



## PV LABELING

NEC2023 Changes to Sections 690, 691, 692, 694, 705, 710 and 790

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## NEC2023 Changes to Sections 690, 691, 692, 694, 705, 710 and 790

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**Scope of This Guide** — *This article summarizes some of the current and new requirements regarding proper labeling for standard solar and wind installations.*

The NEC 2023 code revision was published in October of 2022. This white paper discusses the changes and additions that impact labeling in many sections of the code related to PV and wind. As these systems grow and evolve, the required labeling continues to evolve with it to ensure safe and informative installations. Like any progressive development, input from many sources helped the code-making panel gain a better understanding of what works and what does not, so the process of change could proceed in a way that makes sense for everyday use in real-world applications.

Code-Making Panel 4 of the NEC 2023 reviewed hundreds of public inputs. Each suggestion was weighed, reviewed and compared to similar requests and then voted up or down based on all relevant data and substantiations. Many suggestions were for improved labeling.

One of the goals of the committee was to organize and re-number various sections. The panel consolidated similar labeling requirements, found in many sections of the code, into a single section. This should make compliance and inspection easier. The panel also moved definitions found in section 2 of Articles 690, 692 and 705 to Article 100. This was done in accordance with the NEC Style Manual, which states that definitions of terms used in the requirements of the document shall only be in Article 100.

Several references to requirements associated with plaques and directories, also located in various sections throughout the code, have been consolidated into one section. The proper reference for plaques, labels and directories is now only found in Article 705.10. The definition for required plaques, labels or directories in Articles 710, 712 and 689 are now combined into Article 705.10. If you didn't notice, the word "labels" is now referenced when describing required signage. The term "label" was added to the list of options for signage as some believed that placards were too restrictive of good sign options.

Many label requirements were moved to more suitable locations within the code. Some label requirements were placed in sections that did not immediately apply to the requirement. These changes were part of a larger initiative to group applicable but dispersed information into fewer, more comprehensive sections. Moving and renumbering sections simplifies and streamlines code requirements, allowing for better interpretation by AHJs and installers.

In summary, Code-Making Panel 4 initiated the following label-related changes:

- Consolidated similar labeling requirements found in multiple sections into a single section.
- Simplified label language when possible.
- Moved several label requirements to relevant sections for clarity.
- Added the term “labels” to requirements for “placards and directories.”
- Consolidated all placard requirements found in 690.56 or 712.10 as example into Article 705.10. Other sections will reference 705.10 unless the placards are mentioned or required for stand-alone systems. In that case, they will reference 710.10.
- The reflective “Buildings with Rapid-Shutdown” label is no longer reflective and required colors have been simplified so labels can be field printed by the installer.
- Added one new label related to manual load management for systems operating in island mode.
- Added one new label for PV Systems floating on bodies of water.
- Definitions in sections 2 of Articles 690, 694 and 705 are moved to Article 100 (Definitions).

The details of the changes are listed below along with images of the labels associated with those changes. Actual code language is italicized.

## 690.51 MODULES AND AC MODULES

*Modules and ac modules shall be marked in accordance with their listing.*

Article 690.51 was moved to Article 690.4. The reason this was moved is because Article 690.4 generally covers equipment listing requirements for PV systems, including ac modules. Enforcement requirements for marking of modules and ac modules should be found in one section.

## 690.4(G) PV EQUIPMENT FLOATING ON BODIES OF WATER

A new label was added to identify PV equipment floating on – or attached to structures floating on – bodies of water. Per the code revision, this equipment must be identified as being suitable for the purpose and shall utilize wiring methods that allow for any expected movement of the equipment.

**THIS EQUIPMENT SUITABLE  
FOR ATTACHMENT TO  
FLOATING STRUCTURES, OR  
ATTACHED TO STRUCTURES  
FLOATING ON BODIES  
OF WATER.**

### 690.53 MOVED TO 690.7(D)

*A permanent readily visible label indicating the highest maximum dc voltage in a PV system calculated in accordance with 690.7 shall be provided by the installer at one of the following locations.*

- (1) DC PV system disconnecting means*
- (2) PV system electronic power conversion equipment*
- (3) Distribution equipment associated with the PV system.*

The reason for the change was to correlate the label requirement with the relevant section to increase usability.



596-01001

### 690.54 DELETED

Section 705.14 was moved to 705.5 to improve ease of use on this article. This label was removed as it is redundant and may conflict with product listing requirements and requirements in other power source articles. To further explain, the markings previously associated with 690.54 would have to be on the power source equipment, not a disconnect. These markings would be part of the listing requirements of the source equipment, so no field label is needed on the disconnect.



596-00882

### 690.55 DELETED

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

This has been deleted because the requirements are already covered under 690.31(B)(1), which is now found in 690.31(B)(2)(a). The requirements have not changed, but this section has been reorganized and renumbered for clarity. Identification changes from (1) to (2) with sub-sections added as (a) and (b).

*(2) Identification: PV system dc circuit conductors shall be identified at all termination, connection, and splice points by color coding, marking tape, tagging, or other approved means in accordance with 690.31(B)(2)(a) and (b).*

*Exception: Where the identification of the conductors is evident by spacing or arrangement, further identification shall not be required.*

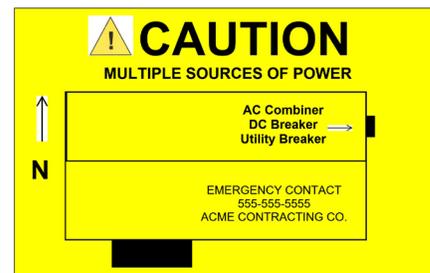
*(a) Conductors that rely on other than color coding for polarity identification shall be identified by an approved permanent marking means such as labeling, sleeving, or shrink-tubing that is suitable for the conductor size.*

(b) The permanent marking means for nonsolidly grounded positive conductors shall include imprinted plus signs (+) or the word POSITIVE or POS durably marked on insulation of a color other than green, white, or gray. The permanent marking means for nonsolidly grounded negative conductors shall include imprinted negative signs (–) or the word NEGATIVE or NEG durably marked on insulation of a color other than green, white, gray, or red. Only solidly grounded PV system dc circuit conductors shall be marked in accordance with 200.6.

### 690.56 CONNECTION TO OTHER SOURCES

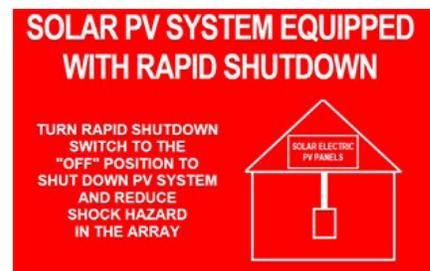
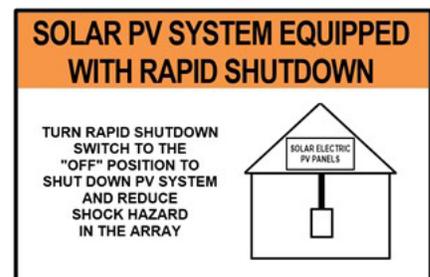
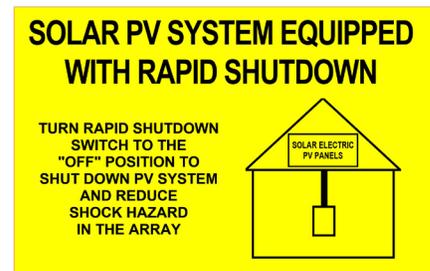
Plaques or directories shall be installed in accordance with 705.10. Title changed from Identification of Power Sources to Connection to Other Sources.

The language was changed to only reference Article 705.10. The proper reference for plaques and directories is now found in 705.10 only with the exception of 710.10 for buildings with stand-alone systems.



### 690.56(C) MOVED TO 690.12 WITH A CHANGE IN LABEL REQUIREMENTS

This revision is notable and important. First, the marking requirements were moved to the more relevant section 690.12(D). Second and even more crucial, the requirements for the “Buildings with Rapid Shutdown” label were radically changed for the better. Most notably, the label no longer needs to be reflective, and no specific color is required. The code simply states that whatever color is used, the printed text must contrast the background. The marking language requirements in the Fire Code, NFPA 111.12.2.1.1.2, and the NEC were different, making it unnecessarily difficult for enforcement and inspections agencies to align. Removing specific color requirements now allows local enforcement agencies more latitude. In addition, this makes it possible to field print these labels as opposed to being forced to purchase an expensive preprinted design. Under these new rules, the labels can take on a variety of colors as long as they maintain the building image and the “title” retains characters that are a minimum of 3/8” (9.5 mm) in height.



Examples of field-printed labels that would be acceptable using the new code requirements.

**690.56(C)(2) MOVED TO 690.12(D)(2)**

**Rapid Shutdown Switch.**

A rapid shutdown switch shall have a label that includes the following wording located on or no more than 1 m (3 ft) from the switch: **RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM**. The label shall be reflective, with all letters capitalized and having a minimum height of 9.5 mm (3/8 in.) in white on red background.

Unlike the previous label, this one does not change. The label is still reflective as described in the code language shown here. It has been moved to the more relevant section in 690.12(D)(2).

**RAPID SHUTDOWN SWITCH FOR SOLAR PV SYSTEM**

596-00887

**692.4(B) IDENTIFICATION OF POWER SOURCES**

With the changes made to other articles, a single reference to this section is necessary. As stated earlier, these references have been consolidated in Section 705.10. The code language has also been simplified as shown below.

~~Fuel cell systems shall be identified according to 692.4(B)(1) through (B)(3).~~

~~(1) Interconnected AC Systems.~~

~~Plaques or directories shall be installed in accordance with 705.10.~~

~~(2) DC Microgrid Systems.~~

~~Plaques or directories shall be marked with a plaque or directory installed in accordance with 712 705.10.~~

~~(3) Stand-Alone Systems.~~

~~Plaques or directories shall be installed in accordance with 710.10.~~

**691.4(2) SPECIAL REQUIREMENTS FOR LARGE-SCALE PV ELECTRIC SUPPLY STATIONS**

(2) Access to PV electric supply stations shall be restricted ~~by fencing or by other adequate means~~ in accordance with 110.31. Field-applied hazard markings shall be applied in accordance with 110.21(B).

In this instance, the reference to “fencing or by other adequate means” is deleted from the description.



**ARTICLE 692**

Part VII is retitled as Part VI. The sections have been renumbered to comply with Section 2.4.2.1 of the NEC Style Manual. The title of Part VI is renamed Source Connections. It was previously titled as Marking.

*Part VI. Source Connections*

**692.53 50 Fuel Cell Power Sources.**

*A marking specifying the fuel cell system, output voltage, output power rating, and continuous output current rating shall be provided at the disconnecting means for the fuel cell power source at an accessible location on the site.*

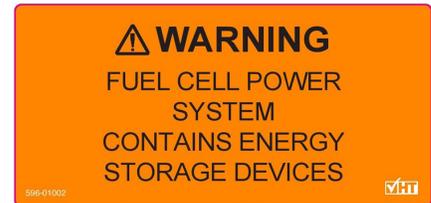
**692.54 51 Fuel Shut-Off.**

*The location of the manual fuel shut-off valve shall be marked at the location of the primary disconnecting means of the building or circuits supplied.*

**692.56 52 Stored Energy**

*A fuel cell system that stores electrical energy shall require the following warning sign, or equivalent, at the location of the service disconnecting means of the premises:*

These next three changes consolidate similar requirements into one article, which redefines the description of this label.



596-01002  
The warning sign(s) or label(s) shall comply with 110.21(B).

**705.10 IDENTIFICATION OF POWER SOURCES**

This first revision continues to refine the identification of power sources requirement by consolidating some of the wording, adding language about off-site emergency contact(s). The term "label" is added to the list of options for signage as some may believe that placards are too restrictive of good sign options. Where multiple sources supply the building, the label shall be marked with the wording CAUTION: MULTIPLE SOURCES OF POWER.

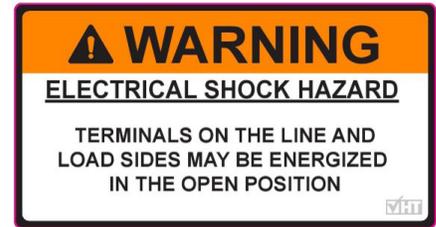
This also the article to which other sections will refer to when describing plaques, labels or directories. Example, Article 692.4 will now point to 705.10 as will Articles 690.56(A) or 712.10 as example. This article will be the single location explaining format and design.



### 690.13(B) TO 705.20

The marking requirement of Section 705.20(7) is revised, and the language of Section 690.13(B) is extracted rather than referenced so the language is located in one place for consistent reference. The informational note is revised for clarity and to remove an unnecessary reference.

Informational note: With interconnected power sources, some equipment, including switches and fuses, is capable of being energized from both directions.



596-00878

### 705.12(B)(2-3) SIMPLIFIED LABEL LANGUAGE

Minor editorial changes were made to the following two labels for clarity. Unnecessary words are eliminated from two marking requirements.



705.12(B)(2)



705.12(B)(3)

### 705.12 (C) AND 705.12 (D) BECOME 705.30 (C) AND 705.30(D)

The requirements in subdivisions (C) and (D) are general requirements to all interconnections, not just the load side. These were moved to new subdivisions within section 705.30 as they apply to the overcurrent protection device installation which is a more suitable location. The fastening requirement (E) is also moved to 705.30(E).



705.30(C) 596-00495



705.30(D) 596-00587

## 710.10 IDENTIFICATION OF POWER SOURCES

*A permanent plaque, label, or directory shall be installed at a building supplied by a stand-alone system at the power source disconnecting means location, or at an approved readily visible location. The plaque, label, or directory shall denote the location of each power source disconnecting means for the building or be grouped with other plaques or directories for other on-site sources. Where multiple sources supply the building, markings shall comply with 705.10.*

This differs from 705.10 in that this article deals with buildings using stand-alone systems. An emergency contact number is not required. The language is simplified with a reference to 705.10 for buildings with multiple power sources. Also, the reference to service equipment is removed since some stand-alone systems will have no service equipment, which are often installed where there is no utility service. The term “label” is added to the list of options for signage as some may believe that plaques are too restrictive of good sign options.

Finally, to clean up definitions found in Articles 692, 694 and 705, those found in section 2 of each article are moved to Article 100. These definitions are deleted from the relevant section and then placed in Article 100. An example of the deleted text from 694.2 is shown below:

## 694.2 DEFINITIONS

*The definitions in this section shall apply only within this article.*

**~~Maximum Voltage:~~**

*The maximum voltage the wind turbine produces in operation including open circuit conditions.*

**~~Nacelle:~~**

*An enclosure housing the alternator and other parts of a wind turbine.*

**~~Rated Power:~~**

*The output power of a wind turbine at its rated wind speed.*

*Informational Note: The method for measuring wind turbine power output is specified in IEC 61400-12-1,*

*Power Performance Measurements of Electricity Producing Wind Turbines.*

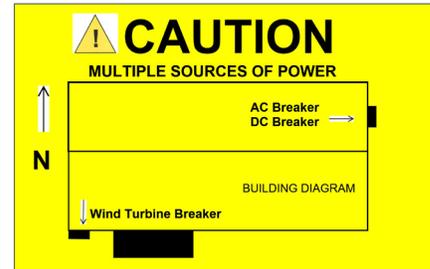
**~~Tower (as applied to wind electric systems):~~**

*A pole or other structure that supports a wind turbine.*

**~~Wind Turbine:~~**

*A mechanical device that converts wind energy to electrical energy.*

**~~Wind Turbine Output Circuit:~~**



## LOCAL REGULATIONS AND FINAL DRAFT REVISIONS

Many adjustments are sure to come as the industry progresses and labeling evolves with the changes to become a standard everyone can define and implement now and in the future.

Always check local codes before defining labeling formats.

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