SECTION 25 00 00

INTEGRATION AUTOMATION - HARDWARE AND SOFTWARE

Display hidden notes to specifier. (Don't know how? [Click Here](https://www.arcat.com/sd/display_hidden_notes.shtml))

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\*\* NOTE TO SPECIFIER \*\* Delta Intelligent Building Technologies (Canada) Inc.; building automation.  
This section is based on the products of Delta Intelligent Building Technologies (Canada) Inc., which is located at:  
17850 - 56th Ave.  
Surrey, BC, Canada V3S 1C7  
Tel: 604-574-9444  
Fax: 604-574-7793  
Email: [request info (sales@deltacontrols.com)](https://arcat.com/rfi?action=email&company=Delta%252BIntelligent%252BBuilding%252BTechnologies%252B(Canada)%252BInc.&message=RE%253A%2520Spec%2520Question%2520(13800dlt)%253A%2520&coid=46655&spec=13800dlt&rep=&fax=604-574-7793)  
Web: <https://deltacontrols.com>   
 [ [Click Here](https://arcat.com/company/delta-intelligent-building-technologies-canada-inc-46655) ] for additional information.  
Delta Controls is at the forefront of building automation systems. Through our network of Partners in over 80 countries, our solutions span the globe. Our focus on innovation and sustainability has made us industry leaders for over 30 years. Delta Controls manufactures all of our products just outside of Vancouver, Canada, and offers dependable and user-friendly control solutions for buildings in the commercial, healthcare, hospitality, education, data center, and leisure markets.  
As part of Delta Electronics, we are committed to leading building automation into a sustainable future.

1. GENERAL
   1. SECTION INCLUDES

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

* + 1. BACnet building controllers. (Red5 Family) (enteliBUS Family)
    2. cySoftware. (enteliWEB, enteliCLOUD and Add-Ons)
    3. Mobile applications.
    4. Sensors and thermostats.
    5. Wireless sensors and thermostats.
    6. Hardwired sensors.
    7. Network sensors and thermostats.
    8. Integration.
  1. RELATED SECTIONS

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

* + 1. Section 08 88 36.16 - Electronically Controlled Switchable Glass.
    2. Section 08 75 13 - Automatic Window Equipment.
    3. Section 12 25 09 - Window Treatment Control System.
    4. Section 14 20 00 - Elevators.
    5. Section 14 30 00 - Escalators and Moving Walks.
    6. Section 23 09 23.11 - Direct Digital Control System for HVAC.
    7. Section 26 09 13 - Electrical Power Management System.
    8. Section 26 09 26 - Lighting Control Panelboards.
    9. Section 26 24 16.16 - Integrated Panelboards.
    10. Section 27 10 00 - Structured Cabling.
    11. Section 28 13 11 - Access Control and Security Management Software.
    12. Section 28 46 21 - Fire Alarm System.
  1. REFERENCES
     1. American Society of Heating, Refrigeration, and Air Conditioning Engineers (ASHRAE):
        1. ASHRAE 90.1-2016, "Energy Efficient Design of New Buildings"
        2. ASHRAE 62.1-2013, "Ventilation for Acceptable Indoor Air Quality"
        3. ASHRAE 189.1-2011, "Standard for the Design of High-Performance, Green Buildings"
        4. ASHRAE 135-2016 "BACnet"
        5. ASHRAE 55-2013, "Thermal Environmental Conditions for Human Occupancy"
     2. Canadian Standards Association (CSA):
        1. CAN/CSA C22.2 No. 205: Signal Equipment - Consumer and Commercial Equipment
     3. Federal Communications Commission (FCC).
     4. International Electrotechnical Commission (IEC):
        1. ISO 9001, "International Organization for Standardization"
     5. International Organization for Standardization (ISO):
        1. ISO 9001, "Quality Management Systems - Requirements"
     6. Underwriters Laboratories, Inc. (UL):
        1. UL / UUKL, "864 Smoke Control"
        2. UL 294, "Access Control"
        3. UK 864
        4. UL 916
  2. 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 of 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 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. The intent of a mock-up is to demonstrate quality of workmanship and visual appearance.
       2. If the mock-up is not acceptable, rebuild the 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: Delta Intelligent Building Technologies (Canada) Inc., which is located at:  
         17850 - 56th Ave.  
         Surrey, BC, Canada V3S 1C7  
         Tel: 604-574-9444  
         Fax: 604-574-7793  
         Email: [request info (sales@deltacontrols.com)](https://arcat.com/rfi?action=email&company=Delta%252BIntelligent%252BBuilding%252BTechnologies%252B(Canada)%252BInc.&message=RE%253A%2520Spec%2520Question%2520(13800dlt)%253A%2520&coid=46655&spec=13800dlt&rep=&fax=604-574-7793);Web: <https://deltacontrols.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 the provisions of Section 01 60 00.

\*\* NOTE TO SPECIFIER \*\* Delete article if not required or delete paragraphs (products) not required.

* 1. BACNET BUILDING CONTROLLERS (RED5 FAMILY)
     1. Red5-PLUS-1180: Programmable BACnet application controller. Fast processing speed, increased memory, and secure, scalable IoT connectivity. Supports a wide range of applications with onboard and modular I/O options. Using the Proviso app, you can adjust network settings, view sensor data, and calibrate sensors via NFC or Bluetooth. Allows custom IoT applications via integrated Node-Red interface.
        1. BACnet Device Profile: BACnet Building Controller (B-BC).
           1. Inputs: 11 universal inputs, 16 bit, Supporting:

0 to 5 VDC.

0 to 10 VDC.

10K ohms thermistor.

Dry Contact using 10K ohm thermistor setting.

4 to 20 mA.

* + - * 1. Outputs: 8 universal outputs.
      1. Device Addressing: Software addressed.
      2. Connectors: Removable screw type terminal connectors.
      3. Wiring Class: Class 2 / SELV.
      4. Power: 24 VAC, 16 VA typ, 50/60 Hz; recommended at 50 VA maximum power.
      5. Power: 24 VDC, 6 W typ; 20 W maximum power.
      6. Technology: 32 bit ARM processor at 792 MHz.
         1. Ram. 512 MB.
         2. Flash Memory. 8 GB.
         3. GCL+ PG Size: 24.4 KB.
         4. Database Space: 20 MB.
         5. Clock: Real-time.
         6. Super Capacitor: 72 hour backup of real-time clock and SRAM.
      7. Communications Ports:
         1. 10/100 Base T/Ethernet: 2.

BACnet/IP

BACnet over Ethernet

BACnet Router

BBMD

BACnet/SC.

* + - * 1. NET1 and NET2:

BACnet MS/TP up to 76800 bps, 64 devices maximum.

Delta LINKnet up to 76800 bps, 12 devices maximum with no more than 12 DFM (1 port only).

Modbus RTU up to 30 devices maximum, 1 port only.

* + - * 1. Red5BUS: 12 maximum local and remote Red5 I/O modules; including maximum 2 modules on local CAN; remote modules require Red5 expanders.
        2. Local CAN: up to 2 Red5 I/O Modules
        3. O3 Hubs: 8 maximum.
        4. USB2 Ports: 2.
        5. Bluetooth: BLE 5.0.
        6. NFC.
      1. Operating Temperature: -22 to 131 degrees F (-30 to 55 degrees C).
         1. Relative Humidity: 10 to 95 percent, non-condensing.
      2. Dimensions: 9.9 x 4.4 x 2.28 inches (252 x 112 x 58 mm).
      3. Weight: 1.1 lbs (497 grams) with housing.
      4. Compliance: CE and FCC.
      5. Listings: cULus, UL 916, UKCA, and BTL.
    1. Red5-PLUS-1146: Programmable IoT system controller. Fast processing speed, increased memory, secure and scalable IoT connectivity. Supports applications, from system-level control to unitary control, with onboard and modular I/O options. Using the Proviso app, you can adjust network settings, view sensor data, and calibrate sensors via NFC or Bluetooth. Allows for custom IoT applications via integrated Node-Red interface.
       1. BACnet Building Controller (B-BC).
          1. Inputs: 11 Universal Inputs, 16-bit, Supporting:

0 to 5 VDC.

0 to 10 VDC.

10K ohms thermistor.

Dry Contact using 10K ohm thermistor setting.

4 to 20 mA.

* + - * 1. Outputs:

Analog Outputs: 4. 0-10VDC @20mA max

Binary TRIAC Outputs: 6. 24 VAC @ 500 mA max. Jumper configured for internal or external Device Addressing: Software addressed.

* + - 1. Connectors: Removable screw type terminal connectors.
      2. Wiring Class: Class 2 / SELV.
      3. Power: 24 VDC, 5 typ; 20 W maximum.
      4. Power: 24 VAC at 14 VA typ, 100 VA maximum with fully loaded, internally powered TRIAC output.
      5. Technology:
         1. ARM Processor: 32 bit at 792 Mhz.
         2. RAM: 512 MB.
         3. Flash Memory: 8 GB.
         4. GCL+ PG Size: 24.4 KB.
         5. Database Space: 20 MB.
         6. Clock: Real-time.
         7. Super Capacitor: 72 hour backup of real-time clock and SRAM.
      6. Communications Ports:
         1. 10/100 Base T/Ethernet: 2.

BACnet/IP

BACnet over Ethernet

BACnet Router

BBMD

BACnet/SC.

* + - * 1. NET1 and NET2:

BACnet MS/TP up to 76800 bps, 64 devices maximum.

Delta LINKnet up to 76800 bps, 12 devices maximum with no more than 12 DFM; 1 port only.

Modbus RTU up to 30 devices maximum, 1 port only.

* + - * 1. NET3: CAN bus. Local and Remote Red5 I/O Modules: 12 maximum, including maximum 2 modules on local CAN. Remote modules require Red5 expanders.
        2. Local CAN: up to 2 Red5 I/O Modules
        3. O3 Hubs: 8 maximum.
        4. USB2 ports: 2.
        5. Bluetooth: BLE 5.0.
        6. NFC.
      1. Operating Temperature: -22 to 131 degrees F (-30 to 55 degrees C).
         1. Relative Humidity: 10 to 95 percent, non-condensing.
      2. Dimensions: 9.9 x 4.4 x 2.28 inches (252 x 112 x 58 mm).
      3. Weight: 1.08 lbs (488 grams) with housing.
      4. Compliance: CE and FCC.
      5. Listings: cULus, UL 916, UKCA, and BTL.
    1. Red5-PLUS-634: Fast processing speed, increased memory, secure, and scalable IoT connectivity. A programmable IoT system controller. Supports a wide range of applications, from system-level control to unitary control. Onboard and modular I/O options. Using the Proviso app, adjust network settings, view sensor data, and calibrate sensors via NFC or Bluetooth. Allows custom IoT applications via integrated Node-Red interface.
       1. BACnet Building Controller (B-BC)
          1. Inputs: 6 Universal Inputs, 16-bit, Supporting:

0 to 5 VDC.

0 to 10 VDC.

10K ohms thermistor.

Dry Contact using 10K ohm thermistor setting.

4 to 20 mA.

* + - * 1. Outputs:

Analog Outputs: 3. 0-10VDC @20mA max

Binary TRIAC Outputs: 4. 24 VAC @ 500 mA max. Jumper configured for internal or external

* + - 1. Device Addressing: Software addressed.
      2. Connectors: Removable screw type terminal connectors.
      3. Power: 24 VAC, 14 VA typ, 50/60 Hz; 80 VA maximum, fully loaded
      4. Power: 24 VDC, 6 W typ; 18 W maximum
      5. Wiring Class: Class 2 / SELV.
      6. Technology:
         1. ARM Processor: 32 bit
         2. RAM: 512 MB.
         3. Flash Memory: 8 GB.
         4. GCL+ PG Size: 24.4 KB.
         5. Database Space: 20 MB.
      7. Communications Ports:
         1. 10/100 Base T/Ethernet: 2.

BACnet/IP

BACnet over Ethernet

BACnet Router

BBMD

BACnet/SC.

* + - * 1. NET1 and NET2:

BACnet MS/TP up to 76800 bps, 64 devices maximum. 1 port only.

Delta LINKnet up to 76800 bps, 12 devices maximum with no more than 12 DFM; 1 port only.

Modbus RTU up to 30 devices maximum, 1 port only.

* + - * 1. NET3: CAN bus. Local and Remote Red5 I/O Modules: 12 maximum, including maximum 2 modules on local CAN. Remote modules require Red5 expanders.
        2. Local CAN: up to 2 Red5 I/O Modules
        3. O3 Hubs: 8 maximum.
        4. USB2 Ports: 2.
        5. Bluetooth: BLE 5.0.
        6. NFC.
      1. Operating Temperature: -22 to 131 degrees F (-30 to 55 degrees C).
         1. Relative Humidity: 10 to 95 percent. Non-condensing.
      2. Dimensions: 8.5 x 4.4 x 2.28 inches (216 x 112 x 58 mm).
      3. Weight: 03.80 lbs (60 grams) with housing.
      4. Compliance: CE and FCC.
      5. Listings: cULus, UL 916, UKCA, and BTL.
    1. Red5-PLUS-606: Fast processing speed, increased memory, and secure, scalable IoT connectivity. Programmable IoT system controller. Supports a wide range of applications, from system-level control to unitary control. Onboard and modular I/O options. Using the Proviso app, adjust network settings, view sensor data, and calibrate sensors via NFC or Bluetooth. Allows custom IoT applications via integrated Node-Red interface.
       1. BACnet Building Controller (B-BC)
          1. Inputs: 6 Universal Inputs, 16-bit, Supporting:

0 to 5 VDC.

0 to 10 VDC.

10K ohms thermistor.

Dry Contact using 10K ohm thermistor setting.

4 to 20 mA.

* + - * 1. Outputs: Binary TRIAC Outputs: 6. 24 VAC @ 500 mA max. Jumper configured for internal or external
      1. Device Addressing: Software addressed.
      2. Connectors: Removable screw type terminal connectors.
      3. Wiring Class: Class 2 / SELV
      4. Power: 24 VAC, 14 VA typ, 50/60 Hz; 100 VA maximum, fully loaded
      5. Power: 24 VDC, 6 W typ; 17 W maximum power.
      6. Technology:
         1. ARM Processor: 32 bit.
         2. RAM: 512 MB.
         3. Flash Memory: 8 GB.
         4. GCL+ PG Size: 24.4 KB.
         5. Database Space: 20 MB.
      7. Communications Ports:
         1. 10/100 Base T/Ethernet: 2.

BACnet/IP

BACnet over Ethernet

BACnet Router

BBMD

BACnet/SC.

* + - * 1. NET1 and NET2:

BACnet MS/TP up to 76800 bps, 64 devices maximum. 1 port only.

Delta LINKnet up to 76800 bps, 12 devices maximum with no more than 12 DFM; 1 port only.

Modbus RTU up to 30 devices maximum, 1 port only.

* + - * 1. NET3: CAN bus. Local and Remote Red5 I/O Modules: 12 maximum, including maximum 2 modules on local CAN. Remote modules require Red5 expanders.
        2. Local CAN: up to 2 Red5 I/O Modules
        3. O3 Hubs: 8 maximum.
        4. USB2 Ports: 2.
        5. Bluetooth: BLE 5.0.
        6. NFC.
      1. Operating Temperature: -22 to 131 degrees F (-30 to 55 degrees C).
         1. Relative Humidity: 10 to 95 percent. Non-condensing.
      2. Dimensions: 8.5 x 4.4 x 2.28 inches (216 x 112 x 58 mm).
      3. Weight: 0.80 lbs (360 grams) with housing.
      4. Compliance: CE and FCC.
      5. Listings: cULus, UL 916, UKCA, and BTL.
    1. Red5-EDGE-1180: Programmable BACnet application controller. Fast processing speed, increased memory, and secure, scalable IoT connectivity. Supports a wide range of applications with onboard and modular I/O options. Using the Proviso app, you can adjust network settings, view sensor data, and calibrate sensors via NFC or Bluetooth. Allows custom IoT applications.
       1. BACnet Device Profile: BACnet Building Controller (B-BC).
          1. Inputs: 11 universal inputs, 16 bit, Supporting:

0 to 5 VDC.

0 to 10 VDC.

10K ohms thermistor.

Dry Contact using 10K ohm thermistor setting.

4 to 20 mA.

* + - * 1. Outputs: 8 universal outputs. 0-10VDC @20mA max
      1. Device Addressing: Software addressed.
      2. Connectors: Removable screw type terminal connectors.
      3. Wiring Class: Class 2 / SELV.
      4. Power: 24 VAC, 16 VA typ, 50/60 Hz; recommended at 31 VA maximum.
      5. Power: 24 VDC, 6 W typ; 12 W maximum power.
      6. Technology: 32 bit ARM processor at 792 MHz.
         1. Ram. 256 MB.
         2. Flash Memory. 4 GB.
         3. GCL+ PG Size: 24.4 KB.
         4. Database Space: 20 MB.
         5. Clock: Real-time.
         6. Optional Super Capacitor: 72 hour backup of real-time clock and SRAM.
      7. Communications Ports:
         1. 10/100 Base T/Ethernet: 2 with bypass.

BACnet/IP

BACnet over Ethernet

BACnet/SC.

* + - * 1. NET1 and NET2:

BACnet MS/TP up to 76800 bps, 4 devices maximum.

Delta LINKnet up to 76800 bps, 12 devices maximum with no more than 4 DFM-4xx (1 port only).

Modbus RTU up to 5 devices maximum, 1 port only.

* + - * 1. NET3: Remote Red5 I/O Modules: 4 maximum. Remote modules require Red5 expanders.
        2. O3 Hubs: 2 maximum.
        3. USB2 Ports: 2.
        4. Bluetooth: BLE 5.0.
        5. NFC.
      1. Operating Temperature: -22 to 131 degrees F (-30 to 55 degrees C).
         1. Relative Humidity: 10 to 95 percent, non-condensing.
      2. Dimensions: 9.9 x 4.4 x 2.28 inches (252 x 112 x 58 mm).
      3. Weight: 1.1 lbs (497 grams) with housing.
      4. Compliance: CE and FCC.
      5. Listings: cULus, UL 916, UKCA, and BTL.
    1. Red5-EDGE-1146: Programmable IoT system controller. Fast processing speed, increased memory, secure and scalable IoT connectivity. Supports applications, from system-level control to unitary control, with onboard and modular I/O options. Using the Proviso app, you can adjust network settings, view sensor data, and calibrate sensors via NFC or Bluetooth. Allows for custom IoT applications via integrated Node-Red interface.
       1. BACnet Building Controller (B-BC).
          1. Inputs: 11 Universal Inputs, 16-bit, Supporting:

0 to 5 VDC.

0 to 10 VDC.

10K ohms thermistor.

Dry Contact using 10K ohm thermistor setting.

4 to 20 mA.

* + - * 1. Outputs:

Analog Outputs: 4. 0-10VDC @20mA max

Binary TRIAC Outputs: 6. 24 VAC @ 500 mA max. Jumper configured for internal or external

* + - 1. Device Addressing: Software addressed.
      2. Connectors: Removable screw type terminal connectors.
      3. Wiring Class: Class 2 / SELV.
      4. Power: 24 VDC, 5W typ; 20 W maximum.
      5. Power: 24 VAC at 14 VA typ, 100 VA maximum with fully loaded, internally powered TRIAC output.
      6. Technology:
         1. ARM Processor: 32 bit at 792 Mhz.
         2. RAM: 256 MB.
         3. Flash Memory: 4 GB.
         4. GCL+ PG Size: 24.4 KB.
         5. Database Space: 20 MB.
         6. Clock: Real-time.
         7. Optional Super Capacitor: 72 hour backup of real-time clock and SRAM.
      7. Communications Ports:
         1. 10/100 Base T/Ethernet: 2 with bypass.

BACnet/IP

BACnet over Ethernet

BACnet/SC.

* + - * 1. NET1 and NET2:

BACnet MS/TP up to 76800 bps, 4 devices maximum.

Delta LINKnet up to 76800 bps, 12 devices maximum with no more than 4 DFM-4xx; 1 port only.

Modbus RTU up to 5 devices maximum, 1 port only.

* + - * 1. NET3: Remote Red5 I/O Modules: 4 maximum. Remote modules require Red5 expanders.
        2. O3 Hubs: 2 maximum.
        3. USB2 ports: 2.
        4. Bluetooth: BLE 5.0.
        5. NFC.
      1. Operating Temperature: -22 to 131 degrees F (-30 to 55 degrees C).
         1. Relative Humidity: 10 to 95 percent, non-condensing.
      2. Dimensions: 9.9 x 4.4 x 2.28 inches (252 x 112 x 58 mm).
      3. Weight: 1.08 lbs (488 grams) with housing.
      4. Compliance: CE and FCC.
      5. Listings: cULus, UL 916, UKCA, and BTL.
    1. Red5-EDGE-634: Fast processing speed, increased memory, secure, and scalable IoT connectivity. A programmable IoT system controller. Supports a wide range of applications, from system-level control to unitary control. Onboard and modular I/O options. Using the Proviso app, adjust network settings, view sensor data, and calibrate sensors via NFC or Bluetooth. Allows custom IoT applications.
       1. BACnet Building Controller (B-BC)
          1. Inputs: 6 Universal Inputs, 16-bit, Supporting:

0 to 5 VDC.

0 to 10 VDC.

10K ohms thermistor.

Dry Contact using 10K ohm thermistor setting.

4 to 20 mA.

* + - * 1. Outputs:

Analog Outputs: 3. 0-10VDC @ 20mA max

Binary TRIAC Outputs: 4. 24 VAC @ 500 mA max. Jumper configured for internal or external addressed.

* + - 1. Connectors: Removable screw type terminal connectors.
      2. Wiring Class: Class 2 / SELV.
      3. Power: 24 VDC, 6W typ; 11 W maximum.
      4. Power: 24 VAC at 14 VA typ, 75 VA maximum with fully loaded, internally powered
      5. Technology:
         1. ARM Processor: 32 bit
         2. RAM: 512 MB.
         3. Flash Memory: 4 GB.
         4. GCL+ PG Size: 24.4 KB.
         5. Database Space: 20 MB.
      6. Communications Ports:
         1. 10/100 Base T/Ethernet: 2 with bypass.

BACnet/IP

BACnet over Ethernet

BACnet/SC.

* + - * 1. NET1 and NET2:

BACnet MS/TP up to 76800 bps, 4 devices maximum. 1 port only.

Delta LINKnet up to 76800 bps, 12 devices maximum with no more than 4 DFM-4xx; 1 port only.

Modbus RTU up to 5 devices maximum, 1 port only.

* + - * 1. NET3: Remote Red5 I/O Modules: 4 maximum. Remote modules require Red5 expanders.
        2. O3 Hubs: 2 maximum.
        3. USB2 Ports: 2.
        4. Bluetooth: BLE 5.0.
        5. NFC.
      1. Operating Temperature: -22 to 131 degrees F (-30 to 55 degrees C).
         1. Relative Humidity: 10 to 95 percent. Non-condensing.
      2. Dimensions: 8.5 x 4.4 x 2.28 inches (216 x 112 x 58 mm).
      3. Weight: .80 lbs (360 grams) with housing.
      4. Compliance: CE and FCC.
      5. Listings: cULus, UL 916, UKCA, and BTL.
    1. Red5-EDGE-606: Fast processing speed, increased memory, and secure, scalable IoT connectivity. Programmable IoT system controller. Supports a wide range of applications, from system-level control to unitary control. Onboard and modular I/O options. Using the Proviso app, adjust network settings, view sensor data, and calibrate sensors via NFC or Bluetooth. Allows custom IoT applications.
       1. BACnet Building Controller (B-BC)
          1. Inputs: 6 Universal Inputs, 16-bit, Supporting:

0 to 5 VDC.

0 to 10 VDC.

10K ohms thermistor.

Dry Contact using 10K ohm thermistor setting.

4 to 20 mA.

* + - * 1. Outputs: Binary TRIAC Outputs: 6. 24 VAC @ 500 mA max. Jumper configured for internal or external
      1. Device Addressing: Software addressed.
      2. Connectors: Removable screw type terminal connectors.
      3. Wiring Class: Class 2 / SELV.
      4. Power: 24 VDC, 6W typ; 10W maximum.
      5. Power: 24 VAC at 14 VA typ, 92 VA maximum with fully loaded, internally powered
      6. Technology:
         1. ARM Processor: 32 bit.
         2. RAM: 256 MB.
         3. Flash Memory: 4 GB.
         4. GCL+ PG Size: 24.4 KB.
         5. Database Space: 20 MB.
      7. Communications Ports:
         1. 10/100 Base T/Ethernet: 2 with Bypass.

BACnet/IP

BACnet over Ethernet

BACnet/SC.

* + - * 1. NET1 and NET2:

BACnet MS/TP up to 76800 bps, 64 devices maximum. 1 port only.

Delta LINKnet up to 76800 bps, 12 devices maximum with no more than 4 DFM-4xx; 1 port only.

Modbus RTU up to 5 devices maximum, 1 port only.

* + - * 1. NET3: Remote Red5 I/O Modules: 4 maximum. Remote modules require Red5 expanders.
        2. O3 Hubs: 2 maximum.
        3. USB2 Ports: 2.
        4. Bluetooth: BLE 5.0.
        5. NFC.
      1. Operating Temperature: -22 to 131 degrees F (-30 to 55 degrees C).
         1. Relative Humidity: 10 to 95 percent. Non-condensing.
      2. Dimensions: 8.5 x 4.4 x 2.28 inches (216 x 112 x 58 mm).
      3. Weight: 0.80 lbs (360 grams) with housing.
      4. Compliance: CE and FCC.
      5. Listings: cULus, UL 916, UKCA, and BTL.
    1. Red5-FIELD-1180: Fast processing speed and increased memory. A native BACnet advanced application controller. Communicates over RS-485 using BACnet MS/TP protocol. Completely programmable. GCL+ programs and BACnet objects can be tailored to a specific application. Provisioning and configuration using the Proviso app.
       1. BACnet Building Controller (B-BC).
          1. Inputs: 11 Universal Inputs, 16-bit, Supporting:

0 to 5 VDC.

0 to 10 VDC.

10K ohms thermistor.

Dry Contact using 10K ohm thermistor setting.

4 to 20 mA.

* + - * 1. Outputs: 8 analog outputs with LED status indication.

Output Type: 0 to 10 VDC at 20 mA maximum per output.

* + - 1. Device Addressing: Software and DNA.
      2. Connectors: Removable screw type terminal connectors.
      3. Wiring Class: Class 2 / SELV.
      4. Recommended Power Sources:
         1. 24 VAC, 50/60 Hz. Maximum Power Consumption: 20 VA.
         2. 24 VDC. Maximum Power Consumption: 8 W.
      5. Technology:
         1. ARM Processor: 32 bit.
         2. RAM: 256 MB.
         3. Flash Memory: 2 GB.
      6. Communications Ports:
         1. RS-485 Ports: 2.
         2. NET1: BACnet MS/TP (RS-485).

Baud Rates: 9600, 19200, 38400, and 76800 bps (Default).

* + - * 1. NET2: LINKnet.

Baud Rate: 76800 bps.

Additional Supported Protocols: Modbus RTU and EnOcean.

* + - * 1. USB2 Port: 1.
        2. NFC
      1. Operating Temperature: 32 to 131 degrees F (0 to 55 degrees C).
         1. Relative Humidity: 10 to 90 percent, non-condensing.
      2. Dimensions: 10 5/16 x 4 1/4 x 1 15/16 inches (262 x 107 x 33 mm). Weight: .959 lbs (435 grams) with housing.
      3. Compliance: CE, FCC, and UKCA.
      4. Listings: cULus, UL 916,and BTL.
    1. Red5-Field-1146: Faster processing speed and increased memory. A native BACnet advanced application controller. Communicates over RS-485 using BACnet MS/TP protocol. Completely programmable. GCL+ programs and BACnet objects can be tailored to a specific application. Provisioning and configuration using the Proviso app.
       1. BACnet Building Controller (B-BC).
          1. Inputs: 11 Universal Inputs, 16-bit, Supporting:

0 to 5 VDC.

0 to 10 VDC.

10K ohms thermistor.

Dry Contact using 10K ohm thermistor setting.

4 to 20 mA.

* + - * 1. Outputs:

Universal: 4. Voltage: 0 to 10 VDC. Maximum Current: 20 mA.

Binary TRIAC: 6. Voltage: 24 VAC @ 500 mA max. Jumper configured for internal or external

* + - 1. Device Addressing: Software and DNA.
      2. Connectors: Removable screw type terminal connectors.
      3. Wiring Class: Class 2 / SELV.
      4. Recommended power sources:
         1. 24 VAC, 50/60 Hz. Maximum Power Consumption: 87 VA.
         2. 24 VDC. Maximum Power Consumption: 7 W.
      5. Technology:
         1. ARM Processor: 32 bit.
         2. RAM: 256 MB.
         3. Flash Memory: 2 GB.
      6. Communications Ports:
         1. RS-485 Ports: 2.
         2. NET1: BACnet MS/TP (RS-485).

Baud Rates: 9600, 19200, 38400, and 76800 bps (Default).

* + - * 1. NET2: LINKnet.

Baud Rate: 76800 bps.

Additional Supported Protocols: Modbus and EnOcean.

* + - * 1. USB2 Port: 1
        2. NFC.
      1. Operating Temperature: 32 to 131 degrees F (0 to 55 degrees C).
         1. Relative Humidity: 10 to 90 percent, non-condensing.
      2. Dimensions: 10 5/16 x 4 1/4 x 1 15/16 inches (262 x 107 x 33 mm).
      3. Weight: .959 lbs (435 grams) with housing.
      4. Compliance: CE, FCC, and UKCA.
      5. Listings: cULus, UL 916,and BTL.
    1. Red5-Field-634: Faster processing speed and increased memory. A native BACnet advanced application controller. Communicates over RS-485 using BACnet MS/TP protocol. Completely programmable. GCL+ programs and BACnet objects can be tailored to a specific application. Provisioning and configuration using the Proviso app.
       1. BACnet Building Controller (B-BC).
          1. Inputs: 6 Universal Inputs, 16-bit, Supporting:

0 to 5 VDC.

0 to 10 VDC.

10K ohms thermistor.

Dry Contact using 10K ohm thermistor setting.

4 to 20 mA.

* + - * 1. Outputs:

Universal: 3. Voltage: 0 to 10 VDC. Maximum Current: 20 mA.

Binary TRIAC: 4. Voltage: 24 VAC @ 500 mA max. Jumper configured for internal or external

* + - 1. Device Addressing: Software and DNA.
      2. Connectors: Removable screw type terminal connectors.
      3. Wiring Class: Class 2 / SELV.
      4. Recommended power sources:
         1. 24 VAC, 50/60 Hz. Maximum Power Consumption: 60 VA max.
         2. 24 VDC. Maximum Power Consumption: 6 W .
      5. Technology:
         1. ARM Processor: 32 bit.
         2. RAM: 256 MB.
         3. Flash Memory: 2 GB.
      6. Communications Ports:
         1. RS-485 Ports: 2.
         2. NET1: BACnet MS/TP (RS-485).

Baud Rates: 9600, 19200, 38400, and 76800 bps (Default).

* + - * 1. NET2: LINKnet.

Baud Rate: 76800 bps.

Additional Supported Protocols: Modbus and EnOcean.

* + - * 1. USB2 Port: 1
        2. NFC.
      1. Operating Temperature: 32 to 131 degrees F (0 to 55 degrees C).
         1. Relative Humidity: 10 to 90 percent, non-condensing.
      2. Dimensions: 8 9/16 x 4 1/4 x 1 5/16 inches (218 x 107 x 33 mm).
      3. Compliance: CE, FCC, and UKCA.
      4. Listings: cULus, UL 916,and BTL.
    1. Red5-Field-606: Faster processing speed and increased memory. A native BACnet advanced application controller. Communicates over RS-485 using BACnet MS/TP protocol. Completely programmable. GCL+ programs and BACnet objects can be tailored to a specific application. Provisioning and configuration using the Proviso app.
       1. BACnet Building Controller (B-BC).
          1. Inputs: 6 Universal Inputs, 16-bit, Supporting:

0 to 5 VDC.

0 to 10 VDC.

10K ohms thermistor.

Dry Contact using 10K ohm thermistor setting.

4 to 20 mA.

* + - * 1. Outputs:

Binary TRIAC: 6. Voltage: 24 VAC @ 500 mA max. Jumper configured for internal or external

* + - 1. Device Addressing: Software and DNA.
      2. Connectors: Removable screw type terminal connectors.
      3. Wiring Class: Class 2 / SELV.
      4. Recommended power sources:
         1. 24 VAC, 50/60 Hz. Maximum Power Consumption: 83 VA max.
         2. 24 VDC. Maximum Power Consumption: 5 W .
      5. Technology:
         1. ARM Processor: 32 bit.
         2. RAM: 256 MB.
         3. Flash Memory: 2 GB.
      6. Communications Ports:
         1. RS-485 Ports: 2.
         2. NET1: BACnet MS/TP (RS-485).

Baud Rates: 9600, 19200, 38400, and 76800 bps (Default).

* + - * 1. NET2: LINKnet.

Baud Rate: 76800 bps.

Additional Supported Protocols: Modbus and EnOcean.

* + - * 1. USB2 Port: 1
        2. NFC.
      1. Operating Temperature: 32 to 131 degrees F (0 to 55 degrees C).
         1. Relative Humidity: 10 to 90 percent, non-condensing.
      2. Dimensions: 8 9/16 x 4 1/4 x 1 15/16 inches (218 x 107 x 33 mm).
      3. Compliance: CE, FCC, and UKCA.
      4. Listings: cULus, UL 916,and BTL.
    1. Red5-PLUS-ROOM Controller: Programmable native BACnet multi-room controller. The primary integration engine of the Red5 system. Contains memory storage, external communication ports, and control logic for the expansion modules. Supports 12 I/O or gateway modules and 24 access modules. Total number of modules cannot exceed 24. Supports multiple communication methods, including BACnet/IP, BACnet over Ethernet, BACnet MS/TP, and Delta LINKnet.
       1. Communication Ports: BACnet/IP, BACnet over Ethernet and BACnet MS/TP.
       2. Dual ethernet ports.
       3. Modular, Expandable I/O: Modular design provides flexibility, ease of service and reduces cost of future upgrades.
       4. Advanced fault detection and diagnostics.
       5. Save Over the Network: Firmware upgrades and database loads.
       6. LED Indicators: Device status, NET, and Ethernet ports.
       7. Expansion Ports: USB.
       8. DIN rail mountable (EN 50022-35x7.5).
       9. Attributes:
          1. BACnet Building Controller (B-BC).
          2. Device Addressing: Software addressed.
          3. Terminal Connectors: Removable screw type.
          4. Wiring Class: Class 2 / SELV.
          5. Power Input: 24 VDC, 2 W typical; 5 W maximum.
          6. Power Input: 24 VDC, 100 W maximum output fully loaded.
          7. Power Out: One, 24 VDC switched power output.

Short circuit protected.

Overcurrent protected.

* + - * 1. Power Out: Two, 24 VDC unswitched power outputs.
        2. Technology: Arm Cortex-A8.

RISC CPU: 32-bit 600 MHz.

RAM: 256 MB DDR3L.

Flash Memory: 4 GB eMMC.

Real-time clock.

Supercapacitor power backup for RTC and CPU.

* + - * 1. Communication Ports: Two, Ethernet 10/100-Base T.
        2. BACnet/IP, BACnet over Ethernet, BACnet/SC.

Three, RS-485 Ports Supporting:

BACnet MS/TP up to 76800 bps, maximum 16 devices per Red5-PLUS-ROOM.

Delta LINKnet up to 76800 bps, maximum 12 devices per Red5-PLUS-ROOM.

Modbus RTU , maximum 16 devices per Red5-PLUS-ROOM.

One, CAN bus port.

Two, USB 2.0 ports.

* + - * 1. Ambient Rating: -22 to 131 degrees F (-30 to 55 degrees C).

Relative Humidity: 10 to 95 percent, non-condensing.

* + - * 1. Dimensions: 4.25 x 4.37 x 2.28 inches (108 x 111 x 58 mm).
        2. Weight: 0.425 lbs (193 grams).
        3. Enclosure Protection Rating: IP20.
        4. Compliance: CE and FCC.
        5. Listings: cULus and UL 916.
    1. Red5 EDGE ROOM: Fully programmable native BACnet single room controller. A primary integration engine of the Red5 system. Contains memory storage, external communication ports, and control logic for the expansion modules. Supports 4 expansion modules. Supports multiple communication methods, including BACnet/IP, BACnet over Ethernet, BACnet MS/TP, and Delta LINKnet.
       1. BACnet Device Profile: BACnet Building Controller (B-BC).
       2. Device Addressing: Software addressed.
       3. Connectors: Removable screw-type terminal connectors.
       4. Wiring Class: Class 2 / SELV.
       5. Power: 24 VDC, 2 W typical; 7 W maximum.
       6. Power: 24 VDC, 100 W maximum output fully loaded.
       7. Power Out: 75 W maximum.
       8. Technology: Arm Cortex-A8.
          1. RISC CPU: 32 bit 600 MHz.
          2. RAM: 256 MB DDR3L.
          3. Flash Memory: 4 GB eMMC.
          4. Clock: Real-time.
          5. Super Capacitor: Power backup for RTC and CPU.
       9. Communication Ports:
          1. Ethernet Ports; 10/100-Base T: 2.

BACnet/IP, BACnet over Ethernet, BACnet/SC.

* + - * 1. One, RS-485 Port Supporting 4 Devices with the Following Protocols:

BACnet MS/TP: Up to 76800 bps.

Delta LINKnet: Up to 76800 bps.

Modbus RTU

* + - * 1. CAN Bus Port: 1. Supporting up to 2 O3-HUB Devices.
        2. USB 2.0 Ports: 2.
      1. Ambient Rating: -22 to 131 degrees F (-30 to 55 degrees C).
         1. Relative Humidity: 10 to 95 percent, non-condensing.
      2. Dimensions: 4.25 x 4.37 x 2.28 inches (108 x 111 x 58 mm).
      3. Weight: 0.425 lbs (193 grams).
      4. Enclosure Protection Rating: IP20.
      5. Compliance: CE and FCC.
      6. Listings: cUL and UL 916.
    1. Red5-MODULE-1DOOR An integral part of Delta Controls V4 access control system. Works with Red5-PLUS-ROOM and Red5-EDGE-ROOM controllers. Provides remote, fully programmable access control over BACnet. Provides expanded I/O capabilities, supporting a combination of universal and door-specific points.
       1. Controls and provides input/output points for one door and one credential reader.
       2. Fully programmable.
       3. Configurable Wiegand credential format, up to 200 bits. Supports multiple formats simultaneously.
       4. Door contact and request-to-exit inputs can be monitored using end-of-line (EOL) circuits (Types 0, 1, 2, 3, 4).
       5. V4 access system supports up to 100,000 local credentials and 10,000 buffered events.
       6. Inputs:
          1. Wiegand Input: 1. For credential reader data; reader, keypad, biometric device, etc.
          2. Input for Request-to-Exit Switch: 1.
          3. Input for Door Contact: 1.
       7. Outputs:
          1. LED Open Collector for Credential Reader: 1. 12 VDC, -25 mA max
          2. Binary Output for Credential Reader Power: 1. 12 VDC, 300 mA
          3. Binary Outputs for Powering Request-to-Exit or Door Accessories:

24 VDC, 450 mA: 1.

12 VDC, 100 mA: 1

* + - * 1. Binary Outputs for Door Lock or Door Accessories:

24 VDC, 450 mA: 1.

12 VDC, 475 mA: 1.

* + - 1. Universal Point: Input or Output.
         1. Input, 16-bit: 1. Supporting:

0 to 5 VDC.

0 to 10 VDC.

10 kOhms thermistor.

Dry Contact using 10 KOhm thermistor setting.

4 to 20 mA; using external 250 Ohm resistor on 0 to 5 V setting.

* + - * 1. Output, 12-bit: 1. Supporting: 0 to 10 V at 20 mA maximum.
      1. Connectors: Removable screw type terminal connectors.
      2. Wiring Class: Class 2 / SELV.
      3. Power: 24 VDC, 1.5 A; 36 W maximum.
      4. Ambient: -22 to 131 degrees F (-30 to 55 degrees C).
         1. Relative Humidity: 10 to 90 percent, non-condensing.
      5. Dimensions: 2.2 x 4.2 x 2.3 inches (57 x 107 x 58 mm).
      6. Weight: 0.22 lbs (102 grams).
      7. Compliance: CE and FCC.
      8. Listings: cUL and UL 916.
    1. Red5-MODULE-4F4xP: A flexible I/O module to control a variety of loads. FET outputs can drive high-current relay coils and can switch either AC or DC power. In a lighting controller application, a single module can drive 2 bi-stable relays, power 0 to 10 V dimming ballasts, and provide input points for sensors or switches.
       1. BACnet Building Controller (B-BC).
          1. Inputs, 16-bit: Up to 4. Supporting:

0 to 5 VDC.

0 to 10 VDC.

10 kOhms thermistor.

* + - * 1. Outputs, 12-bit: Up to 4. Supporting:

0 to 10 VDC at 20 mA maximum; sourcing.

1 to 10 VDC at 10 mA maximum; sinking.

* + - * 1. Outputs, FET Binary outputs: 4.

Voltage: 24 VAC or DC. Maximum Current: 0.5 A each.

* + - 1. Connectors: Removable screw type terminal connectors.
      2. Wiring Class: Class 2 / SELV.
      3. Recommended Power Source:
         1. 24 VDC, 3 W maximum with fully loaded universal points.
         2. Module power is internally supplied from the Red5 controller through the module bus port.
      4. Operating Temperature Range: -22 to 131 degrees F (-30 to 55 degrees C).
         1. Relative Humidity: 10 to 95 percent, non-condensing.
      5. Dimensions: 2.13 x 4.37 x 2.28 inches (54 x 111 x 58 mm).
      6. Weight: 0.23 lbs (105 grams).
      7. Compliance: CE and FCC.
      8. Listings: C-UL and UL 916.
    1. Red5-MODULE-8xP: An I/O module for the Red5 system. 8 universal points that can be configured to create the exact combination of inputs and/or outputs for a given application. Expandable by adding more modules to an existing system.
       1. BACnet Building Controller (B-BC).
       2. Universal Points:
          1. Inputs, 16 bit: Up to 8. Supporting:

0 to 5 VDC.

0 to 10 VDC.

10 kOhms thermistor.

Dry Contact using 10 KOhm thermistor setting.

4 to 20 mA; using external 250 Ohm resistor on 0 to 5 V setting.

* + - * 1. Outputs, 12-bit: Up to 8. Supporting:

0 to 10 V at 20 mA maximum; sourcing.

1 to 10 V at 10 mA maximum; sinking.

* + - 1. Connectors: Removable screw type terminal connectors
      2. Wiring Class: Class 2 / SELV.
      3. Recommended Power Source: 24 VDC, 4 W maximum with fully loaded outputs.
         1. Module power is internally supplied from the Red5 controller through the module bus port.
      4. Operating Temperature Range: -22 to 131 degrees F (-30 to 55 degrees C).
         1. Relative Humidity: 10 to 95 percent, non-condensing.
      5. Dimensions: 1.42 x 4.37 x 2.28 inches (36 x 111 x 58 mm).
      6. Weight: 0.161 lbs (72.9 grams).
      7. Compliance: CE and FCC.
      8. Listings: C-UL and UL 916.
    1. Red5-MODULE-PoE: Adds Power over Ethernet (PoE) capabilities to the Red5 system. Using PoE switches, you can supply both data and power to the system over a single CAT5e or CAT6 cable.
       1. PoE Power In:
          1. 802.3at-2009 Type 1 PoE Switch:

Voltage: 37 to 57 VDC. Maximum Power: 12.95 W.

* + - * 1. 802.3at-2009 Type 2 PoE+ Switch:

Voltage: 42.5 to 57 VDC. Maximum Power: 25.5 W.

* + - 1. Power Out:
         1. 802.3.at-2009 Type 1 PoE Switch:

Voltage: 24 VDC. Current: 458 mA (11 W).

* + - * 1. 802.3.at-2009 Type 2 PoE+ Switch:

Voltage: 24 VDC. Current: 875 mA (21 W).

* + - 1. Operating Temperature: -22 to 131 degrees F (-30 to 55 degrees C).
         1. Relative humidity: 10 to 95 percent, non-condensing.
      2. Dimensions: 2.13 x 4.37 x 2.28 inches (54 x 111 x 58 mm).
      3. Weight: 0.23 lbs (105 grams).
      4. Compliance: CE and FCC.
      5. Listings: C-UL and UL 916.
    1. Red5-EXPAND-04 Power Injector: Increases the number of Red5 modules on a Red5 system by providing power to a maximum of 4 Red5 I/O or gateway modules. Can be located 70 m (230 ft) away and be directly controlled by the Red5-PLUS-ROOM room controller. HVAC, access, and lighting control can be centralized on single controller.
       1. Device Addressing: Set via rotary switch.
       2. Connectors: Removable screw type terminal connectors.
       3. Wiring Class: Class 2 / SELV.
       4. Input Power: 24 VDC, 100 W.
       5. Power Output (PWR OUT 1 and 2): 80 W.
       6. Operating Temperature: -22 to 131 degrees F (-30 to 55 degrees C).
          1. Relative Humidity: 10 to 95 percent, non-condensing.
       7. Dimensions: 1.42 x 4.37 x 2.28 inches (36 x 111 x 58 mm).
       8. Weight: 0.15 lbs (70 grams).
       9. Compliance: CE.
       10. Listings: C-UL and UL 916.
    2. Red5-MODULE-DALI: DALI Lighting Module: A Digital Addressable Lighting Interface (DALI) lighting module for the Red5 system. Provides connectivity between a BACnet building automation system and the DALI lighting groups in the same system. Reconfiguration of lamps gives complete control to the lighting design.
       1. Quick view: DALI lighting module: DALI interface, 100 mA power output.
       2. External Inputs: 2 push buttons for Manual ON/OFF and Auto control.
       3. Connectors: Removable screw-type terminal connectors.
       4. Wiring Class: Class 2 / SELV123.

\*\* NOTE TO SPECIFIER \*\* Delete article if not required or delete paragraphs (products) not required.

* 1. BACNET BUILDING CONTROLLERS (entelibus Family)
     1. enteliBUS Control System: A powerful, fully programmable BACnet controller and modular expandable I/O.
        1. An automation engine, backplane expanders, and I/O modules. Can be configured for any application, from low I/O density to high I/O density applications.
        2. BACnet router that is capable of joining multiple BACnet network segments into one large network.

\*\* NOTE TO SPECIFIER \*\* smoke control system is optional. Delete if not required.

* + - 1. Smoke Control System: UL 864 and UUKL.
      2. Automation Engines: Common features.
         1. Native BACnet building controller.
         2. Fully programmable with GCL+.
         3. BACnet/IP, BACnet over Ethernet, BACnet MS/TP, and Delta LINKnet communications.
         4. Integrates with non-BACnet systems such as EnOcean, M-Bus, Somfy, and Modbus.
         5. Supports access control as an alternative to the ASM-24E.
         6. SD card memory expansion and USB ports.

\*\* NOTE TO SPECIFIER \*\* Only UL 864 models are still available for sale. All other eBCON models have been replaced with the second generation eBCON-2.

* + 1. eBCon: Programmable native BACnet building controller. Multiple communications methods including, as standard, BACnet/IP, BACnet over Ethernet, and BACnet MS/TP.
       1. Includes eBX control logic for 8 enteliBUS backplanes and associated expander and I/O modules.
       2. Device Type/Addressing: Software addressed.
       3. Connectors: Removable screw-type terminal connectors.
       4. Wiring Class: Class 2 / SELV.
       5. Input Voltage: 24 VAC, 50/60 Hz.
          1. Power Consumption: 6 VA; maximum 100 VA with fully loaded I/O modules.
          2. Supplies power for up to 4 I/O modules via the controller backplane.
       6. Mounting: Backplane. Snap mounts to standard 35 mm DIN rail.
       7. Mounting: eBCON. Snap mounts to Backplane & DIN rail assembly.
       8. Technology:
          1. CPU: ARM9 32-bit RISC CPU.
          2. Flash Memory: 64 MB.
          3. SDRAM Memory 32 MB.
          4. Card Slot for Memory Expansion: SD/SDIO.
          5. Real-time Clock: Temperature-compensated.
          6. Ultracap Power Backup: For RTC and memory.
       9. Communication Ports:
          1. Ethernet: 10/100-BaseT.

BACnet Protocols Supported: BACnet/IP and BACnet over Ethernet.

* + - * 1. RS-485 Port:

BACnet MS/TP up to 76800 bps; maximum 99 devices per port.

Delta LINKnet up to 76800 bps; maximum 12 devices.

* + - * 1. USB Host Port.
      1. Operating Temperature: -22 to 131 degrees F (-30 to 55 degrees C).
         1. Relative Humidity: 10 to 95 percent, non-condensing.
      2. Operating Temperature: 32 to 131 degrees F (0 to 55 degrees C) for UL 864 product numbers.
         1. Relative Humidity: 10 to 95 percent, non-condensing.

\*\* NOTE TO SPECIFIER \*\* Dimensions given are for eBCON package with controller backplane

* + - 1. Dimensions: 5.0 x 5.7 x 4.0 inches (126 x 145 x 100 mm).
      2. Weight: 0.820 lbs (372 grams).
      3. Enclosure Protection Rating: IP30.
      4. Compliance: CE, FCC, and EAC.
      5. Listings: UL 916, UL 864, and BTL.
    1. EBCon2: Programmable native BACnet building controller. Functions as the automation engine of the enteliBUS control system. Contains the primary CPU processing power, memory, storage, and external communication ports. Multiple communications methods, including BACnet/IP, BACnet over Ethernet, and BACnet MS/TP.
       1. Includes eBX control logic for 8 enteliBUS backplanes and associated expander and I/O modules.
       2. BACnet Device Profile:
          1. BACnet Building Controller (B-BC).
          2. BACnet Gateway (B-GW).
       3. Device Type/Addressing: Software addressed.
       4. Connectors: Removable screw type terminal connectors.
       5. Wiring Class: Class 2 / SELV.
       6. Input Voltage: 24 VAC, 50/60 Hz, 6 VA.
          1. Maximum 100 VA with fully loaded I/O modules.
          2. Supplies power for up to 4 I/O modules via the controller backplane.
       7. Output Voltage: 24 VDC, 100 W maximum output; fully loaded.

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

* + - 1. Mounting: Backplane. Snap mounts to standard 35 mm DIN rail.
      2. Mounting: eBCON-2. Snap mounts to backplane and DIN rail assembly.
      3. Technology:
         1. CPU: Arm Cortex-A8 CPU.
         2. Flash Memory: 4 GB.
         3. SDRAM Memory: 256 MB.
         4. Card Slot for Memory Expansion: SD/SDIO.
         5. Real-Time Clock: Temperature-compensated.
         6. Supercapacitor Power Backup: For RTC and memory.
      4. Communication Ports:
         1. Ethernet: 10/100-BaseT.

BACnet Protocols Supported: BACnet/IP, BACnet over Ethernet, and BACnet/SC.

* + - * 1. RS-485 Port:

BACnet MS/TP up to 76800 bps; maximum 99 devices per port.

Delta LINKnet.

Modbus.

* + - * 1. USB Host Port.
      1. Operating Temperature Range: -22 to 131 degrees F (-30 to 55 degrees C).
         1. Relative Humidity: 10 to 95 percent, non-condensing.
      2. Operating Temperature: 32 to 131 degrees F (0 to 55 degrees C) for UL 864 product numbers.
         1. Relative Humidity: 10 to 95 percent, non-condensing.

\*\* NOTE TO SPECIFIER \*\* Dimensions given are for eBCON-2 package with controller backplane

* + - 1. Dimensions: 5.0 x 5.7 x 4.0 inches (126 x 145 x 100 mm).
      2. Weight: 0.820 lbs (372 grams).
      3. Enclosure Protection Rating: IP30.
      4. Compliance: CE, FCC, and EAC.
      5. Listings: UL 916, UL 864, and BTL.

\*\* NOTE TO SPECIFIER \*\* There is a newer generation version of this product available: eBMGR-2. eBMGR-2 is recommended unless UL 864 is required, as currently only the first generation eBMGR has UL 864 listing.

* + 1. EbMGR and EbMGRtch: The automation engine of the enteliBUS Control System. Contains the primary CPU processing power, memory storage, and external communication ports.
       1. Fully programmable native BACnet building controller.
       2. Supports multiple communications methods including, as standard, BACnet/IP, BACnet over Ethernet, and BACnet MS/TP.
       3. enteliBUS Manager Touch: The capabilities of the eBMGR, with a color touchscreen user interface:
          1. Integrated LCD Touchscreen: Local interface capabilities. Operators can view, modify, and configure local I/O, variables, alarms, alarm logs and schedules.
       4. Integrated 3 port 10/100 Ethernet Switch supporting BACnet Ethernet, and BACnet IP.

\*\* NOTE TO SPECIFIER \*\* Additional gateway protocols such as EnOcean available with addition of media converter modules.

* + - 1. Ports: 2. RS-485 for MS/TP, LINKnet or MODBUS.
      2. View/edit local controller I/O and variable objects.
      3. Configure controller network settings.
      4. User based login allowing different levels of access for different users.
      5. Customize the display using a programmable menu structure.
    1. eBMGR-2 / eBMGR -2 -TCH: Fully programmable native BACnet building controller. Supports multiple communications methods. The automation engine of the enteliBUS control system. Contains the primary CPU, memory storage, and external communication ports. Provides control logic for enteliBUS I/O expansion backplanes. An optional integrated LCD touchscreen provides local interface capabilities for viewing, modifying, and configuring local I/O, variables, alarms, alarm logs, and schedules.
       1. BACnet Device Profile:
          1. BACnet Building Controller (B-BC).
          2. BACnet Gateway (B-GW).
       2. LCD Touchscreen (Optional): 4.3 inch active-matrix.
          1. Color: 16-bit. Resolution: 480 x 272.
       3. Mounting: Snap mounts to standard 35 mm DIN rail.
       4. Device Addressing: Software addressed.
       5. Connectors: Removable screw type terminal connectors
       6. Wiring Class: Class 2 / SELV.
       7. Power: 24 VAC 50/60Hz at 12 VA.
       8. Power: 10 to 28 VDC, 4.2 W.
       9. Technology:
          1. CPU: Arm Cortex-A8.
          2. SDRAM Memory: 256 MB.
          3. Flash Memory: 4 GB.
          4. Clock: Real-time, temperature compensated.
          5. Supercapacitor power backup for RTC and memory.
       10. Communication Ports:
           1. Ethernet Switch: 3-port 10/100.

\*\* NOTE TO SPECIFIER \*\* BACnet/SC: Requires V4.11 firmware that is currently being approved by BACnet Testing Laboratories (BTL).

* + - * 1. RS-485 Ports: 2. Protocols Supported: BACnet/IP, BACnet over Ethernet, and BACnet/SC, up to 76800 bps.
        2. USB Host Ports: Protocols Supported: BACnet MS/TP, Delta LINKnet, and Modbus.
      1. Operating Temperature for eBMGR-2: -22 to 131 degrees F (-30 to 55 degrees C).
         1. Relative Humidity: 10 to 95 percent, non-condensing.
      2. Operating Temperature for eBMGR-TCH-2: 32 to 131 degrees F (0 to 55 degrees C).
         1. Relative Humidity: 10 to 95 percent, non-condensing.
      3. Dimensions: 5-3/4 x 5-1/2 x 4 inches (145 x 140 x 100 mm).
      4. Weight: eBMGR-2: 0.472 lbs (214 grams).
      5. Weight: eBMGR-TCH-2: 0.871 lbs (395 grams).
      6. Enclosure Protection Rating Power: IP30.
      7. Compliance: CE, FCC, and EAC.
      8. Listings: C-Ulm, UL 916, and BTL.
    1. Backplane Expanders eBX-04 and eBX-08: enteliBUS expander For I/O expansion. Supports 4 or 8 I/O modules. Comes with an expander backplane. One expander module is required for each backplane. Connectors on the ends of each backplane allow up to 8 backplanes to be connected together and controlled from a single enteliBUS automation engine (eBMGR-2 or eBCON-2).
       1. Expandable I/O Up to 8 expanders/backplanes to a single automation engine (eBMGR-2 or eBCON-2) Auto-detecting and hot-swappable I/O modules LED status indications of power.
       2. Module status, and communication bus activity. Snap fit.
       3. No tools required to add or remove modules. Small footprint.
       4. DIN Rail: Mountable Modular design provides flexibility, ease of service, and reduced cost for future upgrades and expansions.
          1. Mounting, Backplane: Snap mounts to standard 35 mm steel DIN rail.
          2. Mounting, eBX: Snap mounts to backplane and standard 35 mm steel DIN rail assembly.
          3. Device Addressing: eBUS address set via rotary switch.
          4. Connectors: Removable screw type terminal connector for power.
          5. Wiring Class: Class 2 / SELV (Safety Extra Low Voltage).
          6. AC/DC Power: 24 V, 50/60 Hz at 3 VA (Volt-Amps).

Maximum Power, with fully loaded modules:

Supplies power for up to 8 I/O modules connected to the backplane.

* + - * 1. Operating Temperature: -22 to 131 degrees F (-30 to 55 degrees C).

Relative Humidity: 10 to 95 percent, non-condensing.

* + - * 1. Operating Temperature: 32 to 131 degrees F (0 to 55 degrees C) for UL 864 product numbers.

Relative Humidity: 10 to 95 percent, non-condensing.

* + - * 1. Dimensions with Backplate: eBX-04. 5.0 x 5.7 x 4.0 inches (126 x 144 x 100 mm). Weight: 0.913 lbs (414 grams).
        2. Dimensions with Backplate: eBX-08. 5.0 x 9.3 x 4.0 inches (126 x 234 x 100 mm). Weight: 0.974 lbs (442 grams).
        3. Enclosure Protection Rating: IP30, Ingress Protection.
        4. Compliance: CE, FCC, and EAC.
        5. Listings: UL 916 and UL 864 for UL 864 product numbers.
    1. I/O Modules: Support the Following Capabilities:
       1. Points per I/O Module: Up to 8.
       2. Inputs: 0 to 5 VDC, 0 to 10 VDC, 4 to 20 mA, 10 kOhms thermistor, and 1 kOhms RTD and dry contact.
       3. Outputs: 0 to 10 VDC, 0 to 20 mA, 24 VAC TRIAC and relay.
       4. Monitored Overrides: 3-position HAO switches and analog 0 to 100 percent levers.
       5. Auto detecting and hot-swappable.

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

* + - 1. eBM Model: eBM-D400R4.
         1. Universal Inputs: n/a.
         2. Digital Inputs: Yes.
         3. RTD Inputs: n/a.
         4. Universal Outputs: n/a.
         5. Relay Outputs: Yes.
         6. TRIAC Outputs: n/a.
         7. Current Outputs: n/a.
         8. HAO: n/a.
         9. UL864: n/a.
      2. eBM Model: eBM-D400R4-H.
         1. Universal Inputs: n/a.
         2. Digital Inputs: Yes.
         3. RTD Inputs: n/a.
         4. Universal Outputs: n/a.
         5. Relay Outputs: Yes.
         6. TRIAC Outputs: n/a.
         7. Current Outputs: n/a.
         8. HAO: Yes.
         9. UL864: n/a.
      3. eBM Model: eBM-404.
         1. Universal Inputs: Yes.
         2. Digital Inputs: n/a.
         3. RTD Inputs: n/a.
         4. Universal Outputs: n/a.
         5. Relay Outputs: n/a.
         6. TRIAC Outputs: Yes.
         7. Current Outputs: n/a.
         8. HAO: n/a.
         9. UL864: n/a.
      4. eBM Model: eBM-404-H.
         1. Universal Inputs: Yes.
         2. Digital Inputs: n/a.
         3. RTD Inputs: n/a.
         4. Universal Outputs: n/a.
         5. Relay Outputs: n/a.
         6. TRIAC Outputs: Yes.
         7. Current Outputs: n/a.
         8. HAO: Yes.
         9. UL864: n/a.
      5. eBM Model: eBM-404-UL864-340.
         1. Universal Inputs: Yes.
         2. Digital Inputs: n/a.
         3. RTD Inputs: n/a.
         4. Universal Outputs: n/a.
         5. Relay Outputs: n/a.
         6. TRIAC Outputs: Yes.
         7. Current Outputs: n/a.
         8. HAO: n/a.
         9. UL864: Yes.
      6. eBM Model: eBM-440.
         1. Universal Inputs: Yes.
         2. Digital Inputs: n/a.
         3. RTD Inputs: n/a.
         4. Universal Outputs: Yes.
         5. Relay Outputs: n/a.
         6. TRIAC Outputs: n/a.
         7. Current Outputs: n/a.
         8. HAO: n/a.
         9. UL864: n/a.
      7. eBM Model: eBM-440-M.
         1. Universal Inputs: Yes.
         2. Digital Inputs: n/a.
         3. RTD Inputs: n/a.
         4. Universal Outputs: Yes.
         5. Relay Outputs: n/a.
         6. TRIAC Outputs: n/a.
         7. Current Outputs: n/a.
         8. HAO: Yes.
         9. UL864: n/a.
      8. eBM Model: eBM-440-UL864-340.
         1. Universal Inputs: Yes.
         2. Digital Inputs: n/a.
         3. RTD Inputs: n/a.
         4. Universal Outputs: Yes.
         5. Relay Outputs: n/a.
         6. TRIAC Outputs: n/a.
         7. Current Outputs: n/a.
         8. HAO: n/a.
         9. UL864: Yes.
      9. eBM Model: eBM-440I.
         1. Universal Inputs: Yes.
         2. Digital Inputs: n/a.
         3. RTD Inputs: n/a.
         4. Universal Outputs: n/a.
         5. Relay Outputs: n/a.
         6. TRIAC Outputs: n/a.
         7. Current Outputs: Yes.
         8. HAO: n/a.
         9. UL864: n/a.
      10. eBM Model: eBM-440I-M.
          1. Universal Inputs: Yes.
          2. Digital Inputs: n/a.
          3. RTD Inputs: n/a.
          4. Universal Outputs: n/a.
          5. Relay Outputs: n/a.
          6. TRIAC Outputs: n/a.
          7. Current Outputs: Yes.
          8. HAO: Yes.
          9. UL864: n/a.
      11. eBM Model: eBM-800.
          1. Universal Inputs: Yes.
          2. Digital Inputs: n/a.
          3. RTD Inputs: n/a.
          4. Universal Outputs: n/a.
          5. Relay Outputs: n/a.
          6. TRIAC Outputs: n/a.
          7. Current Outputs: n/a.
          8. HAO: n/a.
          9. UL864: n/a.
      12. eBM Model: eBM-800-UL864-340.
          1. Universal Inputs: Yes.
          2. Digital Inputs: n/a.
          3. RTD Inputs: n/a.
          4. Universal Outputs: n/a.
          5. Relay Outputs: n/a.
          6. TRIAC Outputs: n/a.
          7. Current Outputs: n/a.
          8. HAO: n/a.
          9. UL864: Yes.
      13. eBM Model: eBM-D800.
          1. Universal Inputs: n/a.
          2. Digital Inputs: Yes.
          3. RTD Inputs: n/a.
          4. Universal Outputs: n/a.
          5. Relay Outputs: n/a.
          6. TRIAC Outputs: n/a.
          7. Current Outputs: n/a.
          8. HAO: n/a.
          9. UL864: n/a.
      14. eBM Model: eBM-D800-UL864-340.
          1. Universal Inputs: n/a.
          2. Digital Inputs: Yes.
          3. RTD Inputs: n/a.
          4. Universal Outputs: n/a.
          5. Relay Outputs: n/a.
          6. TRIAC Outputs: n/a.
          7. Current Outputs: n/a.
          8. HAO: n/a.
          9. UL864: Yes.
      15. eBM Model: eBM-R800-1K.
          1. Universal Inputs: n/a.
          2. Digital Inputs: n/a.
          3. RTD Inputs: Yes.
          4. Universal Outputs: n/a.
          5. Relay Outputs: n/a.
          6. TRIAC Outputs: n/a.
          7. Current Outputs: n/a.
          8. HAO: n/a.
          9. UL864: n/a.

\*\* NOTE TO SPECIFIER \*\* Delete article if not required or delete paragraphs (products) not required.

* 1. SOFTWARE (enteliWEB, enteliCLOUD and Add-Ons)
     1. WEB A web-based application that connects facilities and centralizes building management operations, site engineering, and energy analytics. Create customized dashboards. The user experience in enteliWEB can be tailored to meet your needs.
        1. Energy Analytics: Convert existing data and sensors within your building into virtual meters.
           1. Manage energy consumption down to the zone and equipment level using a software-based approach.
        2. Engineering Tools: Create, edit, and save objects.
           1. Modify system graphics.
           2. Back up databases from a single front end.
        3. Centralize Facility Management: Integrate scheduling, alarm management, and operations.
           1. Connect to buildings under a single login without complex networking.
        4. Track BAS Changes: Monitor building automation system (BAS) changes made by service personnel, partner technicians, and facility managers in enteliWEB.
        5. enteliVAULT Archiving: Powerful and secure data archiving capabilities.
           1. Trend Logs Support: Up to 100,000 trend logs. A large amount of data storage in a central easy to manage location.
           2. Workflow Improvements: Set up and use, with no hardware or software installation required. Automatically detects and archives trend logs on-site.
        6. enteliWEB Energy: An enterprise energy management package designed to simplify understanding of building energy usage.
           1. Dashboard Interface:

View system's energy usage.

Set target energy goals.

Compare energy usage against historical baselines.

* + - * 1. Deployment Flexibility:

Local Applications: Install locally for dashboards and reports.

Cloud Applications: Scale to powerful cloud-based analytics.

* + - 1. Virtual Meters: Identify energy-intensive systems without installing wired meters.
         1. Utilizes existing sensors and data from the building automation system.
         2. Tracks energy consumption for every piece of equipment in the building.
         3. Provides unprecedented visibility into consumption profiles.
         4. Validation: Validate calculated virtual meters against upstream utility meters.
      2. Tracking Energy Production: If your site generates power from renewable sources:

Use the interactive calendar in enteliWEB Energy.

Locate periods of highest and lowest production.

Compare net gains from production in a chart.

* + - 1. Intuitive Dashboards: Analysis and Breakdown:

Interactive dashboards allow analysis and break down of energy usage.

Identify energy-saving opportunities.

* + - 1. Centralizing Facility Management:
         1. Single Login: Manage multiple sites. Each site requires only an IP address.
         2. Active Directory Integration: Allows user logins to be managed via AD FS, Azure, AWS, Google, and LDAP.
         3. Retain Supervisory Control: Keep vendor's front ends on-site while centralizing alarm management, scheduling, and energy analytics with enteliWEB.
         4. Version Independent Software: Operate entire WAN without concerns about maintaining different firmware versions in the hardware.
         5. Restore and Backup: Entire BAS to an earlier state or find specific backups for devices. Schedule daily, weekly, or monthly backups across devices on multiple sites.
      2. Platform for Innovation:
         1. Development Tools: enteliWEB's suite of development tools allows you to:

Create mobile apps.

Customize user interfaces.

Integrate third-party software.

* + - * 1. API Documentation: The well-documented enteliWEB application programming interface (API) enables you to create custom modules, widgets, and interfaces for third-party software.
        2. BACnet Web Services: Facilitate communication between remote applications (such as mobile apps or business systems) and enteliWEB.
      1. Alarm Module: Allows alerts and alarms from non-BACnet systems to be annunciated and managed within enteliWEB.
      2. Open Source Reporting Package: Design custom reports in enteliWEB using an industry-standard open source report package.
      3. ODBC Driver: Integrate the building automation system with business-level software.
      4. Comprehensive Alarm Management:
         1. Intelligent visualizations, alarm assignments, and operator comments on one screen.
         2. Powerful filtering, emailing, and prioritization for effective alarm management, even on large sites.
      5. Alarm Widgets: Add to any dashboard for quick summaries of specific data types.
         1. Site Info Widget: Uses push pins on a map of building locations to indicate the number and severity of alarms.
         2. Alarm List Widget: Displays active alarms for specific equipment and can be added to system dashboards.
      6. Electronic Signatures:
         1. Supports electronic record regulations (such as FDA Code of Regulations Title 21 Part 11).
         2. Enforces electronic signatures on modifications made in validated environments.
         3. Signatures are recorded in the enteliWEB audit log.
      7. User/Group Permissions: Assign roles and determine which BACnet objects and visualizations a user can see and interact with.
      8. Multilanguage Support: Users may select the language they want to use throughout enteliWEB.
      9. Access Control: enteliWEB provides intuitive user-friendly dashboards for effective management of single-site or multisite enterprise access control.
         1. Built-in Dashboards:

Leverage enteliWEB's single-seat management interface.

Easily enroll, provision, assign, and manage access rights.

* + - * 1. Custom User Fields:

Quickly enter user information, including conventional data fields and site-specific details (e.g., title, department, license plate).

* + - * 1. Custom Groups for User Provisioning:

Use unique access groups to link access rights, access points, and access roles for easy user provisioning.

* + - * 1. Real-Time Access Events and Alarms:

View access events in real-time on the Event Viewer dashboard.

Filter events and access alarms by type, priority level, and time range.

* + - * 1. Flexible Access Reporting:

Generate reports answering simple to complex questions about your access system, card users, and their activities.

* + - * 1. VIVOTEK VAST 2 and VSS Integration:

Enhance your access control system by adding VIVOTEK's video surveillance cameras and video management software.

View live video feeds and recorded events directly within enteliWEB.

* + - 1. Audit Log: Tracks changes made to the system.
         1. Powerful filtering and timeline chart for easy retrieval of information.
         2. Includes manual changes to outputs, alarm history, and user-madel modifications.
      2. Attributes:
         1. BACnet Device Profile:

Advanced Operator Workstation (B-AWS): Supported.

Secure Connect Hub (B-SCHUB): Supported.

* + - * 1. Server Operating System:

Microsoft Windows Server 2016, 2019, and 2022.

Microsoft Windows 10 and 11.

* + - * 1. Server Virtualization:

VMware vCenter Server.

Microsoft Hyper-V.

Microsoft Azure.

Amazon EC2.

Rackspace Cloud Server.

* + - * 1. Client Operating System:

Microsoft Windows Server 2016, 2019, and 2022.

Microsoft Windows 10 and 11 (Enterprise, Pro, Education, IoT).

Apple macOS X v10.4+.

* + - * 1. Client Browser: Google Chrome 115+, Microsoft Edge 115+, Mozilla Firefox 116+, and Apple Safari 15+.
    1. CLOUD A web-based SaaS (software as a service) engineering and management tool. Connects equipment and facilities. Gives facility managers and engineers access to building management operations and energy analytics through a web browser. As a hosted cloud site, it offers the same features as an on-premises solution with easier deployment and upgrades.
       1. BACnet Device Profile: Supports the following:
          1. Advanced Operator Workstation (B-AWS).
          2. Secure Connect Hub (B-SCHUB).
       2. Server Operating System:
          1. Microsoft Windows Server 2016, 2019, and 2022
          2. Microsoft Windows 10 and 11
       3. Client Operating System:
          1. Microsoft Windows Server 2016, 2019, and 2022
          2. Microsoft Windows 10 and 11 (Enterprise, Pro, Education, IoT)
          3. Apple macOS X v10.4+
       4. Client Browser: Google Chrome 115+, Microsoft Edge 115+, Mozilla Firefox 116+, and Apple Safari 15+.
       5. Centralized Facility Management:
          1. Single login for managing multiple sites.
          2. Active Directory Integration: Allows user logins to be managed via AD FS, Azure, AWS, Google, and LDAP.
          3. Retain supervisory control while centralizing alarm management, scheduling, and energy analytics.
          4. Track BAS changes by service personnel, partner technicians, and facility managers.
       6. Electronic Signatures:
          1. Supports electronic record regulations (e.g., FDA Code of Regulations Title 21 Part 11).
          2. Enforces electronic signatures on modifications made in validated environments.
          3. Signatures recorded in the enteliWEB audit log.
       7. User Permissions:
          1. Assign roles and determine user access to BACnet objects and visualizations.
          2. Active Directory integration via AD FS, Azure, AWS, Google, and LDAP.
       8. Multilanguage Support: Gives each user the option to select the language they want to use throughout enteliWEB.
       9. enteliVAULT Archiving:
          1. Powerful, secure cloud-based data archiving solution for enteliCLOUD.
          2. Large capacity (up to 100,000 trend logs).
          3. Monthly subscription based on site I/O points.
          4. Energy management integration with enteliCLOUD Energy.
       10. enteliCLOUD Energy:
           1. Enterprise energy management package:

View system energy usage.

Set target energy goals.

Compare energy usage against historical baselines.

Scalable from locally installed dashboards to powerful cloud-based analytics.

Virtual Meters:

Utilize existing sensors to track energy consumption for each equipment piece.

Validate calculated virtual meters with upstream utility meters.

Intuitive Dashboards:

Analyze and break down usage for energy savings.

Create energy reports and send/receive them via email.

Alerts and Insights:

Warns in advance of potential consumption overages.

Annunciated in enteliCLOUD and can be set up for email notification.

* + - 1. Visualizing Your Building:
         1. Enterprise Dashboards: Provide high-level information in simple graphical formats for managing key performance indicators (KPIs).
         2. Personal Dashboards: User-created personalized dashboards with mixed widgets.
         3. System Dashboards: Aggregate system graphics, alarm management, energy information, and more into a single dashboard screen.
         4. Navigator: Automatically scans the BACnet network and presents devices in a logically arranged network tree.

Monitor and command BACnet objects directly from Navigator.

* + - * 1. enteliVIZ Graphics: Create HTML5-based intelligent visualizations and equipment graphics.

Use them in dashboards alongside other widgets or as full-page standalone graphics.

* + - * 1. Mobile Friendly: Optimized for viewing on smartphones and tablets.

Dashboard-driven navigation for easy drill-down from high-level views to specific BACnet objects.

* + - * 1. Multiple Language Display: Display in one of 22 world languages based on user preference.
        2. Building Automation Reports: Gather information by querying controllers and display in professional-looking reports.

Reports can be converted to multiple file types (e.g., .pdf, .xls) and emailed automatically.

* + - 1. Single Login and Centralization: Manage multiple sites using a single login.
         1. Provide an IP address for each site.
      2. Supervisory Control and Alarm Management: Over entire portfolio of BACnet sites.
         1. Centralize critical functions such as alarm management, scheduling, and energy analytics with enteliCLOUD.
      3. Version Independence: Ensure version-independent software operation.
         1. Operate your entire WAN without maintaining different firmware versions across hardware components.
      4. Backup and Restoration:
         1. Restore your entire Building Automation System (BAS) to an earlier state.
         2. Schedule daily, weekly, or monthly backups across devices on multiple sites.
      5. Comprehensive alarm management system:
         1. Intelligent visualizations.
         2. Alarm assignments.
         3. Operator comments.
      6. Filtering, email notifications, and prioritization.
      7. Alarm Widgets: Add to dashboards for quick summaries:
         1. Maps widget: Uses pushpins to indicate alarm severity on a map of building locations.
         2. Alarm list widget: Displays active alarms for specific equipment.
         3. Audit Log: Track changes made to the system.

Powerful filtering and timeline chart for easy information retrieval.

* + - * 1. Electronic Signatures: Supports electronic record regulations (e.g., FDA Code of Regulations Title 21 Part 11).

Enforces electronic signatures for modifications in validated environments.

* + - * 1. User Permissions: Assign roles and determine access to BACnet objects and visualizations.

LDAP integration for controlled user access.

* + - * 1. Multilanguage Support:

\*\* NOTE TO SPECIFIER \*\* enteliVIZ is available for purchase as an enteliWEB license add-on. Delete if not required.

* + 1. enteliVIZHTML5 Designer: A web-based tool for creating intelligent visualizations and equipment graphics in enteliWEB. Use graphics in dashboards alongside other widgets or displayed as full-page standalone graphics.
       1. Graphics: Created by drawing or dragging widgets from the palettes, then binding data and object properties to the graphics.
          1. Switch between Edit and Preview modes to see how graphics look and behave.
    2. enteliVAULT A server-based archiving solution available as a license add-on for enteliCLOUD and enteliWEB On-Premise. Powerful, secure, and easy to set up and use, with no hardware or software to install or firewalls to manage.
       1. Trend Logs: Supports up to 100,000.
       2. Detects and archives on-site trend logs automatically.
       3. Backups to External Drive: Manual or automatic.
       4. Flexible Data Management: Users decide how long data is kept.
       5. Migration Tool: CopperCube.
       6. BACnet Device Profile: Advanced Operator Workstation (B-AWS).
          1. Secure Connect Hub (B-SCHUB).
       7. Server Operating System:
          1. Microsoft Windows Server 2016, 2019, 2022.
          2. Microsoft Windows 10 and 11.
       8. Server Virtualization:
          1. VMware vCenter Server.
          2. Microsoft Hyper-V.
          3. Microsoft Azure.
          4. Amazon EC2.
          5. Rackspace Cloud Server.
       9. Client Operating System:
          1. Microsoft Windows Server 2016, 2019, 2022.
          2. Microsoft Windows 10 and 11 (Enterprise, Pro, Education, IoT).
          3. Apple macOS X v10.4+.
       10. Client Browser:
           1. Google Chrome 80+, Microsoft Edge 80+, Mozilla Firefox 73+, and Apple Safari 13+.
    3. enteliSYNC A software application add on to the enteliWEB server, Used to deploy master-subordinate synchronization between the master device and subordinate devices across multiple sites.
       1. Acts as the access control central database and holds the master copy of synchronized objects on the site.
       2. Objects include the Access Rights, Access Credential, Access Setting, and the Access User objects in addition to Schedule and Calendar objects.
    4. Earthright Energy Dashboard: For use on large screen displays, kiosks, and on the Web. Simple charts and gauges provide daily feedback to occupants to encourage behavior adjustments to reduce individual energy use.
       1. Utility Consumption Summary and Live Data Readings:
          1. From enteliWEB Energy Management System.
          2. Highlight energy-saving features and initiatives through the Green Facts Screen (self-running slideshow).
       2. Comparison Screen: Provides detailed charts comparing utility usage and savings across different time periods.
       3. Weather Reports: Retrieve current weather conditions and forecasts for your locations.
       4. Capital Projects and Savings: List capital projects, track generated cash savings, and calculate payback periods.
       5. Multilanguage Support: Users can select their preferred language on the dashboard.
       6. Customized Energy Equivalencies: Relate energy usage to everyday items (e.g., car travel distances, bottles of water).
       7. Multiple Locations and Buildings: Display data from multiple sites, buildings, and campuses.
       8. Graphics Integration: Embed graphics created in enteliVIZ HTML5 Designer.
       9. Company Branding: Add company logo to the dashboard (customization available).
       10. Campus License Upgrade:
           1. Display the Home Campus Screen and select which locations appear on the Building and Comparison Screens.
           2. Track energy savings competitions between locations or buildings using the Competition Screen.
       11. Server Operating System:
           1. Microsoft Windows Server 2008 R2 Standard Edition, 2012, and 2016.
           2. Microsoft Windows 7 and 10.
       12. Client Browser Compatibility:
           1. Windows Internet Explorer 11 and higher.
           2. Firefox 59 and higher.
           3. Google Chrome 66 and higher.
           4. Safari 10 and higher for Mac.
           5. Microsoft Edge 41 and higher.
       13. Software Versions: enteliWEB 4.6 and higher. PAS Plug-In Manager.
    5. Delta Facility Scheduler (DFS): An enteliWEB add-on module. Synchronizes Event Management Systems (EMS) and Building Automation Systems (BAS). Events booked through the EMS are automatically sent to BACnet schedules in the BAS to control HVAC, lighting, access control and other systems in each room. Saves energy by setting schedules to run HVAC and lighting equipment only when a space is occupied. Reduces labor costs, complexity and potential errors that may result when schedule information is manually entered from a booking system.
       1. Calendar-to-BACnet Conversion Engine: On-demand and recurring times.
          1. Enables seamless communication between calendar systems and BACnet controllers.
       2. Automatic Operation: After initial configuration, the software runs unattended.
       3. Version Independence: Compatible with Delta Controls BACnet controllers version 3.33 and higher, as well as third-party BACnet devices.
       4. BACnet Schedule Support: Supports revision 4 and 6 BACnet schedules (binary, multistate, and analog data types).
          1. Transfers event name information.
       5. Configurable Time Offsets: Configure pre- and post-event time offsets for accurate scheduling.
       6. Email Notifications: Receive notifications related to schedule updates.
       7. History Log: Maintains a complete history log of all schedule update attempts.
       8. Enterprise Booking System Integration:
          1. Supports many enterprise booking systems.
          2. Custom integration available through Delta Controls Professional Application Services.
       9. Scalability: Scalable system to suit different site sizes.
       10. Software: enteliWEB. PAS Plug-In Manager.
       11. Integration with Room Booking and Facilities Management Solutions:
           1. Astra Schedule.
           2. AIMS Airline Software.
           3. Chroma.
           4. Dean Evans EMS.
           5. eBASE Software.
           6. Event Booking.
           7. Facilities Management eXpress.
           8. Google.
           9. Microsoft Exchange 2010, 2013, and 2016.
           10. R25.
           11. Scientia Syllabus Plus.
           12. WebCalendar.
           13. Custom integration available through Delta Controls Professional Application Services.

\*\* NOTE TO SPECIFIER \*\* Delete article if not required or delete paragraphs (products) not required.

* 1. MOBILE APPLICATIONS

\*\* NOTE TO SPECIFIER \*\* This app is not compatible with first-generation O3HUB sensor hubs or enteliZONE products. For eZNS, eZNT, and other enteliZONE products, see the NetBuilder , Stat Configurator, and Chameleon apps.

* + 1. Proviso: Provisioning tool for setting up and configuring O3 Sense, O3 Edge, and Red5 devices. Using Bluetooth wireless communication, or NFC tap to read, tap to write, users can adjust network settings, view sensor data, calibrate sensors, load databases, and initiate firmware updates.
       1. System Requirements:
          1. Android: OS Version: Android 9.0 or later.

Screen Size: 5 to 7 inch screen.

Rendering: Font size 150 percent or less.

* + - * 1. iOS: OS Version: iOS 11 or later.

Screen Size: 5 to 7 inch screen.

Rendering: Font size 150 percent or less.

* + - 1. Supported Controllers:
         1. O3 Sense/Edge: Firmware: 1.6 or later.

NFC: Yes. BLE: Yes. Supports factory reset via NFC.

* + - * 1. Red5 PLUS: Firmware: 4.14.0 or later

NFC: Yes. BLE: Yes. Some NET1/NET2 settings are not available.

* + - * 1. Red5 EDGE: Firmware: 4.14.0 or later.

NFC: Yes. BLE: Yes. Some NET1/NET2 settings are not available.

* + - * 1. Red5 FIELD: Firmware: 4.14.2 or later.

NFC: Yes. BLE: n/a.

* + - * 1. Red5 ROOM: Firmware: n/a.

NFC: n/a. BLE: n/a.

* + - 1. Migration from O3 Setup App: If you currently use the O3 Setup App and have provisioned devices, follow these steps to migrate the device PIN to the Proviso app:
         1. Open the O3 Setup app.
         2. Proceed to the starting page.
         3. Without connecting to an O3, select the Settings tab.
         4. Edit the Security settings.
         5. Make PIN visible by selecting "visibility off" at end of the Bluetooth PIN field.
         6. Write down the PIN.
      2. To set the new device PIN in Proviso:
         1. Open the Proviso app.
         2. Select Bluetooth as your connectivity method.
         3. In the warning at the bottom of the screen, click Set PIN.
         4. Enter the PIN previously set in the O3 Setup app.
         5. Save to apply the change.

\*\* NOTE TO SPECIFIER \*\* O3 App is not compatible with second-generation sensor hubs O3-EDGE and O3-SENSE.

* + 1. O3 App: A room control app for occupants that uses O3-HUB devices. Using Bluetooth beacons in the O3-HUB, the app determines which room the user is in and communicates with the Red5 ROOM controller and enteliWEB to execute a variety of activities or scenes in the room. Quick single-touch selections set up entire scenes. Rooms and activities presented to the app user are configured in enteliWEB.
       1. Apps:
          1. Chameleon:

Version: 1.50.002.

Version: 1.40.002.

Android: Chameleon-1.50.002.apk. Released Sept 2019. The 1.50.002 version has added functionality to support eZNT-Wi.

Android: Chameleon-1.40.002.apk.

iOS: n/a.

* + - * 1. NetBuilder:

Version: 3.20.005.

Version: 3.20.004. Android.

Version: 3.00.008. Android.

Android: NetBuilder-3.20.005.apk. Released Sept 2019: The 3.20.005 version has added functionality to support eZNT-Wi.

Android: NetBuilder-3.10.005.apk.

iOS: n/a.

* + - * 1. Stat Configurator:

Version: 2.10.003.

Version: 2.00.005.

Android: StatConfigurator-2.10.003.apk. Released Sept 2019: The 2.10.003 version has added functionality to support eZNT-Wi.

Android: StatConfigurator2.00.005.apk.

iOS: n/a.

* + - * 1. Provisio App:

Version: 1.10.005 Android.

Version: 1.1.1 iOS (internal build version 1.1.3).

Android: Google Play Store.

iOS: Apple App Store.

\*\* NOTE TO SPECIFIER \*\* Delete article if not required or delete paragraphs (products) not required.

* 1. SENSORS AND THERMOSTATS
     1. Multi Sensors:

\*\* NOTE TO SPECIFIER \*\* Delete O3 sensors not required.

* + - 1. O3 Sensor Hub: Replaces multiple room sensors with a one-per-room solution when installed with a Red5 controllers. Provides occupant- and location-based control for the modern office or meeting space. Using the mobile app, room occupants can select from a list of preconfigured settings, or they can interact with the sensor hub directly to manage room comfort.
         1. Humidity, composite temperature, passive infrared motion, and light sensors in a single device.
         2. Up to 8 sensor hubs per Red5-PLUS controller; up to 2 sensor hubs per Red5-EDGE controller.
         3. Supports up to 32 EnOcean wireless input devices.
         4. Bluetooth beacon broadcasts identifiers to Bluetooth-enabled smartphones with the O3 app installed.
         5. Full-color LED ring provides silent indications to room occupant.
         6. Audio tones provide user feedback.
         7. Specifications:

Temperature Sensors:

Composite Temperature Value: &#177;1.0 degrees F (&#177;0.5 degrees C). with calibration.

Digital Temperature Sensor: &#177;1.0 degrees F (&#177;0.5 degrees C).

Infrared Temperature Sensor: &#177;1.8 degrees F (&#177;1.0 degrees C)

Humidity Sensor: For 20 to 80 percent relative humidity.

Accuracy: &#177;3 percent at 59 to 86 degrees F (15 to 30 degrees C).

Motion Sensor: Passive Infrared (PIR) Motion Sensor:

Motion Sensing Range:

Mounting Height: 10 ft (3 m). Diameter: 22 ft (6.7 m).

Mounting Height: 8 ft (2.4 m). Diameter: 18 ft (5.5 m).

Light Sensor: Accuracy: &#177;(6 + 5 percent reading) lx.

Audio Input: Microphones: 2. For acoustic occupancy detection.

LED Ring: Full Color Articulated with 12 RGB LEDs.

Universal Points (O3-HUB-02 only):

Inputs, 16-bit, Software Configurable:

0 to 5 VDC.

0 to 10 VDC.

10 kOhms thermistor.

Dry contact (using 10 kOhms thermistor software setting).

4 to 20 mA. Using external 250 Ohm resistor on 0 to 5 V setting.

Outputs, 12-bit, Software Configurable:

0 to 10 V at 20 mA maximum; sourcing.

1 to 10 V at 10 mA maximum; sinking, for hardware rev 2.7 and later.

Audio Output: 1.0 W mono speaker for tones and audio output.

Device Addressing: Rotary switch.

Connectors: Removable screw type terminal connectors.

Wiring Class: Class 2 / SELV.

Power: 24 VDC, 1 W typ, 7 W maximum (non-2xP) or 8 W maximum (2xP), Class 2. Power can be supplied from an O3-DIN controller.

Communications:

EnOcean (868 MHz or 902 MHz).

Bluetooth Low Energy beacon (V4.2).

Red5BUS port (CAN-based).

IR transmitter.

Operating Temperature: 32 to 113 degrees F (0 to 45 degrees C).

Relative Humidity: 10 to 95 percent, non-condensing.

Dimensions: 7.1 x 1.6 inches (180 x 41 mm).

Weight: 0.77 lbs (350 grams).

Compliance: CE, EAC, and FCC/IC.

Bluetooth FCC ID: XPYNINAB1.

Bluetooth IC ID: 8595A-NINAB1.

EnOcean: 902 MHz.

FCC ID: ZV-STM300U.

IC ID: 713A-STM300U.

Listings: cULus 916 Listed

* + - 1. O3-SENSE: Standalone multisensor. Uses sensor fusion technology to deliver an accurate view of an interior space. Integrates temperature, humidity, motion, sound, light, and occupant sensing in a single device. Uses machine learning to provide accurate feedback on the monitored space. Can be configured out of the box with just a smartphone.
         1. User feedback via speaker and full color LED ring with customizable audio tones and colors.
         2. Dual Ethernet connection for daisy chaining in large spaces.

Pass-through communication preserved even during controller power loss.

* + - * 1. Configuration: Via Proviso mobile app.
        2. Support for the Seymour Connect occupant app.
        3. For Developing Custom Apps: BLE GATT API.
        4. Sensors:

Composite Temperature Sensor: &#177;1.0 degree F (&#177;0.5 degrees C) typical with calibration.

Digital Temperature Sensor: &#177;1.0 degree F (&#177;0.5 degrees C).

Infrared Temperature Sensor: &#177;1.8 degrees F (&#177;1.0 degrees C) typical.

Humidity Sensor: For 20 to 80 percent relative humidity at 59 to 86 degrees F (15 to 30 degrees ). Accuracy: &#177;3 percent.

Motion Sensor: Passive infrared (PIR) motion sensor.

Mounting Height: 15 ft (4.6 m).

Sensing Range: 30 ft (9.1 m) diameter.

Mounting Height: 8 ft (2.4 m)

Sensing Range: 18 ft (5.5 m) diameter.

Light Sensor: Illuminance accuracy: &#177;(6 + 5 percent reading) lux.

Occupant Sensor: PIROE (passive infrared occupancy estimation) motion sensor.

Audio Sensor: Two microphones for acoustic occupancy detection.

* + - * 1. Audio Output: 1.0 W mono speaker for tones and audio output.
        2. LED Ring: Full-color ring with 12 RGB LEDs for visual feedback.
        3. Connectors: Removable screw type terminal connectors.
        4. Wiring Class: Class 2 / SELV.
        5. Power: 24 VDC (20 to 28 VDC), 2 W typical, 9 W max, Class 2.
        6. Technology:

Arm Cortex-A7 MPU + Cortex-M4 MCU.

RAM: 256 DDR3L.

Flash Memory: 4 GB eMMC.

Clock: Real-time (RTC) with supercapacitor power backup.

* + - * 1. Communication Ports: Dual Ethernet, 10/100Base-T.
        2. Interfaces and Protocols: BACnet/IP, BACnet/Ethernet, MQTT, and BLE 5.0.
        3. Operating Temperature: 32 to 113 degrees F (0 to 45 degrees C).

Relative Humidity: 10 to 95 percent, non-condensing.

* + - * 1. Dimensions: Diameter: 7.1 inches (180 mm). Height: 1.6 inches (41 mm).
        2. Weight: 0.77 lbs (350 grams).
        3. Compliance: CE. FCC/IC, and NCC.
        4. Listings: cULus and UL 916.
      1. O3-EDGE: Standalone multisensor. Uses sensor fusion technology to deliver an accurate view of an interior space. Integrates temperature, humidity, motion, sound, light, and occupant sensing in a single device. Uses machine learning to provide accurate feedback on the monitored space. Can be configured with just a smartphone.
         1. Fully programmable using GCL+ or Node-RED flows.
         2. Supports 32 EnOcean wireless devices.
         3. Dual Ethernet connection for daisy-chaining in large spaces; provides pass-through communication even during power outages.
         4. Configuration via Proviso mobile app.
         5. Support for the Seymour Connect occupant app.
         6. BLE GATT API for developing custom apps.
         7. Temperature Sensors:

Composite Temperature Value: &#177;1.0 degrees F (&#177;0.5 degrees C) typical with calibration.

Digital Temperature Sensor: &#177;1.0 degrees F (&#177;0.5 degrees C).

Infrared temperature sensor: &#177;1.8 degrees F (&#177;1.0 degrees C) typical.

Humidity Sensor: For 20 to 80 percent relative humidity at 59 to 86 degrees F (15 to 30 degrees ). Accuracy: &#177;3 percent.

Motion Sensor: Passive infrared (PIR) motion sensor.

Mounting Height: 15 ft (4.6 m).

Sensing Range: 30 ft (9.1 m) diameter.

Mounting Height: 8 ft (2.4 m)

Sensing Range: 18 ft (5.5 m) diameter.

Light Sensor: Illuminance accuracy: &#177;(6 + 5 percent reading) lux.

Occupant Sensor: PIROE (passive infrared occupancy estimation) motion sensor.

Audio Sensor: Two microphones for acoustic occupancy detection.

* + - * 1. Audio Output: 1.0 W mono speaker for tones and audio output.
        2. LED Ring: Full-color ring with 12 RGB LEDs for visual feedback.
        3. Inputs, Universal Points: Up to 2 inputs, 16-bit. Software configurable for the following types:

0 to 5 VDC.

0 to 10 VDC.

10 kOhms thermistor.

Dry contact; using 10 kOhms thermistor software setting.

4 to 20 mA; using external 250 Ohms resistor on 0 to 5 V setting.

* + - * 1. Outputs, Universal Points: Up to 2 outputs, 12-bit. Software configurable for the following types:

0 to 10 V at 20 mA maximum; sourcing.

1 to 10 V at 10 mA maximum; sinking.

* + - * 1. Connectors: Removable screw type terminal connectors.
        2. Wiring Class: Class 2 / SELV.
        3. Power: 24 VDC (20 to 28 VDC), 2 W typical, 10 W max, Class 2.
        4. Technology: Arm Cortex-A7 MPU + Cortex-M4 MCU.

RAM 256 DDR3L.

Flash Memory: 4 GB eMMC.

Clock: Real-time (RTC) with supercapacitor power backup.

* + - * 1. Communication Ports: Dual Ethernet, 10/100Base-T.
        2. Interfaces and Protocols:

BACnet/IP, BACnet/Ethernet, and BACnet/SC.

EnOcean, 868 MHz or 902 MHz.

MQTT.

BLE 5.0.

* + - * 1. Operating Temperature: 32 to 113 degrees F (0 to 45 degrees C).

Relative Humidity: 10 to 95 percent, non-condensing.

* + - * 1. Dimensions: Diameter: 7.1 inches (180 mm). Height: 1.6 inches (41.2 mm).
        2. Weight: 0.77 lbs (350 grams).
        3. Compliance: CE, FCC/IC, NCC, and EnOcean Level 2 Certification.
        4. Listings: cULus and UL 916

\*\* NOTE TO SPECIFIER \*\* Delete article if not required or delete paragraphs (products) not required.

* 1. WIRELESS SENSORS AND THERMOSTATS

\*\* NOTE TO SPECIFIER \*\* The eZNTW is not a wireless eZNS that can be used with an eZONE or DVC/DAC controller.

* + 1. eZNTW: Programmable wireless BACnet thermostat with onboard EnOcean wireless connectivity and optional Wi-Fi. Temperature sensor with humidity, CO2, and motion options. Intuitive touch interface with assortment of backlit colors providing user feedback.
       1. NFC technology: Enables installers to configure
       2. Wi-Fi wireless BACnet over IP connectivity.
       3. EnOcean wireless control for HVAC and room peripherals, including door contacts, motion sensors, lighting, and blinds control.
       4. GCL+ programmable button layout, display, and backlit colors.
       5. RGB Backlight with Large LCD Screen: Allows choice of colors to indicate conditions, alarms, and night mode.
          1. Capacitive touch zones allow custom button sizes
       6. Slider: To quickly adjust setpoint or tap for precise changes.
       7. USB Service Port: Software enabled or disabled. Service tool not required.
       8. NFC Technology Integration: Setup using smartphone or tablet.
       9. Fits most electrical boxes.
       10. Design: 2-piece with tamper set screw lock.
       11. Inputs: 10 kOhms, 12-bit A/D: Accepts analog signals for various applications.
       12. LCD Display: 2-line segmented display with icons for clear visual feedback.
       13. Capacitive Touch Buttons: Two rows of four touch zones, allowing eight individual buttons or combined larger buttons.
       14. RGB LED Backlight: Illuminates LCD and buttons with multicolor options.
       15. Digital Temperature Sensor: Accuracy of &#177;0.36 degrees F (&#177;0.2 degrees C).

\*\* NOTE TO SPECIFIER \*\* The following sensors are optional. Delete sensors not required.

* + - 1. Digital Humidity Sensor: For 20 to 80 percent relative humidity at 59 to 86 degrees F (15 to 30 degrees C). Accuracy: &#177;3 percent.
      2. CO2 Sensor: Dual-beam, self-calibrating NDIR detection.
         1. Range: 0 to 2000 ppm.
         2. Accuracy at 77 degrees F (25 degrees C): &#177;50 ppm +2 percent of value.
         3. Temperature Dependence: 1 ppm per degree F (2 ppm per degree C).
         4. Pressure Dependence: 0.13 percent of reading per mm Hg.
         5. Stability: 20 ppm per year.
      3. Occupancy Sensor: Passive Infrared (PIR) Motion Sensor.
         1. Range: 16.4 ft (5 m)
         2. Coverage: 100 degrees horizontal.
      4. Connectors: Screw Type Terminal Connectors.
      5. Wiring Class: Class 2 / SELV: Safe low-voltage operation.
      6. Power With Wi-Fi: 24 V AC/DC, 10 VA / 3 W max.
      7. Power Without Wi-Fi: 24 V AC/DC, 8 VA / 2 W max.
      8. Technology: Arm Cortex M4 CPU:
         1. Flash Memory: 1 MB.
         2. RAM Memory: 256 KB.
         3. External Data Flash: 16 Mbit.
      9. Communications:
         1. BACnet/IP over Wi-Fi; 802.11b/g/n at 2.4 GHz.

Typical Output Power: +17 dBm, +15 dBm, and +14 dBm.

* + - * 1. EnOcean: Max power at antenna: 902 MHz: +3.0 dBm.
        2. EnOcean: Max power at antenna: 868 MHz: +7.0 dBm.
        3. RS-485 Ports: Delta LINKnet; Wi-Fi option, up to 76800 bps.
        4. RS-485 Ports: BACnet MS/TP; without Wi-Fi option, up to 76800 bps.
        5. USB Service Port.
        6. Near-Field Communication (NFC): Passive 2-way short range.
      1. Operating Temperature: 32 to 113 degrees F (0 to 45 degrees C).
         1. Relative Humidity: 10 to 90percent, non-condensing.
      2. Dimensions:
         1. With SM Backplate: 5.3 x 3.6 x 0.9 inches (133 x 93 x 23 mm).
         2. With SC (CO2) Backplate: 5.3 x 3.6 x 1.7 inches (133 x 93 x 43 mm).
         3. Mounted Surface Profile: SM and SC backplates. Depth: 0.9 inches (23 mm).
      3. Weight: 0.37 lbs (168 grams).
      4. IP Rating: IP20. Protection against solid objects (e.g., fingers) but not water.
      5. Compliance: CE, FCC Class B, and EAC.
      6. Listings: UL 916.
    1. eZNT-Wi: Programmable wireless BACnet thermostat equipped with onboard Wi-Fi. Temperature sensor with humidity, CO2, and motion options. Intuitive touch interface with assortment of backlit colors providing user feedback.
       1. NFC technology: Enables installers to configure.
       2. Wi-Fi wireless BACnet over IP connectivity.
       3. GCL+ programmable button layout, display, backlit colors.
       4. RGB Backlight with Large LCD Screen: Allows choice of colors to indicate conditions, alarms, and night mode.
          1. Capacitive touch zones allow custom button sizes
       5. Slider: To quickly adjust setpoint or tap for precise changes.
       6. Fits most electrical boxes.
       7. Design: 2-piece with tamper set screw lock.

\*\* NOTE TO SPECIFIER \*\* eZNT-Wi-T331 Wi-Fi network thermostat combines built-in room sensors in a fully programmable controller with 3 universal inputs, 3 analog outputs, and 1 binary output. Delete if not required.

* + - 1. eZNT-Wi-T331: Wi-Fi network thermostat. Combines built-in room sensors in a fully programmable controller with 3 universal inputs, 3 analog outputs, and 1 binary output. Intuitive LCD Touch Interface: A variety of backlit colors that provide additional feedback. Customizable button interfaces. Use NFC enabled mobile devices to configure the thermostat on the wall or in its shipped box. Allows advanced control strategies.
         1. Universal Inputs, 12-bit: 3. Software-configurable for:

0 to 5 VDC.

0 to 10 VDC.

10 kOhms thermistor.

Dry contact; using 10 kOhms thermistor software setting.

* + - * 1. Analog External Outputs: 3. 0 to 10 VDC at 20 mA maximum.
        2. External Output SSR (FET): 1. 24 V AC/DC at 0.5 A maximum; internal or external powered.
        3. LCD Display: 2-line segmented display with icons.
        4. Capacitive Touch Buttons: Two rows of four touch zones, allowing eight individual buttons or combined larger buttons.
        5. RGB LED Backlight: Illuminates LCD and buttons with multicolor options.
        6. Digital Temperature Sensor: Accuracy of &#177;0.36 degrees F (&#177;0.2 degrees C).

\*\* NOTE TO SPECIFIER \*\* the following sensors are optional. Delete options not required.

* + - * 1. Digital Humidity Sensor: Accuracy: &#177;3 percent.
        2. CO2 Sensor: Dual-channel NDIR detection. Range: 0 to 2000 ppm.

Accuracy at 77 degrees F (25 degrees C): &#177; (30 ppm + 3 percent of value).

* + - * 1. Occupancy Passive Infrared (PIR) Motion Sensor: Range: 16.4 ft (5 m).

Coverage: 100 degrees horizontal.

* + - * 1. Connectors: Screw Type Terminal Connectors.
        2. Wiring Class: Class 2 / SELV: Safe low-voltage operation.
        3. Power: 24 V AC/DC: Typical: 8.2 VA / 3 W. Maximum: 19 VA / 21 W.
        4. Communications:

BACnet/IP over Wi-Fi; 802.11b/g/n at 2.4 GHz.

Typical Output Power: +17 dBm, +15 dBm, +14 dBm.

RS-485 Port: Delta LINKnet, up to 76800 bps)

Supports up to 4 LINKnet devices, maximum 2 DFM-4xx devices.

USB Service Port.

Near-Field Communication (NFC): Passive 2-way short range.

* + - * 1. Operating Temperature: 32 to 131 degrees F (0 to 55 degrees C).

Relative Humidity: 10 to 90 percent, non-condensing.

* + - * 1. Dimensions: With SM or SC Backplate: 5.3 x 3.6 x 0.9 inches (133 x 93 x 23 mm).
        2. Weight: 0.38 lbs (172 grams).
        3. IP Rating: IP20: Protection against solid objects (e.g., fingers) but not water.
        4. Compliance: CE, FCC Class B, and EAC.
        5. Listings: UL 916.

\*\* NOTE TO SPECIFIER \*\* The eZNT-Wi-T304 Wi-Fi network thermostat combines built-in room sensors in a fully programmable controller with 3 universal inputs and 4 binary outputs. Delete if not required

* + - 1. eZNT-Wi-T304: Wi-Fi network thermostat. Combines built-in room sensors in a programmable controller with 3 universal inputs and 4 binary outputs. Intuitive LCD touch-interface backlit colors. Customizable button interfaces. Can use NFC-enabled mobile devices to configure the thermostat on the wall or in its shipped box. Allows advanced control strategies such as demand control ventilation based on occupancy.
         1. Universal Inputs, 12-bit: 3. Software-configurable for:

0 to 5 VDC.

0 to 10 VDC.

10 kOhm thermistor.

Dry contact.

* + - * 1. Output SSR (FET): 4. 24 V AC/DC at 0.5 A maximum; internal or external powered.
        2. LCD Display: 2-line segmented display with icons.
        3. Capacitive Touch Buttons: Two rows of four touch zones, allowing eight individual buttons or combined larger buttons.
        4. RGB LED Backlight: Illuminates LCD and buttons with multicolor options.
        5. Digital Temperature Sensor: Accuracy of &#177;0.36 degrees F (&#177;0.2 degrees C).

\*\* NOTE TO SPECIFIER \*\* The following sensors are optional. Delete options not required.

* + - * 1. .Digital Humidity Sensor: Accuracy: &#177;3 percent.
        2. CO2 Sensor: Dual-channel NDIR detection. Range: 0 to 2000 ppm.

Accuracy at 77 degrees F (25 degrees C): &#177; (30 ppm + 3 percent of value).

* + - * 1. Occupancy Passive Infrared (PIR) Motion Sensor: Range: 16.4 ft (5 m).

Coverage: 100 degrees horizontal.

* + - * 1. Connectors: Screw Type Terminal Connectors.
        2. Wiring Class: Class 2 / SELV: Safe low-voltage operation.
        3. Power: 24 V AC/DC: Typical: 6.3 VA / 2.2 W. Maximum: 52 VA / 72 W.
        4. Communications:

BACnet/IP over Wi-Fi; 802.11b/g/n at 2.4 GHz.

Typical Output Power: +17 dBm, +15 dBm, +14 dBm.

RS-485 Port: Delta LINKnet, up to 76800 bps)

Supports up to 4 LINKnet devices, maximum 2 DFM-4xx devices.

USB Service Port.

Near-Field Communication (NFC): Passive 2-way short range.

* + - * 1. Operating Temperature: 32 to 131 degrees F (0 to 55 degrees C).

Relative Humidity: 10 to 90 percent, non-condensing.

* + - * 1. Dimensions: With SM or SC Backplate: 5.3 x 3.6 x 0.9 inches (133 x 93 x 23 mm).
        2. Weight: 0.38 lbs (172 grams).
        3. IP Rating: IP20: Protection against solid objects (e.g., fingers) but not water.
        4. Compliance: CE, FCC Class B, and EAC.
        5. Listings: UL 916.

\*\* NOTE TO SPECIFIER \*\* The eZNT-Wi-T100 is a Wi-Fi network sensor that offers building occupants an intuitive LCD touch-interface to adjust individual comfort levels. One universal input. Delete if not required.

* + - 1. eZNT-Wi-T100: Wi-Fi network sensor that offers building occupants an intuitive LCD touch-interface. A universal input and a temperature sensor with humidity, CO2, and motion options. Backlit colors to provide additional user feedback and esthetic appeal. The network sensor integrates easily to an existing building network by transmitting data to a wireless access point.
         1. Universal Inputs, 12-bit: 1. Software-configurable for:

0 to 5 VDC.

0 to 10 VDC.

10 kOhm thermistor.

Dry contact.

* + - * 1. LCD Display: 2-line segmented display with icons.
        2. Capacitive Touch Buttons: Two rows of four touch zones, allowing eight individual buttons or combined larger buttons.
        3. RGB LED Backlight: Illuminates LCD and buttons with multicolor options.
        4. Digital Temperature Sensor: Accuracy of &#177;0.36 degrees F (&#177;0.2 degrees C).

\*\* NOTE TO SPECIFIER \*\* The following sensors are optional. Delete options not required.

* + - * 1. Digital Humidity Sensor: Accuracy: &#177;3 percent.
        2. CO2 Sensor: Dual-channel NDIR detection. Range: 0 to 2000 ppm.

Accuracy at 77 degrees F (25 degrees C): &#177; (30 ppm + 3 percent of value).

* + - * 1. Occupancy Passive Infrared (PIR) Motion Sensor: Range: 16.4 ft (5 m).

Coverage: 100 degrees horizontal.

* + - * 1. Connectors: Screw Type Terminal Connectors.
        2. Wiring Class: Class 2 / SELV: Safe low-voltage operation.
        3. Power: 24 V AC/DC: Typical: 6.3 VA / 2.2 W. Maximum: 52 VA / 72 W.
        4. Communications:

BACnet/IP over Wi-Fi; 802.11b/g/n at 2.4 GHz.

Typical Output Power: +17 dBm, +15 dBm, +14 dBm.

RS-485 Port: Delta LINKnet, up to 76800 bps)

Supports up to 4 LINKnet devices, maximum 2 DFM-4xx devices.

USB Service Port.

Near-Field Communication (NFC): Passive 2-way short range.

* + - * 1. Operating Temperature: 32 to 121degrees F (0 to 55 degrees C).

Relative Humidity: 10 to 90 percent, non-condensing.

* + - * 1. Dimensions with SM or SC Backplate: 5.3 x 3.6 x 0.9 inches (133 x 93 x 23 mm).
        2. Weight: 0.38 lbs (172 grams).
        3. IP Rating: IP20: Protection against solid objects (e.g., fingers) but not water.
        4. Compliance: CE, FCC Class B, and EAC.
        5. Listings: UL 916.
    1. Wireless CO2, Temperature, and Relative Humidity Sensor: RCT-1H-(U/Y)W-D: For commercial facilities where indoor environmental quality is of concern and potential savings from utilizing CO2-based demand controlled ventilation are desired.
       1. Solar Panel: Harvests light energy from natural or artificial light sources.
       2. Features Solar-powered EnOcean CO2, temperature and relative humidity sensor.
       3. Calibrated in ambient air. Integrated self-calibration feature eliminates maintenance
       4. Built-in absolute pressure sensor corrects CO2 reading for altitude. Integrated solar harvesting light level LED indication
       5. Radio Reception Range: 80 ft (24 m) for commercial office spaces. Up to 330 ft (100 m) line of sight.
       6. Current CO2 Level: Can be displayed at sensor via LED indication coin cell battery included for low-light conditions/
       7. Operates in light conditions as low as 50 lx (5 fc)
       8. Attributes:
          1. Link Button: Allows linking to other devices.
          2. Test Button: Used for testing or diagnostics.
          3. Carbon Dioxide Sensor: Measurement Range: 0 to 2000 ppm.

Accuracy: &#177;50 ppm with a resolution of 10 ppm.

Built-in Correction: Compensates for altitude and pressure variations.

* + - * 1. Temperature Sensor: Range: 32 to 124 degrees F (0 to 51 degrees C).

Accuracy: &#177;0.5 degrees F (&#177;0.3 degrees C).

* + - * 1. Humidity Sensor Range: 0 to 100 percent.

Accuracy: 10 to 90 percent RH: &#177;0.3 percent.

Accuracy: 0 to 10 percent RH: &#177;0.7 percent.

Accuracy: 90 to 100 RH: &#177;0.7 percent.

* + - * 1. Power: Integrated Solar Cell:

Operational Light Level: 50 lx (5 fc).

Minimum Charge Time to Begin Operation: 10 min at 200 lx (18.5 fc).

Charging Light Level: 200 lx (18.5 fc).

Maintain Charge Time: 6 hrs at 200 lx (18.5 fc).

Maximum Charge Time: 16 hrs at 200 lx (18.5 fc).

Operating Life at Full Charge: 75 hrs at 0 lx.

Battery-Start Assist: CR2032 coin cell.

* + - * 1. Mounting: Screws or Double-Sided Tape (not supplied).
        2. Communication: EnOcean.

Frequency: 902 MHz or 868 MHz.

Integrated whip antennae.

Transmission range: 80 ft (24 m) for commercial office spaces (typical), up to 330 ft (100 m) line of sight.

* + - * 1. Operating Temperature: -13 to 145 degrees F (-25 to 65 degrees C).

Relative Humidity: 5 to 92 percent, non-condensing.

* + - * 1. Dimensions: 5.3 x 2.8 x 0.9 inches (135 x 72 x 24 mm).
        2. Weight: 4 oz. (115 grams).
        3. IP Rating: IP20. Protection against solid objects (e.g., fingers) but not water.
        4. Compliance: CE and FCC Class B.
        5. Listings: UL 916.

\*\* NOTE TO SPECIFIER \*\* Delete article if not required or delete paragraphs (products) not required.

* 1. HARDWIRED SENSORS
     1. eZTS: A hardwired 10 kOhms non-communicating precision temperature sensor. Placed in the same plastic enclosure used by the eZNx product line.
        1. 10 kOhm Type 3 thermistor.
        2. Identical styling as existing eZNS/ eZNT/eZNTW products.
        3. Enclosure: Tamper-resistant.
        4. Surface mounts on drywall or any standard North American or European electrical box.
           1. Thermistor Properties:

Resistance at 77 degrees F (25 degrees C): 10 kOhm &#177; 1 percent.

B-Value (Material Constant): 3950 &#177; 1 percent.

Dissipation Factor (ath) In Air: Approximately 7.5 mW per K.

Thermal Cooling Time Constant In Air: 20 seconds or less.

* + - * 1. Operating Temperature Range: -67 to 257 degrees F (-55 to 125 degrees C).
        2. Connectors: Non-Removable Screw Type Terminal Connectors.
        3. Operating Temperature: 32 to 131 degrees F (0 to 55 degrees C).

Relative Humidity: 10 to 90 percent, non-condensing.

* + - * 1. Dimensions: 5.3 x 3.6 x 0.9 inches (133 x 93 x 23 mm).
        2. Weight: 0.14 lbs (62 grams).
        3. Compliance: CE.
    1. RTS-20-xx: Stylized wall mountable sensors. Provides remote room temperature sensing as part of the Delta Controls system.
       1. Built-in Temperature Sensor: 10 kOhms.
       2. Thermistor Properties:
          1. Resistance at 77 degrees F (25 degrees C): 10 kOhm &#177; 1 percent.
          2. B-Value (Material Constant): 3950 &#177; 1 percent.
          3. Dissipation Factor (ath) In Air: Approximately 7.5 mW per K.
          4. Thermal Cooling Time Constant In Air: 20 seconds or less.
       3. Operating Temperature Range: -67 to 257 degrees F (-55 to 125 degrees C).
       4. Connectors: Screw Type Terminal Connectors:
       5. Wiring Class: 2. Safe low-voltage operation.

\*\* NOTE TO SPECIFIER \*\*the remaining items are optional. Delete options not required.

* + - 1. Setpoint Adjustable Dial: 20 kOhms.
      2. Service Port: For direct service tool connection to the BACnet MS/TP or LINKnet network,
      3. Occupancy override push button.
      4. RJ-11 Service Port Jack, 6 Wire.

\*\* NOTE TO SPECIFIER \*\* Delete article if not required or delete paragraphs (products) not required.

* 1. NETWORK SENSORS AND THERMOSTATS
     1. eZNS-T100: Network sensor offers building occupants an intuitive touch interface to adjust individual comfort levels while tailoring to the needs of their specific market. Featuring a standard temperature sensor with humidity, CO2 and motion options, the eZNS also offers a choice of backlit colors to provide additional user feedback and esthetic appeal. The eZNS sensor's NFC technology allows installers to use NFC-enabled mobile devices to configure the eZNS and enable enteliWEB integration.
        1. RGB backlight allows choice of colors to indicate conditions, alarms, and night mode.
        2. Large easy-to-read LCD screen.
        3. Onscreen visual feedback on button selection.
        4. Capacitive touch zones allow custom button size.
        5. Multiple button layout options. Simple one-touch buttons, or two-touch buttons for added functionality.
        6. Slider to quickly adjust setpoint or tap for precise changes.
        7. Fully programmable in GCL+ USB service port, software enabled or disabled.
        8. Service tool not required.
        9. Smartphone and tablet integration and setup using NFC technology Fits most electrical boxes worldwide.
        10. Two-piece design with tamper set screw lock.
        11. Attributes:
            1. Universal Input, 12-bit: One.

Software-configurable for:

0 to 5 VDC.

0 to 10 VDC.

10 kOhms thermistor. Dry contact.

\*\* NOTE TO SPECIFIER \*\* LCD Display and RGB LED Backlight are optional. Delete if not required.

* + - * 1. LCD Display: 2-line custom segmented display with icons.
        2. RGB LED Backlight: Multicolor illumination for the LCD and buttons.
        3. Capacitive Touch Buttons: Two rows of four touch zones, allowing up to eight individual buttons or combined larger buttons.
        4. Digital Temperature Sensor: Accuracy: &#177;0.36 degrees F (&#177;0.2 degrees C).

\*\* NOTE TO SPECIFIER \*\* The following sensors are optional, Delete if not required.

* + - * 1. Sensors:

Digital Humidity Sensor: Accuracy: &#177;3 percent.

CO2 Sensor: Dual-channel NDIR detection.

Range: 0 to 2000 ppm.

Accuracy at 77 degrees F (25 degrees C): &#177;30 ppm +3 percent of value.

Occupancy Sensor: Passive Infrared (PIR) Motion Sensor:

Range: 16.4 feet (5 meters).

Coverage: 100 degrees, horizontal.

* + - * 1. Connectors: Screw-Type Terminal Connectors.
        2. Wiring Class: 2 / SELV. Safe low-voltage operation.
        3. Power: 24 V AC/DC:

Typical: 2 VA / 1.2 W.

Maximum: 19 VA / 21 W.

* + - * 1. Technology: 32-bit Processor. Internal A/D, Flash, and RAM.
        2. Communications:

RS-485 Port:

Delta LINKnet: Up to 76800 bps.

USB Service Port: Used as a virtual COM port to connect the BACnet network to a workstation.

Near-Field Communication (NFC): Passive 2-way short range.

* + - * 1. Operating Temperature: 32 to 131 degrees F (0 to 55 degrees C).

Relative Humidity: 10 to 90 percent. Non-condensing.

* + - * 1. Dimensions with SM or SC Backplate: 5.3 x 3.6 x 0.9 inches (133 x 93 x 23 mm).
        2. Weight: 0.36 lbs (165 grams).
        3. IP Rating: IP20. Protection against solid objects (e.g., fingers) but not water.
        4. Compliance: CE and FCC Class B.
        5. Listings: UL 916.
    1. BACstat Network Sensor: DNS-24L: A LINKnet-only network sensor with a temperature sensor, a customizable LCD display and 4 push buttons for user control. The LCD display and push buttons are programmable via GCL+ over the LINKnet network.
       1. LINKnet communications Programmable 3-value, 96 segment.
       2. Buttons for fan speed control when used with Delta Fan Coil Controllers (DFC)/

\*\* NOTE TO SPECIFIER \*\* Service port and terminal block are optional. Delete if not required.

* + - 1. Service port
      2. Terminal Block: For wiring a remote thermistor to the temperature input.
      3. Attributes:
         1. LCD Display: Custom 3-value display with various icons (96 total segments).

Optional backlighting for enhanced visibility.

* + - * 1. Push Buttons: Four stylized momentary push buttons.
        2. Digital Temperature Sensor: Accuracy: &#177;0.36 degree F (&#177;0.2 degrees C).

\*\* NOTE TO SPECIFIER \*\* The humidity sensor is optional. Delete if not required.

* + - * 1. Humidity Sensor:

From 20 to 80 percent relative humidity. Accuracy: &#177;3 percent.

From 0 to 20 percent and 80 to 100 percent relative humidity.

Linearized Accuracy: &#177;3 to &#177;5 percent.

Display Resolution: 0.1 percent.

Stability: Less than 0.5 percent relative Humidity per year.

* + - * 1. Device Addressing: Set via DIP Switches:

Simple configuration for network integration.

* + - * 1. Connectors: Wiring Class: 2. Safe low-voltage operation.
    1. BACnet Thermostat: eZNT-TXXX: Fully programmable BACnet thermostat equipped with onboard I/O. A temperature sensor with humidity, CO2, and motion options. A choice of backlit colors that provide additional user feedback and esthetic appeal. Enables installers to use NFC-enabled mobile devices to configure the thermostat.
       1. BACnet over MS/TP connectivity.
       2. GCL+ programmable.
       3. Slider to quickly adjust setpoint or tap for precise changes.
       4. Smartphone and tablet integration and setup using NFC technology.
       5. Fits most electrical boxes worldwide.
       6. 2-piece design with tamper set screw lock.

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

* + - 1. eZNT-T331: Network thermostat. Combines local room sensors with a programmable controller.
         1. External Inputs: Universal External Inputs, 12-bit: Three.

Software-Configurable For:

0 to 5 VDC.

0 to 10 VDC.

10 kOhms thermistor.

Dry contact.

* + - * 1. External Outputs:

Analog Outputs: 3. 0 to 10 VDC at 20 mA max.

One, SSR (FET) Output: 24 V AC/DC at 0.5 A maximum; internal or external powered.

* + - * 1. LCD Display: 2-line custom segmented display with icons.
        2. Capacitive Touch Buttons:

Two rows of four touch zones, allowing up to eight individual buttons or combined larger buttons.

* + - * 1. RGB LED Backlight: Multicolor illumination for the LCD and buttons.
        2. Digital Temperature Sensor: Accuracy: &#177;0.36 degrees F (&#177;0.2 degrees C).

\*\* NOTE TO SPECIFIER \*\* The following sensors are optional. Delete if not required.

* + - * 1. Digital Humidity Sensor: Accuracy: &#177;3 percent.
        2. CO2 Sensor: Dual-channel NDIR detection. Range: 0 to 2000 ppm.

Accuracy at 77 degrees F(25 degrees C): &#177; 30 ppm + 3 percent of value).

* + - * 1. Occupancy Sensor: Passive Infrared (PIR) Motion Sensor:

Range: 16.4 ft (5 m).

Coverage: 100 degrees horizontal.

* + - * 1. Connectors: Screw Type Terminal Connectors.
        2. Wiring Class: Class 2 / SELV. Safe low-voltage operation.
        3. Power: 24 V AC/DC. Typical: 8.2 VA / 3 W. Maximum: 19 VA / 21 W.
        4. Technology: Arm Cortex M4 CPU:

Flash: 1 MB.

RAM: 256 KB.

External Data Flash: 16 Mbit.

* + - * 1. Communications:

RS-485 Port: BACnet MS/TP; up to 76800 bps.

USB Service Port.

Near-Field Communication (NFC): Passive 2-way short range.

* + - * 1. Operating Temperature: 32 to 131 degrees F (0 to 55 degrees C).

Relative Humidity: 10 to 90 percent, non-condensing.

* + - * 1. Dimensions with SM or SC Backplate: 5.3 x 3.6 x 0.9 inches (133 x 93 x 23 mm).
        2. Weight: 0.39 lbs (175 grams).
        3. IP Rating: IP20. Protection against solid objects (e.g., fingers) but not water.
        4. Compliance: CE, FCC Class B, and EAC.
        5. Listings: UL 916.

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

* + - 1. eZNT-T304: Network thermostat combines local room sensors with a fully programmable controller with 3 universal inputs and 4 binary outputs. Versatile control and monitoring capabilities.
         1. Universal External Inputs, 12-bit: 3. Software-configurable for:

0 to 5 VDC.

0 to 10 VDC.

10 kOhms thermistor.

Dry contact.

* + - * 1. External Outputs: SSR (FET) Outputs: 4.

24 V AC/DC at 0.5 A maximum, internal, or external powered.

* + - * 1. LCD Display: 2 line custom segmented display with icons.
        2. Capacitive Touch Buttons: Two rows of four touch zones, allowing eight individual buttons or combined larger buttons.
        3. Backlight, RGB LED: Multicolor illumination for the LCD and buttons.
        4. Digital Temperature Sensor: Accuracy: &#177;0.36 degrees F (&#177;0.2 degrees C).

\*\* NOTE TO SPECIFIER \*\* The following three sensors are optional. Delete if not required.

* + - * 1. Digital Humidity Sensor: Accuracy: &#177;3 percent.
        2. CO2 Sensor: Dual-channel NDIR detection. Range: 0 to 2000 ppm.

Accuracy at 77 degrees F (25 degrees C): &#177; (30 ppm + 3 percent of value).

* + - * 1. Occupancy Sensor: Passive Infrared (PIR) Motion Sensor:

Range: 16.4 ft (5 m). Coverage: 100 degrees horizontal.

* + - * 1. Connectors: Screw Type Terminal Connectors.
        2. Wiring Class: Class 2 / SELV: Safe low-voltage operation.
        3. Power: 24 V AC/DC: Typical: 6.3 VA / 2.2 W. Maximum: 52 VA / 72 W.
        4. Technology: Arm Cortex M4 CPU:

Flash: 1 MB.

RAM: 256 KB.

External Data Flash: 16 Mbit.

* + - * 1. Communications:

RS-485 Port: BACnet MS/TP; up to 76800 bps.

USB Service Port.

Near-Field Communication (NFC): Passive 2-way short range.

* + - * 1. Operating Temperature: 32 to 131 degrees F (0 to 55 degrees C).

Relative Humidity: 10 to 90 percent, non-condensing.

* + - * 1. Dimensions with SM or SC Backplate: 5.3 x 3.6 x 0.9 inches (133 x 93 x 23 mm).
        2. Weight: 0.39 lbs (175 grams).
        3. IP Rating: IP20. Protection against solid objects (e.g., fingers) but not water.
        4. Compliance: CE, FCC Class B, and EAC.
        5. Listings: UL 916.

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

* + - 1. eZNT-T100: Adds an MS/TP network sensor option to the enteliZONE line of sensors and thermostats. Gives building occupants an intuitive touch-interface to adjust individual comfort levels while tailoring to the needs of their specific market. A universal input and a temperature sensor with humidity, CO2, and motion options. Offers a choice of backlit colors to provide additional user feedback and esthetic appeal.
         1. Universal External Inputs, 12-bit: 1. Software-configurable for:

0 to 5 VDC.

0 to 10 VDC.

10 kOhms thermistor.

Dry contact.

* + - * 1. LCD Display: 2 line custom segmented display with icons.
        2. Capacitive Touch Buttons: Two rows of four touch zones, allowing eight individual buttons or combined larger buttons.
        3. Backlight, RGB LED: Multicolor illumination for the LCD and buttons.
        4. Digital Temperature Sensor: Accuracy: &#177;0.36 degrees F (&#177;0.2 degrees C).

\*\* NOTE TO SPECIFIER \*\* the following three sensors are optional. Delete if not required.

* + - * 1. Digital Humidity Sensor: Accuracy: &#177;3 percent.
        2. CO2 Sensor: Dual-channel NDIR detection. Range: 0 to 2000 ppm.

Accuracy at 77 degrees F (25 degrees C): &#177; (30 ppm + 3 percent of value).

* + - * 1. Occupancy Sensor: Passive Infrared (PIR) Motion Sensor:

Range: 16.4 ft (5 m). Coverage: 100 degrees horizontal.

* + - * 1. Connectors: Screw Type Terminal Connectors.
        2. Wiring Class: Class 2 / SELV: Safe low-voltage operation.
        3. Power: 24 V AC/DC: Typical: 6.3 VA / 2.2 W. Maximum: 52 VA / 72 W.
        4. Technology: Arm Cortex M4 CPU:

Flash: 1 MB.

RAM: 256 KB.

External Data Flash: 16 Mbit.

* + - * 1. Communications:

RS-485 Port: BACnet MS/TP; up to 76800 bps.

USB Service Port: Used as a virtual COM port to connect the BACnet network to a workstation.

Near-Field Communication (NFC): Passive 2-way short range.

* + - * 1. Operating Temperature: 32 to 131 degrees F (0 to 55 degrees C).

Relative Humidity: 10 to 90 percent, non-condensing.

* + - * 1. Dimensions with SM or SC Backplate: 5.3 x 3.6 x 0.9 inches (133 x 93 x 23 mm).
        2. Weight: 0.39 lbs (175 grams).
        3. IP Rating: IP20. Protection against solid objects (e.g., fingers) but not water.
        4. Compliance: CE, FCC Class B, and EAC.
        5. Listings: UL 916.

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

* 1. INTEGRATION
     1. JACE 8000 Controller: A compact, embedded Niagara Framework-based controller and server platform for connecting multiple and diverse devices and sub-systems. Internet connectivity and web-serving capability. Provides integrated control, supervision, data logging, alarming, scheduling, and network management. It streams data and rich graphical displays to a standard web browser via an ethernet or wireless LAN, or remotely over the internet. The licensing model for the controller features standard drivers along with optional IO and field bus expansion modules for ultimate flexibility and expandability. The controller is optimized for the Niagara 4 platform. In larger facilities, multi-building applications and large-scale control system integrations, Niagara 4 Supervisors can be used with the controllers to aggregate information, including alarms, and historical and real-time data, to create a single, unified application.
        1. Processor: TI AM3352, 1000MHz Arm Cortex-A8.
        2. Memory: 1GB DDR3 SDRAM.
        3. Storage: Removable Storage: micro-SD card, 4GB flash total storage, 2 GB user storage.
        4. Wireless Communication: Wi-Fi: IEEE802.11a/b/g/n, IEEE802.11n HT20 at 2.4GHz, IEEE802.11n HT20/HT40 at 5GHz
           1. Configurable Radio: Off, WAP, or Client.
           2. Security: WPAPSK/WPA2PSK supported.
        5. Connectivity:
           1. USB: Type A connector.
           2. Ethernet Ports: 2. 10/100 MB.
           3. RS-485 Ports: 2. Isolated with selectable bias and termination.
        6. Software:
           1. Operating System: Runs NiagaraAX 3.8u1 and later, Niagara 4: 4.1 and later.
           2. Analytics:

Niagara Analytics 1.1. Requires NiagaraAX 3.8u1 or later.

Niagara Analytics 2.0. Requires Niagara 4.2 and later.

* + - 1. Power Supply: 24 VAC rated at 24 VA minimum.
      2. Power Supply: 24 VDC rated at 1A, 24 W minimum.
      3. Additional Features:
         1. Secure Boot: Enabled.
         2. Real-time Clock: Batteryless.
         3. Back-up and Restore Support: Included.
      4. Environmental Specifications:
         1. Operating Temperature: -4 to 140 degrees F (-20 to 60 degrees C).
         2. Storage Temperature: -40 to 185 degrees F (-40 to 85 degrees C).
         3. Humidity: 5 to 95 percent, non-condensing.
         4. Shipping and Vibration: ASTM D4169, Assurance Level II.
         5. MTTF: 10 years+.
      5. Agency Certifications:
         1. UL: 916.
         2. CE: EN 61326-1.
         3. RCM: Compliant.
         4. FCC: Part 15 Subpart B, Class B; Part 15 Subpart C.
         5. C-UL: Listed to CSA C22.2 No. 205-M1983 "Signal Equipment".
         6. R and TTE Directive: 1999/5/EC.
         7. CCC: Certified.
         8. SRRC: Certified.
         9. RSS: Compliant.

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

* 1. INTEGRATED ACCESS CONTROL SYSTEM
     1. Basis of Design: O3 and Red5-ROOM Controllers as manufactured by Delta Controls.
        1. Native BACnet platform for controlling all aspects of a room..
        2. New generation V4 controllers and Red5 system - engineered exclusively with enteliWEB. And Red5 app control.
        3. Communication: BACnet/IP, BACnet over Ethernet, BACnet MS/TP, and Delta LINKnet communications.
        4. Integration may include Non-BACnet systems such as Modbus, EnOcean, DALI, and SMI.
        5. Components:
           1. Red5-PLUS-ROOM Controller: 3 NET ports and 3 power outputs and excels at control of multiple rooms.
           2. Red5-EDGE-ROOM: 2 NET ports and 1 power output and excels at single room control.
           3. Red5-MODULE-1DOOR Module: Fully programmable door access control and a combination of universal and door-specific I/O points.
           4. Red5-ROOM Controller: Holds the access user database (up to 100,000 records) and provides access granted/denied decision-making intelligence. It also provides the communications network interface to the facility BACnet network and the front-end computer.

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

* 1. INTEGRATED SECURITY AND SURVEILLANCE SYSTEMS

\*\* NOTE TO SPECIFIER \*\* After Hours and Demand Based Ventilation Control: When a building is in an after-hour's mode and the lighting levels, temperature and ventilation set points have been changed to save energy, it should be able to use existing card readers connected to the Access Control System (ACS) integrated into the Enterprise Building Management System (EBMS) to temporarily change the status of the entire building or specific zones back to an occupied mode.

* + 1. Occupancy Status from the Security Access Control System (ACC) Card Readers: Share with EBMS through a web services interface capable of sharing the following data:
       1. System events including but not limited to door open and door closed.
       2. System alarms including but not limited to intruder detection.
       3. Credential holder information.
       4. Real time status information.
    2. Occupancy Status: Used by EBMS to control; lighting, plug-loads, space temperature and ventilation at the facility, floor, room, and zone level.
    3. Entry and Exit Security System Badge Readers: Count the number of facility occupants.
       1. Occupant Count: Shared with EBMS in real time.
       2. In Lieu of Credential Use: Exiting occupancy count may be derived from turnstiles, video surveillance or dedicated people counting sensors.
          1. Share data EBMS in real time through an open web service or API interface.
    4. Use of a Credential at a Designated Card Reader During Off Hours:
       1. After-Hours HVAC Setback Periods: Division 23 HVAC control system will set specific zones into occupancy mode for a predetermine period.
          1. Credential Use Record: Logs identity of the person and their department, and stores data in the ACS with monthly reporting capability.
       2. When required the card reader / keypad may capture a department code / billing code and length of time in override.
          1. Data is to be made available to the reporting systems and the Division 23 HVAC control system for time scheduling.
       3. At any given time during the override process a credential used with a predetermined code will set the Division 23 HVAC control system back to setback mode.
       4. System will notify all employees 5 minutes prior to changing status back to after-hour's mode. This notification will be by the best method available such as blinking the lights, audible message, email, or SMS.
    5. Communication Protocols and Interface Performance:
       1. Integration Between the Security System and EBMS: Via web services, or open protocol of the EBMS.
    6. Basis of Design: Red5 Access Control System as manufactured by Delta Controls.
       1. Extends Delta's BAS by integrating seamlessly with Delta Controls HVAC and Lighting application. A native BACnet system, providing interoperability with other BACnet products in a facility.
       2. Installation Sizes: From a few doors to hundreds of doors and thousands of users.
       3. Basic access control functions are bundled into a highly flexible system.
          1. The system grants or denies access for individual users for a specific access point such as a door or elevator floor.

Decisions are based on identifying the user and determining their access rights.

* + - 1. Components:
         1. Red5 Room: Access system manager.
         2. Red5- MODULE - 1DOOR: Access door module.

When connected to an Red5 controller on the Red5 system, the module provides remote, fully programmable, door access control and expanded I/O capabilities.

Access Modules: Up to 24 can be connected to a Red5-PLUS-ROOM controller with 8, Red5-EXPAND-04 power injector modules.

Access Modules: Up to 4 can be connected to an Red5-EDGE-ROOM controller.

System Options:

VIVOTEK VAST 2 and VIVOTEK VSS Integration. Video surveillance cameras and video management software; VIVOTEK Surveillance license enteliWEB add-on. Requires enteliWEB 4.16 or later.

VIVOTEK People Counting Integration: Red5 firmware 4.8 or later, and enteliWEB 4.13 or later.

OSDP Support: Open Supervised Device Protocol Credential Readers: Red5 firmware 4.9 or later, and enteliWEB 4.14 or later.

* + - * 1. Red5-EXPAND-04 Power Injector: Expands the number of Red5 modules that can be controlled by a single Red5-PLUS-ROOM and distributes I/O closer to where it is needed. Up to 8 power injectors can be connected to an Red5-PLUS-ROOM controller's Red5BUS network, with each power injector supporting up to 4 I/O or gateway modules. The additional modules can be located up to 230 ft (70 m) away from the controller.
        2. enteliWEB and enteliSYNC: Operator workstation software.

\*\* NOTE TO SPECIFIER \*\* Delete article if not required or delete paragraphs not required.

* 1. INTEGRATION ROOM LIGHTING CONTROLS
     1. Integrated Lighting and Room Control:

\*\* NOTE TO SPECIFIER \*\* The Enterprise Building Management System (EBMS) shall incorporate individual room controllers with lighting and window treatment and / or shade controls to increase tenant comfort and decrease energy usage. Combining these systems will streamline facility operations by providing more flexibility in remote and local access to lighting schedules, diagnosing problems, and overriding zones.

* + - 1. EBMS System Supplier: BTL Listed, Advanced Application Controllers dedicated to interfacing to and controlling subsystems within designated rooms, as shown on the plans.
         1. Sensors: Match those provided in Division 23 HVAC Division 26 Electrical and Division 28 Security where possible.
         2. Room Controllers: Match those provided in Division 23 HVAC control system where possible.
         3. Interface to Electrical Equipment: Lighting and room control.
         4. Window treatment and/or Shade Control: Coordinated with Division 8 and Division12.
      2. Space Parameters: Adjustable via room controller, with mobile occupant app, or touchscreen user interface:
         1. Minimum Monitoring: Room temperature, relative humidity, lighting illuminance in LUX, lighting color rendition (light temperature in degrees Kelvin), motion detection and noise level.
         2. If indicated on point list, interface with window shade system via Standard Motor Interface.
         3. If indicated on point list, include an Infra-Red control interface to in-room audio-visual equipment.
         4. Occupied/unoccupied status of room, determined by controller, based upon passive infrared sensors, and noise level.
      3. Daylight Harvesting Sensors: Measure outside light level reaching occupied space. Integrate this data with lighting and blinds control system to balance artificial light levels with incoming natural light.
      4. Corridor Lighting: Reduce after hours. Turn off entire fixtures or individual bulbs based on predefined schedules. Overrides based on occupancy status or occupant command.
      5. Lighting Occupancy Sensors: Used with Division 28 security system access events and integrate with Division 23 HVAC mechanical systems, triggering energy saving strategies. Use lighting occupancy sensors in unoccupied mode to alarm on occupancy status to security system.
      6. Occupancy Signal: From Division 28 integrated security system. User enters a space; lights in user assigned space are set to occupied mode. Signal is available for entire facility and specific zones where user has been assigned access.
      7. Room Controller's Onboard Occupancy Sensor: Disable lights and set HVAC system to unoccupied mode if room is flagged as unoccupied; no motion or occupant noise in the space (adjustable).
      8. Lighting and Shade Control: Occupied Mode: Controlled in conjunction with daylighting controls in space per ASHRAE 90.1-2016, LEED, and Well Community energy and sustainability standards.
      9. Integrate occupancy schedules from user scheduling systems including Google Schedule and Microsoft Outlook. Activate control sequences for comfort, wellness, and energy as defined within Division 23 HVAC mechanical systems.
      10. Communication Protocols and Interfaces Performance: Via BACnet IP, SMI, Web Service API or inherent protocol of the EBMS.
      11. Basis of Design: O3 Room Controllers as manufactured by Delta Controls.
          1. Fully programmable Native BACnet platform for controlling all aspects of a room.
          2. HVAC, lighting, blinds, access/security, and audiovisual equipment, via a single-point controller.
          3. Modular design offers expandable I/O, eases servicing, and reduces upgrade cost.
          4. New generation V4 controllers, O3 system is engineered exclusively with
          5. Communication: BACnet/IP, BACnet over Ethernet, BACnet MS/TP, and Delta LINKnet communications.
          6. Integration: Non-BACnet systems such as Modbus, EnOcean, DALI, and SMI.
          7. Components:

\*\* NOTE TO SPECIFIER \*\* Delete the following control options not required.

Red5-PLUS-ROOM Controller: 3 NET ports and 3 power outputs. Excels at control of multiple rooms.

Red5-EDGE-ROOM: 2 NET ports and 1 power output. Excels at single room control.

Red5-MODULE-1DOOR Module: Fully programmable door access control and a combination of universal and door-specific I/O points.

Red5-ROOM Controller : Holds the access user database (up to 100,000 records). Provides access granted/denied decision-making intelligence. Provides the communications network interface to the facility BACnet network and the front-end computer.

Red5-MODULE-DALI Gateway Module: Allows the O3 to communicate with DALI (Digital Addressable Lighting Interface) lighting groups and can control up to 64.

Dimmable Ballasts or LED Drivers: For in-ceiling mounting. Control is situated close to devices and results in more efficient wire runs.

Red5-MODULE-SMI Gateway Module: Allows the O3 to communicate with SMI (Standard Motor Interface) motors controlling motorized blinds and shades. A single Red5-MODULE-SMI can manage up to 16 SMI drives and integrate up to 16 groups.

Red5-MODULE-8xP Universal I/O Module: Comes with 8 universal points. Can be configured as inputs or outputs to control or read from field equipment.

Red5-MODULE-4F4xP: 4 universal points and 4 binary FET outputs for driving high-current relay coils and switching AC or DC power.

In a lighting Controller Application: A single Red5-MODULE-4F4xP module can drive 2 bi-stable relays, power 0 to 10 V dimming ballasts, and provide input points for sensors or switches.

Red5-MODULE-PoE Module: Adds Power over Ethernet (PoE) capabilities to the O3 system. Provides lighting control over PoE and HVAC and integration.

Red5-EXPAND-04 Power Injector: Expands the number of Red5 modules that can be controlled by a single RED5-PLUS-ROOM and distributes I/O closer to where it is needed.

Up to 8 power injectors can be connected to an RED5-PLUS-ROOM controller's O3BUS network, with each power injector supporting up to 4 I/O or gateway modules.

Additional modules can be located up to 230 ft (70 m) away from the controller.

O3-HUB: The ceiling-mounted sensor hub replaces multiple room sensors with a one-per-room competitive cost solution when installed together with an Red5 room controller.

Combines humidity, composite temperature, passive infrared motion and light sensors in a single device.

Occupant and location based control for office or meeting space.

Models equipped with EnOcean radios (868 MHz and 902 MHz) are also available.

O3 App: A room control application for mobile devices. The app communicates with the Red5 controller and enteliWEB to execute preconfigured comfort settings for different room activities (meetings, presentations, desk work, etc.). The settings are configured in enteliWEB by an administrator. Since the app uses the Bluetooth beacon in the sensor hub to locate rooms, the app is only available with rooms or spaces using sensor hubs.

enteliWEB: Web-based application; connects facilities and centralizes building management operation, site engineering, and energy analytics. New with the O3 system, enteliWEB. Provides services that define and coordinate rooms in a building.

* + 1. Integrated Lighting and Room Control with Sensor Hub:
       1. Basis of Design: O3 Sensor Hub as manufactured by Delta Controls.
          1. Model: Delta Controls O3-HUB2-2xP.
          2. Model: Delta Controls O3-HUB2.
          3. Ceiling-mounted, UL 916 Listed, 24 VDC, 1 W typical, 8 W max, Class 2 device with removable screw-type terminal connectors. Complies with CE, EAC, and FCC/IC.
          4. Infrared Space Temperature Sensor: Plus or minus 1.8 degrees F (1 degree C)
          5. Relative Humidity Sensor: Plus or minus 3 percent from 20 to 80 percent, at 59 to 86 degrees F (15 to 30 degrees C).
          6. Digital Space Temperature: Plus or minus 1.8 degrees F (1 degree C).
          7. Passive Infrared (PIR) Motion Sensor: At 10 ft (3048 mm). Minimum Diameter Coverage: 22 ft (6706 mm).
          8. Audio Sensor: Acoustic occupancy detection.
          9. Light Sensor: 0 to 2500 lumens range. Accuracy at 77 degrees F (25 degrees C): Plus or minus 5 lumens + 2 percent of value.
          10. LED Ring: Fully color articulated.
          11. 1.0 Watt Monospeaker: For tones and audio output.
       2. Support the Following Communication:
          1. Capable of incorporating EnOcean (902 MHz or 868 MHz), supporting 32 wireless devices.
          2. Bluetooth Low Energy Beacon: Broadcasts identifier to Bluetooth enabled smartphones. Bluetooth 2-way Communication: Support hub setup from Android or iOS devices directly.
          3. BLE API must be available for custom app development.
          4. BACnet/IP, BACnet/Ethernet, and BACnet/SC: BACnet Protocol Rev 18 or later. Dual-port Ethernet connections with failsafe Ethernet pass-through to support daisy chain topology.
          5. IR Transmitter/Blaster: 12 Proto IR Codes support.
          6. MQTT: Available external MQTT broker.
          7. Near Field Communication (NFC) for Setup: Lock NFC Read/Writes after configuration.
          8. Input/Output Support: Include support for 2 software configurable universal I/O. Support inputs of 10k thermistor, 0-5 V, 0-10 V, and/or 4-20 mA and outputs of 0-10 V at 20 mA sourcing and/or 1-10 V at 10 mA sinking.
       3. Hardware:
          1. NFC: Supports Android and iOS.
          2. Dual Port Ethernet: Star and Daisy chain configurations with failsafe Ethernet pass-through supporting 30 HUBs.

Power loss to any hub in daisy chain will not take other HUBs off-line.

Daisy Chain: Supports HUBs with 100 meters between them. During power loss this distance is reduced to 15 meters.

* + - * 1. Bluetooth 5.0: BLE Beacon and Bi-directional communication.
        2. Power: 24 VDC, External PoE splitter can be used.
        3. Bluetooth Low Energy (BLE): Customizable passcode.
        4. NFC: Ability to lock NFC Read/Writes after configuration.
        5. MQTT: TLS Security. Encrypted connection between the MQTT broker and MQTT client using a trusted certificate on the Client.
      1. iOS and Android Sensor HUB Setup:
         1. App based configuration tool to configure network information, set security options, perform firmware updates, calibrate sensors, and view diagnostic data.
         2. Network Parameters, Communication Options, and Operating Parameters: Adjustable with this tool without the use of a third-party software program or Building Automation System.
      2. Embedded Diagnostics:
         1. Metrics must be calculated automatically. No additional setup is to be required.
         2. Metrics Table: MQTT and BACnet AV objects.
         3. MQTT and BACnet AV Timestamped Objects:

Space Utilization: Daily, weekly, and monthly.

Average Start and End Time: Weekly.

Busiest Hour: Of workday and week.

Average Sound Levels: Occupied, unoccupied, and mean.

* + - * 1. Average Temperatures: Occupied, unoccupied, and mean.
        2. Average Light Level: Occupied, unoccupied, and mean.
    1. System to System Integrated Lighting Room Control:

\*\* NOTE TO SPECIFIER \*\* The EBMS incorporates individual room controllers, increasing tenant comfort and decreasing energy usage. Combining systems streamlines facility operations providing flexibility in remote and local access to lighting schedules, diagnosing problems, and overriding zones.

* + - 1. EBMS Supplier: Provide Work for integrated lighting control per the following for functionality.
         1. Match sensors in Divisions 23 HVAC, 26 Electrical, and 28 Security, where possible.
         2. Match room controllers provided in Division 23 HVAC control system where possible.
         3. Interface to electrical equipment providing lighting and room control.
         4. Coordinate window treatment and/or shade control with Division 8 and Division12.
      2. Adjustable Room Controller Parameters: Via mobile occupant app or touchscreen user interface:
         1. Space Comfort HVAC Control: Temperature adjustment.
         2. Lighting Control: On / Off, Presets, Raise/Lower support.
         3. Motorized Shade Control: Open / Closed and Raised / Lower, Presets and Stop if moving.
         4. Receptacle Control: On / Off.
      3. EBMS Integration with Networked Lighting and Shade Control System:
         1. Trend Reports: Light scenes, light levels, light sensor levels, window sensors, shade position, room occupancy, lamp and light engine failure for digital ballasts and drivers, digital ballast and driver failure, partition wall state, battery health, and light sources nearing end of life.
         2. Failure Alarms: Batteries, light sources near end of life, light engines, digital ballasts, and drives.
         3. Room-level load shed lighting goals and load shed lighting shall be allowed as well as load shed enable shall be supported.
         4. Override and Schedule: Scenes, light levels, shade position, room occupancy mode in occupied and unoccupied levels, daylight harvesting setpoint, daylight harvesting mode in relationship to room thermal load.
         5. Functionalities: Independent in event of communication loss between two systems. The EBMS provides the mater schedule between systems.
         6. Override Daylight Autonomy Mode: Maximizes occupant comfort while balancing and maintaining energy savings through reduction in glare in occupied mode.
      4. Lighting Occupancy Sensors: Use in combination with security system badge access events. Integrate this information with Division 23 HVAC mechanical systems to enact energy saving setback strategies. Use in unoccupied mode to alarm on status per building schedule.
      5. Room Occupancy Sensor: Room Vacancy Detected: Switch off \_\_\_ percent of lights. Reset HVAC system to unoccupied setpoint.
      6. EBMS Occupancy Schedules Integration: Common user scheduling system such as Google Calendar and Microsoft Outlook as master schedule. Use data to activate automatic control sequences for comfort, wellness, and energy as defined in Division 23 HVAC mechanical systems and Division 26 Lighting Controls.
      7. Communication Protocols and Interfaces Performance:
         1. Integration via BACnet IP, Web Service API or inherent protocol of EBMS.
         2. If using BACnet IP, only integrations supporting Device Change of Value ("COV") Subscriptions, Description, Location, and Profile Name are to be accepted.
      8. Lighting, Shading and Security Response: By EBMS System Supplier:
         1. Provide necessary Work for Integrated Security, Lighting, Room and Blind Control and include the following as required for specified functionality.
         2. Match sensors provided in Division 15 HVAC, 16 Electrical, and 16 Security where possible.
         3. Match room controllers provided in Division 15 HVAC control system where possible.
         4. Interface with electrical equipment providing lighting and room control.
         5. Coordinate window treatment and/or shade control with Division 8 and 12.
      9. Communication Protocols and Interfaces Performance:
         1. Integration to be via BACnet IP, Web Service API or inherent protocol of the Enterprise Building Management System.
         2. If Using BACnet IP: Only integrations supporting Device Change of Value ("COV") Subscriptions, Description, Location, and Profile Name will be accepted.

1. EXECUTION
   1. EXAMINATION
      1. Do not begin installation until the 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
  2. .Clean products in accordance with the manufacturers recommendations.
     1. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION