

Installation, Operation & Maintenance Instructions

200934/935/936 & 200944/945/946 (3-Pcs Body, Full Port Ball Valves)

1. **Scope: This instruction applies to 3-PC Body Screwed End, Butt Weld End And Socket Weld End Full Port 1500-2000WOG Ball Valves.**
Direct Mount: 200934/935/936 and 200944/945/946
2. **Warning (Restrictions on Use)**
 - a. Temperature and Pressure Limit
 - The normal maximum operating pressure at maximum or minimum operating temperature is shown on the nameplate.
 - The operating temperature is within -29°C to 240°C (if shell is WCB), or -40°C to 240°C (if shell is stainless steel) for TFM4215 seats and sealing. Other seats and sealing operating temperature shall be checked with TUNING.
 - The nominal pressure (PN) rating describes maximum working pressure in cold operating temperature (e.g. PN40 describes maximum working pressure 40 bar at $-10^{\circ}\text{C} \sim 40^{\circ}\text{C}$).
 - b. No throttling operation
 - Don't leave the ball partly open (throttling operation) where the pressure drop and/or flow rate damage to the valve seats and/or ball.
3. **Installation**
 - a. Remove the protective cover on cap end, and clean or flush the valve in fully open position.
 - b. Prior to mounting, flush and clean the pipeline and valve to remove all accumulated extraneous matters.
 - c. During the handling process, do not use the valve stem or handle (wheel) as a fulcrum for the lifting cable to avoid collapse and accidental injury.
 - d. The valve may be fitted in any position and direction in the pipeline.
 - e. Make sure the pipeline at the installation point is not bent down and/or tension, use a pipe hanger or supports for the purpose to eliminate any deviation of the piping.
 - f. Installation of threaded ends ball valves:
 - 1). Use conventional sealant (e.g. PTFE tapes) to seal threaded ends on the pipeline.
 - 2). Apply pipe wrench on the hexagon end of valve only, while tightening.
 - 3). In order to allow easy installation and service, or to ease the replacement demand in the future, use union fittings on both sides of the valve.
 - g. Installation of Butt or Socket welding ball valves:
 - 1). Keep valves in open position. lengthen butt welding ends can be welded directly: do intermittent welding in four points of both butt welding ends.
 - 2). If the butt welding ends is not lengthen, disassemble cap bolts, but keep one bolts whose nut should be loosen only. The valve should now rotate freely.
 - 3). Finish the welding of both caps.
 - 4). After cooling, clean body and caps.
 - 5). Rotate the valve to the original position, insert bolts and screw down nuts lightly. During operation, it is very important to keep body and cap in a good parallel state to keep cap from distortion.
 - 6). Screw down all the bolts and make sure to follow the max. value of bolt screwing torque (refer to the attached list)
 - 7). Do a complete examination.

h. After connected with pipe, please tighten the flange bolt crossly with the torque value in table A.

Table A: Torque figure for Flange Bolt tighten

Material & Unit Bolt Size	Alloy Steel (B7)		Stainless Steel	
	IN-LB	N.M	IN-LB	N.M
5/16-18UNC/M8	240	27.2	100	11.3
3/8-16UNC	420	47.5	160	18.1
7/16-14UNC/M10	660	74.7	280	31.7
1/2-13UNC/M12	1000	113.2	400	45.3
9/16-12UNC/M14	1460	165.2	580	65.6
5/8-11UNC/M16	2010	227.4	800	90.5
3/4-10UNC/M20	3580	405.1	1400	158.4
7/8-9UNC/M22	5770	652.9	2250	254.6
1-8UNC/M24	8650	978.7	3250	367.7
1,1/8-8UNC/M28	12700	1437.0	4000	452.6

Table B: Torque figure for Stem Nut tighten

Valve Size	IN-LB	N.M
1/2 "	70~80	8.0~9.0
3/4 "	70~80	8.0~9.0
1 "	90~100	9.0~11.3
1-1/4 "	90~100	9.0~11.3
1-1/2 "	140~160	15.8~18.1
2 "	140~160	15.8~18.1
2-1/2 "	180~200	20.4~22.6
3 "	180~200	20.4~22.6
4 "	250~270	28.3~30.6
5 " ~6 "	300~350	34.0~39.6
8 "	580~630	65.6~71.3

Table C: Torque Value

△ P difference-pressure

unit: inch-lb/nm

Size/△P		75psi		150psi		300psi		700psi		1000psi		1500psi	
		5Bar		10Bar		20Bar		50Bar		63Bar		100Bar	
		Nm	In-lb	Nm	In-lb	Nm	In-lb	Nm	In-lb	Nm	In-lb	Nm	In-lb
3/8	DN10	4.5	40	4.5	40	4.5	40	4.5	40	4.5	40	4.5	40
1/2	DN15	5	44	5	44	5	44	5	44	5	44	5	44
3/4	DN20	6	53	6	53	6	53	6	53	6	53	6	53
1"	DN25	10	89	10	89	10.5	93	11	97	11	97	11	97
1-1/4	DN32	13	115	13	115	15	133	17	150	19	168	20	177
1-1/2	DN40	19	168	19	168	22	195	24	212	26	230	28	248
2"	DN50	25	221	28.5	252	32	283	35	310	38	336	42	372
2-1/2	DN65	40	354	45	398	49	434	54	478	59	522	65	575
3"	DN80	65	575	72	637	81	717	90	797	101	894	112	991
4"	DN100	100	885	110	974	122	1089	135	1195	148	1310	162	1435
5"	DN125	190	1682	208.5	1845	245	2168	285	2522				
6"	DN150	280	2478	306	2708	340	3009	408	3611				
8"	DN200	370	3275	430	3086	487	4310	560	4956				

4. Operation and Use

- a. Flush the ball valve and pipeline thoroughly again before operation.
- b. 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.
- c. When the handle (if used) and/or stem flats or groove are in line with the pipe, the valve is open.
- d. 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 C are based on PTFE seats with clean water as the media.

5. Maintenance

Long life and maintenance-free of valves can be maintained under normal working conditions and in accordance with pressure/temperature and corrosion data chart.

Warning:

- ★ Ball Valves can trap pressurized fluids in the ball cavity when in closed position.
 - ★ Prior to maintenance, relieve the line pressure and put the ball in open position.
- a. Re-tighten packing
 - Should a leakage occur at the gland packing, retighten the stem (gland) nut (13).
 - Take care that the stem nut (13) are not tighten too much. Normally the leakage can be stopped by simply turning the stem nut (13) by 30° to 60°.
 - b. Replacement of seats and seals.

Disassembly

- Place the valve in half-open position and flush the line to remove any hazardous material from the valve body.
- Place the valve in close position, Using the clamp to relax the hinge, the related pip and tie-in and lift the valve from line.
- Remove handle nut (13), handle (16) or actuator set, stop-lock-cap (14), stem nut (13), Belleville washer (12), gland (11), bush (10), Stem Packing (9).
- Remove body bolt (5) and nut (19) to allow the end cap (2) to separate from the body (1), remove the body gasket (22).
- Make sure the ball is in "Close" position, thus the ball (3) can be taken out easily from body, then take out the body ball seat.
- Push the stem (6) down into the body cavity and remove it, then remove the stem seal-ring (8), from the body.

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

Reassembly

- Reassembly process is the reverse sequence of disassembly.
- Clean and inspect all parts, full replacement of all soft parts (seats and seals) is strongly recommended.
- Tighten the body bolt (5) and nut (19) crosswise using the stipulated torque figure (see table A)
- Tighten the stem nut (13) using the table B stipulated torque figure.
- Cycle the valve slowly with gentle back and forth motion to build gradually to full quarter turn.
- If possible, test the valve before placing it back to line for service.

