

▲ Model 110 shown

The Series 110 Differential Control Valve is designed to accurately control the pressure difference between any two points. In some systems this means the valve remains closed until pressure differential commands its opening. It is a pilot-operated, modulating type valve which controls pressure accurately and consistently at the desired setting.

SERIES FEATURES

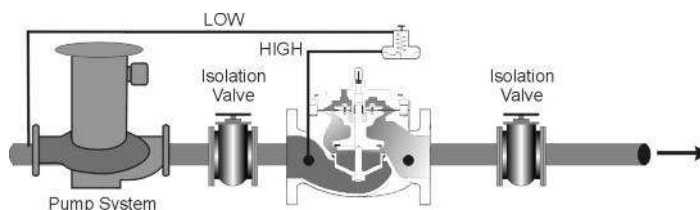
- ▶ Opens on increasing differential.
- ▶ Dual pilot sense lines can be valve or remote connected.
- ▶ Differential is adjustable over complete range of control springs. (see pilot features)

VALVE FEATURES

- ▶ Operates automatically off line pressure.
- ▶ Heavy-duty, nylon-reinforced diaphragm.
- ▶ Rectangular-shaped, soft seat seal provides drip-tight Class VI closure.
- ▶ Diaphragm assembly guided top and bottom.
- ▶ Throttling seat retainer for flow and pressure stability.
- ▶ Easily maintained without removal from the line.
- ▶ Replaceable seat ring.
- ▶ Alignment pins assure proper reassembly after maintenance.
- ▶ Valves are factory tested.
- ▶ Valves are serial numbered and registered to facilitate replacement parts and factory support.

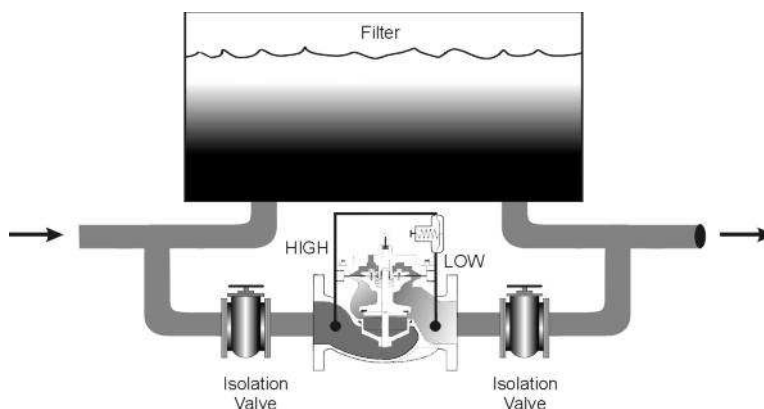
PUMP DIFFERENTIAL CONTROL

Installed on the discharge side of a pump, the valve senses high pressure at pump discharge (valve inlet) and low pressure at the pump suction. Valve modulates to hold differential pressure constant, thus assuring pump is at optimum point on its curve.



FILTER BYPASS CONTROL

In a filtered liquid application where loss of flow cannot be tolerated, the model 110 allows flow should the filter become clogged.



VALVE OPERATION

The OCV MODEL 110

- Maintains a constant differential pressure between two points in a system.
- Valve opens on increased differential.

1) Model 65 Basic Control Valve, a hydraulically-operated, diaphragm-actuated globe or angle valve that closes with an elastomer-on-metal seal.

2) Model 1356 Differential Pilot, a two-way, normally closed pilot valve that senses differential pressure across its diaphragm and balances it against an adjustable spring load. An increase in differential above the set point makes the pilot open.

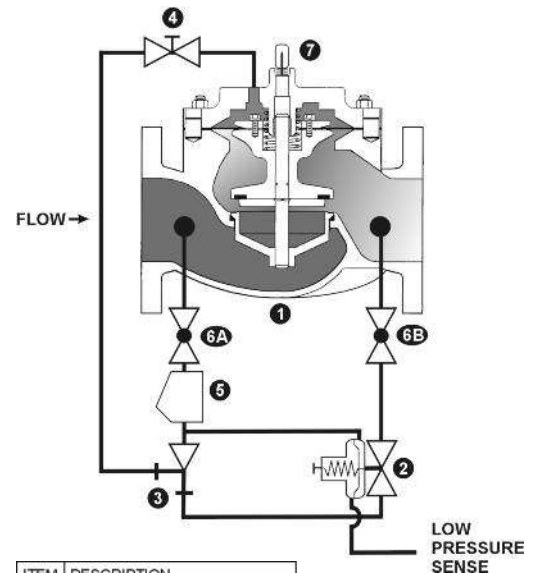
3) Model 126 Ejector, a simple "tee" fitting with a fixed orifice in its upstream port. It provides the proper pressure to the diaphragm chamber of the main valve, depending on the position of the differential pilot.

4) Model 141-2 Needle Valve that controls the opening/closing speed of the main valve.

5) Model 159 Y-Strainer (standard on water service valves), the strainer protects the pilot system from solid contaminants in the line fluid.

6) Model 141-4 Ball Valves (standard on water service valves, optional on fuel service valves), useful for isolating the pilot system for maintenance or troubleshooting.

7) Model 155 Visual Indicator (optional)



| ITEM | DESCRIPTION |
|------|----------------------------|
| 1 | BASIC VALVE ASSEMBLY |
| 2 | DIFFERENTIAL CONTROL PILOT |
| 3 | EJECTOR |
| 4 | NEEDLE VALVE |
| 5 | Y-STRAINER |
| 6 | ISOLATION BALL VALVE |
| 7 | VISUAL INDICATOR |

PILOT 1356

- Accurate sensing of high and low pressure.
- Normally closed, pressure differential to open.
- Simple, single adjustment of differential set point.
- All parts replaceable while mounted on the valve.

- Rubber-to-metal seat provides positive closure until required to open.
- Large area diaphragm for quick, precise control.
- Bronze or stainless steel construction.
- Multiple spring ranges.

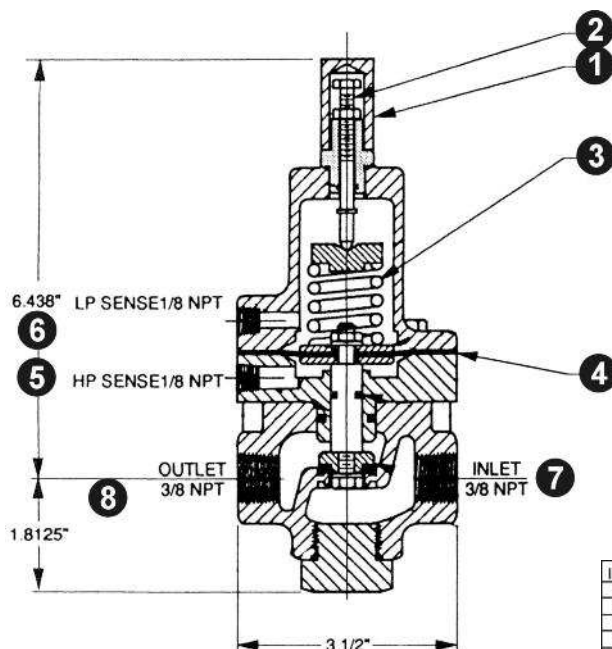
Pilot Materials

Bronze ASTM B584-C89836

Stainless Steel

Spring Ranges

5-30, 20-80, 65-180 psi



| ITEM | QTY | DESCRIPTION |
|------|-----|---------------------|
| 1 | 1 | CAP |
| 2 | 1 | ADJUSTING SCREW |
| 3 | 1 | SPRING |
| 4 | 1 | DIAPHRAGM |
| 5 | 1 | HIGH PRESSURE SENSE |
| 6 | 1 | LOW PRESSURE SENSE |
| 7 | 1 | INLET |
| 8 | 1 | OUTLET |

The Model 1356 Differential Pressure Pilot controls the amount of pressure in the upper chamber of the main valve (hence, the degree of opening or closing of the main valve). The pilot senses high pressure under its diaphragm and low pressure above its diaphragm. As the differential increases above the setting of the spring (adjustable), the pilot opens, decreasing the pressure in the main valve diaphragm chamber, allowing the main valve to open a proportionate amount.

Sense line locations.

High pressure sensing is typically at the main valve inlet. Low pressure can be sensed at the valve outlet or at a field installed remote location.

SIZING CONSIDERATIONS

SIZING DIFFERENTIAL CONTROL VALVES

Because the Model 110 typically controls the differential pressure, that particular parameter of the sizing equation is already defined. All that remains is to ensure the valve is large enough to handle the required flow within proper velocity limits.

$$C_v = \frac{Q_{\max}}{\sqrt{DP/sg}}$$

where: Cv = valve coefficient
 Q = Maximum flow rate, gpm
 sg = Liquid specific gravity (water = 1.0)
 dp = Differential pressure, psig

From the chart below, pick the smallest valve that has a Cv at least equal to the value calculated and where the velocity does not exceed 25 ft/sec.

| SIZE | CV (GLOBE) | CV (ANGLE) | FLOW @ 25 FT/SEC (GPM) |
|------|---------------|---------------|---------------------------|
| 1 ¼ | 23 | 30 | 115 |
| 1 ½ | 27 | 35 | 150 |
| 2 | 47 | 65 | 260 |
| 2 ½ | 68 | 87 | 370 |
| 3 | 120 | 160 | 570 |
| 4 | 200 | 270 | 1000 |
| 6 | 450 | 550 | 2250 |
| 8 | 760 | 1000 | 3900 |
| 10 | 1250 | 1600 | 6150 |
| 12 | 1940 | 2400 | 8700 |
| 14 | 2200 | -- | 10,500 |
| 16 | 2850 | 4000 | 13,800 |
| 24 | 6900 | -- | 31,300 |

VALVE SELECTION GUIDE

By combining various control pilots, multiple valve functions can be performed on a single Series 110 Differential Control Valve. To find the combination function valve, select the desired features and then the model number.

This chart shows only a sample of those most often specified valves.
Consult the factory for specific data on the model you selected.

| Feature | 110 | 110-1 | 110-2 | 110-12 | Definition |
|----------------------|-----|-------|-------|--------|---|
| Differential Control | X | X | X | X | Valve opens on increased pressure differential. |
| Check Valve | | X | | X | Closes valve on pressure reversal |
| Solenoid Shutoff | | | X | X | Opens or closes valve electrically. |

ABOUT YOUR VALVE

OCV Control Valves was founded more than 60 years ago with a vision and commitment to quality and reliability. From modest beginnings, the company has grown to be a global leader just a half century later. In fact, OCV Valves can be found in some capacity in nearly every country around the world from fire protection systems in Malaysia to aircraft fueling systems in Africa and from oil refineries in Russia to water supply systems in the USA and Canada. You will also find our valves in irrigation systems in Europe, South America and the Middle East.

The original foundation on which the company was built allows our team of professionals to not only provide the service required to be a worldwide supplier, but more importantly the opportunity to afford the personal touch necessary to be each of our customers' best partner. Simply stated, we take pride in all that we do.

Committed to the work they do, our employees average over 15 years of service. This wealth of knowledge allows us to provide quality engineering, expert support, exacting control and the know-how to create valves known for their long life.

Being ISO 9001 certified means we are committed to a quality assurance program. Our policy is to supply each customer with consistent quality products and ensure that the process is right every time. Our valves meet and exceed industry standards around the world, including approvals by:



Check individual models for availability.

All valves are not created equal. OCV Control Valves proves that day in and day out. We stand behind our valves and are ready to serve your needs.

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email: sales@controlvalves.com • website: www.controlvalves.com

SPECIFICATIONS



Certified to
NSF/ANSI 61-G & 372

NOTE: ALL waterworks valves meet the Low-Lead laws of the United States, including individual state laws, as of March 2014.

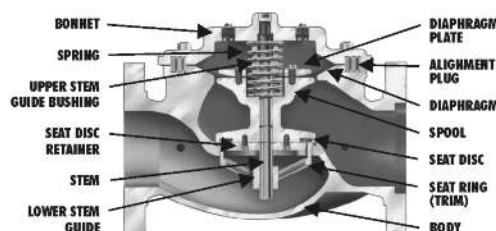
*Valves 1-1/4" through 24" are certified to NSF/ANSI 372. Valves 4" through 24" are also certified to NSF/ANSI 61-G.

| VALVE BODY & BONNET | | DUCTILE IRON | | CAST STEEL | | STAINLESS STEEL | |
|--|--|--|---------|---------------------------------------|-------------------------------------|-------------------------|---------|
| Material Specification | | ASTM A536/65-45-12 (epoxy coated) | | ASTM A216/WCB (epoxy coated) | | ALL GRADES | |
| END CONNECTIONS | | | | | | | |
| Flange Standard (also available in metric) | | ANSI B16.42 | | ANSI B16.5 | | ANSI B16.5 | |
| Flange Class | | 150# | 300# | 150# | 300# | 150# | 300# |
| Flange Face | | Flat | Raised | Raised | Raised | Raised | Raised |
| Maximum Working Pressure | | 250 psi | 640 psi | 285 psi | 740 psi | 285 psi | 740 psi |
| Screwed Working Pressure: ANSI B1.20.1 640 psi | | | | Grooved End Working Pressure: 300 psi | | | |
| INTERNALS | | | | | | | |
| Stem | | STAINLESS STEEL | | | | | |
| Spring | | STAINLESS STEEL | | | | | |
| Spool | | DUCTILE IRON (epoxy coated) / OPTIONAL - STN. STL. | | | | STAINLESS STEEL | |
| Seat Disc Retainer | | DUCTILE IRON (epoxy coated) (10" & LARGER) STN. STL. (8" & SMALLER / OPTIONAL - ALL SIZES) | | | | STAINLESS STEEL | |
| Diaphragm Plate | | DUCTILE IRON (epoxy coated) / OPTIONAL - STN. STL. | | | | STAINLESS STEEL | |
| Seat Ring (Trim) | | LOW-LEAD BRONZE OR STN. STL. | | | | STN. STL. | |
| Upper Stem Bushing | | BRONZE OR TEFLON® | | | | TEFLON® | |
| Lower Stem Bushing | | NOT APPLICABLE FOR LOW-LEAD BROZE SEAT RINGS / TEFLON FOR FOR STN. STL. SEAT RINGS | | | | | |
| ELASTOMER PARTS (Rubber) | | | | | | | |
| Diaphragm/Seat Disc/O-Rings | | EPDM | | | | | |
| Operating Temperature* | | 32°F to 230°F | | | | | |
| *Consult factory when temperatures approach low or high temperature allowance. | | | | | | | |
| COATINGS | | NSF-61 EPOXY COATING | | | | | |
| ELECTRICAL SOLENOIDS | | | | | | | |
| Bodies | | BRASS / OPTIONAL - STAINLESS STEEL | | | | | |
| Enclosures | | WATER TIGHT, NEMA 1, 3, 4, & 4X | | | | | |
| Power | | AC, 60HZ - 24, 120, 240, 480 VOLTS | | AC, 50HZ - In 110 VOLT MULTIPLES | | DC, 6 12, 24, 240 VOLTS | |
| Operation | | ENERGIZE TO OPEN (NORMALLY CLOSED) | | | DE-ENERGIZE TO OPEN (NORMALLY OPEN) | | |
| CONTROL PILOTS | | | | | | | |
| Bodies | | LOW-LEAD BRONZE | | STN. STL. | | | |
| Internal | | STAINLESS STEEL | | STAINLESS STEEL | | | |
| Tubing | | COPPER | | STAINLESS STEEL | | | |
| Fittings | | LOW-LEAD BRASS | | STAINLESS STEEL | | | |

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The diagram illustrates the internal mechanical components of a valve. On the left side, the BONNET is at the top, followed by a SPRING, UPPER STEM GUIDE BUSHING, SEAT DISC RETAINER, and the STEM. On the right side, the DIAPHRAGM PLATE is at the top, followed by an ALIGNMENT PLUG, DIAPHRAGM, SPOOL, and SEAT DISC. The diagram shows how these parts interact to control the flow of fluid through the valve.

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Globe Flanged Sizes

| | | | | | | | | | | | | | | |
|-------|------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| 1.25" | 1.5" | 2" | 2.5" | 3" | 4" | 6" | 8" | 10" | 12" | 14" | 16" | 18" | 20" | 24" |
| 32mm | 40mm | 50mm | 65mm | 80mm | 100mm | 150mm | 200mm | 250mm | 300mm | 350mm | 400mm | 450mm | 500mm | 600mm |

*CONSULT FACTORY



Angle Flanged Sizes

| | | | | | | | | | | |
|-------|------|------|------|------|-------|-------|-------|-------|-------|-------|
| 1.25" | 1.5" | 2" | 2.5" | 3" | 4" | 6" | 8" | 10" | 12" | 16" |
| 32mm | 40mm | 50mm | 65mm | 80mm | 100mm | 150mm | 200mm | 250mm | 300mm | 400mm |



Globe/Angle Screwed Sizes

| | | | | |
|-------|------|------|------|------|
| 1.25" | 1.5" | 2" | 2.5" | 3" |
| 32mm | 40mm | 50mm | 65mm | 80mm |



Globe/Angle Grooved Sizes

| | | | | | |
|------|------|------|------|-------|-------|
| 1.5" | 2" | 2.5" | 3" | 4" | 6" |
| 32mm | 50mm | 65mm | 80mm | 100mm | 150mm |

*GLOBE ONLY

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DIMENSIONS

U.S. DIMENSIONS - INCHES

| DIM | END CONN. | 1 1/4-1 1/2 | 2 | 2 1/2 | 3 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 24 |
|-----|-----------|--------------|---------|---------|--------|---------|--------|----------|---------|--------|--------|----------|--------|
| A | SCREWED | 8 3/4 | 9 7/8 | 10 1/2 | 13 | -- | -- | -- | -- | -- | -- | -- | -- |
| | GROOVED | 8 3/4 | 9 7/8 | 10 1/2 | 13 | 15 1/4 | 20 | -- | -- | -- | -- | -- | -- |
| | 150# FLGD | 8 1/2 | 9 3/8 | 10 1/2 | 12 | 15 | 17 3/4 | 25 3/8 | 29 3/4 | 34 | 39 | 40 3/8 | 62 |
| | 300# FLGD | 8 3/4 | 9 7/8 | 11 1/8 | 12 3/4 | 15 5/8 | 18 5/8 | 26 3/8 | 31 1/8 | 35 1/2 | 40 1/2 | 42 | 63 3/4 |
| B | SCREWED | 1 7/16 | 1 11/16 | 1 7/8 | 2 1/4 | -- | -- | -- | -- | -- | -- | -- | -- |
| | GROOVED | 1* | 1 3/16 | 1 7/16 | 1 3/4 | 2 1/4 | 3 5/16 | -- | -- | -- | -- | -- | -- |
| | 150# FLGD | 2 5/16-2 1/2 | 3 | 3 1/2 | 3 3/4 | 4 1/2 | 5 1/2 | 6 3/4 | 8 | 9 1/2 | 10 5/8 | 11 3/4 | 16 |
| | 300# FLGD | 2 5/8-3 1/16 | 3 1/4 | 3 3/4 | 4 1/8 | 5 | 6 1/4 | 7 1/2 | 8 3/4 | 10 1/4 | 11 1/2 | 12 3/4 | 18 |
| C | SCREWED | 4 3/8 | 4 3/4 | 6 | 6 1/2 | -- | -- | -- | -- | -- | -- | -- | -- |
| | GROOVED | 4 3/8* | 4 3/4 | 6 | 6 1/2 | 7 5/8 | -- | -- | -- | -- | -- | -- | -- |
| | 150# FLGD | 4 1/4 | 4 3/4 | 6 | 6 | 7 1/2 | 10 | 12 11/16 | 14 7/8 | 17 | -- | 20 13/16 | -- |
| | 300# FLGD | 4 3/8 | 5 | 6 3/8 | 6 3/8 | 7 13/16 | 10 1/2 | 13 3/16 | 15 9/16 | 17 3/4 | -- | 21 5/8 | -- |
| D | SCREWED | 3 1/8 | 3 7/8 | 4 | 4 1/2 | -- | -- | -- | -- | -- | -- | -- | -- |
| | GROOVED | 3 1/8* | 3 7/8 | 4 | 4 1/2 | 5 5/8 | -- | -- | -- | -- | -- | -- | -- |
| | 150# FLGD | 3 | 3 7/8 | 4 | 4 | 5 1/2 | 6 | 8 | 11 3/8 | 11 | -- | 15 11/16 | -- |
| | 300# FLGD | 3 1/8 | 4 1/8 | 4 3/8 | 4 3/8 | 5 13/16 | 6 1/2 | 8 1/2 | 12 1/16 | 11 3/4 | -- | 16 1/2 | -- |
| E | ALL | 6 | 6 | 7 | 6 1/2 | 8 | 10 | 11 7/8 | 15 3/8 | 17 | 18 | 19 | 27 |
| F | ALL | 3 7/8 | 3 7/8 | 3 7/8 | 3 7/8 | 3 7/8 | 3 7/8 | 6 3/8 | 6 3/8 | 6 3/8 | 6 3/8 | 6 3/8 | 8 |
| G | ALL | 6 | 6 3/4 | 7 11/16 | 8 3/4 | 11 3/4 | 14 | 21 | 24 1/2 | 28 | 31 1/4 | 34 1/2 | 52 |
| H | ALL | 10 | 11 | 11 | 11 | 12 | 13 | 14 | 17 | 18 | 20 | 20 | 28 1/2 |

*GROOVED END NOT AVAILABLE IN 1 1/4"

METRIC DIMENSIONS - M.M.

| DIM | END CONN. | DN32-DN40 | DN50 | DN65 | DN80 | DN100 | DN150 | DN200 | DN250 | DN300 | DN350 | DN400 | DN600 |
|-----|-----------|-----------|------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|
| A | SCREWED | 222 | 251 | 267 | 330 | -- | -- | -- | -- | -- | -- | -- | -- |
| | GROOVED | 222 | 251 | 267 | 330 | 387 | 508 | -- | -- | -- | -- | -- | -- |
| | 150# FLGD | 216 | 238 | 267 | 305 | 381 | 451 | 645 | 756 | 864 | 991 | 1026 | 1575 |
| | 300# FLGD | 222 | 251 | 283 | 324 | 397 | 473 | 670 | 791 | 902 | 1029 | 1067 | 1619 |
| B | SCREWED | 37 | 43 | 48 | 57 | -- | -- | -- | -- | -- | -- | -- | -- |
| | GROOVED | 25* | 30 | 37 | 44 | 57 | 84 | -- | -- | -- | -- | -- | -- |
| | 150# FLGD | 59-64 | 76 | 89 | 95 | 114 | 140 | 171 | 203 | 241 | 270 | 298 | 406 |
| | 300# FLGD | 67-78 | 83 | 95 | 105 | 127 | 159 | 191 | 222 | 260 | 292 | 324 | 457 |
| C | SCREWED | 111 | 121 | 152 | 165 | -- | -- | -- | -- | -- | -- | -- | -- |
| | GROOVED | 111* | 121 | 152 | 165 | 194 | -- | -- | -- | -- | -- | -- | -- |
| | 150# FLGD | 108 | 121 | 152 | 152 | 191 | 254 | 322 | 378 | 432 | -- | 529 | -- |
| | 300# FLGD | 111 | 127 | 162 | 162 | 198 | 267 | 335 | 395 | 451 | -- | 549 | -- |
| D | SCREWED | 79 | 98 | 102 | 114 | -- | -- | -- | -- | -- | -- | -- | -- |
| | GROOVED | 79* | 98 | 102 | 114 | 143 | -- | -- | -- | -- | -- | -- | -- |
| | 150# FLGD | 76 | 98 | 102 | 102 | 140 | 152 | 203 | 289 | 279 | -- | 398 | -- |
| | 300# FLGD | 79 | 105 | 111 | 111 | 148 | 165 | 216 | 306 | 298 | -- | 419 | -- |
| E | ALL | 152 | 152 | 178 | 165 | 203 | 254 | 302 | 391 | 432 | 457 | 483 | 686 |
| F | ALL | 98 | 98 | 98 | 98 | 98 | 98 | 162 | 162 | 162 | 162 | 162 | 203 |
| G | ALL | 152 | 171 | 195 | 222 | 298 | 356 | 533 | 622 | 711 | 794 | 876 | 1321 |
| H | ALL | 254 | 279 | 279 | 279 | 305 | 330 | 356 | 432 | 457 | 508 | 508 | 724 |

*GROOVED END NOT AVAILABLE IN DN32

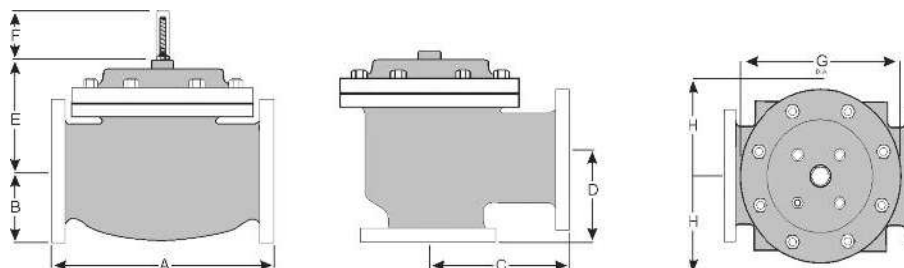
For maximum efficiency, the OCV control valve should be mounted in a piping system so that the valve bonnet (cover) is in the top position. Other positions are acceptable but may not allow the valve to function to its fullest and safest potential. In particular, please consult the factory before installing 8" and larger valves, or any valves with a limit switch, in positions other than described. Space should be taken into consideration when mounting valves and their pilot systems.

A routine inspection & maintenance program should be established and conducted yearly by a qualified technician. Consult our factory @ **1-888-628-8258** for parts and service.

How to order your valve

When Ordering please provide:

Series Number - Valve size - Globe or Angle - Pressure Class - Screwed, Flanged, Grooved - Trim Material - Adjustment Range - Pilot Options - Special needs / or installation requirements.



Represented by:

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