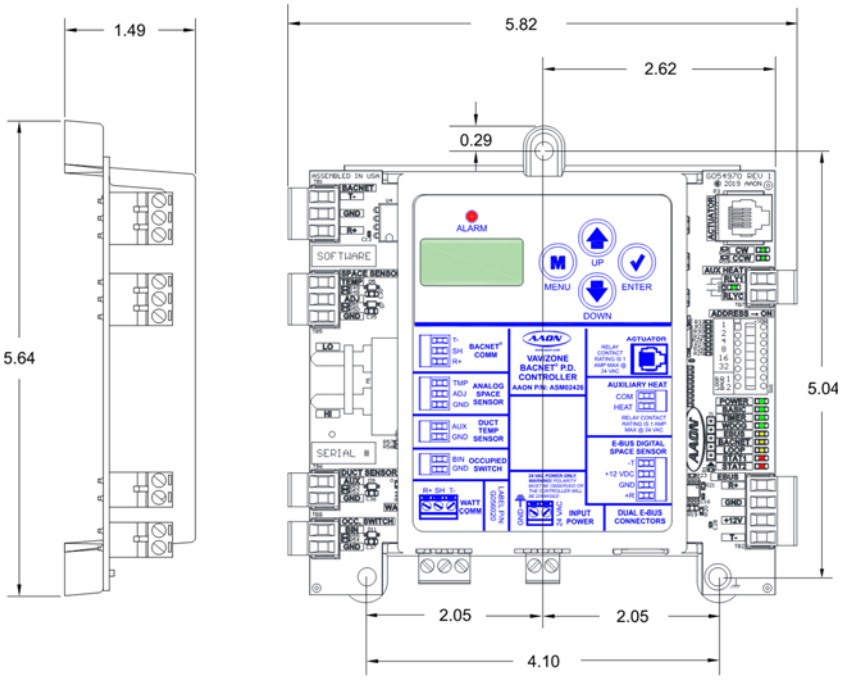
Orion BACnet® P.D. VAV/Zone Controller

ASM02426



Description

The ASM02426 is a BACnet® enabled VAV/Zone Controller that is designed for Pressure Dependent (P.D.) VAV Box and Zone Damper applications. It is mounted in a plastic enclosure.

The Orion BACnet® P.D. VAV/Zone Controller is designed for use with a Damper Actuator with cable package. The VAV/Zone Controller connects to the actuator via the modular cable included with the actuator. One stage of Auxiliary Heat is provided on the controller. The VAV/Zone Controller can use a Standard Room Temperature Sensor wired to the 3 pole terminal block provided or an E-BUS Digital Room Sensor connected via the integral E-BUS cable connector or to the 4 pole terminal block provided. The VAV/Zone Controller also has a 2 pole terminal block for wiring a Discharge Temperature Sensor, if desired.

An optional Reheat Expansion Module is available for applications using fan terminals and/or more than 1 stage of Heat, SCR electric heat, or if using modulating HW heat. The Expansion Module connects to the VAV/Zone Controller by means of a prefabricated E-BUS cable.

Mounting

The Orion BACnet® P.D. VAV/Zone Controller is very easy to mount on your terminal unit or to a round or rectangular damper mounting plate. Three holes are provided in the plastic controller housing for mounting to a control panel base. Detailed mounting and installation instructions are provided with each package.

Technical Data		**Orion BACnet® Pressure Dependent VAV/Zone Controller**
VAV/Zone Controller General Specifications:		**Inputs:**
Supply Power	18-30 VAC	(1) 3 Pole Terminal Block Connector For Watt Comm In & Out
Power Consumption	7 VA Maximum	(1) 3 Pole Terminal Block Connector For BACnet® In & Out
Operating Temperature	10°F to 149°F	(1) 2 Pole Terminal Block Connector For Power In
		(1) 2 Pole Terminal Block For Discharge Temperature Sensor Connection
Operating Humidity	0-95% RH Non-Condensing	(1) 2 Pole Terminal Block for Occupancy or Window Switch Terminals
Communications	RS-485 57.6 K	
Inputs:		**Outputs:**
(1) 3 Pole Terminal Block for Analog Room Temperature Sensor Applications		(2) E-BUS Connectors For Connection of Expansion Module and/or E-BUS Digital Room Temperature Sensor
		(1) RJ-12 Modular Connector for Connection of Actuator
(1) 4 Pole Terminal Block for E-BUS Digital Room Sensor Applications		(1) 2 Pole Terminal For Connection Of Auxiliary Heat Contactor
AAON reserves the right to change specifications without notice.	**All Dimensions are in inches.**	**One Year Warranty**

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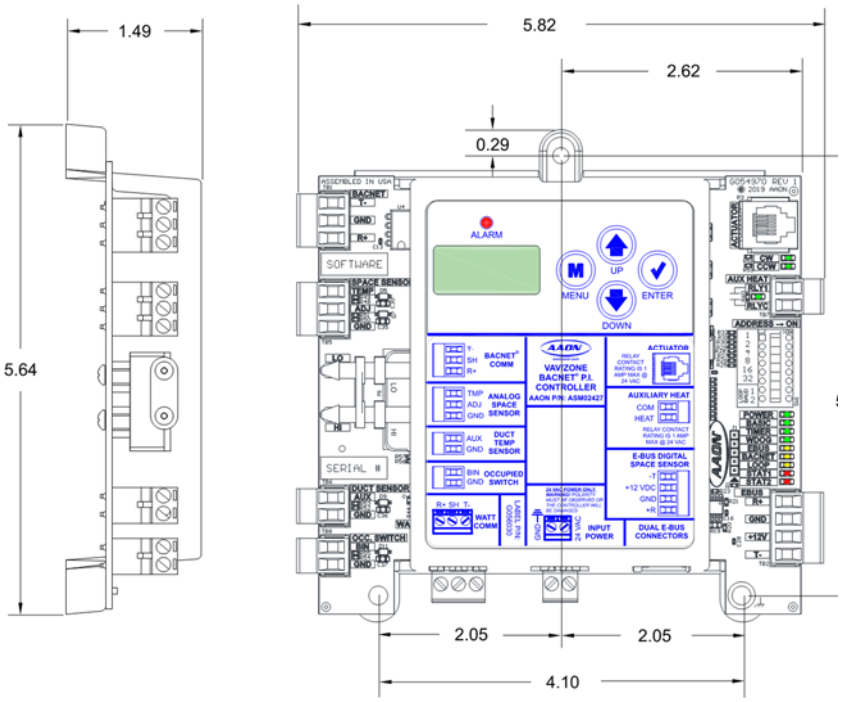
Orion BACnet® P.I. VAV/Zone Controller

ASM02427



Description

The ASM02427 is a BACnet® enabled VAV/Zone Controller that is designed for Pressure Independent (P.I.) VAV Box and Zone Damper applications. It is supplied with an integral Airflow Sensor and is mounted in a plastic enclosure.

The Orion BACnet® P.I. VAV/Zone Controller is designed for use with a Damper Actuator with cable package. The VAV/Zone Controller connects to the actuator via the modular cable included with the actuator. One stage of Auxiliary Heat is provided on the controller. The VAV/Zone Controller can use a Standard Room Temperature Sensor wired to the 3 pole terminal block provided or an E-BUS Digital Room Sensor connected via the integral E-BUS cable connector or to the 4 pole terminal block provided. The VAV/Zone Controller also has a 2 pole terminal block for wiring a Discharge Temperature Sensor, if desired.

An optional Reheat Expansion Module is available for applications using fan terminals and/or more than 1 stage of Heat, SCR electric heat, or if using modulating HW heat. The Expansion Module connects to the VAV/Zone Controller by means of a prefabricated E-BUS cable.

Mounting

The Orion BACnet® P.I. VAV/Zone Controller is very easy to mount on your terminal unit or to a round or rectangular damper mounting plate. Three holes are provided in the plastic controller housing for mounting to a control panel base. Detailed mounting and installation instructions are provided with each package.

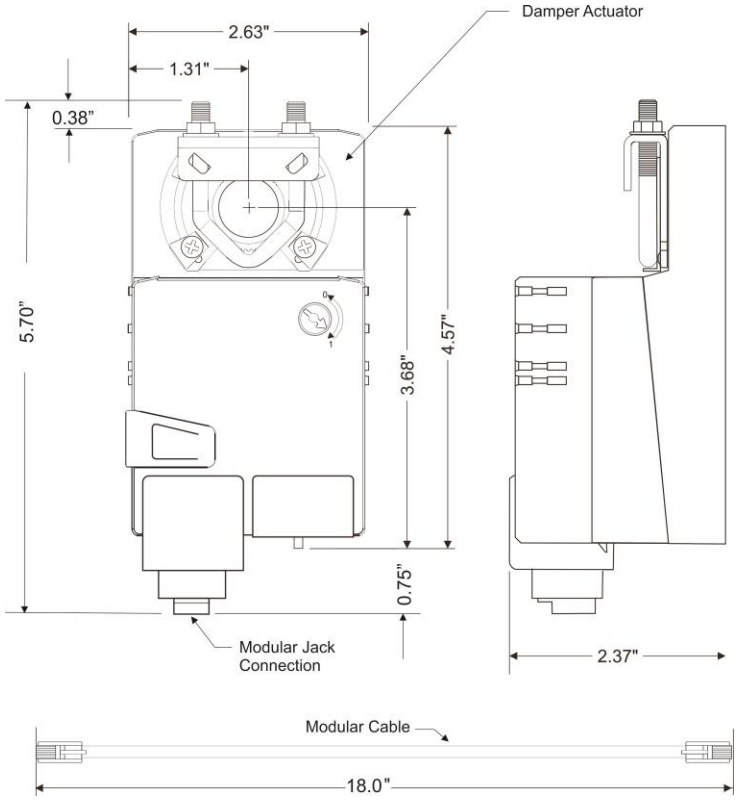
Technical Data		Orion BACnet® Pressure Independent VAV/Zone Controller
VAV/Zone Controller General Specifications:		**Inputs:**
Supply Power	18-30 VAC	(1) 3 Pole Terminal Block Connector For Watt Comm In & Out
Power Consumption	7 VA Maximum	(1) 3 Pole Terminal Block Connector For BACnet® In & Out
Operating Temperature	10°F to 149°F	(1) 2 Pole Terminal Block Connector For Power In
		(1) 2 Pole Terminal Block For Discharge Temperature Sensor Connection
Operating Humidity	0-95% RH Non-Condensing	(1) 2 Pole Terminal Block for Occupancy or Window Switch Terminals
Communications	RS-485 57.6 K	Hi & Lo Pressure Tube Fittings For Integral Air Flow Sensor
Inputs:		**Outputs:**
(1) 3 Pole Terminal Block for Analog Room Temperature Sensor Applications		(2) E-BUS Connectors For Connection of Expansion Module and/or E-BUS Digital Room Temperature Sensor
		(1) RJ-12 Modular Connector for Connection of Actuator
(1) 4 Pole Terminal Block for E-BUS Digital Room Sensor Applications		(1) 2 Pole Terminal For Connection Of Auxiliary Heat Contactor
AAON reserves the right to change specifications without notice.	**All Dimensions are in inches.**	**One Year Warranty**

Zone Damper Actuator

ASM01846 ALT-REF number OE282-01

Description

The Zone Damper Actuator is a shaft mounted, floating point control actuator with an included phone jack cable. Actuators are 24VAC/24VDC with a 10K ohm feedback signal for position monitoring. Wiring connection to the actuator is by means of a modular phone cable connector located on the actuator cover. The actuator is rated for 45 in-lb of torque. All actuators are electronically protected against overload. The angle of rotation is mechanically limited to 95°. When the end position of the actuator or damper is reached, the actuator automatically stops. For adjustment purposes, the gears can be manually disengaged by pushing the manual override button on the actuator cover.



Applications

The Zone Damper Actuator is used to provide control of air volume dampers in a VAV or Zoning system.

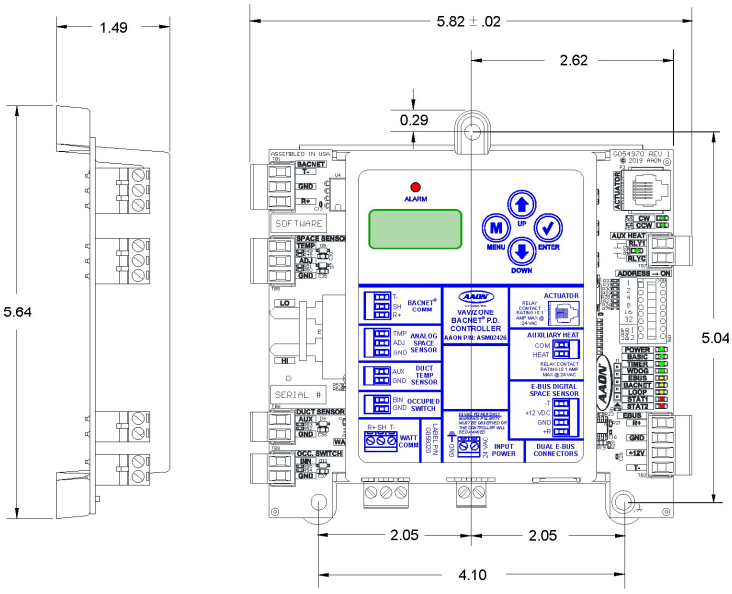
The actuator is included in the P.D. VAV/Zone Controller
Package or the P.I. VAV/Zone Controller Package.

The Zone Damper Actuator is also included in the following pressure dependent and pressure independent round zone damper packages — 6, 8,12,14,16 — the size of the damper's diameter in inches.

Technical Data		**Zone Damper Actuator**	
Power Supply	24VAC ± 20% 50/60HZ	Angle of Rotation	Max. 95°, Adjustable with Mechanical Stops
Life Cycle Rating	2.5 Million Cycles		
Power Consumption	3 VA Maximum	Power Connection	RJ-11 Modular Jack
Operating Temp	-22°F to 122°F	Servicing	Maintenance Free
Operating Humidity	0- 95% RH Non-Condensing	Quality Standard	ISO 9001
Shaft Size	Self-Centering - Adjustable from $^{3}/_{8}$" to ½"	Direction of Rotation	Reversible with Switch
Overload Protection	Electronic Throughout 0 to 95° Rotation	Agency Listings	UL873 listed, CSA 4813 02 Certified and/or cULus acc. to UL 60730-1A/-2-14, CAN/CSA E60730-1:02, CE acc. to 2004/108/EEC and 2006/95/EC
Feedback Signal	10K ohm 1W Potentiometer	Torque	Minimum 45 in-lb
Running Time	80-110 Seconds	Weight	1.2 lb.
One Year Warranty		**AAON reserves the right to change specifications without notice**	

Pressure Dependent VAV/Zone BACnet® Controller Package

ASM02661



Description

The Pressure Dependent (P.D.) VAV/Zone BACnet® Controller Package includes the VAV/Zone BACnet® Controller mounted in a plastic enclosure and the Zone Damper Actuator with cable.

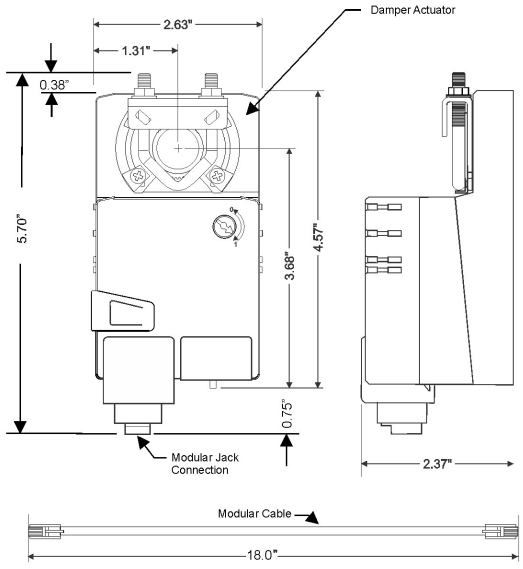
P.D. VAV/Zone BACnet® Controller & Damper Actuator

The P.D. VAV/Zone BACnet® Controller is designed for pressure dependent VAV Box and Zone Damper applications that do not require pressure independent airflow control. The Controller is mounted in a plastic enclosure.

The VAV/Zone BACnet® Controller is designed for use with a Damper Actuator with cable package. The controller and actuator can be purchased separately or as a combined package. The VAV/Zone BACnet® Controller connects to the actuator via the modular cable that is included with the actuator. One stage of Aux Heat is provided on the controller. The VAV/Zone BACnet® Controller can use a Standard Room Temperature Sensor wired to the designated 3-pole terminal block or an E-BUS Digital Room Sensor wired to the designated 4-pole terminal block or connected via the EBC E-BUS port. The VAV/Zone BACnet® Controller also has a 2 pole terminal block for wiring a Discharge Temperature Sensor, if desired.

Optional Reheat Expansion Module

An optional Reheat Expansion Module is available for applications using fan terminals and/or more than 1 stage of Heat, SCR electric heat, or if using modulating HW heat. The Expansion Module connects to the VAV/Zone BACnet® Controller by means of a prefabricated E-BUS cable.



Mounting

The VAV/Zone BACnet® Controller Package is very easy to mount on the Orion round air damper. There are four conduit holes that are sized for ½" conduit fittings that are provided for as part of the mounting plate that is on the Orion series of zone dampers.

The rectangular damper kit also has four ½" conduit knock-outs in its enclosure. Detailed mounting and installation instructions are provided with each VAV/Zone BACnet® Controller Package.

Technical Data		P.D. VAV/Zone BACnet® Controller
Zone Controller General Specifications		**Inputs**
Supply Power	18-30 Volts AC	(1) 3-Pole Terminal Block Connector for Watt Comm In & Out
Power Consumption	7 VA Maximum	(1) 3-Pole Terminal Block Connector for BACnet® In & Out
Operating Temperature	-22°F to 158°F (-30ºC to 70ºC) **NOTE:** If the Outdoor Air Temperature is below -4ºF (20ºC), the display could be less responsive.	(1) 2-Pole Terminal Block for Discharge Temperature Sensor Connection
Operating Humidity	0-95% RH Non-Condensing	(1) 2-Pole Terminal Block for Occupancy or Window Switch Terminals
Communications	RS-485 57,600 Baud	
Inputs		**Outputs**
(1) 3-Pole Terminal Block for Analog Room Temperature Sensor Applications		(2) E-BUS Connectors for Connection of Expansion Module and/or E-BUS Digital Room Temperature Sensor
		(1) RJ-45 Modular Connector for Connection of Actuator
(1) 4-Pole Terminal Block for E-BUS Digital Room Temperature Sensor Applications		(1) 2-Pole Terminal For Connection of Auxiliary Heat Contactor
One Year Warranty		**AAON reserves the right to change specifications without notice**

Technical Data		Zone Damper Actuator	
Power Supply	24VAC ± 20% 50/60HZ	Angle of Rotation	Max. 95°, Adjustable with Mechanical Stops
Life Cycle Rating	2.5 Million Cycles		
Power Consumption	3 VA Maximum	Power Connection	RJ-11 Modular Jack
Operating Temp	-22°F to 122°F	Servicing	Maintenance Free
Operating Humidity	0 to 95% RH Non-Condensing	Quality Standard	ISO 9001
Shaft Size	Self-Centering - Adjustable from ⅜" to ½"	Direction of Rotation	Reversible with Switch
Overload Protection	Electronic Throughout 0 to 95° Rotation	Agency Listings	UL873 listed CSA 4813 02 Certified and/or cULus acc. to UL 60730-1A/-2-14, CAN/CSA E60730-1:02, CE acc. to 2004/108/EEC and 2006/95/EC
Feedback Signal	10K ohm 1W Potentiometer	Torque	Minimum 45 in-lb
Running Time	80-110 Seconds.	Weight	1.2 lb.
One Year Warranty		**AAON reserves the right to change specifications without**	

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Pressure Independent VAV/Zone BACnet® Controller Package

ASM02662

Description

The Pressure Independent (P.I.) VAV/Zone BACnet® Controller Package with Terminal Block connectors includes the VAV/Zone BACnet® Controller mounted in a plastic enclosure, the Zone Damper Actuator with cable, and an Airflow Sensor.

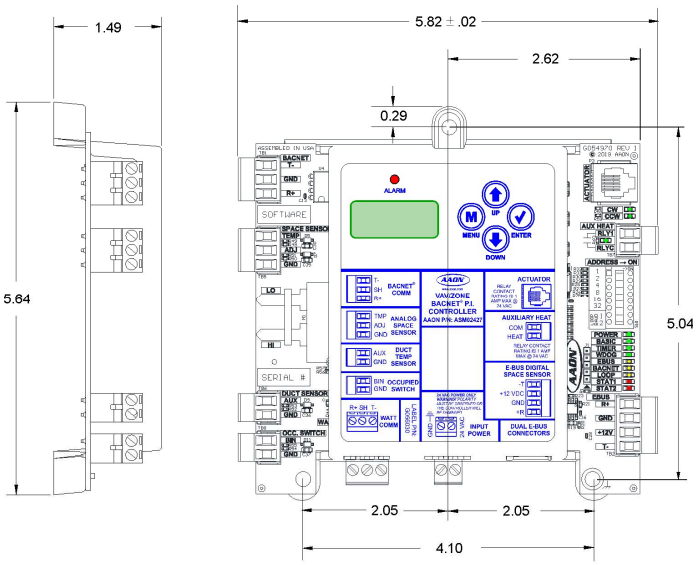
P.I. VAV/Zone BACnet® Controller & Damper Actuator

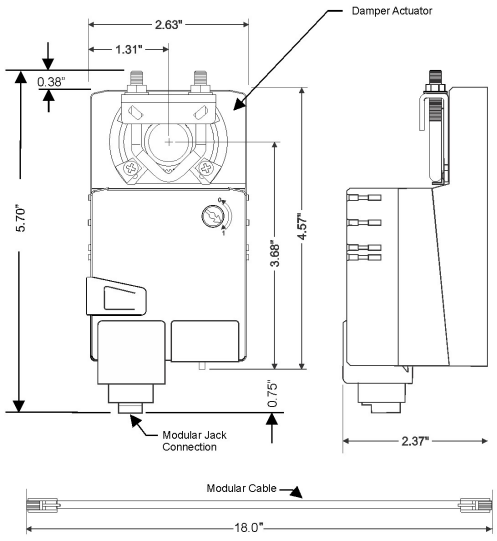
The P.I. VAV/Zone BACnet® Controller is designed for pressure independent VAV Box and Zone Damper applications. It is supplied with an integral Airflow Sensor and is mounted in a plastic enclosure.

The VAV/Zone BACnet® Controller is designed for use with a Damper Actuator with cable package. The controller and actuator can be purchased separately or as a combined package. The VAV/Zone BACnet® Controller connects to the actuator via the modular cable included with the actuator. One stage of Aux Heat is provided on the controller. The VAV/Zone BACnet® Controller wired to the designated 3-pole terminal block or an E-BUS Digital Room Sensor wired to the designated 4-pole terminal block or connected via the EBC E-BUS port. The VAV/Zone BACnet® Controller also has a 2 pole terminal block for wiring a Discharge Temperature Sensor, if desired.

Optional Reheat Expansion Module

An optional Reheat Expansion Module is available for applications using fan terminals and/or more than 1 stage of Heat, SCR electric heat, or if using modulating HW heat. The Expansion Module connects to the VAV/Zone BACnet® Controller by means of a prefabricated E-BUS cable.





Mounting

The VAV/Zone BACnet® Controller Package is very easy to mount on your terminal unit. There are four conduit holes that are sized for ½" conduit fittings that are provided for as part of the mounting plate that is on the Orion series of zone dampers. The rectangular damper kit also has four ½" conduit knock-outs in its enclosure as well. Detailed mounting and installation instructions are provided with each VAV/Zone Controller Package.

Technical Data		P.I. VAV/Zone BACnet® Controller
VAV/Zone Controller General Specifications		**Inputs**
Supply Power	18-30 VAC	(1) 3-Pole Terminal Block Connector for Watt Comm In & Out
Power Consumption	7 VA Maximum	(1) 3-Pole Terminal Block Connector for BACnet® In & Out
Operating Temperature	-22°F to 158°F (-30ºC to 70ºC) **NOTE:** If the Outdoor Air Temperature is below -4ºF (20ºC), the display could be less responsive.	(1) 2-Pole Terminal Block for Discharge Temperature Sensor Connection
Operating Humidity	0-95% RH Non-Condensing	(1) 2-Pole Terminal Block for Occupancy or Window Switch Terminals
Communications	RS-485 57,600 Baud	Hi & Lo Pressure Tube Fittings for Integral Air Flow Sensor
Inputs		**Outputs**
(1) 3-Pole Terminal Block for Analog Room Temperature Sensor Applications		(2) E-BUS Connectors For Connection of Expansion Module and/or E-BUS Digital Room Temperature Sensor
		(1) RJ-45 Modular Connector for Connection of Actuator
(1) 4-Pole Terminal Block for E-BUS Digital Room Sensor Applications		(1) 2-Pole Terminal For Connection of Auxiliary Heat Contactor
One Year Warranty		**AAON reserves the right to change specifications without notice**

Technical Data		Zone Damper Actuator	
Power Supply	24VAC ± 20% 50/60HZ	Angle of Rotation	Max. 95°, Adjustable with Mechanical Stops
Life Cycle Rating	2.5 Million Cycles		
Power Consumption	3 VA Maximum	Power Connection	RJ-11 Modular Jack
Operating Temp	-22°F to 122°F	Servicing	Maintenance Free
Operating Humidity	0-95% RH Non-Condensing	Quality Standard	ISO 9001
Shaft Size	Self-Centering - Adjustable from ⅜" to ½"	Direction of Rotation	Reversible with Switch
Overload Protection	Electronic Throughout 0 to 95° Rotation	Agency Listings	UL873 listed, CSA 4813 02 Certified and/or cULus acc. to UL 60730-1A/-2-14, CAN/CSA E60730-1:02, CE acc. to 2004/108/EEC and 2006/95/EC
Feedback Signal	10K ohm 1W Potentiometer	Torque	Minimum 45 in-lb
Running Time	80-110 Seconds	Weight	1.2 lb.
One Year Warranty		**AAON reserves the right to change specifications**	

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VAV/Zone Controller Expansion Module

ASM01629 ALT-REF number OE325-03

Description

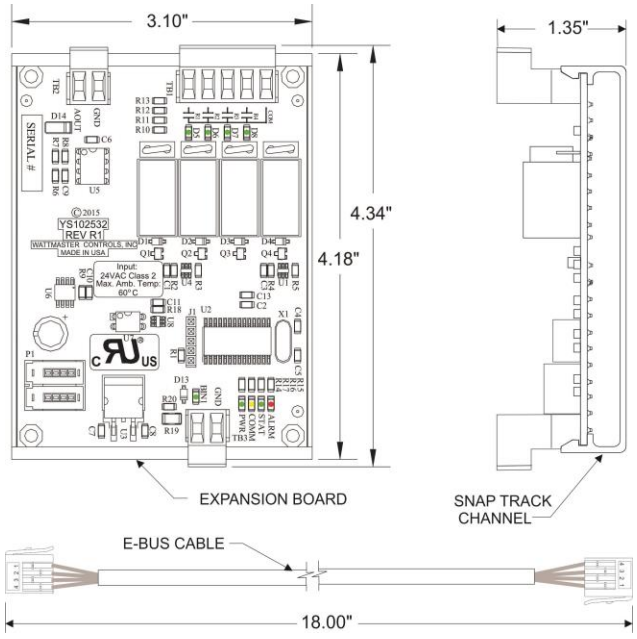
The VAV/Zone Controller Expansion Module is used in conjunction with the pressure dependent or pressure independent VAV/Zone Controller to allow for control of fans included in series and parallel flow fan terminal units and/or additional staged or modulating heat. It can also control up to 3 stages of electric heat, SCR electric heat, on/off HW heat, or modulating hot water heat.

The VAV/Zone Controller Expansion Module provides 4 relay outputs for pilot duty switching control, (1 fan and 3 heat) relay outputs and 1 analog output for control of a 0-10V modulating hot water valve or SCR controlled electric heating coil.

The VAV/Zone Controller Expansion Module connects to the controllers mentioned previously by means of an E-BUS cable that is provided with the Expansion Module. Power to this board is also supplied to the board by means of the E-BUS cable for the VAV/Zone Controller.

De-pluggable screw terminals are provided for connection of field wiring to the relays outputs, the analog outputs, and the binary input (not used in this application).

The relay outputs are N.O. contacts with one common terminal. All outputs and the relay common are electrically isolated from all other circuitry on the board. All relay outputs are supplied with transient suppression devices across each set of contacts to reduce EMI and contact arcing. The relay output circuits are rated for pilot duty control of a maximum of 1 Amp @ 24 VAC or 24 VDC each. These outputs require a separate 24 VAC transformer (or extra added VA) provided by others. The analog output provides a 0-10 VDC modulating signal output into a 1K Ohm minimum load. If a Modulating Hot Water Valve is being used, it will also need a 24 VAC transformer (or extra added VA) by others for its power source.



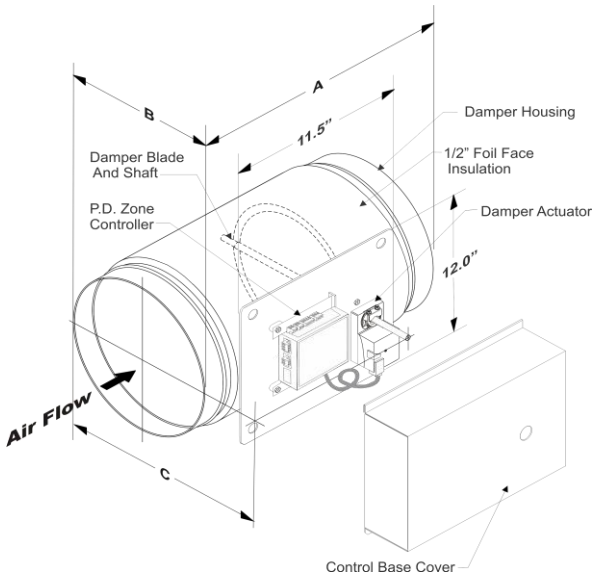
Mounting

The VAV/Zone Controller Expansion Module is supplied mounted on a plastic snap track channel. The snap track channel has a single mounting hold which is used to field mount the board with the provided screw. The module should be mounted in close proximity to the VAV/Zone Controller to allow for connection with the supplied E-BUS cable.

Technical Data		**VAV/Zone Controller Expansion Module**	
Operating Temp	10°F to 150°F	Operating Humidity	0-95% RH Non-Condensing
Weight	4 oz.	Connection to Controller:	E-BUS Modular Cable
Outputs:		***Inputs:***	
Analog Output Qty & Rating	(1) 0-10 VDC @ 1K Ohm Minimum load	Binary Input	Not Used for this Application
Relay Output Qty.	4 – Electrically Isolated		
Analog Output Qty & Rating	(1) 0-10 VDC @ 1K Ohm Minimum load		
One Year Warranty		**AAON reserves the right to change specifications without notice**	

Round P.D. Zone Damper Assembly With Terminal Block Connectors

ASM0XXXX ALT-REF number OE520-XX-PT



Description

The Round Pressure Dependent Zone Damper Assembly with terminal block connectors consists of a round air damper and Zone Controller Actuator Package with terminal wiring connectors. An optional VAV/Zone Controller Expansion Module is available for control of reheat, heat and/or control of series or parallel flow fan terminal units.

The VAV/Zone Controller board is microprocessor based and communicates with the HVAC unit controller on the Orion network communications loop. The VAV/Zone Controller monitors the space temperature and allocates the proper airflow into its assigned space to achieve the desired comfort and ventilation levels.

Pressure Dependent Zone Dampers are used in air conditioning systems that do not require pressure independent airflow control. If your system requires pressure independent control of the airflow, see the Round Pressure Independent Zone Damper submittal sheet for the correct specifications. All dampers are tested for performance in accordance with AMCA 500D standards.

Mounting

The Zone Damper Assembly should be mounted according to standard duct installation practices with airflow direction as shown in the illustration above. After installation of the Zone Damper in the ductwork, insulation should be applied around any remaining un-insulated surface on the damper inlet and outlet. The Zone Damper should be mounted so the control enclosure is positioned to the left or right side of the ductwork with the control enclosure in a vertical plane. Do not mount the Zone Damper Assembly with the control enclosure on the top or bottom of the ductwork. Adequate clearance should be maintained between the control panel and any obstruction to allow for removal of the control panel cover and access to the controls.

Technical Data	**Round Pressure Dependent Zone Damper Assembly with Terminal Block Connectors**

VAV/Zone Controller:	
Supply Power	18-30 Volt AC
Power Consumption	6 VA Maximum
Operating Temperature	35°F to 125°F
Operating Humidity	0-95% RH Non-Condensing
Communications	RS-485 - 9600 Baud

Inputs:
Room Temperature Sensor
Setpoint Adjustment
Actuator Position Feedback
Communication Connectors: Terminals In & Out
Outputs:
Expansion Port for Auxiliary Relay Board
Actuator Port for Connection to Damper Actuator

Air Damper Construction:	
Damper Body	20 Ga. Galv. Steel
Damper Blade	Round -18 Ga. Galv. Steel
Damper Bearings	Stainless Steel
Damper Seal	EPDM Rubber Gasket
Leakage	< 20 CFM Per Sq. Ft. @ 4" SP
Insulation	½" Foil Faced Fiberglass

Dimensions:

Air Damper Model	***"A"***	***"B"***	***"C"***
ASM01914 (6")	23.00	5.88	9.88
ASM01915 (8")	23.00	7.88	12.13
ASM01916 (10")	23.00	9.88	14.31
ASM01917 (12")	23.00	11.88	16.43
ASM01918 (14")	23.00	13.88	18.50
ASM01919 (16")	23.00	15.88	20.56

AAON reserves the right to change specifications without notice. **All dimensions are in inches.**

One Year Warranty On Electronic Components **One Year Warranty On Air Damper**

VAV/Zone Damper Sizing

Use a load program to determine the peak load for each zone. These calculations will be used to select Zone Damper sizes.

The Orion Systems utilize a typical low pressure duct design. To reduce airflow noise problems, duct pressures generally should not exceed 1" W.C.

Primary trunk ducts that are used with Orion systems should not be "undersized". This is especially true of "pressure dependent" systems. With larger trunk ducts, it is easier to assure relatively constant pressure to each Zone Damper. Runs should be as short as possible, and the trunk duct system kept as symmetrical as possible to facilitate system balancing. Wherever possible, run the trunk ducts above corridors and locate the Zone Dampers in the areas above corridors to reduce the noise in the space and to facilitate service of the valves. Trunk ducts should be sized for no more than 0.1" W.C. drop per 100 ft. of duct, and a maximum duct velocity of 2000 FPM.

Using the maximum acceptable velocity for a branch duct (typically 1000-1500 FPM for minimal noise), find the smallest Zone Damper that will deliver the required CFM as determined by the load program. Locate the branch velocity used in the duct design program in the left hand column of the Zone Damper Selection Data table. Move across the table and find the Zone Damper, which will provide the acceptable CFM to meet the zone airflow requirements.

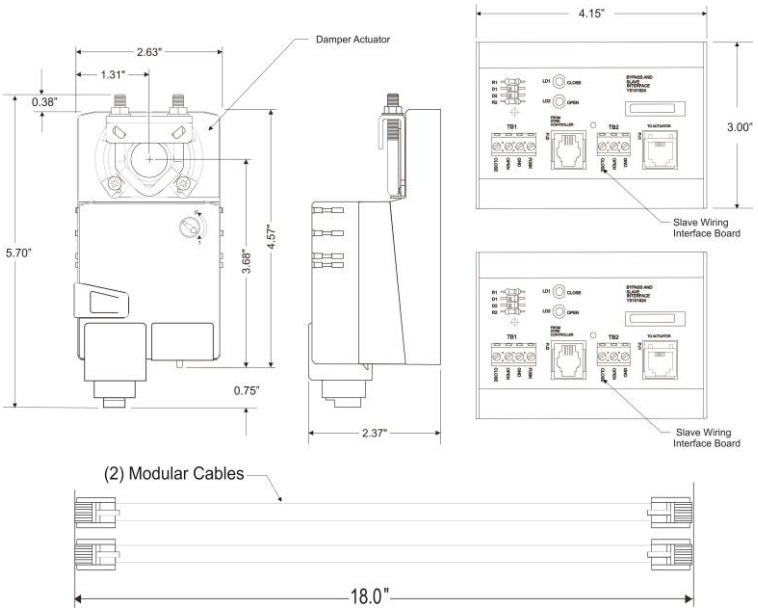
Note: Compare the Zone Damper size selected against the duct size to determine if the next size up or down will provide acceptable performance without requiring a transition fitting.

Up to a maximum of two Slaved Zone Dampers may be slaved together with the main Zone Damper for large zones. This design should be reserved only for situations when it is not practical to use a single Zone Damper. See the Round Slaved Zone Damper submittal sheet for information regarding application and selection of Round Slaved Zone Dampers.

Zone Damper Selection Data	**Round P.D. Zone Damper Assembly with Terminal Connectors**					
Zone Damper Round Duct Size (Area Ft^2)	6" (0.196)	8" (0.349)	10" (0.545)	12" (0.785)	14" (1.069)	16" (1.396)
Velocity Through VAV/Zone Damper FPM	**Airflow Through VAV/Zone Damper - CFM (ΔP_S inches W.C. w/ Damper Full Open)**					
500	98 (< 0.01)	175 (< 0.01)	273 (< 0.01)	393 (< 0.01)	535 (< 0.01)	698 (< 0.01)
750	147 (0.01)	262 (0.01)	409 (0.01)	589 (< 0.01)	802 (< 0.01)	1047 (< 0.01)
1000	196 (0.015)	349 (0.015)	545 (0.01)	785 (< 0.01)	1069 (< 0.01)	1396 (< 0.01)
1250	245 (0.025)	436 (0.02)	681 (0.015)	981 (0.015)	1336 (0.015)	1745 (0.015)
1500	294 (0.035)	523 (0.035)	818 (0.022)	1178 (0.020)	1604 0.020)	2094 (0.020)
1750	343 (0.045)	611 (0.035)	954 (0.034)	1374 (0.030)	1871 (0.030)	2443 (0.025)
2000	392 (0.065)	698 (0.043)	1090 (0.040)	1570 (0.040)	2138 (0.040)	2792 (0.030)
AAON reserves the right to change specifications without notice						

Slaved VAV/Zone Damper Kit

ASM01851 ALT-REF number OE282-03



Description

The Slaved VAV/Zone Damper Kit consists of a Damper Actuator, (2) Slave Wiring Interface Boards and (2) 18" Long Modular Cables.

The Actuator is a shaft mounted, floating point control actuator. The actuator is a 24VAC/24VDC model with a 10K ohm feedback signal for position monitoring. Wiring connection to the actuator is by means of a modular phone cable connector located on the actuator cover.

The actuator is rated for 45 in-lb. of torque. All actuators are electronically protected against overload. The angle of rotation is mechanically limited to 95°. When the end position of the actuator or damper is reached, the actuator automatically stops. For adjustment purposes, the gears can be manually disengaged by pushing the manual override button on the actuator cover.

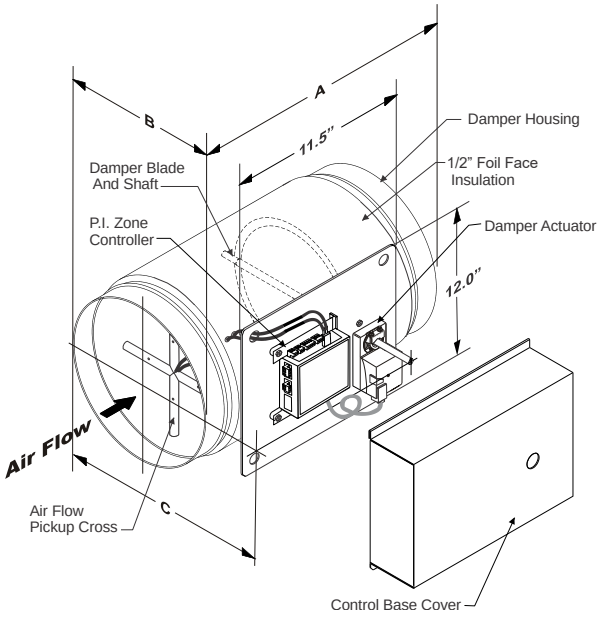
Applications

The Slaved VAV/Zone Damper Kit allows multiple dampers (up to 2 total besides the master) to be connected to a master P.D. VAV/Zone Controller Actuator Package. The Kit is typically used when larger CFM requirements dictate multiple dampers are used. One of the Interface Boards connects to the master VAV/Zone Controller via a modular cable. The other Interface Board connects to the Slave Damper Actuator. Three conductor wiring is then routed and connected between the two Interface Boards. For zones requiring more than one Slave Damper Kit a second one can be purchased and installed in the same manner.

Technical Data		**Slaved VAV/Zone Damper Kit**	
Actuator Power Supply	24VAC ± 20% 50/60HZ	Actuator Angle of Rotation	Max. 95°, Adjustable with Mechanical Stops
Actuator Life Cycle Rating	2.5 Million Cycles		
Actuator Power Consumption	3 VA Maximum	Power Connections	RJ-11 Modular Jack
Operating Temp	-22°F to 122°F	Servicing	Maintenance Free
Operating Humidity	0-95% RH Non-Condensing	Actuator Quality Standard	ISO 9001
Actuator Overload Protection	Electronic Throughout 0 to 95° Rotation	Actuator Agency Listings	UL873 listed CSA 4813 02 Certified
Actuator Feedback Signal	10K ohm 1W Potentiometer	Actuator Torque	Minimum 45 in-lb.
Actuator Running Time	80-110 Seconds.	Approx. Kit Weight	2.2 lb.
Slave wiring Board	(2) RJ-11 Modular Jacks	Slave Wiring Board	(2) Wiring Terminal Blocks
One Year Warranty		**AAON reserves the right to change specifications without notice**	

Round P.I. Zone Damper Assembly with Terminal Block Connectors

ASM0XXXX ALT-REF number OE521-XX-PT



Description

The Round Pressure Independent Zone Damper Assembly with terminal block connectors consists of a round air damper with air flow pickup cross and the Zone Controller Package (including air flow sensor) with terminal block connectors. An optional VAV/Zone Controller Expansion Module is available for control of reheat, auxiliary heat, and/or control of series or parallel flow fan terminal units.

The VAV/Zone Controller board is microprocessor based and communicates with the HVAC unit controller on the Orion local communications loop. The VAV/Zone Controller monitors the space temperature and allocates the proper airflow into its assigned space to achieve the desired comfort and ventilation levels.

Pressure Independent VAV/Zone Dampers are used in air conditioning systems that require pressure independent airflow control. If your system requires pressure dependent control of the airflow, see the Round Pressure Dependent Zone Damper submittal sheet for the correct specifications.
All dampers are tested for performance in accordance with AMCA 500D standards.

Mounting

The Zone Damper Assembly should be mounted according to standard duct installation practices with airflow direction as shown in the illustration above. After installation of the Zone Damper in the ductwork, insulation should be applied around any remaining un-insulated surface on the damper inlet and outlet. The Zone Damper should be mounted so that the control enclosure is positioned to the left or right side of the ductwork with the control enclosure in a vertical plane. Do not mount the Zone Damper Assembly with the control enclosure on the top or bottom of the ductwork.

Technical Data		**Round Pressure Independent Zone Damper Assembly with Terminal Block Connectors**			
Zone Controller:		***Air Damper Construction:***			
Supply Power	18-30 Volt AC	Damper Body	20 Ga. Galv. Steel		
Power Consumption	6 VA Maximum	Damper Blade	Round -18 Ga. Galv. Steel		
Operating Temperature	35°F to 125°F	Damper Bearings	Stainless Steel		
Operating Humidity	0-95% RH Non Condensing	Damper Seal	EPDM Rubber Gasket		
Communications	RS-485 - 57600 Baud	Leakage	< 20 CFM Per Sq. Ft. @ 4" SP		
Inputs:		Insulation	½" Foil Faced Fiberglass		
Air Flow Sensor		***Dimensions:***			
Room Temperature Sensor		**Air Damper Model**	***"A"***	***"B"***	***"C"***
Setpoint Adjustment		ASM01920 (6")	23.00	5.88	9.88
Actuator Position Feedback		ASM01921 (8")	23.00	7.88	12.13
Communication Connectors: 3 Position Terminal Block		ASM01922 (10")	23.00	9.88	14.31
Expansion E-BUS Port for Auxiliary Relay Board		ASM01923 (12")	23.00	11.88	16.43
E-BUS Port for E-BUS Digital Room Sensor and CO_2 Sensor		ASM01924 (14")	23.00	13.88	18.50
Actuator Port for Connection to Damper Actuator		ASM01925 (16")	23.00	15.88	20.56
AAON reserves the right to change specifications without notice		**All dimensions are in inches.**			
One Year Warranty On Electronic Components		**One Year Warranty On Air Damper**			

Zone Damper Sizing

Use a load program to determine the peak load for each zone. These calculations will be used to select Zone Damper sizes. The Orion Systems utilize a typical low pressure duct design. To reduce airflow noise problems, duct pressures generally should not exceed 1" W.C. Primary trunk ducts that are used with Orion systems should not be "undersized". This is especially true of "pressure dependent" systems. With larger trunk ducts, it is easier to assure relatively constant pressure to each Zone Damper. Runs should be as short as possible, and the trunk duct system kept as symmetrical as possible to facilitate system balancing. Wherever possible, run the trunk ducts above corridors and locate the Zone Dampers in the areas above corridors to reduce the noise in the space and to facilitate service of the valves. Trunk ducts should be sized for no more than 0.1" W.C. drop per 100 ft. of duct, and a maximum duct velocity of 2000 FPM.

Using the maximum acceptable velocity for a branch duct (typically 1000-1500 FPM for minimal noise), find the smallest Zone Damper that will deliver the required CFM as determined by the load program. Locate the branch velocity used in the duct design program in the left hand column of the Zone Damper Selection Data table. Move across the table and find the Zone Damper, which will provide the acceptable CFM to meet the zone airflow requirements.

Note: Compare the Zone Damper size selected against the duct size to determine if the next size up or down will provide acceptable performance without requiring a transition fitting.

Pressure Independent Zone Dampers may not be slaved together with Slaved-Zone Damper Assemblies. If more than one damper is required for a zone, all dampers must be selected as pressure dependent. See the Pressure Dependent Zone Damper submittal sheet and Slaved-Zone Damper submittal sheets for selection of master/slave damper configurations.

Zone Damper Selection Data	**Round Pressure Independent Zone Damper Assembly w/Terminal Block Connectors**					
Zone Damper Round Duct Size (Area Ft^2)	6" (0.196)	8" (0.349)	10" (0.545)	12" (0.785)	14" (1.069)	16" (1.396)
CFM @ 1" Velocity Pressure (Air Flow Probe "K" Factor)	448	904	1436	1891	3015	3839
Velocity Through VAV/Zone Damper FPM	**Airflow Through VAV/Zone Damper – CFM (ΔP_S inches W.C. w/ Damper Full Open)**					
500	98 (< 0.01)	175 (< 0.01)	273 (< 0.01)	393 (< 0.01)	535 (< 0.01)	698 (< 0.01)
750	147 (0.01)	262 (0.01)	409 (0.01)	589 (< 0.01)	802 (< 0.01)	1047 (< 0.01)
1000	196 (0.015)	349 (0.015)	545 (0.01)	785 (< 0.01)	1069 (< 0.01)	1396 (< 0.01)
1250	245 (0.025)	436 (0.02)	681 (0.015)	981 (0.015)	1336 (0.015)	1745 (0.015)
1500	294 (0.035)	523 (0.035)	818 (0.022)	1178 (0.020)	1604 0.020)	2094 (0.020)
1750	343 (0.045)	611 (0.035)	954 (0.034)	1374 (0.030)	1871 (0.030)	2443 (0.025)
2000	392 (0.065)	698 (0.043)	1090 (0.040)	1570 (0.040)	2138 (0.040)	2792 (0.030)
AAON reserves the right to change specifications without notice						