

## **SECTION 260923 - LIGHTING CONTROL DEVICES**

### **PART 1 - GENERAL**

#### **1.1 SUBMITTAL REQUIREMENTS**

- A. Product Data
  - 1. For equipment, materials and systems specified in this section. Include product data, descriptive information, technical data, wiring diagrams, load restrictions, etc.
- A. Shop Drawings
  - 1. Submit lighting control drawings with actual occupancy/ vacancy sensor quantities, types, locations and coverage patterns as needed to provide fully operational coverage for each affected area.

### **PART 2 - PRODUCTS**

#### **2.1 MANUAL LIGHTING CONTROL DEVICES – SEE SECTION 262726.00**

#### **2.2 AUTOMATED LIGHTING CONTROL**

- A. Photocells
  - 1. Provide Tork #2107 (for 120/277 volt applications) and Tork #2104 (for 208/277 volt applications) photocells or equal by Intermatic, 2000W tungsten rated, 1800VA ballast rated, -40 to 140 degree F rated, fail-on, with contacts that remain closed from dusk to dawn (on at 1 to 5fc, off at 3 to 15fc). Provide delay of up to two minutes to prevent false switching due to vehicular lights or lightning. Provide mobile light level selector. Provide gasketed heavy duty die cast zinc housing and base. Determine exact mounting locations and adjustment requirements in field relative to structural and site conditions. Aim northward wherever not conflicting with artificial light sources.
- B. Digital Timer Switches: Provide Standard of Quality equal to WattStopper TS-400. Provide time range as indicated on drawings or as directed in field based on specific applications. Provide wall plates and finish colors to match color and style specified in section 262726 “Wiring Devices.”
- C. Time Based Control - Multi-Purpose Time Clocks (7 Day): Provide Tork #T930I-E multi-purpose time clocks (or equal by Intermatic) with photocell initiation (where applicable) and 7-day/24-hour control with external accessibility of override controls. Provide 3-zone unit (1-timer control only, 1-photocell control only and 1-photocell control on/timer control off). Provide required external contactors, relays, etc. to render

the control sequences fully operational. Verify zone control requirements in field prior to rough-in. Provide battery backup extended power carryover and one spare unopened battery.

## 2.3 OCCUPANCY SENSORS

### A. General

1. Provide labor, materials, tools, appliances, control hardware, sensor, wire, junction boxes and equipment necessary for and incidental to the delivery, installation and furnishing of completely operational occupancy sensor lighting controls, as described herein.
2. Provide products supplied from a single manufacturer that has been continuously involved in manufacturing of occupancy sensors for a minimum of five (5) years.
3. Provide occupancy sensors for entire project that are all made by the same manufacturer, regardless of where the materials are specified in Division 26 documents. Provide components that are all made by the same manufacturer in cases where occupancy sensor components are also connected to a building lighting control system, regardless of where the materials are specified in Division 26 documents.
4. Provide components that are U.L. listed, offer a five (5) year warranty and meet state and local applicable code requirements.
5. Provide products manufactured by an ISO 9002 certified manufacturing facility with a defect rate of less than one-third of one percent.
6. Provide sensors capable of operating normally with LED Drivers, electronic ballasts, PL lamp systems and rated motor loads.
7. Provide sensors with coverage that remains constant after sensitivity control has been set. Automatic reduction in coverage due to the cycling of air conditioner or heating fans is not permitted.
8. Provide sensors with readily accessible, user adjustable settings for time delay and sensitivity. Locate settings on the sensor (not the control unit) and recess to limit tampering.
9. Provide bypass manual override on each sensor to accommodate failures. Configure so that when bypass is utilized, lighting remains on constantly or control diverts to a wall switch until sensor is replaced. Recess this control to prevent tampering.
10. Provide sensors with an LED as a visual means of indication at all times to verify that motion is being detected during both testing and normal operation.
11. Where specified, provide sensor with internal additional isolated relay with Normally Open, Normally Closed and Common outputs for use with HVAC control, Data Logging and other control options. Do not use sensors that utilize separate components or specially modified units to achieve this function.
12. Provide sensors with UL rated, 94V-0 plastic enclosures.

- B. Acceptable Manufacturers: Subject to being equivalent and subject to compliance with requirements, provide product by one of the manufacturers listed below. If not listed, submit as substitution.

1. Cooper Greengate CA
  2. Hubbell
  3. LC&D
  4. Leviton
  5. Lutron
  6. Sensor Switch
  7. Phillips
  8. Wattstopper
- C. Passive infrared sensors: Provide sensors that utilize Pulse Count Processing and Digital Signature Analysis to respond only to those signals caused by human motion and that provide high immunity to false triggering from RFI (hand-held radios) and EMI (electrical noise on the line). Provide sensors that also have multiple segmented Fresnel lens, in a multiple-tier configuration, with grooves-in to eliminate dust and residue build-up.
- D. Dual technology sensors: Provide sensors that are either wall mounted, corner mounted or ceiling mounted in such a way as to minimize coverage in unwanted areas. Provide passive infrared and ultrasonic or microphonic technologies for occupancy detection.
- E. Ultrasonic sensors: Provide sensors that utilize Advanced Signal Processing to adjust the detection threshold dynamically to compensate for constantly changing levels of activity and air flow throughout controlled space. Crystal control operating frequency at 25 kHz within  $\pm 0.005\%$  tolerance, 32 kHz within  $\pm 0.002\%$  tolerance, or 40 kHz  $\pm 0.002\%$  tolerance to assure reliable performance and eliminate sensor cross-talk. Do not use sensors with multiple frequencies.
- F. Ceiling Sensors: Provide Standard of Quality equal to WattStopper: WT-605, WT-600, WT-1105, WT-1100, WT-2205, WT-2200, WT-2250, WT-2255, WP-605, WP-1105, WP-2255, WP-2205, W-500A, W-1000A, W-2000A, W-2000H, UT-300, UT-305, UT-355, WPIR, HB-100, HB-150, DT-200, DT-205, DT-300, DT-305, DT-355, CX-100, CX-105, CI-200, CI-205, CI-300, CI-305, CI-355, CI-12 or CI-24 series.
- G. Wall Switch Sensors: Provide Standard of Quality equal to WattStopper: PW-100, PW-100-24, PW-200, WI-200, WI-300, WS-200, WD-170, WD-180, WD-270, WD-280, WN-100-120, WN-100-277, UW-100, UW-100-24, UW-200, DW-100, DW-100-24 or DW-200 series. Provide wall switch sensors capable of detection of occupancy at desktop level up to 300 square feet, and gross motion up to 1000 square feet. Provide units that accommodate loads from 0 to 800 watts at 120 volts; 0 to 1200 watts at 277 volts and that have 180° coverage capability. Provide wall switch products that utilize Zero Crossing Circuitry to increase relay life, protect from the effects of inrush current, and increase sensor's longevity. Provide wall switch sensors that have no leakage current to load, in manual or in Auto/Off mode for safety purposes, and that have voltage drop protection. Where specified, provide wall switch sensors with field selectable option to convert sensor operation from automatic-ON to manual-ON. Where specified, provide vandal resistant wall switch sensors that utilize hard lens with minimum 1.0mm thickness. Do not provide products that utilize a soft lens.

- H. Wall Switch Sensors with Integral Dimmer Controls: Equal to Lutron Maestro Series, Model No. MS-Z101-XX, 120-277V, 8A minimum with 0-10V dimming. Provide occupancy/vacancy sensing using PIR or PIR/US technology. Provide product compliant with latest adopted editions of ASHRAE 90.1 and Title 24.
- I. Power and Auxiliary Packs: Provide Standard of Quality equal to WattStopper: B120E-P, B277E-P, BZ-150, LC-100, C120E-P, C277E-P, S120/277-P, AT-120 or AT-277 series.
- J. Momentary-Contact Toggle Switches: Provide Standard of Quality equal to Legrand: LVS-1, 3 Amp, 24 VAC/VDC, single-pole, double-throw with center rest, designed to fit conventional toggle switch openings.
- K. Circuit Control Hardware: For ease of mounting, installation and future service, provide control units that are able to be externally mounted through a 1/2" knock-out on a standard electrical enclosure and be integrated, self-contained units consisting internally of isolated load switching control relay and transformer to provide low-voltage power. Provide control units that provide power to a minimum of two (2) sensors. Provide control wiring between sensors and controls units that is Class II , 18-24 AWG, stranded U.L. Classified, PVC insulated or TEFLON jacketed cable suitable for use in plenums. Provide minimum #12 AWG wire gauge to and from the circuit control hardware relays. Provide Relay Contacts with ratings of:
  - 1. 20A - 120 VAC Ballast and LED Driver

## **PART 3 - EXECUTION**

### **3.1 GENERAL**

- A. Installation: Provide grounded ("neutral") conductor in all lighting control device (switch, dimmer, occupancy sensor, etc.) wall outlet boxes, even if not immediately used.
- B. Occupancy Sensors
  - 1. Locate and aim sensors in the correct location required for complete and proper volumetric coverage within the range of coverage(s) of controlled areas per the manufacturer's recommendations. Provide ninety (90) to one hundred (100) percent coverage in rooms to completely cover the controlled area to accommodate all occupancy habits of single or multiple occupants at any location within the rooms. The locations and quantities of sensors shown on the drawings are diagrammatic and indicate only the rooms which are to be provided with sensors. Provide additional sensors if required to properly and completely cover the respective room.
  - 2. Arrange a pre-installation meeting with manufacturer's factory authorized representative, at Owner's facility, to verify placement of sensors and installation criteria.

3. Exercise proper judgment in executing the installation to ensure the best possible installation in the available space and to overcome local difficulties due to space limitations or interference of structural components.
4. Provide, at the Owner's facility, the training necessary to familiarize the Owner's personnel with the operation, use, adjustment, and problem solving diagnosis of the occupancy sensing controls.
5. Upon completion of the installation, provide complete commissioning for controls by the manufacturer's factory authorized technician who will verify adjustments and sensor placement to ensure trouble-free occupancy-based lighting controls. Provide the Owner and Design Professionals with ten working days written notice of the scheduled commissioning date. Upon completion of related work, including fine tuning, provide factory authorized technician training to the Owner's personnel in the adjustment and maintenance of the sensors.

**END OF SECTION 260923**