

# TOMOE<sup>®</sup>

Dew condensation Free aluminum diecast butterfly valves,  
satisfying ISO standargrs for face-to-face dimensions

## Z-Z 702Z

**NEW**

AN EXTENDED MODEL RANGE OF  
OUR BEST SELLING  
SUPER LIGHT WEIGHT  
ALUMINUM DIECAST BODY  
BUTTERFLY VALVE



TOMOE VALVE CO.,LTD.

# NAV 773Z

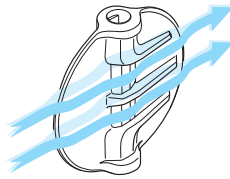
Butterfly Valves
TRITEC
TT2
334A
302A/303Q
304A/304Q
302Y/304Y
304M(HLV)
507V/508V
846T/847T/847Q
841T/842T
773Z (NAV-Z)
700G/704G/705G
731P/732P
732X/731X
700E/700K
704G/722F/720F
LRV
227P
MKT
903C/904C

## Revolutionary super light weight aluminum diecast body butterfly valve

### Features

#### Larger Flow Rate

Improved seat design (new cosine-curve seat) with rib disc (\*except 40mm type) can provide a larger flow rate and larger Cv value than existing models by maintaining mechanical strength of the disc.



\*Patent pending

#### Ultra Super Light Weight

Easy installation due to lighter weight (30% lighter than 702Z on 200mm types) and alignment ribs.

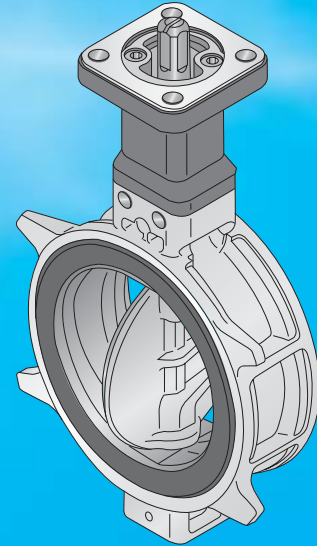
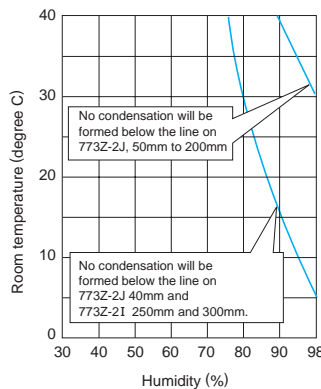
Examples of weight (Kg) with gear operator

	Conventional	702Z-2I	773Z-2J
	(Iron body)	(Aluminum diecast body)	
80mm	4.9	1.8	1.6
100mm	5.7	3.1	2.2
200mm	18.0	9.6	6.7

#### Remarkable Anti-Condensation Capability

Better anti-condensation capability is achieved by utilizing a high performance engineering plastic column. The high performance engineering plastic has excellent features such as low water absorption, high corrosion resistance, heat resistance, non-flammability as well as shock resistance, which is approximately four times that of hard PVC material.

The graph below shows anti-condensation performance under 5 degrees C cold moisture



#### Engineering Plastic Housing of Gear operator with stainless steel worm shaft

The high performance engineering plastic housing and stainless steel worm shaft are standardized to prevent corrosion for the 2J type worm gear operator.

#### Silicon Seat (50mm to 200mm)

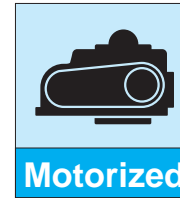
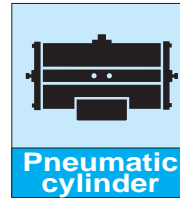
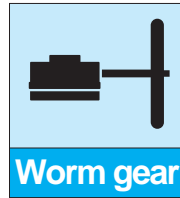
The silicon seat is designed for chlorinated hot water applications for sanitary use in the 778Z.



#### PPS Disc

The PPS lined disc (poly phenylene sulfide with stainless steel core) is available up to 200mm and is an optimum product for corrosive fluids (subject to the performance of the rubber material). It works under the same concept as plastic butterfly valves whose contact parts with fluid consist of a plastic disc and rubber seat.





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TRITEC
TT2
334A
302A/303Q
304A/304Q
302Y/304Y
304M <sup>(HLV)</sup>
507V/508V
846T/847T/847Q
841T/842T
773Z <sup>(NAV-Z)</sup>
700G/704G/705G
731P/732P 732X/731X
700E/700K
704G/722F/720F
LRV
227P
MKT
903C/904C

### Standard specifications

Valve nominal size	40mm to 300mm	
Applicable flange standard	JIS5K / 10K ANS1125 / 150Lb, BS 4504 PN10, DIN NP10, BS10E	
Design standard	JISB2032	
Max.working pressure	1.0MPa	
Working temperature range	*EPDM - 20 to + 120 degrees C, silicon(778Z) - 30 to + 130 degrees C	
Working temperature in continuous use <sup>1</sup>	*EPDM - 10 to + 100 degrees C, silicon(778Z) - 30 to + 130 degrees C	
Body shell test <sup>2</sup>	1.5MPa	
Seat leak test <sup>3</sup>	1.1MPa	
Actuator mounting flange	ISO 5211	
Actuators	Lock lever, Worm gear, Vertical gear	
	Pneumatic cylinder, Electric motor	
Face to face dimensions	ISO 5752/JIS B2032	
Standard materials	Body	Aluminum diecast alloy
	Disc	Stainless steel type 316
	Stem	PPS (Polyphenylene sulfide lined on stainless steel core ) <sup>4</sup>
	Seat <sup>5</sup>	*EPDM, NBR, Silicon
	Column	Engineering plastic
Surface treatment	Body	Epoxy-melanin baked with munsell 2.5BG 6/12
Condensation prevention performance	No condensation is formed on gear actuator and its mounting flange under 34 degrees C room temperature with 75% humidity on 5 degrees C chilled water line.	

1. "Working temperature in continuous use" stands for the temperature continuously kept exceeding one hour.
  2. 1.8MPa piping pressure test at job site is available.
  3. 1.2/1.4MPa test is also available upon request.
  4. 40mm to 200mm types are available.
  5. Silicon seat is available on 50mm to 200mm types as 778Z
- \* Never use an EPDM rubber seat is ring if the valve being used for oil or for a fluid containing even a slight amount of oil.

Dew condensation

### General description

This revolutionary aluminum diecast body butterfly valve is an extended model of our best selling 702Z. The high performance engineering plastic top plate (patent pending) with aluminum diecast body can prevent dew-condensation and allow auto-actuation with the ISO top flange design.



### NAV-Z Actuator selection chart

- Butterfly Valves
- TRITEC
- TT2
- 334A
- 302A/303Q
- 304A/304Q
- 302Y/304Y
- 304M(HLV)
- 507V/508V
- 846T/847T/847Q
- 841T/842T
- 773Z (NAV-Z)
- 700G/704G/705G
- 731P/732P  
732X/731X
- 700E/700K
- 704G/722F/720F
- LRV
- 227P
- MKT
- 903C/904C

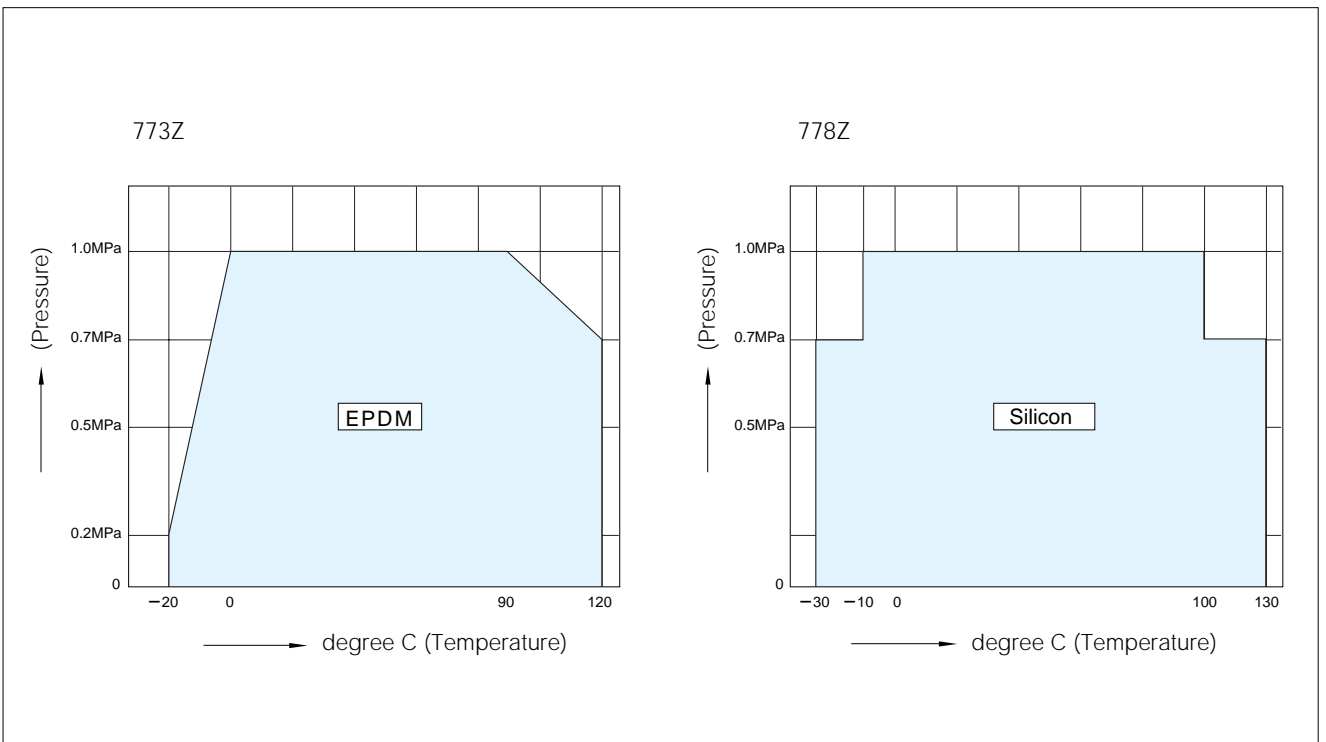
Model	Category	Size (mm / inch)									
		40	50	65	80	100	125	150	200	250	300
		1 1/2	2	2 1/2	3	4	5	6	8	10	12
1J,1T	Standard Heavy duty	1J-1			1J-2		1T-2				
2J,2I	Standard Heavy duty	2J-1			2J-2		2J-3		2I-4		
3E	Standard Heavy duty	K30			K70		K170		K370		K700
3G,3F	Standard Heavy duty	K70S		K170S		K370S		K700S			
4I	ON-OFF Control	4I-00			4I-0		4I-1	4I-2	4I-2.5		4I-3

Remark: For the 200mm type with the accessories below, type 4I-2.5 should be selected. 778Z is available on 50 to 200mm types.

Micom unit  
Servo unit  
Speed control unit  
Potentiometer

Selection criteria	Standard	Select when none of the following heavy duty items apply.
	Heavy duty	Select when any of the following items apply. ① Powder or high viscosity fluid (crude oil, etc.) ② Control specification (with positioner) ③ Emergency open valve or pipe dead end valve

### NAV-Z Pressure-temperature rating

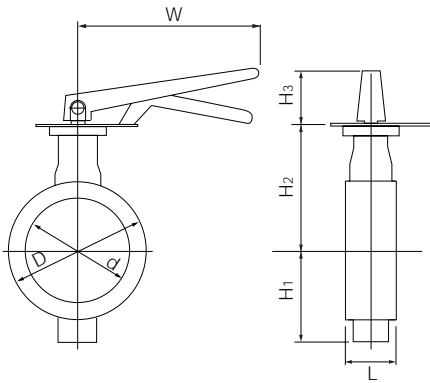


Lock lever type 773Z-1J (40mm to 125m) / 773Z-1T(150mm)  
778Z-1J (50mm to 125m) / 778Z-1T(150mm)

Nominalsize		Dimension (mm)							Lever type	Approx. weight (kg)
mm	inch	d	D	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	W		
40	1 1/2	45	80	35	61	132	54	160	1J-1	1.1
50	2	52	91	43	66	138	56	160	1J-1	1.1
65	2 1/2	65	111	46	72	151	56	160	1J-1	1.3
80	3	80	127	46	85	156	56	160	1J-1	1.5
100	4	101	147	52	98	167	69	200	1J-2	2
125	5	126	178	56	115	191	69	200	1J-2	2.9
150	6	150	207	56	131	202	92	300	1T-2	5

778Z is available on 50 to 200mm types.

773Z/778Z-1J/1T

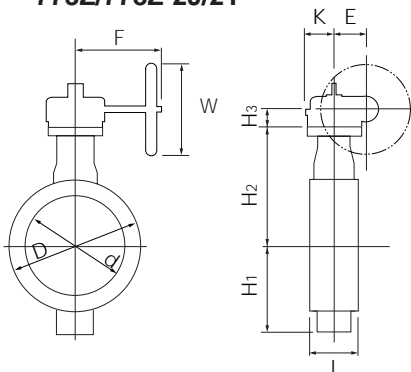


Worm gear type 773Z-2J (40mm to 200m) / 773Z-2I (250mm, 300mm)  
778Z-2J (50mm to 200m)

Nominalsize		Dimension (mm)										Lever type	Approx. weight (kg)
mm	inch	d	D	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	E	K	F	W		
40	1 1/2	45	80	35	61	132	25	27.5	35	90	70	2J-1	1.2
50	2	52	91	43	66	138	25	27.5	35	90	70	2J-1	1.2
65	2 1/2	65	111	46	72	151	25	27.5	35	90	70	2J-1	1.4
80	3	80	127	46	85	156	25	27.5	35	90	70	2J-1	1.6
100	4	101	147	52	98	167	30	35	37	90	70	2J-2	2.2
125	5	126	178	56	115	191	30	35	37	90	70	2J-2	3.1
150	6	150	207	56	131	202	30	49	51	159	125	2J-3	4.5
200	8	196	253	60	163	227	30	49	51	159	125	2J-3	6.8
250	10	253	322	68	215	280	38.5	71	65	193	200	2I-4	19
300	12	302	367	78	253	312	38.5	71	65	193	200	2I-4	26

778Z is available on 50 to 200mm types.

773Z/778Z-2J/2I



Butterfly Valves

TRITEC
TT2
334A
302A/303Q
304A/304Q
302Y/304Y
304M(HLV)
507V/508V
846T/847T/847Q
841T/842T
773Z (NAV-Z)
700G/704G/705G
731P/732P 732X/731X
700E/700K
704G/722F/720F
LRV
227P
MKT
903C/904C

Double-acting pneumatic cylinder type **773Z-3E (40mm to 300mm)**  
**778Z-3E (50mm to 200mm)**

Butterfly Valves

TRITEC

TT2

334A

302A/303Q

304A/304Q

302Y/304Y

304M(HLV)

507V/508V

846T/847T/847Q

841T/842T

773Z (NAV-Z)

700G/704G/705G

731P/732P  
732X/731X

700E/700K

704G/722F/720F

LRV

227P

MKT

903C/904C

**Standard**

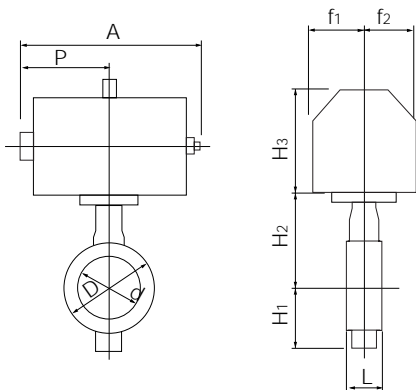
Nominal size		Dimension (mm)										Cylinder type	Approx. weight (kg)
mm	inch	d	D	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
40	1 1/2	45	80	35	61	132	113	216.5	111.5	35	50	K30	2.7
50	2	52	92	43	66	138	113	216.5	111.5	35	50	K30	2.7
65	2 1/2	65	111	46	72	151	113	216.5	111.5	35	50	K30	3
80	3	80	127	46	85	156	113	216.5	111.5	35	50	K30	3.2
100	4	101	147	52	98	167	133	266	136	53	51	K70	5.7
125	5	126	178	56	115	191	133	266	136	53	51	K70	6.6
150	6	150	207	56	131	202	157	330	169	65	58	K170	10.3
200	8	196	253	60	163	227	157	330	169	65	58	K170	12.6
250	10	253	322	68	215	280	184	409	207	83	69	K370	21.3
300	12	302	367	78	253	312	224	518	260	101	85	K700	38.5

**Heavy duty**

Nominal size		Dimension (mm)										Cylinder type	Approx. weight (kg)
mm	inch	d	D	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
40	1 1/2	45	80	35	61	132	113	216.5	111.5	35	50	K30	2.7
50	2	52	92	43	66	138	113	216.5	111.5	35	50	K30	2.7
65	2 1/2	65	111	46	72	151	113	216.5	111.5	35	50	K30	3
80	3	80	127	46	85	156	133	266	136	53	51	K70	5.2
100	4	101	147	52	98	167	133	266	136	53	51	K70	5.7
125	5	126	178	56	115	191	157	330	169	65	58	K170	9.3
150	6	150	207	56	131	202	157	330	169	65	58	K170	10.3
200	8	196	253	60	163	227	184	409	207	83	69	K370	17.6
250	10	253	322	68	215	280	184	409	207	83	69	K370	21.3
300	12	302	367	78	253	321	224	518	260	101	85	K700	38.5

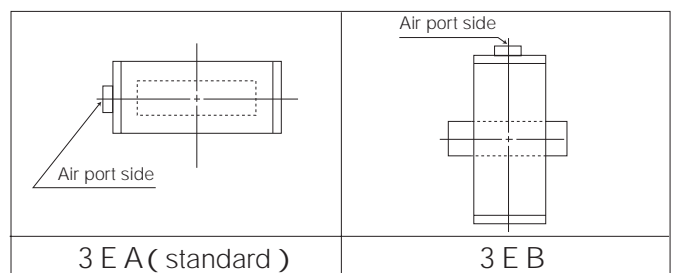
778Z is available on 50 to 200mm types.

**773Z/778Z-3E**



Selection criteria	Standard	Select when none of the following heavy duty items apply.
	Heavy duty	Select when any of the following items apply. ① Powder or high viscosity fluid (crude oil, etc.) ② Control specification (with positioner) ③ Emergency open valve or pipe dead end valve

**3E Installation direction**



Single-acting pneumatic cylinder type **773Z-3G** (Air to open: 40mm to 200mm) / **773Z-3F** (Air to open: 40mm to 200mm)  
**778Z-3G** (Air to open: 50mm to 200mm) / **778Z-3F** (Air to open: 50mm to 200mm)

**Standard**

Nominal size		Dimension (mm)										Cylinder type	Approx. weight (kg)
mm	inch	d	D	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
40	1 1/2	45	80	35	61	132	133	360	176.5	53	51	K70S	5.9
50	2	52	92	43	66	138	133	360	176.5	53	51	K70S	5.9
65	2 1/2	65	111	46	72	151	133	360	176.5	53	51	K70S	6.2
80	3	80	127	46	85	156	157	444	218.5	65	58	K170S	10.2
100	4	101	147	52	98	167	157	444	218.5	65	58	K170S	10.7
125	5	126	178	56	115	191	184	545	269	83	69	K370S	18.5
150	6	150	207	56	131	202	184	545	269	83	69	K370S	19.5
200	8	196	253	60	163	227	224	707	350	101	85	K700S	35.9
250	10	253	322	68	215	280	224	707	350	101	85	K700S	39.6

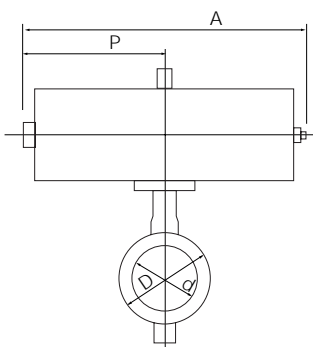
**Heavy duty**

Nominal size		Dimension (mm)										Cylinder typeOp	Approx. weight (kg)
mm	inch	d	D	L	H <sub>1</sub>	H <sub>2</sub>	H <sub>3</sub>	A	P	f <sub>1</sub>	f <sub>2</sub>		
40	1 1/2	45	80	35	61	132	133	360	176.5	53	51	K70S	5.9
50	2	52	92	43	66	138	133	360	176.5	53	51	K70S	5.9
65	2 1/2	65	111	46	72	151	157	444	218.5	65	58	K170S	10
80	3	80	127	46	85	156	157	444	218.5	65	58	K170S	10.2
100	4	101	147	52	98	167	184	545	269	83	69	K370S	17.6
125	5	126	178	56	115	191	184	545	269	83	69	K370S	18.5
150	6	150	207	56	131	202	224	707	350	101	85	K700S	33.6
200	8	196	253	60	163	227	224	707	350	101	85	K700S	35.9

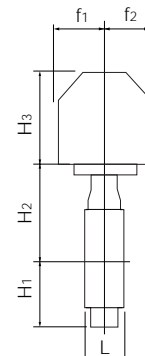
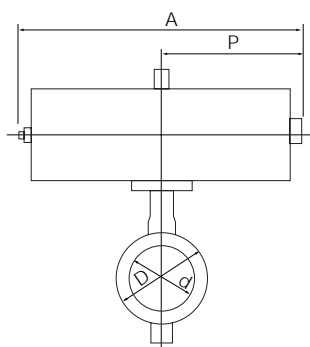
778Z is available on 50 to 200mm types.

Selection criteria	Standard	Select when none of the following heavy duty items apply.
	Heavy duty	Select when any of the following items apply. ① Powder or high viscosity fluid (crude oil, etc.) ② Control specification (with positioner) ③ Emergency open valve or pipe dead end valve

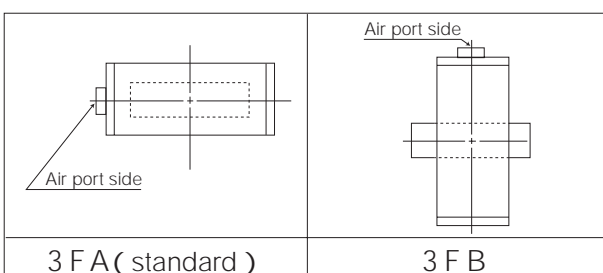
**773Z/778Z-3F**



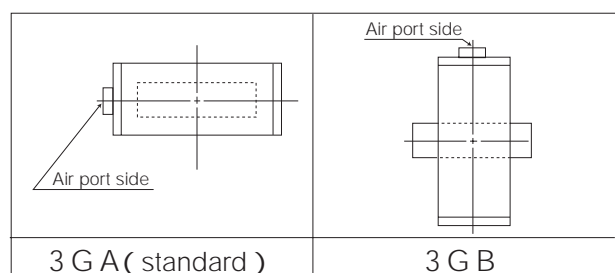
**773Z/778Z-3G**



**3F Installation direction**



**3G Installation direction**



Butterfly Valves

TRITEC
TT2
334A
302A/303Q
304A/304Q
302Y/304Y
304M <sup>(HLV)</sup>
507V/508V
846T/847T/847Q
841T/842T
773Z <sup>(NAV-Z)</sup>
700G/704G/705G
731P/732P 732X/731X
700E/700K
704G/722F/720F
LRV
227P
MKT
903C/904C

**Single phase electric motor type 773Z-4 I ( 40mm to 300mm )  
778Z-4 I ( 50mm to 200mm )**

Butterfly Valves
TRITEC
TT2
334A
302A/303Q
304A/304Q
302Y/304Y
304M(HLV)
507V/508V
846T/847T/847Q
841T/842T
<b>773Z(NAV-Z)</b>
700G/704G/705G
731P/732P 732X/731X
700E/700K
704G/722F/720F
LRV
227P
MKT
903C/904C

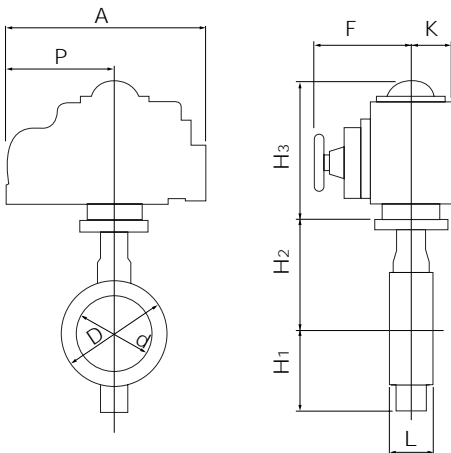
Nominal size		Dimension (mm)										Motor type	Approx. weight (kg)
mm	inch	d	D	L	H1	H2	H3	A	P	F	K		
40	1 1/2	45	80	35	61	132	120	161	84	58	45	4 I-00	3.3
							150	202	100	85	54	4 I-0	5.1
50	2	52	91	43	66	138	120	161	84	58	45	4 I-00	3.4
							150	202	100	85	54	4 I-0	5.1
65	2 1/2	65	111	46	72	151	120	161	84	58	45	4 I-00	3.6
							150	202	100	85	54	4 I-0	5.3
80	3	80	127	46	85	156	150	202	100	85	54	4 I-0	5.5
100	4	101	147	52	98	167	150	202	100	85	54	4 I-0	6
125	5	126	178	56	115	191	165	252	138	126	65	4 I-1	9.1
150	6	150	207	56	131	202	198	310	167	154	85	4 I-2	15
200	8	196	253	60	163	227	198	310	167	154	85	4 I-2	18
							198	310	167	154	85	4 I-2.5	19
250	10	253	322	68	215	280	198	310	167	154	85	4 I-2.5	28
300	12	302	367	78	253	312	230	388	223	246	136	4 I-3	46

Note 1: For nominal size 40 to 65 mm type (for control), the 4I-0 type should be selected. (The 4I-00 type is only designed for ON-OFF operation.)  
 Remark: For the 200mm type with the accessories below, type 4I-2.5 should be selected.

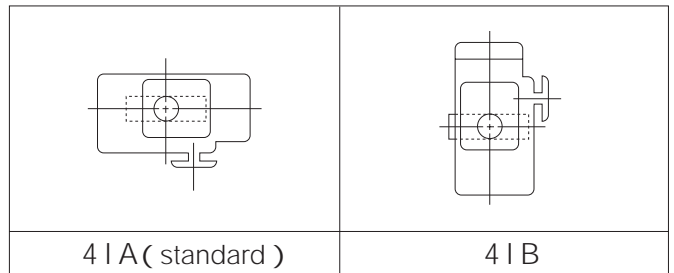
- Micom unit
- Servo unit
- Speed control unit
- Potentiometer

778Z is available on 50 to 200mm types.

**773Z/778Z-4 I**

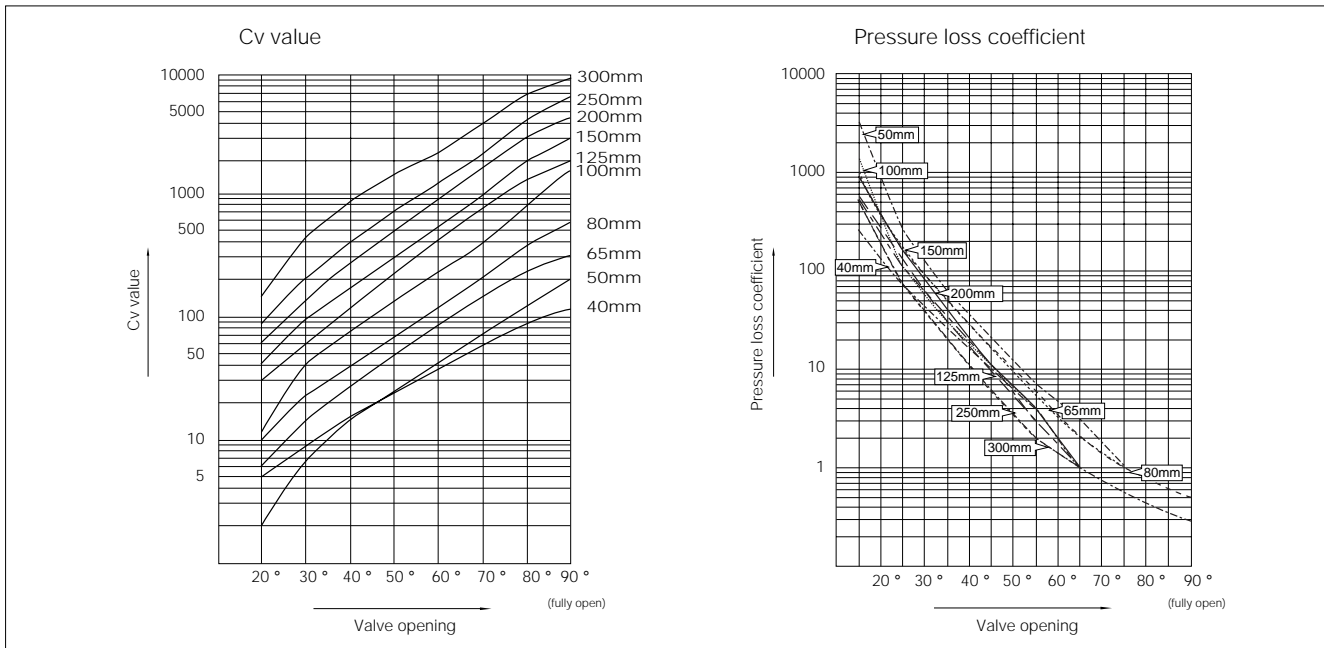


**4 I Installation direction**





### NAV-Z Cv value/pressure loss coefficient



### NAV-Z Cv value

Nominal size		Valve opening							
mm	inch	20°	30°	40°	50°	60°	70°	80°	90°
40	1 1/2	5	9	16	25	39	61	95	121
50	2	2	7	15	25	43	74	125	199
65	2 1/2	6	15	29	52	87	148	251	339
80	3	10	24	40	73	125	217	407	623
100	4	12	44	83	138	242	401	862	1670
125	5	30	64	129	240	433	803	1420	1960
150	6	45	100	178	320	564	1030	2000	2910
200	8	61	145	295	554	943	1630	3050	4420
250	10	82	207	395	727	1360	2360	4300	6660
300	12	152	444	834	1490	2460	4010	6990	9120

### NAV-Z Pressure loss coefficient

Nominal size		Valve opening							
mm	inch	20°	30°	40°	50°	60°	70°	80°	90°
40	1 1/2	264	72	26	10	4	2	1	0.4
50	2	3341	250	59	21	7	3	1	0.4
65	2 1/2	1051	176	47	14	5	2	1	0.4
80	3	917	158	54	17	6	2	1	0.2
100	4	1395	111	31	11	4	1	0.3	0.1
125	5	581	129	31	9	3	1	0.3	0.1
150	6	542	109	34	11	3	1	0.3	0.1
200	8	932	163	39	11	4	1	0.4	0.2
250	10	1242	194	53	16	5	1	0.3	0.2
300	12	746	88	25	8	3	1	0.3	0.2

### Butterfly Valves

TRITEC

TT2

334A

302A/303Q

304A/304Q

302Y/304Y

304M(HLV)

507V/508V

846T/847T/847Q

841T/842T

773Z(NAV-Z)

700G/704G/705G

731P/732P

732X/731X

700E/700K

704G/722F/720F

LRV

227P

MKT

903C/904C

NAV-Z Applicable pipe list in case of **A**

Butterfly Valves	Nominal size		SGP	Sch20	Sch40	VP (TS flange)	Sch10S	Sch20S	Minimum internal diameter of piping (mm)
	mm	inch							
TRITEC	40	1 1/2		-					25
TT2	50	2							34
334A	65	2 1/2							51
302A/303Q	80	3							70
304A/304Q	100	4							91
302Y/304Y	125	5							118
	150	6							144
304M(HLV)	200	8							194
507V/508V	250	10							246
846T/847T/847Q	300	12							294

NAV-Z Applicable pipe list in case of **B**

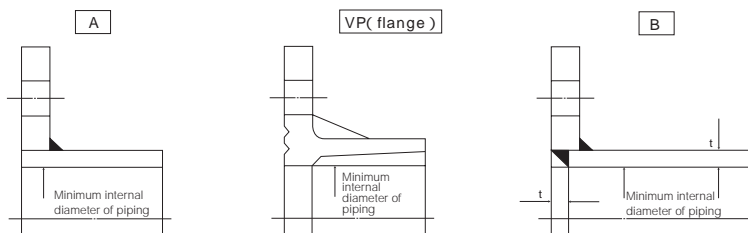
Butterfly Valves	Nominal size		SGP	Sch20	Sch40	Sch10S	Sch20S
	mm	inch					
700G/704G/705G	40	1 1/2		-			
731P/732P 732X/731X	50	2					
700E/700K	65	2 1/2					
704G/722F/720F	80	3					
LRV	100	4					
227P	125	5					
MKT	150	6					
903C/904C	200	8					
	250	10					
	300	12					

Remark 1: = Applicable

Remark 2: Butterfly valves are inserted into a pipe that was fitted with the disc when fully open.

In cases where you are using a pipe or flange that is less than the minimum inner pipe diameter, use is still possible if means are taken such as inserting a spacer between the valve and flange.

For details, please consult us.



## NAV-Z Piping bolt and nut sizes

### Hexagon bolt & nut

Nominal size		JIS 5K	JIS 10K
mm	inch	Hexagon bolts and nuts	Hexagon bolts and nuts
40	1 1/2	4-M12× 75×30	4-M16× 90×38
50	2	4-M12× 90×30	4-M16×100×38
65	2 1/2	4-M12× 90×30	4-M16×105×38
80	3	4-M16× 95×38	8-M16×105×38
100	4	8-M16×105×38	8-M16×110×38
125	5	8-M16×110×38	8-M20×125×46
150	6	8-M16×115×38	8-M20×130×52
200	8	8-M20×130×52	12-M20×130×52
250	10	12-M20×140×52	12-M22×150×60
300	12	12-M20×150×52	16-M22×160×60

### Long bolt & nut

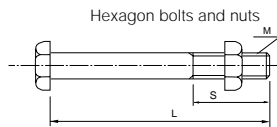
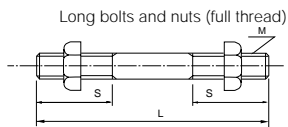
Nominal size		JIS 5K	JIS 10K	ANSI 125Lb/150Lb
mm	inch	Long bolts and nuts	Long bolts and nuts	Long bolts and nuts
40	1 1/2	4-M12× 95×25	4-M16×110×25	4-U1/2×110×32
50	2	4-M12×105×25	4-M16×120×30	4-U5/8×140×38
65	2 1/2	4-M12×110×25	4-M16×125×30	4-U5/8×140×38
80	3	4-M16×120×30	8-M16×125×30	4-U5/8×140×38
100	4	8-M16×130×30	8-M16×130×30	8-U5/8×150×38
125	5	8-M16×130×30	8-M20×150×40	8-U3/4×160×51
150	6	8-M16×140×35	8-M20×155×40	8-U3/4×165×51
200	8	8-M20×155×40	12-M20×155×40	8-U3/4×175×51
250	10	12-M20×165×40	12-M22×175×45	12-U7/8×195×58
300	12	12-M20×175×40	16-M22×185×45	12-U7/8×205×58

Remark 1. Hexagon bolts should be used with hexagon (thin) nuts.  
 2. Unify screw (1 inch or above nominal size): 8 threads/inch.

#### Example

Long bolts : 12 - M22 × 185 × 45  
                   |      |      |      |  
                   N      M      L      S

Hexagon bolts : 12 - M22 × 60 × 50  
                   |      |      |      |  
                   N      M      L      S



Remark 1. Hexagon bolts should be used with hexagon (thin) nuts.  
 2. The values in parenthesis are the number of bolts when the bolts hole are tapped.  
 3. Unify screw (1 inch or above nominal size): 8 threads/inch.

#### Butterfly Valves

TRITEC

TT2

334A

302A/303Q

304A/304Q

302Y/304Y

304M<sup>(HLV)</sup>

507V/508V

846T/847T/847Q

841T/842T

773Z<sup>(NAV-Z)</sup>

700G/704G/705G

731P/732P  
732X/731X

700E/700K

704G/722F/720F

LRV

227P

MKT

903C/904C