

SECTION 16143 - WIRING DEVICES

PART 1 - GENERAL

1.1 SUMMARY:

- A. The extent of wiring device work is indicated by drawings and schedules. Wiring devices are defined as single discrete units of electrical distribution systems which are intended to carry but not utilize electric energy.
- B. Types of electrical wiring devices in this section include the following:
 - 1. Receptacles.
 - 2. Ground-fault circuit interrupters.
 - 3. Switches.
 - 4. Wallplates.
 - 5. Dimmers.
 - 6. Plugs and connectors.
 - 7. Concrete floor boxes
 - 8. Poke-through assemblies.
 - 9. Telephone/power poles.
 - 10. Access floor boxes.
 - 11. Transient Voltage Surge Suppressor Receptacles.

1.2 QUALITY ASSURANCE:

- A. Manufacturers: Firms regularly engaged in manufacture of electrical wiring devices, of types, sizes, and ratings required, whose products have been in satisfactory use in similar service for not less than 3 years.
- B. Installer's Qualifications: Firm with at least 2 years of successful installation experience on projects utilizing wiring devices similar to those required for this project.
- C. Listing and Labeling: Provide products that are listed and labeled for their applications and installation conditions and for the environments in which installed.
 - 1. The Terms "Listed" and "Labeled": As defined in the "National Electrical Code", Article 100.
 - 2. Listing and Labeling Agency Qualifications: A "Nationally Recognized Testing Laboratory" (NRTL) as defined in OSHA Regulation 1910.7.

1.3 SUBMITTALS:

- A. Product Data: Submit manufacturer's data on electrical wiring devices.

- B. Samples of device plates for color selection and evaluation of technical features shall be submitted.
 - C. Operation and maintenance data for materials and products specified in this Section to include in the "Operating and Maintenance Manual" specified in Division 1.
- 1.4 COORDINATION:
- A. Wiring Devices for Owner Furnished Equipment: Match devices to plug connectors for Owner-furnished equipment.
 - B. Cord and Plug sets: Match cord and plug sets to equipment requirements.
- 1.5 EXTRA MATERIALS:
- A. Furnish the following extra materials, packaged with protective covering for storage, and identified with labels describing contents. Deliver extra materials to the Owner.
 - 1. Telephone/Power Service Poles: 1 for each 10, but not less than 1.
 - 2. Floor Service Outlet Assemblies: 1 for each 10, but not less than 1.
 - 3. Poke-through Fire-Rated Closure Plugs: 1 for each 5 floor service outlets installed, but not less than 2.
 - 4. Transient-Voltage Surge-Suppressor Receptacles: 1 for each 8 installed, but not less than 2.

PART 2 - PRODUCTS

- 2.1 ACCEPTABLE MANUFACTURERS:
- A. Manufacturers: Subject to compliance with requirements, provide wiring devices of one of the following:
 - 1. Devices:
 - a. Harvey Hubbell Inc.
 - b. Leviton Mfg Co.
 - c. Pass and Seymour Inc.
 - d. Cooper Crouse-Hinds Co.
 - e. Bryant Electric Co.
 - f. General Electric Co.
 - 2. Concrete Floor Boxes:
 - a. Walker
 - b. Harvey Hubbell Inc.
 - c.
 - 3. Access Floor Boxes:
 - a. Raceway Components
 - b. Donn
 - c. Walker

- d. Midland Ross
 - e. Tate
4. Wiring Devices for Hazardous (Classified) Locations:
- a. Crouse-Hinds Electrical Construction.
 - b. Killark Electrical Mfg. Co.
 - c. Pyle-National Co.
5. Poke-Through, Floor Service Outlets, and Telephone/Power Poles:
- a. American Electric
 - b. Hubbell, Inc.
 - c. Pass & Seymour/LeGrand
 - d. Square D Co.
 - e. Walker Div., Butler Mfg. Co.
 - f. Wiremold Co.

2.2 WIRING DEVICES:

A. Receptacles:

1. All duplex, single, and special receptacles shall be heavy duty, specification grade, listed by Underwriter's Laboratories, have a metal mounting strap with self-grounding and have a hex-head green grounding screw and be side and back wired. Each device shall bear the UL/FS Label.
 - a. Each device shall have terminal screws and clamps listed for use with stranded wire.
2. Convenience Receptacle Configuration: NEMA WD 1; Type 5-20R, with ivory nylon face. All receptacles connected to emergency circuits (when applicable) shall have a red face. Color selection shall be verified with Architect/Engineer prior to ordering.
3. Specific-use Receptacle Configuration: NEMA WD 1; straight blade OR WD 5 locking; as indicated on drawings, black face.
4. Safety Receptacles: Duplex receptacle with integral switch and contacts to prevent energizing unless a plug is inserted. Specification grade nylon face, ivory for normal, red for emergency (when applicable).
5. Ground-Fault Interrupter Receptacles: Provide "feed-thru" type ground-fault circuit interrupters, with integral heavy-duty NEMA 5-20R duplex receptacles, capable of protecting connected downstream receptacles on same circuit. Provide unit capable of being installed in a 2-3/4" deep outlet box without adapter, grounding type, Class A, Group 1 per UL Standard 943.
6. Clock Outlet: Single NEMA 5-15P side wired plug mounted in a recessed faceplate with metal hook which permits clock to be flush mounted on wall.
7. Transient-Voltage Surge-Suppressor (TVSS) Receptacles: Duplex type, NEMA 5-20R configuration with integral transient-voltage surge protection in a minimum of 3 modes: line-to-ground, line-to-neutral, neutral-to-ground; listed as complying with UL Standard 1449 "Transient Voltage Surge Suppressors."

- a. Surge Protection Components: Multiple metal-oxide varistors, rated for 500 V transient suppression voltage nominal clamp level and minimum single transient pulse energy dissipation of 140 J, line-to-neutral, and 70 J, line-to-ground and neutral-to-ground.
 - b. Active Protection Indication: A light visible in the face of the device indicates the state of the device as "active" or "inactive."
 - c. Identification: Distinctive marking on face of device denotes transient-voltage surge-suppressor type unit.
8. Receptacles, Industrial Heavy-Duty: Conform to NEMA Standard PK 4 "Plugs, Receptacles, and Cable Connectors of the Pin and Sleeve Type for Industrial Use."
 9. Receptacles in Hazardous (Classified) Locations: Comply with NEMA Standard FB 11 "Plugs, Receptacles and Connectors on the Pin and Sleeve Type for Hazardous Locations" and UL Standard 1010 "Receptacle-Plug Combinations for Use in Hazardous (Classified locations)."
 10. Pendant Cord/Connector Devices: Matching, locking type, cord and plug receptacle body connector, NEMA L5-20P and L5-20R, heavy-duty grade.
 - a. Bodies: Nylon with screw-open, cable-gripping jaws and provision for attaching external cable grip.
 - b. External Cable Grip: Woven wire mesh type made of high strength galvanized-steel wire strand and matched to cable diameter with attached provision for the corresponding connector.
 11. Cord and Plug Sets: Match voltage and current ratings and number of conductors to requirements of the equipment being connected.
 - a. Cord: Rubber-insulated, stranded copper conductors, with type-SOW-A jacket. Grounding conductor has green insulation. Ampacity is equipment rating plus 30%, minimum.
 - b. Plug: Male configuration with nylon body and integral cable-clamping jaws. Match to cord and receptacle type intended for connection.
- B. Switches:
1. Wall Switches for Lighting Circuits: NEMA WD1; FS W-S-896E; AC quiet type specification grade listed by Underwriter's Laboratories with toggle handle, rated 20 amperes at 120-277 volts AC, unless noted otherwise. Mounting straps shall be metal and be equipped with a green hex-head ground screw. Each switch shall bear the UL/FS Label.
 - a. Each device shall have terminal screws and clamps listed for use with stranded wire.
 2. Handle: Ivory for normal power circuits, red for emergency power circuits (when applicable). Verify color with Architect/Engineer prior to ordering.
 3. Pilot Light Type: Lighted handle lit when switch is "on."

4. Locator Type: Continuously lighted handle.
 5. Switches in Hazardous (Classified) Locations: Comply with UL Standard 894, "Switches for Use in Hazardous (Classified) Locations."
- C. Combination Devices: Provide heavy-duty quiet type switch, 20-amperes, 120-277 volts AC, with toggle switch handle, and 3-wire grounding receptacle, 20-amperes, 120- volts, in a common 4 inch square box.
- D. Incandescent Lamp Dimmers: Provide branch lighting solid-state AC dimmer controls for incandescent lighting; wattage as indicated, 120-volts, 60-Hz, with continuously adjustable slide dimmer, white nylon face, and single-pole with integral ON-OFF switch. Equip with electromagnetic filters to eliminate noise, RF and TV interference, and with 5-inch wire connecting leads. Dimmer shall be Lutron Nova "T" Star NT-Series for single pole and NTB/NTA Series for 3-way dimming with NTETS-R electronic touch switch for auxiliary ON-OFF control. Low voltage dimmer shall be NTLV Series.
- E. Fluorescent Lamp Dimmers: Provide single-pole, full-wave semi-conductor modular type AC dimmers for fluorescent lamps; wattage and voltage as indicated, and with electromagnetic filters to reduce noise, RF and TV interference to minimum. Construct with continuously adjustable trim potentiometer for adjustment of low dimming; and with anodized heat sinks. Provide 5-inch wire connecting leads. Dimmers shall be Lutron Nova "T" Star.

2.3 WIRING DEVICE ACCESSORIES:

- A. Wallplates: Provide wallplates for single and combination wiring devices, of types, sizes, and with ganging and cutouts as indicated. Select plates which mate and match wiring devices to which attached. Install with metal screws for securing plates to devices; screw heads colored to match finish of plates. Identify all wall plates used for receptacles with branch circuit number per requirements of section on Electrical Identification. Provide blank wall plates for all cable, data, telephone and junction and outlet boxes. Where cables are routed through the wallplate, provide grommets in wallplate openings to protect cables. Provide plates possessing the following additional construction features:
1. Material and Finish: 0.04" thick, type 302 satin finished stainless steel in kitchens, laboratories, restrooms, etc.
 2. Material and Finish: Steel plate, galvanized for use in unfinished areas, mechanical, and electrical rooms.
 3. Material and Finish: Nylon, smooth for plates in offices, classrooms, conference rooms, etc.
- B. Concrete Floor Box: Provide modular floor service outlets and fittings of types and ratings indicated. Construct of die cast aluminum, satin finish. Use design compatible with floor type and outlet wiring methods indicated. Provide 20-amperes, 125-volts, back-to-back duplex receptacles, NEMA configuration 5-20R. Provide with 1" NPT, 1" long, locking nipple for installation.
- C. Poke-Through Assembly Devices: Factory-fabricated poke-through assembly devices with modular service outlets, multi-channeled thru-floor raceway/fire stop assembly and below-floor junction box assembly. Construct service fitting of die cast, satin finished aluminum with 20-ampere 120-volts, gray duplex NEMA 5-20R receptacle and modular communication/ data service outlet with separation barrier between power and low-tension section. Provide integral assembly UL listed as a total unit, with fire rating consistent with that of floor penetrated.

- D. Telephone/Power Poles: Provide factory-assembled telephone/power poles of types, sizes and ratings indicated; for use with telephone, data, and power systems installed above suspended ceilings. Construct with provisions for two 50-pair telephone cables, two data outlets and cables, and 2, 20-amperes, 125-volts, 3-wire duplex receptacles. Isolate power section from telephone compartment with separating steel enclosure. Extend wiring from receptacles to junction box at top of pole where connections are made above suspended ceiling. Provide pole foot with carpet pad; provide ceiling trim plate. Provide finish treatment and color as selected by Architect/Engineer.

PART 3 - EXECUTION

3.1 INSTALLATION OF WIRING DEVICES:

- A. Install wiring devices as indicated, in accordance with manufacturer's written instructions, applicable requirements of NEC and in accordance with recognized industry practices to fulfill project requirements.
- B. Coordinate with other work, including painting, electrical boxes and wiring work, as necessary to interface installation of wiring devices with other work.
- C. Install wiring devices only in electrical boxes which are clean; free from excess building materials, dirt, and debris.
- D. Install wiring devices after wiring work is completed.
- E. Install wallplates after painting work is completed.
- F. Tighten connectors and terminals, including screws and bolts, in accordance with equipment manufacturers published torque values for wiring devices. Where manufacturer's torque requirements are not indicated, tighten connectors and terminals to comply with torque values specified in UL Standards 486A.
- G. Install telephone/power service poles in accordance with final furnishing arrangement. Poles shall be plumb, true, and secure.
- H. Provide GFCI type outlets for each above counter duplex receptacle shown within 6 feet-0 inches of sinks/lavatories. For above counter multi-outlet assemblies which do not contain duplex receptacles that can be replaced with GFCI devices, provide GFI circuit breakers on the branch circuit(s) feeding the assembly.
- I. Provide safety type receptacles in areas indicated on drawings (when applicable).
- J. Provide GFCI receptacles throughout in kitchens and at vending machines.

3.2 PROTECTION OF WALLPLATES AND RECEPTACLES:

- A. Upon installation of wallplates and receptacles, advise Contractor regarding proper and cautious use of convenience outlets. At time of Substantial Completion, replace those items which have been damaged, including those burned and scored by faulty plugs.

3.3 GROUNDING:

- A. Provide equipment grounding connections for wiring devices, unless otherwise indicated. Tighten connections to comply with torque values specified in UL Std 486A to assure permanent and effective grounds.

3.4 CLEANING:

- A. Internally clean devices, device outlet boxes and enclosures. Replace stained or improperly painted wall plates or devices.

3.5 TESTING:

- A. Prior to energizing circuitry, test wiring for electrical continuity, and for short-circuits. Ensure proper polarity of connections is maintained. Subsequent to energizing, test wiring devices to demonstrate compliance with requirements. Operate each operable device at least six (6) times.
- B. Test ground fault interrupter operation with both local and remote fault simulations in accordance with manufacturer recommendations.
- C. TVSS receptacle indicating lights for normal indication check.
- D. Replace damaged or defective components.

END OF SECTION 16143