

Top-Guided Single Seated Control Valves with Steam Jacket

Model HTS_ _ _

OVERVIEW

Model HTS Top-Guided Single Seated Control Valves with Steam Jacket are designed for heavy duty service requiring high adiabatic capability. 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 plug is highly vibration-resistant as it is held by a top guide section which has a large sliding area. The flow shut-off performance complies with the ANSI Standards. The actuator integrated with simplest mechanisms utilizes a compact yet powerful diaphragm actuator loaded with multiple springs.

The model HTS Valves are widely applicable for reliable control, with high shut-off performance, in high or low temperature, high pressure process lines.

SPECIFICATIONS

Body

Type: Straight-through, cast globe valve

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

For combining the nominal size and flange size, refer to Table 1.

Pressure rating and End connection: Flanged end;

Connection type	Pressure rating	Applicable standard
RF	JIS10K, 16K, 20K	JIS B2210-1984
	ANSI Class 150, 300	ANSI B16.5-1981
	JPI Class 150, 300	JPI-7S-15-1993

Material

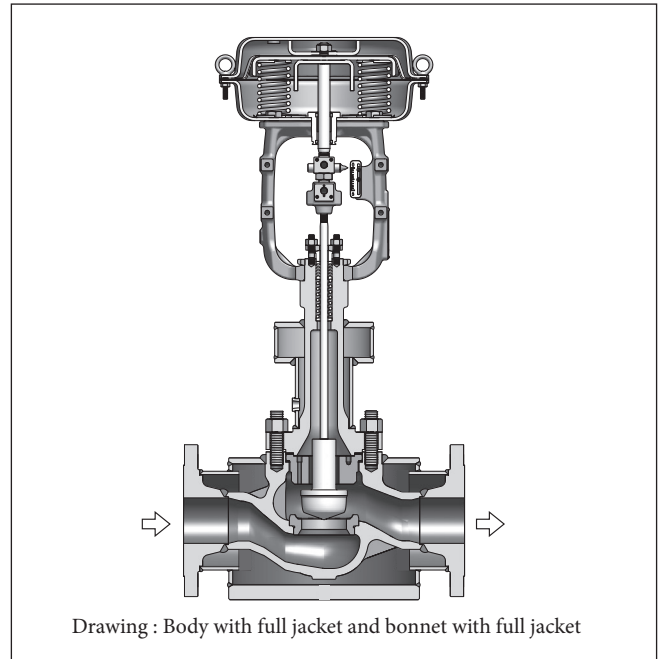
For body/trim material combinations and operating temperature ranges, refer to Table 2.

Jacket

Type: Body; Full-jacket, semi-jacket*
Bonnet; Without jacket, with jacket*

Note) The following structural combinations (*) are used for the jacket

Jacket	Location	Type
Semi-jacket	Body	1
	Body, bonnet	2
Full-jacket	Body	3
	Body, bonnet	4



Jacket connection size: 1/2, 3/4, 1 inch

For combining the nominal size, flange size and jacket connection size, refer to Table 1.

Jacket connection and pressure rating

Connection type	Pressure rating	Applicable standard
Franged end RF	JIS10K, 16K, 20K	JIS B2210-1984
	ANSI Class 150, 300	ANSI B16.5-1981
	JPI Class 150, 300	JPI-7S-15-1993

Threaded end; Rc, NPT

Jacket Operating pressure: 981 kPa {10.0kgf/cm²} or less

Jacket Operating temperature: 350°C or less

Jacket Material: SS400, SUS304

Note) Drain plug is provided as a standard at the jacket.

Bonnet

Plain bonnet	0 to 230 °C
Extension bonnet type1	230 to 566 °C
Bellows bonnet	Temperature and pressure ranges, refer to Figure 3

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

Gland type: Bolted gland

Packing / Grease

- Grease not provided; When V shaped PTFE packing or PTFE yarn packing is used.
- Grease provided; When asbestos yarn, PTFE-impregnated asbestos yarn, asbestos yarn with graphite, or graphite, or graphite packing is used.

Note) PTFE: Polytetrafluoroethylene

Gasket

Type: Flat type, serrated type
 Materials: SUS316, SUS316L, SUS329J1, copper, aluminum

Trim

Valve plug

Single seated, Contoured type plug

- High-capacity characteristics type
 (For flow characteristics, refer to Figure 1.)
 <Metal seat> Equal percentage (%C), Linear (LC)
- High-flow characteristics type
 <Metal seat> (For flow characteristics, refer to Figure 2.)
 Equal percentage (%CF), Linear (LCF)
 Single seated, Quick-opening type plug
 <Metal (CoCr-A) seat> (QS)

Material

For body/trim material combinations and operating temperature ranges, refer to Table 2.

Note) For fluid conditions that require CoCr-A, refer to Figure 4.

Actuator

Type

Diaphragm	Actuator type
Single acting diaphragm actuator	PSA1_, HA_-, VA5_
Spring type piston actuator	PSA6R
Double acting piston actuator	DAP_--

Action: Direct or reverse action

Diaphragm

Actuator type	Material
PSA1_ HA_-	Cloth embedded ethylene propylene rubber
VA5_	Cloth embedded chloroprene rubber

Spring range

Actuator type	Spring range
PSA1_, HA_-, VA5_	20 to 98 kPa {0.2 to 1.0 kgf/cm ² } 80 to 240 kPa {0.8 to 2.4 kgf/cm ² }
PSA6R	200 to 340 kPa {2.0 to 3.5 kgf/cm ² } 200 to 390 kPa {2.0 to 4.0 kgf/cm ² }

Supply pressure

Actuator type	Supply pressure
PSA1_, HA_-	120 to 390 kPa {1.2 to 4.0 kgf/cm ² }
VA5_	120 to 270 kPa {1.2 to 2.8 kgf/cm ² }
PSA6R	400 to 500 kPa {4 to 5 kgf/cm ² }
DAP_--	290 to 490 kPa {3 to 5 kgf/cm ² }

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

Air connection:

Actuator type	Connection
PSA1_, HA_-, VA5_	Rc1/4 or 1/4NPT internal thread
PSA6R	Rc1/4 or 1/4NPT internal thread Rc3/8 or 3/8NPT internal thread
DAP_--	Rc1/2 internal thread

Ambient temperature: -30 to +70 °C

Valve action

Direct action (Direct action actuator is combined.)
 Reverse action (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	Positioner		Hand wheel	
	P/P	I/P	Top	Side
PSA1	VPE_--		Mounted	Mounted
HA2 - 4	HTP_--			
VA5	HTP_--			
PSA6	HTP_-- VPP_--	AVP2_-- AVP3_-- AVP7_--	-	Mounted (Hydraulic)
DAP560 DAP1000 DAP1500	VPP_--			

Additional specification (by special order)

- Special inspection
 Flow characteristics inspection, material inspection (Material certificate), non-destructive inspection, steam inspection
- Seat chamfered flange
- Double gland
- Oil/water free treatment
- Copper free treatment
- York material SCPH2 (York material of PSA1 is SCPH2 as standard)
- Special air piping and joint
- Stainless steel (SUS304) atmosphere-exposed nuts and bolts
- Saline damage countermeasures
- Sand-/dust-preventive measures
- Tropical-area use specifications
- Cold-area use specifications
- Vacuum service

Performance

Rated Cv value: Refer to Table 3, Table 4 and Table 5.

Flow characteristics: Refer to Figure 1 and Figure 2.

Inherent rangeability: 50 : 1 (Optional 75 : 1)

Allowable differential pressure

Refer to Table 7, Table 8, Table 9, Table 10 and Table 11.

Leakage specification

Contoured type plug

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

<Metal seat>

Standard....Class IV: Leakage less than 0.01%

Option.....Leakage less than 0.001% of maximum valve capacity.

Quick opening plug

Leakage less than 0.00001% of maximum valve capacity.

Hysteresis error

Actuator type	PSA1_	HA_ _ VA5_ _ DAP_ _ _	PSA6R
Without positioner	±5% F.S	±3% F.S	±9% F.S
With positioner	±1% F.S	±1% F.S	±2% F.S

Linearity

Actuator type	PSA1_	HA_ _ VA5_ _ DAP_ _ _	PSA6R
Without positioner	±5% F.S	±5% F.S	±9% F.S
With positioner	VPE_ _ : ±3% F.S. AVP_ _ _ : ±2% F.S.	±1% F.S	±2% F.S

Note) When positioner is not provided, operating performance may vary depending on type of packing used.

Dimensions

Refer to Figure 6, Table 18, and Table 19.

Weight: Refer to Table 20 and Table 21.**Actuator orientation:** Refer to Figure 7.**Finish**

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

Table 1. Combination of the nominal size, flange size and jacket connection size

Nominal size (inches)		1-1/2	2	2-1/2	3	4	6
Flange size (inches)	Semi-jacket	1-1/2	2	2-1/2	3	4	6
	Full-jacket	2-1/2	3	4	5	6	8
Jacket connection size (inches)	Flange type	1/2, 3/4				1/2, 3/4, 1	
	Screwed type	1/2, 3/4					

Table 2. Body/trim material combinations and operating temperature ranges range (°C)

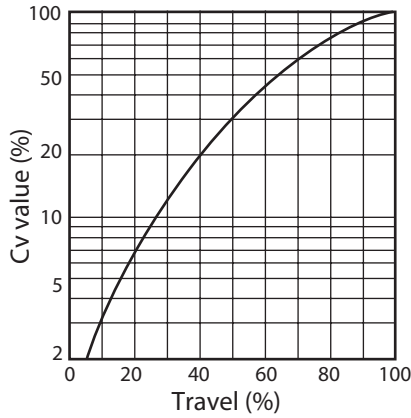
Trim material	Body material	JIS	SCPH2	SCS13A	SCS14A
		ASTM	A216WCB	A351CF8	A351CF8M
JIS	SUS304		0 to +300	0 to +300	—
JIS	SUS316		0 to +300	0 to +300	0 to +300
JIS	SUS304L		—	0 to +300	—
JIS	SUS316L		—	0 to +300	0 to +300
JIS	SUS329J1		—	—	0 to +300
JIS	SUS304 CoCr-A		0 to +425	0 to +550	—
JIS	SUS304 CoCr-A face		0 to +425	0 to +550	—
JIS	SUS316 CoCr-A		0 to +425	0 to +550	0 to +550
JIS	SUS316 CoCr-A face		0 to +425	0 to +550	0 to +550
JIS	SUS304L CoCr-A		—	0 to +550	—
JIS	SUS316L CoCr-A		—	0 to +450	0 to +450
JIS	SUS329J1 CoCr-A		—	—	0 to +550

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

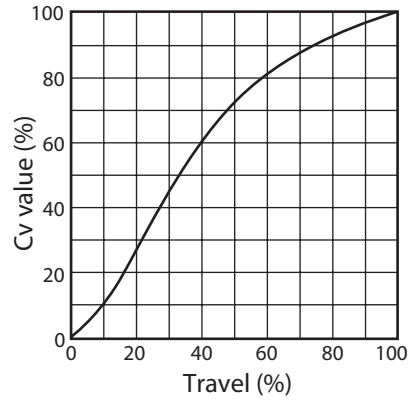
Cv value and travel

Table 3. Contoured type plug (High-capacity type) (%C, LC)

Nominal size (inches)	1-1/2	2	2-1/2	3	4	6
Port size (inches)	1-1/2	2	2-1/2	3	4	6
Rated Cv value (%C, LC)	30	50	85	125	200	420
Rated travel (mm)	25		38			50



a. Equal percentage characteristics (%C : Metal seat)

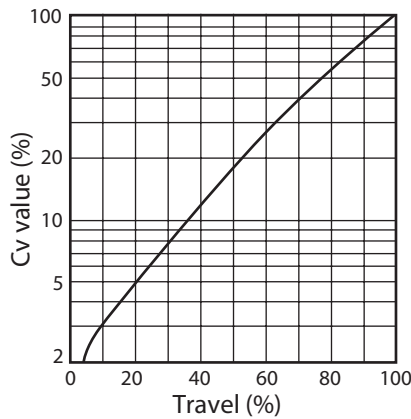


b. Linear characteristics (LC : Metal seat)

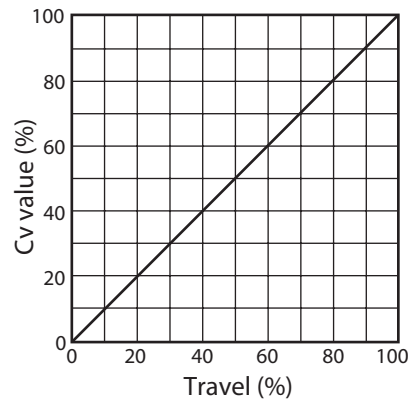
Figure 1. Flow characteristics: High-capacity type

Table 4. High-flow characteristics type contoured plug (%CF, LCF)

Nominal size (inches)	1-1/2			2			2-1/2			3			4		6			
Port size (inches)	1	1-1/4	1-1/2	1-1/4	1-1/2	2	1-1/2	2	2-1/2	2	2-1/2	3	2-1/2	3	4	4	5	6
Rated Cv value (%CF, LCF)	10	17	24	17	24	44	24	44	68	44	68	99	68	99	175	175	275	360
Rated travel (mm)	25						38						50					



a. Equal percentage characteristics (%CF: Metal seat)



b. Linear characteristics (LCF: Metal seat)

Figure 2. Flow characteristics: High-flow characteristics type

Note) The above graphs indicate typical flow characteristics.

Table 5. Quick-opening type plug

Nominal size (inches)	1-1/2	2	2-1/2	3	4	6
Port size (inches)	1-1/2	2	2-1/2	3	4	6
Rated Cv value (QS)	35	55	95	135	220	460
Rated travel (mm)	10	13	19	19	25	30

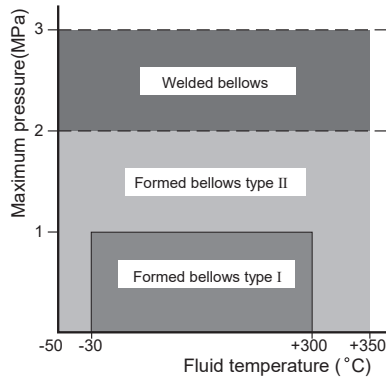


Figure 3. Bellows Type by Temperature and Pressure Ranges

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.

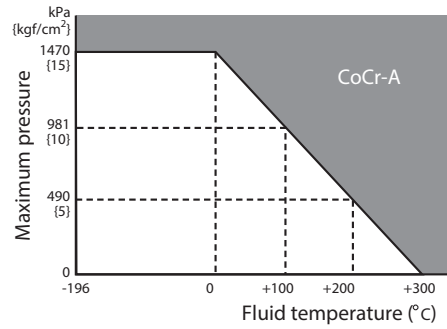


Figure 4. Temperature and normal differential pressure ranges requiring CoCr-A

Note) When cavitation / flushing service, oil prohibitive service, or retention of valve-close performance is required, use of CoCr-A is recommended regardless of temperature or differential pressure.

Table 6. Gland packing

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

Application	Packing Type	Fluid temperature range
		Maximum working pressure
General use (Various chemical, acid and alkali)	PTFE fiber yarn packing with carbon fiber core packing [P4519]	-17 to +230 °C
		10MPa Max.
General use or oil free (Various chemical, acid and alkali)	V shaped pure PTFE packing [Pure PTFE]	-196 to + 230 °C
		10MPa Max.
Vacuum and General use or oil free (Various chemical, acid and alkali)	V shaped pure PTFE packing (Dir. + Rev.) [Pure PTFE (Dir. + Rev.)]	-196 to +230 °C
		10MPa Max.
Low or standard temperature (Various chemical, acid and alkali, LNG, etc.)	V shaped pure PTFE packing + PTFE fiber yarn packing or PTFE braided packing [Pure PTFE +PTFE fiber]	-196 to +230 °C
		10MPa Max.
High temperature	Expanded graphite packing + Expanded graphite yarn packing *1 [P6610CH+P6528]	+230 to +500 °C
		43MPa Max.
Measures against VOC *2 exhaust regulation [ISO15848-1 compliant low emission packing system]	Expanded graphite packing + Carbon fiber reinforced expanded graphite packing *1 [P6610CH+M8590]	+500 to +566 °C
		43MPa MAX.
Measures against VOC *2 exhaust regulation [ISO15848-1 compliant low emission packing system]	Packing with Live Load structure *3	-17 to +350 °C
		15.5 MPa Max.

- *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.

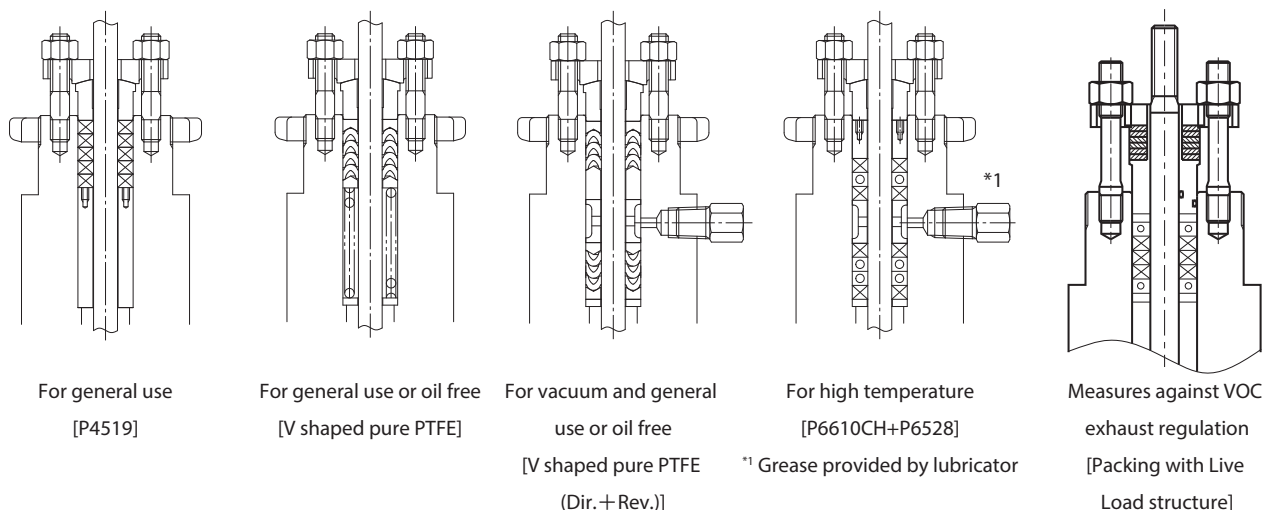


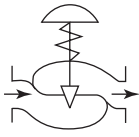
Figure 5. Gland Packing structure

Allowable differential pressure

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

Valves with type PSA1, HA or VA actuator

Table 7. Air-to-close



Actuator Model	Supply pressure kPa{kgf/cm ² }	Spring range kPa{kgf/cm ² }	Positioner	Differential Pressure (by port size(inches)) kPa {kgf/cm ² }								
				1	1-1/4	1-1/2	2	2-1/2	3	4	6	
PSA1D	140 {1.4}	20 to 98 {0.2 to 1.0}	△	320 {3.3}	200 {2.0}	140 {1.4}	80 {0.8}	—	—	—	—	
	160 {1.6}	20 to 98 {0.2 to 1.0}	✓	1570 {16.0}	970 {9.9}	700 {7.1}	400 {4.1}	—	—	—	—	
	390 {4.0}	80 to 240 {0.8 to 2.4}	✓	3920 {40.0}	2840 {29.0}	2060 {21.0}	1180 {12.0}	—	—	—	—	
HA2D	140 {1.4}	20 to 98 {0.2 to 1.0}	△	620 {6.3}	370 {3.8}	260 {2.7}	160 {1.6}	98 {1.0}	70 {0.7}	50 {0.5}	—	
	160 {1.6}	20 to 98 {0.2 to 1.0}	✓	3100 {31.6}	1890 {19.3}	1340 {13.7}	760 {7.8}	500 {5.1}	340 {3.5}	200 {2.0}	—	
	390 {4.0}	80 to 240 {0.8 to 2.4}	✓	3920 {40.0}	3920 {40.0}	3920 {40.0}	2130 {21.7}	1460 {14.9}	1030 {10.5}	580 {5.9}	—	
HA3D	140 {1.4}	20 to 98 {0.2 to 1.0}	△	1100 {11.2}	670 {6.8}	470 {4.8}	270 {2.8}	170 {1.7}	120 {1.2}	70 {0.7}	30 {0.3}	
	160 {1.6}	20 to 98 {0.2 to 1.0}	✓	3920 {40.0}	3350 {34.2}	2370 {24.2}	1370 {14.0}	860 {8.8}	610 {6.2}	340 {3.5}	140 {1.4}	
	390 {4.0}	80 to 240 {0.8 to 2.4}	✓	3920 {40.0}	3920 {40.0}	3920 {40.0}	3920 {40.0}	2600 {26.5}	1830 {18.7}	1030 {10.5}	400 {4.1}	
HA4D	140 {1.4}	20 to 98 {0.2 to 1.0}	△	—	—	810 {8.3}	470 {4.8}	290 {3.0}	220 {2.2}	120 {1.2}	50 {0.5}	
	160 {1.6}	20 to 98 {0.2 to 1.0}	✓	—	—	3920 {40.0}	2370 {24.2}	1490 {15.2}	1050 {10.7}	600 {6.1}	240 {2.4}	
	390 {4.0}	80 to 240 {0.8 to 2.4}	✓	—	—	3920 {40.0}	3920 {40.0}	3920 {40.0}	3160 {32.2}	1780 {18.2}	700 {7.1}	
VA5D	140 {1.4}	20 to 98 {0.2 to 1.0}	△	—	—	—	—	410 {4.2}	280 {2.9}	160 {1.6}	60 {0.6}	
	160 {1.6}	20 to 98 {0.2 to 1.0}	✓	—	—	—	—	2040 {20.8}	1440 {14.7}	810 {8.3}	310 {3.2}	

Note) 1. “” show a model with standard actuator.

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

3. 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.

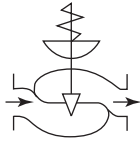
4. The upper figures denote the operating allowable differential pressure. The lower denote allowable differential pressure at full closure.

Allowable differential pressure

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

Valves with type PSA1, HA or VA actuator

Table 8. Air-to-open



Actuator Model	Supply pressure kPa{kgf/cm ² }	Spring range kPa{kgf/cm ² }	Positioner	Differential Pressure (by port size(inches)) kPa {kgf/cm ² }							
				1	1-1/4	1-1/2	2	2-1/2	3	4	6
PSA1R	140 {1.4}	20 to 98 {0.2 to 1.0}	△	320 {3.3}	200 {2.0}	140 {1.4}	80 {0.8}	—	—	—	—
	270 {2.8}	80 to 240 {0.8 to 2.4}	✓	2160 {22.0}	1270 {13.0}	970 {9.9}	560 {5.7}	—	—	—	—
HA2R	140 {1.4}	20 to 98 {0.2 to 1.0}	△	620 {6.3}	370 {3.8}	260 {2.7}	160 {1.6}	98 {1.0}	70 {0.7}	50 {0.5}	—
	270 {2.8}	80 to 240 {0.8 to 2.4}	✓	3920 {40.0}	2650 {27.0}	1870 {19.1}	1090 {11.1}	680 {6.9}	480 {4.9}	270 {2.8}	—
HA3R	140 {1.4}	20 to 98 {0.2 to 1.0}	△	1100 {11.2}	670 {6.8}	470 {4.8}	270 {2.8}	170 {1.7}	120 {1.2}	70 {0.7}	30 {0.3}
	270 {2.8}	80 to 240 {0.8 to 2.4}	✓	3920 {40.0}	3920 {40.0}	3330 {34.0}	1920 {19.6}	1210 {12.3}	850 {8.7}	480 {4.9}	190 {1.9}
HA4R	140 {1.4}	20 to 98 {0.2 to 1.0}	△	—	—	820 {8.4}	470 {4.8}	290 {3.0}	220 {2.2}	120 {1.2}	50 {0.5}
	270 {2.8}	80 to 240 {0.8 to 2.4}	✓	—	—	3920 {40.0}	3090 {31.5}	2090 {21.3}	1470 {15.0}	830 {8.5}	320 {3.3}
VA5R	140 {1.4}	20 to 98 {0.2 to 1.0}	△	—	—	—	—	410 {4.2}	280 {2.9}	170 {1.7}	60 {0.6}
	270 {2.8}	80 to 240 {0.8 to 2.4}	✓	—	—	—	—	2860 {29.2}	2020 {20.6}	1140 {11.6}	440 {4.5}
PSA6R	400 {4.0} *1	200 to 340 {2.0 to 3.5}	✓	—	—	—	—	3920 {40.0}	3920 {40.0}	2370 {24.2}	—
	500 {5.0} *2	200 to 390 {2.0 to 4.0}	✓	—	—	—	—	5100 {52.0}	4220 {43.0}	2370 {24.2}	930 {9.5}

Note) 1. “□” show a model with standard actuator.

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

3. 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.

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

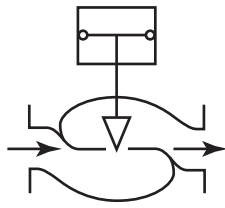
5. *1...Applicable to valve sizes of 2-1/2 to 4 inches, *2 ...Applicable to valve size of 6 inches.

Allowable differential pressure

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

Valves with type DAP actuator

Table 9. Air-to-open and Air-to-close



Actuator Model	Supply Pressure kPa {kgf/cm ² }	Positioner	Differential Pressure (by port size(inches)) kPa {kgf/cm ² }			
			2-1/2	3	4	6
DAP560	290 {3.0}		3920	3610	2030	780
			{40.0}			
	390 {4.0}		5100	{36.8}	{20.7}	{8.0}
			{52.0}			
	490 {5.0}		3920	3920	2730	1060
			{40.0}	{40.0}		
490 {5.0}	5100	4800	{27.8}	{10.8}		
	{52.0}	{49.0}				
DAP1000	290 {3.0}	✓	3920	3920	3620	1410
			{40.0}	{40.0}		
	390 {4.0}		5100	5100	{36.9}	{14.4}
			{52.0}	{52.0}		
	490 {5.0}		3920	3920	3920	1890
			{40.0}	{40.0}	{40.0}	
490 {5.0}	5100	5100	4800	{19.3}		
	{52.0}	{52.0}	{49.0}			
DAP1500	290 {3.0}		—	—	—	2120 {21.6}
	390 {4.0}		—	—	—	2840 {29.0}
	490 {5.0}		—	—	—	3570 {36.4}

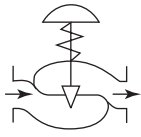
- Note) 1. When a backup system for pressure drop at the air source is used, select the allowable differential pressure from whichever is lower-constant supplied air pressure or backup system set pressure (trip pressure).
2. ✓: Positioner is necessary.
3. Take care not to cause the maximum allowable differential pressure to exceed the maximum operating pressure designated by ANSI B16. 34-1981 or JIS B2201-1984.
4. The upper figures denote the operating allowable differential pressure. The lower denote allowable differential pressure at full closure.

Allowable differential pressure

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

Valves with a type PSA1, HA or VA actuator

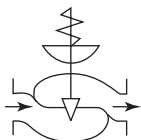
Table 10. Air-to-close



Actuator model	Supply pressure kPa {kgf/cm ² }	Differential pressure by port size(inches) kPa {kgf/cm ² }					
		1-1/2	2	2-1/2	3	4	6
PSA1D	140 {1.4}	320 {3.3}	200 {2.0}	—	—	—	—
	290 {3.0}	1470 {15.0}	960 {9.8}	—	—	—	—
HA2D	140 {1.4}	1090 {11.1}	600 {6.1}	400 {4.1}	300 {3.1}	150 {1.5}	—
	290 {3.0}	3060 {31.2}	1920 {19.6}	1220 {12.5}	910 {9.3}	490 {5.0}	—
HA3D	140 {1.4}	1920 {19.6}	1060 {10.8}	720 {7.4}	540 {5.5}	250 {2.6}	120 {1.2}
	290 {3.0}	3920 {40.0}	3400 {34.7}	2170 {22.1}	1620 {16.5}	870 {8.9}	390 {4.0}
		5100 {52.0}					
HA4D	140 {1.4}	—	—	1240 {12.7}	930 {9.5}	450 {4.6}	200 {2.1}
	290 {3.0}	—	—	3750 {38.2}	2790 {28.5}	1520 {15.5}	680 {6.9}
VA5D	140 {1.4}	—	—	—	—	—	280 {2.9}
	290 {3.0}	—	—	—	—	—	850 {8.7}
Spring range kPa {kgf/cm ² }		20 to 51 {0.2 to 0.52}	20 to 61 {0.2 to 0.62}	20 to 59 {0.2 to 0.6}	20 to 59 {0.2 to 0.6}	20 to 72 {0.2 to 0.73}	20 to 67 {0.2 to 0.68}

Note) 1. “” show a model with standard actuator.

Table 11. Air-to-close



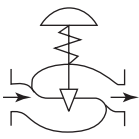
Actuator Model	Supply pressure kPa {kgf/cm ² }	Initial spring compression kPa {kgf/cm ² }	Differential Pressure (by port size(inches)) kPa {kgf/cm ² }					
			1-1/2	2	2-1/2	3	4	6
PSA1R	140 {1.4}	22 {0.22}	110 {1.1}	70 {0.7}	—	—	—	—
	270 {2.8}	80 {0.8}	490 {5.0}	310 {3.2}	—	—	—	—
HA2R	140 {1.4}	20 {0.2}	240 {2.5}	170 {1.7}	98 {1.0}	80 {0.8}	40 {0.4}	—
	270 {2.8}	80 {0.8}	981 {10.0}	640 {6.5}	400 {4.1}	300 {3.1}	180 {1.8}	—
HA3R	140 {1.4}	20 {0.2}	440 {4.5}	290 {3.0}	180 {1.8}	140 {1.4}	80 {0.8}	30 {0.3}
	270 {2.8}	80 {0.8}	1740 {17.8}	1170 {11.9}	720 {7.4}	540 {5.5}	300 {3.1}	140 {1.4}
HA4R	140 {1.4}	20 {0.2}	—	—	310 {3.2}	240 {2.4}	140 {1.4}	60 {0.6}
	270 {2.8}	80 {0.8}	—	—	1240 {12.7}	930 {9.5}	530 {5.4}	240 {2.4}
VA5R	140 {1.4}	20 {0.2}	—	—	—	—	190 {1.9}	80 {0.8}
	270 {2.8}	80 {0.8}	—	—	—	—	720 {7.4}	320 {3.3}
PSA6R	500 {5.0}	200 {2.0}	—	—	—	—	1410 {14.4}	620 {6.3}

Note) 1. “” show a model with standard actuator.

Contoured-type metal seat (%CF, LCF, %C, LC) : Graphite packing (+230 to +500 °C)

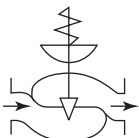
Valves with type PSA1, HA or VA actuator

Table 12. Air-to-close



Actuator Model	Supply pressure kPa{kgf/cm ² }	Spring range kPa{kgf/cm ² }	Positioner	Differential Pressure (by port size(inches)) kPa {kgf/cm ² }							
				1	1-1/4	1-1/2	2	2-1/2	3	4	6
HA2D				3920	3920	3380	1950	1230	870	480	—
				{40.0}	{40.0}						
HA3D	390 {4.0}	80 to 240 {0.8 to 2.4}	✓	3920	3920	3920	3470	2180	1540	860	330
				{40.0}	{40.0}	{40.0}					
HA4D			✓	—	—	3920	3920	3860	2720	1530	590
				—	—	{40.0}	{40.0}				
VA5D	270 {2.8}	40 to 200 {0.4 to 2.0}	✓	—	—	3920	2910	1830	1290	720	280
				—	—	{40.0}					

Table 13. Air-to-open



Actuator Model	Supply pressure kPa{kgf/cm ² }	Spring range kPa{kgf/cm ² }	Positioner	Differential Pressure (by port size(inches)) kPa {kgf/cm ² }							
				1	1-1/4	1-1/2	2	2-1/2	3	4	6
HA2R				3410	2080	1470	850	530	370	210	—
HA3R	270 {2.8}	80 to 240 {0.8 to 2.4}	✓	3920	3690	2610	1510	950	670	370	140
				{40.0}							
HA4R			✓	—	—	3920	2750	1730	1220	680	260
				—	—	{40.0}					
VA5R			✓	—	—	—	—	2250	1580	890	340
PSA6R	400 {4.0} *1	200 to 340 {2.0 to 3.5}	✓	—	—	—	—	3920	3920	2370	—
				—	—	—	—	{40.0}	{40.0}		
				—	—	—	—	—	—	5100	4220
	500 {5.0} *2	200 to 390 {2.0 to 4.0}	✓	—	—	—	—	—	—	2370	930
	400 {4.0} *3	200 to 340 {2.0 to 3.5}	✓	—	—	—	—	—	—	—	930

Note) 1. ✓: Positioner is necessary.

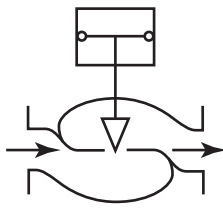
2. Take care not to cause the maximum allowable differential pressure to exceed the maximum operating pressure designated by ANSI B16. 34-1981 or JIS B2201-1984.

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

4. *1...Applicable to valve sizes of 2-1/2 to 4 inches, *2 ...Applicable to valve size of 6 inches.

Contoured-type metal seat (%CF, LCF, %C, LC)

Valves with type DAP actuator

Table 14. Air-to-open and Air-to-close

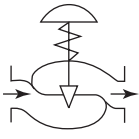
Actuator Model	Supply Pressure kPa {kgf/cm ² }	Positioner	Differential Pressure (by port size(inches)) kPa {kgf/cm ² }			
			2-1/2	3	4	6
DAP560	290 {3.0}		3920	3430	1490	580
			{40.0}			
	390 {4.0}		4770	{34.9}	{15.1}	{5.9}
			{48.6}			
	490 {5.0}		3920	3920	2210	860
			{40.0}	{40.0}		
490 {5.0}	5100	4800	{22.5}	{8.7}		
	{52.0}	{49.0}				
DAP1000	290 {3.0}	✓	3920	3920	2540	990
			{40.0}	{40.0}		
	390 {4.0}		5100	5100	{25.9}	{10.0}
			{52.0}	{52.0}		
	490 {5.0}		3920	3920	3740	1460
			{40.0}	{40.0}		
490 {5.0}	5100	5100	{38.1}	{14.8}		
	{52.0}	{52.0}				
DAP1500	290 {3.0}		—	—	—	1520
	390 {4.0}		—	—	—	{15.5}
	490 {5.0}		—	—	—	2250
						{22.9}
						2970
						{30.2}

- Note) 1. When a backup system for pressure drop at the air source is used, select the allowable differential pressure from whichever is lower-constant supplied air pressure or backup system set pressure (trip pressure).
2. ✓: Positioner is necessary.
3. 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.
4. The upper figures denote the operating allowable differential pressure. The lower denote allowable differential pressure at full closure.

**Contoured-type metal seat (%CF, LCF, %C, LC): Graphite packing “P6610CH+M8590”
(+500 to +566 °C)**

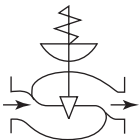
Valves with type PSA1, HA or VA actuator

Table 15. Air-to-close



Actuator Model	Supply pressure kPa{kgf/cm ² }	Spring range kPa{kgf/cm ² }	Positioner	Differential Pressure (by port size(inches)) kPa {kgf/cm ² }							
				1	1-1/4	1-1/2	2	2-1/2	3	4	6
HA2D				3920	3920	3170	1830	1150	810	450	—
				{40.0}	{40.0}						
HA3D	390 {4.0}	80 to 240 {0.8 to 2.4}	✓	3920	3920	3920	3240	2040	1440	810	310
				{40.0}	{40.0}	{40.0}					
HA4D			✓	3920	3920	3920	3920	3660	2580	1450	560
				{40.0}	{40.0}	{40.0}					
VA5D	270 {2.8}	40 to 200 {0.4 to 2.0}		5100	5100	3920	2380	1500	1050	590	230
				{52.0}	{52.0}	{40.0}					

Table 16. Air-to-open



Actuator Model	Supply pressure kPa{kgf/cm ² }	Spring range kPa{kgf/cm ² }	Positioner	Differential Pressure (by port size(inches)) kPa {kgf/cm ² }								
				1	1-1/4	1-1/2	2	2-1/2	3	4	6	
HA2R				2900	1770	1250	720	450	320	180	—	
HA3R				3920	3140	2230	1280	810	570	320	120	
				{40.0}								{32.0}
HA4R	270 {2.8}	80 to 240 {0.8 to 2.4}	✓	3920	3920	3920	2430	1530	1080	600	230	
				{40.0}	{40.0}	{40.0}						{43.0}
VA5R			✓	3920	3920	3920	3040	1910	1350	760	290	
				{40.0}	{40.0}	{40.0}						{30.9}
PSA6R	400 {4.0} *1	200 to 340 {2.0 to 3.5}		3920	3920	3920	3920	3920	3920	2320	—	
				{40.0}	{40.0}	{40.0}	{40.0}	{40.0}	{40.0}	{42.1}	{23.6}	—
				5100	5100	5100	5100	5100	4130	—	—	
	500 {5.0} *2	200 to 390 {2.0 to 4.0}		—	—	—	—	—	—	2320	900	
	400 {4.0} *3	200 to 340 {2.0 to 3.5}		—	—	—	—	—	—	—	900	
				—	—	—	—	—	—	—	—	{9.1}

Note) 1. ✓: Positioner is necessary.

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

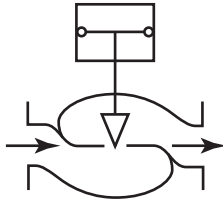
3. The upper figures denote the operating allowable differential pressure. The lower denote allowable differential pressure at full closure.

4. *1...Applicable to valve sizes of 2-1/2 to 4 inches, *2 ...Applicable to valve size of 6 inches, *3 ...Applicable to valve size of 8 inches.

**Contoured-type metal seat (%CF, LCF, %C, LC): Graphite packing “P6610CH+M8590”
(+500 to +566 °C)**

Valves with type DAP actuator

Table 17. Air-to-open and Air-to-close



Actuator Model	Supply Pressure kPa {kgf/cm ² }	Positioner	Differential Pressure (by port size(inches)) kPa {kgf/cm ² }			
			2-1/2	3	4	6
DAP560	290 {3.0}	✓	3590 {36.6}	2530 {25.7}	1420 {14.4}	580 {5.6}
	390 {4.0}		3920 {40.0}	3800 {38.7}	2130 {21.7}	830 {8.4}
			5100 {52.0}			
	490 {5.0}		3920 {40.0}	3920 {40.0}	2850 {29.0}	1110 {11.3}
			5100 {52.0}	5070 {51.6}		
	DAP1000		290 {3.0}	3920 {40.0}	3920 {40.0}	2410 {24.5}
5100 {52.0}				4300 {43.8}		
390 {4.0}			3920 {40.0}	3920 {40.0}	3620 {36.9}	1410 {14.3}
			5100 {52.0}	5100 {52.0}		
490 {5.0}			3920 {40.0}	3920 {40.0}	3920 {40.0}	1880 {19.1}
			5100 {52.0}	5100 {52.0}	4830 {49.2}	
DAP1500	290 {3.0}		—	—	3710 {37.8}	1450 {14.7}
		390 {4.0}	—	—	3920 {40.0}	2170 {22.1}
	5570 {56.7}					
	490 {5.0}	—	—	3920 {40.0}	2900 {29.5}	
		7430 {75.7}				

- Note) 1. When a backup system for pressure drop at the air source is used, select the allowable differential pressure from whichever is lower-constant supplied air pressure or backup system set pressure (trip pressure).
2. ✓: Positioner is necessary.
3. 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.
4. The upper figures denote the operating allowable differential pressure. The lower denote allowable differential pressure at full closure.

Dimensions

Table 18. Face-to-face dimensions

[Unit : mm]

Nominal size (inches)	A				
	Semi-jacket type		Connection port size	Full-jacket type	
	JIS 10K RF ANSI 150 RF JPI 150 RF	JIS 16K RF JIS 20K RF ANSI 300 RF JPI 300 RF		JIS 10K RF ANSI 150 RF JPI 150 RF	JIS 16K RF JIS 20K RF ANSI 300 RF JPI 300 RF
1-1/2	370	380	2-1/2	370	380
2	400	400	3	410	420
2-1/2	430	440	4	430	460
3	460	470	5	470	470
4	510	540	6	530	550
6	600	660	8	620	660

Table 19. Other dimensions

[Unit : mm]

Nominal size (inches)	Actuator Model	H			B	F	C		D		E
		Plain bonnet	Extension type bonnet	Bellows bonnet			Screw-on type	Flange type	Screw-on type	Flange type	
1-1/2	PSA1D,R	446	636	626	230	218	130	190	230	300	95
	HA2D,R	500	665	660	281	267					
	HA3D,R	590	760	810	363	350					
2	PSA1D,R	446	636	626	230	218	130	190	285	350	110
	HA2D,R	500	670	660	281	267					
	HA3D,R	595	765	810	363	350					
2-1/2	HA2D,R	575	755	795	281	267	155	215	285	350	120
	HA3D,R	630	810	850	363	350					
	HA4D,R	865	1045	—	520	470					
	DAP560	1175	1325	—	—	380					
3	HA2D,R	580	765	800	281	267	180	240	335	400	135
	HA3D,R	635	820	855	363	350					
	HA4D,R	870	1055	—	520	470					
	DAP560	1190	1375	—	—	380					
4	HA2D,R	610	820	830	281	267	180	230(260)	370	435(455)	165
	HA3D,R	660	870	880	363	350					
	HA4D,R	890	1110	—	520	470					
	VA5D	1300	—	—	—	620					
	VA5R	1420	—	—	—	620					
	PSA6R	1255	—	—	—	476					
	DAP560	1185	1395	—	—	380					
	DAP1000	1215	1455	—	—	470					
6	HA3D,R	785	1045	1075	363	350	180	240(260)	475	540(560)	220
	HA4D,R	955	1215	1245	520	470					
	VA5D	1360	—	—	—	620					
	VA5R	1480	—	—	—	620					
	PSA6R	1315	—	—	—	476					
	DAP560	1465	1730	—	—	380					
	DAP1000	1440	1790	—	—	470					
	DAP1500	1485	1755	—	—	470					

- Note) 1. "H" dimensions are applicable when a hand wheel is not provided. When top-mounted hand wheel HA or VA actuators or side-mounted hand wheel PSA6R or DAP actuators are used, add the hand wheel dimensions designated in respective specification sheets (No.SS2-8213-0500 for Type HA actuators; No.SS2-8210-0100 and SS2-PSA100-0100 for Type VA, PSA actuators;).
2. Dimensions in () are for jacket size 1 inch.

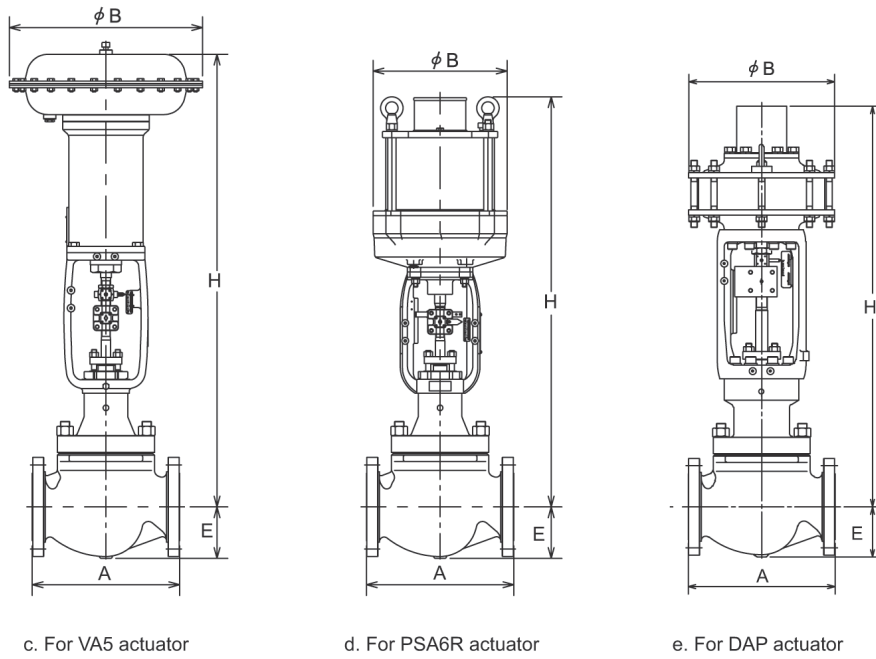
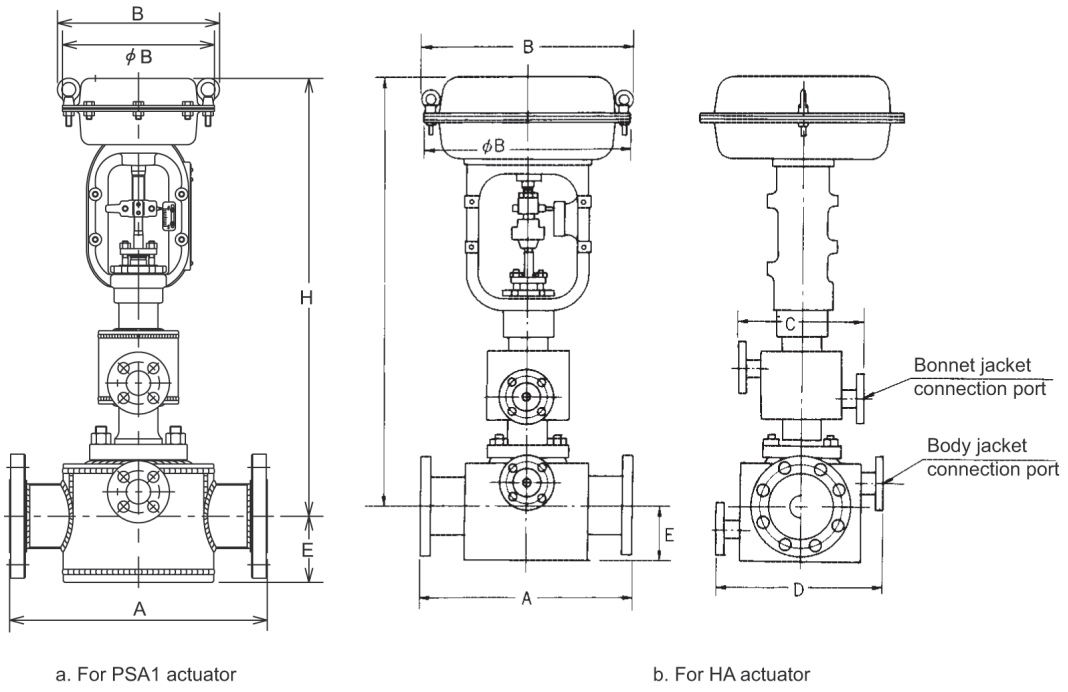


Figure 6. Face-to-face and external dimensions

Weight

Table 20. Semi-jacket type

[Unit : kg]

Connection port size (inches)	Actuator Model	JIS 10K, ANSI 150, JPI150		JIS 16K, JIS 20K, ANSI 300, JPI 300	
		Plain bonnet	Extension type bonnet	Plain bonnet	Extension type bonnet
1-1/2	PSA1D, R	47 (44)	55 (49)	49 (46)	57 (51)
	HA2D, R	54 (51)	62 (56)	56 (53)	64 (58)
	HA3D, R	66 (63)	74 (68)	68 (65)	76 (70)
2	PSA1D, R	65 (63)	73 (68)	67 (64)	75 (70)
	HA2D, R	72 (70)	80 (75)	74 (71)	82 (77)
	HA3D, R	84 (82)	92 (87)	86 (83)	94 (89)
2-1/2	HA2D, R	79 (76)	89 (84)	81 (78)	91 (85)
	HA3D, R	91 (88)	101 (96)	93 (90)	103 (97)
	HA4D, R	122 (119)	132 (127)	124 (121)	134 (128)
	DAP560	229(226)	239(234)	231(228)	241(235)
3	HA2D, R	107 (104)	121 (115)	110 (107)	124 (118)
	HA3D, R	119 (116)	133 (127)	122 (119)	136 (130)
	HA4D, R	150 (147)	164 (158)	153 (150)	167 (161)
	DAP560	257(254)	271(265)	260(257)	274(268)
4	HA2D, R	146 (143)	166 (158)	154 (150)	173 (166)
	HA3D, R	158 (155)	178 (170)	166 (162)	185 (178)
	HA4D, R	189 (186)	209 (201)	197 (193)	216 (209)
	VA5D	291 (288)	311 (303)	299 (295)	318 (311)
	VA5R	316 (313)	336 (328)	324 (320)	343 (336)
	PSA6R	296 (293)	316 (308)	304 (300)	323 (316)
	DAP560	291(288)	311(303)	299(295)	318(311)
	DAP1000	336(333)	356(348)	344(340)	363(356)
6	HA3D,R	307 (304)	332 (325)	324 (320)	349 (342)
	HA4D,R	338 (335)	363 (356)	355 (351)	380 (373)
	VA5D	440 (437)	465 (458)	457 (453)	482 (475)
	VA5R	465 (462)	490 (483)	482 (478)	507 (500)
	PSA6R	445 (442)	470 (463)	462 (458)	487 (480)
	DAP560	440(437)	465(458)	457(453)	482(475)
	DAP1000	480(477)	505(498)	497(493)	522(515)
	DAP1500	610(607)	635(628)	627(623)	652(645)

Note) Figures in () are weight for screw-on type jacket connection.

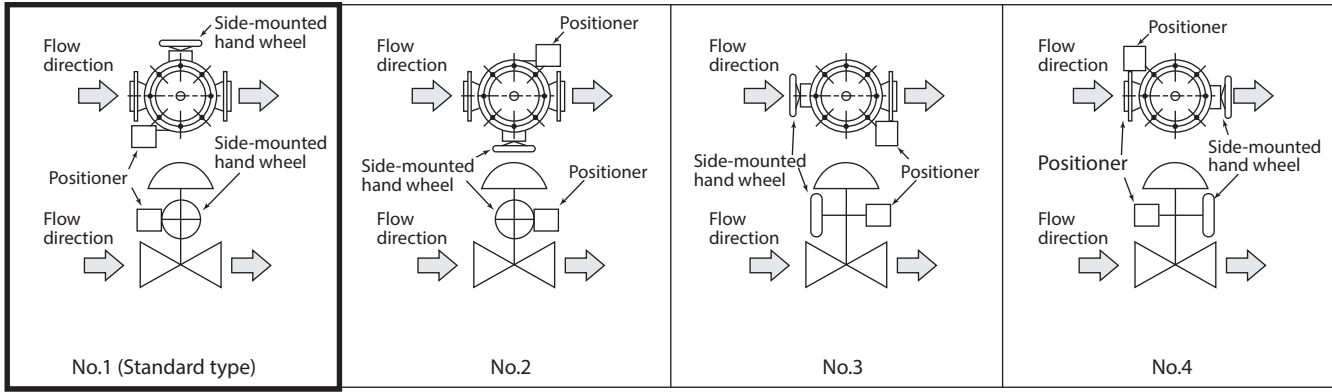
Table 21. Full-jacket type

[Unit : kg]

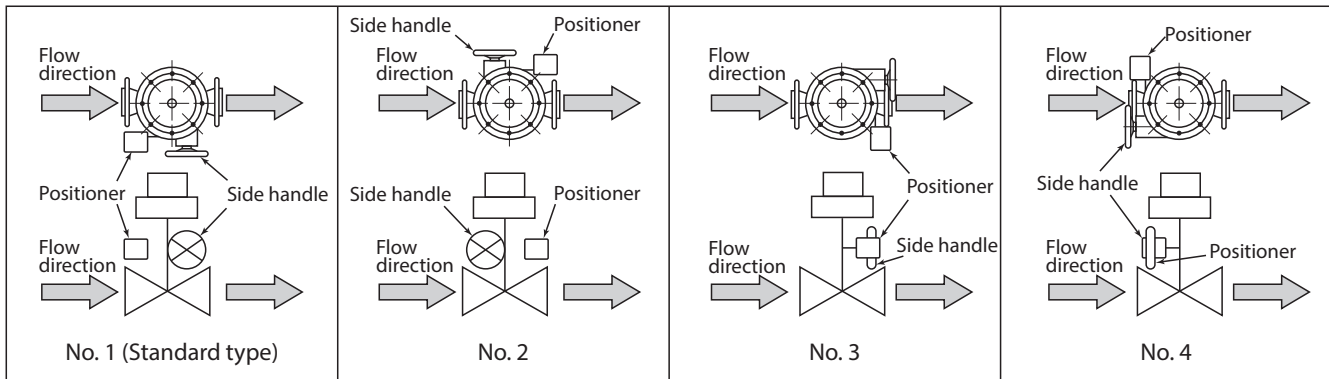
Connection port size (inches)	Actuator Model	JIS 10K, ANSI 150, JPI 150		JIS 16K, JIS 20K, ANSI 300, JPI 300	
		Plain bonnet	Extension type bonnet	Plain bonnet	Extension type bonnet
2-1/2	PSA1D, R	53 (51)	61 (56)	55 (52)	63 (58)
	HA2D, R	60 (58)	68 (63)	62 (59)	70 (65)
	HA3D, R	72(70)	80 (75)	74 (71)	82 (77)
	DAP560	240(237)	250(244)	249(246)	259(253)
3	PSA1D, R	70 (67)	78 (73)	74 (71)	82 (76)
	HA2D, R	77 (74)	85 (80)	81 (78)	89 (83)
	HA3D, R	89 (86)	97 (92)	93 (90)	101 (95)
	DAP560	269(267)	283(277)	283(281)	297(291)
4	HA2D, R	90 (87)	100 (94)	99 (96)	109 (103)
	HA3D, R	102 (99)	112 (106)	111 (108)	121 (115)
	HA4D, R	133 (130)	143 (137)	142 (139)	152 (146)
6	HA2D, R	164 (161)	184 (176)	183 (179)	202 (195)
	HA3D, R	176 (173)	196 (188)	195 (191)	214 (207)
	HA4D, R	207 (204)	227 (219)	226 (222)	245 (238)
	VA5D	309 (306)	329 (321)	328 (324)	347 (340)
	VA5R	334 (331)	354 (346)	353 (349)	372 (365)
	PSA6R	314 (311)	334 (326)	333 (329)	352 (345)
	DAP560	309(306)	329(321)	328(281)	347(340)
	DAP1000	354(351)	374(366)	373(369)	392(385)
8	HA3D, R	335 (331)	360 (353)	360 (356)	385 (378)
	HA4D, R	366 (362)	391 (384)	391 (387)	416 (409)
	VA5D	468 (464)	493 (486)	493 (489)	518 (511)
	VA5R	493 (489)	518 (514)	518 (514)	543 (536)
	PSA6R	473 (469)	498 (491)	498 (494)	523 (516)
	DAP560	468(464)	493(486)	493(489)	518(511)
	DAP1000	508(504)	533(526)	533(529)	558(551)
	DAP1500	638(634)	663(656)	663(659)	688(681)

Note) Figures in () are weight for screw-on type jacket connection.

(PSA1, HA and VA5 Actuator)



(PSA6 Actuator)



(DAP Actuator)

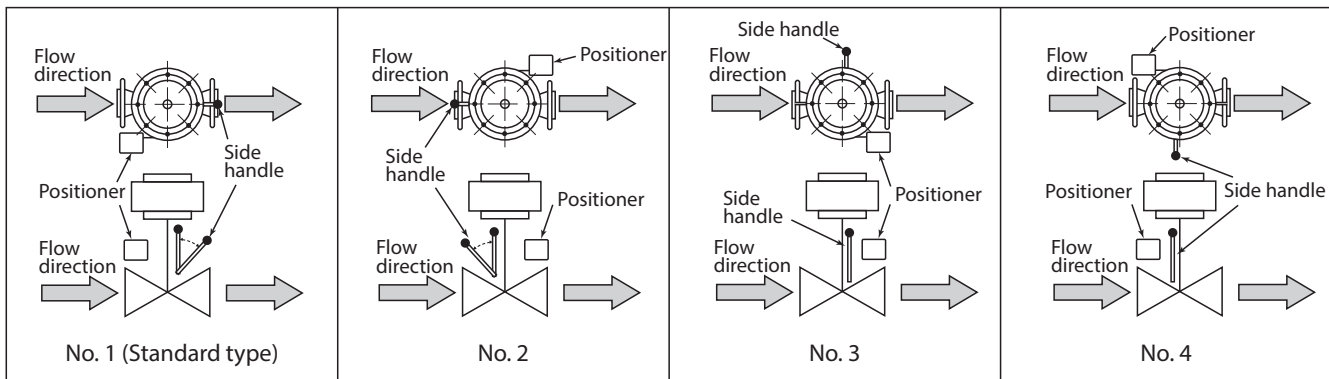


Figure 7. Actuator orientation

Note) 1. Indicate by position number when installation other than the standard type is required.

Ordering information

When ordering, please specify;

- 1) Model number: HTS
- 2) Nominal size × Port size
- 3) Type and rating of end connections
- 4) Body and trim material, necessity of hardening
- 5) Type of bonnet
- 6) Jacket type, rating, connection, material
- 7) Valve and plug characteristics
- 8) Type of actuator, air pressure to diaphragm
- 9) Valve action (direct or reverse)
- 10) Accessories (positioner, hand wheel, pressure regulator with filter and etc.)
- 10) Special requirement of degreasing, oil/copper free treatment, 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

Note

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.

The logo for Azbil Corporation, featuring the word "azbil" in a bold, lowercase, sans-serif font.

Azbil Corporation
Advanced Automation Company

1-12-2 Kawana, Fujisawa
Kanagawa 251-8522 Japan
URL: <https://www.azbil.com/>

1st edition: Apr. 2001
5th edition: Sep. 2019

*No part of this publication may be reproduced or duplicated
without the prior written permission of Azbil Corporation.*