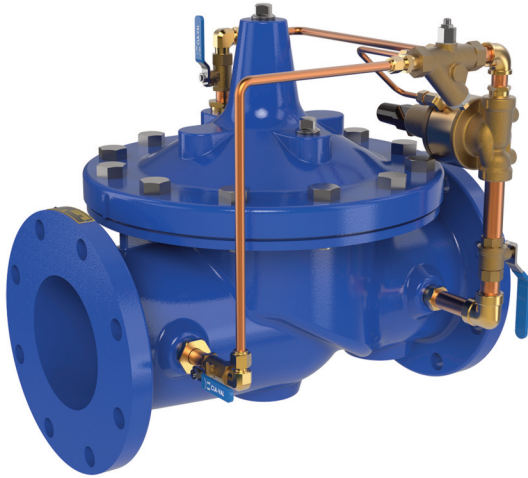




— MODEL — 650-01KO

Anti-Cavitation Pressure Relief and Pressure Sustaining Valve



- Virtually Cavitation Free Operation
- Sensitive and Accurate Pressure Control
- Easy Adjustment and Maintenance
- Tamper Resistant
- Optional Check Feature
- Fully Supported Frictionless Diaphragm

The Cla-Val Model 650-01KO Anti-Cavitation Pressure Relief Valve is a hydraulically operated, pilot-controlled, modulating valve designed to maintain constant upstream pressure within close limits. This valve can be used for pressure relief, pressure sustaining, back pressure, or unloading functions in a by-pass system.

In operation, the valve is actuated by line pressure through a pilot control system, opening fast to maintain steady line pressure but closing gradually to prevent surges. Operation is completely automatic and pressure settings may be easily changed.

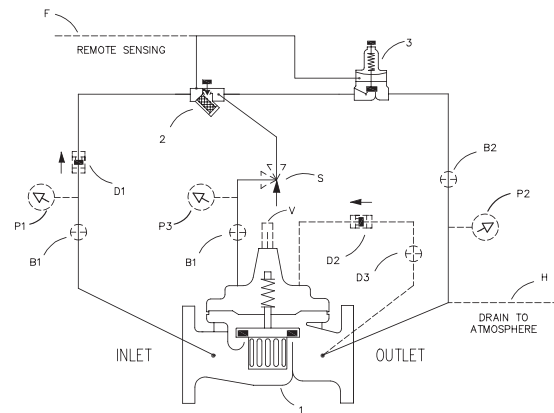
If a check feature is added, and a pressure reversal occurs, the downstream pressure is admitted into the main valve cover chamber, closing the valve to prevent return flow.

Schematic Diagram

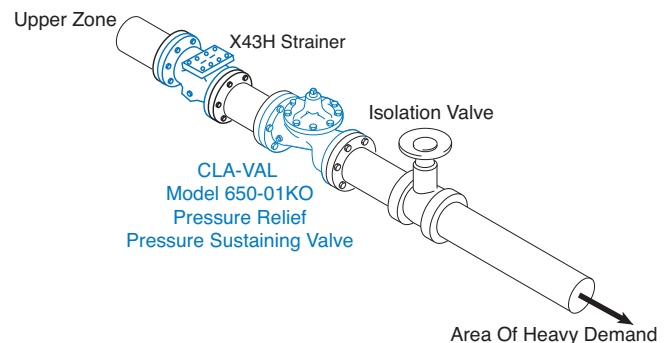
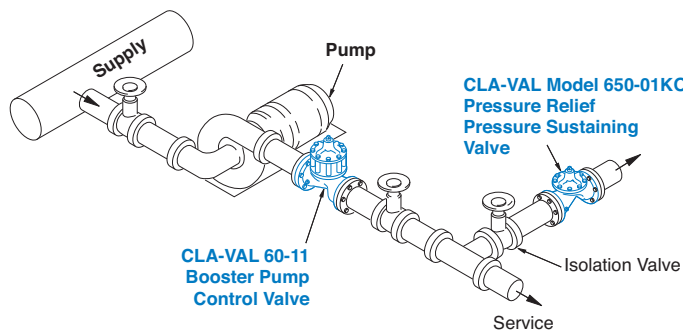
| Item | Description |
|------|--------------------------------|
| 1 | 100-20KO Hytrol Main Valve |
| 2 | X42N-2 Strainer & Needle Valve |
| 3 | CRL-60 Pressure Relief Control |

Optional Features

| Item | Description |
|------|-----------------------------------|
| B | CK2 Isolation Valve |
| D | Check Valves with Isolation Valve |
| F | Remote Pilot Sensing |
| H | Drain to Atmosphere |
| P | X141 Pressure Gauge |
| S | CV Speed Control (Opening) |
| V | X101 Valve Position Indicator |



Typical Applications



Pressure Relief Service

This fast opening, slow closing relief valve provides system protection against high pressure surges on pump start up and pump shut down by dissipating the excess pressure to a safe location.

Pressure Sustaining Service

When installed in a line between an upper zone and a lower area of heavy demand, the valve acts to maintain desired upstream pressure to prevent "robbing" of the upper zone. Water in excess of pressure setting is allowed to flow to an area of heavy demand, control is smooth, and pressure regulation is positive.

Model 650-01KO (Uses 100-20 Hytrol Main Valve)

Operating Temp. Range

| | | |
|---------|------------------------|----------------------------------|
| Pattern | Globe | Angle |
| Size | 3" - 36" 32 - 900 m | 4" - 6" - 8" 100, 150, 200 mm |

| |
|----------------|
| Fluids |
| -40° to 180° F |

Materials

| Component | Standard Material Combinations | | |
|--|---------------------------------|-------------------------|-------------------------|
| Body & Cover | Ductile Iron | Cast Steel | Bronze |
| Available Sizes | 3" - 36" 80 - 900 mm | 3" - 16" 80 - 400 mm | 3" - 16" 80 - 400 mm |
| Disc Retainer & Diaphragm Washer | Cast Iron | Cast Steel | Bronze |
| Trim: Disc Guide, Seat & Cover Bearing | Stainless Steel is Standard | | |
| Disc | Buna-N® Rubber | | |
| Diaphragm | Nylon Reinforced Buna-N® Rubber | | |
| Stem, Nut & Spring | Stainless Steel | | |
| For material options not listed consult factory. | | | |

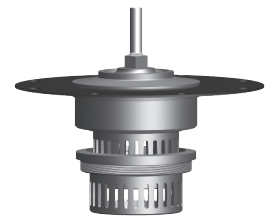
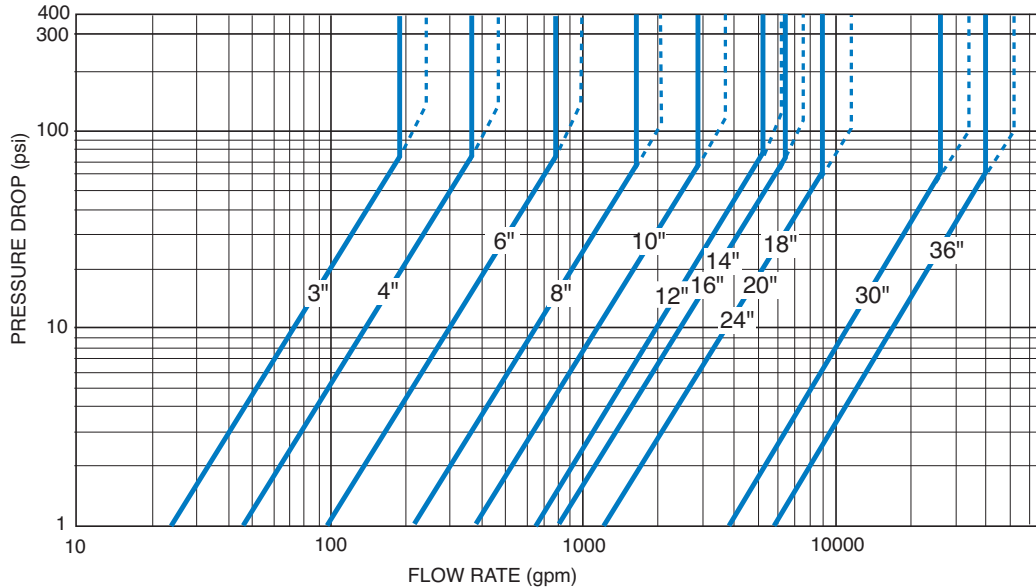
Pressure Ratings (Recommended Maximum Pressure - psi)

| Valve Body & Cover | | Pressure Class | | |
|--------------------|--------------|-----------------|-----------|-----------|
| Grade | Material | ANSI Standards* | Flanged | |
| | | | 150 Class | 300 Class |
| ASTM A536 | Ductile Iron | B16.42 | 250 | 400 |
| ASTM A216-WCB | Cast Steel | B16.5 | 285 | 400 |
| UNS 87850 | Bronze | B16.24 | 225 | 400 |

Note: * ANSI standards are for flange dimensions only. Flanged valves are available faced but not drilled.

100G-20KO ANTI-CAVITATION VALVE CURVES

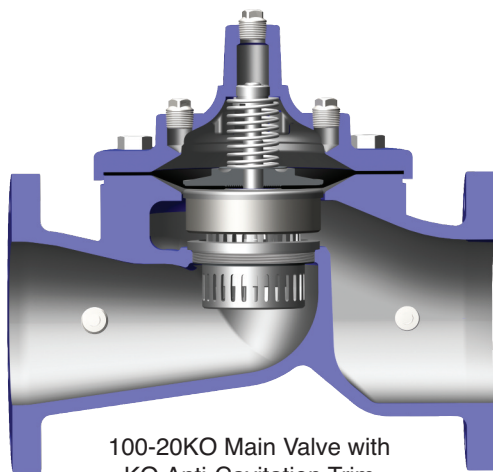
SOLID LINE IS FULL OPEN FLOW CURVES AT 18 FT/SEC FOR CONTINUOUS DUTY APPLICATIONS
DASHED LINE IS FULL OPEN FLOW CURVE AT 25 FT/SEC FOR INTERMITTENT DUTY APPLICATIONS



KO Seat Detail

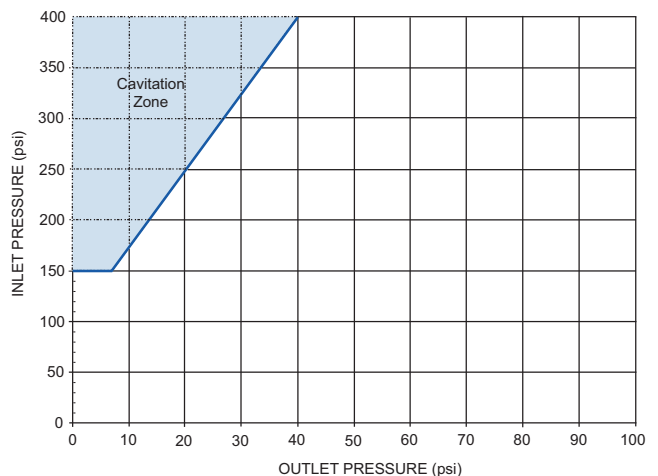
Notes: On Operating Differential

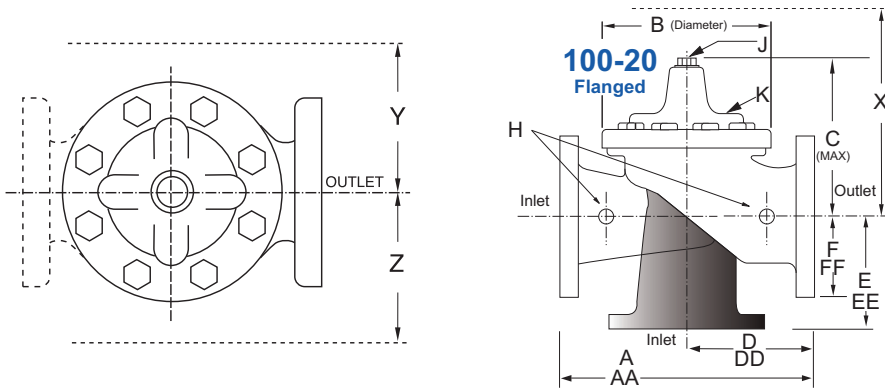
1. For atmospheric discharge, the maximum inlet pressure cannot exceed 150 psi.
2. For pressure differentials greater than 300 psi, the maximum flow velocity should not exceed 18 ft/sec.
3. Flow velocities greater than 25 ft/sec are not recommended.
4. Recommended minimum flow velocity is 1 ft/sec.
5. Consult factory for conditions exceeding these recommendations.



100-20KO Main Valve with KO Anti-Cavitation Trim

SELECTION GUIDELINE FOR KO ANTI-CAVITATION VALVES





Model 100-20 Reduced Port Hytrol Main Valve

Model 650-01KO Dimensions (In Inches)

| Valve Size (Inches) | 3 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 24 | 30 | 36 |
|---------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| A 150 ANSI | 10.25 | 13.88 | 17.75 | 21.38 | 26.00 | 30.00 | 34.25 | 35.00 | 42.12 | 48.00 | 48.00 | 63.25 | 65.00 |
| AA 300 ANSI | 11.00 | 14.50 | 18.62 | 22.38 | 27.38 | 31.50 | 35.75 | 36.62 | 43.63 | 49.62 | 49.75 | 63.75 | 67.00 |
| B Diameter | 6.62 | 9.12 | 11.50 | 15.75 | 20.00 | 23.62 | 27.47 | 28.00 | 35.44 | 35.44 | 35.44 | 53.19 | 56.00 |
| C Maximum | 7.00 | 8.62 | 11.62 | 15.00 | 17.88 | 21.00 | 20.88 | 25.75 | 25.00 | 31.50 | 31.50 | 43.94 | 54.75 |
| D 150 ANSI | — | 6.94 | 8.88 | 10.69 | CF* | 17.00 | CF* | CF* | CF* | CF* | CF* | 21.06 | — |
| DD 300 ANSI | — | 7.25 | 9.38 | 11.19 | CF* | 17.75 | CF* | CF* | CF* | CF* | CF* | — | — |
| E 150 ANSI | — | 5.50 | 6.75 | 7.25 | CF* | 13.75 | CF* | CF* | CF* | CF* | CF* | 15.94 | — |
| EE 300 ANSI | — | 5.81 | 7.25 | 7.75 | CF* | 14.75 | CF* | CF* | CF* | CF* | CF* | — | — |
| F 150 ANSI | 3.75 | 4.50 | 5.50 | 6.75 | 8.00 | 9.50 | 11.00 | 11.75 | 15.88 | 14.56 | 17.00 | 19.88 | 25.50 |
| FF 300 ANSI | 4.12 | 5.00 | 6.25 | 7.50 | 8.75 | 10.25 | 11.50 | 12.75 | 15.88 | 16.06 | 19.00 | 22.00 | 27.50 |
| H NPT Body Tapping | 0.375 | 0.50 | 0.75 | 0.75 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 2.00 |
| J NPT Cover Center Plug | 0.50 | 0.50 | 0.75 | 0.75 | 1.00 | 1.00 | 1.25 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| K NPT Cover Tapping | 0.375 | 0.50 | 0.75 | 0.75 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 2.00 |
| Stem Travel | 0.60 | 0.80 | 1.10 | 1.70 | 2.30 | 2.80 | 3.40 | 4.50 | 4.50 | 4.50 | 6.50 | 7.50 | 7.50 |
| Approx. Ship Weight (lbs) | 45 | 85 | 195 | 330 | 625 | 900 | 1250 | 1380 | 2365 | 2551 | 2733 | 6500 | 8545 |
| Approx. X Pilot System | 13 | 15 | 27 | 30 | 33 | 36 | 36 | 41 | 40 | 46 | 55 | 68 | 79 |
| Approx. Y Pilot System | 10 | 11 | 18 | 20 | 22 | 24 | 26 | 26 | 30 | 30 | 30 | 39 | 40 |
| Approx. Z Pilot System | 10 | 11 | 18 | 20 | 22 | 24 | 26 | 26 | 30 | 30 | 30 | 39 | 42 |

Model 650-01 KO Dimensions (In mm)

| Valve Size (mm) | 80 | 100 | 150 | 200 | 250 | 300 | 350 | 400 | 450 | 500 | 600 | 750 | 900 |
|---------------------------|-------|------|------|------|------|------|------|------|------|------|------|------|------|
| A 150 ANSI | 260 | 353 | 451 | 543 | 660 | 762 | 870 | 889 | 1070 | 1219 | 1219 | 1607 | 1651 |
| AA 300 ANSI | 279 | 368 | 473 | 568 | 695 | 800 | 908 | 930 | 1108 | 1260 | 1263 | 1619 | 1702 |
| B Diameter | 168 | 232 | 292 | 400 | 508 | 600 | 698 | 711 | 900 | 900 | 900 | 1351 | 1422 |
| C Maximum | 178 | 219 | 295 | 381 | 454 | 533 | 530 | 654 | 635 | 800 | 800 | 1116 | 1391 |
| D 150 ANSI | — | 176 | 226 | 272 | CF* | 432 | CF* | CF* | CF* | CF* | CF* | 535 | — |
| DD 300 ANSI | — | 184 | 238 | 284 | CF* | 451 | CF* | CF* | CF* | CF* | CF* | — | — |
| E 150 ANSI | — | 140 | 171 | 184 | CF* | 349 | CF* | CF* | CF* | CF* | CF* | 405 | — |
| EE 300 ANSI | — | 148 | 184 | 197 | CF* | 368 | CF* | CF* | CF* | CF* | CF* | — | — |
| F 150 ANSI | 95 | 114 | 140 | 171 | 203 | 241 | 279 | 289 | 403 | 370 | 432 | 505 | 648 |
| FF 300 ANSI | 105 | 127 | 159 | 191 | 222 | 260 | 292 | 324 | 403 | 408 | 483 | 559 | 699 |
| H NPT Body Tapping | 0.375 | 0.50 | 0.75 | 0.75 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 2.00 |
| J NPT Cover Center Plug | 0.50 | 0.50 | 0.75 | 0.75 | 1.00 | 1.00 | 1.25 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 | 2.00 |
| K NPT Cover Tapping | 0.375 | 0.50 | 0.75 | 0.75 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 2.00 |
| Stem Travel | 15 | 20 | 28 | 43 | 58 | 71 | 86 | 86 | 114 | 114 | 114 | 165 | 191 |
| Approx. Ship Weight (kgs) | 20 | 39 | 89 | 150 | 284 | 409 | 568 | 627 | 681 | 1157 | 1249 | 2951 | 3876 |
| Approx. X Pilot System | 331 | 381 | 686 | 762 | 839 | 915 | 915 | 1042 | 1016 | 1169 | 1397 | 1728 | 2007 |
| Approx. Y Pilot System | 254 | 280 | 458 | 508 | 559 | 610 | 661 | 661 | 762 | 762 | 762 | 991 | 1016 |
| Approx. Z Pilot System | 254 | 280 | 458 | 508 | 559 | 610 | 661 | 661 | 762 | 762 | 762 | 991 | 1067 |

| 650-01KO Valve Selection | 100-20KO Pattern: Globe (G), Angle (A), End Connections: Threaded (T), Grooved (GR), Flanged (F) Indicate Available Sizes | | | | | | | | | | | | | |
|-----------------------------------|---|-----|------|------|------|------|------|------|-------|-------|-------|-------|-------|-------|
| | Inches | 3 | 4 | 6 | 8 | 10 | 12 | 14 | 16 | 18 | 20 | 24 | 30 | 36 |
| | mm | 80 | 100 | 150 | 200 | 250 | 300 | 350 | 400 | 450 | 500 | 600 | 750 | 900 |
| Main Valve 100-20KO | Pattern | G | G, A | G, A | G, A | G | G | G | G | G | G | G | G | G |
| | End Detail | F | F | F | F | F | F | F | F | F | F | F | F | F |
| Suggested Flow (gpm) | Maximum | 190 | 410 | 710 | 1620 | 2810 | 4420 | 6280 | 7590 | 9920 | 12550 | 14900 | 22600 | 33250 |
| | Max. Surge | 260 | 580 | 990 | 2250 | 3900 | 6150 | 8720 | 10540 | 13700 | 17500 | 21700 | 31300 | 48000 |
| Suggested Flow (Liters/Sec) | Maximum | 12 | 26 | 45 | 102 | 177 | 279 | 396 | 479 | 626 | 792 | 940 | 1426 | 2098 |
| | Max. Surge | 16 | 37 | 62 | 142 | 246 | 388 | 550 | 665 | 864 | 1104 | 1369 | 1975 | 3028 |

100-20KO Series is the reduced internal port Hytrol.

*Globe Grooved Only

Pilot System Specifications



Adjustment Ranges

0 to 75 psi
 20 to 200 psi*
 100 to 300 psi
 250 to 600 psi

*Supplied unless otherwise specified.
 Other ranges available, please consult factory.

Temperature Range

Water: to 180°F/82°C

Materials

Standard Pilot System Materials

Pilot Control: Low Lead Bronze
 Trim: Stainless Steel Type 303
 Rubber: Buna-N® Synthetic Rubber
 Tubing & Fitting: Copper and Bronze

Optional Pilot System Materials

Pilot Systems are available with optional
 Aluminum, Stainless Steel or Monel materials.
 Note: Available with remote sensing control.

When Ordering, Specify

1. Catalog No. 650-01KO
2. Valve Size
3. Pattern - Globe or Angle
4. Pressure Class
5. Threaded, Flanged or Grooved
6. Trim Material
7. Adjustment Range
8. Desired Options
9. When Vertically Installed

Valve Options

X141-PT Pressure
 Transmitter



X101 Valve
 Position Indicator



X144 e-FlowMeter



X43H Strainer

Stainless
 Steel Pilot



E-650-01KO (R-02/2019)

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