

BAS CONTROLLERS

Field Controllers

MSEA Controllers

VMA (BACnet)

Variable Air Volume

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 (CO₂) level, setpoint adjustments, VAV box fan speed control, and discharge air temperatures.

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 application 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 over the previous models (VMA1610 & VMA1620), that provides more low-cost sensor options
- A 33 percent smaller package than the earlier VMA1610 and VMA1620s (16-bit) models.
- 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



BAS CONTROLLERS Field Controllers

MSEA Controllers VMA (BACnet)

Ordering Codes	Description
MS-VMA1615-0	32-Bit Integrated BACnet VAV Controller/Actuator/Pressure Sensor (Cooling only) 3 UI and 2 BO, 24 VAC
MS-VMA1630-0	32-Bit Integrated BACnet VAV Controller/Actuator/Pressure Sensor (Cooling with Reheat and Fan Control) 3 UI, 3 BO, and 2 CO, 24 VAC

VMA Selection Charts

Point Types	Signals Accepted	VMA1615	VMA1630
Modular Jacks	Not Applicable	6-pin SA Bus with four communicating sensors and 6-pin FC Bus for tool support	
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	3	3
Binary Output (BO)	24 VAC triac	2	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 sensors when using the ZFR1811 wireless Router configuration and up to 5 WRZ sensors when using the one-to-one WRZ-78xx Wireless configuration	

Note:

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

Accessories

Ordering Codes	Description
MS-DIS1710-0	Local Controller Display: Refer to Local Controller Display Product Bulletin (LIT-12011273) 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 Wireless Room Sensors: Refer to the WRZ Series Wireless Room Sensors Product Bulletin (LIT-12011653) for specific sensor model descriptions.
WRZ Series Sensors	WRZ Series Wireless Room Sensors: Refer to the WRZ Series Wireless Room Sensors Product Bulletin (LIT-12011653) for specific sensor model descriptions.
NS Series Sensors	NS Series Network Sensors: Refer to the NS Series Network Sensors Product Bulletin (LIT-12011574) for specific sensor model descriptions.
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
AP-TBK4FC-0	Replacement MS/TP FC Bus Terminal, 4-Position Connector, Blue, Bulk Pack
AP-TBK3PW-0	Replacement Power Terminal, 3-Position Connector, Grey, Bulk Pack
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.

BAS CONTROLLERS Field Controllers

MSEA Controllers VMA (BACnet)

Technical Specifications

Product Code Numbers	MS-VMA1615-0: Cooling Only VMA MS-VMA1630-0: Cooling with Reheat and Fan Control VMA
Power Requirement	
<i>Voltage</i>	24 VAC (nominal, 20 VAC minimum / 30 VAC maximum), 50/60 Hz, Safety Extra-Low Voltage (SELV) (Europe)
<i>Consumption</i>	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	
<i>Operating</i>	0 to 50°C
<i>Storage Temperature</i>	-40 to 70°C
Terminations	Inputs/Outputs: 6.3 mm Spade Lugs
<i>FC Bus, SA Bus, and Supply Power</i>	4-wire and 2-wire pluggable screw terminal blocks
<i>FC and SA Bus Modular Ports</i>	RJ-12 6-pin modular jacks
Controller Addressing	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)
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.
Processor	RX630 32-bit Renesas® microcontroller
Memory	1 MB Flash Memory and 512 KB Random Access Memory (RAM)
Input and Output Capabilities	
<i>Universal Input</i>	Defined as 0–10 VDC, 4–20 mA, 0–600k ohm, or Binary Dry Contact
<i>Binary Outputs</i>	Defined as 24 VAC Triac (internal power source)
<i>Configurable Outputs</i>	Defined as 0–10 VDC or 24 VAC Triac BO
Analog Input/Analog Output Accuracy	
<i>Analog Input</i>	15-bit resolution on UIs
<i>Analog Output</i>	0–10 VDC ± 200 mV
Air Pressure Differential Sensor	Range: -1.5 inches to 1.5 inches H ₂ O (-374pa to 374pa)
<i>Performance Characteristics</i>	Total Error Band: ±1.3% Full Span Maximum Accuracy: ±0.25% Full Scale Best Fit
Mounting	Mounts to damper shaft using single set screw and to duct with single mounting screw.
<i>Actuator Rating</i>	4 Nm minimum shaft length = 44 mm
Dimensions (H x W x D)	165 x 125 x 73 mm Center of Output Hub to Center of Captive Spacer: 135 mm
Weight	0.65 kg
Compliance	
<i>Europe</i>	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.
<i>BACnet International</i>	BACnet Testing Laboratories (BTL) 135–2010 Protocol Revision 7 Listed BACnet Application Specific Controller (B-ASC)

BAS CONTROLLERS
Field Controllers

MSEA Controllers

VMA (N2)

Variable Air Volume

VMA1832s (32-bit) are programmable digital controllers tailored for VAV applications that communicate via the N2 protocol, which can be integrated to any supervisory controller capable of managing N2 Open networks and devices, such as the Network Communication Module (NCM) and Network Automation Engine (NAE).

The VMA1832 controller features an advanced design that provides optimum performance and easy access to power, network, and field terminations. These controllers come with 32-bit microprocessors that meet and exceed ever demanding industry standards.

Our wide variety of network sensor models provides options for measuring and displaying zone temperature, occupancy detection, duct temperature, zone humidity, carbon dioxide (CO₂) level, setpoint adjustments, and discharge air temperatures.

The VMA1832 controller's embedded capabilities, in addition to its modular accessories, make it well-suited as a replacement for legacy VMA14xx Series Controllers.



Features

- N2 Open Communications Protocol
- Standard Hardware and Software Platform
- 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.
- 32-bit microprocessor ensures optimum performance and meets industry specifications
- Pluggable communications bus and supply power terminal blocks expedite installation and troubleshooting
- Can be converted to BACnet Master-Slave/Token-Passing MS/TP protocol with a software download (Available at a future date).
This functionality provides a differentiated and cost-effective platform upgrade path for existing VMA14xx customers who are looking for a gradual upgrade strategy.

BAS CONTROLLERS Field Controllers

MSEA Controllers VMA (N2)

Ordering Codes	Description
MS-VMA1832-0	Replacement Integrated VAV Controller/Actuator/Pressure Sensor, N2/FC Bus, and SA Bus (32-bit Processor) – Replaces AP-VMA14xx models.

VMA Selection Charts

Point Types	Signals Accepted	VMA1832
Modular Jacks	Not Applicable	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, A99B SI), NTC (10k Type L, 2.252k Type 2) Binary Input, Dry Contact Maintained Mode	3
Binary Output (BO)	24 VAC triac	3
Configurable Output (CO)	Analog output, voltage mode, 0 – 10 VDC Binary output mode, 24 VAC triac	2
Integrated Actuator	Internal	1
Integrated Flow Sensor	Internal	1
Zone Sensor Input	On SA Bus*	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

Note:

* A total of 10 SA bus addresses maximum can be used in a single VMA controller.

Accessories

Ordering Code	Description
MS-DIS1710-0	Local Controller Display: Refer to Local Controller Display Product Bulletin (LIT-12011273) for more information.
MS-BTCVT-1	Wireless Commissioning Converter with Bluetooth® Technology
AS-CBLVMA-1	Cable Adapter, 8-pin Female Socket to 6-Pin Male Jack (Bulk Pack of 10)
AS-CBLVMA-2	Cable Adapter, 8-pin Female Socket to 8-pin Male Jack with 6-Pin Female Socket for Wireless Commissioning Converter (Bulk Pack of 10)
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 Wireless Room Sensors: Refer to the WRZ Series Wireless Room Sensors Product Bulletin (LIT-12011653) for specific sensor model descriptions.
NS Series Sensors	NS Series Network Sensors: Refer to the NS Series Network Sensors Product Bulletin (LIT-12011574) for specific sensor model descriptions.
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
AP-TBK4FC-0	Replacement MS/TP FC Bus Terminal, 4-Position Connector, Blue, Bulk Pack
AP-TBK3PW-0	Replacement Power Terminal, 3-Position Connector, Grey, Bulk Pack
TL-BRTRP-0	Portable BACnet IP to MS/TP Router

BAS CONTROLLERS Field Controllers

MSEA Controllers VMA (N2)

Technical Specifications

Product Code Numbers	MS-VMA1832-0: Cooling with Reheat and Fan Control VMA
Power Requirement	
Voltage	24 VAC (nominal, 20 VAC minimum / 30 VAC maximum), 50/60 Hz, Safety Extra-Low Voltage (SELV) (Europe)
Consumption	10 VA typical, 14 VA maximum Note: 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).
Ambient Conditions	
Operating	0 to 50°C
Storage Temperature	-40 to 70°C
Terminations	Inputs/Outputs, SA bus, and Supply Power: 6.3 mm Spade Lugs
Supply Power	N2/FC Bus Pluggable Screw Terminal Block
TSTAT Modular Port	RJ-12 6-pin modular jacks
Controller Addressing	DIP switch set
N2 Open Protocol	Valid field controller device addresses 1–253
BACnet MS/TP Protocol	Valid field controller device addresses 4–127 (Device addresses 0–3 and 128–255 are reserved and not valid field controller addresses)
Communications Bus	
N2 Open Protocol	N2/FC Bus: 1.5 mm (18 AWG) standard 3-wire, twisted, shielded cable recommended between the supervisory controller and field controllers*
BACnet MS/TP Protocol	SA Bus: 0.6 mm (22 AWG) stranded, 4-wire (2-twisted pairs) shielded cable recommended from the VMA controller for network sensors and other sensor/actuator devices; includes a terminal to source 15 VDC supply power from VMA to SA Bus devices
Processor	RX630 32-bit Renesas® microcontroller
Memory	1 MB Flash Memory and 512 KB Random Access Memory (RAM)
Input and Output Capabilities	
Universal Input	Defined as 0–10 VDC, 4–20 mA, 0–600k ohm, or Binary Dry Contact
Binary Outputs	Defined as 24 VAC triac (internal power source)
Configurable Outputs	Defined as 0–10 VDC or 24 VAC Triac BO
Analog Input/Analog Output Accuracy	
Analog Input	15-bit resolution on UIs
Analog Output	0–10 VDC ± 200 mV
Air Pressure Differential Sensor	Range: -1.5 inches to 1.5 inches H2O (-374pa to 374pa)
Performance Characteristics	Total Error Band: ±1.3% Full Span Maximum Accuracy: ±0.25% Full Scale Best Fit
Mounting	Mounts to damper shaft using single set screw and to duct with single mounting screw.
Actuator Rating	4 Nm minimum shaft length = 44 mm
Dimensions (H x W x D)	165 x 125 x 73 mm – Center of Output Hub to Center of Captive Spacer: 135 mm
Weight	0.65 kg
Compliance	
Europe	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.
BACnet International	BACnet Testing Laboratories (BTL) 135-2010 Protocol Revision 7 Listed BACnet Application Specific Controller (B-ASC)

Note:

* For more information, refer to the N2 Communications Bus Technical Bulletin (LIT-636018).