SECTION 26 0943 - LIGHTING CONTROL SYSTEM

PART 1 - GENERAL

1.1 WORK INCLUDED:

A. Furnish and install a complete lighting control system. System shall include class 2 lighting control relays and micro-processor based programmable lighting controllers. Also include switches, occupancy sensors and other control devices that may be required, as well as wire, conduit and other materials required for the installation. Exact quantities and equipment configurations to be determined by plans, specifications and control schedules.

1.2 QUALITY ASSURANCE:

A. Manufacturer:
1. The supplier of the class 2 lighting relays and the programmable lighting controllers shall have been engaged in the manufacture of such equipment for at least five (5) years and have a documented history of successful installations.
2. Approved manufacturers are: Leviton, Wattstopper, or LC&D.

B. UL Compliance:
1. The class 2 lighting relays and programmable control equipment shall be listed under UL sections, 916 and/or 508.

C. FCC Compliance:
1. The programmable controllers shall comply with FCC emission standards specified in Part 15, sub-part J for commercial applications. In addition, the controllers must meet the higher FCC standards for residential applications.

D. Quality Assurance:
1. All components, equipment, assemblies, and software shall be factory tested before shipment. There shall be a 96 hour burn-in of controller electronics.

1.3 SERVICES:

A. The manufacturer must offer the following services:
1. Factory Assembly:
a. All control stations, panels, lighting controllers and associated apparatus shall be factory assembled and tested.
2. Factory Programming:
a. Controllers shall be factory programmed per project specifications. All required firmware and software shall be installed prior to factory shipment or downloaded from the factory via modem link.
3. Factory Support:
a. Factory assistance shall be available by phone and modem. On-site start-up, training, and troubleshooting assistance shall be available. Provide two (2) on-site start-up visits to the site.
4. Documentation:
a. The manufacturer shall provide a complete submittal package for approval prior to shipment. The package shall consist of: product cuts and specifications, bill of materials, warranty information, wire risers, point-to-point field wiring instructions, and detailed layout of control stations and other custom equipment. In addition to the submittals, a set of installation, operator, and maintenance manuals shall be shipped with the equipment.

1.4 RELATED SECTIONS:

A. Lighting

B. Lighting Control Devices

1.5 DEFINITIONS

PART 2 - EQUIPMENT DESCRIPTION

2.1 LIGHTING CONTROL PANELS

A. Provide lighting control panels in the locations and capacities as indicated on the plans and schedules. Each panel shall be of modular construction and consist of the following components:
   1. Enclosure/Tub shall be NEMA 1, as indicated on the plans, sized to accept an interior with 1-8 relays, 1-24 relays and six (6) four pole contactors, or 1-48 relays with six (6) four pole contactors.
   2. Cover shall be configured for surface wall mounting of the panel as indicated on the plans. The panel cover shall have a hinged and lockable door with restricted access to line voltage section of the panel.
   3. Interior assembly shall be supplied as a factory assembled component specifically designed and listed for field installation. The interior construction shall provide total isolation of high voltage (class 1) wiring from low voltage (class 2) wiring within the assembled panel. The interior assembly shall include intelligence boards, power supply, DIN rails for mounting optional Class 2 control devices, and individually replaceable latching type relays. The panel interiors shall include the following features:
      a. Provision for one or two optional control and automation cards.
      b. Removable, plug-in terminal blocks with screwless connections for all low voltage terminations.
      c. Individual terminal block, override push button, and LED status light for each relay
      d. Switch inputs associated with each relay and group channel shall support two or three wire, momentary or maintained contact switches or 24VDC input from occupancy sensors.
      e. Automatic support for occupancy sensor sequence of operation. Low voltage inputs automatically reconfigure when connected to a Watt Stopper occupancy sensor head. Occupancy sensor shall switch lighting on and off during unoccupied periods but shall not turn lighting off during scheduled occupancy periods.
      f. Isolated contacts within each relay shall provide true relay state to the electronics. True relay state shall be indicated by the on-board LED and shall be available to external control devices and systems.
      g. Automatic sequenced operation of relays reduces impact on the electrical distribution system when large loads are controlled simultaneously.
      h. Group, channel, and pattern control of relays shall be provided through a simple button-press interface within the panel. Any group of relays can be associated with a channel for direct on/off control or pattern (scene) control via a simple programming sequence using the relay and channel override push buttons and LED displays.
      i. Relay group status for each channel shall be provided through bi-color operation of the LED indicators. Solid red indicates that all relays in the group are on, solid green indicates that the group is in a mixed state, and blinking green indicates that the relays have blink warned and are currently timing out.
      j. Each relay and channel terminal block shall provide a 24V pilot light signal. It shall be possible to configure the system for support for any Class 2 pilot light voltage with the use of an auxiliary power supply.
      k. Single pole latching relays with modular plug-in design. Relays shall provide the following ratings and features:
         1) Electrical:
            a) 30 amp ballast at 277V
            b) 20 amp tungsten at 120V
            c) 1.5 HP motor at 120V
         2) Mechanical:
            a) Individually replaceable, ½" KO mounting with removable Class 2 wire harness
            b) Actuator on relay housing provides manual override and visual status indication, accessible from Class 2 section of panel
            c) Dual line and load terminals each support two #14 – #12 solid or stranded conductors
            d) Tested to 300,000 mechanical on/off cycles
         3) Isolated low voltage contacts provide for true relay status feedback and pilot light indication.
   4. Power supply shall be a multi-voltage transformer assembly with rated power to supply all

electronics, occupancy sensors, switches, pilot lights, and photocells as necessary to meet the project requirements. Power supply to have internal over-current protection with automatic reset and metal oxide varistor protection.

2.2 LONWORKS® BASED DIGITAL COMMUNICATIONS

A. The lighting control panel shall support digital communications to facilitate the extension of control to include multiple panels and other intelligent field devices. Digital communications shall be LonWorks® based and use the LonTalk® protocol in an open topology architecture.
   1. Dataline communications wire shall be 18 AWG, 4 unshielded copper conductors (two independent twisted pairs) meeting Class 2P NEC code requirements. The dataline shall be topology free and can be run in a serial, “T”or star configuration.
   2. The Dataline wire will be supplied by the equipment manufacturer and will include the manufacturer’s name, catalog number printed on the wire jacket. The contractor, at their own expense will, replace an improper dataline wire.
   3. Panels shall be digitally addressed and support bi-directional communication between each other and other intelligent field devices specified elsewhere.
   4. Intelligent field devices supported shall include digital dataline switches, network clock/programmer, telephone interface module, BMS interface module, photocell control module, programmable thermostat, and universal switch module.

2.3 DIGITAL NETWORK CLOCK

A. The lighting control system shall include a digital clock module capable of system wide automation of the lighting control on a scheduled basis. The clock shall provide capability for independent schedules for each of the eight system wide channel groups.

B. The clock shall support all of the energy saving features required of ASHRAE 90.1 - 2001, IECC 2003, as well as all state and local energy codes.

C. The clock module shall provide astronomic capabilities, time delays, blink warning, daylight savings, and holiday functions and will include a battery back up for the clock function and EEPROM for program retention. Clocks that require multiple events to meet local code lighting shut off requirements shall not be allowed.

D. The clock shall operate on a basis of unique pre-configured control scenarios. Scenarios shall include:
   1. Scheduled ON / OFF
   2. Manual ON / Scheduled OFF
   3. Manual ON / Auto Sweep OFF

E. The clock shall include system diagnostic functions to identify and verify communication with intelligent field devices anywhere on the network dataline,

F. The clock module shall function as a dataline switch programming tool and allow the assignment of relays and channel groups to dataline switch buttons.

G. The user interface shall incorporate an 8-line, 22-character per line LCD display and a simple pushbutton interface with on line help feature

H. The clock module shall employ non volatile memory and shall retain user programming and time for a minimum of 10 years.

I. Provide DIN rail mounting for the clock programmer in the Class 2 section of the lighting control panels.

PART 3 - EXECUTION

3.1 SUPPORT SERVICES

A. System Start Up and Commissioning
   1. Manufacturer shall provide a factory authorized technician to confirm proper installation and operation of all lighting control system components. The startup requirement is intended to verify:

a. That all occupancy sensors are located, installed, and adjusted as intended by the factory and the contract documents.
b. The occupancy sensors are operating within the manufacturer's specifications.
c. The sensors and relay panels interact as a complete and operational system to meet the design intent.

2. Manufacturer to provide a written statement verifying that the system meets the above requirements.

B. System Training
1. Manufacturer shall provide factory authorized technician to train owner personnel in the operation, programming and maintenance of the lighting control system including all occupancy sensors.
2. Factory authorized technician will provide two (2) site visits for system training.

C. System Programming
1. Manufacturer shall provide system programming including:
a. Wiring documentation.
b. Switch operation.
c. Telephone overrides.
d. Operating schedules.

END OF SECTION