

# Model 02-F

**HIGH PRESSURE**

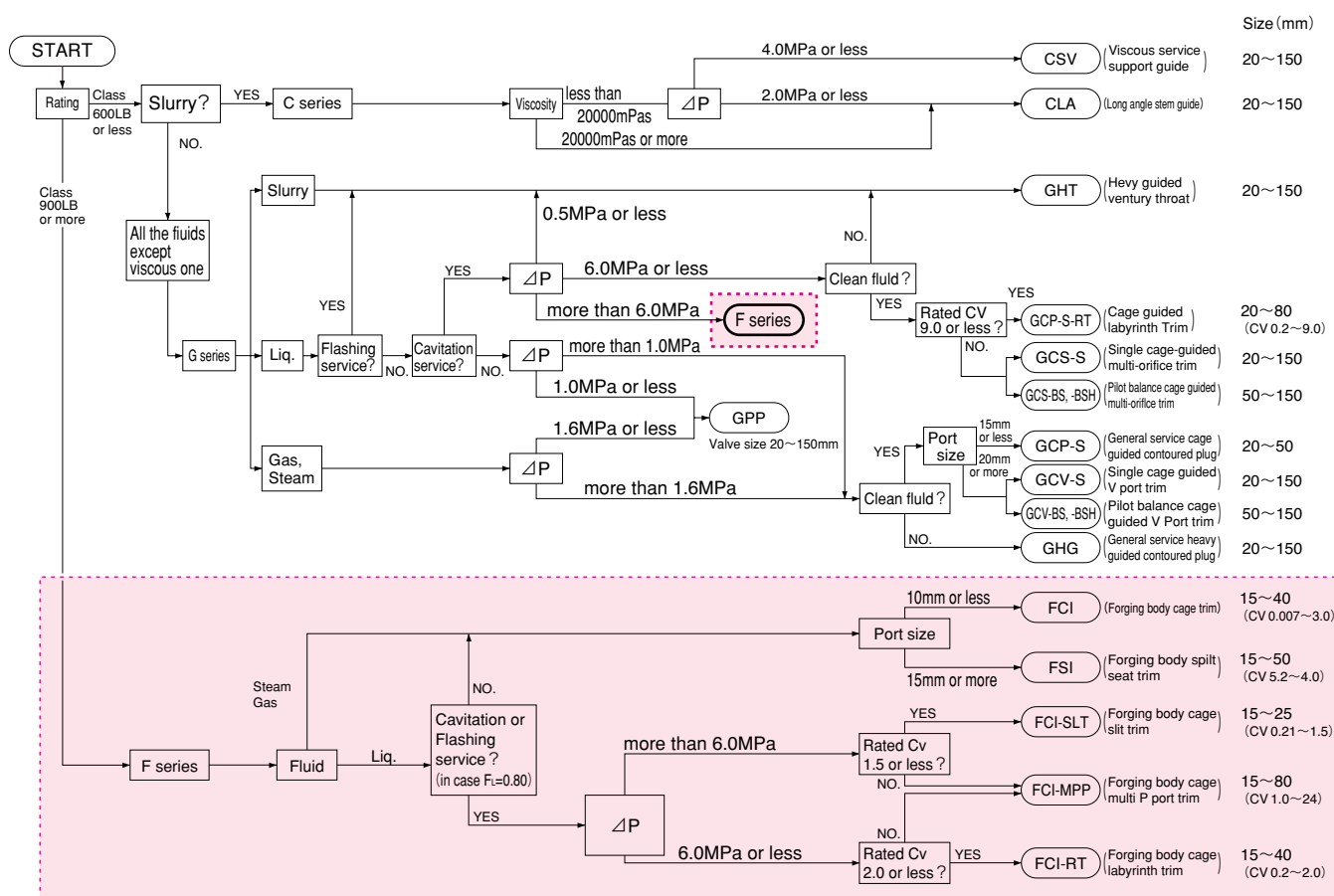
## ANGLE TYPE CONTROL VALVES

Angle-type control valves are indispensable to control fluid of high differential pressure, slurry, high viscosity, or adhesive. They are provided with a number of features such as low resistance of passage, antiwear quality within the valve, easy maintenance and inspection.

**Model 02** series valves are provided as for the general-purpose angle valves to be used under various fluid conditions such as high temperature, high pressure, high differential pressure, extremely low temperature and low noise, and is used for various industries or services such as power, chemical and water process plants. It is available to select optimum valves from a variety of models in this series.

### 1. SELECTION OF VALVE TYPE

Flowchart of angle type control valves



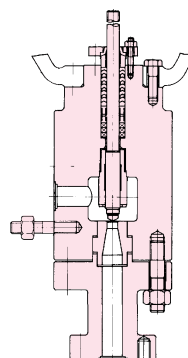
- [Notes]**
1. For the specifications exceeding this range, please contact our sales office.
  2. Closed zone indicates the content of this catalog.
  3. As to the detail of G/C series, refer to catalog (Bulletin No.MCE-B1201).

## 2. FEATURES

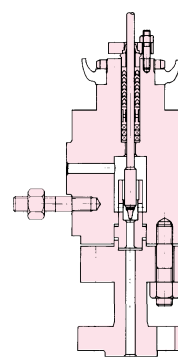
### FSI Type

### FCI Type

Both **FSI** and **FCI** types have been used for the high differential pressure lines class of 29.4MPaG (300kgf/cm<sup>2</sup>G) such as the high-pressure polyethylene plant and ammonia plant, and are well suited to the lines with relatively small diameters of 50mm or smaller. By changing the flow direction from horizontal to vertical (flow to close), the valve body can be prevented from erosion. In addition, the inside of the bottom flange can be layered with stellite to increase the durability against erosion. Even during flow to close operation, the diameter of the valve stem is equal to or larger than the port diameter to have the stabilized construction that eliminates problem for thrust balance. If the seat ring of cage type is used and the fixed orifice is mounted on the cage side, the pressure can be reduced at two stages to prevent the port from eroding.



FSI Type



FCI Type

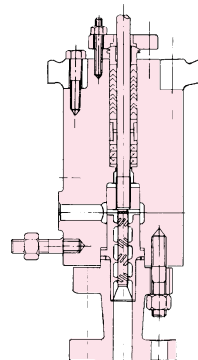
### FCI-SLT Type

**SLT** trim has been developed for servicing the high differential pressure cavitation fluid in small flow.

The valve plug is of the piston type and has a groove on its surface, while the seat ring is of the multi-chamber type. Therefore, fluid pressure can be gradually reduced at each stage.

#### Typical Applications

- High differential pressure control valve for a small liquid flow
- Low noise valve for liquid



FCI-SLT Type

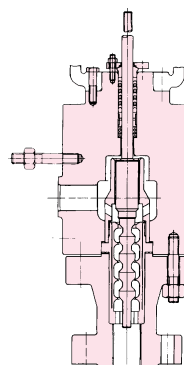
### FCI-MPP Type

**MPP** trim has been developed for servicing the high differential pressure liquid with the Cv value larger than that of the STL trim. Several valve plug are serially connected to enable Eq.% and linear characteristics. The seat employs the multiple chambers to have the labyrinth effect in the same manner as the SLT trim.

Fluid pressure can be gradually reduced at each chamber to evenly disperse cavitation applied to each port. Therefore, compared with the single-port valve, this valve enables stabilized operation with extremely low noise for a long period of time.

#### Typical Applications

- Small size high differential liquid pressure control valve

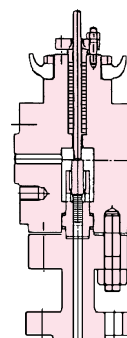


FCI-MPP Type

### FCI-RT Type

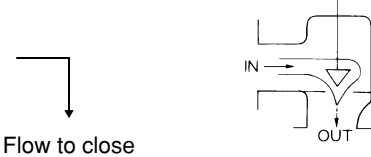
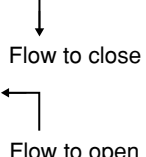
**RT** trim is multi-throttling type and has labyrinth slot of outer valve plug. These valves hardly wear the seating surface inspite of low travel service, and are suited for high differential pressure of liquid. (Ex. Boiler feed water small valve, etc.)

Usually valve travel should be 60 percent of rated travel or less.



FCI-RT Type

## 3. SPECIFICATIONS

|                       |                                   |                                 |                                                                                                                      |                                      |                |                                                                                                                   |                                                                                       |  |
|-----------------------|-----------------------------------|---------------------------------|----------------------------------------------------------------------------------------------------------------------|--------------------------------------|----------------|-------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------------------------------|--|
| Valve Type            |                                   |                                 | Diaphragm operated control valve                                                                                     |                                      |                |                                                                                                                   |                                                                                       |  |
| Valve Model No.       |                                   |                                 | 3802, 2802                                                                                                           |                                      |                |                                                                                                                   |                                                                                       |  |
| VALVE BODY            | Body Type                         |                                 | FSI                                                                                                                  | FCI                                  | FCI-SLT        | FCI-MPP                                                                                                           | FCI-RT                                                                                |  |
|                       | Valve Size                        | (mm)                            | 15 ~ 50                                                                                                              | 15 ~ 40                              | 15 ~ 25        | 15 ~ 50, 80                                                                                                       | 15 ~ 40                                                                               |  |
|                       |                                   | (inch)                          | 1/2 ~ 2                                                                                                              | 1/2 ~ 1 1/2                          | 1/2 ~ 1        | 1/2 ~ 2, 3                                                                                                        | 1/2 ~ 1 1/2                                                                           |  |
|                       | Port Size (mm)                    |                                 | 15 ~ 50                                                                                                              | · Small flow (#00 ~ #3)<br>· φ4 ~ 10 | Cv=0.21 ~ 1.5  | Cv=1.0 ~ 24.0                                                                                                     | Cv=0.2 ~ 2.0                                                                          |  |
|                       | Pressure Rating                   |                                 | JIS63K (inlet connection bolt is stud type as standard.)<br>ASME/JPI Class 900, 1500, 2500                           |                                      |                |                                                                                                                   |                                                                                       |  |
|                       | End Connections                   |                                 | Flange type, FF, RF, RJ, Lens ring fiange type and others                                                            |                                      |                |                                                                                                                   |                                                                                       |  |
|                       | Body Materials                    |                                 | See page 4 "Main Materiais"                                                                                          |                                      |                |                                                                                                                   |                                                                                       |  |
|                       | Bonnet Types                      |                                 | Plain : -17℃ ~ +230℃<br>Fin : -20℃ ~ -17℃, more than 230℃<br>Extention : (Light) -100℃ ~ -20℃, (Heavy) -196℃ ~ -100℃ |                                      |                |                                                                                                                   |                                                                                       |  |
|                       | Gland Type                        |                                 | Bolted gland                                                                                                         |                                      |                |                                                                                                                   |                                                                                       |  |
|                       | Packing(Non Asbestos)             |                                 | See page 4 "Main Materiais"                                                                                          |                                      |                |                                                                                                                   |                                                                                       |  |
|                       | Gaskets(Non Asbestos)             |                                 | See page 4 "Main Materiais"                                                                                          |                                      |                |                                                                                                                   |                                                                                       |  |
| ACTUATOR              | Actuator Type                     |                                 | Model 3800<br>Multi-spring type single acting diaphragm Actuator                                                     |                                      |                | Model 2800<br>Spring type single acting diaphragm Actuator                                                        |                                                                                       |  |
|                       | Actuator Sizes                    |                                 | N28                                                                                                                  | N33S                                 | N40            | 500S                                                                                                              | 650S                                                                                  |  |
|                       | Max. Stroke (mm)                  |                                 | 38                                                                                                                   | 38                                   | 65             | 65                                                                                                                | 65                                                                                    |  |
|                       | Supply Air press. kPaG (kgf/cm²G) |                                 | 240 (2.4), 280 (2.8), 300 (3.0)                                                                                      |                                      |                | 240 (2.4), 280 (2.8)                                                                                              |                                                                                       |  |
|                       | Spring Range. kPaG (kgf/cm²G)     |                                 | 40 ~ 200 (0.4 ~ 2.0), 80 ~ 200 (0.8 ~ 2.0)                                                                           |                                      |                | 20 ~ 180 (0.2 ~ 1.8), 40 ~ 200 (0.4 ~ 2.0)<br>60 ~ 220 (0.6 ~ 2.2), 100 ~ 220 (1.0 ~ 2.2)<br>80 ~ 240 (0.8 ~ 2.4) |                                                                                       |  |
|                       | Action                            |                                 | Direct action, Reverse action                                                                                        |                                      |                |                                                                                                                   |                                                                                       |  |
|                       | Materials                         |                                 | Diaphragm : Cloth reinfoeced chloroprene rubber. Yoke : FC200                                                        |                                      |                |                                                                                                                   |                                                                                       |  |
|                       | Air Connection                    |                                 | Rc 1/4, Rc 3/8 (only for 650S)                                                                                       |                                      |                |                                                                                                                   |                                                                                       |  |
|                       | Ambient Temperature               |                                 | -20℃ ~ +70℃<br>(-50℃ ~ -20℃, +70℃ ~ +100℃※) <sup>(3)</sup>                                                           |                                      |                | -30℃ ~ +70℃<br>(-50℃ ~ -30℃, +70℃ ~ +100℃※) <sup>(3)</sup>                                                        |                                                                                       |  |
| Painting Color        |                                   |                                 | Silver (No painting on stainless steel)                                                                              |                                      |                |                                                                                                                   |                                                                                       |  |
| VALVE CHARACTERISTICS | Flow direction                    |                                 |                                  |                                      |                |                                                                                                                   |  |  |
|                       | Port Characteristics              |                                 | FSI                                                                                                                  | FCI                                  | FCI-SLT        | FCI-MPP                                                                                                           | FCI-RT                                                                                |  |
|                       |                                   | Eq %<br>Linear<br>Quick opening | Eq %<br>Linear<br>Quick opening                                                                                      | Linear<br>Quick opening              | Eq %<br>Linear | Modified<br>parabolic                                                                                             |                                                                                       |  |

|                                       |                               |                                    |                                                                                                                                                                                                                                               |
|---------------------------------------|-------------------------------|------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| VALVE CHARACTERISTICS AND PERFORMANCE | Control Mode                  |                                    | Throtting control, On-Off control                                                                                                                                                                                                             |
|                                       | Valve Action                  |                                    | Direct action (Air-to ciose), Reverse action (Air-to open)                                                                                                                                                                                    |
|                                       | Applicable press. Range       |                                    | 42.3MPaG (431kgf/cm²G) or less (Pressure limit shall conform to pressure-temperature rating)                                                                                                                                                  |
|                                       | Applicable Temp. Range        |                                    | − 196 ℃ ~ +550 ℃ (Temperature limit shall conform to pressure-temperature rating)                                                                                                                                                             |
|                                       | Allowable Differential Press. |                                    | See page 9,10 "Allowable Shut-off Pressure"                                                                                                                                                                                                   |
|                                       | Rated Cv Value                |                                    | See page 7 "Rated Cv Value"                                                                                                                                                                                                                   |
|                                       | Flow Characteristics          |                                    | See page 7, 8 "Flow Characteristics"                                                                                                                                                                                                          |
|                                       | Inherent Rangeability         |                                    | 10 : 1 ~ 30 : 1 (See page7)                                                                                                                                                                                                                   |
|                                       | Allowable seat leakage        |                                    | 0.01 % of rated Cv value (ANSI / FCI Class IV) ※ Option : ANSI / FCI Class V available.                                                                                                                                                       |
|                                       | Action Accuracy               | Hysteresis Error (With positioner) | Max. 2 % F.S.                                                                                                                                                                                                                                 |
| Linearity (With positioner)           |                               | Max. ± 2 % F.S.                    |                                                                                                                                                                                                                                               |
| ADDITIONAL OPTIONS                    | Valve Body                    |                                    | Jacket body, Special treatment for trim                                                                                                                                                                                                       |
|                                       | Actuator                      |                                    | Handwheel (Top-mounted handwheel. Side-mounted handwheel).<br>Travel stop. Diaphragm material : Ethylene propylene rubber.<br>Yoke material : SCPH2                                                                                           |
|                                       | Accessories                   |                                    | Pneumatic positioner (PA92A). Electro-pneumatic positioner (EA91A, EA90A, EA10S) Air filter regulator (MR2000), Limit switch, Solenoide valve, Booster relay, Speed controller, Lock up valve, Pneumatic operated valve.                      |
|                                       | Others                        |                                    | The High Pressure Gas Safety Law Certification, Oil free, Water free<br>Sandproof, Dustproof, Anti-salt damage, Vacuum service,<br>Cold district spec, Tropical district spec, External exposure bolt & nut S.S.,<br>Optional painting color. |

- [Notes]** (1) Valve performance is represented under the condition of standard packing (HTV + P4519).  
 (2) ※ Manufactured and attached as option according to customer's request.  
 (3) For ambient temperature, denoted the extended temperature range as option.  
 (4) Steam jacket construction is recommended for high viscosity and adhesive fluid. On F series valve, built-in steam jacket in the body is provided when steam jacket is requested.  
 (5) For type FCI-RT, "Flow to Open" direction is also available on request.

## 4. MAIN MATERIALS

### 1 Standard Combination of Materials

| Part Name                           | Materials (JIS designation)                                                                                                                                                       |
|-------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>Body</b>                         | SFVC-2A (Forged Carbon Steel), SUS F304, SUS F316 and others                                                                                                                      |
| <b>Trim</b>                         | SUS 316 + CoCr Alloy, SUS 440B, and others                                                                                                                                        |
| <b>Gasket</b>                       | Serrated metal gasket                                                                                                                                                             |
| <b>Gland Packing (Non Asbestos)</b> | <ul style="list-style-type: none"> <li>PTFE V-ring (for high pressure) + PTFE braided packing</li> <li>Graphite packing + Carbon fiber braided packing</li> <li>Others</li> </ul> |

## 2 Pressure-Temperature Rating in accordance with ASME(1996)/JPI(1999)

Following table is comprised of excerpts from ASME B16.5-1996 PIPE FLANGES AND FLANGED FITTINGS and JPI-7S-15-1999 PIPE FLANGE FOR THE PETROLEUM INDUSTRY

Pressure-Temperature unit in ASME B16.5-1996 are specified by psi and °F.

The unit has been converted to SI unit and checked its adequacy by Temperature-Pressure table in JPI-7S-15-1999.

Formula; MPaG=psig × 6.894757 / 1000, °C =(°F-32) × 5 / 9, the way of rounding the figures are in accordance with JPI.

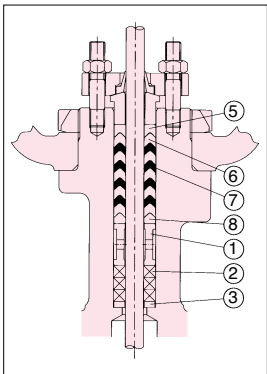
Refer to the table for checking body rating.

Unit: MPaG

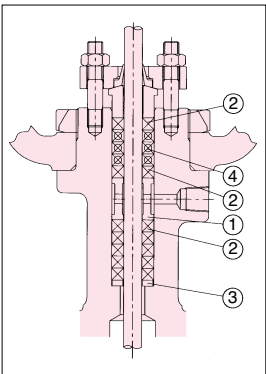
| Material Group | Class 900       |            |                           |            |           |                 | Class 1500  |              |                 |                           |            |           | Class 2500 |                 |              |              |                           |            | Temp.<br>(°C) |            |             |                 |  |
|----------------|-----------------|------------|---------------------------|------------|-----------|-----------------|-------------|--------------|-----------------|---------------------------|------------|-----------|------------|-----------------|--------------|--------------|---------------------------|------------|---------------|------------|-------------|-----------------|--|
|                | 1.1             | 1.5        | 1.9                       | 1.10       | 1.13      | 2.1             | 2.2         | 1.1          | 1.5             | 1.9                       | 1.10       | 1.13      | 2.1        | 2.2             | 1.1          | 1.5          | 1.9                       | 1.10       |               | 1.13       | 2.1         | 2.2             |  |
| Material       | Low Alloy Steel |            |                           |            |           | Stainless Steel |             | Carbon Steel | Low Alloy Steel |                           |            |           |            | Stainless Steel |              | Carbon Steel | Low Alloy Steel           |            |               |            |             | Stainless Steel |  |
|                | Carbon Steel    | C-0.5Mo    | 1Cr-0.5Mo<br>1.25Cr-0.5Mo | 2.25Cr-1Mo | 5Cr-0.5Mo | TYPE 304        | TYPE 316    | Carbon Steel | C-0.5Mo         | 1Cr-0.5Mo<br>1.25Cr-0.5Mo | 2.25Cr-1Mo | 5Cr-0.5Mo | TYPE 304   | TYPE 316        | Carbon Steel | C-0.5Mo      | 1Cr-0.5Mo<br>1.25Cr-0.5Mo | 2.25Cr-1Mo | 5Cr-0.5Mo     | TYPE 304   | TYPE 316    |                 |  |
| Temp.<br>(°C)  | SCPH2 WCB       | SCPH11 WC1 | SCPH21 WC6                | SCPH32 WC9 | SCPH61 C5 | SCS13A CF8      | SCS14A CF8M | SCPH2 WCB    | SCPH11 WC1      | SCPH21 WC6                | SCPH32 WC9 | SCPH61 C5 | SCS13A CF8 | SCS14A CF8M     | SCPH2 WCB    | SCPH11 WC1   | SCPH21 WC6                | SCPH32 WC9 | SCPH61 C5     | SCS13A CF8 | SCS14A CF8M |                 |  |
| -29 ~ 38       | 15.3            | 14.4       | 15.5                      | 15.5       | 15.5      | 14.9            | 14.9        | 25.5         | 23.9            | 25.9                      | 25.9       | 25.9      | 24.8       | 24.8            | 42.5         | 39.9         | 43.1                      | 43.1       | 43.1          | 41.4       | 41.4        | -29 ~ 38        |  |
| 50             | 15.0            | 14.3       | 15.5                      | 15.5       | 15.5      | 14.3            | 14.4        | 25.0         | 23.8            | 25.9                      | 25.9       | 25.8      | 23.9       | 24.1            | 41.7         | 39.7         | 43.1                      | 43.1       | 43.0          | 39.9       | 40.1        | 50              |  |
| 93             | 14.0            | 14.0       | 15.5                      | 15.5       | 15.4      | 12.4            | 12.8        | 23.3         | 23.4            | 25.9                      | 25.9       | 25.7      | 20.7       | 21.3            | 38.8         | 39.0         | 43.1                      | 43.1       | 42.8          | 34.5       | 35.6        | 93              |  |
| 100            | 13.9            | 14.0       | 15.4                      | 15.5       | 15.3      | 12.3            | 12.7        | 23.2         | 23.3            | 25.7                      | 25.8       | 25.6      | 20.4       | 21.1            | 38.7         | 38.8         | 42.9                      | 42.9       | 42.6          | 34.1       | 35.2        | 100             |  |
| 149            | 13.6            | 13.5       | 14.9                      | 15.1       | 14.8      | 11.2            | 11.6        | 22.6         | 22.5            | 24.9                      | 25.1       | 24.7      | 18.6       | 19.3            | 37.7         | 37.5         | 41.5                      | 41.9       | 41.1          | 31.0       | 32.1        | 149             |  |
| 150            | 13.6            | 13.5       | 14.9                      | 15.1       | 14.8      | 11.2            | 11.6        | 22.6         | 22.5            | 24.9                      | 25.1       | 24.7      | 18.6       | 19.2            | 37.7         | 37.5         | 41.4                      | 41.8       | 41.1          | 31.0       | 32.1        | 150             |  |
| 200            | 13.1            | 13.3       | 14.4                      | 14.6       | 14.6      | 10.3            | 10.7        | 21.9         | 22.1            | 24.0                      | 24.4       | 24.4      | 17.3       | 17.8            | 36.5         | 36.8         | 39.9                      | 40.6       | 40.6          | 28.7       | 29.7        | 200             |  |
| 204            | 13.1            | 13.2       | 14.3                      | 14.6       | 14.6      | 10.3            | 10.6        | 21.9         | 22.1            | 23.9                      | 24.3       | 24.3      | 17.1       | 17.7            | 36.4         | 36.7         | 39.8                      | 40.5       | 40.5          | 28.5       | 29.5        | 204             |  |
| 250            | 12.5            | 12.9       | 13.9                      | 13.9       | 13.9      | 9.74            | 10.0        | 20.9         | 21.5            | 23.1                      | 23.2       | 23.2      | 16.3       | 16.7            | 34.8         | 35.9         | 38.5                      | 38.6       | 38.6          | 27.1       | 27.8        | 250             |  |
| 260            | 12.4            | 12.9       | 13.8                      | 13.8       | 13.8      | 9.62            | 9.89        | 20.6         | 21.4            | 22.9                      | 22.9       | 22.9      | 16.1       | 16.5            | 34.4         | 35.7         | 38.2                      | 38.2       | 38.2          | 26.8       | 27.4        | 260             |  |
| 300            | 11.6            | 12.6       | 12.9                      | 12.9       | 12.9      | 9.20            | 9.50        | 19.4         | 21.0            | 21.4                      | 21.4       | 21.4      | 15.3       | 15.8            | 32.3         | 35.0         | 35.7                      | 35.7       | 35.7          | 25.6       | 26.3        | 300             |  |
| 316            | 11.3            | 12.5       | 12.5                      | 12.5       | 12.5      | 9.03            | 9.34        | 18.9         | 20.9            | 20.9                      | 20.9       | 20.9      | 15.1       | 15.5            | 31.4         | 34.7         | 34.7                      | 34.7       | 34.7          | 25.1       | 25.9        | 316             |  |
| 343            | 11.1            | 12.2       | 12.2                      | 12.2       | 12.2      | 8.89            | 9.17        | 18.5         | 20.3            | 20.3                      | 20.3       | 20.3      | 14.8       | 15.3            | 30.9         | 33.8         | 33.8                      | 33.8       | 33.8          | 24.7       | 25.5        | 343             |  |
| 350            | 11.1            | 12.1       | 12.1                      | 12.1       | 12.1      | 8.87            | 9.13        | 18.5         | 20.1            | 20.1                      | 20.1       | 20.1      | 14.8       | 15.2            | 30.8         | 33.5         | 33.5                      | 33.5       | 33.5          | 24.6       | 25.4        | 350             |  |
| 371            | 11.0            | 11.8       | 11.8                      | 11.8       | 11.8      | 8.79            | 9.00        | 18.4         | 19.6            | 19.6                      | 19.6       | 19.6      | 14.7       | 15.0            | 30.6         | 32.6         | 32.6                      | 32.6       | 32.6          | 24.4       | 25.0        | 371             |  |
| 375            | 10.9            | 11.6       | 11.6                      | 11.6       | 11.6      | 8.76            | 8.97        | 18.2         | 19.4            | 19.4                      | 19.4       | 19.4      | 14.6       | 14.9            | 30.4         | 32.3         | 32.3                      | 32.3       | 32.3          | 24.3       | 24.9        | 375             |  |
| 399            | 10.4            | 11.0       | 11.0                      | 11.0       | 10.9      | 8.58            | 8.83        | 17.4         | 18.3            | 18.3                      | 18.3       | 18.2      | 14.3       | 14.7            | 29.0         | 30.5         | 30.5                      | 30.5       | 30.3          | 23.9       | 24.5        | 399             |  |
| 400            | 10.3            | 11.0       | 11.0                      | 11.0       | 10.9      | 8.57            | 8.82        | 17.2         | 18.3            | 18.3                      | 18.3       | 18.2      | 14.3       | 14.7            | 28.7         | 30.5         | 30.5                      | 30.5       | 30.3          | 23.8       | 24.5        | 400             |  |
| 425            | 8.63            | 10.5       | 10.5                      | 10.5       | 10.5      | 8.36            | 8.73        | 14.4         | 17.6            | 17.6                      | 17.6       | 17.6      | 13.9       | 14.6            | 24.0         | 29.2         | 29.2                      | 29.2       | 29.2          | 23.2       | 24.3        | 425             |  |
| 427            | 8.52            | 10.5       | 10.5                      | 10.5       | 10.5      | 8.34            | 8.72        | 14.2         | 17.5            | 17.5                      | 17.5       | 17.5      | 13.9       | 14.5            | 23.6         | 29.2         | 29.2                      | 29.2       | 29.2          | 23.2       | 24.3        | 427             |  |
| 450            | 6.02            | 10.1       | 10.1                      | 10.1       | 10.1      | 8.23            | 8.66        | 10.0         | 16.9            | 16.9                      | 16.9       | 16.8      | 13.7       | 14.4            | 16.7         | 28.2         | 28.2                      | 28.2       | 28.0          | 22.8       | 24.0        | 450             |  |
| 454            | 5.55            | 10.1       | 10.1                      | 10.1       | 10.0      | 8.20            | 8.65        | 9.24         | 16.8            | 16.8                      | 16.8       | 16.7      | 13.7       | 14.4            | 15.4         | 28.0         | 28.0                      | 28.0       | 27.8          | 22.8       | 24.0        | 454             |  |
| 475            | 4.07            | 9.51       | 9.51                      | 9.51       | 8.26      | 8.08            | 8.60        | 6.79         | 15.8            | 15.8                      | 15.8       | 13.8      | 13.5       | 14.3            | 11.3         | 26.4         | 26.4                      | 26.4       | 23.0          | 22.4       | 23.9        | 475             |  |
| 482            | 3.55            | 9.31       | 9.31                      | 9.31       | 7.65      | 8.03            | 8.58        | 5.93         | 15.5            | 15.5                      | 15.5       | 12.8      | 13.4       | 14.3            | 9.86         | 25.8         | 25.8                      | 25.8       | 21.3          | 22.3       | 23.9        | 482             |  |
| 500            | 2.65            | 7.08       | 7.56                      | 8.34       | 6.40      | 7.94            | 8.21        | 4.41         | 11.8            | 12.6                      | 13.9       | 10.6      | 13.3       | 13.7            | 7.34         | 19.6         | 21.0                      | 23.2       | 17.7          | 22.1       | 22.8        | 500             |  |
| 510            | 2.14            | 5.83       | 6.58                      | 7.79       | 5.69      | 7.89            | 8.00        | 3.55         | 9.69            | 11.0                      | 13.0       | 9.45      | 13.2       | 13.3            | 5.93         | 16.2         | 18.3                      | 21.7       | 15.8          | 21.9       | 22.2        | 510             |  |
| 525            | 1.56            | 4.52       | 5.45                      | 6.49       | 4.83      | 7.22            | 7.59        | 2.60         | 7.53            | 9.08                      | 10.8       | 8.05      | 12.0       | 12.6            | 4.33         | 12.5         | 15.1                      | 18.1       | 13.4          | 20.0       | 21.1        | 525             |  |
| 538            | 1.07            | 3.41       | 4.48                      | 5.38       | 4.10      | 6.65            | 7.24        | 1.79         | 5.69            | 7.45                      | 9.00       | 6.86      | 11.1       | 12.1            | 2.96         | 9.45         | 12.4                      | 15.0       | 11.4          | 18.4       | 20.1        | 538             |  |
| 550            |                 |            | 3.81                      | 4.60       | 3.60      | 6.53            | 7.18        |              |                 | 6.35                      | 7.69       | 6.03      | 10.9       | 12.0            |              |              | 10.6                      | 12.8       | 10.0          | 18.1       | 19.9        | 550             |  |
| 566            |                 |            | 2.96                      | 3.62       | 2.96      | 6.38            | 7.10        |              |                 | 4.96                      | 6.03       | 4.96      | 10.7       | 11.9            |              |              | 8.27                      | 10.0       | 8.27          | 17.7       | 19.8        | 566             |  |
| 575            |                 |            | 2.64                      | 3.16       | 2.66      | 6.01            | 6.83        |              |                 | 4.40                      | 5.27       | 4.44      | 10.0       | 11.4            |              |              | 7.34                      | 8.77       | 7.41          | 16.7       | 19.0        | 575             |  |
| 593            |                 |            | 2.00                      | 2.28       | 2.07      | 5.31            | 6.31        |              |                 | 3.31                      | 3.79       | 3.41      | 8.86       | 10.5            |              |              | 5.52                      | 6.31       | 5.72          | 14.8       | 17.5        | 593             |  |
| 600            |                 |            | 1.83                      | 2.07       | 1.88      | 5.02            | 5.97        |              |                 | 3.03                      | 3.45       | 3.11      | 8.38       | 10.0            |              |              | 5.04                      | 5.74       | 5.20          | 14.0       | 16.6        | 600             |  |
| 621            |                 |            | 1.28                      | 1.41       | 1.28      | 4.10            | 4.90        |              |                 | 2.14                      | 2.38       | 2.14      | 6.86       | 8.17            |              |              | 3.55                      | 3.93       | 3.55          | 11.4       | 13.6        | 621             |  |
| 625            |                 |            | 1.21                      | 1.34       | 1.20      | 3.98            | 4.75        |              |                 | 2.02                      | 2.24       | 2.00      | 6.64       | 7.92            |              |              | 3.36                      | 3.71       | 3.33          | 11.1       | 13.2        | 625             |  |
| 649            |                 |            | 0.79                      | 0.86       | 0.72      | 3.21            | 3.83        |              |                 | 1.31                      | 1.41       | 1.17      | 5.31       | 6.38            |              |              | 2.17                      | 2.38       | 1.97          | 8.86       | 10.7        | 649             |  |
| 650            |                 |            |                           |            |           | 3.17            | 3.79        |              |                 |                           |            |           | 5.25       | 6.33            |              |              |                           |            |               | 8.77       | 10.6        | 650             |  |
| 675            |                 |            |                           |            |           | 2.40            | 3.08        |              |                 |                           |            |           | 3.98       | 5.15            |              |              |                           |            |               | 6.66       | 8.61        | 675             |  |
| 677            |                 |            |                           |            |           | 2.34            | 3.03        |              |                 |                           |            |           | 3.90       | 5.07            |              |              |                           |            |               | 6.52       | 8.48        | 677             |  |
| 700            |                 |            |                           |            |           | 1.85            | 2.51        |              |                 |                           |            |           | 3.11       | 4.20            |              |              |                           |            |               | 5.18       | 6.97        | 700             |  |
| 704            |                 |            |                           |            |           | 1.76            | 2.41        |              |                 |                           |            |           | 2.96       | 4.03            |              |              |                           |            |               | 4.93       | 6.69        | 704             |  |
| 725            |                 |            |                           |            |           | 1.40            | 2.11        |              |                 |                           |            |           | 2.35       | 3.50            |              |              |                           |            |               | 3.91       | 5.82        | 725             |  |
| 732            |                 |            |                           |            |           | 1.28            | 2.00        |              |                 | 2.14                      | 2.38       | 2.14      | 6.86       | 8.17            |              |              |                           |            |               | 3.55       | 5.52        | 732             |  |
| 750            |                 |            |                           |            |           | 1.10            | 1.71        |              |                 |                           |            |           | 1.83       | 2.87            |              |              |                           |            |               | 3.04       | 4.77        | 750             |  |
| 760            |                 |            |                           |            |           | 1.00            | 1.55        |              |                 |                           |            |           | 1.65       | 2.62            |              |              |                           |            |               | 2.76       | 4.34        | 760             |  |
| 775            |                 |            |                           |            |           | 0.85            | 1.37        |              |                 | 1.39                      | 2.28       |           | 1.39       | 2.28            |              |              |                           |            |               | 2.33       | 3.80        | 775             |  |
| 788            |                 |            |                           |            |           | 0.72            | 1.21        |              |                 | 1.17                      | 2.00       |           | 1.17       | 2.00            |              |              |                           |            |               | 1.97       | 3.34        | 788             |  |
| 800            |                 |            |                           |            |           | 0.65            | 1.05        |              |                 | 1.07                      | 1.74       |           | 1.07       | 1.74            |              |              |                           |            |               | 1.80       | 2.92        | 800             |  |
| 816            |                 |            |                           |            |           | 0.55            | 0.86        |              |                 |                           |            |           | 0.98       | 1.41            |              |              |                           |            |               | 1.59       | 2.38        | 816             |  |

3 Gland Packing

High pressure application



High temperature & high pressure application



|   | Parts         | Materials             |
|---|---------------|-----------------------|
| 1 | Lantern ring  | SUS 316               |
| 2 | Gland packing | Braided packing       |
| 3 | Packing ring  | SUS316                |
| 4 | Gland packing | Braided packing       |
| 5 | Adapter       | SUS 316               |
| 6 | Gland packing | Glass reinforced PTFE |
| 7 | Shevron       | SUS 316               |
| 8 | Packing seat  | SUS 316               |

5. SCOPE OF PRODUCTION

[Note] Mark ● indicates full port. Mark ◆ indicates reduced port.

FSI Type

| Port Size (mm) |             | 15        | 20 | 25 | 32 | 40 | 50 |
|----------------|-------------|-----------|----|----|----|----|----|
| Valve Size     | Travel (mm) | 15        |    |    | 20 |    | 25 |
|                | 15 (mm)     | 1/2 (in.) | ●  |    |    |    |    |
|                | 20          | 3/4       | ◆  | ●  |    |    |    |
|                | 25          | 1         | ◆  | ◆  | ●  |    |    |
|                | 40          | 1 1/2     |    | ◆  | ◆  | ◆  | ●  |
| 50             | 2           |           |    | ◆  | ◆  | ◆  | ●  |

FCI-RT Type

| Port Size Cv |             | 0.2 | 0.4 | 0.6 | 1.0 | 1.5 | 2.0 |
|--------------|-------------|-----|-----|-----|-----|-----|-----|
| Travel (mm)  |             | 15  |     |     |     |     |     |
| Valve Size   | Travel (mm) | 15  |     |     |     |     |     |
| 15 (mm)      | 1/2 (in.)   | ◆   | ◆   | ◆   | ◆   | ◆   | ◆   |
| 20           | 3/4         | ◆   | ◆   | ◆   | ◆   | ◆   | ◆   |
| 25           | 1           | ◆   | ◆   | ◆   | ◆   | ◆   | ◆   |
| 40           | 1 1/2       |     |     |     | ◆   | ◆   | ◆   |

FCI Type

| Port Size (mm) |             | #00 | #0 | #1 | #2 | #3 | φ3 | φ4 | 6 | 7 | 8 | 10 |
|----------------|-------------|-----|----|----|----|----|----|----|---|---|---|----|
| Travel (mm)    |             | 15  |    |    |    |    |    |    |   |   |   |    |
| Valve Size     | Travel (mm) | 15  |    |    |    |    |    |    |   |   |   |    |
| 15 (mm)        | 1/2 (in.)   | ◆   | ◆  | ◆  | ◆  | ◆  | ◆  | ◆  | ◆ | ◆ | ◆ | ◆  |
| 20             | 3/4         | ◆   | ◆  | ◆  | ◆  | ◆  | ◆  | ◆  | ◆ | ◆ | ◆ | ◆  |
| 25             | 1           | ◆   | ◆  | ◆  | ◆  | ◆  | ◆  | ◆  | ◆ | ◆ | ◆ | ◆  |
| 40             | 1 1/2       | ◆   | ◆  | ◆  | ◆  | ◆  | ◆  | ◆  | ◆ | ◆ | ◆ | ◆  |

FCI-SLT Type

Port size FCI-SLT & FCI-MPP is indicated by Cv Value.

| Port Size (mm) |             | Cv 0.21 | Cv 0.4 | Cv 0.8 | Cv 1.0 | Cv 1.5 |
|----------------|-------------|---------|--------|--------|--------|--------|
| Travel (mm)    |             | 15      |        |        |        |        |
| Valve Size     | Travel (mm) | 15      |        |        |        |        |
| 15 (mm)        | 1/2 (in.)   | ◆       | ◆      | ◆      | ◆      | ◆      |
| 20             | 3/4         | ◆       | ◆      | ◆      | ◆      | ◆      |
| 25             | 1           | ◆       | ◆      | ◆      | ◆      | ◆      |

FCI-MPP Type

| Port Size (mm) |             | Cv 1.0 | Cv 1.5 | Cv 3.0 | Cv 5.0 | Cv 8.0 | Cv 11.0 | Cv 16.0 | Cv 20.0 | Cv 24.0 |
|----------------|-------------|--------|--------|--------|--------|--------|---------|---------|---------|---------|
| Travel (mm)    |             | 15     |        |        | 20     |        |         | 25      |         |         |
| Valve Size     | Travel (mm) | 15     |        |        | 20     |        |         | 25      |         |         |
| 15 (mm)        | 1/2 (in.)   | ◆      | ◆      |        |        |        |         |         |         |         |
| 20             | 3/4         | ◆      | ◆      |        |        |        |         |         |         |         |
| 25             | 1           | ◆      | ◆      | ◆      |        |        |         |         |         |         |
| 40             | 1 1/2       |        |        | ◆      | ◆      | ◆      |         |         |         |         |
| 50             | 2           |        |        | ◆      | ◆      | ◆      |         |         |         |         |
| 80             | 3           |        |        |        | ◆      | ◆      | ◆       | ◆       | ◆       | ◆       |

## 6. FLOW CHARACTERISTICS

### 1 Rated Cv Value

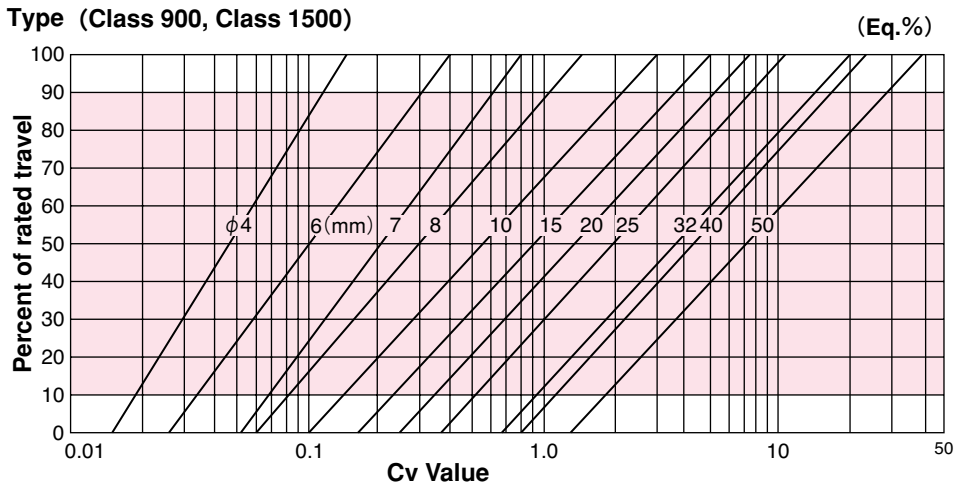
| Body type             |           | FCI    |       |       |       |       |      |      |        |      |        | FSI |        |     |    |       |       |    |
|-----------------------|-----------|--------|-------|-------|-------|-------|------|------|--------|------|--------|-----|--------|-----|----|-------|-------|----|
| Port Size             | (mm)      | #00    | #0    | #1    | #2    | #3    | φ3   | φ4   | 6      | 7    | 8      | 10  | 15     | 20  | 25 | 32    | 40    | 50 |
|                       | (in.)     |        |       |       |       |       |      |      | 1/8    | 3/16 | 1/4    | 3/8 | 1/2    | 3/4 | 1  | 1 1/4 | 1 1/2 | 2  |
| Rated Cv              | 900, 1500 | 0.007  | 0.014 | 0.025 | 0.037 | 0.056 | 0.09 | 0.15 | 0.4    | 0.8  | 1.5    | 3.0 | 5.2    | 7.5 | 11 | 20    | 24    | 40 |
|                       | 2500      |        |       |       |       |       |      |      |        |      | 1      | 2   | 3      | 5   | 8  | 12    | 16    | 28 |
| Inherent Rangeability |           | 10 : 1 |       |       |       |       |      |      | 15 : 1 |      | 25 : 1 |     | 30 : 1 |     |    |       |       |    |

| Body type             | FCI-SLT |     |     |     |     | FCI-MPP |     |     |     |     |      |      |      |      |  |
|-----------------------|---------|-----|-----|-----|-----|---------|-----|-----|-----|-----|------|------|------|------|--|
| Reted Cv              | 0.21    | 0.4 | 0.8 | 1.0 | 1.5 | 1.0     | 1.5 | 3.0 | 5.0 | 8.0 | 11.0 | 16.0 | 20.0 | 24.0 |  |
| Inherent Rangeability | 30 : 1  |     |     |     |     | 30 : 1  |     |     |     |     |      |      |      |      |  |

| Body type             | FCI-RT |     |     |     |     |     |
|-----------------------|--------|-----|-----|-----|-----|-----|
| Reted Cv              | 0.2    | 0.4 | 0.6 | 1.0 | 1.5 | 2.0 |
| Inherent Rangeability | 30 : 1 |     |     |     |     |     |

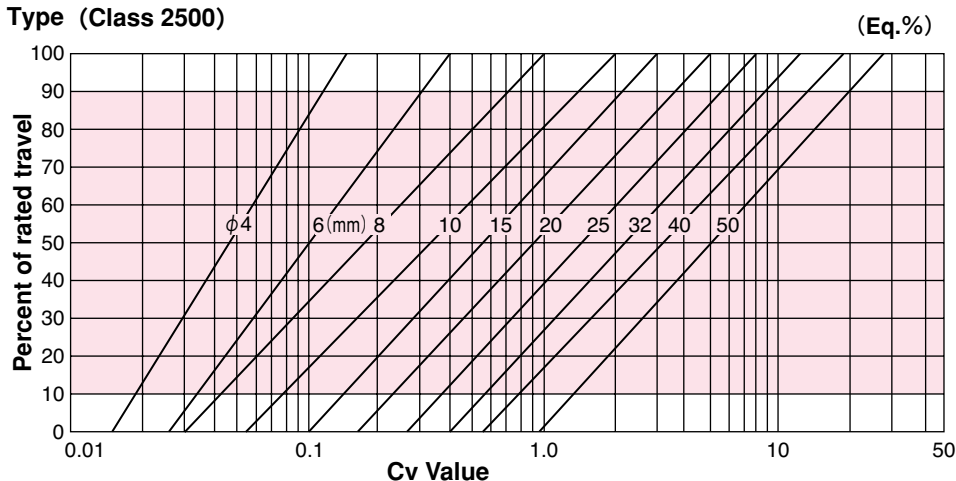
### 2 Flow Characteristics

#### ■ FSI, FCI Type (Class 900, Class 1500)

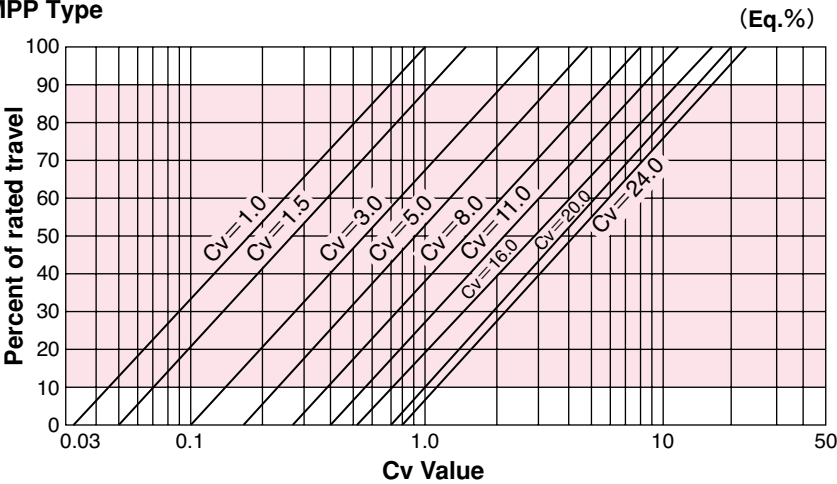


**[Note]** When the port size is φ3 or smaller, the flow characteristics is linear.

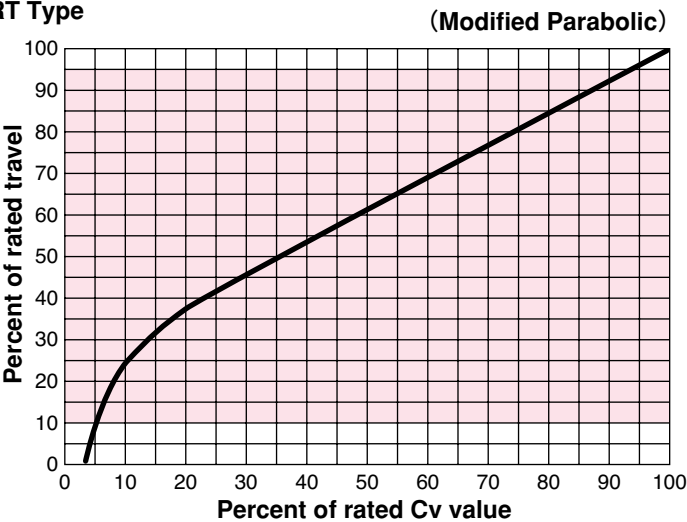
#### ■ FSI, FCI Type (Class 2500)



FCI-MPP Type



FCI-RT Type



7. ALLOWABLE DIFFERENTIAL PRESSURE

1 Off-balance Classification

Unit : kPaG (kgf/cm<sup>2</sup>G)

| Action                           |                |  | Spring Range         |                      | Supply Air Pressure | Off-<br>brlance |
|----------------------------------|----------------|--|----------------------|----------------------|---------------------|-----------------|
|                                  |                |  | Actuafor Size        |                      |                     |                 |
|                                  |                |  | N28 ~ N40            | 500, 650             |                     |                 |
| Contoured Plug,<br>Quick Opening | Direct Action  |  | 40 ~ 200 (0.4 ~ 2.0) |                      | 240 (2.4)           | 40 (0.4)        |
|                                  |                |  | —                    | 60 ~ 220 (0.6 ~ 2.2) | 280 (2.8)           | 60 (0.6)        |
|                                  |                |  | 40 ~ 200 (0.4 ~ 2.0) | 40 ~ 200 (0.4 ~ 2.0) |                     | 80 (0.8)        |
|                                  |                |  |                      | —                    | —                   | 300 (3.0)       |
|                                  | Reverse Action |  | 40 ~ 200 (0.4 ~ 2.0) |                      | 240 (2.4)           | 40 (0.4)        |
|                                  |                |  | —                    | 60 ~ 220 (0.6 ~ 2.2) | 280 (2.8)           | 60 (0.6)        |
|                                  |                |  | 80 ~ 200 (0.8 ~ 2.0) | 80 ~ 240 (0.8 ~ 2.4) |                     | 80 (0.8)        |
|                                  |                |  |                      |                      |                     |                 |



## 2 Allowable Shut-off Pressure

The values for allowable shut-off pressure shown in the following table indicate the static shut-off differential pressures. For the flow in the flow to close direction, the medium opening may cause the valve plug to vibrate vertically because the inner valve is sucked toward the downstream. Therefore, if  $\Delta P$  is large at the medium opening, be sure to contact our nearest sales office for selecting the actuators by telling us your use conditions.

Unit : MPa (kgf/cm<sup>2</sup>)

| FSI (Class900 ~ 1500) |             |                     |               |             |                |                |            |
|-----------------------|-------------|---------------------|---------------|-------------|----------------|----------------|------------|
| Port Size             |             | 15 (mm)             | 20            | 25          | 32             | 40             | 50         |
| Actuator              | Off-balance | $\frac{1}{2}$ (in.) | $\frac{3}{4}$ | 1           | $1\frac{1}{4}$ | $1\frac{1}{2}$ | 2          |
| N33S                  | 40 (0.4)    | 7.84 (80)           | 4.60 (47)     | 3.33 (34)   | 1.47 (15)      | 1.47 (15)      | 0.86 (8.8) |
|                       | 80 (0.8)    | 15.69 (160)         | 9.2 (94)      | 6.66 (68)   | 3.04 (31)      | 3.04 (31)      | 1.66 (17)  |
|                       | 100 (1.0)   | 19.61 (200)         | 11.57 (118)   | 8.33 (85)   | 3.82 (39)      | 3.82 (39)      | 2.15 (22)  |
| N40                   | 40 (0.4)    |                     | 6.47 (66)     | 4.70 (48)   | 2.15 (22)      | 2.15 (22)      | 1.17 (12)  |
|                       | 80 (0.8)    |                     | 13.04 (133)   | 9.41 (96)   | 4.31 (44)      | 4.31 (44)      | 2.35 (24)  |
|                       | 100 (1.0)   |                     | 16.27 (166)   | 11.86 (121) | 5.39 (55)      | 5.39 (55)      | 3.04 (31)  |
| 500S                  | 40 (0.4)    |                     | 10.88 (111)   | 7.84 (80)   | 3.62 (37)      | 3.62 (37)      | 1.96 (20)  |
|                       | 60 (0.6)    |                     | 16.27 (166)   | 11.86 (121) | 5.39 (55)      | 5.39 (55)      | 3.04 (31)  |
|                       | 80 (0.8)    |                     | 21.77 (222)   | 15.78 (161) | 7.25 (74)      | 7.25 (74)      | 4.02 (41)  |
|                       | 100 (1.0)   |                     | 25.30 (258)   | 19.80 (202) | 9.02 (92)      | 9.02 (92)      | 5.00 (51)  |
| 650S                  | 40 (0.4)    |                     |               | 13.72 (140) | 6.27 (64)      | 6.27 (64)      | 3.43 (35)  |
|                       | 60 (0.6)    |                     |               | 20.59 (210) | 9.41 (96)      | 9.41 (96)      | 5.19 (53)  |
|                       | 80 (0.8)    |                     |               | 25.30 (258) | 12.55 (128)    | 12.55 (128)    | 6.96 (71)  |
|                       | 100 (1.0)   |                     |               | 25.30 (258) | 15.69 (160)    | 15.69 (160)    | 8.72 (89)  |

Unit : MPa (kgf/cm<sup>2</sup>)

| FSI (Class 2500) |             |                     |               |             |                |                |             |
|------------------|-------------|---------------------|---------------|-------------|----------------|----------------|-------------|
| Port Size        |             | 15 (mm)             | 20            | 25          | 32             | 40             | 50          |
| Actuator         | Off-balance | $\frac{1}{2}$ (in.) | $\frac{3}{4}$ | 1           | $1\frac{1}{4}$ | $1\frac{1}{2}$ | 2           |
| N33S             | 40 (0.4)    | 9.61 (98)           | 5.39 (55)     | 3.82 (39)   | 1.76 (18)      | 1.76 (18)      | 1.76 (18)   |
|                  | 80 (0.8)    | 19.31 (197)         | 10.88 (111)   | 7.64 (78)   | 3.53 (36)      | 3.53 (36)      | 3.53 (36)   |
|                  | 100 (1.0)   | 24.12 (246)         | 13.63 (139)   | 9.61 (98)   | 4.41 (45)      | 4.41 (45)      | 4.41 (45)   |
| N40              | 40 (0.4)    |                     | 7.25 (74)     | 5.39 (55)   | 2.45 (25)      | 2.45 (25)      | 2.45 (25)   |
|                  | 80 (0.8)    |                     | 14.61 (149)   | 10.78 (110) | 4.90 (50)      | 4.90 (50)      | 4.90 (50)   |
|                  | 100 (1.0)   |                     | 18.33 (187)   | 13.53 (138) | 6.17 (63)      | 6.17 (63)      | 6.17 (63)   |
| 500S             | 40 (0.4)    |                     |               | 9.02 (92)   | 4.11 (42)      | 4.11 (42)      | 4.11 (42)   |
|                  | 60 (0.6)    |                     |               | 13.53 (138) | 6.17 (63)      | 6.17 (63)      | 6.17 (63)   |
|                  | 80 (0.8)    |                     |               | 18.04 (184) | 8.23 (84)      | 8.23 (84)      | 8.23 (84)   |
|                  | 100 (1.0)   |                     |               | 22.55 (230) | 10.39 (106)    | 10.39 (106)    | 10.39 (106) |
| 650S             | 40 (0.4)    |                     |               | 15.69 (160) | 7.15 (73)      | 7.15 (73)      | 7.15 (73)   |
|                  | 60 (0.6)    |                     |               | 23.53 (240) | 10.78 (110)    | 10.78 (110)    | 10.78 (110) |
|                  | 80 (0.8)    |                     |               | 31.38 (320) | 14.41 (147)    | 14.41 (147)    | 14.41 (147) |
|                  | 100 (1.0)   |                     |               | 39.22 (400) | 18.04 (184)    | 18.04 (184)    | 18.04 (184) |

Unit : MPa (kgf/cm<sup>2</sup>)

| FCI (Class900 ~ 2500) |             |             |             |                     |                |               |               |
|-----------------------|-------------|-------------|-------------|---------------------|----------------|---------------|---------------|
| Port Size             |             | φ3          | φ4          | 6 (mm)              | 7              | 8             | 10            |
| Actuator              | Off-balance |             |             | $\frac{1}{8}$ (in.) | $\frac{3}{16}$ | $\frac{1}{4}$ | $\frac{3}{8}$ |
| N28                   | 40 (0.4)    | 17.25 (176) | 17.25 (176) | 17.25 (176)         | 17.25 (176)    | 11.96 (122)   | 8.04 (82)     |
|                       | 80 (0.8)    | 34.51 (352) | 34.51 (352) | 34.51 (352)         | 34.51 (352)    | 24.02 (245)   | 16.08 (164)   |
| N33S                  | 40 (0.4)    | 25.39 (259) | 25.39 (259) | 25.39 (259)         | 25.39 (259)    | 17.65 (180)   | 11.86 (121)   |
|                       | 80 (0.8)    | 42.16 (430) | 42.16 (430) | 42.16 (430)         | 42.16 (430)    | 35.40 (361)   | 23.73 (242)   |
| N40                   | 40 (0.4)    |             |             |                     |                |               | 16.67 (170)   |
|                       | 80 (0.8)    |             |             |                     |                |               | 33.34 (340)   |

[Note] Off balance 100kPaG (1.0kgf/cm<sup>2</sup>G) is not available owing to applying special diameter of stem

Unit : MPa (kgf/cm<sup>2</sup>)

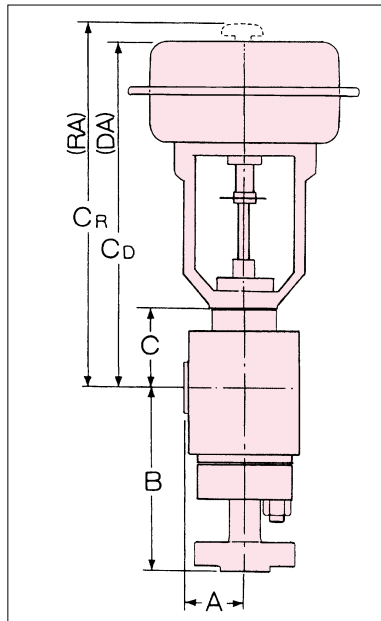
| FCI-SLT, -MPP (Class 900 ~ 2500) |             |                |             |             |             |             |             |             |             |             |
|----------------------------------|-------------|----------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| Actuator                         | Off-balance | Port Size (Cv) |             |             |             |             |             |             |             |             |
|                                  |             | 1.0            | 1.5         | 3.0         | 5.0         | 8.0         | 11          | 16          | 20          | 24          |
| N28                              | 40 (0.4)    | 3.62 (37)      | 3.62 (37)   |             |             |             |             |             |             |             |
|                                  | 80 (0.8)    | 7.35 (75)      | 7.35 (75)   |             |             |             |             |             |             |             |
|                                  | 100 (1.0)   | 9.21 (94)      | 9.21 (94)   |             |             |             |             |             |             |             |
| N33S                             | 40 (0.4)    | 5.39 (55)      | 5.39 (55)   |             |             |             |             |             |             |             |
|                                  | 80 (0.8)    | 10.88 (111)    | 10.88 (111) |             |             |             |             |             |             |             |
|                                  | 100 (1.0)   | 13.63 (139)    | 13.63 (139) |             |             |             |             |             |             |             |
| N40                              | 40 (0.4)    | 6.57 (67)      | 6.57 (67)   | 5.00 (51)   | 3.72 (38)   | 2.35 (24)   | 1.47 (15)   |             |             |             |
|                                  | 80 (0.8)    | 13.14 (134)    | 13.14 (134) | 10.00 (102) | 7.45 (76)   | 4.70 (48)   | 3.04 (31)   |             |             |             |
|                                  | 100 (1.0)   | 16.47 (168)    | 16.47 (168) | 12.45 (127) | 9.31 (95)   | 5.88 (60)   | 3.82 (39)   |             |             |             |
| 500S                             | 40 (0.4)    | 10.98 (112)    | 10.98 (112) | 8.33 (85)   | 6.17 (63)   | 3.92 (40)   | 2.54 (26)   | 2.54 (26)   |             |             |
|                                  | 60 (0.6)    | 16.47 (168)    | 16.47 (168) | 12.55 (128) | 9.31 (95)   | 5.98 (61)   | 3.82 (39)   | 3.82 (39)   |             |             |
|                                  | 80 (0.8)    | 21.96 (224)    | 21.96 (224) | 16.67 (170) | 12.45 (127) | 7.94 (81)   | 5.19 (53)   | 5.19 (53)   |             |             |
|                                  | 100 (1.0)   | 27.55 (281)    | 27.55 (281) | 20.88 (213) | 15.59 (159) | 9.90 (101)  | 6.47 (66)   | 6.47 (66)   |             |             |
| 650S                             | 40 (0.4)    |                |             | 14.51 (148) | 10.78 (110) | 6.86 (70)   | 4.51 (46)   | 4.51 (46)   | 3.13 (32)   | 3.13 (32)   |
|                                  | 60 (0.6)    |                |             | 21.77 (222) | 16.27 (166) | 10.29 (105) | 6.76 (69)   | 6.76 (69)   | 4.70 (48)   | 4.70 (48)   |
|                                  | 80 (0.8)    |                |             | 29.02 (296) | 21.67 (221) | 13.82 (141) | 9.02 (92)   | 9.02 (92)   | 6.37 (65)   | 6.37 (65)   |
|                                  | 100 (1.0)   |                |             | 36.28 (370) | 25.30 (258) | 17.25 (176) | 11.27 (115) | 11.27 (115) | 7.94 (81)   | 7.94 (81)   |
| 600XS                            | 40 (0.4)    |                |             |             |             | 13.82 (141) | 9.02 (92)   | 9.02 (92)   | 6.37 (65)   | 6.37 (65)   |
|                                  | 60 (0.6)    |                |             |             |             | 20.69 (211) | 13.53 (138) | 13.53 (138) | 9.51 (97)   | 9.51 (97)   |
|                                  | 80 (0.8)    |                |             |             |             | 27.69 (282) | 18.04 (184) | 18.04 (184) | 12.74 (130) | 12.74 (130) |
|                                  | 100 (1.0)   |                |             |             |             | 34.61 (353) | 22.55 (230) | 22.55 (230) | 15.88 (162) | 15.88 (162) |

Unit : MPa (kgf/cm<sup>2</sup>)

| FCI-RT (Class 900, 1500) |             |                |             |             |             |             |             |
|--------------------------|-------------|----------------|-------------|-------------|-------------|-------------|-------------|
| Actuator                 | Off-balance | Port Size (Cv) |             |             |             |             |             |
|                          |             | 0.2            | 0.4         | 0.6         | 1.0         | 1.5         | 2.0         |
| N28                      | 40 (0.4)    | 10.10 (103)    | 10.10 (103) | 7.84 (80)   | 5.19 (53)   | 5.19 (53)   | 5.19 (53)   |
|                          | 80 (0.8)    | 20.29 (207)    | 20.29 (207) | 15.69 (160) | 10.39 (106) | 10.39 (106) | 10.39 (106) |
| N33S                     | 40 (0.4)    | 14.90 (152)    | 14.90 (152) | 11.57 (118) | 7.64 (78)   | 7.64 (78)   | 7.64 (78)   |
|                          | 80 (0.8)    | 25.30 (258)    | 25.30 (258) | 23.14 (236) | 15.39 (157) | 15.39 (157) | 15.39 (157) |
| N40                      | 40 (0.4)    | 25.30 (258)    | 25.30 (258) | 25.30 (258) | 7.25 (74)   | 7.25 (74)   | 7.25 (74)   |
|                          | 80 (0.8)    |                |             |             | 14.61 (149) | 14.61 (149) | 14.61 (149) |
| 500S                     | 40 (0.4)    |                |             |             | 12.16 (124) | 12.16 (124) | 12.16 (124) |
|                          | 60 (0.6)    |                |             |             | 18.33 (187) | 18.33 (187) | 18.33 (187) |
|                          | 80 (0.8)    |                |             |             | 24.41 (249) | 24.41 (249) | 24.41 (249) |

- [Notes] (1) Unit of off-balance is kPaG (kgf/cm<sup>2</sup>G) .  
 (2) Off-balance 100kPaG (1.0kgf/cm<sup>2</sup>G) is applied only for direct action.  
 (3) This table shows the value as to standard gland packing (HTV + P4519).  
 (4) When tight shut-off (T.S.O.) is specified for contoured plug of Model FSI and FCI, allowable shut-off pressure is selected by multiply the value in above table by 1 / 1.2.

## 8. MAIN DIMENSIONS



### ■ FCI, FCI-RT Type (Port Size : 10mm, Cv ≤ 2.0)

| Face-to-center |       | Unit : mm     |        |     |
|----------------|-------|---------------|--------|-----|
| Body Size      |       | Actuator Size | Height |     |
| mm             | inch  |               | A      | B   |
| 15             | 1/2   | N28           | 76.4   | 235 |
| 20             | 3/4   | N33S          |        |     |
| 25             | 1     | N40           | 91.4   | 235 |
| 40             | 1 1/2 |               |        |     |

| Dimensions |       | Unit : mm     |        |                |                |
|------------|-------|---------------|--------|----------------|----------------|
| Body Size  |       | Actuator Size | Height |                |                |
| mm         | inch  |               | C      | C <sub>D</sub> | C <sub>R</sub> |
| 15         | 1/2   | N28           | 100    | 440            | 465            |
| 20         | 3/4   | N33S          |        | 495            | 520            |
| 25         | 1     | N40           | 92     | 620            | 640            |
| 40         | 1 1/2 |               |        |                |                |

### ■ FCI-SLT, -MPP Type

| Face-to center |       | Unit : mm |     |     |
|----------------|-------|-----------|-----|-----|
| Body Size      |       | A         | B   | C   |
| mm             | inch  |           |     |     |
| 15             | 1/2   | 96.4      | 266 | 150 |
| 20             | 3/4   |           |     |     |
| 25             | 1     | 100       | 270 | 155 |
| 40             | 1 1/2 |           | 280 | 170 |
| 50             | 2     | 120       | 330 | 245 |
| 80             | 3     | 165       | 480 | 250 |

### ■ FSI Type

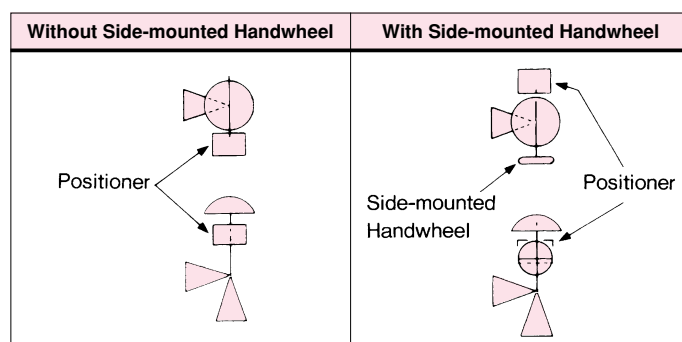
| Face-to-center |       | Unit : mm     |                       |            |     |
|----------------|-------|---------------|-----------------------|------------|-----|
| Body Size      |       | Actuator Size | A                     |            | B   |
|                |       |               | Connection and Rating |            |     |
| mm             | inch  |               | JIS 63K               | ≥ ASME 900 |     |
| 15             | 1/2   | N33S          | 76.0                  | 81.4       | 235 |
| 20             | 3/4   | N40           | 86.0                  | 91.4       |     |
| 25             | 1     | 500S          |                       |            |     |
| 40             | 1 1/2 | N40           | 96.0                  | 101.4      | 250 |
|                |       | 500S          |                       |            |     |
| 50             | 2     | N40           | 126.0                 | 131.4      | 360 |
|                |       | 500S          |                       |            |     |
| 80             | 3     | 500S          | 137.0                 | 143.4      | 390 |

| Dimensions |       | Unit : mm     |        |     |      |
|------------|-------|---------------|--------|-----|------|
| Body Size  |       | Actuator Size | Height |     |      |
| mm         | inch  |               | C      | CD  | CR   |
| 25         | 1     | N33S          | 152    | 545 | 570  |
| 40         | 1 1/2 | N40           | 205    | 725 | 745  |
| 50         | 2     |               | 230    | 750 | 770  |
| 80         | 3     | 500S          | 210    | 950 | 1100 |

**[Note]** These main dimensions are indicated for your reference. Actually be decided according to Trim size and End connection.

## 9. MOUNTING ORIENTATIONS

Standard mounting orientation is as follows.





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