

Fisher™ CV500 Rotary Globe Control Valve

The Fisher CV500 Cam Vee-Ball™ control valve combines the rangeability of the cammed-segmented V-notched ball, with the inherent ruggedness found in the V500 heavy duty bearings, seals and body. This combination provides a balance of erosion resistance and pressure control for gas and liquids. The unrestricted, straight-through flow design provides high capacity for gas, steam, liquids, or fibrous slurries. The flanged valve features streamlined flow passages, rugged metal trim components, and a self-centering seat ring (figures 1 and 2).

With these components, the CV500 valve, designed for throttling or on-off applications, combines globe valve ruggedness with the efficiency of a rotary valve. Matched with a Fisher power or manual actuator, the CV500 valve dependably controls fluids in many process industries.

Unless otherwise noted, all NACE references are to NACE MR0175-2002.

Features

- **Excellent Flow Characteristic**—Precise contouring of V-notch ball provides a modified equal percentage flow characteristic.
- **High Capacity**—Unrestricted, straight-through, flow design provides greater capacity than many conventional globe and rotary eccentric plug valves.
- **Long Seat Life**—The V-notch ball cams into and out of the seat minimizing contact with the seat ring for reduced wear and friction (figure 3). The V-notch ball does not contact the seat during throttling operation. S31600 (316 stainless steel) or R30006 (Alloy 6) seat ring has two shutoff surfaces and can be easily reversed, reducing downtime.



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Fisher CV500 VALVE WITH 2052 ACTUATOR AND FIELDVUE™ DVC6200 DIGITAL VALVE CONTROLLER

- **One-Piece Body**—Valve body is cast in one piece. There are no body gaskets to leak as a result of pipeline stresses.
- **Operational Versatility**—Self-centering seat ring and rugged V-notch ball allow forward or reverse flow with tight shutoff in either flow direction.
- **Easy Installation**—Integral valve flanges mate with many different classes of pipeline flanges, satisfying a variety of piping requirements. Flanges eliminate exposed line flange bolting, shorten alignment and installation time, and promote secure valve installations and piping integrity.

(continued on page 3)

Specifications

Available Configuration

Flanged valve body assembly with reversible⁽¹⁾ metal seat ring and splined shaft. See tables 2 and 3.

Valve Sizes

NPS ■ 3, ■ 4, ■ 6, ■ 8, ■ 10, and ■ 12.
DN 80, 100, 150, 200, 250 and 300 are also available.

End Connection Style and Rating

■ Raised-face flanges or ■ ring-type joint flanges (ASME B16.5). Valve bodies with EN PN10 through PN100 flanges also available. See tables 2 and 3 for ASME and EN availability.

Maximum Inlet Pressure⁽²⁾

Consistent with applicable ASME or EN flange ratings

Maximum Pressure Drops⁽²⁾

See table 4 for both forward and reverse flow pressure drops

Shutoff Classification

Class IV per ANSI/FCI 70-2 and IEC 60534-4, (0.01% of valve capacity at full travel) for either flow direction

Construction Materials

See table 5

Material Temperature Capability⁽²⁾

See table 5

Flow Characteristic

Modified equal percentage

Flow Direction

- Forward (normal) flow is into the convex side of the V-notch ball
- Bidirectional flow is into either side of the V-notch ball

Flow Coefficients

See Fisher Catalog 12

Flow Coefficient Ratio⁽³⁾

200 to 1

Actuator Mounting

■ Right-hand or ■ left-hand as viewed from the upstream side of the valve.

Mounting position depends on the desired open valve position and flow direction required by operating conditions. For more information, see the Installation section.

Valve V-Notch Ball Rotation

Counterclockwise to close (when viewed from the actuator side of the valve body) through 90 degrees of V-notch ball rotation

Valve Body/Actuator Action

With diaphragm or piston rotary actuator, field-reversible between

- push-down-to-close (extending actuator rod closes valve body) and
- push-down-to-open (extending actuator rod opens valve body)

Packing Constructions

PTFE V-Ring: With one carbon-filled PTFE conductive packing ring in ■ single, ■ double, or ■ leak-off arrangements

Braided PTFE Composition and Graphite Ribbon: With one graphited composition conductive packing ring in ■ single, ■ double, or ■ leak-off arrangements

Graphite Ribbon Packing Rings: In ■ single, ■ double, or ■ leak-off arrangements

ENVIRO-SEAL™: ■ PTFE or ■ Graphite in single arrangements

Approximate Weights

See table 1

Dimensions

See figure 4; face-to-face dimensions conform to ISA S75.04. IEC 60534-3-2 face-to-face dimensions are equivalent to S75.04 face-to-face dimensions.

Options

- Sealed bearing constructions, ■ purged bearings

1. The reversible seat is not available in every trim material. Consult your [Emerson sales office](#).
2. The pressure or temperature limits in the referenced tables or figures, and in any applicable code limitation, should not be exceeded.
3. Ratio of maximum flow coefficient to minimum usable flow coefficient. May also be called rangeability.

Table 1. Approximate Weights

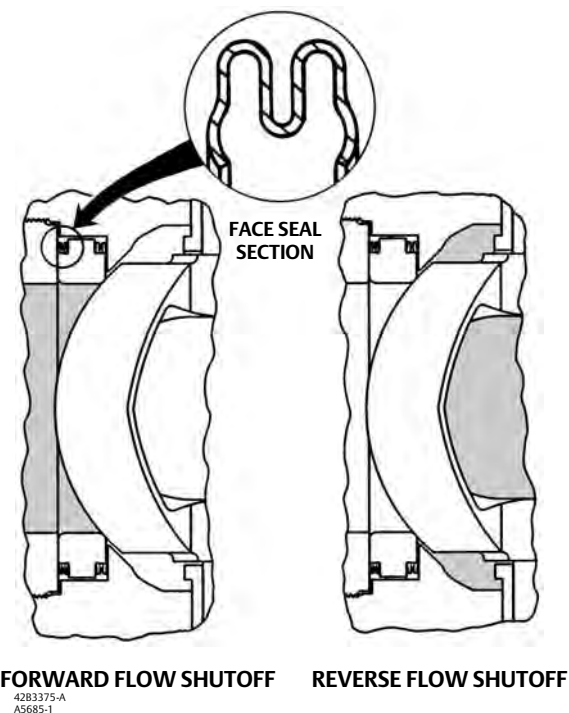
| VALVE SIZE, NPS | FLANGED | | |
|-----------------|---------|-------|-------|
| | CL150 | CL300 | CL600 |
| DN | kg | | |
| 80 | 19 | 24 | 26 |
| 100 | 36 | 42 | 50 |
| 150 | 54 | 69 | 93 |
| 200 | 79 | 98 | 135 |
| 250 | --- | 208 | 312 |
| 300 | --- | 253 | 367 |
| NPS | Pounds | | |
| 3 | 42 | 52 | 57 |
| 4 | 79 | 93 | 111 |
| 6 | 120 | 152 | 204 |
| 8 | 175 | 217 | 298 |
| 10 | --- | 458 | 687 |
| 12 | --- | 558 | 810 |

Table 2. Valve Size, ASME Ratings, and Flange Compatibility

| VALVE SIZE, NPS | ASME FLANGED | | |
|-----------------|--------------|-------|-------|
| | CL150 | CL300 | CL600 |
| 3 | X | X | X |
| 4 | X | X | X |
| 6 | X | X | X |
| 8 | X | X | X |
| 10 | --- | X | X |
| 12 | --- | X | X |

X indicates availability.

Figure 1. Detail of Seat Ring Design



Features (continued)

- **Simple Assembly and Maintenance**—No special orientation, precision clamping or repetitive centering of V-notch ball and seat ring is required when tightening the retainer, promoting accurate alignment and easy assembly.
- **Sour Service Capability**—Trim and bolting materials are available for applications handling sour fluids and gases. These constructions comply with the requirements of NACE MR0175-2002.
- **Rugged Construction**—Durable, solid metal seat ring and ball shut off tightly. Oversized shaft diameters and rugged trim parts allow high pressure drops.
- **Reliable Performance**—The seat ring design (figure 1) self-centers, self-laps, and dynamically aligns with V-notch ball, giving superior cycle life. Optional sealed metal bearings help prevent particle buildup and valve shaft seizure in severe applications.

Figure 2. Sectionals of Fisher CV500 Rotary Control Valves

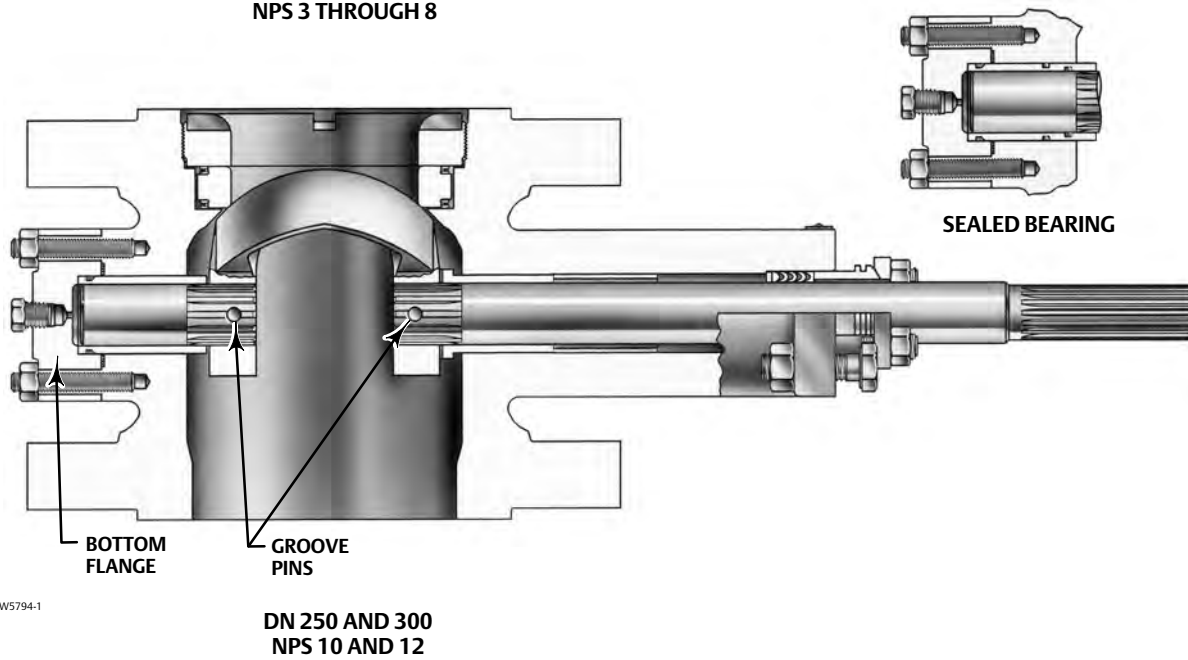
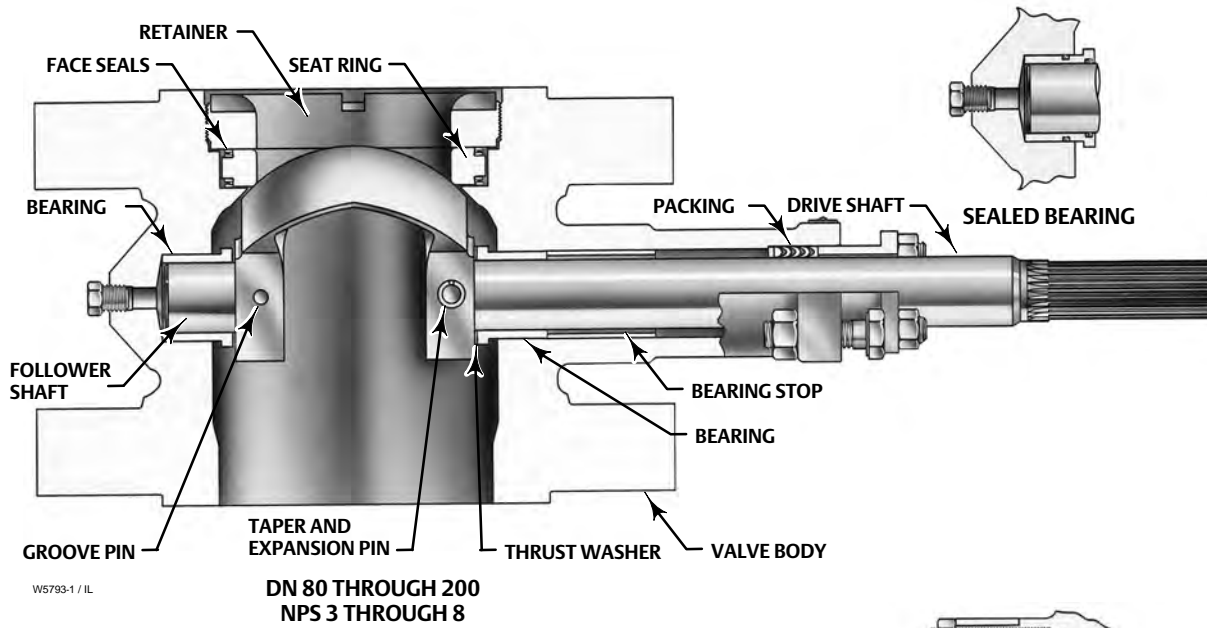


Table 3. Valve Size, DN Ratings, and Flange Compatibility

| VALVE SIZE, DN | EN | | | | | |
|----------------|---------|-------|-------|-------|-------|--------|
| | Flanged | | | | | |
| | PN 10 | PN 16 | PN 25 | PN 40 | PN 63 | PN 100 |
| 80 | X | X | X | X | X | X |
| 100 | X | X | X | X | X | X |
| 150 | X | X | X | X | X | X |
| 200 | X | X | X | X | X | X |
| 250 | --- | --- | X | X | --- | --- |
| 300 | --- | --- | X | X | --- | --- |

X indicates availability.

Table 4. Maximum Allowable Shutoff Pressure Drops⁽²⁾

| VALVE BODY MATERIAL | BEARING MATERIAL | TEMPERATURE, °C | VALVE SIZE, DN | | | | | |
|--|--|---------------------------|----------------|------|------|--|------|------|
| | | | 80 | 100 | 150 | 200 | 250 | 300 |
| | | | Bar | | | | | |
| WCC steel | S44004 (440C SST) | -29 to 149 | 41.4 | 41.4 | 41.4 | 24.1 | 24.1 | 27.6 |
| | | 149 to 204 | 41.4 | 41.4 | 41.4 | 23.8 | 24.1 | 27.6 |
| | | 204 to 316 | 41.4 | 41.4 | 41.4 | 23.1 | 24.1 | 27.6 |
| WCC Steel, 1.0619 steel, CF8M (316 SST), 1.4581 SST, or CF3M ⁽³⁾ (316L SST) | R30006 (Alloy 6) | -46 ⁽¹⁾ to 204 | 41.4 | 41.4 | 20.7 | 15.2 | 24.1 | 27.6 |
| | | 204 to 260 | 41.4 | 41.4 | 20.7 | 15.2 | 24.1 | 27.6 |
| | | 260 to 316 | 41.4 | 41.4 | 20.7 | 15.2 | 24.1 | 27.6 |
| | PTFE/composition-lined S31603 ⁽³⁾ (S316L SST) | -46 ⁽¹⁾ to 93 | 41.4 | 41.4 | 41.4 | 24.1 | 31 | 34.5 |
| | | 93 to 149 | 41.4 | 41.4 | 41.4 | 24.1 ⁽⁴⁾ 23.1 ⁽⁵⁾ | 31 | 34.5 |
| | | 149 to 204 | 41.4 | 41.4 | 41.4 | 23.8 ⁽⁴⁾ 22.1 ⁽⁵⁾ | 31 | 34.5 |
| | | 204 to 232 | 41.4 | 41.4 | 41.4 | 23.4 ⁽⁴⁾ 21.7 ⁽⁵⁾ | 31 | 34.5 |

| VALVE BODY MATERIAL | BEARING MATERIAL | TEMPERATURE, °F | VALVE SIZE, NPS | | | | | |
|--|--|---------------------------|-----------------|-----|-----|--|-----|-----|
| | | | 3 | 4 | 6 | 8 | 10 | 12 |
| | | | Psi | | | | | |
| WCC steel | S44004 (440C SST) | -20 to 300 | 600 | 600 | 600 | 350 | 350 | 400 |
| | | 300 to 400 | 600 | 600 | 600 | 345 | 350 | 400 |
| | | 400 to 600 | 600 | 600 | 600 | 335 | 350 | 400 |
| WCC Steel, 1.0619 steel, CF8M (316 SST), 1.4581 SST, or CF3M ⁽³⁾ (316L SST) | R30006 (Alloy 6) | -50 ⁽¹⁾ to 400 | 600 | 600 | 300 | 220 | 350 | 400 |
| | | 400 to 500 | 600 | 600 | 300 | 220 | 350 | 400 |
| | | 500 to 600 | 600 | 600 | 300 | 220 | 350 | 400 |
| | PTFE/composition-lined S31603 ⁽³⁾ (S316L SST) | -50 ⁽¹⁾ to 200 | 600 | 600 | 600 | 350 | 450 | 500 |
| | | 200 to 300 | 600 | 600 | 600 | 350 ⁽⁴⁾ 335 ⁽⁵⁾ | 450 | 500 |
| | | 300 to 400 | 600 | 600 | 600 | 345 ⁽⁴⁾ 320 ⁽⁵⁾ | 450 | 500 |
| | | 400 to 450 | 600 | 600 | 600 | 340 ⁽⁴⁾ 315 ⁽⁵⁾ | 450 | 500 |

1. -29°C (-20°F) for WCC steel valve body material.
2. The pressure or temperature limits in this table or in any applicable code limitation, should not be exceeded.
3. Fisher standard material offerings in Europe only.
4. S17400 (17-4PH SST) shaft only.
5. ASME SA-479 Grade S20910 stainless steel shaft only. Pressure drops appropriate for both shaft materials.

Table 5. Materials of Construction and Temperature Capabilities

| PART NAME | MATERIAL | MINIMUM TO MAXIMUM TEMPERATURE | | |
|---|---|-----------------------------------|--------------|-------------|
| | | °C | °F | |
| Valve body and retainer | WCC steel bodies | CB7Cu-1 (17-4PH) retainer | -29 to 427 | -20 to 800 |
| | | R30006 (Alloy 6) retainer | -29 to 427 | -20 to 800 |
| | | CF8M (316 SST) retainer | -29 to 260 | -20 to 500 |
| | 1.0619 steel bodies | CB7Cu-1 (17-4PH) retainer | -26 to 427 | -14 to 800 |
| | | R30006 (Alloy 6) retainer | -26 to 427 | -14 to 800 |
| | | CF3M (316L SST) retainer | -26 to 260 | -14 to 500 |
| | CF8M (316 SST) bodies | CF8M retainer | -198 to 427 | -325 to 800 |
| | | R30006 (Alloy 6) retainer | -46 to 316 | -50 to 600 |
| | | CF8M with CoCr-A (Alloy 6) bore | -198 to 427 | -325 to 800 |
| | 1.4581 SST bodies | CF3M retainer | -195 to 427 | -319 to 800 |
| | | R30006 (Alloy 6) retainer | -46 to 316 | -50 to 600 |
| | | CF3M with CoCr-A bore | -198 to 427 | -319 to 800 |
| | CF3M ⁽¹⁾ (316L SST) bodies | CF3M retainer | -198 to 427 | -325 to 800 |
| R30006 (Alloy 6) retainer | | -46 to 316 | -50 to 600 | |
| CF3M with CoCr-A bore | | -198 to 427 | -325 to 800 | |
| Seat ring | CF8M | -198 to 538 | -325 to 1000 | |
| | R30006 (Alloy 6) | -198 to 538 | -325 to 1000 | |
| | CF8M with CoCr-A seat | -198 to 538 | -325 to 1000 | |
| | CF3M ⁽¹⁾ | -198 to 454 | -325 to 850 | |
| | CF3M ⁽¹⁾ with CoCr-A seat | -198 to 454 | -325 to 850 | |
| Ball | Chrome plated CF3M | -198 to 316 | -325 to 600 | |
| | Chrome plated CF3M with CoCr-A V-notch | -198 to 316 | -325 to 600 | |
| Drive shaft and follower shaft | S17400 (17-4PH SST) | -62 to 427 | -80 to 800 | |
| | ASME SA479 grade S20910 | -198 to 538 | -325 to 1000 | |
| Taper and expansion pins (NPS 3 through 8) | ASME SA479 grade S20910 | -198 to 538 | -325 to 1000 | |
| Groove pin | S31600 | -198 to 538 | -325 to 1000 | |
| Bearings | S44004 (440C SST) | -29 to 427 | -20 to 800 | |
| | R30006 (Alloy 6) | -198 to 538 | -325 to 1000 | |
| | PTFE/composition lined S31603 | -46 to 232 | -50 to 450 | |
| O-rings ⁽²⁾ (for S44004 or R30006 sealed bearings) | Fluorocarbon | -18 to 204 | 0 to 400 | |
| | Nitrile | -29 to 93 | -20 to 200 | |
| Bearing stop | S31600 | -198 to 538 | -325 to 1000 | |
| | S31603 ⁽¹⁾ | -198 to 454 | -325 to 850 | |
| Thrust washer | S17700 for S17400 drive shaft | -198 to 427 | -325 to 800 | |
| | Alloy 6B for S20910 drive shaft | -198 to 538 | -325 to 1000 | |
| Face seals | N07718 | -198 to 538 | -325 to 1000 | |
| Retainer gasket | S31600 | -198 to 538 | -325 to 1000 | |
| | S31603 ⁽¹⁾ | -198 to 454 | -325 to 850 | |
| Packing | PTFE V-ring with one carbon-filled PTFE ring ⁽³⁾ | -46 to 260 | -50 to 500 | |
| | Braided PTFE composition with one graphite filament ring ⁽⁴⁾ | -73 to 260 | -100 to 500 | |
| | Graphite ribbon | -198 to 538 | -325 to 1000 | |
| Packing follower | S31600 | -198 to 538 | -325 to 1000 | |
| Studs and nuts | SA-193-B7 studs and SA-194-2H nuts | -46 to 427 | -50 to 800 | |
| | SA-193-B7M studs and SA-194-2HM nuts | -29 to 427 | -20 to 800 | |
| | SA-193-B8M studs and SA-194-8M nuts | -198 to 538 | -325 to 1000 | |
| Packing box ring | S31600 | -198 to 538 | -325 to 1000 | |
| | S31603 ⁽¹⁾ | -198 to 454 | -325 to 850 | |

1. Fisher standard material offerings in Europe only.
 2. For sealed bearing constructions.
 3. Carbon-filled PTFE ring used for grounding purposes.
 4. Graphite filament ring used for grounding purposes.

Installation

The CV500 control valve may be installed in any position. However, for best shutoff performance, a position with the shaft horizontal is recommended.

The control valve may be installed in forward or reverse flow direction. Forward flow (through the seat ring and past the V-notch ball) tends to open the valve; reverse flow (past the V-notch ball and through the seat ring) tends to close the valve. The forward flow direction is recommended. Refer to the Fisher CV500 Rotary Control Valve instruction manual, [D101640X012](#), to determine the proper installation orientation of the V-notch ball and actuator, and to determine the flow direction of the process fluid through the valve.

Refer to the appropriate actuator bulletin for possible assembly and installation options. For assistance in selecting the appropriate combination of actuator action and open valve position, consult your [Emerson sales office](#).

Dimensions are shown in figure 4.

Ordering Information

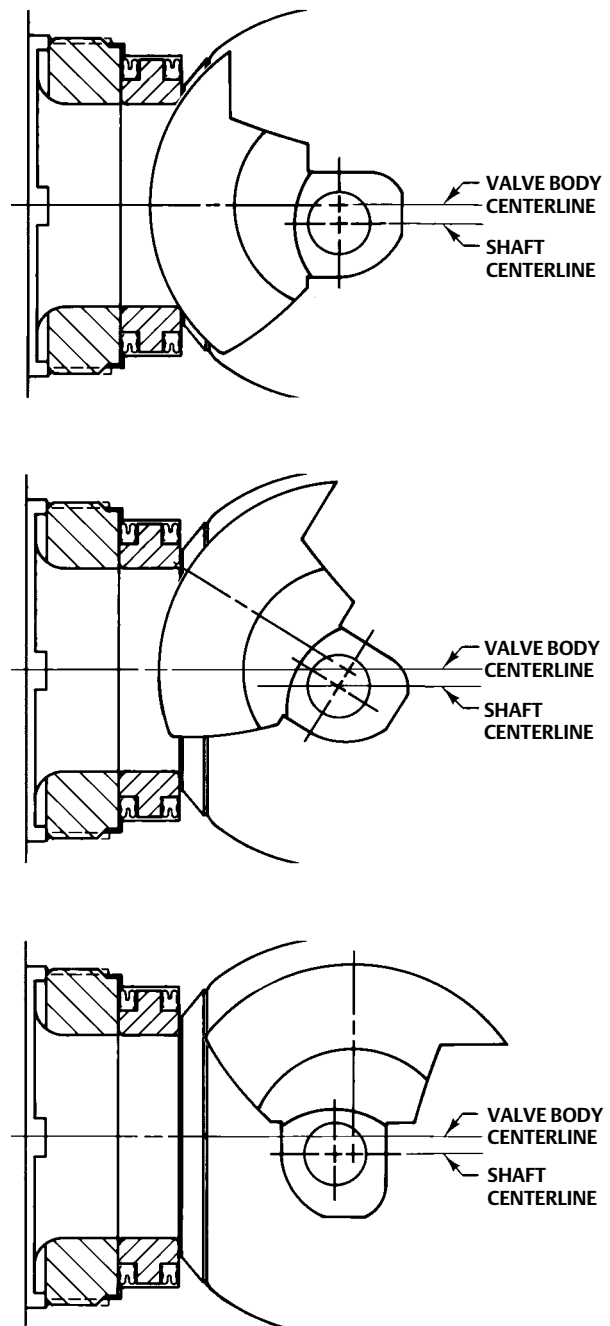
Valve Information

To determine what valve ordering information is needed, refer to the specifications table. Review the information under each specification and in the referenced tables; specify your choice whenever there is a selection to be made.

Actuator and Accessory Information

Refer to the specific actuator and accessory bulletins for required ordering information.

Figure 3. Eccentric V-Notch Ball Rotation



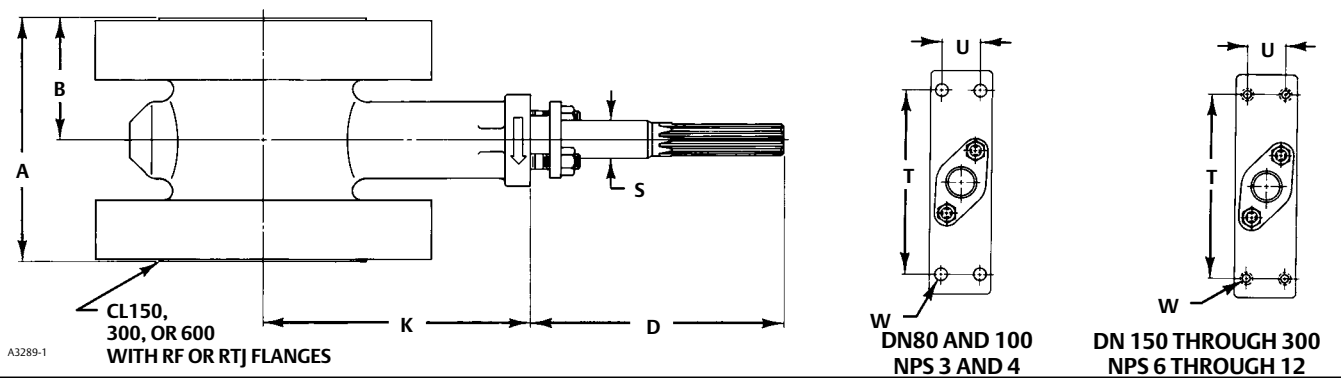
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Table 6. Fisher CV500 Valve Body Dimensions

| VALVE SIZE | DIMENSIONS | | | | | | | | | |
|------------|------------|-------|------|------|-------|-------|---------------------------------|-------|------|-----------------|
| | A | | B | | D | K | S (Shaft Dia) ⁽¹⁾ | T | U | W |
| | RF | RTJ | RF | RTJ | | | | | | |
| DN | mm | | | | | | | | | |
| 80 | 165 | 165 | 83 | 83 | 213 | 200 | 25.4 25.4 x 19.1 | 152 | 32 | 14 |
| 100 | 194 | 194 | 97 | 97 | 208 | 216 | 31.8 | 235 | 46 | 18 |
| 150 | 229 | 229 | 114 | 114 | 208 | 270 | 38.1 38.1 x 31.8 | 235 | 46 | 5/8-inch 11 UNC |
| 200 | 243 | 243 | 121 | 121 | 208 | 318 | 38.1 | 235 | 46 | 5/8-inch 11 UNC |
| 250 | 297 | 312 | 148 | 156 | 356 | 353 | 44.5 | 273 | 51 | 3/4-inch 10 UNC |
| 300 | 338 | 354 | 169 | 177 | 356 | 408 | 53.8 53.8 x 50.8 | 273 | 51 | 3/4-inch 10 UNC |
| NPS | Inches | | | | | | | | | |
| 3 | 6.50 | 6.50 | 3.25 | 3.25 | 8.44 | 7.88 | 1.00 1.00 x 0.75 | 6.00 | 1.25 | 0.56 |
| 4 | 7.62 | 7.62 | 3.81 | 3.81 | 8.19 | 8.50 | 1.25 | 9.25 | 1.81 | 0.69 |
| 6 | 9.00 | 9.00 | 4.50 | 4.50 | 8.19 | 10.62 | 1.50 1.50 x 1.25 | 9.25 | 1.81 | 5/8-inch 11 UNC |
| 8 | 9.56 | 9.56 | 4.78 | 4.78 | 8.19 | 12.50 | 1.50 | 9.25 | 1.81 | 5/8-inch 11 UNC |
| 10 | 11.68 | 12.30 | 5.84 | 6.15 | 14.00 | 13.91 | 1.75 | 10.75 | 2.00 | 3/4-inch 10 UNC |
| 12 | 13.31 | 13.93 | 6.66 | 6.97 | 14.00 | 16.07 | 2.12 2.12 x 2.00 | 10.75 | 2.00 | 3/4-inch 10 UNC |

1. Shaft diameter versus spline diameter.

Figure 4. Fisher CV500 Valve Body Dimensions (also see table 6)



Note:
For dimensions of valves with DN (or other) end connections, contact your [Emerson sales office](#).

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Emerson Process Management
Marshalltown, Iowa 50158 USA
Sorocaba, 18087 Brazil
Cernay, 68700 France
Dubai, United Arab Emirates
Singapore 128461 Singapore

www.Fisher.com

