SECTION 26 09 XX

LIGHTING CONTROL SYSTEM

1. GENERAL
   1. Summary
      1. Provide Architectural Dimming and Control equipment as specified herein and as shown on the schedules and drawings.
      2. Prime electrical contractor shall connect power feed and load circuits to the new dimming and control system.
      3. Related Sections:
         1. Section 01 70 00 Execution and Closeout Requirements
         2. Section 11 61 00 Broadcast, Theatre, and Stage Equipment
         3. Section 26 08 00 Commissioning of Electrical Systems
         4. Section 26 09 00 Instrumentation and Control for Electrical Systems
            1. Section 26 09 16 Electrical Control and Relays
            2. Section 26 09 23 Lighting Control Devices
            3. Section 26 09 33 Central Dimming Controls
            4. Section 26 09 36 Modular Dimming Controls
            5. Section 26 09 43 Network Lighting Controls
            6. Section 26 09 61 Theatrical Lighting and Control
         5. Section 26 50 00 Lighting
            1. Section 26 51 00 Interior Lighting
            2. Section 26 55 00 Special Purpose Lighting
            3. Section 26 56 00 Exterior Lighting

(Edit /Delete above list of Sections as necessary).

* 1. Administrative Requirements
     1. Preconstruction Evaluation: Refer to Division 01 requirements.
     2. Project Meetings: Refer to Division 01 requirements.
     3. Construction Documentation: Refer to Division 01 requirements.
     4. Special Administrative Requirements: Refer to Division 01 requirements.
  2. References and Standards
     1. Abbreviations and Acronyms: Refer to Section 01 42 13
     2. Standards listed by reference, including revisions by issuing authority, form a part of this specification section to extent indicated.
     3. Standards listed are identified by issuing authority, authority abbreviation, designation number, title, or other designation established by issuing authority.
     4. Standards subsequently referenced herein are referred to by issuing authority abbreviation and standard designation.
     5. Reference Standards: Refer to Section 01 42 19 and in addition may include but are not limited to the following:
        1. Underwriters Laboratories (UL)
           1. UL 508 Industrial Control Equipment
           2. UL 508a Industrial Control Panels
           3. UL 891 Dead-Front Switchboards
           4. UL 916 Energy Management Equipment
           5. UL 2043 Standard for Safety Fire Test for Heat and Visible Smoke Release
        2. ANSI/ESTA American National Standards Institute
           1. ANSI/NFPA 70 The National Electrical Code®
           2. ANSI E1.11–2008 (R2013) Entertainment Technology - USITT DMX512-A, Asynchronous Serial Digital Data Transmission Standard for Controlling Lighting Equipment and Accessories
           3. ANSI E1.17–2015 Entertainment Technology - Architecture for Control Networks (ACN)
           4. ANSI E1.31-2016 Entertainment Technology - Lightweight Streaming Protocol for Transport of DMX512 using ACN
           5. ANSI E1.27–1-2006 (R2016) Entertainment Technology - Standard for Portable Control Cables for Use with USITT DMX512/1990 and E1.11 (DMX512-A) Products
           6. ANSI E1.27-2–2009 (R2014) Entertainment Technology - Recommended Practice for Permanently Installed Control Cables for Use with ANSI E1.11 (DMX512-A) and USITT DMX512/1990 Products
        3. ANSI/NEMA
           1. ANSI/NEMA C82.11-2011 High Frequency Fluorescent Lamp Ballasts - Annex A Low Voltage Control Interface for Controllable Ballasts.
        4. ANSI TIA/EIA
           1. TIA-232-F - Interface Between Data Terminal Equipment and Data Circuit-Terminating Equipment Employing Serial Binary Data Interchange.
           2. TIA-485-A - Electrical Characteristics of Generators and Receivers for Use in Balanced Digital Multipoint Systems
        5. Institute of Electronic and Electrical Engineers (IEEE)
           1. IEEE 802.3 CSMA/CD (ETHERNET)
     6. All products with power terminals wiring directly to power systems or branch circuits above 49 Volts AC shall be Listed or Recognized as applicable by a Nationally Recognized Testing Laboratory (NRTL).
     7. All products shall conform to International Committee on Electromagnetic Safety (ICES) and FCC Part 15 for electronic emissions.
     8. Custom field assemblies shall meet all applicable codes and where local jurisdictions require, shall be inspected, and approved by the local code authority at Division 26 installer’s expense.
  3. Temporary Facilities and Controls
     1. Temporary Use of Permanent Work: Refer to Division 01 requirements.
     2. Additional to Division 01 requirements, use of devices provided under this section shall require the Division 26 contractor to clean and refurbish item(s) to “as new out of box” condition.
  4. Protection and Cleaning
     1. Storage and Protection: Store materials protected from exposure to harmful environmental conditions and at temperature and humidity conditions recommended by the manufacturer.
     2. Touch up, repair, or replace damaged components before Substantial Completion.
     3. Remove temporary tags, coverings, and construction debris from interior and exterior surfaces of equipment. Remove construction debris from equipment area and dispose of debris.
     4. Clean integral air filters, heat sinks, grills, and fans before Substantial Completion and Commissioning Services.
  5. Warranty
     1. Philips Lighting warrants that its products (other than ballasts) are free of defects in workmanship and materials for a period of three (3) years from the date of shipment with an option to extend the warranty period to up to five (5) years.
     2. The manufacturer shall provide a single source warranty for all supplied equipment specified in this section.
     3. At its sole option, the manufacturer will repair or replace any supplied product defective in workmanship or materials.
     4. Philips Lighting will not be responsible for any products subjected to inappropriate application, installed, or modified in any way that is not in accordance with Philips Lighting’s instructions.
     5. Warranty service shall be defined as any failure to equipment during standard operation as defined by the equipment’s specification or user guide.

1. PRODUCTS
   1. Product Summary
      1. Architectural Lighting Dimming and Control Equipment utilizing centralized and local dimmers, centralized and device processor control, devices to provide conditional and situational data for use by the lighting control system.
      2. Installing contractor shall receive, place, connect, and mount all equipment specified in this Section per the manufacturer’s instructions.
      3. Installing contractor shall furnish all hardware, wire, conduit, connectors, and other necessary items as required for a complete and functional lighting control system.
   2. Acceptable Manufacturers
      1. Signify
         1. Address: 400 Crossing Blvd, Bridgewater, NJ 08807
         2. Telephone: 800.372.331 (*eastern time zone*)
         3. Website: <https://www.dynalite.org/>
      2. The listing of a manufacturer as acceptable does not imply automatic approval. It is the sole responsibility of the electrical contractor to ensure compatibility of submitted products to other sections of the specification.
      3. Substitutions: No substitutions permitted. Any substitutions shall be at the electrical contractor’s expense including design modifications or compatibility complications that may arise from acceptance of unapproved substitutions.
      4. Pre-bid approval of substitute product manufacturers does not relieve the contractor and the product manufacturer from compliance with the functional and operational requirements of the Specifications. All products will be carefully evaluated during the submittal review process. If, at that time, any pre-bid approved substitute is found to be unsatisfactory and not in compliance, the contractor then must re-submit and supply the specified product(s) without additional costs to the Owner and/or delay to project.
      5. Alternate manufacturer(s) shall furnish a one-line system drawing of the system design upon bid proposal.
   3. Manufacturer Qualifications
      1. Manufacture shall have greater than 100 years of lamp and electrical manufacturing experience.
      2. Perform controls manufacturing, sales, and warranty support with fulltime service personal employed by the manufacturer in the United States and Canada.
      3. Shall have the ability to package lighting controls, fixtures, lamps, and drivers (ballasts) from a single manufacturer and distribute shades and shade control from a qualified third party.
   4. Design
      1. Alternate manufacturer(s) shall furnish a one-line system drawing of the system design upon bid proposal.
      2. Upon completion of project the manufacturer shall furnish as-built one-line system drawings and all pertinent instruction manuals and datasheets to the end user within 120 days of signed completion of the project by the owner or owner’s representative.
      3. Should commissioning be required per contract, end user training of the maintenance and operation of the equipment shall be provided by the manufacture or manufacturer’s representative following the completion of the commissioning of the project (per contract specification).
   5. System Architecture
      1. All network devices are to be configured from the same communications port as their operation port. Systems requiring additional device communications ports for configuration will not be accepted.
      2. The control system shall be a network type providing distributed control, with user interfaces communicating directly with load controllers, without requiring the intervention of a central processing unit. This is required so that the system is not dependent on a single device which could create a central point of failure. Control systems that require a central processing unit will not be considered.
      3. The control system should offer flexibility to be configured in a standalone mode for room level control sequence of operations without requiring any laptop-based configuration tools.
      4. System to achieve required functionality by utilizing distributed intelligence network architecture. The system will automatically continue to operate as two independent lighting control networks in the event of a network cable being severed. Systems that require operator intervention or where one or both networks cease to operate in the event of a severed network connection shall not be accepted.
      5. System shall allow for devices to interconnect with daisy chain communication wiring scheme, thereby allowing scalability of the system architecture on one common communication loop. The control system network power can be supplemented by an external power supply to meet the requirements of devices that are dependent on network power.
      6. The control system shall use advanced Windows based graphical programming to configure all network devices and define the behavior and relationship between network devices. The software must be capable of configuring any device within the system from any location on the network. The software shall not be dependent on extra plugins or drivers to enable configuration of devices.
      7. The system shall utilize an external processor running intuitive and user-friendly software for the remote programming of all devices on the control network. It shall be possible to connect at any point on the network, for access to the entire system.
      8. The performance of the system shall not be affected when the external processor is disconnected. The ability to interrogate the system and save the uploaded configuration information to external storage shall be included. All network messages shall be logged to a file for later analysis while the external processor is connected to the network.
      9. All load controllers and UIs shall be supplied with a basic configuration that allows the control system to operate in a default way immediately upon installation. This allows for UIs to send on, off and preset selection commands onto the network. All load controllers correctly connected to the network will respond to these messages appropriately. Achievement of this functionality shall not require any commissioning.
      10. The system should be scalable to at least 65000 controlled groups of lights and these lighting groups can be either on a single site, on a campus or on remote sites across a country, continent or even globally to offer a true multisite system.
      11. The system should be able to use a customer’s VPN to connect parts of the lighting control system together wherever they are located on the client’s VPN.
      12. All sites on a Multisite system should be able to be accessed from a single client application (single dashboard) and this client application must be able to access the system server from any location on the client’s VPN.
      13. No system configuration or history data is to be stored in any 3rd party commercial Cloud servers. Systems that use commercial Cloud Platforms to operate will not be accepted.
      14. The system shall be capable of communicating and controlling PoE luminaires in addition to line voltage luminaires. Any system that does not interface with PoE luminaires will not be considered.
      15. All configuration information downloaded from the external configuration processor to devices on the network shall be stored in the relevant device, contained within non-volatile EEPROM or FLASH memory. This data shall remain secure for an indefinite period, upon loss of power supply. Devices that utilize battery or “supercap” backed up RAM will not be considered.
      16. When power is restored, without requiring any user intervention the system shall automatically return to the same state as when power supply was lost.
      17. It shall be possible to configure all physical controller channels and input devices with a logical overlay, so that control elements can be bound into logical areas. Each device on the network shall be capable of running conditional scripted logic tasks independently, creating a fully distributed, intelligent control system.
      18. It shall be possible to view controller output channels in logical groups within the system configuration software, so that preset scenes and states can be easily configured for each logical area. Systems that can only be configured with reference to the physical controller or channel will not be accepted.
   6. Network Physical Layer
      1. The Control Network shall utilize an RS485 multi-drop control bus.
      2. Data connections between devices on the network shall be of a four (4) conductor type, with two conductors dedicated for distribution of a Safety Extra Low Voltage (SELV) DC or Class 2 supply only, to power keypads,sensors, and other control devices.
      3. Each Load Controller shall contain an integral Class 2 DC power supply. The failure of a single Load Controller shall not affect the Class 2 DC power Supply, or the performance of the network. Systems that multiplex data and Class 2 DC supply on the same conductors or systems that require external, standalone Class 2 DC power supplies will not be considered.
      4. Every load controller must contribute power to the communications network. Systems completely dependent on external network power supplies will not be accepted. The control system should allow for a single load controller to directly power at least four control system UIs without the need of an external power supply.
      5. All load controllers must internally support the required resources such as mains power supply, micro-processor, memory, direct communication port, and internal logic so that devices are independently responsible for their functionality. This is required so that there are no hidden extra accessories that are required for network devices to operate. Control systems which are dependent on external network accessories for devices to achieve their core functionality will not be accepted.
      6. Devices shall be connected to the ‘control LAN’ via pressure pad type screw terminals, and/or RJ45 connectors.
      7. The NCS manufacturer shall also offer a range of appropriate network interfaces to enable Ethernet to be used for trunk network segments.
   7. Network Topology and Protocol
      1. All devices must be capable of operating on a single network using the same protocol.
      2. Systems that do not allow all products from the same manufacturer to be connect together for global control, or are designed to different specifications for each ‘family or series’ of products shall not be acceptable.
      3. The network protocol shall be an event based message packet type. The output state of load controllers shall revert to preset levels stored within the controller’s memory for each relevant network message.
      4. To ensure network traffic is minimized, the system shall be capable of recalling a preset scene or state involving all circuits in an area from a single network message associated with that area.
      5. Systems that require multiple network messages, or a message for each control channel to recall a preset scene or state, will not be accepted. This is required to reduce commissioning complexities and avoid inconsistent responses when transitioning between scenes.
      6. The protocol shall support network messages to control a logical addressing area with a single message. This network message should contain all the information to instigate a scene change. Information within this message shall contain:
         * 1. The logical area address that is being controlled.
           2. The scene that is being selected.
           3. The fade time to transition between selected scenes.
      7. The system shall be capable of supporting 65530 separate areas, and up to 65530 preset states within each area. Each Area shall be able to contain 65530 Logical Channels and an unlimited number of Physical circuits. The System shall be capable of executing fade times ranging from instant to 23.3 hours, adjustable in 0.02 sec increments, within a single network message.
      8. The network protocol shall also support variable length packets and incorporate file transfer control to allow over the network upgrades of device firmware and other settings.
      9. The protocol shall also support message source identification.
      10. Accessories shall be available from the system manufacturer to enable the creation of a trunk and spur network topology. Individual network spurs shall be optically isolated from trunks with devices that enable message filtering, to minimize unnecessary trunk and spur network traffic.
   8. System Functionality

The Control system shall be capable of readily deploying all functionality outlined within this section, with configuration software using a graphical commissioning tool, intuitive mouse-click and drag, drop down dialogue box, or other similar intuitive user programming methods.

* + 1. Occupancy Control
       1. Through sensor based occupancy detection, enable intensity management of artificial lighting required at any given time, especially in areas that experience high levels of daylight i.e. adjacent to windows.
       2. Delay Timers: dimming lights to a background level for a grace time period to notify that the lights will soon switch OFF, and then switch all lights OFF after this Grace period expires should no movement be detected in the interim.
       3. Daylight Override: configure the system to only illuminate the luminaries if the light level is below a certain threshold.
       4. Step-Over Patterns: the system shall be capable of activating or maintaining desired or proportional light levels in multiple areas adjacent to where occupancy has been detected.
       5. Open Plan Background Lighting: the system shall activate or maintain a background lighting level while at least one work island/station is still occupied. When the last work island area becomes unoccupied, the lights in the open plan must switch Off (with a delay).
       6. Corridor Hold-on (Linking): link areas like offices, meeting rooms, or classrooms to an exit path ensuring that a corridor is switched on if one of the areas/offices it services is still in use for an optimal balance between safety and energy conservation.
    2. Light Level Control
       1. Switching: The system must be capable of implementing basic switching control to turn lights ON and OFF from a flexible choice of networked user interface devices.
       2. Dimming: capable of implementing dimming control of lighting from a flexible choice of networked User Interface Devices such as a protocol (or signal) to a lamp driver (DALI addressable, DALI Broadcast, DSI, DMX512, PoE or 1-10V) or by power control of phase control dimmers.
       3. Daylight Harvesting/Maintained Illuminance: implement level management of artificial lighting to maintain task illuminance at optimum targets.
       4. Scene Setting Task Tuning: users and operators to create and adjust preset states or scenes across any lighting circuit/channel associated with the area/space.
       5. Color Component and White Balance Control: provision to represent and control luminaires that incorporate multiple channels for the adjustment of color (RGB) or white balance/Tunable white (Warm/Cool). When integrating White Balance control in a DALI network, only one DALI address shall be used for controlling both white balance and dimming level.
       6. Corridor-Row Offset: utilize closed loop light level management to control zones adjacent to windows receive more daylight than those closer to the core of the building including corridors in open space offices
    3. Personal Control
       1. Manual Light Control: enable manual user controls to change the behavior of automated functions such as daylight harvesting, occupancy detection or illumination management.
       2. Dedicated User Interfaces: enable manual control to be implemented via the provision of keypads or touchscreens typically installed at the point of entry into areas or zones, where appropriate.
       3. Virtual User Interfaces: a range of virtual interface options for manual user control including applications for portable computing devices, mobile phones, and system tray popup dialogues.
    4. Advanced and Time Control
       1. Scheduling
          1. It shall be possible for lights to be switched ON, OFF, dimmed, or behave differently according to a specific schedule.
          2. It shall be possible for schedules to be adjusted for weekends, public holidays, or other shut down periods.
       2. Sequences/Tasks/Events
          1. The system shall include facility to implement conditional and sequential logic control routines/tasks embedded within sensors, keypads, load controllers, network interfaces and gateways. It shall be possible for the control routines to be located and run from management software on a PC connected to the lighting control network or embedded within individual network devices.
          2. Operation of logic control routines shall not depend on a central control unit.
       3. Area Linking
          1. The system shall have provision to dynamically combine or separate no less than twenty-four (24) control areas for applications where de-mountable partitions are being used (typically in areas such as meeting rooms, training rooms and conference centers).
          2. When partitions are opened the user interfaces and lighting shall combine to act as one single control space. Conversely when the partitions are closed the user interfaces and lighting should separate into the discrete area in which they are located.
       4. Load Shedding
          1. Provision shall be available to allow some or all luminaires to dim or switch off when the buildings energy consumption is in excess of predefined limits.
          2. It shall be possible for the maximum limit to be static or dynamically set, potentially by the energy provider.
  1. Product Schedule
     1. Product Equipment list is specified in each device type sub-section below.
     2. Product quantities shall be shown in schedules, tables, and drawings.
     3. All product options are specified in each device type sub-section below.
  2. Load Controllers
     1. General
        1. All Load Controllers shall be designed to operate continuously at 100% of rated load. They shall be convection cooled, with no cooling fans or other forced ventilation employed in order to reduce noise and increase long-term reliability. Systems that are fan dependent or fan assisted, or which recommend regularly scheduled maintenance for air filtration components are not acceptable.
        2. Load controllers shall be available in wall mount and DIN-rail mount configurations. Wall mount controllers shall be suitable for direct installation incorporating a suitable fire rated enclosure with appropriate protection from access to live parts.
        3. DIN-rail controllers shall be designed for installation within a switchboard and have a section profile consistent with an IEC style circuit breaker to ensure compatibility with standard load center enclosures. Different types of compatible load controllers shall be natively available, including:
           1. Leading and trailing edge power dimming phase control devices for the operation of incandescent lamps, iron core magnetic and electronic transformers • Switching output devices for controlling ON/OFF loads,
           2. 1-10V, DSI, PoE, DALI broadcast and DALI signal-dimming devices for controlling electronically dimmable luminaires,
           3. Pulse Width Modulated (PWM) DC devices for controlling LED loads.
        4. Controllers with fixed outputs shall be completely pre-assembled and factory tested by the control system manufacturer. Modular controllers shall have interchangeable control modules tested by the control system manufacturer available for assembly by the client’s installer.
        5. It must be possible to individually configure channels within all load controllers to unique areas that can be separately controlled. Dimming channels must have the ability to be software configured to provide either dimmed or switched output. It must be possible to set minimum and maximum output levels for all channels.
        6. Configuration data relating to individual area names, individual channel names, preset levels, toggle levels and panic level must be stored within the non-volatile memory of each respective controller. The controller must also support device names, area names and channel names each up to 40 characters in length. The controllers must also be capable of supporting up to 170 presets. These settings must be downloadable with the vendor’s software. Any system that does not provide or can restrict access to the settings will not be accepted.
        7. Load Controller shall incorporate a dry contact ‘AUX’ input. The AUX input shall be located next to the network terminals. The AUX input shall incorporate de-bouncing and requires a minimum of 200μS contact closure for a valid activation. The AUX input shall be capable of performing the following minimum functions:
           1. Keypad Disabled / Panic / Program Disable
           2. Sign on Message
           3. Execute logic macro
           4. Defined Network Message transmission
        8. Load controllers shall be available with various individual channel output capacities, ranging from 1A to 20A. Up to 12 channels shall be available in a single enclosure.
        9. Load controller shall have a configurable start up delay that defines the time from when power is restored to a load controller, to when the load controller sends out its sign-on message and starts to initialize outputs. This setting is useful for staggering the startup of multiple load controllers, or preventing multiple load controllers from cluttering the network with sign-on messages when the system is first energized, thus leaving the network clear for other peripherals to configure the load controllers before they revert back to their previous state.
        10. Load Controller with dual serial control ports shall be available, for the duplication of ‘control LAN’ cabling, to guard against the failure of one data cable. The Load Controller shall be configurable to:
            1. Obey control signals from either port
            2. Obey the Main port DMX512 signal and upon loss of signal
            3. Obey the secondary port
            4. Obey the highest level received from either port.
        11. On start-up after loss of power, it shall be possible to configure load controllers to revert to one of the following output conditions:
            1. All circuits full on
            2. All circuits off
            3. All circuit to previous condition prior to power loss
            4. All circuits to a specific scene
        12. Load controller shall respond to a global ‘panic’ network message. Once in panic mode, the load controllers shall turn all circuits to 100% until they receive an ‘un-panic’ message. The system shall not obey any other network messages whilst in panic mode.
        13. Load controller shall monitor the network for loss of communications by listening for a network watchdog message. When a load controller has not heard a network watchdog message for a user-defined period of time (loss of communications), the load controller must revert to one of the following load conditions:
            1. All circuits full on
            2. All circuits off
            3. All circuit to previous condition prior to communication loss
            4. All circuits to a specific preset
        14. Load controller shall incorporate a service diagnostic indication LED. The LED shall operate in the following modes:
            1. *Normal Operation* - The Service LED should blink on briefly, approximately once per second then the dimmer is operating correctly on a quiet network or with no data cable connected.
            2. *Network Activity Detected* - When network activity is detected, the Service LED will blink on and off at approximately twice the normal speed for a few seconds and then revert to normal speed.
            3. *DMX512 Network Activity Detected* - When DMX is detected, the Service LED should flash continuously at a rate of 2 Hz.
        15. Load controllers shall incorporate a service switch. The Service Switch, when pressed momentarily, shall cause a "sign-on" message to be transmitted onto the network. If the transmission is successful, the Service LED will indicate network activity detected. The sign-on message shall contain information about the device, such as: box number, device type and embedded software version. If the Service Switch is pressed and held for four seconds, the device will perform a software reboot. If the service switch is pushed three times in close succession the controller will drive all outputs to 100%.
        16. Load controllers must offer flexibility to be configured in a standalone mode for room level sequence of operation without requiring any laptop-based configuration tools
        17. It shall be possible to upgrade the firmware of the load controller from any network access point over the control network.
        18. All controllers shall be field serviceable and shall not be a “glued shut” device requiring replacement as the only option for servicing.

* + 1. Switching Load Controllers
       1. Switching controllers shall be used for lighting circuits and general electrical loads where automated on/off operation is required. Controllers shall incorporate relays of appropriately rated capacity for typical lighting loads.
    2. Power (Phase-cut) Dimming Load Controllers
       1. All power dimming controllers shall provide output power conditioning including:
          1. Output regulation
          2. Over voltage protection
          3. Surge protection
          4. Brownout and Sag protection
          5. Spike protection
          6. Soft start
          7. 16 bit fade resolution (65,535 steps)
       2. Compensation for line frequency variations shall be incorporated. The dimmers shall maintain a constant light level with no visible flicker for incoming frequency variations of up to 2 Hz per second, or while connected to a generator, whichever condition is worse. The efficiency of each dimmer channel shall be equal to or better than 98%. Dimmers shall be capable of smooth continuous dimming to 2 different dimming curves appropriate to the load type.
       3. The dimmers must incorporate an electronic soft start facility to smoothly ramp up light levels on start up. They must also incorporate surge suppression and feed forward voltage regulation so fluctuations and variations on the supply are not passed on to the load. Leading edge dimmers must maintain a constant light level with no visible flicker for incoming voltage variations of up to 2% change in RMS voltage per line cycle.
       4. Power dimming controllers shall be suitable for operation from either Single Phase or Three Phase supplies.
       5. All power dimming controllers with outputs rated 4A or greater shall incorporate integral circuit breaker protection on each output channel. Circuit breakers shall be Thermal Magnetic C-Curve with 6KA breaking capacity or approved equal. Connections for emergency lighting shall be provided on output circuits and be clearly labeled.
    3. Signal Dimming Controllers
       1. Broadcast Signal Dimming Controllers
          1. Signal dimming shall be used to control luminaires with integral dimming control gear. Signal dimming controllers shall use commissioning software to select the output as 1-10V, DSI or DALI Broadcast.
          2. The controllers shall optionally incorporate an integral mains supply relay for each ballast control output circuit so that power can be removed from the lighting circuit when the ballast control channel is set to 0% output (off state). The relay shall have an appropriately rated capacity for typical lighting loads. Control systems that require an external DSI or DALI converter shall not be acceptable.

* + - 1. DALI Universe Controllers General
         1. DALI Universe Controllers must be used where independent control of each individual luminaire is required.
         2. Each DALI interface shall output the full DALI protocol and control a maximum of 64 individually addressable luminaires per DALI loop.
         3. It should be possible under normal circumstances to connect at least 255 DALI universe controllers to a control network to individually control 16,575 ballasts.
         4. It should also be possible to upgrade to a method whereby 65,000 separate DALI controllers can be connected on to a single control network to individually control 4,225,000 ballasts.
         5. DALI universe controllers shall incorporate all required circuitry to connect directly to each DALI loop without the use of third-party products. They shall be self-contained and support:

Controller unit power supply

DALI network power supply

DALI network interface

Scene controller

Direct network connection to vendor’s network

* + - * 1. Systems that require controllers with external or separate power supplies, external DALI transmitter or external DALI network interfaces, external scene controllers and integration devices to vendor’s network will not be accepted.
        2. Furthermore, systems that require the introduction of multiple interface connections through assembly of individual components for DALI universe adaptation will not be accepted.
        3. The DALI lighting system components shall be connected as a set of individual loops each initially comprising fifty (50) DALI devices per loop. Each loop shall be expandable to incorporate a total of sixty-four (64) DALI devices if required.
        4. Loop wiring shall comprise three (3) power (active, neutral and earth) and two (2) data/control cables following the same route. Optionally, an un-switched active may be incorporated in cable runs for DALI emergency fitting support. Cables shall comply with the Circuiting Requirements of this specification.
        5. DALI loops may be connected in a radial or bus topology or a combination of these. Ring topologies are not acceptable.
        6. Individual DALI universes shall only be linked together via the control systems DALI universe controllers. The control system will have the capacity to manage each individual DALI universe over multiple controllers together as one system. Any network user interface will have the capacity to send a single network massage that when required can affect multiple DALI universes to respond.
        7. The lighting control system must be able to manage one logical control area or lighting group over multiple DALI universes and over multiple DALI universe controllers. Any system that requires the physical DALI loop to be wired in the same configuration as the logical areas will not be accepted.
        8. DALI loops shall be installed in a logical manner. The addressing sequence for individual DALI devices within a DALI loop is by way of the IEC standard address randomization process. In applications where DALI device short addresses have been pre-assigned, the lighting control system shall be capable of preserving the short address assignments when enumerating the universe. The lighting control system shall be capable of utilizing the 16 native scene groups within the DALI system specification 62386-101.
        9. The DALI controllers shall automatically determine whether to control each luminaire individually (short address mode) or by the DALI group addresses (group and scene mapping mode). The intent of this function is to overcome the limitations of 16 group addresses, and the limited speed of the DALI protocol in respect to avoiding a Mexican wave effect caused by individual luminaires arriving at target levels at different times.
        10. Controllers shall also be capable of interrogating DALI luminaires to provide the following diagnostic information;

Lamp failure

Ballast failure

Ballast run time tracking for each ballast and the switched output

Device Online / Offline status

* + - * 1. A user service switch must be available allowing the universe controller to be set to DALI broadcast test mode, allowing installation testing and verification of all DALI network wiring by slowly flashing correctly terminated DALI luminaires.
        2. The DALI interface should be able to ‘communicate’ to each ballast individually (short address mode) or by the DALI group addresses (group and scene mapping mode). This should happen automatically. This choice will overcome the limitations of 16 group addresses, and the slow speed of the DALI protocol specifically relating to avoiding Mexican wave effect of different ballasts arriving at target levels at different times.
        3. Commissioning of the DALI luminaires shall be undertaken by the Control System Supplier. The system must also have provision for either off-site or on-site commissioning. A system that requires off site enumeration of ballasts is not acceptable.
        4. DALI universe controllers shall support both normal and emergency DALI fittings. Systems that require separate DALI controllers for normal and emergency DALI fittings will not be accepted. The system shall also be capable of testing and reporting on the lamp status and battery condition of DALI emergency luminaires.

* + - 1. DALI MultiMaster Controllers
         1. Where practical DALI MultiMaster controllers shall be used that permit connection of DALI input devices i.e. sensors, keypads and dry contact interfaces to the DALI universe loop to reduce wiring. DALI input devices are to be fully powered from the DALI bus. DALI devices that require an additional power supply will not be considered.
         2. The settings for DALI input devices shall be completely configurable from the vendors commissioning software. Any DALI input devices that require direct or manual adjustment will not be accepted.
         3. The DALI controllers shall be capable of interpreting and relaying messages issued by these devices to the control system, so that the DALI input devices can also control lighting outside of the universe where it is connected.
         4. DALI MultiMaster Controllers shall support up to 10 DALI user interface devices on a fully populated DALI universe. The DALI MultiMaster Controllers shall support 16 sensors/user interfaces on a 34 ballast DALI universe.
         5. It shall also be possible to upgrade the firmware of DALI input devices via the DALI bus.
         6. DALI MultiMaster universe controllers shall have provision to dynamically adjust luminaire fade rates as configured in either the DALI user interfaces or devices on the control network
      2. DIN-rail Mount DALI Universe Controllers
         1. DALI universe controllers shall be offered in DIN-rail mount configuration, and available in single or triple universe configurations to control up to 64 or 192 DALI channels respectively. The controllers should be powered from mains supply without the need for an external low voltage transformer.
         2. DIN-rail Mount DALI universe controllers shall optionally incorporate standby power management via an integral 20A switched output per universe for control of the mains power circuit feeding luminaires connected on each universe. This output should disconnect the mains power supply to the luminaires when all luminaires on the associated DALI universe are set to 0% output (off state), removing all standby current consumption from the DALI luminaires. This function should be completely automated by the lighting control system and require no additional commissioning. Systems that do not allow for the integrated power supply to the ballasts to be disconnected are not acceptable.

* + - 1. Structured Wiring Controllers
         1. For installations that utilize structured wiring solutions, Lighting Control Modules, (LCMs) shall be supplied for final connection of the luminaires. LCMs shall be mounted within the ceiling void and typically be located to facilitate the shortest length of individual load control cabling to the luminaires as possible.
         2. The LCMs shall provide 9 individually controlled output channels. Each output shall be a combination of an isolated dimming signal, switched mains supply of up to 5 amps’ maximum per channel, and a maintained active for emergency luminaires. A maximum total box load of 16 amps shall be possible.
         3. For fast and flexible connection of luminaires, the controlled mains outputs and the dimming signal wiring shall be connected via individual, poled and gated six pin sockets that are integrated into the housing of the controller. Matching connectors shall be available with a range of cable lengths, and shall also incorporate where required a “T” junction enabling the daisy chaining of a particular output circuit up to the LCM individual output maximum load.
         4. The LCMs shall have distributed intelligence such that it may be used 'out-of-the-box' and offer useful functionality prior to commissioning.
         5. Each LCM shall be field serviceable and shall not be a “glued shut” device requiring replacement as the only means of repair.
         6. Each output of the controller shall be software configurable to provide DALI broadcast, DSI, or 1-10V. It shall also be possible to software configure each output to be associated with a single DALI universe per controller, so that it is possible to individually control and monitor individual DALI luminaires that are connected to a single output. DALI outputs shall also support DALI emergency luminaires. LCMs that incorporate DIP or Hexadecimal switches for the purpose of coding, programming etc. shall not be accepted.
         7. The LCMs shall also include 3 serviceable internal fuses, each fuse protecting a group of three outputs. The rating of the fuses shall be suitable to enable a reduction in cross sectional area of wiring from the LCM to the luminaries, relative to the supply wiring to the LCM. Access to the fuses shall be via a housing aperture with integral cover shutter that is locked in place when the supply connector to the LCM is inserted.
         8. The LCM shall also have provision to support 4 X SPDT dry contact inputs for local user switches. The LCM shall also include connection provision for 4 network sensors.

* + - 1. DALI Commissioning
         1. DALI ballasts shall be commissioned via a common graphical commissioning software interface providing graphical representation of all DALI fixtures and necessary related products.
         2. DALI load controllers must support setting and reconfiguring DALI addresses, group addresses and scene level settings. Systems that require third-party commissioning software to set DALI addresses, group addresses and scene level settings shall not be acceptable.
         3. Initial programming shall be via graphical icon positioning and grouping, writing data to products and a single database simultaneously. Systems where DALI ballasts must be pre-configured causing intermediate commissioning layers shall not be acceptable.
    1. DIN rail Multipurpose Controllers
       1. DIN rail Multipurpose Controllers shall be used in applications where operation of various small load types is required in a single location, i.e. boardroom, private residence, hotel etc.
       2. The controllers shall have 2 to 8 output channels and be housed in a 12 unit width DIN-rail mount enclosure. Controllers shall have a maximum load of 16A. The internal structure of the controller shall be configured as a main board assembly with 4 output module sockets. Each output module shall be individually protected via a 6.3amp HRC fuse. There shall be a range of plug-in output modules available to suit various load types including:
          1. Signal dimming module with 2 channels, software configurable to DALI Broadcast, 1-10V and DSI. Modules occupy 1 socket.
          2. Leading Edge power dimming module with 4 channels, for loads up to 2 amps per channel. The module shall incorporate internal protection by a self-resetting mechanical cutout that trips in excess of 2.5A or high temperature. Module occupies 2 sockets.
          3. Leading Edge power dimming module with 2 channels, for loads up to 4A. The module shall incorporate internal protection by a self-resetting mechanical cutoff that trips in excess of 10 amps or in high temperature. Module occupies 1 socket.
          4. Trailing Edge power dimming module with 4 channels, suitable for loads up to 2 amps per channel. The module shall incorporate internal protection by a self resetting mechanical cutoff that trips in excess of 2.5 amps or in high temperature, and an ultra-fast acting electronic cutoff that trips at 3 amps to protect the IGBT drivers. The electronic cutoff will retry 3 times to control the load then trip out permanently, requiring a reboot to reset the trip. If a load not suitable for Trailing Edge is connected, like an iron core transformer for example, the module will automatically configure itself to a switching mode. Module occupies 2 sockets.
          5. Trailing Edge power dimming module with 2 channels, for loads up to 4A. The module shall incorporate internal protection by a self-resetting mechanical cutoff that trips in excess of 10 amps or in high temperature. Module occupies 1 socket.
          6. Switching module with 2 channels, suitable for controlling most types of on/off loads up to 4A. Relays to be rated: 16A, TV5, 100A surge. Module occupies 1 socket.
    2. Wall-mounted Multipurpose Controllers
       1. Wall-mounted Multipurpose Controllers shall be used in applications where operation of various larger load types is required in a single location i.e. hotel etc.
       2. Different sized enclosures shall be available for a different number of multichannel output modules (2, 4 or 6 module bays). There shall be a range of plug-in output modules available to suit various load types including:
          1. Phase-cut dimmer module
          2. Signal dimmer module
          3. Relay module
       3. Standard modules shall be provided for all controllers:
          1. Supply module
          2. Communications module
       4. The controller shall be encased in a galvanized steel enclosure, suitable for surface and recess mounting. The enclosure shall be safely mountable before modules are installed. The enclosure shall include multiple knockouts to cater for flexible wiring configuration. The enclosure shall include two separate front covers so that high and low voltage sections can be accessed separately. Circuit breakers shall protrude through the front cover for visibility and ease of access.
       5. The enclosure module bays shall include mechanical interlocks to ensure correct module location. A wiring loom shall be supplied with the enclosure, fitted with plastic collars to ensure proper wiring orientation and prevent installation errors.
       6. All supply and communications terminals, as well as circuit protection, shall be fitted to each module. Output modules shall plug in to any available output module bay and shall not require modification for installation. All modules shall be fully encased in a metal enclosure.
       7. The controller shall have interchangeable communication modules to accommodate different protocols. The supply, communications and output modules shall be individually replaceable. During servicing, replacement output modules shall be automatically rediscovered and reconfigured without commissioning software.
       8. The phase cut output modules shall be capable of Leading/Trailing Edge dimming. The module shall attempt to identify the required dimming type using harmonic analysis, and allow manual selection of dimming type via the commissioning software.
       9. The signal dimmer output module shall be software-selectable for 1-10V, DSI, DALI Broadcast, DALI Addressable and DALI MultiMaster.
       10. The communications module shall have a dry contact input, an indicating LED for device and network status, an override keypad to allow testing of all modules and channels, and a service switch to enable network sign-on and device reset without opening the enclosure.
    3. Load controller product list
       1. DMCx-UL Multipurpose Modular Controller
          1. Philips Dynalite DMC2 and DMC4 provide multichannel control via two interchangeable modules. The devices are available with a variety of control modules to handle various load types and capacities.
          2. Control a multitude of load types from one device enclosure.
          3. Compatible with most dimming loads.
          4. Phase Control module output selectable per channel for Leading or Trailing Edge.
          5. Suitable for controlling 1-10V, DSI, and DALI drivers.
          6. A built-in relay removes power when channel level is at 0%.
          7. Relay module suitable for controlling most types of switched loads.
          8. Surface or recess mountable enclosure.
          9. Fanless design reduces noise, power consumption, and maintenance costs.
          10. Physical Characteristics

Dimensions (H x W x D):

DMC2 - 21.3” x 15” x 4.1” (380 x 540 x 103mm)

DMC4 - 32.7” x 17.5” x 4.2” (830 x 445 x 106mm)

Packed Weight

DMC2-UL 19.6lbs (8.9kg)

DMC4-UL 30.2lbs (13.7kg)

DSM2-XX 2.4lbs (1.1kg)

DSM4-XX 2.75lbs (1.25kg)

DCM-DyNet 1.8lbs (0.8kg)

DMD316-UL 4.0lbs (1.8 kg)

DMD316-FR-UL 4.1lbs (1.9kg)

DMP310-GL 4.6lbs (2.1kg)

DMP603-GL-UL 5.0lbs (2.3kg)

DMR316-UL 3.7lbs (1.7kg)

DMR610-GL-UL 4.1 lbs (1.9kg)

* + - * 1. Construction

Galvanized steel case.

Powder coated front covers.

* + - * 1. Operating Conditions

Temperature: 32 to 104°F (0 to 40°C) ambient

Humidity: 0 to 95% non-condensing

* + - * 1. Storage & Transport

Temperature: -13 to 140°F (-25 to 60°C) ambient

Humidity: 0 to 90% non-condensing

* + - * 1. Power Supply Module Input

Line 1, Line 2, Line 3, Neutral, and Earth link bar provided.

#6-20 AWG (1x16mm²) max conductor size.

* + - * 1. Electrical Characteristics

Input Voltage

120/208 VAC (+10% / -15%)

230/400 VAC (+10% / -15%)

277/480 VAC (+10% / -15%)

Input Current: 32 or 63 amperes per phase max.

Input Frequency: 50/60Hz 3-Phase Y

* + - * 1. Communications Module

One RS-485 DyNet serial port

1 x 5-way pluggable screw terminal

3 x RJ-12 sockets

* + - * 1. One DMX512 Rx port
        2. Four programmable dry contact AUX inputs (non-isolated)
        3. One UL924 trigger input

must only be used with systems complying to UL924 Standard for Safety of Emergency Lighting and Power Equipment

This function not for use with any non-UL924 compliant system

* + - * 1. Service switch
        2. Diagnostic LED
        3. Channel override keypad
        4. Control Modules

DMD316-UL: Driver Control Module

3 x 16A selectable 1-10 V, DSI, or DALI

Line and Neutral for each channel, 1 x 16mm² (#6-20 AWG) conductor size

Protection: 3 x dual pole 20A UL489 listed circuit breaker

1-10V: 50mA sink/source, max 100 drivers per channel

DALI/DSI: 16VDC 130mA nom.

max drivers: 64 per channel (192 per module)

max current: 190mA per channel

DMD316-FR-UL (Feedthrough Relay)

3 x control output individually selectable: 1-10 V, DSI, or DALI

Line and Neutral for each channel, 1 x 6mm² (#10-14 AWG) conductor size

1-10V: 50mA sink/source, max 100 drivers per channel

DALI Insulation System: Basic

DALI/DSI: 13VDC 160mA nom.

Max drivers: 64 per channel (192 per module)

Max current: 240mA per channel

Auto restart on overload

External DALI power supplies prohibited

DMP310-GL-UL: Dimmer Module

3 x 10A Leading/Trailing Edge dimming

Line and Neutral for each channel, 1 x 16mm² (#6-20 AWG) conductor size

Protection: 3 x dual pole 20A UL489 listed circuit breaker

Maximum module output 14A

Current limited to 4.3Amp per channel at 277V

Regulating Device: dual MOSFETs – 83A, 650V, 297A surge

DMR316-UL\*: Relay Control Module

3 x 16A relay (lighting and resistive load)

Line and Neutral for each channel, 1 x 16mm² (#6-20 AWG) conductor size

Protection: 3 x dual pole 20A UL489 listed circuit breaker

1HP (120V), 2HP (230/277V) (motor load)

In-Rush current rating: 500A for 200μs

DMR610-GL-UL Relay control Module

6 x 10A relay (lighting and resistive load)

Line and Neutral for each channel, 1 x 16mm² (#6-20 AWG) conductor size

Protection: 3 x dual pole 20A UL489 listed circuit breaker

1HP (120V), 2HP (230/277V) (motor load)

In-Rush current rating: 500A for 200μs

* + - * 1. Certification

DMC2-UL and DMC4-UL Multipurpose Modular Controller shall meet appropriate standards of:

CE

CSA

Underwriters Laboratories

RCM

FCC

ICES-003

OSHPD ICC-ES AC156 standard for seismic testing

* + - * 1. Equipment List (quantities as shown in schedules, tables, and drawings):

DMC2-UL (Philips 12NC - 913703666009)

DMC4-UL (Philips 12NC - 913703667809)

DMC-GRMS-UL (Philips 12NC - 913703331209)

DMD316-UL (Philips 12NC - 913703667509)

DMD316-FR-UL (Philips 12NC - 913703668709)

DMP310-GL-UL (Philips 12NC - 913703667609)

DMP603-GL-UL (Philips 12NC - 913703668409)

DMR316-UL (Philips 12NC - 913703667409)

DMR610-GL-UL (Philips 12NC - 913703668109)

DCM-DyNet (Philips 12NC - 913703666209)

DSM2-XX (Philips 12NC - 913703500509)

DSM4-XX (Philips 12NC - 913703668009)

* + - 1. DMC-GRMS-UL Multipurpose Modular Controller
         1. The Philips DMC-GRMS-UL is a flexible modular controller designed for use in various room types. Featuring a range of outputs, this compact unit delivers occupant comfort through control of lighting, blinds and plug loads.

Control a multitude of load types from one device enclosure.

Compatible with most dimming loads.

Phase Control module output selectable per channel for Leading or Trailing Edge.

Suitable for controlling 1-10V, DSI, and DALI drivers.

A built-in relay removes power when channel level is at 0%.

Relay module suitable for controlling most types of switched loads.

Surface, recess or plenum mountable enclosure.

Fanless design.

* + - * 1. Physical Characteristics

Dimensions (H x W x D): 19.69” x 12.6” x 4.21” (500 x 320 x 107mm)

Packed Weight - 11.5 lbs. (5.2kg)

Construction

Galvanized steel case.

Powder coated front covers.

Operating Conditions

Temperature: 32 to 104°F (0 to 40°C) ambient

Humidity: 0 to 90% RH non-condensing

Storage & Transport

Temperature: -13 to 140°F (-25 to 60°C) ambient

Humidity: 0 to 90% RH non-condensing

Power Supply Input

Line, Neutral, and Earth link bar provided.

#10-22 AWG (1x6mm²) max conductor size.

* + - * 1. Electrical Characteristics

Input Voltage

120/230VAC (+10% / -15%)

Input Frequency: 50/60Hz Single Phase

* + - * 1. Communications

Two RS-485 DyNet serial ports

Port 1

1 x 5 way pluggable screw terminal

1 x RJ45 socket

Port 2

1 x 5 way pluggable screw terminal

2 x RJ45 sockets

One DMX512 Tx port

Sixteen DMX512 output channels — Caters for situations where color-changing lighting is required as part of overall room ambience.

Four programmable dry contact AUX inputs (non-isolated)

1 x 6-way pluggable screw terminal

Provide the interface to voltage-free button presses or a keycard switch within the room

Three Dry contact outputs (isolated)

1 x 6-way pluggable screw terminal

Provide the interface for any other integration devices in the room

One UL924 trigger input

Must only be used with systems complying to UL924 Standard for Safety of Emergency Lighting and Power Equipment

This function not for use with any non-UL924 compliant system

Built-in DIP switches — Allows the device’s network address to be configured without commissioning software for faster installation

Service switch

Diagnostic LED

* + - * 1. Control Modules

Four control module slots — provides a tailored combination of forward and reverse phase dimming, 1-10V/DALI Broadcast, and relay/motor control options. Universal load control module provides output of 120/230 VAC, 2-5 A per output.

DGTM104

Trailing Edge 1 x 4 A, occupies 1 slot

DGTM202

Trailing Edge 2 x 2 A, occupies 1 slot

DGLM202

Leading Edge 2 x 2 A, occupies 1 slot

DGLM402

Leading Edge 4 x 2 A, occupies 2 slots

DGLM105

Leading Edge 1 x 5 A, occupies 2 slots

DGRM204

Switched 2 x 4 A, occupies 1 slot

DGBM200

Signal Dimming, 2 Channel, occupies 1 slot

1-10V: 10mA sink/source, ≤10 ballasts per channel

DALI Broadcast / DSI: 13VDC 10mA nom, 250mA max - ≤5 ballasts per channel

* + - * 1. Relay Outputs

Nine relay outputs; 16 A; 277V max

Allows various loads including built-in motor directional relays provides control of motorized blinds and curtains.

Enables a total energy management solution, reducing standby power consumption by powering outlets only when required.

* + - * 1. Certification

DMC-GRMS-UL Flexible Modular Controller shall meet appropriate standards of:

UL/cUL

CE

Underwriters Laboratories

RCM

FCC

ICES-003

RoHS

* + - * 1. Equipment List (quantities as shown in schedules, tables, and drawings):

DMC-GRMS-UL (Philips 12NC - 913703331209)

DGTM104 (Philips 12NC - 913703260609)

DGTM202 (Philips 12NC - 913703260709)

DGTM402 v2 (Philips 12NC - 913703024309)

DGLM202 (Philips 12NC - 913703260909)

DGLM402 (Philips 12NC - 913703261009)

DGLM105 (Philips 12NC - 913703260809)

DGCM102 v2 (Philips 12NC - 913703024409)

DGRM204 (Philips 12NC - 913703261109)

DGBM200 (Philips 12NC - 913703261209)

* + - 1. DRC-GRMS-UL General room relay controller
         1. DRC-GRMS-UL controller is a self-contained purpose-built room automation and energy management system. No external power supply, relays or processor are required

Controls a multitude of load types from one device enclosure.

Relay module suitable for controlling most types of switched loads.

Two 16 A power relays — Enables a total energy management solution, reducing standby power consumption by powering GPO/plug loads and air conditioning systems only when required.

Built-in motor directional relays to provide control of motorized blinds for a full automation solution.

Surface, recess or plenum mountable enclosure.

Fanless design.

* + - * 1. Physical Characteristics

Dimensions (H x W x D): 13” x 12.7” x 4.2” (330 x 322 x 107 mm)

Packed Weight – 7.9 lbs. (3.6 kg)

Construction

Galvanized steel case.

Powder coated front covers.

Operating Conditions

Temperature: 32 to 104°F (0 to 40°C) ambient

Humidity: 0 to 90% RH non-condensing

Storage & Transport

Temperature: -13°F to 140°F (-25°C to 60°C) ambient

Humidity: 0 to 90% RH non-condensing

Power Supply Input

Line, Neutral, and Earth link bar provided.

#10-22 AWG (1x6mm²) max conductor size.

* + - * 1. Electrical Characteristics

Input Voltage

120/230/277 VAC (+10% / -15%)

Input Frequency: 50/60Hz Single Phase

* + - * 1. Communications

One RS-485 DyNet serial port

1 x 5 way pluggable screw terminal

Dry contact AUX inputs (non-isolated)

2 x 12-way pluggable screw terminals

18 programmable dry contact inputs (non-isolated) provide the interface to voltage-free button presses or a keycard switch within the room

Dry contact outputs (isolated)

1 x 6-way pluggable screw terminal

Three dry contact (isolated) outputs provide the interface for any other integration devices in the room

UL924 trigger input

1 x 2-way pluggable screw terminal

Must only be used with systems complying to UL924 Standard for Safety of Emergency Lighting and Power Equipment

This function not for use with any non-UL924 compliant system

Service switch

Diagnostic LED

* + - * 1. Relay Outputs

Fourteen relay outputs; 16 A; 277V max

Allows various loads including built-in motor directional relays provides control of motorized blinds and curtains.

Enables a total energy management solution, reducing standby power consumption by powering outlets only when required.

* + - * 1. Certification

DRC-GRMS-UL Relay Controller shall meet appropriate standards of:

UL/cUL

CE

RCM

FCC

ICES-003

RoHS

* + - * 1. Equipment List (quantities as shown in schedules, tables, and drawings):

DRC-GRMS-UL (Philips 12NC - 913703331109)

* + - 1. Captivation Distributed Load Controllers
         1. Single circuit distributed load control for dimming and switching loads.
         2. Two base models shall exist:

Single circuit Phase dimming device capable of dimming loads requiring forward or reverse phase dimming.

Single circuit 0-10V dimming device with integrated relay capable of driving switching or 0-10V style drivers.

* + - * 1. Universal performance electrical/mechanical specification for all Captivation models:

Shall mount to a standard or deep 4x4 electrical junction box.

All operate to specified load ranges (as listed below) without the use of moving parts for cooling.

Shall be constructed of 16 Gauge Galvanized Steel and be capable of use in all U.S. and Canadian municipalities.

Units shall take in 120V or 277V without the need for different models.

All models shall hold a UL916 and UL924 ratings.

Additionally software or hardware purchased add-ons shall not be required for UL924 operation.

Unit shall have an integrated power supply capable of driving an 60mA 24V motion sensor without the need of an external power pack.

Optional models shall exist to directly support City of Chicago Plenum Requirements without the need for special exception from the City of Chicago.

User selectable dimming curves shall exist and be settable via software. Additionally custom curves shall be programmable using external software tools.

Housing shall legally allow for entry of wiring on both the high voltage and control cabling via EMT or ‘free-air’ cabling.

Units shall be rated to operate at 0-50C ambient with a relative humidity of 10-90% non-condensing.

* + - * 1. Communication performance specification for all Captivation models:

All models shall be provisioned to accept RS485 communication using direct wiring terminal interfacing or through the use of RJ45 connectors.

Units shall support the following data capabilities without the need for additional hardware or software add-ons.

DMX512A input, default addressed to channel #1.

Philips DyNet.

No less than three low voltage (24VDC) Contact inputs allowing triggers of internally stored states.

UL924 input for Emergency lighting capable of software configuration as a normally open or normally closed input. (Default shall be normally open, and not require software setup for operation in this state).

Direct connection from a motion sensor for occupancy state.

Testing of the attached load shall be possible directly at the load controller through a test button which will override data input. The manual override shall be resettable through remote software.

* + - * 1. Single circuit Phase dimming device performance specification:

Device shall be capable of switching from Forward Phase and reverse phase using a hardware settable switch on the load controller. Software changes of this setting shall not be acceptable.

Load controller shall have a published rating for resistive, tungsten, electric, magnetic halogen, and electrical halogen load drivers at 5A and 120V 50/60Hz and 2.2A and 277V 50/60Hz.

* + - * 1. Single circuit 0-10V dimming device with integrated relay device performance specification:

Device shall be capable of controlling 0-10V (ANSI C82.11) drivers.

0-10V drive shall be capable of sourcing or sinking 40mA minimum.

An integrated relay be rated at a minimum of 16A @ 120V and 10A @ 277V.

The integrated relay shall operate mechanically. Electrically held relays shall not be acceptable.

Termination of 0-10V control to the controller shall be possible regardless of wiring entrance via Class 1 or Class 2.

Load controller shall a have published rating for resistive, tungsten, electric ballast, electronic ballast, magnetic halogen, and electrical halogen load drivers at 16A and 120V 50/60Hz and 10A and 277V 50/60Hz.

A listed horsepower rating shall be provided for motor loads of a minimum of 1HP for 120V 50/60Hz and 2HP and 277V 50/60Hz.

* + - 1. Pre-installed DIN Rail cabinets
         1. General

The Philips Multipurpose Control Cabinets shall be designed to house DIN rail mounted equipment and have provisions for proper spacing (per UL508a) to accommodate low voltage control cable and high voltage power wiring.

Cabinet shall exist in models supporting one (1), two (2), up to four (4), or up to five (5) Philips Dynalite Load Controllers, depending on cabinet model.

Cabinets shall be UL Listed to UL508a.

* + - * 1. Mechanical

The cabinets shall be labeled with the manufacturer’s name, catalog number, and appropriate rating information.

The cabinet’s construction shall be treated, primed to prevent corrosion.

The cabinets shall be natural convection cooled and fans shall not be required. Systems requiring forced air cooling shall not be acceptable.

Cabinets shall carry California Special Seismic Certification Preapproval (OSP).

Cabinets shall not reduce FCC and RoHS compliance of components.

* + - * 1. Electrical

All terminations and internal wiring shall be accessible behind a locking door or screwed panel.

High voltage cable entry for all enclosures shall be on the top left, left middle, or bottom left.

Low voltage cable entry shall be from the top right, right middle, or bottom right side of the enclosure.

* + - * 1. Equipment List (quantities as shown in schedules, tables, and drawings):

Standard Order Number codes for Multipurpose Control Cabinets

DBC120-DALI-ENC: 1 x DALI addressing universe and input device support

DBC320-DALI-ENC: 3 x DALI addressing universe and input device support

DBC516FR-ENC: 5 x 16 Amp switching & 5 x 1-10V or DALI broadcast or dimming or 1 x DALI addressing universe

DBC1220-GL-ENC: 12 x 20 Amp switching & 12 x 1-10V or DALI broadcast dimming

DBC2420-GL-ENC: 24 x 20 Amp switching & 24 x 1-10V or DALI broadcast dimming

DRC1220FR-GL-ENC: 12 x 20 Amp switching

DRC2420FR-GL-ENC: 24 x 20 Amp switching

DNG485-ENC: 1 x DMX512 gateway

PDEG-S-ENC: 1 x Remote access ethernet gateway

DRPC802-ENC: 8 x 2 Amp Reverse phase dimmer

DFPC802-ENC: 8 x 2 Amp Forward phase dimmer

DRPC1602-ENC: 16 x 2 Amp Reverse phase dimmer

DFPC1602-ENC: 16 x 2 Amp Forward phase dimmer

PDEG-ENC: 1 x Ethernet Gateway

DMPC802-ENC: 8 x modular multipurpose controller

DMPC1602-ENC: 16 x modular multipurpose controller

* + - 1. CE Series Enclosures
         1. General

The Philips CE Series Load Controller Enclosures shall be designed to house DIN rail mounted equipment and have provisions for proper spacing (per UL508a) to accommodate low voltage control cable and high voltage power wiring.

Enclosures shall exist in models capable of mount one (1), two (2), up to four (4), or up to five (5) Philips Dynalite Load Controllers, depending on enclosure model.

Enclosures shall be UL Listed to UL508a.

* + - * 1. Mechanical

The CE enclosure and sub-panel shall be labeled with the manufacturer’s name, catalog number, and appropriate rating information.

The enclosure’s construction shall be treated, primed to prevent corrosion.

millimeter DIN rail to mount the user desired control modules

The CE Enclosure Series shall be natural convection cooled and fans shall not be required. Systems requiring forced air cooling shall not be acceptable.

CE Enclosures shall carry California Special Seismic Certification Preapproval (OSP).

Enclosure shall not reduce FCC and RoHS compliance of components.

* + - * 1. Electrical

All terminations and internal wiring shall be accessible behind a locking door or screwed panel.

High voltage cable entry for all enclosures shall be on the top left, left middle, or bottom left.

Low voltage cable entry shall be from the top right, right middle, or bottom right side of the enclosure.

* + - * 1. Equipment List (quantities as shown in schedules, tables, and drawings):

Standard Order Number codes for CE Enclosures (CE):

Enclosure CE-1NG-1PS

One RS-485 Network Gateways (xNG).

One Power Supply (PS)

Enclosure CE-1DA

One DDBC-120-DALI controller

Enclosure CE-1J8-1PS

One JACE interface

One Power Supply (PS)

Enclosure CE-ETO

Custom enclosure

Enclosure DCE-ETO

Customer enclosure using DH2x24 panel

* + - 1. DALI load controller DDBC120-DALI
         1. General

The Philips DDBC120-DALI is designed to control of DALI electronic fluorescent ballasts or LED drivers.

The Load Controller shall handle up to 64 DALI addresses

The Load Controller shall support DALI 209 standard and provide controllability to tunable while luminaires.

* + - * 1. Mechanical

Each module shall be labeled with manufacturer’s name, catalog number, and ratings.

The load controller enclosure shall be designed for mounting on thirty-five (35mm) millimeter DIN rail.

The load controller is designed for installation into the Philips CE Series Enclosure, a NEMA-1 approved enclosure or switchboards near the circuit breakers without the use of DIN rail.

The load controller’s construction shall be Lexan 920, UL94-VO in a DIN Rail style case.

The load controller shall measure no more than 3.74 x 4.13 x 2.95 inches (95 x 105 x 75 mm).

The load controller shall weigh no more than 0.99 pounds (0.45 kg).

The load controller shall operate within: -4 to 104 degrees Fahrenheit (-20 - 50°C) in zero (0) to 90 percent relative humidity, non-condensing.

Interface shall be UL, FCC, and RoHS compliant.

User controls shall provide:

Service Switch

Diagnostic LED

(1) Class 2 dry contact inputs, consisting of 1x14 AWG screw terminal.

Dry Contact input shall be rated 0-10 volt DC 0.7mA per input.

The DyNet RS-485 Serial Port connections provided by six (6) 1x14 AWG screw terminals.

* + - * 1. Electrical

DyNet DC supply Input power shall be twelve volts DC (12VDC).

Nominal DyNet power rating shall not exceed one hundred and twenty milliamps (120mA).

Control Circuit Supply shall be rated:

120V-240VAC (+10%/-15%) 50/60 Hz

Single phase and Neutral

Input current Max. 0.25A

Line voltage supply terminals (Line, Neutral, and Ground) shall accept 8-#24 AWG copper wire.

Relay Output Channels:

One (1) load channels rated at 20 amperes for DALI ballast power supply

Channel terminals (channel IN & channel OUT) shall accept 8-#24 AWG copper wire.

Control Output Loops (data buses):

One (1) DALI control loops (data buses).

Sixty-four (64) control channels per loop.

Loops include two way communication capabilities.

DALI output terminals: 12-22 AWG copper wire,

Low Voltage Class 1 or 2

Reference Data Cable: Belden 1502R / 1502P or equivalent as approved by Philips.

* + - * 1. Diagnostic Functions:

Lamp failure reporting.

Driver & Ballast failure reporting.

Driver & Ballast run time tracking for each ballast and switched output.

Driver runtime tracking

Device Online/Off-line status.

Diagnostic Functions, indicating device Online/Offline status, shall be accessible thru Philips Envision Project and Envision Manager, Touch Screen, or BAS interface.

Availability of some diagnostics is dependent on ballast type.

* + - * 1. Equipment List (quantities as shown in schedules, tables, and drawings):

DDBC120 -DALI (Philips 12NC – 913703685109)

* + - 1. DALI broadcast or 0-10V load controller DDBC1200
         1. General

The Philips DDBC1200 is designed to control 12 independent output channels, each selectable to DALI Broadcast or 0-10 V.

The Load Controller shall handle up to 80 DALI drivers per channel and a total of 300 DALI drivers

* + - * 1. Mechanical

Each module shall be labeled with manufacturer’s name, catalog number, and ratings.

The load controller enclosure shall be designed for mounting on thirty-five (35mm) millimeter DIN rail.

The load controller is designed for installation into the Philips CE Series Enclosure, a NEMA-1 approved enclosure or switchboards near the circuit breakers without the use of DIN rail.

The load controller’s construction shall be Lexan 920, UL94-VO in a DIN Rail style case.

The load controller shall measure no more than 8.46 x 3.66 x 2.52 inches (215 x 93 x 64 mm).

The load controller shall weigh no more than 1.19 pounds (0.54 kg).

The load controller shall operate within: 32 to 104 degrees Fahrenheit (0 - 40°C) in zero (0) to 90 percent relative humidity, non-condensing.

Interface shall be UL, FCC, and RoHS compliant.

User controls shall provide:

Service Switch

Diagnostic LED

(1) Class 2 dry contact inputs, consisting of 1x14 AWG screw terminal.

Dry Contact input shall be rated 0-10 volt DC 0.7mA per input.

The DyNet RS-485 Serial Port connections provided by six (6) 1x14 AWG screw terminals.

* + - * 1. Electrical

DyNet DC supply Input power shall be twelve volts DC (12VDC).

Nominal DyNet power rating shall not exceed two hundred milliamps (200mA).

Control Circuit Supply shall be rated:

120V-240VAC (+10%/-15%) 50/60 Hz

Single phase and Neutral

Input current Max. 0.25A

Line voltage supply terminals (Line, Neutral, and Ground) shall accept 8-#24 AWG copper wire.

Control Output Loops (data buses):

12 DALI Broadcast or 0-10V control loops (data buses).

Output terminals: 12-22 AWG copper wire,

Low Voltage Class 1 or 2

Reference Data Cable: Belden 1502R / 1502P or equivalent as approved by Philips.

* + - * 1. Diagnostic Functions:

Device Online/Off-line status.

Diagnostic Functions, indicating device Online/Offline status, shall be accessible thru Philips Envision Project and Envision Manager, Touch Screen, or BAS interface.

* + - * 1. Equipment List (quantities as shown in schedules, tables, and drawings):

DDBC1200 (Philips 12NC – 913703333909)

* + - 1. DALI broadcast or 0-10V load controller DDBC516-FR
         1. General

The Philips DDBC516-FR is designed to control 5 independent output channels, each selectable to DALI Broadcast, DALI Addressable or 0-10 V.

The Load Controller shall handle up to 10 DALI drivers per channel and a total of 50 DALI drivers

* + - * 1. Mechanical

Each module shall be labeled with manufacturer’s name, catalog number, and ratings.

The load controller enclosure shall be designed for mounting on thirty-five (35mm) millimeter DIN rail.

The load controller is designed for installation into the Philips CE Series Enclosure, a NEMA-1 approved enclosure or switchboards near the circuit breakers without the use of DIN rail.

The load controller’s construction shall be Lexan 920, UL94-VO in a DIN Rail style case.

The load controller shall measure no more than 3.70 x 8.31 x 2.95 inches (94 x 211 x 75 mm).

The load controller shall weigh no more than 1.76 pounds (0.8 kg).

The load controller shall operate within: 32 to 104 degrees Fahrenheit (0 - 40°C) in zero (0) to 90 percent relative humidity, non-condensing.

Interface shall be UL, FCC, and RoHS compliant.

User controls shall provide:

Service Switch

5 channel override switch

Diagnostic LED

5 channel status LED

(1) Class 2 dry contact inputs, consisting of 1x14 AWG screw terminal.

Dry Contact input shall be rated 0-10 volt DC 0.7mA per input.

The DyNet RS-485 Serial Port connections provided by six (6) 1x14 AWG screw terminals.

* + - * 1. Electrical

DyNet DC supply Input power shall be twelve volts DC (12VDC).

Nominal DyNet power rating shall not exceed two hundred milliamps (200mA).

Control Circuit Supply shall be rated:

120V-240VAC (+10%/-15%) 50/60 Hz

Single phase and Neutral

Input current Max. 0.25A

Line voltage supply terminals (Line, Neutral, and Ground) shall accept 8-#24 AWG copper wire.

Control Output Loops (data buses):

5 DALI Broadcast, DALI addressable or 0-10V control loops (data buses)

5 relay outputs, up to 16 Amps.

Output terminals: 12-22 AWG copper wire,

Low Voltage Class 1 or 2

Reference Data Cable: Belden 1502R / 1502P or equivalent as approved by Philips.

* + - * 1. Diagnostic Functions:

Lamp failure reporting

Driver failure reporting

Driver runtime tracking

Device online/offline status

Diagnostic Functions, indicating device Online/Offline status, shall be accessible thru Philips Envision Project and Envision Manager, Touch Screen, or BAS interface.

* + - * 1. Equipment List (quantities as shown in schedules, tables, and drawings):

DDRC516-FR (Philips 12NC – 913703031509)

* + - 1. Relay load controllers DDRC series
         1. General

The Philips relay controllers are designed to control up to 12 independent output channels, up to 20A per channel and 180A max per device.

* + - * 1. Mechanical

Each module shall be labeled with manufacturer’s name, catalog number, and ratings.

The load controller enclosure shall be designed for mounting on thirty-five (35mm) millimeter DIN rail.

The load controller is designed for installation into the Philips CE Series Enclosure, a NEMA-1 approved enclosure or switchboards near the circuit breakers without the use of DIN rail.

The load controller’s construction shall be Lexan 920, UL94-VO in a DIN Rail style case.

The load controller shall weigh no more than 1.1 pounds (2.43 kg).

The load controller shall operate within: 32 to 122 degrees Fahrenheit (0 - 50°C) in zero (0) to 90 percent relative humidity, non-condensing.

Interface shall be UL, FCC, and RoHS compliant.

User controls shall provide:

Service Switch

Manual override switch for each channel

Diagnostic LED

(1) Class 2 dry contact inputs, consisting of 1x14 AWG screw terminal.

Dry Contact input shall be rated 0-10 volt DC 0.7mA per input.

The DyNet RS-485 Serial Port connections provided by six (6) 1x14 AWG screw terminals.

* + - * 1. Electrical

DyNet DC supply Input power shall be twelve volts DC (12VDC).

Nominal DyNet power rating shall not exceed two hundred milliamps (200mA).

Control Circuit Supply shall be rated:

120V-240VAC (+10%/-15%) 50/60 Hz

Single phase and Neutral

Input current Max. 0.25A

Line voltage supply terminals (Line, Neutral, and Ground) shall accept 8-#24 AWG copper wire.

Control Output Loops (data buses):

Up to 12 relay output channels,

Output terminals: 12-22 AWG copper wire,

Low Voltage Class 1 or 2

Reference Data Cable: Belden 1502R / 1502P or equivalent as approved by Philips.

* + - * 1. Diagnostic Functions:

Device Online/Off-line status.

Diagnostic Functions, indicating device Online/Offline status, shall be accessible thru Philips Envision Project and Envision Manager, Touch Screen, or BAS interface.

* + - * 1. Equipment List (quantities as shown in schedules, tables, and drawings):

DDBC1220FR-GL (Philips 12NC – 913703243009)

DDBC420FR (Philips 12NC – 913703244609)

* + - 1. Multi-protocol load controllers DDRC-GRMS-E
         1. General

The Philips multi-protocol load controllers are designed to control up to 13 switched outputs and inbuilt ethernet bridge.

* + - * 1. Mechanical

Each module shall be labeled with manufacturer’s name, catalog number, and ratings.

The load controller enclosure shall be designed for mounting on thirty-five (35mm) millimeter DIN rail.

The load controller is designed for installation into the Philips CE Series Enclosure, a NEMA-1 approved enclosure or switchboards near the circuit breakers without the use of DIN rail.

The load controller’s construction shall be Lexan 920, UL94-VO in a DIN Rail style case.

The load controller shall measure no more than 4.13 x 8.50 x 2.91 inches (105 x 216 x 74 mm).

The load controller shall weigh no more than 1.48 pounds (0.67 kg).

The load controller shall operate within: 32 to 122 degrees Fahrenheit (0 - 50°C) in zero (0) to 90 percent relative humidity, non-condensing.

Interface shall be UL, FCC, and RoHS compliant.

User controls shall provide:

Service Switch

Two (2) 8 bit dip switches

Diagnostic LED

Two (2) Ethernet activity LED

Eighteen (18) Class 2 dry contact inputs, consisting of 1x14 AWG screw terminal.

One (1) UL924 input

Dry Contact input shall be rated 0-10 volt DC 0.7mA per input.

The DyNet RS-485 Serial Port connections provided by six (6) 1x14 AWG screw terminals.

* + - * 1. Electrical

DyNet DC supply Input power shall be twelve volts DC (12VDC).

Nominal DyNet power rating shall not exceed three hundred milliamps (300mA).

Control Circuit Supply shall be rated:

120V-240VAC (+10%/-15%) 50/60 Hz

Single phase and Neutral

Input current Max. 0.25A

Line voltage supply terminals (Line, Neutral, and Ground) shall accept 8-#24 AWG copper wire.

Control Outputs:

Up to 13 switched outputs,

64 channel DMX output

Output terminals: 12-22 AWG copper wire,

Low Voltage Class 1 or 2

Reference Data Cable: Belden 1502R / 1502P or equivalent as approved by Philips.

* + - * 1. Diagnostic Functions:

Device Online/Off-line status.

Diagnostic Functions, indicating device Online/Offline status, shall be accessible thru Philips Envision Project and Envision Manager, Touch Screen, or BAS interface.

* + - * 1. Equipment List (quantities as shown in schedules, tables, and drawings):

DDRC-GRMS-E (Philips 12NC – 913703334009)

* + - 1. Multipurpose modular controller DDMC802
         1. General

The Philips multipurpose modular load controllers are designed to control up to 8 configurable output channels.

The controller shall support up to 4 module bays - accommodating any combination of up to four single modules or two double-size modules

* + - * 1. Mechanical

Each module shall be labeled with manufacturer’s name, catalog number, and ratings.

The load controller enclosure shall be designed for mounting on thirty-five (35mm) millimeter DIN rail.

The load controller is designed for installation into the Philips CE Series Enclosure, a NEMA-1 approved enclosure or switchboards near the circuit breakers without the use of DIN rail.

The load controller’s construction shall be Lexan 920, UL94-VO in a DIN Rail style case.

The load controller shall measure no more than 4.13 x 8.50 x 2.91 inches (105 x 216 x 74 mm).

The load controller shall weigh no more than 1.14 pounds (0.52 kg).

The load controller shall operate within: 32 to 104 degrees Fahrenheit (0 - 40°C) in zero (0) to 90 percent relative humidity, non-condensing.

Interface shall be UL, FCC, and RoHS compliant.

User controls shall provide:

Service Switch

Eight (8) manual override switches

Diagnostic LED

Eight (8) channel status LEDs

Nine (9) Class 2 dry contact inputs, consisting of 1x14 AWG screw terminal.

Dry Contact input shall be rated 0-10 volt DC 0.7mA per input.

The DyNet RS-485 Serial Port connections provided by six (6) 1x14 AWG screw terminals.

* + - * 1. Electrical

DyNet DC supply Input power shall be twelve volts DC (12VDC).

Nominal DyNet power rating shall not exceed two hundred milliamps (200mA).

Control Circuit Supply shall be rated:

120V-240VAC (+10%/-15%) 50/60 Hz

Single phase and Neutral

Input current Max. 16A

Line voltage supply terminals (Line, Neutral, and Ground) shall accept 8-#24 AWG copper wire.

* + - * 1. Control Modules

Four control module bays — provides a tailored combination of forward and reverse phase dimming, 1-10V/DALI Broadcast, and relay/motor control options. Universal load control module provides output of 120/230 VAC per output.

DGTM104

Trailing Edge 1 x 4 A, occupies 1 slot

DGTM202

Trailing Edge 2 x 2 A, occupies 1 slot

DGTM402

Trailing Edge 4 x 2 A occupies 2 slots

DGLM202

Leading Edge 2 x 2 A, occupies 1 slot

DGLM105

Leading Edge 1 x 5 A, occupies 2 slots

DGLM402

Leading Edge 4 x 2 A, occupies 2 slots

DGRM204

Switched 2 x 4 A, occupies 1 slot

DGBM200

Signal Dimming, 2 Channel, occupies 1 slot

1-10V: 10mA sink/source, ≤10 ballasts per channel

DALI Broadcast / DSI: 13VDC 10mA nom, 250mA max - ≤5 ballasts per channel

DGCM102

Motorized curtain / blind control 1 x 2 A, occupies 1 slot

* + - * 1. Certification

Multipurpose Modular Controller shall meet appropriate standards of:

UL/cUL

CE

Underwriters Laboratories

RCM

FCC

ICES-003

RoHS

* + - * 1. Equipment List (quantities as shown in schedules, tables, and drawings):

DDMC802 (Philips 12NC - 913703243509)

DGTM104 (Philips 12NC - 913703260609)

DGTM202 (Philips 12NC - 913703260709)

DGTM402 v2 (Philips 12NC - 913703024309)

DGLM202 (Philips 12NC - 913703260909)

DGLM402 (Philips 12NC - 913703261009)

DGLM105 (Philips 12NC - 913703260809)

DGCM102 v2 (Philips 12NC - 913703024409)

DGRM204 (Philips 12NC - 913703261109)

DGBM200 (Philips 12NC - 913703261209)

* + - 1. PWM load controller DDLEDC605GL
         1. General

The PWM controller must control up to six PWM common-anode voltage-mode outputs, suitable for directly driving high-intensity LED sources.

The PWM controller shall connect to a single or dual external DC power supply, enabling the unit to deliver a range of nominal output voltages.

The PWM controller shall be DMX512 compatible and suitable for the high chase speeds commonly found in display lighting

* + - * 1. Mechanical

Each module shall be labeled with manufacturer’s name, catalog number, and ratings.

The load controller enclosure shall be designed for mounting on thirty-five (35mm) millimeter DIN rail.

The load controller is designed for installation into the Philips CE Series Enclosure, a NEMA-1 approved enclosure or switchboards near the circuit breakers without the use of DIN rail.

The load controller’s construction shall be Lexan 920, UL94-VO in a DIN Rail style case.

The load controller shall weigh no more than 2.2 pounds (1 kg).

The load controller shall operate within: 32 to 104 degrees Fahrenheit (0 - 40°C) in zero (0) to 90 percent relative humidity, non-condensing.

Interface shall be UL, FCC, and RoHS compliant.

User controls shall provide:

Service Switch

8 x DMX start address DIP switch

Diagnostic LED

(1) Class 2 dry contact inputs, consisting of 1x14 AWG screw terminal.

The DyNet RS-485 Serial Port connections provided by six (6) 1x14 AWG screw terminals.

* + - * 1. Electrical

DyNet DC supply Input power shall be twelve volts DC (12VDC).

Nominal DyNet power rating shall not exceed one hundred and twenty milliamps (120mA).

Control Circuit Supply shall be rated:

120V-240VAC (+10%/-15%) 50/60 Hz

Single phase and Neutral

Input current Max. 20A

Line voltage supply terminals (Line, Neutral, and Ground) shall accept 8-#24 AWG copper wire.

Control Output:

Up to 6 x LED PWM

Output channel current up to 5 A

Output channel voltage of 10-24 VDC

Output terminals: 12-22 AWG copper wire,

Low Voltage Class 1 or 2

Reference Data Cable: Belden 1502R / 1502P or equivalent as approved by Philips.

* + - * 1. Diagnostic Functions:

Device Online/Off-line status.

Diagnostic Functions, indicating device Online/Offline status, shall be accessible thru Philips Envision Project and Envision Manager, Touch Screen, or BAS interface.

* + - * 1. Equipment List (quantities as shown in schedules, tables, and drawings):

DDLEDC605GL (Philips 12NC – 913703061209)

* + 1. Single zone, J-box mounted controller DDC116
       - 1. General

The Philips Dynalite single zone controller is designed to control 1 output channels, up to 20A per channel.

The load controller must support standalone mode for room-based applications without requiring any laptop-based configuration tool or networked mode for integration across multiple spaces.

It must be possible to toggle the dimming output of the controller between 0-10V and DALI broadcast signals.

The controller must support 1 x DMX 512 input addressing

* + - * 1. Mechanical

Each module shall be labeled with manufacturer’s name, catalog number, and ratings.

The controller must be compliant with UL 2043 / Chicago plenum-rated plastic enclosure and mount directly onto a junction box.

The load controller shall weigh no more than 0.6 pounds (0.27 kg).

The load controller shall operate within: 32 to 113 degrees Fahrenheit (0 - 45°C) in zero (0) to 90 percent relative humidity, non-condensing.

Interface shall be UL, FCC, ICES, and RoHS compliant.

User controls shall provide:

Service Switch

Diagnostic LED

(1) Class 2 dry contact inputs, consisting of 1x14 AWG screw terminal.

(1) DMX 512 addressing input

Dry Contact input shall be rated 0-10 volt DC 0.7mA per input.

The DyNet RS-485 Serial Port connections provided by six (6) 1x14 AWG screw terminals.

* + - * 1. Electrical

DyNet DC supply Input power shall be twelve volts DC (12VDC).

Nominal DyNet power rating shall not exceed two hundred milliamps (200mA).

Control Circuit Supply shall be rated:

120V-277VAC (+10%/-15%) 50/60 Hz

Single phase and Neutral

Input current Max. 0.5A

Line voltage supply terminals (Line, Neutral, and Ground) shall accept 8-#24 AWG copper wire.

Control Output Loops (data buses):

1 relay output channels for 20 A

Output terminals: 12-22 AWG copper wire,

Low Voltage Class 1 or 2

Current sink and sourcing capacity of 100 mA

Reference Data Cable: Belden 1502R / 1502P or equivalent as approved by Philips.

* + - * 1. Diagnostic Functions:

Device Online/Off-line status.

Diagnostic Functions, indicating device Online/Offline status, shall be accessible thru Philips Envision Project and Envision Manager, Touch Screen, or BAS interface.

* + - * 1. Equipment List (quantities as shown in schedules, tables, and drawings):

DDC116-UL (Philips 12NC – 913703376709)

* 1. User Interfaces
     1. A range of compatible user interfaces shall be available for direct connection to the control network, including:
        1. Pushbutton Keypads
        2. Fader Potentiometer
        3. LCD Display with Pushbuttons for navigation through menus and selection of options
        4. LCD Touch Sensitive Screens
        5. Infra-red Receivers for Remote Controls
        6. Infra-red transmitters for controlling third-party Audio and Video equipment

* + 1. Keypads
       1. Keypads shall be of the correct size to suit locally available wall boxes. They shall be available in various fascia finishes including stainless steel, gold, brass, chrome, painted, or any common flat architectural surface finish medium to suit the client’s requirements.
       2. Button caps of pushbutton keypads must be able to be engraved and available in Silver, Charcoal Grey, or White finish. These shall be readily interchangeable with custom engraving available if required. Keypads shall also be available which provide rear text illuminated engraving. It shall be possible to individually control the rear text illumination for each button independently, and set via software the text illumination intensity for the whole keypad.
       3. Faders where used shall be capable of controlling any circuit in any area, or be assigned as a ‘master’ fader to control the overall lighting levels in an area. Facility must be available to accommodate custom keypad requirements. Keypad assemblies shall be capable of accepting a minimum of 16 buttons, 22 faders, and 4 key switch inputs on one circuit board. It shall be possible to link an unlimited number of keypad circuit boards together to create custom keypads with greater than16 buttons, with all buttons appearing in a regular array.
       4. Unless otherwise indicated all keypads shall be ‘universal’ in that any button or key-switch input can initiate the following events:
          1. Select a preset
          2. Set a channel to a level
          3. Start a task
          4. Stop a task
          5. Link / unlink areas
          6. Send any valid user-defined network message, or sequence of messages
       5. Keypads must contain an internal macro control facility that will allow them to perform conditional and sequential logic. Systems that rely on an external logic processor or centralized logic processor shall not be acceptable.
       6. Keypads shall provide an immediate, local status LED response upon button activation or detection of a network message with the same command function to indicate the corresponding change in system state. The status LEDs shall also be independently controllable across the control network.
       7. Keypads shall have an optional ‘organic LED’ informative display, able to be re-deployed based on button operation.
       8. Keypads shall be capable of supporting a minimum of 6 buttons, and be possible to mechanically configure using alternate key assemblies to provide fewer buttons if required.
       9. Keypad configuration data relating to channel names, area names, preset levels and panic level must be stored within the non-volatile memory of each respective keypad. It shall be possible to upgrade the firmware of all keypads over the control network.
       10. Keypads shall incorporate a service mode. The service mode, when activated momentarily, shall cause a "sign-on" message to be transmitted onto the network. The sign-on message shall contain information about the device, such as: box number, device type and embedded software version.
       11. Antumbra keypads
           1. The Antumbra keypads shall include proximity detection that wakes them from an ultra-low power standby mode when an occupants/user approaches the keypad. When in standby mode all indicators should be completely off and only reveal themselves when the proximity sensor is triggered. They shall be able to produce a wall-wash lighting effect when proximity is detected.
           2. Antumbra keypads shall also include an ambient temperature sensor. When requested by the NLCS the key pad is able to communicate the local current temperature to the core network. Internal logic within the sensor should also be capable of triggering a network message when a particular temperature is detected. The temperature range shall be 5 to 40° with an accuracy +/- 1.5°
           3. Antumbra keypads shall have an interchangeable communications module that is compatible with the full range of Button/Touch application modules. This communication module is to contain all the configuration information needed for the keypad’s functionality. The communications module shall be configurable without the application module.
           4. It shall be possible to upload 16 different configurations to the keypad which can be selected during installation using an accessible DIP-switch enabling fast deployment of keypads on-site for different applications.
           5. The Antumbra keypads shall support an IP22 rating allowing for more flexible installation options.
           6. The Antumbra keypads construction must allow for smooth and perfect button operation even though during the installation excessive torque force may have been used on the mounting screws or installed on an uneven wall surface.
           7. Each of the buttons can be labeled with text or icons to indicate the functionality. This should be easily configured using an online tool that does not require the use to have an indepth knowledge of the system or its part codes. This is required so that end-users are able to directly configure their desired finishes and labeling options.
           8. Within the system there should be an option of a keypad with a built in display that will allow for system information to be communicated to the user. This keypad should match the same look, feel and finish of the standard button keypads.
           9. The display should be capable of showing the following system information

Current scene selected (via dynamic icon or text)

Current time

Current measured temperature

Current set point temperature

HVAC mode

Bar graph to indicate lighting or volume channel level

Data point by percentage to indicate lighting or volume channel level

* + - * 1. Keypads with built-in LCDs shall be able to display dynamic information in a range of languages and icons. The Antumbra display keypad shall support different modes of operation for trading hours and after hours functionality.
        2. Keypads that utilize capacitive touch technologies, with no moving parts, shall be available from the control system vendor. These panels shall provide simulated audible button press action feedback. The keypads shall also include proximity detection that wakes them from an ultra-low power standby mode when an occupant /user approaches the keypad. The panels shall also include an ambient temperature sensor, and be available with an optional multi-text icon display.
      1. Keypads product list
         1. Antumbra Series

General

The Antumbra User Control Panels are designed to integrate with other devices over the DyNet RS485 network in a cost-effective manner in commercial buildings and homes, while being highly customizable.

Mechanical

The Antumbra Panel shall be IP22 rated

A complete Antumbra Panel shall be made up of two (2) components – Dynalite Antumbra Communication Module (DACM) and an Application Module.  Each component shall be labeled with manufacturer’s name, catalog number, and ratings.

DACM

Shall be compatible with any Dynalite Application Module.

Shall be a self-contained unit with all the logical and network functions for any DyNet project

Shall contain an RS 485 DyNet serial port with one 5-way removal screw terminal

Shall be capable of being pre-programmed off-site without the use of an Application Module

Each Application Module shall have the following integral capabilities –

Temperature sensor providing sensing range from 40°F to 104°F (5 to 40°C)

Proximity sensor with a range of approximately 6 inches (15 cm)

Ambient light sensor to adjust effects of the light wash triggered by the proximity sensor

Application Modules shall be available in one of three models –

Button (PABPA)–

Shall utilize large mechanical buttons with different finish options available for the fascia and rim of the panels with all color options able to be mixed and matched.

Shall have the option for customized labeling of text and icons

The user panel shall measure no more than 4.6 x 3.0 x 0.9 inches (116 x 75 x 23 mm).

The user panel shall weigh no more than 0.5 pounds (0.2 kg).

Touch (PATPA)–

Shall have a smooth glass finish and use ‘capacitive touch’ technology to detect the presence of a finger on various locations of glass to trigger the button-press action.

Shall be available with different finish options available for the fascia and rim of the panels with all color options able to be mixed and matched.

Shall have the option for customized labeling of text and icons

The user panel shall measure no more than 4.6 x 3.0 x 0.9 inches (116 x 75 x 22 mm).

The user panel shall weigh no more than 0.5 pounds (0.2 kg).

Display (PDPA)–

Shall utilize mechanical buttons and feature a central LCD display to present multiple pages of functions and system information.  Shall be available with different finish options available for the fascia and rim of the panels with all color options able to be mixed and matched.

Shall have the ability to choose from a library of icons appearing on the LCD screen to align with the mechanical buttons

The user panel shall measure no more than 4.6 x 3.0 x 1.4 inches (116 x 75 x 36 mm).

The user panel shall weigh no more than 0.5 pounds (0.2 kg).

Antumbra Panel shall mount in a standard masonry back boxes provided by others.

Antumbra Panel operating environment: 23 to 122 degrees Fahrenheit (-5 to 50°C) in zero (0) to 90 percent relative humidity, non-condensing.

Antumbra Panel shall utilize ‘field effects technology’ which allows the panel to automatically detect a person’s presence and through the use of a built-in ambient light sensor create a soft wall-wash effect around the panel

Each Antumbra Panel shall include an integral temperature sensor

Antumbra Panel shall be FCC, CE, C-Tick, and RoHS compliant.

Electrical

DACM

Input power shall be 12- 24VDC, SELV/Class 2 provided from the DyNet network connection

Nominal power rating shall not exceed 500mA.

A DMX transmit version of the DACM can control up to 64 consecutive DMX channels by applying preset scenes or allowing individual channel controls from the Keypad attached to the DACM. These are stand alone devices and not part of a standard lighting control system.

Button Panel

Shall utilize 40mA maximum from the DyNet network

Touch Panel

Shall utilize 40mA maximum from the DyNet network

Display Panel

Shall utilize 35mA maximum from the DyNet network

Shall have stand-by power less than 0.15W

Reference Data Cable: Belden 1502R / 1502P or equivalent as approved by Philips.

Performance

Antumbra panels shall have the capability to run sequential and conditional logic routines.

The extended functionality of the Antumbra panels shall include but not be limited to:

Describing lighting control functions using the words “if” and “then”.

Complex joining of multi-partitioned rooms.

Controlling light scenes in multiple areas.

Interfacing third-party devices to a DyNet network (multi-function input interface)

Controlling chase sequences.

Equipment List (quantities as shown in schedules, tables, and drawings):

Standard and customized Antumbra panels shall be available.

* + - * 1. Revolution Series

General

The Revolution User Control Panels are designed to integrate with other devices over the DyNet RS485 network in a cost-effective manner in commercial buildings and homes, while being highly customizable.

The user control panel must allow for a customize each button’s backlight from an RGB color palette.

Button labeling language choices must include English, Chinese and Arabic and should be supported with a library of common icons.

Mechanical

The Revolution Panel shall be IP22 rated

A complete Revolution Panel shall be made up of two (2) components – Dynalite Communication Module (DACM) and an Application Module.  Each component shall be labeled with manufacturer’s name, catalog number, and ratings.

DACM

Shall be compatible with any Dynalite Application Module.

Shall be a self-contained unit with all the logical and network functions for any DyNet project

Shall contain an RS 485 DyNet serial port with one 5-way removal screw terminal

Shall be capable of being pre-programmed off-site without the use of an Application Module

Each Application Module shall have the following integral capabilities –

Temperature sensor providing sensing range from 40°F to 104°F (5 to 40°C)

Proximity sensor with a range of approximately 6 inches (15 cm)

Ambient light sensor to adjust effects of the light wash triggered by the proximity sensor

Revolution Panel shall mount in a standard masonry back boxes provided by others.

Revolution Panel operating environment: 32 to 122 degrees Fahrenheit (0 to 50°C) in zero (0) to 90 percent relative humidity, non-condensing.

Revolution Panel shall utilize ‘field effects technology’ which allows the panel to automatically detect a person’s presence and through the use of a built-in ambient light sensor create a soft wall-wash effect around the panel

Each Revolution Panel shall include an integral temperature sensor

Revolution Panel shall be FCC, CE, IECS, and RoHS compliant.

Electrical

DACM

Input power shall be 12- 24VDC, SELV/Class 2 provided from the DyNet network connection

Nominal power rating shall not exceed 500mA.

A DMX transmit version of the DACM can control up to 64 consecutive DMX channels by applying preset scenes or allowing individual channel controls from the Keypad attached to the DACM. These are stand alone devices and not part of a standard lighting control system.

Reference Data Cable: Belden 1502R / 1502P or equivalent as approved by Philips.

Performance

Revolution panels shall have the capability to run sequential and conditional logic routines.

The extended functionality of the Revolution panels shall include but not be limited to:

Describing lighting control functions using the words “if” and “then”.

Complex joining of multi-partitioned rooms.

Controlling light scenes in multiple areas.

Interfacing third-party devices to a DyNet network (multi-function input interface)

Controlling chase sequences.

Equipment List (quantities as shown in schedules, tables, and drawings):

Standard and customized Revolution panels shall be available.

* + 1. Sensors
       1. Sensors shall be installed in appropriate locations to minimize energy consumption, through daylight harvesting and occupancy detection control. The universal sensors shall contain a photoelectric (PE) sensor, a motion detector and an IR receiver in the same package. The sensor shall be available in wall mount or ceiling mount packages.
       2. Sensors shall be easily configurable to achieve daylight control. The universal sensor shall be capable of acting like a conventional motion detector, with a user-definable timer. Sensors shall also incorporate an intelligent function that automatically extends the no-motion time-out period if motion is detected immediately after the sensor sets the status to unoccupied. Sensors shall incorporate 8 preset control modes for motion detection and 8 preset control modes for illuminance control, to provide effective occupancy and daylight harvesting control. The sensor should also be capable of providing PID illuminance control for applications where continuous regulation is preferred. It shall be possible to dynamically enable and disable the sensor by sending a network message. All sensor configuration settings shall be made from commissioning software via the control network. Sensors which incorporate manual adjustments such as potentiometers to set luminance thresholds levels are prohibited. All configuration data required for normal operation including area, illuminance thresholds, motion detect actions etc. should reside in the sensor’s non-volatile memory.
       3. Sensors shall be available that utilize either Passive Infra-red (PIR) or a combination of PIR and Ultrasonic (US) for occupancy detection. It shall be possible with the sensor that incorporates both PIR and US sensing detectors to configure the sensor so that it utilizes either or both detectors for motion detection.
       4. The sensors shall also include a function that enables them to enter a testing witness mode, whereby the timeout delay is shortened so that effective occupancy control can be quickly verified during commissioning. It shall be possible to enable and disable witness mode across a complete site or section thereof, from within the commissioning software with a few simple mouse clicks without the need to modify or enter new configuration data individually for each sensor. Systems that require configuration data to be modified on a sensor-by-sensor basis to implement a witness mode will not be accepted.
       5. PE monitoring shall be incorporated in all occupancy sensors as a standard feature and must be independent of the occupancy detection function. PE trending shall be available via the system software, where sensitivity can also be adjusted.
       6. For rapid deployment of basic illuminance management control, the sensors shall incorporate a function that enables them to be auto calibrated. It shall be possible to initiate auto-calibration across a complete site or section thereof, from within the commissioning software with a few simple mouse clicks without the need to modify or enter new configuration data individually for each sensor. Systems that require configuration data to be modified on a sensor-by-sensor basis to implement auto-calibration, will not be accepted.
       7. Sensors product list:
          1. Universal Sensor – Low Profile 360° Ceiling (Passive Infrared)

General

Ceiling sensors combine motion detection (PIR), infrared remote control reception (IR), and ambient light level detection (PE) in the one device.

The sensor is designed to interface with other devices over the DyNet RS485 network to detect motion and provide infrared control interface.

Mechanical

Each module shall be labeled with manufacturer’s name, catalog number, and ratings.

The ceiling mount PIR sensor shall surface mount on a standard four inch (4”) octagonal back box.

The ceiling mount PIR sensor measure no more than 3.5 inch diameter x 1.0 inch exposed (88.9mm diameter D x 25.4 mm).

The ceiling mount PIR sensor shall weigh no more than 0.23 pounds (.105 kg).

The ceiling mount PIR sensor’s construction shall be polycarbonate plastic enclosure.

The ceiling mount PIR sensor shall operate within: 32 to 113 degrees Fahrenheit (0 - 45°C) in zero (0) to 90 percent relative humidity, non-condensing.

Interface shall be FCC and RoHS compliant.

All configuration functions shall be remotely programmable.

User controls shall provide:

Walk Test

IR received LED indicator

The sensors surrounding bezel shall incorporate a click-up segment (120°) that will readily mask a portion of the sensor element preventing nuisance detections from adjacent doorways and corridors.

The DyNet RS-485 serial port connections shall be provided by 1x14 AWG removable 5 way terminal strip.

Electrical

Input power shall be twenty-four volts DC (24VDC) provided from the DyNet network connection or external power supply.

DyNet DC load rating shall not exceed twenty milliamps (20mA).

Reference Data Cable: Belden 1502R / 1502P or equivalent as approved by Philips.

Performance

Characteristics for the Standard Sensitivity PIR Motion Detector shall include:

LED activation indicator

Sensor: quad element pyro-electric.

Sixty-four (64) detection zones.

Maximum detection range: greater than sixteen feet (16’-4”).

At a mounting height range of eight feet (8’) the standard sensitivity sensor shall cover a rectangular area twenty-six by nineteen feet (26.25’ x 19.7’).

Detection speed: greater than three feet/second (3’/sec).

Detection object: greater than twenty-six by nine inches (26” x 9.6”).

Characteristics for the Infrared Remote Control Receiver shall include:

LED activation indicator

Accept signals from RC5 Series IR remotes.

Accept signals from most other learning IR remote controls.

Range shall be up to nineteen feet (19’).

Characteristics for the Ambient Light Level (PE) detector shall include:

Incident to sensor dynamic range: 5 - 500 lux

Illumination of non-reflective surface: 5-5000 lux

Equipment List (quantities as shown in schedules, tables, and drawings):

DUS360CR (Philips 12NC – 913703689609)

DUS360CS (Philips 12NC – 913703243109)

DUS360CS-DALI (Philips 12NC – 913703023909)

* + - * 1. Universal Sensor – 360° Ceiling (Passive Infrared and Ultrasonic)

General

Ceiling sensors combine motion detection (PIR & Ultrasonic), infrared remote control reception (IR), and ambient light level detection (PE) in the one device.

The sensor is designed to interface with other devices over the DyNet RS485 network to detect motion and provide infrared control interface.

Mechanical

Each module shall be labeled with manufacturer’s name, catalog number, and ratings.

The ceiling mount PIR sensor shall surface mount on a standard four inch (4”) octagonal back box.

The ceiling mount PIR sensor measure no more than 3.5 inch diameter x 1.0 inch exposed (88.9mm diameter D x 25.4 mm).

The ceiling mount PIR sensor shall weigh no more than 0.55 pounds (.25 kg).

The ceiling mount PIR sensor’s construction shall be ABS plastic enclosure.

The ceiling mount PIR sensor shall operate within: 32 to 122 degrees Fahrenheit (0 - 50°C) in zero (0) to 90 percent relative humidity, non-condensing.

Interface shall be FCC and RoHS compliant.

All configuration functions shall be remotely programmable.

User controls shall provide:

Walk Test

IR received LED indicator

The sensors surrounding bezel shall incorporate a click-up segment (120°) that will readily mask a portion of the sensor element preventing nuisance detections from adjacent doorways and corridors.

The DyNet RS-485 serial port connections shall be provided by 1x14 AWG removable 5 way terminal strip.

Electrical

Input power shall be twenty-four volts DC (24VDC) provided from the DyNet network connection or external power supply.

DyNet DC load rating shall not exceed thirty milliamps (30mA).

Reference Data Cable: Belden 1502R / 1502P or equivalent as approved by Philips.

Performance

Characteristics for the Standard Sensitivity PIR Motion Detector shall include:

LED activation indicator

Sensor: quad element pyro-electric.

Sixty-four (64) detection zones.

Maximum detection range: greater than sixteen feet (16’-4”).

At a mounting height range of eight feet (8’) the standard sensitivity sensor shall cover a rectangular area twenty-four by eighteen feet (24’ x 18’).

Detection speed: greater than three feet/second (3’/sec).

Detection object: greater than twenty-six by nine inches (26” x 9.6”).

Characteristics for the Infrared Remote Control Receiver shall include:

LED activation indicator

Accept signals from most other learning IR remote controls.

Range shall be up to nineteen feet (19’).

Characteristics for the Ambient Light Level (PE) detector shall include:

Incident to sensor dynamic range: 5 - 500 lux

Illumination of non-reflective surface: 5-5000 lux

Equipment List (quantities as shown in schedules, tables, and drawings):

DUS804CS-UP-NA (Philips 12NC – 913703570709).

* + - * 1. Universal Sensor – Wall (Passive Infrared)

General

The wall sensors provide motion detection (PIR) and infrared remote control reception (IR) in the one device.

The sensor is designed to interface with other devices over the DyNet RS485 network to detect motion and provide infrared control interface.

Mechanical

Each module shall be labeled with manufacturer’s name, catalog number, and ratings.

Sensor shall surface mount.

The wall mounted sensor shall measure no more than 3.86 x 3.54 x 6.02 inches (98 x 90 x 153 mm).

The wall mounted sensor shall weigh no more than 0.57 pounds (0.26 kg).

The wall mounted sensor’s construction shall be ABS plastic enclosure.

The wall mounted sensor shall operate within: -4 to 113 degrees Fahrenheit (-25 - 45°C) in zero (0) to 90 percent relative humidity, non-condensing.

Interface shall be UL, FCC and RoHS compliant.

All configuration functions shall be remotely programmable.

User controls shall provide:

Walk Test

IR received LED indicator

The DyNet RS-485 serial port connections shall be provided by five (5) way terminal strip.

Electrical

Input power shall be twenty-four volts DC (24VDC) provided from the DyNet network connection or external power supply.

DyNet DC load rating shall not exceed ten milliamps (10mA).

Reference Data Cable: Belden 1502R / 1502P or equivalent as approved by Philips.

Performance

Characteristics for the PIR Motion Detector shall include:

LED activation indicator

Adjustable sensitivity.

Coverage range shall be upto 67.6 feet at 90 degree beam angle and up to 100 feet at 30 degree viewing angle

Characteristics for the Infrared Remote Control Receiver shall include:

LED activation indicator

Accept signals from most other learning IR remote controls.

Range shall be up to 20 feet (20’) angle dependent.

Equipment List (quantities as shown in schedules, tables, and drawings):

DUS90CS (Philips 12NC – 913703244209)

DUS30CS (Philips 12NC – 913703244309)

* + 1. Touchscreens
       1. Configurable color LCD touchscreens shall be used in locations where complex user interface requirements exist that are likely to change over time, and where it is advantageous to provide access to some system maintenance functionality.
       2. LCD touchscreens shall have a resistive touch overlay over the LCD screen for control. Touchscreens shall be capable of supporting a minimum of 255 user configurable pages. Systems that use separate buttons for operation shall not be accepted.
       3. The touchscreen shall be capable of monitoring the network traffic, and displaying decoded ‘plain English’ network messages for diagnostics. It shall be possible to download custom graphics to the touchscreen. The touch interface shall be capable of initiating any of the following events by pressing a graphical button:
          1. Go to a new screen page
          2. Select a preset
          3. Set a channel to a level
          4. Start/Stop a task
          5. Link / unlink areas
          6. Send any valid user-defined network message, or sequence of messages
       4. The touchscreen shall contain an internal task engine that will allow the panel to perform conditional and sequential logic. Systems that rely on an external logic processor or centralized logic processor shall not be acceptable. All set-up and configuration information must be stored in the touchscreen in non-volatile memory.
       5. The touchscreen shall have user password protection to the configuration and set-up features.
       6. Touch screen product list:
          1. PDTS Networked Touchscreen

General

The PDTS is a color LCD touch screen utilizing on-screen controls allowing creation of multiple easy-to-use pages.

The touchscreen shall permit single point control of multiple systems and equipment types.

Touchscreen shall provide intelligent control and direct access to scheduling, scene editing, diagnostics, and local environmental sensing.

Touchscreen must have an ambient halo of LED backlighting.

Backlighting must be triggered through proximity sensor

Backlighting must be adjustable to be enabled, disabled and variable timeouts through software configuration

Mechanical

Each module shall be labeled with manufacturer’s name, catalog number, and ratings.

Touchscreen back box shall be metallic.

Touchscreen shall be 178 mm capacitive with high resolution, rich color and wide viewing angle.

Physical dimensions will be no more than 7.24 x 4.88 x 1.57 inches (124 mm x 184 mm x 40 mm)

Viewable area to be no more than 3.70 x 5.91 inches (94 mm x 150 mm)

Diagonal of 7.01 inches (178 mm)

Packed weight: 1.54lbs (0.7 kg)

The touch screen shall operate within: 32 to 113 degrees Fahrenheit (0 - 45°C) in zero (0) to 90 percent relative humidity, non-condensing.

Touch screen shall be UL, FCC, ICES and RoHS compliant.

Internal controls shall provide:

Astronomical 365 day clock with battery backup.

Sunrise/sunset tracking

Automatic daylight saving adjustment

Auto screen dimming.

Temperature readings

Relative humidity readings

1 service switch

2 LED indicators for power cycle and boot mode

Employs HTTPS for secure, encrypted network communication, with support for onboard security certificates.

Secure login feature available for CGI commands and user functions, with customizable access levels for each user.

The PDTS input/output data ports shall consist of:

DyNet RS485 serial.

Ethernet 10/100BASE-T.

Touch screen shall provide output/input audio capability:

Speakers: one

Electrical

Input power shall be twelve to twenty-four volts DC (12-24VDC) provided from an external power supply.

Nominal power rating shall not exceed three hundred (300 mA) milliamps at 24V DC and five hundred (500 mA) milliamps at 12 VDC

Reference Data Cable: Belden 1502R / 1502P or equivalent as approved by Signify.

IEC Overvoltage Category: III

Protocol support

DyNet

TCP/IP (TCP, UDP IPv4 / IPv6)

HTTPS / CGI

Performance

Operating System and Software:

Integral Touch screen editor or standard HTML editor shall be capable of creating screen pages.

Equipment List (quantities as shown in schedules, tables, and drawings):

PDTS (Philips 12NC – 913703334309)

* + 1. Virtual Interfaces
       1. In areas that require sophisticated and integrated control of lighting, blinds/curtains, HVAC and potentially AV equipment, i.e. boardrooms, lectures theaters, and meeting rooms, Wi-Fi connected portable touchscreen computing devices shall be used. The interfaces shall provide intuitive screen layouts that simplify operation of the systems in their associated spaces. The devices shall be cost-effective consumer type using free downloadable applications authored by the control system vendor. Systems that use third-party applications will not be accepted.
       2. Applications shall be available that utilize standard templates which are auto populated from commissioning software configuration data. Applications of this type shall be available for devices that use the Apple iOS and Google Android operating systems.
       3. Alternate applications shall also be available that permit full customization of the users screens. This type of application shall be available for devices that use the Apple iOS operating system.
       4. Browser based access to control system functions will optionally be provided by the control system vendor.
  1. Networking and Integration
     1. Network Bridges
        1. Network bridges shall be used in strategic locations on the LAN as necessary to establish a trunk and spur topology for efficient data transport. Network bridges shall also be installed where required to facilitate serial communication with third-party systems.
        2. Network bridges shall contain two RS485 data ports, optically isolated from each other and one optional RS232 port. The network bridge shall allow bi-directional variable message passing to block or pass messages based on either:
           1. Area
           2. Message type
        3. The bridge shall contain an internal task engine that will allow the interface to perform conditional and sequential logic. Systems that rely on an external logic processor or centralized logic processor shall not be acceptable.
        4. It shall be possible to configure the network bridge as follows:
           1. One RS485 port as DMX512 Transmit, capable of transmitting 128 channels of DMX512 levels
           2. One RS485 port as DMX512 Receive, capable of receiving 128 channels of DMX512 and converting them to set channel to level messages
           3. To capture a DMX512 ‘show’ and store it into memory. It shall be possible to later play back the recorded show.

* + 1. Remote TCP/IP Access Interface
       1. A remote access interface shall be available which will allow an end-user or factory representative to “tunnel in” to the lighting control system to control, configure, or commission the system over TCP/IP via a 100 BaseT Ethernet network.
       2. It shall be possible to perform all functions across the 100 BaseT interface that can be performed whilst connected directly to the lighting control network.
       3. The interface shall also incorporate an embedded web server which enables system control pages to be authored and stored on the device which can be viewed across a TCP/IP network from any connected PC, PDA, or Web enabled mobile phone using a standard browser.

* + 1. Dry Contact Input Interface
       1. Dry contact input interfaces shall be used where required to integrate control from other systems and devices via switch or relay closure. Dry contact input interfaces shall be optically isolated for immunity to noise, and to protect internal electronics. It shall be possible to connect the dry contact interface to switches located up to 30 meters from the interface. The dry contact interface shall have an isolated internal power supply powered from the network cable to provide a reference voltage for inputs.
       2. The interface shall contain an internal task engine that will allow the interface to perform conditional and sequential logic. Systems that rely on an external logic processor or centralized logic processor shall not be acceptable.
       3. The dry contact interface shall have a jumper to select whether the internal power supply is used, or an external voltage reference. The dry contact interface shall be capable of initiating any of the following events on a change of state of the contact:
          1. Select a preset
          2. Set a channel to a level
          3. Start a task
          4. Stop a task
          5. Link / unlink areas
          6. Send any valid user-defined network message, or sequence of messages

* + 1. Miniature Dry Contact Interface
       1. Miniature dry contact interface devices shall be used to connect third-party sensors, custom switches, to the lighting control network. The miniature dry contact interface shall be no larger than 20mm x 50mm x 20mm suitable for mounting within compact wiring enclosures. The interface shall have a minimum of 4 inputs, and shall be capable of initiating any of the following events on a change of state of the contact:
          1. Select a preset
          2. Set a channel to a level
          3. Link / unlink areas
          4. Send any valid user-defined network message
          5. Emulate the operation of a motion detector
       2. Miniature dry contact interfaces shall also be available which connect directly to a DALI universe on a MultiMaster controller. The device must also be software configurable and firmware updatable over the DALI universe from the control network.

* + 1. Dry Contact Output Interface
       1. Dry contact output interfaces shall be used where required to provide control to other systems and devices via switch or relay closure. The dry contact output interface shall use electro-mechanically isolated outputs, and have zero off-state leakage. Devices that use transistors or other devices with off-state leakage shall not be permitted. Outputs shall be rated to a minimum of 5A.
       2. The interface shall contain a minimum of 8 x SPDT outputs for connection to other devices. The interface shall contain an internal task engine that will allow the interface to perform conditional and sequential logic.
       3. Systems that rely on an external logic processor or centralized logic processor shall not be acceptable.

* + 1. Integration to third-party systems
       1. It shall be possible to easily integrate to third-party systems such as:
          1. Audio-visual systems
          2. Building management systems
          3. HVAC systems
          4. PABX systems
          5. Access control systems
          6. RS232
          7. IR
       2. Direct network connection to common AV control systems shall be possible, and the manufacturer shall have interface libraries written for the following popular systems:
          1. AMX
          2. Crestron
       3. It shall be possible to integrate to the lighting control network using any of the following methods:
          1. From site management software:

ActiveX

DCOM

DDE

* + - * 1. Using dedicated control network gateway interfaces

KNX

BACnet

LON

MODBUS 485

Somfy

* + 1. Networking and Integration Product list
       1. DyNet RS485 Network Gateway
          1. General

The Philips DDNG485-NA is a flexible communications gateway designed for the DyNet RS485 networks.

The gateway shall enable cost effective integration between the Philips controls system and third party equipment and systems.

The gateway shall be configurable for DyNet “trunk and spur” network topology, a DyNet repeater, native Somfy shade control integration, or USITT DMX512 input or output.

* + - * 1. Mechanical

Each module shall be labeled with manufacturer’s name, catalog number, and ratings.

Interface enclosure shall be designed for mounting on thirty-five (35mm) DIN rail and factory wired.

The interface shall measure no more than 3.7 x 4.1 x 3.0 inches (94 x 104.2 x 76.2 mm).

The interface shall weigh no more than 0.55 pounds (0.25 kg).

Construction shall be industry standard 6 unit wide polycarbonate DIN Rail case.

The interface shall operate within: 32 to 122 degrees Fahrenheit (0 - 50°C) in zero (0) to 90 percent relative humidity, non-condensing.

Interface shall be FCC and RoHS compliant.

User controls shall provide a service switch and a diagnostic LED indicator.

The DyNet RS-485 Port #1 Input connections shall be provided by 1x14 AWG screw terminals

The DyNet RS-485 Port #2 Output connections (service port only) shall be provided by 1x14 AWG screw terminals.

A single female RJ-45 connector shall be provided for service access.

* + - * 1. Electrical

Power shall be twenty-four volts DC (24VDC) provided from the DyNet network connection or external power supply.

Nominal power rating shall not exceed a maximum of three hundred thirty milliamps (330mA) with up to a one hundred fifty milliamp (150mA) load on configurable Port #2 24 volt DC terminals.

Serial Ports shall be optically isolated with a 2.5kV surge rating.

The device shall provide trunk and spur topology utilizing a high-speed backbone opto-coupled to many lower speed spurs.

Reference Data Cable: Belden 1502R / 1502P or equivalent as approved by Philips.

* + - * 1. Performance

The Network Gateway shall provide a DMX512 mode capable of transmitting and receiving 64 data slots (channels).

DMX512 mode shall provide automatic DyNet conversion and Task triggering.

The on-board processor shall assemble and transmit user-defined data strings.

Diagnostic functions, indicating device Online/Offline status, shall be accessible thru Philips Envision Project and Envision Manager, Touch Screen, or BAS interface.

* + - * 1. Equipment List (quantities as shown in schedules, tables, and drawings):

DDNG485-NA (Philips 12NC – 913703581009)

* + - 1. RS485 DyNet to USB Interface
         1. General

The Dynalite DMNG-USB-NA is designed to provide and interface between the DyNet lighting control network and a personal computer running system commissioning and end-user software.

The interface is suitable for either temporary connections or permanent installations.

* + - * 1. Mechanical

Each module shall be labeled with manufacturer’s name, catalog number, and ratings.

Interface enclosure shall be manufactured of durable ABS plastic.

The interface shall measure no more than 1.0 x 2.0 x 3.6 inches (25.4 x 51 x 91 mm).

The interface shall weigh no more than 0.3 pounds (0.136 kg).

The interface shall operate within: 32 to 122 degrees Fahrenheit (0 – 50°C) in zero (0) to 90 percent relative humidity, non-condensing.

Interface shall be FCC and RoHS compliant.

User controls shall provide USB status and RS485 status LED indicators.

USB serial port connection shall be a Type B connector supplied with thirty-nine inch (39”) patch lead.

The DyNet RS-485 Port connections provided by screw terminals.

* + - * 1. Electrical

Input power shall be twenty-four volts DC (24VDC) provided from the DyNet network connection or external power supply.

Nominal power rating shall not exceed twenty milliamps (20mA).

Reference Data Cable: Belden 1502R / 1502P or equivalent as approved by Signify.

* + - * 1. Performance

USB Driver shall be compatible with:

Windows 7

* + - * 1. Equipment List (quantities as shown in schedules, tables, and drawings):

DMNG-USB-NA (Philips 12NC – 913703580009)

* + - 1. 10/100BASE-T Envision Gateway
         1. Envision Gateway provides a multipurpose Ethernet connection to a Dynalite lighting control system with a dedicated Dynalite Application.

Provides a web interface delivering access to the internal timeclock and schedule editor functions.

Provides bridging functionality between Ethernet backbone and the DyNet fieldbus devices.

Large storage capacity allows the device to store large project files internally; which apps use to auto configure their settings. This saves configuration time and ensures accuracy for phone and tablet control.

Inbuilt web server allows the user to check system settings via the Network Hardware Checker and System Roll Call tools.

Internal timeclock and schedule manager allow the user to manage operation and task scheduling without advanced technical knowledge.

Powerful custom task engine allows users or third-party systems to run macros, such as ‘After Hours’, ‘Shut Down’, ‘Welcome’ and more.

Advanced interoperability supports management of Philips Dynalite and IP fittings on a single system.

* + - * 1. Physical Characteristics

Dimensions: (H x W x D): 3.8” x 4.3” x 1.5” (97 x 110 x 38 mm)

Packed Weight: 7.41 ounces (0.21 kg).

Construction: Low profile DIN-rail polycarbonate (6 unit)

RS-485 Port Connections

Shield, GND, D-, D+, +Ve, AUX

All available on screw terminals

AWG #14 (1 x 2.5 mm²) conductor size

Also available on RJ12 socket

Ethernet Port Connections: RJ45 female socket

Supply Terminals

1 x 2 pole 5 mm pluggable screw terminal (+, -),

AWG #14 (1 x 2.5 mm²) max conductor size per pole

Operating Conditions

Temperature: 23 to 122° F ( -5 to 50° C) ambient

Humidity: 0 to 90% non-condensing

Storage & Transport

Temperature: 13 to 158° F ( -25 to 70° C) ambient

Humidity: 0 to 90% non-condensing

* + - * 1. Electrical Characteristics

Dual supply option

12 / 24 VDC from an external regulated SELV / Class 2 power supply

Max 100 mA @ 12 V plus DyNet load,

Max 50 mA @ 24 V plus DyNet load

12 / 24 VDC from DyNet (no external PS connected).

Max 100 mA @ 12 V, max 50 mA @ 24 V

DyNet DC Supply

Max 200 mA contribution to the network (when powered from external power supply)

Power supply voltage shall match network voltage

* + - * 1. Control Characteristics

Communications Ports

One RS-485 DyNet serial port

One 10/100BaseT Ethernet port

Supported Ethernet Protocols

TCP/IP (TCP, UDP)

HTTP, FTP

IPv4, IPv6

Storage Capacity

Max 16 MB for XML file storage

28-day rolling network log

User Controls

Service switch

Service LED

Ethernet LED’s status

Diagnostic Functions: Device Online / Offline status

* + - * 1. Certification

Envision Gateway shall meet appropriate standards of:

CE

C-Tick,

Underwriters Laboratories

FCC

ICES

* + - * 1. Equipment List (quantities as shown in schedules, tables, and drawings):

PDEG (Philips 12NC – 913703013809)

PDEB (Philips 12NC – 913703240009)

* + - 1. DyNet Multi-function Input Interface
         1. General

The Dynalite DDMIDC8-NA is a flexible digital/analog input device designed for the DyNet RS485 networks.

The interface is capable of comprehensive conditional and sequential logic and arithmetic functions.

The interface shall enable cost effective integration between the Dynalite controls system and third party equipment and systems such as security, HVAC and BMS.

* + - * 1. Mechanical

Each module shall be labeled with manufacturer’s name, catalog number, and ratings.

Interface enclosure shall be designed for mounting on thirty-five millimeter (35mm) DIN rail and factory wired.

External fixing points shall be provided for attachment without the use of DIN rail.

Construction shall be industry standard 6 unit wide polycarbonate DIN Rail case.

The unit shall measure no more than 3.7 x 4.1 x 3.0 inches (94 x 104.2 x 76.2 mm).

The unit shall weigh no more than 0.60 pounds (0.27 kg).

The unit shall operate within: 32 to 122 degrees Fahrenheit (0 - 50°C) in zero (0) to 90 percent relative humidity, non-condensing.

Interface shall be FCC and RoHS compliant.

User controls shall provide LED status indicator for each digital input.

The DyNet Input Interface shall have four (4) Analog Inputs each consisting of two (2) connections (CH, GND) provided by 1x14 AWG screw terminals.

Analog Input shall be rated in a software selectable 0-5 volt or 0-10 volt range.

The DyNet Input Interface shall have eight (8) Digital Inputs each consisting of two (2) connections (A, B) provided by screw terminals.

Digital Input shall be rated in a 0-24 volt AC/DC (Class 2) range or as dry contacts.

The DyNet RS-485 Serial Port connections shall be provided by screw terminals.

* + - * 1. Electrical

Input power shall be twenty-four volts DC (24VDC) provided from the DyNet network connection or external power supply.

Nominal power rating with twenty (20mA) milliamp load on +5V output (four (4) 1K ohm potentiometers connected) shall not exceed seventy milliamps (70mA) with all Dry Contacts closed.

Digital Ports shall be optically isolated with a 2.5KV surge rating.

Analog Ports shall have an input impedance of 20k ohms.

Reference Data Cable: Belden 1502R / 1502P or equivalent as approved by Signify.

* + - * 1. Performance

The Network Gateway shall provide high noise immunity.

* + - * 1. Equipment List (quantities as shown in schedules, tables, and drawings):

DDMIDC-8NA Multi-function Input Interface.

* + - 1. DLLI818O Dynalite Low Level Interface
         1. Philips Dynalite DLLI818O provides multi-input control for the Dynalite system via dry contact closures.
         2. Physical Characteristics

Surface mountable device for dry locations.

Integral cable tie attachment points.

Fanless design reduces noise, power consumption, and maintenance costs.

Construction: Plastic Housing

Operating Conditions

Temperature: 32 to 122°F (0 to 50°C) ambient

Humidity: 0 to 95% non-condensing

Storage & Transport

Temperature: -13 to 140°F (-25 to 60°C) ambient

Humidity: 0 to 90% non-condensing

Dimensions (H x W x D): 1.2” x 2.1” x .6” (30 x 53 x 15mm)

Packed Weight: .11 pounds (50grams)

* + - * 1. Electrical Characteristics

12-24 VDC @ 30mA max. from DyNet (Class 2/ SELV)

Input: Eight (8) dry contact inputs

Open Switch Voltage 12 V max.

Closed Switch current 0.4 mA max.

Output: Eight (8) LED indicator outputs (1.65 mA per LED channel)

* + - * 1. Communications Module

One RS-485 DyNet serial port 1 x 5-way screw terminal

* + - * 1. Certification

DLLI818O Dynalite Low Level Interface shall meet appropriate standards of:

CE

CSA

Underwriters Laboratories

RCM

FCC

ICES-003

* + - * 1. Equipment List (quantities as shown in schedules, tables, and drawings):

DLLI818O (Philips 12NC – 913703023009)

* + - 1. Philips Dynalite Plenum Rated 24-volt DC Network Power Supply
         1. General

The Philips DMNP24040-P-NA is a Class 2 Plenum Rated power supply comprising a high efficiency switch mode power converter with a comprehensive set of protection features.

Up to four (4) DMNP24040-P-NA units can be connected in parallel on a network, subject to Class 2 and cable rating limits.

The Philips DMNP24040-P-NA shall be Listed or Recognized as applicable by a Nationally Recognized Testing Laboratory (NRTL).

* + - * 1. Mechanical

Each module shall be labeled with manufacturer’s name, catalog number, and ratings.

The power supply shall measure no more than 3.1”W x 3.9”L x 1.7”H (7.87 x 9.90 x 4.32 cm).

The interface shall weigh no more than 11.3 ounces (0.32 kg).

Construction shall be industry standard metal housing.

The power supply shall operate within: 32 to 122 degrees Fahrenheit (0 - 50°C) in zero (0) to 90 percent relative humidity, non-condensing.

Interface shall be ICES, FCC, and RoHS compliant.

The DMNP24040-P-NA Input connections shall be provided by 3x14 AWG PVC insulated leads 12.6” inches (32cm) in length rated 600V/105°C. Leads shall be color coded Line/Black, Neutral/White, and Ground/Green.

The DMNP24040-P-NA Output connections shall be provided by 2x18 AWG PVC insulated leads 9.05” inches (23cm) in length rated 300V/200°C. Leads shall be color coded Voltage+/Red and Voltage-/Black.

* + - * 1. Electrical

The DMNP24040-P-NA supply shall be a Class 2 device utilizing:

120 – 277VAC, 50/60Hz Single Phase supply

Input Current: 0.25A @ 120VAC or 0.10A @ 277VAC

Output Current

400ma @ 24VDC continuous

600ma@ 24VDC max. 10 second duration

Reference Data Cable: Belden 1502R / 1502P or equivalent as approved by Philips.

* + - * 1. Performance

The DMNP24040-P-NA shall withstand indefinite short circuit fault protection across the output Class 2 terminals, with an auto-restart protection employed to protect the device and minimize the energy delivered to the fault.

The DMNP24040-P-NA shall be designed to support short term overload up to one hundred fifty (150%) percent of the rated current to suit high inrush current and transient loads.

* + - * 1. Equipment List (quantities as shown in schedules, tables, and drawings):

DMNP24040-P-NA (Philips 12NC – 913703580309)

* 1. Software
     1. End User Lighting System Management Software (LMS)
        1. The LMS shall have the ability to be run exclusively within the client’s IT environment without the need for any Cloud application support. All software features must be available when running in this ‘on premise’ mode.
        2. The LMS must reuse the commissioning software files. This is required to ensure full access to all system functionality, and to reduce the commissioning time of the LMS for faster project handover.
        3. An intuitive LMS shall be provided so the system can be operated and managed by local personnel without specialist intervention. The LMS shall be mouse driven and run under the Windows operating system and incorporate secure multi-level user access control that can be maintained by an authorized administrator on site without needing specialist intervention. The LMS shall incorporate a two dimensional graphic environment where icons will represent each component in the control system including individual luminaries.
        4. The LMS shall support multi-site management rules and access control.
        5. It will be possible to run no less than 10 client LMS applications simultaneously for each LMS Server on a system.
        6. To assist site navigation, the LMS must be capable of importing floor plan backgrounds from common drawing file formats, at a minimum, wmf, emf, pdf, jpg, jpeg, png, bmp, tif, tiff, and gif formats.
        7. The LMS shall display wiring on the PC
        8. It shall be possible to change lighting control grouping graphically using mouse click and drag techniques.
        9. The LMS shall enable each luminaire to be controlled individually, in predefined groups, or collectively as part of a large area. It shall be possible to double click anywhere within the graphical area boundary to access a tool to change the area state or an individual lighting group state for that area.
        10. Luminaire icons within the floor plan environment of the LMS shall change color to reflect the actual status of the lamp. For example, a yellow lamp is ON, a grey lamp is OFF. An orange lamp indicated that the allowable lamp run time has been exceeded, and the lamp should be replaced. It will be possible to define the state colors specifically to a client’s requirements to ensure the color scheme is clear to the user.
        11. Where circuit breaker trip monitoring and load current monitoring are used, the LMS shall provide a visual warning on the graphical floor plan to identify the specific luminaires that have failed.
        12. The LMS shall support adjustment of the occupancy sensor time outs and target lux levels for any given area. When such changes to an area are made the LMS shall then reprogram these settings in related physical devices on the network.
        13. The LMS shall be able to keep track of luminaire meta data such as manufacturer, part number, wattage, date installed, and location as well as logging the runtime of each fixture
        14. It shall be possible to view the full properties of a luminaire through the LMS, within a structured dialogue box, which can be readily accessed from a drop down menu on the respective luminaire icon. The luminaire properties dialogue box must include but not be limited to the following information:
            1. Lamp Control Group
            2. Luminaire location / ID number
            3. Lamp make and model
            4. Manufacturers estimated lamp life
            5. Cumulative true running hours
            6. Cumulative weighted running hours (incandescent lamps, corrected for power)
            7. Real time lamp active status
            8. Date of last lamp replacement
            9. Lamp status i.e. Good / Blown (if load monitoring is installed)
            10. Circuit Breaker Status (if MCB monitor has been installed)
        15. The LMS shall incorporate a comprehensive scheduler to automate time-based events. It must be possible to trigger scheduled events as a ‘Once Off’ timed event or a recurring event. ‘Once Off’ events are scheduled for a specific date and time. The scheduler shall be capable of initiating events or sequences of events on a specific time or at a time relative to sunrise or sunset on a:
            1. Day of week
            2. Day of month
            3. Calendar date
        16. Sunrise and sunset information may be determined by latitude and longitude, and the LMS shall automatically keep track of daylight saving, and leap years. It shall be possible to schedule the date of recurring events in several ways:
            1. On a specific day and time each week
            2. On a specific day of the month
            3. On a specific day of the week each month
        17. Similarly, the time of recurring events can be scheduled in several ways:
            1. At a specific time, each day
            2. At a specific time before or after Sunrise/ Sunset
            3. At a recurring time for recurring durations
        18. For recurring events provision must also be included for the end-user to schedule exceptions.
        19. The LMS shall also incorporate a macro based logic control builder that utilizes a plain language function editor. The macro builder must be capable of handling sequential and conditional control routines. The macro facility must also present a range of standard or common control routine templates, to assist in implementation of typical control scenarios.
        20. The LMS must incorporate some type of user logon access security. The system shall be capable of displaying alternate menu structures in accordance with the privilege profile defined for each user. The LMS must automatically log out users after a defined period has elapsed since the last keyboard or mouse activity. The system shall also record the time that each user logs on, logs off, and if the log off was manual or automatic for review by the system administrator.
        21. The LMS shall support connection to external sources via a RESTful API. This API will allow an external application to control and request the lighting state of controlled lighting groups at a channel and area level.
        22. The LMS shall be able to store historical data for a user defined period on site without needing any Cloud application support. This data should include all state changes in the system and details of which user made which changes if those changes were made using the LMS.
        23. The LMS shall include an OPC server to support up to 20000 OPC points per LMS Server for control and monitoring of the Lighting system from a 3rd party system such as a BMS. It shall be possible to run Multiple LMS servers when more than 20000 OPC points are required on one system.
        24. The LMS must be capable of sending out emails should there be a problem on the system. It will be possible for the on site administrator of the LMS to set and modify who will get emails and which subjects they will get emails for.
        25. User Access Management
            1. The LMS shall support the use of Microsoft Active Directory to allow users to log in to a LMS Client application using their standard Windows login credentials.
        26. Databases
            1. The LMS must not require any additional database applications beyond those that are part of the standard install.
            2. If a client chooses to use their own Microsoft SQL Enterprise this should be possible easily without any additional software required from the LMS manufacturer. The responsibility for the licensing and maintenance of this SQL instance will be with the client.
     2. Commissioning Software
        1. It shall be possible to completely pre-commission the software off-site without any connection to the lighting control network. Completion of commissioning using the pre-configuration approach, shall then only involve connection of PC with software to the lighting control network, signing on of network devices, and then downloading all configuration data to the devices.
        2. Offsite pre-commissioning shall also be possible for systems that incorporate DALI controllers and luminaires. Provision shall also be included to accommodate both enumerated and non-enumerated DALI luminaires.
        3. To ensure on-time completion of commissioning, it shall be possible to independently operate and commission sections of a facility, i.e. individual floors of a multi-story building, as discrete networks. The commissioning and management software shall also enable configuration files for each of the respective individual areas to be merged into a master site file as they are completed and connected to the overall site network.
        4. The software shall also be capable of configuring all parameters of DALI devices connected to the DALI universe controllers including enumeration of short addresses. The lighting control system must be able to configure ballasts without having to use ‘Ballast Suppliers Software’ or hardware creating intermediate third-party data bases. DALI universe controllers and configuration software shall be capable of natively supporting all DALI configuration and control functionality. Systems that require separate third-party software and interfaces to enumerate devices and assign short addresses will not be accepted. The lighting control systems DALI load controller should support all DALI commissioning requirements. Lighting control systems that are dependent on additional third-party hardware for the commissioning process will not be accepted.
        5. The commissioning software must be able to configure all elements of the lighting control system. Any commissioning software that requires additional patches, plug-ins or drivers to perform commissioning will not be accepted.
        6. The commissioning software will allow multiple programmers on the same network at the same time.
        7. The commissioning software will automatically produce a report of all system settings.

* + 1. System Health Monitoring
       1. The system shall be able to assign essential and non-essential lighting on a circuit-by-circuit basis from the PC. It shall be possible to monitor and control the entire system in real-time.
       2. The system shall be capable of monitoring and displaying a comprehensive range of diagnostic and fault information including but not limited to circuit run time data, re-lamping schedules, ON/OFF status, MCB trip status, DALI luminaires status and other diagnostic information. The system shall also be capable of initiating emergency lighting tests for luminaires that incorporate DALI control gear and incorporate a comprehensive facility for reporting test results. It shall be possible to program, initiate and monitor emergency luminaire testing from the system software.
       3. When a failure event is detected, it shall be possible to generate a report and direct it to an e-mail address or group of addresses, or a printer. It shall be possible to generate preventative maintenance reports from the software that indicate lamps that have operated past a specified allowable run time.
       4. All lighting control network activity, as well as run time and configuration data shall be logged to a SQL compatible database. The end-user shall be able to use the built-in reporting functions or third-party SQL reporting tools to run custom reports. Alternatively, it shall be possible to export the data manually or automatically to a spreadsheet, text file, e-mail, or word processing document for the end-user to analyze.
       5. It shall be possible for the lighting control software to be programmed to run daily system tests to verify that all devices are operating properly. This information shall be displayed graphically using a floor plan view interface, and also logged to a database. The database shall be capable of generating daily maintenance schedules. It shall be possible for reports to be automatically generated and e-mailed to the maintenance personnel each day.
       6. The cumulative running hours of each luminaire shall be available from the lighting control software floor plan view interface. This information shall also be available from the database, where custom reports can be generated, or the information can be exported to a spreadsheet, word processing program, or text file. The information will be required to efficiently plan re-lamping of areas based on actual running hours, rather than estimated running hours.

* + 1. Energy Monitoring
       1. The lighting control system shall be capable of logging the notional power consumption for any luminaire, circuit, area and range of areas. The system shall log running hours and output level to provide an estimate of lighting system energy consumption. It shall be possible to generate the following information:
          1. average energy consumption across a time period
          2. the power consumption of a control group
          3. the power consumption of a luminaire
          4. daily consumption profiles and plan peak load shedding
       2. For the purpose of calculating and reporting on notional power consumption, it shall be possible to define notional power consumption profiles for all luminaire types used plotting power against dimmed output level. It shall be possible to enter this in either raw data format or via a graphical plot dialogue.
       3. Provision shall be included for the user to generate custom reports, graphs, and analyze data using common software tools.
       4. The system software shall also be capable of reporting on metered energy consumption via networked third-party power meters connected through the lighting system Power meters requiring their own software for integration to the lighting system shall not be accepted.

* + 1. Energy Performance Monitoring
       1. The system shall incorporate a utility to publish real-time notional energy performance data in a dashboard format via a web server, which can be readily viewed from PCs or other portable devices with standard web browsers.
       2. The purpose of this facility is to provide clear visibility of lighting system energy performance to occupants, to encourage utilization behavior that reduces energy demand.
       3. The utility shall be configurable to display energy usage information for any user-defined area or zone.
       4. Web pages shall include timeline graphs, which can also include comparative historical data, so that current performance can be readily benchmarked.
       5. Pages shall also be capable of displaying instant and accumulated year-to-date savings in absolute energy, cost, and carbon volume terms.
    2. Guest room monitoring
       1. The guest room monitoring must be intuitive, easy to use, and not require extensive training or expertise to utilize.
       2. The software must be provided by the core hardware manufacture to ensure that there is direct access to all the required features and functions of the system. Support for system component diagnostics within the room is required so that issues can be automatically reported.
       3. Information on each Guest room should be represented in a 2D tile format and utilized different colored icons for Guest room status indications. Software that required 3D rendering graphics will not be accepted as this can create difficulty interpreting the system information.
       4. The software must present the following Guest room information on request
          1. Room occupancy
          2. Guest room automated system status (Devices on or off line)
          3. Current room status; Do Not Disturb (DND) or Make Up Room (MUR) and event timing
          4. Laundry or Service and event timing
          5. Lighting Wake up service
          6. Measured temperature
          7. Measured Humidity
          8. Current set point temperature
          9. Current fan speed
          10. Current HVAC mode (Heating, Cooling, Auto)
          11. Balcony or window door open
          12. Safe door open closed
          13. History of event timeline
       5. Monitoring software should provide easy to follow overview with filtering tools to allow displaying of only relevant information such as Guest Room status (Do Not Disturb, Make Up Room, Pick Up Laundry) information and how long guest room status event has been triggered. Such tools are to assist facility direct cleaning and service resources to the right floors for more efficient management of the hotel.
  1. System Manager
     1. General
        1. Philips Dynalite System Manager LMS allows for multi-user control, management and monitoring of all devices connected to a DyNet network with reporting of maintenance issues and energy usage.
        2. Envision Manager allows areas, entire floors, buildings or campuses to be controlled remotely through any authorized web browser-enabled devices,
     2. Hardware
        1. Philips Dynalite System Manager Server installs and operates on a personal computer with:
           1. Processor: minimum Intel Xenon @ 3.33 GHz.
           2. Hard Disk: minimum 300 GB (10 gigabytes minimum for application).
           3. System Memory: minimum 12 gigabytes RAM.
           4. Network: 10/100BaseT Ethernet card or port.
           5. I/O Ports: at least one (1) USB 2.0 Type A
        2. Minimum requirements will vary depending on the size of the site and the quantity of simultaneously connected clients.
        3. Uninterruptable Power Supply (UPS) for the System Manager Server computer is highly recommended.
        4. Philips System Manager Client installs and operates on a personal computer with:
           1. Processor: minimum Intel Core i5 / i7 @ 2.30 GHz.
           2. Hard Disk: minimum 10 gigabytes free space.
           3. System Memory: minimum 4 gigabytes RAM.
           4. Network: 10/100BaseT Ethernet card or port.
           5. I/O Ports: at least one (1) USB 2.0 Type A
     3. Software
        1. Supported Operating Systems:
           1. Client - Windows 7 Professional SP1
           2. Server – Windows 7 Professional SP1 or Windows Server 2012
     4. Performance
        1. Interface with the operator is visually via a Graphical User Interface (GUI) for end-user control. A pictorial representation of the controlled space is broken up into areas and channels, to provide a strong and intuitive visual link between the control system and the controlled space.
        2. System Manager is optimized to program a vast array of control settings including:
           1. Defining lighting zone areas.
           2. Placement of Philips-controlled specified third-party loads, such as fans, pumps, audio-visual, HVAC equipment, shades, and tasking of DyNet network devices to perform conditional functions.
           3. System Manager also features an energy management reporting capability in relation to lighting consumption, using notional load profiling and metered power monitoring via third-party Modbus metering of lighting load consumption.
        3. Envision Manager delivers granular site-wide visibility, access, and control, enabling building operators to easily customize and expand lighting control systems as they evolve over time.
     5. Features
        1. Console
           1. Allows authorized users to create custom system views for specific applications and for general monitoring of the LMS
           2. Supports user defined color coding to show specific system states.
           3. Provides widgets to:

change/indicate preset scenes for an area

Display current energy meter data

Display the current temperature in an area

Provide controls to adjust the temperature set point in an area

* + - 1. Plan view
         1. Provides a 2D graphical representation of the project floor by floor and building by building
         2. Using the Light Map feature, areas can change color to represent their current illumination level
         3. Using the Occupancy Map feature, areas can change color to show if they are currently occupied/unoccupied
         4. Tooltips provide real time data for every area and each circuit or lamp. The user can change the output level or a preset state from the tooltip if required
         5. The user can adjust the sensor occupancy time out for any area in the system
         6. The user can see the current lux level reading s of any sensor on the system and can adjust the calibration if necessary from the floor plan view.
      2. Maintenance tools
         1. Scheduler

Create and edit scheduled events

Push this configuration down to the hardware on site to ensure highest levels of reliability

Enable and disable schedules

Scheduled events can be run or excluded on public holidays and the public holiday list can be updated as needed over an internet connection automatically

* + - * 1. Macros and triggers

Create a macro to attach to a console button or to a scheduled event to have multiple actions linked to one action

Create a trigger so that a macro in SM can be run from a message on the greater LMS network.

* + - * 1. Emergency Testing

Possible to carry our functional and duration tests on DALI Emergency Lighting fixture groups

Tests can be scheduled or run manually

Central Battery Systems can also be tested with this tool

* + - * 1. Lamp Manager

Shows the number and location of any failed lamps and DALI drivers on the system

Provides a wizard to support local maintenance team in replacing and readdressing DALI drivers.

* + - * 1. Network Manager

Provides details of any failed connection to remote sites and messages that have been missed

The user can define how long the system retries for before it disregards any missed messages.

* + - * 1. Area Manager

The user can regroup circuits and DALI drivers from this tool. It allows the user to graphically resize, add and delete area groups should a project layout change without the need to call in a specialist

There is a safety mechanism to prevent errors when using this tool.

* + - 1. Reporting
         1. SM can provide reports on the following

Alarm status

Channel runtime

Driver reported energy (from drivers with this capability)

Emergency test history

Emergency test status

Metered energy reports

Notional energy reports

Lighting fault report

Historical occupancy report

Historical Lux level report

* + - * 1. Custom reports can be created by the user based on the reports listed above
      1. Alerts
         1. Shows any current alerts
         2. Support alerts maintenance with a status profile for each alert
         3. Shows historical alerts
      2. Dashboard
         1. Graphically shows

Historical Notional energy usage

Historical occupancy levels

* + - * 1. Provides details on

Current alerts status

Latest emergency testing results

Latest network alarms

Next 3 scheduled events

* + - 1. 3rd party accessibility
         1. Provides an OPC DA Server which can provide up to 20000 individual data points for monitoring and control by a 3rd party BMS
         2. Provides a RESTful API to support preset and channel level controls and serve metadata to a 3rd party tool
    1. Equipment List (quantities as shown in schedules, tables, and drawings):
       1. 1x Philips Dynalite System Manager
  1. Standalone control devices
     1. Sunrise Preset Dimmers
        1. The Sunrise Preset Strap Type Dimmers are designer-style, preset slide dimmer, developed for control of low-wattage (600-watt to 1200-watt) incandescent, magnetic or electronic low voltage, LED, fluorescent, and fan loads.
        2. Dimmer:
           1. Streamlined appearance and operations.
           2. The integral slide knob has extended travel for full-range dimming control.
           3. Air Gap push-button switch shall be provided to completely open the attached circuit.
        3. Multiple Dimmers may be installed in a multi-gang box. Some derating may be required depending on model.
        4. Dimmers are supplied with plastics for three (3) colors.
           1. White
           2. Light Almond
           3. Ivory
        5. Faceplates not included.
        6. Equipment List (quantities as shown in schedules, tables, and drawings):
           1. SR1200ZTVUNV – 120V or 277V – 0-10V Dimmable LED or Fluorescent up to 1200VA (Philips 12NC – 912400526434)
     2. OccuSwitch Classic LCA Series Power Packs
        1. General
           1. The Philips LCA series Power Packs are designed to provide low voltage power and line voltage control for Philips LRM series Occupancy Sensors.
           2. LCA series Power Packs shall be compatible with Philips Advance Optanium Programmed Start electronic ballast and Xitanium LED drivers.
           3. The Power Pack is capable of Auto/Manual input, Hold-ON/OFF, and local input for momentary or maintained dry contact switches.
        2. Mechanical
           1. Each module shall be labeled with manufacturer’s name, catalog number, and ratings.
           2. Power Pack enclosure shall conveniently mount inside or outside a standard junction box or fluorescent ballast cavity in a knockout hole with a simple twist-on nut.
           3. Measure no more than 2.0 x 3.811 x 1.432 inches (60.96 x 96.8 x 36.37 mm).
           4. Construction shall be high impact UL rated plastic.
           5. Interface operating environment: 32 to 104 degrees Fahrenheit (0 - 40°C) in zero (0) to 90 percent relative humidity, non-condensing.
           6. Interface shall be UL/cUL Listed, FCC certified, NOM certified, and meet ASHRAE 90.1 requirements.
           7. Power Pack shall be UL 2043 Plenum rated.
           8. The LCA Power Pack relay shall utilize Class B (130°C) insulating material and silver alloy contacts.
           9. The LCA Power Pack switching power supply shall utilize six (6”) inch 18 AWG 120-230-277VAC wire leads.
           10. The low voltage control leads shall be seven (7”) inch 22AWG 24VDC wire.
           11. LCA2287 and 2290 Power Packs shall provide the same features as the LCA2285 plus an optional HVAC relay closure consisting of three (3) control leads; Brown-NO, Brown/White-NC, and Green-Common.
           12. LCA2292 Power Pack shall provide the same features as the LCA2287 plus CEC Title 24 compliant Manual ON, Automatic OFF operation.
        3. Electrical
           1. Internal relay shall be rated for up to twenty (20A) amperes for a 120VAC incandescent load.
           2. Internal relay shall be rated up to twenty (20A) amperes for a 120, 230, or 277VAC ballast load or fifteen (15A) amperes for a 347VAC ballast load.
           3. HVAC relay shall be rated 0.5A @ 120VAC and 1.0A @ 30VDC.
           4. Power Pack shall utilize an internal voltage regulator – regulated 24VDC current, 150mA output.
        4. Equipment List ( quantities as shown in schedules, tables, and drawings ):
           1. LCA2285/00 Power Pack 120/277 VAC (Philips 12NC – 912400473978)
           2. LCA2292/00 Power Pack 120/277 VAC, HVAC Relay, Title 24 Manual ON (Philips 12NC - 912400473980).
     3. OccuSwitch Classic – LRS2210 PIR Wall Switch Line Voltage
        1. General
           1. The Philips LRS2210 wall switch sensors using passive infrared (PIR) motion detection to detect occupancy status.
           2. The sensor is designed to interface with other devices including Philips Advance Programmed Start electronic ballast and Xitanium LED drivers.
           3. Mechanical
           4. Each module shall be labeled with manufacturer’s name, catalog number, and ratings.
           5. Sensor shall mount in a standard one-gang wall box.
           6. Measure no more than 4.06”H inch x 1.75”W and 1.85”D (103.2 x 44.4 x 47.2mm).
           7. Construction shall be rugged, high impact, injection molded plastic enclosure.
           8. Sensor operating environment: 32 to 122 degrees Fahrenheit (0 - 50°C) in twenty to ninety (20-90%) percent relative humidity, non-condensing.
           9. Sensor field of view shall be at least 180° providing approximately 2100 square feet of coverage. Integral blinders on either side of the lens shall allow for adjustment of the field of view from 180 to 60 degrees.
           10. Sensor shall be UL Listed, CSA certified, comply with CES Title 24 energy Code and FCC regulations.
        2. Electrical
           1. Load Rating:

Incandescent: 800VA @ 120VAC

Fluorescent: 1200VA @ 120VAC / 2700VA @ 277VAC.

Motor: ¼ HP @ 120V

* + - * 1. Operational Frequencies: 60 Hertz.
        2. Sensor shall provide zero crossing switching to maximize contact life and compatibility with electronic ballasts.
      1. Performance
         1. LED motion detection and activation indicator.
         2. Manual Timer Setting range: 30 seconds to 30 minutes (default = ten (10) minutes).
         3. Segment Fresnel lens for optimum sensitivity and detection.
         4. At a mounting height range of four (4’) feet the standard lens shall cover an area approximately sixty (60’) feet by forty (40’) feet (2400 square feet).
      2. Equipment List ( quantities as shown in schedules, tables, and drawings ):
         1. LRS2210/00 Wall Switch Occupancy Sensor, 120/277VAC, White (Philips 12NC – 912400474178).
    1. OccuSwitch Classic – LRS2220 PIR/US Wall Switch Line Voltage
       1. General
          1. The Philips LRS2220 wall switch sensors combine digital architecture and both infrared and ultrasonic (Doppler shift) technologies to detect occupancy status.
          2. The sensor is designed to interface with other devices including Philips Advance Programmed Start electronic ballast and Xitanium LED drivers.
       2. Mechanical
          1. Each module shall be labeled with manufacturer’s name, catalog number, and ratings.
          2. Sensor shall mount in a standard one-gang wall box.
          3. Measure no more than 4.06”H inch x 1.75”W and 1.85”D (103.2 x 44.4 x 47.2mm).
          4. Construction shall be rugged, high impact, injection molded plastic enclosure.
          5. Indoor only sensor operating environment: 32 to 122 degrees Fahrenheit (0 - 50°C) in twenty to ninety (20-90%) percent relative humidity, non-condensing.
          6. Sensor field of view shall be at least 180° providing approximately 2100 square feet of coverage. Integral blinders on either side of the lens shall allow for adjustment of the field of view from 180 to 60 degrees.
          7. Sensor shall be UL Listed, CSA certified, comply with CES Title 24 energy Code and FCC regulations.
       3. Electrical
          1. Load Rating:

Incandescent: 800VA @ 120VAC

Fluorescent: 1200VA @ 120VAC / 2700VA @ 277VAC.

Motor: ¼ HP @ 120V

* + - * 1. Operational Frequencies: 50/60 Hertz.
        2. Power Consumption:

120VAC – U/S & PIR 390mW or PIR only 190mW

277VAC – U/S & PIR 480mW or PIR only 270mW.

* + - * 1. Sensor shall provide zero crossing switching to maximize contact life and compatibility with electronic ballasts.
      1. Performance
         1. LED motion detection and activation indicator.
         2. Manual Timer Setting range: 30 seconds to 30 minutes (default = ten (10) minutes).
         3. Segment Fresnel lens for optimum sensitivity and detection.
         4. Photocell shall provide Ambient Light Override keeping controlled lights off when not necessary.
         5. Adjustable photocell 20 to 30,000 Lux, factory default set to 3,000 Lux, disabled.
         6. Sensor shall provide a walk-through feature to extinguish lights if occupied for less than 2.5 minutes.
         7. At a mounting height range of four (4’) feet the standard lens shall cover an area approximately sixty (60’) feet by forty (40’) feet (2400 square feet).
      2. Equipment List ( quantities as shown in schedules, tables, and drawings ):
         1. LRS2220/00 Wall Switch Occupancy Sensor, Multi-Tech 120/277VAC, White (Philips 12NC – 912400474182).
    1. OccuSwitch Classic – LRS2225 PIR/US 2 Circuit Wall Switch Line Voltage
       1. General
          1. The Philips LRS2225 wall switch sensors combine digital architecture and both infrared and ultrasonic (Doppler shift) technologies to detect occupancy status.
          2. The LRS2225 device shall be capable of controlling two (2) separate lighting loads simultaneously.
          3. The sensor is designed to interface with other devices including Philips Advance Programmed Start electronic ballast and Xitanium LED drivers.
       2. Mechanical
          1. Each module shall be labeled with manufacturer’s name, catalog number, and ratings.
          2. Sensor shall mount in a standard one-gang wall box.
          3. Measure no more than 4.06”H inch x 1.75”W and 1.85”D (103.2 x 44.4 x 47.2mm).
          4. Construction shall be rugged, high impact, injection molded plastic enclosure.
          5. Indoor only sensor operating environment: 32 to 122 degrees Fahrenheit (0 - 50°C) in twenty to ninety (20-90%) percent relative humidity, non-condensing.
          6. Sensor field of view shall be at least 180° providing approximately 2100 square feet of coverage. Integral blinders on either side of the lens shall allow for adjustment of the field of view from 180 to 60 degrees.
          7. Sensor is capable of being utilized as either a single pole or 3-way device.
          8. Either sensor, PIR or U/S, shall be capable of being disabled.
          9. Sensor shall be UL Listed, CSA certified, comply with CES Title 24 energy Code and FCC regulations.
       3. Electrical
          1. Primary Relay Load Rating - #16 AWG leads:

Incandescent: 800 watt @ 120VAC

Fluorescent: 1200VA @ 120VAC / 2700VA @ 277VAC.

* + - * 1. Secondary Relay (isolated contacts) Load Rating - #16 AWG leads:

Incandescent: 800 watt @ 120VAC

Fluorescent: 800VA @ 120VAC / 1200VA @ 277VAC

Motor: ¼ HP @ 120VAC

* + - * 1. Operational Frequencies: 50/60 Hertz.
        2. Power Consumption:

120VAC – U/S & PIR 210mW

277VAC – U/S & PIR 410mW

* + - * 1. Sensor shall provide zero crossing switching to maximize contact life and compatibility with electronic ballasts.
      1. Performance
         1. LED motion detection and activation indicator.
         2. Manual Timer Setting range: 30 seconds to 30 minutes (default = ten (10) minutes).
         3. Segment Fresnel lens for optimum sensitivity and detection.
         4. Photocell shall provide Ambient Light Override keeping controlled lights off when not necessary.
         5. Adjustable photocell 20 to 30,000 Lux, factory default set to 3,000 Lux, disabled.
         6. Sensor shall provide a walk-through feature to extinguish lights if occupied for less than 2.5 minutes.
         7. At a mounting height range of four (4’) feet the standard lens shall cover an area approximately sixty (60’) feet by forty (40’) feet (2400 square feet).
      2. Equipment List ( quantities as shown in schedules, tables, and drawings ):
         1. LRS2225/00 Wall Switch Occupancy Sensor, Multi-Tech 120/277VAC, White (Philips 12NC – 912400474184).
    1. OccuSwitch Classic – LRM2250 PIR Ceiling Low Voltage
       1. General
          1. The Philips LRM2250 ceiling sensor is a low voltage occupancy detector that works in conjunction with Philips LCA series Power Packs to control lighting.
          2. The sensor is designed to interface with other devices including Philips Advance Programmed Start electronic ballast and Xitanium LED drivers.
          3. Once installed, the LRM2250 does not require manual adjustment or calibration.
       2. Mechanical
          1. Each module shall be labeled with manufacturer’s name, catalog number, and ratings.
          2. Sensor shall be ceiling surface mount on a standard three or four inch (3”/4”) octagon back box, threaded rod, or drop ceiling directly.
          3. Measure no more than 4.5” inches diameter and 1.5” depth (114 x 38 mm).
          4. Weigh no more than 5 ounces (.142 kg).
          5. Construction shall be rugged, high impact, injection molded plastic enclosure.
          6. Indoor only sensor operating environment: 32 to 104 degrees Fahrenheit (0 - 40°C) in zero to ninety-five (0-95%) percent relative humidity, non-condensing.
          7. Non-Volatile memory shall maintain learned and adjusted settings in the event of power failure.
          8. Sensor shall be UL Listed, CSA certified, comply with CES Title 24 energy Code and FCC regulations.
       3. Electrical
          1. Input power shall be 24 VDC, 20mA provided from Philips series Power Pack.
          2. Output: 24 volt DC active high logic control signal with short circuit protection.
          3. Wire Designations – Class II:
          4. Power (+24 volt) Red #24 AWG 200°C/600V
          5. DC Return Black #24 AWG 200°C/600V
          6. Occupancy Blue #24 AWG 200°C/600V
          7. Occupancy/Photocell Gray #24 AWG 200°C/600V
       4. Performance
          1. Red LED motion detection and activation indicator.
          2. Manual Timer Setting range: 30 seconds to 30 minutes, factory default set to 10 minutes.
          3. Photocell shall provide Ambient Light Override keeping controlled lights off when not necessary.
          4. Adjustable photocell 20 to 30,000 Lux, factory default set to 3,000 Lux, disabled.
          5. Sensor shall provide a walk-through feature to extinguish lights if occupied for less than 2.5 minutes.
          6. At a mounting height range of eight (8’) feet the standard lens shall cover a full circle forty x (40’) feet in diameter (1256 square feet).
       5. Equipment List ( quantities as shown in schedules, tables, and drawings ):
          1. LRM2250/00 Low Voltage Occupancy Sensor, Ceiling Mount (Philips 12NC – 912400474166).
    2. OccuSwitch Classic – LRM2255 PIR/US Ceiling Low Voltage
       1. General
          1. The Philips LRM2255 ceiling sensors combine digital architecture and both infrared and ultrasonic (Doppler shift) technologies into low voltage occupancy detectors that work in conjunction with Philips LCA series Power Packs to control lighting.
          2. The sensor is designed to interface with other devices including Philips Advance Programmed Start electronic ballast and Xitanium LED drivers.
          3. Once installed, the LRM2255 does not require manual adjustment or calibration.
       2. Mechanical
          1. Each module shall be labeled with manufacturer’s name, catalog number, and ratings.
          2. Sensor shall surface mount on a standard three or four inch (3”/4”) octagon back box, threaded rod, or drop ceiling directly.
          3. Measure no more than 4.5” inches diameter and 1.5” depth (114 x 38 mm).
          4. Weigh no more than 5 ounces (.142 kg).
          5. Construction shall be rugged, high impact, flame class rating, UV inhibitors injection molded plastic enclosure.
          6. Sensor operating environment: 32 to 104 degrees Fahrenheit (0 - 40°C) in zero to ninety-five (0-95%) percent relative humidity, non-condensing.
          7. Non-Volatile memory shall maintain learned and adjusted settings in the event of power failure.
          8. Sensor shall be UL Listed, CSA certified, comply with CES Title 24 energy Code and FCC regulations.
       3. Electrical
          1. Input power shall be 24 VDC, 20mA provided from Philips series Power Pack.
          2. Output: 24 volt DC active high logic control signal with short circuit protection.
          3. Wire Designations – Class II:
          4. Power (+24 volt) Red #24 AWG 200°C/600V
          5. DC Return Black #24 AWG 200°C/600V
          6. Occupancy Blue #24 AWG 200°C/600V
          7. Occupancy/Photocell Gray #24 AWG 200°C/600V.
          8. Sensor shall contain two (2) 16mm diameter crystal controlled ultrasonic transmitters and two (2) 16mm ultrasonic receivers
       4. Performance
          1. Red LED infrared motion detection and green LED ultrasonic motion detection.
          2. Manual Timer Setting range: 30 seconds to 30 minutes, factory default set to 10 minutes.
          3. A DIP switch controlled six (6) second time-out Test Mode shall be included.
          4. Photocell shall provide Ambient Light Override keeping controlled lights off when not necessary.
          5. Adjustable photocell 20 to 30,000 Lux, factory default set to 3,000 Lux, disabled.
          6. Sensor shall provide a walk-through feature to extinguish lights if occupied for less than 2.5 minutes.
          7. At a mounting height range of eight (8’) feet the standard lens shall cover a full circle forty x (40’) feet in diameter (1256 square feet).
       5. Equipment List ( quantities as shown in schedules, tables, and drawings ):
          1. LRM2255/00 Low Voltage Sensor, Multi-Tech Ceiling Mount, 2000 sq. ft. 32kHz (Philips 12NC - 912400474167)

1. EXECUTION
   1. Manufacturer’s Instructions
      1. Compliance: Comply with manufacturer’s product data; including product technical bulletins, product catalog, installation instructions, submittal sketches or drawings, and product carton instructions for installation.
   2. Examination
      1. Site Verification of Conditions: Verify that related conditions, including equipment that has been previously installed under other sections, are compatible and acceptable for product installation in accordance with manufacturer’s instructions.
      2. All devices connected to equipment specified in this section shall bear the UL, cUL, ETL, CSA, or other appropriate Nationally Recognized Testing Laboratory (NRTL) label and comply with all applicable National Electrical Code (NEC) requirements.
      3. Verify that the types of lamps installed are compatible and provide complete functionality of the controlling device.
      4. Verify suitability of any preexisting conditions to accept new work and will permit proper installation/application of new products.
   3. Preparation
      1. All equipment related to the system shall be factory tested before shipment.
      2. Refer to Section 01 71 00 Examination and Preparation requirements.
      3. Existing equipment related to work in this Section shall be protected from physical and electrical damage by installer utilizing best practices.
      4. Removal of selective existing work shall be accomplished in such a manner as to maximize reuse of existing infrastructure, including:
         1. Existing wiring lengths at junction and device box locations.
         2. Enclosures, covers, fastener fittings, strain reliefs, insulators, and their supports items.
   4. Installation
      1. Contractor shall furnish all equipment, labor, system setup, and other services necessary for the proper installation of the products/system as indicated on the drawings and specified herein.
      2. System setup information shall include each dimmer’s load type, assigning each dimmer to a control zone (channel), and defining operational control functions desired (i.e. non-dim, constant, dimmable, etcetera).
      3. Philips Controls will not be responsible for any products subjected to inappropriate application or installed or modified in any way that is not in accordance with Philips Controls' instructions.
      4. Install in accordance with all local and pertaining codes and regulations.
      5. Utilize an installer with demonstrated experience in projects of similar size and complexity.
      6. Equipment shall be ready to use condition at end of installation.
   5. System Start-Up
      1. Energize equipment in accordance with manufacturer’s instructions.
      2. Schedule System Commissioning by factory-authorized personnel in accordance with manufacturer’s required lead times and written instructions.
      3. Refer to Section 01 75 00 Starting and Adjusting requirements.
      4. Refer to Section 01 79 00 Demonstration and Training.
      5. Refer to Section 01 91 00 Commissioning.
      6. Should commissioning be required per contract, end user training of the maintenance and operation of the equipment shall be provided by the manufacture or manufacturer’s representative following the completion of the commissioning of the project (per contract specification).
   6. Close Out, Protection, and Maintenance Activities
      1. Upon completion of project the manufacturer shall furnish as-built one-line system drawings and all pertinent instruction manuals and datasheets to the end user within 120 days of signed completion of the project by the owner or owner’s representative.
      2. Prepare and provide electronic Operation and Maintenance Manuals for the equipment provided under this section.
      3. Prepare and provide electronic final shop drawings for the equipment provided under this section. These drawing sets shall include any changes made during fabrication and installation that differ from the submittal drawings provided earlier.

END OF SECTION