

Low leakage Pressure Balanced Cage type Control Valves

Model AC2_ _ _

Overview

The model AC2 low leakage pressure balanced cage type control valves are designed for heavy duty service.

The valve plug employs pressure balance structure to control high differential pressure fluid with small actuator force.

The AC2 realizes seat leakage performance IEC class V per IEC60534-4 by flexible-seat structure.

The actuator is adopted a compact and powerful diaphragm motor.

The AC2 is applicable for high differential pressure process line where low seat leakage performance is required.

This model is conformity with Functional Safety Standard(IEC61508).

Specification

Body

Type

Straight-through, cast globe valve

Nominal size

6, 8, 10, 12, 14, 16, 18, 20, 24 inches

Pressure rating

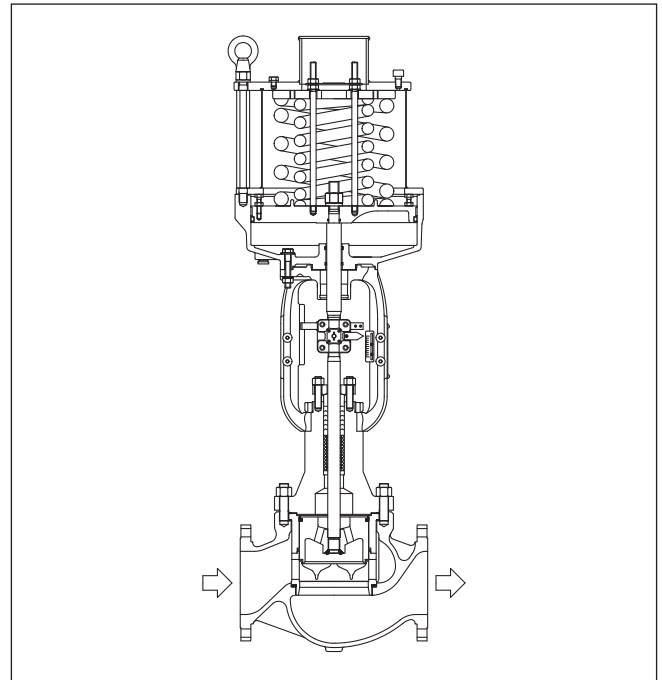
- JIS10K, 20K, 30K
- ANSI Class 150, 300, 600
- JPI Class 150, 300, 600

End connection

- Flanged end

Connection type	Pressure rating	Applicable standard	
		Nominal size 8" and less	Nominal size 10" and more
RF	JIS10K	JIS B2210-1984	JIS B2212-1972
	JIS20K		JIS B2214-1967
	JIS30K		JIS B2215-1967
	ANSI Class 150, 300, 600	ANSI B16.5-1981	ANSI B16.5-1968
	JPI Class 150, 300, 600	JPI-7S-15-1993	JPI-7S-15-1993
RJ	ANSI Class 150, 300, 600	ANSI B16.5-1981	ANSI B16.5-1968
	JPI Class 150, 300, 600	JPI-7S-15-1993	JPI-7S-15-1993

- Welded end; BW



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 (230 to 400°C)

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

Combination of nominal size and temperature range

Nominal size	Temperature range
14 to 24 inches	-17 to +230°C
6 to 12 inches	-17 to +400°C

Gland type

- 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

	General/High temperature	Oil free treatment
Between body and bonnet	Serrated gasket V543	Serrated gasket (PTFE coating) V543 (PTFE)
For upper cage	Serrated gasket V543	Serrated gasket (PTFE coating) V543 (PTFE)
For lower cage	Spiral wound gasket (V8590F)	Spiral wound gasket (V7590)

Trim**Valve plug**

Pressure balanced type

Cage

Metal seat: Equal percentage (%V)
Linear (LV)

(For flow characteristics, refer to Figure 2)

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 5.

Actuator**Type**

Actuator models	Actuator type
PSA6R PSA7R	Spring type piston actuator
DAP_ _ _	Springless piston actuator

Action

Actuator models	Actuator type
PSA6R PSA7R	Reverse action
DAP_ _ _	Direct or reverse action

Spring range and Supply pressure

Actuator models	Spring range	Supply pressure
PSA6R	200 to 390kPa {2.0 to 4.0kgf/cm ² }	500 KPa
PSA7R	200 to 340kPa {2.0 to 3.5kgf/cm ² }	400 kPa
DAP_ _ _	—	400 or 500 kPa

Air connection

Actuator models	Connection
PSA6R PSA7R	<ul style="list-style-type: none"> Rc1/4 or 1/4NPT internal thread Rc3/8 or 3/8NPT internal thread Rc1/2 or 1/2NPT internal thread
DAP_ _ _	<ul style="list-style-type: none"> Rc1/4 or 1/4NPT internal thread Rc3/8 or 3/8NPT internal thread Rc1/2 internal thread

Ambient temperature

-30 to +70°C

Valve action

Air-to-close (Direct action actuator is combined.)

Air-to-open (Reverse action actuator is combined.)

Optional accessories

Positioner*, pressure regulator with filter, hand wheel*, limit switch, solenoid valve, motion transmitter, booster relay, lock-up valve, and others.

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

2. Accessories with the asterisk mark (*) are selected from among the following types depending on the actuators to be combined.

Combination for accessories

Actuator	Positioner		Hand wheel	
	P/P	I/P	Top	Side
PSA6R	VPP0_ _	AVP_ _ _	—	Mounted
PSA7R	VPP0_ _	AVP_ _ _	—	Mounted
DAP560	VPP0_ _	AVP_ _ _	—	Mounted
DAP1000				
DAP1500				
DAP1000X				

Additional specifications (by special order)

- Special inspection

Flow characteristics inspection, material inspection (Material certificate), non-destructive inspection, low-temperature inspection

- With drain plug
- Oil/water free treatment
- Special air piping and joint
- Yoke material carbon steel
- Saline damage preventive measure
- Sand-/dust preventive measure
- Cold-area use specification
- Double gland
- Copper free treatment
- Vacuum service

Functional Safety Standard (IEC61508) conformity:

SIL3 capable - certified by exida consulting LLC

The SIL Certificate is valid with the combination of Model PSA Spring return Actuators.

Performance**Rated Cv value**

Refer to Table 2

Flow characteristics

Refer to Figure 1

Inherent range ability

50:1

Allowable differential pressure

Refer to Table 3

Leakage specification

IEC60534-4:2006 or JIS B2005-4:2012

Class V: 18×10^{-4} x Valve differential pressure(MPa)
x Port size(mm) l/h

Note) Valve plug and seat ring are structural limited-life parts.

Hysteresis error

Without positioner: Within 9% F.S.

With positioner: Within 2% F.S.

Linearity

Without positioner: Within $\pm 9\%$ F.S.

With positioner: Within $\pm 2\%$ F.S.

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

Dimensions

Refer to Figure 4, Table 4 and Table 5

Weight

Refer to Table 6

Actuator orientation

Refer to Figure 5

Finish

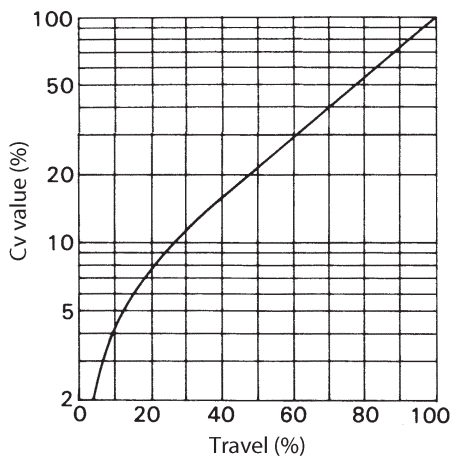
Blue or silver, or other specified colors.

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

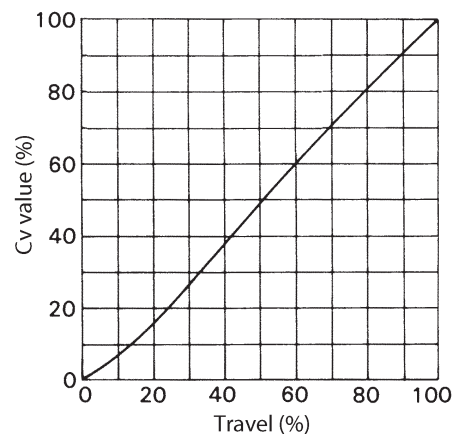
Body material / Trim material		JIS	SCPH2	SCPH21	SCPH61	SCPL1	SCS13A	SCS14A
		ASTM	A216WCB	A217WC6	A217C5	A352LCB	A351CF8	A351CF8M
ASTM	A351CF8M (Nominal size 6 and 8 inches)		-5 to +400	-5 to +400	-5 to +400	-17 to +400	-17 to +400	-17 to +400
	A351CF8M CoCr-A		-5 to +400	-5 to +400	-5 to +400	-17 to +400	-17 to +400	-17 to +400
JIS	SCS14A (Nominal size 10 inches and more)		-5 to +400	-5 to +400	-5 to +400	-17 to +400	-17 to +400	-17 to +400
	SCS14A CoCr-A (Nominal size 10 inches and more)		-5 to +400	-5 to +400	-5 to +400	-17 to +400	-17 to +400	-17 to +400
	SCS24		-5 to +400	-5 to +400	-5 to +400	-17 to +350	-	-

Table 2. Cv value and travel

Nominal size (inches)	6			8			10			12			14			16			18			20			24		
Port size (inches)	4	5	6	5	6	8	6	8	10	8	10	12	10	12	14	12	14	16	14	16	18	16	18	20	20	22	24
Rated Cv value	%V 179	261	322	275	360	610	395	640	1000	640	1000	1440	1000	1440	1930	1440	1930	2560	1930	2560	3180	2560	3180	3970	3180	3970	5820
	LV -	-	371	-	-	795	-	-	1000	-	-	1440	-	-	1930	-	-	2560	-	-	3180	-	-	3970	-	-	5820
Rated travel (mm)	50			75			100			100			100			150			200			200			250		



a. Equal percentage characteristics (%V metal seat)



b. Linear characteristics (LV metal seat)

Figure 1. Flow characteristics

Note) The above graphs indicate typical flow characteristics.

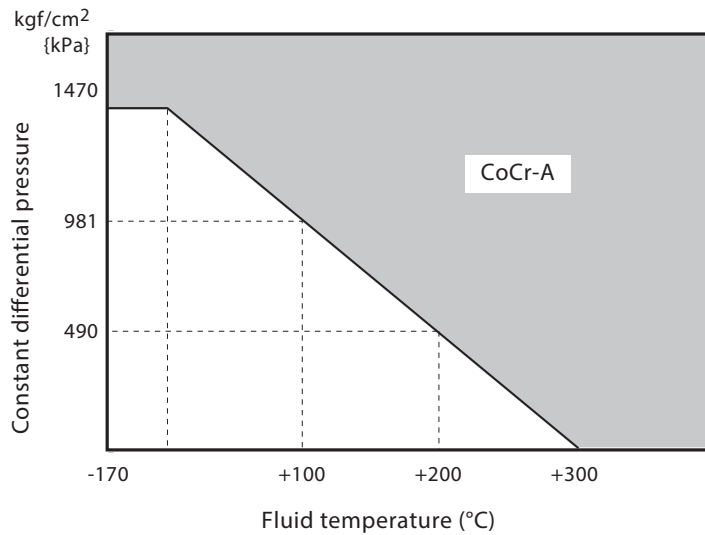


Figure 2. Temperature/normal differential pressure ranges requiring CoCr-A

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.

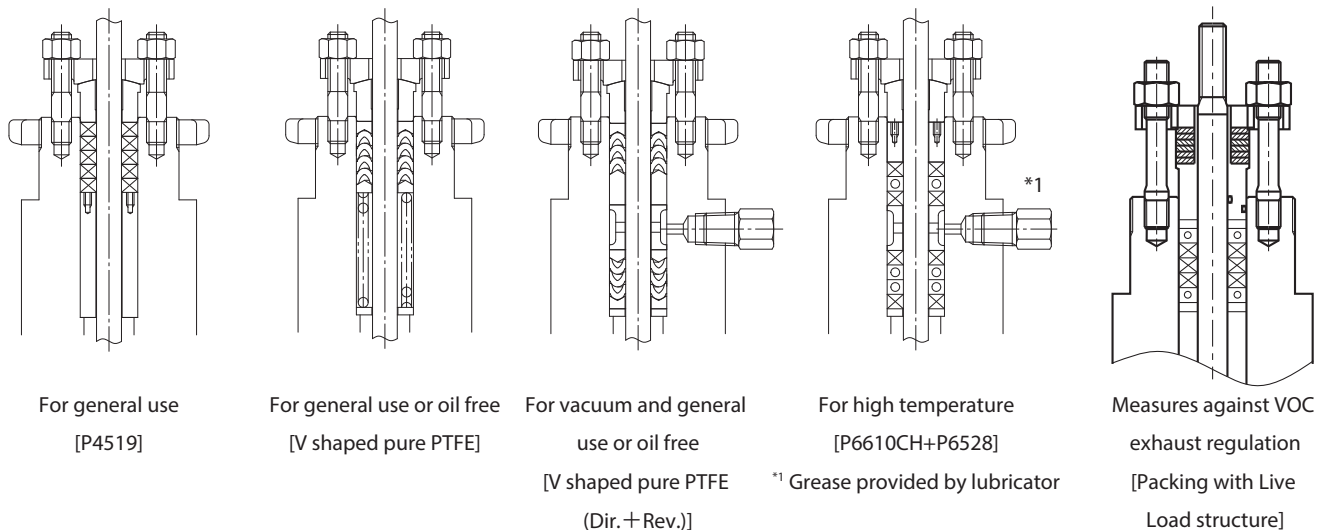


Figure 3. Gland Packing structure

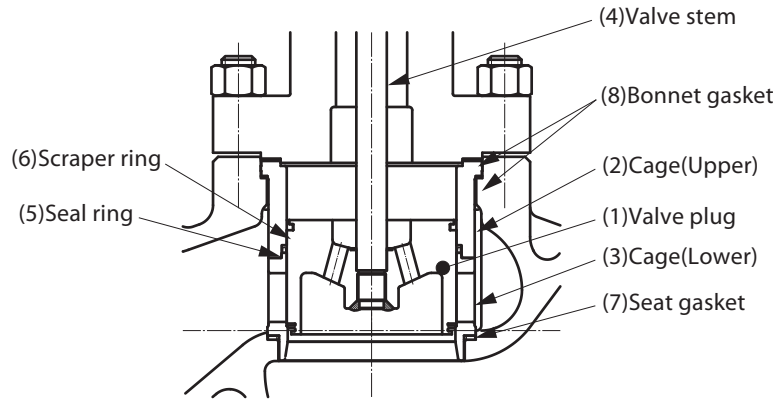


Figure 4. Structural drawing of trim (Plain bonnet)

1. The valve body material is carbon steel (SCPH2/A216WCB), and bonnet type is plain

(1) Valve plug	A351CF8M	SCS24	A351CF8M CoCr-A
(2) Cage(Upper)	A351CF8M	SCS24	A351CF8M
(3) Cage(Lower)	A351CF8M/SUS316	SCS24	A351CF8M/SUS316 CoCr-A
(4) Valve stem	SUS316		
(5) Seal ring	MoS2-inserted PTFE, Hastelloy C276 with spring		
(6) Scraper ring	Carbon-inserted PTFE		
(7) Seat gasket	General		Oil free
	Spiral gasket (hoop:SUS316, filler:inorganic paper)		Spiral gasket (hoop:SUS316, filler:PTFE)
(8) Bonnet gasket	SUS316		SUS316(PTFE coating)

2. The valve body material is stainless steel (SCS13A/A351CF8 of SCS14A/A351CF8M), and bonnet type is plain.

(1) Valve plug	A351CF8M/SCS14A	A351CF8M/SCS14A CoCr-A
(2) Cage(Upper)	A351CF8M/SCS14A	A351CF8M/SCS14A
(3) Cage(Lower)	A351CF8M/SCS14A	A351CF8M/SCS14A CoCr-A
(4) Valve stem	SUS316	
(5) Seal ring	MoS2-inserted PTFE, Hastelloy C276 with spring	
(6) Scraper ring	Carbon-inserted PTFE	
(7) Seat gasket	General	
	Spiral gasket (hoop:SUS316, filler:inorganic paper)	
(8) Bonnet gasket	SUS316	
	SUS316(PTFE coating)	

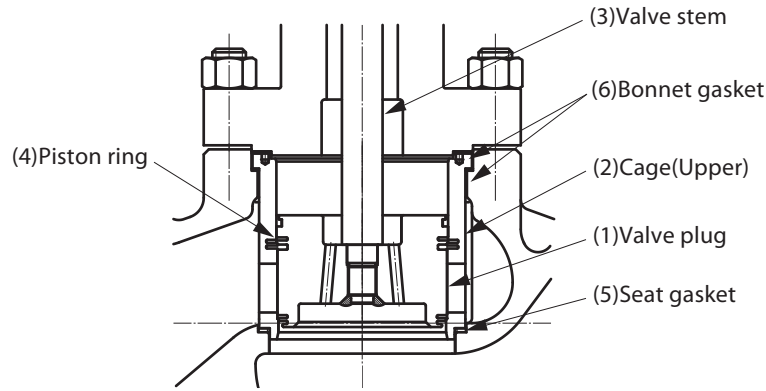


Figure 5. Structural drawing of trim (Extension bonnet type 1)

3. The valve body material is carbon steel (SCPH2/A216WCB), and bonnet type is extension type 1 for high temperature.

(1) Valve plug	SCS14A	SCS14A CoCr-A	SCS24
(2) Cage	SCS14A	SCS14A CoCr-A	SCS24
(3) Valve stem	SUS316		
(4) Piston ring	Carbon impregnated with antimony		
(5) Seat gasket	Spiral gasket (hoop:SUS316, filler:inorganic paper)		
(6) Bonnet gasket	SUS316		

4. The valve body material is carbon steel (SCS13A/A351CF8 of SCS14A/A351CF8M), and bonnet type is extension type 1 for high temperature.

(1) Valve plug	A351CF8M CoCr-A	SCS24
(2) Cage(Upper)	A351CF8M	SCS24
(3) Valve stem	SUS316	
(4) Piston ring	Carbon impregnated with antimony	
(5) Seat gasket	Spiral gasket (hoop:SUS316, filler:inorganic paper)	
(6) Bonnet gasket	SUS316	

Allowable differential pressure

Operating temperature range: -17 to +230°C

Table 4. Spring type piston actuator

Actuator	Supply pressure kPa {kgf/cm ² }	Spring range kPa {kgf/cm ² }	Differential pressure (by nominal size (inches)) MPa {kgf/cm ² }								
			6	8	10	12	14	16	18	20	24
PSA6R	500 {5.0}	200 to 390 {2.0 to 4.0}	3.7 {37}	-	-	-	-	-	-	-	-
			10 {100}								
PSA7R	400 {4.0}	200 to 340 {2.0 to 3.5}	-	3.7 {37}	3.7 {37}	3.7 {37}	-	-	-	-	-
				10 {100}	10 {100}	10 {100}					

In the differential pressure column, upper figures show normal differential pressures and lower figures differential pressures when the valve is fully closed.

Table 5. Springless type piston actuator

Actuator	Supply pressure kPa {kgf/cm ² }	Spring range kPa {kgf/cm ² }	Differential pressure (by nominal size (inches)) MPa {kgf/cm ² }								
			6	8	10	12	14	16	18	20	24
DAP560	400 {4.0}	-	10 {100}	-	-	-	-	-	-	-	-
DAP1000	400 {4.0}	-	-	10 {100}	10 {100}	10 {100}	-	-	-	-	-
DAP1000	500 {5.0}	-	-	-	-	-	10 {100}	-	-	-	-
DAP1500	500 {5.0}	-	-	-	-	-	-	10 {100}	10 {100}	10 {100}	-
DAP1000X	500 {5.0}	-	-	-	-	-	-	-	-	-	10 {100}

Operating temperature range: 230 to 400°C

Table 6. Springless type piston actuator

Actuator	Supply pressure kPa {kgf/cm ² }	Spring range kPa {kgf/cm ² }	Differential pressure (by nominal size (inches)) MPa {kgf/cm ² }			
			6	8	10	12
DAP1000	500 {5.0}	-	10 {100}	-	-	-
DAP1000X	500 {5.0}	-	-	10 {100}	10 {100}	10 {100}

Dimensions

Table 7. Face-to-face dimensions

[Unit: mm]

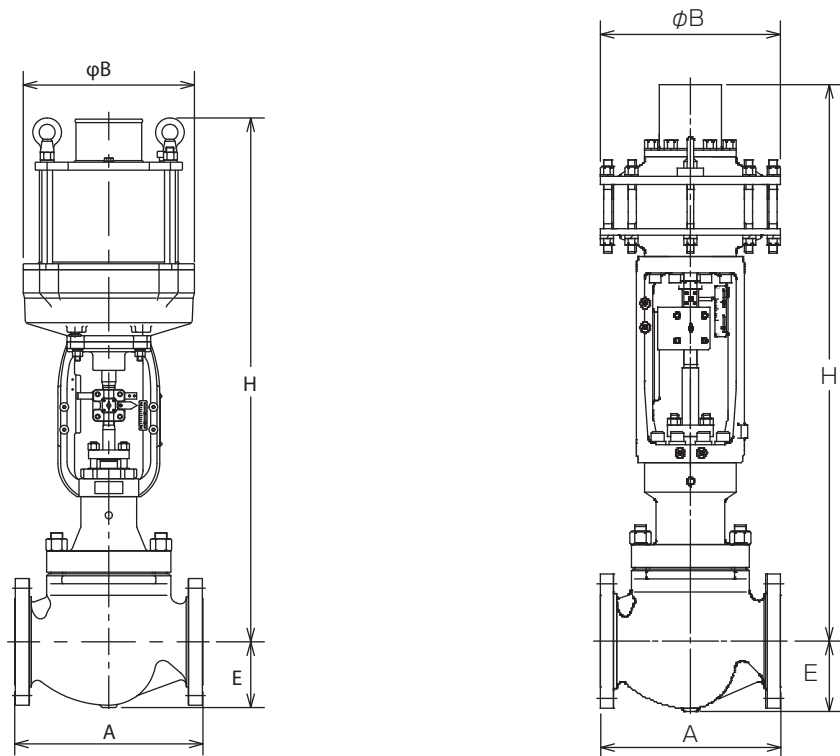
Nominal size (inches)	A				
	JIS10KFF,RF ANSI150RF JPI150RF	JIS20KRF ANSI300RF JPI300RF	ANSI600RF JPI600RF	ANSI150,300 JPI150,300 BW	ANSI600 JPI600 BW
6	451	473	508	473	508
8	543	568	610	568	610
10	673	708	752	708	752
12	737	775	819	775	819
14	889	927	972	927	972
16	1016	1057	1108	1057	1108
18	1360	1400	1550	–	–
20	1700	1745	1900	–	–
24	2000	2100	2300	–	–

Table 8. External dimension

[Unit: mm]

Nominal size (inches)	Actuator	H		B	E
		Plain bonnet	Extension bonnet		
6	PSA6R	1315	–	476	170
	DAP560	1245	–	380	
	DAP1000	–	1545	470	
8	PSA7R	2165	–	580	220
	DAP1000	1440	–	470	
	DAP1000X	–	*	470	
10	PSA7R	*	–	580	300
	DAP1000	*	–	470	
	DAP1000X	–	*	470	
12	PSA7R	*	–	580	325(Class300 and less) 345(Class600)
	DAP1000	*	–	470	
	DAP1000X	–	*	470	
14	DAP1000	*	–	470	380(Class150) 420(Class300)
16	DAP1500	*	–	570	410(Class150) 440(Class300)
18	DAP1500	*	–	570	500(Class150) 520(Class300)
20	DAP1500	*	–	570	650
24	DAP1000X	*	–	470	*

* Contact our sales.



a. For PSA6/7R actuator

b. For DAP___ actuator

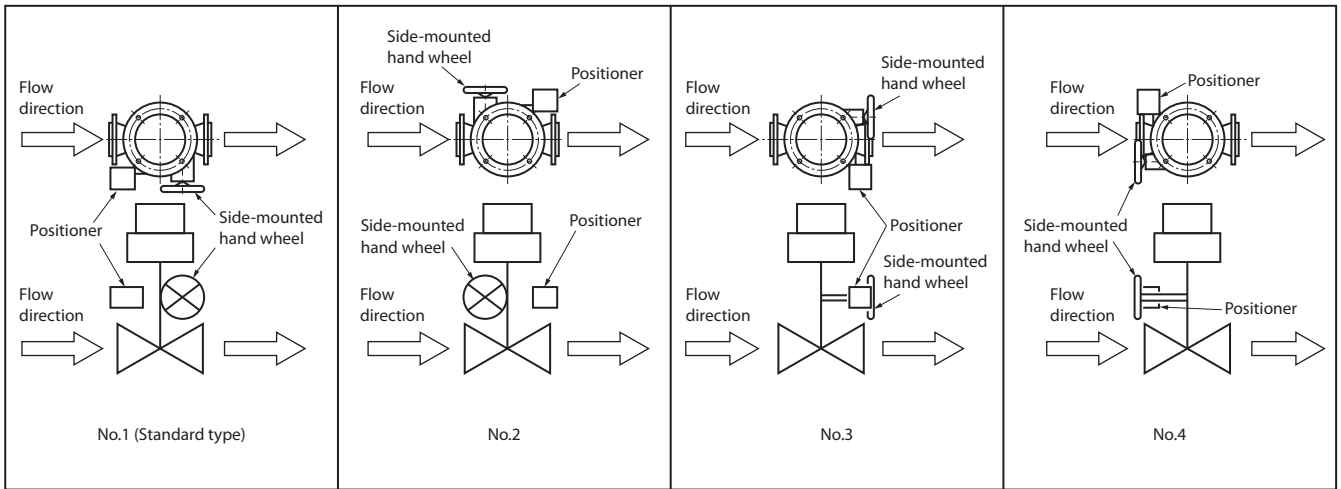
Figure 6. Face-to-face and external dimensions**Table 9. Weight**

[Unit: kg]

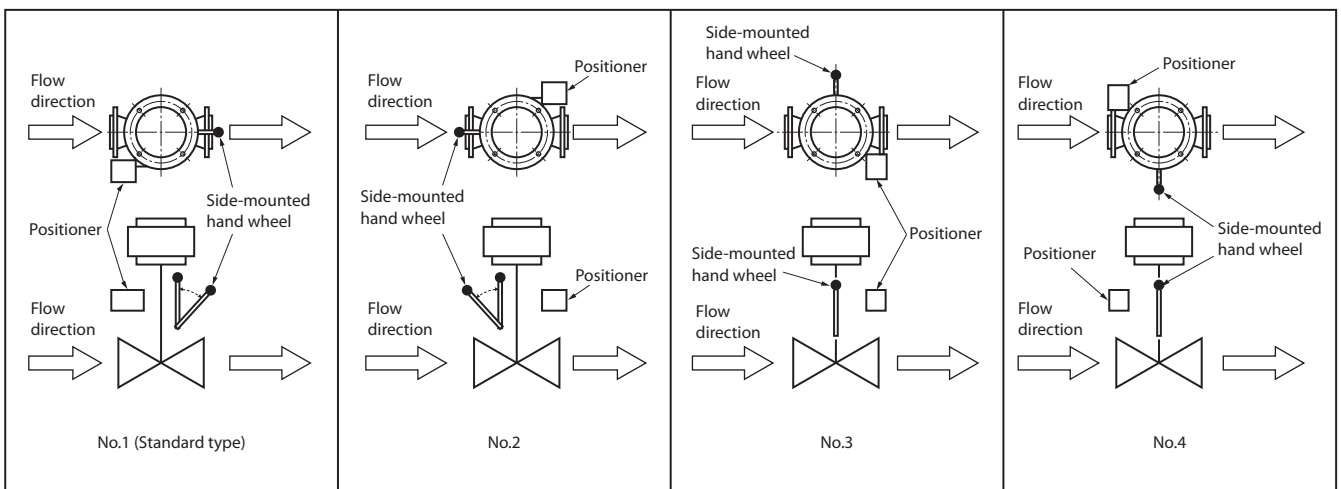
Nominal size (inches)	Actuator	Weight							
		Flanged connection JIS10K, ANSI/JPI150		Flanged connection JIS20K, ANSI/JPI300		Flanged connection ANSI/JPI600		Welded connection ANSI/JPI150, 300, 600	
		Plain bonnet	Extension bonnet	Plain bonnet	Extension bonnet	Plain bonnet	Extension bonnet	Plain bonnet	Extension bonnet
6	PSA6R	385	—	415	—	465	—	315	—
	DAP560	290	—	320	—	370	—	310	—
	DAP1000	—	345	—	375	—	425	—	365
8	PSA7R	770	—	820	—	940	—	745	—
	DAP1000	375	—	425	—	545	—	450	—
	DAP1000X	—	475	—	525	—	645	—	600
10	PSA7R	920	—	1215	—	1395	—	*	—
	DAP1000	585	—	880	—	1060	—	*	—
	DAP1500	—	*	—	*	—	*	—	*
12	PSA7R	1100	—	1240	—	1420	—	*	—
	DAP1000	765	—	905	—	1085	—	*	—
	DAP1000X	—	805	—	945	—	1125	—	*
14	DAP1000	*	—	*	—	*	—	*	—
16	DAP1500	*	—	*	—	*	—	*	—
18	DAP1500	*	—	*	—	*	—	*	—
20	DAP1500	*	—	*	—	*	—	*	—
24	DAP1000X	*	—	*	—	*	—	*	—

* Contact our sales.

(PSA6 Actuator)



(PSA7, DAP Actuator)



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

Figure 7. Actuator orientation

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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.

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