

## **SECTION 26 27 26 - WIRING DEVICES**

### **PART 1 - GENERAL**

#### **1.1 SUBMITTAL REQUIREMENTS**

- A. Product Data
  - 1. For each type include electrical characteristics, configurations, ratings, markings, colors, etc.

#### **1.2 GENERAL**

- A. Information regarding the following is included in other Division 26 specification sections and/or on drawings: weatherproof cover plates, special identification requirements, and occupancy sensors.
- B. Provide wiring devices, in types, characteristics, grades, colors, and electrical ratings for applications indicated which are UL listed and which comply with NEMA WD 1 and other applicable UL and NEMA standards. Verify color selections with Owner's Representative.
- C. Coordination: Receptacles for Owner-Furnished Equipment: Match plug configurations. Cord and Plug Sets: Match equipment requirements.
- D. Definitions:
  - 1. EMI: Electromagnetic interference.
  - 2. GFCI: Ground-fault circuit interrupter.
  - 3. Pigtail: Short lead used to connect a device to a branch-circuit conductor.
  - 4. RFI: Radio-frequency interference.
  - 5. SPD: Surge protection device.
  - 6. Tamper-resistant: This term and "safety type" shall be taken to mean the same thing for receptacles.

### **PART 2 - PRODUCTS**

#### **2.1 GENERAL**

- A. Acceptable Manufacturers: Subject to being equivalent and subject to compliance with requirements, provide product by one of the manufacturers listed below.
  - 1. Cooper Wiring Devices; Division of Cooper Industries, Inc. (Cooper)
  - 2. FSR Inc. (FSR)
  - 3. Hubbell Incorporated (Hubbell)
  - 4. Hubbell Incorporated; Wiring Device-Kellems (Hubbell)
  - 5. Hubbell Incorporated; Wiring Device-Bryant (Hubbell)
  - 6. Legrand
  - 7. Leviton Mfg. Company Inc. (Leviton)
  - 8. Lutron Electronics, Inc. (Lutron)
  - 9. Pass & Seymour/Legrand (Pass & Seymour)
  - 10. Wiremold/Legrand (Wiremold)
- B. For receptacle circuits protected with 15A breakers, provide NEMA 5-15R equivalents for the devices specified in this section.

- C. Provide equivalent quality devices by manufacturers listed in subparagraphs hereafter for cases where voltage, amperage and/or NEMA configurations that are indicated on drawings or, are otherwise required based on project conditions, differ from those specified herein.
- D. Provide Weather-Resistant Receptacles with UL "WR" marking, compliant with NEC 406.8, for all applications in wet or damp locations.
- E. Where GFI protected receptacles are shown on drawings, provide a separate GFI receptacle for each one shown. Do not feed downstream receptacles from load-side (GFI-protected) terminals of upstream receptacles.
- F. Provide corrosion-resistant versions of receptacles specified below for industrial applications and applications in corrosive or potentially-corrosive environments.
- G. Devices that are manufactured for use with modular plug-in connectors may be substituted under the following conditions: Connectors shall comply with UL 2459 and shall be made with stranding building wire; connectors are NRTL listed for intended use; connectors comply with the requirements in this Section; connectors are permitted by Authorities Having Jurisdiction.

## **2.2 STRAIGHT-BLADE RECEPTACLES**

- A. Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 Configuration 5-20R (20A) or 5-15R (15A), UL 498, and FS W-C-596. Provide duplex and single specification grade receptacles, 2-pole, 3-wire grounding, self-grounding, green grounding screw, ground terminals and poles internally connected to mounting yoke, color coded base, 20-amperes, 125-volts, with metal plaster ears, back & side wiring, NEMA configuration 5-20R. Subject to compliance with requirements, provide one of the following (catalog numbers in subparagraphs below are for 20-A, heavy-duty, specification-grade, nylon-face devices; revise catalog numbers to require other configurations and ratings):
  - 1. Cooper; 5351 (single), CR5362 (duplex)
  - 2. Hubbell; HBL5351 (single), HBL5352 (duplex)
  - 3. Bryant; 5351 (single), 5352A (duplex)
  - 4. Leviton; 5351 (single), 5362 (duplex)
  - 5. Pass & Seymour; 5351 (single), 5362 (duplex)
- B. GFCI Receptacles, 125V, 20A: Straight blade, feed-through or non-feed-through type depending on application. Comply with NEMA WD 1, NEMA WD 6, UL 498, UL 943 Class A, and FS W-C-596. Include indicator light that shows when the GFCI has malfunctioned and no longer provides proper GFCI protection. Subject to compliance with requirements, provide one of the following:
  - 1. Cooper; VGF20
  - 2. Hubbell; GF20#LA
  - 3. Bryant; GF20#LA
  - 4. Pass & Seymour; 2097
  - 5. Leviton; 6490

## **2.3 WALL PLATES**

- A. Single and combination types shall match corresponding wiring devices. Provide metal plate-securing screws with head color to match plate finish. Provide factory markings on faces of receptacles that are controlled for energy management or building automation that are compliant with Article 406.3(E), including symbol and the word "Controlled". Provide engraved wall plates where required by prevailing codes, indicated on drawings or indicated in Division 26 specifications.

1. Material for Finished Spaces: satin finish stainless steel, equal to Leviton Type 430 series
  2. Material for Unfinished Spaces with surface-mounted outlet boxes: Galvanized steel
  3. Material for Indoor Damp Locations: Gasketed satin finish stainless steel, equal to Leviton Type 430 series, with spring-loaded lift cover, and listed and labeled for use in wet and damp locations.
- B. Wet-Location, Weatherproof Cover Plates: NEMA 250, complying with Type 3R, weather-resistant. Refer to Section 26 05 33.00.

## **2.4 FINISHES AND INDICATORS**

- A. Device Color (unless otherwise indicated or required by NFPA 70 or device listing):
1. General Wiring Devices Connected to Normal-Utility Branch of Power System: Ivory.
- B. Illuminated Indication: Provide illuminated face or indicator light versions of wiring devices specified herein where indicated as such on drawings and/or where required by prevailing code(s), to indicate that there is power to the device.

## **PART 3 - EXECUTION**

### **3.1 INSTALLATION**

- A. Coordination with Other Trades: Protect installed devices and their boxes. Do not place wall finish materials over device boxes and do not cut holes for boxes with routers that are guided by riding against outside of boxes. Keep outlet boxes free of plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other material that may contaminate the raceway system, conductors, and cables. Install device boxes in brick or block walls so that the cover plate does not cross a joint unless the joint is troweled flush with the face of the wall. Install wiring devices after all wall preparation, including painting, is complete.
- B. Conductors: Provide grounded ("neutral") conductor in all lighting control device (switch, dimmer, occupancy sensor, etc.) wall outlet boxes, even if not immediately used. Do not strip insulation from conductors until right before they are spliced or terminated on devices. Strip insulation evenly around the conductor using tools designed for the purpose. Avoid scoring or nicking of solid wire or cutting strands from stranded wire. The length of free conductors at outlets for devices shall meet provisions of NFPA 70, Article 300, without pigtails. Existing Conductors: Cut back and pigtail, or replace all damaged conductors; Straighten conductors that remain and remove corrosion and foreign matter; Pigtailing existing conductors is permitted, provided the outlet box is large enough.
- C. Device Installation:
1. Replace devices that have been in temporary use during construction and that were installed before building finishing operations were complete.
  2. Keep each wiring device in its package or otherwise protected until it is time to connect conductors.
  3. Do not remove surface protection, such as plastic film and smudge covers, until the last possible moment.
  4. Connect devices to branch circuits using pigtails that are not less than 6 inches in length.
  5. When there is a choice, use side wiring with binding-head screw terminals. Wrap solid conductor tightly clockwise, two-thirds to three-fourths of the way around terminal screw.
  6. Use a torque screwdriver when a torque is recommended or required by manufacturer.
  7. When conductors larger than No. 12 AWG are installed on 15- or 20-A circuits, splice No. 12 AWG pigtails for device connections.
  8. Tighten unused terminal screws on the device.

9. When mounting into metal boxes, remove the fiber or plastic washers used to hold device-mounting screws in yokes, allowing metal-to-metal contact.
10. Install wiring devices only in electrical boxes that are clean; free from building materials, dirt, and debris. Install wiring devices after wiring work is completed. Install wall plates only after respective wall surfaces have received their final finish.
11. Consider locations indicated on the drawings to be approximate (unless specifically dimensioned on drawings, or unless spacings must comply with prevailing codes). Study the general construction with relation to spaces and equipment surrounding each outlet.
12. Do not use aluminum products in concrete.
13. Fasten electrical boxes firmly and rigidly to substrates, or structural surfaces to which attached, or solidly embed electrical boxes in concrete or masonry. Support boxes independent of conduit.
14. Provide feed-through-type GFCI receptacles where downstream receptacles are fed from the line side of the GFCI receptacle.
15. Adjust locations of outlets, devices, etc. to suit arrangement of partitions and furnishings.
16. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical and with grounding terminal of receptacles on top. Group adjacent switches under single, multigang wall plates
17. Receptacle Orientation: Install receptacles so that the ground pin is oriented in a consistent manner throughout the facility, so that the orientation is compliant with all prevailing codes and regulations, and so that the orientation is acceptable to the electrical inspector. Where receptacles are installed horizontally, install so that neutral connection faces up. Coordinate with AHJ and Owner.
18. Device Plates: Do not use oversized or extra-deep plates. Repair wall finishes and remount outlet boxes when standard device plates do not fit flush or do not cover rough wall opening.

### **3.2 FIELD QUALITY CONTROL**

- A. Tests for Receptacles:
  1. Line Voltage (120V): Acceptable range is 105 to 132 V.
  2. Test for correct polarity and grounding.
  3. Percent Voltage Drop under 15-A Load: A value of 6 percent or higher is unacceptable.
  4. Ground Impedance: Values of up to 2 ohms are acceptable.
  5. GFCI Trip: Test for tripping values specified in UL 1436 and UL 943.
  6. Using the test plug, verify that the device and its outlet box are securely mounted.
  7. Tests shall be diagnostic, indicating damaged conductors, high resistance at the circuit breaker, poor connections, inadequate fault current path, defective devices, or similar problems. Correct circuit conditions, remove malfunctioning units and replace with new ones, and retest as specified above.
- B. Installed equipment will be considered defective if it does not pass tests and inspections. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest. Prepare test and inspection reports. Include notation of deficiencies detected, remedial action taken, and observations after remedial action.

**END OF SECTION 26 27 26**