



SECTION 260926 Lighting Control Panels

PART 1 - GENERAL

1.1 RELATED DOCUMENTS [Insert As Required]

1.2 SUMMARY

- A. The products specified in this section shall provide a lighting control panel system of up to two panels with a maximum of 24 relays each with low voltage input devices including occupancy/vacancy sensors, daylight sensors and switch stations for indoor and outdoor lighting applications.
- B. The system shall be capable of turning lighting loads on/off or dimming using inputs, schedules, time clock and astronomical clock programming.
- C. The intent of these specifications is to provide a complete, functional, lighting control system for the control of incandescent, low-voltage, neon, cold cathode, LED, fluorescent and HID lighting.
- D. Where shown on the drawings, the contractor shall furnish and install a low-voltage lighting control system consisting of, but not limited to, panels with relays, 0 - 10vdc dimmers, graphic user interfaces, controllers, enclosures, switch stations, photo sensors, occupancy sensors, low voltage Class 2 wiring for input devices and data wiring between master and secondary panels as required for a complete, operable lighting control system.
- E. The system shall be capable of loading and saving programming via SD Card at the user-interface.

1.3 SUBMITTALS

- A. Manufacturer shall provide submittal drawings and data for approval prior to beginning manufacture of equipment in printed and/or electronic formats.
- B. Submittal package shall include, but not be limited to, the following. Submittals that do not contain all the information listed below will not be considered for approval.
 - 1. Bill of Materials: Provide as part of the submittal package a detailed itemized listing of all proposed equipment, including quantities and capacities for all major system components.
 - 2. Product Data Sheets: Provide as part of the submittal package detailed product data sheets for all major system components.



3. Shop Drawings: Submittal shall include shop drawings that accurately represent the system or systems specified herein. Shop drawings shall include the name of the project, quantity and physical dimensions of all major system components, wire sizes and counts for all required connections between system components.
4. Contractor/Commissioning Worksheet – must be completed prior to factory start-up.
5. Specifications Compliance: Submit a line-by-line comparison that describes the differences between each specifications requirement and the equipment / systems being proposed. Comparison shall include a complete listing of how the proposed equipment / systems differ from that specified with regard to size, quantity, quality, method of control, features and functions, control software functions and installation requirements.

1.4 QUALITY ASSURANCE

- A. Factory Assembly: All devices shall be factory assembled and tested. All system components shall arrive at the job site completely pre-wired and ready for installation, requiring only the connection of lighting circuits and control terminations. All connections shall be made to clearly and permanently labeled termination points.
- B. Component Testing: All system components and assemblies shall be individually tested prior to assembly. Once assembled, all finished products shall be tested for proper operation of all control functions per specifications prior to shipment.
- C. NEC Compliance: All system components shall comply with all applicable sections of the National Electrical Code (NEC) as required.
- D. NEMA Compliance: All system components shall comply with all applicable portions of NEMA standards pertaining to types of electrical equipment and enclosures.
- E. FCC Emissions: All applicable equipment shall comply with FCC emissions standards specified in Part 15, sub-part j for commercial and residential applications and shall bear labels indicating compliance testing. Equipment that does not meet these standards shall not be acceptable.
- F. All applicable products must be ETL or UL Listed or other acceptable national testing organization.
- G. Title 24: All applicable system components and the system as a whole shall be certified as complying with Title 24 requirements.
- H. Manufacturer must have a minimum of [10] years of experience manufacturing lighting controls.



1.5 PROJECT CONDITIONS

- A. Do not install equipment until the following conditions can be maintained in the spaces where equipment is to be placed:
 - 1. Ambient temperature: 0° to 40° C (32° to 104° F).
 - 2. Relative humidity: Maximum 95 percent, non-condensing
 - 3. Lighting control system must be protected from dust during installation

1.6 WARRANTY

- A. All devices in lighting control system shall have a 5 year manufacturer's warranty.
- B. Warranty period shall begin after the completion of the installation and the system's start-up and training, the point at which the system owner receives beneficial use of the control system or 1 year after shipment from the manufacturer, whichever occurs first.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Acceptable Manufacturer:
 - 1. Hubbell Control Solutions, Inc.
 - a. Panels: CX Lighting Control Panels
 - b. Relays: CXR Relays
 - c. Devices: OMNI™ and LightOWL™ Series sensors, LVS and CXSW series low voltage switches and Luxstat photo sensors
 - 2. Basis of design product: Hubbell Control Solutions CX Panels or subject to compliance and prior approval with specified requirements of this section, one of the following:
 - a. HCS CX Panels and low voltage input devices
 - b. <Insert manufacturer's name>
- B. Substitutions: [Not Permitted]
 - 1. All proposed substitutions (clearly delineated as such) must be submitted in writing for approval by the design professional a minimum of 10 working days prior to the bid date and 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.



2. By using pre-approved substitutions, the contractor accepts responsibility and associated costs for all required modifications to circuitry, devices and wiring. The contractor shall provide complete engineered shop drawings (including power and control wiring) with deviations from the original design highlighted in an alternate color to the engineer for review and approval prior to rough-in.

2.2 SYSTEM REQUIREMENTS

- A. System shall consist of up to two panels with a maximum of 24 relays each. In systems with two panels communications between panels shall be Class 2 CAT5 or CAT5e cable with a maximum distance between panels of 750 feet.
- B. Low voltage input devices including occupancy/vacancy sensors, daylight sensors and switch stations shall be connected to the panel and software assignable to any type. Power and control for LED indication at switch stations shall be provided.
- C. Low Voltage cable shall be unshielded multi-conductor Class 2 #18 GA stranded or solid copper conductor. Number of wires per cable varies based on device to be connected.
- D. Panel shall be capable of automatic recognition of relay types when relays are mixed or changed in the panel. Systems requiring programming of relay types shall not be acceptable.
- E. User interface shall be Color LCD Display with a minimum of 8 lines x 24 characters. Home Screen display shall include real time clock display including Hours/Minutes/Seconds, Time Zone, Date with Day of the week and Panel Name. Full text HELP screens shall be available at all Main and sub-Main level screen options.
- F. System shall have an intuitive and easy to use Graphical User Interface (GUI) to control, monitor and schedule individual devices or groups of devices.
- G. System shall remain fully functional during the programming process. Lighting control systems that must be taken "OFF LINE" for programming are not acceptable. All programming changes shall take effect immediately as they are programmed.
- H. Optional dimming interface card(s) are defined by dip switch settings. Dip switch settings are to be defined in the field during installation.
- I. Optional dimming interface shall provide eight 0 - 10vdc dimming channels per option card for a maximum of 24 dimming channels (three cards) per panel.
- J. Optional dimming interface shall provide 4 RJ45 ports designed to accept connection via CAT5 cable to CXSW switch stations. Each RJ45 port is capable of accepting 6 control points defined by programming and quantity of switch stations connected to the dimming interface card.



2.3 PANELS

- A. Panels shall be available in 4, 8, 16, or 24 relay capacities. Panels shall be factory assembled fully populated with a single relay type or with no relays installed for field installation of relays in less than a full panel or combinations of relay types. Panels shall be capable of having mixed types of relays installed in any slot or combination without any programming to assign relay type.
- B. Panels shall provide input power leads to accommodate 120VAC, 208VAC, 220VAC and 277VAC OR 347VAC and 480VAC. Maximum power consumption for 4 and 8 relay shall not exceed 40VA and for 16 and 24 relay panels shall not exceed 100VA.
- C. Panel housing shall be NEMA 1 surface mounting powder coated after fabrication. Knock outs shall be provided in the top and bottom of the housing. The cabinet shall have a hinged door and be provided with a locking mechanism. The user interface is integral with the door for access with the cabinet locked.
- D. The panels shall be configured with control inputs and outputs depending on panel size. Each relay card has one input that can be configured to control any relay or group. All inputs are programmable in any combination and to any relay. The input types are assigned through program selections. Each input terminal can be used for low voltage switches, photocells, or motion sensors.
- E. Panel firmware and programming shall be stored in non-volatile memory and shall be unaffected by loss of power events. The system clock shall be provided with battery back-up that will remain accurate for a minimum of 7 years. Panel system diagnostics shall be provided to check battery performance.
- F. Panels shall be Hubbell Control Solutions CX Series:
 - 1. Panels shall be available in 4, 8, 16, or 24 Relay sizes
 - 2. Panels shall be available as a Master or Secondary Panel for 8, 16, or 24 relay sizes. 4 relay versions shall be available as Stand Alone type.
 - 3. A System of two panels shall be possible using any combination of one Master panel (8, 16, or 24 relay) and one Secondary panel (8, 16, or 24 relay). Panels shall be connected using standard CAT 5 or CAT 5e 8 conductor cable up to 750 feet in overall length. Panels shall be able to receive RJ-45 jacks or have individual wired connected in pressure style terminal blocks.
 - 4. Input voltage shall accommodate 120VAC, 208VAC, 220VAC, 277VAC, or optional 347VAC and 480VAC.



2.4 RELAYS

- A. The CX Panels require the use of CXR Relays for control of lighting loads. The CXR Relays are factory installed fully populated as single type per panel in CX Panels or the CX Panels is supplied with no relays installed and combinations of relay types and quantity are field installed by the electrical contractor
- B. Electrical contractor shall provide and install quantities of lighting control relays as indicated on the drawings and schedules as specified herein. Lighting control relays shall be individually UL and CUL listed and shall bear labels indicating compliance. Lighting control relays shall be tested to UL standard 916 and UL standard 924 for both safety and endurances and bare labels signifying compliance. Lighting control relays shall be cycle tested ON/OFF @ FULL LOAD switching for all loads that the relay is rated to control.
- C. Relays shall bear individual label indicating all load ratings by type and Short Circuit Current Rating (SCCR). Relay SCCR is indicated below. Relays with SCCR lower than the values indicated below will not be accepted.
- D. Lighting control relays shall be specifically designed for control of 120, 277 or 347 VAC loads for single pole relays and 208 or 480 VAC for two pole relays. Lighting loads including but not limited to incandescent, low-voltage, motor loads, neon, cold cathode, LED, fluorescent and HID lighting sources at a the ratings listed below.
 1. CXR2N - 20A/1P Normally Open (N/O) Relay – 20A @ 120VAC, Tungsten; 16A @ 120/277VAC Electronic Fluorescent Ballast; 20A @ 120/277VAC, Standard Fluorescent Ballast; 1H.P. @ 120VAC, Motor Load; ¾ H.P. @ 277VAC Motor Load. 14,000 Amps @ 277VAC SCCR (Short Circuit Current Rating)
 2. CXR3L – 30A/1P Latching Relay - 20A @ 120VAC, Tungsten; 16A @ 120/277VAC Electronic Fluorescent Ballast; 30A @ 120/277VAC, Standard Fluorescent Ballast; 1H.P. @ 120VAC, Motor Load, 20A @ 347VAC, electronic Ballast, 20 A @ 347VAC, standard ballast. 14,000 Amps @ 277VAC and 347VAC SCCR (Short Circuit Current Rating)
 3. CXRTN - 20A/2P Normally Open (N/O) Relay - 20A @ 480VAC, Standard Fluorescent Ballast; 2H.P. @ 480VAC, Motor Load. 14,000 Amps @ 480VAC SCCR (Short Circuit Current Rating)
 4. CXRTC - 20A/2P Normally Closed (N/C) Relay - 20A @ 480VAC, Standard Fluorescent Ballast; 2H.P. @ 480VAC, Motor Load. 14,000 Amps @ 480VAC SCCR (Short Circuit Current Rating)
- E. Each lighting control relay shall include a manual override means of turning the relay ON or OFF without the panel controller connected or operational. Each lighting control relay shall include an LED visual indicator showing the current status of the relay itself.



2.5 DIMMERS

- A. Each dimming option card shall provide capability for eight industry standard 0 - 10vdc dimming channels each capable of sinking a maximum of 30mA of current supplied by dimming ballast(s) or LED drivers. The dimming option card shall be plug-in style for simple field installation where required.
- B. Eight, 0 - 10vdc dimming control connections shall be provided per card via removable plug-in terminal blocks. The dimming control lines shall automatically open upon loss of normal control power to the CX panel insuring that all connected dimmed loads will be at 100% brightness if connected to emergency power.
- C. Each dimming option card shall provide four RJ45 jacks for connection of single gang decorator style dimming switches. Provide capability for manual raise/lower, on/off and preset type low voltage switches. Dimmers shall also be controllable via panel schedules, daylight harvesting via photocell, and integral demand response limiting feature.

2.6 PANEL PROGRAMMING CAPABILITIES

- A. The Panel shall have the following System Settings capabilities:
 - 1. Date/Time Settings: System shall allow time setting of hours/minutes/seconds for 12 or 24 hour format. Display shall be configurable Month-Day-Year, Day-Month-Year or Year-Month-Day. Date and Time including time zone shall display continuously on the panel home screen.
 - 2. Astronomical Clock: System shall use longitude and latitude input with sunset-sunrise offsets adjustable from 1-60 minutes before or after. System shall include major city look-up selection that auto-populates longitude and latitude values.
 - 3. Daylight Savings Time: Automatically adjusts the clock at the appropriate calendar dates standard, with manual date adjustment.
 - 4. System shall have 4 Open/Close time schedules. These allow for schedules and masking to be tied to one of four master Open/Close times.
 - 5. System shall have ability to receive dry contacts to perform limited Demand Response capabilities to dim light levels per utilities requirements.
 - 6. System shall provide for naming of Panels, Relays, Dimmers, Groups, Schedules, Holidays, Inputs, Outputs and Users. Names shall be up to 19 characters long and include upper/lower case alpha/numeric characters.
 - 7. System shall have after hours sweep function that allows for relays to be swept off based on a designated start time (Clock Time or Open/Close Time) with up to four sweeps with intervals of 1-120 minutes.



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8. System shall provide blink/alert capabilities. When relays are selected as Blink type, then switches mapped to control relays or groups will provide override functionality at schedule OFF events. Blink/warn may be set at 1-15 minutes before the schedule OFF event. Override duration may be selected from 1-120 minutes. Blink/warn recur if lights are still on at the end of the override duration. Schedule ON events cancel and impending override OFF that would occur after the ON event.
 9. System shall be capable of setting relays to be ON, OFF or return to the LAST state upon return of power after a loss of power event. The panel shall verify the proper state of the relays for schedules that include both ON and OFF times and execute the appropriate ON or OFF command to bring the relays to the planned state.
 10. System shall have masking capabilities to eliminate on or off functionality for up to 24 hrs.
- B. Groups: System shall provide a minimum of 32 groups that can include any or all relays and dimmers in Stand-Alone, Master or Secondary panels
- C. Schedules: Provide 64 Schedules for 365 day programming (Battery back-up Real Time Clock)
1. Schedules may be selected as M-F or M-F + Saturday with a single input of recurring ON/OFF times
 2. Schedules may be created in the "All Days" type for any or all days with differing ON/OFF times per day
 3. All schedules shall have date range option, copy/paste function, and allow naming using pre-populated terms selection and/or individual letter/number input from the alpha-numeric keypad
 4. Schedules may be programmed as ON only, OFF only or ON/OFF in a single schedule. Systems require separate ON and OFF schedules only will not be accepted. Priorities and Masking apply to schedules that are ON/OFF type.
- D. Holidays: System shall provide the following Holiday functions
1. A list of Standard U.S. holidays may be selected in a single screen that are recurring year to year without entering actual calendar dates. These holidays do not count as a part of the date specific holidays.
 2. 99 date specific holidays shall be available to be programmed as blocked dates in schedules or to have Holiday Schedules applied to them individually.
 3. 4 Holiday Schedules shall be provided that can be applied to date specific holidays. All normal schedule programming selections apply in the creation of Holiday schedules.



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- E. Inputs: Inputs shall be software assigned to any device input including motion sensors, switches, and photocells. Inputs are designed for use with Hubbell Control Solutions devices as specified herein. Dry Contact Inputs shall be capable of receiving normally open or normally closed maintained or momentary inputs from non-HCS devices.
- F. Outputs: Dry contact low voltage outputs shall be provided on 8, 16, and 24 relay panels for use in initiating signals from the CX panels to outside building systems. Output contacts may be programmed to mimic inputs and schedules. Dry contacts are rated Normally-Open/ Normally-Closed, 24V AC/DC 50 mA. Output contacts may be programmed as maintained or momentary. 8 relay panels shall have 2 output contacts, 16 relay panels shall have 3 output contacts and 24 relay panels shall have 4 output contacts.
- G. Demand Response: When equipped with the dimming option, the CX panel can be programmed to automatically limit the output to all dimmed lighting loads to a prescribed maximum demand response level. When activated by a simple maintained contact closure, all dimmed loads will immediately dim down to the maximum set level. Loads currently below the maximum level will remain at their current level. During a demand response event, dimmed loads may be controlled below the maximum set level but not above. At the termination of the demand response event, normal control will be restored. Dim light levels will maintain until the next ramp up command is given via input/schedule.
- H. The Panel shall provide System Tools as follows:
 - 1. Manual Control: Control relays, groups, and schedules ON/OFF and control all relays ON/OFF. Dimmers may be set to dimmed levels between 0% and 100%.
 - 2. System Status: View ON/OFF states of all relays, dimmers, groups, inputs and outputs. View actual sunrise/sunset time for the current date.
 - 3. Save/Restore Programming: The system shall allow for programming to be saved to SD card via slot in user interface. The program can be restored using the upload function from the SD card. The system shall also allow for saving 3 back-up programs to non-volatile memory without the use of removable memory.
 - 4. Access Control: The system shall be capable of creating up to 10 user profiles with 3 levels of access as follows:
 - a. Master: Access to all program functionality
 - b. Limited: Access to limited changes to existing programming
 - c. View-Only: Allows for user to view all programming, but does not allow any changes or deletions



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5. Diagnostics: On-board diagnostics for battery, panel and relay communications
6. Firmware update, controller version information, and system reboot functions
7. System event logging to SD Card

2.7 OCCUPANCY/VACANCY SENSORS

- A. Sensor shall provide automatic switching of lighting load(s) within an area/zone based on the presence of human activity.
- B. Sensor shall have a microprocessor and utilize IntelliDAPT™ technology to optimize the sensor behavior to fit occupant usage patterns and adjust sensitivity and time delay to changing conditions.
- C. Sensor shall not require any manual adjustment at the time of installation or during operation.
- D. Sensor shall adapt automatically to changing room conditions.
- E. Sensor shall utilize either passive infrared, ultrasonic, or both passive infrared and ultrasonic technology to detect motion. Sensor shall not react to noise or ambient sound.
- F. Sensor's microprocessor shall monitor PIR background levels and automatically make corresponding adjustments.
- G. Sensor shall incorporate a dual element pyrometer and 12-element cylindrical Fresnel lens
- H. Sensor shall be provided with a variety of mask inserts for PIR rejection to prevent false tripping.
- I. Sensor's microprocessor shall monitor ultrasonic frequency changes and automatically make corresponding adjustments.
- J. Sensor's microprocessor shall automatically adapt to a continuous airflow situation.
- K. Sensor shall be powered by the CX Panel directly for a maximum of 8 sensors for 4 and 8 Relay panels and 24 sensors for 16 and 24 relay panels. Projects requiring sensor quantities greater than listed above require the addition of HCS power packs and sensors utilizing RP optional remote contacts.
- L. Sensor shall have an ultrasonic frequency of 32kHz or 40kHz depending on model.
- M. Sensor coverage shall range from 0 to 2000 sq. ft. depending on model.
- N. Sensor shall be available with a 110 degree, 180 degree, or 360 degree field of view.



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- O. Sensor shall recognize, as a false on, the failure to detect motion 6 seconds after motion is detected initially (turning on the lighting). The sensor shall decrease the sensitivity in response to the false on.
- P. Sensor shall feature an 8-second time out install test mode, which will automatically revert to standard time out one hour after being put into test mode.
- Q. Sensor shall have manual controls and override switches to force manual adjustments.
- R. Sensor shall have controls behind a cover to resist tampering. All controls shall be accessible from the front of the sensor.
- S. Sensor shall have timer that can be adjusted manually from 8 to 30 minutes.
- T. Sensor sensitivity shall be adjustable from 0% to 100%.
- U. Sensor shall have a control knob that sets the minimum setting for the timer in automatic mode.
- V. Sensor shall have control knobs for setting the initial automatic sensitivity adjustments.
- W. Sensor shall include non-volatile memory for retaining device settings during power outages.
- X. Sensor shall have a switch to restore IntelliDAPT settings.
- Y. Sensor shall have real time motion indicator LED's visible from the front of the unit. Red = Infrared, Green = Ultrasonic.
- Z. Sensor shall be available with a Form C isolated dry relay contact for interfacing the sensor to auxiliary systems.
- AA. Sensor input may be programmed for active and inactive times using the masking function in the CX Panel program.
- BB. Sensor shall be ceiling or wall mounted (depending on model).
- CC. Hubbell Control Solutions Motion Sensors:
 - 1. OMNI series ceiling mounting motion sensors shall be available as passive infrared, ultrasonic, both passive infrared and ultrasonic technology. Sensors shall be available in varying coverages including 500, 1000, and 2000 square feet and specifically designed for corridors
 - 2. LightOwl wall mount motion sensors shall be available as passive infrared, ultrasonic, both passive infrared and ultrasonic technology. Sensors shall be available in varying coverages including 1600 square feet and specifically designed high ceilings of up to 30 feet.



3. All sensors shall be available with optional Form C Relay.

2.8 PHOTOCCELL (DAYLIGHT SENSORS)

- A. Sensor shall provide automatic daylight harvesting switching of lighting load(s) controlled by a relay or group of relays. When used with the dimming option, the sensor shall provide daylight harvesting capability via full range dimming.
- B. Sensors shall be open loop or closed loop daylight sensor depending on sensor selected, with an internal photodiode that measure the ambient light in the space.
- C. Sensors shall provide programmable ON & OFF set points.
- D. Sensors shall support 7 light level ranges: 0.3-30fc, 3-300fc, 30-3000fc and 60-6000fc, 50-750fc, 200-2500fc, 1000-75000fc. Light level ranges shall be selectable via jumper switch and daylight sensor installed.
- E. Sensors shall display real time foot candle levels at the CX Panel user interface.
- F. For daylight harvesting switching, to prevent cycling, sensor shall have programmable ON delay and OFF delay settings.
- G. Sensor may be programmed for active and inactive times using the CX Panel masking program function.
- H. Sensor shall be ceiling or wall mounted in the appropriate location for measuring the available daylight.
- I. Hubbell Control Solutions product number(s):
 1. Interior Daylight Sensors
 - a. LUXSTATLS
 - b. DLCPCI
 - c. DLCPCS
 - d. DLCPSA
 2. Outdoor (Exterior) Daylight Sensors –
 - a. LUXSTATLSO
 - b. DLCPCO

2.9 SWITCH STATIONS

- A. Switch Stations shall provide manual switching of lighting load(s) controlled by a relay or group of relays.



- B. Switches shall be low voltage, momentary switches and shall be available in the following configurations:
 - 1. 1, 2, 3, or 4 Buttons without LED Indication
 - 2. 1, 2, 3, or 4 Buttons with LED Indication
 - 3. 2 Button raise/lower dimming
 - 4. Available in White (WH) or Ivory (IV) color
- C. Switches shall be injection molded and designed to mount in a standard single gang junction box with standard decorator-style plate opening.
- D. Switches shall have removable buttons for field replacement. Button replacement may be completed without removing the switch from the wall.
- E. Switches with LED indication shall have a green LED that is illuminated when the switch is in the ON state.
- F. Switches shall be programmable from the CX Panel user interface.
- G. Switches may be programmed for active and inactive times using the CX Panel masking program function.
- H. Switches shall have 4" low voltage CLASS 2 leads for connection CX Panel inputs. The switch shall have wiring diagram indicated by a label affixed to the switch housing. Dimming switches shall connect to the panel via standard CAT5 cable and connectors.
- I. Hubbell Control Solutions product number(s):
 - 1. Low Voltage Momentary Switch LVSM Series
 - 2. Low Voltage CX Dimming Switch CXSW Series

2.10 POWER PACKS

- A. Power pack shall be a self-contained transformer and relay module measuring 3.69" x 2.33" x 1.36". Power packs are used as an auxiliary power supply for motion sensors when the total sensor count exceeds the maximum allowed count for a specific CX Panel.
- B. Power packs shall have primary universal voltage inputs of 100-277VAC, 50/60Hz.
- C. Power pack shall provide a 24 VDC, 150mA output.
- D. Power pack shall provide low voltage inputs: Control On +12-24 VDC; Manual ON +12-24 VDC.



- E. Power pack shall provide selectable manual control for: ON- to allow switches to turn lighting ON and maintain ON state with occupancy, and OFF- to allow switches to turn lighting OFF with or without occupancy.
- F. Power pack shall provide overload protection. A momentary or continuous short of any of the control wires will not damage the device.
- G. Power pack shall provide Zero Arc Point Switching to protect from the effects of inrush current and increase product life.
- H. Power pack shall be capable of parallel wiring without regard to AC phases on primary.
- I. Power relay packs shall be suitable for use in plenum applications.
- J. For ease and speed of installation, power and auxiliary relay pack shall have 1/2" snap-in nipple for 1/2" knockouts and shall mount on the outside or inside of enclosure.
- K. Hubbell Control Solutions product number(s):
 - 1. Universal Power Pack , 1 SPST Output, 120-277VAC
 - a. UVPP
 - b. UVPPHD
 - c. MP347

PART 3 - EXECUTION

3.1 INSTALLATION

- A. All equipment shall be installed in accordance with manufacturer requirements and in compliance with all applicable local and national codes and requirements.
- B. During installation or removal of components or wiring in the CX panel supply power must be de-energized to prevent damage to component pieces. This will void the warranty.

3.2 SITE VERIFICATION

- A. Verify all wiring conditions installed under separate sections at the time of Panel installation as acceptable to and in accordance to the manufacturer's installation instructions supplied with the products.

3.3 FIELD MEASUREMENTS

- A. The electrical contractor shall be responsible for field measurements and coordination of physical size as appropriate for the product location. The electrical contractor shall coordinate with all architectural requirements for the space that the panel is located.

3.4 INSPECTION



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- A. The electrical contractor shall inspect all materials prior to installation and notify the manufacturer of any unacceptable materials prior to installation.

3.5 SITE PROTECTION

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

3.6 FACTORY COMMISSIONING (OPTIONAL)

- A. Upon completion of the installation, the system shall be commissioned by the manufacturer's factory authorized representative who will verify a complete fully functional system.
- B. The electrical contractor shall provide both the manufacturer and the electrical engineer with ten working days written notice of the system startup and adjustment date.
- C. Upon completion of the system commissioning, the factory-authorized technician shall provide the proper training to the owner's personnel on the adjustment and maintenance of the system.

END OF SECTION