
INSTALLATION, OPERATION & MAINTENANCE MANUAL

KF SERIES M3

THREE – PIECE TRUNNION MOUNTED BALL VALVE





SERIES M3
THREE-PIECE TRUNNION
MOUNTED BALL VALVE

CONTENTS

BILL OF MATERIALS-----3

1) SCOPE-----6

2) INSTALLATION -----6

 2.1) VALVE ORIENTATION -----6

 2.2) BUTTWELD END VALVES-----6

3) OPERATION -----7

 3.1) INITIAL START-UP/COMMISSIONING-----7

 3.2) NORMAL OPERATING ACTIVITY-----7

 3.3) DOUBLE BLOCK AND BLEED OPERATION-----7

 3.4) BODY CAVITY RELIEVING SYSTEMS -----7

4) MAINTENANCE -----7

5) RECONDITIONING-----8

6) REASSEMBLY -----8

7) VALVE SERVICING INTERVALS-----9

8) VALVE MAINTENANCE GUIDELINES -----9

 8.1) ROUTINE MAINTENANCE-----9

 8.2) VALVE FLUSH -----10

 8.3) VALVE CLEANING -----10

 8.4) EMERGENCY REPAIR-----10

9) QUICK REFERENCE -----10

 9.1) NEW INSTALLATION "START-UP"-----10

 9.2) PROPER VALVE TESTING -----10

 9.3) SHELL TESTING -----10

 9.4) HYDROSTATIC SEAT TESTING-----11

 9.5) SUPPLEMENTAL AIR SEAT TEST-----11

 9.6) DOUBLE BLOCK AND BLEED (DBB) VALVES -----11

10) GEAR OPERATOR FIELD ADJUSTMENT-----11

11) VALVE MAINTENANCE OVERVIEW-----12

12) LUBRICATION EQUIPMENT-----12

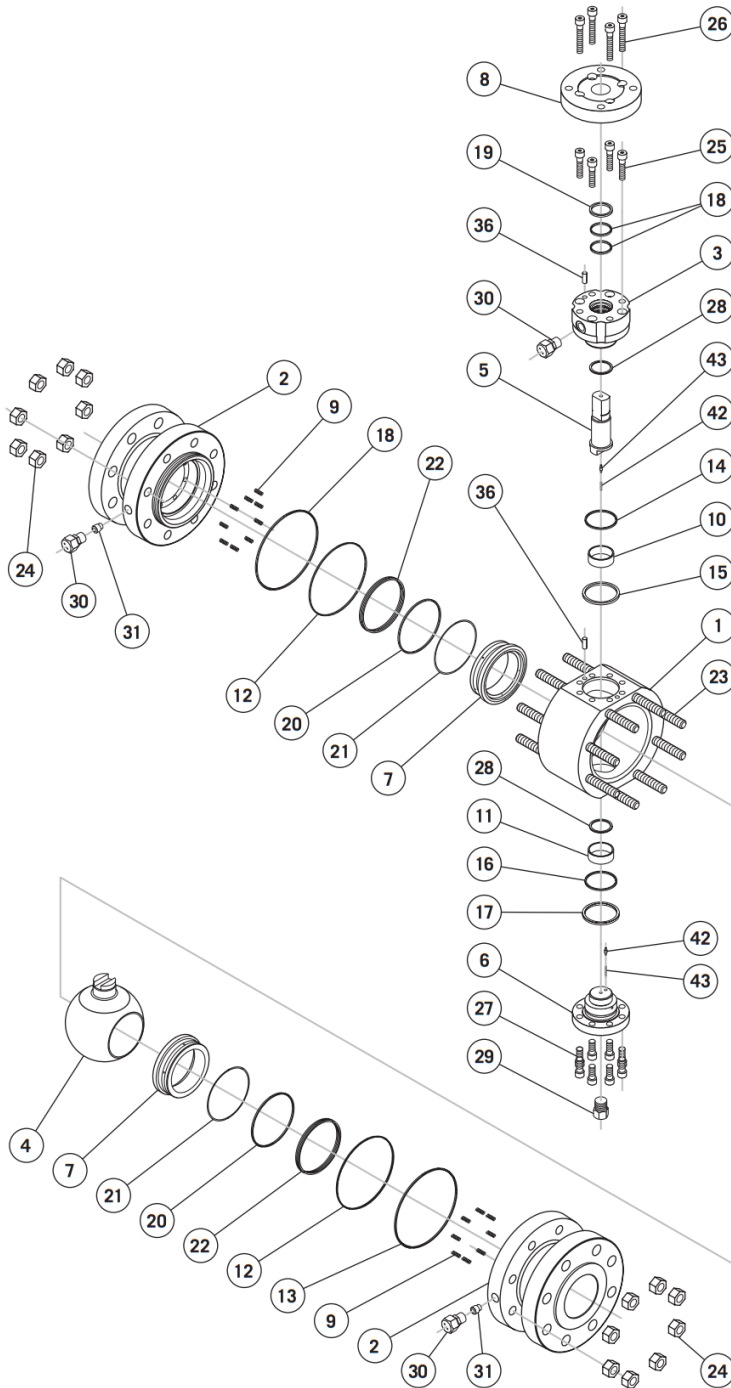
13) PROPER VALVE STORAGE-----12

14) TROUBLESHOOTING-----12

15) HANDLING -----13

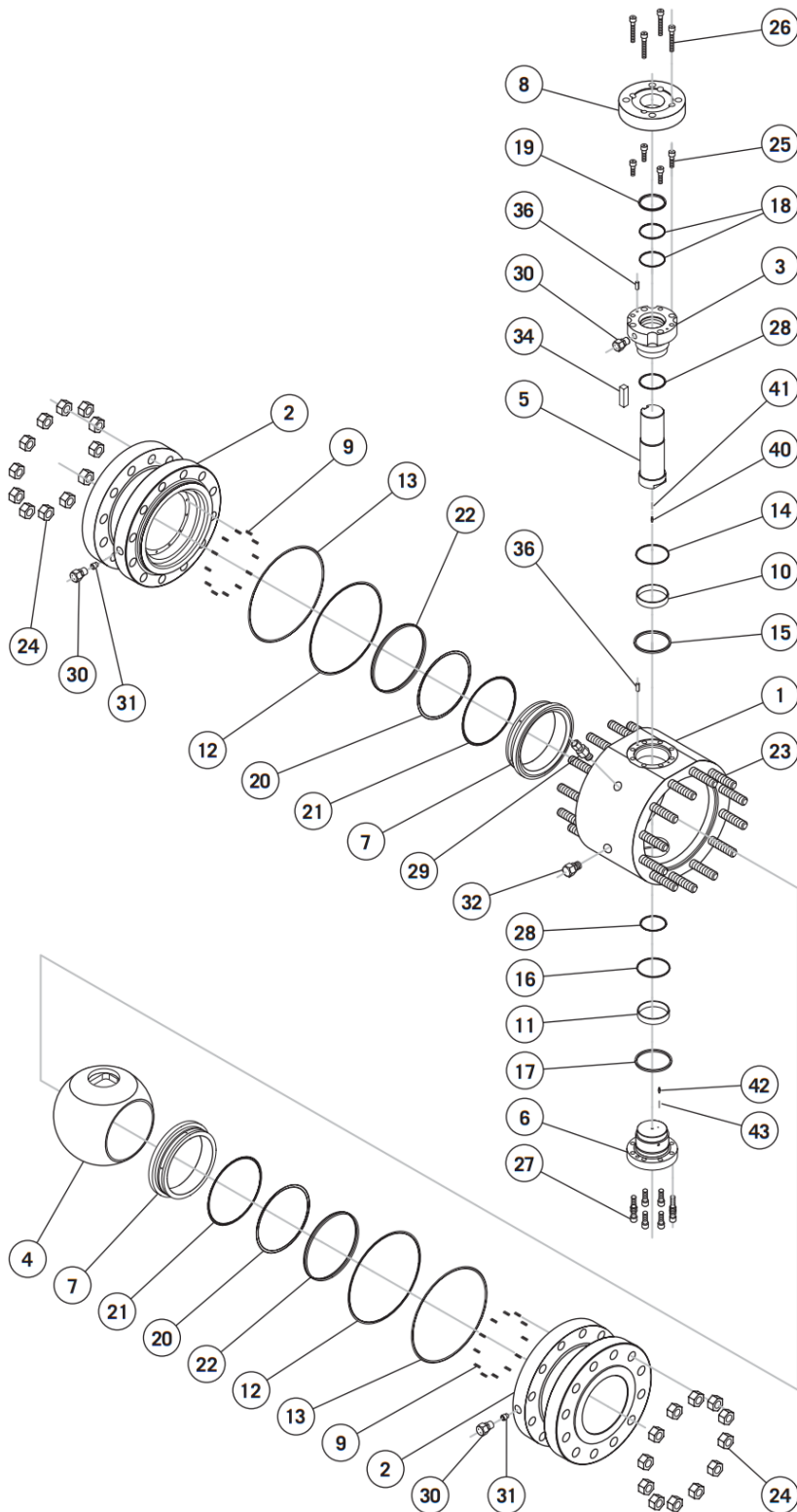
BILL OF MATERIALS

(M3 Component Parts 2" FP – 4" FP)
Class 150, 300, 600, 900, 1500 & 2500



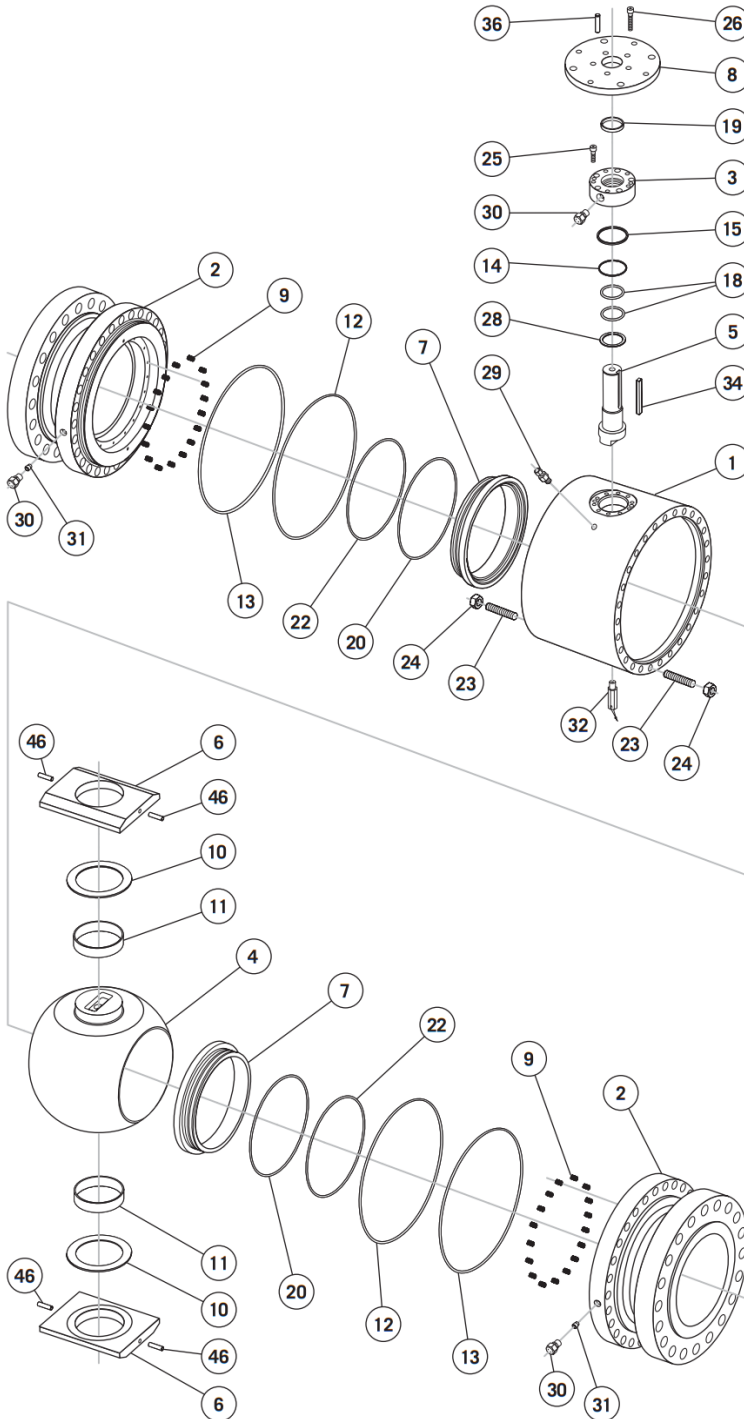
1	Body
2	Adapter
3	Bonnet
4	Ball
5	Stem
6	Lower Trunnion
7	Seat assembly
8	Top cover
9	Seat springs
10	stem bearing
11	Lower Trunnion bearing
12	Adapter primary seal
13	Adapter sub seal
14	Bonnet primary seal
15	Bonnet Sub seal
16	Lower Trunnion primary seal
17	Lower trunnion sub seal
18	Stem seal
19	Stem sub seal
20	Seat seal
21	Seat seal backup
22	Seat sub seal
23	Stud, body
24	Nut, Body
25	Cap screw, bonnet
26	Cap screw, Top cover
27	Cap screw, Lower trunnion
28	Thrust bearing
29	Bleed/Drain valve
30	Injection Fitting
31	Ball check
36	Alignment pin, Bonnet
42	Antistatic Pin
43	Antistatic Spring

(M3 Component Parts 6" FP – 12" FP)
Class 150, 300 & 600



1	Body
2	Adapter
3	Bonnet
4	Ball
5	Stem
6	Lower Trunnion
7	Seat assembly
8	Top Cover
9	Seat Springs
10	stem Bearing
11	Lower Trunnion Bearing
12	Adapter Primary Seal
13	Adapter Sub Seal
14	Bonnet Primary Seal
15	Bonnet Sub Seal
16	Lower Trunnion Primary Seal
17	Lower Trunnion Sub Seal
18	Stem Seal
19	Stem Sub Seal
20	Seat Seal
21	Seat Seal Backup
22	Seat Sub Seal
23	Stud, Body
24	Nut, Body
25	Cap screw, Bonnet
26	Cap screw, Top cover
27	Cap screw, Lower trunnion
28	Thrust Bearing
29	Bleed/Drain valve
30	Injection Fitting
31	Ball Check
32	Drain Plug
34	Key
36	Alignment Pin, Bonnet
42	Antistatic Pin
43	Antistatic Spring

**(M3 Component Parts 6" FP – 12" FP)
Class 900, 1500 & 2500
14" & Larger, All Classes**



1	Body
2	Adapter
3	Bonnet
4	Ball
5	Stem
6	Trunnion Block
7	Seat Assembly
8	Top Cover
9	Seat Springs
10	Stem Bearing
11	Lower Trunnion Bearing
12	Adapter Primary Seal
13	Adapter Sub Seal
14	Bonnet Primary Seal
15	Bonnet Sub seal
16	Lower Trunnion Primary Seal
17	Lower trunnion sub seal
18	Stem Seal
19	Stem Sub Seal
20	Seat Seal
21	Seat Seal Backup
22	Seat Sub Seal
23	Stud, Body
24	Nut, Body
25	Cap screw, Bonnet
26	Cap screw, Top cover
28	Thrust Bearing
29	Bleed/Drain valve
30	Injection Fitting
31	Ball check
32	Drain Plug
34	Key
36	Alignment pin, Bonnet
46	Trunnion Block Pin

1) SCOPE

The following instructions are very important for the maintenance, disassembling and assembling of series M3 ball valve.

The instruction refers also to grease emergency seal valves with back-up rings for high pressure services.

2) INSTALLATION

Install valve in system using proper size and type mating flanges and appropriate gaskets (for RF) or seal rings (for RTJ). Valve design allows for line flow in either direction.

Series M3 Ball Valves (6" bore and larger) are provided with mounting holes on a machined top cover or bonnet surface for convenient actuator or gear operator mounting. Consult factory for location and dimensions of these holes.

KF offers an optional gear operator with hand wheel which can be field mounted. Depending on size, some valves (6" bore and larger) have gear operators mounted with exposed bolting. Installation of a gear operator on these valves simply requires placing the operator over the stem, onto the top cover or bonnet and securing it with bolts.

Important! *After attachment to the valve, you must adjust the threaded "OPEN" and "CLOSED" travel stops on the gear operator by observing ball port and stem key position. Complete assembly by installing covers. Failure to set maximum open and closed positions accurately may result in premature seat failure due to throttling or pinched flow condition.*

2.1) VALVE ORIENTATION

The orientation of the valve is not critical, but the optimal way is to position the stem vertically upwards for ease of use. Installing the valve

upside down can cause the accumulation of dirt and other sediments on the stem seals. Install the ball valve with the valve stem facing upwards wherever possible.

2.2) BUTT-WELD END VALVES

KF weld end valves do not require disassembly prior to installation welding. However, care must be taken to insure seats and seals are protected from excessive temperature during the welding procedure.

1. Prior to welding it is imperative that all welding surfaces be free of contamination such as dirt, rust and grease which may affect weld performance.

Caution: During the welding process, valve body temperature should be monitored around the circumference at a location in line with the seat sealant injection fittings. The temperature at this plane should be checked with tempil stick or other reliable temperature indicator and not allowed to exceed 300°F. This precaution is necessary to assure that non-metallic seat/seals do not suffer heat damage.

2. Tack weld valve into Position and check for proper alignment
3. Finish weld following proper weld procedure for material grade condition and the above caution
4. If weld procedure being used requires post weld heat treatment, one of the following is applicable: (A is preferred)
 - A. Localized post weld heat treatment limited to the weld and the heat affected zone does not require disassembly of the valve, and use of this method does not void the valves pressure test certifications. However, it is imperative that the valve body temperature be

monitored and controlled as described in caution.

- B. Post weld heat treatment of the entire body does require disassembly of the valve in order to prevent damage to the valve internals. Disassembly of the valve voids warranty & test certifications

3) OPERATION

3.1) INITIAL START-UP/COMMISSIONING

Once the valve has been installed on the line it shall be left either in fully open or fully closed position depending on start-up / commissioning operation

Important! Do not leave the valve in half/partially open position for a long period of time. Ensure that the pipeline is free of any debris such as sand, tool, welding slag or weld splatter and rod ends. This will damage the valve ball and seat during start-up/commissioning operations.

3.2) NORMAL OPERATING ACTIVITY

KF Series M3 Ball Valves are recommended for on-off service only. Throttling (partial opening) may cause excessive and non-uniform wear on the seats, preventing tight shut-off. Series P3 Ball Valves open by rotating stem or gear operator hand wheel in a counterclockwise direction. Exact closed and open position is determined by the radial location of the stem flats or keyway with respect to the fluid bore centerline of the body. When the stem flats or keyway are perpendicular to the fluid bore, the valve is closed. Positive stops and arrow indication are provided on handles and gear operators.

3.3) DOUBLE BLOCK AND BLEED OPERATION

KF Series M3 Ball Valves are well suited for sealing fluids, concurrently, at both ends. The bleed valve (29) provides a safe and convenient

method for checking closed valve seat sealing effectiveness as required for Double Block and Bleed valves.

Caution! Before opening the bleed valve note orientation of the exhaust hole in the bleed valve body. Stand clear of this direction when opening the bleed valve. Never remove bleed valve while valve is exposed to line pressure.

3.4) BODY CAVITY RELIEVING SYSTEMS

Trunnion mounted ball valves do have a body cavity where pressure can be trapped into a closed volume. Under this circumstance any increase of the contained fluid temperature or any degradation of the contained fluid can result in an uncontrolled pressure increase of the trapped fluid to figures that are above the design pressures of the pressure equipment.

To avoid the above scenario, all of the KF trunnion mounted ball valves are provided with one of the following body cavity relieving systems (depending on the design of the seats):

Self-Relieving Seats: The design of self-relieving seat is such that when the pressure in the body cavity exceeds the maximum cavity pressure, the seat will automatically disconnect from the ball and allow pressure equalization between the body cavity and the pipeline.

When one or both the seats are of the Self Relieving type there is no need for any other type of body cavity relieving systems.

4) MAINTENANCE

Routine maintenance on Series M3 Ball Valves consists of periodic grease injections through the two seat lube fittings (30), one on the body and one on the adapter. See exploded view on page (3-5). General purpose grease, such as VAL-TEX 2000, is recommended for this service. Two pump strokes per fitting twice a year are

adequate. The use of thick, very viscous grease may hamper designed sealing action and make seat removal during any required disassembly more difficult. The stem journals are permanently lubricated at the factory and require no routine maintenance.

Note: *The stem journal fitting is for sealant injection to provide temporary sealing in the event of a stem seal failure (Seal weld "Ball Valve Sealant" No. 5050, available from Seal weld Corp., Houston, Texas or Calgary, Alberta-Canada). Also, in the event of internal seat/ball interface leakage, sealant may be injected through the two seat lube fittings to provide temporary sealing.*

Caution! *The use of traditional "plug valve sealant" may result in failure of seat and/or stem seals and is not recommended.*

5) RECONDITIONING

KF Series M3 Ball Valves may be rebuilt after removing the valve from the pipeline.

Important! *Prior to disassemble, valve must first be isolated from system pressure and flow. Also, with the valve set at approximately half open, internal pressure must be bled to 0 psi through the ball cavity bleed valve (29). Finally, as a safety precaution, remove the bleed valve entirely.*

After observing the above precautions, remove the valve from the pipeline. Operate the ball to the "CLOSED" position. Remove handle, retainer and stop plate. If the valve is equipped with an actuator or gear operator, remove it. Also, remove the stem key (34). Remove any accessories or hydraulic tubing.

Stand the valve on end, resting on one of the adapters. Care should be taken during this step to avoid scarring the raised sealing portion or ring groove of the flange. Loosen the top cover, the bonnet and Trunnion caps screws (25, 26,

and 27). Remove the top cover (8). Pull the bonnet (3) off, over the stem. Take the stem (5) out of the valve. Remove the trunnion (6) (only for 2"FP to 12"FP size valve). There is a threaded hole in the end of the bonnet and trunnion, which may be used to facilitate this extraction.

Remove the nuts (24) from the studs on the uppermost adapter. Carefully lift the adapter (2) off the body.

Place Nylon lifting strap or rope through the ball port and lift the ball (4) straight out of the body. Care must be exercised to prevent the ball from being banged or scraped during this procedure. Set the ball down on a clean surface free of anything that might scar the ball finish.

Remove the trunnion support (7) (only 14"FP and larger sizes valves) from the ball.

Remove the nuts from the lower adapter. Then, pull the body (1) off the lower adapter. Remove the seats (7) and seat springs (9) from the adapters. Take all the seals and back-up rings off the valve components, clean the parts and inspect them for damage, wear or corrosion. Replace seals and other parts, as required.

Reassemble in reverse order. Use a liberal amount of general purpose grease (such as VAL-TEX 2000) on all seals and machined mating surfaces. Fill the relief area between the O-ring grooves with grease on the stem and trunnion. A quality thread lubricant should be used when making up the adapter nuts.

6) REASSEMBLY

Use new replacement parts, as required. Use a liberal amount of general-purpose grease (such as Mystic JT-6) on seals and machined mating surfaces. Fill the reliefs between stem O-rings with grease.

Install seat assemblies and springs as far as possible, by hand, into seat pockets of body and

adapter. Take care to assure that O-ring seals are not pinched during assembly. Seat assemblies must be placed deep enough into seat pockets so that the wave springs are in contact with both body and seat. Insert stem assembly complete with thrust bearing into lubricated stem journal. (Note: A thin screwdriver or like tool will be required to depress the stem's side anti-static plunger to engage the plunger into the stem journal.) Pull stem assembly through to full engagement and rotate it to a closed position. 8" and above valves require that the keyway be oriented radially toward the lube fitting in the body.

Place bearings in trunnion supports then install this assembly on each trunnion of the ball. The blocks must be oriented such that the 5/16" holes face toward the body and the tapered edges conform to the mating body inside diameters. Carefully lower this assembly into the ball cavity of the body. (Note: A thin strip of steel strap held in the ball's stem slot will depress the stem end plunger smoothly as the ball trunnion blocks are lowered into position.) Assure this assembly has reached its seated position within the body by noting engagement with trunnion alignment pin (46). Place body seal in position on adapter pilot diameter then align adapter with body studs such that flange end holes match body end flange holes. After adapter is in contact with body fasten evenly and securely by tightening hex nuts in a cross-opposing order. Complete assembly by adding stem bearing, stop plate and retainer or gear operator assembly.

Clean the parts and inspect them for damage, wear, and corrosion. Observe seat pocket bores, stem seal bore and adapter seal area for rust pits and scale. If necessary, use fine emery for removal of deposits on machined surfaces. Fine emery may also be used very lightly on the ball's spherical sealing surfaces.

Scratches or cuts on the sealing insert surface of the seats are cause for replacement. Flush lube and sealant injection fittings and channels

with two or three pumps of grease while valve is disassembled. Replace seals and other parts, as required.

Reassemble in reverse order. Use a liberal amount of general-purpose grease (such as Mystic JT-6) on all seals and machined mating surfaces. Fill the relief area between the stem and lower trunnion O-ring grooves with grease. Finally, assemble the adapter to the body and uniformly tighten the adapter nuts.

7) VALVE SERVICING INTERVALS

Valve shall be inspected regularly during operation and subjected to scheduled maintenance. The operator is responsible for servicing the valve at regular intervals. The service intervals are determined by media in line, temperature, pressure, and number of cycles during the operations. High pressure accelerates the loss of lubricants.

8) VALVE MAINTENANCE GUIDELINES

To guarantee efficient valve operation, the valve shall be inspected on a regular basis during the operation and subject to scheduled maintenance. All maintenance work shall be done by qualified personnel. Follow the grease gun or pump manufactures equipment's guidelines for proper use. Local regulations shall be strictly followed for the safety and health of the persons involved.

8.1) ROUTINE MAINTENANCE

The valve lubricants are designed for routine valve maintenance. It consists of injecting lubricant/sealant though the groove or channel inside the valve leading to seal points around the ball thus topping off the lubricant/sealant. The "Top Off" quantity can vary greatly due to frequency of valve operation and service conditions. The lubricant is available in stick or liquid form and should be free from heavy agent such as PTFE, clay and wax. The most widely used

lubricant by manufacturers and users is "HYDROCARBON GREASE".

8.2) VALVE FLUSH

Valve flush is a blend of synthetic oils. It works through penetration by pressure and is often successful in softening hardened deposits of lubricants and sealants. It forms protective coating on the metal surface and impenetrable barrier which will withstand high pressure and friction in server service demands.

8.3) VALVE CLEANING

When the valve does not seal properly and is hard to turn, the valve cleaning is required. Valve cleaners are products that contains detergent, sealant and oils. It clears channels/passage where old grease may have been hardened, Inject cleaner through the lubrication channels, leaves it for three-to-four hours. If possible, cycle the valve to evenly distribute the cleaner in the ball-seat contact area. This procedure is often successful in freeing seized or hard to turn valve.

Note: Always displace the valve cleaner with equal quantities of Lubricant/Sealant after cleaning.

8.4) EMERGENCY REPAIR

Severe seat or ball damage may cause the valve to leak. The valve sealants are designed to stop a leaking valve. The sealant contains heavier agents such as PTFE and clay in a grease base. The temporary seal can be achieved by injecting a heavy sealant. Displace a heavy sealant after use of a lighter lubricant/sealant to avoid complications. The valve which requires continuous heavy sealant injections shall be either replaced or repaired immediately.

9) QUICK REFERENCE

9.1) NEW INSTALLATION "START-UP"

Valves are frequently damaged by debris during hydro testing or start-up of a New Installation

It is very important that the valve be in full open position during this process.

- If the valve is closed or partially open, debris can damage the ball and find its way into seat pockets
- This can cause the valve to leak soon after start-up.

9.2) PROPER VALVE TESTING

- I. Each valve is to be operated before and after testing for any unusual torque requirements.
- II. Test pressure measuring devices are to be either currently calibrated pressure gages or pressure transducers.
- III. Tests are to be made with ball and seat free of any sealant.
- IV. Fluid for shell and seat tests is to be water with a corrosion inhibitor.
- V. Valves are to be substantially relieved of air or gas when tested with liquid.
- VI. Seat closure tests are to be conducted after acceptable shell test.

9.3) SHELL TESTING

Prior to painting or other external coatings, Valves is to be subjected to a hydrostatic shell test. There is to be no leakage under the test pressure when both ends are blanked and ball is partially open. Testing pressure is 1.5 times MOP. Test duration are 2 min for 4" and under valves, 5 min for 6" to 10" valves, 15 min for 12" to 18" valves and 30 min for 20" and larger.

- I. Fit the vent valve and set it in open position.

- II. Operate the valve to the half-open position.
- III. Fill in the valve with the fluid (Venting the air through the vent valve)
- IV. Close the vent valve and apply pressure in accordance with max operating pressure of the pipeline.
- V. Visually check the outside of the ball valve for possible deformations or leakage.
- VI. Depressurize the valve.

1. With the valve in half-open position, the valve shall be completely filled
2. The valve shall then be closed and the valve vent opened to allow excess fluid to overflow from the cavity connection
3. Apply pressure on both the seats simultaneously
4. Seat tightness shall be monitored from the cavity connection
5. Depressurize the valve.

Note: For valve without a body vent or drain connection, the above test is not applicable

9.4) HYDROSTATIC SEAT TESTING

Valves are to be subjected to a hydrostatic seat test. There is to be no leakage under test pressure. Test pressure is to be applied successively to both sides of closed valve with other side open to atmosphere. Testing pressure is 1.1 times MOP. Test durations are 2 min for 4" and under valves, 5 min for 6" and larger valves.

1. Operate the valve to the fully close position and open the vent valve.
2. Pressurize one side in accordance with max operating pressure of the pipeline.
3. From the body vent, check for possible seat leakage.
4. Repeat same operations as per points 2 & 3 on opposite side of the valve.
5. Depressurize the valve.

Note: For valve without a body vent or drain connection, it is necessary to install on the pipeline a control system to measure pressure upstream and downstream the valve.

9.5) SUPPLEMENTAL AIR SEAT TEST

Valves subjected to an 80psi air seat test shall show no signs of visible leakage.

9.6) DOUBLE BLOCK AND BLEED (DBB) VALVES

If the valve has DBB, the test shall be performed as follows:

10) GEAR OPERATOR FIELD ADJUSTMENT

- I. Locate "closed" stop adjustment screw on gear operator. It is the screw on back of gear case on same side of operator as the hand wheel.
- II. Operate ball valve to full closed, "feel" the valve hit the stop.
- III. With pressure on closed ball valve, loosen the lock nut on "closed" stop adjustment screw then back out screw [CCW] 3 or 4 turns.
- IV. Open bleed fitting on side (center) of ball valve.
- V. Line media will escape from bleed fitting while evacuating ball cavity. Allow a minute or two for body cavity to bleed down. If media continues to escape thru bleed fitting, leakage is confirmed.
- VI. If leakage continues to be observed at bleed fitting, turn gear operator hand wheel clockwise (right) to further close the ball valve. As hand wheel is turned, observe for change in amount of flow out bleed fitting. The objective is to find a position where flow no longer comes from bleed fitting. At each check position, it is necessary to allow some time to see if the flow changes. If a position is not found to stop leakage in the CW direction, turn hand wheel CCW to see if the valve may have been over-closing.

- VII.** If a position is found where leakage stops, turn the stop-screw CW until it hits snugly then tighten the lock nut.
- VIII.** If a position is not found where leakage stops, it can be concluded that the seat insert is damaged, and repair is necessary.

11) VALVE MAINTENANCE OVERVIEW

- Establish a valve Maintenance group
- Have a set valve servicing schedule
 - Service schedule is dependent on the media and the number of times the valve is cycled
- Valves should be lubricated at least one time every six months.

12) LUBRICATION EQUIPMENT

- Hydraulic hand guns are efficient for 4” Bore and smaller
- Hand guns require 50 Strokes to move 1oz of product
- Air operated guns are the most efficient for 6” bore and larger

13) PROPER VALVE STORAGE

INSIDE STORAGE

- Ball valves should be in the fully open position
- End connection protectors should be tight to prevent ingress of moisture and debris.
- Valves should be left in original shipping container (If possible).

14) TROUBLESHOOTING

- Verify leakage (Block & Bleed)
- Cycle the valve 3-6 Times
 - Wipes the ball and often allows trapped debris to travel downstream
 - Can free-up a stubborn seat
- Adjust Gear Operator/Actuator Stops
 - Occasionally, a stop set on a gear operator may loosen causing the valve to over or under level.

FAULT	FINDING	CORRECTION
Internal Leakage	<ul style="list-style-type: none"> • Stroke the valve to the fully closed position. • Discharge the residual pressure left inside the cavity through the drain valve and the vent plug (when provided). • Allow the system to stabilize for half an hour minimum. • If the valve is tight no water should drip out the drain valve. 	<ul style="list-style-type: none"> ➤ Small leaks can be stopped by injecting sealant into grease nipples ➤ Bad ones require replacement of seat seals.
Body Leakage	<p>When any of the body flanged connections, drips verify the bolt tightening torque of the joint concerned.</p>	<p>External leaks can be stopped replacing body gaskets.</p>

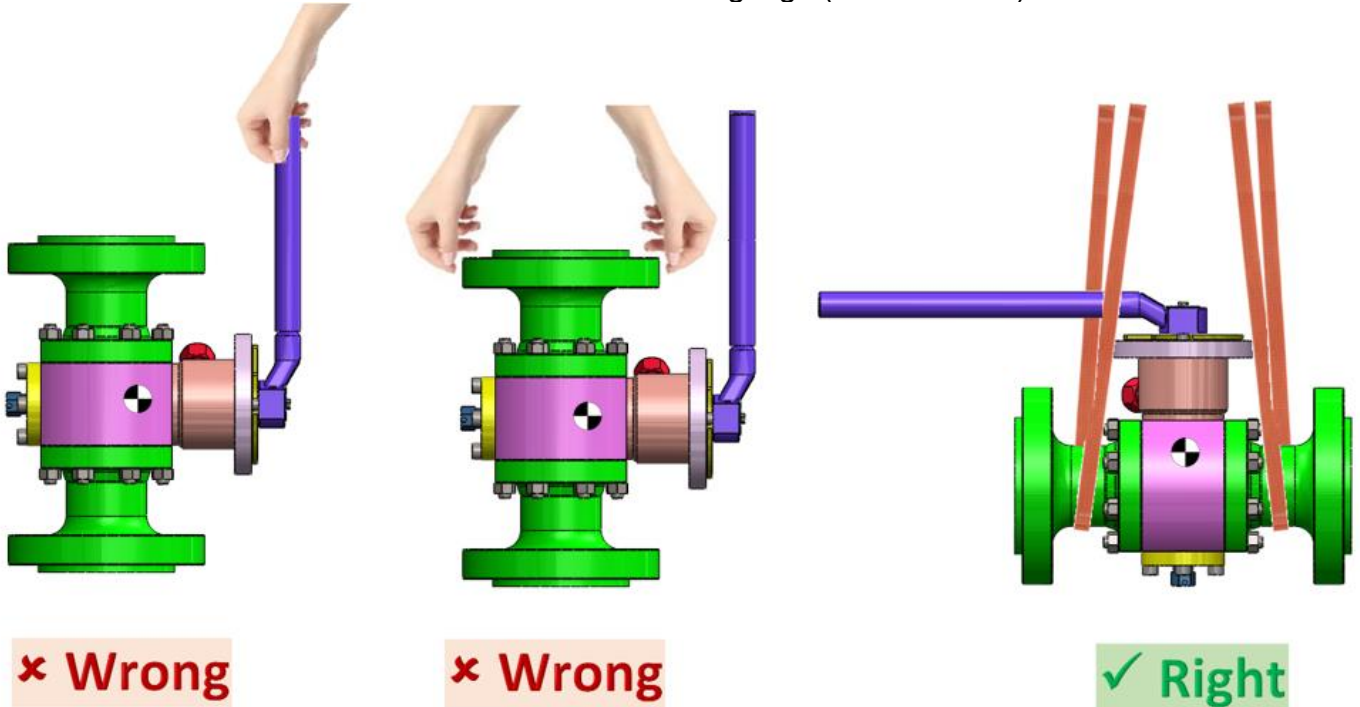
FAULT	FINDING	CORRECTION
Increase in torque requirements	<ul style="list-style-type: none"> • A slight increase in the valve torque requirement is natural during the valve life and has been taken in account when designing the operator device. • This torque increment tends to stabilize with time. • Torque increasing rate that does not trend to stabilize can be caused by external affairs such as sand / debris trapped between stem and bonnet flange or foreign objects, left into the pipeline that gets trapped between seats and ball. 	<ul style="list-style-type: none"> ➤ Inject lubricant grease through the stem grease fitting. ➤ If this operation does not bring any benefit dismantle the stem/gland flange group and verify no galling, scores or damages have occurred. ➤ If possible, remove the foreign objects from the pipeline. ➤ Verify that the operator is correctly set and is delivering its nominal torque.
Stem leakage	<ul style="list-style-type: none"> • Leakages from stem depend on damage of primary and secondary seal on the stem in case the grease injector is not between the two sealing areas. In this case the leakage is recorded through stem seal. • In case the grease injector is positioned between the seals (primary and secondary) the leakage of primary seal can be recorded removing the grease injector or plug forecast during the design stage. 	<ul style="list-style-type: none"> ➤ Small leakages can be stopped or reduced injecting grease sealant through the grease injector. ➤ Big leakages require the dismantling of the valve.
Vent and drain leakage	<ul style="list-style-type: none"> • Leakage through drains and vents caused by damage of elastomeric seal material or when minimum torque required is not achieved (wrong torque applied or threaded parts damaged). • In this case there is a leakage of fluid or gas from vent and drain. 	<ul style="list-style-type: none"> ➤ If elastomeric seal material is damaged it is substituted after dismantling the vent and drain. ➤ In case there is any missing torque the correct torque is applied (after the verification of integrity for threaded area). ➤ Leak from the gasket seal can require the dismantling of the flange and substitution of gasket seal.

15) HANDLING

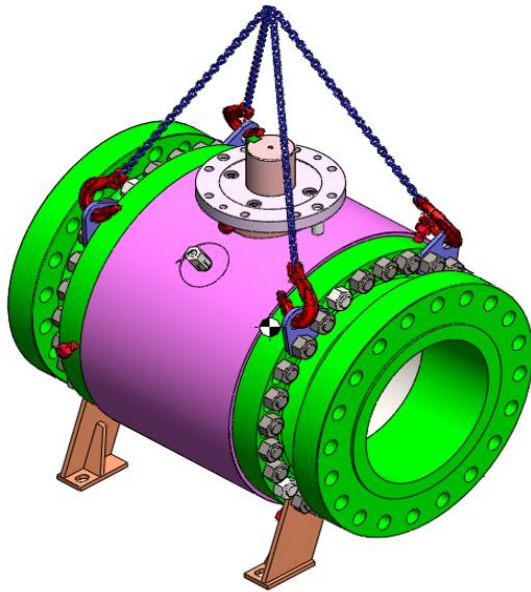
- Always keep the ball in an open position to avoid any possible damages on ball sealing surface.
- If the valve end protectors are removed for any check or testing, the same preservation and protection shall be done after the check or testing.

- Valve sizes 8" and above are provided with lifting lugs for the purpose of proper lifting of the valve. Safe working limit of each lifting point is provided in Table-1. Valves without lifting lugs (sizes 6" & below) shall be handled using ropes/straps.
- Location of Centre of Gravity of the valve marked in the below images with the symbol "☉"
- Following are the right and wrong practices for lifting the valves.

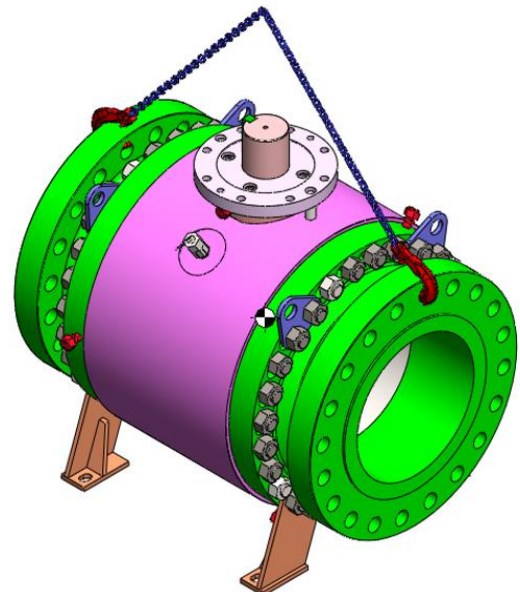
Valves without lifting lugs (6" and below)



Valves with lifting lugs (8" and above)



✓ Right



✗ Wrong

TABLE-1 : SAFE WORKING LIMIT OF LIFTING LUG

SIZE	CLASS	ASSEMBLY NUMBER	No. of Lifting Lugs	SWL per Lifting Lug (Lbs.)	SWL per Lifting Lug (Kg)
8RP	150	M118	2	424	192
8FP	150	M119	2	606	275
10RP	150	M120	2	606	275
10FP	150	M121	2	1278	580
12RP	150	M122	2	1278	580
12FP	150	M123	2	1469	666
14RP	150	M124	2	1469	666
14FP	150	M125	4	2146	973
16RP	150	M126	2	1469	666
16FP	150	M127	4	2645	1200
18RP	150	M128	4	2146	973
18FP	150	M129	4	2680	1216
20RP	150	M130	4	2645	1200
20FP	150	M131	4	2324	1054
24RP	150	M134	4	2324	1054
24FP	150	M135	4	3826	1736
28RP	150	M138	4	3826	1736
30RP	150	M140	4	3826	1736
30FP	150	M141	4	6455	2928
36FP	150	M147	4	6278	2848

TABLE-1 : SAFE WORKING LIMIT OF LIFTING LUG

SIZE	CLASS	ASSEMBLY NUMBER	No. of Lifting Lugs	SWL per Lifting Lug (Lbs.)	SWL per Lifting Lug (Kg)
8RP	300	M218	2	424	192
8FP	300	M219	2	700	318
10RP	300	M220	2	700	318
10FP	300	M221	2	732	332
12RP	300	M222	2	732	332
12FP	300	M223	2	1479	671
14RP	300	M224	2	1479	671
14FP	300	M225	2	3233	1467
16RP	300	M226	2	1479	671
16FP	300	M227	4	2231	1012
18FP	300	M229	4	2136	969
20RP	300	M230	4	2231	1012
20FP	300	M231	4	3233	1467
22FP	300	M233	4	3946	1790
24RP	300	M234	4	3233	1467
24FP	300	M235	4	3349	1519
30FP	300	M241	4	4462	2024
8RP	600	M318	2	812	368
8FP	600	M319	4	921	418
10RP	600	M320	4	921	418
10FP	600	M321	4	1380	626
12RP	600	M322	4	1380	626
12FP	600	M323	4	921	418
14RP	600	M324	4	921	418
14FP	600	M325	4	2146	973
16RP	600	M326	4	921	418
16FP	600	M327	4	3347	1518
18RP	600	M328	4	2146	973
18FP	600	M329	4	3580	1624
20RP	600	M330	4	3347	1518
20FP	600	M331	4	3271	1484
22FP	600	M333	4	3557	1613
24RP	600	M334	4	3271	1484
24FP	600	M335	4	4462	2024
26FP	600	M337	4	3528	1600
30FP	600	M341	4	25205	11433
36FP	600	M347	4	7568	3433
8RP	900	M418	4	921	418
8FP	900	M419	4	1386	629
10RP	900	M420	4	1386	629
10FP	900	M421	4	754	342

TABLE-1 : SAFE WORKING LIMIT OF LIFTING LUG

SIZE	CLASS	ASSEMBLY NUMBER	No. of Lifting Lugs	SWL per Lifting Lug (Lbs.)	SWL per Lifting Lug (Kg)
12RP	900	M422	4	754	342
12FP	900	M423	2	2766	1255
14RP	900	M424	2	2766	1255
14FP	900	M425	4	3347	1518
16RP	900	M426	2	2766	1255
16FP	900	M427	4	4881	2214
18FP	900	M429	4	4350	1973
20RP	900	M430	4	4881	2214
20FP	900	M431	4	4275	1939
24RP	900	M434	4	4275	1939
24FP	900	M435	4	6006	2724
26FP	900	M437	4	8214	3726
30RP	900	M440	4	6006	2724
30FP	900	M441	4	6966	3160
6FP	1500	M517	2	1469	666
8RP	1500	M518	2	1469	666
8FP	1500	M519	2	3233	1467
10RP	1500	M520	2	3233	1467
10FP	1500	M521	4	3233	1467
12RP	1500	M522	4	3233	1467
12FP	1500	M523	4	3233	1467
16RP	1500	M526	4	3233	1467
16FP	1500	M527	4	4781	2169
6FP	2500	M617	4	690	313
8RP	2500	M618	4	690	313
8FP	2500	M619	2	3233	1467

REVISION HISTORY				
REV	PREPARED BY	DESCRIPTION	DATE	APPROVED BY
EC-15333	Sadeesh.S	Initial Release	07/03/2015	SEE ELECTRONIC APPROVALS
EC-15838	Amuthageethan	Handling has been added	11/30/2017	SEE ELECTRONIC APPROVALS
EC-16165	Logesh S	Lifting Lug Offering size corrected	11/19/2020	SEE ELECTRONIC APPROVALS
EC-16251	Silambarasan S	Valve center of gravity, safe working limit of Lifting lug, Valve Orientation added	04/28/2023	SEE ELECTRONIC APPROVALS
EC-25012	Silambarasan S	Installation instruction for weld end valves are added	03/14/2025	SEE ELECTRONIC APPROVALS