

INSTALLATION & MAINTENANCE MANUAL
SERIES 88
3-PIECE FULL OR REDUCED PORT BALL VALVES

1. USE:

1.1 Maximum results and long life of the valves can be maintained under normal working conditions and according with pressure/temperature rating and corrosion data chart.

2. MANUAL OPERATION:

2.1 The opening and closing of the valve is done by turning the lever a ¼" turn (90 degrees).

A. Valve in Open Position – the lever is in line with the valve or pipeline.

B. Valve in Closed Position – the lever is at right angle with the valve or pipeline.

3. DISASSEMBLY & CLEANING PROCEDURE:

Caution: ball valve can trap fluids in the ball cavity when closed.

3.1 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.

A. Relief the line pressure.

B. Place valve in half-open position and flush the line to remove any hazardous material from the valve.

C. 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 and loosening the remain one, 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:

4.1 The valve can be installed in any position on the pipeline.

4.2 Before installation of the valves, the pipe must be flushed clean of dirt, burrs and welding residues, or the seats and ball surface will be damaged.

4.3 The pipe must be free from tension.

5. INSTALLATION OF THREADED VALVES

5.1 Use conventional sealant, such as hemp core, Teflon, etc. on the threads.

5.2 Apply wrench only on the hexagon of the valve ends. Tightening by using the valve body or lever can seriously damage the valve.

5.3 In some applications, screwed valves are backwelded on site, These valves must be treated as per instructions for weld end valves before backwelding.

6. INSTALLATION OF WELD-END VALVES

6.1 Tack weld the valve on the pipe in four points on both end caps.

6.2 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.

6.3 Finish welding both end caps on the pipe.

- 6.4 When cooled down, clean both end caps and body surface.
- 6.5 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.
- 6.6 Tighten body bolts evenly. Make sure that maximum tightening torque is observed.
- 6.7 Check proper operation of the valve.

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.

Series 88 Torque (R-PTFE SEATS)

Valve Size		Break Away Torque		Cv
Inch	DN	In/Lb	Nm	G. P .M.
1/4"	8	69	8	8
3/8"	10	69	8	8
1/2"	15	69	8	15
3/4"	20	92	10	34
1"	25	138	16	56
1 1/4"	32	207	23	85
1 1/2"	40	288	33	125
2"	50	415	47	250
2 1/2"	65	553	62	320
3"	80	898	101	580
4"	100	1094	124	1020

Valve Size		Break Away Torque		Cv
Inch	DN	In/Lb	Nm	G. P .M.
1/4"	-	-	-	-
3/8"	-	-	-	-
1/2"	15	69	8	8
3/4"	20	69	8	15
1"	25	92	10	34
1 1/4"	32	138	16	56
1 1/2"	40	207	23	85
2"	50	288	33	125
2 1/2"	65	415	47	250
3"	80	553	62	320
4"	100	898	101	580

30% safety factor included.(Full port)

30% safety factor included.(Reduced port)

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	365 ~ 399	420 ~ 460	41.2 ~ 45.1	M12	365 ~ 399	420 ~ 460	41.2 ~ 45.1
2.1/2"	9/16"-12UNC	408 ~ 434	470 ~ 500	46.1 ~ 49.0	M14	408 ~ 434	470 ~ 500	46.1 ~ 49.0
3"	5/8"-11UNC	425 ~ 477	490 ~ 550	48.0 ~ 53.9	M16	425 ~ 477	490 ~ 550	48.0 ~ 53.9
4"	5/8"-11UNC	477 ~ 503	550 ~ 580	53.9 ~ 56.8	M16	477 ~ 503	550 ~ 580	53.9 ~ 56.8

Torque of Body Bolt

SERIES 88

Full
port

Size	Non-fire safe valve			Fire Safe valve		
	In-lbs	Nm	kg-cm	In-lbs	Nm	kg-cm
1/4"	69	8.2	80	78	9.2	90
3/8"	69	8.2	80	78	9.2	90
1/2"	78	9.2	90	87	10.2	100
3/4"	78	9.2	90	87	10.2	100
1"	122	14.3	140	130	15.3	150
1 1/4"	122	14.3	140	130	15.3	150
1 1/2"	165	19.4	190	174	20.4	200
2"	165	19.4	190	174	20.4	200
2 1/2"	191	22.4	220	208	24.5	240
3"	191	22.4	220	208	24.5	240
4"	217	25.5	250	226	26.5	260

Torque of stem nut

Non O-ring

Size	Non-fire safe valve			Fire Safe valve		
	In-lbs	Nm	kg-cm	In-lbs	Nm	kg-cm
1/4"	61	7.1	70	78	9.2	90
3/8"	61	7.1	70	78	9.2	90
1/2"	69	8.2	80	87	10.2	100
3/4"	69	8.2	80	87	10.2	100
1"	95	11.2	110	104	12.2	120
1 1/4"	95	11.2	110	104	12.2	120
1 1/2"	139	16.3	160	148	17.3	170
2"	139	16.3	160	148	17.3	170
2 1/2"	165	19.4	190	191	22.4	220
3"	182	21.4	210	191	22.4	220
4"	200	23.5	230	208	24.5	240

Torque of stem nut

O-ring

Red.
port

Size	Non-fire safe valve			Fire Safe valve		
	In-lbs	Nm	kg-cm	In-lbs	Nm	kg-cm
1/2"	69	8.2	80	78	9.2	90
3/4"	78	9.2	90	87	10.2	100
1"	78	9.2	90	87	10.2	100
1 1/4"	122	14.3	140	130	15.3	150
1 1/2"	122	14.3	140	130	15.3	150
2"	165	19.4	190	174	20.4	200
2 1/2"	165	19.4	190	174	20.4	200
3"	191	22.4	220	208	24.5	240
4"	191	22.4	220	208	24.5	240

Torque of stem nut

Non O-ring

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3/4"	69	8.2	80	87	10.2	100
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1 1/2"	95	11.2	110	104	12.2	120
2"	139	16.3	160	148	17.3	170
2 1/2"	139	16.3	160	148	17.3	170
3"	165	19.4	190	191	22.4	220
4"	182	21.4	210	191	22.4	220

Torque of stem nut

O-ring

Media and Service Factors:

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

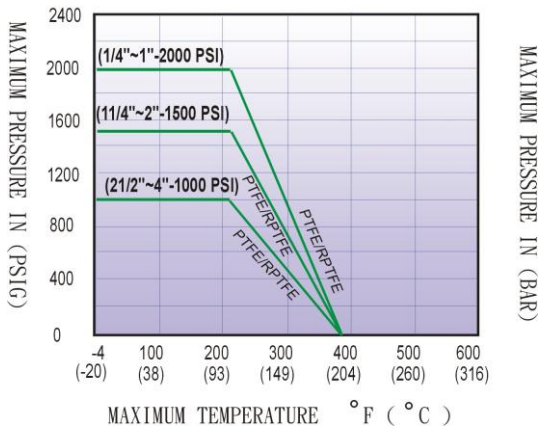
Service Factors	Multiplier
Simple On and Off Operations	1.00
Throttling	1.20
Positioner Control	1.50
Once per day Operations	1.20
Once every two days or a "Plant Critical" Operation	1.50

Torque Determination:

Basic Torque * Media Factor * Service Factor = Sizing Torque

SERIES 88

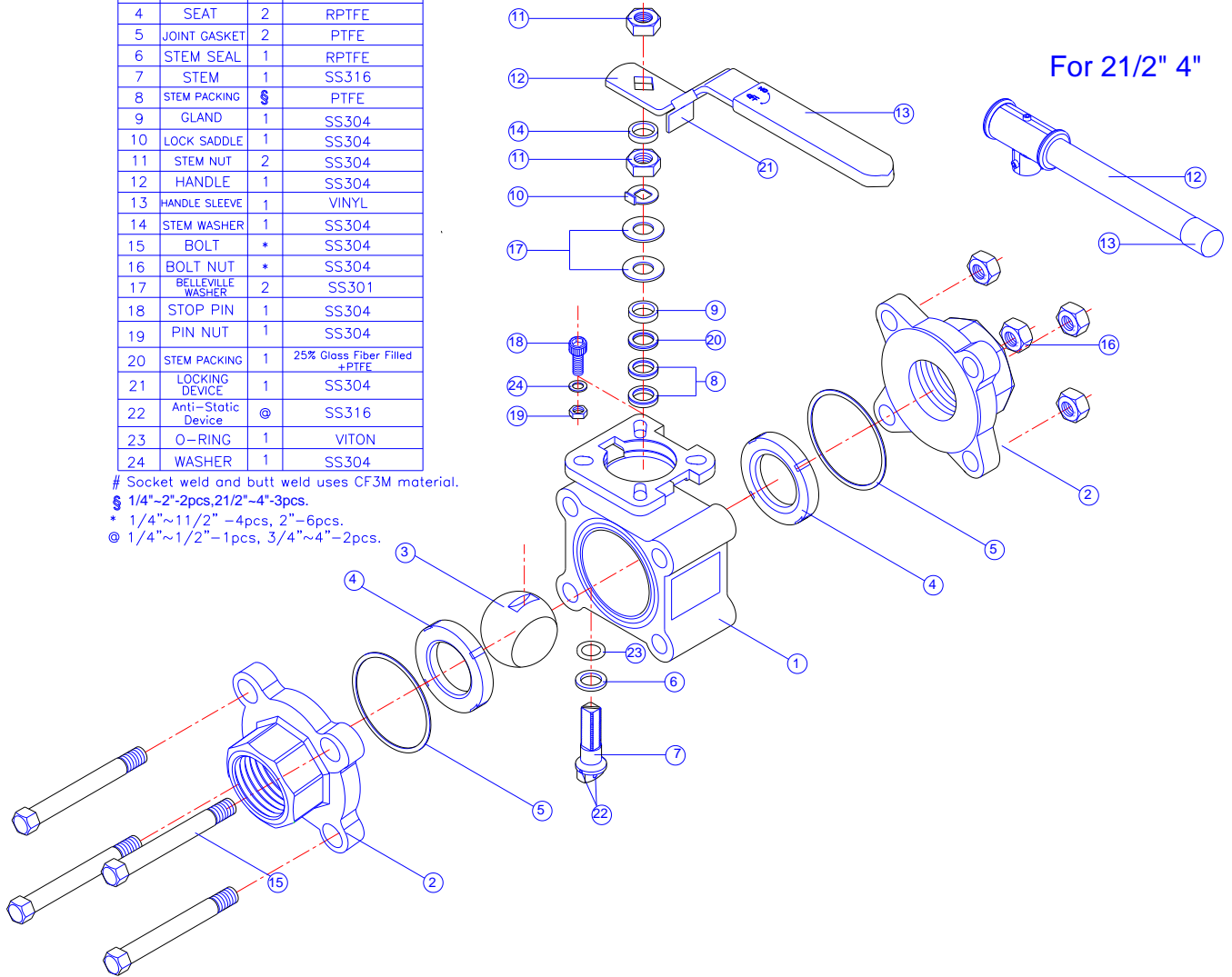
SEAT RATING CHART
PRESSURE-TEMPERATURE DATA



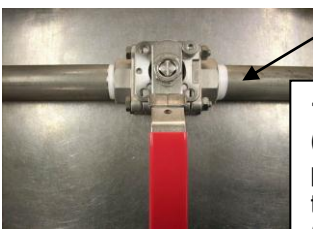
MATERIALS LIST

NO.	PART NAME	QTY	MATERIAL
1	BODY	1	CF8M
2	END CAP	2	CF8M #
3	BALL	1	SS316
4	SEAT	2	RPTFE
5	JOINT GASKET	2	PTFE
6	STEM SEAL	1	RPTFE
7	STEM	1	SS316
8	STEM PACKING	§	PTFE
9	GLAND	1	SS304
10	LOCK SADDLE	1	SS304
11	STEM NUT	2	SS304
12	HANDLE	1	SS304
13	HANDLE SLEEVE	1	VINYL
14	STEM WASHER	1	SS304
15	BOLT	*	SS304
16	BOLT NUT	*	SS304
17	BELLEVILLE WASHER	2	SS301
18	STOP PIN	1	SS304
19	PIN NUT	1	SS304
20	STEM PACKING	1	25% Glass Fiber Filled +PTFE
21	LOCKING DEVICE	1	SS304
22	Anti-Static Device	@	SS316
23	O-RING	1	VITON
24	WASHER	1	SS304

Socket weld and butt weld uses CF3M material.
 § 1/4"~2"-2pcs, 2 1/2"~4"-3pcs.
 * 1/4"~1 1/2" - 4pcs, 2"~6pcs.
 @ 1/4"~1 1/2" - 1pcs, 3/4"~4" - 2pcs.



Re: 3pc Ball Valve – dismantling procedure and illustration



1.) Put valve in close position first (handle and pipe are in vertical position), fix the valve on the pipe temporarily with spot welding on four points of end caps

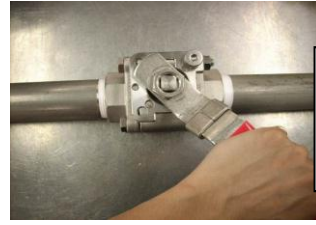


6.) Adjust body and ends by hand, and make sure they're in alignment. Use a tool to screw bolts and nuts together, and avoid the displacement to occur between body and ends.

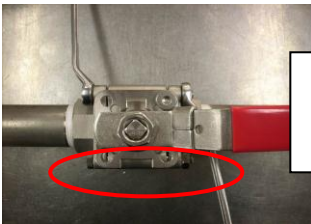
SERIES 88



2.) Then, turn the valve in open position (handle and pipe are in parallel position)



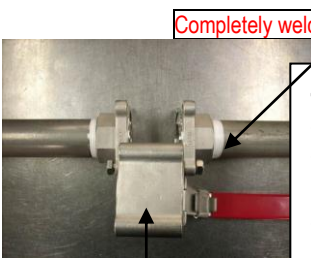
7.) Open and close valve within 3~5 times repeatedly, and finally put valve in close position.



3.) Use a tool to take off three bolts, and keep one bolt in loose position.



8.) Use tools to screw bolts and nuts together tightly (in diagonal line) according to standard torque.



Completely weld ends on body

4.) Swing body outside of pipe, and weld the ends on pipe completely, pay attention and keep off the contact of end joint and seats during such process, in order to avoid the seals being burned and damaged.

Swing out the body



9.) After assembling, check if the valve can open or close smoothly ? Then, do a piping test.



5.) After cooling, clean the surface of whole ends and body. And swing body back to original position, then put back bolts and nuts to original position as well.