INSTRUCTION MANUAL

# CVS Series 2220 Dump Valve

The CVS Series 2220 Dump Valve with pneumatic actuator is a compact economical solution for gas or liquid process. The yokeless design allows for installation in confined areas where space is limited.

The CVS Series 2220 is capable of both throttling and on/off control.

Flow characteristics are quick opening, and modified equal percentage (throttle).

The CVS 2220 body is available in both 1 and 2 inch NPT, also available in 150, 300, 600 and 1500 ANSI.

The 1” CVS Series 2220 is a T Style body, which allows flow straight though the body as it would in a globe pattern, and is able to flow in an angle pattern by placing the plug to the upper port. The 2” CVS 2220 is a Globe Style or angle connection body.

The design allows for easy inspection and maintenance if required, using a hammer-nut connection.

CVS Series 2220

**Head Office**
1107 8A Street
Nisku, Alberta
T9E 7R3
Canada
Office: (780) 437-3055

**Calgary Sales Office**
3516 114 Avenue SE
Calgary, Alberta
T2Z 3V6
Canada
Office: (403) 250-1416
Fax: (403) 291-9487

Website: www.cvs-controls.com Email: info@cvs-controls.com

## SPECIFICATIONS OVERVIEW

| Construction Materials | |
|---|---|
| Component | Available Material |
| Body | LCC |
| Bonnet | ASTM A350LF2 |
| Hammer Nut | ASTM A350 Gr.LF2 |
| Stem | Nitronic 50 |
| Packing | TFE V-Ring, Cotton Nitrile |
| Packing Washer | 316 SST |
| Packing Retainer | 316 SST |
| Packing Spring | Inconel X750 |
| Diaphragm | Neoprene/Nylon |
| O-Ring, wetted | HSN |
| O-Ring, non-wetted | HSN |
| Actuator Spring | Steel |
| Adjusting Screw | Carbon Steel/Plated, 316SS |
| Diaphragm Housing | Carbon Steel |
| Diaphragm Plate | Carbon Steel |
| Travel Indicator | 303SS |
| | |

| Operating Temperature Limits | | |
|---|---|---|
| Model | Material | Temperature |
| 2220 | Standard LCC | -40°F to 180°F (-40°C to 82°C) |
| | | |

| End Connections and Pressure Ratings | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Body Size | | Pressure Rating | | NPT | ASME Class Flanged RF and RTJ Type | | | Style |
| In | mm | Psig | bar | | 150/300 | 600 | 900/1500 | |
| 1 | 25 | 3750 | 259 | Yes | Yes | Yes | Yes | Globe/T |
| 2 | 50 | 3750 | 259 | Yes | Yes | Yes | Yes | Globe |
| Standard ratings based on -20°F to 100°F (-29°C to 38°C). Contact a CVS Controls Representative for additional ratings if required | | | | | | | | |

- ****Note:** Prior to installation, inspect the CVS Series 2220 valve and actuator assembly for any visible damage or debris.
- **Always follow proper safety and lockout procedures** when installing and/or performing any required maintenance or repairs.
- **Never exceed pressure and temperature limits.** Refer to data tag on the valve assembly.

Installation:

1. Ensure all lines are free and clear of dirt or debris. Clean threaded or gasketed surfaces if required.

2. Take note of flow direction marked on valve body. For throttling control, flow direction should be under the seat. Flow direction for quick opening trim may be installed either over or under the seat.

3. For flanged connections, use proper gaskets between flange and pipeline application. Always follow proper bolting and torque procedures. For threaded NPT connections, follow proper piping procedures, use a suitable thread sealant as required.

4. For actuator pressure connections, use 1/4”-18 NPT thread. Connect supply pressure to the actuator. *Do not exceed pressure limits. For Size 9 actuator, max input is 50 psig. For size 12 actuator, max input is 50 psig.

5. Once supply pressure is connected, cycle the valve to verify correct operation and positioning.

Spring Adjustments:

Spring adjustments may be required in order to obtain a fully open or fully closed position, or to prevent trim leakage.

Fail Closed Actuator:

1. First back off the adjusting locknut (18) on the top of the actuator assembly. In order to increase the spring tension and seating, turn the Adjustment Screw (19) in a clockwise rotation. Reduce the spring load by turning the Adjustment Screw in a counter clockwise rotation. Once final adjustments are made, secure by tightening the adjusting locknut.

Fail Open Actuator:

1. Loosen off the three set screws (14), in order to remove the Spring Cover Assembly (16).
2. To increase spring tension, turn the Adjustment Hex Nut (17) in a clockwise rotation. To reduce the spring tension, turn the Adjustment Hex Nut counter clockwise.
3. Replace the Spring Cover Assembly and secure by tightening the set screws.

Adjustments should be made only to allow the valve to operate in a fully open position at operating pressure. Further adjustments past this may result in improper seating or trim leakage.

## MAINTENANCE

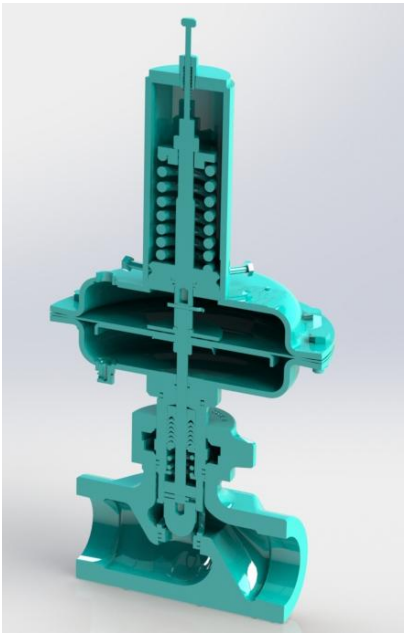
Certain operating conditions may require increased inspection intervals. Valve components are subject to normal wear and tear; regular inspection intervals are recommended.

****Note: Prior to any maintenance or repairs ensure all proper safety and lockout procedures are followed.** The process should be isolated and all supply lines to the actuator should be shut down and purged to prevent accidental operation of the assembly when performing maintenance or repairs.

Actuator Disassembly, Fail Open:

1. Disconnect the supply to the actuator.
2. Back off the Set Screws (14) so the Spring Cover Assembly (16) may be removed.
3. Remove all spring tension by turning the Adjustment Hex Nut (17) counter clockwise.
4. The Adjustment Hex Nut (17), Spring Retainer (19) and Spring (20) may now be removed.
5. Remove the Upper Diaphragm Housing (26) by first removing the Hex Cap Screws (27) and Hex Nuts (29) from around the diaphragm housing. Carefully lift the upper diaphragm housing upwards off Stem.
6. Separate the Upper Stem (21) from Valve Stem (6) by removing the Cotter Pin (23) and unscrewing the upper stem.
7. Remove Bearing Washer (13), Actuator Diaphragm (28), Diaphragm Plate (12), and Hex Nut (31).
8. The Lower Diaphragm Housing (30) may be removed if required by unscrewing from the Bonnet Assembly (10).

Inspect all items and clean or replace if necessary. Assemble in reverse order. Use a suitable O-Ring lubricant when replacing O-Rings.



Actuator Disassembly, Fail Closed:

1. Disconnect the supply to the actuator.

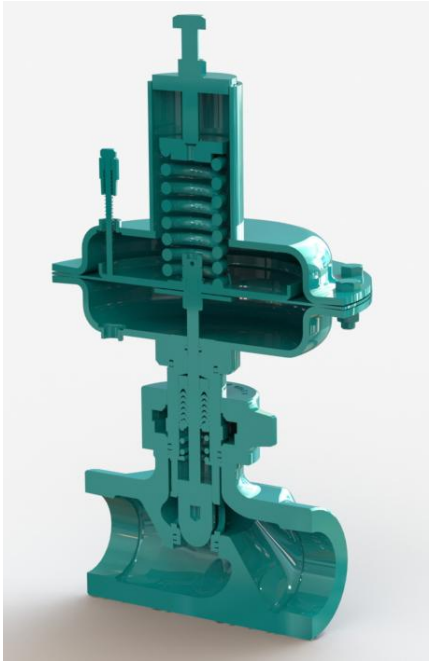
2. Loosen the Adjustment Lock Nut (18) and remove all spring tension by loosening the Adjustment Screw (19). (turn counter clockwise to loosen)

3. Separate Upper Diaphragm (17) from Lower Diaphragm Housing (15) by removing the 12 Hex Cap Screws (28) and Hex Nuts (29). Upper Diaphragm Housing, Spring (22), and Upper Spring Retainer (21) may now be lifted off.

4. Remove 2 Hex Nuts (30) securing the Diaphragm Plate (20). Once removed, the Actuator Diaphragm (16) may be removed and inspected.

5. If required, the Yoke may be unscrewed from the Bonnet Assembly (9).

Inspect all items and clean or replace if necessary. Assemble in reverse order. Use a suitable O-Ring lubricant when replacing O-Rings.



CVS Series 2220 – Reverse Acting

Valve Disassembly

Take special care when disassembling valve components to not damage surfaces.

The following instructions allow inspection and repair of the valve components without fully disassembling the actuator assembly. The actuator assembly of the CVS Series 2220 is easily removed from the valve body by unscrewing the hammer nut.

****Note: Prior to any maintenance or repairs ensure all proper safety and lockout procedures are followed.** The process should be isolated and all supply lines to the actuator should be shut down and purged to prevent accidental operation of the assembly when performing maintenance or repairs.

1. Disconnect the supply to the actuator.

2. Remove all actuator spring tension:

**Fail Closed:** Loosen Adjustment Screw Locknut and turn Adjustment Screw counter clockwise to loosen and remove spring tension.

**Fail Open:** Loosen Set Screws holding Spring Cover Assembly. Remove the Spring Cover Assembly. Loosen Adjustment Hex Nut turning counter clockwise to remove spring tension.

3. Remove Hammer Nut (4, Reverse)(35, Direct), by tapping lugs with hammer in a counter clockwise rotation.

4. The Bonnet Assembly, Actuator, Stem and Plug may now be lifted off carefully and set aside in order to inspect and repair if required. Take care to avoid damaging components or bending stem.

5. Use a punch tool to remove the Drive Pin that secures the Plug to the Valve Stem

6. Remove the Seat and Cage from the Valve Body

Trim Inspection and Maintenance

1. Inspect Valve Plug and Seat for signs of wear and damage from erosion. Certain minor abrasions may be able to be repaired, while excessive damage will most likely affect operation and sealing capabilities of the valve. Utilize magnifying glass to ensure surface finish is acceptable, or is in need of replacement component.

2. Now inspect the Plug and Seat for sealing irregularities. With the Plug and Seat together, determine if any gaps are visible on the seating surface by holding to light and looking through seating area. If light is visible, it is an indication the seating surface may have wear or damage. Again, determine if surfaces may be restored by re-lapping, or if a replacement component is required.

3. The Stem surface should be inspected, and show no signs of scratches, wear or damage. Specifically inspect the Stem area around the Packing and O-Ring areas. Repair or replace as required.

Restoring Trim – Lapping

Clean and dry all components prior to lapping.

1. Select appropriate lapping compound based on trim materials in the application.

2. Apply small amount of lapping compound to three separate areas on seating surface of the plug. Do not use too much lapping compound as it may cause uneven surface lapping.

3. Fit the Seat and Plug together and rotate the Plug or Seat in a back and forth motion.

4. Once complete, clean and inspect the surfaces for any signs of wear or damage again. Reseat the Plug and Seat once again and inspect for gaps as mentioned in trim inspection above.

5. Determine if re lapping is required or if replacement parts are needed.

- Reassemble Valve and Actuator assembly in reverse order.
- Lubricate O-Rings prior to re-installing.

For repair kits or replacement parts, please contact a CVS Controls Ltd. sales representative.

| Actuator | | | | | | |
|---|---|---|---|---|---|---|
| Number | Maximum Working Pressure | | Effective Area/Size | | Travel | |
| | psig | bar | Sq In | Cm Sq | In | mm |
| 9 | 55 | 3.8 | 35 | 226 | 0.625 | 15.9 |
| 12 | 55 | 3.8 | 70 | 452 | 0.625 | 15.9 |

| Flow Coefficients | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Body Size | | Trim Size | | Cv - Flow Coefficient – Globe Body<br>Percent of Total Travel - Valve Opening | | | | | | | | | |
| | | | | Modified Percentage (Flow Up) Throttle | | | | | | | | | |
| In | mm | In | mm | 10 | 20 | 30 | 40 | 50 | 60 | 70 | 80 | 90 | 100 |
| 1 | 25 | 0.25 | 6.4 | .284 | .506 | .657 | .767 | .875 | .989 | 1.10 | 1.20 | 1.32 | 1.43 |
| | | 0.38 | 9.5 | .311 | .621 | .942 | 1.28 | 1.64 | 2.07 | 2.51 | 2.93 | 3.35 | 3.70 |
| | | 0.50 | 12.7 | .557 | 1.11 | 1.68 | 2.26 | 2.92 | 3.62 | 4.30 | 4.98 | 5.43 | 5.60 |
| | | 0.75 | 19.1 | .752 | 1.57 | 2.43 | 3.42 | 4.58 | 6.08 | 7.93 | 9.71 | 10.6 | 11.0 |
| | | 1.00 | 25.4 | .983 | 2.01 | 3.40 | 6.12 | 8.90 | 11.7 | 13.5 | 14.4 | 15.1 | 15.4 |
| 2 | 50 | 0.25 | 6.4 | .284 | .506 | .657 | .767 | .875 | .989 | 1.10 | 1.20 | 1.32 | 1.43 |
| | | 0.38 | 9.5 | .311 | .621 | .942 | 1.28 | 1.64 | 2.07 | 2.51 | 2.93. | 3.35 | 3.70 |
| | | 0.50 | 12.7 | .592 | 1.17 | 1.76 | 2.34 | 2.95 | 3.70 | 4.57 | 5.50 | 5.95 | 6.08 |
| | | 0.75 | 19.1 | .882 | 1.76 | 2.76 | 3.82 | 5.05 | 6.57 | 8.49 | 10.8 | 12.2 | 12.9 |
| | | 1.00 | 25.4 | 1.01 | 2.02 | 3.58 | 6.45 | 9.38 | 12.32 | 13.7 | 15.4 | 16.7 | 17.1 |

| Plug Materials | |
|---|---|
| Standard | Option |
| 17-4<br>DHT 1150 | Tungsten Carbide |

| Shutoff Classification | |
|---|---|
| Metal Seat | ANSI Class IV<br>Leakage less than 0.01% of max valve capacity. |

| Plug Flow Characteristic and Sizing | | | |
|---|---|---|---|
| Size | | Quick Opening | Modified Percentage Throttle |
| In | mm | | |
| 0.19 | 4.7 | | |
| 0.25 | 6.4 | Yes | Yes |
| 0.38 | 9.4 | Yes | Yes |
| 0.50 | 12.7 | Yes | Yes |
| 0.75 | 19.1 | Yes | Yes |
| 1.00 | 25.4 | Yes | Yes |
| 1.25 | 31.75 | Yes | |

## Maximum Differential Pressure: 3 to 15 psi

(Actuator 9, Spring AA 3-11 psi and Actuator 12, Spring HA 3-15 psi)

| Trim Size | | Actuator | Supply Pressure | | Flow Under Seat | | | | Flow Over Seat | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Throttle | | | | Quick Open | | | |
| | | | | | Direct | | Reverse | | Direct | | Reverse | |
| In | mm | Number | psig | bar | psig | bar | psig | bar | psig | bar | psig | bar |
| .25 | 6.4 | 9 | 20 | 1.4 | 2610 | 180 | 4750 | 327 | 6250 | 431 | 6250 | 431 |
| | | | 30 | 2.0 | 6250 | 431 | 6250 | 431 | 6250 | 431 | 6250 | 431 |
| | | 12 | 20 | 1.4 | 6250 | 431 | 6250 | 431 | 6250 | 431 | 6250 | 431 |
| | | | 30 | 2.0 | 6250 | 431 | 6250 | 431 | 6250 | 431 | 6250 | 431 |
| .38 | 9.5 | 9 | 20 | 1.4 | 1050 | 72 | 1975 | 136 | 6250 | 431 | 6250 | 431 |
| | | | 30 | 2.0 | 4220 | 291 | 5150 | 355 | 6250 | 431 | 6250 | 431 |
| | | 12 | 20 | 1.4 | 3695 | 255 | 5550 | 383 | 6250 | 431 | 6250 | 431 |
| | | | 30 | 2.0 | 6250 | 431 | 6250 | 431 | 6250 | 431 | 6250 | 431 |
| .50 | 12.7 | 9 | 20 | 1.4 | 530 | 36 | 1050 | 672 | 6250 | 431 | 6250 | 431 |
| | | | 30 | 2.0 | 2315 | 160 | 2850 | 197 | 6250 | 431 | 6250 | 431 |
| | | 12 | 20 | 1.4 | 2015 | 139 | 3060 | 211 | 6250 | 431 | 6250 | 431 |
| | | | 30 | 2.0 | 5580 | 385 | 6250 | 431 | 6250 | 431 | 6250 | 431 |
| .75 | 19.1 | 9 | 20 | 1.4 | 180 | 12 | 420 | 29 | 2400 | 166 | 1700 | 117 |
| | | | 30 | 2.0 | 975 | 67 | 1210 | 83 | 3460 | 239 | 1700 | 117 |
| | | 12 | 20 | 1.4 | 840 | 58 | 1315 | 91 | 4520 | 312 | 2975 | 205 |
| | | | 30 | 2.0 | 2415 | 167 | 2900 | 200 | 6250 | 431 | 5090 | 351 |
| 1.00 | 25.4 | 9 | 20 | 1.4 | 70 | 5 | 205 | 14 | 1215 | 84 | 780 | 54 |
| | | | 30 | 2.0 | 515 | 35 | 650 | 45 | 1730 | 119 | 780 | 54 |
| | | 12 | 20 | 1.4 | 440 | 30 | 710 | 49 | 2255 | 155 | 175 | 12 |
| | | | 30 | 2.0 | 1330 | 92 | 1600 | 110 | 3290 | 227 | 2230 | 161 |

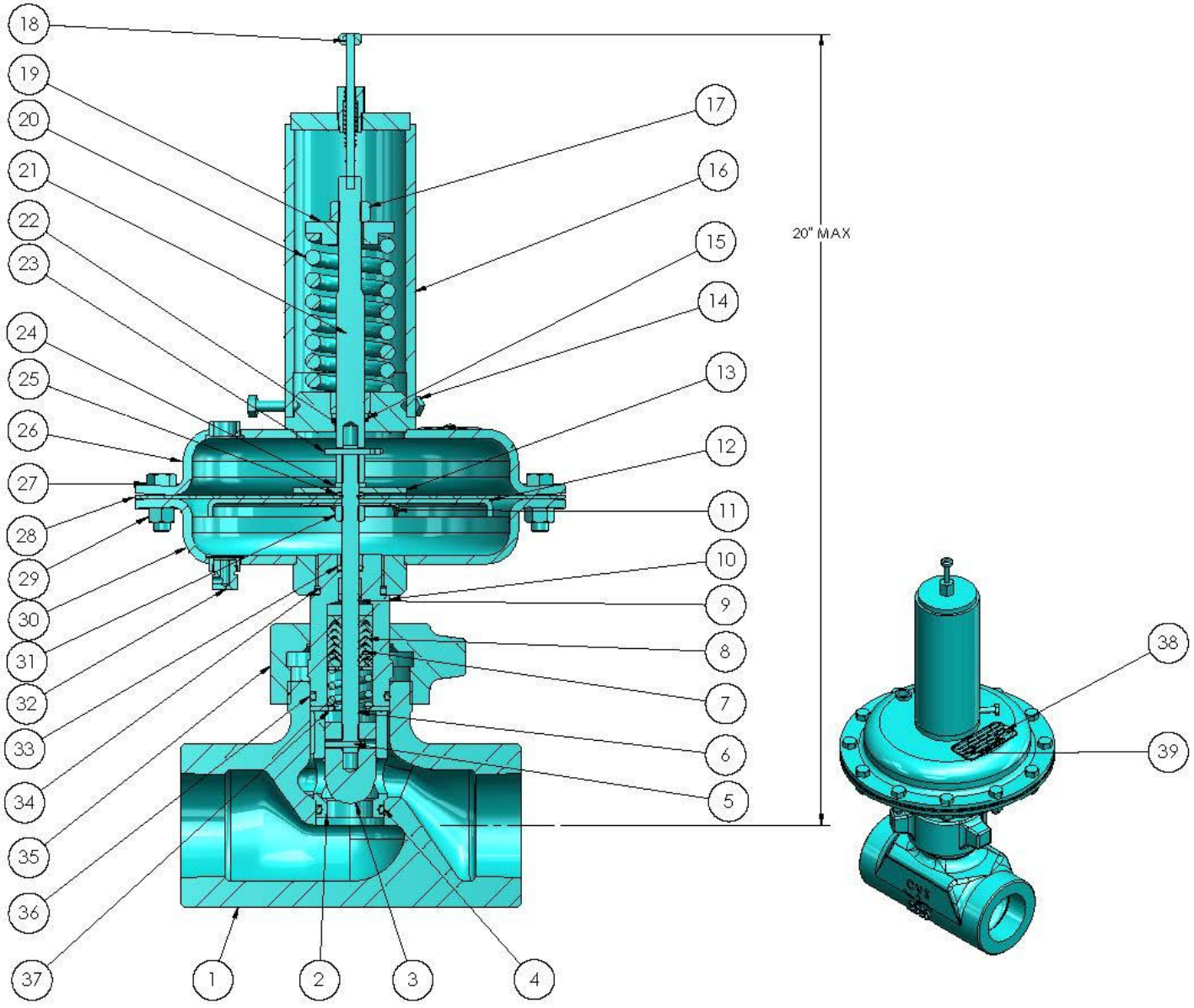
## Maximum Differential Pressure: 6 to 30 psi

(Actuator 9, Spring HA 6-30 psi and Actuator 12, Spring WM 6-30 psi)

| Trim Size | | Actuator | Supply Pressure | | Flow Under Seat | | | | Flow Over Seat | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | Throttle | | | | Quick Open | | | |
| | | | | | Direct | | Reverse | | Direct | | Reverse | |
| In | mm | Number | psig | bar | psig | bar | psig | bar | psig | bar | psig | bar |
| .25 | 6.4 | 9 | 33 | 2.3 | | | 6250 | 431 | 6250 | 431 | | |
| | | 12 | | | 6250 | 431 | 6250 | 431 | 6250 | 431 | 6250 | 431 |
| .38 | 9.5 | 9 | 33 | 2.3 | | | 3300 | 228 | 6250 | 431 | | |
| | | 12 | | | 3955 | 273 | 5855 | 404 | 6250 | 431 | 6250 | 431 |
| .50 | 12.7 | 9 | 33 | 2.3 | | | 1804 | 124 | 6250 | 431 | | |
| | | 12 | | | 2165 | 149 | 3200 | 221 | 6250 | 431 | 6250 | 431 |
| .75 | 19.1 | 9 | 33 | 2.3 | | | 751 | 52 | 3165 | 218 | | |
| | | 12 | | | 905 | 62 | 1380 | 95 | 6250 | 431 | 285 | 20 |
| 1.0 | 25.4 | 9 | 33 | 2.3 | | | 393 | 27 | 1525 | 105 | | |
| | | 12 | | | 480 | 33 | 745 | 51 | 3600 | 248 | 175 | 12 |

## ASSEMBLY

**CVS Series 2220 – ATC/Fail Open (Direct Acting) – 1 and 2 Inch**



## CVS Series 2220 Fail Open – 1 and 2 Inch

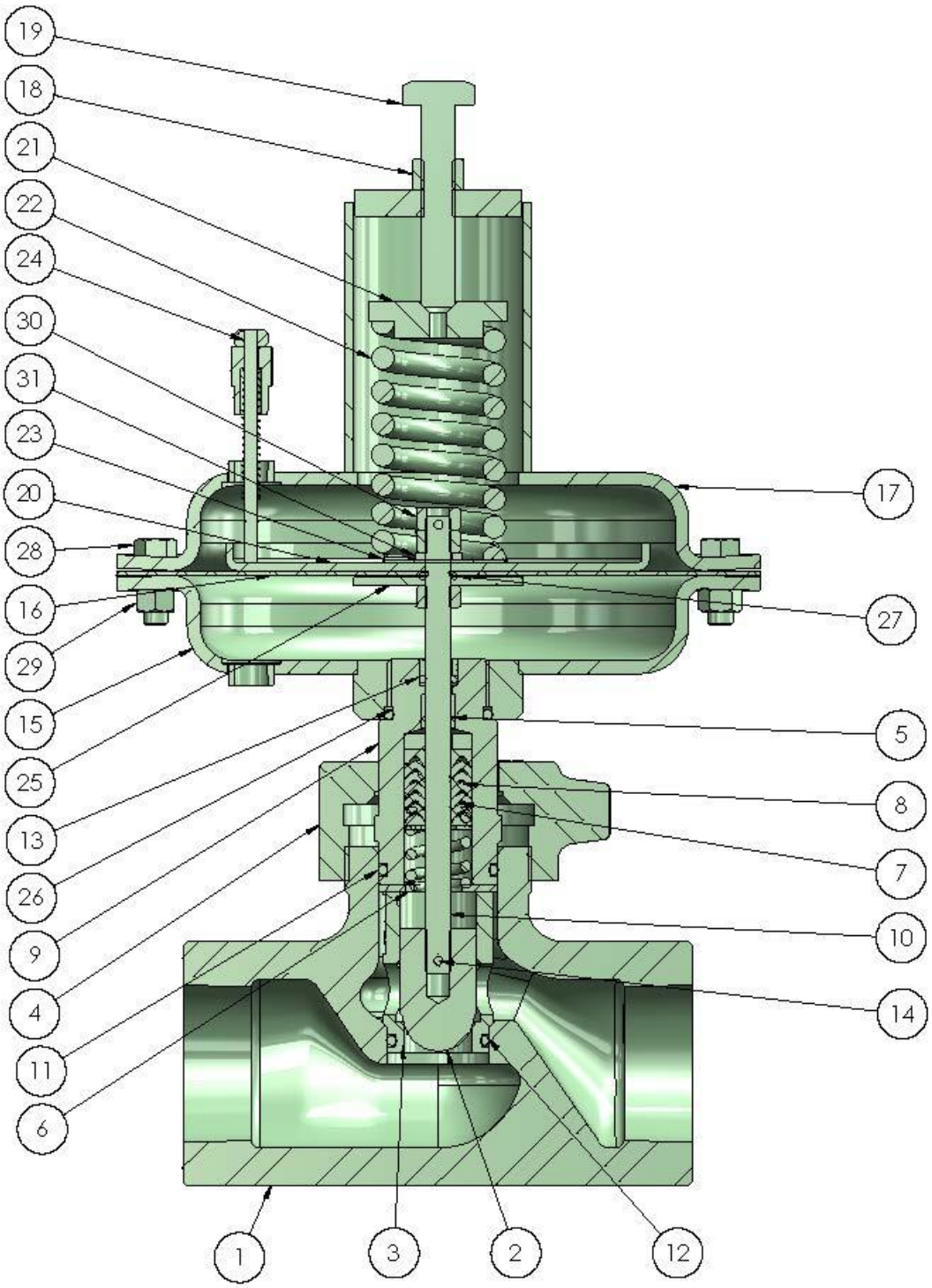
| Item | Part Number | Description | Qty |
|---|---|---|---|
| 1 | Contact CVS | Valve Body, LCC | 1 |
| 2 | See Table* | Seat/Cage (Note 3, page 14) | 1 |
| 3 | See Table* | Valve Plug, (Note 3, page 14) | 1 |
| 4 | CVS 490222A129* | Seat, O-Ring, HSN (Note 1) | 1 |
| 5 | CVS 490222A219* | Drive Pin Grooved | 1 |
| 6 | CVS 490222A115 | Valve Stem | 1 |
| 7 | CVS 490222A109 | Packing Spring | 1 |
| 9 | CVS 490222A164 | Guide Bushing | 1 |
| 10 | CVS 490222A114 | Bonnet Assembly | 1 |
| 11 | CVS 490222A179 | Lower Retainer | 1 |
| 12 | CVS 490222A116 | Diaphragm Plate | 1 |
| 13 | CVS 490222A121 | Washer Bearing | 1 |
| 14 | CVS 450323A211 | Screw, Hex | 3 |
| 15 | CVS 490222A143 | Diaphragm O-Ring, HSN (Note 1) | 1 |
| 16 | CVS 490222A150 | Spring Cover Assy | 1 |
| 17 | CVSB 0442-0502 | Hex Nut | 1 |
| 18 | CVS 490222A123 | Indicator/Vent | 1 |
| 19 | CVS 490222A134 | Upper Spring Retainer | 1 |
| 20 | CVS 490222A117 | Actuator Spring | 1 |
| 21 | CVS 490222A154 | Actuator Upper Stem | 1 |
| 22 | CVS 490222A144 | Backup Ring | 1 |
| 23 | CVS 490222A157 | Clevis Cotter Pin | 1 |
| 24 | CVSB 2175-0370 | Lockwasher, 3/8 | 1 |
| 25 | CVS 490222A133 | Diaphragm O-Ring, HSN (Note 1) | 1 |
| 26 | CVS 490222A148 | Upper Diaphragm Housing Assy | 1 |
| 27 | CVSB 0070-0372-0100 | Hex Cap Screw | 12 |
| 28 | CVS 490222A126LT | Actuator Diaphragm, Neo Nylon | 1 |
| 29 | CVSB 0350-0372 | Hex Nut | 12 |
| 30 | CVS 490222A145 | Lower Diaphragm Housing | 1 |
| 31 | CVSB 0350-0372 | Hex Nut | 1 |
| 32 | CVS 490222A120 | Plug Breather | 1 |
| 33 | CVS 490222A132 | Ret/Stem O-Ring, HSN (Note 1) | 1 |
| 34 | CVS 490222A131 | Bonnet O-Ring, HSN (Note 1) | 1 |
| 35 | CVS 490222A11 | Hammer Nut A350 LF2 | 1 |
| 36 | CVS 490222A130 | Plug Packing O-Ring, HSN (Note 1) | 1 |
| 37 | CVS 490222A218 | Packing Washer | 1 |
| | CVS 490222A113 | Upper Retainer | 1 |
| | CVS 490222A112 | Packing Set, (TFE Note 2) | 1 |
| | CVS 490222A180 | Lower Retainer | 1 |
| 38 | CVS 490222A181 | Name Tag | 1 |
| 39 | CVSB 2290-0020-0018 | Rivet Pin | 2 |

*Items 2, 3, 4 and 5 Sold as Trim Kit Sets Only
Note 1: Only sold as part of an oring kit – P/N CVS 490222A127
Note 2: Optional cotton/nitrile packing available – P/N 1-2200-50/CN

| Item 2, Quick Open Seat + Cage | | |
|---|---|---|
| Part Number | Material | Port Size (in) |
| CVS 490222A095 | 17-4PH DHT 1150 | 1/4 |
| CVS 490222A096 | | 3/8 |
| CVS 490222A097 | | 1/2 |
| CVS 490222A098 | | 3/4 |
| CVS 490222A099 | | 1.00 |
| CVS 490222A074 | | 1-1/4 |
| CVS 490222A161 | Tungsten Carb 17-4 SST DHT 1150 | 1/4 |
| CVS 490222A158 | | 3/8 |
| CVS 490222A162 | | 1/2 |
| CVS 490222A141 | | 3/4 |
| CVS 490222A167-1 | | 1” Set |

| Item 3,Quick Open Plug | | |
|---|---|---|
| Part Number | Material | Port Size (in) |
| CVS 490222A090 | 17-4PH DHT 1150 | 1/4 |
| CVS 490222A091 | | 3/8 |
| CVS 490222A092 | | 1/2 |
| CVS 490222A093 | | 3/4 |
| CVS 490222A094 | | 1.00 |
| CVS 490222A073 | | 1-1/4 |
| CVS 490222A140 | Tungsten Carb 17-4 SST DHT 1150 | 1/4 |
| | | 3/8 |
| | | 1/2 |
| | | 3/4 |
| CVS 490222A167-1 | | 1 |

**CVS Series 2220 ATO/Fail Closed (Reverse Acting) – 1 and 2 Inch**



## CVS Series 2220 Fail Closed – 1 and 2 Inch

| Item | Part Number Size 9 | Part Number Size 12 | Description | Qty |
|---|---|---|---|---|
| 1 | Contact CVS | | Valve Body | 1 |
| 2 | See Table | | Valve Plug (Note 3 next page) | 1 |
| 3 | See Table | | Seat/Cage, (Note 3 next page) | 1 |
| 4 | CVS 490222A110 | | Hammer Nut | 1 |
| 5 | CVS 490222A164 | | Guide Bushing | 1 |
| 6 | CVS 490222A218 | | Packing Washer | 1 |
| 7 | CVS 490222A109 | | Packing Spring, Inconel | 1 |
| 8 | CVS 490222A113 | | Upper Retainer | 1 |
| | CVS 490222A112 | | Packing Set, TFE (Note2) | 1 |
| | CVS 490222A180 | | Lower Retainer | 1 |
| 9 | CVS 490222A114 | | Bonnet Assembly | 1 |
| 10 | CVS 490222A115 | | Valve Stem | 1 |
| 11 | CVS 490323A130 | | Plug Packing O-Ring, HSN (Note 1) | 1 |
| 12 | CVS 490222A129 | | Seat O-Ring, HSN (Note 1) | 1 |
| 13 | CVS 490222A132 | | Retainer/Stem O-Ring, HSN (Note 1) | 1 |
| 14 | CVS 490222A219 | | Drive Pin, Grooved | 1 |
| 15 | CVS 490222A145 | CVS 490222A147 | Lower Diaphragm Housing | 1 |
| 16 | CVS 490222A126LT | CVS 490207A127 | Actuator Diaphragm | 1 |
| 17 | CVS 490222A163 | CVS 490222A188 | Upper Diaphragm Housing | 1 |
| 18 | CVSB 0350-0501 | CVSB 0350-0621 | Hex Nut(No 9), (No 12) | 1 |
| 19 | CVSB 0190-0501-0300 | CVSB 0190-0501-0350 | Sq Head Bolt, (No 9), (No 12) | 1 |
| 20 | CVS 490222A116 | CVS 490222A160 | Diaphragm Plate | 1 |
| 21 | CVS 490222A122 | CVS 490222A198 | Upper Spring Retainer | 1 |
| 22 | CVS 490222A117 | CVS 490222A199 | Actuator Spring | 1 |
| 23 | CVS 490222A179 | CVS 490222A200 | Lower Retainer | 1 |
| 24 | CVS 490222A123 | | Indicator/Vent | 1 |
| 25 | CVS 490222A121 | | Washer Bearing | 1 |
| 26 | CVS 490222A131 | | Bonnet O-Ring, HSN (Note 1) | 1 |
| 27 | CVS 490222A133 | | Diaphragm O-Ring, HSN (Note 1) | 1 |
| 28 | CVSB 0070-0372-0100 | | Hex Cap Screw | 12 |
| 29 | CVSB 0350-0372 | | Hex Nut | 12 |
| 30 | CVSB 0350-0372 | | Hex Nut | 3 |
| 31 | CVSB 2175-0370 | | Lock Washer | 1 |

Note 1: Only sold as part of an oring kit – P/N CVS 490222A127

Note 2: Optional cotton/nitrile packing available – P/N 1-2200-50/CN

| Item 2, Quick Open Seat + Cage | | |
|---|---|---|
| Part Number | Material | Port Size (in) |
| CVS 490222A095 | 17-4PH DHT 1150 | 1/4 |
| CVS 490222A096 | | 3/8 |
| CVS 490222A097 | | 1/2 |
| CVS 490222A098 | | 3/4 |
| CVS 490222A099 | | 1.00 |
| CVS 490222A074 | | 1-1/4 |
| CVS 490222A161 | Tungsten Carb 17-4 SST DHT 1150 | 1/4 |
| CVS 490222A158 | | 3/8 |
| CVS 490222A162 | | 1/2 |
| CVS 490222A141 | | 3/4 |
| CVS 490222A167-1 | | 1” Set |

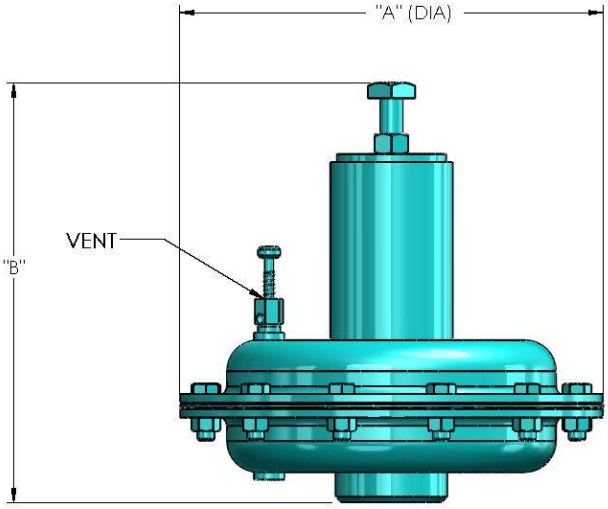
| Item 3,Quick Open Plug | | |
|---|---|---|
| Part Number | Material | Port Size (in) |
| CVS 490222A090 | 17-4PH DHT 1150 | 1/4 |
| CVS 490222A091 | | 3/8 |
| CVS 490222A092 | | 1/2 |
| CVS 490222A093 | | 3/4 |
| CVS 490222A094 | | 1.00 |
| CVS 490222A073 | | 1-1/4 |
| CVS 490222A140 | Tungsten Carb 17-4 SST DHT 1150 | 1/4 |
| | | 3/8 |
| | | 1/2 |
| | | 3/4 |
| CVS 490222A167-1 | | 1 |

# DIMMENSIONS

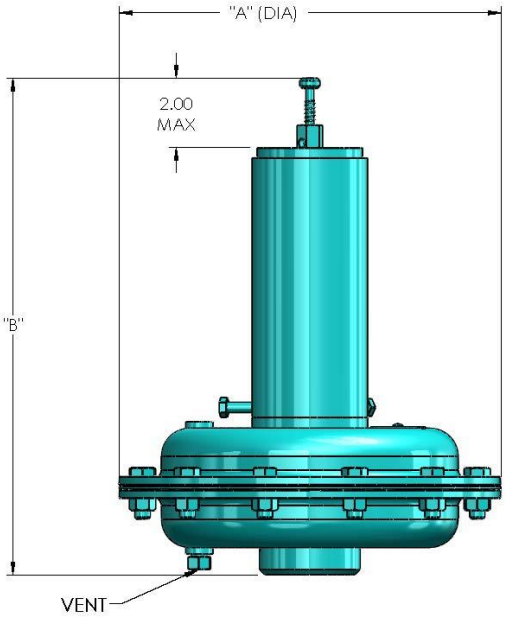
## Actuator Dimensions

| Body Size | | Actuator | Spring | Dimension A | | Dimension B | | | | Fail Open Spring Cover Clearance required | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Actuator Diameter | | Fail Closed | | Fail Open | | | |
| In | mm | | | In | mm | In | Mm | In | mm | In | mm |
| 1 | 25 | 9 | AA | 9.5 | 241 | 9.75 | 248 | 10.25 | 260 | 5.5 | 140 |
| 2 | 50 | | HA | | | 11.50 | 292 | 11.75 | 298 | 7.00 | 178 |
| 1 | 25 | 12 | HA | 12.5 | 318 | 10.88 | 276 | 11.75 | 298 | 7.00 | 178 |
| 2 | 50 | | WM* | | | 14.62 | 371 | 14.38 | 365 | 10.00 | 254 |

*Special order only. Contact a CVS sales representative.




CVS Series 2220 Fail Closed



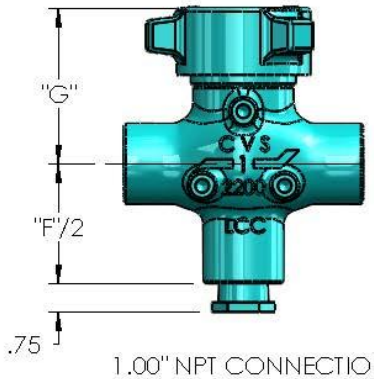

CVS Series 2220 Fail Open

| NOTE 3 - Trim Kit – Consists of: Plug, Seat/Cage, Seat Oring and Drive Pin | | |
|---|---|---|
| Material 17-4PH DHT 1150 | | |
| 1/4” Orifice | CVS 490222A001 | Quick Open |
| 3/8” Orifice | CVS 490222A002 | Quick Open |
| 1/2” Orifice | CVS 490222A003 | Quick Open |
| 3/4" Orifice | CVS 490222A004 | Quick Open |
| 1” Orifice | CVS 490222A005 | Quick Open |
| 1-1/4” Orifice | CVS 490222A006 | Quick Open |
| Material Tungsten Carbide / 17-4PH DHT 1150 | | |
| 1/4" Orifice | CVS 490222A021 | Quick Open |
| 3/8” Orifice | CVS 490222A022 | Quick Open |
| 1/2" Orifice | CVS 490222A023 | Quick Open |
| 3/4" Orifice | CVS 490222A024 | Quick Open |
| 1” Orifice | CVS 490222A025 | Quick Open |
| Material 17-4 DHT 1150 | | |
| 1/4" Orifice | CVS 490222A011 | Modified Equal Percent (Throttle) |
| 3/8” Orifice | CVS 490222A012 | Modified Equal Percent (Throttle) |
| 1/2" Orifice | CVS 490222A013 | Modified Equal Percent (Throttle) |
| 3/4" Orifice | CVS 490222A014 | Modified Equal Percent (Throttle) |
| 1” Orifice | CVS 490222A015 | Modified Equal Percent (Throttle) |

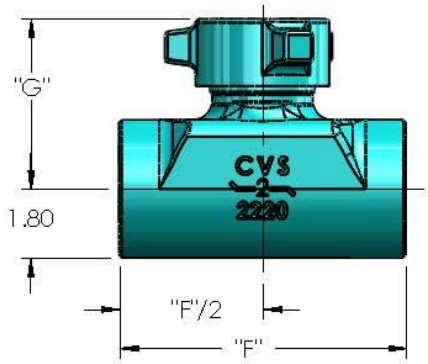
# DIMMENSIONS

## Body Dimensions

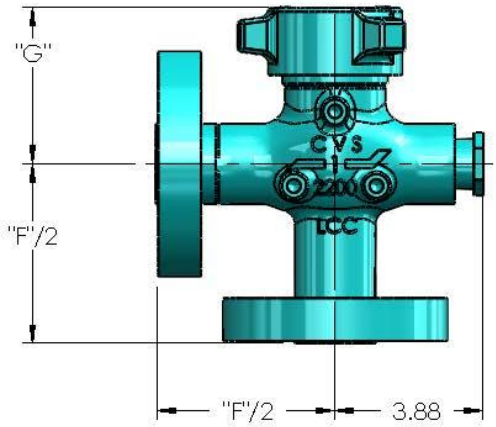
| Body Size | | Face to Face - F | | | | | | | | G | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Connection Type | ASME Rating | | | | | | | | |
| | | | 150 | | 300 | | 600 | | 900/1500 | | |
| In | mm | | In | mm | In | mm | In | mm | In | mm | In | mm |
| 1.00 | 25 | NPT | | | | | | | 6.25 | 159 | 4.88 | 124 |
| | | RF | 7.25 | 184 | 7.75 | 197 | 8.25 | 210 | 9.38 | 238 | | |
| | | RTJ | 7.75 | 197 | 8.25 | 210 | 8.25 | 210 | 9.38 | 238 | | |
| 2.00 | 50 | NPT | | | | | | | 7.50 | 191 | | |
| | | RF | 10.00 | 254 | 10.50 | 267 | 11.25 | 286 | 12.88 | 413 | | |
| | | RTJ | 10.50 | 267 | 11.13 | 283 | 11.38 | 289 | 13.00 | 418 | | |



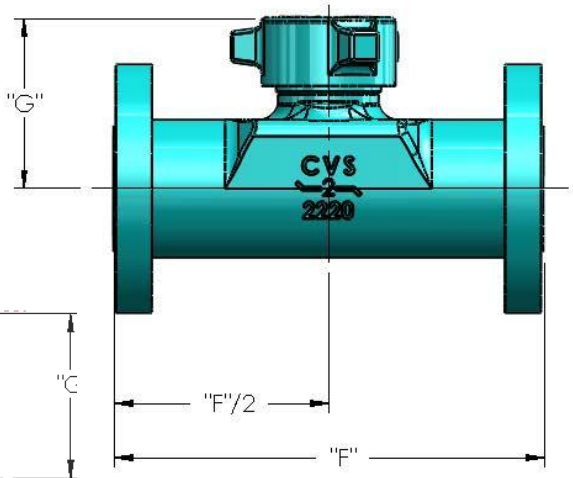

1.00" NPT CONNECTION



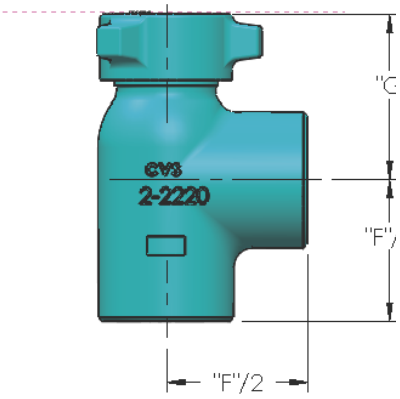

2.00" NPT CONNECTION




1.00" "T" BODY




2.00" GLOBE BODY




2.00" ANGLE BODY

**Head Office**
1107 8A Street
Nisku, Alberta
T9E 7R3
Canada
Office: (780) 437-3055

**Calgary Sales Office**
3516 114 Avenue SE
Calgary, Alberta
T2Z 3V6
Canada
Office: (403) 250-1416
Fax: (403) 291-9487

Website: www.cvs-controls.com

Email: info@cvs-controls.com

CVS Controls Ltd. strives for the highest levels of quality and accuracy. The information included in this publication is presented for informational purposes only. CVS Controls Ltd. reserves the right to modify or change, and improve design, process, and specifications without written notice. Under no circumstance is the information contained to be interpreted to be a guarantee/warranty with regard to our products or services, applicability or use.

Selection, use and maintenance are the sole responsibility of the end user and purchaser. CVS Controls assumes no liability for the selection use and maintenance of any product.

December 2025