



Revisions for the 2020 National Electrical Code - Part 3

An Online Continuing Education Course for Engineers

Course Number: E-3088

Credit: 3 Hours / 3 PDH / 3 CPD

Revisions for the 2020 National Electrical Code - Part 3

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This course is intended to familiarize the reader with the major changes contained in the 2020 National Electrical Code®. These are the “need to know” changes. The document is heavily illustrated to enable effective and efficient visual learning. The course addresses Code revisions that apply to all types of occupancies: residential, commercial, and industrial.

The course series is divided into 3 parts. This course covers Part 3.

- Part 1: Code-wide changes through Article 220
- Part 2: Article 230 through Article 406
- **Part 3: Article 408 through Article 800**

The layout and method of this presentation will enable new Code users to easily navigate through the changes. Those well experienced in the Code will find depth in the coverage. Through the heading(s) at the beginning of each Code change addressed in the document, the reader will readily identify the section affected by the change and the specific subject being discussed.

The Introduction sets the stage. An Analysis of the Code change follows, with explanations where necessary to help the student understand the revision, its background, and the logic of the change. Graphics, photographs, examples, or calculations are used to illustrate the change and to enhance learning. The Summary is a brief re-statement of the highlights of the Code change.

An Application Question with an answer is included at the end of most Code sections studied for exercise in applying the change. The “Top Ten” most significant Code changes, in the author’s opinion, are identified. Less significant changes are addressed in less detail. Some of the sections analyzed contain a Code Refresher that addresses existing Code requirements related to the change. General Code information and rules are weaved into the writing throughout the document. The author’s writing method attempts to provide a general Code study and a Code refresher through discussion of the Code changes. NFPA 70E®, Electrical Safety in the Workplace, is briefly discussed and referenced several times within the course.

Although there are many references to the 2020 NEC® throughout this document, the course and quiz can be completed without the need to refer to the NEC® itself. However, the learning experience will be enhanced by referring to the NEC® as the course is completed. For further study on any Code section within this course, the full text of the 2020 NEC® should be consulted. You can read the 2020 NEC® online at the following site, courtesy of NFPA:

<https://www.nfpa.org/NEC/electrical-codes-and-standards/NFPA-70?code=70>

408.4(A) Switchboards, Switchgear, and Panelboards

Field Identification Required – Circuit Directory or Circuit Identification

Introduction

The Code requires that every circuit and circuit modification be legibly identified as to its clear, evident, and specific purpose or use. Despite recent changes to this requirement in an effort to improve circuit identification, many panel directories are not compliant.

Analysis

Part of the problem is the space that is left inside a panel door after installation of the manufacturer's labels and instructions, warning labels, the installer's business information and advertisement, inspection stickers, list of circuits controlled by energy management systems, highlighted circuits like "heating system" and "alarm system," etc. Also, sometimes equipment is supplied with a small directory label that has inadequate space to provide sufficient detail in the circuit description.

A 2020 Code change provides an option. The directory may be located on the face, inside of, "or in an approved location adjacent to the panel door." This could aid in the space problem, the amount of detail in the circuit description, and in keeping a directory up to date. Typewritten directories, though not required, are legible and allow for easy updating if maintained electronically. This is a practice in some facilities.



Panelboard directories may be located in an approved location adjacent to the panel door.



Code Refresher

Circuit Directory or Circuit Identification – Every circuit and circuit modification shall be identified as to its clear, evident, and specific purpose. The identification shall include an approved degree of detail that allows each circuit to be distinguished from all others. For switchboards or switchgear, circuit identification shall be at each switch or circuit breaker. Spare positions that contain unused overcurrent devices or switches shall be marked accordingly. No circuit shall be described in a manner that depends on transient conditions of occupancy.

408.6—Switchboards, Switchgear, and Panelboards

Short-Circuit Current Rating—Top 10 among significant Code changes

Introduction

Existing Code requires that the available fault current be marked on service equipment (110.24), industrial machinery (670.5), motor control centers (430.99), and other equipment. The 2020 *NEC* requires the marking for switchboards, switchgear, and panelboards.

Analysis

In other than one- and two-family dwellings, the available fault current and the date the calculation was performed shall be field marked on switchboard, switchgear, and panelboard enclosures at the point of the supply. The marking shall comply with the requirements of 110.21(B)(3)—the label shall be of sufficient durability to withstand the environment involved. This information must be known in order to comply with 110.9 and 110.9. These sections require equipment to have interrupting ratings (AIC) and short-circuit current ratings capable of interrupting the available fault current without extensive damage to the circuit equipment.

There are relatively simple methods to obtain the highest fault current available at the secondary terminals of the utility transformer. However, this Code change requires that fault current be calculated downstream of the service through the distribution system. For projects designed by engineers, these calculations will be performed as part of the engineering services. Only qualified persons should perform these calculations.



LABEL
Available fault current at the point
of supply to the equipment:
27,450 amperes
Date of calculation: 12-6-2019

Summary

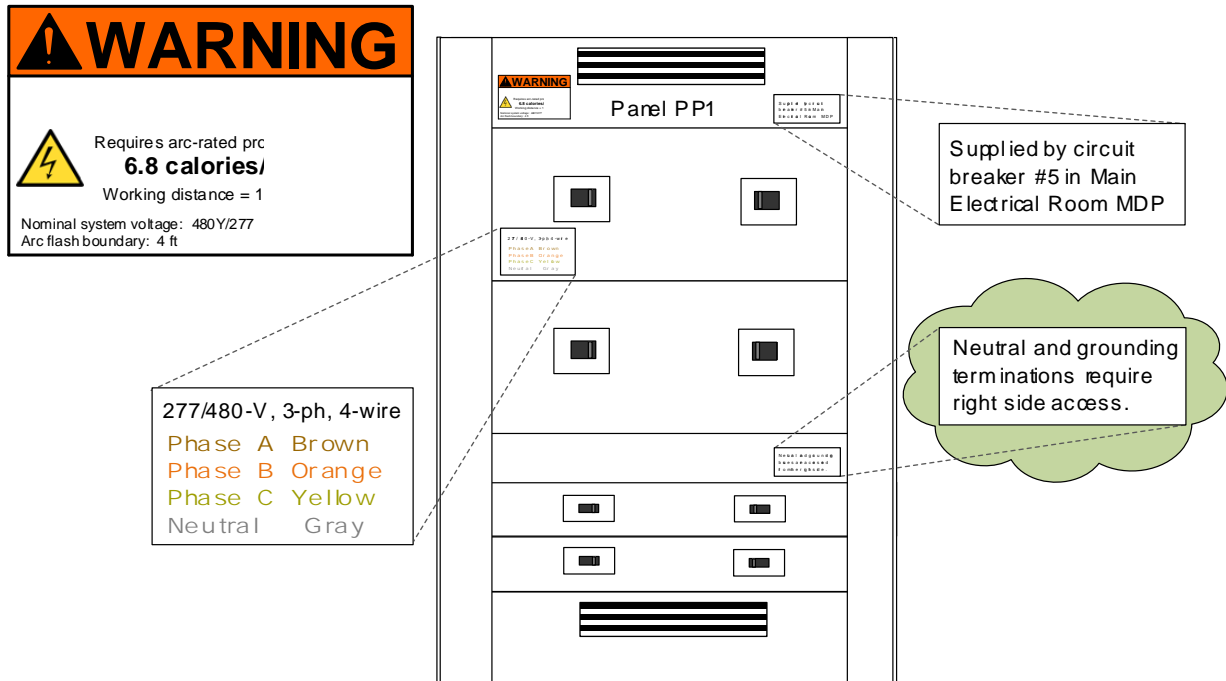
In other than one- and two-family dwellings, the available fault current and the date the calculation was performed shall be field marked on switchboard, switchgear, and panelboard enclosures at the point of the supply.

408.18(C) Switchboards, Switchgear, and Panelboards

Part II. Switchboards and Switchgear – Clearances – Connections

Introduction

The revisions and new requirements in this section are intended to enhance worker safety when permitted energized work is authorized according to the provisions of NFPA 70E.[®] Rules regarding the location of equipment load terminals and access to connections are expanded in the 2020 *NEC*.



Analysis

Compliance with the *NEC* is a safeguard for persons and property from the hazards arising from the use of electricity. For electrical worker safety, compliance with NFPA 70E[®], *Standard for Electrical Safety in the Workplace*[®], is essential. Working on energized equipment should be avoided whenever possible. However, there are rare occasions when de-energization could introduce additional hazards or increased risk or when the task to be performed is infeasible in a de-energized state. Energized work is only permitted in accordance with *NFPA 70E*, section 130.2(A), after an energized work permit is obtained that complies with section 130.2(B) of *70E*.

For switchboards and switchgear, the 2020 *NEC* requires direct access to load terminals for grounded conductor and equipment grounding conductor terminations. Load terminals shall be so located that it is not necessary to reach across uninsulated ungrounded buses to terminate neutral or equipment grounding conductors. This may necessitate rear or side access to the equipment. According to new section 408.18(C), each section of equipment that requires rear or side access to make field connections shall be so marked by the manufacturer on the front of the equipment. All required side or back openings shall comply with the working space requirements in 110.26—working space depth, width, and height.

Requirements for field terminations of ungrounded conductors are less restrictive. Load terminals for ungrounded conductors shall be so located that it is not necessary to reach across *energized* uninsulated buses to make connections.

Code Refresher

Several other labels are required on the equipment shown. If service equipment (it is not), section 110.16(B) in the *NEC* requires equipment rated 1200 A or more to be labeled with the available fault current and clearing time of the service overcurrent device. Also, marking of the available fault current is required by 110.24 for services. (New fault current markings in 408.6)

70E, Section 130.5(H) – Labeling of switchboards, panelboards, etc. in dwellings:

- (1) Nominal system voltage
- (2) Arc flash boundary
- (3)

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215)

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To view the remainder of the course material and to take the quiz for PDH credit, you must purchase the course.

Close this window and click "Add to cart" on the product page.

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