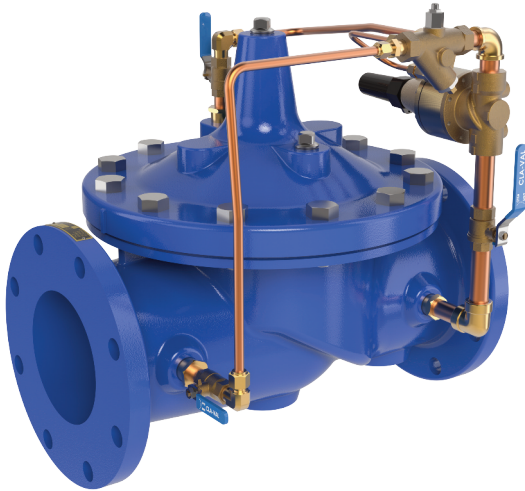




# MODEL 250-01

## Differential Pressure Relief Valve



- **Accurate Differential Pressure Control**
- **Controls Maximum Flow Through Pumps**
- **Circulating Loop Flow Control**
- **Completely Automatic Operation**

The Cla-Val Model 250-01 Differential Pressure Relief Valve is a hydraulically operated, pilot-controlled, modulating valve. It is designed to maintain a constant pressure differential between any two pressure points in a system where the closing of the valve directly causes the differential pressure to increase. The valve tends to open on an increase in differential pressure and close on a decrease in differential pressure.

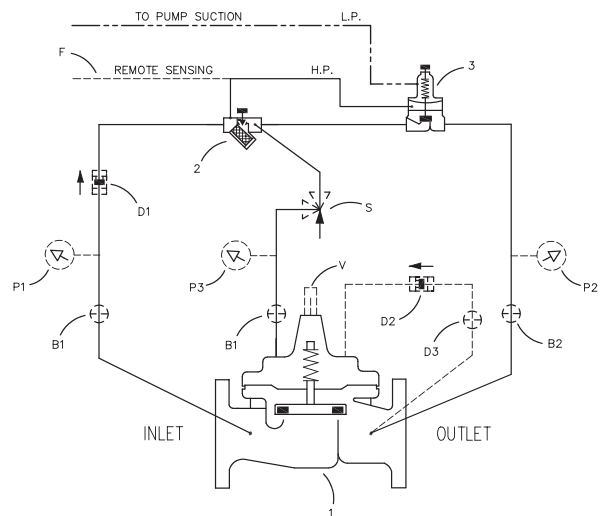
In operation, the valve is actuated by line pressure through a pilot control system sensing from two points across which a differential is to be maintained. Operation is completely automatic and pressure settings may be easily changed.

### Schematic Diagram

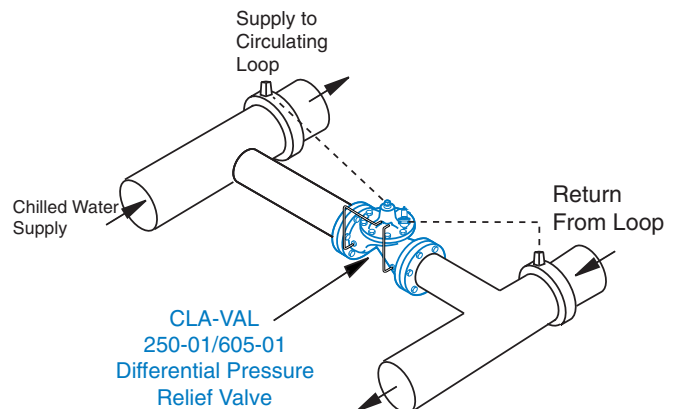
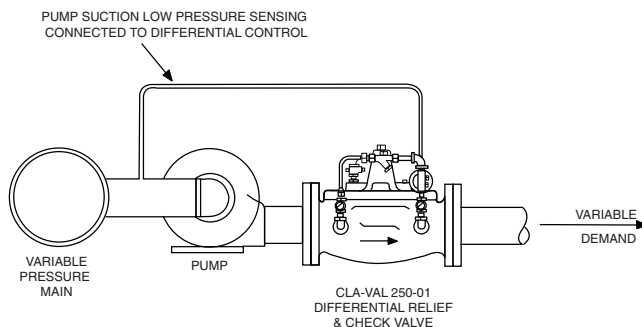
| Item | Description                    |
|------|--------------------------------|
| 1    | 100-01 Hytrol Main Valve       |
| 2    | X42N-2 Strainer & Needle Valve |
| 3    | CDB-7 Differential Control     |

### Optional Features

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



### Typical Applications



The Model 250-01 Differential Pressure Relief Valve maintains a constant differential across centrifugal pump regardless of variable upstream pressures or downstream demand.

By maintaining a constant differential pressure across a centrifugal pump operating at a known capacity, the maximum flow rate is controlled.

On a chilled water circulating loop system the 250-01 Differential Pressure Relief Valve is installed between loop supply and return lines to maintain a constant differential across the loop. The loop differential pressure remains constant regardless of the loop demand change thereby increasing cooling system efficiency.

## Model 250-01 (Uses 100-01Hytrol 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

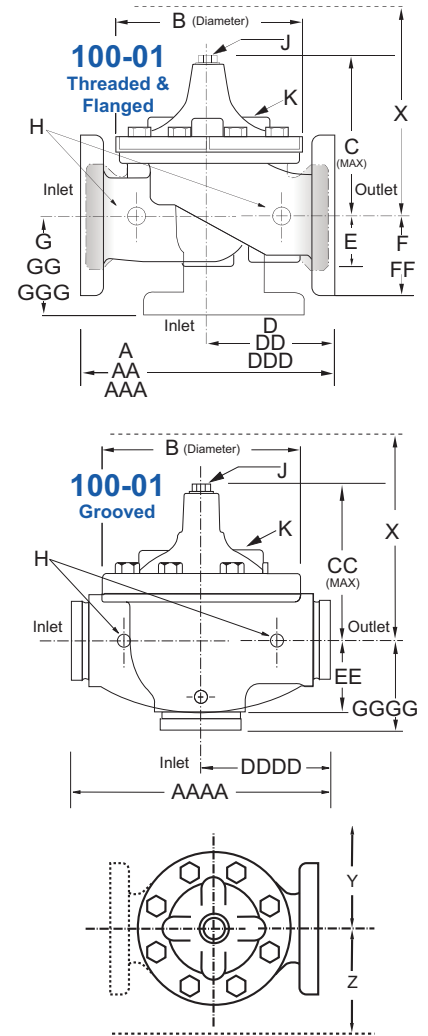
| Component                              | Standard Material Combinations                    |                        |                        |
|----------------------------------------|---------------------------------------------------|------------------------|------------------------|
| Body & Cover                           | Ductile Iron                                      | Cast Steel             | Bronze                 |
| Available Sizes                        | 1" - 36"<br>25 - 900mm                            | 1" - 16"<br>25 - 400mm | 1" - 16"<br>25 - 400mm |
| 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.

### Cover Capacity

Liquid Volume Displaced from Diaphragm Chamber When Valve Opens or Closes

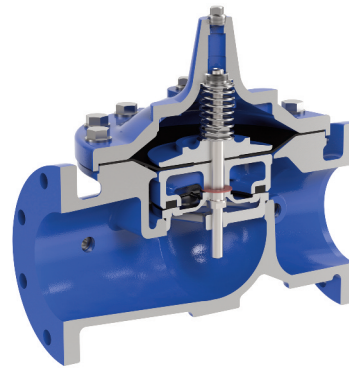
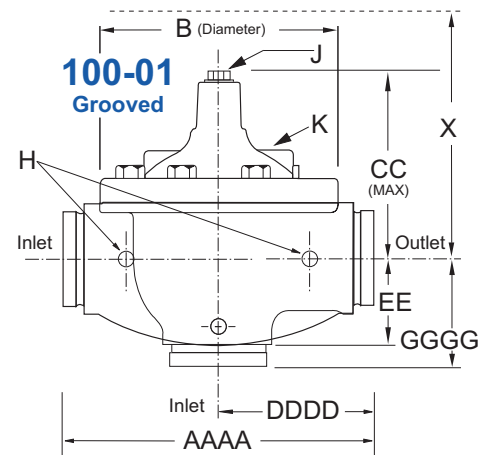
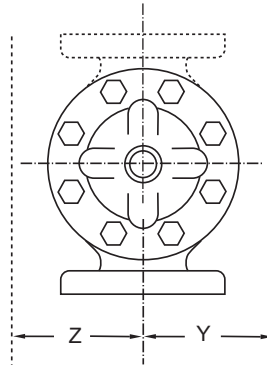
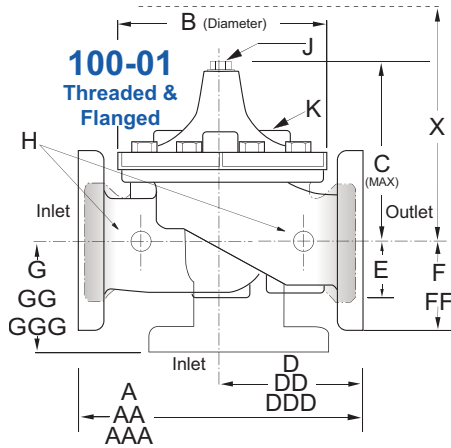
| Valve Size | Displacement |
|------------|--------------|
| 2"         | .032 gal     |
| 2 1/2"     | .043 gal     |
| 3"         | .080 gal     |
| 4"         | .169 gal     |
| 6"         | .531 gal     |
| 8"         | 1.26 gal     |
| 10"        | 2.51 gal     |
| 12"        | 4.00 gal     |
| 14"        | 6.50 gal     |
| 16"        | 9.57 gal     |
| 18"        | 11.00 gal    |
| 20"        | 12.00 gal    |
| 24"        | 29.00 gal    |
| 36"        | 90.00 gal    |



### Model 250-01 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 250-01 Metric Dimensions (Uses 100-01 Hytrol Main Valve)



## Model 250-01 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 |

| 250-01<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   |
| Main 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



**CDB-7 Differential  
Pilot Control**

### Adjustment Ranges (Differential Pressure)

|              |               |
|--------------|---------------|
| 0 to 7 psi   | 50 to 150 psi |
| 5 to 25 psi  | 65 to 180 psi |
| 20 to 80 psi |               |

### 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  
Tubing & Fittings: Stainless Steel

#### Optional Pilot System Materials

Pilot Systems are available with optional Aluminum, Stainless Steel or Monel materials.

### When Ordering, Specify:

1. Catalog No. 250-01
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

### 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



## CLA-VAL

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ZAC du Champ du Périer  
France - 01700 Neyron  
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E-mail: [cla-val@cla-val.fr](mailto:cla-val@cla-val.fr)

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