

SECTION 260936 – MODULAR LIGHTING CONTROLS

A. Related sections:

- 260923 – Occupancy Sensors
- 260923 – Photocell

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1. PART 1 - General

1.1 Overview

- 1.1.1 Provide a complete low voltage digital lighting control system for the building as shown on the plans and specified herein.
- 1.1.2 All relay panels shall be pre-assembled complete with the necessary relays, transformers and interfaces. Relay panel interiors are to contain separate line voltage section and low voltage section to facilitate easy mounting and conduit installation.

1.2 Manufacturers

- 1.2.1 All components are to be supplied by same manufacturer. Manufacturer to be a supplier of this type of equipment for over 10 years.
- 1.2.2 Low voltage digital lighting control system shall be manufactured by Douglas Lighting Controls®.

1.3 Prior Approval Submissions

- 1.3.1 Manufacturers wishing to submit quotations on the lighting control system must pre-qualify. Pre-qualification information must be submitted to the electrical consulting engineer not later than ten (10) working days prior to the final closing of tenders for this project.
- 1.3.2 The manufacturer must be prepared to demonstrate the equipment being proposed before the closing of tender.

1.4 Instruction Manuals

- 1.4.1 Supply manuals on system components to permit ease of installation, system operation and maintenance including, but not limited to the following:
 - Digital Lighting Control system step-by-step operating instructions.

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2. PART 2 - Materials

2.1.1 Relays

Lighting control relays shall be mechanically latching and shall come complete with a manual ON/OFF switch. The mechanical switch shall continuously display the true state of the relay's internal contacts.

- Single pole relays shall be rated and UL/CSA listed for 120, 277 and 347 VAC lighting loads at 30A General Use. Use Panasonic WR-6161K-84.

2.1.2 The single pole relays shall have a label indicating the short circuit current rating of 18,000A @277VAC.

2.1.3 Each lighting control relay shall be capable of controlling incandescent, fluorescent, electronic ballast, LED, and H.I.D lighting loads.

2.1.4 Lighting control relays shall include captive screw terminals for both the line voltage and the low voltage connections. Switching the relay shall be accomplished with ONE signal wire and a common return. The signal wire shall be able to signal ON and OFF and shall carry status current that indicates if the relay is ON or OFF.

2.2 Pre-assembled Relay Panels: LitePak™ 2 Series

2.2.1 Where indicated on the drawings, provide a factory pre-assembled relay panel. The panel shall be for surface or flush installation, with a hinged door assembly as required.

2.2.2 The panel shall be a NEMA 4 surface mount enclosure, with a hinged door assembly.

2.2.3 The panel shall be factory pre-assembled; ETL certified to UL/CSA standards, with capacities for 1 pole or 2 pole relays.

2.2.4 Panel shall include the following pre-assembled and pre-wired:

- Suitable divider separating class 1 and class 2 compartments
- Control transformer, UL/CSA approved for class 2 circuits, Douglas Lighting Controls Cat. No. WR-4075-120/277 or WR-4075-120/347.
- External control devices as required
- A digital Central Panel shall have 8 or 16 relays
- 0, 8, or 16 independent 0-10V dimming channels
- a touchscreen interface
- The digital Central Panel shall connect to expansion panels and peripheral devices (Switches and Sensors) using a common, solid #18/2 wire network
- Expansion panels shall have 8 or 16 relays and 0, 8, or 16 independent 0-10V dimming channels.
- The Central Panel and expansion panels shall have a maximum combination limit of 48 relays.

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2.3 Control Electronics - Lighting Control Unit: WLC-4150-P

- 2.3.1 The Douglas Lighting Controls Dialog WLC-4150-P Lighting Control Unit (LCU) shall be able to operate the local lighting control system on a stand-alone basis.
- 2.3.2 The LCU shall provide the following user interface for viewing and editing data:
- Built-in touch screen
- 2.3.3 Each LCU shall provide the following standard lighting control functions:
- Program and control up to 252 relays and 252 dimmers.
 - Link Outputs to switches and/or sensors to provide ON/OFF, Preset, or Dim Up/Down commands. In addition, functions such as Flick Warn, Time Out, Natural Daylight, and be associated with switches, sensors and relays and have these features scheduled by time-of-day or date.
 - Be able to group Outputs and Inputs to facilitate various control schemes.
 - Be able to program peripheral devices (switches, sensors, etc.) to function differently based on specific situations such as time-of-day, user intervention, etc.
 - Photo Sensor to provide Dusk-to-Dawn (switching) and/or Daylight Harvesting (dimming) with multiple set points to different groups.
 - Astronomic Controls for Dusk-to-Dawn applications not requiring Photo Sensor.
 - Provide Log Reports for diagnostic and run-time tracking purposes.
 - Time Schedule types include: 7-day weekly scheduling, 365-day date specific, Holiday, and event scheduling.
- 2.3.4 The system shall have pre-defined logical applications for lighting controls.
- Astronomical Time Clock
 - Natural Daylight (CLC) – Open Loop & Close Loop
 - Exterior Threshold Photo Control
 - Time Out (Unoccupied Mode)
 - Flick Warn
- 2.3.5 Each LCU shall provide the following system functions:
- Backup data via USB port

2.4 Wall Station Switches – WSW-35XX Series Data Line Switches (where required)

- 2.4.1 Switches shall be Douglas Lighting Controls WSW-35xx and connect to the lighting control network via a common 2-wire, non-polarized data line. Switches shall be

configured and programmed to control one or more outputs in the lighting control system.

- 2.4.2 Switches shall have the capability to be configured an Douglas Lighting Controls WIR-3110 infrared setting unit that accesses programming fields of the switch without removing the switch from the wall box.
- 2.4.3 Switches are linked to a single output or a group of outputs.
- 2.4.4 Switches, Occupancy Sensors and Photo Sensors can be set to a common output address to permit multiple points of control for a single relay or dimming output.
- 2.4.5 Switches, Occupancy Sensors and Photo Sensors can be set to a common group address to permit multiple points of control for a group of outputs.
- 2.4.6 Each switch can be programmed for ON/OFF control of outputs, UP/DOWN control of 0-10VDC dimming ballasts, 0-10VDC LED drivers and/or preset control to set a specific lighting scene.
- 2.4.7 Switches, with LED indicators to indicate both ON and OFF output/group status, shall be available with 1, 2, 3, 4 or 8 single button switches per gang. Switch to fit standard Decora opening.
- 2.4.8 Switches and switch hardware shall mount to standard wall boxes.
- 2.4.9 Each switch shall provide a location for a label to identify function. The label shall be under a clear plastic cover and shall be field replaceable should the operation of the switch change. Permanently etched switches are not acceptable.
- 2.4.10 Adhere to the factory recommended wiring practices so that physical removal of any single switch shall still permit communication between relay panels in the rest of the Dialog lighting control network.

Key Switch: WSK-3502

- 2.4.1 Key switches shall be **Douglas Lighting Controls** WSK-3502 and connected to the lighting control network via a 2-wire, non-polarized data line.
- 2.4.2 Key ON/OFF switches shall include LED indicators for ON and OFF status.
- 2.4.3 Key switches can be programmed to control individual outputs or groups of output and can also be programmed to enable/disable peripheral devices such as switches or sensors.
- 2.4.4 Each key action, clockwise and counter-clockwise, shall allow for independently programmed functions.
- 2.4.5 Key switches can be programmed with a **Douglas Lighting Controls** WIR-3110 infrared setting unit.

Dimmer & 1-button Switch – WSD-3501

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- 2.4.6 Dimmer switches shall be Douglas Lighting Controls WSD-3501 and connected to the lighting control network via a 2-wire, non-polarized data line. Each switch shall be capable of raising or lowering light levels of individual or groups of lighting fixtures.
- 2.4.7 Switches shall include integral LED indication for light levels as well as a switch for ON/OFF control
- 2.4.8 Dimmer switch can be programmed with a Douglas Lighting Controls WIR-3110 infrared setting unit

2.5 Switch plates

- 2.5.1 Select switch plates to suit number of switches as shown on plans. Up to 4 switches can be installed per gang box.
- 2.5.2 Stainless steel switch plates shall be WN-974xx series.
- 2.5.3 Plastic switch plates shall screw-less and shall be white in color. Use WN-803xx series.

2.6 Ceiling Sensor – Low Voltage WOR Series

- 2.6.1 Sensors shall be Dialog WOR series Dual Technology with Passive Infrared (PIR) and ADI-Voice detection.
- 2.6.2 Sensors shall be network connected using #18AWG two wire providing power and data bus
- 2.6.3 Ceiling sensors shall mount recessed in to the ceiling space.
- 2.6.4 Sensors shall have a 360 degree coverage pattern with an adjustable tilt head to maximize coverage, focus on particular areas, or provide adjustment when mounted on sloped ceilings.
- 2.6.5 Sensors shall provide an adjustable time out period of 30 seconds to 30 minutes. If a Photo Sensor is required, it shall be incorporated into the Occupancy Sensor device and operate so that when occupancy is detected, the sensor will only allow the load to be switched ON if the light level is below the daylight level set by the user.
- 2.6.6 A Manual Override Switch is to be provided on the sensor to allow the load to be manually switched ON and OFF for the purpose of testing during installation.

2.7 Wall Station Sensor and Switch – Low Voltage WOS Series

- 2.7.1 Sensors shall be **Dialog** WOS series Dual Technology sensor with Passive Infrared (PIR) and ADI-Voice detection.
- 2.7.2 Sensors shall be network connected using #18AWG two wire providing power and data bus
- 2.7.3 Sensors shall provide an adjustable time out period of 30 seconds to 30 minutes.
- 2.7.4 If a Photo Sensor is required, it shall be incorporated into the Sensor device and operate so that when occupancy is detected, the sensor will only allow the load to be switched ON if the light level is below the daylight level set by the user.

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- 2.7.5 A Manual Override Switch is to be provided on the sensor to allow the load to be manually switched ON and OFF for the purpose of testing during installation or for MANUAL ON/AUTO OFF (vacancy) applications.

2.8 Wall Sensor – Low Voltage WOW Series

- 2.8.1 Sensors shall be **Dialog** WOW series Dual Technology with Passive Infrared (PIR) and ADI-Voice detection.
- 2.8.2 Sensors shall be network connected using #18AWG two wire providing power and data bus
- 2.8.3 Sensors shall have a pivoting head to maximize coverage, focus on particular areas, or provide adjustment when mounted on sloped ceilings.
- 2.8.4 Sensors shall provide an adjustable time out period of 30 seconds to 30 minutes.
- 2.8.5 If a Photo Sensor is required, it shall be incorporated into the Occupancy Sensor device and operate so that when occupancy is detected, the sensor will only allow the load to be switched ON if the light level is below the daylight level set by the user.

2.9 Photo Sensor & Daylight Controls - WPS-3741B Exterior Daylight Sensor

- 2.9.1 Provide where required a Douglas Lighting Controls WPS-3714B Exterior Daylight Sensor capable of sensing from 0 to 65,000 lux (0 to 6500 fc) of direct light. The sensor shall derive both its power and data information from the Dialog data line.
- 2.9.2 The ambient light level shall be continuously monitored in lux by the sensor. The sensor shall broadcast to the network the existing light level when requested or when there is a change in detected light level.
- 2.9.3 Set point adjustments can be made via a touch screen or web server interface to the Douglas Lighting Controls WLC-4150-P.
- 2.9.4 Each sensor can be programmed to provide ON/OFF control of relays, raise/lower of 0-10vdc ballasts and LED drivers via a touch screen or web server interface to the Douglas Lighting Controls WLC-4150-P.
- 2.9.5 One sensor shall permit different outputs to switch and/or control light levels as ambient light changes. Light levels shall be controlled by 'sensor only' or in combination with a time schedule or with a dimming switch.
- 2.9.6 It shall be possible to set a maximum light level which cannot be exceeded during Natural Daylight operations or for non-daylight controlled areas, a permanent or "tuned" light level to maximize energy savings.

2.10 Photo Sensor & Daylight Controls - WPS-3711 Interior Daylight Sensor

- 2.10.1 Provide where required a Douglas Lighting Controls WPS-3711 Interior Daylight Sensor capable of sensing from 0 to 65,000 lux (0 to 6500 fc) of direct light. The

sensor shall derive both its power and data information from the Dialog data line.

- 2.10.2 The ambient light level shall be continuously monitored in lux by the sensor. The sensor shall broadcast to the network the existing light level when requested or when there is a change in detected light level.
- 2.10.3 Set point adjustments can be made via a touch screen or web server interface to the Douglas Lighting Controls WLC-4150-P.
- 2.10.4 Each sensor can be programmed to provide ON/OFF control of relays, raise/lower of 0-10vdc type or ballasts and LED drivers via a touch screen or web server interface to the Douglas Lighting Controls WLC-4150-P.
- 2.10.5 One sensor shall permit different outputs to switch and/or control light levels as ambient light changes. Light levels shall be controlled by 'sensor only' or in combination with a time schedule or with a dimming switch.
- 2.10.6 It shall be possible to set a maximum light level which cannot be exceeded during Natural Daylight operations or for non-daylight controlled areas, a permanent or "tuned" light level to maximize energy savings.

2.11 Infrared Setting Unit - WIR-3110

- 2.11.1 Provide a Douglas Lighting Controls WIR-3110 Infrared Setting Unit to facilitate the following functions:
 - Set input device and address
 - Configure input device presets, group, and individual control
 - Set local or global functionality

3. PART 3 - Installation

3.1 Relay panels and conduit.

- 3.1.1 Ensure that conduit for line voltage wires enters panel in line voltage areas and conduit for low voltage control wires enters panel on low voltage areas. Check manufacturer's drawings for location of line and low voltage areas.

3.2 Low Voltage Wiring

- 3.2.1 For low voltage wiring, provide wire type as recommended by the manufacturer. Adhere to recommendations as to maximum wire length and quantity of relays per switch.

End of Section

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