## 1.0 GENERAL

It is recommended that this entire document shall be read prior to proceeding with the installation or repair. Only correct installation, maintenance and operation will ensure smooth valve operation and maximum life.

CAUTION

Camtech shall not accept any liability if the instructions set forth in this manual are not complied with.

**DESIGN CONDITION**

a) Valves are designed and manufactured to be installed in applications where no more than 1G of force in excess of gravity is applied in any direction. This 1G force can be an effect of traffic, wind or Earthquake.

b) Valve are intended for clean fluid without any specific corrosive, chemical attack or abrasion presents please get the recommendation for such application if abrasion presents.

## 1.1 RESPONSIBILITY FOR VALVE SELECTION AND APPLICATION

Due to the variety of duties on which the product can be employed, it is the end users responsibility to ensure the compatibility of the media with the valve rating and materials of construction of the product for each specific application (i.e. corrosion, erosion and wear which may affect the integrity of the pressure containing parts. Camtech may offer suggestions in the selection but the selection process is solely the responsibility of plant designers. Plant designers should take into account the specific effects that the process media will have on the valve wall thickness and corresponding service life and ensure that the selected material is corresponding with the process media.

**Warning:** The user is advised that misapplication of the product may result in injuries or property damage.

## 2.0 HEALTH AND SAFETY

### 2.1 When installing and maintaining valves

a.) Conduct a risk assessment and eliminate or reduce hazards.

b.) Work in accordance with safe systems of work.

c.) Observe all site health and safety rules, and in conformity with the legal local company specific instructions on occupational health and safety and prevention of accidents

d.) Valve shall only be operated by personnel qualified by training/experience.

e.) Certain processes utilize flammable, Caustic or unstable media. Care should be taken in these circumstances to ensure that the operator is aware of the specific health and safety risks associated with that media.

f.) When operating manual valves, Hand gloves should be worn to minimize the risk of injury to the hands/skin due to high temperature/ low temperature valve body.

g.) When operating any valve stand clear of any moving parts such as the stem and/ or operator moving parts.

h.) If the process or environment that the products are used in is likely to cause temperature (high or low) that may cause injury to personnel if touched, then adequate insulation/protection must be fitted.

**Warning:** Non observance of safety instructions and warning may provoke risks of personnel injury and damage to the valves or damage to the equipment and pollution or damage to the environment

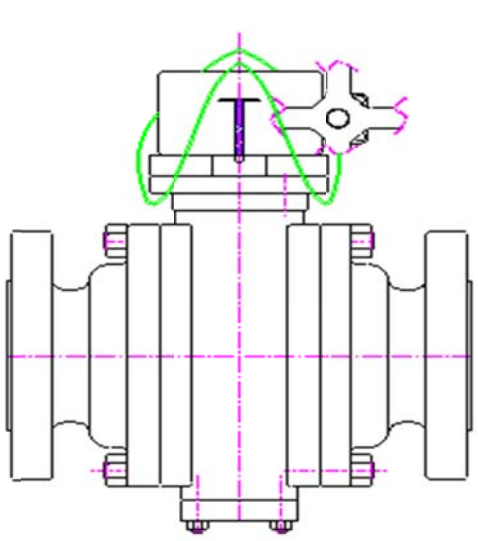
**Warning:** Do not exceed the maximum operating conditions as specified in the name plate. Non observance of this warning may cause personnel injury and damage to property like injuries resulting from fluid leakage ( cold, hot toxic, under pressure ) and impairment of valve function.

## 3.0 PRESERVATION, SHIPMENT AND HANDLING

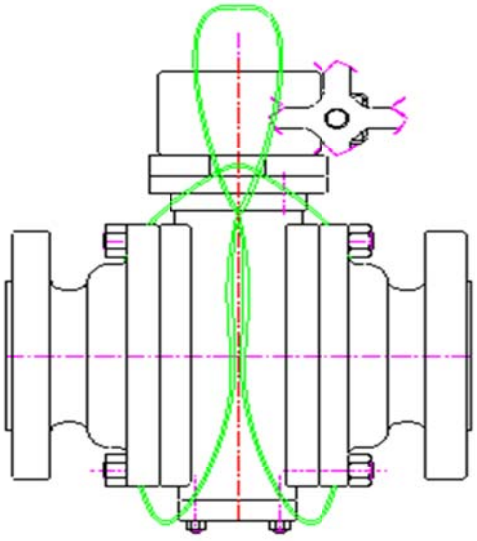
3.1 All valves are properly packed in order to protect the parts that are subject to deterioration during transportation and storage on site. The valves are packed with the ball in the open position. Only Actuated fail close valves shall be supplied with valve in close position. Valve ends, both flanged and butt-weld ends are protected with suitable plastic or wooden caps. The packing are appropriate to ensure safe transportation, protect the valves against external forces such as impacts, and vibration. During handling use appropriate tools like brackets, hook, fastener, ropes, etc. respecting the load capacity as appropriate.

CAUTION

1. Do not lift the valve through hand wheel, gear box or actuator.
2. Caution must be taken during the handling to avoid that this equipment passes over the workers or over any other place where a possible fall could cause damage. In any case, the local safety regulations must be followed.



WRONG HANDLING



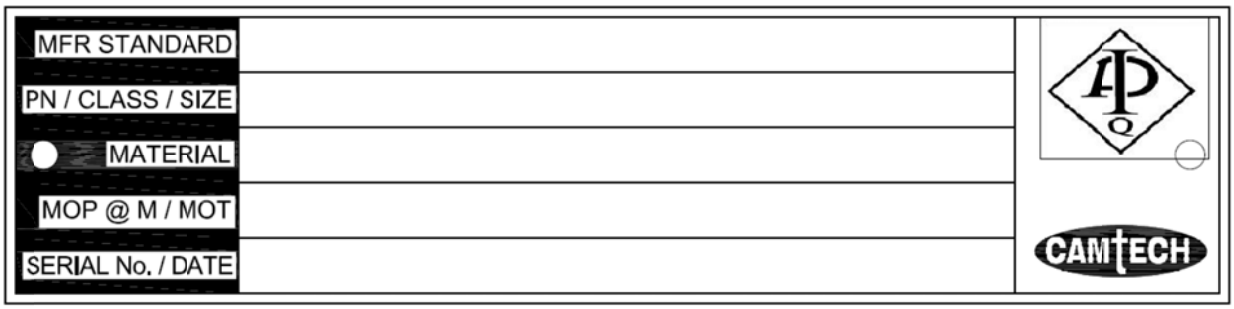
CORRECT HANDLING

## 4.0 STORAGE

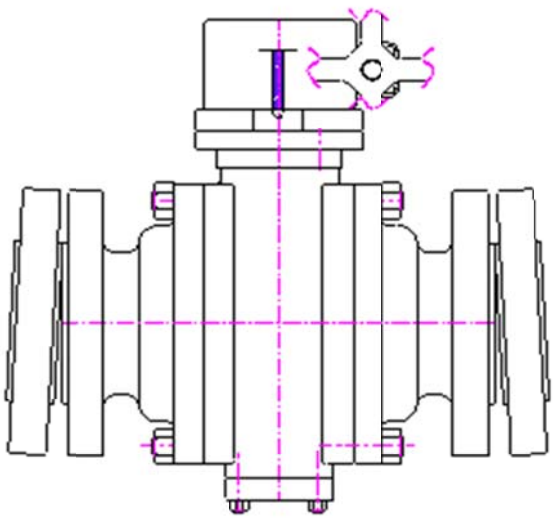
a.) Store the valve in closed dry room on solid ground in a dirt-free atmosphere. Allow the valves to remain in their original protective packings.
b.) Do not place the consignment packages directly on the ground.
c.) Do not expose consignment packages to the weather or directly to the sun.
d.) Check the paint coating for damage and corrosion at regular intervals.
e.) Check the packaging every two months.
f.) Repair the protective coating if necessary.

## 5.0 MARKING

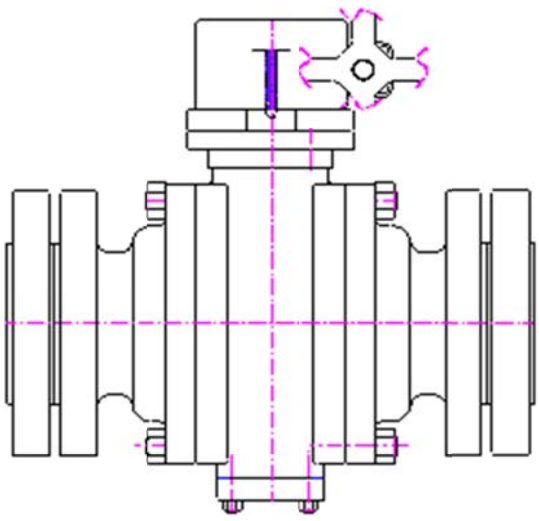
Valves are provided with 1 nameplate




## 6.0 INSTALLATION



WRONG INSTALLATION



CORRECT INSTALLATION

**6.1 PREPARATION BEFORE INSTALLATION**

1. As a rule, the engineering contractor, Construction Company or operator/user is responsible for the positioning and installation of the valves. Planning and installation errors may impair the reliable function of the valves and pose a substantial safety hazard.
2. Confirm that the materials of construction of the valve, and the maximum pressure / temperature specified in the nameplates are appropriate for the service intended and are as specified.
3. Thoroughly clean adjacent piping system to remove any foreign material, weld, pieces of wood/plastic.
4. Verify that the space available for installation is adequate to allow the valve to be installed and to be operated.
5. Clean thoroughly the accessible interior spaces of body ends, surfaces and functional parts and mounting parts (stem, flange for actuator mounting etc.)
6. Ball valves can be installed normally in horizontal pipelines with vertical stem and with flow from either direction. Valves can also be installed in vertical pipelines.

**THE FOLLOWING PROVISIONS SHALL BE MADE IN THE PIPELINE**

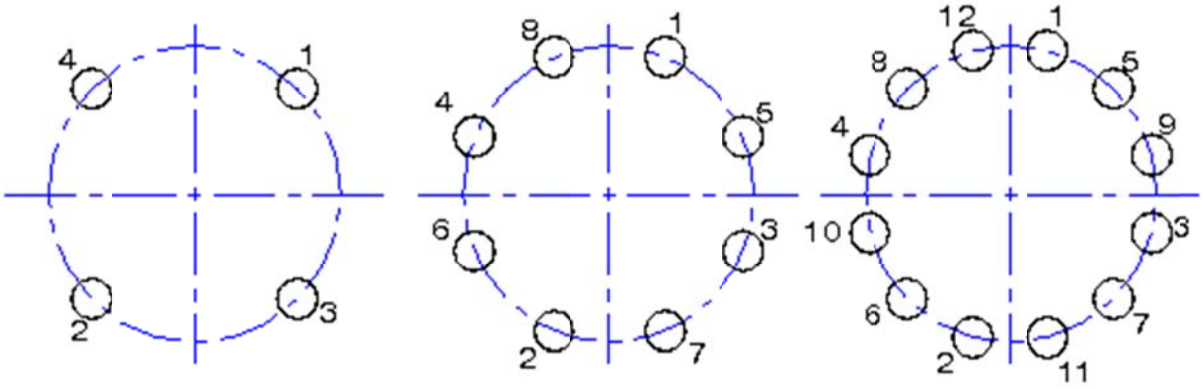
a) Draining and venting. Valves are provided with bosses for draining and venting. Drilled , tapped and plugged connections for draining and venting are provided when requested by the customer.
b) Dangerous discharges of pressure relief blow off.
c) Appropriate measure in the pipeline due to decomposition of unstable fluids where exist. Operator shall have thorough knowledge of such fluids and operate the valve as per established documented instructions.
d) Pressure relief valve, where unexpected increase in pressure, water hammer is anticipated and allowable pressure limit can be exceeded.
e) Valves are not provided with filling or discharge taps. Such provisions if required shall be provided in the pipeline.

**6.2 VALVE INSTALLATION**

1. Install the valve with ball in the open position.
2. Support the valve and adjacent pipelines, such that pipeline thrust and torsional forces are not transmitted to the valve.

**A. FLANGED VALVES**

1. Clean the flange faces to ensure that it is free from damage.
2. The gaskets on the mating flanges are properly centered. Only fasteners and gaskets of approved materials shall be used. Place the valve between the two flanges of the pipe and put the gasket between the valve flanges and the pipe flange. Make sure that it is correctly positioned. Tighten the flange bolts progressively and crosswise. Use torque wrench to tighten to the requested torque specified by the specification. Ensure that the flanges are straight and aligned to the pipe.




**Bolt Tightening Sequence**

**B. BUTT WELD VALVES**

Position the valve and align with the pipe. Remove any grease or protective paint that may have been applied to the weld ends. Use the smallest electrodes and the minimum amperage possible consistent with approved welding procedures. This will help to minimize distortion in the seat areas. Valves of carbon steel should be allowed to cool slowly. The valve may be covered with a heat insulating blanket to promote slow cooling and limit the heat affected zone. Follow ASME standards and industry standards.

**C. VALVE VERIFICATION BEFORE START-UP**

1. Tighten the gland flange just enough to prevent stem leakage. Over tightening will decrease packing life and increase operating torque.
2. Check the operation of the valve by stroking it to full open and full close.

**7.0 OPERATION**

1. Valves are closed by turning the hand wheel in clockwise direction and opened by turning in counter clockwise direction.
2. Subject the valve to the required pressure and temperature gradually and slowly.
3. Retighten all bolts/nuts.
4. Ensure that there is no leak from the valve and the operation is smooth.

**7.1 USE OF BALL VALVES**

Ball valves are used for on-off service and shall not be used in throttling operation. Valve shall be opened/closed slowly and gradually to the position.

**7.2 SHUT DOWN**

Close the valve. De-pressure and drain/vent all fluids. Allow the valve to cool down. De-pressurize the pipeline, and now keep the valve in open position. Remove any electric connector before maintenance. Follow the process guide lines.

**7.3 EXAMINATION OF VALVES**

Periodically examine the valve depending on the fluid condition and criticality. As a minimum annual examination of shell thickness and valve condition shall be made depending upon the fluid.

**7.4 STORAGE PERIOD**

Seal material have shelf life and to be replaced. Valves which were stored for a period more than 18 months shall be disassembled and replaced with new O-rings.

**8.0 MAINTENANCE**

**a. PACKING MAINTENANCE**

If leakage is observed through the packing, tighten the gland nuts slowly and evenly until the leakage stops. Use half-turn increment for tightening.

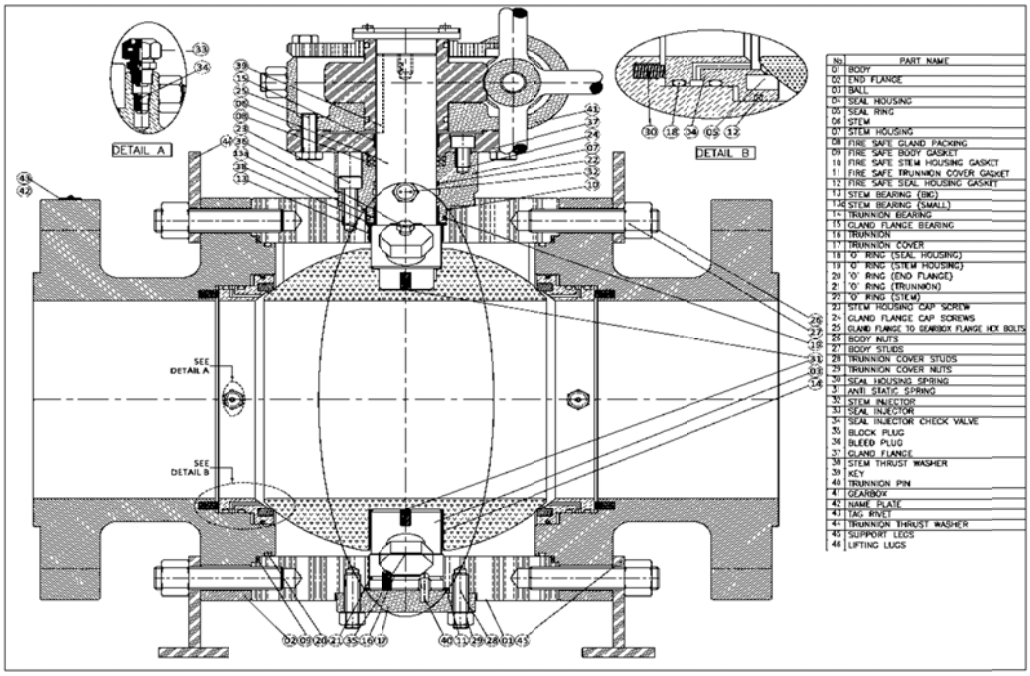
CAUTION

Do not over tighten packing gland nuts. Over tightening will increase the torque required to operate the valve and reduce packing life.

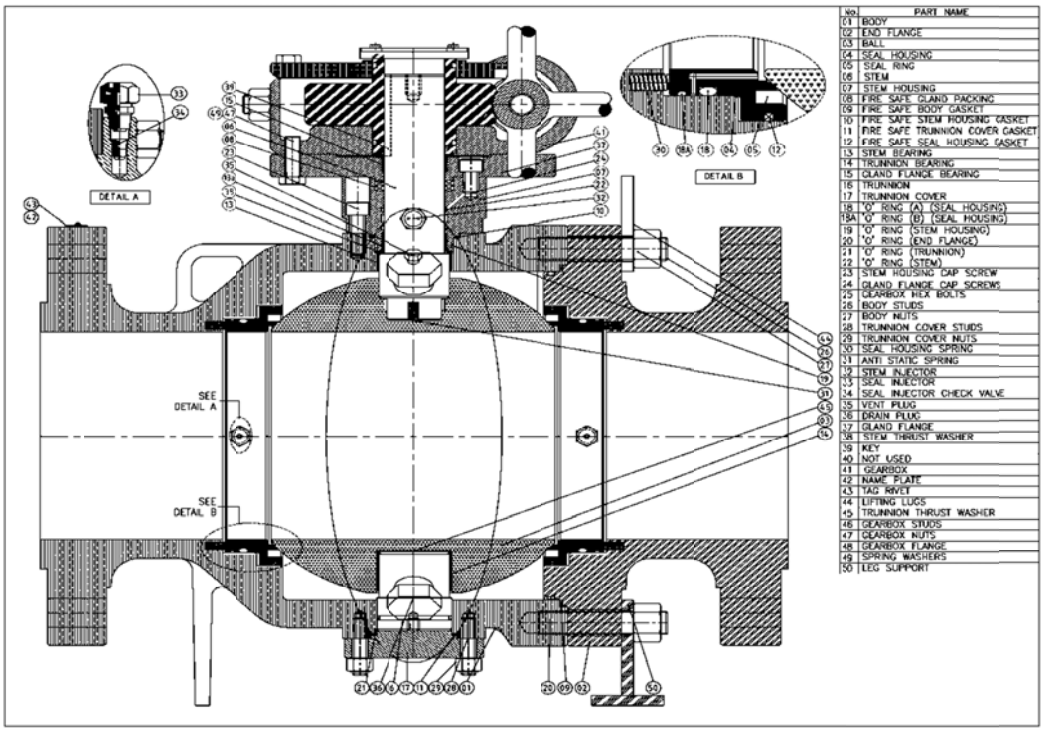
**WARNING:**

Before starting any maintenance, de-pressurize, drain and vent and flushed with air. Check that the valves are not in temperature. Disconnect any electrical power supply.
Failure to do so may cause serious personnel injury and/or equipment damage.

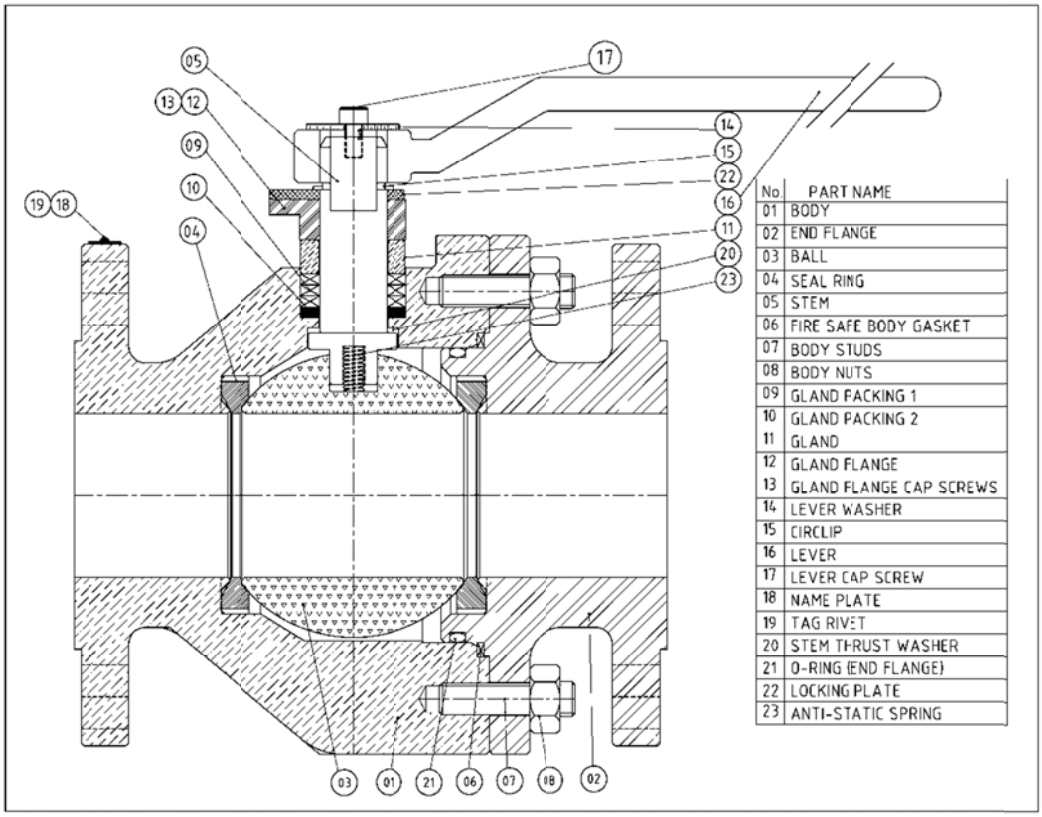
During annual maintenance, all the O-rings shall be replaced.




**THREE PIECE – TRUNNION MOUNTED BALL VALVE**




**TWO PIECE – TRUNNION MOUNTED BALL VALVE**




| No. | PART NAME |
|---|---|
| 01 | BODY |
| 02 | END FLANGE |
| 03 | BALL |
| 04 | SEAL RING |
| 05 | STEM |
| 06 | FIRE SAFE BODY GASKET |
| 07 | BODY STUDS |
| 08 | BODY NUTS |
| 09 | GLAND PACKING 1 |
| 10 | GLAND PACKING 2 |
| 11 | GLAND |
| 12 | GLAND FLANGE |
| 13 | GLAND FLANGE CAP SCREWS |
| 14 | LEVER WASHER |
| 15 | CIRCLIP |
| 16 | LEVER |
| 17 | LEVER CAP SCREW |
| 18 | NAME PLATE |
| 19 | TAG RIVET |
| 20 | STEM THRUST WASHER |
| 21 | O-RING (END FLANGE) |
| 22 | LOCKING PLATE |
| 23 | ANTI-STATIC SPRING |

**TWO PIECE – FLOATING BALL VALVE**

## 1. Bolt tightening Torque

| Nominal bolt size (inch) | Torque (Nm) | Nominal bolt size (inch) | Torque (Nm) |
|---|---|---|---|
| 1/2" | 80 | 1 3/8" | 1780 |
| 5/8" | 160 | 1 1/2" | 2300 |
| 3/4" | 275 | 1 5/8" | 3000 |
| 7/8" | 440 | 1 3/4" | 3700 |
| 1" | 650 | 1 7/8" | 4700 |
| 1 1/8" | 950 | 2" | 5700 |
| 1 1/4" | 1300 | | |

**2. Valve Torque and Mounting of actuator**

The valve torque depends upon many parameters like size, class, and maximum operating pressure, frequency of operation, fluid details, viscosity and flow velocity. Please contact camtech, who selects the optimum size of actuator and supply of mounting plates for field conversion.

## 8.1 PREVENTIVE MAINTENANCE

All valve components have been designed to be largely maintenance free. The material of the moving parts has been selected for minimum wear. However malfunction caused by wrong operation, lack of maintenance or improper use, reduces valve life. All repair and maintenance work shall be performed by qualified personnel following all safety instructions. Maintenance intervals should be selected by the valve user in compliance with the application condition.

## 9.0 TROUBLE SHOOTING

| TROUBLE | POSSIBLE CAUSE | HOW TO ELIMINATE |
|---|---|---|
| No fluid flow | Flange covers not removed.<br>Valve in closed position.<br>Pipeline upstream of valve is blocked. | Open the valve.<br>Clean the valve.<br>Clean or replace strainer/other blocking equipment.<br>Inspect the pipeline |
| Flow Rate not sufficient | Valve is not fully open.<br>Sediments inside the valve.<br>Dirty strainer. | Open the valve.<br>Clean the valve.<br>Clean or replace strainer/other blocking equipment.<br>Inspect the pipeline. |
| Valve is leaking | Valve is not firmly closed.<br>Excessive differential pressure.<br>Ball and seat sealing faces damages.<br>Excessive load from the pipeline. | Close the valve.<br>Check the system.<br>Re-machine/lap seat faces. |
| Valve cannot be operated or it is difficult to open/close | Operating condition might be outside the specification.<br>Bent shaft.<br>Valve cavity clogged. | Check the line/Valve.<br><br>Check and replace worn/bent parts. |

## 10.0 VALVE DISASSEMBLY AND ASSEMBLY

### VALVE DISASSEMBLY

Follow the following steps to disassemble the valve.

**A. END FLANGE ASSEMBLY**

1. Loosen and remove gear box hex bolt (25)
2. Lift the gear box and gear box flange (41) from the gland flange (37)
3. Loosen and remove gland flange cap screw (24) and take out the gland flange (37) from the stem housing (07)
4. Remove the stem housing cap screw (23) and take out the stem housing from the body.
5. Pull out the stem (06) from top side.

**B. TRUNNION**

1. Loosen and remove Trunnion cover nut (29) and take out the Trunnion.
2. Pull out the Trunnion from downside and remove it.

**C. BALL**

1. Loosen the body nut (27) and remove the body stud (26) from the body (01).
2. Take out the end flange (02) and seal assembly.
3. Remove the ball (03) through side of the body.

### VALVE ASSEMBLY

Follow reverse sequence of disassembly and assemble the valve

## 11.0 GREASES AND SPECIAL TOOLS

The following greases or equivalent other make can be used for bearing/stem/nut/gearboxes/stem
BEACON 2 ESSO, MOBILELUX EP2 MOBL, ALVANIAR2 SUPER GREASE SHELL, MULTIFAK EP2 GREASE, TEXACO

### SPECIAL TOOL

No Special tool is required for the maintenance.

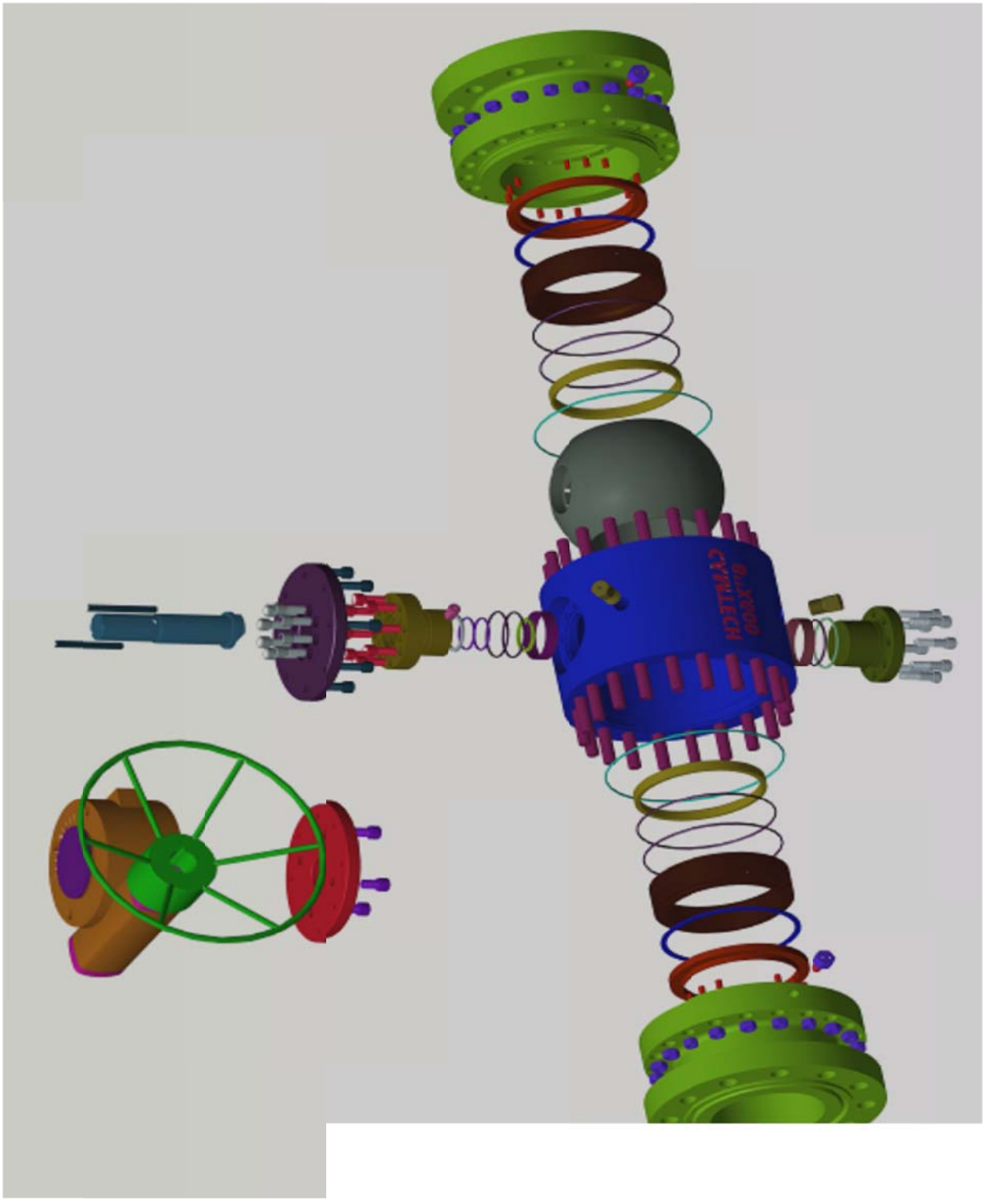
## 12. RECOMMENDED SPARES

Body Gasket, O-Rings, Seat Insert, and Stem packing.

Note : Only Camtech supplied spares shall be used

## 13. ANTI STATIC DEVICE

Anti static spring is provided in the ball valve for electric continuity and discharge of static electricity



**For Explosive atmosphere, following precautions/measures shall be taken.**

**1.0 Maximum Surface Temperature**

Valves do not generate energy / temperature on its own. The maximum surface temperature do not depends upon the valve, but on the operating fluid condition. The maximum operating fluid temperature is limited as per ASME B 16.34. However for explosive atmosphere, where the surface temperature due to operating fluid is potential source of explosion, provide insulation / other appropriate measures.

**2.0 Projected stem**

Ensure that the projected stem do not touch any piping or other part that can create spark.

**3.0 Bearing lubrication**

Bearings are slow moving parts and do not require lubrication. However lubrication is provided for smooth operation.

**4.0 Dust deposit**

Remove dust at regular intervals for explosive atmosphere. Ensure that dust is not present in the gaps and outside surfaces to exclude the possibility of explosion. Ensure that the surroundings are clean and no external part fall on the surface.

5.0 Valves are not provided with any opening or enclosure for explosion prevention.

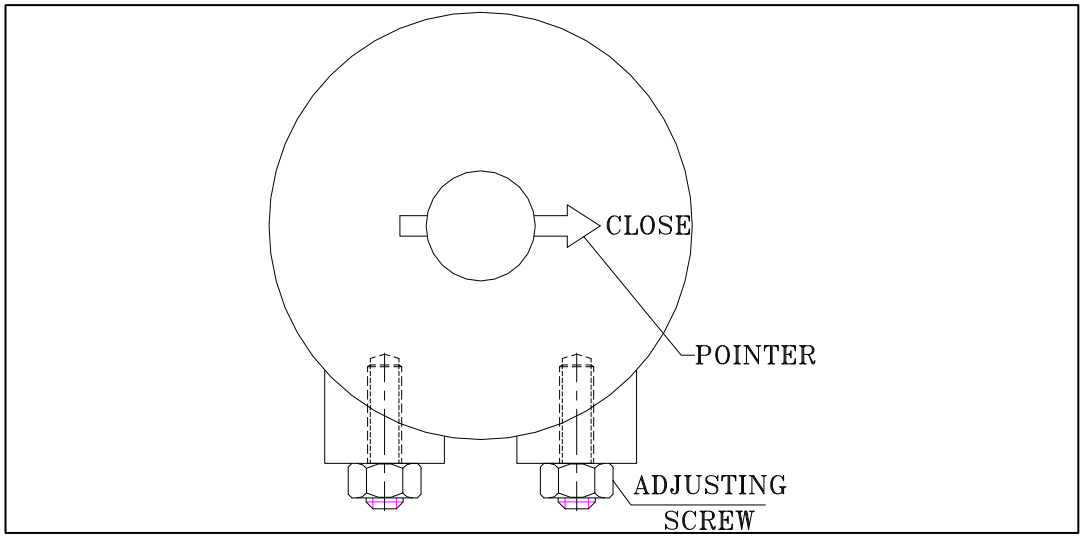
## TROUBLE SHOOTING

### 1.0 VALVE LEAKAGE DUE TO BALL NOT IN FULLY CLOSED POSITION

**Type of Check:- Check the Gear-box close position and adjust**

Procedure: The Valve will be leaking, if the ball is not in fully closed position. The Ball Position can be set by adjusting the gear box.

a) Close the valve by operating the Handwheel.
b) Check the pointer in the Gear box. The Pointer shall be align with the marking "CLOSED"
c) If the marking is not aligned, turn the handwheel such that the position indicator is in the closed position. Loosen the adjusting stud in the Gear Box. Lock the stud with nut such that the adjusting screw do not get loosened




### 2.0 PREVENTING VALVE LEAKAGE BY INJECTING SEALANT

If the valve is leaking, it is necessary to shut down the line, remove the valve and dismantle to know the cause and repair/replace the parts. However where the valve cannot be removed, sealant can be injected in the sealing area with valve in the closed position.

Inject the sealant compatible with the fluid at a pressure higher than the maximum operating pressure. The Pressure shall be 100 PSI or more of Maximum operating pressure.

Once the sealant injection operation is completed remove the grease gun and tighten the cap of fitting.