

BUILDING AUTOMATION PRODUCTS

PROGRAMMABLE CONTROLLERS

METASYS[®] CONTROLLERS

CVM

VAV BOX CONTROLLERS

The CVM03050 equipment controllers are designed for variable air volume (VAV) box applications. CVM03050 controllers operate on an RS-485 BACnet[®] MS/TP bus as BACnet Advanced Application Controllers (B-AACs), and integrate into Johnson Controls[®] and third-party BACnet systems.

CVM03050 controllers feature an integral damper actuator, a digital Differential Pressure Transducer (DPT) sensor, and a 32-bit microprocessor. The CVM03050-OP model features an integral potentiometer to sense actual VAV box damper position. These controllers include an integral real-time clock, which enables the controllers to monitor and control schedules, calendars, and trends, and operate for extended periods of time as stand-alone controllers when offline from the *Metasys*[™] system network. These controllers also connect easily to the wired and wireless network sensors for zone and discharge air temperature sensing.

FEATURES

- **Sleek and modern packaging and styling** - Provides a modern, aesthetically pleasing industrial design.
- **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.
- **High memory capacity and fast processing power** - Provides application engineers with the horsepower to meet sophisticated control requirements.
- **Auto-Tuned Control Loops** - Reduce commissioning time, eliminate change-of-season re-commissioning, and reduce wear and tear on mechanical devices.
- **Patented Proportional Adaptive Control (P-Adaptive) and PRAC** - Provides continuous loop tuning.
- **Standard BACnet protocol** - Provides interoperability with other Building Automation System (BAS) products that use the widely accepted BACnet standard.
- **Models to support both BACnet MS/TP and N2, with auto-detection of the communications protocols** - Controller auto-detects the BACnet MS/TP or N2 protocol that is connected to it, which enables the same controller to support multiple communication protocols without the need to purchase a special model per protocol, and without extra manual setup.
- **BACnet Testing Laboratories (BTL) listed and certified as BACnet Advanced Application Controllers (B-AAC)** - Ensures openness and interoperability with other BTL-listed devices. BTL is a third-party agency, which validates that BAS vendor products meet the BACnet industry-standard protocol.
- **BACnet automatic discovery** - Supports easy controller integration into a *Metasys*[®] BAS.





FEATURES

- **Wireless ZFR and ZFR Pro support** - Provides a wireless alternative to hard-wired MS/TP networking, offering application flexibility and mobility with minimal disruption to building occupants, and also simplifies and speeds up replacements.
- **Integral real-time clock** - An integral real-time clock, which enables the controllers to monitor and control schedules, calendars, and trends, and operate for extended periods of time as stand-alone controllers when offline from the *Metasys* system network.
- **Pluggable screw terminal blocks** - Pluggable input/output wiring terminal blocks that can be removed from the controller provide electrical installers and field technicians the ability to quickly and easily install and service a controller without the need to disconnect and reconnect the input/output wiring.
- **Decimal MS/TP address set with three rotary switches** - Easy-to-use rotary switches set the MS/TP address in decimal format.
- **Universal Inputs and Configurable Outputs** - Allows multiple signal options to provide input/output flexibility.
- **End-of-Line (EOL) switch in MS/TP equipment controllers** - Enables equipment controllers to be terminating devices on the communications bus.
- **Default state for Input/Output wiring validation** - Enables validation of the input and output terminals' wiring prior to download of an application file.
- **Background transfer coupled with enable/disable logic options in Controller Configuration Tool (CCT)** - Saves field technicians' time, enables productivity and minimizes equipment disruption, since the controllers are operating while file updates take place in the background and the application can be left disabled until the system is ready to run.
- **SA Bus commissioning improvements** - Saves field technicians time when commissioning SA Bus devices by enabling an equipment controller to transfer and apply firmware files to all the SA Bus IOM devices connected to it at the same time.



ORDERING INFORMATION

		CVM03050-0	CVM03050-0P
Communication Protocols	BACnet MS/TP, N2		
Network Engines	All network engine model types <i>Refer to the Network Engines Product Bulletin (LIT-12012138) for details.</i>		
Modular Jacks	FC and SA Bus Modular Ports: RJ-12 6-Pin Modular Jacks		
Point Types	Signals Accepted:		
Universal Input (UI)	15 VDC Power Source (Provides 35mA total current source) Analog Input - Voltage Mode (0-10 VDC) Analog Input - Resistive Mode (0-600k ohm), RTD (1k Nickel [Johnson Controls sensor], 1k PT, A998 SI), NTC (10k Type L, 2.252k Type 2) Binary Input, Dry Contact Maintained Mode	3	3
Configurable Output (CO)	Analog Output - Voltage Mode (0-10 VDC) Binary Output 24 VAC Triac Analog Output Signal Common Binary Output Signal Common	2	2
Binary Output (BO)	Binary Output - 24 VAC Triac	3	3
Integrated Actuator	Internal	1	1
Differential Pressure Transducer	Internal	1	1
Integrated Feedback Potentiometer	Internal	No	Yes
Zone Sensor Input	On SA Bus Note: A total of 10 MS/TP addresses (IOMs), not including sensor addresses, can be used in a single CVM equipment controller.	Up to 4 NS Series Network Sensors Up to 9 WRZ sensors when using the ZFR or ZFR Pro Series wireless router configuration and up to 5 WRZ sensors when using the one-to-one WRZ-78xx wireless configuration	



ORDERING INFORMATION

CODES	DESCRIPTION
M4-CVM03050-0	VAV Box Controller with Integrated Actuator and Digital Differential Pressure Transducer (DPT) Sensor. Includes MS/TP (and N2) communication; 8 points (3 UI, 2 CO, and 3 BO); real-time clock; 32-bit microprocessor; 24 VAC input.
M4-CVM03050-OP	VAV Box Controller with Integrated Actuator, Position Feedback, and DPT Sensor. Includes MS/TP (and N2) communication; 8 points (3 UI, 2 CO, and 3 BO); real-time clock; 32-bit microprocessor; 24 VAC input.

ACCESSORIES - ORDER SEPERATELY (PART 1/2)

CODES	DESCRIPTION
IOM Series Controllers	<i>Refer to the Metasys® System Field Equipment Controllers and Related Products Product Bulletin (LIT-12011042) for a complete list of available IOM Series Controllers.</i>
TL-CCT-0	License enabling <i>Metasys</i> Controller Configuration Tool (CCT) software for one user
MS-FCP-0	License enabling <i>Metasys</i> Equipment Controller Firmware Package Files required for CCT
Mobile Access Portal (MAP) Gateway	<i>Refer to the Mobile Access Portal Gateway Catalog Page (LIT-1900869) to identify the appropriate product for your region.</i> Note: The MAP Gateway serves as a replacement for the BTCVT, which is no longer available for purchase, but continues to be supported.
MS-DIS1710-0	Local Controller Display
NS-ATV7003-0	Handheld VAV Balancing Tool
NS Series Network Sensors	<i>Refer to the NS Series Network Sensors Product Bulletin (LIT-12011574) for specific sensor model descriptions.</i>
AS-CBLTSTAT-0	Cable adapter for connection to 8-pin TE-6700 Series sensors
NS-WALLPLATE-0	Network Sensor Wall Plate
WRZ Series Wireless Room Sensors	<i>Refer to the WRZ Series Wireless Room Sensors Product Bulletin (LIT-12000653) for specific sensor model descriptions.</i>
WRZ-7860-0	<i>Refer to the WRZ-7860 Receiver for One-to-One Wireless Room Sensing Product Bulletin (LIT-12011640) for a list of available products.</i>
WRZ-SST-120	<i>Refer to the WRZ-SST-120 Wireless Sensing System Tool Installation Instructions (LIT-24-10563-55) for usage instructions.</i>
WNC1800/ZFR182x Pro Wireless Field Bus System	<i>Refer to the WNC1800/ZFR182x Pro Series Wireless Field Bus System Product Bulletin (LIT-12012320) for a list of available products.</i>
ZFR1800 Series Wireless Field Bus System	<i>Refer to the ZFR1800 Series Wireless Field Bus System Product Bulletin (LIT-12011336) for a list of available products.</i>
ZFR-USBHA-0	ZFR USB Dongle provides a wireless connection through CCT to allow wireless commissioning of the wirelessly enabled CGM, CVM, FAC, FEC, VMA16, and IOM controllers. It also allows use of the ZFR Checkout Tool (ZCT) in CCT. Note: The ZFR-USBHA-0 replaces the IA OEM DAUBI_2400 ZFR USB dongle. <i>For additional information about the ZFRUSBHA-0 ZFR dongle, refer to the ZCT Checkout Tool Help LIT-12012292 or the WNC1800_ZFR182x Pro Series Wireless Field Bus System Technical Bulletin (LIT-12012356).</i>

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ORDERING INFORMATION

ACCESSORIES - ORDER SEPERATELY (PART 2/2)

CODES	DESCRIPTION
Y64T15-0	Transformer, 120/208/240 VAC Primary to 24 VAC Secondary, 92 VA, Foot Mount, 72.2 cm, Primary Leads and 76.2 cm Secondary Leads, Class 2 Y65A13-0 Transformer, 120 VAC Primary to 24 VAC Secondary, 40 VA, Foot Mount (Y65AS), 20.32 cm, Primary Leads and 76.2 cm Secondary Leads, Class 2
Y65T42-0	Transformer, 120/208/240 VAC Primary to 24 VAC Secondary, 40 VA, Hub Mount (Y65SP+), 20.32 cm, Primary Leads and Secondary Screw Terminals, Class 2
F-1000-325	Replacement Barbed Fitting for Connecting Tubing, Bulk Pack of 10. For use on CVM03050-0, and also on VMA1630, VMA1615, and VMA1832 models. Note: This accessory is only available for the CVM and some VMA equipment controllers. This accessory is not compatible with the CVM03050-0P (with position feedback) model.
F-1000-326	Flexible Tubing Extension with Barbed Fitting for CVM03050-0x, VMA1615, VMA1630, and VMA1832, 35.56 cm Length. Bulk Pack of 20. Use to extend tubing that connects between the DPT connectors and the DPT sensors, including when replacing a VMA1400 series controller with a CVM03050-0x, VMA16xx or VMA18xx controller. Note: This accessory is only available for CVM and some VMA equipment controllers.
TL-BRTRP-0	Portable BACnet/IP to MS/TP Router



TECHNICAL SPECIFICATION (PART 1/2)

Codes	
<i>M4-CVM03050-0</i>	VAV Box Controller with Integrated Actuator and Digital Differential Pressure Transducer (DPT) Sensor. Includes MS/TP (and N2) communication; 8 points (3 UI, 2 CO, and 3 BO); real-time clock; 32-bit microprocessor; 24 VAC input.
<i>M4-CVM03050-0P</i>	VAV Box Controller with Integrated Actuator, Position Feedback, and DPT Sensor. Includes MS/TP (and N2) communication; 8 points (3 UI, 3 BO, and 2 CO); real-time clock; 32-bit microprocessor; 24 VAC input.
Power Requirement	24 VAC (nominal, 20 VAC minimum/30 VAC maximum), 50/60 Hz, Safety Extra-Low Voltage (SELV)
Power Consumption	10 VA typical, 14 VA maximum ¹ Note: The USB feature is not currently supported.
Power Source	+15 VDC power source terminals provide 35 mA total current. Quantity 1 located in Universal IN terminals - for active (3-wire) input devices
Ambient Conditions	
<i>Operating</i>	0 to 50°C
<i>Storage</i>	-40 to 70°C
Network Engines	All network engine model types
Communications Protocol	BACnet MS/TP; N2. Wireless also supported (at FC Bus and for Sensors) with additional hardware.
Device Addressing for BACnet MS/TP	Decimal address set via three rotary switches: valid controller device addresses 4-127
Device Addressing for N2	Decimal address set via three rotary switches: valid controller device addresses 1-254
Communications Bus ²	BACnet MS/TP (default), N2 3-wire FC Bus between the supervisory controller and equipment controllers 4-wire SA Bus between equipment controller, network sensors and other sensor/actuator devices, includes a lead to source 15 VDC supply power (from equipment controller) to bus devices
Processor	RX64M 32-bit Renesas microcontroller
Memory	16MB Flash Memory and 8MB SDRAM
Real-Time Clock Backup Power Supply	Super capacitor maintains power to the onboard real-time clock for a minimum of 72 hours when supply power to the controller is disconnected.
Input and Output Capabilities	
<i>3 - Universal Inputs</i>	Defined as 0-10 VDC, 0-600k ohms, or Binary Dry Contact
<i>2 - Configurable Outputs</i>	Defined as 0-10 VDC or 24 VAC Triac BO
<i>3 - Binary Outputs</i>	Defined as 24 VAC Triac (external power source only)
Universal Input (UI) Resolution/Configurable Output (CO) Accuracy	
<i>UI Analog Input Mode</i>	15-bit resolution on UIs
<i>CO Analog Output Mode</i>	0-10 VDC ± 200 mV

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TECHNICAL SPECIFICATION (PART 2/2)

Air Pressure Differential Sensor	Range: -1.5 in. to 1.5 in. W.C.
<i>Performance Characteristics</i>	Typical Accuracy at ambient operating conditions: +/- 1% in W.C. Typical accuracy at zero (null) pressure is +/- 0.0006 in W.C.
Actuator Rating	4 N·m (35 lb·in) minimum shaft length = 44 mm (1-3/4 in.) (if provided)
Terminations	
<i>Inputs/Outputs</i>	Pluggable Screw Terminal
<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
Mounting	Mounts to damper shaft using single set screw and to duct with single mounting screw
Housing	
<i>Enclosure material</i>	ABS and polycarbonate UL94 5VB; Selfextinguishing Protection Class: IP20 (IEC529)
Dimensions (Height x Width x Depth)	165 x 125 x 73 mm Center of Output Hub to Center of Captive Spacer: 135 mm
Weight	0.69 kg
CE Compliance	Johnson Controls declares that this product is in compliance with the essential requirements and other relevant provisions of the EMC Directive and RoHS Directive.
<i>BACnet International</i>	BACnet Testing Laboratories™ (BTL) Protocol Revision 15 Listed and Certified BACnet Advanced Application Controller (B-AAC), based on ANSI/ASHRAE 135-2016

Notes

- 1 The VA rating does not include any power supplied to the peripheral devices connected to Configurable Outputs (COs) or Binary Outputs (BOs), which can consume up to 12 VA for each CO or BO, for a possible total consumption of an additional 60 VA (maximum).
- 2 For more information, refer to the *MS/TP Communications Bus Technical Bulletin (LIT-12011034)*.