

SECTION 26 09 23 - LIGHTING CONTROL DEVICES AND CONTROL PANELS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Remote control lighting relays.
 - 2. Lighting contactors.
 - 3. Switches.
 - 4. Switch plates.
 - 5. Occupancy sensors.
 - 6. Photocells.
 - 7. Photocell control unit.

1.2 SYSTEM DESCRIPTION

- A. The devices are to be connected to the Network Lighting Control System.
- B. Distributed switching control using self-contained individually mounted lighting relays.

1.3 SUBMITTALS

- A. Shop Drawings: Indicate dimensioned drawings of lighting control system components and accessories.
 - 1. Wiring Diagram: Indicating system configuration indicating panels, number and type of switches or devices.
 - 2. Include typical wiring diagrams for each component.
- B. Product Data: Submit manufacturer's standard product data for each system component.

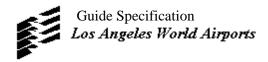
1.4 WARRANTY

A. Furnish five year manufacturer warranty for components.

PART 2 - PRODUCTS

2.1 REMOTE CONTROL LIGHTING RELAYS

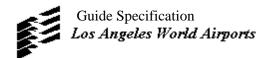
A. Manufacturers:



- 1. LC & D.
- 2. Lutron.
- 3. General Electric.
- B. Product Description: Heavy duty, single-coil momentary contact mechanically held remote control relays.
- C. Contacts: Rated 20 amperes at 120 or 277 volts. Rated for lighting applications with high intensity discharge (HID), quartz halogen, tungsten, or fluorescent lamps.
- D. Line Voltage Connections: Clamp type screw terminals.
- E. Enclosure: NEMA ICS 6, to meet conditions. Fabricate enclosure from steel finished with manufacturer's standard gray enamel.
 - 1. Interior Dry Location: Type 1
 - 2. Exterior Locations: Type 4

2.2 LIGHTING CONTACTORS

- A. Manufacturers:
 - 1. Cutler-Hammer.
 - 2. Square D.
 - 3. General Electric.
- B. Product Description: NEMA ICS 2, magnetic lighting contactor.
- C. Configuration: Mechanical held, 3 wire control.
- D. Coil Operating Voltage: 120 or 277 volts, 60 Hertz.
- E. Poles: To match circuit configuration and control function.
- F. Contact Rating: 20A
- G. Accessories:
 - 1. Cover Mounted Pilot Devices: NEMA ICS 5, standard-duty heavy-duty oil-tight type with Form Z contacts, rated A150.
 - 2. Pushbutton: ON/OFF function, with unguarded recessed covered configuration.
 - 3. Selector Switch: ON/OFF/AUTOMATIC functions, with rotary action.
 - 4. Auxiliary Contacts: One field convertible in addition to seal-in contact.
 - 5. Relays: NEMA ICS 2



- 6. Control Power Transformers: 120 volt secondary, in each enclosed contactor. Furnish fuse primary and secondary, and bond unfused leg of secondary to enclosure.
- H. Enclosure: NEMA ICS 6, to meet conditions. Fabricate enclosure from steel finished with manufacturer's standard gray enamel.
 - 1. Interior Dry Location: Type 1.
 - 2. Exterior Locations: Type 4.

2.3 SWITCHES

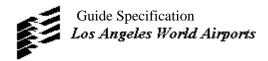
- A. Manufacturers:
 - 1. Hubbell Incorporated.
 - 2. Leviton Manufacturing Co., Inc.
 - 3. Pass and Seymour.
- B. Wall Switch: Specification Grade unlighted, momentary pushbutton type for overriding relays.
 - 1. Material: Plastic.
 - 2. Color: White.
- C. Wall Switch: Industrial Grade non-pilot light toggle switches for overriding relays.
 - 1. Color: White
- D. Key Switch: Cylinder lock type. Match non-key switch rating.

2.4 SWITCH PLATES

- A. Manufacturers:
 - 1. Hubbel Incorporated.
 - 2. Leviton Manufacturing Co., Inc.
 - 3. Pass and Seymour.
- B. Product Description: Specification Grade.
 - 1. Material: Stainless steel, type 302.
 - 2. Color: to be selected by Designer.

2.5 OCCUPANCY SENSOR

- A. Manufacturers:
 - 1. LC & D.



2. Novitas.

3. Watt Stopper.

- B. Compatible with modular relay panels. Capable of being wired directly to Class 2 wiring without auxiliary components or devices.
- C. Separate sensitivity and time delay adjustments with LED indication of sensed movement. User adjustable time-delay: 30 seconds to 12 minutes.
- D. Furnish with manual override.
- E. Operation: Silent.
- F. Room Sensors: Dual Technology.
- G. Corridor and Hallway Sensors:
 - 1. Capable of detecting motion 14 feet wide and 80 feet long with one sensor mounted 10 feet above floor.
 - 2. Capable of detecting motion in warehouse aisle 10 feet wide and 60 feet long or 100 feet long when mounted 22 feet above floor.
 - 3. Capable of being wired in master-slave configuration to extend area of coverage.

2.6 PHOTOCELLS

- A. Manufacturers:
 - 1. LC & D.
 - 2. Novitas.
 - 3. Watt Stopper.
- B. General: Consist of sensor mounted with separate control-calibration module. Sensor connected to control-calibration module via single shielded conductor with maximum distance of 500 feet (150 m).
- C. Control-Calibration Module: Furnish with the following:
 - 1. Capable of being switched between 4 measurement ranges.
 - 2. Separate trip points for high and low response settings.
 - 3. Momentary contact device to override photocell relays.
 - 4. Three minute time delay between switching outputs to avoid nuisance tripping.
- D. Sensor Devices: Each sensor employs photo diode technology to allow linear response to daylight within illuminance range.



- 1. Exterior Lighting: Hooded sensor, horizontally mounted, employing flat lens, and working range 1-10 foot-candles in 10 percent increments. Entire sensor encased in optically clear epoxy resin.
- 2. Indoor Lighting: Sensor with Fresnel lens providing for 60 degree cone shaped response area to monitor indoor office lighting levels.
- 3. Atriums: Sensor with translucent dome with 180 degree field of view and respond in range of 100-1,000 foot-candles.
- 4. Skylights: Sensor with translucent dome with 180 degree field of view and respond in range of 1,000-10,000 foot-candles.

2.7 PHOTOCELL CONTROL UNIT

- A. Manufacturers:
 - 1. LC & D.
 - 2. Novitas.
 - 3. Watt Stopper.
- B. Product Description: Photodiode control unit with PHOTOCELL ENABLE and MASTER OVERRIDE input for remote control, 3 minute time delay, and with selectable ranges for 1-10 foot-candle, 10-100 foot-candle, 100-1,000 foot-candle, and 1,000-10,000 foot-candle.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Mount switches, occupancy sensors, and photocells.
- B. Use only properly color coded, stranded wire, installed in conduit.
- C. Label each low voltage wire clearly indicating connecting relay panel.
- D. Mount relays. Provide wiring to numbered relays in panel to control each load.
- E. Install relays to be accessible. Allow space around relays for ventilation and circulation of air.
- F. Identify power wiring with circuit breaker number controlling load. When multiple circuit breaker panels are feeding into relay panel, label wires to indicate originating panel designation.
- G. Label each low voltage wire with relay number at each switch or sensor.



3.2 MANUFACTURER'S FIELD SERVICES

- A. Furnish services for minimum of one day for check, test, and start-up. Perform the following services:
 - 1. Check installation of panel boards.
 - 2. Test operation of remote controlled devices.
 - 3. Repair or replace defective components.

3.3 TRAINING

- A. Demonstrate operation of the following system components to staff to be trained:
 - 1. Operation of switches.
 - 2. Operation of each type of occupancy sensors.
 - 3. Operation of each type of photocell.
- B. Furnish 4 hours to instruct LAWA's personnel in operation and maintenance of system. Schedule training with LAWA, provide at least 7 days notice to Designer of training date.
- C. Provide manuals for attendees.

END OF SECTION 26 09 23