

NET METERING INTERCONNECTION AGREEMENT

This Net Metering Interconnection Agreement (Agreement) is made and entered into this ____ day of _____, 20____ between _____ (“Member”), and **Kootenai Electric Cooperative, Inc.** (“KEC”). Both parties, who may be herein further referred to collectively as “Parties” and individually as “Party,” agree as follows:

1. MEMBER ELECTRIC DISTRIBUTED GENERATION RESOURCE

- A. Member has elected to operate a Distributed Generation Resource (“DG Resource”), with a generating capacity of less than 200 kilowatts, in parallel with KEC’s electric system. The DG Resource is intended to offset either part or all of Member’s electrical requirements and will be of no greater size than necessary to satisfy that ambition. KEC has no direct financial involvement in the investment, construction, operation, or maintenance of Member’s DG Resource.

Member’s DG Resource shall be located upon Member’s real property (hereinafter “Member’s Premises”) legally described as follows:

Physical Address Street: _____

Physical Address City: _____

Physical Address State _____

Physical Address Zip _____

Parcel and Tract: _____

- B. KEC will not provide for wheeling services for Member. The energy produced by the DG Resource will be fully consumed by Member and production quantities greater than consumption quantities will be credited to Member’s account in accordance with KEC’s Net Metering Rate Schedules in effect during the month of production.
- C. Member’s Application for Net Metering Interconnection shall specify and set forth the size, capacity, fuel source and manufacturers of major equipment comprising the DG Resource in Attachment A of this agreement, which is incorporated by reference.
- D. A separate agreement shall be entered into for each electrical KEC service location at which Member operates DG Resources qualifying for treatment as a Net Metering Resource.
- E. The DG Resource shall comply with all federal, state, and local laws, rules, ordinances, and regulations. It shall include all equipment necessary to meet the current National Electrical Code (NEC), the applicable standards of the Institute of Electrical and Electronics Engineers (IEEE), Underwriters Laboratories (UL), KEC’s Engineering Service

- F. Handbook, KEC's Policy 3-20, and KEC's Net Metering Interconnection Standards, as set forth in Attachment B.
- G. Member agrees to comply with KEC's bylaws, policies, procedures, rules, rates, and schedules, as may be amended from time to time, which are applicable to the operation and interconnection of a DG Resource being used for Net Metering purposes which are incorporated herein by reference.

2. TERM OF AGREEMENT

- A. This Agreement shall be in effect when signed by Member and KEC and shall remain in effect thereafter month to month unless terminated by either Party on thirty (30) days' prior written notice to the other Party, or through the closing of the membership.
- B. KEC may terminate this Agreement if Member fails to generate within 12 months of the date that Member signs this Agreement or stops generating for a period of 8 consecutive months following the commencement of operations. Other reasons for termination includes safety issues, failure to maintain equipment, or if the generator does not drop offline when disconnected from utility source voltage.

3. INTERRUPTION OR REDUCTION OF DELIVERIES

KEC may require Member to interrupt or reduce deliveries as follows:

- A. When necessary in order to construct, install, maintain, repair, replace, remove, investigate, or inspect any of its (KEC's) equipment or part of its system; or
- B. If KEC determines curtailment, interruption or reduction is necessary because of emergencies, force majeure, or compliance with prudent electrical practices.

Whenever possible, KEC shall give Member reasonable notice of the possibility that interruption or reduction of deliveries may be required.

Notwithstanding any other provision of this Agreement, KEC shall have the right to disconnect Member's DG Resource from KEC's electric system if, in KEC's sole judgement:

- C. The DG Resource may endanger utility personnel or other individuals, or
- D. The continued operation of Member's DG Resource may endanger the integrity of the utility's electric system.

Member's DG Resource shall remain disconnected until such time as KEC is satisfied that the condition(s) referenced in this section have been corrected.

4. INTERCONNECTION.

- A. Member shall not commence operation of the DG Resource until inspection and written approval of the DG Resource and interconnection facilities have been provided by State and local inspectors, and by KEC, with such approval not to be unreasonably withheld. Member or Member Contact shall notify KEC with 5-business days advance notice when initial testing is

scheduled to take place to allow KEC to be onsite to witness testing and perform KEC inspection.

- B. KEC shall supply any electric power requirements in excess of actual energy produced by Member's DG Resource. Any DG Resource electric power production quantity that is greater than actual energy consumed shall create an energy credit. The net of these amounts will establish the energy credits (in kWh) due to Member or the amount of energy consumed by Member (in kWh) during each billing month.
- C. Member shall pay all costs of installing, operating, and maintaining the protective equipment and electrical facilities required to interconnect the DG Resource with KEC's electric distribution system. The DG Resource shall comply with KEC's Interconnection Standards set forth in Attachment B. Member shall pay the direct cost incurred by KEC as a result of the interconnection and for providing net metering service which may include a net metering facilities charge. Furthermore, Member shall pay all costs necessary to integrate the DG Resource with KEC's system, including the cost of system upgrades necessary to accommodate it, prior to those costs being incurred.
- D. Member must have or establish electric service with KEC and maintain that account in good standing throughout the term of this Agreement.
- E. KEC shall have the right to access and observe the initial and follow up testing of Member's protective apparatus.

5. MAINTENANCE AND PERMITS

Member shall:

- A. Maintain the DG Resource and Interconnection Facilities in a safe and prudent manner and in compliance with all applicable laws and regulations including, but not limited to KEC's policies and procedures.
- B. Obtain any governmental authorizations and permits required for the construction and operation of the DG Resource and Interconnection Facilities, including electrical permit(s).
- C. Reimburse KEC for any and all losses, damages, claims, penalties, or liability it incurs as a result of Member's failure to obtain or maintain any governmental authorizations and permits required for construction and operation of Member's DG Resource or failure to maintain Member's DG Resource as required herein.

6. ACCESS TO PREMISES

KEC may enter Member's premises or property to:

- A. Inspect, with prior notice, at all reasonable hours, Member's DG Resource and Interconnection Facilities;
- B. Read and test installed metering equipment;
- C. Disconnect the designated disconnect switch, KEC's meter, or transformer, without notice; and

- D. KEC inspections of Member's DG Resource and its acceptance of testing results shall not relieve Member of their overall responsibility to ensure compliance with all applicable codes, regulations, and policies. Member further remains solely responsible for the safe and adequate operation of its facilities.

7. INDEMNITY AND LIABILITY

- A. Member assumes all risk of damages, losses, costs, and expense and agrees to indemnify KEC, its successors and assigns, and its respective directors, officers, employees, and agents from and against any and all claims, losses, costs, liabilities, damages, and expenses including but not limited to reasonable attorney fees resulting from or in connection with performance of the Agreement or which may occur or be sustained by KEC on account of any claim or action brought against KEC for any reason including but not limited to loss to the electrical system of Member caused by or arising out of an electrical disturbance.
- B. Such indemnity, protection, and hold harmless includes any demand, claim, suit, or judgment for damages, death or bodily injury to all persons, including officers, employees or agents and subcontractors of either Party hereto including payment made under or in connection with any Worker's Compensation law or under any plan for employees disability and death benefits or property loss which may be caused or contributed to by the interconnection, maintenance, operation, use, presence, or removal of Member's equipment. The only exception will be liability occasioned by the sole negligence or willful misconduct of KEC or its employees acting within the scope of their employment and liability by a partial negligence of KEC or its employees acting within the scope of their employment to the extent that such partial liability is fixed by a court of competent jurisdiction.
- C. The provisions of this Agreement shall not be construed to relieve any insurer of its obligations to pay any insurance claims in accordance with the provisions of any insurance policy.
- D. KEC shall have no liability, ownership interest, control or responsibility for Member's DG Resource or its Interconnection Facilities with KEC's electric system, regardless of what KEC knows or should know about Member's DG Resource or its Interconnection.

8. INDEPENDENT CONTRACTORS

The Parties hereto are independent contractors and shall not be deemed to be partners, joint ventures, employees, franchisees or franchisers, servants, or agents of each other for any purpose whatsoever under or in connection with this Agreement.

9. GOVERNING LAW

This Agreement shall be interpreted, governed, and construed under the laws of the State of Idaho as if executed and to be performed wholly within the State of Idaho. Venue of any action arising hereunder or related to this agreement shall lie in Kootenai County, Idaho.

10. FUTURE MODIFICATION OR EXPANSION

Any future modification or expansion of Member's DG Resource and related equipment will require an engineering review and prior written approval by KEC. KEC reserves the right to require Member, at

Member's expense, to provide modifications or additions to existing electrical devices including but not limited to protection devices and meters in the event of changes to government or industry regulation and/or standards.

11. AMENDMENTS, MODIFICATIONS OR WAIVER

Any amendments or modifications to this Agreement shall be in writing and signed by both Parties. The failure of any Party at any time or times to require performance of any provision hereof shall in no manner affect the right at a later time to enforce the same. No waiver by any Party of the breach of any term or covenant contained in this Agreement, whether by conduct or otherwise, shall be deemed to be construed as a further or continuing waiver of any such breach or waiver of the breach of any other term or covenant unless such waiver is in writing. Notwithstanding this provision, changes to KEC's Bylaws, policies, procedures, rules, rates, and schedules, as they apply to DG Resources shall automatically gain the willful consent of Member.

12. ASSIGNMENT

Member shall not assign its rights under this Agreement without the express written consent of KEC. KEC may impose reasonable conditions on any such assignment to ensure all of Member's obligations under this Agreement are met and that none of Member's obligations under this Agreement are transferred to KEC as a result of default, bankruptcy, or any other cause.

Should a Member sell or transfer Member's interest in Member's Premises, Member shall terminate this Agreement with KEC and Member's successor shall enter into a new written Agreement with KEC, terms and conditions of which must be reasonably acceptable to KEC.

At any time after any transfer of Member's interest in Member's Premises or any attempted assignment hereunder not in conformity with the provisions of this Agreement, KEC shall have the right to terminate it upon mailing a copy of such Notice of Termination to Member at Member's address set forth below by certified mail, return receipt requested. Such termination shall be effective upon the later of the posting of such Notice or deposit of such Notice, properly addressed as set forth above, in the United States mail.

13. APPENDICES

The Agreement includes the following appendices attached and incorporated by reference:

- A. Appendix A: Application for Net Metering Interconnection of a Distributed Generation Resource of Less Than 200 kW in Production Capacity.
- B. Appendix B: Kootenai Electric Cooperative's Net Metering Interconnection Standards for Member Electric Distributed Generation Resource of Less Than 200 kW of Production Capacity.

14. NOTICES

All written notices shall be directed as follows:

Kootenai Electric Cooperative, Inc.
Attention.: Engineering
9014 W. Lancaster Road
Rathdrum, ID 83858
NetMeter@kec.com

Member:

Name: _____

Address: _____

City, State, Zip: _____

Member Contact (if different from Member):

Name: _____

Address: _____

City, State, Zip: _____

Member Notices to KEC, pursuant to this Agreement, shall refer to the Service Address set forth in Appendix A, Application for Net Metering Interconnection of a Distributed Generation Resource of Less Than 200 kW of Production Capacity.

15. SIGNATURE

This Agreement is effective as of the last date set forth below.

Signature _____

Print Name _____

Title _____

Date _____

Appendix A

**Application for Net Metering Interconnection of a
Distributed Generation Resource of Less Than 200 kW of Production Capacity**

This Application is considered complete when it provides all applicable and correct information required below. Additional information to evaluate the Application may be required.

Fee: A non-refundable Engineering fee of \$250 must accompany this Application.

| | | | |
|---|--|--|--|
| KEC Member Name: | | | |
| KEC Account Number: | | | |
| Does KEC already provide service to this address? | | <input type="checkbox"/> Yes <input type="checkbox"/> No | |
| Is this DG Resource installation new or existing? | | <input type="checkbox"/> New <input type="checkbox"/> Existing | |
| Contact Name: | | | |
| Service Address Street: | | | |
| Service Address City: | | | |
| Service Address State: | | | |
| Service Address Zip: | | | |
| Tel (Day): | | Tel (Eve): | |
| Email: | | | |

Owner of the DG Resource (include % ownership by any electric utility):

System Production Capacity:

_____ (kW)

Energy Source:

_____ Wind _____ Solar _____ Other (describe)

Estimated Installation Date: _____

Appendix A

Estimated In-service Date: _____

Member shall provide one combined PDF drawing submittal package to NetMeter@kec.com including the completed application and the following drawings, technical details, and manufacture data bulletins:

1. Site plan drawing illustrating location of DG Resource and KEC utility meter.
2. System details providing AC/DC rated output voltage, power, and current. System summary should also include number of modules, inverters, and other components.
3. Component details providing manufacturer, model number, technical specifications, and data bulletins for inverters, modules, optimizers, panels, disconnects, wire, conduit, and other accessories.
4. Single line diagram illustrating the interconnection of each DG Resource component to the KEC system, and location of required disconnect switch.

Interconnection Member Signature

I hereby certify that, to the best of my knowledge, the information provided in this Application is true.

Printed Name _____

Signature _____

Date _____

Appendix B

Kootenai Electric Cooperative's Net Metering Interconnection Standards for Member Electric Distributed Generation Resource of Less Than 200 kW of Production Capacity.

This document stipulates the minimum requirements for the safe and reliable operation of Member's DG Resources that will be connected and operated in parallel with KEC's distribution system for the purposes of net metering.

- A. Installation and operation of generator and related facilities shall comply with the National Electrical Code, National Electrical Safety Code, and KEC's policies, procedures, and standards as applicable.
- B. Power Quality and Reliability Requirements:
 - 1. The interconnection of Member's DG Resources with KEC's electric system shall be installed in a manner preventing any reduction in the quality and/or reliability of service provided to other KEC members.
 - 2. Member's net metering equipment shall be UL 1741 listed and compliant with UL 1741 SA, IEEE 519, and IEEE 1547 requirements.
 - 3. The electrical production of Member's DG Resource shall have a power factor within plus or minus 3% of perfect unity, unless otherwise approved by KEC.
 - 4. Member's DG Resource must be synchronized with KEC's electric system at all times and Member shall be responsible for the synchronization.
 - 5. Member's DG Resource shall be designed to automatically disconnect and electrically isolate itself from KEC's electric system when KEC's service is interrupted for any reason. No automatic re-closing of DG Resource equipment shall be allowed until the KEC system power is restored.
- C. Member's DG Resource shall have a manually operated, knife-blade type disconnect switch (fused or non-fused) installed only in accordance with NEC 690.13(E) that is readily accessible, visible, and lockable in the open position. The disconnect shall be located within 10 feet of the utility meter and installed in compliance with NEC 705.20 and grouped as required by NEC 230.72. Any deviation from this placement shall require additional review and approval by KEC. Upon initial installation of a DG Resource, the disconnect switch shall remain open until all required inspections are complete. Additionally, when the required disconnect switch is locked in the open position for any of the following conditions, the disconnect switch may be unlocked ONLY by KEC personnel.

Conditions for KEC locking Member-provided disconnect switch include:

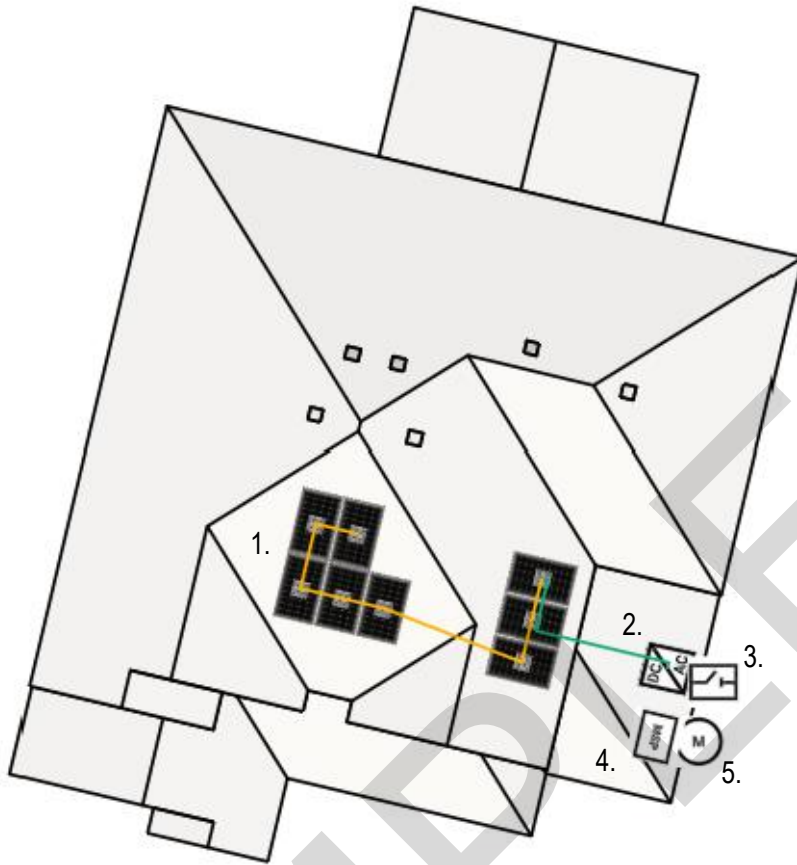
- 1. The protection of KEC's personnel when working on de-energized circuits during a system emergency.
- 2. If/when inspection of Member's DG Resource reveals an actual or potentially hazardous condition.
- 3. Interference by Member's DG Resource with other members, other utilities, or with the efficient operation of KEC's distribution system.
- 4. Whenever reasonable or necessary for general maintenance of KEC's distribution system.

Appendix B

- D. KEC does not require a separate meter to measure the DG Resource energy production. KEC shall own, furnish, and install a meter capable of measuring energy flow in two directions at the member service location. E. Member is fully responsible for the protection of the DG Resource and all equipment on Member's side of the KEC meter. Protection should be provided for Member's own equipment failures, faults, and other disturbances on KEC's system.
- E. To prevent Member's DG Resource from supplying abnormally high current continuously to a fault on KEC's electric system, Member's DG Resource shall be isolated from KEC's system for any fault on KEC's system within 2 seconds.
- F. To prevent any hazardous operating conditions, Member's DG Resource shall be isolated from KEC's electric system for any under voltage (lower than 80% of nominal voltage) and over voltage conditions (higher than 110% of nominal voltage) within 2 seconds.
- G. To prevent any hazardous operating conditions, Member's DG Resource shall be isolated from KEC's electric system for any over frequency and under frequency conditions within 2 seconds.
- H. Islanding may occur when Member's DG Resource is isolated from KEC's distribution system and Member's DG Resource feeds their electrical load. Member shall be fully responsible for protecting their equipment under islanding conditions. Because of very low available fault current under islanding conditions, this type of protection may require special or additional protection schemes or devices.
- I. Member is responsible for the protection of the DG Resource from transient surges initiated by lightning, switching, or other system disturbances.
- J. KEC reserves the right to disconnect a DG Resource that presents a safety hazard or that is not in compliance with the terms of Net Metering Interconnect Agreement.


Appendix C

Sample Submittal Package for Net Metering Application of a Distributed Generation Resource of Less Than 200 kW of Production Capacity



NOTES:

1. ROOFTOP PV SYSTEM WITH DC OPTIMIZERS
2. PV INVERTER WITH INTEGRATED DC DISCONNECT
3. PV SYSTEM AC DISCONNECT
4. MAIN SERVICE PANEL WITH BACKFED BREAKER
5. KECC METER

| | | | | | | | |
|--|------|-----|-------|--|--|-------------|--|
| DESIGN LIMITS: | | | | ENGINEER: | | ISSUE DATE: | |
|  | REV: | BY: | DATE: | DRAWING TITLE: | | DWG NO. | |
| | A | CS | 04/22 | KEC NET METERING SAMPLE PACKET SITE PLAN | | KNM-01 | |
| | | | | | | | |
| DESCRIPTION: INITIAL RELEASE | | | | | | | |

DIRECTORY OF PAGES

| | |
|----------|----------------------------|
| PV-1 | PROJECT SUMMARY |
| PV-2 | SINGLE-LINE DIAGRAM |
| PV-3 | SAFETY LABELS |
| APPENDIX | ELECTRICAL CALCULATIONS |
| | MODULE DATASHEET |
| | OPTIMIZER DATASHEET |
| | ARRAY WIRING BOX DATASHEET |
| | DISCONNECT DATASHEET |
| | INVERTER DATASHEET |

PROJECT DETAILS

| | |
|----------------------------------|---|
| PROPERTY ADDRESS | |
| ZONING | RESIDENTIAL |
| USE AND OCCUPANCY CLASSIFICATION | ONE- OR TWO-FAMILY DWELLING GROUP (GROUP R3) |
| UTILITY COMPANY | AVISTA CORP |
| ELECTRICAL CODE | 2020 NEC (NFPA 70) |
| FIRE CODE | 2015 IFC |
| OTHER BUILDING CODES | IBC 2015 IRC 2012 2015 ID PLUMBING CODE IMC 2012 |

| | |
|--|--|
| | |
| | |
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| | |
| | |
| | |

SCOPE OF WORK

THIS PROJECT INVOLVES THE INSTALLATION OF A GRID-INTERACTIVE PV SYSTEM. PV MODULES WILL BE MOUNTED USING A PREENGINEERED MOUNTING SYSTEM. THE MODULES WILL BE ELECTRICALLY CONNECTED WITH DC TO AC POWER INVERTERS AND INTERCONNECTED TO THE LOCAL UTILITY USING MEANS AND METHODS CONSISTENT WITH THE RULES ENFORCED BY THE LOCAL UTILITY AND PERMITTING JURISDICTION.

THIS DOCUMENT HAS BEEN PREPARED FOR THE PURPOSE OF DESCRIBING THE DESIGN OF A PROPOSED PV SYSTEM WITH ENOUGH DETAIL TO DEMONSTRATE COMPLIANCE WITH APPLICABLE CODES AND REGULATIONS. THE DOCUMENT SHALL NOT BE RELIED UPON AS A SUBSTITUTE FOR FOLLOWING MANUFACTURER INSTALLATION INSTRUCTIONS. THE SYSTEM SHALL COMPLY WITH ALL MANUFACTURERS LISTING AND INSTALLATION INSTRUCTIONS, AS WELL AS ALL APPLICABLE CODES. NOTHING IN THIS DOCUMENT SHALL BE INTERPRETED IN A WAY THAT OVERRIDES THEM. CONTRACTOR IS RESPONSIBLE FOR VERIFICATION OF ALL CONDITIONS, DIMENSIONS, AND DETAILS IN THIS DOCUMENT.

SYSTEM DETAILS

| | |
|---------------------|---|
| DESCRIPTION | NEW GRID-INTERACTIVE PV SYSTEM WITH NO ENERGY STORAGE |
| DC RATING OF SYSTEM | 2.52KW |
| AC RATING OF SYSTEM | 3.00KW |
| AC OUTPUT CURRENT | 12.5A |
| INVERTER(S) | 1 X SOLAR EDGE SE3000H-US000BXX4 |
| MODULE | Q-CELLS Q.PEAK DUO BLK-G5 315 |
| ARRAY WIRING | (1) STRING OF 8 |

INTERCONNECTION DETAILS

| | |
|---------------------|--|
| POINT OF CONNECTION | NEW LOAD-SIDE AC CONNECTION PER NEC 705.12(B)(3)(2) AT MSP |
| UTILITY SERVICE | 120/240V 1Φ |
| LOCATION | MAIN SERVICE PANEL W/200A BUSBAR 200A MCB |

SITE DETAILS

| | |
|------------------------|--------------------|
| ASHRAE EXTREME LOW | -17°C (1°F) |
| ASHRAE 2% HIGH | 34°C (93°F) |
| CLIMATE DATA SOURCE | FELTS FIELD (KSFF) |
| RISK CATEGORY | II |
| WIND EXPOSURE CATEGORY | C |

1 PLOT
PV-1 SCALE: NTS

2 LOCALE
PV-1 SCALE: NTS

DESIGN LIMITS:

ENGINEER:

ISSUE DATE:



| REV: | BY: | DATE: | DESCRIPTION: |
|------|-----|-------|-----------------|
| A | CS | 04/22 | INITIAL RELEASE |

DRAWING TITLE:
KEC NET METERING
SAMPLE PACKET
PROJECT SUMMARY

DWG NO.
KNM-02

| GENERAL ELECTRICAL NOTES | |
|--------------------------|--|
| 1 | UTILITY HAS 24-HR UNRESTRICTED ACCESS TO ALL PHOTOVOLTAIC SYSTEM COMPONENTS LOCATED AT THE SERVICE ENTRANCE. |
| 2 | MODULES CONFORM TO AND ARE LISTED UNDER UL 1703. |
| 3 | CONDUCTORS EXPOSED TO SUNLIGHT SHALL BE LISTED AS SUNLIGHT RESISTANT PER NEC ARTICLE 300.6 (C) (1) AND ARTICLE 310.10 (D). |
| 4 | CONDUCTORS EXPOSED TO WET LOCATIONS SHALL BE SUITABLE FOR USE IN WET LOCATIONS PER NEC ARTICLE 310.10 (C). |

| GROUNDING NOTES | |
|-----------------|---|
| 1 | ALL EQUIPMENT SHALL BE PROPERLY GROUNDED PER THE REQUIREMENTS OF NEC ARTICLES 250 & 690 |
| 2 | PV MODULES SHALL BE GROUNDED TO MOUNTING RAILS USING MODULE LUGS OR RACKING INTEGRATED GROUNDING CLAMPS AS ALLOWED BY LOCAL JURISDICTION. ALL OTHER EXPOSED METAL PARTS SHALL BE GROUNDED USING UL-LISTED LAY-IN LUGS. |
| 3 | INSTALLER SHALL CONFIRM THAT MOUNTING SYSTEM HAS BEEN EVALUATED FOR COMPLIANCE WITH UL 2703 "GROUNDING AND BONDING" WHEN USED WITH PROPOSED PV MODULE. |
| 4 | ALL GROUNDING SYSTEM COMPONENTS SHALL BE LISTED FOR THEIR PURPOSE IF THE EXISTING MAIN SERVICE PANEL DOES NOT HAVE A VERIFIABLE GROUNDING ELECTRODE, IT IS THE CONTRACTOR'S RESPONSIBILITY TO INSTALL A SUPPLEMENTAL GROUNDING ELECTRODE. |
| 5 | AC SYSTEM GROUNDING ELECTRODE CONDUCTOR (GEC) SHALL BE A MINIMUM SIZE #8AWG WHEN INSULATED, #6AWG IF BARE WIRE. |
| 6 | EQUIPMENT GROUNDING CONDUCTORS SHALL BE SIZED ACCORDING TO NEC ARTICLE 690.45, AND BE A MINIMUM OF #10AWG WHEN NOT EXPOSED TO DAMAGE, AND #6AWG SHALL BE USED WHEN EXPOSED TO DAMAGE |
| 7 | GROUNDING AND BONDING CONDUCTORS, IF INSULATED, SHALL BE COLOR CODED GREEN, OR MARKED GREEN IF #4AWG OR LARGER |

| MODULES | |
|----------------|------------|
| MAKE AND MODEL | PM4-S 315W |
| MAX PFC | 0.98 |
| MAX DC VOLTAGE | 60V |
| MAX DC CURRENT | 5.25A |
| MAX DC VOLTAGE | 60V |
| MAX DC CURRENT | 5.25A |
| MAX DC VOLTAGE | 60V |
| MAX DC CURRENT | 5.25A |

| INVERTERS | |
|--------------------|-------------|
| MAKE AND MODEL | 11300-3000W |
| MAX INPUT VOLTAGE | 480V |
| MAX INPUT CURRENT | 8.3A |
| MAX OUTPUT VOLTAGE | 240V |
| MAX OUTPUT CURRENT | 15A |

| OPTIMIZERS | |
|--------------------|--------|
| MAKE AND MODEL | OC2PDS |
| MAX INPUT VOLTAGE | 240VAC |
| MAX INPUT CURRENT | 20A |
| MAX OUTPUT VOLTAGE | 240VAC |
| MAX OUTPUT CURRENT | 20A |

| DISCONNECTS | |
|--------------------|--------|
| MAKE AND MODEL | SW1 |
| MAX INPUT VOLTAGE | 240VAC |
| MAX INPUT CURRENT | 30A |
| MAX OUTPUT VOLTAGE | 240VAC |
| MAX OUTPUT CURRENT | 30A |

NOTES

1. WAITING CONNECTORS SHALL COMPLY WITH NEC 690.33

2. SOLAR EDGE SYSTEM MEETS REQUIREMENTS FOR PHOTOVOLTAIC RAPID SHUTDOWN SYSTEM (PRSS), AS PER NEC 690.12B(2).

3. THE SPECIFIED OPTIMIZER CAN BE SUBSTITUTED WITH A RAMP, PULSE, OR PWM. THESE OPTIMIZERS HAVE AN INPUT VOLTAGE WINDOW WIDE ENOUGH TO ACCOMMODATE THE OUTPUT VOLTAGE RANGE OF THE MODULE AT THE DESIGN TEMPERATURES. HAVE A MAX INPUT CURRENT RATING THAT IS ABOVE THE MAX OUTPUT CURRENT OF THE MODULE, AND A MAX POWER INPUT THAT IS ABOVE THE RATED POWER OUTPUT OF THE MODULE.

4. DC PV CONDUCTORS ARE NOT SOLIDLY GROUNDED. NO DC PV CONDUCTOR SHALL BE WHITE, OR GRAY COLORED.

5. ALL METAL ENCLOSURES, RACKWAYS, CABLES AND EXPOSED NONCURRENT-CARRYING METAL PARTS OF EQUIPMENT SHALL BE GROUNDED TO EARTH AS REQUIRED BY NEC 250.4(A) AND PART II OF ARTICLE 250 AND EQUIPMENT GROUNDING CONDUCTORS SHALL BE SIZED ACCORDING TO NEC 690.45. THE GROUNDING ELECTRODE SYSTEM SHALL ADHERE TO NEC 690.47(A) AND NEC 250.109. THE DC GROUNDING ELECTRODE SHALL BE SIZED ACCORDING TO NEC 250.108 AND INSTALLED IN COMPLIANCE WITH NEC 250.94.

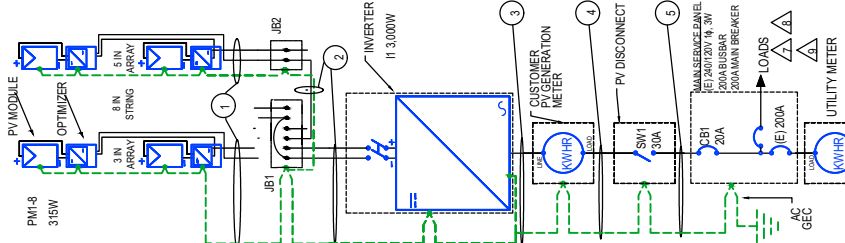
6. MAX DC VOLTAGE OF ARRAY FIXED BY THE INVERTER AT 300V REGARDLESS OF TEMPERATURE. THE MAX DC VOLTAGE OF THE MODULE AT -17C IS 48.0V (-17C - 25C) X 0.119V/C + 40.29V = 45.0V.

7. POINT-OF-CONNECTION IS ON LOAD SIDE OF SERVICE DISCONNECT. IN COMPLIANCE WITH NEC 705.12B(3)(2). OUTPUT IS BACKED THROUGH BREAKER IN MAIN PANEL.

8. THE BREAKER SHALL BE LOCATED AT THE OPPOSITE END OF THE BUSBAR FROM THE MAIN BREAKER. THE BREAKER SHALL NOT BE MARKED FOR "LINE" AND "LOAD".

9. PV SYSTEM DISCONNECT SHALL BE A VISIBLE KNIFE-BLADE TYPE DISCONNECT THAT IS ACCESSIBLE AND LOCKABLE BY THE UTILITY IN ACCORDANCE WITH NEC 690.13(E). THE DISCONNECT SHALL BE LOCATED WITHIN 10 FT OF UTILITY METER AND INSTALLED IN COMPLIANCE WITH NEC 705.50 AND GROUNDED AS REQUIRED BY NEC 230.72.

| CONDUCTOR AND CONDUIT SCHEDULE W/ELECTRICAL CALCULATIONS | | | | | | | | | | | | | | | |
|--|----------------------|--------------|----------------|----------------------------------|------|----------------------|---------------------|-------------|---------------|--------------------|--------------|--------------------|--------------------------|--------|--------------|
| ID | TYPICAL | CONDUCTOR | CONDUIT/ CABLE | CURRENT-CARRYING CONDUCTOR/CABLE | OC2P | EGC | TEMP CORRECT FACTOR | FILL FACTOR | CONT. CURRENT | MAX CURRENT (125%) | DERATED AMP. | TERM. TEMP. RATING | AMP. @ TERM. TEMP RATING | LENGTH | VOLTAGE DROP |
| 1 | 10 AWG THWN-2 COPPER | FREE AIR | 0.5" DIA EMT | 2 | N/A | 6 AWG BARE COPPER | 0.71 (90C) | 1.0 | 15A | 18.75A | 30.05A | 75C | 50A | 10FT | 0.1% |
| 2 | 10 AWG THWN-2 COPPER | 0.5" DIA EMT | 0.5" DIA EMT | 2 | N/A | 10 AWG THWN-2 COPPER | 0.68 (90C) | 1.0 | 15A | 18.75A | 30.05A | 75C | 50A | 10FT | 0.29% |
| 3 | 12 AWG THWN-2 COPPER | 0.5" DIA EMT | 0.5" DIA EMT | 2 | 20A | 12 AWG THWN-2 COPPER | 0.68 (90C) | 1.0 | 12.5A | 15.62A | 25.8A | 75C | 25A | 10FT | 0.21% |
| 4 | 12 AWG THWN-2 COPPER | 0.5" DIA EMT | 0.5" DIA EMT | 2 | 20A | 12 AWG THWN-2 COPPER | 0.68 (90C) | 1.0 | 12.5A | 15.62A | 25.8A | 75C | 25A | 10FT | 0.21% |
| 5 | 12 AWG THWN-2 COPPER | 0.5" DIA EMT | 0.5" DIA EMT | 2 | 20A | 12 AWG THWN-2 COPPER | 0.68 (90C) | 1.0 | 12.5A | 15.62A | 25.8A | 75C | 25A | 10FT | 0.21% |



DESIGN LIMITS:

| | | | |
|--------|--------|-------------|------------------------------|
| REV: A | BY: CS | DATE: 04/22 | DESCRIPTION: INITIAL RELEASE |
|--------|--------|-------------|------------------------------|

ENGINEER:

DRAWING TITLE: KEK NET METERING SAMPLE PACKET SINGLE-LINE DIAGRAM

ISSUE DATE:

DWG NO. KNM-03



1 SEE NOTE NO. 4 (MSP)

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.

NEC 690.56(C)(1)

2 SEE NOTE NO. 5 (DC RACEWAYS)

WARNING PHOTOVOLTAIC POWER SOURCE

NEC 690.31(D)(2)

3 EACH DISCONNECTING MEANS FOR PHOTOVOLTAIC EQUIPMENT (JB1, SW1, I1)

! WARNING !
ELECTRIC SHOCK HAZARD. TERMINALS ON BOTH LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION.

NEC 690.13(B)

4 DC DISCONNECT (I1)

DIRECT-CURRENT PV POWER SOURCE
MAXIMUM VOLTAGE: 380V
MAX CIRCUIT-CURRENT: 18.8A
DC-TO-DC CONVERTER RATED CURRENT: 15.0A

NEC 690.53

5 AC SOLAR DISCONNECT (SW1, CB1 IN MSP)

PV SYSTEM DISCONNECT

NEC 690.13(B)

6 AC DISCONNECT (SW1, CB1 IN MSP)

MAXIMUM AC OPERATING CURRENT: 12.5A
MAXIMUM AC OPERATING VOLTAGE: 240V

NEC 690.54

7 ANY AC ELECTRICAL PANEL THAT IS FED BY BOTH THE UTILITY AND THE PHOTOVOLTAIC SYSTEM (MSP)

! CAUTION !
MULTIPLE SOURCES OF POWER

NEC 705.10

8 SOLAR BREAKER (MSP)

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

NEC 705.12(B)(3)(2)

DC RACEWAYS

2

JB1 - TRANSITION BOX (SOLADECK 0783-3R-2ER6)

3

SW1 - DISCONNECT (SQUARE D DU221RB)

3 5 6

I1 - INVERTER (SOLAR EDGE SE3000H-US000BXX4)

3 4

MSP - MAIN SERVICE PANEL

1 5 6 7 8

LABELING NOTES

| | |
|---|---|
| 1 | ALL PLAQUES AND SIGNAGE REQUIRED BY 2020 NEC AND 2015 IFC WILL BE INSTALLED AS REQUIRED. |
| 2 | LABELS, WARNING(S) AND MARKING SHALL COMPLY WITH ANSI Z535.4, WHICH REQUIRES THAT DANGER, WARNING, AND CAUTION SIGNS USED THE STANDARD HEADER COLORS, HEADER TEXT, AND SAFETY ALERT SYMBOL ON EACH LABEL. THE ANSI STANDARD REQUIRES A HEADING THAT IS AT LEAST 50% TALLER THAN THE BODY TEXT, IN ACCORDANCE WITH NEC 110.21(B). |
| 3 | A PERMANENT PLAQUE OR DIRECTORY SHALL BE INSTALLED PROVIDING THE LOCATION OF THE SERVICE DISCONNECTING MEANS AND THE PHOTOVOLTAIC SYSTEM DISCONNECTING MEANS IF NOT IN THE SAME LOCATION IN ACCORDANCE WITH NEC 690.56(B). |
| 4 | LABEL(S) WITH MARKING, "TURN RAPID SHUTDOWN SWITCH TO THE 'OFF' POSITION TO SHUT DOWN PV SYSTEM AND REDUCE SHOCK HAZARD IN THE ARRAY," SHALL BE LOCATED WITHIN 3 FT OF SERVICE DISCONNECTING MEANS THE TITLE SHALL UTILIZE CAPITALIZED LETTERS WITH A MINIMUM HEIGHT OF 3/8" IN BLACK ON A YELLOW BACKGROUND, AND REMAINING TEXT SHALL BE CAPITALIZED WITH A MINIMUM HEIGHT OF 3/16" IN BLACK ON WHITE BACKGROUND |
| 5 | LABEL(S) WITH MARKING, "WARNING PHOTOVOLTAIC POWER SOURCE," SHALL BE LOCATED AT EVERY 10 FEET OF EACH DC RACEWAY AND WITHIN ONE FOOT ABOVE AND BELOW ALL PENETRATIONS OF ROOF/CEILING ASSEMBLIES, WALLS AND BARRIERS. THE LABEL SHALL HAVE 3/8" TALL LETTERS AND BE REFLECTIVE WITH WHITE TEXT ON A RED BACKGROUND |

| | | |
|----------------|--|---|
| DESIGN LIMITS: | ENGINEER: | ISSUE DATE: |
| | REV: A BY: CS DATE: 04/22 DESCRIPTION: INITIAL RELEASE | DRAWING TITLE: KEC NET METERING SAMPLE PACKET SAFETY LABELS DWG NO. KNM-04 |

Conductor, Conduit, and OCPD Sizing Validation

1. Maximum System Voltage Test

1.1. Solar Edge inverter w/8 Q-Cells Q.PEAK DUO BLK-G5 315 (315W)s

Array Properties

| | |
|--|---|
| Array Type | Distributed MPPT System Inverter Array |
| System Description | Solar Edge inverter w/8 Q-Cells Q.PEAK DUO BLK-G5 315 (315W)s |
| Module | Q.PEAK DUO BLK-G5 315 (315W) |
| Highest number of modules in series in a PV Source Circuit | 1 |
| Design Low Temp. | -17°C |
| Module Voc | 40.29V |
| Temp. Coefficient Voc | -0.113V/C |

NEC Code Calculations

| | |
|--|--------|
| A. Maximum Voltage of PV Source Circuit <i>see 690.7(A)</i> | 45.04V |
|--|--------|

NEC 690.7(A) requires that if the PV module manufacturer provides a temperature coefficient of open-circuit voltage, it must be used to calculate the PV array's maximum system voltage. It includes an information note recommending the use of the ASHRAE 'Extreme Annual Mean Minimum Design Dry Bulb Temperature' as the design low temperature. Using these values, the module Voc (40.29V) will increase to 45.04V at the design low temperature (-17°C).
 $(-17^{\circ}\text{C} - 25^{\circ}\text{C}) \times -0.113\text{V/C} + 40.29\text{V} = 45.04\text{V}$
 The module Voc at the design low temperature is 45.04V.
 $45.04\text{V} \times 1 = 45.04\text{V}$

| | |
|--|------|
| B. Maximum Voltage of DC-DC Converter Source Circuit <i>see 690.7(B)(2)</i> | 380V |
|--|------|

All PV circuits have a voltage that does not exceed 600V. This system's DC-DC Converter Source Circuits are fed by Solar Edge P320 dc-to-dc converter optimization devices. Each device is connected to a single Q.PEAK DUO BLK-G5 315 (315W) PV module. The voltage of this circuit is regulated by the inverter at a constant 380V.

NEC Code Validation Tests

| | | |
|----|--|------|
| 1. | PV Source Circuit maximum Voc must not exceed 600V $45.04\text{V} < 600\text{V} = \text{true}$ | PASS |
| 2. | DC-DC Converter Source Circuit voltage must not exceed 600V $380\text{V} < 600\text{V} = \text{true}$ | PASS |

2. Wire, Conduit, and OCPD Code Compliance Validation

2.1. #1: String of Optimizer(s): Optimizer to Transition Box

Circuit Section Properties

| | |
|------------------------------------|---|
| Conductor | 10 AWG PV Wire, Copper |
| Equipment Ground Conductor (EGC) | 6 AWG Bare, Copper |
| OCPD(s) | N/A |
| Raceway/Cable | Free Air |
| Lowest Terminal Temperature Rating | 75°C |
| Maximum Wire Temperature | 56°C |
| Power Source Description | DC-to-DC converter source circuit consisting of 8 Solar Edge P320 optimizers. |
| Power Source Current | 15A |
| Voltage | 380V |

NEC Code Calculations

| | |
|--|-----|
| A. Continuous Current <i>see 690.8(A)(1)(d)</i> | 15A |
|--|-----|

The continuous current of DC-to-DC converter source circuit is equal to the rated maximum output current of the optimizer.
 Rated Max. Output Current of optimizer is 15A

| | |
|--|-----|
| B. Ampacity of Conductor <i>see Table 310.15(B)(17)</i> | 55A |
|--|-----|

Ampacity (30°C) for a copper conductor with 90°C insulation in free air is 55A.

| | |
|--|--------|
| C. Derated Ampacity of Conductor <i>see Table 310.15(B)(3)(c), Table 310.15(B)(3)(a), and Article 100</i> | 39.05A |
|--|--------|

The temperature factor for 90°C insulation at 56°C is 0.71.
 The fill factor for conductors in free air is 1.
 The ampacity derated for Conditions of Use is the product of the conductor ampacity (55A) multiplied by the temperature factor (0.71) and by the fill factor (1).
 $55\text{A} \times 0.71 \times 1 = 39.05\text{A}$

| | |
|--|-----|
| D. Max Current for Terminal Temp. Rating <i>see 110.14(C)</i> | 35A |
|--|-----|

The lowest temperature rating for this conductor at any termination is 75°C.
 Using the method specified in 110.14(C), the maximum current permitted to ensure that the device terminal temperature does not exceed its 75°C rating would be the amount referenced in the 75°C column in Table 310.15(B)(16), which is 35A.

| | |
|---|--------|
| E. Minimum Required EGC Size <i>see Table 250.122 and 690.45</i> | 12 AWG |
|---|--------|

The smallest EGC size allowed is 12 AWG for OCPD rating 20A according to Table 250.122.
 According to 690.45, it is not necessary to increase the size of the PV array's EGC when conductors are oversized for voltage drop considerations.

NEC Code Validation Tests

| | | |
|----|---|------|
| 1. | Derated Ampacity must be greater than or equal to the Continuous Current (Article 100) $39.05\text{A} \geq 15\text{A} = \text{true}$ | PASS |
| 2. | Conductor Ampacity must be at least 125% of Continuous Current (215.2(A)(1)) $55\text{A} > 15\text{A} \times 1.25 = \text{true}$ | PASS |
| 3. | Max current for terminal must be at least 125% of the Continuous Current. (110.14(C)) $35\text{A} \geq 15\text{A} \times 1.25 = \text{true}$ | PASS |
| 4. | EGC must meet code requirements for minimum size (Table 250.122) $6\text{ AWG} \geq 12\text{ AWG} = \text{true}$ | PASS |
| 5. | EGC must meet code requirements for physical protection (250.120(C)) $6\text{ AWG} \geq 6\text{ AWG} = \text{true}$ | PASS |

2.2. #2: String of Optimizer(s): Transition Box to Inverter

Circuit Section Properties

| | |
|------------------------------------|---|
| Conductor | 10 AWG THWN-2, Copper |
| Equipment Ground Conductor (EGC) | 10 AWG THWN-2, Copper |
| OCPD(s) | N/A |
| Raceway/Cable | 0.5" dia. EMT |
| Lowest Terminal Temperature Rating | 90°C |
| Maximum Wire Temperature | 34°C |
| Power Source Description | DC-to-DC converter source circuit consisting of 8 Solar Edge P320 optimizers. |
| Power Source Current | 15A |
| Voltage | 380V |

NEC Code Calculations

| | |
|--|-----|
| A. Continuous Current <i>see 690.8(A)(1)(d)</i> | 15A |
|--|-----|

The continuous current of DC-to-DC converter source circuit is equal to the rated maximum output current of the optimizer.

Rated Max. Output Current of optimizer is 15A

| | |
|--|-----|
| B. Ampacity of Conductor <i>see Table 310.15(B)(16)</i> | 40A |
|--|-----|

Ampacity (30°C) for a copper conductor with 90°C insulation in conduit/cable is 40A.

| | |
|--|-------|
| C. Derated Ampacity of Conductor <i>see Table 310.15(B)(3)(c), Table 310.15(B)(3)(a), and Article 100</i> | 38.4A |
|--|-------|

The temperature factor for 90°C insulation at 34°C is 0.96.

The fill factor for a conduit/cable that has 2 wires is 1.

The ampacity derated for Conditions of Use is the product of the conductor ampacity (40A) multiplied by the temperature factor (0.96) and by the fill factor (1).

$40A \times 0.96 \times 1 = 38.4A$

| | |
|--|-----|
| D. Max Current for Terminal Temp. Rating <i>see 110.14(C)</i> | 40A |
|--|-----|

The lowest temperature rating for this conductor at any termination is 90°C.

Using the method specified in 110.14(C), the maximum current permitted to ensure that the device terminal temperature does not exceed its 90°C rating would be the amount referenced in the 90°C column in Table 310.15(B)(16), which is 40A.

| | |
|---|--------|
| E. Minimum Required EGC Size <i>see Table 250.122 and 690.45</i> | 12 AWG |
|---|--------|

The smallest EGC size allowed is 12 AWG for OCPD rating 20A according to Table 250.122.

According to 690.45, it is not necessary to increase the size of the PV array's EGC when conductors are oversized for voltage drop considerations.

| | |
|--|-----------|
| F. Minimum Recommended Conduit Size <i>see 300.17</i> | 0.5" dia. |
|--|-----------|

The total area of all conductors is 0.0633in². With a maximum fill rate of 0.4, the recommended conduit diameter is 0.5.

| Qty | Description | Size | Type | Area | Total Area |
|-----|------------------|--------|--------|-----------------------|-----------------------|
| 2 | Conductor | 10 AWG | THWN-2 | 0.0211in ² | 0.0422in ² |
| 1 | Equipment Ground | 10 AWG | THWN-2 | 0.0211in ² | 0.0211in ² |
| 3 | | | | | 0.0633in ² |

$0.0633in^2 / 0.4 = 0.1582in^2$ (Corresponding to a diameter of 0.5")

NEC Code Validation Tests

| | | |
|----|---|------|
| 1. | Derated Ampacity must be greater than or equal to the Continuous Current (Article 100) $38.4A \geq 15A = \text{true}$ | PASS |
| 2. | Conductor Ampacity must be at least 125% of Continuous Current (215.2(A)(1)) $40A > 15A \times 1.25 = \text{true}$ | PASS |
| 3. | Max current for terminal must be at least 125% of the Continuous Current. (110.14(C)) $40A \geq 15A \times 1.25 = \text{true}$ | PASS |
| 4. | EGC must meet code requirements for minimum size (Table 250.122) $10 \text{ AWG} \geq 12 \text{ AWG} = \text{true}$ | PASS |
| 5. | Conduit must meet code recommendation for minimum size (300.17) $0.5in. \geq 0.5in. = \text{true}$ | PASS |

2.3. #3: Inverter Output: Inverter to PV Generation Meter

Circuit Section Properties

| | |
|------------------------------------|---|
| Conductor | 12 AWG THWN-2, Copper |
| Equipment Ground Conductor (EGC) | 12 AWG THWN-2, Copper |
| OCPD(s) | 20A |
| Raceway/Cable | 0.5" dia. EMT |
| Lowest Terminal Temperature Rating | 75°C |
| Maximum Wire Temperature | 34°C |
| Power Source Description | Solar Edge SE3000H-US000BXX4 3000W Inverter |
| Power Source Current | 12.5A |
| Voltage | 240V |
| Inverter Max OCPD rating | 40A |

NEC Code Calculations

| | |
|---|-------|
| A. Continuous Current <i>see Article 100</i> | 12.5A |
|---|-------|

Equipment maximum rated output current is 12.5A

| | |
|--|-----|
| B. Ampacity of Conductor <i>see Table 310.15(B)(16)</i> | 30A |
|--|-----|

Ampacity (30°C) for a copper conductor with 90°C insulation in conduit/cable is 30A.

| | |
|--|-------|
| C. Derated Ampacity of Conductor <i>see Table 310.15(B)(3)(c), Table 310.15(B)(3)(a), and Article 100</i> | 28.8A |
|--|-------|

The temperature factor for 90°C insulation at 34°C is 0.96.

The fill factor for a conduit/cable that has 2 wires is 1.

The ampacity derated for Conditions of Use is the product of the conductor ampacity (30A) multiplied by the temperature factor (0.96) and by the fill factor (1).

$30A \times 0.96 \times 1 = 28.8A$

| | |
|--|-----|
| D. Max Current for Terminal Temp. Rating <i>see 110.14(C)</i> | 25A |
|--|-----|

The lowest temperature rating for this conductor at any termination is 75°C.

Using the method specified in 110.14(C), the maximum current permitted to ensure that the device terminal temperature does not exceed its 75°C rating would be the amount referenced in the 75°C column in Table 310.15(B)(16), which is 25A.

| | |
|--|-----|
| E. Minimum Allowed OCPD Rating <i>see 240.4</i> | 16A |
|--|-----|

NEC 690.9(B) requires that the OCPD be rated for no less than 1.25 times the Continuous Current of the circuit.

$12.5A \times 1.25 = 15.62A$

| | |
|---|-----|
| F. Maximum Allowed OCPD Rating <i>see 240.4(D)</i> | 20A |
|---|-----|

NEC 240.4(D) requires that OCPD rating not exceed 20A when protecting a Copper 12 AWG conductor.

| | |
|--|--------|
| G. Minimum Required EGC Size <i>see Table 250.122</i> | 12 AWG |
|--|--------|

The smallest EGC size allowed is 12 AWG for OCPD rating 20A according to Table 250.122.

| | |
|--|-----------|
| H. Minimum Recommended Conduit Size <i>see 300.17</i> | 0.5" dia. |
|--|-----------|

The total area of all conductors is 0.0532in². With a maximum fill rate of 0.4, the recommended conduit diameter is 0.5.

| Qty | Description | Size | Type | Area | Total Area |
|-----|------------------|--------|--------|-----------------------|-----------------------|
| 2 | Conductor | 12 AWG | THWN-2 | 0.0133in ² | 0.0266in ² |
| 1 | Neutral | 12 AWG | THWN-2 | 0.0133in ² | 0.0133in ² |
| 1 | Equipment Ground | 12 AWG | THWN-2 | 0.0133in ² | 0.0133in ² |
| 4 | | | | | 0.0532in ² |

$0.0532in^2 / 0.4 = 0.133in^2$ (Corresponding to a diameter of 0.5")

NEC Code Validation Tests

| | | |
|----|--|------|
| 1. | OCPD rating must be at least 125% of Continuous Current (240.4) $20A \geq 12.5A \times 1.25 = \text{true}$ | PASS |
| 2. | Derated ampacity must exceed OCPD rating, or rating of next smaller OCPD (240.4) $28.8A \geq 20A \text{ (OCPD Rating)} = \text{true}$ | PASS |
| 3. | OCPD rating must not exceed max OCPD rating for conductor (240.4) $20A \text{ (OCPD Rating)} \leq 20A = \text{true}$ | PASS |
| 4. | Derated Ampacity must be greater than or equal to the Continuous Current (Article 100) $28.8A \geq 12.5A = \text{true}$ | PASS |
| 5. | Conductor Ampacity must be at least 125% of Continuous Current (215.2(A)(1)) $30A > 12.5A \times 1.25 = \text{true}$ | PASS |
| 6. | Max current for terminal must be at least 125% of the Continuous Current. (110.14(C)) $25A \geq 12.5A \times 1.25 = \text{true}$ | PASS |
| 7. | EGC must meet code requirements for minimum size (Table 250.122) $12 \text{ AWG} \geq 12 \text{ AWG} = \text{true}$ | PASS |
| 8. | Conduit must meet code recommendation for minimum size (300.17) $0.5in. \geq 0.5in. = \text{true}$ | PASS |

2.4. #4: Production Meter Output: PV Generation Meter to Utility Disconnect

Circuit Section Properties

| | |
|------------------------------------|---|
| Conductor | 12 AWG THWN-2, Copper |
| Equipment Ground Conductor (EGC) | 12 AWG THWN-2, Copper |
| OCPD(s) | 20A |
| Raceway/Cable | 0.5" dia. EMT |
| Lowest Terminal Temperature Rating | 75°C |
| Maximum Wire Temperature | 34°C |
| Power Source Description | Solar Edge SE3000H-US000BXX4 3000W Inverter |
| Power Source Current | 12.5A |
| Voltage | 240V |

NEC Code Calculations

| | |
|------------------------|-------|
| A. Continuous Current | 12.5A |
| <i>see Article 100</i> | |

Equipment maximum rated output current is 12.5A

| | |
|--------------------------------|-----|
| B. Ampacity of Conductor | 30A |
| <i>see Table 310.15(B)(16)</i> | |

Ampacity (30°C) for a copper conductor with 90°C insulation in conduit/cable is 30A.

| | |
|--|-------|
| C. Derated Ampacity of Conductor | 28.8A |
| <i>see Table 310.15(B)(3)(c), Table 310.15(B)(3)(a), and Article 100</i> | |

The temperature factor for 90°C insulation at 34°C is 0.96.
The fill factor for a conduit/cable that has 2 wires is 1.
The ampacity derated for Conditions of Use is the product of the conductor ampacity (30A) multiplied by the temperature factor (0.96) and by the fill factor (1).
 $30A \times 0.96 \times 1 = 28.8A$

| | |
|--|-----|
| D. Max Current for Terminal Temp. Rating | 25A |
| <i>see 110.14(C)</i> | |

The lowest temperature rating for this conductor at any termination is 75°C.
Using the method specified in 110.14(C), the maximum current permitted to ensure that the device terminal temperature does not exceed its 75°C rating would be the amount referenced in the 75°C column in Table 310.15(B)(16), which is 25A.

| | |
|--------------------------------|-----|
| E. Minimum Allowed OCPD Rating | 16A |
| <i>see 240.4</i> | |

NEC 690.9(B) requires that the OCPD be rated for no less than 1.25 times the Continuous Current of the circuit.
 $12.5A \times 1.25 = 15.62A$

| | |
|--------------------------------|-----|
| F. Maximum Allowed OCPD Rating | 20A |
| <i>see 240.4(D)</i> | |

NEC 240.4(D) requires that OCPD rating not exceed 20A when protecting a Copper 12 AWG conductor.

| | |
|------------------------------|--------|
| G. Minimum Required EGC Size | 12 AWG |
| <i>see Table 250.122</i> | |

The smallest EGC size allowed is 12 AWG for OCPD rating 20A according to Table 250.122.

| | |
|-------------------------------------|-----------|
| H. Minimum Recommended Conduit Size | 0.5" dia. |
| <i>see 300.17</i> | |

The total area of all conductors is 0.0532in². With a maximum fill rate of 0.4, the recommended conduit diameter is 0.5.

| Qty | Description | Size | Type | Area | Total Area |
|-----|------------------|--------|--------|-----------------------|-----------------------|
| 2 | Conductor | 12 AWG | THWN-2 | 0.0133in ² | 0.0266in ² |
| 1 | Neutral | 12 AWG | THWN-2 | 0.0133in ² | 0.0133in ² |
| 1 | Equipment Ground | 12 AWG | THWN-2 | 0.0133in ² | 0.0133in ² |
| 4 | | | | | 0.0532in ² |

$0.0532in^2 / 0.4 = 0.133in^2$ (Corresponding to a diameter of 0.5")

NEC Code Validation Tests

| | | |
|----|--|------|
| 1. | OCPD rating must be at least 125% of Continuous Current (240.4) $20A \geq 12.5A \times 1.25 = true$ | PASS |
| 2. | Derated ampacity must exceed OCPD rating, or rating of next smaller OCPD (240.4) $28.8A \geq 20A$ (OC PD Rating) = true | PASS |
| 3. | OCPD rating must not exceed max OCPD rating for conductor (240.4) $20A$ (OC PD Rating) $\leq 20A = true$ | PASS |
| 4. | Derated Ampacity must be greater than or equal to the Continuous Current (Article 100) $28.8A \geq 12.5A = true$ | PASS |
| 5. | Conductor Ampacity must be at least 125% of Continuous Current (215.2(A)(1)) $30A > 12.5A \times 1.25 = true$ | PASS |
| 6. | Max current for terminal must be at least 125% of the Continuous Current. (110.14(C)) $25A \geq 12.5A \times 1.25 = true$ | PASS |
| 7. | EGC must meet code requirements for minimum size (Table 250.122) $12 AWG \geq 12 AWG = true$ | PASS |
| 8. | Conduit must meet code recommendation for minimum size (300.17) $0.5in. \geq 0.5in. = true$ | PASS |

2.5. #5: Utility Disconnect Output: Utility Disconnect to Main Service Panel

Circuit Section Properties

| | |
|------------------------------------|---|
| Conductor | 12 AWG THWN-2, Copper |
| Equipment Ground Conductor (EGC) | 12 AWG THWN-2, Copper |
| OCPD(s) | 20A |
| Raceway/Cable | 0.5" dia. EMT |
| Lowest Terminal Temperature Rating | 75°C |
| Maximum Wire Temperature | 34°C |
| Power Source Description | Solar Edge SE3000H-US000BXX4 3000W Inverter |
| Power Source Current | 12.5A |
| Voltage | 240V |

NEC Code Calculations

| | |
|------------------------|-------|
| A. Continuous Current | 12.5A |
| <i>see Article 100</i> | |

Equipment maximum rated output current is 12.5A

| | |
|--------------------------------|-----|
| B. Ampacity of Conductor | 30A |
| <i>see Table 310.15(B)(16)</i> | |

Ampacity (30°C) for a copper conductor with 90°C insulation in conduit/cable is 30A.

| | |
|--|-------|
| C. Derated Ampacity of Conductor | 28.8A |
| <i>see Table 310.15(B)(3)(c), Table 310.15(B)(3)(a), and Article 100</i> | |

The temperature factor for 90°C insulation at 34°C is 0.96.
The fill factor for a conduit/cable that has 2 wires is 1.
The ampacity derated for Conditions of Use is the product of the conductor ampacity (30A) multiplied by the temperature factor (0.96) and by the fill factor (1).
 $30A \times 0.96 \times 1 = 28.8A$

| | |
|--|-----|
| D. Max Current for Terminal Temp. Rating | 25A |
| <i>see 110.14(C)</i> | |

The lowest temperature rating for this conductor at any termination is 75°C.
Using the method specified in 110.14(C), the maximum current permitted to ensure that the device terminal temperature does not exceed its 75°C rating would be the amount referenced in the 75°C column in Table 310.15(B)(16), which is 25A.

| | |
|--------------------------------|-----|
| E. Minimum Allowed OCPD Rating | 16A |
| <i>see 240.4</i> | |

NEC 690.9(B) requires that the OCPD be rated for no less than 1.25 times the Continuous Current of the circuit.
 $12.5A \times 1.25 = 15.62A$

| | |
|--------------------------------|-----|
| F. Maximum Allowed OCPD Rating | 20A |
| <i>see 240.4(D)</i> | |

NEC 240.4(D) requires that OCPD rating not exceed 20A when protecting a Copper 12 AWG conductor.

| | |
|------------------------------|--------|
| G. Minimum Required EGC Size | 12 AWG |
| <i>see Table 250.122</i> | |

The smallest EGC size allowed is 12 AWG for OCPD rating 20A according to Table 250.122.

| | |
|-------------------------------------|-----------|
| H. Minimum Recommended Conduit Size | 0.5" dia. |
| <i>see 300.17</i> | |

The total area of all conductors is 0.0532in². With a maximum fill rate of 0.4, the recommended conduit diameter is 0.5.

| Qty | Description | Size | Type | Area | Total Area |
|-----|------------------|--------|--------|-----------------------|-----------------------|
| 2 | Conductor | 12 AWG | THWN-2 | 0.0133in ² | 0.0266in ² |
| 1 | Neutral | 12 AWG | THWN-2 | 0.0133in ² | 0.0133in ² |
| 1 | Equipment Ground | 12 AWG | THWN-2 | 0.0133in ² | 0.0133in ² |
| 4 | | | | | 0.0532in ² |

$0.0532in^2 / 0.4 = 0.133in^2$ (Corresponding to a diameter of 0.5")

NEC Code Validation Tests

| | | |
|----|--|------|
| 1. | OCPD rating must be at least 125% of Continuous Current (240.4) $20A \geq 12.5A \times 1.25 = true$ | PASS |
| 2. | Derated ampacity must exceed OCPD rating, or rating of next smaller OCPD (240.4) $28.8A \geq 20A$ (OC PD Rating) = true | PASS |
| 3. | OCPD rating must not exceed max OCPD rating for conductor (240.4) $20A$ (OC PD Rating) $\leq 20A = true$ | PASS |
| 4. | Derated Ampacity must be greater than or equal to the Continuous Current (Article 100) $28.8A \geq 12.5A = true$ | PASS |
| 5. | Conductor Ampacity must be at least 125% of Continuous Current (215.2(A)(1)) $30A > 12.5A \times 1.25 = true$ | PASS |
| 6. | Max current for terminal must be at least 125% of the Continuous Current. (110.14(C)) $25A \geq 12.5A \times 1.25 = true$ | PASS |
| 7. | EGC must meet code requirements for minimum size (Table 250.122) $12 AWG \geq 12 AWG = true$ | PASS |
| 8. | Conduit must meet code recommendation for minimum size (300.17) $0.5in. \geq 0.5in. = true$ | PASS |



Q.PEAK DUO BLK-G5 300-320

Q.ANTUM SOLAR MODULE

The new Q.PEAK DUO BLK-G5 solar module from Q CELLS impresses with its outstanding visual appearance and particularly high performance on a small surface thanks to the innovative Q.ANTUM DUO Technology. Q.ANTUM's world-record-holding cell concept has now been combined with state-of-the-art circuitry half cells and a six-busbar design, thus achieving outstanding performance under real conditions — both with low-intensity solar radiation as well as on hot, clear summer days.



Q.ANTUM TECHNOLOGY: LOW LEVELIZED COST OF ELECTRICITY

Higher yield per surface area, lower BOS costs, higher power classes, and an efficiency rate of up to 19.3%.



INNOVATIVE ALL-WEATHER TECHNOLOGY

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



ENDURING HIGH PERFORMANCE

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



EXTREME WEATHER RATING

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



A RELIABLE INVESTMENT

Inclusive 12-year product warranty and 25-year linear performance guarantee².



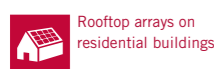
STATE OF THE ART MODULE TECHNOLOGY

Q.ANTUM DUO combines cutting edge cell separation and innovative wiring with Q.ANTUM Technology.



¹ APT test conditions according to IEC/TS 62804-1:2015, method B (-1500V, 168h)
² See data sheet on rear for further information.

THE IDEAL SOLUTION FOR:

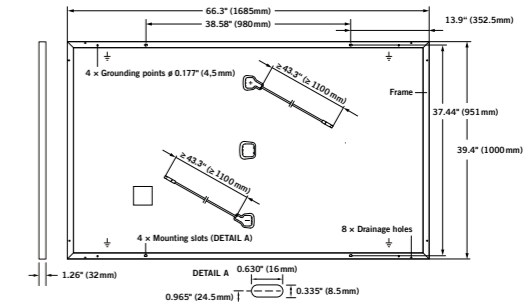


Engineered in Germany



MECHANICAL SPECIFICATION

| | |
|---------------------|---|
| Format | 66.3 in × 39.4 in × 1.26 in (including frame) (1685 mm × 1000 mm × 32 mm) |
| Weight | 41.2 lbs (18.7 kg) |
| Front Cover | 0.13 in (3.2 mm) thermally pre-stressed glass with anti-reflection technology |
| Back Cover | Composite film |
| Frame | Black anodized aluminum |
| Cell | 6 × 20 monocrystalline Q.ANTUM solar half-cells |
| Junction box | 2.76-3.35 in × 1.97-2.76 in × 0.51-0.83 in (70-85 mm × 50-70 mm × 13-21 mm), decentralized, IP67 |
| Cable | 4 mm ² Solar cable; (+) ≥ 43.3 in (1100 mm), (-) ≥ 43.3 in (1100 mm) |
| Connector | Multi-Contact MC4, IP68 |

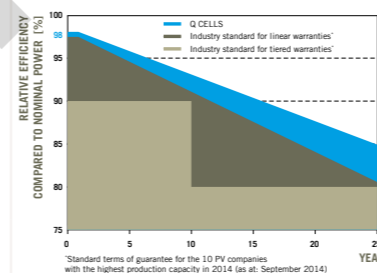


ELECTRICAL CHARACTERISTICS

| POWER CLASS | | 300 | 305 | 310 | 315 | 320 | |
|---|--|----------------------------|--------|--------|--------|--------|--------|
| MINIMUM PERFORMANCE AT STANDARD TEST CONDITIONS, STC ¹ (POWER TOLERANCE +5 W / -0 W) | | | | | | | |
| Minimum | Power at MPP¹ | P_{MPP} [W] | 300 | 305 | 310 | 315 | 320 |
| | Short Circuit Current¹ | I_{SC} [A] | 9.72 | 9.78 | 9.83 | 9.89 | 9.94 |
| | Open Circuit Voltage¹ | V_{OC} [V] | 39.48 | 39.75 | 40.02 | 40.29 | 40.56 |
| | Current at MPP | I_{MPP} [A] | 9.25 | 9.31 | 9.36 | 9.41 | 9.47 |
| | Voltage at MPP | V_{MPP} [V] | 32.43 | 32.78 | 33.12 | 33.46 | 33.80 |
| | Efficiency¹ | η [%] | ≥ 17.8 | ≥ 18.1 | ≥ 18.4 | ≥ 18.7 | ≥ 19.0 |
| MINIMUM PERFORMANCE AT NORMAL OPERATING CONDITIONS, NMOT ² | | | | | | | |
| Minimum | Power at MPP | P_{MPP} [W] | 224.1 | 227.8 | 231.6 | 235.3 | 239.1 |
| | Short Circuit Current | I_{SC} [A] | 7.83 | 7.88 | 7.92 | 7.97 | 8.01 |
| | Open Circuit Voltage | V_{OC} [V] | 37.15 | 37.40 | 37.66 | 37.91 | 38.17 |
| | Current at MPP | I_{MPP} [A] | 7.28 | 7.32 | 7.37 | 7.41 | 7.45 |
| Voltage at MPP | V_{MPP} [V] | 30.78 | 31.11 | 31.44 | 31.76 | 32.08 | |

¹ Measurement tolerances P_{MPP} ± 3%; I_{SC}, V_{OC} ± 5% at STC: 1000 W/m², 25 ± 2°C, AM 1.5G according to IEC 60904-3 - 2800 W/m², NMOT, spectrum AM 1.5G

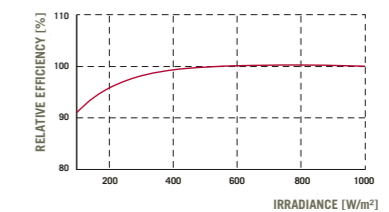
Q CELLS PERFORMANCE WARRANTY



At least 98% of nominal power during first year. Thereafter max. 0.54% degradation per year. At least 93.1% of nominal power up to 10 years. At least 85% of nominal power up to 25 years.

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

PERFORMANCE AT LOW IRRADIANCE



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

TEMPERATURE COEFFICIENTS

| | | | | | |
|---|----------------|-------|--|------------------|----------------------|
| Temperature Coefficient of I_{SC} | α [%/K] | +0.04 | Temperature Coefficient of V_{OC} | β [%/K] | -0.28 |
| Temperature Coefficient of P_{MPP} | γ [%/K] | -0.37 | Normal Operating Module Temperature | NMOT [°F] | 109 ± 5.4 (43 ± 3°C) |

PROPERTIES FOR SYSTEM DESIGN

| | | | | |
|---|------------------------|------------------------------|--|---|
| Maximum System Voltage V_{sys} | [V] | 1000 (IEC) / 1000 (UL) | Safety Class | II |
| Maximum Series Fuse Rating | [A DC] | 20 | Fire Rating | C (IEC) / TYPE 1 (UL) |
| Max. Design Load, Push / Pull (UL)² | [lbs/ft ²] | 75 (3600 Pa) / 55 (2667 Pa) | Permitted module temperature on continuous duty | -40°F up to +185°F (-40°C up to +85°C) |
| Max. Test Load, Push / Pull (UL)² | [lbs/ft ²] | 113 (5400 Pa) / 84 (4000 Pa) | ² see installation manual | |

QUALIFICATIONS AND CERTIFICATES

UL 1703; VDE Quality Tested; CE-compliant; IEC 61215:2016; IEC 61730:2016, Application class A



PACKAGING INFORMATION

| | |
|--|--|
| Number of Modules per Pallet | 32 |
| Number of Pallets per 53' Trailer | 30 |
| Number of Pallets per 40' High Cube Container | 26 |
| Pallet Dimensions (L × W × H) | 69.3 in × 45.3 in × 46.9 in (1760 mm × 1150 mm × 1190 mm) |
| Pallet Weight | 1415 lbs (642 kg) |

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

Hanwha Q CELLS America Inc.
 300 Spectrum Center Drive, Suite 1250, Irvine, CA 92618, USA | TEL +1 949 748 59 96 | EMAIL inquiry@us.q-cells.com | WEB www.q-cells.us

Power Optimizer

For North America

P320 / P340 / P370 / P400 / P405 / P505



POWER OPTIMIZER

PV power optimization at the module-level

- Specifically designed to work with SolarEdge inverters
- Up to 25% more energy
- Superior efficiency (99.5%)
- Mitigates all types of module mismatch losses, from manufacturing tolerance to partial shading
- Flexible system design for maximum space utilization
- Fast installation with a single bolt
- Next generation maintenance with module-level monitoring
- Meets NEC requirements for arc fault protection (AFCI) and Photovoltaic Rapid Shutdown System (PVRSS)
- Module-level voltage shutdown for installer and firefighter safety

Power Optimizer For North America

P320 / P340 / P370 / P400 / P405 / P505

| Optimizer model (typical module compatibility) | P320 (for 60-cell modules) | P340 (for high-power 60-cell modules) | P370 (for higher-power 60 and 72-cell modules) | P400 (for 72 & 96-cell modules) | P405 (for thin film modules) | P505 (for higher current modules) | | |
|---|--|---------------------------------------|--|----------------------------------|----------------------------------|-----------------------------------|---------|---------|
| INPUT | | | | | | | | |
| Rated Input DC Power ⁽¹⁾ | 320 | 340 | 370 | 400 | 405 | 505 | W | |
| Absolute Maximum Input Voltage (Voc at lowest temperature) | 48 | 60 | 80 | 125 ⁽²⁾ | 83 ⁽²⁾ | | Vdc | |
| MPPT Operating Range | 8 - 48 | 8 - 60 | 8 - 80 | 12.5 - 105 | 12.5 - 83 | | Vdc | |
| Maximum Short Circuit Current (Isc) | | 11 | | 10.1 | 14 | | Adc | |
| Maximum DC Input Current | | 13.75 | | 12.63 | 17.5 | | Adc | |
| Maximum Efficiency | | | 99.5 | | | | % | |
| Weighted Efficiency | | | 98.8 | | | 98.6 | % | |
| Overvoltage Category | II | | | | | | | |
| OUTPUT DURING OPERATION (POWER OPTIMIZER CONNECTED TO OPERATING SOLAREEDGE INVERTER) | | | | | | | | |
| Maximum Output Current | 15 | | | | | | Adc | |
| Maximum Output Voltage | 60 | | | 85 | | | Vdc | |
| OUTPUT DURING STANDBY (POWER OPTIMIZER DISCONNECTED FROM SOLAREEDGE INVERTER OR SOLAREEDGE INVERTER OFF) | | | | | | | | |
| Safety Output Voltage per Power Optimizer | 1 ± 0.1 | | | | | | Vdc | |
| STANDARD COMPLIANCE | | | | | | | | |
| EMC | FCC Part15 Class B, IEC61000-6-2, IEC61000-6-3 | | | | | | | |
| Safety | IEC62109-1 (class II safety), UL1741 | | | | | | | |
| RoHS | Yes | | | | | | | |
| INSTALLATION SPECIFICATIONS | | | | | | | | |
| Maximum Allowed System Voltage | 1000 | | | | | | Vdc | |
| Compatible inverters | All SolarEdge Single Phase and Three Phase inverters | | | | | | | |
| Dimensions (W x L x H) | 128 x 152 x 28 / 5 x 5.97 x 1.1 | | 128 x 152 x 36 / 5 x 5.97 x 1.42 | 128 x 152 x 50 / 5 x 5.97 x 1.96 | 128 x 152 x 59 / 5 x 5.97 x 2.32 | | mm / in | |
| Weight (including cables) | 630 / 1.4 | | 750 / 1.7 | 845 / 1.9 | 1064 / 2.3 | | gr / lb | |
| Input Connector | MC4 ⁽³⁾ | | | | | | | |
| Output Wire Type / Connector | Double Insulated; MC4 | | | | | | | |
| Output Wire Length | 0.95 / 3.0 | | 1.2 / 3.9 | | | | m / ft | |
| Input Wire Length | 0.16 / 0.52 | | | | | | | m / ft |
| Operating Temperature Range | -40 - +85 / -40 - +185 | | | | | | | °C / °F |
| Protection Rating | IP68 / NEMA6P | | | | | | | |
| Relative Humidity | 0 - 100 | | | | | | | % |

⁽¹⁾ Rated STC power of the module. Module of up to +5% power tolerance allowed
⁽²⁾ NEC 2017 requires max input voltage be not more than 80V
⁽³⁾ For other connector types please contact SolarEdge

| PV System Design Using a SolarEdge Inverter ⁽⁴⁾⁽⁵⁾ | Single Phase HD-Wave | Single phase | Three Phase 208V | Three Phase 480V | |
|---|---|--------------|---------------------|----------------------|---|
| Minimum String Length (Power Optimizers) | P320, P340, P370, P400 P405 / P505 | 8 | 10 | 18 | |
| Maximum String Length (Power Optimizers) | | 6 | 8 | 14 | |
| Maximum Power per String | | 25 | 25 | 50 ⁽⁶⁾ | |
| Maximum Power per String | 5700 (6000 with SE7600-US - SE11400-US) | 5250 | 6000 ⁽⁷⁾ | 12750 ⁽⁸⁾ | W |
| Parallel Strings of Different Lengths or Orientations | Yes | | | | |

⁽⁴⁾ For detailed string sizing information refer to: http://www.solaredge.com/sites/default/files/string_sizing_na.pdf
⁽⁵⁾ It is not allowed to mix P405/P505 with P320/P340/P370/P400 in one string
⁽⁶⁾ A string with more than 30 optimizers does not meet NEC rapid shutdown requirements; safety voltage will be above the 30V requirement
⁽⁷⁾ For SE14.4KUS/SE43.2KUS: It is allowed to install up to 6,500W per string when 3 strings are connected to the inverter (3 strings per unit for SE43.2KUS) and when the maximum power difference between the strings is up to 1,000W
⁽⁸⁾ For SE30KUS/SE33.3KUS/SE66.6KUS/SE100KUS: It is allowed to install up to 15,000W per string when 3 strings are connected to the inverter (3 strings per unit for SE66.6KUS/SE100KUS) and when the maximum power difference between the strings is up to 2,000W

SolaDeck

FLASHED PV ROOF-MOUNT COMBINER/ENCLOSURE

Basic Features

- Stamped Seamless Construction
- 18 Gauge Galvanized Steel
- Powder Coated Surfaces
- Flashes into the roof deck
- 3 Roof deck knockouts .5", .75", 1"
- 5 Centering dimples for entry/exit fittings or conduit
- 2 Position Ground lug installed
- Mounting Hardware Included



SolaDeck Model SD 0783



SolaDeck UL50 Type 3R Enclosures

Available Models:

Model SD 0783 - (3" fixed Din Rail)

Model SD 0786 - (6" slotted Din Rail)



SolaDeck UL 1741 Combiner/Enclosures

Models SD 0783-41 and SD 0786-41 are labeled and ETL listed UL STD 1741 according to the UL STD 1741 for photovoltaic combiner enclosures.

Max Rated - 600VDC, 120AMPS

Model SD 0783-41 3" Fixed Din Rail fastened using Norlock System

****Typical System Configuration**

- 4- Din Rail Mounted Fuse Holders 600VDC 30 AMP
- 1- Power Distribution Block 600VDC 175AMP
- 1- Bus Bar with UL lug

Model SD 0786-41 6" Slotted Din Rail fastened using steel studs

****Typical System Configuration**

- 4- Din Rail Mounted Fuse Holders 600VDC 30 AMP
- 4- Din Rail Mounted Terminal Blocks
- Bus Bars with UL lug

**Fuse holders and terminal blocks added in the field must be UL listed or recognized and meet 600 VDC 30 AMP 110C for fuse holders, 600V 50 AMP 90C for rail mounted terminal blocks and 600 V 175 AMP 90C for Power Distribution Blocks. Use Copper Wire Conductors.



Cover is trimmed to allow conduit or fittings, base is center dimpled for fitting locations.



Model SD 0783-41, wired with Din Rail mounted fuse holders, bus bar and power distribution block.



Model SD 0786-41, wired with Din Rail mounted fuse holders, terminal blocks and bus bars.

Product data sheet
Characteristics

DU221RB
SWITCH NOT FUSIBLE GD 240V 30A 2P
NEMA3R

Stock Code: Stock - Normally stocked in distribution facility
Price*: 177.00 USD



Main

| | |
|---------------------------|----------------------------|
| Product | Single Throw Safety Switch |
| Current Rating | 30 A |
| Certifications | UL listed |
| Enclosure Rating | NEMA 3R |
| Disconnect Type | Non-fusible disconnect |
| Factory Installed Neutral | None |
| Mounting Type | Surface |
| Number of Poles | 2 |
| Electrical Connection | Lugs |
| Duty Rating | General duty |

Ordering and shipping details

| | |
|-----------------------|-----------------------------------|
| Category | 00106 - D & DU SW,NEMA3R, 30-200A |
| Discount Schedule | DE1A |
| GTIN | 00785901490340 |
| Nbr. of units in pkg. | 1 |
| Package weight(Lbs) | 4.8600000000000003 |
| Returnability | Y |
| Country of origin | MX |

Contractual warranty

| | |
|--------|-----------|
| Period | 18 months |
|--------|-----------|

Product Life Status : **Commercialised**

The information provided in this documentation contains general descriptions and/or technical characteristics of the performance of the products contained herein. This documentation is not intended as a substitute for and is not to be used for determining suitability or reliability of these products for specific user applications. It is the duty of any such user or integrator to perform the appropriate and complete risk analysis, evaluation and testing of the products with respect to the relevant specific application or use thereof. Neither Schneider Electric Industries SAS nor any of its affiliates or subsidiaries shall be responsible or liable for misuse of the information contained herein. *Prices are indicative

Single Phase Inverter with HD-Wave Technology

for North America

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



12-25
YEAR
WARRANTY

INVERTERS

Optimized installation with HD-Wave technology

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

/ Single Phase Inverter with HD-Wave Technology for North America

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

| MODEL NUMBER | SE3000H-US | SE3800H-US | SE5000H-US | SE6000H-US | SE7600H-US | SE10000H-US | SE11400H-US | |
|---|--------------------------------|----------------------------|------------|----------------------------|------------|-------------|------------------------------|-----|
| APPLICABLE TO INVERTERS WITH PART NUMBER | SEXXXXH-XXXXBXX4 | | | | | | | |
| OUTPUT | | | | | | | | |
| Rated AC Power Output | 3000 | 3800 @ 240V 3300 @ 208V | 5000 | 6000 @ 240V 5000 @ 208V | 7600 | 10000 | 11400 @ 240V 10000 @ 208V | VA |
| Maximum AC Power Output | 3000 | 3800 @ 240V 3300 @ 208V | 5000 | 6000 @ 240V 5000 @ 208V | 7600 | 10000 | 11400 @ 240V 10000 @ 208V | VA |
| AC Output Voltage Min.-Nom.-Max. (211 - 240 - 264) | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | Vac |
| AC Output Voltage Min.-Nom.-Max. (183 - 208 - 229) | - | ✓ | - | ✓ | - | - | ✓ | Vac |
| AC Frequency (Nominal) | 59.3 - 60 - 60.5 ¹⁾ | | | | | | | Hz |
| Maximum Continuous Output Current @240V | 12.5 | 16 | 21 | 25 | 32 | 42 | 47.5 | A |
| Maximum Continuous Output Current @208V | - | 16 | - | 24 | - | - | 48.5 | A |
| Power Factor | 1, Adjustable - 0.85 to 0.85 | | | | | | | |
| GFDI Threshold | 1 | | | | | | | A |
| Utility Monitoring, Islanding Protection, Country Configurable Thresholds | Yes | | | | | | | |
| INPUT | | | | | | | | |
| Maximum DC Power @240V | 4650 | 5900 | 7750 | 9300 | 11800 | 15500 | 17650 | W |
| Maximum DC Power @208V | - | 5100 | - | 7750 | - | - | 15500 | W |
| Transformer-less, Ungrounded | Yes | | | | | | | |
| Maximum Input Voltage | 480 | | | | | | | Vdc |
| Nominal DC Input Voltage | 380 | | | | 400 | | | Vdc |
| Maximum Input Current @240V ²⁾ | 8.5 | 10.5 | 13.5 | 16.5 | 20 | 27 | 30.5 | Adc |
| Maximum Input Current @208V ²⁾ | - | 9 | - | 13.5 | - | - | 27 | Adc |
| Max. Input Short Circuit Current | 45 | | | | | | | Adc |
| Reverse-Polarity Protection | Yes | | | | | | | |
| Ground-Fault Isolation Detection | 600k Ω Sensitivity | | | | | | | |
| Maximum Inverter Efficiency | 99 | 99.2 | | | | | | % |
| CEC Weighted Efficiency | 99 | | | | | | 99 @ 240V 98.5 @ 208V | % |
| Nighttime Power Consumption | < 2.5 | | | | | | | W |

¹⁾ For other regional settings please contact SolarEdge support

²⁾ A higher current source may be used; the inverter will limit its input current to the values stated

/ Single Phase Inverter with HD-Wave Technology for North America

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

| MODEL NUMBER | SE3000H-US | SE3800H-US | SE5000H-US | SE6000H-US | SE7600H-US | SE10000H-US | SE11400H-US | |
|--|---|-------------|-------------|-------------------------------------|------------|-------------|-------------|---------|
| ADDITIONAL FEATURES | | | | | | | | |
| Supported Communication Interfaces | RS485, Ethernet, ZigBee (optional), Cellular (optional) | | | | | | | |
| Revenue Grade Metering, ANSI C12.20 | Optional ⁽³⁾ | | | | | | | |
| Consumption metering | | | | | | | | |
| Inverter Commissioning | With the SetApp mobile application using Built-in Wi-Fi Access Point for Local Connection | | | | | | | |
| Rapid Shutdown - NEC 2014 and 2017 690.12 | Automatic Rapid Shutdown upon AC Grid Disconnect | | | | | | | |
| STANDARD COMPLIANCE | | | | | | | | |
| Safety | UL1741, UL1741 SA, UL1699B, CSA C22.2, Canadian AFCI according to T.I.L. M-07 | | | | | | | |
| Grid Connection Standards | IEEE1547, Rule 21, Rule 14 (HI) | | | | | | | |
| Emissions | FCC Part 15 Class B | | | | | | | |
| INSTALLATION SPECIFICATIONS | | | | | | | | |
| AC Output Conduit Size / AWG Range | 1" Maximum / 14-6 AWG | | | 1" Maximum /14-4 AWG | | | | |
| DC Input Conduit Size / # of Strings / AWG Range | 1" Maximum / 1-2 strings / 14-6 AWG | | | 1" Maximum / 1-3 strings / 14-6 AWG | | | | |
| Dimensions with Safety Switch (HxWxD) | 17.7 x 14.6 x 6.8 / 450 x 370 x 174 | | | 21.3 x 14.6 x 7.3 / 540 x 370 x 185 | | | in / mm | |
| Weight with Safety Switch | 22 / 10 | 25.1 / 11.4 | 26.2 / 11.9 | 38.8 / 17.6 | | | lb / kg | |
| Noise | < 25 | | | <50 | | | | dB(A) |
| Cooling | Natural Convection | | | | | | | |
| Operating Temperature Range | -40 to +140 / -40 to +60 ⁽⁴⁾ | | | | | | | °F / °C |
| Protection Rating | NEMA 4X (Inverter with Safety Switch) | | | | | | | |

⁽³⁾ Inverter with Revenue Grade Meter P/N: SExxxxH-US000BNC4; Inverter with Revenue Grade Production and Consumption Meter P/N: SExxxxH-US000BN14 . For consumption metering, current transformers should be ordered separately: SEACT0750-200NA-20 or SEACT0750-400NA-20. 20 units per box

⁽⁴⁾ Full power up to at least 50°C / 122°F; for power de-rating information refer to: <https://www.solaredge.com/sites/default/files/se-temperature-derating-note-na.pdf>

How to Enable Consumption Monitoring

By simply wiring current transformers through the inverter's existing AC conduits and connecting them to the service panel, homeowners will gain full insight into their household energy usage helping them to avoid high electricity bills

