INSTALLATION AND MAINTENANCE MANUAL FOR 3-WAY NPT/SW BALL VALVES

INTRODUCTION

The BI-TORQ InstruPak IS-3WT/S series uses the EG4-Way multi-port ball valve, which provides easy replacement of gaskets, seals and seats without any special tools. The design of the valve allows for the center section of the valve body to be replaced while leaving the ends in place.

1. USE

1.1 The life of the valve can be maximized if valve use is within the stated pressure, temperature and corrosion ranges.

2. MANUAL OPERATION

2.1 The flow pattern of the valve can be adjusted by turning the handle 90° or 180°.
2.2 Both T-port and L-port patterns are available. T and L-balls are interchangeable in the same valve.
2.3 The flow pattern (L or T port) is marked on the valve stem.

3. AUTOMATED OPERATION

3.1 Valves with actuators should be checked for stem alignment. Most applications of the IS-3WF valve are direct mount to the actuator, greatly reducing any sideload or increased torque. Make sure that all insert adapters are properly placed on the valve stem and fully engaged in the actuator.

4. GENERAL INFORMATION FOR ON-SITE INSTALLATION

4.1 The valve may be fitted in any position in the pipeline. For automated operation, BI-TORQ does recommend that the valve and actuator be installed vertically in case of valve leakage, although this is not necessary for proper operation of the valve.
4.2 To prevent damage to the seats and ball surface, the pipeline must be flushed so that it is free of dirt, burrs and welding residues before installing the valve.

5. INSTALLATION OF VALVES WITH NPT ENDS

5.1 When installing or removing threaded piping from the valve, place a wernch on the body or the end cap nearest the end being worked on. Make certain the end cap of the valve does not turn the valve body. NOTE: the body/end cap joint is a rigth hand thread.
5.2 To insure a leak-tight fit, moderate use of a compatible pipe joint compound is necessary. CAUTION: Excessive use of pipe joint compound can affect valve life as well as cause excessive torque on the valve.
5.3 Apply pipe wrench on the end cap of the ball valve only when tightening. Tightening by using the valve body or handle can seriously damage the valve and void the warranty.

6. INSTALLATION OF VALVES WITH SOCKET WELD ENDS

6.1 Tack weld the valve on the pipe in four points on all end caps.
6.2 Remove body bolts and lift out the body with the ball in the OPEN position.
6.3 Close the ball and remove the seat retainer, ball and body seals. IMPORTANT: Note the position of the seats so that they can be replaced in the same position in which they were removed.
6.4 Complete the full welding.
6.5 When the valve ends return to ambient temperature, clean all end caps and body surface. Reassemble with ball, seat retainer and body surface.
6.6 Tighten body bolts evenly in a star pattern. Ensure that maximum torque is observed per body bolt torque (see Table 2).

7. DISSASSEMBLING AND CLEANING THE VALVE

NOTE: If the valve has an electric or pneumatic actuator in place, remove the actuator before proceeding.
CAUTION: Ball valves can trap fluids in the ball cavity when it is in the closed position. If the valve has been used with hazardous media, it must be decontimated before disassembly or handling.
WARNING: All persons involved in the removal or disassembly of the valve should wear protective gear such as eye and face protection, gloves, etc.
7.1 Relieve the line pressure.
7.2 Place the valve in the half-open position and flush the line to remove any hazardous material(s) from the valve.

8. REPLACING THE THRUST WASHER, PACKING AND SEATS

NOTE: The IS-3WF series valve is designed with belleville washers for automatic wear compensation. If there are signs of leakage from the stem, it is time to replace the stem packing and thrust washer.
NOTE: If the valve has an electric or pneumatic actuator, remove the actuator before proceeding.
8.1 STEM PACKING

a. Before replacing the thrust washer and the packing, the pipeline must be depressurized.
b. Remove flange bolts and nuts, then lift the valve from line. Care should be taken to avoid scratching or damaging gaskets. NOTE: The IS-3W series valves generally are heavy, so ensure that the valve is adequately supported before removing it from the line.
c. Loosen the handle nut and remove handle, retainer ring and stop plate. (IMPORTANT: On 2-1/2" through 4" sizes, the bonnet bolts must also be removed.)
d. The stem packing is placed in the center recess of the top cover. A tap to the bottom of the stem packing will get the packing out of the recess.
e. On the 2-1/2" through 4" sizes, the top cover gasket can be found between the contacing surface of the top cover and the valve body.

8.2 SEATS AND END CAP GASKETS

NOTE: In order to replace the end cap gaskets, the end caps must be removed. We recommend that seats and gaskets be replaced at the same time.
a. Remove body bolt nuts on all three end caps and blank (back) plate.
b. Once the end caps are removed, the ball can be removed from the valve body. Caution should be taken to avoid damaging the ball.

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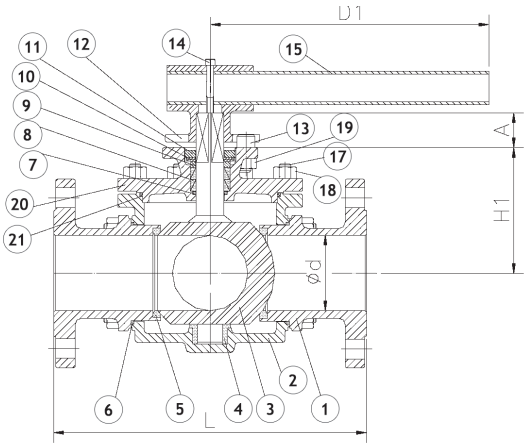
c. Replace all seats, body seals and gaskets at this time. NOTE: The valve may be assembled and operated dry without lubricant. However, a light lubricant will aid in the assembly and reduce initial operating torque. Ensure that the lubricant is acceptable with the intended line fluid.

9. REASSEMBLY

9.1 Install seats on the end caps so that the seats are in the same orientation as the removed seats (i.e., with the curvature facing the ball).
9.2 Install gaskets on the end caps. The end cap gaskets should fit on the outer diameter of the end cap.
9.3 Replace the bottom bushing in the valve cavity.
9.4 Place ball on top of the bushing in the center of the valve body cavity.
9.5 Carefully re-attach the end caps to the valve body. Hand tighten the bolts. Do not tighten with the wrench at this time.
9.6 Tighten the bolts in a star-shaped pattern to the torques specified in TABLE 1.
9.7 Install the stem packing in the center recess of the top cover.
9.8 **2-1/2" through 4" only:** Install top cover gasket.
9.9 **2-1/2" through 4" only:** Place the top cover back on the valve. Tighten in a star shaped pattern in accordance with the torque values in TABLE 1.
9.10 Cycle the valve slowly to gradually build to a full quarter turn. By cycling slowly, the seat curvature will create a permanent seal shape against the ball.
CAUTION: A fast turning motion at before the seats are shaped properly might cut the seals before they have a chance to form a proper seal.
9.11 If possible, test valve before placing back into line. If not properly secured, the valve can separate from the pressure source, resulting in potential injury.
IMPORTANT: Always join the valve to compantion flanges of the same pressure rating of the valve and secure with a full set of flange bolts.

CHART 1.1: Bill of Materials

PART #	NAME	MATERIAL	QTY
1	END CAP	CF8M	3
2	BODY	CF8M	1
3	BALL AND STEM	316SS	1
4	BUSHING	TFE	1
5	BALL SEAT	RTFE THRU 2"; TFE 2-1/2" THRU 4"	4
6	BODY SEAL	TFE	4
7	O-RING	VITON	1
8	STEM PACKING	TFE	1
9	PACKING GLAND	304SS	1
10	BELLEVILLE WASHER	301SS	2
11	GLAND NUT	304SS	1
12	HANDLE NUT	304SS	1
13	STOP PIN	304SS	1
14	HANDLE BOLT	304SS	1
15	HANDLE	304SS	1
16	BLIND CAP	CF8M	1
17, 18, 19	BOLTS AND NUTS	304SS	8
20	BONNET	CF8M	1
21	GASKET	TFE	1



COMPLETE VALVE PART NUMBER: EG4WAY-***
***=VALVE SIZE (002=1/4", 003=3/8", 005=1/2", 007=3/4", 010=1", 012=1-1/4", 015=1-1/2", 020=2", 025=2-1/2", 030=3")
[1] COMPLETE REPAIR KIT INCLUDES SEATS, SEALS AND O-RINGS

TABLE 1: Bolt Torques

VALVE SIZE	BODY BOLT TORQUE (IN LBS)
1/4"	44
3/8"	44
1/2"	53
3/4"	62
1"	125
1-1/4"	278
1-1/2"	408
2"	408
2-1/2"	460
3"	500
4"	550

To order a complete new valve, please refer to BI-TORQ price list for InstruPak valve replacement.