TAWD
TRANSWORLD STEEL

J.S.COCK A/S

OPERATION MANUAL

Series F502

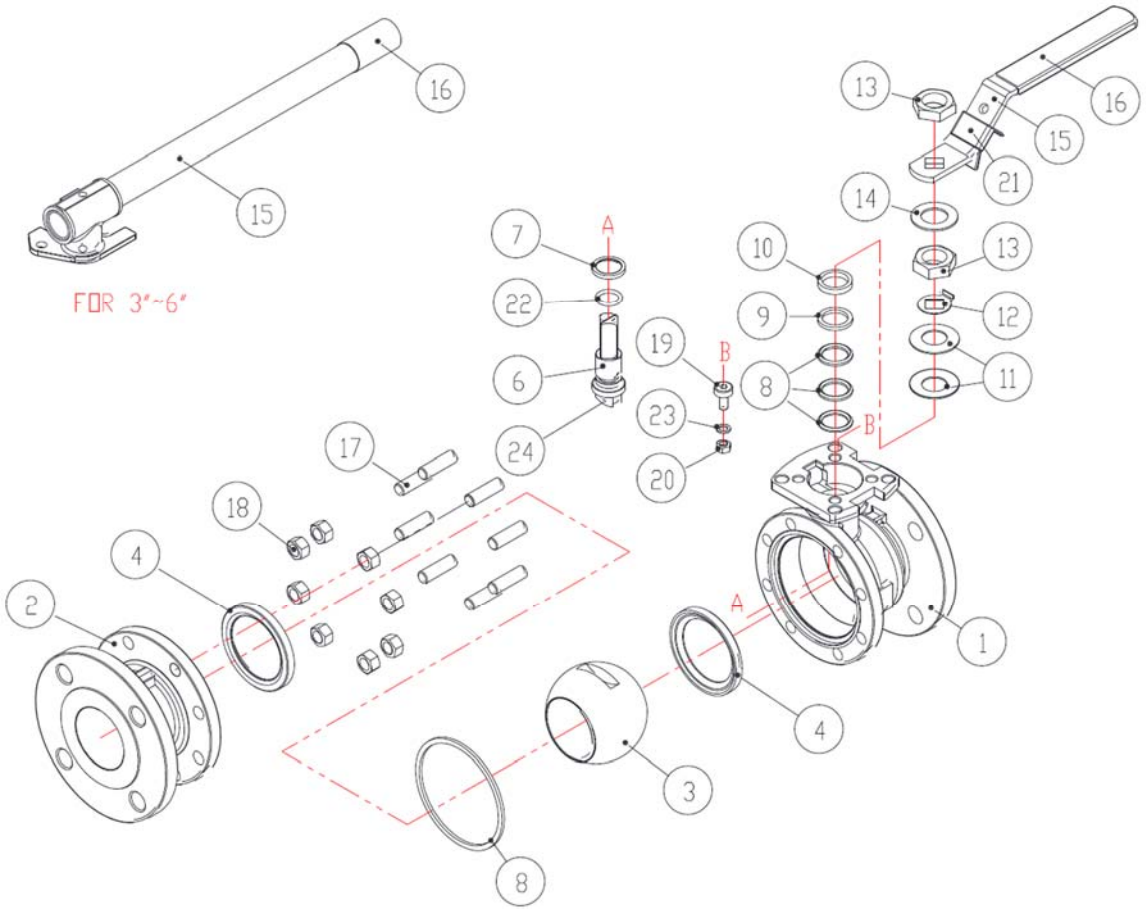
TWO-PIECE FLANGE BALL VALVE

Ver. 2023

INSTALLATION & MAINTENANCE MANUAL

Series F502

Two-piece Full Port Ball Valve



Materials List

No.	Part Name	QTY	Material
1	Body	1	1.4408/1.0619
2	End cap	1	1.4408/1.0619
3	Ball	1	SS316/1.4408
4	Seat	2	CTFE/TFM1600
5	Joint gasket	1	SS316 w/ Graphite
6	Stem	1	SS316
7	Thrust washer	1	RTFE
8	Gland packing	&	Graphite
9	Gland packing	1	25% Glass fiber filled + PTFE
10	Gland Bush	1	SS316
11	Belleville Washer	2	SS301
12	Stop Washer	1	SS316
13	Stem nut	2	SS316
14	Stem Washer	1	SS316

No.	Part Name	QTY	Material
15	Handle	1	SS316
16	Handle Cover	1	VINYL
17	Bolt	*	SS316
18	Bolt Nut	*	SS316
19	Stop Pin	1	SS316
20	Pin Nut	1	SS316
21	Locking Device	1	SS316
22	O-ring	1	VITON
23	Washer	1	SS316
24	Anti-Static Device	2	SS316

PS:
&For1/2”~1-1/4” QTY=2；1-1/2”~6” QTY=3
For 1/2”~2”-4pcs of bolts and bolt nuts
For 2-1/2”~5”-8pcs of bolts and bolt nuts
For 6”-10pcs of bolts and bolt nuts

Note: Certain materials diverge between valves - see individual datasheet for correct composition.

1. USE:

Life of valve can be prolonged if the valve is used within the rated range, in accordance with pressure, temperature, and corrosion parameters.

2. Manual Operation:

The valve's open or closed state is altered by giving the lever a quarter-turn (90-degrees).

— Valve in Open Position: The lever is parallel to the valve or pipeline.

— Valve in Closed Position: The lever is perpendicular to the valve or pipeline.

3. Automated Operation:

For valves fitted with actuators, ensure proper alignment of the valve stem. Misalignment, either angular or linear, will lead to increased operational torque and unnecessary wear on the stem seal.

4. General Information for Installation:

— The valve may be fitted in any position on the pipeline.

— To avoid damaging the internal components, such as the seats and ball, the pipeline must be flushed, free of dirt, burrs, and welding residues before installing the valve.

5. Disassembling & Cleaning the Valve:

— If the valve has been in contact with hazardous substances, decontamination is required before disassembly.

— The valve arrives pre-lubricated with a silicone-free lubricant from the manufacturer. If this is incompatible with your needs, you may disassemble and clean the valve parts using a suitable solvent.

6. Replacing the Thrust Washer and Packing:

Before replacing the thrust washer and the packing, the pipeline must be de-pressurized.

Note:Leakage from the stem seal might be fixed without replacing the seal and/or packing. Tighten the packing nut to compress the belleville washers. If leakage persists or valve' s operating torque becomes excessive, it is likely that the seals are worn and must be replaced.

— Remove all flange bolts and nuts and lift the valve from the pipeline. Care should be taken to avoid scratching or damaging serrated gasket. The valves are heavy, and they should be properly supported before detachment.

— Unscrew the stem nut and remove handle and stop plate. Proceed to, remove lock saddle, packing nuts, belleville washers and the gland. Finally, complete the welding for both end caps on the pipe.

— Use appropriate wrench to remove the body bolt nuts and lift off the body end. One seat should come out with the body end.

- Remove the body seal.
- To take out the ball, rotate the stem so the ball is in a fully closed position. To lift the ball from the body, use a lifting strap and lifting device if needed. Extreme caution should be taken to avoid damage to the ball.
- Remove the other seat.
- Stem must be removed from inside the body. A gentle tap on the top should loosen it. The thrust washer should come out with the stem. Lastly, remove the stem packing.

7. Visual Inspection:

Clean and inspect the metal parts. Replacement of the ball or stem is only required if there are visible signs of abrasion or corrosion. We strongly recommend replacement of all soft parts whenever the valve is disassembled for reconditioning. We supply replacement kits that contain all the replaceable components.

Note: The valve may be assembled and operated dry without any lubricant. However, a light lubrication will help with assembly and reduce initial operating torque. Lubricant used must be compatible with the intended line fluid.

8. Assembly:

- Install one seat in the body cavity with the spherical curvature oriented towards the ball.
- Place the stem seal on the stem and carefully insert the stem horizontally into the center body with the threaded side first and guide it up through the stem bore.
- Hold the stem up and place the new packing set over the stem and fitting it into the stem bore. Then place the gland, belleville washer, lock saddle, stem nut onto the stem.
- Secure the stem nut onto the stem. Tighten the stem nut with proper torque.
- Rotate the handle to the closed position. Align the ball slot with the stem end and slide the ball into position. Then rotate the handle to the open position to hold the ball in place.
- Install the remaining seat into body side.
- Fit the body seal gasket into the body and aligned with the end flange. Because the body flange bolt pattern is different from the line flange bolt pattern, it is possible to assemble the valve such that the line flanges bolt pattern don' t line up. Be certain to align end flanges bolt holes to straddle valve center lines. Be careful not to damage body seal when putting cap end into body.
- Secure the cap end nuts and tighten in the "star pattern" to the proper torque. Extreme care must be exercised during adjustment of cap end nuts to make sure that complete engagement of the studs with body flange is maintained. There should be at least one stud thread exposed on each side.
- Cycle the valve slowly, with a gentle back and forth motion, to build gradually to the full quarter turn. By cycling slowly, the seat lips will assume a permanent seal shape against the ball. A quick turn may cut the seats before they have a chance to form the proper seal.
- If feasible, test the valve before reinstalling it. If not properly secured, the valve can separate from the pressure source, resulting in possible injury. Always join the valve to companion flanges of same pressure rating as valve and secure with a full set of flange bolts.

9. Test As Follows:

— Secure valve to a test fixture by means of a matching flange and full bolting, along with an appropriate sealing gasket. Orient valve so seat to be tested is facing up.

— Apply air pressure between 50 to 100 psi, and partially operate the valve under this pressure, then slowly close to make sure the cavity is pressurized (while using ear protection). Pour water into the upper port to cover the ball and visually check for bubbles. If any bubbles surface, drain the water, cycle the valve a few more times and recheck. To check for leakage in the other port, reverse the valve and apply air pressure to the port just checked.

— To assess the stem seal, apply a water /soap solution to the top area of the stem. If a leakage is found, tighten stem seal just until leakage stops.

Standard (PTFE SEATS)

Valve Size		Break Away Torque F502-10 Series		Cv
Inch	DN	In-lbs.	Nm	G. P .M.
1/2"	15	80	9	15
3/4"	20	115	13	40
1"	25	142	16	70
11/4"	32	195	22	110
11/2"	40	336	31	250
2"	50	354	38	430
21/2"	65	487	55	700
3"	80	823	93	1100
4"	100	894	101	2000
5"	125	1956	170	3700
6"	150	2700	234	5400

Fire safe (PTFE SEATS)

Valve Size		Break Away Torque F502-10 Series		Cv
Inch	DN	In-lbs.	Nm	G. P .M.
1/2"	15	80	9	15
3/4"	20	115	13	40
1"	25	142	16	70
11/4"	32	195	22	110
11/2"	40	336	31	250
2"	50	354	38	430
21/2"	65	487	55	700
3"	80	823	93	1100
4"	100	894	101	2000
5"	125	1956	170	3700
6"	150	2700	234	5400

30% safety factor included.

— Torque of Body Bolts

Valve Size	Threads for F502-10/20 Series	lbf-in			kgf-cm			N-m		
1/2"	5/16"-18UNC	174	~	200	200	~	230	19.6	~	22.5
3/4"	5/16"-18UNC	200	~	217	230	~	250	22.5	~	24.5
1"	7/16"-14UNC	260	~	286	300	~	330	29.4	~	32.3
1.1/4"	7/16"-14UNC	286	~	304	330	~	350	32.3	~	34.3
1.1/2"	7/16"-14UNC	286	~	304	330	~	350	32.3	~	34.3
2"	1/2"-13UNC	347	~	391	400	~	450	39.2	~	44.1
2.1/2"	1/2"-13UNC	347	~	391	400	~	450	39.2	~	44.1

3"	9/16"-12UNC	477	~	521	550	~	600	53.9	~	58.8
4" (#150)	9/16"-12UNC	477	~	521	550	~	600	53.9	~	58.8
4" (#300)	5/8"-11UNC	625	~	694	720	~	800	70.6	~	78.4
5"	9/16"-12UNC	477	~	521	550	~	600	53.9	~	58.8
6" (#150)	9/16"-12UNC	477	~	521	550	~	600	53.9	~	58.8
6" (#300)	3/4"-10UNC	1302	~	1476	1500	~	1700	147.0	~	166.6
8"	3/4"-10UNC	1302	~	1476	1500	~	1700	147.0	~	166.6
10"	3/4"-10UNC	1302	~	1476	1500	~	1700	147.0	~	166.6
12"	3/4"-10UNC	1302	~	1476	1500	~	1700	147.0	~	166.6

— Torque of Body Bolts:

Valve Size	Threads for F502-40/60 Series	lbf-in			kgf-cm			N-m		
1/2"	M8	174	~	200	200	~	230	19.6	~	22.5
3/4"	M8	200	~	217	230	~	250	22.5	~	24.5
1"	M10	260	~	286	300	~	330	29.4	~	32.3
1.1/4"	M10	286	~	304	330	~	350	32.3	~	34.3
1.1/2"	M12	347	~	391	400	~	450	39.2	~	44.1
2"	M12	347	~	391	400	~	450	39.2	~	44.1
2.1/2"	M12	347	~	391	400	~	450	39.2	~	44.1
3"	M14	477	~	521	550	~	600	53.9	~	58.8
4"	M14	477	~	521	550	~	600	53.9	~	58.8
5"	M14	477	~	521	550	~	600	53.9	~	58.8
6" (PN16)	M14	477	~	521	550	~	600	53.9	~	58.8
6" (PN40)	M16	1042	~	1215	1200	~	1400	117.6	~	137.2
8"	M16	1042	~	1215	1200	~	1400	117.6	~	137.2
10"	M16	1042	~	1215	1200	~	1400	117.6	~	137.2
12"	M16	1042	~	1215	1200	~	1400	117.6	~	137.2

10. Media and Service Factors for sizing:

Torque Determination: = Basic Torque * Media Factor * Service Factor= Sizing Torque

Media Factors	Multiplier
Clean, particle free, non-lubricating (water, alcohol, etc)	1.00
Clean, particle free, non-lubricating (oils, hydraulic fluid, etc)	0.80

Slurries or heavily corroded and contaminated systems	2.00
Gas or saturated steam, clean and wet	1.00
Gas or superheated steam, clean and dry	1.30
Gas, dirty unfiltered e.g. natural gas, Chlorine	1.50
Service Factors	**Multiplier**
Simple On and Off Operations	1.00
Throttling	1.20
Positioner Control	1.50
Once per day Operations	1.20
Once every two days or a “Plant Critical” Operation	1.50

11. Remark:

— Do not connect the system before valve pipeline installation to the earthing connection has been inspected, examined and approved by the client.

— The pipeline should be free of any potentially explosive environments.

— Do not allow dust layers on the transportation media as it could charge the valve during high velocity of transportation. The flammable material shall be prohibited to be used on the valve.