Cage Type, Angle Type Control Valve Model VAC

Introduction

Model VAC control valves are used on the application similar to ordinal angle valve. The balanced plug design does not required large valve actuators since the flow passes through cored holes in the plug and pressure are balanced above and below the plug reducing the thrust requirements needed to operated the valve. Trim replacement for this valve is rapid. Removal of the bonnet assembly exposes all valve trim which then can be lifted out of body. The body need not be removed from the line. Also, both capacity and characteristics of valve can be easily changed by exchange of cage only.

Specifications

Body

Type: Double seated, Cast angle valve

Material: Carbon steel (SCPH2), Stainless steel (SCS 13, 14), Low alloy steel (SCPH 21, 61) and Other alloy steel

Size: 1½, 2, 2½, 3, 4, 5, 6, 8, 10, 12 inches

End connection: Flanged end (FF, RF and RJ)

Rating:
- JIS 10K, 16K, 20K, 30K and 40K
- ANSI 150, 300 and 600

Gland type: Bolted gland

Bonnet:
- Plain bonnet (0~200°C)
- Radiator finned bonnet (Over 200°C)
- Extended bonnet (0°C or less)
- Bellows seal bonnet(–30~+300°C, 10 kgf/cm² or less)

Packing: V-Teflon, Asbestos yarn and Others

Trim:

Valve plug: Double seated
Equal percentage cage and Teflon seat
Equal percentage split cage
Linear cage and Teflon seat
Linear split cage

[For the operating temperature and pressure differential range of the Teflon seat plug, refer to the Figure in the following page.]

Material:

Valve plug and cage;
Stainless steel (SCS24, SCS14, SCS14 stellite coating, SCS14 atomloy) and Other alloy steel.

Other trim;
Stainless steel (SUS316) and Other alloy steel

(For combination of materials for valve body, plug, and cage, refer to the table in the next page.)

Actuator

Type: Spring type pneumatic diaphragm actuator, direct or reverse action

Diaphragm material: Chloroprene rubber reinforced with fabric.

Spring range: 0.2~1.0, (0.4~1.2) kgf/cm²
0.4~2.0, (0.8~2.4) kgf/cm²

Air to diaphragm: 1.4~2.8 kgf/cm²

Air tubing connection: Rc¼ female tap
VA 4, VA 5 type . . . Rc½ with Rc¼ adapter, also available Rc3/8 adapter.

Ambient temperature: –30~+70°C

Valve action: Air-to-close or air-to-open available by using direct or reverse actuator.

Optional accessories: Handwheel (side or top mounted), Positioner, Limit switch, Motion transmitter, Volume booster, Air lock relay and Other available.

Additional specifications: Steam jacket (operating pressure 10 kgf/cm² or under) may be provided, if specified.

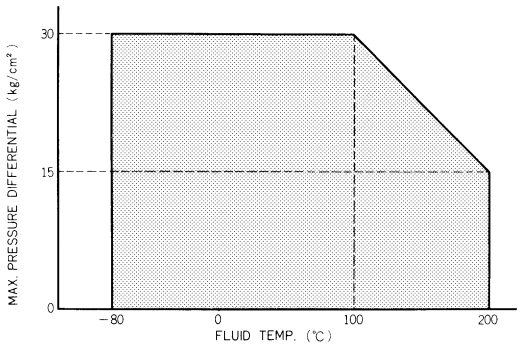
Performance

Seat leakage (percentage to rated Cv value):
Metallic seat; 0.5% or less (Optional: 0.1% or less)
Soft seat (Teflon seat); Bubble-tight shut-off or 0.00001% or less

Action: For standard type gland
Hysteresis error
Without positioner; 3% FS or less
With positioner: 1% FS or less
Linearity
Without positioner; ±5% FS or less
With positioner: ±1% FS or less

Inherent rangeability: 30:1 (Optional 50:1)

Operating Temp. & Press. Diff. Limit of Teflon Seat Valve



Combination of Materials for Valve Body, Plug and Cage, and Operating Temperature Limit

Body material	Plug, cage material	Cage type	Operating temperature range (℃)
Carbon steel (SCPH2)	Stainless steel (SCS24)	Cage	−5~+425
Low alloy steel (SCPH21)	Stainless steel (SCS24)	Split cage	426~ 500
	Stainless steel (SCS14 atomloy)		426~ 550
	Stainless steel (SCS14 Stellite furnished)		
Low alloy steel (SCPH61)	Stainless steel (SCS24)	Cage	−5~+425
	Stainless steel (SCS14 atomloy)	Split cage	426~ 500
	Stainless steel (SCS14 Stellite furnished)		426~ 600
Stainless steel (SCS13)	Stainless steel (SCS14)	Cage	−195~+200
		Split cage	201~ 300
	Stainless steel (SCS14 atomloy)	Cage	−195~+200
		Split cage	201~ 500
	Stainless steel (SCS14 Stellite furnished)	Cage	−195~+200
		Split cage	201~ 600
Stainless steel (SCS14)	Stainless steel (SCS14)	Cage	−195~+200
		Split cage	201~ 300
	Stainless steel (SCS14 Stellite furnished)	Cage	−195~+200
		Split cage	201~ 600

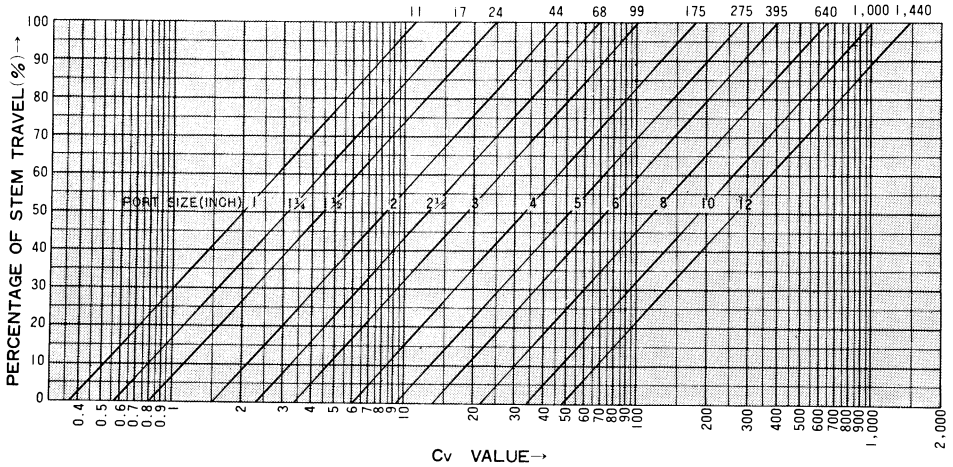
Flow Coefficient Cv and Stem Travel

	Valve size (inch)	1½			2			2½			3			4			5			6			8			10			12		
	Port size (inch)	1	1¼	1½	1¼	1½	2	1½	2	2½	2	2½	3	2½	3	4	3	4	5	4	5	6	5	6	8	6	8	10	8	10	12
	Rated Cv value	11	17	24	17	24	44	24	44	68	44	68	99	68	99	175	99	175	275	175	275	395	275	395	640	395	640	1000	640	1000	1440
Plug type & characteristic	Equal percentage cage, Linear cage & Teflon seat	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	△	△	△	△	△	△	△	△	△
	Stem travel (mm)	25			25			37.5			37.5			37.5			50			50			75			100			100		
	Equal percentage split cage & Linear split cage	—	—	—	—	—	—	—	—	—	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○	○
	Stem travel (mm)	25			25			37.5			37.5			37.5			50			50			75			100			100		

Note) △; Available for only Teflon seat valve.

Flow Characteristics

Equal percentage



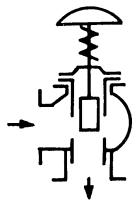
(Idealistic flow characteristics is indicated in this graph.)

Maximum Pressure Differential

A) General use valve

I) Direct action (air-to-close)

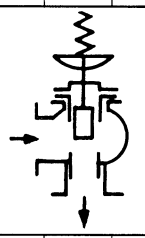
Actuator model no.	Air to diaphragm (kgf/cm²)	Spring range (kgf/cm²)	w or w/o positioner	Pressure differential (kgf/cm²) At corresponding valve size (inch)									
				1½	2	2½	3	4	5	6	8	10	12
VA1D	1.2	0.2~1.0	×	8.1	6.4								
	1.4	0.2~1.0	○	20	16								
	2.6	0.2~1.0	○	40	40								
VA2D	1.2	0.2~1.0	×	11	9.2	7.3	6.3	4.7					
	1.4	0.2~1.0	○	29	23	18	16	12					
	2.6	0.2~1.0	○	40	40	40	40	40					
VA3D	1.2	0.2~1.0	×	19	15	12	10	7.9	6.4	5.3			
	1.4	0.2~1.0	○	40	39	31	26	20	16	13			
	2.6	0.2~1.0	○	40	40	40	40	40	40	40			
VA4D	1.2	0.2~1.0	×			17	14	11	8.9	7.4	5.6		
	1.4	0.2~1.0	○			40	37	28	22	19	14		
	2.6	0.2~1.0	○			40	40	40	40	40	40		
VA5D	1.2	0.2~1.0	×						12	10	7.6	6.1	5.1
	1.4	0.2~1.0	○						31	26	19	15	13
	2.6	0.2~1.0	○						40	40	40	40	40



Notes: 1. The figures inside bold line are for standard actuator.
2. Positioner; X . . . Without, ○ . . . With

II) Reverse action (air-to-open)

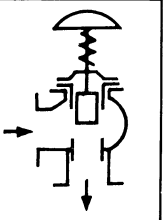
Actuator model no.	Air to diaphragm (kgf/cm²)	Spring range (kgf/cm²)	w or w/o positioner	Pressure differential (kgf/cm²) At corresponding valve size (inch)									
				1½	2	2½	3	4	5	6	8	10	12
VA1R	1.4	0.2~1.0	X or ○	8.1	6.4								
		※0.4~1.2	△	24	19								
	2.8	0.8~2.4	○	40	40								
VA2R	1.4	0.2~1.0	X or ○	11	9.2	7.3	6.3	4.7					
		※0.4~1.2	△	35	27	22	18	14					
	2.8	0.8~2.4	○	40	40	40	40	33					
VA3R	1.4	0.2~1.0	X or ○	19	15	12	10	7.9	6.4	5.3			
		※0.4~1.2	△	40	40	36	31	23	19	16			
	2.8	0.8~2.4	○	40	40	40	40	40	40	37			
VA4R	1.4	0.2~1.0	X or ○			17	14	11	8.9	7.4	5.6		
		※0.4~1.2	△			40	40	33	26	22	16		
	2.8	0.8~2.4	○			40	40	40	40	40	39		
VA5R	1.4	0.2~1.0	X or ○						12	10	7.6	6.1	5.1
		※0.4~1.2	△						36	30	23	18	15
	2.8	0.8~2.4	○						40	40	40	40	36



Notes: 1. * The pressure differential limits for 0.4~2.0kgf/cm² spring range are the same as for 0.4~1.2kgf/cm² spring.
2. The figures inside bold line are for standard actuator.
3. Positioner: X . . . Without, △ . . . Preferably with, ○ . . . With.

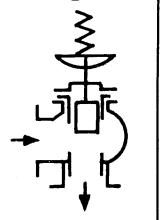
B) Teflon seat valve

I) Direct action (air-to-close)

Actuator model no.	Air to diaphragm (kgf/cm²)	Spring range (kgf/cm²)	w or w/o positioner	Pressure differential (kgf/cm²) At corresponding valve size (inch)						
				1½	2	2½	3	4	5	6
VA1D	1.2	0.2~1.0	×	5.7	4.5					
	1.4	0.2~1.0	○	14	11					
	2.6	0.2~1.0	○	30	30					
VA2D	1.2	0.2~1.0	×	8.2	6.4	5.1	4.4	3.3		
	1.4	0.2~1.0	○	20	16	13	11	8.5		
	2.6	0.2~1.0	○	30	30	30	30	30		
VA3D	1.2	0.2~1.0	×	13	10	8.5	7.3	5.5	4.4	3.7
	1.4	0.2~1.0	○	30	27	21	18	14	11	9.5
	2.6	0.2~1.0	○	30	30	30	30	30	30	30
VA4D	1.2	0.2~1.0	×			11	10	7.7	6.2	5.2
	1.4	0.2~1.0	○			30	26	19	15	13
	2.6	0.2~1.0	○			30	30	30	30	30
VA5D	1.2	0.2~1.0	×						8.5	7.1
	1.4	0.2~1.0	○						21	18
	2.6	0.2~1.0	○						30	30

Notes: 1. The figures inside bold line are for standard actuator.
2. Positioner: X . . . Without, ○ . . . With

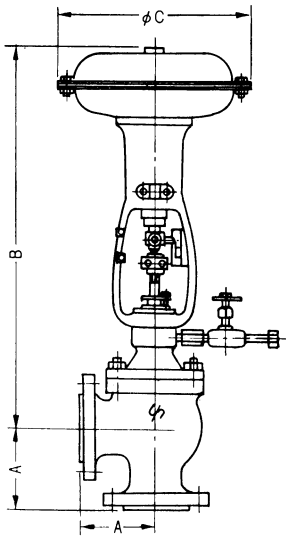
II) Reverse action (air-to-open)

Actuator model no.	Air to diaphragm (kgf/cm²)	Spring range (kgf/cm²)	w or w/o positioner	Pressure differential (kgf/cm²) At corresponding valve size (inch)						
				1½	2	2½	3	4	5	6
VA1R	1.4	0.2~1.0	X or ○	5.7	4.5					
		※0.4~1.2	△	17	13					
	2.8	0.8~2.4	○	30	30					
VA2R	1.4	0.2~1.0	X or ○	8.2	6.4	5.1	4.4	3.3		
		※0.4~1.2	△	24	19	15	13	10		
	2.8	0.8~2.4	○	30	30	30	30	23		
VA3R	1.4	0.2~1.0	X or ○	13	10	8.5	7.3	5.6	4.4	3.7
		※0.4~1.2	△	30	30	25	21	16	13	11
	2.8	0.8~2.4	○	30	30	30	30	30	30	26
VA4R	1.4	0.2~1.0	X or ○			11	10	7.7	6.2	5.2
		※0.4~1.2	△			30	30	23	18	15
	2.8	0.8~2.4	○			30	30	30	30	30
VA5R	1.4	0.2~1.0	X or ○						12	10
		※0.4~1.2	△						25	21
	2.8	0.8~2.4	○						30	30

Notes: 1. *The pressure differential limits for 0.4~2.0kgf/cm² spring range are the same as for 0.4~1.2kgf/cm² spring.
2. The figures inside bold line are for standard actuator.
3. Positioner: X . . . Without, △ . . . Preferably with, ○ . . . With.

Face to Face Dimensions

Valve size (inch)	A (mm)					
	JIS 10K FF, RF ANSI 150 RF	JIS 16K, 20K, 30K RF ANSI 300 RF	JIS 40K RF ANSI 600 RF	ANSI 150 RJ	ANSI 300 RJ	ANSI 600 RJ
1½	111	117	125	117	124	125
2	127	133	143	133	141	144
2½	138	146	156	144	154	157
3	149	159	168	156	167	170
4	176	184	197	183	192	198
5	202	213	229	208	221	230
6	225	237	254	232	244	256
8	271	284	330	278	292	332
10	337	354	394	343	362	396
12	364	388	419	375	396	421



External Dimensions

Valve size (inch)	Actuator model no.	B (mm)						C (φ mm)
		Direct action (Air-to-Close)			Reverse action (Air-to-Open)			
		P	RF	BS	P	RF	BS	
1½	VA1D, R	670	820	830	670	820	830	300
	VA2D, R	810	960		810	960		350
	VA3D, R	975	1125		975	1125		450
2	VA1D, R	670	820	830	670	820	830	300
	VA2D, R	810	960		810	960		350
	VA3D, R	975	1125		975	1125		450
2½	VA2D, R	845	995	1065	845	995	1065	350
	VA3D, R	1015	1165		1015	1165		450
	VA4D, R	1180	1330		1295	1445		520
3	VA2D, R	855	1005	1075	855	1005	1075	350
	VA3D, R	915	1165		915	1165		450
	VA4D, R	1180	1330		1295	1445		520
4	VA2D, R	855	1010	1075	855	1010	1075	350
	VA3D, R	1020	1170		1020	1170		450
	VA4D, R	1185	1335		1300	1450		520
5	VA3D, R	1040	1190	1330	1040	1190	1330	450
	VA4D, R	1205	1355		1320	1470		520
	VA5D, R	1255	1405		1365	1515		620
6	VA3D, R	1060	1210	1345	1060	1210	1345	450
	VA4D, R	1225	1375		1340	1490		520
	VA5D, R	1275	1425		1385	1535		620
8	VA4D, R	1315	1460		1425	1575		520
	VA5D, R	1410	1555		1515	1665		620
10	VA5D, R	1620	1875		1750	2010		620
12	VA5D, R	1670	1880		1800	2010		620

Note) P: Plain bonnet, RF: Radiator finned bonnet, BS: Bellows seal bonnet

Approximate Weights

Valve size (inch)	Actuator model no.	Approximate weights (kg)								
		JIS 10K, ANSI 150			JIS 16K, 20K, 30K, ANSI 300			JIS 40K, ANSI 600		
		P	RF	BS	P	RF	BS	P	RF	BS
1½	VA1D, R	37	39	40	42	44	45	50	52	53
	VA2D, R	48	50		53	55		61	63	
	VA3D, R	76	78		81	83		89	91	
2	VA1D, R	43	45	46	43	46	47	60	63	64
	VA2D, R	54	56		54	57		71	74	
	VA3D, R	82	84		82	85		91	102	
2½	VA2D, R	60	63	65	65	68	70	110	113	115
	VA3D, R	88	91		93	96		138	141	
	VA4D	163	166		168	171		213	216	
	VA4R	188	191		193	196		238	241	
3	VA2D, R	80	85	87	83	88	90	120	125	127
	VA3D, R	108	113		111	116		148	153	
	VA4D	183	188		186	191		223	228	
	VA4R	208	213		211	216		248	253	
4	VA2D, R	95	100	105	110	115	120	150	155	160
	VA3D, R	123	128		138	143		178	183	
	VA4D	198	203		213	218		253	258	
	VA4R	223	228		238	243		278	283	
5	VA3D, R	160	168	173	170	178	183	215	223	228
	VA4D	235	243		245	253		290	298	
	VA4R	260	268		270	278		315	323	
	VA5D	260	268		270	278		315	323	
	VA5R	285	293		295	303		340	348	
6	VA3D, R	230	240	245	240	250	265	300	310	315
	VA4D	305	315		315	325		375	385	
	VA4R	330	340		340	350		400	410	
	VA5D	330	340		340	350		400	410	
	VA5R	355	365		365	375		515	525	
8	VA4D	340	360		390	400		510	530	
	VA4R	365	385		415	425		535	555	
	VA5D	370	390		420	430		540	560	
	VA5R	395	415		445	455		565	585	
10	VA5D	520	560		650	670		710	740	
	VA5R	545	585		675	695		735	765	
12	VA5D	710	740		860	880		960	1060	
	VA5R	735	765		885	905		985	1085	

Note) P: Plain bonnet, RF: Radiator finned bonnet, BS: Bellow seal bonnet

Ordering Information

When ordering, please specify:

1) Model No.: VAC
2) Valve size x Port size or Cv required
3) Type and rating of end connections
4) Body and trim material, necessity of hardening
5) Plug characteristics (on-off, equal percentage, linear)
6) Type of bonnet
7) Type of actuator, air to diaphragm
8) Valve action (direct or reverse)
9) Accessories (positioner, handwheel, pressure regulator, etc.)
10) Special requirement of degreasing, free from copper and 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

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.

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