INSTALLATION-MAINTENANCE MANUAL
FOR TV SPLIT BODY FLANGED BALL VALVE

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1. USE:
Long life of valves can be maintained under normal working conditions and in accordance with pressure/temperature and corrosion data chart.

2. **MANUAL OPERATIONS:**
The opening and closing of the valve is done by turning the handle 1/4 turn (90 degree turn).
A. VALVE IN OPEN POSITION
The handle is in line with the valve or pipeline.
B. VALVE IN CLOSED POSITION
The handle is perpendicular with the pipeline.

3. AUTOMATED OPERATIONS:
Alignment between Actuator and Valve is extremely important. Misalignment will result the highly operational torque, create the stem side loading and cause early stem leakage.

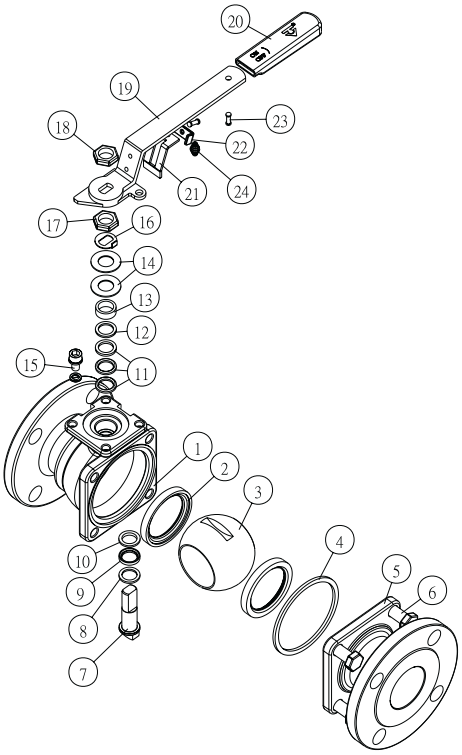
4. **GENERAL INFORMATION FOR ON-SITE INSTALLATION:**
4.1 Remove plastic end flanges protection covers.
4.2 The valve may be fitted in any position on the pipeline.
4.3 Before installing the valves, the pipes must be flushed clean of dirt, burrs and welding residues to prevent damage to the seats and ball surface.
4.4 The pipeline must be free of tension.

5. DISASSEMBLY AND CLEANING PROCEDURES:
Caution: Ball Valves can trap fluids in ball cavity when it is in closed position.
5.1 If the valve has been used to control hazardous media, it must be decontaminated before disassembly. It is recommended that the following steps be taken for safe removal and reassemble.
A. Relieve the line pressure.
B. Place valve in half-open position and flush the line to remove any hazardous material from valve.
C. All persons involved in the removal and disassembly of the vale should wear the proper protective clothing, such as face shield, glove, and apron, etc.
5.2 A. Remove both counter flanges Bolts & Nuts and lift Valve from line for maintenance.
B. Remove Handle (#19) or Actuator Set, Stem Nut (#17), Lock Saddle Washer (#16), Belleville Washers (#14), Gland (#13), Bushing (#12) and Stem Packing (#11).
C. Remove Body Bolts (#6) or Stud Nuts to allow End Cap (#5) separated from Body (#1). The Ball Seat (#2) in the end cap should come out. Remove Body Gasket (#4).
D. Rotate the stem to "close" position, thus, the Ball (#3) can be taken out easily from Body.
E. Take out the Ball Seat (#2) from Body Seat Pocket.
F. Pull out Stem (#7) and remove Stem Seal (#8 & 10) compress Ring (#9).
At this stage, all the parts are in "Loose Condition" and ready for inspection.

6. VISUAL INSPECTION:
Clean and inspect metal parts. It is not necessary to replace the Ball & Stem unless the ball seating surfaces have been damaged by abrasion or corrosion. Full replacement of all soft parts are strongly recommended. The replacement parts can be ordered in "Repair Kit" form.

7. PROCEDURES TO CHANGE PARTS AND ASSEMBLY:
7.1 Install Ball Seat (#2) to Body (#1) seat pocket make sure the spherical curvature facing the ball.
7.2 Put lower Thrust Washer (#8), Compression Ring (#9) and upper Thrust Washer (#10) to Stem (#7) and slide the stem up through the body. Install Stem Packing (#11) with "|V" facing down and top with Bushing (#12), Gland(#13), Belleville Washer (#14), Lock Saddle Washer (#16) and drive Stem Nut (#17) per The Stem Torque Data to ensure the whole stem seals have been properly compressed. Turn the Lock Saddle Washer to engage it with Stem Nut - This is to prevent Stem Nut from unthreading.
7.3 Put the Handle (#19) on stem and secure it with Handle Nut(#18).
7.4 Turn the Handle to "close" position. Line up the Ball slots with Stem Tang and slides Ball (#3) into the position. Turn the Handle to "open" position to prevent the Ball from falling out.
7.5 Install the Body Gasket (#4) into the shoulder of the End Cap (#5), put the Ball Seat (#2) into seat pocket.
7.6 Put the End Cap (#5) into body with all the holes line up between or end cap holes guided by body studs and engaged.
7.7 Finger tight the Body Bolts or Stud Nuts and tighten one side snugly, then the one diagonally across. Repeat for other Bolts or Nuts until the torque is observed Per Bolting Torque Data.
7.8 Cycle the Valve slowly with gentle back and forth motion to build gradually to full quarter turn. By cycling slowly, the Seat Lips will assume a permanent seal shape against the Ball.
7.9 If possible, test the valve before placing it back to line for service to ensure "No" through and external leakage is observed.

CONSTRUCTION



BOLTING TORQUE DATA
FOR TV SPLIT BODY FLANGED BALL VALVE

The body bolts of the valve should be tightened evenly. Tighten one-side snugly, then the one diagonally across. Repeat for the other bolts, bringing them all down tightly in sequence to the torque shown below.

VALVE SIZE		*FOR BODY NUT			⊙FOR STEM NUT		♦FOR STEM EXTENSION BOLT OR NUT		
INCH	DN	SIZE	IN-LB	NM	IN-LB	NM	SIZE	IN-LB	NM
½"	15	5/16-18 M8	160	19	60-80	7-9	M5	50	6
¾"	20	5/16-18 M8	160	19	60-80	7-9	M5	50	6
1"	25	3/8-16 M10	345	39	90-110	10-12	M6	70	8
1¼"	32	3/8-16 M10	345	39	90-110	10-12	M6	70	8
1½"	40	W 1/2-12 M12	580	66	130-150	14-17	M8	160	19
2"	50	W 1/2-12 M12	580	66	130-150	14-17	M8	160	19
2½"	65	1/2-13 M12	580	66	190-210	21-24	M12	580	66
3"	80	1/2-13 M12	580	66	190-210	21-24	M12	580	66
4"	100	1/2-13 M12	580	66	290-310	33-35	M12	580	66
◎4"	100	5/8-11 M16	1450	164	290-310	33-35	M12	580	66
5"	125	½-13 M12	580	66	350-400	39-45	M12	580	66
6"	150	5/8-11 M16	1450	164	500-550	56-62	M12	580	66
8"	200	5/8-11 M16	1450	164	600-650	68-73	M12	580	66
◎8"	200	3/4-10 M20	2900	330	600-650	68-73	M12	580	66
10"	250	5/8-11 M16	1450	164	800-850	90-96	M16	1450	164
◎10"	250	7/8-9 M22	3800	430	800-850	90-96	M16	1450	164
12"	300	3/4-10 M20	2900	330	1000-1050	113-119	M16	1450	164
◎12"	300	1-8 M25	4200	480	1000-1050	113-119	M16	1450	164

* INCH SYSTEM FOR ANSI STANDARD
  METRIC SYSTEM JIS & DIN STANDARD
⊙ ALL STEM NUTS ARE INCH SYSTEM
◎ FOR ANSI #300, JIS20K & DIN25/40

♦ STEM EXTENSION TO INCLUDE
  EMISSION LEAKAGE CONTROL UNIT(ELC)
  STEM EXTENSION FOR ACTUATOR
  STEM EXTENSION FOR PIPING INSULATION
  STEM EXTENSION FOR CRYOGENIC SERVICE

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