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I & M MK9020 Series

Installation & Maintenance Instructions for Mark 9020 BPE 2-Way Three Piece Ball Valves

Please read these instructions carefully!

Your Steriflow product will provide you with long, trouble-free service if it is correctly installed and maintained. Spending a few minutes now reading these instructions can save hours of trouble and downtime later. When making repairs, use only genuine Steriflow Valve parts, available for immediate shipment from the factory.

Scope

This manual is intended as a guide to assist customers in the storage, installations, and maintenance of Steriflow Mark 9020 Series ball valves. Subsequent additions or special instructions will be provided for special ball valves, critical service, or customer requirements.



Applicability

This manual is applicable to the Mark 9020 Series Steriflow ball valves.

Caution

1. Valve pressure ratings are based on many variables, including valve series and size, as well as body, seat and bolt material. Verify that application does not exceed the pressure or temperature rating on the nameplate.
2. **ALWAYS** depressurize the line with the valve in the **OPEN** position before disassembly.
3. After depressurizing line, cycle valve open and closed to depressurize valve before removal from line.
4. Wear protective equipment and take appropriate precautions to safeguard against injury caused by the discharge of trapped fluids.
5. Use only Steriflow recommended spare parts for maintenance.

6. To ensure safety and maintain warranty, never modify valve in any way without prior approval from Steriflow.

Storage

No lubricant is used in Mark 90 assembly. All valves are put in a plastic bag packed and shipped in a strong cardboard box to avoid possible damage during transport and storage.

IMPORTANT: If ball valves are not destined for immediate use, the following precautions should be taken:

1. If possible, leave the ball valves in their packing cases during storage.
2. Ball valves must remain in open position during storage.
3. In order to prevent damage, protective plastic covers on valve ends should not be removed until immediately prior to installation.
4. Ball valves should be protected to safeguard against contamination and environmental effects from humidity, moisture, dust, dirt, sand, mud, salt spray and seawater.
5. All valves and actuators shall be stored in dry conditions.
6. Valves to be stored for a long period of time should be checked by the quality control personnel every six months; every three months when valves are automated.

Maintenance During Storage Period

1. Internal surface should be inspected to check for dust or other foreign objects.
2. Rust or dust must be removed by cleaning with proper solvent.
3. Ball valves should be operated for at least two complete cycles before installing or returning to storage.

Installation

The ball valves may be installed in any position using standard pipe fitting practices.

IMPORTANT: Before installation of the valve:

1. Pipe must be free of tension both during and after installation.

2. Pipe must be flushed to clean dirt, welding residues, etc. which would damage ball or seats.
3. The valve should be kept in OPEN POSITION during installation and protective plastic covers must be removed only at the moment of installation.
4. If the valve was specified to be tested per ASTM 16.34, there may be some trapped water between the ball and the body cavity. This can be removed by partially opening the valve, thereby exposing the cavity through the port of the ball.
5. Special care should always be taken when installing automated ball valves that the ball is in the proper position.

■ Installation of Clamp-End Ball Valves

1. Use specified gasket and clamp. Note: nameplate ratings on clamp end valves are based on Tri-Clover A13MHM (hinged 2-segment clamp with wing nut). Do not exceed rating cast on body regardless of clamp used.
2. Insure gasket is properly seated before tightening clamp.
3. Tighten clamp to torque specified by clamp manufacturer.

■ Installation of Extended-End Butt Weld-End Ball Valves

1. Tack weld in four points on both end caps.
2. Valve shall be in full open position.
3. For conventional welding:
 - a) Limit continuous weld time to 1 minute
 - b) Alternate between ends
 - c) Direct moving air across end or wrap with wet cloth
4. For orbital welding
 - a) MK90 extended end butt weld ends are designed for orbital welding
 - b) Follow approved orbital welding procedure
5. Check body bolts for proper torque after welds have completely cooled.

Manual Operation

1. Open and close the valve by disengaging locking device, if used, and turning the handle one-quarter turn (90°).
2. Valve is in open position when handle is in line with the pipe.
3. Valve is in closed position when the handle is perpendicular to the pipe.

Maintenance

1. Ball valves do not normally need internal lubrication or routine maintenance during service.
2. Packing may be adjusted if the valve is leaking around the stem, or the stem feels loose. See *Troubleshooting A. Stem Leakage*
3. Internal maintenance consists of replacing packing,

seats, and seals and ball or stem if worn or damaged, and requires partial or full disassembly by qualified personnel following the instructions in this manual.

Valve Disassembly

Note: for valves equipped with optional enclosed stem extension, also see IM-MK9020/MK9030_Enc_Ext_Stem.

Before starting maintenance read the information in the **Caution Section** of this manual.

A. To inspect and/or Replace Seals, Seats, Packing & Ball

Reference cross sectional views on pp. 2 and 3 for parts identification.

1. Valve must be in the open position.
 - a) For valves with tri-clamp ends, remove valve from line.
 - b) For valves with extended tube weld ends, remove body bolts per step 2, spread pipe slightly, and lift body from between end caps.
2. Remove bolts (35) securing end cap and separate end caps (9) from body (1).
3. Close the valve and remove ball (4), seats (12), and body seals (11). Be careful not to damage the ball.
4. Remove the handle parts:
 - a) Size 1/2" through 2": Remove handle nut (24), handle (19), and saddle lock washer (30).
 - b) Sizes 2-1/2" through 4": Remove handle bolt (20), slide out handle (19), remove handle nut (24), pull handle adaptor (18) off stem, and remove saddle lock washer (30).
5. Remove gland nut (22), Belleville spring washers (29), gland (15), and packing (14).
6. Push the stem (5) into the body (1). Remove thrust washer (13) from stem.

B. Inspection and Replacement

With the valve completely disassembled, clean and examine all components:

1. The surface of the ball should be free from any defect. If any are found, the ball should be replaced. Using a defective ball will be extremely detrimental to valve performance.
2. Seats - Replacement of seats is recommended.
3. Seals - Stem seals and body seals, including thrust washer, should be discarded and replaced.
4. Remaining components of the valves. After cleaning, carefully examine for wear, corrosion, and mechanical damage. Replace all defective parts.
5. Clean inside of body and stem housing.
6. Inspect grounding cable (if used) for damage, especially wire breakage at terminals.

Note: Recommended spare parts are indicated by an asterisk on the part name in the exploded view at the end of this manual. Please specify specific valve number to ensure proper parts are ordered. Steriflow Valve

does not take responsibility for incorrectly ordered spare parts.

Reassembly

Note: A small amount of USDA H1 incidental contact grease is recommended on external stainless steel stem and body bolt threads to prevent galling.

A. Stem

1. Replace thrust washer (13) on stem, then insert the stem from inside of body.
2. Install stem packing (14), gland (15), Belleville spring washers (29), gland nut (22), and tighten until snug, then one-half turn (see *Bolt Torque Table*). To avoid rotation of stem, insert the handle through ball. Install saddle lock washer (30).
3. Install the handle parts:
 - a) Sizes 1/2" through 2": Install handle (19) and handle nut (24), then tighten.
 - b) Sizes 2-1/2" through 4": Slide handle adaptor (18) on stem, install handle nut (24), push handle (19) through the handle adaptor until the bolt holes line up, and install and tighten handle bolt (20).

B. Ball, Seats and Seals

1. Place the stem (5) in closed position and insert the ball (4), aligning groove in ball with bottom of stem.
2. Position the ball in the open position, a seat (12), body seal (11), and end cap (9) on each side of body (1).
3. Insert lock washers (36), body bolts (35), and nuts (37) and hand tighten.
4. Tighten bolts (35) to recommended torque values (see *Bolt Torque Table*) using an alternating/oppos-

ing pattern with no more than 1/4 turn on each bolt before alternating.

Testing

1. After completing the reassembly, check that the valve operates smoothly by opening and closing valve several times.
2. If entire valve was removed from line and if facilities are available, test the ball valve to appropriate specifications.

Troubleshooting

A. Stem Leakage

Leakage in the stem packing area may be eliminated by adjusting the lower stem (gland) nut. Remove handle parts (see *Valve Disassembly, A5*). See *Bolt Torque Table* for stem nut socket size and reference torque. Increase the torque on the lower stem nut (22) in one-sixth turn increments. Insure stem does not rotate while tightening stem nut. If leakage persists, replace packing (14).

B. Body Seal Leakage

Check the torque of the body bolts (35) according to Torque Table. Replace body seals (11) if leakage persists.

C. In Line or Seat Leakage

Check to be sure valve is in fully closed position. If leakage persists, the valve must be disassembled and damaged parts replaced.

Body Torque Table

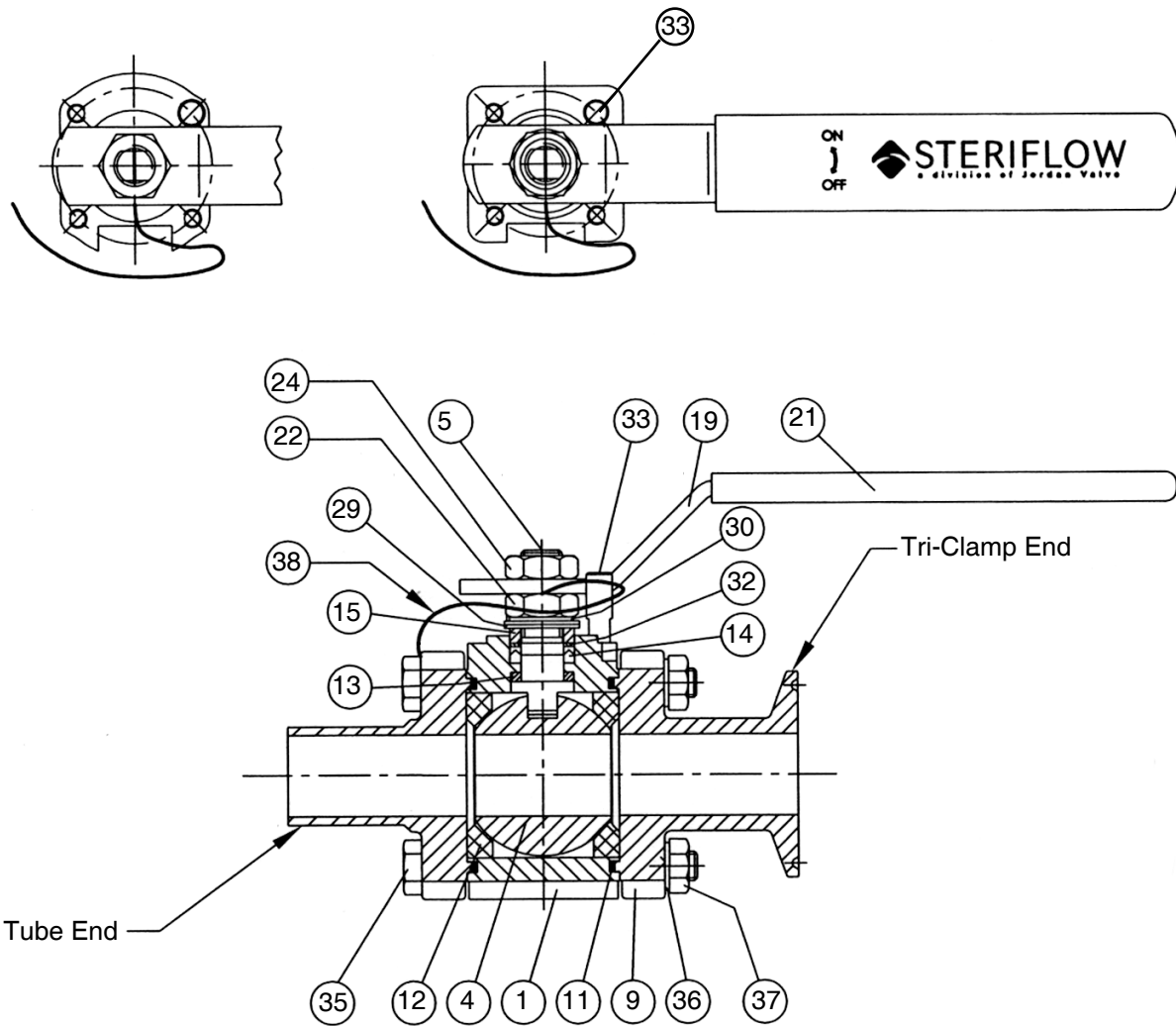
Body Bolt

Valve Size	Bolt Size	Nut Flats	Torque, in-lb (n.M)	Tolerance
1/2"	M6 x 1	10mm	113 (12,8)	+/- 10%
3/4", 1"	M8 x 1.25	13mm	243 (27,5)	
1-1/2"	M10 x 1.5	17mm	347 (100)	
2"	M12 x 1.75	19mm	521 (60)	
2-1/2"	M14 x 2	22mm	735 (83)	
3"	M16 x 2	24mm	575 (65)	
4"	3/4" - 10	1.06"	575 (65)	

Stem Nut

Valve Size	Nut Flats	Torque, in-lb (n.M)	Tolerance
1/2", 3/4"	9/16"	52 (5,9)	+/- 10%
1"	11/16"	78 (8,8)	
1-1/2", 2"	22 mm	217 (24,5)	
2-1/2" - 3"	33 mm	354 (40)	
4"	1-1/2"	443 (50)	

Mark 9020 Parts ~ Sizes 1/2" – 1-1/2"

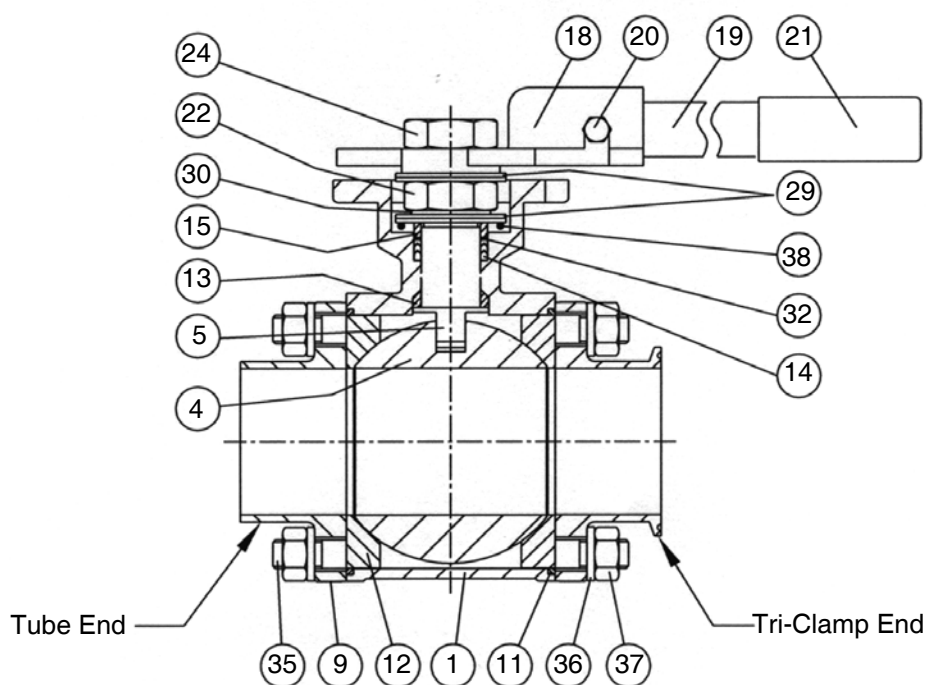
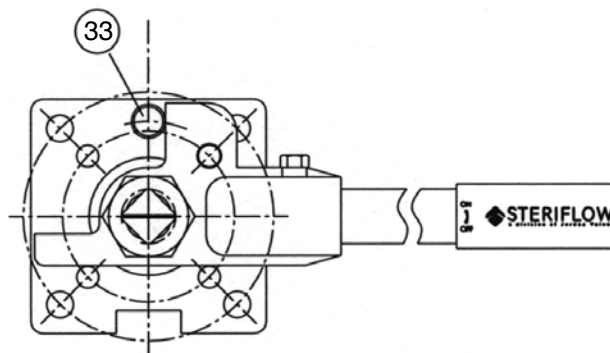


ART0948

Item No.	Part	Qty
1	Body	1
4	Ball	1
5	Stem	1
9	End Cap	2
11	*Body Seal	2
12	*Seat	2
13	*Thrust Washer, Stem	1
14	*Packing, Stem	1 Set
15	Gland, Packing	1
19	Handle	1
21	Cover, Handle	1

Item No.	Part	Qty
22	Nut, Gland	1
24	Nut, Handle	1
29	Belleville Washer	2
30	Lock Tab Washer	1
32	*Thrust Washer, Packing	1
33	Stop Pin, Handle	1
35	Bolt, Body	4
36	Lock Washer, Body Bolt	4
37	Nut, Body Bolt	4
38	Grounding Cable	1

Mark 9020 Parts ~ Sizes 2" – 4"



ART0949

Item No.	Part	Qty
1	Body	1
4	Ball	1
5	Stem	1
9	End Cap	2
11	*Body Seal	2
12	*Seat	2
13	*Thrust Washer, Stem	1
14	*Packing, Stem	1 Set
15	Gland, Packing	1
18	Adaptor, Handle	1
19	Handle	1
20	Bolt, Handle	1

Item No.	Part	Qty
21	Cover, Handle	1
22	Nut, Gland	1
24	Nut, Handle	1
29	Belleville Washer	2
30	Lock Tab Washer	1
32	*Thrust Washer, Packing	1
33	Stop Pin, Handle	1
35	Stud, Body	4 ~ 6
36	Lock Washer, Body Bolt	8 ~ 12
37	Nut, Body Bolt	8 ~ 12
38	Grounding Spring	1

* Recommended spare parts