

PHOTOVOLTAIC WORKSHEET

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 the required Electrical 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 must comply with Article 690, 691, and 705 of the 2020 National Electrical Code (NEC).

At time of permit application, the electrical contractor must provide the following documentation to their electrical inspector:

1. Pages 2 and 3 of this document (completed)
2. Equipment spec/cut sheets for grounding/bonding fittings, modules, inverters, micro inverters, DC to DC converters, disconnects, panels, lugs (lug kits/tap boxes) and any other electrical equipment associated with the Photovoltaic installation.
3. A one-line diagram of the PV system including raceways, boxes, electrical equipment, conductors, service interconnection, and tie to an existing /adding of a “Grounding Electrode System”.
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.

To avoid delays in permit issuance please be sure to check over all of the above required information and paperwork, making sure it is complete and all-inclusive before you submit for a permit. Missing information can cause delays in the approval, permit issuance and inspection process.

Note in reference to Stamped Engineered Drawings: The City of Iowa City reserve the right to request Engineered Stamped Drawings be submitted and reviewed prior to a requested inspection.

PHOTOVOLTAIC SYSTEMS



NOTICE

Please be sure to consult with the local utility company supplying power to the site before the installation commences. This will help insure their requirements are met.

PV SYSTEM INFORMATION

_____ Number of Arrays to be installed for this project.

- Standard String Array Micro-Invertor Array
 Roof Mount Ground Mount Combination of both

Is Rapid Shutdown Required for this project per NEC 2017 690.12. Yes No

PV SYSTEM OVERVIEW		INTERCONNECTIONS	
Maximum System Voltage		Lineside Connect 705.12(A)	
Maximum Circuit Current		*Loadside Connect 705.12(B)	
Number of Inverters		Service Voltage Rating	
Battery Storage Y or N		Service Amperage Rating	
Min. PV Overcurrent Device		Service Buss Rating	
DC to DC Converters		Service Conductor Size	

* Loadside Interconnection: If the interconnection is to be made on the “Loadside” of the Service Over Current Protection Device (NEC 2020 705.12(B)) Please indicate the Code Section below used to determine the interconnection that has been installed.

LOADSIDE CONNECTIONS	
NEC 705.12(B)(1)(a)	<i>Feeders</i>
NEC 705.12(B)(1)(b)	“
NEC 705.12(B)(2)	<i>Taps</i>
NEC 705.12(B)(3)(1)	Busbars
NEC 705.12(B)(3)(2)	“
NEC 705.12(B)(3)(3)	”
NEC 705.12(B)(3)(4)	”
NEC 705.12(B)(3)(5)	”
NEC 705.12 (B)(3)(6)	“

PHOTOVOLTAIC SYSTEMS



CALCULATION SHEET: Please provide the calculations for this project as required by the 2020 NEC articles 690.7, 690.8, and 690.9

The 2020 NEC sets the maximum DC circuit voltage requirement please indicate where the PV system is located.

	On or in a One or Two-Family Dwelling Project (600V or Less)
	On or in all other building types (1000v or Less)
	Not Located on or in buildings (1500v or Less)

Part A: 2020 NEC 690.7 Maximum Voltage. Please indicate the Code Section used and provide the calculations. *If DC to DC Converters are installed, 690.7(B)(1or2) are to be used to calculate.

	690.7(A)(1) – Listing and Labeling Calculation
	690.7(A)(2) – Crystalline and Multicrystalline Calculation
	690.7(A)(3) – PV Systems of 100 KW or Larger Calculation
	*690.7(B)(1) – Single DC-to-DC Converter Calculation
	*690.7(B)(2) – 2 or More Series Connected DC-to-DC Converters

Show calculations here:

Part B: 2020 NEC 690.8 Circuit Sizing & Current. Please indicate the Code Section used and provide the calculations.

	690.8(A)(1)(a-1) – Photovoltaic Source		690.8(A)(1)(d) – DC to DC Converter Output Circuit Current
	690.8(A)(1)(a-2) - Photovoltaic Source		
	690.8(A)(1)(b) – Photovoltaic Output		690.8(A)(1)(e) – Inverter Output Circuit Current
	690.8(A)(1)(c) – DC to DC Converter Source Circuit Current		690.8(A)(2) Circuits Connected to Input of Electronic Power Converters

Show calculations here:

Part C: 2020 NEC 690.9 Overcurrent Protection. Please indicate the Code Section used and provide the calculations.

	2020 NEC 690.9(B) Overcurrent Device Ratings
	2020 NEC 690.9(C) Photovoltaic Source and Output Circuits
	2020 NEC 690.9(D) Power Transformers

Show calculations here:

PHOTOVOLTAIC SYSTEMS



FINAL PV SUBMITTAL CHECKLIST

Please use the following checklist provided to verify that all information required by the City of Iowa City for this Photovoltaic Systems Installation is complete and submitted. Project will not be approved, and permit(s) will not be issued therefor inspections will not be scheduled or performed until **all** of the required documentation submitted and approved. These drawings are inspected to verify that the installation appears to meet the minimum standards of the National Electrical Code adopted by the City of Iowa City.

Incomplete submitted documentation can lead to delays for the project so please review your documents carefully before submitting.

Verify that all the following information is contained in the information you submit for a permit.

1. Type of Installation. (Roof or Ground Mount)
2. Rapid Shutdown Required.
3. “PV System” Page #2 is filled out completely and accurately.
4. “PV Calculations” Page #3 is filled out completely and accurately.
5. All specification sheets for PV/Electrical Equipment to be installed are included.
6. An accurate One-line Diagram as described in item #3 on page #1.
7. An accurate Site Plan as described in item #4 on page #1.
8. Verify requirements for “Point of Connection”. (705.12 (A or B))
9. Verify requirements for the Grounding Electrode System. (690.47)
10. Verify the accuracy of all calculations.

PV and Electrical Contractors Reminder:

PV Installers are allowed to:

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 only).

Responsible Electrical Contractor:

The remainder of the installation such as panelboards, raceways, boxes, fittings, breakers, and building wire shall be sized and installed by a licensed electrical contractor, who shall obtain the appropriate permit(s) along with corresponding inspections prior to the commencement of work.