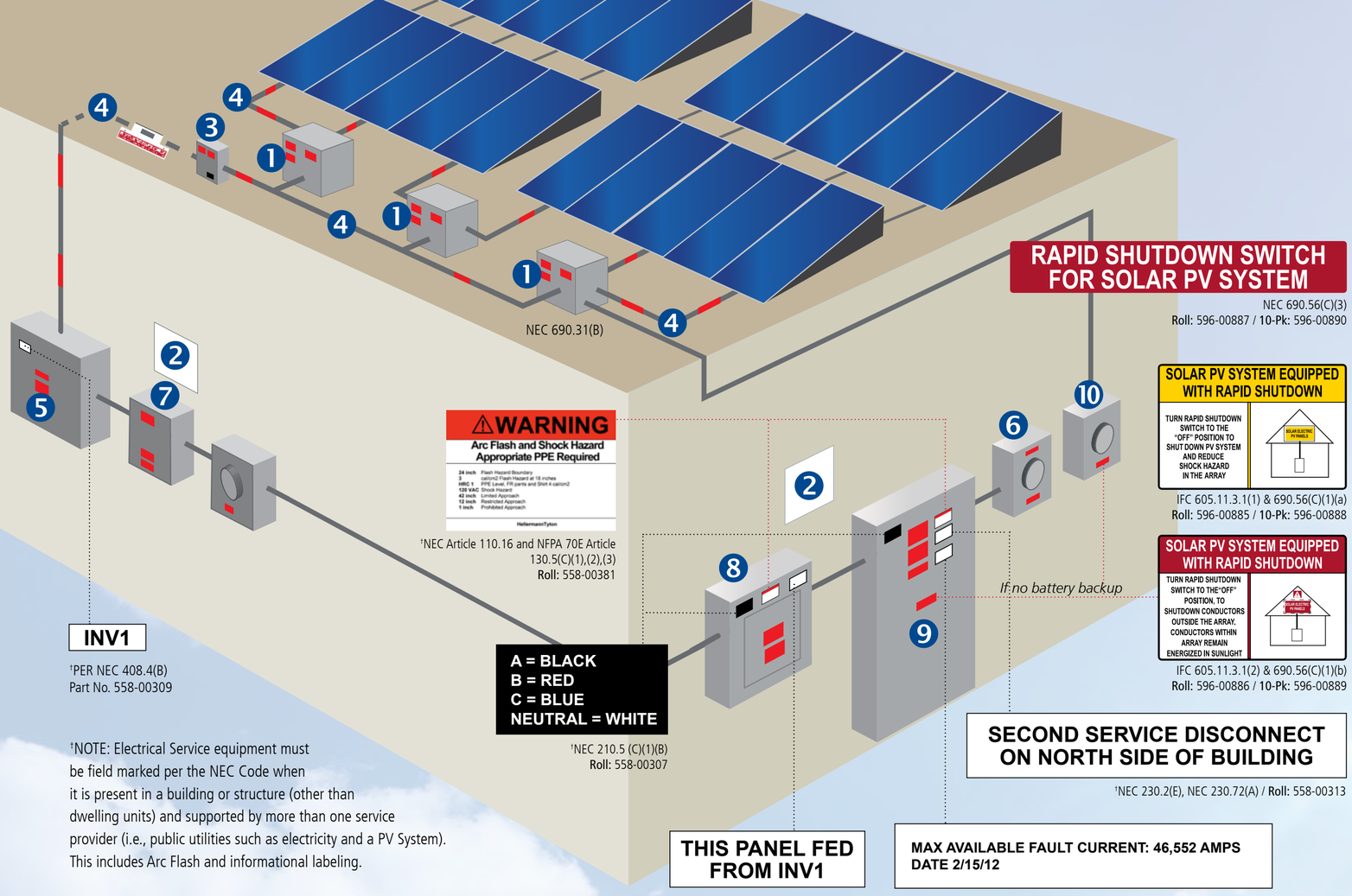
HellermannTyton

# PHOTOVOLTAIC SYSTEM LABELING REQUIREMENTS

*NEC 2017 Article 690 and IFC 2012*




†NOTE: Electrical Service equipment must be field marked per the NEC Code when it is present in a building or structure (other than dwelling units) and supported by more than one service provider (i.e., public utilities such as electricity and a PV System). This includes Arc Flash and informational labeling.

*The diagram shown in this poster is an illustration of one photovoltaic labeling scenario. The number and type of labels needed will vary based on the project scope and its related specifications. Check with AHJ for local requirements.UL1741 allows the use of either PV or Photovoltaic on the pre-printed label.*

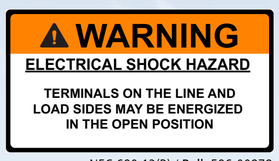
## Adhesive Fastened Signs

ANSI Z535.4-2011 Product Safety Signs and Labels, provides guidelines for suitable font sizes, words, colors, Symbols, and location requirements for labels. NEC 110.21(B)(1)

The label shall be of sufficient durability to withstand the environment involved. NEC 110.21(B)(3)

Adhesive fastened signs may be acceptable if properly adhered. Vinyl signs shall be weather resistant. IFC 605.11.1.3

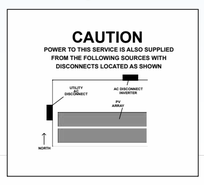
### ❶ Combiner Box / Circuits / Conduit Combiner Box / Enclosures / EMT Enclosures




NEC 690.13(B) / Roll: 596-00878
10-Pk: 596-00893 / Metal 5-Pk: 596-00921


NEC 110.27(C) & OSHA 1910.145(f)(7)
Roll: 596-00499 / 10-Pk: 596-00664
Metal 5-Pk: 596-00832

### ❷ Building / Structure




NEC 705.10 & NEC 690.56(B)
Roll: 558-00350

### ❸ DC Disconnect / Breaker / Recombiner Box


NEC 690.13(B) / Roll: 596-00879
10-Pk: 596-00894 / Metal 5-Pk: 596-00920


NEC 690.13(B)
Roll: 596-00238 / 10-Pk: 596-00854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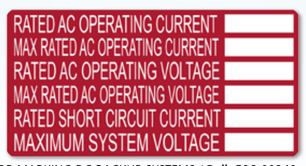
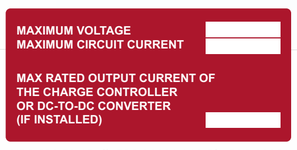
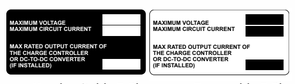
Engravable 5-Pk: 596-00858




FOR MARKING DC BACKUP SYSTEMS / Roll: 596-00240




NEC 690.53 / Roll: 596-00891 / 10-Pk: 596-00881

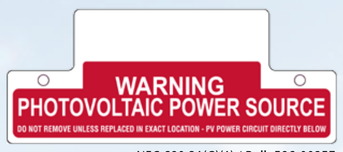



Hand-writable 5-Pk: 596-00918
Engravable 5-Pk: 596-00922

### ❹ EMT / Conduit Raceways

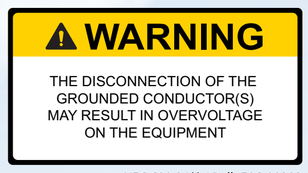
**(Reflective Material Required)*


NEC 690.31(G)(3)(4) / Roll: 596-00206 / 10-Pk: 596-00678




NEC 690.31(G)(1) / Roll: 596-00257

### ❺ Inverter




NEC 690.31(I) / Roll: 596-09323
10-Pk: 596-09324 / Metal 5-Pk: 596-00924


NEC 690.54 / Roll: 596-00892 / 10-Pk: 596-00882


Hand-writable 5-Pk: 596-00919
Engravable 5-Pk: 596-00923

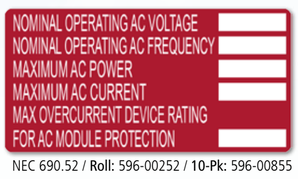
### ❻ Production / Net Meter (Bi-directional)


NEC 705.12(D)(3) & NEC 690.59 / Roll: 596-00495
10-Pk: 596-09665 / Metal 5-Pk: 596-00833

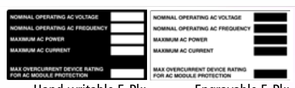
### ❼ AC Disconnect / Breaker / Points of Connection


NEC 690.13(B) / Roll: 596-00237 / 10-Pk: 596-00853


Hand-writable 5-Pk: 596-00841
Engravable 5-Pk: 596-00857




NEC 690.52 / Roll: 596-00252 / 10-Pk: 596-00855

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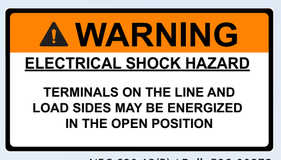
Engravable 5-Pk: 596-00862


NEC 690.13(B) / Roll: 596-00878
10-Pk: 596-00893 / Metal 5-Pk: 596-00921


NEC 690.54 / Roll: 596-00892 / 10-Pk: 596-00882


Hand-writable 5-Pk: 596-00919
Engravable 5-Pk: 596-00923

### ❽ Breaker Panel / Pull Boxes

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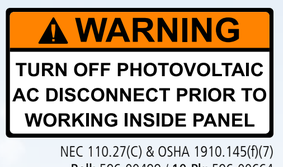
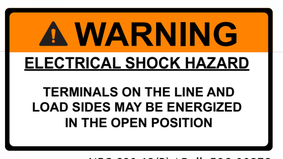



NEC 110.27(C) & OSHA 1910.145(f)(7)
Roll: 596-00499 / 10-Pk: 596-00664
Metal 5-Pk: 596-00832



Hand-writable 5-Pk: 596-00919
Engravable 5-Pk: 596-00923

### ❾ Main Service Disconnect




NEC 690.13(B) / Roll: 596-00878
10-Pk: 596-00893 / Metal 5-Pk: 596-00921


NEC 110.27(C) & OSHA 1910.145(f)(7)
Roll: 596-00499 / 10-Pk: 596-00664
Metal 5-Pk: 596-00832

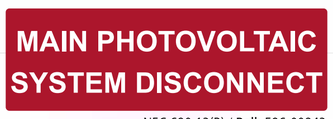

NEC 710.15(C) & 692.9 (C) / Roll: 596-00591
10-Pk: 596-00699 / Metal 5-Pk: 596-00837


NEC 690.15 (C) & NEC 690.33(E)(2)
Roll: 596-00244 / 10-Pk: 596-00671


NEC 690.13 (F), NEC 705.12(B)(3-4) & NEC 690.59
Roll: 596-00587 / 10-Pk: 596-00666
Metal 5-Pk: 596-00834

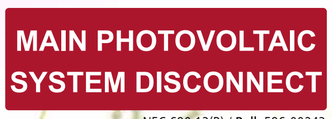

NEC 705.12(B)(3-4) & NEC 690.59 / Roll: 596-00495
10-Pk: 596-00665 / Metal 5-Pk: 596-00833


NEC 705.12 (B)(2)(c) / Roll: 596-00883
10-Pk: 596-00884 / Metal 5-Pk: 596-00917




NEC 690.13(B) / Roll: 596-00243
10-Pk: 596-00675 / Metal 5-Pk: 596-00860

### ❿ Main Service Disconnect / Utility Meter




NEC 690.13(B) / Roll: 596-00243
10-Pk: 596-00675 / Metal 5-Pk: 596-00860

*Labels are not to scale.*

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## LABELING REQUIREMENTS FOR ARTICLE 690

**NEC 690.13(B)** Each PV system disconnecting means shall plainly indicate whether in the open (off) or closed (on) position and be permanently marked "PV SYSTEM DISCONNECT" or equivalent. Additional markings shall be permitted based upon the specific system configuration. For PV system disconnecting means where the line and load terminals may be energized in the open position, the device shall be marked with the following words or equivalent.

**NEC 690.13(F)** Type of Disconnect. A dc PV system disconnecting means shall be marked for use in PV systems or be suitable for backfeed operation.

**NEC 690.15(C)** An isolating device shall be rated to open the maximum circuit current under load or be marked "Do Not Disconnect Under Load" or "Not for Current Interrupting."

**NEC 690.31(B)(1)** PV system circuit conductors shall be identified at all accessible points of termination, connection and splices. The means of identification shall be permitted by separate color coding, marking tape, tagging or other approved means.

**NEC 690.31(G)(1)** Where circuits are embedded in build up, laminate or membrane roofing materials not covered by PV modules and associated equipment, the location of the circuits shall be clearly marked.

**NEC 690.31(G)(4)** PV dc system 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 in this section shall be suitable for the environment where they are installed.

**NEC 690.31(I)** Solidly-grounded bipolar PV systems shall be clearly marked with a permanent, legible warning notice indicating that the disconnection of the grounded conductor(s) may result in overvoltage on the equipment.

**NEC 690.33(E)(2)** Interruption of Circuit. Connectors shall be a type that requires the use of a tool to open and marked "Do Not Disconnect Under Load" or "Not for Current Interrupting."

**NEC 690.52** Alternating-current modules shall be marked with identification of terminals or leads and with identification of the following ratings.

**NEC 690.53** A permanent label for the dc PV power source indicating items (1) through (3) shall be provided by the installer at dc PV system disconnecting means and at each dc equipment disconnecting means required by 690.15. Where a disconnecting means has more than one dc PV power source, the values in 690.53 (1) through (3) shall be specified for each source.

**NEC 690.54** All interactive system(s) points of interconnection with other sources shall be marked as an accessible location at the disconnecting means as a power source and with the rated ac output current and the nominal operating ac voltage.

**NEC 690.55** The PV system output circuit conductors shall be marked to indicate polarity where connected to energy storage systems.

**NEC 690.56(B)** Plaques or directories shall be installed in accordance with 705.10.

**NEC 690.56(C)(3)** A rapid shutdown switch shall have a label located on or no more than 1 meter (3 ft) from the switch that includes the following wording.

**NEC 690.56(C)(1)(a-b)** The type of PV system shall be labeled as described in a) or b):

**NEC 690.59** PV systems connected to other sources shall be installed in accordance with Parts I and II of Article 705.

## REQUIREMENTS FOR ELECTRICAL INSTALLATIONS (FIELD MARKING)

**NEC 110.16** Electrical equipment that are in other than dwelling units shall be field marked to warn qualified persons of a potential Arc Flash hazard.

**NEC 110.16(A)** Arc Flash: Electrical equipment, such as switchboards, switchgear, panelboards, industrial control panels, meter socket enclosures, and motor control centers, that is in other than dwelling units, and is likely to require examination, adjustment, servicing, or maintenance while energized, shall be field or factory marked to warn qualified persons of potential electric arc flash hazards. The marking shall meet the requirements in 110.21(B) and shall be located so as to be clearly visible to qualified persons before examination, adjustment, servicing, or maintenance of the equipment.

**NEC 110.16(B)** In other than dwelling units, in addition to the requirements in (A), a permanent label shall be field or factory applied to service equipment rated 1200 amps or more. The label shall meet the requirements of 110.21(B) and contain the following information.

1. Nominal system voltage
2. Available fault current at the service overcurrent protective devices.
3. The clearing time of service overcurrent protective devices based on the available fault current at the service equipment.
4. The date the label was applied.

**Exception:** *Service equipment labeling shall not be required if an arc flash label is applied in accordance with acceptable industry practice.*

**NEC 110.21(B)(1) FIELD APPLIED HAZARD MARKINGS:** The marking shall warn of the hazards using effective words, colors, symbols, or any combination thereof.

**NEC 110.21(B)(3)** The label shall be of sufficient durability to withstand the environment involved.

**NEC 110.22(B)** Engineered Series Combination Systems: Equipment enclosures for circuit breakers or fuses applied in compliance with series combination ratings selected under engineering supervision in accordance with 250.86(A) shall be legibly marked in the field as directed by the engineer to indicate the equipment has been applied with a series combination rating. The marking shall meet the requirements in 110.21(B) and shall be readily visible and state the following:

**NEC 110.24(A)** Field Marking: Service equipment at other than dwelling units shall be legibly marked in the field with the maximum available fault current. The field marking(s) shall include the date the fault-current calculation was performed and be of sufficient durability to withstand the environment involved. The calculation shall be documented and made available to those authorized to design, install, inspect, maintain, or operate the system.

**NEC 110.27(C)** Entrances to rooms or other guarded locations that contain exposed live parts shall be marked with conspicuous warning signs forbidding unqualified persons to enter.

**NEC 210.5(C)(1)(b) Posting of Identification Means:** The method utilized for conductors originating within each branch-circuit panelboard or similar branch circuit distribution equipment shall be documented in a manner that is readily available and shall be permanently posted at each branch-circuit panelboard or similar branch-circuit distribution equipment. The label shall be of sufficient durability to withstand the environment involved and shall not be handwritten

**NEC 230.2(E)** Identification – Where a building or structure is supplied by more than one service, or any combination of branch circuits, feeders, and services, a permanent plaque or directory shall be installed at each service disconnect location denoting all other services, feeders, and branch circuits supplying that building or structure and the area served by each.

**NEC 408.4(B)** Source of supply: All switchboards, switchgear, and panelboards supplied by feeder(s) in other than one-or-two family dwellings shall be permanently marked to indicate each device or equipment where the power originates. The label shall be permanently affixed, of sufficient durability to withstand the environment involved and not be handwritten.

**NEC 705.10** A permanent plaque or directory, denoting the location of all electric power source disconnecting means on or in the premises, shall be installed at each service equipment location and at the location(s) of the system disconnect(s) for all electric power production sources capable of being interconnected. Also see 690.4(d) One sign required for each PV system.

**NEC 705.12(B)(2)(c)** A permanent warning label shall be applied to the distribution equipment adjacent to the back-fed breaker from the inverter power source that displays the following or equivalent wording:

**NEC 705.12(B)(3-4)** 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. Circuits if backfed shall be suitable for such operations.

**NEC 710.15(C)** Stand-alone systems shall be permitted to supply 120 volts to single-phase, 3-wire, 120/240-volt service equipment or distribution panels where there are no 240-volt outlets and where there are no multiwire branch circuits. In all installations, the sum of the ratings of the power sources shall be less than the rating of the neutral bus in the service equipment. This equipment shall be marked with the following words or equivalent:

**NFPA 2012 130.5(C)**
Same as NEC110.16 but includes additional label information that is required after 9/30/2011. Check latest 2012 NFPA Arc Flash requirements.

**OSHA 1910.145(f)(7)**
Warning tags are used to represent a hazard level between "Caution" and "Danger".