

# Photovoltaic (PV) System Checklist

PA UCC-2009 I-Codes, 2008 NEC as amended/adopted

Location of Construction \_\_\_\_\_ Owner Name \_\_\_\_\_

## Permit Requirements

- Completed *Application for Building Permit and Plans Examination. Copy of Zoning Permit (if required)*
- **(2) copies** of this checklist, PV system specifications, details, and wiring diagram(s).

## Roof Attachment Information

- SITE SPECIFIC ENGINEERING SUBMITTED UNDER SEAL & SIGNATURE OF DESIGN PROFESSIONAL**
  - Rack System manufacturer installation guidelines & specifications provided
  - Design assumptions provided to include applicable loads, roof type, roof slope, and connection details
  - Attachment methods including type, size, and spacing of fasteners provided in engineering

## Wiring Diagram

- SITE SPECIFIC 3-LINE ELECTRICAL DIAGRAM**

The 3-line diagram is to include the following:

- System kW rating \_\_\_\_\_
- Stand Alone System
- Utility Interactive System
- Storage batteries
- Number of modules in series
- Number of parallel source circuits
- Total number of modules
- Microinverters
- # of microinverters on each branch circuit
- Total length of ac home run circuit(s)
  - Circuit #1**, # of inverters \_\_\_ homerun length \_\_\_\_\_
  - Circuit #2**, # of inverters \_\_\_ homerun length \_\_\_\_\_
  - Circuit #3**, # of inverters \_\_\_ homerun length \_\_\_\_\_
  - Circuit #4**, # of inverters \_\_\_ homerun length \_\_\_\_\_
- Combiner/junction box is identified & type/listing information noted
- Wiring method(s) and sizes between array and combiner/junction identified
- Overcurrent protection required with **3 or more parallel strings**
- Equipment grounding** method and wiring type/size identified
- The PV **dc disconnect** is identified—60 amp rated per NEC 230.79(D). **Manufacturer/Model #** \_\_\_\_\_  
(If fused disconnect required, identify dc rating, voltage, current & interrupt rating) NEC 690.9(D)
- Wiring method(s) and sizes between combiner/junction and UL1741 inverter identified
- Inverter manufacturer, size and ratings provided
- Wiring method(s) and sizes between inverter/AC disconnect/house disconnect or panel identified
- Point of connection identified. If load side tap, circuit breaker size(s) \_\_\_\_\_
- The **ac disconnect** is identified – 60 amp rated per NEC 230.79(D). **Manufacturer/Model #** \_\_\_\_\_
- System grounding** method and wiring type/size identified

## Inverter Information **Manufacturer/Model #** \_\_\_\_\_

- MANUFACTURER'S SPECIFICATIONS, LISTING INFORMATION & APPLICABLE RATINGS**
  - UL 1741 listed equipment & identified for use in interactive Photovoltaic Power Systems
  - Continuous output power & input voltage range of inverter provided

## PV Module Information **Manufacturer/Model #** \_\_\_\_\_

- MANUFACTURER'S SPECIFICATIONS, LISTING INFORMATION & APPLICABLE RATINGS**
  - If alternate grounding (i.e. WEEB clips or equal) is to be used, PV module manufacturer approval needed
  - \_\_\_\_\_ Open-circuit voltage (Voc)
  - \_\_\_\_\_ Maximum permissible system voltage
  - \_\_\_\_\_ Short-circuit current (Isc)
  - \_\_\_\_\_ Maximum series fuse rating
  - \_\_\_\_\_ Max Power (Pmax) at STC
  - \_\_\_\_\_ Voltage at Pmax
  - \_\_\_\_\_ Current at Pmax

### **Array Information** (Not applicable for microinverter installations)

- PROJECT VOLTAGE & CURRENT CALCULATIONS**
- \_\_\_\_\_ Operating Voltage = (number of modules in series x module voltage at Pmax)
- \_\_\_\_\_ Operating Current = (number of parallel source circuits x modules at Pmax)
- \_\_\_\_\_ Maximum System Voltage = (Voc X 1.25 X number of modules in series)
- \_\_\_\_\_ Short Circuit Current = (Isc X 1.25 X number of parallel source circuits)

### **Wiring & Overcurrent Protection**

- Wire type is 90 degree C & suitable for wet location. NEC 100, Table 310.15(B)(2)(c)
- Conductor ampacities are sufficient
- Provide adjusted ampacities and calculations (**Not applicable for microinverter installations**)
  - \_\_\_\_\_ Maximum PV source circuit current (Isc X 1.25)
  - \_\_\_\_\_ Maximum PV source circuit conductor ampacity (Isc X 1.25 X 1.25)
  - \_\_\_\_\_ Maximum PV output circuit conductor ampacity (Isc X 1.25 X 1.25 X # of parallel source circuits)
  - \_\_\_\_\_ Minimum inverter output circuit conductor ampacity (inverter output in Watts divided by minimum operating voltage x 1.25=minimum inverter output ampacity)
- Source circuit overcurrent protection sufficient
- If the inverter is listed for no back feed current, overcurrent protection is not necessary for 2 parallel strings
- If the inverter is **not listed** for any back feed current, each source circuit shall have overcurrent protection in compliance with the listed maximum series fuse
- Overcurrent protection provided with 3 or more parallel strings
- Overcurrent protection on Inverter Output Circuit is sufficient
- PV system point of connection complies with NEC 690.64 (A) Supply Side or (B) Load Side requirements  
(Modifications are not to be made to electrical equipment unless approved by the manufacturer – i.e. tapping of bus bars)
- Distribution panel rating information
  - \_\_\_\_\_ Electrical service panel buss bar rating
  - PV breaker same manufacturer as the electrical panel
  - Circuit breaker(s) suitable for backfeed applications are in use
  - Total rating of overcurrent devices supplying power (main + PV breaker) less than load center rating. 120% of rating per NEC 690.64(B)(2)
- Bonding fittings used with metal conduit when dc voltage is more than 250V dc per NEC 250.97

### **Label & Marking Requirements**

- Labels shall be made of sufficient durability to withstand the environments involved per NEC 110.21
- Labels/markings shall be permanently affixed to or adjacent to the equipment it is identifying
- Labels/markings requirements: (**check all boxes that apply to your installation**)
  - Ground-Fault Protection and Interruption label on utility interactive inverter per NEC 690.5(C)
  - Electric Shock Hazard label at disconnecting means per NEC 690.17
  - DC Junction/Combiner/Disconnect labels per NEC 690.35(F)
  - Modules shall be marked per NEC 690.51
  - DC Power Source labeling at the DC disconnect per NEC 690.53
  - Identify remote locations for utility & PV system disconnects-permanent plaque or directory providing the location of each remote source per NEC 690.56(B)
  - Identify maximum ac operating current & operating ac voltage at ac disconnect per NEC 690.54
  - Distribution equipment warning label per NEC 690.64(B)(7)
- General Requirements: All equipment installations to be provided with working space clearances per NEC Section 110.26. Maintain no less than 30 wide x 36 deep working spaces about all electrical equipment.**

Signature of: Owner/Contractor \_\_\_\_\_ Print Name \_\_\_\_\_ Date \_\_\_\_\_

I certify that the above information is true and accurate to the best of my knowledge.