Venturi Air Valve Installation Guide

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Installation checklist

Important: The Venturi Air Valve with UVM1000 Installation Guide supersedes this document. Refer to the Venturi Air Valve with UVM1000 Installation Guide, LIT-12014273, for more information.

Data

- Project information
- Submittals
- Manuals for product

Tools

- Wire strippers
- Flat screwdriver set with different sized drivers
- Phillips screw driver with different sized drivers
- Small vice grips
- Channel locks
- Needle nose pliers
- Crescent wrench
- Nut driver set
- Butane or electric soldering iron
- Fine tip markers

Adherents

- Solder
- Electrical tapes
- Duct tape
- Foil tape
- ASHRAE approved duct sealant

Electronics and components

- Cell phone
- Digital camera
- Flashlight
- Digital volt meter
- DC and AC voltmeter
- DC and AC ammeter
- Resistance measurement with tone
- Extra terminal connectors
- Wire labels
- Laptop with Windows OS and a free USB port
- USB to DB9 male cable
- Universal Valve Module (UVM) Configuration Tool installed

Safety

- Ladder
- Arrest harness

- Safety glasses
- Hard hat or bump cap
- Steel toe cap shoes
- Cut-resistant gloves

Venturi air valves operation overview

The Venturi Valve is an air flow control device that varies the annular orifice to modulate the flow of air. The logarithmic profile of the valve body and the position of the internal damper assembly achieve the variable annular orifice. You can also refer to the orifice as a cone due to its shape. The cone is situated on an actuated shaft, which enables flow control through the full range of the valve, from 0% to 100%.

An increase in duct static pressure compresses a spring housed inside the cone and extends the spring when the pressure reduces. This spring moves the cone independently of the cone shaft, repositions it inside the valve body, and changes the annular orifice. This spring-activated cone travel enables instant mechanical flow adjustments independent of the actuator movement. The spring-enabled cone travel enables mechanical pressure independent flow control by the Venturi air valve.

The pressure-independent flow control feature of the Venturi Valves is functional between 0.3 in. W.C to 3.0 in. W.C for low pressure and 0.6 in. W.C to 3.0 in. W.C for medium pressure applications. This is due to weight, friction and other limiting factors, which attribute to the minimum force required for initiating cone travel.

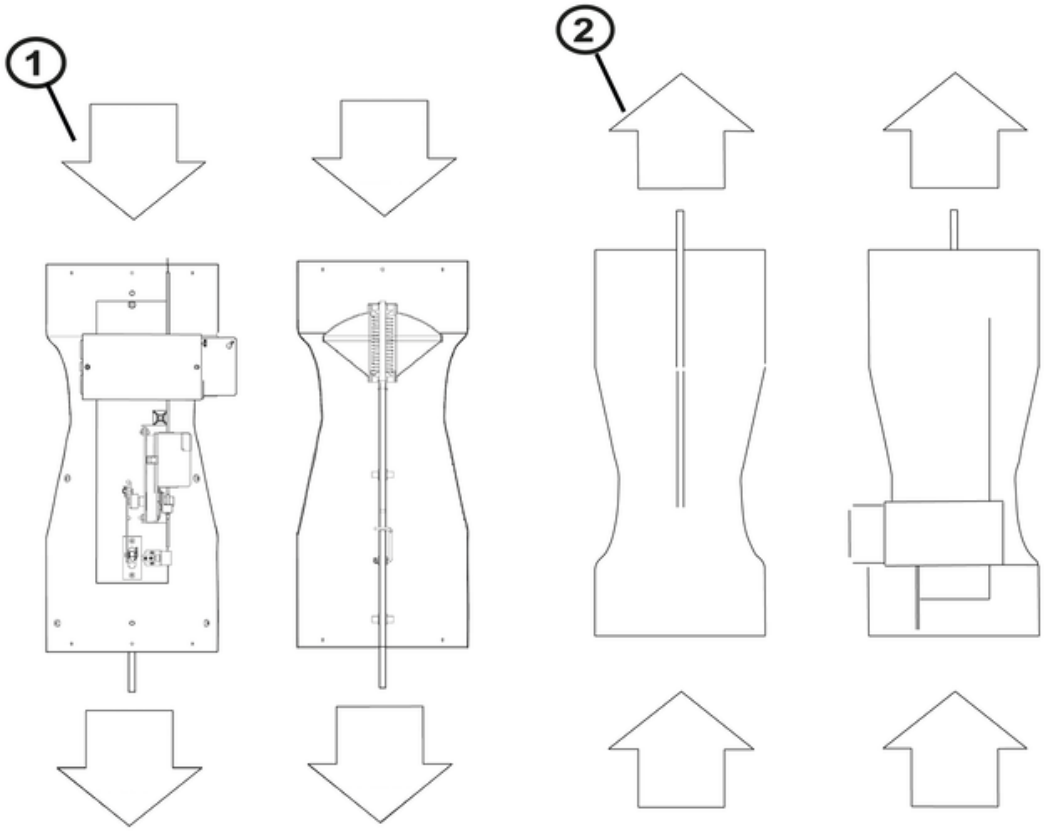
If duct static pressure falls below the minimum level required, 0.3 in. W.C for low pressure and 0.6 in. W.C for medium pressure applications, there is not enough force to move the cone and it begins to compress the spring inside to activate cone travel.

If duct static pressure exceeds the maximum pressure limit allowed, 3.0 in. W.C, the cone fully compresses the spring inside and prevents further cone travel.

Due to the dynamic spring action in the cone assembly, the pressure drop is never constant across a Venturi Valve. Measure at the time of operation for a true reading. To ensure correct operation of the Venturi Valve, maintain the pressure drop across the valve between 0.3 in. W.C and 3 in. W.C for low pressure and between 0.6 in. W.C and 3 in. W.C for medium pressure applications.

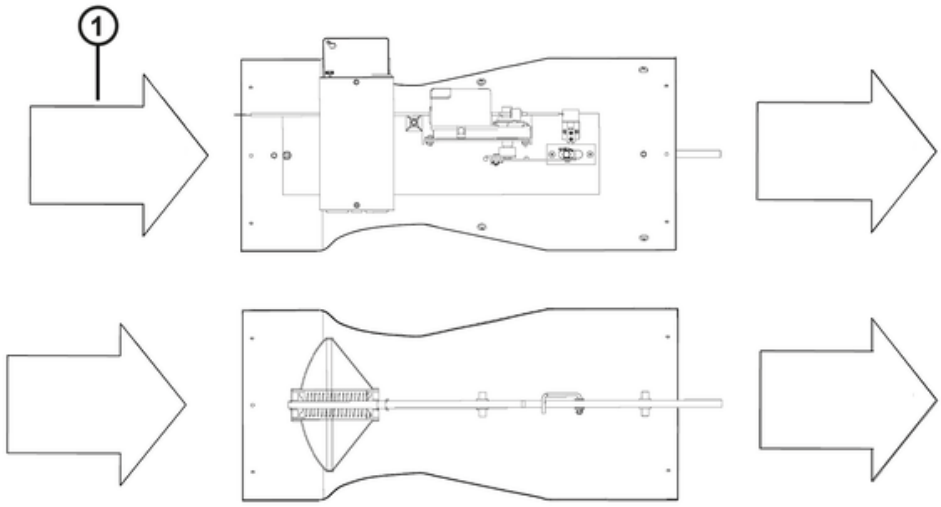
Venturi valve orientations and airflow directions

Figure 1. Vertical position with upward and downward airflows



Callout	Description
1	Downward airflow
2	Upward airflow

Figure 2. Horizontal position with sideways airflow



Callout	Description
1	Sideways airflow

Constant Volume Venturi air valve diagrams

The Constant Volume Venturi air valve, the Fast Actuated Venturi air valve, and the Venturi CCM valve controller and panel layout are described in the following figures and tables.

Figure 1. Constant Volume Venturi Valve

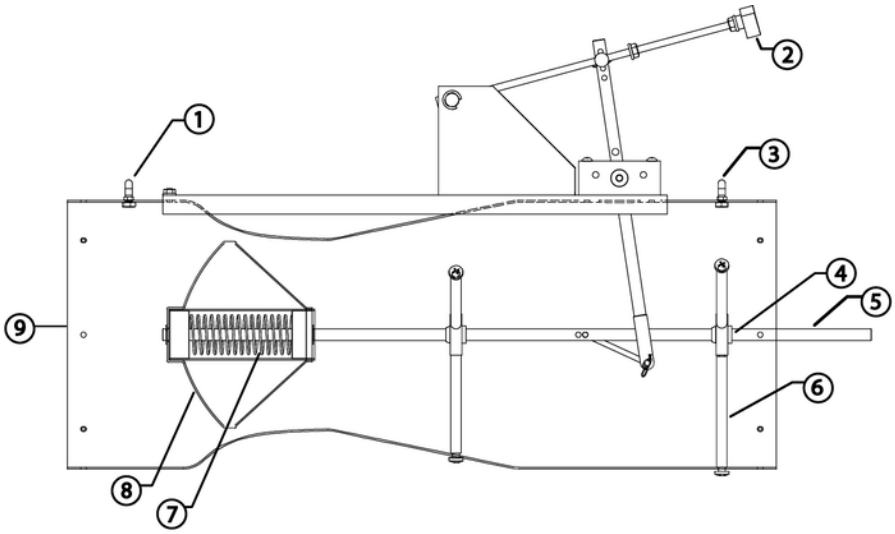


Table 1. Constant Volume Venturi Valve components

Callout	Description
1	Differential pressure pick-up fitting
2	Manual CFM adjustment
3	Differential pressure pick-up fitting
4	Teflon bearing
5	SS316 cone shaft
6	SS316 struts
7	Stainless steel spring
8	Cone assembly
9	Airflow direction

Figure 2. Fast Actuated (FA) Venturi air valve

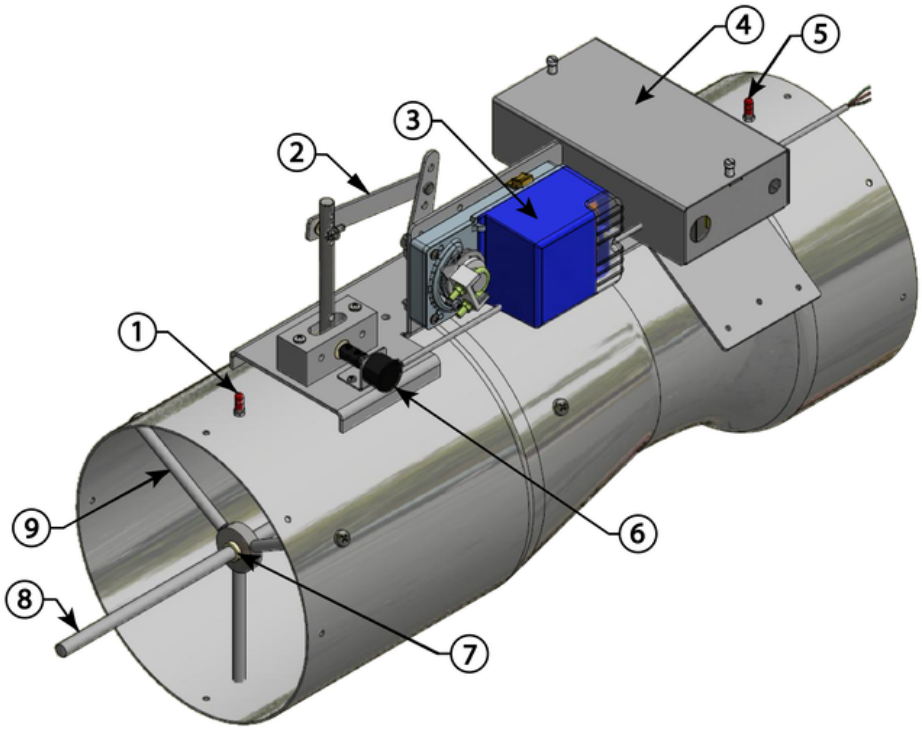


Table 2. Fast Actuated (FA) Venturi air valve components

Callout	Description
1	Differential pressure pick-up fitting
2	Linkage
3	Actuator
4	UVM
5	Differential pressure pick-up fitting
6	Hall effect position sensor
7	Teflon bearings
8	SS316 cone shaft
9	SS316 struts

Figure 3. CCM09090 Valve mounted room level controller

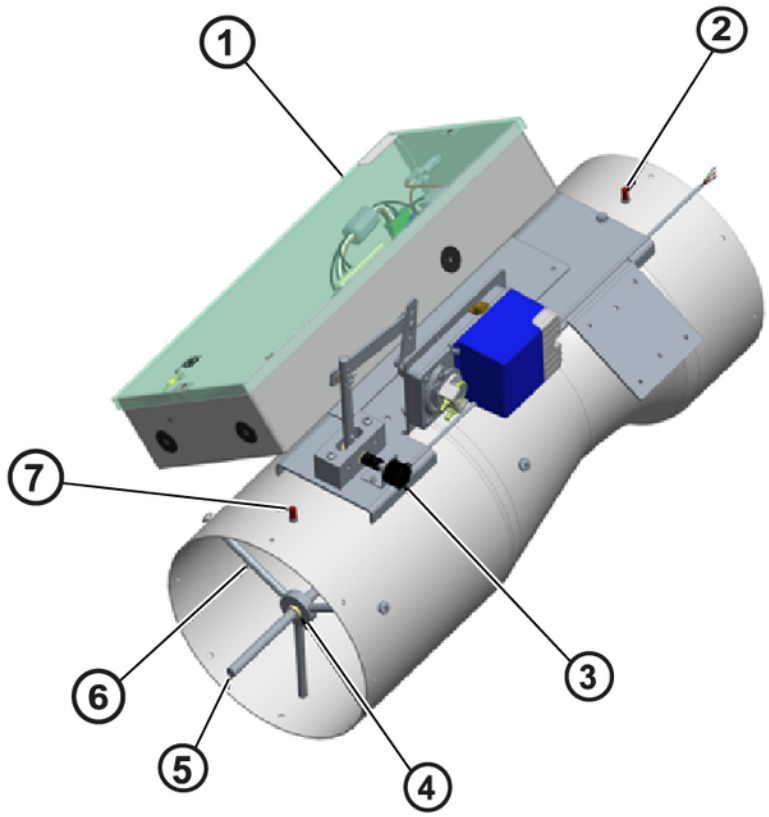
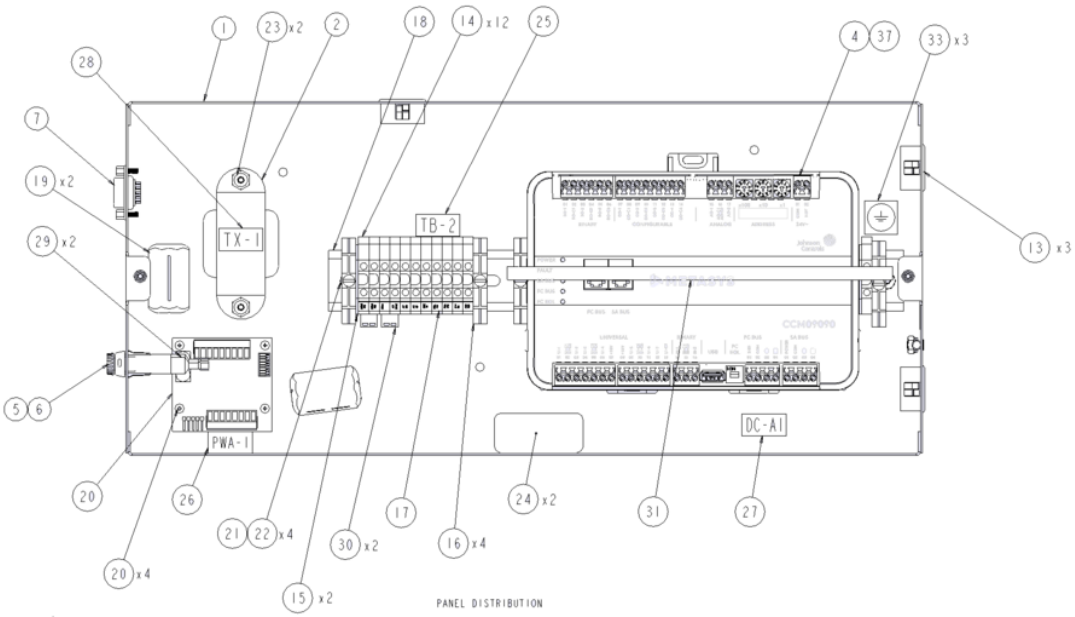


Table 3. CCM09090 Valve mounted room level controller components

Callout	Description
1	CCM panel
2	Differential pressure pick up fitting
3	Hall effect position sensor
4	Teflong bearings
5	S5316 cone shaft
6	S5316 struts
7	Differential pressure pick up fitting

Venturi air valves are available with a factory mounted room level controller CCM09090 on the valve body. This reduces the need for an additional wall mounted panel in the critical space and makes installation easier. The valve mounted controller is the central node in the room for connection to all other devices. It is best practice to designate the location of the controller onto a valve you can easily access, or to a valve with access to the general ventilation supply. For more information, refer to the CCM09090 product documentation.

Figure 4. Venturi CCM panel layout



The following table lists the components for the Venturi CCM panel. All dimensions are in H x W x D.

Table 4. Venturi CCM panel components

Callout	Component	Description	Quantity	Part number
1	Enclosure	Control panel enclosure. 8 in. x 18 in. x 3.5 in. (203 mm x 457.2 mm x 88.9 mm)	1	74-00010-00024
2	Transformer	Control transformer 24 V, 30 VA 50/60Hz	1	02-256-02413
3	PWA	EcoAir printed wire assembly	1	02-01099-00001
4	Controller assembly	M4-CCM09090-0	1	27-05837-00169
5	Fuse	Slow-blow fuse 1.0A, 0.20 in. x 0.79 in. (5 mm x 20 mm)	1	02-412-01437
6	Fuse holder	Fuse holder, 0.20 in. x 0.79 in. (5 mm x 20 mm)	1	02-531-00385
7	Wire harness	Control panel wire harness for Triatek serial port	1	75-00001-00012
8	Insulated wire	Gage 20 AWG, black color	0	02-71-1342
9	Insulated wire	Gage 20 AWG, white color	0	02-71-1202
10	Insulated wire	Gage 18 AWG, orange color	0	02-5549-39

Callout	Component	Description	Quantity	Part number
11	Insulated wire	Gage 18 AWG, red color	0	02-71-1334
12	Insulated wire	Gage 20 AWG, blue color	0	02-71-1326
13	Bushing	Universal nylon flexible bushing, radius size 1 in. (25.4 mm)	3	02-500-00371
14	Terminal block	Single terminal block for DIN rail, width 0.24 in. (6 mm)	13	02-217-2871
15	Terminal block	Single terminal block cap for DIN rail	2	02-217-2898
16	Terminal block	Single terminal block end clamp for DIN rail	3	02-217-2413
17	Label	Marking tags for terminal blocks	1	02-43-530
18	DIN rail	Low profile 13 in. (330.2 mm) length	1	74-00003-00032
19	Ferrite clamp	Ferrite clamp for EMI suppression	2	02-1035-126
20	Screw	Pan head machine screws, size #4 to 40	4	02-10-153
21	Washer	External toothed lock washers	4	02-65-170
22	Nut	Hex machine screw nut, size #8 to 32	4	69-12510-79
23	Nut	Hex machine screw nut, size #6 to 32	2	02-489-268
24	Label	Product identification label	2	14-1113-18
25	Label	Component label TB-2	1	02-814-1048
26	Label	Component label TB-2	1	02-814-1048
27	Label	Component label TB-2	1	02-814-1048
28	Label	Component label TB-2	1	02-814-1048
29	Faston	Solderless faston insulated terminal for wire gage 18 AWG to 22 AWG	2	02-494-633
30	Jumper	2 pole insulated jumper for terminal block	2	02-217-3657
32	Ring tongue terminal	Insulated ring tongue terminal for wire gage 16 AWG to 14 AWG	3	02-494-293
33	Label	Polyester ground label	3	02-814-1072

Callout	Component	Description	Quantity	Part number
34	Insulated wire	PVC insulated wire, gage 14 AWG, green and yellow color	0	02-71-1350
48	Wiring	Triatek Venturi wiring diagram	1	74-00007-00650

Table 5. Dimensions and weights

Size	Ganged valves	Weight				Valve diameter		Valve length (A)		Valve height (B)		Collar width (C)		Collar width (D)	
		lb	kg	lb	kg	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
8 in. (203 mm)	1	15	7	20	9	7.75	197	23	584	14	356	N/A			
10 in. (254 mm)	1	20	9	27	12	9.74	247	26	660	16	406	N/A			
	2	40	18	54	24	N/A	N/A	30	762	17	432	22.63	575	11.44	291
	3	60	27	81	37	N/A	N/A	30	762	17	432	33.75	857	11.44	291
	4	100	45	135	61	N/A	N/A	30	762	35	889	22.63	575	22.88	581
	6	140	64	189	86	N/A	N/A	30	762	35	889	33.75	857	22.88	581
12 in. (305 mm)	1	20	9	27	12	11.68	297	26.8	681	18	457	N/A			
	2	60	27	81	37	N/A	N/A	30.8	782	19	483	26.75	679	13.5	343
	3	80	36	108	49	N/A	N/A	30.8	782	19	483	40	1016	13.5	343
	4	100	45	135	61	N/A	N/A	30.8	782	38	965	26.75	679	27	686
	6	150	68	203	92	N/A	N/A	30.8	782	38	965	40	1016	27	686
14 in. (356 mm)	1	25	11	N/A		13.62	346	30	762	22	559	N/A			
	2	50	23			N/A	N/A	34	864	24	610	32.15	817	16	406
	3	75	34			N/A	N/A	34	864	24	610	48.3	1227	16	406
	4	120	54			N/A	N/A	34	864	48	1219	32.15	817	32	813
	6	160	73			N/A	N/A	34	864	48	1219	48.3	1227	32	813

Table 6. Partially closed (PC) Venturi Valve flow rates

Size	Ganged valves	Low pressure, minimum 0.3 inWC (inches of water column)				Medium pressure, minimum 0.6 inWC			
		Minimum flow		Maximum flow		Minimum flow		Maximum flow	
		CFM	CMH	CFM	CMH	CFM	CMH	CFM	CMH
8 in. (203	1	35	59	500	850	35	59	700	1189

Size	Ganged valves	Low pressure, minimum 0.3 inWC (inches of water column)				Medium pressure, minimum 0.6 inWC			
		Minimum flow		Maximum flow		Minimum flow		Maximum flow	
		CFM	CMH	CFM	CMH	CFM	CMH	CFM	CMH
mm)									
10 in. (254 mm)	1	50	85	550	934	50	85	1000	1699
	2	100	170	1100	1869	100	170	2000	3398
	3	150	255	1650	2803	150	255	3000	5097
	4	200	340	2200	3738	200	340	4000	6796
	6	300	510	3300	5607	300	510	6000	10,194
12 in. (305 mm)	1	90	153	1050	1784	90	153	1500	2549
	2	180	306	2100	3568	180	306	3000	5097
	3	270	459	3150	5352	270	459	4500	7646
	4	360	612	4200	7136	360	612	6000	10,194
	6	540	917	6300	10,704	540	917	9000	15,291
14 in. (356 mm)	1	175	297	1400	2379	175	297	2100	3568
	2	350	595	2800	4757	350	595	4200	7136
	3	525	892	4200	7136	525	892	6300	10,704
	4	700	1189	5600	9514	700	1189	8400	14,272
	6	1050	1784	8400	14,272	1050	1784	12,600	21,408

Table 7. Full shut-off (FS) Venturi Valve flow rates

Size	Ganged valves	Low pressure, minimum 0.3 inWC				Medium pressure 0.6 inWC			
		Minimum flow		Maximum flow		Minimum flow		Maximum flow	
		CFM	CMH	CFM	CMH	CFM	CMH	CFM	CMH
8 in. (203 mm)	1	0	0	400	680	0	0	600	1019
10 in. (254 mm)	1	0	0	450	765	0	0	850	1444
	2	0	0	900	1529	0	0	1700	2888
	3	0	0	1350	2294	0	0	2550	4332
	4	0	0	1800	3058	0	0	3400	5777
	6	0	0	2700	4587	0	0	5100	8665

Size	Ganged valves	Low pressure, minimum 0.3 inWC				Medium pressure 0.6 inWC			
		Minimum flow		Maximum flow		Minimum flow		Maximum flow	
		CFM	CMH	CFM	CMH	CFM	CMH	CFM	CMH
12 in. (305 mm)	1	0	0	750	1274	0	0	1100	1869
	2	0	0	1500	2549	0	0	2200	3738
	3	0	0	2250	3823	0	0	4400	7476
	4	0	0	3000	5097	0	0	8800	14,951
	6	0	0	4500	7646	0	0	17,600	29,903

Ganged valve dimensions and flow data

Figure 1. Dual venturi valve

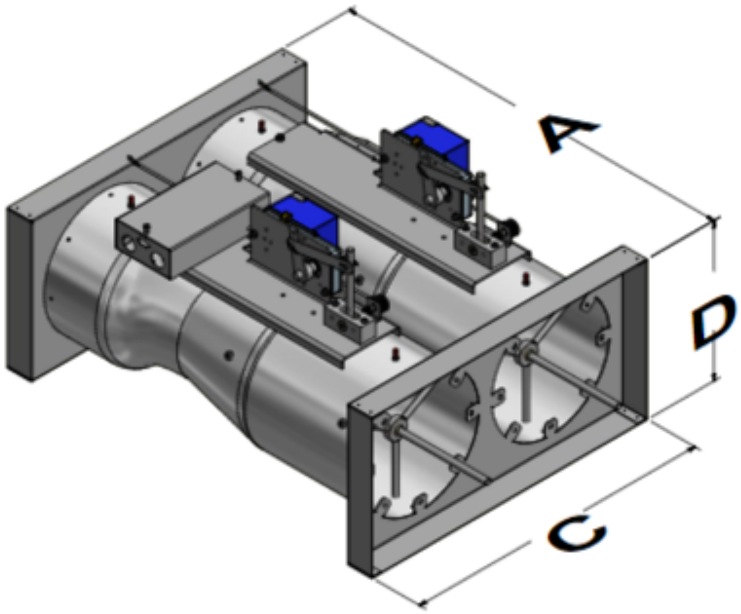


Figure 2. Triple venturi valve

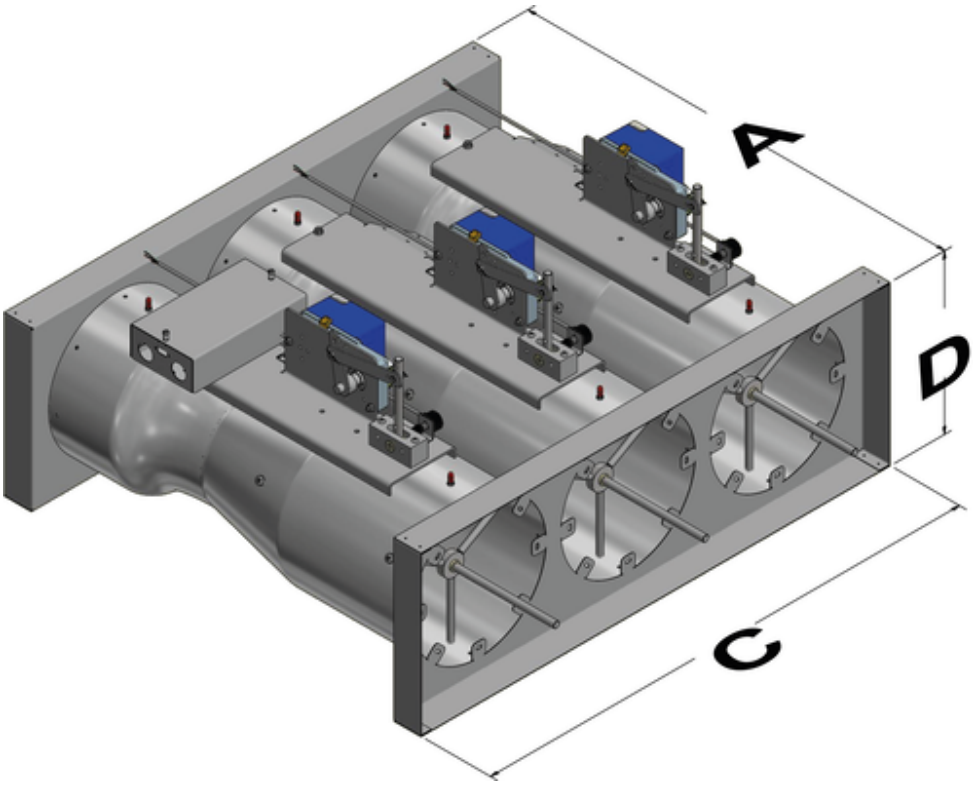


Figure 3. Quad venturi valve

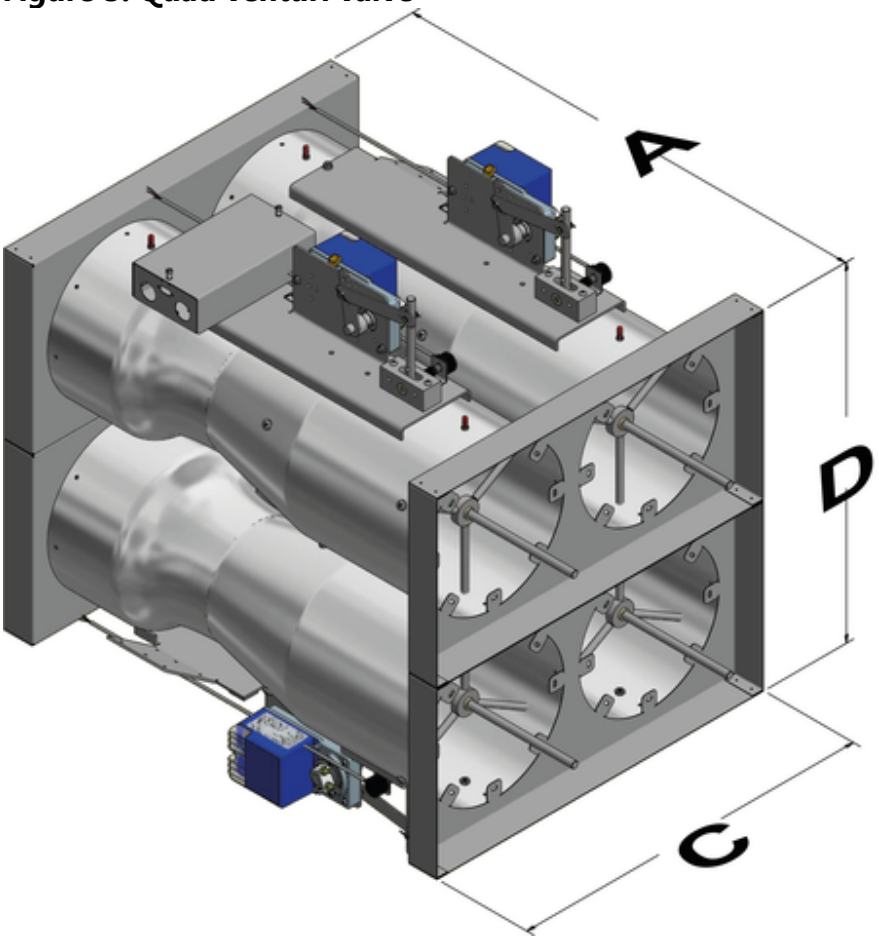


Figure 4. Hex venturi valve

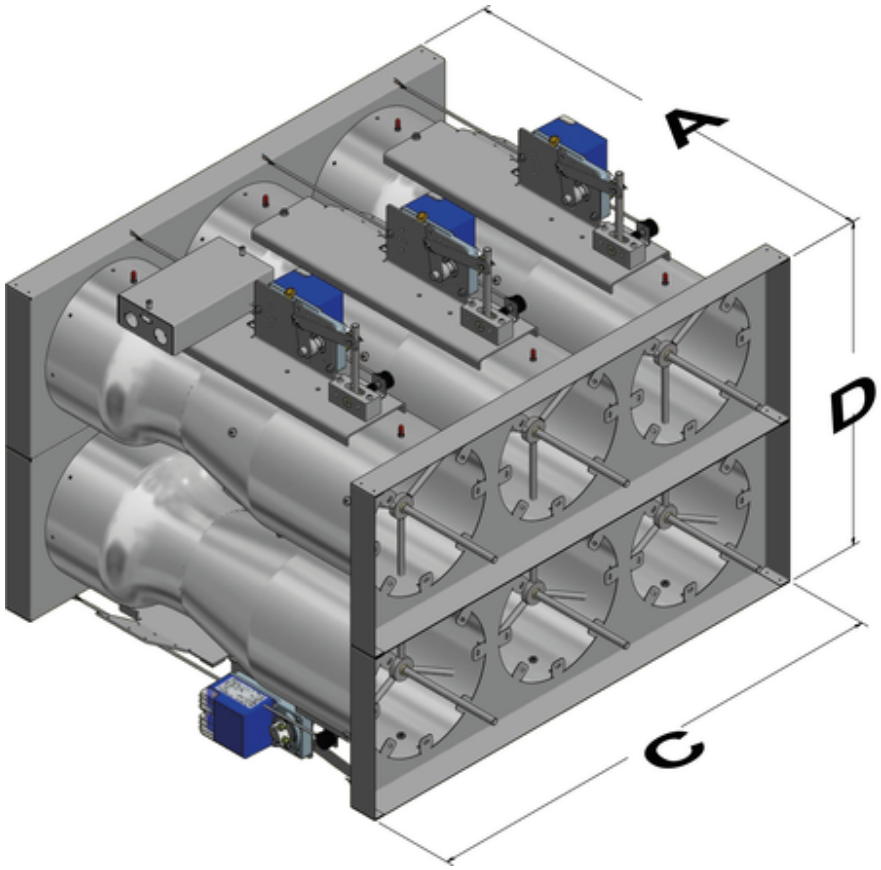


Table 1. Dimensions

Callout	Description
A	Valve length
C	Collar width
D	Collar depth

Note: For specific measurements, see Dimensions and weights.

Actuator specifications

The actuator is microprocessor-based with conditioned feedback. The unit uses brushless DC motor technology and operates on a 24 VAC nominal power supply.

Fast-acting damper actuator

These models deliver a minimum of 50 inlb. or 5.6 Nm. torque at rated voltage and are designed for applications where a fast response is required, typically when fume hoods are involved in the controlled space. The actuator motor is equipped with auto stroking, zero, and span features. Auto stroking means that the maximum stroke of the actuator may be field limited to anywhere between 45° and 90° while still maintaining a full throttling range of 2 VDC to 10 VDC. The zero and span features may also be field set to adjust the control response of the motor to a portion of the 2 VDC to 10 VDC input signal. These features enable the sequence of several motors off the same input signal. Refer to the actuator specifications for more information.

Electrical specifications

Table 1. Electrical specifications

Electrical feature	Specification
Power supply	22 VAC to 26 VAC or 28 VDC to 32 VDC
Maximum power consumption	20 VA at 25 VAC
Wire size	18 AWG minimum
Electrical connections	One 0.63 in. or 15.9 mm knock out One 0.88 in. or 22.2 mm knock out screw terminals
Feedback signal	4 mA to 20 mA output 2 VDC to 10 VDC switch selectable
Control signal	2 VDC to 10 VDC 4 mA to 20 mA switch selectable Zero and span adjustable

Mechanical specifications

Table 1. Mechanical specifications

Mechanical feature	Specification
Torque	50 inlb. or 5.6 Nm. at rated voltage
Angle of rotation	Mechanically adjustable from 0° to 90°
Direction of rotation	Clockwise and counterclockwise
Stroke time	Approximately 22ms per degree of rotation
Typical control	10° to 30° stroke
Shipping weight	Approximately 3 lb or 1.4 kilos enclosure
Electronics	UL recognized QMFZ2 fire rated 94V-0
Gear train	Die cast zinc with a steel base

Environmental specifications

Table 1. Environmental specifications

Environmental feature	Specification
Ambient temperature	0°F or -18°C to 140°F or 60°C

Installing the Venturi air valve duct

Before you begin

Read all of the information in this Venturi Air Valve Installation Guide prior to installation.

Procedure

1. Unpack the valve from the shipping container in the area where you want to mount the valve and verify that the tag number on the valve matches the mechanical engineering schedule.

   Important:
   - The central cone shaft extends out of the valve body outlet opening when it is in the fully open position. Do not stand a Venturi Valve on outlet opening side when it is in the fully open position.
   - Do not carry a valve by the linkage, cone bracket, or any other control component that is mounted onto or into the valve body.

2. To verify the size, flow range, and orientation of the valve, compare the data on the valve label to the specifications listed on the schedule or architectural drawings.

   Note: Valve outside diameter dimensions are sized to fit inside standard spiral and flexible duct.

3. Install all pressure independent valves horizontally or vertically based on submittals, drawings and specifications.

   Note: You cannot interchange or substitute the horizontal, vertical up, and vertical down valves for each other.

4. Make sure to install the valve so that air flow direction corresponds to the arrow on the valve, for example, from short cylindrical section to longer cylindrical section. To verify the cone direction, check the label on the valve and compare the arrow on the label to the direction of cone. The cone moves freely forward and back in the direction that the arrow points.
5. Before you mount the valve to the duct work, verify the direction of flow within the duct and align the valve accordingly.
6. Install a hanger stock to support the duct work within 12 in. (305 mm) of the valve connection. Install the valve onto the duct after hanger stock is in place. For precise operation, ensure the valve is level after mounting.

Note:

- The actuator and linkage operates in any position, it is not affected by the orientation of the installation. However, for future maintenance and adjustments, do not position the linkage or the valve with the actuator completely face down as potential condensation can run into the actuator. Allow a minimum of 14 in. (356 mm) of unobstructed space around the valve for best access.
- Do not position the electronic components below the valve in case of duct condensation build up.

7. To provide for possible future changes, that require re-set of air flow, maintain 5.75 in. (146 mm) of unobstructed space in the duct on the valve's outlet side for the shaft to reach the maximum flow position.
8. When equipped with an electric actuator, you need 24 VAC, separate from the controller, to power it. See Wiring options for more information.
9. Do not use metal screws longer than 0.75 in. (19.05 mm) and do not screw them more than 1 in. (25.40 mm) from either end of the valve.
10. Seal all duct connections, in accordance with local codes, to prevent leaks and provide the highest duct static pressure.

Note:

- Use ASHRAE approved duct sealant on all valve and duct connections or flange gaskets for circular flanges. Do not use a sealant that prevents valve removal.
- Do not remove or paint over the ID and calibration tags.
- Follow the appropriate installation diagram.
- Unless you specifically order for a particular job, Johnson Controls does not provide screws, fasteners, duct sealant, hanger stocks, companion flanges, or gaskets.

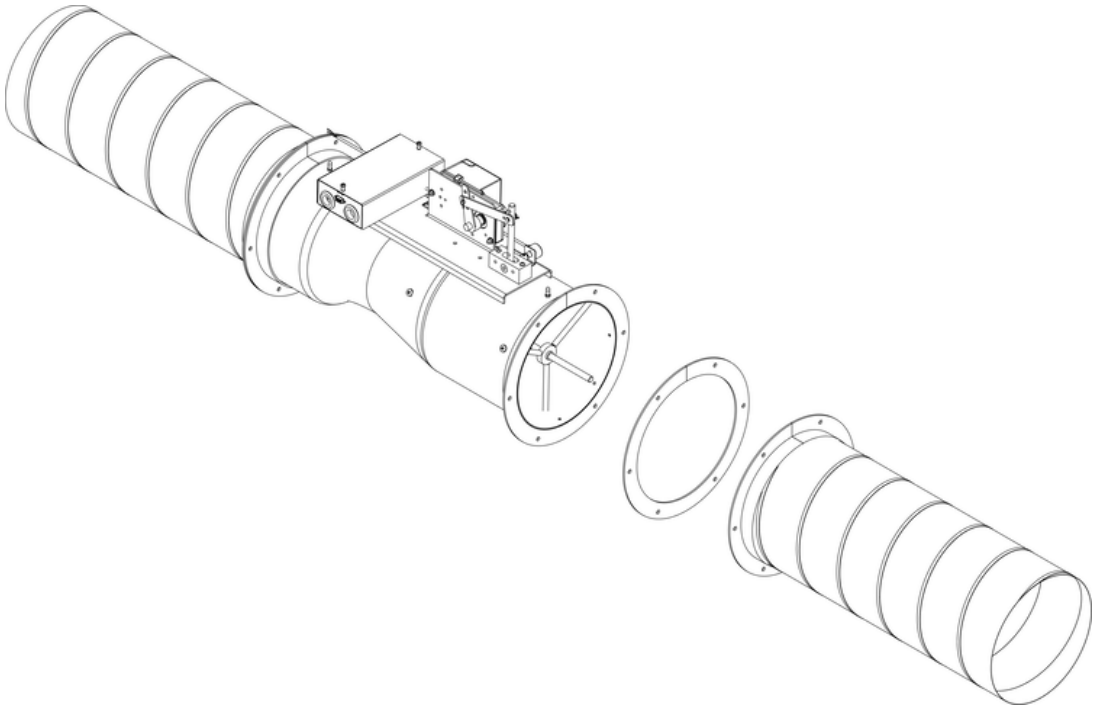
For more information on the installation procedures see Figure 11, Figure 12, Figure 13, and Figure 14.

Mounting the flanged valve

Flanged valves require a gasket between the duct and valve flanges, with the addition of nuts and bolts as flange fasteners. Ensure that the metal straps support both sides of the valve weight and the duct work. For correct hardware, mounting, sealing and installation requirements, consult local building codes.

Note: Gasket, nuts, and bolts are field supplied. They do not come with the valve.

Figure 1. Mounting a flanged valve



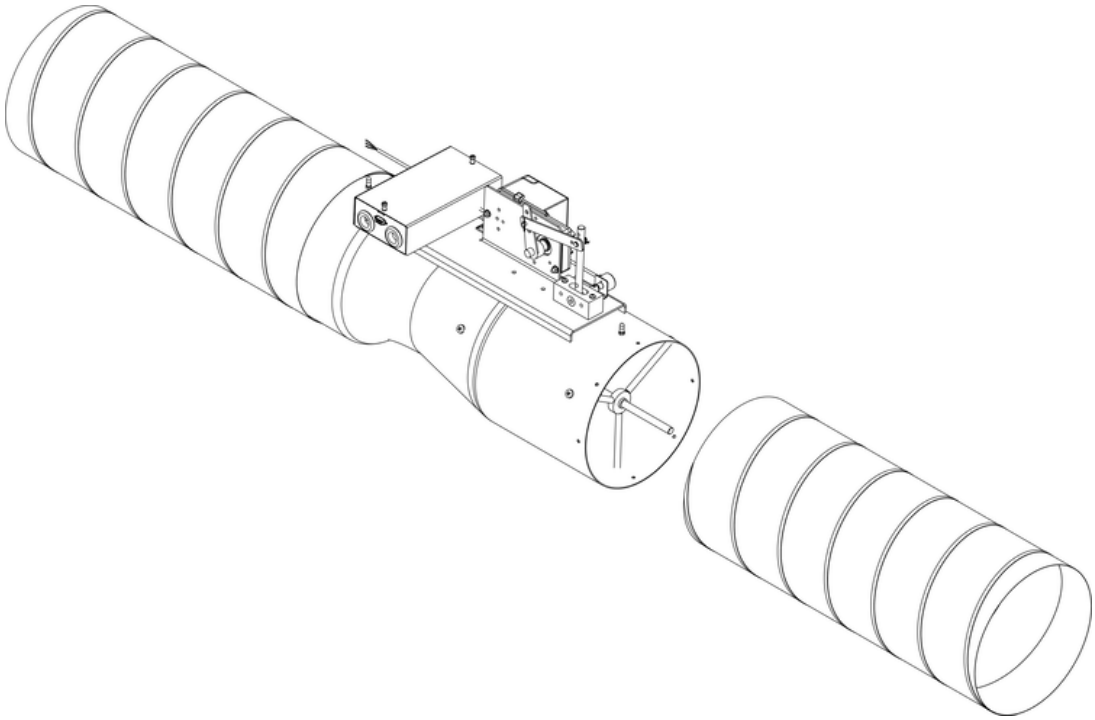
Mounting the slip-in valve

The outside diameter of the valve is undersized to fit inside standard duct sizes. Once the valve slips inside the duct:

1. Secure the valve with sheet metal screws.
2. To ensure the seal is air tight, apply a duct seal.
3. Ensure the metal straps support both sides of the valve weight and the duct work.

For correct hardware, mounting, sealing and installation requirements, consult local building codes.

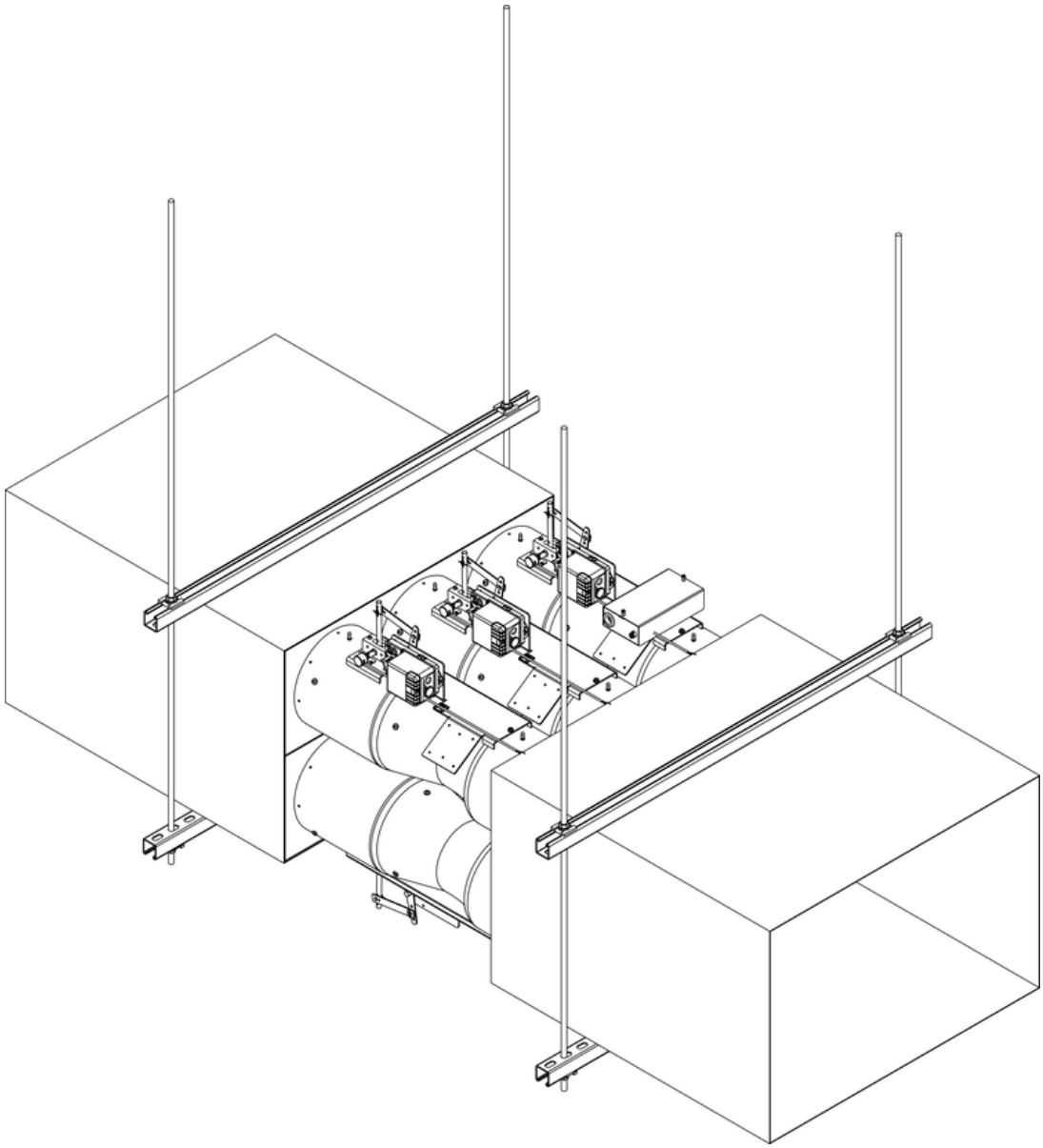
Figure 1. Mounting a slip-in valve



Mounting the ganged valve

Due to the large size and weight of ganged valves, use threaded rods and channel struts to support the installation. Consult the local building codes for correct hardware, mounting, sealing, and installation requirements.

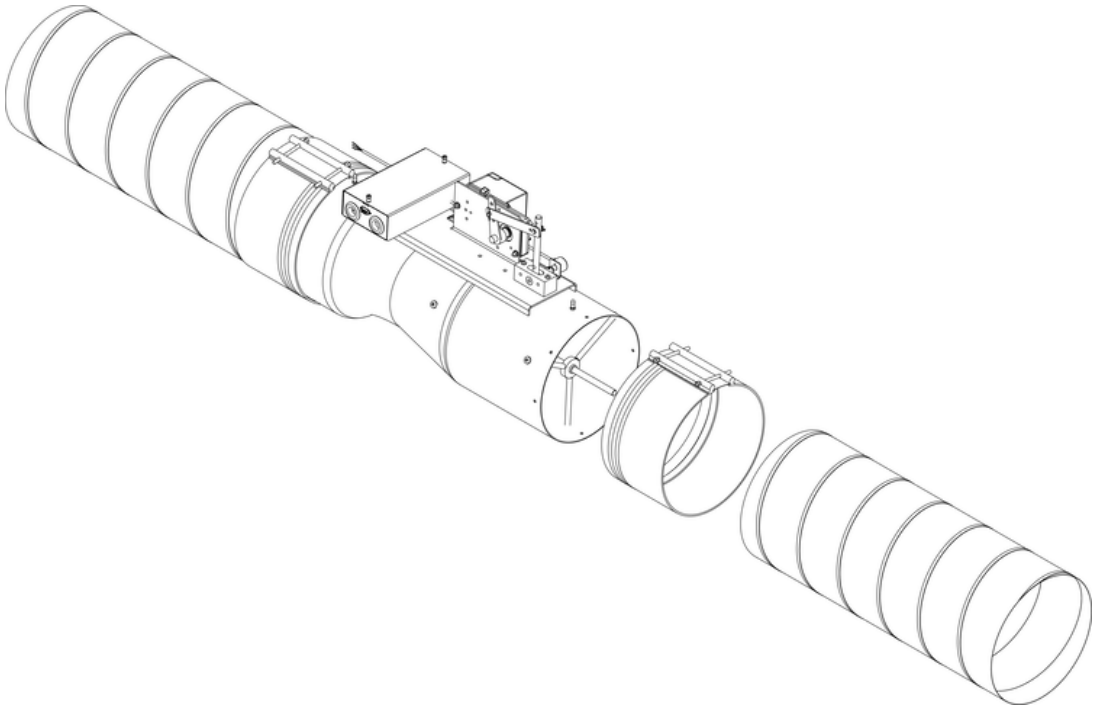
Figure 1. Ganged valve



Mounting the quicksleeve valve

Quicksleeves are an optional accessory to accelerate the installation of the valve. Each valve requires two quicksleeves, one on the inlet side and one on the outlet side of the valve. Due to the reduced diameter of the valve body, it is necessary to install the quicksleeves with the turned groove on the valve. This ensures that an airtight seal forms when the quicksleeve tightens around the valve. For correct hardware, mounting, sealing and installation requirements, consult the local building codes.

Figure 1. Mounting a quicksleeve valve



Quicksleeve order numbers

Table 1. Quicksleeve order part numbers

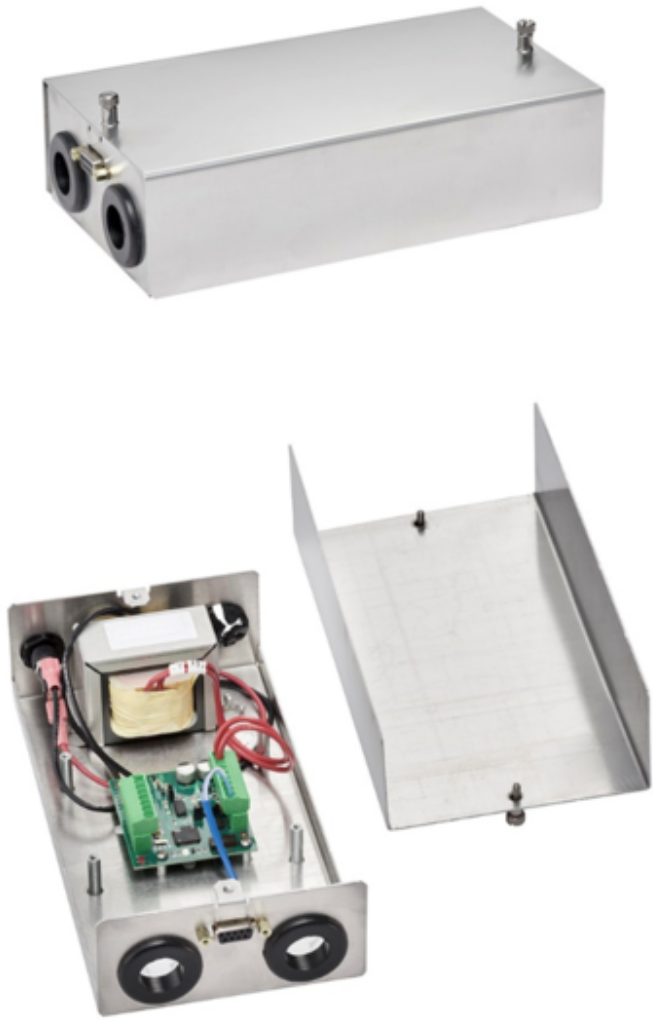
SKU order number	Description
8IN-DUCTSLEEVE	8 in. (203 mm) Ductmate quicksleeve valve X1EA
10IN-DUCTSLEEVE	10 in. (254 mm) Ductmate quicksleeve valve X1EA
12IN-DUCTSLEEVE	12 in. (305 mm) Ductmate quicksleeve valve X1EA
14IN-DUCTSLEEVE	14 in. (356 mm) Ductmate quicksleeve valve X1EA

Universal Valve Module

The Universal Valve Module (UVM) is used to control Venturi Valves through a Building Automation Systems (BAS). Universal Valve Modules come factory-mounted and wired, and are ideal for retrofits or new installations.

Overview

Figure 1. Universal valve module



Venturi air valves equipped with a UVM work with virtually any BAS controller. UVM equipped valves all use 0 V to 10 V signals from the controller and translates these signals into a pre-determined flow position or percentage position for any valve. For example, a valve with a UVM, that is scaled for 2500 CFM max flow only opens at 1250 CFM if voltage sent from the controller to the UVM is at 5 V, or 50%. The UVM can also produce a 0 V to 10 V output signal as feedback of the valve CFM or valve position.

The UVM board has an eight-position DIP switch and enables you to set a hardware address between 0 and 15, the selection of percentage or CFM input interpretation, the percentage or CFM representation of the output signal, and normal or reverse operation. 15 is normally used as the Parent address. Contact the factory before making any adjustments to these DIP switches as they come pre-configured from the factory for most applications.

For more information on the Universal Valve Module, refer to the *UVM-1000 Universal Valve Module Installation Guide*.

Installation

The controller and valve are pre-wired at the factory and require a 24 VAC Class 2 supply capable of 25 VA or more and a 0 V to 10 V set point signal.

Valve calibration information is stored internally on the controller itself at the factory for the valve shipped with the UVM. No additional calibration is necessary in the field. CFM curve adjustments can be done in the field but is not best practice. To make any curve adjustments, you require UVM Configuration Software. The software is not included.

After you wire the controller and connect the power, the actuator initially moves to both the 0% and 100% positions to perform an autostroke to enable the controller to generate a control signal based on the input set point voltage.

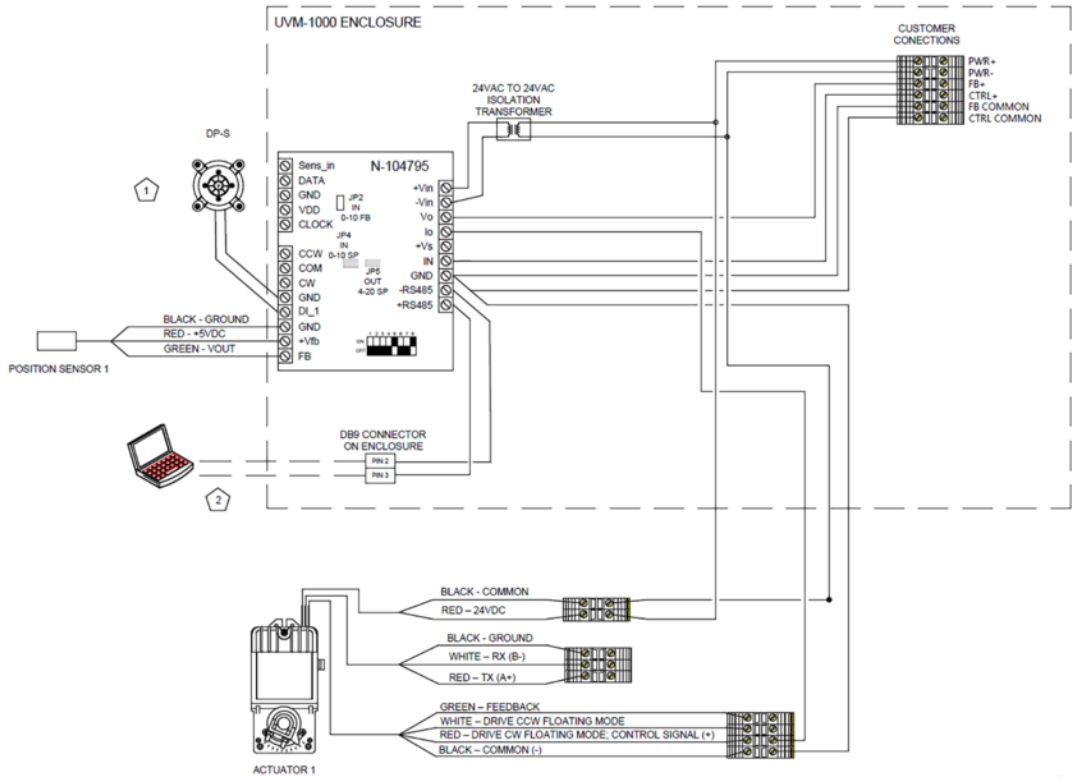
In its minimal configuration, the UVM requires a 24 VAC supply and a 0 V to 10 V control signal. Additionally, the UVM can use a 0 V to 10 V output signal to monitor the actual CFM value the valve is regulated to. The UVM can also optionally take in a digital signal from a differential pressure (DP) switch that indicates the presence or absence of air in the valve. If enabled and inactive, the flow output signal indicates **0**. Optionally, the analog pressure sensor can detect the DP across the valve and indicate flow when above a specific pressure value. To use these features, enable the internal options with the UVM Configuration Software.

The UVM Configuration Tool is a special program to allow adjustments of specific parameters and settings that include the valve CFM curve. Contact Johnson Controls for more information when you use this tool or for information about the RS485 cable you use to connect the PC to the UVM.

Note: If RS485 communications are not employed, you can disconnect the RS485 cable.

Wiring options

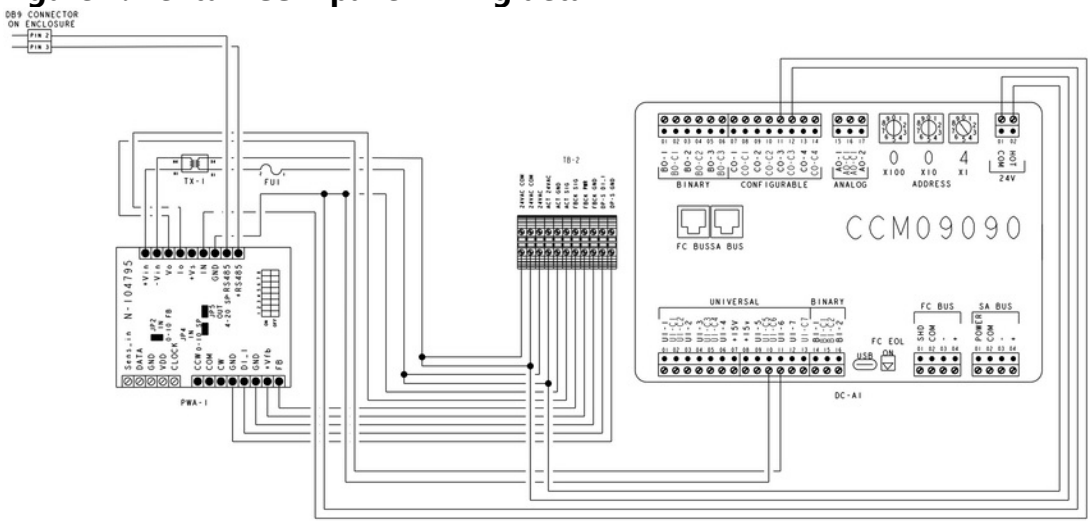
Figure 1. Minimum wiring requirements



Note:

- DP-S is optional.
- To also connect the valve with the UVM configuration, you will need a RS-485 to USB cable. Sold separately. Part Number: UVM-CABLE.
- DP8 engages the RS485 terminating resistor. Only one DP8 per loop is active.

Figure 2. Venturi CCM panel wiring detail



Terminal position	Terminal label description	Tag color	Bom item
TP 1	24 VAC com	White	14
TP 2	24 VAC com	White	14
TP 3	24 VAC	White	14

Terminal position	Terminal label description	Tag color	Bom item
TP 4	Actuator 24 VAC	White	14
TP 5	Actuator 24 GND	White	14
TP 6	Actuator SIG	White	14
TP 7	Feedback sensor SIG	White	14
TP 8	Feedback sensor PWR	White	14
TP 9	Feedback sensor GND	White	14
TP 10	DP-S DI-I	White	14
TP 11	DP-S GND	White	14

UVM PCBA DIP switch settings

Figure 1. DIP switch settings

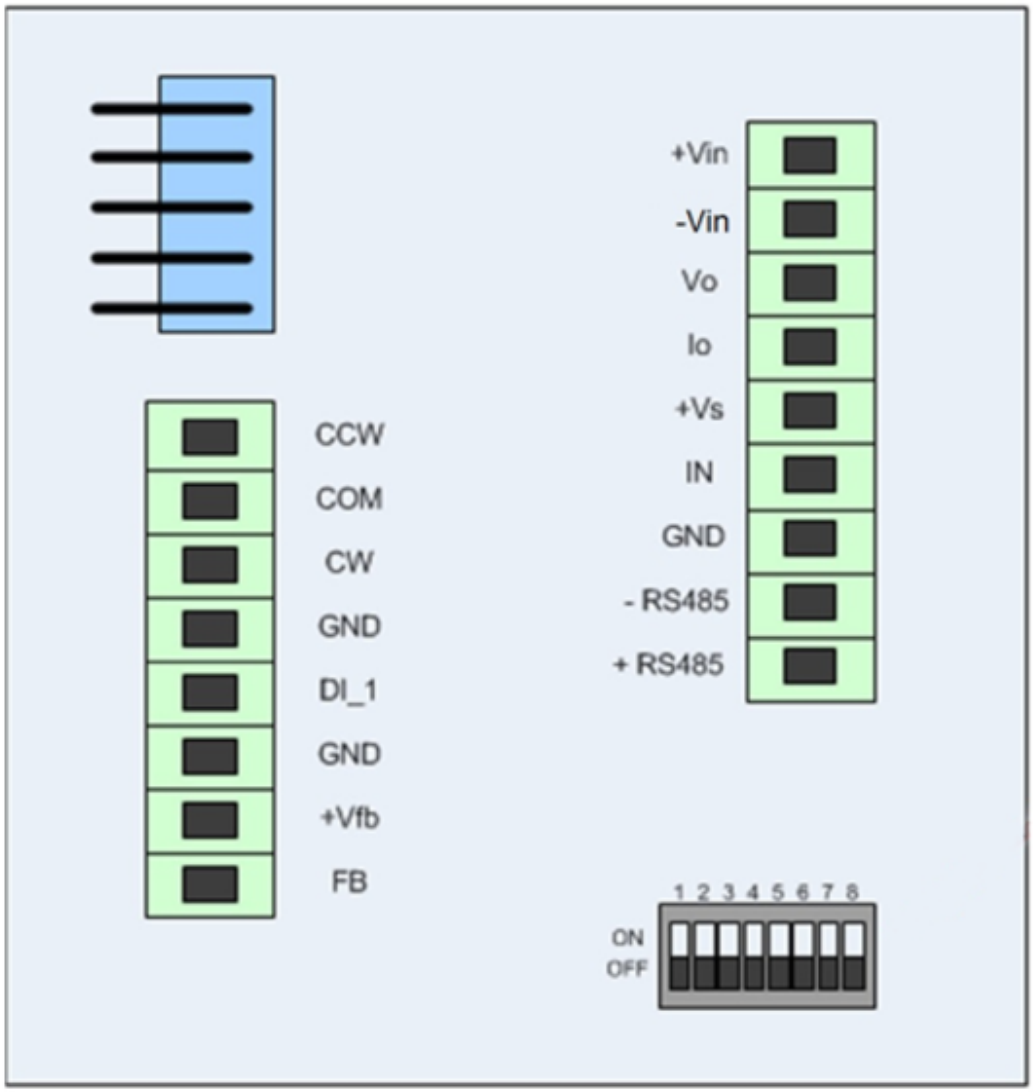
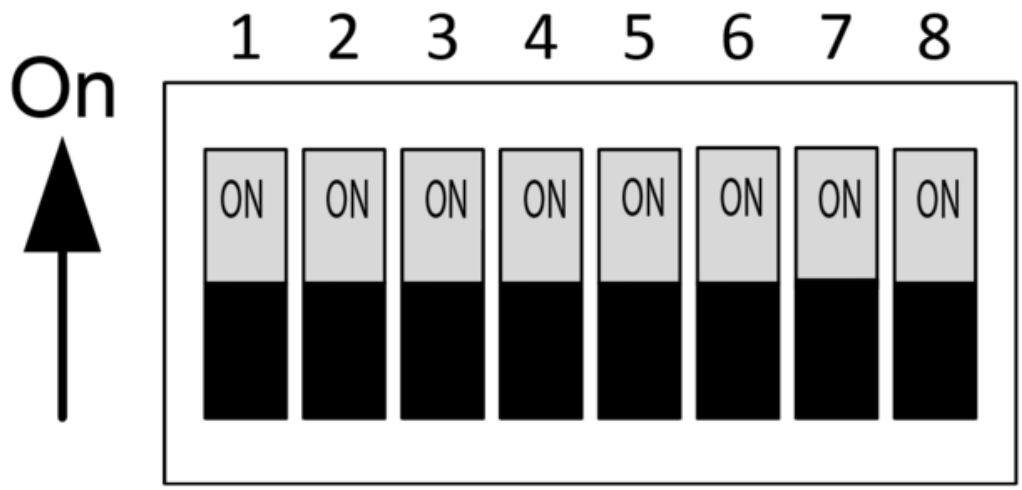


Figure 2. DIP switch functions



Note: DIP Switch function, other than address and termination, can be disabled by internal software setting and selection.

Switch	On	Off	If enabled
1	+1	0	Unit hardware address 0-15
2	+2	0	Unit hardware address 0-15
3	+3	0	Unit hardware address 0-15
4	+8	0	Unit hardware address 0-15
5	Reverse	Normal	Actuator reverse/normal
6	CFM	Position	Input = position/CFM
7	CFM	Position	Output = position/CFM
8	Terminate	Open	RS485 line terminate

Troubleshooting

Use the following information as a guide for potential resolution of a site issue.

Table 1. Troubleshooting

Problem	Causes	Solution

Problem	Causes	Solution
Fume hood monitor in alarm; Room pressurization problem. Low static pressure across valve (<0.6 in. W.C; 150 Pa)	• Too many sashes open at one time • Sash open beyond maximum allowable position • Blocked or kinked pressure switch tubing	• Contact HVAC service maintenance contractor to inspect, verify and correct. • Review operator sash movement.

Problem	Causes	Solution
	• Incorrect valve position • Valve is not responding to input signal • Loss of pneumatics • Mechanical linkage is disconnected • Loss of power or electrical control signal • Broken sash cable • Monitor calibrated incorrectly • Incorrect wiring terminations	Contact HVAC service maintenance contractor to inspect, verify and correct.
Temperature control issues	• Reheat system issues • Thermostat malfunction • Air handler malfunction • Water valve response issues	Contact HVAC service maintenance contractor to inspect, verify and correct.

Problem	Causes	Solution
Valve banging	• Fluctuation in pressure that is out of acceptable design range • Lack of bypass damper control • Slow response to duct pressure control	• Adjust bypass damper control. • Install fast acting actuators; flow probes and VAV control; integrate into stand alone lab control. • Contact HVAC service maintenance contractor for inspection, verification and correction. **Note:** Exposing any Venturi Valve to excessive pressures that are outside of the range of specification may require the valve to be recalibrated and recertified at factory; potential damage to the valve may also occur.
Monitor indicates normal operation, but actual face velocity or flow is measured high or low.	Low or high static pressure	• Verify at least 0.6 in. W.C (150 Pa) across valve. • Connect a Magnahelic gauge across the valve taps. • For hood valves, check voltage at TB-16 at fume hood monitor. (>10 V=low static)

Service and maintenance

In light of the occupational hazards involved with treating patients confined to isolation rooms, or bio hazardous laboratories, it is best practice that a hospital or research lab room pressure sensor be inspected, re-certified, maintained, and recalibrated if necessary, at least once per year.

You do not need to lubricate, replace parts, or periodically service the Venturi Air Valve in any way. Proper installations and field startup ensure that the valves provide years of ongoing operation.

Ensure compliance with any owner or regulatory requirements that may mandate specified periods of inspection, maintenance, and re-calibration.

Further information

NVLAP certification

The National Voluntary Laboratory Accreditation Program (NVLAP) is a US federal program run by the National Institute of Standards and Technology (NIST) that provides third party accreditation to laboratories in the USA. NVLAP tests laboratories and not products, for accordance with ISO/IEC 17025:2005. NVLAP accreditation is available, but it is not required for commercial university and federal laboratories.

It is important to note that NVLAP accreditation to ISO/IEC 17025:2005 is no longer recognized as of November 30, 2020. As a result, NVLAP has developed a transition plan to ensure all NVLAP-accredited laboratories meet the requirements of the 2017 version of the ISO/IEC 17025 standard within the required time frame.

Competitors include this requirement as part of their specifications with the sole purpose of eliminating competitors. It adds no additional value to the performance of the product or the ability of a supplier to achieve excellent performance, accuracy and reliability for the end-users application.

Competitors still calibrate their Venturi Valves to the NIST Policy on Metrological Traceability standard same as Johnson Controls with the same accuracy of ±5% or 10 CFM, whichever is greater and use NVLAP certification to prevent competition. It is important to educate the customer and ask a few questions to clarify for the engineers involved, and explain that the NVLAP certification is not a true requirement for the performance, accuracy and reliability of the Venturi Valves

Data points and the calibration process

The factory calibrates each individual Venturi Valve to 49 points, across the entire operational flow and duct static pressure range of the device, to ensure it meets the published performance specifications.

Some competitors use a 48 point calibration at only one static pressure, whereas Johnson Controls calibrates at least seven different static pressures to ensure pressure independence across the entire operating range of the Venturi Valve.

Venturi Valve certification

The electronics on the Johnson Controls Venturi Valves are UL certified.

Venturi Valve duct static pressure change response

The Venturi Air Valve responds instantly. This is the main benefit of the Venturi Valve and its mechanical spring damper design. As the duct static pressure changes, so does the force on the damper and the spring in the damper assembly responds immediately. It repositions the cone inside the Venturi, to provide the same amount of air flow, independent of the pressure changes or fluctuations in the duct work. For this reason, the Venturi Valves are recognized as pressure independent air flow control devices.

Note: The pressure independence of Venturi Valves is only functional between 0.3 in. W.C to 3.0 in. W.C for low pressure and 0.6 in. W.C to 3.0 in. W.C for medium pressure applications.

Venturi Valve actuator control signal and air flow response

The fast acting actuators respond almost instantly to the controller signal and begin to move to the required position to meet the change in airflow requirement. The time it takes for the actuator to go from 0% to 100% is less than three seconds.

Venturi Valve air flow control accuracy

All Venturi Valves have an industry standard accuracy of ±5% or 10 CFM, whichever is greater.

Venturi Valve pressure drop

The pressure drop across a Venturi Valve is dynamic and not static. It can be anywhere between 0.3 in. W.C to 3.0 in. W.C for low pressure and 0.6 in. W.C to 3.0 in. W.C for medium pressure Venturi Valves. As long as the pressure does not fall below the minimum of 0.3 in. W.C for low pressure and 0.6 in. W.C for medium pressure, or exceed the maximum of 3.0 in. W.C, the Venturi Valve will maintain pressure independent flow control and function as intended. In order to get a true pressure drop reading across the valve, it must be measured during its operation conditions. When you calculate the pressure drop to determine the required Fan static, use any value between 0.3 in. W.G, or 0.6 in. W.G for standard pressure, and 3.0 in. W.G as the value across the valve. Typically the lower value is used plus some margin for static fluctuations.

North American emissions compliance

United States

This equipment has been tested and found to comply with the limits for a Class A digital device pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when this equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area may cause harmful interference, in which case the users will be required to correct the interference at their own expense.

Warning (Part 15.21)

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Canada

This Class (A) digital apparatus meets all the requirements of the Canadian Interference-Causing Equipment Regulations.

Cet appareil numérique de la Classe (A) respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

Industry Canada Statement(s)

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions:

1. This device may not cause interference, and
2. This device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :

1. L'appareil ne doit pas produire de brouillage, et
2. L'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Patents

Patents: https://jcipat.com

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.

Single point of contact

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Contact information

Contact your local Johnson Controls representative: www.johnsoncontrols.com/locations

Contact Johnson Controls: www.johnsoncontrols.com/contact-us