



# CONTROL VALVE STANDARD SPECIFICATION

## BELLOWS SEAL (GAS, HEAT THERMO OIL)

2-WAY & 3-WAY GLOBE VALVE



YAD-12214, 12284 Series



<http://www.proval.co.kr>

**PROVAL** PROVAL Co., Ltd.

[B-5]

PROVAL

**BELLOWS SEAL TYPE 2-WAY & 3-WAY GLOBE VALVE****GENERAL**

Wasted material, employee safety, environmental concerns all good reasons for today's plant operator to be concerned about fugitive emissions from hazardous processes.

To stop packing leakage from control valves.

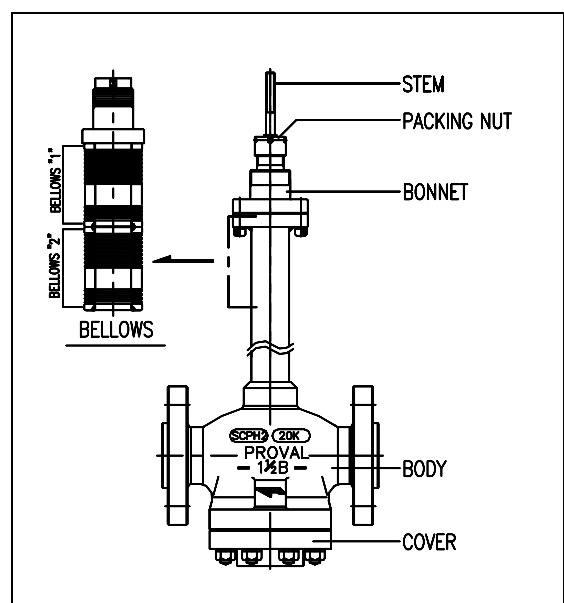
Using a formed a formed metal bellows design with minimal welded joint, the design of **PROVAL** bellows has a full-cycles lift up to 5 a hundred thousands cycles.

This ensures years of safe and reliable operation in hazardous process ranging from  $-160^{\circ}\text{C}(-230^{\circ}\text{F}) \sim 350^{\circ}\text{C} (688^{\circ}\text{F})$  and pressure to  $40(\text{kgf}/\text{cm}^2)$ .

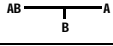
A metal should envelopes the bellows acting as a pressure boundary in service, allowing use of a single, pressurized gasket seal and preventing fluid contact with the bellows housing during normal operation.

**FEATURES**

- Zero – Leakage stem & seal.
- Available with SUS316 or SUS316L bellows.
- No bellows tension
  - Bellows is in a relaxed state at valve's closed position.
- No bellows erosion / fluid impingement
  - Bellows is out of flow stream.
- No special packing requirements
  - Uses standard **PROVAL** V-PTFE packing materials.
- Multiple temperature applications
  - Temperature range from  $-160^{\circ}\text{C} \sim 350^{\circ}\text{C}$ .



## STANDARD SPECIFICATION

Model No.	2-WAY	YAD-12214 (RA Type), YAD-22214 (DA Type)																				
	3-WAY	YAD-12284 (RA Type), YAD-22284 (DA Type)																				
Valve Type		Diaphragm or cylinder actuator operated bellows seal type globe valve.																				
BODY	Valve Size	(mm)	15	20	25	32	40	50	65	80	100	125	150	200	250	300	350	400	450	500		
		(inch)	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	4	5	6	8	10	12	14	16	18	20		
	Stroke (mm)		20					25	30	40	55	60	90			OVER 100						
	Pressure Rating		ANSI 150# ~ 600# / JIS 10K ~ 40K / JPI 150# ~ 600# / PN 6bar ~ 40bar																			
	End Connections		Flanged end: FF, RF, RTJ, M/F(female), T/G(female) ※ Welding end: SW, BW																			
	Body Materials		A216-WCB, A351-CF8, CF8M, CF3M																			
	Bellows Materials		SUS316, SUS316L																			
	Operating Temperature		Standard	Standard Type: -20°C ~ 300°C																		
			Specials	-160°C ~ 350°C																		
	Gland Packing		V-PTFE, PTFE yarn, Graphite yarn																			
	Guiding		Top & Bottom, Cage Guide.																			
	Gasket		SUS316 + Graphite spiral wound, other alloy steels.																			
	Painting Color		Standard is silver. In the case of stainless steel, flange is not painted.																			
	Flow Direction		2-WAY	FTO (Flow Action to Open)																		
			3-WAY	Diverting (AB→A, AB→B, Fail: AB→B) 																		
	Trim Materials		SUS304 (STL.), SUS316 (STL.), SUS316L (STL.)																			
Treatment of Trim		See "MATERIAL DATA" page 3, 4																				
PERFORMANCE	Valve Action		Direct action, Reverse action.																			
	Allowable Differential Press.		See "ALLOWABLE PRESSURE DROP" page 6																			
	Rated Cv Value		See "FLOW CHARACTERISTICS" page 4																			
	Flow Characteristics		See "FLOW CHARACTERISTICS" page 5																			
	Rangeability		See "FLOW CHARACTERISTICS" page 4																			
	Allowable Seat Leakage Ratio		Standard	0.01% of rated Cv (ANSI B16. 104 Class IV)															※ Tight shut off: 0.002%			
			Specials	Soft trim ANSI B16. 104 Class VI.																		
Action Accuracy		Hysteresis	(Without positioner) max. 6% F.S. (With positioner) max. 1.5% F.S.																			
		Linearity	(Without positioner) max. ±7% F.S. (With positioner) max. ±1.5% F.S.																			

Valve Size	(mm)	15	20	25	32	40	50	65	80	100	125	150	200	250	300	350	400	450	500
	(inch)	$\frac{1}{2}$	$\frac{3}{4}$	1	$1\frac{1}{4}$	$1\frac{1}{2}$	2	$2\frac{1}{2}$	3	4	5	6	8	10	12	14	16	18	20
<b>Model</b>	A-220M - A-520M																		
<b>Actuator Type</b>	Multi-spring diaphragm type.																		
<b>Actuator Size (Diaphragm size)</b>	Ø220			Ø270			Ø360			Ø430			Ø520			Cylinder Type			
<b>Max. Stroke (mm)</b>	20			20, 25			30, 40			55, 60			90			Over 100			
<b>Supply Air Pressure kPa (kgf/cm<sup>2</sup>G)</b>	200 (2.0), 320 (3.2)																		
<b>Spring Range kPa (kgf/cm<sup>2</sup>G)</b>	20~98 (0.2~1.0), 40~200 (0.4~2.0)																		
<b>Action</b>	Direct action, Reverse action.																		
<b>Materials</b>	Diaphragm: EPDM, York: FCD450 & A216-WCB, Case: Al-Alloy																		
<b>Air Connection</b>	Rc 1/4															Rc 3/8			
<b>Ambient Temperature</b>	-20°C ~ +70°C (※ -50°C ~ -20°C, +70°C ~ +100°C)																		
<b>Painting Color</b>	Standard is Cobalt Blue(Munsell No : 2.5 PB3/10) [Request other color]																		

[Notes] (1) Valve performance is represented under the condition of standard packing (V-PTFE).  
 (2) ※ : Manufactured and attached as according to customer's order.

## MATERIAL DATA

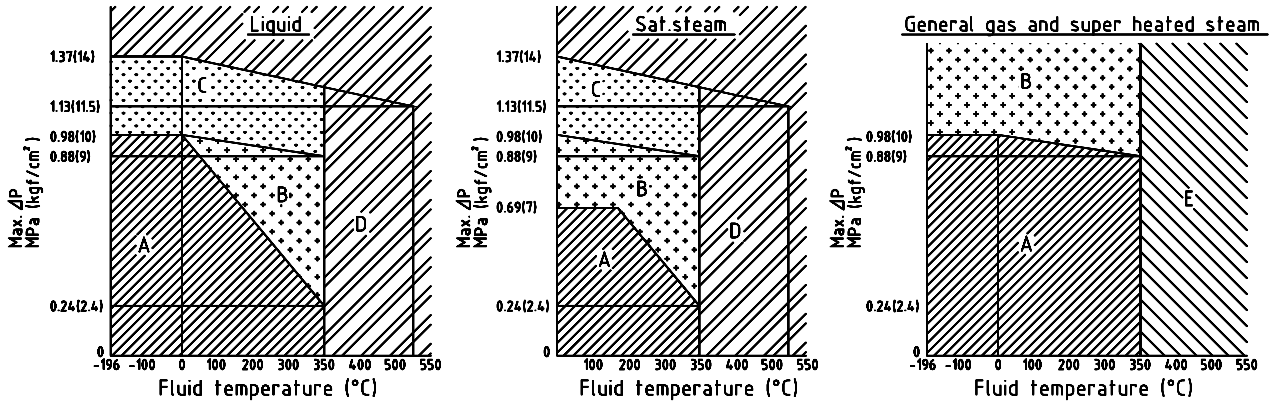
### 1. Combining the valve body, bonnet and trim material.

Parts Name		Materials		
<b>Body, Bonnet</b>		ASTM A216-WCB	ASTM A351-CF8	ASTM A351-CF8M
<b>Trim</b>	<b>Seat Ring</b>	SUS 316 (STL.), SUS 304 (STL.)		SUS 316 (STL.)
	<b>Valve Plug</b>			
	<b>Valve stem</b>	SUS 316 (Hcr plate)		
	<b>Guide Bushing</b>	SUS 420J2 (Hard Face)		SUS 316 (Hcr)
	<b>Bellows</b>	SUS 316, SUS 316L		
<b>Stud Bolt &amp; Nut</b>		SNB7 / S45C (H)	SUS 304	

[Notes] (1) This table shows typical combination of materials. The combination may be subject to pressure-temperature and kind of fluid.  
 (2) Trim materials may be casting in stead of bar materials in some cases.  
 (3) Bonnet may be forged in some cases.

## 2. Trim treatment & material vs operating pressure-temperature ratings.

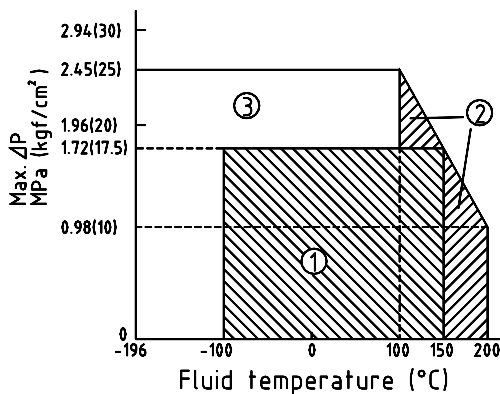
- A: Stellite standard (Plug & Seat) B: Stellite standard and ion treatment C: Stellite face D: Stellite face + stellite of guide bushing and guide post  
E: Stellite seat + stellite of guide bushing and guide post



- (1) Seat ring of on-off control valve and of throttling control valve for tight shut off is hard faced at the area of stellite seat and over.
- (2) In case of flushing fluid, seat ring is hard faces at the area of stellite area.
- (3) In spite of fluid sort, at 350°C and over, guide bushing and guide post is hard faced by stellite treatment.
- (4) In case of saturated steam, if inlet pressure is 0.69 MPa (7 kgf/cm<sup>2</sup>G) and over, seat ring is hard faced at area of stellite seat and over.

## 3. Soft seat operating pressure-temperature ratings.

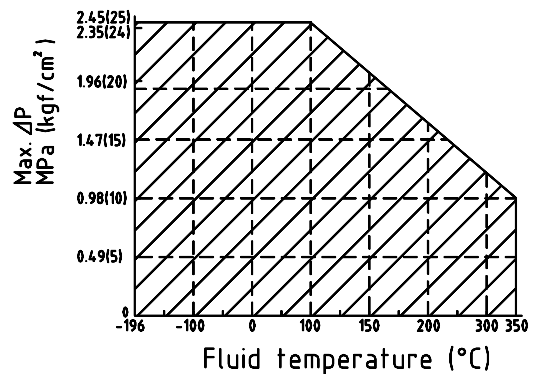
- Disc materials :
- ① PTFE
  - ② Glass reinforced PTFE
  - ③ PCTFE [Note]



[Note] Poly-chlorotrifluoro ethylene

## 4. Bellows operating.

< Bellows Material: SUS 316 >





# BELLOWS SEAL TYPE GLOBE VALVES

## FLOW CHARACTERISTICS

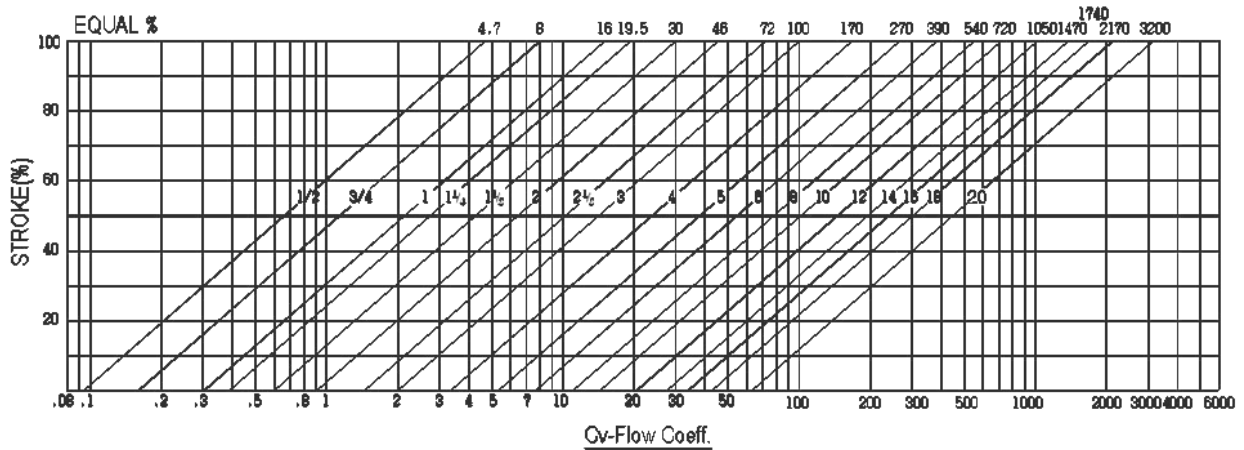
### 1. Rated Cv Value

Port Size	15A (1/2")	20A (3/4")	25A (1")	32A (1 1/4")	40A (1 1/2")	50A (2")	65A (2 1/2")	80A (3")	100A (4")	125A (5")	150A (6")	200A (8")	250A (10")	300A (12")	350A (14")	400A (16")	450A (18")	500A (20")
Cv Value	4.7	8	16	19.5	30	46	72	100	170	270	390	540	720	1050	1470	1740	2170	3200
Range ability	50 : 1									30 : 1								

[Unit: gal/min]

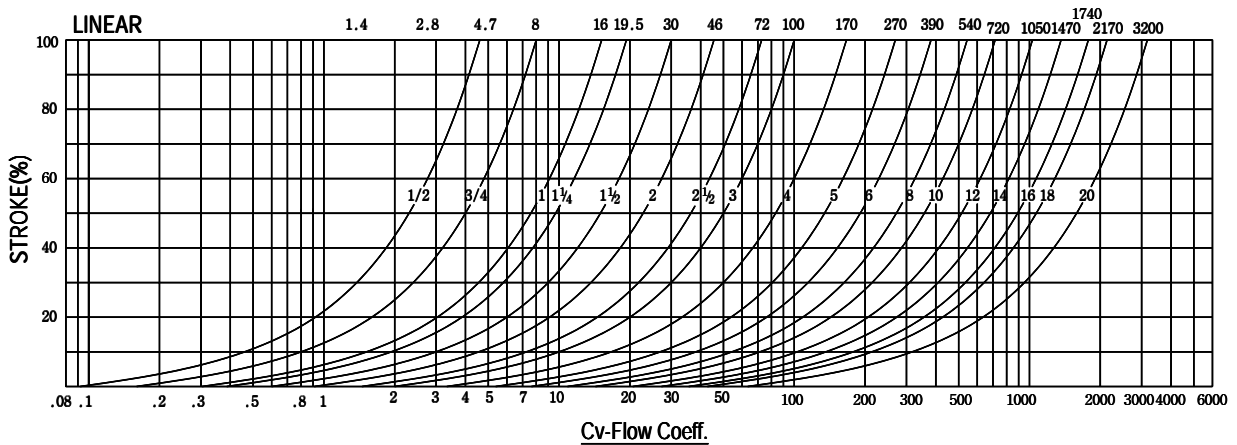
### 2. Flow Characteristics

#### 2-1 Equal %



[Note] Proper throttling control range: 10-90% stroke

#### 2-2 Linear



[Note] Proper throttling control range: 10-90% stroke

**MAX. ALLOWABLE PRESSURE DROP**

## 1. Diaphragm Actuator: Single Unbalance seat. Reverse Action(R.A, Air to Open)

Shaded zone represents standard application.

[ Unit: Kg/cm<sup>2</sup>G ]

Actuator Model	Air Supply (Kg/cm <sup>2</sup> G)	Spring Range (Kg/cm <sup>2</sup> G)	Port Size														
			10A (3/8")	15A (1/2")	20A (3/4")	25A (1")	32A (1 1/4")	40A (1 1/2")	50A (2")	65A (2 1/2")	80A (3")	100A (4")	125A (5")	150A (6")	200A (8")	250A (10")	300A (12")
A-220M	1.4	0.2 ~ 1.0	44	19	10.5	6.5	4	2.7									
	2.4	0.4 ~ 2.0		39.5	22	14.5	8	5.5									
	3.2	0.8 ~ 2.4			37	25	16	10.5									
A-270M	1.4	0.2 ~ 1.0		28.5	16	10	6.5	3.8	2.8								
	2.4	0.4 ~ 2.0		57	32.5	21	12	8	4.5	3.8							
	3.2	0.8 ~ 2.4			64.5	42	24	15	9	7.2							
A-360M	1.4	0.2 ~ 1.0						8	4.5	3.5	1.6	1.2					
	2.4	0.4 ~ 2.0						16	10	7	3.6	2.2					
	3.2	0.8 ~ 2.4						32.5	20.5	14	8	5					
A-430M	2.4	0.4 ~ 2.0											3	2			
	3.2	0.8 ~ 2.4											6	4			
A-520M	2.4	0.4~2.0													2.9	1.9	1.3
	3.2	0.8~2.4													5.8	3.8	2.6

## 2. Diaphragm Actuator: Cage balanced Type. Reverse Action(R.A, Air to Open)

Shaded zone represents standard application.

[ Unit: Kg/cm<sup>2</sup>G ]

Actuator Model	Air Supply (Kg/cm <sup>2</sup> G)	Spring Range (Kg/cm <sup>2</sup> G)	Port Size														
			40A (1 1/2")	50A (2")	65A (2 1/2")	80A (3")	100A (4")	125A (5")	150A (6")	200A (8")	250A (10")	300A (12")	450A (14")	400A (16")	450A (18")	500A (20")	
A-270M	2.6	0.4 ~ 2.0	25	21	11												
	3.2	0.8 ~ 2.4	45	38	19	13											
A-360M	2.6	0.4 ~ 2.0		42	22	13	11										
	3.2	0.8 ~ 2.4		35	40	23	20	17									
A-430M	2.6	0.4 ~ 2.0						21	17	14	9						
	3.2	0.8 ~ 2.4						38	30	25	16						
A-520M	2.6	0.4 ~ 2.0									10.5	9	7	6	CYLINDER ACTUATOR STANDARD		
	3.2	0.8 ~ 2.4									19	16	12.5	10			

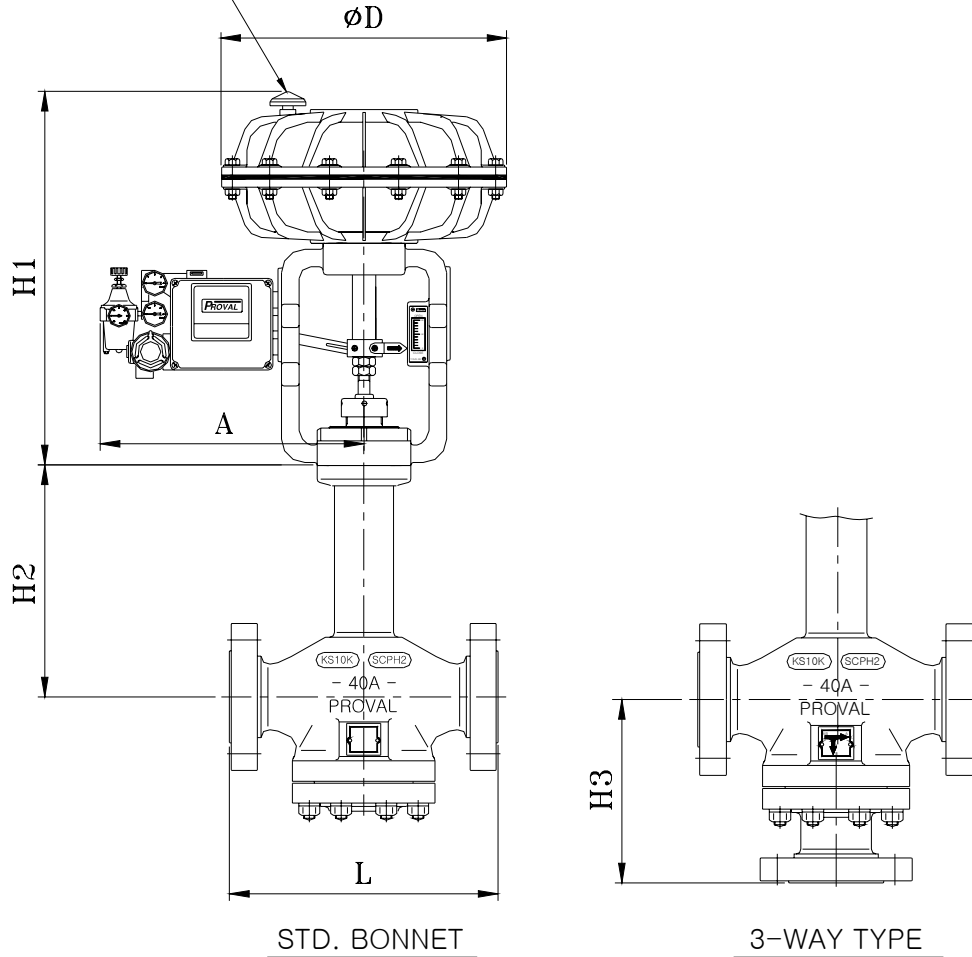




## DIMENSION DRAWING

### ACTUATOR : A-220M

Rc 1/4"  
AIR CONNECTION



### DIMENSIONS

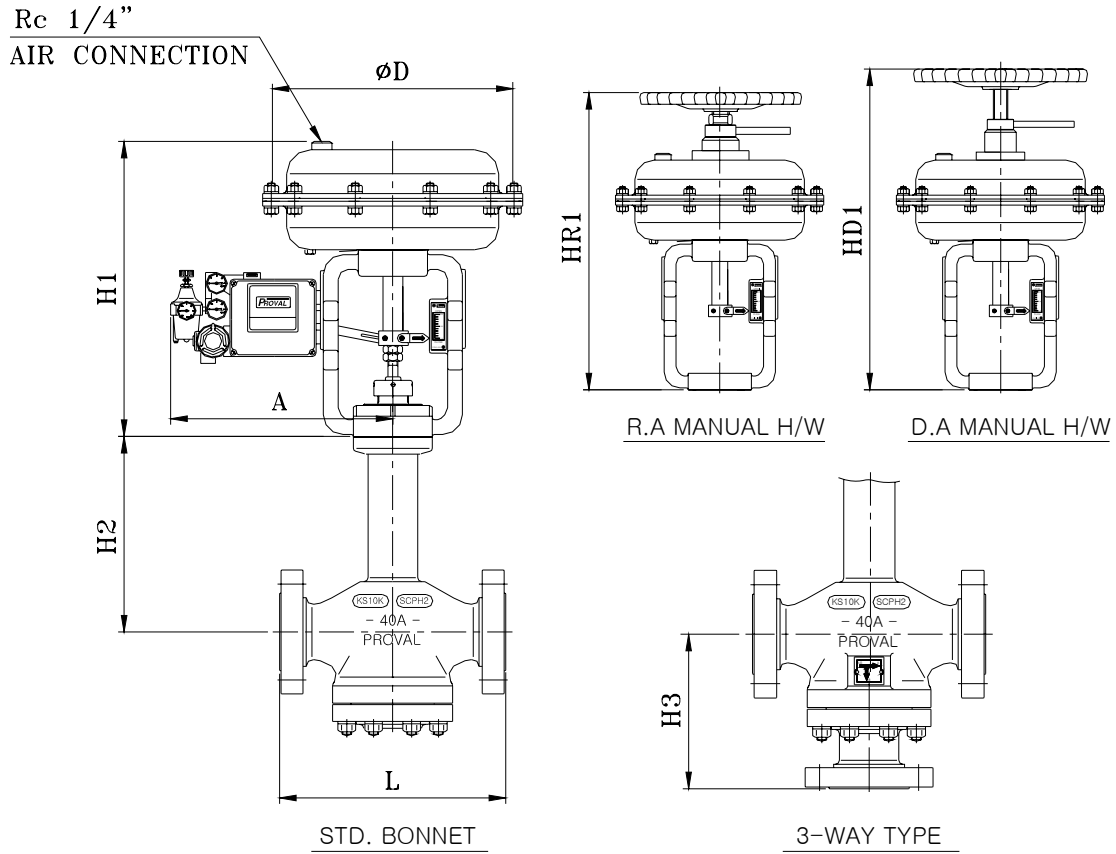
[ Unit: mm ]

Valve Size		Face to Face : L		H3	H2	Actuator size (ØD)	H1	With Manual H/W		A
mm	inch	JIS 10K, 20K ANSI 150#, JPI 150#	ANSI 300#					HR1	HD1	
15	½	185	185	145	270	225	280	335 ~ 355	400 ~ 420	310
20	¾	185	185	145	270	225	280	335 ~ 355	400 ~ 420	310
25	1	185	185	145	270	225	280	335 ~ 355	400 ~ 420	310

<b>MODEL</b>	YAD-12214, YAD-22214	<b>SIZE</b>	15A - 25A
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## DIMENSION DRAWING

### ACTUATOR : A-270M



### DIMENSIONS

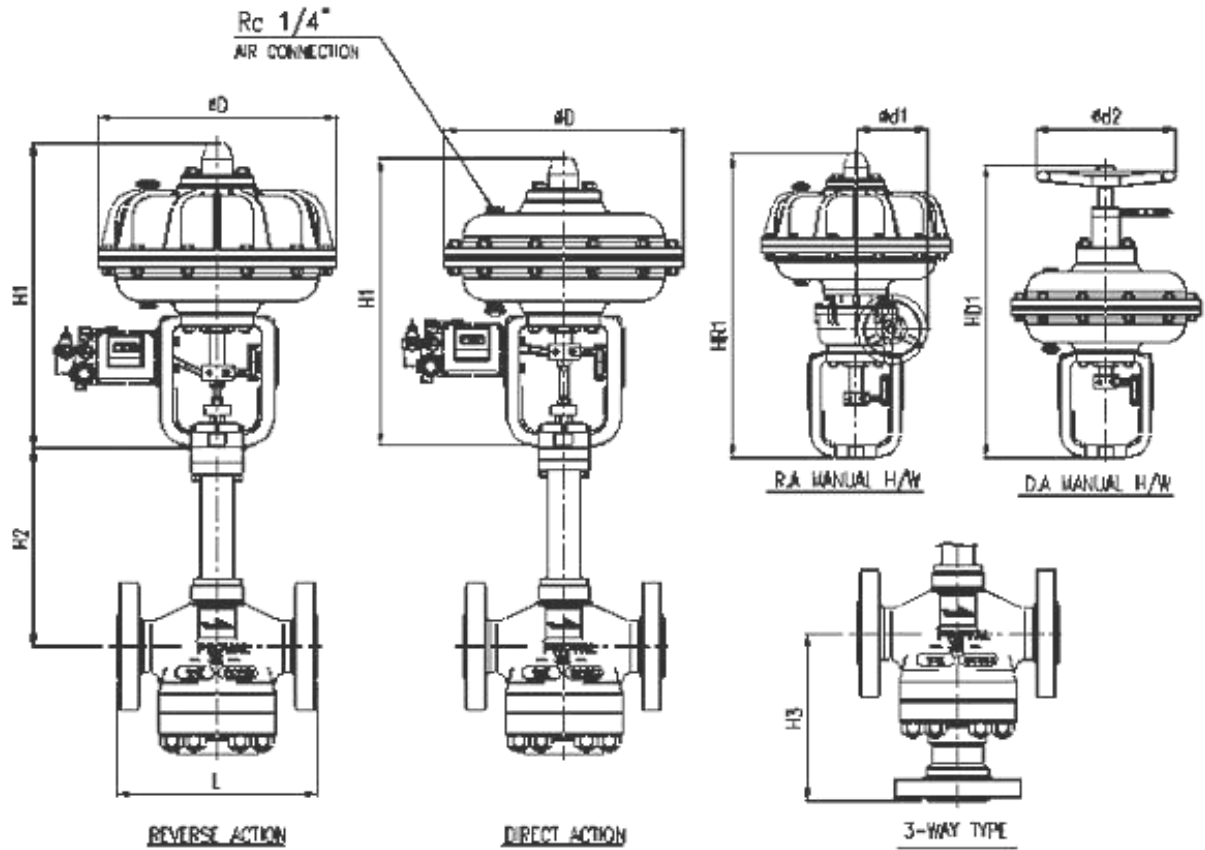
[ Unit: mm ]

Valve Size		Face to Face : L		H3	H2	Actuator size (ØD)	H1	With Manual H/W		A	Ød
mm	inch	JIS 10K, 20K ANSI 150#, JPI 150#	ANSI 300#					HR1	HD1		
15	½	185	185	145	270	270	310	360 ~ 390	442 ~ 422	322	200
20	¾	185	185	145	270	270	310	360 ~ 390	442 ~ 422	322	200
25	1	185	185	145	270	270	310	360 ~ 390	442 ~ 422	322	200
32	1¼	223	228	163	280	270	310	360 ~ 390	442 ~ 422	322	200
40	1½	223	228	163	280	270	310	360 ~ 390	442 ~ 422	322	200
50	2	256	264	178	290	270	310	360 ~ 390	442 ~ 422	322	200

<b>MODEL</b>	YAD-12214, YAD-22214	<b>SIZE</b>	15A ~ 50A
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## DIMENSION DRAWING

### ACTUATOR : A-360M



#### DIMENSIONS

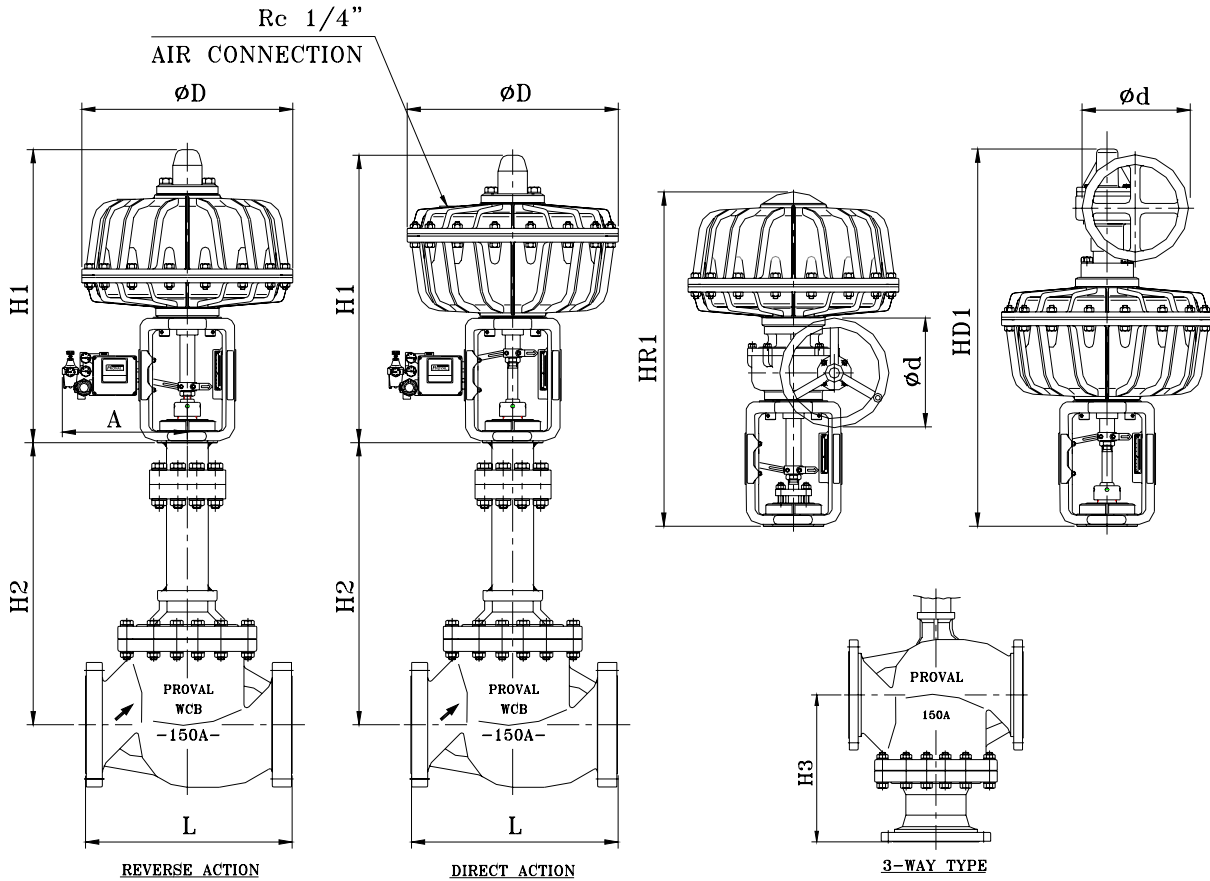
[ Unit: mm ]

Valve Size		Face to Face : L		H3	H2	Actuator size (ØD)	H1		With Manual H/W		A	Ød1	Ød2
mm	inch	JIS 10K, 20K ANSI 150# JPI 150#	ANSI 300#				R.A.	D.A.	HR1	HD1			
50	2	256	264	178	287	360	458	427	590	588 ~ 548	327	200	315
65	2½	283	294	197	355	360	458	427	590	588 ~ 548	327	200	315
80	3	300	313	248	450	360	458	427	590	588 ~ 548	327	200	315
100	4	358	373	280	463	360	458	427	590	588 ~ 548	327	200	315

<b>MODEL</b>	YAD-12214, YAD-22214	<b>SIZE</b>	50A ~ 100A
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## DIMENSION DRAWING

### ACTUATOR : A-430M



### DIMENSIONS

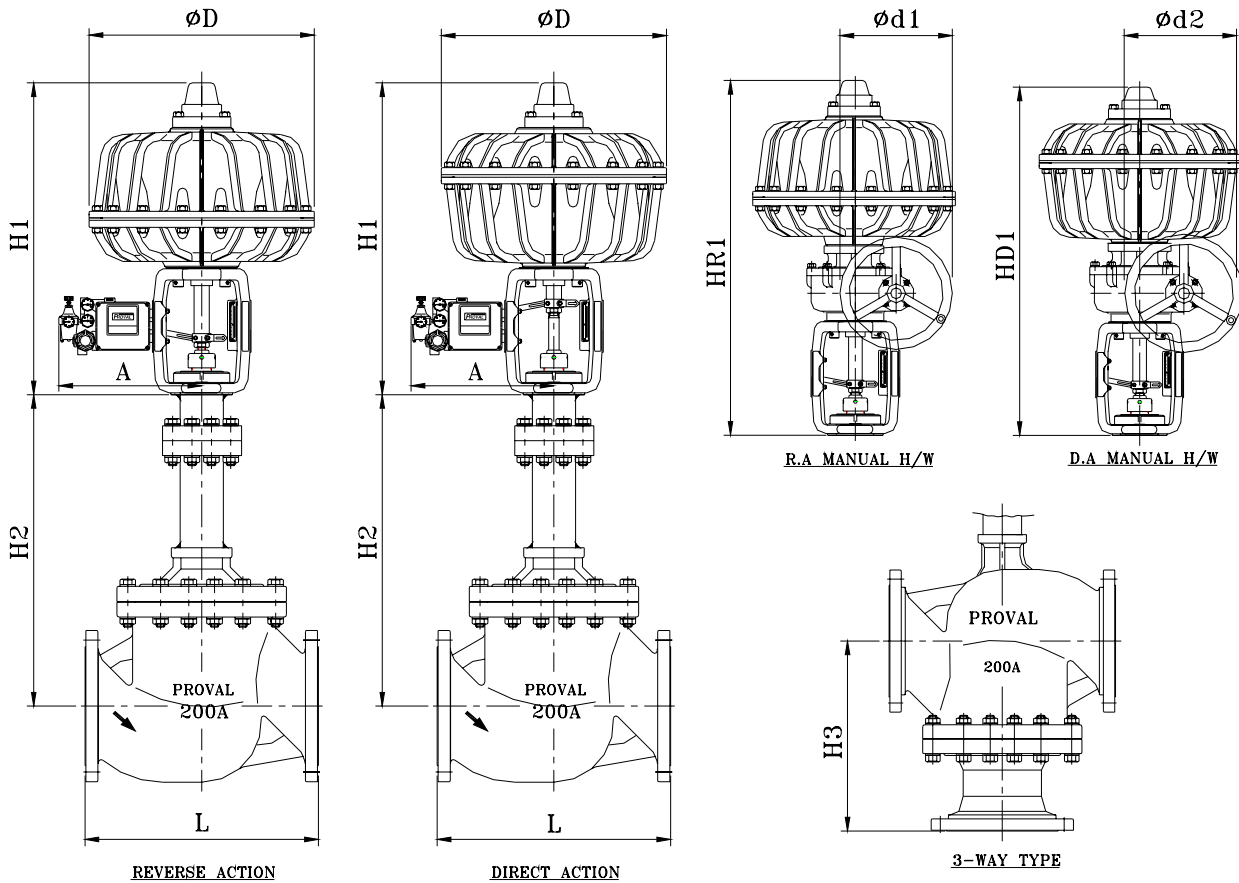
[ Unit: mm ]

Valve Size		Face to Face : L		H3	H2	Actuator size (ØD)	H1		With Manual H/W		A	Ød
mm	inch	JIS 10K, 20K ANSI 150#, JPI 150#	ANSI 300#				R.A.	D.A.	HR1	HD1		
100	4	358	373	280	463	430	554	643	880	870 ~ 780	345	315
125	5	400	417	310	515	430	554	643	880	870 ~ 780	345	315
150	6	462	479	350	565	430	554	643	880	870 ~ 780	345	315
200	8	554	592	460	610	430	554	643	880	870 ~ 780	345	315

<b>MODEL</b>	YAD-12214, YAD-22214	<b>SIZE</b>	100A ~ 200A
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## DIMENSION DRAWING

### ACTUATOR : A-520M



#### DIMENSIONS

[ Unit: mm ]

Valve Size		Face to Face : L		H3	H2	Actuator size (ØD)	H1		With Manual H/W		A	Ød1	Ød2
mm	inch	JIS 10K, 20K ANSI 150#, JPI 150#	ANSI 300#				R.A.	D.A.	HR1	HD1			
200	8	554	592	460	610	520	732	790	990	1060	350	315	315
250	10	676	703	550	760	520	732	790	990	1060	350	315	315
300	12	799	866	866	915	520	732	790	990	1060	350	315	315
350	14	890	940	940	965	520	732	790	990	1060	350	315	315

MODEL	YAD-12214, YAD-22214	SIZE	200A ~ 350A
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