

SUBSTITUTION REQUEST

Project: Covina Valley District Wide HVAC Replacement Substitution Request Number: 001
Barranca Elementary School
To: Robin Harbert From: JESSE DEL RIO
Melinda Pure Date: 1/3/2022
Re: DDC System Manufacturer Qualification: A/E Project Number: 03-122224
Contract For: 75-22605-00

Specification Title: BUILDING MANAGEMENT & DIRECT DIGITAL CONTROL SYSTEM Description: DDC System Manufacturer Qualification
Section: 230923 Page: 1 Article/Paragraph: 3-Products

Proposed Substitution: DISTECH
Manufacturer: Distech Phone: (800)404-0043
Address: 400 East Royal Lane Building Three, suite 290 Irving, Texas 75039
Trade Name: DDC Controls Model No.: Multiple Parts
Installer: Next Level EMS Phone: (213) 703-4453
Address: 9834 Norwalk Blvd, Santa Fe Springs, CA 90670

History: New product 1-4 years old 5-10 years old More than 10 years old

Differences between proposed substitution and specified product:

Carrier is specified in 23 09 00. Distech utilizes the identical protocol specified, BACnet. By

Allowing NXL to bid installing Distech BACnet controls it would encourage competitive bidding.

Point-by-point comparative data attached — REQUIRED BY A/E

Reason for not providing specified item: _____

By only listing Carrier BACnet Controls, the bid will have limited competitive bidding. There are multiple contractors that can install Distech which would allow for competitive bidding and accomplish the campus standards.

Similar Installation:

Project: OC Library - El Toro Architect: IDS Group
Address: 24672 Raymond Way Owner: Orange County Public Libraries
Lake Forest, CA 92630 Date Installed: 10/04/2021

Proposed substitution affects other parts of Work: No Yes; explain _____

Savings to Owner for accepting substitution: Competitive bidding and cost savings for future projects (\$ TBD).

Proposed substitution changes Contract Time: No Yes [Add] [Deduct] _____ days.

Supporting Data Attached: Drawings Product Data Samples Tests Reports Spec Comparison

SUBSTITUTION REQUEST

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Cost data as stated above is complete. Claims for additional costs related to accepted substitution which may subsequently become apparent are to be waived.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.
- Coordination, installation, and changes in the Work as necessary for accepted substitution will be complete in all respects.

Submitted by: _____

Signed by: _____

Firm: _____

Address: _____

Telephone: _____

Attachments:

A/E's REVIEW AND ACTION

- Substitution approved - Make submittals in accordance with Specification Section 01 25 00 Substitution Procedures.
- Substitution approved as noted - Make submittals in accordance with Specification Section 01 25 00 Substitution Procedures.
- Substitution rejected - Use specified materials.
- Substitution Request received too late - Use specified materials.

Signed by: _____ Date: 01/17/2023

Additional Comments: Contractor Subcontractor Supplier Manufacturer A/E
 Other:

SPECIFICATION 23 09 23 - PRODUCT COMPARISON	
Specification	Comments
PART 1 -General	
1.2 Quality Assurance During Constrction	
<p>A. The acceptable DDC manufacturer is: 1. Carrier</p> <p>B. The Building Control System shall be Carrier</p> <p>C. A manufacturer authorized installer shall coordinate all portions of the project and perform final integration.</p> <p>D. The Installation Contractor shall be responsible for the complete installation, including the initial data input, system debugging, and initial calibration of system components.</p> <p>E. A full-time Project Manager with a minimum of ten (10) years experience with facilities of this size project and complexity shall be assigned to manage both the engineering/design and system installation/start-up phases of the projects. Close coordination and approval from and with the Design Professional is required.</p> <p>F. Control system shall be engineered, programmed, and supported completely by representative's local office that must be within 65 miles of project site. The control contractor shall be independent and not part of a Mechanical Contractor's control division.</p> <p>G. The design team reserves the right to immediately disqualify.</p>	Proposing - Distech
Part 3-Products	
3.1-Building Management System and Components Description	
<p>A. The Building Management System (BMS) shall be comprised of a network of interoperable, stand alone digital controllers, a computer system, graphical user interface software, printers, network devices and other devices as specified herein.</p> <p>1. Building Management System to be provided shall perform the following general functions: a. Building management and control. b. Monitoring and control of controllers, remote devices and programmable logic controllers including sensors, actuators, environmental delivery systems (chillers, boilers, room climate control, lighting systems, electrical systems etc.). c. Operator interface to allow general supervision of room controls. d. Data collection and historization. e. Alarm management. f. Trending. g. Report generation. h. Network integration.</p> <p>2. Data exchange and integration with a diverse range of other computing and facilities systems using industry standard techniques.</p> <p>3. System shall employ all standard features and functions as described in Section 1 to monitor and control building equipment. At a minimum, the following data shall be accessible: a. Space temperature. b. Space temperature set point. c. Occupancy status. d. Operating mode. e. Window status. f. Valve positions. g. Air volume flow. h. Percent terminal load. i. Time schedules. j. Zero energy bands. k. Room name. l. Terminal type e.g. fan coil.</p> <p>4. In the event of a power failure or disconnection from the network, the controllers shall continue to be fully operational with full time program capability.</p>	Meets and, in some case exceed specification
3.2 Server Functions and Hardware	
<p>A. The server supports all Network Area Controller (NAC) connected to the customer's network whether local or remote.</p> <p>B. It shall be possible to provide access to all Network Area Controllers via a single connection to the server. In this configuration, each Network Area Controller can be accessed from a remote Graphical User Interface (GUI) or from a standard Web browser (WBI) by connecting to the server.</p> <p>C. The server shall provide the following functions, at a minimum:</p> <p>1. Global Data Access: The server shall provide complete access to distributed data defined anywhere in the system.</p> <p>2. Distributed Control: The server shall provide the ability to execute global control strategies based on control and data objects in any NAC in the network, local or remote.</p> <p>D. The server shall include a master clock service for its subsystems and provide time synchronization for all Network Area Controllers (NAC).</p> <p>E. The server shall accept time synchronization messages from trusted precision Atomic Clock Internet sites and update its master clock based on this data.</p> <p>F. The server shall provide scheduling for all Network Area Controllers and their underlying field control devices.</p> <p>G. The server shall provide demand limiting that operates across all Network Area Controllers. The server must be capable of multiple demand programs for sites with multiple meters and or multiple sources of energy. Each demand program shall be capable of supporting separate demand shed lists for effective demand control.</p> <p>H. The server shall implement the BACnet Command Prioritization scheme (16 levels) for safe and effective contention resolution of all commands issued to Network Area Controllers. Systems not employing this</p>	Meets and, in some case exceed

prioritization shall not be accepted.

I. Each Network Area Controller supported by the server shall have the ability to archive its log data, alarm data and database to the server, automatically. Archiving options shall be user -defined including archive time and archive frequency.

J. The server shall provide central alarm management for all Network Area Controllers supported by the server. Alarm management shall include:

1. Routing of alarms to display, printer, email and pagers.

2. View and acknowledge alarms.

3. Query alarm logs based on user -defined parameters.

K. The

server shall provide central management of log data for all Network Area Controllers supported by the server. Log data shall include process logs, runtime and event counter logs, audit logs and error logs. Log data management shall include:

1. Viewing and printing log data.

2. Exporting log data to other software applications.

3. Query log data based on user -defined parameters.

L. Connection to the BMS network shall be via an Ethernet network interface card, 100 Mbps.

M. Graphics:

1. Provide custom dynamic graphics for systems and controlled devices installed in this project.

2. Provide standardized intelligent dynamic graphics for application specific controllers that will automatically modify itself based on system components installed.

3. All graphics shall be stored at the APM BMS server.

meets and, in some case exceed specification

3.3 NETWORK AREA CONTROLLER (NAC)

A. The Network Area Controller, (NAC) with 1 GB of DDR3 SDRAM and a Quad Core 996 Ghz processor shall be the only acceptable Network Area Controller (NAC).

General Requirements

1. BACnet Conformance. a. Building Controller shall be approved by the BTL as meeting the BACnet Building Controller requirements.

b. Please refer to section 22.2, BACnet Functional Groups, in the BACnet standard, for a complete list of the services that must be directly supported to provide each of the functional groups listed above. All proprietary services, if used in the system, shall be thoroughly documented and provided as part of the submittal data. All necessary tools shall be supplied for working with proprietary information.

2. Building controller shall be of scalable design such that the number of trunks and protocols may be selected to fit the specific requirements of a given project.

3. The controller shall be capable of panel -mounted on DIN rail and/or mounting screws.

4. The controller shall be capable of providing global control strategies for the system based on information from any objects in the system, regardless if the object is directly monitored by the building controller module or by another controller.

5. The controller shall be capable of running up to six (6) independent control instances simultaneously. The modification of one control instance does not interrupt the function or runtime others.

6. The software program implementing the DDC strategies shall be completely flexible and user -definable. All software tools necessary for programming shall be provided as part of project software. Any systems utilizing factory pre-programmed global strategies that cannot be modified by field personnel on -site, using a wide area network (WAN) or downloaded through remote communications are not acceptable. Changing global strategies using firmware changes is also unacceptable.

7 Programming shall be object -oriented using control function blocks and support DDC functions. All flowcharts shall be generated and automatically downloaded to controller. Programming tool shall be supplied and be resident on workstation. The same tool shall be used for all controllers.

8. The programming tool shall provide means to graphically view inputs and outputs to each program block in real-time as program is executing. This function may be performed using the operator's workstation or field computer.

9. Controller shall have 6,000 Analog Values and 6,000 Binary Values.

10. Controller IP configuration can be done via a direct USB connect with an operator's workstation or field computer.

11. Controller shall have at a minimum a Quad Core 996Ghz processor to ensure fast processing speeds.

12. Global control algorithms and automated control functions shall execute using a 64 -bit processor.

13. Controller shall have a minimum of 1 GB of DDR3 SDRAM on a 533Mhz bus to ensure high speed data recording, large data storage capacity and reliability.

14. Controller shall support two (2) on -board EIA-485 ports capable of supporting various EIA-485 protocols including, but not limited to BACnet MS/TP and Modbus. a. Ports are capable of supporting various EIA-485 protocols including, but not limited to BACnet MS/TP and Modbus.

15. Controller shall support two (2) ports-each of gigabit speed-Ethernet (10/100/1000) ports. a. Ports are capable of supporting various Ethernet protocols including, but not limited to BACnet IP, FOX, and Modbus.

16. All ports shall be capable of having protocol(s) assigned to utilize the port's physical connection.

17. The controller shall have at a minimum four (4) onboard inputs, two (2) universal inputs and two (2)

17. The controller shall have at a minimum four (4) onboard inputs, two (2) universal inputs and two (2) binary inputs.

18. Schedules

a. Building controller modules shall provide normal seven-day scheduling, holiday scheduling and event scheduling.

b. Each building controller shall support a minimum of 380 BACnet Schedule Objects and 380 BACnet Calendar Objects.

19. Logging Capabilities.

a. Each building controller shall log as minimum 2,000 objects at 15 -minute intervals. Any object in the system (real or calculated) may be logged. Sample time interval shall be adjustable at the operator's workstation.

b. Logs may be viewed both on -site or off -site using WAN or remote communication.

c. Building controller shall periodically upload trended data to networked operator's workstation for long-term archiving if desired.

d. Archived data stored in database format shall be available for use in third -party spreadsheet or database programs.

20. Alarm Generation.

a. Alarms may be generated within the system for any object change of value or state (either real or calculated). This includes things such as analog object value changes, binary object state changes, and various controller communication failures.

b. Each alarm may be dialed out as noted elsewhere.

c. Alarm log shall be provided for alarm viewing. Log may be viewed on -site at the operator's terminal or off -site using remote communications.

d. Controller must be able to handle up to 2,000 alarm setups stored as BACnet event enrollment objects, with system destination and actions individually configurable.

21. Demand Limiting

a. Demand limiting of energy shall be a built-in, user -configurable function. Each controller module shall support shedding of up to 1,200 loads using a minimum of two types of shed programs.

b. Load shedding programs in building controller modules shall operate as defined in section 2.1.J of this specification.

B. BACnet MS/TP

1. BACnet MS/TP LAN must be software -configurable from 9.6 to 115.4Kbps

a. Each BACnet MS/TP LAN shall support 32 BACnet devices at a minimum.

b. All proprietary object types, if used in the system, shall be thoroughly documented and provided as part of the submittal data. All necessary tools shall be supplied for working with proprietary information.

C. BACnet IP

1. The building controller shall comply with Annex J of the BACnet specification for IP connections. This device shall use Ethernet to connect to the IP internetwork, while using the same Ethernet LAN for non-IP communications to other BACnet devices on the local area network (LAN).

2. Must support interoperability on WANs and local area networks (LANs), and function as a BACnet Broadcast Management Device (BBMD).

3. Each controller shall support at a minimum 128 BBMD entries.

4. BBMD management architecture shall support 3,000 subnets at a minimum.

5. Shall support BACnet Network Address Translation.

6. All proprietary object types, if used in the system, shall be thoroughly documented and provided as part of the submittal data. All necessary tools shall be supplied for working with proprietary information.

Meets specification

3.4 SYSTEM PROGRAMMING

A. The Graphical User Interface software (GUI) shall provide the ability to perform system programming and graphic display engineering as part of a complete software package. Access to the programming functions and features of the GUI shall be through password access as assigned by the system administrator.

B. A library of control, application, and graphic objects shall be provided to enable the creation of all applications and user interface screens. Applications are to be created by selecting the desired control objects from the library, dragging or pasting them on the screen, and linking them together using a built in graphical connection tool. Completed applications may be stored in the library for future use. Graphical User Interface screens shall be created in the same fashion. Data for the user displays is obtained by graphically linking the user display objects to the application objects to provide "real-time" data updates. Any real-time data value or object property may be connected to display its current value on a user display. Systems requiring separate software tools or processes to create applications and user interface displays shall not be acceptable.

C. Programming Methods:

1. Provide the capability to copy objects from the supplied libraries, or from a user -defined library to the user's application. Objects shall be linked by a graphical linking scheme by dragging a link from one object to another. Object links will support one-to-one, many -to -one, or one -to -many relationships. Linked objects shall maintain their connections to other objects regardless of where they are positioned on the page and shall show link identification for links to objects on other pages for easy identification. Links will vary in color depending on the type of link; i.e., internal, external, hardware, etc.

2. Configuration of each object will be done through the object's property sheet using fill-in the blank

fields, list boxes, and selection buttons. Use of custom programming, scripting language, or a manufacturer-specific procedural language for configuration will not be accepted.

3. All programming shall be graphical and utilize a non proprietary tool like Microsoft Visio. Text based programming is not acceptable.

4. The software shall provide the ability to view the logic in a monitor mode. When on-line, the monitor mode shall provide the ability to view the logic in real time for easy diagnosis of the logic execution. When off-line (debug), the monitor mode shall allow the user to set values to inputs and monitor the logic for diagnosing execution before it is applied to the system.

5. All programming shall be done in real-time. Systems requiring the uploading, editing, and downloading of database objects shall not be allowed.

6. The system shall support object duplication within a customer's database. An application, once configured, can be copied and pasted for easy re-use and duplication. All links, other than to the hardware, shall be maintained during duplication.

D. Scheduling:

1. Provide the capability to schedule each object or group of objects in the controller system.

Controllers shall have a minimum of 20 schedules. Each schedule shall consist of the following: a. Daily schedule: Provide daily schedules that are the basic building blocks for any of the following time schedules. Using daily schedules, user shall enter the switching times with the desired set points and switching conditions for the data -points. When preparing a daily schedule and assigning the name, there is initially no specific relationship to a particular day in the week. The modular structure of the time schedule shall make it possible for the user to establish various different daily schedules, keep them in a library, and include them in the weekly schedule. User shall be free to extend the list of daily schedules to meet his/her special requirements. The repeated use of the same daily schedule shall also be possible (for example, the same daily schedule can apply from Monday to Friday in the weekly schedule). Changes in a daily schedule shall be immediately effective in the weekly and annual schedules, as well as in the special day list.

b. Weekly schedule: Provide a separate weekly schedule that shall be generated for each time schedule. Weekly schedule defines which daily schedule is to be used for which weekday. A daily schedule is assigned to each day of the week (Monday to Sunday). It shall also be possible to assign the same daily schedule to several weekdays. Weekly schedule, as defined, shall automatically be copied for each week in the annual schedule. If a change is made to a weekday in a weekly schedule, this change shall affect the weekday in every week of the year. If a daily schedule is entered directly in the annual schedule, this daily schedule shall have priority

over the daily schedule from the weekly schedule. Definition of a weekly schedule forms the basis of the annual schedule. c. Annual schedule: Provide an annual schedule that is structured like a calendar and

consists of successive weekly schedules. It provides an overview of which daily schedules are valid on which calendar days. If the daily schedule in a weekly schedule does not apply on a particular calendar date, another daily schedule can be entered for it directly in the annual schedule. Annual schedule starts on the current day. Each day, the time frame shifts one day. Days added at the end shall automatically be assigned the daily schedule from the weekly schedule. Entries in the annual schedule shall therefore be made only if a daily schedule differing from the one selected is to be used. An undefined daily schedule to be inserted in the annual schedule can be defined in the daily schedule.

d. Holiday schedule: Provide one holiday day list that shall exist per time schedule. List shall make a number of holidays and special days available to which a daily schedule can be assigned. This daily schedule will then apply to this holiday or special day every year. The date of floating holidays shall be calculated automatically by the controller. If no daily schedule is entered on certain holidays, the special day list is not taken into account on this day. Provide capability for 24 holidays and special days

Meets specification

3.5 EXPANDABLE CONTROLLERS

A. General:

1. The NAC shall be able to run at least one dedicated control instance as an Expandable Application Controller and support multiple expansion modules.

2. Expandable Application Controller shall be capable of providing control strategies for the system based on information from any or all connected inputs. The program that implements these strategies shall be completely flexible and user definable. Any systems utilizing factory pre-programmed global strategies that cannot be modified by field personnel on -site via simple download are not acceptable. Changing global strategies via firmware changes is also unacceptable. Program execution of controller shall be a minimum of once per second.

3. Programming shall be object -oriented using control program blocks. Controller shall support a minimum of 500 Analog Values and 500 Binary Values. Each and every analog and binary value shall support standard BACnet priority arrays. Programming tool shall be provided with system and shall be the same tool that is used to program the Building Controller. All flowchartshall be generated and automatically downloaded to controller. No re-entry of database information shall be necessary.

4. Provide means to graphically view inputs and outputs to each program block in real-time as

program is executing. This function may be performed via the operator's terminal or field computer.

5. Controller shall have adequate data storage to ensure high performance and data reliability. Battery shall retain static RAM memory and real-time clock functions for a minimum of 1.5 years (cumulative). Battery shall be a field -replaceable (non -rechargeable) lithium type. Unused battery life shall be 10 years.
6. The onboard, battery -backed real time clock must support schedule operations and trend logs.
7. Global control algorithms and automated control functions should execute via 32 -bit processor.
8. Controller shall include both on -board 10BASE-T/100BASE-TX Ethernet BACnet communication over twisted pair cable (UTP) and shall include BACnet IP communication. In addition, controller shall include BACnet PTP connection port.
9. The NAC shall be able to host up to 8 expansion modules with various I/O combinations. These inputs and outputs shall include universal 12 -bit inputs, binary triac outputs, and 8 -bit switch selectable analog outputs (0-10V or 0-20 mA). Inputs shall support 3K and 10K thermistors, 0-5VDC, 0-10VDC, 4-20mA, dry contacts and pulse inputs directly.
10. All outputs must have onboard Hand -Off -Auto switches and a status indicator light. HOA switch position shall be monitored. Each analog output shall include a potentiometer for manually adjusting the output when the HOA switch is in the Hand position.
11. The position of each and every HOA switch shall be available system wide as a BACnet object. Expandable Application Controller shall provide up to 176 discreet inputs/outputs per base unit.

B. BACnet Conformance:

1. This controller shall as a minimum support Point -to -Point (PTP), MS/TP and Ethernet BACnet LAN types. It shall communicate directly via these BACnet LANs as a native BACnet device and shall support simultaneous routing functions between all supported LAN types. Building controller shall be a BACnet conformance class 3 device and support all BACnet services necessary to provide the following BACnet functional groups:
 - a. Clock Functional Group.
 - b. Files Functional Group.
 - c. Reinitialize Functional Group.
 - d. Device Communications Functional Group.
 - e. Event Initiation Functional Group.
2. Please refer to section 22.2, BACnet Functional Groups, in the BACnet standard for a complete list of the services that must be directly supported to provide each of the functional groups listed above. All necessary tools shall be supplied for working with proprietary information.
3. Standard BACnet object types supported shall include as a minimum: Analog Input, Binary Input, Analog Output, Binary Output, Analog Value, Binary Value, Device, File, Group, Event Enrollment, Notification Class, Program and Schedule object types. All necessary tools shall be supplied for working with proprietary information.
4. The Controller shall comply with Annex J of the BACnet specification for IP connections. This device shall use Ethernet to connect to the IP internetwork, while using the same Ethernet LAN for non-IP communications to other BACnet devices on the LAN. Must support interoperability on wide area networks (WANs) and local area networks (LANs) and function as a BACnet Broadcast Management Device (BBMD).

C. Schedules: Each expandable application controller shall support a minimum of 50 BACnet Schedule Objects.

D. Logging Capabilities:

1. Each controller shall support a minimum of 200 trend logs. Any object in the system (real or calculated) may be logged. Sample time interval shall be adjustable at the operator's workstation.

Meets specification

3.6 TERMINAL UNIT APPLICATION CONTROLLERS (HEAT PUMPS, PACKAGED AC UNITS)

A. Provide one BACnet Application Specific Controller (B-ASC) that is a native BACnet application controller for each piece of unitary mechanical equipment that adequately covers all objects listed in object list for unit. All controllers shall interface to building controller via MS/TP LAN using BACnet protocol. No gateways shall be used. Controllers shall include input, output and self-contained logic program as needed for complete control of unit.

B. BACnet Conformance:

1. Application controllers shall as a minimum support MS/TP BACnet LAN types. They shall communicate directly via this BACnet LAN at 9.6, 19.2, 38.4 and 76.8 Kbps, as a native BACnet device. Application controllers shall be of BACnet conformance class 3 and support all BACnet services necessary to provide the following BACnet functional groups:
 - a. Files Functional Group.
 - b. Reinitialize Functional Group.
 - c. Device Communications Functional Group.
2. Please refer to Section 22.2, BACnet Functional Groups in the BACnet standard for a complete list of the services that must be directly supported to provide each of the functional groups listed above. All proprietary services, if used in the system, shall be thoroughly documented and provided as part of the submittal data. All necessary tools shall be supplied for working with proprietary information.
3. Standard BACnet object types supported shall include as a minimum-Analog Input, Analog Output, Analog Value, Binary Input, Binary Output, Binary Value, Device, File and Program Object Types. All proprietary object types, if used in the system, shall be thoroughly documented and provided as part of the submittal data. All necessary tools shall be supplied for working with proprietary information.

C.

Application controllers shall include universal inputs with 10 -bit resolution that can accept 3K and 10K thermistors, 0-5 VDC, 4-20 mA, dry contact signals and a minimum of 3 pulse inputs. Any input on controller may be either analog or digital. Controller shall also include support and modifiable

Meets specification

programming for interface to intelligent room sensor. Controller shall include binary outputs on board with analog outputs as needed.

D. All program sequences shall be stored on board controller in EEPROM. No batteries shall be needed to retain logic program. All program sequences shall be executed by controller 10 times per second and shall be capable of multiple PID loops for control of multiple devices. Programming of application controller shall be completely modifiable in the field over installed BACnet LANs or remotely via modem interface. Operator shall program logic sequences by graphically moving function blocks on screen and tying blocks together on screen. Application controller shall be programmed using same programming tools as building controller and as described in operator workstation section. All programming tools shall be provided and installed as part of system.

E. Application controller shall include support for the Microset 4 intelligent room sensor. Display on the room sensor shall be programmable at controller and include an operating mode and a field service mode. All button functions and display data shall be programmable to show specific controller data in each mode based on which button is pressed on the sensor. See intelligent room sensor section and sequence of operation for specific display requirements at intelligent room sensor.

3.7 INPUT AND OUTPUT INTERFACE

A. Hardwired inputs and outputs may tie into the system through general purpose, custom application, unitary controllers or distributed I/O devices.

B. Input points and output points shall be protected such that shorting of the point to itself, to another point, or to ground will cause no damage to controller. Input and output points shall be protected from voltage up to 24 V of any duration, such that contact with this voltage will cause no damage to controller. Inputs and outputs shall be arranged on interchangeable modules or circuit boards to allow the replacement of a damaged module or board without replacing the entire controller.

C. Digital inputs shall allow the monitoring of on and off signals from remote devices. Digital inputs shall provide a wetting current of at least 12 mA to be compatible with commonly available control devices, and shall be protected against the effects of contact bounce and noise. Digital inputs shall sense dry contact closure without external power other than that provided by the controller being applied.

D. Totalizer input points: This type of point shall conform to all requirements of digital input points, and also accept up to 15 pulses per second for pulse accumulation.

E. Analog inputs for GPCs shall be minimum 12-bit resolution and allow the monitoring of low -voltage (0 to 10 VDC), current (0 to 20 mA), negative temperature coefficient (NTC), and resistance to detector (RTD). Analog inputs shall be compatible with and field -configurable to commonly available sensing devices. To prevent thermal loading, RTDs and thermistors shall be scanned rather than have continuous power applied.

F. Inputs shall be electrically isolated from their associated field points.

G. Digital outputs shall provide for on and off operation, or a pulsed low -voltage signal for pulse width modulation control. Outputs shall be selectable for either normally open or normally closed operation.

H. Analog outputs shall be minimum 8-bit resolution and provide a modulating signal for the control of end devices. Outputs shall provide either a 0 to 10 VDC or a 4 to 20 mA signal as required to provide proper control of the output device. Analog outputs on general purpose or custom application controllers shall have status lights and a two -position Auto and Manual switch and manually adjustable potentiometer with feedback for manual operation. Analog outputs shall not exhibit a drift of greater than 0.4 percent of range per year.

I. Tri-State outputs: Provide tri-state outputs (two coordinated digital outputs) for control of three-point floating -type electronic actuators without feedback. Use of three-point floating devices shall be limited to zone control and terminal unit control applications (VAV terminal units, duct -mounted heating coils, zone dampers, radiation). Control algorithms shall run the zone actuator to one end of its stroke every 24 hours for verification of operator tracking.

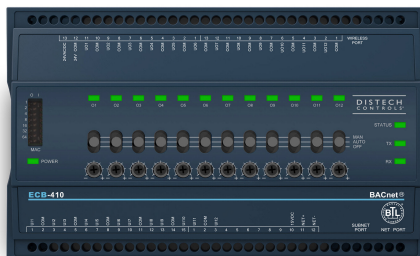
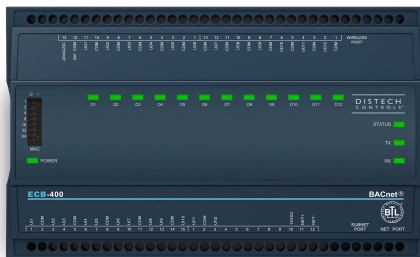
J. System point capacity: System size shall be expandable to at least two times the number of hardware and software input and output points required for this project or 20,000 points, whichever is greater. Additional controllers (along with associated devices and wiring) shall be all that is necessary to achieve this capacity requirement. Operator interfaces installed for this project shall not require any hardware additions or software revisions to expand the system.

K. Spare I/O Points: At each controller location, provide spare points equal to 15 percent of total I/O points at that location or 2 AI, 2 AO, 2 DO and 2 DI, whichever is greater.

Meets specification

ECB-400 Series

BACnet B-AAC 24-Point
Programmable Controllers



Overview

The ECB-400 Series controllers are microprocessor-based programmable controllers designed to control various building automation applications such as air handling units, multi-zone applications, chillers, boilers, pumps, cooling towers, and roof top units.

The ECB-400 Series can also be used for lighting control applications. This controller uses the BACnet[®] MS/TP LAN communication protocol and is BTL[®]-Listed as BACnet Advanced Application Controllers (B-AAC).



Features & Benefits

- Flexible inputs and outputs support all industry-standard HVAC unitary applications
- Rugged hardware inputs and outputs eliminate the need for external protection equipment
- Models available with HOA switches and potentiometers are ideal for equipment testing or commissioning
- An optional full-color backlit display with jog dial provides direct access to a wide range of controller functions
- Supports EC-gfxProgram, making Building Automation System programming effortless
- Open-to-Wireless™ ready, supporting a wide variety of wireless sensors and switches and helping to reduce installation costs
- Supports the Allure™ Series Communicating Sensors, providing intelligent sensing and environmental zone control

Model Selection

Example: ECB-453

Series	Model	Options
ECB-	400: 24-Points, 15Vdc Power Supply, 12 UI, 12 UO	UUKL: UL 864, 10 th Edition UUKL and California State Fire Marshal Listed ¹
	403: 24-Points, 15Vdc Power Supply, 12 UI, 8 DO, 4 UO	
	410: 24-Points, 15Vdc Power Supply, 12 UI, 12 UO, HOA	
	413: 24-Points, 15Vdc Power Supply, 12 UI, 8 DO, 4 UO, HOA	
	450: 24-Points, 15Vdc Power Supply, 12 UI, 12 UO, Color display	
	453: 24-Points, 15Vdc Power Supply, 12 UI, 8 DO, 4 UO, Color display	

1. The UL 864 UUKL Listed Smoke Control Equipment is used only in Distech Controls' UUKL smoke control system. For detailed specifications, requirements and procedures for installing and operating UUKL Listed equipment refer to the Distech Controls' UUKL Smoke Control documentation.

Recommended Applications

Model	ECB-400 / 410 / 450	ECB-403 / 413 / 453	ECB-400 UUKL
Roof Top		■	
Air Handling Unit	■	■	■
Multi-Zone Application	■		
Chiller	■	■	
Boiler	■	■	
Cooling Tower	■	■	
Exhaust Fan			■

BACnet Objects List

BACnet Objects

Calendar Objects	2
Events per calendar	45
Schedule Objects	10
Special events per schedule	10
PID Loop Objects	30
Input Objects (AI, BI, MSI) ¹	64 ²
Output Objects (AO, BO) ¹	12 ³ (400 / 410 / 453 models) 4 ³ (403 / 413 / 453 models)
Alarm Notification Classes	5

1. Supports object internally-generated alarms (intrinsic reporting).
2. This consists of Hardware Inputs, Allure Series Communicating Sensor Inputs, and Open-to-Wireless Inputs.
3. This consists of Hardware Outputs.

Commandable Objects¹

BV Objects	20
MSV Objects	20
AV Objects	35

Non-Commandable Objects

BV Objects	55
MSV Objects	55
AV Objects	115

1. Supports object internally-generated alarms (intrinsic reporting).

Product Specifications

Power Supply Input

Voltage Range	24VAC/DC; ±15%; Class 2
Frequency Range	50/60Hz
Overcurrent Protection	Field replaceable fuse
Fuse Type	3.0A
Power Consumption ECB-400 / 410	22 VA typical plus all external loads ¹ , 60 VA max.
Power Consumption ECB-403 / 413	22 VA typical plus all external loads ¹ , 50 VA max.
Power Consumption ECB-450	25 VA typical plus all external loads ¹ , 63 VA max.
Power Consumption ECB-453	25 VA typical plus all external loads ¹ , 53 VA max.

1. External loads must include the power consumption of any connected modules such as an Allure Series Communicating Sensor. Refer to the respective module's datasheet for related power consumption information.

Communications

Communication Bus	BACnet MS/TP
BACnet Profile	B-AAC ¹
EOL Resistor	Built-in, jumper selectable
Baud Rates	9600, 19 200, 38 400, or 76 800 bps
Addressing	Dip switch or with an Allure EC-Smart-View Series Communicating Sensor

1. Refer to Distech Controls' Protocol Implementation Conformity Statement for BACnet.

Subnetwork

Communication	RS-485
Cable	Cat 5e, 8 conductor twisted pair
Connector	RJ-45
Connection Topology	Daisy-chain

Room Devices Support

Maximum combined number of devices per controller	12 ¹
Allure EC-Smart-View Series	Up to 12
Allure EC-Smart-Comfort Series (not supported by UUKL)	Up to 6
Allure EC-Smart-Air Series (not supported by UUKL)	Up to 6

1. A controller can support a maximum of 2 Allure sensor models equipped with a CO₂ sensor. Any remaining connected sensors must be without a CO₂ sensor.

Hardware

Processor	STM32 (ARM Cortex™ M3) MCU, 32 bit
CPU Speed	72 MHz
Applications Memory	1 MB Non-volatile Flash
Storage Memory	2 MB Non-volatile Flash
RAM Memory	96 kB RAM
Real Time Clock (RTC)	Built-in Real Time Clock with rechargeable battery Network time synchronization is initially required
RTC Battery	20 hours charge time, 20 days recharge time Up to 500 charge/discharge cycles
Green LEDs	Power status & LAN Tx
Orange LEDs	Controller status & LAN Rx
Communication Jack	BACnet 1/8" (3.5mm) stereo audio jack

Wireless Receiver

Communication Protocol	EnOcean wireless standard ¹
Number of Wireless Inputs ²	28
Supported Wireless Receivers	Refer to the Open-to-Wireless Application Guide
Cable	Telephone cord
Connector	4P4C modular jack
Length (maximum)	2m (6.5ft)



1. Available when an optional external Wireless Receiver module is connected to the controller. Refer to the Open-to-Wireless Application Guide for a list of supported EnOcean wireless modules.
2. Some wireless modules may use more than one wireless input from the controller.

Mechanical

Dimensions (H × W × D) ECB-400 / 403 / 410 / 413	4.7 × 7.7 × 2.03" (119.38 × 195.58 × 51.47 mm)
Dimensions (H × W × D) ECB-450 / 453	4.7 × 7.7 × 2.55" (119.38 × 195.58 × 64.68 mm)
Shipping Weight ECB-400 / 403 / 410 / 413	1.17lbs (0.53 kg)
Shipping Weight ECB-450 / 453	1.28lbs (0.58 kg)
Enclosure Material ¹	FR/ABS
Enclosure Rating	Plastic housing, UL94-5VB flammability rating Plenum rating per UL1995
Installation	Direct DIN-rail mounting or wall mounting through mounting holes (see figure above for hole positions)

1. All materials and manufacturing processes comply with the RoHS directive and are marked according to the Waste Electrical and Electronic Equipment (WEEE) directive

Environmental

Operating Temperature	32°F to 122°F (0°C to 50°C)
Storage Temperature	-4°F to 122°F (-20°C to 50°C)
Relative Humidity	0 to 90% Non-condensing

Standards and Regulation

CE Emission	EN61000-6-3: 2007; A1:2011
CE Immunity	EN61000-6-1: 2007
FCC	Compliance with FCC rules part 15, subpart B, class B
UL Listed (CDN & US)	UL916 Energy management equipment
UL 864	UL 864, 10 th Edition, UUKL Listed Smoke Control Equipment (ECB-400 UUKL model only) ¹
California State Fire Marshal Listing	CSFM: 7300-2187:0100 (ECB-400 UUKL model only) ¹
CEC Appliance Database	Appliance Efficiency Program ²



1. For detailed specifications regarding the ECB-400 UUKL model, refer to the Distech Controls UUKL Smoke Control Design Guide.
2. California Energy Commission's Appliance Efficiency Program: The manufacturer has certified this product to the California Energy Commission in accordance with California law.

ECB-450 and ECB-453 Display

Display Type	Backlit-color LCD
Display Resolution	400 W x 240 H pixels (WQVGA)
Effective Viewing Area (W × H)	2.4 × 1.4" (61.2 × 36.7mm) diagonal: 2.8" (71mm)
Menu Navigation	Jog dial turn, select navigation with Exit button

Universal Inputs (UI)

General

Input Type	Universal; software configurable
Input Resolution	16-Bit analog / digital converter
Power Supply Output	15VDC; maximum 240mA

Contact

Type	Dry contact
------	-------------

Counter UI1 to UI4:

Type	SO output compatible
Maximum Frequency	50Hz maximum
Minimum Duty Cycle	10milliseconds On / 10milliseconds Off

UI5 to UI10:

Type	Dry contact
Maximum Frequency	1Hz maximum
Minimum Duty Cycle	500ms On / 500ms Off

0 to 10VDC

Range	0 to 10VDC (40k Ω input impedance)
-------	--

0 to 5VDC

Range	0 to 5VDC (high input impedance)
-------	-------------------------------------

0 to 20mA

Range	0 to 20mA 249 Ω jumper configurable internal resistor
-------	--

Resistance/Thermistor

Range	0 to 350 K Ω
-------	---------------------

Supported Thermistor Types Any that operate in this range

Pre-configured Temperature Sensor Types:

Thermistor	10K Ω Type 2, 3 (10K Ω @ 77°F; 25°C)
Platinum	Pt1000 (1K Ω @ 32°F; 0°C)
Nickel	RTD Ni1000 (1K Ω @ 32°F; 0°C) RTD Ni1000 (1K Ω @ 69.8°F; 21°C)

Universal Outputs (UO)

General

Output Type	Universal; software configurable
Output Resolution	10-bit digital to analog converter
Output Protection	Built-in snubbing diode to protect against back-EMF, for example when used with a 12VDC relay Output is internally protected against short circuits
Load Resistance	Minimum 200 Ω for 0-10VDC and 0-12VDC outputs Maximum 500 Ω for 0-20mA output
Auto-reset fuse	Provides 24VAC over voltage protection

0 or 12VDC (On/Off)

Range	0 or 12VDC
Source Current	Maximum 60 mA at 12VDC (minimum load resistance 200 Ω)

PWM

Range	Adjustable period from 2 to 65 seconds
-------	---

Thermal Actuator Management	Adjustable warm up and cool down time
-----------------------------	--

Floating

Minimum Pulse On/Off Time	500 milliseconds
Drive Time Period	Adjustable

0 to 10VDC

Range	0 to 10VDC
Source Current	Maximum 60 mA at 10VDC (minimum load resistance 200 Ω)

0 to 20mA

Range	0 to 20mA
Type	Current source (jumper configurable)

HOA

Hand-Off-Auto switch	When equipped. Supervision allows control logic to read the current HOA switch and potentiometer settings
----------------------	--

Threshold	Configurable
-----------	--------------

Potentiometer Voltage Range	0 to 12.5VDC
-----------------------------	--------------

Digital Outputs (DO)

General

Output Type	24VAC Triac; software configurable
-------------	---------------------------------------

Maximum Current per Output	0.5A continuous 1A @ 15% duty cycle for a 10- minute period
----------------------------	---

Power Source	External
--------------	----------

0 or 24VAC (On/Off)

Range	0 or 24VAC
-------	------------

PWM

Range	Adjustable period from 2 to 65 seconds
-------	---

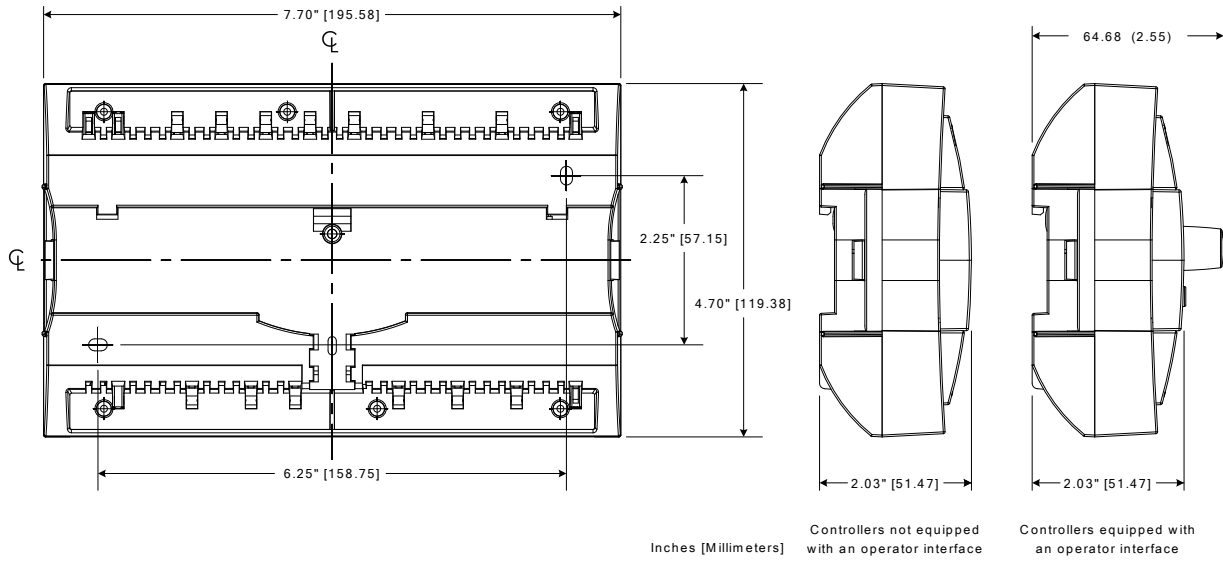
Floating

Minimum Pulse On/Off Time	500 milliseconds
---------------------------	------------------

Drive Time Period	Adjustable
-------------------	------------

Power Source	External
--------------	----------

Dimensions



Specifications subject to change without notice.

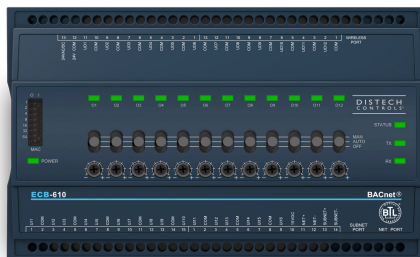
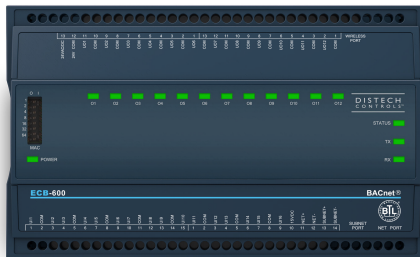
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ECB-600 Series

BACnet B-AAC 28-Point Programmable Controllers



Overview

The ECB-600 Series controllers are microprocessor-based programmable controllers designed to control various building automation applications such as air handling units, chillers, boilers, pumps, cooling towers, and central plant applications. This series supports up to two ECx-400 Series I/O extension modules.

This controller uses the BACnet[®] MS/TP LAN communication protocol and is BTL[®]-Listed as BACnet Advanced Application Controllers (B-AAC).



Features & Benefits

- Flexible inputs and outputs support all industry-standard HVAC unitary applications
- Rugged hardware inputs and outputs eliminate the need for external protection equipment
- Models available with HOA switches and potentiometers are ideal for equipment testing or commissioning
- An optional full-color backlit display with jog dial provides direct access to a wide range of controller functions
- Supports EC-*gfx*Program, making Building Automation System programming effortless
- Open-to-Wireless™ ready, supporting a wide variety of wireless sensors and switches and helping to reduce installation costs
- Supports the Allure™ Series Communicating Sensors, providing intelligent sensing and environmental zone control

Model Selection

Example: ECB-600

Series	Model	Options
ECB-	600 : 28 Points, 15Vdc Power Supply, 16 UI, 12 UO	UUKL : UL 864, 10 th Edition UUKL and California State Fire Marshal Listed ¹
	610 : 28 Points, 15Vdc Power Supply, 16 UI, 12 UO, HOA	
	650 : 28 Points, 15Vdc Power Supply, 16 UI, 12 UO, Color Display	

1. The UL 864 UUKL Listed Smoke Control Equipment is used only in Distech Controls' UUKL smoke control system. For detailed specifications, requirements and procedures for installing and operating UUKL Listed equipment refer to the Distech Controls' UUKL Smoke Control documentation.

Recommended Applications

Model	ECB-600 / 610 / 650	ECB-600 UUKL
Air Handling Unit	■	■
Multi-Zone Application	■	
Chiller	■	
Boiler	■	
Cooling Tower	■	
Central Plant	■	
Exhaust Fan		■

BACnet Objects List

BACnet Objects

Calendar Objects	2
Events per calendar	45
Schedule Objects	10
Special events per schedule	10
PID Loop Objects	30
Input Objects (AI, BI, MSI) ¹	68 ²
Output Objects (AO, BO) ¹	12 ³
Alarm Notification Classes	5

- Supports object internally-generated alarms (intrinsic reporting).
- This consists of Hardware Inputs, Allure Series Communicating Sensor Inputs, and Open-to-Wireless Inputs.
- This consists of Hardware Outputs.

Commandable Objects¹

BV Objects	20
MSV Objects	20
AV Objects	35

Non-Commandable Objects

BV Objects	55
MSV Objects	55
AV Objects	115

- Supports object internally-generated alarms (intrinsic reporting).

Product Specifications

Power Supply Input

Voltage Range	24VAC/DC; ±15%; Class 2
Frequency Range	50/60Hz
Overcurrent Protection	Field replaceable fuse
Fuse Type	3.0A
Power Consumption ECB-600 / ECB-610	22 VA typical plus all external loads ¹ , 65 VA max.
Power Consumption ECB-650	25 VA typical plus all external loads ¹ , 68 VA max.

- External loads must include the power consumption of any connected modules such as an Allure Series Communicating Sensor. Refer to the respective module's datasheet for related power consumption information.

Communications

Communication Bus	BACnet MS/TP
BACnet Profile	B-AAC ¹
EOL Resistor	Built-in, jumper selectable
Baud Rates	9600, 19 200, 38 400, or 76 800 bps
Addressing	Dip switch or with an Allure EC-Smart-View Series Communicating Sensor

- Refer to Distech Controls' Protocol Implementation Conformity Statement for BACnet.

Subnetwork

Communication	RS-485
Cable	Cat 5e, 8 conductor twisted pair
Connector	RJ-45
Connection Topology	Daisy-chain

Room Devices Support

Maximum combined number of devices per controller	12 ¹
Allure EC-Smart-View Series	Up to 12
Allure EC-Smart-Comfort Series (not supported by UUKL)	Up to 6
Allure EC-Smart-Air Series (not supported by UUKL)	Up to 6

- A controller can support a maximum of 2 Allure sensor models equipped with a CO₂ sensor. Any remaining connected sensors must be without a CO₂ sensor.

Hardware

Processor	STM32 (ARM Cortex™ M3) MCU, 32 bit
CPU Speed	72 MHz
Applications Memory	1 MB Non-volatile Flash
Storage Memory	2 MB Non-volatile Flash

RAM Memory	96 kB RAM
Real Time Clock (RTC)	Built-in Real Time Clock with rechargeable battery Network time synchronization is initially required
RTC Battery	20 hours charge time, 20 days recharge time Up to 500 charge/discharge cycles
Green LEDs	Power status & LAN Tx
Orange LEDs	Controller status & LAN Rx
Communication Jack	BACnet 1/8" (3.5mm) stereo audio jack

I/O Extension Modules (ECx-400 Series)

Communication	RS-485
Number of I/O extension modules per controller	Up to 2, in daisy-chain configuration

Wireless Receiver

Communication Protocol	EnOcean wireless standard ¹
Number of Wireless Inputs ²	28
Supported Wireless Receivers	Refer to the Open-to-Wireless Application Guide
Cable	Telephone cord
Connector	4P4C modular jack
Length (maximum)	2m (6.5ft)



1. Available when an optional external Wireless Receiver module is connected to the controller. Refer to the Open-to-Wireless Application Guide for a list of supported EnOcean wireless modules.
2. Some wireless modules may use more than one wireless input from the controller.

Mechanical

Dimensions (H × W × D) ECB-600 / 610	4.7 × 7.7 × 2.03" (119.38 × 195.58 × 51.47 mm)
Dimensions (H × W × D) ECB-650	4.7 × 7.7 × 2.55" (119.38 × 195.58 × 64.68 mm)
Shipping Weight ECB-600 / 610	1.17lbs (0.53 kg)
Shipping Weight ECB-650	1.28lbs (0.58 kg)
Enclosure Material ¹	FR/ABS
Enclosure Rating	Plastic housing, UL94-5VB flammability rating Plenum rating per UL1995
Installation	Direct DIN-rail mounting or wall mounting through mounting holes (see figure above for hole positions)

1. All materials and manufacturing processes comply with the RoHS directive and are marked according to the Waste Electrical and Electronic Equipment (WEEE) directive

Environmental

Operating Temperature	32°F to 122°F (0°C to 50°C)
Storage Temperature	-4°F to 122°F (-20°C to 50°C)
Relative Humidity	0 to 90% Non-condensing

Standards and Regulation

CE Emission	EN61000-6-3: 2007; A1:2011
CE Immunity	EN61000-6-1: 2007
FCC	Compliance with FCC rules part 15, subpart B, class B
UL Listed (CDN & US)	UL916 Energy management equipment
UL 864	UL 864, 10 th Edition, UUKL Listed Smoke Control Equipment (ECB-600 UUKL model only) ¹
California State Fire Marshal Listing	CSFM: 7300-2187:0100 (ECB-600 UUKL model only) ¹
CEC Appliance Database	Appliance Efficiency Program ²



1. For detailed specifications regarding the ECB-600 UUKL model, refer to the Distech Controls UUKL Smoke Control Design Guide.
2. California Energy Commission's Appliance Efficiency Program: The manufacturer has certified this product to the California Energy Commission in accordance with California law.

ECB-650 Display

Display Type	Backlit-color LCD
Display Resolution	400 W x 240 H pixels (WQVGA)
Effective Viewing Area (W × H)	2.4 × 1.4" (61.2 × 36.7mm) diagonal: 2.8" (71mm)
Menu Navigation	Jog dial turn, select navigation with Exit button

Universal Inputs (UI)

General

Input Type	Universal; software configurable
Input Resolution	16-Bit analog / digital converter
Power Supply Output	15VDC; maximum 320mA

Contact

Type	Dry contact
------	-------------

Counter

UI1 to UI4:

Type	SO output compatible
Maximum Frequency	50Hz maximum
Minimum Duty Cycle	10milliseconds On / 10milliseconds Off

UI5 to UI10:

Type	Dry contact
Maximum Frequency	1Hz maximum
Minimum Duty Cycle	500ms On / 500ms Off

0 to 10VDC

Range	0 to 10VDC (40kΩ input impedance)
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0 to 5VDC

Range	0 to 5VDC (high input impedance)
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0 to 20mA

Range	0 to 20mA 249Ω jumper configurable internal resistor
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Resistance/Thermistor

Range 0 to 350 KΩ

Supported Thermistor Types Any that operate in this range

Pre-configured Temperature Sensor Types:

Thermistor 10KΩ Type 2, 3 (10KΩ @ 77°F; 25°C)

Platinum Pt1000 (1KΩ @ 32°F; 0°C)

Nickel RTD Ni1000 (1KΩ @ 32°F; 0°C)
RTD Ni1000 (1KΩ @ 69.8°F; 21°C)

Universal Outputs (UO)

General

Output Type	Universal; software configurable
Output Resolution	10-bit digital to analog converter
Output Protection	Built-in snubbing diode to protect against back-EMF, for example when used with a 12VDC relay Output is internally protected against short circuits
Load Resistance	Minimum 200 Ω for 0-10VDC and 0-12VDC outputs Maximum 500 Ω for 0-20mA output
Auto-reset fuse	Provides 24VAC over voltage protection

0 or 12VDC (On/Off)

Range	0 or 12VDC
Source Current	Maximum 60 mA at 12VDC (minimum load resistance 200Ω)

PWM

Range	Adjustable period from 2 to 65 seconds
Thermal Actuator Management	Adjustable warm up and cool down time

Floating

Minimum Pulse On/Off Time	500 milliseconds
Drive Time Period	Adjustable

0 to 10VDC

Range	0 to 10VDC
Source Current	Maximum 60 mA at 10VDC (minimum load resistance 200Ω)

0 to 20mA

Range	0 to 20mA
Type	Current source (jumper configurable)

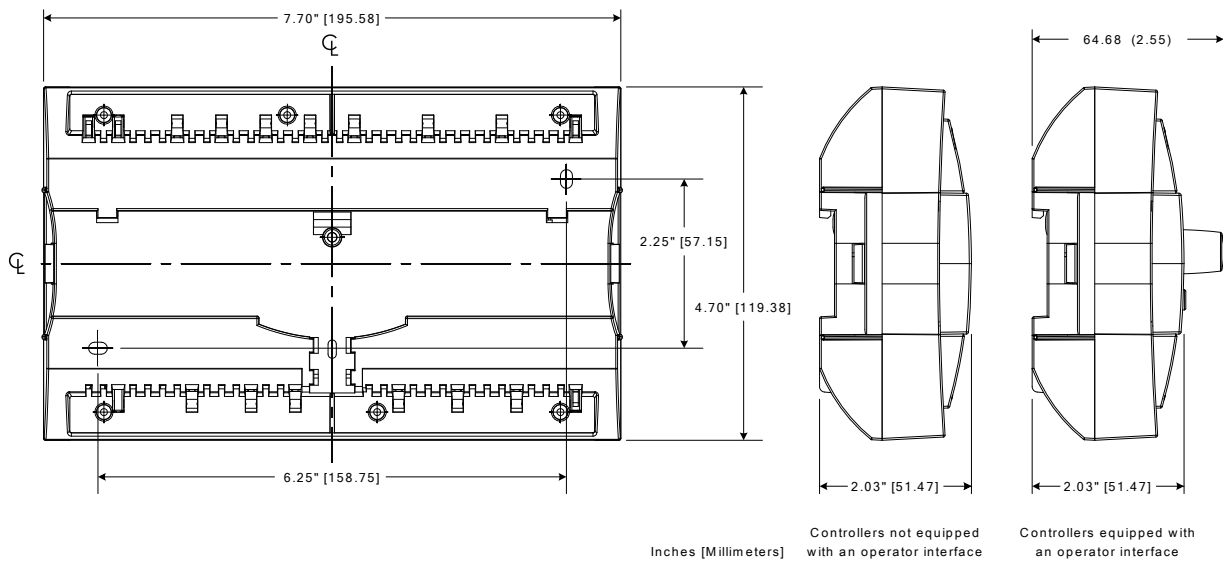
HOA

Hand-Off-Auto switch	When equipped. Supervision allows control logic to read the current HOA switch and potentiometer settings
----------------------	--

Threshold Configurable

Potentiometer Voltage Range 0 to 12.5VDC

Dimensions



Specifications subject to change without notice.

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EC-BOS-8

Multi-Protocol Web Building Controller



Overview

The EC-BOS-8 is a compact, embedded controller and server platform for connecting multiple and diverse devices and sub-systems. With Internet connectivity and Webserving capability, the EC-BOS-8 provides integrated control, supervision, data logging, alarming, scheduling and network management. It streams data and graphical displays to a standard Web browser via an Ethernet or wireless LAN, or remotely over the Internet.

The EC-BOS-8 operates with EC-Net™ web-based building management platform powered by the Niagara Framework®.

The EC-BOS-8 can also run EC-Net Access for managing access control systems.

Features & Benefits

- Scalable licensing model and modular hardware make the EC-BOS-8 suitable for installation in small buildings, as well as large multi-unit campuses when combined with EC-Net Supervisor
- Integrates many communication protocols and automation systems including HVAC, lighting, energy, fire & smoke, physical access, video and industrial/processing
- Two on-board isolated RS-485 ports for connecting to various common networks, e.g. BACnet MS/TP, Modbus RTU, Wiegand access control devices
- Option modules for additional physical network connections, e.g. LONWORKS® FTT-10A, RS-232, RS-485, and Wiegand access readers
- USB type A port for station backup and restore functions

Model Selection

To order a fully functional EC-BOS-8, the following three components are required: EC-BOS-8, Core Software, Software Maintenance Agreement (SMA). If ordering a demo core, an SMA is not required. Refer to the [EC-Net Selection Tool](#) to calculate the required components.

EC-BOS-8 Series

Example: EC-BOS-8 with Worldwide WiFi

Series	WiFi Setting ¹
EC-BOS-8: EC-BOS-8 includes two isolated RS485 ports, two 10/100MB Ethernet ports and USB Backup & Restore.	<p>With US WiFi: US WiFi setting for enabling WiFi on EC-BOS-8 units installed in the US.</p> <p>With Worldwide WiFi: Worldwide WiFi setting for enabling WiFi on EC-BOS-8 units installed anywhere in the world except the US.</p> <p>With Permanently Disabled WiFi: WiFi setting for permanently disabling WiFi on EC-BOS-8 units.</p>

¹. Refer to the [EC-BOS-8 Global Shipping Guide](#) for more information.

EC-BOS-8 Core Software

Example: EC-BOS-8 Core - 100 Devices/5000 Points

Series	Devices/Points ¹
EC-BOS-8 Core: EC-BOS-8 core software. Includes standard open drivers. Requires EC-Net 4.1 or higher. Software Maintenance Agreement (SMA) must be purchased in conjunction with core software.	<p>5 Devices/250 Points: Supports up to 5 devices and 250 points.</p> <p>10 Devices/500 Points: Supports up to 10 devices and 500 points.</p> <p>25 Devices/1250 Points: Supports up to 25 devices and 1250 points.</p> <p>100 Devices/5000 Points: Supports up to 100 devices and 5000 points.</p> <p>200 Devices/10000 Points: Supports up to 200 devices and 10000 points.</p>
EC-BOS-8 Core – Demo: EC-BOS-8 core software. Includes all available drivers. Supports up to 500 devices and 25000 points. Runs on EC-Net 4.1 or higher. Note: This license expires annually, and its renewal is covered by the EC-Net Support Fee.	N/A

¹. Devices/Points cannot be added to the Demo version (EC-BOS-8 Core – Demo) of the EC-BOS-8 core software.

For more information regarding the EC-Net drivers currently offered by Distech Controls, refer to the [EC-Net Drivers Reference Guide](#).

EC-BOS-8 Software Maintenance Agreement

Software maintenance is required when purchasing an EC-BOS-8. The minimum initial software maintenance plan is 18 months. Optional 3- or 5-year maintenance may be substituted.

If Maintenance coverage is not purchased for any period, the price of Maintenance for the next period for which it is purchased will be (a) the Maintenance fee for the period(s) for which Maintenance was not purchased, up to a maximum of 5 years; and (b) the Maintenance fee for the next year.

These software maintenance plans are ordered separately according to the EC-BOS-8 model chosen. See the price list for more details. Take advantage of the Asset Manager online tool to receive notifications about SMA expirations and Enterprise SMA to align all SMA expiration dates to a single one for the entire system.

Example: EC-BOS-8 (100 Device Core) 3 year SMA

Series	Software Maintenance Agreement
EC-BOS-8 (5 Device Core)	<p>18 month SMA: Initial 18-month software maintenance agreement. Must be purchased in conjunction with initial core software. Optional 3 or 5 year maintenance may be substituted.</p> <p>1 year SMA: 1-year software maintenance agreement (includes new and interim releases).</p> <p>3 year SMA: 3-year software maintenance agreement (includes new and interim releases).</p> <p>5 year SMA: 5-year software maintenance agreement (includes new and interim releases).</p>
EC-BOS-8 (10 Device Core)	
EC-BOS-8 (25 Device Core)	
EC-BOS-8 (100 Device Core)	
EC-BOS-8 (200 Device Core)	

EC-BOS-8 Device Integration Pack

Example: EC-BOS-8 Device Integration Pack - 25

Series	Devices/Points
EC-BOS-8 Device Integration Pack: EC-BOS-8 device integration pack purchased in <u>conjunction</u> with initial core software.	10: Adds support for additional 10 devices and 500 points to core software. 25: Adds support for additional 25 devices and 1250 points to core software. 50: Adds support for additional 50 devices and 2500 points to core software.

EC-BOS-8 Device Upgrade Pack

Example: EC-BOS-8 Device Upgrade Pack - 25

Series	Devices/Points
EC-BOS-8 Device Upgrade Pack: EC-BOS-8 device upgrade pack purchased any time <u>after</u> initial core software purchase.	10: Adds support for additional 10 devices and 500 points to core software. 25: Adds support for additional 25 devices and 1250 points to core software. 50: Adds support for additional 50 devices and 2500 points to core software.

EC-BOS-8 Software Option

Example: EC-BOS-8 EC-Net Access Pack

Option	Description
EC-BOS-8 EC-Net Access Pack	Enables EC-BOS-8 to run EC-Net Access (minimum 2.4.45/EC-Net 4 4.7.110). Includes licensing for 32 readers.

EC-BOS-8 Hardware Accessory

Example: EC-BOS-8 Wall Plug Module

Accessory	Description
EC-BOS-8 Wall Plug Module	100-240VAC, 50/60 Hz. Wall Adapter – Connects to the 2.5mm barrel plug 24V input on the EC-BOS-8 and includes US, EU, UK, and AU style plugs.
EC-BOS-8 WLAN Antenna Cable Extension	Extension cable and bracket for EC-BOS-8 WLAN antenna.

EC-BOS-8 Add-on Modules

Example: IO-R-16

Add-on Module	Description
EC-NPB8-LON	EC-BOS-8 - Add-on single port LON FTT10A module.
EC-NPB8-2X-485	EC-BOS-8 - Add-on dual port RS-485 module.
EC-NPB8-232	EC-BOS-8 - Add-on single port RS-232 module.
IO-R-16	16 Point IO Module. Powered by IO-R-34. Connected to the EC-BOS-8 remotely over RS485.
IO-R-34	34 Point IO Module. Powered by 24VAC/DC. Capable of powering (4) IO-R-16 modules. Connected to the EC-BOS-8 remotely over RS485.
EC-Net Access Remote Reader	Remote reader module - 2 card reader inputs, 4 supervised inputs, 2 digital inputs, 2 form C (SPDT) relay outputs.
EC-Net Access Remote IO	Remote I/O module - 8 supervised inputs, 2 digital inputs, 8 form C (SPDT) relay outputs.

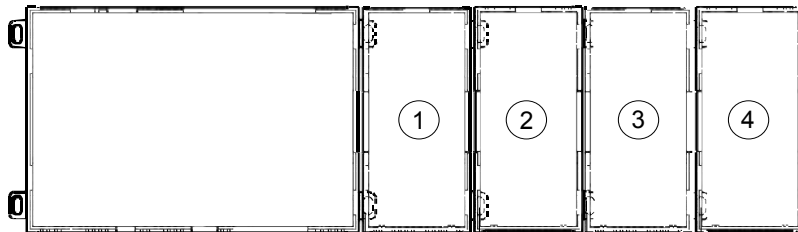
Expansion Modules

Modules	Description	Maximum Expansion Modules Supported
EC-NPB8-LON	EC-BOS-8 - Add-on single port LON FTT10A module.	4
EC-NPB8-2X-485	EC-BOS-8 - Add-on dual port RS-485 module.	2
EC-NPB8-232	EC-BOS-8 - Add-on single port RS-232 module.	4
IO-R-16	16 Point IO Module	16 ¹
IO-R-34	34 Point IO Module	8 ¹
EC-Net Access Remote Reader	Remote reader module	16 (each or combined)
EC-Net Access Remote IO	Remote I/O module	

1. For detailed information about maximum number of modules supported and maximum combinations, refer to the EC-BOS-8 I/O Modules datasheet.

Maximum Combinations (see figure below):

Expansion 1	Expansion 2	Expansion 3	Expansion 4
EC-NPB8-232 OR EC-NPB8-LON	EC-NPB8-232 OR EC-NPB8-LON	EC-NPB8-232 OR EC-NPB8-LON	EC-NPB8-232 OR EC-NPB8-LON
EC-NPB8-2X-485	EC-NPB8-232 OR EC-NPB8-LON	EC-NPB8-232 OR EC-NPB8-LON	EC-NPB8-232 OR EC-NPB8-LON
EC-NPB8-2X-485	EC-NPB8-2X-485	EC-NPB8-232 OR EC-NPB8-LON	



Product Specifications

Platform

Processor	T1 AM3352 1000MHz ARM® Cortex™-A8
Memory	1GB DDR3 SDRAM
	- Removable micro-SD card with 4GB flash total storage/2GB user storage
	- Real-time clock
	- Batteryless
	- Secure boot

Communications

Wi-Fi	Client or WAP
Wi-Fi Communication Protocol	IEEE802.11a/b/g/n
	IEEE802.11n HT20 @ 2.4GHz
	IEEE802.11n HT20/HT40 @ 5GHz
Configurable radio	Off, WAP, or Client
Client Authentication Method	WPAPSK/WPA2PSK supported
USB type A connector	Back-up and restore support
RS-485	2 isolated RS-485 with selectable bias and termination
Ethernet	2 10/100MB Ethernet ports
BACnet Listing	BTL, B-BC listed with version 4.4.93 or later

Power Supply

Voltage	24VAC/DC power supply
Consumption	24VA (24VAC); 24W (24VDC)

Environmental

Operating Temperature	-20 to 60°C (-4 to 140 °F)
Storage Temperature	-40 to 85°C (-40 to 185 °F)
Relative Humidity	5% to 95% - Non condensing
Shipping and Vibration	ASTM D4169, Assurance Level II
MTTF	10 years+

Operating Systems

EC-Net 4	4.1 or later
EC-Net Access	2.4.45 or later

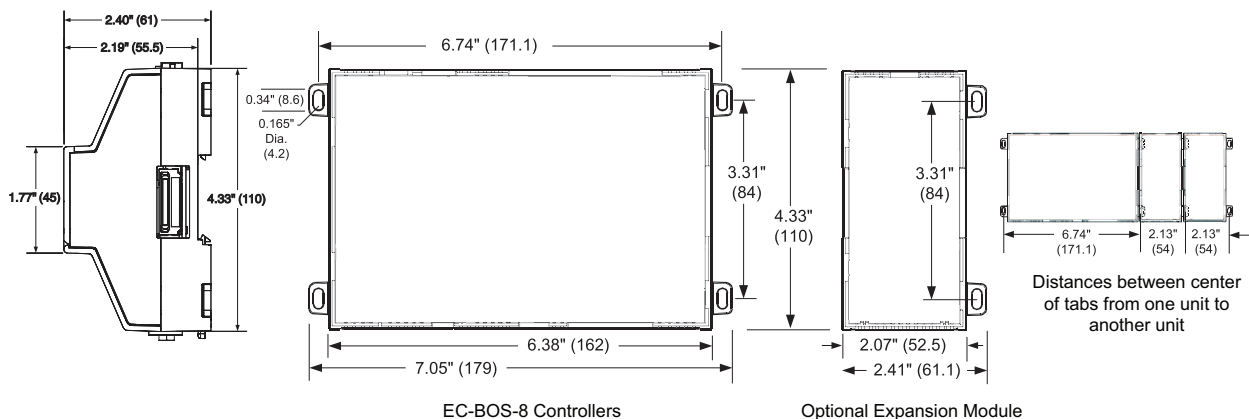
EC-Net Access Licensing Quantities

Card Readers	32
Access Rights	250
Schedules	100
Access Zones	50
Simultaneous Users	10
Personnel	20,000
Area Controllers	N/A

Standards and Regulations

UL	UL 916
	C-UL listed to Canadian Standards Associations (CSA) C22.2 No. 205-M1983 "Signal Equipment"
	UL 864, 10 th Edition, UUKL Listed Smoke Control Equipment ¹ (UUKL model only)
CE	EN 61326-1
FCC	Part 15 Subpart B, Class B, Part 15 Subpart C
R&TTE Compliance	1999/5/EC R&TTE Directive
Other compliances	CCC, SRRC, RSS, RoHS

1. For detailed specifications regarding the EC-BOS-8 UUKL model, refer to the Distech Controls UUKL Smoke Control Design Guide (UUKL Design Guide_UG_10_EN) and Distech Controls UUKL Smoke Control Application Guide (UUKL Application Guide_UG_10_EN).



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Allure™ EC-Smart-Vue Sensor Series

Line of communicating sensors
with backlit display and
graphical menus



Overview

The Allure EC-Smart-Vue Series is designed to interface with Distech Controls' ECLYPSE™ series BACnet/IP and Wi-Fi Controllers, ECB series BACnet® Controllers and ECL series LONWORKS® Controllers.

This line of communicating sensors with backlit display consists of eight models that provide precise environmental zone control. Models are available with any combination of the following: temperature, humidity, CO₂, and motion sensor.

Features & Benefits

- Multi-sensing capabilities (temperature, humidity, CO₂, and motion) using one wire and one connection
- Optional CO₂ sensor facilitates demand-controlled ventilation strategies
- Optional motion sensor helps achieve energy efficiency through occupancy-based control
- Automatic self-calibration system guarantees lifetime CO₂ calibration
- The ECO-Vue leaf pattern graphically indicates energy consumption in real time to promote an occupant's energy-conscious behavior
- Password protected technician mode allows an installer to perform commissioning and troubleshooting
- Can be used as a hand-held tool for HVAC equipment configuration and system troubleshooting
- When associated to VAV controllers, the Allure EC-Smart-Vue Series sensors can also perform air balancing of the system without requiring an onsite controls engineer.
- Programmability with Distech Controls' EC-*gfx*Program, which makes Building Automation System programming effortless
- Quick and easy installation: Both power and communications pass through a single Cat 5e cable for reduced installation costs and easier installation
- Two RJ-45 ports facilitate the daisy-chain connections of room devices.

Model Selection Table

Example: Allure EC-Smart-Vue-*M*

Series	Functionality
Allure EC-Smart-Vue	[blank]: Temperature only - <i>C</i> : CO ₂ ¹ , Temperature - <i>H</i> : Humidity, Temperature - <i>M</i> : Motion, Temperature - <i>CH</i> : CO ₂ ¹ , Humidity, Temperature - <i>CM</i> : CO ₂ ¹ , Motion, Temperature - <i>HM</i> : Humidity, Motion, Temperature - <i>CHM</i> : CO ₂ ¹ , Humidity, Motion, Temperature

1. The Allure EC-Smart-Vue CO₂ models must be used in spaces that are periodically unoccupied (e.g. during evening or nighttime hours). A controller can support a maximum of two communicating sensors equipped with a CO₂ sensor. Any remaining connected communicating sensors must be without a CO₂ sensor.

Product Specifications

Power Supply Input

Voltage	16 VDC maximum, Class 2
Power Consumption	At the connected controller, an additional 5.25 VA per CO ₂ sensor model and 1.0 VA per non-CO ₂ sensor model.

Communications

Rate	38 400 bps
Communications	RS-485
Wiring	Cable length: 600 ft (180 m) maximum
Cable Type	T568B Cat 5e network cable, 4 twisted pairs
Input Connector	RJ-45
Output Connector	RJ-45 (pass-through for daisy chain connection to other room devices)
Network Access Jack ¹	1/8" (3.5 mm) stereo plug connector
Daisy-chaining	Up to 12 Allure EC-Smart-Vue sensors or room devices depending on the controller model – see the controller's datasheet

1. Not available with ECLYPSE Series, PTU Series, ECB-VAVS, or ECL-VAVS

Temperature Sensor

Type	10 kΩ NTC Thermistor
Range	41°F to 104°F (5°C to 40°C)
Sensing Component	±0.5°F (±0.28°C)
Typical Accuracy	
Overall Accuracy	± 0.9°F (± 0.5°C)
Resolution	0.18°F (0.1°C)

Humidity Sensor

Accuracy	±3%
Resolution	1%

Motion Sensor

Type	Passive Infrared (PIR) sensor with Fresnel lens. See Figure 2.
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CO₂ Sensor

Measurement Range	0 to 2000 ppm
Operating Elevation	0 to 10000 ft (0 to 3050 m)
Warm-up Time	< 2 minutes (operational), 10 minutes (maximum accuracy)
CO ₂ Accuracy	400-1000 ppm ± 75 ppm or 3% of reading, whichever is greater ¹ 1000-2000 ppm ± (40 ppm + 5% of reading) ¹
Repeatability	± 10 ppm
Response Time	60 s
Accuracy Drift	< 0.03 °C / year
Additional accuracy drift per year after five years of sensor operation and with automatic self-calibration algorithm enabled	Typical ± (5 ppm + 0.5 % of reading)
Pressure Dependence	0.135% of reading per mm Hg; Elevation adjusted in configuration software
Sensing Method	Non-dispersive infrared (NDIR)
Calibration Method	Automatic self-calibration enabled

1. Tolerance based on span gas of ±2% and automatic self-calibration enabled.

Mechanical

Dimensions with motion sensor (H×W×D)	4.62 × 3.29 × 1.15" (117.27 × 83.57 × 28.84 mm)
Dimensions without motion sensor (H×W×D)	4.62 × 3.29 × 1.06" (117.27 × 83.57 × 26.81 mm)
Shipping weight with motion sensor	0.20 kg (0.44lbs)
Shipping weight without motion sensor	0.18 kg (0.40lbs)
Enclosure Material	ABS
Enclosure Rating	Plastic housing, UL94-V1
Color	white
Installation	wall mounting through mounting holes (see Figure 1 for hole positions)

Environmental

Operating Temperature 32°F to 122°F (0°C to 50°C)
 Storage Temperature -4°F to 122°F (-20°C to 50°C)
 Relative Humidity 0 to 90% Non-condensing

Standards and Regulations

CE Emission EN 61000-6-3: 2007 + A1: ed.2011
 CE Immunity EN 61000-6-1: 2007
 FCC FCC rules part 15, subpart B class B
 UL Listed (CDN & US) UL916 Energy management equipment

WEEE All products are marked according to the Waste Electrical and Electronic Equipment (WEEE) directive
 RoHS All materials and manufacturing processes comply with the RoHS directive

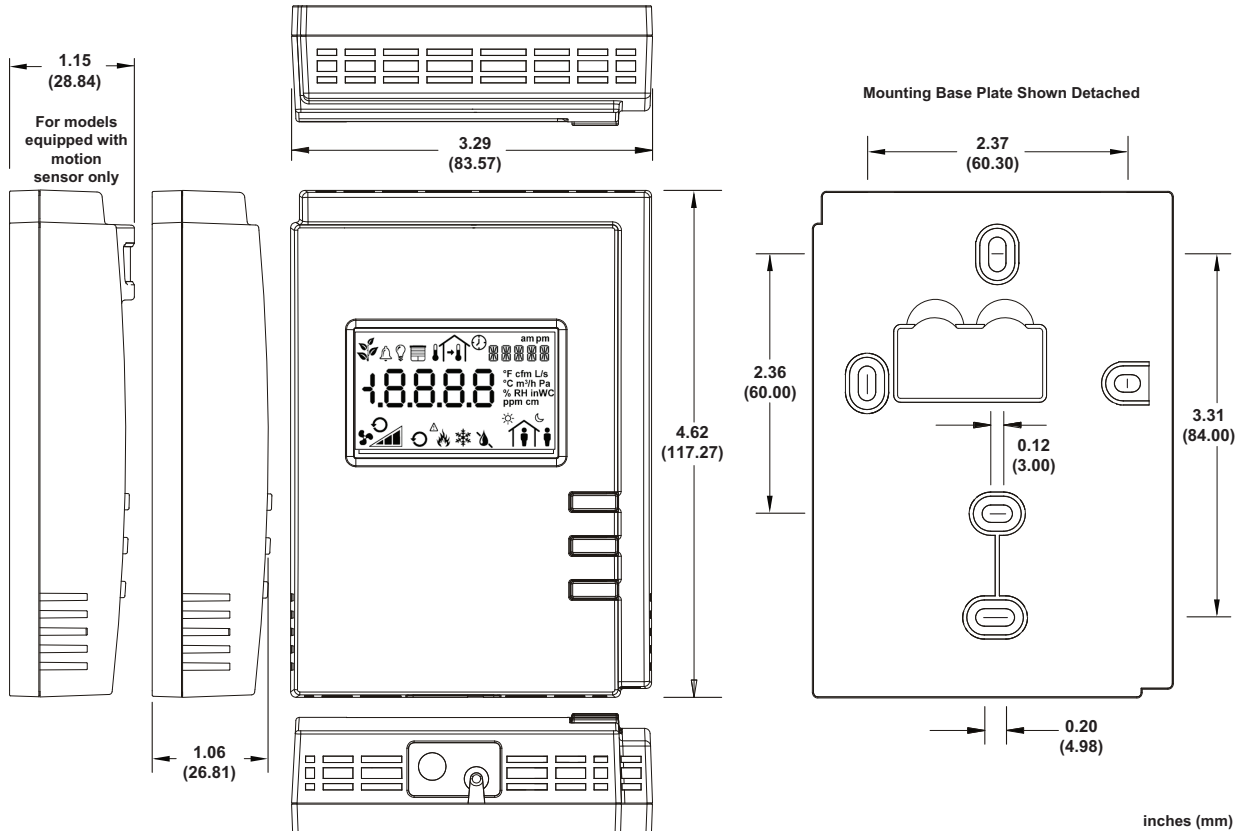


Figure 1: EC-Smart-Vue Dimensions

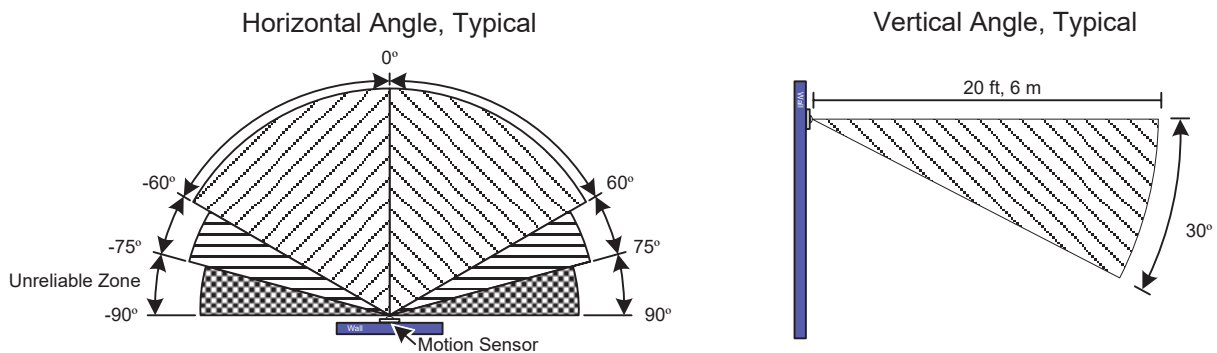


Figure 2: Motion Sensor

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