

Installation

Warning:

Service conditions must not exceed the limits shown on the valve nameplate, or those outlined in this manual. Consequences could include bursting of pressure-retaining parts and uncontrolled process fluid, resulting in personal injury or property damage. Control valves should also be protected from external damages.

Prior to installing the CVS Series 128PQC Control Valve, perform a complete inspection for damage, and remove any foreign debris. Position the valve for desired flow direction. If angle flow is required, switch the pipe plug to left-hand connection. (Figure 2)

The versatility of this valve allows for installation in any orientation, with the standard method being with the actuator above the body. Standard orientation is best when an angle body or angle configuration has been specified.

When installing the valve into the line, accepted piping practices must be used. A three-valve bypass should be used if continuous operation is required during inspection or maintenance.

For a fail-close control valve, connect the input signal line into the 1/4-inch NPT actuator connection (Figure 2) in the lower diaphragm case assembly. The input signal pressure line should be installed in the upper diaphragm case assembly of a fail-open control valve.

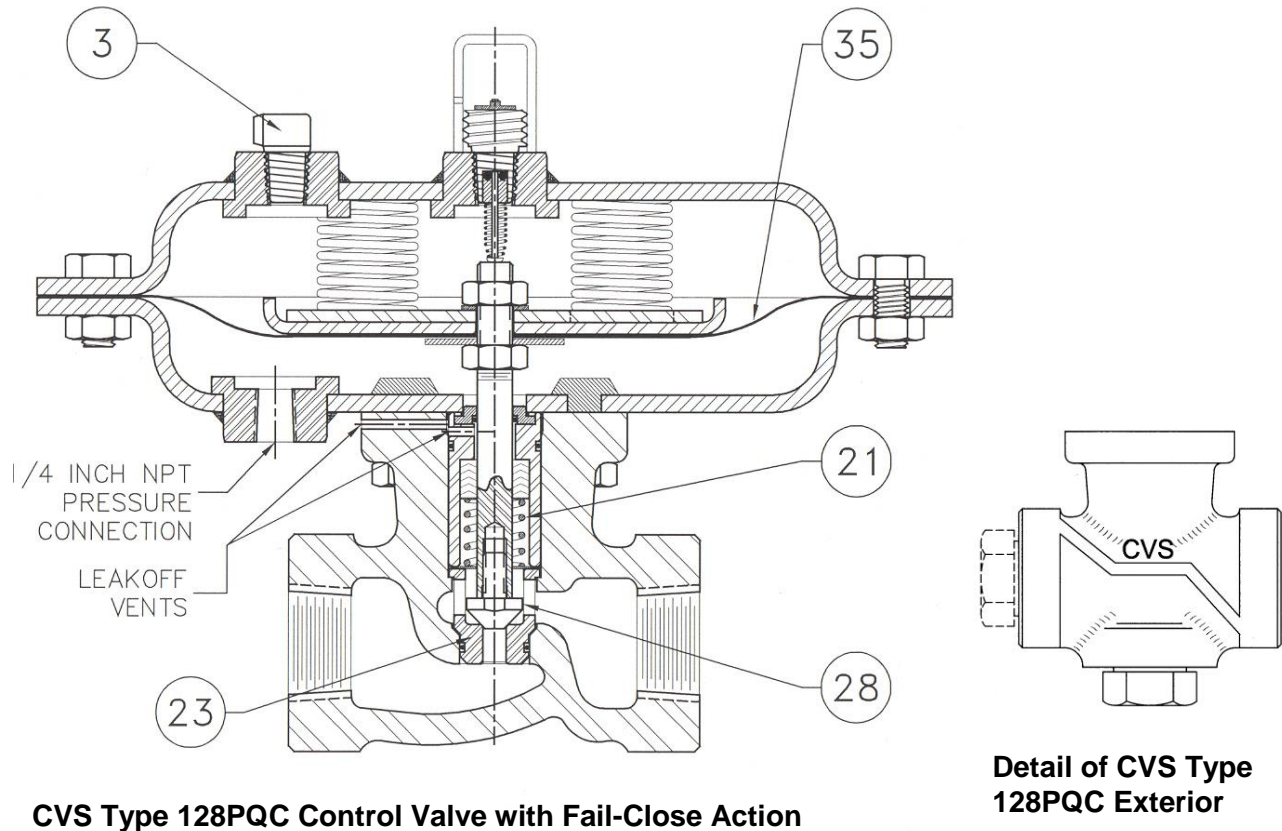


Figure 2: CVS Type 128PQC Control Valve Typical Constructions

Maintenance

Warning:

Prior to performing any maintenance, isolate the valve from the process pressure. Vent control input signal pressure. Relieve the process pressure and drain process media from both sides of valve (Figure 5, Key 27). A sudden release of pressure or fluid can cause personal injury or property damage.

Scheduled inspections and maintenance are vital to continued operation of all pressure control valves and systems. Parts are subject to wear and tear, and must be replaced as necessary, depending on the intensity of service conditions. Unless the valve body requires maintenance or replacement, it may remain in the pressure system or on the vessel.

Replacing Packing and Trim

Follow these procedures when replacing the entire packing and trim assembly or individually replacing packing and trim parts. Unless otherwise indicated, key numbers in this section reference Table 3 for parts listings for replacement packing and trim assembly, Figure 3 for packing and trim assembly key numbers and Figure 5 control valve assembly key numbers.

1. Detach the control valve from all pressure, and release pressure from valve body and actuator. Ensure the valve is completely closed.
2. Remove the four nuts (Key 32) from the screws of the lower diaphragm casing. After disconnecting the input signal tubing, remove the actuator from the valve body, along with attached trim parts.

Table 2: Maximum Allowable Shutoff Pressure Drops

Seating	Actuator Action	Flowing Pressure Drop Tends To:	Port Diameter		Cadmium Coloured Main Spring CVS14A8831X012				Red Main Spring CVS14A9077X012			
			In	mm	At 20 Psig (1.4 bar) Operating Signal Pressure (2 Springs Req'd)		At 35 Psig (2.4 bar) Operating Signal Pressure (4 Springs Req'd)		At 20 Psig (1.4 bar) Operating Signal Pressure (2 Springs Req'd)		At 35 Psig (2.4 bar) Operating Signal Pressure (4 Springs Req'd)	
					Psi	Bar	Psi	Bar	Psi	Bar	Psi	Bar
Metal (All Types)	Fail Close	Open Valve	1/4	6.4	1510	104	3370	232	3380	233	3600	248
			3/8	9.5	520	36	1340	92	1340	92	3120	215
			1/2	12.7	220	15	690	47	700	48	1720	118
	Close Valve	1/4	6.4	940	65	1860	128	1370	94	2920	201	
		3/8	9.5	1130	78	2450	169	1540	106	3300	227	
		1/2	12.7	1330	92	2920	201	1710	118	3600	248	
	Fail Open	Close Valve	1/4	6.4	170	12	350	24	---	---	---	---
			3/8	9.5	530	36	610	42	---	---	---	---
			1/2	12.7	540	37	1150	79	---	---	---	---
Soft	Fail Close	Open Valve	1/4	6.4	1000	69	1000	69	1000	69	1000	69
			3/8	9.5	710	49	1000	69	1000	69	1000	69
			1/2	12.7	400	28	830	57	830	57	1000	69
	Close Valve	1/4	6.4	940	65	1000	69	1000	69	1000	69	
		3/8	9.5	1000	69	1000	69	1000	69	1000	69	
		1/2	12.7	1000	69	1000	69	1000	69	1000	69	
	Fail Open	Close Valve	1/4	6.4	560	39	660	45	---	---	---	---
			3/8	9.5	480	33	960	66	---	---	---	---
			1/2	12.7	540	37	1000	69	---	---	---	---

* Contact CVS Controls for pressure drop

Replacing Packing and Trim continued,

3. Accessible areas should be cleaned at this stage, and all necessary maintenance performed. The actuator and attached trim parts can be turned over and held by the valve body.
4. To separate trim and access packing parts or seal O-rings, first loosen and remove the valve plug (Key 25) and remove the packing box washer (Key 27).
5. Remove the packing box (Key 28), O-ring retainer (Key 18), stem O-ring (Key 19) and diaphragm casing O-ring (Key 31) off the stem.
6. Install replacement parts as necessary.
 - 6.1. If a complete packing and trim assembly is being installed, remove the assembly from the tube (Key 37), keeping the web sleeve (Key 39) on the assembly so the parts remain in place. Roll the sleeve back as necessary during installation.
 - 6.2. Continue pushing the assembly onto the stem until the valve plug and cage are pushed away from the packing box washer or wiper ring. Roll the web sleeve back into place just past the packing box.
 - 6.3. If installing nitrile/cotton packing, the packing rings may be lubricated with silicon based product.
7. Slide the packing box onto the stem until the packing box, the O-ring (Key 19) and the O-ring retainer (Key 18) and the diaphragm casing O-ring (Key 31) are sealed against the diaphragm casing.
 - 7.1. Ensuring proper positioning of the O-rings will prevent them from being cut when other parts are compressed against them.
 - 7.2. Advance the packing spring washer (Key 29), packing spring (Key 21), second packing spring washer, wiper ring and packing box washer (Key 27, if included in the assembly) down onto the stem.
8. For installation of the packing and trim assembly, it is necessary to remove the sleeve, cage puller (Key 40) and cage (Key 23) from the valve plug depending on individual valve configuration.
9. Fix the valve plug onto the stem, rotating the plug until the shoulder makes snug contact with the stem. No further tightening is necessary.
10. To replace the cage or access the cage O-ring (Key 22), remove the cage from the body (Key 26) using the cage puller or a wire hook. Replacement parts can be installed as necessary.
11. Attach the actuator and trim to the valve body (Key 26), paying special attention to the cage O-ring to prevent damage. Thread the four nuts (Key 32) to the lower diaphragm casing assembly screws. Nuts must be tightened to 15-foot-pounds (20N•m).
12. Reconnect the input signal tubing to the actuator connection of the appropriate diaphragm casing.

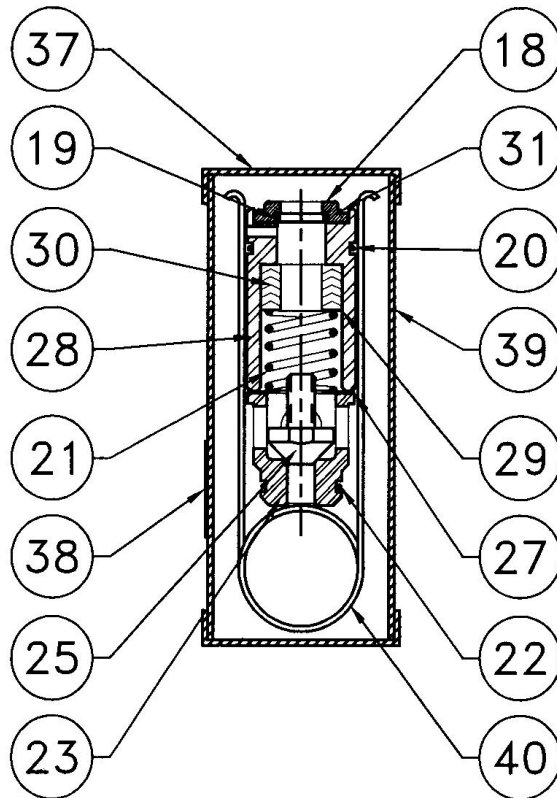


Figure 3: Replacement Packing and Trim Assemblies for Metal Seated Constructions

Reversing Action or Replacing Actuator Parts cont'd

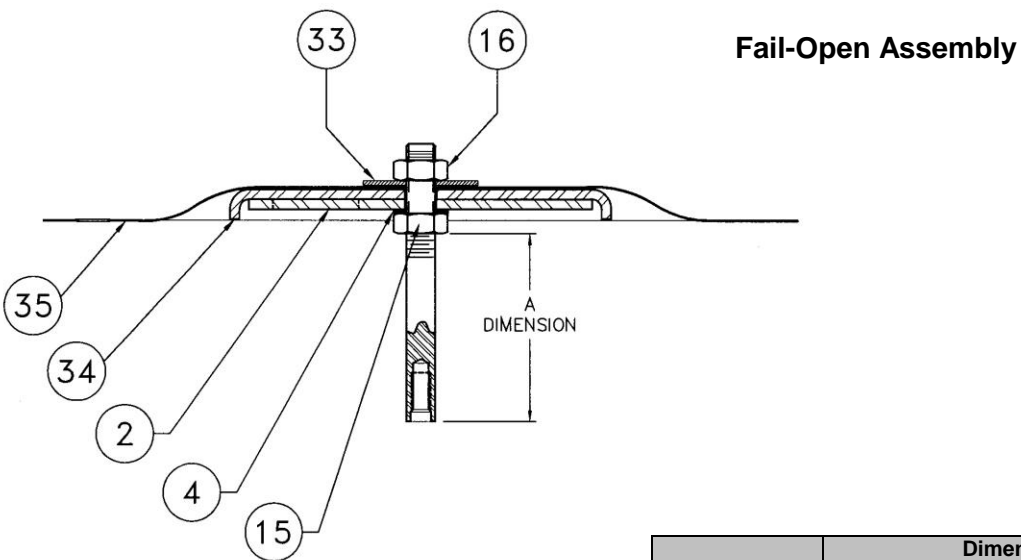
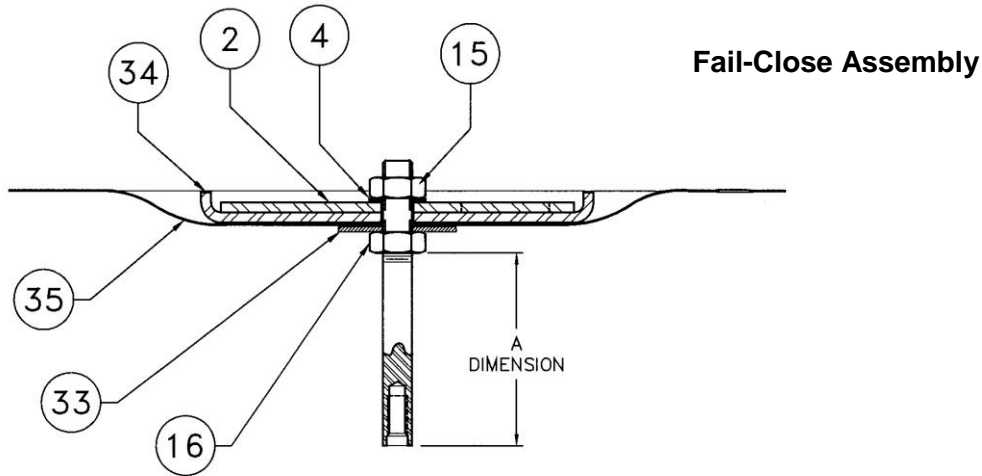
8. Perform the following assembly sequences as necessary to achieve the required control valve action:
 - 8.1. **Fail-close action:** install the following parts: flat washer (Key 33), diaphragm (Key 35), diaphragm plate (Key 34), spring plate (Key 2), lock washer (Key 4) and stem nut (Key 15). Tighten stem nut to 12 foot-pounds (16 N•m).
 - 8.2. **Fail-open action,** install the following parts: lock washer (Key 4), spring plate, diaphragm plate, diaphragm, flat washer (Key 33) and locknut (Key 16). Tighten the locknut to 12-foot-pounds (16 N•m).
9. With fail-open application, place the main springs (Key 12) into the lower diaphragm casing, ensuring that the lower ends of the springs rest over the weld stud heads of the lower diaphragm casing.
10. Following steps 6 through 10 of the "Replacing Packing and Trim" section, install packing and trim parts to secure the stem.
11. When reversing action from previous direction, move the vent (Key 3) to the 1/4-inch NPT actuator connection of the lower diaphragm casing (for fail-open action) or upper diaphragm casing (for fail-close action).
12. For fail-close application, place the main springs so that they rest in the spring plate holes and will not touch the upper diaphragm casing vent boss.
13. Mount the upper diaphragm casing, cap screws, and casing nuts, tightening in an even crisscross pattern to avoid crushing the diaphragm. Tighten to 15 foot-pounds (20 N•m).
14. Replace the actuator and attached trim parts into the valve body (Key 26) with nuts (Key 15) to the lower diaphragm casing integral assembly screws. Tighten nuts to 15 foot-pounds (20 N•m).
15. Reconnect the input signal tubing to the actuator connection of the appropriate diaphragm casing.

Parts Ordering

CVS 128-PQC valves have individual serial numbers, found on the valve nameplate. Please refer to that number when ordering parts or contacting your CVS Controls Sales Representative. Individual parts numbers are listed as follows. Please include these numbers when ordering replacement parts.

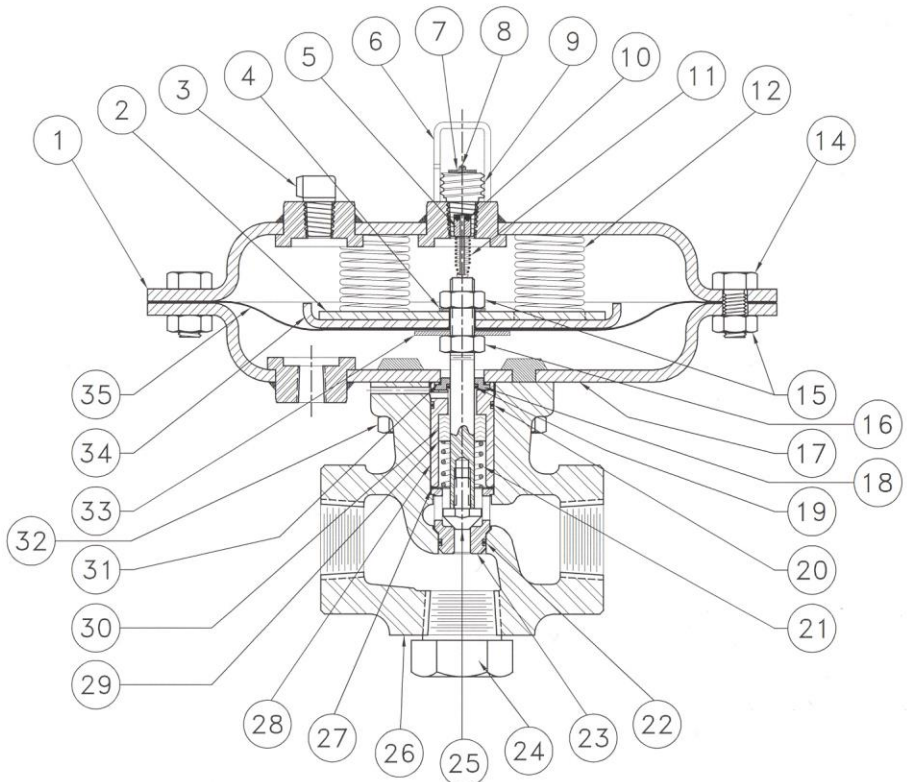
Table 3: Replacement Packing and Trim Assembly Part Numbers

Port Diameter		TFE V-Ring Packing and Heat-Treated 440C SST Valve Plug and Cage	TFE V-Ring Packing, Nitronic 50 SST Valve Plug and Cage, and Inconel X750 Packing Spring
In	mm	CVS Type 128PQC 17-7PH SST Packing Spring	CVS Type 128 PQC
1/4	6.5	CVS15A2611X012	CVS15A2611X042
3/8	9.5	CVS15A2611X022	CVS15A2611X052
1/2	12.7	CVS15A2611X032	CVS15A2611X062

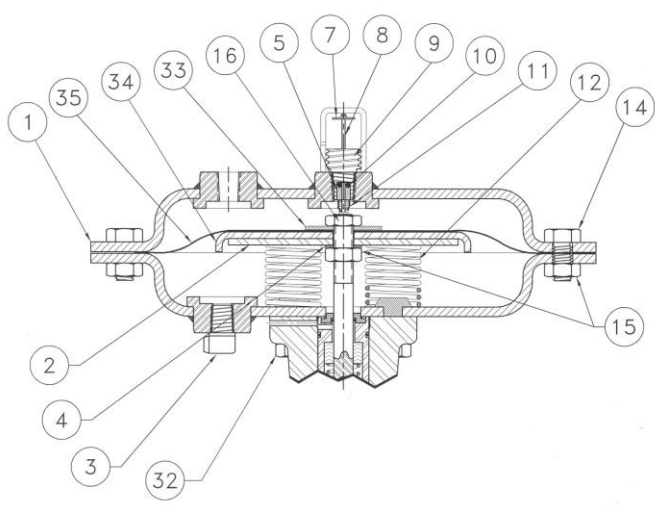


Valve Design	Dimension A			
	Fail-Open		Fail-Close	
	In.	mm	In.	mm
CVS 128PQC	2.72	69.1	2.46	62.5

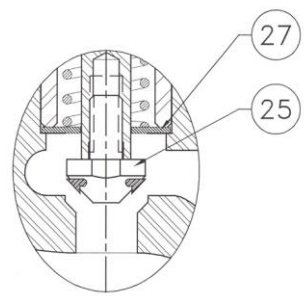
Figure 4: Stem and Diaphragm Assembly Dimensions



CVS Type 128PQC Control Valve: Fail-Closed with Cage-Style Metal Seat and Single TFE-V-Ring Packing



Fail-Open Actuator Detail



CVS Design 128PQC Cageless Soft-Seat Detail

Figure 5: Typical CVS Series 128PQC Control Valve Assembly

Parts List

Key	Description				Part Number	
1	Upper Diaphragm Casing, Steel				CVS24A8816X012	
2	Spring Plate, Zinc Plated Steel				CVS14A8819X012	
3	Vent Assembly				CVS1C8937000A2	
4	Washer, Steel				CVS1A742328992	
5	Indicator Bushing, 316 SST				CVS13A2323X012	
6	Indicator Cover, Plastic				CVS15A1580X012	
7	Travel Indicator Disc Nut, Plastic				CVS1F730506992	
8	Machine Screw, SST				CVS14A8818X012	
9	Indicator Fitting SST				CVS15A0726X012	
10	O-Ring, Nitrile				CVS1H292606992	
11	Spring, 302 SST				CVS16A0431X012	
12	Main Spring, Cadmium Plated Steel				See Table 2	
13	Nameplate, Aluminum				CVS24A7156X012	
14	Cap Screw, Plated Steel (2 req'd)				CVS1E760324052	
15	Hex Nut, Cadmium Plated Steel (17 req'd)				CVS1A346524122	
16	Locknut, Plated Steel				CVS15A7591X012	
17	Lower Diaphragm Casing, Steel				CVS24A8810X012	
18	O-Ring Retainer, Polyethylene	CVS Type 128PQC		CVS14A9053X012		
19	O-Ring, Nitrile	CVS Type 128PQC		CVS1P420706992		
20	O-Ring, Viton	CVS Type 128PQC		CVS1U841806382		
21	Spring	CVS Type 128PQC	Inconel X750	CVS15A1809X012		
22	O-Ring, Nitrile	CVS Type 128PQC		CVS11A8741X012		
23	Cage	316 SST	CVS Type 128PQC	1/4" (6.4 mm)	CVS14A8823X022	
				3/8" (9.5 mm)	CVS14A8805X022	
				1/2" (12.7 mm)	CVS14A7157X022	
		Austenitic SST w/ Tungsten Carbide Seating Surface	CVS Type 128PQC	1/4" (6.4 mm)	CVS15A6800X012	
				3/8" (9.5 mm)	CVS15A6801X012	
24	Pipe Plug, Steel				CVS1A794728992	
25	Valve Plug	Metal Seat	CVS Type 128 PQC 1" Body	1/4" (6.4 mm) and 3/8" (9.5 mm) port	316 SST	CVS16A2087X012
				1/2" (12.7 mm) port	Austenitic SST w/ Tungsten Carbide Seating Surface	CVS15A6804X012
					316 SST	CVS14A6618X012
		Composition Seat, Austenitic SST/polyethylene	CVS Type 128 PQC 1" Body	1/4" (6.4 mm) through 1/2" (12.7 mm) port	CVS15A3199X012	
		Valve Plug Stem, 316 SST		1" Body, CVS Type 128PQC		CVS14A8806X012
26	Valve Body, WCB Steel		1" NPT, CVS Type 128PQC		CVS24A8802X012	
27	Packing Box Washer, SST			1/2" (12.7 mm) or smaller port	CVS14A6617X012	
28	Packing Box, SST		CVS Type 128PQC		CVS14A8809X012	
29	Washer, SST (2 req'd)				CVS14A8808X012	
30	Packing Set, TFE	CVS Type 128PQC	Complete Set		CVS14A8812X012	
			Individual Parts	Male Adaptor		CVS1J227206242
				V-Ring (4 req'd)		CVS1J255206992
				Female Adaptor		CVS1J233201012
				Wiper Ring		CVS1R2516X0012
31	O-Ring, Nitrile				CVS13A1584X012	
33	Washer, Cadmium Plated Steel				CVS14A9770X012	
34	Diaphragm Plate, Zinc Plated Steel				CVS14A8814X012	
35	Diaphragm, Neoprene w/nitrile insert				CVS14A8813X012	
37	Paper Tube				---	
38	Paper Label				---	
39	Protective Sleeve-Web				---	
40	Cage Puller				CVS15A2525X012	

Keys 5, 7, 8, 9, 10, 11

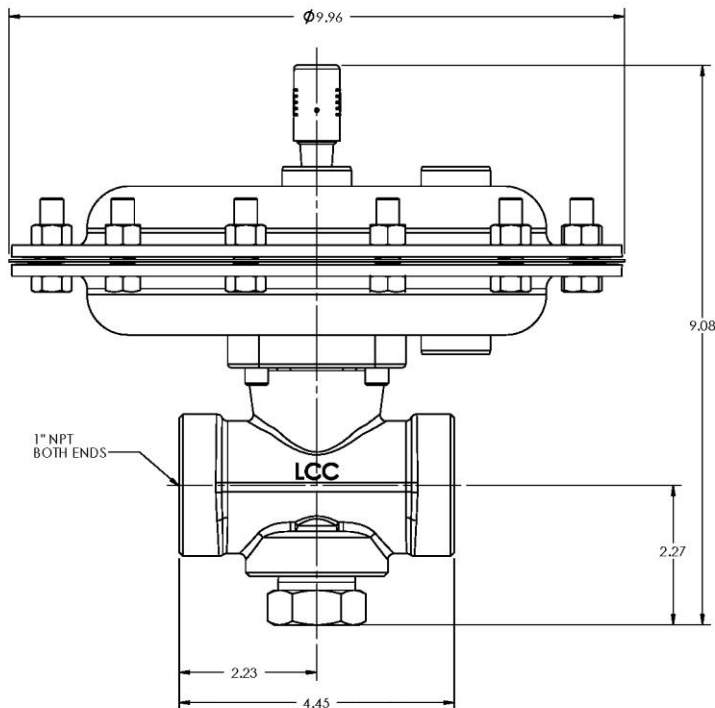
Complete Assembly	CVS35A1588X0A2
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PRODUCT BULLETIN – CVS 128PQC

Flow Coefficients

VALVE SIZE	PORT DIAMETER		MAXIMUM TRAVEL		QUICK OPENING													
					Valve Opening— Percent of Total Travel													
	mm	Inches	mm	Inches	10	30	70	100	10	30	70	100	10	30	70	100	100	
					Kv				Cv				Xt				FL	
	Globe Valve—Flow Up																	
1	6.35	1/4	9.5	3/8	.566	1.14	1.38	1.38	.654	1.32	1.60	1.60	.539	.694	.539	.539	.77	
	9.53	3/8	9.5	3/8	.828	2.02	2.60	2.60	.957	2.33	3.01	3.01	.578	.699	.746	.746	.82	
	12.7	1/2	9.5	3/8	1.02	2.71	3.88	3.88	1.18	3.13	4.49	4.49	.614	.677	.803	.824	.91	
Globe Valve—Flow Down																		
1	6.35	1/4	9.5	3/8	.616	1.28	1.38	1.38	.712	1.48	1.60	1.60	.575	.601	.567	.567	.82	
	9.53	3/8	9.5	3/8	.91	2.23	2.71	2.71	1.05	2.58	3.13	3.13	.559	.613	.717	.717	.87	
	12.7	1/2	9.5	3/8	1.12	2.80	3.58	3.65	1.30	3.24	4.14	4.22	.512	.607	.899	.887	.91	
Angle Valve—Flow Up																		
1	6.35	1/4	9.5	3/8	.699	1.22	1.38	1.38	.808	1.41	1.60	1.60	.398	.706	.553	.553	.77	
	9.53	3/8	9.5	3/8	.943	2.14	2.98	2.98	1.09	2.47	3.44	3.44	.433	.636	.605	.605	.76	
	12.7	1/2	9.5	3/8	1.08	2.77	4.61	4.84	1.25	3.20	5.33	5.59	.510	.660	.674	.663	.90	
Angle Valve—Flow Down																		
1	6.35	1/4	9.5	3/8	.676	1.36	1.46	1.46	.782	1.57	1.69	1.69	.397	.520	.500	.500	.77	
	9.53	3/8	9.5	3/8	.798	2.33	3.16	3.16	.923	2.69	3.65	3.65	.515	.495	.507	.507	.77	
	12.7	1/2	9.5	3/8	1.18	3.10	4.40	4.40	1.36	3.58	5.09	5.09	.414	.469	.602	.602	.78	

Dimensions - Inches



CVS

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