

Instruction Manual

CVS Series D 1-Inch and 2-Inch Globe Valves

Introduction

Contents

Contained in this manual are installation instructions, maintenance procedures and parts information for the 1-inch and 2-inch CVS Series D Globe Valves. Refer to the appropriate manuals for instructions for the accompanying actuator and additional accessories.

Trained or experienced personnel should carry out operation and installation of all pressure equipment. If you have any questions regarding the equipment, contact your CVS Controls representative.

Description

The CVS Series D is a single port screwed-in metal-seated globe style valve with unbalanced post-guided valve plug, and push-down-to-close plug action used for high pressure applications. These valves are used in the oil and gas industry, and are especially useful for throttling or on/off control of liquids or gases.

The flow characteristic is equal percent and flow direction is up through the seat ring and past the valve plug. This valve is available in 1-inch and 2-inch sizes, with cast integral flanges, welded flanges or screwed connections.



Figure 1: CVS Series D Welded Flanged Valve with CVS 667 Actuator

The valve plug and seat ring can be fitted with tungsten carbide inserts or stellite overlay. Please contact your CVS sales representative for availability and delivery time.

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Installation

1. Before installing the valve, inspect the valve body cavity for foreign material that may have occurred during shipping.
2. Clean out all pipelines to remove scale, welding slag, and other foreign debris.
3. Install the valve so the process flow coincides with direction shown by the arrow on the valve body.
4. Use accepted piping and welding practices when installing the valve in the line. For flanged valve bodies, use suitable gaskets between the body flanges and pipeline flanges.
5. The control valve assembly may be installed in any position; the normal method is with the actuator vertical above the valve.
6. Installing a conventional 3-valve bypass around the body will allow for continuous operation during maintenance and inspection.

Maintenance

Warning:

To avoid damage to the process system or personal injury, isolate the valve from the system and relieve any pressure within prior to disassembly. Disconnect any operating lines providing air pressure, control signals or electrical power to the actuator.

Table 1: Torque for Bonnet to Body Joint

Valve Size (In.)	Recommended Torque	
	Lbf•ft	N•m
1	780	1090
2	1500	2040

Table 2: Torque for Seat Ring

Valve Size (In.)	Recommended Torque	
	Lbf•ft	N•m
1	300	420
2	515	720

Trim Maintenance

Refer to Figure 3 for key number locations.

Disassembly

1. Remove the actuator and the bonnet as described in steps 1 through 3 of the "Replacing Packing" procedure.

Warning: The seating surfaces and surface finish of the seat ring (key 2), stem (packing seal) and plug (key 4) are critical for tight shutoff. Protect these parts from damage if you plan to re-use them in the valve.

2. Remove the plug/stem assembly (key 19) and the packing parts from the bonnet.
3. If you re-use the valve plug, protect the valve plug seating surface and the stem threads to prevent damage.
4. Remove the packing parts as described in the "Packing Maintenance" procedure.
5. Use a socket wrench to remove the seat ring (key 8).
6. Remove the seat ring (key 8) and seat ring gasket (key 9) from the valve body.
7. Inspect parts for damage or wear that would prevent proper operation of the valve body. Clean the gasket surfaces.
8. Replace trim parts as necessary or use the "Lapping Metal Seats" procedure.

Lapping Metal Seats

In any valve body, a certain amount of leakage should be expected with metal-to-metal seating. However, if the leakage becomes excessive, lapping can enhance the condition of the seating surfaces of the plug and seat ring. Deep nicks in the seating surfaces should be removed by machining rather than lapping.

There are many lapping compounds available commercially. Be sure to use one of high quality.

Lapping Metal Seats cont'd

Apply the lapping compound to the bottom of the valve plug. Partially assemble the valve so the seat ring and valve plug are in place and the bonnet (with bushing installed) is screwed hand-tight into the body.

Make a simple handle from a piece of metal attached to the plug stem with nuts. Rotate the handle in opposite directions with light downward pressure to lap the seat.

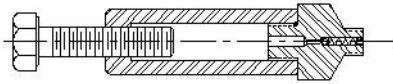
Once lapping is complete, remove the bonnet and plug/stem assembly as a unit, and clean the seating surfaces, reassemble, and then test for shutoff. If leakage is still excessive, repeat the lapping process.

Assembly

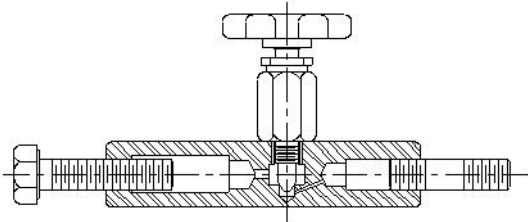
1. Thoroughly clean the valve body gasket surfaces, seat ring and bonnet threads.
2. Apply Never-Seez Nickel lubricant or equivalent to the threads of the seat ring (key 8), bonnet (key 6), and their mating threads in the body.
3. Put the seat ring gasket (key 9) into the body. Screw the seat ring into the body. Use a socket wrench to tighten the seat ring to the torque values shown in Table 1.
4. Clean the bonnet gasket-seating surface, and install a new bonnet gasket (key 17).
5. If you had not removed the plug/stem assembly and packing from the bonnet, then install the bonnet (key 6) and plug/stem assembly (key 19) as a unit, into the valve body. (To prevent galling ensure the seating surface of the plug does not contact the seating surface of the seat ring.) Thread the bonnet tightly into the valve body; see torque values in Table 2.
6. If you chose to remove the plug/stem assembly and packing from the bonnet, then remove any protective covering from the plug/stem assembly (key 19) and carefully install it into the valve body.
7. Slide the bonnet (key 6) over the stem and thread it tightly into the valve body.
8. Use the sequence shown in Figure 3 to install new packing and associated parts.
9. Place a smooth-edged pipe over the valve stem, and gently tap each soft packing part into the packing box bore.
10. Slide the packing follower, upper wiper, and packing flange (keys 11, 10, and 3) into position. Lubricate and install the packing flange studs (key 1), and packing flange nuts (key 2).
11. For spring-loaded PTFE V-ring packing, tighten the packing flange nuts (key 2) until the shoulder of the packing follower (key 11) is approximately 5/8" from the top of the bonnet.

For other packing arrangements, tighten the packing flange nuts (key 2) alternately in small equal increments. Continue until one of the nuts reaches the minimum torque value shown in Table 3. Then tighten the remaining packing flange nut until the packing flange is level and at a 90-degree angle to the valve stem.

12. Mount the actuator on the bonnet (key 6) and connect the actuator and plug stem according to the procedure in the appropriate actuator instruction manual.
13. Check for leakage around the packing follower (key 11) when you put the control valve assembly into service. Retighten the packing flange nuts as required.



LUBRICATOR



LUBRICATOR/ISOLATING VALVE

Figure 2: Lubricator and Lubricator/Isolating Valve

Packing Lubrication

The valve might have an optional lubricator or lubricator/isolating valve (Figure 2) in place of the pipe plug.

Use the lubricator or lubricator/isolating valve for PTFE/ composition or other packings that require lubrication. Use a silicon-base lubricant. Do not lubricate packing used in oxygen service.

Lubricator - turn the cap screw clockwise to force the lubricant into the packing box.

Lubricator/isolating valve - open the isolating valve before turning the cap screw. Close the isolating valve after lubrication is completed.

Table 3: Torque for Packing Box Nuts

Valve Rating	Stem Diameter		Minimum Torque		Maximum Torque	
	In.	mm	Lbf-in	N•m	Lbf-in	N•m
3600 or to ANSI CL 1500	3/8	9.5	36	4	48	5
	1/2	12.7	66	7	96	10
6000 or to ANSI CL 2500	3/8	9.54	42	4	60	6
	1/2	12.7	78	8	108	11

Packing Maintenance

Refer to figure 3 for key number locations.

For specific packing orientation, composition and arrangements please contact your CVS sales representative.

1. For spring-loaded single PTFE V-ring packing, the spring (key 16) maintains a sealing force on the packing. If leakage is detected around the packing follower (Key 11), tighten the packing nuts until the leaking stops. If the shoulder of the packing box is touching the top of the bonnet and leakage cannot be controlled, please see "Packing Replacement."
2. If there is packing leakage with other than spring-loaded packing, first try to limit the leakage, by tightening the packing flange nuts (key 2) to the minimum torque value shown in Table 3 but do not exceed the maximum torque value shown in Table 3. Exceeding the maximum torque value may cause excessive friction to result.
3. If the packing (key 13) is relatively new and tightening the packing flange nuts does not stop the leakage; a worn or nicked valve stem or damaged packing box bore might prevent a seal.

Replacing Packing

Refer to figure 3 for key number locations.

1. Isolate the control valve from the line pressure, release pressure from both sides of the valve body, and drain the process media from both sides of the valve.
2. Disconnect any operating lines providing air pressure, control signals or electrical power to the actuator. Use lockout procedures to ensure the above measures stay in effect while you work on the equipment.
3. Disconnect the stem connector, and then remove the actuator from the valve body by unscrewing the actuator yoke locknut (key 4).

4. Loosen the packing flange nuts (key 2) so the packing is not tight on the valve stem. Remove any travel indicator parts and stem locknuts from the valve stem threads.
5. Unscrew the bonnet (key 6) from the valve body (key 7). Carefully lift off the bonnet and plug/ stem assembly (key 14) as a unit.
6. Remove the plug/stem assembly from the bonnet. If you plan to re-use the valve plug, protect the plug seating surface and the stem threads to prevent damage.
7. Remove the bonnet gasket (key 17).
8. Cover the opening in the valve body to protect the gasket surface and prevent foreign material from entering into the valve body.
9. Remove the packing flange nuts, packing flange, upper wiper, and follower (keys 2, 3, 10, and 11). Carefully push out all the remaining packing box parts from the bonnet using a rounded rod or other tool that will not scratch the packing box wall or bottom guide bushing.
10. Clean the packing box bore and the metal packing box parts.
11. Inspect the valve stem threads and packing box bore for any sharp edges that might cut the packing.
12. Install a new bonnet gasket (key 17), making sure the gasket seating surfaces are clean and smooth. Carefully install the plug/stem assembly into the valve body. Then slide the bonnet over the stem and thread it tightly into the valve body, see torque values in Table 4.
13. Use the sequence shown in Figure 3 to install new packing and associated parts.
14. Slip a smooth-edged pipe over the valve stem, and gently tap each soft packing part into the packing box.
15. Slide the packing follower, upper wiper, and packing flange (keys 11, 10, and 3) into position.
16. Lubricate and install the packing flange studs (key 1), and nuts.
17. For spring-loaded PTFE V-ring packing, tighten the packing flange nuts (key 2) until the shoulder of the packing follower (key 11) is approximately 5/8" above the top of the bonnet.
18. For other packing arrangements, tighten the packing flange nuts (key 2) alternately in small equal increments. Continue until one of the nuts reaches the minimum torque shown in Table 3. Then tighten the remaining packing flange nut until the packing flange is level and at a 90-degree angle to the valve stem.
19. Mount the actuator on the bonnet (key 6) and connect the actuator and valve plug stem according to the procedure in the appropriate actuator instruction manual.
20. Check for leakage around the packing follower when you put the control valve assembly into service. Retighten the packing flange nuts as required.

Parts Ordering

Each body-bonnet assembly is assigned a serial number, which can be found on the front of the valve. Refer to this serial number when contacting your CVS sales representative.

When ordering replacement parts, specify the serial number, key number, and part description, from the following Parts Lists.

CVS Series D Parts List

Key	Quantity	Part Name	Material	Part Number
1	2	Packing Flange Stud Bolt – 2-1/8" Boss	Stainless Steel	CVS1E94413103
		Packing Flange Stud Bolt – 2-13/16" Boss		CVS1E94443103
2	2	Packing Flange Stud Nuts – 2-1/8" Boss	Stainless Steel	CVS1E94403103
		Packing Flange Stud Bolt – 2-13/16" Boss		CVS1E94453103
3	1	Packing Flange – 2-1/8" Boss	Steel, CD Plated	CVS1E94372410
		Packing Flange – 2-13/16" Boss		CVS1E94422307
4	1	Yoke Locknut – 2-1/8"	Steel	CVS1E79302306
		Yoke Locknut – 2-13/16"		CVS1E80742306
5	or	Pipe Plug	Stainless Steel	CVS1A76752466
		Lubricator or Lubricator / Isolator	---	CVSAJ5428000A
6	1	Bonnet – 2-1/8" Boss, 1" Body	Stainless Steel / 4140 L80	CVS2F1383000A
		Bonnet – 2-13/16" Boss, 2" Body		CVS2F1342000A
7	1	Body – Consult your CVS Controls Representative for valve body, style, size and material availability		
8	1	Seat Ring – see following table		
9	1	Seat Ring Gasket – 1" Body	Mild Steel	CVS1B19862001
		Seat Ring Gasket – 2" Body		CVS1B19882001
10	1	Felt Wiper – 3/8" Stem	Felt	CVS1J1826
		Felt Wiper – 1/2" Stem		
11	1	Packing Follower – 3/8" Stem	Steel	CVS1E94393507
		Packing Follower – 1/2" Stem		CVS1E94433507
12	1	Female Adapter Packing – 3/8" Stem	TFE	CVS1F12440101
		Female Adapter Packing – 1/2" Stem		CVS1F12430101
13	1	Packing – 3/8" Stem	TFE	CVS1C7526000A
		Packing – 1/2" Stem		CVS1C7527000A
14	3	Male Adapter Packing – 3/8" Packing	TFE	CVS1F12480101
		Male Adapter Packing – 1/2" Packing		CVS1F12470101
15	1	Washer – 3/8" Packing	Stainless Steel	CVS1F12523604
		Washer – 1/2" Packing		CVS1F12433604
16	1	Spring – 2-1/8" Boss, 3/8" Stem	Stainless Steel	CVS1F12543701
		Spring – 2-13/16", 1/2" Stem		CVS1F12553701
17	1	Bonnet Gasket – 2-1/8" Boss, 1" Body	Mild Steel	CVS1B19822001
		Bonnet Gasket – 2-13/16" Boss, 2" Body		CVS1B19842001
18	1	Guide Bushing – 2-1/8" Boss	Stainless Steel	CVS1B16913501
		Guide Bushing – 2-13/16" Boss		CVS1B16923501
19	1	Plug and Stem – see following tables		

CVS Series D Parts List

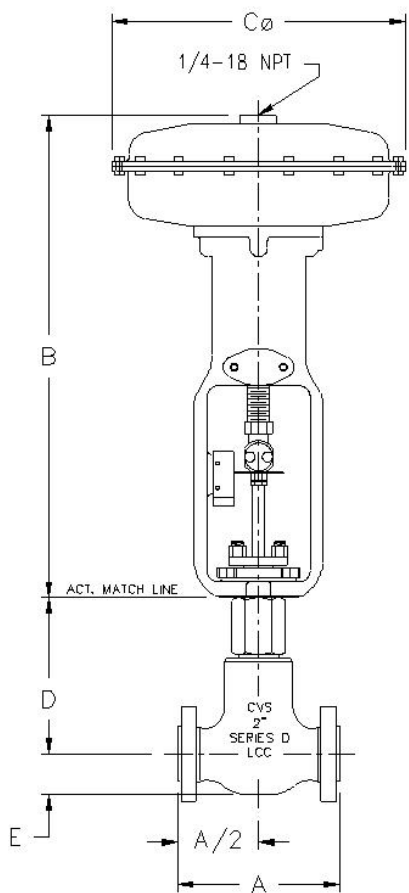
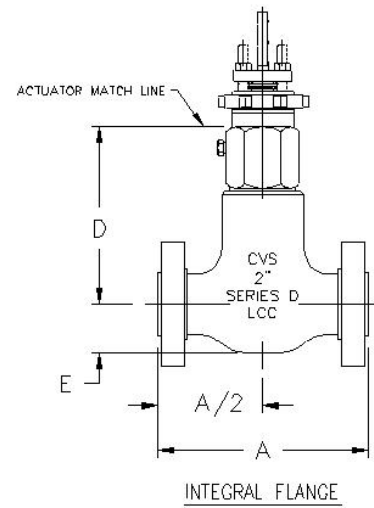
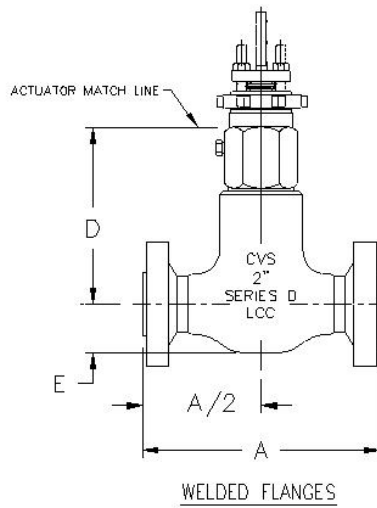
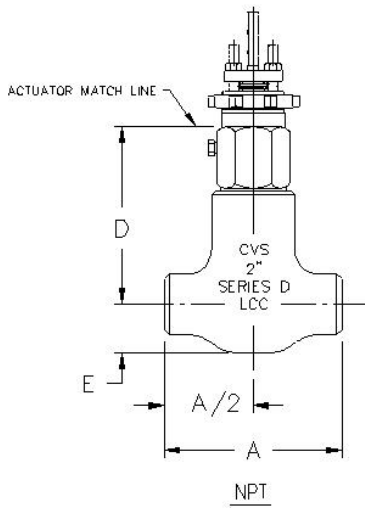
Key 6 Seat Ring

Body Size (In)	Orifice Size (In)	316 SST	316 SST with Alloy 6	316 SST with Tungsten Carbide
1	1/4"	CVS1B50973507	CVS1B50970012	CVS1J6886000A
	3/8"	CVS1B50983507	CVS1B50980012	CVS1J6887000A
	1/2"	CVS1B50993507	CVS1B50990012	CVS1J6888000A
	3/4"	CVS1B51003507	CVS1B51000012	CVS1J6889000A
2	1/4"	CVS1B51063507	CVS1B51060012	CVS1J6899000A
	3/8"	CVS1B51073507	CVS1B51070012	CVS1J8154000A
	1/2"	CVS1B51083507	CVS1B51080012	CVS1J8156000A
	3/4"	CVS1B51093507	CVS1B51090012	CVS1J8158000A
	1"	CVS1B51103507	CVS1B51100012	CVS1J8160000A
	1-1/4"	CVS1B58013507	CVS1B58010012	CVS1P7421000A

Key 19 Valve Plug and Stem

Body Size (In)	Orifice Size (In)	Stem Size (In)	Boss Size (In)	No. of Flutes	Micro Flute	Micro Form	Micro Form
1	1/4	3/8	2-1/8	1	CVS2N71470032	---	---
	1/4			2	CVS2N71480022	---	---
	1/4			3	CVS2F32800022	CVS2F13880042	CVS1J68940022
	3/8			3	CVS2N73890022	CVS2F31890032	CVS1J68950022
	1/2			3	CVS2N73380022	CVS2F13900032	CVS1J68960022
	3/4			3	CVS2N73930022	CVS2F13910032	CVS1J68970022
2	1/4	1/2	2-13/16	3	CVS2N71400022	CVS2F14270022	CVS1J81890022
	3/8			3	CVS27A87920062	CVS2F14280022	CVS1J81910022
	1/2			3	CVS2N73330022	CVS2F14290022	CVS1J81930022
	3/4			3	CVS2N62970022	CVS2F14300022	CVS1J81950022
	1			3	CVS2F32690082	CVS2F14310022	CVS1J81970052
	1-1/4			3	---	CVS2L53310032	CVS1V22340022

CVS Series D Dimensional Data



ACTUATOR DIMENSIONS	657		667		
	B	C	B	C	
SIZE	30	17.31	11.38	18.81	11.38
	34	19.62	13.13	22.56	13.13
	40	21.56	13.13	23.38	13.13
	45	25.94	16.00	30.25	16.00
	46	25.81	18.63	29.44	18.63
	50	28.44	16.00	30.88	16.00
	60	28.44	18.63	30.88	18.63
	70	33.06	21.12	36.75	21.12

FACE TO FACE VALVE DIMENSIONS							
FLANGED DIMENSIONS "A"	VALVE SIZE	FLANGE STYLE	3600 BODY				6000 BODY
			150 ANSI	300 ANSI	600 ANSI	900/1500 ANSI	2500 ANSI
WELDED FLANGE	1"	RF	9.00	9.75	10.25	11.38	13.25
		RTJ	-	-	10.25	11.38	13.25
INTEGRAL FLANGE	2"	RF	12.00	12.63	13.38	15.00	17.50
		RTJ	-	-	13.50	15.13	17.63
INTEGRAL FLANGE	2"	RF	10.50	10.50	11.25	12.12	15.38
		RTJ	-	-	-	12.25	15.50
SCREWED BODY			"A"	"E"	DIMENSION "D"		
3600 CLASS	1"	NPT	6.63	1.81	6.75	7.50	
	2"		9.00	2.75	-	8.50	
6000 CLASS	1"	NPT	7.25	2.13	6.75	7.50	
	2"		10.50	3.25	-	8.50	

Notes

Notes

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