CITY OF FORT WAYNE MASTER UPDATED: 11/16/18

SECTION 26 27 26

WIRING DEVICES

1. GENERAL
	1. DESCRIPTION
		1. Scope:
			1. Contractor shall provide all labor, materials, equipment, and incidentals as shown, specified, and required to furnish and install wiring devices.
			2. Section includes:
				1. Straight-blade Devices, 125 V, 20 A.
				2. GFCI Receptacles, 125 V, 20A.
				3. Hazardous (classified) Location Receptacles.
				4. Twist-locking Receptacles.
				5. Pendant Cord-Connector Devices.
				6. Cord and plug sets.
				7. Toggle switches, 120/277 V, 20 A.
				8. Wall-box dimmers.
				9. Wall plates.
		2. Coordination:
			1. Review installation procedures under other Sections and coordinate installation of items to be installed with or before Wiring Devices.
		3. Related Sections:

NTS: List below only sections covering products, construction, and equipment specifically identified in this section and specified in another section and directly referenced in this specification. Do not list administrative and procedural division 01 sections.

* + - 1. Section 26 05 05, General Provisions for Electrical Systems.
			2. Section 26 05 19, Low-Voltage Electrical Power Conductors and Cables.
			3. Section 26 05 26, Grounding and Bonding for Electrical Systems.
			4. Section 26 05 33, Raceways and Boxes for Electrical Systems.
			5. Section 26 05 53, Identification for Electrical Systems.
	1. REFERENCES
		1. Definitions referenced in this Section are:
			1. Abbreviations of Manufacturers' Names:
				1. Eaton: Eaton; Arrow-Hart Wiring Devices.
				2. Hubbell: Hubbell Incorporated; Hubbell Wiring Devices-Kellems.
				3. Leviton: Leviton Mfg. Company, Inc.
				4. P & S: Pass & Seymour/Legrand.
		2. Standards referenced in this Section are:
			1. FS – Federal Specifications:
				1. FS WC-596, Electrical Power Connector, Plug, Receptacle, and Cable Outlet.
				2. FS W-S-896-E, Switch, Toggle
			2. UL 498, Standard for Attachment Plugs and Receptacles
			3. ULK 1682, Plugs, Receptacles, and Cable Connectors of the Pin and Sleeve Type
			4. NEMA WD 1, General Color Requirements for Wiring Devices.
			5. NEMA OS 3, Selection and Installation Guidelines for Electrical Outlet Boxes.
			6. NEMA WD 6, Wiring Devices – Dimensional Requirements.
			7. NEMA FB 11, Plugs, Receptacles and Connectors of the Pin and Sleeve Type for Hazardous Locations.
			8. NFPA 70, National Electrical Code.
	2. DEFINITIONS
		1. Definitions referenced in this Section are:
			1. BAS: Building automation system.
			2. EMI: Electromagnetic interference.
			3. GFCI: Ground-fault circuit interrupter.
			4. Pigtail: Short lead used to connect a device to a branch-circuit conductor.
			5. RFI: Radio-frequency interference.
			6. SPD: Surge protective device.

NTS: Edit article “1.4” below to suit the Project. DO NOT DELETE (NOT USED) ITEMS.

* 1. SUBMITTALS
		1. Action Submittals: Submit the following:
			1. Product Data
				1. For each type of product.
			2. Shop Drawings (NOT USED)
			3. Samples (NOT USED)
		2. Informational Submittals: (NOT USED)
			1. Certificates (NOT USED)
			2. Delegated Design Submittal (NOT USED)
			3. Test and Evaluation Reports
				1. Results of required Test and Evaluation Reports.
			4. Manufacturers’ Instructions (NOT USED)
			5. Source Quality Control Submittals (NOT USED)
			6. Field Quality Control Submittals (NOT USED)
			7. Manufacturer Reports (NOT USED)
			8. Sustainable Design Submittals (NOT USED)
			9. Special Procedure Submittals (NOT USED)
			10. Qualifications Statements (NOT USED)
		3. Closeout Submittals
			1. Maintenance Contracts (NOT USED)
			2. Operation and Maintenance Data:
				1. Submit complete installation, operation and maintenance manuals including all manufacturer’s packing-label warnings and instruction manuals that include labeling conditions.
			3. Bonds (NOT USED)
			4. Warranty Documentation (NOT USED)
			5. Record Documentation (NOT USED)
			6. Sustainable Design Closeout (NOT USED)
			7. Software (NOT USED)
		4. Maintenance Material Submittals (NOT USED)
			1. Spare Parts (NOT USED)
			2. Extra Stock Materials (NOT USED)
			3. Tools (NOT USED)
	2. QUALITY ASSURANCE
		1. Regulatory Requirements:

NTS: Retain applicable regulations and add others as required.

* + - 1. National Electrical Code (NEC): Components and installation shall comply with National Fire Protection Association (NFPA) 70.
		1. Manufacturer:
			1. Manufacturer shall have not less than five years of experience producing substantially similar equipment to that required and, upon request, shall submit documentation of not less than five installations in satisfactory operation for not less than five years in the United States.
			2. Wiring Devices and Wall Plates shall be product of a single manufacturer.
	1. DELIVERY, STORAGE, AND HANDLING
		1. Deliver materials to site in unopened cartons or bundles as appropriate, clearly identified with manufacturer's name, Underwriter's or other approved label, grade or identifying number.
		2. Store in a clean, dry space. Maintain factory wrapping or provide an additional heavy canvas or heavy plastic cover to protect units from dirt, water, construction debris, and traffic.
1. –products
	1. manufacturers
		1. Subject to compliance with requirements, provide products by the following:
			1. Eaton
			2. Hubbell
			3. Leviton
			4. P & S
		2. The listing of specific manufacturers above does not imply acceptance of their products that do not meet the specified ratings, features and functions. Manufacturers listed above are not relieved from meeting these specifications in their entirety.
	2. general wiring-device requirements
		1. Wiring Devices, Components, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
		2. Comply with NFPA 70.
		3. Comply with NEMA WD 1.
		4. Devices that are manufactured for use with modular plug-in connectors may be substituted under the following conditions:
			1. Connectors shall comply with UL 2459 and shall be made with stranded building wire.
			2. Devices shall comply with the requirements of this Section.
		5. Devices for Owner-Furnished Equipment:
			1. Receptacles: Match plug configurations.
			2. Cord and Plug Sets: Match equipment requirements.

NTS: Retain sections 2.2 thru 2.13 as required. Delete sections not required.

* 1. straight-blade devices, 125 V, 20A
		1. Duplex Receptacles: 125 V, 20 A; comply with NEMA WD 1, NEMA WD 6 Configuration 5-20R, UL 498, and FS W-C-596.
			1. Products: Subject to compliance with requirements, provide one of the following:
				1. Eaton: AH5351 (single), AH5352 (duplex).
				2. Hubbell: HBL5351 (single), HBL5352 (duplex).
				3. Leviton: 5361 (single), 5352 (duplex).
				4. P & S: 5361 (single), 5362 (duplex).
	2. gfci receptacles, 125 V, 20 A
		1. General Description for dry location:
			1. 125 V, 20 A, straight blade, feed-through type.
			2. Comply with NEMA WD 1, NEMA WD 6 Configuration 5-20R, UL 498, UL 943 Class A, and FS W-C-596.
			3. Include indicator light that shows when the GFCI has malfunctioned and no longer provides proper GFCI protection.
				1. Eaton: SGF20.
				2. Hubbell: GF20.
				3. Leviton: G5362.
				4. P & S: 2097TR
		2. General Description for wet location:
			1. 125 V, 20 A, straight blade, feed-through type, weather-proof.
			2. Comply with NEMA WD 1, NEMA WD 6 Configuration 5-20R, UL 498, UL 943 Class A, and FS W-C-596.
			3. Include indicator light that shows when the GFCI has malfunctioned and no longer provides proper GFCI protection.
				1. Eaton: WRSGF20.
				2. Hubbell: GFTR20.
				3. Leviton: G5362-WT
				4. P & S: 2097TRWR
	3. hazardous (classified) location receptacles.
		1. Description: Pin and sleeve receptacle with matching connector.
			1. Class I., Division: Refer to Drawings for requirement(s).
			2. Class II, Division: Refer to Drawings for requirement(s).
			3. Voltage: Refer to Drawings for requirement(s).
			4. Amperage: Refer to Drawings for requirement(s).
			5. Wires and Poles: Refer to Drawings for requirement(s).
			6. Raintight.
			7. Standards: Comply with NEMA FB 11 and UL 1203.
		2. Use GFCI type circuit breaker for GFCI applications.
	4. twist-locking receptacles
		1. Twist-Lock, Single Receptacles, 120 V, 20 A
			1. Configuration: NEMA WD 6, Type L5-20R.
			2. Standards: Comply with UL 498.
		2. Twist-Lock, Single Receptacles, 250 V, 20 A
			1. Configuration: NEMA WD 6, type L7-20R.
			2. Standards: Comply with UL 498.
		3. Use GFCI type circuit breaker for GFCI applications.
	5. pendant cord-connector devices
		1. Description:
			1. Matching, locking type plug and receptacle body connector, heavy-duty grade.
			2. Configuration: NEMA WD6, type L5-20P and L5-20R.
			3. Body: Nylon with screw-open, cable-gripping jaws and provision for attaching external cable grip.
			4. External Cable Grip: Woven wire-mesh type made of high-strength, galvanized-steel wire strand, matched to cable diameter, and with attachment provision designed for corresponding connector.
			5. Standards: Comply with FS W-C-596.
		2. Use GFCI type circuit breaker for GFCI applications.
	6. cord and plug sets
		1. Description:
			1. Match voltage and current ratings and number of conductors to requirements of equipment being connected.
			2. 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.
			3. Plug: Nylon body and integral cable-clamping jaws. Match cord and receptacle type for connection.
		2. Use GFCI type circuit breaker for GFCI applications.
	7. toggle switches, 120/277 V, 20A
		1. Comply with NEMA WD 1, UL 20, and FS W-S-896.
		2. Switches, 120/277 V, 20 A:
			1. Single Pole:
				1. Products: Subject to compliance with requirements, provide one of the following:

Eaton: AH1221.

Hubbell: HBL1221.

Leviton: 1221-S.

P & S: PS20AC1.

* + - 1. Three Way:
				1. Products: Subject to compliance with requirements, provide one of the following:

Eaton: AH1223.

Hubbell: HBL1223.

Levition: 1223-S.

P & S: PS20AC3.

* + - 1. Four Way:
				1. Products: Subject to compliance with requirements, provide one of the following:

Eaton: AH1224.

Hubbell: HBL1224.

Leviton: 1224-S.

P & S: PS20AC4.

* + - 1. Lighted Toggle:
				1. Products: Subject to compliance with requirements, provide one of the following:

Eaton: AH1221LTW (SP), AH1223LTW (3-Way)

Hubbell: HBL1221IL (SP), HBL1223IL (3-Way)

Leviton: 1221-LH (SP), 1223-LH (3-Way)

P & S: PS20AC1SL (SP), SP20AC3SL (3-Way)

* + - * 1. Pilot Light (Red):

Eaton: AH1221PL (SP), AH1223PL (3-Way), AH1224PL (4-Way)

Hubbell: HBL1221PL (SP), HBL1223PL (3-Way)

Leviton: 1221-PL (SP), 1223-PL (3-Way)

P & S: PS20AC1PL (SP), PS20AC3PL (3-Way)

* 1. Wall-Box dimmers
		1. Audible frequency and EMI/RFI suppression filters.
		2. Control: Continuously adjustable slider; with single-pole or three-way switching. Comply with UL 1472.
		3. LED Lamp Dimmer Switches: Modular; compatible with LED lamps and drivers; trim potentiometer to adjust low-end dimming; capable of consistent dimming with low end not greater than 10 percent of full brightness.
			1. Products: Subject to compliance with requirements, provide one of the following:
				1. Eaton:SF10P.
				2. Leviton: IP710-LFZ.
				3. Lutron: DVSTV (Diva Series)
				4. P & S: CD4FBL3P (Titan Series).
	2. wall plates
		1. Single and combination types shall match corresponding wiring devices.
			1. Plate-Securing Screws: Metal with head color to match plate finish.
			2. Material for Finished Spaces: 0.035-inch-thick, satin-finished, Type 302 stainless steel.
			3. Material for Damp Locations: Cast aluminum with spring-loaded lift cover, and listed and labeled for use in wet and damp locations.
			4. Material for areas classified as hazardous locations: Where required by NEC, shall be NEMA 7 explosion-proof and comply with UL 886.
			5. In corrosive locations, where the conduit system is PVC-coated, wall plates shall be Type 316 stainless steel, or non-metallic thermoplastic or fiberglass reinforced plastic material.
	3. exterior wall cover plates
		1. Single and combination types shall be as follows:
			1. All exterior device cover plates shall be while-in-use style.
			2. All exterior device cover plates shall be cast aluminum.
			3. Manufacturers and model shall be as follows:
				1. Single Gang Horizontal Mount:

Hubbell: WP26EH.

Leviton: IUM1H-GY.

P & S: WIUCAST1.

* + - * 1. Single Gang Horizontal Mount:

Hubbell: WP26E.

Leviton: IUM1V-GY.

P & S: WIUCAST1.

* + - * 1. Double Gang Mount:

Hubbell: WP262E.

Leviton: IUM2V-GY.

P & S: WIUCAST2.

* 1. finishes
		1. Device Color:
			1. Wiring Devices Connected to Normal Power System: As selected by Engineer unless otherwise indicated or required by NFPA 70 or device listing.
			2. Wiring Devices Connected to Emergency Power System: Red.
		2. Wall Plate Color: For plastic covers, match device color.
1. – execution
	1. INSTALLATION
		1. Comply with NECA 1, including mounting heights listed in that standard, unless otherwise indicated.
		2. 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. Install wiring devices after all wall preparation, including painting, is complete.
		3. 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 meet provisions of NFPA 70, Article 300, without pigtails.
			4. Existing Conductors:
				1. Cut back and pigtail, or replace all damaged conductors.
				2. Straighten conductors that remain and remove corrosion and foreign matter.
				3. Pigtailing existing conductors is permitted, provided the outlet box is large enough.
		4. 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.
		5. Receptacle Orientation:
			1. Install ground pin of vertically mounted receptacles down, and on horizontally mounted receptacles to the right.
		6. 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.
		7. Dimmers:
			1. Install dimmers within terms of their listing.
			2. Install unshared neutral conductors on line and load side of dimmers according to manufacturers' device listing conditions in the written instructions.
		8. 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, multi-gang wall plates.
		9. Adjust locations of floor service outlets and service poles to suit arrangement of partitions and furnishings.
	2. GFCI RECEPTACLES
		1. Install non-feed-through-type GFCI receptacles where protection of downstream receptacles is not required.
	3. IDENTIFICATION
		1. Comply with Section 26 0553 "Identification for Electrical Systems."
		2. Identify each receptacle with panelboard identification and circuit number. Use hot, stamped, or engraved machine printing with black-filled lettering on face of plate, and durable wire markers or tags inside outlet boxes.
	4. FIELD QUALITY CONTROL
		1. Test Instruments: Use instruments that comply with UL 1436.
		2. Test Instrument for Convenience Receptacles: Digital wiring analyzer with digital readout or illuminated digital-display indicators of measurement.
		3. Perform the following tests and inspections:
			1. Test Instruments: Use instruments that comply with UL 1436.
			2. Test Instrument for Convenience Receptacles: Digital wiring analyzer with digital readout or illuminated digital-display indicators of measurement.
		4. 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 unacceptable.
			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. 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.
		5. Wiring device will be considered defective if it does not pass tests and inspections.
		6. Prepare test and inspection reports.

+ + END OF SECTION + +