

LN Series Variable Air Volume (VAV) and Variable Air Volume and Temperature (VVT) Controllers

Product Bulletin

LN-VAVLF-2, LN-VVTLF-2, LN-VAVLN-2

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The LN Series LN-VAVLF-2, LN-VAVLN-2, and LN-VVTLF-2 controllers use the latest technology to provide you with more flexibility and reliability of control. The LN VAV/VVT controllers are designed to meet the requirements of single duct Variable Air Volume (VAV) or Variable Air Volume and Temperature (VVT) applications.

The LN-VAVLF-2, LN-VAVLN-2, and LN-VVTLF-2 controllers are based on LONWORKS® technology for interoperability and peer-to-peer communication between controllers without any intermediary, but also integrate seamlessly into the Metasys® system.



Figure 1: LN-VAVLN Controller

Table 1: Features and Benefits

Feature	Benefit
Configurable Software	Features an LNS plug-in which provides the ability to easily configure inputs, outputs, and sequence options. Configured device complies with LONMARK® Space Comfort Control (SCC) profile for interoperability with other LONMARK devices.
Robust Hardware	Allows you to use any commercially available thermistor type (100 ohms to 100k ohms) and setpoint potentiometer type. Features an extremely accurate onboard airflow sensor for pressure independent single duct VAV applications. The controller can read differential pressure as small as 0.04 milli-inches.
Powerful Control Options	Perform Demand Control Ventilation based on CO ₂ sensor readings to ensure high indoor air quality in an efficient manner. Provides you with the ability to link VAV occupancy status with local lighting control.
Wireless Functionality	Features an optional EnOcean® wireless receiver (LN-WMOD315-0 or LN-WMOD868-0) that you can use with a variety of wireless sensors and switches. The wireless receiver (LN-WMODxxx-0) supports up to 14 wireless inputs, which allow you to create wire-free installations.

VAV/VVT Overview

The LN-VAVLF-2, LN-VAVLN-2, and LN-VVTLF-2 controllers feature expanded Input/Output (I/O) capability with four universal (analog-digital) inputs, four digital outputs, two universal control outputs, and six network outputs that allow you to simultaneously control eight instances of any type of Heating, Ventilating, and Air Conditioning (HVAC) equipment including duct heaters, fans, multi-stage heaters, coolers, analog and floating valve actuators, and lights.

The network outputs are bound to the physical outputs of other controllers on the network. The universal inputs similarly allow for the connection of any HVAC equipment or peripheral. The controller dynamically adapts its sequence of operations based on the connected equipment without any need for user intervention. Spare I/O points on the controller can also be linked to other controllers on the network to allow for efficient control of devices that are close to the LN-VAVLF-2, LN-VAVLN-2 and LN-VVTLF-2.

The LN-VAVLF-2 and LN-VVTLF-2 models have an integrated brushless constant torque actuator which has a longer life expectancy than standard brushed motors. The 16-bit analog-digital converter provides high accuracy input and flow pressure sensor readings and allows for precise VAV balancing.

LNS® LN-Configure Plug-in

Powerful and intuitive LNS plug-ins provide easy customization of hardware I/O, control sequences, and communication schemes.

Easily configure all of the devices' parameters including inputs, outputs, heating and cooling set points, variable air flow, and Proportional plus Integral plus Derivative (PID) control loops. You can also enable and configure built-in features such as load shedding, flow calibration, frost protection, and slave operation mode.

The plug-in provides automatic flow calibration using duct areas, k-factors, or nominal flow. Use two- or three-point calibration to create manual flow calibration.

LNS LN-Monitor Plug-in

The monitoring plug-in is a graphical interface that monitors all device parameters including inputs, outputs, alarms, and device status. You do not need to create any graphic pages, and you can launch it from any Graphical User Interface (GUI) that supports plug-in applications. Graphics dynamically adapt to the configuration of the device as well as the real-time values being monitored. You can use the LN-Monitor plug-in when the LN-VAVLF-2, LN-VAVLN-2, or LN-VVTLF-2 controllers are not connected as part of a larger Metasys network.

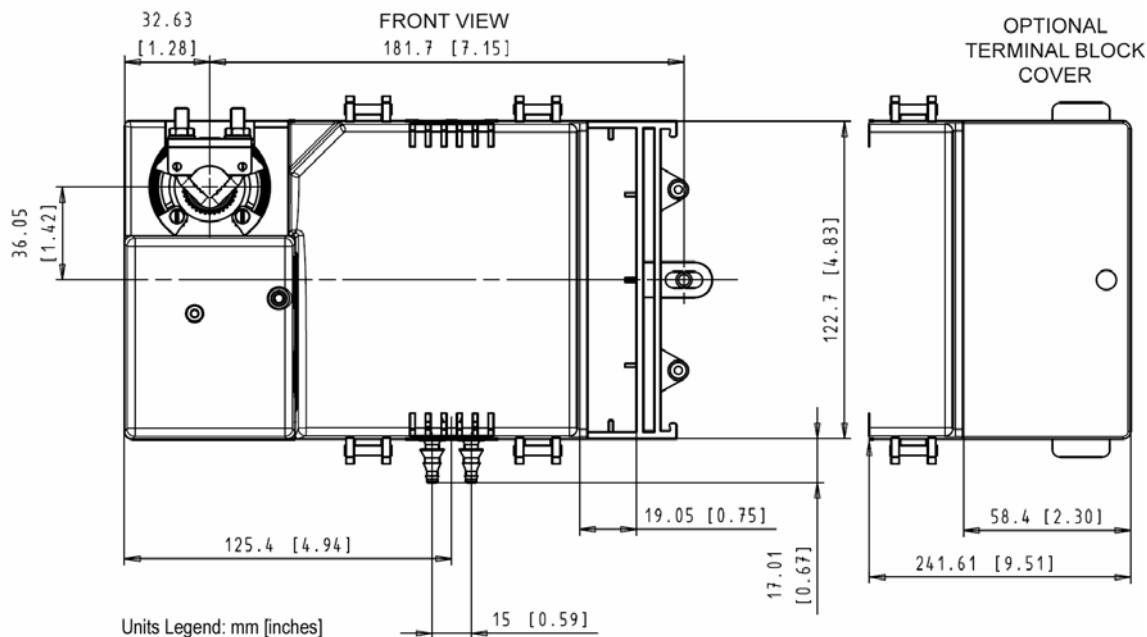


Figure 2: LN VAV/VVT Dimensions, mm (in.)

LONMARK® Objects and Network Variables

Figure 3 shows the LONMARK Objects and Network Variables.

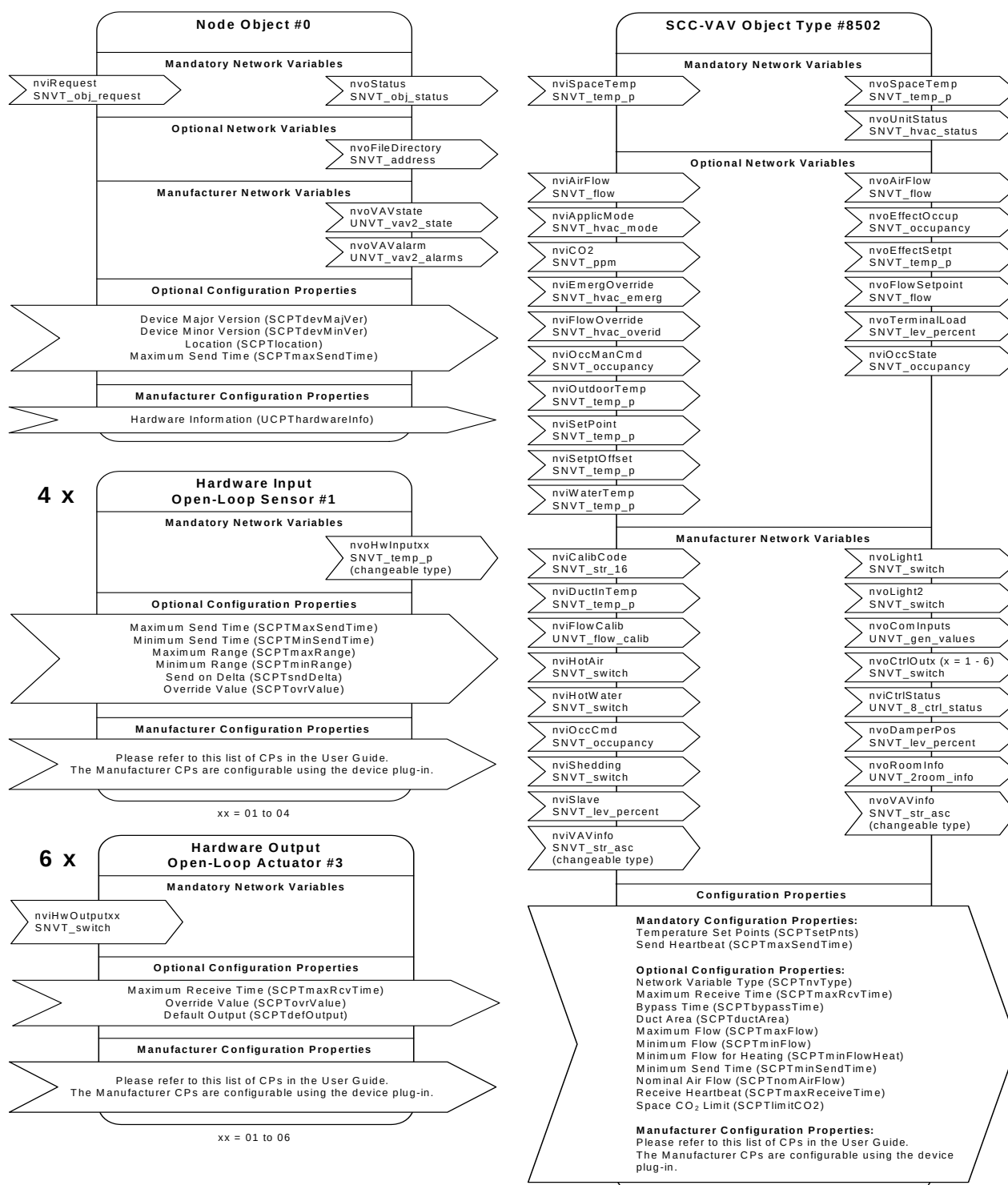


Figure 3: LONMARK Objects and Network Variables--LN-VAVLF-2, LN-VAVLN-2, and LN-VVTLF-2

Selection Chart

Table 2: Selection Chart

Controller Features	LN-VAVLF-2	LN-VVTLF-2	LN-VAVLN-2
Points	10-Point VAV	10-Point VAV	10-Point VAV
Universal Inputs	4	4	4
Ability to Use Spare Inputs	☒	☒	☒
Built-in Flow Sensor (0 to 1 in. W.C)	☒		☒
Wireless Inputs ¹	6	6	0
Digital (triac) Outputs	4	4	4
Universal Outputs	2	2	2
Network Outputs (using NVOs)	6	6	6
Ability to Use Spare Outputs	☒	☒	☒
Built-in Actuator	☒	☒	

1. Available when optional wireless receiver module (LN-WMODxxx-0) is connected to the controller.

Technical Specifications

LN-VAVLF, LN-VAVLN, and LN-VVTLF (Part 1 of 2)

Product Codes	LN-VAVLF-2, LN-VAVLN-2, and LN-VVTLF-2
Power Requirement	Voltage: 24 VAC/DC; +/- 15%, 50/60 Hz, Class 2 Protection: 3 A user-replaceable fuse for triac when using the internal power supply Consumption: 18 VA Maximum Consumption: 70 VA if internal power supply is used
Ambient Storage Conditions	Ambient Operating Temperature: 0 to 50°C, (32 to 122°F) Ambient Storage Temperature: -20 to 50°C, (-4 to 122°F) Ambient Relative Humidity: 0 to 90% noncondensing
General	LONMARK Functional Profile: Space Comfort Controller (SCC) VAV #8502 Processor: Neuron® 3150™, 8 bits, 10 MHz Memory: Nonvolatile Flash 64k (APB application) Media Channel: TP/FT-10; 78 Kbps Communication: LonTalk® protocol LONMARK Interoperability Guidelines: Version 3.4
Enclosure	Material: FR/ABS Resin Dimensions (with screws): LN-VAVLN-2: 4.8 x 5.9 x 2.5 in. (122.7 x 149.1 x 63 mm) LN-VAV-LF-2/LN-VVT-LF-2: 4.8 x 8.4 x 2.5 in. (122.7 x 214.3 x 63 mm) Shipping Weight: LN-VAVLN-2: 0.92 lb (0.42 kg) LN-VAV-LF-2/LN-VVT-LF-2: 2.30 lb (1.05 kg)

LN-VAVLF, LN-VAVLN, and LN-VVTLF (Part 2 of 2)

Inputs	Universal software configurable Input Types: - Digital: Dry Contact - Analog Voltage: 0 to 10 VDC - Analog current: 4 to 20 mA with 249 Ohms external resistor (wired in parallel) - Pulse: Dry contact; 500 milliseconds minimum ON/OFF Resistor Support: - Thermistor: 10k Ohms Type 2, Type 3 (10k Ohms at 25°C [77°F]) - Range: -40° to 153°C (-40° to 302°F) - Platinum: PT1000 (1k ohms at 0°C [32°F]) - Range: -40 to 150°C (-40 to 302°F) - PT100 (100 ohms at 0°C [32°F]) - Range: -40 to 135°C (-40 to 275°F) - Potentiometer: Translation table configurable on several points Input Resolution: 16-bit analog/digital converter Differential: Range 0 to 250 Pa (0 to 1 in. H₂O) Resolution: 0.000162 milli-inches H₂O, Accuracy ±0.3% full scale
Outputs	Digital: 24 VAC Triac, digital (on/off), Pulse Width Modulation (PWM), or floating 0.5 A continuous - PWM control: adjustable period from 2 seconds to 15 minutes - Floating control: requires two consecutive outputs - Minimum pulse on/off: 500 milliseconds - Adjustable drive time period - External or internal power supply (jumper selectable) Digital LED Occupancy: 0 to 10 VDC dedicated output for occupancy sensor LED, Maximum 20 mA Universal: 0 to 10 VDC, digital 0 to 12 VDC (on/off), floating for PWM - PWM control: adjustable period from 2 seconds to 15 minutes - Floating control: requires two consecutive outputs - Minimum pulse on/off: 500 milliseconds - Adjustable drive time period 20 mA maximum at 12 VDC - Minimum load resistance 600 ohms Output Resolution: 10-bit digital/analog converter
Damper Actuator (LN-VAVLF-2 and LV-VVTLF-2 Models Only)	Torque: 35 in-lb, 4 N-m Angle of Rotation: 95° adjustable Fits Shaft Diameter: 5/16 to 3/4 in. (8.5 to 18.2 mm) Power Supply: from controller
Agency	UL Listed: UL916 Energy management equipment Material: UL94-5VA¹
Electromagnetic Compatibility	CE Emission: EN61000-6-3: 2007; Generic standards for residential, commercial, and light-industrial environments. CE Immunity: EN61000-6-1: 2007; Generic standards for residential, commercial, and light-industrial environments.
Wireless²	Communication: EnOcean® Wireless standard Number of Wireless Inputs³: 14 (some sensors may require more than one wireless input) Supported Wireless Receivers: Wireless Receiver 315 (LN-WMOD315-0) and Wireless Receiver 868 (LN-WMOD868-0) Cable: Connector: 4P4C modular jack, Length: 3 ft (0.91 m)

1. All materials and manufacturing processes comply with the RoHS directive and are marked according to the Waste Electrical and Electronic Equipment (WEEE) directive.

2. Available when an optional external Wireless Receiver is connected to the controller. Some wireless inputs may use more than one wireless input from the controller.
3. Some wireless sensors may use more than one wireless input from the controller.

The performance specifications are nominal and conform to acceptable industry standard. For application at conditions beyond these specifications, consult the local Johnson Controls® office. Johnson Controls, Inc. shall not be liable for damages resulting from misapplication or misuse of its products.

United States Emissions Compliance

This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when this equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his/her own expense.

Canadian Emissions Compliance

This Class (A) digital apparatus meets all the requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la Classe (A) respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.



Building Efficiency

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