# PHOTOVOLTAIC ROOF MOUNT SYSTEM

11.5 KW (AC), 16.28 (DC) KW, 8201 N 54th St, Paradise Valley, AZ 85253

AHJ: PARADISE VALLEY
UTILITY: APS

## SYSTEM SPECIFICATIONS

SYSTEM SIZE: 16.28 kW DC
11.5 kW AC
MODULE TYPE: (N) 37 - SEG-440-BTD-BG

INVERTER TYPE: (N) 1 - TESLA INC. POWERWALL 3 INVERTER

RSD DEVICE: (N) 15 - TESLA MCI-2 High Current
ESS TYPE: (N) 1 - TESLA INC. POWERWALL 3
BATTERY STORAGE - 1707000-XX-Y

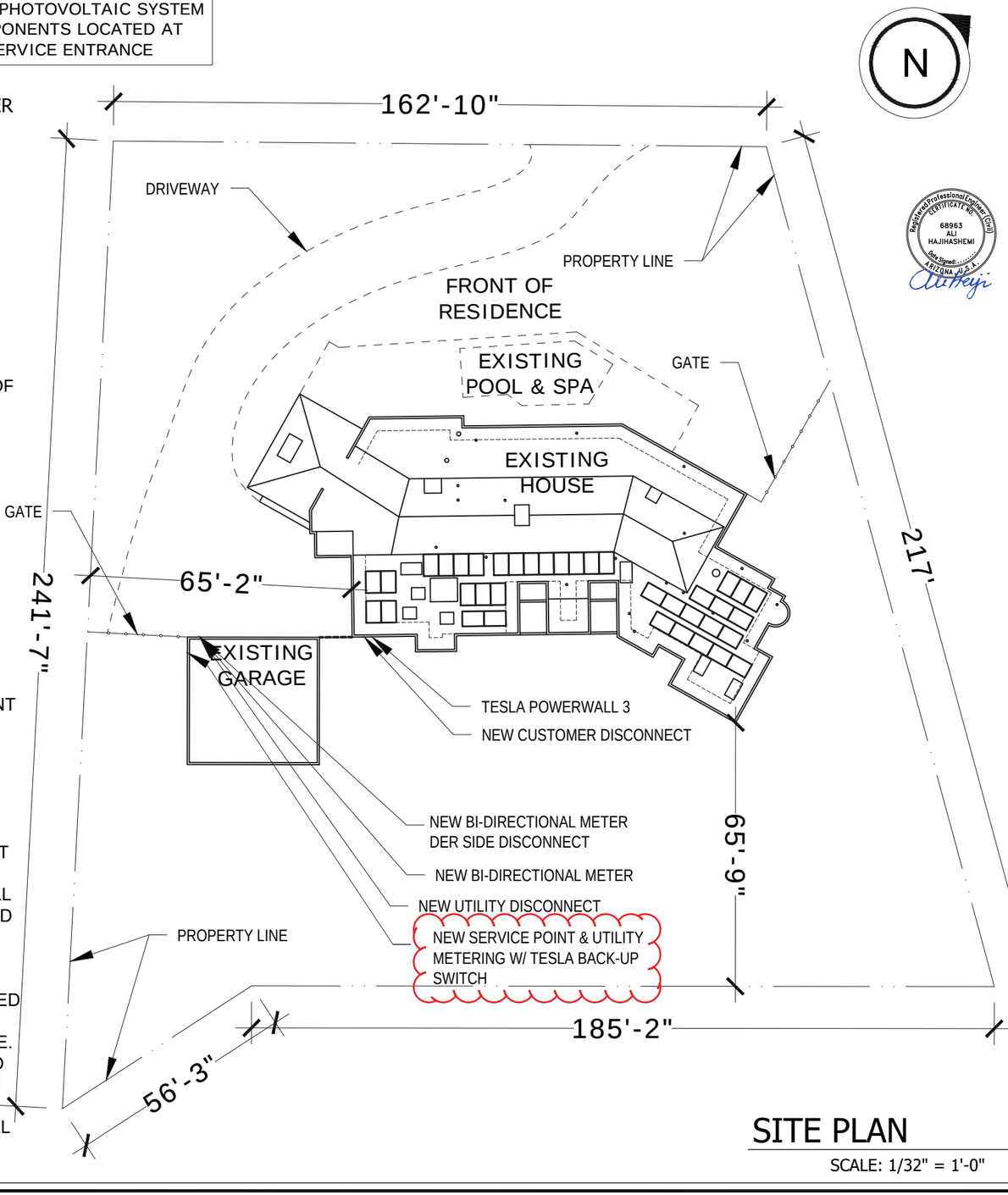
UTILITY HAS 24-HOUR ACCESS TO ALL PHOTOVOLTAIC SYSTEM COMPONENTS LOCATED AT SERVICE ENTRANCE

## NOTES

1. UTILITY HAS 24 HR. UNRESTRICTED ACCESS TO ALL PV SYSTEM COMPONENTS: LOCATED AT SERVICE ENTRANCE
2. WORKSPACE IN FRONT OF AC ELECTRICAL SYSTEM COMPONENTS SHALL BE IN ACCORDANCE WITH APS AND NEC
3. REQUIREMENTS: FOR APS REQUIREMENTS, REF. SECTION 300 OF THE APS ESRM AND SECTION 8.2 OF THE APS INTERCONNECTION REQUIREMENTS.
4. REFERENCE SECTION 301.15 OF THE APS ESRM FOR ELECTRICAL METER SEPARATION BETWEEN WATER AND GAS.
5. ALL CONSTRUCTION / INSTALLATION IS TO COMPLY WITH THE FOLLOWING: ALL DIMENSIONS ARE APPROXIMATE
6. ROOF VENTS, SKYLIGHTS, WILL NOT BE COVERED UPON PV INSTALLATION
7. METER LOCATED ON ACCESSIBLE EXTERIOR WALL WITHIN 5 FEET OF UTILITY METER
8. NO LOCKED GATES, DOGS, ETC SHALL IMPEDE ACCESS TO THE SERVICE EQUIPMENT.

## GENERAL NOTES

1. ALL PANELS, SWITCHES, ETC. SHALL HAVE SUFFICIENT GUTTER SPACE AND LUGS IN COMPLIANCE WITH UL REQUIREMENTS TO ACCOMMODATE CONDUCTORS SHOWN.
2. THIS SYSTEM WILL NOT BE INTERCONNECTED UNTIL APPROVAL FROM THE LOCAL JURISDICTION AND UTILITY IS OBTAINED.
3. ALL EXTERIOR ELECTRICAL DEVICES AND EQUIPMENT INCLUDING THOSE THAT ARE EXPOSED TO OUTSIDE ENVIRONMENT SHALL BE WEATHERPROOF AND SHALL BE LISTED BY 'UL' FOR THE TYPE OF APPLICATION AND 'UL' LABEL SHALL APPEAR ON ALL ELECTRICAL EQUIPMENT.
4. WIRING METHOD SHALL BE EMT ABOVE GROUND MOUNTED IN CONCEALED SPACES (UNLESS APPROVED OTHERWISE) AND SCHEDULE-40 PVC FOR BELOW GROUND INSTALLATIONS UNLESS NOTED OTHERWISE.
5. AN OSHA APPROVED LADDER PROVIDING ACCESS TO ALL PORTIONS OF THE ARRAY SHALL BE SECURED IN PRIOR TO REQUESTING INSPECTION.
6. IT IS THE CONTRACTOR'S RESPONSIBILITY TO INSTALL A SUPPLEMENTAL GROUNDING ELECTRODE CONDUCTOR IF NECESSARY.




## SITE PLAN

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

## SHEET INDEX:

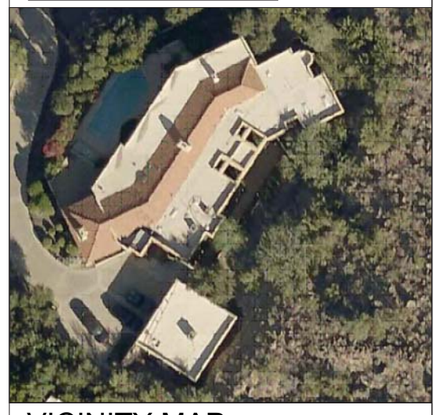


MANUFACTURER DATA SHEETS ATTACHED AT THE END OF PLAN SET

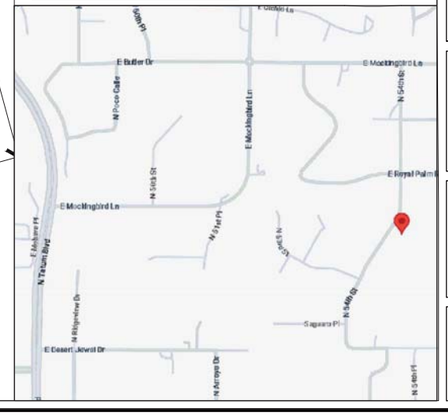
GOVERNING CODES

- ELECTRIC CODE: NEC 2017
- FIRE CODE: IFC 2018
- BUILDING CODE: IBC 2018
- RESIDENTIAL CODE: IRC 2018

## SATELLITE VIEW:



## VICINITY MAP:





SUNLINK ENERGY

CONTRACTOR:
SUNLINK ENERGY LLC
ADDRESS: 1355 NORTH MONDEL DR,
GILBERT, AZ 85233 USA
PHONE: (480) 624-8105
LICENSE #: ROC 326376
CR-11 CGL017824521


SIGNATURE WITH SEAL

Registered Professional Engineer (Civil) CERTIFICATE NO. 68963 ALI HAJIHASHEMI Date Signed: ARIZONA, U.S.A.

Matthew W Bailey
Digitally signed by Matthew W Bailey
Date: 2026.01.20 10:06:42 -07'00'

Registered Professional Engineer (Electrical) CERTIFICATE NO. 51214 MATTHEW W. BAILEY Expires: 9-30-28 ARIZONA U.S.A.

PROJECT NAME & ADDRESS

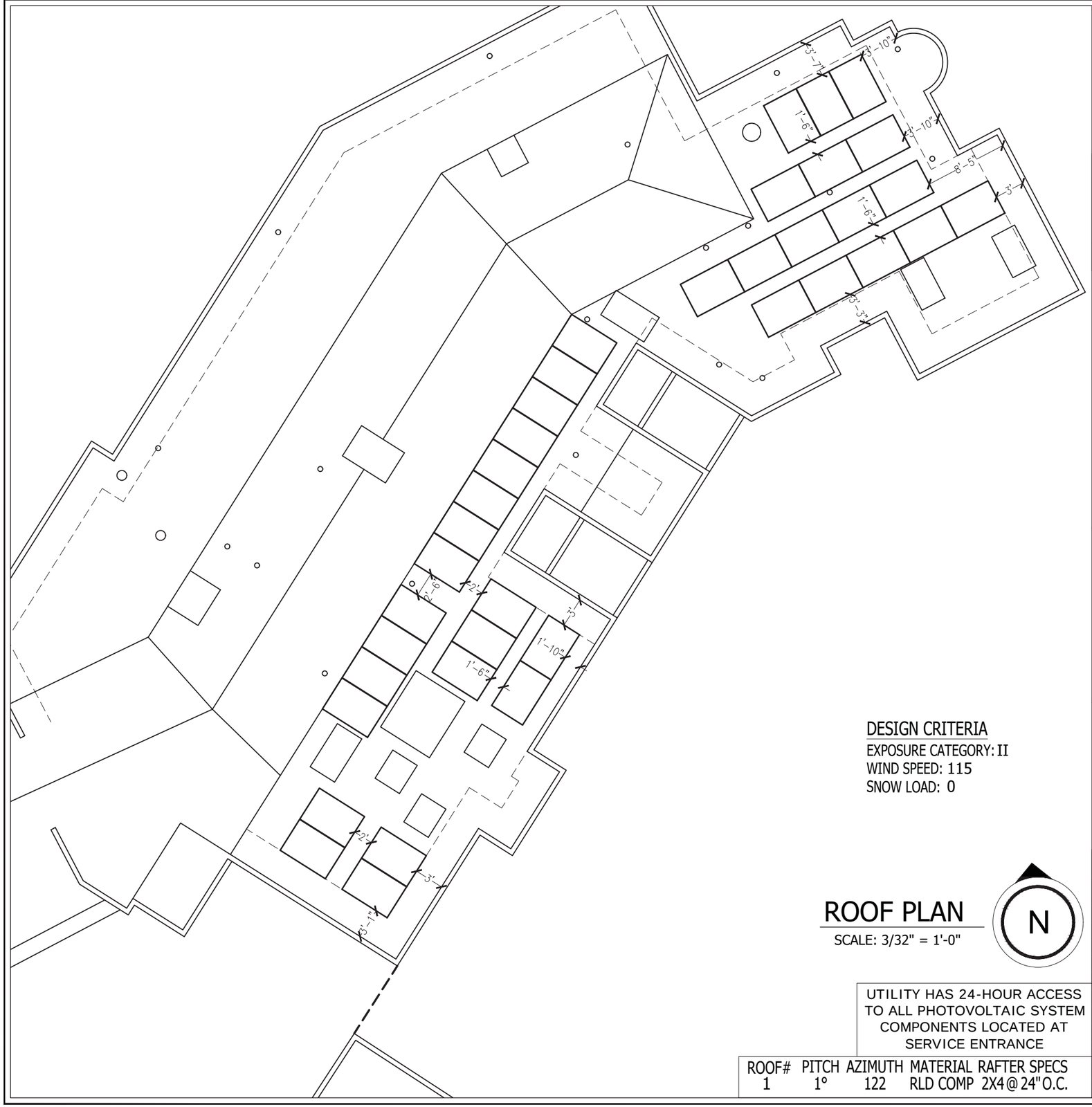
PROPOSED SOLAR PHOTOVOLTAIC SYSTEM FOR:
Farid Ghebleh
Parcel number: 16875022
602-909-0909
8201 N 54th St,
Paradise Valley, AZ 85253

SHEET NAME
COVER SHEET

SHEET SIZE
ANSI B
11" X 17"

| | |
|---|---|
| DRAWN BY: | SE |
| DATE: | 12/26/25 |
| (DC) kW: | 16.28 |
| (AC) kW: | 11.5 |
| PROJECT #: | AZ1885-VE25-FaGhebleh |

SHEET NUMBER:
PV 1.0



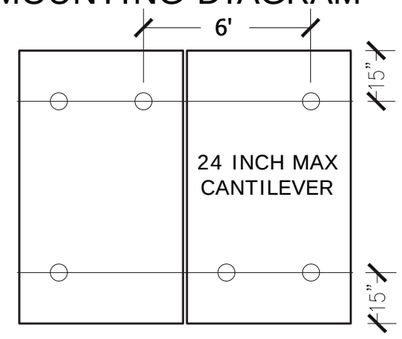

**ROOF ACCESS POINT**

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

## ARRAY AREA & ROOF AREA CALC'S

| ROOF AREA (Sq. Ft.) | ARRAY AREA (SQ. FT.) | ROOF AREA COVERED BY ARRAY (%) |
|---|---|---|
| 6161 | 777 | 13% |

## MOUNTING DIAGRAM




NOTE:

1. PV WIRING – EXPOSED CONDUIT RUN ON EXTERIOR OR ROMEX RUN INSIDE ATTIC.
2. ALL CONDUCTORS UNDER ARRAY TO BE A MINIMUM OF 7/8" ABOVE ROOF WITH PROPER J-BOXES AT EACH END PER 690.31A
3. THE VISIBLE, LOCKABLE, LABELED DISCONNECT (VLLD) IS LOCATED ON AN ACCESSIBLE EXTERIOR WALL WITHIN 10FT OF THE UTILITY METER.

STRING MAP:

- STRING #1
- STRING #2
- STRING #3
- STRING #4
- STRING #5
- STRING #6
- STRING #7

## DESIGN CRITERIA

EXPOSURE CATEGORY: II
WIND SPEED: 115
SNOW LOAD: 0

## ROOF PLAN

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

N

UTILITY HAS 24-HOUR ACCESS TO ALL PHOTOVOLTAIC SYSTEM COMPONENTS LOCATED AT SERVICE ENTRANCE

| ROOF# | PITCH | AZIMUTH | MATERIAL | RAFTER SPECS |
|---|---|---|---|---|
| 1 | 1° | 122 | RLD COMP | 2X4 @ 24" O.C. |

## DEAD LOAD CALCULATIONS

| BOM | QUANTITY | LBS/UNIT | TOTAL WEIGHT (LBS) |
|---|---|---|---|
| MODULES | 37 | 44.09 | 1631.33 |
| MID-CLAMP | 54 | 0.05 | 2.7 |
| END-CLAMP | 40 | 0.05 | 2 |
| RAIL LENGTH (in inches) | 3164.24 | 0.0354 | 112.014096 |
| SPLICE BAR (sets) | 6 | 0.36 | 2.16 |
| IRONRIDGE STANDOFF | 62 | 1.95 | 120.9 |
| RSD | 15 | 0.26 | 3.9 |
| **TOTAL WEIGHT OF THE SYSTEM (LBS)** | | | 1875.004096 |
| **TOTAL ARRAY AREA ON THE ROOF (SQ. FT.)** | | | 784.4 |
| **WEIGHT PER SQ. FT.(LBS)** | | | 2.390367282 |
| **WEIGHT PER PENETRATION (LBS)** | | | 30.24200155 |

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Registered Professional Engineer (Civil) CERTIFICATE NO. 68963 ALI HAJIHASHEMI Date Signed: ARIZONA U.S.A.

PROJECT NAME & ADDRESS

Farid Ghebleh
Parcel number: 168750225
602-909-0909
8201 N 54th St,
Paradise Valley, AZ 85253

SHEET NAME

ROOF PLAN

SHEET SIZE

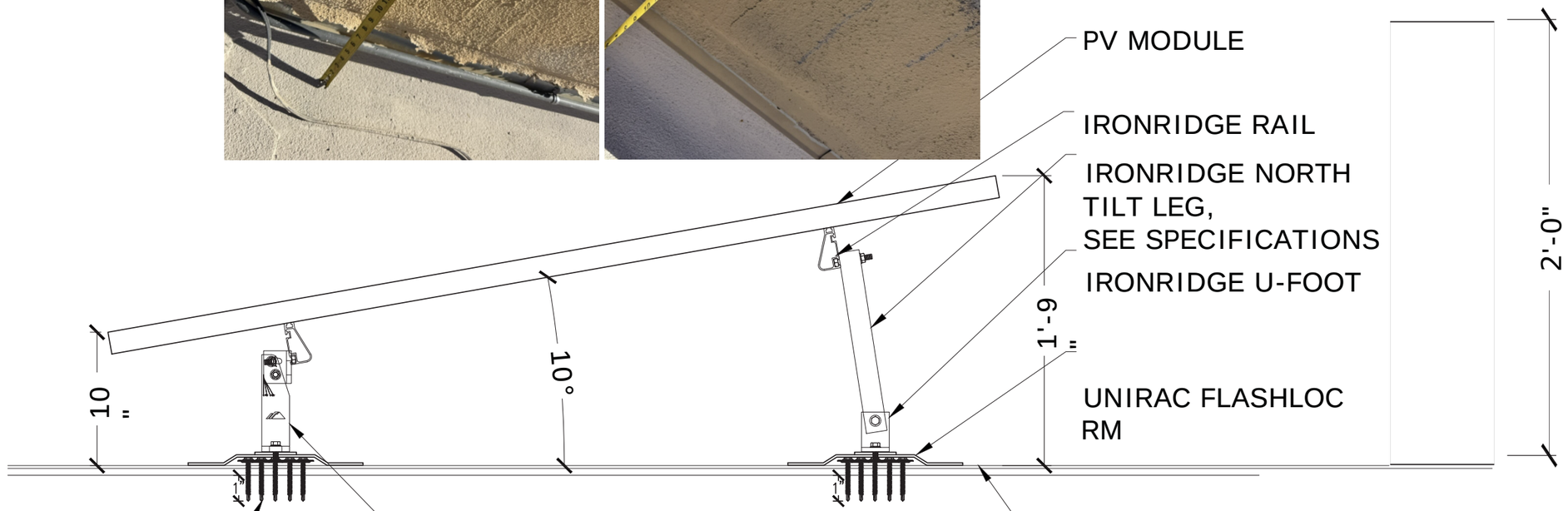
ANSI B
11" X 17"

| | |
|---|---|
| DRAWN BY: | SE |
| DATE: | 12/26/25 |
| (DC) kW: | 16.28 |
| (AC) kW: | 11.5 |
| PROJECT #: | AZ1885-VE25-FaGhebleh |

SHEET NUMBER:

PV 2.0

NOTES:
1. ARRAY DIMENSIONS WILL VARY BASED ON MODULE WIDTH, LENGTH AND RETURN FLANGE.




## STANDOFF DETAIL

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

COATED ROOF AREAS TO BE BROWN OWL COLOR WITH LRV OF 33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SHEET NAME
ATTACHMENT DETAILS

SHEET SIZE
ANSI B
11" X 17"

| | |
|---|---|
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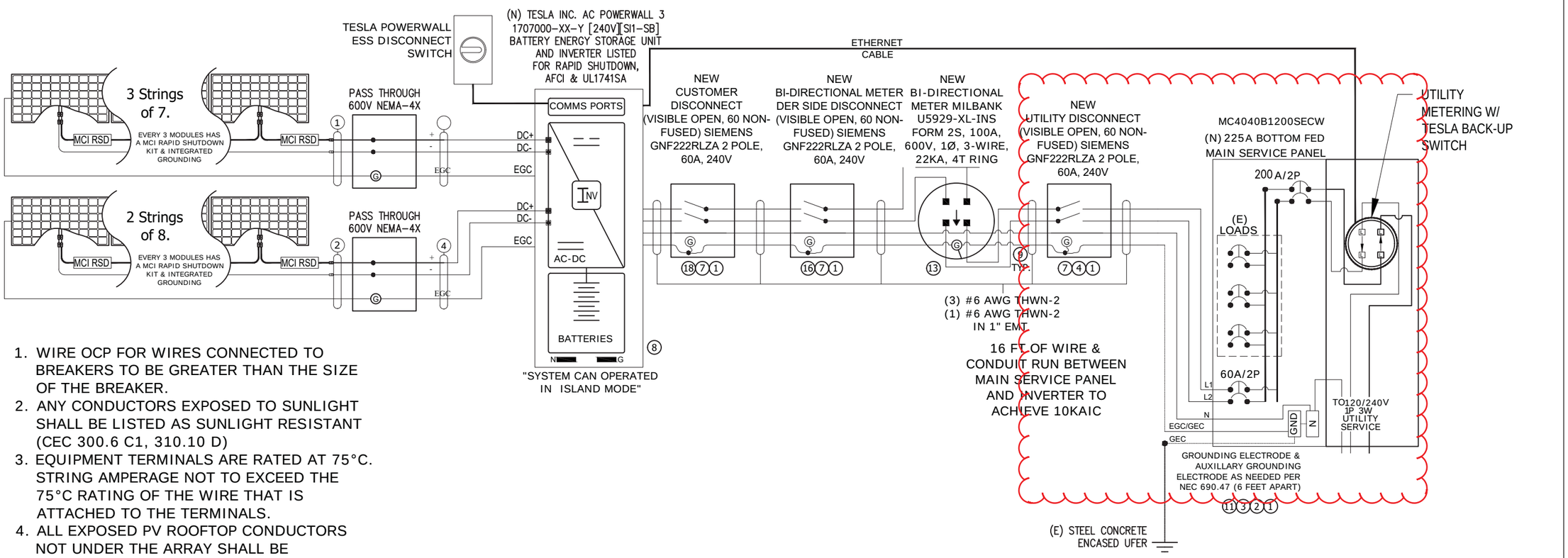
SHEET NUMBER:
S 1.0

# MULTI LINES

THE VISIBLE, LOCKABLE, LABELED DISCONNECT (VLLD) IS LOCATED ON AN ACCESSIBLE EXTERIOR WALL WITHIN 10FT OF THE UTILITY METER.

NOTE TO CONTRACTOR: LABEL: "METER SOCKET ADAPTER DISCONNECT - NOT SERVICE EQUIPMENT".

UTILITY HAS 24-HOUR ACCESS TO ALL PHOTOVOLTAIC SYSTEM COMPONENTS LOCATED AT SERVICE ENTRANCE




1. WIRE OCP FOR WIRES CONNECTED TO BREAKERS TO BE GREATER THAN THE SIZE OF THE BREAKER.
2. ANY CONDUCTORS EXPOSED TO SUNLIGHT SHALL BE LISTED AS SUNLIGHT RESISTANT (CEC 300.6 C1, 310.10 D)
3. EQUIPMENT TERMINALS ARE RATED AT 75°C. STRING AMPERAGE NOT TO EXCEED THE 75°C RATING OF THE WIRE THAT IS ATTACHED TO THE TERMINALS.
4. ALL EXPOSED PV ROOFTOP CONDUCTORS NOT UNDER THE ARRAY SHALL BE PROTECTED BY A RACEWAY WITH A LISTED JUNCTION BOX AT BOTH ENDS. 2017 NEC ARTICLE 690.31(A).
5. ROOFTOP CONDUITS SHALL BE A MINIMUM 7/8INCH ABOVE THE ROOFTOP, 2017 NEC ARTICLE 310.15(B)(3)(C).
6. ALL EQUIPMENT MUST BE UTILIZED IN ACCORDANCE WITH THE MANUFACTURER'S INTENDED USE AND DESIGN SPECIFICATIONS.

**WARNING:**
THIS EQUIPMENT FED BY MULTIPLE SOURCES. TOTAL RATING OF ALL OVERCURRENT DEVICES, EXCLUDING MAIN SUPPLY OVERCURRENT DEVICE, SHALL NOT EXCEED AMPACITY OF BUSBAR.

PCS CONTROLLED CURRENT SETTING: 200A

THE MAXIMUM OUTPUT CURRENT FROM THIS SYSTEM TOWARDS THE MAIN PANEL IS CONTROLLED ELECTRONICALLY. REFER TO MANUFACTURER'S INSTRUCTIONS FOR MORE INFORMATION

| INVERTER | |
|---|---|
| TESLA INC. POWERWALL 3 INVERTER W/ BUILT-IN BATTERY STORAGE - 1707000-XX-Y [240V, 11.5KW] | |
| NOM OUTPUT VOLTAGE | 240V |
| MAX OUTPUT CURRENT | 48A |

| SERVICE INFO | | |
|---|---|---|
| UTILITY COMPANY: APS | MSP VOLTAGE: 120/240 | |
| MSP LOC: RIGHT | SERV. TYPE: UG | MSP GROUND: (E) UFER |

| ASHRAE AMBIENT TEMPERATURE SPECS | | |
|---|---|---|
| High Temp | DISTANCE ABOVE ROOF | EXTREME |
| 2% Avg. | 1" | MIN |
| 43° C | NO TEMP ADDER PER 310.15(B)(3)(C) | 1° C |

| MODULE SPECS | | | |
|---|---|---|---|
| MODULE TYPE: | QTY: | WATTAGE: | FRAME COLOR: |
| SEG-440-BTD-BG | 37 | 440 | BLACK |
| Voc: 39.30 | Isc: 14.15 | Imp: 13.46 | Vpmax: 32.70 |

| WIRE TAG # | CONDUIT | WIRE QTY | WIRE GAUGE: | WIRE TYPE | TEMP RATING: | WIRE AMP | TEMP DE-RATE: | CONDUIT FILL: | WIRE OCP: | TERMINAL 75°C RATING: | DC CALCS (VOLTS X MODULES IN STRING) (AMPS X STRINGS) Voc | Vmp | Isc | Imp | AC CALCS SERVICE VOLTAGE | TOTAL INVERTER AMPS | INVERTER AMPS OR VOC STRING AMPS | x NEC: | = MAX AMPS | GRND SIZE | GRND WIRE TYPE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | AIR | 2 | 10 | PV WIRE | 90C | 40 x | .87 x | 1 = | 34.8A | 35 A | 275.10 | 228.90 | 14.15 | 13.46 | | A | 14.15 | x 1.56 = | 22.07 A | #6 | SBC |
| 2 | AIR | 2 | 10 | PV WIRE | 90C | 40 x | .87 x | 1 = | 34.8A | 35 A | 314.40 | 261.60 | 14.15 | 13.46 | | A | 14.15 | x 1.56 = | 22.07 A | #6 | SBC |
| 3 | 3/4" EMT | 6 | 10 | THWN-2 | 90C | 40 x | .87 x | .8 = | 27.84A | 35 A | 275.10 | 228.90 | 14.15 | 13.46 | | A | 14.15 | x 1.56 = | 22.07 A | #8 | THWN-2 |
| 4 | 3/4" EMT | 4 | 10 | THWN-2 | 90C | 40 x | .87 x | .8 = | 27.84A | 35 A | 314.40 | 261.60 | 14.15 | 13.46 | | A | 14.15 | x 1.56 = | 22.07 A | #8 | THWN-2 |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PROJECT NAME & ADDRESS

Farid Ghebleh
Parcel number: 16875022
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8201 N 54th St,
Paradise Valley, AZ 85253

SHEET NAME
3-LINE DIAGRAM

SHEET SIZE
ANSI B
11" X 17"

| | |
|---|---|
| DRAWN BY: | SE |
| DATE: | 12/26/25 |
| (DC) kW: | 16.28 |
| (AC) kW: | 11.5 |
| PROJECT #: | AZ1885-VE25-FaGhebleh |

SHEET NUMBER:
E 1.1

# SINGLE LINES

THE VISIBLE, LOCKABLE, LABELED DISCONNECT (VLLD) IS LOCATED ON AN ACCESSIBLE EXTERIOR WALL WITHIN 10FT OF THE UTILITY METER.

NOTE TO CONTRACTOR: LABEL: "METER SOCKET ADAPTER DISCONNECT - NOT SERVICE EQUIPMENT".

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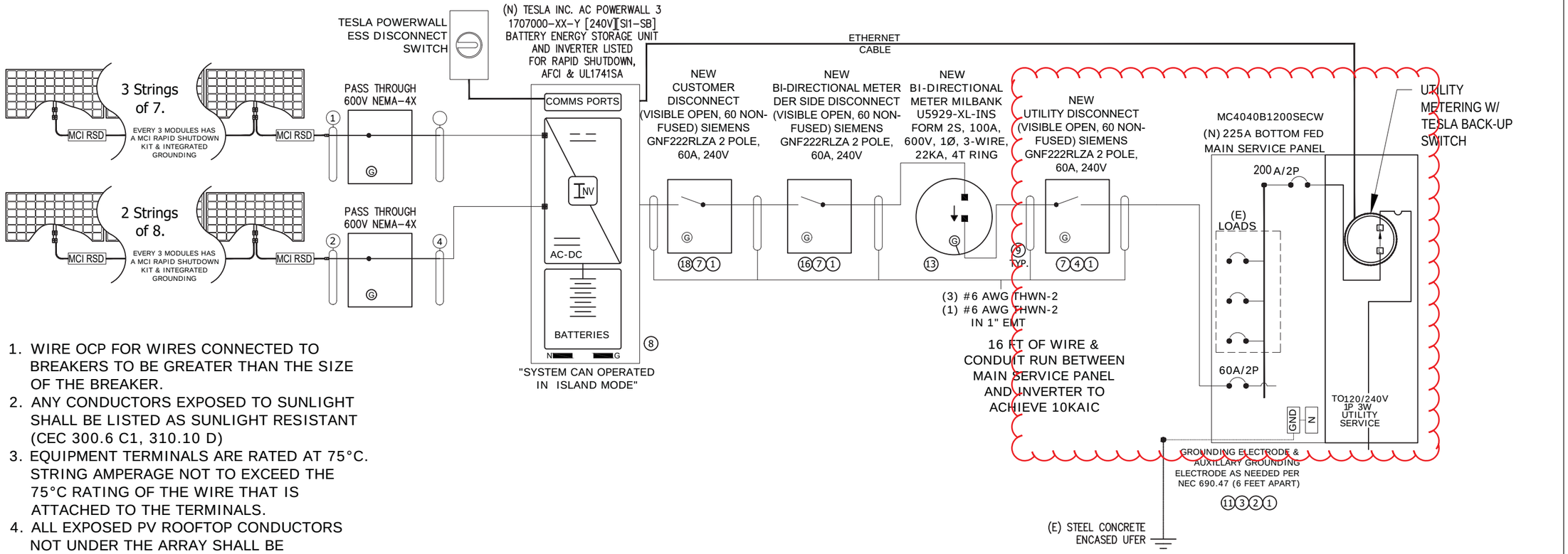


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2. ANY CONDUCTORS EXPOSED TO SUNLIGHT SHALL BE LISTED AS SUNLIGHT RESISTANT (CEC 300.6 C1, 310.10 D)
3. EQUIPMENT TERMINALS ARE RATED AT 75°C. STRING AMPERAGE NOT TO EXCEED THE 75°C RATING OF THE WIRE THAT IS ATTACHED TO THE TERMINALS.
4. ALL EXPOSED PV ROOFTOP CONDUCTORS NOT UNDER THE ARRAY SHALL BE PROTECTED BY A RACEWAY WITH A LISTED JUNCTION BOX AT BOTH ENDS. 2017 NEC ARTICLE 690.31(A).
5. ROOFTOP CONDUITS SHALL BE A MINIMUM 7/8INCH ABOVE THE ROOFTOP, 2017 NEC ARTICLE 310.15(B)(3)(C).
6. ALL EQUIPMENT MUST BE UTILIZED IN ACCORDANCE WITH THE MANUFACTURER'S INTENDED USE AND DESIGN SPECIFICATIONS.

WARNING:
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| NOM OUTPUT VOLTAGE | 240V |
| MAX OUTPUT CURRENT | 48A |

| SERVICE INFO | | |
|---|---|---|
| UTILITY COMPANY: APS | MSP VOLTAGE: 120/240 | |
| MSP LOC: RIGHT | SERV. TYPE: UG | MSP GROUND: (E) UFER |

| ASHRAE AMBIENT TEMPERATURE SPECS | | |
|---|---|---|
| High Temp | DISTANCE ABOVE ROOF | EXTREME |
| 2% Avg. | 1" | MIN |
| 43° C | NO TEMP ADDER PER 310.15(B)(3)(C) | 1° C |

| MODULE SPECS | | | |
|---|---|---|---|
| MODULE TYPE: | QTY: | WATTAGE: | FRAME COLOR: |
| SEG-440-BTD-BG | 37 | 440 | BLACK |
| Voc: 39.30 | Isc: 14.15 | Imp: 13.46 | Vpmax: 32.70 |

| WIRE TAG # | CONDUIT | WIRE QTY | WIRE GAUGE: | WIRE TYPE | TEMP RATING: | WIRE AMP | TEMP DE-RATE: | CONDUIT FILL: | WIRE OCP: | TERMINAL 75°C RATING: | DC CALCS (VOLTS X MODULES IN STRING) (AMPS X STRINGS) Voc | Vmp | Isc | Imp | AC CALCS SERVICE VOLTAGE | TOTAL INVERTER AMPS | INVERTER AMPS OR VOC STRING AMPS | NEC: | MAX AMPS | GRND SIZE | GRND WIRE TYPE |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
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SHEET NAME
1-LINE DIAGRAM

SHEET SIZE
ANSI B
11" X 17"

| | |
|---|---|
| DRAWN BY: | SE |
| DATE: | 12/26/25 |
| (DC) kW: | 16.28 |
| (AC) kW: | 11.5 |
| PROJECT #: | AZ1885-VE25-FaGhebleh |

SHEET NUMBER:
E 1.2

1.CONDUCTORS EXPOSED TO SUNLIGHT SHALL BE LISTED AS SUNLIGHT RESISTANT PER NEC 310.10(D).
2.CONDUCTORS EXPOSED TO WET LOCATIONS SHALL BE SUITABLE FOR USE IN WET LOCATIONS PER NEC 310.10(C).
3.MAXIMUM DC/AC VOLTAGE DROP SHALL BE NO MORE THAN 2%.
4.ALL CONDUCTORS SHALL BE IN CONDUIT UNLESS OTHERWISE NOTED.
5.BREAKER/FUSE SIZES CONFORMS TO NEC 240.6 CODE SECTION.
6.AC GROUNDING ELECTRODE CONDUCTOR SIZED PER NEC 250.66.
7.AMBIENT TEMPERATURE CORRECTION FACTOR IS BASED ON NEC 690.31(C).
8.AMBIENT TEMPERATURE ADJUSTMENT FACTOR IS BASED ON NEC 310.15(B)(2).
9.MAX. SYSTEM VOLTAGE CORRECTION IS PER NEC 690.7.
10.CONDUCTORS ARE SIZED PER WIRE AMPACITY TABLE NEC 310.15(B)(16).

NOTE:
1. ALL TERMINALS SHALL BE MINIMUM 75 DEG RATED.
2. ROOF TOP CONDUIT SHALL BE MINIMUM 7/8" ABOVE ROOF SURFACE.

**AC WIRE SIZING CALCULATIONS**

REQUIRED CONDUCTOR AMPACITY:

INVERTER OUTPUT CURRENT X #OF INVERTERS X MAX CURRENT PER 690.8(A)(3)X125% PER 690.8(B)(2)(A)

CORRECTED AMPACITY CALCULATIONS: AMPACITY X TEMPERATURE DERATE FACTOR X CONDUIT FILL DERATE = DERATED CONDUCTOR AMPACITY

DERATED CONDUCTOR AMPACITY CHECK: MAX CURRENT PER 690.8(B)(2)(2) < DERATED CONDUCTOR AMPACITY

## KEYED NOTES:

1. LABEL: "CAUTION – MULTI SOURCES OF POWER" ON PLACARD/DIRECTORY PER NEC 705.10.
2. BI–DIRECTIONAL UTILITY METER TO BE INSTALLED BY UTILITY COMPANY.
3. LABEL BREAKER "PHOTOVOLTAIC ELECTRIC POWER SOURCE" "BREAKERS ARE BACKFED". LABEL WITH THE RATED AC OUTPUT CURRENT AND THE NOMINAL OPERATING VOLTAGE PER NEC 690.54.
4. LABEL "UTILITY DISCONNECT". SWITCH COVER TO BE LOCKED PER NEC 690.13(B) AT ALL TIMES BY UTILITY. SWITCH TO BE VISIBLE OPEN AND ACCESSIBLE PER UTILITY REQUIREMENTS AND CONFORM TO NEC 705.20.
5. LABEL "PHOTOVOLTAIC ARRAY DC DISCONNECT" PER NEC 690.13(B).
   LABEL WITH MAXIMUM DC VOLTAGE, CURRENT PER NEC 690.53.
   SWITCH COVER TO BE LOCKED PER NEC 690.13(A).
6. LABEL "WARNING: THIS SUB–PANEL FED FROM MULTI–POWER PRODUCTION SOURCES".
7. PROVIDE WARNING SIGN PER NEC 690.13(B) AND 706.15(C) READING "WARNING–ELECTRIC SHOCK HAZARD–TERMINALS ON THE LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION.
8. INVERTER TO BE LISTED TO UL 1741SA AND SB.
9. METALLIC CONDUIT SHALL BE USED WITHIN BUILDING AND LABELED PER NEC 690.31 (D).
10. GROUND FAULT PROTECTION PER NEC 690.41(B) PROVIDED IN DC/AC INVERTER.
11. GEC TO BE INSTALLED AS REQUIRED PER MANUFACTURER INSTRUCTIONS AND NEC 690.47.
12. CUSTOMER WILL INSTALL RING–TYPE METER SOCKET WITH NON–DETENTED FORM 2S. APS WILL INSTALL THE PRODUCTION METERS. LABEL METER SOCKET UNII–DIRECTIONAL METER".
13. CUSTOMER WILL INSTALL RING–TYPE METER SOCKET WITH NON–DETENTED FORM 2S. APS WILL INSTALL THE PRODUCTION METERS. LABEL METER SOCKET "BI–DIRECTIONAL METER".
14. LABEL: "UNI–DIRECTIONAL METER LINE SIDE DISCONNECT". SWITCH COVER TO BE LOCKED PER NEC 690.13(B) AT ALL TIMES BY UTILITY. SWITCH TO BE VISIBLE OPEN & ACCESSIBLE PER UTILITY REQUIREMENTS AND CONFORM TO NEC 705.20.
15. LABEL: "BI–DIRECTIONAL METER LINE SIDE DISCONNECT". SWITCH COVER TO BE LOCKED PER NEC 690.13(B) AT ALL TIMES BY UTILITY. SWITCH TO BE VISIBLE OPEN & ACCESSIBLE PER UTILITY REQUIREMENTS AND CONFORM TO NEC 705.20.
16. LABEL: "BI–DIRECTIONAL METER DER SIDE DISCONNECT". SWITCH COVER TO BE LOCKED PER NEC 690.13(B) AT ALL TIMES BY UTILITY. SWITCH TO BE VISIBLE OPEN & ACCESSIBLE PER UTILITY REQUIREMENTS AND CONFORM TO NEC 705.20.
17. SYSTEM COMPLIES WITH RAPID SHUTDOWN PER NEC 690.56.
18. LABEL "CUSTOMER FUSED DISCONNECT". SWITCH COVER TO BE LOCKED PER NEC 690.13(8) AT ALL TIMES BY CUSTOMER. SWITCH TO BE VISIBLE OPEN AND ACCESSIBLE PER UTILITY REQUIREMENTS AND CONFORM TO NEC 705.20.

SUNLINK ENERGY
CONTRACTOR:
SUNLINK ENERGY LLC
ADDRESS: 1355 NORTH MONDEL DR,
GILBERT, AZ 85233 USA
PHONE: (480) 624-8105
LICENSE #: ROC 326376
CR-11 CGL017824521

SIGNATURE WITH SEAL

Registered Professional Engineer (Electrical) CERTIFICATE NO. 51214 MATTHEW W. BAILEY Expires: 9-30-28 ARIZONA U.S.A.

PROJECT NAME & ADDRESS

Farid Ghebleh
Parcel number: 168750220
602-909-0909
8201 N 54th St,
Paradise Valley, AZ 85253

SHEET NAME

NOTES

SHEET SIZE

ANSI B
11" X 17"

| | |
|---|---|
| DRAWN BY: | SE |
| DATE: | 12/26/25 |
| (DC) kW: | 16.28 |
| (AC) kW: | 11.5 |
| PROJECT #: | AZ1885-VE25-FaGhebleh |

SHEET NUMBER:

E 1.3

**CAUTION**
**PHOTOVOLTAIC SYSTEM CIRCUIT IS BACKFEED**

LABEL LOCATION: BACKFED BREAKER
CODE REF: NEC 705.12(4)

**WARNING**
INVERTER OUTPUT CONNECTION
DO NOT RELOCATE THIS
OVERCURRENT DEVICE

LABEL LOCATION: BACKFED BREAKER
CODE REF: 2017 NEC 705.12(2)(3)(b)

**WARNING**
A GENERATION SOURCE IS CONNECTED TO THE SUPPLY (UTILITY) SIDE OF THE MAIN SERVICE DISCONNECT. FOLLOW THE PEOPLE LOCK-OUT/ TAG OUT PROCEDURES TO ENSURE THE PHOTOVOLTAIC SYSTEM UTILITY DISCONNECT SWITCH IS OPENED PRIOR TO PERFORMING WORK ON THIS DEVICE

LABEL LOCATION: (IF APPLICABLE)
SUPPLY SIDE TAP LOAD PANEL
CODE REF: UTILITY

**PHOTOVOLTAIC AC DISCONNECT**

| | |
|---|---|
| NOMINAL OPERATING AC VOLATGE | 240 |
| RATED AC OUTPUT CURRENT | 48 |

LABEL LOCATION: MAIN SERVICE
DISCONNECT(S)
CODE REF: NEC 690.54

**RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM**

LABEL LOCATION: MAIN PANEL (EXTERIOR)
PV BREAKER (INTERIOR)
CODE REF: NEC 690.56(C)(3)

**WARNING**
ELECTRICAL SHOCK HAZARD
TERMINALS ON THE LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION

LABEL LOCATION: COMBINER PANEL, AC
DISCONNECT, JUNCTION BOX, INVERTER(S)
CODE REF: NEC 690.31(B)

**PHOTOVOLTAIC**
**SYSTEM METER**

LABEL LOCATION: DEDICATED KWH METER
CODE REF: NEC 690.4(B) UTILITY

**WARNING**
PHOTOVOLTAIC SYSTEM COMBINER PANEL DO NOT ADD LOADS

LABEL LOCATION: AC COMBINER PANEL
CODE REF: NEC 690.13(B)

MAXIMUM VOLTAGE
MAXIMUM CIRCUIT CURRENT
MAXIMUM RATED OUTPUT CURRENT OF THE CHARGE CONTROLLER OR DC-TO-DC CONVERTER (IF INSTALLED)

LABEL LOCATION: DC DISCONNECT
INVERTER
CODE REF: UTILITY

**WARNING**
ELECTRICAL SHOCK HAZARD
TERMINALS ON THE LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION
DC VOLTAGE IS ALWAYS PRESENT WHEN SOLAR MODULES ARE EXPOSED TO SUNLIGHT

LABEL LOCATION: DC DISCONNECT
COMBINER BOX
CODE REF: NEC 690.13(B)

**SOLAR PV SYSTEM EQUIPPED WITH RAPID SHUTDOWN**

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


LABEL LOCATION: MAIN SERVICE
(OUTSIDE COVER)
CODE REF: NEC 690.12, NEC 690.56(C)(1)(a)

**WARNING: PHOTOVOLTAIC POWER SOURCE**

LABEL LOCATION: DC CONDUIT, JUNCTION BOX, NOT MORE THAN 10FT
CODE REF: NEC 690.31(G) 3,
REFLECTIVE AND WEATHER RESISTANT LABEL REQUIRES CAPITALIZED LETTERS WITH A MINIMUM HEIGHT OF 3/8 NICHE, WHITE LETTERS ON RED BACKGROUND LABELS SHALL BE PLACED OF INTERIOR AND EXTERIOR DC CONDUIT, RACEWAYS, ENCLOSURES, AND CABLES ASSEMBLIES EVERY 10 FEET, WITHIN 1 FOOT OF TURNS OR BENDS AND WITHIN 1 FOOT ABOVE AND BELOW PENETRATIONS OF ROOF/CEILING ASSEMBLIES, WALLS OR BARRIERS.

**WARNING**
DUAL POWER SOURCE
SECOND SOURCE IS PHOTOVOLTAIC

LABEL LOCATION: SERVICE METER MAIN PANEL
CODE REF: UTILITY

**WARNING**
INVERTER OUTPUT CONNECTION
DO NOT RELOCATE THIS
OVERCURRENT DEVICE

LABEL LOCATION: (IF APPLICABLE)
SERVICE PANEL
CODE REF: NEC 705.12(7)

**PHOTOVOLTAIC SYSTEM UTILITY DISCONNECT SYSTEM**

LABEL LOCATION: AC DISCONNECT
CODE REF: UTILITY

**PV SOLAR BREAKER**
DO NOT RELOCATE THIS OVERCURRENT DEVICE

LABEL LOCATION: MAIN PANEL (EXTERIOR)
PV BREAKER (INTERIOR)
CODE REF: NEC 705.12(B)(2)(3)(B)

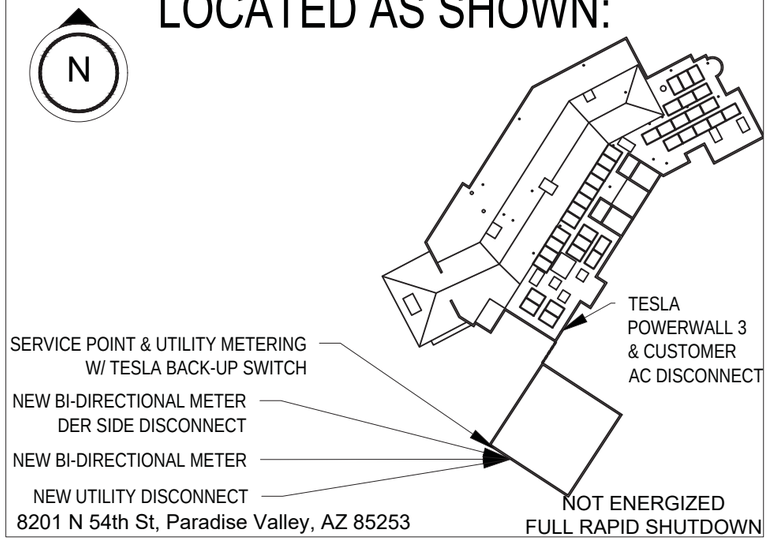
CUSTOMER DISCONNECT

SERVICE/UTILITY DISCONNECT

BI-DIRECTIONAL METER

# CAUTION

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




PLACARD EPOXIED TO THE MAIN SERVICE PANEL

NOTE:
1. NOT EVERY LABEL PERTAINS TO EVERY JOB
2. WE WILL USE THE LABELS PERTAINING TO THIS DESIGN PACKET.

SUNLINK ENERGY

CONTRACTOR:
SUNLINK ENERGY LLC
ADDRESS: 1355 NORTH MONDEL DR,
GILBERT, AZ 85233 USA
PHONE: (480) 624-8105
LICENSE #: ROC 326376
CR-11 CGL017824521

SIGNATURE WITH SEAL


PROJECT NAME & ADDRESS

Farid Ghebleh
Parcel number: 16875022
602-909-0909
8201 N 54th St,
Paradise Valley, AZ 85253

SHEET NAME
WARNING LABELS

SHEET SIZE
ANSI B
11" X 17"

| | |
|---|---|
| DRAWN BY: | SE |
| DATE: | 12/26/25 |
| (DC) kW: | 16.28 |
| (AC) kW: | 11.5 |
| PROJECT #: | AZ1885-VE25-FaGhebleh |

SHEET NUMBER:
E 1.4


EQUIPMENT PHOTOS

SCALE: N.T.S.

SUNLINK ENERGY

CONTRACTOR:
SUNLINK ENERGY LLC
ADDRESS: 1355 NORTH MONDEL DR,
GILBERT, AZ 85233 USA
PHONE: (480) 624-8105
LICENSE #: ROC 326376
CR-11 CGL017824521

SIGNATURE WITH SEAL

PROJECT NAME & ADDRESS

Farid Ghebleh
Parcel number: 16875022
602-909-0909
8201 N 54th St,
Paradise Valley, AZ 85253

SHEET NAME

EQUIPMENT PHOTO

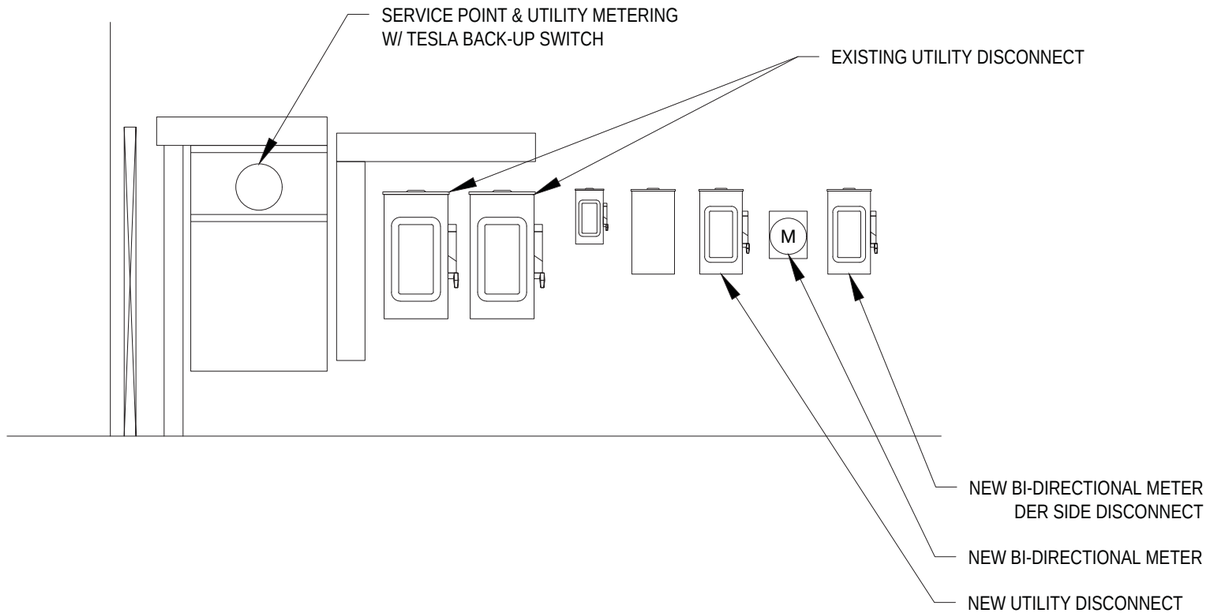
SHEET SIZE

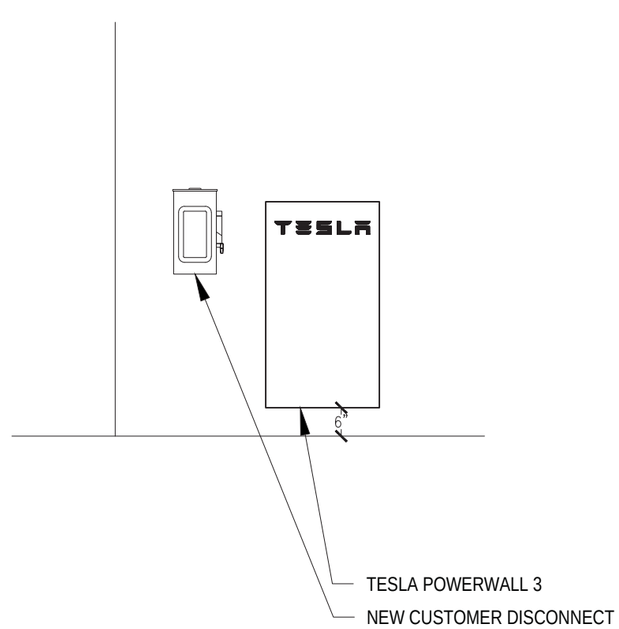
ANSI B
11" X 17"

| | |
|---|---|
| DRAWN BY: | SE |
| DATE: | 12/26/25 |
| (DC) kW: | 16.28 |
| (AC) kW: | 11.5 |
| PROJECT #: | AZ1885-VE25-FaGhebleh |

SHEET NUMBER:

E 1.5




# EQUIPMENT ELEVATION

SCALE: N.T.S.

Registered Professional Engineer (Civil)
CERTIFICATE NO.
68963
ALI
HAJIHASHEMI
Date Signed:
ARIZONA, U.S.A.

SUNLINK ENERGY

CONTRACTOR:
SUNLINK ENERGY LLC
ADDRESS: 1355 NORTH MONDEL DR,
GILBERT, AZ 85233 USA
PHONE: (480) 624-8105
LICENSE #: ROC 326376
CR-11 CGL017824521

SIGNATURE WITH SEAL

Registered Professional Engineer (Electrical)
CERTIFICATE NO.
51214
MATTHEW W. BAILEY
Expires: 9-30-28
ARIZONA U.S.A.

PROJECT NAME & ADDRESS

Farid Ghebleh
Parcel number: 168750220
602-909-0909
8201 N 54th St,
Paradise Valley, AZ 85253

SHEET NAME

EQUIPMENT ELEVATION

SHEET SIZE

ANSI B
11" X 17"

| | |
|---|---|
| DRAWN BY: | SE |
| DATE: | 12/26/25 |
| (DC) kW: | 16.28 |
| (AC) kW: | 11.5 |
| PROJECT #: | AZ1885-VE25-FaGhebleh |

SHEET NUMBER:

E 1.6

SEG SOLAR

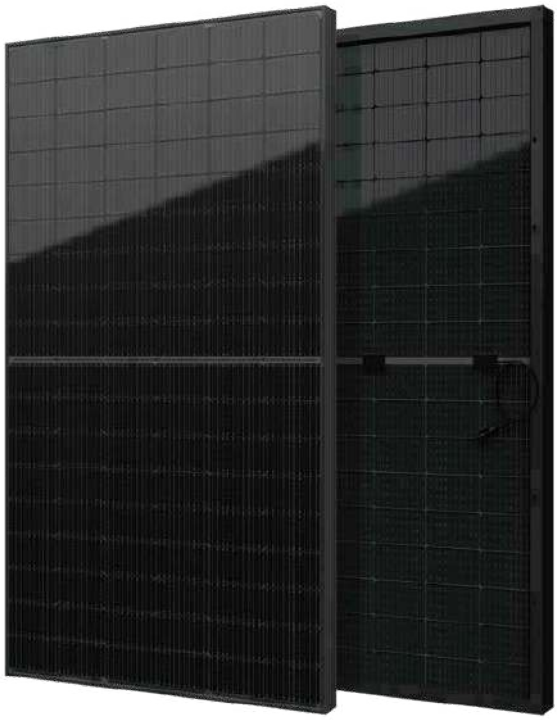
www.segsolar.com

# YUKON N Series

Half-Cell N-Type Bifacial Module

**430-445Wp** Module Power Output

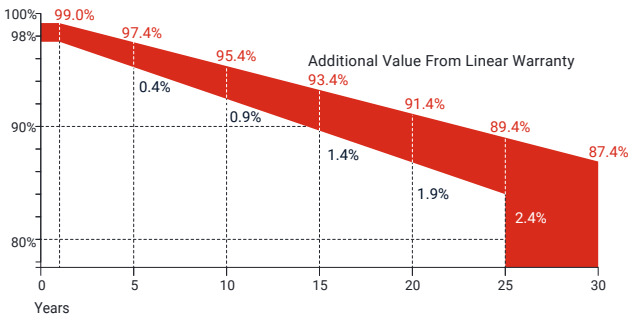
**22.79%** Max Efficiency



## 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 | |

Intertek · PV CYCLE · CE · TÜV SÜD · DEKRA · CALIFORNIA ENERGY COMMISSION · FSEC

### 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

# 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

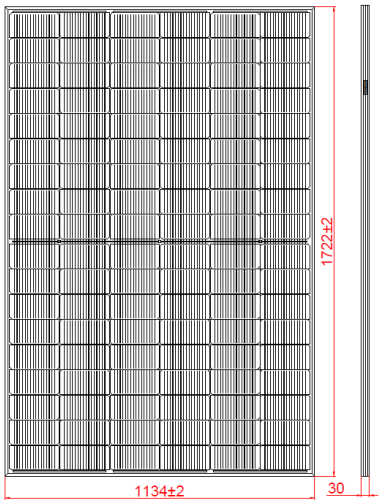
*Measuring tolerance: ±3%

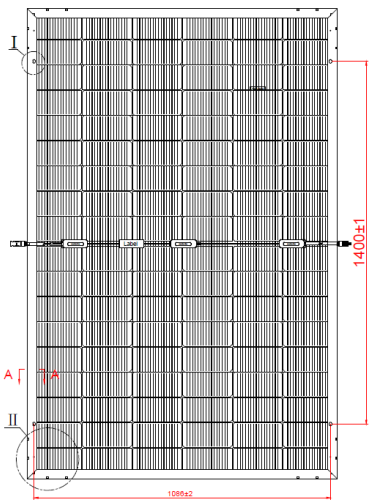
## Mechanical Specifications

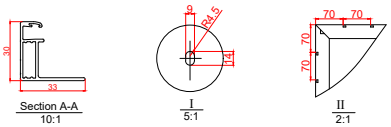
| | |
|---|---|
| External Dimension | 1722 x 1134 x 30 mm |
| Weight | 24.0 kg |
| Solar Cells | N-Type Mono 108 pcs(54 x 2) |
| Front Glass | 2.0 mm AR coating semi-tempered glass |
| Back Glass | 2.0 mm Semi-tempered glass |
| Frame | Black anodized aluminium alloy |
| Junction Box | IP68 / 3 diodes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

*Refer to SEG installation manual for details

## Technical Drawing




*Refer to SEG installation manual for details

## Temperature Characteristics

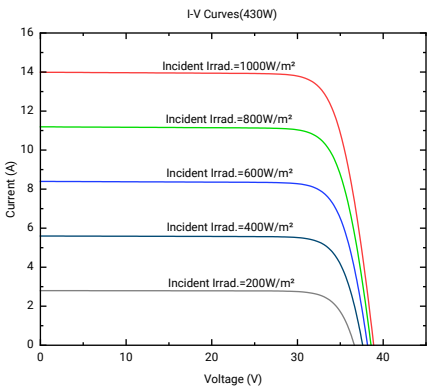
| | |
|---|---|
| Pmax Temperature Coefficient | -0.30 %/°C |
| Voc Temperature Coefficient | -0.25 %/°C |
| Isc Temperature Coefficient | +0.046 %/°C |
| Operating Temperature | -40~+85 °C |
| Nominal Operating Cell Temperature (NOCT) | 45±2 °C |

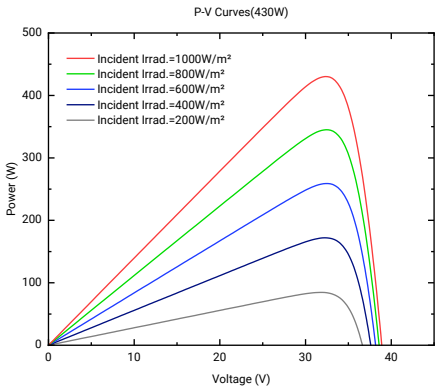
## Packing Configuration

| Container* | 20'GP | 40'HQ |
|---|---|---|
| Pieces per Pallet | 36 | 36 |
| Pallets per Container | 6 | 24 |
| Pieces per Container | 216 | 864 |

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

## Curves of PV Module



# Powerwall 3

## Power Everything

—

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

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



# Powerwall 3 Technical Specifications

### System Technical Specifications

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

### Solar Technical Specifications

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

### Battery Technical Specifications

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

[1] Typical solar shifting use case.

[2] Values provided for 25°C (77°F), at beginning of life. 3.3 kW charge/discharge power.

[3] Tested using CEC weighted efficiency methodology.

[4] Cellular connectivity subject to network service coverage and signal strength.

[5] Where the DC input current exceeds the MPPT rating, a jumper can be used to combine two MPPTs into a single input to intake DC current up to 26 A $I_{MP}$ / 30 A $I_{SC}$.

# Powerwall 3 Technical Specifications

## Environmental Specifications

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

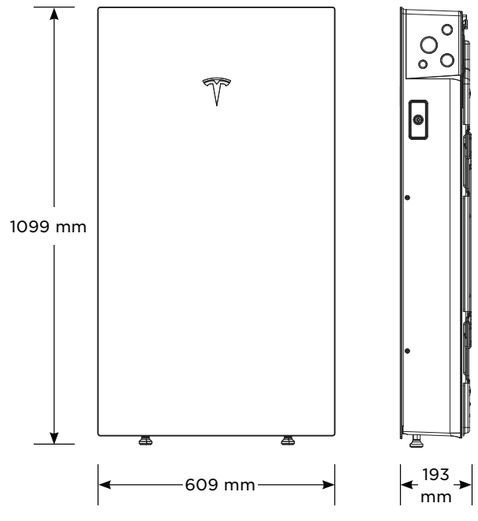
[6] Performance may be de-rated at operating temperatures above 40°C (104°F).

## Compliance Information

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

## Mechanical Specifications

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






# Solar Shutdown Device Technical Specifications

—

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

## Electrical Specifications

| **Model** | **MCI-1** | **MCI-2** |
|---|---|---|
| **Nominal Input DC Current Rating ($I_{MP}$)** | 12 A | 13 A |
| **Maximum Input Short Circuit Current ($I_{SC}$)** | 19 A | 17 A |
| **Maximum System Voltage (PVHCS)** | 600 V DC | 1000 V DC [7] |

[7] Maximum System Voltage is limited by Powerwall to 600 V DC.

## RSD Module Performance

| | | |
|---|---|---|
| **Maximum Number of Devices per String** | 5 | 5 |
| **Control** | Power Line Excitation | Power Line Excitation |
| **Passive State** | Normally Open | Normally Open |
| **Maximum Power Consumption** | 7 W | 7 W |
| **Warranty** | 25 years | 25 years |

## Environmental Specifications

| | | |
|---|---|---|
| **Operating Temperature** | -40°C to 50°C<br>(-40°F to 122°F) | -45°C to 70°C<br>(-49°F to 158°F) |
| **Storage Temperature** | –30°C to 70°C<br>(–22°F to 158°F) | –30°C to 70°C<br>(–22°F to 158°F) |
| **Enclosure Rating** | NEMA 4X / IP65 | NEMA 4X / IP65 |

## Mechanical Specifications

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

## Compliance Information

| | |
|---|---|
| **Certifications** | UL 1741 PVRSE, UL 3741,<br>PVRSA (Photovoltaic Rapid Shutdown Array) |
| **RSD Initiation Method** | External System Shutdown Switch or<br>Powerwall 3 Enable Switch |

## UL 3741 PV Hazard Control (and PVRSA) Compatibility

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

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

# Backup Switch

The Tesla Backup Switch controls connection to the grid in a Powerwall system, and can be easily installed behind the utility meter or in a standalone meter panel downstream of the utility meter.

The Backup Switch automatically detects grid outages, providing a seamless transition to backup power. It communicates directly with Powerwall, allowing home energy usage monitoring from any mobile device with the Tesla app.

## Performance Specifications

| | |
|---|---|
| **Model Number** | 1624171-xx-y |
| **Continuous Load Rating** | 200 A, 120/240 V split phase |
| **Maximum Supply Short Circuit Current** | 22 kA with breaker [10] |
| **Communication** | CAN |
| **AC Meter** | Revenue accurate (+/- 0.5%) |
| **Expected Service Life** | 21 years |
| **Warranty** | 10 years |

[8] Breaker maximum supply short circuit current rating must be equal to or greater than the available fault current.

## Environmental Specifications

| | |
|---|---|
| **Operating Temperature** | –40°C to 50°C (–40°F to 122°F) |
| **Storage Temperature** | –40°C to 85°C (–40°F to 185°F) |
| **Enclosure Rating** | NEMA 3R |
| **Pollution Rating** | PD3 |

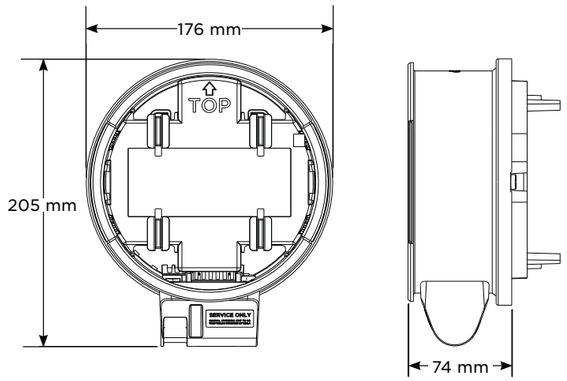
## Compliance Information

| | |
|---|---|
| **Safety Standards** | USA: UL 414, UL 2735, UL 916, CA Prop 65 |
| **Emissions** | FCC, ICES |

## Mechanical Specifications

| | |
|---|---|
| **Dimensions** | 176 x 205 x 74 mm (6.9 x 8.1 x 2.9 in) |
| **Weight** | 2.8 lb |
| **Meter and Socket Compatibility** | ANSI Type 2S, ringless or ring type |
| **External Service Interface** | Contactor manual override [11] |
| | Reset button |
| **Conduit Compatibility** | 1/2-inch NPT |

[9] Manually overrides the contactor position during a service event.






# Backup Gateway 2

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

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

## Performance Specifications

| | |
|---|---|
| **Model Number** | 1232100-xx-y |
| **AC Voltage (Nominal)** | 120/240 V |
| **Feed-in Type** | Split phase |
| **Grid Frequency** | 60 Hz |
| **Current Rating** | 200 A |
| **Maximum Supply Short Circuit Current** | 10 kA [8] |
| **Overcurrent Protection Device** | 100 - 200 A, Service entrance rated [9] |
| **Overvoltage Category** | Category IV |
| **Internal Primary AC Meter** | Revenue accurate (+/- 0.2%) |
| **Internal Auxiliary AC Meter** | Revenue accurate (+/- 2%) |
| **Primary Connectivity** | Ethernet, Wi-Fi |
| **Secondary Connectivity** | Cellular (3G, LTE/4G) [10] |
| **User Interface** | Tesla App |
| **Operating Modes** | Support for solar self-consumption, time-based control, and backup |
| **Backup Transition** | Automatic disconnect for seamless backup |
| **Modularity** | Supports up to 10 AC-coupled Powerwalls |
| **Optional Internal Panelboard** | 200 A 6-space / 12 circuit breakers Siemens QP or Square D HOM breakers rated 10 - 80A or Eaton BR breakers rated 10 - 125A |
| **Warranty** | 10 years |

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

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

## Environmental Specifications

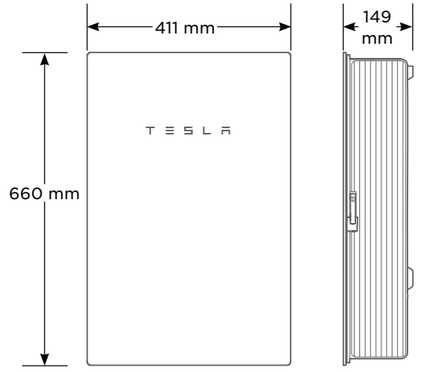
| | |
|---|---|
| **Operating Temperature** | –20°C to 50°C (–4°F to 122°F) |
| **Operating Humidity (RH)** | Up to 100%, condensing |
| **Maximum Elevation** | 3000 m (9843 ft) |
| **Environment** | Indoor and outdoor rated |
| **Enclosure Type** | NEMA 3R |

## Compliance Information

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

## Mechanical Specifications

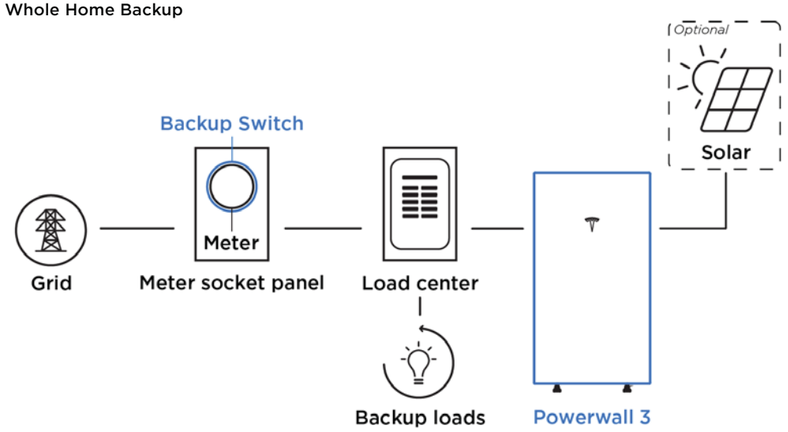
| | |
|---|---|
| **Dimensions** | 660 x 411 x 149 mm (26 x 16 x 6 in) |
| **Weight** | 20.4 kg (45 lb) |
| **Mounting options** | Wall mount, Semi-flush mount |



# Powerwall 3 Example System Configurations

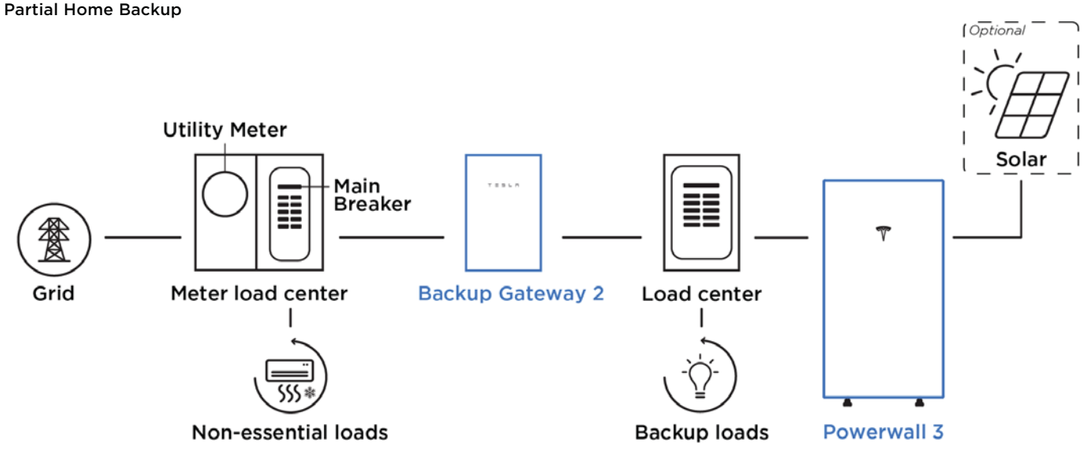
## Powerwall 3 with Backup Switch

**Whole Home Backup**




## Powerwall 3 with Backup Gateway 2

**Partial Home Backup**



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August 18, 2023

**Tesla Powerwall 3 Hardware Compliance Letter**

Written Permission Statement: This document has been released for all licensed contractors working with the purchaser of the Tesla Powerwall equipment for permitting and installation use.

CA

Applicable Codes:

- 2021, 2018, and 2015 International Building Code® (IBC)
- 2021, 2018, and 2015 International Residential Code® (IRC)
- American Society of Civil Engineers® (ASCE) 7-16 and 7-10
- 2022, 2019, and 2016 California Building Code® (CBC)
- 2022, 2019, and 2016 California Residential Code® (CRC)

To whom  it may concern:

The Tesla Powerwall 3 energy storage system, which from this point on will be referred to as Powerwall, has been designed by Tesla for common applications. The design of the mounting system including hardware has been reviewed and it was determined, for the configurations and criteria contained within this document, to be compliant with the structural requirements of the applicable codes listed above.

All wall framing referenced in the details must be part of the home's main permitted bearing wall and or lateral resisting system.  The contractor and their licensed design professional are responsible for ensuring the walls, and their load transfer connections, are structurally sound to support all code-specified vertical and lateral loading imposed by the equipment.

This report is not site-specific and therefore is intended for attachments in regions where the design criteria outlined is not exceeded. Only the hardware attachment of the Powerwall mounting bracket to various structure types is considered in this document.

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Professional Engineer
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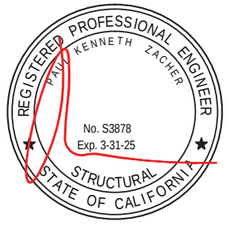


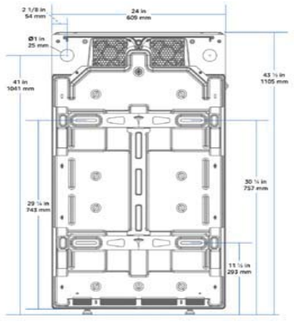

DIGITALLY SIGNED

TABLE OF CONTENTS

## GLOBAL DESIGN CRITERIA

### PowerWall Unit and Bracket Design Specifications

| | | | |
|---|---|---|---|
| Unit Height | = | 43.50 | in. |
| Unit Width | = | 24.00 | in. |
| Unit Depth | = | 7.60 | in. |
| Vertical Dist. btw Fasteners, $Y_f$ | = | 19.00 | in. |
| Unit Weight, $W_p$ | = | 300 | lbs |
| Ecc From Powerwall, e | = | 5.80 | in. |




### Applicable Site Loads and Coefficients

| | | | |
|---|---|---|---|
| Wind Speed, V | = | 165 | mph |
| Risk Category | = | II | |
| Exposure Category | = | C | |
| Velocity Pressure Coefficient, $K_z$ | = | 0.85 | |
| Topographic Factor, $K_{zt}$ | = | 1.00 | |
| Wind Directionality Factor, $K_d$ | = | 0.85 | |
| External Pressure Coefficient, $GC_p$ | = | 1.40 | |
| Internal Pressure Coefficient, $Gc_{pi}$ | = | 0 | (Ignored for fastener Calc) |
| Snow Load Density | = | 60 | pcf |
| Seismic Design Category | = | E | |
| Seismic SRA at Short Period, $S_s$ | = | 3.3 | |
| Site Class | = | D | |
| Short Period Site coefficient, $F_a$ | = | 1.2 | |
| Long Period Site Coefficient, $F_v$ | = | 1.50 | |
| Short Period Spectral Acceleration, $S_{DS}$ | = | 2.64 | [11.4-3] |



## GRAVITY LOAD CALCULATIONS

### Snow Load

Snow Accumulation on Unit = Snow Density x Unit Depth x Unit Width x Unit Depth / 2

= 24.1 lbs

### Wind Pressure

Velocity Pressure, $q_z$ = $.00256 * K_z * K_{zt} * K_d * V^2$ [26.10-1]

= 50.4 psf

Design Wind Pressure, p = $q_z * [GC_p + Gc_{pi}]$ [30.3-1]

= 70.5 psf

### Seismic Forces

Horizontal Seismic Force, $F_p$ = $\dfrac{0.4 * a_p * S_{DS} * W_p * [1 + (2 * z / h)]}{(R_p / I_p)}$ [13.3-1]

| | | | |
|---|---|---|---|
| $(z/h)_{wall}$ | = | 1.0 | (need not exceed 1.0) |
| Component Amplification Factor, $a_p$ | = | 1.0 | (batteries - Table 13.6-1) |
| Component Importance Factor, $I_p$ | = | 1.0 | (hazardous material - 13.1.3) |
| Response Modification Factor, $R_p$ | = | 2.5 | (batteries - Table 13.6-1) |
| $F_{p,wall}$ | = | 1.27 * $W_p$ | |

$F_{p,min}$ = $0.3 * S_{DS} * I_p * W_p$ $F_{p,max}$ = $1.6 * S_{DS} * I_p * W_p$

[13.3-3] = $0.79 * W_p$ [13.3-2] = $4.22 * W_p$

Weight of 1 Powerwall + Bracket, $W_p$ = 300 lbs

$F_{p,final}$ = 1.27 * $W_p$

= 380.2 lbs

Vertical Seismic Force, $F_{p,vert}$ = $0.2 * S_{DS} * W_p$ [13.3-3]

= 0.53 * $W_p$

= 158.4 lbs

## LOAD APPLICATIONS

**Dead Load**

Shear Load

Unit Load = 300 lbs (distributed over # fasteners)

Withdrawal Load

Withdrawal Force = Ecc moment / $Y_f$

Ecc Moment = 1740.0 in-lbs

Withdrawal Force = 91.6 lbs (distributed @ Top Bracket)

**Snow Load**

Shear Load

Shear Force, $S_{parallel}$ = 24.1 lbs (distrbuted over # fasteners)

Withdrawal Load

Withdrawal Force = Ecc moment / $Y_f$

Ecc Moment = 139.6 in-lbs

Withdrawal Force = 7.3 lbs (distributed @ Top Bracket)

**Wind Load**

Shear Load

Wind Load, $W_{parallel}$ = p * Side Surface Area of Unit

= 161.9 lbs (distributed over # fasteners)

Withdrawal Load (Suction)

Withdrawal Load on Fastener =

from Wind Load, $W_{perp}$ = p * Front Surface Area of Unit

= 511.1 lbs (distributed over # fasteners)

**Seismic Load**

Shear Load

Vertical Seismic Force, $F_{p,vert}$ = 158.4 lbs

Vertical Effect, $E_v$ = 158.4 lbs [12.4-4]

Withdrawal Load (accounts for horizontal components of $F_{p,vert}$ and $F_p$)

Horizontal Seismic Force, $F_p$ = 380.2 lbs

Horizontal Effect, $E_h$ = 380.2 lbs [12.4-3]

| | Vertical | | Horizontal |
|---|---|---|---|
| Seismic Load, E = | 158.4 / # Top Fasteners | + | 380.2 / # Total Fasteners |

Note: All withdrawal loads account for eccentricity, e, of the unit/bracket/wall system



## ATTACHMENTS USING WOOD STUDS

Greatest Withdrawal Load from [D+.7E] Load Combination

Greaest Shear load from [D + .7E] Load Combination

Greatest Combined Loads from [D+.7E] Load Combination

| Wood Stud (With & Without Blocking) | | | | Reference Appendix A: Wood Studs |
|---|---|---|---|---|
| # of 1/4" Wood Screws | = | 4 | | |
| Thread Length, p | = | 2.5 | in | |
| Withdrawal per Fastener, T | = | 129.2 | lbs | |
| SPF Lumber Specific Gravity, G | = | 0.42 | | [NDS Table 12.2B] |
| Withdrawal Design, W | = | 121 | lbs/in | [NDS 12.2.2.1 (SPF)] |
| Load Duration Factor, $C_D$ | = | 1.6 | | |
| W' | = | 484 | lbs | |
| 484 | > | 129.2 | | Therefore: ok |
| Shear Load per Fastener, V | = | 102.7 | lbs | |
| Shear Design, Z | = | 139 | lbs/in | [NDS Table 12M (SPF)] |
| Load Duration Factor, $C_D$ | = | 1.6 | | |
| Z' | = | 222.4 | lbs | |
| 222.4 | > | 102.7 | | Therefore: ok |
| α | = | 52 | deg | |

Combined Shear and Withdrawal Analyzed per NDS Sec. 12.4 and Eq. 12.4-1

DCR = R/Z' α = 0.50 < 1.05 Therefore: ok

| Wood Stud with Channel Strut | | | | Reference Appendix A: Wood Studs |
|---|---|---|---|---|
| Minimum # of 1/4" Wood Screws | = | 4 | | |
| Thread Length, p | = | 2.5 | in | |
| Eccentricity with Channel Strut, e | = | 7.43 | | |
| Withdrawal per Fastener, T | = | 134.0 | lbs | |
| SPF Lumber Specific Gravity, G | = | 0.42 | | [NDS Table 12.2B] |
| Withdrawal Design, W | = | 121 | lbs/in | [NDS 12.2.2.1 (SPF)] |
| Load Duration Factor, $C_D$ | = | 1.6 | | |
| W' | = | 484 | lbs | |
| 484 | > | 134.0 | | Therefore: ok |
| Shear Load per Fastener, V | = | 102.7 | lbs | |
| Shear Design, Z | = | 139 | lbs/in | [NDS Table 12M (SPF)] |
| Load Duration Factor, $C_D$ | = | 1.6 | | |
| Z' | = | 222.4 | lbs | |
| 222.4 | > | 102.7 | | Therefore: ok |
| α | = | 53 | deg | |

Combined Shear and Withdrawal Analyzed per NDS Sec. 12.4 and Eq. 12.4-1

DCR = R/Z' α = 0.50 < 1.05 Therefore: ok

## ATTACHMENTS USING METAL STUDS

Greatest Withdrawal Load from [D+.7E] Load Combination
Greaest Shear load from [D + .7E] Load Combination
Greatest Combined Loads from [D+.7E] Load Combination

| Metal Stud (With & Without Backing) | | | | | Reference Appendix A: Metal Studs |
|---|---|---|---|---|---|
| # of 1/4" Sheet Metal Screws | = | 4 | | | |
| Minimum Penetration | = | 3 | threads | | |
| Withdrawal per Fastener, T | = | 129.2 | lbs | | |
| Reference SSMA Light Gauge Metal Stud Catalog | | | | (43mils, 18 Gauge Min.) | |
| Withdrawal Strength of Connection, $P_{not}$ | = | 144 | lbs | | |
| 144 | > | 129.2 | | Therefore: ok | |
| Shear Load per Fastener, Q | = | 102.7 | | | |
| Shear Strength of Connection, $P_{ns}$ | = | 302 | lbs | | |
| 302 | > | 102.7 | | Therefore: ok | |
| Combined Shear and Withdrawal Analyzed per AISI-S100 Sec. E4.5.1-1 | | | | | |
| DCR | = | 0.98 | < | 1.1 | Therefore: ok |

| Metal Stud with Channel Strut | | | | | Reference Appendix A: Metal Studs |
|---|---|---|---|---|---|
| # of 1/4" Sheet Metal Screws | = | 4 | | | |
| Minimum Penetration | = | 3 | threads | | |
| Eccentricity with Channel Strut, e | = | 7.4 | in | | |
| Withdrawal per Fastener, T | = | 134.0 | lbs | | |
| Reference SSMA Light Gauge Metal Stud Catalog | | | | (43mils, 18 Gauge Min.) | |
| Withdrawal Strength of Connection, $P_{not}$ | = | 144 | lbs | | |
| 144 | > | 134.0 | | Therefore: ok | |
| Shear Load per Fastener, Q | = | 102.7 | lbs | | |
| Shear Strength of Connection, $P_{ns}$ | = | 302 | lbs | | |
| 302 | > | 102.7 | | Therefore: ok | |
| Combined Shear and Withdrawal Analyzed per AISI-S100 Sec. E4.5.1-1 | | | | | |
| DCR | = | 1.00 | < | 1.1 | Therefore: ok |

| Channel Strut Loading Check | | | | | Reference Appendix A: Channel Strut |
|---|---|---|---|---|---|
| Greatest Withdrawal and Shear loads calculated in metal and wood stud sections. | | | | | |
| Maximum allowable uniform load based on 1-5/8" x 7/8" Unistrut P4100 and Eaton B54. | | | | | |
| Reference Unistrut and Eaton Channel Strut Catalogs | | | | | |
| Maximum Channel Strut Span | = | 24 | in | | |
| Allowable Uniform Load | = | 450 | lbs | | |
| Loading Condition Factor | = | 0.67 | | | |
| Allowable Load at Center of Both Spans | = | 301.5 | lbs | | |
| Withdrawal per Fastener, T | = | 134.0 | lbs | | |
| Shear Load per Fastener, Q | = | 102.7 | lbs | | |
| Resultant Force from Shear and Withdrawal | = | 168.8 | lbs | | |
| 301.5 | > | 168.8 | | Therefore: ok | |



## ATTACHMENTS USING CONCRETE/CMU

Fastener schedules for Concrete/CMU are available in the installation manual.
Greatest Withdrawal Load from [D+.7E] Load Combination
Greaest Shear load from [D + .7E] Load Combination
Greatest Combined Loads from [D+.7E] Load Combination

**Concrete/CMU ESR Fasteners Only** — **Reference Appendix A: Concrete or Masonry**

Special reinforced concrete shear walls required in Seismic Design Category D,E per ASCE table 12.14-1.
Worst-case values taken from ESR-1056 Fully Grouted CMU

| Tension (lb) | Shear (lb) | Diameter | Embedment |
|---|---|---|---|
| 425 | 570 | 0.375 | 2.75 |

| | | | | | |
|---|---|---|---|---|---|
| Fasteners | = | 4 | | | |
| Overstrength Factor, Ωo | = | 2 | | | [Table 13.6-1] |
| Withdrawal Load per Fastener, $P_s$ | = | 195.8 | lbs | | |
| Allowable Service Withdrawal Load, $P_t$ | = | 425 | lbs | | |
| 425 | > | 195.8 | | | Therefore: ok |
| Shear Load per Fastener, $V_s$ | = | 102.7 | lbs | | |
| Allowable Service Shear Load, $V_t$ | = | 570 | lbs | | |
| 570 | > | 102.7 | | | Therefore: ok |
| Combined Shear and Withdrawal Analyzed per ACI 530 Eq. 8-14 | | | | | |
| DCR | = | 0.64 | <= | 1.00 | Therefore: ok |

## ATTACHMENTS USING HOLLOW CMU

Greatest Withdrawal Load from [D+.6W] Load Combination
Greaest Shear load from [D + .6W] Load Combination
Greatest Combined Loads from [D+.6W] Load Combination

**Hollow CMU ESR Fasteners Only** — **Reference Appendix A: Concrete or Masonry**

Hollow CMU only allowed where special reinforced concrete shear walls are not required per ASCE table 12.14-1.
Wind load combinations will govern in Seismic Design Category A,B,C regions with hollow CMU.
Worst-case values taken from ESR-1056 for Hollow Masonry

| Tension (lb) | Shear (lb) | Diameter | Embedment |
|---|---|---|---|
| 185 | 450 | 0.375 | 2.5 |

| | | | | | |
|---|---|---|---|---|---|
| Fasteners | = | 4 | | | |
| Overstrength Factor, Ωo | = | 2 | | | |
| Withdrawal Load per Fastener, $P_s$ | = | 122.5 | lbs | | |
| Allowable Service Withdrawal Load, $P_t$ | = | 185 | lbs | | |
| 185 | > | 122.5 | | | Therefore: ok |
| Shear Load per Fastener, $V_s$ | = | 99.3 | lbs | | |
| Allowable Service Shear Load, $V_t$ | = | 450 | lbs | | |
| 450 | > | 99.3 | | | Therefore: ok |
| Combined Shear and Withdrawal Analyzed per ACI 530 Eq. 8-14 | | | | | |
| DCR | = | 0.88 | <= | 1.00 | Therefore: ok |

## Anchoring Details for Ground- or Wall-mounting Powerwall 3 with Wall Bracket on Existing Approved Foundation

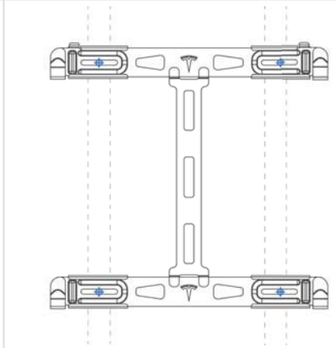
**A6**

Reference these anchoring details when mounting Powerwall 3 to the provided mounting bracket.

**Wood Studs (spaced at 12 to 17 inches)**

If anchoring directly into wood studs, use at least four (one in each corner) ¼ inch wood screws with washers, of sufficient length for at least 2-½ inch embedment into the studs.

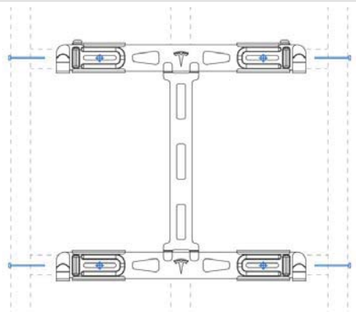
**NOTE:** See *Channel Strut (Unistrut) on page A8* for stud spacing greater than 17 inches, up to 24 inches.



**Wood Studs (spaced at 12 to 17 inches)**

If anchoring to blocking between wood studs, use minimum 2 x 4 inch blocks, end-nailed into studs with two 16d nails or toe-nailed into studs with four 8d nails. Use at least four (one in each corner) ¼ inch wood screws with washers, of sufficient length for at least 2-½ inch embedment into the blocking.

**NOTE:** See *Channel Strut (Unistrut) on page A8* for stud spacing greater than 17 inches, up to 24 inches.

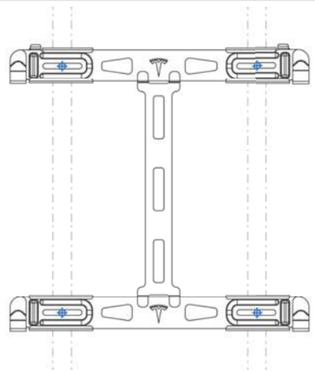


**Metal Studs (spaced at 12 to 17 inches)**

If anchoring directly to metal studs, studs must be minimum 18 gauge. Use at least four (one in each corner) #14 (¼ inch) sheet metal screws with washers, of sufficient length to penetrate at least 3 threads beyond the stud.

If backing is needed between the studs, the backing must be minimum 18 gauge. Attach backing to metal studs with 12 gauge 3x3 inch angle clip or Simpson SFC2.25 clips with two #10 sheet metal screws in each leg.

**NOTE:** See *Channel Strut (Unistrut) on page A8* for stud spacing greater than 17 inches, up to 24 inches.





APPENDIX A: POWERWALL 3 ANCHORING DETAILS

**A7 - Anchoring Details for Ground- or Wall-mounting Powerwall 3 with Wall Bracket on Existing Approved Foundation**

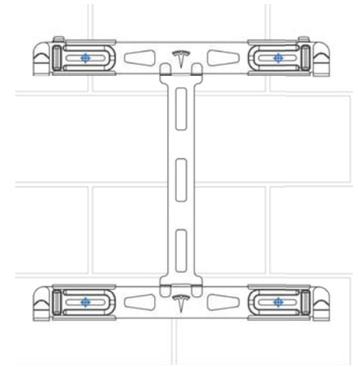
**Concrete Masonry Unit Wall**

Minimum strength must be 2000 PSI.

Use at least four (one in each corner, in any available anchor slot) 3/8 inch concrete anchors of sufficient length for the embedment listed below.

- *ESR 1056 for Simpson Titen HD 3/8-inch concrete anchor*. Minimum 2-¾ inch (70 mm) embedment required
- *ESR 3056 for Hilti KH-EZ 3/8-inch concrete anchor*. Minimum 1-5/8 inch (41.3 mm) embedment requiredin fully grouted CMU cells only

Anchors shall not be installed within 12 inches (305 mm) of wall edges or 1-½ inches (38 mm) of masonry block edges.

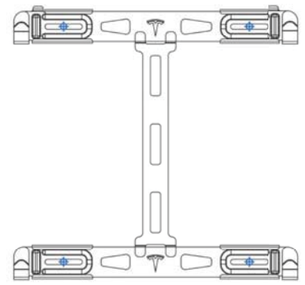


**Solid Concrete Wall**

Minimum strength must be 2500 PSI.

Use at least four (one in each corner, in any available anchor slot) 3/8 inch concrete anchors of sufficient length for at least 2-½ inch (63.5 mm) embedment into the wall.

- *ESR 2713 for Simpson Titen HD 3/8-inch concrete anchor*
- *ESR 3027 for Hilti KH-EZ 3/8-inch concrete anchor*



Powerwall 3 Installation Manual

# APPENDIX A: POWERWALL 3 ANCHORING DETAILS

**A8 - Anchoring Details for Ground- or Wall-mounting Powerwall 3 with Wall Bracket on Existing Approved Foundation**

**Brick Wall**

**(Double and Single Layer of Brick Masonry)**

Minimum strength must be 2500 PSI.

Use at least four (one in each corner, in any available anchor slot) ¼ inch masonry anchors of sufficient length for the embedment listed below.

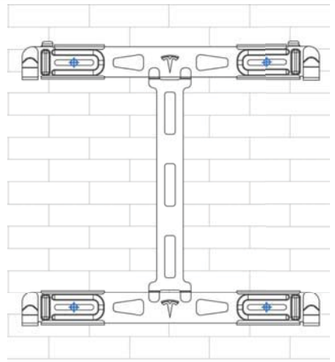
- Kwik Conn 2 (No ESR). Minimum 1-¾ inch (44.5 mm) embedment required

Brick installation is only permitted in seismic design category A or B, and where ESR anchors are not required. Ground mount only.

| Maximum Wind Speed | Mounting Location |
|---|---|
| 145 mph | Within 10 ft (3048 mm) of wall edge |
| 165 mph | Not within 10 ft (3048 mm) of wall edge |

**NOTE:** Faux brick veneer is not a supported wall type for Powerwall installations.

**NOTE:** Fasteners shall not be installed in mortar joints.



**Channel Strut (Unistrut)**

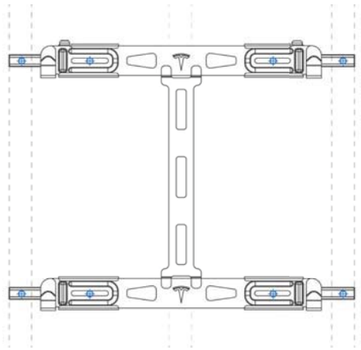
Struts must be minimum 12 gauge, and either 1-5/8 inch or 7/8 inch.

If mounting on wood studs, attach each strut to at least two studs, using at least one ¼ inch wood screw with washer per stud, of sufficient length for at least 2-½ inch embedment into the studs.

If mounting on metal studs, attach each strut to at least three studs, using at least one #14 (¼ inch) sheet metal screws with washers per stud, of sufficient length to penetrate at least 3 threads beyond the studs.

To attach the bracket to the struts, use at least four (one in each corner) 3/8 inch hex head screws with washers and strut nuts.

Channel strut shall have a maximum unsupported span of 24 inches (610 mm) and shall not be cantilevered.



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P 650 681 5100 F 650 681 5101

02/01/2024

## Tesla Backup Switch

The Backup Switch greatly simplifies installation of residential energy storage systems by augmenting the homeowner's standard form 2S meter socket panel, enabling a plug and play installation of grid connection control at the ideal location for whole home back up – directly behind the utility meter. Key product features and operational information are included below.

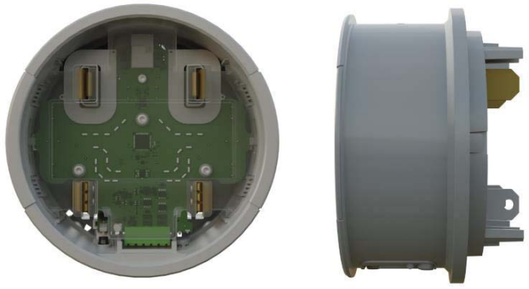

Figure 1: Tesla Backup Switch

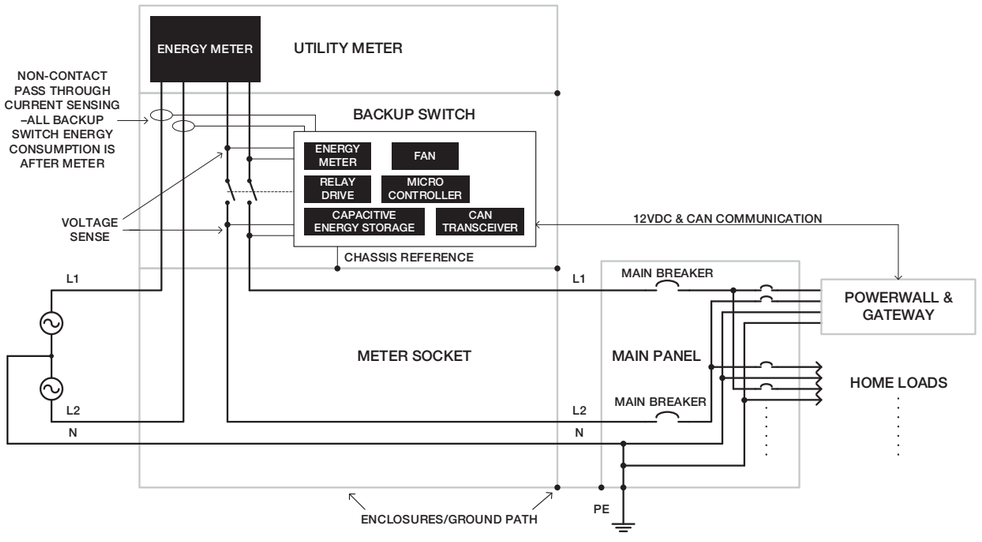


Figure 2: Typical Installation Simplified Schematic





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### Unintentional Backfeed Prevention

Safety is of paramount importance. The Backup Switch is part of the Tesla energy storage system which is designed to provide backup to the home while preventing unintentional backfeed on the distribution grid.

Backup power will only be provided if the system can confirm the Backup Switch relay is open. The system requires confirmation that the relay is in an open state, which is verified through redundant checks including feedback values on either side of the relay to confirm the situation. Without confirmation of a safe condition, the system will not enter backup mode.

The Tesla energy storage system complies with IEEE 1547 intentional and unintentional islanding, and UL 1741 Power Control Systems (PCS) requirements.

### Safe and Compliant Interface for the Utility Meter

The Backup Switch is certified to safety standard UL 414, which is the same standard used to certify utility meter sockets and which has special considerations for meter socket adapters. Tesla has certified the Backup Switch for use with any meter socket at the full rated capacity of 200A.Through this process, the Backup Switch has been proven to meet regulatory construction and performance criteria, ensuring safe operation throughout its performance and environmental specifications.

### Reliability

The Backup Switch is designed for a 20+ year service life after installation. Tesla understands that reliable operation of this device is critical to customer experience and to the availability of electrical service .We have leveraged learnings from years of operation from over one hundred thousand deployed systems operating the same way as a Powerwall installed with the Backup Switch.

### Power Consumption and Meter Tampering

The Backup Switch does not consume any energy drawn before the utility meter. Aside from pass-through bus bars, the Backup Switch does not touch any conductors on the line side of the utility meter. Voltage sensing is done on the load side of the utility meter and power for the device is provided by an external power supply through the attached power and communication cable. The Backup Switch locks to the meter socket and the utility meter the same way the utility meter locks to the meter socket, preserving the same level of physical security.

### Utilities That Have Approved Backup Switch

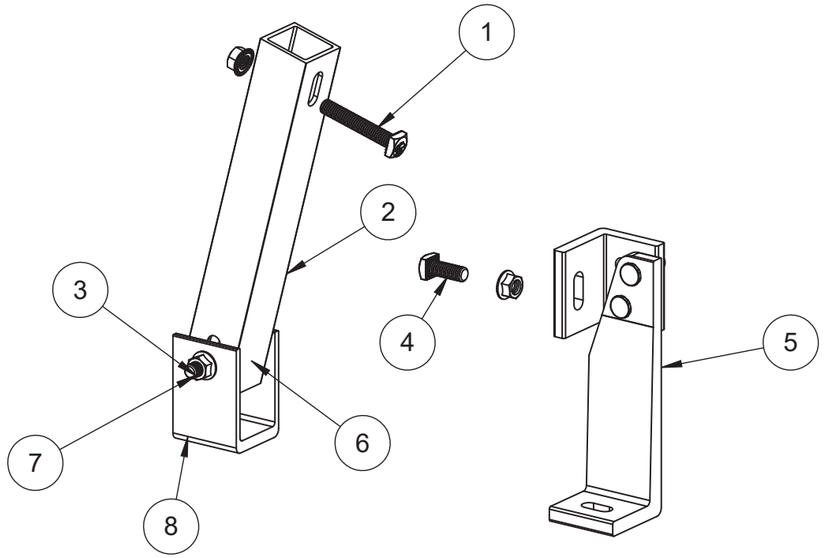
See the complete list at https://www.tesla.com/support/energy/powerwall/learn/tesla-backup-switch.

Printed copies not controlled.

Cut Sheet

IRONRIDGE

# Tilt Leg




| ITEM NO | DESCRIPTION | QTY IN KIT |
|---|---|---|
| 1 | BOLT, BONDING 3/8-16 SQ HEAD, 2.25" | 1 |
| 2 | NORTH TILT LEG, 1.5" SQ, LENGTH VARIES | 1 |
| 3 | NUT, FLANGE HEX 3/8-16 SS | 3 |
| 4 | BOLT, BONDING 3/8-16 SQ HEAD, 1.0" | 1 |
| 5 | PRE-ASSEMBLED SOUTH TILT LEG | 1 |
| 6 | WASHER, FLAT 3/8 SS | 1 |
| 7 | BOLT, 3/8-16 X 2.5" CS SST | 1 |
| 8 | U-FOOT | 1 |

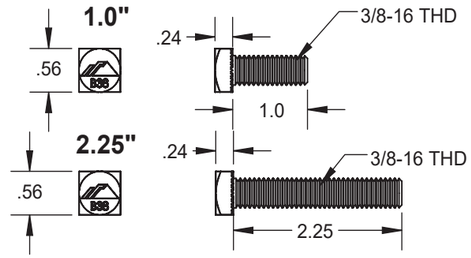
## TILT MOUNT KIT OPTIONS

| PART NUMBER | DESCRIPTION | NORTH TILT LEG LENGTH |
|---|---|---|
| TM-FTL-010 | Kit, Fixed Tilt Leg, 10", Mill | 10" |
| TM-FTL-015 | Kit, Fixed Tilt Leg, 15", Mill | 15" |
| TM-FTL-020 | Kit, Fixed Tilt Leg, 20", Mill | 20" |
| TM-FTL-025 | Kit, Fixed Tilt Leg, 25", Mill | 25" |
| TM-FTL-030 | Kit, Fixed Tilt Leg, 30", Mill | 30" |

v1.1

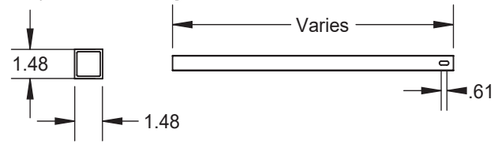
Cut Sheet

### 1,4) Bolt, Bonding 3/8-16 Sq Head



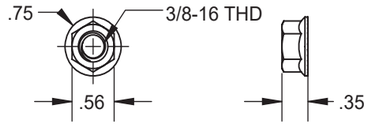

| Property | Value |
|---|---|
| Material | Stainless Steel |
| Finish | Clear |

### 2)North Tilt Leg



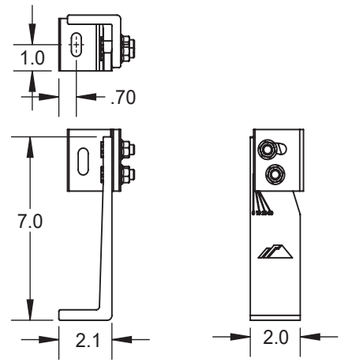

| Property | Value |
|---|---|
| Material | Aluminum |
| Finish | Mill |

### 3) Nut, Flange Hex 3/8-16 SS



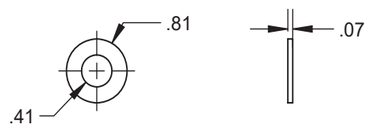

| Property | Value |
|---|---|
| Material | Stainless Steel |
| Finish | Clear |

### 5)Pre-assembled South Tilt Leg



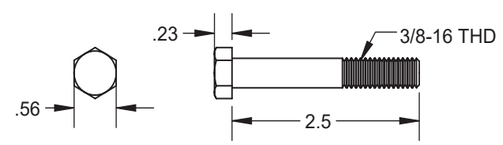

| Property | Value |
|---|---|
| Material | Aluminum |
| Finish | Mill |

### 6) Washer, Flat 3/8 SS



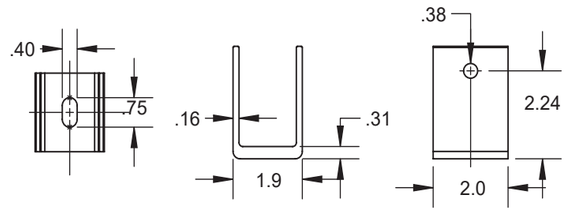

| Property | Value |
|---|---|
| Material | Stainless Steel |
| Finish | Clear |

### 7) Bolt, 3/8-16 X 2.5" CS SS




| Property | Value |
|---|---|
| Material | Stainless Steel |
| Finish | Clear |

### 8) U-Foot




| Property | Value |
|---|---|
| Material | Aluminum |
| Finish | Mill |

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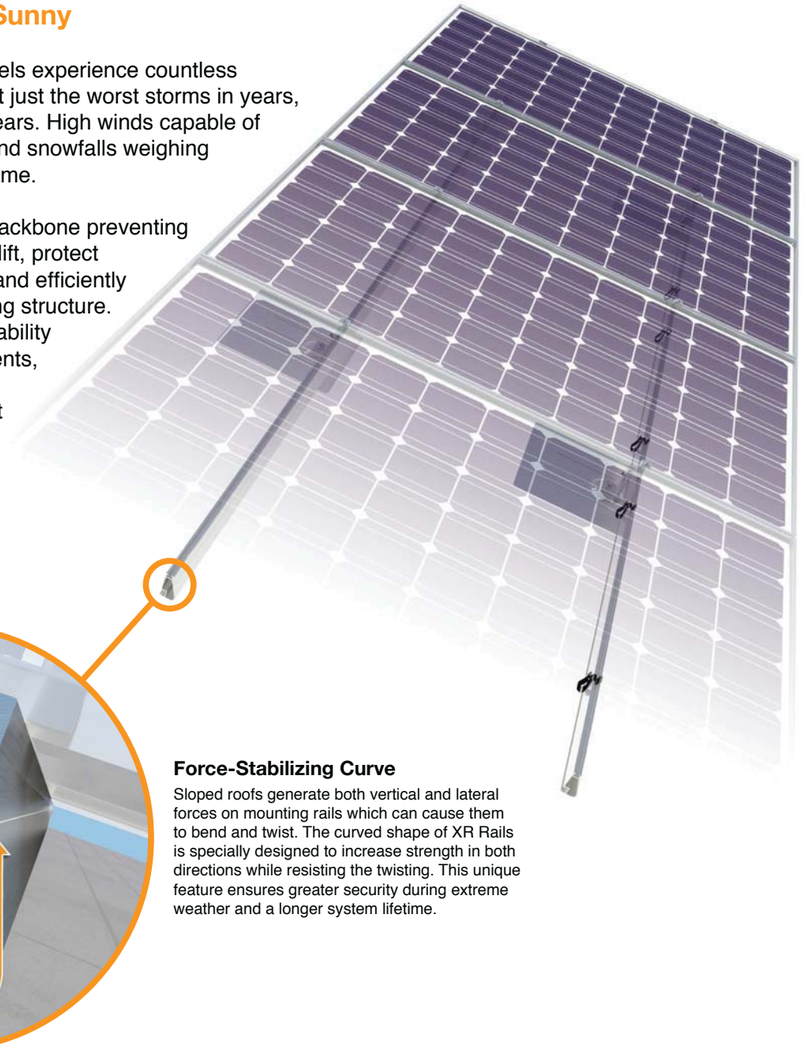
IRONRIDGE

# XR Rail Family

## Solar Is Not Always Sunny

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

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



### Force-Stabilizing Curve

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

### Compatible with Flat & Pitched Roofs

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

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

### Corrosion-Resistant Materials

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

Tech Brief

## XR Rail Family

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

### XR10

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

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

### XR100

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

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

### XR1000

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

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

## Rail Selection

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

| Load | | Rail Span | | | | | |
|---|---|---|---|---|---|---|---|
| Snow (PSF) | Wind (MPH) | 4’ | 5’ 4” | 6’ | 8’ | 10’ | 12’ |
| None | 100 | XR10 | | XR100 | | XR1000 | |
| | 120 | | | | | | |
| | 140 | | | | | | |
| | 160 | | | | | | |
| 10-20 | 100 | | | | | | |
| | 120 | | | | | | |
| | 140 | | | | | | |
| | 160 | | | | | | |
| 30 | 100 | | | | | | |
| | 160 | | | | | | |
| 40 | 100 | | | | | | |
| | 160 | | | | | | |
| 50-70 | 160 | | | | | | |
| 80-90 | 160 | | | | | | |

## EXPANSION JOINTS

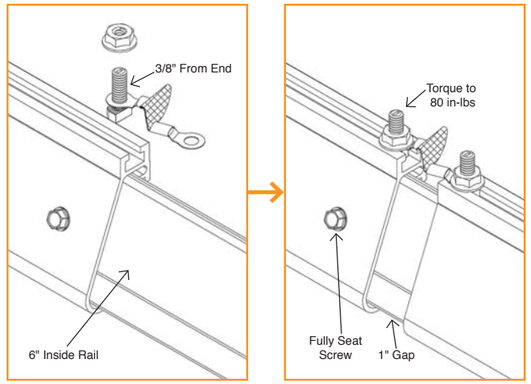
### GROUNDING STRAP EXPANSION JOINT

Grounding Strap Expansion Joints are required for thermal expansion of rows exceeding 100 feet of rail.

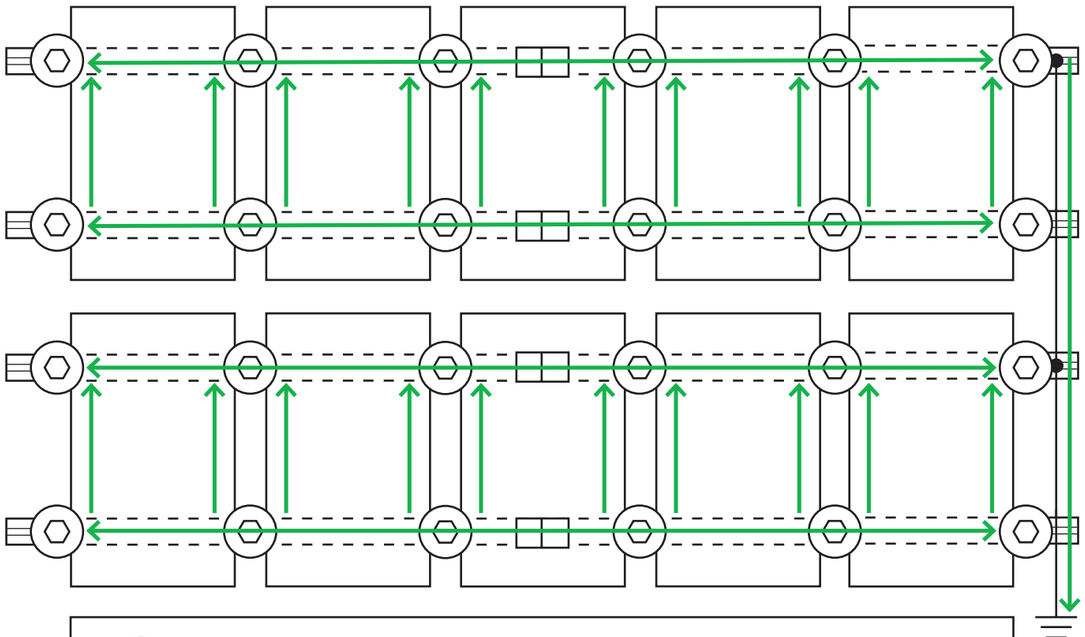
Insert Internal Splice into first rail and secure with screw. Assemble and secure Grounding Strap 3/8" from rail end. Slide second rail over Internal Splice leaving 1" gap between rails. Attach other end of Grounding Strap with hardware, and torque hex nuts to **80 in-lbs**.

**Second Bonded Splice screw is not used with Expansion Joints.**

**Do not install module over top of expansion joint location.**




## ELECTRICAL DIAGRAM




*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.

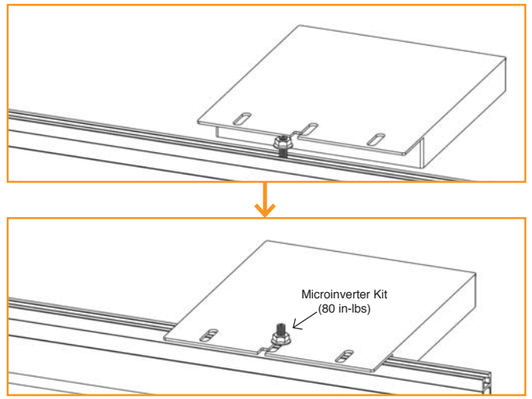


## MICROINVERTER KITS

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**.

**If installing in areas with ground snow loads greater than 40 psf, install MLPE devices directly next to module frame edge.**




### COMPATIBLE PRODUCTS

**Enphase**
**M250-72, 250-60, M215-60, C250-72, S230, S280, IQ 6, IQ 6+, IQ 7, IQ 7+, IQ 7X, Q Aggregator**

**Darfon**
**MIG240, MIG300, G320, G640**

**Solar Edge**
**P300, P320, P370, P400, P405, P505, P600, P700, P730, P800p, P800s, P850**

## SYSTEMS USING ENPHASE MICROINVERTERS OR SUNPOWER AC MODULES

IronRidge systems using approved Enphase products or SunPower modules eliminate the need for lay-in lugs and field installed equipment grounding conductors (EGC). This solution meets the requirements of UL 2703 for bonding and grounding and is included in this listing.

The following Sunpower modules are included in this listing: Modules with model identifier Ab-xxx-YY and InvisiMount (G5) 46mm frame; where "A" is either E, or X; “b” can be 17, 18, 19, 20, 21, or 22; and “YY” can be C-AC, D-AC, BLK-C-AC, or BLK-D-AC.

The following Enphase products are included in this listing: Microinverters M250-72, M250-60, M215-60, C250-72, and Engage cables ETXX-240, ETXX-208, ETXX-277.

**A minimum of two inverters mounted to the same rail and connected to the same Engage cable are required.**

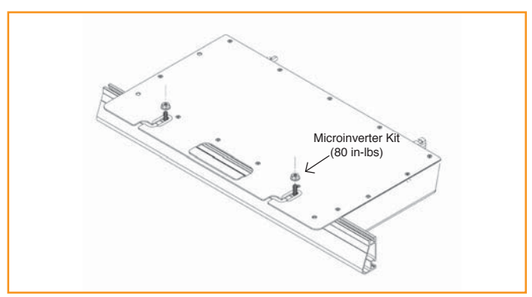
**The microinverters or Sunpower AC modules must be used with a maximum 20 A branch rated overcurrent protection device (OCPD).**

**If an AC module is removed from a circuit for maintenance, you must first disconnect AC power and then install a temporary EGC to bridge the gap by inserting an AC extension cable (or via other NEC-compliant means), in order to maintain effective ground continuity to subsequent modules.**

## SYSTEMS USING PHAZR MICROSTORAGE PRODUCTS

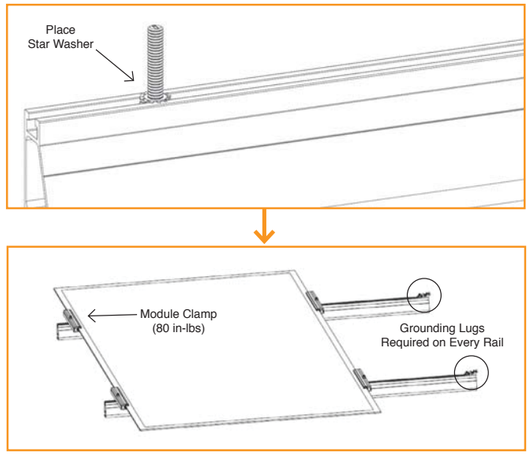
Bonding and grounding is achieved via the IronRidge system when using the Microinverter Kit. Running a separate equipment grounding conductor to the PHAZRs is not required.

**If installing in areas with ground snow loads greater than 40 psf and underneath a module, install PHAZR devices as close as possible to module frame edge.**



## FRAMELESS MODULE KITS

Insert Frameless Kit T-bolt in top rail slot. Place star washer over T-bolt, allowing it to rest on top of rail. Secure module clamps with a hex nut and torque to **80 in-lbs**.




- **Tested or evaluated module clamps:**
  - **Sunforson silver or black SFS-UTMC-200(B) mid and SFS-UTEC-200(B) end clamps.**
  - **Sunpreme silver or black mid and end clamps with part numbers 7500105X where "X" is 1, 5, 6 or 7.**
  - **IronRidge silver or black mid and end clamps with part numbers FMLS-XC-001-Y where "X" is E or M and "Y" is B or blank.**
- **Follow module manufacturer's installation instructions to install the module clamps.**
- **Frameless modules require using a Grounding Lug on every rail.**
- **For Sunpreme Modules Only: If required to use slide prevention hardware, see Module Slide Prevention Addendum (Version 1.10).**

## MODULE COMPATIBILITY

The Flush Mount System may be used to ground and/or mount a PV module complying with UL 1703 only when the specific module has been evaluated for grounding and/or mounting in compliance with the included instructions. Unless otherwise noted, “xxx” refers to the module power rating and both black and silver frames are included in the certification.

| MAKE | MODELS |
|---|---|
| Amerisolar | Modules with 35, 40 and 50mm frames and model identifier ASbYxxxZ; where "b" can be 5 or 6; "Y" can be M, P, M27, P27, M30, or P30; and "Z" can be blank, W or WB. |
| Astronergy Solar | Modules with 35, 40, or 45mm frames and model identifier aaSM66yyPzz-xxx; where “aa” is CH or A; “yy” is either 10 or 12; and “zz” is blank or (BL). Frameless modules with model identifier CHSM6610P(DG)-xxx. |
| Auxin | Modules with 40mm frames and model identifier AXN6y6zAxxx; where "y" can be M or P; "z" can be 08, 09, 10, 11, or 12; and "A" can be F or T. |
| Axitec | Modules with 35 or 40mm frames and model identifier AC-xxxY/aa-ZZ; where “Y” is M or P; “aa” is 125 or 156; and “ZZ” is 54S, 60S or 72S. |
| Boviet | Modules with 40mm frames and model identifier BVM66aaYY-xxx; where "aa" can be 9, 10 or 12; and "YY" is M or P. |
| BYD | Modules with 35mm frames and model identifier BYDxxxAY-ZZ; where "A" can be M6, P6, or PH; "Y" can be C or K; and "ZZ" can be 30 or 36. |
| Canadian Solar | Modules with 35 and 40mm frames and model identifier CSbY-xxxZ; where "b" can be 1, 3 or 6; "Y" can be H, K, P, U, V, or X; and "Z" can be M, P, MS, PX , M-SD, P-AG, P-SD, MB-AG, PB-AG, MS-AG, or MS-SD. Frameless modules with model identifier CSbY-xxx-Z; where "b" can be 3 or 6; "Y" is K, P, U, or X; and "Z" can be M-FG, MS-FG, P-FG, MB-FG, or PB-FG. |
| CertainTeed | Modules with 35 and 40mm frames and model identifier CTxxxYZZ-AA; where "Y" can be M or P; "ZZ" can be 00,01, 10, or 11; and "AA" can be 01, 02 or 03. |
| CSUN | Modules with 35 and 40mm frames and model identifier YYxxx-zzAbb; where "YY" is CSUN or SST; "zz" is blank, 60, or 72; "A" is blank, P or M; and "bb" is blank, BB, BW, or ROOF. |
| Ecosolargy | Modules with 35, 40, and 50mm frames and model identifier ECOxxxYzzA-bbD; where "Y" can be A, H, S, or T; "zz" can be 125 or 156; "A" can be M or P; "bb" can be 60 or 72; and "D" can be blank or B. |

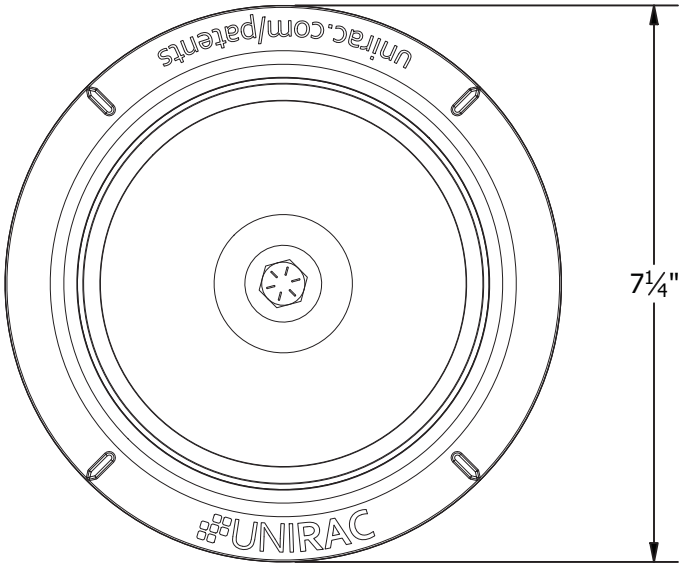


## MODULE COMPATIBILITY

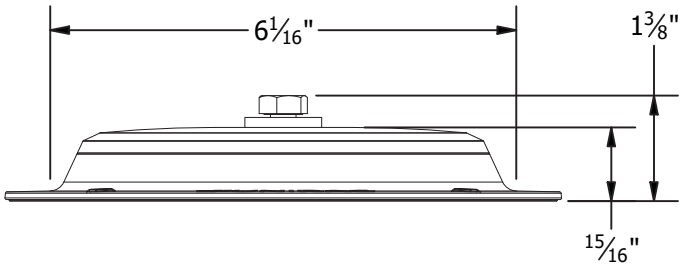
| MAKE | MODELS |
|---|---|
| ET Solar | Modules with 35, 40, or 50mm frames and model identifier ET-Y6ZZxxxAA; where "Y" is P, L, or M; "ZZ" is 60 or 72; and "AA" is WB, WW, BB, WBG, WWG, WBAC, WBCO, WWCO, WWBCO or BBAC. |
| Flex | Modules with 35, 40, or 50mm frames and model identifier FXS-xxxYY-ZZ; where "xxx" is the module power rating; "YY" is BB or BC; and "ZZ" is MAA1B, MAA1W, MAB1W, SAA1B, SAA1W, SAC1B, SAC1W, SAD1W, SBA1B, SBA1W, SBC1B, or SBC1W. |
| GCL | Modules with 35 and 40mm frames and and model identifier GCL-a6/YY xxx; where "a" can be M or P; and "YY" can be 60, 72, or 72H. |
| GigaWatt Solar | Modules with 40mm frames and model identifier GWxxxYY; where “YY” is either PB or MB. |
| Hansol | Modules with 35 and 40mm frames and model identifier HSxxxYY-zz; where "YY" can be TB, TD, UB or UD; and "zz" can be AN1, AN3, AN4. |
| Hanwha Solar | Modules with 40, 45, or 50mm frames and model identifier HSLaaP6-YY-1-xxxZ; where "aa" is either 60 or 72; "YY" is PA or PB; and "Z" is blank or B. |
| Hanwha Q CELLS | Modules with 32, 35, 40, and 42mm frames and model identifier aaYY-ZZ-xxx; where "aa" can be Q. or B.; "YY" can be PLUS, PRO, PEAK, LINE PRO, LINE PLUS, or PEAK DUO; and "ZZ" can be G3, G3.1, G4, G4.1, L-G2, L-G2.3, L-G3, L-G3.1, L-G3y, L-G4, L-G4.2, L-G4y, LG4.2/TAA, BFR-G3, BLK-G3, BFR-G3.1, BLK-G3.1, BFR-G4, BFR-G4.1, BFR G4.3, BLK-G4.1, G4/SC, G4.1/SC, G4.1/TAA, G4.1/MAX, BFR G4.1/TAA, BFR G4.1/MAX, BLK G4.1/TAA, BLK G4.1/SC, EC-G4.4, G5, BLK-G5, L-G5.2, or L-G5.2/H. |
| Heliene | Modules with 40mm frames and model identifier YYZZxxx; where "YY" is 36, 60, 72, or 96; and "ZZ" is M, P, or MBLK. |
| Hyundai | Modules with 35, 40 and 50mm frames and model identifier HiS-YxxxZZ; where "Y" can be M or S; and "ZZ" can be MI, MF, MG, SG, RI, RG(BF), RG(BK), TI, or TG. |
| Itek | Modules with 40 or 50mm frames and model identifier IT-xxx-YY; where "YY" is blank, HE, or SE, or SE72. |
| JA Solar | Modules with 35, 40 and 45mm frames and model identifier JAyyzz-bb-xxx/aa; where “yy” can be M, P, M6 or P6; “zz” can be blank, (K), (L), (R), (V), (BK), (FA), (TG), (FA)(R), (L)(BK), (L)(TG), (R)(BK), (R)(TG), (V)(BK), (BK)(TG), or (L)(BK)(TG); “bb” can be 48, 60, 72, 60S01 or 72S01; and “aa” can be MP, SI, SC, PR, RE, 3BB, 4BB, 4BB/RE, 5BB. |
| Jinko | Modules with 35 and 40mm frames and model identifier JKMYxxxZZ-aa; where "Y" can either be blank or S; "ZZ" can be P, PP, M; and "aa" can be blank, 60, 60B, 60H, 60-J4, 60B-J4, 60B-EP, 60(Plus), 60-V, 60-MX, 72, 72-V, 72H-V, 72L-V, 72-MX. Frameless modules with model identifier JKMxxxPP-DV. |
| Kyocera | Modules with 46mm frames and model identifier KYxxxZZ-AA; where “Y” is D or U; “ZZ” is blank, GX, or SX; and “AA” is LPU, LFU, UPU, LPS, LPB, LFB, LFBS, LFB2, LPB2, 3AC, 3BC, 3FC, 4AC, 4BC, 4FC, 4UC, 5AC, 5BC, 5FC, 5UC, 6BC, 6FC, 8BC, 6MCA, or 6MPA. |
| LG | Modules with 35, 40, and 46mm frames and model identifier LGxxxYaZ-bb; where "Y" is A, E, N, Q, S; "a" is 1 or 2; "Z" is C, K, T, or W; and "bb" is A3, A5, B3, G3, G4, or K4. |
| Longi | Modules with 40mm frames and model identifier LR6-YYZZ-xxxM; where "YY" can be 60 or 72; and "ZZ" can be BK, BP, HV, PB, PE, or PH. |
| Mission Solar | Modules with 40mm frames and model identifier MSExxxZZaa; where "ZZ" can be MM, SE, SO or SQ; and "aa" can be 1J, 4J, 4S, 5K, 5T, 6J, 6S, or 6W. |
| Mitsubishi | Modules with 46mm frames and model identifier PV-MYYxxxZZ; where "YY" is LE or JE; and "ZZ" is either HD, HD2, or FB. |
| Motech | IM and XS series modules with 40, 45, or 50mm frames. |
| Neo Solar Power | Modules with 35mm frames and model identifier D6YxxxZZaa; where "Y" can be M or P; "ZZ" can be B3A, B4A, E3A, E4A, H3A, H4A; and "aa" can be blank, (TF), ME or ME (TF). |
| Panasonic | Modules with 35 and 40mm frames and model identifier VBHNxxxYYzzA; where “YY” can be either SA or KA; “zz” can be either 01, 02, 03, 04, 06, 06B, 11, 11B, 15, 15B, 16, 16B, 17, or 18; and “A” can be blank, E or G. |
| Peimar | Modules with 40mm frames and model identifier SGxxxYzz; where "Y" can be M or P; and "zz" can be blank, (BF), or (FB). |

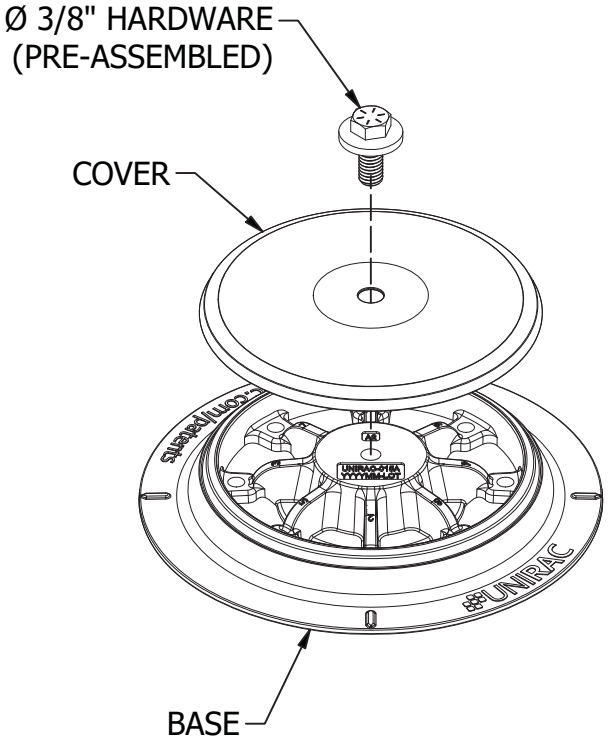
NOTES:

1. ATTACHMENT CAN ACCOMMODATE ROOFING SCREW SIZES #12 - #15. FASTENER SIZE, LENGTH, AND QUANTITY TO BE SELECTED BY STRUCTURAL ENGINEER OF RECORD WHEN DESIGNING FOR THE SPECIFIC PROJECT CONSTRUCTION AND CAPACITY.
2. REFER TO THE UNIRAC INSTALLATION GUIDE FOR PROPER USE OF CHEM LINK M1 AND ONE-PART SEALANTS FOR WATER TIGHT INSTALLATION.




TOP VIEW




| PART # TABLE | |
|---|---|
| P/N | DESCRIPTION |
| 310999 | FLASHLOC RM KIT |

ULTIMATE TEST LOAD (WITH 8 ROOF FASTENERS)

| | |
|---|---|
| UPLIFT ULTIMATE CAPACITY | 6,670 lbs. |
| SHEAR ULTIMATE CAPACITY | 5,760 lbs. |


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


| | |
|---|---|
| PRODUCT LINE: | RM |
| DRAWING TYPE: | ASSEMBLY DETAIL |
| DESCRIPTION: | FLASHLOC RM KIT |
| REVISION DATE: | 6/26/2020 |

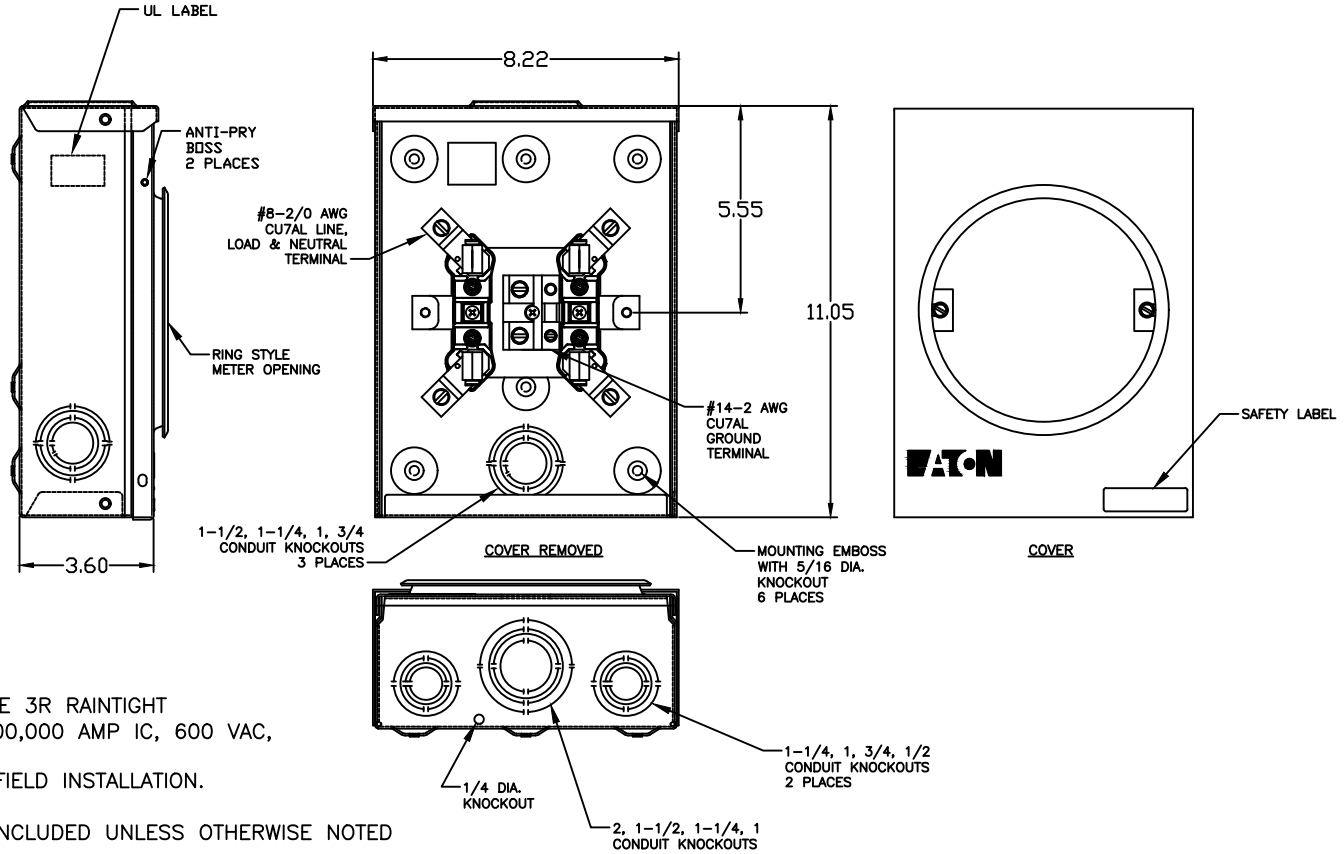
DRAWING NOT TO SCALE
ALL DIMENSIONS ARE NOMINAL

PRODUCT PROTECTED BY ONE OR MORE US PATENTS

LEGAL NOTICE

RMF-A01

SHEET




NOTES:
1) FINISH: ANSI 61 GRAY
2) CABINET: 16 GA GALV. STEEL, TYPE 3R RAINTIGHT
3) 125 AMP CONTINUOUS, 10,000–200,000 AMP IC, 600 VAC, 1 PHASE, 3 WIRE
4) USE MSR5TK FOR 5TH TERMINAL FIELD INSTALLATION.
5) ALL DIMENSIONS ARE IN INCHES
6) STANDARD SNAP RETAINING RING INCLUDED UNLESS OTHERWISE NOTED
7) UL 414 LISTED

| B–LINE PART # | CONFIGURATION |
|---|---|
| 011 | STANDARD |
| 011 MS18 | WITH LEXAN COVER |
| 011 MS73 | WITH SCREW TYPE RING |

# METER SOCKETS
# 011
# 125AMP, 1ø OH/UG
# RINGTYPE STYLE
# SEE TABLE FOR CONFIGURATION

| | | | |
|---|---|---|---|
| TITLE DESCRIPTION: 125A B-LINE SINGLE METER SOCKETS | | DRAWN/DESIGNED BY: M. BOHN | DATE (YYYY/MM/DD): 2020/03/12 |
| THE INFORMATION ON THIS DRAWING IS DISCLOSED IN CONFIDENCE AND IS NOT TO BE REPRODUCED, USED OR DISCLOSED, EXCEPT FOR THE PURPOSE WHICH FURNISHED. | Powering Business Worldwide | SIZE: D | DRAWING NUMBER: 98-1247 |
| |  | UNLESS OTHERWISE SPECIFIED DIMENSIONS IN INCHES | SCALE: N/A |
| | | | REVISION: 02 |
| | | | SHEET: 1 OF 1 |

DSD_DFM_ACAD_WEB.DWG

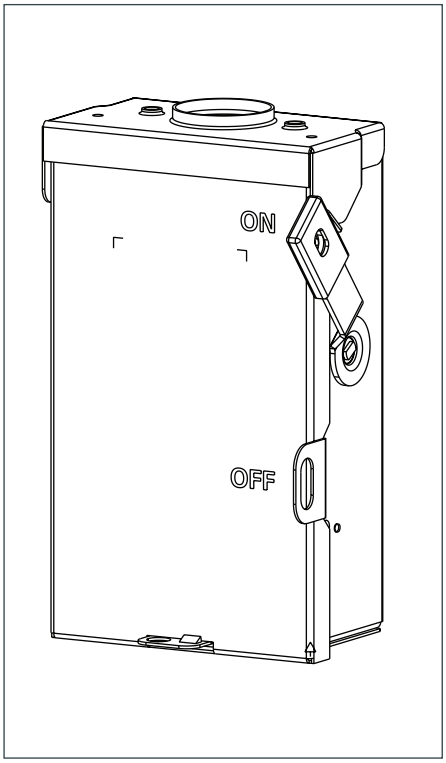
SIEMENS

Data Sheet

# VBII General Duty Safety Switch

## 60A 240V, Type 3R, Non-Fusible

usa.siemens.com/switches




Note: Image is representative only, refer to dimensional drawing for details.

### Standards and Ratings

- UL Listed under file #E4776
- Meets UL98 for switches and UL50 for enclosures
- Meets NEMA Standard KS-1 for enclosed switches
- Meets NEC wire bending space requirements

### Features

- Rated 10,000 AIC when protected by Class K fuses or H fuses or rated 100,000 AIC when protected by Class R fuses
- Quick-make and break switching action
- Double break visible blade design
- Easy to wire lay-in ground lug included (factory installed)
- Oversized lugs

# Product Specifications

**General Duty 60A, 240V, Type 3R**

## General Information

| Catalog Number | Amps | Volts | Description | Shipping Weight (lbs.) [1] |
|---|---|---|---|---|
| GNF222RLZA | 60 | 240 | 2 Pole, Non-Fusible | 20 |

## Horsepower Ratings – 240 Volts

| Catalog Number | 1 Phase, 240V AC | 3 Phase, 240V AC | 250V DC |
|---|---|---|---|
| GNF222RLZA | 10 | N/A | 10 |

## Mechanical Lug Wire Range[2]

| Description | Wire Range with Wire Bending Space per NEC Requirements | Lug Wire Range |
|---|---|---|
| Line and Load Terminals | #14-6 AWG | #14-2 AWG |

1 Package of 5.
2 See "Wire Torque Information" table for specific wire torque values.
3 Use closure plate screws provided to mount hubs.
4 Use Cu/Al 60°/75° C Wire.

## Accessories and Hub Kits

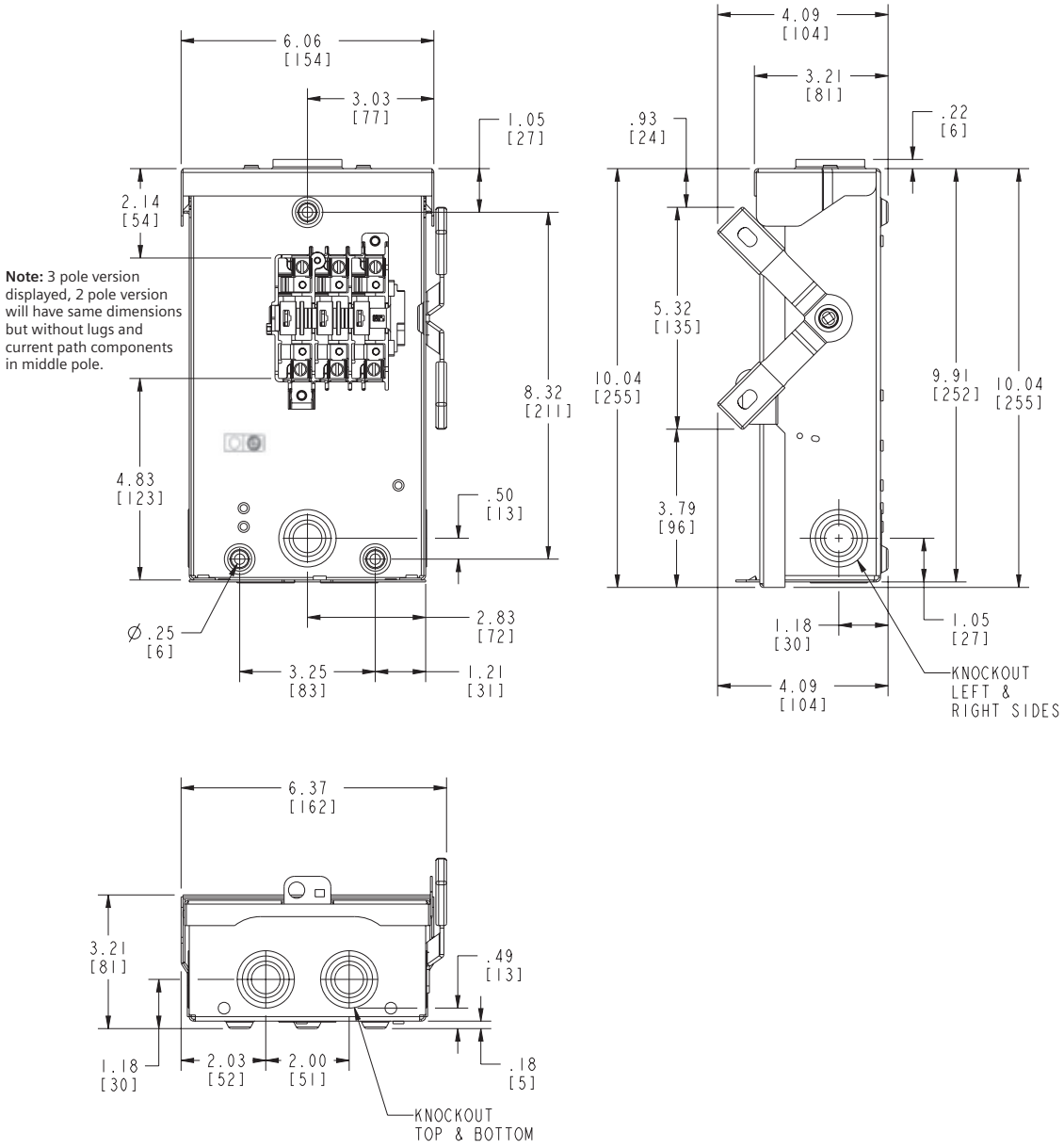
| Catalog Number | Description |
|---|---|
| ECHA075 [3] | 0.75" Type "HA" Outdoor Hub |
| ECHA100 [3] | 1.00 " Type "HA" Outdoor Hub |
| ECHA125 [3] | 1.25 " Type "HA" Outdoor Hub |

## Wire Torque Information

| Application | Wire Size | Nominal Torque |
|---|---|---|
| Mechanical Lug Wire Connector [4] | 14 -10 AWG | 35 lb.-in. |
| | 8 AWG | 40 lb.-in. |
| | 6 AWG | 45 lb.-in. |

# Dimension Drawings

## General Duty 60A, 240V, Type 3R




No knockouts in enclosures.
Dimensions shown in inches and millimeters ( ).
Dimension shown accurate to ± ⅛ inch.

| KNOCKOUT CODE | CONDUIT SIZE |
|---|---|
| A (Concentric) | .50 .75 1.00 |

| LINE SIDE WIRE BEND | LOAD SIDE WIRE BEND |
|---|---|
| 2" | 2" |

Enclosure: Cold Rolled Steel
0.45 Thick (17 Gauge)
Finish: ANSI #61 Grey Paint

**Published by**
**Siemens Industry, Inc. 2022.**

Siemens Industry, Inc.
3617 Parkway Ln
Peachtree Corners, GA 30092

For more information, please contact our Customer Support Center.
Phone: 1-800-241-4453
E-mail: info.ipc.us@siemens.com
info.hmi.us@siemens.com

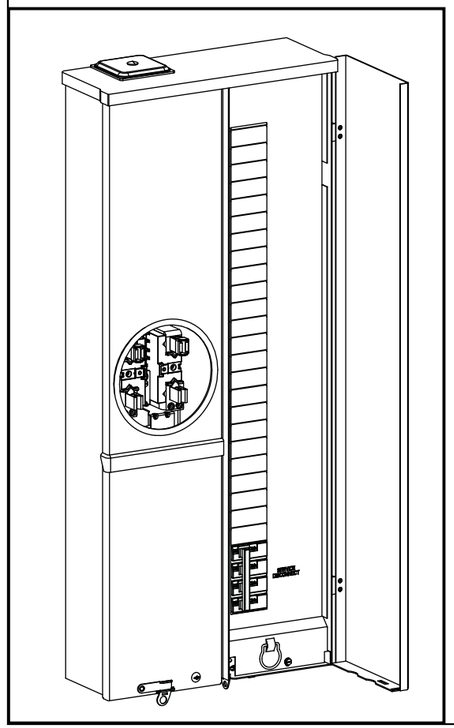
**usa.siemens.com/switches**

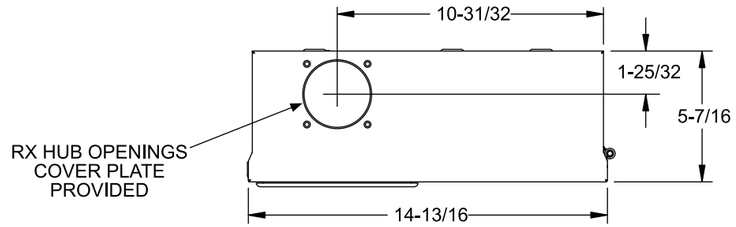
Order No.: SDS-GZ222R-1022
Printed in U.S.A.

# Catalog Number: MC2442B1225ESC

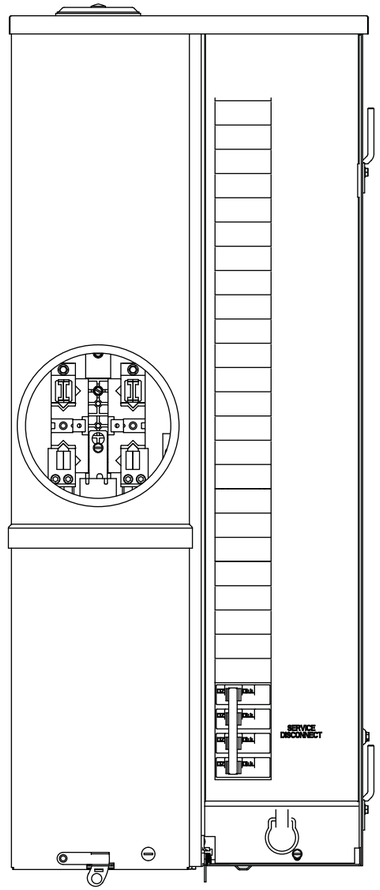
## Features and Ratings

- Outdoor Enclosure (NEMA Type 3R)
- Ring Type Meter Cover
- Meter Socket Rating: 200A Continuous
- Panelboard Rating: 225A Max; Bus rating: 225 Amps Max.
- 1 Phase, 3 Wire, 120/240V~, 120/208V~
- 225A Breaker Factory Installed
- 22,000 AIC Max. Rated (See Wiring Diagram for Details)
- (24) 1" Spaces, (42) Circuits Max.
- Copper Bus Bars
- Overhead or Underground Service Entrance
- Surface Mounting
- Complies with EUSERC Dwg. No. 301

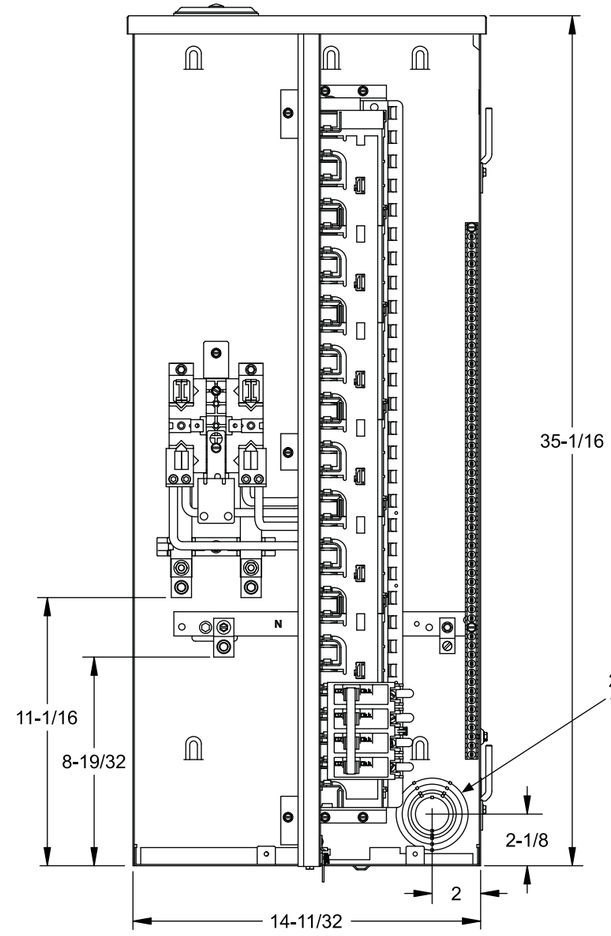


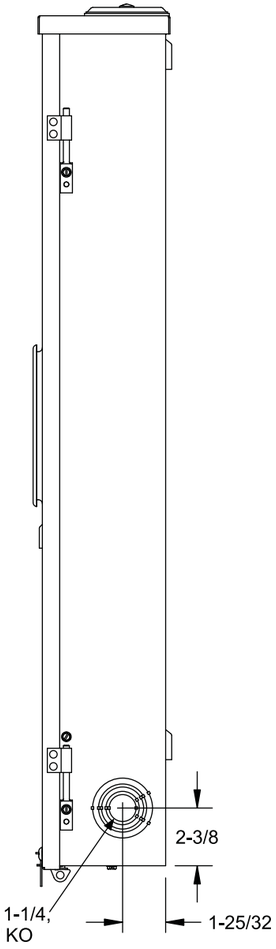


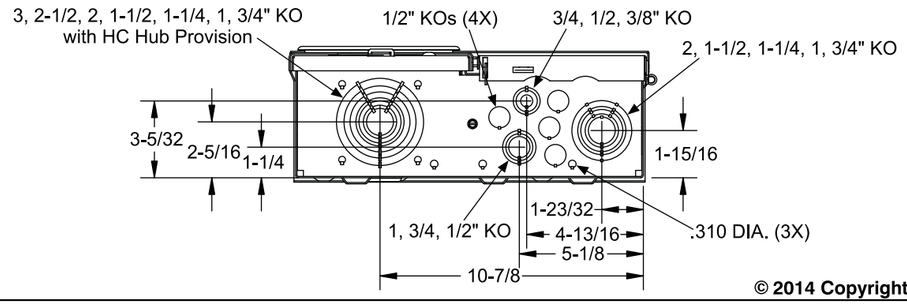

**View Shown Without Door**




**View Shown Without Covers, Door, Deadfront**



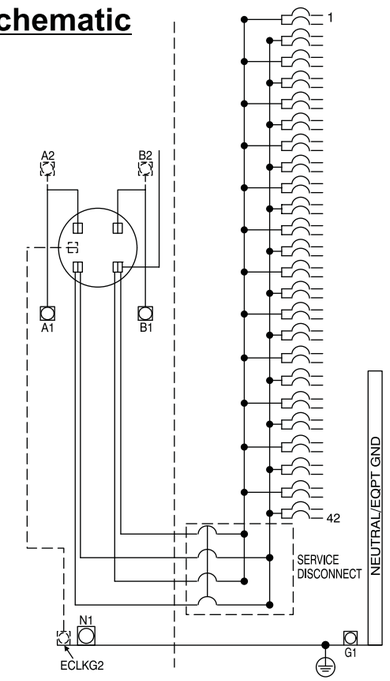

## Accessories, Torques & Wire Sizes

| Trade size (in) | Catalog number |
|---|---|
| *RX Type Hub (top endwall)* | |
| 1 ¼" | EC38597 |
| 1 ½" | EC38598 |
| 2" | EC38599 |
| 2 ½" | EC38600 |
| RX Cover Plate | EC38595 |
| *HC Type Hub (bottom endwall)* | |
| 2" | ECHC200 |
| 2 ½" | ECHC250 |
| 3" | ECHC300 |

| Accessories | Cat. No. |
|---|---|
| Filler Plate | ECQF3 |
| 5th Jaw Assembly | EMC5J |
| Mechanical Interlock | ECQML12 |
| Meter Socket Jumper | ECJS |
| Interlock Kit | ECSBPK02 |

| Lug Kit | Wire Range | Torque |
|---|---|---|
| ECLKG2 | 2/0 - #14 | 50 lb in |

## Schematic




Any 80-100 Amp circuit breaker must be installed in the lowest position in the branch panel. All other positions are limited to 70 Amp maximum circuit breakers.

| Terminal | Wire Size | Torque |
|---|---|---|
| A1, B1, A2, B2 | 250kcmil - #4 | 250 lb-in |
| N1 | 250kcmil - #4 | 250 lb-in |
| G1 | 2/0 - #14 | 50 lb-in |
| Branch Breaker Terminals | See Markings on Breaker | |
| Neutral/ Equipment Ground | #10 - #14 CU<br>#10 - #12 AL<br>#8<br>#6 - #4 | 20 lb-in<br>20 lb-in<br>25 lb-in<br>35 lb-in |
| Ground Conductors Only | (2) or (3) #14 AWG | 20 lb-in |
| | (2) #12-#10 AWG | 20 lb-in |

Line terminals A1 and B1 are installed for underground service entry as shown in the wiring diagram. For overhead entry, service bus may be repositioned.



**SIEMENS**
Siemens Industry, Inc.

**Meter Load Center Combination**

Description:
**225A, 24 Sp/42 Ckt, OH/UG, Surf Mount**

| KAM 1/27/14 | Fam G | DO NOT SCALE DRAWING | Dwg. No. | MC2442B1225ESC |
|---|---|---|---|---|

FamG T-24