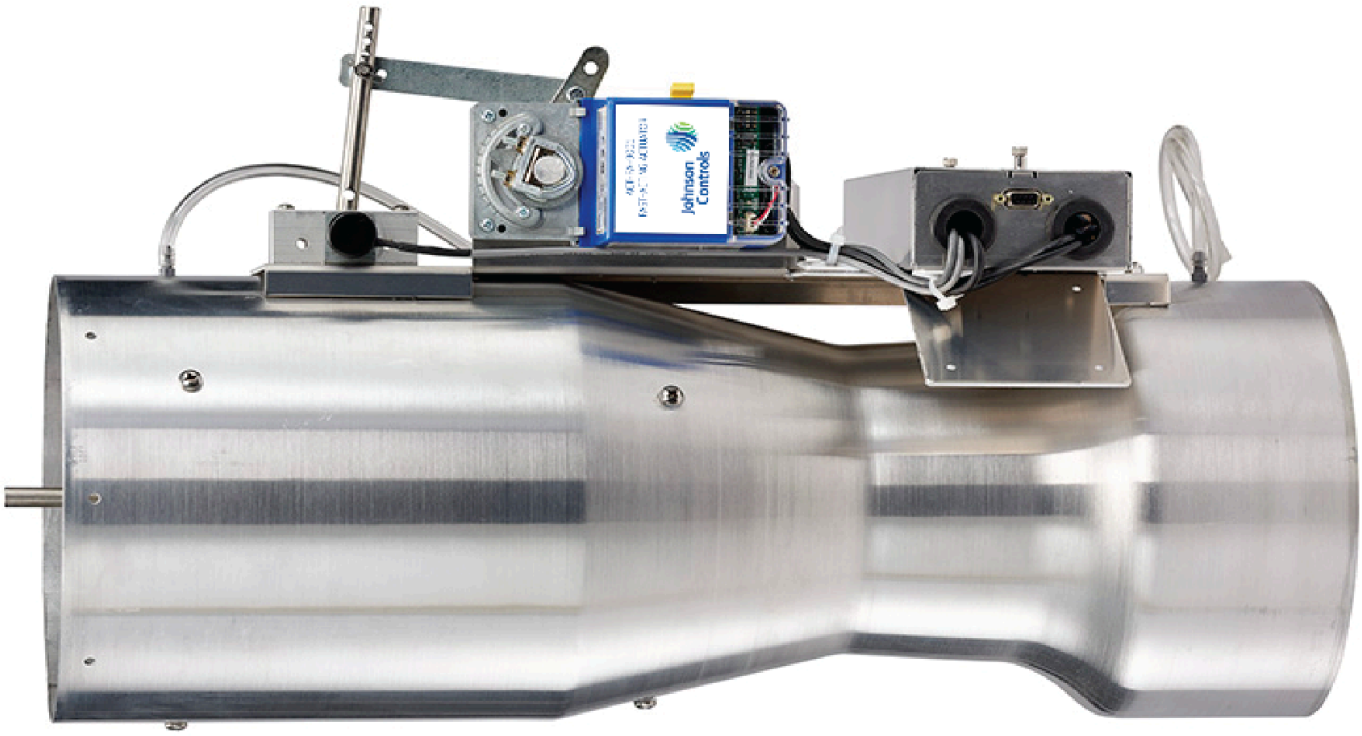
Venturi Valve Installation Instructions



Building Technologies & Solutions

www.johnsoncontrols.com

2021-10-12

LIT-12013213

Contents

Contractor recommendations

Installation checklist

Data

- Project information
- Submittals
- Manuals for Product

Tools

- Wire strippers
- Flat screwdriver set with various size larger drivers
- Phillips screw driver with various size larger drivers
- Small vise grips
- Channel locks
- Needle nose pliers
- Crescent wrench
- Pocket knife
- 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 ameter
- Resistance measurement with tone
- Extra terminal connectors
- Wire labels
- Windows computer with USB port
- USB to RS485 cable
- Universal Vavle Module (UVM) PC tool installed

Safety

- Ladder (s)
- Arrest harness
- Safety glasses
- Hardhat
- Steel toed shoes

Description

Venturi Valves Fume Hood and Room Pressure Control Applications

The Venturi Valve is a novel air flow control device. It varies the annular orifice to modulate the flow of air. The variable annular orifice is achieved with the logarithmic profile of the valve body and the positioning of the internal damper assembly, sometimes referred to as a cone due to its shape. The cone is situated on an actuated shaft, which enables flow control through the full range (0% - 100%) of the valve.

The cone houses a spring that compresses when more pressure is applied to the cone from duct static changes and extends when the duct static pressure is reduced. This moves the cone independent of the cone shaft and repositions it inside the valve body, and changes the annular orifice. This spring activated cone travel provides instant mechanical flow adjustments independent of the actuator movement. This spring-enabled cone travel, allows the mechanically pressured independent flow control by a Venturi air valve.

Currently, the pressure independent flow control feature of the Venturi Valves is only functional between 0.3 inWC – 3 inWC for low pressure and 0.6 inWC – 3.0 inWC 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 required, there is not enough force to move the cone and begins to compress the spring inside to activate cone travel.

If duct static pressure exceeds the maximum pressure limit allowed, 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 and should be measured at the time of operation for a true reading. To ensure correct operation of the Venturi Valve, the pressure drop across the valve should be between 0.3 in. – 3 in. WC for low pressure and 0.6 in. – 3 in. WC for medium pressure applications.

Venturi valve orientations and airflow directions

Figure 1: Vertical position with upward and downward airflows

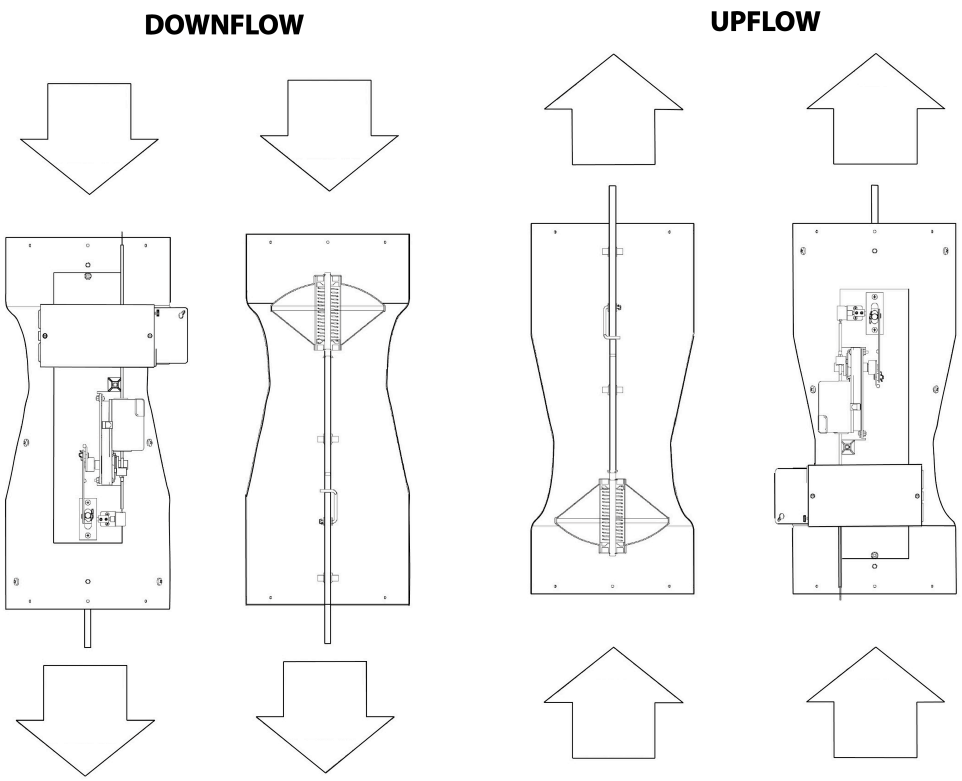
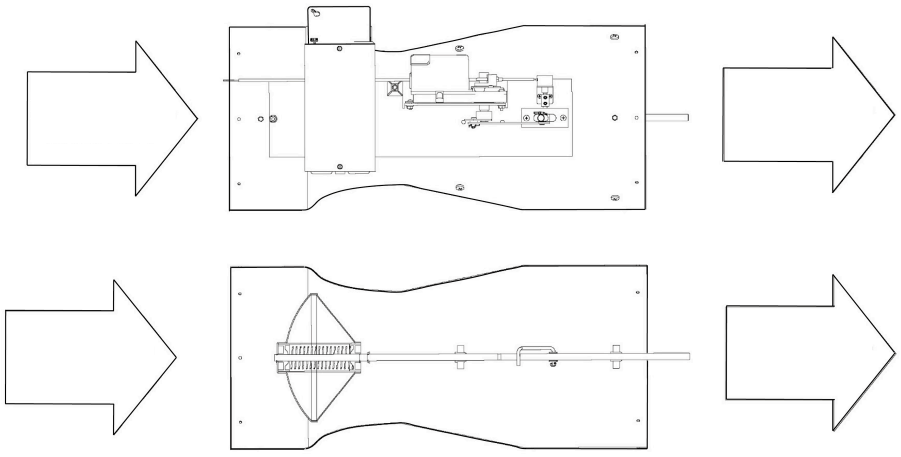


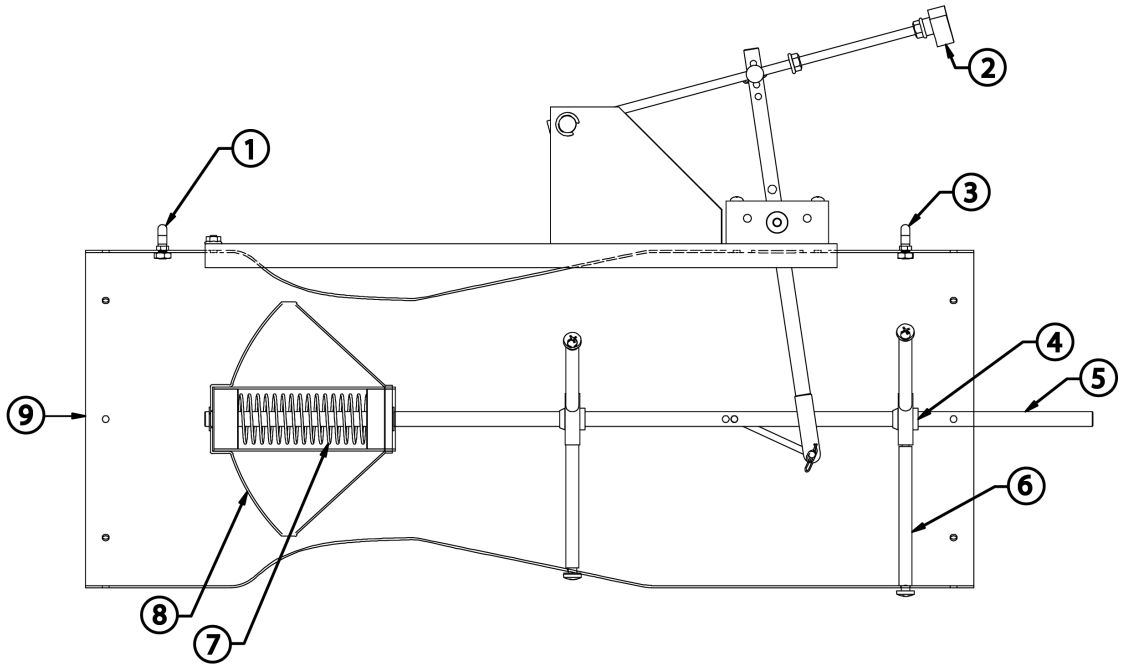
Figure 2: Horizontal position with sideways airflow



ⓘ **Note:** Arrows represent airflow direction

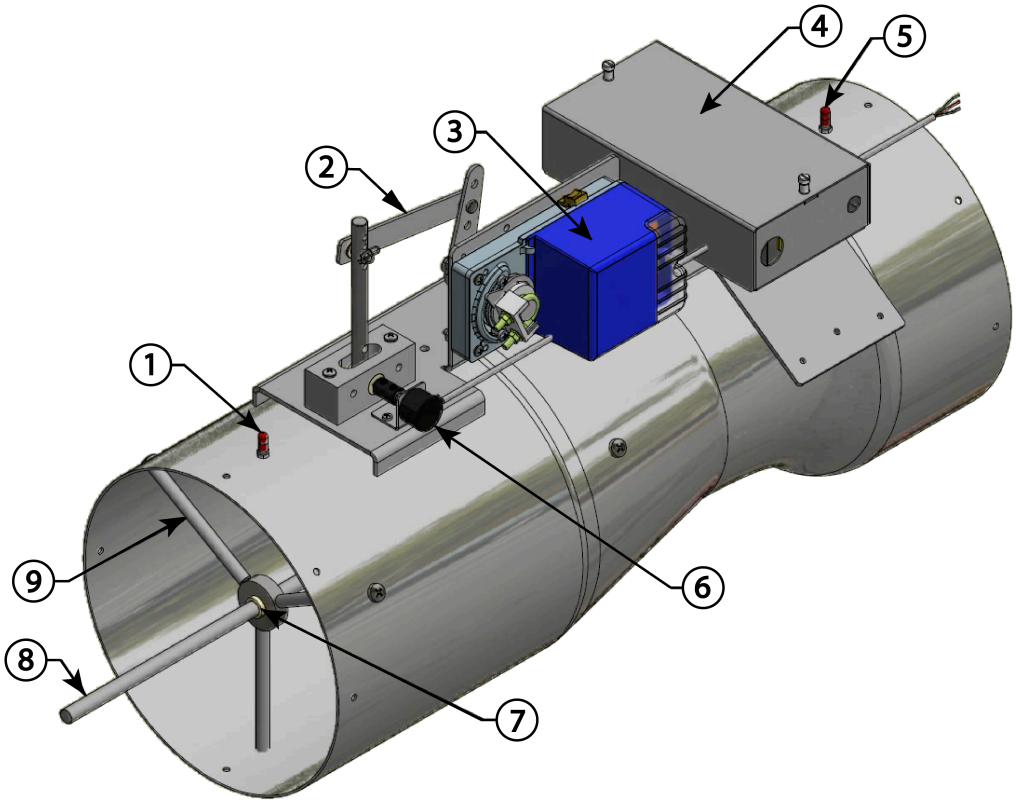
Constant Volume Venturi Valve

Figure 3: Constant Volume Venturi Valve



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 4: Fast Actuated (FA) Venturi air valve



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

Table 1: Dimensions and weights

Unit size		Weight				Valve diameter		Valve length (A)		Valve height (B)		Collar width (C)		Collar width (D)	
		Aluminium		SS316											
		lb	kg	lb	kg	in.	mm	in.	mm	in.	mm	in.	mm	in.	mm
8 in.	1	15	7	20	9	7.75	197	23	584	14	356	N/A			
10 in.	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.	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.	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 2: Partially closed (PC) Venturi valve flow rates

Unit size		Low pressure - 0.3 inches of water column (inWC)				Medium pressure - 0.6 inWC			
		Minimum flow		Maximum flow		Minimum flow		Maximum flow	
		cfm	cmh	cfm	cmh	cfm	cmh	cfm	cmh
8 in.	1	35	59	500	850	35	59	700	1189
10 in.	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	10194
12 in.	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	10194
	6	540	917	6300	10704	540	917	9000	15291
14 in.	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	10704
	4	700	1189	5600	9514	700	1189	8400	14272
	6	1050	1784	8400	14272	1050	1784	12600	21408

Table 3: Full shut-off (FS) Venturi valve flow rates

Unit size		Low pressure - 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.	1	0	0	400	680	0	0	600	1019
10 in.	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
12 in.	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	14951
	6	0	0	4500	7646	0	0	17600	29903

Ganged valve dimensions and flow data

Table 4: Dimensions

Callout	Description
A	Valve length
C	Collar width
D	Collar depth

Note: For specific measurements, refer to Table 1.

Figure 5: Dual Venturi Valve

Figure 6: Triple Venturi Valve

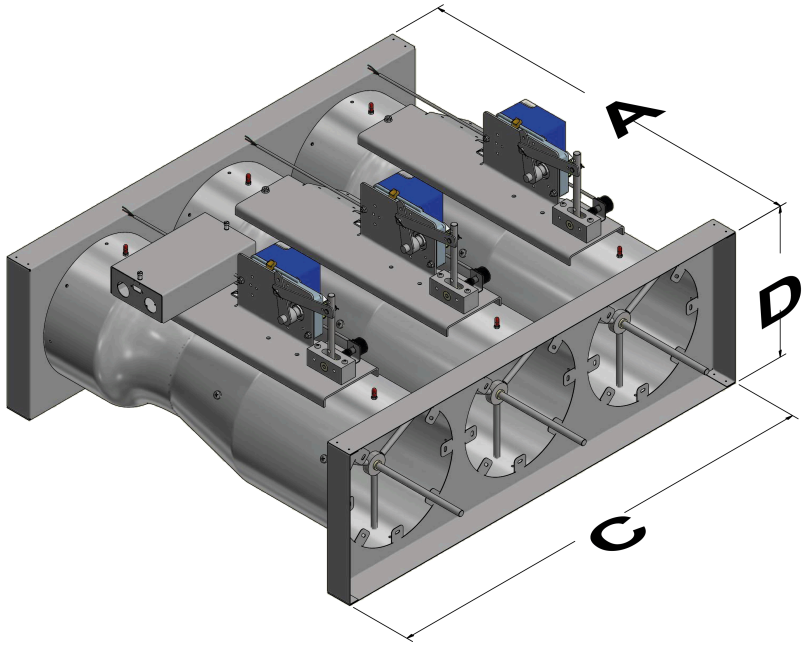


Figure 7: Quad Venturi Valve

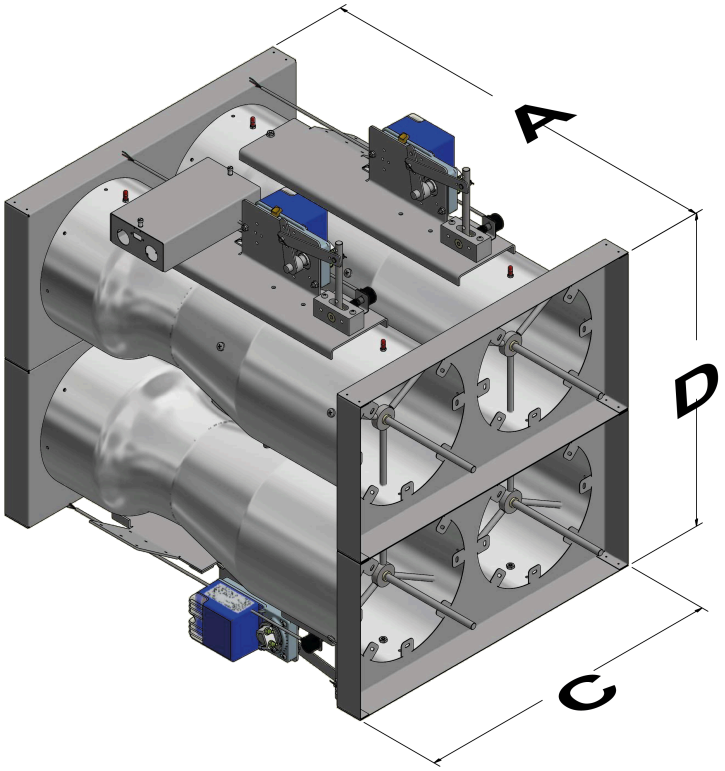
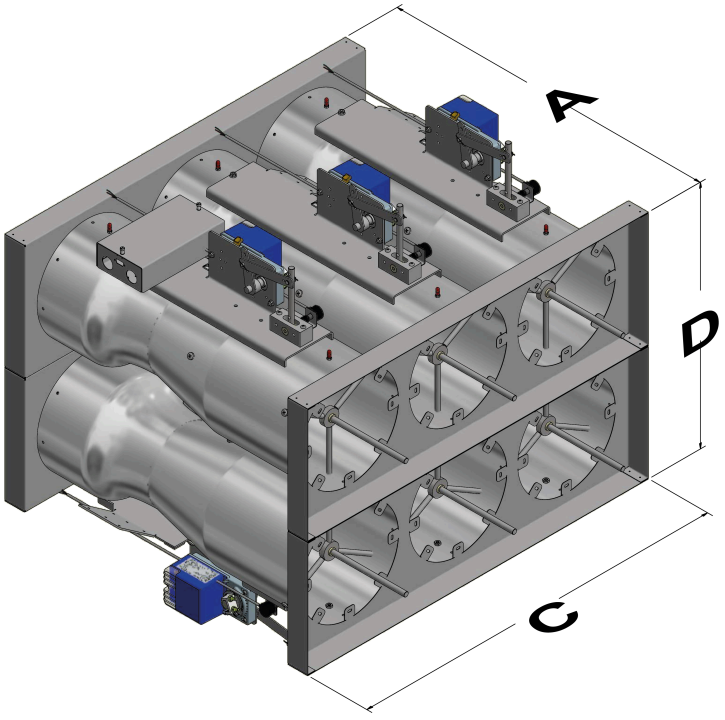


Figure 8: Hex Venturi Valve



Actuator

Fast acting damper actuator

The actuator is a microprocessor based actuator with conditioned feedback. The unit utilizes brushless DC motor technology and operates on a 24 VAC nominal power supply. These models deliver a minimum of 50 in. lb. 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 and zero and span features. Auto stroking means that the maximum stroke of the actuator may be field limited to anywhere between 45 and 90 degrees while still maintaining a full throttling range of 2-10 VDC. The zero and span may also be field set to adjust the control response of the motor to a portion of the 2-10 VDC input signal. This allows for the sequencing of the several motors off the same input signal. Refer to the actuator specifications for more information.

Electrical specifications

Table 5: Electrical specifications

Electrical feature	Specification
Power Supply	22 VAC -26 VAC or 28 VDC - 32 VDC
Maximum power consumption	20 VA at 25 VAC
Wire size	18 AWG minimum
Electrical connections	One 5/8 in./15.9 mm knock out One 7/8 in./22.2 mm knock out screw terminals
Feedback signal	4-20 mA Output 2-10 VDC switch selectable
Control signal	2-10 VDC 4-20 mA switch selectable Zero & span adjustable

Mechanical specifications

Table 6: Mechanical specifications

Mechanical feature	Specification
Torque	50 in. lb. or 5.6 Nm. at rated voltage
Angle of rotation	0-90°, mechanically adjustable
Direction of rotation	Reversible
Stroke time	~22ms/Degree of rotation
Typical control	10° to 30° stroke
Shipping weight	Approx. 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 7: Environmental specifications

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

Installation procedure

Before you begin:
Read complete guidebook and all installation procedures prior to installation.

1. Unpack the valve from the shipping container in the area where it will be mounted and verify that the tag number on the valve matches schedule.

   ⓘ **Note:** Never carry a valve by the linkage, cone bracket, or any other control component that is mounted onto or into the valve body. The central cone shaft extends out of the valve body outlet opening when in its full open position. Do not stand a Venturi Valve on outlet opening side when it is in the full open position.

2. Verify the size, flow range and orientation of the valve by comparing the data on the valve label to the specifications listed on the schedule or architectural drawings.

   ⓘ **Note:** Valve O.D. 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:** Horizontal, Vertical Up and Vertical Down Valves cannot be interchanged or substituted for each other.

4. Make sure to install valve so that air flow direction corresponds to the arrow on 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 ductwork, verify the direction of flow within the duct and align the valve accordingly.
6. Install a hanger stock to support the ductwork within 12 in. (305 mm) of the valve connection. Install valve into duct after hanger stock is in place.

   ⓘ **Note:** To ensure precise operation, ensure the valve is level after mounting.

   ⓘ **Note:** Allow a minimum of 14 in. (356 mm) of free unobstructed space around the valve for access. Do not mount the valve with the actuator fully down as potential condensation can run into the actuator. The actuator and linkage position is not affected whether it is up, down or sideways. However, for future maintenance, adjustment or potential condensation issues it is recommended that the linkage is not positioned facing down.

   ⓘ **Note:** It is recommended that single body horizontal hood valves should be installed so that the pivot arm is located at the 3 and 9 o'clock position. Never mount the pivot arm at the 12 or 6 o'clock position. It is also recommended that the valve should be installed to allow for the best access to the actuator or linkage in the event that future adjustments are required.

7. Access to the valve must be provided for possible future changes requiring re-setting of air flow. Allow 5.75” (146 mm) of unobstructed space in the duct on valve’s outlet side for the shaft to reach the maximum flow position.
8. When equipped with an electric actuator, 24 VAC separate from the controller is needed to power it. See wiring instructions provided for the actuator.
9. Sheet metal screws should not exceed ¾ in. length and should not be located more than 1 in. from either end of valve.
10. Seal all duct connections to the seal suitable for the highest duct static.

Note:

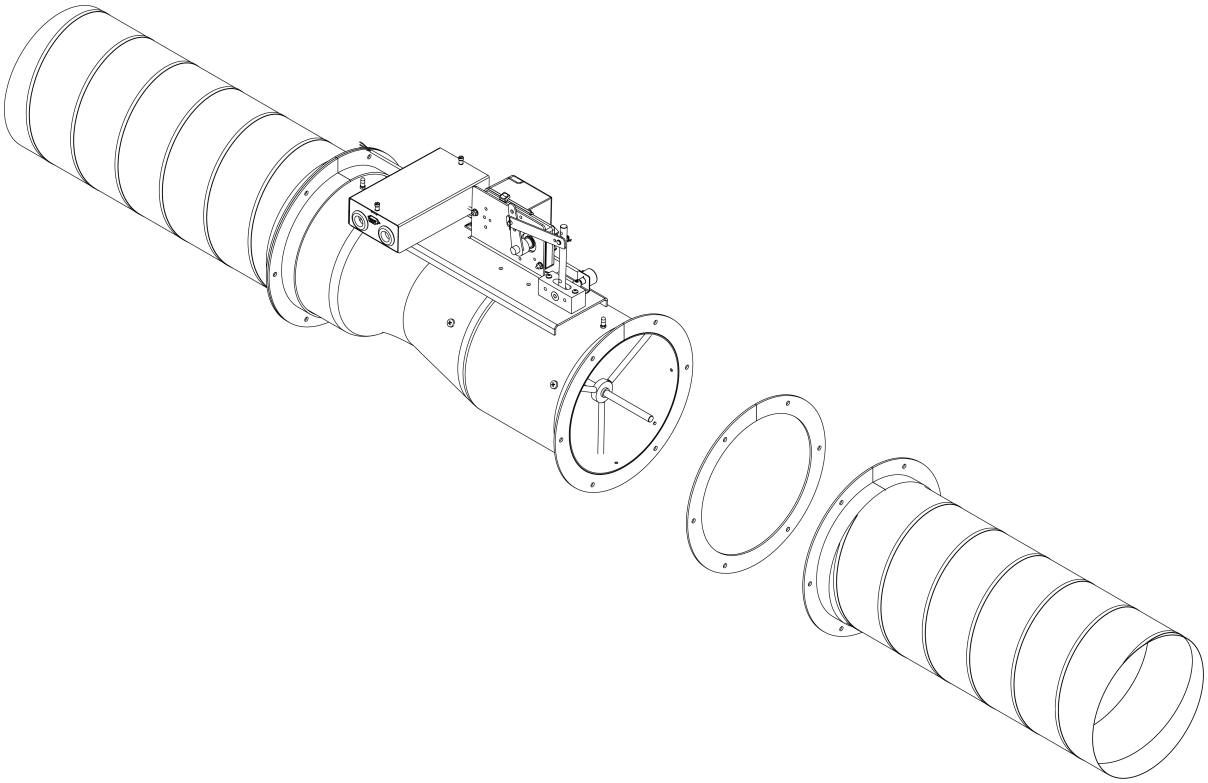
- Use ASHRAE approved duct sealant on all valve / duct connections or flange gaskets for circular flanges. Do not use a sealant that prevents valve removal.
- I.D. and calibration tags should not be removed or painted over.
- Follow the appropriate installation diagram.
- Unless you specifically order 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 procedure, follow the appropriate installation diagram.

Mounting a flanged valve

Flanged valves require a gasket between the duct and valve flanges with the addition of the flange fasteners. 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.

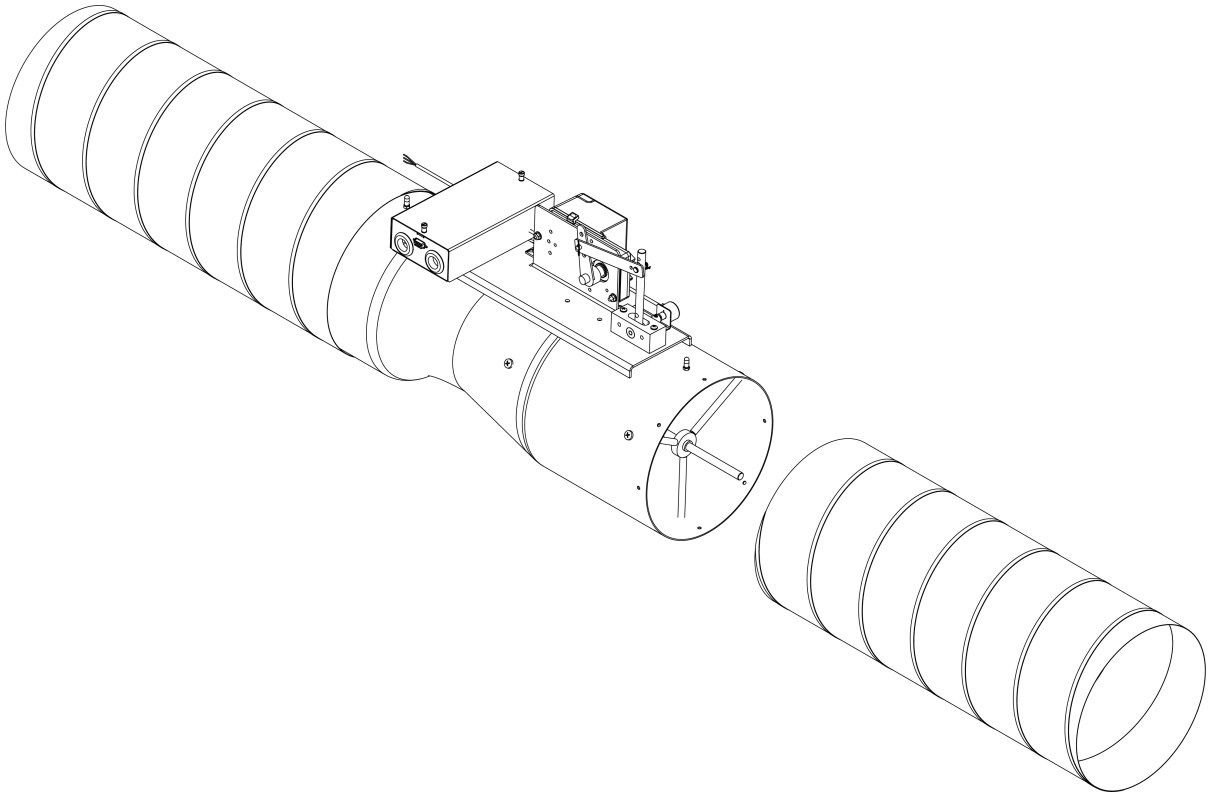
Figure 9: Mounting a flanged valve



Mounting a slip-in valve

The outside diameter of the valve is undersized to fit inside standard duct sizes. Once the valve slips inside the duct, secure the valve with sheet metal screws. Apply a duct seal to ensure an air tight seal. 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.

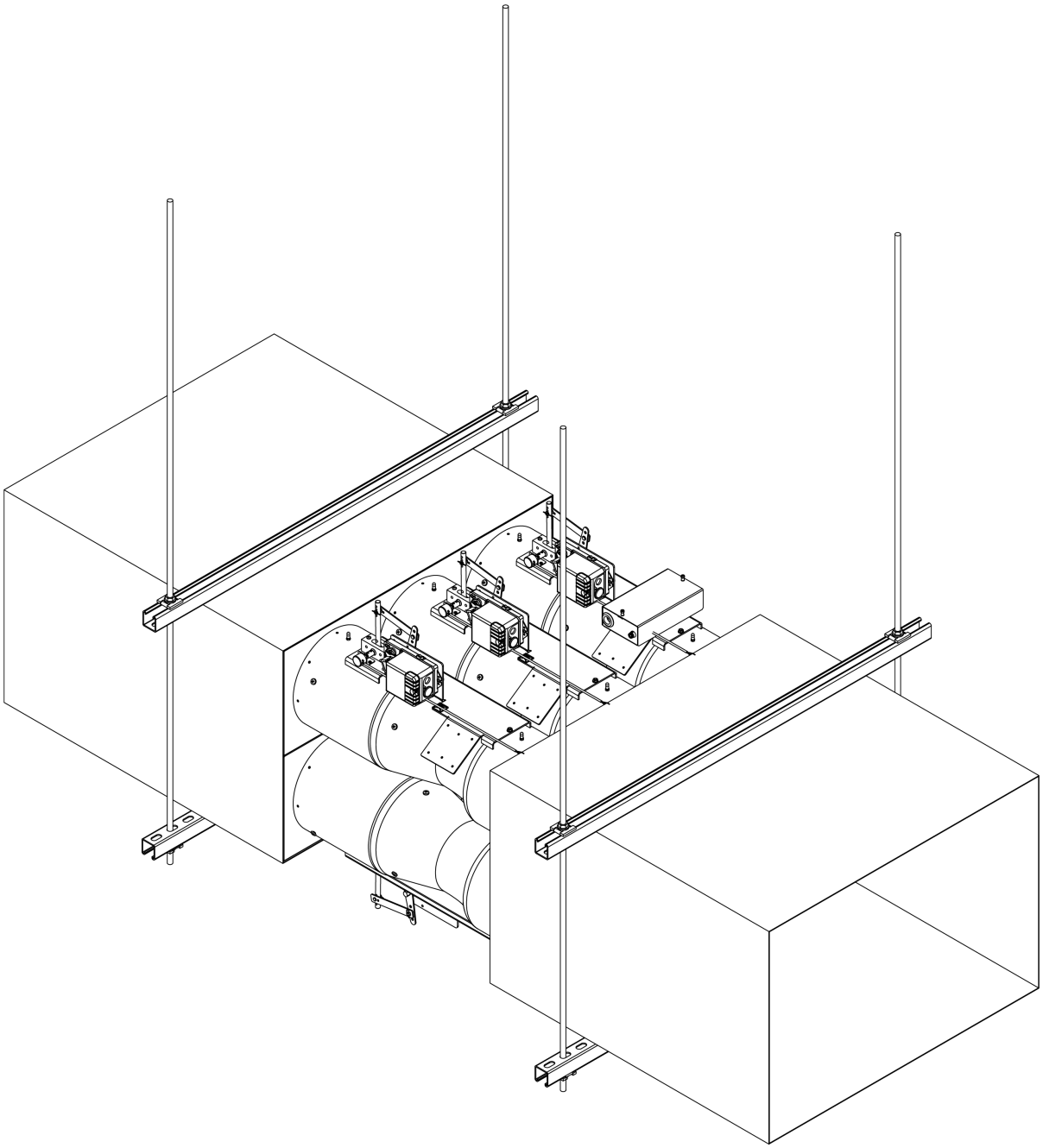
Figure 10: Mounting a slip-in valve



Mounting a ganged valve

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

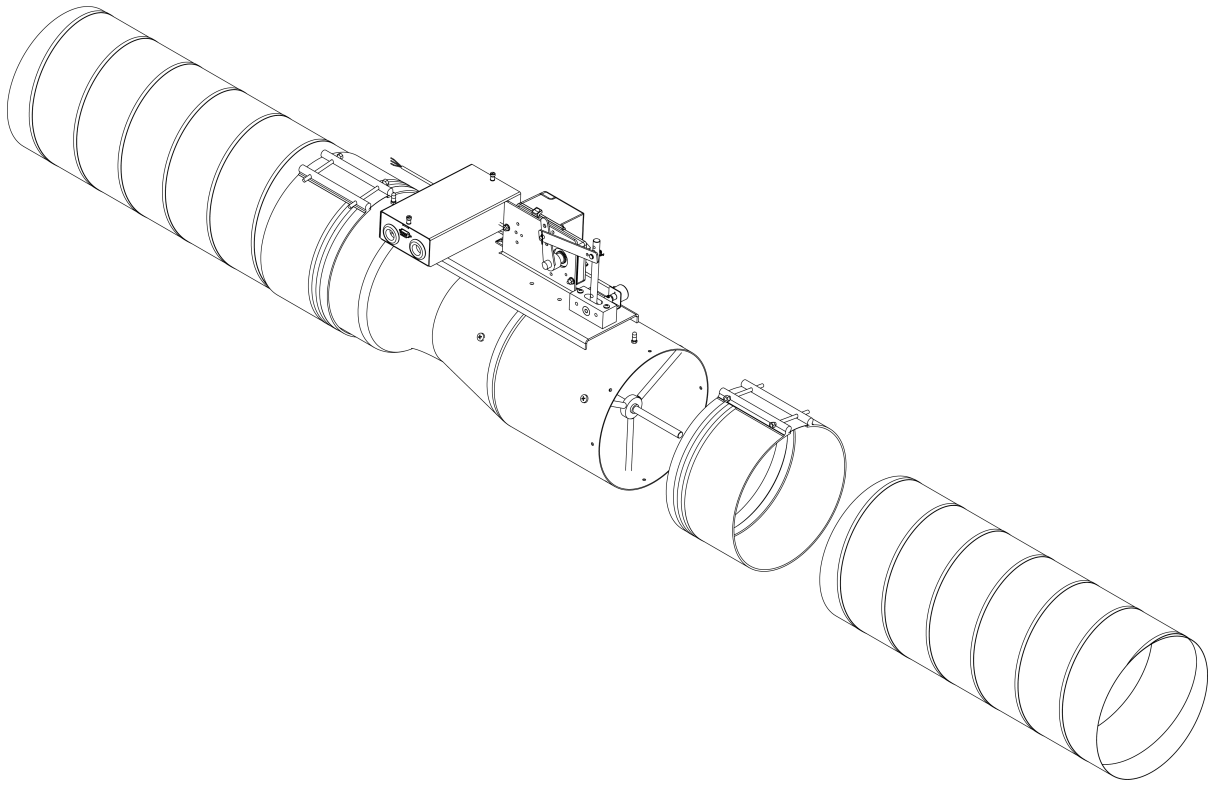
Figure 11: Ganged valve



Mounting a 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 air tight seal forms when the quicksleeve tightens around the valve. 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 12: Mounting a quicksleeve valve



Universal Valve Module

Overview

You can use the Venturi Valves that are equipped with a UVM with virtually any Building Automation Systems (BAS) controller. UVM equipped valves all use 0 V-10 V signals from the controller and translates these signals into a pre-determined flow position or percentage position for any valve. Therefore, 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 0-10 V output signal as feedback of the valve CFM or valve position.

An eight position DIP switch is present on the UVM board and enables setting a hardware address between 0 and 15 (15 is normally used as the Master address), the selection of percentage or CFM input interpretation, percentage or CFM representation of the Output signal, and Normal or Reverse operation. 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 0-10 V set point signal.

Valve calibration information is stored internally on the controller itself at the factory for the valve shipped with the UVM. Therefore, no additional calibration is necessary in the field. CFM curve adjustments can be done in the field but is not recommended. UVM Configuration Software (not included) is required to make any curve adjustments.

Once wired and the power is connected, the actuator initially moves to both the 0% and 100% positions to do perform an autostroke to enable the controller to generate a control signal based on the input set point voltage.

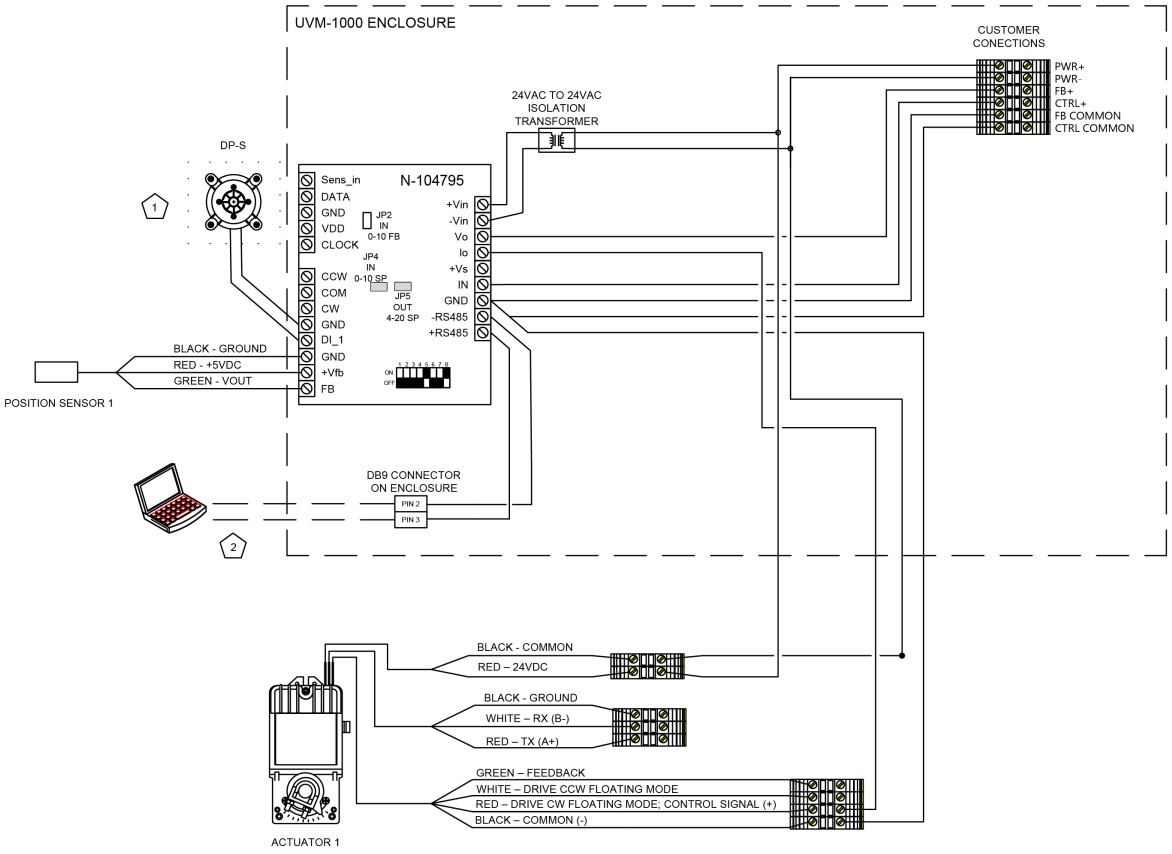
In its minimal configuration, the UVM requires a 24 VAC supply and a 0-10 V control signal. Additionally, the UVM can use a 0 V-10 V output signal to monitor the actual CFM the value is regulated to. The UVM can also optionally take in a digital signal from a differential pressure (DP) switch that indicates 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, it is necessary to enable internal options by 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.

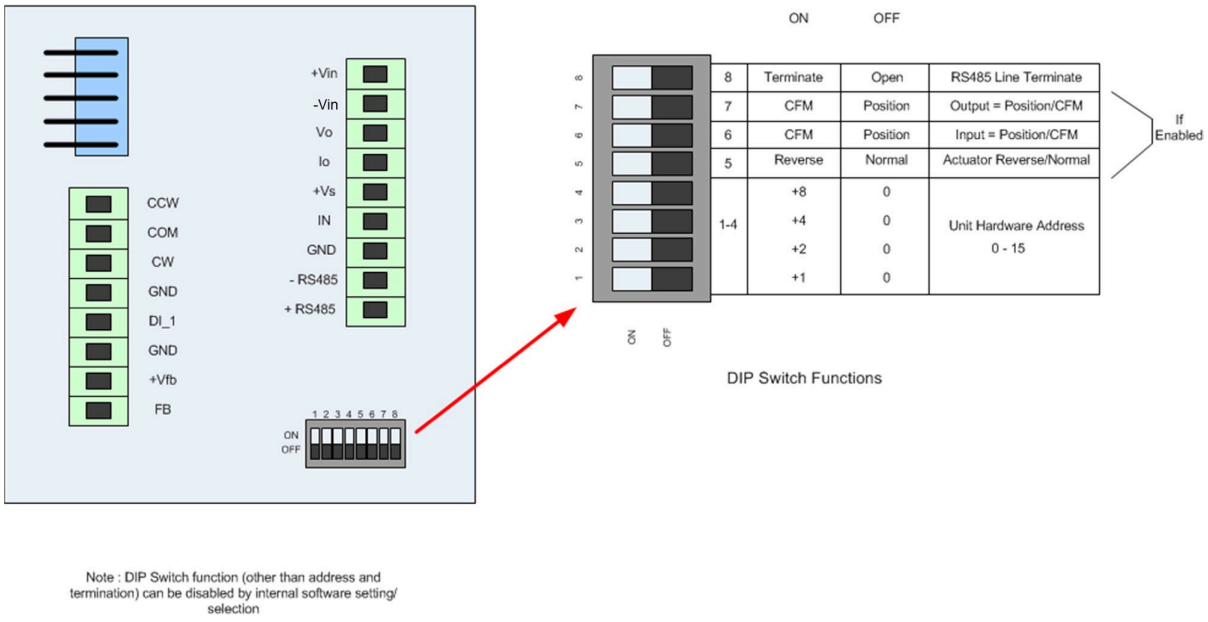
Wiring options

Figure 13: Minimum wiring requirements



DIP switch settings

Figure 14: DIP switch settings



Note : DIP Switch function (other than address and termination) can be disabled by internal software setting/ selection

Troubleshooting

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

Table 8: Troubleshooting

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
	• 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.

Table 8: Troubleshooting

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

Periodic servicing such as lubrication or parts replacement is not required. Proper installations and field startup ensure that the valves provide years of ongoing operation.

In light of the occupational hazards involved with treating patients confined to isolation rooms, or bio hazardous laboratories although not required it is recommended that a hospital or research lab room pressure sensor be inspected, re-certified, maintained and recalibrated if necessary, at least once per year.

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

Frequently asked questions

Table 9: Frequently asked questions

Question	Answer
What to do if the customer asks for 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. While NVLAP accreditation is available, 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 be recognized as of November 30,2020. As a result, NVLAP has developed a transition plan to ensure all NVLAP-accredited laboratories meets 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 10cfm, 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.
How many data points are tested during the calibration process?	Johnson Controls 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.
Are Venturi Valves UL or CSA or EAB certified?	The electronics on the Johnson Controls's Venturi Valves are UL certified.

Table 9: Frequently asked questions

Question	Answer
How fast does the Venturi Valve respond to duct static pressure changes?	Instantaneously. 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 ductwork. 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 inWC – 3.0 inWC for low pressure and 0.6 inWC – 3.0 inWC for medium pressure applications.
How fast does the Venturi Valve actuator respond to a control signal and starts to move the actuator to meet the change in air flow requirement?	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.
How accurate is the air flow control of the Venturi Valves?	All Venturi Valves have an industry standard accuracy of ±5% or 10cfm, whichever is greater.
What is the pressure drop across the Venturi Valve?	The pressure drop across a Venturi Valve is dynamic and not static. It can be anywhere between 0.3 – 3.0 inWC for low pressure and 0.6 – 3.0 inWC for medium pressure Venturi Valves. As long as the pressure does not fall below the minimum of 0.3 inWC for low pressure and 0.6 inWC for medium pressure, or exceed the maximum of 3.0 inWC, 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 operating conditions. When you calculate the pressure drop to determine the required Fan static, use any value between 0.3 inWg (or 0.6 inWg for standard pressure) and 3.0 inWg 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.

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

APAC	Europe	NA/SA
JOHNSON CONTROLS C/O CONTROLS PRODUCT MANAGEMENT NO. 32 CHANGJIANG RD NEW DISTRICT WUXI JIANGSU PROVINCE 214028 CHINA	JOHNSON CONTROLS VOLTAWEG 20 6101 XK ECHT THE NETHERLANDS	JOHNSON CONTROLS 507 E MICHIGAN ST MILWAUKEE WI 53202 USA

Contact information

Contact your local branch office: www.johnsoncontrols.com/locations

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