Division 26

26 09 43 Network Lighting Controls

1. GENERAL
   1. SYSTEM DESCRIPTION
      1. The Unified Lighting Control System shall consist of panels, interiors, and kits incorporating BACnet native lighting controllers and I/O modules that reside on the BACnet MS/TP network of the Building Automation System (BAS). It shall be an integral part of the BAS so that the operator experiences one unified system for controlling, monitoring, scheduling, trending, alarming, etc.
         1. Systems requiring option cards, gateways, or protocol translators are unacceptable.
            1. BACnet MSTP/IP Routers are acceptable when detailed on the drawings.
         2. Systems that require separate master controllers, servers, or front-end computers are not acceptable.
         3. Systems that require client or server licensing are not acceptable.
         4. Systems with an actuation time greater than 100 milliseconds are unacceptable. Actuation time is measured from an occupant signal (via low voltage field device, addressable stations, occupancy sensors, wall switches, etc.) to the first output actuation. Succeeding outputs may be delayed, minimizing peak demand.
      2. The Unified Lighting Control System shall also consist of low-voltage field devices such as stations, occupancy sensors, wall switches, and light level sensors, as detailed in the drawings.
         1. Systems requiring pre-manufactured cables or proprietary wire to connect low-voltage field devices to the Control or I/O modules are unacceptable.
      3. The Unified Lighting Control System shall directly control the lighting as specified in Section 3.6—Sequence of Operations for Unified Lighting Controls.
   2. SCOPE OF WORK
      1. The BAS Contractor shall furnish all Unified Lighting Control System components as detailed in the drawings and specifications. These components shall consist of panels, interiors, and kits that incorporate control and I/O modules, low-voltage field devices such as stations, occupancy sensors, wall switches, and light level sensors. The BAS Contractor shall provide the Electrical Contractor with all necessary documents, including the approved submittal package, riser diagrams, and termination schematics required to provide a complete and correct installation.
      2. The Electrical Contractor under Division 26 shall furnish all labor to install the Unified Lighting Control System furnished by the BAS Contractor. The Electrical Contractor shall receive the Unified Lighting Control System components from the BAS Contractor and store them in a secure and dry location. The Electrical Contractor shall provide all of the required materials (conduit, raceways, wire, etc.) and make all of the line and low voltage wiring terminations for the furnished equipment to ensure the Unified Lighting Control System functions correctly and in accordance with the specifications and drawings. The Electrical Contractor shall provide installation as-built drawings to the BAS Contractor.
   3. RELATED SECTIONS
      1. The General Conditions of the Contract, Supplementary Conditions, and General Requirements are part of this specification. They shall be used with this section as part of the contract documents.
      2. The following sections constitute related work:
         1. Section 23 09 23 -Direct Digital Control System for HVAC
         2. Section 25 00 00 - Integrated Automation
         3. Section 25 56 00 - Integrated Automation Control of Electrical Systems
         4. Section 26 05 00 - Common Work Results for Electrical
         5. Section 26 06 00 - Schedules for Electrical
         6. Section 26 09 23 - Wiring Devices
         7. Section 26 09 43 - Network Lighting Controls
   4. QUALITY ASSURANCE
   5. CODES AND STANDARDS
      1. Work, materials, and equipment shall comply with the most restrictive local, state, and federal authorities' codes and ordinances or these plans and specifications. As a minimum, the installation shall comply with current editions in effect 30 days before receipt of bids of the following codes:
         1. National Electric Code (NEC)
         2. International Building Code (IBC)
         3. International Energy Conservation Code (IECC)
         4. National Electrical Manufacturer Association (NEMA)
         5. ANSI/ASHRAE 135-2010 Rev 12: Data Communication Protocol for Building Automation and Control Systems (BACNET)
         6. Underwriters Laboratory (UL) – UL916 Energy Management, UL508A Industrial Control Panels, and UL924 Emergency Lighting and Power Equipment.
   6. Contractor Provided Submittals
      1. The Electrical Contractor shall provide complete and accurate as-built drawings to the BAS Contractor before Unified Lighting Control System Check-out and Testing.
      2. The Electrical Contractor shall provide as-built drawings that document all wiring termination information necessary to configure, troubleshoot, and complete the Unified Lighting Control System, including but not limited to:
         1. Low voltage network wiring information;
            1. Type and quantity of wires
            2. Distance and route of each wire run
            3. Terminations performed at each device
            4. Junctions performed between devices, if any
         2. Low voltage wiring for low voltage field devices;
            1. Type and quantity of wires
            2. Distance and route of each wire run
            3. Terminations performed at each device
            4. Junctions performed between devices, if any
         3. Line voltage wiring for panels, interiors, and kits;
            1. Circuit identifications and load designation for each relay/line voltage I/O module output
            2. Circuit identification for feed to each control power transformer or power source.
   7. Warranty
      1. The Electrical Contractor shall provide a twelve (12) month warranty for installing the Unified Lighting Control System. The warranty shall include all labor and materials furnished (including but not limited to pipe, wire conduit, fasteners, junction boxes, switch boxes, raceways, and face plates) and all line and low voltage wiring terminations. If within twelve (12) months from the date of acceptance of the Unified Lighting Control System, upon written notice from the owner, it is found to be defective in operation, workmanship, or materials, it shall be replaced, repaired, or adjusted at the option of the Electrical Contractor.
2. PRODUCTS
   1. APPROVED PRODUCTS AND SUPPLIERS
      1. Basis of design is Unified Lighting Control System by Blue Ridge Technologies, Marietta, GA (800-241-9173), furnished by the BAS Contractor listed below:
      2. Approved Manufacturer and BAS Contractor:

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| --- | --- |
| **Manufacturer** | **BAS Contractor** |
| Blue Ridge Technologies | <Automated Logic Dealer or Branch> |
| Blue Ridge Technologies | <Johnson Controls> |
| Blue Ridge Technologies | <Siemens Industry> |
| Competitor a | <BAS Contractor X> |
| Competitor b | <BAS Contractor Y> |
| Competitor c | <BAS Controls Contactor Z> |

* + 1. All proposed Manufacturer and BAS Contractor substitutions must be submitted in writing for approval by the design professional (electrical or mechanical) a minimum of ten (10) working days before the bid date. Proposed substitutions must be accompanied by a review of the specification noting compliance on a line-by-line basis.
    2. BAS Contractors using pre-approved substitutions accept responsibility and associated costs for all required circuitry, devices, and wiring modifications. In addition, the BAS Contractor shall also 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 before rough-in.
  1. CONTROL PANELS
     1. The Electrical Contractor shall install control panels as detailed in the drawings.
        1. The BAS Contractor under Division 25 shall furnish control panels as detailed in the drawings.
  2. Interiors
     1. The Electrical Contractor shall install interiors as detailed on the drawings.
        1. The BAS Contractor under Division 25 shall furnish interiors as detailed in the drawings.
  3. Kits
     1. The Electrical Contractor shall install kits as detailed on the drawings.
        1. The BAS Contractor under Division 25 shall furnish kits as detailed in the drawings.
  4. Low Voltage Wall Switches
     1. The Electrical Contractor shall install low-voltage wall switches as detailed in the drawings.
        1. The BAS Contractor under Division 25 shall furnish Low Voltage Wall Switches as detailed in the drawings.
        2. The Electrical Contractor shall furnish and install all face plates with labels or engraving as required. The BAS Contractor under Division 25 shall provide the text for labeling all faceplates.
        3. Line voltage wall switches that are not part of the Unified Lighting Control System shall be furnished and installed by the Electrical Contractor under Division 26
        4. Low-voltage switches shall be gang-able with other low-voltage decorator-style devices under a common face plate.
  5. LOW VOLTAGE Stations
     1. The Electrical Contractor shall install low-voltage stations and set the station address as detailed in the drawings.
        1. The BAS Contractor under Division 25 shall furnish low-voltage stations as detailed in the drawings.
        2. The Electrical Contractor shall furnish and install all face plates with labels or engraving as required. The BAS Contractor under Division 25 shall provide the text for labeling all faceplates.
        3. Low voltage stations shall be gang-able with other low voltage decorator style devices under a common face plate.
  6. Low Voltage Light Level Sensors
     1. The Electrical Contractor shall install low-voltage light level sensors as detailed in the drawings.
        1. The BAS Contractor under Division 25 shall furnish low voltage light level sensors as detailed in the drawings.
        2. Refer to approved BAS Contractor documents for location.
  7. Low Voltage Occupancy Sensors
     1. The Electrical Contractor shall install low-voltage occupancy sensors and set the time-out value as detailed in the drawings.
        1. The BAS Contractor under Division 25 shall furnish low-voltage occupancy sensors as detailed in the drawings.
        2. Under Division 26, the electrical contractor shall furnish and install line-voltage occupancy sensors not part of the Unified Lighting Control System.
        3. The installer shall set all low-voltage occupancy sensor timers to the minimum setting, 1 minute or less.
        4. The installer shall set all low-voltage occupancy sensor adjustments for sensing area/coverage and be responsible for fine-tuning settings to provide proper operation.
  8. LINE VOLTAGE OCCUPANCY
     1. BAS Contractor shall provide line voltage occupancy sensors directly connected to the Unified Lighting Control System.
        1. The Electrical Contractor under Division 26 shall install all line voltage occupancy sensors as detailed in the drawings and per the manufacturer’s recommendation.
     2. Under Division 26, the electrical contractor shall furnish and install line-voltage occupancy sensors not part of the Unified Lighting Control System.
  9. LINE VOLTAGE SWITCHES
     1. The Electrical Contractor shall furnish and install All line voltage switches under Division 26.

1. EXECUTION
   1. Installation
      1. Install and wire all Unified Lighting Control System equipment furnished by the BAS Contractor. All work, materials, and equipment shall comply with the most restrictive local, state, and federal authorities' codes and ordinances or these plans and specifications. As a minimum, the installation shall comply with current editions in effect 30 days before receipt of bids of the following codes:
         1. National Electric Code (NEC)
         2. International Building Code (IBC)
         3. International Energy Conservation Code (IECC)
         4. ANSI/ASHRAE 135-2004: Data Communication Protocol for Building Automation and Control Systems (BACNET)
         5. Underwriters Laboratory (UL) – UL 916 Energy Management, UL 508 Industrial Control Equipment, and UL 924 Emergency Lighting and Power Equipment.
      2. Installation shall include all low voltage wiring and terminations in accordance with the drawings and submittals provided by the BAS Contractor, including wiring and terminations for:
         1. between I/O modules and low-voltage field devices (including, but not limited to, low-voltage switches, stations, occupancy sensors, and light-level sensors).
         2. between I/O modules, and the 0-10Vdc dimming ballast(s). It applies to 0-10V DC dimming ballast control leads (violet & grey) wired as CL2.
      3. Installation shall include all line voltage wiring and terminations in accordance with the drawings and submittals provided by the BAS Contractor, including wiring and terminations for:
         1. between I/O modules and line voltage loads.
         2. between I/O modules, and the 0-10Vdc dimming ballast(s). This applies to the 0-10VDC dimming ballast control leads (violet and grey) wired as CL1.
      4. Installation shall include all low voltage network wiring and terminations in accordance with the drawings and submittals provided by the BAS Contractor, including wiring and terminations;
         1. The BACnet network
         2. The CANbus station and I/O module network.
   2. Programming
      1. The BAS Contractor shall furnish all Unified Lighting Control System programming as specified under Division 25.
      2. The Electrical Contractor shall provide complete and accurate as-built drawings to the BAS Contractor upon completion of installation.
   3. System Checkout and Testing
      1. Before the BAS contractor checks out and tests the system, the Electrical Contractor shall verify that all line and low-voltage wiring is connected correctly and free of shorts and ground faults. The contractor shall also verify that terminations are torqued correctly.
      2. Before system check-out and testing by the BAS Contractor and before final termination of control leads at the control and I/O modules, the Electrical Contractor shall demonstrate to the BAS Contractor that all 0-10Vdc dimming ballasts operate as follows:
         1. Open 0-10Vdc control leads to demonstrate that all 0-10Vdc dimming ballasts connected achieve full (100%) light output.
         2. Short 0-10Vdc control leads to each other to demonstrate that all 0-10Vdc dimming ballasts connected achieve minimum (typically 5%) light output.
         3. Lamp flicker, tiger tails, or irregularities with the 0-10Vdc dimming ballasts are unacceptable. Replace, rewire, or repair the ballast as required.
         4. Lamps shall be operated at full output for 100 continuous hours before system check-out and testing.
   4. Control System Demonstration and Acceptance
   5. After the BAS Contractor performs tests described in this specification to the satisfaction of the Engineer, the Engineer will accept the control system as meeting completion requirements. Engineer may exempt tests from completion requirements that cannot be performed due to circumstances beyond Contractor's control. The engineer will provide a written statement of each exempted test.
   6. The system shall not be accepted until completed demonstration forms and checklists are submitted and approved.

END