



City of Rancho Cucamonga

BUILDING AND SAFETY SERVICES DEPARTMENT

10500 Civic Center Drive | Rancho Cucamonga, CA 91730
Tel: (909) 477-2710 | Fax: (909) 477-2711 | www.CityofRC.us

PHOTOVOLTAIC SYSTEM PLAN CHECK SUBMITTAL REQUIREMENTS

PURPOSE

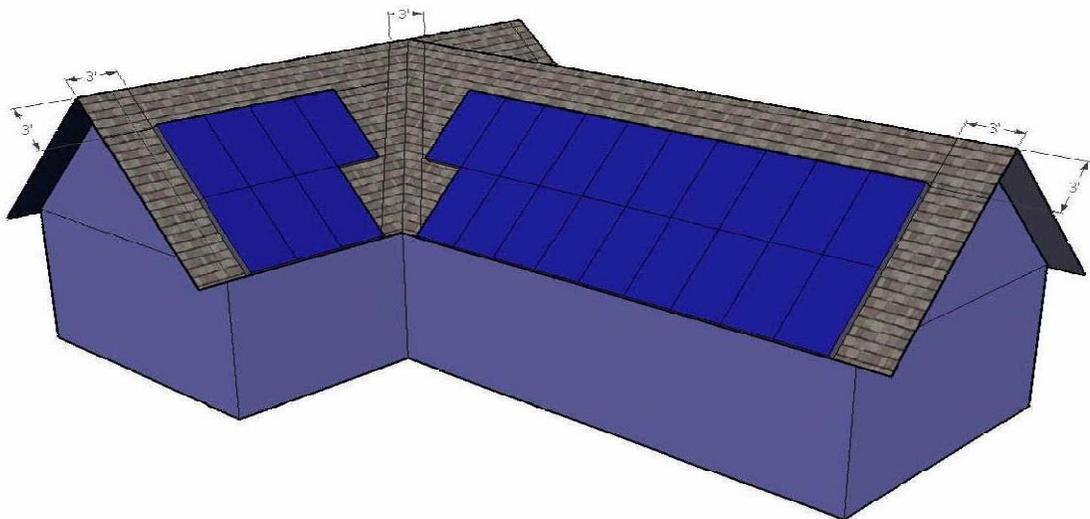
The following plan check submittal requirements are designed to expedite your photovoltaic installation through the **Building and Safety Department** in a timely matter your cooperation in providing all necessary information will allow our staff to conduct a thorough review of your plans.

GENERAL

All departments (Building, Planning, Engineering and Fire) approval will be required prior to issuance of any permit(s). Also approval will be required if equipment is installed on adjacent property.

REQUIREMENTS

- 1) All work shall be performed by a **Calif. Licensed Solar Contractor (C-46) or Calif. Licensed Electrical Contractor (C-10)** and with a current business license in order to operate in the City of Rancho Cucamonga California. Electrical contractors shall comply with current codes and ordinances (California Electrical Code 2007 / NEC 2005 Article 690).
- 2) Structural engineering calculations shall comply with Climate Zone 10, Exposure C at 90 mph winds below 210 freeway and 100 mph above 210 freeway. **Note:** Some areas north of the 210 freeway shall be calculated at 110 mph.
- 3) Provide **THREE (3) COMPLETE SET OF PLANS**, specifications and manufacturer's cut sheets. Plans must be legible for review by plans examiner. Do not copy specification manufacturer's cut sheets onto the plans, provide originals only.
 - 3.1) Site Plan:
 - 3.1.1) Provide a full dimensional site plan — indicate property lines, all structure(s), location of main electrical service, streets, alleys, setbacks, direction arrow (North), etc.
 - 3.2) Roof Plans:
 - 3.2.1) Array / Panel layout, setback, fire access pathways on roof and surrounding area per





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California Department of Forestry and Fire Protection Office of the State fire Marshal.

3.2.2) Rafter or beam sizes, spacing, roof slope, type of roof covering, and number of overlays.

3.2.3) Additional information may be required if roof system is designed with truss. **Note:** No attachment shall be made within 6 inches of all nailing plates / gusset).

3.3) General Plans

3.3.1) Where dc current over 150 volts to ground is present, provide a note on plans to restrict access to only qualified personnel.

”Equipment operating 150 volts or greater shall only be serviced or replaced by qualified personnel.”

3.3.1.1) Field protection may be in the form of conduit, closed cabinet or an enclosure which requiring use of tools to open.

3.3.2) Placard will be required which states as a minimum the following information.

“WARNING”

ELECTRIC SHOCK HARAZD. THE DIRECT CURRENT CIRCUIT CONDUCTORS OF THIS PHOTOVOLTAIC POWER SYSTEM ARE UNGROUNDED BUT MAY BE ENERGERIZED WITH RESPECT TO GROUND DUE TO LEAKAGE PATHS AND/OR GROUND FAULTS.

“WARNING:”

ELECTRIC SHOCK HAZARD

DO NOT TOUCH TERMINALS. TERMINALS ON BOTH THE LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION.

PHOTOVOLTAIC

AC – DISCONNECT

PHOTOVOLTAIC

“DC – DISCONNECT

CAUTION:

SOLAR CIRCUIT

“WARNING”

BIPOLAR PHOTOVOLTAIC ARRY

DISCONNECTION OF NEUTRAL OR GROUNDED CONDUCTORS MAY RESULT IN OVERVOLTAGE ON ARRAY OR INVERTER.

CAUTION:

SOLAR ELECTRIC SYSTEM

“WARNING”

DUAL POWER SUPPLY

AC	
PHOTOVOLTAIC DISCONNECT	
Open-circuit Voltage	XXXX Vdc
Operating Voltage	XXXX Vdc
Maximum System Voltage	XXXX Vdc
Operating Current	XXXX Amps
Short Circuit Current	XXXX Amps
Maximum Power	XXXX Watts

DC	
PHOTOVOLTAIC DISCONNECT	
Open-circuit Voltage	XXXX Vdc
Operating Voltage	XXXX Vdc
Maximum System Voltage	XXXX Vdc
Operating Current	XXXX Amps
Short Circuit Current	XXXX Amps
Maximum Power	XXXX Watts



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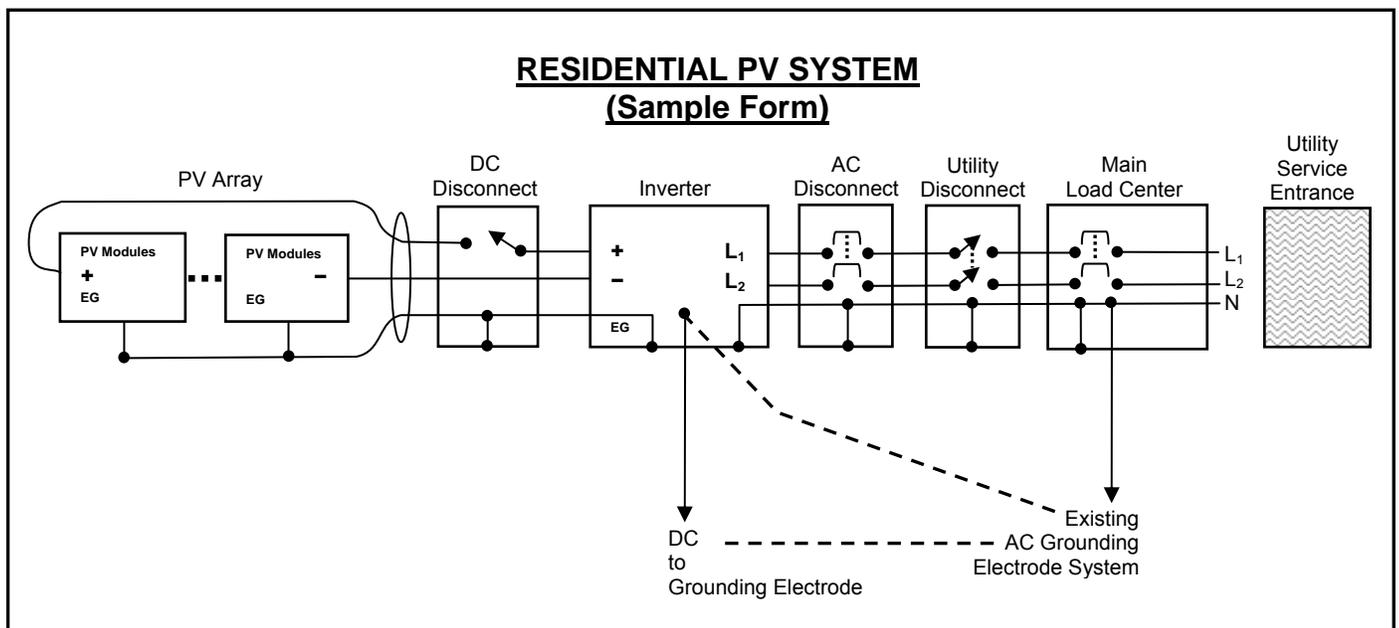
3.3.3) Photovoltaic source circuits and photovoltaic output circuits shall not be contained in the same raceway, cable tray, cable, outlet box, junction box, or similar fitting as feeders or branch circuits of other systems unless conductors are separated by a dividing plate.

3.3.4) Photovoltaic (PV) equipment

3.3.4.1) All equipment (PV modules, inverters, combiner boxes, modules, fuses, circuit breakers, etc.) shall be rated for use DC use and must be listed and labeled by an authorized testing laboratory (UL, CSA, ETL) standards.

3.3.5) PV System Diagram and Modules

3.3.5.1) Three line diagram showing, Inverter, Fuses, Circuit Breakers, Conductor Type and Sizes, Conduit Size and Type, Overcurrent Protection, Equipment Ground, Disconnect Devices (AC and DC), etc.



Three-line PV system diagram

3.3.5.2) Number of modules in series and parallel, Open-circuit voltage (Voc) per panel, Short-circuit current (Isc), Operating voltage (Vpmax), Operating current (Ipmax), Circuit conductor sizes and types (Min. 125% of panel Isc), Overcurrent Protection Devices Rating (156 % of panel Isc), Conduit/raceway size, Module fuse size, Ground conductor (minimum #8 bare or green insulated), etc.

3.3.5.3) Provide calculation sheet(s) to justify size of conductors, circuit breakers, conduits and overcurrent protection devices. Remember to use the required derating value, 90°C column in 310-16, and an additional 17°C / 30°F for all



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elevated temperatures of conductors and conduits exposed to sunlight environment.

3.3.5.4) Neutral conductor shall be bonded at the inverter.

3.3.5.5) Inverter output circuit conductor size and type (Min. 125% of inverter continuous output current rating).

3.3.6) Breakers /Fusing

3.3.6.1) Specify main services disconnect rating.

3.3.6.2) Size and listing if back-fed breakers when used.

3.3.6.3) Residential Only – The sum of the Main Breaker plus PV Breaker shall not be greater than 120% of Main Breaker / Buss.

3.3.6.4) All disconnect means shall be a minimum rating of 1.56 of I_{sc} .

3.3.7) Equipment Grounding Conductor (EGC)

3.3.7.1) Conductor shall be sized at 125% of the short-circuit current from the PV circuits.

3.3.8) Direct-Current Systems

3.3.8.1) Grounding Electrode Conductor (GEC) 4 AWG or larger shall be protected from physical damage and securely fastened to the surface on which it is carried.

3.3.8.2) Size shall be a minimum 8AWG or based on not smaller than the neutral or largest conductor feed whichever is the largest (Reference Table 250.66).

3.3.9) Combiner boxes

3.3.9.1) If exposed to sunlight and ambient temperatures over 40°C (104°F) provide a 10 to 15 percent derating factor and apply to the overcurrent device rating then verify conductors are protected.

3.3.10) Inverters AC Outputs

3.3.10.1) Inverter Output circuits shall be sized and protected at 125% of the steady-state output currents.

3.3.11) Roof mounted systems

3.3.11.1) Specify size of DC rated fuse [Ground Fault Protection (GFP)] on all roof mounted PV system in order to reduce fire hazard.

3.3.11.2) Equipment Grounding

3.3.11.2.1) Exposed non-current-carrying metal parts of modules frames equipment, and conductors enclosures shall be grounded regardless of voltage.

3.3.11.2.2) Re-roofing permit will be required if work exceeds 10% of the total roof area or greater than 100 square feet.



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3.3.12) Stand-Alone System

3.3.12.1) Any structure or building with photovoltaic power system that is not connected to a utility service source and is a “**Stand-alone System**” shall have a permanent plaque or directory installed on the exterior of the building or structure at a readily visible location.

3.3.12.2) Battery Storage Systems

3.3.12.2.1) Batteries must be installed in a listed rack, wooden racking system or a racking system approved by the Building Official, within the garage a minimum of 18” above the garage floor or in an approved location outside the main structure. Batteries must be ventilated and **may not** be installed in habitable space(s).

3.3.12.2.2) Provide means of protection such as bollards within a garage if storage rack is subject to damage by vehicles.

3.3.13) Mounting Design of Array/Panel

3.3.13.1) Provide manufacture’s cut sheet(s) or engineered design for anchorage and support of array/panels to roof structure (Minimum 6” from nailing plate).

3.3.14) Methods and Materials

3.3.14.1) Seal all roof penetrations with weather tight UV resistant compounds. Urethane caulking such as (Sikaflex 1a) is both temperature and UV resistant. Silicones and roofing tars are less durable and are prone to leakage over time.

3.3.14.2) Verify cable used are sunlight resistant and all connections termination (i.e. SE, USE, USE-2 and UF).

3.3.14.3) If flexible cords and cables are used for tracking PV system very compliance with California Electrical Code Article 400. All cables and cords shall be identified as hard service or portable power cords/cables suitable for extra-hard usage, listed for outdoor use, water resistant, and sunlight resistant.

3.3.14.4) Verify all post and flashing are secure and weather tight.

3.4) Workmanship

3.4.1) All conductors shall be securely fastened to the module frames and support structure to meet good workmanship standards. Also all outdoor rated plastic wire ties/wire wraps shall be UV resistant. Proof of products must be provided to the city inspector on site.



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3.5) General Notes required on Plans

3.5.1) Provide the following information on all plan submittals

“Local utility provider shall be notified prior to use and activation of any solar photovoltaic installation.”

“No sheet metal or tech screws shall be used to ground disconnect enclosure with tin-plated aluminum lugs; proper grounding/ground bar kits should be used”

3.6) Utility Provider Regulations

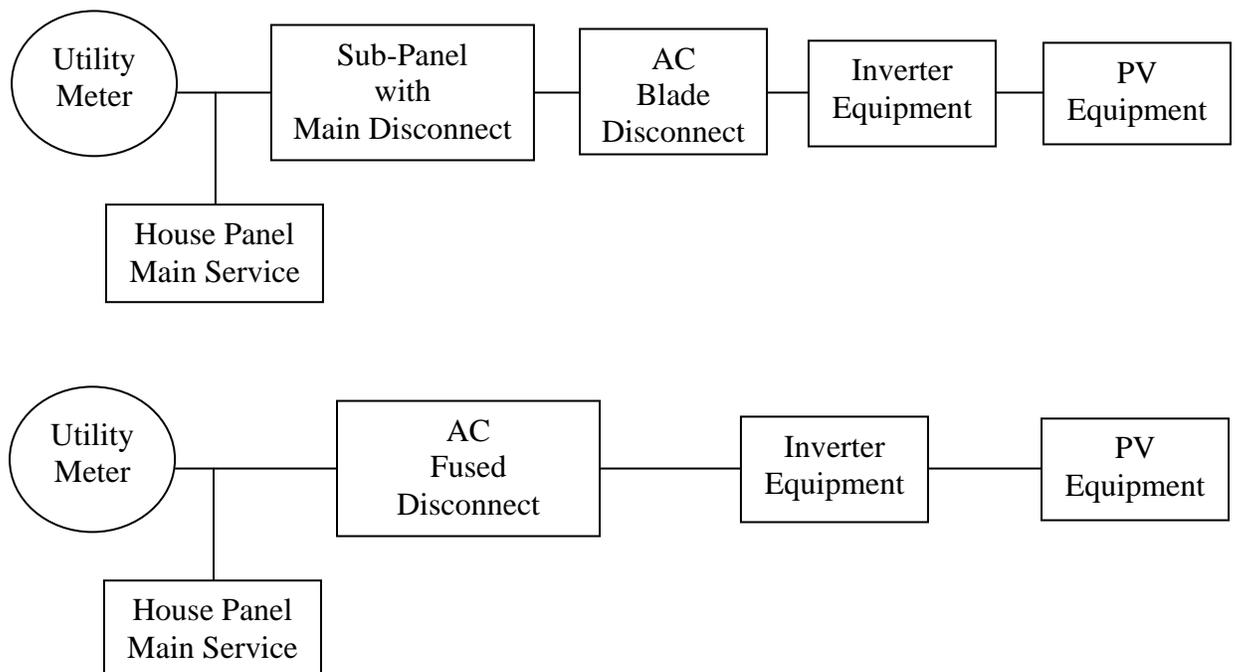
3.6.1) Net metering application shall be completed presented to the local utility provider and local city agency during plan check submittals.

3.6.2) Direct tap of PV system is an approved method, contact the local utility provider for specific limitations and conditions by which PV system may be connected.

3.6.2.1) Main disconnect must remain visibly open during all inspection.

3.6.2.2) A clear arch flash cover must be installed on all fuse disconnects systems.

3.6.2.3) Reference diagram below as an example of direct tap installation.





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GENERAL WEB SITE INFORMATION

PV Modules

For a current list of compliant modules visit California Energy Commissions website,

<http://www.gosolarcalifornia.ca.gov/equipment/pvmodule.php>

Inverter

For a current list of compliant modules visit California Energy Commissions website,

<http://www.gosolarcalifornia.ca.gov/equipment/inverter.php>

NOTE: Inverters and modules must be listed and cross-referenced to above web site.