

Model 13-1 (DAMPER), 13-3 (STEP SEAL) LIGHT DUTY FLANGED STEEL PLATE WELDED BUTTERFLY CONTROL VALVES

Steel plate welded butterfly valves are designed for low pressure and large capacity gas plant line, and featured to have simplified construction and light weighted.

The main features are as follows.

1 High Temperature Applicability up to Max. + 750 °C for Gases

Applicable up to + 750 °C for high temperature gas service because of outer bearing construction.

2 Small Actuator

Capable to operate the valve by small actuator.

By applying self-aligning ball bearing, only small torque required to operate the valve.

3 Light-Weighted Construction

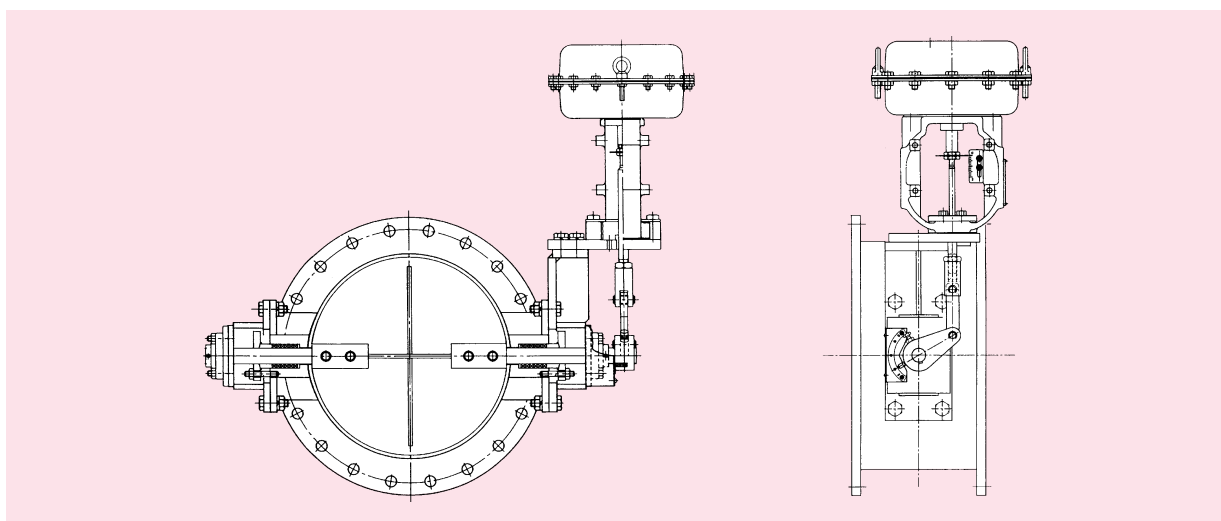
Materialized the light-weight construction in comparison with casting valve, owing to steel plate welded construction.

4 Lower Seat Leakage Ratio at Fully Close

Model 13-3 step seal type valves are materialized low seat leakage ratio. It is less than 50% of Model 13-1 damper type.

5 Wide Compatibility with Various Actuators

It is available to apply air-operated diaphragm actuator, air cylinder, electric motor, electro-hydraulic motor, manual lever, manual worm gear...etc.



13-1
13-3

1. SPECIFICATIONS

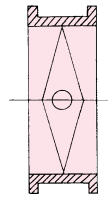
Valve Type		Spring Diaphragm Actuated Control Valve													
Valve Model No.		3813-1 & 3813-3							2813-1 & 2813-3						
VALVE BODY	Body Type	Model 13-1 Welding steel plate type damper, Model 13-3 Welding steel plate type step seal (see page 3 "Body construction")													
	Valve Sizes	(mm)	80	100	125	150	200	250	300	350	400	450	500	550	
		(in.)	3	4	5	6	8	10	12	14	16	18	20	22	
		(mm)	600	650	700	750	800	850	900	1000	1100	1200	1350	1500	
		(in.)	24	26	28	30	32	34	36	40	44	48	54	60	
End Connection & Rating		Flanged end : JIS 2K, 5K, 10K/FF, RF, ANSI/JPI Class 150 RF													

VALVE BODY	Body Materials	SS 400, SUS 304, SUS 316				
	Gland Type	Bolted gland				
	Packing	Braided packing, Molded packing				
	Guiding	Outer bearing guide : unit bearing				
	Disc Action	(Direct Action) rotating (valve) clockwise to close		(Reverse Action) rotating (valve) counter clockwise to close		
	Seat Type	Model 13-1 (Damper type), Model 13-3 (Step seal type)				
	Disc Characteristics	Butterfly valve inherent characteristics				
ACTUATOR	Actuator Type	Model 3800	Multi-spring type Single diaphragm operated	Model 2800	Spring type Single diaphragm operated	
	Actuator Sizes	N 28	N 40	500 L	650 L	
	Stroke (mm)	38	50	100	130	
	Supply Air Press.	280kPaG (2.8kgf/cm ² G)				
	Spring Range	80 ~ 200kPaG (0.8 ~ 2.0kgf/cm ² G)		60 ~ 220kPaG (0.6 ~ 2.2kgf/cm ² G)		
	Action	Direct Action				
	Materials	(Diaphragm) : Cloth reinforced chloroprene rubber, (Yoke) FC 200				
	Air Connection	Rc 1/4, Rc 3/8 (only 650L)				
	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					
(1) VALVE CHARACTERISTICS AND PERFORMANCE	Control Mode	Throtting control, On-off control, [Opening 60°, 75°, 90°]				
	Valve Action	Direct Action (Air-to close)		Reverse Action (Air-to open)		
	Applicable Max. Pressure	Valve Size	80 mm ~ 500 mm	550 mm ~ 1000 mm	1100 mm ~ 1500 mm	
		Pressure	0.1 MPaG (1.0kgf/cm ² G)	0.05 MPaG (0.5kgf/cm ² G)	0.02 MPaG (0.2kgf/cm ² G)	
	Applicable Temperature	0 °C ~ + 750 °C ⁽⁴⁾				
	Allowable Differential Press.	See page 5 "Allowable Shut-off Pressure"				
	Rated Cv Value	See page 3,4 "Rated Cv Value"				
	Flow Characteristics	See page 4 "Flow Characteristics"				
	Inherent Rangeability	(Damper) 15 : 1 [See page 4 "Flow characteristics" for proper throttling control range.] (Step seal) 30 : 1				
	Allowable Seat Leakage Ratio	See page 4,5 "Allowable Seat Leakage Ratio"				
	Accuracy of Performance ⁽¹⁾	Hysteresis Error	(with positioner) : max. 1.5 % F.S.			
Linearity		(with positioner) : max. ± 1.5 % F.S.				
OPTIONS*	Actuator	Handwheel (Top-mounted handwheel, side mounted handwheel), Travel stop, Diaphragm material : Ethylene propylene rubber (EPDM)				
	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	Sandproof, Dustproof, Anti-salt damage, Cold district spec. Tropical district spec. External exposure bolt & nut S.S. Optional painting color				

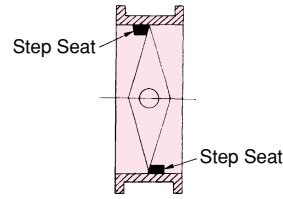
- [Notes] (1) Valve performance is represented under the condition of standard combination of gland packing (P4519+V#7010).
 (2) ※ Manufactured and attached as option on customer's request.
 (3) Material designation is represented by new JIS(SI Unit). Please consent in advance that approval drawings and other documents may represent with old material designation.
 (4) For the applications higher than 750 °C, please contact our sales office.

2. BODY CONSTRUCTION

Model 13-1 Damper



Model 13-3 Step Seal



3. MAIN MATERIALS

Material combinations in accordance with fluid temperature are as follows.

Fluid Temperature Range		Over 0°C to 350°C	Over 350°C to 600°C	Over 600°C to 750°C
Materials	Body	SS 400	SUS 304	SUS 316
	Disc	SS 400	SUS 304	SUS 316
	Shaft	SUS 304	SUS 304	SUS 316

4. SCOPE OF PRODUCTION

Combination of Valve Body and Actuator

Valve Model No.		3813-1 & 3813-3		2813-1 & 2813-3	
Actuator Size		N 28	N 40	500 L	650 L
Rated Travel (mm)					
Valve Size		38	50	100	130
(mm)	(in.)				
80	3	●			
100	4	●			
125	5	●			
150	6	●			
200	8	●			
250	10	●			
300	12	●			
350	14		●		
400	16		●		
450	18		●		
500	20			●	
550	22			●	

Valve Model No.		3813-1 & 3813-3		2813-1 & 2813-3	
Actuator Size		N 28	N 40	500 L	650 L
Rated Travel (mm)					
Valve Size		38	50	100	130
(mm)	(in.)				
600	24			●	
650	26			●	
700	28			●	
750	30				●
800	32				●
850	34				●
900	36				●
1000	40				●
1100	44				●
1200	48				●
1350	54				●
1500	60				●

[Notes] (1) ● : Scope of Production.
 (2) Model. 13-3 Valves are available for valve size 125 mm and larger.

5. FLOW CHARACTERISTICS

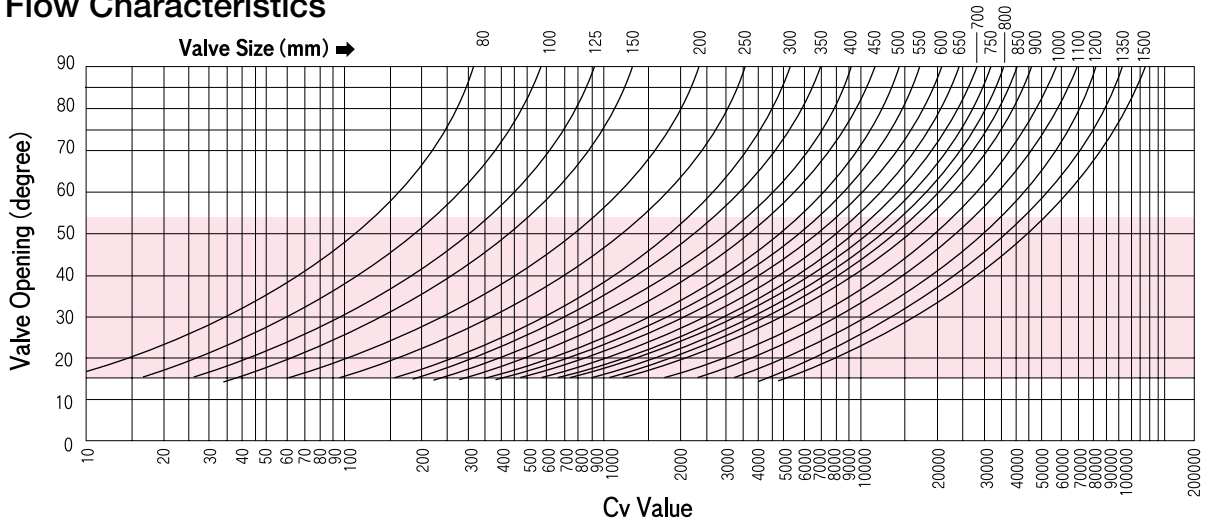
■ No. 13-1 (DAMPER)

1 Rated Cv Value

Valve Size		Cv Valve		
(mm)	(in.)	60°	75°	90°
80	3	160	240	320
100	4	280	430	560
125	5	450	700	900
150	6	640	980	1280
200	8	1150	1780	2300
250	10	1780	2760	3560
300	12	2600	4000	5200
350	14	3400	5200	6800
400	16	4500	7000	9000
450	18	5600	8650	11200
500	20	7000	10800	14000
550	22	8500	13100	17000

Valve Size		Cv Valve		
(mm)	(in.)	60°	75°	90°
600	24	10200	15700	20400
650	26	12000	18500	24000
700	28	13700	21100	27400
750	30	15700	24200	31400
800	32	17900	27600	35800
850	34	20000	30800	40000
900	36	22700	35000	45400
1000	40	28000	43000	56000
1100	44	34000	52400	68000
1200	48	40000	61600	80000
1350	54	51000	78500	102000
1500	60	63000	97000	126000

2 Flow Characteristics



[Note] Shaded zone represents proper throttling control range.

3 Allowable Seat Leakage Ratio

Unit : %

Valve Size(mm)	Fluid Temp. Opening	0 °C and over to 350 °C or less			350 °C and over to 750 °C or less		
		60 °	75 °	90 °	60 °	75 °	90 °
80 ~ 125		6.0	4.5	3.0	7.2	5.4	3.6
150 , 200		5.0	3.8	2.5	6.0	4.0	3.0
250 ~ 350		4.5	3.4	2.25	5.4	4.1	2.7
400 ~ 500		4.0	3.0	2.0	4.8	3.6	2.4
550 ~ 700		3.6	2.7	1.8	4.4	3.3	2.2
750 ~ 1000		3.2	2.4	1.6	3.8	2.9	1.9
1100 ~ 1500		2.9	2.2	1.45	3.6	2.7	1.8

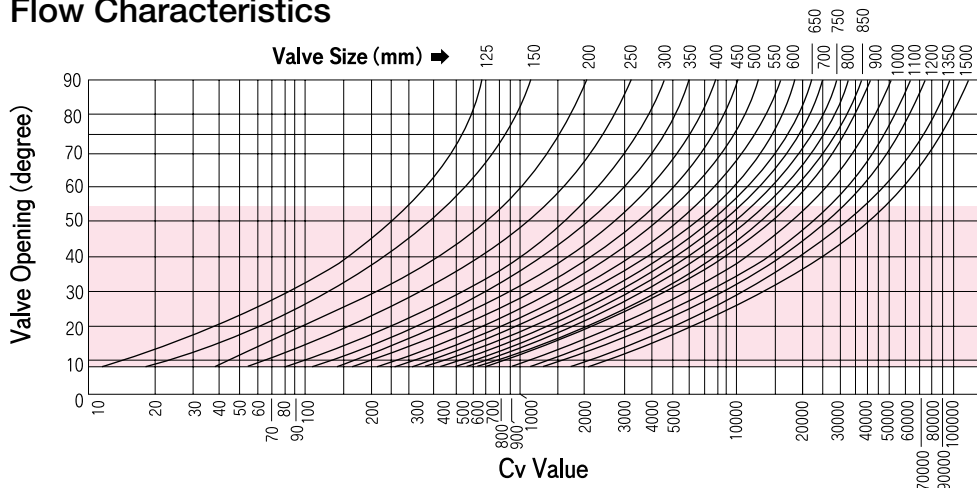
No. 13-3 (STEP SEAL)

1 Rated Cv Value

Valve Size		Cv Value		
(mm)	(in.)	60 °	75 °	90 °
125	5	380	560	650
150	6	575	880	1150
200	8	1035	1560	2070
250	10	1635	2500	3270
300	12	2390	3680	4780
350	14	3125	4800	6250
400	16	4150	6400	8300
450	18	5150	7900	10300
500	20	6450	9900	12900
550	22	8000	12300	16000
600	24	9600	14800	19200

Valve Size		Cv Value		
(mm)	(in.)	60 °	75 °	90 °
650	26	11300	17400	22600
700	28	12850	19800	25700
750	30	14750	22700	29500
800	32	16800	25900	33600
850	34	18800	29000	37600
900	36	21300	32800	42600
1000	40	26300	40500	52600
1100	44	32300	49700	64600
1200	48	38000	58500	76000
1350	54	48500	74600	97000
1500	60	59850	92200	119700

2 Flow Characteristics



[Note] Shaded zone represents proper throttling control range.

3 Allowable Seat Leakage Ratio

Unit : %

Valve Size (mm)	Fluid Temp. Opening	0 °C to 350 °C			350 °C to 750 °C		
		60°	75°	90°	60°	75°	90°
125		3.0	2.6	1.5	3.6	3.1	1.8
150 , 200		2.5	1.8	1.25	3.0	2.2	1.5
250 ~ 350		2.25	1.7	1.13	2.7	2.0	1.35
400 ~ 500		2.0	1.5	1.0	2.4	1.8	1.2
550 ~ 700		1.8	1.3	0.9	2.2	1.6	1.1
750 ~ 1000		1.6	1.2	0.8	1.9	1.4	0.95
1100 ~ 1500		1.45	1.1	0.75	1.8	1.3	0.9

6. ALLOWABLE DIFFERENTIAL PRESSURE

1 Off-balance Classification

Unit : kPaG (kgf/cm²G)

Action	Spring Range	Supp. Air Press.	Off-balance	Positioner	Actuator Model No.
Throttling (60° Opening)	80 ~ 200 (0.8 ~ 2.0)	280 (2.8)	80 (0.8)	with	3800
	60 ~ 220 (0.6 ~ 2.2)		60 (0.6)	with	2800
On-off (90° Opening)	80 ~ 200 (0.8 ~ 2.0)	280 (2.8)	80 (0.8)	without	3800
	60 ~ 220 (0.6 ~ 2.2)		60 (0.6)	without	2800

(Note) Painted part represents the disc position at the air-less condition.

2 Allowable Shut-off Pressure

Unit : MPa (kgf/cm²G)

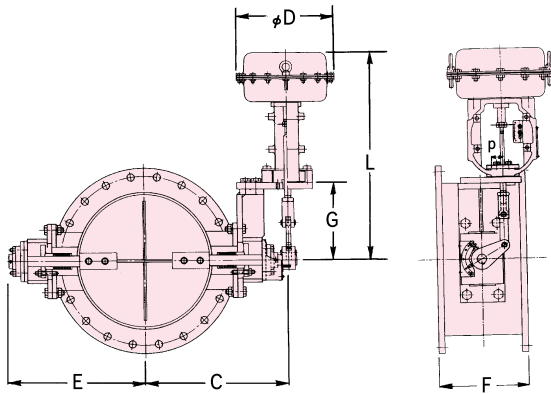
Actuator Size Valve Size	Actuator Size			
	N28	N40	500L	650L
80 (mm)	0.098 (1.0)	—	—	—
300	—	—	—	—
350	—	0.098 (1.0)	—	—
450	—	—	—	—
500	—	—	0.098 (1.0)	—
550	—	—	0.049 (0.5)	—
700	—	—	—	—
750	—	—	—	0.049 (0.5)
1000	—	—	—	—
1100	—	—	—	0.019 (0.2)
1500	—	—	—	—

7. DIMENSIONS AND WEIGHT

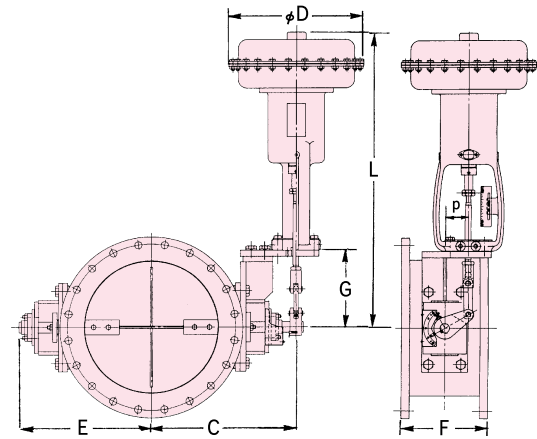
Unit : mm

Valve Size		Face-to-face F	E	C	D	G	L	P			Appr. Weight (kg)
(mm)	(in.)							60° Opening	75° Opening	90° Opening	
80	3	220	225	253	280	190	550	33	25	19	45
100	4		235	263							50
125	5		250	278							55
150	6	240	262	290	400	255	790	44	33	25	60
200	8		288	316							70
250	10	260	316	342	500	285	1125	87	66	50	90
300	12		341	367							105
350	14	300	395	422	650	330	1485	130	107	92	180
400	16		420	447							195
450	18		450	473							215
500	20	320	490	533	500	285	1125	87	66	50	280
550	22		523	558							310
600	24	360	549	584	650	330	1485	130	107	92	350
650	26		587	619							390
700	28	380	613	645	650	330	1485	130	107	92	430
750	30		652	693							640
800	32	400	677	718	650	330	1485	130	107	92	715
850	34		716	754							775
900	36		741	779							835
1000	40	420	798	830	650	330	1485	130	107	92	900
1100	44		852	882							975
1200	48	420	914	947.5	650	330	1485	130	107	92	1025
1350	54		994	1023.5							1105
1500	60	440	1073	1100	650	330	1485	130	107	92	1230

Model 3813-1 & 3813-3



Model 2813-1 & 2813-3



8. MOUNTING ORIENTATIONS

Standard mounting orientations are as follows.

Without Side-mounted Handwheel	With Side-mounted Handwheel

- Dimension "C" in ITEM7 is for the case of piping to the horizontal pipe line.
- For the case of piping to the vertical pipe line, dimension "C" is longer than ones mentioned in ITEM7.
- Please consult with our sales office.

13-1
13-3



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