TVEC

TRINITY VALLEY ELECTRIC COOPERATIVE

# DER / Solar Installation Guidelines

• **All DER applications require an engineer-stamped complete plan set.** This must include an aerial site layout, a wiring diagram, and all equipment spec sheets. Design and installation shall comply with the NEC and local governing requirements.

• **Every applicant must submit verification of the installer's Texas Electrical Contractor's License.** All installations or system alterations must be conducted by a TDLR electrical contractor who is a master electrician or employs a master electrician who will oversee the installation.

• **Jacket/insulation piercing connectors:** taps for interconnection are only permitted if installed after the first overcurrent device, where an OCPD is between the utility meter and the Jacket piercing connectors.

• **Each distributed energy system must have a Rapid Shutdown function.** Lockable disconnect(s) must also be installed at each alternate source, allowing for the disconnection of each source without disconnecting the site from grid power. Please see our sample line diagrams for proper placement.

• **TVEC requires a production meter for every DER installation,** which captures total production before any consumption from the site loads. Termination of the DER source shall occur on the Load/Bottom side of the production meter base. TVEC does not supply the meter base but will install the production meter upon notification of a completed installation. Please see our sample line diagrams for proper placement.

• **The disconnect(s) for all grid-tied distributed energy sources and production meter base shall accompany the utility meter** (within 10 feet) and be accessible to the utility from the exterior of the installation site. This requirement applies to all ground—and roof-mounted systems where the interconnection occurs on the same structure that houses the utility billing meter.

• **All disconnects, and the production meter base must have permanent identifying labels,** such as "Battery Disconnect, Solar Disconnect, Production Meter." The utility meter base must have a permanent label that states "Caution: Multiple Sources Of Power."

• **The Production meter base and all alternate source disconnects shall be installed at a minimum height of 4 feet** and a maximum height of 6 feet above the finished grade. All measurements are taken from the finished grade to the center of the equipment.

**Disconnect & Production Meter Proximity Exceptions**
Under the exceptions below, placards (Minimum size 5"x 5") must be installed within one foot of the utility billing meter and one foot of the source disconnects. The placards must contain a complete aerial layout of the site and equipment, giving specific directions to the location of all alternate source disconnects and the production and utility billing meters.

**a.** If there is not enough space within 10 feet of the utility meter to house all the proposed equipment. (TVEC must approve this assessment)

**b.** The DER installation and interconnection will occur on a structure served by a utility meter located on a separate structure. (i.e., The house meter also services the shop where the installation and interconnection are to take place)

**c.** The utility meter that serves the site is on a meter pole, pedestal, or pad-mounted transformer, not mounted on the actual structure where the installation will occur.

Under any exception, TVEC access to the production, utility billing meter, and all alternate source disconnects shall not be hindered.

TVEC acknowledges certain developments, and HOAs may have different requirements regarding DER equipment placement. However, to ensure ease of access for all emergency and utility personnel, TVEC requires that the alternate source disconnect(s), Rapid Shutdown Device, and the production meter base accompany the existing utility meter with no fence, partition, or divider separating this equipment. ( Approved exceptions are still subject to all placarding requirements.)

**Installations that do not meet these requirements are prohibited.**

# ENPHASE MICRO INVERTERS SYSTEM LINE SIDE CONNECTION

THIS DRAWING IS AN EXAMPLE ONLY, MEANT TO SHOW THE MINIMUM SYSTEM DETAIL AND THE PROPER PLACEMENT OF THE AC DISCONNECT(S) AND PRODUCTION METER BASE. ALL INTERCONNECTIONS REQUIRE AN ENGINEER STAMPED/APPROVED COMPLETE PLAN SET. DESIGN, WIRE, CONDUIT, AND OCPDs SHALL COMPLY WITH THE NEC & LOCAL GOVERNING REQUIREMENTS.

| INVERTER SPECIFICATIONS | |
|---|---|
| MANUFACTURER | ENPHASE IQ8PLUS-72-2-US [240V] |
| MAX. DC VOLTAGE RATING | 60 VOLTS |
| MAX. POWER AT 40°C | 290 WATTS |
| NOMINAL AC VOLTAGE | 240 VOLTS |
| MAX. AC CURRENT | 1.21 AMPS |
| MAX OCPD RATING | 20 AMPS |
| MAX. PANELS/CIRCUIT | 13 |
| SHORT CIRCUIT CURRENT | 15 AMPS |

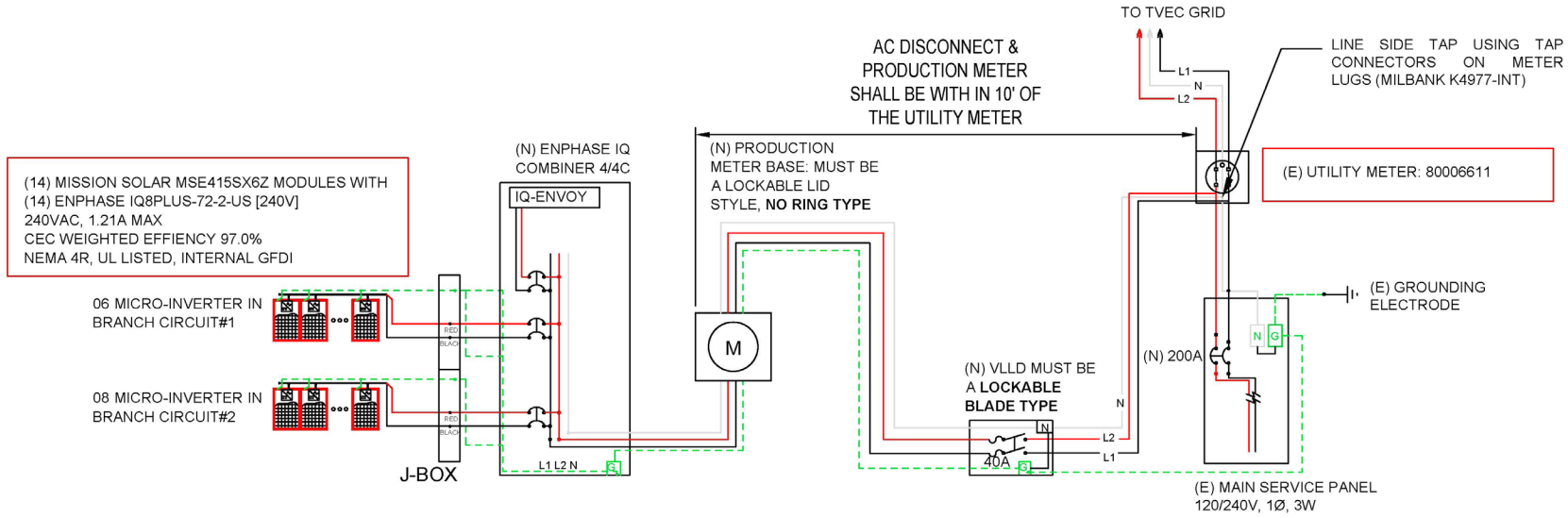
| PV MODULE RATING @ STC | |
|---|---|
| MANUFACTURER | MISSION SOLAR MSE415SX6Z |
| MAX POWER-POINT CURRENT (IMP) | 10.35 AMPS |
| MAX POWER-POINT VOLTAGE (VMP) | 40.09 VOLTS |
| OPEN CIRCUIT VOLTAGE (VOC) | 48.91 VOLTS |
| SHORT-CIRCUIT CURRENT (ISC) | 10.91 AMPS |
| NOM. MAX POWER AT STC (PMAX) | 415 WATT |
| MAX. SYSTEM VOLTAGE | 1500 VOLTS |
| VOC TEMP. COEFF. | -0.26/°C |

SYSTEM SIZE: 5.810 kW DC
4.060 kW AC
MODULE: (14) MISSION SOLAR MSE415SX6Z
INVERTER: (14) ENPHASE IQ8PLUS-72-2-US [240V]

**NOTES:**
THE HIGHLIGHTED INFORMATION REPRESENTS THE MINIMUM SYSTEM & SITE INFORMATION REQUIRED ON EVERY LINE DRAWING.

- SYSTEM SIZE (KW)
- INVERTER SPECIFICATIONS
- MODULE SPECIFICATIONS
- BATTERY SPECIFICATIONS (IF APPLICABLE)
- TVEC ACCOUNT NUMBER
- TVEC METER NUMBER (POINT OF INTERCONNECTION)

ACCOUNT# 60111568-002





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TRINITY VALLEY ELECTRIC COOPERATIVE

ENPHASE MICRO INVERTERS SYSTEM
LINE SIDE CONNECTION

No installation shall begin before design approval and all applicable fees have been paid.
If our examples do not address your site design, please email us at energymanagement@tvec.coop for further clarification.

# ENPHASE MICRO INVERTERS SYSTEM LOAD SIDE CONNECTION

THIS DRAWING IS AN EXAMPLE ONLY, MEANT TO SHOW THE MINIMUM SYSTEM DETAIL AND THE PROPER PLACEMENT OF THE AC DISCONNECT(S) AND PRODUCTION METER BASE. ALL INTERCONNECTIONS REQUIRE AN ENGINEER STAMPED/APPROVED COMPLETE PLAN SET. DESIGN, WIRE, CONDUIT, AND OCPDs SHALL COMPLY WITH THE NEC & LOCAL GOVERNING REQUIREMENTS.

| INVERTER SPECIFICATIONS | |
|---|---|
| MANUFACTURER | ENPHASE IQ8PLUS-72-2-US [240V] |
| MAX. DC VOLTAGE RATING | 60 VOLTS |
| MAX. POWER AT 40°C | 290 WATTS |
| NOMINAL AC VOLTAGE | 240 VOLTS |
| MAX. AC CURRENT | 1.21 AMPS |
| MAX OCPD RATING | 20 AMPS |
| MAX. PANELS/CIRCUIT | 13 |
| SHORT CIRCUIT CURRENT | 15 AMPS |

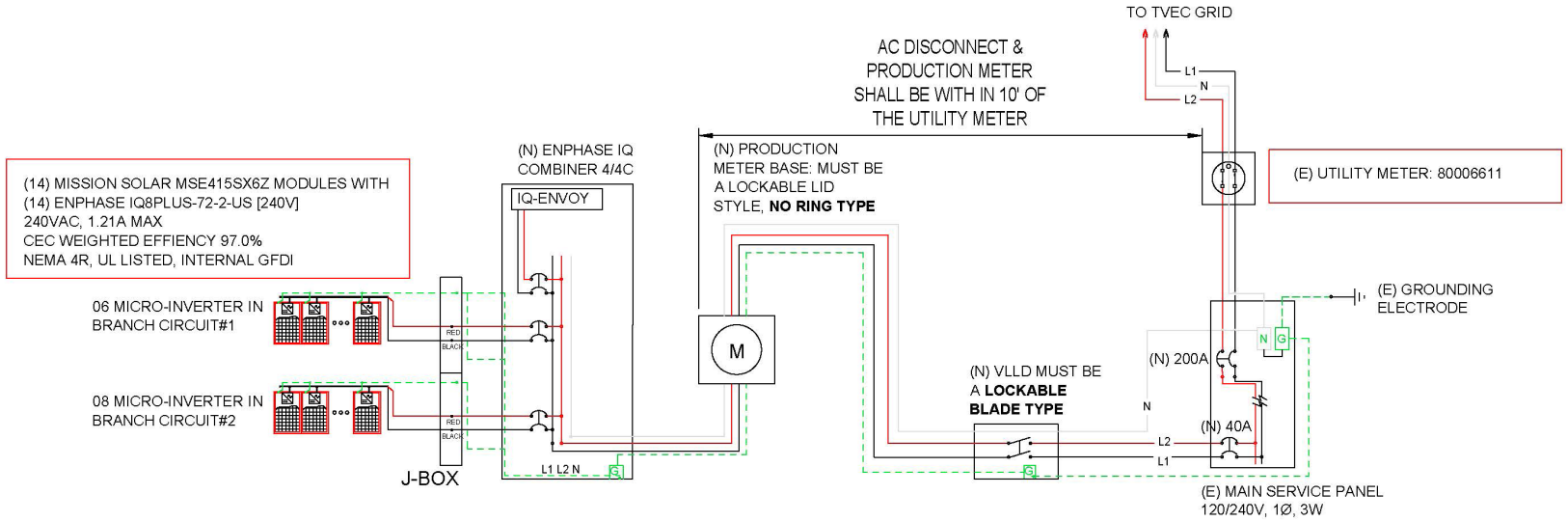
| PV MODULE RATING @ STC | |
|---|---|
| MANUFACTURER | MISSION SOLAR MSE415SX6Z |
| MAX POWER-POINT CURRENT (IMP) | 10.35 AMPS |
| MAX POWER-POINT VOLTAGE (VMP) | 40.09 VOLTS |
| OPEN CIRCUIT VOLTAGE (VOC) | 48.91 VOLTS |
| SHORT-CIRCUIT CURRENT (ISC) | 10.91 AMPS |
| NOM. MAX POWER AT STC (PMAX) | 415 WATT |
| MAX. SYSTEM VOLTAGE | 1500 VOLTS |
| VOC TEMP. COEFF. | -0.26/°C |

SYSTEM SIZE: 5.810 kW DC
4.060 kW AC
MODULE: (14) MISSION SOLAR MSE415SX6Z
INVERTER: (14) ENPHASE IQ8PLUS-72-2-US [240V]

**NOTES:**
THE HIGHLIGHTED INFORMATION REPRESENTS THE MINIMUM SYSTEM & SITE INFORMATION REQUIRED ON EVERY LINE DRAWING.

- SYSTEM SIZE (KW)
- INVERTER SPECIFICATIONS
- MODULE SPECIFICATIONS
- BATTERY SPECIFICATIONS (IF APPLICABLE)
- TVEC ACCOUNT NUMBER
- TVEC METER NUMBER (POINT OF INTERCONNECTION)

ACCOUNT# 60111568-002





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ENPHASE MICRO INVERTERS SYSTEM
LOAD SIDE CONNECTION

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# STRING INVERTER SYSTEM LOAD SIDE CONNECTION

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| INVERTER SPECIFICATIONS | |
|---|---|
| MANUFACTURER | SMA SUNNY BOY 7.7-US |
| MAX. DC VOLTAGE RATING | 600 VOLTS |
| MAX. POWER AT 40°C | 7680 WATTS |
| NOMINAL AC VOLTAGE | 240 VOLTS |
| MAX. AC CURRENT | 32 AMPS |
| MAX OCPD RATING | 40 AMPS |
| MAX. INPUTS | 3 |
| SHORT CIRCUIT CURRENT | 18 AMPS |

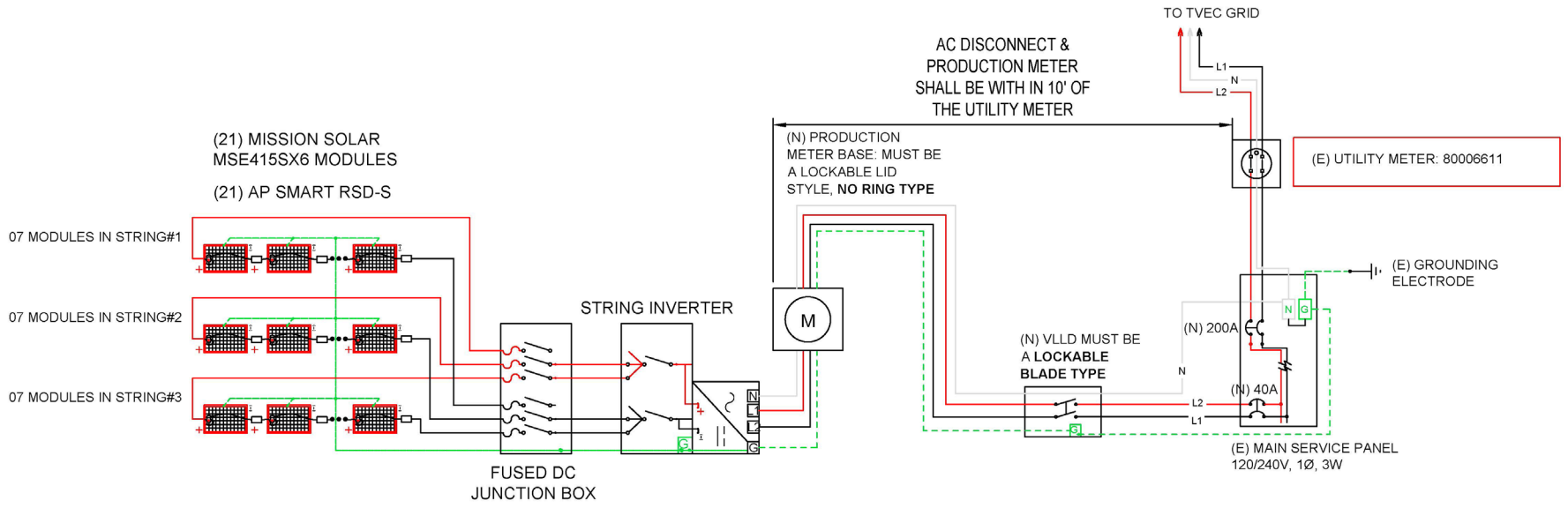
| PV MODULE RATING @ STC | |
|---|---|
| MANUFACTURER | MISSION SOLAR MSE415SX6Z |
| MAX POWER-POINT CURRENT (IMP) | 10.35 AMPS |
| MAX POWER-POINT VOLTAGE (VMP) | 40.09 VOLTS |
| OPEN CIRCUIT VOLTAGE (VOC) | 48.91 VOLTS |
| SHORT-CIRCUIT CURRENT (ISC) | 10.91 AMPS |
| NOM. MAX POWER AT STC (PMAX) | 415 WATT |
| MAX. SYSTEM VOLTAGE | 1500 VOLTS |
| VOC TEMP. COEFF. | -0.26/°C |

SYSTEM SIZE: 8.72 kW DC
7.16 kW AC
MODULE: (21) MISSION SOLAR MSE415SX6Z
INVERTER: (1) SMA SUNNY BOY 7.7-US [240V]

ACCOUNT# 90111568-002

**NOTES:**
THE HIGHLIGHTED INFORMATION REPRESENTS THE MINIMUM SYSTEM & SITE INFORMATION REQUIRED ON EVERY LINE DRAWING.

- SYSTEM SIZE (KW)
- INVERTER SPECIFICATIONS
- MODULE SPECIFICATIONS
- BATTERY SPECIFICATIONS (IF APPLICABLE)
- TVEC ACCOUNT NUMBER
- TVEC METER NUMBER (POINT OF INTERCONNECTION)





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STRING INVERTER SYSTEM
LOAD SIDE CONNECTION

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# ENPHASE MICRO INVERTERS SYSTEM LINE WITH WHOLE SITE BACKUP

THIS DRAWING IS AN EXAMPLE ONLY, MEANT TO SHOW THE MINIMUM SYSTEM DETAIL AND THE PROPER PLACEMENT OF THE AC DISCONNECT(S) AND PRODUCTION METER BASE. ALL INTERCONNECTIONS REQUIRE AN ENGINEER STAMPED/APPROVED COMPLETE PLAN SET. DESIGN, WIRE, CONDUIT, AND OCPDs SHALL COMPLY WITH THE NEC & LOCAL GOVERNING REQUIREMENTS.

| INVERTER SPECIFICATIONS | |
|---|---|
| MANUFACTURER | ENPHASE IQ8PLUS-72-2-US [240V] |
| MAX. DC VOLTAGE RATING | 60 VOLTS |
| MAX. POWER AT 40°C | 290 WATTS |
| NOMINAL AC VOLTAGE | 240 VOLTS |
| MAX. AC CURRENT | 1.21 AMPS |
| MAX OCPD RATING | 20 AMPS |
| MAX. PANELS/CIRCUIT | 13 |
| SHORT CIRCUIT CURRENT | 15 AMPS |

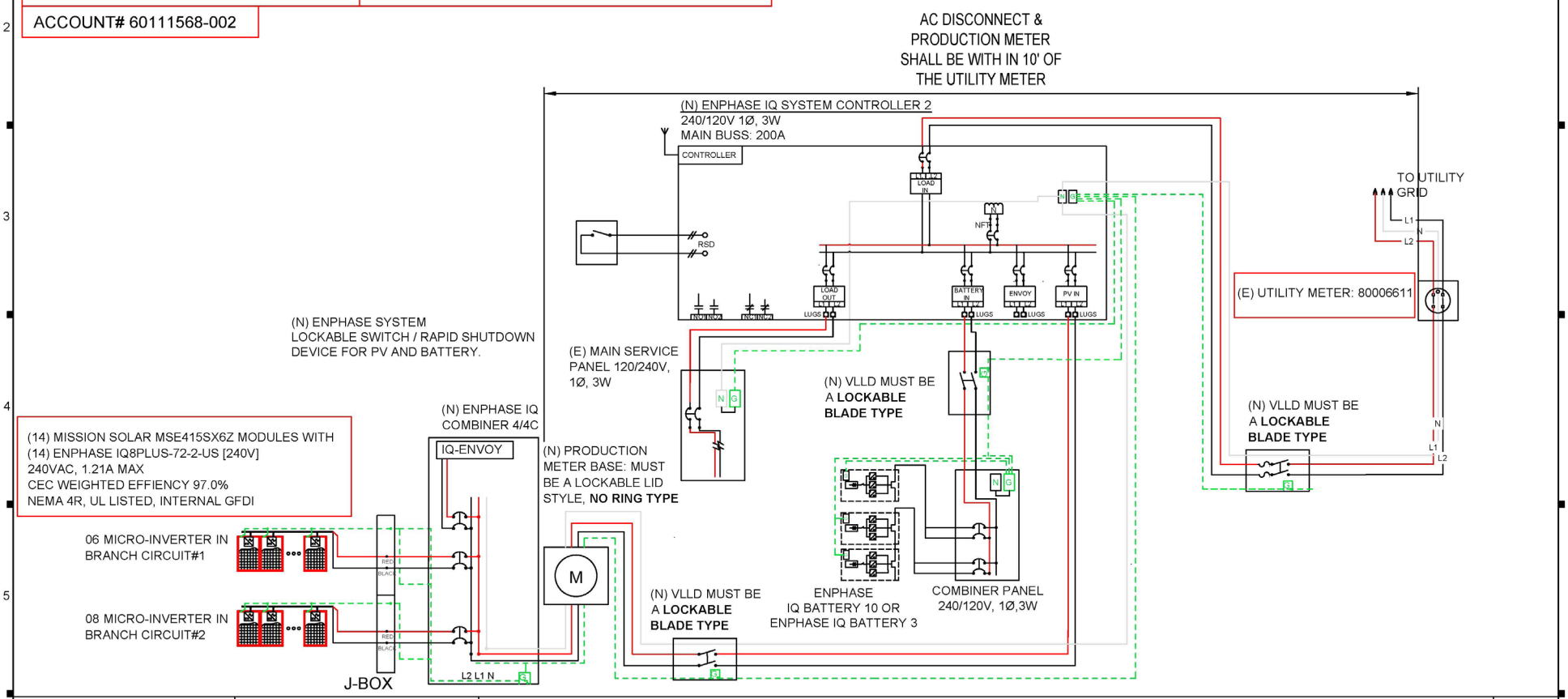
| PV MODULE RATING @ STC | |
|---|---|
| MANUFACTURER | MISSION SOLAR MSE415SX6Z |
| MAX POWER-POINT CURRENT (IMP) | 10.35 AMPS |
| MAX POWER-POINT VOLTAGE (VMP) | 40.09 VOLTS |
| OPEN CIRCUIT VOLTAGE (VOC) | 48.91 VOLTS |
| SHORT-CIRCUIT CURRENT (ISC) | 10.91 AMPS |
| NOM. MAX POWER AT STC (PMAX) | 415 WATT |
| MAX. SYSTEM VOLTAGE | 1500 VOLTS |
| VOC TEMP. COEFF. | -0.26/°C |

SYSTEM SIZE: 5.810 kW DC
4.060 kW AC
MODULE: (14) MISSION SOLAR MSE415SX6Z
INVERTER: (14) ENPHASE IQ8PLUS-72-2-US [240V]

**NOTES:**
THE HIGHLIGHTED INFORMATION REPRESENTS THE MINIMUM SYSTEM & SITE INFORMATION REQUIRED ON EVERY LINE DRAWING.

- SYSTEM SIZE (KW)
- INVERTER SPECIFICATIONS
- MODULE SPECIFICATIONS
- BATTERY SPECIFICATIONS (IF APPLICABLE)
- TVEC ACCOUNT NUMBER
- TVEC METER NUMBER (POINT OF INTERCONNECTION)

ACCOUNT# 60111568-002





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ENPHASE MICRO INVERTERS SYSTEM WITH WHOLE SITE BACKUP

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# SOLAREDGE ENERGY HUB WHOLE SITE BACKUP

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| INVERTER SPECIFICATIONS | |
|---|---|
| MANUFACTURER | SOLAREDGE SE5000H-US ENERGY HUB |
| MAX. DC VOLTAGE RATING | 600 VOLTS |
| MAX. POWER AT 40°C | 5000 WATTS |
| NOMINAL AC VOLTAGE | 240 VOLTS |
| MAX. AC CURRENT | 21 AMPS |
| MAX OCPD RATING | 30 AMPS |
| MAX. INPUTS | 3 |
| SHORT CIRCUIT CURRENT | 45 AMPS |

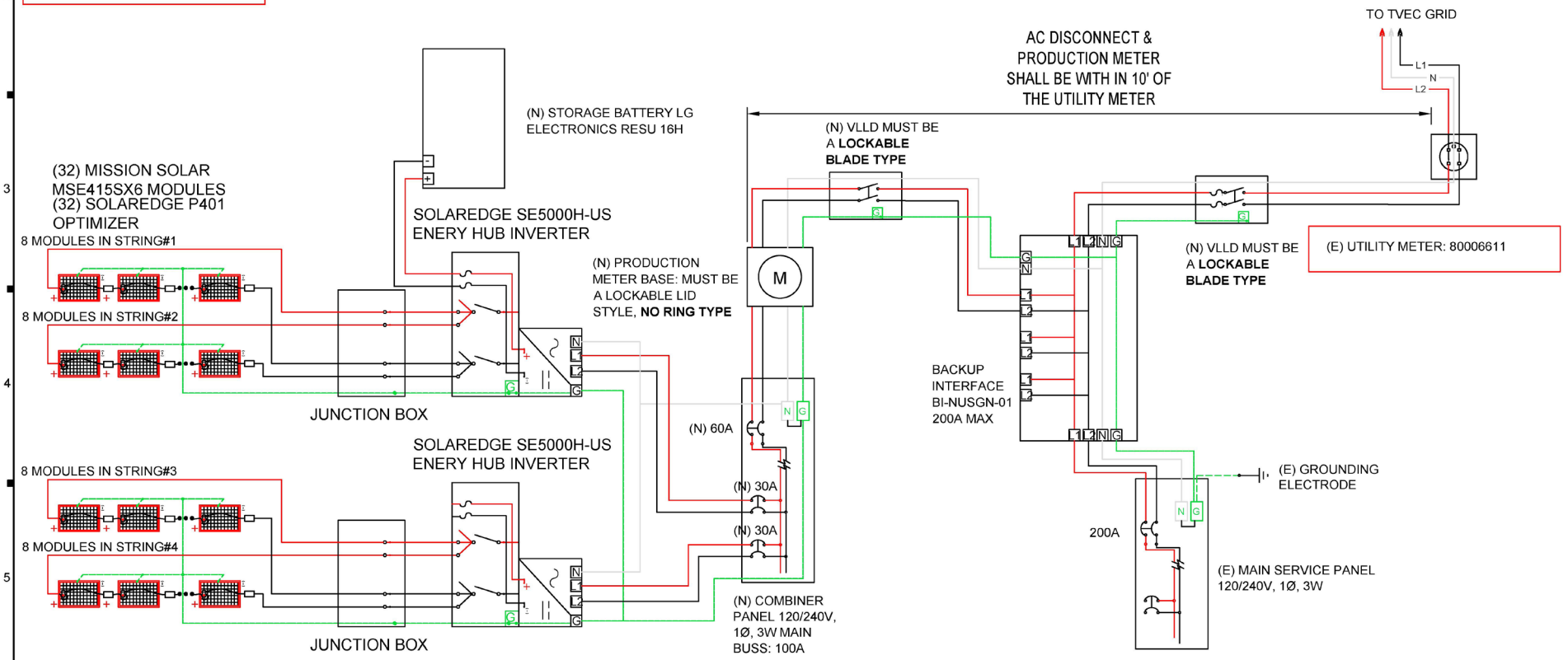
| PV MODULE RATING @ STC | |
|---|---|
| MANUFACTURER | MISSION SOLAR MSE415SX6Z |
| MAX POWER-POINT CURRENT (IMP) | 10.35 AMPS |
| MAX POWER-POINT VOLTAGE (VMP) | 40.09 VOLTS |
| OPEN CIRCUIT VOLTAGE (VOC) | 48.91 VOLTS |
| SHORT-CIRCUIT CURRENT (ISC) | 10.91 AMPS |
| NOM. MAX POWER AT STC (PMAX) | 415 WATT |
| MAX. SYSTEM VOLTAGE | 1500 VOLTS |
| VOC TEMP. COEFF. | -0.26/°C |

SYSTEM SIZE: 13.28 kW DC
10.00 kW AC
MODULE: (32) MISSION SOLAR MSE415SX6Z
INVERTER: (2) SOLAREDGE SE5000H-US ENERGY HUB [240V]

**NOTES:**
THE HIGHLIGHTED INFORMATION REPRESENTS THE MINIMUM SYSTEM & SITE INFORMATION REQUIRED ON EVERY LINE DRAWING.

- SYSTEM SIZE (KW)
- INVERTER SPECIFICATIONS
- MODULE SPECIFICATIONS
- BATTERY SPECIFICATIONS (IF APPLICABLE)
- TVEC ACCOUNT NUMBER
- TVEC METER NUMBER (POINT OF INTERCONNECTION)

ACCOUNT# 60111568-002





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SOLAREDGE ENERGY HUB
WHOLE BACKUP

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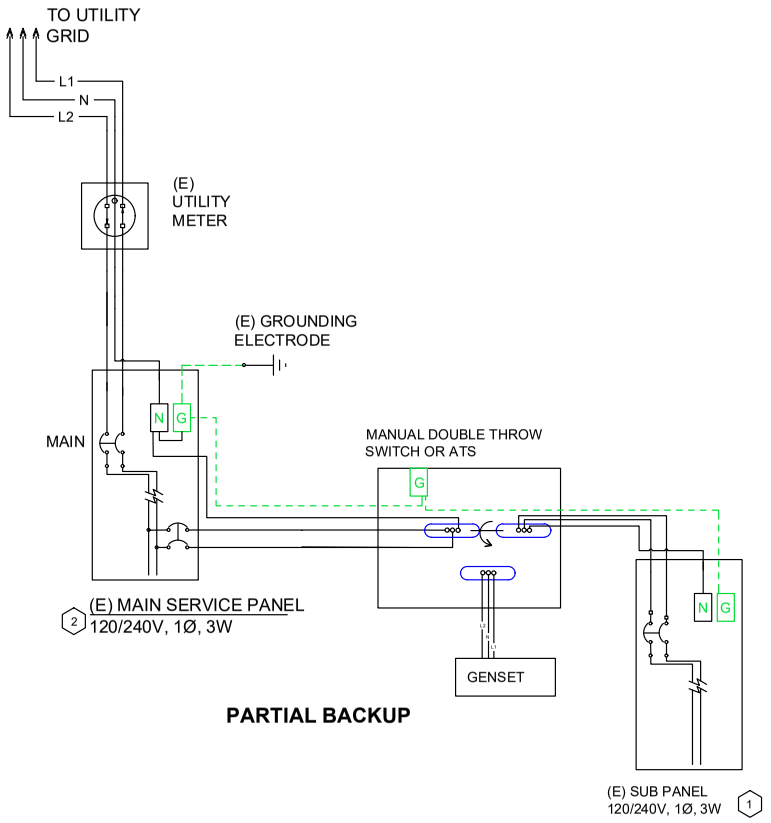
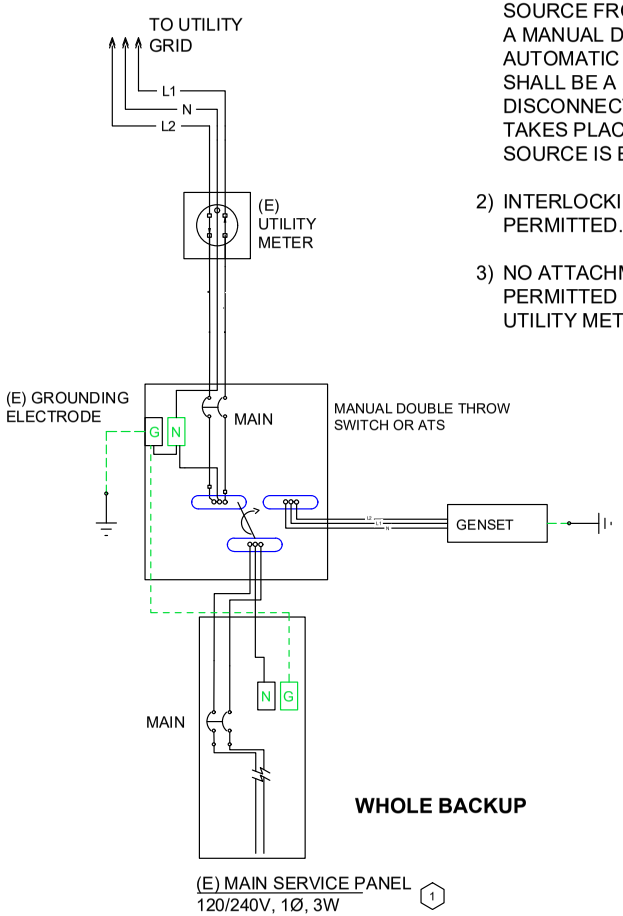
# GENERATOR PARTIAL AND WHOLE SITE BACKUP

THIS DRAWING IS AN EXAMPLE ONLY, MEANT TO SHOW THE PROPER ISOLATION OF A BACKUP GENERATOR FROM THE TVEC DISTRIBUTION SYSTEM. ALL GENERATOR INSTALLATIONS SHALL BE IN COMPLIANCE WITH THE NEC & LOCAL GOVERNING REQUIREMENTS.




**NOTES**:

1) SEPERATION OF ANY ALTERNATE POWER SOURCE FROM THE UTILITY MUST BE DONE VIA A MANUAL DOUBLE THROW SWITCH OR AN AUTOMATIC TRANSFER SWITCH / ATS. THESE SHALL BE A BREAK-BEFORE-MAKE TYPE WHERE DISCONNECTION FROM THE UTILITY SOURCE TAKES PLACE BEFORE ANY ALTERNATE SOURCE IS ENGAGED.

2) INTERLOCKING BREAKER DEVICES ARE NOT PERMITTED.

3) NO ATTACHMENTS OR ISOLATION DEVICES ARE PERMITTED TO BE PLACED BETWEEN THE UTILITY METER AND THE METER BASE.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GENERATOR PARTIAL AND WHOLE HOME BACKUP


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# Solar/DER Installation Acknowledgment Form

Installations and system additions must meet the latest National Electric Code specifications and specifications established by TVEC and local governing authorities.

Upon completion, one site review of the installation is conducted at no charge. If the installation does not meet all requirements upon the initial review, TVEC will charge the system installer $250 for each additional site assessment.

TVEC will provide the appropriate meters for monitoring each member's grid-tied distributed generation installation. This includes one dual-register billing meter and one system production meter.

## Member

_____ I have received the TVEC Distributed Energy Resource Installation Guide.
_____ I have verified that my installer is a TDLR-licensed electrical contractor who employs or is a master electrician who will oversee this installation.
_____ I understand that any DER installation may not be operated until all installation requirements are met and permission to operate is granted.

Member Name: _____ TVEC Account Number: _____
Phone: _____ Email Address: _____
Service Address: _____
Signature: _____ Date: _____

## Installer (if other than member)

_____ I have received the TVEC Distributed Energy Resource Installation Guide.
_____ I understand a TDLR-licensed electrical contractor employing a master electrician will oversee this installation.
_____ I understand that any DER installation cannot be operated until all installation requirements are met and permission to operate is granted.

Installation Company Name: _____
Name: _____ Title: _____
TDLR Electrical Contractor Name: _____ License Number: _____
Business Address: _____
Phone : _____ Email Address:_____
Signature:_____ Date:_____