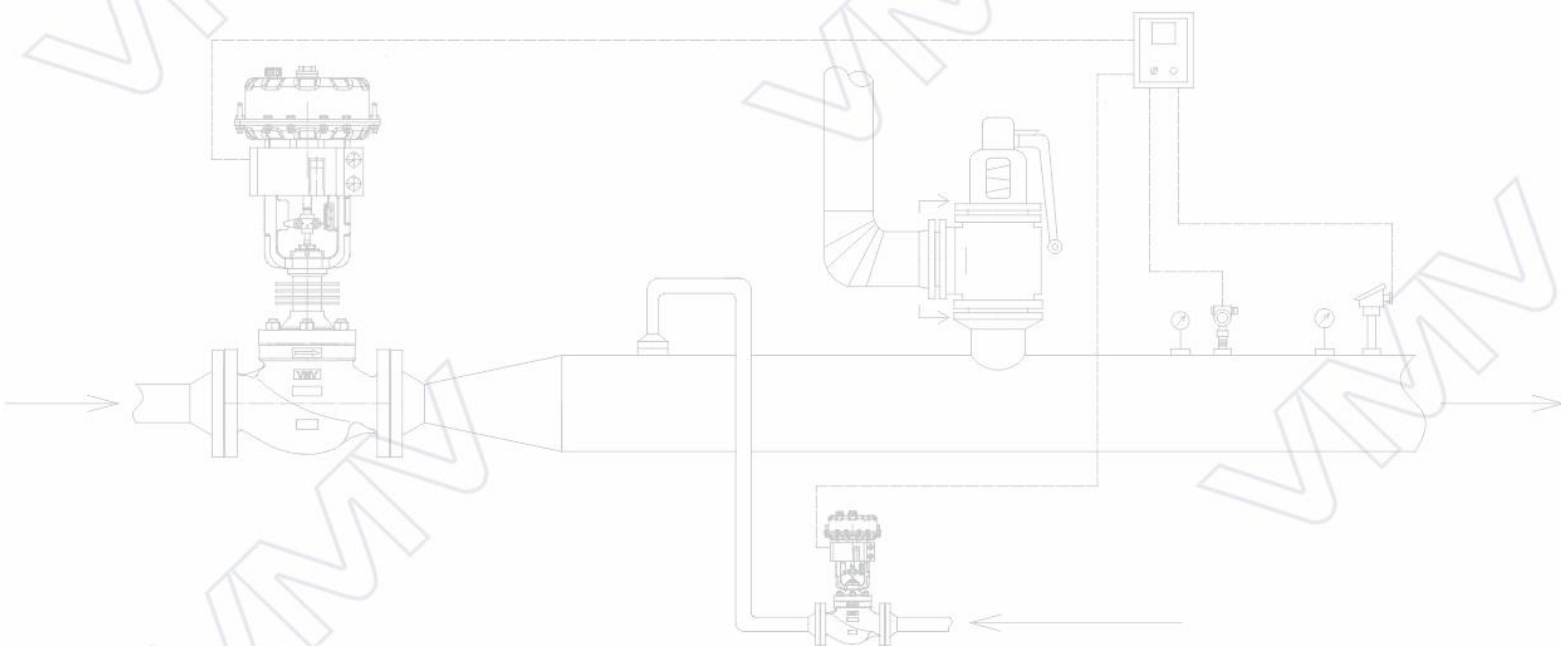




CONTROL VALVES SERIES

V9000 Series Bellows Control Valve



V9000 SERIES BELLOWS CONTROL VALVE



V9000 SERIES BELLOWS CONTROL VALVE

1. Product Introduction

VMV V9000 series GLOBE straight-stroke bellows control valve is developed by Newton's professional R&D team. In view of the conventional control valve, packing is easy to wear, leak externally, poor adjustment regulating, bellows seal is not durable and other phenomena, VMV has collected much operational condition information and researched technically for the above phenomenon. Many tests have proved that the V9000 series can fully meet the users' needs, especially applied in the petrochemical industry and high requirements for fresh air and other special conditions.

2. Product advantage

- Long-term operation, maintenance-free to keep working
- Zero leakage of valve stem during long operation cycles
- Bellows' operational service life >500,000 times
- High regulating precision
- Fast response speed
- Convenient and quick on-site valve maintenance
- Wide temperature range (-196°C~588°C)

VMV equipped with either pneumatic diaphragm actuator or electric actuator according to the user's on-site energy

3. Technical parameters

Nominal diameter	DN15(NPS1/2) ~ DN300
Pressure rating	PN16 ~ PN420、Class150 ~ Class2500
Operating voltage (electric actuator)	220VAC, 380VAC, 24VDC
Air supply pressure (pneumatic actuator)	0.4 ~ 0.6MPa
Operating temperature	-45 ~ 588 °C
Packing	V-type combination packing(≤300°C) Graphite combination packing(>300°C)

4. Performance

Rated Cv value	See table below
Flow characteristic	Equal percentage, linear, quick opening
Regulating	50:1
Leakage level	IV (metal hard seal) V (metal hard seal) VI (soft seal)
Hysteresis	<1%
Dead zone	<0.8%
Allowable differential pressure	See table below

V9000 SERIES BELLOWS CONTROL VALVE

5. Structure and Characteristics

5.1 Single-seat control valve

Bellows anti-rotation Structure

The keyway on the valve stem is matched with the pin of the bellows sleeve. Forcing the bellows to move along the axis to prevent damage and increase the service life of the bellows.

Bellows failure detection structure

A pressure gauge or pressure sensor can be connected to the detection port on the valve bonnet for real-time monitoring of bellows leakage.

Single bonnet structure

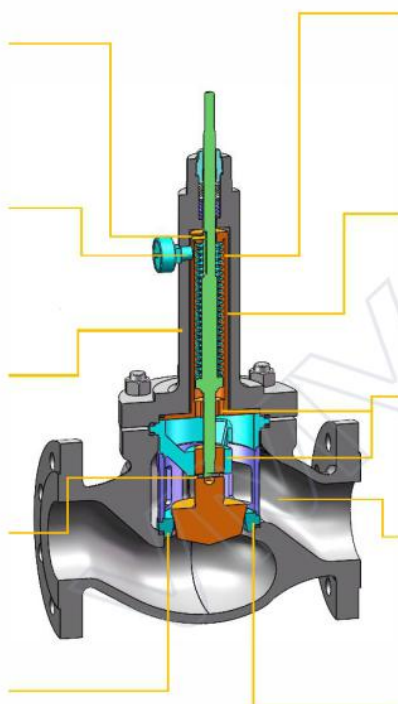
Lower external leakage risk.

Thread + Pin Connection Structure

The plug and stem are closely connected, and there is no relative moving gap. Effectively prevent stem fatigue and fracture caused by the relative swing of the plug and stem.

Sealing gasket quantitative compression structure

Prevent the gasket from being overly compressed to achieve durable sealing without leakage.



Bellows external pressure bearing structure

Provide stable pressure load for bellows, reduce movement and increase the maximum allowable stress, thus improving the bellows service life and valve operation accuracy.

Bellows structure with protective armor

Protects the bellows during handling, installation, and operation. Without bonnet parts, more convenient and fast to replace.

Double-guided valve plug structure

The valve core operates smoothly, not prone to vibration and sticking, ensuring higher regulating precision.

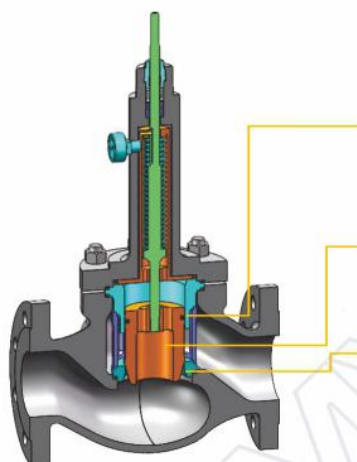
Bellows and flow channel separation structure

Prevent the medium from directly impacting the bellows, improve the service life of the bellows.

Up-pressure valve seat structure

By loosening the valve bonnet bolts, the internal components of the valve can be removed one by one, allowing for quick maintenance and replacement of the valve seat and internal components on-site, thus saving the user's maintenance time.

5.2 Balanced Single-Seat Bellows Control Valve



Wear-resistant piston ring seal structure

The wear-resistant piston ring still has self-lubricating at temperatures above 200°C, making the valve not easy to stretch and stick during the long period regulating process, maintaining a seal class above level IV.

Balanced single-seat structure

Low thrust overcomes the large pressure difference, has better performance of overcoming differential pressure.

Spherical valve plug structure

The throttling orifice is uniformly distributed on the surface of the valve core, allowing the medium to flow smoothly and stably, thus has higher regulating precision.

6. Common material and temperature range of V9000 Series

6.1 Common valve trim materials

Body	Seat	plug	Stem	Bellows	Packing
JS1249	420+HT	420+HT	410	304	PTFE
WCB	304+STL	304+STL	630	316	Flexible graphite
LCB	304	304	XM-19	HC276	
WC6	316L+STL	316L+STL	304	316Ti	
WC9	321+STL	321+STL	316L		
CF8	304+RPTFE	304+RPTFE	HC276		
CF3	316L+RPTFE	316L+RPTFE			
CF8M	F11+Q.STL	F11+Q.STL			
CF3M	HC276	HC276			
HC276					

6.2 Temperature and pressure corresponding range of valve body material(MPa)

Temp°C	Class150					Class300					Class600				
	WCB	WC6	WC9	CF8	CF8M	WCB	WC6	WC9	CF8	CF8M	WCB	WC6	WC9	CF8	CF8M
-196~-30	-	-	-	1.90	1.90	-	-	-	4.96	4.96	-	-	-	9.93	9.93
-29~38	1.96	1.98	1.98	1.90	1.90	5.11	5.17	5.17	4.96	4.96	10.21	10.34	10.34	9.93	9.93
50	1.92	1.95	1.95	1.83	1.84	5.01	5.17	5.17	4.78	4.81	10.2	10.34	10.34	9.56	9.62
100	1.77	1.77	1.77	1.57	1.62	4.66	5.15	5.15	4.09	4.22	9.32	10.3	10.3	8.17	8.44
150	1.58	1.58	1.58	1.42	1.48	4.51	4.97	5.03	3.7	3.85	9.02	9.95	10.03	7.4	7.7
200	1.38	1.38	1.38	1.32	1.37	4.38	4.80	4.86	3.45	3.57	8.76	9.59	9.72	6.9	7.13
250	1.21	1.21	1.21	1.21	1.21	4.19	4.63	4.63	3.25	3.34	8.39	9.27	9.27	6.5	6.68
300	1.02	1.02	1.02	1.02	1.02	3.98	4.29	4.29	3.09	3.16	7.96	8.57	8.57	6.18	6.32
325	0.93	0.93	0.93	0.93	0.93	3.87	4.14	4.14	3.02	3.09	7.74	8.26	8.26	6.04	6.18
350	0.84	0.84	0.84	0.84	0.84	3.76	4.03	4.03	2.96	3.03	7.51	8.04	8.04	5.93	6.07
375	0.74	0.74	0.74	0.74	0.74	3.64	3.89	3.89	2.9	2.99	7.27	7.76	7.76	5.81	5.98
400	0.65	0.65	0.65	0.65	0.65	3.47	3.65	3.65	2.84	2.94	6.94	7.33	7.33	5.69	5.89
425	0.55	0.55	0.55	0.55	0.55	2.88	3.52	3.52	2.8	2.91	5.75	7.00	7.00	5.6	5.83
450	-	0.46	0.46	0.46	0.46	-	3.37	3.37	2.74	2.88	-	6.77	6.77	5.48	5.77
475	-	0.37	0.37	0.37	0.37	-	3.17	3.17	2.69	2.87	-	6.34	6.34	5.39	5.73
500	-	0.28	0.28	0.28	0.28	-	2.57	2.82	2.65	2.82	-	5.15	5.65	5.3	5.65
538	-	0.14	0.14	0.14	0.14	-	1.49	1.84	2.44	2.52	-	2.98	3.69	4.89	5.00
550	-	-	-	-	-	-	1.27	1.56	-	-	-	2.54	3.13	-	-
575	-	-	-	-	-	-	0.88	1.05	-	-	-	1.76	2.11	-	-
600	-	-	-	-	-	-	0.61	0.69	-	-	-	1.22	1.38	-	-

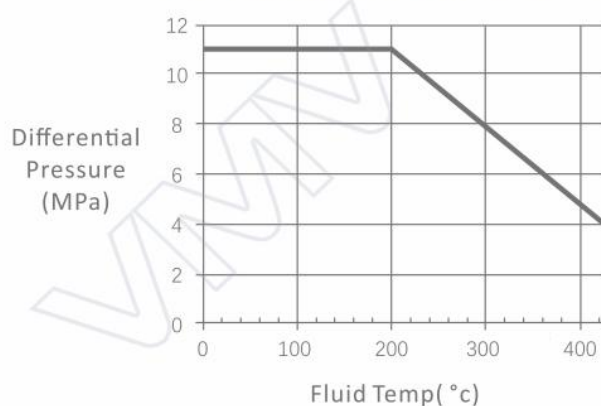
V9000 SERIES BELLOWS CONTROL VALVE

Temp°C	PN16					PN25					PN40				
	WCB	WC6	WC9	CF8	CF8M	WCB	WC6	WC9	CF8	CF8M	WCB	WC6	WC9	CF8	CF8M
-196~-30	-	-	-	1.57	1.57	-	-	-	2.45	2.45	-	-	-	3.92	3.92
-29~38	1.61	1.63	1.63	1.57	1.57	2.52	2.55	2.55	2.45	2.45	4.03	4.08	4.08	3.92	3.92
50	1.58	1.63	1.63	1.51	1.52	2.47	2.55	2.55	2.36	2.37	3.95	4.08	4.08	3.78	3.8
100	1.46	1.63	1.63	1.29	1.33	2.29	2.54	2.54	2.02	2.08	3.66	4.06	4.07	3.23	3.33
150	1.43	1.57	1.58	1.17	1.22	2.23	2.45	2.48	1.83	1.90	3.57	3.93	3.96	2.93	3.04
200	1.38	1.51	1.54	1.09	1.13	2.16	2.37	2.41	1.70	1.76	3.46	3.79	3.85	2.72	2.82
250	1.32	1.46	1.46	1.03	1.05	2.06	2.28	2.29	1.60	1.65	3.29	3.64	3.66	2.56	2.63
300	1.22	1.35	1.35	0.97	1.00	1.91	2.11	2.11	1.51	1.56	3.06	3.38	3.38	2.42	2.50
350	1.17	1.27	1.27	0.93	0.96	1.82	1.98	1.98	1.46	1.5	2.90	3.18	3.18	2.33	2.40
375	1.15	1.23	1.23	0.92	0.94	1.80	1.91	1.91	1.44	1.47	2.88	3.06	3.06	2.30	2.36
400	1.09	1.15	1.15	0.90	0.93	1.70	1.80	1.80	1.41	1.45	2.72	2.89	2.89	2.26	2.32
425	0.91	1.11	1.11	0.88	0.92	1.42	1.73	1.73	1.37	1.44	2.27	2.77	2.77	2.20	2.30
450	-	1.07	1.07	0.86	0.91	-	1.67	1.67	1.35	1.42	-	2.67	2.67	2.16	2.28
475	-	1.00	1.00	0.85	0.91	-	1.56	1.56	1.33	1.41	-	2.50	2.50	2.13	2.26
500	-	0.80	0.88	0.84	0.86	-	1.24	1.37	1.31	1.35	-	1.99	2.19	2.09	2.16
525	-	0.57	0.68	0.76	0.80	-	0.90	1.07	1.19	1.25	-	1.43	1.71	1.90	2.00
550	-	0.40	0.49	0.69	0.76	-	0.63	0.76	1.07	1.18	-	1.00	1.21	1.72	1.89
575	-	0.28	0.33	0.63	-	-	0.43	0.52	0.99	-	-	0.69	0.83	1.58	-
600	-	0.19	0.22	0.53	-	-	0.30	0.31	0.83	-	-	0.48	0.51	1.32	-

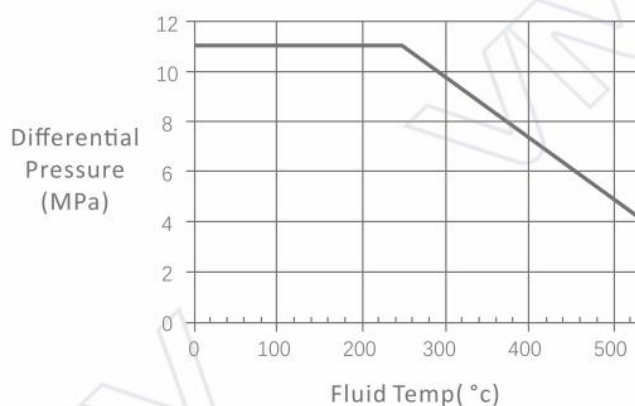
Temp°C	PN63					PN100				
	WCB	WC6	WC9	CF8	CF8M	WCB	WC6	WC9	CF8	CF8M
-196~-30	-	-	-	6.17	6.17	-	-	-	9.8	9.8
-29~38	6.35	6.43	6.43	6.17	6.17	10.08	10.21	10.21	9.8	9.8
50	6.22	6.43	6.43	5.95	5.98	9.88	10.21	10.21	9.44	9.5
100	5.77	6.4	6.41	5.08	5.25	9.15	10.16	10.17	8.07	8.33
150	5.62	6.19	6.24	4.62	4.79	8.92	9.82	9.9	7.34	7.6
200	5.45	5.96	6.06	4.29	4.43	8.65	9.47	9.63	6.81	7.04
250	5.19	5.74	5.76	4.04	4.15	8.23	9.11	9.14	6.41	6.59
300	4.81	5.33	5.33	3.81	3.93	7.64	8.46	8.16	6.05	6.24
350	4.59	5.00	5.00	3.67	3.79	7.29	7.94	7.94	5.83	6.01
375	4.53	4.82	4.82	3.63	3.72	7.2	7.66	7.66	5.76	5.90
400	4.29	4.55	4.55	3.56	3.66	6.81	7.22	7.22	5.64	5.81
425	3.57	4.36	4.36	3.46	3.62	5.67	6.92	6.92	5.50	5.75
450	-	4.20	4.20	3.40	3.59	-	6.67	6.67	5.40	5.69
475	-	3.94	3.94	3.35	3.56	-	6.25	6.25	5.32	5.66
500	-	3.14	3.46	3.29	3.40	-	4.98	5.49	5.23	5.40
525	-	2.26	2.69	2.99	3.14	-	3.58	4.28	4.75	4.99
550	-	1.58	1.91	2.70	2.97	-	2.51	3.03	4.29	4.72
575	-	1.09	1.31	2.50	-	-	1.74	2.08	3.96	-
600	-	0.75	0.86	2.08	-	-	1.19	1.36	3.31	-

6.3 The valve trim material corresponds to the temperature and pressure range

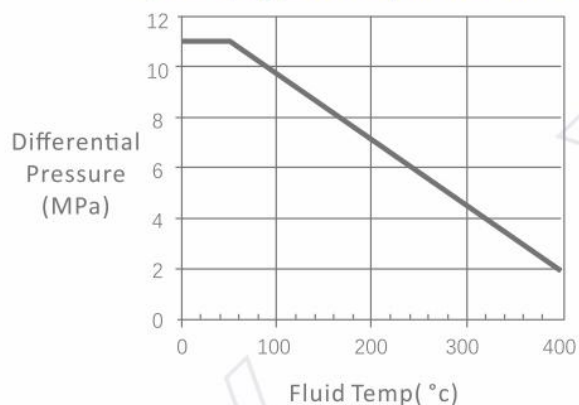
① Valve plug (valve seat) material: 420+HT



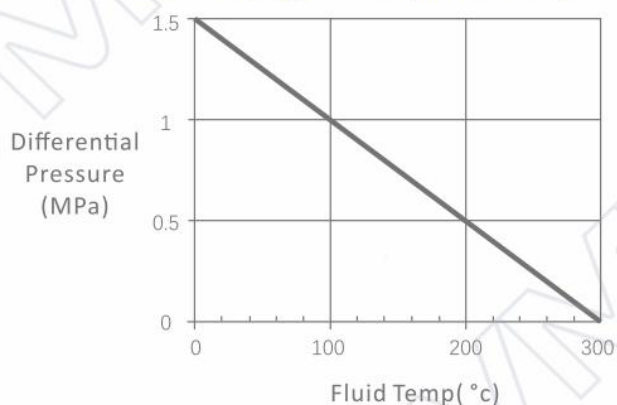
② Valve plug (valve seat) material: F11+Q.STL



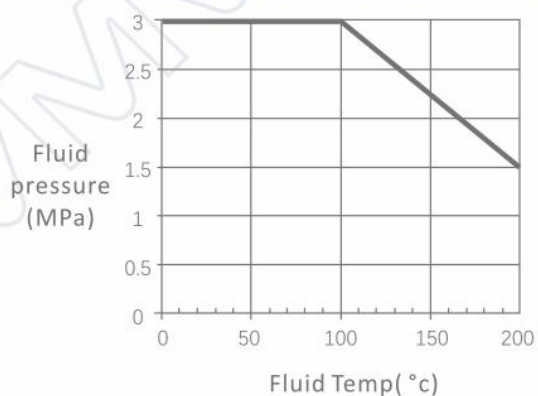
③ Valve plug (valve seat) material: 304+STL/316L+STL



④ Valve plug (valve seat) material: 304/316L

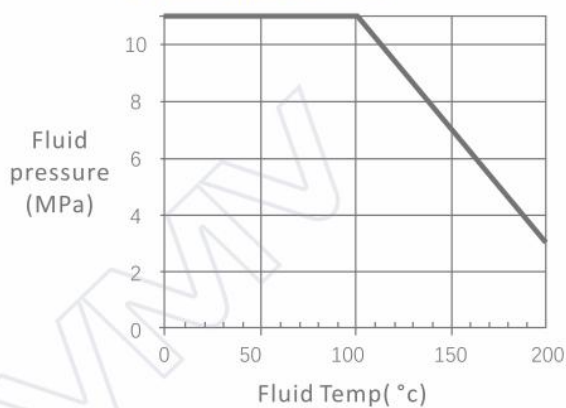


⑤ Valve plug material: 304+RPTFE/316L+RPTFE

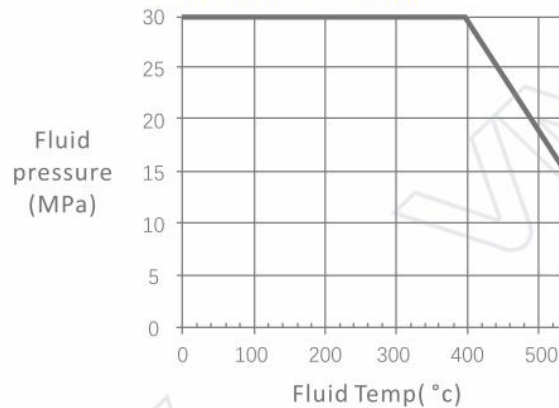


V9000 SERIES BELLOWS CONTROL VALVE

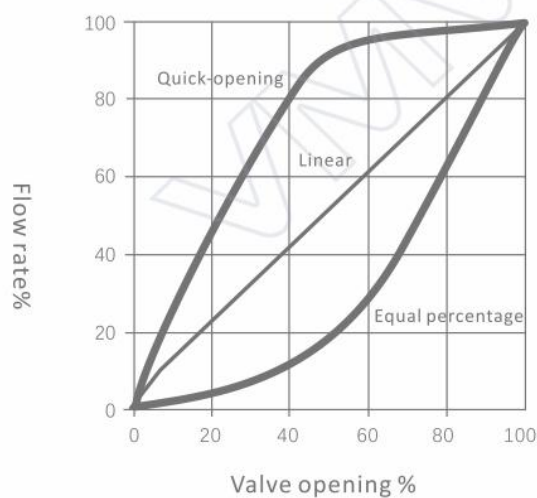
⑥ Packing material: PTFE



⑦ Packing material: graphite



7. Typical flow characteristic curve



8. Rated Cv and Travel

Nominal diameter	Travel	Valve seat diameter code	Rated CV	
			Linear	Equal percentage
-	16	6E	0.002	-
-	16	6D	0.005	-
-	16	6C	0.008	-
-	16	6B	0.01	-
-	16	6A	0.08	-
-	16	6	0.12	0.12

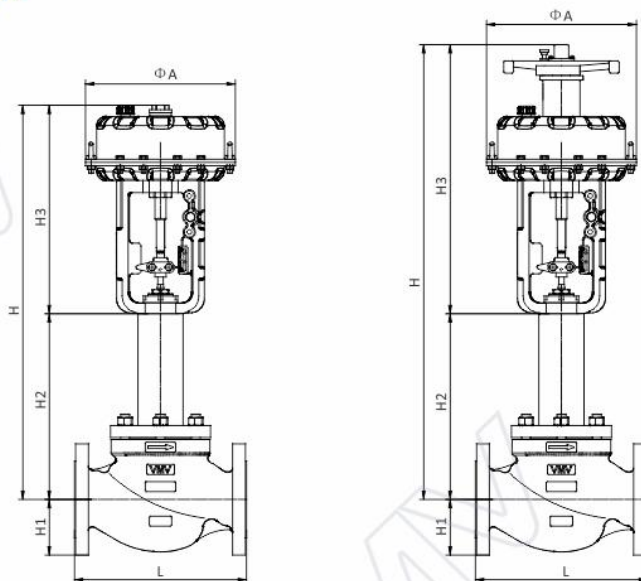
-	16	7	0.23	0.23
-	16	8	0.58	0.58
-	16	10	1.2	1.2
-	16	12	1.9	1.9
-	16	14	2.9	2.9
DN15	16	15	4.7	4.7
-	16	18	7.4	7.4
DN20	16	20	10	10
DN25	16	25	14	14
DN32	20	32	24	24
DN40	20	40	30	30
DN50	20	50	48	45
DN65	30	65	74	74
DN80	30	80	117	117
DN100	30	100	187	187
DN125	60	125	320	287
DN150	60	150	456	433
DN200	60	200	749	678
DN250	10	250	1100	950
DN300	10	300	1600	1400
DN350	130	350	2100	1900
DN400	130	400	2800	2600

9. Maximum Closing Differential Pressure (Mpa)

Nominal diameter	Actuator model	PN < 10MPa (metal seal level IV)			
		PTFE packing		Graphite packing	
		Unbalanced single seat structure	Balanced single seat structure	Unbalanced single seat structure	Balanced single seat structure
DN20	MT1	4.3	-	1.9	-
DN25	MT1	3.6	-	1.6	-
DN32	MT1	1.9	6	0.9	2.2
DN40	MT1	1.3	6	0.7	2.2
DN50	MT1	0.8	6	0.4	2.2
DN65	MT2	1.2	8.7	1.1	5
DN80	MT2	0.8	8.7	0.7	6.5
DN100	MT2	0.5	6.8	0.4	5
DN125	MT3	0.7	10	0.2	9.2
DN150	MT3	0.5	9.8	-	7.7
DN200	MT3	-	6	-	4.6
DN250	MT4	-	7.2	-	5.6
DN300	MT4	-	5.7	-	4.5

V9000 SERIES BELLOWS CONTROL VALVE

10. Dimensions and Weight



10.1 Overall dimensions (mm)

Nominal diameter	Actuator model	L						H1	H2		H3		ΦA
		PN16	PN25	PN40	CLASS 150	CLASS 300	PN63 PN100 CLASS600		Standard type bonnet	Radiator fin type bonnet	Without handwheel	With handwheel	
DN15	MT1	130	130	130	-	-	-	75	310	425	300	450	180
DN20	MT1	150	150	150	184	194	206	75	310	425	300	450	180
DN25	MT1	160	160	160	184	197	210	75	310	425	300	450	180
DN32	MT1	180	180	180	180	222	251	90	335	455	300	450	180
DN40	MT1	200	200	200	222	235	251	90	335	455	300	450	180
DN50	MT1	230	230	230	254	267	286	105	375	495	300	450	180
DN65	MT2	290	290	290	276	292	311	115	454	654	398	651	270
DN80	MT2	310	310	310	298	318	337	120	454	654	398	651	270
DN100	MT2	350	350	350	352	368	394	145	479	689	398	651	270
DN125	MT3	400	400	400	403	425	457	189	780	1100	610	950	400
DN150	MT3	480	480	480	451	473	508	189	780	1100	610	950	400
DN200	MT3	600	600	568	600	568	610	239	801	1150	610	950	400
DN250	MT4	730	730	708	730	708	752	305	1129	1500	1100	1700	620
DN300	MT4	850	850	775	850	775	819	335	1294	1650	1100	1700	620

10.2 Weight (kg)

Nominal Diameter	Actuator model	Weight			
		PN≤5MPa		PN≤10MPa	
		Without handwheel	With handwheel	Without handwheel	With handwheel
DN15	MT1	17	24	20	27
DN20	MT1	17	24	20	27
DN25	MT1	17	24	20	27
DN32	MT1	33	40	41	48
DN40	MT1	34	41	42	49
DN50	MT1	35	42	43	50
DN65	MT2	65	75	79	89
DN80	MT2	67	77	82	92
DN100	MT2	86	96	106	116
DN125	MT3	171	190	209	228
DN150	MT3	202	221	249	268
DN200	MT3	285	304	357	376
DN250	MT4	531	566	662	697
DN300	MT4	703	738	885	920

11. Valve Body Casting Material Comparison Table

ASTM	DIN	EN	JIS
A216 WCB	1.0619	GS-C25	G5151 SCPH2
A536 60-40-80	JS1049	GGG40	G5502 FCD400-15
A352 LCB	1.1131	G17Mn5	G5152 SCPL1
A217 WC6	1.7357	G17CrMo5-5	G5151 SCPH21
A217 WC9	1.7379	G17CrMo9-10	G5151 SCPH-32
A351 CF8	1.4308	GX5CrNi19-10	G5151 SCS13A
A351 CF3	1.4309	GX2CrNi19-11	G5151 SCS19A
A351 CF8M	1.4408	GX5CrNiMo19-11-2	G5151 SCS14A
A351 CF3M	1.4409	GX2CrNiMo19-11-2	G5151 SCS16A
A351 CF8C	1.4552	GX5CrNiNb19-11	G5151 SCS21



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