

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. This Section includes the following:
 - 1. Receptacles, receptacles with integral GFCI, and associated device plates.
 - 2. Twist-locking receptacles.
 - 3. Wall-box motion sensors.
 - 4. Isolated-ground receptacles.
 - 5. Hospital-grade receptacles.
 - 6. Snap switches and wall-box dimmers.
 - 7. Wall-switch and exterior occupancy sensors.
 - 8. Floor service outlets, poke-through assemblies, service poles, and multioutlet assemblies.

1.3 DEFINITIONS

- A. EMI: Electromagnetic interference.
- B. GFCI: Ground-fault circuit interrupter.
- C. Pigtail: Short lead used to connect a device to a branch-circuit conductor.
- D. RFI: Radio-frequency interference.
- E. TVSS: Transient voltage surge suppressor.
- F. UTP: Unshielded twisted pair.

1.4 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: List of legends and description of materials and process used for premarking wall plates.

- C. Samples: One for each type of device and wall plate specified, in each color specified.
- D. Field quality-control test reports.
- E. Operation and Maintenance Data: For wiring devices to include in all manufacturers' packing label warnings and instruction manuals that include labeling conditions.

1.5 QUALITY ASSURANCE

- A. Source Limitations: Obtain each type of wiring device and associated wall plate through one source from a single manufacturer. Insofar as they are available, obtain all wiring devices and associated wall plates from a single manufacturer and one source.
- B. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- C. Comply with NFPA 70.

1.6 COORDINATION

- A. Receptacles for Owner-Furnished Equipment: Match plug configurations.
 - 1. Cord and Plug Sets: Match equipment requirements.

1.7 EXTRA MATERIALS

- A. Furnish extra materials described in subparagraphs below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Poke-Through, Fire-Rated Closure Plugs: One for every five floor service outlets installed, but no fewer than two.
 - 2. Receptacles and switches: One for every 10 of each type installed, but no fewer than two of each type.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers' Names: Shortened versions (shown in parentheses) of the following manufacturers' names are used in other Part 2 articles:

1. Hubbell Incorporated; Wiring Device-Kellems (Hubbell).
2. Leviton Mfg. Company Inc. (Leviton).
3. Pass & Seymour/Legrand; Wiring Devices & Accessories (Pass & Seymour).

2.2 STRAIGHT BLADE RECEPTACLES

- A. Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 configuration 5-20R, and UL 498.
 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Hubbell; HBL5351 (single), CR5352 (duplex).
 - b. Leviton; 5891 (single), 5352 (duplex).
 - c. Pass & Seymour; 5381 (single), 5352 (duplex).
- B. Hospital-Grade, Duplex Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 configuration 5-20R, and UL 498 Supplement SD.
 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Hubbell; HBL8310 (single), HBL8300H (duplex).
 - b. Leviton; 8310 (single), 8300 (duplex).
 - c. Pass & Seymour; 9301-HG (single), 9300-HG (duplex).
- C. Tamper-Resistant Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 configuration 5-20R, and UL 498.
 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Hubbell; HBL8300SG.
 - b. Leviton; 8300-SGG.
 - c. Pass & Seymour; 63H.
 2. Description: Labeled to comply with NFPA 70, "Health Care Facilities" Article, "Pediatric Locations" Section.

2.3 GFCI RECEPTACLES

- A. General Description: Straight blade, non-feed-through type. Comply with NEMA WD 1, NEMA WD 6, UL 498, and UL 943, Class A, and include indicator light that is lighted when device is tripped.

- B. Hospital-Grade, Duplex GFCI Convenience Receptacles, 125 V, 20 A: Comply with UL 498 Supplement SD.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Hubbell; HGF8300.
 - b. Leviton; 6898-HG.
 - c. Pass & Seymour; 2091-SHG.

2.4 TWIST-LOCKING RECEPTACLES

- A. Single Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 configuration L5-20R, and UL 498.
 - 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 - 2. Products: Subject to compliance with requirements, provide one of the following:
 - a. Hubbell; HBL2310.
 - b. Leviton; 2310.
 - c. Pass & Seymour; L520-R.

2.5 TOGGLE SWITCHES

- A. Comply with NEMA WD 1 and UL 20.
- B. Switches, 120/277 V, 20 A:
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Hubbell; CS1221 (single pole), CS1222 (two pole), CS1223 (three way), CS1224 (four way).
 - b. Leviton; 1221-2 (single pole), 1222-2 (two pole), 1223-2 (three way), 1224-2 (four way).
 - c. Pass & Seymour; 20AC1 (single pole), 20AC2 (two pole), 20AC3 (three way), 20AC4 (four way).

C. Pilot Light Switches, 20 A:

1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Hubbell; HPL1221PL for 120 V and 277 V.
 - b. Leviton; 1221-PLR for 120 V, 1221-7PLR for 277 V.
 - c. Pass & Seymour; PS20AC1-PLR for 120 V.
2. Description: Single pole, with neon-lighted handle, illuminated when switch is "ON."

D. Key-Operated Switches, 120/277 V, 20 A:

1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Hubbell; HBL1221L.
 - b. Leviton; 1221-2L.
 - c. Pass & Seymour; PS20AC1-L.
2. Description: Single pole, with factory-supplied key in lieu of switch handle.

E. Single-Pole, Double-Throw, Momentary Contact, Center-Off Switches, 120/277 V, 20 A; for use with mechanically held lighting contactors.

1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Hubbell; HBL1557.
 - b. Leviton; 1257.
 - c. Pass & Seymour; 1251.

2.6 WALL-BOX DIMMERS

- A. Dimmer Switches: Modular, full-wave, solid-state units with integral, quiet on-off switches, with audible frequency and EMI/RFI suppression filters.
- B. Control: Continuously adjustable slider; with single-pole or three-way switching. Comply with UL 1472.
- C. Incandescent Lamp Dimmers: 120 V; control shall follow square-law dimming curve. On-off switch positions shall bypass dimmer module.
 1. 600 W; dimmers shall require no derating when ganged with other devices. Illuminated when "OFF."

- D. Fluorescent Lamp Dimmer Switches: Modular; compatible with dimmer ballasts; trim potentiometer to adjust low-end dimming; dimmer-ballast combination capable of consistent dimming with low end not greater than 20 percent of full brightness.

2.7 OCCUPANCY SENSORS

A. Wall-Switch Sensors:

1. Products: Subject to compliance with requirements, provide one of the manufacturers' as indicated on the legend.
2. Description: Dual technology, with both passive-infrared- and ultrasonic-type sensing, 120/277 V, adjustable time delay up to 30 minutes, 110-degree field of view, and a minimum coverage area of 1200 sq. ft. (111 sq. m).

2.8 WALL PLATES

A. Single and combination types to match corresponding wiring devices.

1. Plate-Securing Screws: Metal with head color to match plate finish.
2. Material for Finished Spaces: 0.035-inch- (1-mm-) thick, satin-finished stainless steel.
3. Material for Unfinished Spaces: Galvanized steel.
4. Material for Damp Locations: Cast aluminum with spring-loaded lift cover, and listed and labeled for use in "wet locations."

B. Wet-Location, Weatherproof Cover Plates: NEMA 250, complying with type 3R weather-resistant with rain tight while in use covers.

C. Coordinate colors and material with Architect.

2.9 FLOOR SERVICE FITTINGS

A. Type: Modular, flush-type, dual-service units suitable for wiring method used.

B. Compartments: Barrier separates power from voice and data communication cabling.

C. Service Plate: Rectangular and round, die-cast aluminum with satin finish.

D. Power Receptacle: NEMA WD 6 configuration 5-20R, gray finish, unless otherwise indicated.

E. Voice and Data Communication Outlet: Two modular, keyed, color-coded, RJ-45 Category 6e jacks for UTP cable. Coordinate with Telcom drawings and specifications.

- F. Coordinate all finishes, materials and colors with architect.

2.10 POKE-THROUGH ASSEMBLIES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Hubbell Incorporated; Wiring Device-Kellems.
 - 2. Pass & Seymour/Legrand; Wiring Devices & Accessories.
 - 3. Wiremold Company (The).
- B. Description: Factory-fabricated and -wired assembly of below-floor junction box with multichanneled, through-floor raceway/firestop unit and detachable matching floor service outlet assembly.
 - 1. Service Outlet Assembly: Flush type with four simplex receptacles and space for four RJ-45 jacks.
 - 2. Size: Selected to fit nominal 4-inch (100-mm) cored holes in floor and matched to floor thickness.
 - 3. Fire Rating: Unit is listed and labeled for fire rating of floor-ceiling assembly.
 - 4. Closure Plug: Arranged to close unused 4-inch (100-mm) cored openings and reestablish fire rating of floor.
 - 5. Wiring Raceways and Compartments: For a minimum of four No. 12 AWG conductors and a minimum of four, 4-pair, Category 6e voice and data communication cables.

2.11 MULTIOUTLET ASSEMBLIES

- A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - 1. Hubbell Incorporated; Wiring Device-Kellems.
 - 2. Wiremold Company (The).
- B. Components of Assemblies: Products from a single manufacturer designed for use as a complete, matching assembly of raceways and receptacles.
- C. Raceway Material: Aluminum.
- D. Wire: No. 12 AWG.

2.12 FINISHES

- A. Color: Wiring device catalog numbers in Section Text do not designate device color.
 - 1. Wiring Devices Connected to Normal Power System: As selected by Architect (White), unless otherwise indicated or required by NFPA 70 or device listing.

2. Wiring Devices Connected to Emergency Power System: Red.
3. TVSS Devices: Blue.
4. Isolated-Ground Receptacles: Orange.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Comply with NECA 1, including the mounting heights listed in that standard, unless otherwise noted.
- B. Coordination with Other Trades:
 1. Take steps to insure that devices and their boxes are protected. 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 the 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. Install wiring devices after all 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 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 meet provisions of NFPA 70, Article 300, without pigtails.
 4. Existing Conductors:
 - a. Cut back and pigtail, or replace all damaged conductors.
 - b. Straighten conductors that remain and remove corrosion and foreign matter.
 - c. Pigtail existing conductors is permitted provided the outlet box is large enough.
- D. Device Installation:
 1. Replace all devices that have been in temporary use during construction or that show signs that 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 the last possible moment.
4. Connect devices to branch circuits using pigtails that are not less than 6 inches (152 mm) in length.
5. When there is a choice, use side wiring with binding-head screw terminals. Wrap solid conductor tightly clockwise, 2/3 to 3/4 of the way around terminal screw.
6. Use a torque screwdriver when a torque is recommended or required by the 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.

E. Receptacle Orientation:

1. Install ground pin of vertically mounted receptacles up, and on horizontally mounted receptacles to the right.
2. Install hospital-grade receptacles in patient-care areas with the ground pin or neutral blade at the top.

F. 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.

G. Dimmers:

1. Install dimmers within terms of their listing.
2. Verify that dimmers used for fan speed control are listed for that application.
3. Install unshared neutral conductors on line and load side of dimmers according to manufacturers' device listing conditions in the written instructions.

H. 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.

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

3.2 IDENTIFICATION

A. Comply with Division 26 Section "Identification for Electrical Systems."

1. Receptacles: Identify panelboard and circuit number from which served. Use hot, stamped or engraved machine printing with black-filled lettering on face of plate, and durable wire markers or tags inside outlet boxes.

3.3 FIELD QUALITY CONTROL

- A. Perform tests and inspections and prepare test reports.
 - 1. In healthcare facilities, prepare reports that comply with recommendations in NFPA 99.
 - 2. Test Instruments: Use instruments that comply with UL 1436.
 - 3. Test Instrument for Convenience Receptacles: Digital wiring analyzer with digital readout or illuminated LED indicators of measurement.

- B. Tests for Convenience Receptacles:
 - 1. Line Voltage: Acceptable range is 105 to 132 V.
 - 2. Percent Voltage Drop under 15-A Load: A value of 6 percent or higher is not acceptable.
 - 3. Ground Impedance: Values of up to 2 ohms are acceptable.
 - 4. GFCI Trip: Test for tripping values specified in UL 1436 and UL 943.
 - 5. Using the test plug, verify that the device and its outlet box are securely mounted.
 - 6. The 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.

- C. Test straight blade hospital-grade convenience outlets for the retention force of the grounding blade according to NFPA 99. Retention force shall be not less than 4 oz. (115 g).

END OF SECTION