Solar Labeling Requirements
2014 NEC Edition

**Junction Box & Conduit Raceways**

NEC 690.31(G)(1, 3, and 4) - DC CONDUIT

**WARNING**
PHOTOVOLTAIC POWER SOURCE

NEC 690.35(F) - UNGROUNDED SYSTEM JUNCTION BOXES

**WARNING**
ELECTRIC SHOCK HAZARD
THE DC CONDUCTORS OF THIS PHOTOVOLTAIC SYSTEM ARE UNGROUNDED AND MAY BE ENERGIZED.

**DC Disconnects**

NEC 690.17(E)

**WARNING**
ELECTRIC SHOCK HAZARD
DO NOT TOUCH TERMINALS. TERMINALS ON BOTH LINE AND LOAD SIDES MAY BE ENERGIZED IN THE OPEN POSITION.

NEC 690.35(F) - UNGROUNDED SYSTEMS

**WARNING**
ELECTRIC SHOCK HAZARD
THE DC CONDUCTORS OF THIS PHOTOVOLTAIC SYSTEM ARE UNGROUNDED AND MAY BE ENERGIZED.

NEC 690.13(B)

**PHOTOVOLTAIC DC DISCONNECT**

NEC 690.53

- RATED MAX POWER-POINT CURRENT
- RATED MAX POWER-POINT VOLTAGE
- MAXIMUM SYSTEM VOLTAGE
- SHORT CIRCUIT CURRENT

**Inverter**

NEC 690.5(C) GROUNDED INVERTERS ONLY

**WARNING**
ELECTRIC SHOCK HAZARD
IF A GROUND FAULT IS INDICATED, NORMALLY GROUNDED CONDUCTORS MAY BE UNGROUNDED AND ENERGIZED

NEC 690.35(F) - UNGROUNDED INVERTERS/ JUNCTION BOXES

**WARNING**
ELECTRICAL SHOCK HAZARD.
THE DC CONDUCTORS OF THIS PHOTOVOLTAIC SYSTEM ARE UNGROUNDED AND MAY BE ENERGIZED.

**Main Service Panel**

NEC 705.12(D)(2)(3)(b) NEAR PV BREAKER

**WARNING**
INVERTER OUTPUT CONNECTION
DO NOT RELOCATE THIS OVERCURRENT PROTECTION DEVICE

NEC 705.12(D)(3), NEC 705.10, NEC 690.56(B) - ON PANEL COVER

**WARNING**
DUAL POWER SOURCE
POWER IS BEING SUPPLIED TO THIS PANEL FROM THE UTILITY AND A SOLAR PV SYSTEM. THE SOLAR PV DISCONNECT IS LOCATED:

Location description or map here

**Production Meter**

NEC 690.13(B)

**PHOTOVOLTAIC SYSTEM METER**

**AC Disconnects**

NEC 690.54

- NOMINAL AC VOLTAGE
- RATED AC OUTPUT CURRENT

NEC 705.12(D)(3)

**WARNING**
SECOND SOURCE IS PV SYSTEM

NEC 690.35(F) - UNGROUNDED SYSTEM JUNCTION BOXES

**DISCLAIMER**
The purpose of this graphic is to provide a reference guide to solar photovoltaic system labeling requirements in accordance with the 2014 National Electrical Code (NEC), National Fire Protection Association (Copyright 2013), as interpreted by the Institute for Building Technology and Safety (IBTS). Users should always follow the code requirements and interpretations for specific placement of labels of the presiding Authority Having Jurisdiction (AHJ). NFPA 70®, National Electrical Code® and NEC® are registered trademarks of the National Fire Protection Association, Quincy, MA.
NEC 690.31(G)(1, 3. and 4) Direct-Current Photovoltaic Source and Direct- Current Output Circuits on or Inside a Building

(3) Marking or Labeling Required. The following wiring methods and enclosures that contain PV power source conductors shall be marked with the wording “PHOTOVOLTAIC POWER SOURCE” by means of permanently affixed labels or other approved permanent marking:

1. Exposed raceway, cable trays and other wiring methods
2. Covers or enclosures of pull boxes and junction boxes
3. Conduit bodies in which any of the available conduit openings are unused

(4) Marking and Labeling Methods and Locations. The labels or markings shall be visible after installation. The labels shall be reflective, and all letters shall be capitalized and shall be a minimum height of 9.5 mm (38 in.) in white on a red background. PV power circuit labels shall appear on every section of the wiring system that is separated by enclosures, walls, partitions, ceilings, or floors. Spacing between labels or markings, or between a label and a marking, shall not be more than 3 m (10 ft). Labels required by this section shall be suitable for the environment where they are installed.

IBTS INTERPRETATION: This code is specific to DC circuits to be identified as a Photovoltaic Power Source. This includes DC conduit, Junction Boxes, and Combiner Boxes that are on or inside a building structure. NEC 690.31(G)(1) also clarifies embedded circuits must be clearly identified where they are present beneath a surface.

NEC 690.35(F) Ungrounded Photovoltaic Power Systems

The PV power source shall be labeled with the following warning at each junction box, combiner box, disconnect and device where energized, ungrounded circuits may be exposed during service:

**WARNING:**

ELECTRIC SHOCK HAZARD. THE DC CONDUCTORS OF THE PHOTOVOLTAC SYSTEM ARE UNGROUNDED AND MAY BE ENERGIZED.

The warning sign(s) or label(s) shall comply with 110.21(B).

IBTS INTERPRETATION: This label should be installed for Ungrounded PV Systems on DC components where ungrounded circuits may be exposed during service. This includes the junction box, combiner box, DC disconnect, and inverter. Per NEC 110.21(B) labels must permanently affixed, not handwritten, and able to withstand environment.

NEC 690.17 (E) Switch or Circuit Breaker

The disconnecting means for ungrounded conductors shall consist of manually operable switch(es) or circuit breaker(s) complying with all of the following requirement:

1. Located where readily accessible
2. Externally operable without exposing the operator to live parts
3. Plainly indicating whether in the open or closed position
4. Having an interrupting rating sufficient for the nominal circuit voltage and the current that is available at the line terminals of the equipment. Where all terminals of the disconnecting means may be energized in the open position, a warning sign shall be mounted on or adjacent to the disconnecting means. The sign shall be clearly legible and have the following words or equivalent:

**WARNING:**

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

The warning sign(s) or label(s) shall comply with 110.21(B).

IBTS INTERPRETATION: This label should be installed on the covers of the disconnecting means that may be energized in the open position. This includes combiner boxes, DC disconnects and inverters with integrated DC disconnects.

NEC 690.53 Direct-Current Photovoltaic Power Source

A permanent label for the direct-current photovoltaic power source indicating items 1 through 5 shall be provided by the installer at the photovoltaic disconnecting means:

1. Rated maximum power-point current
2. Rated maximum power-point voltage
3. Maximum system voltage
4. Maximum circuit current. Where the PV power source has multiple outputs, 690.53(1) and (4) shall be specified for each output.
5. Maximum rated output current of the charger controller (if installed)

Informational Note: Reflecting International Standard IEC61851-1, Power enhancement may result in increased levels of output current and power.

IBTS INTERPRETATION: This code reference describes the label content to be present at any DC disconnecting means of a system. 2014 NEC clarifies that each PV power output shall have its own values defined.

NEC 690.5(C) Ground Fault Protection, Labels and Markings

A warning label shall appear on the utility-interactive inverter or be applied by the installer near the ground-fault indicator at a visible location, stating the following:

**WARNING:**

ELECTRIC SHOCK HAZARD IF A GROUND FAULT IS INDICATED, NORMALLY GROUNDED CONDUCTORS MAY BE UNGROUNDED AND ENERGIZED.

When the PV system also has batteries, the same warning shall also be applied by the installer in a visible location at the batteries. The warning sign(s) or label(s) shall comply with 110.21(B).

IBTS INTERPRETATION: A warning label shall be applied to the Inverter or near the ground fault indicator describing the hazard that would exist in the event of a ground fault.

NEC 690.13(B) Additional Provisions Requirements for Disconnecting Means, Markings

Each PV system disconnecting means shall be permanently marked to identify it as a PV system disconnect.

IBTS INTERPRETATION: Required at any disconnecting means including AC Disconnect, DC Disconnect, and Main Service Panel. Also required at inverters with integrated disconnects and subpanels. This label should be applied directly to the component and does not apply to the “line of sight” provision. The DC or AC reference is not specifically required.

NEC 705.12(D)(3) Point of Connection, Utility-Interactive Inverters, Markings

Equipment containing overcurrent devices in circuits supplying power to a bus bar or conductor supplied from multiple sources shall be marked to indicate the presence of all sources.

IBTS INTERPRETATION: This label is required on the main service panel to identify that the panel is energized from multiple sources, the Utility and a PV system. Label is also required on subpanels, fused AC disconnects, or any other component housing an overcurrent protective device.

705.12(D)(2)(i) and (c) Point of Connection, Utility Interactive Inverters

(b) Where two sources, one a utility and the other an inverter, are located at opposite ends of a busbar that contains loads, the sum of 125 percent of the inverter(s) output circuit current and the rating of the overcurrent device protecting the busbar shall not exceed 120 percent of the ampacity of the busbar. The busbar shall be sized for the loads connected in accordance with Article 220. A permanent warning label shall be applied to the distribution equipment adjacent to the back-fed breaker from the inverter that displays the following equivalent wording:

**WARNING:**

INVERTER OUTPUT CONNECTION; DO NOT RELOCATE THIS OVERCURRENT DEVICE.

The warning sign(s) or label(s) shall comply with 110.21(B).

(c) The sum of the ampere ratings of all overcurrent devices on panelboards, both load and supply devices, excluding the rating of the overcurrent device protecting the busbar, shall not exceed the ampacity of the busbar. The rating of the overcurrent protective device of the busbar shall not exceed the rating of the busbar. Permanent warning labels shall be applied to distribution equipment that displays the following or equivalent wording:

**WARNING:**

This equipment fed by multiple sources. Total rating of all overcurrent devices, excluding main supply overcurrent device, shall not exceed ampacity of busbar.

The warning sign(s) or label(s) shall comply with 110.21(B).

IBTS INTERPRETATION: 705.12(D)(2)(i) and (c) This label must be used when the sum of the PV system inverter output current and Main Service Panel breaker/fuse is greater than 100% of the busbar rating. It is not required if the sum of the main breaker and inverter output current circuit supplying the busbar is equal to or less than the busbar is rated for.

- Example A: 200A maximum rating on busbar. 200A main breaker + 19.58A back fed inverter output circuit current = label required
- Example B: 220A maximum rating on busbar. 200A main breaker + 19.58A back fed inverter output circuit current = no label required.

705.12(D)(2)(i)(c) This label isn’t often used at point of interconnection as it would quickly limit the size of the system that could be interconnected. If this method is used, the PV breaker can be placed anywhere inside the electrical panel.

NEC 690.56(B) and (C) Facilities with Utility Services and PV Systems, Facilities with Rapid Shutdown.

(B) Buildings or structures with both utility service and a PV system shall have a permanent plaque or directory providing the location of the service disconnecting means and the PV system disconnecting means if not located in the same location. The warning sign(s) or label(s) shall comply with 110.21(B).

(C) Facilities with Rapid Shutdown. Buildings or structures with both utility service and a PV system, complying with 690.12, shall have a permanent plaque or directory including the following wording:

PHOTOVOLTAIC SYSTEM EQUIPPED WITH RAPID SHUTDOWN

The plaque or directory shall be reflective, with all letters capitalized and having a minimum height of 9.5 mm (38 in.), in white on red background.

IBTS INTERPRETATION: (B) All system disconnects on a Utility-Interactive PV System, are required to have this label identifying where other system disconnecting means are located if not visible from either component.

(C) If system is equipped with rapid shutdown this must be clearly identified with a reflective label using white on red capitalized letters 9.5mm high or larger. Location for this label is not specified, but should be at the first location an emergency responder would access (most often considered to be the main service panel).

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