

CRESTRON® GREEN LIGHT® POWER SWITCHING SYSTEMS (GLPS)

Crestron Green Light and Green Light Express Network Power Switching Systems are web accessible network connected lighting control systems that receive digital or analog signals from addressable input devices, assemble signals at a signal processor and distribute operating instructions to addressable control devices that effect a change in state. The distributed architecture of input and output hardware includes addressable input occupancy sensors, photocells, daylight sensing devices, and keypads; and output control devices include dimmable lighting control devices, window shade controllers, and electronic switching modules in the panels that control on-off power relays. A firmware based astronomical clock program allows on/off events to be precisely timed, or timed to an offset of sunset and sunrise.

GLPS Green Light network power switching panels available with 10 to 42 circuits, rated for 120/230/277V loads, are configured with (a) main lug only and integrated branch circuit protection, or (b) optional main breaker and integrated branch circuit protection.

GLPS Green Light Express network power switching panels available with 8 to 32 circuits rated for 120/277/347V loads are configured as feed through type with branch circuit protection provided by a separate circuit breaker panel.

GLPS electronic power switching modules include individual circuit load indicator, mechanical and emergency override, and manual line test features for each switched circuit. Emergency signal from phase loss sensor Model No GLS-PLS-120/277 overrides the preset state of the relay; and changes it to the preprogrammed emergency condition.

Power Switching Relays in the electronic power switching modules for **Green Light and Green Light Express** are high current, mechanical latching type available with (a) high inrush, zero-cross arclless relays for 1,000,000 on/off lifetime cycles or (b) standard high inrush relays for 10,000 on/off lifetime cycles. **Green Light** is also available with a 0-10 Volt 4-Wire fluorescent dimming control (requiring dimming module Crestron Model #GLXP-DIMFLV8). **Green Light Express** is also available with two pole relays and heavy duty 50 amp modular power switching relays for 30,000 lifetime on/off cycles. Load types include incandescent, magnetic Low-Voltage (MLV), electronic Low-voltage ELV), neon/cold cathode, fluorescent lamp ballast, high-intensity discharge lamps (HID), motors to 2 HP and 0 – 10V dimmable florescent ballasts.

Low-voltage connections for power supply, emergency override signal and Cresnet communications are made via a connector block located near the bottom of the GLPS panel.

RoomView Server Edition management software allows the user to monitor, manage and control all Crestron connected equipment throughout the global enterprise. Crestron Control Systems can only be accessed with the correct IP address, port number, user name and password.

Crestron control systems, touchpanels, and RoomView® enterprise management software have been certified by Cisco and Microsoft Corporations. After rigorous testing, Cisco and Microsoft have standardized on Crestron technology to manage and control AV resources worldwide.

Crestron is the world's leading manufacturer of advanced control and automation systems, innovating technology and reinventing the way people live and work. Offering integrated solutions to control lighting, motors, audio, video, computer, and environmental systems, Crestron streamlines technology, improving the quality of life for people in corporate conference rooms, classrooms, auditoriums, and in their homes.

Contact Crestron Electronics, Inc., Rockleigh, NJ 07647, Phone (800)237-2041, Fax: (201)767-1903, www.crestron.com, email: info@crestron.com.

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SECTION 26 09 43
NETWORK LIGHTING CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Network integrated power switching systems.

B. Related Information:

Specifier: Related Information paragraph is optional. If retaining, edit and coordinate list of sections below to correspond to Project requirements.

1. Division 12 Section "Window Treatments" for window treatments controlled by network dimming control system.
2. Division 25 Section "Integrated Automation Control of Electrical Systems" for software and integration hardware for network lighting controls.
3. Division 26 Section "Common Work Results For Electrical".
4. Division 26 Section "Wiring Devices".
5. Division 26 Section "Lighting Control Devices" for occupancy sensors, photoelectric sensors.
6. Division 26 Section "Interior Lighting" for light fixtures controlled by network lighting control systems.
7. Division 27 Section "Communications Horizontal Cabling" for communications cabling requirements for network power switching systems.
8. Division 27 Section "Audio-Visual Communications" for communications and network cabling requirements for lighting systems and over all control systems communications.

1.2 REFERENCES

Specifier: References Article is optional. If retaining, edit and coordinate list of sections below to correspond to Project requirements.

A. California Energy Commission (CEC):

1. CEC CCR Title 24, Part 6: California Energy Efficiency Standards for Residential and Nonresidential Buildings, California's Appliance Efficiency Program: Listed lighting control devices.

B. National Fire Protection Association (NFPA):

1. NFPA 70 - National Electrical Code.

C. Underwriters Laboratories (UL)

1. UL 508 – Industrial Control Equipment

1.3 ABBREVIATIONS

- A. BAS: Building Automation System.
- B. AV: Audio Visual.

1.4 SYSTEM DESCRIPTION

Specifier: Edit description below to correspond to Project requirements.

- A. Web Accessible, network connected, lighting control system utilizing preset control software, central signal microprocessor, lighting control panel including integrated branch circuit protection, and solid-state power switching modules and relays.
- B. System Components: System includes the following addressable components:
 - 1. Keypad controls.
 - 2. Touch panel controls.
 - 3. Window treatment controls.
 - 4. Remote occupancy sensors.
 - 5. Room-combining partition sensor.
 - 6. Lighting load shedding.
 - 7. Timed room lighting.
 - 8. Daylight compensating lighting controls.
 - 9. Interface to facility-wide room management.
 - 10. Interface to building automation system interface.
- C. System Communication:
 - 1. Native communication with building wide Audio Visual Systems.
- D. Unified System Integration – Controller supports native communication protocol utilized by the AV control system.
 - 1. Communication protocol adaptors or translation interfaces between AV control system and lighting control system will not be accepted.

1.5 ACTION SUBMITTALS

Specifier: Action submittals require responsive action by A/E or Owner.

- A. Product Data: For each type of product required for complete network lighting control system, demonstrating compliance with requirements.
- B. Shop Drawings: Indicated the following:
 - 1. Schematic diagram showing complete network lighting control system and accessories.
 - 2. Circuits and emergency circuits with capacity and phase, control zones, load type and voltage per circuit.

1.6 INFORMATIONAL SUBMITTALS

Specifier: Informational submittals require review, but not response, by A/E or Owner.

- A. Buy American Act certificate.
- B. CEC CCR Title 24 appliance efficiency listing certification.
- C. Sample of manufacturer's warranty.
- D. Load Measurement Report: Submit field test report of completed installation.

1.7 CLOSEOUT SUBMITTALS

- A. Operating and maintenance instructions.

1.8 QUALITY ASSURANCE

- A. Manufacturer Qualification: Manufacturer of network lighting controls with minimum [five] years record of satisfactory manufacturing and support of components comparable to basis of design system.
- B. Source Requirements: Provide Network Lighting Controls through a single source from a single manufacturer.

Specifier: Retain paragraph below if Owner allows substitutions but requires strict control over qualifying of substitutions.

- C. Manufacturer Qualifications: Approved manufacturer of network lighting controls listed in this Section with minimum [five] years record of satisfactory manufacturing and support of components comparable to basis of design system.
 - 1. Approval of Comparable Products: Submit the following in accordance with project substitution requirements, within time allowed for substitution review:
 - a. Product data, including certified independent test data indicating compliance with requirements.
 - b. Samples of each component.
 - c. Sample submittal from similar project.
 - d. Project references: Minimum of 5 installations not less than 5 years old, with Owner and Architect contact information.
 - e. Sample warranty.
 - 2. Substitutions following award of contract are not allowed except as stipulated in Division 01 General Requirements.
 - 3. Approved manufacturers must comply separate requirements of Submittals Article.
- D. Electrical Components, Devices, and Accessories: UL listed and labeled per NFPA 70.

Specifier: Retain paragraphs below when Project requirements include compliance with Federal Buy American provisions. Crestron components comply with requirement.

- E. Buy American Act Certification: Submit documentation certifying that products comply with provisions of the Buy American Act 41 U.S.C 10a – 10d.

Specifier: Retain paragraph below when Project requirements include compliance with California title 24 provisions. Crestron Green Light components comply with requirement.

- F. California Appliance Efficiency Listing: Provide products that comply with provisions of CEC CCR Title 24, Part 6.

1.9 COORDINATION

Specifier: Edit list below to reference sections controlled by modular dimming controls for Project. Crestron Green Light system is able to integrate with Crestron's Cresnet building-wide automation network, BAS, building security systems, and a variety of equipment and devices.

- A. Coordinate integrated lighting and dimming controls with systems and components specified in the following sections:
 - 1. Division 11 Section "Audio-Visual Equipment".
 - 2. Division 12 Section "Window Treatments".
 - 3. Division 23 Section "Instrumentation and Control for HVAC".
 - 4. Division 25 Section "Integrated Automation Control of Electrical Systems".
 - 5. Division 26 Section "Panelboards".
 - 6. Division 26 Section "Wiring Devices".
 - 7. Division 26 Section "Lighting Devices".
 - 8. Division 26 Section "Interior Lighting".
 - 9. Division 27 Section "Communications Horizontal Cabling".
 - 10. Division 28 Section "Electronic Access Control and Intrusion Detection".

1.10 PROJECT CONDITIONS

- A. Environmental Conditions Range:
 - 1. Temperature: 32 – 104 deg F (0 - 40 deg C).
 - 2. Relative Humidity: 10 – 90 percent, noncondensing.

1.11 WARRANTY

- A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of modular dimming controls system the fail in materials or workmanship within the specified warranty period following substantial completion.
 - 1. Warranty Period: Touch screen display and overlay components: 90 days.
 - 2. Warranty Period: Disc drives and other moving parts, pan/tilt heads, and power supplies: 1 year.
 - 3. Warranty Period: Other components, 3 years.
- B. Manufacturer's Extended Support Service: Extended telephone support: Unlimited period.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Manufacturer: Subject to compliance with requirements, provide products of **Crestron Electronics, Inc., Rockleigh, NJ 07647**, Phone (800)237-2041, Fax: (201)767-1903, www.crestron.com [or comparable products from a single manufacturer approved by Architect prior to bidding], with the following components and characteristics.

2.2 SYSTEM CHARACTERISTICS

- A. Web-accessible, network-connected programmable lighting control system that receives digital or analog signals from addressable input devices, assembles signals at central signal processor, and distributes operating signals to addressable control devices that effect a change in state.
 - 1. Electronic power switching modules and relays process signals and effect circuit on-off switching, emergency switching, and 0 – 10V fluorescent dimming where indicated. Emergency switching overrides preset state and puts each circuit to the programmed emergency condition. Buttons on the module provide manual disconnect and manual circuit testing.

2.3 NETWORK LIGHTING CONTROL PANELS

Specifier: Crestron Green Light Network lighting control panels are expandable from 8 to 56 circuits and are available with lug only mains and branch circuit protection, main disconnect and branch circuit protection, or feed-through type requiring separate branch circuit protection.

- A. Control Panels, General: Comply with NEMA PB 1 and UL 50 (CAN/CSA C22.2, No. 94), UL 67 (CSA C22.2, No. 29), UL 489 (CAN/CSA C22.2, No. 65), and UL 916 (CSA C22.2, No. 205).

Specifier: Retain panel types required for project.

- B. Circuit Protected Network Lighting Control Panels: Arc-less high inrush.
 - 1. Basis of Design Product: **Crestron, Green Light Power Switching Network Lighting Control panel Model GLPS-HSW.**
 - 2. Main Circuit: [Main circuit breaker as indicated] [Main Lugs Only] [60 amp main circuit breaker] [80 amp main circuit breaker] [100 amp main circuit breaker] [125 amp main circuit breaker].
 - 3. Branch Circuit Protection: [120/208] [277/480] 20 amp thermal magnetic type.
 - 4. Switching Relay Types: Arc-less high inrush, lifetime rated minimum 1,000,000 on/off cycles, with air gap off protection.
 - 5. Cabinet Capacity: [12 circuits] [30 circuits] [42 circuits] [As required for circuits indicated].
- C. Line Protected Network Lighting Control Panels: Standard high inrush.
 - 1. Basis of Design Product: **Crestron, Green Light Power Switching Network Lighting Control panel Model No. GLPS-SW.**
 - 2. Main Circuit: [Main circuit breaker as indicated] [Main Lugs Only] [60 amp main circuit breaker] [80 amp main circuit breaker] [100 amp main circuit breaker] [125 amp main circuit breaker].
 - 3. Branch Circuit Protection: [120/208] [277/480] 20 amp thermal magnetic type.
 - 4. Switching Relay Types: Standard high inrush, lifetime rated minimum 10,000 on/off cycles, with air gap off protection.
 - 5. Cabinet Capacity: [12 circuits] [30 circuits] [42 circuits] [As required for circuits indicated].
- D. Feed-Through Network Lighting Control Panels: Arc-less high inrush.
 - 1. Basis of Design Product: **Crestron Green Light Express Power Switching Network Lighting Control panel Model No. GLPS-HSW-FT.**

2. Branch Circuit Protection: Pass through type utilizing separate branch circuit protection indicated on Drawings.
 3. Switching Relay Types: Arcless high inrush, lifetime rated minimum 1,000,000 on/off cycles, with air gap off protection.
 4. Cabinet Capacity: [12 circuits] [30 circuits] [42 circuits] [As required for circuits indicated].
- E. Feed-Through Network Lighting Control Panels: Standard high inrush.
1. Basis of Design Product: **Crestron Green Light Express Power Switching Network Lighting Control panel Model GLPS-SW-FT.**
 2. Branch Circuit Protection: Pass through type utilizing separate branch circuit protection indicated on Drawings.
 3. Switching Relay Types: Standard high inrush, lifetime rated minimum 10,000 on/off cycles, with air gap off protection.
 4. Cabinet Capacity: [12 circuits] [30 circuits] [42 circuits] [As required for circuits indicated].
- F. Feed-Through Network Lighting Control Panels: Standard modular high inrush.
1. Basis of Design Product: **Crestron Green Light Express Power Switching Network Lighting Control panel Model GLPS-HDSW-FT.**
 2. Branch Circuit Protection: Pass through type utilizing separate branch circuit protection indicated on Drawings.
 3. Switching Relay Types: Standard modular high inrush, lifetime rated minimum 30,000 on/off cycles, with air gap off protection.
 4. Cabinet Capacity: [12 circuits] [30 circuits] [42 circuits] [As required for circuits indicated].

2.4 POWER SWITCHING ACCESSORIES

- A. Switching Module, High Inrush:
1. Basis of Design Product: **Crestron Electronic Power Switching Module Model No. GLXP-SW- series.**
 2. Channels of Switching: [10] [12] [16] channel high inrush switching.
 3. Maximum Load.
 - a. Lighting: 16A per channel.
 - b. Motor: [1HP at 120V] [2HP at 230/277V] per channel.
- B. Switching Module, 0 – 10V Dimmable Fluorescent Ballast Load Switching Module:
1. Basis of Design Product: Crestron Electronic power switching module **Model No. GLXP-GLXP-DIMFLV8.**
 2. Channels of Switching: 8 channel high inrush switching.
 3. Maximum Nondimmable Load:
 - a. Incandescent, HID, magnetic low voltage (MLV), electronic low voltage (ELV), neon/cold cathode, and fluorescent ballasts: 16A per channel.
 - b. Motor: [1/2HP at 120V] [1HP at 230/277V] per channel.
 4. Maximum Dimmable Load:

- a. Lighting: 0 - 10V dimmable fluorescent ballasts.
- C. Power Switching Relay, Single Pole.
 - 1. Basis of Design Product: **Crestron Model No. GLR-HD-1P.**
- D. Power Switching Relay, Double Pole.
 - 1. Basis of Design Product: **Crestron Model No. GLR-HD-2P.**
- E. Emergency Phase Loss Sensor: 120/277V, tripping transfer to emergency state.
 - 1. Basis of Design Product: **Crestron Model No. GLS-PLS-120/277.**
- F. Power Supply: 50W, 24 V regulated power supply with two 4-pin network connectors, fuse-protected.
 - 1. Basis of Design: **Crestron Cresnet Power Supply Model GLA-PWS-50.**

2.5 CENTRAL SIGNAL PROCESSOR

Specifier: Select control processor from 3 models listed below according to project requirements.

The **Crestron IPAC-GL1** can be used as a pre-programmed or custom programmed control processor supporting virtually any functionality imaginable. It works seamlessly with Crestron's entire line of touchpanels, wireless remotes, lighting dimmers, shade controllers, thermostats, and more. It can also interface with third-party devices and systems such as security and access controls, surveillance cameras, and HVAC for a fully integrated solution.

- A. Control Processor: Wall-mounted lighting control processor enabling user system programming via LCD front panel or PC software, integrating occupancy sensing, daylight harvesting, and remote management. 2 RS-232, 4 digital/analog input, & 4 relay control ports. 3-gang standard box configuration.
 - 1. Basis of Design: **Crestron Integrated Professional Automation Computer Model IPAC-GL1.**
 - 2. Mounting: [Room wall mounted, in standard 3-gang box] [Table top kit] [Table top kit with swivel].
 - 3. Face Color: [Black] [White].

Specifier: The **Crestron PAC2** works seamlessly with Crestron's entire line of lighting dimmers and shade controls, keypads and touchpanels, thermostats, wireless gateways, control cards, and expansion modules.

- B. Control Processor: Network connected dual bus programmable control processor for low voltage controls, devices, and subsystems through multiple control interfaces. SNMP support, with built-in firewall, NAT, and router. 4-wire bus providing 24 VDC power to network devices, with two independent sensing inputs. In separate enclosure.
 - 1. Basis of Design: **Crestron Professional Automation Control System Model PAC2.**
 - 2. Mounting: [Surface-mounted] [Modular enclosure-mounted, in array indicated].

Specifier: The **Crestron PAC2M** is a compact, low-cost alternative to the PAC2 designed for small lighting and automation applications. At half the size of a PAC2, the PAC2M is perfect for apartments and smaller homes as well as individual meeting rooms and lecture halls.

- C. Control Processor: Integrates sensors and other low voltage controls, devices, and subsystems through multiple control interfaces with control network. Enables addition of relays, 8 separate I/O ports in 2 isolated segments supporting up to 20 devices each, serial COM ports, DTMF interfaces, and shade controllers. MMC memory expansion card slot. 4-wire bus providing 24 VDC power to network devices, with two independent sensing inputs. Use with separate power supply.
 - 1. Basis of Design: **Crestron Professional Automation Mini-Control System Model PAC2M.**
 - 2. Mounting: [Surface-mounted] [Modular enclosure-mounted in array indicated].

2.6 SYSTEM ACCESSORIES

Specifier: Retain and edit accessory paragraphs below as required to match system requirements.

- A. Touchpanel: Controls lighting and AV settings along with other modular dimming controller functions.
 - 1. 5.7 inch active-matrix color LCD touch screen 640 by 480 SVGA resolution display.
 - a. Basis of design: **Crestron Isys TPS-6L Touchpanel.**
 - 2. 16-bit color graphics, and dual-window HD video, HDTV, and high-resolution RGB streaming multimedia, IP intercom, and web browsing capabilities. Dynamic graphics and text capability. Enables custom control screen programming.
 - 3. Video display: Scalable display on touchpanel screen.
 - 4. Pushbutton Controls: 12 engraved backlit tactile pushbuttons for volume, channel, and on-screen menu navigation and programmable functions, snap-on front bezel button cover[, and custom engravable button kit].
 - 5. Mounting Kit: [Wall] [Rack] [Lectern] mounting kit with power, wired Ethernet and CAT5 video connectivity, with back box and trim ring[, and speaker kit].
 - 6. Powerpack: 24VDC.
 - 7. Color: [Almond] [Black] [White].
- B. Touchpanel: Controls lighting and AV settings along with other modular dimming controller functions.
 - 1. 3.6 inch active-matrix compact color LCD touch screen 320 by 240 QVGA resolution display.
 - a. Basis of design: **Crestron Isys TPS-4L Touchpanel.**
 - 2. 16-bit color graphics, and dual-window HD video, HDTV, and high-resolution RGB streaming multimedia, IP intercom, and web browsing capabilities. Dynamic graphics and text capability. Enables custom control screen programming.
 - 3. Video display: Scalable display on touchpanel screen.
 - 4. Pushbutton Controls: 10 engraved backlit tactile pushbuttons for volume, channel, and on-screen menu navigation and programmable functions, snap-on front bezel button cover[, and custom engravable button kit].

5. Mounting Kit: [Flush wall] [Lectern] mounting kit with power, wired Ethernet and CAT5 video connectivity, with back box and trim ring[, and speaker kit].
6. Powerpack: 24VDC.
7. Color: As selected from manufacturer's full range of minimum 10 colors.

Specifier: **Cameo Series Keypads** are available in 12 designer colors in 2- to 6- button arrays. Faceplates are not furnished by Crestron.

- C. Remote Keypad Controls: Field-configurable remote keypad with auto-adjusting backlight illuminating replaceable, engravable programmable buttons in number indicated, with white LED indicators, configured to fit in standard single-gang box.
1. Basis of Design: **Crestron, Cameo Series Keypad Model C2N-CB (D/F) Series.**
 2. Color: As selected from manufacturer's full range of minimum 12 colors.
 3. Faceplates: [Insert faceplate description].

Specifier: **Designer Series Keypads** are available with backlit black buttons or standard white or ivory buttons in 2, 4, 6, 8, or 12- button arrays. Textured finish integrated faceplates or optional architectural faceplates are available.

- D. Remote Keypad Controls: Remote keypad with[backlight illuminating] replaceable, engravable buttons in number indicated, with amber LED indicators, configured to fit in standard single-gang box.
1. Basis of Design: **Crestron, Designer Series Keypad Model CNX- Series.**
 2. Faceplates: [As selected from manufacturer's full line] [Insert faceplate description].

Specifier: **Decorator Series Keypads** are available with black, white, or ivory buttons in 6, 8, or 12- button arrays. Faceplates are not furnished by Crestron.

- E. Remote Keypad Controls: Remote keypad with replaceable, engravable buttons in number indicated, with red LED indicators, 3W, configured to fit in standard single-gang box.
1. Basis of Design: **Crestron, Decorator Series Keypad Model C2N-DB Series.**
 2. Faceplates: [Insert faceplate description].

Specifier: Retain optional IR remote control and remote receiver accessories below if required.

- F. Remote Control: Handheld infrared remote control device.
- G. Infrared Remote Receiver: Provide integral 36 kHz infrared receiver for use with remote control.

Specifier: **Crestron GLS-OIR Series Occupancy Sensors** utilize passive infrared technology to achieve dependable motion detection with superior immunity to false triggering from air currents, inanimate objects, or movement in an adjacent corridor. Advanced self-adaptive, passive infrared motion sensing affords excellent reliability for control of lighting, climate control and other devices in the room. Sensitivity is adjustable for optimum performance.

- H. Passive Infrared Occupancy Sensors: Passive infrared detection with internal microprocessor. Sensor independently adjustable for installed conditions. Delayed time off adjustment. Walk-

through mode. Adjustable built-in photocell for daylight optimization. Equipped with 3-wire interface for direct connection to control system; 24 VDC power from network control bus.

1. Basis of Design: **Crestron Photocell Model GLS-OIR Series.**
2. Mounting and Coverage: [Low profile ceiling surface mounted, 360 deg., 450 sq. ft.] [Low profile ceiling surface mounted, 360 deg., 1500 sq. ft.] [Wall bracket mounted, 360 deg., 2500 sq. ft.] [Ceiling bracket mounted, 360 deg., 2500 sq. ft.] [As indicated].

Specifier: **Crestron GLS-ODT Series Occupancy Sensors** offer dual-technology sensing utilizing both ultrasonic and passive infra-red detection with an internal microprocessor to maintain accurate control of lighting systems, reducing energy costs while maintaining user convenience. Sensors detect movement within space while reducing false triggering or shutoffs while space is occupied. Several mounting types and coverage areas are available.

- I. Remote Occupancy Sensors: Combination of ultrasonic motion detection and passive infrared detection with internal microprocessor. Sensor independently adjustable for installed conditions. Delayed time off adjustment. Walk-through mode. Adjustable built-in photocell for daylight optimization. Equipped with 3-wire interface for direct connection to control system; 24 VDC power from network control bus.
 1. Basis of Design: **Crestron Photocell Model GLS-ODT Series.**
 2. Coverage: [180 deg., 500 sq. ft.] [360 deg., 1000 sq. ft.] [360 deg., 2000 sq. ft.] [1200 sq. ft.].
 3. Mounting: [Ceiling flush mounted] [Ceiling surface mounted] [Ceiling bracket mounted] [Wall flush mounted] [Wall surface mounted] [Wall bracket mounted] [As indicated].
- J. Occupancy Sensor Interface Device: Integrates occupancy sensors and related sensors with control network. In separate enclosure. 4-wire bus providing 24 VDC power to network devices, with two independent sensing inputs.
 1. Basis of Design: **Crestron Sensor Integration Module Model GLS-SIM.**

Specifier: **Crestron Photocell Model GLS-LOL** open-loop photocell sensing provides a cost-effective solution for daylight harvesting, allowing multiple lighting zones to be controlled by a single sensor. In a typical office, classroom, or similar space, the photocell is installed on the ceiling near a window, or in the light well of a skylight, directed toward the incoming daylight and away from any electrical lighting fixtures. The system estimates the total amount of ambient lighting in the room according to the light level measured by the photocell.

Requires use of control processor specified below.

- K. Photocell Sensor, Open Loop Type: Continually monitors daylight entering window or skylight to enable daylight harvesting applications to provide control of room lighting based on presence of daylight. Equipped with 3-wire interface for direct connection to control system utilizing control processor; 24 VDC power from network control bus.
 1. Basis of Design: **Crestron Photocell Model GLS-LOL.**
 2. Mounting: [Ceiling flush mounted] [Ceiling surface mounted] [Wall flush mounted] [Wall surface mounted] [As indicated].

Specifier: **Crestron Photocell GLS-LCL** is intended for use with closed-loop type daylight harvesting systems. It continually monitors the total ambient light level from all available light sources, enabling precise control of room lighting and window shades to maintain a consistent level of light throughout the

day. The best place to install the GLS-LCL in a typical office or similar space is on the ceiling directly above the primary work area. The sensor measures all light within a 60° cone, which consists predominately of reflected light, acquiring the most natural approximation of perceived changes in ambient light levels.

Requires use of control processor specified below.

- L. Photocell Sensor, Closed Loop Type: Continually monitors daylight at work station location to enable daylight harvesting applications to provide control of room lighting based on lighting level at workstation. Equipped with 3-wire interface for direct connection to control system utilizing control processor; 24 VDC power from network control bus.
 - 1. Basis of Design: **Crestron Photocell GLS-LCL.**
 - 2. Mounting: [Ceiling flush mounted] [Ceiling surface mounted] [Wall flush mounted] [Wall surface mounted] [As indicated].

2.7 CONDUCTORS AND CABLING

- A. Power Supply Side of Remote-Control Power Sources: Comply with requirements of Division 26 Section "Low-Voltage Electrical Power Conductors."
- B. UTP Cable: 100-ohm, UTP. Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with UL 444 and NFPA 70 for the following types:
 - 1. Communications Control Cable, Non-Plenum Rated: 22 AWG data pair stranded bare copper, and 18 AWG power pair stranded bare copper, Type CM.
 - a. Basis of Design Product: **Crestron CRESNET-NP.**
 - 2. Communications Control Cable, Plenum Rated: 22 AWG data pair, stranded bare copper and 18 AWG power pair, stranded bare copper, Type CMP, complying with NFPA 262.
 - a. Basis of Design Product: **Crestron CRESNET-P.**
 - 3. Communications High-Power Control Cable, Non-Plenum Rated: 22 AWG stranded bare copper data pair, and 12 AWG stranded bare copper power pair, Type CM.
 - a. Basis of Design Product: **Crestron CRESNET-HP-NP.**

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Prior to installation, examine work area to verify measurements, and that commencing installation complies with manufacturer's requirements.

3.2 INSTALLATION

- A. Comply with requirements of Division 26 Sections "Common Work Results for Electrical."
- B. Do not install network power controls until space is enclosed, HVAC systems are running, and overhead and wet work in space are complete.

- C. Install network power switching controls in accordance with manufacturer's instructions.
- D. Grounding: Provide electrical grounding in accordance with NFPA 70.
- E. Provide panelboard schedule in pocket provided in panel doors.

3.3 SOFTWARE

- A. Install and program software to meet the Owner's requirements. Provide current licenses. And backup copies of the software for the Owner's records.

3.4 SYSTEM STARTUP

- A. Provide manufacturer's system startup and adjustment.
- B. Switch each load on and off with manual line test feature of the power switching module before installing processors.
- C. Perform operational testing to verify compliance with Specifications. Adjust as required.

3.5 ADJUSTING

- A. Within 12 months of the date of Substantial Completion provide onsite service to adjust the system to account for actual occupied conditions.

3.6 DEMONSTRATION

- A. Factory authorized service representative to instruct owner's staff to adjust, operate and maintain network power switching systems; and provide instruction using the system software.

3.7 CLOSEOUT ACTIVITIES

- A. Demonstration: Schedule demonstration with Owner.
- B. Training: Train Owner's personnel to operate, maintain, and program network power switching systems. Allow for a minimum of trips to the jobsite to provide additional training as needed.
 - 1. Furnish set of approved submittals, and record drawings of actual installation for Owner's personnel in attendance at training session.

END OF SECTION 26 09 43