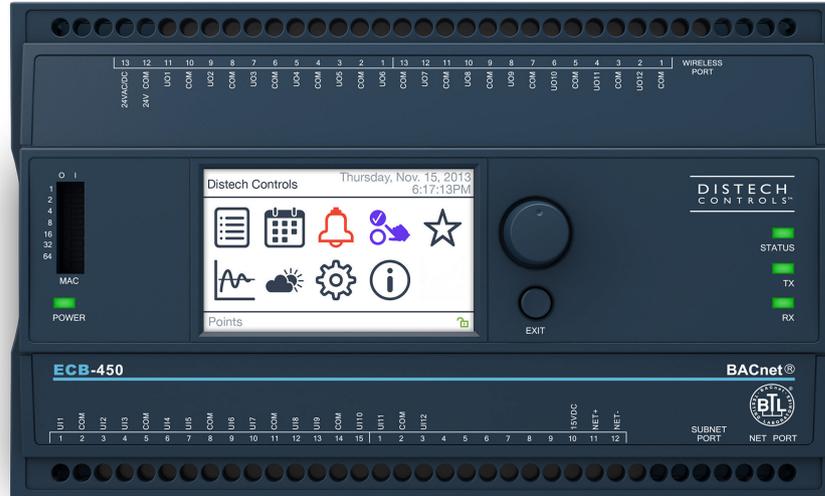




ECB-400 Series

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).



Applications

These controllers meet the requirements of the following applications:

- Air Handling Units
- Multi-Zone Applications
- Chillers
- Boilers
- Cooling Towers
- Roof Top Units

Features & Benefits

Universal Inputs and Outputs

This controller has various software configurable universal inputs and software configurable universal outputs, and covers all medium to large-size industry-standard HVAC applications.

Highly Accurate Universal Inputs

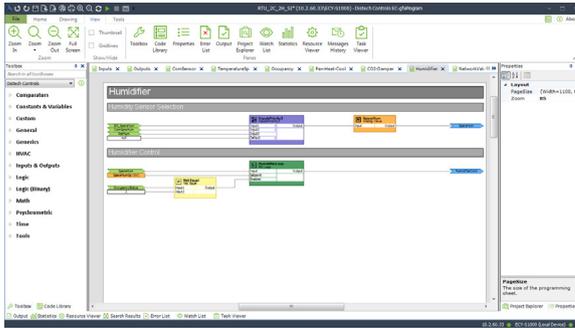
Highly accurate universal inputs support thermistors and resistance temperature detectors (RTDs) that range from 0 Ohms to 350,000 Ohms, as well as support for inputs requiring 0 to 10VDC or a pulse count. 0-20mA inputs and outputs have a jumper that eliminates the need for external resistors. This provides the freedom of using your preferred or engineer-specified sensors, in addition to any existing ones. The first four universal inputs support fast pulse count reading up to 50 Hz for gas, water, and electric meters and are compatible with an SO rated (optically-isolated) output.

Rugged Inputs/Outputs

Rugged hardware inputs and outputs eliminate need for external protection components, such as diodes for 12V DC relays.

Programmability

Supports Distech Controls' EC-*gfx*Program, which makes Building Automation System (BAS) programming effortless by allowing you to visually assemble building blocks together to create a custom control sequence for any HVAC / building automation application.



Increased Energy Efficiency

Improves energy efficiency when combined with:

- CO₂ sensors as part of a demand-controlled ventilation strategy that adjusts the amount of fresh air intake according to the number of building occupants
- Variable-frequency drives to adjust motor speed according to the instantaneous demand of the application.

Open-to-Wireless™ Solution



The controllers are Open-to-Wireless™ ready, and when paired with the Wireless Receiver, work with a variety of wireless battery-less sensors and switches, to reduce the cost of installation and minimize the impact on existing partition walls. For supported frequencies in your area, refer to the [Open-to-Wireless Solution Guide](#).

Available with an optional Wireless Receiver that supports up to 28 wireless inputs to create wire-free installations.

HOA Switches & Potentiometers

Certain models have the convenience of supervised Hand-Off-Auto (HOA) switches and potentiometers that provide feedback on an operator's manual override of an output to the controller's code. HOA switches are ideal for testing purposes or when performing equipment commissioning and maintenance.

Allure™ Series Communicating Sensor Support

These controllers work with a wide range of sensors, such as the Allure Series Communicating Sensors that are designed to provide intelligent sensing and control devices for increased user experience and energy efficiency.

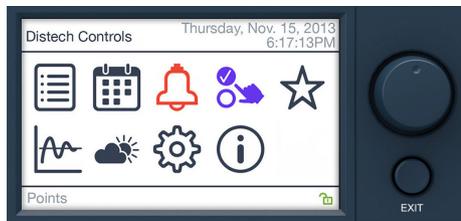
- Allure EC-Smart-Vue sensors feature a backlit-display and graphical menus that provide precise environmental zone control, with any combination of the following: temperature, humidity, CO₂, and motion sensor.
- Allure EC-Smart-Comfort sensors feature colored LED indicators to provide user feedback, rotary knobs to adjust the setpoint offset and fan speed, and an occupancy override push button. This sensor can also be expanded with a combination of up to 4 add-on push button modules for lighting and shade/ sunblind control.
- Allure EC-Smart-Air sensors combine precise environmental sensing in a discreet and alluring enclosure for temperature, humidity, and CO₂.



Operator Interface

The ECB-450 and ECB-453 model has a full-color backlit-display and a jog dial for turn and select navigation to access a wide range of internal controller functions:

- View and override values. The status is color coded to show if the value is overridden.
- Visually tune PID loops with system response graphing.
- View active alarm list including details and acknowledge alarms.
- View and modify schedules and calendars through a graphic interface. Also create or delete schedule events, special events, and calendar entries.
- Create a list of favorites to provide quick access to commonly-used values.
- Multi-User access management.
- Multilingual interface: English, French, German, etc.



UUKL Smoke Control System

The Distech Controls UUKL Smoke Control System is designed to protect occupants and buildings in the event of a building fire by maintaining tenable evacuation routes and containing smoke within the fire area. It is a unique Niagara^{AX}-based system that complies with the Underwriters Laboratories Inc[®] (UL) requirements for UL 864 UUKL 9th Edition Smoke Control Listing.

For detailed specifications, requirements, and procedures for installing, wiring, and operating UUKL Listed equipment, refer to the Distech Controls UUKL Listed documentation on SmartSource: Smoke Control Design Guide (05DI-UGULDES-10) and the Smoke Control Application Guide (05DI-UGULAPP-10).

Model Selection

							
Model	ECB-400	ECB-403	ECB-410	ECB-413	ECB-450	ECB-453	ECB-400 UUKL
Points	24-Point Controller	24-Point Controller	24-Point Controller with HOA	24-Point Controller with HOA	24-Point Controller with Color Display	24-Point Controller with Color Display	24-Point Controller
Universal hardware inputs	12	12	12	12	12	12	12
Wireless inputs ¹	28	28	28	28	28	28	28
15 Vdc Power Supply	■	■	■	■	■	■	■
Digital (Triac) outputs		8		8		8	
Universal outputs	12	4	12	4	12	4	12
HOA switch & potentiometer			■	■			
Operator interface: interactive color display to monitor and override controller parameters					■	■	
UL 864, 9th Edition, UUKL Listed Smoke Control Equipment ²							■
California State Fire Marshal Listed							■

1. All controllers are Open-to-Wireless ready. Available when an optional Wireless Receiver is connected to the controller. Some wireless sensors may use more than one wireless input from the controller.
2. 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 on SmartSource.

Recommended Applications

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

BACnet Objects List

Model	ECB-400	ECB-403	ECB-410	ECB-413	ECB-450	ECB-453
BACnet Calendar Objects	2	2	2	2	2	2
□ Events per calendar	45	45	45	45	45	45
BACnet Schedule Objects	10	10	10	10	10	10
□ Special events per schedule	10	10	10	10	10	10
BACnet PID Loop Objects	30	30	30	30	30	30
BACnet Input Objects (AI, BI, MSI) ¹	64 ²					
BACnet Output Objects (AO, BO) ¹	12 ³	4 ³	12 ³	4 ³	12 ³	4 ³
BACnet BV Objects:						
□ Commandable ¹	20	20	20	20	20	20
□ Non-Commandable	55	55	55	55	55	55
BACnet MSV Objects:						
□ Commandable ¹	20	20	20	20	20	20
□ Non-Commandable	55	55	55	55	55	55
BACnet AV Objects:						
□ Commandable ¹	35	35	35	35	35	35
□ Non-Commandable	115	115	115	115	115	115
BACnet Alarm Notification Classes	5	5	5	5	5	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.

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/ECB-410 22 VA typical plus all external loads¹, 60 VA max.

ECB-403/ECB-413 22 VA typical plus all external loads¹, 50 VA max.

ECB-450 25 VA typical plus all external loads¹, 63 VA max.

ECB-453 25 VA typical plus all external loads¹, 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-AAC¹

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-Vue Series Communicating Sensor

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

Hardware

Processor STM32 (ARM Cortex™ M3) MCU, 32 bit

CPU Speed 72 MHz

Memory 1 MB Non-volatile Flash (applications)

2 MB Non-volatile Flash (storage)

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

Status Indicator Green LEDs: power status & LAN Tx

Orange LEDs: controller status & LAN Rx

Communication Jack BACnet 1/8" (3.5mm) stereo audio jack

Subnetwork

Communication RS-485

Cable Cat 5e, 8 conductor twisted pair

Connector RJ-45

Connection Topology Daisy-chain

Maximum number of supported devices per controller combined 12

Allure EC-Smart-Vue Series Up to 12¹

Allure EC-Smart-Comfort Series (not supported by UUKL) Up to 6

Allure EC-Smart-Air Series (not supported by UUKL) Up to 6¹

1. A controller can support a maximum of two Allure Series Communicating Sensor models equipped with a CO₂ sensor. The remaining connected Allure Series Communicating Sensor models must be without a CO₂ sensor.

Wireless Receiver¹

Communication Protocol _____ EnOcean wireless standard
 Number of Wireless Inputs² _____ 28
 Supported Wireless Receivers _____ Refer to the Open-to-Wireless Solution Guide
 Cable _____ Telephone cord
 Connector _____ 4P4C modular jack
 Length (maximum) _____ 6.5ft (2m)

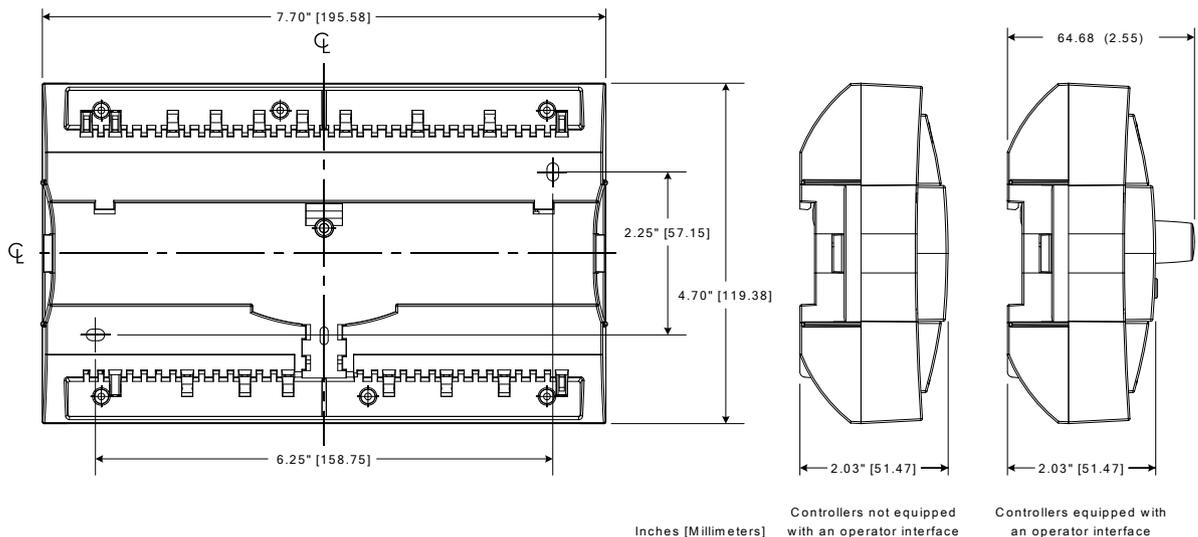


1. Available when an optional external Wireless Receiver module is connected to the controller. Refer to the Open-to-Wireless Solution Guide for a list of supported EnOcean wireless modules.
2. Some wireless modules may use more than one wireless input from the controller.

Mechanical

Dimensions (H × W × D):

- ECB-400 _____ 4.7 × 7.7 × 2.03" (119.38 × 195.58 × 51.47 mm)
- ECB-450 _____ 4.7 × 7.7 × 2.55" (119.38 × 195.58 × 64.68 mm)



Shipping Weight:

- ECB-400 _____ 1.17lbs (0.53 kg)
- ECB-450 _____ 1.28lbs (0.58 kg)

Enclosure Material¹ _____ FR/ABS

Enclosure Rating _____ Plastic housing, UL94-5VB flammability rating
 Plenum rating per UL1995

Color _____ Black & blue casing & grey connectors

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 Regulations

CE:

- Emission ————— EN61000-6-3: 2007; A1:2011; Generic standards for residential, commercial and light-industrial environments
- Immunity ————— EN61000-6-1: 2007; Generic standards for residential, commercial and light-industrial environments

FCC ————— This device complies with FCC rules part 15, subpart B, class B

UL Listed (CDN & US) ————— UL916 Energy management equipment

UL 864 ————— UL 864, 9th 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 Program²

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 x H) ————— 2.4 x 1.4" (61.2 x 36.7mm)
2.8" (71mm) diagonal

Menu Navigation ————— Jog dial turn, select navigation with Exit button

Specifications - 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 ————— 500milliseconds On / 500milliseconds 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 $^{\circ}$ F; 25 $^{\circ}$ C)
- Platinum Pt1000 (1K Ω @ 32 $^{\circ}$ F; 0 $^{\circ}$ C)
- Nickel RTD Ni1000 (1K Ω @ 32 $^{\circ}$ F; 0 $^{\circ}$ C)
- RTD Ni1000 (1K Ω @ 69.8 $^{\circ}$ F; 21 $^{\circ}$ C)

Specifications - 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 65seconds

Thermal Actuator Management Adjustable warm up and cool down time

Floating

Minimum Pulse On/Off Time 500milliseconds

Drive Time Period Adjustable

0 to 10VDC

Voltage Range 0 to 10VDC linear

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

Specifications - Digital Output (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 65seconds

Floating

Minimum Pulse On/Off Time _____ 500milliseconds

Drive Time Period _____ Adjustable

Power Source _____ External

Specifications subject to change without notice.

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