FIGURE 220A - 221A - 220AC - 221AC
2-PIECE BALL VALVE

This instruction manual includes installation, operation, and maintenance information for Figure 220A, 221A, 220AC & 221AC 2-piece 2000CWP (1/4"–1"), 1500CWP (1-1/4"–2"), 1000 CWP (2-1/2" & 3") threaded end (NPT) ball valve.



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FIGURE 220A - 221A - 220AC - 221AC
2-PIECE BALL VALVE

INSTALLATION

WARNING:

To avoid personal injury to yourself, fellow workers, or damage to property from release of process fluid, before installation:

- Shut off all operating lines to the valve site
- Isolate the valve site completely from the process
- Release process pressure
- Drain the process fluid from the valve site

1. Before installation, please make sure the marking on valve (such as pressure, flow direction, material, etc.) is in accordance with the application requirement.
2. Remove the protective plastic cap on both threaded ends, and clean or flush the valves.
3. Prior to mounting, flush and/or clean the pipeline to remove all accumulated extraneous matter, as this can damage the seats and ball surface.
4. Use conventional sealant (e.g., PTFE tapes) to seal threaded ends on the pipeline.
5. Apply pipe wrench on the hexagon end of valve only while tightening. Tightening by using the valve body or handle can seriously damage the valve.
6. After installation, make sure there is no stress left on the pipeline.

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FIGURE 220A - 221A - 220AC - 221AC
2-PIECE BALL VALVE

OPERATION

1. Prior to operation, make sure to clean and flush the whole pipeline completely.
2. The operation of the valve consists of turning the stem (by manual or automated means) 1/4 turn (90°) clockwise to close, and 1/4 turn counter-clockwise to open.
3. When the handle (if used) and/or stem flats or groove are in line with the pipeline, the valve is open.
4. Operating torque requirements will vary depending on the length of time between cycles, media in the system, line pressure, and type of valve seat. The figures in the following table B are based on TFM4215 seats with clean water as the media.

Table A: Torque Figure for Stem Nut Tighten & Body-Cap Tighten

Valve Size		Stem Nut Tighten				Body-Cap Tighten	
NPS	DN	FNW220A, FNW221A		FNW220AM		in • lb	N • m
		in • lb	N • m	in • lb	N • m		
1/4	8	265	30	80 ~ 106	9 ~ 12	974 ~ 1150	110 ~ 130
3/8	10	265	30	80 ~ 106	9 ~ 12	974 ~ 1150	110 ~ 130
1/2	15	265	30	80 ~ 106	9 ~ 12	974 ~ 1150	110 ~ 130
3/4	20	353	40	80 ~ 106	9 ~ 12	1328 ~ 1593	150 ~ 180
1	25	574	65	106 ~ 142	12 ~ 16	1682 ~ 1947	190 ~ 220
1-1/4	32	574	65	106 ~ 142	12 ~ 16	2920 ~ 3186	330 ~ 360
1-1/2	40	971	110	151 ~ 195	17 ~ 22	3805 ~ 4160	430 ~ 470
2	50	971	110	151 ~ 195	17 ~ 22	4780 ~ 5310	540 ~ 600
2-1/2	65	971	110	221 ~ 283	25 ~ 32	6903 ~ 7346	780 ~ 830
3	80	971	110	221 ~ 283	25 ~ 32	9293 ~ 9824	1050 ~ 1100

Table B: Torque Valve

Size (NPS/ΔP)	75 PSIG		150 PSIG		300 PSIG		700 PSIG		1000 PSIG		1500 PSIG		2000 PSIG	
	5 bar		10 bar		20 bar		50 bar		63 bar		100 bar		130 bar	
	N • m	in • lb	N • m	in • lb	N • m	in • lb	N • m	in • lb	N • m	in • lb	N • m	in • lb	N • m	in • lb
1/4	6.5	57.5	6.5	57.5	6.5	57.5	6.5	57.5	6.5	57.5	6.5	57.5	7	62
3/8	6.5	57.5	6.5	57.5	6.5	57.5	6.5	57.5	6.5	57.5	6.5	57.5	7	62
1/2	6.5	57.5	6.5	57.5	6.5	57.5	6.5	57.5	6.5	57.5	6.5	57.5	7	62
3/4	7.8	69	7.8	69	7.8	69	7.8	69	7.8	69	7.8	69	8.4	74.3
1	13	115.1	13	115.1	14.3	126.6	14.3	126.6	14.3	126.6	14.3	126.6	16	141.6
1-1/4	16.9	149.6	16.9	149.6	19.5	172.6	24.7	195.6	24.7	218.6	26	230.1	-	-
1-1/2	24.7	218.6	24.7	218.6	28.6	253.1	33.8	276.1	33.8	299.1	37	327.5	-	-
2	35	309.8	35	309.8	38	336.3	45	354	45	398.3	45	398.3	-	-
2-1/2	52	460.2	60	531	65	575.3	83	663.8	83	734.6	91	805.4	-	-
3	85	752.3	90	796.5	95	840.8	115	1035.5	115	1017.8	125	1106.3	-	-

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FIGURE 220A - 221A - 220AC - 221AC
2-PIECE BALL VALVE

MAINTENANCE

Valve parts are subject to normal wear and must be inspected and replaced as necessary. Inspection and maintenance frequency depends on the severity of the service conditions. This section includes instructions for packing adjustments, repacking, seat replacement, and seating adjustment.

WARNING:

To avoid personal injury to yourself, fellow workers, or damage to property from release of process fluid, before installation:

- Shut off all operating lines to the valve site
- Isolate the valve site completely from the process
- Drain the process fluid from the valve site
- Ball valves can trap pressurized fluid in ball cavity when in the closed position
- Prior to maintenance, relieve the line pressure and put valve in open position. Ball valves can trap pressurized fluids in the valve cavity in the closed position. If the fluid is toxic, harmful, high-pressure, or dangerous mediums, please ensure safety in disassembling.

Retighten Packaging

For maximum stem packing life, proper packing adjustment procedures must be followed:

- Should a leakage occur at the gland packing, retighten the gland.
- Be careful to not tighten gland too much. Normally the leakage can be stopped by simply turning the stem nut or gland by 30° to 60°.

Replacement of Seats and Seals

Disassembly

1. Before disassembly, make sure to discharge any hazardous media from the valve inside body cavity.
2. Remove valves from pipeline.
3. Remove parts as follows:
   - Handle nut, washer, handle, stop-lock-cap, stem nut, belleville washer, gland, bushing.
4. Use pipe wrench to remove end cap, body gasket, ball seat, ball.
5. Push stem down into body cavity and remove, then remove stem seal ring and V-ring packing from the body.

CAUTION:

Use care to avoid scratching the surface of stem and packing chamber.

Reassembly

Reassembly processes are reverse sequence of disassembly.

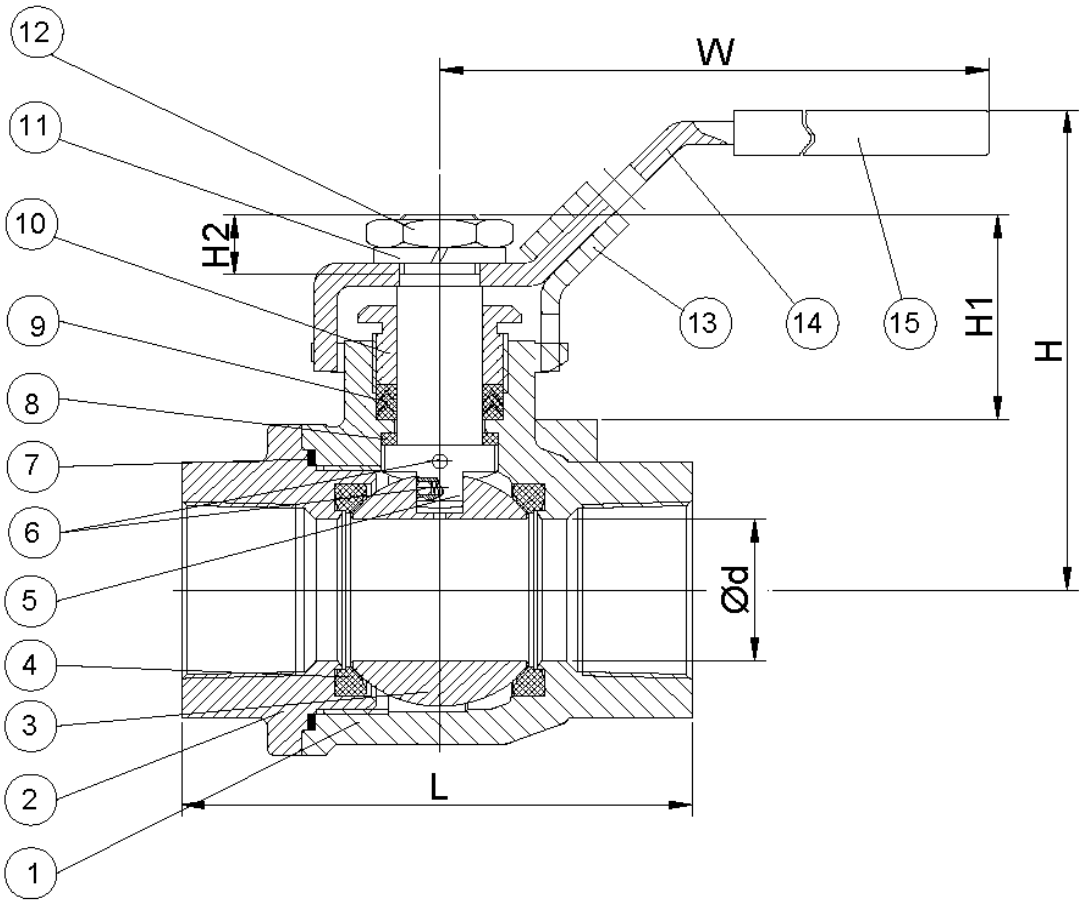
1. Clean and inspect all parts; full replacement of all soft parts (seats and seals) are strongly recommended.
2. Tighten the stem nut, using table A stipulated torque figure.
3. If possible, test the valve, then cycle valve several times before resuming service.

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FIGURE 220A - 221A - 220AC - 221AC

2-PIECE BALL VALVE



Ref No.	Description	Material				Qty
		Figure 220A	Figure 220AC	Figure 221A	Figure 221AC	
1	Body	ASTM A351 Gr. CF8M Stainless		ASTM A216 Gr. WCB Carbon Steel		1
2	End Cap	ASTM A351 Gr. CF8M Stainless		ASTM A216 Gr. WCB Carbon Steel		1
3	Ball	316SS Stainless				1
4	Seat	TFM1600+20%GF	TFM4215	TFM1600+20%GF	TFM4215	2
5	Stem	316SS Stainless				1
6	Anti-Static Device	316SS Stainless				1
7	Body Gasket	PFTE	PFTE + 20%CF	PFTE	PFTE + 20%CF	1
8	Thrust Washer	TFM4215				1
9	V-Ring Packing	PTFE	TFM1600	PTFE	TFM1600	1 Set
10	Gland Nut	304SS Stainless				1
11	Handle Washer	304SS Stainless				1
12	Handle Nut	304SS Stainless				1
13	Locking Pad	304SS Stainless				1
14	Handle	304SS Stainless				1
15	Handle Cover	Vinyl Plastic				1

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WARRANTY

Limited Warranty

Subject to the limitations expressed herein, Seller warrants that products manufactured by Seller shall be free from defects in design, material and workmanship under normal use for a period of one (1) year from installation but in no case shall the warranty period extend longer than eighteen months from the date of sale. This warranty is void for any damage caused by misuse, abuse, neglect, acts of God, or improper installation. For the purpose of this section, “Normal Use” means in strict accordance with the installation, operation and maintenance manual. The warranty for all other products is provided by the original equipment manufacturer.

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