

Code Change Alert: Permitting of Solar Photovoltaic Systems in Washington State

Emergency Rule Regarding Rooftop Solar Photovoltaic Installations

On June 13, 2014 the Washington State Building Code Council approved an emergency rule-making order to allow installation of residential rooftop solar photovoltaic (PV) systems without the need for engineering. The effective date of the emergency rule is July 1, 2014. The rule identifies the minimal structural characteristics that PV systems must satisfy in order to be deemed to comply with engineering requirements. The rule is meant to apply to simple residential rooftop PV systems that are commonly installed in Washington State.

The permitting requirements for PV systems in Washington State currently vary from jurisdiction to jurisdiction, and this inconsistency negatively impacts the residential rooftop PV market. Requirements for full engineering reports and stamped drawings for simple systems can result in an additional \$500 to \$2,500 per system for engineering-related expenses, construction delays of up to 8 weeks, and can be a deterrent in some jurisdictions. In order to implement a standard, predictable process statewide, the Washington State University Energy Program worked with the Northwest Solar Communities team to develop and submit an amendment to the International Residential Code for solar photovoltaic systems. The amended code was approved as an emergency rule. Under the rule, the [following section](#) is added to the Washington amendments to the International Residential Code:

WAC 51-51-2300 Section M2302—Photovoltaic solar energy systems.

M2302.2 Requirements. *The installation, inspection, maintenance, repair and replacement of photovoltaic systems and all system components shall comply with the manufacturer's instructions, sections M2302.2.1 through M2302.2.3, NFPA 70, and the IFC as amended by Washington State.*

M2302.2.1 Roof-mounted panels and modules. *Where photovoltaic panels and modules are installed on roofs, the roof shall be constructed to support the loads imposed by such modules.*

EXCEPTION: *The roof structure shall be deemed adequate to support the load of the rooftop solar photovoltaic system if all of the following requirements are met:*

- 1. The solar photovoltaic panel system shall be designed for the wind speed of the local area, and shall be installed per the manufacturer's specifications.*
- 2. The ground snow load does not exceed 70 pounds per square foot.*
- 3. The total dead load of modules, supports, mountings, raceways, and all other appurtenances weigh no more than four pounds per square foot.*
- 4. Photovoltaic modules are not mounted higher than 18 inches above the surface of the roofing to which they are affixed.*
- 5. Supports for solar modules are to be installed to spread the dead load across as many roof-framing members as needed, so that no point load exceeds 50 pounds.*

Roof-mounted photovoltaic panels and modules that serve as roof covering shall conform to the requirements for roof coverings in Chapter 9. Where mounted on or above the roof coverings, the photovoltaic panels and modules and supporting structure shall be constructed of noncombustible materials or fire-retardant treated wood equivalent to that required for the roof construction.

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Building Permit Process

To support implementation of the emergency rule, a checklist template is available for adoption by jurisdictions. The checklist identifies the minimal structural characteristics that a proposed PV system must satisfy in order to be deemed to comply with engineering requirements. If all of the checklist criteria are met and a site plan is provided, the building permit may be issued over the counter (in person or online) without providing an engineer's stamped drawing pursuant to the emergency rule. Jurisdictions may opt to exempt solar PV systems from building permits entirely if the checklist criteria are satisfied. For example, the City of Bellevue passed an ordinance amending the Bellevue City Code to eliminate the permit requirement for standard rooftop solar PV installations. See: <http://www.bellevuewa.gov/Ordinances/Ord-6113.pdf> and http://www.ci.bellevue.wa.us/solar_photovoltaic_systems_permitting.htm

Building Permit Fees

Jurisdictions should establish fees that are reasonably necessary to cover the costs of administering and enforcing the provision of this rule. In order to obtain statewide consistency, the following is provided as a suggestion in developing the cost structure for a local jurisdiction.

1. **Fixed fee.** For systems that qualify for the over-the-counter building permit process, it is recommended that a flat fee be charged for the permit. The amount of the fee should be calculated so that it is sufficient to cover the cost of checklist review and a single inspection. For example, the City of Edmonds has implemented a flat fee of \$135 for over-the-counter residential solar installations.
See: <http://edmondswa.gov/additional-links/rooftop-solar-installations.html>
2. **Valuation based fee.** For systems that do not qualify for the over-the-counter building permit process, a valuation-based fee can be charged for the permit. Costs for building permits are often based on the total project cost, assuming that the cost of the project accurately represents the scale of the project and the level of permit review required. However, with a rooftop solar PV installation, the equipment costs are much higher than with conventional projects of similar scope. It is therefore recommended that the permit fee be calculated based on a valuation of the structural components and labor only. The value of the electrical components, including the solar modules and inverters, is subtracted from the overall valuation because these elements are not part of the structural review.

Electrical Permit Process

All PV systems require electrical permits. For jurisdictions that use their own electrical reviewers and inspectors, a checklist template is available to use in determining when a solar PV system qualifies for an over-the-counter electrical permit. The checklist includes a set of electrical one-line diagram templates and is intended to simplify the application process and minimize the need for detailed plan review. The checklist and templates are provided as an example process and are not required for jurisdictions to adopt. The Department of Labor and Industries will also accept the electrical diagram templates for their review, and the over-the-counter process presented here does not change their authority.

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For more information

To obtain electronic versions of the templates or for questions related to the code change, contact:

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WSU Energy Program
(360) 956-2040
nordeeng@energy.wsu.edu
www.energy.wsu.edu/code



Northwest Solar Communities
<http://nwsolarcommunities.org/priorities/permitting/>
info@nwseed.org
(206) 328-2441



OVER-THE-COUNTER BUILDING PERMIT CHECKLIST FOR RESIDENTIAL SOLAR PHOTOVOLTAIC SYSTEMS: ROOFTOP MOUNTED

Contractors can apply for an Over-The-Counter (OTC) permit where the PV system meets the requirements listed in this Checklist. All project plans and supporting documentation must be provided on site for the inspector.

-----TO BE COMPLETED BY APPLICANT-----

1 Project Information

Property Owner Name:			
Project Address:		Parcel #	
	City:	State:	ZIP:
Day Phone:			
Contractor Name			
Contractor License #:			
Contractor Day Phone:			
PV system description (include manufacturer and model # of PV modules and inverters):			

2 Determine if your project qualifies for expedited permitting:

	Yes	No
1. PV system is designed and proposed for a detached one- or two-family dwelling or townhouse not more than three stories above grade or detached accessory structure that is code compliant to setbacks and height, or code allows expansion of nonconformity for solar modules. [IRC 101.2]	<input type="checkbox"/>	<input type="checkbox"/>
2. Modules on pitched roofs do not exceed the highest point of the roof unless approved by the local jurisdiction.	<input type="checkbox"/>	<input type="checkbox"/>
3. Rooftop is made from lightweight material such as a single layer of composition shingles, metal roofing, lightweight masonry, or cedar shingles.	<input type="checkbox"/>	<input type="checkbox"/>
4. The installation shall comply with the manufacturer's instructions. [IRC M2302.2]	<input type="checkbox"/>	<input type="checkbox"/>
5. The installation shall meet the requirements of NFPA 70 National Electric Code, and all required electrical permit(s) must be obtained from the Authority Having Jurisdiction to administer the electrical code. [IRC M2302.2]	<input type="checkbox"/>	<input type="checkbox"/>
6. The installation shall meet the requirements of the International Fire Code as amended by WA State. [IRC M2302.2]	<input type="checkbox"/>	<input type="checkbox"/>
7. The PV system is designed for the wind speed of the local area, and will be installed per the manufacturer's specifications. [IRC M2302.2.1(1)]	<input type="checkbox"/>	<input type="checkbox"/>
8. The ground snow load does not exceed 70 pounds per square foot. [IRC M2302.2.1(2)]	<input type="checkbox"/>	<input type="checkbox"/>
9. Total dead load of modules, supports, mountings, raceways and all other appurtenances weigh no more than four pounds per square foot. [IRC M2302.2.1(3)] Enter total dead load of system (lbs/ft ²): _____	<input type="checkbox"/>	<input type="checkbox"/>
10. To address uplift, modules are mounted no higher than 18" above the surface of the roofing to which they are affixed. [IRC M2302.2.1(4)]	<input type="checkbox"/>	<input type="checkbox"/>

11. Supports for solar modules are installed to spread the dead load across as many roof-framing members as needed to ensure that no point load exceeds fifty (50) pounds. [IRC M2302.2.1(5)]	<input type="checkbox"/>	<input type="checkbox"/>
12. The photovoltaic modules and supporting structure shall be constructed of noncombustible materials or fire-retardant treated wood equivalent to that required for the roof construction. [IRC M2302.2.1]	<input type="checkbox"/>	<input type="checkbox"/>
13. Roof and wall penetrations shall be flashed and sealed to prevent entry of water, rodents, and insects. [IRC M2302.2.2]	<input type="checkbox"/>	<input type="checkbox"/>
14. PV modules are listed and labeled with a fire classification in accordance with UL 1703. [IRC M2302.2.3]	<input type="checkbox"/>	<input type="checkbox"/>
Comments:		

 **If you answered yes to all of the above questions, the project qualifies for the over-the-counter permitting process.**

3 Submit this Checklist, Site Plan (optional), and other required permit application forms to:

[insert contact info for jurisdiction having authority]

 **As the property owner or authorized representative of the above listed property, I attest that all information in this checklist is accurate to the best of my knowledge.**

Applicant Signature:	Date:
Applicant Name (Please Print):	

-----TO BE COMPLETED BY CITY STAFF-----

Qualifies for OTC Building Permit? <input type="checkbox"/> Yes <input type="checkbox"/> No	Permit Application #:
Staff Initials _____ Date:	

OVER-THE-COUNTER ELECTRICAL PERMIT CHECKLIST FOR RESIDENTIAL SOLAR PHOTOVOLTAIC SYSTEMS

Contractors can apply for an Over-The-Counter (OTC) permit where the PV system meets the requirements listed in this Checklist and use a template electrical diagram provided by the City or other approved diagram. All project plans and supporting documentation must be provided on site for the inspector.

-----TO BE COMPLETED BY APPLICANT-----

1 Project Information

Property Owner Name:	Click here to enter text.		
Project Address:	Click here to enter text.	Parcel #	Click here to enter text.
	City: Click here to enter text.	State: Click here to enter text.	ZIP: Click here to enter text.
Day Phone:	Click here to enter text.		
Contractor Name	Click here to enter text.		
Contractor License #:	Click here to enter text.		
Contractor Day Phone:	Click here to enter text.		
PV system description (include manufacturer and model # of PV modules and inverters):	Click here to enter text.		

2 Determine if your project qualifies for an Over-the-Counter electrical permit


	Yes	No	N/A
1. PV modules, inverters, and combiner boxes are identified for use in PV systems.	<input type="checkbox"/>	<input type="checkbox"/>	
2. The inverters are listed and labeled in accordance with UL 1741 and are listed for utility interaction. [IRC M2302.4]	<input type="checkbox"/>	<input type="checkbox"/>	
3. The AC interconnection point is on the load side of service disconnect. [NEC 690.64(B)]	<input type="checkbox"/>	<input type="checkbox"/>	
4. The system meets all current NEC, City and Washington Cities Electrical Code requirements.	<input type="checkbox"/>	<input type="checkbox"/>	
5. For Split-Buss modules the AC interconnection must be one of the six service disconnects.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
6. Maximum load added to the panelboard is based on the rating of the panelboards bus/main OCPD combination in accordance with NEC 705.12(D)(2)(3)(b), and is limited to (check combination that applies): <input type="checkbox"/> 225 amp bus/200 amp main OCPD - 13,440 AC watts, maximum 70 amp inverter OCPD. <input type="checkbox"/> 225 amp bus/225 amp main OCPD - 8,640 AC watts, maximum 45 amp inverter OCPD. <input type="checkbox"/> 200 amp bus/200 amp main OCPD - 7,680 AC watts, maximum 40 amp inverter OCPD. <input type="checkbox"/> 150 amp bus/150 amp main OCPD - 5,760 AC watts, maximum 30 amp inverter OCPD. <input type="checkbox"/> 125 amp bus/125 amp main OCPD - 4,800 AC watts, maximum 25 amp inverter OCPD.			

<input type="checkbox"/> 125 amp bus/100 amp main OCPD - 9,600 AC watts, maximum 50 amp inverter OCPD. <input type="checkbox"/> 100 amp bus/100 amp main OCPD - 3,840 AC watts, maximum 20 amp inverter OCPD. <input type="checkbox"/> Other- Electrical Permit with Plan Review Required <i>Note 1: Listed un-altered factory main/bus combination. Alteration of the panelboard main OCPD will require plan review.</i> <i>Note 2: The circuit conductors and overcurrent devices shall be sized to carry not less than 125 percent of the maximum currents as calculated in 690.8(A). The rating or setting of overcurrent devices shall be permitted in accordance with 240.4(B) and (C).NEC 690.8(B)(1)</i> <i>Note 3: If a panelboard employs a snap switch rated 30 amperes or less in any branch circuit, it cannot be rated more than 200 amperes unless there is a supply side overcurrent protection at 200 amperes or less within the panelboard. This requirement does not apply to panelboards equipped with circuit breakers. Section 408.36(A) of the NEC.</i>	
7. I have attached the following Electrical One-Line Diagram: <input type="checkbox"/> Standard Electrical Diagram- 6 Strings or Less <input type="checkbox"/> Standard Electrical Diagram- 4 Strings or Less <input type="checkbox"/> Standard Electrical Diagram- Micro Inverter <input type="checkbox"/> None of the above- Electrical Permit with Plan Review Required	
Comments:	Click here to enter text.

 **If you answered yes to all of the above questions, your project qualifies for over the Over-the-Counter electrical permit.**

3 Submit this Checklist, the Electrical Permit Application, One-line Diagram, and Site Plan to:

[insert contact info for jurisdiction having authority]

 **As the property owner or authorized representative of the above listed property, I attest that all information in this checklist is accurate to the best of my knowledge**

Applicant Signature: Click here to enter text.	Date: Click here to enter text.
Applicant Name (Please Print): Click here to enter text.	

-----TO BE COMPLETED BY CITY STAFF-----

Qualifies for Electrical OTC? <input type="checkbox"/> Yes <input type="checkbox"/> No Staff Initials _____ Date: Click here to enter text.	Permit #: Click here to enter text.
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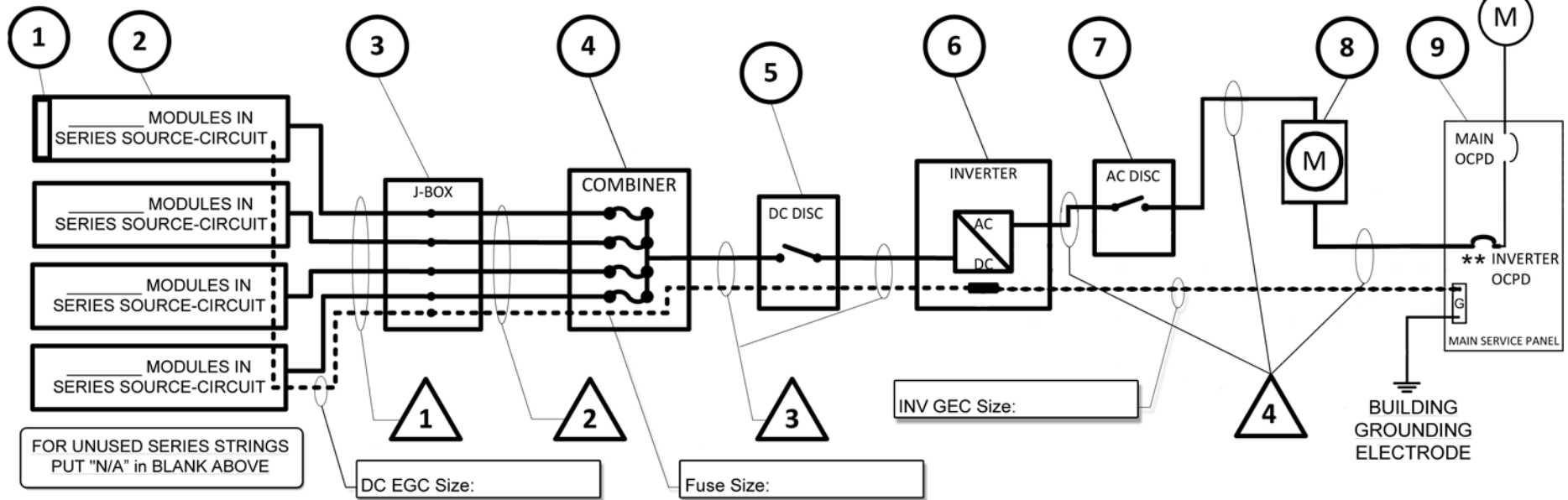
Solar PV Electrical One-Line Diagram Requirements

The electrical one-line diagram must be used to accurately represent the electrical components of the solar PV system and shall include:

- The correct conductor sizing based on the ambient temperature, number of conductors, and distance of conduit off the roof.
 - The correct “Output circuit” conductors sizing from the combiner to the inverter based on the number of strings multiplied by the “Max amps.”
 - Where a combiner box is installed, or where more than two strings of modules are electrically connected together in “parallel,” each individual string shall be protected by its own overcurrent protection device or feeders are for the sum of the short circuit current of all strings. The fuse or breaker shall be listed as being suitable for use in a DC circuit and shall meet or exceed the maximum voltage of the circuit. The rating of the fuse or circuit breaker shall not be larger than the maximum size specified on the lowest rated module in the string.
 - Per NEC Section 690.31(E), metallic raceway and enclosures must be used where DC wiring is installed inside of the house.
 - Grounding on the DC side of the inverter requires a minimum #8 copper grounding electrode conductor run un-spliced from the factory identified system grounding terminal of the inverter to the grounding electrode system of the house.
 - The inverter shall be listed and labeled by a recognized electrical testing laboratory and be identified as “Utility interactive.”
 - Inverter ground fault protection (GFP) shall comply with NEC 690.5.
 - A performance meter and a safety disconnect switch may be required to be installed between the PV power source and the electrical utility equipment. Contact the local serving utility for requirements. Where a performance meter is required by the local utility to record the power produced by the PV system, the output wiring from the inverter shall always connect to the “LINE” side terminals of the meter.
 - Where disconnect switches (with or without fuses) are installed in the circuit from the inverter output terminals to the house electrical panel, the wiring originating at the inverter(s) shall always connect to the “LOAD” side terminals of ANY disconnect that has been installed.
 - The connection to the service panel shall be through a dedicated circuit breaker that connects to the panel bus bars in an approved manner.
 - “Load Side Taps” where the inverter AC wiring does not terminate using a dedicated breaker or set of fuses are prohibited under ANY condition by NEC 690.64(B).
 - The location of the PV backfed breaker must be identified per 690.64(B)(7) with the following verbiage: **“WARNING INVERTER OUTPUT CONNECTION. DO NOT RELOCATE THE OVERCURRENT DEVICE.”**
 - Where it is not possible to locate the PV breakers at opposite ends of the panel bus, the sum of the two PV breakers is not permitted to exceed 100% of the bus rating per NEC 690.64(B)(7)
 - Per NEC 690.53, a permanent label for the DC power source shall be installed at the PV DC disconnecting means. This label shall show the following:
 - Rated maximum power-point current.
 - Rated maximum power-point voltage.
 - Maximum system voltage.
 - Short circuit current of the PV system.
-

TAG	EQUIPMENT SCHEDULE				
1	SOLAR PV MODULE	MAKE:	MODEL:	(Attach Cut Sheet - See notes for ratings)	
2	PV ARRAY	WEIGHT:	HEIGHT FROM ROOF:	(Attach cut sheet of mounting system)	
3	J-BOX	LENGTH:	WIDTH:	HEIGHT:	NEMA RATING:
4	COMBINER	MAKE:	MODEL:	(Attach cut sheet)	
5	DC DISCONNECT	VDC:	DC AMP:	MAKE:	
6	DC/AC INVERTER	MAKE:	(Attach cut sheet - See notes for ratings)		
7	AC DISCONNECT	VAC:	AMPS:	MODEL:	
8	PRODUCTION METER	METER #:	(Check with serving utility for meter requirements & location)		
9	SERVICE PANEL	VAC:	MAIN OCPD:	BUS AMP:	INVERTER OCPD:

Contractor - Installer Information	
Permit #:	Date:
Name:	
Address:	
Contact Name:	
Contact Phone:	
Email:	



TAG	Conductor Insulation Type	CU/AL	Conductors			*Derated Amps	Raceway		Ambient Temp		Distance off Roof
			Size	Amps	Num		Size	Type	Roof	Attic	
1											
2											
3											
4											

* Note: Derating of conductors based on number of conductors in raceway, ambient temp and distance off roof where applicable. (NEC 310.15)
 ** Note: Conductors and overcurrent devices shall be sized to carry not less than 125 percent of the maximum currents. (NEC 690.8(B))

**Standard Electrical Diagram - Residential Small Scale PV System
Central Inverter Systems**

THIS PLAN MUST BE PROVIDED TO THE INSPECTOR AT THE JOB SITE

Site Name: _____

Site Address: _____

This plan is NOT intended to be used with micro inverters or transformer-less inverters. Conductors, where installed outdoors in raceways shall be "W" rated and have an insulation rating of 90 deg C.

Rev - 02/21/2013

NOTES for Residential Small Scale PV System Electrical Diagram

Permit #:	Date:
Contractor:	
Job Address:	
Contact Name:	
Contact Phone:	

SIGNS

SIGN FOR DC DISCONNECT	
PHOTOVOLTAIC POWER SOURCE	
RATED MPP CURRENT	A
RATED MPP VOLTAGE	V
MAX SYSTEM VOLTAGE	V
MAX CIRCUIT CURRENT	A
WARNING: ELECTRICAL SHOCK HAZARD—LINE AND LOAD MAY BE ENERGIZED IN OPEN POSITION	
SIGN FOR INVERTER OCPD AND AC DISCONNECT (IF USED)	
SOLAR PV SYSTEM AC POINT OF CONNECTION	
AC OUTPUT CURRENT	A
NOMINAL AC VOLTAGE	V
THIS PANEL FED BY MULTIPLE SOURCES (UTILITY AND SOLAR)	

PV MODULE RATINGS

MODULE MAKE	
MODULE MODEL	
MAX POWER-POINT CURRENT (I_{MP})	A
MAX POWER-POINT VOLTAGE (V_{MP})	V
OPEN-CIRCUIT VOLTAGE (V_{OC})	V
SHORT-CIRCUIT CURRENT (I_{SC})	A
MAX SERIES FUSE (OCPD)	A
MAXIMUM POWER (P_{MAX})	W
MAX VOLTAGE (TYP 600V _{DC})	V
VOC TEMP COEFF (mV/°C <input type="checkbox"/> or %/°C <input type="checkbox"/>)	
IF COEFF SUPPLIED, CIRCLE UNITS	

INVERTER RATINGS

INVERTER MAKE	
INVERTER MODEL	
MAX DC VOLT RATING	V
MAX POWER @ 40°C	W
NOMINAL AC VOLTAGE	V
MAX AC CURRENT	A
MAX OCPD RATING	A

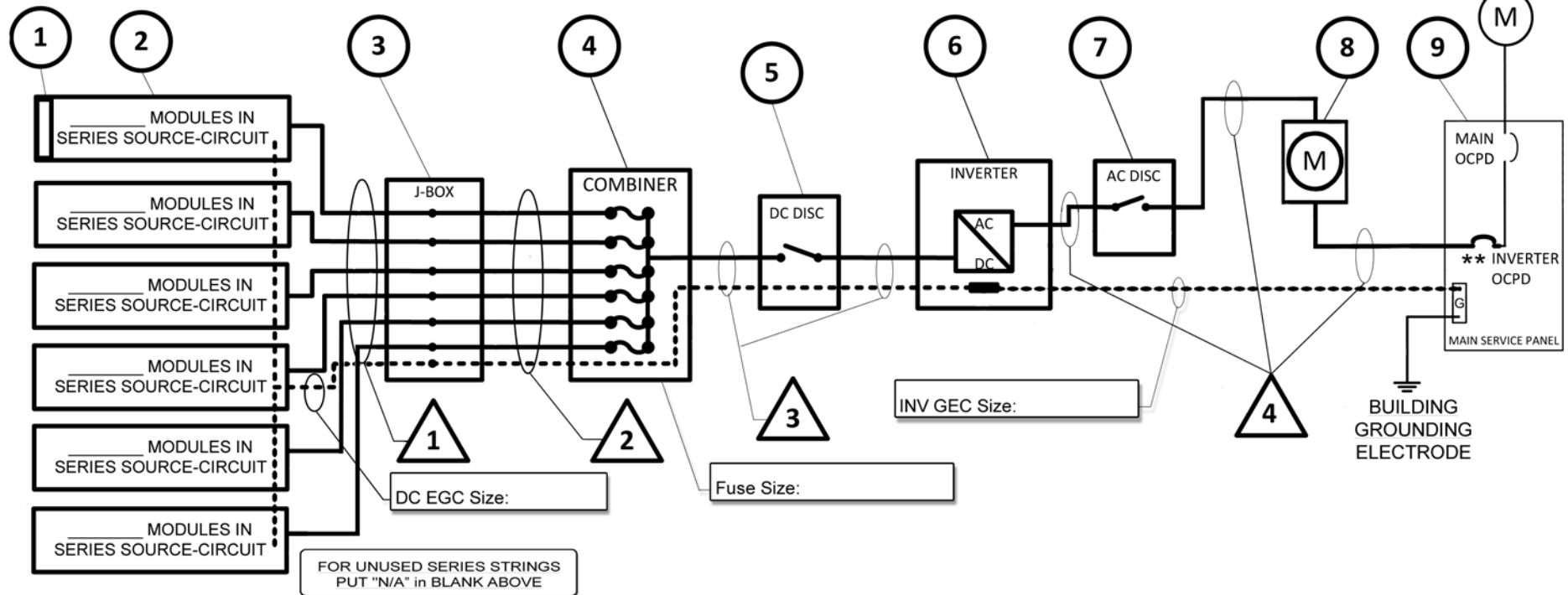
LOWEST EXPECTED AMBIENT TEMP:	°C
HIGHEST CONTINUOUS TEMPERATURE:	°C

NEC 690.8(B) Photovoltaic system currents shall be considered continuous.
 NEC 690.8(B)(1) The circuit conductors and overcurrent devices shall be sized to carry not less than 125 percent of the maximum currents calculated in 690.8(A).
Exception: Circuits containing an assembly, together with its overcurrent device(s), that is listed for continuous operation at 100 percent of its rating shall be permitted to be utilized at 100 percent of its rating.
 All signage and markings shall be a phenolic or metallic plate or other similar material in block letters 1/4 inch or greater in height, and suitable for the environment. Letters and background shall be in contrasting colors. Screws, rivets or other approved means shall be used to affix plates to equipment.

INVERTER		PANELBOARD	
Maximum Current	OCPD Size	Main Bus	Main OCPD
56 amps	70 amps	225 amps	200 amps
36 amps	45 amps	225 amps	225 amps
33 amps	40 amps	200 amps	200 amps
24 amps	30 amps	150 amps	150 amps
20 amps	25 amps	125 amps	125 amps
16 amps	20 amps	100 amps	100 amps

TAG	EQUIPMENT SCHEDULE				
1	SOLAR PV MODULE	MAKE:	MODEL:	(Attach Cut Sheet - See notes for ratings)	
2	PV ARRAY	WEIGHT:	HEIGHT FROM ROOF:	(Attach cut sheet of mounting system)	
3	J-BOX	LENGTH:	WIDTH:	HEIGHT:	NEMA RATING:
4	COMBINER	MAKE:	MODEL:	(Attach cut sheet)	
5	DC DISCONNECT	VDC:	DC AMP:	MAKE:	
6	DC/AC INVERTER	MAKE:	(Attach cut sheet - See notes for ratings)		
7	AC DISCONNECT	VAC:	AMPS:	MODEL:	
8	PRODUCTION METER	METER #:	(Check with serving utility for meter requirements & location)		
9	SERVICE PANEL	VAC:	MAIN OCPD:	BUS AMP:	INVERTER OCPD:

Contractor - Installer Information	
Permit #:	Date:
Name:	
Address:	
Contact Name:	
Contact Phone:	
Email:	



TAG	Conductor Insulation Type	CU/AL	Conductors			*Derated Amps	Raceway		Ambient Temp		Distance off Roof
			Size	Amps	Num		Size	Type	Roof	Attic	
1											
2											
3											
4											

* Note: Derating of conductors based on number of conductors in raceway, ambient temp and distance off roof where applicable. (NEC 310.15)
 ** Note: Conductors and overcurrent devices shall be sized to carry not less than 125 percent of the maximum currents. (NEC 690.8(B))

**Standard Electrical Diagram - Residential Small Scale PV System
Central Inverter Systems**

THIS PLAN MUST BE PROVIDED TO THE INSPECTOR AT THE JOB SITE

Site Name: _____

Site Address: _____

This plan is NOT intended to be used with micro inverters or transformer-less inverters. Conductors, where installed outdoors in raceways shall be "W" rated and have an insulation rating of 90 deg C.

Rev - 02/23/2013

NOTES for Residential Small Scale PV System Electrical Diagram

Permit #:	Date:
Contractor:	
Job Address:	
Contact Name:	
Contact Phone:	

SIGNS

SIGN FOR DC DISCONNECT	
PHOTOVOLTAIC POWER SOURCE	
RATED MPP CURRENT	A
RATED MPP VOLTAGE	V
MAX SYSTEM VOLTAGE	V
MAX CIRCUIT CURRENT	A
WARNING: ELECTRICAL SHOCK HAZARD—LINE AND LOAD MAY BE ENERGIZED IN OPEN POSITION	
SIGN FOR INVERTER OCPD AND AC DISCONNECT (IF USED)	
SOLAR PV SYSTEM AC POINT OF CONNECTION	
AC OUTPUT CURRENT	A
NOMINAL AC VOLTAGE	V
THIS PANEL FED BY MULTIPLE SOURCES (UTILITY AND SOLAR)	

PV MODULE RATINGS

MODULE MAKE	
MODULE MODEL	
MAX POWER-POINT CURRENT (I_{MP})	A
MAX POWER-POINT VOLTAGE (V_{MP})	V
OPEN-CIRCUIT VOLTAGE (V_{OC})	V
SHORT-CIRCUIT CURRENT (I_{SC})	A
MAX SERIES FUSE (OCPD)	A
MAXIMUM POWER (P_{MAX})	W
MAX VOLTAGE (TYP 600V _{DC})	V
VOC TEMP COEFF (mV/°C <input type="checkbox"/> or %/°C <input type="checkbox"/>)	
IF COEFF SUPPLIED, CIRCLE UNITS	

INVERTER RATINGS

INVERTER MAKE	
INVERTER MODEL	
MAX DC VOLT RATING	V
MAX POWER @ 40°C	W
NOMINAL AC VOLTAGE	V
MAX AC CURRENT	A
MAX OCPD RATING	A

LOWEST EXPECTED AMBIENT TEMP:	°C
HIGHEST CONTINUOUS TEMPERATURE:	°C

NEC 690.8(B) Photovoltaic system currents shall be considered continuous.
 NEC 690.8(B)(1) The circuit conductors and overcurrent devices shall be sized to carry not less than 125 percent of the maximum currents calculated in 690.8(A).
Exception: Circuits containing an assembly, together with its overcurrent device(s), that is listed for continuous operation at 100 percent of its rating shall be permitted to be utilized at 100 percent of its rating.
 All signage and markings shall be a phenolic or metallic plate or other similar material in block letters 1/4 inch or greater in height, and suitable for the environment. Letters and background shall be in contrasting colors. Screws, rivets or other approved means shall be used to affix plates to equipment.

INVERTER		PANELBOARD	
Maximum Current	OCPD Size	Main Bus	Main OCPD
56 amps	70 amps	225 amps	200 amps
36 amps	45 amps	225 amps	225 amps
33 amps	40 amps	200 amps	200 amps
24 amps	30 amps	150 amps	150 amps
20 amps	25 amps	125 amps	125 amps
16 amps	20 amps	100 amps	100 amps

SITE PLAN		Provide roof outline with location of all PV panels, j-box, combiner and DC disconnect. If required, show fire code access pathways.	
RESIDENTIAL SMALL SCALE PV SYSTEM			
Permit #:	Date:	Contractor:	Contrator Phone:
Job Address:		Contact Name:	Contact Phone: