

# VMA16 Variable Air Volume Controller Series

## Description

The Variable Air Volume (VAV) Modular Assembly (VMA) 16 controllers are programmable digital controllers that communicate via BACnet® Master-Slave/Token-Passing (MS/TP) Protocol. Both the VMA1610 and VMA1620 controllers have a pressure sensor and actuator in a pre-wired unit. The VMA16 controllers connect easily to the NS Series Network Sensors for zone and discharge air temperature sensing.

The VMA16 controllers can be configured for both single-duct and dual-duct VAV applications. The VMA1610 and VMA1620 controllers require an additional damper actuator and Differential Pressure Transducer (DPT) sensor for dual-duct or supply/exhaust applications.

Refer to the *Metasys® System Field Equipment Controllers and Related Products Product Bulletin (LIT-12011042)* for important product application information.

## Features

- BACnet MS/TP protocol communication — provides open system compatibility.
- Writable flash memory — allows standard or customized applications to be downloaded from the Controller Configuration Tool (CCT).
- Integrated pressure sensor and actuator — reduces installation time.
- Wireless capabilities via ZFR1800 Series Wireless Field Bus System enable wireless mesh connectivity between VMA16s to WRZ Series Wireless Room Temperature Sensors, and to Network Automation Engine (NAE) and Network Control Engine (NCE) devices — facilitate easy initial location and relocation.
- The fast response actuator — drives the damper from full open to full closed (90°) in 60 seconds to reduce commissioning time.
- Point capacity can be expanded by adding Input/Output Modules (IOMs) to the Sensor Actuator bus — providing further application flexibility.
- Patented proportional adaptive control (P-Adaptive) and Pattern Recognition Adaptive Control (PRAC) technologies — provide continuous loop tuning.



VMA16 Controller

## Repair Information

If the VMA16 controller fails to operate within its specifications, replace the unit. For a replacement VMA, contact the nearest Johnson Controls® representative.

## Selection Charts

### VMA Series Point Type Counts per Model

Point Types	Signals Accepted	VMA1610	VMA1620
Universal Input (UI)	Analog Input, Voltage Mode, 0–10 VDC Analog Input, Resistive Mode, 0–2k ohm, RTD (1k NI [Johnson Controls], 1k PT, A99B SI), NTC (10k Type L, 2.252k Type 2) Binary Input, Dry Contact Maintained Mode	1	1
Binary Output (BO)	24 VAC Triac	0	3
Configurable Output (CO)	Analog Output, Voltage Mode, 0–10 VDC Binary Output Mode, 24 VAC Triac	0	2
Integrated Actuator	Internal	1	1
Integrated Flow Sensor	Internal	1	1
Zone Sensor Input	On SA Bus	up to 4 NS Series Network Zone sensors up to 9 WRZ wireless zone sensors	
Discharge Air Sensor Input	On SA Bus	up to 5 discharge air sensors	

### Ordering Information

Product Code Number	Description
MS-VMA1610-0	Integrated VAV Controller/Actuator/Pressure Sensor (Cooling only), FC Bus, and SA Bus
MS-VMA1620-0	Integrated VAV Controller/Actuator/Pressure Sensor (with Reheat and Fan Control), FC Bus, and SA Bus

### Ordering Information for UL Listed, File S4977, UUKL 864 - 9th Edition, Smoke Control Equipment

Product Code Number <sup>1</sup>	Description
MS-VMA1610-0U	Integrated VAV Controller/Actuator/Pressure Sensor (Cooling only), FC Bus, and SA Bus
MS-VMA1620-0U	Integrated VAV Controller/Actuator/Pressure Sensor (with Reheat and Fan Control), FC Bus, and SA Bus

1. These devices are UL Listed, File S4977, UUKL 864 - 9th Edition, Smoke Control Equipment.

## VMA16 Variable Air Volume Controller Series (Continued)


### Accessories (Order Separately)

Product Code Number	Description
Y64T15-0	Transformer, 120/208/240 VAC Primary to 24 VAC Secondary, 92 VA, Foot Mount, 30 in. Primary Leads and 30 in. Secondary Leads, Class 2
Y65A13-0	Transformer, 120 VAC Primary to 24 VAC Secondary, 40 VA, Foot Mount (Y65AS), 8 in. Primary Leads and 30 in. Secondary Leads, Class 2
Y65T42-0	Transformer, 120/208/240 VAC Primary to 24 VAC Secondary, 40 VA, Hub Mount (Y65SP+), 8 in. Primary Leads and Secondary Screw Terminals, Class 2
Y65T31-0	Transformer, 120/208/240 VAC Primary to 24 VAC Secondary, 40 VA, Foot Mount (Y65AR+), 8 in. Primary Leads and Secondary Screw Terminals, Class 2
AP-TBK1002-0	2-Position Screw Terminal that Plugs onto VMA output point Spade Lugs
AP-TBK1003-0	3-Position Screw Terminal that Plugs onto VMA output point Spade Lugs
AP-TBK4SA-0	Replacement MS/TP SA Bus Terminal, 4-Position Connector, Brown, Bulk Pack
AP-TBK4FC-0	Replacement MS/TP FC Bus Terminal, 4-Position Connector, Blue, Bulk Pack
AP-TBK3PW-0	Replacement Power Terminal, 3-Position Connector, Gray, Bulk Pack
MS-BTCVT-1	Wireless Commissioning Converter, with Bluetooth® technology
MS-BTCVTCBL-700	Cable replacement Set for the MS-BTCVT-1 or the NS-ATV7003-0; includes one 5 ft (1.5 m) retractable cable.
MS-ZFR1810-0	Wireless Field Bus Coordinator, 10 mW Transmission Power. Functions with NAE35xx, NAE45xx, NAE55xx, and NCE25xx Models.
MS-ZFR1811-0	Wireless Field Bus Router, 10 mW Transmission Power. Functions with Metasys BACnet FECs, VMA1600s, and WRZ-TTx Series Wireless Mesh Room Temperature Sensors.
MS-ZFRCBL-0	Wire Harness for use with ZFR1811 Router. Allows ZFR1811 Router to function with FEC1620; and with FEC1610, VMA1610, or VMA1620 controllers in conjunction with NS Series Sensors, Wireless Commissioning Converter, or DIS1710 Local Controller Display.

### Technical Specifications

VMA Series	
Product Code Numbers	<b>MS-VMA1610-0:</b> Cooling Only <b>MS-VMA1620-0:</b> Cooling with Reheat and Fan Control
Supply Voltage	24 VAC (nominal, 20 VAC minimum/30 VAC maximum), 50/60 Hz, power supply Class 2 (North America), Safety Extra-Low Voltage (SELV) (Europe)
Power Consumption	10 VA typical, 14 VA maximum Note: VA rating does not include any power supplied to the peripheral devices connected to Binary Outputs (BOs) or Configurable Outputs (COs), which can consume up to 12 VA for each BO or CO for a possible total consumption of an additional 60 VA (maximum).
Ambient Conditions	<b>Operating:</b> 0 to 50°C (32 to 122°F) <b>Storage:</b> -40 to 70°C (-40 to 158°F)
Terminations	Inputs/Outputs: 6.3 mm (1/4 in.) spade lugs FC Bus, SA Bus, and Supply Power: 4-Wire and 3-Wire Pluggable Screw Terminal Blocks Sensor Port: RJ-12 6-Pin Modular Jacks
Controller Addressing	DIP switch set; valid field controller device addresses 4–127 (Device addresses 0–3 and 125–255 are reserved and not valid field controller addresses.)
Communications Bus	BACnet MS/TP, RS-485: 3-wire FC Bus between the supervisory controller and field controllers 4-wire SA Bus from the VMA controller, network sensors, and other sensor/actuator devices, includes a terminal to source 15 VDC supply power from VMA to SA Bus devices. <sup>1</sup>
Analog Input/Analog Output Resolution and Accuracy	<b>Analog Input:</b> 15-bit resolution <b>Analog Output:</b> 16-bit resolution and ±200 mV in 0-10 VDC applications
Air Pressure Differential Sensor	Setra transducer, differential pressure to electrical, 0 to 38.1 mm (0 to 1.5 in) WC, 0.5 to 4.5 VDC, 5 VDC supply, aluminum plated. <b>Performance Characteristics:</b> Combined Repeatability and Hysteresis Error: ±0.05% of Full Span Maximum Non-linearity Errors (Best Fit Method): ±1.0% of Full Span Maximum Response Time (to within 63% of Full Scale Pressure with Step Change on Input): 15 ms Temperature Error from 15.6 to 48.9°C (60 to 120°F) Null: ±0.06% of Full Span per °F Maximum Span: ±1.5% of Full Span Maximum Stability, Null: ±0.5% of Full Scale Maximum, 1 Year Minimum Stability, Span: ±2.0% of Full Scale Maximum, 1 Year Minimum
Mounting	Mounts to damper shaft using single set screw, and to duct with single mounting screw.
Actuator Rating	4 N-m (35 lb-in) minimum shaft length = 44 mm (1-3/4 in.)
Dimensions	<b>(Height x Width x Depth):</b> 182 x 182 x 64 mm (7-3/16 x 7-3/16 x 2-1/2 in.) <b>Center of Output Hub to Center of Anti-rotation Slot:</b> 160 mm (6-5/16 in.)
Weight	0.86 kg (1.9 lb)

## VMA16 Variable Air Volume Controller Series (Continued)

VMA Series	
	<b>United States:</b> UL Listed, File E107041, CCN PAZX, UL 916, Energy Management Equipment; UL Listed, File S4977, UUKL 864 - 9th Edition, Smoke Control Equipment (MS-VMA1610-0U, MS-VMA1620-0U only); FCC Compliant to CFR47, Part 15, Subpart B, Class A
	<b>Canada:</b> UL Listed, File E107041, CCN PAZX7, CAN/CSA C22.2 No. 205, Signal Equipment; Industry Canada Compliant, ICES-003
	<b>Europe:</b> CE Mark – Johnson Controls, Inc., declares that the VMA16 Variable Air Volume Controllers are in compliance with the essential requirements and other relevant provisions of the EMC Directive 2004/108/EC, and the Low Voltage Directive 2006/95/EC.
	<b>Australia and New Zealand:</b> C-Tick Mark, Australia/NZ Emissions Compliant.
	<b>BACnet International:</b> BACnet Testing Laboratories (BTL) 135-2004 Listed BACnet Application Specific Controller (B-ASC)

1. For more information, refer to the *MS/TP Communications Bus Technical Bulletin (LIT-12011034)*.