INSTALLATION, OPERATION AND MAINTENANCE INSTRUCTIONS

MERIDIAN, 2 or 3 PIECE, TRUNNION MOUNTED BALL VALVES

Size Range 2” – 48”

ASME Classes 150 - 2500

VALVES · ACTUATION · PVF

a WOLSELEY company

***It is recommended that the valve installer is familiar with the MSS-SP-92 Valve User Guide.**

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⚠ WARNING ⚠

These instructions need to be fully read and understood before installation, removal or maintenance

1. If in any doubt regarding any aspect of the following instructions, contact Meridian's office for guidance.
2. Use of these valves for any purpose other than its intended purpose may result in property damage, serious personal injury or death!
3. The user is responsible for ensuring compliance with local guidelines, regulations, safety standards and laws applicable to the use of these valves.
4. Only use qualified personnel for installation, removal and maintenance.
5. Use appropriate protective equipment/clothing such as eye protection, safety shoes, industrial gloves and hearing protection as applicable.
6. The specified service pressure, temperatures and media must not be exceeded; read the name tag and check the rating. Do not exceed these ratings.
7. Know what media is in the line. If there is any doubt, check with the proper authority.
8. When used on line fluids with a temperature of 80^0C or higher, the valve body can become very hot and should not be handled without appropriate protection.
9. Heavy impacts, such as blows with a steel headed hammer, to the valve should be avoided.
10. Do not modify the valve's design and its components (e.g. such as drilling of mounting holes) as this will void written or implied warranty.
11. These valves are not recommended for dead end service.
12. Always follow the respective manufacturer's instructions when attaching items such as actuators and limit switches to the valves.
13. Never disassemble valves under warranty without consulting the manufacturer first, since doing so without proper authorization can void the warranty.

⚠ WARNING ⚠

- **Valves must be inspected for damage before installation.**
- **Do not install damaged valves.**
- **For your safety and protection, please read the following precautions before installing the valve.**

1.0 VALVE INSTALLATION

The practical and safe use of this product is determined by the seat material, seal materials and body ratings. Read the name tag and check body ratings. This product is available with a variety of seat and seal materials. Some of the seat materials have pressure ratings that are less than the body ratings. All of the body, seat and seal ratings are dependent on valve material, class, size, seat material, seal material, bolting material, and temperature. Do not exceed these ratings.

Flow through the Trunnion mounted ball valve can be in either direction but combination seat designs have a preferred direction. For proper installation of valves these steps should be followed:

1.1 Remove all left over particles of rust, slag, and debris from inside the pipeline.

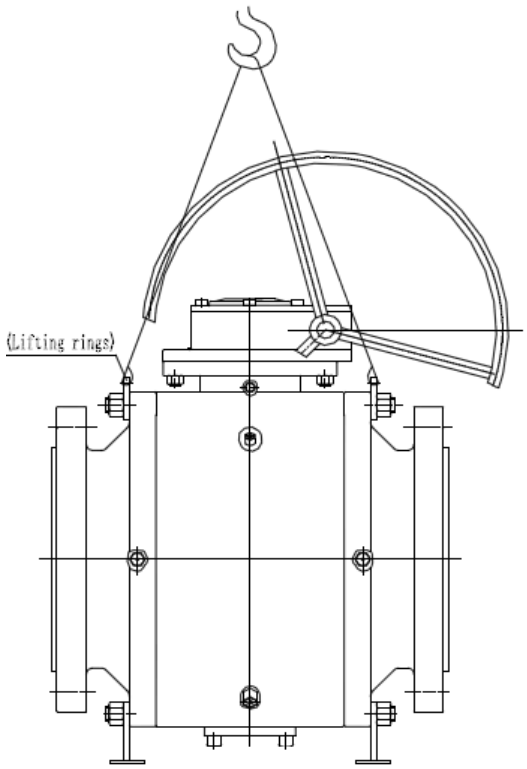
1.2 Proper support of valve and/or pipeline should be provided to eliminate strain and fatigue of end connections.

1.3 Before installation, carefully check the valve markings and pressure rating to ensure the valve is suitable for service.

1.4 Make sure valve opens and closes correctly. Install valve in open position to protect the surface of the ball during installation. Valve stops are set at the factory but may be adjusted in the field if required (gear or actuated valves only).

1.5 The valve should be tightened between flanges using appropriate gaskets and fasteners for the service. Tighten the bolts in compliance with the requirements of the gasket manufacturer.

CAUTION: Ball valves should be lifted so that the body supports the load. They should never be lifted by the lever or the gear operator. Please see diagram below on proper method of lifting a valve with a gear operator.



2.0 OPERATION

To operate ball valves properly, the following indications should be taken into account:

⚠ WARNING ⚠

- **Always get specific authorization before operating any valve in the system.**
- **Do not open the body bleed or drain fitting in the body cavity unless it is safe to do so.**
- **Line media may be lethal. Follow all company approved venting and safety procedures.**
- **Never use excessive force to turn a seized valve as you may bend or break the stem making valve inoperable.**
- **For your safety and protection, please read the following precautions before operating the valve.**

2.1 The valve must be operated either fully open or fully closed. Leaving the ball in some intermediate position can rapidly cause severe damage to the seats.

2.2 In lever operated valves, when the lever is aligned with the valve axis (bore) it indicates open position. Viewed from the top, the valve stem rotates 90 degrees clockwise to go from open to closed position.

2.3 All gear boxes or actuators have a device which indicates open and closed positions. The hand wheel on all gear operators rotates clockwise to close the valve.

3.0 MAINTENANCE

⚠ WARNING ⚠

- **Always get specific authorization before operating or removing any valve in the system.**
- **Do not open the body bleed or drain fitting in the body cavity unless it is safe to do so.**
- **Line media may be lethal. Follow all company approved venting and safety procedures.**
- **Never use excessive force to turn a seized valve as you may bend or break the stem making valve inoperable.**
- **For your safety and protection, please read the following precautions before conducting maintenance on the valve.**

⚠ WARNING ⚠

- **Ensure you remove ONLY the safety cap from the fitting when cleaning, lubricating or emergency sealing the valve.**
- **NEVER remove the grease fitting when valve is under pressure.**

3.1 General maintenance requires periodic operation to ensure that the valve is functioning properly.

3.2 Cleaning Valves

3.2.1 Valves which are hard to operate or do not seal properly may require cleaning. Inject sufficient quantities of an approved Valve cleaner into valve injection fittings to displace all the lubricant and sealant in the valve sealant system. Leave cleaner in the valve for at least 30 minutes and cycle valve, if permitted. Purge the valve cleaner from the system after use with lubricant.

3.3 Lubricating Valves

3.3.1 Routine maintenance consists of lubricating/greasing the valve sealant system at injection points on the bonnet and seats of the valve. Quantity of grease required can vary greatly depending on the valve size, cycle frequency and service condition. As a general guide line use 1 ounce (30ml) of lubricant per inch of valve size into each seat fitting. Use proper lubricant/grease for your line media application to ensure resistant and compatibility to media and temperature flowing through the line. A good standard valve lubricant for most applications is EQ80 available through Sealweld Corporation (www.sealweld.com).

3.4 Ball valves should not be immobilized for long periods of time. If possible, they should be cycled at periodic intervals to ensure continued and proper operation as part of your maintenance program.

3.5 Overhaul maintenance consists of replacing seats and seals making the valve virtually new again. A standard service kit consisting of these parts may be obtained, with the model number and serial number of the valve, through Meridian.

4.0 EMERGENCY SEALING

4.1 By introducing a heavy sealant (designed for this purpose) into the injection fittings can achieve a temporary seal in trunnion ball valve when a leak is detected and it may not be possible to repair or the replace the valve immediately. Emergency sealant greases are available through Sealweld Corporation (www.sealweld.com).

4.2 Emergency sealants may be injected into valve to provide sealing for minor damage such as scratches on seal faces or even more serious seal damage in case of emergency. For best results, inject while the valve is in fully open or closed position. If leakage persists also check the valve stops to ensure proper setting of the open and closed position.

4.3 Once you operate the valve step 4.2 will have to be repeated as the emergency sealant may be washed away. Replace or repair valve as soon as possible.

5.0 STORAGE PROCEDURE

5.1 Care should be taken to cover both ends of the valve with covers to prevent foreign materials from entering the valve body which could result in damage to the valve seats.

5.2 For long term storage valve machined surfaces should be covered with a light film of oil or grease to prevent these areas from rusting.

5.3 The ball valve should be stored under cover in a clean dry place with the ball in the open position.

6.0 VALVE REMOVAL FROM LINE

For your safety and protection, it is important that the following precautions are taken prior to removing the valve from service, or before any disassembly of the valve.

⚠ WARNING ⚠

- **Always get specific authorization before operating or removing any valve in the system.**
- **Do not open any body bleed or drain fitting in the body cavity unless it is safe to do so.**
- **Line media may be lethal. Follow all company approved venting and safety procedures.**
- **Never use excessive force to turn a seized valve as you may bend or break the stem making valve inoperable.**
- **For your safety and protection, please read the following precautions before removing valve from line.**

6.1 Keep hands safely out of the valve at all times during this entire procedure to avoid accidents resulting in serious injury. (i.e.: closure of valve by a remote controlled actuator.)

6.2 Know what media is in the line. If there is any doubt, check with the proper authority.

6.3 Wear any protective clothing or equipment normally required when working with the media involved.

6.4 Depressurize the line and valve as follows:

A) Open the valve and drain the pipe line.

B) Open body bleed and leave open to ensure all trapped pressure is removed.

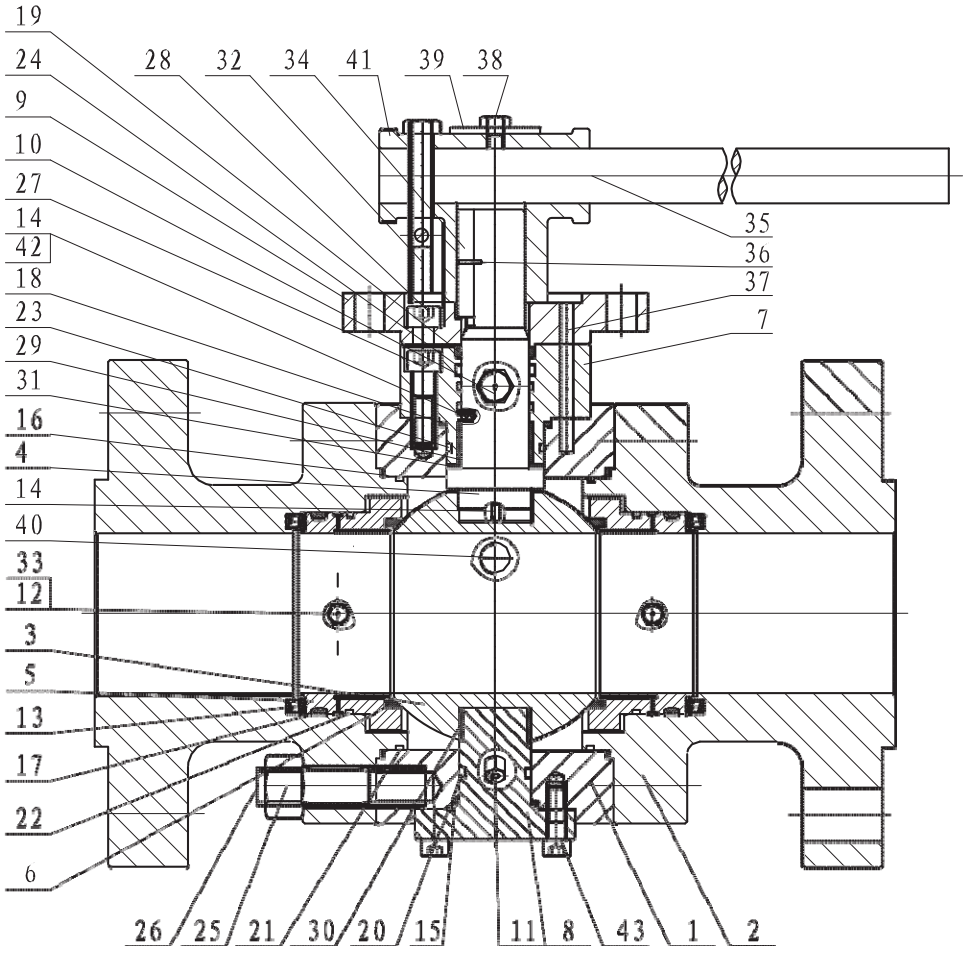
C) Close and open the valve to relieve any residual pressure that may be in the valve prior to removing the valve from service and leave the valve in the open position.

D) After removal and prior to any disassembly, drain any remaining media by placing the valve in the vertical position and carefully open and close the valve several times.

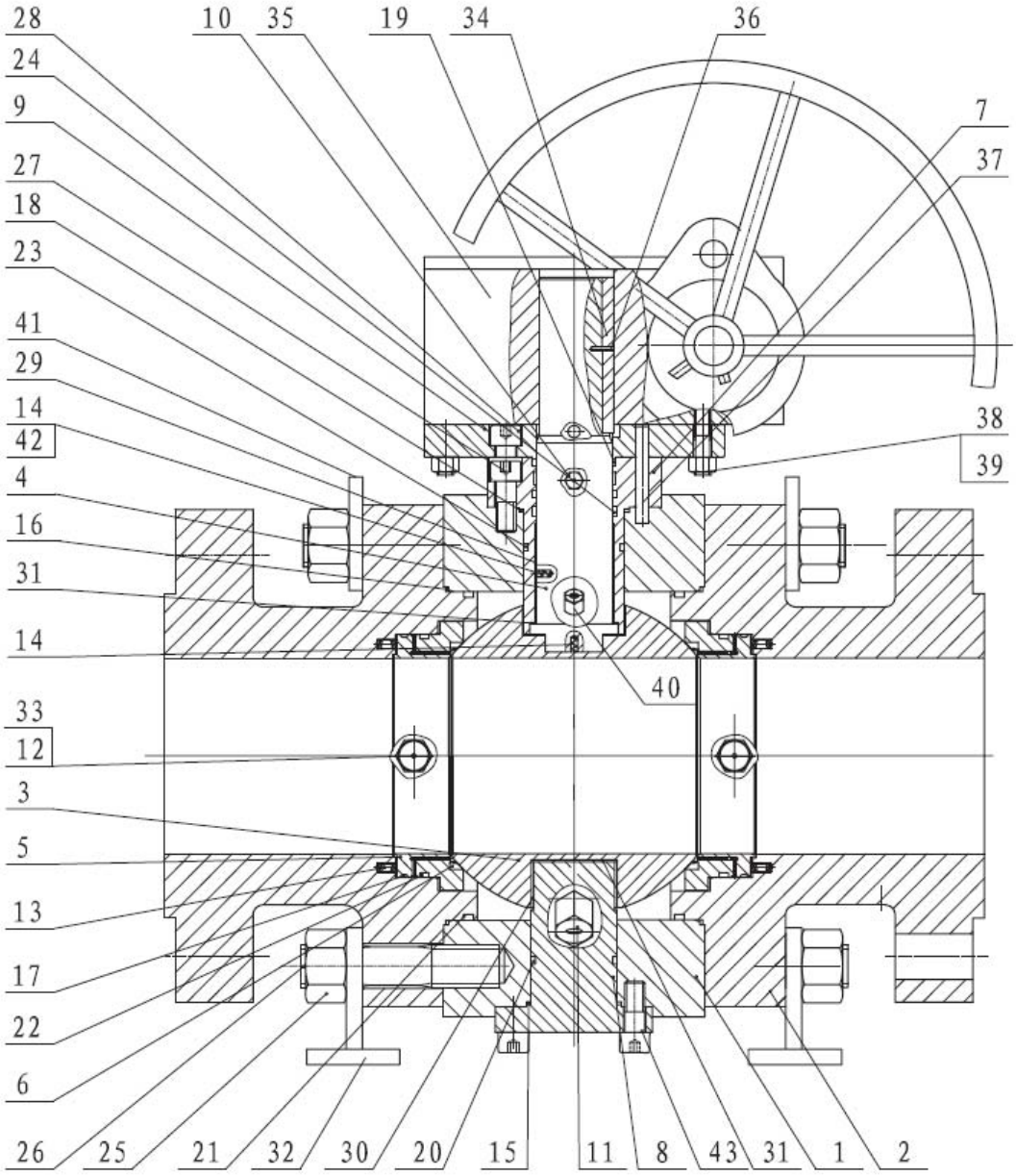
7.0 VALVE REPAIR AND OVERHAUL

This procedure is applicable for 2 or 3 piece design valves. It is considered as a typical overhaul procedure and some valve models may vary slightly from this procedure as written. Drawings shown are typical. Please contact Meridian for the drawing of the specific valve model you will be repairing.

Typical valve parts identification Lever Operated Three Piece Trunnion ball valve



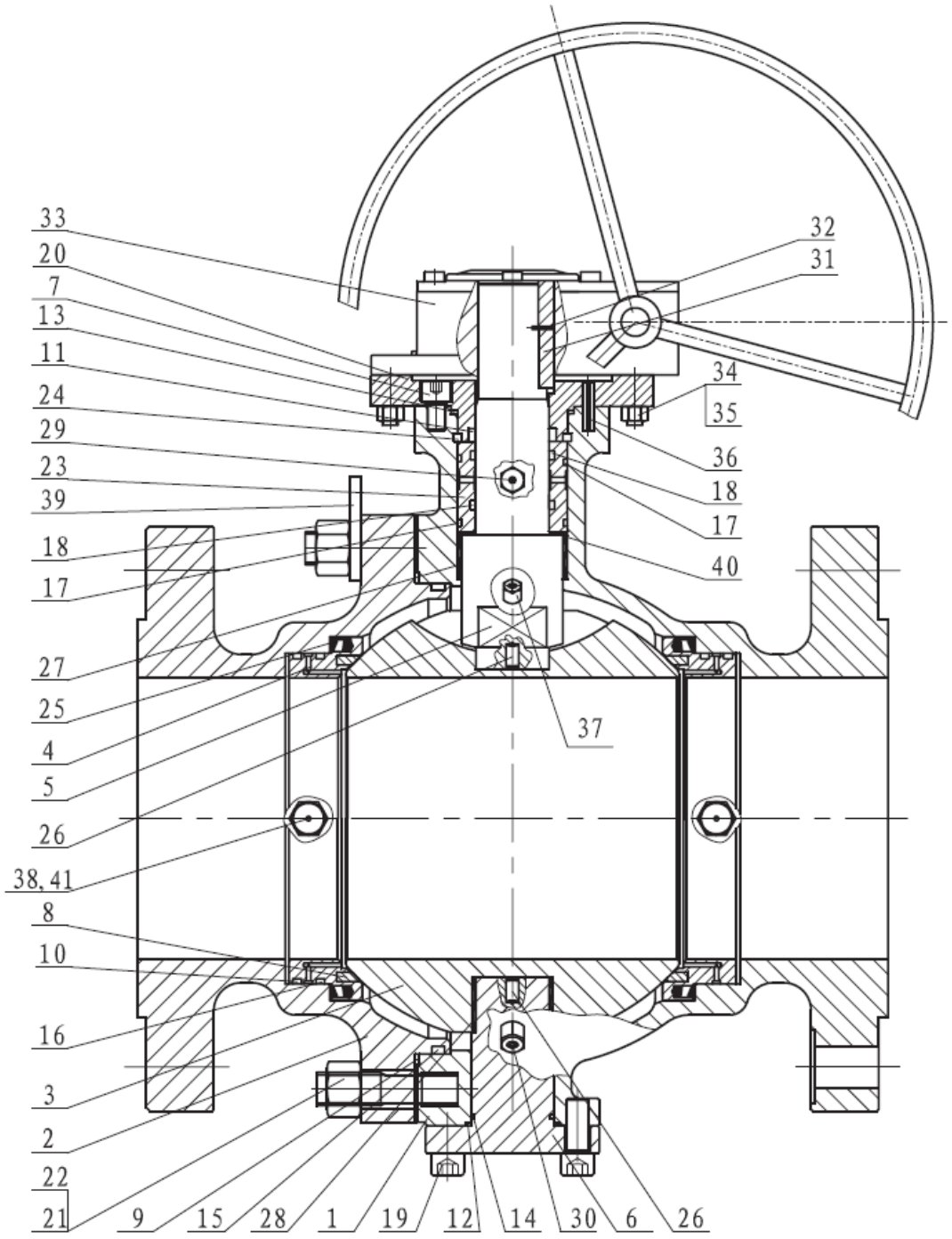
Typical valve parts identification Gear Operated Three Piece Trunnion ball valve



Typical Parts Listing for Two and Three Piece Trunnion Ball Valves

ITEM	NAME		ITEM	NAME
1	BODY		23	UPPER CAP SEAL O-RING
2	LEFT/RIGHT BODY END CAPS		24	STEM SEAL O-RING
3	BALL		25	STUD
4	STEM		26	NUT
5	SEAT		27	ALLEN HEAD BOLT
6	SEAT RING		28	ALLEN HEAD BOLT
7	UPPER CAP		29	BEARING
8	TRUNNION		30	BEARING
9	LIMIT STOP PLATE		31	THRUST WASHER
10	SEALANT INJECTION VALVE		32	HEX HEAD BOLT
11	DRAIN VALVE		33	CHECK VALVE
12	SEALANT INJECTION VALVE		34	KEY
13	SEAT SPRING		35	LEVER OR GEAR
14	ANTISTATIC SPRING		36	PIN
15	FIRE SAFE GASKET		37	PIN
16	FIRE SAFE GASKET		38	HEX HEAD BOLT
17	FIRE SAFE GASKET		39	INDICATING PLATE
18	FIRE SAFE GASKET		40	VENT VALVE
19	FIRE SAFE GASKET		41	LEVER HEAD
20	TRUNNION SEAL O-RING		42	ANTISTATIC BALL
21	BODY SEAL O-RING		43	ALLEN HEAD BOLT
22	SEAT SEAL O-RING			

Typical valve parts identification Gear Operated Two Piece Trunnion ball valve



Typical Parts Listing for Two Piece Trunnion Ball Valves

ITEM	NAME	ITEM	NAME
1	BODY	22	NUT
2	END CAP	23	SEAL RING
3	BALL	24	SEGMENT
4	SEAT	25	SEAT SPRING
5	STEM	26	ANTISTATIC SPRING
6	TRUNNION	27	BEARING
7	ALLEN HEAD BOLT	28	BEARING
8	SEAT RING	29	SEALANT INJECTION VALVE
9	FIRE SAFE GASKET	30	DRAIN VALVE
10	FIRE SAFE GASKET	31	KEY
11	FIRE SAFE PACKING	32	PIN
12	FIRE SAFE GASKET	33	GEAR OPERATOR
13	FIRE SAFE GASKET	34	STUD
14	TRUNNION SEAL O-RING	35	NUT
15	BODY SEAL O-RING	36	PIN
16	SEAT SEAL O-RING	37	VENT VALVE
17	UPPER CAP SEAL O-RING	38	SEALANT INJECTION VALVE
18	STEM SEAL O-RING	39	LIFTING LUGS
19	ALLEN HEAD BOLT	40	THRUST WASHER
20	LIMIT STOP PLATE	41	CHECK VALVE
21	STUD		

7.1 VALVE DISASSEMBLY FOR SEAT/SEAL REPLACEMENT ONLY

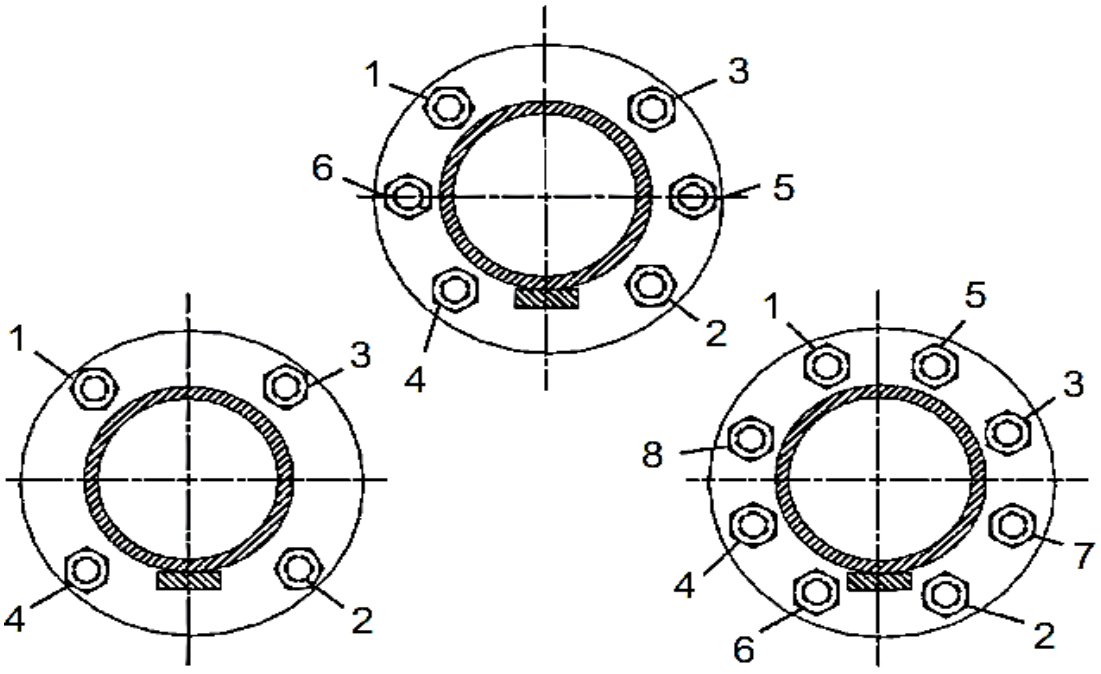
7.1.1 Stand valve on bench or floor, taking care not to damage the flange sealing surfaces. Turn clockwise to close the valve.
7.1.2 Unscrew the flange nuts and remove the end/cap.
7.1.3 Turn valve around and repeat 7.1.2
7.1.4 Place end cap on protected bench or floor with raised face flange facing up.
7.1.5 Using a small punch, gently tap behind the seat follower until the seat assembly falls out of the end caps.
7.1.6 Pick up end cap and remove and inspect seat assembly and seat follower.
7.1.7 Remove end cap o-rings and gaskets.
7.1.8 Remove springs from adapter.
7.1.8 Clean and inspect all parts for damage.

7.2 VALVE ASSEMBLY FOR SEAT/SEAL REPLACEMENT ONLY

7.2.1 Clean and inspect all parts prior to use. Replace any damaged parts with new parts as required. A standard service kit consisting of soft parts and seat may be obtained, with the valve serial number, through Meridian.
7.2.2 Place the end caps with raised face flange on a bench or floor facing down protecting the raised face from damage.
7.2.3 Take the new seat assembly c/w insert and install new o-rings.
7.2.4 Install new seat gasket and seat follower on seat assemblies.
7.2.5 Generously grease the o-rings and adapter seat area prior to assembly.
7.2.6 Install cleaned or replacement springs into adapter. (Hint: a small amount of grease on each spring or in spring hole will ensure they stay in place during the assembly process.)
7.2.7 Gently and evenly push and tap seat assemblies into end cap. Ensure you do not damage the o-rings during installation.
7.2.8 Install new o-rings and gaskets on end cap.
7.2.9 Clean ball and body
7.2.10 Pick up end cap and gently flip over and install end cap on body bolts making sure to straddle centre line of body with raised face flange holes. Ensure you do not damage o-rings or gasket during installation.
7.2.11 Install and tighten nuts in a criss-cross pattern and torque in accordance with recommended torque table 1 below.
7.2.12 Turn valve assembly around and repeat 7.2.10 & 7.2.11
7.2.13 Operate valve, opening to the left and closing to the right ensuring the valve is in fully open and closed position. Operation should be smooth.
7.2.14 Valve should be hydrostatically tested in accordance with API 6D to check for leakage prior to installation.

Table 1, REFERENCE BOLT TIGHTENING TORQUES / PATTERN

Bolt size (mm)	B7M / L7M（NM / ft-lbs ）	B8M（NM / ft-lbs）
M10	66 / 49	24 / 18
M12	116 / 86	43 / 32
M14	185 / 136	69 / 51
M16	288 / 212	160 / 118
M20	564 /416	210 / 155
M24	976 / 720	363 / 268
M27	1432 / 1056	535 / 395
M30x3	2010 / 1482	748 / 552
M33x3	2726 / 2011	1016 / 749
M36x3	3596 / 2652	1339 / 988
M39x3	4631 / 3416	1726 / 1273
M42x3	5849 / 4314	2179 / 1607
M45x3	7263 / 5357	2706 / 1996
M48x3	8889 / 6556	3312 / 2443
M52x3	11411 / 8416	4252 / 3136
M56x3	14369 / 10598	5355 / 3950



8.0 TROUBLESHOOTING GUIDE

Issue	Potential Causes	Recommended Solution
Valve won't turn.	1. Operating device (gearbox or actuator) is damaged. 2. No Lubrication. 3. Ice inside operating device. 4. Ice inside valve. 5. Stem is damaged.	1. Remove operating device cover, check for damage. Repair or replace as necessary. 2. Lubricate using suitable grease. 3. Remove operating device cover and check for ice. Remove and replace grease if required. 4. Heating line or injecting antifreeze as per your company procedures. 5. Repair or replace stem(4)
Stem Leak.	1. Improper O-ring selection or damaged O-ring. 2. Stem sealing face damaged.	1. Replace O-ring (11). 2. Repair or replace damaged stem (7).
Valve won't fully close.	1. Operating device needs adjustment. 2. Operating device is damaged. 3. Stem is damaged. 4. Foreign matter is block the valve opening.	1. Adjust the operating device. 2. Remove the operating device cover and check for damage. Repair or replace as necessary. 3. Repair or replace damaged stem (7). 4. Valve must be removed as per your company procedures to check for foreign matter.
Valve is leaking downstream.	1. Foreign particles on the seat insert. 2. Seat insert is damaged. 3. Seat O-rings are damaged.	1. Remove foreign particles using valve cleaner injected through the injection fittings. 2. Repair or replace seat insert. 3. Replace seat O-rings.
Leakage between end and body sections.	1. Body Joint O-ring is damaged and body joint gasket damaged. 2. Pipeline is causing extremely high forces on the valve.	1. Replace O-ring (9) and replace body joint gasket(14). 2. Check pipeline stresses.

Injection fitting won't accept grease	1. Buried check valve has precipitant or lubricant blocking flow	1. Ensure valve is closed with body vent open to bleed down cavity. 2. Remove injection fitting and inject hydraulic oil until clear. 3. Clear away any grease or debris visible on top of the buried check valve. 4. Reattach injection fitting and inject hydraulic oil through to the body. 5. Inject synthetic grease such as EQ80 or equivalent.

When properly selected, this Meridian product is designed to perform its intended function safely during its useful life. However, the purchaser or user of Meridian products should be aware that Meridian products might be used in numerous applications under a wide variety of industrial service conditions. Although Meridian can (and often does) provide general guidelines, it cannot provide specific data and warnings for all possible applications. The purchaser/user must therefore assume the ultimate responsibility for the proper sizing and selection, installation, operation, and maintenance of Meridian products. The purchaser/user should read and understand the Installation; Operation Maintenance (IOM) instructions included with the product, and train its employees and contractors in the safe use of Meridian products in connection with the specific application.

While the information, instructions and specifications contained in this literature are believed to be accurate, they are supplied for informative purposes only and should not be considered certified or as a guarantee of satisfactory results by reliance thereon. Nothing contained herein is to be construed as a warranty or guarantee, express or implied, regarding any matter with respect to this product. Because Meridian is continually improving and upgrading its product design, the specifications, dimensions and information contained herein are subject to change without notice. Should any question arise concerning these provisions, the purchaser/user should contact Meridian at the following:

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