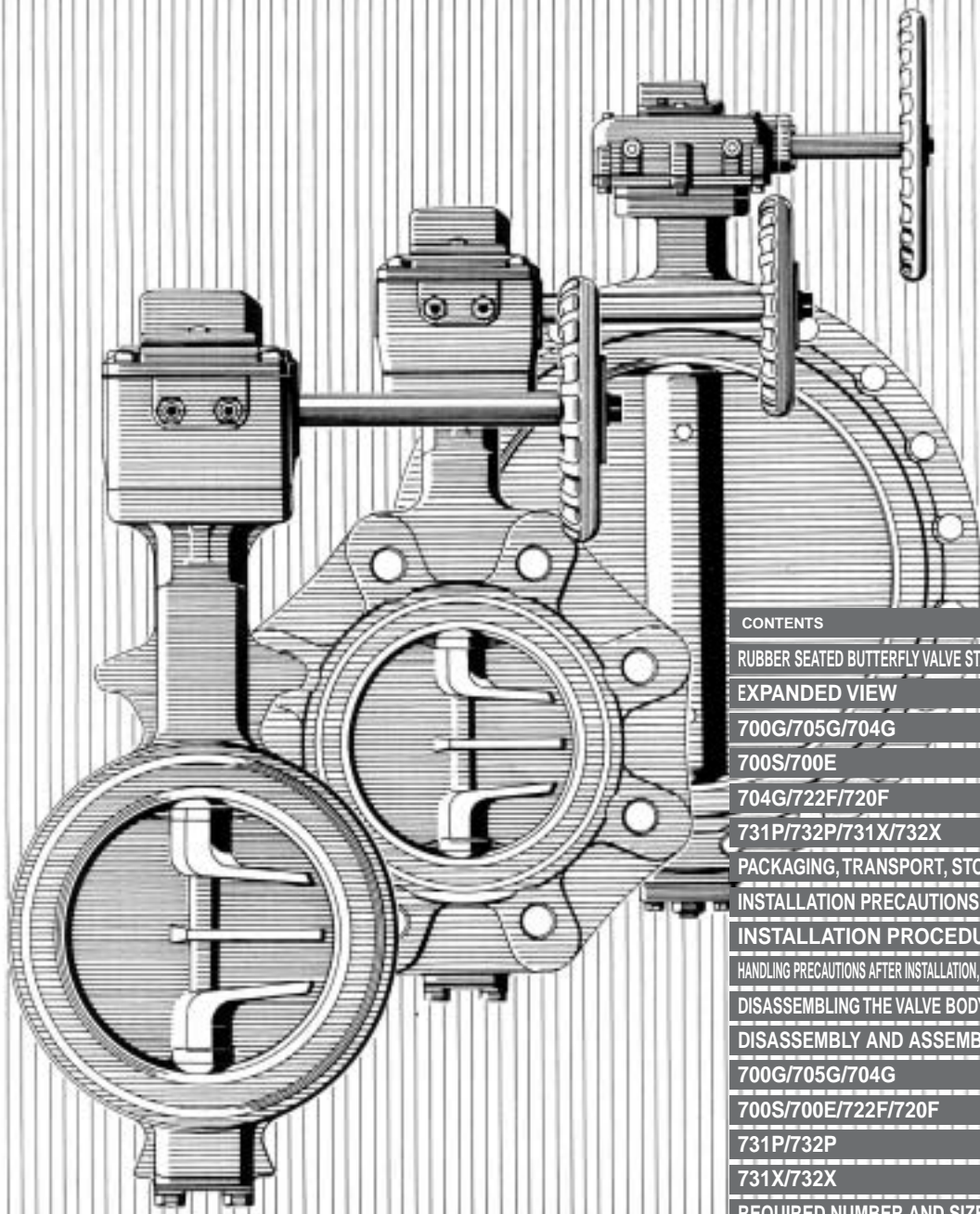


Rubber Seated Butterfly Valve

700G·705G·704G·700S·700E
 731P·732P·731X·732X
 722F·720F

INSTRUCTION MANUAL



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This instruction manual explains standard usage of the Rubber Seated Butterfly Valve 700G, 705G, 704G, 700S, 700EM731P, 732P, 731X, 732X, 722F, 720F .

Please read this manual thoroughly in order to ensure correct use of the product.

RUBBER SEATED BUTTERFLY VALVE STANDARD SPECIFICATIONS

1.0 MPa Rubber seated butterfly valve

Disc type	700G		705G		704G		
Body shape (Connection)	Wafer type		Wafer type (Semi lugged)		Lugged type		
Valve nominal size	40mm to 300mm	350mm to 600mm	50mm to 300mm	350mm to 600mm	50mm to 300mm	350mm to 600mm	
Applicable flange standard	JIS 5K/10K ANSI 125Lb/150Lb, etc	JIS 5K/10K	JIS 5K/10K, ANSI 125Lb/150Lb, etc		JIS 5K/10K, ANSI 125Lb/150Lb, etc		
Face-to-face dimensions	JIS B2002 (46 series)/ISO 5752 (20 series)		JIS B2002 (46 series)/ISO 5752 (20 series)		JIS B2002 (46 series)/ISO 5752 (20 series)		
Max. working pressure	1.0MPa		1.0MPa		1.0MPa		
Working temperature range	*EPDM : -20 to 120 degrees C, NBR : -10 to 80 degrees C		*EPDM : -20 to 120 degrees C, NBR : -10 to 80 degrees C		*EPDM : -20 to 120 degrees C, NBR : -10 to 80 degrees C		
Allowable temperature in continuous use	*EPDM : 0 to 100 degrees C, NBR : 0 to 60 degrees C		*EPDM : 0 to 100 degrees C, NBR : 0 to 60 degrees C		*EPDM : 0 to 100 degrees C, NBR : 0 to 60 degrees C		
Standard materials	Body	FCD450	FC250	FCD450	FC250	FCD450	
	Disc	SCS 14, PPS, etc	SCS13, FCD450	SCS 14, PPS, etc	SCS13, FCD450	SCS 14, PPS, etc SCS13, FCD450	
	Stem	SUS420J2		SUS420J2		SUS420J2	
	Seat ring	*EPDM, NBR		*EPDM, NBR		*EPDM, NBR	

Disc type	700S	700E	704G	722F	720F
Body shape (Connection)	Wafer type		Lugged type	Double flanged type	
Valve nominal size	50mm to 600mm	650mm to 1350mm	50mm to 100mm	125mm to 800mm	850mm to 1350mm
Applicable flange standard	JIS 5K/10K ANSI 125Lb/150Lb, etc	JIS 5K/10K	JIS 5K/10K, ANSI 125Lb/150Lb, etc	JIS 5K/10K, ANSI 125Lb/150Lb, etc	
Face-to-face dimensions	Manufactured standard		JIS B2002 (46 series)/ISO 5752 (20 series)	JIS B2002 (123 series)	Manufactured standard
Max. working pressure	1.0MPa		1.0MPa	1.0MPa	
Working temperature range	*EPDM : -20 to 120 degrees C, NBR : -10 to 80 degrees C		*EPDM : -20 to 120 degrees C, NBR : -10 to 80 degrees C	*EPDM : -20 to 120 degrees C, NBR : -10 to 80 degrees C	
Allowable temperature in continuous use	*EPDM : 0 to 100 degrees C, NBR : 0 to 60 degrees C		*EPDM : 0 to 100 degrees C, NBR : 0 to 60 degrees C	*EPDM : 0 to 100 degrees C, NBR : 0 to 60 degrees C	
Standard materials	Body	FC250	SCPH2	SCPH2	
	Disc	SCS13, FCD450	SCS 14, etc	SCS13, FCD450	
	Stem	SUS403	SUS420J2	SUS403	
	Seat ring	*EPDM, NBR		*EPDM, NBR	

1.6 MPa Rubber seated butterfly valve

Disc type	731P	732X	731X
Body shape (Connection)	Wafer type		Wafer type
Valve nominal size	50mm to 300mm	350, 400mm	450mm to 600mm
Applicable flange standard	JIS 10K/16K, ANSI150Lb, etc		JIS 10K/16K, ANSI150Lb, etc
Face-to-face dimensions	JIS B2002 (46 series)/ISO 5752 (20 series)		Manufactured standard
Max. working pressure	1.6MPa		1.6MPa
Working temperature range	*EPDM : -20 to 120 degrees C, NBR : -10 to 80 degrees C		*EPDM : -20 to 120 degrees C, NBR : -10 to 80 degrees C
Allowable temperature in continuous use	*EPDM : 0 to 100 degrees C, NBR : 0 to 60 degrees C		*EPDM : 0 to 100 degrees C, NBR : 0 to 60 degrees C
Standard materials	Body	FCD450	FCD450
	Disc	SCS14	SCS13
	Stem	SUS420J2	
	Seat ring	*EPDM, NBR	

2.0 MPa Rubber seated butterfly valve

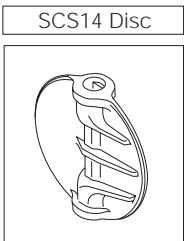
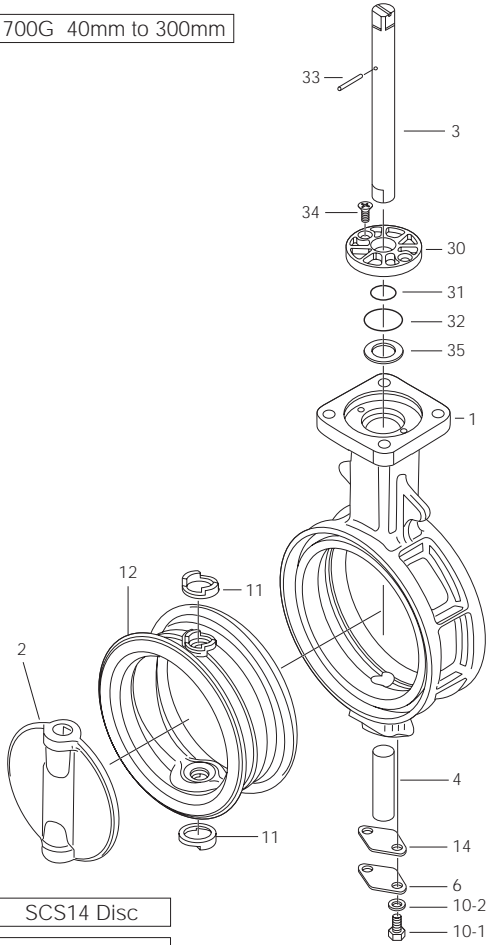
Disc type	732P	732X	731X
Body shape (Connection)	Wafer type		Wafer type
Valve nominal size	50mm to 300mm	350, 400mm	450mm to 600mm
Applicable flange standard	JIS 20K		JIS 20K
Face-to-face dimensions	JIS B2002 (46 series)/ISO 5752 (20 series)		Manufactured standard
Max. working pressure	2.0MPa		2.0MPa
Working temperature range	*EPDM : -20 to 120 degrees C, NBR : -10 to 80 degrees C		*EPDM : -20 to 120 degrees C, NBR : -10 to 80 degrees C
Allowable temperature in continuous use	*EPDM : 0 to 100 degrees C, NBR : 0 to 60 degrees C		*EPDM : 0 to 100 degrees C, NBR : 0 to 60 degrees C
Standard materials	Body	FCD450	FCD450
	Disc	SCS14	SCS13
	Stem	SUS420J2	SUS630
	Seat ring	*EPDM, NBR	

* 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.

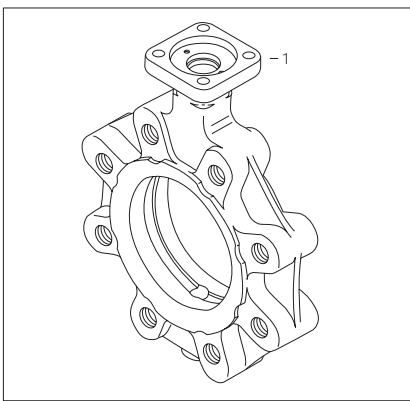
700G/705G/704G

Expanded View

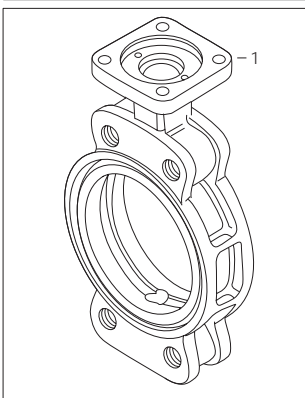
700G 40mm to 300mm



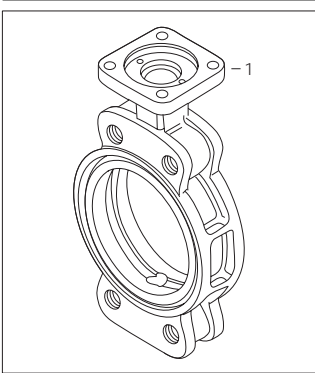
704G 80mm(JIS10K) 100mm to 300mm



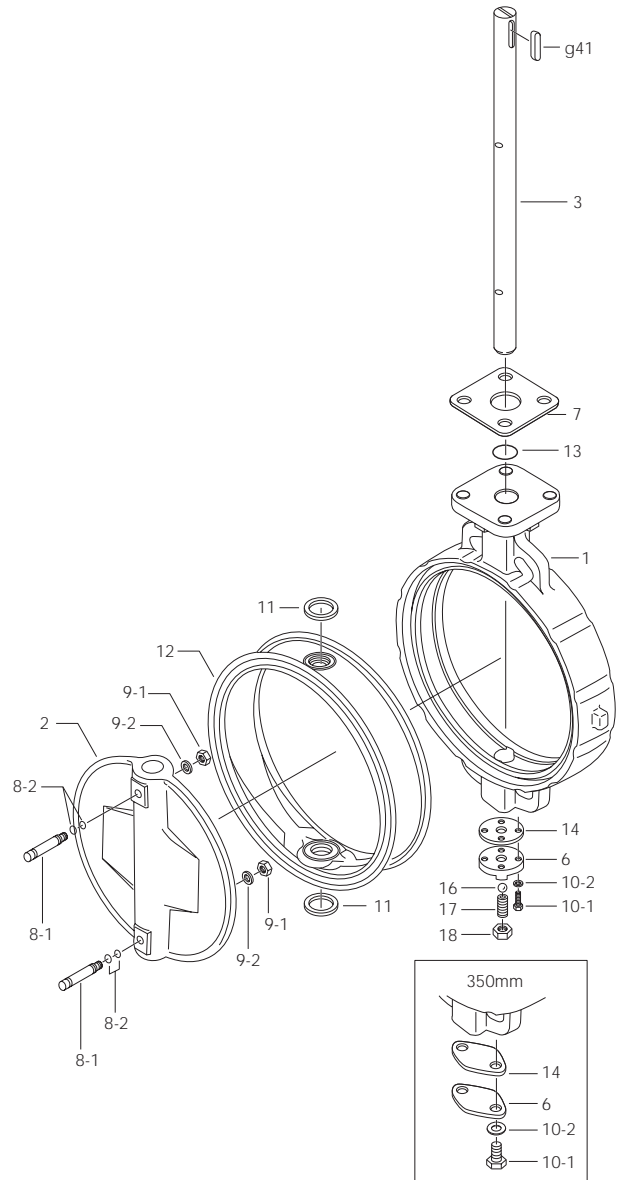
705G 50mm to 300mm



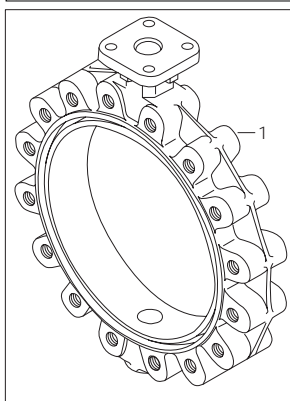
704G 50mm, 65mm, 80mm(JIS 5K)



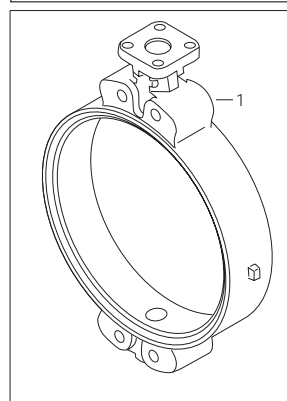
700G 350mm to 600mm



704G 350mm to 600mm



705G 350mm to 600mm



700G Parts list(40mm to 300mm)

No.	Description	Q'ty	Remarks
1	Body	1	
2	Disc	1	
3	Upper stem	1	
4	Lower stem	1	See Remark 2.
6	Bottom cover	1	
10-1	Hexagon bolt	2	
10-2	Spring washer	2	
11	Secondary ring	2	Only 50mm to 300mm
12	Seat ring	1	
14	Gasket	1	
30	Bushing	1	
31	O-ring	1	
32	O-ring	1	
33	Spring pin	1	
34	Machine screw	2	
35	Plate	1	

Remark 1: The indicates recommended spare parts. They are supplied as 'Seat ring set' with a small hexagonal spanner to remove hollow bolt.
 Remark 2: When the disc material is PPS, the lower stem length of types 50mm to 100mm is different from standard.

700G Parts list(350mm to 600mm)

No.	Description	Q'ty	Remarks
1	Body	1	
2	Disc	1	
3	Stem	1	
6	Bottom cover	1	
7	Retainer plate	1	
8-1	Taper bolt	2	
8-2	O-ring	4	
9-1	Hexagon nut	2	
9-2	Spring washer	2	
10-1	Hexagon bolt	2	350mm
		4	400mm to 600mm
10-2	Spring washer	2	350mm
		4	400mm to 600mm
11	Secondary ring	2	350mm
11	Secondary ring	2	400mm to 600mm
12	Seat ring	1	
13	O-ring	1	
14	Gasket	1	
16	Ball	1	Only 400mm to 600mm
17	Hollow bolt	1	Only 400mm to 600mm
18	Lock nut	1	Only 400mm to 600mm
g41	Key	1	

Remark 1: The indicates recommended spare parts. They are supplied as 'Seat ring set' with a small hexagonal spanner to remove hollow bolt.

705G Parts list(50mm to 300mm)

No.	Description	Q'ty	Remarks
1	Body	1	
2	Disc	1	
3	Upper stem	1	
4	Lower stem	1	See Remark 2.
6	Bottom cover	1	
10-1	Hexagon bolt	2	
10-2	Spring washer	2	
11	Secondary ring	2	
12	Seat ring	1	
14	Gasket	1	
30	Bushing	1	
31	O-ring	1	
32	O-ring	1	
33	Spring pin	1	
34	Machine screw	2	
35	Plate	1	

Remark 1: The indicates recommended spare parts. They are supplied as 'Seat ring set' with a small hexagonal spanner to remove hollow bolt.
 Remark 2: When the disc material is PPS, the lower stem length of types 50mm to 100mm is different from standard.

705G Parts list(350mm to 600mm)

No.	Description	Q'ty	Remarks
1	Body	1	
2	Disc	1	
3	Stem	1	
6	Bottom cover	1	
7	Retainer plate	1	
8-1	Taper bolt	2	
8-2	O-ring	4	
9-1	Hexagon nut	2	
9-2	Spring washer	2	
10-1	Hexagon bolt	2	350mm
		4	400mm to 600mm
10-2	Spring washer	2	350mm
		4	400mm to 600mm
11	Secondary ring	2	350mm
11	Secondary ring	2	400mm to 600mm
12	Seat ring	1	
13	O-ring	1	
14	Gasket	1	
16	Ball	1	Only 400mm to 600mm
17	Hollow bolt	1	Only 400mm to 600mm
18	Lock nut	1	Only 400mm to 600mm
g41	Key	1	

Remark 1: The indicates recommended spare parts. They are supplied as 'Seat ring set' with a small hexagonal spanner to remove hollow bolt.

704G Parts list(50mm to 300mm)

No.	Description	Q'ty	Remarks
1	Body	1	
2	Disc	1	
3	Upper stem	1	
4	Lower stem	1	See Remark 2.
6	Bottom cover	1	
10-1	Hexagon bolt	2	
10-2	Spring washer	2	
11	Secondary ring	2	
12	Seat ring	1	
14	Gasket	1	
30	Bushing	1	
31	O-ring	1	
32	O-ring	1	
33	Spring pin	1	
34	Machine screw	2	
35	Plate	1	

Remark 1: The indicates recommended spare parts. They are supplied as 'Seat ring set' with a small hexagonal spanner to remove hollow bolt.
 Remark 2: When the disc material is PPS, the lower stem length of types 50mm to 100mm is different from standard.

704G Parts list(350mm to 600mm)

No.	Description	Q'ty	Remarks
1	Body	1	
2	Disc	1	
3	Stem	1	
6	Bottom cover	1	
7	Retainer plate	1	
8-1	Taper bolt	2	
8-2	O-ring	4	
9-1	Hexagon nut	2	
9-2	Spring washer	2	
10-1	Hexagon bolt	2	350mm
		4	400mm to 600mm
10-2	Spring washer	2	350mm
		4	400mm to 600mm
11	Secondary ring	2	350mm
11	Secondary ring	2	400mm to 600mm
12	Seat ring	1	
13	O-ring	1	
14	Gasket	1	
16	Ball	1	Only 400mm to 600mm
17	Hollow bolt	1	Only 400mm to 600mm
18	Lock nut	1	Only 400mm to 600mm
g41	Key	1	

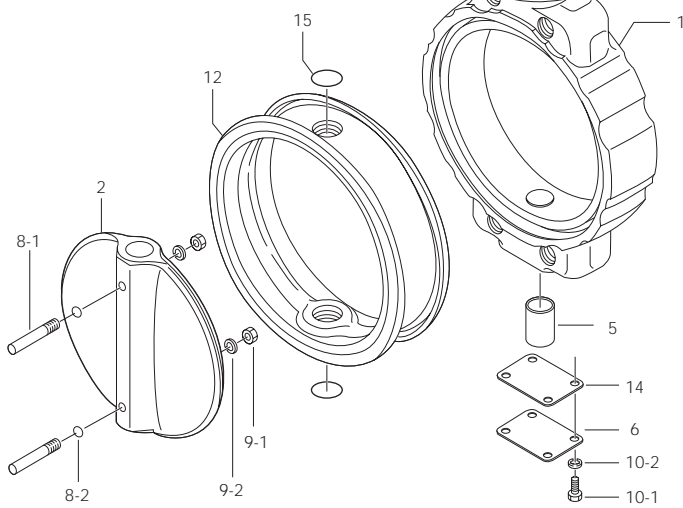
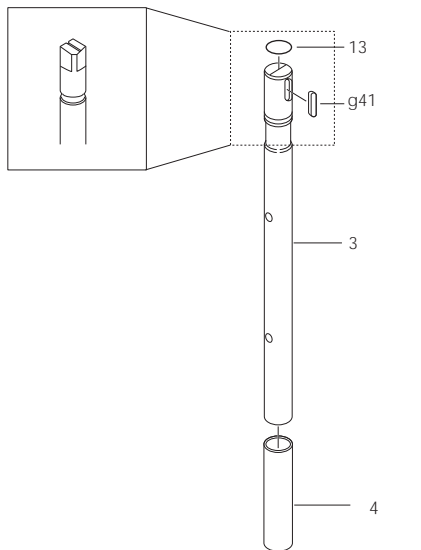
Remark 1: The indicates recommended spare parts. They are supplied as 'Seat ring set' with a small hexagonal spanner to remove hollow bolt.

700S/700E

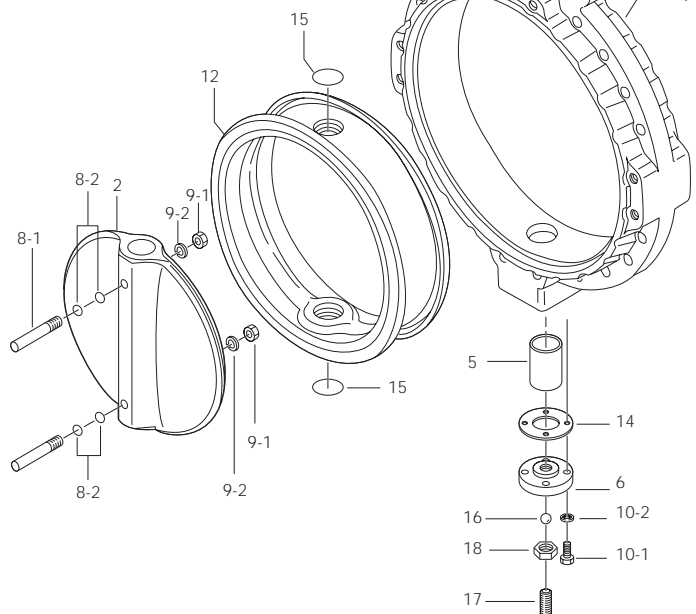
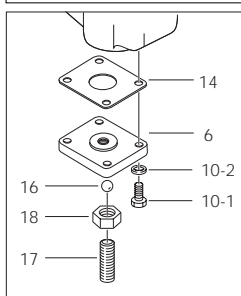
Expanded View

700S-01

700S 50mm to 600mm

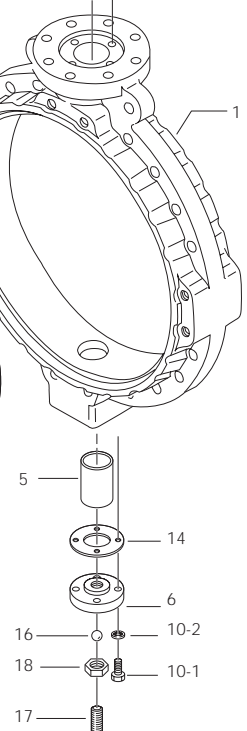
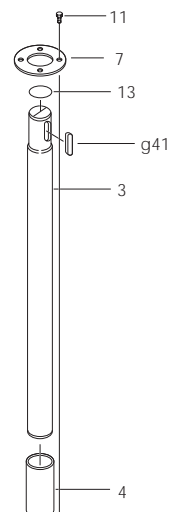
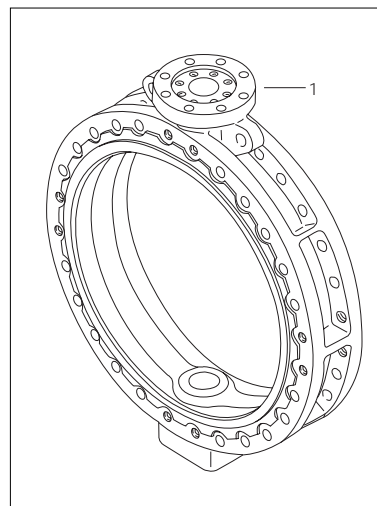


700S 350mm to 600mm



700E 1000mm to 1350mm

700E 650mm to 1350mm



700S Parts list (700S-01/02: 50 mm to 300 mm)

No.	Description	Q'ty	Remarks
1	Body	1	
2	Disc	1	
3	Stem	1	
4	*Bushing	1	For except *body material FC250*
5	*Bushing	1	For except *body material FC250*
6	Bottom cover	1	Except 100 mm
8-1	Taper bolt	1	50 mm to 125 mm
		2	150 mm to 300 mm
8-2	*O* ring	4	Only 300 mm
9-1	Hexagon nut	1	50 mm to 125 mm
		2	150 mm to 300 mm
9-2	Spring washer	1	50 mm to 125 mm
		2	150 mm to 300 mm
10-1	Hexagon bolt	4	Except 100 mm
10-2	Spring washer	4	Except 100 mm
12	Seat ring	1	
13	*O* ring	1	See Remark 2.
14	Gasket	1	Except 100 mm
15	*O* ring	2	100 mm to 300 mm, See Remark 2.
q41	Key	1	Only 700S-02

700S Parts list

(700S-01: 350 mm to 500 mm/700S-02: 350 mm to 600 mm)

No.	Description	Q'ty	Remarks
1	Body	1	
2	Disc	1	
3	Stem	1	
4	*Bushing	1	For except *body material FC250*
5	*Bushing	2	For except *body material FC250*
6	Bottom cover	1	
8-1	Taper bolt	2	
8-2	*O* ring	4	
9-1	Hexagon nut	4	
9-2	Spring washer	6	
10-1	Hexagon bolt	4	350 mm to 500 mm
		6	550 mm and 600 mm
10-2	Spring washer	4	350 mm to 500 mm
		6	550 mm and 600 mm
12	Seat ring	1	
13	*O* ring	1	See Remark 2.
14	Gasket	1	
15	*O* ring	2	See Remark 2.
16	Ball	1	
17	Hollow bolt	1	
18	Nut	1	
q41	Key	1	Only 700S-02

Remark 1: The * indicates recommended spare parts. They are supplied as "Seat ring set" with a small hexagonal spanner to remove hollow bolt.

Remark 2: The *O* ring material (item number 13 and 15) should be the same as the seat ring (item number 12).

700E Parts list(650mm to 1350mm)

No.	Description	Q'ty	Remarks
1	Body	1	
2	Disc	1	
3	Stem	1	
4	Bushing	1	
5	Bushing	1	
6	Bottom cover	1	
7	Retainer plate	1	
8-1	Taper bolt	2	650mm to 900mm
		4	1000mm to 1350mm
8-2	*O*ring	4	650mm to 900mm
		8	1000mm to 1350mm
9-1	Hexagon nut	2	650mm to 900mm
		4	1000mm to 1350mm
9-2	Sp.washer	2	650mm to 900mm
		4	1000mm to 1350mm
10-1	Hexagon bolt	4	650mm to 850mm
		8	900mm to 1350mm
10-2	Sp.washer	4	650mm to 850mm
		8	900mm to 1350mm
11	Hexagon bolt	4	650mm to 850mm
		8	900mm to 1350mm
12	Seat ring	1	1000mm to 1350mm:Vulcanized to the body
13	*O*ring	1	See Remark 2.
14	Gasket	1	
15	*O*ring	2	See Remark 2.
16	Ball	1	
17	Hollow bolt	1	
18	Nut	1	
q41	Key	1	

Remark 1: The * indicates recommended spare parts. They are supplied as "Seat ring set" with a small hexagonal spanner to remove hollow bolt (P.17).

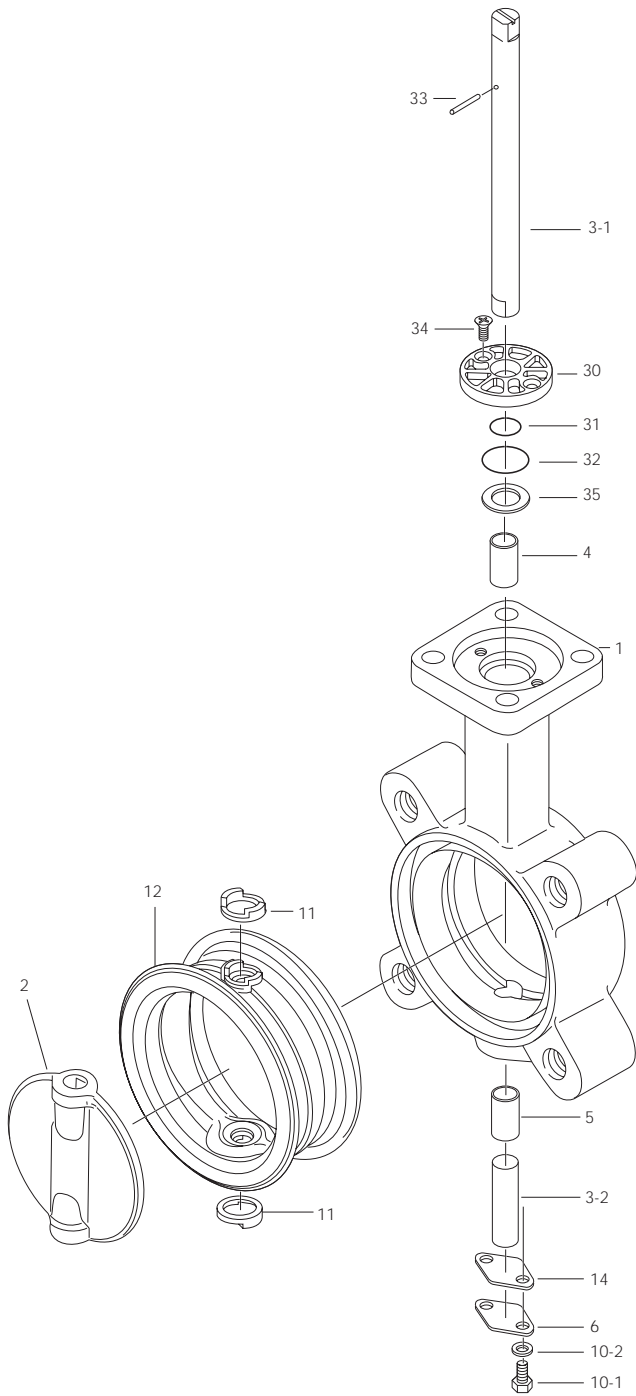
Consult us when repairing the seating on 1000 to 1350mm types as it is vulcanized to the body.

Remark 2: The O-ring material (item numbers 13 and 15) should be the same as the seating (item number 12).

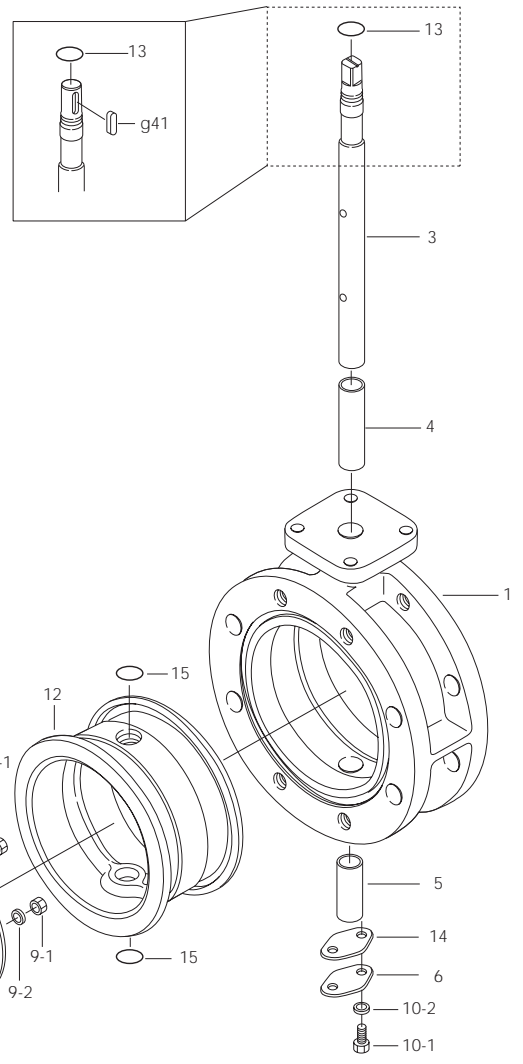
704G/722F/720F

Expanded View

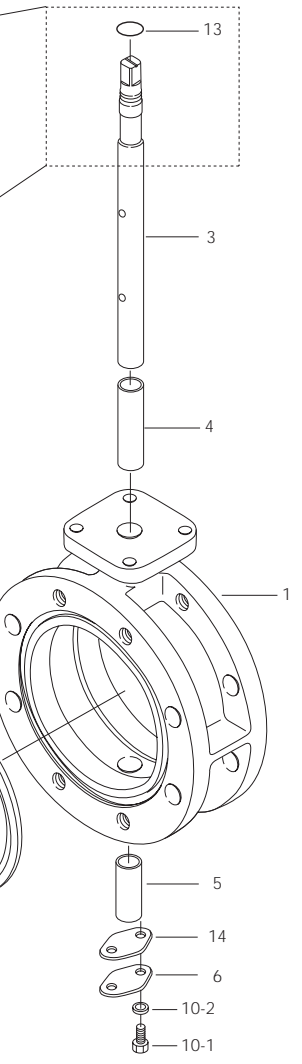
704G 50mm to 100mm



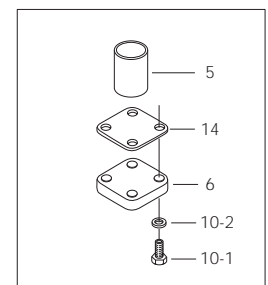
722F 350mm to 600mm



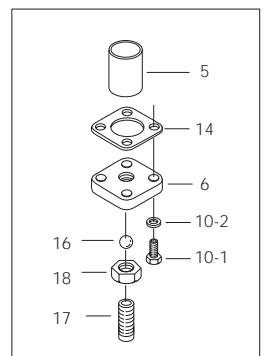
722F 125mm to 300mm



722F 300mm



722F 350mm to 600mm



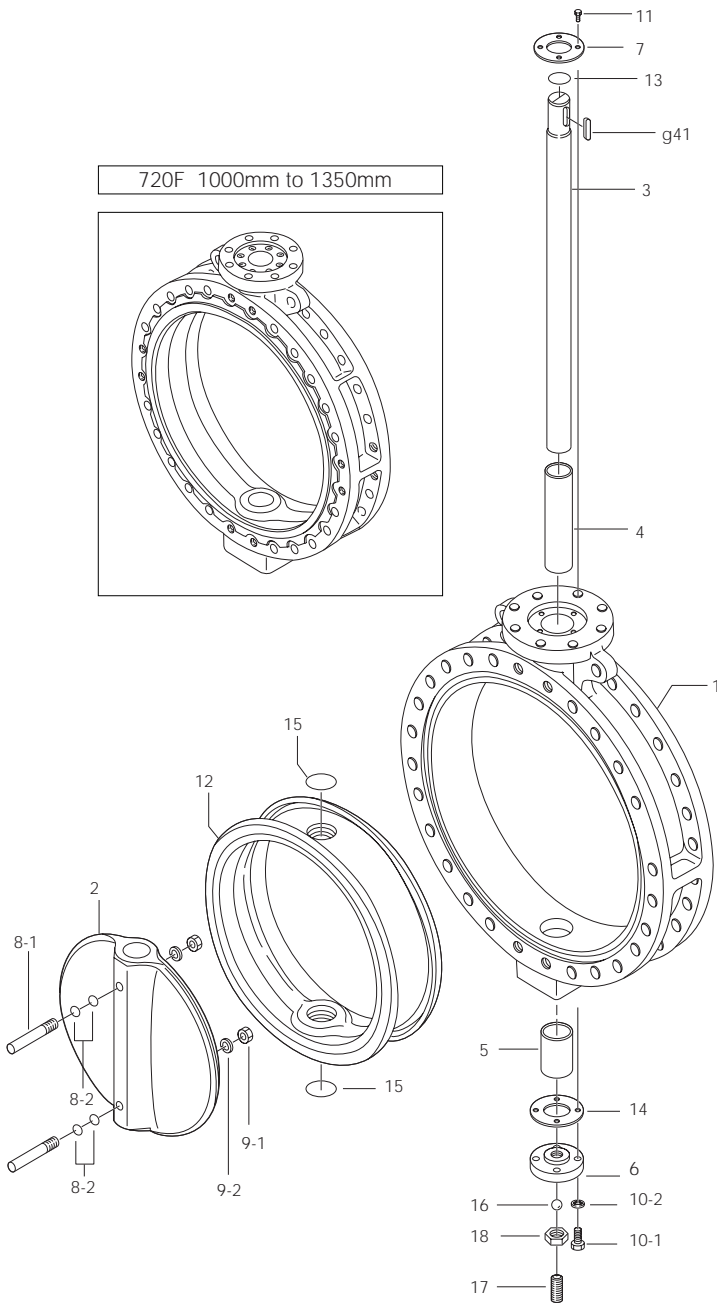
704G Parts list (50mm to 100mm)

No.	Description	Qty	Remarks
1	Body	1	
2	Disc	1	
3-1	Upper stem	1	
3-2	Lower stem	1	
4	Bearing	1	
5	Bearing	1	
6	Bottom cover	1	
10-1	Hex bolt	2	
10-2	Sp.washer	2	
11	Secondary ring	2	
12	Seat ring	1	
14	Gasket	1	
30	Bushing	1	
31	O'ring	1	
32	O'ring	1	
33	Spring pin	1	
34	Machine screw	2	
35	Plate	1	

Remark: The **11** indicates recommended spare parts. They are supplied as "Seat ring set" with a small hexagonal spanner to remove set screws.

722F•720F 650mm to 1350mm

720F 1000mm to 1350mm



722F Parts list(125mm to 300mm)

No.	Description	Q'ty	Remarks
1	Body	1	
2	Disc	1	
3	Stem	1	
4	Bushing	1	
5	Bushing	1	
6	Bottom cover	1	
8-1	Taper bolt	1	125mm
		2	150mm to 300mm
8-2	*O*ring	4	Only 300mm
9-1	Hexagon nut	1	125mm
		2	150mm to 300mm
9-2	Sp.washer	1	125mm
		2	150mm to 300mm
10-1	Hexagon bolt	2	125mm to 250mm
		4	300mm
10-2	Sp.washer	2	125mm to 250mm
		4	300mm
12	Seat ring	1	
13	*O*ring	1	
14	Gasket	1	
15	*O*ring	2	See Remark 2.

722F Parts list(350mm to 600mm)

No.	Description	Q'ty	Remarks
1	Body	1	
2	Disc	1	
3	Stem	1	
4	Bushing	1	
5	Bushing	1	
6	Bottom cover	1	
8-1	Taper bolt	2	
8-2	*O*ring	4	
9-1	Hexagon nut	2	
9-2	Sp.washer	2	
10-1	Hexagon bolt	4	
10-2	Sp.washer	4	
12	Seat ring	1	
13	*O*ring	1	
14	Gasket	1	
15	*O*ring	2	See Remark 2.
16	Ball	1	
17	Hollow bolt	1	
18	Nut	1	
g41	Key	1	

Remark 1: The indicates recommended spare parts. They are supplied as "Seat ring set" with a small hexagonal spanner to remove hollow bolt (P.17).

Remark 2: The O-ring material (item number 15) should be the same as the sea tring (item number 12).

722F and 720F Parts list (722F: 650mm to 800mm / 720F: 850mm to 1350mm)

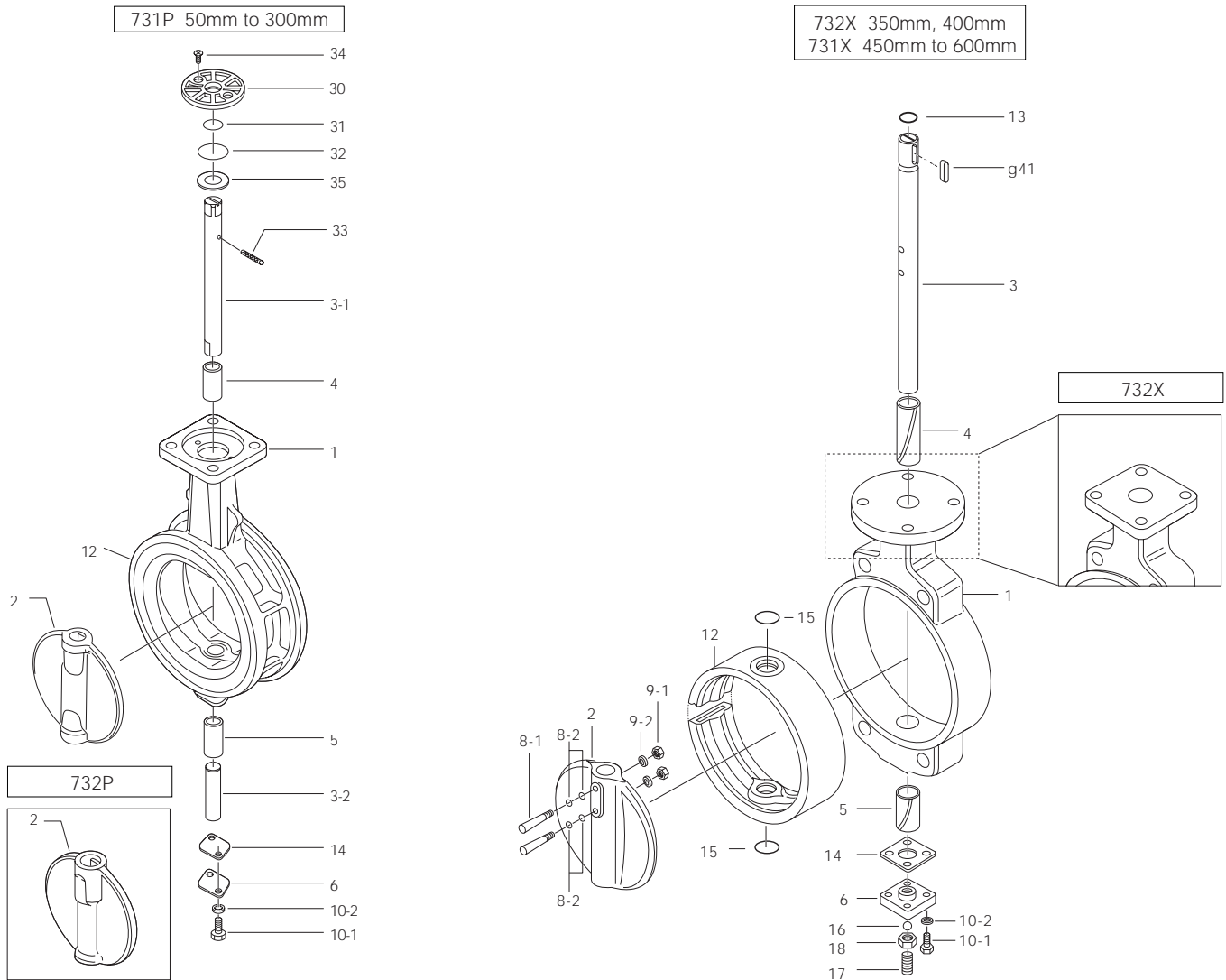
No.	Description	Q'ty	Remarks
1	Body	1	
2	Disc	1	
3	Stem	1	
4	Bushing	1	
5	Bushing	1	
6	Bottom cover	1	
7	Retainer plate	1	
8-1	Taper bolt	2	650mm to 900mm
		4	1000mm to 1350mm
8-2	*O*ring	4	650mm to 900mm
		8	1000mm to 1350mm
9-1	Hexagon nut	2	650mm to 900mm
		4	1000mm to 1350mm
9-2	Sp.washer	2	650mm to 900mm
		4	1000mm to 1350mm
10-1	Hexagon bolt	4	650mm to 850mm
		8	900mm to 1350mm
10-2	Sp.washer	4	650mm to 850mm
		8	900mm to 1350mm
11	Hexagon bolt	4	650mm to 850mm
		8	900mm to 1350mm
12	Seat ring	1	Vulcanized on 1000mm to 1350mm types.
13	*O*ring	1	See Remark 2.
14	Gasket	1	
15	*O*ring	2	See Remark 2.
16	Ball	1	
17	Hollow bolt	1	
18	Nut	1	
g41	Key	1	

Remark 1: The indicates recommended spare parts. They are supplied as "Seat ring set" with a small hexagonal spanner to remove hollow bolt (P.17).
Since the seat ring is vulcanized to the body of types 1000mm to 1350mm, please consult us if you wish to replace it.

Remark 2: The O-ring material (item numbers 13 and 15) should be the same as the seatring (item number 12).

731P/732P/731X/732X

Expanded View



731P/732P Parts list (50mm to 300mm)

No.	Description	Q'ty	Remarks
1	Body	1	
2	Disc	1	
3-1	Upper stem	1	
3-2	Lower stem	1	
4	Bearing	1	
5	Bearing	1	
6	Bottom cover	1	
10-1	Hexagon bolt	2	
10-2	Sp.washer	2	
12	Seat ring	1	Vulcanized to body
14	Gasket	1	
30	Bushing	1	
31	*O-ring	1	
32	*O-ring	1	
33	Spring pin	1	
34	Machine screw	2	
35	Plate	1	

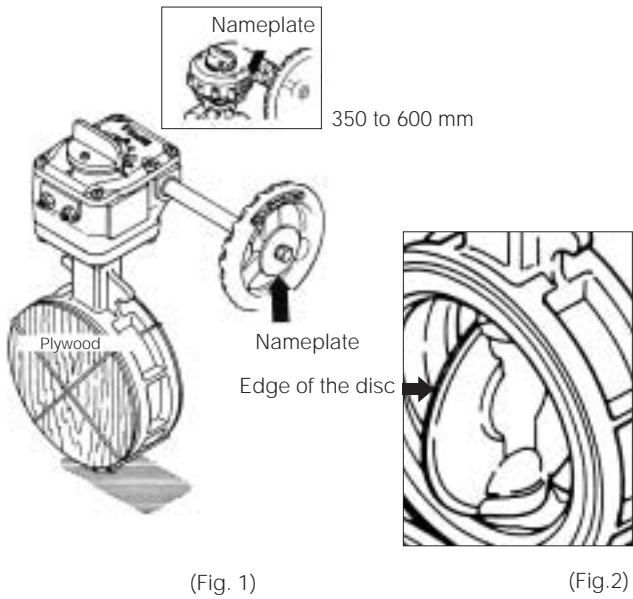
Remark: The * indicates recommended spare parts. They are supplied as "Seat ring set" with a small hexagonal spanner to remove hollow bolt (P.17).

**732X/731X Parts list
(732X: 350mm, 400mm/731X: 450mm to 600mm)**

No.	Description	Q'ty	Remarks
1	Body	1	
2	Disc	1	
3	Stem	1	
4	Bushing	1	
5	Bushing	1	
6	Bottom cover	1	
8-1	Taper bolt	2	
8-2	*O-ring	4	
9-1	Hexagon nut	2	
9-2	Sp.washer	2	
10-1	Hexagon bolt	4	
10-2	Stem key	4	
12	Seat ring	1	
13	*O-ring	1	
14	Gasket	1	
15	*O-ring	2	
16	Ball	1	
17	Hollow bolt	1	
18	Nut	1	
g41	Key	1	

Remark: The * indicates recommended spare parts. They are supplied as "Seat ring set" with a small hexagonal spanner to remove hollow bolt (P.17).

PACKAGING



(Fig. 1)

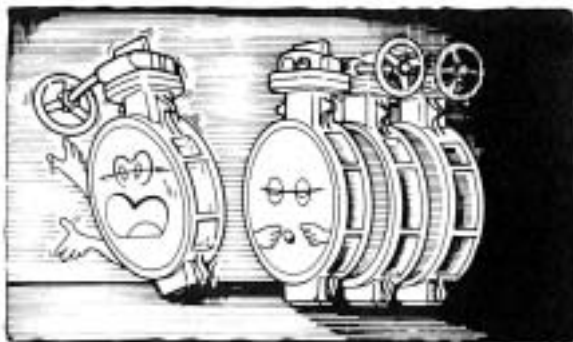
(Fig.2)

- (1) For 40 to 300 mm, standard gear type and lever type off-the-shelf products are packed in cardboard or wooden boxes. For products other than these, a plywood protective plate is attached to the flange face of the valve body (piping flange contact surface) in order to protect the inside of the valve. (Fig. 1)
- (2) The valve is kept open about 10 degrees from its closed position when shipped.
- (3) Some silicon oil is applied on the edge of the disc. (Fig. 2)
- (4) The valve has a nameplate with which you can verify information such as the nominal size and material. (Fig. 1)
(For lock lever type, this information is provided on the indicator.)

TRANSPORT

- (1) Use containers for ocean transport.
- (2) Use a covered vehicle for inland transport. If an uncovered vehicle is used, be sure to cover the valves with a protective tarp.

STORAGE



(Fig.3)

- (1) When storing valves, keep them indoors in as cool and dark a place as possible (temperature: -10 to +60 degrees C, humidity: 70% or less) without removing the cardboard packaging or the protective plate attached to the valve.
- (2) For long periods of storage, apply FERROGUARD (use designated product) once per year to the plated parts (indicator, bolts, nuts, handle shaft, etc.).
- (3) Operate the valve once every three months.
- (4) When storing unpackaged butterfly valves, make sure that no unreasonable load is being applied to the valve body and drive member. (Fig. 3)

UNPACKING

- (1) Unpack the valve immediately before installing it into the piping. Do not leave the valve unpacked for long periods of time.

INSTALLATION PRECAUTIONS

Using an impact wrench

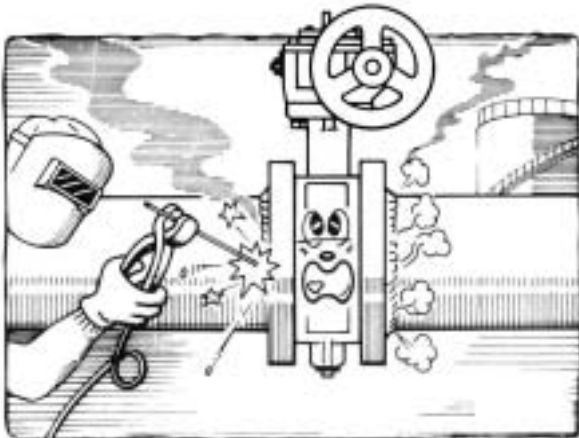
Please be careful when using a high-output impact wrench for installation and tightening piping bolts of rubber seated butterfly valves. Doing so can deform or damage parts such as the valve body, seat ring, piping flange (especially the resin lining pipe) and bolts, depending on the type of impact wrench and how it is used.

If you wish to use an impact wrench, use one with a maximum output that is no more than the values (piping bolt strength) given in the table below.

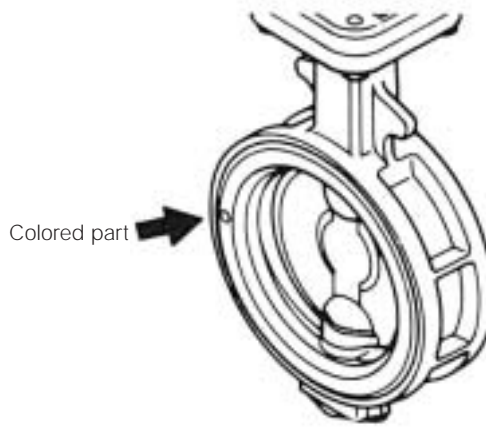
Bolt dia.	M12	M16	M20	M22	M24	M30	M36
Max. impact wrench output (Nm)	64 or less	150 or less	300 or less	400 or less	640 or less	1280 or less	2200 or less

Recommended piping bolt tightening torque (JIS 10K piping) (Nm)

Valve port dia.	Bolt dia.	Recommended torque
40 to 100 mm	M16	40
125 to 200 mm	M20	80
250 to 350 mm	M22	100
400 to 500 mm	M24	130
550 to 600 mm	M30	250



(Fig.5)



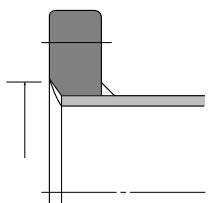
(Fig.4)

- (1) Install after verifying the material of the valve seat ring and disc. The seat ring material is indicated by the color code located at the position indicated by the arrow. (Fig. 4)

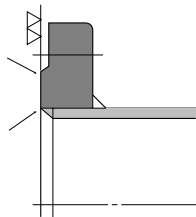
Blue: NBR	Orange: EPDM
Red: CR	Yellow: IIR
Green: Hi-NBR	Gray: FKM

Note: 700G, 705G and 704G EPDM seat rings are indicated by the raised letters "EPDM" indicated in the position indicated by the arrow.

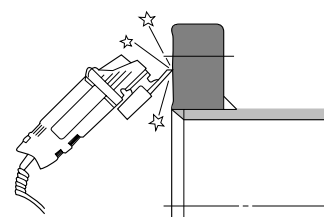
- (2) Installation of the valve immediately after welding the pipe flange will lead to adverse consequences, such as damage to the seat ring. Make sure that the temperature has cooled sufficiently and that you have removed weld spatter before installing the valve. Never weld when the valve is in the piping. (Fig. 5)
- (3) The seat ring might become damaged or the flange may leak if the flange face that contacts the valve seat ring is as shown in Fig. 6. Also, please confirm that there is no distortion to the flange or that there is no damage, such as scratches, to the



• **Excessive weld**
The resulting oversized inner pipe diameter may cause a flange leak.

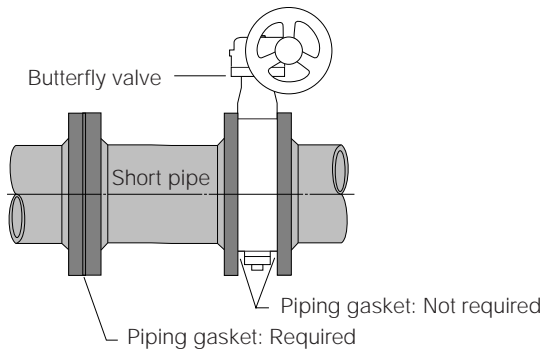


• **Sharp edges**
May cause damage to the seat ring.

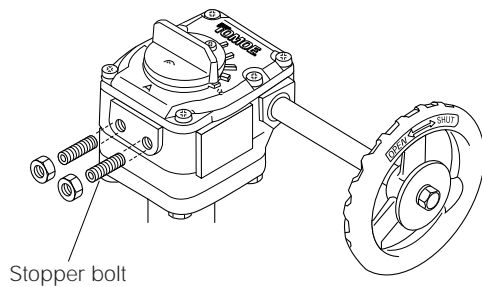


• **Rough surface from grinding**
May cause a flange leak.

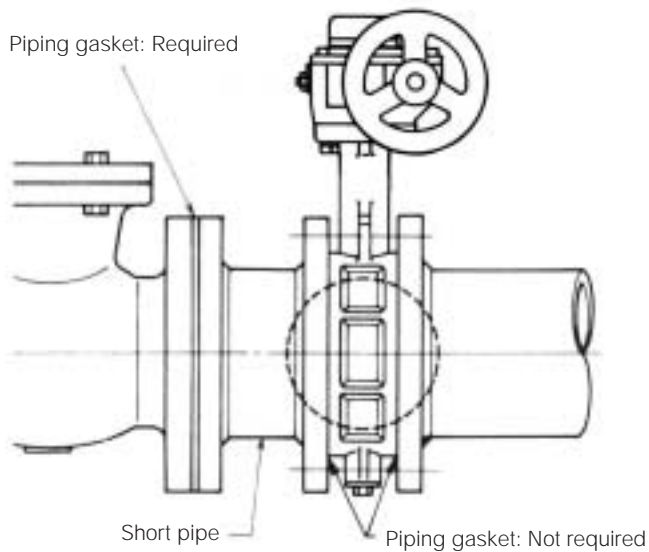
(Fig.6)



(Fig. 7)



(Fig. 8)



(Fig. 9)

(4) A piping gasket is not required. Do not use one. A soft gasket such as one made of rubber will cause the valve to malfunction. Please note, however, that when using a short pipe, a piping gasket may be required for the connection surface that is not the butterfly valve.

(Fig. 7)

(5) Do not apply strong shock such as by throwing the valve and do not put objects or put your weight on the lever or handwheel.

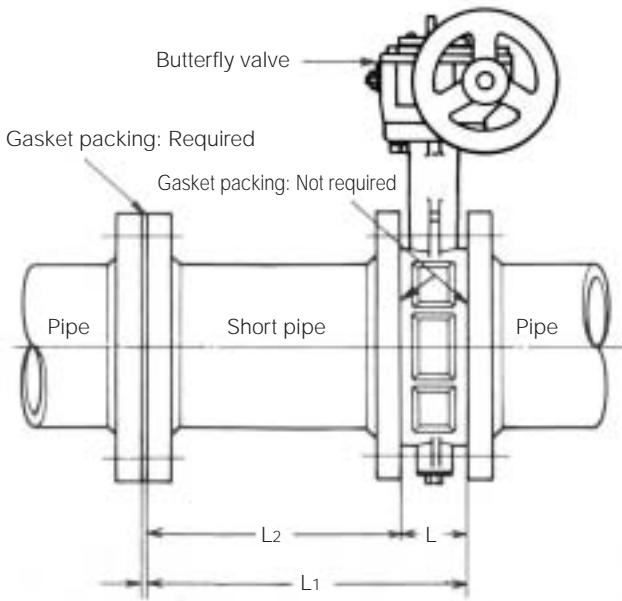
(6) Do not touch the stopper bolts on the gear box. Changing the valve close position will cause valve seat leakage. (Fig. 8)

(7) Alignment of the valve to the flange should be done accurately.
In case the set bolt holes are tapped:
Never install the valve to one flange side using the tap holes for the four setting bolts located at the top and bottom of the valve body. The setting bolts are used for piping alignment. Tighten the setting bolts after completely securing the valve with the long bolts.

(8) Before tightening the piping bolts, check that the disc does not touch the inside of the flange when the valve is open.

(9) When installing a non-return valve, pump or flexible rubber joint with a butterfly valve, always insert a short pipe in between. Not doing so will cause the disc to hit during operation and lead to faulty operation. (Fig. 9)

INSTALLATION PRECAUTIONS



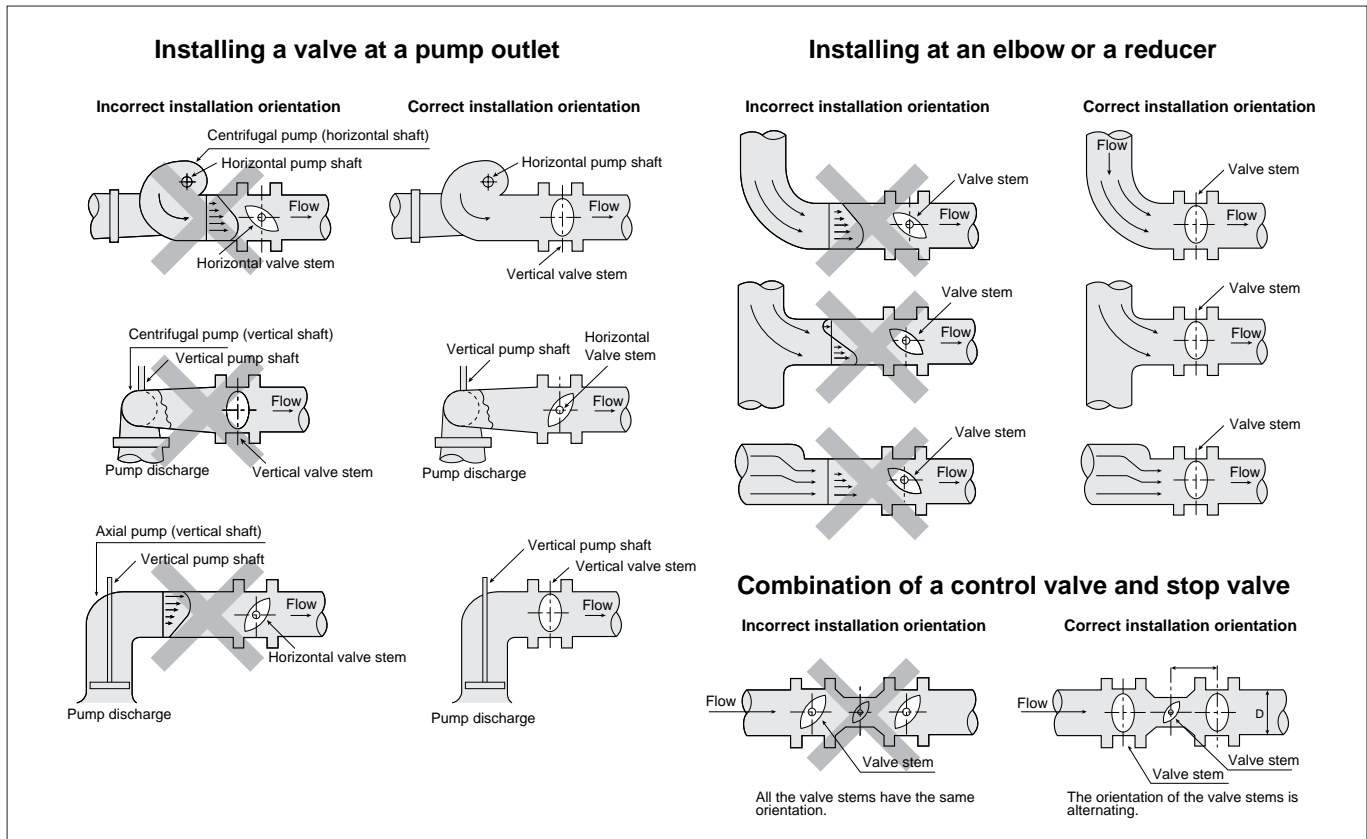
(Fig. 10)

- (10) Make sure no solvent gets onto the seat ring. Also, except for those made of NBR and fluorocarbon rubber (FKM), always keep the seat ring away from any machine oil.
- (11) When installing a resin pipe with tapered core, use one that has a collar and whose internal diameter is more than that of the pipe internal diameters given on page 43.
- (12) When replacing a previously installed regular valve with a butterfly valve, since the face-to-face dimension of the previously installed valve will be greater, you must insert a short pipe and adjust to the face-to-face dimension of the original valve pipe flange. Use the equation below when making the short pipe. (Fig. 10)

Length of short pipe

$L_2 = L_1 - L$	mm
L_2 : Length of short pipe	mm
L_1 : Face-to-face dimension of existing valve	mm
L : Face-to-face dimension of TOMOE butterfly valve	mm

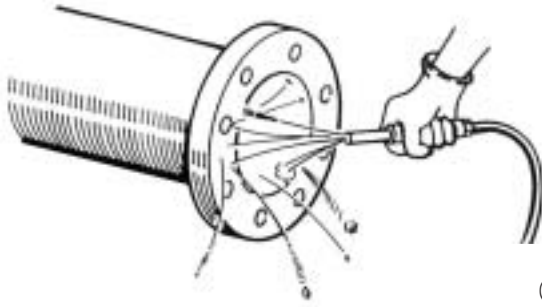
- (13) Although it is okay to install a valve in the direction that makes installation easy, please take caution in the following conditions.
 - 1 Valves with nominal diameters 350 mm and above (700G, 705G, 704G are 400 mm and above) have steel balls at the lower end of the stems; therefore, make sure that the drive member does not face downward (relative to horizontal).
 - 2 Be careful of the stem direction when piping conditions are as shown in Fig. 11.



(Fig. 11)

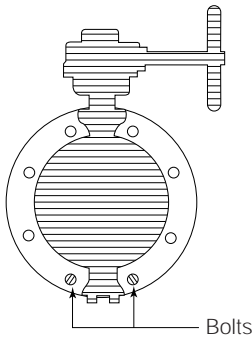
INSTALLATION PROCEDURE

When installing a non-return valve, pump or flexible rubber joint with a butterfly valve, always insert a short pipe in between. Otherwise the disc may hit the other device, resulting in faulty operation.



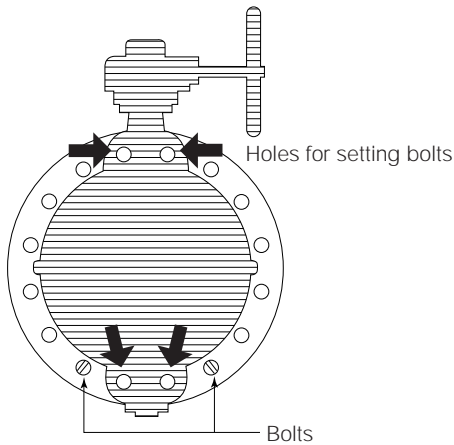
(Fig. 12)

Without setting bolts holes



(Fig. 13)

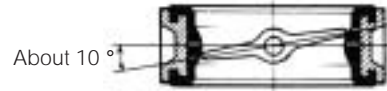
With setting bolt holes



(Fig. 14)

- (1) Use air purging to clean the flange faces that will contact the valve. If there is rust or some other foreign material sticking to a flange face, clean it with a suitable cleaning fluid (alcohol or neutral detergent, etc.). (Fig. 12)
If possible, install in the piping a short pipe with a face-to-face dimension identical to the butterfly valve and blow into the pipe to completely remove foreign substances.

- (2) During installation or removal, keep the disc slightly open (about 10 ° from the completely shut position).



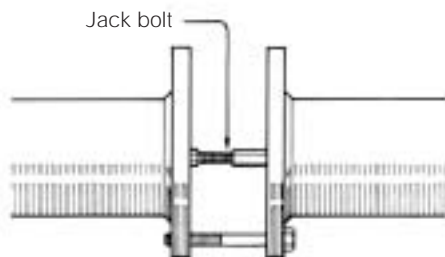
- (3) After aligning the piping, insert a piping bolt into the position in the figure and secure the valve to prevent it from dropping.

*The valves in Table A have two drilled or tapped setting bolt holes at both the top and bottom of the valve body. Insert piping bolts in the locations shown in the diagram to prevent falling.

(Fig. 13) (Fig. 14)

Table A

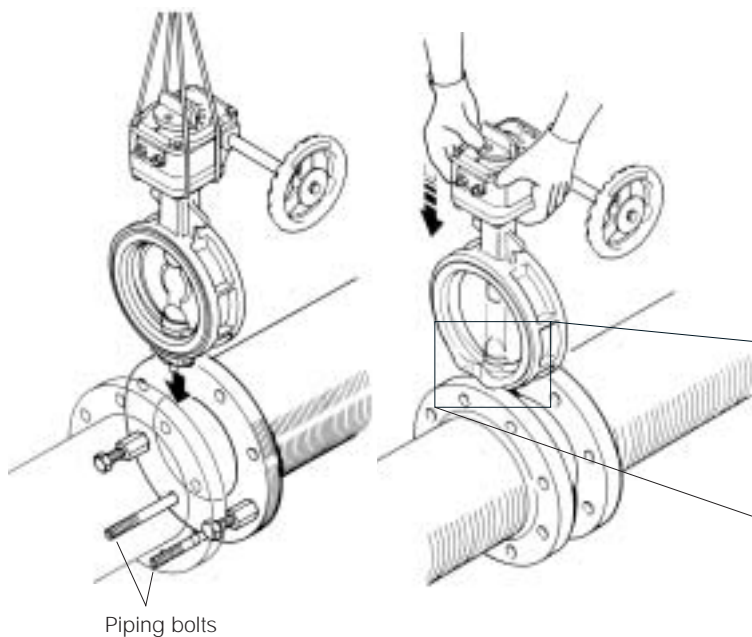
700G	600mm
705G/704G	50 mm to 600 mm (All bore diameters)
732X	350 mm and 400 mm (All bore diameters)
731X	450 mm to 600 mm (All bore diameters)
700S	100 mm to 600 mm
700E	650 mm to 1350 mm (All bore diameters)
722F	125 mm to 800 mm (All bore diameters)
720F	850 mm to 1350 mm (All bore diameters)



(Fig. 15)

- (4) Place a jack bolt in the position shown in the figure to widen the face-to-face dimension. (If you require, we can supply jack bolts.) Push and widen to make the face-to-face dimension 3 to 5 mm greater than the valve width on each side. (Fig. 15)

INSTALLATION PRECAUTIONS

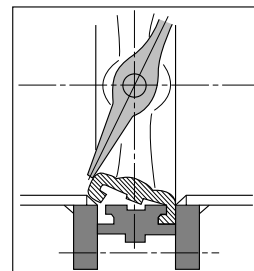


Piping bolts

(Fig. 16)

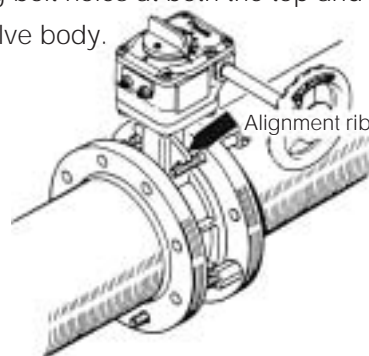
(Fig. 17)

- (5) Insert as shown in the diagram, taking care to avoid damaging the seat ring faces of the valve. If the valve is forcibly pushed between the piping edges, the seat rings will be damaged and leakage will result. (Fig. 16) (Fig. 17) In addition, if inserting a blind flange or similar device, forcibly inserting the flange will damage the seat ring and leakage will result.

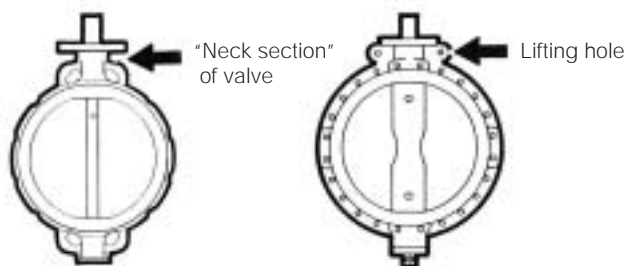


- (6) When the valve is completely inserted, insert piping bolts so that the bolts support the alignment ribs. (Fig. 18)

*If the valve is one of the valves in Table A on the previous page, insert setting bolts in the two setting bolt holes at both the top and the bottom of the valve body.

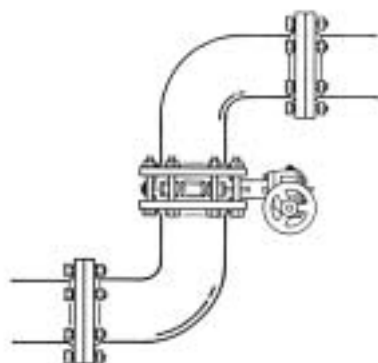


(Fig. 18)



(Fig. 19)

*To facilitate installation, suspend the valve with a crane or similar equipment while working. To lift the valve, use nylon string and lift from the "neck" of the valve if it has no eye bolts or lifting holes. (Fig. 19)



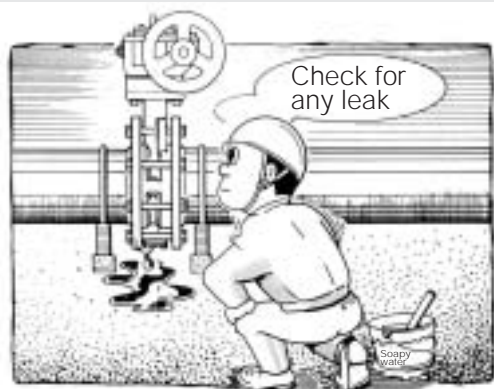
(Fig. 20)

- (7) After inserting all of the bolts, remove the jacking bolts and then gradually tighten the nuts alternating diagonally so that the nuts are tightened evenly. Tighten until the piping flanges come in contact with the faces of the valve (until the seat rings are no longer visible).

*If using an impact wrench, be sure to read "Installation Precautions" (Page 11) before beginning work.

- (8) Align the valve to the flanges accurately. Loosely tighten both flanges, tighten the valve completely, and then tighten the flanges completely. (Fig. 20)

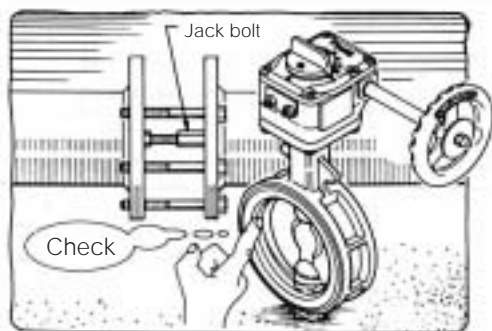
HANDLING PRECAUTIONS AFTER INSTALLATION



(Fig. 21)

- (1) Before beginning operation, air-purge the outside of the piping and clean the inside of the piping by running water through the piping.
- (2) Prior to operating, increase the internal pressure of the piping and check for possible leakage from the flanges, glands, and bottom cover by employing soapy water or similar. (Fig. 21)
- (3) If leakage is observed from the bottom cover, immediately retighten the bottom cover installation bolts. Alternate and tighten gradually with equal strength to avoid lopsided tightening. If leakage is observed from the flanges or glands, release the internal pressure and remove the valve from the piping. Check that there is nothing wrong with the seat rings.
- (4) Opening and closing operation of the lock lever type and worm gear type must be done by hand. Do not use a pipe on the lever or a Wilky key on the gear handle. Doing so can damage the lever and handle, or break the valve.
- (5) When performing a pressure test (if using a pressure higher than the rated pressure), completely open the valve. Never use a fully closed valve in place of a blind flange. If inserting a blind flange or similar device, take care not to forcibly insert the flange as damage to the seat ring and leakage will result.
- (6) If the system will be not be operated for a prolonged period of time after the piping work is finished, exercise the valve by opening and closing it about once every two weeks.
- (7) Please consult us if the valve is to be used at an opening of 30 °or less.

INSPECTION AND MAINTENANCE

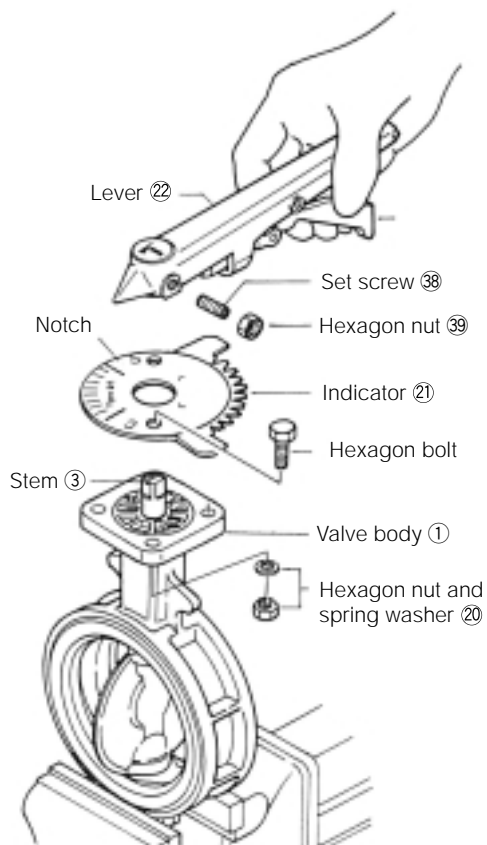


(Fig. 22)

- (1) **Periodic inspection**
Perform an inspection once per year and check for disc corrosion and wear of the seat ring. The gear box and lever unit have been designed to be maintenance-free.
- (2) **Abnormal operation**
Abnormal operation is usually caused by accumulation of foreign material or damage to the seat ring. If foreign material has accumulated and the disc is in the fully open position, it can be removed by maintaining the fully open position and flushing it out. If that does not work and if the seat ring is damaged, remove the valve from the piping and inspect it. (Fig. 22)
- (3) **Lubricants**
Use Lithium-base grease to lubricate the cylinder.
Use grease to lubricate the stem and silicon oil to lubricate the disc edge. (Use only the specified greases.)

Rust preventive agents and Lubricants	Product name (manufacturers)	To be applied to:
FELLOW GUARD	FELLOW GUARD #1009	FCD disc and Plated parts (Indicator, bolts, nuts and handle shaft)
Lithium-base grease	Multinoc grease No.2 (Nippon Oil Corporation)	Pneumatic Actuator T-DYNAMO
Grease	Shaft grease D (SATO SPECIAL OIL CO., LTD.)	Stem
	M ystik JI-6 (Kyodo yushi)	Gear box
Silicon oil	Shin-Etsu Silicon KF96H (Shin-Etsu Chemical Co., Ltd.)	Disc edge

DISASSEMBLING THE VALVE BODY AND DRIVE MEMBER

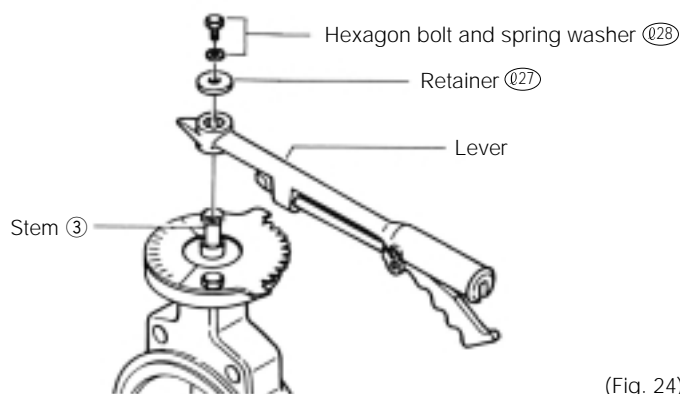


(Fig. 23)

700G / 705G / 704G / 731P /
732P / 722F-1T,1G

Disassembling the lock lever type

- (1) Open the disc completely.
- (2) Remove the hexagon nut and spring washer (20) that secure the indicator (21) to the valve body (1).
- (3) Remove the set screw (38) and the hexagon nut (39) that secure the lever (22) to the stem (3).
- (4) Hold the valve body (1) with a vise or similar tool and pull the indicator (21) and lever up to remove them. The upper stem (3) remains in the valve body (1). (Fig. 23)

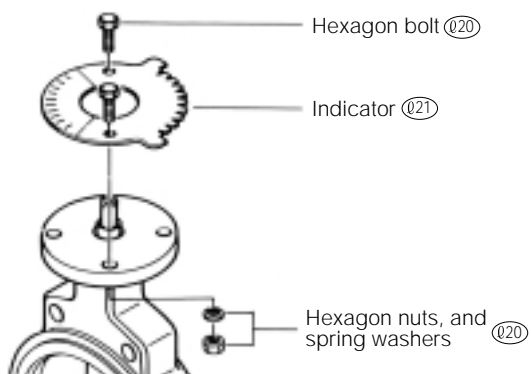


(Fig. 24)

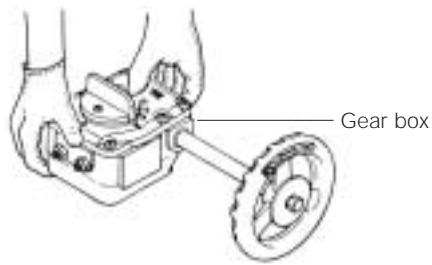
700S-1L

Disassembling the lock lever type

- (1) Loosen the hexagon bolt and spring washer (28) that secure the lever to the stem (3), and remove the retainer (27) and lever. (Fig. 24)
- (2) Loosen the hexagon bolts, hexagon nuts, and spring washers (20), and remove the indicator (21). (Fig. 25)

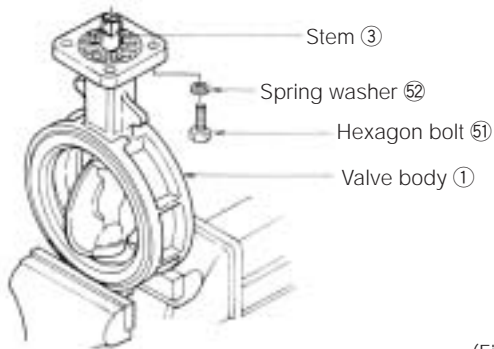


(Fig. 25)

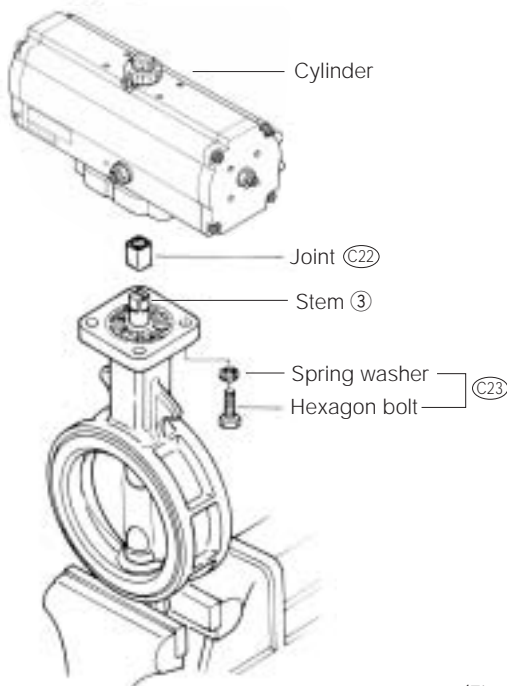


Disassembling the worm gear type

- (1) Open the disc completely.
- (2) Remove the hexagon bolts ⑤① (4 bolts) that secure the gear box to the valve body ① (2 bolts on a 21 type gearbox).
- (3) Hold the valve body ① with a vise and pull the gear box up to remove it. The stem ③ remains in the valve body ①. (Fig. 26)



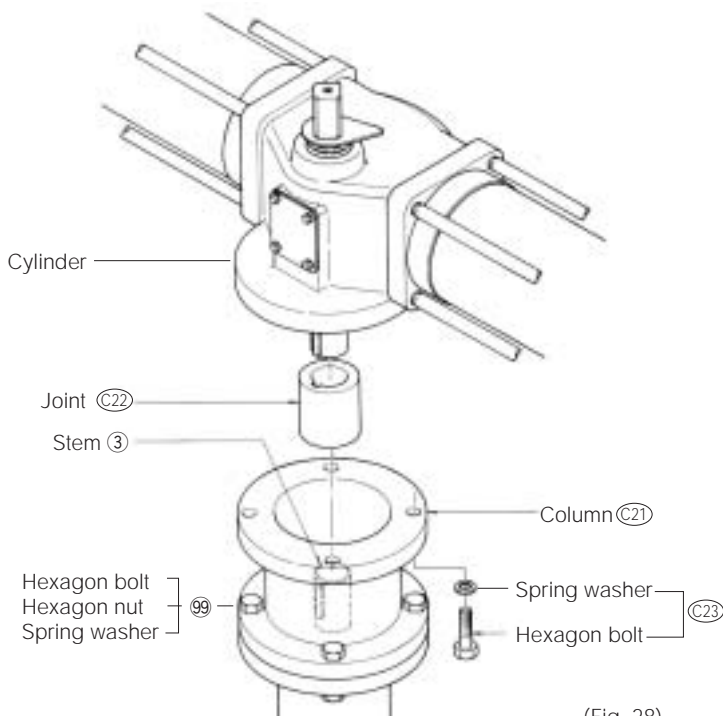
(Fig. 26)



(Fig. 27)

Disassembling the cylinder (T-DYNAMO)

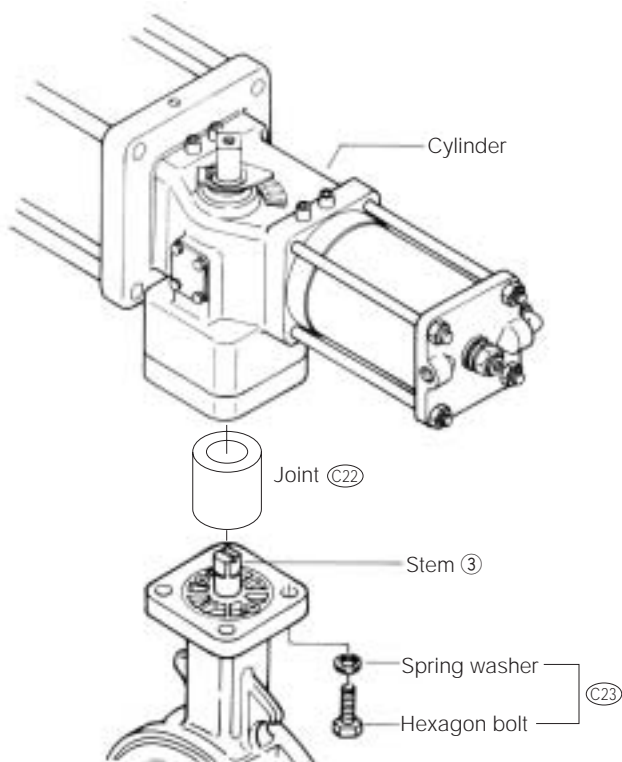
- (1) Loosen the hexagon bolt and spring washer ②③ and then remove the cylinder. (Fig. 27)
- (2) If the joint ②② still remains on the stem ③, remove it.



(Fig. 28)

Disassembling the cylinder (TGA)

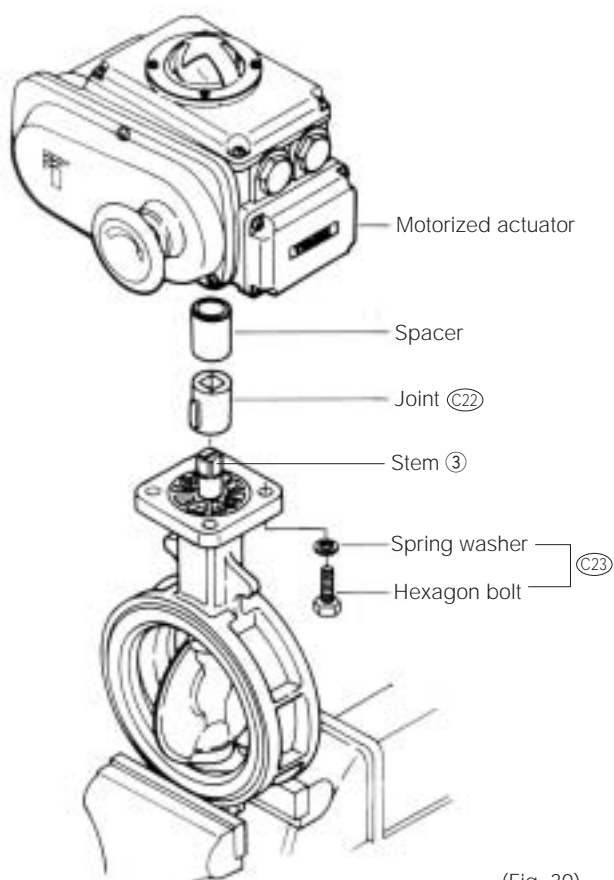
- (1) Loosen the hexagon bolt and spring washer ②③ from the column ②① and then remove the cylinder. (Fig. 28)
- (2) Remove the hexagon bolt, hexagon nut, and spring washer ②③, and then remove the column ②① and joint ②②. (Fig. 28)



(Fig. 29)

Disassembling the cylinder (TGS)

- (1) Loosen the hexagon bolt and spring washer (C23) and then remove the cylinder. (Fig. 29)
- (2) If the joint (C22) still remains on the stem (3), remove it.



(Fig. 30)

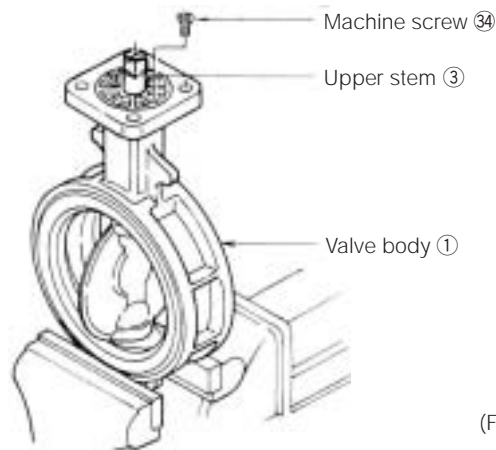
Removing the motorized actuator (New ELMY)

- (1) Loosen the hexagon bolt and spring washer (C23) and then remove the motorized actuator. (Fig. 30)
- (2) If the joint (C22) and spacer still remain on the stem (3), remove them. If the joint and spacer remain on the motorized actuator, take care not to lose them.

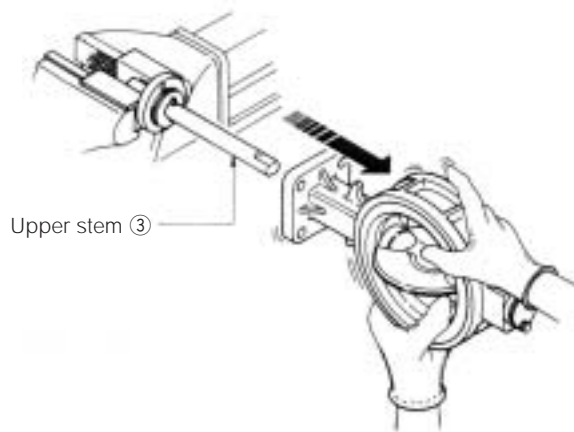
*To assemble the drive member on the valve, reverse the disassembly procedure.

DISASSEMBLY AND ASSEMBLY PROCEDURE

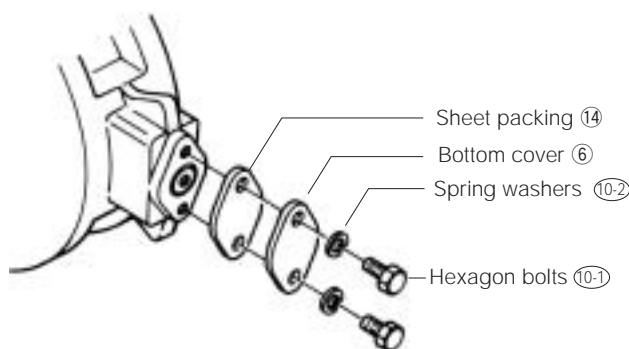
When performing periodic inspection or when trouble has occurred due to a worn or damaged seat ring, refer to the expanded view and follow the steps below to disassemble the valve.



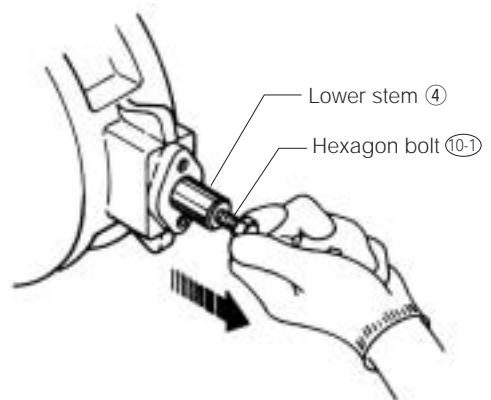
(Fig. 31)



(Fig. 32)



(Fig. 33)



(Fig. 34)

Disassembly procedure of valve body

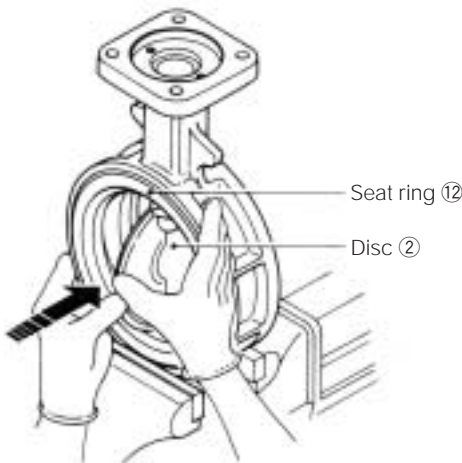
700G (40 to 350 mm)
705G (50 to 350 mm)
704G (50 to 350 mm)

- (1) Hold the valve body ① firmly with a vice and put the disc in the fully open position.
- (2) Remove the machine screw ③④ with a Phillips head screwdriver. (Fig. 31)
- (3) Hold the upper stem ③ with a vise and grasp both sides of the valve body ① to pull it off. (Fig. 32)
- (4) Remove the hexagon bolts ⑩① and spring washers ⑩② (two each) that secure the bottom cover ⑥, and remove the bottom cover ⑥ and sheet packing ⑭. (Fig. 33)
- (5) To remove the lower stem ④, first screw one of the hexagon bolts ⑩① removed in the previous step into the threaded hole in the stem about 3 to 5 threads, and then pull the hexagon bolt ⑩① to pull out the lower stem. (Fig. 34)

(6) Use both hands to push the disc ② out and remove it from the seat ring ⑫. (Fig. 35)

(7) Insert a flat-blade screwdriver between the outer periphery of the seat ring ⑫ and the valve body ① in order to remove the seat ring. (Fig. 36)

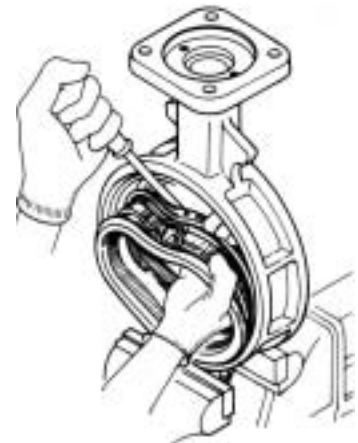
(8) Use a prying motion to insert the screwdriver between the seat ring ⑫ and valve body ①, insert your hand into the gap that is created between the two, and pull the seat ring ⑫ out. (Fig. 37)



(Fig. 35)



(Fig. 36)



(Fig. 37)



(Fig. 38)

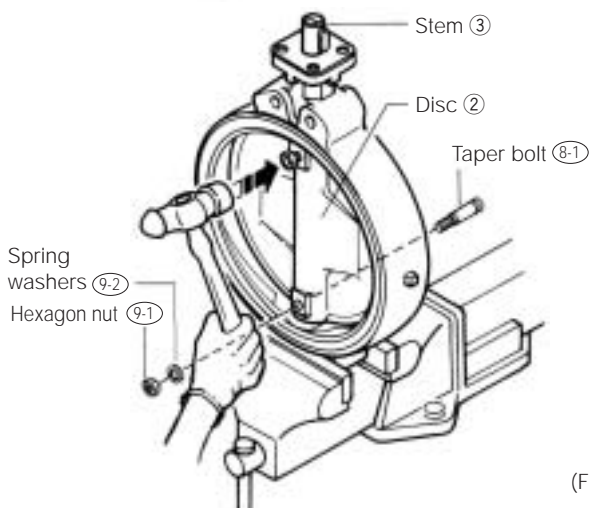
Disassembly Procedure of Valve Body

700G/705G/704G (400mm to 600 mm)

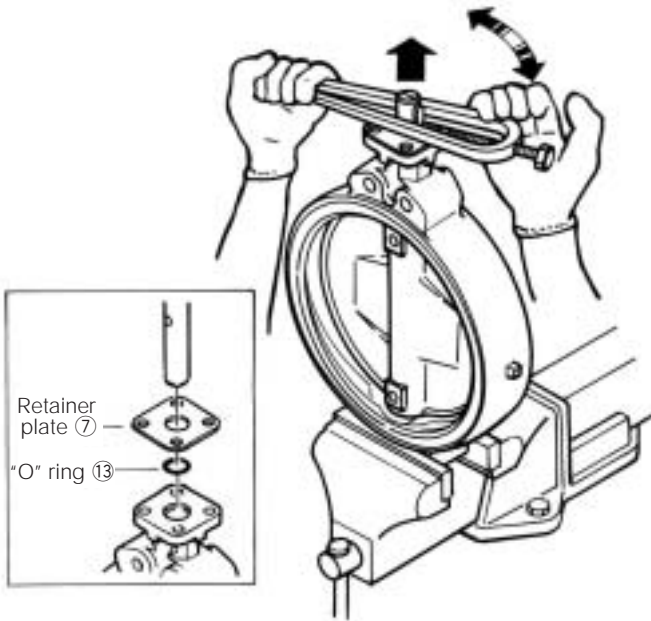
(1) Hold the valve body ① firmly in a vise.

(2) Loosen the hexagon nut ⑨-1 on each taper bolt ⑧-1 that secures the stem ③ and disc ② until it is flush with the threaded end of the taper bolt ⑧-1. (This is to protect the threads when the bolt is tapped by a hammer.) (Fig. 38)

(3) Tap the hexagon nut ⑨-1 straight with a hammer straight to remove the taper bolt ⑧-1. (Fig. 39)

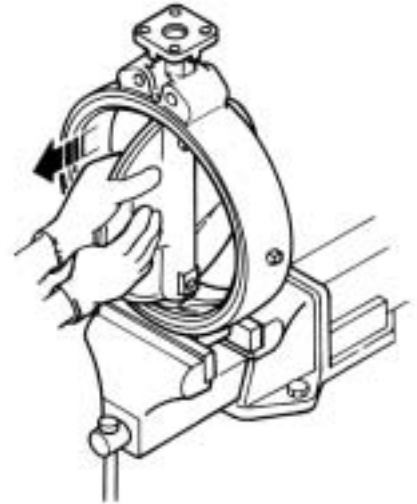


(Fig. 39)



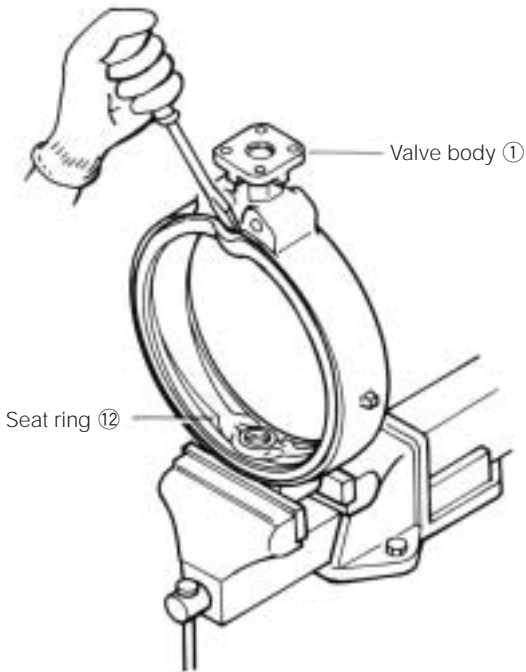
(Fig. 40)

(4) Grip the end of the stem ③ with a gripping tool and rotate it back and forth to pull it out. Also remove the retainer plate ⑦ and "O" ring ⑬. (Fig. 40)



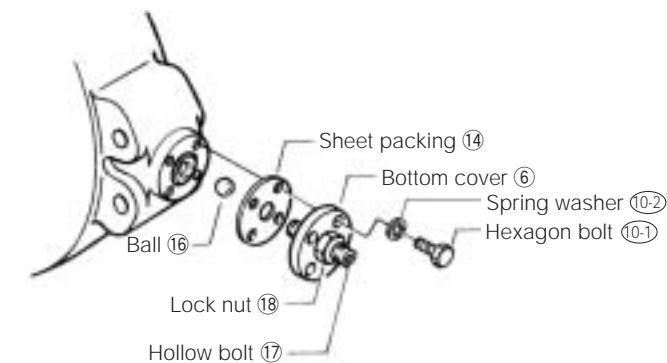
(Fig. 41)

(5) Rotate the disc ② 90 °so that it is fully open and pull it out with both hands. (Fig. 41)



(Fig. 42)

(6) Insert a flat-blade screwdriver between the outer periphery of the seat ring ⑫ and the valve body ① in order to remove the seat ring. (Fig. 42)



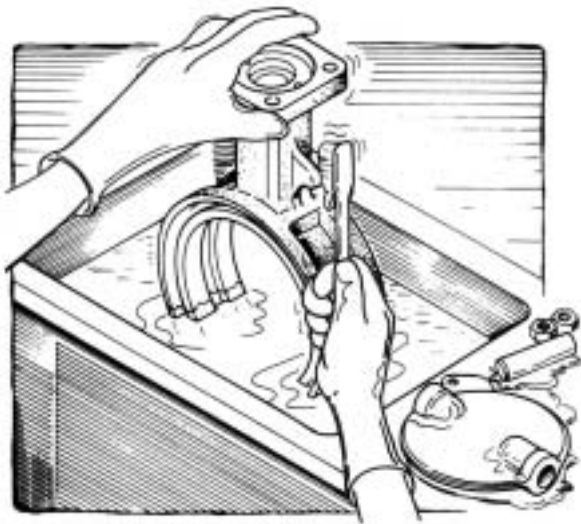
(Fig. 44)

(7) Use a prying motion to insert the screwdriver between the seat ring ⑫ and valve body ①, insert your hand into the gap that is created between the two, and pull the seat ring ⑫ out. (Fig. 43)



(Fig. 43)

(8) Remove the valve body ① from the vise, remove the hexagon bolt ⑩-① and spring washer ⑩-② that secure the bottom cover ⑥, and remove the bottom cover ⑥ and sheet packing ⑭. When removing the bottom cover, keep the hollow bolt ⑰ and lock nut ⑱ on the bottom cover ⑥. Take care not to lose the ball ⑰. (Fig. 44)



(Fig. 45)

Assembling the Valve Body

700G (40 to 300 mm)
 705G (50 to 300 mm)
 704G (50 to 300 mm)

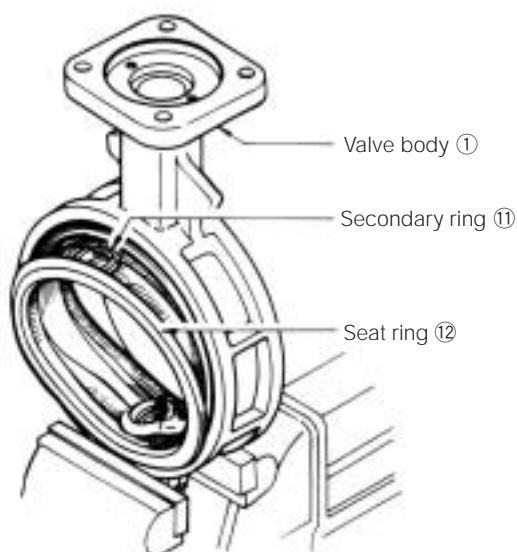
(1) Before assembly, clean all parts well using a cleaning fluid such as alcohol or a neutral detergent and make sure that none are damaged or abnormal. (Fig. 45)

(2) Any parts judged unusable or "O" rings that have deteriorated due to the passage of time (even if not showing signs of wear) should be replaced with new parts.

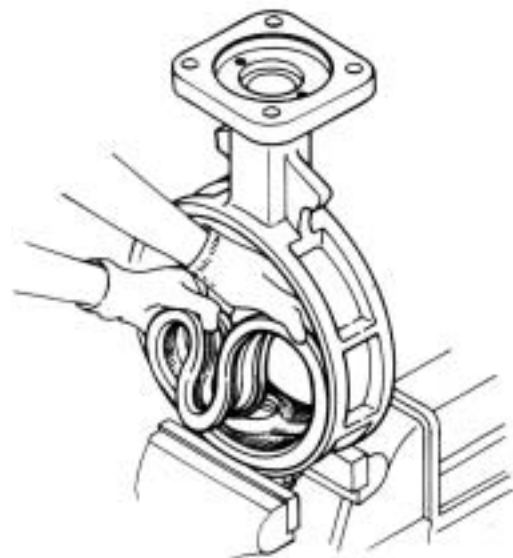
Note: If the seat ring material is other than NBR (EPDM or other material), use only silicon grease for the grease that is applied to the shaft, disc and other parts. Regular grease will cause swelling and corrosion.

(3) When inserting the seat ring ⑫ into the valve body ①, insert from the bottom side. Make sure that the holes in the seat ring ⑫ are correctly aligned with the holes in the valve body ①. (Fig. 46)

(4) Press down on the top part of the seat ring ⑫ with your thumbs to make it curve downward and insert the seat ring ⑫ into the valve body ① working from the bottom up. When inserting the seat ring, make sure that the secondary ring ⑪ does not shift out of position. (Fig. 47)



(Fig. 46)

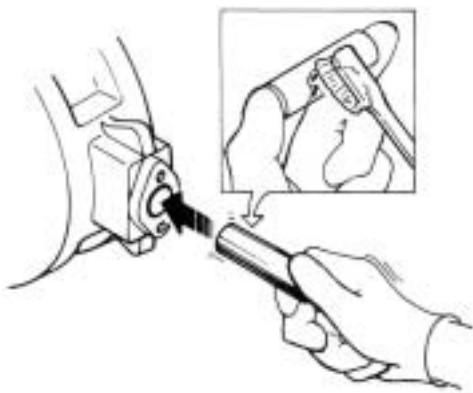


(Fig. 47)

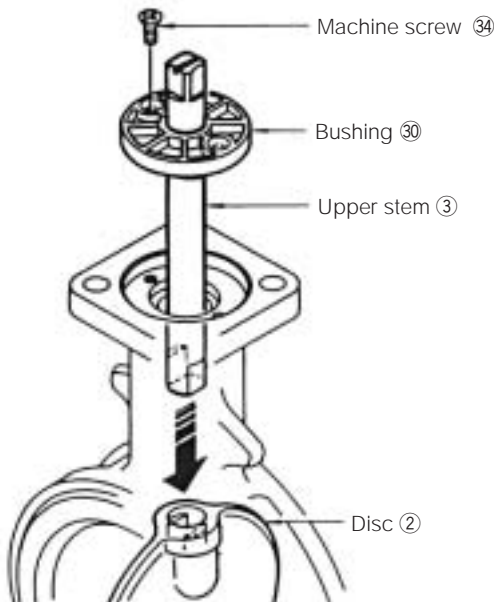
(5) After inserting the seat ring ⑫, verify that the stem holes at the top and bottom of the valve body ① are correctly aligned.



(Fig. 48)



(Fig. 49)

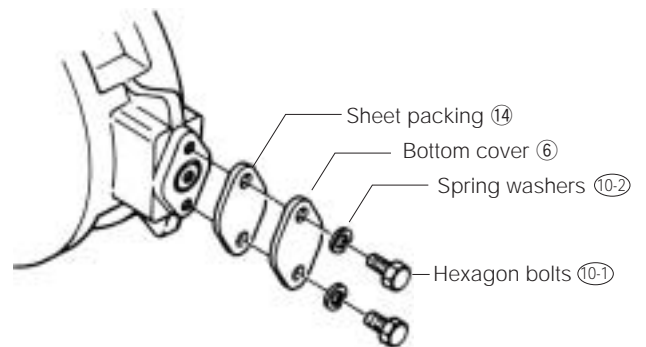


(Fig. 51)

(6) Apply silicon oil or similar lubricant to the top and bottom of the disc (2) and insert it into the seat ring (12). (Fig. 48)

(7) Insert the lower stem (4). Apply silicon grease and insert the stem carefully to prevent damage to the hole in the seat ring (12). (Fig. 49)

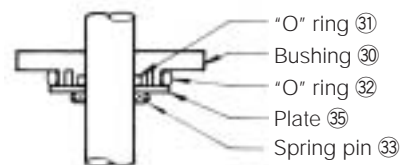
(8) Once the stem has been correctly inserted, secure the sheet packing (14) and bottom cover (6) to the bottom of the valve body (1) with the hexagon bolts (10-1) and spring washers (10-2). (Fig. 50)



(Fig. 50)

(9) Look down through the valve body (1) and verify that the seat ring (12) and disc (2) are set correctly.

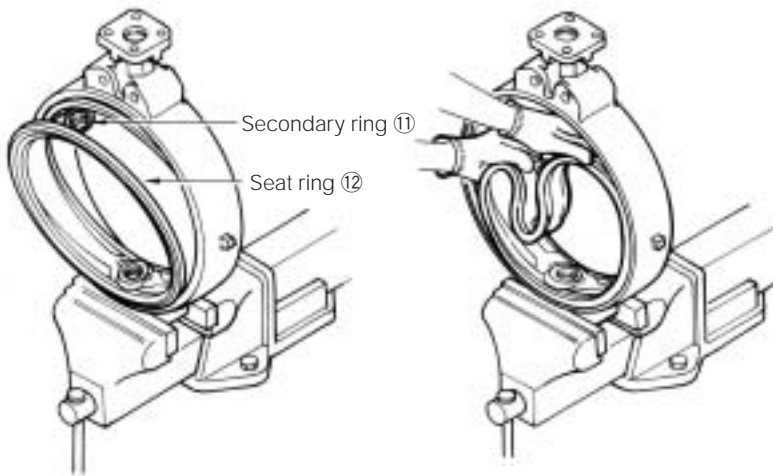
(10) Align the disc (2) with the upper stem (3) slit, apply sufficient silicon grease to the upper stem (3), and insert the upper stem (3) into the valve body (1). Insert the bushing (30) until it is flush with the flange face on the valve body (1) and secure it with the two machine screws (34). Apply sufficient silicon grease to "O" ring (31) and "O" ring (32) on the inside and outside of the bushing (30). (Fig. 51) (Fig. 52)



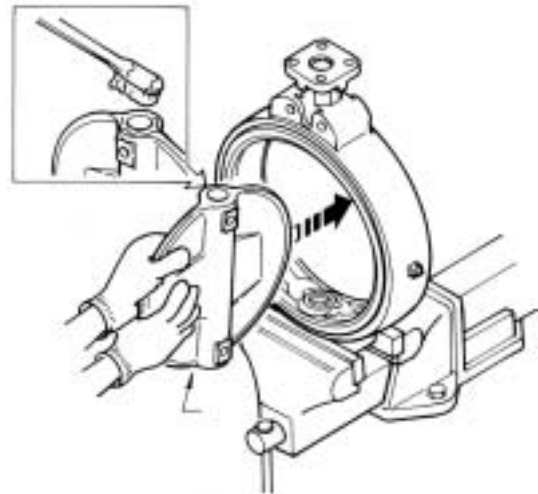
(Fig. 52)

Assembling the Valve Body

700G/705G/704G (350 mm to 600 mm)



(Fig. 53)

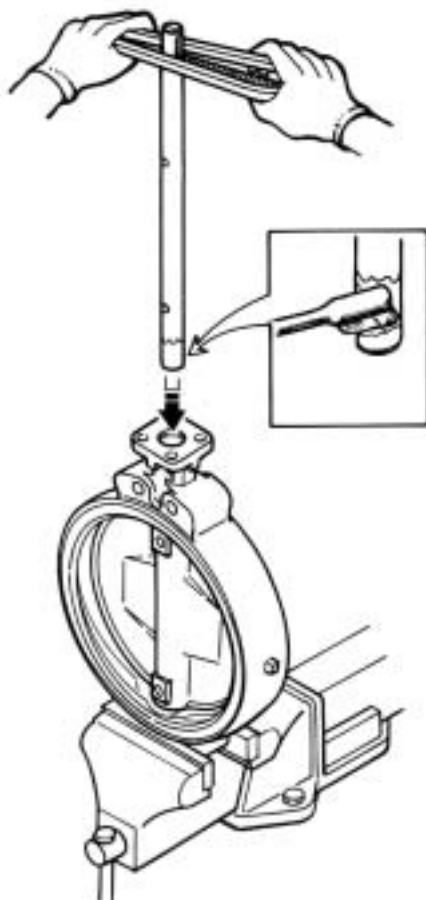


(Fig. 54)

(Fig. 55)

- (1) When inserting the seat ring ⑫ into the valve body ①, insert from the bottom side. Make sure that the holes in the seat ring ⑫ are correctly aligned with the holes in the valve body ①.

(Fig. 53)



(Fig. 56)

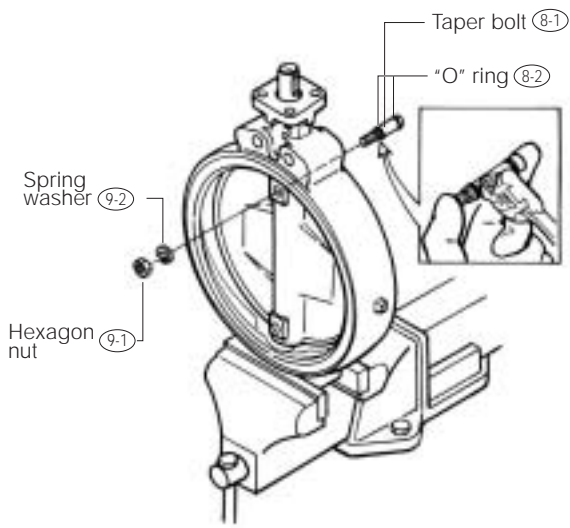
- (2) Press down on the top part of the seat ring ⑫ with your thumbs to make it curve downward and insert the seat ring ⑫ into the valve body ① working from the bottom up. When inserting the seat ring, make sure that the secondary ring ① does not shift out of position. (Fig. 54)

- (3) After inserting the seat ring ⑫, verify that the stem holes at the top and bottom of the valve body ① are correctly aligned.

- (4) Apply silicon oil or similar lubricant to the top and bottom of the disc ② and insert it into the seat ring ⑫. (Fig. 55)

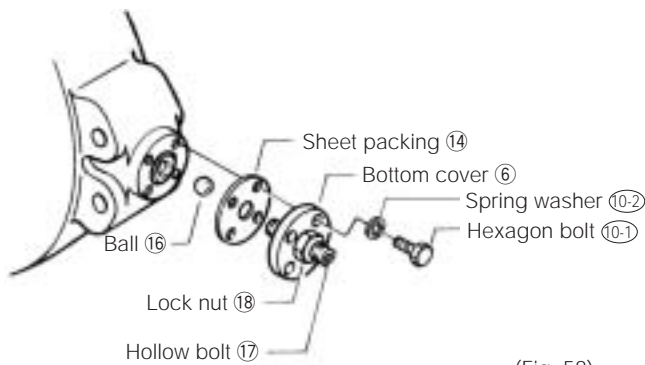
*If the bore diameter is large and insertion proves difficult, it may be possible to facilitate insertion by pulling the disc ② in.

- (5) Insert the stem ③. When inserting the stem, apply silicon grease to the tip of the stem and insert carefully to prevent damage to the hole in the seat ring ⑫ (Fig. 56)



(Fig. 57)

- (6) Rotate the stem (3) and verify that the taper bolt holes in the disc (2) and stem (3) are aligned. Place a new "O" ring (8-2) on the taper bolt (8-1), apply grease to the bolt, and insert it in the taper bolt hole in the disc (2). Next, tap the taper bolt (8-1) in with a hammer and tighten the taper bolt firmly with the hexagon nut (9-1) and spring washer (9-2). (Fig. 57)



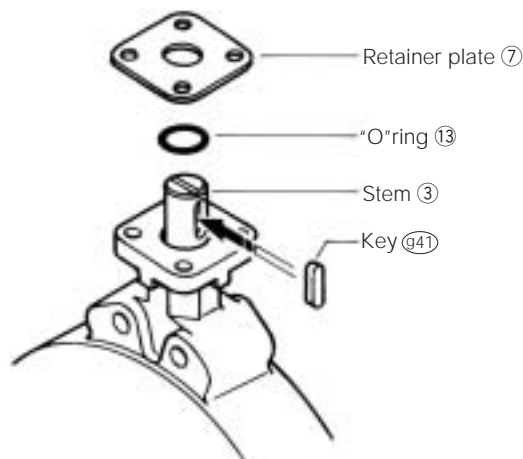
(Fig. 58)

- (7) Secure the sheet packing (14) and bottom cover (6) with the hexagon bolt (10-1) and spring washer (10-2). For 400 mm to 600 mm types, apply grease to the tip of the hollow bolt (17) and use the grease to hold the ball (16) in the tip of the hollow bolt (17). Secure the sheet packing (14) and bottom cover (6) with the hexagon bolt (10-1) and spring washer (10-2). (Fig. 58)

- (8) Place the "O" ring (13) on the stem (3) and attach the retainer plate (7) to the valve body (1). (Fig. 59)

- (9) Attach the key (941) to the stem (3). (Fig. 59)

This completes the assembly of the valve body. Verify that no parts were forgotten or assembled incorrectly.

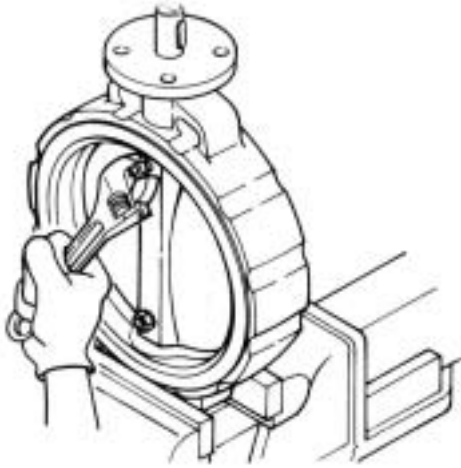


(Fig. 59)

*To assemble the drive member on the valve, reverse the disassembly procedure.

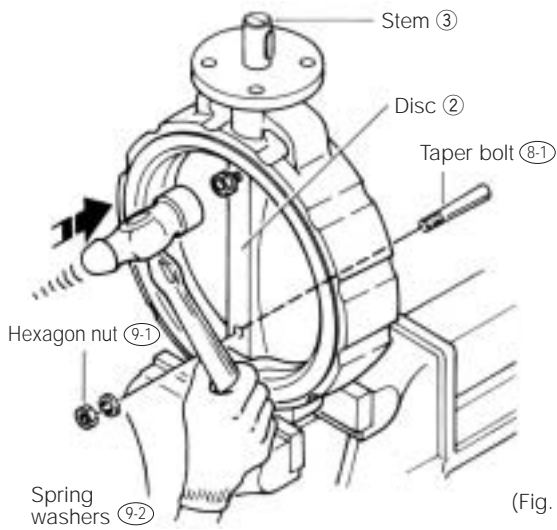
Disassembly Procedure of Valve Body

700S / 700E / 722F / 720F



(Fig. 60)

- (1) Hold the valve body ① firmly in a vise.
- (2) Loosen the hexagon nut ⑨-1 on each taper bolt ⑧-1 that secures the stem ③ and disc ② until it is flush with the threaded end of the taper bolt ⑧-1. (This is to protect the threads when the bolt is tapped by a hammer.) (Fig. 60)
- (3) Tap the hexagon nut ⑨-1 straight with a hammer straight to remove the taper bolt ⑧-1. (Fig. 61)
- (4) Grip the end of the stem ③ with a gripping tool and rotate it back and forth to pull it out. (Fig. 62)
On 700S (valve body material other than FC250) and 722F (125 mm to 600 mm) models, the bushing ④ may come off at the same time.

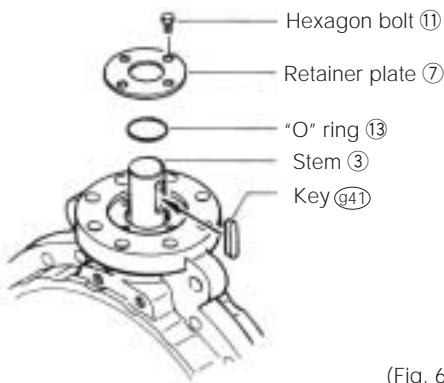


(Fig. 61)



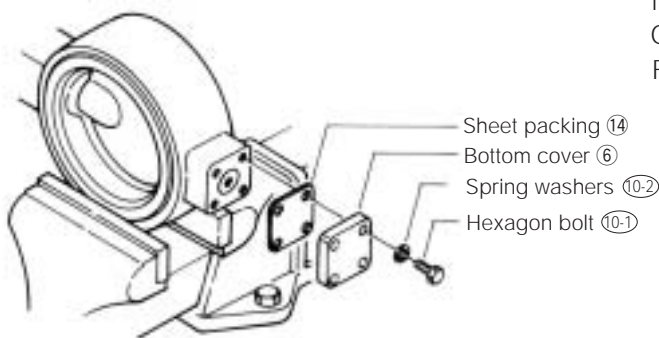
(Fig. 62)

*On **650 mm to 1350 mm** types, first remove the key ④-1 from the stem ③, then remove the hexagon bolt ⑪ and retainer plate ⑦, and then pull out the stem ③. (Fig. 63)



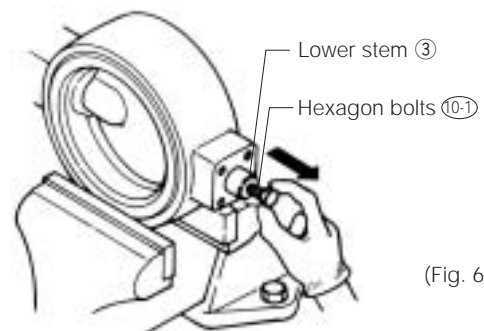
(Fig. 63)

- (5) On **50 mm to 80 mm** types, the stem ③ is an upper and lower two-part stem.
First remove the hexagon bolts ⑩-1 and spring washers ⑩-2 (four each) that secure the bottom cover ⑥, and then remove the bottom cover ⑥ and sheet packing ⑭. (Fig. 64)

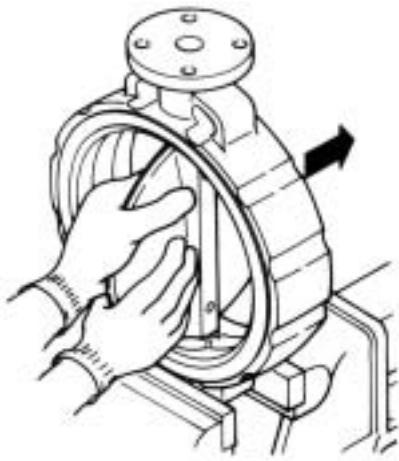


(Fig. 64)

- (6) To remove the lower stem, first screw one of the hexagon bolts ⑩-1 removed in the previous step into the threaded hole in the stem about 3 to 5 threads, and then pull the hexagon bolt ⑩-1 to pull out the lower stem. (Fig. 65)
On the 700S model (valve body material other than FC250), the bushing ⑤ may come off at the same time.



(Fig. 65)

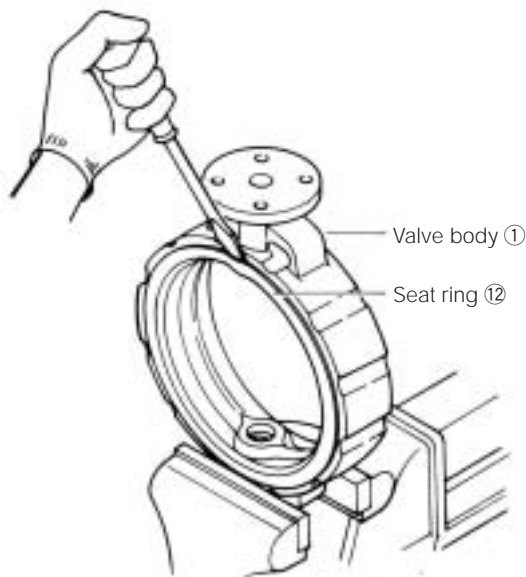


(Fig. 66)

(7) Rotate the disc (2) 90 °so that it is completely open and use both hands to push the disc (2) out and remove it from the seat ring (12). (Fig. 66)

*On **1000 mm to 1350 mm** types, the seat ring (12) is baked onto the valve body (1) and thus cannot be removed. Steps (8) and (9) are not necessary.

(8) Insert a flat-blade screwdriver between the outer periphery of the seat ring (12) and the valve body (1) in order to remove the seat ring. (Fig. 67)



(Fig. 67)

(9) Use a prying motion to insert the screwdriver between the seat ring (12) and valve body (1), insert your hand into the gap that is created between the two, and pull the seat ring (12) out. (Fig. 68)

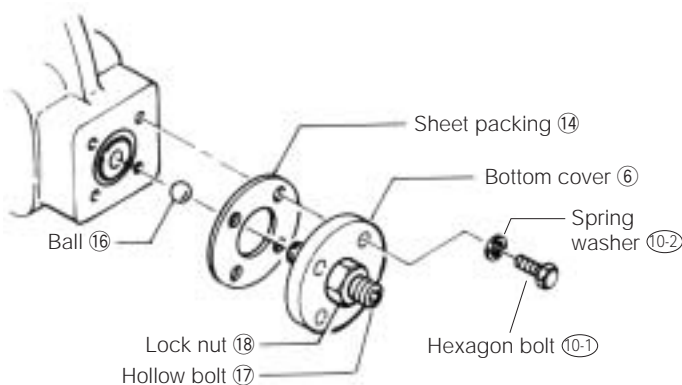


(Fig. 68)

(10) Remove the "O" ring (15) from the seat ring (12) using a scriber or similar implement.

(11) Remove the valve body (1) from the vise and remove the bottom cover (6) and sheet packing (14) that are secured with the hexagon bolt (10-1) and spring washer (10-2). (Fig. 69)

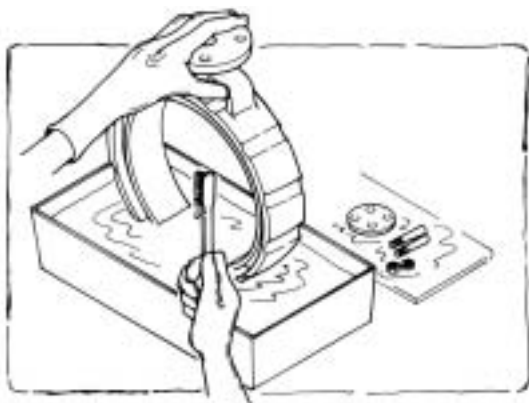
*On **350 mm to 1350 mm** types, a ball (16) is set in the assembly. Take care not to lose the ball. Keep the hollow bolt (17) and lock nut (18) in the bottom cover (6).



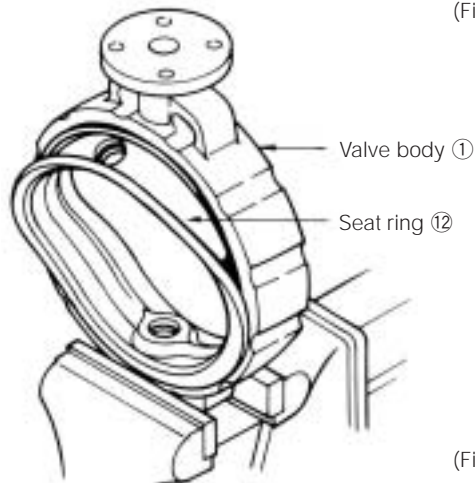
(Fig. 69)

(12) On **50 mm to 80 mm** types, there is an "O" ring (13) at the top of the valve body stem hole. Use a scriber or similar implement to remove the "O" ring.

(13) On the 700S (valve body material other than FC250) and 722F (125 mm to 600 mm) models, bushings (4) (5) may remain in the upper and lower stem holes of valve body (1). If so, remove the bushings.



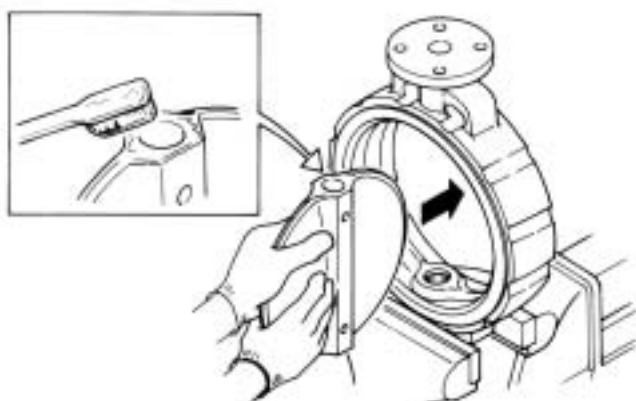
(Fig. 70)



(Fig. 71)



(Fig. 72)



(Fig. 73)

Assembling the Valve Body

700S / 700E / 722F / 720F

(1) Before assembly, clean all parts well using a cleaning fluid such as alcohol or a neutral detergent and make sure that none are damaged or abnormal. (Fig. 70)

(2) Any parts judged unusable or "O" rings and packing that have deteriorated due to the passage of time (even if not showing signs of wear) should be replaced with new parts.

Note: If the seat ring material is other than NBR (EPDM or other material), use only silicon grease for the grease that is applied to the shaft, disc and other parts. Regular grease will cause swelling and corrosion.

(3) Insert "O" rings (15) in the upper and lower stem holes in the seat ring (12).

*Not necessary on **50 mm to 80 mm** types.

*On **1000 mm to 1350 mm** types, the seat ring (12) is baked onto the valve body (1) and thus steps (4) to (6) are not necessary.

(4) When inserting the seat ring (12) into the valve body (1), insert from the bottom side. Make sure that the holes in the seat ring (12) are correctly aligned with the holes in the valve body (1).

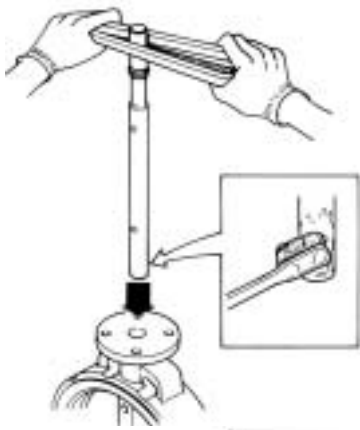
(Fig. 71)

(5) Press down on the top part of the seat ring (12) with your thumbs to make it curve downward and insert the seat ring (12) into the valve body (1) working from the bottom up. (Fig. 72)

(6) After inserting the seat ring (12), verify that the stem holes at the top and bottom of the valve body (1) are correctly aligned.

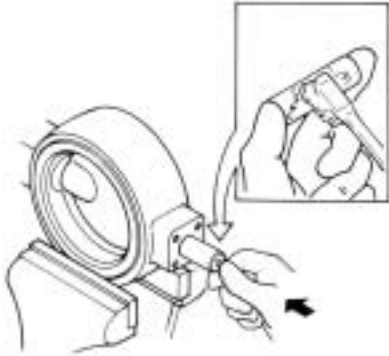
(7) Apply silicon oil to the top and bottom of the disc (2) and insert it into the seat ring (12). (Fig. 73)

*If the bore diameter is large and insertion proves difficult, it may be possible to facilitate insertion by pulling the disc (2) in.



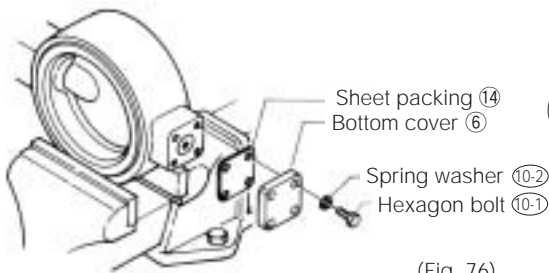
(Fig. 74)

- (8) On 50 mm to 80 mm types, insert the "O" ring (13) into the "O" ring groove at the top of the valve body stem hole. On 100 mm to 600 mm types, place the "O" ring (13) in the "O" ring groove at the top of the stem.
- (9) On 700S (valve body material other than FC250) and 722F (125 mm to 600 mm) models, round the bushings (4) (5) into a cylinder shape, apply grease to the outer surface, and insert the bushings into the upper and lower stem holes of valve body (1). The longer bushing goes into the upper stem hole.



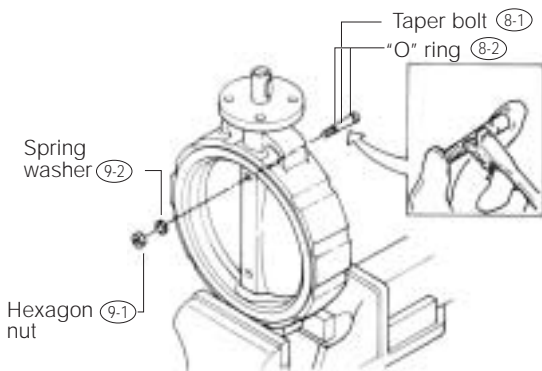
(Fig. 75)

- (10) Insert the stem (3). When inserting the stem, apply silicon grease to the tip of the stem and insert carefully to prevent damage to the hole in the seat ring (12) (Fig. 74)
- (11) On 50 mm to 80 mm types, the stem (3) is an upper and lower two-part stem. Insert the lower stem first. Apply silicon grease and insert the stem carefully to prevent damage to the hole in the seat ring (12) (Fig. 75)



(Fig. 76)

- (12) Once the stem has been correctly inserted, secure the sheet packing (14) and bottom cover (6) to the bottom of the valve body (1) with the hexagon bolts (10-1) and spring washers (10-2) . (Fig. 76)



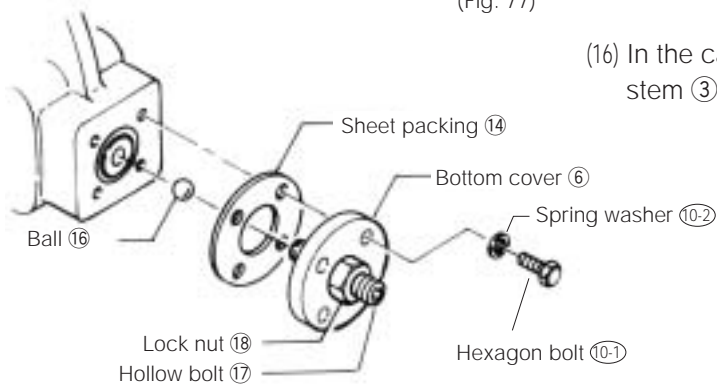
(Fig. 77)

- (13) Rotate the stem (3) and verify that the taper bolt holes in the disc (2) and stem (3) are aligned. Place a new "O" ring (8-2) on the taper bolt (8-1) (an "O" ring is not used on 50 mm to 250 mm types), apply grease to the bolt, and insert it in the taper bolt hole in the disc. Next, tap the taper bolt (8-1) in with a hammer and tighten firmly with the hexagon nut (9-1) and spring washer (9-2) . (Fig. 77)

- (14) Secure the sheet packing (14) and bottom cover (6) with the hexagon bolt (10-1) and spring washer (10-2) . (Fig. 78)

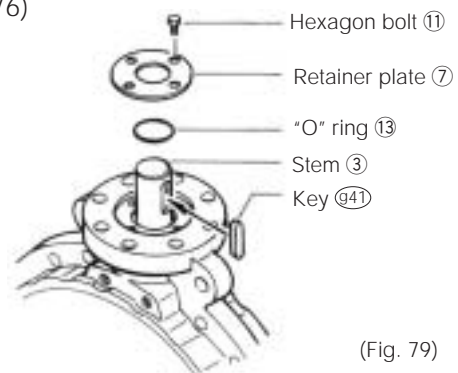
On 350 mm or larger types, apply grease to the tip of the hollow bolt (17) and use the grease to hold the ball (16) in the tip of the hollow bolt (17). Secure the sheet packing (14) and bottom cover (6) with the hexagon bolt (10-1) and spring washer (10-2) .

- (15) **On 650 mm or larger types**, insert the "O" ring (13) and then attach the retainer plate (7) with the hexagon bolt (11). (Fig. 79)



(Fig. 78)

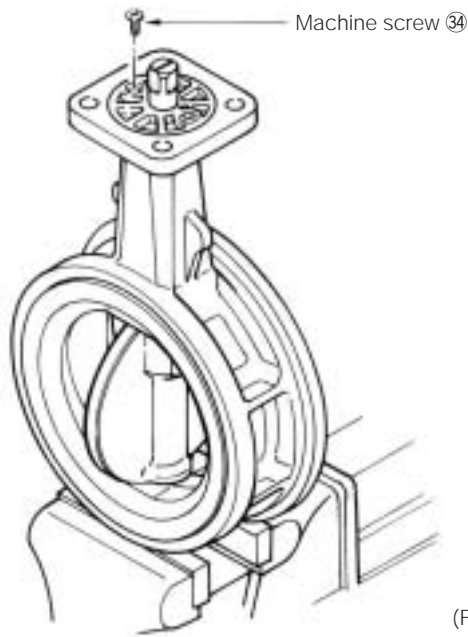
- (16) In the case of a O2 stem (round) only, attach the key (g41) to the stem (3). (Fig. 76)



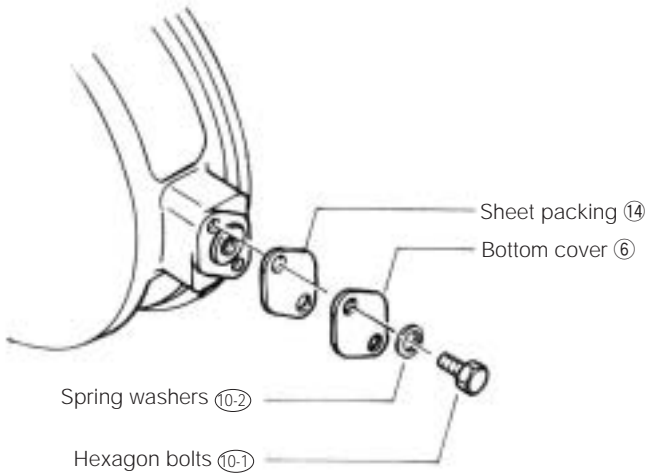
(Fig. 79)

*To assemble the drive member on the valve, reverse the disassembly procedure.

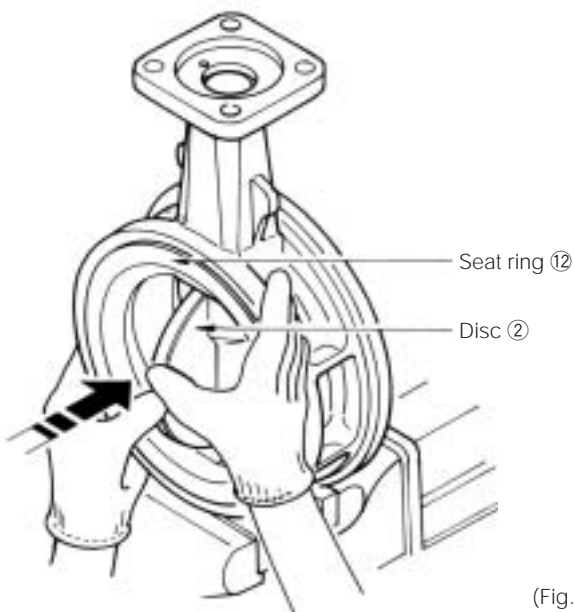
This completes the assembly of the valve body. Verify that no parts were forgotten or assembled incorrectly.



(Fig. 80)



(Fig. 82)

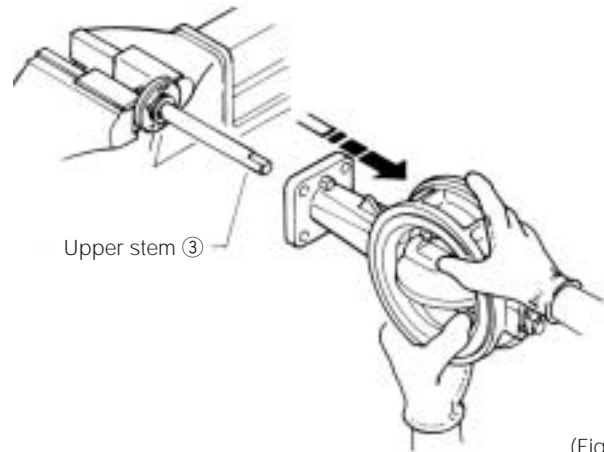


(Fig. 84)

Disassembly Procedure of Valve Body

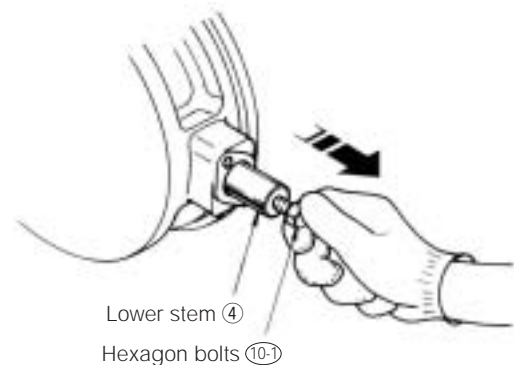
731P/732P (50 mm to 300 mm)

- (1) Rotate the disc ② to the completely open position.
- (2) Remove the machine screw ③④ with a Phillips head screwdriver. (Fig. 80)
- (3) Hold the upper stem ③ with a vise and grasp both sides of the valve body ① to pull it off. (Fig. 81)



(Fig. 81)

- (4) Remove the hexagon bolts ⑩-① and spring washers ⑩-② (two each) that secure the bottom cover ⑥, and remove the bottom cover ⑥ and sheet packing ⑭. (Fig. 82)
- (5) To remove the lower stem ④, first screw one of the hexagon bolts ⑩-① removed in the previous step into the threaded hole in the stem about 3 to 5 threads, and then pull the hexagon bolt ⑩-① to pull out the lower stem ④. (Fig. 83)

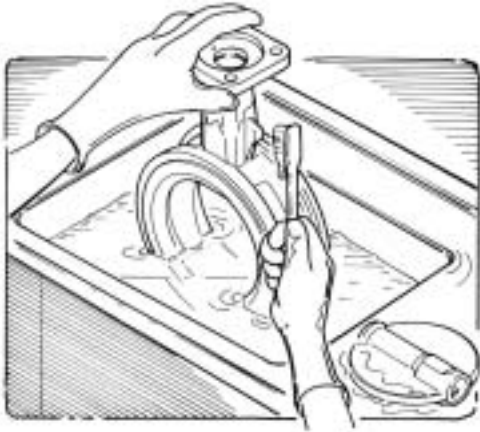


(Fig. 83)

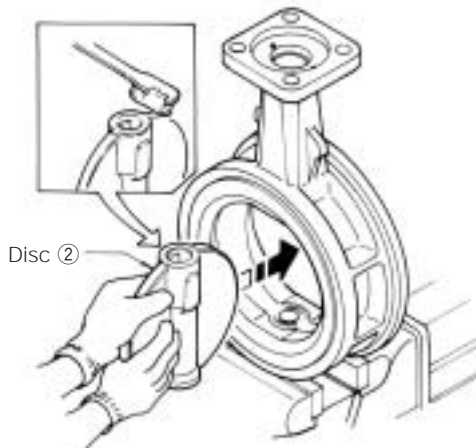
- (6) Use both hands to push the disc ② out and remove it from the seat ring ⑫. The seat ring ⑫ is baked onto the valve body ① and cannot be removed. (Fig. 84)

Assembling the Valve Body

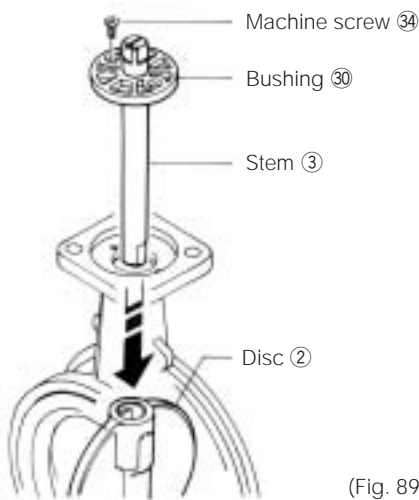
731P/732P (50 mm to 300 mm)



(Fig. 85)



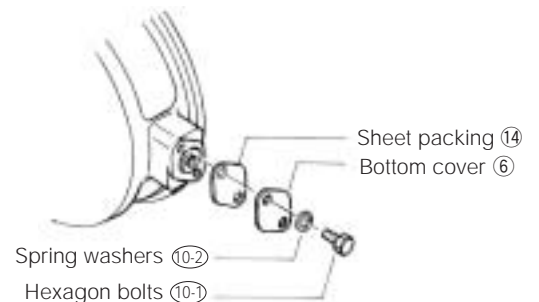
(Fig. 86)



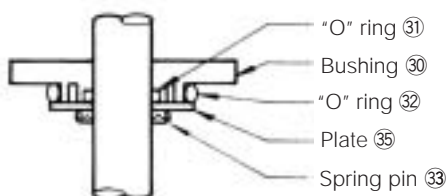
(Fig. 89)



(Fig. 87)



(Fig. 88)



(Fig. 90)

(1) Before assembly, clean all parts well using a cleaning fluid such as alcohol or a neutral detergent and make sure that none are damaged or abnormal. (Fig. 85)

(2) Any parts judged unusable or "O" rings that have deteriorated due to the passage of time (even if not showing signs of wear) should be replaced with new parts.

Note: If the seat ring material is other than NBR (EPDM or other material), use only silicon grease for the grease that is applied to the shaft, disc and other parts. Regular grease will cause swelling and corrosion.

(3) Apply silicon oil or similar lubricant to the top and bottom of the disc (2) and insert it into the seat ring (12). (Fig. 86)

(4) Insert the lower stem (4). Apply silicon grease and insert the stem carefully to prevent damage to the hole in the seat ring (12). (Fig. 87)

(5) Once the stem has been correctly inserted, secure the sheet packing (14) and bottom cover (6) to the bottom of the valve body (1) with the hexagon bolts (10-1) and spring washers (10-2). (Fig. 88)

(6) Look down through the valve body (1) and verify that the seat ring (12) and disc (2) are set correctly.

(7) Align the disc (2) with the upper stem (3) slit, apply sufficient silicon grease to the upper stem (3), and insert the stem (3) into the valve body (1). Insert the bushing (30) until it is flush with the flange face on the valve body (1) and secure it with the two machine screws (34). Apply sufficient silicon grease to "O" ring (31) and "O" ring (32) on the inside and outside of the bushing (30). (Fig. 89) (Fig. 90)

*To assemble the drive member on the valve, reverse the disassembly procedure.

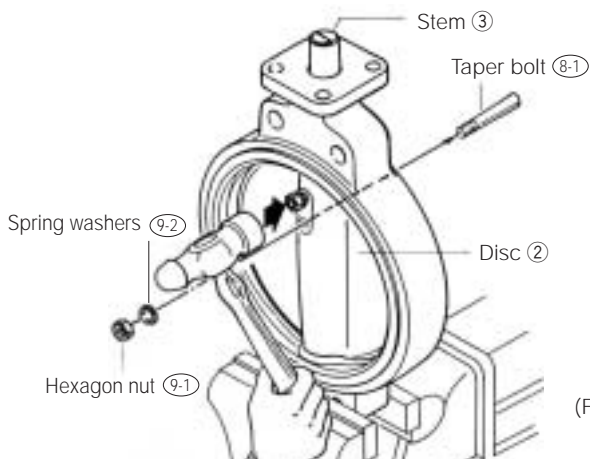
This completes the assembly of the valve body. Verify that no parts were forgotten or assembled incorrectly.

Disassembly Procedure of Valve Body

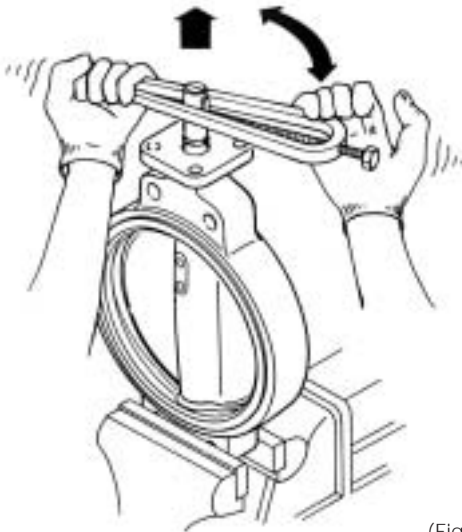
731X/732X(350mm to 600mm)



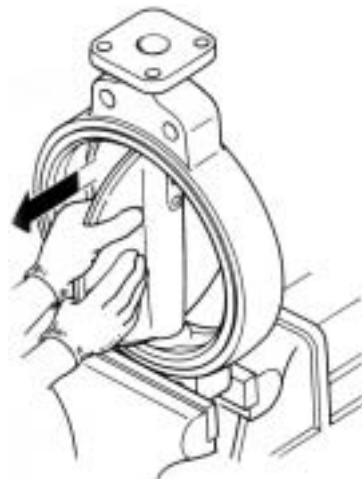
(Fig. 91)



(Fig. 92)



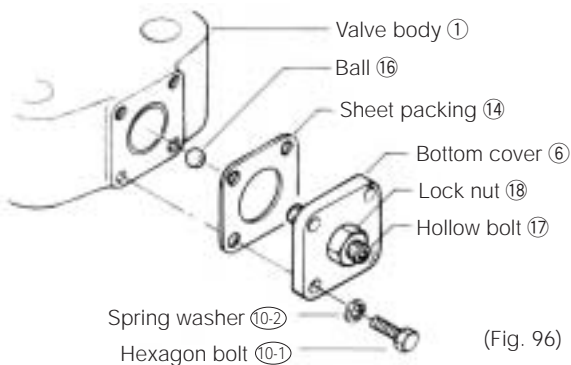
(Fig. 93)



(Fig. 94)

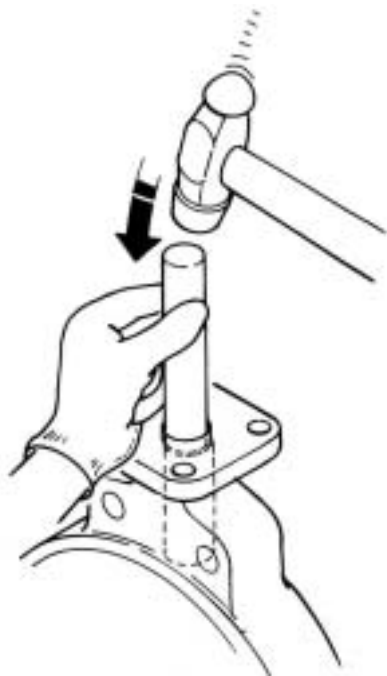


(Fig. 95)



(Fig. 96)

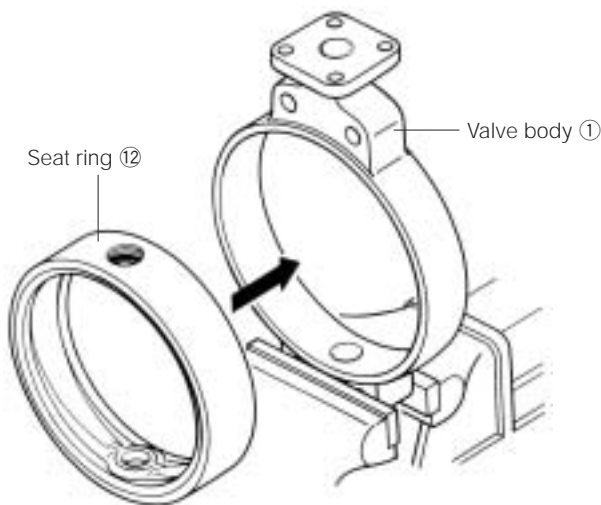
- (1) Hold the valve body ① firmly in a vise.
- (2) Loosen the hexagon nut ⑨-1 on each taper bolt ⑧-1 that secures the stem ③ and disc ② until it is flush with the threaded end of the taper bolt ⑧-1 . (This is to protect the threads when the bolt is tapped by a hammer.) (Fig. 91)
- (3) Tap the hexagon nut ⑨-1 straight with a hammer straight to remove the taper bolt ⑧-1 . (Fig. 92)
- (4) Grip the end of the stem ③ with a gripping tool and rotate it back and forth to pull it out. (Fig. 93)
- (5) Rotate the disc ② 90 °so that it is fully open and pull it out with both hands. (Fig. 94)
- (6) Gently tap around the edge of the seat ring ⑫ with a plastic hammer or similar tool to remove it. (Fig. 95)
- (7) Remove the "O" ring ⑮ from the seat ring ⑫ using a scriber or similar implement.
- (8) Remove the valve body ① from the vise and remove the bottom cover ⑥ and sheet packing ⑭ that are secured with the hexagon bolt ⑩-1 and spring washer ⑩-2 . When removing the bottom cover, keep the hollow bolt ⑰ and lock nut ⑱ on the bottom cover ⑥. Take care not to lose the ball ⑩. (Fig. 96)



(Fig. 97)



(Fig. 98)



(Fig. 99)

- (9) Insert a round rod with an outer diameter approximately 1 mm larger than the stem diameter into the stem hole and tap it gently with a hammer to remove bushing ④ and bushing ⑤ from the valve body ①. (Fig. 97)

Assembling the Valve Body

731X/732X (350 mm to 600 mm)

- (1) Before assembly, clean all parts well using a cleaning fluid such as alcohol or a neutral detergent and make sure that none are damaged or abnormal. (Fig. 98)

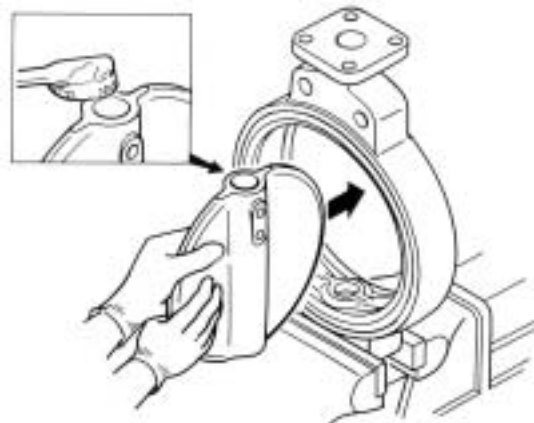
- (2) Any parts judged unusable or "O" rings that have deteriorated due to the passage of time (even if not showing signs of wear) should be replaced with new parts.

Note: If the seat ring material is other than NBR (EPDM or other material), use only silicon grease for the grease that is applied to the shaft, disc and other parts. Regular grease will cause swelling and corrosion.

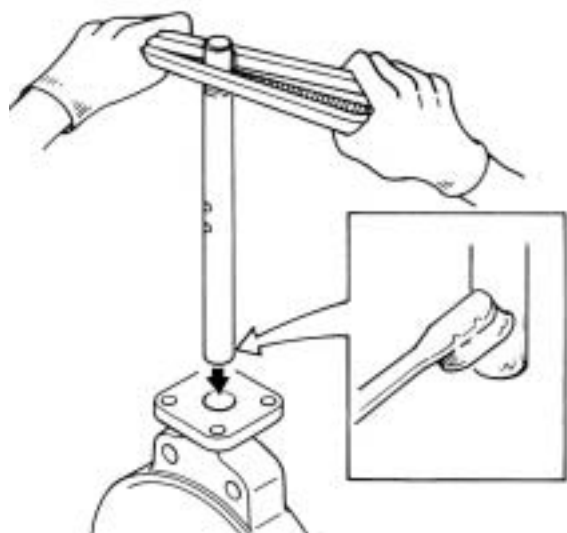
- (3) Insert "O" rings ⑮ in the upper and lower stem holes in the seat ring ⑫.

- (4) Apply silicon oil to the outer periphery of the seat ring ⑫ and tap it gently and evenly with a plastic hammer to insert it into the valve body ①. At this time, verify that the stem holes at the top and bottom of the seat ring ⑫ and valve body ① are correctly aligned. (Fig. 99)

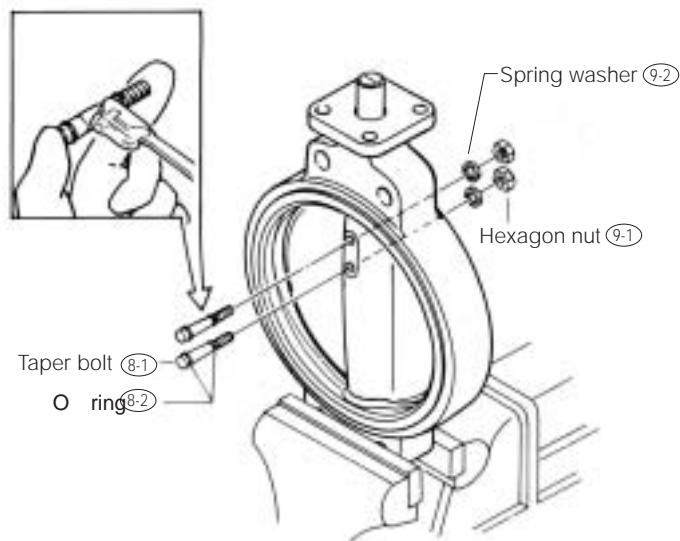
- (5) Apply silicon oil or similar lubricant to the top and bottom of the disc ② and insert it into the seat ring ⑫. (Fig. 100)



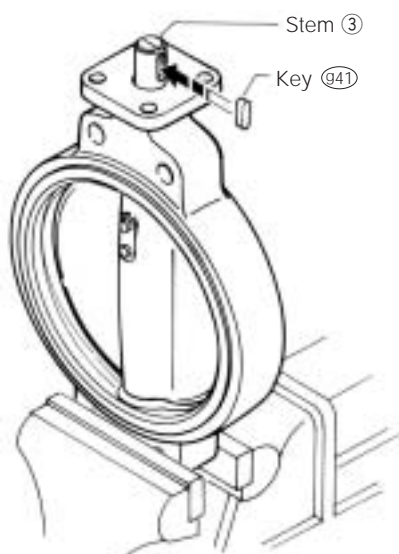
(Fig. 100)



(Fig. 102)



(Fig. 103)



(Fig. 105)

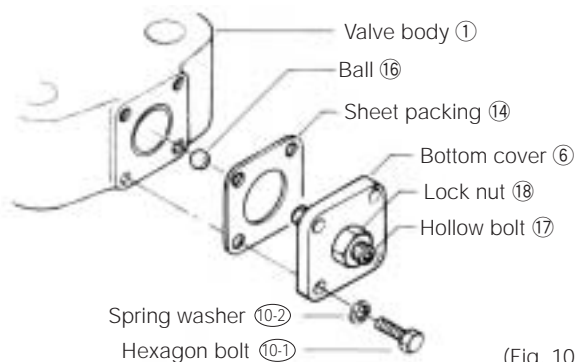
(6) Round the bushings (4) (5) into a cylinder shape, apply grease to the outer surface, and insert the bushings into the stem holes in the valve body (1). At this time, make sure that the direction of turning of the bushings is correct. The longer bushing goes into the upper stem hole. (Fig. 101)



(Fig. 101)

(7) Insert the stem (3). When inserting the stem, apply silicon grease to the tip of the stem (3) and insert carefully to prevent damage to the hole in the seat ring (12) (Fig. 102)

(8) Rotate the stem (3) and verify that the taper bolt holes in the disc (2) and stem (3) are aligned. Place a new "O" ring (8-2) on the taper bolt (8-1), apply grease to the bolt, and insert it in the taper bolt hole in the disc (2). Next, tap the taper bolt (8-1) in with a hammer and tighten the taper bolt firmly with the hexagon nut (9-1) and spring washer (9-2). (Fig. 103)



(Fig. 104)

(9) Apply grease to the tip of the hollow bolt (17) and use the grease to hold the ball (16) in the tip of the hollow bolt (17). Secure the sheet packing (14) and bottom cover (6) with the hexagon bolt (10-1) and spring washer (10-2). (Fig. 104)

(10) Attach the key (941) to the stem (3). (Fig. 105)

This completes the assembly of the valve body. Verify that no parts were forgotten or assembled incorrectly.

*To assemble the drive member on the valve, reverse the disassembly procedure.

REQUIRED NUMBER AND SIZE OF PIPING BOLTS

705G (Flange bolt hole: drilled holes) and 700G Piping bolts and nuts sizes

For hexagon bolts and nuts

Nominal size		JIS 5K		JIS 10K	
mm	inch	Hexagon bolts and nuts	Setting bolts	Hexagon bolts and nuts	Setting bolts
40	1 1/2	4-M12x 75x30	—	4-M16x 90x38	—
50	2	4-M12x 90x30	—	4-M16x100x38	—
65	2 1/2	4-M12x 90x30	—	4-M16x105x38	—
80	3	4-M16x 95x38	—	8-M16x105x38	—
100	4	8-M16x105x38	—	8-M16x110x38	—
125	5	8-M16x110x38	—	8-M20x125x46	—
150	6	8-M16x115x38	—	8-M20x130x52	—
200	8	8-M20x130x52	—	12-M20x130x52	—
250	10	12-M20x140x52	—	12-M22x150x60	—
300	12	12-M20x150x52	—	16-M22x160x60	—
350	14	12-M22x160x60	—	16-M22x160x60	—
400	16	16-M22x175x45	—	16-M24x190x45	—
450	18	16-M22x185x45	—	20-M24x205x45	—
500	20	20-M22x205x45	—	20-M24x215x45	—
600	24	16-M24x230x50	8-M24x 70x54	20-M30x260x50	8-M30x 70x60

For long bolts and nuts

Nominal size		JIS 5K		JIS 10K		ANSI 125Lb/150Lb	
mm	inch	Long bolts and nuts	Setting bolts	Long bolts and nuts	Setting bolts	Long bolts and nuts	Hexagon bolts
40	1 1/2	4-M12x 95x25	—	4-M16x110x25	—	4-U1/2 x110x32	—
50	2	4-M12x105x25	—	4-M16x120x30	—	4-U5/8 x140x38	—
65	2 1/2	4-M12x110x25	—	4-M16x125x30	—	4-U5/8 x140x38	—
80	3	4-M16x120x30	—	8-M16x125x30	—	4-U5/8 x140x38	—
100	4	8-M16x130x30	—	8-M16x130x30	—	8-U5/8 x150x38	—
125	5	8-M16x130x30	—	8-M20x150x40	—	8-U3/4 x160x51	—
150	6	8-M16x140x35	—	8-M20x155x40	—	8-U3/4 x165x51	—
200	8	8-M20x155x40	—	12-M20x155x40	—	8-U3/4 x175x51	—
250	10	12-M20x165x40	—	12-M22x175x45	—	12-U7/8 x195x58	—
300	12	12-M20x175x40	—	16-M22x185x45	—	12-U7/8 x205x58	—
350	14	12-M22x185x45	—	16-M22x185x45	—	12-U1 x225	—
400	16	16-M22x205x45	—	16-M24x220x50	—	16-U1 x255	—
450	18	16-M22x225x45	—	20-M24x230x50	—	16-U1 1/8 x280	—
500	20	20-M22x230x45	—	20-M24x245x50	—	20-U1 1/8 x295	—
600	24	16-M24x275x50	8-M24x 70x54	20-M30x290x60	8-M30x 70x60	16-U1 1/4 x340	8-U1 1/4x95x70

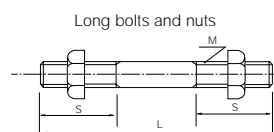
Remarks:

1. Please use a hexagon nut with 80% threading. (For ANSI, use heavy nut.)
 2. A unified screw should have 8 threads per inch if its nominal diameter exceeds 1 inch.
- * Nominal size "600 mm" requires hexagon bolt for setting.

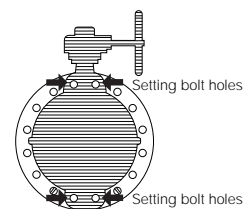
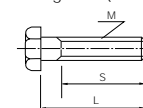
Example

Long bolts: 4 - M12 x 95 x 25
 Quantity Nominal size (M) Length of bolt (L) Effective screw length (S)

Setting bolts: 8 - M24 x 70 x 54
 (Hexagon bolts) Quantity Nominal size (M) Length of bolt (L) Effective screw length (S)



Setting bolts (Hexagon bolts)



REQUIRED NUMBER AND SIZE OF PIPING BOLTS

705G Piping bolts and nuts sizes

For hexagon bolts and nuts (Flange bolt hole: tapped holes)

Nominal size		JIS 5K		JIS 10K	
mm	inch	Hexagon bolts and nuts	Setting bolts	Hexagon bolts and nuts	Setting bolts
50	2	—	8-M12× 30×28	—	8-M16× 35×33
65	2 1/2	—	8-M12× 35×33	—	8-M16× 35×33
80	3	—	8-M16× 35×33	4-M16×110×40	8-M16× 35×33
100	4	4-M16×110×40	8-M16× 40×38	4-M16×110×40	8-M16× 40×38
125	5	4-M16×110×40	8-M16× 40×38	4-M20×120×50	8-M20× 45×41
150	6	4-M16×120×40	8-M16× 40×38	4-M20×130×50	8-M20× 45×41
200	8	4-M20×130×50	8-M20× 45×41	8-M20×135×50	8-M20× 50×46
250	10	8-M20×135×50	8-M20× 50×46	8-M22×150×60	8-M22× 55×50
300	12	8-M20×150×50	8-M20× 55×51	12-M22×160×60	8-M22× 60×55
350	14	8-M22×160×60	8-M22× 60×50	12-M22×160×60	8-M22× 60×50
400	16	12-M22×175×45	8-M22× 60×50	12-M24×190×45	8-M24× 70×50
450	18	12-M22×185×45	8-M22× 60×50	16-M24×205×45	8-M24× 70×50
500	20	16-M22×205×45	8-M22× 60×50	16-M24×215×45	8-M24× 70×50
600	24	16-M24×230×50	8-M24× 70×54	20-M30×260×50	8-M30× 70×60

For long bolts and nuts (Flange bolt hole: tapped holes)

Nominal size		JIS5K		JIS10K		ANSI125Lb/150Lb	
mm	inch	Long bolts and nuts	Setting bolts	Long bolts and nuts	Setting bolts	Long bolts and nuts	Setting bolts
50	2	—	8-M12× 30×28	—	8-M16× 35×33	—	8-U5/8-11UNC×35×30
65	2 1/2	—	8-M12× 35×33	—	8-M16× 35×33	—	8-U5/8-11UNC×40×30 (8-U5/8-11UNC×35×30)
80	3	—	8-M16× 35×33	4-M16×125×30	8-M16× 35×33	—	8-U5/8-11UNC×45×38 (8-U5/8-11UNC×40×30)
100	4	4-M16×130×30	8-M16× 40×38	4-M16×130×30	8-M16× 40×38	4-U5/8-11UNC×165×50	8-U5/8-11UNC×45×38
125	5	4-M16×130×30	8-M16× 40×38	4-M20×150×40	8-M20× 45×41	4-U3/4-10UNC×175×55	8-U3/4-10UNC×50×44
150	6	4-M16×140×35	8-M16× 40×38	4-M20×155×40	8-M20× 45×41	4-U3/4-10UNC×175×55	8-U3/4-10UNC×50×44
200	8	4-M20×155×40	8-M20× 45×41	8-M20×155×40	8-M20× 50×46	4-U3/4-10UNC×175×55	8-U3/4-10UNC×55×44
250	10	8-M20×165×40	8-M20× 50×46	8-M22×175×45	8-M22× 55×50	8-U7/8- 9UNC×215×55	8-U7/8- 9UNC×60×50
300	12	8-M20×175×40	8-M20× 55×51	12-M22×185×45	8-M22× 60×55	8-U7/8- 9UNC×215×55	8-U7/8- 9UNC×60×50
350	14	8-M22×185×45	8-M22× 60×50	12-M22×185×45	8-M22× 60×50	8-U1 - 8UNC×225	8-U1 - 8UNC×70×57
400	16	12-M22×205×45	8-M22× 60×50	12-M24×220×50	8-M24× 70×50	12-U1 - 8UNC×255	8-U1 - 8UNC×75×57
450	18	12-M22×225×45	8-M22× 60×50	16-M24×230×50	8-M24× 70×50	12-U1 1/8- 8UN×280	8-U1 1/8-8UN×85×63
500	20	16-M22×230×45	8-M22× 60×50	16-M24×245×50	8-M24× 70×50	16-U1 1/8- 8UN×295	8-U1 1/8-8UN×85×63
600	24	16-M24×275×50	8-M24× 70×54	20-M30×290×60	8-M30× 70×60	16-U1 1/4- 8UN×340	8-U1 1/4-8UN×95×70

Remarks:

Bolt/Nut material: SS400/SS400, SUS304/SUS304

The dimensions in parenthesis show ANSI125Lb. (for 65 mm and 80 mm)

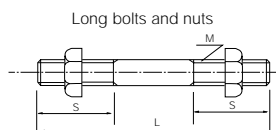
Heavy nut shall be used for ANSI125Lb/150Lb hexagon nuts.

A unified screw should have 8 threads per inch if its nominal diameter exceeds 1 inch.

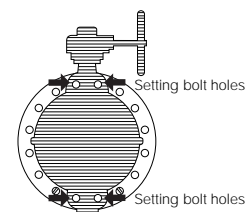
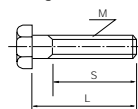
Example

Long bolts: 4 - M16 × 130 × 30
 Quantity Nominal size (M) Length of bolt (L) Effective screw length (S)

Setting bolts: 8 - M12 × 30 × 28
 (Hexagon bolts) Quantity Nominal size (M) Length of bolt (L) Effective screw length (S)



Setting bolts (Hexagon bolts)



704G Piping bolts and nuts sizes

* Dimensions on the table show when the piping flange hole are tapped. For drilled holes, please consult us.

Nominal size		JIS 5K	JIS 10K	ANSI 125Lb	ANSI 150Lb	DIN NP10 BS 4504 PN10
mm	inch					
50	2	8-M12×30×25	8-M16×35×30	8-U 5/8×35×30	8-U 5/8×40×30	8-M16×35×33
65	2 1/2	8-M12×35×30	8-M16×35×30	8-U 5/8×40×30	8-U 5/8×40×30	8-M16×35×33
80	3	8-M16×35×30	16-M16×35×30	8-U 5/8×40×38	8-U 5/8×45×38	16-M16×40×38
100	4	16-M16×40×35	16-M16×40×35	16-U 5/8×45×38	16-U 5/8×45×38	16-M16×40×38
125	5	16-M16×40×38	16-M20×45×41	16-U 3/4×50×44	16-U 3/4×50×44	16-M16×40×38
150	6	16-M16×40×38	16-M20×45×41	16-U 3/4×50×44	16-U 3/4×50×44	16-M20×45×41
200	8	16-M20×45×41	24-M20×50×46	16-U 3/4×55×44	16-U 3/4×55×44	16-M20×50×46
250	10	24-M20×50×46	24-M22×50×46	24-U 7/8×60×50	24-U 7/8×60×50	24-M20×55×50
300	12	24-M20×55×51	32-M22×55×51	24-U 7/8×60×50	24-U 7/8×60×50	24-M20×55×50
350	14	24-M22×60×50	32-M22×60×50	24-U1 ×70×57	24-U1 ×70×57	32-M20×60×46
400	16	32-M22×60×50	32-M24×70×50	32-U1 ×75×57	32-U1 ×75×57	32-M24×70×50
450	18	32-M22×60×50	40-M24×70×50	32-U1•1/8×85×63	32-U1•1/8×85×63	40-M24×70×50
500	20	40-M22×60×50	40-M24×70×50	40-U1•1/8×85×63	40-U1•1/8×85×63	40-M24×70×50
600	24	40-M24×70×50	48-M30×75×60	40-U1•1/4×95×70	40-U1•1/4×95×70	40-M27×80×60

Remarks:

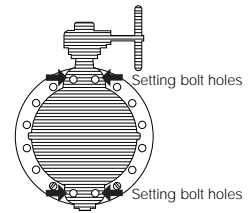
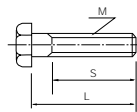
1. The bolt lengths are in accordance with thickness of steel flanges.
2. A unified screw should have 8 threads per inch if its nominal diameter exceeds 1 inch.
3. The list is exclusively for standard material "SS400".

Example

Setting bolts: 8 - M12 × 30 × 28
 (Hexagon bolts)

Quantity Nominal size (M) Length of bolt (L) Effective screw length (S)

Setting bolts (Hexagon bolts)



REQUIRED NUMBER AND SIZE OF PIPING BOLTS

700S/700E Piping bolts and nuts sizes

For 700S hexagon bolts and nuts (Flange bolt hole: drilled holes)

Nominal size		JIS 5K	JIS 10K
mm	inch	Hexagon bolts and nuts	Hexagon bolts and nuts
50	2	4-M12×90×30	4-M16×100×40
65	2 1/2	4-M12×90×30	4-M16×100×40
80	3	4-M16×100×40	8-M16×110×40
100	4	8-M16×100×40	8-M16×110×40
125	5	8-M16×110×40	8-M20×120×50
150	6	8-M16×120×40	8-M20×130×50
200	8	8-M20×130×50	12-M20×135×50
250	10	12-M20×150×50	12-M22×160×60
300	12	12-M20×160×50	16-M22×170×60
350	14	12-M22×175×45	16-M22×180×45
400	16	16-M22×185×45	16-M24×195×50
450	18	16-M22×195×45	20-M24×210×50
500	20	20-M22×215×45	20-M24×230×50

For 700S long bolts and nuts (Flange bolt hole: drilled holes)

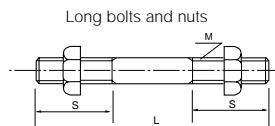
Nominal size		JIS5K	JIS10K	ANSI125Lb/150Lb
mm	inch	Long bolts and nuts	Long bolts and nuts	Long bolts and nuts
50	2	4-M12×110×25	4-M16×120×30	4-U5/8-11UNC×140×40
65	2 1/2	4-M12×110×25	4-M16×125×30	4-U5/8-11UNC×140×40
80	3	4-M16×120×30	8-M16×130×30	4-U5/8-11UNC×150×50
100	4	8-M16×125×30	8-M16×130×30	8-U5/8-11UNC×150×50
125	5	8-M16×130×30	8-M20×145×35	8-U3/4-10UNC×165×50
150	6	8-M16×140×35	8-M20×155×40	8-U3/4-10UNC×165×50
200	8	8-M20×155×40	12-M20×160×40	8-U3/4-10UNC×180×50
250	10	12-M20×175×40	12-M22×185×45	12-U7/8-9UNC×220×55
300	12	12-M20×185×40	16-M22×195×45	12-U7/8-9UNC×220×55
350	14	12-M22×205×45	16-M22×205×45	12-U1 - 8UNC×260×60
400	16	16-M22×215×45	16-M24×230×50	16-U1 - 8UNC×260×60
450	18	16-M22×225×45	20-M24×245×50	16-U1 1/8- 8UN×285×65
500	20	20-M22×245×45	20-M24×265×50	20-U1 1/8- 8UN×310×65

Remarks:
 Bolt/Nut material: SS400/SS400, SUS304/SUS304
 Heavy nut shall be used for ANSI125Lb/150Lb hexagon nuts.
 A unified screw should have 8 threads per inch if its nominal diameter exceeds 1 inch.

Example

Long bolts: 4 - M12 × 110 × 25

Quantity Nominal size (M) Length of bolt (L) Effective screw length (S)



For long bolts and nuts (Flange bolt hole: tapped holes)

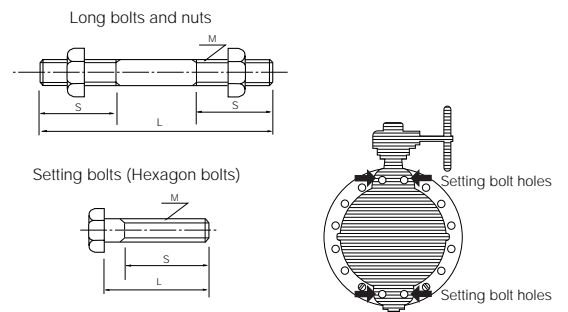
Type	Nominal size		JIS5K		JIS10K		ANSI125Lb/150Lb	
	mm	inch	Long bolts and nuts	Setting bolts	Long bolts and nuts	Setting bolts	Long bolts and nuts	Setting bolts
700S	100	4	4-M16x125x30	8-M16x40x38	4-M16x130x30	8-M16x40x38	4-U5/8-11UNCx150x50	8-U5/8-11UNCx45x38
	125	5	4-M16x130x30	8-M16x40x38	4-M20x145x35	8-M20x45x45	4-U3/4-10UNCx165x50	8-U3/4-10UNCx50x44
	150	6	4-M16x140x35	8-M16x40x38	4-M20x155x40	8-M20x50x46	4-U3/4-10UNCx165x50	8-U3/4-10UNCx50x44
	200	8	4-M20x155x40	8-M20x50x46	8-M20x160x40	8-M20x50x46	4-U3/4-10UNCx180x50	8-U3/4-10UNCx55x44
	250	10	8-M20x175x40	8-M20x50x46	8-M22x185x45	8-M22x55x50	8-U7/8-9UNCx220x55	8-U7/8-9UNCx65x50
	300	12	8-M20x185x40	8-M20x50x46	12-M22x195x45	8-M22x55x50	8-U7/8-9UNCx220x55	8-U7/8-9UNCx65x50
	350	14	8-M22x205x45	8-M22x60x50	12-M22x205x45	8-M22x60x50	8-U1-8UNCx260x60	8-U1-8UNCx75x57
	400	16	12-M22x215x45	8-M22x60x50	12-M24x230x50	8-M24x70x54	12-U1-8UNCx260x60	8-U1-8UNCx75x57
	450	18	12-M22x225x45	8-M22x60x50	16-M24x245x50	8-M24x70x54	12-U1 1/8-8UNx285x65	8-U1 1/8-8UNx85x63
	500	20	16-M22x245x45	8-M22x60x50	16-M24x265x50	8-M24x70x54	16-U1 1/8-8UNx310x65	8-U1 1/8-8UNx85x63
	550	22	16-M24x265x50	8-M24x65x54	16-M30x290x60	8-M30x80x66	—	—
600	24	16-M24x275x50	8-M24x65x54	20-M30x300x60	8-M30x80x66	16-U1 1/4-8UNx345x70	8-U1 1/4-8UNx95x70	
700E	650	26	16-M24x285x50	16-M24x65x54	16-M30x310x60	16-M30x80x66	—	—
	700	28	16-M24x295x50	16-M24x65x54	16-M30x320x60	16-M30x80x66	—	—
	750	30	16-M30x320x60	16-M30x75x66	16-M30x335x60	16-M30x80x66	—	—
	800	32	16-M30x335x60	16-M30x75x66	20-M30x345x60	16-M30x80x66	—	—
	850	34	16-M30x345x60	16-M30x75x66	20-M30x360x60	16-M30x80x66	—	—
	900	36	16-M30x360x60	16-M30x75x66	20-M30x385x65	16-M30x85x66	—	—
	1000	40	20-M30x385x65	16-M30x85x66	20-M36x420x75	16-M36x100x78	—	—
	1100	44	20-M30x420x65	16-M30x85x66	20-M36x450x80	16-M36x100x78	—	—
	1200	48	24-M30x445x65	16-M30x85x66	24-M36x475x80	16-M36x100x78	—	—
1350	54	24-M30x475x65	16-M30x85x66	28-M42x525x80	16-M42x100x90	—	—	

Remarks:
 Bolt/Nut material: SS400/SS400, SUS304/SUS304
 Heavy nut shall be used for ANSI125Lb/150Lb hexagon nuts.
 A unified screw should have 8 threads per inch if its nominal diameter exceeds 1 inch.

Example

Long bolts: 4 - M16 x 125 x 30
 Quantity Nominal size (M) Length of bolt (L) Effective screw length (S)

Setting bolts: 8 - M16 x 40 x 38
 (Hexagon bolts) Quantity Nominal size (M) Length of bolt (L) Effective screw length (S)



731P/732X/731X Piping bolt and nut sizes

Hexagon bolt and nut

Type	Nominal size		JIS 10K		JIS 16K	
	mm	inch	Hexagon bolts	Setting bolts	Hexagon bolts	Setting bolts
731P	50	2	4-M16×105×40	-	8-M16× 95×35	-
	65	2 1/2	4-M16×105×40	-	8-M16×105×40	-
	80	3	8-M16×110×40	-	8-M20×110×50	-
	100	4	8-M16×110×40	-	8-M20×120×50	-
	125	5	8-M20×120×50	-	8-M22×130×40	-
	150	6	8-M20×130×50	-	12-M22×130×40	-
	200	8	12-M20×135×50	-	12-M22×140×40	-
	250	10	12-M22×150×60	-	12-M24×155×50	-
732X	300	12	16-M22×160×60	-	16-M24×170×50	-
	350	14	16-M22×160×60	-	16-M30(P3)×180×55	-
731X	400	16	16-M24×190×45	-	16-M30(P3)×215×55	-
	450	18	20-M24×205×45	-	20-M30(P3)×230×55	-
731X	500	20	20-M24×215×45	-	20-M30(P3)×245×55	-
	600	24	20-M30×260×50	8-M30× 70×60	20-M36(P3)×285×65	8-M36(P3)×85

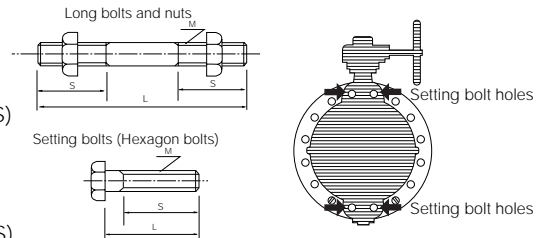
Long bolt and nut

Type	Nominal size		JIS 10K		JIS 16K	
	mm	inch	Long bolts and nuts	Setting bolts	Long bolts and nuts	Setting bolts
731P	50	2	4-M16×120×30	—	8-M16×125	—
	65	2 1/2	4-M16×125×30	—	8-M16×125	—
	80	3	8-M16×125×30	—	8-M20×135	—
	100	4	8-M16×130×30	—	8-M20×150	—
	125	5	8-M20×150×40	—	8-M22×165	—
	150	6	8-M20×155×40	—	12-M22×165	—
	200	8	12-M20×155×40	—	12-M22×170	—
	250	10	12-M22×175×45	—	12-M24×190	—
732X	300	12	16-M22×185×45	—	16-M24×210	—
	350	14	16-M22×185×45	—	16-M30(P3)×225	—
731X	400	16	16-M24×220×50	—	16-M30(P3)×260	—
	450	18	20-M24×230×50	—	20-M30(P3)×280	—
731X	500	20	20-M24×245×50	—	20-M30(P3)×295	—
	600	24	20-M30×290×60	8-M30×70×60	20-M36(P3)×340	8-M36(P3)×85

Example

Long bolts: 4 - M16 × 120 × 30
 Quantity Nominal size (M) Length of bolt (L) Effective screw length (S)

Setting bolts : 8 - M30 × 70 × 60
 (Hexagon bolts) Quantity Nominal size (M) Length of bolt (L) Effective screw length (S)



732P/732X/731X Piping bolt and nut sizes

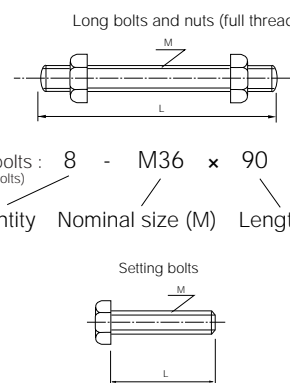
Type	Nominal size		732P/732X/731X	
	mm	inch	Long bolts and nuts	Setting bolts
732P			JIS 20K	
	50	2	8-M16×125	—
	65	2 1/2	8-M16×125	—
	80	3	8-M20×135	—
	100	4	8-M20×150	—
	125	5	8-M22×165	—
	150	6	12-M22×165	—
	200	8	12-M22×170	—
732X	250	10	12-M24×190	—
	300	12	16-M24×210	—
731X	350	14	16-M30(P3)×225	—
	400	16	16-M30(P3)×260	—
731X	450	18	20-M30(P3)×280	—
	500	20	20-M30(P3)×295	—
600	24	20-M36(P3)×340	8-M36(P3)×90	

Example

Long bolts: 8 - M16 × 125
 Quantity Nominal size (M) Length of bolt (L)

Long bolts and nuts (full thread)

Setting bolts : 8 - M36 × 90
 (Hexagon bolts) Quantity Nominal size (M) Length of bolt (L)



704G/722F/720F Piping bolts sizes

Type	Nominal size		JIS 5K		JIS 10K	
	mm	inch	Hexagon bolts and nuts	Hexagon bolts	Hexagon bolts and nuts	Hexagon bolts
704G	50	2	—	8-M12×30×25	—	8-M16×35×30
	65	2 1/2	—	8-M12×35×30	—	8-M16×35×30
	80	3	—	8-M16×35×30	—	16-M16×35×30
	100	4	—	16-M16×40×35	—	16-M16×40×35
722F	125	5	8-M16×60×38	8-M16×40×35	8-M20×65×46	8-M20×45×37
	150	6	8-M16×60×38	8-M16×40×35	8-M20×70×46	8-M20×50×42
	200	8	8-M20×65×46	8-M20×50×42	16-M20×70×46	8-M20×50×42
	250	10	16-M20×70×46	8-M20×50×42	16-M22×75×50	8-M22×50×42
	300	12	16-M20×70×46	8-M20×50×42	24-M22×75×50	8-M22×50×42
	350	14	16-M22×80×50	8-M22×55×47	24-M22×80×50	8-M22×55×47
	400	16	24-M22×85×50	8-M22×55×47	24-M24×90×54	8-M24×60×50
	450	18	24-M22×90×50	8-M22×60×50	32-M24×100×54	8-M24×65×54
	500	20	32-M22×90×50	8-M22×60×50	32-M24×100×54	8-M24×70×54
	550	22	32-M24×100×54	8-M24×65×54	32-M30×110×66	8-M30×70×54
	600	24	32-M24×100×54	8-M24×65×54	40-M30×110×66	8-M30×70×54
	650	26	40-M24×100×54	8-M24×70×54	40-M30×110×66	8-M30×80×66
	700	28	40-M24×100×54	8-M24×70×54	40-M30×110×66	8-M30×80×66
	750	30	40-M30×110×66	8-M30×80×66	40-M30×115×66	8-M30×80×66
800	32	40-M30×110×66	8-M30×80×66	48-M30×115×66	8-M30×80×66	
720F	850	34	40-M30×110×66	8-M30×80×66	48-M30×115×66	8-M30×80×66
	900	36	40-M30×115×66	8-M30×75×66	48-M30×120×66	8-M30×80×66
	1000	40	40-M30×130×72	16-M30×90×66	40-M36×145×84	16-M36×110×78
	1100	44	40-M30×130×72	16-M30×90×66	40-M36×145×84	16-M36×110×78
	1200	48	48-M30×130×72	16-M30×90×66	48-M36×150×84	16-M36×110×78
	1350	54	56-M30×135×72	16-M30×90×66	56-M42×165×96	16-M42×110×90

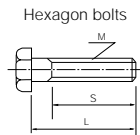
Remarks:

1. The bolt for valve positioning uses the screw hole.
2. The hexagon bolt is used in the screw hole part for valve positioning.
3. Please use a hexagon nut with 80% threading.
4. For uses other than marine, use SS400 as the bolt (and nut) material.

Example

Hexagon bolts: 4 - M30 × 95 × 65

Quantity Nominal size (M) Length of bolt (L) Effective screw length (S)



APPLICABLE PIPE LIST IN CASE OF A AND B

: Installation possible, -: No standard, /: No supported nominal size

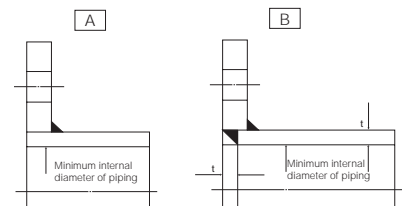
Nominal size (mm)	SGP					STPY					Sch20				
	700G	705G 704G	731P 732P 732X 731X	700S 700E	704G 722F 720F	700G	705G 704G	731P 732P 732X 731X	700S 700E	704G 722F 720F	700G	705G 704G	731P 732P 732X 731X	700S 700E	704G 722F 720F
40						-					-				
50						-									
65						-									
80						-									
100						-									
125						-									
150						-									
200						-									
250						-									
300						-									
350															
400															
450															
500															
550				-	-										
600	-	-	-	-	-										
650				-	-										
700				-	-									-	-
750				-	-									-	-
800				-	-									-	-
850				-	-									-	-
900				-	-									-	-
1000				-	-									-	-
1100				-	-									-	-
1200				-	-									-	-
1350				-	-									-	-

: Installation possible, -: No standard, /: No supported nominal size

Nominal size (mm)	Sch40					Minimum internal diameters of piping (mm)				
	700G	705G 704G	731P 732P 732X 731X	700S 700E	704G 722F 720F	700G	705G 704G	731P 732P 732X 731X	700S 700E	704G 722F 720F
40						25				
50						34	34	34	37	34
65						51	51	51	59	51
80						70	70	70	67	70
100						91	91	91	91	91
125						118	118	118	118	118
150						144	144	144	143	143
200						194	194	194	187	187
250						246	246	246	240	240
300						294	294	294	286	286
350						330	330	332	322	322
400						381	381	379	372	372
450						427	427	428	421	421
500						477	477	477	463	463
550									509	509
600						567	567	569	566	566
650									612	612
700				-	-				653	653
750				-	-				705	705
800				-	-				754	754
850				-	-				803	803
900				-	-				834	834
1000				-	-				950	950
1100				-	-				1040	1040
1200				-	-				1138	1138
1350				-	-				1277	1277

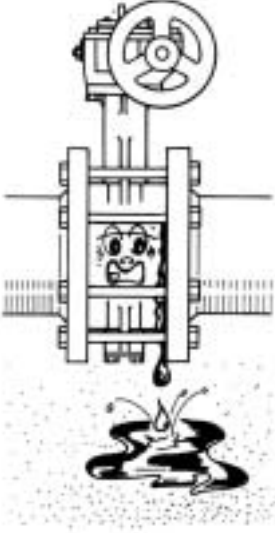
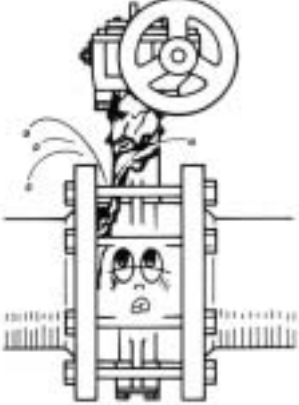
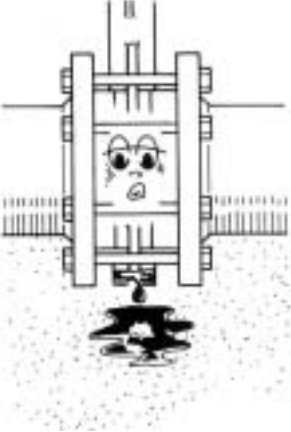
Remark:

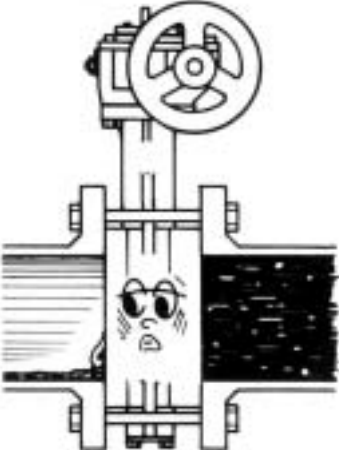
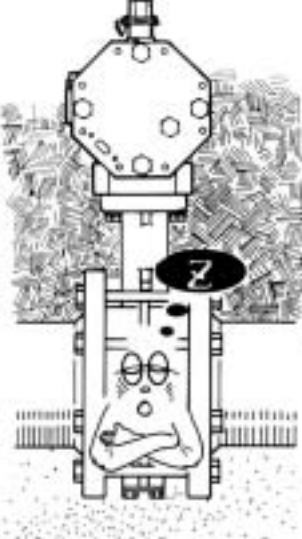
Butterfly valves are inserted into a pipe that was fitted with the disc when fully open. You are using a pipe or flange that is less than the minimum inner pipe diameter, use is still possible if means are taken such as inserting a spacer between the valve and flange. For details, please consult us.



TROUBLESHOOTING

Please refer to the following when there is a problem with a valve.

Problem	Cause	Countermeasure
<p data-bbox="180 353 580 421">There is a leak between the body and pipe flange faces.</p> 	<p data-bbox="635 353 1038 421">The piping bolts are loose or they were not tightened evenly.</p>	<p data-bbox="1093 353 1458 421">Loosen the bolts and then retighten them.</p>
	<p data-bbox="635 461 1011 591">The flange gasket face is scratched or there is waste material or other foreign matter adhering.</p>	<p data-bbox="1093 461 1493 560">Remove the body and clean the flange gasket face. Clean the piping flange gasket face and re-install the valve.</p>
	<p data-bbox="635 647 927 680">The valve is misaligned.</p>	<p data-bbox="1093 647 1481 714">Loosen the bolts and realign the valve correctly.</p>
	<p data-bbox="635 757 956 790">Torn or damaged seat ring</p>	<p data-bbox="1093 757 1493 913">Remove the valve body and check the seat ring for signs of tearing or other damage. If any damage is observed, replace the seat ring.</p>
<p data-bbox="180 1025 544 1059">There is a leak from the gland.</p> 	<p data-bbox="635 1025 927 1059">The valve is misaligned.</p>	<p data-bbox="1093 1025 1481 1093">Loosen the bolts and realign the valve correctly.</p>
	<p data-bbox="635 1133 956 1167">Torn or damaged seat ring</p>	<p data-bbox="1093 1133 1493 1290">Remove the valve body and check the seat ring for signs of tearing or other damage. If any damage is observed, replace the seat ring.</p>
<p data-bbox="180 1585 552 1641">There is a leak from the bottom cover.</p> 	<p data-bbox="635 1585 983 1641">The bottom cover installation bolts are loose.</p>	<p data-bbox="1093 1585 1430 1641">Re-tighten the bottom cover installation bolts.</p>
	<p data-bbox="635 1693 1027 1749">The seat packing is damaged or has deteriorated.</p>	<p data-bbox="1093 1693 1481 1749">Replace the seat packing with a new one.</p>
	<p data-bbox="635 1803 927 1836">The valve is misaligned.</p>	<p data-bbox="1093 1803 1481 1870">Loosen the bolts and realign the valve correctly.</p>
	<p data-bbox="635 1912 956 1946">Torn or damaged seat ring</p>	<p data-bbox="1093 1912 1493 2069">Remove the valve body and check the seat ring for signs of tearing or other damage. If any damage is observed, replace the seat ring.</p>

Problem	Cause	Countermeasure
<p data-bbox="108 136 512 197">There is leaking from the valve seat.</p> 	<p data-bbox="555 136 968 226">The wrong material was selected for the fluid application. (Parts are being corroded.)</p>	<p data-bbox="1018 136 1358 226">Change the material. Please inquire with us regarding selection.</p>
	<p data-bbox="555 286 983 376">There is damage to the disc seal or seat ring due to the presence of foreign matter inside the piping.</p>	<p data-bbox="1018 286 1401 347">Replace the disc seal wrapping and the seat ring.</p>
	<p data-bbox="555 443 903 504">Movement of disc in the fully closed position.</p>	<p data-bbox="1018 443 1417 504">Adjust the fully closed position of the disc.</p>
	<p data-bbox="555 555 983 616">The disc cannot fully close due to insufficient output from the actuator.</p>	<p data-bbox="1018 555 1382 616">Refer to the actuator selection table for correction.</p>
	<p data-bbox="555 701 983 790">Fluid specification is not compatible with valve specification. (Specifications have been exceeded.)</p>	<p data-bbox="1018 701 1358 734">Re-check the specifications.</p>
	<p data-bbox="555 813 959 902">There is torsion of stem due to an unusual increase in opening/closing torque.</p>	<p data-bbox="1018 813 1310 846">Replace the valve body.</p>
	<p data-bbox="555 925 943 1014">Movement of disc in fully closed position due to loose actuator installation bolts.</p>	<p data-bbox="1018 925 1382 1014">Re-adjust the fully closed disc position by re-tightening the installation bolts.</p>
	<p data-bbox="555 1037 959 1126">Uneven connection between seat ring and disc due to unequal tightening of piping bolts.</p>	<p data-bbox="1018 1037 1417 1097">Loosen the piping bolts and then re-tighten them.</p>
	<p data-bbox="555 1182 943 1243">Wearing of seat ring due to long period of use.</p>	<p data-bbox="1018 1182 1278 1216">Replace the seat ring.</p>
<p data-bbox="108 1294 512 1355">Faulty operation (The valve does not work.)</p> 	<p data-bbox="555 1294 975 1355">Prescribed actuator air pressure or voltage not being supplied.</p>	<p data-bbox="1018 1294 1342 1355">Check by using a pressure gauge, tester, or similar.</p>
	<p data-bbox="555 1406 951 1529">For pneumatic pressure cylinder types, diaphragm of speed controller is stuck in the fully closed position.</p>	<p data-bbox="1018 1406 1342 1467">Open the diaphragm of the speed controller.</p>
	<p data-bbox="555 1552 895 1612">By-pass valve is in the open position.</p>	<p data-bbox="1018 1552 1310 1585">Close the by-pass valve.</p>
	<p data-bbox="555 1630 975 1691">Insufficient output due to damaged cylinder parts.</p>	<p data-bbox="1018 1630 1382 1753">Apply the prescribed pressure and observe functioning. If defective parts are suspected, replace them with new parts.</p>
	<p data-bbox="555 1776 903 1809">Erroneous actuator selection.</p>	<p data-bbox="1018 1776 1382 1836">Refer to the actuator selection table for correction.</p>
	<p data-bbox="555 1888 967 1948">Increased torque due to presence of foreign matter in the piping.</p>	<p data-bbox="1018 1888 1414 1977">Keep valve in the fully opened position and flush out the foreign material.</p>

The specifications are subject to change without notice. Please consult us for the latest specifications.
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TOMOE VALVE CO., LTD. www.tomoevalve.com

Head Office
3-11-11 Shinmachi, Nishi-ku, Osaka 550-0013, Japan
Telephone: 81-6-6110-2101/2102/2103 Telefax: 81-6-6110-2105/2106 E-mail:sales@tomoevalve.com

Global Sales Operations

TOMOE VALVE ASIA PACIFIC PTE. LTD.

Blk 8 Chia Ping Road #07-11 Singapore 619973
Telephone: 65-68995060 Telefax: 65-68995061 E-mail:sales@tomoe.com.sg

TOMOE VALVE LIMITED www.tomoeurope.co.uk

Clearwater Road, Queensway Meadows Industrial Estate,
Newport, South Wales NP19 4ST, United Kingdom
Telephone: 44-1633-636800 Telefax: 44-1633-636801 E-mail:sales@tomoevalve.co.uk
sales@tomotrtec.co.uk

TOMOE VALVE CORPORATION

600, Rockmead Drive Suite 115,
Kingwood, Houston Texas, 77339, USA
Telephone: 001-281-358-7571/7859 Telefax: 001-281-358-7861

Regional Office : Abu Dhabi, Dubai