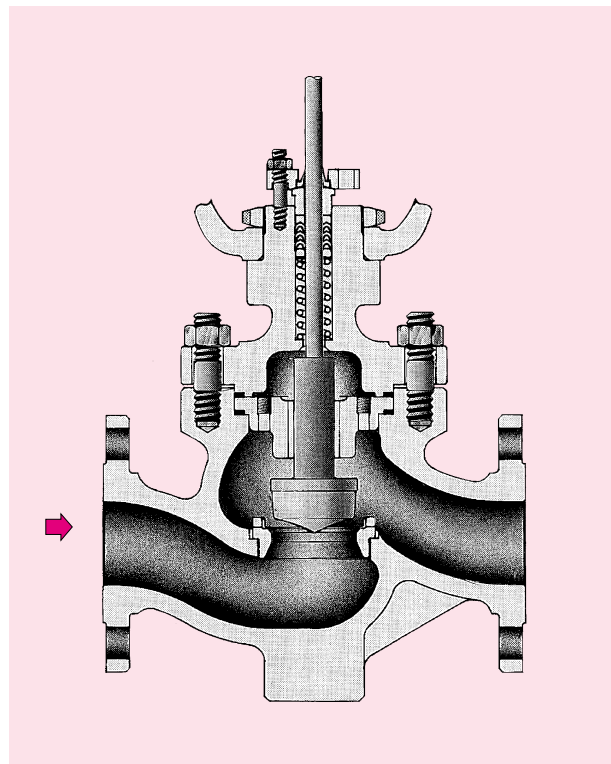


Model 89

TOP-GUIDED AND SINGLE SEATED GLOBE VALVES

Model 89 globe valves provide topguided and single seated structure with simple stream-lined body for high flow capacity and are designed to meet various service process control requirements such as high viscosity flow or slurry flow etc. in a wide range of related industries.

Together with compactly designed multispring diaphragm actuator, Model No.89 globe valves provide stable control performance with high thrust power.



89

1. SPECIFICATIONS

Valve Type		Diaphragm operated control valve											
Valve Model No.		3889, 2889											
VALVE BODY	Body Type	Model 89 Globe type											
	Valve Sizes	(mm)	15	20	25	40	50	65	80	100	125	150	200
		(in.)	1/2	3/4	1	1 1/2	2	2 1/2	3	4	5	6	8
	Pressure Rating	JIS 10K, 20K, 30K, 40K, ANSI/JPI Class 150, 300, 400, 600											
	End Connections	Flanged end : FF, RF, RJ, Male and female, Tongue and groove (※ Welding end : SW, BW)											
	Body Materials	SCPH2, SCS13A, SCS14A											
	Bonnet Types	Plain Bonnet (- 17 < T ≤ 230 °C) Extension Type F (- 45 ≤ T < - 17 °C, 230 < T ≤ 550 °C) Extension Type H (- 196 ≤ T < - 45 °C)											
		Bellows seal (See page 4 4)											
	Gland Type	Bolted gland											
	Packing (Non Asbestos)	PTFE V-ring, Braided packing, Molded packing.											
	Gaskets (Non Asbestos)	Serrated gasket, Spiral wound gasket											
	Guiding	Top guide											
	Valve Plug Action	Push-down close											
	Seat Type	Single seated											
	Valve Plug Shapes	Contoured plug (P), Quick opening (Q)											
Plug Characteristics	Equal percentage, Linear, Quick opening												
Trim Materials	SUS 316, SUS 304												
Treatment of Trim	See page 3 "Main Materials"												

ACTUATOR	Actuator Type	Model 3800 Multi-spring type single acting diaphragm actuator				Model 2800 Spring type single acting diaphragm actuator		
	Actuator Sizes	N24	N28	N33S	N40	500S	650S	
	Max. Stroke(mm)	25	38	38	65	65	65	
	Supply Air Press. kPa(kgf/cm²G)	120(1.2), 240(2.4),280(2.8),300(3.0), 400(4.0)				120(1.2), 240(2.4),280(2.8)		
	Spring Range kPa(kgf/cm²G)	20 ~ 100(0.2 ~ 1.0), 40 ~ 200(0.4 ~ 2.0) 80 ~ 200(0.8 ~ 2.0), 120 ~ 280(1.2 ~ 2.8)				20 ~ 100(0.2 ~ 1.0) 40 ~ 200(0.4 ~ 2.0) 60 ~ 220(0.6 ~ 2.2) 80 ~ 240(0.8 ~ 2.4) 100 ~ 220(1.0 ~ 2.2)		
	Action	Direct action, Reverse action						
	Materials	(Diaphragm)Cloth reinforced chloroprene rubber, (Yoke)FC200						
	Air Connection	Rc 1/4, Rc 3/8 (only for 650 S)						
	Ambient Temperature	- 20 ~ + 70 °C (- 50 ~ - 20 °C, + 70 ~ + 100 °C)*				- 30 ~ + 70 °C (- 50 ~ - 30 °C, + 70 ~ + 100 °C)*		
Painting Color	Silver, No painting on stainless steel							
VALVE CHARACTERISTICS AND PERFORMANCE	Control Mode	Throttling control, On-Off						
	Valve Action	Direct action (Air-to close), Reverse action (Air-to open)						
	Available Max. Pressure	9.8MPaG(100kgf/cm ² G) or less (Pressure limit shall conform to the standard of material & pressure temperature rating)						
	Available Temperature	- 196 °C ~ + 550 °C(Temperature limit shall conform to the standard of material & pressure temperature rating)						
	Allowable Differential Press.	See page 7 "Allowable Shut-off Pressure"						
	Rated Cv Value	See page 5 "Rated Cv Value"						
	Flow Characteristics	See page 5 "Flow Characteristics"						
	Inherent Rangeability	Standard 50 : 1 High-Range 100 : 1 (6mm,7mm only)						
	Allowable Seat Leakage Rate	Metal Seat	Contoured Plug	0.01% of rated Cv (ANSI/FCI Class IV)			Tight Shut Off (TSO) * (Valve size)(% of rated Cv) 25mm or less ... 0.0001% 100mm or less ... 0.001% 200mm or less ... 0.002%	ANSI/FCI Class V*
			Quick Opening	(Valve size)(% of rated Cv) 25mm or less ... 0.0001% 100mm or less ... 0.001% 200mm or less ... 0.002%				
	Soft Seat	Contoured Plug	ANSI/FCI Class VI					
			Quick Opening					
	Function Accuracy	Plain Bonnet	Hysteresis Error (With positioner)	Max. 1 % F.S. ... PTFE V-ring		Max. 2% F.S. ... Other Gland Packing		
Linearity (With positioner)			Max. ± 1 % F.S. ... PTFE V-ring		Max. ± 2% F.S. ... Other Gland Packing			
Bellows Seal Bonnet		Hysteresis Error (With positioner)	Max. 1.5% F.S. ... PTFE V-ring		Max. 2% F.S. ... Other Gland Packing			
		Linearity (With positioner)	Max. ± 1.5% F.S. ... PTFE V-ring		Max. ± 2% F.S. ... Other Gland Packing			
OPTIONS*	Valve Body	Drain plug, Special treatment to trim, Jacketed body						
	Actuator	Handwheel (Top-mounted or Side-mounted). Travel stop. Diaphragm material:Ethylene propylene rubber. Yoke material:SCPH2						
	Accessories	Pneumatic valve positioner(PA92A), Electro-pneumatic valve positioner(EA90A, EA91A, EA10S), Air filter regulator(MR 2000), Limit switch, Solenoid valve, Booster relay, Speed controller, Lock up valve, Pneumatic operated valve.						
	Others	The high pressure gas safety law certification, Oil free, Water free, Sandproof, Dustproof, Anti-salt damage, Vacuum service, Cold district spec, Tropical district spec, External exposure Bolts & Nuts S.S., Optional painting color.						

[Notes] (1) ※ Manufactured and mounted as option on customer's request.
(2) Jacketed body is available for body rating 300LB and less.

2. MAIN MATERIALS

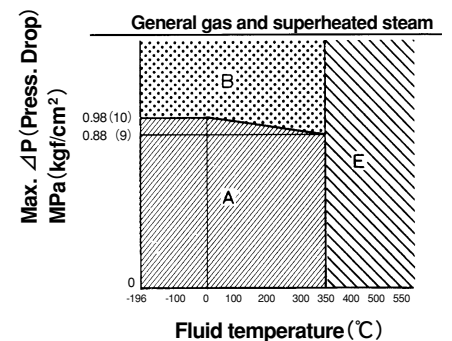
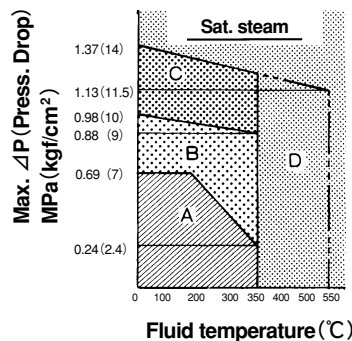
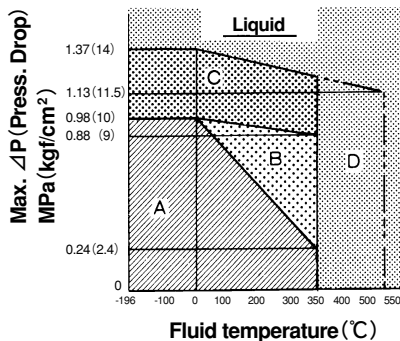
1 Typical Combination of Materials

Parts Name		Materials		
Body, Bonnet		SCPH2 (ASTM A216 WCB)	SCS13A (ASTM A351 CF8)	SCS14A (ASTM A351 CF8M)
Trim	Seat Ring Valve Plug	Valve size ≤ 80mm : SUS316 Valve size ≤ 100mm : SUS304		SUS316
	Valve Stem	SUS316		
	Guide Bushing	SUS630		SUS316
Stud Bolts & Nuts	10K, 20K, 30K 150, 300	SNB7/S45C(H)	SUS304/SUS304	
	40K 400, 600	SNB7/S45C(H)	A193 GrB8 CL2/SUS304	

- 【Notes】 (1) This table shows typical combination of materials. The combination may be subject to change by pressure, temperature and kind of fluid.
 (2) Trim materials may be used casting instead of bar materials.
 (3) Bonnet may be forged in some cases.

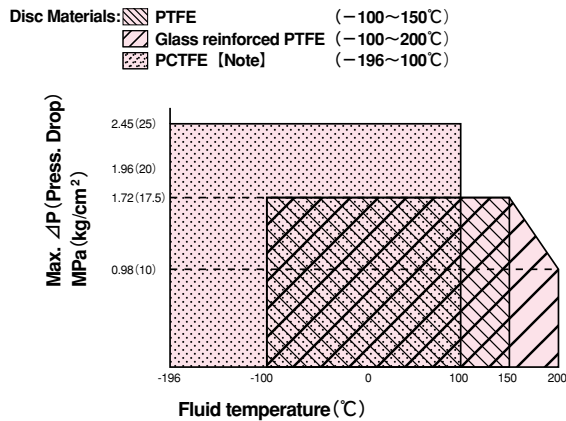
2 Pressure and Temperature Range for Stellite Hard Facing on Trim

- A : No Stellite is required B : Stellite seat C : Stellite face
 D : Stellite face + stellite on guide bushing and guide post
 E : Stellite seat + stellite on guide bushing and guide post



- (1) Stellite seat or higher surface treatment is required for ON-OFF and Tight-shut-off(TSO) valves.
- (2) SUS440B Trim material is suitable for flashing or cavitation conditions or saturated steam, in range of temperature from - 20 to 400 °C.
- (3) Irrespective of service fluid, when the temperature is 350 °C and over, guide bushing and guide post shall be made stellite hard facing treatment.
- (4) For saturated steam with inlet pressure of 0.69MPaG(7kg/cm²G) and over, stellite seat or better surface treatment is required.
- (5) For liquid service with shut-off pressure exceeding 1.37MPaG(14kg/cm²G), stellite seat or better treatment is required.

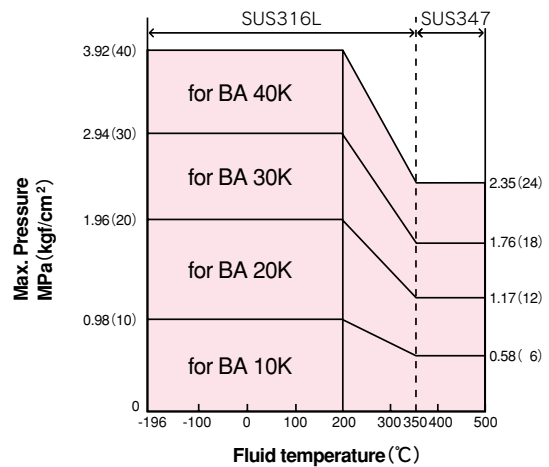
3 Pressure and Temperature Range of Soft Disc



[Note] Polychlorotrifluoroethylene

4 Pressure and Temperature Range of Bellows Seal Bonnet

Bellows Material : SUS 316L



3. SCOPE OF PRODUCTION

1 Combination of Valve Body and Actuator

Valve Model		3889				2889	
Actuator Size		N24	N28	N33S	N40	500S	650S
Valve Size							
15 (mm)	1/2 (in.)	●	●	●			
20	3/4	●	●	●			
25	1	●	●	●			
40	1 1/2	●	●	●	●	●	
50	2	●	●	●	●	●	
65	2 1/2		●	●	●	●	
80	3		●	●	●	●	●
100	4		●	●	●	●	●
125	5				●	●	●
150	6				●	●	●
200	8				●	●	●

2 Scope of Port

Metal Seat · Contoured plug

Port Sizes		mm	φ4	6	7	8	10	15	20	25	32	40	50	65	80	100	125	150	200
Rated Travel (mm)		in.	—	1/8	3/16	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	5	6	8
Valve Size			15							20		25	38			50		65	
15 (mm)	1/2 (in.)		◆	◆	◆	◆	◆	●											
20	3/4		◆	◆	◆	◆	◆	◆	●										
25	1		◆	◆	◆	◆	◆	◆	◆	●									
40	1 1/2		◆	◆	◆	◆	◆	◆	◆	◆	◆	●							
50	2						◆	◆	◆	◆	◆	◆	●						
65	2 1/2									◆	◆	◆	◆	●					
80	3									◆	◆	◆	◆	◆	●				
100	4												◆	◆	◆	●			
125	5													◆	◆	◆	●		
150	6														◆	◆	◆	●	
200	8															◆	◆	◆	●

- [Notes] (1) ● : Full port, ◆ : Reduced port
 (2) Rated travel shall be determined in accordance with port size, irrespective of valve size.
 (3) PCTFE is used for resilient seat material of port size 3/8 inch (10 mm) and under.
 (4) For quick-opening service, only full port is available for valve size 1 1/2 inch and over except 1 1/2 inch × 1 1/4 inch. For valve size 1 inch and less, reduced port up to 1/4 inch is available.

4. FLOW CHARACTERISTICS

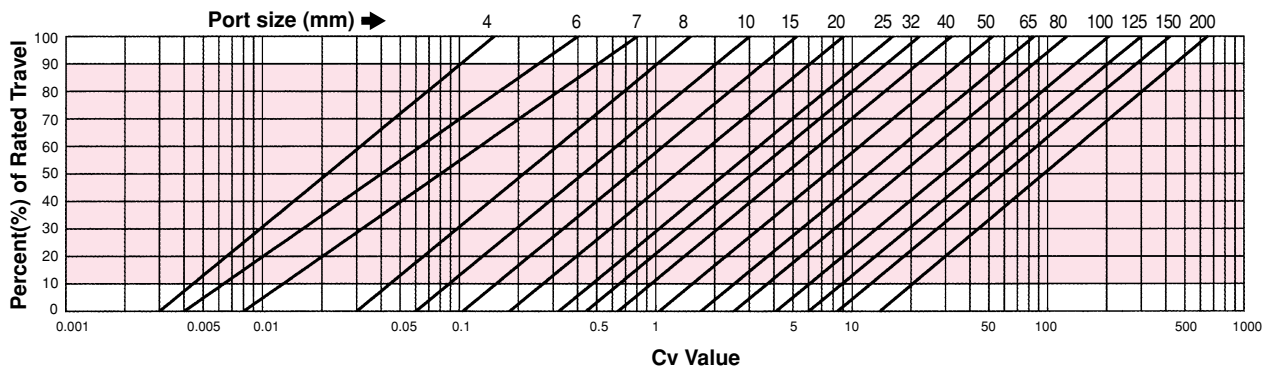
1 Rated Cv Value

Port size	mm	4	6	7	8	10	15	20	25	32	40	50	65	80	100	125	150	200	
	in.	—	1/8	3/16	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	5	6	8	
Rated Travel(mm)		15									20		25	38			50		65
Rated Cv Value	Contoured	0.15	0.4	0.8	1.5	3.0	5.2	9	16	22	32	52	85	125	205	300	420	640	
	Quick opening	—	—	—	2.0	3.5	6	10	18	25	40	60	90	135	220	350	460	800	
Inherent Rangeability(Eq%)		50:1	100:1		50:1														
Inherent Rangeability(Lin)		30:1	50:1																

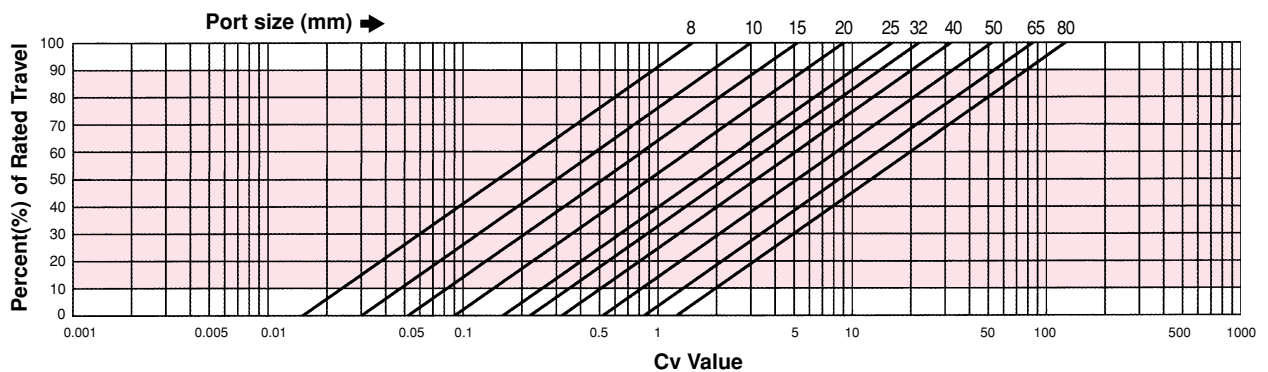
[Notes] (1) High rangeability is applicable for port size 4 mm ~ 7 mm with equal percentage plug.
 (2) Rangeability 100 : 1 is available on request for port size 1/4 inch ~ 3 inch with equal percentage plug.

2 Flow Characteristics

■ Contoured plug Equal percentage(P)



■ Contoured plug Equal percentage(P)
 Rangeability 100 : 1



[Note] Shaded zone represents proper throttling control range.

[Note] If micro-flow control Cv is required, Model 3306 is recommended.

Model No.	3306-M										3306-L				
Rangeability	500 : 1										50 : 1				
Rated Cv	0.0005	0.001	0.002	0.005	0.01	0.02	0.05	0.1	0.15	0.02	0.05	0.1	0.15	0.2	0.4
Flow Characteristics	Modified Eq%										Linear				

See Catalogue No. MCE-B 1601 for details.

5. ALLOWABLE DIFFERENTIAL PRESSURE

1 Off-balance Classification

Unit : kPaG(kg/cm²G)

Action			Spring Range		Supply Air Pressure	Off-balance	Positioner	
			Actuator Size					
			N24 ~ N40	500, 650				
Contoured Plug	Direct Action		20 ~ 100(0.2 ~ 1.0)		120(1.2)	20(0.2)	without	
			40 ~ 200(0.4 ~ 2.0)		240(2.4)	40(0.4)	with	
			—	60 ~ 220(0.6 ~ 2.2)	280(2.8)	60(0.6)		
			40 ~ 200(0.4 ~ 2.0)	40 ~ 200(0.4 ~ 2.0)	280(2.8)	80(0.8)		
			—	—	300(3.0)	100(1.0)		
	—	—	280(2.8)	100(1.0)	with			
	—	20 ~ 180(0.2 ~ 1.8)	400(4.0)	120(1.2)				
	Reverse Action		20 ~ 100(0.2 ~ 1.0)			120(1.2)	20(0.2)	without
			40 ~ 200(0.4 ~ 2.0)			240(2.4)	40(0.4)	with
			—	60 ~ 220(0.6 ~ 2.2)		280(2.8)	60(0.6)	
80 ~ 200(0.8 ~ 2.0)			80 ~ 240(0.8 ~ 2.4)	280(2.8)	80(0.8)			
—			100 ~ 220(1.0 ~ 2.2)	280(2.8)	100(1.0)			
—	—	400(4.0)	120(1.2)	with				
—	—	280(2.8)	100(1.0)					
Direct Action		40 ~ 200(0.4 ~ 2.0)			240(2.4)	40(0.4)	with	
		—	60 ~ 220(0.6 ~ 2.2)		280(2.8)	60(0.6)		
		40 ~ 200(0.4 ~ 2.0)	40 ~ 200(0.4 ~ 2.0)		280(2.8)	80(0.8)		
		—	—	300(3.0)	100(1.0)			
		—	20 ~ 180(0.2 ~ 1.8)	280(2.8)	100(1.0)	with		
—	—	400(4.0)	120(1.2)					
Reverse Action		40 ~ 200(0.4 ~ 2.0)		240(2.4)	40(0.4)		with	
		—	60 ~ 220(0.6 ~ 2.2)	280(2.8)	60(0.6)			
		80 ~ 200(0.8 ~ 2.0)	80 ~ 240(0.8 ~ 2.4)	280(2.8)	80(0.8)			
		—	100 ~ 220(1.0 ~ 2.2)	280(2.8)	100(1.0)			
		—	—	400(4.0)	120(1.2)			

[Notes] (1) Spring Range 120 ~ 280kPaG is available for actuator size N33S and N40.
 (2) Off-balance 100kPaG(1.0kgf/cm²G) is applied only to direct action for the actuator size N24, N28, N33S and N40.

2 Limit of Operating Δ P at intermediate opening

State of Fluid	Port Size 20 mm and less	Port Size 25 mm ~ 200 mm
GAS, STEAM	Less than Δ P 6.0MPa	Less than Δ P 2.5MPa
LIQ. (NO CAVITATION OR FLASHING)		Less than Δ P 1.5MPa

[Note] It is recommended to select Model # 89 cage valves for the services bigger than above Δ P.

3 Allowable Shut-off Pressure

■ Metal Seat · Contoured Plug (See p.8 [Note(5)])

Unit : MPa(kgf/cm²)

Port Size		≤ 6(mm)	7	8	10	15	20	25	32	40	50	65	80	100	125	150	200	
Actuator size	Off-balance	≤ 1/8 (in.)	3/16	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	5	6	8	
N24	20 (0.2)	6.96 (71)		4.65 (47.5)	3.10 (31.7)	1.88 (19.2)	1.019 (10.4)	0.69 (7.1)	0.47 (4.8)	0.34 (3.5)	0.20 (2.1)							
	40 (0.4)	9.80 (100)		9.21 (94)	6.17 (63)	3.76 (38.4)	2.04 (20.9)	1.39 (14.2)	0.95 (9.7)	0.69 (7.1)	0.41 (4.2)							
	80 (0.8)			9.80 (100)	7.45 (76)	4.10 (41.9)	2.78 (28.4)	1.90 (19.4)	1.39 (14.2)	0.83 (8.5)								
	100 (1.0)			9.80 (100)	9.41 (96)	5.09 (52)	3.48 (35.5)	2.38 (24.3)	1.74 (17.8)	1.04 (10.7)								
N28	20 (0.2)	9.02 (92)		5.98 (61)	4.03 (41.1)	2.44 (24.9)	1.33 (13.6)	0.90 (9.2)	0.62 (6.3)	0.45 (4.6)	0.26 (2.7)	0.16 (1.7)	0.11 (1.2)	0.06 (0.7)				
	40 (0.4)	9.80 (100)		8.04 (82)	4.88 (49.8)	2.66 (27.2)	1.80 (18.4)	1.23 (12.6)	0.90 (9.2)	0.53 (5.5)	0.34 (3.5)	0.24 (2.5)	0.13 (1.4)					
	80 (0.8)			9.80 (100)	5.29 (54)	3.59 (36.7)	2.46 (25.2)	1.80 (18.4)	1.07 (11.0)	0.68 (7.0)	0.49 (5.0)	0.28 (2.9)						
	100 (1.0)			9.80 (100)	6.66 (68)	4.52 (46.1)	3.08 (31.5)	2.26 (23.1)	1.35 (13.8)	0.86 (8.8)	0.61 (6.3)	0.35 (3.6)						
N33S	20 (0.2)	9.80 (100)		5.88 (60)	3.58 (36.6)	1.96 (20.0)	1.32 (13.5)	0.90 (9.2)	0.66 (6.8)	0.39 (4.0)	0.24 (2.5)	0.17 (1.8)	0.09 (1.0)					
	40 (0.4)			7.15 (73)	3.92 (40.0)	2.65 (27.1)	1.81 (18.5)	1.33 (13.6)	0.79 (8.1)	0.50 (5.1)	0.36 (3.7)	0.20 (2.1)						
	80 (0.8)			9.80 (100)	7.84 (80)	5.29 (54)	3.63 (37.1)	2.66 (27.2)	1.59 (16.3)	1.01 (10.3)	0.72 (7.4)	0.42 (4.3)						
	100 (1.0)			9.80 (100)	6.57 (67)	4.54 (46.4)	3.33 (34.0)	2.00 (20.4)	1.26 (12.9)	0.91 (9.3)	0.52 (5.4)							
	120 (1.2)			9.80 (100)	7.94 (81)	5.39 (55)	4.00 (40.8)	2.39 (24.4)	1.52 (15.5)	1.09 (11.2)	0.63 (6.5)							
N40	20 (0.2)								1.27 (13.0)	0.93 (9.5)	0.55 (5.7)	0.35 (3.6)	0.25 (2.6)	0.14 (1.5)	0.08 (0.9)	0.05 (0.6)	0.03 (0.4)	
	40 (0.4)								2.55 (26.1)	1.87 (19.1)	1.11 (11.4)	0.71 (7.3)	0.509 (5.2)	0.29 (3.0)	0.18 (1.9)	0.12 (1.3)	0.07 (0.8)	
	80 (0.8)								5.09 (52)	3.74 (38.2)	2.24 (22.9)	1.43 (14.6)	1.02 (10.5)	0.59 (6.1)	0.38 (3.9)	0.26 (2.7)	[0.15] [(1.6)]	
	100 (1.0)								6.37 (65)	4.68 (47.8)	2.81 (28.7)	1.78 (18.2)	1.28 (13.1)	0.74 (7.6)	0.48 (4.9)	0.33 (3.4)	0.19 (2.0)	
	120 (1.2)								7.64 (78)	5.58 (57)	3.37 (34.4)	2.14 (21.9)	1.53 (15.7)	0.89 (9.1)	0.57 (5.9)	0.40 (4.1)	0.23 (2.4)	
500	20 (0.2)								2.13 (21.8)	1.55 (15.9)	0.93 (9.5)	0.59 (6.1)	0.42 (4.3)	0.24 (2.5)	0.15 (1.6)	0.10 (1.1)	0.05 (0.6)	
	40 (0.4)								4.27 (43.6)	3.12 (31.9)	1.87 (19.1)	1.19 (12.2)	0.85 (8.7)	0.49 (5.0)	0.32 (3.3)	0.22 (2.3)	0.12 (1.3)	
	60 (0.6)								6.37 (65)	4.69 (47.9)	2.81 (28.7)	1.79 (18.3)	1.28 (13.1)	0.74 (7.6)	0.48 (4.9)	0.33 (3.4)	0.19 (2.0)	
	80 (0.8)								8.53 (87)	6.17 (63)	3.75 (38.3)	2.39 (24.4)	1.71 (17.5)	0.99 (10.1)	0.64 (6.6)	0.45 (4.6)	0.26 (2.7)	
	100 (1.0)								9.80 (100)	7.74 (79)	4.69 (47.9)	2.99 (30.5)	2.14 (21.9)	1.24 (12.7)	0.81 (8.3)	0.56 (5.8)	0.33 (3.4)	
650	40 (0.4)												1.49 (15.2)	0.86 (8.8)	0.55 (5.7)	0.39 (4.0)	0.23 (2.4)	
	60 (0.6)												2.23 (22.8)	1.29 (13.2)	0.84 (8.6)	0.58 (6.0)	0.35 (3.6)	
	80 (0.8)												2.98 (30.4)	1.72 (17.6)	1.12 (11.5)	0.78 (8.0)	0.47 (4.8)	
	100 (1.0)												3.73 (38.1)	2.15 (22)	1.41 (14.4)	0.98 (10)	0.58 (6.0)	

■ Metal Seat · Quick Opening

Unit : MPa(kgf/cm²)

Port Size		8(mm)	10	15	20	25	32	40	50	65	80	100	125	150	200	
Actuator size	Off-balance	1/4 (in.)	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	5	6	8	
N24	40 (0.4)	7.74 (79)	5.09 (52)	3.17 (32.0)	1.70 (17.4)	1.15 (11.8)	0.79 (8.1)	0.57 (5.9)	0.34 (3.5)							
	80 (0.8)	9.80 (100)	6.27 (64)	3.42 (34.9)	2.32 (23.7)	1.58 (16.2)	1.15 (11.8)	0.69 (7.1)								
	100 (1.0)		7.84 (80)	4.28 (43.7)	2.90 (29.6)	1.98 (20.3)	1.45 (14.8)	0.87 (8.9)								
N28	40 (0.4)	9.80 (100)	6.66 (68)	4.06 (41.5)	2.21 (22.6)	1.50 (15.3)	0.99 (10.5)	0.75 (7.7)	0.45 (4.6)	0.28 (2.9)	0.20 (2.1)	0.11 (1.2)				
	80 (0.8)		8.13 (83)	4.44 (45.3)	3.01 (30.7)	2.06 (21.0)	1.50 (15.4)	0.90 (9.2)	0.56 (5.8)	0.41 (4.2)	0.23 (2.4)					
	100 (1.0)		9.80 (100)	5.58 (57)	3.76 (38.4)	2.57 (26.3)	1.68 (17.2)	1.12 (11.5)	0.71 (7.3)	0.509 (5.2)	0.29 (3.0)					
N33S	40 (0.4)	9.80 (100)	5.98 (61)	3.26 (33.3)	2.21 (22.6)	1.50 (15.4)	1.10 (11.3)	0.66 (6.8)	0.42 (4.3)	0.30 (3.1)	0.17 (1.8)					
	80 (0.8)		6.47 (66)	4.43 (45.2)	3.02 (30.9)	2.21 (22.6)	1.33 (13.6)	0.84 (8.6)	0.60 (6.2)	0.35 (3.6)						
	100 (1.0)		9.80 (100)	8.13 (83)	5.49 (56)	3.79 (38.7)	2.77 (28.3)	1.66 (17.0)	1.05 (10.8)	0.75 (7.7)	0.44 (4.5)					
	120 (1.2)		9.80 (100)	6.57 (67)	4.55 (46.4)	3.33 (34)	2.00 (20.4)	1.26 (12.9)	0.91 (9.3)	0.52 (5.4)						
N40	40 (0.4)						2.13 (21.0)	1.55 (15.9)	0.93 (9.5)	0.58 (6.0)	0.42 (4.3)	0.24 (2.5)	0.15 (1.6)	0.10 (1.1)	0.05 (0.6)	
	80 (0.8)						4.27 (43.6)	3.12 (31.9)	1.86 (19.0)	1.18 (12.1)	0.85 (8.7)	0.49 (5.0)	0.32 (3.3)	0.22 (2.3)	[0.12] (1.3)	
	100 (1.0)						5.29 (54)	3.90 (39.8)	2.34 (23.9)	1.49 (15.2)	1.06 (10.9)	0.61 (6.3)	0.40 (4.1)	0.28 (2.9)	0.16 (1.7)	
	120 (1.2)						6.37 (65)	4.68 (47.8)	2.81 (28.7)	1.78 (18.2)	1.28 (13.1)	0.74 (7.6)	0.48 (4.9)	0.33 (3.4)	0.19 (2.0)	
500	40 (0.4)						3.56 (36.4)	2.60 (26.6)	1.55 (15.9)	0.99 (10.1)	0.71 (7.3)	0.41 (4.2)	0.26 (2.7)	0.18 (1.9)	0.10 (1.1)	
	60 (0.6)						5.29 (54)	3.91 (39.9)	2.34 (23.9)	1.49 (15.2)	1.06 (10.9)	0.61 (6.3)	0.40 (4.1)	0.28 (2.9)	0.16 (1.7)	
	80 (0.8)						7.06 (72)	5.19 (53)	3.12 (31.9)	1.99 (20.3)	1.43 (14.6)	0.82 (8.4)	0.53 (5.5)	0.37 (3.8)	0.22 (2.3)	
	100 (1.0)						8.92 (91)	6.47 (66)	3.91 (39.9)	2.49 (25.4)	1.78 (18.2)	1.03 (10.6)	0.67 (6.9)	0.47 (4.8)	0.27 (2.8)	
650	40 (0.4)											1.24 (12.7)	0.71 (7.3)	0.47 (4.8)	0.32 (3.3)	0.19 (2.0)
	60 (0.6)											1.86 (19.0)	1.07 (11.0)	0.70 (7.2)	0.49 (5.0)	0.29 (3.0)
	80 (0.8)											2.49 (25.4)	1.44 (14.7)	0.94 (9.6)	0.65 (6.7)	0.39 (4.0)
100 (1.0)											3.10 (31.7)	1.80 (18.4)	1.17 (12)	0.82 (8.4)	0.49 (5.0)	

■ Soft Seat(PTFE)

Unit : MPa(kgf/cm²)

Port Size		4~8(mm)	10	15	20	25	32	40	50	65	80	100	125	150	200
Actuator size	Off-balance	≤1/4(in.)	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	5	6	8
N24	40(0.4)	—	—	1.71(17.5)	1.16(11.9)	0.85(8.7)	0.59(6.0)	0.45(4.6)	0.29(3.0)						
	80(0.8)	—	—	—	—	—	1.18(12.1)	0.91(9.3)	0.58(6.0)						
	100(1.0)	—	—	—	—	—	1.47(15.1)	1.13(11.6)	0.73(7.5)						
N28	20(0.2)	—	1.71(17.5)	1.22(12.5)	0.75(7.7)	0.54(5.6)	0.38(3.9)	0.29(3.0)	0.18(1.9)	0.12(1.3)	0.08(0.9)	0.05(0.6)			
	40(0.4)	—	—	—	1.52(15.5)	1.10(11.3)	0.76(7.8)	0.58(6.0)	0.38(3.9)	0.25(2.6)	0.18(1.9)	0.11(1.2)			
	80(0.8)	—	—	—	—	—	1.53(15.7)	1.18(12.1)	0.76(7.8)	0.51(5.3)	0.38(3.9)	0.23(2.4)			
N33S	100(1.0)	—	—	—	—	—	—	—	0.96(9.8)	0.64(6.6)	0.48(4.9)	0.29(3.0)			
	20(0.2)			1.71(17.5)	1.11(11.4)	0.81(8.3)	0.56(5.7)	0.43(4.4)	0.27(2.8)	0.18(1.9)	0.13(1.4)	0.07(0.8)			
	40(0.4)			—	—	1.62(16.6)	1.12(11.5)	0.87(8.9)	0.55(5.7)	0.38(3.9)	0.28(2.9)	0.16(1.7)			
	80(0.8)			—	—	—	—	—	1.12(11.5)	0.76(7.8)	0.56(5.8)	0.34(3.5)			
N40	100(1.0)			—	—	—	—	—	—	0.95(9.7)	0.70(7.2)	0.43(4.4)			
	120(1.2)			—	—	—	—	—	—	—	0.85(8.7)	0.51(5.3)			
	20(0.2)						0.79(8.1)	0.60(6.2)	0.39(4.0)	0.26(2.7)	0.19(2.0)	0.11(1.2)	0.07(0.8)	0.05(0.6)	0.02(0.3)
	40(0.4)						—	1.22(12.5)	0.79(8.1)	0.52(5.4)	0.40(4.1)	0.24(2.5)	0.15(1.6)	0.11(1.2)	0.06(0.7)
	80(0.8)						—	—	—	—	0.80(8.2)	0.49(5.0)	0.32(3.3)	0.23(2.4)	0.13(1.4)
500	100(1.0)						—	—	—	—	—	0.60(6.2)	0.41(4.2)	0.29(3.0)	0.17(1.8)
	120(1.2)						—	—	—	—	—	0.73(7.5)	0.49(5.0)	0.35(3.6)	0.21(2.2)
	40(0.4)									—	0.66(6.8)	0.40(4.1)	0.27(2.8)	0.19(2.0)	0.11(1.2)
	60(0.6)									—	—	0.60(6.2)	0.41(4.2)	0.29(3.0)	0.17(1.8)
650	80(0.8)									—	—	—	0.54(5.6)	0.39(4.0)	0.23(2.4)
	100(1.0)									—	—	—	—	0.50(5.1)	0.29(3.0)
	40(0.4)												0.48(4.9)	0.34(3.5)	0.20(2.1)
	60(0.6)												—	0.51(5.3)	0.31(3.2)
650	80(0.8)												—	—	0.41(4.2)
	100(1.0)												—	—	—

■ Soft Seat(GL-PTFE)

Unit : MPa(kgf/cm²)

Port Size		4~8(mm)	10	15	20	25	32	40	50	65	80	100	125	150	200
Actuator size	Off-balance	≤1/4(in.)	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	5	6	8
N24	40(0.4)	—	—	1.89(19.3)	1.16(11.9)	0.85(8.7)	0.59(6.0)	0.45(4.6)	0.29(3.0)						
	80(0.8)	—	—	—	—	1.70(17.4)	1.18(12.1)	0.91(9.3)	0.58(6.0)						
	100(1.0)	—	—	—	—	—	1.47(15.1)	1.13(11.6)	0.73(7.5)						
N28	20(0.2)	—	1.79(18.3)	1.22(12.5)	0.75(7.7)	0.54(5.6)	0.38(3.9)	0.29(3.0)	0.18(1.9)	0.12(1.3)	0.08(0.9)	0.05(0.6)			
	40(0.4)	—	—	—	1.52(15.5)	1.10(11.3)	0.76(7.8)	0.58(6.0)	0.38(3.9)	0.25(2.6)	0.18(1.9)	0.11(1.2)			
	80(0.8)	—	—	—	—	—	1.53(15.7)	1.18(12.1)	0.76(7.8)	0.51(5.3)	0.38(3.9)	0.23(2.4)			
	100(1.0)	—	—	—	—	—	—	1.48(15.1)	0.96(9.8)	0.64(6.6)	0.48(4.9)	0.29(3.0)			
N33S	20(0.2)			1.80(18.4)	1.11(11.4)	0.81(8.3)	0.56(5.7)	0.43(4.4)	0.27(2.8)	0.18(1.9)	0.13(1.4)	0.07(0.8)			
	40(0.4)			—	—	1.62(16.6)	1.12(11.5)	0.87(8.9)	0.55(5.7)	0.38(3.9)	0.28(2.9)	0.16(1.7)			
	80(0.8)			—	—	—	—	—	1.12(11.5)	0.76(7.8)	0.56(5.8)	0.34(3.5)			
	100(1.0)			—	—	—	—	—	—	0.95(9.7)	0.70(7.2)	0.43(4.4)			
	120(1.2)			—	—	—	—	—	—	—	0.85(8.7)	0.51(5.3)			
N40	20(0.2)						0.79(8.1)	0.60(6.2)	0.39(4.0)	0.26(2.7)	0.19(2.0)	0.11(1.2)	0.07(0.8)	0.05(0.6)	0.02(0.3)
	40(0.4)						1.58(16.2)	1.22(12.5)	0.79(8.1)	0.52(5.4)	0.40(4.1)	0.24(2.5)	0.15(1.6)	0.11(1.2)	0.06(0.7)
	80(0.8)						—	—	—	1.06(10.9)	0.80(8.2)	0.49(5.0)	0.32(3.3)	0.23(2.4)	0.13(1.4)
	100(1.0)						—	—	—	—	1.00(10.2)	0.60(6.2)	0.41(4.2)	0.29(3.0)	0.17(1.8)
	120(1.2)						—	—	—	—	—	0.73(7.5)	0.49(5.0)	0.35(3.6)	0.21(2.2)
500	40(0.4)								1.32(13.5)	0.89(9.1)	0.66(6.8)	0.40(4.1)	0.27(2.8)	0.19(2.0)	0.11(1.2)
	60(0.6)								—	—	1.00(10.2)	0.60(6.2)	0.41(4.2)	0.29(3.0)	0.17(1.8)
	80(0.8)								—	—	—	0.81(8.3)	0.54(5.6)	0.39(4.0)	0.23(2.4)
	100(1.0)								—	—	—	—	—	0.50(5.1)	0.29(3.0)
650	40(0.4)											0.70(7.2)	0.48(4.9)	0.34(3.5)	0.20(2.1)
	60(0.6)											—	—	0.51(5.3)	0.31(3.2)
	80(0.8)											—	—	—	0.41(4.2)
	100(1.0)											—	—	—	0.51(5.3)

■ Soft Seat(PCTFE)

Unit : MPa(kgf/cm²)

Port Size	Off-balance	4~8 (mm)	10	15	20	25	32	40	50	65	80	100	125	150	200	
		≤1/4 (in.)	3/8	1/2	3/4	1	1 1/4	1 1/2	2	2 1/2	3	4	5	6	8	
N24	40(0.4)	2.45(25.0)	2.45(25.0)	1.89(19.3)	1.16(11.9)	0.85(8.7)	0.59(6.0)	0.45(4.6)	0.29(3.0)							
	80(0.8)	-		2.34(23.9)	1.70(17.4)	1.18(12.1)	0.91(9.3)	0.58(6.0)								
	100(1.0)	-		2.45(25.0)	2.13(21.8)	1.47(15.1)	1.13(11.6)	0.73(7.5)								
N28	20(0.2)	2.28(23.3)	1.79(18.3)	1.22(12.5)	0.75(7.7)	0.54(5.6)	0.38(3.9)	0.29(3.0)	0.18(1.9)	0.12(1.3)	0.08(0.9)	0.05(0.6)				
	40(0.4)	2.45(25.0)	2.45(25.0)	2.45(25.0)	1.52(15.5)	1.10(11.3)	0.76(7.8)	0.58(6.0)	0.38(3.9)	0.25(2.6)	0.18(1.9)	0.11(1.2)				
	80(0.8)	-			2.21(22.6)	1.53(15.7)	1.18(12.1)	0.76(7.8)	0.51(5.3)	0.38(3.9)	0.23(2.4)					
100(1.0)	-	2.45(25.0)			1.92(19.6)	1.48(15.1)	0.96(9.8)	0.64(6.6)	0.48(4.9)	0.29(3.0)						
N33S	20(0.2)			1.80(18.4)	1.11(11.4)	0.81(8.3)	0.56(5.7)	0.43(4.4)	0.27(2.8)	0.18(1.9)	0.13(1.4)	0.07(0.8)				
	40(0.4)			2.45(25.0)	2.23(22.8)	1.62(16.6)	1.12(11.5)	0.87(8.9)	0.55(5.7)	0.38(3.9)	0.28(2.9)	0.16(1.7)				
	80(0.8)				2.26(23.1)	1.74(17.8)	1.12(11.5)	0.76(7.8)	0.56(5.8)	0.34(3.5)						
	100(1.0)				2.45(25.0)		2.18(22.3)	1.41(14.4)	0.95(9.7)	0.70(7.2)	0.43(4.4)					
	120(1.2)			-			2.45(25.0)	2.45(25.0)	1.69(17.3)	1.14(11.7)	0.85(8.7)	0.51(5.3)				
N40	20(0.2)						0.79(8.1)	0.60(6.2)	0.39(4.0)	0.26(2.7)	0.19(2.0)	0.11(1.2)	0.07(0.8)	0.05(0.6)	0.02(0.3)	
	40(0.4)						1.58(16.2)	1.22(12.5)	0.79(8.1)	0.52(5.4)	0.40(4.1)	0.24(2.5)	0.15(1.6)	0.11(1.2)	0.06(0.7)	
	80(0.8)								2.45(25.0)	1.58(16.2)	1.06(10.9)	0.80(8.2)	0.49(5.0)	0.32(3.3)	0.23(2.4)	0.13(1.4)
	100(1.0)								2.45(25.0)	1.99(20.3)	1.34(13.7)	1.00(10.2)	0.60(6.2)	0.41(4.2)	0.29(3.0)	0.17(1.8)
	120(1.2)								2.45(25.0)	2.39(24.4)	1.60(16.4)	1.20(12.3)	0.73(7.5)	0.49(5.0)	0.35(3.6)	0.21(2.2)
500	40(0.4)						2.45(25.0)	2.04(20.9)	1.32(13.5)	0.89(9.1)	0.66(6.8)	0.40(4.1)	0.27(2.8)	0.19(2.0)	0.11(1.2)	
	60(0.6)								1.99(20.3)	1.34(13.7)	1.00(10.2)	0.60(6.2)	0.41(4.2)	0.29(3.0)	0.17(1.8)	
	80(0.8)							2.45(25.0)	1.79(18.3)	1.33(13.6)	0.81(8.3)	0.54(5.6)	0.39(4.0)	0.23(2.4)		
	100(1.0)							2.45(25.0)	2.24(22.9)	1.67(17.1)	1.01(10.4)	0.68(7.0)	0.50(5.1)	0.29(3.0)		
650	40(0.4)										1.15(11.8)	0.70(7.2)	0.48(4.9)	0.34(3.5)	0.20(2.1)	
	60(0.6)										1.74(17.8)	1.05(10.8)	0.71(7.3)	0.51(5.3)	0.31(3.2)	
	80(0.8)										2.32(23.7)	1.42(14.5)	0.96(9.8)	0.68(7.0)	0.41(4.2)	
	100(1.0)										2.45(25.0)	1.77(18.1)	1.19(12.2)	0.86(8.8)	0.51(5.3)	

- [Notes] (1) Thick frame represents standard combination of body size at full port and actuator size.
 (2) Unit of off-balance is kPaG(kgf/cm²G)
 (3) Off-balance 100kPaG(1.0kgf/cm²G) is applied only to direct action for the actuator size N24, N28, N33S and N40.
 (4) This table shows available shut-off pressure only for combination with standard gland packing(PTFE V-ring)
 (5) If TSO(Tight Shut-Off) is required for contoured plug, available shut-off pressure must be obtained with multiplying the value in the column by 1/1.2(only applicable to metal-seat). For ANSI Class V requirement, multiply 1/1.5.
 (6) PCTFE is used for resilient seat material of port size 3/8 inch(10mm) and under.
 (7) In case N33S or N40 of actuator size with Off-balance 120kPaG(1.2kgf/cm²G), oil free or bellow seal bonnet or special gland packing shall not be applied.
 (8) When port size 8 inch(200mm), actuator size N40 and Off-balance 80kPaG(0.8kgf/cm²G), above shut-off pressure table is not applicable for reverse action valve with 65mm rated travel.

6. MAIN DIMENSIONS AND MASSES

1 Face-to-face Dimensions of Valve Body

Unit : mm

Press. Rating		Face-to-face Dimension F				
Valve Size (mm)	(in.)	JIS 10K RF	JIS 20K RF	JIS 30K 40KRF	ANSI 600 RJ	SW(≤ 50 mm) BW(≥ 65 mm)
		ANSI 150 RF	ANSI 300 RF	ANSI 300 RJ ANSI 600 RF		
15	1/2		190		203	
20	3/4	184	194		206	206
25	1	184	197		210	220
40	1 1/2	222	235		251	270
50	2	254	267	286	289	320
65	2 1/2	276	292	311	314	380
80	3	298	317	337	340	430
100	4	352	368	394	397	490
125	5	403	425	457	460	580
150	6	451	473	508	511	630
200	8	543	568	610	613	800

- [Notes] (1) Face-to-Face dimension in hatched zone conform to IEC 534-3(JIS B2002) and ISA-S75.03.
 (2) Face-to-Face dimension of male and female, tongue and groove flange for JIS 10K-30K(ANSI 150, ANSI 300) is coincident with JIS30K RF.

2 Standard Dimensions

Unit : mm

Valve Size		Actuator Size	D	E	Plain Bonnet Type		Extension Bonnet Type				Bellows Seal Bonnet Type				C _R
(mm)	(in.)				G	C	Type-F		Type-H		BA20K		BA40K		
							G	C	G	C	G	C	G	C	
15	1/2	N24	240	56/65	133	430	530	233	696	993	366	663	693	C+25	
		N28	280			469	569					1032	702		732
		N33S	330			524	624					1087	757		787
20	3/4	N24	240	63/65	133	430	530	233	696	993	366	663	693	C+25	
		N28	280			469	569					1032	702		732
		N33S	330			524	624					1087	757		787
25	1	N24	240	70/65	136	433	533	236	699	996	369	666	696	C+25	
		N28	280			477	572					1035	705		735
		N33S	330			527	627					1090	760		790
40	1 1/2	N24	240	83	152	449	599	302	715	1012	400	697	739	C+25	
		N28	280			488	638					1051	736		778
		N33S	330			453	693					1106	791		833
		N40	400		696	846	1259	1015	1057	C+160					
		500S	500		915	1065	1478	1234	1276						
50	2	N24	240	95	171	468	618	321	734	1031	442	739	793	C+25	
		N28	280			507	657					1070	778		832
		N33S	330			562	712					1125	833		887
		N40	400		715	865	1315	1039	1091	C+160					
		500S	500		934	1084	1534	1258	1310						
65	2 1/2	N28	280	106	217	553	703	367	752	1088	549	885	900	C+25	
		N33S	330			608	758					1143	940		1015
		N40	400		761	911	1361	1146	1219	C+160					
		500S	500		980	1130	1580	1365	1438						
80	3	N28	280	130	218	554	704	368	806	1142	550	886	961	C+25	
		N33S	330			609	759					1197	941		1016
		N40	400			762	912					1387	1147		1220
		500S	500		981	1131	1606	1366	1439	C+160					
		650S	650		1277	1427	1902	1673	1746						
100	4	N28	280	145	256	592	742	406	844	1180	588	924	999	C+25	
		N33S	330			647	797					1235	979		1054
		N40	400			800	950					1425	1185		1258
		500S	500		1019	1169	1644	1404	1477	C+160					
		650S	650		1315	1465	1940	1711	1784						
125	5	N40	400	180	313	828	978	463	938	1453	759	1274	1382	C+25	
		500S	500			1047	1197					1672	1493		1601
		650S	650			1343	1493					1968	1794		1899
		N40	400		856	1006	1481	1302	1410	C+25					
500S	500	1075	1225	1700	1521	1629									
650S	650	1371	1521	1966	1822	1930									
150	6	N40	400	205	341	856	1006	491	966	1481	787	1302	1410	C+25	
		500S	500			1075	1225					1700	1521		1629
		650S	650			1371	1521					1966	1822		1930
200	8	N40	400	225	447	962	1112	597	1149	1664	1019	1534	1679	C+25	
		500S	500			1181	1331					1883	1753		1898
		650S	650			1477	1627					2179	2074		2219

- [Notes] (1) Dimension C represents actuator for direct action. For actuator of reverse action, use the dimension CR.
 (2) The dimensions G & C of bellows seal bonnet type represent that press. rating of bellows is 20K, or less. If the press. rating is 30K, 1 mm is to be added to dimensions G & C for actuator size N24-N33S. If the press. rating is 40K, the above table is not available.
 (3) Edimensions, Upper is for class 150 ~ 300, Lower is for class 400 ~ 600.

Plain Bonnet Type Actuator Size

N24 ~ N40

500, 650

Extension Bonnet Type Type-F, Type-H

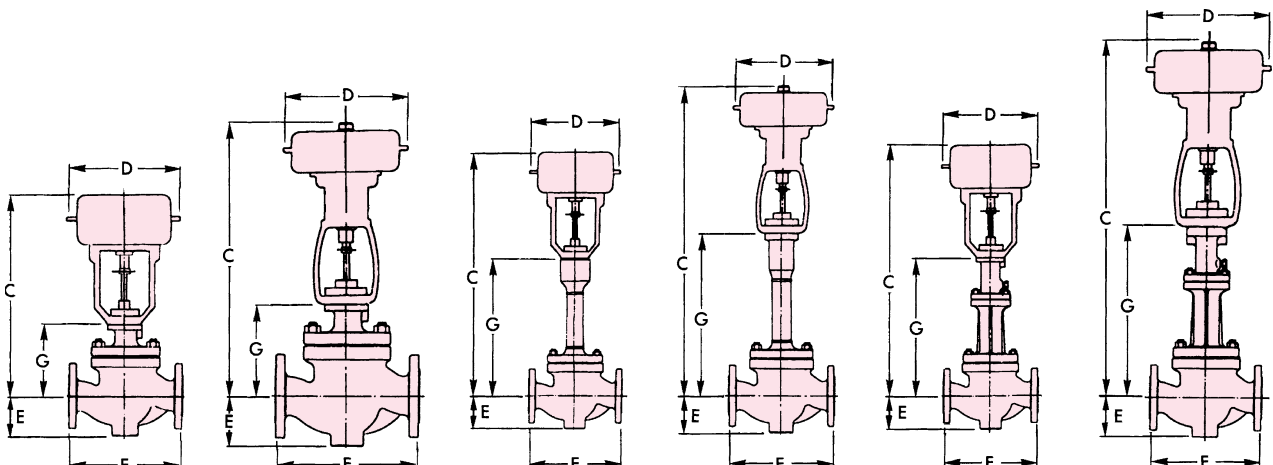
N24 ~ N40

500, 650

Bellows Seal Bonnet Type (BA20K)

N24 ~ N40

500, 650



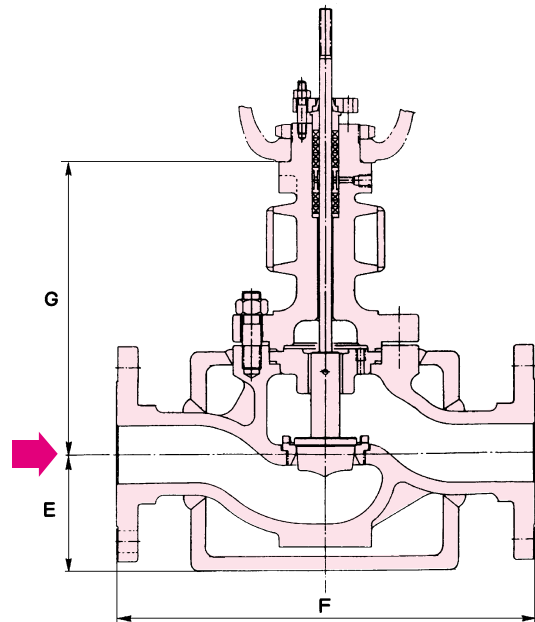
2 Semi-Jacket Type G

Semi-Jacket is employed if pipe flange size is equal to the valve size

Standard Dimensions Unit : mm

Valve size Flange size		F	E	G		
				Actuator size		
				N24 N28 N33S	N40 500	650
(mm)	(in)					
15	1/2	240	70	201	—	—
20	3/4	240	70	201	—	—
25	1	260	75	204	—	—
40	1 1/2	320	100	226	262	—
50	2	360	100	253	289	—
65	2 1/2	380	117	280	316	—
80	3	410	142	321	350	350
100	4	460	157	370	404	404
125	5	580	230	—	406	406
150	6	630	265	—	428	428
200	8	800	290	—	518	518

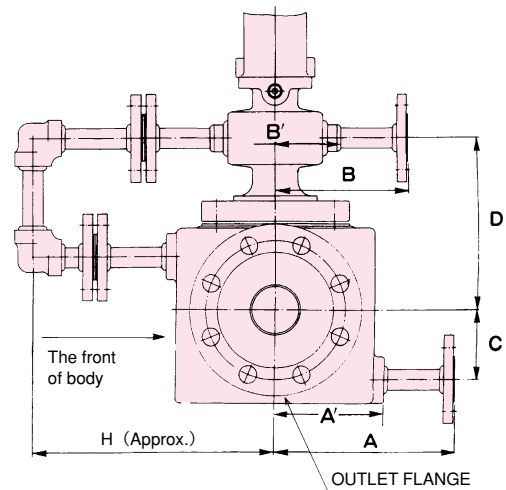
[Note] Face to face dimension "F" is available for JIS 10K RF, 20K RF, ANSI/JPI 150 RF and 300 RF Flange Rating.



3 Piping Specifications

MOTOYAMA assemble the piping between the valve body and bonnet.
The standard connection to customer's jacket piping is as follows.

- (1) **Heating with Hot Water or Steam**
Inlet and Outlet Connection : Rc 1/2 Screwed
Piping on Valve : STPG 370, 15mm, JIS 10K RF
- (2) **Heating with Heating medium**
Inlet and Outlet Connection : Flange, JIS 20K, 15mm
Piping on Valve : STPG 370, 15mm, JIS 20K RF
- (3) **Option**
Inlet and Outlet Connection : 20mm Flange (JIS, ANSI, JPI)
Piping on Valve : 15mm Flange (JIS, ANSI, JPI)
10K, 20K, Class 150, 300,
Rc 3/4, NPT 1/2, NPT 3/4



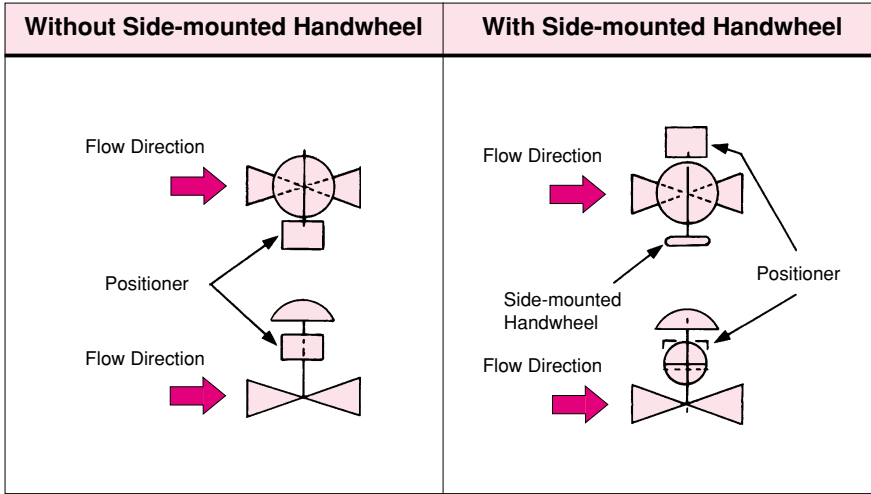
Dimensions

Unit : mm

Valve size		Type B, Type G (Common)										Type B			Type G		
(mm)	(in.)	B			C	D			B'			A	A'	H (Approx.)	A	A'	H (Approx.)
		Actuator size				Actuator size			Actuator size								
		N24 N28 N33S	N40 500	650		N24 N28 N33S	N40 500	650	N24 N28 N33S	N40 500	650						
15	1/2	144	—	—	45	145	—	—	66	—	—	162	84	230	162	84	230
20	3/4	144	—	—	45	145	—	—	66	—	—	162	84	230	162	84	230
25	1	144	—	—	50	148	—	—	66	—	—	162	84	230	162	84	230
40	1 1/2	144	176	—	75	159	177	—	66	98	—	176	98	250	188	110	260
50	2	144	176	—	75	186	204	—	66	98	—	196	118	270	203	125	280
65	2 1/2	144	176	—	85	213	235	—	66	98	—	202	124	280	227	149	300
80	3	151	176	176	110	252	270	272	72	98	98	223	145	300	253	175	330
100	4	163	176	201	125	299	324	326	85	98	123	239	161	310	271	193	340
125	5	—	201	201	170	—	328	328	—	123	123	271	193	340	271	193	340
150	6	—	201	201	195	—	350	350	—	123	123	322	244	390	322	244	390
200	8	—	239	239	215	—	430	430	—	162	162	372	292	440	372	292	440

8. MOUNTING ORIENTATIONS

Standard mounting orientations are as follows.





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