Product

VFR

Eccentric Rotary Valves

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Preface

This Specification is applicable to the VFR eccentric rotary valves, which are composed of VR, AW, AT actuators or electric actuators and eccentric rotary valve body components. Models include VFR-010, VFR-110, VFR-011, and VFR-111.

We hope that users (customers) will carefully read this Specification and fully understand it prior to its use. In addition, upon proper startups, operators and maintenance personnel must keep this Specification properly for reference when needed.

This Specification mainly incorporates the contents related to the structure, action principle, main technical parameters and performance, acceptance, handling and custody, unpacking, installation, startup preparation and startup, daily inspection and regular inspection, faults and abnormality identification methods and measures, disassembly and assembly, etc.

Due to the ongoing research and improvement of control valves, there may be any discrepancies in this Specification with the specific information of any purchased products. If you have any questions about any purchased product or this Specification, please contact the following department:

Sales Department: TEL: 023-67032525, 67032526, 67032527
FAX: 023-67032523

Safety Precautions

The control valves must be used correctly and maintained regularly to ensure the safe conduct of acceptance, handling, custody, installation, startup preparation, startup, and maintenance related thereto. Please carefully read and fully understand the Safety Precautions indicated in this Specification prior to its operation and use.

This Specification and the Safety Precautions indicated herein mainly introduce how to use the VFR eccentric rotary valves to adjust the flow, pressure, temperature, liquid level of fluids, and to control the on/off of fluids. If the use or operating methods described in this Specification are not followed, the user shall bear the relevant safety responsibility.

The safety precautions that must be followed in this Specification are indicated as follows, including warning and caution headings and explanations of precautions.

⚠ Warning

Failure to follow the precautions may result in injuries and casualties at any time.

⚠ Caution

Failure to follow the precautions may cause damage and malfunctions to the control valves or other equipment at any time.

1 Structure and Operating Principle

1-1. VR1～3 (D, R) Actuators

VR actuators consist of direct-acting (VR1～3D) actuators and reverse-acting actuators (VR1～3R), as shown in Figures 1-1, 1-2, and 1-3.

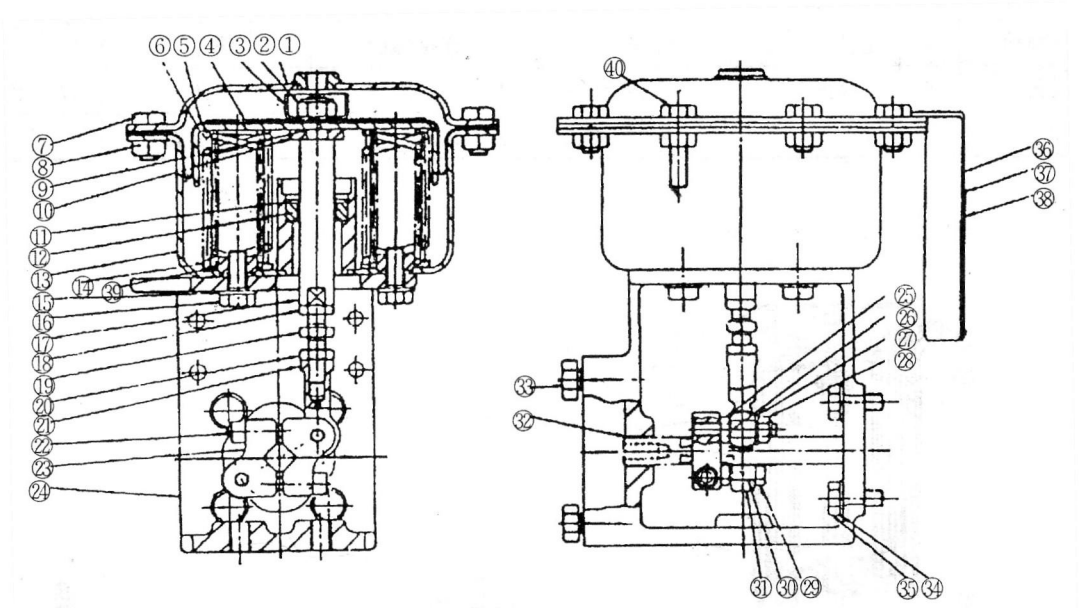


Figure 1-1 Structural Presentation of VR1 Actuator

S.N.	Part Name	S.N.	Part Name	S.N.	Part Name	S.N.	Part Name	S.N.	Part Name	S.N.	Part Name
1	Bonnet component	8	Hexagon nut	15	Flat gasket	22	Hexagon socket cap head screw	29	Hexagon bolt	36	Nameplate rack
2	Hexagon nut	9	O-ring seal	16	Hexagon bolt	23	Fixture block	30	Liner bushing	37	Sign rivet
3	Locating part	10	Stem gasket	17	Stem	24	Bracket	31	Roller	38	Nameplate
4	Diaphragm pressure plate	11	Hole retaining ring	18	Left-hand thread hex nut	25	Hexagon nut	32	Sleeve	39	Small spring
5	Diaphragm	12	Inner guide sleeve	19	Connecting bolt	26	Drive bolt	33	Hexagon bolt	40	Hexagon bolt
6	Pallet	13	Lower	20	Hexagon	27	Flat gasket	34	Flat		

			diaphragm cover component		nut				gasket		
7	Hexagon bolt	14	Big spring	21	Rod end joint bearing	28	Hexagon nut	35	Hexagon nut		

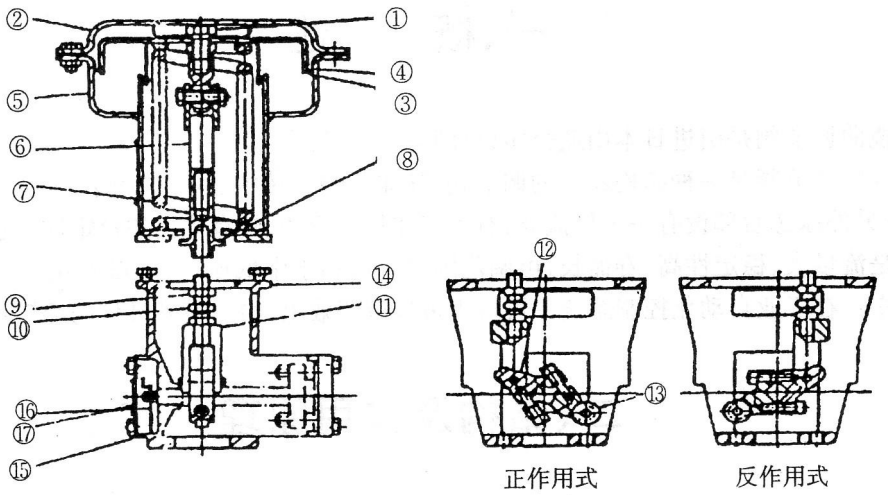


Figure 1-2 Structural Presentation of VR2 Actuator

S.N.	Part Name	S.N.	Part Name	S.N.	Part Name	S.N.	Part Name	S.N.	Part Name	S.N.	Part Name
1	Hexagon bolt	4	Pallet	7	Spring	10	Connecting bolt	13	Roller	16	Pointer
2	Upper diaphragm cover	5	Lower diaphragm cover component	8	Thrust liquid needle bearing	11	Connecting block assembly	14	Bracket	17	Nameplate
3	Diaphrag	6	Stem	9	Left-hand thread	12	Fixture	15	Directiona		

	m				hex thin nut		block		l indicator cover		

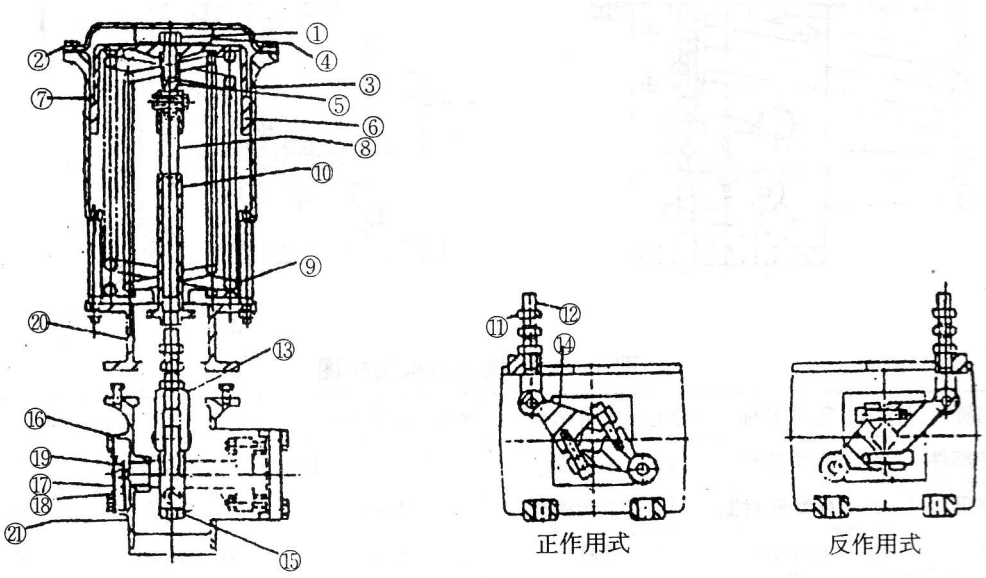


Figure 1-3 Structural Presentation of VR3 Actuator

S.N.	Part Name	S.N.	Part Name	S.N.	Part Name	S.N.	Part Name	S.N.	Part Name	S.N.	Part Name
1	Hexagon bolt	5	Rod end joint bearing	9	Spring	13	Connecting block assembly	17	Pointer	21	Bracket
2	Upper diaphragm cover	6	Piston	10	Spring-loaded adjusting bolt	14	Fixture block	18	Cam		
3	Diaphragm	7	Lower diaphragm cover	11	Left-hand thread hex thin nut	15	Roller	19	Nameplate		
4	Locating part	8	Stem	12	Connecting bolt	16	Directional indicator cover	20	Upper bracket		

1-2. AW Actuators

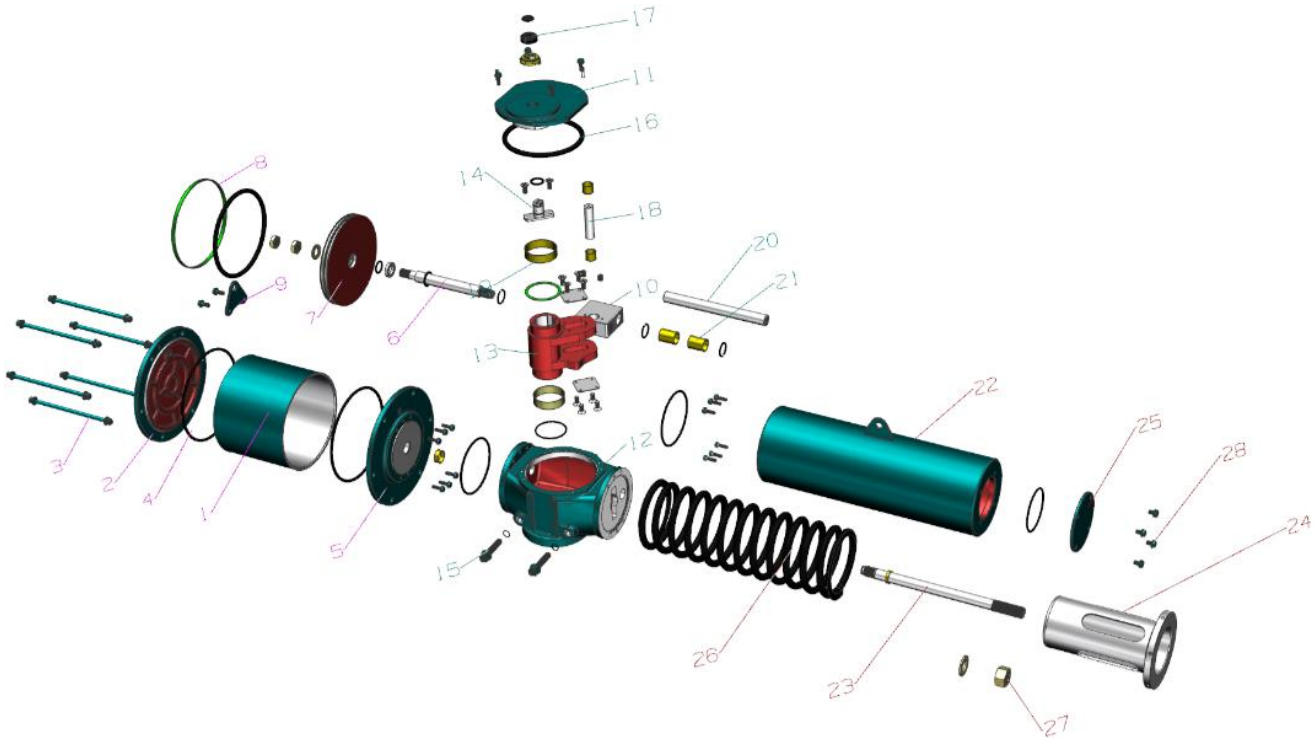


Figure 2 Structural Presentation of AW Fork Type Pneumatic Actuator

Cylinder Module				**Spring Cylinder Module**				**Tank Module**			
S.N.	Name	Quantity	Material	S.N.	Name	Quantity	Material	S.N.	name	Quantity	Material
1	Cylinder block	1	20#	22	Spring canister	1	Steel	10	Guide drive element	1	Steel
2	Cylinder lid	1	Nodular cast iron	23	Spring rod	1	45#	11	Tank cover	1	Nodular cast iron
3	Rod	n	Steel	24	Spring seat	1	Steel	12	Tank	1	Nodular cast iron
4	O-ring	1	Oil resistant rubber	25	Blind flange	1	Steel	13	Fork	1	Steel/ Nodular cast iron
5	Cylinder base	1	Nodular cast iron	26	Spring	1	Spring steel	14	Head cover component	1	Steel
6	Piston lever	1	45+HCr	27	Nut	1	Steel	15	Limit bolt	2	Steel
7	Piston	1	Q235B	28	Screw	n	Steel	16	O-ring	1	Oil resistant

											rubber
8	Guide ring	1	Plastics					17	Indicator	1	Plastics
9	Lifting lug	1	Q235B					18	Slider pin	1	Steel

1-3. **AT Actuators**

See Figure 3 for the structural presentation of a actuator.

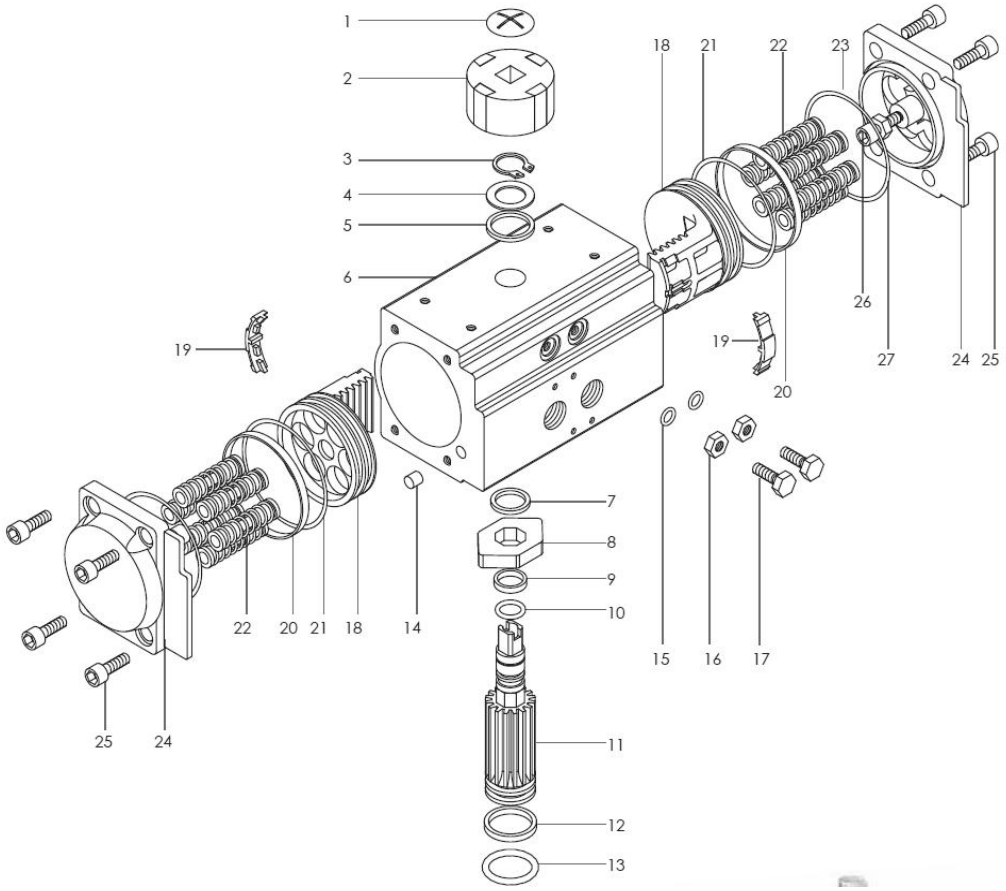
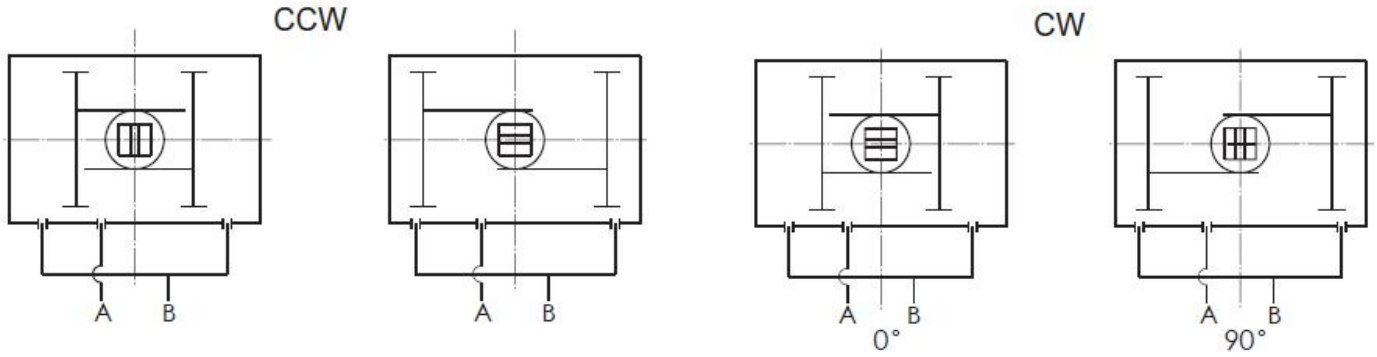


Figure 3 Structural Presentation of AT Actuator

S.N.	Name	S.N.	Name
1	Indicator screw	15	O-ring of adjustment screw
2	Indicator	16	Nut of adjustment screw
3	Jump ring	17	Adjusting bolt
4	Gasket	18	Piston
5	Outer gasket	19	Piston guide plate
6	Cylinder block	20	Piston bearing
7	Inner gasket	21	Piston O-ring
8	Cam	22	Spring
9	Upper shaft bearing	23	O-ring of end cover
10	O-ring of upper shaft	24	End cover
11	Gear shaft	25	End cover bolt
12	Lower shaft bearing	26	Limit bolt
13	O-ring of lower shaft	27	Limit bolt
14	Closure plug		

Operating Principle

Double-acting Actuators



CCW (air to open)

In case of the air inlet at Port A, the compressed air pushes the piston outward, causing the actuator output shaft to rotate counterclockwise (0°→90°), with the air outlet at Port B.

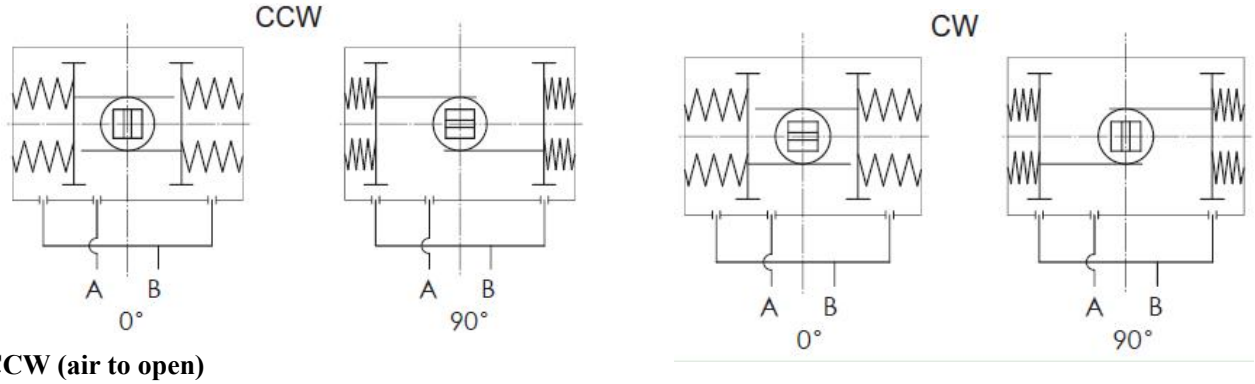
In case of the air inlet at Port B, the compressed air pushes the piston inward, causing the actuator output shaft to rotate clockwise (0°→90°), with the air outlet at Port A.

CW (air to close)

In case of the air inlet at Port A, the compressed air pushes the piston outward, causing the actuator output shaft to rotate clockwise (0°→90°), with the air outlet at Port B.

In case of the air inlet at Port B, the compressed air pushes the piston inward, causing the actuator output shaft to rotate counterclockwise (90°→0°), with the air outlet at Port A.

Single-acting Actuators



CCW (air to open)

In case of the air inlet at Port A, the compressed air overcomes the spring force to push the piston outward, causing the actuator output shaft to rotate counterclockwise (0°→90°), with the air outlet at Port B.

When the actuator loses its compressed air, the piston moves inward under the action of spring force, causing the actuator output shaft to rotate clockwise (90°→0°), with the air outlet at Port A.

CW (air to close)

With air inlet at Port A, the compressed air overcomes the spring force to push the piston outward, causing the actuator output shaft to rotate clockwise (0°→90°), with the air outlet at Port A.

When the actuator loses its compressed air, the piston moves inward under the action of spring force, causing the

actuator output shaft to rotate counterclockwise (90°→0°), with the air outlet at Port A.

1-4. VFR Eccentric Rotary Valve Body Assembly

Structure: It mainly consists of valve body, valve seat, ball core, packing, pressure plate, guide sleeve, gland, and other components, as shown in Figure 4.

Principle: The control valve directly contacts the regulated medium. The rotation of the ball core changes the throttling area between the ball core and the valve seat, and the resistance coefficient of the valve, thus realizing the regulation of fluid flow, temperature, pressure, etc.

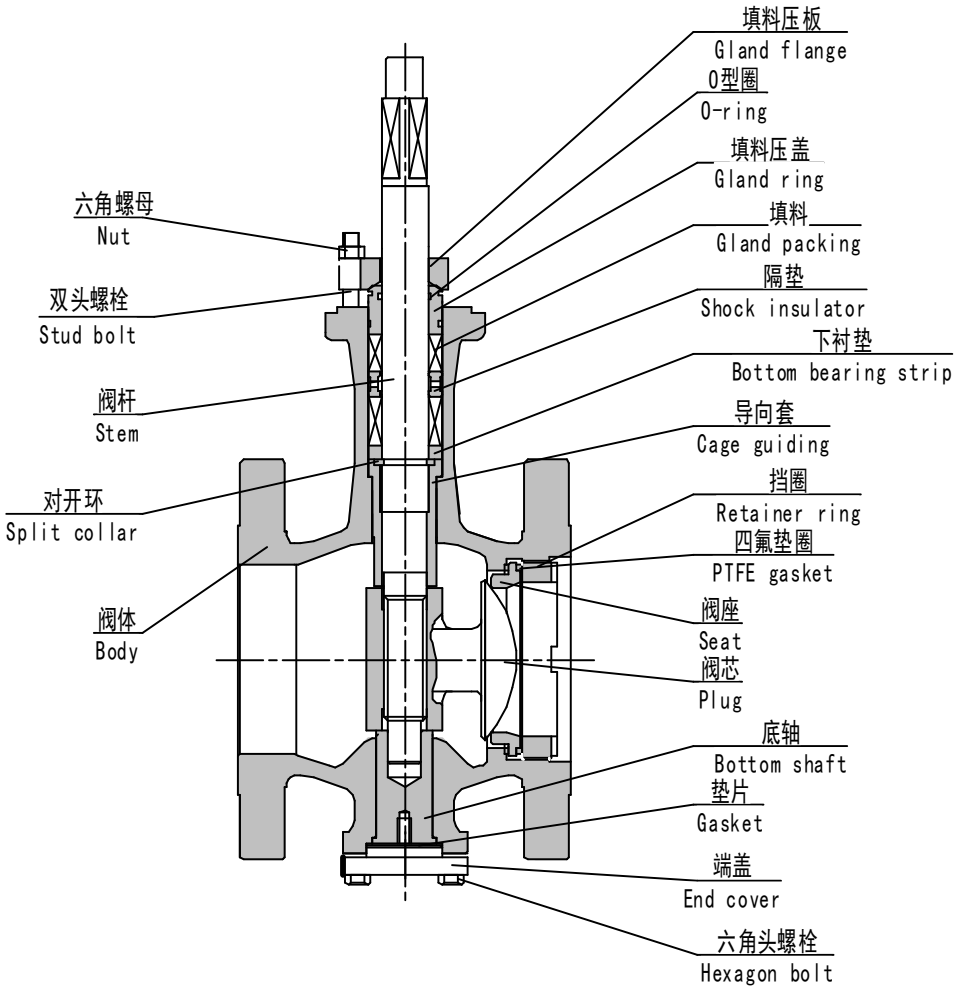
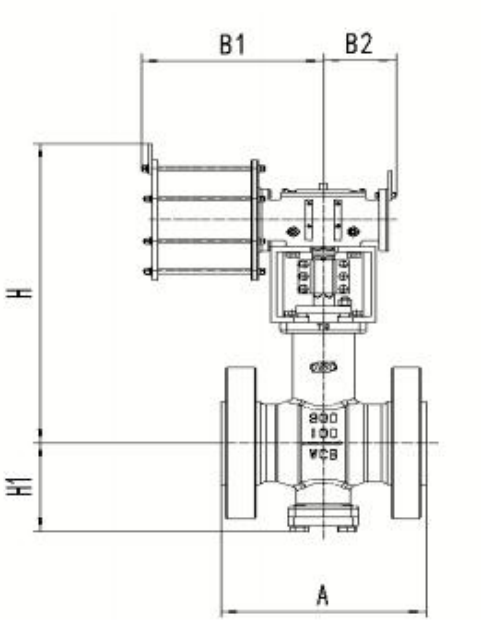


Figure 4 - Structure Presentation of VFR Valve Body Assembly

1-5. VFR Eccentric Rotary Valves



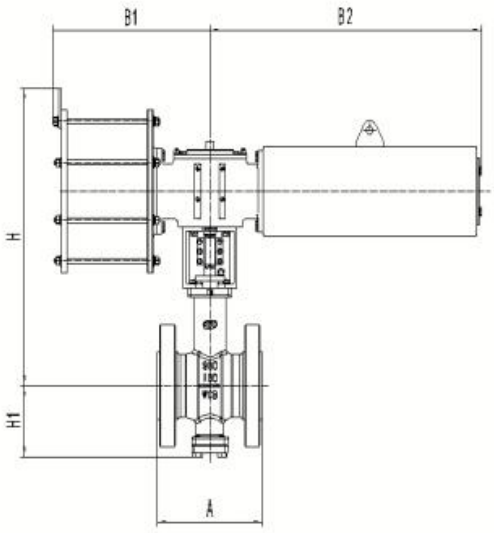


Figure 5-1 Outline Dimensions of Equipment with AW Double-acting Actuator

Figure 5-2 Outline Dimensions of Equipment with AW Single-acting Actuator

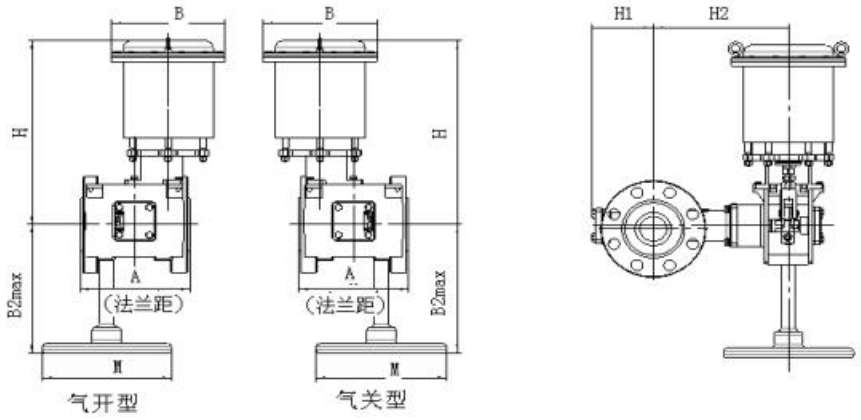
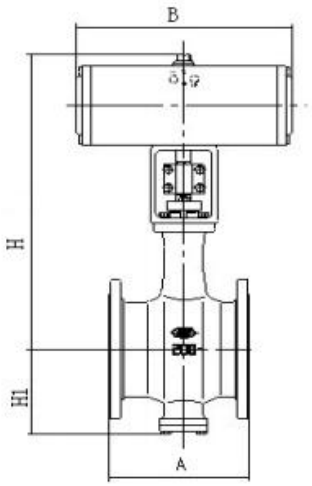


Figure 5-3 Outline Dimensions of Equipment with VR Actuator



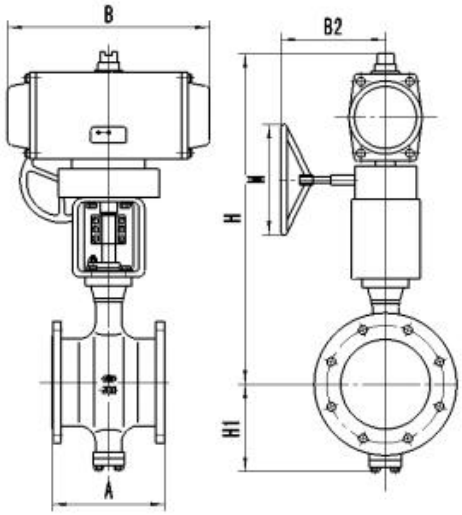
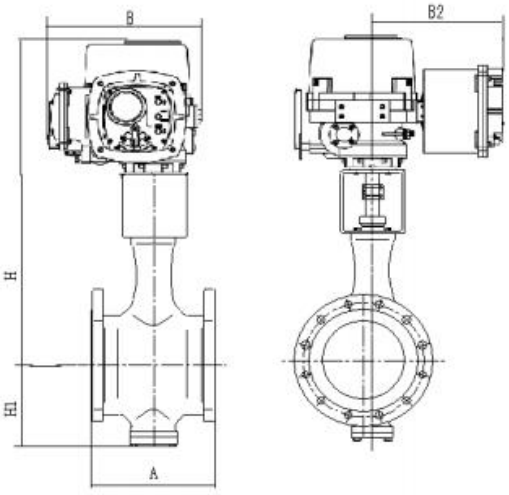


Figure 5-4 Outline Dimensions of Equipment with AT Actuator

Figure 5-5 Outline Dimensions of Equipment with AT Actuator (with Handwheel)



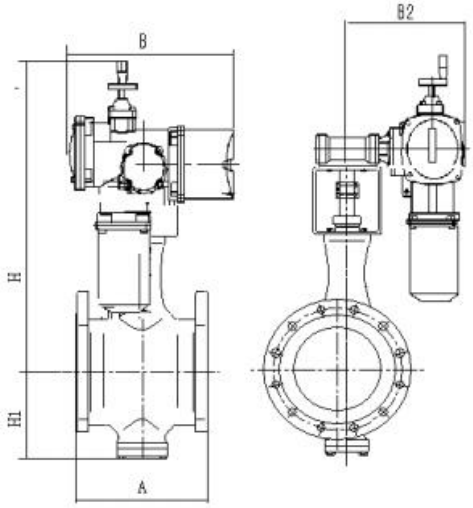


Figure 5-6 Outline Dimensions of Equipment with M Electric Actuator

Figure 5-7 Outline Dimensions of Equipment with M+A Electric Actuator

2 Technical Parameters and Performance

- Valve Body

Type: Eccentric rotary valve

Nominal diameter: 100, 125, 150, 200, 250, 300, 350, 400mm

Pressure rating: PN16, 20, 25, 40, 50, 63, 100, 110, 150, 160

End connections: RF MFM

Flange standards: JIS B2201, JB/T79.1, JB/T 79.2, ASME B16.5, HG/T 20592, HG/T 20615, GB/T 9112

Materials: See Table 1

Bonnet: Integrated with valve body: －45～+350℃

Gland type: Bolted gland

Packing: Graphite, PTFE

● **Trim**

Spool type: Eccentric rotary valve spool

Flow characteristics: See Figure 6

Seat: Compressed seat

Materials: See Table 1

Rated travel: With a VR actuator, the fully-open position is 60°, while with an AT/AW actuator, the fully-open position is 90°.

● Actuator

Model / Specification	Pneumatic Actuator						
	VR1	VR2	VR3		VR4	AT	AW
Spring range kPa	70～140	100～200	80～160	180～280	60~120	—	—
Air supply pressure kPa	220	350	350	500	350	400~700	
Air connection	NPT 1/8", NPT1/4", NPT3/8", NPT1/2", NPT3/4"						
Ambient temperature	Standard type -20 ~ +80℃ High Temp. service -15 ~ +120℃ Low Temp. service -40 ~ +80℃						
Attachments	Positioner, air-set, lock-up valve, travel switch, position transmitter, hand wheel, etc						

● **Performance:**

1) Leakage: Metal seat: compliant with IEC60534-4-2006 or ANCI FCI70-2-2013 Class IV, Class V

Soft seat: compliant with IEC60534-4-2006 or ANCI FCI70-2-2013 Class VI

2) Hysteresis Error: 2%

3) Limit of Intrinsic Error: ±2%

4) Rangeability: 100:1

Figure 6 Flow Characteristics

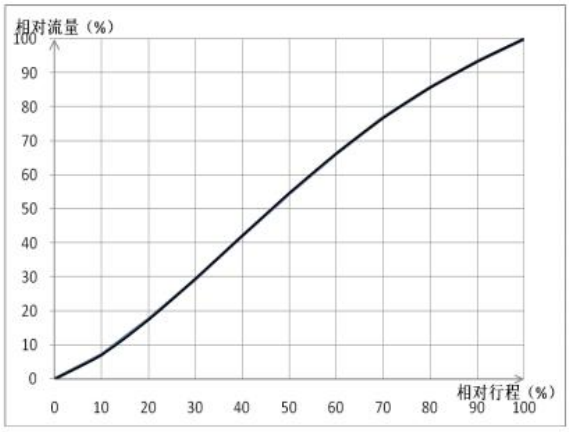


Table 1 Body/Trim Standard Material Combination

Principal part materials: WCB, WC6, LCB

·RTFE: Reinforced PTFE • HF: Hard Face

HT: Heat Treatment

Body Materials		A216-WCB, A217-WC6, A352-LCB		A351-CF8, A351-CF8M, A351-CF3M	
Ball core	Material	304/316L	304/316L	304/316L	304/316L
	Treatment	—	HF	—	HF
Stem	Material	630/S20910	630/S20910	630/S20910	630/S20910
	Treatment	HT	HT	HT	HT
Retainer ring	Material	304/316L	304/316L	304/316L	304/316L
	Treatment	—	HF	—	HF
Guide sleeve	Material	316L	316L	316L	316L
	Treatment	HF	HF	HF	HF
Seat	Material	304/316L	304/316L	304/316L	304/316L
	Treatment	RTFE	HF	RTFE	HF
Operating Temp. ℃	Body: WCB	-17～+200	-17～+350		
	Body: LCB	-45～+200	-45～+350		
	Body: WC6	-17～+200	-17～+400		
	Body: Stainless steel			-45～+200	-45～+400
Seat leakage		Compliant with IEC60534-4-2006 or ANSI FCI70-2-2013 Class VI	Less than 0.01% of the rated capacity, compliant with IEC60534-4-2006 or IEC60534-4-2006+HF Class VI	Compliant with IEC60534-4-2006 or ANSI FCI70-2-2013 Class VI	Less than 0.01% of the rated capacity, IEC60534-4-2006 or ANSI FCI70-2-2013 Class VI

3. Overall Dimensions

(1) Equipment with AW Actuators

mm

Nominal Size (mm)	Pressure Rating	Actuator	A	H2	H1	B	H	B2	M	N	Weight (kg)			
											16	40	150	300
1″(25)	PN16, 40 Class150, 300	VR1D, VR1R	102	174	68	208	220	130	128	23	25	25	25	25
1½″(40)		VR1D, VR1R	114	180	74	208	220	130	128	23	28	28	28	28
2″(50)		VR1D, VR1R	124	184	83	208	220	130	128	23	32	32	32	32
2½″(65)		VR2D, VR2R	143	268	106	315	445	220	200	35	59	59	59	62
3″(80)		VR2D, VR2R	165	280	118	315	445	220	200	35	63	65	65	68
4″(100)		VR2D, VR2R	194	283	121	315	445	220	200	35	71	73	73	80
5″(125)		VR3D, VR3R	223	365	148	315	620 (540)	340	360	93	140	145	143	153
6″(150)		VR3D, VR3R	229	377	159	315	620 (540)	340	360	93	152	152	152	167
8″(200)		VR3D, VR3R	243	404	190	315	620 (540)	340	360	93	170	182	173	192
10″(250)		VR3D, VR3R	297	461	228	315	620 (540)	340	360	93	222	250	230	260
12″(300)		VR3D, VR3R	338	481	260	315	620 (540)	340	360	93	254	290	270	310

Note: 1· Flange distance A complies with the standard PMC23.3A of the Scientific Apparatus Makers Association (SAMA).

2. In case of the dimension H in brackets, the spring range is 80 ~ 160kPa.

3. The dimensions in this table do not cover any attachments.

(2) Equipment with Cylinder Actuator (PN16~PN50; Class150,300; without hand-operated device) **mm**

Nominal Size (mm)	Actuator	H	B1	B2	B	A	H1	Weight (kg)			
								16	40	150	300
1" (25)	AT63DR0, AT63DD0	350	/	/	195	102	68	15	15	15	15
	AT75DR0, AT75DD0	360	/	/	220			15	15	15	15
	AT83SR5, AT83SD5	375	/	/	235			16	16	16	16
1½" (40)	AT63DR0, AT63DD0	356	/	/	195	114	74	18	18	18	18
	AT75DR0, AT75DD0	366	/	/	220			18	18	18	18
	AT105DR0, AT105DD0, AT105SR5, AT105SD5	406	/	/	285			22	22	22	22
	AT83SR5, AT83SD5	381	/	/	235			19	19	19	19
2" (50)	AT63DR0, AT63DD0	360	/	/	195	124	83	22	22	22	22
	AT75DR0, AT75DD0	370	/	/	220			22	22	22	22
	AT105DR0, AT105DD0, AT105SR5, AT105SD5	410	/	/	285			26	26	26	26
	AT125DR0, AT125DD0	445	/	/	350			29	29	29	29
	AT83SR5, AT83SD5	385	/	/	235			23	23	23	23
2½" (65)	AT105DR0, AT105DD0, AT105SR5, AT105SD5	468	/	/	285	143	106	30	31	30	33
	AT125DR0, AT125DD0, AT125SR5, AT125SD5	503	/	/	350			33	34	33	36
	AT140SR5, AT140SD5	523	/	/	405			38	39	38	41
	AT160DR0, AT160DD0, AT160SR5, AT160SD5	543	/	/	470			44/48	45/49	44/48	47/51
3" (80)	AT105DR0, AT105DD0	480	/	/	285	165	118	34	36	36	39
	AT125DR0, AT125DD0, AT125SR5, AT125SD5	515	/	/	350			37	39	39	41
	AT140SR5, AT140SD5	535	/	/	405			42	44	44	46
	AT160DR0, AT160DD0, AT160SR5, AT160SD5	555	/	/	470			48/52	50/54	50/54	53/57
	AT210SR5, AT210SD5	615	/	/	560			82	84	84	87
4" (100)	AT105DR0, AT105DD0	483	/	/	285	194	121	42	44	44	51
	AT125DR0, AT125DD0	518	/	/	350			45	47	47	54
	AT140SR5, AT140SD5	538	/	/	405			50	52	52	59
	AT160DR0, AT160DD0, AT160SR5, AT160SD5	558	/	/	470			56/60	58/62	58/62	65/69
	AW22D001	586	520	200	/			150	152	152	159
	AW22SR51, AW22SD51	586	520	910	/			225	227	227	234
	AT210SR5, AT210SD5	618	/	/	560			90	92	92	99
5" (125)	AT125DR0, AT125DD0	647	/	/	350	223	148	70.5	75.5	73.5	93.5
	AT160DR0, AT160DD0, AT160SR5, AT160SD5,	687	/	/	470			80	85	83	93
	AW22D001	715	520	200	/			171	176	174	184
	AW22SR51, AW22SD51	715	520	910	/			246	251	249	259
	AW27SR52, AW27SD52	772	650	950	/			336	341	339	349
	AT270SR5, AT270SD5	822	/	/	740			179	184	182	192
	AT210DR0, AT210DD0 AT210SR5, AT210SD5	747	/	/	560			106/114	111/119	109/117	119/127

(2) Equipment with Cylinder Actuator (PN16~PN50; Class150,300; without hand-operated device) (Continued)

mm

Nominal Size (mm)	Actuator	H	B1	B2	B	A	H1	Weight (kg)			
								16	40	150	300
6" (150)	AT160DR0, AT160DD0	698	/	/	470	229	159	92	92	92	108
	AW22D001	726	520	200	/			186	186	186	202
	AW22SR51, AW22SD51	726	520	910	/			261	261	261	277
	AW27D002	783	650	250	/			221	221	221	352
	AT270SR5, AT270SD5	833	/	/	740			191	191	191	207
	AW27SR52, AW27SD52	783	650	950	/			351	351	351	367
	AT210DR0, AT210DD0, AT210SR5, AT210SD5	758	/	/	560			118/126	118/126	118/126	134/142
8" (200)	AW22D001	754	520	200	/	243	190	204	216	207	214
	AW22SR51, AW22SD51	754	520	910	/			279	291	282	298
	AW27D002	811	650	250	/			239	251	242	249
	AW27SR52, AW27SD52	811	650	950	/			369	381	372	388
	AT210DR0, AT210DD0, AT210SR5, AT210SD5	786	/	/	560			135/144	147/156	138/147	145/154
	AT270DR0, AT270DD0, AT270SR5, AT270SD5	861	/	/	740			185/205	196/217	187/208	194/215
	AW40SR53, AW40SD53	956	700	1160	/			589	601	592	590
10" (250)	AT210DR0, AT210DD0	868	/	/	560	297	228	187	215	195	225
	AW22D001	836	520	200	/			252	280	260	290
	AT270DR0, AT270DD0, AT270SR5, AT270SD5	943	/	/	740			236/257	264/285	244/265	274/295
	AW27D002	892	650	250	/			287	315	295	325
	AW27SR52, AW27SD52	892	650	950	/			417	445	425	455
	AW40SR53, AW40SD53	1018	700	1160	/			637	665	645	675
12" (300)	AT210DR0, AT210DD0	888	/	/	560	338	260	225	255	234	275
	AW22D001	856	520	200	/			292	322	302	342
	AW27D002	913	650	250	/			327	352	337	377
	AW27SR52 AW27SD52	913	650	950	/			457	487	467	507
	AT270DR0, AT270DD0, AT270SR5, AT270SD5	963	/	/	740			274/297	304/327	284/307	324/347
	AW40SR53, AW40SD53	1038	700	1160	/			677	707	687	727
14" (350)	AT270DR0, AT270DD0	1070	/	/	740	400	330	336			
	AW27D002	1096	650	250	/						
	AW40SR53, AW40SD53	1165	690	1583	/						
16" (400)	AT270DR0, AT270DD0	1100	/	/	740	400	350				
	AW27D002	1126	650	250	/						
	AW40SR53 AW40SD53	1195	700	1160	/						

Note: The dimensions in this table do not cover any attachments.

(3) Equipment with Cylinder Actuator (PN16~PN50; Class150,300; with hand-operated device) **mm**

Nominal Size (mm)	Actuator+hand-operated device	H	M	B2	B	A	H1	Weight (kg)			
								16	40	150	300
1" (25)	AT63DR0+SD1, AT63DD0+SD1	460	180	140	195	102	68	18	18	18	18
	AT75DR0+SD1, AT75DD0+SD1	470	180	140	220			18	18	18	18
	AT83SR5+SD2, AT83SD5+SD2	495	200	180	235			21	21	21	21
1½" (40)	AT63DR0+SD1, AT63DD0+SD1	466	180	140	195	114	74	21	21	21	21
	AT75DR0+SD1, AT75DD0+SD1	476	180	140	220			21	21	21	21
	AT105DR0+SD3, AT105DD0+SD3, AT105SR5+SD3, AT105SD5+SD3	536	280	210	285			29	29	29	29
	AT83SR5+SD2, AT83SD5+SD2	501	200	180	235			24	24	24	24
2"(50)	AT63DR0+SD1, AT63DD0+SD1	470	180	140	195	124	83	25	25	25	25
	AT75DR0+SD1, AT75DD0+SD1	480	180	140	220			25	25	25	25
	AT105DR0+SD3, AT105DD0+SD3, AT105SR5+SD3, AT105SD5+SD3	540	280	210	285			33	33	33	33
	AT125DR0+SD3, AT125DD0+SD3	575	280	210	350			36	36	36	36
	AT83SR5+SD2, AT83SD5+SD2	505	200	180	235			28	28	28	28
2½" (65)	AT105DR0+SD3, AT105DD0+SD3	598	280	210	285	143	106	37	38	37	40
	AT125DR0+SD3, AT125DD0+SD3 AT125SR5+SD3, AT125SD5+SD3	633	280	210	350			40	41	40	43
	AT140SR5+SD4, AT140SD5+SD4	693	320	280	405			52	54	53	56
	AT160DR0+SD4, AT160DD0+SD4	713	320	280	470			59	60	59	62
	AT160SR5+SD4, AT160SD5+SD4	713	320	280	470			63	64	63	66
3"(80)	AT105DR0+SD3, AT105DD0+SD3	610	280	210	285	165	118	41	43	43	46
	AT125DR0+SD3, AT125DD0+SD3	645	280	210	350			44	46	46	48
	AT140SR4+SD4, AT140SD5+SD4	705	320	280	405			57	59	59	61
	AT160DR0+SD4, AT160DD0+SD4	725	220	280	470			63	65	65	68
	AT160SR5+SD4, AT160SD5+SD4	725	320	280	470			67	69	69	72
	AT210SR5+SD5, AT210SD5+SD5	800	400	290	560			104	106	106	109
4" (100)	AT105DR0+SD3, AT105DD0+SD3	613	280	210	285	194	121	49	51	51	58
	AT125DR0+SD3, AT125DD0+SD3	648	280	210	350			52	54	54	61
	AT140SR5+SD4, AT140SD5+SD4	708	320	280	405			65	67	67	74
	AT160DR0+SD4, AT160DD0+SD4	720	320	280	470			71	73	73	80
	AT160SR5+SD4, AT160SD5+SD4	720	320	280	470			75	77	77	84
	AT210SR5+SD5, AT210SD5+SD5	803	400	290	560			112	114	114	121
5" (125)	AT125DR0+SD3, AT125DD0+SD3	780	280	210	350	223	148	77.5	82.5	80.5	100.5
	AT160DR0+SD4, AT160DD0+SD4	857	320	280	470			95	100	98	108
	AT270DR0+SD6, AT270DD0+SD6	1022	500	330	740			209	214	212	222
	AT210SR5+SD5, AT210SD5+SD5	882	400	290	560			136	141	139	149
6" (150)	AT160DR0+SD4, AT160DD0+SD4	868	320	280	470	229	159	107	107	107	123
	AT210SR5+SD5, AT210SD5+SD5	943	400	290	560			148	148	148	164
	AT270DR0+SD6, AT270DD0+SD6	1033	500	330	740			221	221	221	237
8" (200)	AT210DR0+SD5, AT210DD0+SD5	971	400	290	560	243	190	157	169	160	167
	AT210SR5+SD5, AT210SD5+SD5	971	400	290	560			166	178	169	176
	AT270DR0+SD6, AT270DD0+SD6	1061	500	330	740			214	226	217	224
	AT270SR5+SD7, AT270SD5+SD7	1066	600	370	740			245	257	248	255
10" (250)	AT210DR0+SD5, AT210DD0+SD5	1053	400	290	560	297	228	209	237	217	247
	AT270DR0+SD6, AT270DD0+SD6	1143	500	330	740			266	294	274	304
	AT270SR5+SD7, AT270SD5+SD7	1148	600	370	740			297	325	305	335
12" (300)	AT210DR0+SD5, AT210DD0+SD5	1073	400	290	560	338	260	247	277	257	297
	AT270DR0+SD6, AT270DD0+SD6	1163	500	330	740			304	334	314	354
	AT270SR5+SD7, AT270SD5+SD7	1168	600	370	740			314	344	324	364
14" (350)	AT270DR0+SD6, AT270DD0+SD6	1470	500	330	740	400	330	394			
16" (400)	AT270DR0+SD6, AT270DD0+SD6	1500	500	330	740	400	350				

Note: The dimensions in this table do not cover any attachments.

(4) Equipment with Cylinder Actuator (Class600; PN63~PN110; without hand-operated device)

mm

Nominal Size (mm)	Actuator	H	B1	B2	B	A	H1	Weight (kg)
1"(25)	AT75DR0, AT75DD0	381	/	/	220	152	65	
	AT83DR0, AT83DD0	396	/	/	235			
	AT105SR5, AT105SD5	421	/	/	285			
1½"(40)	AT75DR0, AT75DD0	387	/	/	220	165	78	
	AT83DR0, AT83DD0	402	/	/	235			
	AT105SR5, AT105SD5	427	/	/	285			
2"(50)	AT75DR0, AT75DD0	425	/	/	220	203	110	24
	AT83DR0, AT83DD0	440	/	/	235			25
	AT105SR5, AT105SD5	465	/	/	285			
	AT125SR5, AT125SD5	485	/	/	350			31
2½"(65)	AT83DR0, AT83DD0	530	/	/	235	216	130	33
	AT125DR0, AT125DD0	575	/	/	350			39
	AT140DR0, AT140DD0, AT140SR5, AT140SD5	590	/	/	405			44
	AT160SR5, AT160SD5	620	/	/	470			50
	AT190SR5, AT190SD5	655	/	/	540			59
3"(80)	AT125DR0, AT125DD0	585	/	/	350	229	155	50
	AT140DR0, AT140DD0	600	/	/	405			56
	AT160DR0, AT160DD0	630	/	/	470			61
	AT160SR5, AT160SD5							
	AT190SR5, AT190SD5	665	/	/	540			70
	AT210SR5, AT210SD5	690	/	/	560			90
	AW22SD51, AW22SR51	823	520	910	/			
4"(100)	AT140DR0, AT140DD0	630	/	/	405	241	165	82
	AT160DR0, AT160DD0	650	/	/	470			90
	AT210DR0, AT210DD0, AT210SR5, AT210SD5	710	/	/	560			124
	AT240SR5, AT240SD5	745	/	/	620			149
	AT270SR5, AT270SD5	785	/	/	740			189
	AW27SR52, AW27SD52	895	650	950	/			
5"(125)	AT160DR0, AT160DD0	700	/	/	470	283	170	130
	AT190DR0, AT190DD0	730	/	/	540			148
	AT210DR0, AT210DD0	755	/	/	560			164
	AT240DR0, AT240DD0, AT240SR5, AT240SD5	790	/	/	620			187
	AT270SR5, AT270SD5	830	/	/	740			227
	AT300SR5, AT300SD5	855	/	/	800			243
	AW27SR52, AW27SD52	930	650	950	/			
6"(150)	AT210DR0, AT210DD0	770	/	/	560	292	181	163
	AT240DR0, AT240DD0	800	/	/	620			181
	AT270DR0, AT270DD0, AT270SR5, AT270SD5	830	/	/	740			233/256
	AW32SR53, AW32SD53	919	700	1160	/			

(4) Equipment with Cylinder Actuator (Class600; PN63~PN110; without hand-operated device) (Continued)

mm

Nominal Size (mm)	Actuator	H	B1	B2	B	A	H1	Weight (kg)
8"(200)	AT240DR0, AT240DD0	873	/	/	620	330	210	233
	AT270DR0, AT270DD0	913	/	/	740			263
	AW27D002	1056	650	250	/			
	AW30D003	1081	700	270	/			
	AT300DR0, AT300DD0, AT300SR5, AT300SD5	932	/	/	800			300
	AW40SR53, AW40SD53	1145	700	1160	/			
10"(250)	AT270DR0, AT270DD0	1020	/	/	740	356	280	359
	AW27D002	1144	650	250	/			
	AW30D003	1169	700	270	/			
	AW35D004	1199	800	320	/			
	AW40SR53, AW40SD53	1275	700	1160	/			
	AW55SR55, AW55SD55	1345	950	1600	/			
12”(300)	AT300DR0, AT300DD0	1080	/	/	800	432	350	470
	AW30D003	1370	700	270	/			
	AW35D004	1400	800	320	/			
	AW45D004	1450	800	320	/			
	AW40SR53, AW40SD53	1325	700	1160	/			
	AW60SR55, AW60SD55	1420	950	1600	/			
14”(350)	AW35D004	1460	800	320	/	508	380	
	AW45D004	1370	800	320	/			
	AW40SR53, AW40SD53	1385	700	1160	/			
	AW60SR55, AW60SD55	1480	950	1600	/			
16”(400)	AW35D004	1480	800	320	/	559	405	
	AW45D004	1370	800	320	/			
	AW40SR53, AW40SD53	1405	700	1160	/			
	AW60SR55, AW60SD55	1470	950	1600	/			

Note: The dimensions in this table do not cover any attachments.

(5) Equipment with Cylinder Actuator (Class600; PN63~PN110; with hand-operated device) **mm**

Nominal Size (mm)	Actuator+hand-operated device	H	M	B2	B	A	H1	Weight (kg)
1″(25)	AT75DR0+SD1,	491	180	160	220	152	65	
	AT75DD0+SD1							
	AT83DR0+SD2,	516	200	190	235			
	AT83DD0+SD2							
	AT105SR5+SD3,	551	280	220	285			
	AT105SD5+SD3							
1½″(40)	AT75DR0+SD1,	497	180	160	220	165	78	
	AT75DD0+SD1							
	AT83DR0+SD2,	514	200	190	235			
	AT83DD0+SD2							
	AT105SR5+SD3,	557	280	220	285			
	AT105SD5+SD3							
2″(50)	AT75DR0+SD1,	535	180	160	220	203	110	27
	AT75DD0+SD1							
	AT83DR0+SD2,	700	200	190	235			30
	AT83DD0+SD2							
	AT105SR5+SD3,	595	280	220	285			34
	AT105SD5+SD3							
	AT125SR5+SD3,	745	280	220	350			38
	AT125SD5+SD3							
2½″(65)	AT83DR0+SD2,	790	200	190	235	216	130	38
	AT83DD0+SD2							
	AT125DR0+SD3,	835	280	220	350			46
	AT125DD0+SD3							
	AT140DR0+SD4,	920	320	290	405			59
	AT140DD0+SD4							
	AT140SR5+SD4,							
	AT140SD5+SD4							
	AT160SR5+SD4,	950	320	290	470			65
	AT160SD5+SD4							
	AT190SR5+SD5,	960	400	320	540			81
	AT190SD5+SD5							
3″(80)	AT125DR0+SD3,	845	280	220	350	229	155	57
	AT125DD0+SD3							
	AT140DR0+SD4,	930	320	290	405			71
	AT140DD0+SD4							
	AT160DR0+SD4,	960	320	290	470			76
	AT160DD0+SD4,							
	AT160SR5+SD4,							
	AT160SD5+SD4							
	AT190SR5+SD5,	960	400	320	540			92
	AT190SD5+SD5							
	AT210SR5+SD5,	985	400	320	560			112
	AT210SD5+SD5							
4″(100)	AT140DR0+SD4,	960	320	290	405	241	165	97
	AT140DD0+SD4							
	AT160DR0+SD4,	980	320	290	470			105
	AT160DD0+SD4							
	AT210SR5+SD5,	1080	400	290	560			146
	AT210SD5+SD5							
	AT240SR5+SD6,	1045	500	340	620			179
	AT240SD5+SD6							
	AT270SR5+SD7,	1090	550	440	740			229
	AT270SD5+SD7							

(5) Equipment with Cylinder Actuator (Class600; PN63~PN110; with hand-operated device) (Continued)
mm

Nominal Size (mm)	Actuator+hand-operated device	H	M	B2	B	A	H1	Weight (kg)
5″(125)	AT160DR0+SD4, AT160DD0+SD4	1030	320	280	470	283	170	145
	AT190DR0+SD5, AT190DD0+SD5	1100	400	290	540			170
	AT240SR5+SD6, AT240SD5+SD6	1190	500	330	620			217
	AT270SR5+SD7, AT270SD5+SD7	1130	550	440	740			257
	AT300SR5+SD7, AT300SD5+SD7	1160	550	440	800			283
6″(150)	AT210DR0+SD5, AT210DD0+SD5	1140	400	290	560	292	181	185
	AT240DR0+SD6, AT240DD0+SD6	1200	500	330	620			211
	AT270SR5+SD7, AT270SD5+SD7	1230	600	370	740			273
8″(200)	AT240DR0+SD6, AT240DD0+SD6	1273	500	330	620	330	210	263
	AT300SR5+SD7, AT300SD5+SD7	1332	600	370	800			340
10″(250)	AT270DR0+SD6, AT270DD0+SD6	1420	500	330	740	356	280	389
12” (300)	AT300DR0+SD7, AT300DD0+SD7	1480	600	370	800	432	350	510

Note: The dimensions in this table do not cover any attachments.

(6) Equipment with Cylinder Actuator (Class900; PN150,160; without hand-operated device) **mm**

Nominal Size (mm)	Actuator	H	B1	B2	B	A Flange type	H1	Weight (kg)
2"(50)	AT83DR0, AT83DD0	440	/	/	235	216	110	36
	AT125SR5, AT125SD5	485	/	/	350			42
2½"(65)	AT83DR0, AT83DD0	530	/	/	235	229	130	48
	AT125DR0, AT125DD0	575	/	/	350			54
	AT140DR0, AT140DD0, AT140SR5, AT140SD5	590	/	/	405			62
	AT160SR5, AT160SD5	620	/	/	470			69
	AT190SR5, AT190SD5	645	/	/	540			78
3"(80)	AT125DR0, AT125DD0	585	/	/	350	241	155	61
	AT140DR0, AT140DD0	600	/	/	405			64
	AT160DR0, AT160DD0, AT160SR5, AT160SD5	630	/	/	470			76
	AT190SR5, AT190SD5	665	/	/	540			85
	AT210SR5, AT210SD5	690	/	/	560			105

	AW22SD51, AW22SR51	823	520	910	/			

(6) Equipment with Cylinder Actuator (Class900; PN150,160; without hand-operated device) (Continued)

mm

Nominal Size (mm)	Actuator	H	B1	B2	B	A Flange type	H1	Weight (kg)
4"(100)	AT140DR0, AT140DD0	630	/	/	405	305	165	100
	AT160DR0, AT160DD0	650	/	/	470			108
	AW27SR52, AW27SD52	895	650	950	/			
	AT210DR0, AT210DD0, AT210SR5, AT210SD5	710	/	/	560			142
	AT240SR5, AT240SD5	745	/	/	620			167
	AT270SR5, AT270SD5	785	/	/	740			207
5"(125)	AT160DR0, AT160DD0	700	/	/	470	356	170	150
	AT210DR0, AT210DD0	755	/	/	560			184
	AT190DR0, AT190DD0	730	/	/	540			188
	AW27SR52, AW27SD52	930	650	950	/			
	AT270SR5, AT270SD5	830	/	/	740			247
	AT300SR5, AT300SD5	855	/	/	800			263
	AT240SR5, AT240SD5	790	/	/	620			207
6"(150)	AT210DR0, AT210DD0	770	/	/	560	394	181	205
	AT240DR0, AT240DD0	800	/	/	620			223
	AT270DR0, AT270DD0, AT270SR5, AT270SD5	830	/	/	740			275
	AW32SR53, AW32SD53	919	700	1160	/			
8"(200)	AT240DR0, AT240DD0	873	/	/	620	457	227	333
	AT270DR0, AT270DD0	913	/	/	740			363
	AW27D002	1056	650	250	/			
	AW30D003	1081	700	270	/			
	AT300DR0, AT300DD0, AT300SR5, AT300SD5	932	/	/	800			400
	AW40SR53, AW40SD53	1145	700	1160	/			
10"(250)	AT270DR0, AT270DD0	1020	/	/	740	533	280	494
	AW27D002	1144	650	250	/			
	AW30D003	1169	700	270	/			
	AW35D004	1199	800	320	/			
	AW40SR53, AW40SD53	1350	700	1160	/			
	AW55SR55, AW55SD55	1345	950	1600	/			
12”(300)	AT300DR0, AT300DD0	1080	/	/	800	610	350	680
	AW30D003	1370	700	270	/			
	AW35D004	1400	800	320	/			
	AW45D004	1450	800	320	/			
	AW40SR53, AW40SD53	1325	700	1160	/			
	AW60SR55, AW60SD55	1420	950	1600	/			
14”(350)	AW35D004	1460	800	320	/	686	380	
	AW45D004	1370	800	320	/			
	AW40SR53, AW40SD53	1385	700	1160	/			
	AW60SR55, AW60SD55	1480	950	1600	/			
16”(400)	AW35D004	1480	800	320	/	762	405	
	AW40SR53, AW40SD53	1405	700	1160	/			
	AW45D004	1470	800	320	/			
	AW60SR55, AW60SD55	1584	950	1600	/			

Note: The dimensions in this table do not cover any attachments.

（7）Equipment with Cylinder Actuator (Class900; PN150,160; with hand-operated device) mm

Nominal Size (mm)	Actuator+hand-operated device	H	M	B2	B	A	H1	Weight (kg)
2"(50)	AT75DR0+SD1, AT75DD0+SD1	535	**180**	**160**	220	216	110	38
	AT83DR0+SD2, AT83DD0+SD2	700	200	190	235			41
	AT105SR5+SD3, AT105SD5+SD3	595	**280**	**220**	285			45
	AT125SR5+SD3, AT125SD5+SD3	745	280	220	350			49
2½"(65)	AT83DR0+SD2, AT83DD0+SD2	790	200	190	235	229	130	53
	AT125DR0+SD3, AT125DD0+SD3	835	280	220	350			61
	AT140DR0+SD4, AT140DD0+SD4	920	320	290	405			77
	AT140SR5+SD4, AT140SD5+SD4							
	AT160SR5+SD4, AT160SD5+SD4	950	320	290	470			84
	AT190SR5+SD5, AT190SD5+SD5	960	400	320	540			96
3"(80)	AT125DR0+SD3, AT125DD0+SD3	845	280	220	350	241	155	68
	AT140DR0+SD4, AT140DD0+SD4	930	320	290	405			79
	AT160DR0+SD4, AT160DD0+SD4, AT160SR5+SD4, AT160SD5+SD4	960	320	290	470			91
	AT190SR5+SD5, AT190SD5+SD5	960	400	320	540			107
	AT210SR5+SD5, AT210SD5+SD5	985	400	320	560			127
4"(100)	AT140DRO+SD4, AT140DDO+SD4	960	320	290	405	305	165	115
	AT160DR0+SD4, AT160DD0+SD4	980	320	290	470			123
	AT210SR5+SD5, AT210SD5+SD5	1080	400	290	560			164
	AT240SR5+SD6, AT240SD5+SD6	1045	**500**	**340**	620			197
	AT270SR5+SD7, AT270SD5+SD7	1090	**550**	**440**	740			247
5"(125)	AT160DR0+SD4, AT160DD0+SD4	1030	320	280	470	356	170	165
	AT190DR0+SD5, AT190DD0+SD5	1100	400	290	540			210
	AT240SR5+SD6, AT240SD5+SD6	1190	500	330	620			237
	AT270SR5+SD7, AT270SD5+SD7	1130	**550**	**440**	740			277
	AT300SR5+SD7, AT300SD5+SD7	1160	**550**	**440**	800			303
6"(150)	AT210DR0+SD5, AT210DD0+SD5	1140	400	290	560	394	181	227
	AT240DR0+SD6, AT240DD0+SD6	1200	500	330	620			253
	AT270SR5+SD7, AT270SD5+SD7	1230	600	370	740			315
8"(200)	AT240DR0+SD6, AT240DD0+SD6	1273	500	330	620	457	210	363
	AT300SR5+SD7, AT300SD5+SD7	1332	600	370	800			440
10"(250)	AT270DR0+SD6, AT270DD0+SD6	1420	500	330	740	533	280	524
12”(300)	AT300DR0+SD7, AT300DD0+SD7	1480	600	370	800	610	350	720

Note: The dimensions in this table do not cover any attachments.

（8）Equipment with Electric Actuator (Class150,300; PN16~50) mm

Nominal Size (mm)	Actuator	H	B2	B	A	H1	Weight (kg)				
							16	40	64	150	300
1"(25)	M0411	550	280	365	102	77	34	34	34	34	34
1½"(40)	M0411	556	280	365	114	83	37	37	71	37	37
2"(50)	M0411	560	280	365	124	87	41	41	41	41	41
2½"(65)	M0421	653	280	365	143	122	44	45	47	44	47
3"(80)	M0430	710	300	410	165	140	59	61	64	61	64
4"(100)	M0430	730	300	410	194	143	67	68	73	68	75
5"(125)	M0460	786	300	410	223	166	92	97	112	95	105
6"(150)	M8410+A8020	860	385	460	229	180	142	142	164	142	158
8"(200)	M8420+A8040	900	405	460	243	208	198	210	232	201	220
10"(250)	M8430+A8090	1041	454	492	297	248	315	348	368	328	358
12"(300)	M8430+A8090	1061	454	492	338	267	360	390	430	370	410
14"(350)	M8440+A8160	1340	684	544	400	330					
16"(400)	M8440+A8160	1340	684	544	400	350					

Note: The dimensions in this table do not cover any attachments.

（9）Equipment with Electric Actuator (Class600; PN63~110) mm

Nominal Size (mm)	Actuator	H	B2	B	A Flange type	H1	Weight (kg)
2"(50)	M0411	740	280	365	203	110	43
2½"(65)	M0421	830	280	365	216	130	51
3"(80)	M0430	900	300	410	229	155	73
4"(100)	M0430	930	300	410	241	165	102
5"(125)	M0460	980	300	410	283	170	142
6"(150)	M8410+A8020	870	385	460	292	181	185
8"(200)	M8420+A8040	900	405	460	330	210	236
10"(250)	M8430+A8090	1060	454	492	356	280	445
12"(300)	M8430+A8090	1120	454	492	432	350	545
14"(350)	M8440+A8160	1280	684	544	508	380	
16"(400)	M8440+A8160	1280	684	544	559	405	

Note: The dimensions in this table do not cover any attachments.

（10）Equipment with Electric Actuator (Class900; PN150,160) mm

Nominal Size Inch(mm)	Actuator	H	B2	B	A Flange type	H1	Weight (kg)
2"(50)	M0411	740	280	365	216	110	54
2½"(65)	M0421	830	280	365	229	130	66
3"(80)	M0430	900	300	410	241	155	84
4"(100)	M0430	930	300	410	305	165	120
5"(125)	M0460	980	300	410	356	170	162
6"(150)	M8410+A8020	870	385	460	394	181	225
8"(200)	M8420+A8040	900	405	460	457	227	375
10"(250)	M8430+A8090	1060	454	492	533	280	580
12"(300)	M8430+A8090	1120	454	492	610	350	750
14"(350)	M8440+A8160	1280	684	544	686	380	
16"(400)	M8440+A8160	1280	684	544	762	405	

Note: The dimensions in this table do not cover any attachments.

4. Acceptance Inspection, Handling and Custody

4-1. Acceptance Inspection and Handling

> ⚠ Warning
>
> Due to the heavy weight of control valves, attention must be paid to the following points during handling. Failure to do so may cause significant harm to personal safety.
>
> ● Use lifting equipment that complies with labor safety and health regulations for loading, unloading, and handling. Avoid standing or operating lifting equipment under suspended objects.
>
> ● For small-sized products packaged in corrugated cardboard boxes, the boxes may have reduction

(1) Control valves must be kept in its original packaging until installation on pipelines.

(2) Storage in the following locations is not allowed:

(a) Places exposed to rainwater.

(b) Places with temperatures exceeding 60°C.

(c) Places exposed to excessive dust.

(d) Places with humidity exceeding the allowable limits.

(3) If the packaging is opened for performance inspection during acceptance inspection, it must be repackaged until installation begins.

(4) Do not remove the plugs and covers of air piping interfaces and electrical wiring interfaces before starting the air piping and electrical wiring work.

(5) In cases where the period of custody is over one year, packing materials tend to harden and age. Therefore, please open the package, loosen the hex nut that tightens the packing materials by two turns, and store it in this state. With respect to its use, please tighten the hex nut and apply air pressure or water pressure equivalent to the operating fluid pressure from the pipe flange connection to check for any leakage in the packing area. If there is any leakage, please replace with new packing materials. Please follow the instructions for disassembly and assembly when replacing.

(6) For cases where a control valve is to be stored after use, please follow the instructions below:

（a） Carefully clean the inside of the control valve with water and dry it.

（b） Do not damage the sealing surface of the pipe flange connection.

（c） Apply anti-rust treatment to areas prone to rusting.

（d） Apply waterproof treatment to the air pipe connection and electrical wiring interface.

5. Unpacking

> ⚠ Warning
>
> ● For purpose of removing and lifting the control valve from the packaging box, please use standardized slings suitable for the weight of the control valve to avoid damage.

⚠ Caution

After unpacking, please note the following to prevent damage to the control valve:

- Do not damage the sealing surface or welding groove of the pipe flange connection to avoid leakage of the sealing surface.
- In the case that any attachments such as positioners, accelerators, solenoid valves, and

6. Installation

6-1. Safety Precautions

⚠ Warning

Due to the heavy weight of control valves, attention must be paid to the following points to avoid causing significant personal injuries due to improper operation:

- Use appropriate lifting equipment that meets the requirements of labor safety and health laws

⚠ Caution

To maintain the performance of control valves, attention should be paid to the following items.

- Do not damage the sealing surface or welding groove of the pipe flange connection to avoid leakage of the sealing surface.
- For purpose of removing and lifting the control valve from the packaging box, please comply with the above-mentioned warnings and precautions, and use standardized lifting straps suitable for the weight of the control valve to prevent damages.
- Please thoroughly clean the inside of the pipes and remove debris, welding slags and water rust before installing the control valve. Any residual foreign objects will cause leakage between the valve spool and the valve seat. In addition, if these foreign matters enter the guiding part of the valve spool, it will cause malfunctions.
- Do not remove the plugs and covers of air piping interfaces and electrical wiring interfaces after the installation of the control valve and piping and before starting the air piping and electrical wiring work.
- For purpose if installing the control valve onto the pipeline, please do not subject it to severe impacts such as collisions or drops. Otherwise, it will cause malfunctions and require recalibration.

Note: As considers are not taken into the above-mentioned ambient temperature range due to radiation and direct

sunlight and other factors, please take protective measures such as installing appropriate sunshades and heat insulation materials.

6-2. Maintenance Space and Equipment

Necessary space should be reserved above control valves for replacing actuators and inspecting valve trims.

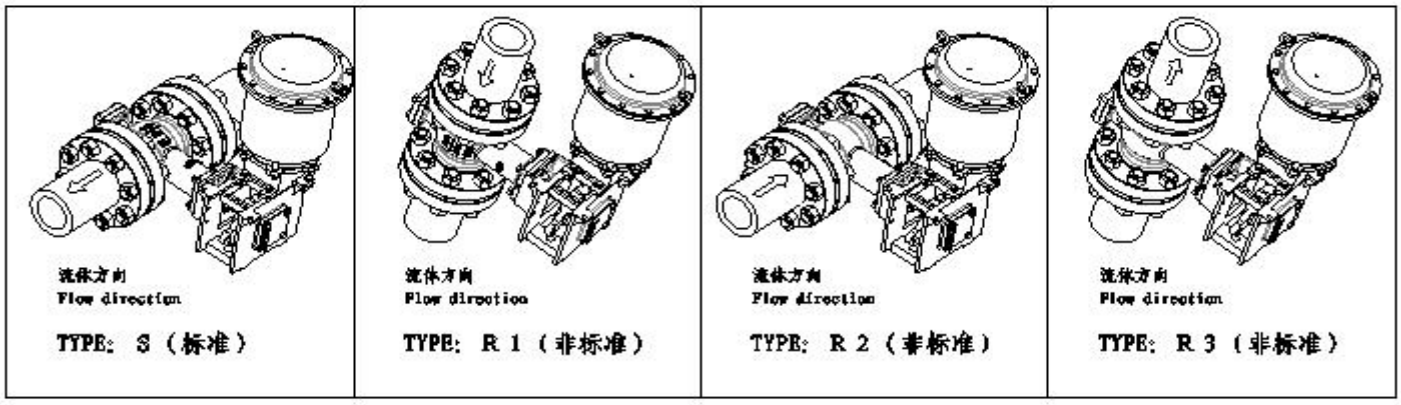
6-3. Piping and Wiring Engineering

⚠ Caution

To maintain the performance of control valves, attention should be paid to the following items.

- For the air supply piping of instruments such as positioners and accelerators, please select a sufficient piping diameter to ensure the air supply pressure. The air supply quality must meet the requirements in the instructions of attached parts to avoid the blockage of internal air passages of attached parts.
- Positioners, accelerators, solenoid valves, etc. installed according to user requirements are factory-assembled with actuators. Please be careful not to damage them.
- When control valves are equipped with attachments, piping and wiring should be performed according to respective installation instructions of each attachment.

6-4. Installation Form of VR Actuators



Note: 1. As shown in the figure, the VR actuator can only be installed vertically;

2. The combination of VFR valve and VR actuator is limited to the above four installation forms, and other forms are prohibited.

3. The first standard type is selected for default installation upon delivery. If it is a non-standard installation in the last three forms, please note in the order.

7. Start-up Preparation and Start-up

7-1. Start-up Preparation

> ⚠ Caution
>
> - If the control valve actuator is equipped with any attachments, please do not prepare for start-up in rainy or wet environments, as this may cause electric leakage or performance degradation.
> - Before the power supply is connected to an attachment that requires power, please confirm that the power supply voltage matches the voltage indicated on the attachment nameplate.
> - The operating source of an actuator is dry and clean air, and the air supply pressure cannot exceed the range

7-2. Start-up

> ⚠ Caution
>
> ● Tighten the covers on the attachments and wiring terminal boxes during during a start-up. Prevent electric leakage, malfunctions of any attachments, and electric shock accidents caused by the ingress of rainwater or

（1） Manual Operation

Please manually operate the valve's on-off in the absence of an air supply (for valves with hand-operated devices).

> ⚠ Caution
>
> In case of a manual operation, it is not necessary to continue to apply force when the mechanical stop position is reached, as this may damage the entire manual operating mechanism.

8. Daily Inspection and Regular Inspection

8-1 Daily Inspection

Please carry out daily inspections over control valves that play an important role in the production process according to the following items.

- To prevent malfunctions, please check for air leakages at the air supply connections.
- Please check for leakages at the packing and gaskets. If there is fluid leakage, please check the valve stem for damage or seizing. If there are no abnormalities, tighten the packing while confirming the operating state.
- Confirm if there are any abnormal sounds during action and whether the control valve and piping are vibrating.

8-2 Regular Inspection

All control valves should undergo all items of the above daily inspection once every six months.

If it is unable to handle any abnormalities found during daily inspection and regular inspection, disassembly and maintenance can be performed during shutdown or contact the sales department of Chongqing Chuanyi Control Valve Co., Ltd.

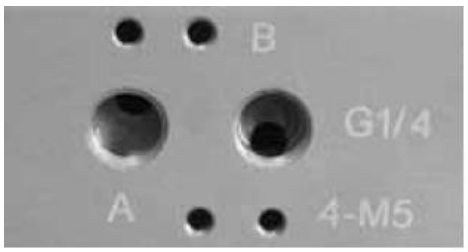
9. Fault Phenomena, Causes, and Solutions

Fault Status	Main Causes	Fault Elimination
No action or slow action by the valve	1） Low air supply pressure 2） Blocked or leaking air piping 3） Substances sticked on the valve spool's guide component, bent or broken valve stem 4） Abnormal attachments: positioner, solenoid valve, etc.	1） Supply the specified air pressure 2） Clean, reinforce the connection parts, and re-arrange the piping 3） Clean and replace parts 4） Apply the specified air pressure to the actuator's air supply port without connecting attachments. Adjust the positioner or inspect and replace other attachments, if there are no abnormalities,
Unstable operation	1） Low actuator rigidity, and insufficient thrust due to changes in medium pressure. 2） Changes in the positioner signal 3） Changes in air supply pressure 4） Faulty in pressure reducing valve	1） Replace the actuator with larger rigidity. 2） Adjust various settings of the positioner, and inspect the signal system. 3） Confirm or replace the piping diameter of air supply pipeline 4) Repair or replace the pressure reducing valve
Large leakage of the valve	1） Corrosion on or damage to the sealing surfaces between the valve spool and valve seat, and between the valve seat and valve body 2） Great differential pressure of the medium, and the insufficient output force of the actuator 3） Foreign matters in the valve body 4） Insufficient total stroke	1） Inspect, repair, or replace parts 2） Install a positioner or replace the actuator 3) Remove foreign matters 4） Adjust the total stroke

Packing	1) Packing gland not tightly pressed 2) Aged, deteriorated, or distorted tetrafluoroethylene packing 3) Worn sealing surface of the valve stem	1) Tighten the packing 2) Replace the packing 3) Replace the valve stem
Leakage at the connection	1) Loose nut 2) Damaged sealing gasket 3) Corroded or damaged sealing surface of other parts in contact with the gasket	1) Tighten the nut 2) Replace the spacer 3) Repair or replace related parts

10. Disassembly and Assembly

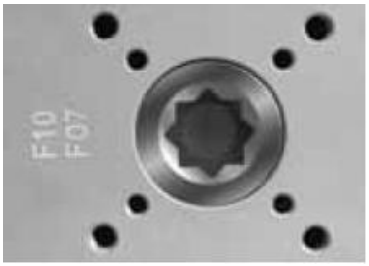
10-1. Assembly of AT Actuators



The air supply interface conforms to NAI
.



The NAMUR standard slot of the output sh
limit switches and positioners to be directly
.



The design of the bottom mounting hole conforms to ISO 5211 and DIN3337 standards, allowing direct installation of

n the u

10-2. If users need to disassemble the equipment on-site, please do so under the guidance of our maintenance or technical personnel to avoid affecting the performance of the actuator and causing safety accidents.

11. Suggestions on Disposal of Abandoned Valves

⚠ Caution

● The term "abandoned valves" refers to valves that have been abandoned as fixed assets according to relevant regulations and are no longer in production.

● After abandonment, parts contaminated by the media should be disposed of by qualified professional institutions.

1. After planned shutdown, the identification and evaluation of safety and environmental factors shall be performed on abandoned valves, and corresponding countermeasures shall be formulated for thorough technological processing. Sampling analysis should be conducted to ensure that no residual materials are present inside, achieving a state of safe shutdown and controlled pollution.

2. During the technological processing of abandoned valves, the venting, depressurization, replacement, and blowdown operations should be strictly executed according to the emptying and replacement plan. The discharged "three wastes" must be disposed of in accordance with relevant regulations to ensure that wastewater and waste gas are discharged within standard limits. It is prohibited to discharge any type of wastewater or wastes into open ditches or rainwater drainage systems. Waste residues should be sent to locations designated by the environmental protection department. Noise elimination and insulation facilities should be installed during the blowdown process to ensure that the noise does not disturb residents or cause pollution to the surrounding environment.

3. Abandoned Valves. In connection with washing and cleaning operation, a detailed cleaning plan should be formulated to clarify the types, toxicity, hazards, and control measures of substances discharged during the cleaning process. The cleaning wastewater must be treated and analyzed to ensure it meets discharge requirements before being discharged or further processed.

4. Valves that have been applied for asset abandonment should be stored, dismantled, or disposed of as waste materials. They should not be put back into production, leased, or transferred.

12. Order Instructions

Please specify in orders:

1. Product model
2. Nominal diameter × seat diameter
3. Pressure rating and flange connection type
4. Materials of valve body and trim components
5. Bonnet type
6. Flow characteristic
7. Actuator model, air supply pressure
8. Valve action type
9. Attachments (positioner, handwheel mechanism, pressure reducing valve)
10. Special requirements such as oil-free, copper-free, etc.
11. Medium name, temperature, and specific gravity
12. Whether the medium viscosity contains a suspension
13. Spare parts

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Chongqing Chuanyi Control Valve Co., Ltd.

Business contact: Sales Department

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