

Solar Labeling Requirements



Junction Box & Conduit Raceways

NEC 690.31(E)(3) - CONDUIT/ALL JUNCTION BOXES

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(4) - GROUNDED SYSTEMS

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 690.14(C)(2)

**PHOTOVOLTAIC
DC DISCONNECT**

NEC 690.53

RATED MAX POWER-POINT CURRENT	<input type="text"/>
RATED MAX POWER-POINT VOLTAGE	<input type="text"/>
MAXIMUM SYSTEM VOLTAGE	<input type="text"/>
SHORT CIRCUIT CURRENT	<input type="text"/>

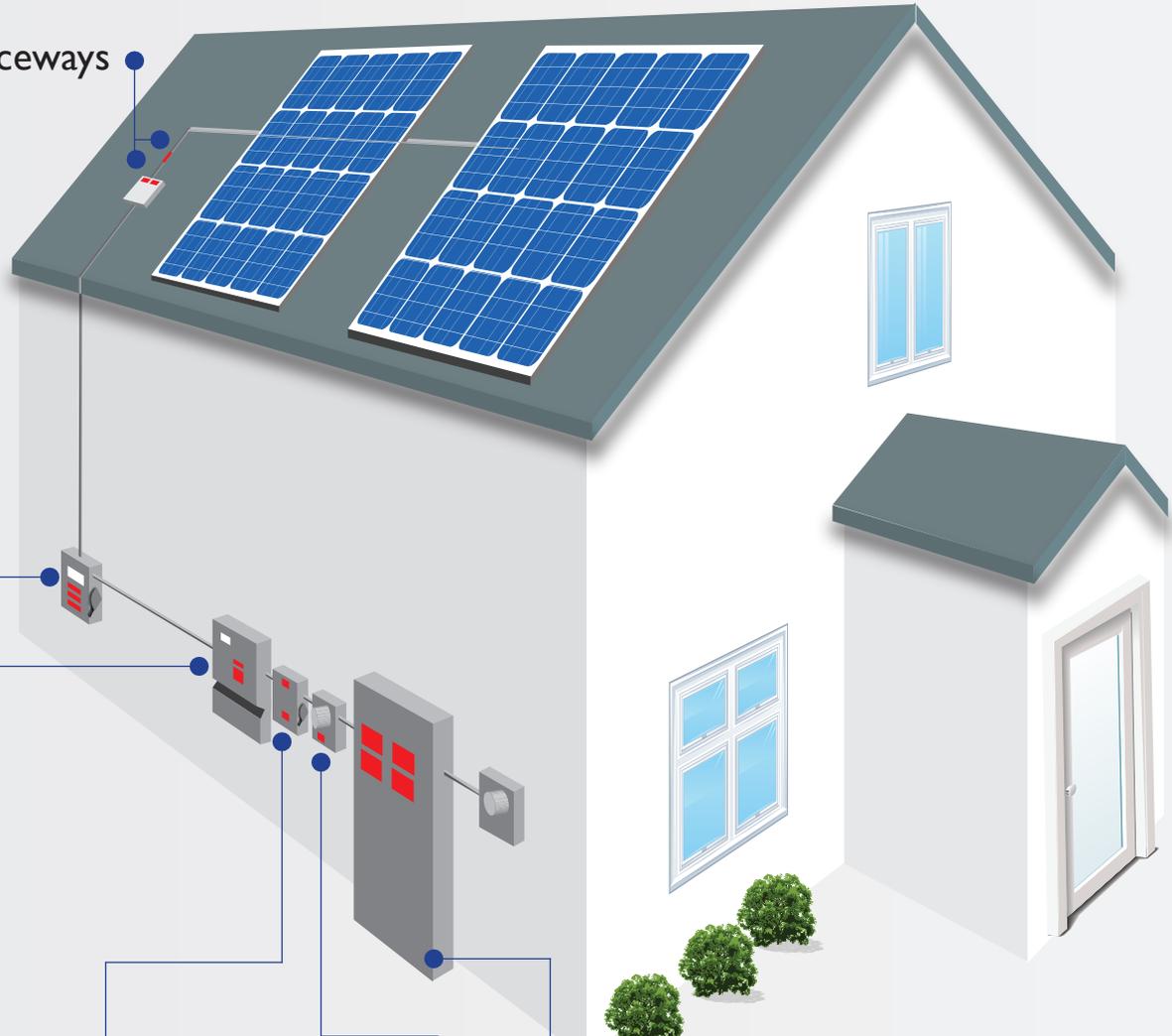
Inverter

NEC 690.5(C) - GROUNDED SYSTEMS

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

NEC 690.35(F) - UNGROUNDED SYSTEMS

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



Production Meter

NOT A CODE REQUIREMENT

**PHOTOVOLTAIC
SYSTEM METER**

Main Service Panel

NEC 705.12(D)(7) - NEAR PV BREAKER

WARNING
INVERTER OUTPUT CONNECTION
DO NOT RELOCATE THIS
OVERCURRENT PROTECTION
DEVICE

NEC 705.12(D)(4), 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

NEC 690.14(C)(2) - NEAR PV BREAKER

**PHOTOVOLTAIC
AC DISCONNECT**

NEC 690.54 - ON PANEL COVER

NOMINAL AC VOLTAGE:	<input type="text"/>
RATED AC OUTPUT CURRENT:	<input type="text"/>

AC Disconnects

NEC 690.14(C)(2)

**PHOTOVOLTAIC
AC DISCONNECT**

NEC 690.54

NOMINAL AC VOLTAGE:	<input type="text"/>
RATED AC OUTPUT CURRENT:	<input type="text"/>

NEC 705.12(D)(4) - ON A LINE SIDE TAP

WARNING DUAL POWER SOURCE
SECOND SOURCE IS PV SYSTEM

DISCLAIMER

The purpose of this graphic is to provide a reference guide to solar photovoltaic system labeling requirements in accordance with the 2011 National Electric Code (NEC), National Fire Protection Association (Copyright 2010), 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(E)(3), (4) Wiring Methods, Direct-Current Photovoltaic Source and Output Circuits Inside a Building, Marking or Labeling Required

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

The labels or markings shall be visible after installation. Photovoltaic 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 inside or connected to the building structure.

NEC 690.35(F) Ungrounded Photovoltaic Power Systems

The photovoltaic 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 PHOTOVOLTAIC SYSTEM ARE
UNGROUNDING AND MAY BE ENERGIZED.

 **IBTS INTERPRETATION:** This label should be installed for Ungrounded Photovoltaic Systems on DC components where ungrounded circuits may be exposed during service. This includes the junction box, combiner box, DC disconnect, and Inverter.

NEC 690.17 Switch or Circuit Breaker

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

1. Located where readily accessible
2. Externally operable without exposing the operator to contact with 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.

Exception: A connector shall be permitted to be used as an AC or a DC disconnecting means, provided that it complies with the requirements of 690.33 and is listed and identified for the use.

 **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. Should be installed on grounded and ungrounded systems.

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
Informational Note to 3.: See 690.7 (A) for maximum photovoltaic system voltage.
4. Short-circuit current
Informational Note to 4.: See 690.8 (A) for calculation of maximum circuit current.
5. Maximum rated output current of the charge controller (if installed)
Informational Note: Reflecting systems used for irradiance 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. If applicable, this includes inverters with an integrated DC disconnect.

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 photovoltaic system also has batteries, the same warning shall also be applied by the installer in a visible location at the batteries.

 **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 690.14(c)(2) Additional Provisions Requirements for Disconnecting Means, Markings

Each photovoltaic system disconnecting means shall be permanently marked to identify it as a photovoltaic 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)(4) Point of Connection, Utility-Interactive Inverters, Markings

Equipment containing overcurrent devices in circuits supplying power to a busbar 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 Photovoltaic system. Label is also required on subpanels, fused AC disconnects, or any other component housing an overcurrent protective device.

705.12(D)(7) Point of Connection, Inverter Output Connection

Unless the panelboard is rated not less than the sum of the ampere ratings of all over-current devices supplying it, a connection in a panelboard shall be positioned at the opposite (load) end from the input feeder location or main circuit location. The bus or conductor rating shall be sized for the loads connected in accordance with Article 220. In systems with panelboards connected in series, the rating of the first overcurrent device directly connected to the output of a utility-interactive inverter(s) shall be used in the calculations for all busbars and conductors. A permanent warning label shall be applied to the distribution equipment with the following or equivalent wording:

WARNING
INVERTER OUTPUT CONNECTION
DO NOT RELOCATE THIS
OVERCURRENT DEVICE

 **IBTS INTERPRETATION:** This label must be used when the sum of the Photovoltaic system breaker/fuse and Main Service Panel breaker/fuse is greater than 100% of the busbar rating. It is not required if the sum of those two breakers supplying the busbar is equal to or less than the busbar is rated for.

- Example A: 200A maximum rating on busbar. 200A main breaker+20A back fed PV breaker = label required
- Example B: 220A maximum rating on busbar. 200A main breaker+20A back fed PV breaker = no label required.

NEC 690.56(B) Facilities with Utility Services and PV Systems

Buildings or structures with both utility service and a photovoltaic system shall have a permanent plaque or directory providing the location of the service disconnecting means and the photovoltaic system disconnecting means if not located in the same location.

 **IBTS INTERPRETATION:** 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.

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