

INSTALLATION, OPERATION & MAINTENANCE MANUAL

KF SERIES F/FE

FLANGED FLOATING BALL VALVES



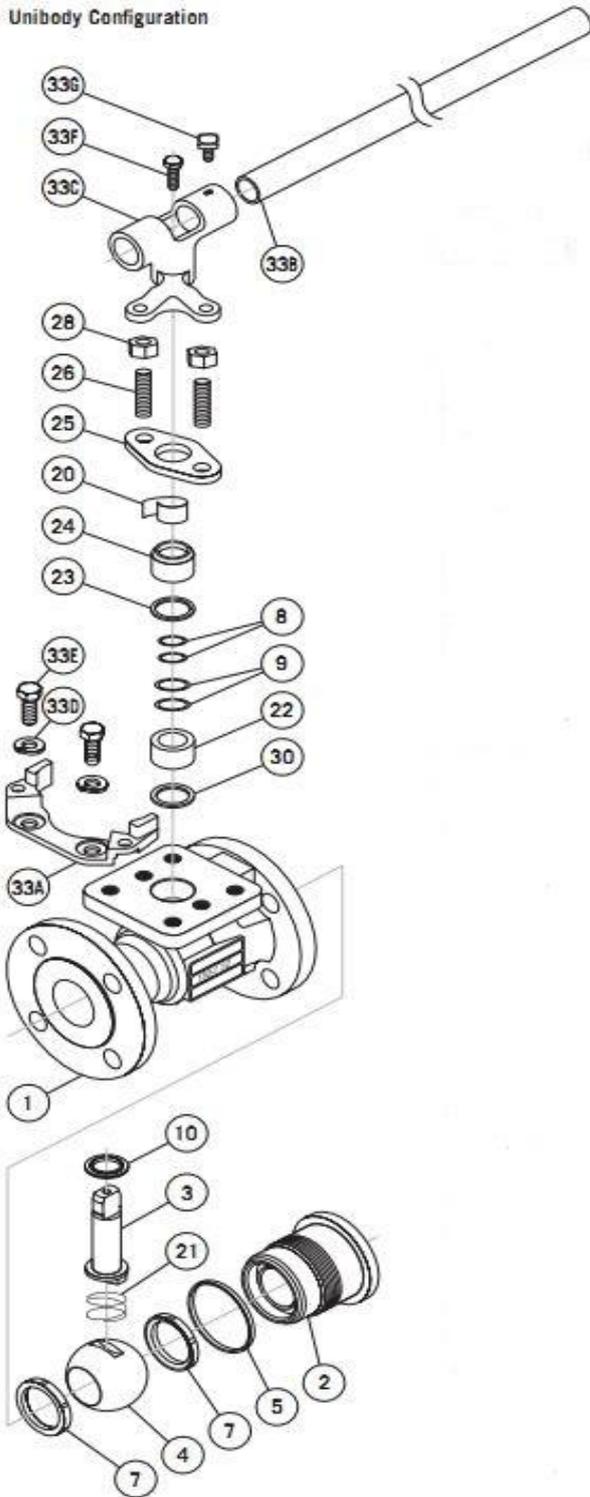
CONTENTS

BILL OF MATERIALS	3
1) SCOPE	7
2) INSTALLATION	7
2.1) <i>Valve Orientation</i>	7
3) OPERATION	7
3.1) <i>INITIAL START-UP/COMMISSIONING</i>	7
3.2) <i>NORMAL OPERATING ACTIVITY</i>	7
3.3) <i>BODY CAVITY RELIEVING SYSTEMS</i>	7
4) MAINTENANCE	8
5) RECONDITIONING	8
6) VALVE SERVICING INTERVALS	8
7) VALVE MAINTENANCE GUIDE LINES	8
7.1) <i>ROUTINE MAINTENANCE</i>	8
7.2) <i>VALVE FLUSH</i>	8
8) QUICK REFERENCE	9
8.1) <i>NEW INSTALLATION "START-UP"</i>	9
8.2) <i>PROPER VALVE TESTING</i>	9
8.3) <i>SHELL TESTING</i>	9
8.4) <i>HYDROSTATIC SEAT TESTING</i>	9
8.5) <i>SUPPLEMENTAL AIR SEAT TEST</i>	9
9) VALVE MAINTENANCE OVERVIEW	10
10) PROPER VALVE STORAGE	10
11) TROUBLESHOOTING	10
12) HANDLING	11

BILL OF MATERIALS

Packed Style - Unibody Configuration Class 150 & 300

Unibody Configuration



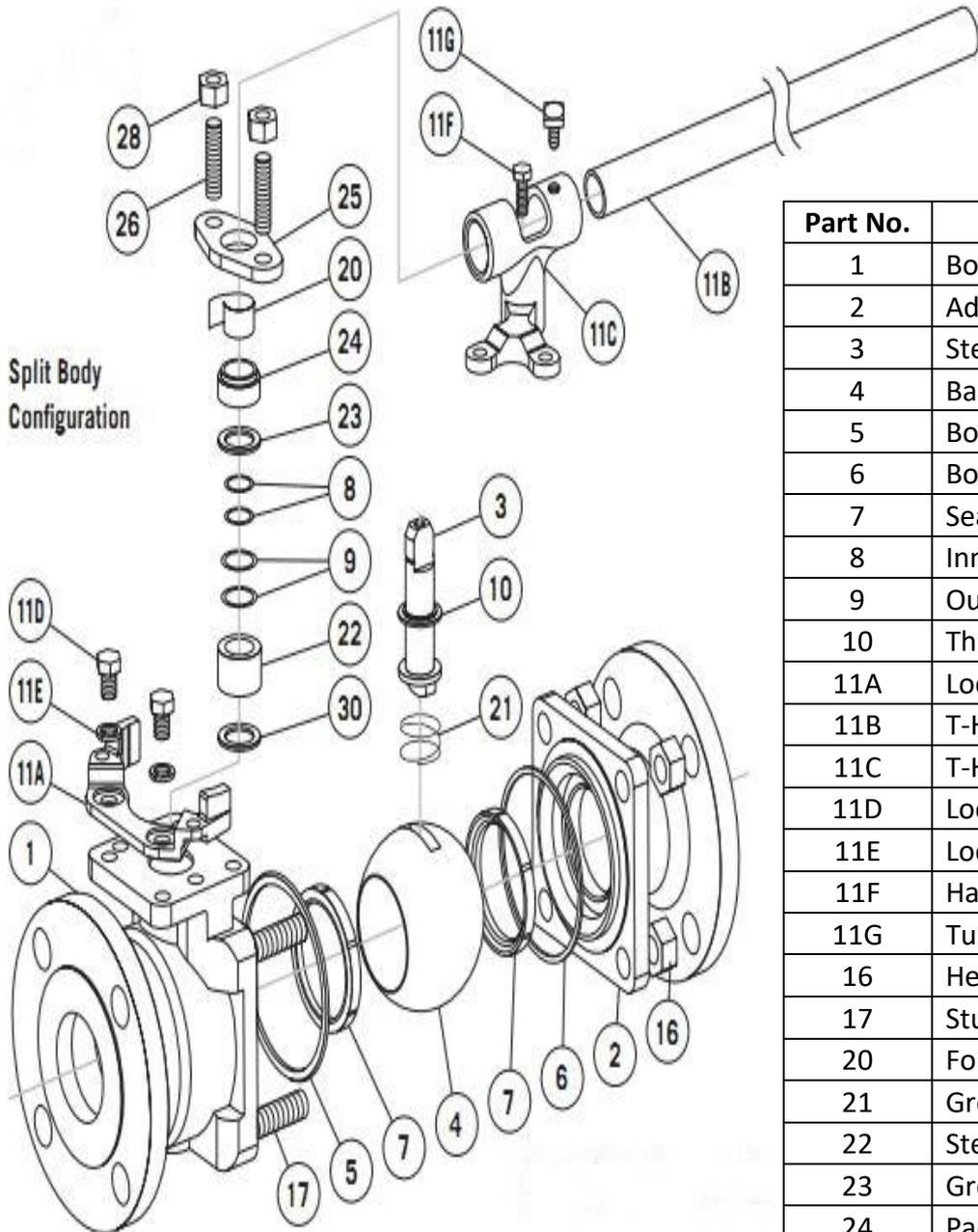
Part No.	Description
1	Body
2	Seat Retainer
3	Stem
4	Ball
5	Body Seal
7	Seat
8	Inner Stem O-Rings***
9	Outer Stem O-Rings***
10	Thrust Washer
20	Liner
21	Ground Spring
22	Stem Seal, Gland or Packing
23	Ground Washer*
24	Follower
25	Retainer
26	Follower Stud
28	Follower Nut
30	Stem Washer**
33A	Lock Plate
33B	T-Handle Tube
33C	T-Handle Hub
33D	Lock Washer
33E	Hex Screw
33F	Hex Screw
33G	Square Screw

*Not required with Grafoil® packing in Firesafe valves.

**Required in 2" and larger packed valves only.

*** Not used in packed stem valves.

Packed Style - Split Body Configuration
Class 150 & 300



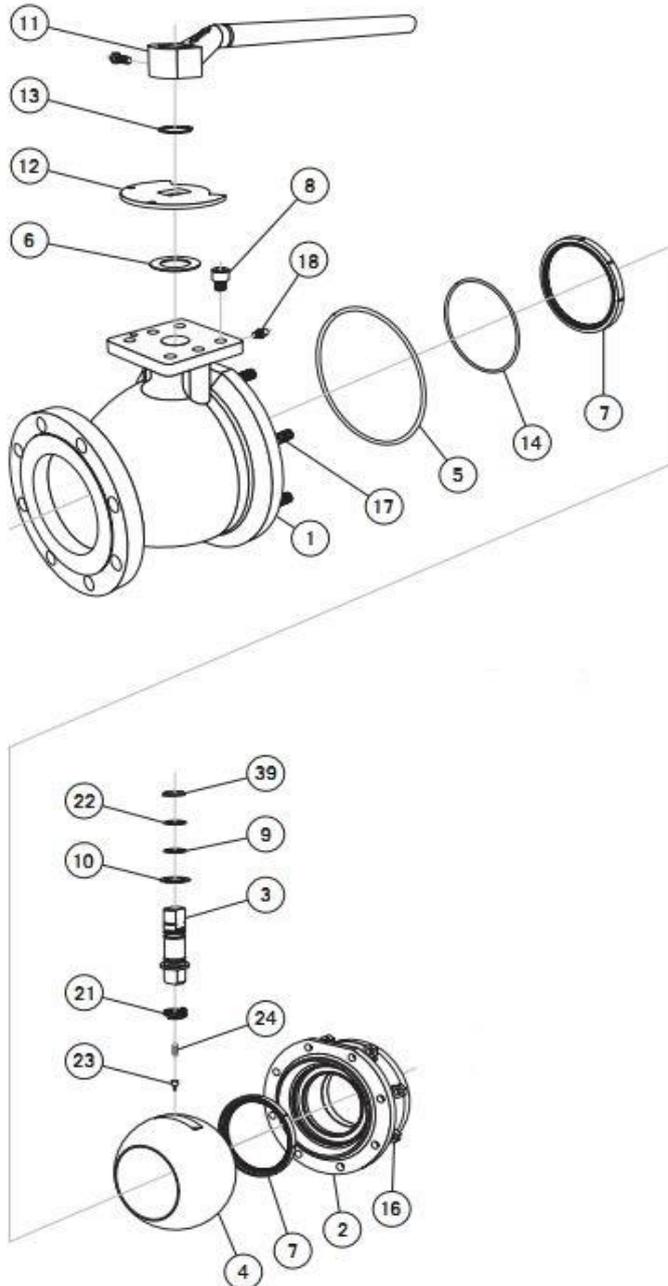
Part No.	Description
1	Body
2	Adapter
3	Stem
4	Ball
5	Body Gasket
6	Body O-Ring***
7	Seat
8	Inner Stem O-Rings***
9	Outer Stem O-Rings***
10	Thrust Bearing
11A	Lock Plate
11B	T-Handle Tube
11C	T-Handle Hub
11D	Lock Plate Screw
11E	Lock Plate Lock Washer
11F	Handle Hub Screw
11G	Tube Lock Screw
16	Hex Nut
17	Stud
20	Follower Liner
21	Ground Spring
22	Stem Seal, Gland or Packing
23	Ground Washer*
24	Packing Follower
25	Packing Retainer
26	Packing Stud
28	Packing Nut
30	Stem Washer**

*Not required with Grafoil® packing in Firesafe valves.

**Required in 2" and larger packed valves only.

*** Not used in packed stem valves.

O-ring Style - 1" FP thru 8"FP Class 150 & 300

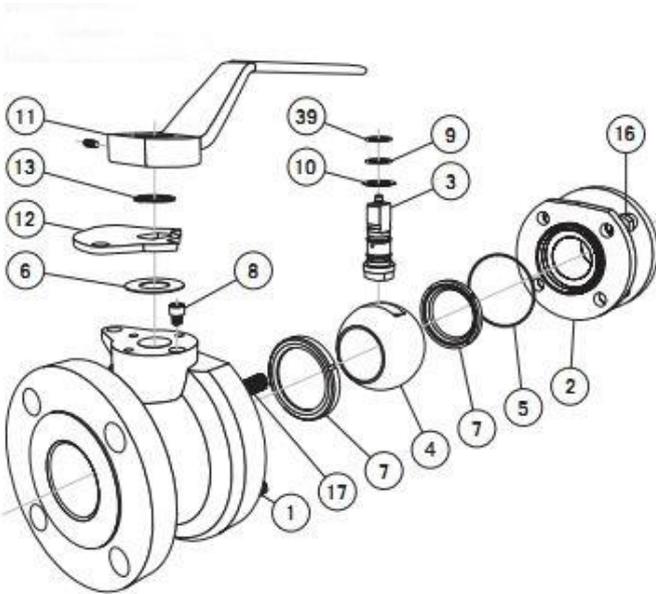


Part No.	Description
1	Body
2	Adapter
3	Stem
4	Ball
5	Body Seal
6	Stem Bearing*
7	Seat
8	Stop Screw*
9	Stem Seal
10	Thrust Bearing
11	Handle Assembly*
12	Stop Plate*
13	Retainer*
14	Adapter Pilot Seal
16	Hex Nut
17	Stud
18	Lube Fitting
21	Ground Spring**
22	Fire-safe Stem Packing
23	Ground Plunger*
24	Ground Spring*
39	Weather Seal

*4" Bore Only

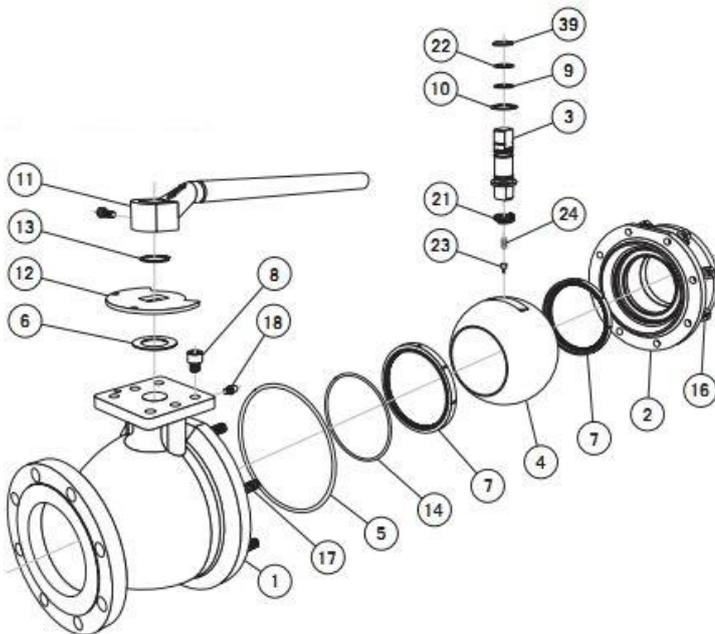
**6" Bore Only

O-ring Style - 1" FP thru 4"RP
Class 600, 900 & 1500



Part No.	Description
1	Body
2	Adapter
3	Stem
4	Ball
5	Body Seal
6	Stem Bearing
7	Seat
8	Stop Screw
9	Stem Seal
10	Thrust Bearing
11	Handle Assembly
12	Stop Plate
13	Retainer
16	Hex Nut
17	Stud
39	Weather Seal

O-ring Style - 4" FP thru 6"RP Class 600



Part No.	Description
1	Body
2	Adapter
3	Stem
4	Ball
5	Body Seal
6	Stem Bearing*
7	Seat
8	Stop Screw*
9	Stem Seal
10	Thrust Bearing
11	Handle Assembly*
12	Stop Plate*
13	Retainer*
14	Adapter Pilot Seal
16	Hex Nut
17	Stud
18	Lube Fitting
21	Ground Spring**
22	Fire-safe Stem Packing
23	Ground Plunger*
24	Ground Spring*
39	Weather Seal

*4" Bore Only
 **6" Bore Only

1) SCOPE

The following instructions are very important for the maintenance, disassembling and assembling of series F/FE 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).

KF offers handle and optional gear operator with hand wheel which can be field mounted. 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 flats 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.

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 F/FE 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 F/FE Ball Valves open by rotating stem or gear operator hand wheel in a counter-clockwise direction. Exact closed and open position is determined by the radial location of the stem flats with respect to the fluid bore centerline of the body. When the stem flats are perpendicular to the fluid bore, valve is closed. Positive stops and arrow indication are provided on handles and gear operators.

3.3) BODY CAVITY RELIEVING SYSTEMS

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 floating ball valves are provided with the following body cavity relieving systems:

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 excess pressure will be relieved through upstream this maintaining pressure equalization between the body cavity and the pipeline.

4) MAINTENANCE

KF Ball Valves are permanently lubricated during assembly and normally require no routine maintenance. However, all Series F/FE assemblies include an external stem lube fitting for periodic lubrication of stem journal if desired.

5) RECONDITIONING

Open valve, unbolt adapter (for unibody unthread seat retainer) (2) from body (1). Remove body seal (5). Turn ball (4) to the closed position and remove. Remove seats (7) with care to prevent damaging flat surfaces of the seat cavity in body and adapter.

Clean seat cavities and body seal seating surfaces using fine emery. Replace seats and ball. Grease body seal and position it in its groove in the adapter. Replace adapter, assuring that it butts metal-to-metal against the body.

To Replace Stem or Stem Seal:

With ball removed loosen set screw or locknut and lift handle/square nut from stem. Remove retainer, allowing removal of stop plate and stem bearing. Remove stem, stem seals, and thrust bearing through body bore. Clean stem journal in body using fine emery. Grease stem journal. Place thrust bearing and stem seals on stem in that order. Apply a coat of grease to all parts. Replace stem, using a wooden pry against the

bottom of the stem if necessary. Assure that the stem seals are not pinched during re-assembly.

Replace stem bearing, stop plate and retainer. Reaffix handle/square nut on stem and tighten set screw. Re-assemble valve as above.

6) 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.

7) VALVE MAINTENANCE GUIDE LINES

In order to guarantee efficient valve operation, the valve shall be inspected on 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 persons involved.

7.1) ROUTINE MAINTENANCE

The valve lubricants are designed for routine valve maintenance. It consists of lube fitting through the hole of stem inside the valve leading to seal points. 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.

7.2) VALVE FLUSH

Valve flush is a blend of synthetic oils. It works through penetration by pressure and 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) QUICK REFERENCE

8.1) 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.

8.2) PROPER VALVE TESTING

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

8.3) 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.

1. Fit the vent valve and set it in open position.
2. Operate the valve to the half-open position.
3. Fill in the valve with the fluid (Venting the air through the vent valve)
4. Close the vent valve and apply pressure in accordance with max operating pressure of the pipeline.
5. Visually check the outside of the ball valve for possible deformations or leakage.
6. Depressurize the valve.

8.4) 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 other end, 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.

8.5) SUPPLEMENTAL AIR SEAT TEST

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

9) 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.

10) PROPER VALVE STORAGE

INSIDE STORAGE

- Ball valves should be in the full 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).

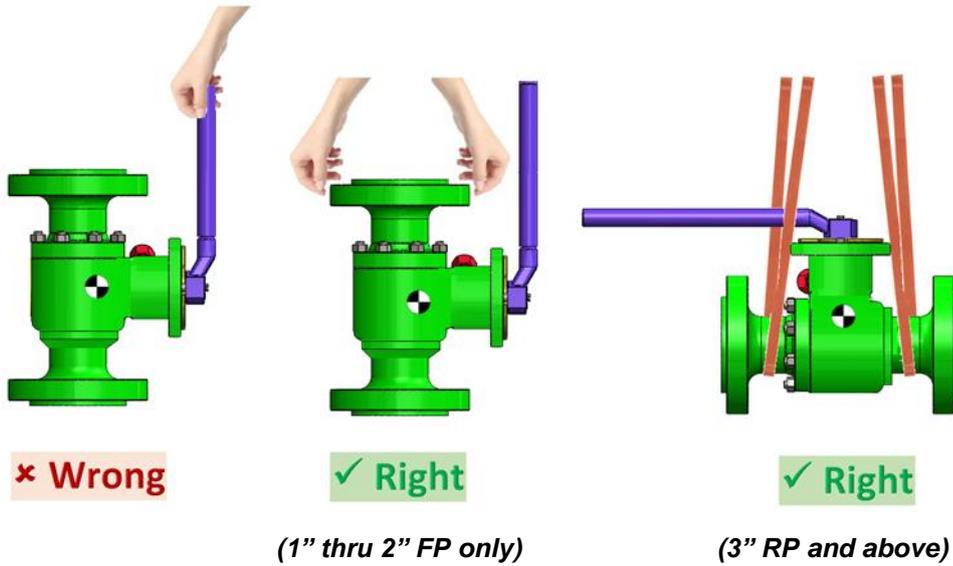
11) TROUBLESHOOTING

- Verify Leakage.
- 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
Body Leakage	When any of the body flanged connections drips verify the bolt tightening torque of the joint concerned.	External leaks can be stopped replacing body gaskets.
Increase 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"> ➤ 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 from damage of primary and secondary seal on the stem. 	<ul style="list-style-type: none"> ➤ Leakages can be stopped or reduced dismantle the stem/gland flange group and verify no galling, scores or damages have occurred.

12) HANDLING

- Always keep the ball in an open position to avoid any possible damage 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.
- Location of Center of Gravity of the valve marked in the below images with the symbol 
- The following are the right and wrong practices for lifting the valves.



REVISION HISTORY				
REV	PREPARED BY	DESCRIPTION	DATE	APPROVED BY
EC-15333	BHARATH D K	Initial Release	08/28/2015	SEE ELECTRONIC APPROVALS
EC-15838	AMUTHAGEETHAN	Handling has been added	11/30/2017	SEE ELECTRONIC APPROVALS
EC-16226	Naveen M	Logo changed from Circor to KF	03/21/2022	SEE ELECTRONIC APPROVALS
EC-16273	Sundhararaman S	Valve Orientation notes added and Center of Gravity logo added in Valve Handling images.	09/27/2023	SEE ELECTRONIC APPROVALS