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**BuildingName**
**The Description of the Project**
**P00000000 0000**

**SPECIFICATION DIVISION 26**

NUMBER SECTION DESCRIPTION

**DIVISION 26 ELECTRICAL**
SECTION 262726 - WIRING DEVICES

**END OF CONTENTS TABLE**

**DIVISION 26 ELECTRICAL**
**SECTION 262726 - WIRING DEVICES**

## PART 1 - GENERAL

### 1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, Standard General and Supplementary General Conditions, Division 1 Specification Sections, and other applicable Specification Sections, in particular the Related Sections listed below, apply to this Section.

B. Related Sections:

1. Section 017823 - Operation and Maintenance Manual
2. Section 019100/019110 - Commissioning
3. Section 260513 - Medium, Low & Control Voltage Cables
4. Section 260526 - Grounding and Bonding for Electrical
5. Section 260533 - Electrical Materials and Methods
6. Section 260800 - Electrical Acceptance Tests

### 1.2 SUMMARY

A. Section Includes:

1. Lighting switches, occupancy sensors, and low voltage, stand-alone, room lighting controllers.
2. Receptacles.
3. Device cover plates.
4. Receptacle strips and power poles.
5. Floor boxes and floor poke-through devices.
6. Pin and sleeve connectors.

### 1.3 SUBMITTALS

A. Product Data: Include manufacturers, catalog illustrations, models, rated capacities, dimensions, rough-in requirements, wiring diagrams, shop drawings, and materials of construction. Wiring diagrams shall be project specific and differentiate between factory wiring and field wiring. Provide written sequences of operation for all controls, including a list of room numbers for each typical control sequence. Sequences of operation shall include all scenarios pertaining to normal, emergency, and egress modes.

B. Installation, Operation, and Maintenance Manuals

### 1.4 QUALITY ASSURANCE

A. Manufacturers and Products: The products and manufacturers specified in this Section establish the standard of quality for the Work. Subject to compliance with all requirements, provide specified products from the manufacturers named in Part 2.

B. Reference Standards: Products in this section shall be built, tested, and installed in compliance with the specified quality assurance standards, latest editions, of all NEMA and UL standards applicable to each type of wiring device.

## 1.5 WARRANTY

A. Provide a complete warranty for parts and labor for a minimum of one year from the date of Substantial Completion.

# PART 2 - PRODUCTS

## 2.1 LINE VOLTAGE LIGHTING CONTROLS

A. Toggle Switches

1. Toggle switches shall be rated 120/277 volts, 20-amperes, single-pole, double-pole, 3-way or 4-way as shown, heavy-duty, back and side wired, with white handles. Arrow Hart (Cooper), Bryant, Hubbell, Leviton, or Pass & Seymour.

B. Dimmer Switches

1. Dimmer switches shall be rated for the types of lamps being controlled, 1,000 watts minimum, specification grade, heavy-duty, with white slider or knob and radio noise filter, and suitable for use in a single gang box. Leviton, Lithonia, or Lutron.

C. Occupancy Sensors

1. Wall mounted occupancy sensors shall be rated 600 watts minimum, 180 degrees coverage minimum, 300 sq. ft. coverage minimum, infrared type, heavy-duty, white color, with SCR power switching devices, adjustable range or sensitivity, adjustable time delay between 5-30 minutes minimum, adjustable setting of manual or auto “on”, integral manual override switches, and suitable for mounting in single gang wall mounted boxes. Sensors with triac power switching devices are not acceptable. Cooper Controls, Hubbell, Leviton, Lutron, Sensor Switch, Tork, or WattStopper.
2. Ceiling mounted occupancy sensors shall be rated 1,000 watts minimum, 180-360 degrees coverage as required, 1,000 sq. ft. coverage minimum, infrared type, heavy-duty, white color, with SCR power switching devices, adjustable range or sensitivity, adjustable time delay between 5-30 minutes minimum, adjustable setting of manual or auto “on”, and suitable for mounting in ceiling mounted boxes. Sensors shall utilize a low voltage power supply and control circuits, and be interlocked with the switch circuit for local control. Sensors with triac power switching devices are not acceptable. Cooper Controls, Hubbell, Leviton, Lutron, Sensor Switch, Tork, or WattStopper.

3. Dual technology microphonic/PIR occupancy sensors shall be rated 1,000 watts minimum, 180-360 degrees coverage as required, 1,000 sq. ft. coverage minimum, and combination microphonic/infrared type. The microphonic component shall be acoustically passive and "listen" for sounds indicating occupant motion. The overall occupancy sensor shall be heavy-duty, white color, with SCR power switching devices, adjustable range or sensitivity, adjustable time delay between 5-30 minutes minimum, adjustable setting of manual or auto “on”, and suitable for mounting in ceiling or wall mounted boxes. Sensors shall utilize low voltage power supply and control circuits and be interlocked with the switch circuit for local control. Sensors with triac power switching devices are not acceptable. Sensor Switch.
4. Dual technology ultrasonic/PIR occupancy sensors shall be rated 1,000 watts minimum, 180-360 degrees coverage as required, 1,000 sq. ft. minimum coverage, and combination ultrasonic/infrared type. The ultrasonic component shall operate at 32 kHz minimum and be compatible with hearing aids. The overall occupancy sensor shall be heavy-duty, white color, with SCR power switching devices, adjustable range or sensitivity, adjustable time delay between 5-30 minutes minimum, adjustable setting of manual or auto “on”, and suitable for mounting in ceiling or wall mounted boxes. Sensors shall utilize low voltage power supply and control circuits and be interlocked with the switch circuit for local control. Sensors with triac power switching devices are not acceptable. Cooper Controls, Hubbell, Leviton, Lutron, Tork, or WattStopper.

## 2.2 LOW VOLTAGE, STAND-ALONE, ROOM LIGHTING CONTROL SYSTEM

A. Room Controller

1. Room controller shall be fully functional, plug-and-play, out-of-the-box. Factory or field program room controller to the sequence of operation provided on the drawings. The controller shall not require specialized tools, software, networks, or manufacturer technicians to program or re-program.
2. The room controller shall be stand-alone and not require a building network, PC or server, fire walls, internet, cloud, or other implements to operate.
3. The room controller shall be plenum-rated and operate on 120VAC or 277VAC, 60 Hz input and shall include knockouts for direct conduit connection.
4. The room controller(s) shall be capable of controlling 1 to 3 lighting zones as shown on drawings, with non-proprietary fluorescent ballast or LED driver loads, 16 amps total load. Inputs to the room controller shall be wired (no wireless) and accommodate 0-10V dimmer switches, occupancy sensors, and daylight photocells where indicated. 0-10V wiring shall be RJ45 CAT5/CAT5e/CAT6 cables or Class 1/Class 2 circuiting.

5. Where central emergency power is provided via generator or inverter, provide room controller with emergency power line in and out connections, normal power circuit monitoring, test button or testing function, and UL924 listing. A loss of normal power shall force designated emergency lighting to 100% illumination.
6. Room controller shall be AcuityControls nLight nPP16 series, Cooper WaveLinx CAT RSP-C series, Hubbell NXRC series, or Legrand Wattstopper LMRC series. UL924 devices shall be AcuityControls nPP16-ER series, Cooper WaveLinx CAT ESP-C series, or Hubbell NXRC-UL924-UNV series. Alternative UL924 devices may include Legrand Wattstopper ELCU-200 series.

B. Low Voltage Wall Switches

1. Wall switches shall be fully compatible plug-and-play with the local room controller, rated 24VDC, Class 2, and shall utilize CAT5/CAT5e/CAT6 cables. Provide wall switch configurations as indicated on the drawings, able to accommodate up to four channels with on, off, and dimming of each channel. Provide white finish for buttons and cover.
2. AcuityControls nLight nPODM series, Cooper WST-C series, Hubbell NXSW series, or Legrand Wattstopper LM series.

C. Sensors

1. All sensor types shall be fully compatible, plug-and-play with the local room controller, rated 24VDC, and shall utilize RJ45 CAT5/CAT5e/CAT6 cables or Class 1/Class 2 circuiting.
2. Infrared Wall Switch: Infrared wall switch shall have 180 degree coverage, with small motion range of 20 feet minimum. Push-button programmable with adjustable time delays. Provide dimming control where indicated on drawings. Provide white finish for buttons and cover. AcuityControls nLight nWSX-LV series, Cooper ONW-P-1001-SP with SIM-C-V series, or Legrand Wattstopper LMPW-101 series.
3. Ceiling Mounted Infrared Occupancy Sensor: Infrared sensor shall have 360 degree coverage, with small motion range of 12 feet minimum (nominal 300 sqft). Adjustable push-button settings for time delays. Provide auxiliary low voltage relay with dry contact output for HVAC controls. Provide white finish. AcuityControls nLight nCM series, Cooper OCS-C series, Hubbell NXOS-IR series with RJ45 adapter, or Legrand Wattstopper LMPC-100 with LMRL-100 series.
4. Ceiling Mounted Dual Technology Occupancy Sensor: Infrared/Microphonics or Infrared/Ultrasonic sensor shall have 360 degree coverage, with large motion range of 24 feet minimum (nominal 1,800 sqft). The ultrasonic component shall operate at 32 kHz minimum and not interfere with hearing aids. Adjustable push-button settings for time delays. Provide auxiliary low voltage relay with dry contact output for HVAC controls. Provide white finish. AcuityControls nLight nCM-PDT series, Cooper OAC-DT series with CAT SIM-C-V interface, Hubbell NXOS-DT series with RJ45 adapter, or Legrand Wattstopper LMDC-100 with LMRL-100 series.

5. Ceiling Mounted Daylight Harvesting Photocell: Photocell shall provide automatic dimming; manual override or dimming level adjustment shall be possible at the wall switch. Provide adjustable push-button settings for set-points. Provide white finish. AcuityControls nLight nCM-ADCX series, Cooper OCS-C series, Hubbell NXDS series with RJ45 adapter, or Legrand Wattstopper LMLS-400 series.

## 2.3 DUPLEX RECEPTACLES

A. Duplex receptacles shall be rated 125 volts, 20 amps, 2-pole, 3-wire, NEMA Type 5-20R, heavy duty, back and side wired, grounding type with nylon or Lexan bodies. Except where shown otherwise, normal power receptacles shall have white faces, emergency power receptacles shall have red faces, and "special power" receptacles shall have gray faces. Arrow Hart (Eaton), Bryant, Hubbell, Leviton, or Pass & Seymour 5362.

## 2.4 GFCI AND AFCI DUPLEX RECEPTACLES

A. Ground-fault circuit interrupter (GFCI) duplex receptacles shall be rated 125 volts, 20 amps, 2-pole, 3-wire straight blade type with nylon or Lexan bodies and white faces. GFCI receptacles shall comply with UL 498 and UL 943 and have a blinking light that indicates the GFCI has malfunctioned and no longer provides protection. GFCI receptacles shall trip when ground currents exceed 5 ma, and shall trip in 25 milliseconds maximum. GFCI receptacles shall have an advanced microcontroller that isolates true ground fault conditions from building noise, transient events, and harmonics. Receptacles shall have an interrupting rating of 2,000 amps and shall lock out (off) when the protection system fails. Hubbell with CLAD technology, Legrand Radiant 2097 series, or equivalent by Arrow Hart (Eaton), Bryant, Leviton, or Pass & Seymour.

B. Arc-fault circuit interrupter (AFCI) duplex receptacles shall be rated 125 volts, 20 amps, 2-pole, 3-wire straight blade type with nylon or Lexan bodies and white faces. AFCI receptacles shall recognize characteristics unique to an arcing fault and trip when an arc fault is detected. Receptacles shall have an interrupting rating of 2,000 amps and shall lock out (off) when the protection system fails. Arrow Hart (Eaton), Bryant, Hubbell, Leviton, or Pass & Seymour.

## 2.5 TVSS AND TAMPER-RESISTANT DUPLEX RECEPTACLES

A. TVSS and tamper-resistant duplex receptacles shall be rated 125 volts, 20 amps, 2-pole, 3-wire straight blade type with nylon or Lexan bodies and white faces. TVSS receptacles shall clamp at 330 volts or less, and shall have visual indication of the failure of their protective circuitry. Tamper-resistant receptacles shall require the simultaneous insertion of both line and neutral plug blades before power is applied to the receptacle contacts. Arrow Hart (Eaton), Bryant, Hubbell, Leviton, or Pass & Seymour.

## 2.6 USB CHARGER DUPLEX RECEPTACLES

A. USB charger duplex receptacles shall be rated 125 volts, 20 amps, with two 2-pole, 3-wire, tamper-resistant receptacles and two USB **[select: both Type A, both Type C, or one Type A and one Type C]** charger ports. Receptacles shall be NEMA Type 5-20R, heavy-duty, back and side wired or pigtail wired, grounding type with nylon or Lexan bodies and white faces. USB ports shall be 5 volts DC, 3.1 amps minimum combined total, compatible with USB Type 2.0 and 3.0 devices. Arrow Hart (Eaton), Bryant, Hubbell, Leviton, or Pass & Seymour.

## 2.7 SPECIAL PLUGS AND RECEPTACLES

A. Special plugs and receptacles including twist-lock devices shall be of the voltage, amperage, number of poles, number of wires, configuration, and NEMA Type shown, heavy-duty, with nylon or Lexan bodies and white or gray faces. Arrow Hart (Eaton), Bryant, Hubbell, Leviton, or Pass & Seymour. Provide the required quantity of mating plugs when shown on the drawings.

## 2.8 DEVICE COVER PLATES

A. Except where unique cover plates are required (wall box dimmers, occupancy sensors, surface raceways, etc.), cover plates for devices shall be of high quality Type 302 stainless steel unless otherwise indicated.

## 2.9 RECEPTACLE STRIPS

A. Surface mounted receptacle strips shall consist of white color surface wireways containing matching receptacles of the types shown. Receptacles shall be heavy duty, specification grade, and shall be grounded by a separate green ground conductor. The receptacles shall be spaced and circuited as shown.

## 2.10 POWER POLES

A. Power poles shall be white color painted steel unless shown otherwise, with an internal barrier to separate power wiring from telecommunications wiring. Poles shall utilize a Velcro pad at the bottom for attachment to carpeting or tile, and an adjustable T-bar assembly with trim plate for attachment to the ceiling. Receptacles shall be rated 125 volts, 20 amps, 2-pole, 3-wire, NEMA Type 5-20R, heavy-duty, white color, and shall be grounded by a separate green ground conductor. Hubbell, Steelcase, or Wiremold.

## 2.11 FLOOR BOXES

A. Floor boxes shall be of the flush, multi-service type, UL listed for fire resistance. Boxes shall be of stamped, galvanized steel, fully adjustable, with a minimum capacity of 80 [50, 30] cubic inches, split into 2 [3] compartments of equal capacity by removable partitions. Boxes shall include polycarbonate [brass] gasketed and watertight covers with integral carpet flanges, dual locking flip lids on the power side and four concentric breakouts on the telecommunications side. FSR, Hubbell, Leviton FBI, or Wiremold.

## 2.12 FLOOR POKE-THROUGH DEVICES

A. Floor poke-through devices shall be of the flush type, with two duplex 20A power receptacles and two telecom outlets. Unit shall include two blank inserts for unused telecom openings and the "Communication Adapter" for connecting two 1/2" conduits to the assembly. Flange shall be of brushed brass finish. Unit shall be UL listed for fire resistance. Wiremold RC9 Series or Hubbell PT9 Series.

## 2.13 PIN AND SLEEVE CONNECTORS

A. Pin and sleeve connectors shall comply with IEC Standard 309. They shall consist of nylon housings with integral locking rings and cord grips that are color coded by voltage. Pins and sleeves shall be sized, arranged, and keyed to prevent incorrect assembly. Pins or sleeves shall be staggered so that the ground conductor mates first, the neutral conductor mates second, and the energized conductors mate last. Provide integral safety switch interlocks where shown. Crouse-Hinds, Hubbell, Leviton, or Pass & Seymour.

# PART 3 - EXECUTION

## 3.1 INSTALLATION

A. Provide hospital-grade receptacles in patient care areas.

B. Except where necessary to match existing receptacles, install receptacles with their ground slots below or to the left of the line and neutral slots.

C. Provide a minimum No. 10 AWG wire to NEMA Type 6-20R receptacles serving freezers, window air conditioners, or other large appliances.

D. For each new 120 volt or 277 volt branch circuit, provide a dedicated neutral. Neutrals of branch circuits shall not be shared or daisy-chained.

E. Receptacles installed in surface raceways being fed by multiple circuits, shall have adjacent receptacles from alternate circuits.

F. Provide GFCI receptacles or GFCI-protected branch circuits for new and existing 120 volt duplex receptacles located outdoors, in garages, on rooftops, in toilet rooms, in unfinished basements, in kitchens, and within 6 feet of water sources including sinks, cup sinks, fume hood sinks, faucets, and hose bibs. Provide GFCI receptacles for water coolers and vending machines. Standard receptacles protected by an upstream GFCI receptacle or a GFCI circuit breaker are not acceptable.

G. Provide AFCI receptacles or AFCI-protected branch circuits for new and existing 120 volt duplex receptacles located in dwelling unit common rooms, dining rooms, living rooms, bedrooms, closets, hallways, and similar rooms or areas. Standard receptacles protected by an upstream AFCI receptacle are acceptable only when shown on the drawings.

H. Provide tamper-resistant receptacles for new and existing 120 volt duplex receptacles located in dwelling units, guest rooms, guest suites, child care facilities, and locations indicated in NEC 406.12.

I. Provide waterproof enclosures for receptacles located outdoors or when designated "waterproof" in special indoor applications. Enclosures shall remain watertight even while in use. Cantex, Carlon, Leviton, or TayMac Corporation.

J. Provide a nametag on each cover plate of new and existing light switches and receptacles identifying the panel and circuit number feeding the device. Trace the existing circuits using an electronic circuit tracer if necessary. Nametags shall consist of black text permanently laminated to adhesive backed clear nylon or Mylar tape. Brother P-Touch. Embossed plastic tape labels are not acceptable.

K. Color code junction boxes and box covers of emergency circuits with red paint.

L. Mark junction box covers in indelible ink with the panel and breaker numbers of the circuits contained within.

M. Set occupancy sensors as follows:

1. Classrooms, labs: Set for “50% auto on” and timer off for 20 minutes.
2. Offices: Set for “manual on” and timer off for 20 minutes.
3. Storage rooms, janitor closets, telecommunication rooms, copy rooms, kitchenettes: Set for “50% auto on” and timer off for 5 minutes.
4. Toilet rooms and locker rooms: Set for “100% auto on” and timer off for 10 minutes.
5. Corridors: Set for “100% auto on” and timer off for 20 minutes.

N. For low-voltage, stand-alone, room lighting control systems, wire systems per approved manufacturer shop drawings. Where systems are not factory programmed, provide field programming in accordance with the project drawings, details, and sequence of operations. Provide all necessary accessories and wiring for a fully functional system; provide additional room controllers as necessary to accommodate the number of lighting zones.

O. Mount power packs and low-voltage, stand-alone, room lighting control systems within the room's accessible ceiling space, adjacent to the room entrance. Where there is no accessible ceiling, provide a ceiling access panel.

**3.2 FIELD QUALITY CONTROL**

A. Perform testing in accordance with Specification Section 260800 and submit a test report.

**3.3 COMMISSIONING**

A. Perform commissioning activities in accordance with Related Sections.

**END OF SECTION 262726**