



Second Revision No. 7929-NFPA 70-2021 [Detail]

[700.5]

(C) Automatic Transfer Switches.

Automatic transfer switches shall be electrically operated and mechanically held.

~~Automatic transfer switches shall not be permitted to be reconditioned.~~

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Mon Oct 18 12:21:04 EDT 2021

Committee Statement

Committee Statement: Deleted the reconditioning statement from 700.5(C). The accompanying SR 7928 relocates this to new section 700.2 as requested by the correlating committee. Also, changed the “shall not be permitted to be” to “shall not be” in accordance with the style manual.

Response Message: SR-7929-NFPA 70-2021



Second Revision No. 8001-NFPA 70-2021 [Detail]

[700.12(H)(2)]

(2) Installation.

Battery-equipped emergency luminaires shall be installed in accordance with the following:

- (1) Battery-equipped emergency luminaires shall be permanently fixed in place (i.e., not portable).
- (2) Wiring to each luminaire shall be installed in accordance with the requirements of any of the wiring methods in Chapter 3 unless otherwise specified in Part II, IV, or V of this article. Flexible cord-and-plug connection shall be permitted, provided that the cord does not exceed 900 mm (3 ft) in length. Flexible cord, with or without a plug, provided that the cord does not exceed 1800 mm (6 ft) in length, shall also be permitted for battery-equipped emergency luminaires installed in accordance with 410.62(C)(1).
- (3) The branch circuit feeding the battery-equipped emergency luminaire shall be one of the following:
 - a. The same branch circuit as that serving the normal lighting in the area and connected ahead of any local switches.
 - b. The same or a different branch circuit as that serving the normal lighting in the area if that circuit is equipped with means to monitor the status of that area's normal lighting branch circuit ahead of any local switches.
 - c. ~~Where the normal lighting circuit is served by one or more branch circuits, a separate branch circuit, provided with a lock-on feature, that originates from the same panelboard as the normal lighting circuits. The branch circuit disconnecting means for this branch circuit shall be provided with a lock-on feature.~~ A separate branch circuit originating from the same panelboard as one or more normal lighting circuits. This separate branch circuit disconnecting means shall be provided with a lock-on feature.
- (4) The branch circuit that feeds battery-equipped emergency luminaires shall be clearly identified at the distribution panel.
- (5) Emergency luminaires that obtain power from a battery-equipped emergency luminaire shall be wired to the battery-equipped emergency luminaires as required in Part II, IV, or V of this article.
- (6) Remote luminaires providing lighting for the exterior of an exit door shall be permitted to be supplied by the battery-equipped emergency luminaire serving the area immediately inside the exit door.

Supplemental Information

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
NEC_CMP13_700.12_SR8001.docx	For staff use	

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Tue Oct 19 11:55:42 EDT 2021

Committee Statement

Committee Statement: The language was changed to comply with the style manual section 3.3.4 for word clarity and for usability.

Response Message: SR-8001-NFPA 70-2021

[Public Comment No. 1587-NFPA 70-2021 \[Section No. 700.12\(H\)\(2\)\]](#)



Second Revision No. 8115-NFPA 70-2021 [Detail]

[702.5]

(B) Transfer Switches.

~~(1) Reconditioned.~~

~~Transfer switches shall not be permitted to be reconditioned.~~

Supplemental Information

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
NEC_CMP13_702.5_SR8115.docx	Staff use only.	

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Thu Oct 21 10:33:47 EDT 2021

Committee Statement

Committee Statement: Deleted the reconditioning statement from 702.5(B)(1) and relocated to new section 702.2 as requested by the correlating committee. Also, changed the "shall not be permitted to be" to "shall not be" in accordance with the style manual.

Response Message: SR-8115-NFPA 70-2021

[Public Comment No. 1115-NFPA 70-2021 \[Section No. 702.5\]](#)



Second Revision No. 8181-NFPA 70-2021 [Detail]

[Article 100]

Diversion Controller (**Diversion Charge Controller**, **Diversion Load Controller**).

Equipment that regulates the output of a source or charging process ~~of an ESS by diverting power from energy storage~~ to direct-current or alternating-current loads or to an interconnected utility service. ~~(706)~~
(CMP-13)

~~**Diversion Charge Controller.**~~

~~Equipment that regulates the charging process of a battery or other energy storage device by diverting power from energy storage to dc or ac loads, or to an interconnected utility service. (CMP-4)~~

~~**Diversion Load Controller.**~~

~~Equipment that regulates the output of a wind generator by diverting power from the generator to dc or ac loads or to an interconnected utility service. (CMP-4)~~

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Fri Oct 22 12:35:31 EDT 2021

Committee Statement

Committee Statement: Definitions Task Group 6, as directed by the Correlating Committee, reviewed the definitions and usage of the terms " Diversion Charge Controller" and "Diversion Load Controller." After reviewing usage in Articles 694 and 706, the definition is updated to define the globally applicable term "Diversion Controller" with alternate terms (Diversion Charge Controller, Diversion Load Controller) per the Style Manual Section 2.2.2.2. Correspondingly, the definitions for "Diversion Charge Controller" and "Diversion Load Controller" are deleted from Article 100.

Response Message: SR-8181-NFPA 70-2021

[Public Comment No. 555-NFPA 70-2021 \[Definition: Diversion Load Controller.\]](#)

[Public Comment No. 1979-NFPA 70-2021 \[Definition: Diversion Load Controller.\]](#)

[Public Comment No. 554-NFPA 70-2021 \[Definition: Diversion Charge Controller.\]](#)

[Public Comment No. 553-NFPA 70-2021 \[Definition: Diversion Charge Controller.\]](#)

[Public Comment No. 1154-NFPA 70-2021 \[Global Input\]](#)



Second Revision No. 8468-NFPA 70-2021 [Detail]

695.3(1) Phase Converters.

Phase converters shall not be permitted to be used ~~for~~to supply power to
a fire pump service. [20:9.1.7]

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Tue Oct 26 19:46:38 EDT 2021

Committee Statement

Committee Statement: This editorial revision is made for compliance with the NFPA extract policy.

Response Message: SR-8468-NFPA 70-2021



Second Revision No. 8469-NFPA 70-2021 [Detail]

695.7(D)

The voltage at the contactor(s) load terminals to which the motor is connected shall not drop more than 5 percent below the voltage rating of the motor ~~connected to those terminals~~ when the motor is operating at 115 percent of the full-load current rating of the motor. [20:9.4.4]

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Tue Oct 26 20:10:45 EDT 2021

Committee Statement

Committee Statement: This editorial revision is made to comply with the NFPA extract policy.

Response Message: SR-8469-NFPA 70-2021



Second Revision No. 7894-NFPA 70-2021 [Definition: Critical Operations Areas, Designated (DCOA). (...)]

Critical Operations Areas, Designated (~~DCOA~~) . (Designated Critical Operations Areas) (DCOA)

Areas within a facility or site designated as requiring critical operations power. (CMP-13)

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Mon Oct 18 10:56:28 EDT 2021

Committee Statement

Committee Statement: The formatting of the term modifier and acronym were modified to comply with the NEC Style Manual.

Response Message: SR-7894-NFPA 70-2021

[Public Comment No. 1368-NFPA 70-2021 \[Definition: Critical Operations Areas, Designated \(DCOA\). \(...\)\]](#)



Second Revision No. 8081-NFPA 70-2021 [Definition: Direct Current

Microgrid, Direct Current. (Dire...]

Microgrid, Direct Current. (Direct Current Microgrid) (DC Microgrid)

~~A direct current microgrid is a power distribution system consisting of more than one interconnected dc power source, supplying dc-dc converter(s), dc load(s), and/or ac load(s) powered by dc-ac inverter(s). A dc microgrid is typically not directly connected to an ac primary source of electricity, but some dc microgrids interconnect via one or more dc-ac bidirectional converters or dc-ac inverters. (712) (CMP-13)~~

~~Informational Note: Direct current power sources include ac-dc converters (rectifiers), bidirectional dc-ac inverters/converters, photovoltaic systems, wind generators, energy storage systems (including batteries), and fuel cells.~~

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Wed Oct 20 14:54:29 EDT 2021

Committee Statement

Committee Statement: This definition is being deleted as the term is no longer used in the requirements of the document with the deletion of Article 712.

Response Message: SR-8081-NFPA 70-2021

[Public Comment No. 1445-NFPA 70-2021 \[Definition: Microgrid, Direct Current. \(Direct Current Micr...\]](#)

[Public Comment No. 1927-NFPA 70-2021 \[Definition: Microgrid, Direct Current. \(Direct Current Micr...\]](#)



Second Revision No. 7895-NFPA 70-2021 [Definition: Emergency Luminaire, Battery-Equipped (Battery-...)

Emergency Luminaire, Battery-Equipped. (Battery-Equipped Emergency Luminaire).

A luminaire with a rechargeable battery, a battery charging means, and an automatic load control relay. ~~(700)~~ ~~(701)~~ (CMP-13)

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Mon Oct 18 10:57:42 EDT 2021

Committee Statement

Committee Statement: The reference to multiple articles was removed in accordance with 2.2.2.3.2 of the NEC Style Manual.

Response Message: SR-7895-NFPA 70-2021

Public Comment No. 1372-NFPA 70-2021 [Definition: Emergency Luminaire, Battery-Equipped (Battery-...)]



Second Revision No. 7897-NFPA 70-2021 [Definition: Emergency Power Supply System (EPSS).]

Emergency Power Supply System (EPSS).

~~This definition shall apply within this article and throughout the code.~~ A complete functioning EPS system coupled to a system of conductors, disconnecting means and overcurrent protective devices, transfer switches, and all control, supervisory, and support devices up to and including the load terminals of the transfer equipment needed for the system to operate as a safe and reliable source of electric power. [110:3.3.4] (CMP-13)

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Mon Oct 18 10:59:38 EDT 2021

Committee Statement

Committee Statement: The first sentence in the definition was removed in compliance with 2.2.2 of the NEC Style Manual.

Response Message: SR-7897-NFPA 70-2021

[Public Comment No. 1373-NFPA 70-2021 \[Definition: Emergency Power Supply System \(EPSS\).\]](#)



Second Revision No. 7909-NFPA 70-2021 [Definition: Energy Management System.]

Energy Management System_(EMS) .

A system consisting of any of the following: a monitor(s), communications equipment, a controller(s), a timer(s), or other device(s) that monitors and/or controls an electrical load or a power production or storage source. (CMP-13)

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Mon Oct 18 11:23:24 EDT 2021

Committee Statement

Committee Statement: The definition format was revised to include an acronym in accordance with 2.2.2.3 of the NEC Style Manual.

Response Message: SR-7909-NFPA 70-2021

[Public Comment No. 36-NFPA 70-2021 \[Definition: Energy Management System.\]](#)



Second Revision No. 8079-NFPA 70-2021 [Definition: Grounded, Functionally. (Functionally Grounded)]

~~Grounded, Functionally. (Functionally Grounded)~~

~~A system that has an electrical ground reference for operational purposes that is not solidly grounded. (712) (CMP-13)~~

~~Informational Note: Examples of operational reasons for functionally grounded systems include ground fault detection and performance related issues for some power sources.~~

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Wed Oct 20 14:17:00 EDT 2021

Committee Statement

Committee Statement: This definition is being removed with the deletion of Article 712. A definition for "functionally grounded" remains in Article 100.

Response Message: SR-8079-NFPA 70-2021

[Public Comment No. 1463-NFPA 70-2021 \[Definition: Grounded, Functionally. \(Functionally Grounded\)\]](#)

[Public Comment No. 424-NFPA 70-2021 \[Definition: Grounded, Functionally. \(Functionally Grounded\)\]](#)

[Public Comment No. 551-NFPA 70-2021 \[Definition: Grounded, Functionally. \(Functionally Grounded\)\]](#)



Second Revision No. 8068-NFPA 70-2021 [Definition: Load Management.]

Load Management.

The process of limiting within an energy management system that limits the total electrical load on an electrical supply system to a set value by adjusting or controlling the individual loads. (625) (CMP-12)

Informational Note: Load management is sometimes called *demand-side management* (DSM).

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Wed Oct 20 12:35:06 EDT 2021

Committee Statement

Committee Statement: The definition of "Load Management" has been revised for clarity and correlation with Article 750. Load management is a function of a listed energy management system.

Response Message: SR-8068-NFPA 70-2021

[Public Comment No. 1036-NFPA 70-2021 \[Definition: Load Management.\]](#)



Second Revision No. 7899-NFPA 70-2021 [Definition: Luminaire, Emergency,Directly Controlled. (Dire...]

Emergency_ Luminaire, Emergency, Directly Controlled. (Directly Controlled Emergency Luminaire)

A luminaire supplied by the facility emergency power system and with a control input for dimming or switching that provides an emergency illumination level upon loss of normal power. (700) (CMP-13)

Informational Note: See ANSI/UL 924, *Emergency Lighting and Power Equipment*, for information covering directly controlled emergency luminaires.

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Mon Oct 18 11:00:43 EDT 2021

Committee Statement

Committee Statement: The definition format was rearranged to align with the base term “emergency luminaire” in accordance with 2.2.2.3 of the NEC Style Manual.

Response Message: SR-7899-NFPA 70-2021

Public Comment No. 1374-NFPA 70-2021 [Definition: Luminaire, Emergency,Directly Controlled. (Dire...]



Second Revision No. 8080-NFPA 70-2021 [Definition: Nominal Voltage (as applied to battery or cell).]

Voltage, Nominal (Nominal Voltage) (as applied to battery or cell).

The value assigned to a cell or battery of a given voltage class for the purpose of convenient designation. The operating voltage of the cell or battery may vary above or below this value. (CMP-13)

Informational Note: The most common nominal cell voltages are 2 volts per cell for the lead-acid batteries, 1.2 volts per cell for alkali batteries, and 3.2 to 3.8 volts per cell for Li-ion batteries. Nominal voltages might vary with different chemistries.

Submitter Information Verification

Committee: NEC-P13

Submission Date: Wed Oct 20 14:32:09 EDT 2021

Committee Statement

Committee Statement: Definitions Task Group 7, as directed by the Correlating Committee, reviewed the multiple definitions of "Nominal Voltage" that were presented in the First Draft Report. The task group recommends retaining this definition assigned to CMP-13 due to the specific applicability to a cell or battery. The formatting of the definition title and addition of the searchable term were added to comply with Section 2.2.2.3 of the NEC Style Manual.

Response Message: SR-8080-NFPA 70-2021

[Public Comment No. 548-NFPA 70-2021 \[Definition: Nominal Voltage \(as applied to battery or cell\).\]](#)

[Public Comment No. 203-NFPA 70-2021 \[Definition: Nominal Voltage \(as applied to battery or cell\).\]](#)

[Public Comment No. 1156-NFPA 70-2021 \[Definition: Nominal Voltage \(as applied to battery or cell\).\]](#)

[Public Comment No. 1375-NFPA 70-2021 \[Definition: Nominal Voltage \(as applied to battery or cell\).\]](#)



Second Revision No. 7890-NFPA 70-2021 [Definition: Optional Standby Systems.]

Optional Standby Systems.

Those systems intended to supply power to public or private facilities or property where life safety does not depend on the performance of the system. These systems are intended to supply on-site generated or stored power to selected loads either automatically or manually. (CMP-13)

~~Informational Note: Optional standby systems are typically installed to provide an alternate source of electric power for such facilities as industrial and commercial buildings, farms, and residences and to serve loads such as heating and refrigeration systems, data processing and communications systems, and industrial processes that, when stopped during any power outage, could cause discomfort, serious interruption of the process, damage to the product or process, or the like.~~

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Mon Oct 18 10:51:04 EDT 2021

Committee Statement

Committee Statement: The informational note for the definition of Optional Standby Systems was removed in accordance with 4.1.1 of the NEC Style Manual and guidance from the Correlating Committee in CN 434.

Response Message: SR-7890-NFPA 70-2021

[Public Comment No. 1355-NFPA 70-2021 \[Definition: Optional Standby Systems.\]](#)

[Public Comment No. 1987-NFPA 70-2021 \[Definition: Optional Standby Systems.\]](#)



Second Revision No. 8082-NFPA 70-2021 [Definition: Primary DC Source.]

Primary DC Source.

~~A source that supplies the majority of the dc load in a dc microgrid. (712) (CMP-13)~~

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Wed Oct 20 14:56:23 EDT 2021

Committee Statement

Committee Statement: This definition is being deleted as the term is no longer used in the requirements of the document with the deletion of Article 712.

Response Message: SR-8082-NFPA 70-2021

[Public Comment No. 1466-NFPA 70-2021 \[Definition: Primary DC Source.\]](#)

[Public Comment No. 1376-NFPA 70-2021 \[Definition: Primary DC Source.\]](#)



Second Revision No. 7892-NFPA 70-2021 [Definition: Stored-Energy Power Supply System (SEPSS).]

Stored-Energy Power Supply System (SEPSS).

~~This definition shall apply within this article and throughout the code.~~ A complete functioning EPSS powered by a stored-energy electrical source. (CMP-13)

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Mon Oct 18 10:54:41 EDT 2021

Committee Statement

Committee Statement: The first sentence of the definition was removed in accordance with 2.2.2 of the NEC Style Manual and guidance from the Correlating Committee in CN 435.

Response Message: SR-7892-NFPA 70-2021

[Public Comment No. 1366-NFPA 70-2021 \[Definition: Stored-Energy Power Supply System \(SEPSS\).\]](#)

[Public Comment No. 1988-NFPA 70-2021 \[Definition: Stored-Energy Power Supply System \(SEPSS\).\]](#)



Second Revision No. 7903-NFPA 70-2021 [Definition: Supervisory Control and Data Acquisition (SCADA...)

Supervisory Control and Data Acquisition (SCADA).

An electronic system that provides monitoring and controls for the operation of the critical operations power system. ~~This can include the fire alarm system, security system, control of the HVAC, the start/stop/monitoring of the power supplies and electrical distribution system, annunciation and communications equipment to emergency personnel, facility occupants, and remote operators. (CMP-13)~~

Informational Note: This can include the fire alarm system, security system, control of the HVAC, the start/stop/monitoring of the power supplies and electrical distribution system, annunciation and communications equipment to emergency personnel, facility occupants, and remote operators.

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Mon Oct 18 11:12:56 EDT 2021

Committee Statement

Committee Statement: SCADA system examples in the second sentence of the definition were moved into an informational note to improve clarity.

Response Message: SR-7903-NFPA 70-2021

[Public Comment No. 1378-NFPA 70-2021 \[Definition: Supervisory Control and Data Acquisition \(SCADA...\)\]](#)



Second Revision No. 7905-NFPA 70-2021 [Definition: Switch, Bypass Isolation.]

Transfer Switch, Bypass Isolation. (Bypass Isolation Transfer Switch)

A manual, nonautomatic, or automatic operated device used in conjunction with a transfer switch to provide a means of directly connecting load conductors to a power source and of disconnecting the transfer switch. (CMP-13)

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Mon Oct 18 11:15:55 EDT 2021

Committee Statement

Committee Statement: The definition format was rearranged to align with the base term “Transfer Switch” in accordance with 2.2.2.3 of the NEC Style Manual. In addition, a term modifier was added to provide easier searchability for users.

Response Message: SR-7905-NFPA 70-2021

Public Comment No. 1380-NFPA 70-2021 [Definition: Switch, Bypass Isolation.]



Second Revision No. 7912-NFPA 70-2021 [Definition: Switch, Meter-Mounted Transfer. (Meter-Mounted ...)]

Transfer Switch, Meter-Mounted ~~Transfer~~ . (Meter-Mounted Transfer Switch)

A transfer switch connected between the utility meter and the meter base ~~or fabricated as part of the meter base~~ . (CMP-13)

Informational Note: Meter-mounted transfer switches can plug into the meter base ~~or be fabricated as part of the meter base~~ . Transfer switches that incorporate the meter base in the transfer equipment assembly are not considered meter-mounted transfer switches.

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Mon Oct 18 11:25:20 EDT 2021

Committee Statement

Committee Statement: The title of the definition was modified to group the base term “Transfer Switch” in accordance with the NEC Style Manual. The phrase “fabricated as part of the meter base” was removed from the definition and informational note to clarify the construction of these devices.

Response Message: SR-7912-NFPA 70-2021

[Public Comment No. 33-NFPA 70-2021 \[Definition: Switch, Meter-Mounted Transfer. \(Meter-Mounted ... \)\]](#)

[Public Comment No. 1281-NFPA 70-2021 \[Definition: Switch, Meter-Mounted Transfer. \(Meter-Mounted ... \)\]](#)

[Public Comment No. 1381-NFPA 70-2021 \[Definition: Switch, Meter-Mounted Transfer. \(Meter-Mounted ... \)\]](#)

[Public Comment No. 2134-NFPA 70-2021 \[Definition: Switch, Meter-Mounted Transfer. \(Meter-Mounted ... \)\]](#)



Second Revision No. 7904-NFPA 70-2021 [Definition: Switch, Transfer.]

Transfer Switch, Transfer .

An automatic or nonautomatic device for transferring one or more load conductor connections from one power source to another. (CMP-13)

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Mon Oct 18 11:14:56 EDT 2021

Committee Statement

Committee Statement: The definition format was rearranged to align with the base term "Transfer Switch" in accordance with 2.2.2.3 of the NEC Style Manual.

Response Message: SR-7904-NFPA 70-2021

[Public Comment No. 1379-NFPA 70-2021 \[Definition: Switch, Transfer.\]](#)



Second Revision No. 8083-NFPA 70-2021 [Definition: Voltage, Nominal. (Nominal Voltage)]

~~Voltage, Nominal. (Nominal Voltage)~~

~~A value assigned to a circuit or system for the purpose of conveniently designating its dc voltage class. (712) (CMP-13)~~

~~Informational Note: The actual voltage at which a circuit operates can vary from the nominal voltage within a range that permits satisfactory operation of equipment.~~

Submitter Information Verification

Committee: NEC-P13

Submission Date: Wed Oct 20 15:00:12 EDT 2021

Committee Statement

Committee Statement: Definitions Task Group 7, as directed by the Correlating Committee, reviewed the multiple definitions of "Nominal voltage" that were presented in the First Draft Report. Deleting this definition assigned to CMP-13 (Article 712), while retaining the global definition assigned to CMP-1 resolves the multiple definitions issue with no alteration of the defined term or of its applicability or usage in the document.

Response Message: SR-8083-NFPA 70-2021

[Public Comment No. 550-NFPA 70-2021 \[Definition: Voltage, Nominal. \(Nominal Voltage\)\]](#)

[Public Comment No. 1282-NFPA 70-2021 \[Definition: Voltage, Nominal. \(Nominal Voltage\)\]](#)

[Public Comment No. 1465-NFPA 70-2021 \[Definition: Voltage, Nominal. \(Nominal Voltage\)\]](#)



Second Revision No. 8084-NFPA 70-2021 [Definitions (100): DC System, ... to DC System, ...]

~~DC System, Reference-Grounded. (Reference-Grounded DC System)~~

~~A system that is not solidly grounded but has a low-resistance electrical reference that maintains voltage to ground in normal operation. (712) (CMP-13)~~

~~DC System, Three-Wire, Grounded. (Grounded Three-Wire DC System)~~

~~A system with a solid connection or reference-ground between the center point of a bipolar dc power source and the equipment-grounding system. (712) (CMP-13)~~

~~DC System, Two-Wire, Grounded. (Grounded Two-Wire DC System)~~

~~A system that has a solid connection or reference-ground between one of the current-carrying conductors and the equipment-grounding system. (712) (CMP-13)~~

~~DC System, Ungrounded. (Ungrounded DC System)~~

~~A system that has no direct or resistive connection between the current-carrying conductors and the equipment-grounding system. (712) (CMP-13)~~

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Wed Oct 20 15:06:30 EDT 2021

Committee Statement

Committee Statement: These definitions are being deleted as the terms are no longer used in the requirements of the document with the deletion of Article 712.

Response Message: SR-8084-NFPA 70-2021

[Public Comment No. 1369-NFPA 70-2021 \[Definition: DC System, Three-Wire, Grounded. \(Grounded Thre...\]](#)

[Public Comment No. 1370-NFPA 70-2021 \[Definition: DC System, Two-Wire, Grounded. \(Grounded Two-Wi...\]](#)

[Public Comment No. 1464-NFPA 70-2021 \[Definitions \(100\): DC System, ... to DC System, ...\]](#)

[Public Comment No. 552-NFPA 70-2021 \[Definition: DC System, Reference-Grounded. \(Reference-Groun...\]](#)



Second Revision No. 8050-NFPA 70-2021 [Section No. 445.4]

445.4 ~~Reconditioned Generators.~~

~~The reconditioning of generators shall be in accordance with instructions provided by a generator manufacturer. The generator nameplate shall not be required to be removed. Where a generator is reconditioned it shall be identified as reconditioned and marked in accordance with 110.21(A)(2) .~~

~~Reconditioned, rewound, or repaired classified (hazardous) generators identified for use in Class I, Division 1 (or Zone 0 or 1) locations shall be listed as reconditioned (or certified as reconditioned).~~

~~Informational Note No. 1: See ANSI/EASA AR100-2015, *Recommended Practice for the Repair of Rotating Electrical Apparatus* , for information pertaining to the rewinding and repair of generators.~~

~~Informational Note No. 2: See Title 40, Code of Federal Regulations, for emissions nameplate labeling of engine generators subject to Environmental Protection Agency regulations.~~

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Tue Oct 19 17:45:03 EDT 2021

Committee Statement

Committee Statement: Article 445 is for generators, also called gensets. Although portions of stationary gensets may be reconditioned, manufacturers typically do not publish instructions for reconditioning a complete genset.

Response Message: SR-8050-NFPA 70-2021

[Public Comment No. 1830-NFPA 70-2021 \[Section No. 445.4\]](#)



Second Revision No. 8051-NFPA 70-2021 [Section No. 445.11]

445.11 Marking.

Each generator shall be provided with a an accessible nameplate giving the manufacturer's name, the rated frequency, the number of phases if ac, the rating in kilowatts or kilovolt-amperes, the power factor, the normal volts and amperes corresponding to the rating, and the rated ambient temperature.

Nameplates or manufacturer's instructions shall provide the following information for all stationary generators and portable generators rated more than 15 kW:

- (1) Alternator subtransient, transient, synchronous, and zero sequence reactances
- (2) Generator set power rating category (including but not limited to prime, standby, or continuous)
- (3) Alternator temperature rise at rated load and insulation system class
- (4) Indication if the generator is protected against overload by inherent design, an overcurrent protective relay, a circuit breaker, or a fuse
- (5) Available fault current for inverter-based generators, in lieu of the synchronous, subtransient, and transient reactances

Marking shall be provided by the manufacturer to indicate whether or not the generator neutral is bonded to its frame. Where the bonding is modified in the field, additional marking shall be required to indicate whether the neutral is bonded to the frame.

~~Equipment mounted to the generator assembly shall not conceal or obscure the generator nameplate.~~

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Tue Oct 19 18:01:05 EDT 2021

Committee Statement

Committee Statement: The list of examples in (2) is not all inclusive and has been modified accordingly.

The final sentence has been removed in favor of adding "accessible" to the first sentence, to provide clarity on the location of the nameplate and to use a defined term.

Response Message: SR-8051-NFPA 70-2021

[Public Comment No. 1477-NFPA 70-2021 \[Section No. 445.11\]](#)

[Public Comment No. 1832-NFPA 70-2021 \[Section No. 445.11\]](#)



Second Revision No. 8052-NFPA 70-2021 [Section No. 445.19(B)]

(B) Remote Emergency Shutdown.

For other than one- and two-family dwelling units, generators with greater than 15 kW rating shall be provided with a remote emergency stop switch to shut down the prime mover. The remote emergency stop switch shall be located outside the equipment room or generator enclosure at a readily accessible location and shall also meet the requirements of 445.19(A)(1) and (A)(2).

The remote emergency stop switch shall be permitted to be mounted on the exterior of the generator enclosure. The remote emergency stop switch shall ~~have a field applied label as be~~ labeled Generator Emergency Shutdown, and the label shall meet the requirements of 110.21(B).

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Wed Oct 20 10:54:22 EDT 2021

Committee Statement

Committee Statement: The revision improves clarity and meets the intent of the submitter.

Response Message: SR-8052-NFPA 70-2021

Public Comment No. 1396-NFPA 70-2021 [Section No. 445.19(B)]



Second Revision No. 8104-NFPA 70-2021 [Section No. 480.1]

480.1 Scope.

This article applies to all installations of stationary standby batteries ~~composed of lead-acid or nickel-cadmium cells~~ having a capacity greater than 3.6 MJ (1 kWh) .

Informational Note No. 1: See Article 706 for installations that do not meet the definition of stationary standby batteries ~~or are composed of cells other than lead-acid or nickel-cadmium~~ .

Informational Note No. 2: The following standards are frequently referenced for the installation of stationary batteries:

- (1) IEEE 484, *Recommended Practice for Installation Design and Installation of Vented Lead-Acid Batteries for Stationary Applications*
- (2) IEEE 485, *Recommended Practice for Sizing Vented Lead-Acid Storage Batteries for Stationary Applications*
- (3) IEEE 1145, *Recommended Practice for Installation and Maintenance of Nickel-Cadmium Batteries for Photovoltaic (PV) Systems*
- (4) IEEE 1187, *IEEE Recommended Practice for Installation Design, and Installation of Valve-Regulated Lead-Acid Batteries for Stationary Applications*
- (5) IEEE 1375, *IEEE Guide for the Protection of Stationary Battery Systems*
- (6) IEEE 1578, *Recommended Practice for Stationary Battery Electrolyte Spill Containment and Management*
- (7) IEEE 1635/ASHRAE 21, *Guide for the Ventilation and Thermal Management of Batteries for Stationary Applications*
- (8) UL 1973, *Standard for Batteries for Use in Stationary, Vehicle Auxiliary Power, and Light Electric Rail (LER) Applications*
- (9) UL Subject 2436, *Outline of Investigation for Spill Containment for Stationary Lead Acid Battery Systems*
- (10) UL 1989, *Standard for Standby Batteries*
- (11) UL Subject 1974, *Standard for Evaluation of Repurposed Batteries*
- (12) NFPA 855-2020, *Standard for the Installation of Stationary Energy Storage Systems*

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Wed Oct 20 17:45:15 EDT 2021

Committee Statement

Committee Statement: The scope of Article 480 and the informational note were revised to remove the limitation of application to solely lead-acid or nickel-cadmium battery chemistries in accordance with the Correlating Committee direction in CN 290. There are other battery technologies that are used for stationary standby applications. The scope was limited to apply to only those batteries having a capacity greater than 3.6 MJ (1 kWh). This limitation aligns with the scope of Article 706 and excludes small batteries considered

outside the scope of Article 480 such as those in fire alarm panels.

Response SR-8104-NFPA 70-2021

Message:

[Public Comment No. 1116-NFPA 70-2021 \[Section No. 480.1\]](#)

[Public Comment No. 175-NFPA 70-2021 \[Section No. 480.1\]](#)

[Public Comment No. 1683-NFPA 70-2021 \[Section No. 480.1\]](#)



Second Revision No. 8094-NFPA 70-2021 [Section No. 480.10(G)]

(G) Illumination.

Illumination shall be provided for working spaces containing stationary standby batteries. The lighting outlets shall not be controlled by automatic means only. Additional lighting outlets shall not be required where the work space is illuminated by an adjacent light source. The location of luminaires shall not cause result in the following:

- (1) Expose personnel to energized battery components while performing maintenance on the luminaires in the battery space
- (2) Create a hazard to the battery upon failure of the luminaire

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Wed Oct 20 16:21:58 EDT 2021

Committee Statement

Committee Statement: The phrase "cause the following" was deleted as it is considered unnecessary.

Response Message: SR-8094-NFPA 70-2021

Public Comment No. 1117-NFPA 70-2021 [Section No. 480.10(G)]



Second Revision No. 8066-NFPA 70-2021 [New Section after 695.1]

695.2 Reconditioned Equipment.

Reconditioned fire pump controllers and transfer switches shall not be permitted.

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Wed Oct 20 12:27:32 EDT 2021

Committee Statement

Committee Statement: The requirements in 695.10 for reconditioned equipment have been moved to a new 695.2 for consistency of location of requirements. The term "shall not be permitted to be" has been revised to "shall not be" for clarity.

Response Message: SR-8066-NFPA 70-2021



Second Revision No. 8063-NFPA 70-2021 [Section No. 695.3(I)]

[Detail SR-8468](#)

(I) Phase Converters.

Phase converters shall not be ~~permitted to be used for~~ to supply power to a fire pump service.
[20:9.1.7]

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Wed Oct 20 12:14:48 EDT 2021

Committee Statement

Committee Statement: The term “shall not be permitteded to be” has been revised to “shall not be” for clarity.

Response Message: SR-8063-NFPA 70-2021



Second Revision No. 8064-NFPA 70-2021 [Section No. 695.6(D)(3)]

(3) Connections.

Electrical connections at motor terminal boxes shall be made with a listed means of connection. Twist-on, insulation-piercing-type, and soldered wire connectors shall not be permitted to be used for this purpose. [20:9.4.4.2, 9.4.4.3]

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Wed Oct 20 12:24:18 EDT 2021

Committee Statement

Committee Statement: The term “shall not be permitteded to be” has been revised to “shall not be” for clarity.

Response Message: SR-8064-NFPA 70-2021



Second Revision No. 8054-NFPA 70-2021 [Section No. 695.7(D)]

[Detail SR-8469](#)

(D) Motor Running.

The voltage at the contactor(s) load terminals to which the motor is connected shall not drop more than 5 percent below the voltage rating of the motor ~~connected to those terminals when~~ the motor is operating at 115 percent of the full-load current rating of the motor. [20:9.4.4]

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Wed Oct 20 11:10:28 EDT 2021

Committee Statement

Committee Statement: The term "contactor(s)" is replaced with "contactor" to comply with 3.3.3 of the NEC Style Manual.

Response Message: SR-8054-NFPA 70-2021

[Public Comment No. 1119-NFPA 70-2021 \[Section No. 695.7\]](#)



Second Revision No. 8065-NFPA 70-2021 [Section No. 695.10]

695.10 Listed Equipment.

Diesel engine fire pump controllers, electric fire pump controllers, electric motors, fire pump power transfer switches, foam pump controllers, and limited service controllers shall be listed for fire pump service. [20:9.5.1.1, 10.1.2.1, 12.1.3.1]

~~Fire pump controllers and transfer switches shall not be permitted to be reconditioned.~~

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Wed Oct 20 12:25:36 EDT 2021

Committee Statement

Committee Statement: The requirements in 695.10 for reconditioned equipment have been moved to a new 695.2 for consistency of location of requirements. The term “shall not be permitted to be” has been revised to “shall not be” for clarity.

Response Message: SR-8065-NFPA 70-2021



Second Revision No. 8062-NFPA 70-2021 [Section No. 695.15]

695.15 Surge Protection.

A listed surge protective device (SPD) shall be installed in or on the fire pump controller.

Informational Note: See UL 1449-2021, *Standard for Surge Protective Devices*, for proper application of SPD types.

Exception: Surge-protective devices shall not be required in or on a fire pump controller for diesel fire pumps.

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Wed Oct 20 12:12:35 EDT 2021

Committee Statement

Committee Statement: UL 1449 (5th edition) provides guidance on the different types of SPD and the appropriate use of those types. 10.4.1.1 of NFPA 20 does not specify the Type of SPD required.

Response Message: SR-8062-NFPA 70-2021

Public Comment No. 1685-NFPA 70-2021 [Section No. 695.15]



Second Revision No. 7928-NFPA 70-2021 [New Section after 700.1]

700.2 Reconditioned Equipment.

Reconditioned transfer switches shall not be permitted.

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Mon Oct 18 12:18:51 EDT 2021

Committee Statement

Committee Statement: Deleted the reconditioning statement from 700.5(C) and relocated to new section 700.2 as requested by the correlating committee. Also, changed the “shall not be permitted to be” to “shall not be” in accordance with the style manual.

Response Message: SR-7928-NFPA 70-2021



Second Revision No. 7939-NFPA 70-2021 [Section No. 700.3(A)]

(A) Commissioning Witness Test.

The authority having jurisdiction shall conduct or witness the commissioning ~~and testing~~ of the complete system upon installation and periodically afterward.

Informational Note: See NECA 90, *Standard for Commissioning Building Electrical Systems*.

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Mon Oct 18 12:38:53 EDT 2021

Committee Statement

Committee Statement: The words “and testing” are redundant and therefore are being removed from the requirement. The term testing is used in the definition of commissioning. The informational note was added because NECA-90 provides thorough information on effective commissioning of systems to ensure that required objectives are met.

Parts of PC 1236 were not accepted for the following reasons: Changing the title to the suggestion would be adding requirements in the title. Furthermore, removing the witness aspect would solely rely upon documentation while maintaining the witness allows for the AHJ to either witness the commissioning in person, remotely or through documentation.

Response Message: SR-7939-NFPA 70-2021

[Public Comment No. 1236-NFPA 70-2021 \[Section No. 700.3\(A\)\]](#)

[Public Comment No. 1833-NFPA 70-2021 \[Section No. 700.3\(A\)\]](#)

[Public Comment No. 1887-NFPA 70-2021 \[Section No. 700.3\(A\)\]](#)



Second Revision No. 7942-NFPA 70-2021 [Section No. 700.4(A)]

~~(A)– Rating.~~

~~The emergency system equipment shall be suitable for the available fault current at its terminals.~~

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Mon Oct 18 12:48:58 EDT 2021

Committee Statement

Committee Statement: The deletion of part (A) will comply with the style manual section 4.1.1 as the requirement is already covered in sections 110.9 and 110.10

Response Message: SR-7942-NFPA 70-2021

[Public Comment No. 1641-NFPA 70-2021 \[Section No. 700.4\(A\)\]](#)



Second Revision No. 7947-NFPA 70-2021 [Section No. 700.4(B)]

(A) Capacity.

An emergency system shall have adequate capacity in accordance Parts I through IV of with Article 220 or by another approved method. The system capacity shall be sufficient for the rapid load changes and transient power and energy requirements associated with any expected loads.

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Mon Oct 18 13:10:26 EDT 2021

Committee Statement

Committee Statement: "Parts I through IV of Article 220" was added for compliance with NEC Style Manual section 4.1.4.

Response Message: SR-7947-NFPA 70-2021

[Public Comment No. 126-NFPA 70-2021 \[Section No. 700.4\(B\)\]](#)

[Public Comment No. 1152-NFPA 70-2021 \[Section No. 700.4\(B\)\]](#)



Second Revision No. 7949-NFPA 70-2021 [Section No. 700.4(C)]

(B) Selective Load Pickup and Load Shedding Management .

The alternate power source shall be permitted to supply emergency, legally required standby, and optional standby system loads where the source has adequate capacity or where load management (that includes automatic selective load pickup and load shedding) is provided as needed to ensure adequate power to the following in order of priority:

- (1) Emergency circuits
- (2) Legally required standby circuits
- (3) Optional standby circuits

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Mon Oct 18 13:15:51 EDT 2021

Committee Statement

Committee Statement: The title of 700.4(C) has been modified so that it doesn't include functions from the actual requirement, and that it does include the proper level of abstraction along with the use of common terminology. This will improve consistency in the code. The requirement has been modified to include the common terminology while retaining the extremely important functional context that's needed.

Response Message: SR-7949-NFPA 70-2021

[Public Comment No. 1045-NFPA 70-2021 \[Section No. 700.4\(C\)\]](#)



Second Revision No. 7952-NFPA 70-2021 [Sections 700.5(B), 700.5(C)]

(B) Bypass Isolation Transfer Switches.

Means shall be permitted to bypass and isolate the transfer equipment. Where bypass isolation transfer switches are used, inadvertent parallel operation shall be prevented.

~~Where emergency loads are supplied by a single automatic transfer switch, the automatic transfer switch shall include a bypass isolation function to facilitate maintenance as required in 700.3(C) without jeopardizing continuity of power. When the automatic transfer switch has been bypassed to facilitate maintenance, the bypass switch shall automatically transfer the load between power sources upon loss of the connected power source, or it shall remain actively supervised by a qualified person who can manually initiate a transfer of the load between power sources. Where bypass isolation switches are used, inadvertent parallel operation shall be avoided.~~

~~Exception: The requirement for a bypass isolation transfer switch shall not apply where any of the following conditions exists:~~

- ~~(0) All processes that rely on the emergency system source are capable of being disabled during maintenance or repair activities.~~
- ~~(0) The building or structure is unoccupied and fire protection systems are fully functional and do not require an alternate power source.~~
- ~~(0) Other temporary means shall be permitted to be substituted for the emergency system.~~
- ~~(0) A permanent switching means to bypass the transfer equipment is provided to supply the connected load. The written procedures for bypassing the transfer equipment and ensuring operation by qualified persons shall be made available to the authority having jurisdiction. Where the switching means is not capable of automatically starting and transferring the load to the emergency source, the switching means shall be supervised and provisions for manually performing these functions shall be provided.~~
- ~~(0) A written emergency plan that includes mitigation actions and responsibilities for qualified persons to address the recognized site hazards for the duration of the maintenance or repair activities shall be developed and implemented. The emergency plan shall be made available to the authority having jurisdiction.~~

Detail SR-7929

(C) Automatic Transfer Switches.

~~Automatic transfer switches shall be electrically operated and mechanically held. Automatic transfer switches shall not be permitted to be reconditioned.~~

(D) Redundant Transfer Equipment.

If emergency loads are supplied by a single feeder, the emergency power system shall include redundant transfer equipment or a bypass isolation transfer switch to facilitate maintenance as required in 700.3(C), without jeopardizing continuity of power. If the redundant transfer equipment or bypass isolation transfer switch is manual (or nonautomatic), then it shall be actively supervised by a qualified person when the primary (automatic) transfer equipment is disabled for maintenance or repair.

Exception: The requirement for a bypass isolation redundancy with the transfer switch equipment shall not apply where any of the following conditions exists :

- (1) *All processes that rely on the emergency system source are capable of being disabled during maintenance or repair activities without jeopardizing the safety to human life.*
- (2) *The building or structure is unoccupied and fire protection systems are fully functional and do not require an alternate power source.*
- (3) *Other temporary means shall be permitted to be substituted for the emergency system.*
- (4) *A written emergency plan that includes mitigation actions and responsibilities for qualified persons to address the recognized site hazards for the duration of the maintenance or repair activities shall be developed and implemented. The emergency plan shall be made available to the authority having jurisdiction.*

Supplemental Information

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
NEC_CMP13_700.5_SR7952.docx	Staff Use Only	

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Mon Oct 18 13:23:27 EDT 2021

Committee Statement

Committee Statement: The 700.5 article structure for transfer equipment has been modified so that subsections mirror the subsections for transfer equipment in article 708.24. This will improve consistency with the code.

In addition, the subsection content was changed back to the way that it read in 2020, and a new subsection (D) for “Redundant Transfer Equipment” was inserted immediately after subsection (C). This will shift previous subsections (D) and (E) to (E) and (F) respectively. The new subsection describes the functionality that’s needed when emergency loads are supplied by a single feeder rather describing how to do it. This will improve clarity and useability of the code. The term for Bypass Isolation Transfer Switches was revised to correlate with the defined term in Article 100.

Note: 700.5(C) is being revised by a separate Second Revision.

Response Message: SR-7952-NFPA 70-2021

[Public Comment No. 1854-NFPA 70-2021 \[Section No. 700.5\]](#)



Second Revision No. 7959-NFPA 70-2021 [Section No. 700.6]

700.6 Signals.

Audible, visual, and facility or network remote annunciation devices shall be provided, where applicable, for the purpose described in 700.6(A) through (D).

(A) Malfunction.

~~To~~ Malfunction signals indicate a malfunction of the emergency source.

(B) Carrying Load.

~~To~~ Load carrying signals indicate that the emergency source is carrying load.

(C) Storage Battery Charging Malfunction.

~~To~~ Storage battery charging malfunction signals indicate a charging malfunction on a battery required for source readiness, including starting the prime mover, is not functioning.

(D) Ground Fault.

~~To~~ Ground-fault signals indicate a ground fault in solidly grounded wye emergency systems of more than 150 volts to ground and circuit-protective devices rated 1000 amperes or more. The sensor for the ground-fault signal devices shall be located at, or ahead of, the main system disconnecting means for the emergency source, and the maximum setting of the signal devices shall be for a ground-fault current of 1200 amperes. Instructions on the course of action to be taken in the event of indicated ground fault shall be located at or near the sensor location.

For systems with multiple emergency sources connected to a paralleling bus, the ground fault sensor and the system bonding jumper shall be permitted to be at an alternative location.

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Mon Oct 18 14:24:10 EDT 2021

Committee Statement

Committee Statement: Editorial modifications were made throughout this section for compliance with the NEC style manual.

Response Message: SR-7959-NFPA 70-2021

Public Comment No. 1121-NFPA 70-2021 [Section No. 700.6(C)]



Second Revision No. 8077-NFPA 70-2021 [Section No. 700.9]

700.9– Cybersecurity.

Emergency systems that are connected to a communication network and have the capability to permit control of any portion of the premises emergency electrical system shall comply with either of the following:

- (0) The ability to control the system is limited to a direct connection through a local nonnetworked interface.
- (0) It is connected through a networked interface complying with one of the following methods:
 - 0. The system and associated software are identified as being evaluated for cybersecurity.
 - 0. A cybersecurity assessment is conducted on the connected system to determine vulnerabilities to cyberattacks.

The cybersecurity assessment shall be conducted when the system configuration changes and at not more than 5-year intervals.

Documentation of the evaluation, assessment, and certification shall be made available to those authorized to inspect, operate, and maintain the system.

Informational Note No. 1: See ISA 62443, Cybersecurity Standards series; UL 2900, Cybersecurity Standards series; or the NIST Framework for Improving Critical Infrastructure Cybersecurity, Version 1.1, for assessment requirements.

Informational Note No. 2: Examples of the commissioning certification used to demonstrate the system has been investigated for cybersecurity vulnerabilities could be one of the following:

- (0) The ISA Security Compliance Institute (ISCI) conformity assessment program
- (0) Certification of compliance by a nationally recognized test laboratory
- (0) Manufacturer certification for the specific type and brand of system provided

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Wed Oct 20 13:53:01 EDT 2021

Committee Statement

Committee Statement: While Panel 13 agrees that cybersecurity is an important aspect of overall system reliability, the requirements are better suited in Article 110 to encompass this code as outlined in 90.3. Upon consultation with experts in the field, it has become clear that a 5-year assessment is insufficient to ensure a system remains protected once implemented in addition to being protected when installed. Enforcement of such a standard would be difficult, and would cause confusion for installers, enforcers, and entities performing assessments. Assessments are needed on an ongoing basis as potential threats to the system are constantly evolving. Furthermore, making documentation of assessments available risks disclosing the specific security measure implemented, decreasing the security of the emergency systems as well as any other interconnected systems or processes.

The installation and performance requirements proposed should be separated by the development of a new industry standard for cybersecurity outside of the NEC. This would allow industry subject matter experts within the field of cybersecurity to determine consensus requirements for specific equipment and evaluations. This action would also provide the AHJ with a compliance path which includes any necessary product listings or system certifications.

Response SR-8077-NFPA 70-2021

Message:

[Public Comment No. 2127-NFPA 70-2021 \[Section No. 700.9\]](#)



Second Revision No. 8000-NFPA 70-2021 [Section No. 700.10(B)]

(B) Wiring.

Wiring from an emergency source or emergency source distribution overcurrent protection to emergency loads shall be kept entirely independent of all other wiring and equipment unless otherwise permitted in the following:

- (1) Wiring from the normal power source located in transfer equipment enclosures
- (2) Wiring supplied from two sources in exit or emergency luminaires
- (3) Wiring from two sources in a listed load control relay supplying exit or emergency luminaires, or in a common junction box, attached to exit or emergency luminaires
- (4) Wiring within a common junction box attached to unit equipment, containing only the branch circuit supplying the unit equipment and the emergency circuit supplied by the unit equipment
- (5) Wiring within a traveling cable to an elevator
- (6) Wiring from an emergency source to supply emergency and other (nonemergency) loads in accordance with the following:
 - a. Separate vertical switchgear sections or separate vertical switchboard sections, with or without a common bus, or individual disconnects mounted in separate enclosures shall be used to separate emergency loads from all other loads.
 - b. The common bus of separate sections of the switchgear, separate sections of the switchboard, or the individual enclosures shall be either of the following:
 - i. Supplied by single or multiple feeders without overcurrent protection at the source
 - ii. Supplied by single or multiple feeders with overcurrent protection, provided that the overcurrent protection that is common to an emergency system and any nonemergency system(s) is selectively coordinated with the next downstream overcurrent protective device in the nonemergency system(s)

Informational Note: See Informational Note Figure 700.10(B)(1) and Informational Note Figure 700.10(B)(2) for further information.

Figure Informational Note Figure 700.10(B)(1) Single or Multiple Feeders Without Overcurrent Protection.

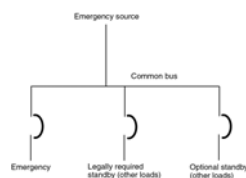
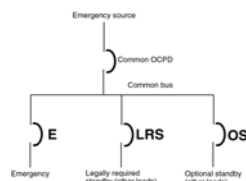


Figure Informational Note Figure 700.10(B)(2) Single or Multiple Feeders with Overcurrent Protection.



- c. Emergency circuits shall not originate from the same vertical switchgear section, vertical switchboard section, panelboard enclosure, or individual disconnect enclosure as other circuits.
- d. It shall be permissible to use single or multiple feeders to supply distribution equipment between an emergency source and the point where the emergency loads are separated from all other loads.

- e. At the emergency power source, such as a generator, multiple integral overcurrent protective devices shall each be permitted to supply a designated emergency or a designated nonemergency load, provided that there is complete separation between emergency and nonemergency loads beginning immediately after the overcurrent protective device line-side connections.

Wiring of two or more emergency circuits supplied from the same source shall be permitted in the same raceway, cable, box, or cabinet.

Supplemental Information

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
NEC_CMP13_700.10_SR8000.docx	Staff Use	

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Tue Oct 19 10:45:27 EDT 2021

Committee Statement

Committee Statement: A new subsection has been added to 700.10(B)(6) with the proper requirement to cover cases for standby or alternate power sources that supply mixed loads with multiple overcurrent protective devices. This was done to improve clarity and useability of the code.

Response Message: SR-8000-NFPA 70-2021

[Public Comment No. 1835-NFPA 70-2021 \[Section No. 700.10\(B\)\]](#)



Second Revision No. 7990-NFPA 70-2021 [Section No. 700.10(D)(4)]

(4) Source Control Wiring.

Control conductors installed between the emergency power supply system/stored-energy power supply system (EPSS/SEPSS) and transfer equipment or control systems that initiate the operation of emergency sources or initiate the automatic connection to emergency loads shall be kept entirely independent of all other wiring and shall meet the conditions of 700.10(D)(2). The integrity of source control wiring shall be monitored for broken, disconnected, or shorted wires. Loss of integrity shall result in the following actions:

- (1) *Generators.* Shall start the generator(s).
- (2) *All other sources.* Shall be considered a system malfunction and initiate the designated signal(s) in 700.6(A).

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Mon Oct 18 17:11:59 EDT 2021

Committee Statement

Committee Statement: The addition of the words and acronym provide clarity in subsequent articles as permitted in the style manual section 3.2.3. The words were added to correlate to the terms defined in article 100.

Response Message: SR-7990-NFPA 70-2021

Public Comment No. 2080-NFPA 70-2021 [Section No. 700.10(D)(4)]



Second Revision No. 7994-NFPA 70-2021 [Section No. 700.11(B)]

(B) Identification.

Emergency circuits shall be permanently marked so they will be readily identified as a component of an emergency circuit or system by the following methods:

- (1) All boxes and enclosures for Class 2 emergency circuits shall be permanently marked as a component of an emergency circuit or system.
- (2) ~~Where boxes or enclosures are not encountered, exposed~~ Exposed cable, cable tray, or raceways systems shall be permanently marked to be identified as a component of an emergency circuit or system, within ~~3~~ 0.9 m (~~4~~ 3 ft) of each connector and at intervals not to exceed 7.6 m (25 ft).

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Mon Oct 18 17:35:55 EDT 2021

Committee Statement

Committee Statement: A mathematical error was identified in the unit conversion for 700.11 (B)(2) which was corrected. The phrasing of the requirement was also simplified for easier code comprehension and to comply with the NEC Style Manual.

Response Message: SR-7994-NFPA 70-2021



Second Revision No. 7991-NFPA 70-2021 [Section No. 700.11(C)]

(C) Separation of Circuits.

Class 2 emergency circuits shall be wired in a listed, jacketed cable or with one of the wiring methods of Chapter 3. If installed alongside nonemergency Class 2 circuits that are bundled, Class 2 emergency circuits shall be bundled separately. If installed alongside nonemergency Class 2 circuits that are not bundled, Class 2 emergency circuits shall be separated by a nonconductive sleeve or nonconductive barrier from all other Class 2 circuits. ~~Class 2 emergency circuits shall be separated from nonemergency Class 2 circuits.~~ Separation from other circuits shall comply with 725.136.

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Mon Oct 18 17:29:43 EDT 2021

Committee Statement

Committee Statement: Separation of Class 2 circuits from other circuit types is well defined in the previous edition of the code 725.136, but this section has been moved to 722.141, so this reference has been updated. Separation of Class 2 circuits used for different purposes, however, is not defined so 700.11(C) was updated to clearly define acceptable methods.

Response Message: SR-7991-NFPA 70-2021

Public Comment No. 1649-NFPA 70-2021 [Section No. 700.11(C)]



Second Revision No. 7992-NFPA 70-2021 [Section No. 700.11(D)]

(D) Protection.

Wiring shall comply with the requirements of 300.4 and be installed in a raceway, armored or metal-clad cable, or cable tray.

Exception No. 1: Section 700.11(D) shall not apply to wiring that does not exceed 1.83 m (6 ft) in length and that terminates at an emergency luminaire or an emergency lighting control device.

Exception No. 2: Section 700.11(D) shall not apply to locked rooms or locked enclosures that are accessible only to qualified persons.

Informational Note: Locked rooms accessible only to qualified persons include locked telecommunications rooms, locked electrical equipment rooms, or other access-controlled areas.

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Mon Oct 18 17:33:42 EDT 2021

Committee Statement

Committee Statement: Separation of circuits does provide additional integrity to the emergency lighting system in so far as it prevents collateral damage during maintenance activities and is not an onerous requirement. Subject to physical damage is subject to interpretation and is repeated in 300.4. However, due to the concerns raised exceptions have been added allowing current Class 2 cabling systems to be used at the luminaire or control device with a length limitation and at the source equipment end with appropriate access control to the equipment. The informational note clarifies the term “locked room” as it is used in Exception 2.

Response Message: SR-7992-NFPA 70-2021

[Public Comment No. 9-NFPA 70-2021 \[Sections 700.11\(C\), 700.11\(D\)\]](#)

[Public Comment No. 1079-NFPA 70-2021 \[Section No. 700.11\(D\)\]](#)



Second Revision No. 7995-NFPA 70-2021 [Section No. 700.12(C)]

(C) Supply Duration.

The emergency power source shall be of suitable rating and capacity to supply and maintain the total load for the duration determined by the system design. In no case shall the duration be less than 2 hours of system operation unless used for emergency illumination in 700.12(C)(4) or unit equipment in 700.12(H). Additionally, the power source shall comply with 700.12(C)(1) through (C)(5) as applicable.

Informational Note: See NFPA 110 -2022, *Standard for Emergency and Standby Power Systems*, for information on classification of emergency power supply systems (EPSS).

(1) On-Site Fuel Supply.

An on-site fuel supply shall be provided, sufficient for not less than 2 hours operation of the system.

(2) Fuel Transfer Pumps.

Where power is needed for the operation of the fuel transfer pumps to deliver fuel to the source, these pumps shall be connected to the emergency power system.

(3) Public Gas System, Municipal Water Supply.

Sources shall not be solely dependent on a public utility gas system for their fuel supply or municipal water supply for their cooling systems.

Exception: Where approved by the authority having jurisdiction, the use of other than on-site fuels shall be permitted where there is a low probability of a simultaneous failure of both the off-site fuel delivery system and power from the outside electrical utility company. Where the public gas system is approved, the requirements of 700.12(C)(1) shall not apply.

(4) Storage Batteries and UPS.

Storage batteries and ~~uninterruptable power supply systems~~ UPS used to supply emergency illumination shall be of suitable rating and capacity to supply and maintain the total load for a minimum period of 1½ hours, without the voltage applied to the load falling below 87½ percent of nominal voltage. Automotive-type batteries shall not be used. An automatic battery charging means shall be provided.

(5) Automatic Fuel Transfer

Where dual fuel sources are used, means shall be provided for automatically transferring from one fuel source to another.

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Mon Oct 18 17:57:23 EDT 2021

Committee Statement

Committee Statement: The informational note was added to provide clarity and point users to NFPA 110 for the various classifications of EPSS.

Response Message: SR-7995-NFPA 70-2021

[Public Comment No. 1844-NFPA 70-2021 \[Section No. 700.12\(C\) \[Excluding any Sub-Sections\]\]](#)



Second Revision No. 7996-NFPA 70-2021 [Section No. 700.12(G)]

(G) Microgrid Systems.

On-site sources, designated as emergency sources, shall be permitted to be connected to a microgrid system.

The system shall isolate the emergency system from all nonemergency loads when the normal electric supply is interrupted or shall meet the requirements of 700.4(B). Interruption or partial or complete failure of the normal or nonemergency source(s) shall not impact the availability, capacity, and duration provided by the designated emergency sources.

The designated stored-energy electrical emergency power source(s) of a microgrid system shall be permitted to remain interconnected to any available power production source during operation of the emergency source(s) where the lack of, or failure of, the interconnected power production source(s), or related controls, does not impact system operation. Interconnected power production sources, other than the designated stored emergency power source(s), shall not be required to meet the requirements of ~~Article 700~~ [this article](#) .

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Mon Oct 18 18:02:14 EDT 2021

Committee Statement

Committee Statement: The phrase "article 700" is not used in 700.12(H) but it is used in 700.12(G) and has been changed in accordance with the style manual.

Response Message: SR-7996-NFPA 70-2021

[Public Comment No. 1140-NFPA 70-2021 \[Section No. 700.12\(H\)\]](#)



Second Revision No. 7999-NFPA 70-2021 [Section No. 700.12(H)(2)]

Detail SR-8001

(2) Installation.

Battery-equipped emergency luminaires shall be installed in accordance with the following:

- (1) Battery-equipped emergency luminaires shall be permanently fixed in place (i.e., not portable).
- (2) Wiring to each luminaire shall be installed in accordance with the requirements of any of the wiring methods in Chapter 3 unless otherwise specified in Part II, IV, or V of this article. Flexible cord-and-plug connection shall be permitted for unit equipment, provided that the cord does not exceed 900 mm (3 ft) in length. Flexible cord, with or without a plug, ~~provided that the cord does not exceed 1800 mm (6 ft) in length,~~ shall also be permitted for battery-equipped emergency luminaires installed in accordance with 410.62(C)(1).
- (3) The branch circuit feeding the battery-equipped emergency luminaire shall be one of the following:
 - a. The same branch circuit as that serving the normal lighting in the area and connected ahead of any local switches.
 - b. The same or a different branch circuit as that serving the normal lighting in the area if that circuit is equipped with means to monitor the status of that area's normal lighting branch circuit ahead of any local switches.
 - c. ~~Where the normal lighting circuit is served by one or more branch circuits, a separate branch circuit, provided with a lock-on feature, that originates from the same panelboard as the normal lighting circuits. The branch circuit disconnecting means for this branch circuit shall be provided with a lock-on feature. A separate branch circuit originating from the same panelboard as one or more normal lighting circuits. This separate branch circuit disconnecting means shall be provided with a lock-on feature.~~
- (4) The branch circuit that feeds battery-equipped emergency luminaires shall be clearly identified at the distribution panel.
- (5) Emergency luminaires that obtain power from a battery-equipped emergency luminaire shall be wired to the battery-equipped emergency luminaires as required in Part II, IV, or V of this article.
- (6) Remote luminaires providing lighting for the exterior of an exit door shall be permitted to be supplied by the battery-equipped emergency luminaire serving the area immediately inside the exit door.

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Tue Oct 19 10:31:27 EDT 2021

Committee Statement

Committee Statement: The panel agrees with the term "unit equipment" for clarity as it is a defined term, but does not want to limit to unit equipment in (5) and (6). Unit equipment is only energized

upon loss of normal power, while battery equipped emergency luminaires may also provide illumination when normal power is present.

The panel also agrees with the substantiation provided for removal of the requirement “the length of the flexible cord does not exceed 6 ft.”: there was no substantiation for limiting the length of cord, and there are many battery-equipped emergency luminaires in the field with longer cords and no reported problems.

Note: (2)(3)(b) is being revised by a separate Second Revision.

Response SR-7999-NFPA 70-2021
Message:

[Public Comment No. 1781-NFPA 70-2021 \[Section No. 700.12\(H\)\(2\)\]](#)

[Public Comment No. 1682-NFPA 70-2021 \[Section No. 700.12\(H\)\]](#)



Second Revision No. 8002-NFPA 70-2021 [Section No. 700.23]

700.23 Dimmer and Relay Systems.

A dimmer or relay system containing more than one dimmer or relay and listed for use in emergency systems shall be permitted to be used as a control device for energizing emergency lighting circuits. Upon failure of normal power, the dimmer or relay system shall be permitted to selectively energize only those branch circuits required to provide minimum emergency illumination using a control bypass function. Where the dimmer or relay system is fed by a normal/emergency power source from an upstream transfer switch, normal power sensing for this function shall be permitted to be from a normal-only power source upstream of the transfer switch. All branch circuits supplied by the dimmer or relay system cabinet shall comply with the wiring methods of Part II of Article 700.

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Tue Oct 19 12:04:06 EDT 2021

Committee Statement

Committee Statement: The word “power” is added to correlate with defined terms for clarity.

Response Message: SR-8002-NFPA 70-2021

[Public Comment No. 1367-NFPA 70-2021 \[Section No. 700.23\]](#)

[Public Comment No. 1155-NFPA 70-2021 \[Definition: Normal/Emergency Power Source.\]](#)



Second Revision No. 8004-NFPA 70-2021 [Section No. 700.32(C)]

(C) Modifications.

Where If modifications, additions, or deletions to the emergency system(s) occur, selective coordination of the emergency system(s) OCPDs with all supply-side and load-side OCPDs shall be reevaluated.

Exception: Selective coordination shall not be required between two overcurrent devices located in series if no loads are connected in parallel with the downstream device.

Informational Note: See Informational Note Figure 700.32(C) for an example of how emergency system OCPDs selectively coordinate with all supply-side OCPDs.

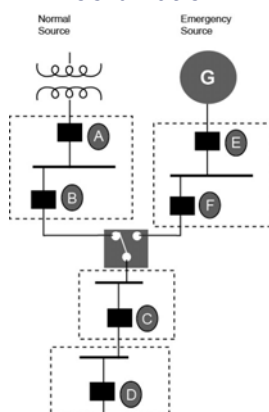
OCPD D selectively coordinates with OCPDs C, F, E, B, and A.

OCPD C selectively coordinates with OCPDs F, E, B, and A.

OCPD F selectively coordinates with OCPD E.

OCPD B is not required to selectively coordinate with OCPD A because OCPD B is not an emergency system OCPD.

Figure Informational Note Figure 700.32(C) Emergency System Selective Coordination.



Submitter Information Verification

Committee: NEC-P13

Submittal Date: Tue Oct 19 12:09:42 EDT 2021

Committee Statement

Committee Statement:	The word “where” is deleted and replaced with “if” as this requirement describes a condition and not a location as listed in the style manual in section 3.3.4.
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Response Message: SR-8004-NFPA 70-2021

Public Comment No. 2154-NFPA 70-2021 [Section No. 700.32(C)]



Second Revision No. 8009-NFPA 70-2021 [New Section after 701.1]

701.2 Reconditioned Equipment.

Reconditioned transfer switches shall not be permitted.

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Tue Oct 19 12:29:01 EDT 2021

Committee Statement

Committee Statement: There isn't a practical method to ensure that a transfer switch can properly be reconditioned without testing it to destruction. Deleted the reconditioning statement from 701.5(C) and relocated to new section 701.2 as requested by the correlating committee.

Response Message: SR-8009-NFPA 70-2021



Second Revision No. 8005-NFPA 70-2021 [Section No. 701.3(A)]

(A) Commissioning Witness Test.

The authority having jurisdiction shall conduct or witness the commissioning ~~and testing~~ of the complete system upon installation.

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Tue Oct 19 12:11:19 EDT 2021

Committee Statement

Committee Statement: The word “testing” has been removed as it is included in the definition of commissioning.

Response Message: SR-8005-NFPA 70-2021

[Public Comment No. 1846-NFPA 70-2021 \[Section No. 701.3\(A\)\]](#)



Second Revision No. 8006-NFPA 70-2021 [Section No. 701.4(B)]

(B) Capacity.

A legally required standby system shall have adequate capacity in accordance with [Parts I through IV of Article 220](#) or by another approved method. The system capacity shall be sufficient for the rapid load changes and transient power and energy requirements associated with any expected loads.

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Tue Oct 19 12:14:28 EDT 2021

Committee Statement

Committee Statement: Added "Parts I through IV of Article 220" for compliance with NEC Style Manual section 4.1.4. The intent of PC 127 was met with the change.

Response Message: SR-8006-NFPA 70-2021

[Public Comment No. 1142-NFPA 70-2021 \[Section No. 701.4\(B\)\]](#)

[Public Comment No. 127-NFPA 70-2021 \[Section No. 701.4\(B\)\]](#)



Second Revision No. 8007-NFPA 70-2021 [Section No. 701.4(C)]

(C) Load Pickup and Load Shedding Management .

The alternate power source shall be permitted to supply legally required standby and optional standby system loads where the alternate source has adequate capacity or where load management (that includes automatic selective load pickup and load shedding~~are provided~~) is provided that will ensure adequate power to the legally required standby circuits.

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Tue Oct 19 12:23:41 EDT 2021

Committee Statement

Committee Statement: The title and content of 701.4(C) has been modified so that it doesn't include functions from the actual requirement, and that it does include the proper level of abstraction along with the use of common terminology. This will improve consistency in the code. The requirement has been modified to include the common terminology while retaining the extremely important functional context that's needed.

Response Message: SR-8007-NFPA 70-2021

Public Comment No. 1046-NFPA 70-2021 [Section No. 701.4(C)]



Second Revision No. 8008-NFPA 70-2021 [Section No. 701.5(C)]

(C) Automatic Transfer Switches.

Automatic transfer switches shall be electrically operated and mechanically held. Automatic transfer switches shall not be permitted to be reconditioned.

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Tue Oct 19 12:27:29 EDT 2021

Committee Statement

Committee Statement: There isn't a practical method to ensure that a transfer switch can properly be reconditioned without testing it to destruction. Deleted the reconditioning statement from 701.5(C) and relocated to new section 701.2 as requested by the correlating committee.

Response Message: SR-8008-NFPA 70-2021

[Public Comment No. 42-NFPA 70-2021 \[Section No. 701.5\]](#)



Second Revision No. 8010-NFPA 70-2021 [Sections 701.6(A), 701.6(B), 701.6(C), 701.6(D)]

(A) Malfunction.

To Malfunction signals indicate a malfunction of the standby source.

(B) Carrying Load.

To Load carrying signals indicate that the standby source is carrying load.

(C) Battery Charging Malfunction.

To Battery charging malfunction signals indicate charging malfunction on a battery required for source readiness, including the prime mover starting battery.

Informational Note: See NFPA 110-2019, *Standard for Emergency and Standby Power Systems*, for signals for generator sets.

(D) Ground Fault.

To Ground-fault signals indicate a ground fault in solidly grounded wye, legally required standby systems of more than 150 volts to ground and circuit-protective devices rated 1000 amperes or more. The sensor for the ground-fault signal devices shall be located at, or ahead of, the main system disconnecting means for the legally required standby source, and the maximum setting of the signal devices shall be for a ground-fault current of 1200 amperes. Instructions on the course of action to be taken in the event of an indicated ground fault shall be located at or near the sensor location.

For systems with multiple emergency sources connected to a paralleling bus, the ground-fault sensor shall be permitted at an alternate location.

Informational Note: See NFPA 110-2019, *Standard for Emergency and Standby Power Systems*, for signals for generator sets.

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Tue Oct 19 12:31:05 EDT 2021

Committee Statement

Committee Statement: Editorial modifications were made throughout this section for compliance with the NEC style manual.

Response Message: SR-8010-NFPA 70-2021

Public Comment No. 1143-NFPA 70-2021 [Section No. 701.6(C)]



Second Revision No. 8011-NFPA 70-2021 [Section No. 701.9]

~~701.9– Cybersecurity.~~

~~Legally required systems that are connected to a communication network and have the capability to permit control of any portion of the premises legally required electrical system shall comply with either of the following:~~

- ~~(0) The ability to control the system is limited to a direct connection through a local nonnetworked interface.~~
- ~~(0) It is connected through a networked interface complying with one of the following methods:~~
 - ~~0. The system and associated software are identified as being evaluated for cybersecurity.~~
 - ~~0. A cybersecurity assessment is conducted on the connected system to determine vulnerabilities to cyberattacks.~~

~~The cybersecurity assessment shall be conducted when the system configuration changes and at not more than 5-year intervals.~~

~~Documentation of the evaluation, assessment, and certification shall be made available to those authorized to inspect, operate, and maintain the system.~~

~~Informational Note No. 1: See ANSI/ISA 62443, *Cybersecurity Standards* series; UL 2900, *Cybersecurity Standards* series; or the NIST Framework for Improving Critical Infrastructure Cybersecurity, Version 1.1, for assessment requirements.~~

~~Informational Note No. 2: Examples of the commissioning certification used to demonstrate the system has been investigated for cybersecurity vulnerabilities could be one of the following:~~

- ~~(0) The ISA Security Compliance Institute (ISCI) conformity assessment program~~
- ~~(0) Certification of compliance by a nationally recognized testing laboratory~~
- ~~(0) Manufacturer certification for the specific type and brand of system provided~~

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Tue Oct 19 12:55:55 EDT 2021

Committee Statement

Committee Statement: While Panel 13 agrees that cybersecurity is an important aspect of overall system reliability, the requirements are better suited in Article 110 to encompass this code as outlined in 90.3. Upon consultation with experts in the field, it has become clear that a 5-year assessment is insufficient to ensure a system remains protected once implemented in addition to being protected when installed. Enforcement of such a standard would be difficult, and would cause confusion for installers, enforcers, and entities performing assessments. Assessments are needed on an ongoing basis as potential threats to the system are constantly evolving. Furthermore, making documentation of assessments available risks disclosing the specific security measure implemented, decreasing the security of the emergency systems as well as any other interconnected systems or processes.

The installation and performance requirements proposed should be separated by the development of a new industry standard for cybersecurity outside of the NEC. This would allow industry subject matter experts within the field of cybersecurity to determine consensus requirements for specific equipment and evaluations. This action would also provide the AHJ with a compliance path which includes any necessary product listings or system certifications.

Response SR-8011-NFPA 70-2021
Message:

[Public Comment No. 2130-NFPA 70-2021 \[Section No. 701.9\]](#)

[Public Comment No. 2123-NFPA 70-2021 \[Section No. 701.9\]](#)



Second Revision No. 8012-NFPA 70-2021 [Section No. 701.12(C)]

(C) Supply Duration.

The alternate power source shall be of suitable rating and capacity to supply and maintain the total load for the duration determined by the system design. In no case shall the duration be less than 2 hours of system operation. Additionally, the power source shall comply with 701.12(C)(1) through (C)(5) as applicable.

Informational Note: See NFPA 110 -2022, *Standard for Emergency and Standby Power Systems*, for information on classification of emergency power supply systems (EPSS).

(1) On-Site Fuel Supply.

An on-site fuel supply shall be provided, sufficient for not less than 2 hours operation of the system.

(2) Fuel Transfer Pumps.

Where power is needed for the operation of the fuel transfer pumps to deliver fuel to the source, these pumps shall be connected to the legally required standby power system.

(3) Public Gas System, Municipal Water Supply.

Sources shall not be solely dependent on a public utility gas system for their fuel supply or on a municipal water supply for their cooling systems.

Exception: Where approved by the authority having jurisdiction, the use of other than on-site fuels shall be permitted where there is a low probability of a simultaneous failure of both the off-site fuel delivery system and power from the outside electrical utility company. Where a public gas system is approved, the requirements of 701.12(C)(1) shall not apply.

(4) Storage Batteries and UPS.

Storage batteries and ~~uninterruptable power supply systems~~ UPS used to supply standby illumination shall be of suitable rating and capacity to supply and maintain the total load for a minimum period of 1½ hours, without the voltage applied to the load falling below 87½ percent of nominal voltage. Automotive-type batteries shall not be used. An automatic battery charging means shall be provided.

(5) Automatic Fuel Source Transfer.

Where dual fuel sources are used, means shall be provided for automatically transferring from one fuel source to another.

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Tue Oct 19 13:00:15 EDT 2021

Committee Statement

Committee Statement: The informational note was added to provide clarity and point users to NFPA 110 for the various classifications of EPSS.

Response Message: SR-8012-NFPA 70-2021

Public Comment No. 1848-NFPA 70-2021 [Section No. 701.12(C) [Excluding any Sub-Sections]]



Second Revision No. 8014-NFPA 70-2021 [Section No. 701.12(D)(3)]

(3) Outdoor Generator Sets.

Where ~~If~~ an outdoor-housed generator set is equipped with a readily accessible disconnecting means in accordance with 445.18, and the disconnecting means is located within sight of the building or structure supplied, an additional disconnecting means shall not be required where ungrounded conductors serve or pass through the building or structure. Where the generator supply conductors terminate at a disconnecting means in or on a building or structure, the disconnecting means shall meet the requirements of 225.36.

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Tue Oct 19 13:16:44 EDT 2021

Committee Statement

Committee Statement: The word "If" is used to comply with style manual section 3.3.4.

Response Message: SR-8014-NFPA 70-2021

[Public Comment No. 2155-NFPA 70-2021 \[Section No. 701.12\(D\)\(3\)\]](#)



Second Revision No. 8015-NFPA 70-2021 [Section No. 701.12(E)(1)]

(1) Types.

Systems shall consist of one or more of the following system types:

(1) Uninterruptible power supply (UPS)

Informational Note: See UL 1778, *Uninterruptable Power Systems*, and UL 924, *Emergency Lighting and Power Equipment* , for further information.

(2) Fuel cell system

(3) Energy storage system (ESS)

(4) Storage battery

(5) Other approved equivalent stored energy sources that comply with 701.12

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Tue Oct 19 13:18:41 EDT 2021

Committee Statement

Committee Statement: The informational note was modified to include both UL standards (1778 and 924) as both are required for such a listing.

Response Message: SR-8015-NFPA 70-2021

[Public Comment No. 529-NFPA 70-2021 \[Section No. 701.12\(E\)\(1\)\]](#)



Second Revision No. 8016-NFPA 70-2021 [Section No. 701.12(H)]

(H) Microgrid Systems.

On-site sources, designated as legally required standby sources, shall be permitted to be connected to a microgrid system.

The system shall isolate the legally required standby system from all nonlegally required loads when the normal electric supply is interrupted or shall meet the requirements of 701.4(C). Interruption or partial or complete failure of the normal source(s) shall not impact the availability, capacity, and duration provided by the designated legally required standby sources.

The designated stored-energy legally required standby power source(s) of a microgrid system shall be permitted to remain interconnected to any available power production source during operation of the legally required standby source(s) where the lack of, or failure of, the interconnected power production source(s), or related controls, does not impact system operation. Interconnected power production sources, other than the designated SEPSS, shall not be required to meet the requirements of ~~Article 704~~ this article .

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Tue Oct 19 13:47:26 EDT 2021

Committee Statement

Committee Statement: Editorial modification was made to comply with style manual section 4.1.4.

Response Message: SR-8016-NFPA 70-2021

Public Comment No. 1145-NFPA 70-2021 [Section No. 701.12(I)]



Second Revision No. 8017-NFPA 70-2021 [Section No. 701.32(C)]

(C) Modifications.

Where if modifications, additions, or deletions to the legally required standby system(s) occur, selective coordination of the legally required system(s) OCPDs with all supply-side and load-side OCPDs shall be reevaluated.

Exception: Selective coordination shall not be required between two overcurrent devices located in series if no loads are connected in parallel with the downstream device.

Informational Note: See Informational Note Figure 701.32(C) for an example of how legally required standby system OCPDs selectively coordinate with all supply-side OCPDs.

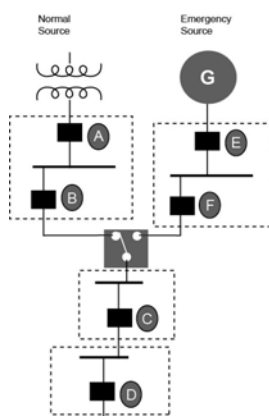
OCPD D selectively coordinates with OCPDs C, F, E, B, and A.

OCPD C selectively coordinates with OCPDs F, E, B, and A.

OCPD F selectively coordinates with OCPD E.

OCPD B is not required to selectively coordinate with OCPD A because OCPD B is not a legally required standby system OCPD.

Figure Informational Note Figure 701.32(C) Legally Required Standby System Selective Coordination.



Submitter Information Verification

Committee: NEC-P13

Submittal Date: Tue Oct 19 13:51:48 EDT 2021

Committee Statement

Committee Statement: The word "If" is used to comply with style manual section 3.3.4.

Response Message: SR-8017-NFPA 70-2021

Public Comment No. 2157-NFPA 70-2021 [Section No. 701.32(C)]



Second Revision No. 8024-NFPA 70-2021 [New Section after 702.1]

702.2 Reconditioned Equipment.

Reconditioned transfer switches shall not be permitted.

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Tue Oct 19 15:12:23 EDT 2021

Committee Statement

Committee Statement: Deleted the reconditioning statement from 702.5(B)(1) and relocated to new section 702.2 as requested by the correlating committee. Also, changed the “shall not be permitted to be” to “shall not be” in accordance with the style manual.

Response Message: SR-8024-NFPA 70-2021



Second Revision No. 8020-NFPA 70-2021 [Section No. 702.4(A)]

~~(A)– Available Fault Current.~~

~~Optional standby system equipment shall be suitable for the available fault current at its terminals.~~

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Tue Oct 19 14:38:09 EDT 2021

Committee Statement

Committee Statement: Removal of part (A) to comply with style manual section 4.1.1 due to redundancy with 110.9 and 110.10.

Response Message: SR-8020-NFPA 70-2021

[Public Comment No. 1642-NFPA 70-2021 \[Section No. 702.4\(A\)\]](#)



Second Revision No. 8021-NFPA 70-2021 [Section No. 702.4(B)]

(A) System Capacity.

(1) Manual and Nonautomatic ~~Transfer Equipment Load Connection~~ .

~~Where~~ If the connection of load is manual or nonautomatic transfer equipment is used , an optional standby system shall have adequate capacity and rating for the supply of all equipment intended to be operated at one time. The user of the optional standby system shall be permitted to select the load connected to the system.

Informational Note: Manual and nonautomatic transfer equipment ~~use~~ require human intervention.

(2) Automatic ~~Transfer Equipment Load Connection~~ .

~~Where automatic transfer equipment is used~~ If the connection of load is automatic , an optional standby system shall comply with 702.4(A)(2)(a) or (B)(2)(b) in accordance with Parts I through IV of Article 220 or by another approved method.

(a) *Full Load*. The standby source shall be capable of supplying the full load that is ~~transferred by the automatic transfer equipment automatically connected~~ .

(b) *Load Energy Management System (EMS)* . Where a system is employed in accordance with 750.30 that will automatically manage the connected load, the standby source shall have a capacity sufficient to supply the maximum load that will be connected by the ~~load management system EMS~~ .

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Tue Oct 19 14:44:05 EDT 2021

Committee Statement

Committee Statement: This revision provides clarity and usability for this section. The panel agrees with the term Energy Management System (EMS) for consistency throughout the Code. “Parts I through IV of Article 220” was added for compliance with NEC Style Manual section 4.1.4. Capacity calculation is ambiguous and load calculations are covered in this requirement already. Changed “Where” to “If” to comply with NEC style manual 3.3.4.

Response Message: SR-8021-NFPA 70-2021

[Public Comment No. 128-NFPA 70-2021 \[Section No. 702.4\(B\)\(2\)\]](#)

[Public Comment No. 1936-NFPA 70-2021 \[Section No. 702.4\(B\)\(2\)\]](#)

[Public Comment No. 1047-NFPA 70-2021 \[Section No. 702.4\(B\)\]](#)

**Second Revision No. 8112-NFPA 70-2021 [Section No. 702.5(B)]**[Detail SR-8115](#)**(B) Meter-Mounted Transfer Switches.**

~~Transfer switches shall not be permitted to be reconditioned.~~ Transfer switches installed between the utility meter and the meter enclosure shall be listed meter-mounted transfer switches and shall be approved.

Informational Note No. 1: See UL 1008M, *Transfer Switch Equipment, Meter Mounted*, for more information.

Informational Note No. 2: Manual and nonautomatic transfer equipment use human intervention.

~~(1) Reconditioned.~~

~~Transfer switches shall not be permitted to be reconditioned. Transfer switches installed between the utility meter and the meter enclosure shall be listed meter-mounted transfer switches and shall be approved.~~

~~Informational Note No. 1: See UL 1008M, *Transfer Switch Equipment, Meter Mounted*, for more information.~~

~~Informational Note No. 2: Manual and nonautomatic transfer equipment use human intervention.~~

~~(2) Meter-Mounted Transfer Switches.~~

~~Transfer switches installed between the utility meter and the meter enclosure shall be listed meter-mounted transfer switches and shall be approved. Meter-mounted transfer switches shall be of the manual or nonautomatic type unless rated as determined by 702.4(B)(2).~~

Supplemental Information

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
NEC_CMP13_702.5_SR8112.docx	Staff use only	

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Thu Oct 21 10:22:54 EDT 2021

Committee Statement

Committee Statement: Section was reformatted and last sentence deleted as requirement already exists.

Note that (B)(1) is being deleted/moved by a separate Second Revision.

Response Message: SR-8112-NFPA 70-2021

[Public Comment No. 1589-NFPA 70-2021 \[Section No. 702.5\(B\)\(2\)\]](#)



Second Revision No. 8032-NFPA 70-2021 [Section No. 702.7(A)]

(A) Standby.

A sign shall be placed at the service-entrance equipment for commercial installations, industrial installations, and multifamily housing other than one- and two-family dwellings that indicates the type and location of each on-site optional standby power source. For one- and two-family dwelling units, a sign shall be placed at the disconnecting means required in 230.85 that indicates the location of each permanently installed on-site optional standby power source disconnect or means to shut down the prime mover as required in ~~445.18(D)~~ 445.19(C).

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Tue Oct 19 15:31:07 EDT 2021

Committee Statement

Committee Statement: The changes provide clarity, usability, and consistency of defined terms for service equipment.

The cross reference has been corrected, because what was previously in 445.18(D) is now located at 445.19(C).

Response Message: SR-8032-NFPA 70-2021

[Public Comment No. 1146-NFPA 70-2021 \[Section No. 702.7\(A\)\]](#)

[Public Comment No. 1590-NFPA 70-2021 \[Section No. 702.7\(A\)\]](#)



Second Revision No. 8116-NFPA 70-2021 [Section No. 706.1]

706.1 Scope.

This article applies to all energy storage systems (ESS) having a capacity greater than 3.6 MJ (1 kWh) that may be stand-alone or interactive with other electric power production sources. These systems are primarily intended to store and provide energy during normal operating conditions.

~~Informational Note No. 1: For batteries rated in ampere hours, kWh is equal to the nominal rated voltage times ampere-hour rating divided by 1000.~~

~~Informational Note No. 1: See Article 480 for installations that meet the definition of stationary standby batteries and are composed of lead-acid or nickel-cadmium cells. For all other chemistries and for lead-acid and nickel-cadmium stored energy systems that do not fall under the definition of stationary standby batteries, this article applies.~~

~~Informational Note No. 2: For batteries rated in ampere hours, kWh is equal to the nominal rated voltage times ampere-hour rating divided by 1000.~~

Informational Note No. 3: The following standards are frequently referenced for the installation of ESSs:

- (1) NFPA 1-2021, *Fire Code*
- (2) NFPA 111-2019, *Standard on Stored Electrical Energy Emergency and Standby Power Systems*
- (3) NECA 416-2016, *Recommended Practice for Installing Energy Storage Systems (ESS)*
- (4) UL 810A, *Electrochemical Capacitors*
- (5) NFPA 855-2020, *Standard for the Installation of Stationary Energy Storage Systems*
- (6) UL 1973, *Standard for Batteries for Use in Stationary, Vehicle Auxiliary Power, and Light Electric Rail (LER) Applications*
- (7) UL 1989, *Standard for Standby Batteries*
- (8) UL 9540, *Standard for Safety Energy Storage Systems and Equipment*
- (9) UL Subject 2436, *Spill Containment For Stationary Lead Acid Battery Systems*

Supplemental Information

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
NEC_CMP13_706.1_SR8116.docx	Staff use only.	

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Thu Oct 21 10:54:06 EDT 2021

Committee Statement

Committee Statement: The informational note was revised to align with the scope of Article 480. Informational Note No. 1 is moved to Informational Note No. 2 to order notes in level of importance.

Response Message: SR-8116-NFPA 70-2021

[Public Comment No. 1147-NFPA 70-2021 \[Section No. 706.1\]](#)



Second Revision No. 8086-NFPA 70-2021 [Section No. 706.7]

706.7 Commissioning and Maintenance.

(A) Commissioning.

ESSs shall be commissioned upon installation. This shall not apply in one- and two-family dwellings ~~where the ESS does not exceed a 20 kWh capacity~~.

Informational Note: See NFPA 855-2020, *Standard for the Installation of Stationary Energy Storage Systems*, for information related to the commissioning of ESSs.

(B) Maintenance.

ESSs shall be maintained in proper and safe operating condition. The required maintenance shall be in accordance with the manufacturer's requirements and industry standards. A written record of the system maintenance shall be kept and shall include records of repairs and replacements necessary to maintain the system in proper and safe operating condition. This shall not apply in one- and two-family dwellings.

Informational Note: See NFPA 70B-2019, *Recommended Practice for Electrical Equipment Maintenance*, or ANSI/NETA ATS-2017, *Standard for Acceptance Testing Specifications for Electrical Power Equipment and Systems*, for information related to general electrical equipment maintenance and developing an effective electrical preventive maintenance (EPM) program.

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Wed Oct 20 15:21:36 EDT 2021

Committee Statement

Committee Statement: Delete requirements for commissioning and maintenance in one- and two- family dwellings. This aligns with NFPA 855 for maintenance and with a proposed revision to NFPA 855 for commissioning.

Response Message: SR-8086-NFPA 70-2021

[Public Comment No. 160-NFPA 70-2021 \[Section No. 706.7\]](#)



Second Revision No. 8467-NFPA 70-2021 [Section No. 706.16(E)]

(E) Other Energy Sources.

The connection of an ESS to other energy sources shall be in accordance with 705.12 and Parts III and VI of Article 712 .

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Tue Oct 26 19:37:21 EDT 2021

Committee Statement

Committee Statement: This editorial second revision is to correlate with the deletion of Article 712.

Response Message: SR-8467-NFPA 70-2021



Second Revision No. 8089-NFPA 70-2021 [Section No. 706.30(B)]

(B) Conductor Ampacity.

The ampacity of the ~~feeder~~ output circuit conductors ~~from the~~ of the ESS(s) connected to the wiring system serving the loads to be serviced by the system shall not be less than the greater of the (1)- nameplate(s)-rated circuit current as determined in accordance with 706.30(A)(1) or (A)(2)- the rating of the ESS(s) overcurrent protective device(s).

Supplemental Information

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
Errata_70-20-4_Final_CMP-13.docx	For reference only	

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Wed Oct 20 15:52:09 EDT 2021

Committee Statement

Committee Statement: The language in this section in the first draft contains what appears to be a typo and is confusing to most users of this Code. The reference to "(1)" is deleted as it is not clear what it refers to because it is not followed by a "(2)" which give the impression of an incomplete list. These editorial changes help clarify the requirements without changing them and use terms that are in use within this article. Conductor types and sizes within a listed ESS are evaluated through its listing so the addition of the term "output" in this section would further clarify what circuits this section is applied to.

Response Message: SR-8089-NFPA 70-2021

[Public Comment No. 2188-NFPA 70-2021 \[Section No. 706.30\(B\)\]](#)



Second Revision No. 8091-NFPA 70-2021 [Sections 706.31(A), 706.31(B)]

(A) Circuits and Equipment.

~~ESS circuit conductors shall be protected in accordance Article 240 .~~ Protection devices for ESS circuits shall be in accordance with 706.31(B) through (F). Circuits shall be protected at the source from overcurrent. A circuit conductor connected at one end to a supply with integral fault protection, where the conductor is rated for the maximum circuit current from that supply, and also connected to sources having an available maximum circuit current greater than the ampacity of the conductor, shall be protected from overcurrent at the point of connection to the higher current source.

Informational Note: Listed electronic power converter circuits powered by an ESS have integral fault protection. Where these circuits are connected to higher current sources such as a utility service, the overcurrent device is more appropriately installed at the higher current source end of the circuit conductor.

(B) Overcurrent Device Ampere Ratings.

~~Overcurrent protective devices, where required, shall be rated in accordance with Article 240 and the rating provided on systems serving the ESS and shall be~~ not less than 125 percent of the maximum currents calculated in 706.30(A).

Exception: Where the assembly, including the overcurrent protective devices, is listed for operation at 100 percent of its rating, the ampere rating of the overcurrent devices shall be permitted to be not less than the maximum currents calculated in 706.30(B).

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Wed Oct 20 15:53:56 EDT 2021

Committee Statement

Committee Statement: ESS systems with listed power electronic interfaces have low and/or very brief short-circuit current relative to the utility, conventional generators, and direct battery interfaces. As such the appropriate location for overcurrent protection of conductors for ESS installations connected to the utility or other primary source is at the utility/primary source side.

Section 706.31(A) is revised to align with similar requirements in 690.9(A)(2). An informational note is added to explain the effect of having “integral fault protection.” The first sentence is deleted to remove the reference to an entire Article.

Section 706.31(B) is revised to delete the reference to an entire Article and to clarify the requirement.

Response Message: SR-8091-NFPA 70-2021

[Public Comment No. 1148-NFPA 70-2021 \[Section No. 706.31\(A\)\]](#)

[Public Comment No. 2139-NFPA 70-2021 \[Section No. 706.31\(A\)\]](#)



Second Revision No. 8092-NFPA 70-2021 [Section No. 706.50]

706.50 General.

All electrical connections to and from the system and system components shall be in accordance with the applicable provisions of this *Code*. The systems shall comply with Parts I, II, III, and IV of this article.

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Wed Oct 20 16:05:06 EDT 2021

Committee Statement

Committee Statement: The reference to Part IV of Article 706 is added to the second sentence. The requirements in Part IV for “Circuits” would also apply to other energy storage technologies.

Response Message: SR-8092-NFPA 70-2021

[Public Comment No. 332-NFPA 70-2021 \[Section No. 706.50\]](#)



Second Revision No. 8034-NFPA 70-2021 [New Section after 708.1]

708.2 Reconditioned Equipment.

Reconditioned transfer switches shall not be permitted.

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Tue Oct 19 15:55:28 EDT 2021

Committee Statement

Committee Statement: Added section 708.2 on Reconditioned Equipment to correlate with articles 700, 701, 702 and per recommendation of correlating committee.

Response Message: SR-8034-NFPA 70-2021



Second Revision No. 8719-NFPA 70-2021 [Section No. 708.4(B)]

(B) Identification of Hazards.

Hazards to be considered at a minimum shall include, but shall not be limited to, the following:

- (1) Naturally occurring hazards (geological, meteorological, and biological)
- (2) Human-caused events (accidental and intentional) [~~1600: 5.3.2~~]

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Tue Nov 23 18:15:01 EST 2021

Committee Statement

Committee Statement: This editorial second revision is created by NFPA staff for compliance with the extract policy. The current text in 708.4(B)(2) does not align with the section of NFPA 1600 cited in the extract reference.

Response Message: SR-8719-NFPA 70-2021



Second Revision No. 8036-NFPA 70-2021 [Section No. 708.7]

~~708.7— Cybersecurity.~~

~~COPS that are connected to a communication network and have the capability to permit control of any portion of the premises COPS shall comply with either of the following:~~

- ~~(0) The ability to control the system is limited to a direct connection through a local nonnetworked interface.~~
- ~~(0) It is connected through a networked interface complying with one of the following methods:~~
 - ~~0. The system and associated software are identified as being evaluated for cybersecurity.~~
 - ~~0. A cybersecurity assessment is conducted on the connected system to determine vulnerabilities to cyberattacks.~~

~~The cybersecurity assessment shall be conducted when the system configuration changes and at not more than 5-year intervals.~~

~~Documentation of the evaluation, assessment, and certification shall be made available to those authorized to inspect, operate, and maintain the system.~~

~~Informational Note No. 1: See ANSI/ISA 62443, *Cybersecurity Standards* series; UL 2900, *Cybersecurity Standards* series; or the NIST Framework for Improving Critical Infrastructure Cybersecurity, Version 1.1, for assessment requirements.~~

~~Informational Note No. 2: Examples of the commissioning certification used to demonstrate the system has been investigated for cybersecurity vulnerabilities could be one of the following:~~

- ~~(0) The ISA Security Compliance Institute (ISCI) conformity assessment program~~
- ~~(0) Certification of compliance by a nationally recognized test laboratory~~
- ~~(0) Manufacturer certification for the specific type and brand of system provided~~

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Tue Oct 19 16:01:21 EDT 2021

Committee Statement

Committee Statement: While Panel 13 agrees that cybersecurity is an important aspect of overall system reliability, the requirements are better suited in Article 110 to encompass this code as outlined in 90.3. Upon consultation with experts in the field, it has become clear that a 5-year assessment is insufficient to ensure a system remains protected once implemented in addition to being protected when installed. Enforcement of such a standard would be difficult, and would cause confusion for installers, enforcers, and entities performing assessments. Assessments are needed on an ongoing basis as potential threats to the system are constantly evolving. Furthermore, making documentation of assessments available risks disclosing the specific security measure implemented, decreasing the security of the emergency systems as well as any other

interconnected systems or processes.

The installation and performance requirements proposed should be separated by the development of a new industry standard for cybersecurity outside of the NEC. This would allow industry subject matter experts within the field of cybersecurity to determine consensus requirements for specific equipment and evaluations. This action would also provide the AHJ with a compliance path which includes any necessary product listings or system certifications.

Response SR-8036-NFPA 70-2021

Message:

[Public Comment No. 2125-NFPA 70-2021 \[Section No. 708.7\]](#)



Second Revision No. 8037-NFPA 70-2021 [Section No. 708.22(B)]

(B) Selective Load Pickup, Load Shedding, and Peak Load Shaving Management .

The alternate power source shall be permitted to supply COPS emergency, legally required standby, and optional loads where the source has adequate capacity or where load management (that includes automatic selective load pickup and load shedding) is provided as needed to ensure adequate power to (1) the COPS and emergency circuits, (2) the legally required standby circuits, and (3) the optional standby circuits, in that order of priority. The alternate power source shall be permitted to be used for peak load shaving, provided these conditions are met.

Peak load-shaving operation shall be permitted for satisfying the test requirement of 708.6(B), provided all other conditions of 708.6 are met.

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Tue Oct 19 16:11:21 EDT 2021

Committee Statement

Committee Statement: The title of 708.22(B) has been modified so that it doesn't include functions from the actual requirement, and that it does include the proper level of abstraction along with the use of common terminology. This will improve consistency in the code. The requirement has been modified to include the common terminology while retaining the extremely important functional context that's needed.

Response Message: SR-8037-NFPA 70-2021

[Public Comment No. 1048-NFPA 70-2021 \[Section No. 708.22\(B\)\]](#)



Second Revision No. 8040-NFPA 70-2021 [Section No. 708.24(A)]

(A) General.

Transfer equipment, including automatic transfer switches, shall be automatic, listed, and identified for emergency use. Transfer equipment shall be designed and installed to prevent the inadvertent interconnection of normal and critical operations sources of supply in any operation of the transfer equipment. Transfer equipment and electric power production systems installed to permit operation in parallel with the normal source shall meet the requirements of Parts I and II of Article 705.

~~Transfer equipment shall not be permitted to be reconditioned.~~

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Tue Oct 19 16:42:24 EDT 2021

Committee Statement

Committee Statement: Added the language to reference Part I and II of Article 705.

Reconditioning statement was deleted in 708.24 and moved to 708.2 (see separate SR) per correlating committee recommendation.

Response Message: SR-8040-NFPA 70-2021

Public Comment No. 1149-NFPA 70-2021 [Section No. 708.24(A)]



Second Revision No. 8041-NFPA 70-2021 [Sections 708.24(B), 708.24(C), 708.24(D)]

(B) Bypass Isolation Transfer Switches.

Means shall be permitted to bypass and isolate the transfer equipment. ~~Where~~ If bypass isolation transfer switches are used, inadvertent parallel operation shall be avoided.

(C) Automatic Transfer Switches.

~~Where~~ If used with sources that are not inherently synchronized, automatic transfer switches shall comply with the following:

- (1) Automatic transfer switches shall be listed for emergency use.
- (2) Automatic transfer switches shall be electrically operated and mechanically held.

~~(D) Bypass Isolation Automatic Transfer Switches Redundant Transfer Equipment~~

~~Where~~ If COPS loads are supplied by ~~only one automatic transfer switch a single feeder~~, the ~~automatic transfer switch~~ COPS shall include redundant transfer equipment or a bypass isolation transfer switch to facilitate maintenance as required in 708.6(C) without jeopardizing continuity of power. ~~When~~ If the redundant transfer equipment or bypass isolation transfer switch is in the bypass mode, ~~either it shall automatically initiate transfer between power sources upon loss of the connected power source or it shall remain manual (or nonautomatic), then it shall be actively supervised by a qualified person who can manually initiate a transfer between power sources when the primary (automatic) transfer equipment is disabled for maintenance or repair~~.

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Tue Oct 19 16:44:16 EDT 2021

Committee Statement

Committee Statement: Section 708.24 for transfer equipment has been modified by changing the titles so that the subsections mirror the subsections for transfer equipment in section 700.5. This will improve consistency with the code.

In addition, the subsection (D) content was modified to describe the functionality that's needed when emergency loads are supplied by a single feeder rather describing how to do it. This will improve clarity and useability of the code.

Response Message: SR-8041-NFPA 70-2021

Public Comment No. 1850-NFPA 70-2021 [Section No. 708.24(D)]



Second Revision No. 8043-NFPA 70-2021 [Section No. 708.54(C)]

(C) Modifications.

Where if modifications, additions, or deletions to the critical operations power system(s) occur, selective coordination of the critical operations power system(s) OCPDs with all supply-side and load-side OCPDs shall be reevaluated.

Exception: Selective coordination shall not be required between two overcurrent devices located in series if no loads are connected in parallel with the downstream device.

Informational Note: See Informational Note Figure 708.54(C) for an example of how critical operations power system OCPDs selectively coordinate with all supply-side OCPDs.

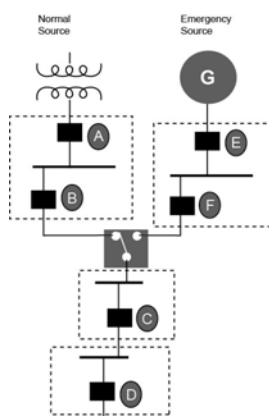
OCPD D selectively coordinates with OCPDs C, F, E, B, and A.

OCPD C selectively coordinates with OCPDs F, E, B, and A.

OCPD F selectively coordinates with OCPD E.

OCPD B is not required to selectively coordinate with OCPD A because OCPD B is not a critical operations power system OCPD.

Figure Informational Note Figure 708.54(C) Critical Operations Power System Selective Coordination.



Submitter Information Verification

Committee: NEC-P13

Submittal Date: Tue Oct 19 16:58:02 EDT 2021

Committee Statement

Committee Statement: The word "where" is deleted and replaced with "if" as this requirement describes a condition and not a location as listed in the style manual in section 3.3.4.

Response Message: SR-8043-NFPA 70-2021

Public Comment No. 2158-NFPA 70-2021 [Section No. 708.54(C)]



Second Revision No. 8074-NFPA 70-2021 [Article 712]

Article 712— Direct Current Microgrids

Part I.— General

712.1— Scope.

This article applies to direct current microgrids.

712.3— Other Articles.

Wherever the requirements of other articles of this Code and Article 712 differ, the requirements of Article 712 shall apply. DC microgrids interconnected through an inverter or bi-directional converter with ac electric power production sources shall comply with Article 705.

712.4— Listing and Labeling.

Any equipment used in the dc circuits of a dc microgrid shall be listed and labeled for dc use.

712.8— Commissioning.

Direct current microgrid systems shall be commissioned upon installation.

712.10— Directory.

(A)— Source Directory.

A permanent directory denoting all dc electric power sources operating to supply the dc microgrid shall be installed at each source location capable of acting as the primary dc source.

(B)— Building Directory.

A building supplied by a dc microgrid system shall have a permanent plaque or directory installed outside the building at each service equipment location or at an approved readily visible location. The plaque or directory shall denote the location of each power source disconnecting means on or in the building or be grouped with other plaques or directories for other on-site sources.

Exception: Multiple power production sources that are grouped at one location shall be permitted to be identified as a group.

Part II.— Circuit Requirements

712.25— Identification of Circuit Conductors.

Circuit conductors in dc microgrids that are not solidly grounded shall be identified according to the requirements of 210.5(C)(2) for branch circuits and 215.12(C)(2) for feeders.

712.30— System Voltage.

The system voltage of a dc microgrid shall be determined by one of the following methods:

- (0) The nominal voltage to ground for solidly grounded systems
- (0) The nominal voltage to ground for reference-grounded systems
- (0) The highest nominal voltage between conductors for resistively grounded dc systems and ungrounded dc systems.

Informational Note: Examples of nominal dc system voltages include but are not limited to 24, 48, 125, 190/380, or 380 volts.

Part III.— Disconnecting Means

~~712.34~~ DC Source Disconnecting Means.

~~The output of each dc source shall have a readily accessible disconnecting means that is lockable open in accordance with 110.25 and adjacent to the source.~~

~~712.35~~ Disconnection of Ungrounded Conductors.

~~In solidly grounded two- and three-wire systems, the disconnecting means shall simultaneously open all ungrounded conductors. In ungrounded, resistively grounded, functionally grounded, and reference-grounded systems, such devices shall open all current-carrying conductors.~~

~~712.37~~ Directional Current Devices.

~~Disconnecting means shall be listed, shall be marked for use in a single current direction, and shall only be used in the designated current direction.~~

~~Informational Note: Examples of directional current devices are magnetically quenched contactors and semiconductor switches in overcurrent devices.~~

~~Part IV.~~ Wiring Methods**~~712.52~~ System Grounding.****~~(A)~~ General.**

~~Direct-current microgrids shall be grounded in accordance with 250.162 .~~

~~(B)~~ Over 300 Volts.

~~DC microgrids operating at voltages greater than 300 volts dc shall be reference-grounded dc systems or functionally grounded dc systems.~~

~~712.55~~ Ground-Fault Detection Equipment.

~~Ungrounded, reference-grounded, or functionally grounded dc microgrids operating at greater than 60 volts dc shall have ground-fault detection that indicates that a fault has occurred. The ground-fault equipment shall be marked in accordance with 250.167(C) or in accordance with any marking rules that apply to the power source equipment.~~

~~712.57~~ Arc-Fault Protection.

~~Where required elsewhere in this Code , specific systems within the dc microgrid shall have arc-fault protection. The arc-fault protection equipment shall be listed.~~

~~Informational Note: See 90.4 when suitable equipment for arc-fault protection is not available.~~

~~Part V.~~ Marking**~~712.62~~ Distribution Equipment and Conductors.**

~~Distribution equipment and conductors shall be marked as required elsewhere in this Code .~~

~~712.65~~ Available DC Fault Current.**~~(A)~~ Field Marking.**

~~The available dc fault current on the dc microgrid shall be field marked at the dc source(s). The field marking(s) shall include the date the available fault current calculation was performed and be of sufficient durability to withstand the environment involved.~~

~~(B)~~ Modifications.

~~When modifications to the electrical installation occur that affect the available fault current at the dc source, the available fault current shall be verified or recalculated as necessary to ensure the equipment ratings are sufficient for the available fault current at the line terminals of the equipment. The required field marking(s) in 712.65(A) shall indicate the new available fault current and date.~~

~~Part VI.~~ Protection

~~712.70~~ Overcurrent Protection.

~~Equipment and conductors connected to more than one electrical source shall have overcurrent protective devices to provide protection from all sources.~~

~~712.72~~ Interrupting and Short-Circuit Current Ratings.

~~Consideration shall be given to the contribution of available fault currents from all interconnected power sources for the interrupting ratings and short-circuit current ratings of equipment in the dc microgrid system(s). Overcurrent protective devices and equipment used within a dc microgrid shall have an interrupting rating at nominal circuit voltage or a short-circuit current rating sufficient for the available fault current at the line terminals of the equipment.~~

~~Part VII.~~ Systems over 1000 Volts**~~712.80~~** General.

~~Systems with a maximum voltage between conductors of over 1000 volts dc shall comply with Article 490 and other requirements in this Code applicable to installations rated over 1000 volts.~~

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Wed Oct 20 13:10:42 EDT 2021

Committee Statement

Committee Statement: This article is deleted in keeping with the request of a task group appointed by the Correlating Committee to “consider removing the definition of “DC Microgrid” and Article 712 based on the review of requirements in Article 705.” It is the determination of this task group that the deletion of this article and related term will not adversely impact users of this Code and will in fact, improve the usability of this document by removing terms and requirements that conflict with other terms and requirements that are globally applied throughout this Code, other common regulatory documents, and other standards. This task group carefully reviewed the language in each section of this article and compared these to other requirements located in article 705, in addition to other related articles including those in Chapters 1 through 4.

As part of this work this task group reviewed the related public inputs and actions taken by CMP-13 and CMP-4 with regards to this article and topic. This task group is satisfied that the actions taken by CMP4 during the first revision in response to related public inputs, addressed any substantive gaps that existed between article 705 and 712 in the 2020 edition.

For reference, the following points address each section in this article and this task group’s analysis.

- 712.1 is deleted as redundant since the interconnection of power production sources (both ac or dc) has been covered under Article 705 since 1987. Article 705 has covered microgrid systems for several cycles. Each power source is further addressed in each related article (i.e. 690 for PV systems or 706 for energy storage systems) and any specific load requirements are covered under general Chapter 2 rules or as modified in such articles as 700 or 701. The existence of Article 712 alongside article 705 is confusing to a user since many power sources used in microgrids are dc sources but may connect to other sources either through dc connections, or ac connections through a dedicated inverter. It is therefore not practical to try to define a “dc microgrid” as being different from a “microgrid” since the vast majority of microgrids addressed in 705 will involve the connection of dc sources and dc distribution equipment, regardless of the presence of ac connections. This fact is supported in practice since the term “dc

microgrid” is not used in the vast majority of microgrid commercial or regulatory references.

- 712.3 is deleted as redundant. The reference to 705 is insufficient to add any clarity since the two articles overlap significantly already.
- 712.4 is deleted since this is adequately covered in 705.6. Language for microgrid devices to be listed was added into 705.6 during the first revision (FR-9374). The existing 705.6 language is more preferred since it addresses specific pieces of equipment.
- 712.8 is deleted as no longer required with the deletion of this article.
- 712.10 is deleted as this requirement is included in 705.10. Though there are slight variations in the two sections’ original text, they are not substantial enough to result in different requirements being enforced.
- 712.25 is deleted as pointers back to 210 and 215 are not required.
- 712.30 is deleted as the voltages in various systems are defined by a calculation based on the technologies used. This issue is adequately covered in each source article and in 705.14.
- 712.34 and 712.35 are deleted as these requirements are already addressed in the specific source articles as referenced in 705.20.
- 712.37 is deleted. Existing requirements in 110.3 and 705.6 deemed adequate.
- 712.52 is deleted as unnecessary. Article 250 adequately addresses the installation requirements for these applications. Chapters 1 – 4 apply to all wiring in a microgrid that does not fall under the scope of any particular power source system such as PV in Article 690.
- 712.55 is deleted and was effectively moved to new 705.75 (see FR-9412).
- 712.57 is deleted as the requirements elsewhere in the NEC already address this, as noted in the informational note. This text is not required and is duplicative.
- 712.62 is deleted as unnecessary to repeat requirements located elsewhere in the Code.
- 712.65 is deleted as fault current marking requirements are found in 110.9/10/16, in addition to any modifications in each source article.
- 712.70 is deleted and is covered in 705.30(A).
- 712.72 is deleted as interrupting rating requirements and SCCR requirements are addressed in 110.9 and 110.10.
- 712.80 is unnecessary since it does not contain modifications or additions to requirements elsewhere in the Code.

Response SR-8074-NFPA 70-2021
Message:

[Public Comment No. 1443-NFPA 70-2021 \[Article 712\]](#)

[Public Comment No. 1150-NFPA 70-2021 \[Section No. 712.57\]](#)

[Public Comment No. 463-NFPA 70-2021 \[New Section after 712.72\]](#)



Second Revision No. 8069-NFPA 70-2021 [Section No. 750.6]

750.6 Listing.

Energy management systems shall be ~~listed under~~ one of the following ~~conditions~~ :

- (1) Listed as a complete energy management system
- (2) Listed as a kit for field installation in switch or overcurrent device enclosures
- (3) ~~Identified as a recognized component of a field-installed accessory kit as part of the listed equipment~~ Listed individual components assembled as a system

Supplemental Information

<u>File Name</u>	<u>Description</u>	<u>Approved</u>
NEC_CMP13_750.6_SR8069.docx	Staff use only.	

Submitter Information Verification

Committee: NEC-P13

Submittal Date: Wed Oct 20 12:39:21 EDT 2021

Committee Statement

Committee Statement: The term "listed" is deleted from the charging statement as it is contained in the list items. The term "recognized component" is deleted from list item (3) since this term is specific to a particular testing laboratory. "Listed individual components assembled as a system" was substituted for list item (3) allow for systems which are not listed as a complete entity.

Response Message: SR-8069-NFPA 70-2021

[Public Comment No. 1151-NFPA 70-2021 \[Section No. 750.6\]](#)

[Public Comment No. 1615-NFPA 70-2021 \[Section No. 750.6\]](#)

[Public Comment No. 2190-NFPA 70-2021 \[Section No. 750.6\]](#)



Second Revision No. 8070-NFPA 70-2021 [Section No. 750.30]

750.30 Load Management.

Energy management systems shall be permitted to monitor and control electrical loads ~~unless restricted and sources~~ in accordance with 750.30(A) through (C).

(A) Load Shedding Controls.

An energy management system shall not override the load shedding controls put in place to ensure the minimum electrical capacity for the following:

- (1) Fire pumps
- (2) Emergency systems
- (3) Legally required standby systems
- (4) Critical operations power systems

(B) Disconnection of Power.

An energy management system shall not ~~be permitted to~~ cause disconnection of power to the following:

- (1) Elevators, escalators, moving walks, or stairway lift chairs
- (2) Positive mechanical ventilation for hazardous (classified) locations
- (3) Ventilation used to exhaust hazardous gas or reclassify an area
- (4) Circuits supplying emergency lighting
- (5) Essential electrical systems in health care facilities

(C) Capacity of Branch Circuit, Feeder, or Service.

An energy management system shall not cause a branch circuit, feeder, or service to be overloaded ~~at any time~~. If an EMS is used to limit the current on a conductor, 750.30(C)(1) through (C)(4) shall apply:

(1) Current Setpoint.

A single value equal to the maximum ampere setpoint of the EMS shall be permitted for one or more of the following:

- (1) For calculating the connected load per 220.70
- (2) For the maximum source current permitted by EMS control

(2) System Malfunction.

The EMS shall use monitoring and controls to automatically cease current flow upon malfunction of the EMS.

(3)_ Settings.

Adjustable settings shall be permitted if access to the settings is accomplished by at least one of the following:

- (1) Located behind removable and sealable covers over the adjustment means
- (2) Located behind a cover or door that requires the use of a tool to open
- (3) Located behind locked doors accessible only to qualified personnel
- (4) Password protected with password accessible only to qualified personnel
- (5) Software that has password protected access to the adjusting means accessible to qualified personnel only

(4)_ Marking.

The equipment that supplies the branch circuit, feeder, or service shall be field marked with the following information:

- (1) Maximum current setting
- (2) Date of calculation and setting
- (3) Identification of loads and sources associated with the current limiting feature
- (4) The following or equivalent wording: "The setting for the EMS current limiting feature shall not be bypassed"

The markings shall meet the requirements in 110.21(B) and shall be located such that they are clearly visible to qualified persons before examination, adjustment, servicing, or maintenance of the equipment.

Submitter Information Verification

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Committee Statement

Committee Statement: References to sources as well as loads are added to this section in keeping with the definition of an EMS. The text "be permitted to" in (B) was removed to comply with Section 3.3.1.4 of the NEC Style Manual and improve the clarity of this section. The phrase "at any time" has been struck for lacking sufficient clarity to be uniformly applied. With the new addition of 705.6 requiring listings for all EMS, any allowable time periods related to the product's performance are located in the relevant standard. The remaining new language in (C) has been moved and assembled here from other sections in this Code. Requirements from multiple sections in other articles are replaced by these changes. This new language will consolidate all these related sections into a single set of requirements located within the appropriate Article 750 whose scope covers EMS. This will allow for greater consistency when applying this Code among all applications of EMS.

Response Message: SR-8070-NFPA 70-2021

Public Comment No. 1037-NFPA 70-2021 [Section No. 750.30]