

# ECL-VAV

LONMARK® Certified 12-Point  
Programmable VAV Controller



## Overview

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



## Features & Benefits

- Internal power supply uses power factor correction (PFC) to optimize power usage when multiple controllers are connected at the same power transformer
- Flexible inputs and outputs support all industry-standard VAV unitary applications
- Rugged hardware inputs and outputs eliminate the need for external protection equipment
- Polarity free, on-board airflow sensor for precise airflow monitoring and control at low and high airflow rates
- Built-in actuator with an integrated position feedback system for worry-free operation
- Factory pre-loaded applications allow for out-of-the-box, energy efficient operation of standard VAV equipment
- Optimized air balancing through *myDC* AirBalancing saving time during the commissioning process
- End-to-end solution for support of Smart Room Control of HVAC equipment, lighting and sunblinds
- 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: ECL-VAV

## ECL-VAV Plenum-rated

Series	Model	Options
ECL-	VAV: 12 points, 15 Vdc power supply output, flow sensor, damper actuator, 4 UI, 4 DO, 2 UO, standard 24VAC/DC power supply	<b>Plenum-rated:</b> UL2043 plenum-rated (only for North America)

## Accessories

Terminal covers	Terminal cover designed to conceal the controller's wire terminals. Required to meet local safety regulations in certain jurisdictions.
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# Recommended Applications

Model	ECL-VAV
Cooling Only VAV Boxes	■
Dual-Duct VAV Systems	■
Cooling with Reheat VAV Boxes	■
Parallel Fan VAV Boxes	■
Series Fan VAV Boxes	■
Room Pressurization	■
Smart Room Control support for HVAC, light, and shades/sunblinds	■

# Objects List

## Objects

Calendar Objects	1
Special events per calendar	25
Schedule Objects	2
Special events per schedule	5
PID Loop Objects	8

## Constants

Boolean	124
Enumeration	62
Numeric	56

## Variables

Boolean	124
Enumeration	54
Numeric	56
nciSetpoint	Yes
Total Network Variables	171

## Network Variable Input (General Usage)

NVI Changeable Type,	50
Up to 31 Bytes	

## Network Variable Output (General Usage)

NVO Changeable Type,	50
Up to 31 Bytes	

## Hardware Input Network Variable

nvoHwInput per Hardware	Yes
Input	

## Hardware Output Network Variable

nviHwInput per Hardware	Yes
Output	
nvoHwInput per Hardware	Yes
Output	

# Product Specifications

## Power Supply Input

Voltage Range <sup>1</sup>	24VAC/DC; ±15%; Class 2
Frequency Range	50/60Hz
Overcurrent Protection	Field replaceable fuse

- 24VDC does not support DO (triac outputs).
- 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.

Fuse Type	3.0A
Power Consumption	4 VA typical plus all external loads <sup>2</sup> , 75 VA max (including powered triac outputs).

Power Factor >90%

- 24VDC does not support DO (triac outputs).
- 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

Communications	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 Objects	Open-Loop Sensor #1
Output Objects	Open-Loop Actuator #3
Node Object	Node Object #0
Real Time Clock	Real Time Keeper #3300
Scheduler	Scheduler #20020
Calendar	Calendar #20030
Programmable Device	Static Programmable Device #410
SCC Object	SCC VAV #8502

## Subnetwork

Communication	RS-485
Cable	Cat 5e, 8 conductor twisted pair
Connector	RJ-45
Connection Topology	Daisy-chain
Maximum number of room devices supported per controller combined	4 <sup>1</sup>
Allure Series sensor	Up to 4
EC-Multi Sensor	Up to 4
ECx-Light-4 / ECx-Light-4D / ECx-Light-DALI	Up to 2
ECx-Blind-4 / ECx-Blind-4LV	Up to 2

1. A controller can support a maximum of 2 Allure sensor models equipped with a CO<sub>2</sub> sensor. Any remaining connected sensors must be without a CO<sub>2</sub> sensor.

## Hardware

Processor	STM32 (ARM Cortex™ M3) MCU, 32 bit
CPU Speed	68 MHz
Applications Memory	384 kB Non-volatile Flash
Storage Memory	1 MB Non-volatile Flash
Memory (RAM)	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
Green LEDs	Power status & LAN Tx
Orange LEDs	Controller status & LAN Rx

## Wireless Receiver

Communication Protocol	EnOcean wireless standard <sup>1</sup>
Number of Wireless Inputs <sup>2</sup>	18
Supported Wireless Receivers	Refer to the Open-to-Wireless Application 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 Application Guide for a list of supported EnOcean wireless modules.  
2. Some wireless modules may use more than one wireless input from the controller.

## Integrated Damper Actuator

Motor	Belimo brushless DC motor
Torque	45 in-lb, 5 Nm
Degrees of Rotation	95° adjustable
Shaft Diameter	5/16 to 3/4"; 8.5 to 18.2mm
Acoustic Noise Level	< 35 dB (A) @ 95° rotation in 95 seconds

## Mechanical

Dimensions (H × W × D)	7.90 × 5.51 × 3.70" (200.61 × 139.93 × 94.04 mm)
Dimensions with terminal block covers (H × W × D)	7.90 × 10.84 × 3.70" (200.61 × 275.26 × 94.04 mm)
Shipping Weight (Controller)	1.95lbs (0.89 kg)
Shipping Weight Terminal Cover (one side, bulk packaged)	0.30lbs (0.14 kg)
Enclosure Material <sup>1</sup>	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
Nema Rating	1

## 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 UL2043 Suitable for use in air handling spaces (for Plenum-rated models only)
CEC Appliance Database	Appliance Efficiency Program <sup>1</sup>



1. California Energy Commission's Appliance Efficiency Program: The manufacturer has certified this product to the California Energy Commission in accordance with California law.

## On-Board Air-Flow Sensor

Differential Pressure Range	±2.0 in. W.C. (±500 Pa) Polarity-free high-low sensor connection
Input Resolution	0.00007 in. W.C. (0.0167 Pa)
Air Flow Accuracy	±4.0% @ > 0.05 in. W.C. (12.5 Pa) ±1.5% once calibrated through air flow balancing @ > 0.05 in. W.C. (12.5 Pa)
Pressure Sensor Accuracy	±(0.2 Pa +3% of reading)

## Universal Inputs (UI)

### General

Input Type	Universal; software configurable
Input Resolution	16-Bit analog / digital converter
Power Supply Output	18 VDC; maximum 80mA

### Contact

Type	Dry contact
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### Counter

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

### 0 to 10VDC

Range	0 to 10VDC (40k $\Omega$ 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 249 $\Omega$ external resistor wired in parallel
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### Resistance/Thermistor

Range	0 to 350 K $\Omega$
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Supported Thermistor Types Any that operate in this range

#### Pre-configured Temperature Sensor Types:

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

Auto-reset fuse	12VDC relay Output is internally protected against short circuits Provides 24VAC over voltage protection
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### 0 or 12VDC (On/Off)

Range	0 or 12VDC
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### PWM

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

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

### 0 to 10VDC

Range	0 to 10VDC linear
Source Current	Maximum 20 mA at 10VDC (minimum load resistance 600 $\Omega$ )
Sink Current	Maximum 2.5mA at 1 VDC (minimum load resistance 4K $\Omega$ )

## Digital Outputs (DO)

### General

Output Type	24VAC Triac; software configurable
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Maximum Current per Output	0.5A continuous 1A @ 15% duty cycle for a 10-minute period
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Power Source	External or internal power supply (jumper selectable)
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### 0 or 24VAC (On/Off)

Range	0 or 24VAC
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### PWM

Range	Adjustable period from 2 to 65 seconds
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### Floating

Minimum Pulse On/Off Time	500 milliseconds
Drive Time Period	Adjustable
Power Source	Internal power supply

# Dimensions

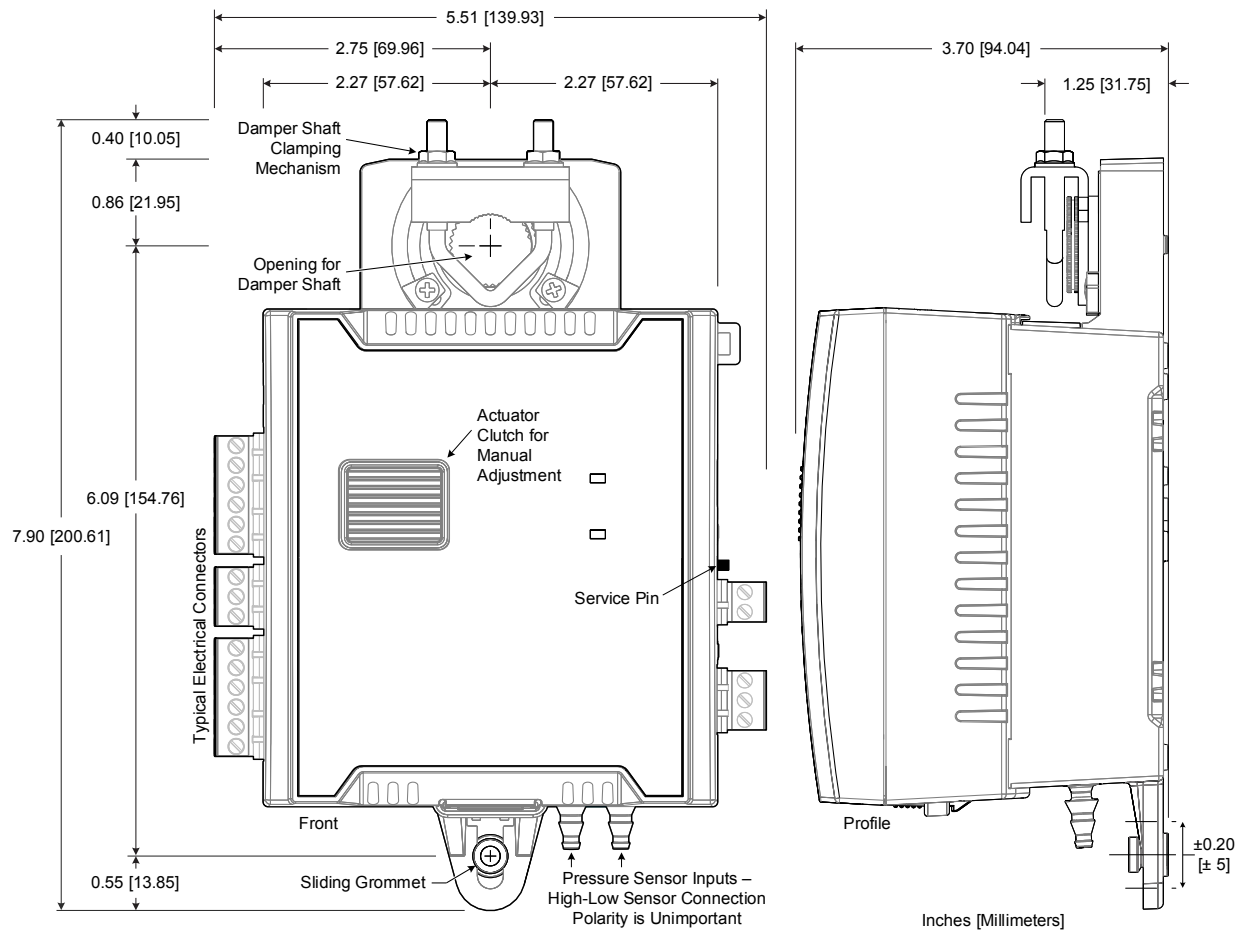


Figure 1: ECL-VAV Controller Dimensions

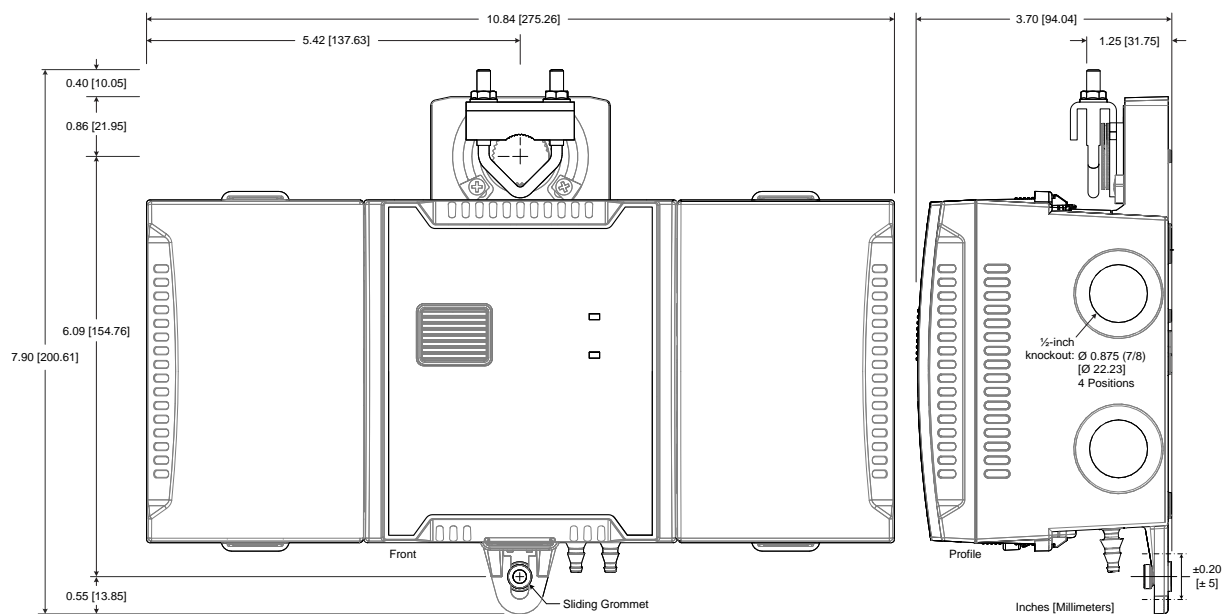
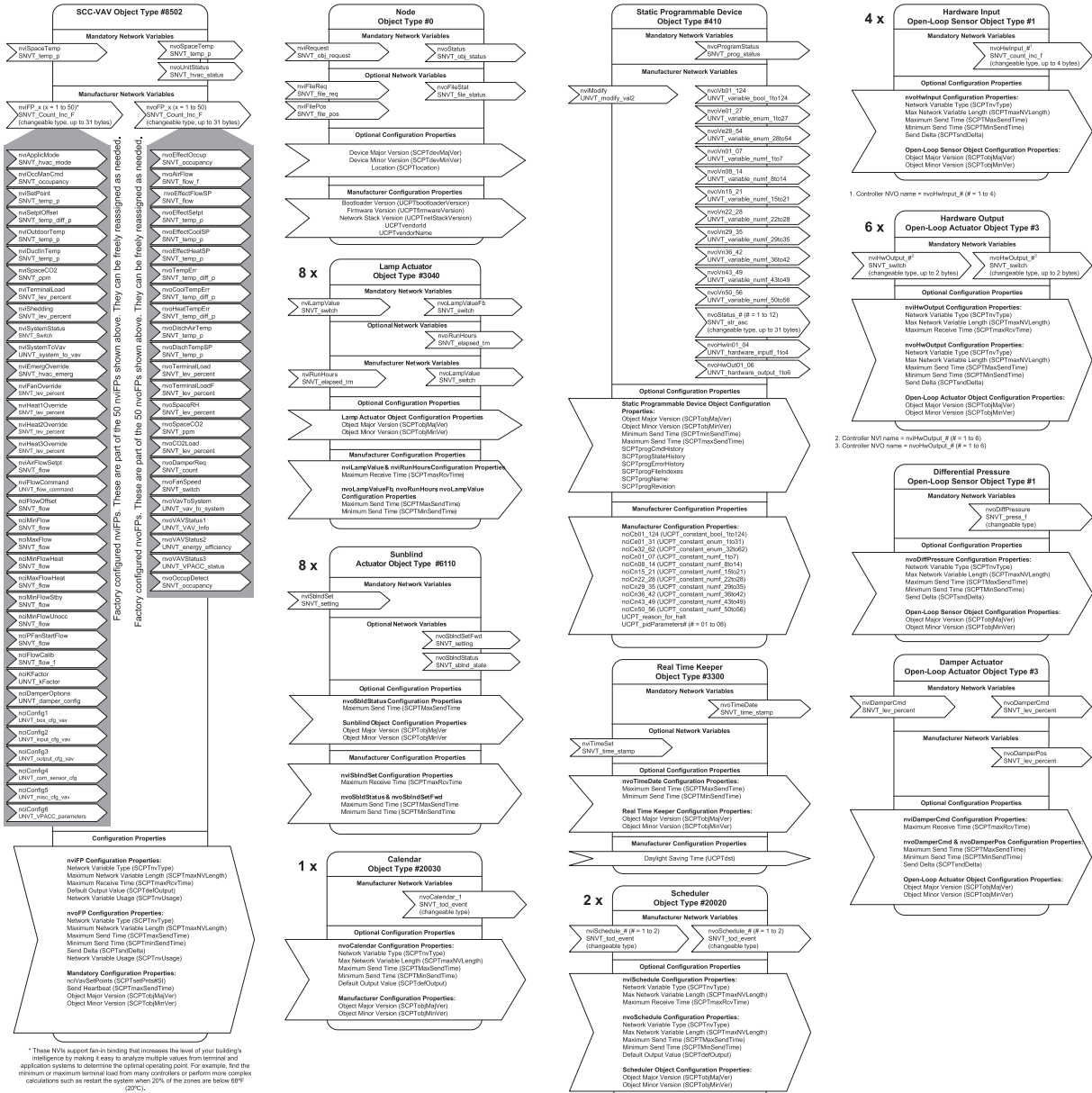


Figure 2: ECL-VAV Controller with Terminal Covers Dimensions

# Functional Profile



Specifications subject to change without notice.

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