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SECTION 26 09 43 16

ADDRESSABLE LUMINAIRE LIGHTING CONTROLS

Leviton Intellect

This specification is dated **May 18, 2021**. It replaces any and all previous Intellect specifications.

# GENERAL

## RELATED DOCUMENTS

### Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 specification Sections.

### All contract documents and addenda.

## SUMMARY

### Section Includes:

#### Addressable Luminaire Level Lighting Controls.

### Related Sections:

NOTE TO SPECIFIER: Edit the following paragraphs to coordinate with other sections in the Project Manual.

#### Section [26276 — Wiring Devices].

#### Section [265113 — Interior Lighting Fixtures, Lamps, and Ballasts:] Lighting luminaires, LED drivers, and/or Fluorescent lighting ballasts controlled by lighting control system.

#### Section [260923 — Lighting Control Devices:] Occupancy sensors used in conjunction with lighting control system.

#### Section [260943.13 – Digital Network Lighting Controls:] Network lighting control systems integrated with Addressable Luminaires.

### Contractor responsibilities:

#### Coordinate, receive, mount, connect, and place into operation all equipment. Furnish all conduit, wire, connectors, hardware, and other incidental items necessary for the complete and properly functioning relay lighting control system as described herein and shown on the plans.

## REFERENCES

NOTE TO SPECIFIER: Standards that are not applicable can be deleted.

### American National Standards Institute/Institute of Electrical and Electronic Engineers (ANSI/IEEE) ([www.ansi.org](http://www.ansi.org/) and www.ieee.org)

#### C62.41-1991 — Recommended Practice for Surge Voltages in Low-Voltage AC Power Circuits.

### ASTM International (ASTM) ([www.astm.org](http://www.astm.org/))

#### D4674 -02a Standard Test Method for Accelerated Testing for Color Stability of Plastics Exposed to Indoor Fluorescent Lighting and Window-Filtered Daylight.

### Canadian Standards Association (CSA) ([www.csa.ca](http://www.csa.ca/)).

#### CSA C22.2 # 14 Industrial Control Equipment.

#### CSA C22.2 # 184 Solid-State Lighting Controls.

### International Electrotechnical Commission ([www.iec.ch](http://www.iec.ch/)).

#### (IEC) 801-2 Electrostatic Discharge Testing Standard.

#### IEC/EN 60669-2-1 Switches for household and similar fixed electrical installations - electronic switches.

### International Organization for Standardization (ISO) ([www.iso.ch](http://www.iso.ch/)):

#### 9001:2000 — Quality Management Systems.

### National Electrical Manufacturers Association (NEMA) ([www.nema.org](http://www.nema.org/))

#### WD1 (R2005) - General Color Requirements for Wiring Devices.

### Norma Official Mexicana (NOM).

#### NOM-003-SCFI Productos eléctricos - Especificaciones de seguridad (Electrical products - Safety Specifications).

### Underwriters Laboratories, Inc. (UL) ([www.ul.com](http://www.ul.com/)):

#### 508 (1999) - Standard for Industrial Control Equipment.

#### 924 – Standard for Safety of Emergency Lighting and Power Equipment.

### International Energy Code Conservation (IECC)

#### IECC

As referenced in Article 1.3.H, Paragraph 1, if ballasted loads are or will be controlled by any relay cabinet on this project, all cabinets must carry a UL listing that directly addresses ballasted loads. If ballasted loads are controlled, cabinets which bear only a UL916 listing should not be acceptable on this project.

### American Society of Heating, Refrigerating and Air-Conditioning (ASHRAE)

#### ASHRAE 90.1

### California Energy Commission (CEC)

#### Title 24

### Design Lights Consortium, (DLC)

#### Network Lighting Control Systems Technical Requirements

## SUBMITTALS

NOTE TO SPECIFIER: Edit the following to coordinate with other sections in the Project Manual.

### Submit under provisions of Section [01 33 00] and in accordance with Conditions of the Contract. Submittal Set shall include the following:

#### Bill of Materials: Complete list of all parts needed to fully install selected system components.

#### Device detail drawings providing wiring details and dimensional data.

#### Product Data Sheets.

## Closeout Submittals

### To be provided within two weeks following system turn-on.

#### Warranty documents specified herein.

#### Three sets of operation and maintenance manuals.

#### Two complete sets of as-built drawings.

## QUALITY ASSURANCE

NOTE TO SPECIFIER: Edit the following to indicate the minimum level of experience required by architectural lighting control manufacturers.

NOTE TO SPECIFIER: The following applies to all components covered herein.

### Manufacturer Requirements

#### Continuously engaged in the manufacture of architectural lighting controls and relays for no less than ten years.

#### Provide factory-direct technical support hotline 24 hours per day, 7 days per week.

#### Maintain a quality system that is registered to the ISO 9001:2000 Quality Standard.

### Listings:

#### Listed by UL/cUL specifically for the required loads or certified by recognized independent testing organizations that test to UL/cUL standards.

##### UL916 – Energy Management Equipment

As mentioned in Article 1.6.B Paragraph 1.a, if ballasted loads are or will be controlled by any relay cabinet on this project, all cabinets must carry a UL listing that directly addresses ballasted loads. UL916-listed cabinets are not acceptable when ballasted loads are controlled.

##### UL924 – Emergency Equipment

##### UL2043 – Plenum Rated

#### Comply with ASHRAE 90.1

#### Comply with CEC Title 24, Part 6

#### Comply with IECC

#### DLC Advanced Lighting Controls compliant

#### RoHS 2 Compliant

#### IEEE 802.15.4

#### Radio Certifications:

##### FCC certified for wireless communication (U.S.)

##### FCC ID 2473A-PVDIM

##### IC certified (Canada)

##### IC ID: 2473A-PVDM

### Installer Qualifications

#### Experienced in performing the work of this section.

#### Has specialized in installation of work similar to that required for this project.

NOTE TO SPECIFIER: Paragraph E below assures continued effective service and warranty support for the Owner.

### Source Limitations

#### To assure compatibility, obtain all system components from a single source with complete responsibility for all lighting controls and accessories specified in this Section and elsewhere in Division 26 Section 09 “Lighting Controls.” The use of subcontracted component assemblers is not acceptable.

## products installed but not furnished under this section

### Fluorescent Ballasts and/or LED Drivers

#### Supply ballasts/drivers that are compatible with the network lighting control system.

#### Accept 0 – 10V dimming control.

### All conduit, wire, connectors, hardware, and other incidental items necessary for the complete and properly functioning Addressable Luminaire Level Lighting Control system as described herein and shown on the plans.

## DELIVERY, STORAGE & HANDLING

### General: Comply with Division 1 Product Requirements Sections.

### Ordering: Comply with manufacturer’s ordering instructions and lead-time requirements to avoid construction delays.

### Delivery

#### Deliver materials in manufacturer’s original, unopened, undamaged packages with intact identification labels.

#### Deliver to other trades in a timely manner.

NOTE TO SPECIFIER: Coordinate Article below with Environmental Specifications sections.

### Storage and Protection: Store materials away from exposure to harmful weather conditions and at temperature and humidity conditions recommended by manufacturer.

NOTE TO SPECIFIER: Coordinate Article below with Conditions of the Contract and with Division 1 Closeout Submittals (Warranty) Section.

## PROJECT CONDITIONS

### Do not install equipment until the following conditions can be maintained in spaces to receive equipment:

#### Ambient temperature: 0° to 50° C (32° to 122° F).

#### Relative humidity: Maximum 90 percent, non-condensing.

#### Lighting control system must be protected from dust during installation.

NOTE TO SPECFIER: This Leviton Manufacturing Inc. warranty provides the Owner with replacement relay modules for 10 years at no cost. Other manufacturers provide replacements at additional expense, and may require the Owner to pay increasing amounts after Year Two.

## WARRANTY

### Manufacturer’s Warranty

#### Warrant all equipment free of defects in materials and workmanship.

#### Warranty Period

##### Warrant all system components for 61 months from date of shipment, or five years from date of turn-on, whichever occurs first.

##### Make extended warranties available.

As specified in Article 1.10, Paragraph A.3, Leviton Manufacturing Inc.’s GreenMAX warranty includes replacement of relay modules for 10 years at no cost to the Owner. Manufacturers who charge for replacements within the 10 year period, or who require additional payments for warranty support after a two year period, should not be acceptable on this project.

#### Owner’s Rights: Manufacturer’s warranty is in addition to, not a limitation of, other rights the Owner may have under contract documents.

# PRODUCTS

## ACCEPTABLE MANUFACTURERS

NOTE TO SPECIFIER: Only manufacturers that meet all specifications herein should be added to the list of Acceptable Manufacturers. Products that fail to meet energy management standards such as CEC Title 24 can affect the Owner’s ability to obtain occupancy or Green certifications. Under Execution (Part 3 of this Section), make the contractor responsible that installed equipment meets all specification requirements. Require that contractor replace, at no charge to the Owner, any equipment that does not meet this specification.

\*\*\* EITHER \*\*\*

### Acceptable Manufacturer: Leviton Manufacturing Co. Inc. — System: Leviton Intellect – Intelligent Integrated Fixture Controls

\*\*\*OR\*\*\*

### Basis of design product: Leviton Manufacturing Co. Inc. Intellect or subject to compliance and prior approval with specified requirements of this section, one of the following:

#### Leviton Manufacturing Co. Inc. Intellect

#### <<To specify an alternate manufacturer and product, insert the names here. Otherwise, delete this entire line.>>

### Substitutions: [Not permitted.] [Permitted.]

Note to Specifier: Delete items 1 through 4 if substitutions are not permitted.

#### Show all substitutions as an add or deduct from the base bid price.

##### All substitutions subject to provisions of [Section 00 26 00] [Section 01 25 00] [Section 01 62 00] [Division 1]

#### Clearly delineate all proposed substitutions as such and submit in writing for approval by the design professional a minimum of 10 working days prior to the bid date.

##### Proposed substitutions must be made available to all bidders.

##### Proposed substitutes must be accompanied by a review of the specification noting compliance on a line-by-line basis.

#### Prior to rough-in, provide complete engineered shop drawings, including power wiring, with deviations from the original design highlighted in an alternate color, to the engineer for review and approval.

#### By using pre-approved substitutions, the contractor accepts responsibility and associated costs for all required modifications to circuitry, devices, and wiring.

## Description

### Addressable luminaire level lighting controls comprised of the following components:

#### Enabled Fixtures.

#### Wireless Keypad Room Controller.

#### Wi-Fi App for configuration, control, and monitoring.

## Performance Criteria

As noted in Article 2.3, Paragraph A, GreenMAX is engineered for quick setup and simple operation. The system can implement a variety of control strategies in order to meet energy savings goals for a particular project.

Emergency Operation — overrides all other control inputs.

Daylight Harvesting — allows interior and/or exterior photocells to dim lights and/or ballasts and/or turn them on or off.

Occupancy Sensing — interface with occupancy sensors in spaces where they are utilized.

(1) Manual On/Auto Off — An occupant must manually turn lights on, but the occupancy sensor automatically turns lights off when the space is unoccupied.

(2) Auto On/Auto Off — the occupancy sensor automatically turns lights on and off without the need of a switch.

Wall Station Enable/Disable.

Scheduled Events — meeting energy code requirements with astronomical time clock for automatic daily updates of sunrise/sunset times.

### Lighting Control System shall provide networking of luminaires and devices.

### Lighting Control System shall have the following capabilities”

#### Multi-Zone Occupancy / Vacancy sensing

#### Multi-Zone Daylight Harvesting with configurable dead band, and, target for each zone

#### Continuous Dimming

#### Software reconfigurable zoning

#### High end trim

#### Energy monitoring

#### UL924 for emergency lighting control

#### Device Monitoring – Remote diagnostics

#### Operational and standby power.

#### Fixture Grouping

#### Scene Control

### Emergency Operation

##### Monitors local normal power through the control input to ensure device is ON upon loss of normal power, forces fixture to “on” state and allows power to pass-through from emergency system.

As specified in Article 2.6, Paragraph B.1, GreenMAX photocell inputs have eight pairs of rising and / or falling trigger points, allowing system programmers to use open-loop or closed-loop strategies with photocell daylight sensors. Open-loop sensors integrate the light within the space to maintain average light levels. Closed-loop sensors look at a fixed point, changing the lighting in the space as the status of that fixed point changes. Systems that restrict the programmer’s choices to one mode or the other should not be acceptable on this project.

### Wireless Communication:

#### Intellect Secure wireless communication using AES 128bit Encryption

#### Frequency: 2.4 GHz, IEEE 802.15.4 Mesh Network

#### Range: up to 75’ between devices.

#### Bluetooth for configuration.

### Energy Monitoring capabilities:

#### 3% accurate metrology.

#### Monitored points:

##### kWh

##### kW

##### Voltage

##### Power Factor

##### kVAR

##### kVARH

NOTE TO SPECIFIER: Edit this heading as appropriate (delete “GreenMAX” if substitutions are allowed).

NOTE TO SPECIFIER: As noted in Article 2.7, Paragraph A, the ability to install relays in the field without voiding the cabinet’s UL listing allows for flexibility during and after the construction process to easily correct or modify issues that arise during the installation process.

NOTE TO SPECIFIER: As noted in Article 2.2.B, Paragraphs 1.a.1 & 1.b.1 allow for snap-in installation of single or dual pole relays without increasing the size of the cabinet or requiring special wiring.

## [Intellect] ENABLED FIXTURES

As specified in Article 2.7, Paragraph A, GreenMAX command, remote input and relay modules can be installed in the field without voiding the cabinet’s UL listing. This provides flexibility both during and after the construction process, reducing the cost of modifying the cabinet to address any issues that may arise during installation. Systems that cannot be modified after delivery to the job site without voiding the UL listing should not be acceptable on this project.

### Intelligent fixture with integrated Intellect Solo or Intellect Wireless controls, fully compatible with Leviton GreenMAX DRC Wireless Room Control System. All controls pre-installed and fully integrated within the fixture, requiring the contractor to land only hot/neutral/ground to the fixture. On emergency fixtures, an additional EM Hot/Neutral will be allowed.

### Performance Criteria

#### Full range dimming.

#### Occupancy detection over coverage area of fixture and within recommended mounting heights.

#### Provides 3% accurate or better energy metering to include the following points.

##### KWH

##### KW

##### Voltage

##### Power Vactor

##### kVAR

##### kVARH

#### Upon initial power-up, and, until commissioned, fixture shall support default out-of-the box functionality to include:

##### Occupancy Detection

##### Fixture Turns off on vacancy

##### Fixture Turn on upon occupancy

##### Automatically calibrated Daylighting Harvesting

#### Reports product failure and status to the network.

#### Detects and reports ambient light level to network for use by daylight harvesting controllers.

As specified in Article 2.2.B, Paragraphs 1.a.1 & 1.b.1, GreenMAX allows installation of single or dual pole relays in any combination, without increasing the size of the cabinet or requiring special wiring. Systems lacking this flexibility should not be acceptable on this project.

#### Wireless communicates with all other devices in a room.

#### Daylight Harvesting capabilities:

##### Closed loop daylight harvesting.

##### Configurable dead band.

##### Override of the daylighting target level may be enabled or disabled in the configuration App.

#### Fully digital with the following configurable attributes:

##### Time Out

##### Sensitivity

##### Target Light Level

##### Occupancy / Vacancy mode

##### Exclude sensor.

#### Physical Test Switch allows manual control, restore factory defaults, and pushbutton pairing.

### Product Components:

#### Leviton Intellect-Enabled LED ALLURA Linear Pendant Type M, model # ALRM

#### Leviton Intellect-Enabled LED ALLURA Linear Pendant Type A, model # ALRA

#### Leviton Intellect-Enabled LED ALLURA Linear Pendant Type B, model # ALRB

#### Leviton Intellect-Enabled LED Troffer Dish Lensed, model # LRTH

#### Leviton Intellect-Enabled LED Commercial Type N Square, model # LCOMN SQ L

#### Leviton Intellect-Enabled 4” Integrated LED Universal New Construction Downlight, model # R4NCIE

#### Leviton Intellect-Enabled 4” Square Integrated LED Universal New Construction Downlight, model # R4SQNCIE

#### Leviton Intellect-Enabled 6” LED Recessed Downlight; Universal New Construction Downlight, model # R6NCIE

#### Leviton Intellect-Enabled Jake Recessed Linear Luminaire, model # JAK-LED

#### Leviton Intellect-Enabled 4” LED Round Downlight, model # SS4G4DR

#### Additional Intellect-Enabled Fixtures available from other manufacturers.

## [GREENMAX DRC WIRELESS] keypad room controllers

### Wall mounted keypad device to function as primary user interface to the digital addressable lighting control system. Also acts as Bluetooth interface between smartphone / tablet configuration and control devices and the wireless lighting control system.

### Performance Criteria

#### Bluetooth interface for iOS and Android devices using Bluetooth 3.0 or later.

##### Bluetooth devices provide configuration, control, and monitoring of the Lighting Control System.

#### ZigBee mesh based communication between devices for operation.

#### Individual buttons provide multiple operating modes:

##### Toggle Maintained, Toggle Momentary, and Preset.

#### Individual buttons may be programmed for the following functions:

##### Room ON/OFF

##### Group ON/OFF

##### Scene Select

##### Raise / Lower

##### Fade Time

##### Individual Fixture or Group Preset

##### Toggle

#### Individual button LED’s track room status.

### Physical

#### Each button shall have an LED status indicator.

#### Single Gang Leviton Decora™ style device and wall plate.

##### Provide 1, 2, 4, or 8 button stations as shown on plans.

##### Provide color as shown on plans or as determined by architect.

##### Provide optional engraving if shown on plans or as determined by architect.

#### Environmental

##### Operating Temperature: 32º to 122º F (0º to 50º C).

##### Ambient Humidity 0% to 90% non-condensing.

As specified in Article 2.11, Paragraphs C.1.b and D.1.b, GreenMax double pole relays are rated for 30 Amperes with General Fluorescent Ballast loads at up to 480VAC. This industry-leading rating allows the lighting designer to put more lights on these branch circuits, saving time and money for the Owner. Systems offering double relays rated for 20A with ballast loads will require more complicated and costly wiring, and should not be acceptable on this project.

### Electrical

#### Frequency: 2.4 GHz, IEEE 802.15.4 Mesh Network.

#### Wireless Range:

##### Mesh Network for operation: Up to 75’ between devices.

##### Bluetooth for configuration: Up to 30’ between keypad and Bluetooth phone or tablet.

#### Input Power: 30mA, 120 – 277VAC, 50/60 Hz.

#### Output: None – Wireless communication only.

### Product Components:

#### Leviton GreenMAX DRC WIreless Keypad Room Controller, model # DRKDN-Uxx.

## [GREENMAX DRC] bluetooth configuration and control app.

### Provide a wireless configuration App compatible with wireless addressable lighting control system. App to facilitate system configuration, manual control, and status monitoring of the lighting control system.

### Performance Criteria:

#### Compatible with iOS and Android devices.

#### App provides for configuration of the following attributes:

##### Identify and address individual luminaires.

##### Create Groups and Zones.

##### Create Presets and Scenes.

##### Set daylight target level with multi-zone offsets.

##### Configure occupancy and light level sensor parameters.

##### Configure keypad button functionality.

##### User security and access controlled through cloud access control system.

#### App to provide monitoring of Lighting Control System:

##### Energy Use.

##### Device status.

##### Room Status.

NOTE TO SPECIFIER: For a complete range of occupancy sensors for use with GreenMAX, refer to

[www.leviton.com/cenergyproducts](http://www.leviton.com/cenergyproducts).

# EXECUTION

## INSTALLATION

### Coordinate, receive, mount, connect, [and place into operation] all equipment.

### Install equipment in accordance with manufacturer’s installation instructions.

#### Install relay cabinets in locations where audible noise is acceptable.

#### Use only with 75° C (167° F) copper wire at 75% ampacity.

### Provide complete installation of system in accordance with Contract Documents.

### Maintain performance criteria stated by the manufacturer without defects, damage, or failure.

### Provide equipment at locations and in quantities indicated on Drawings. Provide any additional equipment required to provide control intent.

As specified in Article 3.1, Paragraph F, interior sensors work mainly with diffused light and have a much higher lighting gain than exterior sensors. Electric light sources can affect these sensors unless the sensors are shielded from the light given off by electric light sources.

NOTE TO SPECIFIER: Contractor places equipment into operation unless factory commissioning is specified.

### Furnish all conduit, wire, connectors, hardware, and other incidental items necessary for a properly functioning lighting control and relay system as described herein and shown on the plans. The Electrical Contractor shall maintain performance criteria stated by the manufacturer without defects, damage, or failure.

### Compliance: Contractor shall comply with manufacturer’s product data, including shop drawings, technical bulletins, product catalog installation instructions, and product carton instructions for installation.

### Circuit Testing: The contractor shall test that all branch load circuits are operational before connecting loads to system load terminals, and then de-energize all circuits before installation.

NOTE TO SPECIFIER: Delete the following item if factory commissioning is required. If the contractor should include switch programming as part of the installation, delete any switch types that are not included in the project (if both analog low-voltage and digital switches are included, you will delete all brackets in the following item).

## SITE VERIFICATION

### Verify that wiring conditions, which have been previously installed under other sections or at a previous time, are acceptable for product installation in accordance with manufacturer’s instructions.

## FIELD MEASUREMENTS

### The electrical contractor shall be responsible for field measurements and coordinating the physical size of all equipment with the architectural requirements of the spaces into which they are to be installed.

## INSPECTION

### Inspect all material included in this contract prior to installation. Manufacturer shall be notified of unacceptable material prior to installation.

## SITE PROTECTION

### Contractor shall protect installed product and finished surfaces from damage during all phases of installation including storage, preparation, testing, and cleanup.

## COMMISSIONING

As specified in Article 3.6, a lighting control system requires at least one site visit for proper commissioning. If multiple site visits are required, the first ensures that the contractor is trained to install the system correctly. On the second, the factory engineer will start up the system, ensure that it is operating according to specification, and perform initial programming. The third visit is for the purposes of refining the programming, and training the owner/end user on the system.

NOTE TO SPECIFIER: Delete the commissioning option you DO NOT want in this specification.

### System to be configured by the installing contractor using the GreenMAX DRC Wi-Fi App unless a site visit by a factory certified field service technician has been purchased from the manufacturer.

### If purchased, provide factory-certified field service technician to ensure proper system installation and operation under following parameters:

#### Certified by the equipment manufacturer on the system installed.

\*\*\* EITHER \*\*\*

#### Site visit activities:

##### Verify connection of power feeds and load circuits.

##### Verify communication of controls.

##### Verify system operation control by control.

##### Obtain sign-off on system functions.

##### Demonstrate system capabilities, operation and maintenance and educate Owner’s representative on the foregoing.

### Notification: Upon completion of the installation, the contractor shall notify the manufacturer that the system is ready for formal checkout. Notification shall be given in writing a minimum of 21 days prior to the time factory-trained personnel are required on site. A test report must be furnished to manufacturer prior to scheduling commissioning activity. Manufacturer shall have the option to waive formal turn-on.

### Turn-On: Upon completion of all line, load and interconnection wiring, and after all fixtures are installed and lamped, Manufacturer’s Rep or, if waived, Contractor shall completely check the installation prior to energizing the system. At the time of checkout and testing, the owner’s representative shall be thoroughly instructed in the proper operation of the system.

## MAINTENANCE

### Enable the end user to order new equipment for system expansion, replacements, and spare parts.

### Make new replacement parts available for a minimum of five years from the date of manufacture.

As specified in Article 3.7, Paragraph D, Leviton Manufacturing provides telephone technical support by factory personnel 24 hours a day, 7 days a week. Project cost overruns and delays can occur without this service. Answering services can add to frustration and delay the resolution of any problems or issues. Manufacturers who do not offer factory-direct technical support on a 24/7 basis should not be acceptable on this project.

### Provide factory-direct technical support hotline 24 hours per day, 7 days per week.

### Offer renewable annual service contracts, to include parts, factory labor, and annual training visits. Make service contracts available up to ten years after date of system commissioning.

END OF SECTION