

SECTION 26 27 26 WIRING DEVICES

PART 1 GENERAL

1.01 REFERENCES

A. The following is a list of standards which may be referenced in this section:

1. ASTM International (ASTM): A167, Standard Specification for Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
2. Federal Specifications (FS):
 - a. W-C-596G, General Specification for Connector, Electrical, Power.
 - b. W-S-896F, Switches, Toggle (Toggle and Lock), Flush Mounted (General Specification).
3. Institute of Electrical and Electronic Engineers, Inc. (IEEE):
 - a. C62.41.2, Recommended Practice on Characterization of Surges in Low-Voltage (1000V and less) AC Power Circuits.
 - b. C62.45, Recommended Practice on Surge Testing for Equipment Connected to Low-Voltage (1000V and less) AC Power Circuits.
4. National Electrical Contractors Association (NECA): 1, Standard Practice of Good Workmanship in Electrical Contracting.
5. National Electrical Manufacturers Association (NEMA):
 - a. 250, Enclosures for Electrical Equipment (1000 Volts Maximum).
 - b. FB 11, Plugs, Receptacles, and Connectors of the Pin and Sleeve Type for Hazardous Locations.
 - c. WD 1, General Color Requirements for Wiring Devices.
 - d. WD 6, Wiring Devices – Dimensional Specifications.
6. National Fire Protection Association (NFPA): 70, National Electrical Code (NEC).
7. UL:
 - a. 498, Standard for Safety for Attachment Plugs and Receptacles.
 - b. 508, Standard for Safety for Industrial Control Equipment.
 - c. 943, Standard for Safety for Ground-Fault Circuit-Interrupters.
 - d. 1010, Standard for Safety for Receptacle-Plug Combinations for Use in Hazardous (Classified) Locations.
 - e. 1436, Standard for Safety for Outlet Circuit Testers and Similar Indicating Devices.
 - f. 1449, Standard for Safety for Surge Protective Devices (SPD).

1.02 SUBMITTALS

A. Action Submittals: Manufacturer's product data for wiring devices.

PART 2 PRODUCTS

2.01 SWITCHES

A. Switch, General Purpose:

1. Manufacturers and Products:
 - a. Leviton; 1221 Series.
 - b. Or equal.
2. Physical Characteristics:
 - a. Color: White.
3. Functional Characteristics:
 - a. NEMA WD 1 and FS W-S-896F.
 - b. Totally enclosed, ac type, with quiet tumbler switch and screw terminal.
 - c. Rivetless one-piece brass or copper alloy contact arm with silver alloy contact.
 - d. Capable of controlling 100 percent tungsten filament and fluorescent lamp loads.
 - e. Rating: 20 amps, 120/277 volts.
 - f. Automatic grounding clip and integral grounding terminal on mounting strap.
 - g. Special Features:
 - 1) Provide the following features in comparable devices where indicated:
 - a) Three-way and four-way.
 - b) Three-position, maintained contact, center off.
4. Performance Characteristics: None.

B. Switch, Motor Rated:

1. Manufacturers:
 - a. Leviton.
 - b. Or equal.
2. Physical Characteristics:
 - a. Type: Two-pole or three-pole, manual motor starting/disconnect switch without overload protection.
3. Functional Characteristics:
 - a. UL 508 listed.
 - b. Totally enclosed snap-action switch. Quick-make, slow-break design with silver alloy contacts.
 - c. Minimum General-Purpose Rating: 30 amperes, 600V ac.
 - d. Screw-type terminal.

4. Performance Characteristics:
 - a. Minimum Motor Ratings:
 - 1) 2 hp for 120V ac, single-phase, 2-pole.
 - 2) 3 hp for 240V ac, single-phase, 2-pole.
 - 3) 15 hp for 480V ac, three-phase, 3-pole.

2.02 RECEPTACLES

A. Receptacle, General Purpose:

1. Manufacturers:
 - a. Leviton.
 - b. Or equal.
2. Physical Characteristics:
 - a. Duplex, 2-pole, 3-wire grounding type with screw type wire terminals.
 - b. Size: For 2-inch by 4-inch outlet box.
3. Functional Characteristics:
 - a. NEMA WD 1 and FS W-C-596G.
 - b. Impact resistant nylon cover and body, with finger grooves in face, unless otherwise indicated.
 - c. One-piece mounting strap with integral ground contact (rivetless construction).
 - d. Contact Arrangement: Contact to be made on two sides of each inserted blade without detent.
 - e. Rating: 125 volts, NEMA WD 1, Configuration 5-20R, 20 amps, unless otherwise indicated.
 - f. Special Features: Provide the following features in comparable devices where indicated:
 - 1) Listed weather-resistant per NEC 406.8 for installation in damp or wet locations.
4. Performance Characteristics: None.

B. Receptacle, Ground Fault Circuit Interrupter:

1. Manufacturers:
 - a. Leviton.
 - b. Or equal.
2. Physical Characteristics: Rectangular smooth face with push-to-test and reset buttons.

- 3. Functional Characteristics:
 - a. Meet requirements of general-purpose receptacle.
 - b. Listed Class A to UL 943, tripping at 5 mA.
 - c. Listed weather-resistant per NEC 406.8 for installation in damp or wet locations.
 - d. Feed-through Capability: 20 amps.
 - 4. Performance Characteristics: None.
- C. Receptacle, Corrosion-Resistant:
- 1. Manufacturers:
 - a. Leviton.
 - b. Or equal.
 - 2. Physical Characteristics: None.
 - 3. Functional Characteristics:
 - a. Meet requirements of general-purpose receptacle.
 - b. Nickel coated metal parts.
 - 4. Performance Characteristics: None.
- D. Receptacle, Special-Purpose:
- 1. Physical Characteristics:
 - a. Rating and number of poles as indicated or required for anticipated purpose.
 - b. Provide one matching plug with cord-grip features for each special-purpose receptacle.
 - 2. Functional Characteristics: None.
 - 3. Performance Characteristics: None.

2.03 TELEPHONE AND DATA JACK

- A. Manufacturers:
- 1. Leviton.
 - 2. Or equal.
- B. Physical Characteristics: None.
- C. Functional Characteristics:
- 1. Compatible with Category 6 cable, and backwards compatible with Category 5 and Category 5e.
 - a. High-impact thermoplastic body.
 - b. Termination Type:
 - 1) IDC with pair separation towers.
 - 2) Compatible with 110-style termination tool.

- c. Snap-on cap to secure connections.
- d. Listed UL 1863.

D. Performance Characteristics: None.

2.04 DEVICE PLATES

A. Plastic:

- 1. Physical Characteristics:
 - a. Color: To match associated wiring device.
- 2. Functional Characteristics:
 - a. Material: Specification grade, 0.10-inch minimum thickness, noncombustible, thermosetting.
 - b. Mounting Screw: Oval-head metal, color matched to plate.
 - c. Sectional type plate not permitted.
- 3. Performance Characteristics: None.

B. Stainless Steel:

- 1. Physical Characteristics: None.
- 2. Functional Characteristics:
 - a. Material: Specification grade, one-piece, 0.040-inch nominal thickness stainless steel.
 - b. Finish: ASTM A167, Type 302/304, satin.
 - c. Mounting Screw: Oval-head, finish matched to plate.
- 3. Performance Characteristics: None.

C. Cast Metal:

- 1. Physical Characteristics: None.
- 2. Functional Characteristics:
 - a. Material: Copper-free aluminum, with gaskets.
 - b. Screw: Oval-head stainless steel.
- 3. Performance Characteristics: None.

D. Sheet Steel:

- 1. Manufacturers:
 - a. Crouse-Hinds.
 - b. Or equal.
- 2. Physical Characteristics: None.
- 3. Functional Characteristics:
 - a. Finish: Zinc electroplate.
 - b. Screws: Oval-head stainless steel.
- 4. Performance Characteristics: None.

E. Weatherproof:

1. Manufacturers:
 - a. Crouse-Hinds.
 - b. Or equal.
2. Physical Characteristics: None.
3. Functional Characteristics:
 - a. Receptacle, Weatherproof Type 2:
 - 1) UL listed for wet location while in use.
 - 2) Die cast metal cover.
 - b. Switch:
 - 1) Gasketed, cast-metal or cast-aluminum, incorporating external operator for internal switch.
 - 2) Mounting Screw: Stainless steel.
4. Performance Characteristics: None.

F. Raised Sheet Steel:

1. Physical Characteristics: 1/2-inch high, designed for one-piece drawn type sheet steel box.
2. Functional Characteristics: Zinc- or cadmium-plated steel.
3. Performance Characteristics: None.

2.05 FINISHES

- A. Wiring devices specified in this section may not designate device color. Unless otherwise indicated, or required by code, provide colors as specified below.
- B. Wiring Device Connected to Normal Power System:
1. Office Areas: White.
 2. Other Areas: Gray.
- C. Wiring Device Connected to Uninterruptible Power System: Red except receptacle which shall be orange.
- D. Special purpose devices may be manufacturer's standard color.
- E. Corrosion-resistant receptacle may be manufacturer's standard color (yellow).

PART 3 EXECUTION

3.01 INSTALLATION, GENERAL

A. Comply with NECA 1.

B. Coordination with Other Trades:

1. Ensure device and its box are protected. Do not place wall finish materials over device box and do not cut holes for box with router that is guided by riding against outside of box.
2. Keep outlet box free of plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other material that may contaminate raceway system, conductors, and cables.
3. Install device box in brick or block wall such that cover plate does not cross a joint, unless otherwise indicated. Where indicated or directed to cross joint, trowel joint flush with face of wall.
4. Install wiring device after wall preparation, including painting, is complete.

C. Conductors:

1. Do not strip insulation from conductors until just before they are spliced or terminated on devices.
2. Strip insulation evenly around conductor using tools designed for the purpose. Avoid scoring or nicking of solid wire or cutting strands from stranded wire.
3. Length of free conductors at outlets for devices shall meet provisions of NFPA 70, Article 300, without pigtails.
4. Existing Conductors:
 - a. Cut back and pigtail or replace damaged conductors.
 - b. Straighten conductors that remain and remove corrosion and foreign matter.
 - c. Pigtailling existing conductors is permitted provided outlet box is large enough.

D. Device Installation:

1. Replace devices that have been in temporary use during construction or that show signs they 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 last possible moment.
4. Connect devices to branch circuits using pigtails that are not less than 6 inches (150 mm) in length.

5. Use torque screwdriver when a torque is recommended or required by manufacturer.
6. When conductors larger than 12 AWG are installed on 15-amp or 20-amp circuits, splice 12 AWG pigtails for device connections.
7. Tighten unused terminal screws on device.
8. Device Plates:
 - a. Do not use oversized or extra deep plate.
 - b. Repair wall finishes and remount outlet box when standard device plate does not fit flush or does not cover rough wall opening.

3.02 SWITCH INSTALLATION

A. Switch, General Purpose:

1. Mounting Height: See Section 26 05 33, Raceway and Boxes.
2. Install with switch operation in vertical position.
3. Install single-pole, two-way switch such that toggle is in up position when switch is on.

B. Switch, Motor Rated:

1. Mounting Height: See Section 26 05 33, Raceway and Boxes.
2. Install with switch operation in vertical position such that toggle is in up position when ON.
3. Install within sight of motor when used as disconnect switch.

C. Occupancy Sensor, Wall Switch: Install in accordance with manufacturer's instructions.

3.03 RECEPTACLE INSTALLATION

A. Duplex Receptacle:

1. Install with grounding slot down, except where horizontal mounting is shown, in which case install with neutral slot up.
2. Weatherproof Receptacle:
 - a. Install in cast metal box.
 - b. Install such that hinge for protective cover is above receptacle opening.
3. Ground Fault Interrupter: Install feed-through model at locations where ground fault protection is specified for "downstream" conventional receptacles.
4. Special-Purpose Receptacle: Install in accordance with manufacturer's instructions.

3.04 DEVICE PLATE INSTALLATION

- A. Securely fasten to wiring device; ensure tight fit to box.
- B. Flush Mounted: Install with all four edges in continuous contact with finished wall surface without use of mat or similar material. Plaster fillings will not be acceptable.
- C. Surface Mounted: Plate shall not extend beyond sides of box, unless plate has no sharp corners or edges.
- D. Install with alignment tolerance to box of 1/16 inch.
- E. Label with designated panel and circuit number:
 - 1. Printed:
 - a. Character Height: 1/8-inch.
 - b. Text: Black.
 - c. Background: White.
- F. Type (Exterior):
 - 1. Switch: Weatherproof.
 - 2. Receptacle in Damp Location: Weatherproof Type 1.
 - 3. Receptacle in Wet Location: Weatherproof Type 2.
- G. Type (Interior):
 - 1. Office Areas: Nylon.
 - 2. Other Areas: Nylon.
 - 3. Flush Mounted Box: Nylon.
 - 4. Surface Mounted, Metal Box:
 - a. General Purpose Areas (Dry, Non-process): Sheet Steel.
 - b. Other Areas: Cast metal.
 - 5. Surface Mounted, Aluminum Box:
 - a. General Purpose Areas: Stamped.
 - b. Other Areas: Cast metal.
 - 6. Surface Mounted, Sheet Steel Box: Raised sheet steel.
 - 7. Surface Mounted, Cast Box: Cast.
 - 8. Surface Mounted, Nonmetallic Box: Manufacturer's standard.
 - 9. Receptacle Shown as Weatherproof on the Drawings: Weatherproof Type 1.

3.05 IDENTIFICATION

- A. Use tape labels for identification of individual wall switches and receptacles in dry indoor locations:
 - 1. Degrease and clean device plate surface to receive tape labels.
 - 2. Use 3/16-inch Kroy black letters on white background, unless otherwise indicated.
 - 3. Identify panelboard and circuit number from which item is served on face of plate.
- B. Identify conductors with durable wire markers or tags inside outlet boxes.

3.06 FIELD QUALITY CONTROL

- A. Perform tests and inspections and prepare test reports.
- B. Test Instrument for 125-Volt 20-Amp Receptacle: Digital wiring analyzer with digital readout or illuminated LED indicators of measurement.
- C. Using test plug, verify device and its outlet box are securely mounted.
- D. Line Voltage Range: 105 volts to 132 volts.
- E. Percent Voltage Drop under 15-Amp Load: Less than 6 percent; 6 percent or higher is not acceptable.
- F. Ground Impedance: 2 ohms, maximum.
- G. GFCI Trip: Test for tripping values specified in UL 1436 and UL 943.
- H. Tests shall be diagnostic, indicating damaged conductors, high resistance at 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.

END OF SECTION