

# VMA1615, VMA1617, VMA1630, and VMA1632 VAV Controllers Catalog Page

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VMA16s (32-bit) are programmable digital controllers tailored for VAV applications that communicate via the BACnet Master-Slave/Token-Passing (MS/TP) protocol. The VMA16 (32-bit) controllers feature an integral digital pressure sensor, an integral damper actuator, and a 32-bit microprocessor. The controllers' small package size facilitates quick field installation and efficient use of space, while not compromising high-tech control performance. The VMA16 (32-bit) controllers connect easily to the NS Series Network Sensors for zone and discharge air temperature sensing.

These features make the VMA16 (32-bit) the product of choice for VAV systems. The wide variety of network sensor models provides options for measuring and displaying zone temperature, occupancy detection, duct temperature, zone humidity and dewpoint determination, carbon dioxide (CO<sub>2</sub>) level, setpoint adjustments, VAV box fan speed control, and discharge air temperatures.

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

## Features

- Standard BACnet® Protocol - Provides interoperability with other Building Automation System (BAS) products that use the widely accepted BACnet standard.
- Standard Hardware and Software Platform - Uses a common hardware design throughout the family line to support standardized wiring practices and installation workflows. Also uses a common software design to support use of a single tool for control applications, commissioning, and troubleshooting to minimize technical training.
- ZigBee™ Wireless Field Controller (FC)/Sensor/Actuator (SA) Bus Interface - Provides a wireless alternative to hard-wired Metasys® system counterparts, providing application flexibility and mobility with minimal disruption to building occupants.
- Bluetooth® Wireless Commissioning Interface - Provides an easy-to-use connection to the configuration and commissioning tool.
- Auto Tuned Control Loops - Reduce commissioning time, eliminate change-of-season re-commissioning, and reduce wear and tear on mechanical devices.
- Universal Inputs, Configurable Outputs, and Point Expansion Modules - Allow multiple signal options to provide input/output flexibility.
- Optional Local User Interface Display - Allows convenient monitoring and adjusting capabilities at the local device.
- BACnet Testing Laboratories™ (BTL) Listing - Ensures interoperability with other BTL-listed devices. BTL is a third-party agency which validates that BAS vendor products meet the BACnet industry-standard protocol.
- 32-bit microprocessor ensures optimum performance and meets industry specifications.
- BACnet Automatic Discovery support enables easy controller integration into Metasys BAS.
- Integral End-of-Line (EOL) switch enables 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 a ZFR1800 Series Wireless Field Bus System enable wireless mesh connectivity between Metasys field controllers to WRZ Series Wireless Room Temperature Sensors and to supervisory controllers, facilitating easy initial location and relocation.
- 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 mix to meet application requirements and allows the addition of one or more Input/Output Module (IOM)s and/or Network Sensors to provide even more I/O capacity.
- a state-of-the-art digital non-flow pressure sensor to provide 14-bit resolution with bidirectional flow operation that supports automatic correction for polarity on high- and low-pressure DP tube connections; this pressure sensor eliminates high- and low-pressure connection mistakes
- two additional Universal Inputs that provide more low-cost sensor options
- a 33 percent smaller package than the VMA16s (16-bit)
- the phone jack-style connector on the FC Bus and SA Bus of the VMA1615 and VMA1630 to support quick connection to the BTCVT Wireless Commissioning Converter, ZFR1811 wireless router, and network sensors
- a fast response actuator that drives the damper from full open to full closed (90°) in 60 seconds to reduce commissioning time

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

Figure 1: VMA1630 Controller



**Table 1: VMA16 (32-bit) Series Point Type Counts per Model**

Point Types	Signals Accepted	VMA1615	VMA1630	VMA1617	VMA1632
Modular Jacks		6-pin SA Bus with four communicating sensors and 6-pin FC Bus for tool support		8-pin SA Bus supports analog non-communicating sensor	
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	3	3	3	3
Binary Output (BO)	24 VAC Triac	2	3	2	3
Configurable Output (CO)	Analog Output, Voltage Mode, 0–10 VDC  Binary Output Mode, 24 VAC Triac		2		2
Integrated Actuator	Internal	1	1	1	1
Integrated Flow Sensor	Internal	1	1	1	1
Zone Sensor Input	On SA Bus <sup>1</sup>	Up to 4 NS Series Network Zone Sensors  Up to 9 WRZ sensors when using the ZFR1811 wireless router configuration and up to 5 WRZ sensors when using the one-to-one WRZ-78xx wireless configuration			

<sup>1</sup> A total of 10 MS/TP master addresses (IOMs), not including sensor addresses (MS/TP slaves), can be used in a single VMA controller.

**Table 2: VMA16 (32-bit) Series Ordering Information**

Product Code Number	Description
MS-VMA1615-0	32-bit, Integrated VAV Controller/Actuator/Pressure Sensor, 3 UI and 2 BO; 24 VAC; Field Controller (FC) Bus, and Sensor/Actuator (SA) Bus
MS-VMA1630-0	32-bit, Integrated VAV Controller/Actuator/Pressure Sensor, 3 UI, 3 BO, and 2 CO; 24 VAC; FC Bus, and SA Bus
MS-VMA1617-0 <sup>1</sup>	Same description as VMA1615, but includes 8-pin TSTAT Port for use with TE-7xx Series Non-Communicating Sensors
MS-VMA1632-0 <sup>1</sup>	Same description as VMA1630, but includes 8-pin TSTAT Port for use with TE-7xx Series Non-Communicating Sensors

<sup>1</sup> This model is currently available only in Asia; contact your local Johnson Controls representative for more information.

**Accessories**

**Table 3: VMA16 (32-bit) Accessories**

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
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, VMA16s, and WRZ-TTx Series Wireless Mesh Room Temperature Sensors
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
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-TBK1002-0	2-Position Screw Terminal that Plugs onto VMA Output Point Spade Lug
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

**Table 3: VMA16 (32-bit) Accessories**

Product Code Number	Description
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
AP-TBK2PW-0	Replacement Power Terminal, 2-Position Connector, Gray, Bulk Pack
MS-VMAACT-701	VMA Actuator Assembly Gearbox Replacement Kit (Canada Only)
NS-WALLPLATE-0	Network Sensor Wall Plate
TL-BRTRP-0	Portable BACnet IP to MS/TP Router
WRZ-7860-0	Many-to-One ZigBee Wireless Receiver for Wireless Sensor Only Applications
WRZ-SST-100	Wireless Sensing System Tool Kit
ZFR-USBHA-0	USB dongle with ZigBee driver to provide a wireless connection through CCT to allow wireless commissioning of the wirelessly enabled FEC, FAC, IOM, and VMA16 controllers. The dongle is used with the ZFR Checkout Tool to troubleshoot and validate ZFR wireless meshes using a laptop computer. <sup>1</sup>

**Technical Specifications**

**Table 4: VMA16 (32-bit) Series**

<b>Product Code Numbers</b>	<p><b>MS-VMA1615-0:</b> 32-bit, Integrated VAV Controller/Actuator/Pressure Sensor, 3 UI and 2 BO; 24 VAC; FC and SA Bus</p> <p><b>MS-VMA1630-0:</b> 32-bit, Integrated VAV Controller/Actuator/Pressure Sensor, 3 UI, 3 BO, 2CO; 24 VAC; FC and SA Bus</p> <p><b>MS-VMA1617-0<sup>1</sup>:</b> Same description as VMA1615 but includes 8-pin TSTAT Port for use with TE-7xx Series Non-Communicating Sensors</p> <p><b>MS-VMA1632-0<sup>1</sup>:</b> Same description as VMA1630 but includes 8-pin TSTAT Port for use with TE-7xx Series Non-Communicating Sensor</p>
<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 ratings do 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>	<p><b>Operating:</b> 0 to 50°C (32 to 122°F)</p> <p><b>Storage:</b> -40 to 70°C (-40 to 158°F)</p>
<b>Terminations</b>	<p><b>VMA1615 and VMA1630:</b></p> <p>Inputs/Outputs: 6.3 mm (1/4 in.) Spade Lugs</p> <p>FC Bus, SA Bus, and Supply Power: 4-Wire and 2-Wire Pluggable Screw Terminal Blocks</p> <p>FC and SA Bus Modular Ports: RJ-12 6-Pin Modular Jacks</p> <p><b>VMA1617 and VMA1632:</b></p> <p>Inputs/Outputs, SA Bus, and Supply Power: 6.3 mm (1/4 in.) Spade Lugs</p> <p>FC Bus Pluggable Screw Terminal Block</p> <p>TSTAT Modular Port: RJ-45 8-Pin Modular Jack</p>
<b>Controller Addressing</b>	DIP switch set; valid field controller device addresses 4–127 (Device addresses 0–3 and 128–255 are reserved and not valid field controller addresses.)
<b>Communications Bus<sup>2</sup></b>	<p>BACnet MS/TP, RS-485:</p> <p>3-wire FC Bus between the supervisory controller and field controllers</p> <p>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.</p>
<b>Processor</b>	RX630 32-bit Renesas® microcontroller
<b>Memory</b>	1 MB Flash Memory and 512 KB Random Access Memory (RAM)
<b>Input and Output Capabilities</b>	<p>1 - Universal Input: Defined as 0–10 VDC, 4–20 mA, 0–600k ohm, or Binary Dry Contact</p> <p>3 - Binary Outputs: Defined as 24 VAC Triac (internal power source)</p> <p>2 - Configurable Outputs: Defined as 0–10 VDC or 24 VAC Triac BO</p>
<b>Analog Input/Analog Output Accuracy</b>	<p><b>Analog Input:</b> 15-bit resolution on UIs</p> <p><b>Analog Output:</b> 0–10 VDC ± 200 mV</p>

**Table 4: VMA16 (32-bit) Series**

<b>Air Pressure Differential Sensor</b>	Range: -1.5 inches to 1.5 inches H <sub>2</sub> O  <b>Performance Characteristics:</b> Total Error Band: ±1.3% Full Span Maximum Accuracy: ±0.25% Full Scale Best Fit
<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>	(Height x Width x Depth): 165 x 125 x 73 mm (6.5 x 4.92 x 2.9 in.)  <b>Center of Output Hub to Center of Captive Spacer:</b> 135 mm (5-5/16 in.)
<b>Weight</b>	0.65 kg (1.45 lb)
<div style="text-align: center; font-size: 2em; font-weight: bold;">CE</div>	<b>United States:</b> UL Listed, File E107041, CCN PAZX, UL 916, Energy Management Equipment.  Suitable for use in other environmental air space (plenums) in accordance with Section 300.22(C) of the National Electric Code (VMA1615 and VMA1630 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 this product is in compliance with the essential requirements and other relevant provisions of the EMC Directive 2004/108/EC.  <b>Australia and New Zealand:</b> C-Tick Compliant (N1813), Australia/NZ Emissions Compliant.  <b>BACnet International:</b> BACnet Testing Laboratories (BTL) 135-2010 Protocol Revision 7 Listed BACnet Application Specific Controller (B-ASC)

1 This model is currently available only in Asia; contact your local Johnson Controls representative for more information.  
 2 For more information, refer to the *MS/TP Communications Bus Technical Bulletin (LIT-12011034)*.



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