FRANK RESIDENCE

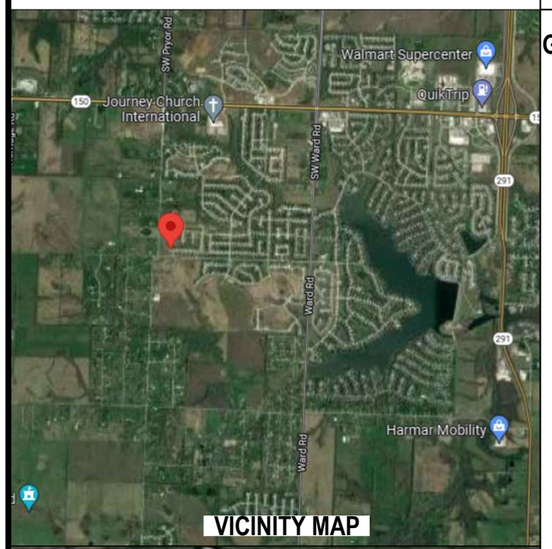
PHOTOVOLTAIC SYSTEM
1900 SOUTHWEST MERRYMAN DRIVE,
LEE'S SUMMIT MO 64082

SYSTEM SIZE: 8.40 kW-DC | 7.60 kW-AC
MODULE: (21) HANWHA Q. PEAK DUO BLK ML- G10+400W
INVERTER: (1) SOLAREDGE SE7600H-US

GOVERNING CODES

ALL MATERIALS, EQUIPMENT, INSTALLATION AND WORK SHALL COMPLY WITH THE FOLLOWING APPLICABLE CODES:

- 2018 IBC
- 2018 IRC
- 2018 IFC
- 2017 NEC
- IEEE STANDARD 929
- UL STANDARD 1741
- OSHA 29 CFR 1910.269
- WHERE APPLICABLE, RULES OF THE PUBLIC UTILITIES COMMISSION REGARDING SAFETY AND RELIABILITY.
- THE AUTHORITY HAVING JURISDICTION
- MANUFACTURER'S' LISTINGS AND INSTALLATION INSTRUCTIONS
- ELECTRICAL EQUIPMENT SHALL BY APPROVED BY LEE'S SUMMIT CITY (MO)



VICINITY MAP


AERIAL MAP

GENERAL

1. UTILITY SHALL BE NOTIFIED BEFORE ACTIVATION OF PHOTOVOLTAIC SYSTEM.
2. 110.2 APPROVAL: ALL ELECTRICAL EQUIPMENT SHALL BE LABELED, LISTED, OR CERTIFIED BY A NATIONALLY RECOGNIZED TESTING LABORATORY ACCREDITED BY THE UNITED STATES OCCUPATIONAL SAFETY HEALTH ADMINISTRATION
3. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS PRIOR TO INITIATING CONSTRUCTION.
4. CONTRACTOR SHALL REVIEW ALL MANUFACTURER INSTALLATION DOCUMENTS PRIOR TO INITIATING CONSTRUCTION.
5. ALL EQUIPMENT AND ASSOCIATED CONNECTIONS, ETC, AND ALL ASSOCIATED WIRING AND INTERCONNECTIONS SHALL BE INSTALLED ONLY BY QUALIFIED PERSONNEL.
6. THE CONTRACTOR OR OWNER MUST PROVIDE ROOF ACCESS (LADDER TO ROOF) FOR ALL THE REQUIRED INSPECTIONS. LADDERS MUST BE OSHA APPROVED, MINIMUM TYPE I WITH A 250LB. RATING, IN GOOD CONDITION AND DESIGNED FOR ITS INTENDED USE.
7. CONTRACTOR SHALL VERIFY THAT THE ROOF STRUCTURE WILL WITHSTAND THE ADDITIONAL LOADS.
8. LAG SCREWS SHALL PENETRATE A MINIMUM 2" INTO SOLID SAWN STRUCTURAL MEMBERS AND SHALL NOT EXCEED MANUFACTURER RECOMMENDATIONS FOR FASTENERS INTO ENGINEERED STRUCTURAL MEMBERS.
9. AN ACCESS POINT SHALL BE PROVIDED THAT DOES NOT PLACE THE GROUND LADDER OVER OPENINGS SUCH AS WINDOWS OR DOORS ARE LOCATED AT STRONG POINTS OF BUILDING CONSTRUCTION AND IN LOCATIONS WHERE THE ACCESS POINT DOES NOT CONFLICT WITH OVERHEAD OBSTRUCTIONS SUCH AS TREE LIMBS, WIRES, OR SIGNS.
10. WHERE DC CONDUCTORS ARE RUN INSIDE BUILDING, THEY SHALL BE CONTAINED IN A METAL RACEWAY; THEY SHALL NOT BE INSTALLED WITHIN 10" OF THE ROOF DECKING OR SHEATHING EXCEPT WHERE COVERED BY THE PV MODULES AND EQUIPMENT.
11. PLUMBING AND MECHANICAL VENTS THROUGH THE ROOF SHALL NOT BE COVERED BY SOLAR MODULES- - NO BUILDING, PLUMBING OR MECHANICAL VENTS TO BE COVERED, CONSTRUCTED OR ROUTED AROUND SOLAR MODULES.
12. ALL FIELD -INSTALLED JUNCTION, PULL AND OUTLET BOXES LOCATED BEHIND MODULES SHALL BE ACCESSIBLE DIRECTLY OR BY DISPLACEMENT OF A MODULE SECURED BY REMOVABLE FASTENERS.

ELECTRICAL

1. WIRING MATERIALS SHALL COMPLY WITH MAXIMUM CONTINUOUS CURRENT OUTPUT AT 25°C AND MAXIMUM VOLTAGE AT 600V; WIRE SHALL BE WET RATED AT 90°C.
2. EXPOSED PHOTOVOLTAIC SYSTEM CONDUCTORS ON THE ROOF WILL BE USE 2 OR PV-TYPE WIRE.
3. PHOTOVOLTAIC SYSTEM CONDUCTORS SHALL BE IDENTIFIED AND GROUPED. THE MEANS OF IDENTIFICATION SHALL BE PERMITTED BY SEPARATE COLOR-CODING, MARKING TAPE, TAGGING OR OTHER APPROVED MEANS.
4. ALL EXTERIOR CONDUIT, FITTINGS, AND BOXES SHALL BE RAIN-TIGHT AND APPROVED FOR USE IN WET LOCATIONS.
5. ALL METALLIC RACEWAYS AND EQUIPMENT SHALL BE BONDED AND ELECTRICALLY CONTINUOUS.
6. WHERE SIZES OF JUNCTION BOXES, RACEWAYS, AND CONDUITS ARE NOT SPECIFIED, CONTRACTOR SHALL SIZE THEM ACCORDING TO APPLICABLE CODES.
7. REMOVAL OF A UTILITY-INTERACTIVE INVERTER OR OTHER EQUIPMENT SHALL NOT DISCONNECT THE BUILDING CONNECTION BETWEEN THE GROUNDING ELECTRODE CONDUCTOR AND THE PV SOURCE AND/OR OUTPUT CIRCUIT GROUNDED CONDUCTOR.
8. FOR GROUNDED SYSTEMS, THE PHOTOVOLTAIC SOURCE AND OUTPUT CIRCUITS SHALL BE PROVIDED WITH A GROUND-FAULT PROTECTION DEVICE OR SYSTEM THAT DETECTS A GROUND FAULT, INDICATES THAT FAULT HAS OCCURED AND AUTOMATICALLY DISCONNECTS ALL CONDUCTORS OR CAUSES THE INVERTER TO AUTOMATICALLY CEASE SUPPLYING POWER TO OUTPUT CIRCUITS.
9. FOR UNGROUNDED SYSTEMS, THE INVERTER IS EQUIPPED WITH GROUND FAULT PROTECTION AND A GFI FUSE PORT FOR GROUND FAULT INDICATION.
10. PV MODULE FRAMES SHALL BE BONDED TO RACKING RAIL OR BARE COPPER GEC/GEC PER THE MODULE MANUFACTURER'S LISTED INSTRUCTION SHEET.
11. PV MODULE RACKING RAIL SHALL BE BONDED TO BARE COPPER GEC VIA WEEB LUG, ILSCO GBL-4DBT LAY-IN LUG, OR EQUIVALENT LISTED LUG.
12. THE PHOTOVOLTAIC INVERTER WILL BE LISTED AS UL 1741 COMPLIANT.
13. RACKING AND BONDING SYSTEM TO BE UL2703 RATED.
14. ANY REQUIRED GROUNDING ELECTRODE CONDUCTOR WILL BE CONTINUOUS, EXCEPT FOR SPLICES OR JOINTS AS BUS BARS WITHIN LISTED EQUIPMENT.
15. WHEN BACKFED BREAKER IS THE METHOD OF UTILITY INTERCONNECTION, THE BREAKERS SHALL NOT READ "LINE AND LOAD".
16. WHEN APPLYING THE 120% RULE, THE SOLAR BREAKER TO BE POSITIONED AT THE OPPOSITE END OF THE BUS BAR FROM THE MAIN BREAKER.
17. THE WORKING CLEARANCE AROUND THE EXISTING ELECTRICAL EQUIPMENT AS WELL AS THE NEW ELECTRICAL EQUIPMENT WILL BE MAINTAINED.

SHEET INDEX:

FRANK, ALEXANDER
1900 SOUTHWEST MERRYMAN DRIVE,
LEE'S SUMMIT MO 64082
(913) 200-9105

LICENSE # MO # 21-06-071590

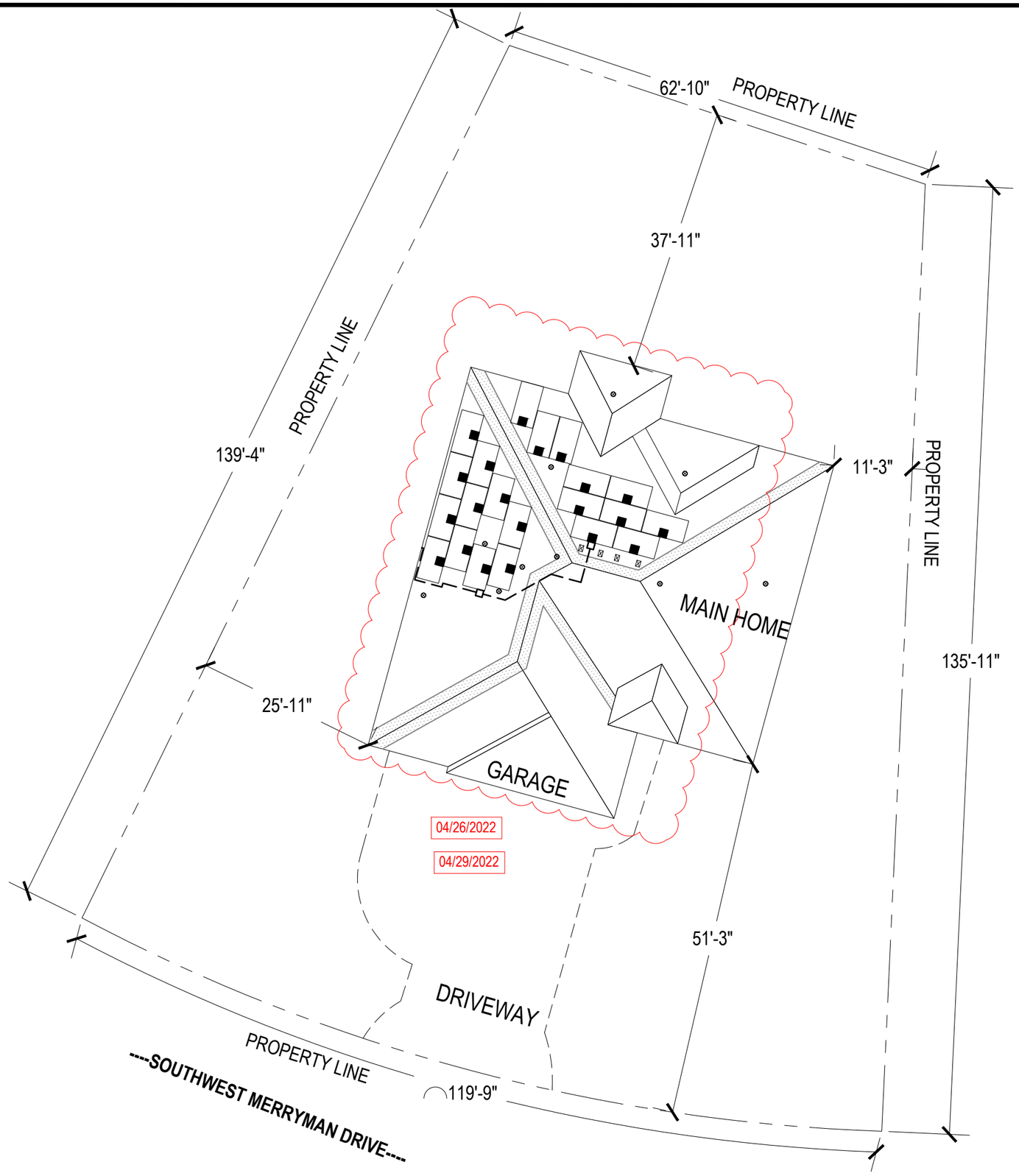
TITAN SOLAR POWER
525 W BASELINE RD.
MESA, AZ 85210
WWW.TITANSOLARPOWER.COM

COVER PAGE

JOB #: TSP120548
DATE: 4/29/2022
DRAWN BY: RK

REV #1:
REV #2:
REV #3:

PV-1



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LEGEND:

PROPERTY LINE: ——— – – ———

DRIVEWAY: – — – — – — – — – — –

APN: 69-700-12-01-00-0-00-000

SCALE: 1/16" = 1'-0"

FRANK, ALEXANDER
1900 SOUTHWEST MERRYMAN DRIVE,
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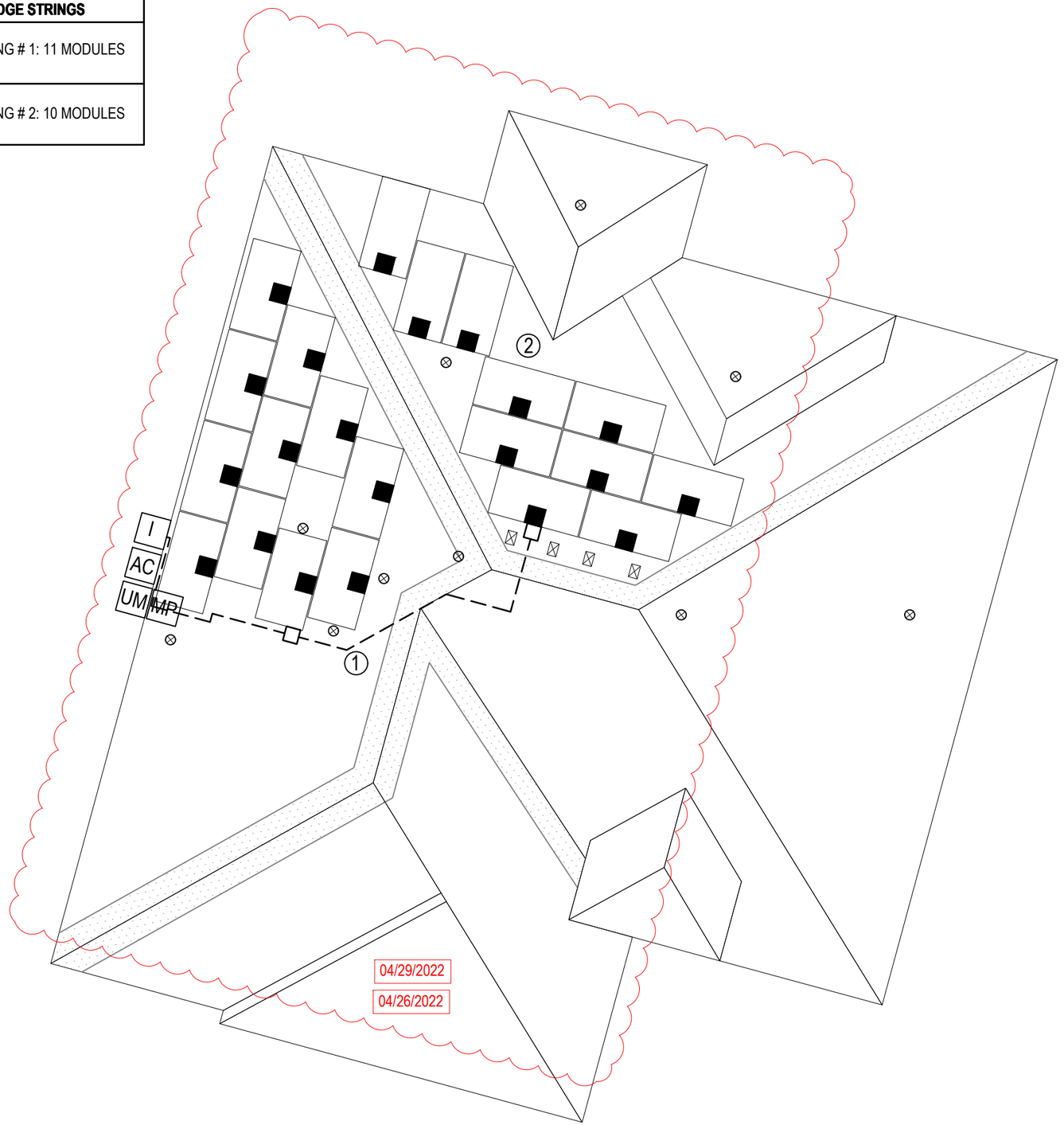
PROPERTY PLAN

JOB #: TSP120548
DATE: 4/29/2022
DRAWN BY: RK

PV-2

ROOF DETAIL	STRING DETAIL
ROOF TYPE: COMPOSITE SHINGLE	**SOLAREDGE STRINGS**
ROOF SECTION 1: 11 MODULES AZIMUTH: 285° PITCH: 18° ①	STRING # 1: 11 MODULES
ROOF SECTION 2: 10 MODULES AZIMUTH: 15° PITCH: 18° ②	STRING # 2: 10 MODULES



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SYSTEM LEGEND

PHOTOVOLTAIC SYSTEM:
DC SYSTEM SIZE: 8.40 kW
AC SYSTEM SIZE: 7.60 kW

UM	MAIN SERVICE METER AND SERVICE POINT
MP	MAIN SERVICE PANEL
I	(1) SOLAREDGE SE7600H-US INVERTER
AC	UTILITY AC DISCONNECT
	(21) HANWHA Q. PEAK DUO BLK ML-G10+400W WITH SOLAREDGE P401 OPTIMIZERS MOUNTED UNDER EACH
	JUNCTION BOX AND CONDUIT

CONDUIT RUN

CONDUIT TO BE RUN IN ATTIC IF POSSIBLE, OTHERWISE CONDUIT BLOCKS MIN. 1"/MAX 6" ABOVE ROOF SURFACE, CLOSE TO RIDGE LINES, AND UNDER EAVES; TO BE PAINTED TO MATCH EXTERIOR/EXISTING BACKGROUND COLOR OF ITS LOCATION; TO BE LABELED AT MAX 10' INTERVALS. CONDUIT RUNS ARE APPROXIMATE AND ARE TO BE DETERMINED IN THE BY THE INSTALLERS

FIRE CODE SETBACK (18" MIN. & 36" MAX.)

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

FRANK, ALEXANDER
1900 SOUTHWEST MERRYMAN DRIVE,
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LICENSE # MO # 21-06-071590

TITAN SOLAR POWER
525 W BASELINE RD.
MESA, AZ 85210
WWW.TITANSOLARPOWER.COM

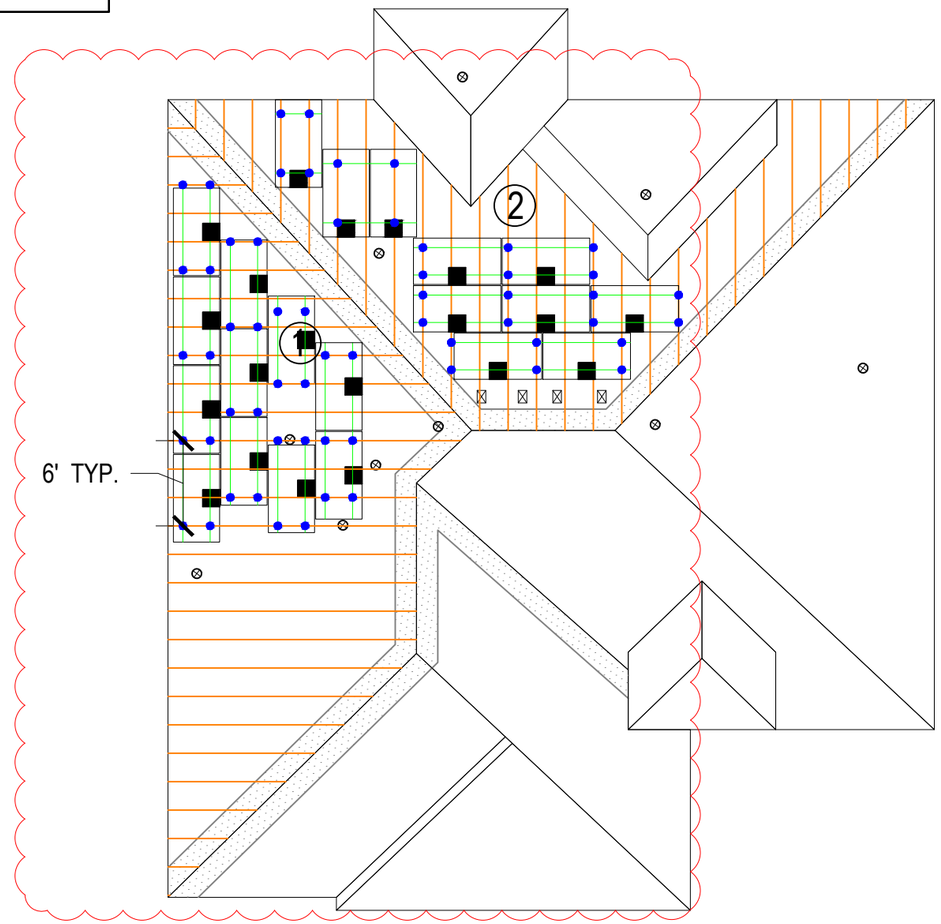
SITE PLAN

JOB #: TSP120548
DATE: 4/29/2022
DRAWN BY: RK

PV-3

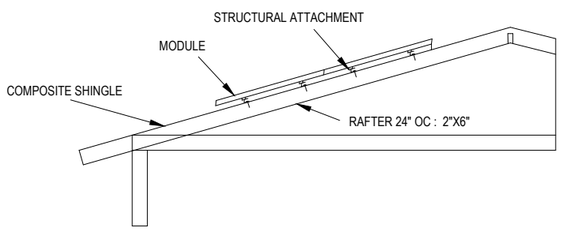
ROOF DETAIL	STRING DETAIL
ROOF TYPE: COMPOSITE SHINGLE	SOLAREDGE STRINGS
ROOF SECTION 1: 11 MODULES AZIMUTH: 285° PITCH: 18° (1)	STRING # 1: 11 MODULES
ROOF SECTION 2: 10 MODULES AZIMUTH: 15° PITCH: 18° (2)	STRING # 2: 10 MODULES

ROOF AREA	4292 SQ FT ROOF		
SOLAR PANEL AREA	21.11 SQ FT EACH	21	443.31 SQ FT ARRAY
SOLAR % OF ROOF AREA	10.33 %	10.33 % < 33%, 18" SETBACK IS VALID	



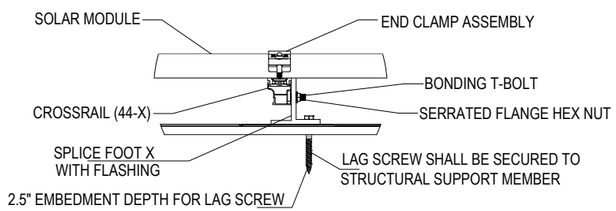
04/26/2022

04/29/2022



NTS

ELEVATION DETAIL



NTS

ATTACHMENT DETAIL

MODULE MECHANICAL SPECIFICATIONS	
DESIGN WIND SPEED	109 MPH
DESIGN SNOW LOAD	20 PSF
NUMBER OF STORIES	1
ROOF PITCH	18°
TOTAL ARRAY AREA (SQ. FT)	443.31
TOTAL ROOF AREA (SQ. FT)	4292
ARRAY SQ. FT / TOTAL ROOF SQ. FT	10.33%

N

SYSTEM LEGEND

PHOTOVOLTAIC SYSTEM:
DC SYSTEM SIZE: 8.40 kW
AC SYSTEM SIZE: 7.60 kW

- FIRE CODE SETBACK (18" MIN. & 36" MAX.)
- ROOF ATTACHMENT POINT
- ROOF FRAMING (RAFTER/TRUSS)
- RACKING

NOTE:- 2.5" LAG EMBEDMENT

SCALE: 3/32" = 1'-0"

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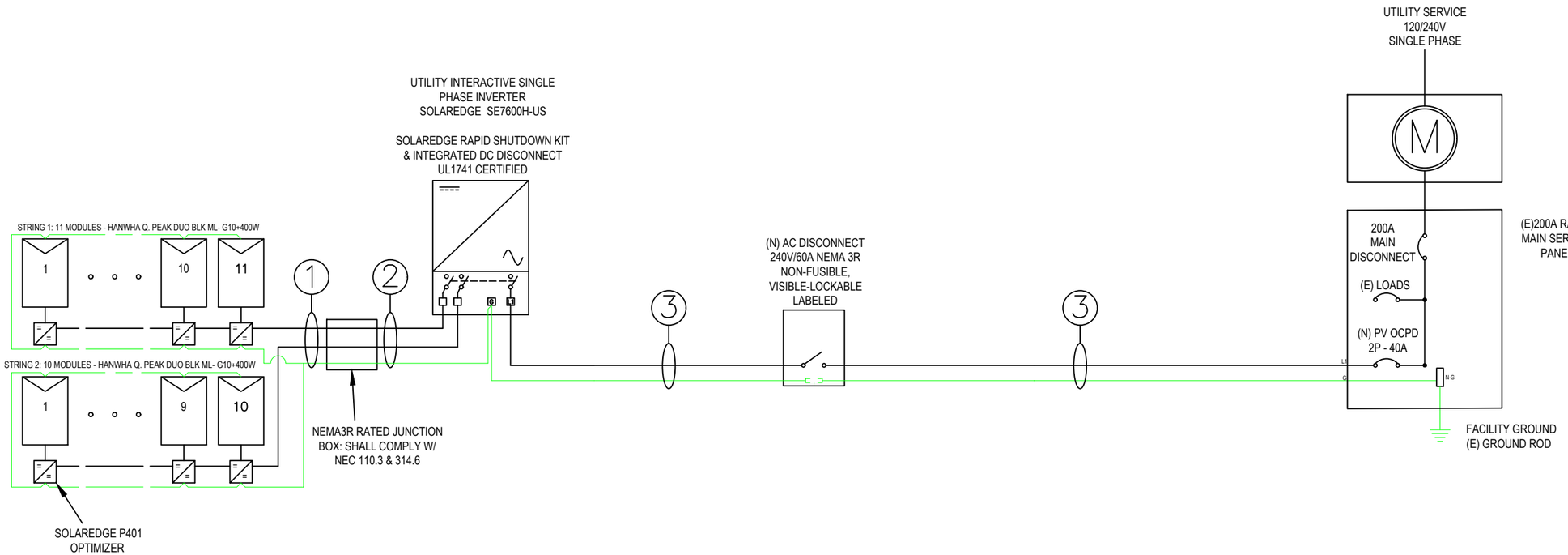
525 W BASELINE RD.
MESA, AZ 85210
WWW.TITANSOLARPOWER.COM

ROOF PLAN

JOB #: TSP120548
DATE: 4/29/2022
DRAWN BY: RK

PV-3.1

CONDUCTOR AND CONDUIT SCHEDULE					
TAG	WIRE TYPE	WIRE SIZE	# OF CONDUCTORS	CONDUIT TYPE	MIN. CONDUIT SIZE
1	PV WIRE	#10	4 - L1 L2	FREE AIR	N/A
1	BARE COPPER	#6	1 - BARE	FREE AIR	N/A
2	THWN-2	#10	4 - L1 L2	EMT	3/4"
2	THWN-2 EGC	#8	1 - GND	EMT	3/4"
3	THWN-2	#8	3 - L1 L2 N	EMT	3/4"
3	THWN-2 EGC	#8	1 - GND	EMT	3/4"



PHOTOVOLTAIC SYSTEM:
DC SYSTEM SIZE: 8.400 kW
AC SYSTEM SIZE: 7.600 kW
INVERTER: (1) SOLAREDGE SE7600H-US
MODULE: (21) HANWHA Q. PEAK DUO BLK ML- G10+400W

NOTES:
1. MODULES ARE BONDED TO RAIL USING UL 2703 RATED BONDING SYSTEM - INTEGRATED BONDING MID-CLAMPS + DIRECT-BURIAL LAY-IN-LUGS; SEE ATTACHED FOR SPECIFICATIONS IF APPLICABLE
2. PV DC SYSTEM IS UNGROUNDED
3. PV ARRAY WILL HAVE A GROUNDING ELECTRODE SYSTEM IN COMPLIANCE WITH CEC 250.58 AND 690.47(A)
4. PV SOURCE, OUTPUT, AND INVERTER INPUT CIRCUIT WIRING METHODS SHALL COMPLY WITH CEC 690.1(G)
5. BACKFED PV BREAKER WILL BE INSTALLED AT OPPOSITE END OF THE BUS BAR FROM THE MAIN BREAKER. A PERMANENT WARNING LABEL TO BE INSTALLED PER SYSTEM SIGNAGE, PAGE
6. BARE COPPER IS TRANSITIONED TO THWN-2 VIA IRREVERSIBLE CRIMP; WHEN PRESENT, THE GEC TO BE CONTINUOUS
7. INVERTER(S) TO BE COMPLIANT WITH UL 1741 SUPPLEMENT A
8. CONDUIT AND CONDUCTOR SPECIFICATIONS ARE BASED ON MINIMUM CODE REQUIREMENTS AND ARE NOT MEANT TO LIMIT UP-SIZING AS REQUIRED BY FIELD CONDITIONS
9. CONDUIT AND CONDUCTOR SPECIFICATIONS ARE BASED ON MINIMUM CODE REQUIREMENTS AND ARE NOT MEANT TO LIMIT UPSIZING AS REQUIRED BY FIELD CONDITIONS.

PV MODULE ELECTRICAL SPECIFICATIONS	
MODULE TYPE	HANWHA Q. PEAK DUO BLK ML- G10+400W
POWER MAX (P_{MAX})	395W
OPEN CIRCUIT VOLTAGE (V_{OC})	45.30V
SHORT CIRCUIT CURRENT (I_{SC})	11.14A
MAX POWER-POINT VOLTAGE (V_{MP})	37.13V
MAX POWER-POINT CURRENT (I_{MP})	10.77A
SERIES FUSE RATING	20A

INVERTER ELECTRICAL SPECIFICATIONS	
INVERTER TYPE	SOLAREDGE SE7600H-US
MAX INPUT DC VOLTAGE	480V
MAX INPUT CURRENT	20A
NOMINAL DC INPUT VOLTAGE	400V
MAXIMUM OUTPUT POWER	7600W
NOMINAL AC OUTPUT VOLTAGE	240V
MAXIMUM CONT. OUTPUT CURRENT	32A
CEC EFFICIENCY	99%

POWER OPTIMIZER ELECTRICAL SPECIFICATIONS	
OPTIMIZER TYPE	SOLAREDGE P401
RATED INPUT DC POWER	401W
MAXIMUM INPUT VOLTAGE (V_{OC})	60V
MAXIMUM SHORT CIRCUIT CURRENT (I_{SC})	12.5A
MAXIMUM DC INPUT CURRENT	12.5A
MAXIMUM OUTPUT CURRENT	15A
MAXIMUM OUTPUT VOLTAGE	60V
MINIMUM STRING LENGTH	8
MAXIMUM POWER PER STRING	5700W (6000W WITH SE7600- SE11400)

OVER-CURRENT PROTECTION DEVICE (OCPD) CALCULATIONS	
INVERTER TYPE	SOLAREDGE 7600H-US
# OF INVERTERS	1
MAX CONTINUOUS OUTPUT CURRENT	32A
(# OF INVERTERS) X (MAX CONT. OUTPUT CURRENT) X 125% <= OCPD RATING	
(1 x 32A x 1.25)= 40.00A <= 40A, OK	

BUSBAR CALCULATIONS - PV BREAKER - 120% RULE	
MAIN BUS RATING	200
MAIN DISCONNECT RATING	200
PV BREAKER RATING	40
(MAIN BUS RATING x 1.2) - MAIN DISCONNECT RATING >= OCPD RATING	
(200A x 1.2) - 200A >= 40A, OK	

FRANK, ALEXANDER
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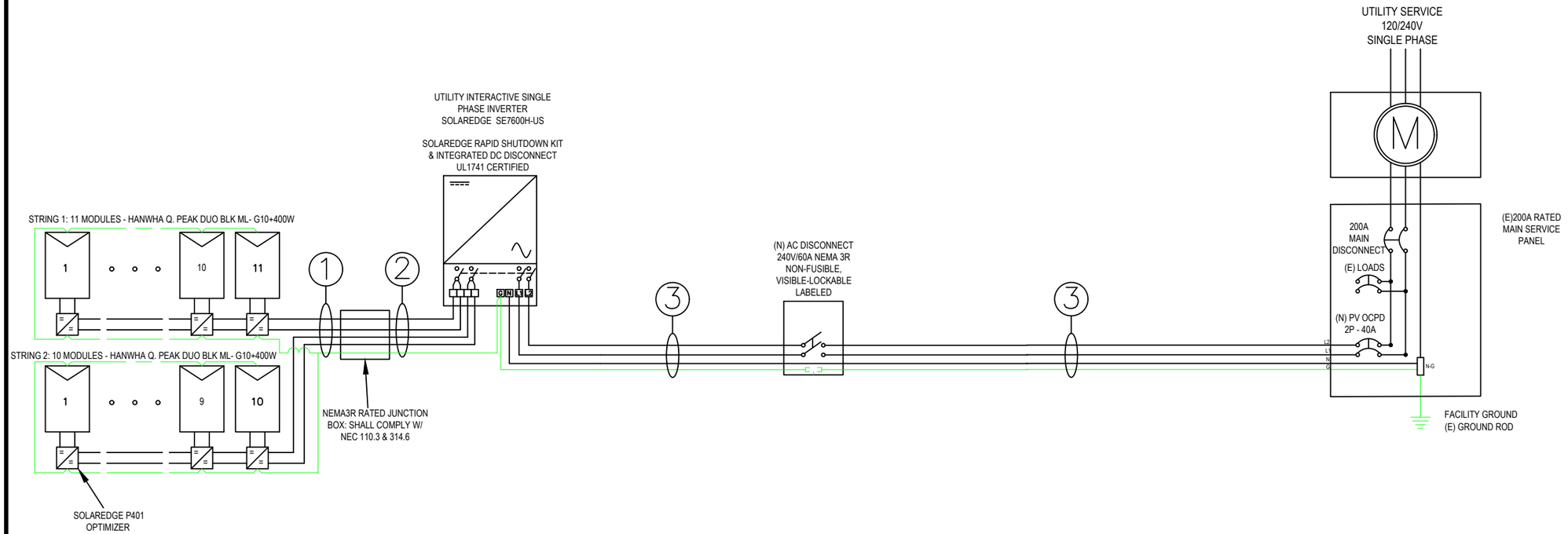
1-LINE DIAGRAM & CALCULATIONS

JOB #: TSP120548
DATE: 4/29/2022
DRAWN BY: RK

PV-4

CONDUCTOR AND CONDUIT SCHEDULE					
TAG	WIRE TYPE	WIRE SIZE	# OF CONDUCTORS	CONDUIT TYPE	MIN. CONDUIT SIZE
1	PV WIRE	#10	4 - L1 L2	FREE AIR	N/A
1	BARE COPPER	#6	1 - BARE	FREE AIR	N/A
2	THWN-2	#10	4 - L1 L2	EMT	3/4"
2	THWN-2 EGC	#8	1 - GND	EMT	3/4"
3	THWN-2	#8	3 - L1 L2 N	EMT	3/4"
3	THWN-2 EGC	#8	1 - GND	EMT	3/4"



PV MODULE ELECTRICAL SPECIFICATIONS	
MODULE TYPE	HANWHA Q. PEAK DUO BLK ML- G10+400W
POWER MAX (P_{MAX})	395W
OPEN CIRCUIT VOLTAGE (V_{OC})	45.30V
SHORT CIRCUIT CURRENT (I_{SC})	11.14A
MAX POWER-POINT VOLTAGE (V_{MP})	37.13V
MAX POWER-POINT CURRENT (I_{MP})	10.77A
SERIES FUSE RATING	20A

INVERTER ELECTRICAL SPECIFICATIONS	
INVERTER TYPE	SOLAREDGE SE7600H-US
MAX INPUT DC VOLTAGE	480V
MAX INPUT CURRENT	20A
NOMINAL DC INPUT VOLTAGE	400V
MAXIMUM OUTPUT POWER	7600W
NOMINAL AC OUTPUT VOLTAGE	240V
MAXIMUM CONT. OUTPUT CURRENT	32A
CEC EFFICIENCY	99%

POWER OPTIMIZER ELECTRICAL SPECIFICATIONS	
OPTIMIZER TYPE	SOLAREDGE P401
RATED INPUT DC POWER	401W
MAXIMUM INPUT VOLTAGE (V_{OC})	60V
MAXIMUM SHORT CIRCUIT CURRENT (I_{SC})	12.5A
MAXIMUM DC INPUT CURRENT	12.5A
MAXIMUM OUTPUT CURRENT	15A
MAXIMUM OUTPUT VOLTAGE	60V
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OVER-CURRENT PROTECTION DEVICE (OCPD) CALCULATIONS	
INVERTER TYPE	SOLAREDGE 7600H-US
# OF INVERTERS	1
MAX CONTINUOUS OUTPUT CURRENT	32A
(# OF INVERTERS) X (MAX CONT. OUTPUT CURRENT) X 125% <= OCPD RATING	
(1 x 32A x 1.25)= 40.00A <= 40A, OK	

BUSBAR CALCULATIONS - PV BREAKER - 120% RULE	
MAIN BUS RATING	200
MAIN DISCONNECT RATING	200
PV BREAKER RATING	40
(MAIN BUS RATING x 1.2) - MAIN DISCONNECT RATING >= OCPD RATING	
(200A x 1.2) - 200A >= 40A, OK	

PHOTOVOLTAIC SYSTEM:
DC SYSTEM SIZE: 8.400 kW
AC SYSTEM SIZE: 7.600 kW
INVERTER: (1) SOLAREDGE SE7600H-US
MODULE: (21) HANWHA Q. PEAK DUO BLK ML- G10+400W

NOTES:
1. MODULES ARE BONDED TO RAIL USING UL 2703 RATED BONDING SYSTEM - INTEGRATED BONDING MID-CLAMPS + DIRECT-BURIAL LAY-IN-LUGS; SEE ATTACHED FOR SPECIFICATIONS IF APPLICABLE
2. PV DC SYSTEM IS UNGROUNDED
3. PV ARRAY WILL HAVE A GROUNDING ELECTRODE SYSTEM IN COMPLIANCE WITH CEC 250.58 AND 690.47(A)
4. PV SOURCE, OUTPUT, AND INVERTER INPUT CIRCUIT WIRING METHODS SHALL COMPLY WITH CEC 690.1(G)
5. BACKFED PV BREAKER WILL BE INSTALLED AT OPPOSITE END OF THE BUS BAR FROM THE MAIN BREAKER. A PERMANENT WARNING LABEL TO BE INSTALLED PER SYSTEM SIGNAGE, PAGE
6. BARE COPPER IS TRANSITIONED TO THWN-2 VIA IRREVERSIBLE CRIMP; WHEN PRESENT, THE GEC TO BE CONTINUOUS
7. INVERTER(S) TO BE COMPLIANT WITH UL 1741 SUPPLEMENT A
8. CONDUIT AND CONDUCTOR SPECIFICATIONS ARE BASED ON MINIMUM CODE REQUIREMENTS AND ARE NOT MEANT TO LIMIT UP-SIZING AS REQUIRED BY FIELD CONDITIONS
9. CONDUIT AND CONDUCTOR SPECIFICATIONS ARE BASED ON MINIMUM CODE REQUIREMENTS AND ARE NOT MEANT TO LIMIT UPSIZING AS REQUIRED BY FIELD CONDITIONS.

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LICENSE # MO # 21-06-071590

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3-LINE DIAGRAM & CALCULATIONS

JOB #: TSP120548
DATE: 4/29/2022
DRAWN BY: RK

PV-4.1

WARNING: PHOTOVOLTAIC POWER SOURCE

NEC 690.31(E)(3) - CONDUIT/ALL JUNCTION BOXES

! WARNING !
ELECTRIC SHOCK HAZARD
THE DC CONDUCTORS OF THIS PHOTOVOLTAIC SYSTEM ARE UNGROUNDED AND MAY BE ENERGIZED.

AT EACH DC DISCONNECTING MEANS, JUNCTION BOXES, CONDUIT RACEWAY, INVERTER
NEC 690.35(F) - UNGROUNDED SYSTEM

! WARNING !
ELECTRIC SHOCK HAZARD.
DO NOT TOUCH TERMINALS.
TERMINALS ON BOTH LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION.

AT EACH DC DISCONNECTING MEANS
NEC 690.17(4) - GROUNDED SYSTEMS

PHOTOVOLTAIC DC DISCONNECT

AT EACH DC DISCONNECTING MEANS
NEC 690.14(C)(2)

MAXIMUM VOLTAGE: 480 V DC

MAXIMUM CIRCUIT CURRENT: 20 A DC

MAX RATED OUTPUT CURRENT OF THE CHARGE CONTROLLER OR DC-TO-DC CONVERTER (IF INSTALLED): 20 A DC

AT EACH DC DISCONNECTING MEANS
NEC 690.14(C)(2)

! WARNING !
ELECTRIC SHOCK HAZARD
IF A GROUND FAULT IS INDICATED, NORMALLY GROUNDED CONDUCTORS MAY BE UNGROUNDED AND ENERGIZED

AT EACH INVERTER
NEC 690.5(C) - GROUNDED SYSTEM

PHOTOVOLTAIC SYSTEM METER

AT PRODUCTION METER
NOT A CODE REQUIREMENT

PHOTOVOLTAIC AC DISCONNECT

AT EACH AC DISCONNECTING MEANS & NEAR PV BREAKER
NEC 690.14(C)(2)

PHOTOVOLTAIC AC DISCONNECT

OPERATING CURRENT: 32A AC
OPERATING VOLTAGE: 240 V AC

AT EACH AC DISCONNECTING MEANS & POINT OF INTERCONNECTION
NEC 690.54

! WARNING !

DUAL POWER SOURCES.
SECOND SOURCE IS PV SYSTEM

AT EACH AC DISCONNECTING MEANS
NEC 705.12(D)(4)

! WARNING !
POWER SOURCE OUTPUT CONNECTION - DO NOT RELOCATE THIS OVERCURRENT DEVICE

AT POINT OF INTERCONNECTION OVERCURRENT DEVICE
NEC 705.12(D)(7)

! WARNING !

DUAL POWER SOURCES.
POWER IS BEING SUPPLIED TO THIS PANEL FROM THE UTILITY AND A SOLAR PV SYSTEM. THE SOLAR PV DISCONNECT IS LOCATED:

AT POINT OF INTERCONNECTION
NEC 705.12(D)(4), 690.56(B)

ALL SIGNAGE MUST BE PERMANENTLY ATTACHED AND BE WEATHER RESISTANT/SUNLIGHT RESISTANT AND CANNOT BE HAND-WRITTEN PER NEC 110.21(B)

PERMANENT PLAQUE OR DIRECTORY PROVIDING THE LOCATION OF THE SERVICE DISCONNECTING MEANS AND THE PHOTOVOLTAIC SYSTEM DISCONNECTING MEANS IF NOT IN THE SAME LOCATION
[NEC 690.56(B)]

WHERE THE PV SYSTEMS ARE REMOTELY LOCATED FROM EACH OTHER, A DIRECTORY IN ACCORDANCE WITH 705.10 SHALL BE PROVIDED AT EACH PV SYSTEM DISCONNECTING MEANS.
PV SYSTEM EQUIPMENT AND DISCONNECTING MEANS SHALL NOT BE INSTALLED IN BATHROOMS
[NEC 690.4(D),(E)]

LABELING NOTES
1.1 LABELING REQUIREMENTS BASED ON THE 2017 NATIONAL ELECTRICAL CODE, INTERNATIONAL FIRE CODE 605.11, OSHA STANDARD 1910.145, ANSI Z535
1.2 MATERIAL BASED ON THE REQUIREMENTS OF THE AUTHORITY HAVING JURISDICTION.
1.3 LABELS TO BE OF SUFFICIENT DURABILITY TO WITHSTAND THE ENVIRONMENT INVOLVED.
1.4 LABELS TO BE A MINIMUM LETTER HEIGHT OF 3/8" AND PERMANENTLY AFFIXED.
1.5 ALERTING WORDS TO BE COLOR CODED. "DANGER" WILL HAVE RED BACKGROUND; "WARNING" WILL HAVE ORANGE BACKGROUND; "CAUTION" WILL HAVE YELLOW BACKGROUND. [ANSI Z535]

LABELS ARE NOT DRAWN TO SCALE

FRANK, ALEXANDER
1900 SOUTHWEST MERRYMAN DRIVE,
LEE'S SUMMIT MO 64082
(913) 200-9105

LICENSE # MO # 21-06-071590

TITAN SOLAR POWER
TITAN SOLAR POWER
525 W BASELINE RD.
MESA, AZ 85210
WWW.TITANSOLARPOWER.COM

ELECTRICAL LABELS

JOB #: TSP120548
DATE: 4/29/2022
DRAWN BY: RK

PV-5

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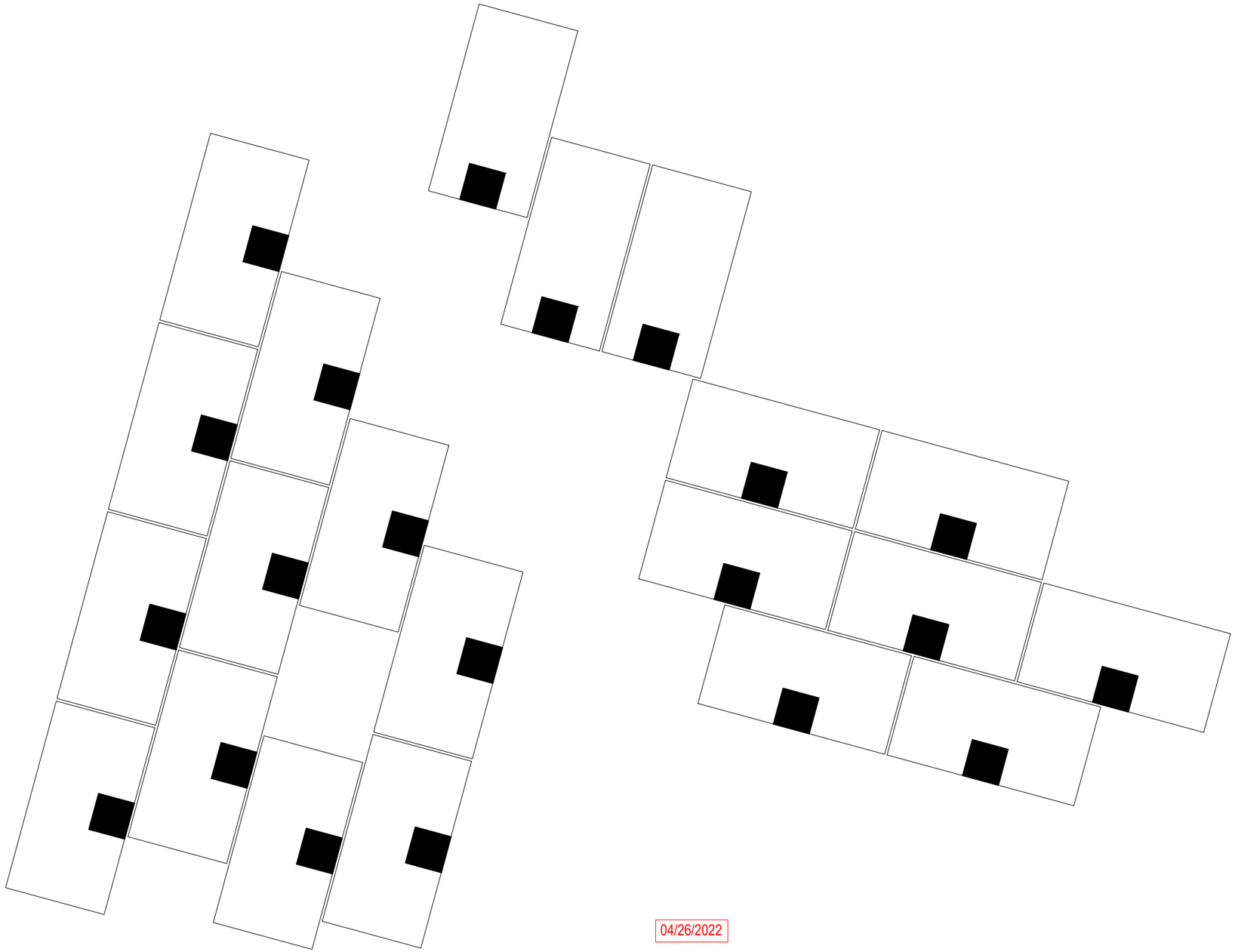
ELECTRICAL PHOTOS

JOB #: TSP120548
DATE: 4/29/2022
DRAWN BY: RK

PV-6



04/26/2022

04/29/2022

FOR INSTALLER USE ONLY

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OPTIMIZER MAP

JOB #: TSP120548
DATE: 4/29/2022
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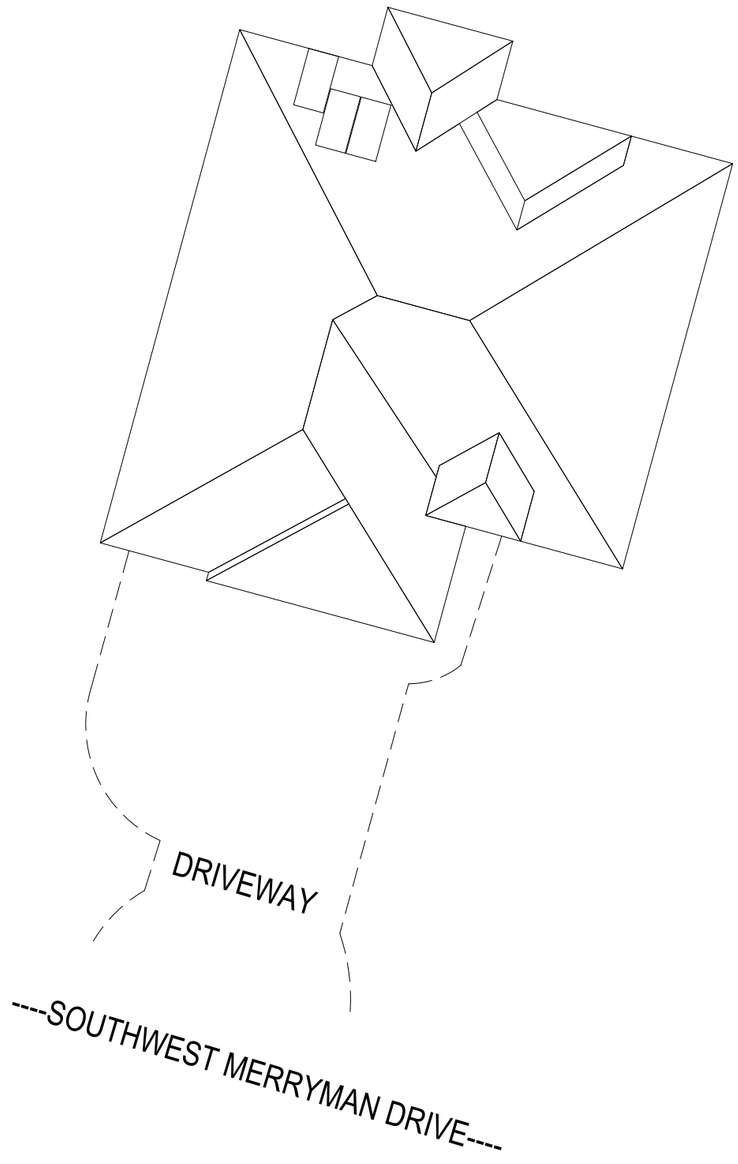
PV-7



N

SITE SAFETY CHECKLIST:

1. LADDER LOCATION	
2. RAZ ZONE	
3. TRUCK	
4. ANCHORS	
5. EGRESS ANCHOR (FPU)	
6. WATER LOCATION	
7. ENTRY POINTS TO HOME	
8. ROOF FALL HAZARDS	
9. EMERGENCY GATHERING POINT	

NOTE: INSTALL CREW TO MARK LOCATIONS ON DAY OF CONSTRUCTION

PERSONS COVERED BY THIS JOB SAFETY PLAN

INJURED AT WORK TODAT? INITIAL YES OR NO

PRINT NAME	INITIAL	YES	NO

FOR INSTALLER USE ONLY

SCALE: 1/16" = 1'-0"

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SITE SAFETY PLAN

JOB #: TSP120548
DATE: 4/29/2022
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PV-8

TITAN SOLAR PANEL

25 YR Warranty Product & Performance

EUPD RESEARCH TOP BRAND PV MODULES EUROPE 2021

Q CELLS Yield Security

BREAKING THE 20% EFFICIENCY BARRIER

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

INDUSTRY'S MOST THOROUGH TESTING

Q CELLS is the first solar module manufacturer to pass the most comprehensive quality programme in the industry:
The new "Quality Controlled PV" of the independent certification institute TÜV Rheinland.

ENDURING HIGH PERFORMANCE

Long-term yield security with Anti LID Technology, Anti PID Technology1, Hot-Spot Protect and Traceable Quality Tra.Q™.

EXTREME WEATHER RATING

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

A RELIABLE INVESTMENT

Inclusive 25-year product warranty and 25-year linear performance warranty2.

INNOVATIVE ALL-WEATHER TECHNOLOGY

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

1 APT test conditions according to IEC / TS 62804-1:2015, method A (−1500 V, 96 h)
2 See data sheet on rear for further information.

Q CELLS

Q PEAK DUO BLK ML-G10+

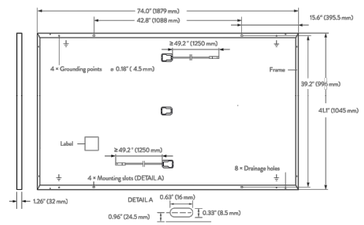
395-400 *ENDURING HIGH PERFORMANCE*

THE IDEAL SOLUTION FOR:

Rooftop arrays on residential buildings

MECHANICAL SPECIFICATION

FORMAT	74.0 in × 41.1 in × 1.26 in (including frame) (1879 mm × 1045 mm × 32 mm)
WEIGHT	48.5 lbs (22.0 kg)
FRONT COVER	0.13 in (3.2 mm) thermally pre-stressed glass with anti-reflection technology
BACK COVER	Composite film
FRAME	Black anodized aluminum
CELL	6 × 22 monocrystalline Q.ANTUM solar half cells
JUNCTION BOX	2.09-3.98 in × 1.26-2.36 in × 0.59-0.71 in (53-101 mm × 32-60 mm × 15-18 mm), IP67, with bypass diodes
CABLE	4 mm² Solar cable; (+) ≥ 49.2 in (1250 mm), (−) ≥ 49.2 in (1250 mm)
CONNECTOR	Stäubli MC4; IP68

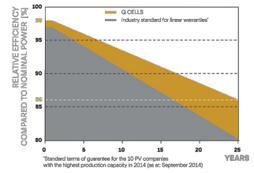


ELECTRICAL CHARACTERISTICS

POWER CLASS				385	390	395	400	405
MINIMUM PERFORMANCE AT STANDARD TEST CONDITIONS, STC [1] (POWER TOLERANCE +5 W / −0 W)								
MINIMUM	POWER AT MPP	P_{MPP}	[W]	385	390	395	400	405
	SHORT CIRCUIT CURRENT	I_{SC}	[A]	11.04	11.07	11.10	11.14	11.17
	OPEN CIRCUIT VOLTAGE	V_{OC}	[V]	45.19	45.23	45.27	45.30	45.34
	CURRENT AT MPP	I_{MPP}	[A]	10.59	10.65	10.71	10.77	10.83
	VOLTAGE AT MPP	V_{MPP}	[V]	36.36	36.62	36.88	37.13	37.39
	EFFICIENCY	η	[%]	≥19.6	≥19.9	≥20.1	≥20.4	≥20.6
MINIMUM PERFORMANCE AT NORMAL OPERATING CONDITIONS, NMOT [2]								
MINIMUM	POWER AT MPP	P_{MPP}	[W]	288.8	292.6	296.3	300.1	303.8
	SHORT CIRCUIT CURRENT	I_{SC}	[A]	8.90	8.92	8.95	8.97	9.00
	OPEN CIRCUIT VOLTAGE	V_{OC}	[V]	42.62	42.65	42.69	42.72	42.76
	CURRENT AT MPP	I_{MPP}	[A]	8.35	8.41	8.46	8.51	8.57
	VOLTAGE AT MPP	V_{MPP}	[V]	34.59	34.81	35.03	35.25	35.46

[1] Measurement tolerances P_{MPP} ±3%; I_{SC}; V_{OC} ±5% at STC: 1000 W/m², 25±2 °C, AM 1.5 according to IEC 60904-3 • [2] 800 W/m², NMOT, spectrum AM 1.5

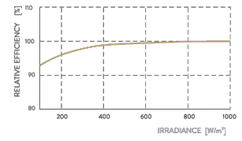
Q CELLS PERFORMANCE WARRANTY



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

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

PERFORMANCE AT LOW IRRADIANCE



Typical module performance under low irradiance conditions in comparison to STC conditions (25 °C, 1000 W/m²)

TEMPERATURE COEFFICIENTS							
TEMPERATURE COEFFICIENT OF I_{SC}	α	[%/K]	+0.04	TEMPERATURE COEFFICIENT OF V_{OC}	β	[%/K]	−0.27
TEMPERATURE COEFFICIENT OF P_{MPP}	γ	[%/K]	−0.34	NOMINAL MODULE OPERATING TEMPERATURE	NMOT	[°F]	109±5.4 (43±3 °C)

PROPERTIES FOR SYSTEM DESIGN

Maximum System Voltage V_{SYS}	[V]	1000 (IEC) / 1000 (UL)	PV module classification		Class II
Maximum Series Fuse Rating	[A DC]	20	Fire Rating based on ANSI / UL 61730		TYPE 2
Max. Design Load, Push / Pull[3]	[lbs/ft²]	75 (3600 Pa) / 55 (2660 Pa)	Permitted Module Temperature on Continuous Duty		−40 °F up to +185 °F (−40 °C up to +85 °C)
Max. Test Load, Push / Pull[3]	[lbs/ft²]	113 (5400 Pa) / 84 (4000 Pa)			

[3] See Installation Manual

QUALIFICATIONS AND CERTIFICATES

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

C Certified US UL 61730 · CE · TÜVRheinland CERTIFIED www.tuv.com ID 1111220277

PACKAGING INFORMATION

Horizontal packaging	76.4 in 1940 mm	43.3 in 1100 mm	48.0 in 1220 mm	1656 lbs 751 kg	24 pallets	24 pallets	32 modules

Note: Installation instructions must be followed. See the installation and operating manual or contact our technical service department for further information on approved installation and use of this product.

Q CELLS
400 Spectrum Center Drive, Suite 1400, Irvine, CA 92618, USA
TEL: +1 949 748 5996
EMAIL: sales@q-cells.com.

TITAN SOLAR PANEL
525 W Baseline Rd., Mesa, AZ, 85210
TEL: 855.SAY.SOLAR
EMAIL: info@titansolarpower.com

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MODULES DATASHEET

JOB #: TSP120548
DATE: 4/29/2022
DRAWN BY: RK

PV-9.1

Single Phase Inverter with HD-Wave Technology

for North America

SE3000H-US / SE3800H-US / SE5000H-US / SE6000H-US / SE7600H-US / SE10000H-US / SE11400H-US

INVERTERS

12-25 YEAR WARRANTY

Optimized installation with HD-Wave technology

- Specifically designed to work with power optimizers
- Record-breaking 99% weighted efficiency
- Quick and easy inverter commissioning directly from a smartphone using the SolarEdge SetApp
- Fixed voltage inverter for longer strings
- Integrated arc fault protection and rapid shutdown for NEC 2014, NEC 2017 and NEC 2020 per article 690.11 and 690.12
- UL1741 SA certified, for CPUC Rule 21 grid compliance
- Small, lightweight, and easy to install both outdoors or indoors
- Built-in module-level monitoring
- Optional: Faster installations with built-in consumption metering (1% accuracy) and production revenue grade metering (0.5% accuracy, ANSI C12.20)

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Single Phase Inverter with HD-Wave Technology

for North America

SE3000H-US / SE3800H-US / SE5000H-US / SE6000H-US/
SE7600H-US / SE10000H-US / SE11400H-US

MODEL NUMBER	SE3000H-US	SE3800H-US	SE5000H-US	SE6000H-US	SE7600H-US	SE10000H-US	SE11400H-US	
APPLICABLE TO INVERTERS WITH PART NUMBER	SEXXXXH-XXXXXBXX4							
OUTPUT								
Rated AC Power Output	3000	3800 @ 240V 3300 @ 208V	5000	6000 @ 240V 5000 @ 208V	7600	10000	11400 @ 240V 10000 @ 208V	VA
Maximum AC Power Output	3000	3800 @ 240V 3300 @ 208V	5000	6000 @ 240V 5000 @ 208V	7600	10000	11400 @ 240V 10000 @ 208V	VA
AC Output Voltage Min.-Nom.-Max. (211 - 240 - 264)	✓	✓	✓	✓	✓	✓	✓	Vac
AC Output Voltage Min.-Nom.-Max. (183 - 208 - 229)	-	✓	-	✓	-	-	✓	Vac
AC Frequency (Nominal)	59.3 - 60 - 60.5(1)							Hz
Maximum Continuous Output Current @240V	12.5	16	21	25	32	42	47.5	A
Maximum Continuous Output Current @208V	-	16	-	24	-	-	48.5	A
Power Factor	1, Adjustable - 0.85 to 0.85							
GFDI Threshold	1							A
Utility Monitoring, Islanding Protection, Country Configurable Thresholds	Yes							
INPUT								
Maximum DC Power @240V	4650	5900	7750	9300	11800	15500	17650	W
Maximum DC Power @208V	-	5100	-	7750	-	-	15500	W
Transformer-less, Ungrounded	Yes							
Maximum Input Voltage	480							Vdc
Nominal DC Input Voltage	380				400			Vdc
Maximum Input Current @240V(2)	8.5	10.5	13.5	16.5	20	27	30.5	Adc
Maximum Input Current @208V(2)	-	9	-	13.5	-	-	27	Adc
Max. Input Short Circuit Current	45							Adc
Reverse-Polarity Protection	Yes							
Ground-Fault Isolation Detection	600kΩ Sensitivity							
Maximum Inverter Efficiency	99	99.2						%
CEC Weighted Efficiency	99						99 @ 240V 98.5 @ 208V	%
Nighttime Power Consumption	< 2.5							W

(1) For other regional settings please contact SolarEdge support
(2) A higher current source may be used; the inverter will limit its input current to the values stated

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INVERTER DATASHEET

JOB #: TSP120548
DATE: 4/29/2022
DRAWN BY: RK

PV-9.2

Power Optimizer
Frame-Mounted

P370 / P401 / P404 / P500

POWER OPTIMIZER

Fast mount power optimizers with module-level optimization

- Specifcally designed to work with SolarEdge inverters
- Quicker installation - Power optimizers can be mounted in advance saving installation time
- Up to 25% more energy
- Superior efficiency (99.5%)
- Mitigates all types of modules mismatch-loss, from manufacturing tolerance to partial shading
- Flexible system design for maximum space utilization
- Next generation maintenance with module level monitoring
- Module-level voltage shutdown for installer and firefighter safety

solaredge.com

solaredge

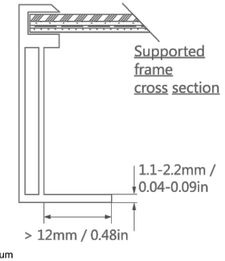
Power Optimizer
Frame-Mounted
P370 / P401 / P404 / P500

OPTIMIZER MODEL (TYPICAL MODULE COMPATIBILTY)	P370 (FOR HIGH-POWER 60-CELL AND FOR 72-CELL MODULES)	P401 (FOR HIGH POWER 60/72-CELL MODULES)	P404 (FOR 60-CELL AND 72-CELL, SHORT STRINGS)	P500 (FOR 96-CELL MODULES)	
INPUT					
Rated Input DC Power[1]	370	420	405	500	W
Absolute Maximum Input Voltage (Voc at lowest temperature)	60		80		Vdc
MPPT Operating Range	8 - 60		12.5 - 80	8 - 80	Vdc
Maximum Short Circuit Current (Isc)	11	12.5	11	10.1	Adc
Maximum Efficiency	99.5				%
Weighted Efficiency	98.8				%
Overvoltage Category	II				
OUTPUT DURING OPERATION (POWER OPTIMIZER CONNECTED TO OPERATING SOLAREDGE INVERTER)					
Maximum Output Current	15				Adc
Maximum Output Voltage	60		85	60	Vdc
OUTPUT DURING STANDBY (POWER OPTIMIZER DISCONNECTED FROM SOLAREDGE INVERTER OR SOLAREDGE INVERTER OFF)					
Safety Output Voltage per Power Optimizer	1 ± 0.1				Vdc
STANDARD COMPLIANCE					
EMC	FCC Part15 Class B, IEC61000-6-2, IEC61000-6-3				
Safety	IEC62109-1 (class II safety), UL1741				
RoHS	Yes				
Fire Safety	VDE-AR-E 2100-712:2013-05				
INSTALLATION SPECIFICATIONS					
Maximum Allowed System Voltage	1000				Vdc
Dimensions (W x L x H)	139 x 165 x 40 / 5.5 x 6.5 x 1.6	129 x 153 x 29.5 / 5.08 x 6.02 x 1.16	139 x 165 x 48 / 5.5 x 6.5 x 1.9		mm / in
Weight (including cables)	775 / 1.7	655 / 1.5	895 / 2.0	870 / 1.9	gr / lb
Input Connector	MC4[2]				
Input Wire Length	0.16 / 0.52				m / ft
Output Connector	MC4				
Output Wire Length	1.2 / 3.9				m / ft
Operating Temperature Range[3]	-40 to +85 / -40 to +185				°C / °F
Protection Rating	IP68 / NEMA6P				
Relative Humidity	0 - 100				%

(1) Rated power of the module at STC will not exceed the optimizer "Rated Input DC Power". Modules with up to +5% Power tolerance are allowed
(2) For other connector types please contact SolarEdge
(3) For ambient temperature above +85°C / +185°F power de-rating is applied. Refer to Power Optimizers Temperature De-Rating Technical Note for more details

PV SYSTEM DESIGN USING A SOLAREDGE INVERTER[4]		SINGLE PHASE HD-WAVE	SINGLE PHASE	THREE PHASE	THREE PHASE FOR 277/480V GRID	
Minimum String Length (Power Optimizers)	P370/ P401/ P500[5]	8		16	18	
	P404	6		14 (13 with SE3K)[6]	14	
Maximum String Length (Power Optimizers)		25		50	50	
Maximum Nominal Power per String		5700[7]	5250[7]	11250[8]	12750	W
Parallel Strings of Different Lengths or Orientations		Yes				

(4) It is not allowed to mix P404 with P370/P401/P500 in one string
(5) The P370/P401/P500 cannot be used with the SE3K three phase inverter (available in some countries; refer to Three Phase Inverter SE3K-SE10K datasheet)
(6) Exactly 10 when using SE3K-RW010BNN4
(7) If the inverters rated AC power ≤ maximum nominal power per string, then the maximum power per string will be able to reach up to the inverters maximum input DC power Refer to: https://www.solaredge.com/sites/default/files/se-power-optimizer-single-string-design-application-note.pdf
(8) For SE27.6K, SE55K, SE82.8K: It is allowed to install up to 13,500W per string when 3 strings are connected to the inverter and when the maximum power difference between the strings is up to 2,000W; inverter max DC power: 37,250W



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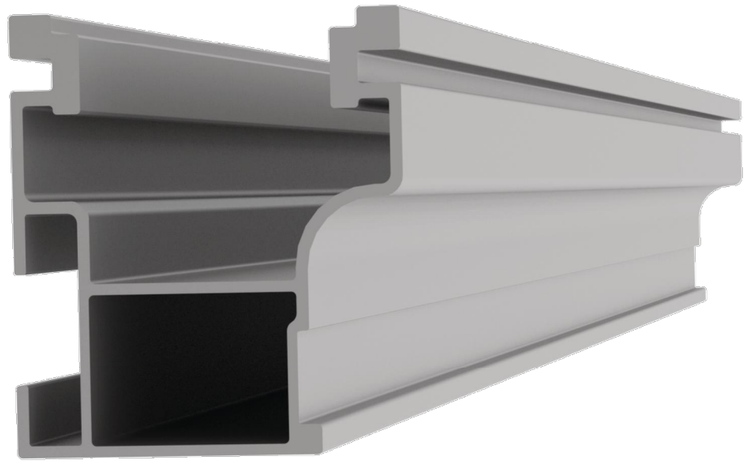
OPTIMIZER DATASHEET

JOB #: TSP120548
DATE: 4/29/2022
DRAWN BY: RK

PV-9.3

Mounting systems for solar technology

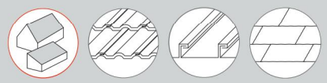
NEW!



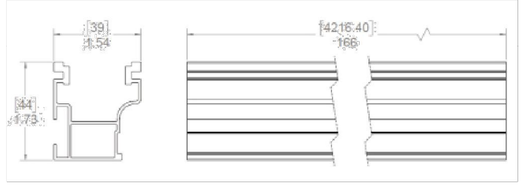
NEW PRODUCT

CrossRail 44-X

- Optimized rail profile
- One rail for all markets
- Built-in wire management
- Maintains same structural integrity as 48-X
- Tested up to 200 mph winds
- Tested up to 100 PSF snow loads



Part Number	Description
4000019	CrossRail 44-X 166'', Mill
4000020	CrossRail 44-X 166'', Dark
4000021	CrossRail 44-X 180", Mill
4000022	CrossRail 44-X 180", Dark
4000051	RailConn Set, CR 44-X, Mill
4000052	RailConn Set, CR 44-X, Dark
4000067	End Cap, Black, CR 44-X



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RACKING DATASHEET

JOB #: TSP120548
DATE: 4/29/2022
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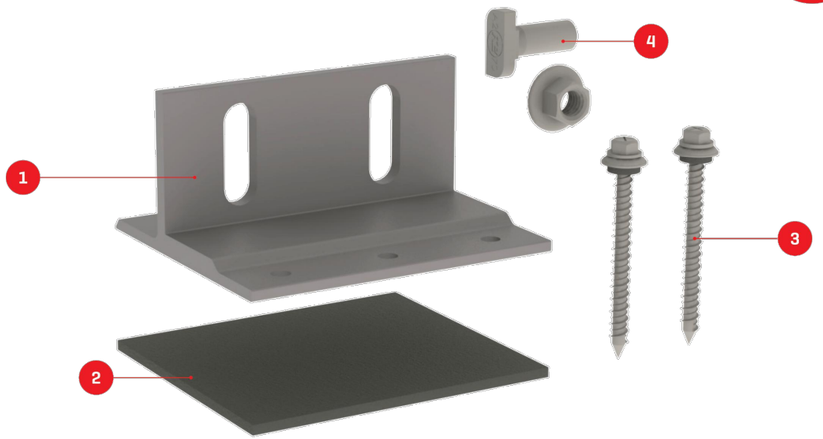
PV-9.4

We support PV systems
Formerly Everest Solar Systems



Splice Foot X

Patent Pending

TECHNICAL SHEET

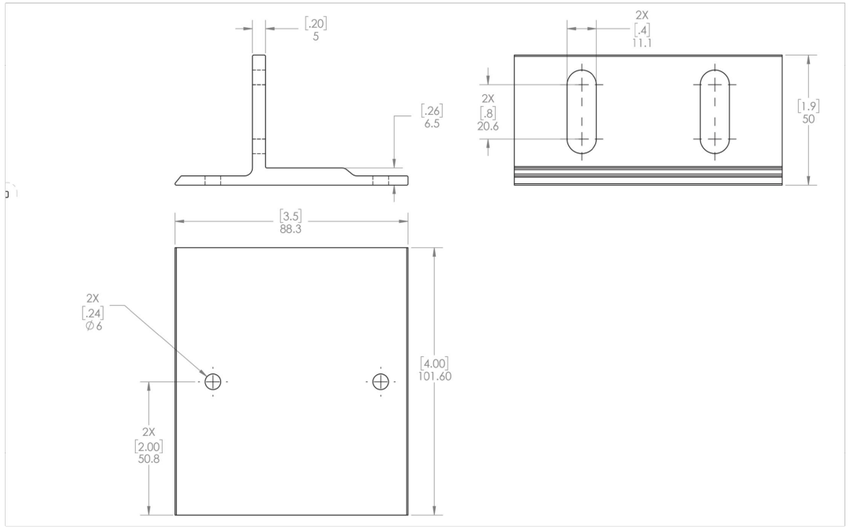
Item Number	Description	Part Number
1	Splice Foot X	4000113 | Splice Foot X Kit, Mill
2	K2 FlexFlash Butyl	
3	M5 x 60 lag screws	
4	T-Bolt & Hex Nut Set	

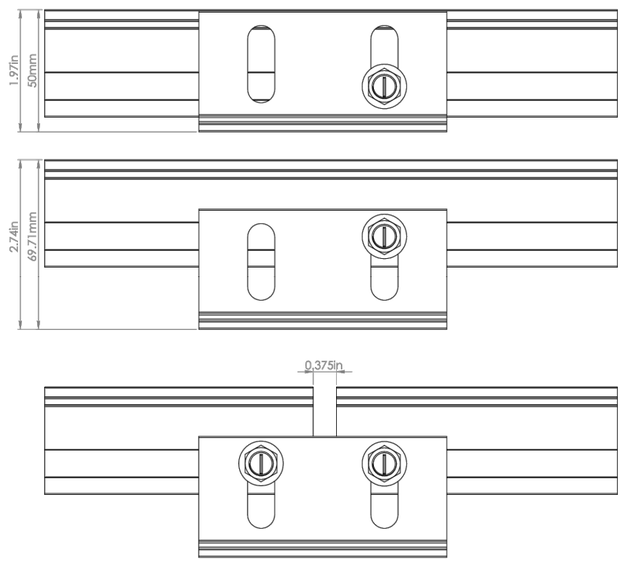
Technical Data

	Splice Foot X
Roof Type	Composition shingle
Material	Aluminum with stainless steel hardware
Finish	Mill
Roof Connection	M5 x 60 lag screws
Code Compliance	UL 2703
Compatibility	CrossRail 44-X, 48-X, 48-XL, 80

We support PV systems
Formerly Everest Solar Systems

Units: [in] mm





k2-systems.com

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MOUNTING DATASHEET

JOB #: TSP120548
DATE: 4/29/2022
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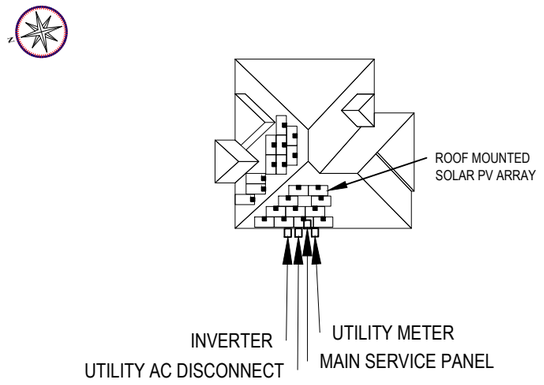
PV-9.5

⚠ CAUTION ⚠

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

SERVICE 1 OF 1



1900 SOUTHWEST MERRYMAN DRIVE, LEE'S SUMMIT MO 64082

FRANK, ALEXANDER
1900 SOUTHWEST MERRYMAN DRIVE,
LEE'S SUMMIT MO 64082

LICENSE # MO # 21-06-071590

TITAN SOLAR POWER
TITAN SOLAR POWER
525 W BASELINE RD.
MESA, AZ 85210
WWW.TITANSOLARPOWER.COM

PLACARD

DATE: 4/29/2022
DRAWN BY: RK

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