CVR CONSTANT AIR VOLUME VALVE

- Precision constant air volume control
- Shock absorber built in to stabilise flow
- Fine tuning via indicator volume adjuster
- Heavy duty volume control blade
- High quality springs for linear control
- Instant response from 50 to 1000 Pa
- Response time milliseconds
- Body construction air tight
- Pressed in lip seals for fast installation
- Supplied factory calibrated and adjusted
- Individually Tag numbering on request
- 24 month warranty
- 30 Years field application experience

CVR Mechanical Constant Volume Valve

Valve Body Construction
The CMR CVR Constant Volume Valve is manufactured to the highest engineering precision with CNC machines.The valve is nudged out as a flat sheet from galvanised senzimir sheet metal with all cut outs for the damper adjustment and the blade axle. The flat plate is then formed into a precision round body and the edges are butt laser welded with a CNC Laser, which provides a perfect seal without the need for anti corrosion paint.

The damper consists of a specially shaped control blade which is secured into PTFE bearings on the side. A spring mechanism hold the blade in position. Aerodynamic forces push the blade to a defined position which finally controls the volume flow. A shock absorber is fitted within the valve which is secured to the body and the blade to eliminate any bouncing caused by turbulent air. The spring tension can be adjusted by an external screw type indicator which is also air tight. The air volume can be adjusted at the factory or on site. The valve is factory assembled and tested.

Pressure accuracy
The CVR Valves works reliably from a minimum static pressure, of 50Pa which depends on the air velocity and a maximum of 1000Pa . The flow rate variation is usually within a tolerance of +/- 10% (up to 100m3/h +/- 10m3/h), if the air velocity is less then 4m/s and the controller is installed horizontally The variation can be higher if the CVR is installed Vertically at elbows and unusual duct locations. But by re-adjusting the set point on the spring dial, this can be easily fine tuned on site to bring it to its final control point. Furthermore, it is recommended to design the air velocity to be around 4.5 to 5 m/s but it should not be below 2.7 m/s.

Temperature
The CVR operates within a temperature range of -30°C to 70°C. Higher temperatures can be achieved with a special heat resistant version.

Insulation
A 25 or 50mm thick insulation for noise or heat transfer protection can be supplied on request.

CVR Mechanical Constant Air Volume Control Valve

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CVR VALVE VOLUMES AND DIMENSIONS

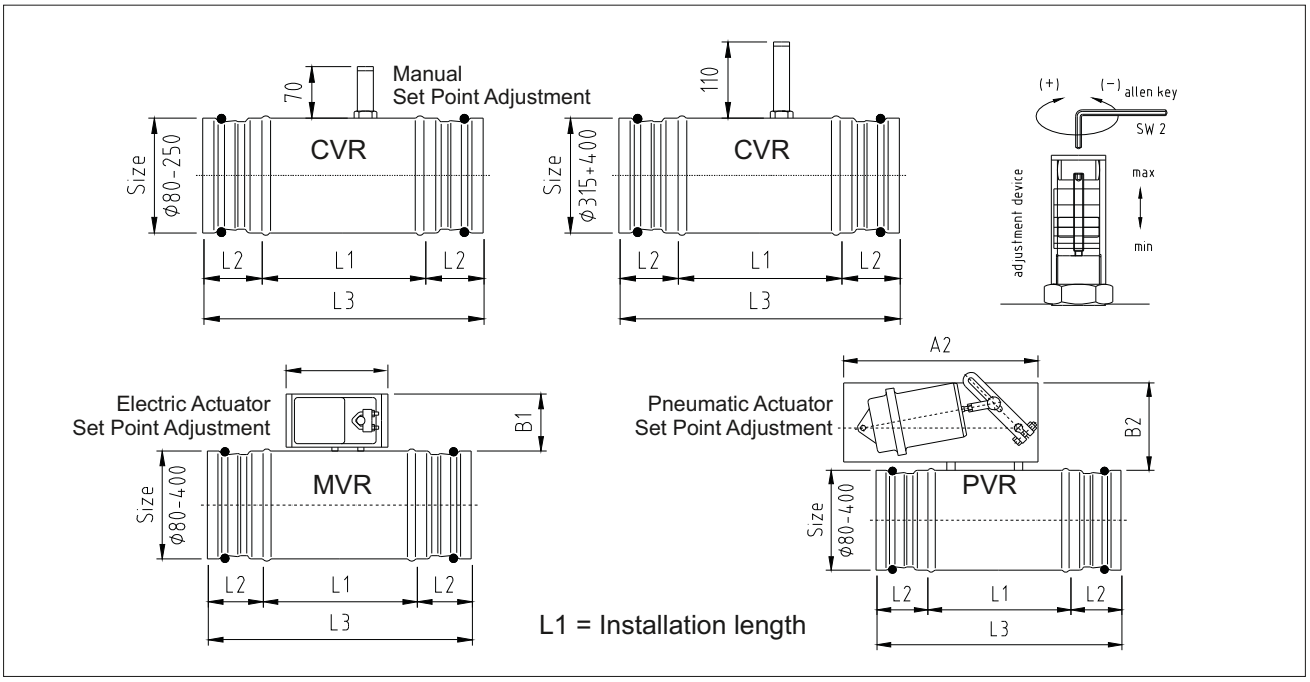
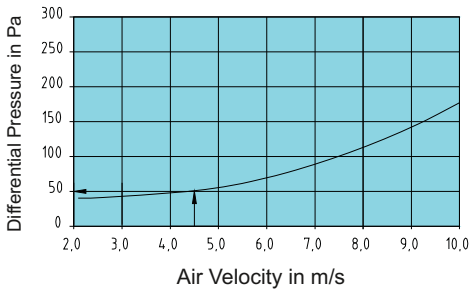


Fig 1: Minimum differential pressure on the CVR



Example:

Valve	CVR-160-320
Diameter	160mm
Air velocity	4.5 m/s
Airflow	325 m3/h

Minimum static pressure in Pa

Δ Pa see Fig 1 50 Pa

Air Volumes and Dimensions

Size	Volume flow [m^3/h]		Dimensions [mm]						
[mm]	min.	max.	l_1	l_2	l_3	A_1	B_1	A_2	B_2
80	40	125	140	40	220	155	105	225	100
100	70	220	170	40	250	155	105	255	100
125	100	280	170	40	250	155	105	225	100
140	150	400	170	40	250	155	105	225	100
150	170	450	170	40	250	155	105	225	100
160	180	500	240	40	320	155	105	225	100
180	200	600	240	40	320	155	105	225	100
200	250	900	240	40	320	155	105	225	100
250	500	1600	240	40	320	155	105	225	100
315	800	2800	220	60	340	155	105	300	150
355	900	3200	300	60	420	230	160	300	150
400	1000	4000	300	60	420	230	160	300	150

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CVR VALVE SOUND DATA NOISE LEVELS

Table 1: Air flow noise generated by the CVR

Size [mm]	Volume flow [m³/h]	Static pressure difference at the controller [Pa]																									
		100 Pa									250 Pa									500 Pa							
		Octave power level* L_w [dB/octave]								Summation $L_{w\,sum}$ A-weighted dB(A)	Octave power level* L_w [dB/octave]								Summation $L_{w\,sum}$ A-weighted dB(A)	Octave power level* L_w [dB/octave]							Summation $L_{w\,sum}$ A-weighted dB(A)
		63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz		63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz		63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	
80	40	37	37	35	33	33	33	28	27	38	39	42	43	44	44	46	41	41	50	46	49	49	50	51	53	48	48	57
	82	49	47	44	41	39	39	33	32	45	51	51	50	49	48	49	44	44	54	58	58	56	55	55	56	51	51	61
	125	52	51	48	45	44	44	38	37	49	61	60	57	54	53	53	47	46	58	68	66	63	61	59	59	53	52	65
100	70	40	39	38	36	35	36	30	29	41	43	45	46	46	47	49	44	43	53	49	52	52	53	54	55	50	50	60
	135	50	48	45	42	41	40	34	33	46	59	57	54	51	50	49	43	42	55	60	60	58	57	57	58	53	52	63
	200	54	52	49	47	45	45	39	38	51	63	61	58	55	54	54	48	47	59	70	68	65	62	61	60	54	53	66
125	100	41	40	38	36	35	36	30	29	41	45	47	47	48	48	49	44	43	54	52	54	54	54	55	56	50	49	60
	190	51	49	46	42	41	40	34	32	46	55	54	53	51	51	51	46	45	56	61	61	59	58	57	58	52	52	63
	280	54	53	50	47	45	45	39	37	50	63	61	58	55	54	53	47	46	59	64	64	62	61	61	62	57	56	67
140	150	43	42	40	38	37	37	31	30	42	47	49	49	49	50	51	46	45	55	53	56	56	56	56	58	52	51	62
	270	53	51	47	44	43	42	36	34	48	61	59	56	53	51	51	44	43	57	63	63	61	60	59	60	54	54	65
	400	56	55	52	49	47	47	41	39	52	65	63	60	57	56	55	49	48	61	72	70	67	64	62	62	56	55	68
150	150	43	42	40	38	37	37	31	30	42	47	49	49	49	50	51	45	44	55	54	56	56	56	56	57	52	51	62
	270	52	50	46	43	41	41	34	33	47	56	56	54	52	52	52	46	46	57	63	62	60	59	58	59	53	52	64
	400	56	54	50	47	46	45	39	38	51	64	62	59	56	54	54	48	46	60	65	65	64	62	62	63	57	57	68
160	180	44	43	41	39	38	38	32	31	43	48	50	50	50	50	51	46	45	56	55	57	57	57	57	58	53	51	63
	340	53	51	48	44	43	42	36	34	48	62	60	56	53	51	51	44	43	57	64	64	62	60	60	60	55	54	65
	500	57	55	52	49	47	47	40	39	52	66	64	61	58	56	55	49	48	61	72	70	67	64	62	62	56	54	68
200	250	45	43	41	39	38	37	31	30	43	51	52	52	51	51	51	45	44	56	57	59	58	58	57	58	52	50	63
	575	55	53	50	46	44	44	37	36	50	64	62	58	55	53	53	46	45	59	66	66	64	62	62	62	56	56	67
	900	-	-	-	-	-	-	-	-	-	68	66	63	60	58	58	52	50	64	75	73	70	67	65	65	58	57	70
250	500	48	47	45	43	41	41	35	34	47	54	56	55	55	54	55	49	48	60	61	62	62	61	61	62	56	54	66
	1000	57	55	52	49	47	46	39	38	52	66	64	61	57	55	55	48	47	61	69	68	67	65	64	64	59	58	69
	1500	-	-	-	-	-	-	-	-	-	70	68	65	62	60	60	53	52	65	77	75	72	68	67	66	60	58	72
315	800	48	46	44	41	39	39	32	31	44	55	56	55	54	53	53	46	44	58	62	63	62	61	60	59	53	51	65
	1400	57	55	52	48	46	45	39	37	51	66	64	60	57	55	54	47	46	60	70	69	67	65	64	64	58	57	69
	2200	-	-	-	-	-	-	-	-	-	71	69	65	62	60	59	53	51	65	77	75	72	69	67	66	60	58	72
355	900	50	48	46	43	42	41	35	33	47	57	58	57	56	55	55	49	47	60	64	65	64	63	62	62	55	53	67
	2000	59	57	53	50	48	47	40	39	53	68	66	62	59	57	56	49	47	62	72	71	69	67	66	66	60	59	71
	3200	-	-	-	-	-	-	-	-	-	73	71	67	64	62	61	55	54	68	79	77	74	71	69	68	62	60	74
400	1000	50	48	45	42	41	40	33	31	46	58	59	57	56	55	54	47	45	59	65	65	64	62	61	61	54	51	66
	2200	58	56	52	49	47	46	39	37	52	67	65	61	57	55	54	48	46	61	72	71	68	66	65	65	59	57	70
	3800	-	-	-	-	-	-	-	-	-	73	71	67	64	62	61	55	53	67	79	77	74	70	68	68	61	60	74

* sound level in dB/octave in relation to 10^{-12} W

If air is discharged into a room, additional attenuation will take place as a result of duct outlet attenuation which results in a reduction in the sound level.The room and duct outlet attenuation can be calculated according to VDI 2081. As a rough estimate, about 8 dB can be deducted.

The flow noise is heavily dependent on the local conditions, the radiating duct length upstream, or downstream of the sound attenuator and the acoustic insulation. Therefore the data provide dis calculated in the laboratory and can only be used as a guide.

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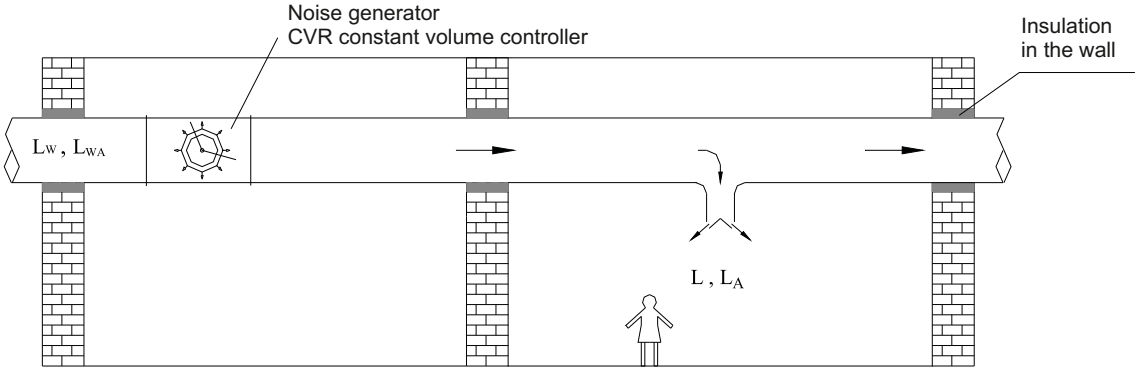
CVR AIR FLOW NOISE LEVEL EXAMPLES

Example 1: Calculation of noise generated by air flow without attenuation.



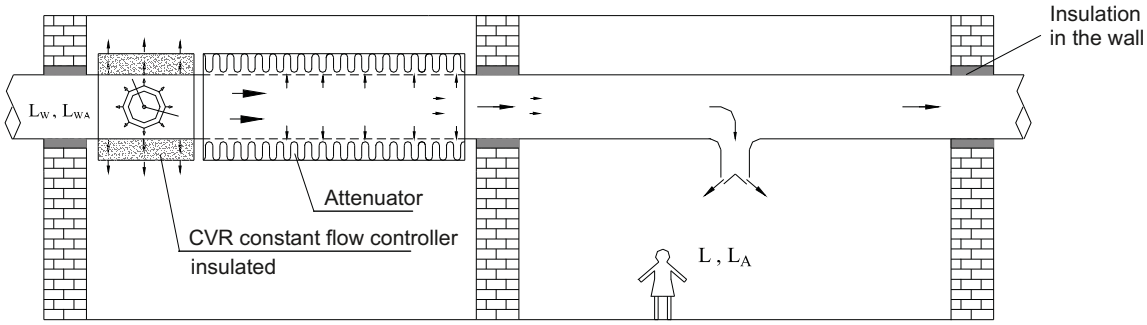
	Sound level in dB / octave								Summation A-weighted dB (A)
fm	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	
Flow noise Lw acc. to table 1	53	51	47	44	43	42	36	34	48
Reflection attenuation	-21	-16	-10	-4	-2	0	0	0	
Room attenuation	-4	-4	-4	-4	-4	-4	-4	-4	
A- weighting	-26	-16	-9	-3	0	+1	+1	-1	
Corrected sound pressure level L_A	2	15	24	33	37	39	33	29	42

CVR Size 140mm
Air Volume 270 m3/h
Static Pressure 100 Pa

Specified sound pressure level in room L_A: 42 dB(A)
With 4 dB/ octave room attenuation (see e.g. VDI 2081)

Result : air generated noise in room 42 dB(A)

Example 12 Calculation of noise generated by air flow with attenuation



	Sound level in dB / octave								Summation A-weighted dB (A)
fm	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	
Flow noise Lw acc. to table 1	62	60	56	53	51	51	44	43	57
Attenuation by silencer	-1	-2	-5	-10	-25	-34	-17	-12	
Reflection attenuation	-20	-14	-9	-3	-1	0	0	0	
Room attenuation	-4	-4	-4	-4	-4	-4	-4	-4	
A- weighting	-26	-16	-9	-3	0	+1	+1	-1	
Corrected sound pressure level L_A	11	24	29	33	21	14	24	26	35

CVR Size 160mm
Air Volume 340 m3/h
Static Pressure 250 Pa

Specified sound pressure level in room L_A: 38 dB(A)
With 4 dB/ octave room attenuation (see e.g. VDI 2081)

Result : air generated noise in room 35 dB(A)

Lw
in dB Sound Power Level
L_{WA} in dB (A) 'A' weighted sound power level
L in dB sound pressure level
L_A in dB(A) 'A' weighted sound pressure level

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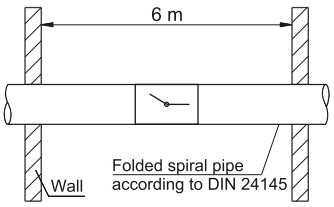
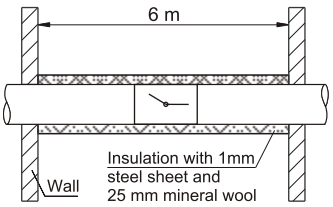
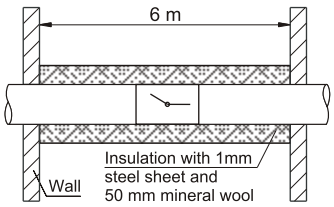
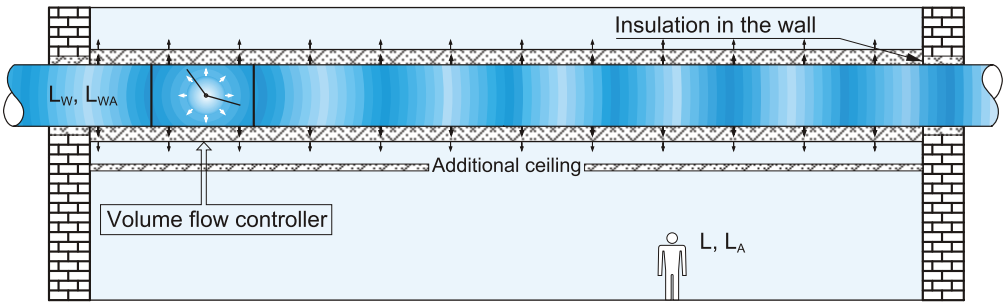
CVR VALVE AND RADIANT NOISE LEVELS

Table 2: Correction data for calculation of the radiant noise of a 6m long duct with a built in CVR

Size [mm]																								
	Correction value [dB/octave]								Correction value [dB/octave]								Correction value [dB/octave]							
	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz
80	36	33	32	23	17	12	11	11	39	35	39	35	32	33	34	29	42	37	45	46	47	54	56	47
100	34	32	30	22	16	12	11	10	38	35	38	34	31	33	34	28	41	38	46	45	47	54	57	47
125	29	29	31	24	21	19	15	11	35	33	37	36	32	33	36	27	35	36	42	48	51	60	58	45
140	27	28	27	21	18	14	12	10	29	29	32	32	32	33	33	26	31	30	37	42	45	52	54	44
150																								
160	23	23	20	18	11	10	9	8	27	26	28	29	27	31	31	25	29	28	35	40	44	51	54	44
180																								
200	22	19	16	16	15	11	9	8	23	18	23	26	29	29	29	24	26	22	29	37	42	51	53	43
250	19	16	13	12	12	10	9	8	23	18	20	24	26	30	28	24	25	20	26	35	41	50	52	42
315	18	14	12	13	11	11	8	8	22	17	19	23	27	29	28	24	26	18	26	38	42	51	53	45
355																								
400	17	11	10	10	10	9	7	6	19	14	17	22	25	28	27	23	20	16	23	33	39	48	50	40



L_W	in dB	Sound Power Level
L_{WA}	in dB (A)	'A' weighted sound power level
L	in dB	sound pressure level
L_A	in dB(A)	'A' weighted sound pressure level

Calculation of the radiating noise of an insulated duct

f_m	Sound level [dB/octave]								Summation A-weighted dB (A)
	63 Hz	125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz	4000 Hz	8000 Hz	
Flow noise L_W acc. to table 1	72	70	67	64	62	62	56	54	68
Reflection attenuation	-27	-26	-28	-29	-27	-31	-31	-25	-
Room attenuation	-4	-4	-4	-4	-4	-4	-4	-4	-
A-weighting	-26	-16	-9	-3	0	+1	+1	-1	-
Corrected sound pressure level L_A	15	24	26	28	31	28	22	24	35

Example:
Acoustic Pressure 38 dB9A)
CVR Size NW 160mm
Air Volume 500 m3/h
Static Pressure 500 Pa

Specified sound pressure level in room L_A: 38 dB(A)
with 4 dB/ octave room attenuation (see e.g. VDI 2081)

Result : Radiating noise of a 6m long duct with 25mm insulation 35 dB (A)
(-4 dB(A) if false ceiling is also insulated.)

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CVR SELECTIONS AND INSTALLATION

Part Number Selection Table 1 CVR manual mechanical air volume controller

Part Number	Description	Size	Length	Area	Volume	Volume	Volume	Volume	Volume	Volume
		DN	L3		at 3m/s	at 5m/s	at 9 m/s	at 3m/s	at 5m/s	at 9 m/s
		mm	mm	m2	m3/s	m3/s	m3/s	m3/h	m3/h	m3/h
CVR-080-215	080mm Constant Volume Valve	80	215	0.00503	0.015	0.025	0.045	54	90	163
CVR-100-250	100mm Constant Volume Valve	100	250	0.00786	0.024	0.039	0.071	85	141	255
CVR-125-250	125mm Constant Volume Valve	125	250	0.01227	0.037	0.061	0.110	133	221	398
CVR-140-250	140mm Constant Volume Valve	140	250	0.01540	0.046	0.077	0.139	166	277	499
CVR-150-250	150mm Constant Volume Valve	150	250	0.01767	0.053	0.088	0.159	191	318	573
CVR-160-320	160mm Constant Volume Valve	160	320	0.02011	0.060	0.101	0.181	217	362	652
CVR-200-320	200mm Constant Volume Valve	200	320	0.03142	0.094	0.157	0.283	339	566	1018
CVR-250-320	250mm Constant Volume Valve	250	320	0.04909	0.147	0.245	0.442	530	884	1591
CVR-315-340	315mm Constant Volume Valve	315	340	0.07794	0.234	0.390	0.701	842	1403	2525
CVR-355-415	355mm Constant Volume Valve	355	415	0.09899	0.297	0.495	0.891	1069	1782	3207
CVR-400-415	400mm Constant Volume Valve	400	415	0.12568	0.377	0.628	1.131	1357	2262	4072

The Part Number is made of the Type i.e. CVR- 100 is the diameter and 250 is the length L3

Installation of the CVR

The CVR mechanical volume Controller can be installed in supply and extract ducts. It can be installed vertically or horizontally.

The best is to make sure to have access to the set point adjustment which is done manually with an allen key.

500mm space should kept for commissioning and maintenance.

The CVR is suitable for operating temperatures of -30°C to 70°C but care must be taken of the insulation to avoid condensation.

CMR can provide insulated CVR's with 25mm and 50mm on special order request.

All flow rate set points of the CVRs can be factory adjusted and can be fine tuned on site.

The set point can also be adjusted on site with an allen key on the set point scale over the range of the design of the CVR.

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