



ECL-VAV-N



Overview

The ECL-VAV-N controller is a microprocessor-based programmable variable air volume (VAV) controller designed to control any variable air volume box. This controller uses the LonTalk® communication protocol and is LONMARK certified as an SCC VAV.



Applications

This controller meets the requirements of the following applications:

- Large damper VAV box
- Existing damper actuator

Features & Benefits

Flexible Inputs and Outputs

This controller has various input types including resistance, voltage, and digital-based ones. Moreover, it provides digital, floating, pulse width modulation, and proportional control outputs for valves, heating elements, fans, and lighting applications. This controller covers all industry-standard HVAC unitary 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 0 to 20mA with an external resistor. This provides the freedom of using your preferred or engineer-specified sensors, in addition to any existing ones.

Rugged Inputs/Outputs

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

Preloaded Applications

Factory preloaded applications allow these controllers, straight out of the box, to operate standard VAV equipment with a proven energy-efficient sequence of operation thereby eliminating the need for programming.

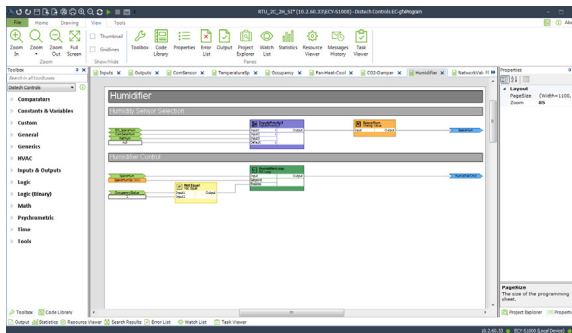
The preloaded application can be selected using an Allure EC-Smart-Vue sensor even before the network has been installed for rapid deployment or through the EC-Net™ solution using Distech Controls' *dcgfx* Applications.

Integrated VPACC

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.

Programmability

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



Increased Energy Efficiency

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

On-Board Air Flow Sensor

This controller is equipped with an accurate on-board airflow sensor for precise air flow monitoring and control at low and high air flow rates, allowing the design for maximum energy efficiency while maintaining an optimal comfort level.

The on-board air flow sensor has a range of 0 to 2 inches (5 cm) of water column (500 Pascal).

Optimized Air Balancing

Optimized air balancing process saves time during commissioning: the flow sensor requires no zero flow calibration, and its variable-speed motor goes to minimum and maximum flow position in half the time of typical VAV actuators.

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 18 wireless inputs to create wire-free installations.

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.
- Allure EC-Smart-Air sensors combine precise environmental sensing in a discreet and alluring enclosure for temperature, humidity, and CO₂.

Supported Platforms

EC-Net Solution

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

Model Attributes

Points	11-Point VAV
Universal Hardware Inputs	4
Built-in Flow Sensor	■
Wireless Inputs ¹	18
15 VDC Power Supply	■
Digital (triac) Outputs	4
Universal Outputs	2

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.

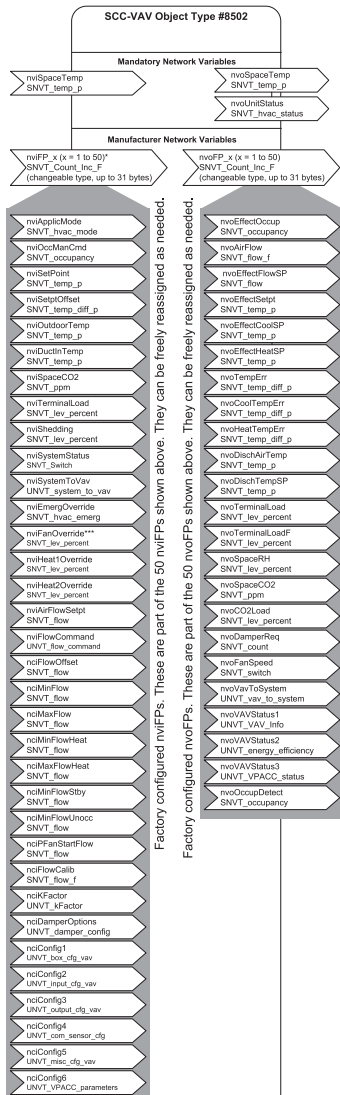
Accessories

Terminal Block Cover	A cover designed to conceal the wire terminals. It is required to meet local safety regulations in certain jurisdictions.
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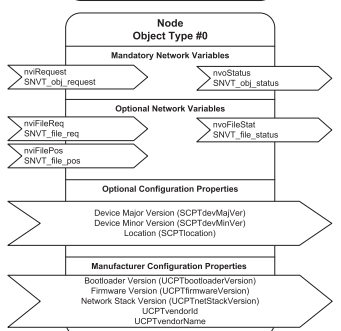
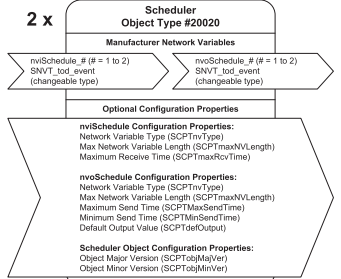
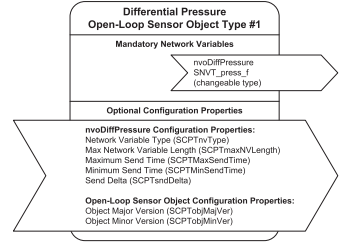
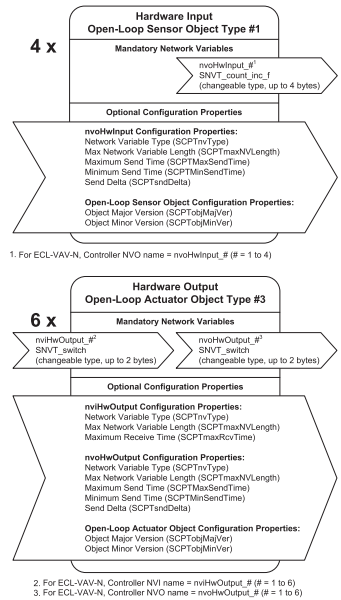
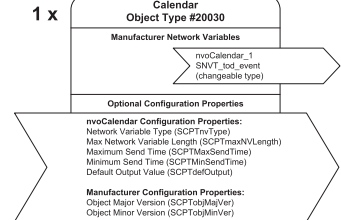
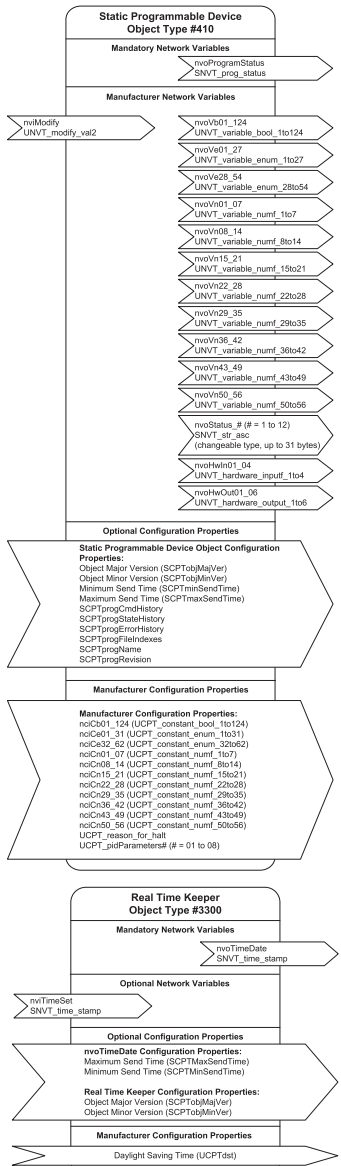
Objects List

Calendar Objects	1
<input type="checkbox"/> Events per calendar	25
Schedule Objects	2
<input type="checkbox"/> Special events per schedule	5
PID Loop Objects	8
Constants:	
<input type="checkbox"/> Boolean	124
<input type="checkbox"/> Enumeration	62
<input type="checkbox"/> Numeric	56
Variables:	
<input type="checkbox"/> Boolean	124
<input type="checkbox"/> Enumeration	54
<input type="checkbox"/> Numeric	56
nciSetpoint	■
Total Network Variables	171
Network Variable Input (General Usage):	
<input type="checkbox"/> NVI Changeable Type, Up to 31 Bytes	50
Network VariableOutput (General Usage):	
<input type="checkbox"/> NVO Changeable Type, Up to 31 Bytes	50
Hardware Input Network Variable:	
<input type="checkbox"/> nvoHwInput per Hardware Input	■
Hardware Input Network Variable:	
<input type="checkbox"/> nviHwInput per Hardware Output	■
<input type="checkbox"/> nvoHwInput per Hardware Output	■

Functional Profile



* These NVs support fan-in binding that increases the level of your building's intelligence by making it easy to analyze multiple values from terminal and application systems to determine the optimal operating point. For example, find the minimum or maximum terminal load from many controllers or perform more complex calculations such as restart the system when 20% of the zones are below 68°F (20°C).



Product Specifications

Power Supply Input

Voltage Range	24VAC/DC; ±15%; Class 2
Frequency Range	50/60Hz
Overcurrent Protection	Field replaceable fuse
Fuse Type	2.0A
	3.0A (for triacs when using the internal power supply)
Power Consumption	10 VA typical plus all external loads ¹ , 85 VA max. (including powered triac outputs)

1. External loads must include the power consumption of any connected modules such as subnet devices, wireless module (1VA) and triac outputs.. Refer to the respective module's datasheet for related power consumption information.

Communications

Communication	LonTalk Protocol
Transceiver	FT 5000 Free Topology Smart Transceiver
Channel	TP/FT-10; 78Kbps
LonMark Interoperability Guidelines	Version 3.4
Device Class	SCC VAV

LonMark Functional Profile :

<input type="checkbox"/> Input Objects	Open-Loop Sensor #1
<input type="checkbox"/> Output Objects	Open-Loop Actuator #3
<input type="checkbox"/> Node Object	Node Object #0
<input type="checkbox"/> Real Time Clock	Real Time Keeper #3300
<input type="checkbox"/> Scheduler	Scheduler #20020
<input type="checkbox"/> Calendar	Calendar #20030
<input type="checkbox"/> Programmable Device	Static Programmable Device #410
<input type="checkbox"/> SCC Object	SCC VAV #8502

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
Real Time Clock (RTC)	Built-in Real Time Clock without battery Network time synchronization is required at each power-up cycle before the RTC become available
Status Indicator	Green LEDs: power status & LAN Tx Orange LEDs: controller status & LAN Rx

Subnetwork

Communication	RS-485
Cable	Cat 5e, 8 conductor twisted pair
Connector	RJ-45
Connection Topology	Daisy-chain
Maximum Number of Allure Series Communicating Sensors combined	4 ¹

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

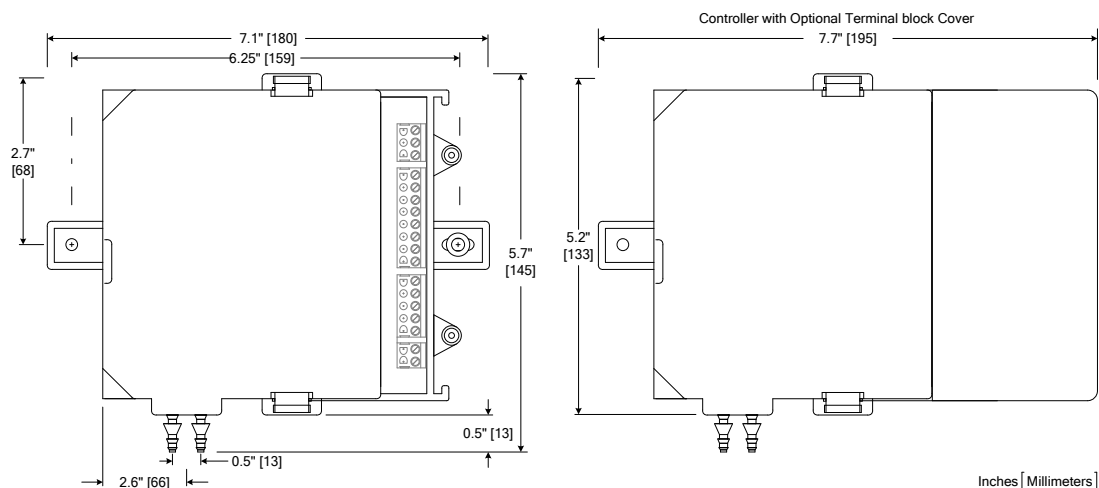
Communication Protocol _____ EnOcean wireless standard
 Number of Wireless Inputs² _____ 18
 Supported Wireless Receivers _____ Refer to the Open-to-Wireless Solution Guide
 Cable _____ Telephone cord
 Connector _____ 4P4C modular jack
 Length (maximum) _____ 6.5ft (2m)



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 _____ 5.7 x 7.1 x 2.13" (145 x 180 x 54.0 mm)



Shipping weight _____ 0.92 lbs (0.42 kg)
 Enclosure Material¹ _____ FR/ABS
 Enclosure Rating _____ Plastic housing, UL94-5VB flammability rating
 Plenum Rating per UL1995

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



ECL-VAV-N

Specifications - On-Board Air Flow Sensor

Range ————— 0-2.0 in. W.C. (0-500 Pa)
Input Resolution ————— 0.00007 in. W.C. (0.0167 Pa)
Air Flow Accuracy ————— $\pm 4.0\%$ @ > 0.05 in. W.C. (12.5 Pa)
 $\pm 1.5\%$ once calibrated through air flow balancing @ > 0.05 in. W.C. (12.5 Pa)

Specifications - Universal Inputs (UI)

General

Input Type ————— Universal; software configurable
Input Resolution ————— 16-bit analog / digital converter
Power Supply Output ————— 15VDC; maximum 80mA

Contact

Type ————— Dry contact

Counter

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 external resistor wired in parallel

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)

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 600 Ω for 0-10VDC and 0-12VDC outputs
Auto-reset fuse — Provides protection from accidental 24VAC connection

0 or 12VDC (On/Off)

Range — 0 or 12VDC
Source Current — Maximum 20 mA at 12VDC (minimum load resistance 600 Ω)¹

1. Relays equipped with coil that consume between 20 and 35mA can be used with up to 2 Universal Outputs when the 15V Power Supply Output is de-rated to supply 50mA maximum current.

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 20 mA at 10VDC (minimum load resistance 600 Ω)

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 or internal power supply (jumper selectable)

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 or internal power supply (jumper selectable)

Specifications subject to change without notice.

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