Venturi Air Valve Product Bulletin

LIT-12013206

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Description

Figure 1: Venturi Air Valve



Venturi Air Valves play a critical role in room pressure containment applications to ensure safety, reliability, and efficiency. Venturi Air Valves are a position-based flow control device that relies on factory calibration instead of real-time flow measurement by a flow sensor. Venturi Air Valves do not feature sensors in the air stream, which allows for safe and reliable operation in various caustic environments where flow sensors need regular maintenance. This robust design gives Venturi Air Valves an advantage in critical environments with many years of reliable service.

Venturi Air Valves are mechanically pressure independent due to a spring-loaded cone design. As the duct pressure fluctuates, the spring-loaded cone assembly rides these pressure waves to maintain a consistent volumetric flow, regardless of the duct static pressure variances. This mechanism provides immediate speed of response to duct pressure changes and does not require actuator movement.

Venturi Air Valves use fast-acting electric actuators that provide a rapid response to changes in conditions and dynamic air flow requirements. This rapid response ensures that room pressure containment is maintained to protect people from airborne threats such as viruses, chemicals, and particulates.

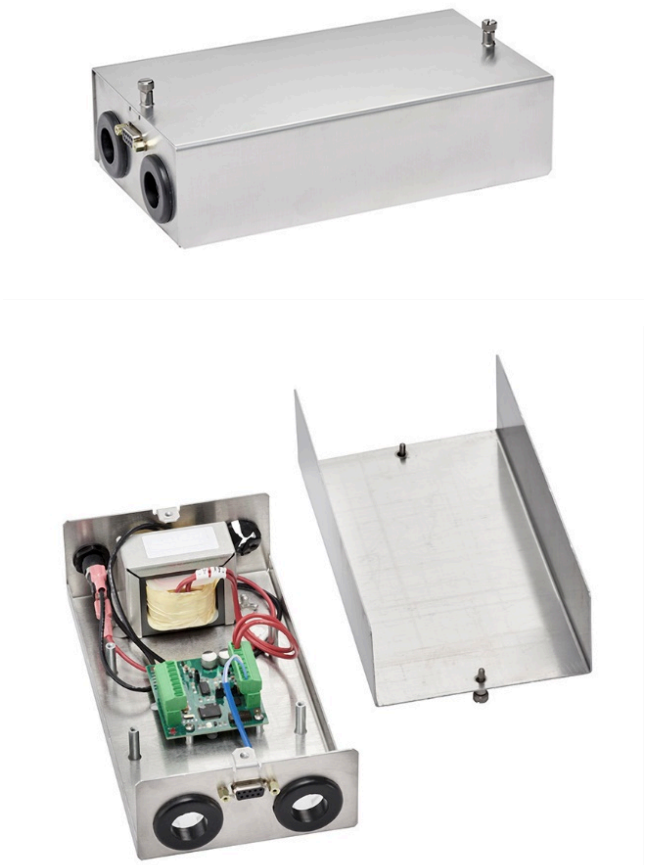
Features and benefits

- Medium or low pressure ratings
- Partially closed or full shut-off design
- Valves available in 8 in., 10 in., 12 in., and 14 in. (203 mm, 254 mm, 305 mm, and 355 mm) diameters
- Available with Heresite® coatings
- Kynar® coated valve options are available for special requirements
- Dependable design, without sensors in the air stream, which results in years of reliable maintenance-free service
- Easy to install
- Available as a constant volume or with a fast acting smart actuator
- Mechanically pressure independent in low and medium pressure applications
- Factory calibrated airflow
- Field adjustable Universal Valve Module (UVM) configuration tool
- Low pressure drop
- Gang together for increased flow
- Maintenance-free link with no sensors due to position based CFM
- Calibration for vertical or horizontal positions

Venturi Air Valve options

Universal valve module

Figure 2: Universal valve module

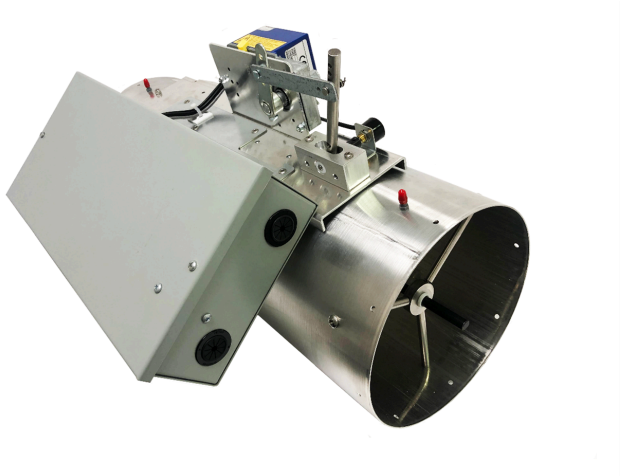


Each Venturi Air Valve comes with a UVM1000 linearization module that provides fast and simple control of the air valve. You can commanded with a 0 VDC to 10 VDC control signal which is scaled to represent 0% to 100% of the air valve's minimum to maximum CFM range. The UVM1000 provides a 0 VDC to 10 VDC position feedback signal as confirmation the actuator has been repositioned to meet the target CFM set point. For example, if 0 VDC to 10 VDC is equal to 0 CFM to 1000 CFM, a 750 CFM set point could require a 7.5 VDC command signal to be sent to the UVM1000, which drives the valve to the 750 CFM position and return a 7.5 VDC position feedback signal as confirmation.

For more information, refer to the *UVM-1000 Product Bulletin (LIT-12013224) and the UVM-1000 Installation Guide (LIT-12013226).*

Valve mounted room level controller

Figure 3: Valve mounted room level controller



Venturi Air Valves can be ordered with a factory mounted Metasys CCM09090 room level controller 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 becomes the central node in the room for connection to all other devices. It is best practice to designate the location of the controller onto the valve with the easiest access, or the general supply.

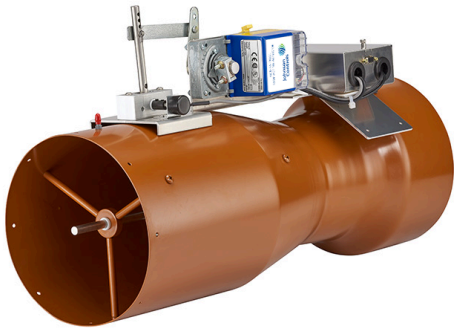
For more information, refer to the *Venturi Air Valve with UVM1000 Installation Guide (LIT-12014272), the M4-CC Critical Environment Equipment Controllers Catalog Page (LIT-1901167), and the M4-CC Critical Environment Equipment Controller Installation Guide (Part No. 24-10143-02236)*on Knowledge Exchange.

Aluminum or stainless steel

Venturi Air Valves are made of aluminum for general exhaust or supply applications. A 316 stainless steel (SS316) option is also available for environments with highly corrosive or dangerous chemicals in the air stream.

Heresite

Figure 4: Heresite coated valve



Heresite is a brown phenolic coating baked on exposed aluminum to minimize corrosion. Heresite coatings provide resistance to a wide range of corrosives.

Kynar

Figure 5: Kynar coated valve



Kynar provides excellent chemical resistance. Kynar is often used as a protective coating in applications where phenolic coating is not sufficient.

Thermal insulation

You can use thermal insulation for supply valves. Thermal insulation decreases energy costs which reduces thermal losses and prevents duct condensation.

Constant volume

Figure 6: Constant volume lateral front Venturi Air Valve



Constant volume (CV) Venturi Air Valves provide a single CFM set point for applications that require only one air flow set point. CV valves do not come with a controller or actuator.

Medium or low pressure

Medium pressure Venturi Air Valves (0.6 in. W.C. to 3 in. W.C.) allow for higher flows for a given valve size, while low pressure Venturi Air Valves (0.3 in. W.C. to 3 in. W.C.) require a smaller pressure drop across the valve to maintain a constant flow.

Partially closed or full shut-off

Partially closed Venturi Air Valves allow for higher flows for a given valve size, while full shut-off Venturi Air Valves allow the valve to close completely for zero flow application requirements.

Horizontal or vertical

You can specify how the valve is situated in the duct work; horizontal, vertical up flow, or vertical down flow. Each orientation is calibrated differently to account for the effects of gravity on the spring-loaded cone assembly to ensure mechanical pressure independence is maintained.

Size

Johnson Controls offers 8 in., 10 in., 12 in., and 14 in. diameter valves for a variety of applications

Figure 7: Venturi Air Valve sizes



Ganged valves

To increase flow, gang valves together.

Figure 8: Dual Venturi Air Valve

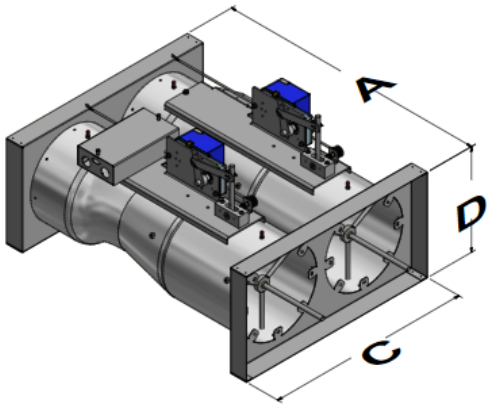


Figure 9: Triple Venturi Air Valve

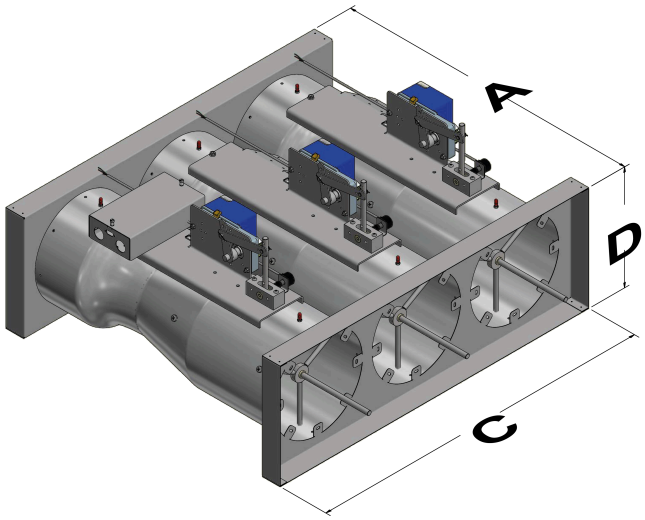


Figure 10: Quad Venturi Air Valve

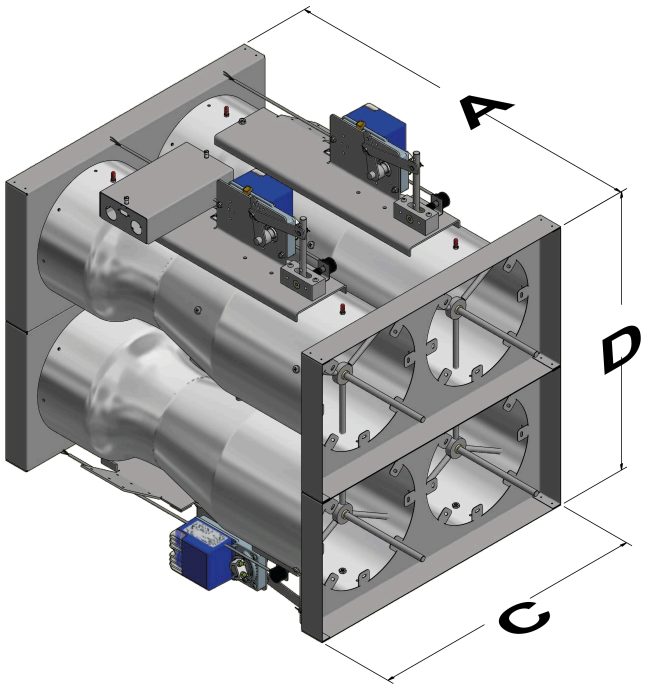


Figure 11: Hex Venturi Air Valve

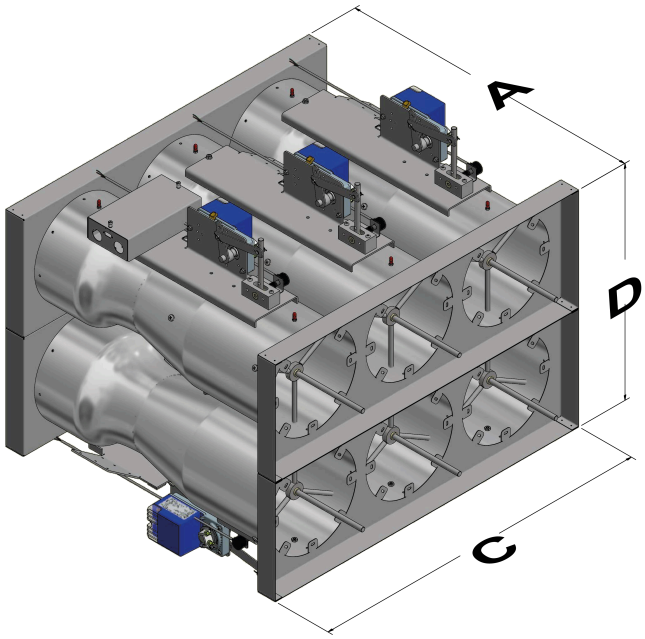


Table 1: Dimensions

Callout	Description
A	Valve length
C	Collar width
D	Collar height

Selection charts

Table 2: 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				
	2	40	18	54	24	N/A		30	762	17	432	22.63	575	11.44	291
	3	60	27	81	37			30	762	17	432	33.75	857	11.44	291
	4	100	45	135	61			30	762	35	889	22.63	575	22.88	581
	6	140	64	189	86			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		30.8	782	19	483	26.75	679	13.5	343
	3	80	36	108	49			30.8	782	19	483	40	1016	13.5	343
	4	100	45	135	61			30.8	782	38	965	26.75	679	27	686
	6	150	68	203	92			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		34	864	24	610	32.15	817	16	406
	3	75	34					34	864	24	610	48.3	1227	16	406
	4	120	54					34	864	48	1219	32.15	817	32	813
	6	160	73					34	864	48	1219	48.3	1227	32	813

Table 3: Partially closed (PC) Venturi valve flow rates

Unit size		Low pressure 0.3 in. W.C.				Medium pressure 0.6 in. W.C.			
		Minimum flow		Maximum flow		Minimum flow		Maximum flow	
		CFM	Cubic meter per hour (CMH)	CFM	CMH	CFM	CMH	CFM	CMH
8 in.	1	35	59	500	850	35	59	700	1,189
10 in.	1	50	85	550	934	50	85	1,000	1,699
	2	100	170	1,100	1,869	100	170	2,000	3,398
	3	150	255	1,650	2,803	150	255	3,000	5,097
	4	200	340	2,200	3,738	200	340	4,000	6,796
	6	300	510	3,300	5,607	300	510	6,000	10,194
12 in.	1	90	153	1,050	1,784	90	153	1,500	2,549
	2	180	306	2,100	3,568	180	306	3,000	5,097
	3	270	459	3,150	5,352	270	459	4,500	7,646
	4	360	612	4,200	7,136	360	612	6,000	10,194
	6	540	917	6,300	10,704	540	917	9,000	15,291

Table 3: Partially closed (PC) Venturi valve flow rates

Unit size		Low pressure 0.3 in. W.C.				Medium pressure 0.6 in. W.C.			
		Minimum flow		Maximum flow		Minimum flow		Maximum flow	
		CFM	Cubic meter per hour (CMH)	CFM	CMH	CFM	CMH	CFM	CMH
14 in.	1	175	297	1,400	2,379	175	297	2,100	3,568
	2	350	595	2,800	4,757	350	595	4,200	7,136
	3	525	892	4,200	7,136	525	892	6,300	10,704
	4	700	1,189	5,600	9,514	700	1,189	8,400	14,272
	6	1,050	1,784	8,400	14,272	1,050	1,784	12,600	21,408

Note: Minimum flow for SS316 8 in. PC valve is 50 CFM. Minimum flow for SS316 12 in. PC valve is 110 CFM.

Table 4: Full shut-off (FS) Venturi valve flow rates

Unit size		Low pressure 0.3 in. W.C.				Medium pressure 0.6 in. W.C.			
		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	1,019
10 in.	1	0	0	450	765	0	0	850	1,444
	2	0	0	900	1,529	0	0	1,700	2,888
	3	0	0	1,350	2,294	0	0	2,550	4,332
	4	0	0	1,800	3,058	0	0	3,400	5,777
	6	0	0	2,700	4,587	0	0	5,100	8,665
12 in.	1	0	0	750	1,274	0	0	1,100	1,869
	2	0	0	1,500	2,549	0	0	2,200	3,738
	3	0	0	2,250	3,823	0	0	4,400	7,476
	4	0	0	3,000	5,097	0	0	8,800	14,951
	6	0	0	4,500	7,646	0	0	17,600	29,903

Table 5: SS316 PC Venturi valve flow rates

Unit size		Low pressure 0.3 in. W.C.				Medium pressure 0.6 in. W.C.			
		Minimum flow		Maximum flow		Minimum flow		Maximum flow	
		CFM	CMH	CFM	CMH	CFM	CMH	CFM	CMH
8 in.	1	50	85	500	850	50	85	700	1,189
10 in.	1	50	85	550	934	50	85	1,000	1,699
	2	100	170	1,100	1,869	100	170	2,00	3,398
	3	159	255	1,650	2,803	150	255	3,000	5,097
	4	200	340	2,200	3,738	200	340	4,000	6,796
	6	300	510	3,300	5,607	300	510	6,000	10,194
12 in.	1	110	187	1,050	1,784	110	187	1,400	2,379
	2	220	374	2,100	3,568	220	374	2,800	4,757
	3	330	561	3,150	5,352	330	561	4,200	7,136
	4	440	748	4,200	7,136	440	748	5,600	9,514
	6	660	1,121	6,300	10,704	660	1,121	8,400	14,272

Note:

- Full shutoff low pressure valves are not available in vertical upflow orientation.
- Vertical upflow low pressure valves maintain flow from 0.4 in. W.C. to 3 in. W.C.

Table 6: Johnson Controls actuator options

Valve body diameter	Johnson Controls SKU	Torque	Fail safe options
14 in.	LB-SM060-TK7	70 in.lb. (5.6 Nm)	Fail safe through charged capacitor
8 in., 10 in., 12 in.	LB-BM060-TK6	50 in.lb. (5.6 Nm)	Fail safe through charged capacitor
14 in.	LB-SM00-TK7	70 in.lb. (8 Nm)	No fail safe. Fails in last position
8 in, 10 in., 12 in.	LB-BM00-TK6	50 in.lb. (8 Nm)	No fail safe. Fails in last position

Ordering information

Table 7: Ordering guide

Feature	Code letter or number and description	Product code number example: JVN10HNFAFULU
Johnson Controls	JV = Johnson Controls	JV
Ganged	N = Not ganged 2 = Dual 3 = Triple 4 = Quad 6 = Hexa F = Flanged	N
Size	08 = 8 in. 10 = 10 in. 12 = 12 in. 14 = 14 in.	10
Material	A = Aluminium H = Heresite S = SS316 K = Kynar	H
Insulation	N = No insulation I = Insulated	N
Actuator	CV = Constant volume FA = Fast acting SA = Special actuator	FA
Type	P = Partially closed F = Full shut-off	F
Airflow	H = Horizontal U = Upflow D = Downflow	U
Pressure	L = Low pressure 0.3 in. W.C. to 3 in. W.C. M = Medium pressure 0.6 in. W.C. to 3 in. W.C.	L
Linearization module	U = Universal Valve Module (UVM) N = None (CV valves only) C = Valve mounted CCM09090 room level controller	U

Note:

- Flanged valves cannot be ganged together.
- Contact Johnson Controls Sales for Kynar valve requirements.
- When you order constant volume (CV) valves, include the required flow volume. Specify CFM for this purpose.
- Constant volume valves do not come with a UVM or any electronic components.
- 14 in. valves are not available in full shut-off (Type = F) or SS316 (Material = S) at this time.
- Low pressure (Pressure = L), full shutoff (Type = F) valves are not available in vertical upflow orientation (Airflow = U).
- Vertical upflow (Airflow = U) low pressure (Pressure = L) valves maintain flow from 0.4 in. W.C. to 3 in. W.C.

Technical specifications

Table 8: Technical specifications

Specification	Description
Aluminum shell thickness	14 gauge (0.0641 in.)
Stainless steel shell thickness	18 gauge (0.05 in.)
Air flow setpoint accuracy	± 5% or 10 CFM; whichever is greater
Internal assembly construction materials	Stainless steel shaft and struts with Teflon® PTFE bearings
Operating range	32°F to 150°F (0°C to 65°C) 10% to 90% non-condensing RH
Performance	• Pressure independent over a 0.3 in. W.C. to 3 in. W.C. for low pressure and 0.6 in. W. C. to 3 in. W.C. for medium pressure applications. • Volume control accurate to ±5% of airflow command signal. • No additional straight duct runs needed before or after valve. • Response time to change in command signal: <1 second. • Response time to change in duct static pressure: <1 second.

The performance specifications are nominal and conform to acceptable industry standard. For application at conditions beyond these specifications, consult your local Johnson Controls representative. Johnson Controls shall not be liable for damages resulting from misapplication or misuse of its products.

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