SECTION 26 09 43

BLUETOOTH MESH LIGHTING SYSTEM AND CONTROLS

Editor's Note: Although this specification is directed towards a distributed network lighting and controls system. There are numerous applications where a distributed Bluetooth control system is applicable such as Access Control and HVAC/Environmental Control. In fact, numerous facility systems could be incorporated into a single BAS or BMS control system. Numerous facilities could also be under a single distributed network.

When incorporating numerous control systems into one distributed network a more appropriate section number for this Specification may be Section 25 00 00 - Integrated Automation or Section 25 50 00 integrates Automation Facility Controls.

When setting up specific digital control systems for work results other than Lighting, other appropriate specification numbers may be as follows:
22 09 00 - Instrumentation and Control for Plumbing Systems
23 09 00 - Instrumentation and Control for HVAC and Environmental Systems
26 09 00 - Instrumentation and Control for Electrical Systems
27 09 00 - Instrumentation and Control for Communications Systems
28 09 00 - Instrumentation and Control for Electronic Safety and Security Systems
33 09 00 - Instrumentation and Control for Utilities

It should be noted that the work results covered by the Level 2 section numbers listed above are also covered in level three section numbers in Division 25 as well.

1. GENERAL

1.   GENERAL PROVISIONS

1.A.   Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.

2.   DESCRIPTION OF WORK

2.A.   Work Included: Provide labor, materials, and equipment necessary to complete the work of this Section, including but not limited to the following:

1.   BAS/BMS Distributed Network Bluetooth Enabled Systems:

a.   Mobile Application. User interface.

b.   Products:

1)   Accessories.

2)   Controllers.

3)   Drivers.

4)   Gateways.

5)   Partner devices.

6)   Sensors.

7)   Switches.

8)   Special devices.

9)   Touchscreens.

3.   RELATED WORK

Editor's Note: Delete sections not relevant to this project; add others as required.

A.   Section 28 15 00 - Integrated Access Control Hardware Devices.

B.   Section 08 75 13 - Automatic Window Equipment.

C.   Section 12 25 13 - Motorized Drapery Rods.

D.   Section 12 25 09 - Window Treatment Controls System.

E.   Section 23 09 00 - Instrumentation and Controls for HVAC.

F.   Section 23 09 23.11 - Direct Digital Control Systems for HVAC.

G.   Section 26 09 00 - Instrumentation and Control for Electrical Systems.

H.   Section 26 09 13 - Electrical Power Management System.

I.   Section 26 09 23 - Lighting Control Devices.

4.   REFERENCES CODES AND STANDARDS

A.   The following codes and standards are referenced throughout. The edition used is that currently enforced by authorities having jurisdiction (AHJ) at the Project's location. In absence of such direction then as referenced by the current enforceable IBC code or as indicated in the Contract Documents, except where specifically referenced.

1.   Bluetooth.

2.   European Commission (CE).

3.   Federal Communications Commission (FCC).

4.   Underwriters Laboratories (UL).

5.   Underwriters Laboratories Canada (C-UL).

6.   Restriction of Hazardous Substances (RoHS).

7.   Comply with local codes and regulations of local authorities having jurisdiction at Project location.

5.   GENERAL SYSTEM DESCRIPTION

    A.   Distributed Bluetooth Mesh Network: No central or peripheral devices. All devices and designated groups of devices (aka Nodes) have similar authority and are autonomous in terms of resources and computing power.

        1.   Topography: Defined by groups. Groups can be nested up to 16 levels but cannot intersect. Number of Groups in a Network: 16,383.

        2.   Subscribing: Assigning a Node to a group.

        3.   Publishing: Communication from the node to the group.

        4.   Nodes:

            a.   Do not communicate with each other.

            b.   Nodes subscribe and publish to groups.

            c.   Node Types:

                1)   Low Power Nodes: Devices running on small battery or energy harvesting, to suspend communication and enter sleep mode, sending a few data bytes over time periods without receiving or relaying messages and able to communicate with network immediately after wakeup.

                2)   Proxy Node: Communicates in B-Mesh and BLE.

                    a)   BLE: Point-to-point standard. Devices can communicate with a mesh network via a proxy node.

                    b)   B-Mesh: Many-to-many standard.

                3)   Friend Node: Stores messages addressed to LPNs they are friends with and forwards messages when the LPN occasionally wakes up and polls. An automated feature that can be enabled or disabled.

            d.   Messages:

                1)   Sent from nodes to publishing node.

                2)   Sent from nodes to other nodes in direct radio range of publishing node.

            e.   Act as "relays" and retransmit messages so they travel further, in a series of "Hops."

                1)   Hop Time: 2 to 15 milliseconds depending on the network traffic.

            f.   Small Networks: By default, all nodes are relays.

g. Large Networks: Traffic is managed by tuning the network; turning relays ON and OFF in strategic places.

B. System Architecture: Multi-hop and multi path.

1. Because system is not centralized, hacking requires hack a multitude of devices. Often, individual devices do not contain useful data since data is widely dispersed on distributed networks.

2. Not dependent upon a single point. Interconnectedness inherently protects it. If one point goes down, the network will operate around it.

3. As you increase the number of devices you create a larger network without increasing the stress on any one point.

C. Bluetooth Mesh: A distributed network system using B-Mesh and BLE to connect devices.

1. The network is not at risk of going down due to a failure at a single point and is more secure.

2. Network will not suffer increased strain from adding devices.

D. No Privacy Loss:

1. Distributed Bluetooth Mesh Network: Completely stand-alone. No connection with other facility systems, Wi-Fi, and other data systems unless specifically requested and authorized by Network Manager.

2. Data is not broadcast anywhere and cannot be breached through Wi-Fi and internet.

E. No Single Point Failures: No key point on system that may become overloaded or fail.

1. System Intelligence: Distributed across devices with no single point of failure.

F. Self-Healing: Mesh Network continues working if multiple portions experience issues. Data traffic is routed around overloaded or broken terminals.

G. Supported System Protocols:

1. Open Protocol System: Allows any number of general devices, often from different producers, to work with each other.

2.   Proprietary Protocol System: Devices that work together, produced by single manufacturer, and usually incompatible with devices from other manufacturers.

H.   Comply with California and Oregon IoT security laws and is secure.

1.   Use of Bluetooth Mesh Network:

a.   Devices are not connected to the internet and will not be able to contract malware from online sources.

b.   Network is isolated from rest of business' networks. Infection of one system will not lead to infection of the other.

c.   Bluetooth Mesh is encrypted and authenticated, with no known security vulnerabilities, apart from physical access to devices.

1)   Network Keys: Generated when network is created during provisioning. Without network key a node or provisioner (such a smartphone + app) cannot communicate with the network.

2)   App Key: Encrypted and bound to a network key, provided to nodes after provisioning with function of further securing specific applications (also called "models"). App Keys are bounded to one or more models.

a)   Allows for instance to separate applications such as lighting, audio, and video.

b)   Authorizes users access to certain applications only.

I.   Control System Commissioning: Simple and straightforward. To be performed by electricians setting up the system.

Editor's Note: Wi-Fi typically requires up to 500 microwatts. In part, this difference in energy use is because Wi-Fi systems are centralized and so signals must be powerful enough to reach every device, while Bluetooth Mesh networks instead relay messages between devices, allowing for individual messages to be very weak while still easily reaching the next node.

J.   Energy Requirements:

1.   Bluetooth Low Energy (BLE). For ten messages per day, Bluetooth uses approximately 50 microwatts.

6.   ACTION SUBMITTALS

A.   Submit under provisions of Section 01 30 00.

B.   Product Data: Technical data sheets including manufacturer's data for materials and equipment.

1.   Instruction manuals on application utilization.

C.   Design: Include CAD drawings of site with location of each component.

1.   Shop Drawings and Schematics: Depict in final proposed "as built" configuration.

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2. Connection diagrams for interfacing equipment.

3. List of connected equipment.

4. Locations for major equipment components to be installed under this specification.

D. Certification: Installer's proof of training and certification by manufacturer

E. Schedule of installation: Pending approval.

F. Sample warranties.

7. CLOSEOUT SUBMITTALS

A. As-Built Drawings: A continuation of Contractor's shop drawings as modified, and reviewed during installation, inspection, and acceptance Project phases.

1. Contractor: A set of "As-Built" Drawings prior to Date of Substantial Project Completion.

B. Operation and Maintenance Data: Include emergency, operation, and maintenance manuals.

1. Hard copies of manufacturer's specification sheets, operating specifications, design guides, user's guides for software.

2. System installation and setup guides with data forms to plan and record options and setup decisions.

8. QUALITY ASSURANCE

A. Manufacturer Qualifications: Company manufacturing products specified with five years documented experience.

B. Installer Qualifications: Company with two years documented experience installing projects of similar scope.

9. PRE-INSTALLATION CONFERENCE

A. Convene conference before scheduled commencement of Work. Include Architect, Contractor, and trades. Verify schedule, responsibilities, and approvals.

10. DELIVERY, STORAGE, AND HANDLING

A. Deliver components in manufacturer's original packaging.

B. Handle components according to manufacturer's instructions and recommendations.

C. Storage: Protect from weather, temperature extremes, and construction operations. Keep components in original packaging until time of installation.

11. FIELD CONDITIONS

A. Maintain manufacturer's recommended environmental conditions for installation and component operation. Do not install outside manufacturer's recommended limits.

12. WARRANTY

    A.   Manufacturer's limited component warranties unless otherwise indicated.

2.PRODUCTS

1.   **MANUFACTURERS**

    A.   Acceptable Manufacturer: BubblyNet Inc.

        1.   Address: 615 Drew Street, Clearwater Florida, 33755 USA.

        2.   Telephone: +1-727-316-5319

        3.   Sales: Sales@BubblyNet.com

        4.   Support: Support@BubblyNet.com

        5.   OEM Sales: OEMSales@bubblynet.com

        6.   Website: https://bubblynet.com/

    B.   Basis of Design: BubblyNet Distributed Network System:

        1.   BubblyNet Smart Building Automation Control Mobil Application.

        2.   BubblyNet Components or Approved Components.

            a.   Core Processor for BubblyNet Devices: ARM Cortex M4. Runs 40 plus functions; keeps track of schedules, scenes, transitions, and a multitude of settings, all while constantly updating, and keeping other devices in the network in constant communication.

2.   **PERFORMANCE AND DESIGN REQUIREMENTS**

    A.   System Design: To operate in the background of day-to-day operations requiring the smallest possible amount of attention.

        1.   A smartphone can monitor and control a Bluetooth Mesh Network.

            a.   Standard Configuration: When a network is commissioned, the first 10 nodes are proxy and subsequent nodes are proxy 1 out of 5.

                1)   Configuration may be modified.

        2.   Implement Calm Information Technology Principles:

            a.   Inform and create calm.

            b.   Make use of the periphery.

            c.   Amplify the best of technology and the best of humanity.

d. Communicate, but doesn't need to speak.

e. Must continue to work even when it experiences failures.

f. Technology amount is the minimum needed to solve a problem.

g. Respect social norms.

3. Features and Benefits to be Incorporated:

a. Wireless System built on standard Bluetooth mesh protocol.

b. Make use of the fast growing eco system of 3rd party standard BLE mesh certified devices, e.g. sensors, switches, controllers, and drivers.

c. Lighting: Perceived lightness dimming scales in accordance with CIE (International Commission of Illumination).

d. Programmable CCT ranges and programmable fixed CCT presets.

e. Warm dim curves presets for daylight and hospitality user friendliness.

f. Built-in automation, scheduler, scenes, and group controls.

g. User friendly app for all used Bluetooth mesh qualified devices.

h. Ready for GPS synchronization for location based sunset and sunrise scheduling.

i. Ready for remote control and energy monitoring.

j. Firmware updates over the air.

k. Security architecture protecting devices and network from 3rd party attacks.

4. Device Nodes: Low power nodes, employing BLE, using as little as 5 microwatts under typical conditions. Whenever possible use BLE devices that go on standby, markedly reducing energy spend.

5. Energy Efficiency:

a. Light Dimming: Allows any person, given access to the network, to dim lighting with precision down to a single fixture.

1) Save dimming levels as preferences or as automatic scenes.

b. High-End Trim: Establish maximum light intensity for each luminaire, zone, or multiple zones with control application. Be able to choose any value between 1 and 100 percent.

c. Daylight Harvesting: Use of daylight sensors allow setting the desired amount of foot candles within different spaces of building and reduce the artificial light intensity as natural light increases.

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        d.   Occupancy / Vacancy Sensing: Utilize sensors programmed for full lighting automation.

            1)   Parameters: Include but are not limited to the following.

                 a)   Delays, transitions, run and prolong times, and standby light levels.

                 b)   Set to maximize energy efficiency of building, while providing seamless implementation for full comfort of occupants.

        e.   Automated Shades Control: Reduce energy required to cool or heat indoor spaces based on season change. Set automated shades to open or close based on time of day allowing them to keep in heat, block heat, or improve Daylight Harvesting results.

        f.   HVAC Integration and Control: Integrate HVAC functions in the control App, allowing automation of HVAC functions depending on time of the day, occupancy, etc.

        g.   Scheduling: Creation of scenes and a scheduler. Integratable with a GPS module or a gateway allowing calculation of sunrise and sunset times for every day of the year, to trigger events based on astronomical values for maximum energy efficiency and user experience.

        h.   Energy Data: Provide a cloud based energy management portal paired with a gateway on site to allow tracking of lighting levels, energy consumption, space occupancy, etc.

    6.   End-User Capabilities:

        a.   Advancing Productivity: Distraction-free environments. Precision personalized lighting control, scheduling, and task-specific lighting configurations.

        b.   Lighting Designed for Human Well Being: Create human-centric environments through high-performance Tunable White control, which emulates daylight at any hour of the day, and dimming with digital accuracy and curves that emulate the logarithmic sensitivity of the human eye.

        c.   Dynamic Lighting: Full color control, ranging from pastel to saturated colors.

        d.   Dynamic Shading: Enable shades to open and close based on amount of light entering environment as measured by daylight sensors or based on position of the sun depending on the hour/minute of the day and day of the year. Integrate seamlessly with any shade and motor such as Somfy and Forest.

        e.   Creating Scenes: Utilize lighting and shading controls to create multiple preset scenes which can then be activated through wireless switches or the control app.

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f. Space Utilization and Energy Efficiency: Utilize sensors and control app to reduce energy consumption without impacting occupants. Optimize lighting through task tuning and automation. Underutilized and unoccupied spaces can be identified through sensors.

g. Space Management: Using occupancy sensors, notify workers when meeting spaces are available, and assist with desk hoteling by keeping track of occupied and free desks.

h. Adaptability and Scalability: Gateways enable updates to entire suite of products, allow for remote monitoring, and control of facilities. Allow for off-site pre-commissioning of whole system. Over-the-air updates ensure up-to-date security, functionality, and integration of new fixtures or systems.

i. Analytics: Energy mapping analyzes energy usage within a building, and provides detailed analysis on which areas consume most, and where increased efficiency may be possible. Make available as a non-recurring expense or subscription.

j. On-Site Security: Integrated security cameras and occupancy sensors send alert when unrecognized people are detected in facilities, or when secured spaces are entered.

k. Remote Assistance: Allows multiple network control at a distance, from status reports down to editing and pushing of new device settings.

l. Hospitality: Guest experience enhanced through human-centric network of sensors and devices providing next-level services and functions but reduces overall cost of operation.

m. Intelligent Lighting: Preset multiple lighting scenes such as morning, dinner, movie time, and night while retaining control of individual luminaires.

1) Lighting can be automated to anticipate needs of guests.

2) Sheers and blackouts independently controlled and included on scene automation.

n. Extraordinary Lighting: Interior lighting emulates or enhances natural light by adjusting lighting levels and tons of white throughout the day in an automatic inconspicuous manner. Use color to generate emotions and to surprise guests.

o. Touchless Experience:

1) Lighting, air conditioning, in room services, TV streaming, etc. controlled from guest's smart phone.

2) Select designated floor in elevator without touching buttons. Unlock / lock hotel room and open and close doors, from their phone and without having to touch doorknobs. Access front door camera to see who is at the door and choose to let them in without physically going to open the door.

3) Enabling custom fragrances, all enabled and set from a smart device.

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p. Integration with Property Management Systems: Sensors and devices can be integrated into a Property Management System allowing tracking space occupancy for improved energy efficiency.

q. Adaptability and Scalability: A gateway enabling remote control, remote monitoring, and updates to entire suite of devices and ensure up-to-date security, functionality, and integration of new systems.

3. MOBILE APP: USER INTERFACE

A. The BubblyNet Mobile App: An intuitive commissioning tool and User Interface tool for any Qualified Bluetooth Mesh system whether BubblyNet or not.

1. Mobile Device Usage: iOS and Android devices. Free to download.

2. Accessibility: Dependent on user credentials, at different levels of complexity.

B. Capabilities:

1. Lighting control.

2. Sound control.

3. Security cameras.

4. Air quality control.

5. Environmental control.

C. User Control: Three levels.

1. Basic User: Default interface. Allows for basic lighting controls including ON/OFF, dimming, recalling scenes and other basic commands.

a. Functions available at this level:

1) Bubblynet App Info Icon: Learn-as-you-go tool provides a guide to navigate each screen of the App.

a) Location: Top right corner of each screen of App. Clicking icon provides detailed instructions to navigate that screen.

2) Dimming: Static color, Warm Dim, Tunable White and Full Spectrum RGBW luminaries can easily be controlled with this powerful app.

3) Tunable White: White light flexibility. Intensity and color temperature are selectable independently. Paired with Light Sensors and Clock functions, emulate natural light variations throughout the day.

4) Full Color Spectrum (RGBW): Intuitive ways to select colors with kelvin or hex values, and an CCT slider.

2. Advanced User: Password protected.

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a. Allows the most common functions while commissioning a system:

    1) Group settings.

    2) scanning for devices.

    3) commissioning of devices.

    4) assigning devices to groups.

    5) creating scenes.

    6) setting schedules.

    7) Transitioning.

    8) delays, and more.

b. Functions available at this level:

    1) All Basic User functions.

    2) Grouping: Create groups and subgroups.

        a) Assign fixtures to groups.

        b) Create scenes for groups.

        c) Control groups with switches.

        d) Sensors and schedulers.

c. Commissioning of Devices: Press SCAN to see the non-commissioned devices in the area.

    1) A selected device will respond with a series of blinks.

    2) Follow menu with two more options then device is fully commissioned within the network.

d. Scenes: Set specific levels of dimming and color tuning for single fixtures or for groups and save for later use

    1) Activate by a switch, a sensor, or a clock.

    2) Durations and transitions between Scenes can be set for sophisticated effects.

e. Schedular: Allows for exact dimming values and scenes to be recalled at a specific time and date.

f. Light Controls for Lighting Automation: Set 8 different parameters for full and dynamic lighting automation.

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3. Pro User: Password protected.

    a. Allows for full control of system including critical settings and security parameters such as:

        1) Default TTL (Time to Live) editing for network traffic.

        2) Device Power factor.

        3) Device Key editing.

        4) Device Cache Clear.

        5) Device Restart.

        6) Device's Network and Application Keys access.

        7) Device's Elements, Models, Servers, and Clients.

        8) Device blacklisting.

        9) Devices Composition Data Provisioners: add, edit, or delete.

        10) Friend Enable/Disable.

        11) Group addressing.

        12) Group as a subnet.

        13) IV Index (Initialization Vector Index) for security.

        14) Network Keys.

        15) Network export and provisioning capabilities.

        16) Network Reset.

        17) Network Beacon Enable/Disable.

        18) Network's Application Keys.

        19) Node complete deletion from the network.

        20) Proxy Enable/Disable.

        21) Proxy Filter, Whitelist, and Blacklist.

        22) Publication Settings: Destination, TTL, pub interval, retransmit count, and interval.

        23) Scenes ID editing.

        24) Sensor Sensitivity.

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25) Subscription change.

4. ACCESSORIES

A. 10A Emergency Lighting Relay with 0 to 10 Override:

1. Product: A-E10-00-17-DJR0. Enclosed Relay. 10 Amp SPST Automatic Load Control Relay with 120 to 277 Vac Coil Input, 0 to 10 V Dimmer Override.

   a. Approvals: UL Listed, UL924, C-UL, CE, and RoHS.

   b. Number of Relays and Contact Type: One SPST continuous duty coil.

   c. Expected Relay Life: 10 million cycles minimum mechanical.

   d. Operating Temperature: -30 to 140 degrees F (-34 to 60 degrees C).

   e. Operate Time: 18 ms.

   f. LEDs:

      1) Green: Normal Power.

      2) Red: Emergency Power.

      3) Yellow: Load Power.

   g. Dimensions: 5.15 x 1.68 x 1.32 inches (131 x 43 x 33 mm).

   h. Wires: 16 inch (406 mm), 600 V rated.

   i. Gold Flash: No.

   j. Override (Test Switch): Yes.

   k. Humidity Range: 5 to 95 percent noncondensing.

   l. Coil Current:

      1) Normal Power: 24 mA max.

      2) Emergency Power: 118 mA max.

   m. Coil Voltage Input:

      1) Emergency Input: 120 to 277 Vac (50/60 Hz).

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2) Normal Input: 120 to 277 Vac (50/60 Hz).

n. Relay Contact Ratings: [**10 Amp Magnetic Ballast at 277 Vac.**] [**10 Amp Electronic Ballast at 277 Vac.**] [**10 Amp Tungsten at 120 V.**]

o. Feedback/Dimmer Override Contact: 130 mA at 250 V Max.

Editor's Note: Bypass/Shunt Relays are UL924 Listed and suitable for shunting around wall switches and/or lighting control panel circuits, to turn on emergency lighting when normal utility power is lost.

B. 20A Emergency Lighting Relay with 0 to 10 Override:

1. Product: A-E20-00-17-DJR0. Enclosed Relay 20 Amp SPST Automatic Load Control Relay, 120 to 277 Vac Coil Input, 0 to 10 V Dimmer Override.

a. Approvals: UL Listed, UL924, C-UL, CE, and RoHS.

b. No of Relays and Contact Type: One SPST Continuous Duty Coil.

c. Expected Relay Life: 10 million cycles minimum mechanical.

d. Operating Temperature: -30 to 140 degrees F (-34 to 60 degrees C).

e. Operate Time: 18 ms.

f. LEDs: Green: Normal Power. Red: Emergency Power. Yellow: Load Power.

g. Dimensions: 4.0 x 4.57 x 1.80 inches (102 x 116 x 46 mm) with 0.50 inch NPT Nipple.

h. Wires: 16 inch (406 mm), 600 V rated.

i. Housing Rating: UL Accepted for Use in Plenum, NEMA 1.

j. Gold Flash: No.

k. Override (Test Switch): Yes.

l. Humidity Range: 5 to 95 percent noncondensing

m. Coil Current:

1) Normal Power: 24 mA max.

2) Emergency Power: 118 mA max.

n. Coil Voltage Input:

1) Emergency Input: 120-277 Vac (50/60 Hz).

2) Normal Input: 120-277 Vac (50/60 Hz).

o. Contact Ratings: [**20 Amp Magnetic Ballast at 277 Vac.**] [**16 Amp Electronic Ballast at 277 Vac.**] [**10 Amp Tungsten at 120 Vac.**]

C.   24 VDC 96 W Transformer:

    1.   [**Product: A-T96-24-17DL00 (Without Metal Box).**] [**Product: A-T96-24-17DLB0 (With Metal Box - Black).**] [**Product: A-T96-24-17DLW0 (With Metal Box - White).**]

    2.   Certifications: Intertek, CE.

    3.   Features:

        a.   Input Range: 110 to 277 VAC, 50/60Hz.

        b.   Built-in active PFC function.

        c.   Constant voltage design.

        d.   Class 2, single channel.

        e.   Protections: Over voltage and short circuit.

    4.   DC Voltage: 24 VDC.

    5.   Max Load: 96 W.

    6.   Voltage and Frequency Range: 110 to 277 VAC ; 50 / 60 Hz.

    7.   AC Current: 0.96 A max.

    8.   Inrush Current: 5 MA max at 120 Vac.

    9.   Over Voltage: Yes.

    10.   Short Circuit: Yes.

    11.   Working Temp. Minus 25 to 40 degrees C.

    12.   Storage Temperature, Humidity: Minus 40 to 85 degrees C.

    13.   Dimensions: 12.10 x 2.36 x 1.40 inches (308 x 60 x 35 mm).

Editor's Note: Our Bypass/Shunt Relays are UL924 Listed and suitable for shunting around wall switches and/or lighting control panel circuits, to turn on emergency lighting when normal utility power is lost. In certain applications where a designated emergency light is desired for dimmed normal lighting, our UL924 relays will open the dimming control and override the switch position or 0 to 10 Vdc controller output to provide full illumination when normal utility power is lost.

D.   Enclosed Relay 20 Amp SPDT with 24 Vac/dc/208-277 Vac Coil:

    1.   Product: A-E20-27-27-DJ00. Enclosed Relay 20 Amp SPDT with 24 Vac/dc/208-277 Vac Coil.

        a.   Approvals: UL Listed, UL924, C-UL, CE, and RoHS.

        b.   Housing Rating: UL Accepted for Use in Plenum, NEMA 1.

c. Number of Relays and Contact Type: One SPDT Continuous Duty Coil.

d. Expected Relay Life: 10 million cycles minimum mechanical.

e. Operating Temperature: -30 to 140 degrees F (-34 to 60 degrees C).

f. Operate Time: 18 ms.

g. Relay Status: LED On: Normal power present.

h. Dimensions: 2.30 x 3.20 x 1.80 inches (58 x 81 x 46 mm) with 0.50 inch NPT Nipple.

i. Wires: 16 inch (406 mm), 600 V rated.

j. Gold Flash: No.

k. Override (Test Switch): No.

l. Coil Current: [**50 mA at 18 Vac.**] [**83 mA at 24 Vac.**] [**69 mA at 208-277 Vac.**] [**33 mA at 22 Vdc.**] [**35 mA at 24 Vdc.**] [**47 mA at 30 Vdc.**]

m. Coil Voltage:

1) Input: [**24 Vac/dc**] [**120 Vac**]; 50-60 Hz.

2) Drop Out: [**2.1 Vac**] [**3.8 Vdc**].

3) Pull In: [**18 Vac**] [**22 Vdc**].

n. Contact Ratings: [**20 Amp Resistive at 277 Vac.**] [**20 Amp Ballast at 277 Vac.**] [**16 Amp Electronic Ballast at 277 Vac (N/O)**] [**10 Amp Tungsten at 120 Vac (N/O).**] [**770 VA Pilot Duty at 120 Vac.**] [**1,110 VA Pilot Duty at 277 Vac.**] [**2 HP at 277 Vac.**] [**1 HP at 120 Vac.**]

E. Enclosed Relay 20 Amp SPDT with 24 Vac/dc/120 Vac Coil:

1. Product: A-E20-11-11-DJ00. Enclosed Relay 20 Amp SPDT with 24 Vac/dc/120 Vac Coil.

a. Approvals: UL Listed, UL924, C-UL, CE, RoHS.

b. Housing Rating: UL Accepted for Use in Plenum, NEMA 1

c. Number of Relays and Contact Type: One SPDT Continuous Duty Coil.

d. Expected Relay Life: 10 million cycles minimum mechanical.

e. Operating Temperature: -30 to 140 degrees F (-34 to 60 degrees C).

f. Operate Time: 18 ms.

g. Relay Status: LED On: Normal power present.

h. Dimensions: 2.30 x 3.20 x 1.80 inches (58 x 81 x 46 mm) with 0.50 inch NPT Nipple.

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i. Wires: 16 inch (406 mm), 600V Rated.

j. Gold Flash: No.

k. Override (Test Switch): No.

l. Coil Current: [**50 mA at 18 Vac.**] [**83 mA at 24 Vac.**] [**47 mA at 120 Vac.**] [**33 mA at 22 Vdc.**] [**35 mA at 24 Vdc.**] [**47 mA at 30 Vdc.**]

m. Coil Voltage Input:

   1) [**24 Vac/dc**] [**208-277 Vac**]; 50-60 Hz.

   2) Drop Out: [**2.1 Vac**] [**3.8 Vdc**].

   3) Pull In: [**18 Vac**] [**22 Vdc**].

n. Contact Ratings: [**20 Amp Resistive at 277 Vac**] [**20 Amp Ballast at 277 Vac.**] [**16 Amp Electronic Ballast at 277 Vac (N/O).**] [**10 Amp Tungsten at 120 Vac (N/O).**] [**770 VA Pilot Duty at 120 Vac.**] [**1,110 VA Pilot Duty at 277 Vac.**] [**2 HP at 277 Vac.**] [**1 HP at 120 Vac.**]

Editor's Note: The AC/DC Transformer is ideal to power up Sensors, DC Controllers, and our Q Series Keypad Switch. Small enough to fit in most junction boxes, the AC/DC Transformer brings power to Sensors, DC Controllers, our Q Series Keypad Switch. Comes with a 2 year warranty.

F. 3W Single Output AC/DC Transformer:

1. Product: Model A-T03-12-17-DS00. 3 Watt Single Output AC/DC Transformer.

2. Features:

   a. Isolated Output 3 kVAC per 1 min.

   b. SCP, OVP Protection.

   c. Universal Input 85 to 305 VAC.

3. Protections:

   a. Short Circuit Protection (SCP) below 100mΩ - continuous, automatic recovery.

   b. Over Voltage Protection (OVP) zener diode clamp: 112 to 140 percent.

   c. Over Current Limit: 120 to 190 percent.

   d. Over Voltage Category: OVCII.

   e. Isolation Voltage I/P to 0/P (tested for 1 minute): 3 kVAC.

   f. Isolation Resistance: 1 GΩ min.

   g. Leakage Current: 85 to -305 VAC, 47 to 63 Hz at 10µA max.

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4. Input Voltage Range nom. Vin: 230 VAC: [**85 VAC to 305 VAC**] [**120 VDC to 430 VDC**] [**Typ. 277 VAC**].

5. Output Voltage: 12 V.

6. Input Current: [**115 VAC to 70 mA**] [**230 VAC to 45 mA**].

7. Inrush Current Cold Start at 77 degrees F (25 degrees C): [**115 VAC – 15 A**] [**230 VAC – 30 A**].

8. No Load Power Consumption: 85 to 305 VAC, 47 to 63Hz, 30 mW.

9. Input Frequency Range AC Input: 47 to 440 Hz.

10. Minimum Load: 2 percent.

11. Hold-up Time: [**115 VAC – 15 ms**] [**230 VAC – 80 ms**].

12. Internal Operating Frequency: 100 percent load at nominal Vin: 55 kHz.

13. Output Ripple and Noise: 200 mVp-p.

14. Operating Temperature Range: -40 to 167 degrees F(-40 to 75 degrees C).

    a. At low input voltage (85 to 140 VAC) and temperature below -13 degrees F (-25 degrees C) the RAC03-3.3SE/277/W and RAC03-05SE/277/W will not start.

15. Maximum Case Temperature: 221 degrees F (105 degrees C).

16. Thermal Impedance: 10K/W typ.

17. Operating Humidity (non-condensing): 5 to 95 percent RH max.

18. MTBF according to MIL-HDBK 217F, G.B., 77 degrees F (25 degrees C): [**115VAC - 3502 x 103 hours**] [**230VAC - 1816 x 103 hours**].

19. Dimensions: 1.5 x 0.96 x 0.69 inches (38 x 24 x 17 mm).

20. Weight: 1 oz (29 g).

21. Color: Black.

Editor's Note: Controllers are devices which, once added to a network, allow to wireless control fixtures that otherwise would be controlled with a wired standard such as 0 to 10 V or DMX. Controllers are also called Bridges as they are a bridge between Bluetooth Mesh wireless standard and other wired standards such as Phase dimming or RS485. Controllers can be used with any brand and kind of luminaire, sensor, shade. Just pair the fixture/device with its proper Controller and it will integrate with the remainder of the Bluetooth Mesh Network.

5. CONTROLLERS

Editor's Note: A wireless module that controls a Non Bluetooth Mesh Sensor. This pairing can be used in a multitude of applications such as; turning lights on or off when vacancy or occupancy has been detected.

A. Sensor Controller:

1. Product: C-S1C-24-DS00. Sensor Controller. Bluetooth Mesh Bridge. Converts any 12-24 VDC Occupancy Sensor into a Bluetooth Mesh Node. Can be installed inside fixtures, j-boxes, or remoted. A non-Bluetooth sensor can be added to any network with the addition of the Sensor Controller. The auxiliary 0 to 10 V DC output can control one or multiple 0 to 10 V devices connected.

2. Operation:

   a. Operates on 12 to 24 VDC. Broadcasts its identification code waiting to be provisioned through the Bubblynet App. A Bluetooth Mesh Qualified device, it can be controlled and be part of any Bluetooth Mesh Network, independent of brand or manufacturer of additional devices or controls.

3. Features:

   a. Simple to Install.

   b. Converts any Non Mesh sensor into a Mesh Device.

   c. Auxiliary 0 to 10 V Output.

   d. Does Not Require a Gateway.

4. Certification Bluetooth. FCC, UL, CE.

5. DC Input Voltage: 12 to 24 VDC.

6. Auxiliary Output Voltage: 0 to 10 VDC.

7. Sensor Input Voltage: 12 to 24 VDC.

8. Operating Temperature: -22 to 158 degrees F (-30 to 70 degrees C).

9. 0 to 10 V Dimming: 100 mA Max.

10. Optional Power Supply.

11. Dimensions: 3.25 x 1.5 x 0.25 inches (83 x 38 x 6 mm).

B. DMX Controller:

1. Product: C-X4C-24-DS00. DMX controller. Controls up to four DMX channels (slots). For RGBW, RGB+W, TN + TW, applications with BubblyNet color-picker compatible 4-channel control. Power Supply: 12 to 24 VDC Class 2. Provides a DMX-512 control, relay output, and sensor input. Can be installed outside of a junction box.

   a. Certifications: Bluetooth, FCC, ETL Listed.

   b. Input Voltage Range: 12-24 VDC, Power Supply: Class 2.

   c. No-Load Input Current: 30 mA.

   d. Aux-Relay Control Output: 12 to 24 VDC, same as input.

e. Max Output Current: 100 mA.

f. Aux-Sensor Input Voltage: Max 24 VDC.

g. Ambient Temperature: -13 to 113 degrees F (-25 to 45 degrees C).

h. Max Relative Humidity: 0 to 80 percent, non-condensing.

i. Wire Range, Solid and Standard: 0.5 to 1.5 mm, 14 to 22 AWG.

j. Wire Strip Length: .25 inches (6 to 7 mm).

k. Dimensions: 2.2 x 1.2 x 0.7 inches (72.6 x 30.0 x 18.0 mm).

l. Weight: 0.8 oz (23 g).

2. Range: In a mesh network each DMX Controller can act as a repeater. When testing the network, it is important to test that each unit can be controlled from any point of the network covered area.

Editor's Note: The ideal Bluetooth Mesh Control for Forest Drapery Systems. Receives power from the Forest Motor. No external power supply is needed. Drapes or blinds are controlled by the BubblyNet App and Q Series Keypad, as separate engraved keypads specifically for shade control or included as part of a scene with or without light control. Occupancy Sensors and Schedulers also work seamlessly with the controller. The integration, interface and testing for any special application will be quoted as a non-recurring charge.

C. Shade Controller:

1. Product: Model C-400-12-DS00. RS485 Controller. For standalone projects and as the backbone of complex mesh networks. Once powered up, the device broadcasts its identification code waiting to be commissioned through the BubblyNet App.

2. Features:

a. Can be installed in dry and damp locations.

b. Control for Forest Drapery Motors.

c. No External Power Supply Needed.

d. Single RJ45 Female Connector.

e. Receives Single Standard Cat 6 Network Cable.

3. Certifications: Bluetooth, CE, RoHS.

4. Power Input: 5 to 30 VDC.

5. RS485 Forest Drapery Protocol Compatible.

6. Operating Temperature: 50 to 104 degrees F (10 to 40 degrees C).

7. Indoor use only.

8. Dimensions: 3.5 x 1.7 x 1.36 inches (90 x 43.2 x 34.5mm).

D. Phase Controller Reverse:

1. Product: Model C-R00-11-DL00 Reverse Phase Controller. A wireless device that controls via Bluetooth mesh any line voltage load connected to it. It is a great solution to control decorative LED luminaries such as pendants and sconces.

2. Features:

   a. For ELV Dimmable Light Sources.

   b. Wireless. Bluetooth Mesh.

3. Certifications: Bluetooth, FCC, UL, CE.

4. Reverse Phase Dimming.

5. 200 W Max.

6. Line Input: 110 to 277 VAC 50/60 Hz.

7. Auxiliary +24 VDC Output: 100 mA.

8. Operating Temperature: -4 to 149 degrees F (-20 to 65 degrees C).

9. Power Measurements: 0.03 to 10 Amps. 2 percent accuracy.

10. Wire Range: 18 to 22 AWG Wire, Solid or Stranded.

11. Strip Length: Strip Length: 0.35 inches (9 mm max).

12. Dimensions: 5.25 x 1.5 x 1.25 inches (134 x 38 x 29 mm).

Editor's Note: A wireless module that controls via Bluetooth any ON/OFF power unit or other devices. It transforms any AC device into a smart wireless device and does not require the use of a gateway.

E. 20A 0 to 10 V Load Controller with ON/OFF Beta Test:

1. Product: Model C-L20-17-DJ00. 20A 0 to 10 V Load Controller with ON/OFF/. A Bluetooth Mesh Bridge converts any AC device into a Bluetooth Mesh Node. Can be installed outside of J-boxes through the standard opening according to electrical codes. It can control a single or multiple AC devices connected. A Bluetooth Mesh qualified device. Can be controlled and be part of any Bluetooth Mesh Network, independently of the brand or manufacturer of the additional devices or controls.

2. Certifications: Bluetooth, FCC, UL, and CE.

3. Does Not Require a Gateway.

4. AC Input Voltage: 100 to 277 VAC, 50/60 Hz.

5. Output Relay: 100 to 277 VAC, 50/60 Hz, 20 Amps Max.

6. Operating Temperature: 4 to 122 degrees F (-20 to 50 degrees C).

7. Wire Range: 12 to 18 AWG Wire.

8. Dimensions: 3.25 x 2.17 x 1.22 inches (83 x 55 x 31 mm).

Editor's Note: The 0 to 10 V Controller is a wireless module that controls via Bluetooth any 0 to 10 V driver, motorized blinds, power unit or other devices. It transforms any 0 to 10 V device into a smart wireless device and does not require the use of a gateway.

F. 1CH 0 to 10 V Controller with Relay (C-T1C-11):

1. Product: Model C-T1C-11-DL00. Single Channel, 0 to 10 V Controller with Relay. A Bluetooth Mesh Controller that converts any 0 to 10 V device into a Bluetooth Mesh Node. It can control a single or multiple 0 to 10 V devices connected.

   a. Dimming Performance: Depends on dimmability of 3rd party 0 to 10 V driver. can only be determined by testing.

2. Features:

   a. Converts any 0 to 10 V Device into a Wireless Device.

   b. Programmable Dimming Curves, Soft ON/OFF.

   c. Does Not Require a Gateway.

3. Certifications: Bluetooth, FCC, UL, CE.

4. AC Input Voltage: 110 to 277 VAC, 50/60 Hz.

5. Output Relay: 110 to 277 VAC, 50/60Hz, 10 Amps Max.

6. Output DC: 0 to 0 VDC.

7. 200 W Max LED Load.

8. 0 to 10 V Dimming: 100 mA Max.

9. Auxiliary +24 VDC Output: 100 mA.

10. Operating Temperature: -4 to 149 degrees F (-20 to 65 degrees C).

11. Wire Range: 18 to 22 AWG wire, solid or stranded.

12. Strip Length: 0.35 inches (9 mm max).

13. Dimensions: 5.125 x 1.5 x 1.125 inches (134 x 38 x 29 mm).

Editor's Note: The 0 to 10 V Dual Channel Tunable White Controller is a wireless module that controls via Bluetooth 0 to 10 V drivers. It transforms any 0 to 10 V device into a smart wireless device and does not require the use of a gateway.

G. 2CH 0 to 10 V Tunable White Controller (C-T2C):

1. Product: Model: C-T2C-24-DS00. Dual Channel, 0 to 10 V Tunable White Controller. A Bluetooth 2 Channel Controller. Converts two 0 to 10 V drivers into a Bluetooth Mesh Tunable White Node. Can be installed inside fixtures, j-boxes, inside its own UL listed enclosure or remoted. It controls two 0 to 10 V drivers connected.

   a. Each of the 2 channels control independently a 0 to 10 V driver. The 2 channels are used to mix different light sources for Tunable White applications. Once powered the device broadcasts its identification code waiting to be commissioned through the Bubblynet App.

2. Features:

   a. Converts any 0 to 10 V Driver into a Wireless Device.

   b. Programmable Dimming Curves, Soft ON/OFF.

   c. For Tunable White Applications.

   d. Does Not Require a Gateway.

3. Certifications: Bluetooth, FCC, UL, and CE.

4. DC Input Voltage: 12 to 24 VDC.

5. DC Output Voltage: 0 to 10 VDC x 2 Channels.

6. Operating Temperature: 4 to 140 degrees F (-10 to 60 degrees C).

7. Dimensions: 3.25 x 1.5 x 0.875 inches (82.5 x 38 x 22 mm).

Editor's Note: The Single Channel 0 to 10 V Controller is a wireless module that controls via Bluetooth any 0 to 10 V driver, motorized blinds, power unit or other devices. It transforms any 0 to 10 V device into a smart wireless
device and does not require the use of a gateway. Controller does not have a relay to cut power. If driver does not go to zero at 0 V, then the luminaire will be not turned off. Use instead a 0 to 10 V Controller with relay.

H. 1CH 0 to 10 V Controller (C-T1C-24):

1. Product: Model C-T1C-24-DS00. Single Channel 0 to 10 V Controller. A Bluetooth Mesh Bridge that converts any 0 to 10 V device into a Bluetooth Mesh Node. It can be installed inside fixtures, j-boxes, or remoted. It can control a single or multiple 0 to 10 V devices connected.

   a. Dimming Performance: Depends on dimmability of 3rd party 0 to 10 V driver.

2. Features:

   a. Converts any 0 to 10 V Device into a Wireless Device.

   b. Programmable Dimming Curves, Soft ON/OFF.

   c. Does Not Require a Gateway.

3. Certifications: Bluetooth, FCC, UL, and CE.

4. DC Input Voltage: 12 to 24 VDC.

5. DC Output Voltage: 0 to 10 VDC.

6. Operating Temperature: -22 to 158 degrees F (-30 to 70 degrees C).

7. 0 to 10 V Dimming: 100 mA Max.

8. Optional Power Supply.

9. Dimensions: 3.25 x 1.5 x 0.25 inches (82.5 x 38 x 6.35 mm).

Editor's Note: A wireless device that controls via Bluetooth mesh any line voltage load connected to it. It is a great solution to control decorative incandescent luminaries such as pendants and sconces. This device has been tested with different sources and resulted in proper performance. Full and proper dimmability cannot be guaranteed for all kinds of 3rd party devices. Expected results of the driver(s) to be controlled can only be determined by testing in BubblyNet's facilities.

I. Phase Controller Forward (C-F00):

1. Product: Model: C-F00-11-DL00. Forward Phase Controller. Forward phase dimming for Incandescent Light Sources. Wireless and Bluetooth mesh.

2. Certifications: Bluetooth, FCC, UL, and CE.

3. Power: 200 W Max.

4. AC Line Input: 120 VAC, 50/60Hz.

5. Auxiliary 24 VDC Output: 100 mA.

6. Max Output Current: 1.9 A.

7. Operating Temperature: -4 to 149 degrees F (-20 to 65 degrees C).

8. Power Measurements: 0.03 to 10 Amps. 2 percent accuracy.

9. Wire Range: 18 to 22 AWG Wire, Solid or Stranded.

10. Strip Length: 0.35 inches (9 mm) Max.

11. Dimensions: 5.25 x 1.5 x 1.25 inches (134 x 38 x 29 mm).

6. DRIVERS

A. CV 96W/48V AC/DC 1CH Driver (D-V2K):

1. Product: Model D-V2K-00-48-17-DL00. 96 W Max, 48 VDC Bluetooth Mesh LED Driver, Constant Voltage. Dimming driver for constant voltage applications like LED strip lights, LED panels, and linear fixtures for up to 96 W.

2. Features:

a. Programmable Dimming Curves. Soft ON/OFF. Linear and Logarithmic Dimming.

b. Wireless 2.4 GHz Constant Voltage LED Driver.

c. Available with optional metal housing box.

3. Certifications: Bluetooth, FCC, UL, and CE.

4. Input Voltage: 110 to 277 VAC, 50/60 Hz.

5. Output Current: 2,000 mA Max.

6. Output DC Voltage: 48 VDC.

7. Operating Temperature: -10 to 50 degrees F (-23 to 10 degrees C).

8. Protections: Over Current, Short Circuit Over Voltage, Over Temperature.

9. Dimensions: 7.5 x 2.125 x 1.5 inches (190.5 x 54 x 38 mm).

10. Metal Housing Dimensions: 14.75 x 3.125 x 1.75 inches (374.65 x 80 x 44.5 mm).

B. CV 96W AC/DC 2CH Tunable White Driver (D-D4K):

1. Product: Model: D-D4K-00-24-17-DL00. CV 96W AC/DC 2CH Tunable White Driver. Like two drivers in one, this dual channel driver is used for Tunable White applications. The Tunable White driver is a wireless device that controls via Bluetooth a Tunable White fixture and does not require the use of a gateway.

2. Features:

a. Programmable Dimming Curves. Soft ON/OFF.

b. Available with metal housing box. Dimensions: 14.75 x 3.125 x 1.75 inches (375 x 80 x 44.5mm).

3. Certifications: Bluetooth, FCC, UL, and CE.

4. AC Input Voltage: 110 to 277 VAC.

5. DC Output Voltage: 24 VDC.

6. Max AC Input Current: 1 A.

7. Max DC Output Current: 4 A (2 channel combined).

8. Protections: Over Current, Short Circuit Over Voltage, Over Temperature.

9. Dimensions: 7.5 x 2.125 x 1.5 inches (190.5 x 54 x 38 mm).

C. CV 36W DC/DC 2CH Tunable White Driver (D-D2K):

1. Product: Model: D-D2K-00-24-24-D000. CV 36W Dual Channel Driver with Tunable White. A wireless device that controls via Bluetooth a Tunable White fixture and does not require use of a gateway. Operates on 110 to 277 V. Two channels are used to mix different light sources for Tunable White applications. Once powered, device broadcasts its identification code waiting to be commissioned through the Bubblynet App.

2. Features:

   a. Programmable Dimming Curves, Soft ON/OFF.

   b. Programmable Maximum Output Current.

3. DC Input Voltage: 24 VDC.

4. DC Output Voltage: 24 VDC.

5. Max DC Input Current: 2 A.

6. Max DC Output Current: 2 A (2 channel combined).

7. Protections: Over Current, Short Circuit, Over Temperature.

8. Dimensions: 4 x 1.7 x 1.125 inches (102 x 44.5 x 28.6 mm).

D. CC 36W AC/DC 2CH Tunable White Driver (D-B1K):

1. Product: Model D-B1K-30-42-17-DL00. Tunable White driver. A wireless device that controls via Bluetooth a Tunable White fixture and does not require use of a gateway. Like two drivers in one, dual channel driver programmable from 100 mA up to 1,000 mA and used for Tunable White applications. Once powered, device broadcasts its identification code waiting to be commissioned through the Bubblynet App.

2. Features:

   a. Programmable Dimming Curves, Soft ON/OFF.

   b. Programmable Maximum Output Current.

   c. Also available with metal housing box.

3. Certifications: Bluetooth, FCC, UL, and CE.

4. AC Input Voltage: 110 to 277 VAC.

5. DC Output Voltage: 30 to 42 VDC.

6. Max AC Input Current: 0.6 A.

7. Max DC Output Current: 1 A (2 channel combined).

8. Protections: Over Current, Short Circuit, Over Temperature.

9. Dimensions: 4.25 x 1.7 x 1.25 inches (108 x 43 x 25.4 mm).

10. Housing Dimensions: 12 x 2.5 x 1.625 inches (305 x 63.5 x 41.3 mm).

E. CV 25W DC/DC 4CH RGBW Driver (D-G1K):

1. Product: Model: D-G1K-24-24-24-D000. 25W Max, Four Channel, Constant Voltage, RGBW LED Driver. For all constant voltage RGBW applications like LED strips, LED panels, linear fixtures for up to 25 W. Once powered up, the device broadcasts its identification code waiting to be commissioned through the Bubblynet App.

2. Features:

   a. Programmable Dimming Curves. Soft ON/OFF. Linear and Logarithmic Dimming.

   b. Wireless 2.4 GHz Constant Voltage LED Driver.

   c. Class 2 Driver.

3. Certifications: Bluetooth, FCC, UL, and CE.

4. DC Input Voltage: 24 VDC.

5. DC Output Voltage: 24 VDC.

6. Output Current: 1,000 mA Max.

7. Operating Temperature: -10 to 50 degrees F (-23 to 10 degrees C).

8. Protections: Over Current, Short Circuit Over Voltage, Over Temperature.

9. Dimensions: 4 x 1.75 x 1.125 inch (102 x 44.5 x 28.6 mm).

F. CV 96W/24V AC/DC 1CH Driver (D-V4K):

1. Product: Model: D-V4K-00-24-17-DL00. 96 W Max, 24VDC Bluetooth Mesh LED Driver, Constant Voltage. Dimming driver for all constant voltage applications like LED strip lights, LED panels, and linear fixtures for up to 96 W.

2. Features:

   a. Programmable Dimming Curves. Soft ON/OFF. Linear and Logarithmic Dimming.

   b. Wireless 2.4 GHz Constant Voltage LED Driver.

   c. Available with optional metal housing box.

3. Certifications: Bluetooth, FCC, UL, and CE.

4. Input Voltage: 110 to 277 VAC, 50/60 Hz.

5. Output Current: 4,000 mA Max.

6. Output DC Voltage: 24 VDC.

7. Operating Temperature: -10 to 50 degrees F (-23 to 10 degrees C).

8. Protections: Over Current, Short Circuit Over Voltage, Over Temperature.

9. Dimensions: 7.5 x 2.125 x 1.5 inches (190.5 x 54 x 38 mm).

10. Housing Dimensions: 14.75 x 3.125 x 1.75 inches (374.65 x 80 x 44.5 mm).

G. CV 25W AC/DC 24VDC Driver (D-V1K):

1. Product: Model: D-V1K-00-24-17-D000. 25W Max, 24 VDC Bluetooth Mesh LED Driver, Constant Voltage. Dimming driver for constant voltage applications (LED strips, LED panels, linear fixtures) up to 25 W. Operates on 110 to 277 V. Once powered, device broadcasts its identification code waiting to be commissioned through the Bubblynet App.

2. Features:

   a. Programmable Dimming Curves. Soft ON/OFF. Linear and Logarithmic Dimming.

   b. Wireless 2.4 GHz Constant Voltage LED Driver.

   c. Also available with metal housing box.

3. Certifications: Bluetooth, FCC, UL, and CE.

4. Input Voltage: 110 to 277 VAC, 50/60 Hz.

5. Output Current: 1,000 mA Max.

6. Output DC Voltage: 24 VDC.

7. Operating Temperature: -10 to 50 degrees F (-23 to 10 degrees C),

8. Protections: Over Current, Short Circuit Over Voltage, Over Temperature,

9. Driver Dimensions: 3.54 x 1.7 x 1.36 inches (90 x 43 x 32 mm).

10. Housing Dimensions: 6 x 1.38 x 1.89 inches (152.4 x 35 x 48 mm).

H. CC 40W DC/DC 4CH RGBW Driver (D-F70):

1. Product: Model: D-F70-07-20-24-D000. 40W Max, Four Channel, Constant Current, RGBW LED Driver. Like four drivers in one, this quad channel driver is programmable up to 700mA and used for RGBW applications. A wireless device that controls via Bluetooth an RGBW fixture and does not require the use of a gateway.

2. Features:

   a. Programmable Dimming Curves, Soft ON/OFF.

   b. Programmable Maximum Output Current.

   c. Wireless 2.4 GHz Constant Current LED Driver.

> d.   Accepts Universal 24VDC Power Supplies.
>
> e.   Class 2 Driver.

3.   Certifications: Bluetooth, FCC, UL, and CE.

4.   DC Input Voltage: 24 VDC.

5.   DC Output Voltage: 3 to 20 VDC.

6.   Max DC Input Current: 3 A.

7.   Max DC Output Current: 700 mA MAX per channel.

8.   Protections: Over Current, Short Circuit, Over Temperature.

9.   Dimensions: 4 x 1.75 x 1.125 inches (102 x 44.5 x 28.6 mm).

I.   CV 96W DC/DC 4CH RGBW Driver (D-G4K):

1.   Product: Model: D-G4K-00-24-24-DL00. 96 W Max, Four Channel, Constant Voltage, RGBW LED Driver. A driver for all constant voltage RGBW applications like LED strips, LED panels, linear fixtures for up to 96 W.

2.   Features:

> a.   Programmable Dimming Curves. Soft ON/OFF. Linear and Logarithmic Dimming.
>
> b.   Wireless 2.4 GHz Constant Voltage LED Driver.
>
> c.   Class 2 Driver.

3.   Certifications: Bluetooth, FCC, UL, and CE.

4.   DC Input Voltage: 24 VDC.

5.   DC Output Voltage: 24 VDC.

6.   Output Current: 4,000 mA Max.

7.   Operating Temperature: -10 to 50 degrees F (-23 to 10 degrees C).

8.   Protections: Over Current, Short Circuit Over Voltage, Over Temperature.

9.   Dimensions: 5.875 x 1.75 x 1.125 inches (149.2 x 44.5 x 28.6 mm).

J.   CC 20W AC/DC 1,000mA Max Driver (D-C11):

1.   Product: 18w AC/DC, 1000mA Max Bluetooth Mesh LED Driver. The constant current Single Channel Driver is a wireless module that controls via Bluetooth any LED fixture into a smart wireless device and does not require the use of a gateway.

> a.   Model: D-C13-03-18-17-D000 - 350 mA Max.

b. Model: D-C17-03-18-17-D000 - 700 mA Max.

c. Model: D-C11-03-18-17-D000 - 1,000 mA Max.

2. Features:

a. Programmable Dimming Curves, Soft ON/OFF.

b. Wireless 2.4 GHz Constant Current LED Driver.

c. Use for 7W, 9W, 13W, 18W Fixtures.

d. Also available with metal housing box.

3. Certifications: Bluetooth, FCC, UL, and CE.

4. Input Voltage: 110 to 277 VAC, 50/60 Hz.

5. DC Output Voltage: 6 to 18 VDC.

6. Output Current: 100 to 1,000 mA Max.

7. Operating Temperature: 14 to 104 degrees F (-10 to 40 degrees C).

8. Driver Dimensions: 3.54 x 1.7 x 1.36 inches (90 x 43.2 x 34.5 mm).

9. Optional Housing Dimensions: 6 x 1.38 x 1.89 inches (152.4 x 35 x 48.01 mm).

K. CC 26W AC/DC 700mA Max Driver (D-C70):

1. Product: Model: D-C70-30-42-17-D000. 26 W Max, 700 mA Bluetooth Mesh Constant Current LED Driver. The constant current Single Channel Driver is a wireless module that controls via Bluetooth any LED fixture and transforms it into a smart wireless device and does not require the use of a gateway.

2. Features:

a. Programmable Dimming Curves. Soft ON/OFF.

b. Wireless 2.4 GHz Constant Current LED Driver.

c. Use for 9W, 13W, 18W, or 26W fixtures.

d. Also available with metal housing box.

3. Certifications: Bluetooth, FCC, UL, and CE.

4. Input Voltage: 110 to 277 VAC, 50/60 Hz.

5. Output Current: 100 to 700 mA.

6. DC Output Voltage: 30 to 42 VDC.

7. Operating Temperature: 14 to 104 degrees F (-10 to 40 degrees C).

8. Dimensions: 3.54 x 1.7 x 1.36 inches (90 x 43.2 x 34.5 mm).

9. Housing Dimensions: 6 x 1.38 x 1.89 inches (152.4 x 35 x 48.01 mm).

L. CC 26W AC/DC 2CH Tunable White Driver (D-B70):

1. Product: Model: D-B70-30-42-17-D000. CC 26W Dual Channel Driver with Tunable White. Like two drivers in one. Dual channel driver is programmable and used for Tunable White applications and does not require the use of a gateway. The two channels are used to mix different light sources for Tunable White applications. Once powered up, the device broadcasts its identification code waiting to be commissioned through the Bubblynet App.

2. Features:

   a. Programmable Dimming Curves, Soft ON/OFF.

   b. Programmable Maximum Output Current.

   c. Also available with metal housing box.

3. Certifications: Bluetooth, FCC, UL, and CE.

4. AC Input Voltage: 110 to 277 VAC.

5. DC Output Voltage: 30 to 42 VDC.

6. Max AC Input Current: 0.4 A.

7. Max DC Output Current: 0.7 A (2 channel combined).

8. Protections: Over Current, Short Circuit, Over Temperature.

9. Dimensions: 4.25 x 1.7 x 1.25 inches (108 x 43 x 25.4 mm).

10. Housing Dimensions: 12 x 2.5 x 1.625 inches (305 x 63.5 x 41.3 mm).

7. GATEWAY

A. Internet Gateway:

1. Product: Model: G-RA-C05-D000. Internet gateway. a small form factor, open source a microcomputer that is widely used throughout the tech industry. With the ability to run the Linux Operating System it is a safe and secure solution to bridging many of the most used IOT protocols.

2. Applications:

   a. Gateway Between Various Protocols and the BubblyNet Bluetooth Mesh Ecosystem.

   b. Allow user access from remote locations.

        c.   Control basic functions HSL, CTL, ON/OFF and Dimming.

        d.   Remote Debugging and Configuration of Bluetooth Mesh Networks.

        e.   Internet Gateway for the Bluetooth Mesh Network.

3.   Certifications: Bluetooth, FCC, and CE.

4.   Processor: Broadcom BCM2711, quad-core Cortex-A72 (ARM v8) 64-bit SoC at 1.5G Hz.

5.   Connectivity: 2.4 GHz and 5.0 GHz IEEE 802.11ac wireless, Bluetooth 5.0, BLE, Gigabit Ethernet.

        a.   2 x USB 3.0 ports.

        b.   2 x USB 2.0 ports.

6.   SD Card Support: Micro-SD card slot for loading operating system and data storage.

7.   Memory: 2GB LPDDR4.

8.   Input Power: 5V, 2A operating input range.

        a.   Short circuit, overcurrent and overtemperature protection.

        b.   1.5m 18 AWG captive cable with USB-C output connector.

        c.   Available in four different models to suit different international power sockets.

9.   Operating Ambient Temperature: 32 to 122 degrees F (0 to 50 degrees C).

10.   Dimensions: 2.3 x 3.5 x 1.5 inches (60 x 90 x 40 mm).

11.   Color: Black.

8.   **SENSORS**

    A.   DualTech Ceiling Mounted Sensor:

        1.   Product: S-OD-C24-D000. DualTech Ceiling Mounted Sensor. A recessed, ceiling mounted Occupancy Sensor with Passive Infrared sensing capabilities. Will automatically turn luminaires on to a set dimming level when motion is detected and turn lights off after area is vacated. Can be used in line of sight applications. With addition of the ultrasonic sensor the device can detect motion in the presence of partitions and obscure sight lines.

        2.   Features:

        a.   PIR sensor.

        b.   LED motion indicator.

c. 360 degree coverage pattern.

d. Program occupancy/vacancy.

e. Suitable for indoor use only.

f. Available with white trim.

3. Certifications: FCC, UL, CE.

4. Sensor Type PIR occupancy sensor.

5. Input Voltage 24 VDC.

6. Current Consumption: 9 mA sensor.

7. Mounting Height: 10 ft (3 m)

8. Max Detection Area: 44 ft (13.411 m) / 1600 sq ft (148.64 sq m).

9. Photocell Sensitivity: 100 to 1600 Lux.

10. Operating Temperature: -32 to 131 degrees F (0 to 55 degrees C)

11. Storage Temperature: 14 to 140 degrees F (-10 to 60 degrees C)

12. Relative Humidity: 95 percent non-condensing.

13. Mounting: Recessed in ceiling.

14. Dimensions: 4.52 inches (115 mm) diameter.

15. Warranty: 2 years.

B. Low Bay Photocell + Occupancy Sensor:

1. Product: S-OP-012-D0LB. Low Bay Photocell + Occupancy Sensor. A low bay, surface mounted Occupancy Sensor with Passive Infrared Sensor. Automatically turns on luminaires to a set dimming level when motion is detected. Turns lights off after area is vacated.

a. Uses digital PIR motion detector architecture and dual element passive infrared (PIR) technology for improved detection coverage for high ceiling mount applications up to 30 ft (9.144 m).

b. A Class 2 Device satisfying CA Title 24 requirements for bi-level dimming of lighting fixtures. Capable of dimming lighting loads down to any user defined level. Suitable for a variety of indoor and outdoor applications.

c. End users can program length of time delays, light level sensitivity, sensor range and other settings using the BubblyNet App.

2. Features:

a. Bluetooth Mesh qualified.

b. Photocell + occupancy.

c. PIR sensor.

d. LED motion indicator.

e. 360 degree coverage pattern.

f. Photocell for ambient light detection.

g. Program occupancy / vacancy.

h. Suitable for indoor and outdoor use.

3. Certifications: FCC, UL, CE.

4. Sensor Type: PIR occupancy sensor.

5. Input Voltage: 12 to 24 VDC.

6. Current Consumption: 25 mA Sensor (50 mA with BLE).

7. Mounting Height: Ceiling mount up to 30 ft (9.14 m).

8. Max Detection Area: 25 ft (7.62 m) diameter.

9. Photocell Sensitivity: 30 Lux to daylight.

10. Operating Temperature: 22 to 158 degrees F (-30 to 70 degrees C).

11. Storage Temperature: -40 to 176 degrees F (-40 to 80 degrees C).

12. Relative Humidity: 90 to 95 percent non-condensing at 86 degrees F (30 degrees C).

13. Mounting: Surface ceiling mounted.

14. Dimensions: 3.66 inch (93 mm) diameter.

15. Color: White.

16. Warranty: 2 years.

C. High Bay Photocell + Occupancy Sensor:

1. Product: S-OP-012-D0HB. High Bay Photocell + Occupancy Sensor. A high ceiling, surface mounted Occupancy Sensor with Passive Infrared Sensor. The sensor will automatically turn on luminaires to the set dimming level when motion is detected and turn lights off automatically after the area is vacated.

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a. The High Bay Photocell + Occupancy Sensor uses digital PIR Motion Detector Architecture and Dual Element passive infrared (PIR) technology for improved detection coverage for high ceiling mount applications up to 40 ft (12.192 m).

b. The High Bay Photocell + Occupancy Sensor is a Class 2 Device designed to satisfy new CA Title 24 requirements for bi-level dimming of lighting fixtures. The sensor can dim lighting loads down to any level the user defines. The sensor is suitable for a variety of indoor applications. It supports ceiling mounts up to 40 ft (12.192 m) high. Both sensor and transformer are rated for use in temperatures ranging from 22 to 158 degrees F (-30 to 70 degrees C) and relative humidity from 90 to 95 percent at 86 degrees F (30 degrees C).

c. End users can program length of time delays, light level sensitivity, sensor range and other settings using the BubblyNet App.

2. Features:

a. Bluetooth Mesh Qualified.

b. Photocell + Occupancy.

c. PIR Sensor.

d. LED Motion Indicator.

e. 360 degree Coverage Pattern.

f. Photocell for Ambient Light Detection.

g. Program Occupancy/Vacancy.

h. Suitable for Indoor Use Only.

3. Certifications: Bluetooth, FCC, UL, CE.

4. Sensor Type: PIR occupancy sensor.

5. Input Voltage: 12 to 24 VDC.

6. Current Consumption: 25 mA Sensor. 50 mA with BLE.

7. Mounting Height: Ceiling mount up to 40 ft (12.2 m).

8. Max Detection Area: 35 ft (10.67 m) diameter.

9. Photocell Sensitivity: 30 Lux to daylight.

10. Operating Temperature: 22 to 158 degrees F (-30 to 70 degrees C).

11. Storage Temperature: -40 to 176 degrees F (-40 to 80 degrees C).

12. Relative Humidity: 90 to 95 percent non-condensing at 30 degree C.

13. Mounting: Surface.

14. Dimensions: 3.66 inch (93 mm) diameter.

15. Color: White.

16. Warranty: 2 years.

D. Daylight Sensor:

1. Product: S-DL-012-DTWH. Daylight Sensor. A recessed, ceiling mounted Occupancy Sensor with a Photocell and Passive Infrared sensing capabilities. The sensor will automatically turn luminaires on to the dimming level necessary to reach the set level of light intensity with or without daylight.

   a. A Class 2 device designed to satisfy CA Title 24 requirements for daylight harvesting. Capable of dimming lighting loads down to any user defined level. Suitable for a variety of indoor applications. Supports ceiling mounts up to 10 ft (3 m) high.

2. Features:

   a. Daylight Harvesting.

   b. PIR Sensor.

   c. Bluetooth Mesh Qualified.

   d. LED Motion Indicator.

   e. 360 degrees Coverage Pattern.

   f. Program Daylight/Occupancy/Vacancy.

   g. Suitable for Indoor Use Only.

   h. Available with White or Black Trim.

3. Certifications: Bluetooth, FCC, UL, CE.

4. Sensor Type: Photocell.

5. Input Voltage: 12 to 24 VDC.

6. Current Consumption: 50 mA sensor.

7. Mounting Height: 10 ft (3 m).

8. Max Detection Area:

   a. 12 ft (3.66 m) diameter at 10 ft (3 m) mount.

   b. 8 ft (2.4 m) diameter at 8 ft (2.4 m) mount.

9. Sensitivity: 30 Lux to daylight.

10. Operating Temperature: 22 to 158 degrees F (-30 to 70 degrees C).

11. Storage Temperature: -40 to 176 degrees F (-40 to 80 degrees C).

12. Relative Humidity: 90 to 95 percent non-condensing at 30 degrees C.

13. Mounting: Recessed in ceiling.

14. Dimensions: 3.66 inch (93 mm) diameter.

15. Warranty: 2 Years.

E. Dual-Tech Wall Occupancy Sensor:

1. Product: S-OC-024-D00W. Dual-Tech Occupancy Wall Sensor, A wall or ceiling mounted with Passive Infrared and High Frequency Doppler occupancy sensing capabilities. Automatically turns luminaires on to a set dimming level when motion is detected and turns lights off after area is vacated.

   a. Uses PIR Motion Detector Architecture and High-Frequency Doppler technology for improved detection coverage for wall or ceiling mount applications. Suitable for a variety of indoor applications.

   b. A Class 2 Device designed to satisfy CA Title 24 requirements for bi-level dimming of lighting fixtures.

   c. Control options can be enabled, or disabled via on-board 6-pole DIP switch, including three LED's to indicate the sensing status which can be disabled, if necessary. Program length of time delays, light level sensitivity, sensor range and other settings using the BubblyNet App.

   d. Built-in buzzer can be enabled for audible Delay-End Warning and Test Mode.

   e. SmartDelay: Can be enabled to automatically adjust the OFF-delay from 3 to 30 minutes according to duration of previous occupancies.

   f. OFF-delay time will be constantly calibrated based on historical data collected. May detect traffic behind certain types of partitions and result in unwanted OFF-delay extension.

   g. FORCE-OFF function: Can be enabled to disengage the relay at 5 times of FORCE-OFF delay set, if sensor detects movements during OFF-delay duration.

   h. Lower PIR sensitivity can be achieved by setting the DIP switch to ON position to eliminate unwanted activation.

2. Features:

   a. Bluetooth Mesh Qualified.

   b. PIR and High Frequency Doppler Sensing.

   c. 110 degree coverage pattern.

   d. Control Options: LED Indication, Buzzer Output, Smart delay, Force off, PIR sensitivity.

   e. Wall or Ceiling Mount with Angle Adjustability.

   f. Suitable for Indoor Use Only.

  3. Certifications: Bluetooth, FCC, UL, CE.

  4. Sensor Type: PIR and High Frequency Doppler Occupancy.

  5. Power Supply: 24 VDC.

  6. Mounting Height: 6 to 10 ft (1.8 to 3 m).

  7. Max Detection Area: 110 degrees to 50 ft (15.240m).

  8. Operating Temperature: -14 to 122 degrees F (-10 to 50 degrees C).

  9. Operating Humidity: Max 95 percent RH.

  10. Mounting: Wall or Ceiling.

  11. Dimensions: 4.4 x 2.6 x 1.8 inches (112 x 66 x46 mm) diameter.

  12. Color: White.

  13. Warranty: 2 Years.

F. Keypad Switch + Occupancy Sensor:

  1. Product: K-C3-UDS-00WH. Keypad Switch + Occupancy Sensor. A Wall Dimmer Switch with integrated Occupancy Sensor. Dimming and sensing functions are wireless but requires 110-277V connection to power device. Passive Infrared Sensor for applications with clear line of sight and good air circulation. Will turn on lights to a set dimming level when motion is detected and turn off lights after area is vacated.

  2. Features:

   a. Bluetooth Mesh Qualified.

   b. Wireless Dimming and Sensing Functions.

   c. LED Status Indicator Light.

   d. Program Occupancy/Vacancy, ON/OFF, Up/Down.

   e. Mounts in standard J-box.

   f. Suitable for Indoor Use Only.

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3. Certifications: Bluetooth, FCC, UL, CE.

4. Sensor Type: PIR occupancy sensor.

5. Input Voltage: 110 to 277 VAC, 50/60 Hz.

6. Maximum Sensor Range: 48 x 36 ft at 3.5 ft mounting height (14.6 x 11 m at 1.1 m mounting height).

7. BLE Range: 30 ft (15.2 m).

8. Time Delay: Varies.

9. Sensitivity Settings: Low, Medium, High.

10. Operating Temperature: 32 to 131 degrees F (0 to 55 degrees C).

11. Storage Temperature: 14 to 140 degrees F (-10 to 60 degrees C).

12. Relative Humidity: 95 percent non-condensing.

13. Mounting: Standard J-Box.

14. Dimensions: 4.5 x 2.75 x 0.75 inches (114.3 x 69.85 x 19.05 mm).

15. Color: White (Faceplates: White, Light Almond, or Light Gray).

16. Warranty: 5 Years.

G. Occupancy Sensor:

1. Product: S-OP-012-DTWH. Occupancy Sensor. A recessed, ceiling mount with Passive Infrared (PIR) sensing capabilities. Turn luminaires on to a set dimming level when motion is detected. Turns lights off after area is vacated.

   a. Uses digital PIR technology for improved detection coverage. Ceiling mount applications up to 10 ft (3 m).

   b. A Class 2 Device satisfying CA Title 24 requirements for bi-level dimming of lighting fixtures. Capable of dimming lighting loads down to any user defined level.

   c. Suitable for a variety of indoor occupancy/vacancy applications. A Photocell for basic light sensing. Not recommended for daylight harvesting.

   d. End users can program length of time delays, light level sensitivity, sensor range and other settings using the BubblyNet App.

2. Features:

   a. PIR Sensor.

   b. Photocell.

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   c. Bluetooth Mesh Qualified.

   d. LED Motion Indicator.

   e. 360 degrees Coverage Pattern.

   f. Program Occupancy/Vacancy.

   g. Photocell for Ambient Light Detection.

   h. Suitable for Indoor Use Only.

   i. Available with White or Black trim.

  3. Certifications: Bluetooth, FCC, UL, CE.

  4. Sensor Type: PIR occupancy sensor.

  5. Input Voltage: 12 to 24 VDC.

  6. Current Consumption: 25 mA Sensor (50 mA with BLE).

  7. Mounting Height: 10 ft (3 m).

  8. Max Detection Area: 12 ft (3.66 m) diameter.

  9. Operating Temperature: 22 to 158 degrees F (-30 to 70 degrees C).

  10. Storage Temperature: -40 to 176 degrees F (-40 to 80 degrees C).

  11. Relative Humidity: 90 to 95 percent non-condensing at 30 degrees C.

  12. Mounting: Recessed in ceiling.

  13. Dimensions: 2.68 inches (68 mm) diameter.

  14. Warranty: 2 Years.

H. Contact Sensor:

  1. Product: S-MP-003-D000. Contact Sensor. A magnetic sensor that monitors the status activities of doors, windows, and other areas via Bluetooth Mesh. Communicates wirelessly with other device supporting Bluetooth Mesh. 3V coin battery.

  2. Features:

   a. Bluetooth mesh qualified.

   b. Magnetic contact.

   c. Monitors door and window status activities.

   d. 3 V Battery operated. 3-year battery life, based on normal daily usage.

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3.   Certifications: Bluetooth, UL.

4.   Operating Temperature: 32 to 104 degrees F (0 to 40 degrees C).

5.   Dimensions: 2.6 x 1.6 x 0.6 inches (65 x 40 x 15 mm).

6.   Color: White.

9.   SWITCHES

A.   Keypad Switch + Occupancy Sensor:

1.   Product: K-C3-UDS-00WH. A Wall Dimmer Switch with integrated Occupancy Sensor. Dimming and sensing functions are wireless but require 110-277V connection to power device. A passive Infrared Sensor best suited for applications with clear line of sight and good air circulation. Turns on lights to set dimming level when motion is detected, turns off lights after area is vacated.

2.   Features:

a.   Bluetooth Mesh Qualified.

b.   Wireless Dimming and Sensing Functions.

c.   LED Status Indicator Light.

d.   Program Occupancy/Vacancy, ON/OFF, Up/Down.

e.   Mounts in standard J-box.

f.   Suitable for Indoor Use Only.

3.   Certifications: Bluetooth, FCC, UL, CE.

4.   Sensor Type: PIR occupancy sensor.

5.   Input Voltage: 110-277 VAC, 50/60Hz.

6.   Maximum Sensor Range: 48 x 36 ft. at 3.5 ft mounting height (14.6 x 11 m at 1.1 m mounting height).

7.   BLE Typical Range: 30 ft (15.2 m).

8.   Time Delay: Varies.

9.   Sensitivity Settings: Low, Medium, and High.

10.   Operating Temperature: 32 to 131 degrees F (0 to 55 degrees C).

11.   Storage Temperature: 14 to 140 degrees F (-10 to 60 degrees C).

12.   Relative Humidity: 95 percent non-condensing.

13.   Mounting: Standard J-Box.

14.   Dimensions: 4.5 x 2.75 x 0.75 inches (114.3 x 69.85 x 19.05 mm).

15.   Color: White. Faceplates to be [**White**] [**Light Almond**] [**Light Gray**].

16.   Warranty: 5 Years.

B.   Hospitality Key Card Switch:

1.   Product: K-K0-UDH-00WH. Wireless and requires no battery. Ensures that no devices are left on when room is not in use. When guest enters room, insertion of key into slot activates the intended effect. From simple powering of entire room with a BT relay, to more sophisticated scenes including the gradual turning on of the lights, opening motorized curtains, HVAC settings, accents of music and more. When guest leaves room and takes key them, vacant room settings become effective.

2.   Wireless technology allows installations in historical buildings, glass walls, furniture, and thin partitions. Uses Energy Harvesting technology to communicate wirelessly with other devices supporting Bluetooth Mesh.

3.   Features:

a.   Wireless.

b.   No Battery Required.

c.   Surface Mounted with Screws or Adhesive Tape.

d.   Communicates with other Bluetooth Mesh Devices.

4.   Certifications: Bluetooth, FCC.

5.   Dimensions: 3.05 x 4.65 x 1.05 inches (77.47 x 118.11 x 26.67 mm).

6.   Recommended Card Size: 2.125 x 3 inches (55 x 76 mm) Cards not included.

7.   Color: White.

C.   Q Series Keypad Switch:

1.   Product: Q Series. Wireless keypads with one to four buttons per standard US single gang. Each button can be used as an ON/OFF switch, dim up and down a single light or group of luminaries, or control a wide variety of electric loads. The small LED indicator can be used to highlight a certain active status, or if the keypad is connected to the mains, can be used for night identification.

2.   Communicates wirelessly with other devices supporting Bluetooth Mesh. Three and four-way switching and does not require any programming or additional wiring.

3.   LED indicator's function will differ between a battery operated and a wired switch.

a.　　Battery Operated Switch: LED indicator will turn on for a fraction of a second when key is pressed.

　　　　b.　　Wired Switch: Will illuminate LED indicator for last key pressed. Standard blue LED unless otherwise specified.

　4.　　Certifications: Bluetooth and FCC.

　5.　　Location: Dry only.

　6.　　Wireless, Bluetooth mesh.

　7.　　Battery-operated, Low Voltage or Line Voltage with AC/DC Transformer (included).

　8.　　Use for Light and/or Shade Control.

　9.　　LED Indicators Standard Blue unless otherwise specified.

　10.　　Mounting: Recessed in J-Box; non-metallic recommended.

　11.　　Mounting: Surface on glass. Requires additional spacer.

　12.　　Mounting: Surface on drywall. Requires additional spacer.

　13.　　Button Options: 1, 2, 3, and 4.

　14.　　Button Color: White.

　15.　　Button Color: Black.

　16.　　Face Plate Color: White.

　17.　　Face Plate Color: Light almond.

　18.　　Face Plate Color: Light gray.

　19.　　Face Plate Color: Dark gray.

　20.　　Face Plate Color: Black.

　21.　　Face Plate Color: Bronze.

　22.　　Face Plate Color: Brown.

　23.　　Configuration with the use of the BubblyNet App.

　24.　　Standard and Custom Engraving Options: See product literature for more information.

　25.　　Face Plate Dimensions:

　　　　a.　　Single: 3.17 x 4.97 x 0.26 inches (80.5 x 126.24 x 6.6 mm).

　　　　b.　　Double: 4.96 x 4.94 x 0.26 inches (125.98 x 125.48 x 6.6 mm).

      c.   Triple: 6.77 x 4.94 x 0.26 inches (171.96 x 125.48 x 6.6 mm).

      d.   Quad: 8.59 x 4.94 x 0.26 inches (218.19 x 125.48 x 6.6 mm).

      e.   Interior Cutout Dimensions: 1.31 x 2.63 inches (33.27 x 66.8 mm).

10.   **SPECIAL DEVICES**

    A.   Superfriend Controller:

      1.   Product: X-SF-024-DS00. Superfriend Controller is a Bluetooth Mesh Bridge that increases retransmissions and strength of any Bluetooth Mesh network. Installs inside fixtures, j-boxes, or remotely. Once powered, the bridge increases the Bluetooth Mesh network efficacy by Increasing the throughput and retransmission of messages in the Mesh network.

           a.   Increases friendships between devices. Can have up to 20 friendships.

           b.   Use where distance between devices exceeds 30 ft (9.1 m).

           c.   Use with devices placed inside metal boxes, diminishing the Bluetooth signal.

      2.   Certifications: Bluetooth, FCC, UL, CE.

      3.   DC Input Voltage: 12 to 24 VDC [**with power supply**].

      4.   Operating Temperature: -22 to 158 degrees F (-30 to 70 degrees C).

      5.   Dimensions: 3.25 x 1.5 x 0.25 inches (82.5 x 38 x 6.35 mm).

      6.   Does not require a Gateway.

    B.   GPS TimeKeeper:

      1.   Product: X-GT-024-MG00. The BubblyNet GPS based TimeKeeper keeps time synchronized across a Bluetooth Mesh network, correcting time drift caused by environmental changes such as temperature and humidity. Scheduled events stay synchronized with accuracy less than one second. Publish a time update message several times per day to keeping devices synchronized.

      2.   Features:

           a.   Low voltage input.

           b.   Powered by 3W Transformer; not included.

           c.   Operable by the Advanced User Level of the BubblyNet App.

      3.   Certifications: Bluetooth, FCC, CE.

      4.   Power Input: 5 to 24 VDC.

5.   GPS Module: GNSS receiver, receives signals from GPS, GLONASS, Galileo and BeiDou Constellations.

6.   Timekeeper Dimensions: 3-1/2 x 1-5/8 x 1-1/4 inches (89 x 41.3 x 31.8 mm)

7.   Cable Length: 9 ft 10 inches (3 m).

8.   Antenna: GPS/GNSS Magnetic Mount.

9.   Antenna Dimensions: 2 x 1-1/2 x 3/4 inches (50 x 38.1 x 19 mm).

11.   TOUCHSCREENS

A.   Apple iPad Wall Mount: The wall mount allows for convenient touchscreen control.

1.   Mounting: Held in place by friction creating a semi-permanent installation which resists theft or vandalism.

2.   Material: Acrylic with gloss finish matching the touch screen surface.

3.   Color: White.

4.   Color: Black.

5.   Depth: 0.49 inches (12.5 mm).

6.   For iPad Mini 1|2|3: Wall Mount: SD-iPADM123-[**W**] [**B**].

   a.   Overall (WxH): 9.45 x 6.6 inches (240 x 168 mm).

7.   For iPad Mini 4|5: Wall Mount: SD-iPADM4-[**W**] [**B**].

   a.   Overall (WxH): 9.45 x 6.6 inches (240 x 168 mm).

8.   For iPad 9.7 inch 5|6: Wall Mount: SD-iPAD97-[**W**] [**B**].

   a.   Overall (WxH): 11 x 7.95 inches (279 x 202 mm).

9.   For iPad 9.7 inch Air 1|2: Wall Mount: SD-iPAD97-[**W**] [**B**].

   a.   Overall (WxH): 11 x 7.95 inches (279 x 202 mm).

10.   For iPad 7|8 10.2 inch: Wall Mount: SD-iPAD-10.5-[**W**] [**B**].

   a.   Overall (WxH): 11.33 x 8.1 inches (288 x 206 mm).

11.   For iPad Air 3: Wall Mount: SD-iPAD-10.5-[**W**] [**B**].

   a.   Overall (WxH): 11.33 x 8.1 inches (288 x 206 mm).

12.   For iPad Pro 10.5 inch: Wall Mount: SD-iPAD-10.5-[**W**] [**B**].

   a.   Overall (WxH): 11.33 x 8.1 inches (288 x 206 mm).

13. For iPad Pro 11 inch/Air 4 : Wall Mount: SD-iPAD11-[**W**] [**B**].

      a. Overall (WxH): 11.63 x 8.92 inches (295.5 x 226.5 mm).

14. For iPad Pro 12.9 Generation 1|2: Wall Mount: SD-iPAD129G1-[**W**] [**B**].

      a. Overall (WxH): 13.6 x 10 inches (345 x 254 mm).

15. For iPad Pro 12.9 Generation 3|4: Wall Mount: SD-129G3-[**W**] [**B**].

      a. Overall (WxH): 12.93 x 10.36 inches (328.5 x 263 mm).

3. EXECUTION

1. EXAMINATION

  A. Do not begin installation of Components until substrates have been completed.

    1. Notify Architect of unsatisfactory conditions prior to proceeding with installation.

2. PREPARATION

  A. Clean surfaces where components are to be installed.

  B. Prepare substrates for each component as described on component's respective data sheets and installation instructions.

3. INSTALLATION

  A. Install in accordance with component manufacturer's instructions and submitted data.

4. FIELD QUALITY CONTROL

  A. Field Inspection: Coordinate field inspection in accordance with appropriate sections in Division 01.

  B. Manufacturer's Services: Coordinate with appropriate sections in Division 01.

5. SYSTEM COMMISSIONING

  A. As instructed in the Mobile Interface Application.

6. CLEANING AND PROTECTION

  A. Clean components per manufacturers recommendations.

END OF SECTION

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