

**Series 10
High Performance
Butterfly valves
For Rating ANSI 150**

Feature

General :

The series 10 butterfly valves has been developed for a large number of applications throughout process industries. The series 10 high performance butterfly valves are mainly used for the control of fluids flowing in large valve at low differential pressure. It offers added advantages such as simple structure and low cost.

Performance :

- High Cv to valve weight ratio compared to conventional control valves.
- Throttling controls 60° rotation, on-off controls 90° rotation.
- Excellent control range ability.

Design Flexibility :

- Swing through and tight shut-off seated trim design.
- Flange connection versions available.
- Full range of bonnet and packing design to suit Various temperatures and fluids.
- Provides fire safe sealing, which combines a soft seal ring and metal seal ring.
- Full range of body and vane material options, With availability of hard facings.

Design Integrity :

- Wafer type as standard.
- Triple eccentric mechanism.
- Actuator mounting flange dimensions in accordance with ISO 5211/1-1977

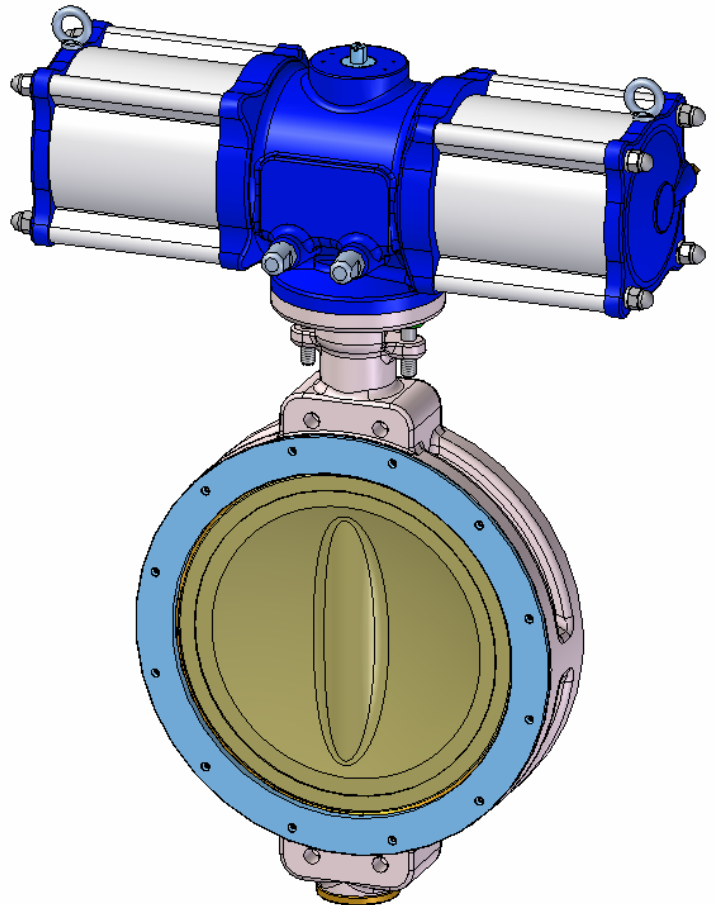


Figure 1. Series 10 Butterfly Valve

Quality Manufacturing :

- Rigorously tested to ensure specified performance on site.
- Quality assurance systems in accordance with ISO 9001.

Scope of Design**End Connection Size :**

3" to 24" (80mm to 600mm) nominal size.

End connection styles :

ANSI, DIN and BS wafer are standard, only other requirements available on request.

Valve Body Ratings :

ANSI 150

BS 9504, PN6 ~ PN40.

Working Pressure :

In accordance with ASME / ANSI B16. 34

Working Temperature :

Up to 450°C.

For cryogenic rang (-196°C), please contact a sales office.

Face to Face Dimensions :

in accordance with ISO 5752-1982

Trim Design Options :

The vane with swing through or
fire safe seating

Inherent Characteristics :

Modified equal percentage

Standard Material Combinations :

These are shown in table 1.

Special Applications :

For arduous service other material combinations, hard facings on valve bore and vane are available.

Actuation :

Various type of actuation are available including 5500 series spring opposed pneumatic diaphragm.

3800 Series double acting, or spring opposed pneumatic cylinder.

In addition electric, electro-hydraulic, hydraulic and manually operated versions are available.

Sizing/noise Predication :

The procedures for performing valve sizing, velocity and sound pressure level calculations are detailed in the technical selection manual.

Design**Seat Designs :**

Triple offset-zero leakage

Double offset-zero leakage

Concentric-rubber seated designs

Trip Designs :

Triple offset

Double offset

Concentric design

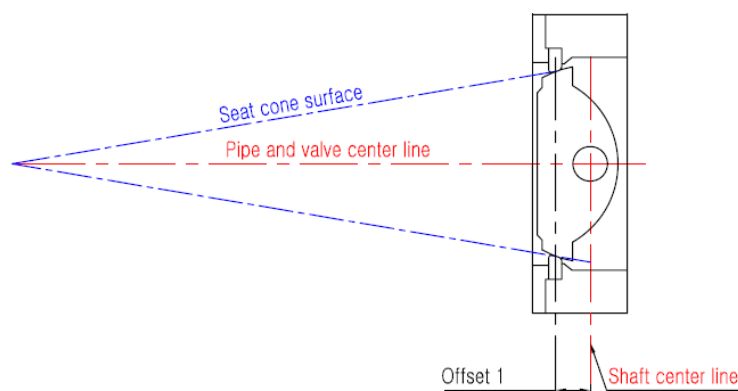
Anti - cavitations / low noise designs

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The Evolution of Triple Offset Design

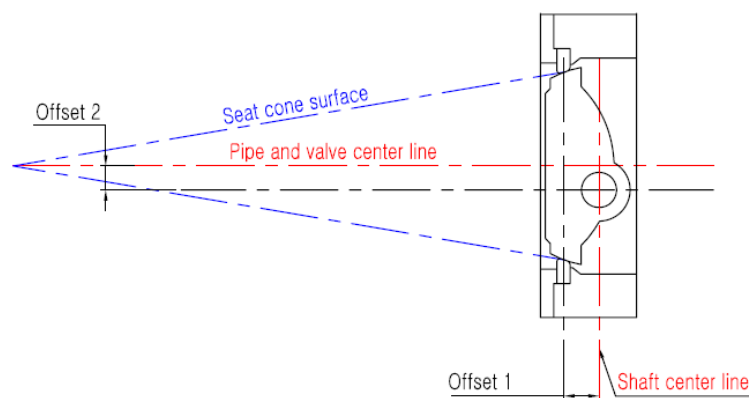
1. Single Offset

The center of rotation is moved back from the centerline of the valve disc. The seat and Seal are designed conically and on center, this design relies on a frictional, interference seal and so it is applicable only to soft-seated valves.



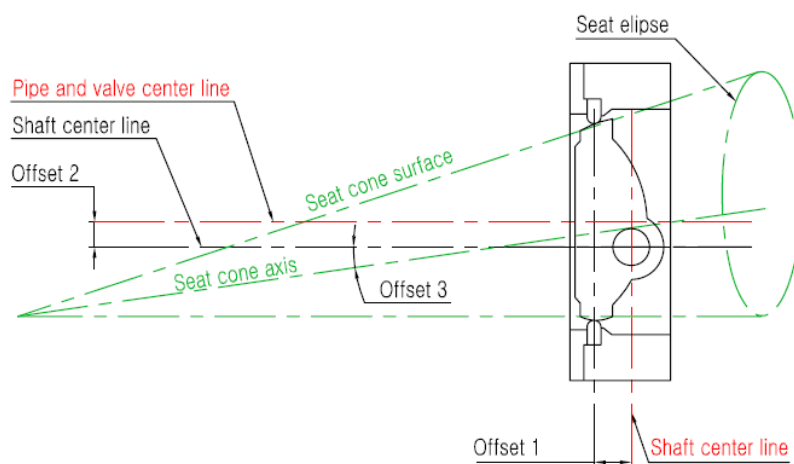
2. Double Offset

The center of rotation is moved from the Centerline of the valve body. The seat and seal Design remains frictional, interference seal, but The length of rotation over which this friction occurs Is reduced, allowing a larger range of process resistant Seat materials to be used. However these materials Must be relatively soft or highly elastic to prevent "jamming"



3. Triple Offset

The centerline of the cone is rotated away from The valve centerline resulting in an ellipsoidal profile And providing the third offset. With this geometry, Seat seal interference is completely eliminated Ensuring long sealing life. The result is a torque Seated, process pressure aided **FRictionless Seal**. The geometry allows the body seat to be Used as the closed limit stop, aiding operator Adjustment. The Triple Offset design is ideally Suited to metal seated valves providing bubble-tight Performance on high temperature, high pressure And fire-safe applications.



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THE TRIPLE OFFSET GEOMETRY

OFFSET 1 The shaft is offset behind the seat axis to allow complete sealing to contact around the entire seat.

OFFSET 2 The shaft centerline is offset from the pipe and valve which provides interference free opening and Closing of the valves.

OFFSET 3 The seat cone axis offset from the shaft centerline to eliminate friction during closing and opening And to achieve uniform compressive sealing around the entire seat.

- Triple offset and ellipsoidal sealing geometry
- Bi-directional bubble tight shut-off.
- Inherently Fire-safe by design.
- Developed geometry results in zero seat/seal friction

Low torques

Extended service life

Continued seal through thermal cycling torque seating

- Excellent flow and throttling characteristics covering services from Cryogenic to high temperature
- Excellent control of fugitive emission by virtue of rotary stem movement and advanced packing Materials

PRESSUR/TEMPERATURE RATINGS (ASME B16.34)

Temp °F	CLASS 150				CLASS 150				Temp ℃
	Carbon steel A216 Gr. WCB		Stainless steel A351 Gr. CF8M		Carbon steel A216 Gr. WCB		Stainless steel A351 Gr. CF8M		
	Psig	Bar	Psig	Bar	Psig	Bar	Psig	Bar	
-20~100	285	19.65	275	18.96	740	51.02	720	49.64	-29~38
200	260	17.93	235	16.62	675	46.54	620	42.75	93
300	230	15.86	215	14.82	655	45.16	560	38.61	149
400	200	13.79	195	13.44	635	43.78	515	35.51	204
500	170	11.72	170	11.72	600	41.37	480	33.09	260
600	140	9.65	124	9.65	550	37.92	450	31.03	316
650	125	8.62	125	8.62	535	36.89	445	30.68	343
700	110	7.58	110	7.58	535	36.89	430	29.65	371
750	95	6.55	95	6.55	505	34.82	425	29.3	399
800	80	5.52	80	5.52	410	26.27	415	28.61	427

Table 1. Standard Material Construction.

Valve Body	Carbon steel ASTM A216 WCB	Stainless steel ASTMA351 CF8	Stainless steel ASTMA351 CF8M
Vane	Carbon steel ASTM A216 WCB (hard Cr. Plated)	Stainless steel ASTMA351 CF8	Stainless steel ASTMA351 CF8M
Shaft	Stainless steel 17-4PH	Stainless steel 17-4PH	Stainless steel 316SS
Inboard Bearing	Oiless bearing	Oiless bearing	Oiless bearing
Packing	Teflon fiber	Teflon fiber	Teflon fiber
Packing Follower and Steel	Stainless steel	Stainless steel	Stainless steel
Seat Ring	Stainless steel 316SS	Stainless steel 316SS	Stainless steel 316SS
Soft Seat Ring	Reinforced teflon	Reinforced teflon	Reinforced teflon

Figure 2. Sealing Design.

(1) TRIPLE OFFSET



Fig.1 triple offset metal seal



Fig.2 Triple offset laminated seal



Fig.3 triple offset laminated seal



Fig.4 triple offset metal seal

(2) DOUBLE OFFSET



Fig.5 Rubber seal(integral body seat)



Fig.6 Rubber seal(Replacement seat)

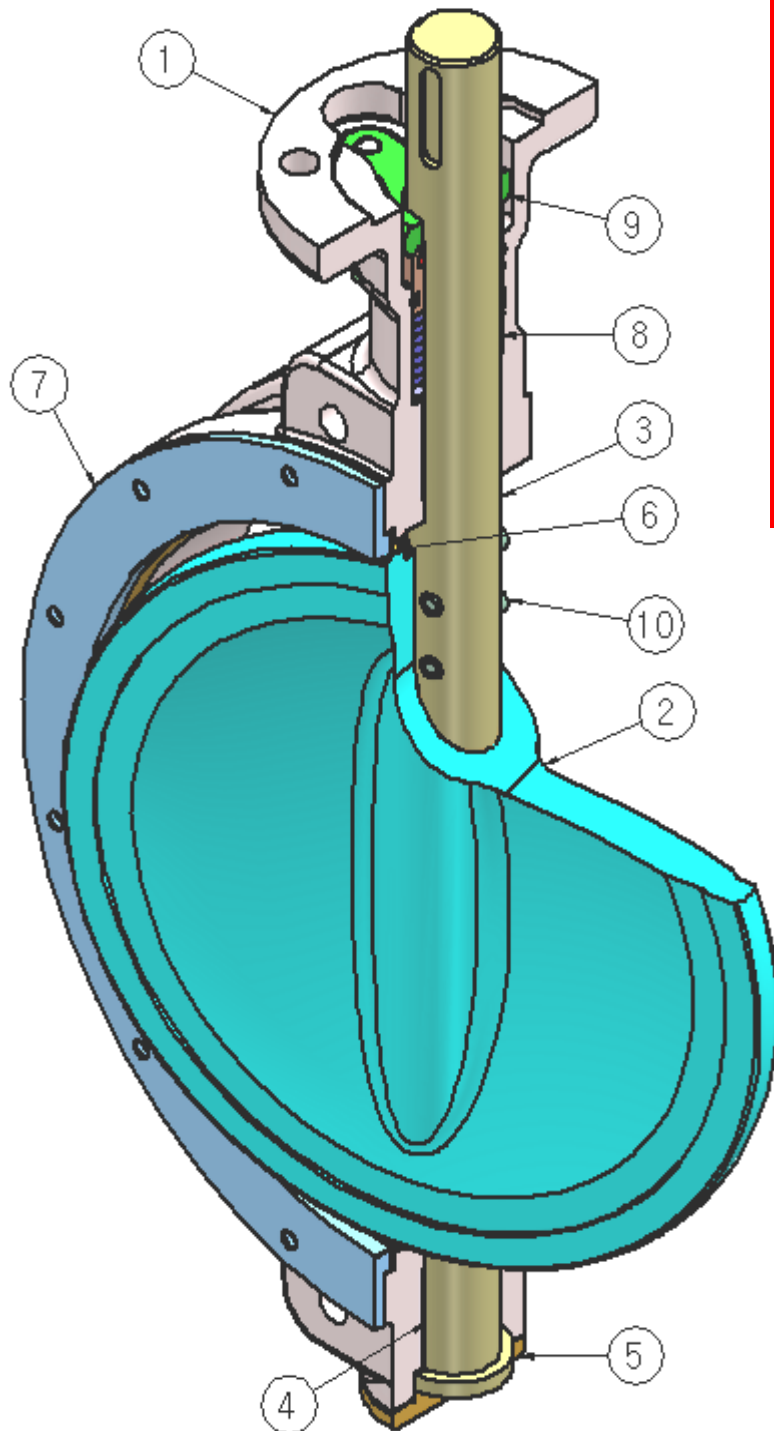


Fig.7 Rubber seal



Fig.8 PTFE seal

*** Butterfly Valve Part List.**



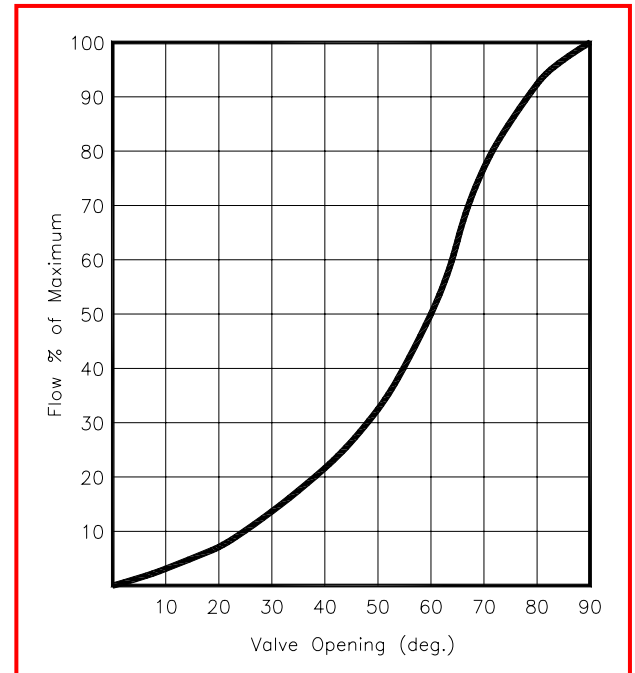
No.	Part Name	Material
1	BODY	SCPH2
2	VANE [DISC]	SCS14
3	SHAFT	SUS304
4	DU BUSH	BC6
5	BOTTEM COVER	S25C
6	SEAT RING	SUS316
7	RETAINER	SUS304
8	PACKING	GRAPHITE
9	GLAND FLANGE	SCPH2
10	PIN	S45C

* Cv Values

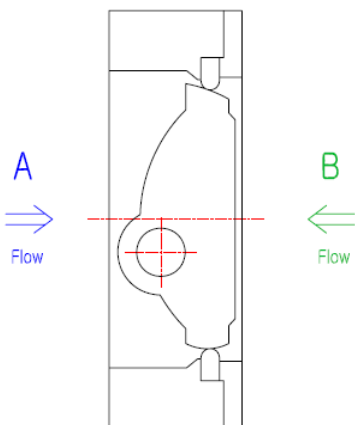
Table 2. Cv Values.

Valve size		Throttling 60	On-off 90
Inch	mm		
3"	80A	160	320
4"	100A	280	560
5"	125A	450	900
6"	150A	640	1280
8"	200A	1150	2300
10"	250A	1780	3560
12"	300A	2600	5200
14"	350A	3400	6800
16"	400A	4500	9000
18"	450A	5600	11200
20"	500A	7000	14000
24"	600A	12000	24000

Figure 3. Characteristic Curves.

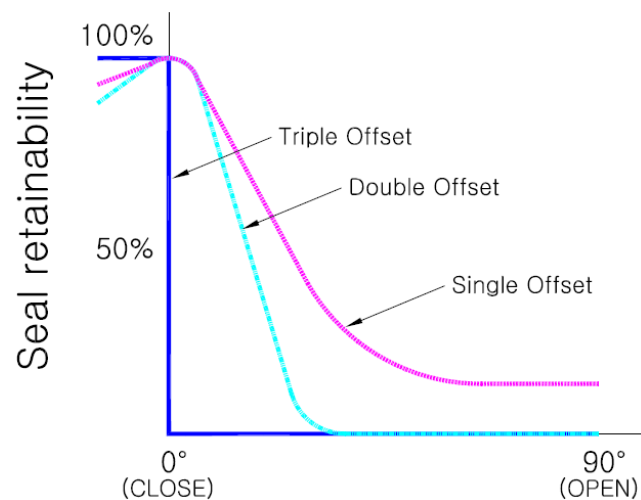


* Leakage Rates :



	A	B
Metal Seat	Class VI	Class V
Soft Seat	Class VI	Class VI

* Disc Friction :



ΔP Limitation for Butterfly Valve**A0-3800 Double Acting Cylinder Actuator**Supply Air : 5.0 kgf/cm²G.

ACTUATOR SIZE	8	10	13	15	15D	17	17D	20D	25D	30D	35D	40D
TORQUE	13.5	21.1	48.9	70.4	140.8	137.1	274.2	428.6	740.8	1543.7	2101.2	4036.5
3"	20											
4"	20											
5"	15.7	20										
6"		20										
8"		10	20									
10"			15.2	20								
12"				12.9	20							
14"					20	20						
16"					16.9	12.3	20					
18"							20					
20"							20					
24"							8.1	14.4	20			

ΔP Limitation for Butterfly Valve**A0-3800 Double Acting Cylinder Actuator****Air to Open**Supply Air : 5.0 kgf/cm²G.Spring Range : 2~3 kgf/cm²G.

ACTUATOR SIZE	8S	10S	13S	15S	15SD	17S	17SD	20SD	25SD	30SD
TORQUE	5.4	8.6	19.6	28.4	42.5	54.8	87.4	128.8	222.2	463.1
3"	15.4	20								
4"		17.6	20							
5"			20							
6"			18.3	20						
8"				15.6	20	20				
10"					12.6	17.5	20			
12"							16.8	20		
14"								20		
16"								11.5	20	
18"									16.4	20
20"										17.1
24"										14.2

ΔP Limitation for Butterfly Valve**A0-3800 Double Acting Cylinder Actuator****Air to Close**Supply Air : 5.0 kgf/cm²G.Spring Range : 2~3 kgf/cm²G.

ACTUATOR SIZE	8S	10S	13S	15S	15SD	17S	17SD	20SD	25SD	30SD
TORQUE	5.4	8.6	19.6	28.4	42.5	54.8	87.4	128.8	222.2	463.1
3"	20									
4"	15.6	20								
5"		14.1	20							
6"			20							
8"			16.3	20						
10"				12.5	20	20				
12"					19.2	15.7	20			
14"							20			
16"							18	20		
18"								20		
20"								18.8	20	
24"									16.1	20

ΔP Limitation for Butterfly Valve**A0-5500 Rotary Diaphragm Actuator**Supply Air : 4.0 kgf/cm²G.Spring Range : 1~3 kgf/cm²G.

ACTUATOR SIZE	T-2	T-3	T-4	T-5
TORQUE	12	23	64	108
3"	20			
4"	20			
5"	12.8	20		
6"	7.8	20		
8"		11.5	20	
10"		5	20	
12"			14.4	20
14"			8.9	12.6
16"			4.8	9.4
18"			3.6	6
20"				5.1
24"				2.7

* DIMENSION

Figure 4. Series 10 High Performance Butterfly Valve

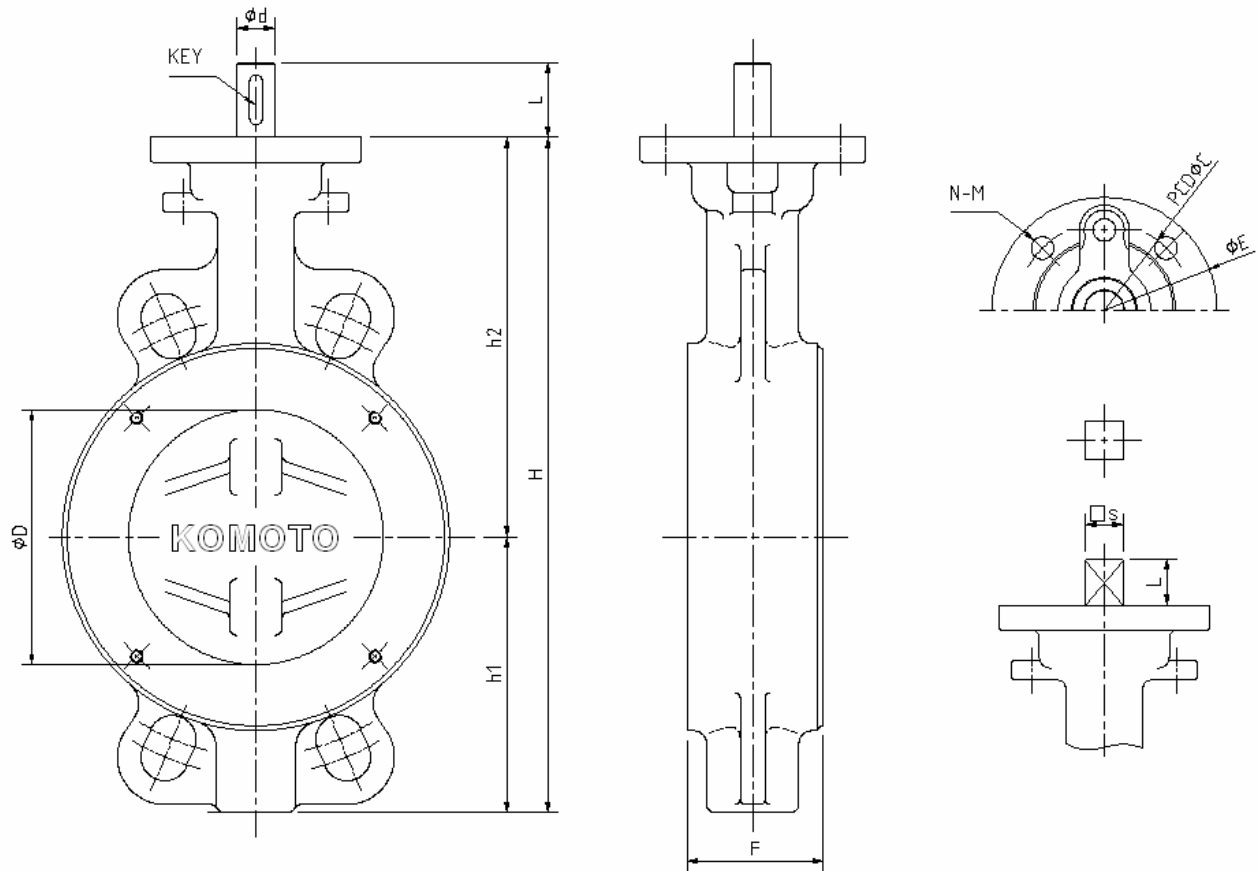


Table 5. Dimensions.

SIZE	F	h1	h2	H	ϕD	ϕd	$\square s$	KEY	L	PCD ϕC	E	N-M	ISO. BASE
3" 80A	49	114	144	258	80	16	11	-	30	70	90	4- $\phi 9$	F07
4" 100A	56	135	160	295	102	20	14	-	30	70	90	4- $\phi 9$	F07
5" 125A	64	145	200	345	127	20	14	-	30	102	125	4- $\phi 11$	F10
6" 150A	70	165	215	380	150	25	17	-	30	102	125	4- $\phi 11$	F10
8" 200A	71	210	255	465	200	25	22	-	40	125	150	4- $\phi 14$	F12
10" 250A	76	255	295	550	250	30	22	-	40	125	150	4- $\phi 14$	F12
12" 300A	83	285	335	620	298	35	27	-	40	140	175	4- $\phi 18$	F14
14" 350A	92	310	400	710	350	40	-	12x8	40	140	175	4- $\phi 18$	F14
16" 400A	102	345	435	480	400	45	-	12x8	60	165	210	4- $\phi 22$	F16
18" 450A	114	370	480	850	450	45	-	12x8	60	165	210	4- $\phi 22$	F16
20" 500A	127	420	510	930	500	50	-	16x10	75	254	300	8- $\phi 18$	F25
24" 600A	154	480	565	1045	598	65	-	16x10	85	254	300	8- $\phi 18$	F25

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