SECTION 265120 – LIGHTING CONTROL PANELS

PART 1 GENERAL

1.1 INTRODUCTION

A. The work covered in this section is subject to the requirements in the General Conditions of the Specifications. Contractor shall coordinate the work in this section with the trades covered in other sections of the specification to provide a complete and operable system.

1.2 SYSTEM DESCRIPTION

A. Extent of lighting control system work is indicated by drawings and by the requirements of this section. It is the intent of this section to provide an integrated, energy saving lighting control system including Lighting Control Panels, Occupancy Sensors from a single supplier. Contractor is responsible for confirming that the panels and sensors interoperate as a single system.

1.3 QUALITY ASSURANCE

A. Manufacturers: Firms regularly engaged in the manufacture of lighting control equipment and ancillary equipment, of types and capacities required, whose products have been in satisfactory use in similar service for not less than 5 years.

B. Comply with NEC, NEMA, and FCC Emission requirements for Class A applications.

C. UL Approvals: Relay panels and accessory devices are to be UL listed under UL 916 Energy Management Equipment. Configured to order or custom relay panels shall be UL Listed under UL 508, Industrial Control Panels.

1.4 SUBMITTALS

A. Submit manufacturer's data on lighting control system and components including shop drawings, detailed point to point wiring diagrams, **and floor plans showing** occupancy sensor locations. Provide typical mounting details for occupancy sensors for this application.

1.5 MANUFACTURERS

A. This specification is based on products from Watt Stopper/Legrand, Santa Clara, CA. Any other system wishing to be considered must submit descriptive information 10 days prior to bid. Prior approval does not guarantee final approval by the electrical engineer. The contractor shall be completely responsible for providing a system meeting this specification in its entirety. All deviations from this specification must be listed and individually signed off by the consultant. Other Approved Manufactures are LC&D, Hubbell and Lutron.

PART 2 PRODUCTS

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:

B. 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.

C. Cover shall be configured for surface or flush 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.

D. 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:

E. Provision for one or two optional control and automation cards.

F. Removable, plug-in terminal blocks with screw less connections for all low voltage terminations.

G. Individual terminal block, override push button, and LED status light for each relay

H. 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.

I. 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.

J. Automatic sequenced operation of relays reduces impact on the electrical distribution system when large loads are controlled simultaneously.

K. 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.

L. 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.

M. 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.

N. 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
   b. Tested to 300,000 mechanical on/off cycles
   c. Isolated low voltage contacts provide for true relay status feedback and pilot light indication.
   d. 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.

P. Provide an automation card

2.2 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:
   a. Scheduled ON / OFF
   b. Manual ON / Scheduled OFF
   c. Manual ON / Auto Sweep OFF (for AS-100 Switches)
   d, Astro ON / OFF (or Photo ON / OFF)
   e. Astro and Schedule ON / OFF (or Photo and Schedule ON / 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.

2.3 EIGHT CHANNEL DIGITAL PHOTOCONTROL MODULE

A. Provide a weatherproof Class 2 photocell for measuring exterior light levels. The photocell shall be mounted facing north as indicated on the plans. The photocell shall be connected to a photocontrol module mounted on the DIN rail inside the low voltage section of a lighting control panel and connected to the dataline communications wire.

B. The photocontrol Module shall integrate seamlessly with either the Network Clock, Automation Appliance, or the BMS Interface Module. The control module shall measure the actual exterior light and display this level in foot candles (fc) on the unit LCD display.

C. The controller shall have eight individual set point adjustments that are available to the lighting control network over the dataline communications wire.

D. Features:

a. Real time, 2 line LCD display of actual exterior light level up to 200 fc.

b. Channel set points and parameters programmed via the Network Clock or BMS Interface Module.

c. Choice of OPERATE or TEST modes, with simulated light level for testing.

d. Automatic dead band and 5 minute time delay to avoid cycling.

2.4 DIGITAL DATALINE SWITCHES

A. Intelligent digital switching shall be provided operating on the dual twisted pair communication wire. Switches shall be available in single, dual, quad, or octal (1-button, 2-button, 4-button, or 8-button) designs. The single, dual, and quad devices shall mount in a standard single-gang box, the octal version in a two-gang box.

B. Each button shall be individually programmable. Programming of buttons shall not require the use of a computer or other programming device. It shall be possible to assign relays or channels to buttons using a simple button press interface. Each button can control any one of the following options:

C. Any individual relay in any single panel.

D. Any group of relays in any single panel.

E. Any group of relays in the system (via network clock, Automation Appliance, or WinControl software package).

F. For applications that require pattern switching, buttons shall function as a scene control using an ON/OFF/Not Controlled pattern of relays instead of the normal All ON/OFF.

G. Switches shall be constructed of non-breakable Lexan on all exposed parts and shall include a matching screwless Lexan wall plate.

H. Individual buttons shall have a removable clear cover to allow standard 9 mm (3/8 inch) labeling tape to be used to identify the controlled loads.

I. Each switch shall use a bi-color LED pilot light for the individual buttons to indicate status of the controlled relay or group of relays. LED indications are Red for All ON, Green for Mixed State (some relays in the group ON and others OFF), and No LED for All OFF.

J. Switch LED pilot lights shall flash green to indicate impending off sweep during the five-minute grace period following blink warning of the lights. Once the button is pressed, the LED will change to Red to acknowledge the occupant's override command to keep lights ON.

K. Multiple dataline switches programmed to control the same relay or relay group shall indicate the same status automatically.

L. Each switch shall also include a locator light illuminating the switch for easy location in the dark.

M. The dual, quad, and octal switches shall all include a single master button that will override all relays controlled by the individual buttons OFF, or Restore them to their original state. Each switch's master button configuration can be altered to perform a Master ON/OFF, OFF Only, or Disabled function if desired.

N. Switches can be configured to follow a "Cleaning" scenario. This specific scenario shall prevent the cleaners from overriding OFF any relays previously turned ON by an occupant.

O. Each switch is available in a Key lock override version. Once a key is inserted, the individual buttons will function for five minutes.

P. Provide professional and logical labeling of each button.

Q. Gym locations and larger locations shall have 4 button units minimum and all classrooms shall be 4 button minimum.

R. **The contractor shall provide a complete layout of the system including detailed floorplan drawings, riser diagrams, details, and schedules for approval.**

S. Provide key lock versions in gyms, corridors, and other locations as directed.

2.5 PARTITION BARRIER

A. <u>Provide a barrier to separate the normal power and emergency power wiring and relays in each panel.</u>

2.6 WIRING

A. All wiring shall be as recommended by the manufacturer and shall be plenum rated and installed in conduit.

PART 3 EXECUTION

3.1 SUPPORT SERVICES

A. **System Start Up and Commissioning of each panels and the entire system. Provide multiple visits to the site to commission the panels as they are completed at various times in different phases.**

B. 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:

C. That all occupancy sensors are located, installed, and adjusted as intended by the factory and the contract documents.

D. The occupancy sensors are operating within the manufacturers specifications.

E. The sensors and relay panels interact as a complete and operational system to meet the design intent.

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

G. System Training:

a. 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 controls. There shall be a minimum of 16 of owner user training with video taping.

H. System Programming:

a. Manufacturer shall provide system programming including:

b. Wiring documentation.

c. Switch operation. This shall include meeting and consultations with the owner and design team to fine tune the desired operations of fixtures.

d. Telephone overrides.

I. Operating schedules.

3.2 INSTALLATION

A. Provide complete installation of the system including all labor, materials, raceways, wiring etc, as directed and as recommended by the manufacturer.

END OF SECTION 265120