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PHOTOVOLTAIC SYSTEMS

This form must be submitted with the Permit Application **PV WORKSHEET – STANDARD STRING ARRAY**

Solar photovoltaic (PV) systems have widely gained acceptance as an alternative energy source and installations range from the small array supplying a bus stop luminaire to a large array that covers acres. Since each installation comes with its own characteristics this worksheet has been provided for the installer to complete and submit with a Solar Photovoltaic (PV) Permit Application. With this information in advance the inspector can get a good idea of what the project entails and perhaps warn the installer of an electrical code issue before the installation is complete. The entire PV system installation shall comply the Article titled Solar Photovoltaic (PV) System in the currently adopted National Electrical Code (NEC).

The following documentation must be provided with the PV Permit Application:

1. Pages 2 and 3 of this document
2. Equipment spec/cut sheets for grounding/bonding fittings, modules, inverters, micro inverters, or optimizers (if these are not available complete page 4 of this document)
3. A one-line diagram of the PV system including service interconnection
4. A site plan showing the relative location of the array and the PV equipment on the property. Also provide location of service and distance from array.
5. Roof mounted arrays shall have engineering certifying the existing roof will support the imposed load.
6. Roof mount and Ground mounted arrays shall be engineered to withstand 125 mph wind load.

A PV installer is allowed to construct the support system, mount the modules, inverters or optimizers, and connect the factory provided module wiring harness (plug and play). The remainder of the installation such as panel boards, raceways, boxes, fittings, breakers, and building wire shall be installed by a licensed electrical contractor.

STANDARD STRING ARRAY PV SYSTEM INFORMATION

TYPE OF ARRAY			
Y		N	
Roof Array?	<input type="checkbox"/>	<input type="checkbox"/>	Rapid Shutdown Required (690.12)?
Ground Array?	<input type="checkbox"/>	<input type="checkbox"/>	Guarding of Conductors Required (690.31A)?

PV SYSTEM OVERVIEW	
Maximum System Voltage	
# Modules/String	
# Strings in System	
Maximum Circuit Current	
Battery Storage? Y N	

LOAD SIDE CONNECTION ¹	
Service Voltage	
Service Panel Main Breaker	
Service Panel Bus Rating	
Service Conductor Size	
PV System OCPD ² Rating	

CALCULATIONS:

MAXIMUM SYSTEM VOLTAGE – 690.7(A);
 $(V_{oc}) (\text{module label}) \times \text{Thermal Coefficient}^3 \times \# \text{ of modules/string} = V_{MAX}$

MAXIMUM CIRCUIT CURRENT - 690.8(A)(1):
 $(I_{sc})(\text{module label}) \times (\text{Sum of the paralleled modules}) \times 125\% = I_{MAX}$

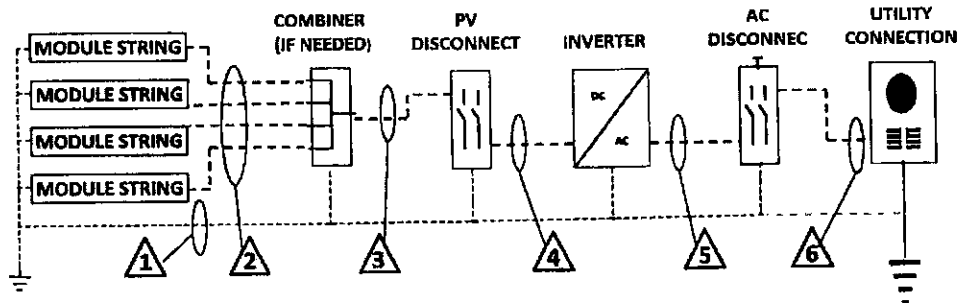
OVERCURRENT DEVICE RATING – 690.9(B):
 $(I_{max}) \times 125\% = \text{OCPD}^2$

¹Supply side connections may be allowed by your utility and shall comply with 705.12(A)

²OCPD – Overcurrent Protective Device

STANDARD STRING ARRAY

CONDUCTOR AND RACEWAY SCHEDULE



△	Conductor Type	Conductor AWG	Conduit Type	Conduit Size
1	Copper Grounding Electrode Conductor Copper Equipment Grounding Conductor		NA	NA
2	PV Source Conductors USE-2 PV Wire		NA	NA
3	THWN-2 XHHW-2 RHW-2			
4	THWN-2 XHHW-2 RHW-2			
5	THWN-2 XHHW-2 RHW-2			
6	THWN-2 XHHW-2 RHW-2			

STANDARD STRING ARRAY

COMPONENT RATINGS

PV MODULE RATINGS

Module Name

Module Model

Open Circuit Voltage

Short Circuit Current

Maximum Power

Maximum Voltage

Thermal Coefficient³

INVERTER RATINGS

Inverter Name

Inverter Model

Maximum DC Volt Rating

Maximum Power at 40°C

Nominal AC Voltage

Maximum AC Current

Maximum OCPD2

³Use thermal coefficient as provided by manufacturer. If not provided, use 1.20. (690.7)

Project Information

Contractor name

Project address

PV system information

Type of array

Roof Array Yes No

Rapid Shutdown Required (690.12)? Yes No

Ground Array? Yes No

Guarding of Conductors Required (690.31A)? Yes No

PV system overview

Maximum system voltage

Number of modules/string

Number of strings in system

Maximum circuit current

Battery storage Yes No

Load side connection**

**Supply side connections may be allowed by your utility and shall comply with 705.12(A)

Service voltage

Service panel main breaker

Service panel bus rating

Service conductor size

PV system Overcurrent Protective Device (OCPD) rating

Conductor and Raceway Schedule

conductor type

See diagram on Standard String Array page.

1a. Copper grounding electrode conductor

(provide conductor AWG)

1b. Copper equipment grounding conductor

(provide conductor AWG)

2. PV source conductors

Select conductor type USE-2 PV Wire

Indicate conductor AWG

3. Conductor type

Select one THWN-2 XHHW-2 RHW-2

Indicate conductor AWG

Indicate conduit type

Indicate conduit size

Residential Roof Mounted Solar Photovoltaic (PV) System Verification Form

Durant, I



Project Address:
Owner:
Installer:

Required Documentation for Permit Submittal. Answer the questions below to verify whether engineering is required. Submit this form in association with all residential roof-mounted solar system applications.

1. Is the roof supporting the installation a pitched roof in good condition, without visible sag, cracking or splintering of support, or another potential structural defect ?
 Yes No
2. Is the roof framing composed of an engineered truss system?
 Yes No
3. Is the equipment to be flush-mounted to the roof such that the collector surface is parallel to the roof slope ?
 Yes No
4. Is the roofing type lightweight, such as asphalt shingles or metal?
 Yes No
5. Does the roof have a single-layer roof covering?
 Yes No
6. Are the solar panels less than 5 pound per square foot?
 Yes No

If answering NO to any of the questions above, additional documentation is required in the form of a statement stamped by an Iowa-licensed structural engineer. The documentation will need to demonstrate the structural integrity of the roof and all necessary structural modifications needed to maintain integrity. The undersigned applicant confirms that the foregoing information is true and correct:

Applicant's Signature: _____ Date: _____