

Compressible Fluid Service Low-Noise Cage type Control Valves

Model HCN_ _ _

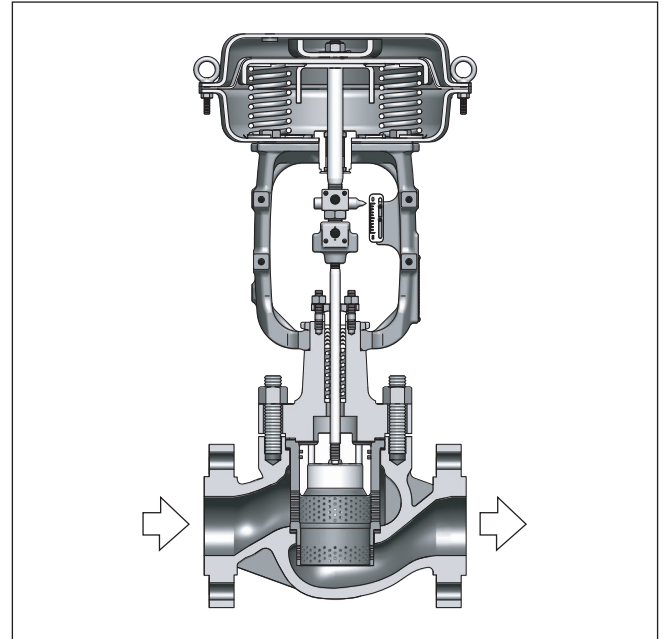
OVERVIEW

Model HCN Low-Noise Cage type Control Valves have been designed to remarkably reduce acoustic noise in services of compressible fluids such as steam, air, and natural gas. The cage has a large number of small holes and renders an ideal pressure reduction with a combination in two steps of “restriction” and “diffusion and expansion.” The fluid passage has been designed in S-figure shape for smooth flow of fluid with less pressure loss and a stabilizer is provided as a strainer for flow near the cage, thereby permitting a large Cv value.

The valve plug is of a pressure-balanced type which allows control of a high differential pressure with a small actuating force. The actuator is a compact but high output diaphragm motor of a multiple spring type structured in a simple mechanism.

The model HCN valves, which are compact but of a low noise type and render high dynamic stability, are suitable especially for control of high temperature, high pressure or high differential pressure process lines.

Model HCN_ _ _ is compliant to Functional Safety Standard (IEC61508).



SPECIFICATIONS

Body

Type

Straight-through, cast globe valve

Nominal size

1-1/2, 2, 2-1/2, 3, 4, 6, 8 inches

Pressure rating and End connection

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, 2 inches)
BW (2-1/2 to 8 inches)

Material

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

Bonnet

Plain bonnet	-17 to +230 °C	
Extension bonnet type 1	-45 to -17 °C	
	+230 to +566 °C	
Extension bonnet type 2	-100 to -45 °C	Integral cast type
	-196 to -100 °C	Welded type

Note) Take care not 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 graphite packing is used.

Note) PTFE: Polytetrafluoroethylene

Gasket

Type

Combination of serrated type and spiral wound type (integral cage),
Serrated type (split cage)

Material

Stainless steel (SUS316), copper, aluminum

Trim

Valve plug

Pressure-balanced type

Cage (integral or split cage)

Multiple-orifice design
Metal seat
Linear (LV)

Note) For cage design (integral cage or split cage), refer to Table 1.

Material

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

Note) For fluid conditions that require CoCr-A, refer to Figure 2.

Actuator

Model

Motor type	Actuator Model
Single acting diaphragm actuator	HA__ or VA5_
Spring type piston actuator	PSA6R

Action

Direct or reverse action

Diaphragm

Actuator Model	Diaphragm material
HA__	Cloth embedded ethylene propylene rubber
VA5_	Cloth embedded chloroprene rubber

Spring range

Actuator Model	Spring range
HA__ VA5_	20 to 98 kPa {0.2 to 1.0 kgf/cm ² }
	40 to 120 kPa {0.4 to 1.2 kgf/cm ² }
PSA6R	80 to 240 kPa {0.8 to 2.4 kgf/cm ² }
	200 to 340 kPa {2.0 to 3.5 kgf/cm ² }

Supply pressure

Actuator Model	Supply pressure
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	390 kPa {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

Note) With Type VA, Rc1/4 or 1/4NPT adapter is provided on Rc1/2 internal thread (also providing Rc3/8 adapter is possible).

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		Hand wheel	
	P/P	I/P	Top	Side
HA__	HTP-__	AVP7__	Mounted	Mounted
VA5_		AVP3__		
PSA6R	HTP-__ VPP-__	AVP2__	—	

Additional specification (by special order)

- Special inspection
Flow characteristics inspection, material inspection (material certificate), non-destructive inspection, steam inspection
- With drain plug
- Double gland
- Oil-/ water-free treatment
- Copper-free treatment
- York material SCPH2
- 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

Functional Safety Standard (IEC61508) conformity:

SIL3 capable - certified by exida Consulting LLC

Performance

Rated Cv Value

Refer to Table 2.

Flow characteristics

Refer to Figure 1.

Inherent rangeability

- 25 : 1
- Optional 50 : 1 for full port size

Allowable differential pressure

Refer to Table 8 to Table 13.

Leakage specification

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

Class III: Leakage less than 0.1% of maximum valve capacity.

Hysteresis error

Actuator Model	HA__ or VA5_	PSA6R
Without positioner	±3% F.S.	±3% F.S.
With positioner	±1% F.S.	±1% F.S.

Linearity

Actuator Model	HA__ or VA5__	PSA6R
Without positioner	±5% F.S.	±9% F.S.
With positioner	±1% F.S.	±2% F.S.

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

[For estimating noise volume, refer to related instrumentation document No. ID2-8000-1700.]

Dimensions

Refer to Figure 6, Table 14 and Table 15.

Weight

Refer to Table 16.

Actuator orientation

Refer to Figure 7.

Finish

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

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

Body material / Trim material		JIS	SCPH2	SCPH21	SCPH61	SCS13A	SCS14A
		ASTM	A216WCB	A217WC6	A217C5	A351CF8	A351CF8M
JIS	SCS24 and SUS630		-5 to +425	-5 to +425	-5 to +425	—	—
JIS	SCS14A and SUS316		-5 to +300*	-5 to +300*	-5 to +300*	-196 to +300	-196 to +300
JIS	SCS14A CoCr-A and SUS316 CoCr-A		-5 to +425*	-5 to +550*	-5 to +566*	-196 to +550	-196 to +550
JIS	SCS14A Atomlloy treatment SUS316 Atomlloy treatment		-5 to +425*	-5 to +500*	-5 to +500*	—	—

Note) 1. Asterisk marked (*) combinations, split cages are used when fluid temperature exceeds 230 °C or valve size is greater than 3 inches.
2. " — " shows standard combination of valve body and trim materials.

Table 2. Cv value and travel

Nominal size (inch)	1-1/2			2			2-1/2			3			4			6			8		
Port size (inch)	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	5	6	8
Rated Cv value	11	17	24	17	24	44	24	44	68	44	68	99	68	99	120	120	175	330	175	330	580
Rated travel (mm)	25						38						50			75					

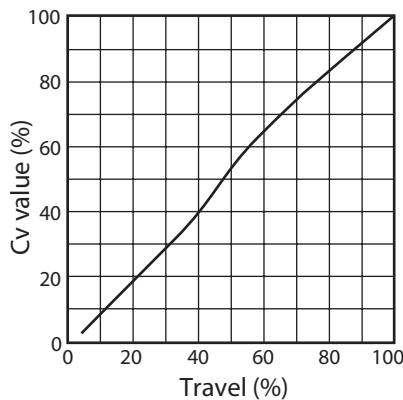


Figure 1. Flow characteristics

Note) This graph, indicates typical flow characteristics.

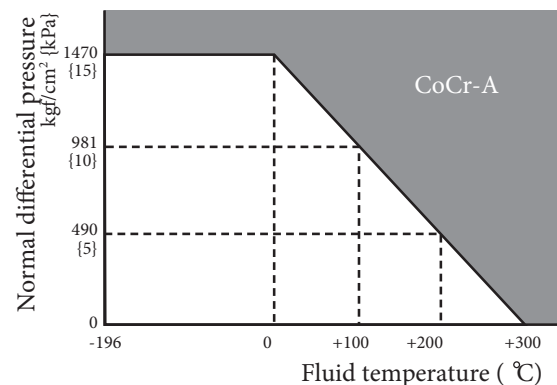


Figure 2. Temperature / normal differential pressure ranges requiring CoCr-A

Note) SCS24 (Precipitation hardened stainless steel) requires no CoCr-A.

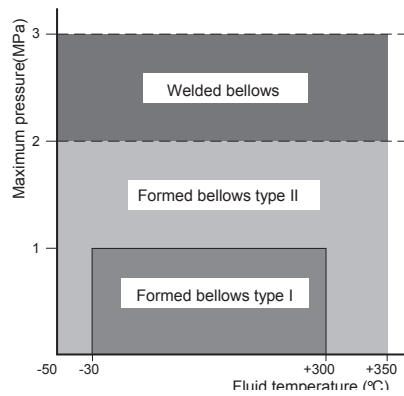


Figure 3. Bellows Type by Temperature and Pressure Ranges

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.

Table 3. 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.

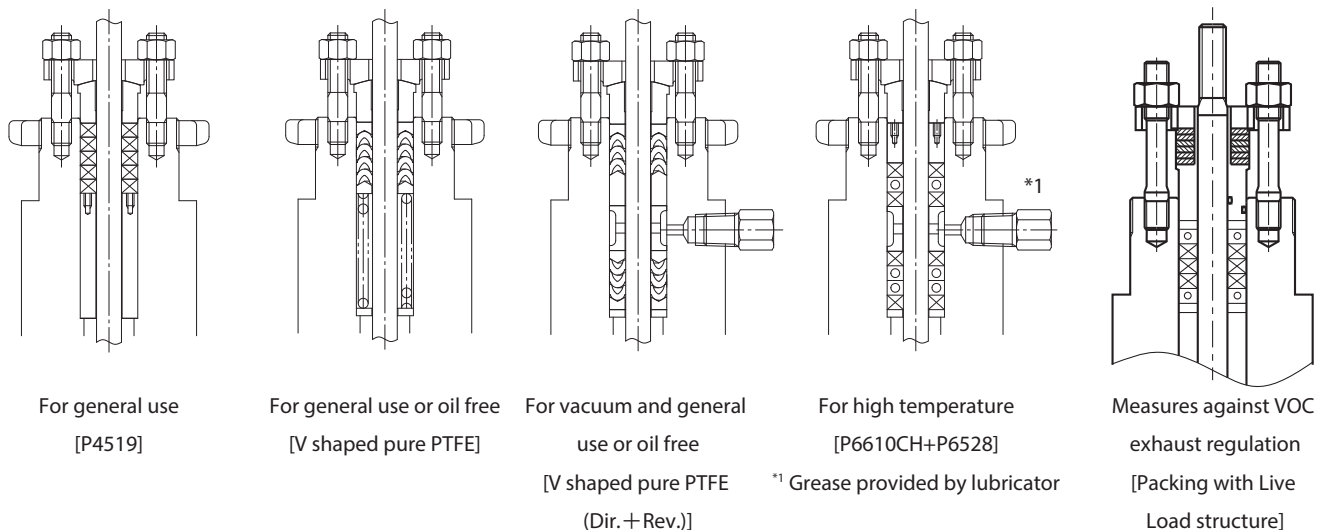


Figure 4. Gland Packing structure

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.

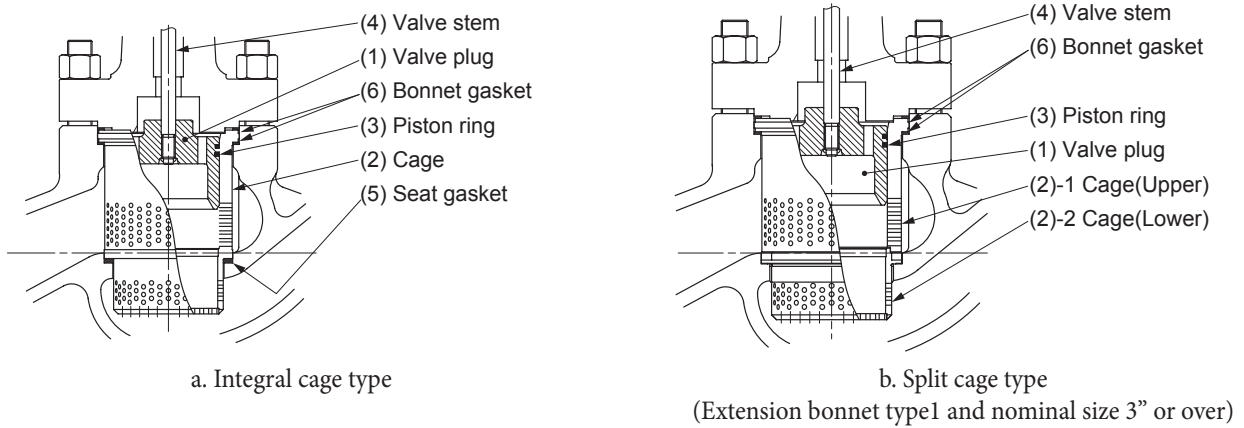


Figure 5. Structural drawing of trim

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

	Figure 5 a		
(1) Valve plug	SCS24 or SUS630 *1	SCS14A or SUS316 *2	SCS14A CoCr-A or SUS316 CoCr-A *3
(2) Cage			
(3) Piston ring*1	Ni-resist		CoCr-E
(4) Valve stem	SUS316		
(5) Seat gasket	General		Oil-free
	Spiral wound (hoop: SUS316, filler: Inorganic paper)		Spiral wound(hoop: SUS316, filler: PTFE)
(6) Bonnet gasket	SUS316		SUS316(PTFE coating)

Note) *1. Material combination; Size 2-1/2” or less is SUS630 and size 3” or over is SCS24.

*2. Material combination; Size 2-1/2” or less is SUS316 and size 3” or over is SCS14A.

*3. Material combination; Size 2-1/2” or less is SUS316 CoCr-A and size 3” or over is SCS14A CoCr-A.

Table 5. The valve body material is carbon steel (SCPH2/A216WCB) and Extension bonnet type1.

	Figure 5 a		Figure 5 b
(1) Valve plug	SCS24 or SUS630 *1	SCS14A CoCr-A or SUS316 CoCr-A *2	SCS14A CoCr-A or SUS316 CoCr-A *2
(2) Cage			
(3) Piston ring	CoCr-E		
(4) Valve stem	SUS316		
(5) Seat gasket	Spiral wound(hoop: SUS316, filler: Inorganic paper)		-
(6) Bonnet gasket	SUS316		

Note) *1. Material combination; Size 2-1/2” or less is SUS630 and size 3” or over is SCS24.

*2. Material combination; Size 2-1/2” or less is SUS316 CoCr-A and size 3” or over is SCS14A CoCr-A.

Table 6. The valve body material is stainless steel (SCS13A/A351CF8 or SCS14A/A351CF8M) and plain bonnet

	Figure 5 a	
(1) Valve plug	SCS24 or SUS630 *1	SCS14A CoCr-A or SUS316 CoCr-A *2
(2) Cage		
(3) Piston ring	CoCr-E	
(4) Valve stem	SUS316	
(5) Seat gasket	General	Oil-free
	Spiral wound(hoop: SUS316, filler: Inorganic paper)	Spiral wound(hoop: SUS316, filler: PTFE)
(6) Bonnet gasket	SUS316	SUS316(PTFE coating)

Note) *1. Material combination; Size 2-1/2" or less is SUS630 and size 3" or over is SCS24.

*2. Material combination; Size 2-1/2" or less is SUS316 CoCr-A and size 3" or over is SCS14A CoCr-A.

Table 7. The valve body material is stainless steel (SCS13A/A351CF8 or SCS14A/A351CF8M) and extension bonnet type1

	Figure 5 a	Figure 5 b
(1) Valve plug	SCS14A CoCr-A or SUS316 CoCr-A *1	SCS14A CoCr-A or SUS316 CoCr-A *1
(2) Cage		
(3) Piston ring	CoCr-E	
(4) Valve stem	SUS316	
(5) Seat gasket	Spiral wound(hoop: SUS316, filler: Inorganic paper)	-
(6) Bonnet gasket	SUS316	

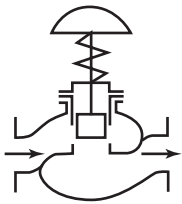
Note) *1. Material combination; Size 2-1/2" or less is SUS316 CoCr-A and size 3" or over is SCS14A CoCr-A.

Allowable differential pressure

Metal seat (LV) : PTFE packing

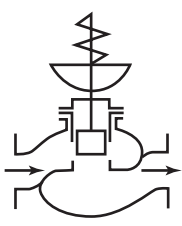
Valves with type PSA, HA and VA actuator

Table 8. Air-to-close




Actuator Model	Supply pressure kPa{kgf/cm ² }	Spring range kPa{kgf/cm ² }	Positioner	Differential pressure (by Nominal size (inch)) kPa {kgf/cm ² }						
				1-1/2	2	2-1/2	3	4	6	8
HA2D	160 {1.6}	20 to 98 {0.2 to 1.0}	✓	1960 {20.0}	1960 {20.0}	—	—	—	—	—
				9810 {100}	7260 {74.0}					
	390 {4.0}	80 to 240 {0.8 to 2.4}	✓	1960 {20.0}	1960 {20.0}	—	—	—	—	—
				9810 {100}	9810 {100}					
HA3D	160 {1.6}	20 to 98 {0.2 to 1.0}	✓	1960 {20.0}	1960 {20.0}	1960 {20.0}	1960 {20.0}	1960 {20.0}	1960 {20.0}	—
				9810 {100}	9810 {100}	9810 {100}	9220 {94.0}	6960 {71.0}	5000 {51.0}	
	390 {4.0}	80 to 240 {0.8 to 2.4}	✓	1960 {20.0}	1960 {20.0}	1960 {20.0}	1960 {20.0}	1960 {20.0}	1960 {20.0}	—
				9810 {100}	9810 {100}	9810 {100}	9810 {100}	9810 {100}	9810 {100}	
HA4D	160 {1.6}	20 to 98 {0.2 to 1.0}	✓	—	—	1960 {20.0}	1960 {20.0}	1960 {20.0}	1960 {20.0}	1960 {20.0}
						9810 {100}	9810 {100}	9810 {100}	8530 {87.0}	3920 {40.0}
	390 {4.0}	80 to 240 {0.8 to 2.4}	✓	—	—	1960 {20.0}	1960 {20.0}	1960 {20.0}	1960 {20.0}	1960 {20.0}
						9810 {100}	9810 {100}	9810 {100}	9810 {100}	3920 {40.0}

Table 9. Air-to-open



Actuator Model	Supply pressure kPa{kgf/cm ² }	Spring range kPa{kgf/cm ² }	Positioner	Differential pressure (by Nominal size (inch)) kPa {kgf/cm ² }						
				1-1/2	2	2-1/2	3	4	6	8
HA2R	270 {2.8}	80 to 240 {0.8 to 2.4}	✓	1960 {20.0}	1960 {20.0}	—	—	—	—	—
				9810 {100}	9810 {100}					
HA3R	270 {2.8}	80 to 240 {0.8 to 2.4}	✓	1960 {20.0}	1960 {20.0}	1960 {20.0}	1960 {20.0}	1960 {20.0}	1960 {20.0}	—
				9810 {100}	9810 {100}	9810 {100}	9810 {100}	9810 {100}	6960 {71.0}	
HA4R	270 {2.8}	80 to 240 {0.8 to 2.4}	✓	—	—	1960 {20.0}	1960 {20.0}	1960 {20.0}	1960 {20.0}	1960 {20.0}
						9810 {100}	9810 {100}	9810 {100}	9810 {100}	3920 {40.0}
VA5R	270 {2.8}	80 to 240 {0.8 to 2.4}	✓	—	—	—	—	1960 {20.0}	1960 {20.0}	1960 {20.0}
								9810 {100}	9810 {100}	3920 {40.0}
PSA6R	400 {4.0}	200 to 340 {2.0 to 3.5}	✓	—	—	—	—	1960 {20.0}	—	—
								9810 {100}		
PSA6R	500 {5.0}	200 to 390 {2.0 to 4.0}	✓	—	—	—	—	1960 {20.0}	—	—
								9810 {100}		

Note) 1. "  " shows a model with standard actuator.

2. ✓: Positioner is necessary.

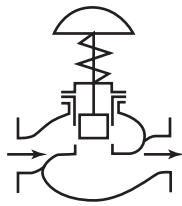
3. Take care not to cause the maximum allowable differential pressure to exceed the maximum operating pressure designated by ANSI B16. 34-1981 or JIS B2201-1984.

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

Metal seat (LV) : Graphite packing “P6610+P6528” (+230 to +500 °C)

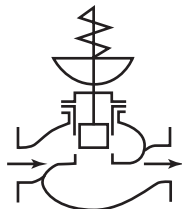
Valves with type PSA, HA or VA actuator

Table 10. Air-to-close



Actuator Model	Supply pressure kPa{kgf/cm ² }	Spring range kPa{kgf/cm ² }	Positioner	Differential Pressure (by Nominal size(inche)) kPa {kgf/cm ² }						
				1-1/2	2	2-1/2	3	4	6	8
HA2D	390 {4.0}	80 to 240 {0.8 to 2.4}	✓	1960 {20.0}	1960 {20.0}	—	—	—	—	—
				9810 {100}	9810 {100}					
HA3D	390 {4.0}	80 to 240 {0.8 to 2.4}	✓	1960 {20.0}	1960 {20.0}	1960 {20.0}	1960 {20.0}	1960 {20.0}	1960 {20.0}	—
				9810 {100}	9810 {100}	9810 {100}	9810 {100}	9810 {100}	9810 {100}	
HA4D	390 {4.0}	80 to 240 {0.8 to 2.4}	✓	—	—	1960 {20.0}	1960 {20.0}	1960 {20.0}	1960 {20.0}	1960 {20.0}
						9810 {100}	9810 {100}	9810 {100}	9810 {100}	3920 {40.0}

Table 11. Air-to-open



Actuator Model	Supply pressure kPa{kgf/cm ² }	Spring range kPa{kgf/cm ² }	Positioner	Differential Pressure (by Nominal size(inche)) kPa {kgf/cm ² }						
				1-1/2	2	2-1/2	3	4	6	8
HA2R	270 {2.8}	80 to 240 {0.8 to 2.4}	✓	1960 {20.0}	1960 {20.0}	—	—	—	—	—
				9810 {100}	8190 {83.5}					
HA3R	270 {2.8}	80 to 240 {0.8 to 2.4}	✓	1960 {20.0}	1960 {20.0}	1960 {20.0}	1960 {20.0}	1960 {20.0}	1960 {20.0}	—
				9810 {100}	9810 {100}	9810 {100}	9810 {100}	7940 {80.9}	5620 {57.3}	
HA4R	270 {2.8}	80 to 240 {0.8 to 2.4}	✓	—	—	1960 {20.0}	1960 {20.0}	1960 {20.0}	1960 {20.0}	1960 {20.0}
						9810 {100}	9810 {100}	9810 {100}	9810 {100}	3920 {40.0}
VA5R	270 {2.8}	80 to 240 {0.8 to 2.4}	✓	—	—	—	—	1960 {20.0}	1960 {20.0}	1960 {20.0}
								9810 {100}	9810 {100}	3920 {40.0}
PSA6R	400 {4.0}	200 to 340 {2.0 to 3.5}	✓	—	—	—	—	1960 {20.0}	—	—
	500 {5.0}	200 to 390 {2.0 to 4.0}	✓	—	—	—	—	9810 {100}	1960 {20.0}	—

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

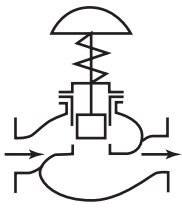
2. ✓: Positioner is necessary.

3. 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.

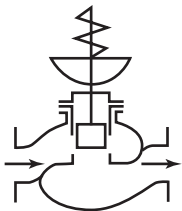
4. The upper figures denote the operating allowable differential pressure. The lower denote allowable differential pressure at full closure.

Metal seat (LV) : Graphite packing "P6610+M8590" (+500 to +566 °C)

Valves with type PSA, 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 Nominal size(inche)) kPa {kgf/cm ² }						
				1-1/2	2	2-1/2	3	4	6	8
HA2D	390 {4.0}	80 to 240 {0.8 to 2.4}	✓	1960 {20.0}	1960 {20.0}	—	—	—	—	—
				9810 {100}	9810 {100}					
HA3D	390 {4.0}	80 to 240 {0.8 to 2.4}	✓	1960 {20.0}	1960 {20.0}	1960 {20.0}	1960 {20.0}	1960 {20.0}	1960 {20.0}	—
				9810 {100}	9810 {100}	9810 {100}	9810 {100}	9810 {100}	9810 {100}	
HA4D	390 {4.0}	80 to 240 {0.8 to 2.4}	✓	—	—	1960 {20.0}	1960 {20.0}	1960 {20.0}	1960 {20.0}	1960 {20.0}
						9810 {100}	9810 {100}	9810 {100}	9810 {100}	9810 {100}

Table 13. Air-to-open

Actuator Model	Supply pressure kPa{kgf/cm ² }	Spring range kPa{kgf/cm ² }	Positioner	Differential Pressure (by Nominal size(inche)) kPa {kgf/cm ² }						
				1-1/2	2	2-1/2	3	4	6	8
HA2R			✓	1960 {20.0}	1960 {20.0}	—	—	—	—	—
				8900 {90.7}	6980 {71.1}					
HA3R	270 {2.8}	80 to 240 {0.8 to 2.4}	✓	1960 {20.0}	1960 {20.0}	1960 {20.0}	1960 {20.0}	1960 {20.0}	1960 {20.0}	—
				9810 {100}	9810 {100}	9810 {100}	8840 {90.1}	6760 {68.9}	4790 {48.8}	
HA4R			✓	—	—	1960 {20.0}	1960 {20.0}	1960 {20.0}	1960 {20.0}	1960 {20.0}
						9810 {100}	9810 {100}	9810 {100}	9070 {92.4}	3710 {37.8}
VA5R			✓	—	—	—	—	1960 {20.0}	1960 {20.0}	1960 {20.0}
								9810 {100}	9810 {100}	3920 {40.0}
PSA6R	400 {4.0}	200 to 340 {2.0 to 3.5}	✓	—	—	—	—	1960 {20.0}	—	—
	500 {5.0}	200 to 390 {2.0 to 4.0}	✓	—	—	—	—	9810 {100}	—	—

Note) 1. "■" shows a model with standard actuator.

2. ✓: Positioner is necessary.

3. 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.

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

DIMENSIONS

Table 14. Face-to-face dimensions

[Unit: mm]

Nominal size (inch)	A							
	JIS 10KFF, RF ANSI 150RF JPI 150RF *	JIS 16KRF	JIS 20KRF JIS 30KRF ANSI 300RF JPI 300RF *	JIS 40KRF ANSI 600RF JPI 600RF *	JIS 16K Tongue and groove male and female	JIS 20K Tongue and groove male and female	JIS 30K Tongue and groove male and female	JIS 40K Tongue and groove male and female
1-1/2	222	231	235	251	235	236	248	251
2	254	263	267	286	265	267	276	286
2-1/2	276	288	292	311	290	292	303	311
3	298	313	317	337	310	317	326	337
4	352	364	368	394	360	368	379	394
6	451	465	473	508	475	473	486	508
8	543	560	568	610	570	568	580	610

Nominal size (inche)	A							
	ANSI 150RJ JPI 150RJ	ANSI 300RJ JPI 300RJ	ANSI 600RJ JPI 600RJ	ANSI 150LG JPI 150LG	ANSI 300LG JPI 300LG	ANSI 600LG JPI 600LG	ANSI 150 JPI 150SW, BW *	ANSI 300, 600 JPI 300, 600SW, BW *
1-1/2	235	248	251	232	244	248	251	251
2	267	283	289	264	276	283	286	286
2-1/2	289	308	314	286	302	308	311	311
3	311	333	340	308	327	333	337	337
4	365	384	397	362	378	391	394	394
6	464	489	511	460	483	505	473	508
8	556	584	613	552	578	606	568	610

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

- IEC 60534-3-1 : 2001

- IEC 60534-3-3 : 1998 (2-1/2 inches or over)

- JIS B 2005-3-1 : 2005

- JIS B 2005-3-3 : 2005 (2-1/2 inches or over)

Table 15. Other dimensions

[Unit: mm]

Nominal size (inch)	Actuator Model	H				Bellows bonnet	B	φB	E
		Plain bonnet	Extension bonnet Type 1	Extension bonnet Type 2					
				Integral cast type	Welded type				
1-1/2	HA2D, R	500	665	780	1020	660	281	267	70
	HA3D, R	590	760	875	1140	750	363	350	
2	HA2D, R	500	670	785	1025	660	281	267	80
	HA3D, R	595	765	875	1140	750	363	350	
2-1/2	HA2D, R	575	745/755	880	1130	795	281	267	90
	HA3D, R	630	800/810	930	1180	850	363	350	
	HA4D, R	865	1035/1045	1165	1495	—	520	470	
3	HA2D, R	580	755/765	900	1135	800	281	267	100
	HA3D, R	635	810/820	955	1190	855	363	350	
	HA4D, R	870	1045/1055	1190	1505	—	520	470	
4	HA2D, R	610	810/820	915	1150	830	281	267	115
	HA3D, R	660	860/870	1020	1205	880	363	350	
	HA4D, R	890	1100/1110	1255	1520	—	520	470	
	VA5R	1420	1635	1820	2050	—	—	620	
	PSA6R	1255	1470	1655	1885	—	—	476	
6	HA3D, R	785	1020/1045	1250	1385	1075	363	350	170
	HA4D, R	955	1190/1215	1425	1570	1245	520	470	
	VA5R	1480	1740	1980	2110	—	—	620	
	PSA6R	1315	1575	1815	1945	—	—	476	
8	HA4D, R	1090	1350	1580	1710	1340	520	470	220
	VA5R	1585	1850	2145	2275	—	—	620	

- Note) 1. "H" dimensions are applicable when a hand wheel is not provided. When top mounted hand wheel type HA or VA actuators or side mounted hand wheel PSA6R 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 for type VP actuators, and SS2-PSA100-0100 for type PSA actuators).
2. "H" dimensions of Extension bonnet type 1 are as follows: Upper figures for ANSI 150 and JIS 10K, and lower figures for JIS 16K or ANSI 300 or over.

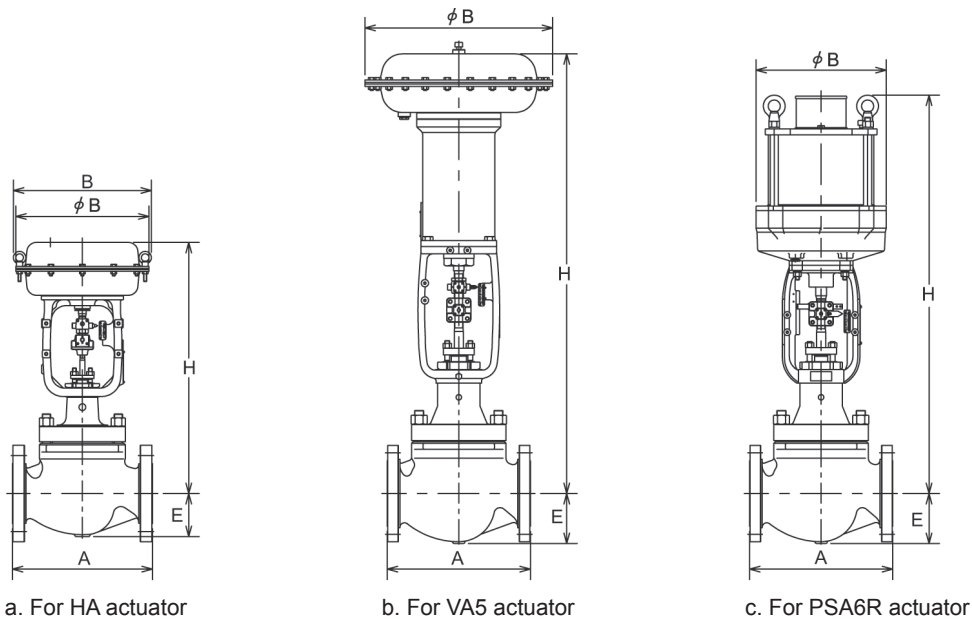


Figure 6. Face-to-face and other dimensions

Table 16. Weight

[Unit: kg]

Nominal size (inch)	Actuator Model	Weight							
		Flanged type JIS 10K ANSI/JPI 150		Flanged type JIS16K, 20K, 30K ANSI/JPI 300		Flanged Type JIS 40K ANSI/JPI 600		Welded type JIS 10K,16K,20K, 30K, 40K ANSI/JPI 150, 300, 600	
		Plain bonnet	Extension bonnet	Plain bonnet	Extension bonnet	Plain bonnet	Extension bonnet	Plain bonnet	Extension bonnet
1-1/2	HA2D,R	31	34	36	39	44	47	36	39
	HA3D,R	43	46	48	51	56	59	48	51
2	HA2D,R	37	40	42	45	47	50	42	45
	HA3D,R	49	52	54	57	59	62	54	57
2-1/2	HA2D,R	43	47	48	52	65	69	48	52
	HA3D,R	55	59	60	64	77	81	60	64
	HA4D,R	86	90	91	95	108	112	91	95
3	HA2D,R	53	59	63	69	85	91	63	69
	HA3D,R	65	71	75	81	97	103	75	81
	HA4D,R	96	102	106	112	128	134	106	112
4	HA2D,R	63	73	78	88	113	123	75	85
	HA3D,R	75	85	90	100	125	135	87	97
	HA4D,R	106	116	121	131	156	166	118	128
	VA5R	233	243	248	258	283	293	245	255
	PSA6R	213	223	228	238	258	273	225	235
6	HA3D,R	157	172	187	202	237	252	177	192
	HA4D,R	188	203	218	233	268	283	208	223
	VA5R	315	330	345	360	395	410	335	350
	PSA6R	295	316	325	340	375	390	315	330
8	HA4D,R	268	288	318	338	438	458	308	328
	VA5R	395	415	445	465	565	585	435	455

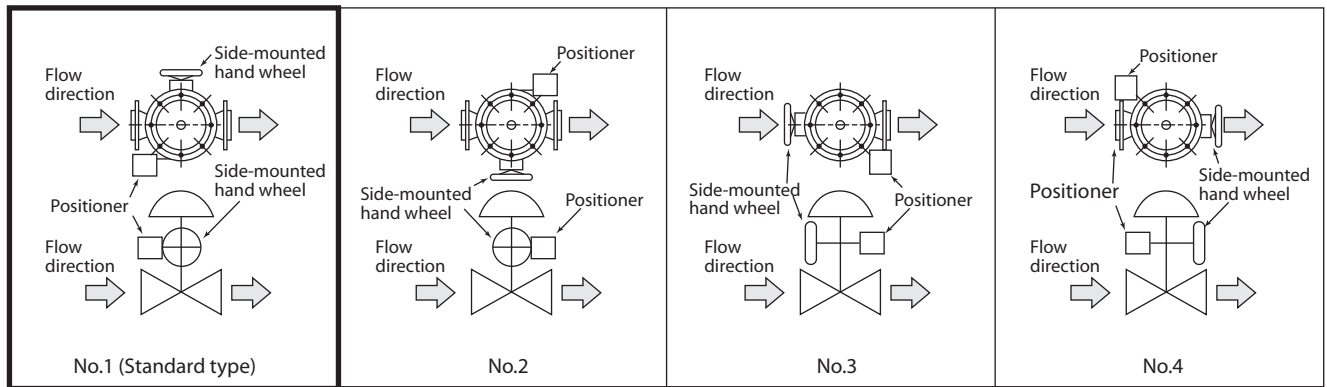


Figure 7. Actuator orientation

- Note) 1. Indicate by position number when installation other than the standard type is required.
 2. With type PSA6R actuator, the side-mounted hand wheel is mounted on the same side as the positioner.

Ordering Information

When ordering, please specify ;

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

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