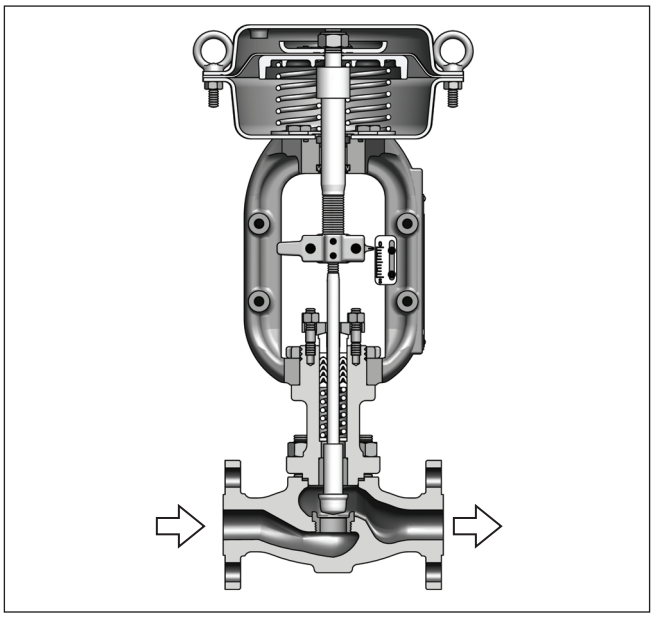
Small-Port Single Seated Control Valves

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) 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 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^2} or
80 to 240 kPa {0.8 to 2.4 kgf/cm^2}

Supply pressure

120 to 390 kPa {1.2 to 4.0 kgf/cm^2}

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 _ _–_ HTP–_ _	AVP_ _ _ 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 ± 5% F.S.
With positioner: Within ± 1% F.S.
(VPE _ _-_ : Within ±3% F.S., AVP _ _ _ &HEP _ _ _ : Within ± 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 / 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	——	——

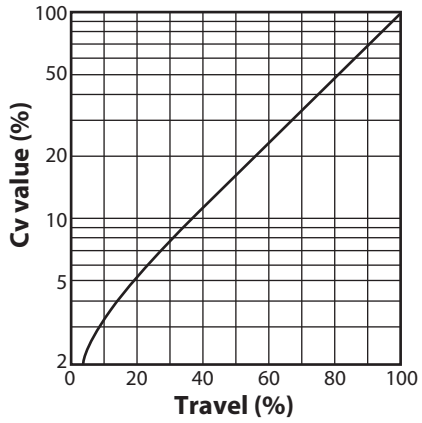
Body material / Trim material		JIS	SCPH2	SCS13A	SCS14A	SCS16A	SCS19A	Titanium	ASTM CW-12MW (Hastelloy C equivalent)	SCS23
		ASTM	A216WCB	A351CF8	A351CF8M	A351CF3M	A351CF3	——	——	——
JIS	Titanium with weld Nitride overlay		——	——	——	——	——	-196 to +315	——	——
JIS	Titanium		——	——	——	——	——	-196 to +315	——	——
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.

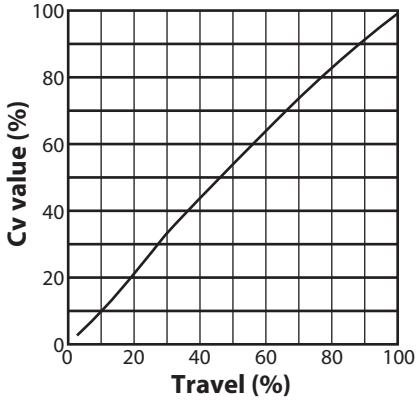
Table 2. Cv value and travel

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			◄													

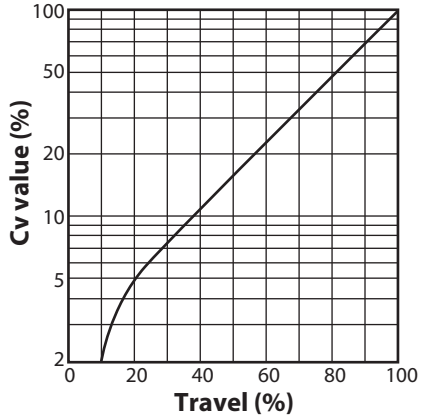
Note) "✓" denotes production ranges.



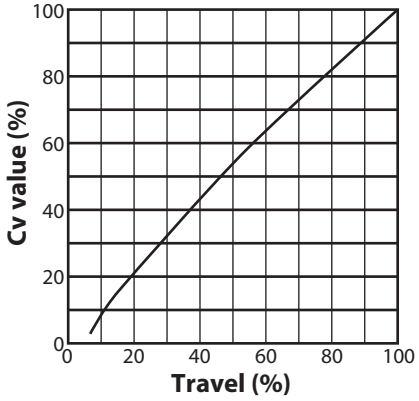
a. Equal percentage characteristics (%CF Metal seat)



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.

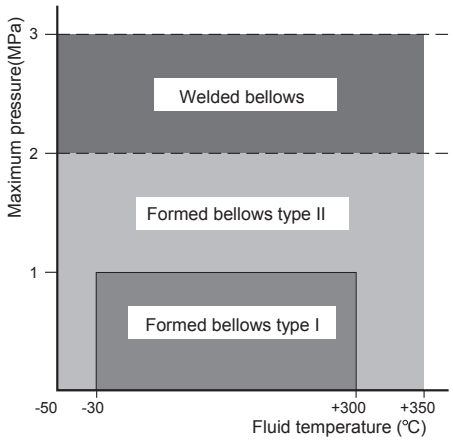


Figure 2. Bellows Type by Temperature and Pressure Ranges

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.

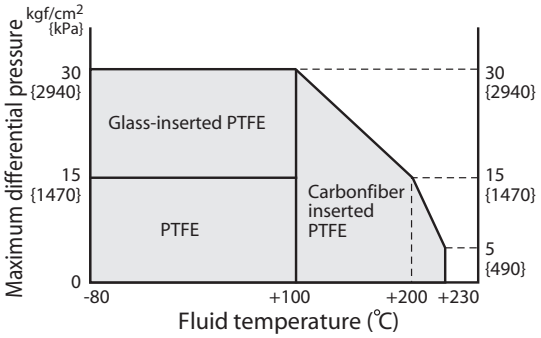


Figure 3. Temperature and maximum differential pressure range for soft-seat

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

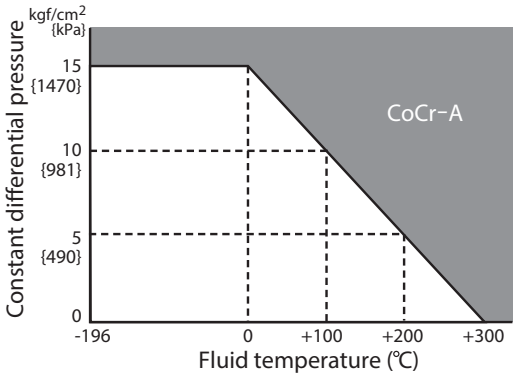


Figure 4. Temperature / normal differential pressure ranges requiring CoCr-A

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:

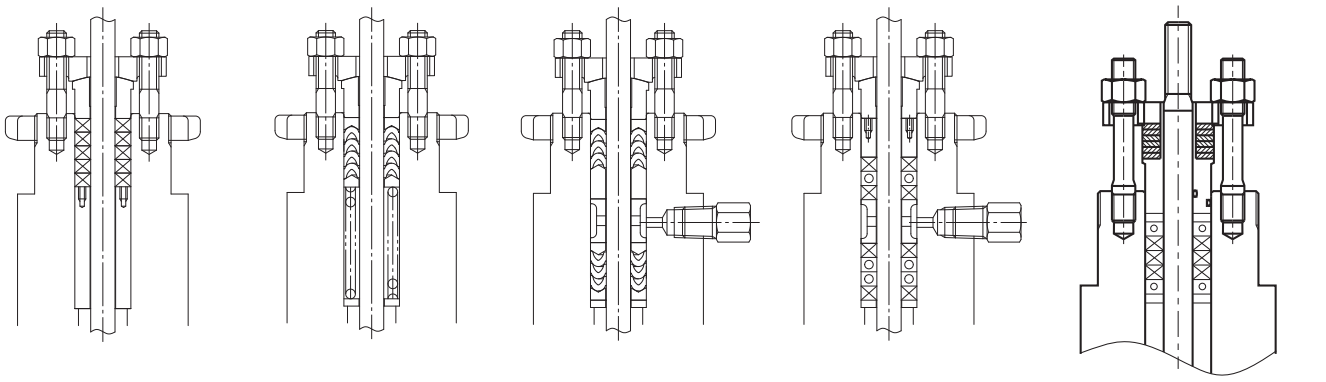
Application	Packing configuration	Fluid temp range Maximum working pressure	Material
General use (Oil, Various chemical, Acid and Alkali, etc)	PTFE yarn packing	-17 to +230 °C 10MPa Max.	PTFE fiber yarn with carbon fiber core
General use or Oil free	V shaped pure PTFE packing	-196 to +230 °C 10MPa Max.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



PTFE yarn packing

V shaped pure PTFE packing

V shaped pure PTFE packing (Dir.+Rev.)

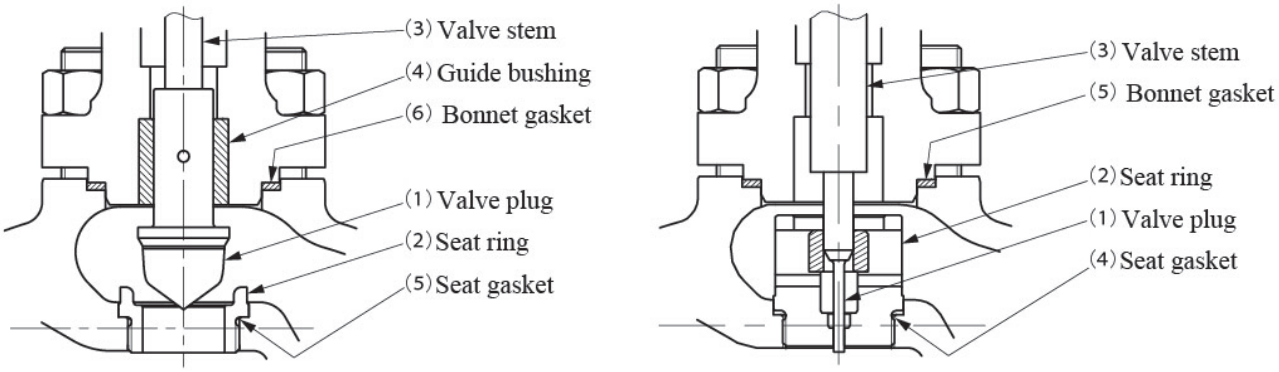
Graphite yarn packing*1 Grease provided by lubricator

Packing with Live Load structure

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.



a. Cv 0.16 or over b. Cv 0.1 or less

Figure 6. Structural drawing of micro flow trim

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

(1) Valve plug (2) Seat ring	SUS316 SUS304	SUS440C	SUS316 CoCr-A SUS316 CoCr-A face		SUS304 CoCr-A 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 CoCr-A	Solid CoCr-A	SUS316 CoCr-A	Solid CoCr-A	SUS440C	Solid CoCr-A	SUS440C	Solid CoCr-A
(5) Seat gasket	Without (Design temperature: -17 to +230 °C)		SUS316 (PTFE coating)		Without (Design temperature: -17 to +230 °C)	SUS316 (PTFE coating)	Without	SUS316 (PTFE coating)	Without	SUS316 (PTFE coating)
	SUS316 (Design temperature: above 230 °C)				SUS316 (Design temperature: above 230 °C)					
(6) Bonnet gasket	SUS316		SUS316 (PTFE coating)		SUS316	SUS316 (PTFE coating)	SUS316	SUS316 (PTFE coating)	SUS316	SUS316 (PTFE coating)

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

(1) Valve plug (2) Seat ring	SUS316 SUS304	SUS316 CoCr-A SUS316 CoCr-A face		SUS304 CoCr-A 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 (Design temperature: -17 to +230 °C)	SUS316 (PTFE coating)		Without (Design temperature: -17 to +230 °C)	SUS316 (PTFE coating)	Without (Design temperature: -17 to +230 °C)	SUS316 (PTFE coating)	Without (Design temperature: -17 to +230 °C)	SUS316 (PTFE coating)
	SUS316 (Design temperature: below -17 °C and above 230 °C)			SUS316 (Design temperature: below-17 °C and above 230 °C)		SUS316 (Design temperature: below -17 °C)		SUS316 (Design temperature: below -17 °C)	
(6) Bonnet gasket	SUS316	SUS316 (PTFE coating)		SUS316	SUS316 (PTFE coating)	SUS316	SUS316 (PTFE coating)	SUS316	SUS316 (PTFE coating)

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

(1) Valve plug (2) Seat ring	SUS316	SUS316 CoCr-A 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 (Design temperature: -17 to +230 °C)		SUS316 (PTFE coating)	Without (Design temperature: -17 to +230 °C)	SUS316 (PTFE coating)
	SUS316 (Design temperature: below -17 °C and above 230 °C)			SUS316 (Design temperature: below -17 °C)	
(6) Bonnet gasket	SUS316		SUS316 (PTFE coating)	SUS316	SUS316 (PTFE coating)

Cv 0.1 or less

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

(1) Valve plug (2) Seat ring	SUS316 CoCr-A SUS316 CoCr-A face		SUS304 CoCr-A 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)

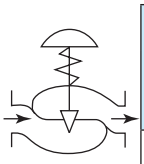
Table 8. The valve body material is stainless steel (SCS13A/A351CF8 or SCS14A/A351CF8M)

Body material	SCS13A/A351CF8 SCS14A/A351CF8M		SCS13A/A351CF8	
(1) Valve plug (2) Seat ring	SUS316 CoCr-A SUS316 CoCr-A face		SUS304 CoCr-A 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

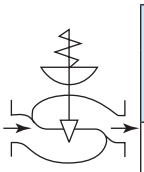
Contoured-type metal seat (%CF, LCF) : PTFE packing

Table 9. Air-to-close



Actuator Model No.	Supply Pressure kPa{kgf/cm²}	Spring range kPa {kgf/cm²}	Positioner	Differential pressure {by Cv value} kPa {kgf/cm²}										
				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}	9810 {100}	9810 {100}	8240 {84.0}	8240 {84.0}	5100 {52.0}	5100 {52.0}			
	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}						9810 {100}	9810 {100}	8240 {84.0}	6180 {63.0}	
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}	6080 {62.0}	6080 {62.0}							
	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}	3920* {40.0}	2470 {25.2}
				——		9810 {100}	9810 {100}	9810 {100}	9810 {100}	9810 {100}	9810 {100}	5300 {54.0}		
	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}								9810 {100}	9810 {100}	7350 {75.0}

Table 10. Air-to-open



Actuator Model No.	Supply pressure kPa{kgf/cm²}	Spring range kPa{kgf/cm²}	Positioner	Differential pressure {by Cv value} kPa {kgf/cm²}									
				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.

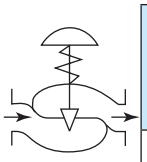
3. The upper figures denote the operating allowable differential pressure. The lower denote allowable differential pressure at full closure.

4. When liquid service the operating allowable differential pressure with an asterisk(*) should be read as 2940 kPa {30 kgf/cm²}. When operating differential pressure of liquid exceeds 2940 kPa {30 kgf/cm²}, use model HLC. (Refer to the Specification sheet No.SS2-8113-0210.)

Allowable differential pressure

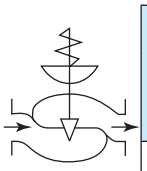
Contoured type soft seat (%TF, LTF) : PTFE packing

Table 11. Air-to-close



Actuator Model No.	Supply Pressure kPa{kgf/cm²}	Spring range kPa{kgf/cm²}	Positioner	Differential pressure {by Cv value} kPa {kgf/cm²}									
				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



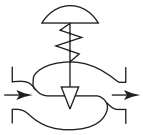
Actuator Model No.	Supply Pressure kPa{kgf/cm²}	Spring range kPa{kgf/cm²}	Positioner	Differential pressure {by Cv value} kPa {kgf/cm²}									
				Below 0.25	0.4	0.63	1.0	1.6	2.5	4.0	6.3	10	14
PSA1R	140 {1.4}	20 to 98 {0.2 to 1.0}	△	710 {7.2}	710 {7.2}	710 {7.2}	710 {7.2}	710 {7.2}	710 {7.2}	710 {7.2}	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.

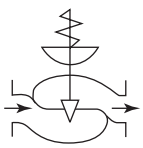
Quick-opening type metal (CoCr-A) seat (QS) : PTFE packing

Table 13. Air-to-close



Action Model No.	Supply pressure kPa {kgf/cm²}	Spring range kPa {kgf/cm²}	Differential pressure kPa {kgf/cm²}	
			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

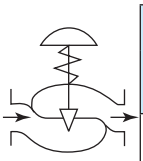


Action Model No.	Supply pressure kPa {kgf/cm²}	Initial spring compression kPa {kgf/cm²}	Differential pressure kPa {kgf/cm²}	
			Cv=10	Cv=14
PSA1R	140{1.4}	40{0.4}	330{3.4}	290{3.0}
	270{2.8}	80{0.8}	670{6.8}	590{6.0}
HA2R	140{1.4}	40{0.4}	660{6.7}	590{6.0}
	270{2.8}	80{0.8}	1320{13.5}	1190{12.1}

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.

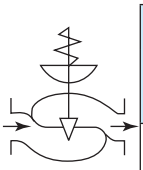
Contoured type metal seat (%CF, LCF) : Graphite packing "P6610CH+P6528"(+230 to +500 °C)

Table 15. Air-to-close



Actuator Model No.	Supply Pressure kPa{kgf/cm²}	Spring range kPa{kgf/cm²}	Positioner	Differential pressure {by Cv value} kPa {kgf/cm²}										
				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/cm²}	Spring range kPa{kgf/cm²}	Positioner	Differential pressure {by Cv value} kPa {kgf/cm²}										
				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.

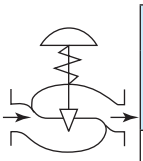
2. Take care not to cause the maximum allowable differential pressure to exceed the maximum operating pressure designated by JIS B 2201-1984 or ANSI B 16.34-1981.

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/cm²}. When operating differential pressure of liquid exceeds 2940 kPa {30 kgf/cm²}, use model HLC. (Refer to the Specification sheet No.SS-8113-0210)

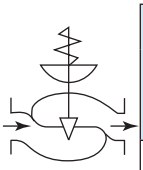
Contoured type metal seat (%CF, LCF) : Graphite packing "P6610CH+M8590"(+500 to +560 °C)

Table 17. Air-to-close



Actuator Model No.	Supply Pressure kPa{kgf/cm²}	Spring range kPa{kgf/cm²}	Positioner	Differential pressure {by Cv value} kPa {kgf/cm²}										
				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/cm²}	Spring range kPa{kgf/cm²}	Positioner	Differential pressure {by Cv value} kPa {kgf/cm²}										
				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.

2. 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.

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/cm²}. When operating differential pressure of liquid exceeds 2940 kPa {30 kgf/cm²}, 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 125 FF JPI 125 FF	ANSI 150 RF * JPI 150 RF	184	184	184
	JIS 16K RF		190	190	193
	JIS 20K RF JIS 30K RF	ANSI 300 RF * JPI 300 RF	194	194	197
	JIS 40K RF ANSI 600 RF	JPI 600 RF SW, BW *	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

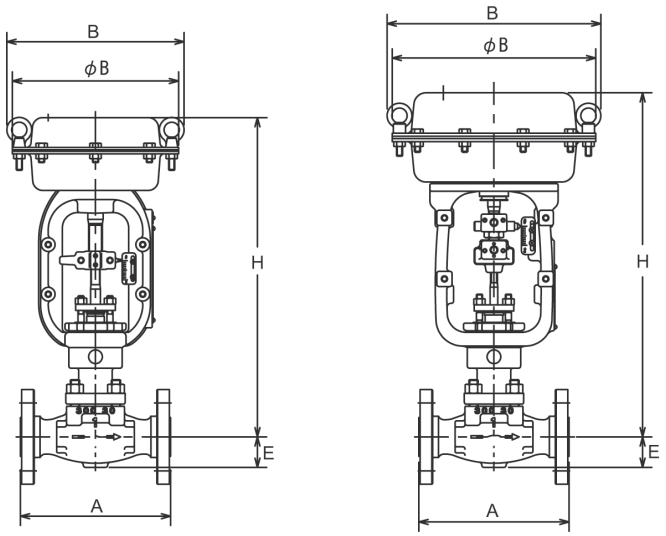
*Note) * : Face-to-face dimensions conform to following standards.*
-IEC 60534-3-1:2001
-JIS B 2005-3-1:2005

Table 20. External dimensions

[Unit: mm]

Actuator model no.	H					ϕB	B	E
	Plain bonnet	Extension bonnet Type 1	Extension bonnet Type 2		Bellows -type 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).



a. For PSA actuator b. For HA actuator

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 3/4 1	PSA1D, R	13	15	18	23	16
	PSA2D, R	20	22	25	30	23

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.

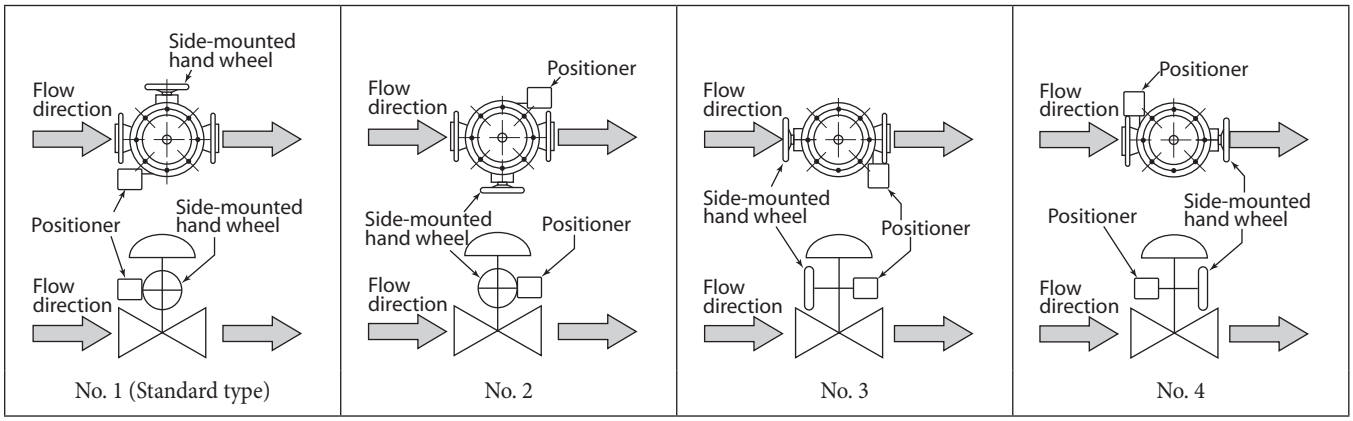


Figure 8. Actuator orientation

Ordering information

When ordering, please specify;

1) Model Number: HLS
2) Nominal size × Cv required
3) Type and rating of end connections
4) Body and trim material, necessity of hardening
5) Type of bonnet
6) Valve and plug characteristics
7) Type of actuator, necessity of hand wheel, and air to diaphragm
8) Valve action (direct or reverse)
9) Accessories (pressure regulator and etc.)
10) Special requirement of degreasing, copper free 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

Please read "Terms and Conditions" from the following URL before ordering and use.

https://www.azbil.com/products/factory/order.html

Specifications are subject to change without notice.

Azbil Corporation

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