PCV Programmable VAV Box Controllers Catalog Page

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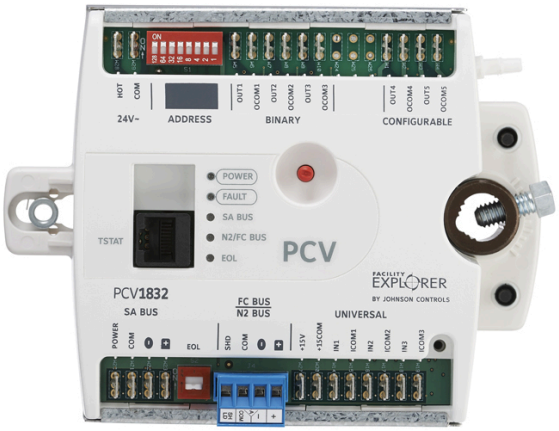

PCV Programmable VAV Box Controller Series

PCV16 and PCV18 series controllers are programmable digital controllers tailored for VAV applications that can switch between MS/TP and N2 Communications protocols. When they are used as MS/TP devices, they communicate through the BACnet® MS/TP protocol. In N2 mode, they can be used as replacements for legacy Johnson Controls® controllers.

The PCV controllers' small package size facilitates quick field installation and efficient use of space, while not compromising high-tech control performance. These controllers easily adapt NS Series Network Sensors for zone and discharge air temperature sensing.

The PCV18 models are designed to be functional replacements for the VMA14xx Series Variable Air Volume Modular Assembly Controllers. They contain a sensor bus port and accessories well suited for replacing VMA14xx Controllers.

The PCV1626 Controller is shipped with an actuator but without a differential pressure transducer (DPT), making the controller well suited for commercial zoning applications or for pressure-dependent VAV box applications where no DPT is required. The PCV1656 controller is shipped without a differential pressure transducer but with an integrated actuator and ball valve linkage. This controller is for use on the Johnson Controls VG-1000 1/2 to 1 inch valves and needs to be used primarily as a replacement for the assembly of the VG-1000 Series Smart Valve product. The smart valve product line is ideal for chilled beam applications. The PCV1628 includes a DPT but does not have an actuator. Without an actuator, this controller is well suited for controlling large VAV boxes that require more than 4 N•m of torque.

These features make the PCV controllers 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_2) 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.
- **Switchable communications protocols from BACnet MS/TP to N2 protocols or N2 to BACnet MS/TP protocols**
- **Wireless ZFR and ZFR Pro support**—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.

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- **Auto-Tuned Control Loops**—Proportional Adaptive Control (P-Adaptive) and Pattern Recognition Adaptive Control (PRAC) delivers continuous control loop tuning, which reduces commissioning time, eliminates change-of-season recommissioning, and reduces wear and tear on actuators.
- **Universal Inputs and configurable Outputs**—Allows 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) listed**—Provides 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**—Supports easy controller integration into a Facility Explorer BAS.
- **End-of-Line (EOL) switch in MS/TP Field Controllers** —Enables field controllers to be terminating devices on the communications bus.
- **Pluggable Communications Bus and supply power terminal blocks**—Expedites installation and troubleshooting.
- **Writable Flash Memory**—Allows standard or customized applications to be downloaded from the CCT and enables persistent application data.

The following features are specific to particular models:

- Models that include a DPT feature a state-of-the-art digital non-flow DPT 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.
- A phone jack-style RJ-12 connector on the FC Bus and SA Bus of the PCV16 supports quick connection to the Mobile Access Portal (MAP) Gateway, ZFR or ZFR Pro Series Wireless Field Bus System wireless routers, and network sensors.
- Models that include an actuator feature a fast response actuator that drives the damper from full open to full closed (90°) in 60 seconds to reduce commissioning time.

PCV series model information

Table 1: PCV16 series model information

		PCV1626	PCV1628	PCV1656
Communication protocol		BACnet MS/TP, N2, or Wireless (using add-on modules)		
Modular jacks		6-pin SA Bus port		
		6-pin FC Bus port		
Point types	**Signals accepted**			
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
Binary Output (BO)	24 VAC Triac	3	3	3
Configurable Output (CO)	Analog Output, Voltage Mode, 0–10 VDC Binary Output Mode, 24 VAC Triac	2	2	2
Integrated actuator	Internal	1	1	1 with ball valve linkage
Integrated flow sensor	Internal		1	

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Table 1: PCV16 series model information

		PCV1626	PCV1628	PCV1656
SA Bus	Supports up to 10 total wired SA Bus devices, including the XPM and PCX series expansion I/O modules and up to 4 NS series network sensors			
WRZ sensors	Supports up to 9 WRZ sensors when using the ZFR or ZFR Pro Series wireless router configuration			
	Supports up to 5 WRZ sensors when using the one-to-one WRZ-78xx wireless configuration			

Table 2: PCV18 series model information

Point types	Signals accepted	PCV1826	PCV1832
Modular jacks		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
Binary Output (BO)	24 VAC Triac	3	3
Configurable Output (CO)	Analog Output, Voltage Mode, 0–10 VDC Binary Output Mode, 24 VAC Triac	2	2
Integrated actuator	Internal	1	1
Differential pressure transducer	Internal		1
SA Bus	Supports up to 10 total wired SA Bus devices, including the XPM and PCX series expansion I/O modules and up to 4 NS series network sensors		
WRZ sensors	Supports up to 9 WRZ sensors when using the ZFR or ZFR Pro Series wireless router configuration		
	Supports up to 5 WRZ sensors when using the one-to-one WRZ-78xx wireless configuration		

PCV series ordering information

Table 3: PCV series ordering information

Product code number	Description
FX-PCV1626-1	32-bit, Integrated VAV Controller and Actuator, 3 UI, 3 BO, and 2 CO; 24 VAC; FC Bus, and SA Bus (No DPT)
FX-PCV1628-1	32-bit, Integrated VAV Controller and DPT, 3 UI, 3 BO, and 2 CO; 24 VAC; FC Bus, and SA Bus (No Actuator)
FX-PCV1656-1	32-bit, Integrated VAV Controller and Actuator, 3 UI, 3 BO, and 2 CO; 24 VAC; FC Bus, and SA Bus, Integrated Ball Valve Linkage
FX-PCV1826-1	32-bit, Integrated VAV Controller and Actuator, 3 UI, 3 BO, and 2 CO; 24 VAC; FC Bus, and SA Bus; Includes cable adapters for use when replacing VMA14xx Series controllers. Recommended replacement for VMA1440 controller (No DPT)
FX-PCV1832-1	32-bit, Integrated VAV Controller/Actuator/DPT, 3 UI and 2 BO; 24 VAC; FC Bus, and SA Bus includes cable adapters for use when replacing VMA14xx Series controllers. Recommended replacement for VMA1410, VMA1415, or VMA1420 controller

Accessories

Table 4: Accessories

Product code number	Description
PCX Series	Refer to the *FX-PC Series Programmable Controllers and Related Products Product Bulletin (LIT-12011657)* for a complete list of available PCX series expansion modules.
TL-CCT-0	Controller Configuration Tool (CCT) software.
FX-FCP-0	License enabling Facility Explorer Equipment Controller Firmware Package Files required for the Controller Configuration Tool (CCT).

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Table 4: Accessories

Product code number	Description
Mobile Access Portal (MAP) Gateway	Refer to the *Mobile Access Portal Gateway Catalog Page (LIT-1900869)* to identify the appropriate product for your region.
NS Series Network Sensors	Refer to the *NS Series Network Sensors Product Bulletin (LIT-12011574)* for specific sensor model descriptions.
TL-BRTRP-0	Portable BACnet/IP to MS/TP Router
WRZ Series Wireless Room Sensors	Refer to the *WRZ Series Wireless Room Sensors Product Bulletin (LIT-12011653)* for specific sensor model descriptions.
F4-DLK0350-0	Local Controller Display, 3.5 in. (89 mm) color display with navigation keypad. For more information, refer to the *F4-DLK0350 Product Bulletin (LIT-12014010)*.
FX-DIS1710-0	Local Controller Display, 3.0 in. (76 mm) monochrome display with navigation keypad. For more information, refer to the *Local Controller Display Product Bulletin (LIT-12011273)*.
WRZ-7860-0	Receiver for One-to-One Wireless Room Sensing Systems - functions with WRZ Series Sensors room sensors. Refer to the *WRZ-7860 Receiver for One-to-One Wireless Room Sensing Product Bulletin (LIT-12011640)* for a list of available products.
WRZ-SST-120	Wireless System Survey Tool (for use with the lower power 10mW WRZ and WRZ-7860 systems). Refer to the *WRZ-SST-120 Wireless Sensing System Tool Installation Instructions (LIT-24-10563-55)* for usage instructions.
ZFR-HPSST-0	Wireless System Survey Tool. For use with the higher power WRG1830/ZFR183x System and lower power WRZ Sensors (10mW). Refer to the *ZFR-HPSST-0 Wireless Sensing System Tool Installation Guide (LIT-24-11461-00012)* for usage instructions.
ZFR-USBHA-0	ZFR USB Dongle provides a wireless connection through CCT to allow wireless commissioning of the wirelessly enabled equipment controllers. It also allows use of the ZFR Checkout Tool (ZCT) in CCT. ⓘ **Note:** The ZFR-USBHA-0 is not compatible with the WRG1830/ZFR183x Pro Series. ⓘ **Note:** The ZFR-USBHA-0 replaces the IA OEM DAUBI_2400 ZFR USB dongle. For additional information about the ZFR-USBHA-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)*.
WRG1830/ZFR183x Pro Wireless Field Bus System	For more information on products needed for wireless field bus installations and for a list of available products, refer to the *WRG1830/ZFR183x Pro Series Wireless Field Bus System Catalog Page (LIT-1901153)*.
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 PCV Output Point Spade Lug
AB-TBK1003-0	2-Position Screw Terminal that Plugs onto PCV Output Point Spade Lug
AP-TBK4SA-0	Replacement MS/TP SA Bus Terminal, 4-Position Connector, Brown (Bulk Pack of 10)
AP-TBK4FC-0	Replacement MS/TP FC Bus Terminal, 4-Position Connector (Bulk Pack of 10)
AP-TBK3PW-0	Replacement Power Terminal, 3-Position Connector, Gray (Bulk Pack of 10)
AS-CBLTSTAT-0	2-Position Screw Terminal that Plugs onto PCV Output Point Spade Lug
AS-CBLVMA-1	Cable Adapter, 8-Pin Female Socket to 6-Pin Male Jack (Bulk Pack of 10)
F-1000-325	Replacement Barbed Fitting for use on PCV1832 for Connecting Tubing (Bulk Pack of 10)
F-1000-326	Flexible Tubing Extension with Barbed Fitting for PCV1832, 14 in. 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 PCV18xx controller.

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PCV series technical specifications

Table 5: PCV series technical specifications

Technical specification	Description
Product code numbers	**FX-PCV1626-1:** 32-bit, Integrated VAV Controller and Actuator, 3 UI, 3 BO, and 2 CO; 24 VAC; FC Bus, and SA Bus (No DPT) **FX-PCV1628-1:** 32-bit, Integrated VAV Controller and DPT, 3 UI, 3 BO, and 2 CO; 24 VAC; FC Bus, and SA Bus (No Actuator) **FX-PCV1656-1:** 32-bit, Integrated VAV Controller and Actuator, 3 UI, 3 BO, and 2 CO; 24 VAC; FC Bus, and SA Bus, Integrated Ball Valve Linkage (No DPT) **FX-PCV1826-1:** 32-bit, Integrated VAV Controller and Actuator, 3 UI, 3 BO, and 2 CO; 24 VAC; FC Bus, and SA Bus, with 8–pin TSTAT Port, Recommended for use as a replacement for VMA1440 (No DPT) **FX-PCV1832-1:** 32-bit, Integrated VAV Controller/Actuator/DPT, 3 UI, 3 BO, 2 CO; 24 VAC; FC and SA Bus, with 8-pin TSTAT Port. Recommended for use as a replacement for VMA1410, VMA1415, or VMA1420
Communications protocol	BACnet MS/TP, N2, and Wireless (using add-on modules)
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	**Operating:** 0°C to 50°C (32°F to 122°F); 10% to 90% RH noncondensing **Storage:** -40°C to 80°C (-40°F to 176°F); 5% to 95% RH noncondensing
Terminations	**PCV1626, PCV1628, and PCV1656:** Inputs/Outputs: 6.3 mm (1/4 in.) Spade Lugs FC Bus, SA Bus, and Supply Power: 4-Wire and 2-Wire Pluggable Screw Terminal Blocks FC and SA Bus Modular Ports: RJ-12 6-Pin Modular Jacks **PCV1826 and PCV1832:** Inputs/Outputs, SA Bus, and Supply Power: 6.3 mm (1/4 in.) Spade Lugs N2/FC Bus Pluggable Screw Terminal Block TSTAT Modular Port: RJ-45 8-Pin Modular Jack
Controller addressing	**For BACnet MS/TP-configured controllers:** DIP switch set: valid field controller device addresses 4-127 (device addresses 0–3 and 128–255 are reserved) **For N2-configured controllers:** DIP switch set; valid control device addresses 1–255
Communications bus	**PCV16xx and PCV18xx models:** RS-485, field selectable between BACnet MS/TP and N2 communications: **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:** 0.6 mm (22 AWG) stranded, 4-wire (2-twisted pairs) shielded cable recommended from the PCV controller for network sensors and other sensor/actuator devices; includes a terminal to source 15 VDC supply power from PCV to SA Bus devices ⓘ **Note:** For more information, refer to the *FX-PC Series Controllers MS/TP Communications Bus Technical Bulletin (LIT-12011670).*
Processor	**PCV16 (32-bit) and PCV18 models:** RX630 32-bit Renesas® microcontroller
Memory	**PCV16 (32-bit) and PCV18 models:** 1 MB Flash Memory and 512 KB RAM
Input and Output capabilities	**PCV1626-1, PCV1628-1, PCV1656-1, PCV1826-1, and PCV1832-1:** 3 - Universal Input: 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

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Table 5: PCV series technical specifications

Technical specification	Description
Analog Input/Analog Output accuracy	**Analog Input:** 15-bit resolution on UIs **Analog Output:** 0–10 VDC ± 200 mV
Differential pressure transducer	Range: -1.5 in. to 1.5 in. W.C. **Performance Characteristics:** Accuracy +/-1.3% Full Span Maximum (+/- .039 in. w.c.) ⓘ **Note:** Combined error due to offset, non-linearity, and temperature variation. Typical accuracy at zero (null) pressure is +/-0.2% fullscale ⓘ **Note:** Includes error due to non-linearity.
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	**(Height x Width x Depth):** 165 mm x 125 mm x 73 mm (6.5 in. x 4.92 in. x 2.9 in.) **Center of Output Hub to Center of Captive Spacer:** 135 mm (5-5/16 in.)
Weight	0.65 kg (1.45 lb)
Compliance	**United States:** 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 (1626, 1628, 1656, 1832, 1826). FCC Compliant to CFR47, Part 15, Subpart B, Class A
	Canada: UL Listed, File E107041, CCN PAZX7, CAN/CSA C22.2 No. 205, Signal Equipment; Industry Canada Compliant, ICES-003
CE	**Europe:** CE Mark – Johnson Controls declares that this product is in compliance with the essential requirements and other relevant provisions of the EMC Directive and RoHS Directive.
	**Australia and New Zealand:** RCM Mark, Australia/NZ Emissions Compliant
	BACnet International: **PCV16xx and PCV18 models:** BACnet Testing Laboratories (BTL) Protocol Revision 7 Listed BACnet Application Specific Controller (B-ASC)
UK CA	**United Kingdom:** Johnson Controls declares that this product is in compliance with Electromagnetic Compatibility Regulations, The Electrical Equipment (Safety) Regulations, and Restriction of the Use of Certain Hazardous Substances in Electrical and Electronic Equipment Regulations.

Repair Information

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

Product warranty

This product is covered by a limited warranty, details of which can be found at www.johnsoncontrols.com/buildingswarranty.

Software terms

Use of the software that is in (or constitutes) this product, or access to the cloud, or hosted services applicable to this product, if any, is subject to applicable end-user license, open-source software information, and other terms set forth at www.johnsoncontrols.com/techterms. Your use of this product constitutes an agreement to such terms.

Patents

Patents: https://jcipat.com

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