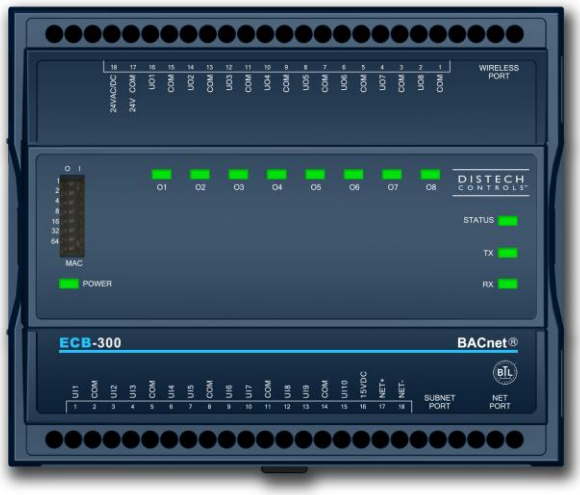
ECB-300

BACnet B-AAC 18-Point Programmable Controller



Overview

The ECB-300 is a microprocessor-based programmable controller designed to control equipment such as Air Handling Units, Chillers, Boilers, pumps, and Cooling Towers. The ECB-300 can also be used for lighting control and power measurement applications. This Application Specific Controller (ASC) uses the BACnet® MS/TP LAN communication protocol.

The ECB-300 supports various input types including resistance, voltage, and digital-based ones. Moreover, it provides digital, floating, pulse width modulation, and proportional control for valves, heating elements, fans, and lighting applications.

This controller works with a wide range of sensors, such as those in the EC-Smart-Vue series of communicating room sensors that feature a backlit display and graphical menus. These sensors are used for indoor temperature measurement, setpoint adjustment, fan speed selection, and occupancy state override. In addition, this controller is Open-to-Wireless ready, and when paired with the Wireless Receiver, it works with a variety of wireless battery-less sensors and switches.

Custom program this controller using EC-*gfx*Program through EC-Net^{AX} Pro which is powered by the Niagara^{AX} Framework®. This allows you to quickly and easily create your own control sequences capable of meeting the most demanding requirements of any engineering specification.

Applications

- Meets the requirements of the following applications:
  - Air Handling Units
  - Chillers
  - Boilers
  - Cooling Towers
  - Heat-Exchangers
  - Pumps
  - Lighting Control
- Improves energy efficiency when combined with:
  - CO_2 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
- Works with a wide range of wireless battery-less sensors

Features & Benefits

- Use the EC-*gfx*Program's state-of-the-art visual programming wizard to create operation sequences that meet specific engineering specifications. EC-*gfx*Program is accessible through EC-Net^{AX} Pro which is powered by the Niagara^{AX}-based management platform.
- Accelerate custom programming development by using pre-built HVAC control sequences supplied with EC-*gfx*Program.
- An optional Wireless Receiver supports up to 9 wireless battery-less sensors, allowing you to create wire-free installations.
- Highly accurate universal inputs support thermistors and resistance temperature detectors (RTDs) that range from 100 Ohms to 100 000 Ohms, giving you the freedom of using your preferred or engineer-specified sensors, in addition to any existing ones.
- With 8 universal inputs and 10 universal outputs, this controller covers all small to medium-size industry-standard HVAC applications.

ECB-300 Controller

Model	**ECB-300**
Points	18-Point Controller
Universal hardware inputs	10[1]
EC-Smart-Vue	8
Wireless battery-less sensors or switches[2]	27
15 Vdc Power Supply	■
Universal outputs	8
Product Number	CDIB-300G-00

1 The first four inputs are software configurable for pulse counting up to 20 Hz.

2 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.

Recommended Applications

Model	**ECB-300**
Air Handling Unit	■
Chiller	■
Boiler	■
Cooling Tower	■
Pumps	■

BACnet Objects List

BACnet Calendar Objects	4
BACnet Schedule Objects	15
BACnet PID Loop Objects	20
BACnet BV Objects	
- Commandable	15
- Non-Commandable	60
BACnet MV Objects	
- Commandable	15
- Non-Commandable	60
BACnet AV Objects	
- Commandable	35
- Non-Commandable	100

Open-to-Wireless – Wireless Receiver Add-on

Open-to-Wireless

To reduce the cost of installation, and minimize the impact on existing partition walls, the Wireless Receiver enables this controller to communicate with a line of wireless battery-less room sensors and switches.

Wireless Receiver (315)	- Receiver for EnOcean® 315MHz wireless-enabled sensors and switches
Wireless Receiver (868)	- Receiver for EnOcean® 868.3MHz wireless-enabled sensors and switches

Note that controllers have one wireless port to support a single Wireless Receiver.

For more information about the EnOcean technology and Open-to-Wireless, refer to the Open-to-Wireless Solution Guide. For more information about the Wireless Receiver module, refer to the Wireless Receiver Datasheet. These documents can be found on our web site at www.distech-controls.com..

Supported Platforms

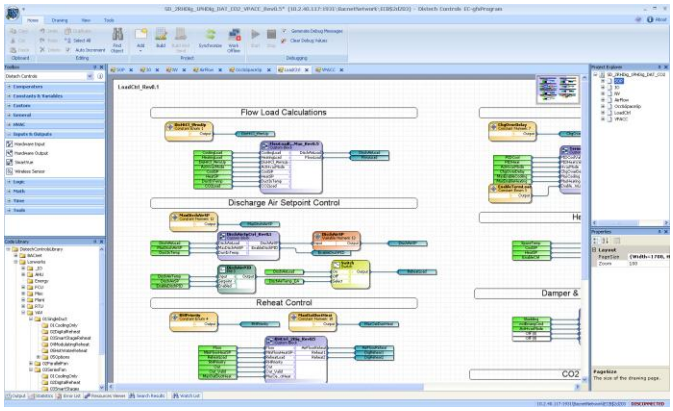
EC-Net^{AX}

EC-Net^{AX} is a web-enabled multi-protocol integration solution powered by the Niagara^{AX} Framework, establishing a fully Internet-enabled, distributed architecture for real-time access, automation and control of devices. EC-Net^{AX}'s open framework creates a common development and management environment for integration of LonWorks®, BACnet® and other protocols. Regardless of manufacturer and protocol, the EC-Net^{AX} system provides a unified modeling of diverse systems and data, providing one common platform for development, management and enterprise applications.

EC-Net^{AX} Wizards

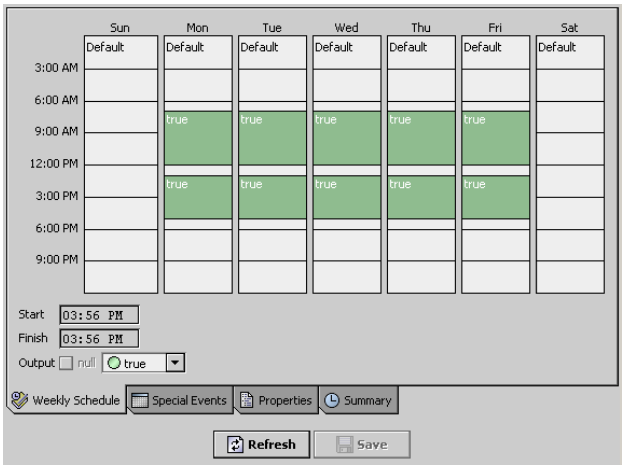
EC-*gfx*Program Graphical Programming Tool

Distech Controls' EC-*gfx*Program is a programming tool that allows you to quickly create control sequences by "dragging and dropping" block objects and then linking the objects with a simple "click, select and release". Select objects from an extensive library of over 100 commonly used functions as well as create your own custom blocks. With a user-friendly interface and intuitive programming environment, HVAC programming could not be easier. Refer to the EC-*gfx*Program datasheet for more information.



Scheduling Tool

Schedules and holidays are configured through the EC-NET^{AX} schedule configuration. It features a weekly schedule for regular, repeating, events by "time-of-day" and "day-of-week", while a holiday schedule is available to define events for specific days.



EC-*gfx*Program Software Features:

- Program both ECP Series LonWorks and ECB Series BACnet controllers with the same tool
- Supplied as freeware – there are no associated licensing costs
- Block-oriented programming
- Live debugging allows user to view code execution, input/output values and to detect errors in real-time
- Furnished with *gfx*Applications: A library of standard pre-coded and tested HVAC sequences that suit most field applications while allowing you to make your own modifications if necessary. For example, this library supports the following applications:
  - VAV
  - Air Handling Unit
  - Fan Coil Unit, and more
- Extensive block library of the most commonly used functions divided into 11 convenient categories containing over 100 block objects
- A code library for managing your favorite or most commonly used code or code sections
- Backup / Restore function stores the complete code in the controller allowing the retrieval of all programming code features
- The following advanced features are available with the ECB Series and controllers:
  - Advanced mathematical functions such as sin, cosine, power, exponential, logarithm, and so on
  - For loop can be used to find highest, lowest, and average values

Scheduling Wizard Features

- Easily configure schedules using a graphical slider
- Allows you to easily copy and paste entries
- Duplicate a schedule entry for Monday to Friday
- Special events allow you to set exceptions such as holidays to a schedule
- Holidays can be set for recurring events such as the 9th day, or the 3rd Thursday of a given month
- A schedule has an effective period during which it is active
- Schedule provides Next State and Time to Next State that are ideal for use with programming functions such as Optimum Start or morning Warm Up.

Complementary Products

Temperature Sensors

Allure EC-Smart-Vue

Line of communicating sensors with backlight display and graphical menus. This sensor is used to set the ECB-300's network address.

EC-Smart-Vue	Communicating room temperature sensor with backlight display and graphic menus
EC-Smart-Vue-H	Communicating room temperature and humidity sensor with backlight display and graphic menus

Allure EC-Sensor

Line of discrete sensors

EC-Sensor	Room temperature sensor with communication jack
EC-Sensor-O	Room temperature sensor with occupancy override button and communication jack
EC-Sensor-S	Room temperature sensor with setpoint adjustment and communication jack
EC-Sensor-SO	Room temperature sensor with setpoint adjustment, occupancy override button, and communication jack
EC-Sensor-SOF	Room temperature sensor with setpoint adjustment, occupancy override button, fan speed selection, and communication jack

Open-to-Wireless Sensors and Switches (requires Wireless Receiver)

Allure Wireless Battery-less ECW-Sensor

Line of wireless, battery-less sensors. Available in EnOcean 315MHz and 868.3MHz versions.

ECW-Sensor	Room temperature sensor
ECW-Sensor-O	Room temperature sensor with occupancy override button
ECW-Sensor-S	Room temperature sensor with setpoint adjustment
ECW-Sensor-SO	Room temperature sensor with setpoint adjustment and occupancy override button
ECW-Sensor-SOF	Room temperature sensor with setpoint adjustment, occupancy override button, and fan speed selection

Wireless Sensors and Switches

	SR-MDS	Wireless solar-cell powered motion detector and light sensor for room occupancy detection and/or lighting applications. Available in EnOcean 315MHz and 868.3MHz versions.
	2-channel Light Switch 4-channel Light Switch	2-/4-channel wireless light switches (European models). Available in EnOcean 315MHz and 868.3MHz versions.
	PTM265 PTM265D	2-/4-channel wireless light switches (North American models). Available in EnOcean 315MHz and 868.3MHz versions.
	SR65	Wireless, solar-cell powered outdoor temperature sensor. Available in EnOcean 315MHz and 868.3MHz versions.
	SR65 VFG	Wireless, solar-cell powered surface temperature contact sensor. Available in EnOcean 315MHz and 868.3MHz versions.
	SR65 AKF Series	Wireless, solar-cell powered duct temperature sensor. Available in EnOcean 315MHz and 868.3MHz versions.

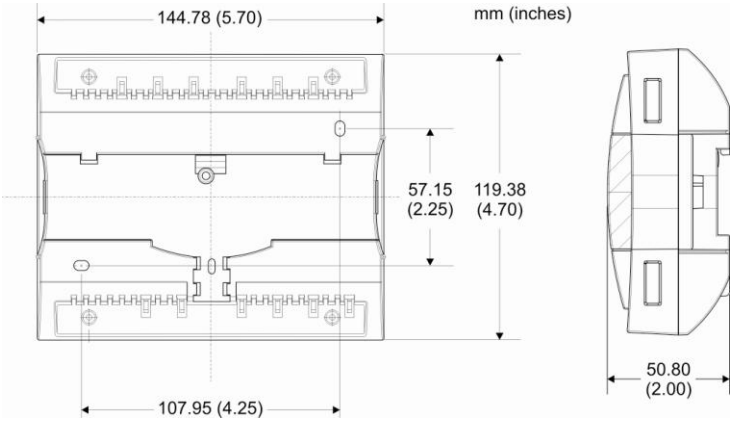
For more information about the available wireless sensors and switches, refer to the Open-to-Wireless Solution Guide which can be found on our web site at www.distech-controls.com.

Other

	07KIT-RELAYUNDI	SPDT relay with din-rail mountable socket base. 12VDC coil; consumption < 20mA. Dry contact NO/NC; maximum 8A @ 250VAC.

For more information on these or other Distech Controls products please refer to our web site at www.distech-controls.com or contact sales@distech-controls.com.

Controller Dimensions



Product Specifications

Power	
Voltage	24VAC/DC; ±15%; 50/60Hz; Class 2
Protection	3.0A user-replaceable fuse
Power Consumption	16 VA typical plus all external loads
	33 VA maximum
Interoperability	
Communication Bus	BACnet MS/TP
BACnet Profile	B-AAC[1] (Pending)
Baud Rates	9600, 19 200, 38 400, or 76 800 bps
Addressing	Dip Switch (0-127)
Hardware	
Processor	STM32 (ARM Cortex™ M3) MCU, 32 bit
Memory	384 kB Non-volatile Flash
	128 kB RAM
Status Indicator	Green LEDs: Power Status & LAN Tx
	Orange LEDs: Controller Status & LAN Rx
BACnet Communication Jack	1/8" (3.5mm) stereo audio jack
Environmental	
Operating Temperature	0°C to 50°C; 32°F to 122°F
Storage Temperature	-20°C to 50°C; -4°F to 122°F
Relative Humidity	0 to 90% Non-condensing
Enclosure	
Material	FR/ABS
Color	Black & blue casing & grey connectors
Dimensions (with Screws)	5.7" x 4.7" x 2.0"
	(144.8mm x 119.4mm x 50.8mm)
Shipping Weight	0.97lbs (0.44kg)

Inputs	
Input Types	Universal; software configurable
-Voltage	- 0 to 10VDC (40kΩ input impedance)
	- 0 to 5VDC (high input impedance)
-Current	0 to 20mA with 249Ω external resistor (wired in parallel)
-Digital	Dry contact
-Pulse	Up to 4 (UI1 to UI4); 20Hz maximum
-Resistor	
Thermistor	10KΩ Type 2, 3 (10KΩ @ 25°C; 77°F)
	Range: -40°C to 150°C; -40°F to 302°F
Platinum	Pt1000 (1KΩ @ 0°C; 32°F)
	Range: -40°C to 150°C; -40°F to 302°F
Nickel	RTD Ni1000 (1KΩ @ 0°C; 32°F)
	Range: -40°C to 150°C; -40°F to 302°F
Input Resolution	16-bit analog / digital converter
Power Supply Output	15VDC; maximum 200mA (10 inputs x 20mA each)
Outputs	
Universal	0-10VDC linear, digital 0-12VDC (on/off), floating or PWM; software configurable
	- PWM control: adjustable period from 2 seconds to 15 minutes
	- Floating control: requires two consecutive outputs
	- Min pulse on/off: 500msec.
	- Adjustable drive time period
	- 60mA max. @ 12VDC (60°C; 140°F)
	- Minimum resistance 200Ω
	- Auto-reset fuse
	- 60mA @ 60°C; 140°F
	- 100mA @ 20°C; 68°F
Output Resolution	10-bit digital / analog converter

Product Specifications (continued)

Wireless Receiver[2]	
Communication	EnOcean wireless standard
Number of wireless inputs[3]	20
Supported Wireless Receivers	Wireless Receiver (315) Wireless Receiver (868)
Cable	Telephone cord
- Connector	4P4C modular jack
- Length	3ft; 1m

Electromagnetic Compatibility	
CE -Emission	EN61000-6-3: 2007; Generic standards for residential, commercial and light-industrial Environments (pending)
-Immunity	EN61000-6-1: 2007; Generic standards for residential, commercial and light-industrial environments (pending)
FCC	This device complies with FCC rules part 15, subpart B, class B (pending)
	(pending)

EC-Smart-Vue	
Communication	RS-485
Number of sensors per controller	Up to 8, in daisy-chain configuration
Cable	Cat 5e, 8 conductor twisted pair
Connector	RJ-45

Agency Approvals	
UL Listed (CDN & US)	UL916 Energy management equipment (pending)
Material[4]	UL94-5VA (pending)
	(pending)

Communication Protocols

1. Refer to Distech Controls' Protocol Implementation Conformity Statement for BACnet.
2. 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.
3. Some wireless modules may use more than one wireless input from the controller.
4. All materials and manufacturing processes comply with the RoHS directive and are marked according to the Waste Electrical and Electronic Equipment (WEEE) directive.

Product Warranty & Total Quality Commitment

All Distech Controls product lines are built to meet rigorous quality standards and carry a two-year warranty. Distech Controls is an ISO 9001 registered company.

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