



# CONTROL VALVE STANDARD SPECIFICATION

## CRYOGENIC BUTTERFLY VALVE



YABHC-123E3 Series



<http://www.proval.co.kr>



**PROVAL Co., Ltd.**

[D-3]

PROVAL

## CRYOGENIC BUTTERFLY VALVE

### GENERAL

The PROVAL valve utilizes a double offset disc design, coupled with a flexible metal seat design which provides an independent static and dynamic seal. Seat design allows for self-centering on the disc.

The valve is capable of achieving tight shut off at cryogenic temperatures, bidirectional sealing, and is fire-safe.

The use of an all metal seat design, allows the valve to withstand a partial or full burn in a condition. The metal seat design provides a fire safe seal, all the time; and is not dependent on fire intensity.

THE PROVAL CRYOGENIC BUTTERFLY VALVE range has been extensively used on applications including low temperature gas and liquid service(Liquid Nitrogen, Oxygen & Hydrogen)

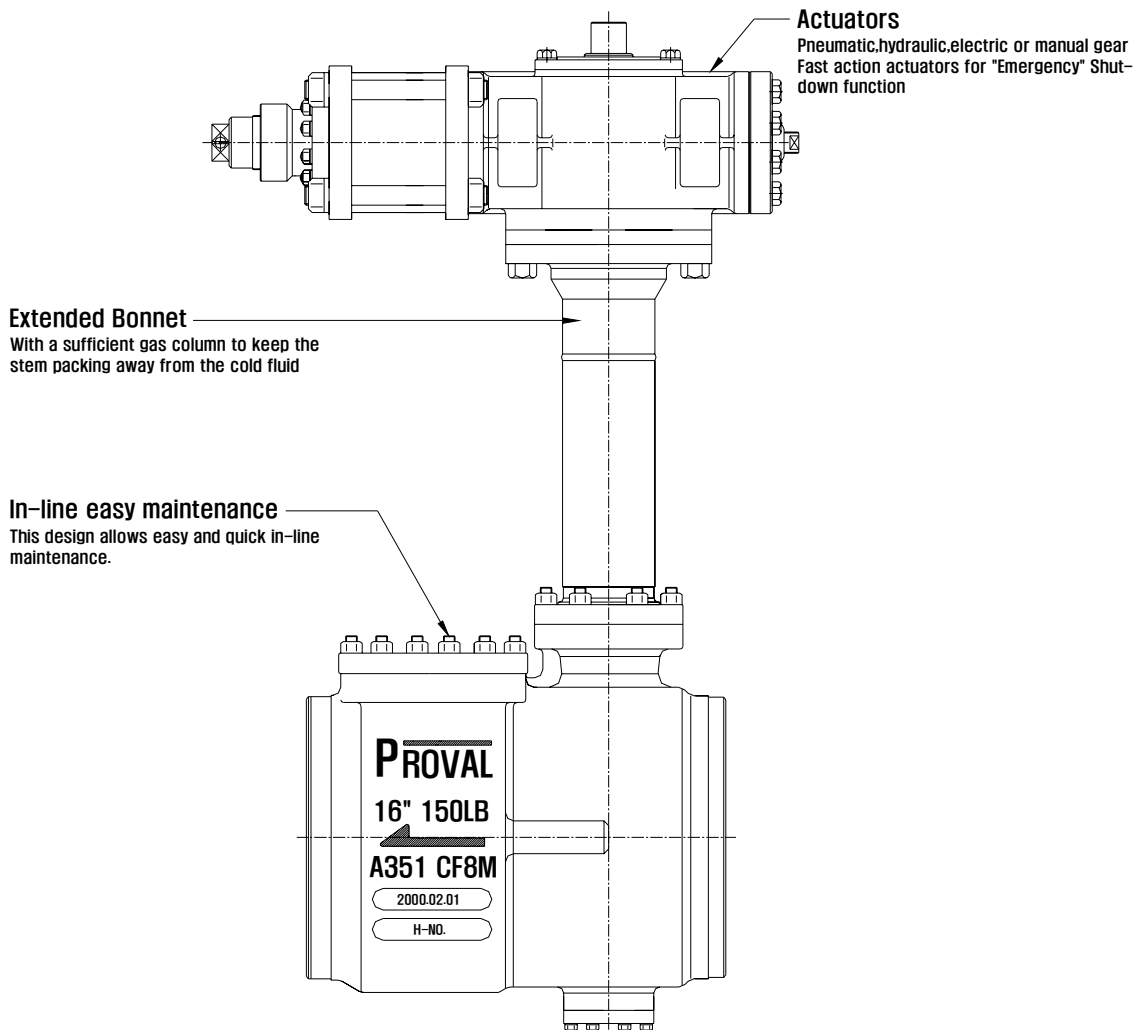
LNG Tankers on process duties, Onshore LNG Production Plants and Onshore Gas Distribution Terminals.

### DESIGNS

- Operating temperature range to -196 °C .~ 260 °C
- Pressure Rating to Class 150,300# and 600#.
- Seat tightness in accordance with BS rate A, API-598, ISO rate A at ambient temperature, and BS 6364 at cryogenic temperature.
- Firesafe to BS6755 part2, API 6fa, API 4<sup>th</sup> edition.
- Wafer, lug, flanged, butt-weld side entry, and butt-weld top entry body styles
- Maintenance free stem packing design, requiring no adjustments.
- Available de-greased and specially cleaned to customer standards for clean gas service.
- Standard extension bonnet length to BS6364 with other extension bonnet length to customer order.



## FEATURES



## RELIABILITY

Reliability of valve operation affects service life and ease of inspection and maintenance. In order to predict reliability, a sound valve design must be backed up by a stress analysis and functional qualification testing under critical operating conditions.

STANDARD SPECIFICATION

Model No.		YABC-113E3, YABBC-113E3, YABBC-123E3, YABHC-123E3																			
Valve Type		Cryogenic Butterfly Valve.																			
Actuator		Pneumatic, Hydraulic, Electric or Manual gear operating.																			
BODY	Valve Size	(mm)	100A	125A	150A	200A	250A	300A	350A	400A	450A	500A	550A	600A	650A	700A	750A	800A	850A	900A	1000A
		(inch)	4"	5"	6"	8"	10"	12"	14"	16"	18"	20"	22"	24"	26"	28"	30"	32"	34"	36"	40"
	Pressure Rating		ANSI 150# ~ 300# / JIS 10K ~ 20K / JPI 150# ~ 300# / PN 6bar ~ 25bar (※JIS 30K, ANSI 600#)																		
	End Connections		BUTT-WELDING, FLANGED, WAFER Type																		
	Body Materials		CAST : A351-CF8, CF8M, CF3, CF3M    FORGING : A182-F304, F316, F316L																		
	Operating Temperature	Soft Seat	-196°C ~ 150°C (PCTFE)																		
		Metal Seat	-196°C ~ 260°C (CURVE Copper, Inconel625, Steel+STL.)																		
	Guide		Top & Bottom guide																		
	Gland Packing		V-PTFE, GRAPHITE, VITON O-RING.																		
	Painting Color		Standard is silver. In the case of stainless steel, flange is not painted.																		
	Disc Characteristics		Modify EQ %, Quick opening																		
	Flow Direction		Direct																		

PERFORMANCE	Valve Action		Direct action, Reverse action. & Manual gear Operator																	
	Rated Cv Value		See "FLOW CHARACTERISTICS" page 5																	
	Flow Characteristics		See "FLOW CHARACTERISTICS" page 5																	
	Rangeability		20:1																	
	Allowable Seat Leakage Ratio	Soft Seat	ANSI B16. 104 Class VI																	
		Metal Seat	See "ALLOWABLE SEAT LEAKAGE" Page 5																	
	Action Accuracy	Hysteresis	(Without positioner) max. 5% F.S. (With positioner) max. 2% F.S.																	
Linearity		(Without positioner) max. ±6% F.S. (With positioner) max. ±2% F.S.																		

[Notes] ※ : Manufactured and attached as according to customer's order.

**MATERIAL DATA**

## 1. Combining the valve body and trim material.

### 1-1 Soft seat type

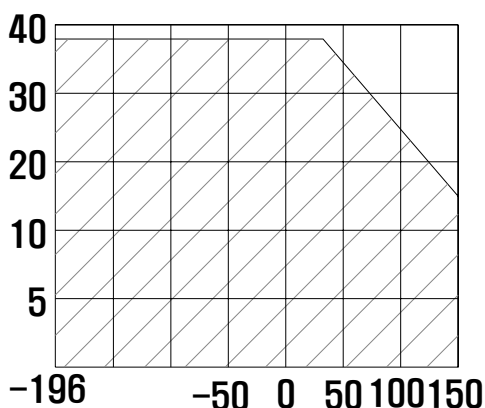
Parts Name		Materials	
Body		A351-CF8, CF8M	A351-CF3, CF3M
Trim	Disc	A351-CF8 + Hard chrome plated A351-CF8M + Hard chrome plated	A351-CF3M + Hard chrome plated
	Seat ring	PTFE, RTFE	
	Stem	A351-CF3, CF3M, A351-CF8M + Hcr plated	A351-CF3M + Hcr plated
Gland Packing		PTFE, Graphite, Viton	
Gland		SUS304 or SUS316	
Stud Bolt & Nut		SNB7/S45C(H)	SUS304 or SUS316

### 1-2 Metal seat type

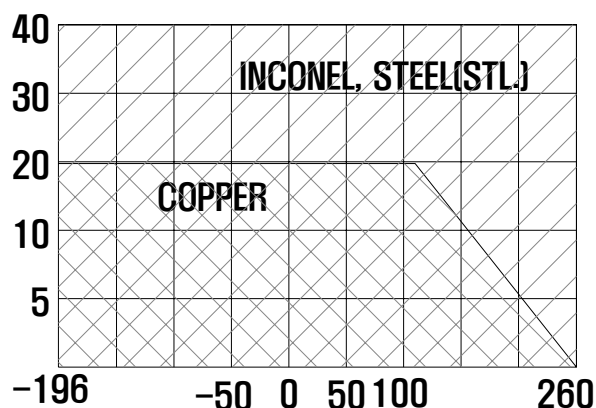
Parts Name		Materials	
Body		A351-CF8, CF8M	A351-CF3M
Trim	Disc	A351-CF8 + Stellite face A351-CF8M + Stellite face	A351-CF3M + Stellite face
	Seat ring	Copper,+ Inconel625, Steel + Steel(STL.)	A351-CF3M + Hard ion. N & Chrome plated
	Stem	A351-CF8M + Hard Chrome plated	A351-CF3M + Hard Chrome plated
Gland Packing		PTFE, Graphite, Viton	
Gland		SUS304 or SUS316	
Stud Bolt & Nut		SNB7/S45C(H)	SUS304, SUS316

## 2. Trim treatment & material vs. operating pressure-temperature ratings.

### 2-1. PCTFE Seating (-196°C ~ 150°C)



### 2-2 Metal Seating (-196°C ~ 260°C)



Examples: de-mineralized water, air-conditioning chilled / hot water, sea water, shite liquor, formaldehyde solution organic solvent, air oxygen, exhaust has, town gas, coke-oven gas.

Examples: steam, air combustion gas exhaust gas, sulfurous-acid gas, nitrogen gas.

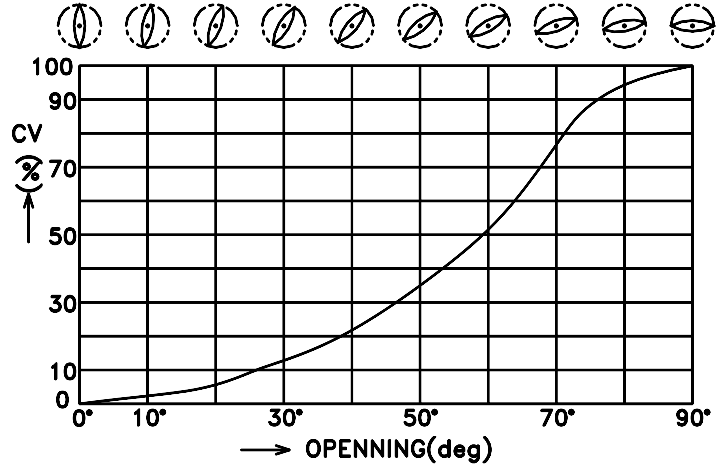
## MATERIAL DATA

### 1-1 Cv value

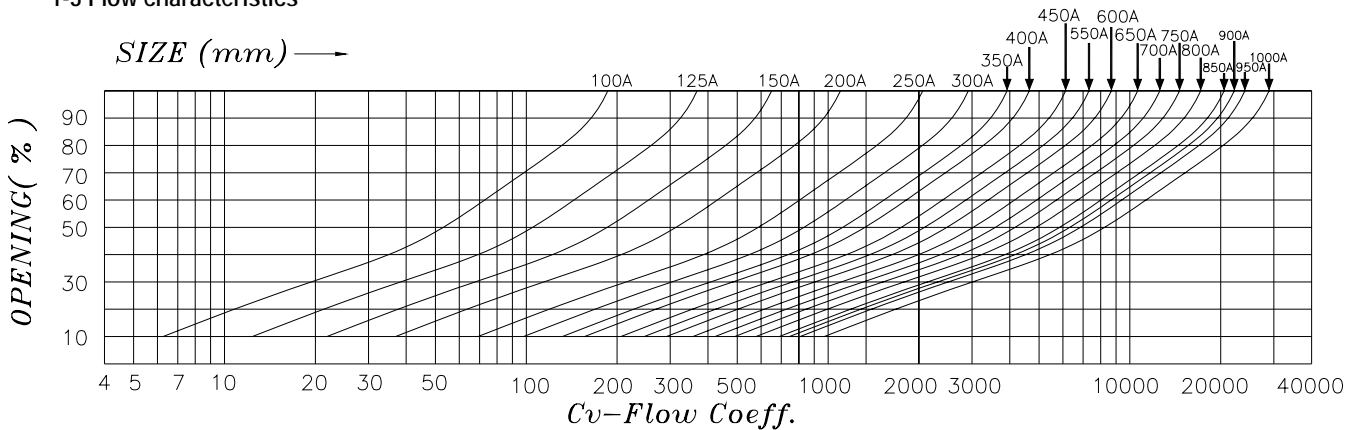
Size (mm)	Cv	Size (mm)	Cv
100	430	550	17000
125	730	600	21700
150	1250	650	25400
200	2200	700	29800
250	4000	750	33500
300	5800	800	40100
350	7600	850	46100
500	14200	900	50100
		1000	58000

[Notes] Rangeability (20:1)

### 1-2 Flow curve



### 1-3 Flow characteristics



## ALLOWABLE SEAT LEAKAGE

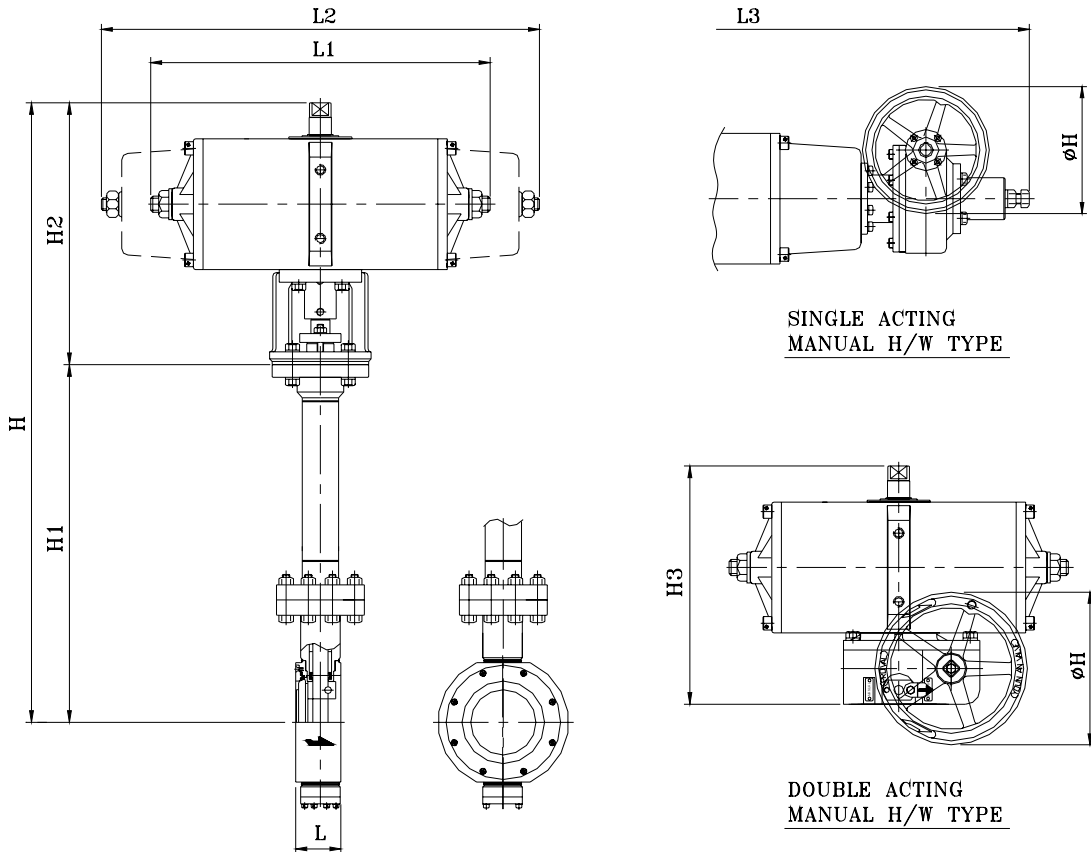
※: ONLY FOR "METAL" SEAT TYPE

- Test medium : Nitrogen gas, ambient temperature
- Test pressure : 1.1Mpa (11 bar g = 1,1 times Design Pressure)
- Test duration : 15 minutes
- Maximum leakage rate : 10Ncc / mn/inch of ND ie :

Valve Diameter	Maximum leakage	Valve Diameter	Maximum leakage
DN100 mm/4"	40 Ncc/mn	DN450 mm/18"	180 Ncc/mn
DN150 mm/6"	60 Ncc/mn	DN500 mm/20"	200 Ncc/mn
DN200 mm/8"	80 Ncc/mn	DN550 mm/22"	220 Ncc/mn
DN250 mm/10"	100 Ncc/mn	DN600 mm/24"	240 Ncc/mn
DN300 mm/12"	120 Ncc/mn	DN700 mm/28"	280 Ncc/mn
DN350 mm/14"	140 Ncc/mn	DN800 mm/32"	320 Ncc/mn
DN400 mm/16"	160 Ncc/mn	DN900 mm/36"	360 Ncc/mn
		DN1000 mm/40"	400 Ncc/mn

## DIMENSION DRAWING

### ACTUATOR : B6S(R) (WAFER TYPE)



## DIMENSIONS

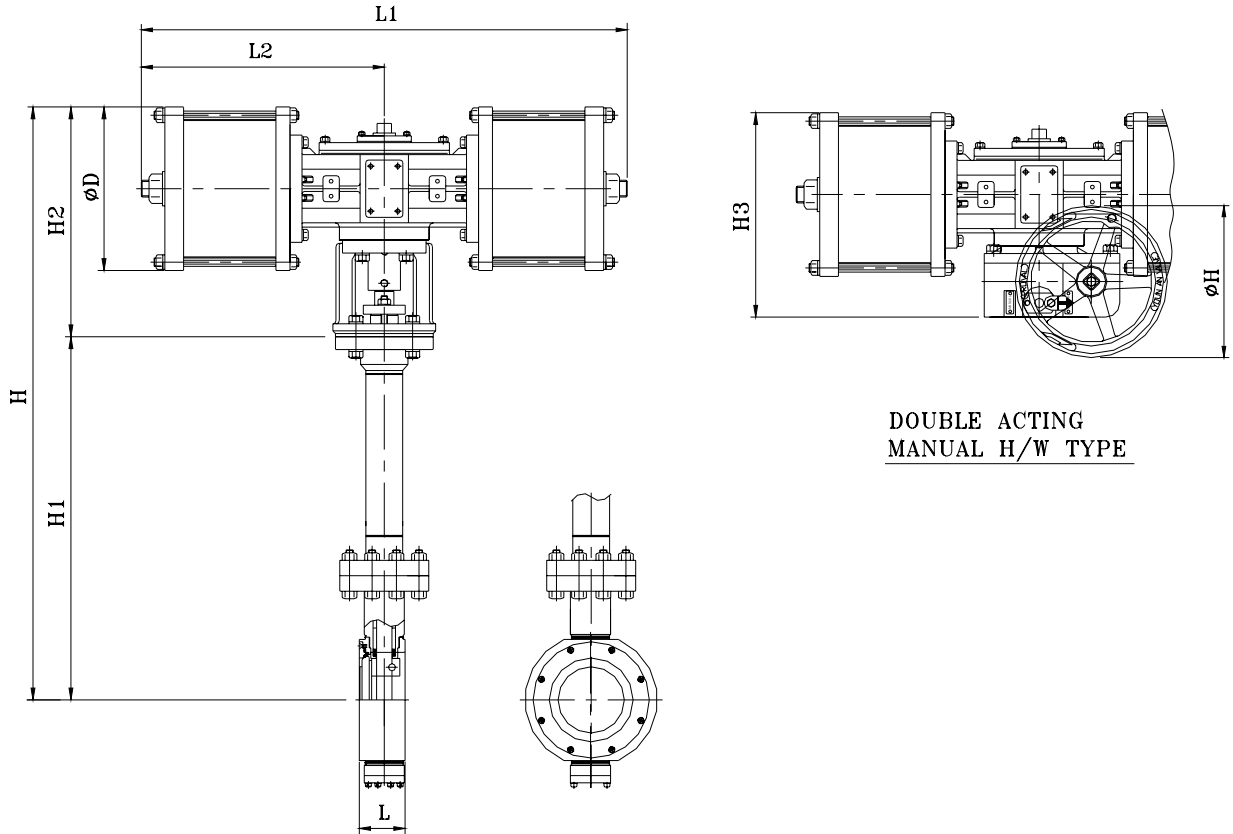
[ Unit: mm ]

Valve Size		L (JIS 10K, /ANSI 150#)	ACTUATOR				L3	H1	H2	H3	ØH
mm	Inch		Double Action		Single Action						
			Model No.	L1	Model No.	L2					
50	2	56	B3S	310	B4SR	610	600	400	360	335	315
65		61	B3S	310	B4SR	610	600	500	360	335	315
80	3	65	B4S	400	B6SR	700	700	550	360/460	335	315/430
100	4	68	B4S	400	B6SR	700	700	600	460/460	440	315/430
125	5	74	B6S	475	-	-	830	700	460	440	430
150	6	77	B6S	475	-	-	830	800	460	440	430

MODEL	YABB-122E1, 322E1 Series	SIZE	50A ~ 150A
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## DIMENSION DRAWING

### ACTUATOR : R6S ~ R10S (WAFER TYPE)



DOUBLE ACTING  
MANUAL H/W TYPE

## DIMENSIONS

[ Unit: mm ]

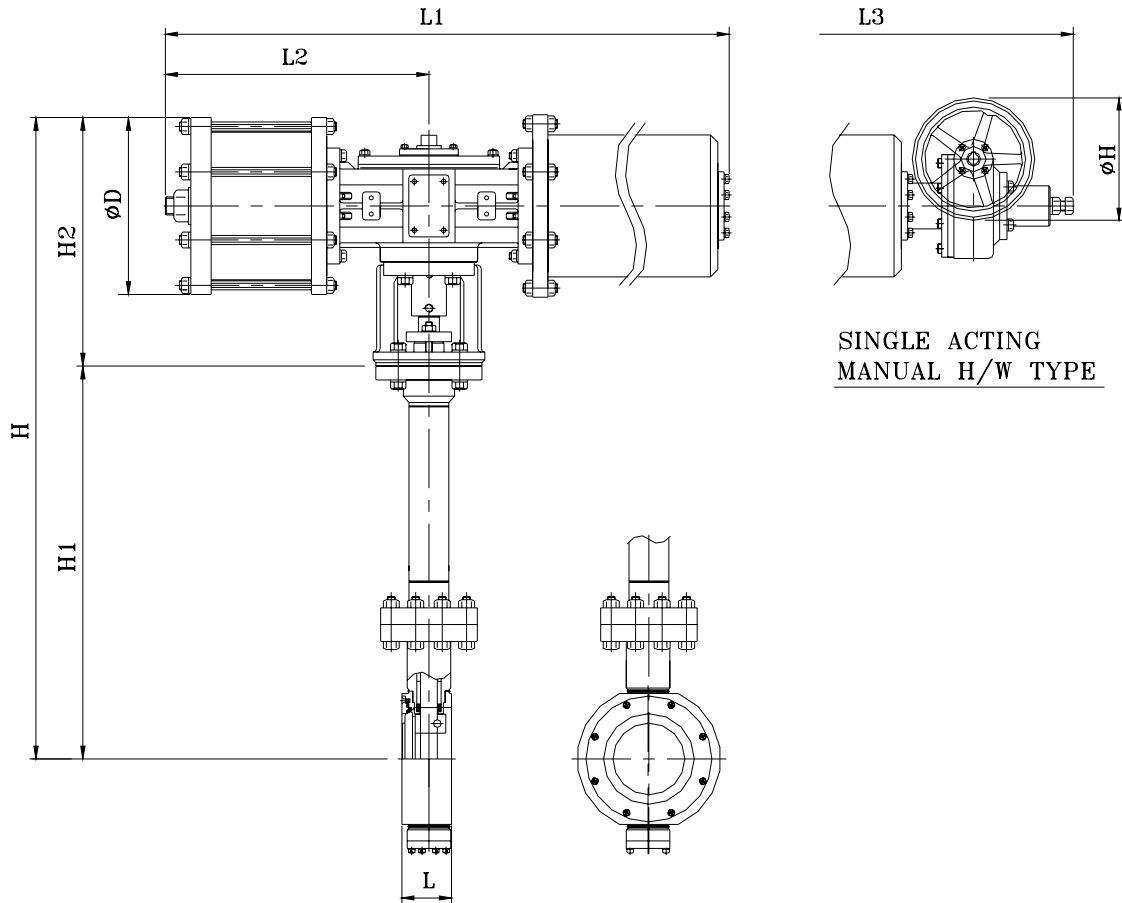
Valve Size		L (JIS 10K, ANSI 150#)	ACTUATOR			L2	H	H1	H2	H3	ØH
mm	inch		Model No.	L1	ØD						
125	5	74	R6S	840	272	420	1105	700	405	430	450
150	6	77	R6S	840	272	420	1205	800	405	430	450
200	8	102	R7S	1300	272	615	1490	1000	490	565	450
250	10	114	R7S	1300	272	615	1490	1000	490	565	450
300	12	127	R8S	1300	325	615	1535	1000	535	580	450
350	14	154	R9S	1300	390	615	1735	1200	535	580	450
400	16	165	R10S	1500	420	750	1835	1300	535	580	450
450	18	190	R12S	1600	490	800	1910	1300	610	680	450
500	20	216	R14S	1600	600	800	2010	1400	610	680	450

MODEL	YABBC-322E1	SIZE	125A - 500A
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## DIMENSION DRAWING

### ACTUATOR : R6SR~ R10SR (WAFER TYPE)



## DIMENSIONS

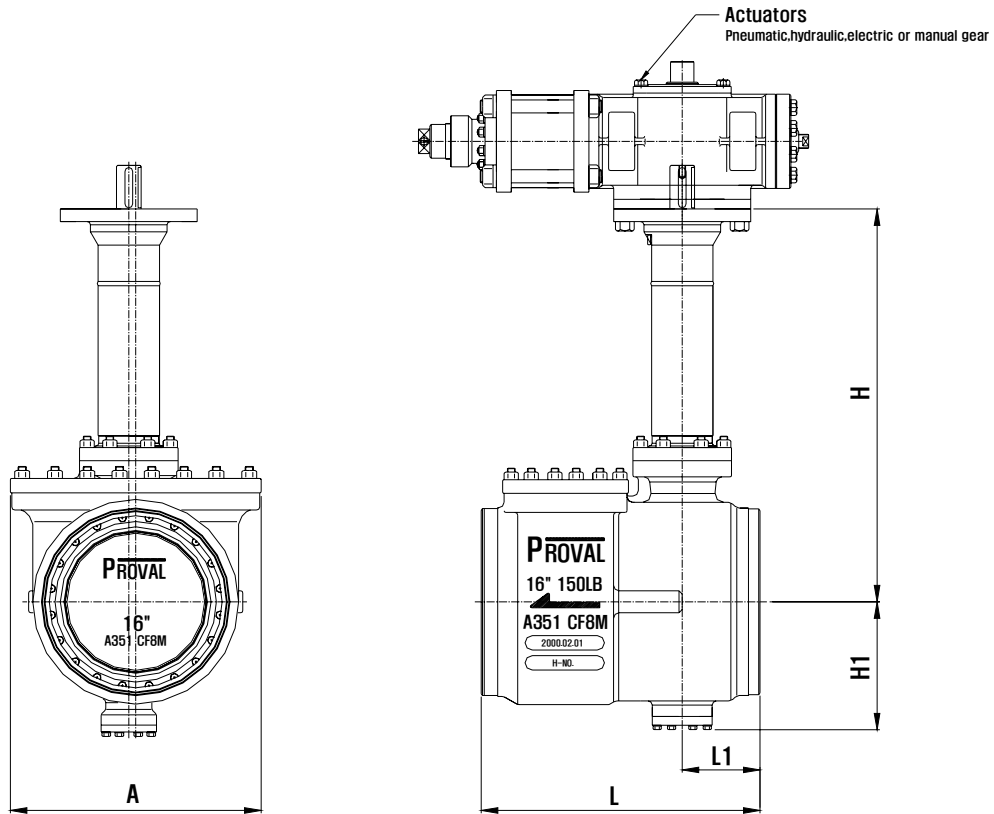
[ Unit: mm ]

Valve Size		L (JIS 10K, /ANSI 150#)	ACTUATOR			L2	L3	H	H1	H2	H3	ØH
mm	inch		Model No.	L1	ØD							
125	5	74	R6SR	1450	272	420	1700	1105	700	405	430	450
150	6	77	R6SR	1950	272	420	2150	1205	800	405	430	450
200	8	102	R7SR	1950	272	650	2150	1490	1000	490	565	450
250	10	114	R7SR	1950	272	650	2150	1490	1000	490	565	450
300	12	127	R8SR	1950	325	800	2150	1535	1000	535	580	450
350	14	154	R9SR	2100	390	850	2450	1735	1200	535	580	450
400	16	165	R10SR	2300	420	900	2450	1835	1200	535	580	450

MODEL	YABBC-122E1	SIZE	125A - 400A
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## DIMENSION DRAWING

### CRYOGENIC BUTTERFLY VALVE (BUTT-WELDING TYPE)



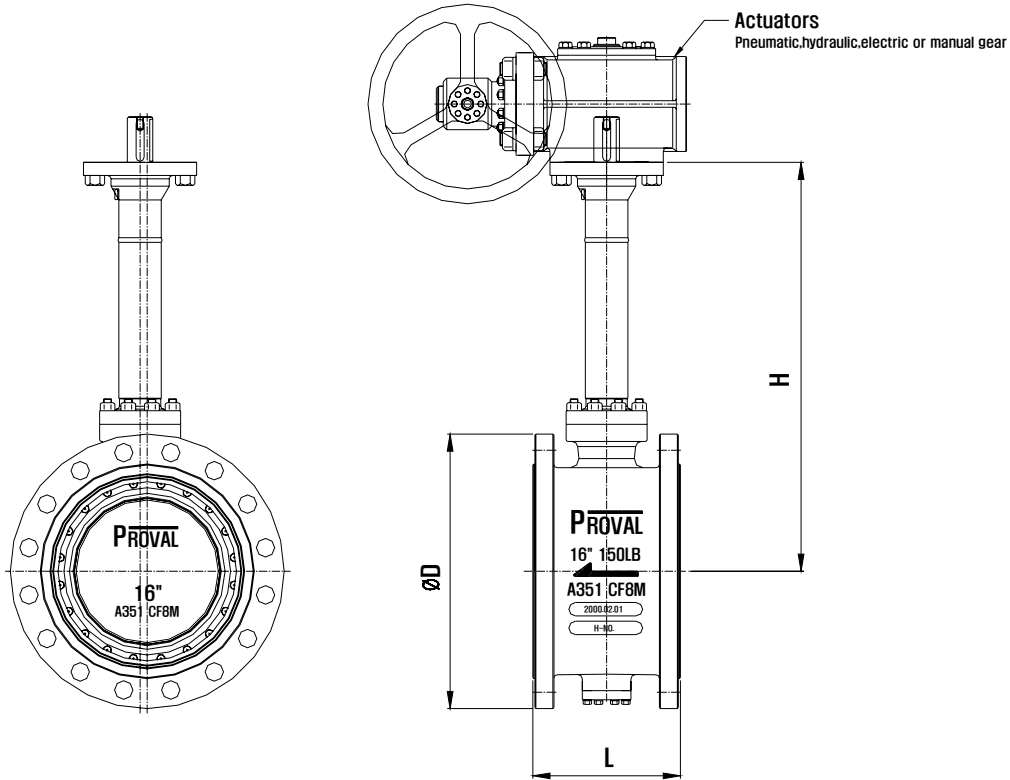
#### DIMENSIONS

SIZE		L	L1	A	H	H1
mm	inch					
150	6	395	130	305	620	125
200	8	410	135	355	650	150
250	10	455	145	390	675	190
300	12	480	150	440	730	215
350	14	530	170	500	775	240
400	16	555	170	545	820	280
450	18	590	180	615	880	315
500	20	625	190	710	1000	410
600	24	680	195	790	1150	470
700	28	770	220	975	1230	510
800	32	830	240	1200	1350	610
900	36	900	270	1410	1450	680
1000	40	1190	340	1500	1620	750

TITLE	CRYOGENIC BUTTERFLY(BUT.WELDING TYPE)	SIZE	150A ~ 1000A
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## DIMENSION DRAWING

### CRYOGENIC BUTTERFLY VALVE (FLANGED TYPE)



#### DIMENSIONS

SIZE		L	H	ØD			
mm	inch			JIS10K	JIS20K	ANSI 150#	PN10bar
150	6	140	615	280	305	279	285
200	8	152	645	330	350	343	340
250	10	165	670	400	430	406	395
300	12	178	720	445	480	493	445
350	14	190	770	490	540	535	505
400	16	216	815	560	605	595	565
450	18	222	865	620	675	635	-
500	20	229	950	675	730	700	670
600	24	267	1100	795	845	815	780
700	28	292	1250	905	995	-	-
800	32	318	1320	1020	1140	-	-
900	36	330	1400	1120	1250	-	-
1000	40	410	1690	1235	-	-	-

TITLE	CRYOGENIC BUTTERFLY(FLANGED TYPE)	SIZE	150A ~ 1000A
PROVAL Co., Ltd.			