

Design Standard

Lighting Control Devices

Purpose:

This design standard has the purpose of creating a consistent application of lighting control requirements throughout the East Side Union High School District, therefore achieving a standard of quality for maintenance, reliability, and operational efficiency throughout all renovation and new building projects. This design standard covers occupancy and daylight sensors.

Design Standard:

1. General

- a. Provide service access to low voltage sensor power packs.
- b. Design lighting relays to be in a single location.
- c. Ensure labeling of devices for easy identification for service/repair.

2. Occupancy Sensors

- a. Design and specify occupancy sensors, combined occupancy sensors/wall switches, and/or automatic switches to sense the presence of human activity within the desired space and enable or disable the on/off manual lighting control function provided by local switches.
- b. Occupancy sensors to be UL listed and carry factory warranty for minimum 5-year duration.
- c. Occupancy Sensors
 - i. Passive Infrared Sensors:
 - Sensor Function: Detects human presence in the floor area being controlled by detecting changes in the Infrared energy. Sensor detects small movements, i.e., when a person is writing while seated at a desk.
 - ii. Ultrasonic Occupancy Sensors:
 - Sensor Function: Detects human presence in the controlled floor area by detecting Doppler shifts in 40kHz ultrasound created by sensor.
 - iii. Dual Technology Sensors:
 - Sensor Function: Sensor has combined capability of passive infrared and ultrasonic sensors as described above.
- d. Combined Occupancy Sensor/Wall Switches (“Sensor Switches”):
 - i. Completely self-contained sensor system that fits into a standard single gang box. Internal transformer power supply, latching dry contact relay switching mechanism compatible with electronic

- ballasts, compact fluorescent, and inductive loads. Triac and other harmonic generating devices are not allowed.
- e. Upon detection of human activity by the detector, sensor initiates a time delay to maintain the lights on for a preset period of time. The detector shall have field adjustable time delay settings from 30 seconds to 30 minutes.
 - f. Factory set sensors for maximum sensitivity.
 - g. LED lamp built into sensor indicates when occupant is detected.
 - h. Provide zero cross relay control with sensors and sensor/switches; relay contacts close and open when AC voltage signal is at zero.
 - i. Where line voltage sensors and sensor/switches are used, provide to match voltage of controlled circuit.
 - j. Install occupancy and vacancy sensors as directed by manufacturer's instructions. Provide connections to control circuits, sensors, power supply pack and low voltage wiring.
 - k. Provide power packs for the sensor to control the number of circuits and/or switch legs within its area of coverage. Power pack may serve more than one sensor.
 - l. Sensor locations shall be coordinated with furnishings and equipment plans prior to installation.
 - m. Field adjust each sensor to maximize its coverage of the room space.
 - n. Relocate sensors with ultrasonic technology to avoid being closer to HVAC diffusers and power packs than recommended by manufacturer.
 - o. Field set time delay for each device as noted below:
 - i. Classrooms, Offices, Conference Rooms: 15 minutes.
 - ii. Multiple Stall Restrooms: 15 minutes. 30 minutes if interlocked with the exhaust fan.
 - iii. Single Stall Restrooms: 5 minutes. 15 minutes if interlocked with the exhaust fan.
 - iv. Storage Rooms, Custodial Closets, Single Stall Restrooms: 5 minutes.
 - v. All Other Spaces: 15 minutes.
 - vi. Timer Switches: 2 hours.
 - p. Prior to applying dimming controls, maintain fluorescent lighting at full output for a minimum of 100 hours of burn-in, so as not to degrade the service life of the lamps and ballasts. If this is not done, replace lamps and ballasts of affected luminaires at no cost to Owner.

3. Daylight Sensors

- a. Daylighting control systems include but are not limited to the following:
 - i. Continuous Dimming Daylighting Controller: Provide dimming control systems capable of controlling 10VDC control input fluorescent dimming ballasts in three output zones via one photocell,

- with system adjustments capable of being made at control module instead of remote photocell.
- ii. Switched Daylighting Controller: Provide switched control systems capable of controlling three output zones via one photocell with system adjustments capable of being made at control module instead of remote photocell.
 - iii. Local Continuous Dimming Photocell: Provide local daylighting photocell capable of directly controlling up to fifty 10VDC control input fluorescent dimming ballasts.
 - iv. Local Switched Photocell: interfaces with room occupancy sensor power pack, where available.
 - v. HID High/Low Ballast Switching: Provide HID bi-level HID controller for each HID luminaire in switched daylighting control area. Controller to contain both capacitor and control module, allowing HID ballast to be switched to 50 percent of full power output based on 24VDC control signal.
- b. Daylighting controls to be UL listed and carry factory warranty for minimum 5-year duration.
 - c. Design and specify all daylighting controls to meet the following requirements based on Code requirements and industry standard of care:
 - i. Continuous Dimming Daylight Controller: Provide dimming control of interior lights in response to light level data, compatible with 0 to 10VDC dimming ballasts. Control system to be open loop, and will provide three output control zones consisting of a 0 to 10VDC signal compatible with fluorescent dimmable ballasts. Control system includes three relay outputs capable of switching each of the three output zones off after an adjustable time delay when a given channel is fully dimmed.
 - d. Installation
 - i. Install photocells as directed by manufacturer's instructions. Complete connections to control circuits, photocells, control modules, power supply pack and low voltage wiring.
 - ii. Verify with manufacturer's representative that the sensors and photocells are laid out in compliance to manufacturer's published sensing distribution. Provide additional sensors for complete coverage of the space being served.

Approved Manufacturers:

- WattStopper

Substitutes Allowed:

No substitutes allowed.

Pursuant to Section 3400 of the Public Contract Code: WattStopper lighting controls are now in use on the particular public improvement described as East Side Union High School District. At each instance in these specifications that a lighting control sensor is designated by the brand name “WattStopper”, that product is designated to support the existing controls system that is in place at East Side Union High School District. The Contractor will furnish and apply only “WattStopper” sensors as required, and no substitutions shall be deemed to be “or equal” or allowed.

Associated Design Standards and Construction Specifications:

- Division 26 Electrical Design Standards
- Division 26 50 00 Lighting Design Standards

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