

Field guide

2023 National Electrical Code updates and additions

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Introduction

Every three years, the National Fire Protection Association (NFPA®) convenes teams of experts who review and refine the National Electrical Code® (NEC®). The NEC receives several Public Inputs and Public Comments for the consideration in the approval of a 2/3 majority by the code-making panel of a change to the appropriate article.

The NEC is crucial for bolstering electrical safety in both workplaces and homes. The 2023 edition of the NEC brings noteworthy changes that could significantly affect your upcoming projects and electrical safety.

This Eaton 2023 NEC pocket guide provides a summary of the most important code updates in the 2023 edition of the NEC. Use this guide in the field for a quick explanation of the code changes and convenient links to more information in the Eaton 2023 NEC online guide.

The top nine additions and updates in the 2023 NEC that electricians need to know

1. GFCI

Sections **210.8(A)** and **210.8(B)** expanded GFCI to protect all receptacles found in the kitchen. Section **210.8(D)** was expanded to include appliances like electric ranges, wall-mounted ovens, counter-mounted cooking units, clothes dryers, and microwave ovens. Hardwired, non-cord-and-plug-connected equipment is also addressed in **210.8(F)** for outdoor outlets.

2. Surge protection

Surge protection is required for services supplying dormitory units, guest rooms and guest suites of hotels and motels, and areas of nursing homes and limited-care facilities used as patient sleeping rooms. Additionally, surge requirements were placed in Article 215 for feeders and Article 225 for outdoor branch circuits and feeders. Lastly, a new requirement creates a minimum nominal discharge current rating (I_n) of 10 kA.

3. Barriers

New section **215.15** was added to address the increased risk for panelboards, switchboards, switchgear, and motor control centers that are supplied by the secondaries of transformers and feeder tap conductors. **Barriers** are now needed so that no energized, uninsulated, ungrounded busbar or terminal is exposed to contact by persons or maintenance equipment while servicing load terminations.

4. Arc flash labeling

Section **110.16(B)** was expanded beyond just services and beyond services rated 1200 A and above. This section now requires labeling for services and feeder-supplied equipment rated 1000 A and above. These requirements only affect other than dwelling units.

5. Reconditioned equipment

The 2023 code moved all definitions to Article 100. Code panels included **reconditioning requirements** in the nnn.2 sections of the articles. This consistency is important to improve usability of the NEC.

6. **Cybersecurity**

Cybersecurity is now included in the National Electrical Code. Systems that perform a life safety function and are connected to the network, circuit breakers connected to a network that can have their set points changed remotely, and equipment in a critical operation power system that is connected to the network must be evaluated for cybersecurity risks.

7. **Receptacles in islands and peninsulas**

The 2023 code cycle made the placement of a **receptacle** on islands and peninsulas optional, but provisions must be put in place to ensure it can be added in the future. In addition, the receptacle must be on or in the countertop to avoid cords of appliances draping over the edge of the countertop.

8. **Selective coordination**

Selective coordination has historically been addressed by areas of the NEC focused on life safety systems such as Article 700. Informational notes in these articles where selective coordination is required added clarity that the requirements are only for overcurrent protective devices that are in, for example, the life safety system.

9. **Service equipment**

Meter centers are still included in **230.71** language to permit multiple overcurrent devices in the same structure, but recent UL® 67 changes have been made so that equipment can be constructed and circuit breakers can be compartmentalized so barriers can be placed on the line side of service overcurrent protective devices and no other energized parts are exposed.

Dwelling unit area reference chart for AFCI and GFCI requirements

Location	2008 NEC	2011 NEC	2014 NEC	2017 NEC	2020 NEC	2023 NEC
Family rooms	AFCI	AFCI	AFCI	AFCI	AFCI	AFCI
Dining rooms	AFCI	AFCI	AFCI	AFCI	AFCI	AFCI
Kitchens						
125 V receptacles	GFCI	GFCI	AF/GF	AF/GF	AF/GF	AF/GF
250 V receptacles	TM	TM	TM	TM	GFCI A	GFCI
Bedrooms	AFCI	AFCI	AFCI	AFCI	AF/GF A	AF/GF A
Living rooms	AFCI	AFCI	AFCI	AFCI	AFCI	AFCI
Garages						
125 V receptacles	GFCI	GFCI	GFCI	GFCI	GFCI	GFCI
250 V receptacles	TM	TM	TM	TM	GFCI	GFCI
Sunrooms	AFCI	AFCI	AFCI	AFCI	AFCI	AFCI
Parlors	AFCI	AFCI	AFCI	AFCI	AFCI	AFCI
Libraries	AFCI	AFCI	AFCI	AFCI	AFCI	AFCI
Dens	AFCI	AFCI	AFCI	AFCI	AFCI	AFCI
Recreation rooms	AFCI	AFCI	AFCI	AFCI	AFCI	AFCI
Closets	AFCI	AFCI	AFCI	AFCI	AFCI	AFCI
Hallways	AFCI	AFCI	AFCI	AFCI	AF/GF A	AF/GF A
Laundry areas						
125 V	GFCI C	GFCI C	AF/GF	AF/GF	AF/GF	AF/GF
250 V	TM	TM	TM	TM	GFCI	GFCI
Basements	GFCI B	GFCI B	GFCI B	GFCI B	AF/GF	AF/GF
Bathrooms	GFCI	GFCI	GFCI	GFCI	GFCI	GFCI
Dishwashers	TM	TM	AFCI	AFCI	AF/GF	AF/GF
Microwaves	TM	TM	AFCI	AFCI	AFCI	AF/ GF
Ranges, Ovens	TM	TM	TM	TM	GFCI ^F	GFCI
Dryers	TM	TM	TM	TM	GFCI ^F	GFCI
Outdoor outlets (i.e., A/C, garages and accessory buildings) D	TM	TM	TM	TM	GFCI	GFCI
Sump pumps	TM	TM	TM	TM	GFCI	AF/GF
Outdoor receptacles						
125 V	GFCI	GFCI	GFCI	GFCI	GFCI	GFCI
250 V	TM	TM	TM	TM	GFCI	GFCI

A GFCI protection required if receptacle outlet is within 6 ft of edge of sink (i.e., bedroom bathroom; hallway bathroom, etc.).

B Unfinished basements.

C Where the receptacle is installed within 6 ft of the outside edge of the sink.

D Example of outdoor outlet loads (150 V to ground or less; 50 A or less; single-phase) are air conditioner unit, septic aerator, etc. Refer to the appropriate section of the NEC for further details on the specific requirements.

E In Dwelling Units

F In areas where protection is required

Legend:

TM = Thermal-magnetic breaker

AF/AFCI = Arc fault circuit interrupter

GF/GFCI = Ground fault circuit interrupter

Reconditioned equipment

Article no./title or topic

210.2 AFCI, GFCI, GFPE

100 Definition of Reconditioned Equipment

100 Definition of Servicing

110.21(A) Reconditioned Equipment

110.21(B) Field-Applied Hazard Markings

Relates to: Residential and commercial buildings

NEC requirement

If your actions being performed on a product meet the definition of reconditioning, there are three basic steps you should follow:

- Determine if reconditioning is permitted: Review requirements found in each article that includes the product being worked on in the scope of that article. It is very likely that the “nnn.2” section includes the information necessary to determine if reconditioning is permitted or not permitted.
- Follow the reconditioning requirements in Section 110.20. List the product as reconditioned, make sure proper parts are sourced and used, and know that the Authority Having Jurisdiction (AHJ) must approve of the actions taken on the equipment.
- Follow the equipment marking requirements of Section 110.21. Reconditioned equipment must be marked and identified as being reconditioned. The original listing mark must be removed or made illegible. The date of reconditioning and who reconditioned the equipment must also be marked.

If your actions meet the definition of servicing, then the requirements found in 110.17 apply. The qualified person must follow manufacturer instructions and information included as part of the listing of the equipment and all replacement parts must be provided by the original equipment manufacturer or be designed by an engineer who is experienced in the design of replacement parts for the type of equipment that’s being serviced or maintained, or the AHJ can approve these parts.



Use the QR code to find additional details about this code requirement in the Eaton 2023 NEC Online Guide. Tap the QR code to go to the online guide if you are viewing this on a mobile device.

GFCI 210.8(A)

Dwelling units

Article no./title or topic

210.8(A) GFCI Protection for Dwelling Units

Relates to: Residential buildings

NEC requirement

- List item (6), kitchens, was expanded to require GFCI protection of all receptacles in a dwelling unit kitchen.
- List item (7) was created to include a new requirement for areas with sinks and permanent provisions for food preparation, beverage preparation, or cooking.
- Exception No. 4 recognizes that the receptacle in a bathroom exhaust fan does not require GFCI protection.

Style manual changes that occurred can be found on the website.



Use the QR code to find additional details about this code requirement in the Eaton 2023 NEC Online Guide. Tap the QR code to go to the online guide if you are viewing this on a mobile device.

GFCI 210.8(B)

Other than dwelling units (commercial, etc.)

Article no./title or topic

100 Definitions

210.8(B)(13) GFCI Protection for Aquariums

Relates to: Commercial buildings

NEC requirement

Section 210.8(B) includes requirements for other than dwelling units and includes a list of locations that requires receptacles to be protected by a listed Class A GFCI. The protection can be a part of the receptacle or an upstream circuit breaker or upstream receptacle. The requirements of 210.8(B) impact all 125 V through 250 V receptacles supplied by single-phase branch circuits rated 150 V or less to ground. The ampere range of the single-phase branch circuit is 50 A or less. Three-phase branch circuits of 100 A or less and 150 V or less to ground are also included.

There is a total of 15 identified locations and six exceptions.

When determining which receptacles, or in the case of list item (7), which receptacles supplying cord-and-plug-connected fixed or stationary appliances, must be GFCI protected in the identified locations, a measurement must be taken. The measurement is made as the shortest path the power supply cord that is connected to the receptacle, or fixed or stationary appliance, would follow without piercing a floor, wall, ceiling, or fixed barrier.



Use the QR code to find additional details about this code requirement in the Eaton 2023 NEC Online Guide. Tap the QR code to go to the online guide if you are viewing this on a mobile device.

GFCI 210.8(D)

Protection for specific appliances

Article no./title or topic

210.8(D) GFCI Protection for Specific Appliances

Relates to: Residential and commercial buildings

NEC requirement

This section was modified to ensure that the GFCI protection for appliances rated 150 V or less to ground and 60 A or less, single- or three-phase, is placed in the branch circuit either at the breaker, the receptacle, or some other location upstream of the outlet to which the appliance is hardwired into the circuit. This provision is for the branch circuit supplying the appliance regardless of whether it is cord-and-plugged connected or hardwired. The hazard is the same in both cases.

The list of appliances includes:

- Automotive vacuum machines
- Drinking water coolers and bottle fill stations
- High-pressure spray washing machines
- Tire inflation machines
- Vending machines
- Sump pumps
- Dishwashers
- Electric ranges
- Wall-mounted ovens
- Counter-mounted cooking units
- Clothes dryers
- Microwave ovens



Use the QR code to find additional details about this code requirement in the Eaton 2023 NEC Online Guide. Tap the QR code to go to the online guide if you are viewing this on a mobile device.

GFCI 210.8(F)

Outdoor outlets

Article no./title or topic

210.8(F) Outdoor Outlets

Relates to: Residential buildings

NEC requirement

Dwelling unit outdoor outlets (other than those that are supplying electric snow-melting, deicing, or pipeline and vessel heating equipment) that are supplied by single-phase branch circuits rated 150 V or less to ground and that are 50 A or less are required to be GFCI protected. In addition to dwelling unit outdoor outlets, the outdoor outlets on garages that have floors located at or below grade level, accessory buildings, and boathouses are also included in this requirement. If equipment that is being supplied by an outlet falling under the requirement of 210.8(F) is replaced, the outlet must be provided with GFCI protection.

The introduction of this section was a part of NEC 2020. An effective date was included as part of the passing of TIA 20-13 for some specific equipment that may pose a challenge about compatibility with GFCIs. The exception, which is written in positive text language within 210.8(F), excludes GFCI protection from those circuits supplying mini-split-type heating/ventilating/air-conditioning (HVAC) equipment and other HVAC units that employ power conversion equipment to control compressor speed. GFCI protection is required for this equipment as of January 1, 2023.



Use the QR code to find additional details about this code requirement in the Eaton 2023 NEC Online Guide. Tap the QR code to go to the online guide if you are viewing this on a mobile device.

Energy management

Article no./title or topic

100 Definitions

220.70 Energy Management Systems (EMS)

705.13 Power Control Systems

750 Energy Management Systems

750.6 Listing Requirements

Relates to: Residential and commercial buildings

NEC requirement

Systems that meet the new definition of an energy management system must comply with the requirements found in Article 750 when used as permitted in the following sections:

220.70 Energy Management Systems

Load calculations are permitted to take advantage of an energy management system (EMS) when sizing feeders, service conductors, and equipment. If an EMS such that current to a feeder or service is limited and when the EMS is in accordance with 750.30, the setpoint value for maximum current amperes is permitted to be used for the load calculations. The current value used must be a continuous load.

705.13 Power Control Systems

The previous edition of the NEC included details that were more appropriately located in Article 750 Energy Management Systems. Section 705.13 Energy Management Systems (EMS) now points to 750.30 with permissions to leverage the setpoints of the EMS to limit current and size equipment based on this setpoint value.

The new definition of an EMS found in Article 100 helps the user of the Code to understand that an EMS consists of any of the following:

- Monitor(s)
- Communications equipment
- Controller(s)
- Timer(s)

Energy management (cont.)

The listed devices, or other device(s), must monitor and/or control an electrical load or a power production or storage source.

When an installed system meets the definition of an EMS, it must comply with the requirements of Article 750 Energy Management Systems.

Section 750.6 includes listing requirements, ensuring that EMS be one of the following:

- Listed as a complete energy management system
- Listed as a kit for field installation in switch or overcurrent device enclosures
- Listed individual components assembled as a system

In addition, 750.20 includes requirements to make certain that the EMS does not override any control necessary to ensure continuity of an alternate power source for:

- Fire pumps (695)
- Healthcare facilities (517)
- Emergency systems (700)
- Legally required standby systems (701)
- Critical operations power systems (708)



Use the QR code to find additional details about this code requirement in the Eaton 2023 NEC Online Guide. Tap the QR code to go to the online guide if you are viewing this on a mobile device.

Surge protection

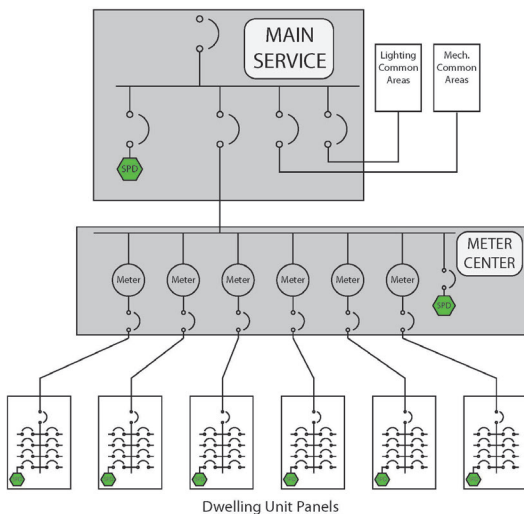
Article no./title or topic

230.67 Surge Protection

215.18 Feeders

225.42 Outside Branch Circuits and Feeders

Relates to: Residential and commercial buildings



NEC requirement

Surge protection products have been expanded beyond dwelling units to dormitory units, guest rooms and guest suites of hotels and motels, and areas of nursing homes and limited care facilities used exclusively as patient sleeping rooms. These additional locations now require surge protective devices at their service equipment as per 230.67.

The 2023 Code cycle also expanded surge protection provisions by placing requirements in Article 215 for feeders and Article 225 for outdoor feeders and branch circuits. When a feeder supplies any one of these occupancy types, including dwelling units, dormitory units, guest rooms and guest suites of hotels and motels, and areas of nursing homes and limited care facilities used exclusively as patient sleeping rooms, the equipment at the load side of the feeder must include a surge protective device. Exception 4 of Article 230 states that if a surge protective device is located at each next level distribution equipment downstream toward the load, then a surge protective device is not required to be placed in the service equipment. The goal is to place the surge protective device as close to the occupancy type as possible.

Surge protection (cont.)

Section 225.42 requirements are not necessarily needed because an inside and outside branch circuit would not serve a dwelling unit or any of the occupancy types. Because the requirements for surge protection are in Article 215, the outdoor feeder requirements are not necessary, as all feeders (inside and outside) are addressed in Article 215.



Use the QR code to find additional details about this code requirement in the Eaton 2023 NEC Online Guide. Tap the QR code to go to the online guide if you are viewing this on a mobile device.

Receptacles

Article no./title or topic

406.6(D)(3) Receptacles

Relates to: Residential and commercial buildings

NEC requirement

GFCI receptacles are now required to be listed.

The public input identified the requirement for other similar products such as AFCIs in the NEC to be listed. CMP agreed that life safety devices such as GFCIs should be tested and certified by a Nationally Recognized Testing Laboratory (NRTL).



Use the QR code to find additional details about this code requirement in the Eaton 2023 NEC Online Guide. Tap the QR code to go to the online guide if you are viewing this on a mobile device.

Emergency disconnect

Article no./title or topic

230.85 Emergency Disconnect

Relates to: Residential buildings

NEC requirement

For one- and two-family dwelling units, all service conductors shall terminate in disconnecting means having a short-circuit current rating equal to or greater than the available fault current, installed in a readily accessible outdoor location. If more than one disconnect is provided, they shall be grouped. Each disconnect shall be one of the following:

1. Service disconnects marked as: emergency disconnect, service disconnect.
2. Meter disconnects installed per 230.82(3) and marked as: emergency disconnect, meter disconnect, not service equipment.
3. Other listed disconnect switches or circuit breakers on the supply side of each service disconnect that are suitable for use as service equipment and marked as: emergency disconnect, not service equipment. Markings shall comply with 110.21(B).



Use the QR code to find additional details about this code requirement in the Eaton 2023 NEC Online Guide. Tap the QR code to go to the online guide if you are viewing this on a mobile device.

Receptacles—GFPE replacements

Article no./title or topic

406.4(D)(8) Receptacle Replacement

Relates to: Residential and commercial buildings

NEC requirement

When a receptacle is replaced, which is required elsewhere in the Code to be protected by ground-fault protection of equipment (GFPE), the replacement receptacle must be protected by a GFPE device. GFPE is available in circuit breaker format and so when a receptacle is replaced and is on a circuit that is required to have GFPE protection, the GFPE circuit breaker must be placed in the branch circuit.

A GFPE device is UL 1053 listed. There is no trip threshold requirement as part of this GFPE. GFPE is required in the following applications:

- NEC Section 555.35 Marina Applications
- NEC Section 427.22 Electric Heat Tracing and Heating Panels

GFPE trip thresholds are set by the manufacturer and are for equipment protection only and not for personnel protection.



Use the QR code to find additional details about this code requirement in the Eaton 2023 NEC Online Guide. Tap the QR code to go to the online guide if you are viewing this on a mobile device.

Receptacles—bathtubs and shower space

Article no./title or topic

406.9(C) Bathtub and Shower Space

Relates to: Residential and commercial buildings

NEC requirement

Allows a single GFCI protected receptacle for electric personal hygiene devices (plug-in seat warmers, etc.).



Use the QR code to find additional details about this code requirement in the Eaton 2023 NEC Online Guide. Tap the QR code to go to the online guide if you are viewing this on a mobile device.

Receptacles—damp locations

Article no./title or topic

406.9 Receptacles in Damp or Wet Locations

Relates to: Residential and commercial buildings

NEC requirement

This section addresses receptacle installations in damp or wet locations. It is separated into four first-level subdivisions including (A) Damp Locations, (B) Wet Locations, (C) Bathtub and Shower Space, and (D) Flush Mounting with Faceplate. Receptacles in these locations must meet the requirements to address not only possible shock hazards but also to ensure the installation aligns with the UL standards to which they are listed.

Receptacles installed in damp locations must have a weatherproof enclosure for the receptacle when it is covered. When the cover is hinged, the cover must be able to be opened to at least 90 degrees.

Receptacles installed in wet locations must have a weatherproof enclosure with and without the attachment plug cap inserted. The outlet box hood must be listed and identified as extra-duty. Hinged covers of outlet box hoods must open to at least 90 degrees, or fully open if the cover is not designed to open 90 degrees from the closed to open position, after installation.

Receptacles are not permitted to be installed inside the tub or shower or within a zone measured 3 ft horizontally from any outside edge of the bathtub or shower stall, including the space outside the bathtub or shower stall space below the zone. This zone also includes the space measured vertically from the floor to 8 ft above the top of the bathtub rim or shower stall threshold.

There are exceptions that are detailed in the National Electrical Code. Always take care when applying exceptions.



Use the QR code to find additional details about this code requirement in the Eaton 2023 NEC Online Guide. Tap the QR code to go to the online guide if you are viewing this on a mobile device.

Receptacles—tamper-resistant

Article no./title or topic

406.12 Tamper-Resistant Receptacles

Relates to: Residential and commercial buildings

NEC requirement

This section identifies the locations where the receptacle must be of the tamper-resistant type. It specifically calls out that 15 A and 20 A, 125 V and 250 V non-locking-type receptacles in the areas specified in 406.12(1) through 406.12(810) be listed as tamper-resistant receptacles.

The 10 locations include:

1. Dwelling units, boat houses, mobile homes, and manufactured homes, including their attached and detached garages, accessory buildings, and common areas.
2. Guest rooms and guest suites of hotels, motels, and their common areas.
3. Childcare facilities.
4. Preschools and education facilities.
5. Business offices that are accessible to the public, lobbies, and waiting areas and spaces of nursing homes and limited care facilities.
6. Places of awaiting transportation, gymnasiums, skating rinks, fitness centers, and auditoriums.
7. Dormitory units.
8. Residential care/assisted living facilities, social and substance abuse rehabilitation facilities, and group homes.
9. Foster care facilities, nursing homes, and psychiatric hospitals.
10. Areas of agricultural buildings accessible to the public and any common areas.



Use the QR code to find additional details about this code requirement in the Eaton 2023 NEC Online Guide. Tap the QR code to go to the online guide if you are viewing this on a mobile device.

Receptacles—basements

Article no./title or topic

210.52(G) Basements

Relates to: Residential and commercial buildings

NEC requirement

This section has requirements for one- and two-family dwellings as well as multifamily dwellings requiring at least one receptacle outlet to be installed in garages, accessory buildings, and basements. The receptacles required as part of this section are in addition to any other receptacles that may be required in these locations for specific equipment.



Use the QR code to find additional details about this code requirement in the Eaton 2023 NEC Online Guide. Tap the QR code to go to the online guide if you are viewing this on a mobile device.

Receptacles—countertops and work surfaces

Article no./title or topic

210.52(C)(2) Island and Peninsular Countertops and Work Surfaces

210.52(C)(3) Receptacle Outlet Location

Relates to: Residential and commercial buildings

NEC requirement

A receptacle on the island or peninsula countertop is optional but if placed, the receptacle must be in a specific location that is not on the face of the cabinet below the countertop. If a receptacle outlet is not provided, provisions shall be provided for future addition of a receptacle outlet to serve the island or peninsular countertop or work surface.

The gray area still exists between what is a wall countertop space and what is a peninsula countertop space when determining whether you need a receptacle for a space on the wall to serve the countertop portion of the peninsula.



Use the QR code to find additional details about this code requirement in the Eaton 2023 NEC Online Guide. Tap the QR code to go to the online guide if you are viewing this on a mobile device.

Article no./title or topic

210.12 Arc-Fault Circuit Interrupter Protection

Relates to: Residential and commercial buildings

NEC requirement

Specific locations within various occupancy types are required to have arc fault circuit interrupter protection (one of the options found in 210.12[A]), for single-phase, 120 V, 10 A, 15 A, and 20 A branch circuits. In dwelling units, the list of locations includes kitchens, family rooms, dining rooms, living rooms, parlors, libraries, dens, bedrooms, sunrooms, recreation rooms, closets, hallways, laundry areas, and similar areas.

Dormitory units are also required to have AFCI protection on single-phase, 120 V, 10 A, 15 A, and 20 A branch circuits supplying the following areas: bedrooms, living rooms, hallways, closets, bathrooms, and similar rooms.

Other occupancy types where AFCIs are required include:

- Guest rooms and guest suites of hotels and motels
- Areas used exclusively as patient sleeping rooms in nursing homes and limited care facilities
- Areas designed for use exclusively as sleeping quarters in fire stations, police stations, ambulance stations, rescue stations, ranger stations, and similar locations (this is a new requirement per the 2023 NEC edition)

There are also requirements for when branch circuits are extended, modified, or replaced. Section 210.12(E) addresses when the branch circuit wiring for any of those areas that are specified for dwelling units, dormitory units, or other occupancies are modified, replaced, or extended. The branch circuit must be protected by one of the following:

- Any of the means permitted in Section 210.12(A)
- A listed outlet branch circuit type AFCI is located at the first receptacle outlet of the existing branch circuit



Use the QR code to find additional details about this code requirement in the Eaton 2023 NEC Online Guide. Tap the QR code to go to the online guide if you are viewing this on a mobile device.

Arc energy

Article no./title or topic

110 General Requirements for Electrical Installations

110.16 Arc-Flash Hazard Warning

Relates to: Commercial buildings

NEC requirement

Section 110.16 requires arc flash hazard warning labels on equipment. Section 110.16(A) includes general requirements for all electrical equipment (such as switchboards, switchgear, enclosed panelboards, industrial control panels, meter socket enclosures, and motor control centers) in other than dwelling units and likely to require examination, adjustment, servicing, or maintenance while being energized to have a warning label. This label must be field or factory applied to warn the qualified person of potential electric arc flash hazards.

Section 110.16(B) requires an arc flash label. This arc flash label must be applied to service equipment and feeder-supplied equipment in other than dwelling units when the service equipment and/or feeder-supplied equipment is rated 1000 A or more. The arc flash label that is required is in addition to the general label found in 110.16(A). This arc flash label must be made in accordance with the applicable industry practice and include the date that the label was applied.

An informational note recognizes two standards. The first standard, ANSI Z535.4-2011, titled "Product safety signs and labels," provides guidelines for the design of safety signs and labels for application to products. The second standard, NFPA 70E, titled "Standard for electrical safety in the workplace," includes applicable industry practices for equipment labeling. NFPA 70E provides specific criteria for developing arc flash labels for equipment that provides nominal system voltage, incident energy levels, arc flash boundaries, minimum required levels of personal protective equipment, and more.



Use the QR code to find additional details about this code requirement in the Eaton 2023 NEC Online Guide. Tap the QR code to go to the online guide if you are viewing this on a mobile device.

Article no./title or topic

110.3(A) Examination, Identification, Installation, Use, and Listing (Product Certification) of Equipment Examination

240.6(D) Standard Ampere Ratings

708.7 Critical Operations Power Systems (COPS)

708.8(A) Critical Operations Power Systems (COPS)

Relates to: Commercial buildings

NEC requirement

The National Electrical Code Article 110, Article 240, and Article 708 include requirements and a level of attention to cybersecurity. The general requirements found in Article 110, Section 110.3(A), require that cybersecurity be evaluated for networked-connected life safety equipment to ensure this equipment's ability to withstand unauthorized updates and malicious attacks do not stop it from performing its intended safety function. This is a general requirement and working with your AHJ will be important to understanding how that individual will ensure this code requirement will be implemented.

The informational note to this requirement identifies solutions that are out there in the industry, but the challenge here is the categorization of equipment to be life safety related. In addition, circuit breakers that can be connected to a network must be listed to a cybersecurity standard or a cybersecurity evaluation of the system must be performed. When the cybersecurity evaluation is completed, it must be documented and provided to the AHJ. There are similar requirements in Article 708 for any critical operation power system that is connected to a network that can be modified or controlled remotely. Review the requirements in 110.3, 240.6, 708.7, and 708.8 to ensure your cybersecurity assessments or installed listed products are adequate to meet cybersecurity standards and the requirements of the National Electrical Code.



Use the QR code to find additional details about this code requirement in the Eaton 2023 NEC Online Guide. Tap the QR code to go to the online guide if you are viewing this on a mobile device.

Working space

Article no./title or topic:

110 General Requirements for Electrical Installations

110.26 Spaces About Electrical Equipment

110.33 Entrance to Enclosures and Access to Working Space

Relates to: Commercial buildings

NEC requirement

Parent text of 110.26 for low-voltage equipment and 110.33 for medium-voltage equipment now includes language that requires all open and simultaneously opened equipment doors must not impede access to and egress from the working space. This can make hallways and similar areas where equipment is located on either side of the walk space challenging for clearances. Access or egress is impeded if one or more simultaneously opened equipment doors restrict working space access to less than 24 inches wide and 6.5 feet high.



Use the QR code to find additional details about this code requirement in the Eaton 2023 NEC Online Guide. Tap the QR code to go to the online guide if you are viewing this on a mobile device.

Lighting outlets

Article no./title or topic

210.70 Lighting Outlets Required

Relates to: Residential and commercial buildings

NEC requirement

This section includes lighting outlet requirements for Dwelling Units (210.70[A]), Guest Rooms or Guest Suites (210.70[B]), and All Occupancies (210.70[C]).

For dwelling units, a lighting outlet is required in each habitable room, kitchen, and bathroom. There must be one wall-mounted control device located near an entrance to the room. There are two exceptions:

1. In other than kitchens and bathrooms, one or more receptacles can be controlled by a listed wall-mounted control device instead of providing a lighting outlet.
2. The lighting outlet can be controlled by occupancy sensors that are in addition to the listed wall-mounted control device or located at a customary wall switch located and equipped with a manual override that will allow the sensor to function as a wall switch.

Additional dwelling unit locations with electric power, specifically hallways, stairways, and attached and detached garages, require a lighting outlet controlled by a listed wall-mounted control device to be installed. Also, for attached and detached garages that have electric power, at least one lighting outlet controlled by a listed wall-mounted control device must be installed to provide illumination on the exterior side of outdoor entrances or exits with grade-level access. A vehicle door inside a garage is not considered to be an outdoor entrance or exit. Where one or more lighting outlets are installed for interior stairways, you must have a listed wall-mounted control device at each floor level and at each landing level with an entryway to control the lighting outlets where each stairway between floor levels has six risers or more.

The only exception to this requirement for interior stairways, hallways, and attached and detached garages with electric power are stairways at an outdoor entrance are permitted to have remote control or automatic control of the lighting. Finally, these additional locations require that lighting outlets controlled in accordance with shall not be controlled by use of listed wall-mounted control devices unless they provide the full range of dimming control at each location.

Lighting outlets (cont.)

The requirements for guest rooms or guest suites at hotels, motels, or similar occupancies must have at least one lighting outlet controlled by a listed wall-mounted control device installed in every habitable room and bathroom. There are two exceptions:

1. Other than bathrooms and kitchens, one or more receptacles controlled by listed wall-mounted controlled devices shall be permitted in lieu of these lighting outlets.
2. Occupancy sensors require that they are in addition to a listed wall-mounted control device or incorporated as part of the wall-mounted control device, but they must have a manual override on that device.

Section 210.70, All Occupancies, requires attics, underfloor spaces, quality rooms, and basements must have at least one lighting outlet (containing a switch or controlled by a wall switch or a listed wall-mounted control device) be installed where these spaces are used for storage or contain equipment that requires servicing. In this case, a point of control has to be located at each entry that permits access to the attic, underfloor space, utility room, or basement. A lighting outlet has to be installed at or near the equipment that requires servicing.



Use the QR code to find additional details about this code requirement in the Eaton 2023 NEC Online Guide. Tap the QR code to go to the online guide if you are viewing this on a mobile device.

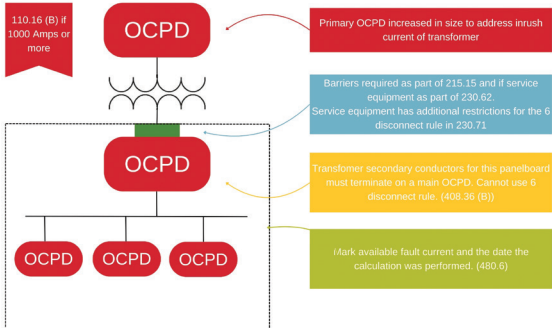
Barriers

Article no./title or topic

215 Feeders

215.15 Barriers

Relates to: Commercial buildings



NEC requirement

Section 215.15 includes requirements for barriers placed such that no energized or uninsulated or ungrounded busbar or terminal is exposed to inadvertent contact by persons or maintenance personnel while servicing low terminations inside of panelboards, switchboards, switchgear, or motor control centers. This requirement only applies to that equipment when supplied by feeder taps or transformer secondary conductors. It is required that when the disconnecting device to which the tap conductors or transformer secondary conductors are terminated is in the **open** position, no exposed energized parts exist.

It is important to ensure the panelboard, switchboard, switchgear, or motor control center is supplied with these barriers.



Use the QR code to find additional details about this code requirement in the Eaton 2023 NEC Online Guide. Tap the QR code to go to the online guide if you are viewing this on a mobile device.

Disconnects—maximum number

Article no./title or topic

230 Services

230 Part 5 Service Equipment—General

230.71 Maximum Number of Disconnects

Relates to: Residential and commercial buildings

NEC requirement

When installing two to six service disconnecting means, the requirements found in Article 200 and Section 230.71 must be adhered to. First-level subdivision B, Two to Six Service Disconnecting Means, requires:

- Separate enclosures with a main service disconnecting means in each enclosure
- Panelboards with a main service disconnecting means in each panelboard enclosure
- Switchboards where there is only one service disconnecting each separate vertical section with barriers that provide assurance of inadvertent contact protection based on access from adjacent sections
- Service disconnects in switchgear, transfer switches, or metering centers are required to have a disconnect located in separate compartments
- Meter centers must have a main service disconnecting means in each metering center
- Motor control centers where there is only one service disconnect and motor control center unit, and a maximum of two service disconnects in a single motor control center with barriers between each motor control center unit or compartment containing a service disconnect, to maintain the inadvertent contact protection based on access from adjacent motor control center units or compartments

Disconnects—maximum number (cont.)

There is only one exception for existing service equipment that was installed to comply with previous editions of the NEC where it was permitted to have multiple service disconnecting means in a single enclosure, section, or compartment. The exception applies to panelboards, switchboards, switchgear, transfer switches, meter centers, and motor control centers.



Use the QR code to find additional details about this code requirement in the Eaton 2023 NEC Online Guide. Tap the QR code to go to the online guide if you are viewing this on a mobile device.

Notes

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Notes

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