

CV3000 Series

Electric Pressure-Balanced Cage-type Control Valves

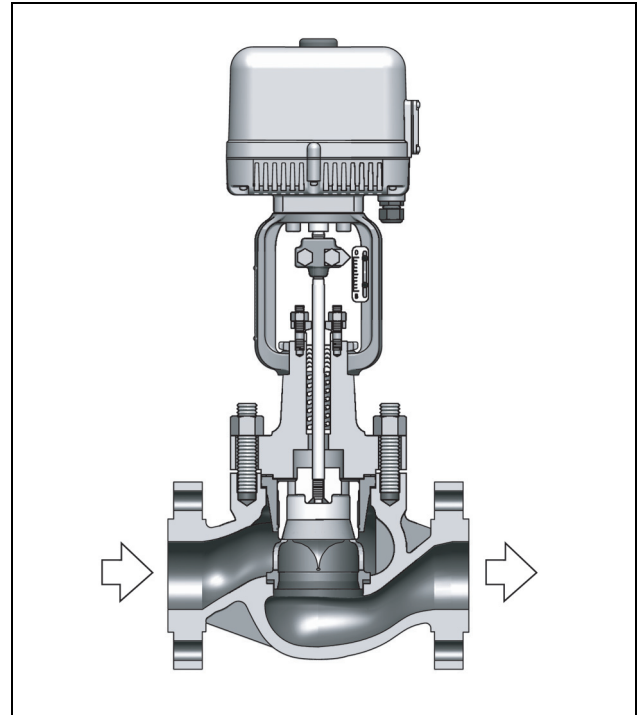
Model HCB

OVERVIEW

Model HCB Pressure-Balanced Cage-Type Control Valves are designed for heavy duty services. The compact valve body, having a S-shape flow passage that features low pressure loss and a stabilizer that regulates turbulent flow around the cage, allows a large flow capacity, rangeability, and high-accuracy flow characteristics, which comply with the IEC Standards.

The valve plug is structured in a pressure- balanced type that permits flow control of a high differential pressure with a small actuating force. The actuator section performs two-position operation or proportional operation by directly receiving the signal of 4-20 mA DC or 1-5V DC from the electronic-type controller. The provided electric-type actuator offers high accuracy, compactness, and sturdy structure.

The model HCB Valves are widely applicable for reliable control of process lines where dynamic stability, low noise, and cavitation/flashing resistance are required.



SPECIFICATIONS

Body

Type: Straight-Through, Cast globe valve

Nominal size: 1½, 2, 2½, 3, 4, 6, 8 inches

Pressure rating:

- JIS 10K, 16K, 20K, 30K, 40K
- ANSI Class 125, 150, 300, 600
- JPI Class 125, 150, 300, 600

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 (1½, 2 inches), BW (2½ ~ 8 inches)

Material:

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

Bonnet style:

- Plain bonnet: (-17 to 230 °C)
- Extension Type 1: (-45 to -17 °C and 230 to 566 °C)
- Extension Type 2: Integral cast type (-100 to -45 °C)
Welded type (-196 to -100 °C)
- Bellows type For operating temperature and pressure range, 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 graphite packing is used.

Note) PTFE: Polytetrafluoroethylene.

Gasket:

Type; Combination of serrated type, spiral type (integral cage), and serrated type (split cage)

Material; Stainless steel (SUS316, SUS316L, SUS329J1), copper, aluminum

Trim**Valve plug:**

Pressure balanced type

- High-capacity (for flow characteristics, refer to Figure 1.)
 - Metal seat; Equal percentage cage (%V), Linear cage (LV)
 - Soft seat; Equal percentage cage (%T), Linear cage (LT)
- High-flow characteristics type
 - Metal seat (for flow characteristics, refer to Figure 2.); Equal percentage cage (%VF), Linear cage (LVF)
 - Soft seat (for flow characteristics, refer to Figure 2.); Equal percentage cage (%TF), Linear cage (LTF)

- Note*
1. Integral cage and split cage vary depending on their valve sizes, materials, and operating temperature. Refer to Table 1.
 2. For operating temperature and max. differential pressure range of soft-seat type, refer to Figure 4.

Material:

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

Note For fluid conditions requiring Stellite, refer to Figure 5.

Actuator

Type: Electric motor

Action: Direct or reverse action

Control operation: Proportional or ON-OFF action

Input signal:

- Proportional operation
 - Current input: 4-20, 4-12 or 12-20 mA DC
 - Voltage input: 1-5, 1-3 or 3-5V DC
- Two-position operation
 - Power supply voltage, relay point of contact

Note Select the control valve operation mode during input signal "OFF" (At the selected position, the valve stops, or is fully open or closed).

Power supply:

Single phase 100, 200, 24V AC ($\pm 10\%$, 50/60 Hz) or 110, 115, 120, 210, 215, 220, 230, 240V AC (note that model EA4, EA5 removes 24V AC)

Input resistance: 250 Ω

Power consumption:**Model EA2 and EA3**

- 50VA during operation, 1.5VA during non-operation (100V AC)
- 50VA during operation, 1.5VA during non-operation (200V AC)
- 75VA during operation, 1.5VA during non-operation (24V AC)

Model EA4 and EA5

- 130VA during operation, 1.5VA during non-operation (100V AC)
- 140VA during operation, 1.5VA during non-operation (200V AC)

Insulation resistance:

Between input terminal and housing; 100 M Ω / 500V DC
Between power supply terminal and housing; 100 M Ω / 500V DC

Withstand voltage:

Between input terminal and housing; 500V DC, 1 min.
Between power supply terminal and housing; 1500V DC, 1 min.

Housing material: Aluminum diecast (ADC12)

Housing:

Waterproof type (NEMA4, 4X, IEC529(1989)IP-65 equivalent)

Motor:

Capacitor motor (Built-in continuous rating thermal switch, Class E insulation)

Feedback mechanism:

Conductive-plastic-type potentiometer (with backlash compensation mechanism)

Electrical conduit connection: G1/2 (2 positions)

Protective device: Built-in open/close limit switch (with motor burn-preventive thermal switch)

Ambient temperature: -5 to 55 °C

Ambient humidity: 10 to 90% RH

Allowable vibration: 2 G / 100 Hz

Output:**Analog feedback**

4 to 20 mA DC (For proportional control)

Contact feedback (Option)

Open/Close 2 points

- Model EA2, EA3 contact capacity ; 5A, 125V AC or more
- Model EA4, EA5 contact capacity ; Upper limit..... 10A, 250V AC or more
Lower limit 21A, 250V AC or more

Resistance feedback

With 135 Ω potentiometer (accuracy 135 Ω \pm 10%, linearity \pm 1%)

Manual operation: With multi-turn lever

Additional specification (by special order)

- Special inspection
 - Flow characteristics inspection, material inspection (Material certificate), nondestructive inspection, steam inspection, low-temperature inspection
- Seat chamfered flange
- Double gland
- Stainless steel (SUS304) nuts and bolts for atmospheric exposure
- Sand-/dust-preventive measure
- Cold-proof specification
- With drain plug
- Oil/water free treatment
- Yoke material (SCPH2)
- Vacuum service

Performance

Rated Cv value: Refer to Table 2 and 3.

Flow characteristics: Refer to Figure 1 and 2.

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

Allowable differential pressure:

Refer to Table 8 and 9.

Leakage specification

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

- Metal seat
 - Standard..... Class II: Leakage less than 0.5% of maximum valve capacity.
 - Option..... Class III: Leakage less than 0.1% of maximum valve capacity.
- Soft seat
 - Class VI: Leakage less than 0.00001% of maximum valve capacity.

Accuracy: Within $\pm 2\%$ F.S.

Dead band: Within 1% F.S.

Hysteresis error: Within 2% F.S.

Linearity: Within $\pm 2\%$ F.S.

Operating time:

(fully open \leftrightarrow fully closed, load reference value)

Valve size 1½, 2 inches: 21 sec.

2½ to 4 inches: 32 sec.

6 inches: 31 sec.

8 inches: 47 sec.

Dimensions

Refer to Figure 7, Table 12 and Table 13.

Weight

Refer to Table 14.

Block diagram

Refer to Figure 8.

Terminal connection

Refer to Figure 9.

Finish

Valve body and bonnet; Blue (Munsell 10B5/10) or silver.
Actuator ; Silver

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

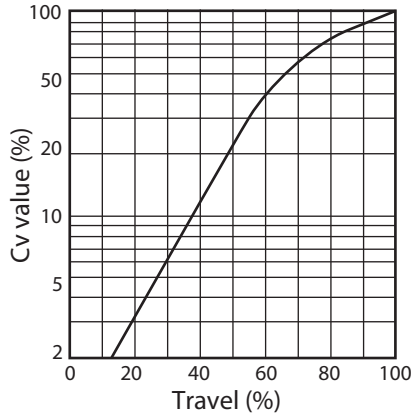
Body Material Trim material		JIS	FC200	SCPH2	SCPH21	SCPH61	SCPL1	SCS11	SCS13A	SCS14A	SCS16A	SCS19A
		ASTM	A126Gr.B	A216WCB	A217WC6	A217C5	A352LCB	—	A351CF8	A351CF8M	A351CF3M	A351CF3
JIS	SCS24		0 ~ 200	-5 ~ 425	-5 ~ 425	-5 ~ 425	-45 ~ 350	—	—	—	—	—
JIS	SCS11		—	—	—	—	—	-5 ~ 300	—	-5 ~ 300	—	—
JIS	SCS14A		0 ~ 200	-5 ~ 300*	-5 ~ 300*	-5 ~ 300*	-45 ~ 300	—	-196 ~ 300	-196 ~ 300	—	—
JIS	SCS16A		—	—	—	—	-45 ~ 300	—	-196 ~ 300	-196 ~ 300	-196 ~ 300	—
JIS	SCS19A		—	—	—	—	-45 ~ 300	—	-196 ~ 300	-196 ~ 300	—	-196 ~ 300
JIS	SCS11 Stellite		—	—	—	—	—	-5 ~ 300	—	-50 ~ 550	—	—
JIS	SCS14A Stellite		—	-5 ~ 425*	-5 ~ 550*	-5 ~ 556*	-45 ~ 350	—	-196 ~ 550	-196 ~ 450	—	—
JIS	SCS16A Stellite		—	—	—	—	-45 ~ 350	—	-196 ~ 450	-196 ~ 450	-196 ~ 450	—
JIS	SCS19A Stellite		—	—	—	—	-45 ~ 350	—	-196 ~ 450	-196 ~ 450	—	-196 ~ 450
JIS	SCS14A Atomroy		—	-5 ~ 425*	-5 ~ 500*	-5 ~ 500*	—	—	—	—	—	—
JIS	SCS24 Soft seat		0 ~ 200	-5 ~ 200	—	—	-45 ~ 200	—	—	—	—	—
JIS	SCS11 Soft seat		—	—	—	—	—	-50 ~ 200	—	-50 ~ 200	—	—
JIS	SCS14A Soft seat		0 ~ 200	-5 ~ 200	—	—	-45 ~ 200	—	-80 ~ 200	-80 ~ 200	—	—
JIS	SCS16A Soft seat		—	—	—	—	-45 ~ 200	—	-80 ~ 200	-80 ~ 200	-80 ~ 200	-80 ~ 200

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

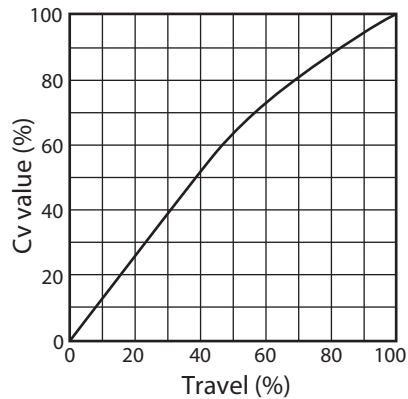
Cv value and travel

Table 2 High-capacity type cage (%V, LV, %T, LT)

Nominal size (inches)		1½	2	2½	3	4	6	8
Port size (inches)		1½	2	2½	3	4	6	8
Rated Cv value	Metal or soft seat type, Equal percentage characteristics (%V,%T)	36	60	100	140	220	420	820
	Metal or soft seat type Linear characteristics (LV, LT)	40	75	110	150	240	435	850
Rated travel (mm)		25		38		50	75	



a. Equal percentage characteristics (%V metal seat, %T soft seat)

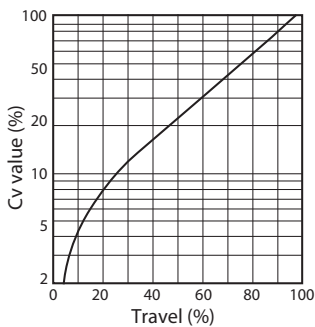


b. Linear characteristics (LV metal seat, LT soft seat)

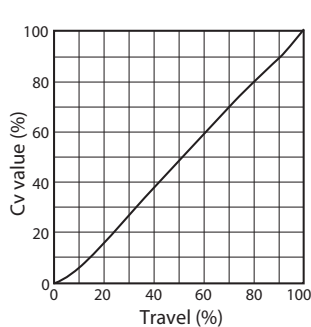
Figure 1 High-capacity type

Table 3 High-flow characteristic type cage (%VF, LVF, %TF, LTF)

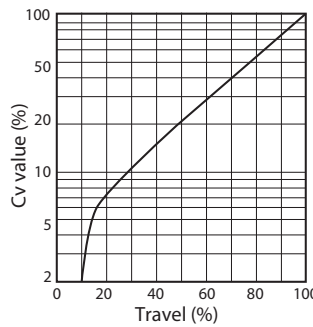
Nominal size (inches)	1½			2			2½			3			4			6			8		
Port size (inches)	1	1¼	1½	1¼	1½	2	1½	2	2½	2	2½	3	2½	3	4	4	5	6	4	5	6
Rated Cv value (%VF, LVF, %TF, LTF)	11	17	24	17	24	44	24	44	68	44	68	99	68	99	175	175	275	360	275	360	650
Rated travel (mm)	25						38						50			75					



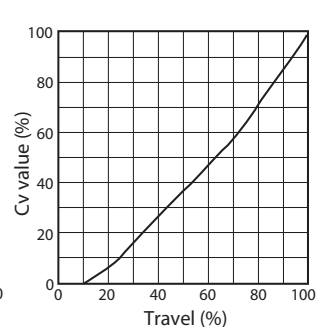
a. Equal percentage characteristics (%VF: metal seat)



b. Linear characteristics (LVF: metal seat)



c. Equal percentage characteristics (%TF Soft seat)



d. Linear characteristics (LTF Soft seat)

Figure 2 High-flow characteristics type cage flow characteristics

Note) The above graphs indicate typical flow characteristics.

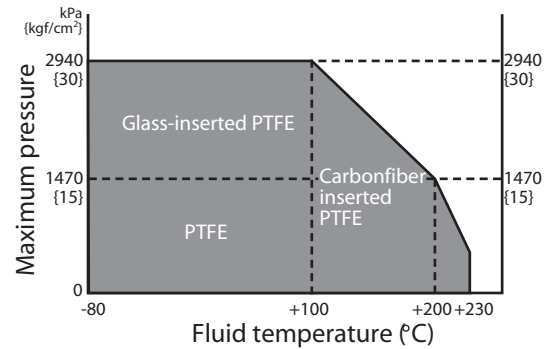
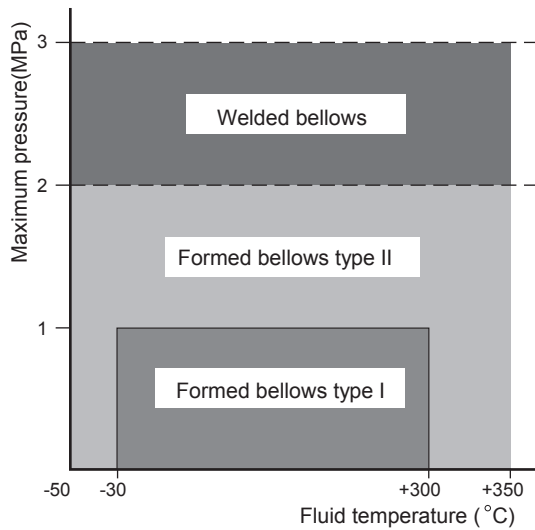


Figure 3 Bellows Type by Temperature and Pressure Ranges **Figure 4 Temperature and maximum differential pressure range of soft-seat type**

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.

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

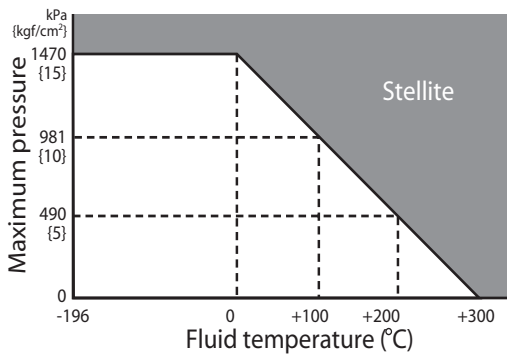


Figure 5 Temperature / normal differential pressure ranges requiring Stellite

- Note) 1) SCS24 (Precipitation-hardened stainless steel) requires no Stellite.
 2) When cavitation / flashing service or oil prohibited service is required, use of SCS24 or Stellite is recommended regardless of temperature and differential pressure.

Structural drawing of trim and body/trim material combinations

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

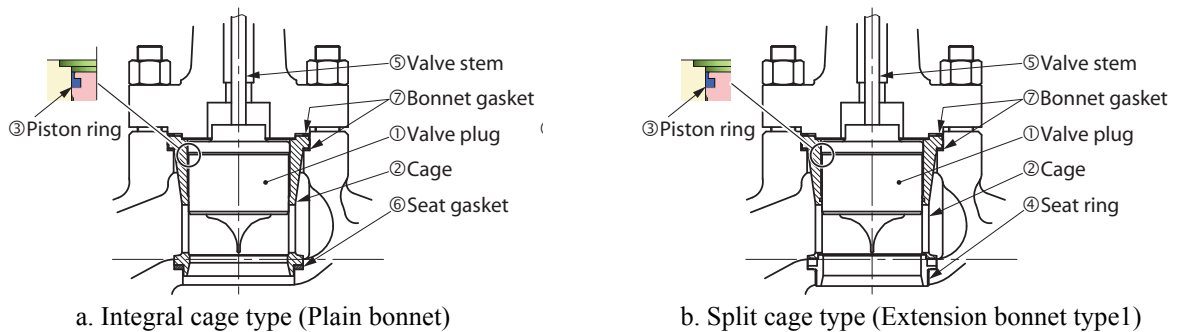


Figure 6 Structural drawing of trim

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

	Figure 5-1			
① Valve plug	SCS24	SCS14A	SCS14A Stellite	SCS14A Soft seat
② Cage				
③ Piston ring *1	General		Oil free	General
	Ni-resist		Stellite #21	---
④ Valve stem	SUS316			
⑤ Seat gasket	Spiral wound(hoop: SUS316, filler: Inorganic paper)		Spiral wound(hoop: SUS316, filler: PTFE)	Spiral wound(hoop: SUS316, filler: Inorganic paper)
⑥ Bonnet gasket	SUS316		SUS316(PTFE coating)	SUS316

Note) *1. For gas or steam only.

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

	Figure 5-1			Figure 5-2	
① Valve plug	SCS24	SCS14A	SCS14A Stellite	SCS14A	SCS14A Stellite
② Cage					
③ Piston ring *1	Austenitic cast iron				
④ Seat ring *2	---			SCS14A	SCS14A Stellite
⑤ Valve stem	SUS316				
⑥ Seat gasket	Spiral wound(hoop: SUS316, filler: Inorganic paper)			---	
⑦ Bonnet gasket	SUS316				

Note) *1. For gas or steam only.

*2. For split cage only.

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

	Figure 5-1			
① Valve plug	SCS14A	SCS14A Stellite		SCS14A Soft seat
② Cage				
③ Piston ring *1	General		Oil free	General
	Ni-resist		Stellite #21	---
④ Valve stem	SUS316			
⑤ Seat gasket	Spiral wound(Hoop: SUS316, Filler: Inorganic paper)		Spiral wound(Hoop: SUS316, Filler: PTFE)	Spiral wound(Hoop: SUS316, Filler: Inorganic paper)
⑥ Bonnet gasket	SUS316		SUS316(PTFE coating)	SUS316

Note) *1. For gas or steam only.

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

	Figure 5-1			Figure 5-2	
① Valve plug	SCS24	SCS14A	SCS14A Stellite	SCS14A	SCS14A Stellite
② Cage					
③ Piston ring *1	Austenitic cast iron				
④ Seat ring *2	---			SCS14A	SCS14A Stellite
⑤ Valve stem	SUS316				
⑥ Seat gasket	Spiral wound(Hoop: SUS316, Filler: Inorganic paper)			---	
⑦ Bonnet gasket	SUS316				

Note) *1. For gas or steam only.

*2. For split cage only.

Allowable differential pressure

Table 8 Metal seat (%VF, LVF, %V, LV) : PTFE packing

Actuator model	Differential pressure (Nominal size (inches) / Port size (inches)) kPa {kgf/cm ² }																				
	1			2			2½			3			4			6			8		
	1	1¼	1½	1¼	1½	2	1½	2	2½	2	2½	3	2½	3	4	4	5	6	5	6	8
EA2	5280 {53.8}	5280 {53.8}	5280 {53.8}	5280 {53.8}	5280 {53.8}	5280 {53.8}	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
EA3	—	—	—	—	—	—	5180 {52.8}	5180 {52.8}	5180 {52.8}	4310 {44.0}	4310 {44.0}	4310 {44.0}	3300 {33.6}	3300 {33.6}	3300 {33.6}	—	—	—	—	—	—
EA4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	3000 {30.6}	3000 {30.6}	3000 {30.6}	—	—	—
EA5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	6700 {68.3}	6700 {68.3}	6700 {68.3}

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.

Table 9 Soft seat (%TF, LTF, %T, LT) : PTFE packing

Actuator model	Differential pressure (Nominal size (inches) / Port size (inches)) kPa {kgf/cm ² }																				
	1			2			2½			3			4			6			8		
	1	1¼	1½	1¼	1½	2	1½	2	2½	2	2½	3	2½	3	4	4	5	6	5	6	8
EA2	2940 {30.0}	2940 {30.0}	2940 {30.0}	2940 {30.0}	2940 {30.0}	2940 {30.0}	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
EA3	—	—	—	—	—	—	2940 {30.0}	2940 {30.0}	2940 {30.0}	2940 {30.0}	2940 {30.0}	2940 {30.0}	2300 {23.5}	2300 {23.5}	2300 {23.5}	—	—	—	—	—	—
EA4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2100 {21.4}	2100 {21.4}	2100 {21.4}	—	—	—
EA5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	4900 {50.0}	4900 {50.0}	4900 {50.0}

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.

Table 10 Metal seat (%VF, LVF, %V, LV) : Graphite packing “P6610CH+P6528” (+230 to +500 °C)

Actuator model	Differential pressure (Nominal size (inches) / Port size (inches)) kPa {kgf/cm ² }																				
	1			2			2½			3			4			6			8		
	1	1¼	1½	1¼	1½	2	1½	2	2½	2	2½	3	2½	3	4	4	5	6	5	6	8
EA2	3690 {37.6}	3690 {37.6}	3690 {37.6}	2880 {29.3}	2880 {29.3}	2880 {29.3}	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
EA3	—	—	—	—	—	—	3200 {32.6}	3200 {32.6}	3200 {32.6}	2670 {27.2}	2670 {27.2}	2670 {27.2}	2030 {20.7}	2030 {20.7}	2030 {20.7}	—	—	—	—	—	—
EA4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	2780 {28.3}	2780 {28.3}	2780 {28.3}	—	—	—
EA5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	5710 {58.2}	5710 {58.2}	5710 {58.2}

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.

Table 11 Contoured type metal seat (%CF, LCF, %C, LC) : Graphite packing “P6610CH+P8590” (+500 to +566 °C)

Actuator model	Differential pressure (Nominal size (inches) / Port size (inches)) kPa {kgf/cm ² }																				
	1			2			2½			3			4			6			8		
	1	1¼	1½	1¼	1½	2	1½	2	2½	2	2½	3	2½	3	4	4	5	6	5	6	8
EA2	1860 {18.9}	1130 {11.5}	800 {8.1}	1130 {11.5}	800 {8.1}	460 {4.6}	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—
EA3	—	—	—	—	—	—	940 {9.5}	540 {5.5}	340 {3.4}	540 {5.5}	340 {3.4}	240 {2.4}	340 {3.4}	240 {2.4}	130 {1.3}	—	—	—	—	—	—
EA4	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	310 {3.1}	200 {2.0}	120 {1.2}	—	—	—
EA5	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	—	510 {5.2}	310 {3.1}	190 {1.9}

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.

DIMENSIONS**Table 12 Face-to-face dimensions**

[Unit: mm]

Nominal size (inches)	A							
	JIS 10KFF, RF ANSI 125FF 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
1½	222	231	235	251	235	236	248	251
2	254	263	267	286	265	267	276	286
2½	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 (inches)	A						
	ANSI 150RJ JPI 150RJ	ANSI 300RJ JPI 300RJ	ANSI 600RJ JPI 600RJ	ANSI 300LG JPI 300LG	ANSI 600LG JPI 600LG	ANSI 150 JPI 150SW, BW *	ANSI 300, 600 JPI 300, 600SW, BW *
1½	235	248	251	244	248	251	251
2	267	283	289	276	283	286	286
2½	289	308	314	302	308	311	311
3	311	333	340	327	333	337	337
4	365	384	397	378	391	394	394
6	464	489	511	483	505	473	508
8	556	584	613	578	606	568	610

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

- IEC 60534-3-1 : 2001 - IEC 60534-3-3 : 1998 (2½ inches or over)
- JIS B 2005-3-1 : 2005 - JIS B 2005-3-3 : 2005 (2½ inches or over)

Table 13 External dimensions

[Unit: mm]

Nominal size (inches)	Actuator model No.	H					h	B	E	C	F
		Plain bonnet	Extension bonnet Type 1	Extension bonnet type 2		Bellows-type bonnet					
				Integral-cast type	Welded type						
1½	EA2	540	705	820	1060	700	355	214	70	138	116
2	EA2	540	705	820	1060	700	355	214	70	138	116
2½	EA3	625	795/805	930	1180	845	378	244	90	140	120
3	EA3	630	805/815	950	1185	850	378	244	100	140	120
4	EA3	660	860/870	965	1200	880	378	244	115	140	120
6	EA4	338	1073/1098	1300	1435	1125	515	264	170	166	131
8	EA5	1068	1328	1558	1688	1318	588	264	220	166	131

- Note) 1. "H" dimensions are applicable when a hand wheel is provided. When the hand wheel is not required, subtract the hand wheel dimensions.
2. "H" dimensions of Extended bonnet Type 1 are as follows: Top rows for JIS 10K and ANSI 150, and bottom row for JIS 16K and ANSI 300 or over.

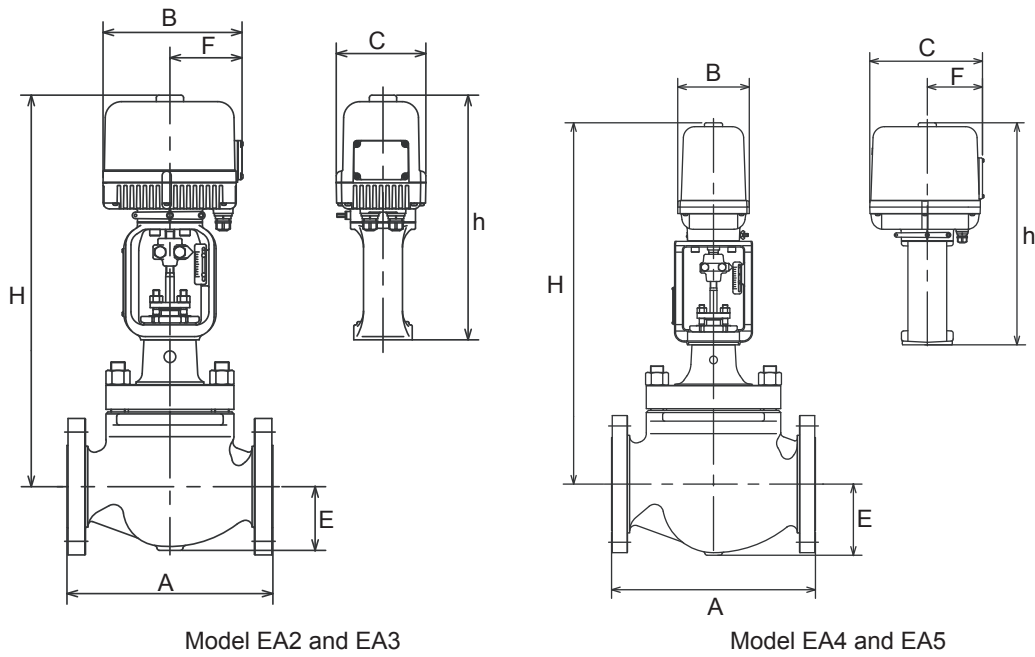


Figure 7 Face-to-face and external dimensions

Table 14 Weight

[Unit: kg]

Nominal size (inches)	Actuator model No.	Weight															
		Flanged type JIS 10K, ANSI/JPI 150				Flanged type JIS 16K, 20K, 30K ANSI/JPI 300				Flanged type JIS 40K ANSI/JPI 600				Welded type JIS 10K, 16K, 20K, 30K ANSI/JPI 150, 300, 600			
		Plain	Extension Type 1, bellows type		Extension Type 2		Plain	Extension Type 1, bellows type		Extension Type 2		Plain	Extension Type 1, bellows type		Extension Type 2		
			Integral-cast type	Welded type	Integral-cast type	Welded type		Integral-cast type	Welded type	Integral-cast type	Welded type						
1½	EA2	27	30	33	35	32	35	38	40	40	43	46	48	32	35	38	40
2	EA2	33	36	39	41	38	41	44	46	43	46	49	51	38	41	44	46
2½	EA3	39	43	47	49	44	48	52	54	61	65	69	71	44	48	52	54
3	EA3	49	55	61	64	59	65	71	74	81	87	93	96	59	65	71	74
4	EA3	59	69	74	77	74	84	89	92	109	119	124	127	71	81	86	89
6	EA4	152	167	174	177	182	197	204	207	232	247	254	257	172	187	194	197
8	EA5	230	250	260	265	280	300	310	315	400	420	430	435	270	290	300	305

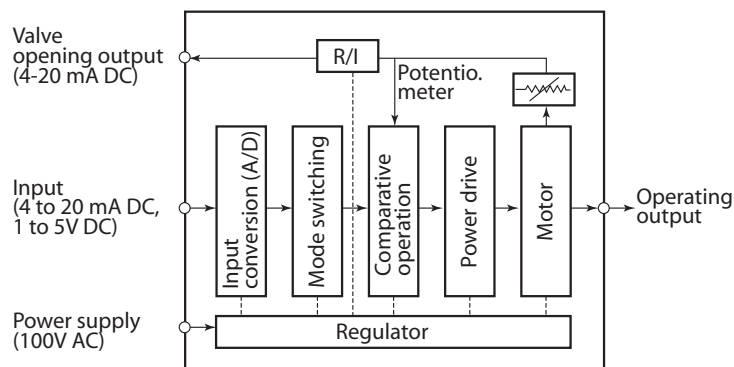


Figure 8 Operating principle of block diagram

Input conversion block:

Receives gate opening command signals of 1-5 V DC under high impedance (4-20 mA DC signals are converted to voltage signals by a resistor of 250 Ω connected to the input terminal) and converts to the level convenient for internal processing.

Mode switching block:

Monitors gate opening command signals, judges signal "OFF", and generates drive signals according to the preset mode.

Comparative operation block:

Effects comparative operation between output axis rotating angle signals (Potentiometer) and signals converted by the input conversion block.

Power drive block:

Issues direct/reverse rotation command output to the motor depending on comparative judgement signals received from the comparative operation block.

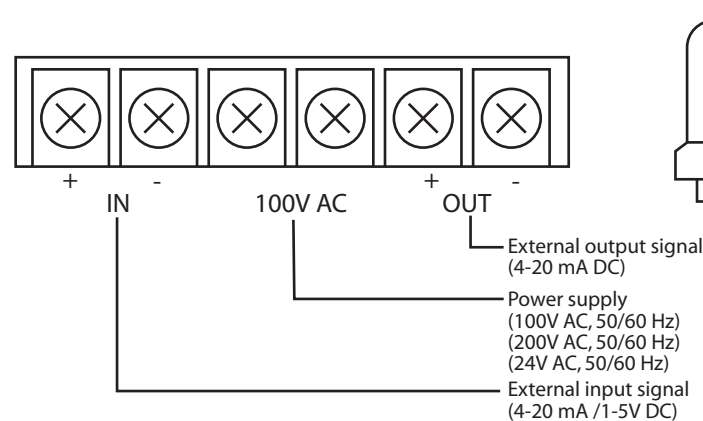


Figure 9 Terminal connection

Ordering information

When ordering, please specify;

- | | |
|--|---|
| 1) Model number: HCB | 9) Accessories (limit switch) |
| 2) Nominal size \times Port size | 10) Special requirement of oil free treatment, and etc. |
| 3) Type and rating of end connections | 11) Name of flow medium |
| 4) Body and trim material, necessity of hardening | 12) Normal flow and maximum required flow |
| 5) Type of bonnet | 13) Pressure of flow medium, upstream and downstream pressure at maximum and minimum, required flow |
| 6) Valve and plug characteristics | 14) Temperature and specific gravity of flow medium |
| 7) Type of actuator, power supply, frequency. | 15) Viscosity of flow medium, inclusive or exclusive of slurry |
| 8) Valve action (direct or reverse), operation mode of input signal "OFF". | |

Please, read 'Terms and Conditions' from following URL before the order and use.

<http://www.azbil.com/products/bi/order.html>

Specifications are subject to change without notice.

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1st edition: Mar. 2001
7th edition: Aug. 2015

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