MOTOYAMA

General Specifications

Model 83B 150 • 300 • 600LB

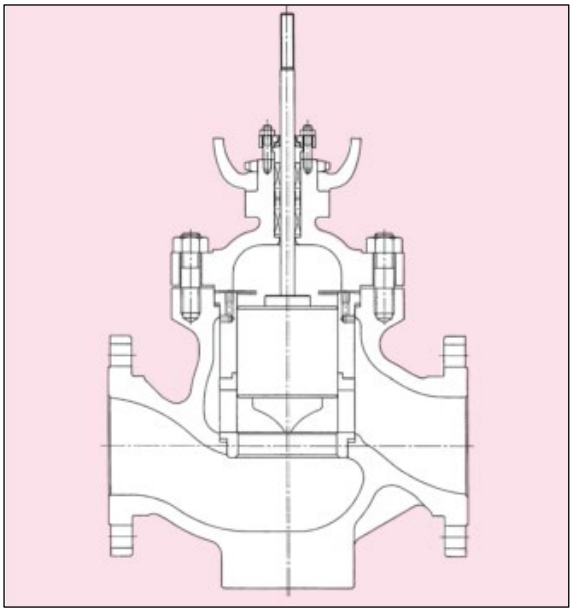
CAGE GUIDED TYPE CONTROL VALVES

1. FEATURES

Model 83B control valves have cage guided trim, providing wide controllability, having wide scope of production range for reduced port, and capable for comprehensive application for various kinds of services.

These valves permit stable control for plug closing and opening against the thrust of fluid, and are available for applications not only for general use but also for controlling high temperature and high pressure for power plants and chemical plants. Especially, these valves are suited for low noise application because of the superior noise reduction effect at high load.

For high viscosity fluids, slurry fluids or fluids having scale and/or adhesion, this cage guide-type valve is not suitable.



【Notes】This drawing shows plane bonnet structure of CVPS.

2. VALVE TYPE

Valve Style and Cage Type

83B-Guide Type

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C…..Cage Guided

Port Type

↓

PP…..Contoured
VP…..V-Port
QP…..Quick Opening
SM…..Single Stage Multi Hole
DM…..Double Stage Multi Hole
LT……Labyrinth

Plug Type

↓

S…..Single Seated (Unbalanced)
B…..Seal Ring Balanced (For Low & Standard Temp.)
H…..Seal Ring Balanced (For High Temp.)
P…..Pilot Balanced

【Notes】
(1) Regarding the manufacturing of the double sheet plug, for existing replacements, please choose the 83A series (refer to catalogue MCE-B4306), the new product also recommends plug type B and/or H of this 83B series.
(2) Regarding 83-NRV in particular, refer to catalogue MCE-B4304.
(3) Please see catalogue MCE-B4302 and/or MCE-B4308 about pressure rating class 900, 1500.

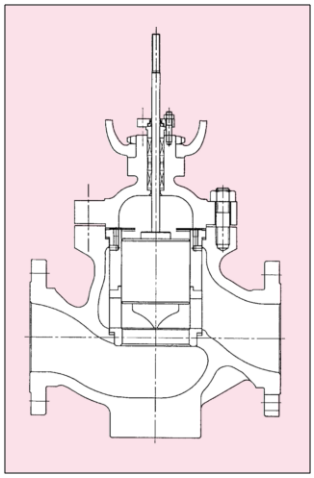
3. PROPERTY OF THE CAGE SHAPE

1 Port Type

VP V-Port Type

Model CVP is cage guided control valve and is used for most general purpose with V-port of cage characterized, proving wide applicability, excellent characteristics at high load, and easy maintenance.

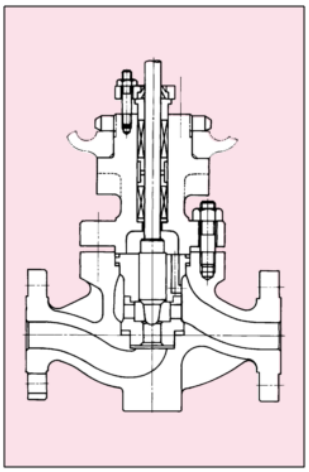
■Typical Application
- ○General services
- ○ Power plant and/or Chemical plant
- ○For medium or high pressure



PP Contoured Plug Type

Model CPP is cage guided and single seated control valve with contoured plug. Which is suited for high temperature and pressure, and stands against lateral vibration, and is available for anti-erosion material for trim

■Typical Application
- ○General services, small diameter
- ○For high temperature and high differential pressure

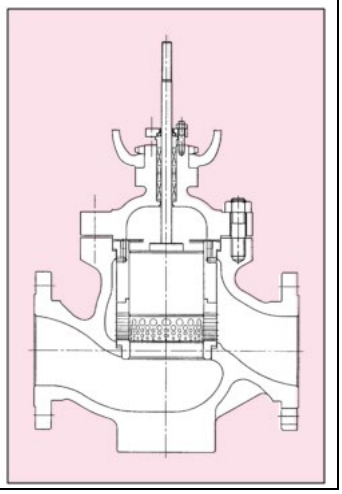


SM Multi-hole Type

Model CSM helps to attenuate aerodynamic noise in gas service, with Multi-hole in outer cage.

In liquid service which may occur cavitation, CSM helps to prevent trim from cavitation damage.

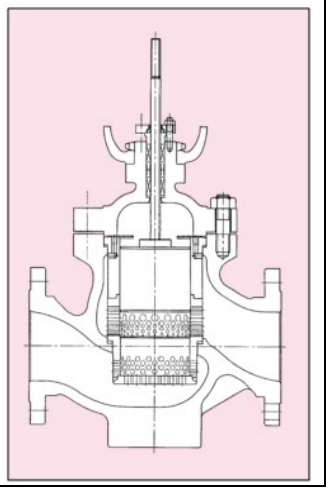
■Typical Application
- ○Low noise valve
- ○Anti-cavitation valve
- ○Anti-erosion valve



DM Double Staged Multi-hole Type

Model CDM is double staged multi-hole throttling type control valve providing fixed orifice at the bottom of cage of the Model CSM. Because of double throttling mechanism, the valve permit large noise reduction effect.

■Typical Appication
- ○For medium and high pressure gas
- ○Steam control valve
- ○Low noise valve

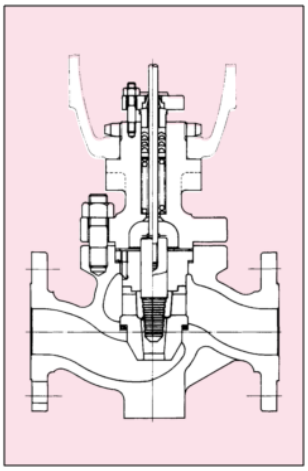


LT Labyrinth Trim Type

Model CLT provides multi-throttling with a trim having labyrinth slots on outer valve plug.

These valve hardly wear the seating surface in spite of low travel service, and are suited for high differential pressure of liquid.

■Typical Application
- ○Boiler feed water small valve
- ○High differential pressure valve
- ○Anti-cavitation valve



2 Seal Ring Balance and Pilot Balance Type

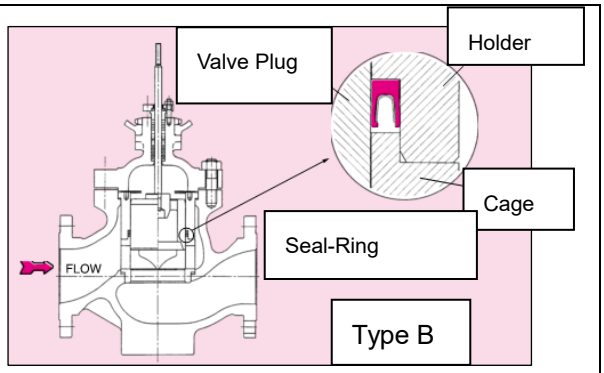
Plug Type B Seal-Ring Balance

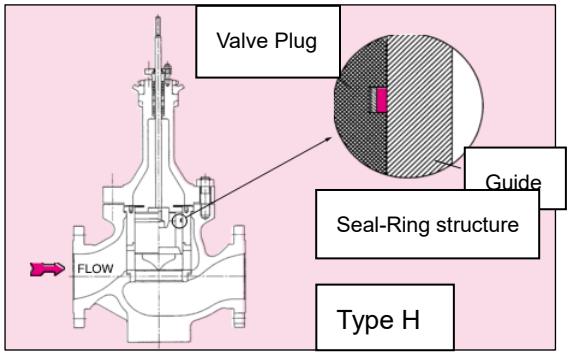
Plug Type H Seal-Ring Balance

■FEATURES

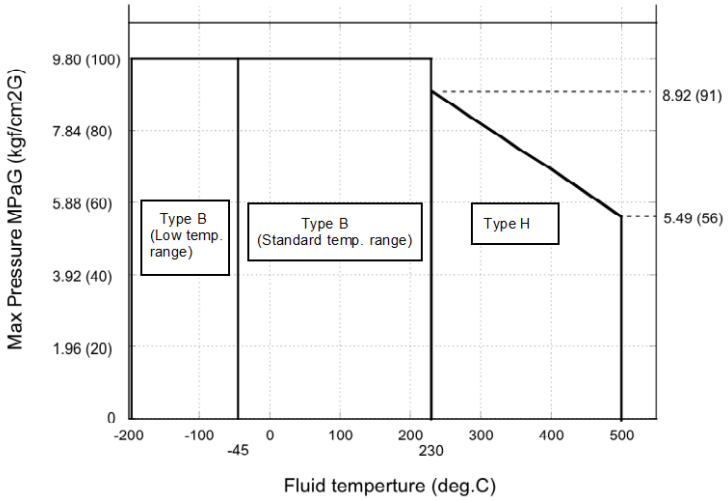
Plug Type B and H Cage Guided Control Valve realized very limited seat leakage like single seat valves with installing small actuator like double seat valves.

Seal-Ring inserted in Cage for Type B and inserted in Valve Plug for Type H, seals the guide clearance tightly between Valve Plug and Cage to prevent the valve inlet pressure comes into the Bonnet. This design makes the outlet pressure comes into the upper and lower side of the Plug and it makes the pressure well balanced. Consequently, small actuator is required to operate the valve.





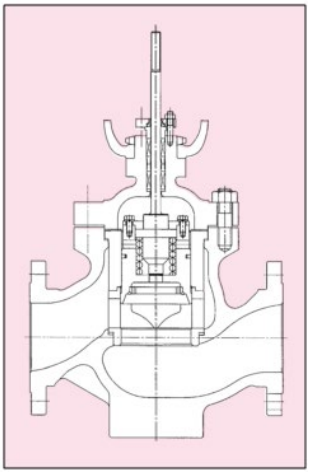
■ APPLICABLE PRESSURE and TEMPERATURE



Plug Type P Pilot Balance

■FEATURES

Plug Type P is cage guided control valve that valve plug has pilot balance construction which permits low seat leakage ratio such as single seat, and high shut-off thrust in spite of small actuator size such as double seat.



■Typical Application

○Open valve

○Shut-off valve

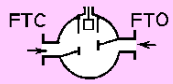
4. SPECIFICATIONS

Common Notes

(1) Please refer to the globe valve basics selection flowchart of our Engineering Handbook (Bulletin No.MCE-B1003) for the model choice of Control Valves.
(2) The value of these Function Accuracy represents a case of our standard grand packing (PTFE yarn).
(3) Please install the valve in correct direction. Wrong installation will increase seat leakage.

1 Standard Specification (Valve)

(1) Plug Type S and P

Valve Type		**Diaphragm Operated Cage Guided Control Valve**										
Valve Model No.		3883B-, 2883B-										
VALVE BODY	**Body Model**	CVPS	CQPS	CSMS	CDMS	CVPP	CQPP	CSMP	CDMP	CPPS	CLTS	
	Body Size	20mm to 350mm（3/4inch to 14inch）				50mm to 350mm（2inch to 14inch）				15mm to 80mm（1/2inch to 3inch）		
	Pressure Rating	JIS10K, 20K, 30K, 40K, ASME/JPI Class 150, 300, 600										
	End Connections	Flanged end : RF										
	Body Materials	SCPH2(A216 WCB), SCS13A(A351 CF8), SCS14A(A351 CF8M)										
	Trim Materials	SUS316, SUS440B Please refer to Page7 for the hardening treatment.										
	Bonnet Types	■-196℃ ≦T< -45℃ : Extension Bonnet, Type-H ■-45℃ ≦T< -17℃ : Extension Bonnet, Type-F ■-17℃ ≦T≦+230℃ : Plain Bonnet ■+230℃ 〈T≦+538℃ : Extension Bonnet, Type-F										
	Gland Type	Bolted gland										
	Packing	Braided packing, Molded packing										
	Gaskets	Serrated gasket, Spiral wound gasket										
	Guiding	Cage guide										
	Valve Plug Action	Push-down close										
	Seat Type	Single seated										
	Plug Type	S				P				S	S	
	Port Type	VP	QP	SM	DM	VP	QP	SM	DM	PP	LT	
	Flow Direction 	FTC: Liquid 2.45 MPa (25kgf/cm2) and over in diff press. FTO: Except above		FTC: Liquid FTO: Except liquid	FTC	FTC				FTO		
VALVE CHARACTERISTICS & PERFORMANCE	**Control Mode**	Throttling control, On-Off										
	Valve Action	Direct action (Air-to close), Reverse action (Air-to open)										
	Available Max. Pressure	9.8 MPaG (100kgf/cm^{2}G) or less (Pressure limit shall conform to the Standard and/or Code of material & pressure temperature rating)										
	Available Temperature	-196℃ to +538℃ (Temperature limit shall confirm to pressure temperature rating)									-196℃ to +400℃	
	Allowable Differential Pressure	See Page 14 to 18 “Allowable Differential Pressure”										
	Rated Cv Value	See Page 12 “Rated Cv Valve”										
	Flow Characteristics	See Page 12 & 13 “Flow Characteristics”										
	Inherent Rangeability	See Page 12 “Rated Cv Valve”										
	Allowable Seat Leak-age Ratio	Port Type: VP, SM, DM 0.01% at rated CV (ANSI/FCI 70-2 Class IV)				0.001% at rated CV				Control Mode: Throttling 0.01% at rated CV (ANSI/FCI 70-2 Class IV)		
		Port Type: QP Tight shut off Body size …% of rated Cv 25mm or smaller…0.0001%, 100mm or smaller…0.001%, 125mm and larger…0.002%								On-Off: Port size is less than 20mm… 0.0001% of rated Cv,	—	
	Hysteresis Error (With Positioner)	Max. 2% F.S.										
	Linearity (With Positioner)	Max. ±2% F.S.										
Painting Color		Silver, No painting on stainless steel, glass or plastic product										

(2) Plug Type B and H

【Notes】

(1) Plug Type B and/or H control valve is all with a positioner other than On-Off control in consideration of Seal Ring friction.
(2) It is not recommended to install Plug Type B and/or H horizontally. It will decline the sealing performance.
(3) Plug Type B and H Seal Ring design is not recommended for the sudden operating conditions (high frequency operation, large temperature gradient) to protect the life cycle or sealing performance of the Seal Ring.
(4) Plug Type B and/or H are not applicable to a system that reverse pressure is expected.
(5) When valve seat leakage less than ANSI/FCI 70-2Class IV is necessary, in Plug Type H, please choose Plug Type S or P.
(6) Application service is limited as follows because of Seal Ring material property for Plug Type B and H.

Plug Type B (Standard temperature range)

Because the material of the Seal Ring is the PTFE which filled carbon graphite, please do not use it for the following applications.

- ●Food processing service ●Oxygen service ●Any process, coloring by resin is undesirable.
- ●Acids at high temperature and pressure (aqua regia, nitric acid, sulfuric acid, hydrochloric acid, etc.)
- ●Fluorine gas(F2), CIF3, OF2 etc. at high temperature.
- ●Metal-hydrogen compound such as 80% KOH, B2H6 etc.

For a fluid such as the statement above, as there is the case which can be accepted by the change of Seal Ring material, please contact our sales.

Plug Type B (Low temperature range)

It is not acceptable to use Plug Type B (low temperature range) for following applications.

- ●Fluorine gas(F2), CIF3, OF2 etc. at high temperature.
- ●The specifications that corrosion resistance materials more than SUS316L are required.

Plug Type H

It is recommended to use Plug Type H within the following range because of Seal Ring material properties to prevent oxidation.

- ●For Air service : 0 to +400℃
- ●For steam and Non-oxide service : 0 to +500℃

Moreover, in the case of a strongly acidic fluid and/or special chemicals more than 100℃, please inquire whether Seal Ring material is suitable.

It is recommended to change Seal Ring on every overhaul services like Gland Packing or Gaskets. Kindly keep some Seal Rings for your stock.

Valve Type		**Diaphragm Operated Cage Guided Control Valve**							
Valve Model No.		3883B-, 2883B-							
VALVE BODY	**Body Model**	CVPB	CQPB	CSMB	CDMB	CVPH	CQPH	CSMH	CDMH
	Body Size	Standard temperature range: 40mm to 350mm（1-1/2inch to 14inch） Low temperature range: 50mm to 350mm（2inch to 14inch）				50mm to 350mm（2inch to 14inch）			
	Pressure Rating	JIS10K, 20K, 30K, 40K, ASME/JPI Class 150, 300, 600							
	End Connections	Flanged end : RF							
	Body Materials	SCPH2(A216 WCB), SCS13A(A351 CF8), SCS14A(A351 CF8M)							
	Trim Materials	SUS316, SUS440B Please refer to Page7 for the hardening treatment.							
	Seal ring Materials	Standard temperature range: PTFE with Carbon Graphite (Spring: Elgiloy ®) Low temperature range: PTFE (Spring:SUS316L)				Metal-reinforced carbon			
	Tension ring Material	—				SUS316			
	Bonnet Types	■-196℃ ≦T< -45℃ : Extension Bonnet, Type-H ■-45℃ ≦T< -17℃ : Extension Bonnet, Type-F ■-17℃ ≦T≦+230℃ : Plain Bonnet ■+230℃ 〈T≦+500℃ : Extension Bonnet, Type-F							
	Gland Type	Bolted gland							
	Packing	Braided packing, Molded packing							
	Gaskets	Serrated gasket, Spiral wound gasket							
	Guiding	Cage guide							
	Valve Plug Action	Push-down close							
	Seat Type	Single seated							
	Plug Type	B				H			
	Port Type	VP	QP	SM	DM	VP	QP	SM	DM
	Flow Direction	FTC							
VALVE CHARACTERISTICS & PERFORMANCE	**Control Mode**	Throttling control, On-Off							
	Valve Action	Direct action (Air-to close), Reverse action (Air-to open)							
	Available Max. Pressure	9.8 MPaG (100kgf/cm^{2}G) or less (Pressure limit shall conform to the Standard and/or Code of material & pressure temperature rating and also see Page 3 APPLICABLE PRESSURE and TEMPERATURE.)							
	Available Temperature (See Page 3 APPLI-CABLE PRESS. and TEMPERATURE.)	Standard temperature range: -45℃≦T≦+230℃ Low temperature range: -196℃≦T< -45℃				T≦+550℃			
	Allowable Differential Pressure	See Page 17 & 18 “Allowable Differential Pressure”							
	Rated Cv Value	See Page 12 “Rated Cv Valve”							
	Flow Characteristics	See Page 12 & 13 “Flow Characteristics”							
	Inherent Rangeability	50：1							

VALVE CHARACTERISTICS & PERFORMANCE	Body Model		CVPB CQPB CSMB CDMB	CVPH CQPH CSMH CDMH
	Allowable Seat Leakage Ratio		Port Type: VP, SM, DM 0.01% at rated Cv (ANSI/FCI 70-2 Class IV)	0.01% at Rated Cv (ANSI/FCI 70-2 Class IV)
			Port Type: QP Tight shut off Body size …% of rated Cv 100mm or smaller…0.001%, 125mm and larger…0.002%	
	Function Accuracy	Hysteresis Error (With Positioner)	Max. 2% F.S.	
		Linearity (With Positioner)	Max. ±2% F.S.	
Painting Color			Silver, No painting on stainless steel, glass or plastic product	

2 Standard Specification (Actuator)

AUTUATOR	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	500L	650S	650L	650XS	650XL
	Supply Air Pressure	Please refer to catalogue No. MCE-B5102 for the details.				Please refer to catalogue No.MCE-B5101 for the details.					
	Spring Range										
	Off-Balance										
	Action	Direct action, Reverse action									
	Air Connection	Rc1/4						Rc3/8			
	Ambient Temperature	−20℃ to +70℃									

3 Special Specification

【Notes】

(1) When Seat Leakage less than Tight shut off is required, in Plug Type B (Low temperature range), please ask the nearest office.
(2) About the Fugitive emission examination, MEW has the certificates according to the international standard ISO 15848-1, and please inquire for the details at the nearest office.
(3) Please refer to our Engineering Handbook (Bulletin No.MCE-B1003) for the range of pressure and temperature of Bellows Seal Bonnet.

VALVE BODY	End Connections	Flanged end (FF, RJ, Male and female, Tongue and groove), Welding end (SW, BW)						
	Body Materials	Metal materials except the Body Materials of 1 Standard Specification mentioned above						
	Trim Materials	Metal materials except the Trim Materials of 1 Standard Specification mentioned above, Special treatment to trim.						
	Bonnet Type	Bellows seal (Note3, Allowable Shut-Off Pressure is differed from tables of P14 to P18 because of Bellows effective area. Please inquire for the details at the nearest office.)						
	Seal ring Material	Plug Type B Seal Ring for the special fluid (O2, HCL, CL2)						
	Etc.	Drain plug, Vacuum service, External exposure Bolts & Nuts S.S., Oil free, Water free, Sandproof, Fugitive emission (Note2)						
VALVE CHARACTERISTICS & PERFORMANCE	Inherent Rangeability	Port Type PPS: Equal percentage100：1（Port size 20mm to 80mm） Please refer to P12 "Rated Cv Value".						
	Allowable Seat Leakage Ratio	Plug Type S				Plug Type B (Standard temperature range)	Plug Type B (Low temperature range)	Plug Type P
		VP, SM, DM	PP	LT		VP, SM, DM		All
		Tight shut off Body size..% of rated Cv 25mm or less.. 0.0001%, 100mm or less.. 0.001%, 125mm and larger.. 0.002%, or ANSI/FCI 70-2 Class V	Control Mode: Throttling Tight shut off Body size..% of rated Cv 25mm or less.. 0.0001%, 80mm or less..0.001%, or ANSI/FCI 70-2 Class V			Tight shut off Body size..% of rated Cv 100mm or less.. 0.001%, 125mm and larger.. 0.002%, or ANSI/FCI 70-2 Class V	Tight shut off Body size…% of rated Cv 100mm or less …0.001%, 125mm and larger…0.002%	ANSI/FCI 70-2 Class V
		QP	On-Off	—		QP		
		ANSI/FCI 70-2 Class V				ANSI/FCI 70-2 Class V	—	
Actuator Type		Please refer to catalogue MCE-B5102 for the addition specifications of #3800 and catalogue MCE-B5101 for the addition specifications of #2800.						
Accessories		Electro-pneumatic valve positioner (EA90A, EA91A, EA10S), Pneumatic valve positioner (PA92A), Air filter regulator (MR2000), Limit switch, Solenoid valve, Booster relay, Speed controller, Lock up valve, Pneumatic operated valve, Etc.						

5. MAIN MATERIALS

【Notes】
(1) Following tables show typical combination of materials. The combination may be subject to change by pressure, temperature and kind of fluid.
(2) Trim (Valve plug, Cage, Holder, Guide, Etc.) materials may be used casting instead of bar materials.
(3) Bonnet may be forged in some cases.
(4) For flashing and/or cavitation service Cage Material SUS440B (in the range of -20 to 400 ℃) is most suitable. But SUS440B is not applicable to Port Type DM type. From a reason with high hardness of SUS440B than the material which overlaid in CoCr alloy to other base metal than it, MEW recommends SUS440B.

1 Typical Combination of Materials

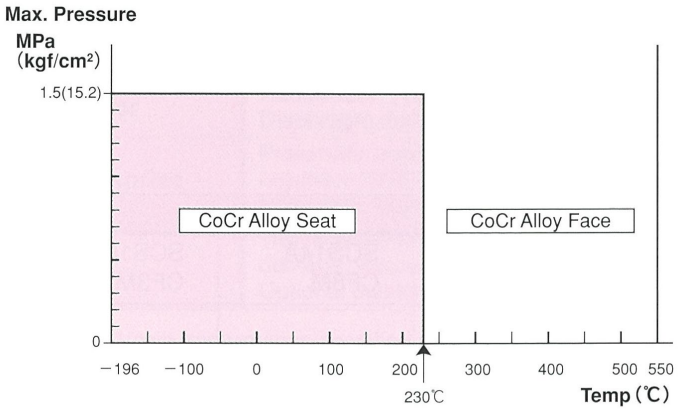
Parts Name	Materials		
Body, Bonnet	SCPH2 （A216 WCB）	SCS13A （A351 CF8）	SCS14A （A351 CF8M）
Trim	SUS316、SUS440B		SUS316
Stud Bolt and Nuts	A193 Gr.B7 / S45C(H)	A193 Gr.B8 CL2 / SUS304	

2 Hard Facing for Trim

■ In the case of SUS316

	A	B	C
Model No	CVPS、CQPS、CSMS、CDMS CVPB、CQPB、CSMB、CDMB	CVPS、CQPS、CSMS、CDMS CVPB、CQPB、CSMB、CDMB CVPH、CQPH、CSMH、CDMH CVPP、CQPP、CSMP、CDMP	CPPS CLTS
Valve plug	SUS316+CoCr Alloy Seat	SUS316+CoCr Alloy Face	
Guide	SUS316 : Design Temperature ≦400℃, SUS316+CoCr Alloy Face : Design Temperature ＞400℃		
Holder (Only Plug Type B)	SUS316		-
Cage	SUS316+CoCr Alloy Seat : Body size 50mm or less SUS316 : Body size 65mm or over		SUS316+CoCr Alloy Face
Seat ring	SUS316 : Body size 50mm or less SUS316+CoCr Alloy Seat : Body size 65mm or over		-

Pressure-Temperature Range of Valve Plug



■ In the case of SUS440B

	D	E	F	G
Model No	CVPS、CQPS、CSMS CVPB、CQPB、CSMB CVPH、CQPH、CSMH	CDMS CDMB CDMH	CPPS CLTS	CVPP, CQPP, CSMP
Valve plug	SUS440B			SUS316+CoCr Alloy Face
Guide	SUS316			
Holder (Only Plug Type B)	SUS316			
Cage	SUS440B: Body size 50mm or less SUS316: Body size 65mm or over	SUS316+CoCr Alloy Seat: Body size 50mm or less SUS316: Body size 65mm or over	SUS440B	
Seat ring	SUS316: Body size 50mm or less SUS440B: Body size 65mm or over	SUS316+CoCr Alloy Seat	-	SUS316

6. SCOPE OF PRODUCTION

1 Combination of Valve Body and Actuator

【Note】Please refer to【Notes】from 7 to 10 described in P14 for combination condition（●）.

■CVPS, CSMS, CDMS, CQPS

Body Model		3883B-				2883B-					
Actuator Size / Valve Size (mm)	(inch)	N24	N28	N33S	N40	500S	500L	650S	650L	650XS	650XL
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				●	●	(●)	●	(●)	●	
250	10						●		●		●
300	12						●		●		●
350	14								●		●

■CVPP, CSMP, CDMP, CQPP

Body Model		3883B-				2883B-					
Actuator Size / Valve Size (mm)	(inch)	N24	N28	N33S	N40	500S	500L	650S	650L	650XS	650XL
50	2	●	●	●	●	●					
65	2-1/2	●	●	●	●	●					
80	3		●	●	●	●		●			
100	4		●	●	●	●		●			
125	5				●	●	(●)	●	(●)		
150	6				●	●	(●)	●	(●)		
200	8				●	●	(●)	●	(●)	●	
250	10						●		●		●
300	12						●		●		●
350	14								●		●

■CPPS

Body Model		3883B-				2883B-	
Actuator Size / Valve Size (mm)	(inch)	N24	N28	N33S	N40	500S	650S
15	1/2	●	●	●			
20	3/4	●	●	●			
25	1	●	●	●			
40	1-1/2	●	●	●	●	●	
50	2	●	●	●	●	●	
65	2-1/2		●	●	●	●	
80	3		●	●	●	●	●

■CLTS

Body Model		3883B-				2883B-	
Actuator Size / Valve Size (mm)	(inch)	N24	N28	N33S	N40	500S	650S
15	1/2	●	●	●			
20	3/4	●	●	●			
25	1	●	●	●			
40	1-1/2	●	●	●	●	●	
50	2	●	●	●	●	●	
65	2-1/2		●	●	●	●	
80	3		●	●	●	●	●

■CVPB, CSMB, CDMB, CQPB (Standard temperature range)

Body Model		3883B-			2883B-					
Actuator Size / Valve Size		N28	N33S	N40	500S	500L	650S	650L	650XS	650XL
(mm)	(inch)									
40	1-1/2	●	●	●	●					
50	2	●	●	●	●					
65	2-1/2	●	●	●	●					
80	3	●	●	●	●		●			
100	4	●	●	●	●		●			
125	5			●	●	(●)	●	(●)		
150	6			●	●	(●)	●	(●)		
200	8			●	●	(●)	●	(●)	●	
250	10					●		●		●
300	12					●		●		●
350	14							●		●

■CVPB, CSMB, CDMB, CQPB (Low temperature range:)

Body Model		3883B-			2883B-					
Actuator Size / Valve Size		N28	N33S	N40	500S	500L	650S	650L	650XS	650XL
(mm)	(inch)									
50	2	●	●	●	●					
65	2-1/2	●	●	●	●					
80	3		●	●	●		●			
100	4		●	●	●		●			
125	5			●	●	(●)	●	(●)		
150	6			●	●	(●)	●	(●)		
200	8					(●)	●	(●)	●	
250	10					●		●		●
300	12							●		●
350	14							●		●

■CVPH, CSMH, CDMH, CQPH

Body Model		3883B-			2883B-					
Actuator Size / Valve Size		N28	N33S	N40	500S	500L	650S	650L	650XS	650XL
(mm)	(inch)									
50	2	●	●	●	●					
65	2-1/2	●	●	●	●					
80	3		●	●	●		●			
100	4		●	●	●		●			
125	5			●	●	(●)	●	(●)		
150	6			●	●	(●)	●	(●)		
200	8					(●)	●	(●)	●	
250	10					●		●		●
300	12							●		●
350	14							●		●

2 Scope of Port Size

●：Full port, ◆：Reduced port

■CVPS, CSMS, CDMS, CQPS

Port Size / Valve Size	(mm)	20	25	32	40	50	65	80	100	125	150	200	250	300	350
	(in.)	3/4	1	1-1/4	1-1/2	2	2-1/2	3	4	5	6	8	10	12	14
(mm)	(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								◆	◆	◆	●			
250	10									◆	◆	◆	●		
300	12										◆	◆	◆	●	
350	14											◆	◆	◆	●

■CVPP, CSMP, CDMP, CQPP

Port Size / Valve Size	(mm)	32	40	50	65	80	100	125	150	200	250	300	350
	(in.)	1-1/4	1-1/2	2	2-1/2	3	4	5	6	8	10	12	14
(mm)	(in.)												
50	2	◆	◆	●									
65	2-1/2	◆	◆	◆	●								
80	3	◆	◆	◆	◆	●							
100	4			◆	◆	◆	●						
125	5				◆	◆	◆	●					
150	6					◆	◆	◆	●				
200	8						◆	◆	◆	●			
250	10							◆	◆	◆	●		
300	12								◆	◆	◆	●	
350	14									◆	◆	◆	●

■CPPS

【Note】In the place where port size notation makes two rows, the upper row and the lower row shows respectively EQ%-characteristics and Linear-characteristics.

Port Size / Valve Size	(mm)	CV=0.2 / 4	6	CV=0.6 / 7	8	CV=1.8 / 10	CV=5.2 / 15	20	25	32	40	50	65	80
	(in.)	CV=0.2 / —	1/8	CV=0.6 / 3/16	1/4	CV=1.8 / 3/8	CV=5.2 / 1/2	3/4	1	1-1/4	1-1/2	2	2-1/2	3
(mm)	(in.)													
15	1/2	◆	◆	◆	◆	◆	●							
20	3/4	◆	◆	◆	◆	◆	◆	●						
25	1	◆	◆	◆	◆	◆	◆	◆	●					
40	1-1/2	◆	◆	◆	◆	◆	◆	◆	◆	◆	●			
50	2	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	●		
65	2-1/2						◆	◆	◆	◆	◆	◆	●	
80	3							◆	◆	◆	◆	◆	◆	●

■CLTS

Port Size / Valve Size		CV=0.2	CV=0.4	CV=0.6	CV=1.0	CV=1.5	CV=2.0	CV=3.0	CV=5.2	CV=9.0	CV=12
(mm)	(in.)										
15	1/2	◆	◆	◆	◆	◆	◆				
20	3/4	◆	◆	◆	◆	◆	◆				
25	1	◆	◆	◆	◆	◆	◆	◆	◆		
40	1-1/2	◆	◆	◆	◆	◆	◆	◆	◆		
50	2	◆	◆	◆	◆	◆	◆	◆	◆	◆	
65	2-1/2	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
80	3	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆

■CVPB, CSMB, CDMB, CQPB (Standard Temperature Range)

Port Size / Valve Size	(mm)	20	25	32	40	50	65	80	100	125	150	200	250	300	350
(mm)	(in.)	3/4	1	1-1/4	1-1/2	2	2-1/2	3	4	5	6	8	10	12	14
40	1-1/2	◆	◆	◆	●										
50	2		◆	◆	◆	●									
65	2-1/2			◆	◆	◆	●								
80	3			◆	◆	◆	◆	●							
100	4					◆	◆	◆	●						
125	5						◆	◆	◆	●					
150	6							◆	◆	◆	●				
200	8								◆	◆	◆	●			
250	10									◆	◆	◆	●		
300	12										◆	◆	◆	●	
350	14											◆	◆	◆	●

■CVPB, CSMB, CDMB, CQPB (Low Temperature Range)

Port Size / Valve Size	(mm)	25	32	40	50	65	80	100	125	150	200	250	300	350
(mm)	(in.)	1	1-1/4	1-1/2	2	2-1/2	3	4	5	6	8	10	12	14
50	2	◆	◆	◆	●									
65	2-1/2		◆	◆	◆	●								
80	3		◆	◆	◆	◆	●							
100	4				◆	◆	◆	●						
125	5					◆	◆	◆	●					
150	6						◆	◆	◆	●				
200	8							◆	◆	◆	●			
250	10								◆	◆	◆	●		
300	12									◆	◆	◆	●	
350	14										◆	◆	◆	●

■CVPH, CSMH, CDMH, CQPH

【Note】The maximum of the port size of Plug Type H is 300mm(12inch).

Port Size / Valve Size	(mm)	25	32	40	50	65	80	100	125	150	200	250	300
(mm)	(in.)	1	1-1/4	1-1/2	2	2-1/2	3	4	5	6	8	10	12
50	2	◆	◆	◆	●								
65	2-1/2		◆	◆	◆	●							
80	3		◆	◆	◆	◆	●						
100	4				◆	◆	◆	●					
125	5					◆	◆	◆	●				
150	6						◆	◆	◆	●			
200	8							◆	◆	◆	●		
250	10								◆	◆	◆	●	
300	12									◆	◆	◆	●
350	14										◆	◆	◆

7. FLOW CHARACTERISTICS

When the valve of the Cv value which is smaller than the following tables is necessary; please refer to catalogue No.MCE-B1601(No. 3306 microflow control valve).

1 Rated Cv Value

【Note】The port size of the Plug Type P is 32mm(1-1/4inch) or over.

Body Model	Port size	(mm)	20	25	32	40	50	65	80	100	125	150	200	250	300	350
		(in.)	3/4	1	1-1/4	1-1/2	2	2-1/2	3	4	5	6	8	10	12	14
	Rated Travel (mm)		15		20		25		38		50		65	90	100	130
CVPS, CVPP, CVPB, CVPH, CSMS, CSMP, CSMS, CSMH, CQPS, CQPP, CQPB, CQPH	Rated Cv Value		7.5	14	18	27	46	71	110	180	275	395	640	1050	1460	2000
CDMS, CDMP, CDMB, CDMH			6.0	11.2	14.4	22	36	56	88	144	220	316	512	840	1168	1600
	Inherent Rangeability		50：1													

Body Model	Port size	(mm)	Cv=0.2	Cv=0.6	Cv=1.8	Cv=5.2	20	25	32	40	50	65	80
		(in.)	-	-	-	-	3/4	1	1-1/4	1-1/2	2	2-1/2	3
	Rated Travel (mm)		15						20		25	38	
CPPS	Rated Cv Value	Contoured	0.2	0.6	1.8	5.2	9	16	22	32	52	85	125
	Inherent Rangeability (Eq.%)		100：1				50:1						

Body Model	Port size	(mm)	4	6	7	8	10	15	20	25	32	40	50	65	80
		(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
	Rated Travel (mm)		15								20		25	38	
CPPS	Rated Cv Value	Contoured	0.15	0.4	0.8	1.5	3.0	5.2	9	16	22	32	52	85	125
		Quick opening	—	—	—	2.0	3.5	6	-	-	-	-	-	-	-
	Inherent Rangeability (Linear)		30:1	50：1											

Body Model	Port size	Cv=0.2	Cv=0.4	Cv=0.6	Cv=1.0	Cv=1.5	Cv=2.0	Cv=3.0	Cv=5.2	Cv=9.0	Cv=12
	Rated Cv Value										
	Rated Travel (mm)	15							20	25	
CLTS	Inherent Rangeability	30：1									

2 The Flow Characteristic of Each Type

【Notes】

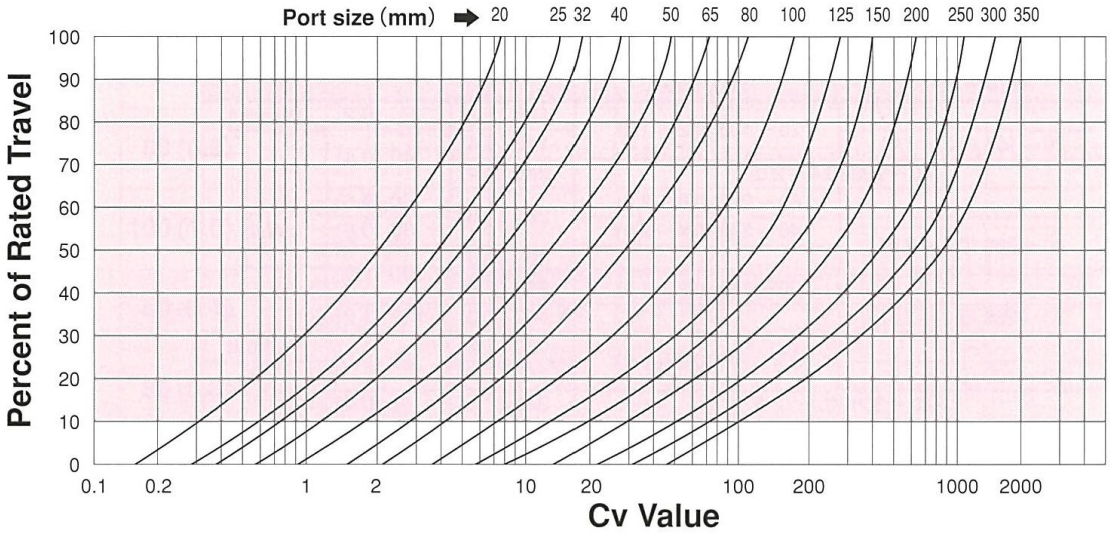
(1) Shaded zone represents proper throttling control range. However, the controllable range of Plug Type P (CVPP, CSMP, CDMP) is 15 to 90%.

(2) Each characteristic curve represents theory flow characteristics.

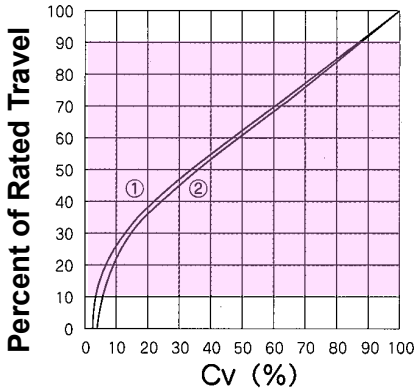
■The overall table that relations are identified

Flow Characteristics / Body Model	Equal percentage	Linear	Modified Parabolic	ON-OFF
CVPS, CVPP, CVPB, CVPH	○ Please refer to a figure of following characteristics.	○		
CSMS, CSMP, CSMS, CSMH CDMS, CDMP, CDMB, CDMH		○	○ Please refer to a figure of following characteristics.	
CPPS	○ Please refer to a figure of following characteristics.	○		○
CLTS			○ Please refer to a figure of following characteristics.	
CQPS, CQPP, CQPB, CQPH				○

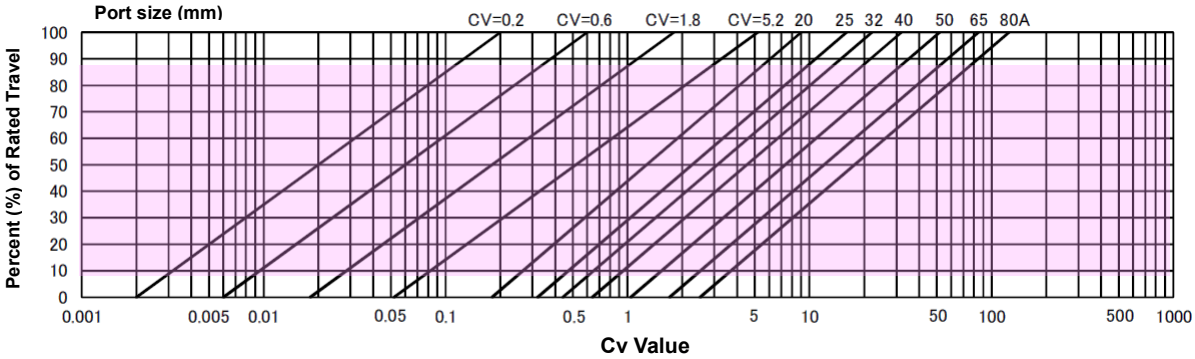
■V-port Equal percentage (CVPS, CVPP, CVPB, CVPH)



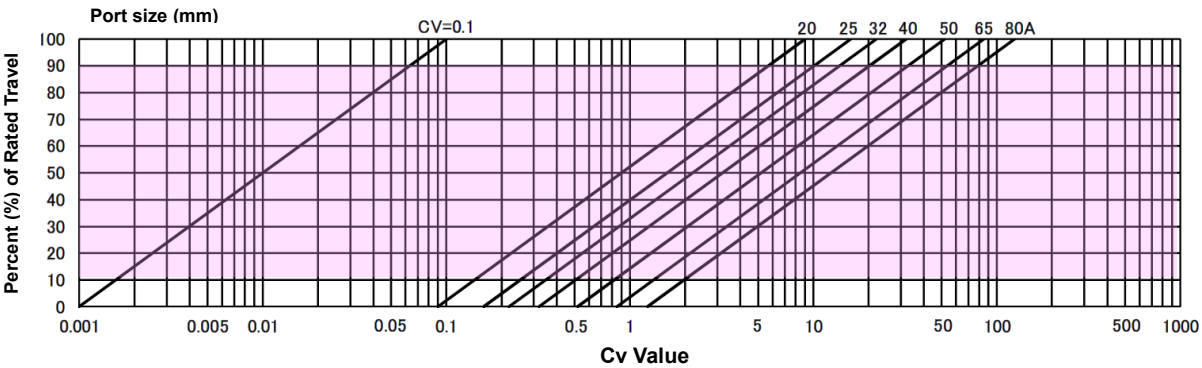
■Modified Parabolic（①: CSMS, CSMP, CSMS, CSMH, CDMS, CDMP, CDMB, CDMH, ②:CLTS



■Contoured plug Equal percentage（CPPS Standard Specification）



■Contoured plug Equal percentage, High Rangeability100:1（CPPS Special Specification）



8. ALLOWABLE DIFFERENTIAL PRESSURE

Common Notes

(1) Shut-off pressure of following tables shows the value with standard gland packing (P4519+V7010).
(2) The Unit of off-balance is kPaG (kgf/cm^{2}G).
(3) Off-balance 100kPaG (1.0 kgf/cm^{2}G) of N24 to N40 is applied to only Direct Action.
(4) When Off-Balance is 100kPaG (1.0kgf/cm^{2}G) and/or 120kPaG (1.2kgf/cm^{2}G) on reverse action actuator size 500～650X, Spring Range may differs by actuator size and valve rated travel.
(5) On Bellow Seal Bonnet valve, Allowable Shut-Off Pressure is differed from above table because of Bellows effective area. Please inquire for the details at the nearest office.
(6) Off-balance 80kPaG (0.8kgf/cm^{2}G) of N40 does not apply to Reverse Action of rated travel 65mm.
(7) Off-Balance 100kPaG (1.0kgf/cm^{2}G) is not applicable for Reverse Action actuator size 500S rated travel 65mm. Actuator size 500L should be selected.
(8) Off-Balance 100kPaG (1.0kgf/cm^{2}G) is not applicable for Reverse Action actuator size 650S rated travel 65mm. Actuator size 650L should be selected.
(9) Off-Balance 120kPaG (1.2kgf/cm^{2}G) is not applicable for Reverse Action actuator size 500S rated travel 50mm and/or 65mm. Actuator size 500L should be selected.
(10) Off-Balance 120kPaG (1.2kgf/cm^{2}G) is not applicable for Reverse Action actuator size 650S rated travel 65mm. Actuator size 650L should be selected.

■Plug Type S (CVPS, CQPS, CSMS, CDMS)

【Notes】

(1) For ANSI/FCI 70-2 Class V, allowable Shut-off pressure shall be multiplied by 1/1.5 from following table, and please choose actuator size N28 or over.
(2) For CQPS, allowable Shut-off pressure shall be multiplied by 1/1.2 from following table.
(3) When Tight shut off is required on Body Model (CVPS, CSMS, CDMS), allowable shut-off pressure shall be multiplied by 1/1.2 from following table.
(4) When liquids flow through FTC in Body model (CVPS, CSMS, CDMS), consideration of the intermediate differential pressure is required. As a result, a case guided to the larger actuator size is possible.

Unit : MPa

Valve Size		20(mm)	25	40	50	65	80	100	125	150	200	250	300	350
Actuator Size	Off-balance	3/4(in.)	1	1-1/2	2	2-1/2	3	4	5	6	8	10	12	14
N24	20 (0.2)	0.97	0.68	0.33	0.20	0.12								
	40 (0.4)	1.86	1.37	0.67	0.41	0.25								
	80 (0.8)	3.82	2.74	1.27	0.83	0.50								
	100 (1.0)	4.80	3.43	1.66	0.98	0.63								
N28	20 (0.2)	1.17	0.88	0.43	0.26	0.16	0.11	0.06						
	40 (0.4)	2.45	1.76	0.87	0.53	0.33	0.24	0.14						
	80 (0.8)	5.00	3.53	1.66	1.07	0.66	0.50	0.29						
	100 (1.0)	6.27	4.41	2.15	1.27	0.83	0.62	0.37						
N33S	20 (0.2)	1.86	1.27	0.64	0.39	0.24	0.17	0.10						
	40 (0.4)	3.72	2.54	1.27	0.79	0.49	0.36	0.21						
	80 (0.8)	7.45	5.19	2.54	1.56	0.98	0.73	0.43						
	100 (1.0)	9.31	6.47	3.23	1.96	1.17	0.92	0.54						
	120 (1.2)	9.80	7.84	3.82	2.35	1.47	1.07	0.65						
N40	20 (0.2)			0.91	0.55	0.34	0.25	0.14	0.09	0.06	0.03			
	40 (0.4)			1.76	1.07	0.68	0.51	0.30	0.19	0.13	0.07			
	80 (0.8)			3.62	2.25	1.37	0.98	0.61	0.40	0.28	0.15			
	100 (1.0)			4.51	2.74	1.66	1.27	0.76	0.50	0.35	0.20			
	120 (1.2)			5.39	3.33	2.05	1.47	0.92	0.60	0.43	—			
500S 500L	20 (0.2)			1.47	0.94	0.56	0.43	0.25	0.16	0.11	0.06			
	40 (0.4)			3.04	1.86	1.07	0.86	0.50	0.33	0.23	0.13	0.08	0.05	
	60 (0.6)			4.51	2.74	1.66	1.27	0.76	0.50	0.35	0.20	0.12	0.08	
	80 (0.8)			6.08	3.72	2.25	1.66	0.98	0.67	0.48	0.27	0.17	0.11	
	100 (1.0)			7.55	4.70	2.84	2.15	1.27	0.84	0.59	0.34	0.21	0.14	
	120 (1.2)			9.12	5.58	3.43	2.54	1.47	0.98	0.71	0.41	0.26	0.17	
650S 650L	40 (0.4)						1.47	0.89	0.58	0.41	0.23	0.14	0.09	0.07
	60 (0.6)						2.25	1.27	0.88	0.62	0.35	0.22	0.15	0.11
	80 (0.8)						2.94	1.76	1.17	0.83	0.47	0.30	0.20	0.15
	100 (1.0)						3.72	2.15	1.47	0.98	0.59	0.38	0.26	0.19
	120 (1.2)						4.51	2.64	1.76	1.17	0.71	0.46	0.31	0.23
650XS 650XL	40 (0.4)										0.47	0.30	0.20	0.15
	60 (0.6)										0.71	0.46	0.31	0.23
	80 (0.8)										0.95	0.61	0.42	0.31
	100 (1.0)										1.17	0.77	0.52	0.39
	120 (1.2)										1.37	0.93	0.63	0.47

■Plug Type P (CVPP, CQPP, CSMP, CDMP)

【Notes】

(1) Upper row: Allowable shut-off pressure. Lower row: Allowable intermediate differential pressure.

(2) When a fluid passing in CVPP, CSMP and CDMP is liquid and/or steam, actuator size should be selected to satisfy both Allowable shut-off pressure and Allowable intermediate differential pressure.

Unit : MPa

Valve Size		50(mm)	65	80	100	125	150	200	250	300	350
Actuator Size	Off-balance	2(in.)	$2^1/_2$	3	4	5	6	8	10	12	14
N24	40 (0.4)	1.86	1.07								
		1.27	1.07								
	80 (0.8)	4.60	3.23								
		1.27	1.27								
	100 (1.0)	6.08	4.31								
		1.27	1.27								
N28	40 (0.4)	2.64	1.66	0.98	0.46						
		1.66	1.66	0.98	0.46						
	80 (0.8)	6.27	4.51	3.23	2.05						
		1.66	1.66	1.27	0.98						
	100 (1.0)	8.13	5.88	4.31	2.94						
		1.66	1.66	1.27	0.98						
N33S	40 (0.4)	3.82	2.74	1.86	1.17						
		2.54	2.45	1.86	1.17						
	80 (0.8)	8.43	6.37	4.90	3.43						
		2.54	2.45	1.86	1.37						
	100 (1.0)	9.80	8.23	6.37	4.60						
		2.54	2.45	1.86	1.37						
	120 (1.2)	9.80	9.80	7.94	5.78						
		2.54	2.45	1.86	1.37						
N40	40 (0.4)	3.72	2.94	2.45	1.76	1.07	0.89	0.38			
		3.62	2.94	2.45	1.76	1.07	0.89	0.38			
	80 (0.8)	8.53	6.96	5.98	4.51	3.33	2.74	1.66			
		3.62	3.43	2.64	1.96	1.66	1.37	1.07			
	100 (1.0)	9.80	9.02	7.64	5.88	4.41	3.72	2.25			
		3.62	3.43	2.64	1.96	1.66	1.37	1.07			
	120 (1.2)	9.80	9.80	9.41	7.25	5.49	4.70	—			
		3.62	3.43	2.64	1.96	1.66	1.37	—			
500S 500L	40 (0.4)	5.88	4.90	4.02	3.04	2.15	1.86	1.17	0.51	0.14	
		5.88	4.90	4.02	3.04	2.15	1.86	1.17	0.51	0.14	
	60 (0.6)	9.31	7.84	6.57	5.09	3.92	3.33	2.25	1.17	0.64	
		6.08	5.68	4.41	3.33	2.84	2.35	1.76	1.17	0.64	
	80 (0.8)	9.80	9.80	9.12	7.25	5.58	4.80	3.33	1.86	1.07	
		6.08	5.68	4.41	3.33	2.84	2.35	1.76	1.27	0.98	
	100 (1.0)	9.80	9.80	9.80	9.31	7.35	6.27	4.41	2.54	1.56	
		6.08	5.68	4.41	3.33	2.84	2.35	1.76	1.27	0.98	
	120 (1.2)	9.80	9.80	9.80	9.80	9.02	7.74	5.49	3.23	2.05	
		6.08	5.68	4.41	3.33	2.84	2.35	1.76	1.27	0.98	
650S 650L	40 (0.4)			6.86	5.49	4.31	3.72	1.86	0.98	0.59	0.35
				6.86	5.49	4.31	3.72	1.86	0.98	0.59	0.35
	60 (0.6)			9.80	8.82	7.06	6.17	3.33	1.96	1.27	0.94
				7.74	5.88	5.00	4.11	3.13	1.96	1.27	0.94
	80 (0.8)			9.80	9.80	9.80	8.53	4.70	2.94	2.05	1.47
				7.74	5.88	5.00	4.11	3.13	2.35	1.66	1.27
	100 (1.0)			9.80	9.80	9.80	9.80	6.08	3.92	2.74	2.05
				7.74	5.88	5.00	4.11	3.13	2.35	1.66	1.27
	120 (1.2)			9.80	9.80	9.80	9.80	7.45	5.00	3.53	2.64
				7.74	5.88	5.00	4.11	3.13	2.35	1.66	1.27
650XS 650XL	40 (0.4)							4.70	2.94	2.05	1.07
								4.70	2.94	2.05	1.07
	60 (0.6)							7.45	5.00	3.53	2.25
								6.27	4.70	3.33	2.25
	80 (0.8)							9.80	6.96	5.00	3.43
								6.27	4.70	3.33	2.64
	100 (1.0)							9.80	8.92	6.47	4.60
								6.27	4.70	3.33	2.64
	120 (1.2)							9.80	9.80	8.04	5.78
								6.27	4.70	3.33	2.64

■CPPS

① Contoured

【Notes】

(1) For ANSI/FCI 70-2 Class V, allowable Shut-off pressure shall be multiplied by 1/1.5 from following table, and please choose actuator size N28 or over if port size is 20mm (3/4inch) or over.

(2) When Tight shut off is required, allowable shut-off pressure shall be multiplied by 1/1.2 from following table.

Unit : MPa

Port size		7(mm) CV=0.6	8	10	15 CV=5.2	20	25	32	40	50	65	80
Actuator Size	Off-balance	3/16(in.)	1/4	3/8	1/2	3/4	1	1-1/4	1-1/2	2	2-1/2	3
N24	20 (0.2)	6.96	4.65	3.10	1.88	1.01	0.69	0.47	0.34	0.20		
	40 (0.4)	9.80	9.21	6.17	3.76	2.04	1.39	0.95	0.69	0.41		
	80 (0.8)		9.80		7.45	4.10	2.78	1.90	1.39	0.83		
	100 (1.0)				9.41	5.09	3.48	2.38	1.74	1.04		
N28	20 (0.2)	9.02	5.98	4.03	2.44	1.33	0.90	0.62	0.45	0.26	0.16	0.11
	40 (0.4)	9.80		8.04	4.88	2.66	1.80	1.23	0.90	0.53	0.34	0.24
	80 (0.8)			9.80		5.29	3.61	2.46	1.80	1.07	0.68	0.49
	100 (1.0)					6.66	4.52	3.08	2.26	1.35	0.86	0.61
N33S	20 (0.2)	9.80	7.94	5.88	3.58	1.96	1.32	0.90	0.66	0.39	0.24	0.17
	40 (0.4)		9.80		7.15	3.92	2.65	1.81	1.33	0.79	0.50	0.36
	80 (0.8)				9.80	7.84	5.29	3.63	2.66	1.59	1.01	0.72
	100 (1.0)					9.80	6.57	4.54	3.33	2.00	1.26	0.91
	120 (1.2)						7.94	5.39	4.00	2.39	1.52	1.09
N40	20 (0.2)							1.27	0.93	0.55	0.35	0.25
	40 (0.4)							2.55	1.87	1.11	0.71	0.50
	80 (0.8)							5.09	3.74	2.24	1.43	1.02
	100 (1.0)							6.37	4.68	2.81	1.78	1.28
	120 (1.2)							7.64	5.58	3.37	2.14	1.53
500S	20 (0.2)							2.13	1.55	0.93	0.59	0.42
	40 (0.4)							4.27	3.12	1.87	1.19	0.85
	60 (0.6)							6.37	4.69	2.81	1.79	1.28
	80 (0.8)							8.53	6.17	3.75	2.39	1.71
	100 (1.0)							9.80	7.74	4.69	2.99	2.14
	120 (1.2)								9.39	5.63	3.58	2.57
650S	40 (0.4)											1.49
	60 (0.6)											2.23
	80 (0.8)											2.98
	100 (1.0)											3.73
	120 (1.2)											4.48

② Quick opening

【Notes】

(1) When port size is 20mm (3/4inch) or over, please choose body model (CQPS, CQPB, CQPP).

(2) For ANSI/FCI 70-2 Class V, allowable Shut-off pressure shall be multiplied by 1/1.5 from following table.

Unit : MPa

Port size		8(mm)	10	15
Actuator Size	Off-balance	1/4(in.)	3/8	1/2
N24	40 (0.4)	7.74	5.09	3.17
	80 (0.8)	9.80		6.27
	100 (1.0)			7.84
N28	40 (0.4)	9.80	6.66	4.06
	80 (0.8)		9.80	8.13
	100 (1.0)			9.80
N33S	40 (0.4)		9.80	5.98
	80 (0.8)			9.80
	100 (1.0)			
	120 (1.2)			

■CLTS

【Notes】

(1) For ANSI/FCI 70-2 Class V, allowable Shut-off pressure shall be multiplied by 1/1.5 from following table, and please choose actuator size N28 or over if port size is Cv=3.0 or over.

(2) When Tight shut off is required, allowable shut-off pressure shall be multiplied by 1/1.2 from following table.

Unit : MPa

Actuator Size	Off-balance	Port size									
		Cv= 0.2	Cv= 0.4	Cv= 0.6	Cv= 1.0	Cv= 1.5	Cv= 2.0	Cv= 3.0	Cv= 5.2	Cv= 9.0	Cv= 12
N24	20 (0.2)	3.92		2.94	1.96			0.96			
	40 (0.4)	7.84		5.98	4.02			1.86			
	80 (0.8)	9.80			8.04			3.82			
	100 (1.0)				9.80			4.80			
N28	20 (0.2)	5.00		3.92	2.54			1.17		0.35	0.21
	40 (0.4)	9.80		7.84	5.19			2.45		0.70	0.43
	80 (0.8)			9.80				4.90		1.37	0.86
	100 (1.0)							6.17		1.76	1.07
N33S	20 (0.2)	7.45		5.78	3.82			1.76		0.51	0.31
	40 (0.4)	9.80			7.64			3.62		0.98	0.62
	80 (0.8)				9.80			7.25		2.05	1.17
	100 (1.0)							9.12		2.54	1.56
	120 (1.2)							9.80		3.13	1.86
N40	20 (0.2)				4.90			2.54		0.73	0.44
	40 (0.4)				9.80			5.09		1.47	0.89
	80 (0.8)							9.80		2.94	1.76
	100 (1.0)									3.62	2.15
	120 (1.2)									4.41	2.64
500S	20 (0.2)				6.08			4.31		1.17	0.74
	40 (0.4)				9.80			8.62		2.45	1.47
	60 (0.6)							9.80		3.62	2.15
	80 (0.8)									4.90	2.94
	100 (1.0)									6.08	3.72
	120 (1.2)									7.35	4.41
650S	40 (0.4)				9.80			9.80		4.21	2.54
	60 (0.6)									6.37	3.82
	80 (0.8)									8.53	5.09
	100 (1.0)									9.80	6.47
	120 (1.2)										7.74

■Plug Type B (Standard temperature range) (CVPB, CQPB, CSMB, CDMB)

①Allowable Seat Leakage Ratio: 0.01% at rated Cv (ANSI/FCI 70-2 Class IV)

【Notes】

(1) For CQPB, allowable Shut-off pressure shall be multiplied by 1/1.2 from following table.

(2) When Tight shut off is required on Body Model (CVPB, CSMB, CDMB), allowable shut-off pressure shall be multiplied by 1/1.2 from following table.

Unit : MPa

Valve Size		40(mm)	50	65	80	100	125	150	200	250	300	350
Actuator Size	Off-balance	1-1/2(in.)	2	2-1/2	3	4	5	6	8	10	12	14
N28	40 (0.4)	2.54	1.96	1.37	1.17	0.83						
	80 (0.8)	5.09	3.92	2.74	2.35	1.66						
	100 (1.0)	6.47	5.00	3.43	2.94	2.05						
N33S	40 (0.4)	3.72	2.94	1.96	1.76	1.17						
	80 (0.8)	7.55	5.88	4.02	3.53	2.45						
	100 (1.0)	9.51	7.35	5.09	4.41	3.04						
	120 (1.2)	9.80	8.82	6.08	5.29	3.62						
N40	40 (0.4)	5.29	4.11	2.84	2.45	1.66	1.37	1.07	—			
	80 (0.8)	9.80	8.23	5.78	4.90	3.43	2.74	2.25	1.56			
	100 (1.0)		9.80	7.15	6.17	4.31	3.43	2.84	1.96			
	120 (1.2)			8.62	7.45	5.19	4.11	3.43	—			
500S 500L	40 (0.4)	8.92	6.86	4.80	4.11	2.84	2.25	1.86	1.27	1.07	0.66	
	60 (0.6)	9.80	9.80	7.15	6.17	4.31	3.43	2.84	1.96	1.56	0.98	
	80 (0.8)			9.61	8.23	5.78	4.60	3.82	2.64	2.15	1.27	
	100 (1.0)			9.80	9.80	7.15	5.78	4.80	3.33	2.64	1.66	
	120 (1.2)					8.62	6.96	5.78	4.02	3.23	1.96	
650S 650L	40 (0.4)				7.15	5.00	4.02	3.33	2.25	1.86	1.07	0.79
	60 (0.6)				9.80	7.45	5.98	5.00	3.43	2.74	1.66	1.17
	80 (0.8)					9.80	8.04	6.76	4.60	3.72	2.25	1.56
	100 (1.0)						9.80	8.43	5.78	4.60	2.84	1.96
	120 (1.2)							9.80	6.96	5.58	3.43	2.35
650XS 650XL	40 (0.4)								4.60	3.72	2.25	1.56
	60 (0.6)								6.96	5.58	3.43	2.35
	80 (0.8)								9.31	7.45	4.60	3.13
	100 (1.0)								9.80	9.31	5.78	3.92
	120 (1.2)									9.80	6.96	4.80

②Allowable Seat Leakage Ratio: ANSI/FCI 70-2 Class V (Special Specification)

【Notes】
(1) Off-balance 40kPaG (0.4kgf/cm^{2}G) is not applied.
(2) In the case of oil free specifications, actuator size is N33S or over.

Unit : MPa

Valve Size		40(mm)	50	65	80	100	125	150	200	250	300	350
Actuator Size	Off-balance	1-1/2(in.)	2	2-1/2	3	4	5	6	8	10	12	14
N28	80 (0.8)	4.31	3.33	2.25								
	100 (1.0)	5.39	4.11	2.84								
N33S	80 (0.8)	6.27	4.90	3.33	2.94	1.96						
	100 (1.0)	7.94	6.08	4.21	3.62	2.54						
	120 (1.2)	9.51	7.35	5.09	4.41	3.04						
N40	80 (0.8)	8.92	6.86	4.80	4.11	2.84	2.25	—				
	100 (1.0)	9.80	8.62	5.98	5.09	3.53	2.84	—				
	120 (1.2)		9.80	7.15	6.17	4.31	3.43	2.84				
500S 500L	60 (0.6)	9.80	8.62	5.98	5.19	3.53	2.84	2.35				
	80 (0.8)		9.80	8.04	6.86	4.80	3.82	3.23				
	100 (1.0)			9.80	8.62	5.98	4.80	4.02				
	120 (1.2)				9.80	7.15	5.78	4.80				
650S 650L	60 (0.6)				9.02	6.27	5.00	4.21	2.84	—		
	80 (0.8)				9.80	8.33	6.66	5.58	3.82	3.04		
	100 (1.0)					9.80	8.33	6.96	4.80	3.82		
	120 (1.2)						9.80	8.43	5.78	4.60		
650XS 650XL	60 (0.6)								5.78	4.60	2.84	—
	80 (0.8)								7.74	6.17	3.82	—
	100 (1.0)								9.70	7.74	4.80	3.33
	120 (1.2)								9.80	9.31	5.78	3.92

■Plug Type B (Low temperature range) (CVPB, CQPB, CSMB, CDMB)

【Notes】
(1) Lower than Off-balance 60kPaG (0.6 kgf/cm^{2}G) are not applied.
(2) For CQPB, allowable Shut-off pressure shall be multiplied by 1/1.2 from following table.
(3) When Tight shut off is required on Body Model (CVPB, CSMB, CDMB), allowable shut-off pressure shall be multiplied by 1/1.2 from following table.

Unit : MPa

Valve Size		50(mm)	65	80	100	125	150	200	250	300	350
Actuator Size	Off-balance	2(in.)	2-1/2	3	4	5	6	8	10	12	14
N28	80 (0.8)	3.43	2.25								
	100 (1.0)	4.41	2.94								
N33S	80 (0.8)	5.29	3.62	3.04	1.96						
	100 (1.0)	6.76	4.60	3.92	2.54						
	120 (1.2)	8.23	5.68	4.80	3.23						
N40	80 (0.8)	7.74	5.29	4.41	2.94	2.25	1.86				
	100 (1.0)	9.80	6.66	5.68	3.82	3.04	2.45				
	120 (1.2)		8.13	6.96	4.70	3.72	3.04				
500S 500L	80 (0.8)	9.80	9.12	7.74	5.29	4.11	3.43	2.25	1.66		
	100 (1.0)		9.80	9.80	6.76	5.29	4.31	2.84	2.25		
	120 (1.2)				8.23	6.47	5.29	3.53	2.74		
650S 650L	80 (0.8)			9.80	9.51	7.55	6.27	4.21	3.23	1.96	1.27
	100 (1.0)				9.80	9.61	7.94	5.39	4.21	2.54	1.66
	120 (1.2)					9.80	9.61	6.57	5.19	3.13	2.05
650XS 650XL	80 (0.8)							8.82	7.06	4.31	2.94
	100 (1.0)							9.80	8.92	5.49	3.72
	120 (1.2)								9.80	6.66	4.51

■Plug Type H (CVPH, CQPH, CSMH, CDMH)

【Notes】
(1) Lower than Off-balance 60kPaG (0.6kgf/cm^{2}G) are not applied.
(2) Off-balance 120kPaG (1.2kgf/cm^{2}G) is applied to only direct action.

Unit : MPa

Valve Size		50(mm)	65	80	100	125	150	200	250	300	350
Actuator Size	Off-balance	2(in.)	2-1/2	3	4	5	6	8	10	12	14
N28	80 (0.8)	3.53	2.35								
	100 (1.0)	4.51	3.04								
N33S	80 (0.8)	5.39	3.62	3.04	2.05						
	100 (1.0)	6.86	4.70	3.92	2.64						
	120 (1.2)	8.33	5.68	4.80	3.23						
N40	80 (0.8)	7.74	5.29	4.51	3.04	2.35	1.86				
	100 (1.0)	9.80	6.76	5.78	3.92	3.04	2.45				
	120 (1.2)		8.23	6.96	4.80	3.72	3.04				
500S 500L	80 (0.8)	9.80	9.21	7.84	5.39	4.21	3.43	2.25	1.76		
	100 (1.0)		9.80	9.80	6.76	5.39	4.41	2.94	2.25		
	120 (1.2)				8.23	6.57	5.39	3.62	2.84		
650S 650L	80 (0.8)			9.80	9.61	7.64	6.37	4.21	3.33	2.05	
	100 (1.0)				9.80	9.70	8.04	5.39	4.31	2.64	
	120 (1.2)					9.80	9.70	6.57	5.19	3.23	
650XS 650XL	80 (0.8)							8.92	7.06	4.31	
	100 (1.0)							9.80	8.92	5.49	
	120 (1.2)								9.80	6.66	

9. MAIN DIMENSIONS AND WEIGHT

1 Face-to-face Dimensions of Valve

【Notes】

(1) Face-to-Face dimension in ▭ shaded zone conform to IEC 60534-3-1 (JIS B2005-3-1) and ISA 75.08.01.

(2) Face-to-Face dimension of male and female, tongue and groove flange for JIS 10K to 30K (ASME 150, ASME 300) is coincident with JIS30K RF.

Unit: mm

Press. Rating / Valve Size (mm)	Valve Size (inch)	Face-to-face Dimension F				
		JIS 10K RF ASME 150 RF	JIS 20K RF ASME 300 RF	JIS 30K 40K RF ASME 300 RJ ASME 600 RF	ASME 600 RJ	SW(≦50 mm) BW(≧65 mm)
15	1/2	184	190	203	203	206
20	3/4	184	194	206	206	206
25	1	184	197	210	210	220
40	1-1/2	222	235	251	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
250	10	673	708	752	755	910
300	12	737	775	819	822	1030
350	14	889	927	972	975	1150

2 Standard Dimensions

【Notes】

(1) This table shows the outline dimensions of a control valve, and therefore the dimensions of attached accessories are not included.
(2) Dimension C represents actuator for direct action. For actuator of reverse action, use the dimension C_R.
(3) In the place where E and/or C notation makes two rows, the upper row and the lower row shows respectively Class 150 to 300 and Class 400 to 600.
(4) "S" is a dimension necessary to remove actuator from a valve at the time of maintenance.

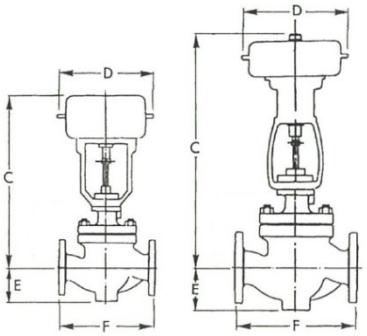
Unit: mm

Valve Size		Actuator Size	D	E	C			C_R	S (Note4)
					Plain Bonnet Type	Extension Bonnet Type			
(mm)	(inch)					Type-F	Type-H		
15	1/2	N24	240	60 65	430 425	530 525	995 985	C+30	200
		N28	280		470 465	570 565	1035 1025		220
		N33S	330		525 520	625 620	1090 1080		240
20	3/4	N24	240	65	430 435	530 535	995		200
		N28	280		470	570	1035		220
		N33S	330		525	625	1090		240
25	1	N24	240	70 65	430	530	995		200
		N28	280		470	570	1035		220
		N33S	330		525	625	1090		240
40	1-1/2	N24	240	85	450	600	1015		200
		N28	280		490	640	1055		220
		N33S	330		545	695	1110		240
		N40	400		700	850	1260		350
		500S	500		920	1070	1485	C+150	370
50	2	N24	240	95	470	620	1035	C+30	200
		N28	280		510	660	1070		220
		N33S	330		565	715	1125		240
		N40	400		720	870	1320		350
		500S	500		940	1090	1540	C+150	370
65	2-1/2	N28	280	110	555	705	1090	C+30	220
		N33S	330		610	760	1145		240
		N40	400		765	915	1365		350
		500S	500		985	1135	1585	C+150	370
80	3	N28	280	130 135	555	705	1145	C+30	220
		N33S	330		610	760	1200		240
		N40	400		765	915	1390		350
		500S	500		985	1135	1610	C+150	370
		650S	650		1280	1430	1905	C+240	380
100	4	N28	280	145	595	745	1185	C+30	220
		N33S	330		650	800	1240		240
		N40	400		805	955	1430		350
		500S	500		1025	1175	1650	C+150	370
		650S	650		1320	1470	1945	C+240	380
125	5	N40	400	180	830	980	1455	C+30	350
		500S	500		1050	1200	1675	C+150	370
		500L			1135	1285	1760	C+135	370
		650S	650		1345	1495	1970	C+240	380
		650L			1450	1600	2075	C+295	410
150	6	N40	400	205	860	1010	1485	C+30	350
		500S	500		1080	1230	1705	C+150	370
		500L			1165	1315	1790	C+135	370
		650S	650		1375	1525	2000	C+240	380
		650L			1475	1625	2100	C+295	410
200	8	N40	400	225	965	1115	1665	C+30	350
		500S	500		1185	1335	1885	C+150	370
		500L			1270	1420	1970	C+135	370
		650S	650		1480	1630	2180	C+240	380
		650L			1580	1730	2285	C+295	410
		650XS			1955	2105	2655	C+300	410
250	10	500L	500	270	1285	1435	1985	C+135	370
		650L	650		1595	1745	2300	C+295	410
		650XL			2205	2355	2905	C+300	480
300	12	500L	500	290	1380	1530	2045	C+135	370
		650L	650		1690	1840	2355	C+295	410
		650XL			2300	2450	2965	C+300	480
350	14	650L	650	320	1740	1890	2435	C+295	410
		650XL			2345	2495	3045	C+300	480

■ **Plain Bonnet Type**

Actuator Size

N24 to N40 500 to 650X

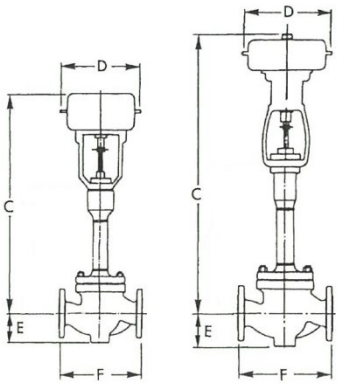


■ **Extension Bonnet Type**

Type-F, Type-H

Actuator Size

N24 to N40 500 to 650X



3 Weight

Unit: kg

Bonnet Type	Actuator Size	15 (1/2) JIS 10K ASME 150	15 (1/2) JIS 20K ASME 300	15 (1/2) JIS 30K, 40K ASME 600	20 (3/4) JIS 10K ASME 150	20 (3/4) JIS 20K ASME 300	20 (3/4) JIS 30K, 40K ASME 600	25 (1) JIS 10K ASME 150	25 (1) JIS 20K ASME 300	25 (1) JIS 30K, 40K ASME 600	40 (1-1/2) JIS 10K ASME 150	40 (1-1/2) JIS 20K ASME 300	40 (1-1/2) JIS 30K, 40K ASME 600	50 (2) JIS 10K ASME 150	50 (2) JIS 20K ASME 300	50 (2) JIS 30K, 40K ASME 600	65 (2-1/2) JIS 10K ASME 150	65 (2-1/2) JIS 20K ASME 300	65 (2-1/2) JIS 30K, 40K ASME 600	80 (3) JIS 10K ASME 150	80 (3) JIS 20K ASME 300	80 (3) JIS 30K, 40K ASME 600	100 (4) JIS 10K ASME 150	100 (4) JIS 20K ASME 300	100 (4) JIS 30K, 40K ASME 600
Plain Type	N24	23	23	25	24	24	25	25	25	27	33	34	35	41	41	44	53	54	58						
Plain Type	N28	26	26	28	27	27	28	28	28	30	36	37	38	44	44	47	56	57	61	67	70	74	97	101	108
Plain Type	N33S	35	35	37	36	36	37	37	37	39	45	46	47	53	53	56	65	66	70	76	79	83	106	110	117
Plain Type	N40										78	79	80	86	86	89	98	99	103	109	112	116	139	143	150
Plain Type	500S										112	113	114	120	120	123	132	133	137	143	146	150	173	177	184
Plain Type	650S																			333	336	340	363	367	374
Extension Type-F	N24	25	25	28	26	26	27	27	27	29	35	36	37	44	44	47	56	57	61						
Extension Type-F	N28	28	28	30	29	29	30	30	30	32	38	39	40	47	47	50	59	60	64	71	74	78	101	105	112
Extension Type-F	N33S	37	37	39	38	38	39	39	39	41	47	48	49	56	56	59	68	69	73	80	83	87	110	114	121
Extension Type-F	N40										80	81	82	89	89	92	101	102	106	113	116	120	143	147	154
Extension Type-F	500S										114	115	116	123	123	126	135	136	140	147	150	154	177	181	188
Extension Type-F	650S																			337	340	344	363	371	378
Extension Type-H	N24	26	26	28	27	27	28	28	28	30	37	38	39	46	46	49	59	60	64						
Extension Type-H	N28	29	29	31	30	30	31	31	31	33	40	41	42	49	49	52	62	63	67	74	77	81	105	109	116
Extension Type-H	N33S	38	38	40	39	39	40	40	40	42	49	50	51	58	58	61	71	72	76	83	86	90	114	118	125
Extension Type-H	N40										82	83	84	91	91	94	104	105	109	116	119	123	147	151	158
Extension Type-H	500S										116	117	118	125	125	128	138	139	143	150	153	157	181	185	192
Extension Type-H	650S																			340	343	347	371	375	382

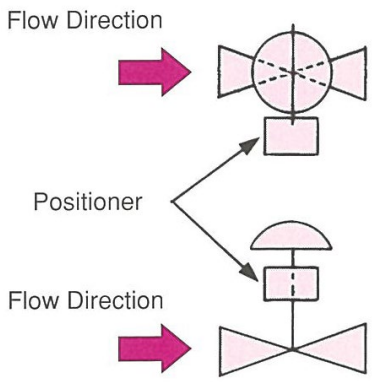
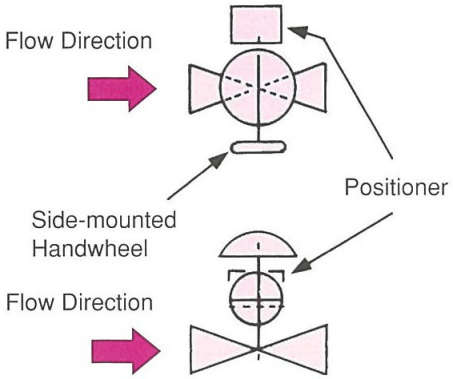
Bonnet Type	Actuator Size	125 (5) JIS 10K ASME 150	125 (5) JIS 20K ASME 300	125 (5) JIS 30K, 40K ASME 600	150 (6) JIS 10K ASME 150	150 (6) JIS 20K ASME 300	150 (6) JIS 30K, 40K ASME 600	200 (8) JIS 10K ASME 150	200 (8) JIS 20K ASME 300	200 (8) JIS 30K, 40K ASME 600	250 (10) JIS 10K ASME 150	250 (10) JIS 20K ASME 300	250 (10) JIS 30K, 40K ASME 600	300 (12) JIS 10K ASME 150	300 (12) JIS 20K ASME 300	300 (12) JIS 30K, 40K ASME 600	350 (14) JIS 10K ASME 150	350 (14) JIS 20K ASME 300	350 (14) JIS 30K, 40K ASME 600
Plain Type	N40	175	182	192	220	229	244	260	300	360									
Plain Type	500S	209	216	226	254	263	278	294	334	394									
Plain Type	500L	226	233	243	271	280	295	311	351	411	410	457	554	579	644	774			
Plain Type	650S	399	406	416	444	453	468	479	519	579									
Plain Type	650L	404	411	421	449	458	473	484	524	584	583	630	727	752	817	947	950	1042	1234
Plain Type	650XS							835	862	961									
Plain Type	650XL										1025	1105	1212	1205	1310	1486	1449	1551	1783
Extension Type-F	N40	180	187	197	226	235	250	274	314	374									
Extension Type-F	500S	214	221	231	260	269	284	308	348	408									
Extension Type-F	500L	231	238	248	277	286	301	325	365	425	426	473	570	597	662	792			
Extension Type-F	650S	404	411	421	450	459	474	493	533	593									
Extension Type-F	650L	409	416	426	455	464	479	498	538	598	599	646	743	770	835	965	970	1062	1254
Extension Type-F	650XS							849	876	975									
Extension Type-F	650XL										1041	1121	1228	1223	1328	1504	1469	1571	1803
Extension Type-H	N40	185	192	202	232	241	256	288	328	388									
Extension Type-H	500S	219	226	236	266	275	290	322	362	422									
Extension Type-H	500L	236	243	253	283	292	307	339	379	439	442	489	586	615	680	810			
Extension Type-H	650S	409	416	426	456	465	480	507	547	607									
Extension Type-H	650L	414	421	431	461	470	485	512	552	612	615	662	759	788	853	983	990	1082	1274
Extension Type-H	650XS							863	890	989									
Extension Type-H	650XL										1057	1137	1244	1241	1346	1522	1489	1591	1823

【Notes】

(1) This table shows approximate weight for valve body assembly completed with actuator except accessories.
(2) For the case actuator size N24 to N40, the weight of Direct action (DA) and/or Reverse action (RA) is equal.
(3) The value of actuator size 500S to 650XL shows a case of the Direct action (DA).

10. MOUNTING ORIENTATIONS

Standard mounting orientations are as follows.

Without Side-mounted Handwheel	With Side-mounted Handwheel
	

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