SECTION 26 09 43

WIRELESS NETWORK LIGHTING CONTROLS

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\*\* NOTE TO SPECIFIER \*\* ETC Inc.; lighting and rigging products.  
  
This section is based on the products of ETC Inc., which is located at:  
  
3031 Pleasant View Rd. P. O. Box 620979  
Middleton, WI 53562-0979  
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[ [Click Here](https://www.arcat.com/company/etc-inc-43555) ] for additional information.  
Christmas Eve 2020 marked ETC's 45th anniversary, and there's no denying we've come a long way. Now a global leader in the manufacturing of lighting and rigging technology, ETC employs over 1,200 people in 16 corporate offices around the world. ETC is proud of its industry reputation for unmatched technical and customer service, 24/7/365. And with a family of over 300 authorized service centers throughout the world, staffed by hundreds of certified technicians, customers are never far from an ETC resource with a face and a name.  
We develop professional tools and make them accessible to everyone. Our products can be found in small and large venues worldwide, such as theatres, churches, restaurants, hotels, schools, television studios, casinos, theme parks, and opera houses.

1. GENERAL
   1. SECTION INCLUDES

\*\* NOTE TO SPECIFIER \*\* Delete items below not required for project.

* + 1. Wireless Sensors:
       1. Wall occupancy sensors.
       2. Wall switch sensors.
       3. Passive infrared ceiling occupancy sensors.
       4. Dual tech ceiling occupancy sensors.
       5. Cubicle occupancy sensor.
       6. Photo sensors.
       7. Magnetic contact sensor.
    2. Wireless Switches:
       1. Self-powered switches.
       2. Keycard switches.
       3. Keycard switch stations.
       4. Decorator style self-powered wall switches.
       5. Pushbutton wall switch stations.
       6. Pushbutton wall switch scene stations.
    3. Wireless Controllers:
       1. LED fixture controller.
       2. Tunable white.
       3. Tri-zone dimming.
       4. Phase adaptive dimmers.
       5. Power load controller.
       6. Load controller split duplex controller.
       7. Signal relay.
    4. Wireless Interfaces and Gateways:
       1. Astronomical time clock station.
       2. Echoflex 03 Edge.
       3. Contact interfaces:
          1. Active circuit transmitter.
          2. Contact input interface.
          3. Contact output interface.
          4. Demand response interface.
          5. Universal input output interface.
          6. Echo Echoflex interface.
  1. RELATED SECTIONS

\*\* NOTE TO SPECIFIER \*\* Delete any sections below not relevant to this project; add others as required.

* + 1. Section 26 27 16 - Electrical Cabinets and Enclosures.
    2. Section 26 50 00 - Lighting.
    3. Section 26 52 00 - Safety Lighting.
    4. Section 41 67 19 - Plant Safety Equipment. Building integrator shall provide integration of the lighting control system with Building Automation Systems.
  1. REFERENCES

\*\* NOTE TO SPECIFIER \*\* Delete references from the list below that are not actually required by the text of the edited section.

* + 1. International Electrotechnical Commission (IEC).
    2. International Standards Organization (ISO):
       1. ISO/IEC 7810 - Identification cards - Physical characteristics.
    3. California Energy Code (CEC):
       1. CEC Title 24 - Collection of Energy Standards.
    4. Canadian Standards Association (CAN/CSA):
       1. CAN/CSA Standard 22.2 No. 14 - Industrial control equipment.
       2. CAN/CSA Standard E60730 - Automatic electrical controls for household and similar use.
    5. Electrical Testing Laboratories (ETL):
       1. ETL listed.
    6. Federal Communications Commission (FCC):
       1. FCC Part 15.231 - Periodic operation in the band 40.66 - 0.70 MHz and above 70 MHz.
    7. Industry Canada Radio Standards Specification (IC RSS):
       1. IC RSS-210 - License-Exempt Radio Apparatus: Category I Equipment.
    8. National Electric Code (NEC):
       1. NEC 700.24 - Emergency Lighting. Directly Controlled Luminaires.
    9. Underwriters Laboratories (UL):
       1. UL 508A - Industrial Control Panels.
       2. UL 514D - Standard for Cover Plates for Flush-Mounted Wiring Devices.
       3. UL 924 - Standard for Emergency Lighting and Power Equipment.
       4. UL 2043 - Standard for Fire Test for Heat and Visible Smoke Release for Discrete Products and Their Accessories Installed in Air-Handling Spaces.
       5. UL 60730 - Automatic Electrical Controls - Part 1: General Requirements
  1. SUBMITTALS
     1. Submit under provisions of Section 01 30 00.
     2. Product Data:
        1. Manufacturer's data sheets on each product to be used.
        2. Preparation instructions and recommendations.
        3. Storage and handling requirements and recommendations.
        4. Typical installation methods.

\*\* NOTE TO SPECIFIER \*\* Delete if not applicable to product type.

* + 1. Verification Samples: Two representative units of each type, size, pattern, and color.
    2. Shop Drawings: Include details of materials, construction, and finish. Include relationship with adjacent construction.
  1. QUALITY ASSURANCE
     1. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with a minimum five years documented experience.
     2. Installer Qualifications: Company specializing in performing Work of this section with minimum two years documented experience with projects of similar scope and complexity.
     3. Source Limitations: Provide each type of product from a single manufacturing source to ensure uniformity.

\*\* NOTE TO SPECIFIER \*\* Include mock-up if the project size or quality warrant the expense. The following is one example of how a mock-up on might be specified. When deciding on the extent of the mock-up, consider all the major different types of work on the project.

* + 1. Mock-Up: Construct a mock-up with actual materials in sufficient time for Architect's review and to not delay construction progress. Locate mock-up as acceptable to Architect and provide temporary foundations and support.
       1. Intent of mock-up is to demonstrate quality of workmanship and visual appearance.
       2. If mock-up is not acceptable, rebuild mock-up until satisfactory results are achieved.
       3. Retain mock-up during construction as a standard for comparison with completed work.
       4. Do not alter or remove mock-up until work is completed or removal is authorized.
  1. PRE-INSTALLATION CONFERENCE
     1. Convene a conference approximately two weeks before scheduled commencement of the Work. Attendees shall include Architect, Contractor and trades involved. Agenda shall include schedule, responsibilities, critical path items and approvals.
  2. DELIVERY, STORAGE, AND HANDLING
     1. Store and handle in strict compliance with manufacturer's written instructions and recommendations.
     2. Protect from damage due to weather, excessive temperature, and construction operations.
  3. PROJECT CONDITIONS
     1. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's recommended limits.
  4. WARRANTY
     1. Manufacturer's standard limited warranty unless indicated otherwise.

1. PRODUCTS
   1. MANUFACTURERS
      1. Acceptable Manufacturer: ETC, which is located at: 3031 Pleasant View Rd., P. O. Box 620979; Middleton, WI 53562-0979; Phone: 608-831-4116; Email: [mail@etcconnect.com](mailto:mail@etcconnect.com); Web: [www.etcconnect.com](https://www.etcconnect.com).

\*\* NOTE TO SPECIFIER \*\* Delete one of the following two paragraphs; coordinate with requirements of Division 1 section on product options and substitutions.

* + 1. Substitutions: Not permitted.
    2. Requests for substitutions will be considered in accordance with provisions of Section 01 60 00.

\*\* NOTE TO SPECIFIER \*\* Delete Article if not required or delete basis of design options not required.

* 1. SENSORS
     1. Basis of Design: ROS-xx-UW Series Wall Occupancy Sensors by ETC, Inc.
        1. Standards Compliance: FCC Part 15.231, IC RSS-210.
        2. Mechanical:
           1. Polycarbonate injection molded plastic. Fully enclosed components. Color: White.
           2. Mount to Wall: Using screws or peel-and-stick attachment.

May be mounted to an electrical box.

Mounting Brackets: For ceiling mount, corner mount, and wall mount.

When Bracket Mounted: Vertical Adjustment: 30 degrees. Horizontal Adjustment: 90 degrees.

* + - * 1. Removable Back Plate: Sensor can be detached after mounting.

Sensor Enclosure: A security tab prevents sensor from being detached from back plate without a tool.

* + - * 1. Button: For linking sensor to a wireless controller.

Accessible when Sensor is detached from back plate.

* + - * 1. Button For sending an immediate transmission.

Accessible when Sensor is mounted.

* + - * 1. Red LED Indicator: Behind a lens showing PIR and/or functionality is present. LED indicator may be disabled.
        2. Start-assist battery.
      1. Electrical:
         1. Photovoltaic energy harvesting for power from natural or artificial light sources.

Low voltage power or batteries for normal operation is not acceptable.

Stored Energy: 200 hrs of normal operation without light when charged in 320 lux (30 FC) for 12 hrs.

* + - * 1. Radio: 902 MHz EnOcean. Other frequency radios are not acceptable.
        2. Radio Range: Laterally Through Walls: 80 ft (24 m). Open Space: 300 ft (100 m).
      1. Functional:
         1. Wirelessly transmit occupancy state and stored energy level when there is sufficient stored energy or sufficient solar energy for operation.

PIR Coverage Area: ROS-WA-UW, 140 degrees wide angle, 2700 sq ft (250.8 sq m).

PIR Coverage Area: ROS-HW-UW, hallway application, 20 x 100 ft (6.096 x 30.480 m).

PIR Coverage Area: ROS-KM-UW, 88.5 degrees corner application 2600 sq ft (241.5 sq m).

* + - * 1. Operation: Occupancy or vacancy based on configuration settings of compatible linked wireless lighting controllers.
        2. Transmit: Every 100 seconds when PIR or detection is activated.
        3. Simple Tap Programming: For configuration of compatible wireless lighting controllers.
        4. Radio-Range Confirmation Test Mode: Visual indication of communication signal strength with compatible lighting controllers.
        5. Light-Level Evaluation Test Mode: Visual indication of ambient light level where sensor is mounted.
        6. Walk-Test Test Mode: Immediate visual indication of PIR and activity.
        7. PIR Sensitivity Adjustment Test Mode: Three levels of PIR sensitivity selectable.
        8. LED indication of PIR and acoustic activity can be enabled or disabled. Allows user to disable the LED blink.
    1. Basis of Design: Dual Tech Wall Switch Sensors by ETC, Inc. A wall mount, dual technology occupancy sensor with integrated wall switch that communicates wirelessly to Echoflex controllers.

\*\* NOTE TO SPECIFIER \*\* Delete model option not required.

* + - 1. Model OWS-DT-UW-120/277. A no-neutral conductor powered device connecting to line voltage and earth ground.
      2. Model OWS-DT-UW-BTY. Powered by a long shelf life battery.
      3. Standards Compliance:
         1. CEC Title 24 Compliant. ASHRAE 90.1-2019. IECC 2018. RoHS.
         2. Safety: ETL Recognized Component. Conforms to UL 773A. Certified to CAN/CSA Std. C22.2 No.284-16.
         3. Radio Frequency 902 MHz: FCC Part 15.231. IC RSS-210.
      4. Mechanical:
         1. Operating Temperature: 14 to 113 degrees F (Minus 10 to 45 degrees C).
         2. Storage Temperature: Minus 13 to 149 degrees F (Minus 25 to 65 degrees C).
         3. Relative Humidity, Non-Condensing: 5 to 95 percent.
         4. Weight: 3.9 oz. (111 grams).
         5. Dimensions: 1.6 x 4.2 x 1.7 inch (42 x 107 x 43 mm).
         6. Mounting: Electrical box size; 12.5 cu inches. Cover plate not included.
         7. Housing: Polycarbonate and ABS blend molded plastic. Fully enclosed components. Color: White, RAL Classic Standard 9001.
         8. Sensors fit standard decorator style switch plates.
         9. Button for linking sensor to a wireless controller.

Accessible when Wall Switch Sensor is mounted.

Covered by face plate.

Separate linking capabilities for switch and sensor portion of Sensor.

* + - * 1. Red LED Indicator: Behind a lens showing PIR and/or acoustic functionality is present. LED indicator may be disabled.
        2. PIR Coverage: 180 degrees from sensor mounting location.
        3. Vandal resistant lens.
      1. Electrical:

\*\* NOTE TO SPECIFIER \*\* Delete power required options not required.

* + - * 1. Power Required: 120 or 277 VAC 60 Hz for power. No-neutral conductor connecting to line voltage present within the wall electrical box and earth ground.

Power Consumption: 450 micro amps max

* + - * 1. Power Required: Two AA energizer Lithium batteries.

Battery Life Expectancy: 12 years of typical office use at (25 degrees C).

* + - 1. Communication:
         1. Radio Frequency: 902 MHz. Antenna: Integrated Whip.
         2. Radio Transmission Range:

Commercial Office Spaces: 80 ft (24 m).

Line of Sight: Up to 330 ft (100 m).

* + - * 1. Telegram Transmission: On motion or on heartbeat period.
        2. Telegram Heartbeat Period: Minimum 100 seconds.
      1. User Controls:
         1. Rocker Switch: ON, OFF and Dimming Control.
         2. Teach Button: For occupancy sensor and switch assignment to receiver and test mode selection.
         3. Output: 3 LEDs (behind PIR lens) - indicating PIR activity.
      2. Functional:
         1. Wirelessly Transmits Occupancy State:

PIR Coverage Area: Large Motion: 2000 sq ft (18538 sq m).

PIR Coverage Area: Small motion: 300 sq ft (27.9 sq m).

Acoustic Coverage Area: Coverage Area: Greater than 900 sq ft (83.6 sq m).

* + - * 1. Operation: Occupancy or vacancy based on configuration settings of compatible linked wireless lighting controllers.
        2. Manually turn loads on and off using compatible wireless controller.
        3. Manually dim loads up and down using compatible wireless dimming controller.
        4. Transmit: Every 100 seconds when PIR or acoustic detection is activated.
        5. Simple Tap Programming: For configuration of compatible wireless lighting controllers.
        6. Radio-Range Confirmation Test Mode: Visual indication of communication signal strength with compatible lighting controllers.
        7. Walk-Test Test Mode: Immediate visual indication of PIR and Acoustic activity when operating.
        8. PIR and Acoustic Sensitivity Adjustment Modes:

Three levels of PIR sensitivity adjustment when operating.

Two levels of acoustic sensitivity adjustment when operating.

* + - * 1. LED indication of PIR and acoustic activity can be enabled or disabled. Allows user to disable the LED blink.
    1. Basis of Design: Passive Infrared Wall Switch Sensors by ETC, Inc. A wall mount passive infrared (PIR) occupancy sensor with integrated wall switch that communicates wirelessly to Echoflex controllers.

\*\* NOTE TO SPECIFIER \*\* Delete model option not required.

* + - 1. Model OWS-IR-UW-120/277. A no-neutral conductor powered device connecting to line voltage and earth ground.
      2. Model OWS-IR-UW-BTY. Powered by a long shelf life battery.
      3. Standards Compliance:
         1. CEC Title 24 Compliant. ASHRAE 90.1-2019. IECC 2018. RoHS.
         2. Safety: ETL Recognized Component. Conforms to UL 773A. Certified to CAN/CSA Std. C22.2 No.284-16.
         3. Radio Frequency 902 MHz: FCC Part 15.231. IC RSS-210.
      4. Mechanical:
         1. Operating Temperature: 14 to 113 degrees F (Minus 10 to 45 degrees C).
         2. Storage Temperature: Minus 13 to 149 degrees F (Minus 25 to 65 degrees C).
         3. Relative Humidity, Non-Condensing: 5 to 95 percent.
         4. Weight: 2.12 oz. (60 grams).
         5. Dimensions: 1.6 x 4.2 x 1.7 inch (42 x 107 x 43 mm).

Wires exit from the rear of the OWS-IR-UW-120/277.

* + - * 1. Mounting: Electrical box size; 12.5 cu inches. Cover plate not included.
        2. Housing: Polycarbonate and ABS blend molded plastic. Fully enclosed components. Color: White, RAL Classic Standard 9001.
        3. Fit standard decorator style switch plates.
        4. Button for linking sensor to wireless controller.

Accessible when Wall Switch Sensor is mounted.

Covered by face plate.

Separate pairing capabilities for switch and sensor portion of Sensor.

* + - * 1. Red LED Indicator: Behind a lens showing PIR functionality is present. LED indicator may be disabled.
        2. PIR Coverage: 180 degrees from sensor mounting location.
        3. Vandal resistant lens.
      1. Electrical:

\*\* NOTE TO SPECIFIER \*\* Delete power required options not required.

* + - * 1. Power Required: 120 or 277 VAC 60 Hz for power. No-neutral conductor connecting to line voltage present within the wall electrical box and earth ground.

Power Consumption: 450 micro amps max.

* + - * 1. Power Required: Two AA energizer Lithium batteries.

Battery Life Expectancy: 12 years of typical office use at (25 degrees C)

* + - 1. Communication:
         1. Radio Frequency: 902 MHz. Antenna: Integrated Whip.
         2. Radio Transmission Range:

Commercial Office Spaces: 80 ft (24 m).

Line of Sight: Up to 330 ft (100 m).

* + - * 1. Telegram Transmission: On motion or on heartbeat period.
        2. Telegram Heartbeat Period: Minimum 100 seconds.
      1. User Controls:
         1. Rocker Switch: ON, OFF and Dimming Control.
         2. Teach Button: For occupancy sensor and switch assignment to receiver and test mode selection.
         3. Output: 3 LEDs (behind PIR lens) - indicating PIR activity.
      2. Functional:
         1. Wirelessly transmits occupancy state:

PIR Coverage Area: Large Motion: 2000 sq ft (185.8 sq m).

PIR Coverage Area: Small motion: 300 sq ft (27.8 sq m).

* + - * 1. Operation: Occupancy or vacancy based on configuration settings of compatible linked wireless lighting controllers.
        2. Manually turn loads on and off using compatible wireless controller.
        3. Manually dim loads up and down using compatible wireless dimming controller.
        4. Transmit: Every 100 seconds when PIR or detection is activated.
        5. Simple Tap Programming: For configuration of compatible wireless lighting controllers.
        6. Radio-Range Confirmation Test Mode: Visual indication of communication signal strength with compatible lighting controllers.
        7. Walk-Test Test Mode: Immediate visual indication of PIR and activity when operating.
        8. PIR and Sensitivity Adjustment: Three levels of PIR sensitivity adjustment.
        9. LED indication of PIR activity can be enabled or disabled. Allows user to disable the LED blink.
    1. Basis of Design: Passive Infrared Ceiling Vacancy-Occupancy Sensors by ETC, Inc.

\*\* NOTE TO SPECIFIER \*\* Delete model option not required.

* + - 1. Model RCS Series: Battery powered.
      2. Model RVS Series: Photovoltaic energy harvesting for power from natural or artificial light sources. Low voltage power or batteries for normal operation is not acceptable.
      3. Standards Compliance: FCC Part 15.231, IC RSS-210.
      4. Mechanical:
         1. Polycarbonate injection molded plastic. Fully enclosed components. Color: White.
         2. Mount to Ceiling: Using screws, peel-and-stick attachment, wire straps, or integrated magnets.
         3. Button: For linking sensor to wireless controller.

Accessible when Sensor is mounted.

* + - * 1. Red LED Indicator: Behind a lens showing PIR functionality is present. LED indicator may be disabled.
        2. PIR Coverage: 360 degree hemispherical from mounting location.
      1. Electrical:
         1. Operation from Discharge: In 2 minutes from discharged state when charged at 65 lux (6 FC).
         2. Radio: 902 MHz EnOcean. Other frequency radios are not acceptable.
         3. Radio Range: Laterally Through Walls: 80 ft (24 m). Open Space: 300 ft (100 m).
      2. Functional:
         1. Wirelessly transmit occupancy state and stored energy level when there is sufficient stored energy or sufficient solar energy for operation.

PIR Coverage Area: RVS (RCS)-UA, 1000 sq ft (92.9 sq m).

PIR Coverage Area: RVS (RCS)-UB, 1900 sq ft (176.5 sq m).

* + - * 1. Operation: Occupancy or vacancy based on configuration settings of compatible linked wireless lighting controllers.
        2. Transmit: Every 100 seconds when PIR or acoustic detection is activated.
        3. Simple Tap Programming: For configuration of compatible wireless lighting controllers.
        4. Radio-Range Confirmation Test Mode: Visual indication of communication signal strength with compatible lighting controllers.
        5. Light-Level Evaluation Test Mode: Visual indication of ambient light level where sensor is mounted.
        6. Walk-Test Test Mode: Immediate visual indication of PIR and activity when operating.
        7. PIR Sensitivity Adjustment Test Mode: Three levels of PIR sensitivity selectable.
        8. LED indication of PIR and acoustic activity can be enabled or disabled. Allows user to disable the LED blink.
    1. Basis of Design: MOS-IR Series Passive Infrared Ceiling and High Bay Occupancy Sensors by ETC, Inc.
       1. Standards Compliance: FCC Part 15.231, ICRSS-210.
       2. Mechanical:
          1. Injection molded plastic. Fully enclosed components.

Top Cover: Polycarbonate.

Bottom Plate: ABS.

* + - * 1. Ceiling Mounting Plate, Supports electrical box mounting.

Mounting Options: Screws, peel-and-stick attachment, wire straps, or integrated magnets.

Once the plate is mounted, the sensor is slid onto the plate.

* + - * 1. Button: For linking sensor to wireless controller.

Accessible when Sensor is mounted.

* + - * 1. LED Indicator: Behind a lens showing PIR functionality is present. LED indicator may be disabled.

Flashes green when new start-assist battery is installed.

If battery has depleted voltage, LED flashes blue.

If battery is dead or not installed, LED flashes red.

* + - * 1. Start-assist battery.
        2. PIR Coverage: 360 degree hemispherical from mounting location.
      1. Electrical:
         1. Photovoltaic energy harvesting for power from natural or artificial light sources.

Low voltage power or batteries for normal operation is not acceptable.

Stored Energy: 200 hrs of normal operation without light when charged in 320 lux (30 FC) for 6 hrs.

* + - * 1. Operation from Discharge: 3 minutes from discharged state when charged at 200 lux (19 FC).
        2. Radio: 902 MHz EnOcean. Other frequency radios are not acceptable.
        3. Radio Range: Laterally Through Walls: 80 ft (24 m). Open Space: 300 ft (100 m).
      1. Functional:
         1. Wirelessly transmit occupancy state and stored energy level when there is sufficient stored energy or sufficient solar energy for operation.

PIR Coverage Area: MOS-IR-UA, 1000 sq ft (92.9 sq m).

PIR Coverage Area: MOS-IR-UB, 1900 sq ft (176.5 sq m).

PIR Coverage Area: MOS-IR-UC, 6300 sq ft (1920 sq m) high bay.

* + - * 1. Operation: Occupancy or vacancy based on configuration settings of compatible linked wireless lighting controllers.
        2. Transmit: Every 100 seconds when PIR is activated.
        3. Simple Tap programming for configuration of compatible wireless lighting controllers.
        4. Radio-Range Confirmation Test Mode: Visual indication of communication signal strength with compatible lighting controllers.
        5. Light-Level Evaluation Test Mode: Visual indication of ambient light level where sensor is mounted.
        6. Walk-Test Test Mode: Immediate visual indication of PIR and Acoustic activity when operating.
        7. PIR Sensitivity Adjustment Test Mode: Three levels of PIR sensitivity adjustment when operating.
        8. LED indication of PIR and acoustic activity can be enabled or disabled. Allows user to disable the LED blink.
    1. Basis of Design: MOS-DT Series Dual Tech Ceiling Occupancy Sensors by ETC, Inc.
       1. Standards Compliance: FCC Part 15.231, IC RSS-210.
       2. Mechanical:
          1. Injection molded plastic. Fully enclosed components.

Top Cover: Polycarbonate.

Bottom Plate: ABS.

* + - * 1. Ceiling Mounting Plate, Supports electrical box mounting.

Mounting Options: Screws, peel-and-stick attachment, wire straps, or integrated magnets.

Once the plate is mounted, the sensor is slid onto the plate.

* + - * 1. Button: For linking sensor to wireless controller.

Accessible when Sensor is mounted.

* + - * 1. LED Indicator: Behind a lens showing PIR/Acoustic functionality is present. LED indicator may be disabled.

Flashes green when new start-assist battery is installed.

If battery has depleted voltage, LED flashes blue.

If battery is dead or not installed, LED flashes red.

* + - * 1. Start-assist battery.
        2. PIR Coverage: 360 degree hemispherical coverage from mounting location.
      1. Electrical:
         1. Photovoltaic energy harvesting for power from natural or artificial light sources.

Low voltage power or batteries for normal operation is not acceptable.

Stored Energy: 120 hrs of normal operation without light when charged in 320 lux (30 FC) for 6 hrs.

* + - * 1. Operation from Discharge: 3 minutes from discharged state when charged at 200 lux (19 FC).
        2. Radio: 902 MHz EnOcean. Other frequency radios are not acceptable.
        3. Radio Range: Laterally Through Walls: 80 ft (24 m). Open Space: 300 ft (100 m).
      1. Functional:
         1. Wirelessly transmit occupancy state and stored energy level when there is sufficient stored energy or sufficient solar energy for operation.

PIR Coverage Area: MOS-DT-UA, 1000 sq ft (92.9 sq m).

PIR Coverage Area: MOS-DT-UB, 1900 sq ft (176.5 sq m).

Acoustic Coverage Area: MOS-DT-UA 1000 sq ft (92.9 sq m).

Acoustic Coverage Area: MOS-DT-UB 1000 sq ft (92.9 sq m).

* + - * 1. Operation: Occupancy or vacancy based on configuration settings of compatible linked wireless lighting controllers.
        2. Transmit: Every 100 seconds when PIR or acoustic detection is activated.
        3. Simple Tap programming for configuration of compatible wireless lighting controllers.
        4. Radio-Range Confirmation Test Mode: Visual indication of communication signal strength with compatible lighting controllers.
        5. Light-Level Evaluation Test Mode: Visual indication of ambient light level where sensor is mounted.
        6. Walk-Test Test Mode: Immediate visual indication of PIR and Acoustic activity when operating.
        7. PIR and Acoustic Sensitivity Adjustment Modes:

Three levels of PIR sensitivity adjustment when operating.

Two levels of acoustic sensitivity adjustment when operating.

* + - * 1. Acoustic functionality can be enabled or disabled. Allows user to disable the LED blink.
    1. Basis of Design: Dual Tech Ceiling Vacancy Occupancy Sensors by ETC, Inc.

\*\* NOTE TO SPECIFIER \*\* Delete model options not required.

* + - 1. Model RCS-DT Series: Sensors have batteries installed.
      2. Model RVS-DT Series: Photovoltaic energy harvesting for power from natural or artificial light sources. Low voltage power or batteries for normal operation is not acceptable.
      3. Standards Compliance: FCC Part 15.231, IC RSS-210.
      4. Mechanical:
         1. Polycarbonate injection molded plastic. Fully enclosed components. Color: White.
         2. Mount to Ceiling: Using screws, peel-and-stick attachment, wire straps, or integrated magnets.
         3. Button: For linking sensor to wireless controller.

Accessible when Sensor is mounted.

* + - * 1. LED Indicator: Behind a lens showing PIR/Acoustic functionality is present. LED indicator may be disabled.

Flashes green when new start-assist battery is installed.

If battery has depleted voltage, LED flashes blue.

If battery is dead or not installed, LED flashes red.

* + - * 1. PIR Coverage: 360 degree hemispherical coverage from sensor mounting location.
      1. Electrical:
         1. Operation from Discharge: 2 minutes from discharged state when charged at 65 lux (6 FC).
         2. Radio: 902 MHz EnOcean. Other radio frequencies are not acceptable.
         3. Radio Range: Laterally Through Walls: 80 ft (24 m). Open Space: 300 ft (100 m) line of sight.
      2. Functional:
         1. Wirelessly transmit occupancy state and battery charge level when there is sufficient battery power or solar energy for operation.

PIR Coverage Area: RVS (RCS)-DT-UA, 1000 sq ft (92.9 sq m).

PIR Coverage Area: RVS (RCS)-DT-UB, 1900 sq ft (176.5 sq m).

Acoustic Coverage Area: RVS (RCS)-DT-UA, 1000 sq ft (92.9 sq m).

Acoustic Coverage Area: RVS (RCS)-DT-UB, 1000 sq ft (92.9 sq m).

* + - * 1. Operation: Occupancy or vacancy based on configuration settings of compatible linked wireless lighting controllers.
        2. Transmit: Every 100 seconds when PIR or acoustic detection is activated.
        3. Simple Tap programming for configuration of compatible wireless lighting controllers.
        4. Radio-Range Confirmation Test Mode: Visual indication of communication signal strength with compatible lighting controllers.
        5. Light-Level Evaluation Test Mode: Visual indication of ambient light level where sensor is mounted.
        6. Walk-Test Test Mode: Immediate visual indication of PIR and Acoustic activity when operating.
        7. LED indication of PIR and acoustic activity can be enabled or disabled. Allows user to disable the LED blink.
        8. PIR and acoustic sensitivity adjustment modes:

Three levels of PIR sensitivity adjustment when operating.

Two levels of acoustic sensitivity adjustment when operating.

Acoustic functionality can be disabled when in this mode.

* + 1. Basis of Design: ERUSB-CU Series Cubicle Controller Sensor by ETC, Inc.
       1. Standards Compliance: FCC Part 15.231 and IC RSS-210.
       2. Mechanical:
          1. Polycarbonate injection molded plastic. Fully enclosed electronics assembly. Color: Black.
          2. Sensor Range: 6 ft (1.828 m).
          3. Button: For linking sensor to wireless controller.

Accessible when Sensor is mounted.

* + - * 1. Power Input: USB connection. 3 ft (0.914 m) cable. USB type A to USB mini-B included.
        2. Mounting: Peel-and-stick using double sided tape or Velcro to any surface.
      1. Electrical:
         1. Power: 5.0 V USB. Supports external power supply.
         2. Radio: 902 MHz EnOcean radio. Other frequency radios are not acceptable.
         3. Radio Range: Laterally Through Walls: 80 ft (24 m). Open Space: 300 ft (100 m).
      2. Functional:
         1. Transmit cubicle occupancy status to compatible wireless lighting controllers.
         2. Switch loads on and off via button when used with compatible wireless load controllers.
         3. Occupancy or Vacancy Operation: Based on configuration settings of compatible linked wireless lighting controllers.
    1. Basis of Design: Echoflex TAP-31U Series Photo Sensor by ETC, Inc.
       1. Standards Compliance: FCC Part 15.231, IC RSS-210.
       2. Mechanical:
          1. Polycarbonate injection molded plastic. Fully enclosed components. Color: White.
          2. Mount to Ceiling: Using screws, peel-and-stick attachment, wire straps, or integrated magnets.
          3. Frosted Cover: Over photovoltaic panels.
          4. Button: For linking sensor to a wireless controller.

Accessible when Sensor is mounted.

* + - * 1. Start-assist battery.
      1. Electrical:
         1. Photovoltaic energy harvesting for power from natural or artificial light sources.

Sensors requiring low voltage or batteries are not acceptable

Stored Energy: 70 hrs without light when charged in 960 lux (90 FC) for 7.5 hrs.

Operation from Discharge: In 5 minutes from discharged state when charged at 50 lux (5 FC).

* + - * 1. Radio: 902 MHz EnOcean. Other frequency radios are not acceptable.
        2. Radio Range: Laterally Through Walls: 80 ft (24 m). Open Space: 300 ft (100 m).
      1. Functional:
         1. Wirelessly transmit measured ambient light level supply voltage when there is sufficient stored energy or sufficient solar energy for operation.

Light Levels Above 100 Lux: Sample the ambient light level every 16 seconds.

Light levels 100 to 10 Lux: Sample period increases from 16 to 128 seconds proportionally.

Transmit last sampled value at maximum ten times the sample rate,

If sampled value varies 12.5 percent from averaged value of last four samples, Sensor will transmit new value immediately.

* + - * 1. Simple Tap programming for configuration of compatible wireless lighting controllers.
        2. Two Ranges of Light Intensity Value:

0 to 1020 Lux (0 to 95 FC) or 0-65,535 Lux (0 to 6090 FC)

Mechanism to change data profile type or light intensity range.

* + - * 1. Radio-Range Confirmation Test Mode: Visual indication of communication signal strength with compatible lighting controllers.
        2. Light-Level Evaluation Test Mode: Visual indication of ambient light level where sensor is mounted.
        3. Daylight Harvesting Commissioning Mode:

Sensor transmits every 10 seconds for five minute duration.

* + 1. Basis of Design: Echoflex MC-31 Magnetic Contact Sensor Series by ETC, Inc. For entry door or window switch.
       1. Standards Compliance: FCC Part 15.231 and IC RSS- 210.
       2. Mechanical:
          1. PC and ABS injection molded plastic. Fully enclosed electronics assembly. Color: White
          2. Button: For manual linking to controllers.
          3. Mounting: Using screws, peel-and-stick double sided tape, or Velcro.
          4. Magnetic Switch: Detects open status of window or door.
          5. Replaceable battery.
       3. Electrical:
          1. Radio: 902 MHz EnOcean radios. Other frequencies radios are not acceptable.
          2. Power Input: Single replaceable coin cell battery.

Battery Life: 10 years based on an average of 10 operations per day.

* + - * 1. Range: Commercial Office Space: 80 ft (24 m). Line of Sight: 330 ft (100 m).
      1. Functional:
         1. Link to compatible controller as room occupancy state latch or for purpose of switching lighting or miscellaneous electrical load control.
         2. Radio-Range Confirmation Test Mode: Visual indication of communication signal strength with compatible lighting controller.
         3. Magnet Placement Test Mode: Visual indication of switch state verifying magnet placement.
         4. Select Event Which Triggers a Message:

On each open or close event and heartbeat.

Open events and heartbeat.

Closed events and heartbeat.

Status only on heartbeat.

* + - * 1. Select heartbeat period including disabling heartbeat.
        2. Select providing battery status via a wireless message.
        3. Select wireless message profile used.
        4. Enable a redundant message.
        5. Disable LED blinks when switch opens or closes.
        6. Restore switch to factory defaults.
    1. Basis of Design: Echoflex TAP-41U Correlated Color Temperature Photo Sensors Series by ETC, Inc.
       1. Standard Compliance: FCC Part 15.231, IC RSS-210.
       2. Mechanical:
          1. Polycarbonate injection molded plastic. Fully enclosed components. Color: White.
          2. Mount to Ceiling: Using screws, peel-and-stick attachment, wire straps, or integrated magnets.
          3. Frosted Cover: Over photovoltaic panels.
          4. Button: For linking sensor to wireless controller.

Accessible when Sensor is mounted.

* + - * 1. Start-assist battery.
      1. Electrical:
         1. Photovoltaic energy harvesting for power from natural or artificial light sources.

Sensors requiring low voltage or batteries are not acceptable.

Stored Energy: 70 hrs without light when charged in 960 lux (90 FC) for 7.5 hrs.

Operation from Discharge: In 5 minutes from discharged state when charged at 50 lux (5 FC).

* + - * 1. Radio: 902 MHz EnOcean. Other frequency radios are not acceptable.
        2. Radio Range: Laterally Through Walls: 80 ft (24 m). Line of Sight: 330 ft (100 m).
      1. Functional:
         1. Wirelessly transmit measured ambient light level, color temperature, and supply voltage when there is sufficient stored energy or sufficient solar energy for operation.

Light Levels Above 100 Lux: Sample ambient light level and color temperature every 16 seconds.

Light levels 100 to 0 Lux: Sample period increases from 16 to 128 seconds proportionally.

Transmit last sampled value of light intensity and color temperature at maximum ten times the sample rate.

If sampled value varies 12.5 percent from averaged value of last four samples, Sensor will transmit new value immediately.

* + - * 1. Simple Tap programming for configuration of compatible wireless lighting controllers.
        2. Transmit Using EnOcean Generic Profile or Standard Profile type with Data Fields.

Light intensity: 0 to 100,000 Lux (0 to 6090 FC).

Color Temperature: 0 to 32,767 degrees Kelvin.

Supply Voltage: 0 to 5.5 V.

Mechanism to change data profile type.

* + - * 1. Radio-Range Confirmation Test Mode: Visual indication of communication signal strength with compatible lighting controllers.
        2. Light-Level Evaluation Test Mode: Visual indication of ambient light level where sensor is mounted.
        3. Daylight Harvesting Commissioning Mode:

Sensor transmits every 10 seconds for a duration of five minutes.

\*\* NOTE TO SPECIFIER \*\* Delete Article if not required or delete basis of design options not required.

* 1. SWITCHES
     1. Basis of Design: Self-Powered ETR Switches by ETC, Inc. Single and dual paddle rocker switch configurations.
        1. Standards Compliance: FCC Part 15.231 and IC RSS-210.
        2. Mechanical:
           1. Polycarbonate plastic. Fully enclosed electronics assembly.
           2. Wall Mount Switches: ETRS.

Rear Surface: Solid plane for adhering to transparent surfaces.

Double Sided Tape: From Manufacturer for peel-and-stick attachment.

\*\* NOTE TO SPECIFIER \*\* Delete color option not required.

Color: White.

Color: Black.

* + - * 1. Hand-Held Switches: ETRH.

Accommodate connection to lanyard without modification.

Two key-hole style holes on switch back for mounting with screws.

Color: White.

* + - 1. Electrical:
         1. Kinetic Energy Harvesting: No batteries or external power input required.
         2. Radios: 902 MHz EnOcean. Other frequency radios are not acceptable.
         3. Radio Range: Laterally Through Walls: 80 ft (24 m). Open Space: 300 ft (100 m).
      2. Functional:
         1. Switch relay loads on and off when used with compatible wireless load controllers.
         2. Dim loads up and down when used with compatible wireless dimming controllers.
         3. Adjust LED color temperature when using compatible wireless tunable white controllers
         4. Smart Click Programming: For linking with compatible wireless lighting controllers
    1. Basis of Design: KSS-UW Series Keycard Switch Stations by ETC, Inc.
       1. Standards Compliance: FCC Part 15.231 and IC RSS-210.
       2. Mechanical:
          1. Polycarbonate+ABS plastic blend. Fully enclosed electronics assembly. Color: White. Conform to RAL Classic Standard 9003.
          2. Standalone switch with exposed slot. Accepts cards meeting ISO/IEC 7810: ID-1 card specifications.

Slot: Will not allow embossed cards to be inserted.

Allows card to be inserted and removed.

* + - * 1. Mounting: On flat surface without any additional brackets.

Adhered using double sided tape, or screws and wall anchors.

* + - * 1. Barrier Plates: UL Standard 514D available from manufacturer for mounting station over electrical junction boxes.
        2. Screw-less faceplates.
      1. Electrical:
         1. Power Input: Replaceable coin cell battery.

Battery Life: 100,000 button activations or 10 years.

* + - * 1. Radios: 902 MHz EnOcean. Other frequency radios are not acceptable.
        2. Radio Range: Commercial Office Space: 80 ft (24 m). Line of Sight: 330 ft (100 m).
      1. Functional:
         1. Switch relay loads on and off when using compatible wireless load controllers.
         2. Smart Click programming for linking with compatible wireless load controllers.
    1. Basis of Design: PTM365 Decorator Style Wall Switches by ETC, Inc.
       1. Standards Compliance: FCC Part 15.231 and IC RSS- 210.
       2. Mechanical:
          1. Polycarbonate plastic. Fully enclosed electronics assembly.

\*\* NOTE TO SPECIFIER \*\* Delete color options not required.

* + - * 1. Color: White. Conform to RAL Classic Standard 9003.
        2. Color: Gray. Conform to RAL Classic Standard 9001.
        3. Color: Black. Conform to RAL Classic Standard 9004.
        4. Single and dual paddle rocker switch configurations.
        5. Attach multiple switches together using surface mounting plates available from Manufacturer or standard electrical gang boxes.
        6. Barrier Plates: Provided with switch assemblies.
        7. Switch Faceplates: Provided with switch assemblies.
      1. Electrical:
         1. Kinetic Energy Harvesting: No batteries or external power input required.
         2. Radios: 902 MHz EnOcean. Other frequency radios are not acceptable.
         3. Radio Range: Laterally Through Walls: 80 ft (24 m). Open Space: 300 ft (100 m).
      2. Functional:
         1. Switch loads on and off when using compatible wireless load controllers.
         2. Dim loads up and down when using compatible wireless dimming controllers.
         3. Adjust LED color temperature when using compatible wireless tunable white controllers.
         4. Smart Click programming for linking with compatible wireless load controllers.
    1. Basis of Design: Multi-Button Interface Switch Stations by ETC, Inc.

\*\* NOTE TO SPECIFIER \*\* Delete model options not required.

* + - 1. Model MBI-2 Series. 2 button station assemblies.
      2. Model MBI-4 Series. 4 button station assemblies.
      3. Model MBI-8 Series. 8 button station assemblies.
      4. Standards Compliance: FCC Part 15.231 and IC RSS- 210.
      5. Mechanical:
         1. Polycarbonate+ABS plastic blend. Fully enclosed electronics assembly.
         2. Multi-button, decorator style plastic switches.
         3. Mounting: On flat surface without additional brackets. Double sided tape or screws and wall anchors.
         4. Attach multiple switches together using standard decorator style face plates available from Manufacturer or electrical distributors.
         5. Barrier Plates: UL rated. Available from Manufacturer for mounting over electrical junction boxes.

\*\* NOTE TO SPECIFIER \*\* Delete color option not required.

* + - * 1. Color: White. Conform to RAL Classic Standard 9003.
        2. Color: Black. Conform to RAL Classic Standard 9004.
        3. Color: Gray. Conform to RAL Classic Standard 9001.
        4. Color: Cream. Conform to RAL Classic Standard 9001.
        5. Assemblies include screw-less faceplates.
      1. Electrical:
         1. Power Input: Single replaceable coin cell battery.

Battery Life: 100,000 button activations or 10 years.

* + - * 1. Radios: 902 MHz EnOcean radios. Other frequency radios are not acceptable.
        2. Radio Range: Commercial Office Space: 80 ft (24 m). Line of Sight: 330 ft (100 m).
      1. Functional:
         1. Switch loads on and off when using compatible wireless load controllers.
         2. Dim loads up and down when using compatible wireless dimming controllers.
         3. Adjust color temperature when using compatible wireless tunable white controllers.
         4. Smart Click programming for linking with compatible wireless load controllers.
    1. Basis of Design: MSS Series Multi-Scene Stations by ETC, Inc.
       1. Standards Compliance: FCC Part 15.231 and IC RSS- 210.
       2. Mechanical:
          1. Polycarbonate+ABS plastic blend. Fully enclosed electronics assembly.

\*\* NOTE TO SPECIFIER \*\* Delete color options not required.

* + - * 1. Colors: White. Conform to RAL Classic Standard 9003.
        2. Colors: Black. Conform to RAL Classic Standard 9004.
        3. Colors: Gray. Conform to RAL Classic Standard 9001.
        4. Colors: Cream. Conform to RAL Classic Standard 9001.
        5. Multi-button, decorator style plastic switches.
        6. Available in multi-button assemblies.
        7. Mounting: On a flat surface without any additional brackets.

Adhered using double sided tape or screws and wall anchors.

* + - * 1. Attach multiple switches together using standard decorator style face plates available from Manufacturer or electrical distributors.
        2. Barrier Plates: UL rated available from Manufacturer for mounting over electrical junction boxes.
        3. Screw-less faceplates.
      1. Electrical:
         1. Power Input: Replaceable coin cell battery.

Battery Life: 100,000 button activations or 10 years.

* + - * 1. Radios: 902 MHz EnOcean. Other frequency radios are not acceptable.
        2. Radio Range: Commercial Office Space: 80 ft (24 m). Line of Sight: 330 ft (100 m).
      1. Functional:
         1. Switch loads on and off when using compatible wireless load controllers.
         2. Dim loads up and down when using compatible wireless dimming controllers.
         3. Adjust color temperature when using compatible wireless tunable white controllers.
         4. Station Buttons: Programmed to send commands: Preset Activate, Zone Raise/Lower Start, Zone Raise/Lower End, Zone Set Output Level.

Valid Preset Activate Values: 0 to 15.

Valid Preset Zone Values: 1 to 24.

\*\* NOTE TO SPECIFIER \*\* Delete Article if not required or delete basis of design options not required.

* 1. CONTROLLERS
     1. Basis of Design: Phase Adaptive Dimmer Controller by ETC, Inc.

\*\* NOTE TO SPECIFIER \*\* Delete model option not required.

* + - 1. Model ER6CD-xU-120.
      2. Model ER12CD-xU-277.
      3. Standards Compliance:
         1. ETL listed. Conform to UL 508A.
         2. Certified to CAN/CSA Standard 22.2 No. 14.
         3. FCC Part 15.231 and IC RSS-210.
         4. Plenum Rating: UL 2043.
      4. Mechanical:
         1. Mounting: To a 1/2 inch (13 mm) electrical junction box knock-out using a threaded nipple and retaining nut.
         2. Learn and Clear Buttons: For manual linking of stations and sensors.

Buttons: Accessible when Controller is mounted.

* + - * 1. Two LED Indicators: Display power/operational mode and linked status.
      1. Electrical:

\*\* NOTE TO SPECIFIER \*\* Delete controller model not required.

* + - * 1. Controller Model ER6CD-xU Input Power: 600 W, 120 VAC, 60 Hz.

Fully Rated Line Voltage Dimming Power: 600 W at 120 VAC.

* + - * 1. Controller Model: ER12CD-xU Input Power: 1200 W, 277 VAC, 60 Hz.

Fully Rated Line Voltage Dimming Power: 1200 W at 277 VAC.

* + - * 1. Forward or Reverse Phase Dimming: For tungsten, 2-wire fluorescent ballasts, line voltage LED, electronic low-voltage transformer, or magnetic low-voltage transformer loads.
        2. Radio: 902 MHz EnOcean. Other frequency radios are not acceptable.
        3. Radio Range: Commercial Office Space: 80 ft (24 m). Line of Sight: 330 ft (100 m).
      1. Functional:
         1. Line voltage dimming control for individual light fixture or lighting zone.
         2. Sense forward or reverse phase loads and adjust automatically.

Manual or software changing dimming phase are not acceptable.

Lock output phase control into forward phase or reverse phase.

* + - * 1. Support wireless Echoflex switches and sensors for dimming control.

Link 20 devices in any combination of stations, sensors, interfaces, or gateways.

* + - * 1. Single or dual-hop wireless signal repeating to other controllers.
        2. Central Command functions for use with integrated control systems.
        3. Demand Response Commands: Temporary ceiling to maximum dimming output level.
        4. Store values for 15 Presets. Include ramp time and output value.
        5. Supported Preset Commands Include: Preset Teach, Preset Activate, Group Raise/Lower Start, Group Raise/Lower End, Group Set Output Level, Preset Record, Lockout, and Group Mask Set.
        6. Support 24 Groups Defined by a Group Mask:

If a Preset Command transmitting device is linked to Controller and message includes a group mask shared with the Controller, the Controller will respond to the command.

* + - * 1. Commissioning and linking through software and/or mechanical means.
        2. Configuration Variables: Allow customization of controller's operation with linked sensors, switches, interfaces, and gateways.
        3. Reporting operational status wirelessly.
        4. Configuration Settings and Linked Device Details: In non-volatile memory.

Save user-defined configuration settings and linked devices as recoverable default settings.

* + - * 1. Resettable to factory defaults.
    1. Basis of Design: ERNR-xxU Series Split Duplex Controller by ETC, Inc.
       1. Standards Compliance:
          1. ETL listed. Conform to UL 508A.
          2. Certified to CAN/CSA Standard 22.2 No. 14.
          3. FCC Part 15.231 and IC RSS-210.
       2. Mechanical:
          1. Mount in a standard single-gang wall box.
          2. Learn and Clear Buttons: For manual linking of switches and sensors.

Accessible when Controller is mounted, prior to mounting faceplate.

* + - * 1. Two LED Indicators: Display power and linked device information.
        2. LED Arrows: Pointing to controlled side of receptacle so controlled side is permanently marked and easily visible in dark locations.
        3. An embossed Power Icon so controlled side is permanently marked.
      1. Electrical:
         1. Power Input: 120 VAC.
         2. Normally Open Relay Contact: Rated for 15 amps to switch power to controlled receptacle.

Auxiliary output controlled from internal relay for wiring directly to other duplex receptacles.

* + - * 1. Radio: 902 MHz EnOcean. Other frequency radios are not acceptable.
        2. Radio Range: Commercial Office Space: 80 ft (24 m). Open Space: 330 ft (100 m).
      1. Functional:
         1. Switching control for individual load plugged into controlled receptacle.
         2. Support wireless Echoflex switches and sensors for relay control.

Link 20 wireless devices in any combination of Echoflex of stations, sensors, interfaces, or gateways.

* + - * 1. Single or dual-hop wireless signal repeating to other controllers.
        2. Central Command functions for use with integrated control systems.
        3. Commissioning and linking through software and/or mechanical means.
        4. Allow customization of controller's operation with linked sensors, switches, interfaces, and gateways.
        5. Report relay status wirelessly.
        6. Save configuration settings and linked device details in non-volatile memory.

Saving user-defined configuration settings as recoverable default settings.

* + 1. Basis of Design: ERM-FxU Series Load Control Module by ETC, Inc.
       1. Standards Compliance:
          1. UL 508A. Certified to CAN/CSA Standard C22.2 No.14. ETL listed.
          2. FCC Part 15.231 and IC RSS-210.
       2. Mechanical:
          1. Installs inside a standard electrical junction box.
          2. Learn and Clear Buttons: For manual linking of switches and sensors.

Accessible when Controller is mounted, prior to installing cover on junction box.

* + - * 1. Two LED Indicators: Display power, linked device information, and operating mode.
      1. Electrical:
         1. Supply Voltage: 120, 50/60 Hz.
         2. A single, non-isolated normally open relay contact fully rated for 15 amps.
         3. Radio: 902 MHz EnOcean radio. Other frequency radios are not acceptable.
         4. Radio Range: Commercial Office Space: 80 ft (24 m). Open Space: 330 ft (100 m).
      2. Functional:
         1. Switching Control: For individual light fixture, lighting zone, or miscellaneous electrical loads.
         2. Support wireless Echoflex switches and sensors for relay control.

Link 20 wireless devices in any combination of Echoflex of stations, sensors, interfaces, or gateways.

* + - * 1. Single or dual-hop wireless signal repeating to other controllers.
        2. Central Command functions for use with integrated control systems.
        3. Commissioning and linking through software and/or mechanical means.
        4. Configuration variables that allow customization of the controllers operation with linked sensors and switches.
        5. Reporting relay status wirelessly.
        6. Save configuration settings and linked device details in non-volatile memory.

Save user-defined configuration settings as recoverable default settings.

* + 1. Basis of Design: ERM-FSU Series Signal Relay Controller, 24 VDC/AC by ETC, Inc.
       1. Standards Compliance:
          1. FCC Part 15.231 and IC RSS-210.
       2. Mechanical:
          1. Installs inside a standard electrical junction box.
          2. Learn and Clear Buttons: For manual linking of switches and sensors.

Accessible when Controller is mounted, prior to installing cover on junction box.

* + - * 1. Two LED Indicators: Display power, linked device information, and operating mode.
      1. Electrical:
         1. Supply Voltage: 24 VDC/AC.
         2. A single, isolated normally open relay contact fully rated for 3 amps.
         3. Radio: 902 MHz EnOcean radio. Other frequency radios are not acceptable.
         4. Radio Range: Commercial Office Space: 80 ft (24 m). Open Space: 330 ft (100 m).
      2. Functional:
         1. Dry Contact Switching Control: For interfacing with other control panels, systems, or miscellaneous low voltage loads.
         2. Support wireless Echoflex switches and sensors for relay control.

Link 20 wireless devices in any combination of Echoflex of stations, sensors, interfaces, or gateways.

* + - * 1. Single or dual-hop wireless signal repeating to other controllers.
        2. Central Command functions for use with integrated control systems.
        3. Commissioning and linking through software and/or mechanical means.
        4. Configuration variables that allow customization of the controllers operation with linked sensors and switches.
        5. Reporting relay status wirelessly.
        6. Save configuration settings and linked device details in non-volatile memory.

Save user-defined configuration settings as recoverable default settings.

* + 1. Basis of Design: Tri-Zone Dimming LED Controller by ETC, Inc.

\*\* NOTE TO SPECIFIER \*\* Delete model not required.

* + - 1. Model ELED3-xU 120-277.
      2. Model ELED3H-xU 240-347.
      3. Standards Compliance:
         1. UL 60730. Certified to CAN/CSA Standard E60730, UL listed.
         2. UL 924 for Directly Controlled Luminaires; 0-10 V dimming, NEC 700.24.
         3. FCC Part 15.231 and IC RSS-210.
         4. Plenum Rating: UL 2043.
      4. Mechanical:
         1. Offered in a power pack model mounting to a 1/2 inch (23 mm) electrical junction box knock-out using the threaded nipple and retaining nut.

Controller wires exit enclosure through the threaded nipple.

* + - * 1. Learn and Clear Buttons: Accessible when mounted.

Learn Button: For manual linking of switches and sensors.

Clear Button: For resetting to factory pre-commissioned state or factory default state.

* + - * 1. Two LED Indicators: Display power/operational mode and per channel linked device information.
      1. Electrical:

\*\* NOTE TO SPECIFIER \*\* Delete supply voltage option not required.

* + - * 1. Supply Voltage: 120-277 VAC, 50/60 Hz.
        2. Supply Voltage: 240-347 VAC, 50/60 Hz.
        3. Relay Output: Single, non-isolated latching SPST relay.

Electronic or LED Driver Loads: 20.0 Amps at 120-277 VAC.

Electronic or LED Driver Loads: 16.0 Amps at 347 VAC.

Magnetic Ballast Loads: 20.0 Amps at 120-277 VAC.

Magnetic Ballast Loads: 20.0 Amps at 347 VAC.

* + - * 1. Inrush Current: 460 A2s at 277 VAC.
        2. Three Low Voltage Dimming (0-10 VDC at 100 mA sinking current) Channels: LED drivers and dimming ballasts.
        3. Radio: 902 MHz EnOcean. Other frequency radios are not acceptable.
        4. Radio Range: Commercial Office Space: 80 ft (24 m). Open Space: 330 ft (100 m).
      1. Functional:
         1. Switching and/or low voltage dimming control for three light fixtures or lighting zones.
         2. Wireless Echoflex switches and sensors for relay control.

Link 20 wireless devices in any combination of Echoflex stations, sensors, interfaces, or gateways.

Linked switches can operate individual channels or all three channels.

Linked Occupancy sensors operate all three channels.

Automatically configured for automatic lights-on when no switches have been linked.

* + - * 1. Assign dedicated channels for daylighting control when wireless photo sensor is linked.

Assign a single dedicated channel as the primary daylighting channel.

A set point value determined by type of sensor linked, open or closed loop, will be assigned to this channel.

Assign a single dedicated channel as secondary daylighting channel.

An offset value from primary channel set point will be applied to derive the set point for this channel.

* + - * 1. Single or dual-hop wireless signal repeating to other controllers.
        2. Central Command functions for use with integrated control systems.
        3. Demand Response commands provide a temporary ceiling to maximum dimming output level.
        4. Store Values for a minimum 15 Presets.

Presets include ramp time and output value.

* + - * 1. Preset Command messages.

Preset Commands Include: Preset Teach, Preset Activate, Group Raise/Lower Start, Group Raise/Lower End, Group Set Output Level, Preset Record, Lockout, and Group Mask Set.

* + - * 1. Support 24 Groups Defined by a Group mask.

If a Preset Command transmitting device is linked to Controller and a message includes a group mask shared with the Controller, the Controller will respond to the command.

* + - * 1. Commissioning and linking through software and/or mechanical means.
        2. Configuration variables that allow customization of controllers operation with linked sensors and switches.
        3. Report relay and each dimming channels status wirelessly.
        4. Save configuration settings and linked device details in non-volatile memory.

Save user-defined configuration settings and linked devices as recoverable default settings.

* + - * 1. Provide method of resetting to factory defaults.
    1. Basis of Design: Tunable White Dimming LED Controller by ETC, Inc.

\*\* NOTE TO SPECIFIER \*\* Delete model not required.

* + - 1. Model ELED2-xU 120-277.
      2. Model ELED2H-xU 240-347.
      3. Standards Compliance:
         1. UL 60730, Certified to CAN/CSA Standard E60730. UL listed.
         2. UL 924 for Directly Controlled Luminaires with 0-10V dimming, NEC 700.24.
         3. FCC Part 15.231 and IC RSS-210.
         4. Plenum Rating: UL 2043.
      4. Mechanical:
         1. Offered in a power pack model mounting to a 1/2 inch (23 mm) electrical junction box knock-out using the threaded nipple and retaining nut.

Controller wires exit enclosure through the threaded nipple.

* + - * 1. Learn and Clear Buttons: Accessible when mounted.

Learn Button: For manual linking of switches and sensors.

Clear Button: For resetting to factory pre-commissioned state or factory default state.

* + - * 1. Two LED Indicators: Display power/operational mode and per channel linked device information.
      1. Electrical:

\*\* NOTE TO SPECIFIER \*\* Delete supply voltage option not required.

* + - * 1. Supply Voltage: 120-277 VAC, 50/60 Hz.
        2. Supply Voltage: 240-347 VAC, 50/60 Hz.
        3. Relay Output: Single, non-isolated latching SPST relay.

Electronic or LED Driver Loads: 20.0 Amps at 120-277 VAC.

Electronic or LED Driver Loads: 16.0 Amps at 347 VAC.

Magnetic Ballast Loads: 20.0 Amps at 120-277 VAC.

Magnetic Ballast Loads: 20.0 Amps at 347 VAC.

* + - * 1. Inrush Current: 460 A2s at 277 VAC.
        2. Two Low Voltage Output (0-10 VDC at100mA sinking current) Channels: For LED drivers and dimming ballasts.
        3. Radio: 902 MHz EnOcean. Other frequency radios are not acceptable.
        4. Radio Range: Commercial Office Space: 80 ft (24 m). Open Space: 330 ft (100 m).
      1. Functional:
         1. Switching, low voltage dimming and tunable white color temperature control of an individual fixture or lighting zone.

Dedicated low voltage outputs:

Intensity control of connected LED drivers or ballasts.

Tunable white color temperature control of connected LED drivers.

* + - * 1. Wireless Echoflex switches and sensors for light intensity, tunable white color temperature. and relay control.

Link 20 wireless devices in any combination of Echoflex stations, sensors, interfaces, or gateways.

Automatically configured for automatic lights-on with occupancy when no switches have been linked.

Daylighting control when wireless photo sensor is linked.

Tunable white color temperature control when linked wireless photo sensor provides a Correlated Color Temperature (CCT) value.

Use a dynamic set point to drive tunable white temperature output.

A linked switch can provide manual control of tunable white output.

When tunable white channel has no devices linked it will assume a dim-to-warm operation.

* + - * 1. Single or dual-hop wireless signal repeating to other controllers.
        2. Central Command functions for use with integrated control systems.
        3. Demand Response commands provide a temporary ceiling to maximum dimming output level.
        4. Store values for minimum of 15 Presets. Include a ramp time and output value.
        5. Preset Command Messages:

Supported Preset commands Include: Preset Teach, Preset Activate, Group Raise/Lower Start, Group Raise/Lower End, Group Set Output Level, Preset Record, Lockout, and Group Mask Set.

* + - * 1. Support 24 Groups Defined by a Group mask.

If a Preset Command transmitting device is linked to Controller and the message includes a group mask shared with the Controller, the Controller will respond to the command.

* + - * 1. Commissioning and linking through software and/or mechanical means.
        2. Configuration variables allowing customization of controllers' operation with linked sensors, switches, interfaces, and gateways.
        3. Report relay and each low voltage channel status wirelessly.
        4. Save configuration settings and linked device details in non-volatile memory.

Save user-defined configuration settings and linked devices as recoverable default settings.

* + - * 1. Provide method of resetting to factory defaults.
    1. Basis of Design: Power Load Controller by ETC, Inc.

\*\* NOTE TO SPECIFIER \*\* Delete model not required.

* + - 1. Model ELEDR-xU120-277.
      2. Model ELEDRH-xU 240-347.
      3. Standards Compliance:
         1. UL 60730, Certified to CAN/CSA Standard E60730. UL listed.
         2. FCC Part 15.231 and IC RSS-210.
         3. Plenum Rating: UL 2043.
      4. Mechanical:
         1. Offered in a power pack model mounting to a 1/2 inch (23 mm) electrical junction box knock-out using the threaded nipple and retaining nut.

Controller wires exit enclosure through the threaded nipple.

* + - * 1. Learn and Clear Buttons: Accessible when mounted.

Learn Button: For manual linking of switches and sensors.

Clear Button: For resetting to factory pre-commissioned state or factory default state.

* + - * 1. Two LED Indicators: Display power/operational mode and linked device information.
      1. Electrical:

\*\* NOTE TO SPECIFIER \*\* Delete supply voltage option not required.

* + - * 1. Supply Voltage: 120-277 VAC, 50/60 Hz.
        2. Supply Voltage: 240-347 VAC, 50/60 Hz.
        3. Relay Output: Single, non-isolated latching SPST relay.

\*\* NOTE TO SPECIFIER \*\* Delete relay output options not required.

Electronic or LED Driver Loads: 20.0 Amps at 120-277 VAC.

Electronic or LED Driver Loads: 16.0 Amps at 347 VAC.

Magnetic Ballast Loads: 20.0 Amps at 120-277 VAC.

Magnetic Ballast Loads: 20.0 Amps at 347 VAC.

Horsepower: 1.5 HP at 120 VAC.

Horsepower: 3.0 HP at 277 VAC.

* + - * 1. Radio: 902 MHz EnOcean. Other frequency radios are not acceptable.
        2. Radio Range: Commercial Office Space: 80 ft (24 m). Line of Sight: 330 ft (100 m).
      1. Functional:
         1. Switching control for individual light fixture, lighting zone, motor load, or miscellaneous electrical loads.
         2. Wireless Echoflex Switches and Sensors for Relay Control:

Link 20 wireless devices in any combination of Echoflex stations, sensors, interfaces, or gateways.

Automatically configured for automatic lights-on with occupancy when no switches have been linked.

Daylighting control when a wireless photo sensor is linked.

* + - * 1. Single or dual-hop wireless signal repeating to other controllers.
        2. Central Command functions for use with integrated control systems.
        3. Store values for minimum of 15 Presets.

Presets to include a ramp time and output value.

* + - * 1. Preset Command Messages:

Preset commands Include: Preset Teach, Preset Activate, Group Raise/Lower Start, Group Raise/Lower End, Group Set Output Level, Preset Record, Lockout, and Group Mask Set.

* + - * 1. Support 24 Groups Defined by a Group mask.

If a Preset Command transmitting device is linked to the Controller and the message includes a group mask shared with the Controller, the Controller will respond to the command.

* + - * 1. Commissioning and linking through software and/or mechanical means.
        2. Configuration variables that allow customization of controllers' operation with linked sensors, switches, interfaces, and gateways.
        3. Report relay status wirelessly.
        4. Save configuration settings and linked device details in non-volatile memory.

Save user-defined configuration settings and linked devices as recoverable default settings.

* + - * 1. Provide method of resetting to factory defaults.
    1. Basis of Design: LED Fixture Controller by ETC, Inc.
       1. Standards Compliance:
          1. UL 60730, Certified to CAN/CSA Standard E60730. UL listed.
          2. UL 924 for Directly Controlled Luminaires with 0-10V dimming, NEC 700.24.
          3. FCC Part 15.231 and IC RSS-210.
          4. Plenum Rating: UL 2043.

\*\* NOTE TO SPECIFIER \*\* Delete models not required.

* + - 1. Model ELED1-xUN 120-277:
         1. Mounting: To 1/2 inch (13 mm) electrical junction box knock-out using threaded nipple and retaining nut. Wires exit enclosure through threaded nipple.
      2. Model ELED1-xUS 120-277:
         1. Mounting: Surface mount using provided mounting strap.
      3. Model ELED1H-xU 240-347:
         1. Mounting: To 1/2 inch (13 mm) electrical junction box knock-out using threaded nipple and retaining nut. Wires exit enclosure through threaded nipple.
      4. Mechanical:
         1. Learn and Clear Buttons: For manual linking of switches and sensors.

Accessible when Controller is mounted, prior to installing cover on junction box.

* + - * 1. Two LED Indicators: Display power, linked device information, and operating mode.
      1. Electrical:

\*\* NOTE TO SPECIFIER \*\* Delete supply voltage option not required.

* + - * 1. Supply Voltage: 120-277 VAC, 50/60 Hz.
        2. Supply Voltage: 240-347 VAC, 50/60 Hz.
        3. Relay Output: Single, non-isolated latching SPST relay.

Electronic or LED Driver Loads: 11.5 Amps at 120-277 VAC.

Electronic or LED Driver Loads: 16.0 Amps at 347 VAC.

Magnetic Ballast Loads: 20.0 Amps at 347 VAC.

* + - * 1. Inrush current of 460 A^2s at 277 VAC.
        2. Low Voltage Dimming (0-10 VDC at 100 mA sinking current): For LED drivers and dimming ballasts.
        3. Radio: 902 MHz EnOcean. Other frequency radios are not acceptable.
        4. Radio Range: Commercial Office Space: 80 ft (24 m). Open Space: 330 ft (100 m).
      1. Functional:
         1. Switching and/or low voltage dimming control for individual light fixtures or lighting zone.
         2. Wireless Echoflex switches and sensors for relay control.

Link 20 wireless devices in any combination of Echoflex stations, sensors, interfaces, or gateways.

* + - * 1. Single or dual-hop wireless signal repeating to other controllers.
        2. Central Command functions for use with integrated control systems.
        3. Demand Response commands providing a temporary ceiling to maximum dimming output level.
        4. Store values for a minimum 15 Presets.

Presets to include a ramp time and output value.

* + - * 1. Preset Command Messages:

Supported Preset commands Include: Preset Teach, Preset Activate, Group Raise/Lower Start, Group Raise/Lower End, Group Set Output Level, Preset Record, Lockout, and Group Mask Set.

* + - * 1. A minimum of 24 Preset Groups defined by a group mask.

If a Preset Command transmitting device is linked to the Controller and the message includes a group mask shared with the Controller, the Controller will respond to the command.

* + - * 1. Commissioning and linking through software and/or mechanical means.
        2. Configuration variables that allow customization of controller's operation with linked sensors, switches, interfaces, and gateways.
        3. Reporting relay and low voltage channel status wirelessly.
        4. Save configuration settings and linked device details in non-volatile memory.

Save user-defined configuration settings and linked devices as recoverable default settings.

* + - * 1. Provide method of resetting to factory defaults.

\*\* NOTE TO SPECIFIER \*\* Delete Article if not required.

* 1. WIRELESS INTERFACES AND GATEWAYS

\*\* NOTE TO SPECIFIER \*\* Delete basis of design options not required.

* + 1. Basis of Design: Astronomical Wireless TimeClock Station by ETC, Inc.
       1. Standards Compliance: FCC Part 15.231 and IC RSS-210.
       2. Mechanical:
          1. User interface for timeclock programming, scene recall, and event override.
          2. Faceplates: ABS plastic.

\*\* NOTE TO SPECIFIER \*\* Delete color options not required.

Color: Cream. Conform to RAL Classic Standard 9001.

Color: Black. Conform to RAL Classic Standard 9004.

Color: White. Conform to RAL Classic Standard 9003.

Entire assembly mounts into a two gang back box.

\*\* NOTE TO SPECIFIER \*\* Delete mounting options not required.

Mounting: Flush. Show no visible means of attachment.

Back Boxes: Industry standard back boxes.

Mounting: Surface. Show no visible means of attachment.

Back Boxes: Manufacturer to provide back boxes.

* + - * 1. Electronics: Mount directly behind faceplate.
        2. External Antenna:

Connection: SMA connector.

Selection Jumper: Used to select which antenna is being used.

Antenna Cables: From timeclock to mounting location of antenna.

* + - 1. Electrical:
         1. Two No. 16 AWG stranded wires for 24VDC/AC operating power.

Wire Termination Connectors: Provided with stations.

* + - * 1. Radio: 902 MHz EnOcean. Other frequency radios are not acceptable.
        2. Radio Range: Commercial Office Space: 80 ft (24 m). Line of Sight: 330 ft (100 m).
      1. Functional:
         1. Allow programming of timeclock events.

Astronomical, real-time, and manual control events in 24 control groups.

Events: Support for 50 events, programmable via user interface.

Assigned to a recurring day type.

Day Types: Every day, weekdays, weekends, Sunday, Monday, Tuesday, Wednesday, Thursday, Friday, and Saturday.

Activated based on sunrise, sunset, or time-of-day.

Allow a configurable timed offset for sunrise and sunset activation.

Allow a configurable time-of-day for event activation.

Automatically compensate for regions using fully configurable daylight saving time.

* + - * 1. Support configurable actions for each event in 24 control groups.

Scene Activation: Recall controllers preset values when controller is a member of assigned group.

Mask Activation: Commands controllers to ignore linked sensor or switch stations when controller is a member of assigned group.

ON to Level Activation: Command controllers to configurable set value when controller is a member of assigned group.

OFF Activation: Command controllers to OFF state when controller is a member of assigned group.

* + - * 1. Manual scene activation from user interface default screen.
        2. Link and unlink controllers from user interface.

Linked controllers to be viewable on screen.

Cycle a linked controller's relay.

Test radio signal strength between station and linked controller and displaying result on screen.

* + - * 1. Support timed event hold.

Start timed hold events from user interfaces default screen.

Timed event hold to meet energy code requirements.

* + - * 1. Defining days as a holiday.

Holidays events are assigned to groups.

Defined holidays will shut lights off and ignore scheduled events.

Allow holiday events to span several days.

* + 1. Basis of Design: Echoflex 03 Edge. Provides networked control of Echoflex products. System capabilities like Timed Control, Demand Response, and Manual Override are standard. Includes native BACnet capabilities, allowing an Echoflex system to share status and control with building energy management systems (BEMS).
       1. Model: EchoFlex 03 Coordinator. The interface for adding scheduling and demand response to Echoflex projects.
       2. Model: EchoFlex 03 Repeater. Networks the commands provided by the Coordinator, transmitting them to power controllers across a facility or campus.
       3. Model: EchoFlex 03 Sensor. Allows the status of remote sensors and stations to be shared across a network to update control devices located elsewhere.
       4. Features:
          1. The Coordinator can publish scheduled events, demand response commands and manual overrides across a network of Repeaters and Sensors.
          2. Supports 32 channels, input from, or output to Echoflex wireless devices.
          3. Dual Ethernet connection for daisy-chaining in large spaces; provides pass-through communication even during power outages.
       5. Standards Compliance:
          1. cULus 916 Listed.
          2. FCC / IC. NCC.
       6. Environmental: Indoor use only.
          1. Operating Temperature: 32 to 113 degrees F (0 to 45 degrees C) ambient.
          2. Relative Humidity: 10 to 95 percent non-condensing.
       7. Communications:
          1. Radio Frequency: 902 MHz (U).
          2. Wireless Range: 80 ft (24 m) in commercial office spaces.

Line of Sight: 330 ft (100 m).

* + - * 1. Integrated whip antenna.
        2. Dual Ethernet; 10/100Base-T.
        3. BACnet: BACnet/IP, BACnet/Ethernet, and BACnet/SC.
      1. Hardware:
         1. 24 VDC; 20 to 28 VDC. 2 W typical, 10 W max, Class 2.
         2. Terminal Connectors: Removable screw-type.
         3. Dry Contact Inputs: 2.
         4. Technology:

ARM Cortex-A7 MPU + Cortex-M4 MCU.

RAM: 256 DDR3L.

Flash Memory: 4 GB eMMC.

Real-time clock (RTC): With supercapacitor power backup.

* + - 1. Mounting: In typical flush-mount North American style two-gang electrical boxes.
         1. Minimum Depth: 2 inches (50 mm).
      2. Overall Dimensions:
         1. Diameter: 7.1 inches (100 mm).
         2. Depth: 1.62 inches (41.2 mm).
         3. Weight: 12.32 oz (350 grams.
    1. Contact Interfaces:

\*\* NOTE TO SPECIFIER \*\* Delete basis of design options not required.

* + - 1. Basis of Design: Wireless Active Circuit Transmitter, Echoflex ERM-xAU Series by ETC, Inc.
         1. Standards Compliance:

UL 508A. Certified to CAN/CSA Standard C22.2 No.14. ETL listed.

FCC Part 15.231 and IC RSS-210.

* + - * 1. Mechanical:

Mounting: Inside a standard electrical junction box.

Buttons: Repeater enable / disable and status for configuration.

Buttons to be accessible when Power Sensor is mounted prior to installation of junction box cover.

Two LED Indicators: Display power and status information.

* + - * 1. Electrical:

\*\* NOTE TO SPECIFIER \*\* Delete supply voltage options not required.

* + - * 1. Supply Voltage: 120 VAC, 50/60 Hz.
        2. Supply Voltage: 24 VAC/VDC.
        3. Radio: 902 MHz EnOcean. Other radio frequencies are not acceptable.
        4. Radio Range: Laterally Through Walls: 80 ft. Open Space: 300 ft.
        5. Functional:

Monitor power from connected circuit and transmit circuit status to connected controllers as occupancy status.

Single or dual-hop wireless signal repeating to other controllers.

* + - 1. Basis of Design: Contact Input Interface, 4 Channel. Model ERCII-AU by ETC, Inc.
         1. Standards Compliance: FCC Part 15.231, IC RSS-210.
         2. Input Channels: 4. Each input has two +5 V terminals.

Operated separately, channels send switch or sensor commands to Echoflex controllers.

When two terminals are bridged through an external dry contact, the input triggers transmission of a telegram based on standard EEP profiles.

Switch F6-02-02.

Key Card Switch F6-04-01.

Occupancy Sensor A5-07-01.

Window/Door Contact A5-30-02.

* + - * 1. Low Voltage Interface: Fire alarm, security, lighting, or control panels.
        2. Energy Management System Integration: Any system.
        3. Doubles as a repeater.
        4. Mounting: Panel or DIN rail.
        5. Channel Status: LED interface.
        6. Pluggable terminal strips.
        7. Supports key card switch, rocker switch, occupancy sensor, and window switch profiles.
        8. Mechanical:

Operating Temperature: 14 to 113 degrees F (Minus 10 to 45 degrees C).

Relative Humidity, Non-Condensing: 5 to 95 percent.

Weight: 3.9 oz. (111 grams).

Dimensions: 3 x 5 x 1 inch (76 x 127 x 27 mm).

Mounting: Two screws; not included.

* + - * 1. Hardware Specifications:

Power Supply: 8-30 VDC or 24VAC, 250 mA maximum draw.

Inputs Three buttons: Channel Select, EEP Select, Teach Four +5 V input channels.

Outputs: Two bi-color LEDs per channel.

Channel Mode and Channel State.

* + - * 1. Communications:

Radio Frequency: 902 MHz.

Antenna: Whip.

Transmission Range:

Commercial Office Spaces: 80 ft (24 m).

Line of Sight: Up to 330 ft (100 m).

* + - 1. Basis of Design: Contact Output Interface, 4 Channel. Model ERCOI-AU by ETC, Inc.
         1. Standards Compliance: FCC Part 15.231, IC RSS-210.
         2. Output Interface: 4 dry type-C contact relay channel outputs to interface with third-party devices and control systems.

Rated for 1 A at 30 VDC.

Interface with equipment creating a hybrid control solution.

* + - * 1. Each output can be set up separately, linked to wireless switches or sensors based on standard profiles.

Light and blinds control - US/CA application F6-02-02.

Key Card Activated Switch F6-04-01.

Occupancy Sensor A5-07-01.

Single Input Contact A5-30-02.

1BS Input D5-00-01.

Central Command, Switching and Set Point A5-38-08.

* + - * 1. Low Voltage Interface: Fire alarm, security, lighting, or control panels.
        2. Energy Management System Integration: Any system.
        3. Doubles as a repeater.
        4. Mounting: Panel or DIN rail.
        5. Channel Status: LED interface.
        6. Pluggable terminal strips.
        7. Supports key card switch, rocker switch, occupancy sensor, and window switch and central command profiles.
        8. Mechanical:

Operating Temperature: 14 to 113 degrees F (Minus 10 to 45 degrees C).

Relative Humidity, Non-Condensing: 5 to 95 percent.

Weight: 3.9 oz. (111 grams).

Dimensions: 3 x 5 x 1 inch (76 x 127 x 27 mm).

Mounting: Two screws; not included.

* + - * 1. Hardware Specifications:

Power Supply: 8-30 VDC or 24 VAC, 250 mA maximum draw.

Inputs: CH. Select, LEARN, and CLEAR buttons.

Outputs: Four dry contact type-C relays; Com, N.C., and N.O.

Contact Rating: 1 A, 30 VAC/DC max.

LEDs; 2 per Channel: Red: CH.MODE. Green: RELAY STATE.

* + - * 1. Communications:

Radio Frequency: 902 MHz.

Antenna: Whip.

Transmission Range:

Commercial Office Spaces: 80 ft (24 m).

Line of Sight: Up to 330 ft (100 m).

* + - 1. Basis of Design: Demand Response Interface, Model ERDRI-AU by ETC, Inc. A dedicated contact closure interface. Ensures system can response to Demand Response requests from the power utility.
         1. Standards Compliance: FCC Part 15.231, IC RSS-210.

Energy Codes:

California Energy Commission Title 24.

Washington State Energy Code.

ASHRAE 90.1-2013.

IECC 2015.

RoHS compliant product.

* + - * 1. Low-voltage interface.
        2. Doubles as a telegram repeater for Echoflex wireless signals.
        3. Available in 902 MHz.
        4. Integrates energy management into any Echoflex system.
        5. LED interface for Demand Response threshold level and input state indication.
        6. Interfaces directly with OpenADR appliances with dry contact outputs.
        7. Supported Profiles: Transmitted.

Demand Response command A5-37-01.

* + - * 1. Mechanical:

Operating Temperature: 14 to 113 degrees F (Minus 10 to 45 degrees C).

Relative Humidity, Non-Condensing: 5 to 95 percent.

Weight: 3.9 oz. (111 grams).

Dimensions: 3 x 5 x 1 inch (76 x 127 x 27 mm).

Mounting: Panel mount. Two screws; not included.

* + - * 1. Hardware Specifications:

Power Supply: 8-30 VDC or 24 VAC, 250 mA maximum draw.

Inputs: Three buttons: Threshold Select, Reset, Teach.

One 5V input channel.

Outputs: Four LEDs indicating selected threshold level.

One bi-color LED indicating active/inactive input state.

* + - * 1. Communications:

Radio Frequency: 902 MHz.

Antenna: Integrated Whip.

Transmission Range:

Commercial Office Spaces: 80 ft (24 m),

Line of Sight: Up to 330 ft (100 m).

* + - 1. Basis of Design: Universal Input Output Interface by ETC, Inc. A hybrid control solution using 2 UIOs to transmit wireless data from one location to another replacing wiring runs. The interface includes two inputs and two outputs. Integrates wireless devices with existing panels, wired control systems, or building energy management systems.
         1. Model UIO-AU: 902 MHz

Standards Compliance: FCC Part 15.231, IC RSS-210. ROHS compliant. WEEE marked: Energy Management Equipment.

* + - * 1. Model UIO-AY: 868 MHz.

Standards Compliance: CE Marking. ROHS compliant. WEEE marked: Energy Management Equipment.

* + - * 1. Input Channels: 2. Supporting 0-10 VDC or 4-20 mA.
        2. Output Channels: 2. Supporting 0-10 VDC or 4-20 mA.
        3. Voltage pull up's available on the inputs for dry contact applications.
        4. Doubles as a repeater.
        5. Mounting: DIN rail.
        6. Terminal Blocks: Cage-clamp style for all wiring connections.
        7. LED interface for channel status indication.
        8. Mechanical:

Operating Temperature: 32 to 41 degrees F (0 to 50degrees C).

Relative Humidity, Non-Condensing: 5 to 95 percent.

Weight: 0.22. (0.10 kg).

Dimensions (HcWxD): 3.5 x 3 x 1 inch (90 x 76 x 25 mm).

Mounting: DIN.

* + - * 1. Hardware Specifications:

Power Supply: 9-24 VDC or 24 VAC, 250 mA maximum draw.

Inputs: Three buttons: Threshold Select, Reset, Teach.

One 5V input channel.

Outputs: Four LEDs indicating selected threshold level.

One bi-color LED indicating active/inactive input state.

* + - * 1. Communication:

Antenna: Integrated Whip or External.

Transmission Range:

Commercial Office Spaces: 80 ft (24 m).

Line of Sight: Up to 330 ft (100 m).

* + - 1. Basis of Design: Unison Echo-Echoflex Interface. Model EEI by ETC, Inc. Allows for wireless communication between Echo and Echoflex wireless control systems. Built-in 902 MHz radio can transmit or receive wireless signals to communicate with Echoflex control devices within 80 feet (24 meters). DIN-rail-mount device, which can be installed nearly anywhere.
         1. Standards Compliance: UL and cUL Listed. CE Marked.

UL2043 LISTED for use in plenum.

* + - * 1. Receives wireless trigger from Echoflex system and translates it into an Echo preset trigger.
        2. Receives zone level from Echo system and translates it into a wireless Echoflex command.
        3. Compatible with Echo stations, sensors, interfaces, and power controllers.
        4. Compatible with Echoflex station, sensors, and power controllers.
        5. Mechanical:

Buttons and LED indicators for wireless inputs and wired output configuration and status.

Din-rail mounting complies with DIN43880 (35/7.5 rail).

Construction: Black ABS plastic.

Connection for external antenna; provided separately.

* + - * 1. Electrical:

Connects via two-wire low-voltage Class 2 wiring and 24 VDC auxiliary power.

Topology-free wiring over Belden 8471 and one No. 14 ESD drain wire.

Two No. 16 AWG wires for 24 VDC auxiliary power.

Wiring: Bus, loop, homerun, or any combination.

Supports use of Belden 1583A or equivalent Ethernet control wire when used with Cat5 termination accessories.

Supports 1640 ft (500 m) of control wiring.

Up to 1000 ft (300 m) using Cat5.

MicroSD card slot for firmware maintenance.

Wireless Radio: 902 MHz.

Open Air Transmission Range: 80 ft (24 m).

Presets: 16.

* + - * 1. Operational Room Temperature: 32 to 122 degrees F (0-50 degrees C).
        2. Relative Humidity, Non-Condensing: 5 to 95 percent.

1. EXECUTION
   1. EXAMINATION
      1. Do not begin installation until substrates have been properly constructed and prepared.
      2. If substrate preparation is the responsibility of another installer, notify Architect in writing of unsatisfactory preparation before proceeding.
   2. PREPARATION
      1. Clean surfaces thoroughly prior to installation.
      2. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.
   3. INSTALLATION
      1. Install in accordance with manufacturer's instructions, approved submittals, and in proper relationship with adjacent construction.
   4. FIELD QUALITY CONTROL
      1. Field Inspection: Coordinate field inspection in accordance with appropriate sections in Division 01.

\*\* NOTE TO SPECIFIER \*\* Include if manufacturer provides field quality control with onsite personnel for instruction or supervision of product installation, application, erection, or construction. Delete if not required.

* + 1. Manufacturer's Services: Coordinate manufacturer's services in accordance with appropriate sections in Division 01.
  1. CLEANING AND PROTECTION
     1. Clean products in accordance with the manufacturer's recommendations.
     2. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION