

# VMA16 VAV Modular Assembly Controller Series Catalog

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VMA16 VAV Modular Assembly controllers are programmable BACnet® Advanced Application Controllers (B-AACs) with RS-485 Master-Slave/Token Passing (MS/TP) communications. VMA controllers feature an integral 4N m damper actuator and Differential Pressure Transducer (DPT) with models for cooling only or cooling with reheat applications. VMA16 controllers integrate into the Web-based Metasys® system.

The differential pressure sensor in the VMA16 controllers provides consistent flow readings with minimal drift and requires minimal auto-zero calibration. There are no filters to change, which helps to ensure very close tolerance to published accuracy.

The VMA16 controllers can be configured single-duct, dual-duct, and supply/exhaust applications. Note that some of these applications may require an additional actuator and DPT.

VMA16 controllers support NS and WRZ series communications network sensors for temperature sensing, fan override, and occupancy override control.

All VMA16 series controllers support wireless communications using the ZigBee™ ZFR1800 Series Wireless Field Bus System series accessories.

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

### Features

- BACnet® MS/TP communication protocol provides open system compatibility.
- A 32-bit microprocessor ensures optimum performance and meets industry specifications.
- Universal and configurable inputs and outputs support multiple signal options and increase controller application flexibility.
- BACnet Automatic Discovery support enables easy controller integration into Metasys Building Automation System (BAS).
- Integral End-of-Line (EOL) switch to enable field controller as a terminating device on the communications bus.
- Pluggable communications bus and supply power terminal blocks expedite installation and troubleshooting.
- Wireless capabilities via ZFR1800 Series Wireless Field Bus System enable ZigBee wireless mesh connectivity between VMA16s to WRZ Series Wireless Room Temperature Sensors, and to NAE/NCE devices facilitate easy initial location and relocation.

### Selection Charts

Table 1: VMA Series Features and 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, A998 SI), NTC (10k Type L, 2.252k Type 2) Binary Input, Dry Contact Maintained Mode	1	1
Binary Output (BO)	24 VAC Triac Binary Output Mode, 24 VAC Triac		3
Configurable Output (CO)	Analog Output, Voltage Mode, 0–10 VDC Binary Output Mode, 24 VAC Triac		2

- Patented proportional adaptive control (P-Adaptive) and Pattern Recognition Adaptive Control (PRAC) technologies provide continuous loop tuning.
- Writable flash memory allows standard or customized applications to be downloaded from the Controller Configuration Tool (CCT) and enables persistent application data.
- Large product family provides a wide range of point mixes to meet application requirements and allows for the addition of one or more Input/Output Module (IOM)s and/or Network Sensors to provide even more application capacity.
- Integrated pressure sensor and actuator reduces installation time.
- 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.

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

Figure 1: VMA16 Controller

**Table 1: VMA Series Features and Point Type Counts per Model**

Point Types	Signals Accepted	VMA1610	VMA1620
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	

**Table 2: VMA16 Ordering Information**

Product Code Number	Description
MS-VMA1610-x	1-Point Variable-Air-Volume Modular Assembly with Integrated VAV Controller, Actuator and Pressure Sensor; 1 UI; 24 VAC; FC and SA Bus Support (Cooling only)
MS-VMA1620-x	6-Point Variable-Air-Volume Modular Assembly with Integrated VAV Controller, Actuator, and Pressure Sensor; 1 UI, 3 BO, and 2 CO; 24 VAC; FC Bus, and SA Bus (with Reheat and Fan Control)

**Table 3: VMA16 Series for Smoke Control Ordering Information**

Product Code Number <sup>1</sup>	Description
MS-VMA1610-0U	1-Point Variable-Air-Volume Modular Assembly with Integrated VAV Controller, Actuator and Pressure Sensor; 1 UI; 24 VAC; FC and SA Bus Support (Cooling only)
MS-VMA1620-0U	6-Point Variable-Air-Volume Modular Assembly with Integrated VAV Controller, Actuator, and Pressure Sensor; 1 UI, 3 BO, and 2 CO; 24 VAC; FC Bus, and SA Bus (with Reheat and Fan Control)

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

**Accessories (Order Separately)**


Product Code Number	Description
MS-DIS1710-0	Local Controller Display: Refer to <i>Local Controller Display Product Bulletin (LIT-12011273)</i> for more information.
MS-BTCVT-1	Wireless Commissioning Converter, with Bluetooth® technology
LP-KIT204-000C	BACnet IP to MS/TP router for connecting a computer with CCT to MS/TP field controllers.
MS-ZFR1811-0	Wireless Field Bus Router, 10 mW Transmission Power. Functions with Metasys BACnet FECs, VMA16s, 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.
MS-BTCVTCBL-700	Cable replacement Set for the MS-BTCVT-1 or the NS-ATV7003-0; includes ones 5 ft (1.5 m) retractable cable
WRZ Series Sensors	WRZ Series Wireless Room Sensors: Refer to the <i>WRZ Series Wireless Room Sensors Product Bulletin (LIT-12011653)</i> for specific sensor model descriptions.
NS Series Sensors	NS Series Network Sensors: Refer to the <i>NS Series Network Sensors Product Bulletin (LIT-12011574)</i> for specific sensor model descriptions.
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-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

## Technical Specifications

**Table 4: VMA16 Series**

<b>Product Code Numbers</b>	<b>MS-VMA1610-x:</b> 1-Point VMA (Cooling Only) <b>MS-VMA1620-x:</b> 6-Point VMA (Cooling with Reheat and Fan Control)
<b>Supply Voltage</b>	24 VAC (nominal, 20 VAC minimum/30 VAC maximum), 50/60 Hz, power supply Class 2 (North America), Safety Extra-Low Voltage (SELV) (Europe)
<b>Power Consumption</b>	10 VA typical, 14 VA maximum <b>Note:</b> 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).
<b>Ambient Conditions</b>	<b>Operating:</b> 0 to 50°C (32 to 122°F) <b>Storage:</b> -40 to 70°C (-40 to 158°F)
<b>Terminations</b>	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
<b>Controller Addressing</b>	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.)
<b>Communications Bus<sup>1</sup></b>	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.
<b>Input and Output Capabilities</b>	<b>VMA1610:</b> 1 - Universal Input: Defined as 0–10 VDC, 4–20 mA, 0–600k ohm, or Binary Dry Contact <b>VMA1620:</b> 1 - Universal Inputs: Defined as 0–10 VDC, 4–20 mA, 0–600k ohm, or Binary Dry Contact 3 - Binary Outputs: Defined as 24 VAC Triac (internal power source) 2 - Configurable Outputs: Defined as 0–10 VDC or 24 VAC Triac BO
<b>Analog Input/Analog Output Resolution and Accuracy</b>	<b>Analog Input:</b> 15-bit resolution <b>Analog Output:</b> 16-bit resolution and ±200 mV in 0-10 VDC applications
<b>Air Pressure Differential Sensor</b>	Setra transducer, differential pressure to electrical, 0 to 0.375 kPa (0 to 1.5 in. WC) , 0.5 to 4.5 VDC output, 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
<b>Mounting</b>	Mounts to damper shaft using single set screw, and to duct with single mounting screw.
<b>Actuator Rating</b>	4 N m (35 lb in.) minimum shaft length = 44 mm (1-3/4 in.)
<b>Dimensions</b>	<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.) <b>Note:</b> Mounting space for all field controllers requires an additional 50 mm (2 in.) space on top, bottom, and front face of controller for easy cover removal, ventilation, and wire terminations.
<b>Weight</b>	0.86 kg (1.9 lb)

**Table 4: VMA16 Series**

	<p><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-VMA 1620-0U only); FCC Compliant to CFR47, Part 15, Subpart B, Class A</p>
	<p><b>Canada:</b> UL Listed, File E107041, CCN PAZX7, CAN/CSA C22.2 No. 205, Signal Equipment; Industry Canada Compliant, ICES-003</p>
	<p><b>Europe:</b> CE Mark – Johnson Controls, Inc., declares that this product is 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.</p>
	<p><b>Australia and New Zealand:</b> C-Tick Mark, Australia/NZ Emissions Compliant</p>
	<p><b>BACnet International:</b> BACnet Testing Laboratories™ (BTL) 135-2004 Listed BACnet Application Specific Controller (B-ASC)</p>

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



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