

# High Pressure Service Top-Guided Single Seated Control Valves (Rating : ANSI 900 to 2500)

## Model VST

### OVERVIEW

The top guiding single seated valve with body ratings of ANSI900, JIS 63K or up has a single guided construction. Ample throttling area is proven by the guiding parts, which result in durable construction and disassembling and inspection with ease.

### SPECIFICATIONS

#### Body

**Type:** Straight-through, cast globe valve

**Nominal size:** 1, 1-1/2, 2, 2-1/2, 3, 4, 5, 6 inches

**Pressure rating:** JIS 63K, ANSI900, 1500, 2500

**End connections:**

Flange end

| Connection type | Pressure rating            | Applicable standard |
|-----------------|----------------------------|---------------------|
| RF              | JIS63K                     | JIS B2217-1967      |
|                 | ANSI Class 900, 1500, 2500 | ANSI B16.5-1968     |
|                 | JPI Class 900, 1500, 2500  | JPI-7S-15-1993      |
| RJ              | ANSI Class 900, 1500, 2500 | ANSI B16.5-1968     |
|                 | JPI Class 900, 1500, 2500  | JPI-7S-15-1993      |

Welded end (socket weld; 3 inches or less and butt weld; 2-1/2 inches or more)

**Material:** Carbon steel (SCPH2),  
Low alloy steel (SCPH21, 32, 61),  
Stainless steel (SCS13) and other alloy steel

**Gland type:** Bolted gland

**Bonnet:** Plain bonnet (0 to 200°C)  
Radiator finned bonnet (over 200°C)

**Packing:** Graphite packing and others

**Drain plug:** Optional

#### Trim

**Valve plug:** Single seated,  
Equal percentage (%C)  
Linear (LC)

#### Material

Stainless steel (SUS 304 stellite coating furnished to the seat or entire surface), SUS440C and other alloy steel

#### Actuator

##### Type

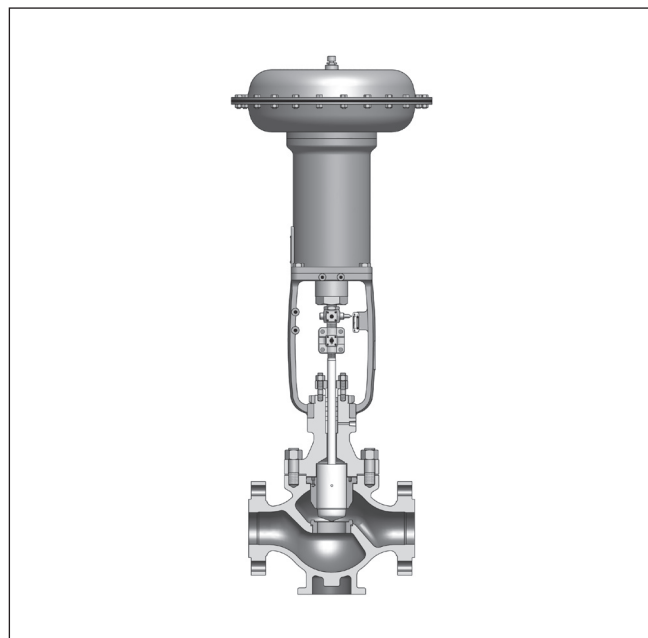
Spring type pneumatic diaphragm actuator (direct or reverse action) or model DAP springless type piston cylinder actuator

##### Diaphragm material

Chloroprene rubber with fabric reinforced

##### Spring range

20 to 98 kPa {0.2 to 1.0 kgf/cm<sup>2</sup>}  
40 to 200 kPa {0.4 to 2.0 kgf/cm<sup>2</sup>}  
20 to 180 kPa {0.2 to 1.8 kgf/cm<sup>2</sup>}  
80 to 240 kPa {0.8 to 2.4 kgf/cm<sup>2</sup>}



#### Air supply pressure

Diaphragm actuator.....250 or 270 kPa {2.6 or 2.8 kgf/cm<sup>2</sup>}  
Piston cylinder actuator.....490 kPa {5 kgf/cm<sup>2</sup>}

**Air tubing connection:** Rc1/4 internal thread  
(VA4, VA5 and DAP type: Rc1/2 with Rc1/4 adapter, also available Rc3/8 adapter)

**Ambient temperature:** -30 to +70 °C

#### Valve action

Air-to-close or air-to-open available by using direct or reverse actuator. Non-reversible body.

#### Optional accessories

Positioner, Handwheel (side or top mounted)  
Limit switch, Motion transmitter,  
Volume booster, Air lock relay and other available

#### Performance

##### Leakage specification

IEC 60534-4:2006 or JIS B 2005-4:2008  
Class IV

Leakage less than 0.01% of maximum valve capacity

**Hysteresis error (with positioner):** 1% F.S. or less

**Linearity (with positioner):** ± 1% F.S. or less

**Rangeability:** 30:1

#### Dimensions

Refer to Table 5 on page 4.

#### Finish

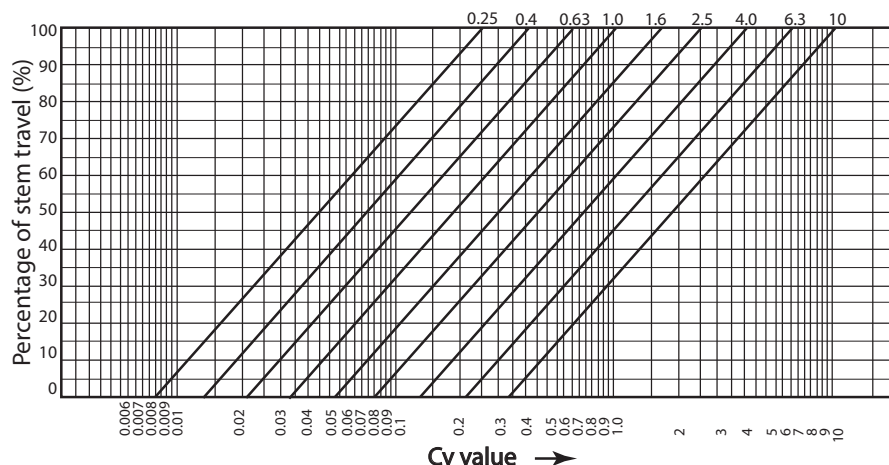
Blue (Munsell 10B5/10), silver or other specified colors.

Table 1. Cv value and rated travel

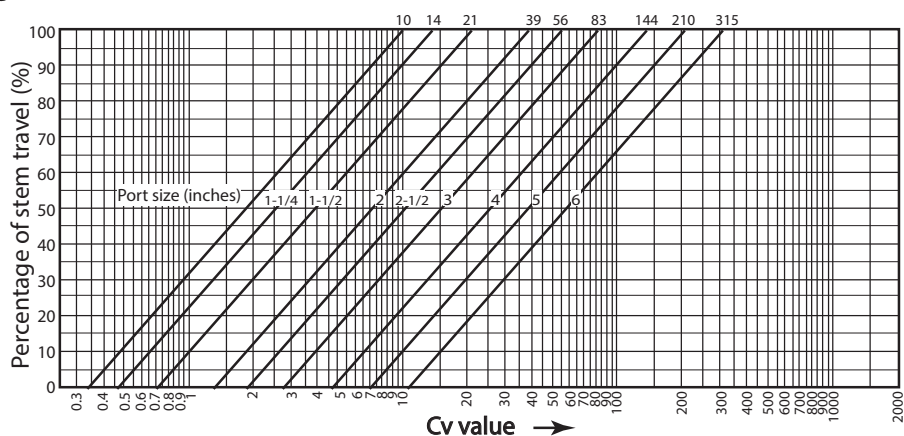
| Nominal size (inches) |               | 1                   |    | 1     |       | 2     |       | 2  |       | 3  |       | 4  |       | 5  |       | 6  |     |    |     |     |     |     |     |
|-----------------------|---------------|---------------------|----|-------|-------|-------|-------|----|-------|----|-------|----|-------|----|-------|----|-----|----|-----|-----|-----|-----|-----|
| Port size (inches)    |               | 0.25, 0.4,          | 1  | 1-1/4 | 1-1/2 | 1-1/4 | 1-1/2 | 2  | 1-1/2 | 2  | 2-1/2 | 2  | 2-1/2 | 3  | 2-1/2 | 3  | 4   | 3  | 4   | 5   | 4   | 5   | 6   |
| Rated Cv value        | JIS 63K       | 0.63, 1.0,          |    |       |       |       |       |    |       |    |       |    |       |    |       |    |     |    |     |     |     |     |     |
|                       | ANSI900, 1500 | 1.6, 2.5, 4.0, 6.3, | 10 | 14    | 21    | 14    | 21    | 39 | 21    | 39 | 56    | 39 | 56    | 83 | 56    | 83 | 144 | 83 | 144 | 210 | 144 | 210 | 315 |
|                       | ANSI2500      | 10                  | -  | 10    | 14    | 10    | 14    | 25 | 14    | 25 | 39    | 25 | 39    | 56 | 39    | 56 | 91  | 56 | 91  | 144 | 91  | 144 | 210 |
| Rated travel (mm)     |               | 14.3                | 25 |       | 25    |       | 37.5  |    | 37.5  |    | 37.5  |    | 37.5  |    | 50    |    | 50  |    |     |     |     |     |     |

## Flow characteristics

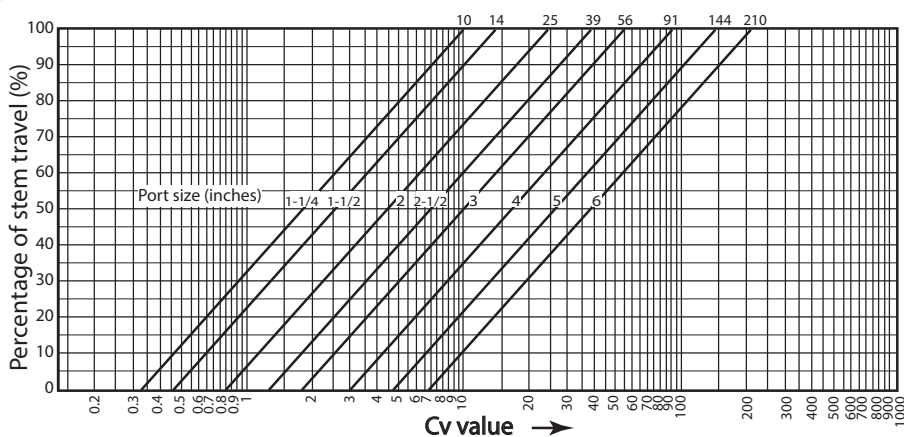
## Equal percentage



## Equal percentage (JIS 63K, ANSI 900, 1500)



## Equal percentage (ANSI 2500)



(Idealistic flow characteristics is indicated in this pragraph.)

## Allowable differential pressure

### Model VA, Spring type pneumatic diaphragm actuator (with positioner) : PTFE packing

Table 2. Air-to-close

| Rating                  | Actuator model no. | Supply pressure<br>kPa {kgf/cm <sup>2</sup> } | Spring range<br>kPa {kgf/cm <sup>2</sup> } | Differential pressure MPa {kgf/cm <sup>2</sup> } |               |               |               |               |               |              |              |              |
|-------------------------|--------------------|-----------------------------------------------|--------------------------------------------|--------------------------------------------------|---------------|---------------|---------------|---------------|---------------|--------------|--------------|--------------|
|                         |                    |                                               |                                            | Cv value or port size (inches)                   |               |               |               |               |               |              |              |              |
|                         |                    |                                               |                                            | Cv=4.0<br>or less                                | Cv=6.3        | Cv=10<br>1    | 1-1/4         | 1-1/2         | 2             | 2-1/2        | 3            | 4            |
| JIS 63K, ANSI 900, 1500 | VA3D               | 270 {2.8}                                     | 20 to 180<br>{0.2 to 1.8}                  | 20.8<br>{212}                                    | 14.7<br>{150} | 11.1<br>{113} | 6.77<br>{69}  | 4.61<br>{47}  | 2.74<br>{28}  | —            | —            | —            |
|                         |                    | 250 {2.6}                                     | 20 to 98<br>{0.2 to 1.0}                   | 24.5<br>{250}                                    | 22.9<br>{234} | 17.2<br>{175} | 10.6<br>{108} | 7.16<br>{73}  | 4.31<br>{44}  | —            | —            | —            |
|                         | VA4D               | 270 {2.8}                                     | 20 to 180<br>{0.2 to 1.8}                  | —                                                | 18.6<br>{190} | 15.4<br>{157} | 9.51<br>{97}  | 6.37<br>{65}  | 3.82<br>{39}  | 2.35<br>{24} | 1.67<br>{17} | —            |
|                         |                    | 250 {2.6}                                     | 20 to 98<br>{0.2 to 1.0}                   | —                                                | 24.5<br>{250} | 24.0<br>{245} | 14.7<br>{150} | 10.0<br>{102} | 5.98<br>{61}  | 3.63<br>{37} | 2.65<br>{27} | —            |
|                         | VA5D               | 270 {2.8}                                     | 20 to 180<br>{0.2 to 1.8}                  | —                                                | —             | 16.3<br>{166} | 12.9<br>{132} | 8.82<br>{90}  | 5.30<br>{54}  | 3.24<br>{33} | 2.35<br>{24} | 1.27<br>{13} |
|                         |                    | 250 {2.6}                                     | 20 to 98<br>{0.2 to 1.0}                   | —                                                | —             | 24.5<br>{250} | 20.3<br>{207} | 13.7<br>{140} | 8.24<br>{84}  | 5.00<br>{51} | 3.63<br>{37} | 2.06<br>{21} |
| ANSI 2500               | VA3D               | 270 {2.8}                                     | 20 to 180<br>{0.2 to 1.8}                  | 20.8<br>{212}                                    | 14.7<br>{150} | 11.1<br>{113} | 11.1<br>{113} | 6.77<br>{69}  | 4.61<br>{47}  | —            | —            | —            |
|                         |                    | 250 {2.6}                                     | 20 to 98<br>{0.2 to 1.0}                   | 31.9<br>{325}                                    | 22.9<br>{234} | 17.2<br>{175} | 17.2<br>{175} | 10.6<br>{108} | 7.16<br>{73}  | —            | —            | —            |
|                         | VA4D               | 270 {2.8}                                     | 20 to 180<br>{0.2 to 1.8}                  | —                                                | 18.6<br>{190} | 15.4<br>{157} | 15.4<br>{157} | 9.51<br>{97}  | 6.37<br>{65}  | 3.82<br>{39} | 2.35<br>{24} | —            |
|                         |                    | 250 {2.6}                                     | 20 to 98<br>{0.2 to 1.0}                   | —                                                | 29.1<br>{297} | 24.0<br>{245} | 24.0<br>{245} | 14.7<br>{150} | 10.0<br>{102} | 5.98<br>{61} | 3.63<br>{37} | —            |
|                         | VA5D               | 270 {2.8}                                     | 20 to 180<br>{0.2 to 1.8}                  | —                                                | —             | 16.3<br>{166} | 16.3<br>{166} | 12.9<br>{132} | 8.82<br>{90}  | 5.30<br>{54} | 3.24<br>{33} | 2.35<br>{24} |
|                         |                    | 250 {2.6}                                     | 20 to 98<br>{0.2 to 1.0}                   | —                                                | —             | 25.4<br>{259} | 25.4<br>{259} | 20.3<br>{207} | 13.7<br>{140} | 8.24<br>{84} | 5.00<br>{51} | 3.63<br>{37} |

Note) 1. The data inside shaded column are for standard actuator.

2. The maximum operating pressure are 10.5 MPa {107 kgf/cm<sup>2</sup>} for rating of JIS 63K and 14.7 MPa {150 kgf/cm<sup>2</sup>} for rating ANSI900.

3. When inlet pressure at operating condition is higher than differential pressure at full closure, select actuator using the inlet pressure.

Table 3. Air-to-open

| Rating                  | Actuator model no. | Supply pressure<br>kPa {kgf/cm <sup>2</sup> } | Spring range<br>kPa {kgf/cm <sup>2</sup> } | Differential pressure MPa {kgf/cm <sup>2</sup> } |               |               |               |               |              |              |              |              |
|-------------------------|--------------------|-----------------------------------------------|--------------------------------------------|--------------------------------------------------|---------------|---------------|---------------|---------------|--------------|--------------|--------------|--------------|
|                         |                    |                                               |                                            | Cv value or port size (inches)                   |               |               |               |               |              |              |              |              |
|                         |                    |                                               |                                            | Cv=4.0<br>or less                                | Cv=6.3        | Cv=10<br>1    | 1-1/4         | 1-1/2         | 2            | 2-1/2        | 3            | 4            |
| JIS 63K, ANSI 900, 1500 | VA3R               | 250 {2.6}                                     | 40 to 200<br>{0.4 to 2.0}                  | 6.86<br>{70}                                     | 4.90<br>{50}  | 3.63<br>{37}  | 2.26<br>{23}  | 1.47<br>{15}  | 0.88<br>{9}  | —            | —            | —            |
|                         |                    | 270 {2.8}                                     | 80 to 240<br>{0.8 to 2.4}                  | 16.2<br>{165}                                    | 11.3<br>{115} | 8.34<br>{85}  | 5.39<br>{55}  | 3.43<br>{35}  | 2.16<br>{22} | —            | —            | —            |
|                         | VA4R               | 250 {2.6}                                     | 40 to 200<br>{0.4 to 2.0}                  | —                                                | 6.37<br>{65}  | 4.90<br>{50}  | 3.92<br>{40}  | 2.16<br>{22}  | 1.27<br>{13} | 0.78<br>{8}  | 0.59<br>{6}  | —            |
|                         |                    | 270 {2.8}                                     | 80 to 240<br>{0.8 to 2.4}                  | —                                                | 14.7<br>{150} | 11.8<br>{120} | 7.35<br>{75}  | 4.90<br>{50}  | 2.94<br>{30} | 1.96<br>{20} | 1.27<br>{13} | —            |
|                         | VA5R               | 250 {2.6}                                     | 40 to 200<br>{0.4 to 2.0}                  | —                                                | —             | 5.39<br>{55}  | 4.41<br>{45}  | 2.94<br>{30}  | 1.76<br>{18} | 1.08<br>{11} | 0.78<br>{8}  | 0.39<br>{4}  |
|                         |                    | 270 {2.8}                                     | 80 to 240<br>{0.8 to 2.4}                  | —                                                | —             | 12.7<br>{130} | 10.3<br>{105} | 6.86<br>{70}  | 3.92<br>{40} | 2.45<br>{25} | 1.76<br>{18} | 0.98<br>{10} |
| ANSI 2500               | VA3R               | 250 {2.6}                                     | 40 to 200<br>{0.4 to 2.0}                  | 6.86<br>{70}                                     | 4.90<br>{50}  | 3.63<br>{37}  | 3.63<br>{37}  | 2.26<br>{23}  | 1.47<br>{15} | —            | —            | —            |
|                         |                    | 270 {2.8}                                     | 80 to 240<br>{0.8 to 2.4}                  | 16.2<br>{165}                                    | 11.3<br>{115} | 8.34<br>{85}  | 8.34<br>{85}  | 5.39<br>{55}  | 3.43<br>{35} | —            | —            | —            |
|                         | VA4R               | 250 {2.6}                                     | 40 to 200<br>{0.4 to 2.0}                  | —                                                | 6.37<br>{65}  | 4.90<br>{50}  | 4.90<br>{50}  | 3.92<br>{40}  | 2.16<br>{22} | 1.27<br>{13} | 0.78<br>{8}  | —            |
|                         |                    | 270 {2.8}                                     | 80 to 240<br>{0.8 to 2.4}                  | —                                                | 14.7<br>{150} | 11.8<br>{120} | 11.8<br>{120} | 7.35<br>{75}  | 4.90<br>{50} | 2.94<br>{30} | 1.96<br>{20} | —            |
|                         | VA5R               | 250 {2.6}                                     | 40 to 200<br>{0.4 to 2.0}                  | —                                                | —             | 5.39<br>{55}  | 5.39<br>{55}  | 4.41<br>{45}  | 2.94<br>{30} | 1.76<br>{18} | 1.08<br>{11} | 0.78<br>{8}  |
|                         |                    | 270 {2.8}                                     | 80 to 240<br>{0.8 to 2.4}                  | —                                                | —             | 12.7<br>{130} | 12.7<br>{130} | 10.3<br>{105} | 6.86<br>{70} | 3.92<br>{40} | 2.45<br>{25} | 1.76<br>{18} |

Note) 1. The data inside shaded column are for standard actuator.

2. The maximum operating pressure are 10.5 MPa {107 kgf/cm<sup>2</sup>} for rating of JIS 63K and 14.7 MPa {150 kgf/cm<sup>2</sup>} for rating ANSI900.

3. When inlet pressure at operating condition is higher than differential pressure at full closure, select actuator using the inlet pressure.

## Model VP, springless type piston cylinder actuator (with positioner)

Table 4. Air-to-close

| Rating                   | Actuator model No. | Supply pressure<br>kPa{kgf/cm <sup>2</sup> } | Differential pressure MPa {kgf/cm <sup>2</sup> } |               |               |               |               |               |               |               |              |              |              |
|--------------------------|--------------------|----------------------------------------------|--------------------------------------------------|---------------|---------------|---------------|---------------|---------------|---------------|---------------|--------------|--------------|--------------|
|                          |                    |                                              | Cv value or port size (inches)                   |               |               |               |               |               |               |               |              |              |              |
|                          |                    |                                              | Cv=4.0<br>or less                                | Cv=6.3        | Cv=10<br>1    | 1-1/4         | 1-1/2         | 2             | 2-1/2         | 3             | 4            | 5            | 6            |
| JIS 63K<br>ANSI900, 1500 | DAP560             | 490<br>{5.0}                                 | 24.5<br>{250}                                    | 24.5<br>{250} | 24.5<br>{250} | 24.5<br>{250} | 23.5<br>{240} | 14.2<br>{145} | 8.82<br>{90}  | 5.88<br>{60}  | 4.41<br>{45} | —            | —            |
|                          | DAP1000            | 490<br>{5.0}                                 | —                                                | —             | —             | —             | 24.5<br>{250} | 24.5<br>{250} | 14.7<br>{150} | 10.8<br>{110} | 5.88<br>{60} | 3.73<br>{38} | 2.55<br>{26} |
|                          | DAP1500            | 490<br>{5.0}                                 | —                                                | —             | —             | —             | —             | —             | 23.0<br>{235} | 16.7<br>{170} | 9.32<br>{95} | 5.78<br>{59} | 4.02<br>{41} |
| ANSI 2500                | DAP560             | 490<br>{5.0}                                 | 41.2<br>{420}                                    | 41.2<br>{420} | 39.2<br>{400} | 35.3<br>{360} | 23.5<br>{240} | 14.2<br>{145} | 8.82<br>{90}  | 5.88<br>{60}  | 4.41<br>{45} | —            | —            |
|                          | DAP1000            | 490<br>{5.0}                                 | —                                                | —             | —             | 41.2<br>{420} | 41.2<br>{420} | 24.5<br>{250} | 14.7<br>{150} | 10.8<br>{110} | 5.88<br>{60} | 4.41<br>{45} | 3.73<br>{38} |
|                          | DAP1500            | 490<br>{5.0}                                 | —                                                | —             | —             | —             | —             | 37.8<br>{385} | 23.0<br>{235} | 16.7<br>{170} | 9.32<br>{95} | 6.18<br>{63} | 5.78<br>{59} |

Note) 1. The data inside shaded column are for standard actuator.

2. The maximum operating pressure are 10.5 MPa {107 kgf/cm<sup>2</sup>} for rating of JIS 63K and 14.7 MPa {150 kgf/cm<sup>2</sup>} for rating ANSI900.

3. When inlet pressure at operating condition is higher than differential pressure at full closure, select actuator using the inlet pressure.

## DIMENSIONS

Table 5. Face-to-face dimensions

| Valve size<br>(inches) | JIS 63K RF | ANSI 900   |     | ANSI 1500  |     | ANSI 2500  |     |
|------------------------|------------|------------|-----|------------|-----|------------|-----|
|                        |            | RF, SW, BW | RJ  | RF, SW, BW | RJ  | RF, SW, BW | RJ  |
| 1                      | 275        | 290        | 290 | 290        | 290 | 290        | 290 |
| 1-1/2                  | 325        | 335        | 335 | 335        | 335 | 380        | 383 |
| 2                      | 355        | 375        | 378 | 375        | 378 | 440        | 443 |
| 2-1/2                  | 390        | 410        | 413 | 410        | 413 | 500        | 506 |
| 3                      | 435        | 440        | 443 | 460        | 463 | 540        | 546 |
| 4                      | 495        | 510        | 513 | 530        | 533 | 615        | 625 |
| 5                      | 620        | 635        | 638 | 680        | 683 | 680        | 693 |
| 6                      | 700        | 715        | 718 | 770        | 776 | 770        | 783 |

## Ordering Information

When ordering, please specify ;

- 1) Model Number: VST
- 2) Valve size × Port size of Cv required
- 3) Type and rating of end connections
- 4) Body and trim material, necessity of hardening
- 5) Plug characteristics (on-off, equal percentage, linear)
- 6) Type of bonnet
- 7) Type of actuator, air to diaphragm
- 8) Valve action (direct or reverse)
- 9) Accessories (positioner, handwheel, pressure regulator etc.)
- 10) Special requirement of degreasing, free from copper and etc.
- 11) Name of flow medium
- 12) Normal flow and maximum required flow
- 13) Pressure of flow medium, upstream and downstream pressure at maximum and minimum required flow
- 14) Temperature and specific gravity of flow medium
- 15) Viscosity of flow medium, inclusive or exclusive of slurry

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