

OPERATION MANUAL



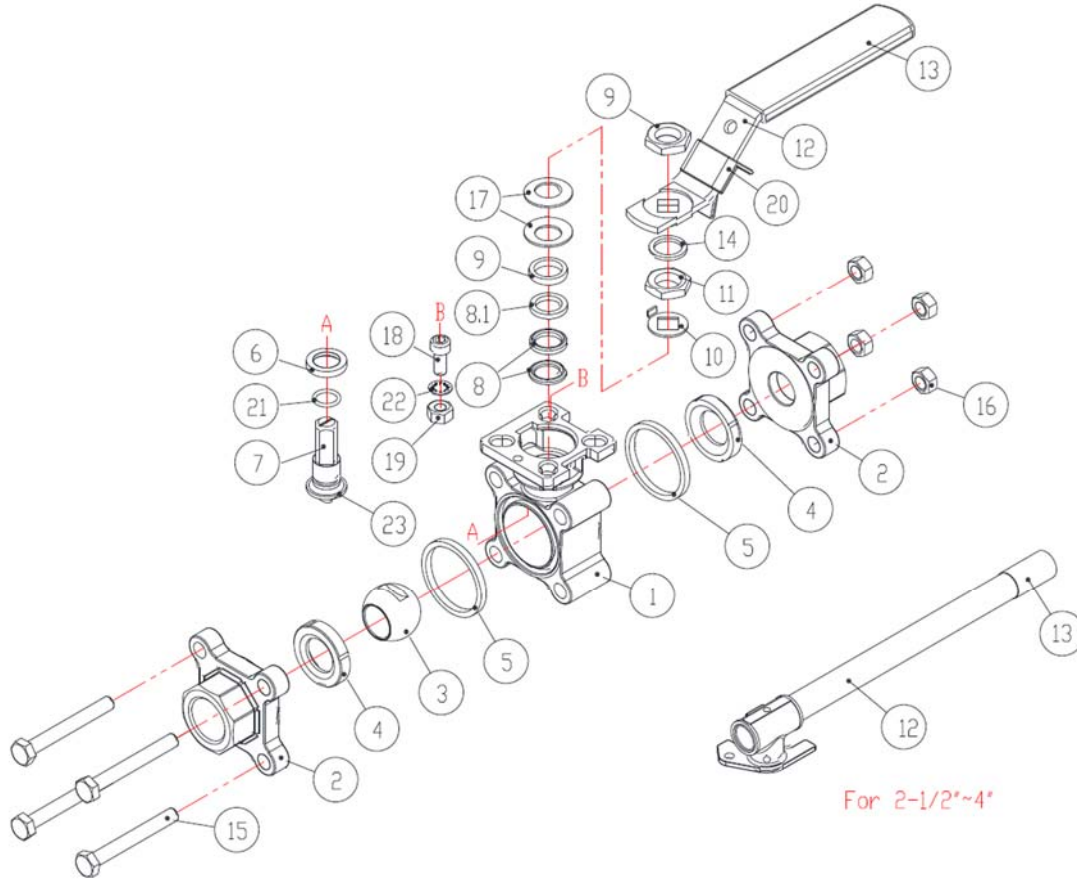
Series S600

THREE-PIECE BALL VALVE

INSTALLATION & MAINTENANCE MANUAL

Series S600

Three-piece Full Port or Reduced Port Ball Valve



Materials List			
No.	Part Name	QTY	Material
1	Body	1	CF8M/WCB
2	End cap	2	CF8M/WCB
3	Ball	1	SS316/CF8M
4	Seat	2	CTFE
5	Joint gasket	2	Graphite
6	Thrust Washer	1	RTFE
7	Stem	1	SS316
8	Gland Packing	1	Graphite
8.1	Gland Packing	1	25% Glass fiber filled + PTFE
9	Gland Bush	1	SS316
10	Stop Washer	1	SS316
11	Stem Nut	2	SS316
12	Handle	1	SS316
13	Handle Cover	1	Vinyl

14	Stem Washer	1	SS316
15	Bolt	*	SS316
16	Bolt nut	*	SS316
17	Belleville washer	2	SS301
18	Stop Pin	1	SS316
19	Pin Nut	1	SS316
20	Locking Device	1	SS316
21	O-ring	1	VITON
22	Washer	1	SS316
23	Anti-static device	@	SS316

PS :

*For 1/4" to 1-1/2"-4pcs ; 2"-4"-6pcs

@For 1/4" to 1/2"-1pcs ; 3/4"-4"-2pcs

For 4"- When Body and End Cap were CF8M, bolts and bolt nuts are SS316 ; When Body and End Cap were WCB, bolts are B7M, bolt nuts are 2HM

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. Disassembly & Cleaning Procedure:

Caution : Ball valve may be residual fluid in the ball cavity when closed.

If the valve has been used to control hazardous media, it must be decontaminated before disassembly. It is recommended that the following steps are taken for safe removal and reassembly.

- Relieve the line pressure.
- Place valve in half-open position and flush the line to remove any hazardous material from the valve.
- All persons involved in the removal and disassembly of the valve should wear the proper Protective clothing, such as face shield, gloves, etc.

Maintenance of parts is easy, even if the valve is installed in the line:

- By removing all the body bolts except one, then loosening the remaining bolt, the valve body can be swung out. Seats, gaskets and ball can be replaced without disturbing pipe alignment.
- On threaded lines, valve can be screwed on without the use of unions, as the three-piece construction makes valve ends free, by removing the bolts.

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. Installation of Threaded Valves:

- Use a sealant, such as hemp core, Teflon, etc. on the threads that is compatible with the intended service.
- Apply wrench only on the hexagon of the valve ends. Tightening by using the valve body or lever can seriously damage the valve.
- In some applications, screwed valves are back welded on site, these valves must be treated as per instructions for weld end valves before back welding. (See item 6 and illustration page 6)

6. Installation of Weld-End Valves:

- Tack welds the valve on the pipe in four points on both end caps.
- With the valve in the open position, (lever to be parallel to the axis of the pipe), remove all the body bolts except one. Loosen the nut on the remaining bolt
- Swing the body outside the pipe and remove seats and ball to prevent accidental damage and protect the exposed valve body and ends from weld splatter.
- Finish welding both end caps on the pipe.
- When cooled down, clean both end caps and body surface.
- Lightly lubricate ball seats (with a media compatible lubricant) and install ball and seats into body taking care to install larger curve of the seats facing the ball.
- Swing the body back in position and replace the bolts. Tighten all nuts slightly. This Operation is very important, to keep body and end caps perfectly parallel, thus preventing distortion of the end caps.
- Tighten body bolts evenly. Make sure that maximum tightening torque is observed.
- Check proper operation of the valve and hydrostatic system and check for leaks.

7. Bolt Tightening Specifications:

- The body bolts of the valve should be tightened evenly.
- Tighten one-side snugly, then the one diagonal across.
- Repeat for the other bolts, bringing them all down tightly in sequence.
- Torque of Body Bolt: [Full Bore S600 Series](#)

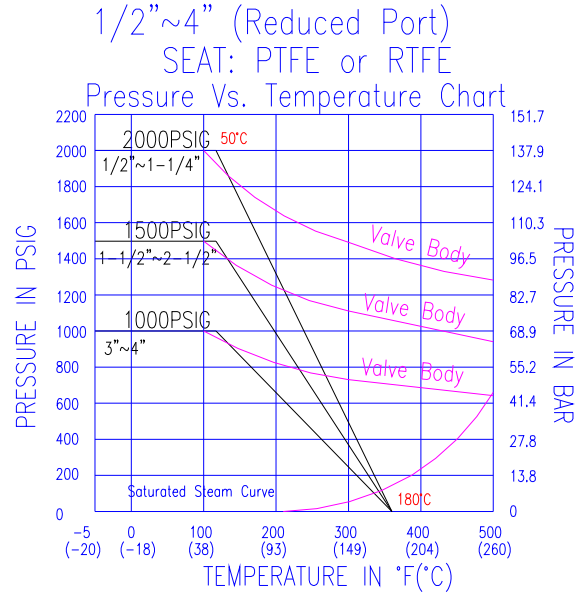
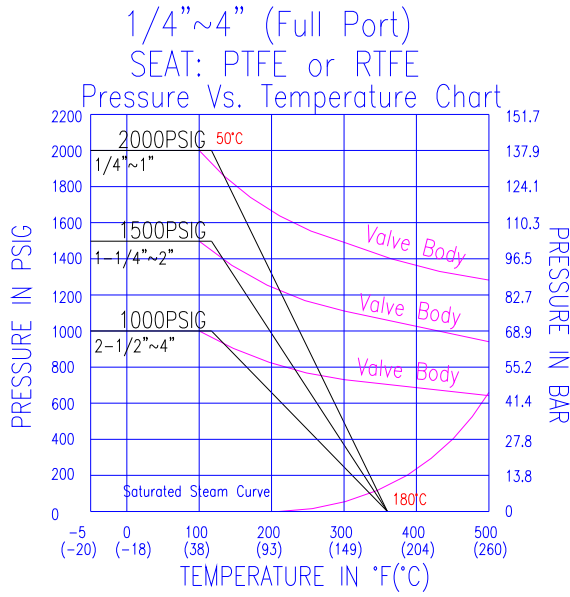
Size	Threads	lbf-in	kgf-cm	N-m	Threads	lbf-in	kgf-cm	N-m
1/4"	1/4"-20UNC	87 ~ 95	100 ~ 110	9.8 ~ 10.8	M6	87 ~ 95	100 ~ 110	9.8 ~ 10.8
3/8"	1/4"-20UNC	87 ~ 95	100 ~ 110	9.8 ~ 10.8	M6	87 ~ 95	100 ~ 110	9.8 ~ 10.8
1/2"	1/4"-20UNC	95 ~ 130	110 ~ 150	10.8 ~ 14.7	M6	95 ~ 130	110 ~ 150	10.8 ~ 14.7
3/4"	5/16"-18UNC	122 ~ 156	140 ~ 180	13.7 ~ 17.6	M8	122 ~ 156	140 ~ 180	13.7 ~ 17.6
1"	5/16"-18UNC	165 ~ 200	190 ~ 230	18.6 ~ 22.5	M8	165 ~ 200	190 ~ 230	18.6 ~ 22.5
1.1/4"	3/8"-16UNC	191 ~ 217	220 ~ 250	21.6 ~ 24.5	M10	191 ~ 217	220 ~ 250	21.6 ~ 24.5
1.1/2"	3/8"-16UNC	330 ~ 365	380 ~ 420	37.2 ~ 41.2	M10	330 ~ 365	380 ~ 420	37.2 ~ 41.2
2"	7/16"-14UNC	391 ~ 434	450 ~ 500	44.1 ~ 49	M12	391 ~ 434	450 ~ 500	44.1 ~ 49
2.1/2"	9/16"-12UNC	625 ~ 694	720 ~ 800	70.6 ~ 78.4	M14	625 ~ 694	720 ~ 800	70.6 ~ 78.4
3"	5/8"-11UNC	694 ~ 781	800 ~ 900	78.4 ~ 88.2	M16	694 ~ 781	800 ~ 900	78.4 ~ 88.2
4"	5/8"-11UNC	694 ~ 781	800 ~ 900	78.4 ~ 88.2	M16	694 ~ 781	800 ~ 900	78.4 ~ 88.2

- Torque of Body Bolt: [Reduced Bore S600 Series](#)

Size	Threads	lbf-in	kgf-cm	N-m	Threads	lbf-in	kgf-cm	N-m
1/2"	1/4"-20UNC	87 ~ 95	100 ~ 110	9.8 ~ 10.8	M6	87 ~ 95	100 ~ 110	9.8 ~ 10.8
3/4"	1/4"-20UNC	95 ~ 130	110 ~ 150	10.8 ~ 14.7	M6	95 ~ 130	110 ~ 150	10.8 ~ 14.7
1"	5/16"-18UNC	122 ~ 156	140 ~ 180	13.7 ~ 17.6	M8	122 ~ 156	140 ~ 180	13.7 ~ 17.6
1.1/4"	5/16"-18UNC	165 ~ 200	190 ~ 230	18.6 ~ 22.5	M8	165 ~ 200	190 ~ 230	18.6 ~ 22.5
1.1/2"	3/8"-16UNC	191 ~ 217	220 ~ 250	21.6 ~ 24.5	M10	191 ~ 217	220 ~ 250	21.6 ~ 24.5
2"	3/8"-16UNC	330 ~ 365	380 ~ 420	37.2 ~ 41.2	M10	330 ~ 365	380 ~ 420	37.2 ~ 41.2
2.1/2"	7/16"-14UNC	391 ~ 434	450 ~ 500	44.1 ~ 49	M12	391 ~ 434	450 ~ 500	44.1 ~ 49
3"	9/16"-12UNC	625 ~ 694	720 ~ 800	70.6 ~ 78.4	M14	625 ~ 694	720 ~ 800	70.6 ~ 78.4
4"	5/8"-11UNC	694 ~ 781	800 ~ 900	78.4 ~ 88.2	M16	694 ~ 781	800 ~ 900	78.4 ~ 88.2

— Tensioning Torque of stem nut: 1 kg-cm = 0.098Nm = 0.868 In-lbs.

Size		Torque of stem nut for Standard O-ring Type			Torque of stem nut for Standard O-ring Type			Torque of stem nut for Non-Standard Non-O-ring Type			Torque of stem nut for Non-Standard Non-O-ring Type		
		S600 Series Non-fire safe valve			S600 Series Fire Safe valve			S600 Series Non-fire safe valve			S600 Series Fire Safe valve		
Full port	Red Port	In-lbs.	Nm	kg-cm	In-lbs.	Nm	kg-cm	In-lbs.	Nm	kg-cm	In-lbs.	Nm	kg-cm
1/4"		61	6.9	70	78	8.8	90	69	7.8	80	78	8.8	90
3/8"	1/2"	61	6.9	70	78	8.8	90	69	7.8	80	78	8.8	90
1/2"	3/4"	69	7.8	80	87	9.8	100	78	8.8	90	87	9.8	100
3/4"	1"	69	7.8	80	87	9.8	100	78	8.8	90	87	9.8	100
1"	1.1/4"	95	10.8	110	104	11.8	120	122	13.7	140	130	14.7	150
1.1/4"	1.1/2"	95	10.8	110	104	11.8	120	122	13.7	140	130	14.7	150
1.1/2"	2"	139	15.7	160	148	16.7	170	200	22.5	230	174	19.6	200
2"	2.1/2"	139	15.7	160	148	16.7	170	200	22.5	230	174	19.6	200
2.1/2"	3"	165	18.6	190	191	21.6	220	191	21.6	220	208	23.5	240
3"	4"	182	20.6	210	191	21.6	220	191	21.6	220	208	23.5	240
4"		200	22.5	230	208	23.5	240	217	24.5	250	226	25.5	260



9. Series S600 Basic Torque (R-PTFE SEATS):

Valve Size Full bore		Break Away Torque		Cv
Inch	DN	In-lbs.	Nm	G. P .M.
1/4"	8	69	8	7
3/8"	10	69	8	8
1/2"	15	69	8	15
3/4"	20	92	10	40
1"	25	138	16	70
1 1/4"	32	207	23	110
1 1/2"	40	288	33	250
2"	50	301	34	430
2 1/2"	65	553	62	700
3"	80	780	88	1100
4"	100	1010	114	2000

Valve Size Reduced bore		Break Away Torque		Cv
Inch	DN	In-lbs.	Nm	G. P .M.
-	-	-	-	-
1/2"	15	69	8	8
3/4"	20	69	8	15
1"	25	92	10	40
1 1/4"	32	138	16	70
1 1/2"	40	207	23	110
2"	50	288	33	250
2 1/2"	65	301	34	430
3"	80	553	62	700
4"	100	780	88	1100
-	-	-	-	-

30% safety factor included. (Full port)

30% safety factor included. (Reduced port)

*The above torque figures are based on "valve with grease".

*Torque figure is 30% higher if valve is dry assembled (Degreased).

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.