



—MODEL— **50-90**

# Pressure Sustaining Valve



## Schematic Diagram

| Item | Description                   |
|------|-------------------------------|
| 1    | 100-01 Hytrol Main Valve      |
| 2    | X58C Restriction Assembly     |
| 3    | CRL5A Pressure Relief Control |

## Optional Features

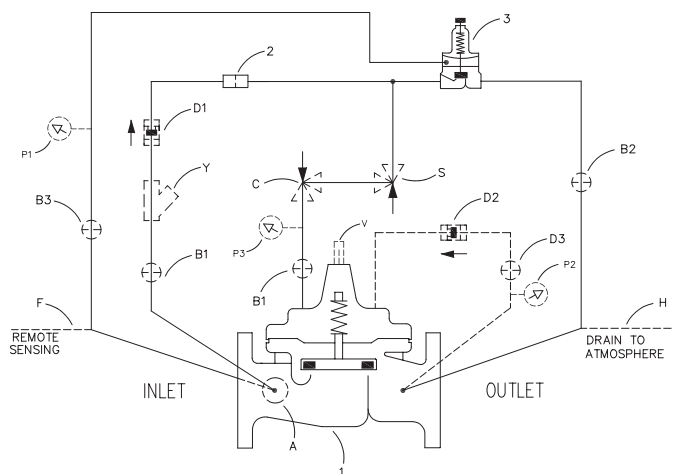
| Item | Description                       |
|------|-----------------------------------|
| A    | X46A Flow Clean Strainer          |
| B    | CK2 Isolation Valve               |
| c    | CV Speed Control (Closing)        |
| D    | Check Valves with Isolation Valve |
| F    | Remote Pilot Sensing              |
| H    | Drain to Atmosphere               |
| P    | X141 Pressure Gauge               |
| S    | CV Speed Control (Opening)        |
| V    | X101 Valve Position Indicator     |
| Y    | X43 "Y" Strainer                  |

- **Accurate Pressure Control**
- **Optional Check Feature**
- **Fast Opening to Maintain Line Pressure**
- **Slow Closing to Prevents Surges**
- **Completely Automatic Operation**

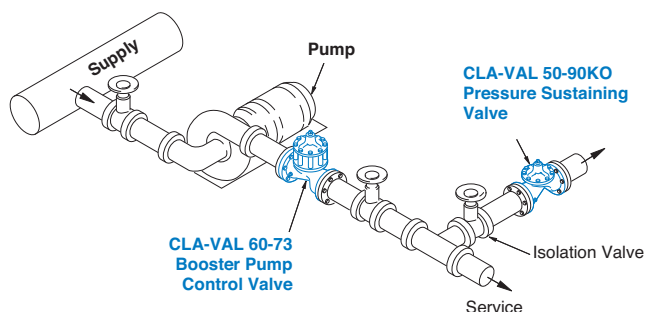
The Cla-Val Model 50-90 Pressure Sustaining Valve is a hydraulically operated, pilot-controlled, modulating valve designed to maintain constant upstream pressure within close limits. This valve can be used for pressure relief, pressure sustaining, back pressure, or unloading functions in a by-pass system.

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.

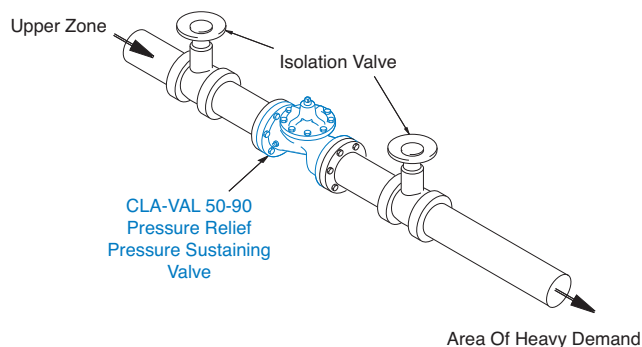


## Typical Applications



## Pressure Service

This typical application controls the maximum system pressure when VFD pumps are at minimum speed.



## 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 50-90 (Uses 100-01 Hytrol Main Valve)

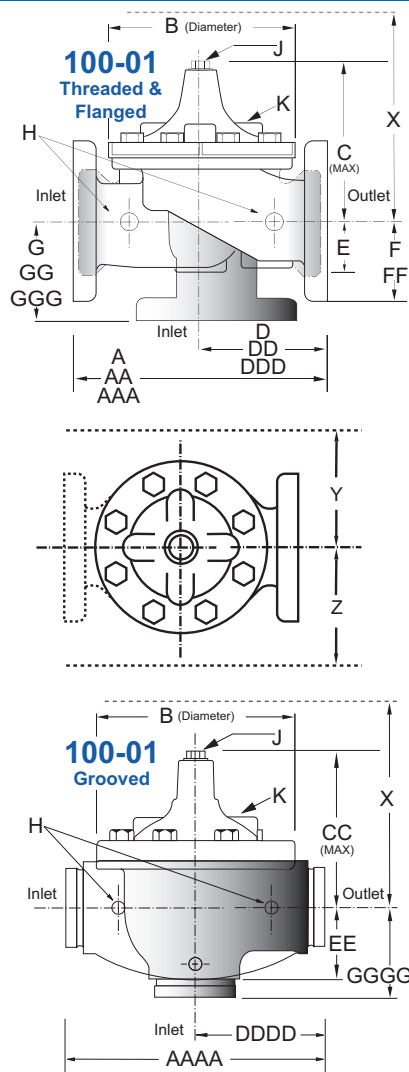
### Pressure Ratings (Recommended Maximum Pressure - psi)

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

### Materials

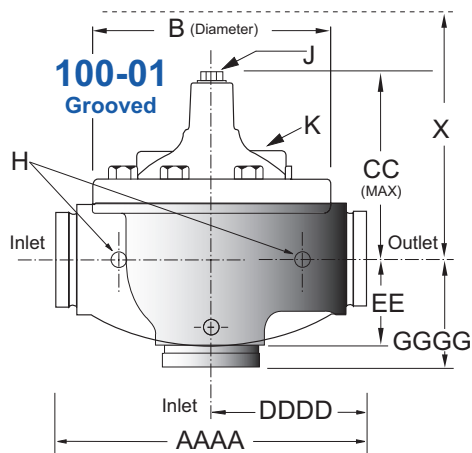
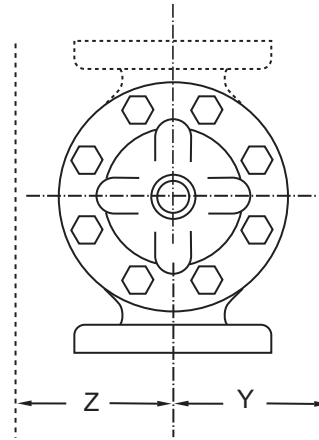
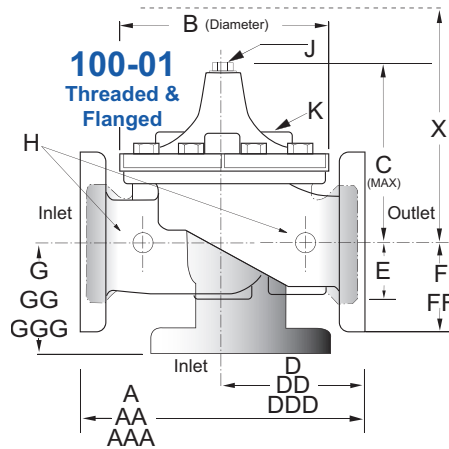
| Component                                                                                                          | Standard Material Combinations                    |            |          |
|--------------------------------------------------------------------------------------------------------------------|---------------------------------------------------|------------|----------|
| Body & Cover                                                                                                       | Ductile Iron                                      | Cast Steel | Bronze   |
| Available Sizes                                                                                                    | 1" - 36"                                          | 1" - 16"   | 1" - 16" |
| Disc Retainer & Diaphragm Washer                                                                                   | Cast Iron                                         | Cast Steel | Bronze   |
| Trim: Disc Guide, Seat & Cover Bearing                                                                             | Bronze is Standard<br>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.<br>Cla-Val manufactures valves in more than 50 different alloys. |                                                   |            |          |



### Model 50-90 Dimensions (In Inches)

| Valve Size (Inches)       | 1     | 1 1/4 | 1 1/2 | 2     | 2 1/2 | 3     | 4     | 6     | 8     | 10    | 12    | 14    | 16    | 18    | 20    | 24    | 30    | 36    |
|---------------------------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| A Threaded                | 7.25  | 7.25  | 7.25  | 9.38  | 11.00 | 12.50 | —     | —     | —     | —     | —     | —     | —     | —     | —     | —     | —     | —     |
| AA 150 ANSI               | —     | —     | 8.50  | 9.38  | 11.00 | 12.00 | 15.00 | 20.00 | 25.38 | 29.75 | 34.00 | 39.00 | 41.38 | 46.00 | 52.00 | 61.50 | 63.00 | 72.75 |
| AAA 300 ANSI              | —     | —     | 9.00  | 10.00 | 11.62 | 13.25 | 15.62 | 21.00 | 26.38 | 31.12 | 35.50 | 40.50 | 43.50 | 47.64 | 53.62 | 63.24 | 64.50 | 74.75 |
| AAAA Grooved End          | —     | —     | 8.50  | 9.00  | 11.00 | 12.50 | 15.00 | 20.00 | 25.38 | —     | —     | —     | —     | —     | —     | —     | —     | —     |
| B Diameter                | 5.62  | 5.62  | 5.62  | 6.62  | 8.00  | 9.12  | 11.50 | 15.75 | 20.00 | 23.62 | 28.00 | 32.75 | 35.50 | 41.50 | 45.00 | 53.16 | 56.00 | 66.00 |
| C Maximum                 | 5.50  | 5.50  | 5.50  | 6.50  | 7.56  | 8.19  | 10.62 | 13.38 | 16.00 | 17.12 | 20.88 | 24.19 | 25.00 | 39.06 | 41.90 | 43.93 | 54.60 | 59.00 |
| CC Maximum Grooved End    | —     | —     | 4.75  | 5.75  | 6.88  | 7.25  | 9.31  | 12.12 | 14.62 | —     | —     | —     | —     | —     | —     | —     | —     | —     |
| D Threaded                | 3.25  | 3.25  | 3.25  | 4.75  | 5.50  | 6.25  | —     | —     | —     | —     | —     | —     | —     | —     | —     | —     | —     | —     |
| DD 150 ANSI               | —     | —     | 4.00  | 4.75  | 5.50  | 6.00  | 7.50  | 10.00 | 12.69 | 14.88 | 17.00 | 19.50 | 20.81 | —     | —     | 30.75 | —     | —     |
| DDD 300 ANSI              | —     | —     | 4.25  | 5.00  | 5.88  | 6.38  | 7.88  | 10.50 | 13.25 | 15.56 | 17.75 | 20.25 | 21.62 | —     | —     | 31.62 | —     | —     |
| DDDD Grooved End          | —     | —     | —     | 4.75  | —     | 6.00  | 7.50  | —     | —     | —     | —     | —     | —     | —     | —     | —     | —     | —     |
| E                         | 1.12  | 1.12  | 1.12  | 1.50  | 1.69  | 2.06  | 3.19  | 4.31  | 5.31  | 9.25  | 10.75 | 12.62 | 15.50 | 12.95 | 15.00 | 17.75 | 21.31 | 24.56 |
| EE Grooved End            | —     | —     | 2.00  | 2.50  | 2.88  | 3.12  | 4.25  | 6.00  | 7.56  | —     | —     | —     | —     | —     | —     | —     | —     | —     |
| F 150 ANSI                | —     | —     | 2.50  | 3.00  | 3.50  | 3.75  | 4.50  | 5.50  | 6.75  | 8.00  | 9.50  | 10.50 | 11.75 | 15.00 | 16.50 | 19.25 | 22.50 | 28.50 |
| FF 300 ANSI               | —     | —     | 3.06  | 3.25  | 3.75  | 4.13  | 5.00  | 6.25  | 7.50  | 8.75  | 10.25 | 11.50 | 12.75 | 15.00 | 16.50 | 19.25 | 24.00 | 30.00 |
| G Threaded                | 1.88  | 1.88  | 1.88  | 3.25  | 4.00  | 4.50  | —     | —     | —     | —     | —     | —     | —     | —     | —     | —     | —     | —     |
| GG 150 ANSI               | —     | —     | 4.00  | 3.25  | 4.00  | 4.00  | 5.00  | 6.00  | 8.00  | 8.62  | 13.75 | 14.88 | 15.69 | —     | —     | 22.06 | —     | —     |
| GGG 300 ANSI              | —     | —     | 4.25  | 3.50  | 4.31  | 4.38  | 5.31  | 6.50  | 8.50  | 9.31  | 14.50 | 15.62 | 16.50 | —     | —     | 22.90 | —     | —     |
| GGGG Grooved End          | —     | —     | —     | 3.25  | —     | 4.25  | 5.00  | —     | —     | —     | —     | —     | —     | —     | —     | —     | —     | —     |
| H NPT Body Tapping        | 0.375 | 0.375 | 0.375 | 0.375 | 0.50  | 0.50  | 0.75  | 0.75  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 2.00  | 2.00  |
| J NPT Cover Center Plug   | 0.25  | 0.25  | 0.25  | 0.50  | 0.50  | 0.50  | 0.75  | 0.75  | 1.00  | 1.00  | 1.25  | 1.50  | 2.00  | 1.00  | 1.00  | 1.00  | 2.00  | 2.00  |
| K NPT Cover Tapping       | 0.375 | 0.375 | 0.375 | 0.375 | 0.50  | 0.50  | 0.75  | 0.75  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 1.00  | 2.00  | 2.00  |
| Stem Travel               | 0.40  | 0.40  | 0.40  | 0.60  | 0.70  | 0.80  | 1.10  | 1.70  | 2.30  | 2.80  | 3.40  | 4.00  | 4.50  | 5.10  | 5.63  | 6.75  | 7.50  | 8.50  |
| Approx. Ship Weight (lbs) | 15    | 15    | 15    | 35    | 50    | 70    | 140   | 285   | 500   | 780   | 1165  | 1600  | 2265  | 2982  | 3900  | 6200  | 7703  | 11720 |
| Approx. X Pilot System    | 11    | 11    | 11    | 13    | 14    | 15    | 17    | 29    | 31    | 33    | 36    | 40    | 40    | 43    | 47    | 68    | 79    | 85    |
| Approx. Y Pilot System    | 9     | 9     | 9     | 9     | 10    | 11    | 12    | 20    | 22    | 24    | 26    | 29    | 30    | 32    | 34    | 39    | 40    | 45    |
| Approx. Z Pilot System    | 9     | 9     | 9     | 9     | 10    | 11    | 12    | 20    | 22    | 24    | 26    | 29    | 30    | 32    | 34    | 39    | 42    | 47    |

## Model 50-90 Metric Dimensions (Uses 100-01 Hytrol Main Valve)



## Model 50-90 Dimensions (in mm)

| Valve Size (mm)           | 25    | 32    | 40    | 50    | 65   | 80   | 100  | 150  | 200  | 250  | 300  | 350  | 400  | 450  | 500  | 600  | 750  | 900  |
|---------------------------|-------|-------|-------|-------|------|------|------|------|------|------|------|------|------|------|------|------|------|------|
| A Threaded                | 184   | 184   | 184   | 238   | 279  | 318  | —    | —    | —    | —    | —    | —    | —    | —    | —    | —    | —    | —    |
| AA 150 ANSI               | —     | —     | 216   | 238   | 279  | 305  | 381  | 508  | 645  | 756  | 864  | 991  | 1051 | 1168 | 1321 | 1562 | 1600 | 1848 |
| AAA 300 ANSI              | —     | —     | 229   | 254   | 295  | 337  | 397  | 533  | 670  | 790  | 902  | 1029 | 1105 | 1210 | 1326 | 1606 | 1638 | 1899 |
| AAAA Grooved End          | —     | —     | 216   | 228   | 279  | 318  | 381  | 508  | 645  | —    | —    | —    | —    | —    | —    | —    | —    | —    |
| B Diameter                | 143   | 143   | 143   | 168   | 203  | 232  | 292  | 400  | 508  | 600  | 711  | 832  | 902  | 1054 | 1143 | 1350 | 1422 | 1676 |
| C Maximum                 | 140   | 140   | 140   | 165   | 192  | 208  | 270  | 340  | 406  | 435  | 530  | 614  | 635  | 992  | 1064 | 1116 | 1387 | 1499 |
| CC Maximum Grooved End    | —     | —     | 120   | 146   | 175  | 184  | 236  | 308  | 371  | —    | —    | —    | —    | —    | —    | —    | —    | —    |
| D Threaded                | 83    | 83    | 83    | 121   | 140  | 159  | —    | —    | —    | —    | —    | —    | —    | —    | —    | —    | —    | —    |
| DD 150 ANSI               | —     | —     | 102   | 121   | 140  | 152  | 191  | 254  | 322  | 378  | 432  | 495  | 528  | —    | —    | 781  | —    | —    |
| DDD 300 ANSI              | —     | —     | 108   | 127   | 149  | 162  | 200  | 267  | 337  | 395  | 451  | 514  | 549  | —    | —    | 803  | —    | —    |
| DDDD Grooved End          | —     | —     | —     | 121   | —    | 152  | 191  | —    | —    | —    | —    | —    | —    | —    | —    | —    | —    | —    |
| E                         | 29    | 29    | 29    | 38    | 43   | 52   | 81   | 110  | 135  | 235  | 273  | 321  | 394  | 329  | 381  | 451  | 541  | 624  |
| EE Grooved End            | —     | —     | 52    | 64    | 73   | 79   | 108  | 152  | 192  | —    | —    | —    | —    | —    | —    | —    | —    | —    |
| F 150 ANSI                | —     | —     | 64    | 76    | 89   | 95   | 114  | 140  | 171  | 203  | 241  | 267  | 298  | 381  | 419  | 489  | 572  | 724  |
| FF 300 ANSI               | —     | —     | 78    | 83    | 95   | 105  | 127  | 159  | 191  | 222  | 260  | 292  | 324  | 381  | 419  | 489  | 610  | 762  |
| G Threaded                | 48    | 48    | 48    | 83    | 102  | 114  | —    | —    | —    | —    | —    | —    | —    | —    | —    | —    | —    | —    |
| GG 150 ANSI               | —     | —     | 102   | 83    | 102  | 102  | 127  | 152  | 203  | 219  | 349  | 378  | 399  | —    | —    | 560  | —    | —    |
| GGG 300 ANSI              | —     | —     | 102   | 89    | 110  | 111  | 135  | 165  | 216  | 236  | 368  | 397  | 419  | —    | —    | 582  | —    | —    |
| GGGG Grooved End          | —     | —     | —     | 83    | —    | 108  | 127  | —    | —    | —    | —    | —    | —    | —    | —    | —    | —    | —    |
| H NPT Body Tapping        | 0.375 | 0.375 | 0.375 | 0.375 | 0.50 | 0.50 | 0.75 | 0.75 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 2.00 | 2.00 |
| J NPT Cover Center Plug   | 0.25  | 0.25  | 0.25  | 0.50  | 0.50 | 0.50 | 0.75 | 0.75 | 1.00 | 1.00 | 1.25 | 1.50 | 2.00 | 1.00 | 1.00 | 1.00 | 2.00 | 2.00 |
| K NPT Cover Tapping       | 0.375 | 0.375 | 0.375 | 0.375 | 0.50 | 0.50 | 0.75 | 0.75 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 2.00 | 2.00 |
| Stem Travel               | 10    | 10    | 10    | 15    | 18   | 20   | 28   | 43   | 58   | 71   | 86   | 102  | 114  | 130  | 143  | 171  | 190  | 216  |
| Approx. Ship Weight (kgs) | 7     | 7     | 7     | 16    | 23   | 32   | 64   | 129  | 227  | 354  | 528  | 726  | 1027 | 1353 | 1769 | 2812 | 3494 | 5316 |
| Approx. X Pilot System    | 280   | 280   | 280   | 331   | 356  | 381  | 432  | 737  | 788  | 839  | 915  | 1016 | 1016 | 1093 | 1194 | 1728 | 2007 | 2159 |
| Approx. Y Pilot System    | 229   | 229   | 229   | 229   | 254  | 280  | 305  | 508  | 559  | 610  | 661  | 737  | 762  | 813  | 864  | 991  | 1016 | 1143 |
| Approx. Z Pilot System    | 229   | 229   | 229   | 229   | 254  | 280  | 305  | 508  | 559  | 610  | 661  | 737  | 762  | 813  | 864  | 991  | 1067 | 1194 |

| 50-90<br>Valve<br>Selection       | 100-01 Pattern: Globe (G), Angle (A), End Connections: Threaded (T), Grooved (GR), Flanged (F) Indicate Available Sizes |      |      |              |             |              |             |          |           |           |       |       |       |       |       |       |       |       |       |
|-----------------------------------|-------------------------------------------------------------------------------------------------------------------------|------|------|--------------|-------------|--------------|-------------|----------|-----------|-----------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
|                                   | Inches                                                                                                                  | 1    | 1¼   | 1½           | 2           | 2½           | 3           | 4        | 6         | 8         | 10    | 12    | 14    | 16    | 18    | 20    | 24    | 30    | 36    |
|                                   | mm                                                                                                                      | 25   | 32   | 40           | 50          | 65           | 80          | 100      | 150       | 200       | 250   | 300   | 350   | 400   | 450   | 500   | 600   | 750   | 900   |
| Basic Valve<br>100-01             | Pattern                                                                                                                 | G, A | G, A | G, A         | G, A        | G, A         | G, A        | G, A     | G, A      | G, A      | G, A  | G, A  | G, A  | G, A  | G     | G     | G, A  | G     | G     |
|                                   | End Detail                                                                                                              | T    | T    | T, F,<br>Gr* | T, F,<br>Gr | T, F,<br>Gr* | T, F,<br>Gr | F,<br>Gr | F,<br>Gr* | F,<br>Gr* | F     | F     | F     | F     | F     | F     | F     | F     | F     |
| Suggested<br>Flow<br>(gpm)        | Maximum                                                                                                                 | 55   | 93   | 125          | 210         | 300          | 460         | 800      | 1800      | 3100      | 4900  | 7000  | 8400  | 11000 | 14000 | 17000 | 25000 | 42000 | 50000 |
|                                   | Maximum<br>Surge                                                                                                        | 120  | 210  | 280          | 470         | 670          | 1000        | 1800     | 4000      | 7000      | 11000 | 16000 | 19000 | 25000 | 31000 | 39000 | 56500 | 63000 | 85000 |
| Suggested<br>Flow<br>(Liters/Sec) | Maximum                                                                                                                 | 3.5  | 6    | 8            | 13          | 19           | 29          | 50       | 113       | 195       | 309   | 442   | 530   | 694   | 883   | 1073  | 1577  | 2650  | 3150  |
|                                   | Maximum<br>Surge                                                                                                        | 7.6  | 13   | 18           | 30          | 42           | 63          | 113      | 252       | 441       | 693   | 1008  | 1197  | 1577  | 1956  | 2461  | 3560  | 3975  | 5360  |

100-01 Series is the full internal port Hytrol.

\*Globe Grooved Only

## Pilot System Specifications

### Adjustment Ranges

0 to 75 psi Max.  
20 to 105 psi  
20 to 200 psi \*  
100 to 300 psi

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

### Temperature Range

Water: to 180°F



## 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 Aluminum, Stainless Steel or Monel materials.

## Main Valve Options

### EPDM Rubber Parts

Optional diaphragm, disc and o-ring fabricated with EPDM synthetic rubber

### Viton® Rubber Parts - suffix KB

Optional diaphragm, disc and o-ring fabricated with Viton® synthetic rubber

### Epoxy Coating - suffix KC

NSF/ANSI 61 Fusion Bonded Epoxy

### Dura-Kleen® Stem - suffix KD

Fluted design prevents dissolved minerals build-up on the stem

### LFS Trim

Designed to regulate precisely and smoothly at typical flow rates as well as lower than the industry standard of 1 fps, without decreasing the valve's capacity

## When Ordering, Specify:

1. Catalog No. 50-90
2. Valve Size
3. Pattern - Globe or Angle
4. Pressure Class
5. Threaded, Flanged, Grooved
6. Trim Material
7. Adjustment Range
8. Desired Options
9. When Vertically Installed

## Valve Options

X141 Pressure Gauge



X101AR Valve Position Indicator with Air Release



X101 Valve Position Indicator



X144 e-FlowMeter



X43H Strainer



Stainless Steel Pilot



E-50-90 (R-06/2021)

## CLA-VAL

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