

SECTION 26 09 26 LOW VOLTAGE LIGHTING CONTROLS

PART 1 - GENERAL

1.01 RELATED DOCUMENTS:

- A. The Conditions of the Contract and applicable requirements of Division 1, "General Requirements", and Section 26 00 01, "Electrical General Provisions", govern this Section.

1.02 DESCRIPTION OF WORK:

- A. Work Included: The extent of low voltage lighting control work is as shown and scheduled, as indicated by the requirements of this Section, and as specified elsewhere in these Specifications.
- B. Types: The types of low voltage lighting control devices required for the project include, but are not limited to:
 - 1. Low Voltage Lighting Control.
 - 2. Relays and Transformers.
 - 3. Low voltage wiring.

1.03 QUALITY ASSURANCE:

- A. Manufacturers Provide products complying with these specifications and produced by one of the following:
 - 1. Douglas,
 - 2. Watt Stoppper,
 - 3. General Electric Company.
 - 4. Lutron
- B. All components are to be supplied by same manufacturer. Manufacturer to be a supplier of this type of equipment for over 10 years
- C. UL Label: All low voltage lighting control products shall be UL Labeled.

1.04 SUBMITTALS:

- A. Shop Drawing submittals shall include, but not be limited to, the following:
 - 1. Manufacturer's product data on all system components and accessories.
 - 2. Wiring diagrams indicating all control zones.
 - 3. Additional information as specified in Section 26 00 01.
 - 4. System shall be simple. No complex systems for easy maintenance.

1.05 PRODUCT DELIVERY, STORAGE AND HANDLING:

- 1. Deliver components in factory-fabricated water resistant packaging.
- 2. Handle components carefully to avoid damage to components, enclosures, and finish.
- 3. Store components in a clean, dry space and protect from weather.

PART 2 - PRODUCTS

2.01 LOW VOLTAGE SWITCHING CONTROLS:

- A. The Low Voltage Switching System shall consist of relay panel assemblies, low voltage switches, as well as their associated wiring in accordance with manufacturer's recommendations.
1. System shall provide time or photocell input based automatic control on all switched circuits that shall operate independently in each panel.
 2. A dataline shall interconnect all panels, and allow programming and manual override from a PC, furnished and set-up by Division 26.
- B. All relay panel interiors shall be pre-assembled complete with the necessary relays, transformers and devices. Relay panel interiors are to be separate from enclosure to permit easy mounting, conduit installation and wire pull to enclosures. Interiors to be inserted last and connections made. Modular Relay Panels shall be UL listed and consist of the following:
1. Tub: Empty NEMA 1 enclosure that can accept an interior sized to accept up to 12, 24, or 48 mechanically latching relays.
 2. Power Supply: Transformer assembly with VA as required to support relays and motion sensors with separate secondaries. Transformers include internal overcurrent protection with automatic reset and metal oxide varistor protection against power line spikes. Single unit provides either 120 or 277 VAC as required, 60 Hz +/- 10%.
 3. Cover: Surface or Flush as required, with captive screws in a hinged, lockable configuration.
 4. Interior: Bracket and intelligence board back pan with pre-mounted relays. Interiors shall be provided with up to 12, 24, or 48 installed and tested relays.
 5. Panel shall be provided with an integral DIN rail mounting bar for easy installation of other system components (such as a time clock and/or photocell controller). Terminals shall be included in the interior to accept a dataline for the connection of dataline switches to the system.
 6. Eight channels for grouping relays shall be provided in each interior regardless of size, each with an associated pushbutton to toggle the channel ON/OFF, and a terminal block for a separate dry contact input. Any number of relays in the panel can be assigned to each channel, with overlapping allowed. Channels shall be set up via Smartwiring, i.e. no hand held programmer or keypad is required. Systems that require programmers or keypads, or that change relay states during set up, are not acceptable. Each channel pushbutton shall provide LED status indication: RED shall indicate that all relays within the channel group are ON; NO LED shall indicate that all relays within the group are OFF, and GREEN shall indicate the channel's relays are in a MIXED state (some OFF, some ON).
- C. Relays shall be momentary-pulsed mechanically latching contactors with plug in connector. Relays shall have mechanically latching contacts with single moving part design for improved reliability.
1. Relays will have the following characteristics:

- a. Coil
 - 1) Magnetically held, momentary coil activation (50 milliseconds).
 - 2) 2.2 VA max per relay to allow up to 20 relays to be controlled in parallel using class 2 wiring.
 - 3) Split coil – ½ for ON, ½ for OFF.
 - b. Power Contacts
 - 1) 20 amp tungsten and NEMA electronic ballast rated.
 - 2) Rated for 50,000 ON/OFF cycles at full load.
 - 3) Support #10 - #14 AWG solid or stranded wire.
 - 4) 120, 277 and 347 volt rated.
 - 5) Standard 1 year warranty.
 - c. 30 VAC Isolated contacts for status feedback and pilot light indication.
 - d. FCC approved for commercial use only.
2. Next to each relay shall be an individual override button and a bi-color LED to indicate status.
 3. Panels shall support the “blink warning” function, with LED indication for each relay.
 4. Relays controlling HID fixtures shall not utilize the blink function.
 5. Captive screw terminations will be provided for all wiring connections.
 6. Each channel button’s dry control contact input terminal shall accept either 2 or 3-wire, maintained or momentary inputs. They shall also accept a 2-wire toggling input.
 7. Each channel shall also have an associated 1 amp, 30 VDC isolated contact which may be used for status feedback or pilot light control.
 8. Each panel shall include simple dials for setting a 2-digit panel address.
 9. The Relay Panel shall use an EEPROM to record the channel’s smartwiring assignments and the current status of all relays, thus insuring a 20-year backup of information in the event of a power failure. Systems that require a chargeable battery with less than 10 year’s life shall not be allowed.
 10. The unit shall provide LED status indication of the power supply status. Access to 24VAC and 24V rectified power for accessory devices shall be provided within the panel.
 11. The panel shall have an integrated DIN rail for mounting dataline control modules.
- D. The relay panel shall be capable of being networked using LonWorks Inter-Operable technology and the network nodes attached to the relay scanners shall be LonMark certified to the Level 3.1 standard for lighting.
- E. Switches: Provide Specification Grade standard, keyed, pilot, or locator configuration momentary pushbutton type switches as shown on the plans for overriding the relays. Colors and markings as indicated on plans.
1. Provide coverplates of materials as specified in Section 26 27 26, “Wiring Devices”.

2.02 PHOTOCONTROL MODULE

- A. Provide a photometric sensor, capable of sensing from 1-6,000 foot candles. The sensor is to be connected via 2-conductor, #18 AWG wire to the control unit located in the panel. Existing light levels shall be continuously displayed by LED’s. Set point adjustments shall

be easy to set with UP and DOWN control buttons. Instructions shall be printed on the label of the control unit.

- B. The control unit shall have two sets of outputs. Both output sets shall be capable of being overridden by a remote switch or via a button built into the photocell control unit.
- C. Each of the channels shall have the ability to be assigned a different trip level.

2.03 WIRING AND RACEWAYS:

- A. Line Voltage Control Wiring: This wiring shall be as specified in Section 26 05 13, "Medium Voltage Connectors and Cable".
- B. Low Voltage Control Wiring: This wiring shall be as specified in Section 26 05 19 except that conductors shall consist of a multiconductor jacketed cable whenever possible.
- C. Raceways: Raceways for line voltage and low voltage control wiring shall be as specified in Section 26 05 33, "Electrical Raceways", and Section 26 05 34, "Electrical Boxes".

PART 3 - PART 3 - EXECUTION

3.01 INSTALLATION OF MISCELLANEOUS ELECTRICAL CONTROLS:

- A. General: Install miscellaneous electrical control devices as shown, in accordance with applicable portions of the NECA's "Standard of Installation", and recognized industry practices to ensure that products serve the intended functions.
- B. Conductors: Connect electrical conductors to miscellaneous electrical control devices in accordance with equipment manufacturer's written instructions and wiring diagrams. Wherever possible, match conductors of the electrical connection for proper interface between the electrical supply and the installed equipment.
- C. Contactors, Relays and Low Voltage Switches: Install contactors, relays and low voltage switches mounted in panelboards or individual enclosures as shown and be complete, including all control wiring and devices.
- D. Programming: The Field Service Representative shall be responsible for programming the system based on the preliminary lighting schedule.
- E. Line and Low Voltage Control Wiring: Line and low voltage control wiring shall be installed in a suitable raceway.
- F. Connections: Refer to Section 26 27 17, "Equipment Wiring", for connections to equipment.
- G. Dataline switches shall be mounted in the spaces as indicated on the Reflected Ceiling Plans. Each low voltage wire shall be labeled clearly indicating which relay panel it connects to. Use only properly color-coded, stranded #18 AWG (or larger) wire as indicated on the drawings. All relays and switches shall be tested after installation to confirm proper operation, and all connected loads shall be recorded on the relay schedule for each panel.
- H. The relay panel shall be mounted as indicated on the drawings. The numbered relays in the panel shall be wired to control the power to each load as indicated on the Panel Wiring Schedules included in the drawings. All power wiring will be identified with the circuit

breaker number controlling the load. If multiple circuit breaker panels are feeding into a relay panel, wires shall clearly indicate the originating panel's designation.

3.02 SYSTEM STARTUP

- A. Manufacturer shall provide a factory authorized technician to confirm proper installation and operation of all system components.

3.03 TRAINING

- A. Lighting Control manufacturer shall provide Owner personnel training on the operation and programming of the lighting control system. Provide 24 hours for programming and system training. Also to include utilities & technical services.

3.04 DOCUMENTATION

- A. Manufacturer shall provide system documentation including:
 1. System 1-line showing all panels, system inputs and outputs and dataline.
 2. Drawings for each panel showing hardware configuration and numbering.
 3. Relay panel schedules indicating circuits connected, inputs assigned, area controlled, panel location and panel equipment details.
 4. Typical wiring diagrams for each component.

3.05 TESTING:

- A. Test contactors, relays, photocells, time switches, and related controls to verify that they function as designed and specified.
- B. Repair or replace any devices or installation which does not function as designed and specified.

3.06 IDENTIFICATION:

- A. General: Refer to Section 26 05 01, "Electrical Basic Materials and Methods", for nameplates and identification.

3.07 WARRANTY

- A. Refer to Division 1 and General Conditions for information regarding warranty.

END OF SECTION 26 09 26