



ECL-VAVS



Overview

The ECL-VAVS controllers are microprocessor-based programmable variable air volume (VAV) controllers designed to control cooling only and cooling with reheat single duct variable air volume boxes.

Each controller uses the LonTalk® communication protocol and is LONMARK certified as an SCC VAV.



Applications

- Cooling Only VAV Boxes
- Cooling with Reheat VAV Boxes
- Room Pressurization

Features and 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.

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.

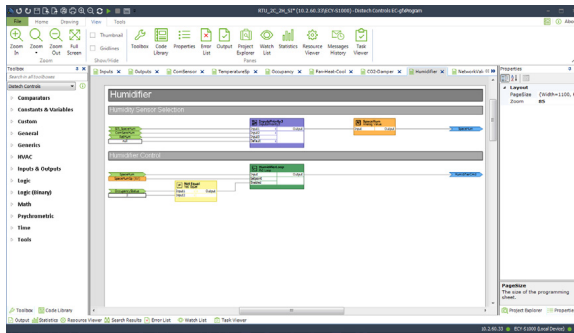
Preloaded Applications

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-View sensor even before the network has been installed for rapid deployment or through the EC-Net™ solution using Distech Controls' *dcgfx* Applications.

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 optional Allure sensors:

- 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 air flow 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 ± 2 inches of water column (± 500 Pascal) and is polarity free.

Built-in Actuator

A 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.

The built-in actuator for precise damper positioning used for loads requiring up to 45 inch-pounds (5 Newton-meters) of torque.

Robust Hardware Design

This Controller features durable pitot terminal bars which help prevent damage when connecting and disconnecting the pitot tubes. The anchor point and mounting bracket are metallic, making the mounting of the VAV very solid.

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-View 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. This sensor can also be expanded with a combination of up to 4 add-on push button modules for lighting and shade/ sunblind control.
- 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 Selection

Model	ECL-VAVS
Points	9-Point VAV
Universal Hardware Inputs	3
Built-in flow sensor ($\pm 500\text{Pa}$, $\pm 2.0''$ w.c.)	■
Wireless inputs ¹	18
Digital (triac) outputs	3
Universal Outputs	1
Integrated damper actuator (45 in-lb, 5 Nm)	■
Allure™ Series Communicating Sensors ²	4

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

2. 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.

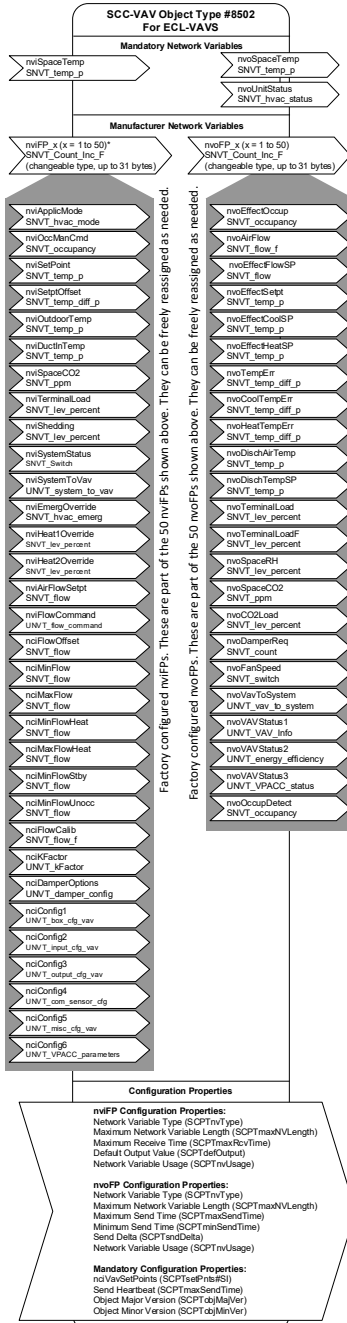
Accessories

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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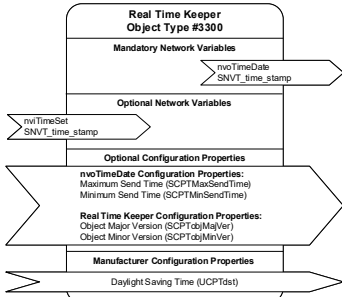
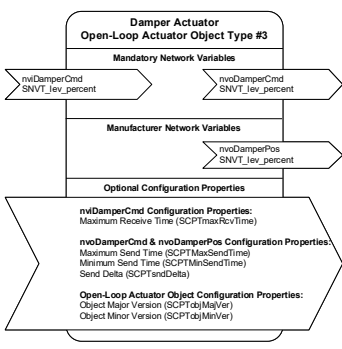
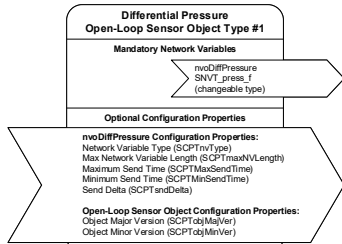
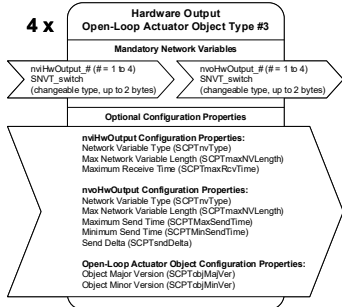
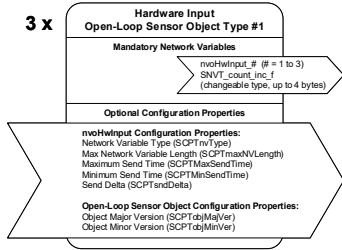
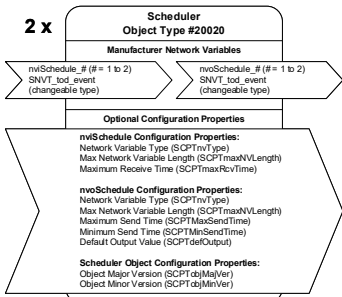
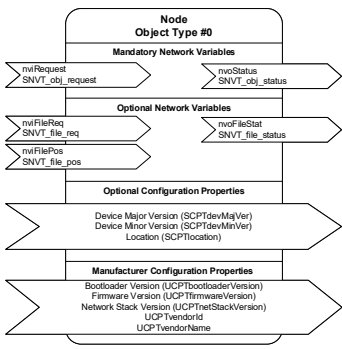
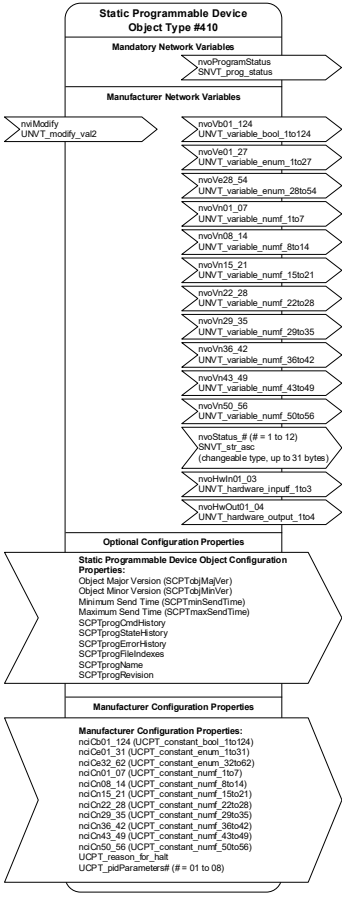
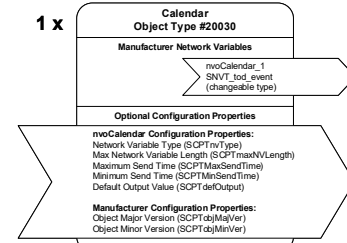
Objects List

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	166
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 ¹	24VAC/DC; ±15%; Class 2
Frequency Range	50/60Hz
Overcurrent Protection	Field replaceable fuse
Fuse Type	3.0A
Power Consumption	4 VA typical plus all external loads ² , 75 VA max. (including powered triac outputs)

1. 24VDC does not support DO (triac outputs).

2. 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

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

Subnetwork¹

Communication	RS-485
Cable	Cat 5e, 8 conductor twisted pair
Connector	RJ-45
Connection Topology	Daisy-chain Configuration
Maximum number of supported room devices per controller	4

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 Inputs ²	_____	18
Supported Wireless Receivers	_____	Refer to the Open-to-Wireless Solution Guide
Cable	_____	Telephone cord
<input type="checkbox"/> Connector	_____	4P4C modular jack
<input type="checkbox"/> 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.

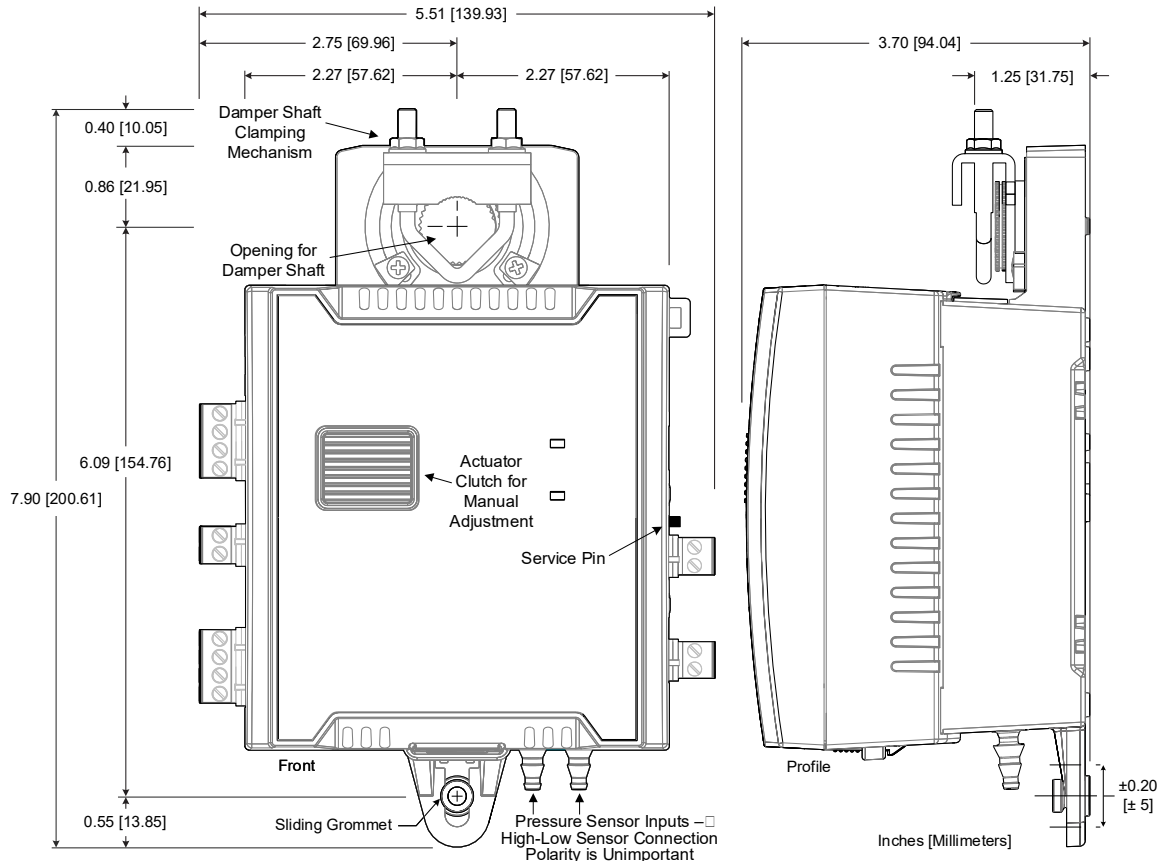
Integrated Damper Actuator

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

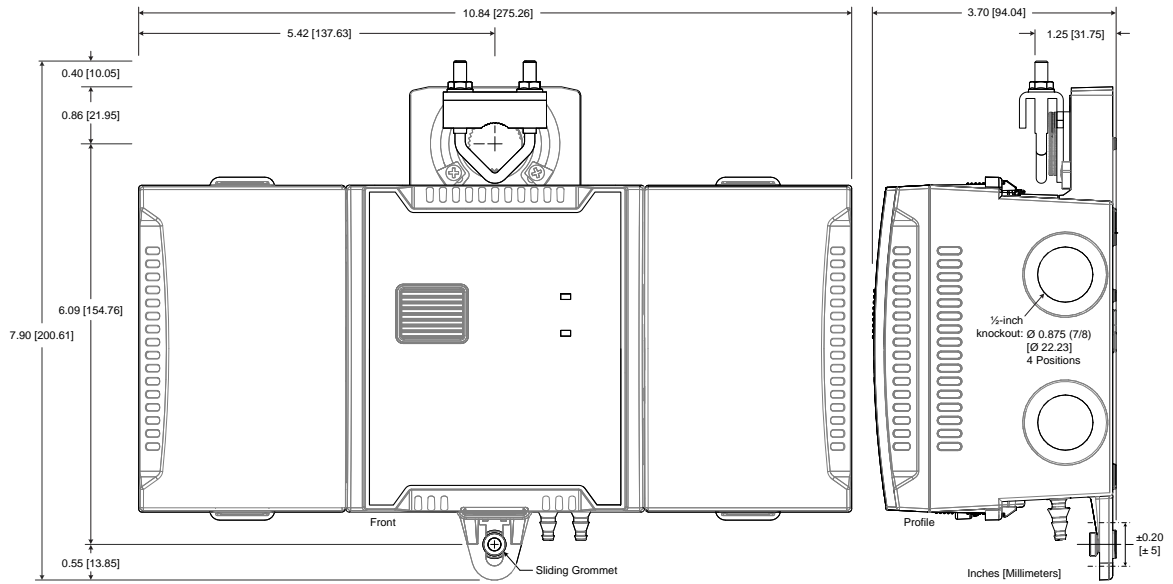
Mechanical

Dimensions:

- Without Terminal covers (H x W x D) _____ 7.90 x 5.51 x 3.70" (200.61 x 139.93 x 94.04 mm)



- With Terminal covers (H x W x D) _____ 7.90 x 10.84 x 3.70" (200.61 x 275.26 x 94.04 mm)



Shipping weight:

- Controller _____ 1.35lbs (0.61 kg)
- Terminal Cover (one side, bulk packaged) _____ 0.30lbs (0.14 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 to 122°F (0 to 50°C)

Storage Temperature _____ -4 to 122°F (-20 to 50°C)

Relative Humidity _____ 0 to 90% non-condensing

Ingress Protection Rating _____ IP20

Nema Rating _____ 1

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

CEC Appliance Database _____ Appliance Efficiency Program¹

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



Specifications – 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)

Specifications - Universal Inputs (UI)

General

Input Type	Universal; software configurable
Input Resolution	12-bit analog / digital converter

Contact

Type	Dry contact
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Counter

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

0 to 10VDC

Range	0 to 10VDC (40kΩ input impedance)
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0 to 20mA

Range	0 to 20mA
	165Ω external resistor wired in parallel

Resistance/Thermistor

Range	0 to 350 KΩ
Supported Thermistor Types	10KΩ Type 2, 3 (10KΩ @ 77°F; 25°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 10 mA at 12VDC or 20 mA at 11VDC

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)

Sink Current ————— Maximum 2.5mA at 1 VDC (minimum load resistance 4K 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 ————— Internal power supply

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 ————— Internal power supply

Specifications subject to change without notice.

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