

SECTION 26 09 23 - LIGHTING CONTROL DEVICES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Electronic dial-time switches.
2. Electromechanical dial-time switches.
3. Outdoor photoelectric switches, solid state, flexible mounting.
4. Outdoor photoelectric switches, solid state, luminaire-mounted.
5. Outdoor photoelectric switches, low voltage.
6. Daylight-harvesting switching controls.
7. Daylight-harvesting dimming controls, analog.
8. Daylight-harvesting dimming controls, digital.
9. Indoor occupancy and vacancy sensors.
10. Switchbox-mounted occupancy sensors.
11. Digital timer light switch.
12. High-bay occupancy sensors.
13. Extreme-temperature occupancy sensors.
14. Outdoor motion sensors.
15. Lighting contactors.
16. Emergency shunt relay.
17. Conductors and cables.

B. Related Requirements:

1. Section 26 00 10 "Supplemental Requirements for Electrical" for additional abbreviations, definitions, submittals, qualifications, testing agencies, and other Project requirements applicable to Work specified in this Section.
2. Section 26 00 11 "Facility Performance Requirements" for seismic-load, wind-load, acoustical, and other field conditions applicable to Work specified in this Section.
3. Section 26 27 26 "Wiring Devices" for wall-box dimmers, non-networkable wall-switch occupancy sensors, and manual light switches.

1.2 ACTION SUBMITTALS

A. Product Data:

1. Electronic dial-time switches.
2. Electromechanical dial-time switches.
3. Outdoor photoelectric switches, solid state, flexible mounting.
4. Outdoor photoelectric switches, solid state, luminaire-mounted.
5. Outdoor photoelectric switches, low voltage.
6. Daylight-harvesting switching controls.
7. Daylight-harvesting dimming controls, analog.
8. Daylight-harvesting dimming controls, digital.

9. Indoor occupancy and vacancy sensors.
10. Switchbox-mounted occupancy sensors.
11. Digital timer light switch.
12. High-bay occupancy sensors.
13. Extreme-temperature occupancy sensors.
14. Outdoor motion sensors.
15. Lighting contactors.
16. Emergency shunt relay.
17. Conductors and cables.

B. Shop Drawings:

1. Show installation details for the following:
 - a. Occupancy sensors.
 - b. Vacancy sensors.
2. Interconnection diagrams showing field-installed wiring.
3. Include diagrams for power, signal, and control wiring.

C. Field quality-control reports.

1.3 INFORMATIONAL SUBMITTALS

- A. Sample Warranty: For manufacturer's warranties.

1.4 WARRANTY

- A. Special Extended Warranty: Manufacturer and Installer warrant that installed lighting control devices perform in accordance with specified requirements and agree to repair or replace, including labor, materials, and equipment, devices that fail to perform as specified within extended warranty period.
1. Failures include, but are not limited to, the following:
 - a. Faulty operation of lighting control software.
 - b. Faulty operation of lighting control devices.
 2. Extended Warranty Period: Two year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURER'S

- A. If they comply with these specifications, products from the following, and only the following, manufacturers will be acceptable
1. Acuity Controls
 2. Hubbell Controls

3. Leviton
4. Lutron
5. nLite
6. WattStopper

2.2 MANUFACTURED UNITS

- A. All parts of the lighting control system shall be manufactured by the same company and shall be aesthetically compatible. i.e., from the same product line or family of products.
- B. All sensors shall be from the latest release generation. Do not mix product of different releases or generations.
- C. Interior lighting controls are not to be integrated into building energy management control system (EMCS) but are to be capable of integration in the future.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine lighting control devices before installation. Reject lighting control devices that are wet, moisture damaged, or mold damaged.
- B. Examine walls and ceilings for suitable conditions where lighting control devices will be installed.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.
- D. If the work is to be performed in an existing facility, visit the site of the proposed work and observe its conditions so that you may be fully informed as to the materials, labor, workmanship and conditions under which the work is to be done. If an existing lighting controls system exists, then the new system shall work with the existing system.
- E. No allowances shall be made on account of any errors, negligence or failure to be aware of the condition of the existing site.

3.2 INSTALLATION

- A. General
 1. Provide all lighting controls as required and where indicated, in accordance with manufacturer's written instructions and project shop drawings, applicable requirements of the NEC, and recognized industry practices to ensure that products serve the intended function.
 2. Provide the room controller as required located above the ceiling above the switches near the exit door. Provide a permanent label on the ceiling t-grid to identify its location. The label material shall be as described in section 26 05 53.

The label shall say "Lighting Controller". It is acceptable for a room controller to serve more than one space.

3. Provide conduit and wiring in accordance with specification sections 260519.
- B. Shop Drawing Preparation: At least five working days prior to bid time, provide a set of floor plan drawings and a copy of these specifications to the manufacturer for the purpose of system layout with quantities and creating shop drawings for the owner. Coordinate with the manufacturer to determine the required medium (hard copy or electronic) and the format required by the manufacturer.
- C. Sensor design and layout by Manufacturer:
 1. Refer to Design Requirements article regarding sensor design and layout.
 2. Exact locations of control unit hardware boxes shall be based on observing good installation practice and shall be coordinated with other elements of the reflected ceiling plan. Control unit hardware shall be fully concealed.
 3. Select the appropriate type of sensor for complete coverage of each space.

3.3 SEQUENCE OF OPERATION

A. Lighting Controls

1. The smart switch shall be required to be pressed to turn the lights on in all spaces where a vacancy sensor is required. Otherwise, an occupancy sensor may automatically turn the luminaires on. Two minutes prior to turning the lights off, the lighting controls shall dim the luminaires in the space to 50% of their previous output as a notification to the occupants that the controls will soon turn the lighting off. A momentary "blink" is allowed if luminaires are not dimmable. If the motion sensor is not triggered in two minutes, the lighting in the space is to turn off. If the motion sensor is triggered, the lighting controls shall dim the lighting back up to the previous lighting level and timeout is restarted. In spaces with timer switches, the system shall accept an override signal at any time either before or after the lighting is turned off. The occupant shall not be required to wait for the lights to go out before issuing the override.
2. Where shown on the plans, a photocell is to be used to measure the light level and signal to the room controller to dim the luminaires continuously (from 100% to 15% or lower, including off) in the daylight zone to maintain a consistent (within +10% and -0%) lighting level in the space.

3.4 MANUFACTURER'S FIELD SERVICES

- #### A. Coordinate with the sales representative to coordinate the below requirements with the manufacturer.
1. The manufacturer shall provide instruction at the start of the job to Contractor regarding the proper installation of the system.
 2. As part of the system startup process, the manufacturer shall provide all initial field programming of the system.
 3. Using certified factory representatives, the manufacturer shall inspect the finished installation against the shop drawings and installation instructions.

4. Using certified factory representatives, the manufacturer shall do functional testing of the finished installation. Submit documentation of the functional testing in accordance with Part 1 of this specification.

3.5 ADJUSTING

- A. Motion sensors may be affected by various conditions in the room. It may be necessary for Contractor to make adjustments, change the location or type of sensor to obtain proper operation in a specific room. Contractor/equipment manufacturer shall have final responsibility for proper operation and coverage of the system in each room and should therefore make labor allowance for such changes and adjustments. Contractor is also responsible for acquiring approval from Engineer for any changes or deviations from project specifications.
- B. Work with the manufacturer to correct all findings from manufacturer functional testing.
- C. Work with the manufacturer to correct all findings made by the third party commissioning agent or registered design professional, whichever entity performs the commissioning service. This contractor is responsible for the entire lighting control system and luminaires to pass the commissioning inspection and reporting.

3.6 OWNER'S TRAINING AND DEMONSTRATION

- A. Upon completion of testing and adjustment, demonstrate operation of the system to representatives of Owner.
- B. Instruct Owner's personnel in proper maintenance, adjustment, and operation of the motion sensor lighting controls.
- C. Discuss with Owner the time clock feature programming requirements (on/off times and school schedule) and teach them to program the clock feature to match the required schedule.
- D. Upon completion of testing and adjustment (commissioning), Contractor and a direct employee of the equipment manufacturer (who is already familiar with the details of the project) shall demonstrate operation, proper maintenance, troubleshooting and adjustment of the lighting control system and all sensors throughout the building. Owner shall receive a minimum of 4 hours and a maximum of 8 hours in an on-site training session. The length of the training session shall be at the discretion of Owner. The training shall cover the following areas in detail:
 1. Scope of system: Review the as-built documentation with Owner to detail extent of system. Identify locations of all wall stations, wiring, and panels that fall within the scope of the lighting control system. Define clear lines of scope between lighting control system and EMS functions if applicable.
 2. Operation of system: Cover normal operation of switches, push-buttons, LCD interfaces and software (if provided). Provide documentation to Owner showing the operational zoning of controlled circuits and all time-clock events

programmed into the Lighting Control System. Show Owner how to change and add/delete events.

3. Maintenance and Troubleshooting of system: Detail any required or optional preventive maintenance actions required of Owner. Go over step-by-step procedures to troubleshoot all possible failure modes of each component type of the lighting control system. Cover procedure to get lights turned on in any space containing a lighting control system in the event the control system fails. Identify any specialized equipment necessary to support all the above actions.
4. Service and Support of system: Identify nearest direct support contact for the manufacturer and provide both telephone and email contact details.

END OF SECTION 26 09 23