

Top and Bottom Guided Double-Seat Control Valves (6 to 12 inches)

Model ADVB___/ADVM___

OVERVIEW

Model ADVB___/ADVM___ top and bottom guided double-seat control valves have a flow passage that allows fluid to flow smoothly and with minimal pressure loss.

Valve plug shape implements design features that optimize flow and pressure balance around the plug, and improves the stability of control for a wide range of fluid conditions. The plug guide is supported at the top and bottom, and has a high resistance to vibration and abrasion.

Valve body is light-weight, and employs a fixed guide structure for the bottom guide of the plug. For the plug and seat ring, a top-entry method improves ease of maintenance regardless of the valve action. Integral seat ring ensures identical seat-leakage performance (IEC Class IV) as single-seat valves.

The valve also features a compact, but powerful, multi-spring actuator.

Model ADVB___/ADVM___ control valves are particularly applicable for high-pressure and high differential-pressure process lines where high dynamic stability and high reliability are essential.

1. Selection of model ADVB/ADVM Specifications

Selection of control valves has traditionally required special knowledge and experience. However, Model ADVB___/ADVM___ offers you more accurate product specifications, so that you can easily pinpoint the control valve that satisfies fluid specifications (such as flowrate, pressure, and temperature) at your plant and provides the functions you need.

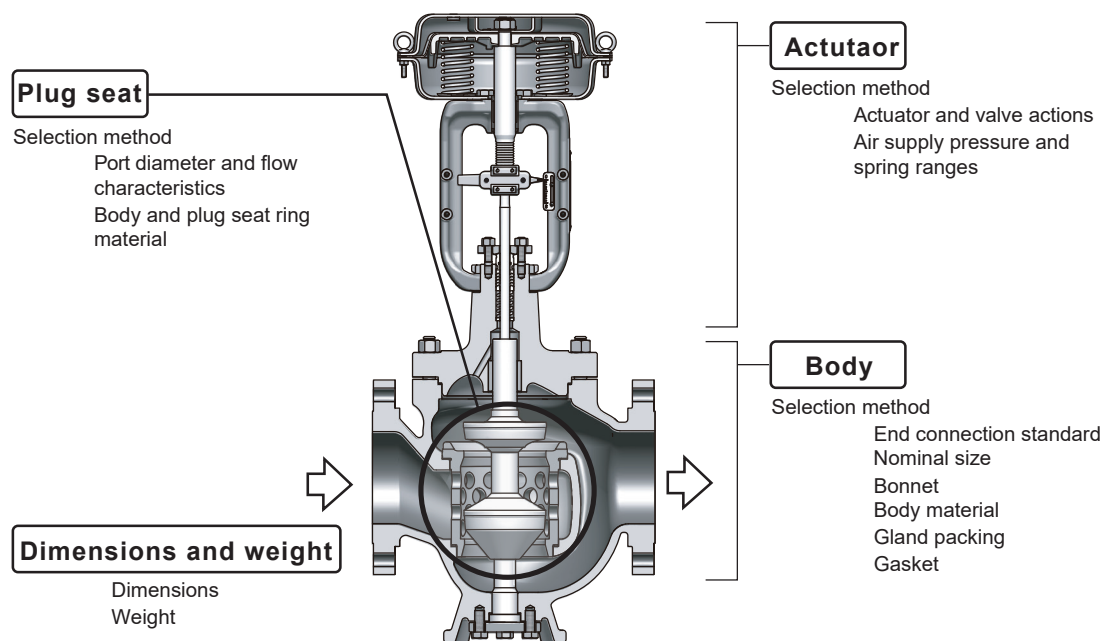


Figure 1. Model ADVB___/ADVM___ selection map

2. Basic Model Numbers

The basic model number of ADVB/ADVM you eventually choose will be either:

Model ADVB: JIS 10K, ANSI 150, JPI 150

Model ADVM: JIS 20K, JIS 30K, ANSI 300, JPI 300

3. Body Specifications

3-1 Port diameter and flow control characteristics

The selection of the port diameter and the rated Cv value falls within the scope of Table 1 according to the flange diameter.

Table 1. Nominal size and port diameter

Nominal size (inches)	6		8		10			12		
Port diameter (inches)	4	6	6	8	6	8	10	8	10	12
Rated Cv value (%)	215	450	450	705	450	705	1100	705	1100	1580
Rated travel (mm)	38		75							
Flow characteristics	Equal percentage, linear*									

Note) *: In case of linear characteristics, it is changed a characteristics by positioner.

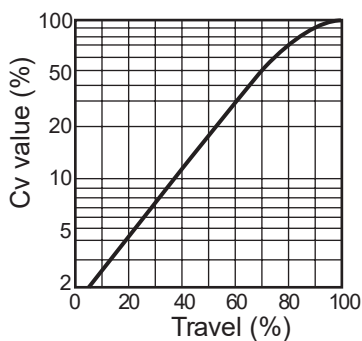


Figure 2. Equal percentage characteristics

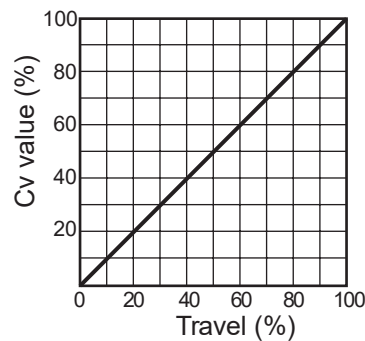


Figure 3. Linear characteristics

3-2 End connection and Pressure rating

End connection : Flanged end

Connection type	Pressure rating	Applicable standard
RF	JIS 10K, 20K, 30K	JIS B2210-1984
	ANSI 150, 300	ASME/ANSI B16.5-1988
	JPI 150, 300	JPI-75-15-1993

3-3 Bonnet

Bonnet type	Temperature range	Note
Plain type	-5 °C ≤ t ≤ +230 °C	Carbon steel:SCPH2
	-17 °C ≤ t ≤ +230 °C	Stainless steel:ASTM A351CF8, A351CF8M
Extension type	-45 °C ≤ t ≤ -17 °C	Stainless steel:ASTM A351CF8, A351CF8M
	+230 °C ≤ t ≤ +400 °C	Stainless steel or carbon steel

3-4 Body and Trim ring materials

For combination of body and plug seat ring materials and their applicable temperature ranges, see Table 2. In some ranges the plug seat ring material needs hardening treatment.

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

Material combination		Temperature ranges (°C)		
Trim material	SUS316	-5 to +300	-45 to +300	-45 to +300
	SUS316 CoCr-A seat	-5 to +400	-45 to +400	-45 to +400
	SUS316 CoCr-A face	-5 to +400	-45 to +400	-45 to +400
Body Material	JIS	SCPH2	SCS13A	SCS14A
	ASTM	A216WCB	A351CF8	A351CF8M

Note) For valve for cavitations/flashing service, oil-free service or tight shut-off service, CoCr-A is recommended regardless of process fluid temperatures or differential pressures

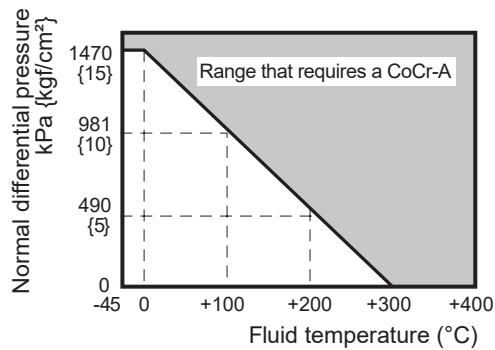


Figure 4. Temperature and normal differential pressure ranges that require CoCr-A

3-5 Leakage specification

For the seat leak performance when the valve is fully closed, select from among the following two classifications, which conform to IEC 60534-4:2006 and JIS B 2005-4:2008.

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

Class IV : Leakage less than 0.01% of maximum valve capacity.

3-6 Inherent range ability

50 : 1

3-7 Gland packing

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

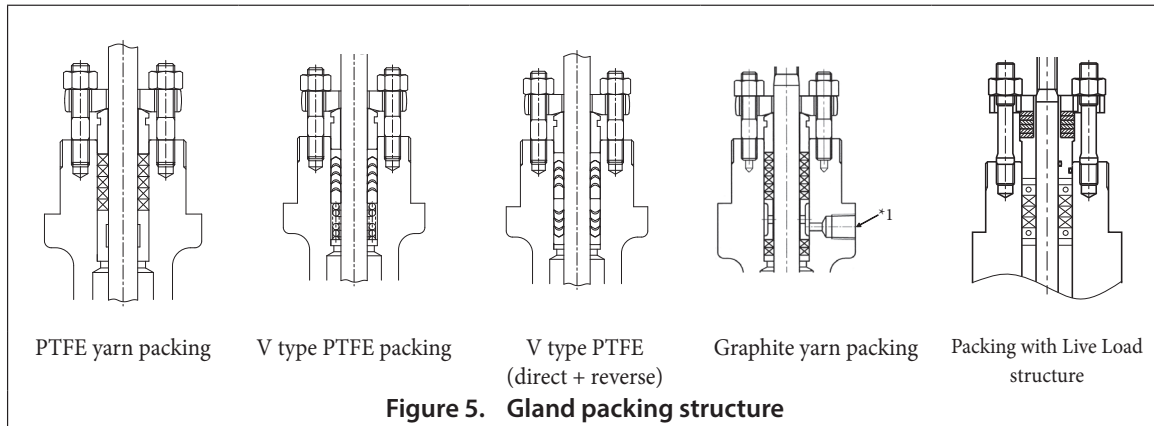
Application	Packing Type	Fluid temperature range
		Maximum working pressure
General use (Oil, Various chemical, Acid and Alkali, etc.)	PTFE fiber yarn packing with carbon fiber core packing[P4519]	-17 to +230 °C 10MPa Max.
General use or oil free (Various chemical, acid and alkali)	V shaped pure PTFE 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]	Up to -196 °C 10MPa Max.
High temperature	Expanded graphite packing + Aramid fiber reinforced expanded graphite yarn packing *1	+400 °C Max 43MPa Max.
Measures against VOC *2 exhaust regulation [ISO15848-1 certified low emission packing system]	Packing with Live Load structure *3	*3

Note) PTFE: polytetrafluoroethylene resin

*1 Grease provided

*2 Volatile Organic Compound

*3 Refer to special spec sheet No.SS2-SSL100-0100 about detail of Low emission gland packing.



Note) *1 Grease provided by lubricator

3-8 Gasket

Table 3. The combination of gaskets for carbon steel (SCPH2/A216WCB)

Trim material notation	SUS316	SUS316 CoCr-A	
Valve plug	SUS316L	SUS316L CoCr-A	
Seat ring	SCS14A	SCS14A CoCr-A	
Valve stem	SUS316		
	General	General	Oil-free
Guide bushint	SUS440C	SUS440C	SUS316 full CoCr-A
Plug gude	SUS440C	SUS440C	SUS316 full CoCr-A
Seat gasket (Upper)	SUS316 (PTFE coating) (Design temperature: -17 to +230 °C)	SUS316 (PTFE coating) (Design temperature: -17 to +230 °C)	SUS316 (PTFE coating) (Design temperature: -17 to +230 °C)
	SUS316 (Graphite coating) (Design temperature: above 230 °C)	SUS316(Graphite coating) (Design temperature: above 230°C)	
Seat gasket (Lower)	Spiral wound (Hoop: SUS316, Filler: Graphite)	Spiral wound (Hoop: SUS316, Filler: Graphite)	Spiral wound (Hoop: SUS316, Filler: PTFE)
Bonnet gasket	SUS316(PTFE coating) (Design temperature: -17 to +230 °C)	SUS316 (PTFE coating) (Design temperature: -17 to +230 °C)	SUS316 (PTFE coating) (Design temperature: -17 to +230 °C)
	SUS316 (Graphite coating) (Design temperature: above 230 °C)	SUS316 (Graphite coating) (Design temperature: above 230 °C)	

Table 4. The combination of gaskets for carbon steel (SCS13A/A351CF8 or SCS14A/A351CF8M)

Trim material notation	SUS316	SUS316 CoCr-A	
Valve plug	SUS316L	SUS316L CoCr-A	
Seat ring	SCS14A	SCS14A CoCr-A	
Valve stem	SUS316		
	General	General	Oil-free
Guide bushint	SUS316 full CoCr-A	SUS316 full CoCr-A	SUS316 full CoCr-A
Plug gude	SUS316 full CoCr-A	SUS316 full CoCr-A	SUS316 full CoCr-A
Seat gasket (Upper)	SUS316 (PTFE coating) (Design temperature: -17 to +230 °C)	SUS316 (PTFE coating) (Design temperature: -17 to +230 °C)	SUS316 (PTFE coating) (Design temperature: -17 to +230 °C)
	SUS316 (Graphite coating) (Design temperature: above 230 °C)	SUS316 (Graphite coating) (Design temperature: above 230 °C)	
Seat gasket (Lower)	Spiral wound (Hoop: SUS316, Filler: Graphite)	Spiral wound (Hoop: SUS316, Filler: Graphite)	Spiral wound (Hoop: SUS316, Filler: PTFE)
Bonnet gasket	SUS316 (PTFE coating) (Design temperature: -17 to +230 °C)	SUS316 (PTFE coating) (Design temperature: -17 to +230 °C)	SUS316 (PTFE coating) (Design temperature: -17 to +230 °C)
	SUS316 (Graphite coating) (Design temperature: above 230 °C)	SUS316 (Graphite coating) (Design temperature: above 230 °C)	

4. Actuator Specification

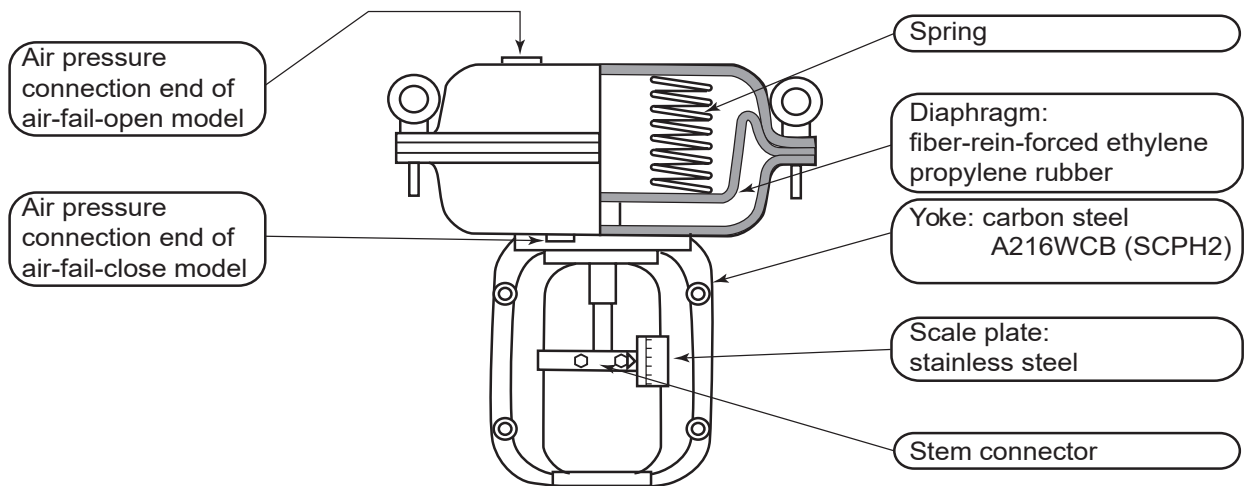


Figure 6. Actuator structure

4-1 Actuator and valve actions

Selection of actuator actions determines valve actions (in response to input signals).

Air-to-open : actuator action where the valve opens as the input signal increases

Air-to-close : actuator action where the valve closes as the input signal increases

The valve closes as the plug lowers. The valve action depends, in turn, on whether an Reverse or Direct actuator is chosen.

4-2 Tables of allowable differential pressures

Ensure the required shutoff differential pressure specified in the equipment design is satisfied by selecting an actuator with an allowable differential pressure equal to or higher than the shut-off pressure.

4-3 Air supply pressure and spring ranges

Select the actuator using the table of allowable differential pressures. The table also assists in determining the actuator's required air supply pressure and required spring range.

If the applicable value in the table of allowable differential pressures is not large enough for the shut-off pressure you need, we will, at your request, consider a larger actuator size.

4-4 Ambient temperature

-30 to +70 °C

5. Finish

The normal standard finish color for Azbil Corporation's control valves is blue (Munsell 10B 5/10). Silver is also available as standard.

You can specify any other color using the number code of the Japan Paint Industry Assignment or the Munsell color system.

6. Accessories

6-1 Hand wheel

Use: The manual hand wheel enables you to open and close the valve manually.

Orientation: Side hand wheel, which is mounted to the yoke of the actuator.

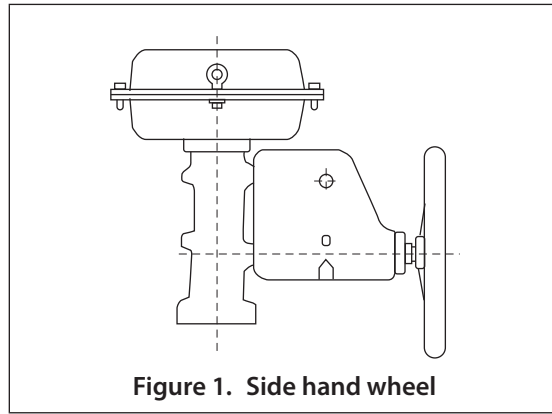


Figure 1. Side hand wheel

6-2 Positioner

Use: In response to input signals from the controller, the positioner controls the valve accurately and swiftly, switches between direct and reverse operation, and changes valve characteristics.

Models: According to input signals and applications, select one of the models shown below.

Input/Output signal	Type	Model
I/P	Smart valve positioner	AVP7_ _ _
		AVP3_ _ _
		AVP2_ _ _
P/P	Mechanical	HTP- _ _

6-3 Pressure regulator with filter

Function: The Pressure regulator with filter reduce the pressure of application air, drains application air, and removes foreign substances.

Model: The model KZ03 is the standard

6-4 Booster relay

Function: The booster relay improves the working speed of the control valve.
Use a booster relay that amplifies the output signals of the positioner.

Model: OEM products

6-5 Solenoid valve

Function: Electric signals make the solenoid valve to open and close the control valve.

Model: OEM products

6-6 Limit switch

Function: The limit switch converts the open and closed positions of the control valve into electric signals.

Model: The roller lever actuator is standard.

6-7 Lock-up valve

Function: In response to air pressure signals or in anticipations of fluctuations in the supply

Model: OEM products

Allowable differential pressure for model ADVB

Table 5. Air-to-open

Nominal size (inches)	Actuator	Supply kPa{kgf/cm ² }	Spring range kPa{kgf/cm ² }	Differential pressure (classified by port diameter) kPa{kgf/cm ² }				
				4	6	8	10	12
6	PSA3R	390 {4.0}	80 to 240 {0.8 to 2.4}	1800 {18.0}	1800 {18.0}	-	-	-
				1960 {20.0}	1960 {20.0}	-	-	-
	PSA4R	390 {4.0}	80 to 240 {0.8 to 2.4}	1960 {20.0}	1960 {20.0}	-	-	-
				1960 {20.0}	1960 {20.0}	-	-	-
8	HA4R	390 {4.0}	80 to 240 {0.8 to 2.4}	-	1960 {20.0}	1960 {20.0}	-	-
				-	1960 {20.0}	1960 {20.0}	-	-
10	HA4R	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}	-
12	HA4R	390 {4.0}	80 to 240 {0.8 to 2.4}	-	-	500 {5.0}	500 {5.0}	500 {5.0}
				-	-	1960 {20.0}	1960 {20.0}	1960 {20.0}

Table 6. Air-to-close

Nominal size (inches)	Actuator	Supply kPa{kgf/cm ² }	Spring range kPa{kgf/cm ² }	Differential pressure (classified by port diameter) kPa{kgf/cm ² }				
				4	6	8	10	12
6	PSA3D	390 {4.0}	80 to 240 {0.8 to 2.4}	1800 {18.0}	1800 {18.0}	-	-	-
				1960 {20.0}	1960 {20.0}	-	-	-
	PSA4D	390 {4.0}	80 to 240 {0.8 to 2.4}	1960 {20.0}	1960 {20.0}	-	-	-
				1960 {20.0}	1960 {20.0}	-	-	-
8	HA4D	390 {4.0}	80 to 240 {0.8 to 2.4}	-	1500 {15.3}	1500 {15.3}	-	-
				-	1960 {20.0}	1960 {20.0}	-	-
10	HA4D	390 {4.0}	80 to 240 {0.8 to 2.4}	-	1500 {15.3}	1500 {15.3}	1500 {15.3}	-
				-	1960 {20.0}	1960 {20.0}	1960 {20.0}	-
12	HA4D	390 {4.0}	80 to 240 {0.8 to 2.4}	-	-	500 {5.0}	500 {5.0}	500 {5.0}
				-	-	1960 {20.0}	1960 {20.0}	1960 {20.0}

Note) 1. Note that the maximum allowable differential pressures must not exceed the maximum working pressure specified by JIS B2201-1984, ANSI B 16.34-1981, and JPI-7S-65-83.

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

Allowable differential pressures for model ADVM

Table 7. Air-to-open

Nominal size (inches)	Actuator	Supply kPa{kgf/cm ² }	Spring range kPa{kgf/cm ² }	Differential pressure (classified by port diameter) kPa {kgf/cm ² }				
				4	6	8	10	12
6	PSA3R	390 {4.0}	80 to 240 {0.8 to 2.4}	1800 {18.0}	1800 {18.0}	-	-	-
				5100 {52.0}	5100 {52.0}	-	-	-
	PSA4R	390 {4.0}	80 to 240 {0.8 to 2.4}	2900 {30.0}	2900 {30.0}	-	-	-
				5100 {52.0}	5100 {52.0}	-	-	-
8	HA4R	390 {4.0}	80 to 240 {0.8 to 2.4}	-	2900 {30.0}	2900 {30.0}	-	-
				-	5100 {52.0}	5100 {52.0}	-	-
10	HA4R	390 {4.0}	80 to 240 {0.8 to 2.4}	-	2000 {20.4}	2000 {20.4}	2000 {20.4}	-
				-	4400 {45.0}	4400 {45.0}	4400 {45.0}	-
12	HA4R	390 {4.0}	80 to 240 {0.8 to 2.4}	-	-	500 {5.0}	500 {5.0}	500 {5.0}
				-	-	2000 {20.4}	2000 {20.4}	2000 {20.4}

Table 8. Air-to-close

Nominal size (inches)	Actuator	Supply kPa{kgf/cm ² }	Spring range kPa{kgf/cm ² }	Differential pressure (classified by port diameter) kPa {kgf/cm ² }				
				4	6	8	10	12
6	PSA3D	390{4.0}	80 to 240 {0.8 to 2.4}	1800 {18.0}	1800 {18.0}	-	-	-
				5100 {52.0}	5100 {52.0}	-	-	-
	PSA4D	390{4.0}	80 to 240 {0.8 to 2.4}	2900 {30.0}	2900 {30.0}	-	-	-
				5100 {52.0}	5100 {52.0}	-	-	-
8	HA4D	390{4.0}	80 to 240 {0.8 to 2.4}	-	1500 {15.3}	1500 {15.3}	-	-
				-	5100 {52.0}	5100 {52.0}	-	-
10	HA4D	390{4.0}	80 to 240 {0.8 to 2.4}	-	1500 {15.3}	1500 {15.3}	1500 {15.3}	-
				-	5100 {52.0}	5100 {52.0}	5100 {52.0}	-
12	HA4D	390{4.0}	80 to 240 {0.8 to 2.4}	-	-	500 {5.0}	500 {5.0}	500 {5.0}
				-	-	4400 {45.0}	4400 {45.0}	4400 {45.0}

Note) 1. Note that the maximum allowable differential pressures must not exceed the maximum working pressure specified by JIS B2201-1984, ANSI B 16.34-1981, and JPI-7S-65-83.

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

DIMENSIONS

Table 9. Main dimensions

Nominal size (inches)	Actuator	A		H		E (mm)	B (mm)
		JIS 10K ANSI 150 JPI 150 (mm)	ANSI 300 JPI 300 (mm)	Plain bonnet (mm)	Extension bonnet (mm)		
6	PSA3D, R	451	473	750	1010	265	350
	PSA4D, R			810	1060		
8	HA4D, R	543	568	1030	1280	350	470
10	HA4D, R	673	708	1090	1340	400	470
12	HA4D, R	737	772	1090	1340	470	470

Table 10. Product weights

Nominal size (inches)	Actuator	Weight (kg) without handwheel			
		Class 150		Class 300	
		Bonnet	Extension bonnet	Bonnet	Extension bonnet
6	PSA3	195	200	215	215
	PSA4	215	220	230	235
8	HA4	410	415	440	445
10	HA4	595	600	635	640
12	HA4	825	830	890	895

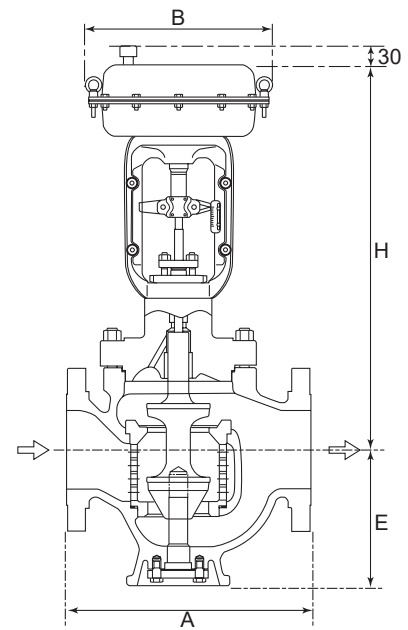


Figure 7. Face-to-face dimension and overall dimensions

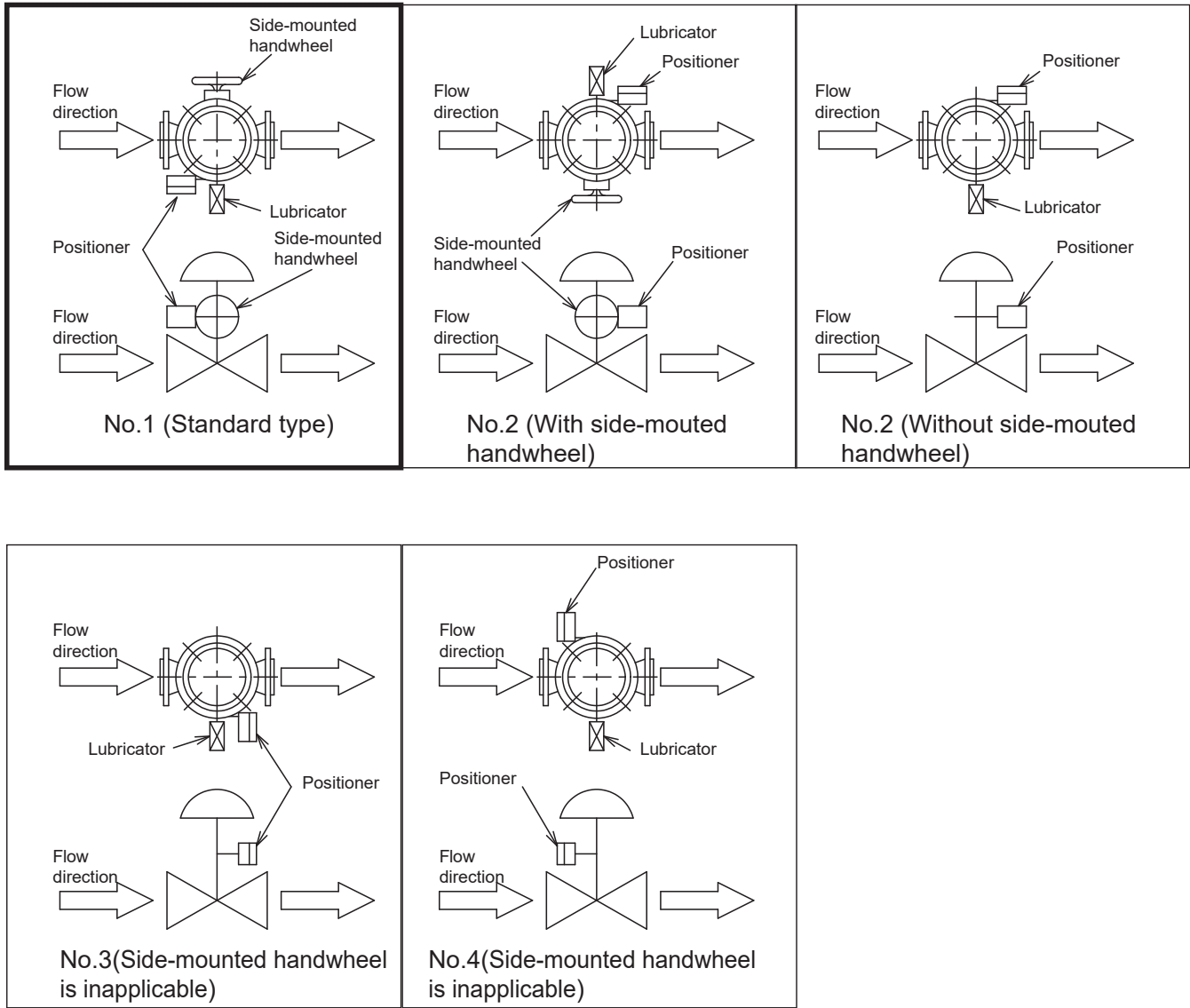


Figure 8. Actuator orientation

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

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Specifications are subject to change without notice.

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