

SECTION 26 09 23
LIGHTING CONTROLS

PART 1 - GENERAL

1.1 DESCRIPTION

This section specifies the furnishing, installation and connection of the lighting controls.

1.2 RELATED WORK

- ~~A. Section 23 09 23, DIRECT-DIGITAL CONTROL SYSTEM FOR HVAC: Interface of lighting controls with HVAC control systems.~~
- B. Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS: General requirements that are common to more than one section of Division 26.
- C. Section 26 05 19, LOW-VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES (600 VOLTS AND BELOW): Cables and wiring.
- D. Section 26 05 26, GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS: Requirements for personnel safety and to provide a low impedance path to ground for possible ground fault currents.
- E. Section 26 24 16, PANELBOARDS: Panelboard enclosure and interior bussing used for lighting control panels.
- F. Section 26 27 26, WIRING DEVICES: Wiring devices used for control of the lighting systems.
- G. Section 26 51 00, INTERIOR LIGHTING: Luminaire ballast and drivers used in control of lighting systems.

1.3 QUALITY ASSURANCE

- A. Refer to Paragraph, QUALIFICATIONS (PRODUCTS AND SERVICES), in Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS.

~~1.4 SUBMITTALS~~

- ~~A. Submit six copies of the following in accordance with Section 26 05 11, REQUIREMENTS FOR ELECTRICAL INSTALLATIONS.~~
 - ~~1. Shop Drawings:~~
 - ~~a. Submit the following information for each type of lighting controls.~~
 - ~~b. Material and construction details.~~
 - ~~c. Physical dimensions and description.~~
 - ~~d. Wiring schematic and connection diagram.~~
 - ~~e. Installation details.~~

~~2. Manuals:~~

~~a. Submit, simultaneously with the shop drawings, complete maintenance and operating manuals, including technical data sheets, wiring diagrams, and information for ordering replacement parts.~~

~~b. If changes have been made to the maintenance and operating manuals originally submitted, submit updated maintenance and operating manuals two weeks prior to the final inspection.~~

~~3. Certifications: Two weeks prior to final inspection, submit the following.~~

~~a. Certification by the Contractor that the lighting control systems have been properly installed and tested.~~

1.5 APPLICABLE PUBLICATIONS

A. Publications listed below (including amendments, addenda, revisions, supplements, and errata) form a part of this specification to the extent referenced. Publications are referenced in the text by designation only.

B. Green Seal (GS):

GC-12-03.....Occupancy Sensors

C. National Electrical Manufacturer's Association (NEMA):

C136.10-10.....American National Standard for Roadway and Area
Lighting Equipment—Locking-Type Photocontrol
Devices and Mating Receptacles—Physical and
Electrical Interchangeability and Testing

ICS-1-08.....Standard for Industrial Control and Systems
General Requirements

ICS-2-05.....Standard for Industrial Control and Systems:
Controllers, Contractors, and Overload Relays
Rated Not More than 2000 Volts AC or 750 Volts
DC: Part 8 - Disconnect Devices for Use in
Industrial Control Equipment

ICS-6-11.....Standard for Industrial Controls and Systems
Enclosures

D. National Fire Protection Association (NFPA):

70-14.....National Electrical Code (NEC)

E. Underwriters Laboratories, Inc. (UL):

- 20.....Standard for General-Use Snap Switches
- 773-95.....Standard for Plug-In Locking Type Photocontrols
for Use with Area Lighting
- 773A-06.....Nonindustrial Photoelectric Switches for
Lighting Control
- 98-04.....Enclosed and Dead-Front Switches
- 916-07.....Standard for Energy Management Equipment
Systems
- 917-06.....Clock Operated Switches
- 924-06.....Emergency Lighting and Power Equipment (for use
when controlling emergency circuits).

PART 2 - PRODUCTS**~~2.1 ELECTRONIC TIME SWITCHES~~**

- ~~A. Electronic, solid-state programmable units with alphanumeric display, complying with UL 916 and or 917.~~
- ~~1. Contact Configuration: SPST~~
- ~~2. Contact Rating: 20-A ballast load, 120-277 volt/.~~
- ~~3. Astronomical Clock: Capable of switching a load on at sunset and off at sunrise, and automatically changing the settings each day in accordance with seasonal changes of sunset and sunrise. Additionally, it shall be programmable to a fixed on/off weekly schedule.~~
- ~~4. Power Backup: Battery or capacitor for schedules and time clock.~~

~~2.2 OUTDOOR PHOTOELECTRIC SWITCHES~~

- ~~A. Solid state, with SPST dry contacts rated for 1800 VA tungsten or 1000 VA inductive, complying with UL 773A.~~
- ~~1. Light Level Monitoring Range: 16.14 to 108 lx (1.5 to 10 fc), with adjustable turn-on and turn-off levels.~~
- ~~2. Time Delay: 15-second minimum.~~
- ~~3. Surge Protection: Metal-oxide varistor.~~
- ~~4. Mounting: Twist lock, with base and stem mounting or stem and swivel mounting accessories as required.~~

~~2.3 INDOOR OCCUPANCY SENSORS~~

- ~~A. Wall or ceiling mounting, solid-state units with a power supply and relay unit, suitable for the environmental conditions in which installed.~~

- ~~1. Operation: Unless otherwise indicated, turn lights on when covered area is occupied and off when unoccupied; with a 1 to 15 minute adjustable time delay for turning lights off.~~
- ~~2. Sensor Output: Contacts rated to operate the connected relay. Sensor shall be powered from the relay unit.~~
- ~~3. Relay Unit: Dry contacts rated for 20A ballast load at 120 volt and 277 volt, for 13A tungsten at 120 volt, and for 1 hp at 120 volt.~~
- ~~4. Mounting:~~
 - ~~a. Sensor: Suitable for mounting in any position on a standard outlet box.~~
 - ~~b. Time-Delay and Sensitivity Adjustments: Recessed and concealed behind hinged door.~~
- ~~5. Indicator: LED, to show when motion is being detected during testing and normal operation of the sensor.~~
- ~~6. Bypass Switch: Override the on function in case of sensor failure.~~
- ~~7. Manual/automatic selector switch.~~
- ~~8. Automatic Light-Level Sensor: Adjustable from 21.5 to 2152 lx (2 to 200 fc); keep lighting off when selected lighting level is present.~~
- ~~9. Faceplate for Wall-Switch Replacement Type: Refer to wall plate material and color requirements for toggle switches, as specified in Section 26 27 26, WIRING DEVICES.~~
- ~~B. Dual-technology Type: Ceiling mounting; combination PIR and ultrasonic detection methods, field-selectable.~~
 - ~~1. Sensitivity Adjustment: Separate for each sensing technology.~~
 - ~~2. Detector Sensitivity: Detect occurrences of 150 mm (6-inch) minimum movement of any portion of a human body that presents a target of not less than 232 sq. cm (36 sq. in), and detect a person of average size and weight moving not less than 305 mm (12 inches) in either a horizontal or a vertical manner at an approximate speed of 305 mm/s (12 inches/s).~~
- ~~C. Detection Coverage: Shall be sufficient to provide coverage as required by sensor locations shown on drawing.~~

2.4 LIGHTING CONTROL SYSTEM - RELAY PANEL TYPE

- A. The contractor shall ~~be responsible for the extension of the~~ utilize existing spare relays located in the existing lighting control relay panels currently installed build 1 and building 30.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Installation shall be in accordance with the NEC, manufacturer's instructions and as shown on the drawings or specified.
- ~~B. Aiming for wall-mounted and ceiling-mounted motion sensor switches shall be per manufacturer's recommendations.~~
- ~~D. Set occupancy sensor "on" duration to 15 minutes.~~
- ~~E. Locate photoelectric sensors as indicated and in accordance with the manufacturer's recommendations. Adjust sensor for the available light level at the typical work plane for that area.~~
- F. Label time switches and contactors with a unique designation.
- ~~G. Program lighting control panels per schedule on drawings.~~

3.2 ACCEPTANCE CHECKS AND TESTS

- A. Perform in accordance with the manufacturer's recommendations.
- B. Upon completion of installation, conduct an operating test to show that equipment operates in accordance with requirements of this section.
- ~~C. Test for full range of dimming ballast and dimming controls capability. Observe for visually detectable flicker over full dimming range.~~
- ~~D. Test occupancy sensors for proper operation. Observe for light control over entire area being covered.~~

3.3 FOLLOW-UP VERIFICATION

Upon completion of acceptance checks and tests, the Contractor shall show by demonstration in service that the lighting control devices are in good operating condition and properly performing the intended function in the presence of RE/COR.

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