

HLS Pneumatic Small-Port Single-Seated Control Valve

OVERVIEW

Model HLS Pneumatic Small-Port Single-Seated Control Valve are designed for heavy duty service. The compact valve body, having an S-shape flow passage that features low pressure loss, allows a large flow capacity, rangeability and high accuracy flow characteristics. Furnished by multi-spring diaphragm actuator, the control valve is compact in structure and big in output force.

SPECIFICATIONS

Body

Type

Straight-through, cast globe valve

Nominal size

3/4, 1 inch

Pressure rating

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

Bonnet

- Plain bonnet (-17 to 230°C)
- Extension bonnet Type1(-45 to -17°C and 230 to 566°C)
- Extension bonnet Type 2 Cryogenic
Integral cast type (-100 to -45°C)
Welded type (-196 to -100°C)
- Bellows type

Gland type

Bolted Gland

Packing

V shaped PTFE, PTFE, Flexible graphite

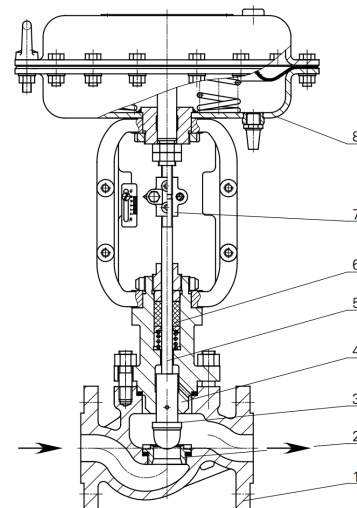
Gasket material

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

Trim

Valve plug

Single-seated, Contoured type plug



HLS Standard Type

1. Body 2. Seat 3. Plug 4. Bonnet 5. Stem
6. Packing 7. Indicator scale 8. Actuator

Actuator

Type

Single-acting diaphragm 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, 0.40 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 IV, leakage less than 0.01% of maximum valve capacity.
- Soft Seat
According to ANSI B16.104 VI, leakage less than 0.001% of maximum valve capacity.

Inherent rangeability

50:1($C_v \geq 1.0$), 30:1($C_v = 0.63$) or 20:1($C_v \leq 0.4$)

Hysteresis error

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

Linearity

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

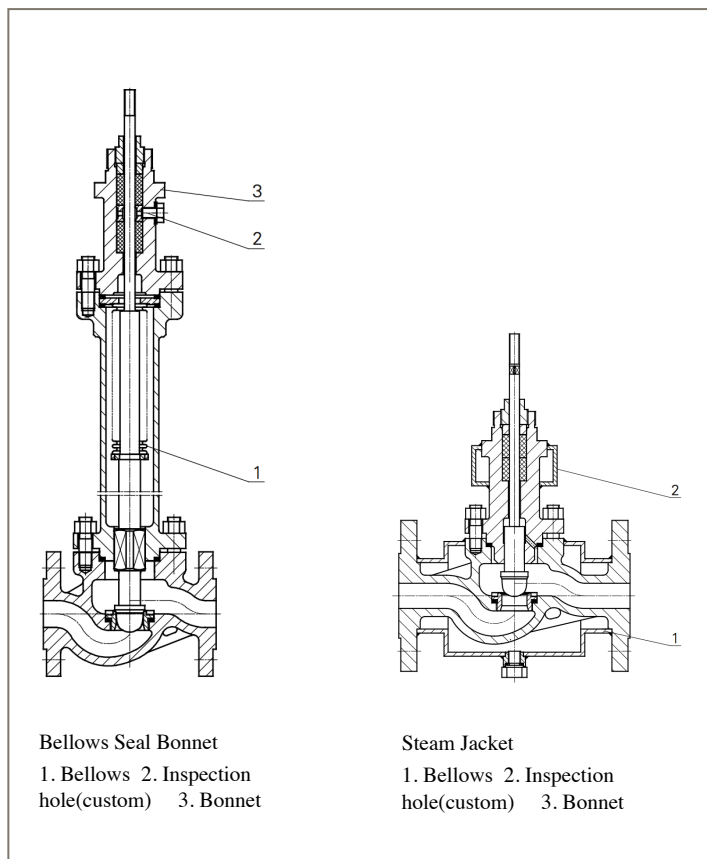
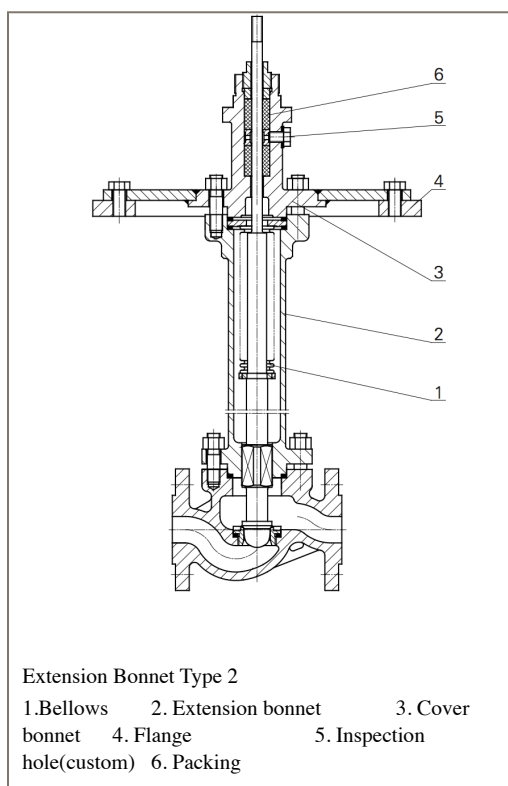
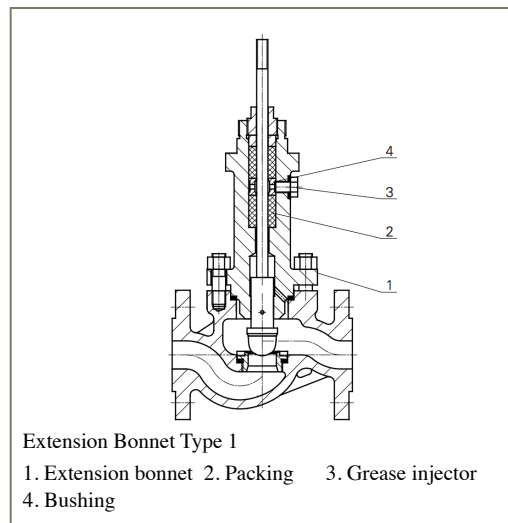
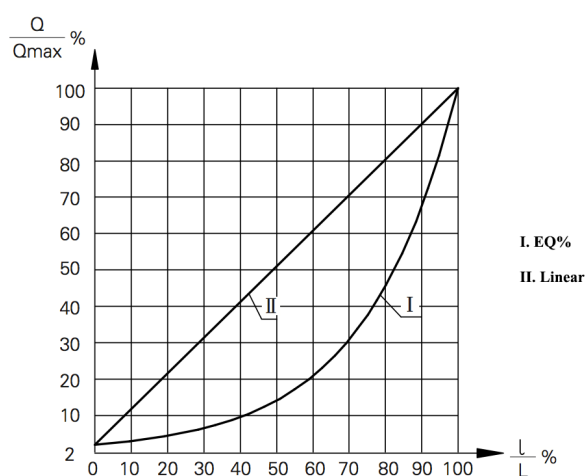


Table 1. Rated Cv Value and Travel

Nominal Diameter DN(mm)	20										
	25										
Rated Cv Value		0.16	0.25	0.40	0.63	1.0	1.6	2.5	4.0	7.37	11.7
Metal Seat	Linear	*	*	△	△	△	△	△	△	△	△
	EQ%		*	△	△	△	△	△	△	△	△
Soft Seat	Linear	*	*	*	*	*	*	*	*	*	*
	EQ%		*	*	*	*	*	*	*	*	*
Actuator Model	Direct action	PZMA-4									
	Reverse action	PZMB-4									
Rated Travel L(mm)		16									
Eff. Area(cm2)		280									
Nominal Pressure	PN(Mpa)	1.6, 4.0, 6.4, 10.0									
	ANSI	150LB, 300LB, 600									
Inherent Flow Characteristics		Linear, EQ%									
Inherent rangeability		20:1			30:1		50:1				
Spring Range Pr(Kpa)		20~100, 40~200, 80~240									
Air Supply Ps(Mpa)		0.14, 0.25, 0.4									

Note:

- 1) "*" denotes production ranges.
- 2) "△" denotes the curve of flow characteristics accord with GB/T4213.
- 3) Please select model HLS for values of rated Cv 0.01, 0.04, 0.1

Table 2. Flow characteristics

Allowable Differential Pressure

Allowable Differential Pressure Table for Metal Seat Type

Unit: Mpa

Action Type	Actuator	Spring Range(Kpa)	Air Supply (Mpa)	Positioner Y/N	Rated Cv Value								
					≤0.25	0.40	0.63	1.0	1.6	2.5	4.0	7.37	11.7
Direct	PZMA-4	20~100	0.14	No	3.0 10.0	3.0 5.92	3.0 5.92	3.0 3.15	3.0 3.15	1.94	1.69	0.95	0.61
				Yes	3.0 10.0	3.0 10.0	3.0 10.0	3.0 9.2	3.0 10.0	3.0 5.68	3.0 4.95	2.55	1.63
		40~200	0.25	Yes	—	—	—	3.0 10.0	3.0 10.0	3.0 7.30	3.0 6.3	3.0 3.34	2.14
		80~240	0.40	Yes	—	—	—	—	—	3.0 10.0	3.0 10.0	3.0 6.52	4.17
Reverse	PZMB-4	20~100	0.14	Yes/No	3.0 10.0	3.0 5.92	3.0 5.92	3.0 3.15	3.0 3.15	1.94	1.69	0.95	0.61
		40~200	0.25	Yes	—	3.0 10.0	3.0 10.0	3.0 3.15	3.0 8.0	3.0 5.19	3.0	2.55	1.63
		80~240	0.40	Yes	—	—	—	3.0 10.0	3.0 10.0	3.0 10.0	3.0 10.0	3.0 5.73	3.67

Allowable Differential Pressure Table for Soft Seat Type

Unit: Mpa

Action Type	Actuator	Spring Range(Kpa)	Air Supply (Mpa)	Positioner Y/N	Rated Cv Value								
					≤0.25	0.40	0.63	1.0	1.6	2.5	4.0	7.37	11.7
Direct	PZMA-4	20~100	0.14	No	—	2.0	2.0	2.0	2.0	1.4	1.4	1.2	0.76
				Yes	—	3.0	3.0	3.0	3.0	3.0	3.0	2.78	1.78
		40~200	0.25	Yes	—	3.0	3.0	3.0	3.0	3.0	3.0	3.0	2.29
		80~240	0.40	Yes	—	—	—	—	—	—	—	—	3.00
Reverse	PZMB-4	20~100	0.14	Yes/No	—	2.0	2.0	2.0	2.0	1.4	1.4	1.19	0.76
		40~200	0.25	Yes	—	3.0	3.0	3.0	3.0	3.0	3.0	2.78	1.78
		80~240	0.40	Yes	—	—	—	—	—	—	—	3.00	3.00

Additional Note:

a) Packing material is PTFE.

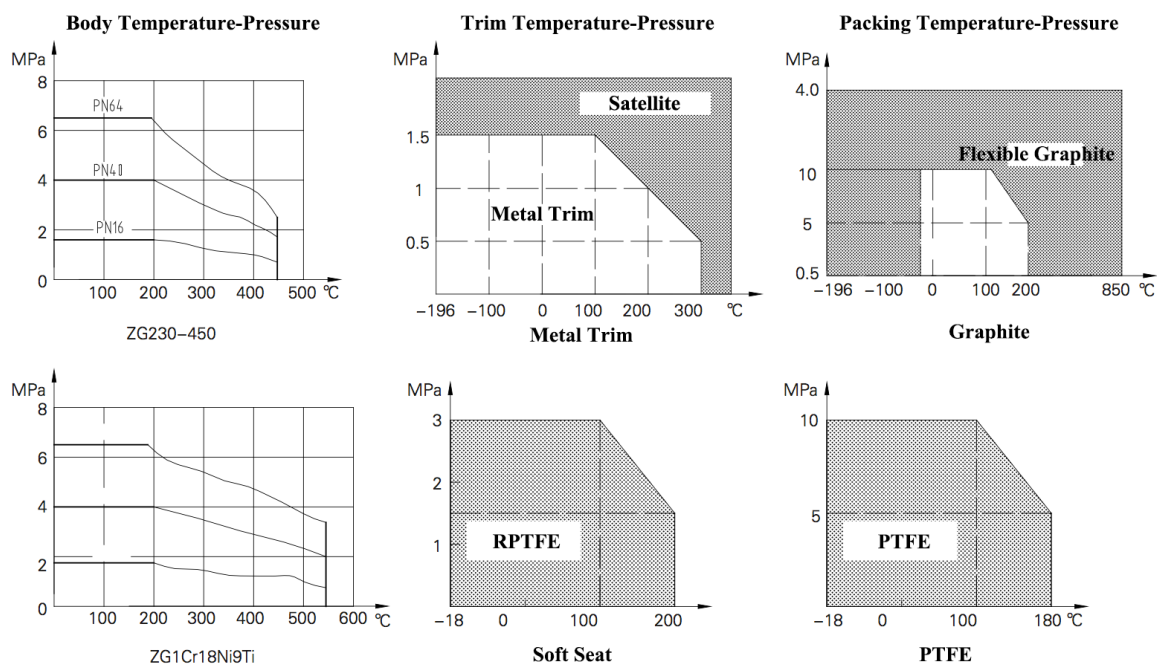
b) Leakage of Metal seat as Class IV.

c) The upper figures denote the operating allowable differential pressure. The lower denote allowable differential pressure at full closure.

d) When liquid service, the operating allowable differential pressure of liquid exceeds 3.0Mpa {30 kgf/cm²}, we recommend to use model HLC.

e) The data is restricted by pressure-temperature sheet.

Pressure-Temperature Sheet



Working Temperature Range and Seat Leakage

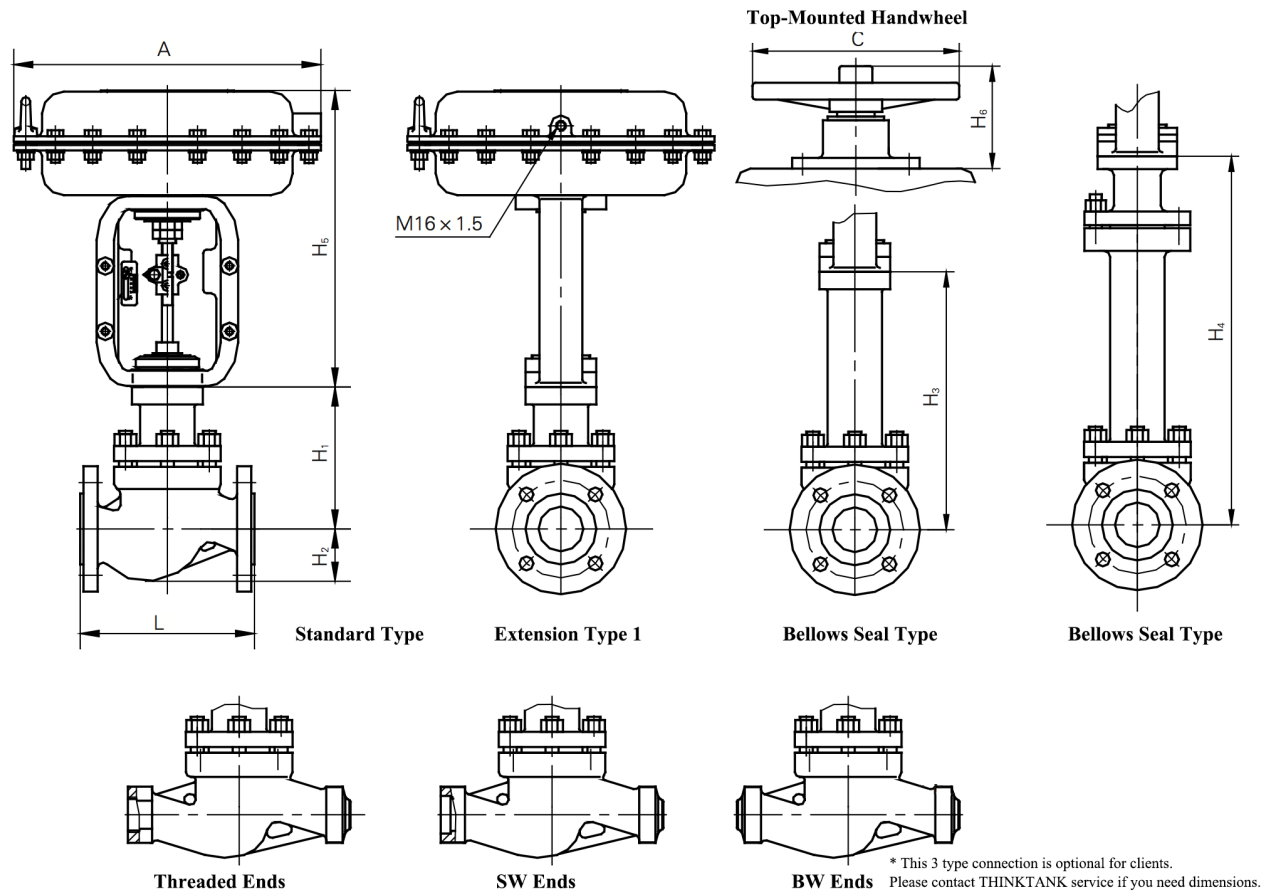
Table 3-1 Valve Body Material: Carbon Steel

Valve Body Material		WCB, WCC, WC6, WC9, LCB			
Trim	Material	304/316	304/316	304/316	304/316
	Treatment	RPTFE	—	ST	SS
Seat	Material	304/316	304/316	304/316	304/316
	Treatment	—	—	ST	SS
Allowable Leakage	Class	V/VI	IV	IV/V/VI	IV/V/VI
	Standard	GB/T4213, FCI70.2, ANSI B16.104			
Working Temperature(°C)	WCB, WCC	-5 ~ +160°C	-5 ~ +230°C	-5 ~ +425°C	-5 ~ +425°C
	WC6, WC9	-5 ~ +160°C	-5 ~ +230°C	-5 ~ +538°C	-5 ~ +538°C
	LCB	-45 ~ +160°C	-45 ~ +230°C	-45 ~ +350°C	-45 ~ +350°C

Table 3-1 Valve Body Material: Stainless Steel

Valve Body Material		CF3, CF8, CF3M, CF8M			
Trim	Material	304/316	304/316	304/316	304/316
	Treatment	RPTFE	—	ST	SS
Seat	Material	304/316	304/316	304/316	304/316
	Treatment	—	—	ST	SS
Allowable Leakage	Class	V/VI	IV	IV/V/VI	IV/V/VI
	Standard	GB/T4213, FCI70.2, ANSI B16.104			
Working Temperature(°C)		-45 ~ +160°C	-196 ~ +538°C	-196 ~ +538°C	-196 ~ +538°C

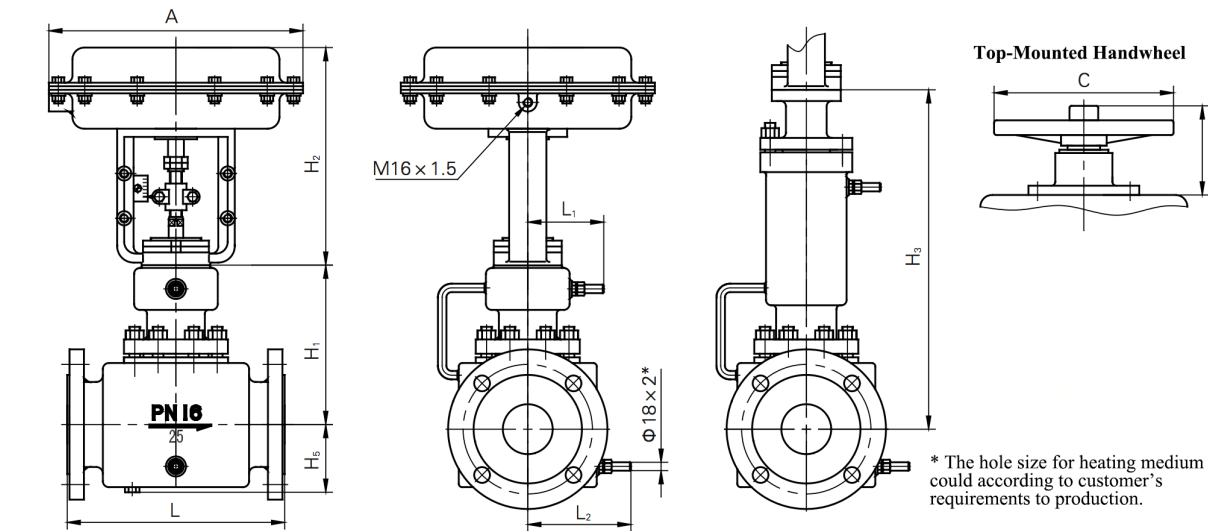
External Dimensions for Standard, Bellows and Extension



Unit: mm

Nominal Diameter DN(mm)	ANSI 150RF, JIS 10K FF, RF PN1.6Mpa				ANSI 300 RF, JIS 20K, 30K RF, PN4.0	ANSI 600 RF, JIS 40K RF, PN6.4, PN10.0				H5	H6	C	A	GW(kg)
	L	H1	H2	H3	L	L	H1	H2	H3					
20	184	130	45	251	194	194	140	48	260	258	180	220	282	21
25	184	130	48	251	197	197	140	48	260					22

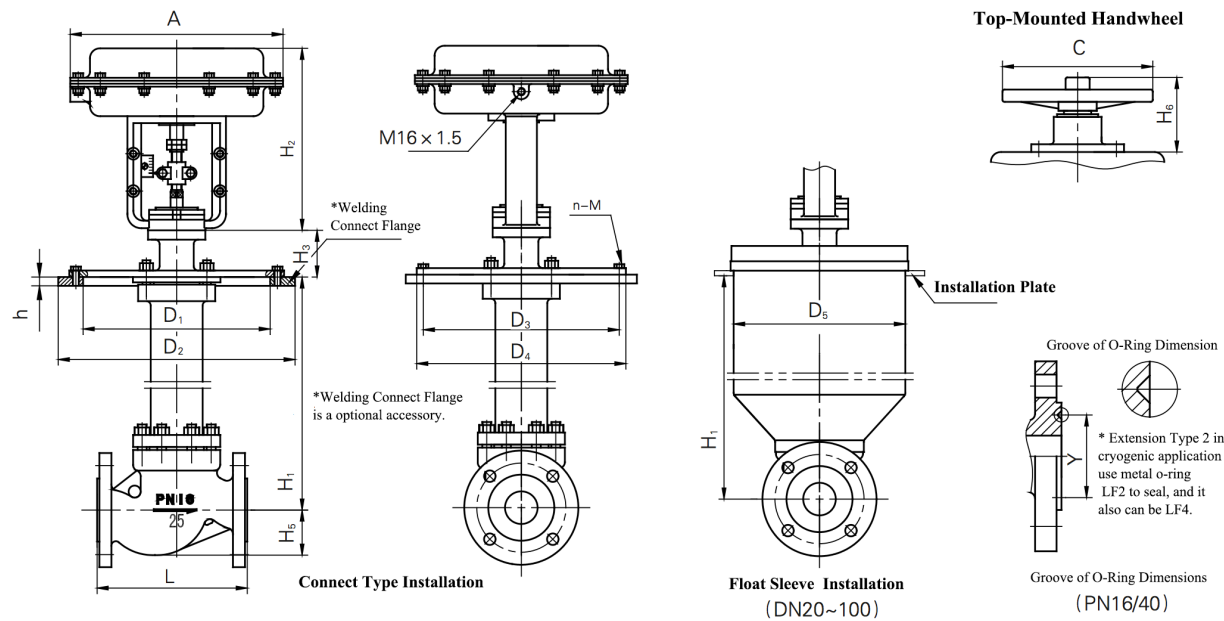
External Dimensions for Steam Jacket



Unit: mm

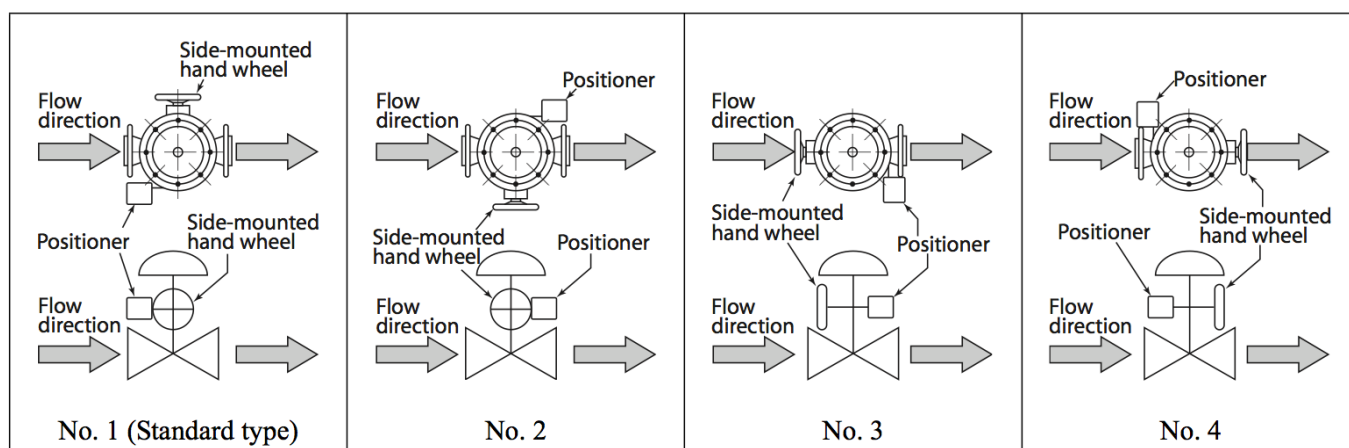
Nominal Diameter DN(mm)	L	A	H1	H2	H3	H5	H6	L1	L2	C	Flange
20	230	282	140	258	220	45	180	50	70	220	40
25	230	282	140	258	220	50	180	50	70	220	40

External Dimensions for Extension Type 2



Unit: mm

Nominal Diameter DN(mm)	L			A	H1	H2	H3	H5	D3	D4	n-M	D5	X	Y	C	H6	Flange
	150LB	300LB	600LB														
20	184	194	194	282	700	58	69	42	260	290	8-M12	285	2.5	45	220	180	40
25	184	197	197														40



Actuator orientation

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

Ordering Information

When ordering, please specify;

- | | |
|--|---|
| 1) Model Number: HLS | 9) Accessories (pressure regulator and etc.) |
| 2) Nominal size × Cv required | 10) Special requirement of degreasing, copper free and etc. |
| 3) Type and rating of end connections | 11) Name of flow medium |
| 4) Body and trim material, necessity of hardening | 12) Normal flow and maximum required flow |
| 5) Type of bonnet | 13) Pressure of flow medium, upstream and downstream pressure at maximum and minimum, required flow |
| 6) Valve and plug characteristics | 14) Temperature and specific gravity of flow medium |
| 7) Type of actuator, necessity of hand wheel, and air to diaphragm | 15) Viscosity of flow medium, inclusive or exclusive of slurry |
| 8) Valve action (direct or reverse) | |

*Specifications are subject to change without notice.

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