

# Small-Port Single Seated Control Valves

Model HLS \_ \_ \_

## OVERVIEW

Small-Port Single Seated Control Valves (model HLS \_ \_ \_) are designed for heavy duty service. The compact valve body, having an S-shape flow passage that features low pressure loss, allows a large flow capacity, rangeability, and high accuracy flow characteristics.

The valve plugs are available in wide range of Cv values. The flow shutoff performance complies with the IEC or JIS standards. The actuator integrated with simplest mechanisms utilizes a compact yet powerful diaphragm actuator leaded with multiple springs.

The model HLS Control Valve are widely applicable for reliable control of small flows in high or low temperature, high pressure process lines.

Model HLS is compliant to Functional Safety Standard (IEC61508).

## SPECIFICATIONS

### Body

#### Type

Straight-through, cast globe valve

#### Nominal size

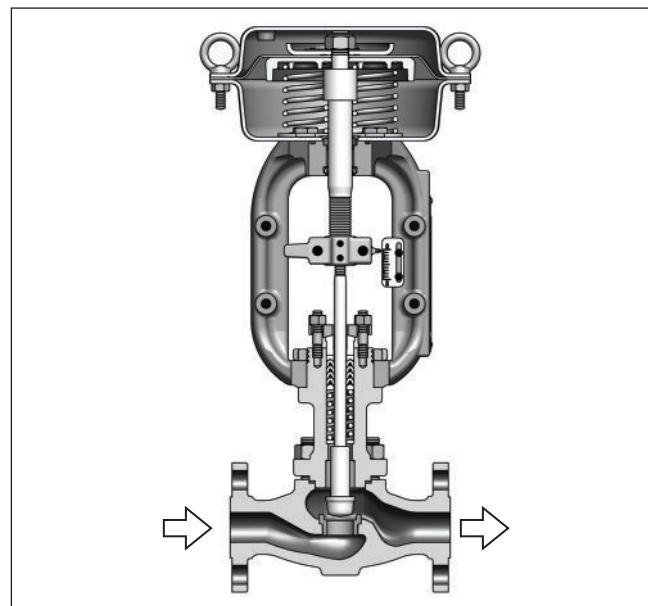
1/2, 3/4, 1 inch

#### Pressure rating and End connection

- Flanged end:

| Connection type                                      | Pressure rating            | Applicable standard |
|------------------------------------------------------|----------------------------|---------------------|
| FF                                                   | JIS10K                     | JIS B2210-1984      |
|                                                      | ANSI Class 125             | ANSI B16.5-1981     |
|                                                      | JPI Class 125              | JPI-7S-15-1993      |
| RF                                                   | JIS10K, 16K, 20K, 30K, 40K | JIS B2210-1984      |
|                                                      | ANSI Class 150, 300, 600   | ANSI B16.5-1981     |
|                                                      | JPI Class150, 300, 600     | JPI-7S-15-1993      |
| RJ, LG                                               | ANSI Class 150, 300, 600   | ANSI B16.5-1981     |
|                                                      | JPI Class 150, 300, 600    | JPI-7S-15-1993      |
| Tongue and groove(groove)<br>Male and female(female) | JIS16K, 20K, 30K, 40K      | JIS B2202-1984      |

- Welded end: SW: 1-1/2 to 2B  
BW: 2-1/2 to 8B



### Material

For body/trim material combinations and operating temperature ranges, refer to Table 1.

### Bonnet

|                        |                                |                                                       |
|------------------------|--------------------------------|-------------------------------------------------------|
| Plain bonnet           | -17 to +230 °C                 | —                                                     |
| Extention bonnet Type1 | -45 to -17 °C<br>230 to 566 °C | —                                                     |
| Extention bonnet Type2 | -100 to -45 °C                 | Integral-cast type                                    |
|                        | -196 to -100 °C                | Welded type                                           |
| Bellows type           | -50 to +350 °C                 | Formed or welded bellows (Detail is showing in Fig.2) |

Note) Take care not to exceed the operating temperature ranges specified for respective materials.

### Gland type

Bolted gland

### Packing / Grease

- Grease not provided:  
V shaped PTFE packing or PTFE yarn packing
- Grease provided:  
graphite packing

Note) PTFE: Polytetrafluoroethylene

**Gasket****Type**

Flat type, Serrated type

**Material**

Stainless steel (SUS316, SUS316L, SUS329J1), copper, aluminum, titanium, ASTM B574 (Hastelloy C-276 equivalent), or Alloy 20

*Note)* The material conforms to the material of the trim.

**Trim****Valve plug**

Single seated, Contoured type plug

- Metal seat (for flow characteristics, refer to Figure 1.)  
Equal percentage (%CF), Linear (LCF)
- Soft seat (for flow characteristics, refer to Figure 1.)  
Equal percentage (%TF), Linear (LTF)

Single seated, Quick-opening type plug

- Metal (CoCr-A) seat (QS)  
When a soft seat is required, use a contoured type soft seat.

*Note)* 1. For operating temperature or pressure range of soft seat, refer to Figure 3.

2. For rated Cv 0.01 to 0.1 cage guide trim

**Material**

For body/trim material combinations and operating temperature ranges, refer to Table 1.

*Note)* For fluid conditions requiring CoCr-A, refer to Figure 4.

**Actuator****Type**

Single acting diaphragm actuator (Type PSA, HA)

**Action**

Direct or reverse action

**Diaphragm**

Cloth embedded ethylene propylene rubber

**Spring range**

20 to 98 kPa {0.2 to 1.0 kgf/cm<sup>2</sup>} or  
80 to 240 kPa {0.8 to 2.4 kgf/cm<sup>2</sup>}

**Supply pressure**

120 to 390 kPa {1.2 to 4.0 kgf/cm<sup>2</sup>}

*Note)* Allowable differential pressure varies depending on spring range and air supply pressure.

**Air connection**

Rc1/4 or 1/4NPT internal thread

**Ambient temperature**

-30 to +70 °C

**Valve action**

Air-to-close (Direct action actuator is combined.)

Air-to-open (Reverse action actuator is combined.)

**Optional accessories**

Positioner\*, pressure regulator with filter, hand wheel\*, limit switch, solenoid valve, motion transmitter, booster relay, lock-up valve, and others.

*Note)* 1. For the optional items, refer to the specification sheets and installation drawings of respective accessories.

2. Accessories with the asterisk mark(\*) are selected from among the following types depending on the actuators to be combined.

| Actuator model | Positioner type        |                        | Hand wheel |         |
|----------------|------------------------|------------------------|------------|---------|
|                | P/P                    | I/P                    | Top        | Side    |
| PSA1           | VPE _ _ _<br>HTP _ _ _ | AVP _ _ _<br>HEP _ _ _ | Mounted    | Mounted |
| HA2            | HTP _ _ _              |                        |            |         |

**Functional Safety Standard (IEC61508) conformity:**

SIL3 capable - certified by exida Consulting LLC

**Additional specifications (by special order)**

- Special inspection  
Flow characteristics inspection, material inspection (Material certificate), non-destructive inspection, steam inspection, low-temperature inspection
- With drain plug
- Double gland
- Oil/water free treatment
- Copper free treatment
- York material SCPH2 (Yoke material of PSA1 is SCPH2 as standard)
- Stainless steel (SUS304) atmosphere-exposed nuts and bolts
- Special air piping and joint
- Sand-/dust-preventive measure
- Saline damage countermeasure
- Cold-area use specification
- Tropical-area use specification
- Vacuum service

## Performance

### Rated Cv value

Refer to Table 2.

### Flow characteristics

Refer to Figure 1.

### Inherent rangeability

Refer to Table 2.

- Optional; 75 : 1 for rated Cv 1.0 to 14

### Allowable differential pressure

Refer to Table 9 to Table 18.

### Leakage specifications

- Contoured type plug  
IEC 60534-4:2006 or JIS B 2005-4:2008  
<Metal seat>  
Standard.....Class IV: Leakage less than 0.01% of maximum valve capacity.  
Option.....Leakage less than 0.001% of maximum valve capacity.  
<Soft seat>  
Class VI: Leakage less than 0.00001% of maximum valve capacity.
- Quick opening type plug  
Leakage less than 0.00001% of maximum valve capacity

### Hysteresis error

Without positioner: Within 3% F.S. (Within 5% F.S.)

With positioner: Within 1% F.S.

### Linearity

Without positioner: Within  $\pm 5\%$  F.S.

With positioner: Within  $\pm 1\%$  F.S.

(VPE \_ \_ \_ : Within  $\pm 3\%$  F.S., AVP \_ \_ \_ & HEP \_ \_ \_ :  
Within  $\pm 2\%$  F.S.)

- Note)*
1. When positioner is not provided, operating performance may vary depending on types of packings used.
  2. Parenthesized figures are applicable to Type PSA1.

## Dimensions

Refer to Figure 7, Table 19 and Table 20.

## Weight

Refer to Table 21, Table 22 and Table 23.

## Actuator orientation

Refer to Figure 8.

## Finish

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

**Table 1. Body/trim material combinations and operating temperature ranges (°C)**

| Body material<br>Trim material | JIS  | SCPH2      | SCPH21     | SCPH61    | SCPL1       | SCS11       | SCS13A       | SCS14A       | SCS16A       | SCS19A       |
|--------------------------------|------|------------|------------|-----------|-------------|-------------|--------------|--------------|--------------|--------------|
|                                | ASTM | A216WCB    | A217WC6    | A217C5    | A352LCB     | -           | A351CF8      | A351CF8M     | A351CF3M     | A351CF3      |
| JIS SUS304                     |      | -5 to +300 | —          | —         | -45 to +300 | —           | -196 to +300 | —            | —            | —            |
| JIS SUS316                     |      | -5 to +300 | —          | —         | -45 to +300 | —           | -196 to +300 | -196 to +300 | —            | —            |
| JIS SUS304L                    |      | —          | —          | —         | -45 to +300 | —           | -196 to +300 | —            | —            | -196 to +300 |
| JIS SUS316L                    |      | -5 to +300 | -5 to +300 | —         | -45 to +300 | —           | -196 to +300 | -196 to +300 | -196 to +300 | -196 to +300 |
| JIS SUS440C                    |      | -5 to +425 | -5 to +425 | -5 to 425 | —           | —           | —            | —            | —            | —            |
| JIS SUS329J1                   |      | —          | —          | —         | —           | -5 to +300  | —            | -196 to +300 | —            | —            |
| JIS SUS304 CoCr-A              |      | -5 to +425 | -5 to +550 | -5 to 566 | -45 to +350 | —           | -196 to +550 | —            | —            | —            |
| JIS SUS304 CoCr-A face         |      | -5 to +425 | -5 to +550 | -5 to 566 | -45 to +350 | —           | -196 to +550 | —            | —            | —            |
| JIS SUS316 CoCr-A              |      | -5 to +425 | -5 to +550 | -5 to 566 | -45 to +350 | —           | -196 to +550 | -196 to +550 | —            | —            |
| JIS SUS316 CoCr-A face         |      | -5 to +425 | -5 to +550 | -5 to 566 | -45 to +350 | —           | -196 to +550 | -196 to +550 | —            | —            |
| JIS SUS304L CoCr-A             |      | —          | —          | —         | -45 to +350 | —           | -196 to +550 | —            | —            | -196 to +450 |
| JIS SUS316L CoCr-A             |      | —          | —          | —         | -45 to +350 | —           | -196 to +450 | -196 to +450 | -196 to +450 | -196 to +450 |
| JIS SUS329J1 CoCr-A            |      | —          | —          | —         | —           | -50 to +550 | —            | -196 to +550 | —            | —            |
| JIS SUS304 Soft seat           |      | -5 to +230 | —          | —         | -45 to +230 | —           | -80 to +230  | —            | —            | —            |
| JIS SUS316 Soft seat           |      | -5 to +230 | —          | —         | -45 to +230 | —           | -80 to +230  | -80 to +230  | —            | —            |
| JIS SUS316L Soft seat          |      | —          | —          | —         | -45 to +230 | —           | -80 to +230  | -80 to +230  | -80 to +230  | -80 to +230  |
| JIS SUS329J1 Soft seat         |      | —          | —          | —         | —           | -50 to +230 | —            | -80 to +230  | —            | —            |

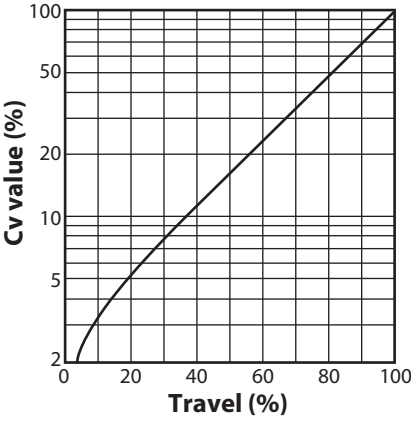
| Body material<br>Trim material              | JIS  | SCPH2      | SCS13A       | SCS14A       | SCS16A       | SCS19A       | Titanium     | ASTM CW-12MW (Hastelloy C equivalent) | SCS23        |
|---------------------------------------------|------|------------|--------------|--------------|--------------|--------------|--------------|---------------------------------------|--------------|
|                                             | ASTM | A216WCB    | A351CF8      | A351CF8M     | A351CF3M     | A351CF3      | —            | —                                     | —            |
| JIS Titanium with weld Nitride overlay      |      | —          | —            | —            | —            | —            | -196 to +315 | —                                     | —            |
| JIS Titanium                                |      | —          | —            | —            | —            | —            | -196 to +315 | —                                     | —            |
| JIS ASTM B574 (Hastelloy C-276 equivalent ) |      | —          | —            | —            | —            | —            | —            | -196 to +450                          | —            |
| JIS Alloy 20                                |      | —          | —            | —            | —            | —            | —            | —                                     | -196 to +300 |
| JIS Nickel-Copper Alloy                     |      | -5 to +300 | -196 to +300 | -196 to +300 | -196 to +300 | -196 to +300 | —            | —                                     | —            |

Note) “ ” shows standard combination of value body and trim materials.

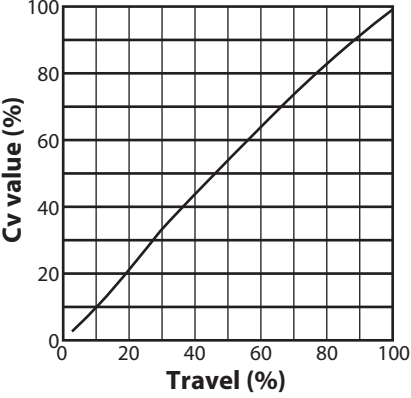
**Table 2. Cv value and travel**

| Plug type/ characteristics / Rated travel (mm) / Rated Cv value |                          |                        | 0.01                                                                                 | 0.04 | 0.1  | 0.16 | 0.25 | 0.4 | 0.63 | 1.0  | 1.6 | 2.5 | 4.0 | 6.3 | 10 | 14 |   |
|-----------------------------------------------------------------|--------------------------|------------------------|--------------------------------------------------------------------------------------|------|------|------|------|-----|------|------|-----|-----|-----|-----|----|----|---|
| Contoured type                                                  | Metal seat               | Equal percentage (%CF) | 14.3                                                                                 |      |      |      |      | ✓   | ✓    | ✓    | ✓   | ✓   | ✓   | ✓   | ✓  | ✓  |   |
|                                                                 |                          | Linear (LCF)           |                                                                                      | ✓    | ✓    | ✓    | ✓    | ✓   | ✓    | ✓    | ✓   | ✓   | ✓   | ✓   | ✓  |    |   |
|                                                                 | Soft seat                | Equal percentage (%TF) |                                                                                      |      |      |      |      | ✓   | ✓    | ✓    | ✓   | ✓   | ✓   | ✓   | ✓  | ✓  | ✓ |
|                                                                 |                          | Linear (LTF)           |                                                                                      |      |      |      | ✓    | ✓   | ✓    | ✓    | ✓   | ✓   | ✓   | ✓   | ✓  | ✓  | ✓ |
| Quick-opening type                                              | Metal (CoCr-A) seat (QS) |                        | 6.0                                                                                  |      |      |      |      |     |      |      |     |     |     |     | ✓  | ✓  |   |
| Inherent rangeability                                           |                          |                        |                                                                                      | 20:1 | 25:1 | 20:1 |      |     | 30:1 | 50:1 |     |     |     |     |    |    |   |
| Nominal size (inch)                                             |                          | 1/2 inch               |  |      |      |      |      |     |      |      |     |     |     |     |    |    |   |
|                                                                 |                          | 3/4 inch               |  |      |      |      |      |     |      |      |     |     |     |     |    |    |   |
|                                                                 |                          | 1 inch                 |  |      |      |      |      |     |      |      |     |     |     |     |    |    |   |

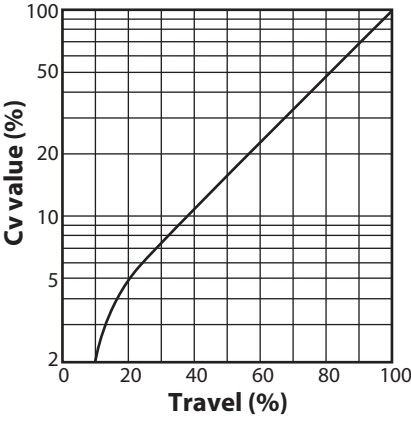
Note) “✓” denotes production ranges.



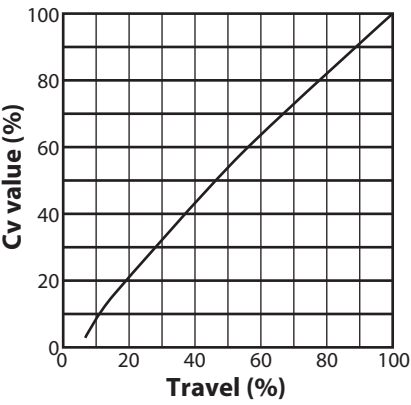
a. Equal percentage characteristics (%CF Metal seat)



b. Linear characteristics (LCF Metal seat)



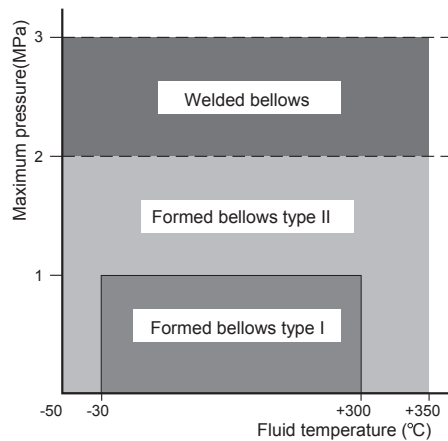
c. Equal percentage characteristics (%TF Soft seat)



d. Linear characteristics (LTF Soft seat)

**Figure 1. Flow characteristics: Contoured type (Cv value: 0.4 to 1.4)**

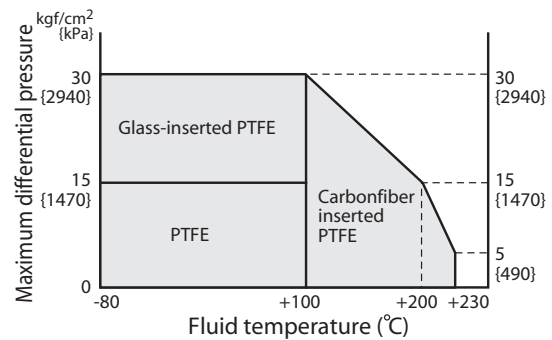
*Note) The above graphs indicate typical flow characteristics.*



**Figure 2. Bellows Type by Temperature and Pressure Ranges**

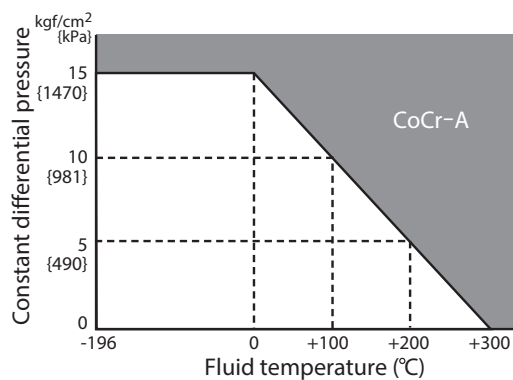
Note) Bellows type are classified into Formed bellows type I, II and welded bellows by temperature and pressure ranges.

Please refer to No. SS2-BSL100-0100 about detail of bellows specification.



**Figure 3. Temperature and maximum differential pressure range for soft-seat**

Note) If there is any possibility to cause erosion due to saturated steam or superheated-water, use the metal seat.



**Figure 4. Temperature / normal differential pressure ranges requiring CoCr-A**

- Note) 1. When cavitation / flashing service, oil prohibitive service, or retention of valve-close performance is required, use of CoCr-A is recommended regardless of temperature or differential pressure.
2. SUS440C hardened Stainless steel is recommended for valves for cavitation / flashing service of water or for superheated service of water of higher than 100°C.
3. When rated Cv value is 0.16 or lower, CoCr-A faced valve plugs or 440C hardened Stainless steel valve plugs are standard.

**Table 3. Gland packing**

According to your application, select appropriate type of gland packing from the following:

| Application                                                                                              | Packing configuration                                            | Fluid temp range         | Material                                  |
|----------------------------------------------------------------------------------------------------------|------------------------------------------------------------------|--------------------------|-------------------------------------------|
|                                                                                                          |                                                                  | Maximum working pressure |                                           |
| General use<br>(Oil, Various chemical, Acid and Alkali, etc)                                             | PTFE yarn packing                                                | -17 to +230 °C           | PTFE fiber yarn<br>with carbon fiber core |
|                                                                                                          |                                                                  | 10MPa Max.               |                                           |
| General use or Oil free                                                                                  | V shaped pure PTFE packing                                       | -196 to +230 °C          | Pure PTFE                                 |
|                                                                                                          |                                                                  | 10MPa Max.               |                                           |
| Vacuum                                                                                                   | V shaped pure PTFE packing<br>(Dir.+Rev.)                        | -196 to +230 °C          | Pure PTFE                                 |
|                                                                                                          |                                                                  | 10MPa Max.               |                                           |
| Low temperature                                                                                          | V shaped pure PTFE packing                                       | Up to -196 °C            | Pure PTFE                                 |
|                                                                                                          |                                                                  | 10MPa Max.               |                                           |
| High temperature                                                                                         | Expanded graphite packing +<br>Expanded graphite yarn packing *1 | +500 °C Max.             | Graphite                                  |
|                                                                                                          |                                                                  | 43MPa Max.               |                                           |
| Measures against VOC *2<br>exhaust regulation<br>[ISO15848-1 compliant low emis-<br>sion packing system] | Packing with Live Load structure                                 | *3                       | *3                                        |

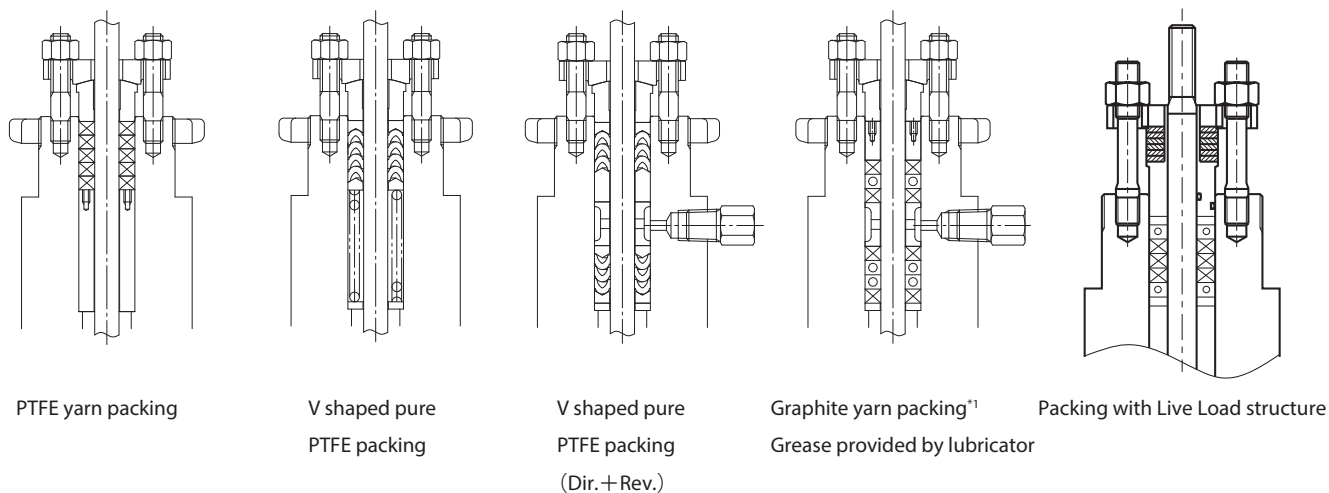
Note) PTFE: polytetrafluoroethylene resin

\*1. Grease provided

It cannot be applied to PSA1 actuator (spring range 20 to 98 kPa).

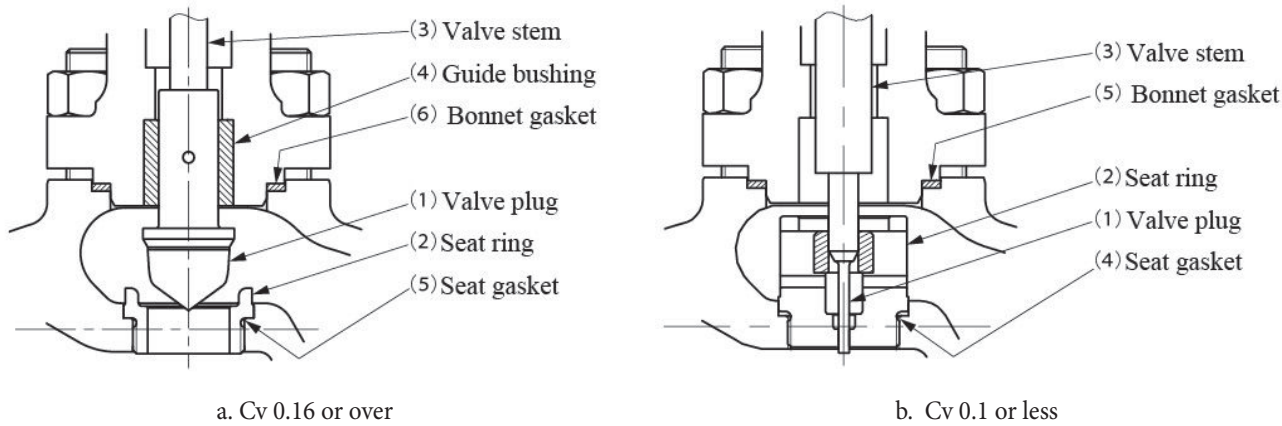
\*2. Volatile Organic Compound

\*3. Refer to special spec sheet No.SS2-SSL100-0100 about detail of Low emission gland packing.

**Figure 5. Gland Packing structure**

**Structural drawing of trim and body/trim material combinations**

Following table shows typical body/trim material combinations.  
Please contact us about materials that are not listed in this table.



**Figure 6. Structural drawing of micro flow trim**



**Table 4. The valve body material is carbon steel (SCPH2/A216WCB)**

|                                 |                                                    |         |                                     |                                                    |                                     |              |                          |              |                          |              |
|---------------------------------|----------------------------------------------------|---------|-------------------------------------|----------------------------------------------------|-------------------------------------|--------------|--------------------------|--------------|--------------------------|--------------|
| (1) Valve plug<br>(2) Seat ring | SUS316<br>SUS304                                   | SUS440C | SUS316 CoCr-A<br>SUS316 CoCr-A face |                                                    | SUS304 CoCr-A<br>SUS304 CoCr-A face |              | SUS316 soft seat         |              | SUS304 soft seat         |              |
|                                 | General                                            | General | General                             | Oil-free                                           | General                             | Oil-free     | General                  | Oil-free     | General                  | Oil-free     |
| (3) Valve stem                  | SUS316                                             |         |                                     |                                                    |                                     |              |                          |              |                          |              |
| (4) Guide bushing               | SUS440C                                            |         | SUS316<br>CoCr-A                    | Solid CoCr-A                                       | SUS316<br>CoCr-A                    | Solid CoCr-A | SUS440C                  | Solid CoCr-A | SUS440C                  | Solid CoCr-A |
| (5) Seat gasket                 | Without<br>(Design temperature:<br>-17 to +230 °C) |         | SUS316<br>(PTFE coating)            | Without<br>(Design temperature:<br>-17 to +230 °C) | SUS316<br>(PTFE coating)            | Without      | SUS316<br>(PTFE coating) | Without      | SUS316<br>(PTFE coating) |              |
|                                 | SUS316<br>(Design temperature:<br>above 230 °C)    |         |                                     | SUS316<br>(Design temperature:<br>above 230 °C)    |                                     |              |                          |              |                          |              |
| (6) Bonnet gasket               | SUS316                                             |         | SUS316<br>(PTFE coating)            | SUS316                                             | SUS316<br>(PTFE coating)            | SUS316       | SUS316<br>(PTFE coating) | SUS316       | SUS316<br>(PTFE coating) |              |

**Table 5. The valve body material is stainless steel (SCS13A/A351CF8)**

|                                 |                                                                     |                                     |                                                                     |                                     |                                                    |                             |                                                    |                             |              |
|---------------------------------|---------------------------------------------------------------------|-------------------------------------|---------------------------------------------------------------------|-------------------------------------|----------------------------------------------------|-----------------------------|----------------------------------------------------|-----------------------------|--------------|
| (1) Valve plug<br>(2) Seat ring | SUS316<br>SUS304                                                    | SUS316 CoCr-A<br>SUS316 CoCr-A face |                                                                     | SUS304 CoCr-A<br>SUS304 CoCr-A face |                                                    | SUS316 soft seat            |                                                    | SUS304 soft seat            |              |
|                                 | General                                                             | General                             | Oil-free                                                            | General                             | Oil-free                                           | General                     | Oil-free                                           | General                     | Oil-free     |
| (3) Valve stem                  | SUS316                                                              |                                     |                                                                     |                                     |                                                    |                             |                                                    |                             |              |
| (4) Guide bushing               | SUS316                                                              | Solid CoCr-A                        |                                                                     |                                     |                                                    | SUS316                      | Solid CoCr-A                                       | SUS316                      | Solid CoCr-A |
| (5) Seat gasket                 | Without<br>(Design temperature:<br>-17 to +230 °C)                  | SUS316<br>(PTFE<br>coating)         | Without<br>(Design temperature:<br>-17 to +230 °C)                  | SUS316<br>(PTFE<br>coating)         | Without<br>(Design temperature:<br>-17 to +230 °C) | SUS316<br>(PTFE<br>coating) | Without<br>(Design temperature:<br>-17 to +230 °C) | SUS316<br>(PTFE<br>coating) |              |
|                                 | SUS316<br>(Design temperature:<br>below -17 °C and<br>above 230 °C) |                                     | SUS316<br>(Design temperature:<br>below -17 °C and<br>above 230 °C) |                                     | SUS316<br>(Design temperature:<br>below -17 °C)    |                             |                                                    |                             |              |
| (6) Bonnet gasket               | SUS316                                                              | SUS316<br>(PTFE<br>coating)         | SUS316                                                              | SUS316<br>(PTFE<br>coating)         | SUS316                                             | SUS316<br>(PTFE<br>coating) | SUS316                                             | SUS316<br>(PTFE<br>coating) |              |

**Table 6. The valve body material is stainless steel (SCS14A/A351CF8M)**

|                                 |                                                                  |                                     |                          |                                                    |                          |
|---------------------------------|------------------------------------------------------------------|-------------------------------------|--------------------------|----------------------------------------------------|--------------------------|
| (1) Valve plug<br>(2) Seat ring | SUS316                                                           | SUS316 CoCr-A<br>SUS316 CoCr-A face |                          | SUS316 soft seat                                   |                          |
|                                 | General                                                          | General                             | Oil-free                 | General                                            | Oil-free                 |
| (3) Valve stem                  | SUS316                                                           |                                     |                          |                                                    |                          |
| (4) Guide bushing               | SUS316                                                           | Solid CoCr-A                        |                          | SUS316                                             | Solid CoCr-A             |
| (5) eat gasket                  | Without<br>(Design temperature: -17 to +230 °C)                  |                                     | SUS316<br>(PTFE coating) | Without<br>(Design temperature:<br>-17 to +230 °C) | SUS316<br>(PTFE coating) |
|                                 | SUS316<br>(Design temperature:<br>below -17 °C and above 230 °C) |                                     |                          | SUS316<br>(Design temperature:<br>below -17 °C)    |                          |
| (6) Bonnet gasket               | SUS316                                                           |                                     | SUS316<br>(PTFE coating) | SUS316                                             | SUS316<br>(PTFE coating) |

Cv 0.1 or less

**Table 7. The valve body material is carbon steel (SCPH2/A216WCB)**

|                                 |                                     |  |                       |                                     |                       |
|---------------------------------|-------------------------------------|--|-----------------------|-------------------------------------|-----------------------|
| (1) Valve plug<br>(2) Seat ring | SUS316 CoCr-A<br>SUS316 CoCr-A face |  |                       | SUS304 CoCr-A<br>SUS304 CoCr-A face |                       |
|                                 | General                             |  | Oil-free              | General                             | Oil-free              |
| (3) Valve stem                  | SUS316                              |  |                       |                                     |                       |
| (4) Seat gasket                 | Without                             |  | SUS316 (PTFE coating) | Without                             | SUS316 (PTFE coating) |
| (5) Bonnet gasket               | SUS316                              |  | SUS316 (PTFE coating) | SUS316                              | SUS316 (PTFE coating) |

**Table 8. The valve body material is stainless steel (SCS13A/A351CF8 or SCS14A/A351CF8M)**

|                                 |                                     |  |                       |                                     |                       |
|---------------------------------|-------------------------------------|--|-----------------------|-------------------------------------|-----------------------|
| Body material                   | SCS13A/A351CF8<br>SCS14A/A351CF8M   |  |                       | SCS13A/A351CF8                      |                       |
| (1) Valve plug<br>(2) Seat ring | SUS316 CoCr-A<br>SUS316 CoCr-A face |  |                       | SUS304 CoCr-A<br>SUS304 CoCr-A face |                       |
|                                 | General                             |  | Oil-free              | General                             | Oil-free              |
| (3) Valve stem                  | SUS316                              |  |                       |                                     |                       |
| (4) Seat gasket                 | Without                             |  | SUS316 (PTFE coating) | Without                             | SUS316 (PTFE coating) |
| (5) Bonnet gasket               | SUS316                              |  | SUS316 (PTFE coating) | SUS316                              | SUS316 (PTFE coating) |

## Allowable differential pressure

### Contoured-type metal seat (%CF, LCF) : PTFE packing

Table 9. Air-to-close

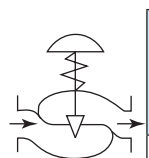
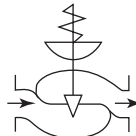
|  | Actuator Model No. | Supply Pressure kPa{kgf/cm <sup>2</sup> } | Spring range kPa {kgf/cm <sup>2</sup> } | Positioner | Differential pressure {by Cv value} kPa {kgf/cm <sup>2</sup> } |              |              |              |              |              |              |              |              |              |              |
|----------------------------------------------------------------------------------|--------------------|-------------------------------------------|-----------------------------------------|------------|----------------------------------------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
|                                                                                  |                    |                                           |                                         |            | Below 0.1                                                      | 0.16 to 0.25 | 0.4          | 0.63         | 1.0          | 1.6          | 2.5          | 4.0          | 6.3          | 10           | 14           |
| PSA1D                                                                            | 140 {1.4}          | 20 to 98 {0.2 to 1.0}                     | △                                       |            | —                                                              | 3920* {40.0} | 3040 {31.0}  | 3040 {31.0}  | 1570 {16.0}  | 1570 {16.0}  | 981 {10.0}   | 981 {10.0}   | 550 {5.6}    | 410 {4.2}    | 250 {2.6}    |
|                                                                                  |                    |                                           |                                         |            | —                                                              | 5490 {56.0}  |              |              |              |              |              |              |              |              |              |
|                                                                                  | 160 {1.6}          | 20 to 98 {0.2 to 1.0}                     | ✓                                       |            | —                                                              | 3920* {40.0} | 3920* {40.0} | 3920* {40.0} | 3920* {40.0} | 3920* {40.0} | 3920* {40.0} | 3920* {40.0} | 2740 {28.0}  | 2060 {21.0}  | 1270 {13.0}  |
|                                                                                  |                    |                                           |                                         |            | —                                                              | 9810 {100}   |              |              |              |              |              |              |              |              |              |
|                                                                                  | 390 {4.0}          | 80 to 240 {0.8 to 2.4}                    | ✓                                       |            | 3920* {40.0}                                                   | —            | —            | —            | —            | —            | 3920* {40.0} | 3920* {40.0} | 3920* {40.0} | 3920* {40.0} | 3820 {39.0}  |
|                                                                                  |                    |                                           |                                         |            | 9810 {100}                                                     |              |              |              |              |              |              |              |              |              |              |
| HA2D                                                                             | 140 {1.4}          | 20 to 98 {0.2 to 1.0}                     | △                                       |            | —                                                              | 3920* {40.0} | 3920* {40.0} | 3920* {40.0} | 3200 {32.6}  | 3200 {32.6}  | 1960 {20.0}  | 1960 {20.0}  | 1070 {10.9}  | 800 {8.2}    | 490 {5.0}    |
|                                                                                  |                    |                                           |                                         |            | —                                                              | 9810 {100}   |              |              |              |              |              |              |              |              |              |
|                                                                                  | 160 {1.6}          | 20 to 98 {0.2 to 1.0}                     | ✓                                       |            | —                                                              | —            | 3920* {40.0} | 3920* {40.0} | 3920* {40.0} | 3920* {40.0} | 3920* {40.0} | 3920* {40.0} | 3920* {40.0} | 3920* {40.0} | 2470 {25.2}  |
|                                                                                  |                    |                                           |                                         |            | —                                                              |              |              |              |              |              |              |              |              |              |              |
|                                                                                  | 390 {4.0}          | 80 to 240 {0.8 to 2.4}                    | ✓                                       |            | 3920* {40.0}                                                   | —            | —            | —            | —            | —            | —            | —            | 3920* {40.0} | 3920* {40.0} | 3920* {40.0} |
|                                                                                  |                    |                                           |                                         |            | 9810 {100}                                                     |              |              |              |              |              |              |              |              |              |              |

Table 10. Air-to-open



| Actuator Model No. | Supply pressure kPa{kgf/cm <sup>2</sup> } | Spring range kPa{kgf/cm <sup>2</sup> } | Positioner | Differential pressure {by Cv value} kPa {kgf/cm <sup>2</sup> } |              |              |              |              |              |              |              |              |             |             |  |
|--------------------|-------------------------------------------|----------------------------------------|------------|----------------------------------------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-------------|-------------|--|
|                    |                                           |                                        |            | Below 0.1                                                      | 0.16 to 0.25 | 0.4          | 0.63         | 1.0          | 1.6          | 2.5          | 4.0          | 6.3          | 10          | 14          |  |
| PSA1R              | 140 {1.4}                                 | 20 to 98 {0.2 to 1.0}                  | △          | —                                                              | 3920* {40.0} | 3040 {31.0}  | 3040 {31.0}  | 1570 {16.0}  | 1570 {16.0}  | 981 {10.0}   | 981 {10.0}   | 550 {5.6}    | 410 {4.2}   | 250 {2.6}   |  |
|                    |                                           |                                        |            | —                                                              | 5490 {56.0}  |              |              |              |              |              |              |              |             |             |  |
|                    | 270 {2.8}                                 | 80 to 240 {0.8 to 2.4}                 | ✓          | —                                                              | 3920* {40.0} | 3920* {40.0} | 3920* {40.0} | 3920* {40.0} | 3920* {40.0} | 3920* {40.0} | 3920* {40.0} | 3820 {39.0}  | 2840 {29.0} | 1760 {18.0} |  |
|                    |                                           |                                        |            | —                                                              | 9810 {100}   | 9810 {100}   | 9810 {100}   | 9810 {100}   | 9810 {100}   | 7060 {72.0}  | 7060 {72.0}  |              |             |             |  |
| HA2R               | 140 {1.4}                                 | 20 to 98 {0.2 to 1.0}                  | △          | —                                                              | 3920* {40.0} | 3920* {40.0} | 3920* {40.0} | 3200 {32.6}  | 3200 {32.6}  | 1960 {20.0}  | 1960 {20.0}  | 1070 {10.9}  | 800 {8.2}   | 490 {5.0}   |  |
|                    |                                           |                                        |            | —                                                              | 9810 {100}   | 6080 {62.0}  | 6080 {62.0}  |              |              |              |              |              |             |             |  |
|                    | 270 {2.8}                                 | 80 to 240 {0.8 to 2.4}                 | ✓          | —                                                              | 3920* {40.0} | 3920* {40.0} | 3920* {40.0} | 3920* {40.0} | 3920* {40.0} | 3920* {40.0} | 3920* {40.0} | 3920* {40.0} | 3920 {40.0} | 3430 {35.0} |  |
|                    |                                           |                                        |            | —                                                              | 9810 {100}   | 9810 {100}   | 9810 {100}   | 9810 {100}   | 9810 {100}   | 9810 {100}   | 9810 {100}   | 7450 {75.9}  | 5490 {56.0} |             |  |

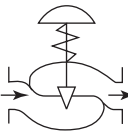
Note) 1. ✓: Positioner is necessary, △: Can be operated either with or without positioner.

2. Take care not to cause the maximum allowable differential pressure to exceed the maximum operating pressure designated by ANSI B 16. 34-1981 or JIS B2201-1984.
3. The upper figures denote the operating allowable differential pressure. The lower denote allowable differential pressure at full closure.
4. When liquid service the operating allowable differential pressure with an asterisk(\*) should be read as 2940 kPa {30 kgf/cm<sup>2</sup>}. When operating differential pressure of liquid exceeds 2940 kPa {30 kgf/cm<sup>2</sup>}, use model HLC. (Refer to the Specification sheet No.SS2-8113-0210.)

## Allowable differential pressure

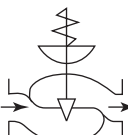
### Contoured type soft seat (%TF, LTF) : PTFE packing

Table 11. Air-to-close



| Actuator Model No. | Supply Pressure<br>kPa{kgf/cm <sup>2</sup> } | Spring range<br>kPa{kgf/cm <sup>2</sup> } | Positioner | Differential pressure {by Cv value} kPa {kgf/cm <sup>2</sup> } |             |             |             |             |             |             |             |             |             |
|--------------------|----------------------------------------------|-------------------------------------------|------------|----------------------------------------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
|                    |                                              |                                           |            | Below 0.25                                                     | 0.4         | 0.63        | 1.0         | 1.6         | 2.5         | 4.0         | 6.3         | 10          | 14          |
| PSA1D              | 140 {1.4}                                    | 20 to 98 {0.2 to 1.0}                     | △          | 710 {7.2}                                                      | 710 {7.2}   | 710 {7.2}   | 710 {7.2}   | 710 {7.2}   | 710 {7.2}   | 710 {7.2}   | 390 {4.0}   | 280 {2.9}   | 180 {1.8}   |
|                    | 160 {1.6}                                    | 20 to 98 {0.2 to 1.0}                     | ✓          | 2940 {30.0}                                                    | 2940 {30.0} | 2940 {30.0} | 2940 {30.0} | 2940 {30.0} | 2940 {30.0} | 2940 {30.0} | 1860 {19.0} | 1370 {14.0} | 890 {9.1}   |
|                    | 390 {4.0}                                    | 80 to 240 {0.8 to 2.4}                    | ✓          | —                                                              | —           | —           | —           | —           | —           | —           | 2940 {30.0} | 2940 {30.0} | 2650 {27.0} |
| HA2D               | 140 {1.4}                                    | 20 to 98 {0.2 to 1.0}                     | △          | 1960 {20.0}                                                    | 1960 {20.0} | 1960 {20.0} | 1960 {20.0} | 1960 {20.0} | 1370 {14.0} | 1370 {14.0} | 740 {7.6}   | 560 {5.7}   | 340 {3.5}   |
|                    | 160 {1.6}                                    | 20 to 98 {0.2 to 1.0}                     | ✓          | —                                                              | 2940 {30.0} | 2940 {30.0} | 2940 {30.0} | 2940 {30.0} | 2940 {30.0} | 2940 {30.0} | 2940 {30.0} | 2740 {28.0} | 1720 {17.6} |
|                    | 390 {4.0}                                    | 80 to 240 {0.8 to 2.4}                    | ✓          | —                                                              | —           | —           | —           | —           | —           | —           | 2940 {30.0} | 2940 {30.0} | 2940 {30.0} |

Table 12. Air-to-open



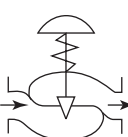
| Actuator Model No. | Supply Pressure<br>kPa{kgf/cm <sup>2</sup> } | Spring range<br>kPa{kgf/cm <sup>2</sup> } | Positioner | Differential pressure {by Cv value} kPa {kgf/cm <sup>2</sup> } |             |             |             |             |             |             |             |             |             |
|--------------------|----------------------------------------------|-------------------------------------------|------------|----------------------------------------------------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
|                    |                                              |                                           |            | Below 0.25                                                     | 0.4         | 0.63        | 1.0         | 1.6         | 2.5         | 4.0         | 6.3         | 10          | 14          |
| PSA1R              | 140 {1.4}                                    | 20 to 98 {0.2 to 1.0}                     | △          | 710 {7.2}                                                      | 710 {7.2}   | 710 {7.2}   | 710 {7.2}   | 710 {7.2}   | 710 {7.2}   | 710 {7.2}   | 390 {4.0}   | 280 {2.9}   | 180 {1.8}   |
|                    | 270 {2.8}                                    | 80 to 240 {0.8 to 2.4}                    | ✓          | 2940 {30.0}                                                    | 2940 {30.0} | 2940 {30.0} | 2940 {30.0} | 2940 {30.0} | 2940 {30.0} | 2940 {30.0} | 2650 {27.0} | 1960 {20.0} | 1180 {12.0} |
| HA2R               | 140 {1.4}                                    | 20 to 98 {0.2 to 1.0}                     | △          | 1960 {20.0}                                                    | 1960 {20.0} | 1960 {20.0} | 1960 {20.0} | 1960 {20.0} | 1370 {14.0} | 1370 {14.0} | 740 {7.6}   | 560 {5.7}   | 340 {3.5}   |
|                    | 270 {2.8}                                    | 80 to 240 {0.8 to 2.4}                    | ✓          | —                                                              | 2940 {30.0} | 2940 {30.0} | 2940 {30.0} | 2940 {30.0} | 2940 {30.0} | 2940 {30.0} | 2940 {30.0} | 2940 {30.0} | 2350 {24.0} |

Note) 1. ✓: Positioner is necessary, △: Can be operated either with or without positioner.

2. Take care not to cause the maximum allowable differential pressure to exceed the maximum operating pressure designated by ANSI B 16. 34-1981 or JIS B2201-1984.

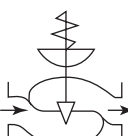
### Quick-opening type metal (CoCr-A) seat (QS) : PTFE packing

Table 13. Air-to-close



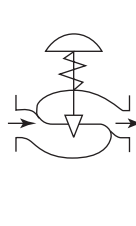
| Action Model No. | Supply pressure<br>kPa {kgf/cm <sup>2</sup> } | Spring range<br>kPa {kgf/cm <sup>2</sup> } | Differential pressure kPa {kgf/cm <sup>2</sup> } |             |
|------------------|-----------------------------------------------|--------------------------------------------|--------------------------------------------------|-------------|
|                  |                                               |                                            | Cv=10                                            | Cv=14       |
| PSA1D            | 140 {1.4}                                     | 20 {0.2}                                   | 720 {7.3}                                        | 490 {5.0}   |
|                  | 290 {3.0}                                     | 20 {0.2}                                   | 1960 {20.0}                                      | 1760 {18.0} |
| HA2D             | 140 {1.4}                                     | 20 to 52 {0.2 to 0.53}                     | 1430 {14.6}                                      | 1270 {13.0} |
|                  | 290 {3.0}                                     | 20 to 52 {0.2 to 0.53}                     | 3920 {40.0}                                      | 3630 {37.0} |

Table 14. Air-to-open

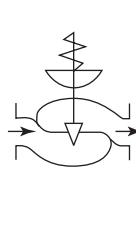


| Action Model No. | Supply pressure<br>kPa {kgf/cm <sup>2</sup> } | Initial spring compression<br>kPa {kgf/cm <sup>2</sup> } | Differential pressure kPa {kgf/cm <sup>2</sup> } |             |
|------------------|-----------------------------------------------|----------------------------------------------------------|--------------------------------------------------|-------------|
|                  |                                               |                                                          | Cv=10                                            | Cv=14       |
| PSA1R            | 140 {1.4}                                     | 40 {0.4}                                                 | 330 {3.4}                                        | 290 {3.0}   |
|                  | 270 {2.8}                                     | 80 {0.8}                                                 | 670 {6.8}                                        | 590 {6.0}   |
| HA2R             | 140 {1.4}                                     | 40 {0.4}                                                 | 660 {6.7}                                        | 590 {6.0}   |
|                  | 270 {2.8}                                     | 80 {0.8}                                                 | 1320 {13.5}                                      | 1190 {12.1} |

Note) Take care not to cause the maximum allowable differential pressure to exceed the maximum operating pressure designated by ANSI B16. 34-1981 or JIS B2201-1984.

**Contoured type metal seat (%CF, LCF) : Graphite packing "P6610CH+P6528" (+230 to +500 °C)****Table 15. Air-to-close**


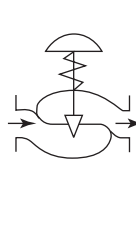
| Actuator Model No. | Supply Pressure kPa{kgf/cm <sup>2</sup> } | Spring range kPa{kgf/cm <sup>2</sup> } | Positioner | Differential pressure {by Cv value} kPa {kgf/cm <sup>2</sup> } |              |              |              |              |              |              |              |              |              |              |
|--------------------|-------------------------------------------|----------------------------------------|------------|----------------------------------------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
|                    |                                           |                                        |            | Below 0.1                                                      | 0.16 to 0.25 | 0.4          | 0.63         | 1.0          | 1.6          | 2.5          | 4.0          | 6.3          | 10           | 14           |
| HA1D               | 390 {4.0}                                 | 80 to 240 {0.8 to 2.4}                 | ✓          | 3920* {40.0}                                                   | 3920* {40.0} | 3920* {40.0} | 3920* {40.0} | 3920* {40.0} | 3920* {40.0} | 3920* {40.0} | 3920* {40.0} | 3920* {40.0} | 3920* {40.0} | 3920* {40.0} |
|                    |                                           |                                        |            | 9810 {100}                                                     | 9810 {100}   | 9810 {100}   | 9810 {100}   | 9810 {100}   | 9810 {100}   | 9810 {100}   | 9810 {100}   | 9810 {100}   | 9810 {100}   | 6240 {63.6}  |

**Table 16. Air-to-open**


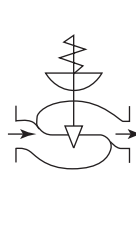
| Actuator Model No. | Supply Pressure kPa{kgf/cm <sup>2</sup> } | Spring range kPa{kgf/cm <sup>2</sup> } | Positioner | Differential pressure {by Cv value} kPa {kgf/cm <sup>2</sup> } |              |              |              |              |              |              |              |              |              |             |
|--------------------|-------------------------------------------|----------------------------------------|------------|----------------------------------------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-------------|
|                    |                                           |                                        |            | Below 0.1                                                      | 0.16 to 0.25 | 0.4          | 0.63         | 1.0          | 1.6          | 2.5          | 4.0          | 6.3          | 10           | 14          |
| HA1R               | 270 {2.8}                                 | 80 to 240 {0.8 to 2.4}                 | ✓          | 3920* {40.0}                                                   | 3920* {40.0} | 3920* {40.0} | 3920* {40.0} | 3920* {40.0} | 3920* {40.0} | 3920* {40.0} | 3920* {40.0} | 3920* {40.0} | 3920* {40.0} | 2710 {27.6} |
|                    |                                           |                                        |            | 9810 {100}                                                     | 9810 {100}   | 9810 {100}   | 9810 {100}   | 9810 {100}   | 9810 {100}   | 9810 {100}   | 9810 {100}   | 5900 {60.1}  | 4400 {44.8}  |             |

Note) 1. ✓ : Positioner is necessary.

- Take care not to cause the maximum allowable differential pressure to exceed the maximum operating pressure designated by JIS B 2201-1984 or ANSI B 16.34-1981.
- The upper figures denote the operating allowable differential pressure. The lower denote allowable differential pressure at full closure.
- When liquid service, the operating allowable differential pressure with an asterisk(\*) should be read as 2940 kPa {30 kgf/cm<sup>2</sup>}. When operating differential pressure of liquid exceeds 2940 kPa {30 kgf/cm<sup>2</sup>}, use model HLC. (Refer to the Specification sheet No.SS-8113-0210)

**Contoured type metal seat (%CF, LCF) : Graphite packing "P6610CH+M8590" (+500 to +560 °C)****Table 17. Air-to-close**


| Actuator Model No. | Supply Pressure kPa{kgf/cm <sup>2</sup> } | Spring range kPa{kgf/cm <sup>2</sup> } | Positioner | Differential pressure {by Cv value} kPa {kgf/cm <sup>2</sup> } |              |              |              |              |              |              |              |              |              |              |
|--------------------|-------------------------------------------|----------------------------------------|------------|----------------------------------------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|
|                    |                                           |                                        |            | Below 0.1                                                      | 0.16 to 0.25 | 0.4          | 0.63         | 1.0          | 1.6          | 2.5          | 4.0          | 6.3          | 10           | 14           |
| HA2D               | 390 {4.0}                                 | 80 to 240 {0.8 to 2.4}                 | ✓          | 3920* {40.0}                                                   | 3920* {40.0} | 3920* {40.0} | 3920* {40.0} | 3920* {40.0} | 3920* {40.0} | 3920* {40.0} | 3920* {40.0} | 3920* {40.0} | 3920* {40.0} | 3920* {40.0} |
|                    |                                           |                                        |            | 9810 {100}                                                     | 9810 {100}   | 9810 {100}   | 9810 {100}   | 9810 {100}   | 9810 {100}   | 9810 {100}   | 9810 {100}   | 9810 {100}   | 9450 {96.3}  | 5840 {59.5}  |

**Table 18. Air-to-open**


| Actuator Model No. | Supply Pressure kPa{kgf/cm <sup>2</sup> } | Spring range kPa{kgf/cm <sup>2</sup> } | Positioner | Differential pressure {by Cv value} kPa {kgf/cm <sup>2</sup> } |              |              |              |              |              |              |              |              |             |             |
|--------------------|-------------------------------------------|----------------------------------------|------------|----------------------------------------------------------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|--------------|-------------|-------------|
|                    |                                           |                                        |            | Below 0.1                                                      | 0.16 to 0.25 | 0.4          | 0.63         | 1.0          | 1.6          | 2.5          | 4.0          | 6.3          | 10          | 14          |
| HA2R               | 270 {2.8}                                 | 80 to 240 {0.8 to 2.4}                 | ✓          | 3920* {40.0}                                                   | 3920* {40.0} | 3920* {40.0} | 3920* {40.0} | 3920* {40.0} | 3920* {40.0} | 3920* {40.0} | 3920* {40.0} | 3920* {40.0} | 3750 {38.2} | 2310 {23.5} |
|                    |                                           |                                        |            | 9810 {100}                                                     | 9810 {100}   | 9810 {100}   | 9810 {100}   | 9810 {100}   | 9810 {100}   | 9810 {100}   | 9260 {94.4}  | 5020 {51.1}  |             |             |

Note) 1. ✓ : Positioner is necessary.

- Take care not to cause the maximum allowable differential pressure to exceed the maximum operating pressure designated by JIS B 2201-1984 or ANSI B 16.34-1981.
- The upper figures denote the operating allowable differential pressure. The lower denote allowable differential pressure at full closure.
- When liquid service, the operating allowable differential pressure with an asterisk(\*) should be read as 2940 kPa {30 kgf/cm<sup>2</sup>}. When operating differential pressure of liquid exceeds 2940 kPa {30 kgf/cm<sup>2</sup>}, use model HLC. (Refer to the Specification sheet No.SS-8113-0210)

## DIMENSIONS

Table 19. Face-to-face dimensions

[Unit: mm]

| Nominal size (inch) |                                                | 1/2 | 3/4 | 1   |
|---------------------|------------------------------------------------|-----|-----|-----|
| A                   | JIS 10K FF, RF      ANSI 150 RF      *         |     |     |     |
|                     | ANSI 125 FF      JPI 150 RF                    | 184 | 184 | 184 |
|                     | JPI 125 FF                                     |     |     |     |
|                     | JIS 16K RF                                     | 190 | 190 | 193 |
|                     | JIS 20K RF      ANSI 300 RF      *             |     |     |     |
|                     | JIS 30K RF      JPI 300 RF                     | 194 | 194 | 197 |
|                     | JIS 40K RF      JPI 600 RF SW, BW              |     |     |     |
|                     | ANSI 600 RF      *                             | 206 | 206 | 210 |
|                     | ANSI 150 RJ      JPI 150 RJ                    | —   | —   | 197 |
|                     | ANSI 300 RJ      JPI 300 RJ                    | 206 | 206 | 210 |
|                     | ANSI 600 RJ      JPI 600 RJ                    | 206 | 206 | 210 |
|                     | JIS 20K      Tongue and groove male and female | 198 | 198 | 198 |
|                     | JIS 30K      Tongue and groove male and female | 208 | 208 | 212 |
|                     | ANSI 300 LG      JPI 300                       | 203 | 203 | 206 |

Note) \*: Face-to-face dimensions conform to following standards.

-IEC 60534-3-1:2001

-JIS B 2005-3-1:2005

Table 20. External dimensions

[Unit: mm]

| Actuator<br>model no. | H               |                               |                         |             |                         | ϕ B | B   | E  |
|-----------------------|-----------------|-------------------------------|-------------------------|-------------|-------------------------|-----|-----|----|
|                       | Plain<br>bonnet | Extension<br>bonnet<br>Type 1 | Extension bonnet Type 2 |             | Bellows -type<br>bonnet |     |     |    |
|                       |                 |                               | Integral cast type      | Welded type |                         |     |     |    |
| PSA1D, R              | 416             | 566                           | 726                     | 941         | 576                     | 218 | 230 | 40 |
| HA2D, R               | 450             | 600                           | 760                     | 975         | 608                     | 267 | 281 | 40 |

Note) "H" dimensions are applicable when a hand wheel is not provided. When a top-mounted hand wheel actuator is used, add the dimensions of hand wheel specified on Specification Sheets (No.SS2-8213-0500).

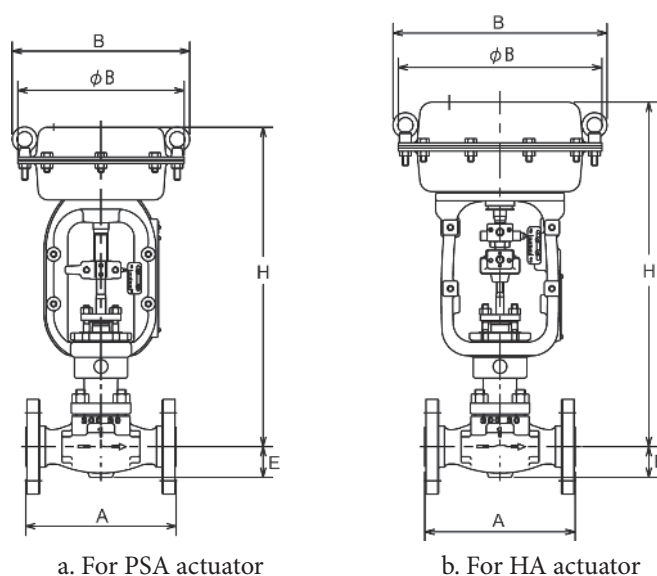


Figure 7. Face-to-face and external dimensions

## Weight

**Table 21. Screwed end connection type**

[Unit: kg]

| Nominal size (inch) | Actuator model | Weight       |                         |                         |             |                     |
|---------------------|----------------|--------------|-------------------------|-------------------------|-------------|---------------------|
|                     |                | Plain bonnet | Extension bonnet Type 1 | Extension bonnet Type 2 |             | Bellows-type bonnet |
|                     |                |              |                         | Integral cast type      | Welded type |                     |
| 1/2                 | PSA1D, R       | 13           | 15                      | 18                      | 23          | 16                  |
| 3/4                 | PSA2D, R       | 20           | 22                      | 25                      | 30          | 23                  |
| 1                   |                |              |                         |                         |             |                     |

**Table 22. Flanged end connection type**

[Unit: kg]

| Nominal size (inch) | Actuator model No. | Weight                               |                       |                         |             |                     |                                                     |                         |                         |             |                     |
|---------------------|--------------------|--------------------------------------|-----------------------|-------------------------|-------------|---------------------|-----------------------------------------------------|-------------------------|-------------------------|-------------|---------------------|
|                     |                    | JIS 10K, ANSI 125, 150, JPI 125, 150 |                       |                         |             |                     | JIS 16K, 20K, 30K, 40K, ANSI 300, 600, JPI 300, 600 |                         |                         |             |                     |
|                     |                    | Plain bonnet                         | Extension bonnet type | Extension bonnet Type 2 |             | Bellows-type bonnet | Plain bonnet                                        | Extension bonnet Type 1 | Extension bonnet Type 2 |             | Bellows-type bonnet |
|                     |                    |                                      |                       | Integral-cast type      | Welded type |                     |                                                     |                         | Integral-cast type      | Welded type |                     |
| 1/2                 | PSA1D,R            | 15                                   | 17                    | 20                      | 25          | 18                  | 16                                                  | 18                      | 21                      | 26          | 19                  |
|                     | HA2D,R             | 22                                   | 24                    | 27                      | 32          | 25                  | 23                                                  | 25                      | 28                      | 33          | 26                  |
| 3/4                 | PSA1D,R            | 16                                   | 18                    | 21                      | 26          | 19                  | 17                                                  | 19                      | 22                      | 27          | 20                  |
|                     | HA2D,R             | 23                                   | 25                    | 28                      | 33          | 26                  | 24                                                  | 26                      | 29                      | 34          | 27                  |
| 1                   | PSA1D,R            | 16                                   | 18                    | 21                      | 26          | 19                  | 17                                                  | 19                      | 22                      | 27          | 20                  |
|                     | HA2D,R             | 23                                   | 25                    | 28                      | 33          | 26                  | 24                                                  | 26                      | 29                      | 34          | 27                  |

**Table 23. Welded type**

[Unit: kg]

| Nominal size (inch) | Actuator model No. | Weight       |                         |                         |             |                     |
|---------------------|--------------------|--------------|-------------------------|-------------------------|-------------|---------------------|
|                     |                    | Plain bonnet | Extension bonnet Type 1 | Extension bonnet Type 2 |             | Bellows-type bonnet |
|                     |                    |              |                         | Integral cast type      | Welded type |                     |
| 1/2, 3/4, 1 (SW)    | PSA1D, R           | 14           | 16                      | 19                      | 24          | 19                  |
|                     | HA2D, R            | 21           | 23                      | 26                      | 31          | 26                  |

Note) Indicate by position number when installation other than the standard type is required.

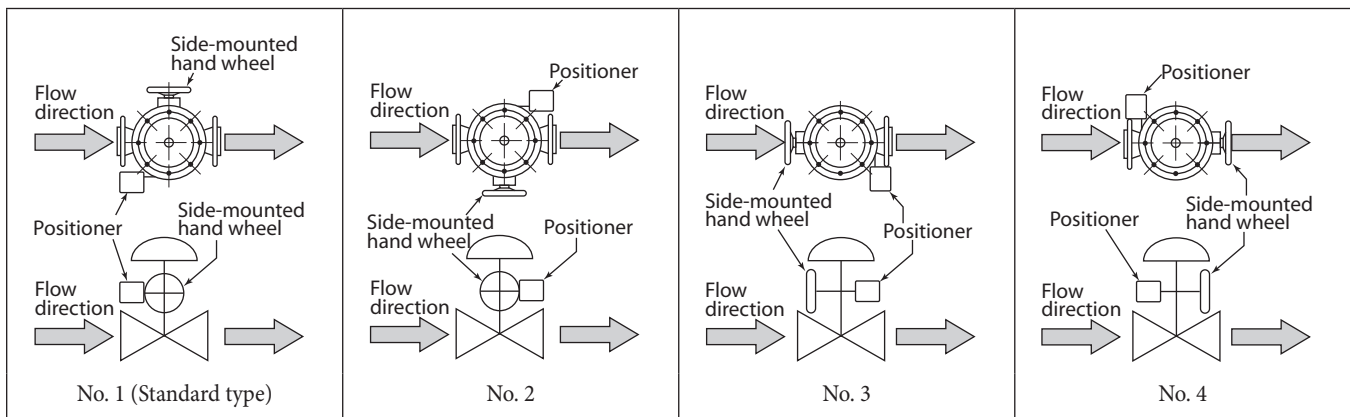


Figure 8. Actuator orientation

### Ordering information

When ordering, please specify;

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

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