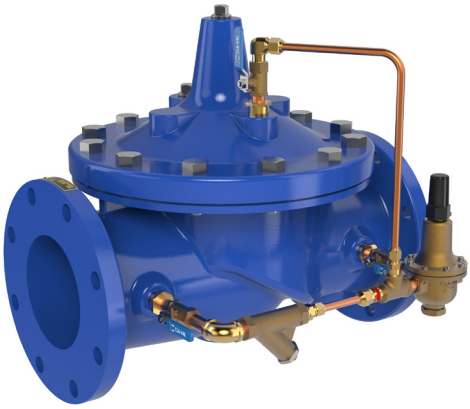
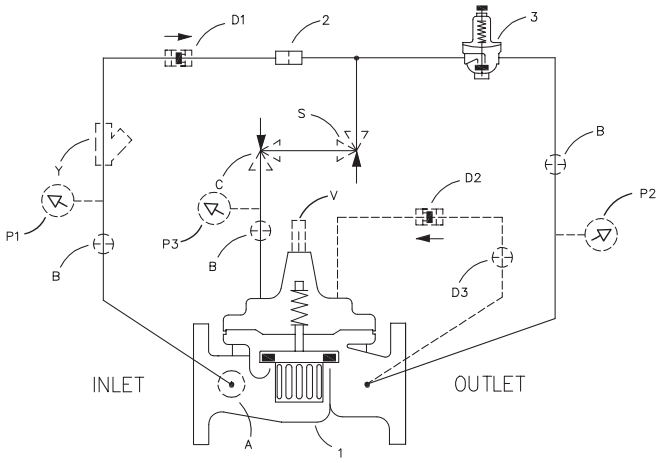
# Model 690-01KO

## ANTI-CAVITATION PRESSURE REDUCING VALVE



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




**For space savings, see Cla-Val Model 90-48 or 90-99 with integral Low Flow Bypass Pressure Regulator.**

The Cla-Val Model 690-01KO Anti-Cavitation Hytrol Pressure Reducing Valve automatically reduces a higher inlet pressure to a steady lower downstream pressure, regardless of changing flow rate and/or varying inlet pressure. This valve is an accurate, pilot-operated regulator capable of holding downstream pressure to a pre-determined limit. When downstream pressure exceeds the pressure setting of the control pilot, the main valve and pilot valve close drip-tight. If a check feature is added, and a pressure reversal occurs, the downstream pressure is admitted in the main valve cover chamber, closing the valve to prevent return flow.

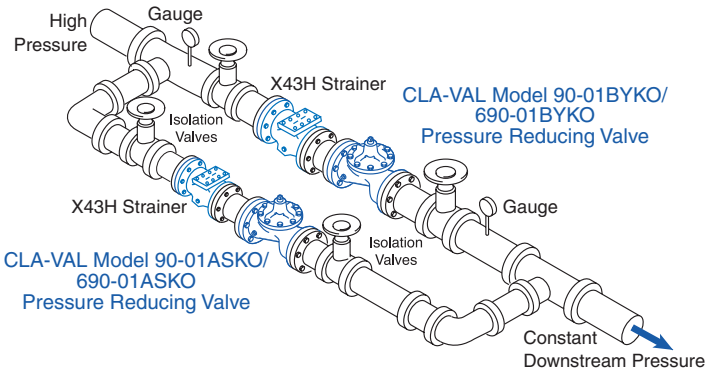
| Schematic Diagram | |
|---|---|
| **Item** | **Description** |
| 1 | 100-20KO Hytrol Main Valve |
| 2 | X58 Restriction Fitting |
| 3 | CRD Pressure Reducing Control |

| Optional Features | |
|---|---|
| **Item** | **Description** |
| A | X46A Flow Clean Strainer |
| B | CK2 Isolation Valve |
| C | CV Flow Control (Closing)* |
| D | Check Valves with Isolation Valve |
| P | X141 Pressure Gauge |
| S | CV Flow Control (Opening) |
| V | X101D Valve Position Indicator |
| Y | X43 "Y" Strainer |

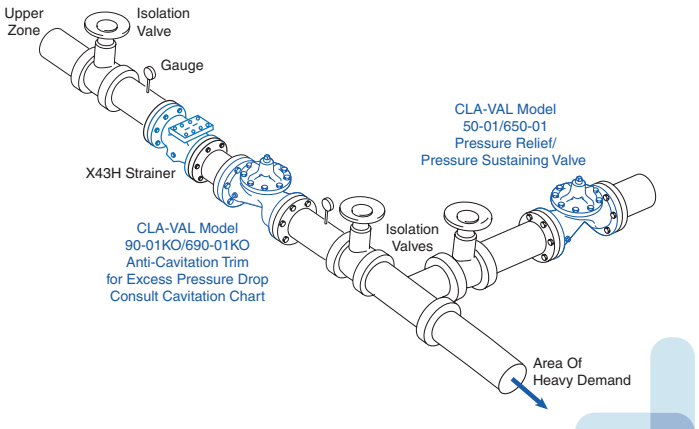
***The closing speed control (optional) on this valve should always be open at least three (3) turns off its seat.**

## Typical Applications

Typical applications include pressure reducing valve station using Model 690-01KO and Model 690-01KO in parallel to handle wide range of flow rates. Larger valve meets requirements of peak loads. The smaller valve handles low flows. A downstream pressure relief valve is recommended for this type of application.




Cla-Val Model 690-01KO provides optimum downstream pressure control while reducing noise and eliminating damage associated with cavitation. See Cavitation Guide to determine if the valve is a candidate for the KO Anti-Cavitation Trim. A downstream pressure relief valve is recommended for this type of application.



## Model 690-01KO (Uses 100-20 Hytrol Main Valve)

Recommended Maximum Pressure - psi

### Pressure Ratings

| Valve Body & Cover | | Pressure Class | | |
|---|---|---|---|---|
| | | Flanged | | |
| Grade | Material | ANSI Standards* | 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.
‡ End Details machined to ANSI B2.1 specifications.
Valves for higher pressure are available; consult factory for details

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

### Materials

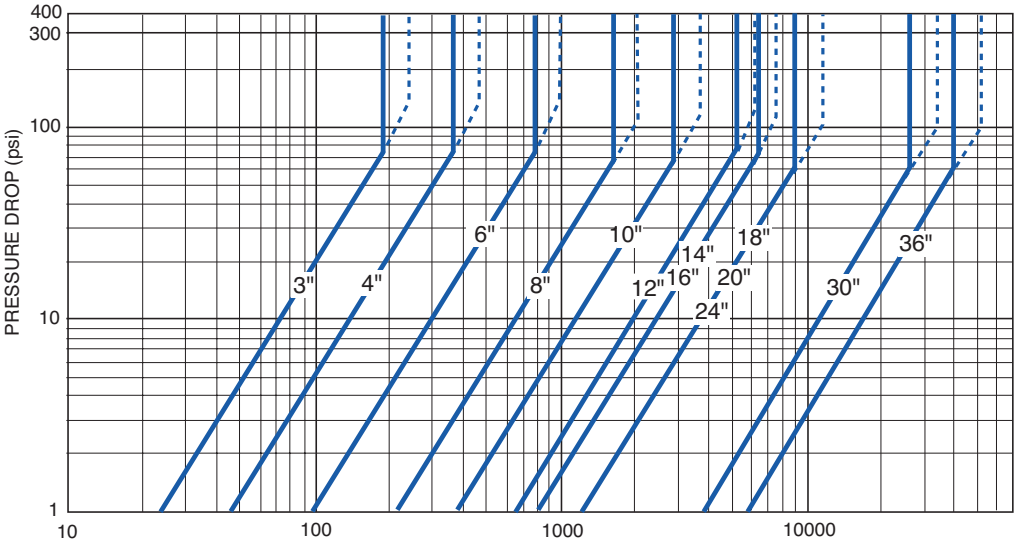
| Component | Standard Material Combinations | | |
|---|---|---|---|
| Body & Cover | Ductile Iron | Cast Steel | Bronze |
| Available Sizes | 3" - 36"<br>80 - 900 mm | 3" - 16"<br>80 - 400 mm | 3" - 16"<br>80 - 400 mm |
| Disc Retainer & Diaphragm Washer | Cast Iron | Cast Steel | Bronze |
| Trim: Disc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

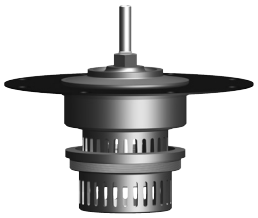
### Operating Temp. Range

**Fluids:** -40° to 180° F

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

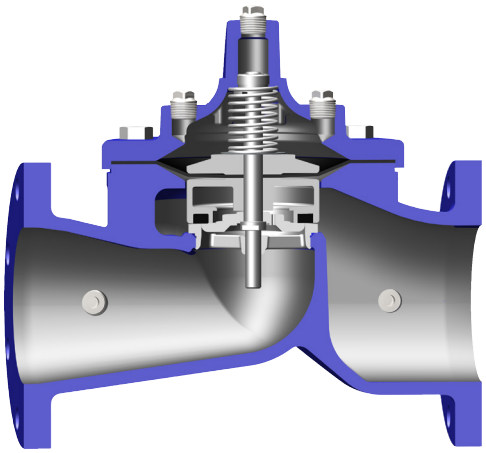


**KO Seat Detail**

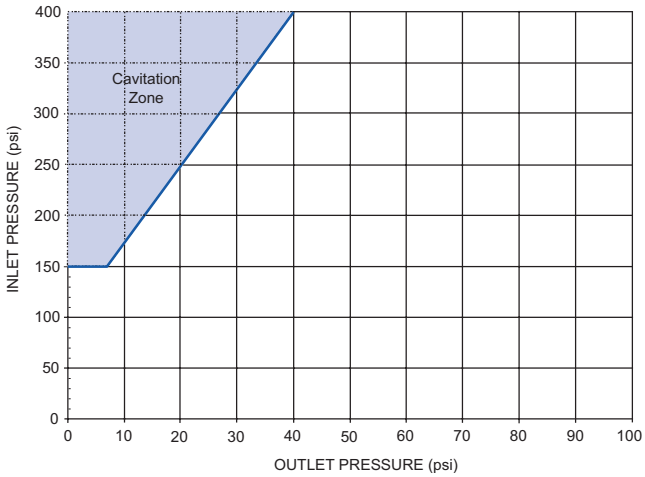
### Notes: On Operating Differential

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.



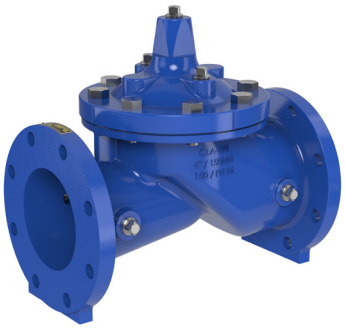
**100-20KO (Main Valve)**

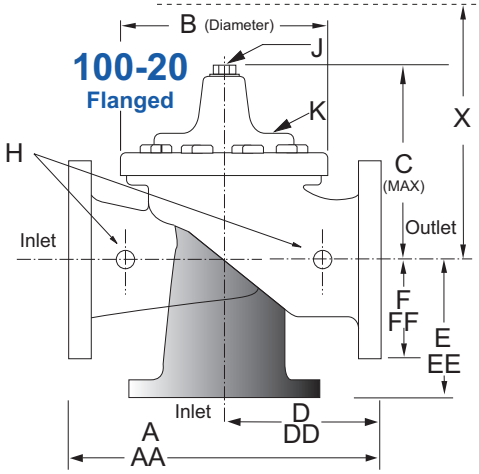
SELECTION GUIDELINE FOR KO ANTI-CAVITATION VALVES

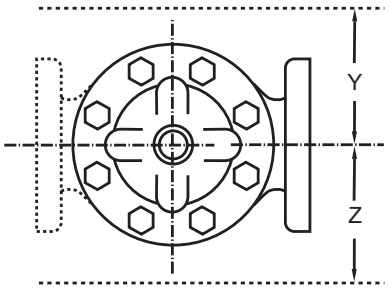


## Model 690-01KO Dimensions (Uses 100-20 Hytrol Main Valve)

### Model 100-20 Reduced Port Hytrol Main Valve






In Inches

### Model 690-01KO Dimensions

| **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 | 12.75 | 14.94 | — | — | 20.93 | 21.06 | — | — | — |
| **DD** 300 ANSI | — | 7.25 | 9.38 | 11.19 | — | — | — | — | — | — | — | — | — |
| **E** 150 ANSI | — | 5.50 | 6.75 | 7.25 | 8.06 | 8.68 | — | — | 15.81 | 15.94 | — | — | — |
| **EE** 300 ANSI | — | 5.81 | 7.25 | 7.75 | — | — | — | — | — | — | — | — | — |
| **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 | 12.00 | 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 | 1.25 | 2.00 | 2.00 | 2.00 | 1.00 | 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 |

In mm

### Model 690-01KO Dimensions

| **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 | 324 | 380 | — | — | 532 | 535 | — | — | — |
| **DD** 300 ANSI | — | 184 | 238 | 284 | — | — | — | — | — | — | — | — | — |
| **E** 150 ANSI | — | 140 | 171 | 184 | 205 | 349 | — | — | 402 | 405 | — | — | — |
| **EE** 300 ANSI | — | 148 | 184 | 197 | — | — | — | — | — | — | — | — | — |
| **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 | 305 | 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 | 1.25 | 2.00 | 2.00 | 2.00 | 1.00 | 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 |

| 690-01KO Valve Selection | 100-20KO Pattern: Globe (G), Angle (A), End Connections: 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 100-01 | 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 Continuous | 190 | 410 | 710 | 1620 | 2810 | 4420 | 6280 | 7590 | 9920 | 12550 | 14900 | 22600 | 38000 |
| | Minimum Continuous | 15 | 30 | 50 | 115 | 200 | 300 | 400 | 500 | 650 | 560 | 1073 | 1577 | 2650 |
| Suggested Flow (Liters/Sec) | Maximum Continuous | 12 | 26 | 45 | 102 | 177 | 279 | 396 | 479 | 626 | 792 | 940 | 1426 | 2098 |
| | Minimum Continuous | 1 | 2 | 3 | 7 | 13 | 19 | 25 | 32 | 41 | 35 | 68 | 99 | 167 |
| **100-20KO Series is the reduced internal port size version of the 100-01 Series** | | | | | | | | | | | | | For Lower Flows Consult Factory | |

**Many factors should be considered in sizing pressure reducing valves including inlet pressure, outlet pressure and flow rates. For sizing questions or cavitation analysis, consult Cla-Val with system details.**

## Pilot System Specifications

**Adjustment Range**
2 to 30 psi
15 to 75 psi
20 to 105 psi
30 to 300 psi*
150 to 600 psi
***Supplied unless otherwise specified**

**Temperature**
Water: to 180° F
***Consult factory for hot water applications**

**Materials**
**Standard Pilot System Materials**
Pilot Control: Low Lead Bronze
Trim: Stainless Steel Type 303
Rubber: Buna-N® Synthetic Rubber

**Optional Pilot System Materials**
Pilot Systems are available with optional Stainless Steel or Monel materials.
**Note: Available with remote sensing control**

## Valve Options

**Model X141**
Pressure Gauge

**Model X101AR**
Valve Position Indicator with Air Release

**Model X101D**
Valve Position Indicator

**Model X43H**
Strainer

**Stainless Steel Pilot**

## When Ordering, Please Specify

1. Catalog No. 690-01KO
2. Valve Size
3. Pattern - Globe or Angle
4. Pressure Class
5. Threaded or Flanged
6. Trim Material
7. Adjustment Range
8. Desired Options
9. When Vertically Installed