

SECTION 260923
LIGHTING CONTROL DEVICES
EATON'S LIGHTING SYSTEMS INTEGRATED SENSORS

PART 1- GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. This section includes all Integrated Sensor technology products to be directly installed within a lighting fixture. This includes self-contained multi technology passive infrared (PIR) and daylight dimming sensors factory installed within a light fixture.
- B. Related Sections:
 - 1. Section [260926 – Lighting Control Panelboards:] Lighting panels (switching) controlled by Central Dimming Control System.
 - 2. Section [262726 - Wiring Devices] Lighting Controls
 - 3. Section [265113 – Interior Lighting Fixtures, Lamps and Ballasts:] Fluorescent lighting ballasts controlled by central dimming control system.

1.2 REFERENCES

- A. American National Standards Institute/Institute of Electrical and Electronic Engineers (ANSI/IEEE)
 - 1. C62.41-1991 – Recommended Practice for Surge Voltages in Low Voltage AC Power Circuits.
- B. ASTM International (ASTM)
 - 1. D4674 -02a Standard Test Method for Accelerated Testing for Color Stability of Plastics Exposed to Indoor Fluorescent Lighting and Window-Filtered Daylight.
- C. Canadian Standards Association (CSA).
 - 1. CSA C22.2 # 14 Industrial Control Equipment
 - 2. CSA C22.2 # 184 Solid-State Lighting Controls
 - 3. CSA C22.2 # 156 Solid-State Speed Controls
- D. International Electrotechnical Commission .
 - 1. (IEC) 801-2 Electrostatic Discharge Testing Standard.
 - 2. IEC/EN 60669-2-1 Switches for household and similar fixed electrical installations - electronic switches.
- E. International Organization for Standardization (ISO)
 - 1. 9001:2000 – Quality Management Systems.
- F. National Electrical Manufacturers Association (NEMA)
 - 1. WD1 (R2005) - General Color Requirements for Wiring Devices.
- G. Norma Oficial Mexicana (NOM).
 - 1. NOM-003-SCFI Productos eléctricos - Especificaciones de seguridad (Electrical products - Safety Specifications)
- H. Underwriters Laboratories, Inc. (UL):
 - 1. 94 – Flammability Rating
 - 2. 916 – Energy Management Equipment.
 - 3. 508 (2005) - Standard for Industrial Control Equipment.
 - 4. 244A – Appliance Controls
 - 5. 935 (2005) - Fluorescent Ballasts

1.3 SYSTEM DESCRIPTION

- A. Permanently installed
 - 1. [Sensors within lighting fixtures]
 - 2. [Wall switch occupancy sensors]
 - 3. [Ceiling mounted occupancy sensors]
 - 4. [Switchpacks]

1.4 SUBMITTALS

- A. Submit under provisions of Section [013300.]

- B. Specification Conformance Document: Indicate whether the submitted equipment:
 1. Meets specification exactly as stated.
 2. Meets specification via an alternate means and indicate the specific methodology used.
- C. Shop Drawings; include:
 1. Lighting plan clearly marking product type, location and orientation of each sensor upon request of sensor and lighting layout.
- D. Product Data: Catalog specification sheets with performance specifications demonstrating compliance with specified requirements.

1.5 QUALITY ASSURANCE

- A. Manufacturer: Minimum [20] years' experience in manufacture of occupancy sensor lighting controls.
- B. Manufacturer's Quality System: Registered to ISO 9001:2000 Quality Standards, including in-house engineering for product design activities.
- C. Occupancy Sensing Lighting Controls:
 1. Listed by [CSA] [NOM] [UL] specifically for the required loads. Provide evidence of compliance upon request.
- D. Installer Qualifications: Installer shall be one who is experienced in performing the work of this section, and who has specialized in installation of work similar to that required for this project.
- E. Source Limitations: To assure compatibility, obtain lighting fixtures with integrated occupancy sensors from a single source with complete responsibility over all lighting controls, including accessory products. The use of subcontracted component assemblers is not acceptable.

1.6 PROJECT CONDITIONS

- A. Do not install equipment until following conditions can be maintained in spaces to receive equipment:
 1. Ambient temperature: 0° to 40° C (32° to 104° F).
 2. Relative humidity: Maximum 90 percent, non-condensing.
 3. Occupancy Sensors must be protected from dust during installation.

1.7 WARRANTY

- A. [Provide manufacturer's 5-year parts warranty.]

1.8 MAINTENANCE

- A. Make ordering of new equipment for expansions, replacements, and spare parts available to end user.
- B. Make new replacement parts available for minimum of ten years from date of manufacture.
- C. Provide factory direct technical support.

PART 2- PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer: Eaton Lighting Systems
- B. Substitutions: [Not permitted.] [Under provisions of Division 1.]
 1. All proposed substitutions (clearly delineated as such) must be submitted in writing for approval by the design professional a minimum of 10 working days prior to the bid date and must be made available to all bidders.
 2. Proposed substitutes must be accompanied by a review of the specification noting compliance on a line-by-line basis.
 3. Any substitutions provided by the contractor shall be reviewed at the contractor's expense by the electrical engineer at a rate of [\$200.00] per hour.
 4. By using pre-approved substitutions, the contractor accepts responsibility and associated costs for all required modifications to circuitry, devices, and wiring.
 5. Provide complete engineered shop drawings (including power wiring) with deviations for the original design highlighted in an alternate color to the engineer for review and approval prior to rough-in.

2.2 SENSOR PERFORMANCE REQUIREMENTS

- A. Factory Installation:

1. The integrated sensor shall be fully factory prewired to the luminaire, requiring only a power connection to fully operate.
- B. Sensing mechanism:
 1. [Infrared]: Utilize multiple segmented lens, with internal grooves to eliminate dust and residue build-up.
 2. [Daylight Dimming]:
 - a. An integral daylight sensor shall continually measure the amount of visible light under the lighting fixture to provide continuous dimming.
 - b. The integral daylight sensor shall maintain six daylighting scenes that can be factory set or user adjustable. Daytime Occupied, Daytime UnOccupied, Twilight Occupied, Twilight UnOccupied, Nighttime Occupied, Nighttime UnOccupied.
 - c. The integral daylight sensor shall utilize a closed loop daylighting algorithm to maintain the light level.
 - d. The integral daylight sensor shall have a 60° cone of reference to measure the amount of light on the work surface.
- C. Power failure memory:
 1. Controls incorporate non-volatile memory. Should power be interrupted and subsequently restored, settings and parameters saved in protected memory shall not be lost.
- D. Designed and tested to withstand discharges without impairment of performance when subjected to discharges of 15,000 volts per IEC 801-2.
- E. Products tested in identical manner, complaint to NEMA WD 7 -2011 Occupancy Motion Sensors Standards.
- F. Integrated occupancy sensor shall have time delays from 5 to 20 min, with a 20 minute default.
- G. Integrated daylight dimming sensor shall maintain a default Occupied light level of 500 lux at the work surface without the need for user intervention.
- H. Integrated daylight dimming sensor shall be adjustable to other light levels using the optional programming remote.
- I. Integrated sensors shall provide an LED as a visual means of indication at all times to verify that motion is being detected during both testing and normal operation.
- J. Integrated sensors shall provide an LED as visual means of indication of IR commands from the optional programming or personal remote controls.
- K. On power up, the integrated sensor shall turn the lighting ON immediately and respond to visible light within 1 minute, without the need of user intervention or programming.

2.3 Programming Handheld Remote

- A. Product: [HHPRG-MS]
- B. Optional handheld remote providing the ability to adjust settings of the integrated sensor system.
 1. On/Off – Shall provide a mechanism to turn On and Off the luminaire for manual control or occupancy scene programming.
 2. Raise/Lower – Shall provide the ability to raise and lower the luminaire light level for manual control or occupancy scene programming.
 3. Occupancy Timeout – Shall provide the ability to set the occupancy time out value in the following intervals 5,10,15,20 minutes.
 4. LO/HI – Shall provide a mechanism to adjust the PIR sensitivity level from Low to High
 5. SET – Shall provide a mechanism to store occupancy scene values by adjusting the light level to the desired setting, pressing the SET button and the DO, DU, TO, TU, NO, NU, and ES scene buttons.
 6. ES – Shall provide the ability to store an Energy Saver (ES) scene for automatic energy savings when the sensor does not detect occupancy for half of the occupancy timeout value.
 7. DO/DU – Shall provide occupancy scenes for Daytime Occupied (DO) and Daytime UnOccupied (DU) light levels.
 8. TO/TU - Shall provide occupancy scenes for Twilight Occupied (TO) and Twilight UnOccupied (TU) light levels.
 9. NO/NU - Shall provide occupancy scenes for Nighttime Occupied (NO) and Nighttime

UnOccupied (NU) light levels.

- 2.4 Personal Handheld Remote
 - A. Product: [ISHH-02]
 - B. Optional handheld remote providing the ability to adjust personal light levels of the integrated sensor system.
 - 1. On/Off – Shall provide a mechanism to turn On and Off the luminaire for manual control.
 - 2. Raise/Lower – Shall provide the ability to raise and lower the luminaire light level for manual control.
 - 3. Scene Buttons – Shall provide the ability for the user to select pre-defined scenes for light level adjustments. Scenes are programmed using the optional Programming Handheld Remote [HHPRG-MS]
- 2.5 SOURCE QUALITY CONTROL
 - A. Perform full-function testing on 100% of all system components and luminaire assemblies at the factory.

PART 3- EXECUTION

3.1 INSTALLATION

- A. Install equipment in accordance with manufacturer's installation instructions.
- B. Provide complete installation of system in accordance with Contract Documents.
- C. Provide equipment at locations and in quantities indicated on Drawings. Provide any additional equipment required to provide control intent.

3.2 TESTING

- A. Upon completion of all wiring and after all fixtures are installed, each installed luminaire integrated sensor shall be tested by ensuring the following.
 - 1. The luminaire turns On upon power up.
 - 2. The integrated sensor LED blinks as it detects motion
 - 3. Using the optional handheld remote
 - a. Press the On/Off button and ensure the luminaire turns On/Off
 - b. Press the Raise/Lower button and ensure the luminaire light level increases and decreases
 - c. Press the DU button and ensure the luminaire turns Off
 - d. Press the DO button and ensure the luminaire turns On
 - e. If possible leave the area and ensure the lighting turns Off based on no occupancy
- B. At the time testing, the owner's representative shall be thoroughly instructed in the proper operation of the system.

END OF SECTION