2023 National Electrical Code

Code Changes

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Instructor

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    - 13 Years in Defense/Aerospace
    - 34 Years in Home/Building Automation
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    - IEEE Life Member
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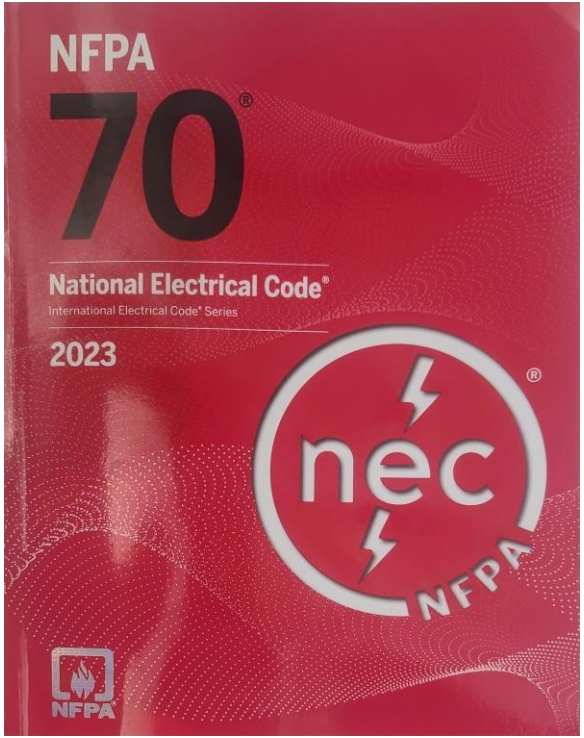
Code Making Panel 3, CMP3

Articles and Members

- 720, 725, 727, 728, 760, 300, 590
- Chapter 9 Tables,11 A,B and 12 A,B
- New Articles
  - 722
  - 724
  - 726

- Total of 18 CMPs and overseen by the NFPA Technical Staff



Article 100, Definitions

- In prior editions, definitions in Article 100 were referenced in multiple sections of the code
- 2023 Edition moves all definitions to Article 100, even if it only applies to a particular section or chapter

Article 110, Requirements for Electrical Installations

- NEW Cybersecurity requirements for connected electrical equipment – 110.3 (A) (8)
- This a first for the NEC, while many of the requirements are undefined, this addition will make it clear to manufacturers and installers that these products must be protected from intrusion and un-desired operations from bad actors. This requirement will need to be refined to address the many questions surrounding device updates (firmware), rules for cloud/remote access, and privacy concerns.
- Informational note references
  - ANSI/ISA 62443 – Standards for industrial automation and control systems
  - UL 2900 – Standards for software cybersecurity for network-connectable products
  - UL 5500 – Standard for Remote Software Updates

Article 210.23 (A) 10 Ampere Branch Circuits

- NEW 10 Ampere branch circuits allow for:
  - Lighting outlets
  - Dwelling unit exhaust fans (bathroom/laundry)
  - Gas fireplace unit (on individual branch)
- NOT ALLOWED
  - Receptacle outlets
  - Fixed appliances
  - Garage door openers
  - Laundry equipment

Article 240, Overcurrent Protection

- NEW Cybersecurity requirements for “Remotely Accessible Adjustable-Trip Circuit Breakers” – 240.6 (D)
- Many open questions:
  - Physical vs software lockouts
  - Commissioning
  - Who is responsible for what... Installer, Manufacturer, Inspector, IT
  - Critical vs non-critical circuits

Article 310.3 (A) Minimum Size of Conductors

- Proposal to allow 16 AWG copper as the minimum conductor size for 10-amp circuits
- Proposal to allow 14 AWG copper and aluminum conductors for lighting circuits
- These proposals are a result of reduced circuit loads based on the use of LED lamps and other energy saving measures

Did not make into final code

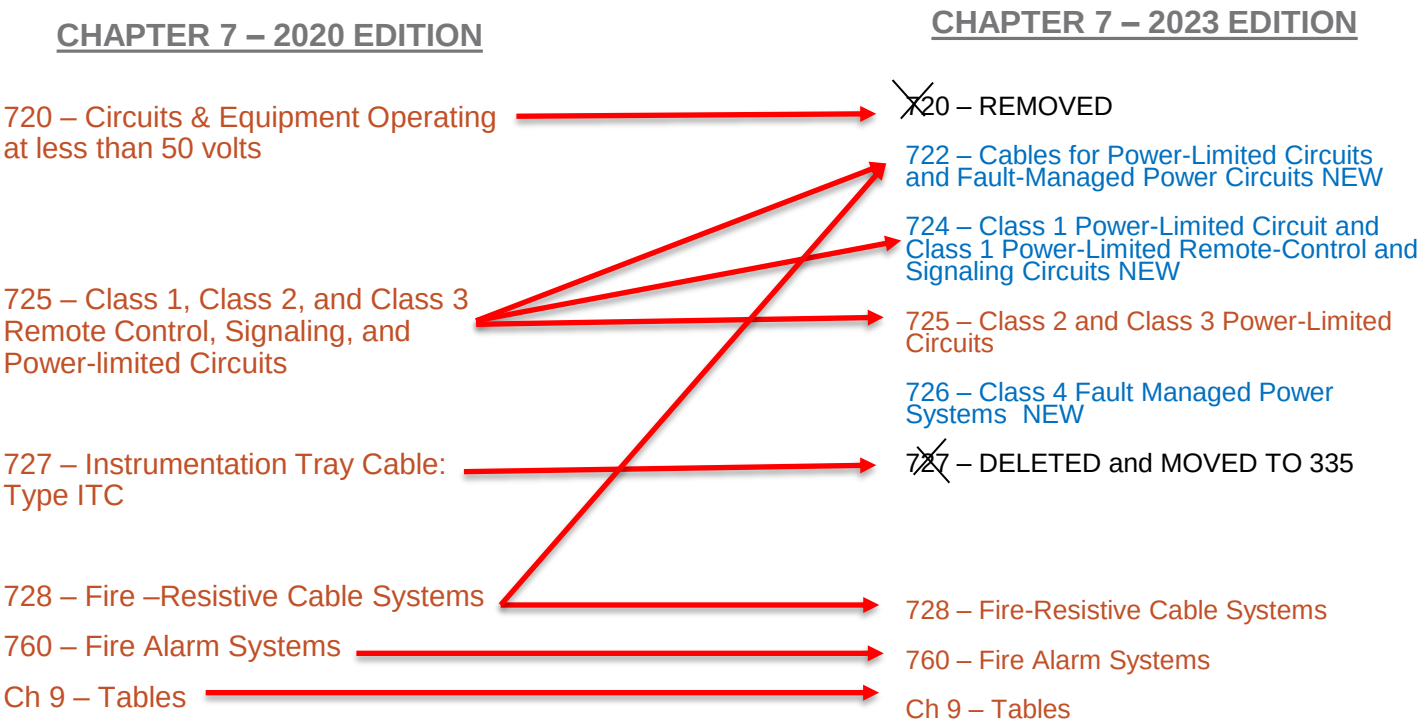
Article 335, Instrumentation Tray Cable

- New Article relocates the old Article 727 to this article covering the use and installation of instrumentation tray cable.
- This application covers circuits operating at 150 volts or less and 5 amperes or less

Article 404, Switches

- This change to article 404 addresses the proliferation of wireless control devices for lighting and ceiling fans.
- Notice is made here that the wireless device, if it does not connect to the building wiring is not subject to any code requirements.

BIG CHANGES TO CHAPTER 7



Article 722, Cables for Power Limited Circuits

- New article combines the cable characteristics and properties from the chapter 7 articles. Each article in chapter 7 has cable information which was redundant because it was mostly the information just repeated for each article. This consolidates the information and cleans up the other articles.
- New designations for some class 2 and 3 rated cables. Includes power limited cables for fire alarm systems and Class 4.
- Some ongoing controversy concerning the inclusion of fiber optic cables described in article 770.

Article 724, Class One Circuits

- This NEW article takes class one circuit requirements from article 725 and eliminates Class 1 non-power limited circuits
- Class one power-limited circuits are defined here. These are Class 1 remote control and signaling circuits operating at 30 volts or less.
- There are no special circumstances with these circuits including a listing for a power supply. This classification is not dependent on the equipment being supplied, unless specifically referenced in this article.

Article 725, Class 2 and Class 3 Power-Limited Circuits

- This revised article covers remote control, signaling and power limited circuits that are not an integral part of a device or utilization equipment
- These circuits are at the heart of what most Low Voltage Integrators do. When supplied by a listed class 2 or 3 power supply they create the foundation or our installations.
- These circuits have specific power and voltages levels which must be adhered to.
- The revisions included moving class 1 circuits to their own article and relocating the cable properties to a new article

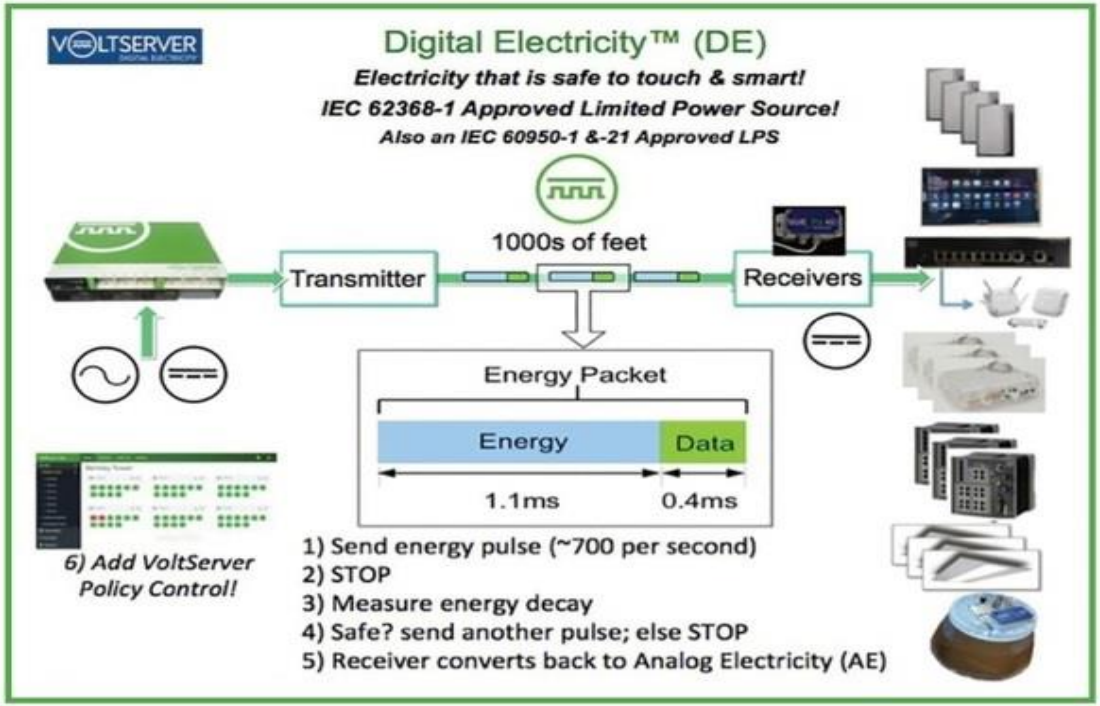
Article 726, Class 4 Power Systems

- NEW Article 726 covers a new wiring classification. Class 4 systems do not limit the output power source but rather the systems limit the energy available into any fault condition, (arcing, short circuits or series resistive faults) including personnel contact.
- Class 4 circuits are referred to by many names, fault managed power, pulse power, digital electricity, smart transfer system and packet energy.
- Sent over any approved cabling method including Class 2 and UTP
- AC or DC – 450 volts line to line or 225 volts to ground
- Max fault current 100 VA
- Conductor size limited to #6

Article 726, Class 4 Power Systems

- Currently not approved for residential or hazardous occupancies
- Deployed in some form in about 200 stadiums and similar locations
- Current designs call for wide deployment in telecommunication systems including small cell G5 wireless cell towers

CLASS 4 – aka Digital Electricity/Packet Power



Article 810, Antenna Systems

- This change drops the provisions for radio and television equipment previously covered in this article
- The revised article is now limited to the antenna systems themselves and includes both receiving and transmitting antennas.
- Special notice is made to the requirements of article 250 for grounding of these systems.

Changes That Might Have An Impact

- All Connected/Networked Electrical Equipment must meet minimum standards for Cybersecurity, load centers, transfer switches, UPS
- 10 Amp Circuits
- Class 4 Circuits
- Cannabis oil production equipment, power and control – NEW article 512

Final Thoughts, Questions

- LED Lighting is inherently Low Voltage. Power and control may no longer require Mains power. Consider ....
  - Class 4
  - PoE
  - Single Pair Ethernet
  - DMX
  - Dali
  - Wireless to fixture
  - DC Microgrids