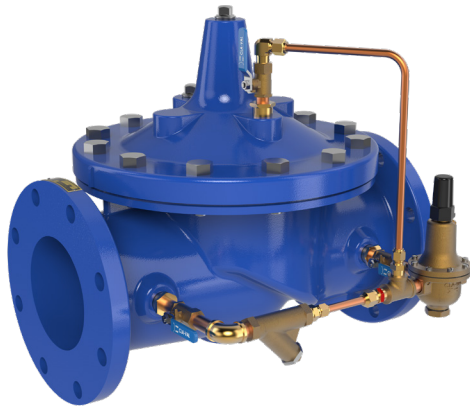




# Model 90-05

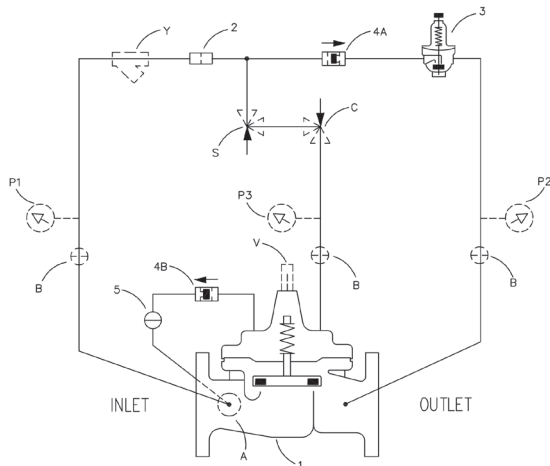
## PRESSURE REDUCING VALVE WITH RETURN FLOW FEATURE



- Sensitive and Accurate Pressure Control
- Easy Adjustment and Maintenance
- Optional Check Feature
- Fully Supported Frictionless Diaphragm
- Meets National Lead Reduction Mandate

The Cla-Val Model 90-05 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.

A CDC/CSC check valve is included to permit return flow when outlet pressure is greater than inlet pressure.

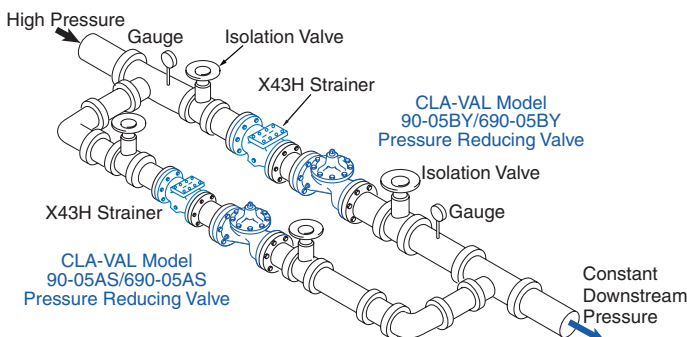


| Schematic Diagram |                               |
|-------------------|-------------------------------|
| Item              | Description                   |
| 1                 | 100-01 Hytrol Main Valve      |
| 2                 | X58 Restriction Fitting       |
| 3                 | CRD Pressure Reducing Control |
| 4                 | CDC/CSC Check Valve           |
| 5                 | CK2 Isolation Valve           |

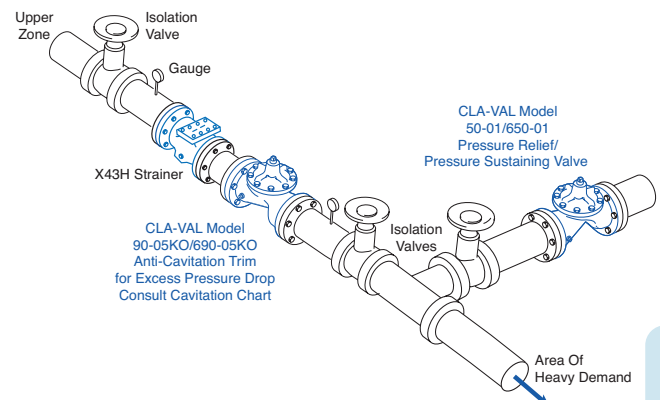
| Optional Features |                                |
|-------------------|--------------------------------|
| Item              | Description                    |
| A                 | X46A Flow Clean Strainer       |
| B                 | CK2 Isolation Valve            |
| C                 | CV Flow Control (Closing)*     |
| KO                | KO Anti-Cavitation Trim        |
| P                 | X141 Pressure Gauge            |
| S                 | CV Flow Control (Opening)      |
| V                 | X101D Valve Position Indicator |
| Y                 | X43 "Y" Strainer               |
| H                 | X43H Strainer                  |

### Typical Applications

Typical applications include pressure reducing valve station using Model 90-05BY and Model 90-05AS in parallel to handle wide range of flow rates. Larger Model 90-05BY valve meets requirements of peak loads and smaller Model 90-05AS handles low flows. A downstream pressure relief valve is also recommended for this type of application.



Cla-Val Model 90-05KO Pressure Reducing Valve with Anti-Cavitation Trim provides for 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 90-05 (Uses 100-01 Hytrol Main Valve)

Recommended Maximum Pressure - psi

### Pressure Ratings

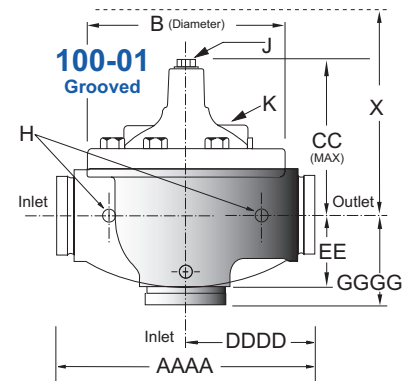
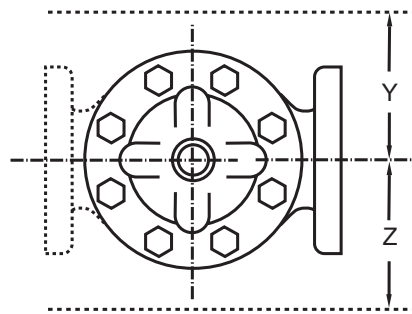
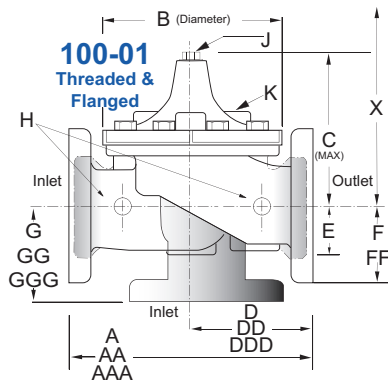
| Valve Body & Cover |              | Pressure Class  |           |           |           |              |
|--------------------|--------------|-----------------|-----------|-----------|-----------|--------------|
|                    |              | Flanged         |           |           | Grooved   | Threaded     |
| Grade              | Material     | ANSI Standards* | 150 Class | 300 Class | 300 Class | End† Details |
| ASTM M536          | 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"<br>25 - 900 mm                           | 1" - 16"<br>25 - 400 mm | 1" - 16"<br>25 - 400 mm |
| 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. Cla-Val manufactures valves in more than 50 different alloys.



In Inches

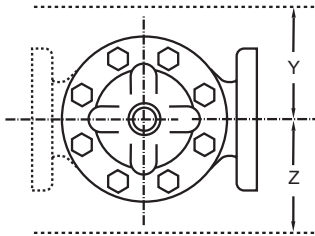
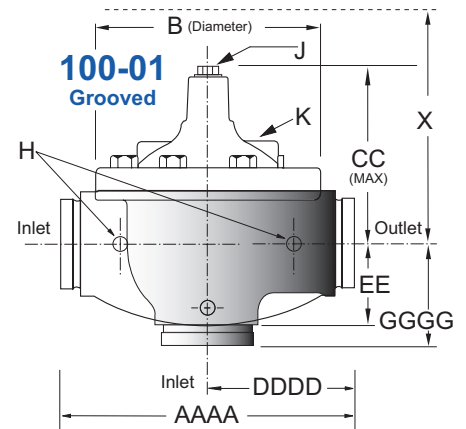
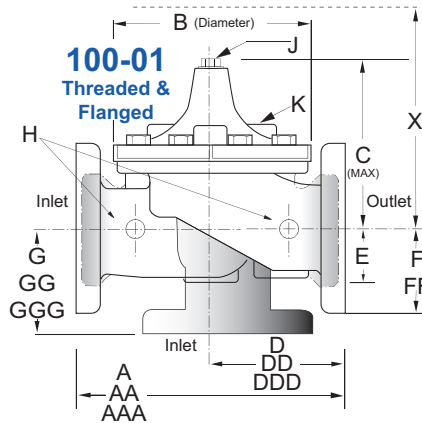
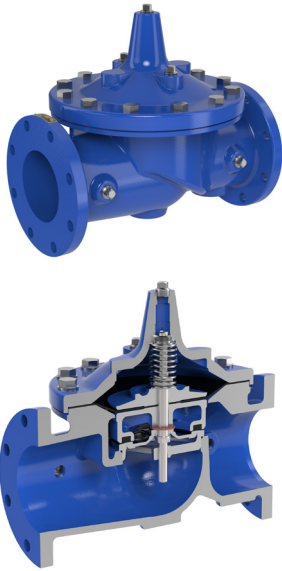
### Model 90-05 Dimensions

| 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    |

For sizes 18 through 36-inches, use 90-66 E-Sheet

## Model 90-05 Metric Dimensions (Uses 100-01 Hytrol Main Valve)

### Model 100-01 Full Port Hytrol Main Valve



| Other 90 Series Products |                                                                     |
|--------------------------|---------------------------------------------------------------------|
| Model                    | Description                                                         |
| 90-01KO                  | Model 90-01 supplied with with KO Anti-Cavitation Trim              |
| 90-01H                   | Model 90-01 supplied with X43H Strainer                             |
| 90-01KOH                 | Model 90-01 supplied with KO Trim & X43H Strainer                   |
| 690-01                   | Reduced Port Pressure Reducing Valve                                |
| 690-01KO                 | Reduced Port Pressure Reducing Valve with KO Trim                   |
| 690-01H                  | Reduced Port Pressure Reducing Valve with X43H Strainer             |
| 690-01KOH                | Reduced Port Pressure Reducing Valve with KO Trim and X43H Strainer |

In mm

### Model 90-05 Dimensions

| 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 |

| 90-05<br>Valve Selection                                                                                                                                                                                                                                                                                                                                                    | 100-01 Pattern: Globe (G), Angle (A), End Connections: Threaded (T), Grooved (GR), Flanged (F) Indicate Available Sizes |      |       |           |          |           |          |       |        |                                 |      |      |       |       |                     |       |       |       |       |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------|------|-------|-----------|----------|-----------|----------|-------|--------|---------------------------------|------|------|-------|-------|---------------------|-------|-------|-------|-------|
|                                                                                                                                                                                                                                                                                                                                                                             | 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    |
|                                                                                                                                                                                                                                                                                                                                                                             | mm                                                                                                                      | 25   | 32    | 40        | 50       | 65        | 80       | 100   | 150    | 200                             | 250  | 300  | 350   | 400   | 450                 | 500   | 600   | 750   | 900   |
| Main Valve 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, Gr* | T, F, Gr | T, F, Gr* | T, F, Gr | F, Gr | F, Gr* | F, Gr*                          | F    | F    | F     | F     | F                   | F     | F     | F     | F     |
| Suggested Flow (gpm)                                                                                                                                                                                                                                                                                                                                                        | Maximum                                                                                                                 | 55   | 93    | 125       | 210      | 300       | 460      | 800   | 1800   | 3100                            | 4900 | 7000 | 8400  | 11000 | 14000               | 17000 | 25000 | 42000 | 50000 |
|                                                                                                                                                                                                                                                                                                                                                                             | Maximum Intermittent                                                                                                    | 68   | 120   | 160       | 260      | 370       | 580      | 990   | 2250   | 3900                            | 6150 | 8720 | 10540 | 13700 | 17500               | 21700 | 31300 | 48000 | 62500 |
|                                                                                                                                                                                                                                                                                                                                                                             | Minimum                                                                                                                 | 1    | 1     | 1         | 1        | 2         | 2        | 4     | 10     | 15                              | 35   | 50   | 70    | 95    | 120                 | 150   | 275   | 450   | 650   |
| Suggested Flow (Liters/Sec)                                                                                                                                                                                                                                                                                                                                                 | Maximum                                                                                                                 | 3.5  | 6     | 8         | 13       | 19        | 29       | 50    | 113    | 195                             | 309  | 442  | 530   | 694   | 883                 | 1073  | 1577  | 2650  | 3150  |
|                                                                                                                                                                                                                                                                                                                                                                             | Maximum Intermittent                                                                                                    | 4.3  | 7.6   | 10        | 16       | 23        | 37       | 62    | 142    | 246                             | 387  | 549  | 664   | 863   | 1104                | 1369  | 1972  | 3028  | 3940  |
|                                                                                                                                                                                                                                                                                                                                                                             | Minimum                                                                                                                 | .03  | .03   | .03       | .06      | .09       | .13      | .25   | .63    | .95                             | 2.2  | 3.2  | 4.4   | 6.0   | 7.6                 | 9.5   | 17.4  | 28.4  | 41.0  |
| <b>Note:</b> <ul style="list-style-type: none"> <li>For sizes 18 through 36-inches / 450 mm through 900 mm, use 90-66 E-Sheet</li> <li>Many factors should be considered in sizing pressure reducing valves including inlet pressure, outlet pressure and flow rates.</li> <li>For sizing questions or cavitation analysis, consult Cla-Val with system details.</li> </ul> |                                                                                                                         |      |       |           |          |           |          |       |        |                                 |      |      |       |       |                     |       |       |       |       |
| 100-01 Series is the full internal port Hytrol.                                                                                                                                                                                                                                                                                                                             |                                                                                                                         |      |       |           |          |           |          |       |        | For Lower Flows Consult Factory |      |      |       |       | *Globe Grooved Only |       |       |       |       |

## 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 (CRD-18)

\*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

- Catalog No. 90-05
- Valve Size
- Pattern - Globe or Angle
- Pressure Class
- Threaded, Flanged or Grooved
- Trim Material
- Adjustment Range
- Desired Options
- When Vertically Installed

## 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