

SECTION 26 27 26 - WIRING DEVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

- A. Section Includes:
 - 1. Switches and fan-speed controller switches.
 - 2. Straight-blade receptacles.
 - 3. Receptacles with arc-fault and ground-fault protective devices.
 - 4. Locking receptacles.
 - 5. Special-purpose power outlet assemblies.
 - 6. Connectors, cords, and plugs.

1.3 RELATED SECTIONS

- A. Section 26 09 23 "Lighting Control Devices" for occupancy sensors, timers, control-voltage switches, and control-voltage dimmers.

1.4 DEFINITIONS

- A. AFCI: Arc-fault circuit interrupter.
- B. BAS: Building automation system.
- C. EMI: Electromagnetic interference.
- D. GFCI: Ground-fault circuit interrupter.
- E. Pigtail: Short lead used to connect a device to a branch-circuit conductor.
- F. RFI: Radio-frequency interference.
- G. SPD: Surge protective device.

1.5 ACTION SUBMITTALS

- A. Product Data: For each type of product.
- B. Field quality-control reports.

1.6 INFORMATIONAL SUBMITTALS

- A. Manufacturers' Instructions: Record copy of official installation and testing instructions issued to Installer by manufacturer.
- B. Sample warranties.

1.7 WARRANTY FOR DEVICES

- A. Provide manufacturer standard warranty.

PART 2 - PRODUCTS

2.1 GENERAL WIRING DEVICE REQUIREMENTS

- A. Manufacturers: Subject to compliance with requirements, provide devices from one of the following:
 - 1. Hubbell Wiring Devices.
 - 2. Pass and Seymour / Legrand.
 - 3. Eaton / Cooper.
 - 4. Leviton.
- B. Wiring devices shall be heavy-duty, specification grade, unless noted otherwise.
- C. Wiring devices shall be "weather-resistant" type where installed in wet or damp locations.
 - 1. Marking: Listed and labeled as complying with NFPA 70, "Receptacles in Damp or Wet Locations" Article.
- D. Provide tamper-resistant wiring devices in all areas required by the National Electrical Code.
- E. Wiring devices shall be back and side wired, unless noted otherwise.
- F. Wiring Devices, Components, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
- G. Comply with NFPA 70.
- H. Comply with NEMA WD 1.
- I. Device and Wall Plate Colors:

The device and wall plate color combinations below are for all wiring devices served by the system indicated, unless otherwise specified here or on the drawings or required by NFPA.

 - 1. Normal Power System (standard device and wall plate color):
 - a. White device .

- J. Source Limitations: Obtain each type of wiring device and associated wall plate from single source from single manufacturer.

2.2 GENERAL-USE SWITCHES, DIMMER SWITCHES, AND FAN-SPEED CONTROLLER SWITCHES

A. General Requirements

- 1. All switches shall be rated 120/277V, 20A unless noted otherwise.
- 2. Switches shall have anti-microbial finish where indicated on drawings.
 - a. Description: Contact surfaces treated with a coating that kills 99.9 percent of certain common bacteria within two hours when regularly and properly cleaned.

B. Toggle Switch

- 1. Description: Single or double pole, three-way or four-way as indicated on drawings.
- 2. Reference Standards: UL CCN WMUZ and UL 20.

2.3 SPECIFICATION GRADE STRAIGHT-BLADE RECEPTACLES

A. Standard Receptacle

- 1. Simplex or duplex as indicated.
- 2. Description: Two pole, three wire, and self-grounding.c
- 3. Reference Standards: UL CCN RTRT and UL 498.
- 4. Configuration: NEMA WD 6, Configuration 5-20R.

B. Special Receptacles

- 1. Simplex, NEMA configuration as indicated on drawings.
- 2. Voltage and poles as required by indicated NEMA configuration.

2.4 RECEPTALCES WITH ARC-FAULT AND GROUND-FAULT PROTECTIVE DEVICES

A. General Requirements:

- 1. All GFCI receptacles shall be UL 498, UL 943 compliant.
 - a. Self-Test Function: Periodic, automatic testing of ground fault module. If test fails, receptacle shall deny power or provide visual and/or audible notification.
 - b. Line-Load Reversal Function: If line power is connected to load terminals, power to receptacle face shall be denied.
 - c. Trip Threshold: 5 mA plus or minus 1 mA, Class A.
 - d. Trip Time: 0.025 seconds.
 - e. Test and reset buttons. Indicator light to indicate tripped condition.
 - f. Automatic grounding feature.
- 2. Install in accordance with manufacturer's instructions.

B. Standard GFCI Receptacle

1. Duplex.
2. Configuration: NEMA WD 6, Configuration 5-20R.

2.5 LOCKING RECEPTACLES

A. Special Receptacles

1. Simplex, NEMA configuration as indicated on drawings.
2. Voltage and poles as required by indicated NEMA configuration.
3. Material and Color: Black nylon.
4. Description: Single-piece, rivetless, nickel-plated, all-brass grounding system. Nickel-plated, brass mounting strap. Automatic grounding feature.

B. CONNECTORS, CORDS, AND PLUGS

1. Cord and Plug Sets
 - a. Match voltage and current ratings and number of conductors to requirements of equipment being connected.
 - b. Cord: Rubber-insulated, stranded-copper conductors, with Type SOW-A jacket; with green-insulated grounding conductor and ampacity of at least 130 percent of the equipment rating.
 - c. Plug: Nylon body and integral cable-clamping jaws. Match cord and receptacle type for connection.

2.6 WALL PLATES

A. General Requirements

1. Single Source: Obtain wall plates from same manufacturer of wiring devices.
2. Single and combination types shall match corresponding wiring devices.
3. Plate-Securing Screws: Metal with head color to match plate finish.

B. Interior:

1. Material for Finished Spaces: 0.035-inch- thick, satin-finished, Type 302 stainless steel.
2. Material for Unfinished Spaces: Galvanized steel.
3. Material for Damp Locations: Cast aluminum with spring-loaded lift cover, and listed and labeled for use in wet and damp locations.

C. Wet-Location, Weatherproof Cover Plates: NEMA 250, complying with Type 3R, weather-resistant, impact-resistant polycarbonate with lockable cover.

1. NEMA 3R rating while in use, hinged cover clearly marked "Suitable for Wet Locations While in Use".
2. Gasketing between enclosure and mounting surface and between hinged cover and mounting plate/base.
3. Stainless steel mounting screws.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Receptacles:

1. Verify that receptacles to be procured and installed for Owner-furnished equipment are compatible with mating attachment plugs on equipment.

3.2 GENERAL INSTALLATION

A. Comply with NECA 1.

B. Owner, through Architect, reserves the right to move any outlet or stubbed-up conduit, a distance of twenty-five feet before roughing-in, without additional cost to Owner.

C. Coordination with Other Trades:

1. 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.
2. 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.
3. 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.
4. If the designated location of a switch or receptacle places it partially between two finishes, the actual location shall be adjusted to set the plate entirely on one finished surface only. Actual height shall not exceed mounting heights indicated herein or required by codes.
5. Outlet boxes for flush mounted wiring devices installed in masonry shall be installed so bottom of outlet box coincides with bottom of block or brick that is below specified mounting height, and actual height shall not exceed mounting heights indicated herein or required by code.
6. Install wiring devices after all wall preparation, including painting, is complete.

D. Conductors:

1. Do not strip insulation from conductors until right before they are spliced or terminated on devices.
2. 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.
3. The length of free conductors at outlets for devices shall comply with NFPA 70, Article 300, without pigtails.
4. Existing Conductors:
 - a. Straighten conductors that remain and remove corrosion and foreign matter.
 - b. Pigtailling existing conductors is permitted, provided the outlet box is large enough.

E. 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.

F. Receptacle Orientation:

1. Install ground pin of vertically mounted receptacles up, and on horizontally mounted receptacles to the right.

G. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical. Group adjacent switches under single, multigang wall plates.

H. Adjust locations of floor service outlets and service poles to suit arrangement of partitions and furnishings.

3.3 INSTALLATION OF GFCI RECEPTACLES

- A. Do not wire GFCI receptacles for downstream protection.
- B. Install GFCI receptacles in all locations where required by NFPA 70, even where not indicated on drawings.
- C. At a minimum, install GFCI receptacles, or receptacles protected by GFCI circuit breakers, in the following locations:
 1. All toilet rooms.
 2. Within six feet of any sink, lavatory, or mop receptor.
 3. Within twenty-five feet of all HVAC equipment as required by NFPA 70.
 4. All outdoor locations.
 5. All kitchens located in spaces defined as "other than dwelling units".

3.4 INSTALLATION OF SWITCHES

- A. Install switches with 'off' position down. Where multi-way switches are installed in a room, lights shall be off when all toggle switches are down.
- B. Locate switch outlets on strike side of door, unless otherwise indicated or unless building construction prohibits installation on strike side of door. Verify mounting location with Architect if mounting on strike side of door is not possible if alternate location is not indicated on drawings.

3.5 FIELD QUALITY CONTROL OF SWITCHES

A. Tests and Inspections:

1. Perform tests and inspections in accordance with manufacturers' instructions.

B. Nonconforming Work:

1. Unit will be considered defective if it does not pass tests and inspections.
2. Remove and replace defective units and retest.

C. Assemble and submit test and inspection reports.

3.6 FIELD QUALITY CONTROL OF STRAIGHT-BLADE RECEPTACLES

A. Tests and Inspections:

1. Insert and remove test plug to verify that device is securely mounted.
2. Verify polarity of hot and neutral pins.
3. Measure line voltage.
4. Measure percent voltage drop.
5. Measure grounding circuit continuity; impedance must be not greater than 2 ohms.

B. Nonconforming Work:

1. Device will be considered defective if it does not pass tests and inspections.
2. Remove and replace defective units and retest.

C. Assemble and submit test and inspection reports.

3.7 FIELD QUALITY CONTROL OF LOCKING RECEPTACLES

A. Tests and Inspections:

1. Insert and remove test plug to verify that device is securely mounted.
2. Verify polarity of hot and neutral pins.
3. Measure line voltage.
4. Measure percent voltage drop.
5. Measure grounding circuit continuity; impedance must be not greater than 2 ohms.
6. Perform additional installation and maintenance inspections and diagnostic tests in accordance with NECA NEIS 130 and manufacturers' instructions.

B. Nonconforming Work:

1. Device will be considered defective if it does not pass tests and inspections.
2. Remove and replace defective units and retest.

C. Assemble and submit test and inspection reports.

3.8 FIELD QUALITY CONTROL OF CORD REELS AND FITTINGS

A. Nonconforming Work:

1. Components and assemblies will be considered defective if they do not pass tests and inspections.
2. Remove and replace defective units and retest.

B. Assemble and submit test and inspection reports.

3.9 FIELD QUALITY CONTROL OF CONNECTORS, CORDS, AND PLUGS

A. Tests and Inspections:

1. Perform tests and inspections indicated in manufacturer's instructions.

B. Nonconforming Work:

1. Unit will be considered defective if it does not pass tests and inspections.
2. Remove and replace defective units and retest.

C. Assemble and submit test and inspection reports.

3.10 IDENTIFICATION

A. Comply with Section 26 05 53 "Identification for Electrical Systems." Identify each receptacle with panelboard identification and circuit number.

B. Essential Electrical System: Mark receptacles supplied from the essential electrical system to allow easy identification using a self-adhesive label.

3.11 PROTECTION

A. Devices:

1. Schedule and sequence installation to minimize risk of contamination of wires and cables, devices, device boxes, outlet boxes, covers, and cover plates by plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other materials.

B. Connectors, Cords, and Plugs:

1. After installation, protect connectors, cords, and plugs from construction activities. Remove and replace items that are contaminated, defaced, damaged, or otherwise caused to be unfit for use prior to acceptance by Owner.

END OF SECTION