



General Specifications

Model 02-F

HIGH PRESSURE

ANGLE TYPE CONTROL VALVES

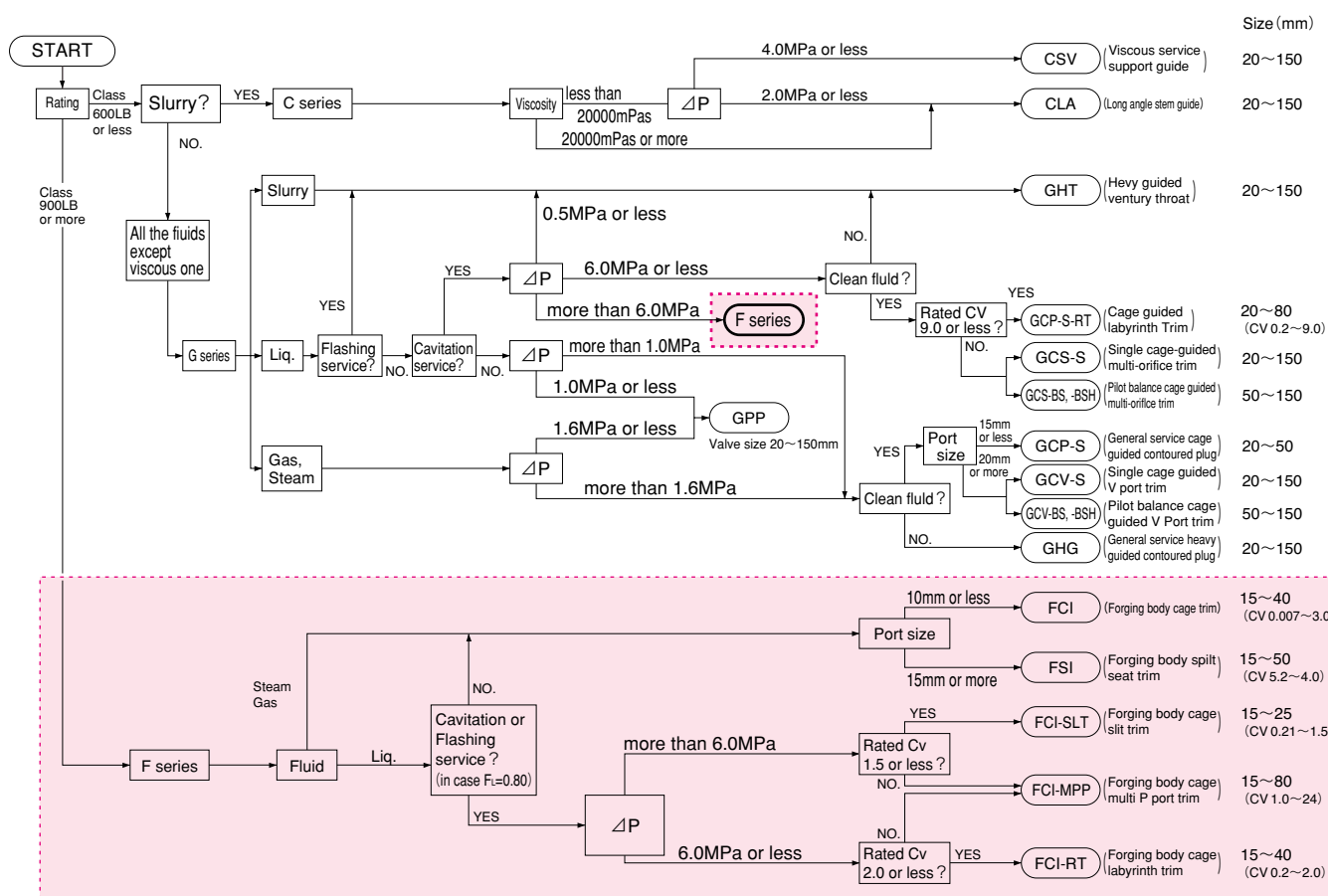
Angle-type control valves are indispensable to control fluid of high differential pressure, slurry, high viscosity, or adhesive. They are provided with a number of features such as low resistance of passage, antiwear quality within the valve, easy maintenance and inspection.

Model 02 series valves are provided as for the general-purpose angle valves to be used under various fluid conditions such as high temperature, high pressure, high differential pressure, extremely low temperature and low noise, and is used for various industries or services such as power, chemical and water process plants. It is available to select optimum valves from a variety of models in this series.

1. SELECTION OF VALVE TYPE

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Flowchart of angle type control valves



- [Notes]**
1. For the specifications exceeding this range, please contact our sales office.
 2. Closed zone indicates the content of this catalog.
 3. As to the detail of G/C series, refer to catalog (Bulletin No.MCE-B1201).

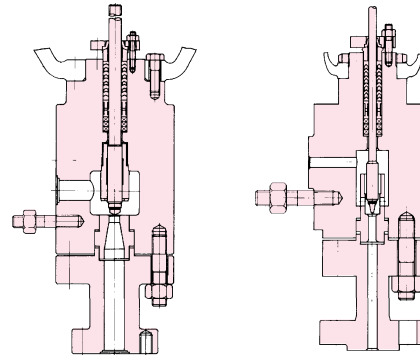
2. FEATURES

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FSI Type

FCI Type

Both **FSI** and **FCI** types have been used for the high differential pressure lines class of 29.4MPaG (300kgf/cm²G) such as the high-pressure polyethylene plant and ammonia plant, and are well suited to the lines with relatively small diameters of 50mm or smaller. By changing the flow direction from horizontal to vertical (flow to close), the valve body can be prevented from erosion. In addition, the inside of the bottom flange can be layered with stellite to increase the durability against erosion. Even during flow to close operation, the diameter of the valve stem is equal to or larger than the port diameter to have the stabilized construction that eliminates the problem for thrust balance. If the seat ring of cage type is used and the fixed orifice is mounted on the cage side, the pressure can be reduced at two stages to prevent the port from eroding.



FSI Type

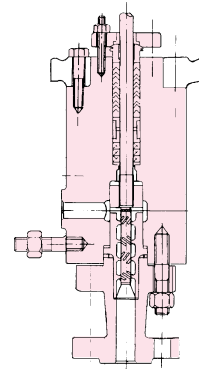
FCI Type

FCI-SLT Type

SLT trim has been developed for servicing the high differential pressure cavitation fluid in small flow. The valve plug is of the piston type and has a groove on its surface, while the seat ring is of the multi-chamber type. Therefore, fluid pressure can be gradually reduced at each stage.

Typical Applications

- High differential pressure control valve for a small liquid flow
- Low noise valve for liquid



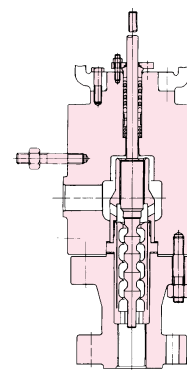
FCI-SLT Type

FCI-MPP Type

MPP trim has been developed for servicing the high differential pressure liquid with the Cv value larger than that of the STL trim. Several valve plug are serially connected to enable Eq.% and linear characteristics. The seat employs the multiple chambers to have the labyrinth effect in the same manner as the SLT trim. Fluid pressure can be gradually reduced at each chamber to evenly disperse cavitation applied to each port. Therefore, compared with the single-port valve, this valve enables stabilized operation with extremely low noise for a long period of time.

Typical Applications

- Small size high differential liquid pressure control valve

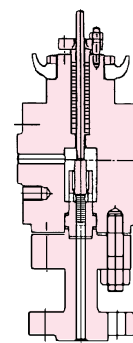


FCI-MPP Type

FCI-RT Type

RT trim is multi-throttling type and has labyrinth slot of outer valve plug. These valves hardly wear the seating surface inspite of low travel service, and are suited for high differential pressure of liquid. (Ex. Boiler feed water small valve, etc.)

Usually valve travel should be 60 percent of rated travel or less.



FCI-RT Type

3. SPECIFICATIONS

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Valve Type		Diaphragm operated control valve					
Valve Model No.		3802, 2802					
VALVE BODY	Body Type	FSI	FCI	FCI-SLT	FCI-MPP	FCI-RT	
	Valve Size	(mm)	15 ~ 50	15 ~ 40	15 ~ 25	15 ~ 50, 80	15 ~ 40
		(inch)	1/2 ~ 2	1/2 ~ 1 1/2	1/2 ~ 1	1/2 ~ 2, 3	1/2 ~ 1 1/2
	Port Size (mm)		15 ~ 50	· Small flow (#00 ~ #3) · φ4 ~ 10	Cv=0.21 ~ 1.5	Cv=1.0 ~ 24.0	Cv=0.2 ~ 2.0
	Pressure Rating	JIS63K (inlet connection bolt is stud type as standard.) ASME/JPI Class 900, 1500, 2500					
	End Connections	Flange type, FF, RF, RJ, Lens ring fiange type and others					
	Body Materials	See page 4 "Main Materials"					
	Bonnet Types	Plain : -17 °C ~ +230 °C Fin : -20 °C ~ -17 °C, more than 230 °C Extention : (Light) -100 °C ~ -20 °C, (Heavy) -196 °C ~ -100 °C					
	Gland Type	Bolted gland					
Packing (Non Asbestos)	See page 4 "Main Materials"						
Gaskets (Non Asbestos)	See page 4 "Main Materials"						
ACTUATOR	Actuator Type	Model 3800 Multi-spring type single acting diaphragm Actuator			Model 2800 Spring type single acting diaphragm Actuator		
	Actuator Sizes	N28	N33S	N40	500S	650S	
	Max. Stroke (mm)	38	38	65	65	65	
	Supply Air press. kPaG (kgf/cm²G)	240 (2.4), 280 (2.8), 300 (3.0)			240 (2.4), 280 (2.8)		
	Spring Range. kPaG (kgf/cm²G)	40 ~ 200 (0.4 ~ 2.0), 80 ~ 200 (0.8 ~ 2.0)			20 ~ 180 (0.2 ~ 1.8), 40 ~ 200 (0.4 ~ 2.0) 60 ~ 220 (0.6 ~ 2.2), 100 ~ 220 (1.0 ~ 2.2) 80 ~ 240 (0.8 ~ 2.4)		
	Action	Direct action, Reverse action					
	Materials	Diaphragm : Cloth reinforced chloroprene rubber. Yoke : FC200					
	Air Connection	Rc 1/4, Rc 3/8 (only for 650S)					
	Ambient Temperature	-20 °C ~ +70 °C (-50 °C ~ -20 °C, +70 °C ~ +100 °C*) ⁽³⁾			-30 °C ~ +70 °C (-50 °C ~ -30 °C, +70 °C ~ +100 °C*) ⁽³⁾		
Painting Color		Silver (No painting on stainless steel)					
VALVE CHARACTERISTICS	Flow direction						
	Port Characteristics	FSI	FCI	FCI-SLT	FCI-MPP	FCI-RT	
		Eq % Linear Quick opening	Eq % Linear Quick opening	Linear Quick opening	Eq % Linear	Modified parabolic	

VALVE CHARACTERISTICS AND PERFORMANCE	Control Mode		Throtting control, On-Off control
	Valve Action		Direct action (Air-to close), Reverse action (Air-to open)
	Applicable press. Range		42.3MPaG (431kgf/cm ² G) or less (Pressure limit shall conform to pressure-temperature rating)
	Applicable Temp. Range		-196 °C ~ +550 °C (Temperature limit shall conform to pressure-temperature rating)
	Allowable Differential Press.		See page 9,10 "Allowable Shut-off Pressure"
	Rated Cv Value		See page 7 "Rated Cv Value"
	Flow Characteristics		See page 7, 8 "Flow Characteristics"
	Inherent Rangeability		10 : 1 ~ 30 : 1 (See page7)
	Allowable seat leakage		0.01 % of rated Cv value (ANSI / FCI Class IV) ※ Option : ANSI / FCI Class V available.
	Action Accuracy	Hysteresis Error (With positioner)	Max. 2 % F.S.
Linearity (With positioner)		Max. ± 2 % F.S.	
ADDITIONAL OPTIONS	Valve Body		Jacket body, Special treatment for trim
	Actuator		Handwheel (Top-mounted handwheel. Side-mounted handwheel). Travel stop. Diaphragm material : Ethylene propylene rubber. Yoke material : SCPH2
	Accessories		Pneumatic positioner (PA92A). Electro-pneumatic positioner (EA91A, EA90A, EA10S) Air filter regulator (MR2000), 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 bolt & nut S.S., Optional painting color.

- [Notes] (1) Valve performance is represented under the condition of standard packing (HTV + P4519).
 (2) ※ Manufactured and attached as option according to customer's request.
 (3) For ambient temperature, denoted the extended temperature range as option.
 (4) Steam jacket construction is recommended for high viscosity and adhesive fluid. On F series valve, built-in steam jacket in the body is provided when steam jacket is requested.
 (5) For type FCI-RT, "Flow to Open" direction is also available on request.

4. MAIN MATERIALS

1 Standard Combination of Materials

Part Name	Materials (JIS designation)
Body	SFVC-2A (Forged Carbon Steel), SUS F304, SUS F316 and others
Trim	SUS 316 + CoCr Alloy, SUS 440B, and others
Gasket	Serrated metal gasket
Gland Packing (Non Asbestos)	<ul style="list-style-type: none"> · PTFE V-ring (for high pressure) + PTFE braided packing · Graphite packing + Carbon fiber braided packing · Others

2 Pressure-Temperature Rating in accordance with ASME(1996)/JPI(1999)

Following table is comprised of excerpts from ASME B16.5-1996 PIPE FLANGES AND FLANGED FITTINGS and JPI-7S-15-1999 PIPE FLANGE FOR THE PETROLEUM INDUSTRY

Pressure-Temperature unit in ASME B16.5-1996 are specified by psi and °F.

The unit has been converted to SI unit and checked its adequacy by Temperature-Pressure table in JPI-7S-15-1999.

Formula: MPaG=psig × 6.894757 / 1000, °C=(°F-32) × 5 / 9, the way of rounding the figures are in accordance with JPI.

Refer to the table for checking body rating.

Unit: MPaG

Material Group	Class 900						Class 1500						Class 2500						Temp. (°C)										
	1.1		1.5		1.9		1.10		1.13		2.1		2.2		1.1		1.5			1.9		1.10		1.13		2.1		2.2	
	Carbon Steel		Low Alloy Steel				Stainless Steel				Carbon Steel		Low Alloy Steel				Stainless Steel			Carbon Steel		Low Alloy Steel				Stainless Steel			
	Temp. (°C)	SCPH2 WCB	SCPH11 WC1	1Cr-0.5Mo 1.25Cr-0.5Mo Wc6	2.25Cr-1Mo Wc9	5Cr-0.5Mo C5	TYPE 304	TYPE 316	SCS13A CF8	SCS14A CF8M	SCPH2 WCB	SCPH11 WC1	1Cr-0.5Mo 1.25Cr-0.5Mo Wc6	2.25Cr-1Mo Wc9	5Cr-0.5Mo C5	TYPE 304	TYPE 316	SCS13A CF8		SCS14A CF8M	SCPH2 WCB	SCPH11 WC1	1Cr-0.5Mo 1.25Cr-0.5Mo Wc6	2.25Cr-1Mo Wc9	5Cr-0.5Mo C5	TYPE 304	TYPE 316	SCS13A CF8	SCS14A CF8M
-29~38		15.3	14.4	15.5	15.5	15.5	14.9	14.9	25.5	23.9	25.9	25.9	25.9	25.9	25.9	24.8	24.8	42.5	39.9	43.1	39.9	43.1	43.1	43.1	43.1	41.4	41.4	41.4	50
50	15.0	14.3	15.5	15.5	15.5	15.5	14.3	14.4	25.0	23.8	25.9	25.9	25.9	25.8	23.9	24.1	41.7	39.7	43.1	39.7	43.1	43.0	43.0	43.0	39.9	40.1	40.1	50	
93	14.0	14.0	15.5	15.5	15.4	12.4	12.8	23.3	23.4	25.9	25.9	25.7	20.7	21.3	38.8	39.0	43.1	43.1	42.8	34.5	35.6	93							
100	13.9	14.0	15.4	15.5	15.3	12.3	12.7	23.2	23.3	25.7	25.8	25.6	20.4	21.1	38.7	38.8	42.9	42.9	42.6	34.1	35.2	100							
149	13.6	13.5	14.9	15.1	14.8	11.2	11.6	22.6	22.5	24.9	25.1	24.7	18.6	19.3	37.7	37.5	41.5	41.9	41.1	31.0	32.1	149							
150	13.6	13.5	14.9	15.1	14.8	11.2	11.6	22.6	22.5	24.9	25.1	24.7	18.6	19.2	37.7	37.5	41.4	41.8	41.1	31.0	32.1	150							
200	13.1	13.3	14.4	14.6	14.6	10.3	10.7	21.9	22.1	24.0	24.4	24.4	17.3	17.8	36.5	36.8	39.9	40.6	40.6	28.5	29.5	200							
204	13.1	13.2	14.3	14.6	14.6	10.3	10.6	21.9	22.1	23.9	24.3	24.3	17.1	17.7	36.4	36.7	39.8	40.5	40.5	28.5	29.5	204							
250	12.5	12.9	13.9	13.9	13.9	9.74	10.0	20.9	21.5	23.1	23.2	23.2	16.3	16.7	34.8	35.9	38.5	38.6	38.6	27.1	27.8	250							
260	12.4	12.9	13.8	13.8	13.8	9.62	9.89	20.6	21.4	22.9	22.9	22.9	16.1	16.5	34.4	35.7	38.2	38.2	38.2	26.8	27.4	260							
300	11.6	12.6	12.9	12.9	12.9	9.20	9.50	19.4	21.0	21.4	21.4	21.4	15.3	15.8	32.3	35.0	35.7	35.7	35.7	25.6	26.3	300							
316	11.3	12.5	12.5	12.5	12.5	9.03	9.34	18.9	20.9	20.9	20.9	20.9	15.1	15.5	31.4	34.7	34.7	34.7	34.7	25.1	25.9	316							
343	11.1	12.2	12.2	12.2	12.2	8.89	9.17	18.5	20.3	20.3	20.3	20.3	14.8	15.3	30.9	33.8	33.8	33.8	33.8	24.7	25.5	343							
350	11.1	12.1	12.1	12.1	12.1	8.87	9.13	18.5	20.1	20.1	20.1	20.1	14.8	15.2	30.8	33.5	33.5	33.5	33.5	24.6	25.4	350							
371	11.0	11.8	11.8	11.8	11.8	8.79	9.00	18.4	19.6	19.6	19.6	14.7	15.0	30.6	32.6	32.6	32.6	32.6	24.4	25.0	371								
375	10.9	11.6	11.6	11.6	11.6	8.76	8.97	18.2	19.4	19.4	19.4	19.4	14.6	14.9	30.4	32.3	32.3	32.3	32.3	24.3	24.9	375							
399	10.4	11.0	11.0	11.0	10.9	8.58	8.83	17.4	18.3	18.3	18.3	18.2	14.3	14.7	29.0	30.5	30.5	30.5	30.3	23.9	24.5	399							
400	10.3	11.0	11.0	11.0	10.9	8.57	8.82	17.2	18.3	18.3	18.3	18.2	14.3	14.7	28.7	30.5	30.5	30.5	30.3	23.8	24.5	400							
425	8.63	10.5	10.5	10.5	10.5	8.36	8.73	14.4	17.6	17.6	17.6	17.6	13.9	14.6	24.0	29.2	29.2	29.2	29.2	23.2	24.3	425							
427	8.52	10.5	10.5	10.5	10.5	8.34	8.72	14.2	17.5	17.5	17.5	17.5	13.9	14.5	23.6	29.2	29.2	29.2	29.2	23.2	24.3	427							
450	6.02	10.1	10.1	10.1	10.1	8.23	8.66	10.0	16.9	16.9	16.9	16.8	13.7	14.4	16.7	28.2	28.2	28.2	28.0	22.8	24.0	450							
454	5.55	10.1	10.1	10.1	10.0	8.20	8.65	9.24	16.8	16.8	16.8	16.7	13.7	14.4	15.4	28.0	28.0	28.0	27.8	22.8	24.0	454							
475	4.07	9.51	9.51	9.51	8.26	8.08	8.60	6.79	15.8	15.8	15.8	13.8	13.5	14.3	11.3	26.4	26.4	26.4	23.0	22.4	23.9	475							
482	3.55	9.31	9.31	9.31	7.65	8.03	8.58	5.93	15.5	15.5	15.5	12.8	13.4	14.3	9.86	25.8	25.8	25.8	21.3	22.3	23.9	482							
500	2.65	7.08	7.56	8.34	6.40	7.94	8.21	4.41	11.8	12.6	13.9	10.6	13.3	13.7	7.34	19.6	21.0	23.2	17.7	22.1	22.8	500							
510	2.14	5.83	6.58	7.79	5.69	7.89	8.00	3.55	9.69	11.0	13.0	9.45	13.2	13.3	5.93	16.2	18.3	21.7	15.8	21.9	22.2	510							
525	1.56	4.52	5.45	6.49	4.83	7.22	7.59	2.60	7.53	9.08	10.8	8.05	12.0	12.6	4.33	12.5	15.1	18.1	13.4	20.0	21.1	525							
538	1.07	3.41	4.48	5.38	4.10	6.65	7.24	1.79	5.69	7.45	9.00	6.86	11.1	12.1	2.96	9.45	12.4	15.0	11.4	18.4	20.1	538							
550			3.81	4.60	3.60	6.53	7.18			6.35	7.69	6.03	10.9	12.0			10.6	12.8	10.0	18.1	19.9	550							
566			2.96	3.62	2.96	6.38	7.10			4.96	6.03	4.96	10.7	11.9			8.27	10.0	8.27	17.7	19.8	566							
575			2.64	3.16	2.66	6.01	6.83			4.40	5.27	4.44	10.0	11.4			7.34	8.77	7.41	16.7	19.0	575							
593			2.00	2.28	2.07	5.31	6.31			3.31	3.79	3.41	8.86	10.5			5.52	6.31	5.72	14.8	17.5	593							
600			1.83	2.07	1.88	5.02	5.97			3.03	3.45	3.11	8.38	10.0			5.04	5.74	5.20	14.0	16.6	600							
621			1.28	1.41	1.28	4.10	4.90			2.14	2.38	2.14	6.86	8.17			3.55	3.93	3.55	11.4	13.6	621							
625			1.21	1.34	1.20	3.98	4.75			2.02	2.24	2.00	6.64	7.92			3.36	3.71	3.33	11.1	13.2	625							
649			0.79	0.86	0.72	3.21	3.83			1.31	1.41	1.17	5.31	6.38			2.17	2.38	1.97	8.86	10.7	649							
650						3.17	3.79						5.25	6.33						8.77	10.6	650							
675						2.40	3.08						3.98	5.15						6.66	8.61	675							
677						2.34	3.03						3.90	5.07						6.52	8.48	677							
700						1.85	2.51						3.11	4.20						5.18	6.97	700							
704						1.76	2.41						2.96	4.03						4.93	6.69	704							
725						1.40	2.11						2.35	3.50						3.91	5.82	725							
732						1.28	2.00						2.14	3.31						3.55	5.52	732							
750						1.10	1.71						1.83	2.87						3.04	4.77	750							
760						1.00	1.55						1.65	2.62						2.76	4.34	760							
775						0.85	1.37						1.39	2.28						2.33	3.80	775							
788						0.72	1.21						1.17	2.00						1.97	3.34	788							
800						0.65	1.05						1.07	1.74						1.80	2.92	800							
816						0.55	0.86						0.98	1.41						1.59	2.38	816							

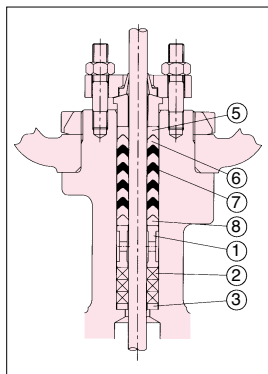
[Note] Within the thick line shows temperature limit for the materials (casting) specified in the table.

Typical Material Groups and their Applicable Material

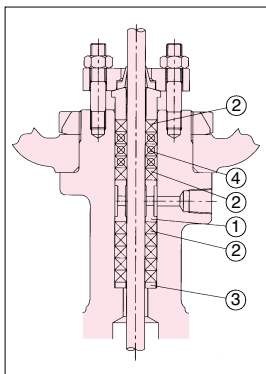
Material Group	Material equivalent to JIS	Material ASTM Designation
1.1 Carbon Steel	(a)(b) SFVC 2A, (a)(b) SFL2, (a)(b) SCPH2	(a)(b) A105, (a)(b) A350-LF2, (a)(b) A216-WCB
1.5 Carbon Steel	(b)(c) SFVA F1, (b)(c) SCPH11, (d) SCPL11	(b)(c) A182-F1, (b)(c) A217-WC1, (d) A352-LC1
1.9 Low Alloy Steel	1Cr-0.5Mo 1.25Cr-0.5Mo (e)(f) SFVA F11A, (e)(f) SFVA F12, (g) SCPH21	(e)(f) A182-F11 CL2, (e)(f) A182-F12 CL2, (g) A217-WC6
1.10 Low Alloy Steel	2.25Cr-1Mo (e)(f) SFVA F22B	

3 Gland Packing

High pressure application



High temperature & high pressure application



Parts	Materials
1 Lantern ring	SUS 316
2 Gland packing	Braided packing
3 Packing ring	SUS316
4 Gland packing	Braided packing
5 Adapter	SUS 316
6 Gland packing	Glass reinforced PTFE
7 Chevron	SUS 316
8 Packing seat	SUS 316

02
F

5. SCOPE OF PRODUCTION

[Note] Mark ● indicates full port. Mark ◆ indicates reduced port.

FSI Type

Port Size (mm)		15	20	25	32	40	50
Valve Size	Travel (mm)	15		20		25	
15 (mm)	1/2 (in.)	●					
20	3/4	◆	●				
25	1	◆	◆	●			
40	1 1/2		◆	◆	◆	●	
50	2			◆	◆	◆	●

FCI-RT Type

Port Size Cv		0.2	0.4	0.6	1.0	1.5	2.0
Valve Size	Travel (mm)	15					
15 (mm)	1/2 (in.)	◆	◆	◆	◆	◆	◆
20	3/4	◆	◆	◆	◆	◆	◆
25	1	◆	◆	◆	◆	◆	◆
40	1 1/2				◆	◆	◆

FCI Type

Port Size (mm)		#00	#0	#1	#2	#3	φ3	φ4	6	7	8	10
Valve Size	Travel (mm)	15										
15 (mm)	1/2 (in.)	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
20	3/4	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
25	1	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆
40	1 1/2	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆	◆

FCI-SLT Type

Port size FCI-SLT & FCI-MPP is indicated by Cv Value.

Port Size (mm)		Cv 0.21	Cv 0.4	Cv 0.8	Cv 1.0	Cv 1.5
Valve Size	Travel (mm)	15				
15 (mm)	1/2 (in.)	◆	◆	◆	◆	◆
20	3/4	◆	◆	◆	◆	◆
25	1	◆	◆	◆	◆	◆

FCI-MPP Type

Port Size (mm)		Cv 1.0	Cv 1.5	Cv 3.0	Cv 5.0	Cv 8.0	Cv 11.0	Cv 16.0	Cv 20.0	Cv 24.0
Valve Size	Travel (mm)	15			20			25		
15 (mm)	1/2 (in.)	◆	◆							
20	3/4	◆	◆							
25	1	◆	◆	◆						
40	1 1/2			◆	◆	◆				
50	2			◆	◆	◆				
80	3				◆	◆	◆	◆	◆	◆

6. FLOW CHARACTERISTICS

1 Rated Cv Value

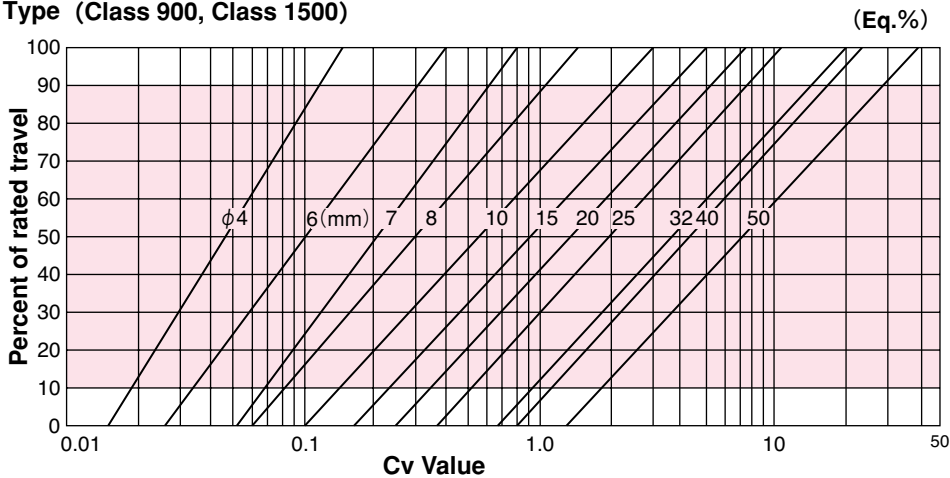
Body type		FCI										FSI							
Port Size	(mm)	#00	#0	#1	#2	#3	φ3	φ4	6	7	8	10	15	20	25	32	40	50	
	(in.)								1/8	3/16	1/4	3/8	1/2	3/4	1	1 1/4	1 1/2	2	
Rated Cv	900, 1500	0.007	0.014	0.025	0.037	0.056	0.09	0.15	0.4	0.8	1.5	3.0	5.2	7.5	11	20	24	40	
	2500										1	2	3	5	8	12	16	28	
Inherent Rangeability		10 : 1						15 : 1			25 : 1		30 : 1						

Body type	FCI-SLT					FCI-MPP								
Rated Cv	0.21	0.4	0.8	1.0	1.5	1.0	1.5	3.0	5.0	8.0	11.0	16.0	20.0	24.0
Inherent Rangeability	30 : 1					30 : 1								

Body type	FCI-RT					
Rated Cv	0.2	0.4	0.6	1.0	1.5	2.0
Inherent Rangeability	30 : 1					

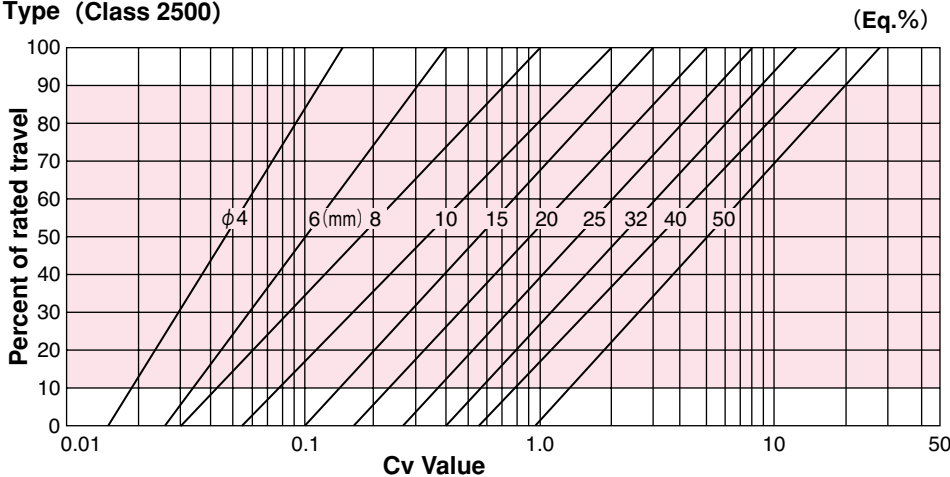
2 Flow Characteristics

■ FSI, FCI Type (Class 900, Class 1500)



[Note] When the port size is φ3 or smaller, the flow characteristics is linear.

■ FSI, FCI Type (Class 2500)

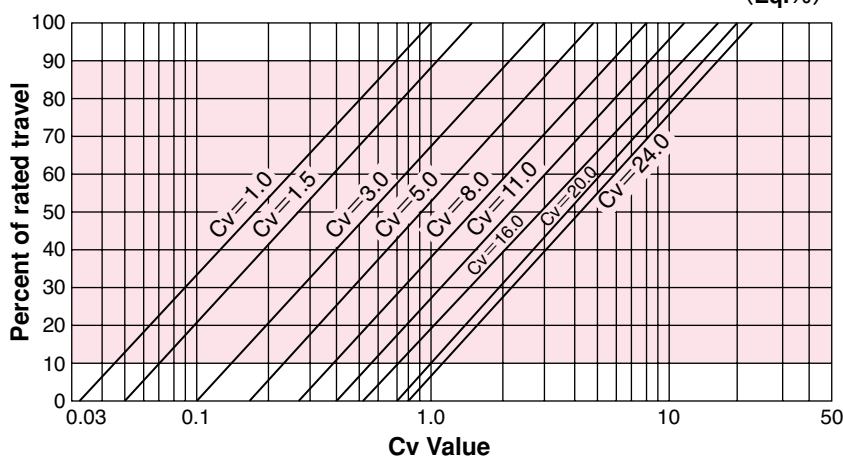


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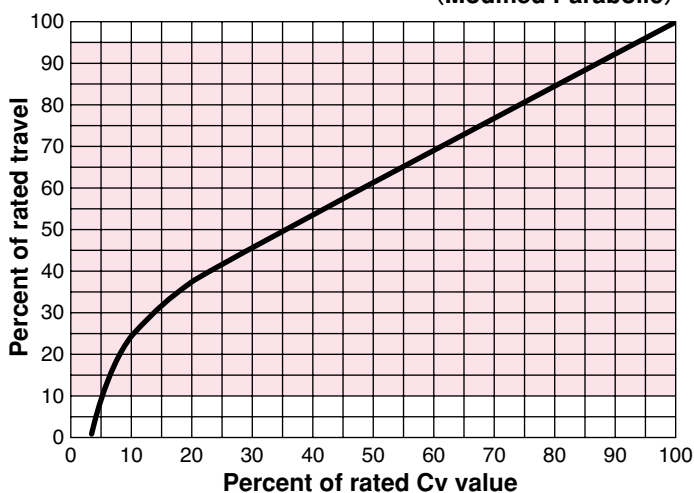
FCI-MPP Type

(Eq.%)



FCI-RT Type

(Modified Parabolic)



7. ALLOWABLE DIFFERENTIAL PRESSURE

1 Off-balance Classification

Unit : kPaG (kgf/cm²G)

Action		Spring Range		Supply Air Pressure	Off-balance
		Actuator Size			
		N28 ~ N40	500, 650		
Contoured Plug, Quick Opening	Direct Action	40 ~ 200 (0.4 ~ 2.0)		240 (2.4)	40 (0.4)
		—	60 ~ 220 (0.6 ~ 2.2)	280 (2.8)	60 (0.6)
	40 ~ 200 (0.4 ~ 2.0)		40 ~ 200 (0.4 ~ 2.0)	300 (3.0)	80 (0.8)
	—		—	240 (2.4)	100 (1.0)
Reverse Action	—	40 ~ 200 (0.4 ~ 2.0)		240 (2.4)	40 (0.4)
		—	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)

2 Allowable Shut-off Pressure

The values for allowable shut-off pressure shown in the following table indicate the static shut-off differential pressures. For the flow in the flow to close direction, the medium opening may cause the valve plug to vibrate vertically because the inner valve is sucked toward the downstream. Therefore, if ΔP is large at the medium opening, be sure to contact our nearest sales office for selecting the actuators by telling us your use conditions.

Unit : MPa (kgf/cm²)

FSI (Class900 ~ 1500)							
Port Size		15 (mm)	20	25	32	40	50
Actuator	Off-balance	1/2 (in.)	3/4	1	1 1/4	1 1/2	2
N33S	40 (0.4)	7.84 (80)	4.60 (47)	3.33 (34)	1.47 (15)	1.47 (15)	0.86 (8.8)
	80 (0.8)	15.69 (160)	9.2 (94)	6.66 (68)	3.04 (31)	3.04 (31)	1.66 (17)
	100 (1.0)	19.61 (200)	11.57 (118)	8.33 (85)	3.82 (39)	3.82 (39)	2.15 (22)
N40	40 (0.4)		6.47 (66)	4.70 (48)	2.15 (22)	2.15 (22)	1.17 (12)
	80 (0.8)		13.04 (133)	9.41 (96)	4.31 (44)	4.31 (44)	2.35 (24)
	100 (1.0)		16.27 (166)	11.86 (121)	5.39 (55)	5.39 (55)	3.04 (31)
500S	40 (0.4)		10.88 (111)	7.84 (80)	3.62 (37)	3.62 (37)	1.96 (20)
	60 (0.6)		16.27 (166)	11.86 (121)	5.39 (55)	5.39 (55)	3.04 (31)
	80 (0.8)		21.77 (222)	15.78 (161)	7.25 (74)	7.25 (74)	4.02 (41)
	100 (1.0)		25.30 (258)	19.80 (202)	9.02 (92)	9.02 (92)	5.00 (51)
650S	40 (0.4)			13.72 (140)	6.27 (64)	6.27 (64)	3.43 (35)
	60 (0.6)			20.59 (210)	9.41 (96)	9.41 (96)	5.19 (53)
	80 (0.8)			25.30 (258)	12.55 (128)	12.55 (128)	6.96 (71)
	100 (1.0)			25.30 (258)	15.69 (160)	15.69 (160)	8.72 (89)

Unit : MPa (kgf/cm²)

FSI (Class 2500)							
Port Size		15 (mm)	20	25	32	40	50
Actuator	Off-balance	1/2 (in.)	3/4	1	1 1/4	1 1/2	2
N33S	40 (0.4)	9.61 (98)	5.39 (55)	3.82 (39)	1.76 (18)	1.76 (18)	1.76 (18)
	80 (0.8)	19.31 (197)	10.88 (111)	7.64 (78)	3.53 (36)	3.53 (36)	3.53 (36)
	100 (1.0)	24.12 (246)	13.63 (139)	9.61 (98)	4.41 (45)	4.41 (45)	4.41 (45)
N40	40 (0.4)		7.25 (74)	5.39 (55)	2.45 (25)	2.45 (25)	2.45 (25)
	80 (0.8)		14.61 (149)	10.78 (110)	4.90 (50)	4.90 (50)	4.90 (50)
	100 (1.0)		18.33 (187)	13.53 (138)	6.17 (63)	6.17 (63)	6.17 (63)
500S	40 (0.4)			9.02 (92)	4.11 (42)	4.11 (42)	4.11 (42)
	60 (0.6)			13.53 (138)	6.17 (63)	6.17 (63)	6.17 (63)
	80 (0.8)			18.04 (184)	8.23 (84)	8.23 (84)	8.23 (84)
	100 (1.0)			22.55 (230)	10.39 (106)	10.39 (106)	10.39 (106)
650S	40 (0.4)			15.69 (160)	7.15 (73)	7.15 (73)	7.15 (73)
	60 (0.6)			23.53 (240)	10.78 (110)	10.78 (110)	10.78 (110)
	80 (0.8)			31.38 (320)	14.41 (147)	14.41 (147)	14.41 (147)
	100 (1.0)			39.22 (400)	18.04 (184)	18.04 (184)	18.04 (184)

Unit : MPa (kgf/cm²)

FCI (Class900 ~ 2500)							
Port Size		φ3	φ4	6 (mm)	7	8	10
Actuator	Off-balance			1/8 (in.)	3/16	1/4	3/8
N28	40 (0.4)	17.25 (176)	17.25 (176)	17.25 (176)	17.25 (176)	11.96 (122)	8.04 (82)
	80 (0.8)	34.51 (352)	34.51 (352)	34.51 (352)	34.51 (352)	24.02 (245)	16.08 (164)
N33S	40 (0.4)	25.39 (259)	25.39 (259)	25.39 (259)	25.39 (259)	17.65 (180)	11.86 (121)
	80 (0.8)	42.16 (430)	42.16 (430)	42.16 (430)	42.16 (430)	35.40 (361)	23.73 (242)
N40	40 (0.4)						16.67 (170)
	80 (0.8)						33.34 (340)

[Note] Off balance 100kPaG (1.0kgf/cm²G) is not available owing to applying special diameter of stem

Unit : MPa (kgf/cm²)

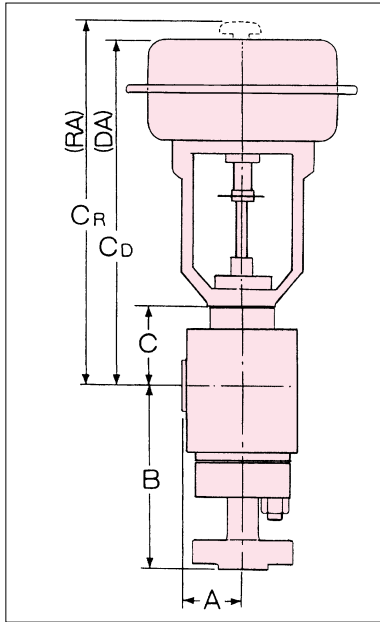
FCI-SLT, -MPP (Class 900 ~ 2500)										
Actuator	Off-balance	Port Size (Cv)								
		1.0	1.5	3.0	5.0	8.0	11	16	20	24
N28	40 (0.4)	3.62 (37)	3.62 (37)							
	80 (0.8)	7.35 (75)	7.35 (75)							
	100 (1.0)	9.21 (94)	9.21 (94)							
N33S	40 (0.4)	5.39 (55)	5.39 (55)							
	80 (0.8)	10.88 (111)	10.88 (111)							
	100 (1.0)	13.63 (139)	13.63 (139)							
N40	40 (0.4)	6.57 (67)	6.57 (67)	5.00 (51)	3.72 (38)	2.35 (24)	1.47 (15)			
	80 (0.8)	13.14 (134)	13.14 (134)	10.00 (102)	7.45 (76)	4.70 (48)	3.04 (31)			
	100 (1.0)	16.47 (168)	16.47 (168)	12.45 (127)	9.31 (95)	5.88 (60)	3.82 (39)			
500S	40 (0.4)	10.98 (112)	10.98 (112)	8.33 (85)	6.17 (63)	3.92 (40)	2.54 (26)	2.54 (26)		
	60 (0.6)	16.47 (168)	16.47 (168)	12.55 (128)	9.31 (95)	5.98 (61)	3.82 (39)	3.82 (39)		
	80 (0.8)	21.96 (224)	21.96 (224)	16.67 (170)	12.45 (127)	7.94 (81)	5.19 (53)	5.19 (53)		
	100 (1.0)	27.55 (281)	27.55 (281)	20.88 (213)	15.59 (159)	9.90 (101)	6.47 (66)	6.47 (66)		
650S	40 (0.4)			14.51 (148)	10.78 (110)	6.86 (70)	4.51 (46)	4.51 (46)	3.13 (32)	3.13 (32)
	60 (0.6)			21.77 (222)	16.27 (166)	10.29 (105)	6.76 (69)	6.76 (69)	4.70 (48)	4.70 (48)
	80 (0.8)			29.02 (296)	21.67 (221)	13.82 (141)	9.02 (92)	9.02 (92)	6.37 (65)	6.37 (65)
	100 (1.0)			36.28 (370)	25.30 (258)	17.25 (176)	11.27 (115)	11.27 (115)	7.94 (81)	7.94 (81)
600XS	40 (0.4)					13.82 (141)	9.02 (92)	9.02 (92)	6.37 (65)	6.37 (65)
	60 (0.6)					20.69 (211)	13.53 (138)	13.53 (138)	9.51 (97)	9.51 (97)
	80 (0.8)					27.69 (282)	18.04 (184)	18.04 (184)	12.74 (130)	12.74 (130)
	100 (1.0)					34.61 (353)	22.55 (230)	22.55 (230)	15.88 (162)	15.88 (162)

Unit : MPa (kgf/cm²)

FCI-RT (Class 900, 1500)							
Actuator	Off-balance	Port Size (Cv)					
		0.2	0.4	0.6	1.0	1.5	2.0
N28	40 (0.4)	10.10 (103)	10.10 (103)	7.84 (80)	5.19 (53)	5.19 (53)	5.19 (53)
	80 (0.8)	20.29 (207)	20.29 (207)	15.69 (160)	10.39 (106)	10.39 (106)	10.39 (106)
N33S	40 (0.4)	14.90 (152)	14.90 (152)	11.57 (118)	7.64 (78)	7.64 (78)	7.64 (78)
	80 (0.8)	25.30 (258)	25.30 (258)	23.14 (236)	15.39 (157)	15.39 (157)	15.39 (157)
N40	40 (0.4)	25.30 (258)	25.30 (258)	25.30 (258)	7.25 (74)	7.25 (74)	7.25 (74)
	80 (0.8)				14.61 (149)	14.61 (149)	14.61 (149)
500S	40 (0.4)				12.16 (124)	12.16 (124)	12.16 (124)
	60 (0.6)				18.33 (187)	18.33 (187)	18.33 (187)
	80 (0.8)				24.41 (249)	24.41 (249)	24.41 (249)

- [Notes] (1) Unit of off-balance is kPaG (kgf/cm²G) .
 (2) Off-balance 100kPaG (1.0kgf/cm²G) is applied only for direct action.
 (3) This table shows the value as to standard gland packing (HTV + P4519) .
 (4) When tight shut-off (T.S.O.) is specified for contoured plug of Model FSI and FCI, allowable shut-off pressure is selected by multiply the value in above table by 1 / 1.2.

8. MAIN DIMENSIONS



■ FCI, FCI-RT Type (Port Size : 10mm, Cv ≤ 2.0)

Face-to-center		Unit : mm		
Body Size		Actuator Size	A	B
mm	inch			
15	1/2	N28	76.4	235
20	3/4	N33S		
25	1	N40	91.4	235
40	1 1/2			

Dimensions			Unit : mm		
Body Size		Actuator Size	Height		
mm	inch		C	CD	CR
15	1/2	N28	100	440	465
20	3/4	N33S		495	520
25	1	N40	92	620	640
40	1 1/2				

■ FCI-SLT, -MPP Type

Face-to center		Unit : mm		
Body Size		A	B	C
mm	inch			
15	1/2	96.4	266	150
20	3/4			
25	1	100	270	155
40	1 1/2		280	170
50	2	120	330	245
80	3	165	480	250

■ FSI Type

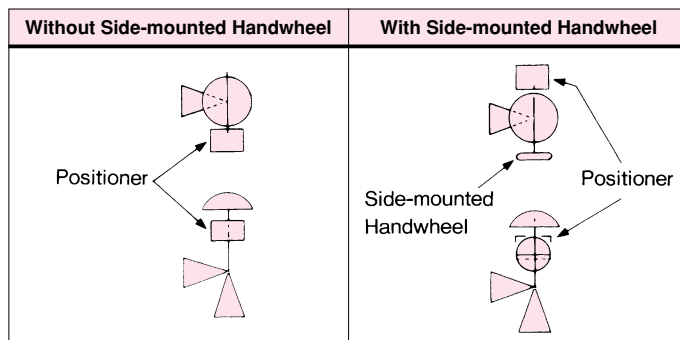
Face-to-center		Unit : mm			
Body Size		Actuator Size	A		B
mm	inch		Connection and Rating		
			JIS 63K	≧ ASME 900	
15	1/2	N33S	76.0	81.4	235
20	3/4	N40	86.0	91.4	
25	1	500S			
40	1 1/2	N40	96.0	101.4	250
		500S			
50	2	N40	126.0	131.4	360
		500S			
80	3	500S	137.0	143.4	390

Dimensions			Unit : mm		
Body Size		Actuator Size	Height		
mm	inch		C	CD	CR
25	1	N33S	152	545	570
40	1/2	N40	205	725	745
50	2		230	750	770
80	3	500S	210	950	1100

[Note] These main dimensions are indicated for your reference. Actually be decided according to Trim size and End connection.

9. MOUNTING ORIENTATIONS

Standard mounting orientation is as follows.



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