



Flow Control

KEYSTONE

Figure V20 is a metal seated cryogenic butterfly valve designed according to ISO and ANSI standards, available with double flange & butt-weld type connections.

Features & Benefits

- Bi-directional shut-off performance
- All cryogenic valves are tested in fully-equipped cryogenic testing facilities at Keystone plant
- Body design options : Double flange or butt-weld side entry
- One-piece through stem for maximum strength and safety over extended periods of time
- Integrally cast mounting pad provides direct mounting of Keystone actuators
- Flattened body bore at stem journal ports positions stem bearings near disc, providing maximum stem support
- Integrally cast disc position stop perfectly locates the disc in seat, achieving maximum seat and seal life
- Accessible packing adjustment without actuator removal
- Provides inherent fire-safe characteristics
- Combination of double off-set disc and patented pressurized metallic seat provides an exceptional tight shut-off regardless of temperature change
- Fast and simple seat replacement



General Applications

Cryogenic configuration is ideal for any application involving media at very low temperatures, such as LNG, LPG, liquid hydrogen and liquid oxygen.

Technical Data

Temperature : Cryogenic down to -196°C (-320°F)
 Size : 80mm to 900mm (3" to 36")
 Pressure Rating : ANSI/ASME Class 150 Flange
 Accommodation : ANSI 150
 Face to face : ISO 5752/BS EN558 (Double flange)
 ANSI B16.10 Table 1, Series 9 (Butt-weld)

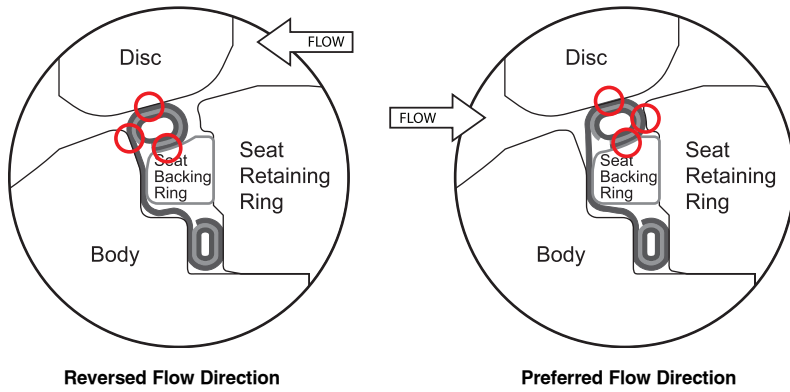
* Other flange accommodation : Consult factory

Cryogenic Butterfly Valve Figure V20

Design Features

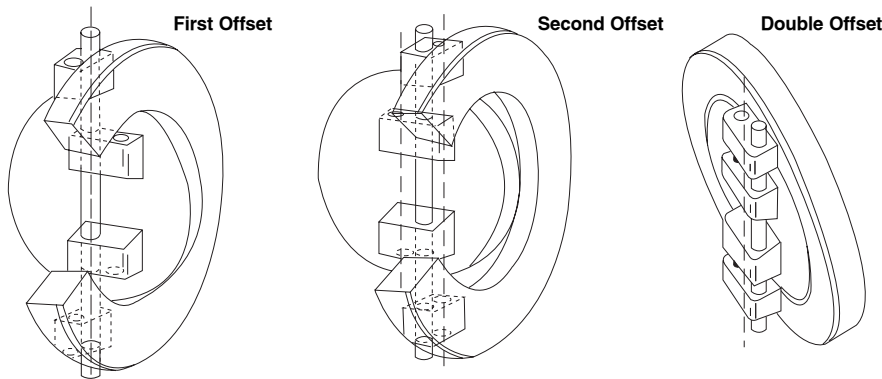
Patented Metal Seat

Keystone Figure V20's patented metal seat is pressure-activated with multiple sealing points to provide tight bi-directional shut-off. The all-metal components also ensure that the seat is inherently firesafe, and is able to retain its tightness even during a fire.



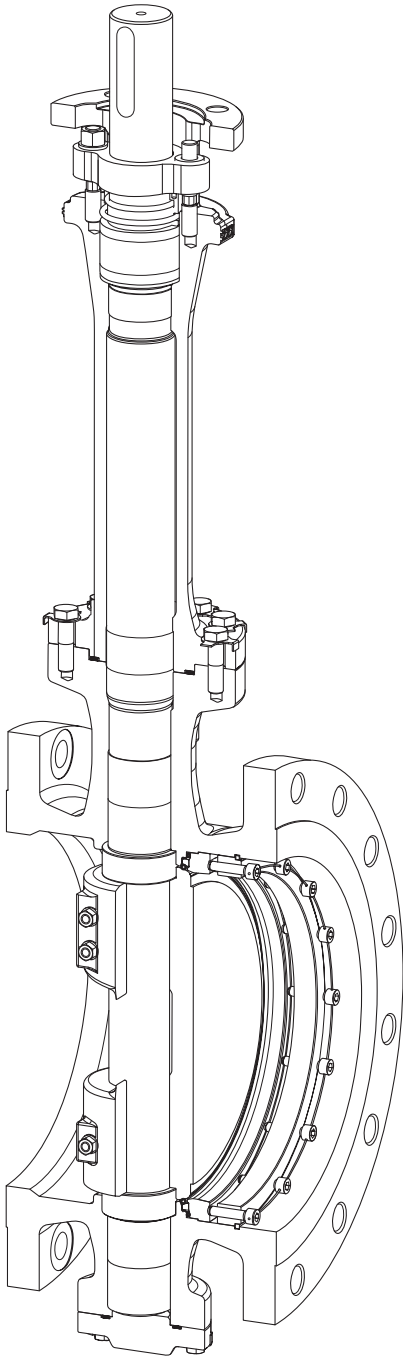
Double Offset Disc/Stem Design

Keystone Figure V20 uses a double offset disc/stem design. The first offset is achieved by locating the stems downstream of the centerline of the seat. This allows for total unobstructed 360 degrees sealing surface. The second offset locates the stems off the center of the vertical axis of the seat. The combination of these two offsets creates a camming effect as the disc swings into and out of the seat. The disc lifts quickly out of the seat in the first few degrees of travel and does not contact the seat again until it is nearly closed. There is no wear point between the seat and disc, so operating torques are reduced and seat lift is extended. The combination of the double offset disc/stem design and the patented pressure-activated metal seat provides exceptional tight shut-off regardless of temperature change.



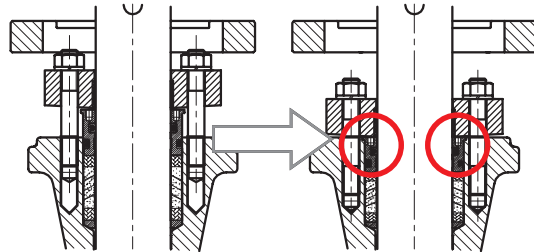
One-Piece Stem

The one-piece through stem (BS 6364 para 4.12) offers maximum strength and added safety



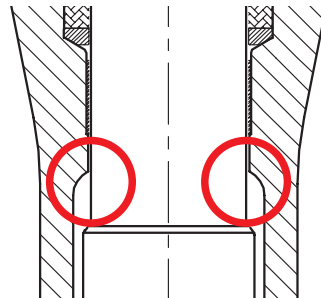
Accessible Packing Adjustment

Keystone Figure V20 features an accessible packing adjustment without removal of the actuator. A unique rocker shaped gland bridge compensates for the uneven adjustment of gland nuts to maximize packing efficiency.



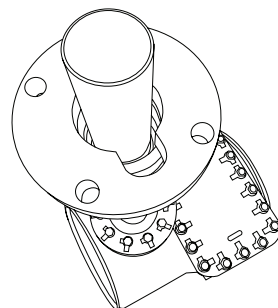
Anti-Blowout Design

Stem shoulder is integral part of stem, and is retained internally to prevent stem blowout from pressure in body cavity



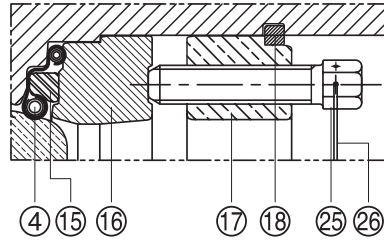
Direct Actuator Mounting

Integrally cast mounting pad to ISO 5211 and Keystone standards enables direct mounting of actuator to the Figure V20. This reduces the need for additional brackets and connections for reduced torque and maximum efficiency.

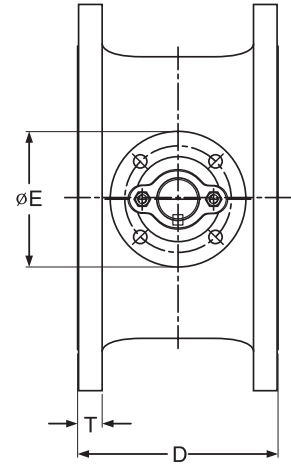
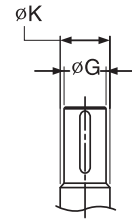


Cryogenic Butterfly Valve Figure V20

Valve Dimensions - Double flange



DETAIL A

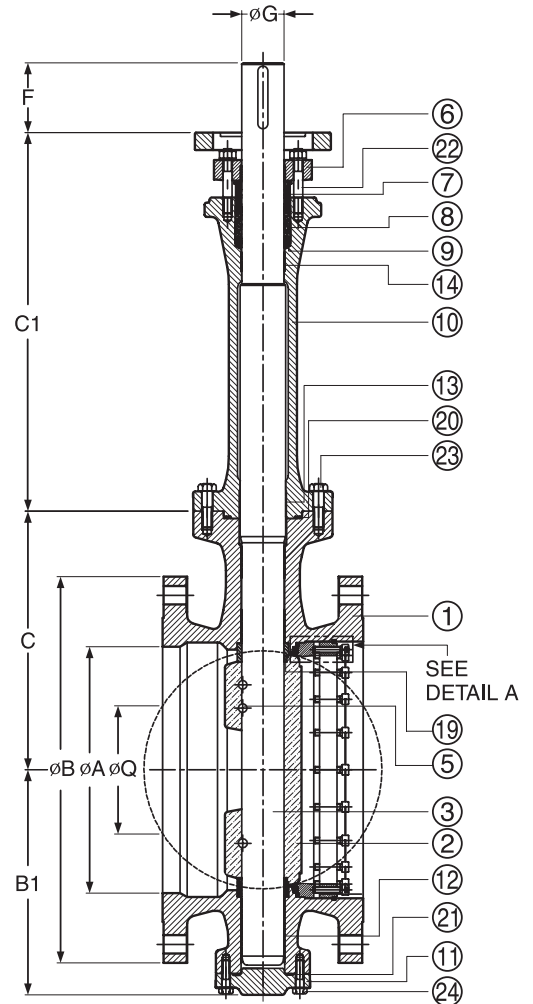


Part Name

1 Body	14 Bearing
2 Disc	15 Seat Backing Ring
3 Stem	16 Seat Retaining Ring
4 Seat	17 Seat Adjust Ring
5 Taper Pin Bolt Hex Nut Washer	18 Locking Ring
6 Gland Bridge Bushing	19 Spacer
7 Gland O-ring	20 Bonnet Gasket
8 VOC Packing	21 Bottom Cover Gasket
9 Anti-Extrusion Ring	22 Stud Bolt Hex Nut Washer
10 Extension Bonnet	23 Hex Head Screw Washer
11 Bottom Cover	24 Hex Head Screw Washer
12 Bearing	25 Hex Head Screw
13 Bearing	26 Locking Wire

Figure V20 Valve Dimensions (mm)

Valve Size (inch) (mm)	ϕA	ϕB	B1	C	C1	D	ϕE	F	ϕG	ϕK	T	ϕQ	Top Plate Data B.C.D. Hole No. Hole Dia.		Weight (kg)		
3	80	80	191	125	176	411	180	125	32	28.6	30	27	-	102	4	11	33
4	100	100	229	143	194	426	190	125	51	34.9	35	27	-	102	4	11	42
5	125	125	254	159	210	426	200	125	51	34.9	35	27	-	102	4	11	56
6	150	150	280	172	223	440	210	125	51	34.9	40	29	-	102	4	11	75
8	200	200	343	207	258	472	230	150	77	41.3	45	32	-	125	4	13	94
10	250	250	406	238	280	480	250	175	77	47.6	50	32	-	140	4	17	127
12	300	300	483	276	318	497	270	175	77	47.6	55	35	96	140	4	17	180
14	350	346	533	304	344	527	290	210	108	57.2	60	38	152	165	4	21	227
16	400	381	597	348	400	585	310	210	108	65.0	-	38	204	165	4	21	300
18	450	442	635	374	425	560	330	210	108	70.0	-	43	264	165	4	21	360
20	500	496	700	411	458	595	350	300	147	75.0	-	46	326	254	8	17	459
22	550	548	749	443	487	598	370	300	147	80.0	-	49	376	254	8	17	543
24	600	600	813	477	525	640	390	300	147	85.0	-	51	422	254	8	17	652
26	650	650	870	515	560	710	430	350	178	95.0	-	72	451	298	8	22	886
28	700	715	927	540	595	775	430	350	178	110.0	-	72	515	298	8	22	1,025
30	750	760	984	569	624	798	430	350	178	115.0	-	76	563	298	8	22	1,230
32	800	812	1,060	607	672	814	470	415	250	120.0	-	82	600	356	8	32	1,538
34	850	868	1,111	633	698	830	510	415	250	125.0	-	84	640	356	8	32	1,998
36	900	918	1,168	661	726	848	510	415	250	135.0	-	91	708	356	8	32	2,398

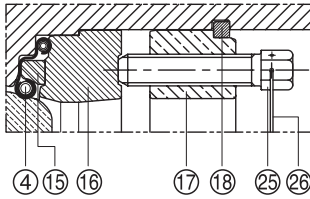
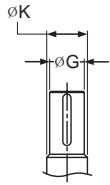


Notes

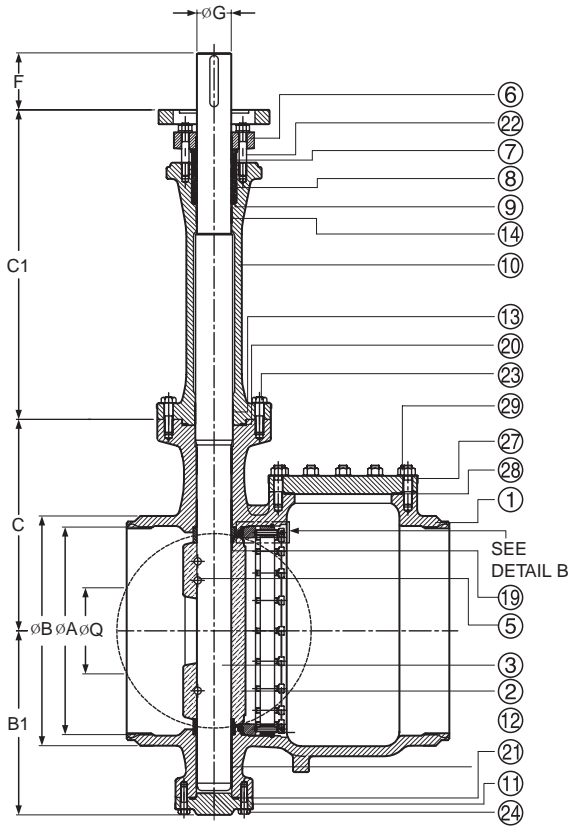
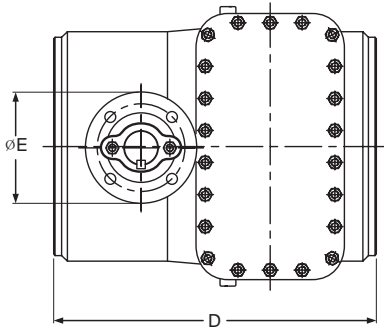
- Valve size shown is the 400mm.
- "Q" is the disc chordal dimension at face of valve for disc clearance into pipe fitting or equipment.
- The valve dimensions are for reference only. For detailed information, please consult factory.

Cryogenic Butterfly Valve Figure V20

Valve Dimensions - Butt weld



DETAIL B



Part Name

1 Body	16 Seat Retaining Ring
2 Disc	17 Seat Adjust Ring
3 Stem	18 Locking Ring
4 Seat	19 Spacer
5 Taper Pin Bolt Hex Nut Washer	20 Bonnet Gasket
6 Gland Bridge Bushing	21 Bottom Cover Gasket
7 Gland O-ring	22 Stud Bolt Hex Nut Washer
8 VOC Packing	23 Hex Head Screw Washer
9 Anti-Extrusion Ring	24 Hex Head Screw Washer
10 Extension Bonnet	25 Hex Head Screw
11 Bottom Cover	26 Locking Wire
12 Bearing	27 Port Cover
13 Bearing	28 Port Cover Gasket
14 Bearing	29 Stud Bolt Hex Nut Washer
15 Seat Backing Ring	

Figure V20 Valve Dimensions (mm)

Valve Size (inch) (mm)	ϕA	ϕB	B1	C	C1	D	ϕE	F	ϕG	ϕK	ϕQ	Top Plate Data			Weight (kg)	
												B.C.D. No.	Hole Dia.	Hole Dia.		
3	80	82	108	125	176	411	282	125	32	28.6	30	-	102	4	11	36
4	100	106	134	143	194	426	305	125	51	34.9	35	-	102	4	11	47
5	125	132	160	159	210	426	381	125	51	34.9	35	-	102	4	11	62
6	150	158	190	172	223	440	403	125	51	34.9	40	-	102	4	11	84
8	200	206	242	207	258	472	419	150	77	41.3	45	-	125	4	13	118
10	250	259	292	238	280	480	457	175	77	47.6	50	-	140	4	17	145
12	300	306	343	276	318	497	502	175	77	47.6	55	96	140	4	17	192
14	350	340	386	304	344	527	572	210	108	57.2	60	130	165	4	21	257
16	400	388	434	348	400	585	610	210	108	65.0	-	169	165	4	21	345
18	450	435	489	374	425	560	660	210	108	70.0	-	220	165	4	21	415
20	500	486	544	411	458	595	711	300	147	75.0	-	260	254	8	17	530
22	550	535	598	443	487	598	762	300	147	80.0	-	318	254	8	17	654
24	600	575	642	477	525	640	813	300	147	85.0	-	412	254	8	17	784
26	650	625	690	515	560	710	864	350	178	95.0	-	460	298	8	22	982
28	700	684	742	540	595	775	914	350	178	110.0	-	497	298	8	22	1,244
30	750	736	794	569	624	798	914	350	178	115.0	-	547	298	8	22	1,493
32	800	785	845	607	672	814	965	415	250	120.0	-	575	356	8	32	1,792
34	850	836	900	633	698	830	1,016	415	250	125.0	-	685	356	8	32	2,240
36	900	889	961	661	726	848	1,016	415	250	135.0	-	748	356	8	32	2,688

Notes

1. Valve size shown is the 400mm.
2. "Q" is the disc chordal dimension at face of valve for disc clearance into pipe fitting or equipment.
3. The valve dimensions are for reference only. For detailed information, please consult factory.

Cryogenic Butterfly Valve Figure V20

Actuator Selection / Material Selection

Actuator Selection

Actuator	Figure	Remark
Handle	F401	Handlever
Gear	F421 to F430	Range of heavy duty gear operators available
Pneumatic	F79U	Double acting and spring return rack and pinion designs
Gear & Pneumatic	F453/79U	Declutchable gear unit provides manual override for the Keystone pneumatic actuator
Electric	EPI ₂	Compact electric actuators

K_v Values

Size		Angle of Disc opening								
(inch)	(mm)	10°	20°	30°	40°	50°	60°	70°	80°	90°
3	80	5	8	15	26	41	61	85	113	134
4	100	11	16	30	55	91	135	188	251	296
5	125	22	33	62	112	182	274	378	504	596
6	150	39	54	100	178	286	426	588	782	925
8	200	67	95	203	354	563	853	1,213	1,622	1,978
10	250	115	162	363	603	948	1,457	2,088	2,832	3,631
12	300	170	248	554	860	1,329	2,262	3,139	4,356	5,656
14	350	221	309	641	1,018	1,638	2,679	3,791	5,344	7,125
16	400	263	369	686	1,215	1,956	3,087	4,486	6,433	8,578
18	450	321	472	965	1,610	2,575	4,079	5,795	8,480	10,733
20	500	406	596	1,217	2,028	3,512	5,409	7,704	11,085	13,516
22	550	520	791	1,653	3,010	4,822	7,247	10,582	14,728	17,324
24	600	570	869	1,820	3,334	5,313	7,971	11,662	16,189	18,990
26	650	619	944	1,976	3,620	5,769	8,654	12,662	17,578	20,619
28	700	673	1,026	2,150	3,938	6,275	9,413	13,772	19,120	22,427
30	750	870	1,329	2,778	4,609	8,111	12,174	18,347	25,548	30,864
32	800	926	1,413	2,955	5,038	8,628	12,951	19,517	27,178	32,833
34	850	1,068	1,659	3,403	5,483	9,996	15,175	22,381	31,817	39,547
36	900	1,245	1,961	3,783	6,025	11,509	17,906	25,920	37,516	47,748

Notes

1. Rated Kv = the volume of water in m³/hr that will pass through a given valve opening at a pressure drop of 1 bar.
2. The connection between Kv and Cv can be expressed as : Cv = 1.156 Kv

Material Selection

Part Name	Material	ASTM Standard
Body	Stainless Steel	A351 Grade CF8M A351 Grade CF3M
Disc	Stainless Steel	A351 Grade CF8M
Stem	Stainless Steel	A276 Type 316
Seat	Copper	
Bonnet	Stainless Steel	A351 Grade CF8M
Packing	Graphite	
Gasket	Graphite/Stainless Steel	
Bolts	Stainless Steel	A320 Grade B8M
Nuts	Stainless Steel	A194 Grade 8M

Notes

Other materials or combination of materials are available on request.

Model Coding System

	Valve size(mm)	Figure number	Trim code	Style code
Example :	080	V20	001	400

Cryogenic Temperature Trims

Trim Code	Body	Disc	Stem	Seat	Extended Bonnet
001	CF8M	CF8M	316SS	Copper	CF8M
002	CF3M	CF8M	316SS	Copper	CF8M

Body Style

Style Code	End Connection
400	Double franged
900	Butt-weld Side entry