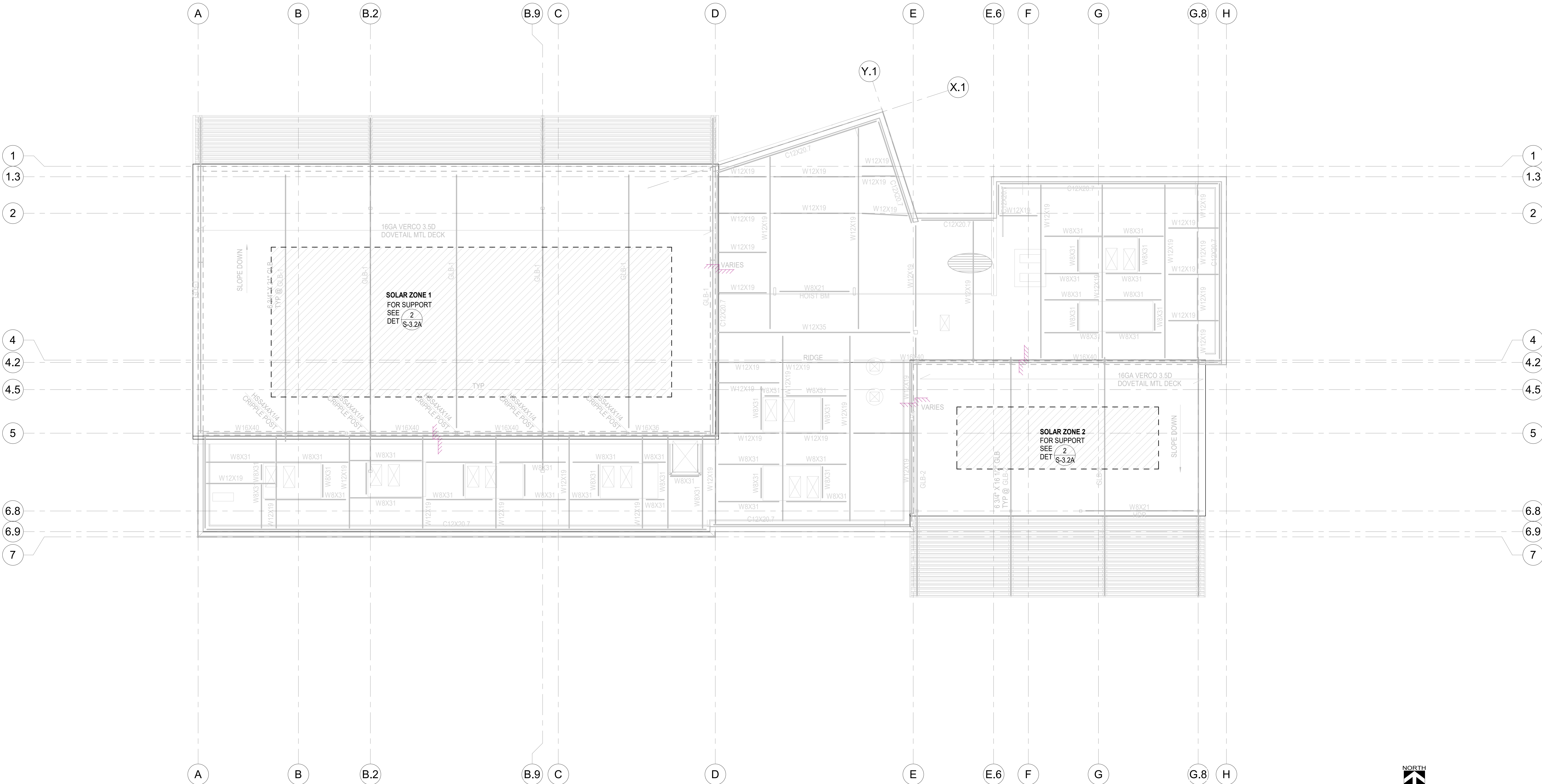
I = 1.25	RISK CATEGORY = III	SITE CLASS = D
Ss = 1.795	S1 = 0.636	SDS = 1.196
SEISMIC DESIGN CATEGORY = D		
- RAIN INTENSITY**  
(PER NOAA ATLAS 14 POINT PRECIPITATION FREQUENCY ESTIMATES)

PRIMARY DRAINAGE: 60 MIN DURATION/100YR RETURN PERIOD: 1.67 IN / HOUR  
SECONDARY DRAINAGE: 15 MIN DURATION/100YR RETURN PERIOD: 3.45 IN / HOUR



2 SOLAR FRAME SUPPORT

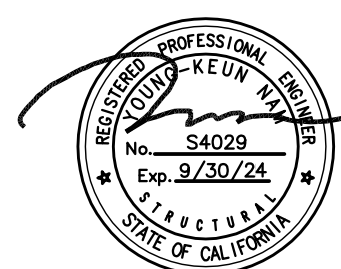
S-3.2A SCALE: N.T.S. REF DET 1.7 S-3.2A



1 SOLAR ROOF FRAMING PLAN  
S-3.2A SCALE: 3/16" = 1'-0" REF DET 1.1 S-3.1



PREPARED BY:  
**VCA ENGINEERS, INC.**  
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Irvine, CA 92612  
Tel. 949.679.0870  
Fax. 949.679.9370  
Project No.: 1699



REVISIONS			CITY OF GARDENA	
NO.	DESCRIPTION	DATE	DEPARTMENT OF PUBLIC WORKS - ENGINEERING	
1	10% CD SUBMITTAL	12/15/2022	SOLAR ROOF FRAMING PLAN	
2	100% CD SUBMITTAL	05/01/2023	COMMUNITY AQUATICS & SENIOR CENTER	
3	FINAL SUBMITTAL	04/30/2023	S-3.2A	
DESIGNED BY: AG			INITIAL	DATE
DRAWN BY: AN			04/29/23	05/01/23
CHECKED BY: YN			04/29/23	
APPROVED BY:			APPROVED BY:	
SHT. 8 OF 8			DIRECTOR OF PUBLIC WORKS	
DWG. NO. 5-2606				