



Overview

The **ECB-VAVS and ECB-VAV Series** are microprocessor-based variable air volume (VAV) controllers designed to control any variable air volume box. Each controller uses the BACnet® MS/TP LAN communication protocol and are BTL®-Listed as BACnet Application Specific Controllers (B-ASC).

This series contains five models as follows: ECB-VAVS-O, ECB-VAVS, ECB-VAV, ECB-VVTS, and ECB-VAV-N. Models with inputs support various measurement types including resistance, voltage, and digital-based ones. All models provide digital, floating, pulse width modulation, and proportional control outputs for valves, heating elements, fans, and lighting applications. In particular, the ECB-VAVS-O, ECB-VAVS, and ECB-VAV models have an on-board air flow sensor with a range of 0-2 inches of water column (500 Pascal), as well as a built-in brushless actuator for precise positioning of dampers requiring up to 35 inch-pounds (4 Newton-meters) of torque.

All controller models work with the EC-Smart-Vue series of communicating sensors that feature a backlit display and graphical menus. These sensors are used for indoor temperature measurement, setpoint adjustment, and occupancy state override. An EC-Smart-Vue can be used to perform system air balancing without requiring an onsite controls engineer and to commission the system. In addition, all controller models are Open-to-Wireless® ready, and when paired with the Wireless Receiver, they work with a variety of wireless battery-less sensors and switches.

These controllers come preloaded with all standard VAV controller applications that can be selected using an EC-Smart-Vue. All controllers can also be custom-programmed using EC-gfxProgram 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 single duct VAV zone applications, including:
 - Cooling Only VAV Boxes
 - Cooling with Reheat VAV Boxes
 - Parallel Fan VAV Boxes
 - Series Fan VAV Boxes
 - Dual-Duct VAV Systems
- Improves energy efficiency when combined with:
 - Motion detectors to automatically adjust a zone's occupancy mode from standby to occupied when presence is detected
 - 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
 - Light switches to control both lighting and a room's HVAC occupancy / standby mode setting
- Works with a wide range of wireless battery-less sensors

Features & Benefits

- Select from a range of pre-configured VAV controller applications with the EC-Smart-Vue allowing you to commission a VAV box before the network has been installed for rapid deployment. Then later use the EC-gfxProgram's state-of-the-art visual programming wizard to customize controller operation to meet specific engineering requirements. EC-gfxProgram 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-gfxProgram.
- Available with an optional Wireless Receiver that supports up to 18 wireless inputs, letting you create wire-free installations and use various wireless battery-less sensors and switches.
- Accurate on-board air flow sensor for precise air flow monitoring and control at low and high air flow rates permitting you to design for maximum energy efficiency while maintaining an optimal comfort level.
- Built-in actuator with a brushless motor and integrated position feedback system eliminates periodic damper re-initialization and ensures worry-free operation, providing increased occupant comfort and extended service life.
- Integrated VAV Performance Assessment Control Charts (VPACC) control sequences, provides a means of automatically detecting when the VAV is operating outside of its design parameters including: Persistent High / Low Space Temperature, Persistent High / Low Discharge Temperature, Persistent High / Low Air Flow, and Unstable Air Flow.
- With up to 4 software configurable universal inputs and up to 6 software configurable outputs, this controller series covers all industry-standard VAV applications.
- Highly accurate universal inputs support thermistors and resistance temperature detectors (RTDs) that range from 0 Ohms to 350 000 Ohms, giving you the freedom of using your preferred or engineer-specified sensors, in addition to any existing ones.
- Rugged hardware Inputs and Outputs eliminate need for external protection components, such as diodes for 12V DC relays.

ECB-VAV Series Controllers



Model	ECB-VAVS-O	ECB-VAVS	ECB-VAV	ECB-VVTS	ECB-VAV-N
Points	5-Point VAV	7- Point VAV	12- Point VAV	6- Point VVT	11- Point VAV
Universal hardware inputs	0	2	4	2	4
Built-in flow sensor	■	■	■	■	■
EC-Smart-Vue	4	4	4	4	4
Wireless inputs ¹	18	18	18	18	18
15 Vdc Power Supply	■	■	■	■	■
Universal output	1	1	2	1	2
Digital (triac) outputs	2	2	4	2	4
Built-in Actuator	■	■	■	■	■
Product Number	CDIB-VASO-00	CDIB-VASX-00	CDIB-VAXX-00	CDIB-VTSX-00	CDIB-VANX-00

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.

Recommended Applications

Model	ECB-VAVS-O	ECB-VAVS	ECB-VAV	ECB-VVTS	ECB-VAV-N
Cooling Only VAV Box	■	■		■	
Cooling w/ Reheat VAV Box	■	■		■	
Cooling w/ Reheat VAV Box & Perimeter Heating			■		
Parallel Fan VAV Box			■		
Series Fan VAV Box			■		
Dual Duct VAV Box ¹	■	■			
Large Damper VAV Box ²					■
Existing Damper Actuator					■
Room Pressurization			■		

1 Two controllers are required.

2 Requiring More Than 35 in-lb (4 Nm) Actuator Torque.

BACnet Objects List

BACnet Calendar Objects	1
BACnet Schedule Objects	2
BACnet PID Loop Objects	8
BACnet BV Objects	
- Commandable	10
- Non-Commandable	40
BACnet MSV Objects	
- Commandable	10
- Non-Commandable	40
BACnet AV Objects	
- Commandable	25
- Non-Commandable	75

Open-to-Wireless – Wireless Receiver Add-on



To reduce the cost of installation, and minimize the impact on existing partition walls, the Wireless Receiver enables every controller from this series 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 [Wireless Resource 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



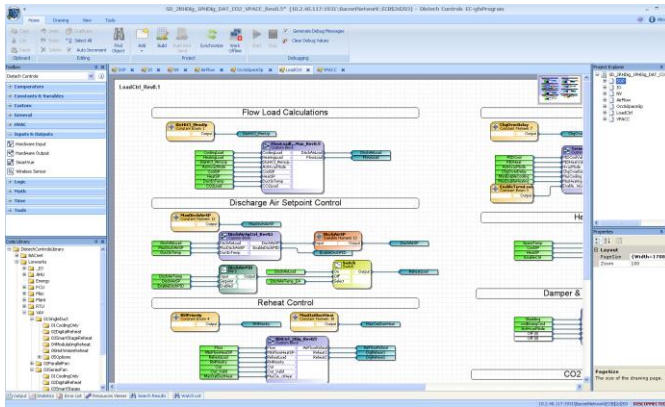
EC-Net^{AX}

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-gfxProgram Graphical Programming Tool

Distech Controls' EC-gfxProgram 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-gfxProgram datasheet for more information.

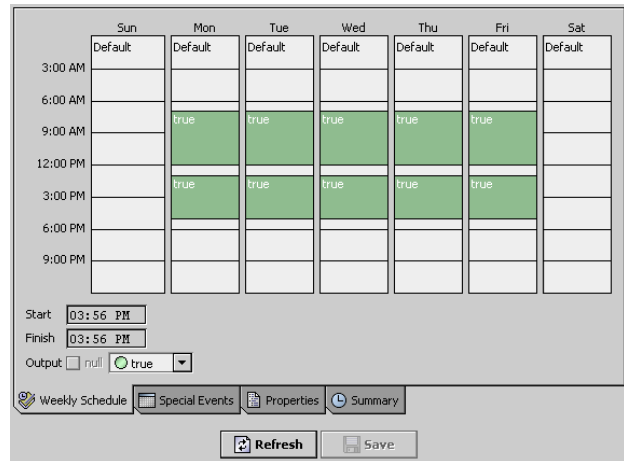


EC-gfxProgram Software Features:

- 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 *gfxApplications*: 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 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.



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 backlit display and graphical menus. VAV commissioning can start immediately after installation, as it can also be used as a hand-held tool. This sensor is used to set the ECB-VAV's network address, to select the appropriate VAV controller application for the VAV box configuration in use, to perform air balancing of the system without requiring an onsite controls engineer, and to troubleshoot the system.



EC-Smart-Vue
EC-Smart-Vue-H

Communicating room temperature sensor with backlit display and graphic menus
Communicating room temperature and humidity sensor with backlit display and graphic menus

Allure EC-Sensor

Line of discrete sensors



EC-Sensor
EC-Sensor-O
EC-Sensor-S
EC-Sensor-SO
EC-Sensor-SOF

Room temperature sensor with communication jack
Room temperature sensor with occupancy override button and communication jack
Room temperature sensor with setpoint adjustment and communication jack
Room temperature sensor with setpoint adjustment, occupancy override button, and communication jack
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
ECW-Sensor-O
ECW-Sensor-S
ECW-Sensor-SO
ECW-Sensor-SOF

Room temperature sensor
Room temperature sensor with occupancy override button
Room temperature sensor with setpoint adjustment
Room temperature sensor with setpoint adjustment and occupancy override button
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.

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

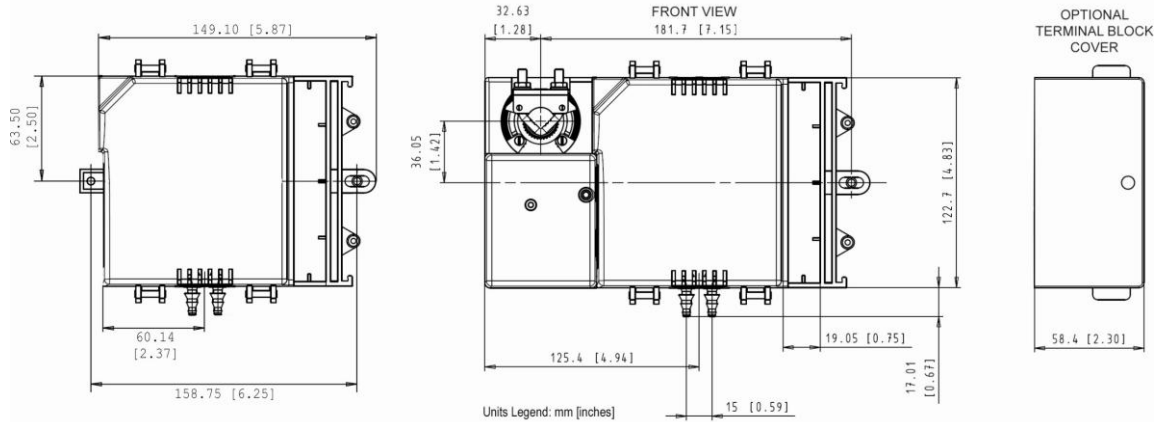


VAV Terminal Block
Cover

A cover designed to conceal the wire terminals. Required to meet local safety regulations in certain jurisdictions.

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; $\pm 15\%$; 50/60Hz; Class 2
Protection	2.0A user-replaceable fuse 3.0A user-replaceable fuse for triacs when using the internal power supply
Power Consumption	10 VA typical plus all external loads 85 VA maximum

Interoperability

Communication Bus	BACnet MS/TP
BACnet Profile	B-ASC ¹
EOL Resistor	Built-in, jumper selectable
Baud Rates	9600, 19 200, 38 400, or 76 800 bps
Addressing	Field configurable with any EC-Smart-Vue model

Hardware

Processor	STM32 (ARM Cortex™ M3) MCU, 32 bit
CPU Speed	68 MHz
Memory	384 kB Non-volatile Flash (applications) 1 MB Non-volatile Flash (storage) 64 kB RAM
Status Indicator	Green LEDs: Power Status & LAN Tx Orange LEDs: Controller Status & LAN Rx

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)	
- ECB-VAV-N	4.8" x 5.9" x 2.5" (122.7mm x 149.1mm x 63.0mm)
- Other models	4.8" x 8.4" x 2.5" (122.7mm x 214.3mm x 63.0mm)

Shipping Weight

- ECB-VAV-N	0.92lbs (0.42kg)
- Other models	2.30lbs (1.05kg)

Integrated Damper Actuator

Motor	Belimo LMZS-H brushless DC motor
Torque	35 in-lb, 4 Nm
Degrees of Rotation	95° adjustable
Fits Shaft Diameter	5/16 to 3/4"; 8.5 to 18.2mm

Inputs

Input Types	Universal; software configurable
-Voltage	- 0 to 10VDC (40k Ω input impedance) - 0 to 5VDC (high input impedance)
-Current	0 to 20mA with 249 Ω external resistor (wired in parallel)
-Digital	Dry contact
-Pulse	Dry contact; 500ms minimum ON/OFF
-Resistor	0 to 350 K Ω . All thermistor types that operate in this range are supported. The following temperature sensors are pre-configured:
<i>Thermistor</i>	10K Ω Type 2, 3 (10K Ω @ 25°C; 77°F)
<i>Platinum</i>	Pt1000 (1K Ω @ 0°C; 32°F)
<i>Nickel</i>	RTD Ni1000 (1K Ω @ 0°C; 32°F) RTD Ni1000 (1K Ω @ 21°C; 69.8°F)
Input Resolution	16-bit analog / digital converter
Differential Pressure Range	0 to 500 Pa (0 to 2.0 in. W.C.)
Accuracy	$\pm 5.5\%$ of reading over operating temperature range
Input Resolution	0.0167 Pa (0.00007 in. H ₂ O)
Power Supply Output	15VDC; maximum 80mA (4 inputs x 20mA each)

Outputs

Digital	24 VAC Triac, digital (on/off), PWM, or floating; software configurable
	- 0.5A continuous
	- 1A @ 15% duty cycle for a 10-minute period
	- PWM control: adjustable period from 2 to 65sec.
	- Floating control:
	- Min pulse on/off: 500msec.
	- Adjustable drive time period
	External or internal power supply (jumper selectable)
	0 to 10VDC linear, digital 0 to 12VDC (on/off), floating or PWM. Built-in snubbing diode to protect against back EMF, for example when used with a 12VDC relay.
	- PWM control: adjustable period from 2 to 65sec.
	- Floating control:
	- Min pulse on/off: 500msec.
	- Adjustable drive time period
	- 20mA max. @ 12VDC
	- Minimum resistance 600 Ω
Output Resolution	10-bit digital / analog converter

Product Specifications (continued)

Wireless Receiver²

Communication	EnOcean wireless standard
Number of wireless inputs ³	18
Supported Wireless Receivers	Wireless Receiver (315) Wireless Receiver (868)
Cable	Telephone cord
- Connector	4P4C modular jack
- Length (maximum)	6.5ft; 2m

Electromagnetic Compatibility

CE -Emission	EN61000-6-3: 2007; 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



EC-Smart-View

Communication	RS-485
Number of sensors per controller	Up to 4, in daisy-chain configuration
Cable	Cat 5e, 8 conductor twisted pair
Connector	RJ-45



Agency Approvals

UL Listed (CDN & US) Material ⁴	UL916 Energy management equipment UL94-5VA
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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.

Specifications subject to change without notice.

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ECB-VAV & ECB-VAVS Series

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