

HDB Pneumatic Double-Seated Control Valve

OVERVIEW

Model HDB Control valve is an excellent choice for applications involving dirty fluids combined with high-pressure drops. Some typical service conditions and operating requirements include:

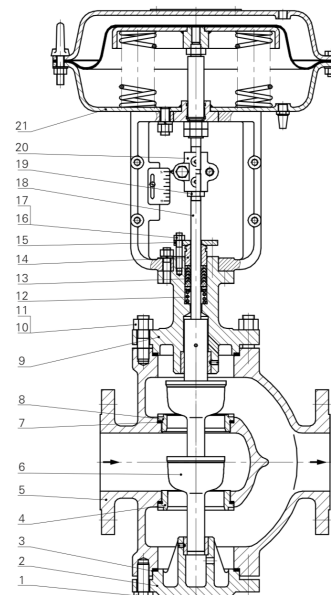
- Clean and dirty process fluids
- Moderate to high pressure drops
- Large flow capacities and operating range
- Resistant to process system vibration
- Low emissions and zero leakage options

Double-seated control valve combines excellent high-pressure drop control performance along with the ability to handle dirty fluid applications. The dual port design provides a pressure balanced effect within the valve, which reduces actuator size and thrust requirements.

Dynamic force on plug tends to be balanced as flow tends to open one port and close the other. Reverse-Acting double ported Globe-Style valve bodies normally have higher capacity than single-port valves of same line size. Many double-port bodies reverse, so the valve plug can be install as either push down to open or push down to close.

Metal to metal seating of double-seated control valve usually provides only Class II shutoff capability, although Class III capability is also possible.

Port-guided valve plugs from THINKTANK® are often used for on-off or low-pressure throttling service. Top and bottom guided valve plugs furnish stable operation for severe service conditions.



HDB Standard Type

1. Hexagon Bolts 2. Cover Cap 3. Winding Sealing Ring
4. Bottom Seat 5. Valve Body 6. Plug 7. Sealing Gasket 8. Top Seat 9. Valve Bonnet 10. Stud 11. Hexagon Nuts 12. Packing Spring 13. Packing Set 14. Packing Screw 15. Packing Gland 16. Screw 17. Nuts 18. Stem 19. Locking Nut 20. Indicator 21. Actuator

SPECIFICATIONS

Body

Type

Straight-through, cast globe valve

Nominal size

3/4", 1", 1-1/4", 1-1/2", 2", 2-1/2", 3", 4", 5", 6", 8", 10", 12", 14", 16"

Pressure rating

- ANSI Class 125, 150, 300, 600
- JIS 10K, 16K, 20K, 30K, 40K
- PN1.6, 4.0, 6.4, 10.0 Mpa

End connection

- Flanged End: FF, RF, RJ, LG
According to ANSI B16.5, JIS B2201, JB/T79.1
PN1.6MPa, JB/T79.2
- Welded End: SW, BW
- Threaded End: Rc

Material

A216 WCB, A216WC6, A352 LCB, A351 CF8, A351 CF8M, A351 CF3M, A351 CF3(see table3-1,3-2)

Gland type

Bolted Gland

Packing

V shaped PTFE, PTFE, Flexible graphite

Gasket material

Stainless steel(SUS304, SUS316, SUS316L), copper, aluminum

Trim

Valve plug

Pressure balanced type

Actuator

Type

Single-acting diaphragm actuator, Spring type piston actuator, Double acting piston actuator

Diaphragm material

Cloth embedded nylon and ethylene propylene rubber

Spring range

- 20 to 100 kPa(0.2 to 1.0 kgf/cm²)
- 40 to 200 kPa(0.4 to 2.0 kgf/cm²)
- 80 to 240 kPa(0.8 to 2.4 kgf/cm²)

Supply pressure

0.14, 0.16, 0.28, 0.4, 0.5 Mpa

Air connection

Rc1/4 or 1/4NPT internal thread

Ambient temperature

-30 to 70°C

Valve action

- FO: Air to close(Direct action actuator is combined.)
- FC: Air to open(Reverse action actuator is combined.)

Optional accessories

- P/P or I/P Positioner
- Air filter regulator
- Top-mounted or Side-mounted Handwheel
- Limit switch
- Solenoid valve
- Motion transmitter
- Booster relay
- Lock-up valve
- Air lock relay
- Others

Performance

Rated Cv value

Refer to table 1.

Flow characteristics (Refer to table 2)

- Equal percentage
- Linear

Leakage

- Metal Seat
According to ANSI B16.104 Class II, leakage less than 0.5% of maximum valve capacity.
- Soft Seat
According to ANSI B16.104 Class VI, leakage less than 0.00001% of maximum valve capacity.

Inherent rangeability

- 50:1 (Optional 75:1 for full port size)

Hysteresis error

- Without positioner: Within 3% F.S.
- With positioner: Within 1% F.S.

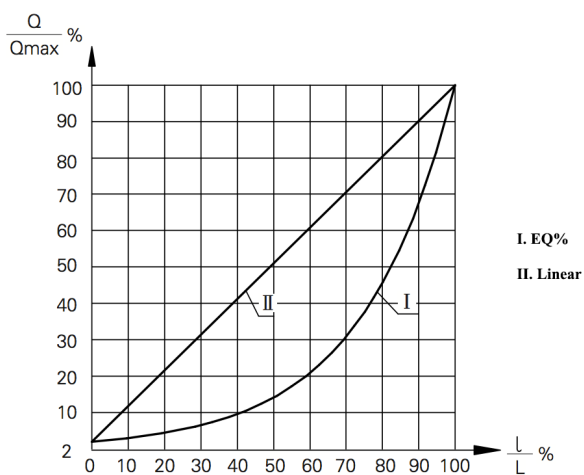
Linearity

Without positioner: Within $\pm 5\%$ F.S.
With positioner: Within $\pm 1\%$ F.S.

Table 1. Rated Kv Value and Travel

Nominal Diameter DN(mm)	Port Size	Rated Kv Value		Travel (mm)
		EQ%	Linear	
20	20	6.9	7.6	16
25	20	6.9	7.6	16
	25	11	12.1	16
32	20	6.9	7.6	16
	25	11	12.1	16
	32	17.6	19.4	25
40	25	11	12.1	16
	32	17.6	19.4	25
	40	27.5	30.3	25
50	32	17.6	19.4	25
	40	27.5	30.3	25
	50	44	48.3	25
65	40	27.5	30.3	25
	50	44	48.3	25
	65	69.3	75.9	40
80	50	44	48.3	25
	65	69.3	75.9	40
	80	110	121	40
100	65	69.3	75.9	40
	80	110	121	40
	100	176	193.6	40

Nominal Diameter DN(mm)	Port Size	Rated Kv Value		Travel (mm)
		EQ%	Linear	
125	80	110	121	40
	100	176	193.6	40
	125	275	302.5	60
150	100	176	193.6	40
	125	275	302.5	60
	150	440	484	60
200	125	275	302.5	60
	150	440	484	60
	200	693	759	60
250	150	440	484	60
	200	693	759	60
	250	1100	1210	100
300	200	693	759	60
	250	1100	1210	100
	300	1760	1936	100
350	250	1100	1210	100
	300	1760	1936	100
	350	2375	2612	100
400	300	1760	1936	100
	350	2375	2612	100
	400	4400	4830	100

Table 2. Flow characteristics

R50

Unit: %

Q/Qmax I/L Characteristics	0	10	20	30	40	50	60	70	80	90	100
EQ%	2	11.8	21.6	31.4	41.2	51	60.8	70.6	80.4	90.2	100
Linear	2	3	4.37	6.5	9.6	14.1	20.9	30.9	45.7	67.6	100

Allowable Differential Pressure(Diaphragm Actuator)

Air to Close(Direct action)

Unit: Mpa

Actuator	Spring Range(Kpa)	Air Supply (Mpa)	Positioner Y/N	Seat Diameter dg (mm)															
				20	25	32	40	50	65	80	100	125	150	200	250	300	350	400	
PZMA-4	20~100	0.14	No	0.92	0.72														
			Yes	5.51	4.33														
	40~200	0.25	Yes	7.80	6.14														
	80~240	0.40	Yes	10.0	10.0														
PZMA-5	20~100	0.14	No			0.73	0.58	0.46											
			Yes			4.41	3.49	2.77											
	40~200	0.25	Yes			6.25	4.95	3.93											
	80~240	0.40	Yes			10.0	10.0	8.55											
PZMA-6	20~100	0.14	No						0.55	0.44	0.35								
			Yes						3.27	2.65	2.11								
	40~200	0.25	Yes						4.64	3.75	2.99								
	80~240	0.40	Yes						10.0	8.16	6.50								
PZMA-7	20~100	0.14	No									0.48	0.40	0.30					
			Yes									2.90	2.41	1.81					
	40~200	0.25	Yes									4.11	3.42	2.56					
	80~240	0.40	Yes									8.95	7.44	5.57					
PZMA-8	20~100	0.14	No												0.38	0.32	0.27	0.24	
			Yes												2.28	1.91	1.64	1.43	
	40~200	0.25	Yes											3.23	2.71	2.32	2.03		
	80~240	0.40	Yes											7.02	5.98	5.05	4.41		

Air to Open(Reverse action)

Unit: Mpa

Actuator	Spring Range(Kpa)	Air Supply (Mpa)	Positioner Y/N	Seat Diameter dg (mm)															
				20	25	32	40	50	65	80	100	125	150	200	250	300	350	400	
PZMB-4	20~100	0.14	Yes/No	0.92	0.72														
	40~200	0.25	Yes	5.51	4.33														
	80~240	0.40	Yes	10.0	10.0														
PZMB-5	20~100	0.14	Yes/No			0.73	0.58	0.46											
	40~200	0.25	Yes			4.41	3.49	2.77											
	80~240	0.40	Yes			10.0	9.31	7.39											
PZMB-6	20~100	0.14	Yes/No						0.55	0.44	0.35								
	40~200	0.25	Yes						3.27	2.65	2.11								
	80~240	0.40	Yes						8.73	7.06	5.63								
PZMB-7	20~100	0.14	Yes/No									0.48	0.40	0.30					
	40~200	0.25	Yes									2.90	2.41	1.81					
	80~240	0.40	Yes									7.74	6.44	4.82					
PZMB-8	20~100	0.14	Yes/No												0.38	0.32	0.27	0.24	
	40~200	0.25	Yes												2.28	1.91	1.64	1.43	
	80~240	0.40	Yes												6.07	5.10	4.36	3.82	

Allowable Differential Pressure (Piston Actuator)

Unit: Mpa

Actuator Size	Spring Range (Kpa)	Air Supply (Mpa)	Seat Diameter dg(mm)									
			65	80	100	125	150	200	250	300	350	400
150	125~375	0.5	6.44	5.21								
200	125~375	0.5	10.0	9.36	7.38	5.88	4.89					
250	125~375	0.5	10.0	10.0	10.0	9.19	7.65	5.72				
280	125~375	0.5				10.0	9.59	7.18	5.69			
300	125~375	0.5						8.24	6.53	5.48	4.69	4.10
350	125~375	0.5						11.21	8.88	7.46	6.42	5.58
400	125~375	0.5								9.74	8.34	7.29

Working Temperature Range and Seat Leakage

Table 3-1 Valve Body Material: Carbon Steel

Valve Body Material		WCB, WCC, WC6, WC9, LCB		
Trim	Material	304/316	304/316	304/316
	Treatment	—	ST	SS
Seat	Material	304/316	304/316	304/316
	Treatment	—	ST	SS
Allowable Leakage	Class	IV	IV/V	IV/V
	Standard	GB/T4213, FCI70.2, ANSI B16.104		
Working Temperature(°C)	WCB, WCC	-5 ~ +230°C	-5 ~ +230°C	-5 ~ +425°C
	WC6, WC9	-5 ~ +230°C	-5 ~ +538°C	-5 ~ +538°C
	LCB	-45 ~ +230°C	-45 ~ +350°C	-45 ~ +350°C

Table 3-2 Valve Body Material: Stainless Steel

Valve Body Material		CF3, CF8, CF3M, CF8M		
Trim	Material	304/316	304/316	304/316
	Treatment	—	ST	SS
Seat	Material	304/316	304/316	304/316
	Treatment	—	ST	SS
Allowable Leakage	Class	IV	IV/V	IV/V
	Standard	GB/T4213, FCI70.2, ANSI B16.104		
Working Temperature(°C)		-196 ~ +538°C	-196 ~ +538°C	-196 ~ +538°C

Figure 1. Valve Trim Material · Treatment

Figure1-1 Metal Seated

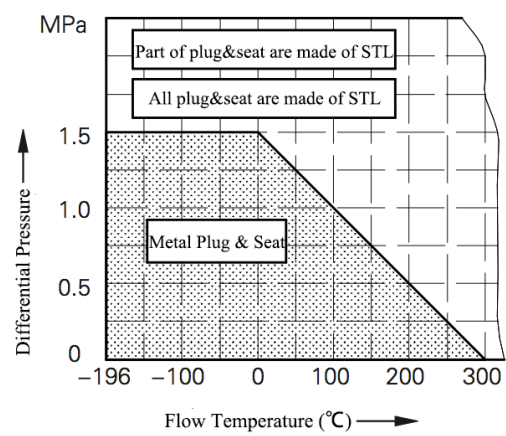


Figure 2. Working Temperature of Packing Material · Pressure Ranges

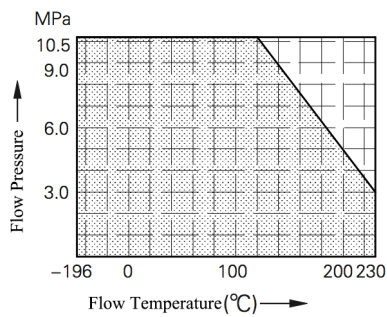


Figure 2-1 V-Type RPTFE

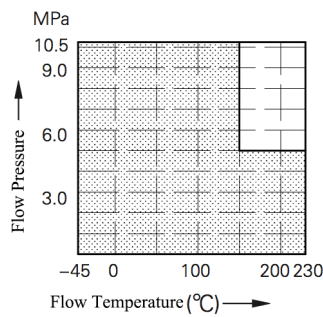


Figure 2-2 PTFE+Carbon Fiber/PTFE+Asbestos

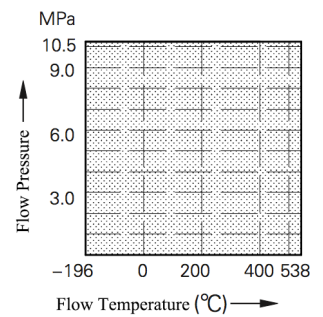


Figure 2-3 Flexible Graphite

Bonnet Type

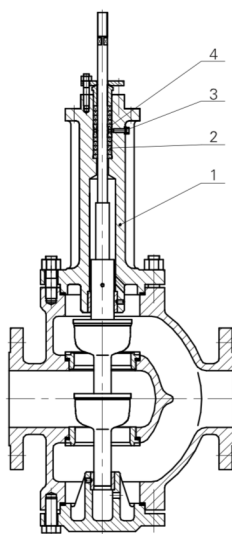


Figure 2-1 Extension Bonnet 1. Extension Bonnet 2. Packing 3. Bushing 4. Stem

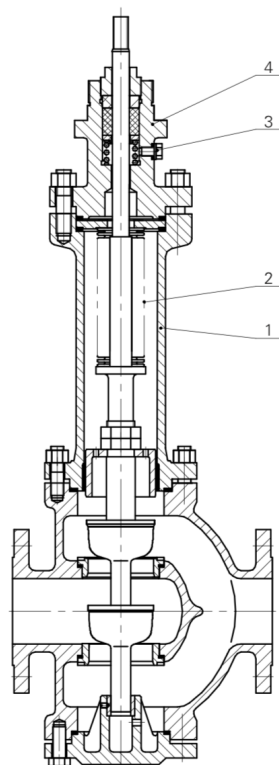


Figure 2-2 Bellows Seal Bonnet 1. Lower Bonnet 2. Bellows 3. Inspection Hole 4. Upper Bonnet

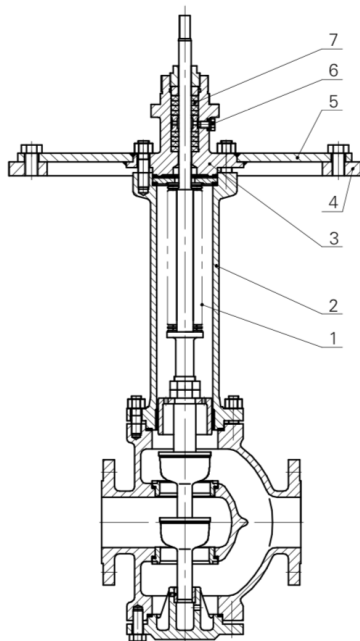


Figure 2-3 Extension Bonnet 2 1. Bellows 2. Lower Bonnet 3. Upper Bonnet 4. Welding Flange 5. Connect Flange 6. Inspection Hole 7. Packing

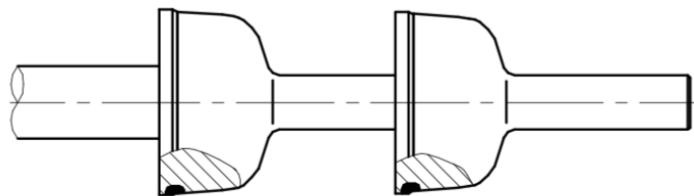
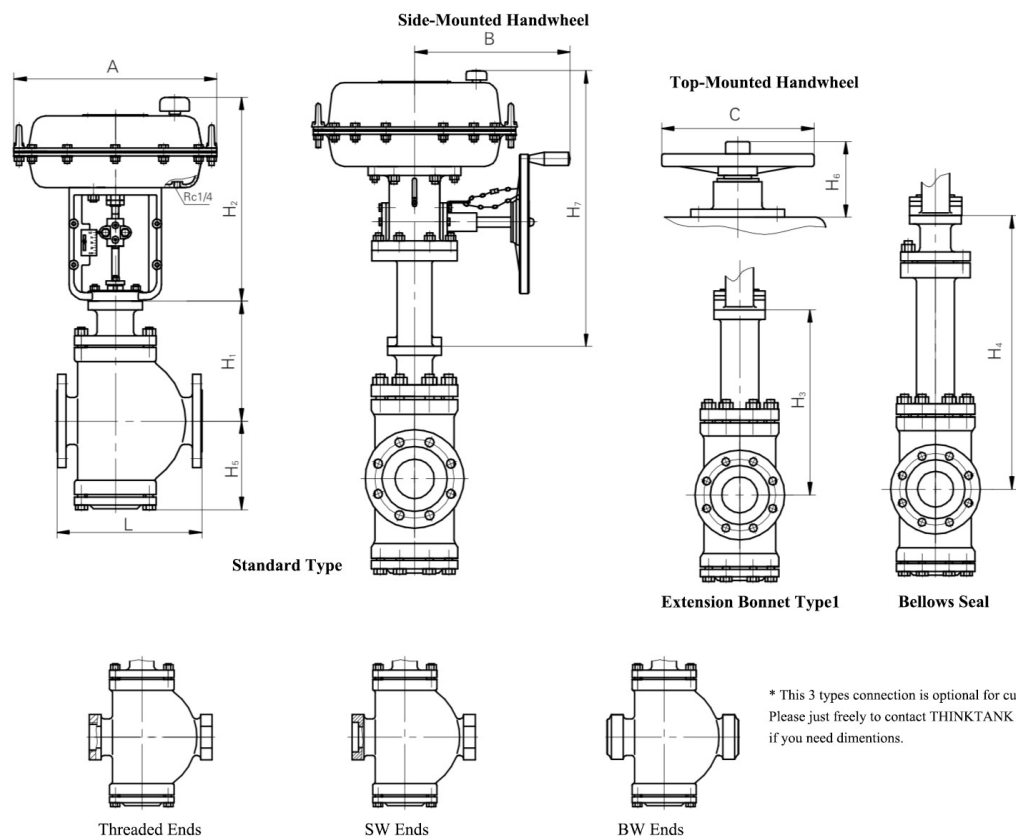


Figure 2-4 Plug Type Sealing with Stellited surfacing on the plug part.

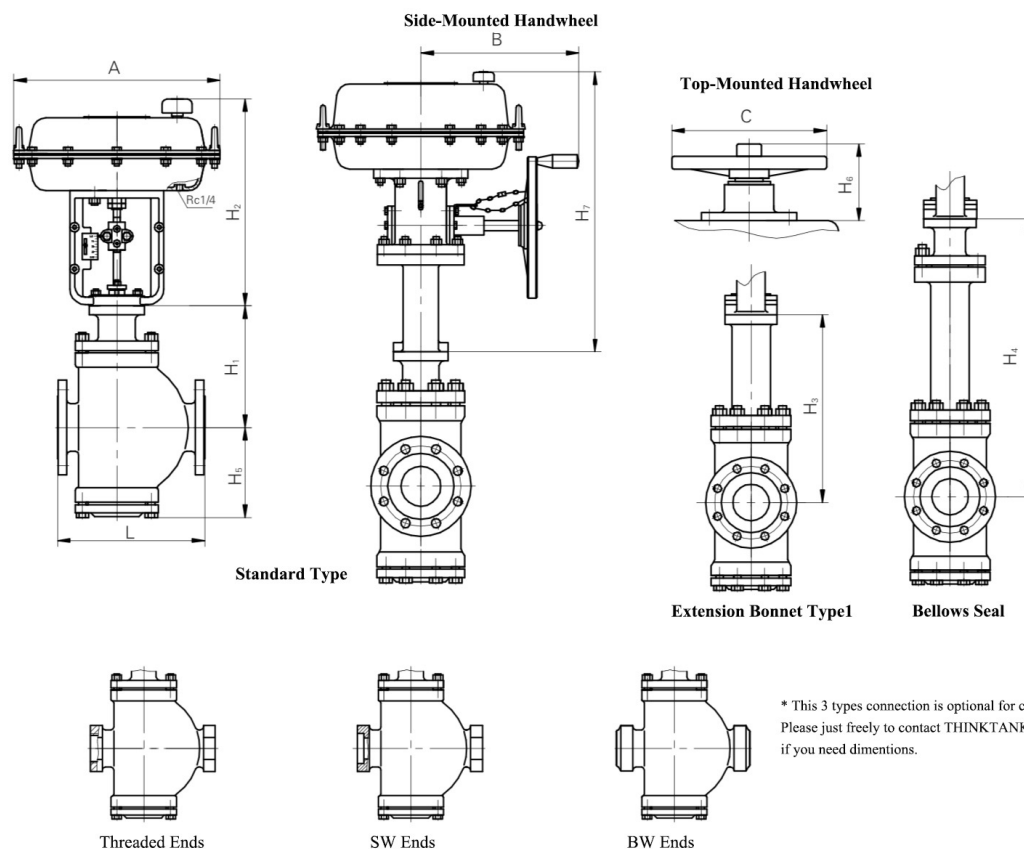
DN20 ~ DN50 External Dimensions for Standard, Bellows and Extension



Unit: mm

Nominal Diameter DN(mm)	L			H1	H3	H4	H5	Actuator					
	PN16/ 25/40, 150LB	PN64, 300LB	PN100, 600LB					A	B	C	H2	H6	H7
20(3/4")	150	230	230	137	262	346	140	282	360	220	258	180	465
25(1")	160	230	230	137	262	346	140	282	360	220	258	180	465
32(1-1/4")	180	260	260	176	324	390	108	282	360	220	258	180	465
								308	360	220	280	180	465
40(1-1/2")	200	260	260	167	335	416	120	282	360	220	258	180	465
								308	360	220	280	180	465
50(2")	230	300	300	185	346	430	133	308	360	220	280	180	465

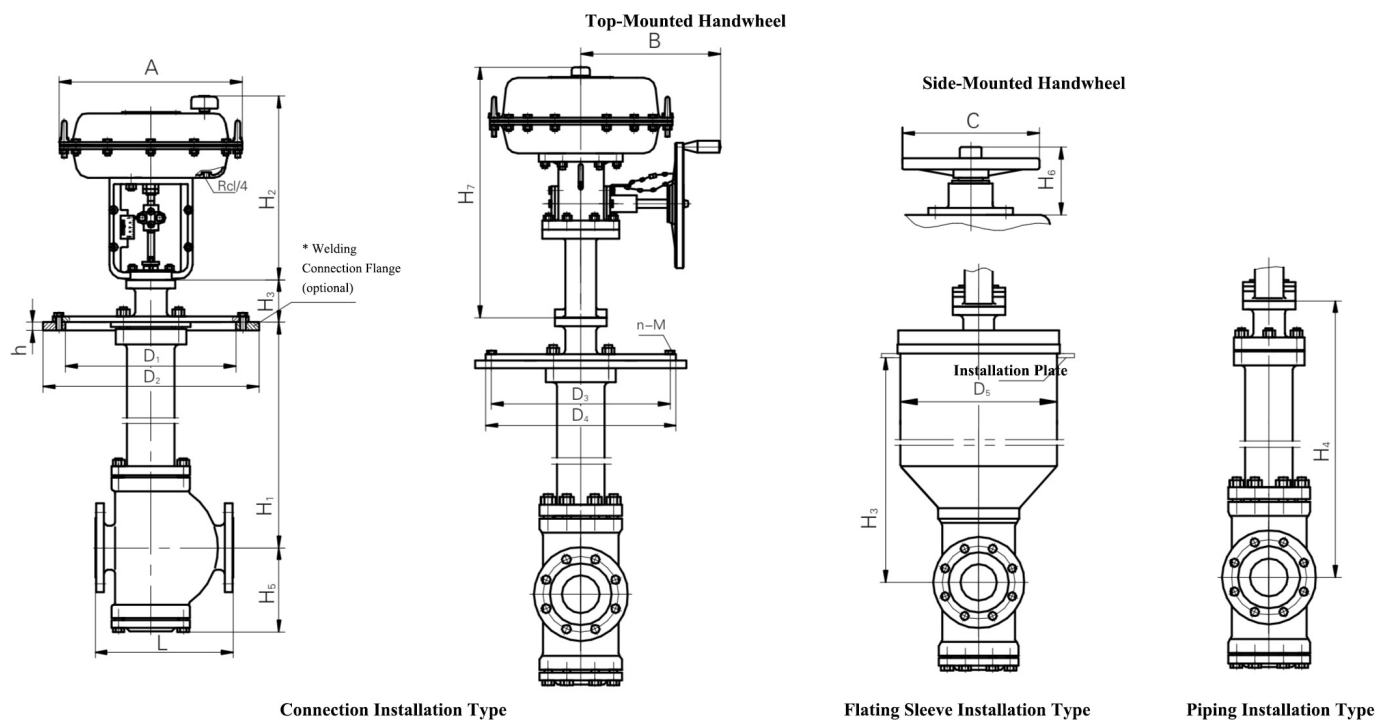
DN65 ~ DN400 External Dimensions for Standard, Bellows and Extension



Unit: mm

Nominal Diameter DN(mm)	L			H1	H3	H4	H5	Actuator					
	PN16/ 25/40, 150LB	PN64, 300LB	PN100, 600LB					A	C	H2	H6	H7	B
65(2-1/2")	290	340	340	226	366	653	168	308	220	280	180	465	260
								394	270	360	236	580	305
80(3")	310	380	380	245	412	726	189	308	220	280	180	465	260
								394	270	360	236	580	305
100(4")	350	430	430	250	415	741	202	394	270	360	236	580	305
125(5")	400	500	500	315	520	813	282	394	270	360	236	580	305
								498	320	435	310	675	330
150(6")	480	550	550	353	545	843	283	394	270	360	236	580	305
								498	320	435	310	675	330
200(8")	600	650	650	418	608	903	338	498	320	435	310	675	330
250(10")	730	775	775	517	708	915	456	618	500	621	394	959	374
300(12")	850	900	900	629	850	972	493	618	500	621	394	959	374
350(14")	980	980	980	685	850	987	513	618	500	621	394	959	374
400(16")	980	980	980	752	910	1053	566	618	500	621	394	959	374

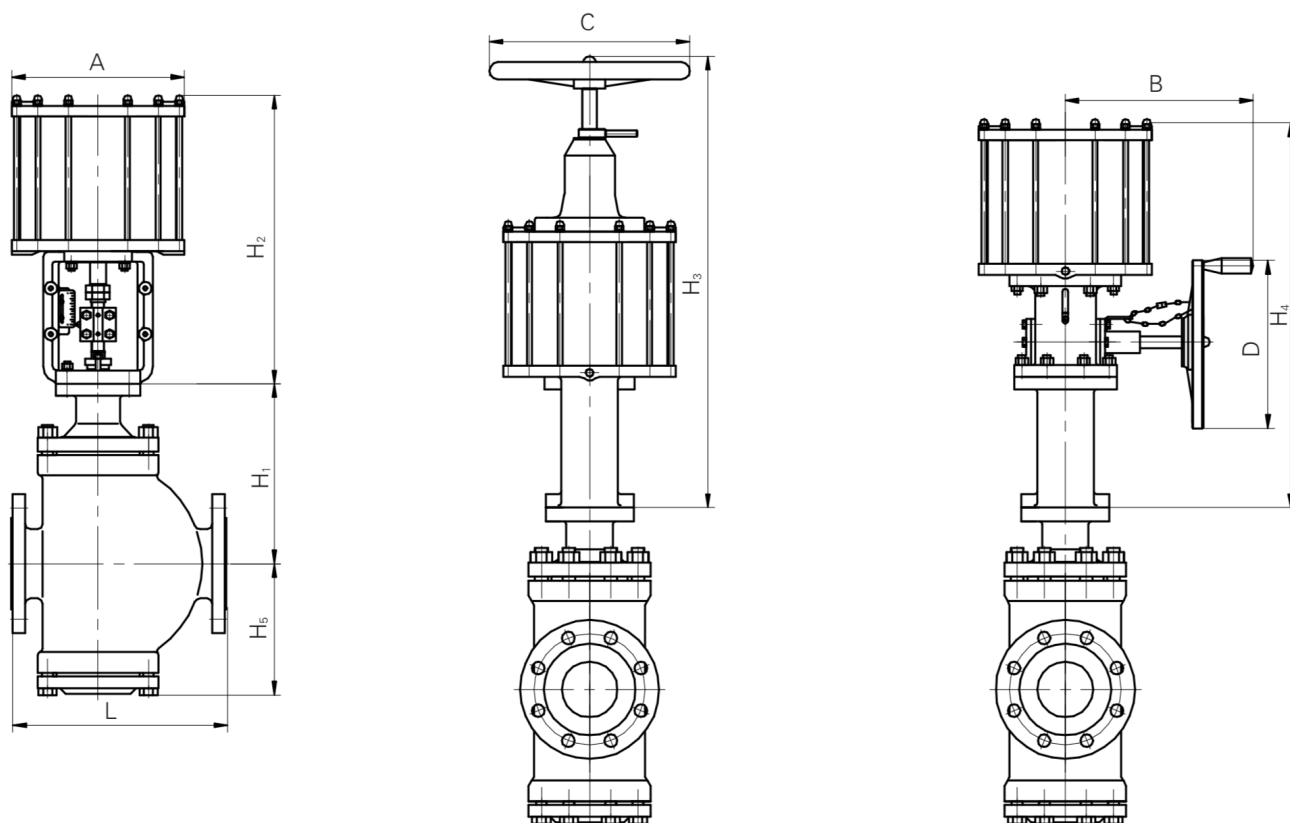
External Dimensions for Extension Type 2



Unit: mm

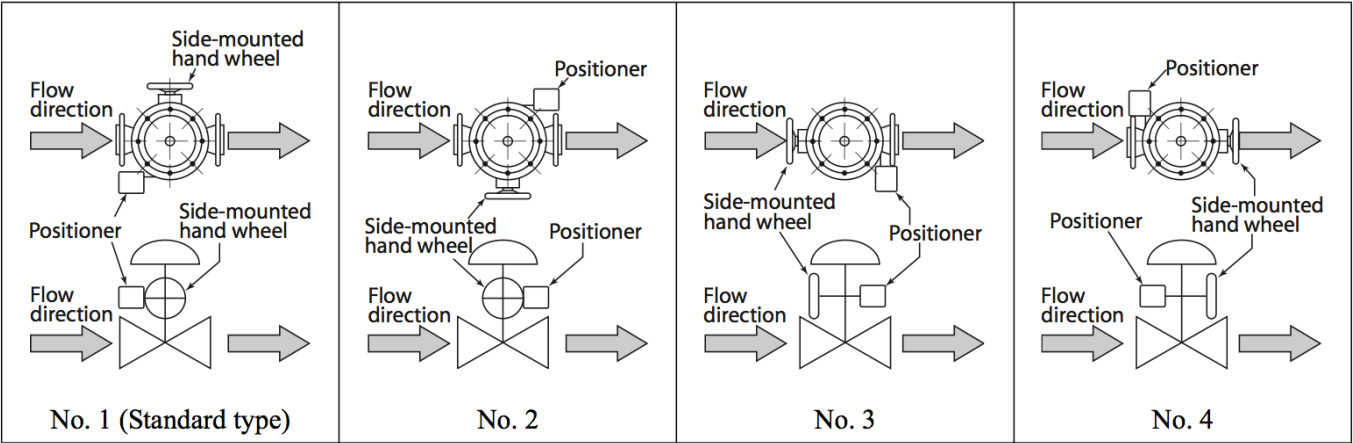
Nominal Diameter DN(mm)	L	Actuator														
	PN64, PN100, 300LB, 600LB	D1	D2	D3	D4	D5	H1	H3	H4	H5	A	C	H2	H6	H7	B
20(3/4")	230	270	335	305	335	285	700	88	588	92	282	220	258	180	465	260
25(1")	230	270	335	305	335	285	700	88	588	92	282	220	258	180	465	260
32(1-1/4")	260	305	390	340	370	285	700	88	588	108	282	220	258	180	465	260
											308	220	280	180	465	260
40(1-1/2")	260	342	430	370	400	285	700	88	688	120	282	220	258	180	465	260
											308	220	280	180	465	260
50(2")	300	375	465	405	435	285	700	88	688	133	308	220	280	180	465	260
65(2-1/2")	340	430	520	460	490	470	700	95	695	168	308	220	280	180	465	260
											394	270	280	236	580	305
80(3")	380	490	585	525	555	470	700	95	695	189	308	220	280	180	305	260
											394	270	360	236	580	305
100(4")	430	556	660	590	630	470	700	95	870	202	394	270	360	236	580	305
125(5")	500	665	770	700	740	—	800	170	870	282	394	270	360	236	580	305
											498	320	435	310	675	330
150(6")	550	665	700	700	740	—	800	170	870	283	394	270	360	236	580	305
											498	320	435	310	675	330
200(8")	650	765	890	805	845	—	800	170	870	338	498	320	435	310	675	330
250(10")	775	980	1120	1030	1080	—	900	110	910	456	618	500	621	394	959	374
300(12")	900	1080	1220	1130	1180	—	900	110	910	493	618	500	621	394	959	374
350(14")	980	1180	1320	1230	1280	—	900	110	910	513	618	500	621	394	959	374
400(16")	980	1380	1440	1500	1540	—	900	110	910	566	618	500	621	394	959	374

External Dimensions for Piston Type Actuator



Unit: mm

Nominal Diameter DN(mm)	L		H1	H5	Actuator						
	PN16/25/40, 150LB	PN64, 300LB			A	B	C	D	H2	H3	H4
65(2-1/2")	290	340	226	168	215	305	270	270	447	683	612
					275	305	270	270	495	731	660
80(3")	310	380	245	189	215	305	270	270	447	683	612
					275	305	270	270	495	731	660
100(4")	350	430	250	202	215	305	270	270	447	683	612
					275	305	270	270	495	731	660
125(5")	400	500	315	282	325	330	320	270	600	911	795
					340	330	320	270	727	1038	922
150(6")	480	559	353	282	325	330	320	270	600	911	795
200(8")	600	650	418	338	325	330	320	270	600	911	795
250(10")	730	775	517	456	340	330	500	270	727	1121	1035
300(12")	850	900	629	493	385	374	500	320	710	1104	1018
350(14")	980	980	685	513	412	374	500	320	775	1169	1083
400(16")	980	980	752	566	485	374	500	320	775	1169	1083



Actuator orientation

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

Ordering Information

When ordering, please specify;

- | | |
|---|---|
| <ul style="list-style-type: none">1) Model Number: HDB2) Nominal size × Cv required3) Type and rating of end connections4) Body and trim material, necessity of hardening5) Type of bonnet6) Valve and plug characteristics7) Type of actuator, necessity of hand wheel, and air to diaphragm8) Valve action (direct or reverse) | <ul style="list-style-type: none">9) Accessories (pressure regulator and etc.)10) Special requirement of degreasing, copper free and etc.11) Name of flow medium12) Normal flow and maximum required flow13) Pressure of flow medium, upstream and downstream pressure at maximum and minimum, required flow14) Temperature and specific gravity of flow medium15) Viscosity of flow medium, inclusive or exclusive of slurry |
|---|---|

*Specifications are subject to change without notice.

THINKTANK®

SHANGHAI THINKTANK PROCESS MANAGEMENT CO., LTD
Headquarters: #233 Renai Rd, Sanchong County, Taipei City, Taiwan.
Factory in China: Rd 1, Hongkuan Industrial Zone, Fuqing City, Fujian Province.
Office: #407 Rongxing Rd, Songjiang District, Shanghai City.
URL: <https://www.valve-cn.com/>