

CV3000 Series

Smart-Port Single Seated Control Valves

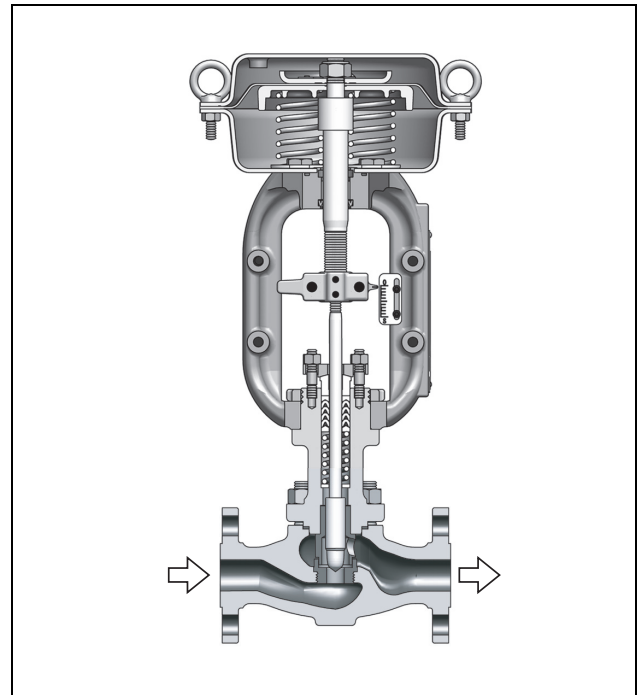
Model HLC

OVERVIEW

Model HLC Small-Port Cage Guide Type Single Seated Control Valves are designed for high differential pressure Service where fluid normal differential pressure exceeds 2940 kPa {30 kgf/cm²} or for heavy-duty service where flashing/cavitation may occur. Further, they are ideal for preventing erosion from the valve body, because their guides are sturdy and the valve body is protected by a cage. The compact valve body, having an S-shaped flow passage that features low pressure loss, allows a large flow capacity and rangeability.

The valve plugs are available in a wide range of Cv values. The flow shutoff performance complies with simplest mechanisms, utilizes a compact yet powerful diaphragm actuator loaded with multiple springs.

The model HLC Control Valves are widely applicable for reliable control of small flows in high- or low-temperature, high differential pressure process lines.



SPECIFICATIONS

Body

Type

Straight-through, cast globe valve

Nominal size

1/2, 3/4, 1 inch

Pressure rating

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

End connections

- 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 Class 150, 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 , BW
- Threaded end: Rc

Materials

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 and 230 to 566 °C)
- Extension bonnet Type 2
Integral-cast type (-100 to -45°C)
Welded type (-196 to -100 °C)

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: Flat type, serrated type

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

Trim

Valve plug

- Single-seated, contoured type plug
- Metal seat Equal percentage (%CC)
- Linear (LCC)

Cage

Separated type cage

Materials

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

Actuator

Type

Single-acting diaphragm actuator (Type PSA or HA)

Action

Direct or reverse action

Diaphragm

Cloth embedded ethylene propylene rubber

Spring range

20 to 98 kPa {0.2 to 1.0 kgf/cm²} or
80 to 240 kPa {0.8 to 2.4 kgf/cm²}

Supply pressure

120 to 390 kPa {1.2 to 4.0 kgf/cm²}

Note) Spring range and air supply pressure vary depending on permissible differential 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, air lock relay, and others

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

2) Accessories with an 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/HTP	AVP/HEP	THM	SHM
HA2	HTP	AVP/HEP	THM	SHM

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 measures
- Saline damage countermeasures
- Cold-area use specifications
- Tropical-area use specifications
- Vacuum service

Performance

Rated Cv value

Refer to Table 2.

Flow characteristics

Refer to Figure 1 and Figure 2.

Inherent rangeability

Refer to Table 2.

(Optional: 75: 1 for values of rated Cv1.0 or more)

Allowable differential pressure

Refer to Table 3 and Table 8.

Leakage specifications

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

- Standard
- Class IV: Leakage less than 0.01% of maximum valve capacity.
- Optional
- Leakage less than 0.001% 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. (Within ±10% F.S.)

With positioner: Within ±1% F.S. (VPE: Within ±3% F.S., 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 3, Table 9 and Table 10.

Weight

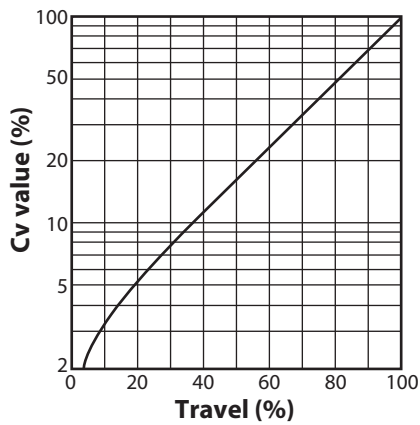
Refer to Table 11, Table 12 and Table 13.

Actuator orientation

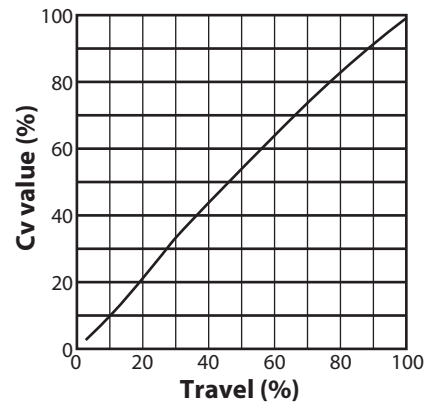
Refer to Figure 4.

Finish

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

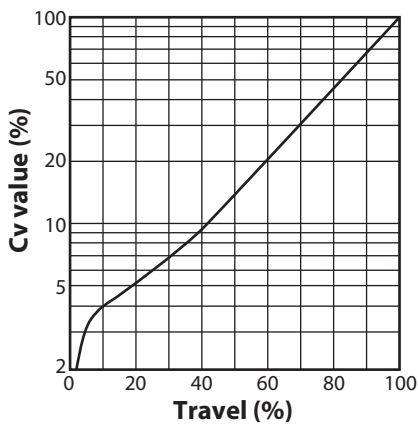


a. Equal percentage characteristics (%CC)

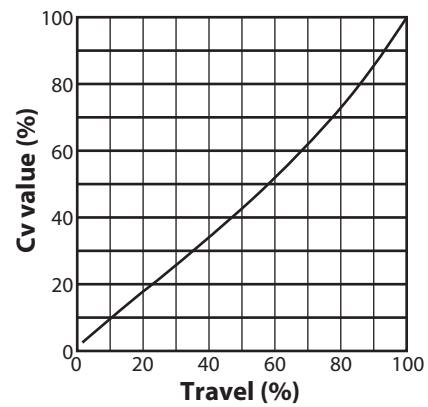


b. Linear characteristics (LCC)

Figure 1 Flow characteristics: Contoured type (Cv value: 0.4 to 4.0)



a. Equal percentage characteristics (%CC/Cv value: 0.25)



b. Linear characteristics (LCC)

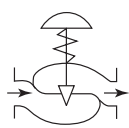
Figure 2 Flow characteristics: Contoured type (Cv value: 0.01 to 0.25)

Note)The above graphs indicate typical flow characteristics.

Allowable differential pressure

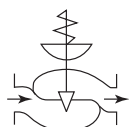
Contoured type metal seat (%CC LCC) : PTFE packing

Table 3 Air-to-close



Actuator Model No.	Supply pressure kPa {kgf/cm ² }	Spring range kPa {kgf/cm ² }	Positioner	Differential pressure {by Cv value} kPa {kgf/cm ² }						
				Below 0.25	0.4	063	1.0	1.6	2.5	4.0
PDA1D	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}
				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}
				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}
				-	-	-	9810 {100}	9810 {100}	9810 {100}	9810 {100}
HA2D	140 {1.4}	20 to 98 {0.2 to 1.0}	△	3920 {40.0}	3920 {40.0}	3920 {40.0}	3200 {32.6}	3200 {32.6}	1960 {20.0}	1960 {20.0}
				9810 {100}	62.0 {6080}	62.0 {6080}				
	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}
				-	9810 {100}	9810 {100}	9810 {100}	9810 {100}	9810 {100}	9810 {100}

Table 4 Air-to-open

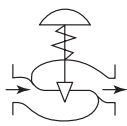


Actuator Model No.	Supply pressure kPa {kgf/cm ² }	Spring range kPa {kgf/cm ² }	Positioner	Differential pressure {by Cv value} kPa {kgf/cm ² }						
				Below 0.25	0.4	063	1.0	1.6	2.5	4.0
PSA1R	140 {1.4}	20 to 98 {0.2 to 1.0}	△	3920 {40.0}	3040 {31.0}	3040 {31.0}	1570 {16.0}	1570 {16.0}	981 {10.0}	981 {10.0}
				5490 {56.0}						
	270 {2.7}	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}
				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}
				9810 {100}	6080 {62.0}	6080 {62.0}				
	270 {2.7}	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}
				-	9810 {100}	9810 {100}	9810 {100}	9810 {100}	9810 {100}	9810 {100}

- Note) 1) ✓ : Positioner is necessary, △ : Can be operated either with or without positioner.
 2) Take care not to cause the maximum permissible 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 permissible differential pressure. The lower denote permissible differential pressure at full closure.

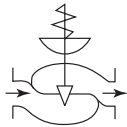
Contoured type metal seat (%CC LCC) : Graphite packing (+230 to +500 °C)

Table 5 Air-to-close



Actuator Model No.	Supply Pressure kPa {kgf/cm ² }	Spring range kPa {kgf/cm ² }	Positioner	Differential pressure {by Cv value} kPa {kgf/cm ² }						
				Bellow 0.25	0.4	0.63	1.0	1.6	2.5	4.0
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}
				9810 {100}	9810 {100}	9810 {100}	9810 {100}	9810 {100}	9810 {100}	9810 {100}

Table 6 Air-to-open

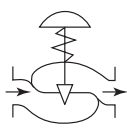


Actuator Model No.	Supply Pressure kPa {kgf/cm ² }	Spring range kPa {kgf/cm ² }	Positioner	Differential pressure {by Cv value} kPa {kgf/cm ² }						
				Bellow 0.25	0.4	0.63	1.0	1.6	2.5	4.0
HA2R	270 {2.8}	80 to 240 {0.8 to 2.4}	✓	3920* {40.0}	3920* {40.0}	3920* {40.0}	3920* {40.0}	3920* {40.0}	3920* {40.0}	3920* {40.0}
				9810 {100}	9810 {100}	9810 {100}	9810 {100}	9810 {100}	9810 {100}	9810 {100}

- 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.

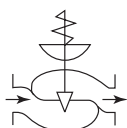
Contoured type metal seat (%CC LCC) : Graphite packing “P6610+M8590” (+500 to +560 °C)

Table 7 Air-to-close



Actuator Model No.	Supply Pressure kPa {kgf/cm ² }	Spring range kPa {kgf/cm ² }	Positioner	Differential pressure {by Cv value} kPa {kgf/cm ² }						
				Bellow 0.25	0.4	0.63	1.0	1.6	2.5	4.0
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}
				9810 {100}	9810 {100}	9810 {100}	9810 {100}	9810 {100}	9810 {100}	9810 {100}

Table 8 Air-to-open



Actuator Model No.	Supply Pressure kPa {kgf/cm ² }	Spring range kPa {kgf/cm ² }	Positioner	Differential pressure {by Cv value} kPa {kgf/cm ² }						
				Bellow 0.25	0.4	0.63	1.0	1.6	2.5	4.0
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}
				9810 {100}	9810 {100}	9810 {100}	9810 {100}	9810 {100}	9810 {100}	9260 {94.4}

- 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.

DIMENSIONS

Table 9 Face-to-face dimensions

(Unit: mm)

Nominal size (inches)	A										
	JIS 10K FF,RF ANSI 125FF JPI 125FF ANSI 150RF JPI 150RF *	JIS 16KRF	JIS20KRF JIS30KRF ANSI300RF JPI300RF *	JIS40KRF ANSI600RF JPI600RF SW,BW *	ANSI150RJ JPI150RJ	ANSI300RJ JPI300RJ	ANSI 600RJ JPI600RJ	JIS20K Tongue and groove Male and female	JIS30K Tongue and groove Male and female	ANSI 1300LG JPI300LG	Screw-on Type
1/2	184	190	194	206	-	206	206	198	208	203	125
3/4	184	190	194	206	-	206	206	198	208	203	125
1	184	193	197	210	197	210	210	198	212	206	125
1½	222	231	235	251	235	248	251	236	248	244	-
2	254	263	267	286	267	283	289	267	276	276	-
2½	276	288	292	311	289	308	314	292	303	302	-
3	298	313	317	337	311	333	340	317	326	327	-

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

-IEC 60534-3-1:2001

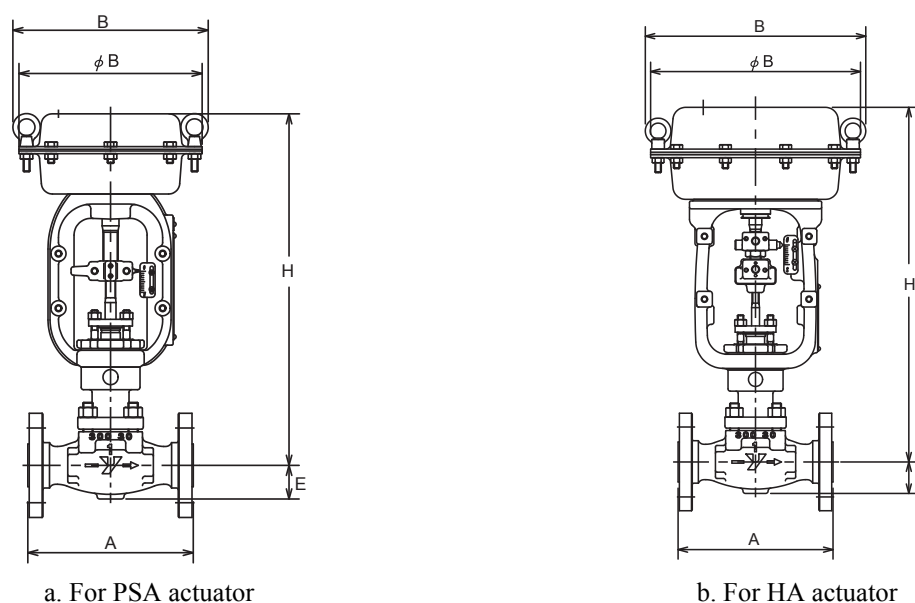
-JIS B 2005-3-1:2005

Table 10 External dimensions

(Unit: mm)

Actuator model no.	H				φB	B	E
	Plain bonnet	Extension bonnet Type 1	Extension bonnet Type 2				
			Integral cast type	Welded type			
PSA1D, R	416	566	726	941	218	230	40
HA2D, R	450	600	760	975	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 Sheet (No.SS2-8213-0500).


Figure 3 Face-to-face and external dimensions

Weight

Table 11 Screw-on type

(Unit: kg)

Nominal size (inch)	Actuator model	Weight			
		Plain bonnet	Extension bonnet Type 1	Extension bonnet Type 2	
				Integral cast type	Welded type
1/2, 3/4, 1	PSA1D,R	13	15	18	23
	HA2D,R	20	22	25	30

Table 12 Flanged type

(Unit: kg)

Nominal size (inches)	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		Plain bonnet	Extension bonnet Type 1	Extension bonnet Type 2	
				Integral-cast type	Welded type			Integral-cast type	Welded type
1/2	PSA1D,R	15	17	20	25	16	18	21	26
	HA2D,R	22	24	27	32	23	25	28	33
3/4	PSA1D,R	16	18	21	26	17	19	22	27
	HA2D,R	23	25	28	33	24	26	29	34
1	PSA1D,R	16	18	21	26	17	19	22	27
	HA2D,R	23	25	28	33	24	26	29	34
1½	PSA1D,R	17	19	22	27	18	20	23	28
	HA2D,R	24	26	29	34	25	27	30	35
2	PSA1D,R	19	21	24	29	20	22	25	30
	HA2D,R	26	28	31	36	27	29	32	37
2½	PSA1D,R	22	24	27	32	23	25	28	33
	HA2D,R	29	31	34	39	30	32	35	40
3	PSA1D,R	27	29	32	37	28	30	33	38
	HA2D,R	34	36	39	44	35	37	40	45

Table 13 Welded type

(Unit: kg)

Nominal size (inches)	Actuator model no.	Weight			
		Plain bonnet	Extension bonnet Type 1	Extension bonnet Type 2	
				Integral cast type	Welded type
1/2, 3/4, 1 (SW)	PSA1D,R	14	16	19	24
	HA2D,R	21	23	26	31
1½, 2 (SW)	PSA1D,R	15	17	20	25
	HA2D,R	22	24	27	32
2½ (BW)	PSA1D,R	16	18	21	26
	HA2D,R	23	25	28	33
3 (BW)	PSA1D,R	19	21	24	29
	HA2D,R	26	28	31	36

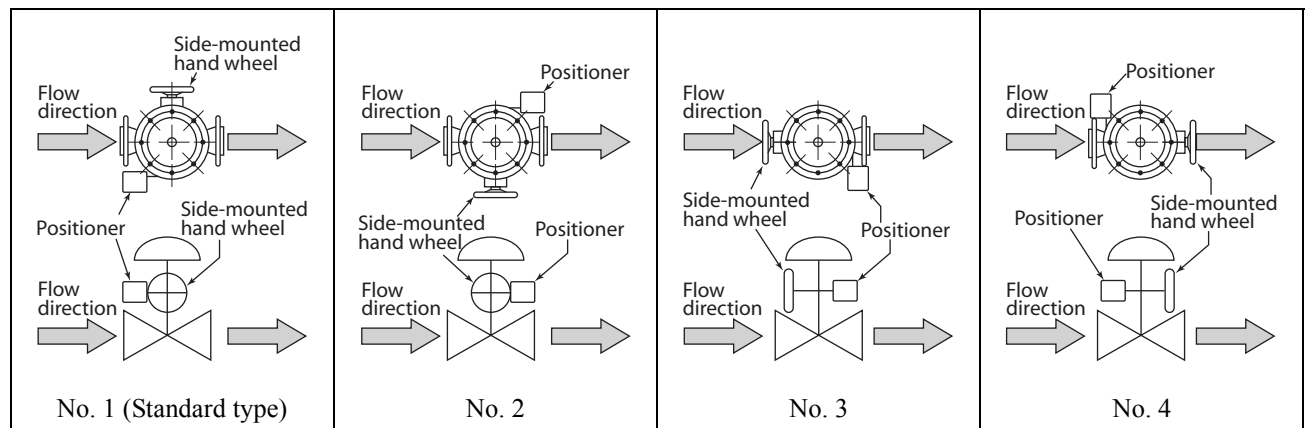


Figure 4 Actuator orientation

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

Ordering information

When ordering, please specify;

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

Note

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

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

Specifications are subject to change without notice.

azbil

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