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INSTALLATION, MAINTENANCE & OPERATING INSTRUCTIONS

4" AND LARGER TYPE (R3T/3T/2T) ANSI CLASS 150/300/600/900/1500/2500 TRUNION BALL VALVES

Read these instructions carefully before installation or servicing.

INSTALLATION, MAINTENANCE & OPERATING INSTRUCTIONS

DESIGN

GLOBAL VALVE & CONTROLS series Reduced Port (R3T) & Full Port (3T/2T) trunion mounted ball valves are a three piece or two piece bolted body design. The valves are non-directional and can be installed with either end upstream. These valves are designed and manufactured in strict accordance with API 6D. Flanged end valves NPS 2" to 24" (except 22") have flange dimensions in accordance with ASME/ANSI B16.5. Size 22" and sizes 26" and larger have flange dimensions conforming to MSS SP-44, or customer specifications. Face-to-face and end-to-end dimensions conform to API 6D.

DOUBLE BLOCK & BLEED

GLOBAL VALVE & CONTROLS valves series are designed for double block & bleed service. Each valve is equipped with a drain valve in the lower portion of the body. Valves 4" and larger also include a vent in the upper quadrant of the body.

EMERGENCY SEALANT SYSTEM

All Series R3T/3T/2T valves have fittings at the stem which can be used to inject a sealant in the unlikely event of leakage in the stem area. Valves NPS 4" and larger have provisions for emergency sealant injection in the seating through 1/4", 1/2" and 3/4" NPT giant buttonhead fittings at the midpoint of the end closures.

Each injection port has an internal check valve installed as an added safety precaution. Valves NPS 4" through 12" have two emergency sealant fittings on the front of the 14" and larger have four fittings, two in front and two in back.

FIELD WELDABILITY WELDING END VALVES

GLOBAL VALVE & CONTROLS ball valves with ASME B16.25 welding end connection(s) are readily field weldable. Installation should be done by qualified personnel using approved welding procedures in accordance with applicable codes and jurisdictional regulations.

Check welding end surfaces for cleanliness. The welding ends should be free from paint, oil or rust which may be detrimental to welding.

BODY PRESSURE RELIEF

In GLOBAL VALVE & CONTROLS R3T/3T/2T series, independent spring loaded seat design eliminates excess pressure build-up in the body cavity by automatic pressure release through the downstream seat.

A 1/2" NPT body relief valve may be furnished as an option to further protect the body from thermal over-pressuring when the valve is in the fully closed position. A relief valve is

recommended when the line pressure is expected to be very close to the valve maximum rated operating pressure.

If a relief valve is installed, an appropriate relief drain system should be considered for safety and environmental purposes.

STORAGE

While in storage, protect valves from the effects of weather. Ideally, valves should be kept indoors in a clean, well-ventilated area with the temperature maintained above the dew point. If valves are stored outdoors, support them off the ground or pavement and provide a watertight cover.

Valves are shipped in the open position to protect the ball surface. End protectors are placed on the valve for protection from damage and deterioration and to prevent entrance of dirt or debris. Do not remove the end protectors except for inspection or installation.

INSTALLATION

Handling equipment is required for the weight involved. Take care to avoid damage to the valves while handling. Sling or rig the valve carefully. The end flange may be used to lift smaller valves. Larger valves are provided with lifting lugs to facilitate handling.

Verify the valve is correct as shown on the piping arrangement. Look at the identification plate, tags, and markings on the valve for size, pressure class, maximum operating pressure and temperature, and materials.

WARNING

SAFETY FIRST! FOR YOUR SAFETY, TAKE THE FOLLOWING PRECAUTIONS BEFORE REMOVING THE VALVE ASSEMBLY FROM THE LINE, OR BEFORE ANY DISASSEMBLY:

1. WHAT'S IN THE LINE?

BE SURE YOU KNOW WHAT FLUID IS IN THE LINE. IF THERE IS ANY DOUBT, DOUBLE CHECK WITH THE PROPER SUPERVISOR.

2. ARE YOU PROTECTED?

WEAR ANY PROTECTIVE CLOTHING AND EQUIPMENT NORMALLY REQUIRED TO AVOID INJURY FROM THE PARTICULAR FLUID IN THE LINE.

3. IS THE LINE DEPRESSURIZED?

DEPRESSURIZE THE LINE AND DRAIN THE SYSTEM FLUID. CYCLE THE VALVE SEVERAL TIMES TO RELIEVE ANY PRESSURE STILL INSIDE THE VALVE.

IT IS IMPORTANT TO REFER TO THE IDENTIFICATION PLATE FASTENED TO EACH VALVE FOR MAXIMUM PRESSURE RATINGS AND MATERIAL DESCRIPTION. IN CASE THERE IS ANY QUESTION CONCERNING THE VALVE, REFER TO Global Valve & Controls FOR MAXIMUM RATINGS.

WARNING: AT ALL TIMES KEEP HANDS OUT OF THE BALL CAVITY. A REMOTELY ACTUATED VALVE COULD CLOSE AT ANY TIME AND RESULT IN SERIOUS INJURY.

Remove end protectors when ready for installation. Check valve interior and connecting pipe to assure they are reasonably clean and free of foreign material.

Install in line with either end upstream.

On valves having extensions, check all extension piping and fittings to ensure that all are tight prior to placing valve in service.

Do not inject sealant into the stem or seat grease fittings. These are for emergency only. Be sure that flange end gasket surfaces are free from dirt or irregularities, which may affect sealing performance.

Align bolt holes of valve flanges and pipe flanges. Insert gasket and bolts. Alignment must be accurate to prevent unbalanced tightening and subsequent excessive stress on bolting.

Use suitable lubricants on bolt threads. Tighten the bolts gradually and uniformly in a crosswise pattern in accordance with standard piping practices. The ends of the studs should extend equally beyond the nuts.

After installing the valve, be sure to check the studs and nuts of the Body-Closure flanges and retighten if necessary.

ON STREAM MAINTENANCE

This section covers maintenance and repair which can be performed without removing valve from the line.

When performing any work on this valve, use normal safety precautions to protect yourself against any residual fluid or trapped pressure in the line.

BLOCK AND BLEED

With the line under pressure the valve body cavity can be vented to the atmosphere and completely drained down with the ball in CLOSED POSITION ONLY.

STEM SEAL REPLACEMENT

(Refer to Assembly Illustration on the last page for part identification and location.)

The GLOBAL VALVE & CONTROLS R3T/3T/2T series has 2 stem seals, one primary seal backed up by second independent seal.

If the primary o-ring seals become faulty, sealant may be injected to reduce leakage before replacing the seals.

Upper stem seals may be replaced by the following procedure:

1. Turn valve to fully closed position.
 2. Release body cavity pressure through relief/drain valve and leave that valve open.
 3. With valve in fully closed position, mark vertical line(s) on, adapter plate, gland and body to insure correct alignment of these parts after re-assembly.
 4. Remove mounting NUTS [48] holding GEAR OPERATOR [57] to ADAPTER PLATE [12] and lift operator off plate.
 5. Remove STEM KEY [20], and clean stem and key surfaces.
 6. Remove faulty upper STEM O-RING [34] and replace it with new, lubricating as required with a silicone lubricant.
 7. Reassemble ADAPTER PLATE [12] and tighten it to the body.
- NOTE:** Make sure that vertical line marks on the body and adapter plate are in alignment.
8. Replace STEM KEY [20].
 9. For gear operated valves, replace the gear operator, making certain that the vertical line mark on the body, adapter plates and gear operator are in alignment.
 10. Replace the MOUNTING NUTS [48] and tighten evenly all around.

EMERGENCY SEAT SEALANT SYSTEM

¼", ⅜", ½" and ¾" NPT steel fittings with giant buttonheads are installed in the mid-section of both end closures.

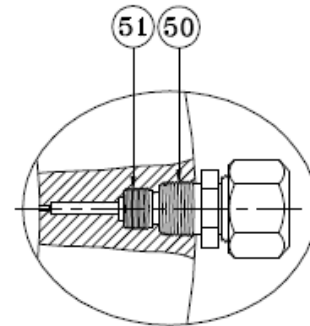
EMERGENCY SHUT-OFF

The seat seals of all GLOBAL VALVE &

CONTROLS R3T/3T/2T series valves are designed not to require sealants. However, in the presence of excessive line contaminants, the possibility of leakage due to erosion is greater than when valve is used for normal on-off service. If the primary seal and the secondary metal-to-metal seal are damaged, an emergency shut-off may be obtained with a sealant injected through grease fittings. Core valves are equipped with fittings for emergency sealant injection.

SEALANT INJECTION INSTRUCTION

First purge the sealant passages by injecting valve cleaner, Seal weld Total-Lube #911 or Engineering approved cleaner. This operation purges old greases and residual build-up which contributes to seat leakage and excessive operating torque. With valve in the fully closed position slowly inject Seal Weld #5050 ball valve sealant through the large BUTTONHEAD FITTING [50] provided on the upstream end closure. If possible, move ball slightly during injection to insure sealant is evenly distributed over the seating surfaces of the seat ring and ball. A damaged grease fitting may be removed and replaced while the valve is under pressure by first injecting a small amount of sealant to insure the tightness of the BALL CHECK VALVE [51] installed in the sealant passage under the grease fitting. (See Figure 3)



**GREASE FITTING & CHECK VALVE
DETAIL**

Figure 3

OFF STREAM MAINTENANCE

Major repairs which necessitate removing the valve from the line.

EQUIPMENT

Handling equipment as required for the weight involved. Also a plywood sheet is required to press in large seat rings.

DISASSEMBLY PROCEDURE

(Refer to Assembly Illustration on last page for part identification and location.)

1. If the valve is in line, isolate the valve from the line pressure.
2. Release the pressure from the inlet and outlet ports.
3. Open the DRAIN VALVE [54] to relieve body cavity pressure.
4. Place the valve in the open position.
5. Remove the valve from the line.
6. Remove the GEAR OPERATOR [57] per the previous instructions.
7. Remove the ADAPTER PLATES [58]-[12].
8. Position the valve so that it rests on one port/flange face.
9. Scribe witness marks across the interface of the BODY [1] and both END CLOSURES [2]. Also across the TRUNNION [9] FLANGE and BODY, and the GLAND PLATE [12] and BODY.
10. Remove the NUTS [40] from the bottom end CLOSURE [2], lift up body/upper closure unit and place it on a clean solid surface.
11. Remove the NUTS [40] from the upper end CLOSURE [2], lift up the upper end closure from the body and place on a clean solid surface.
9. Insert lifting eye bolts in provided threaded holes in bearing plates [9].
10. Using eye bolts lift ball up out of seat ring.
11. For re-assembly, mark position of seat snap ring opening on seat [6] and in end closure [2] to ensure proper seat ring alignment to dowel holes in the closure.

NOTE: For re-assembly purposes, it is recommended to mark seat and closure as a set.

12. Lower ball onto wood block with the bearing retainers clear and remove the bearing retainers from the ball. Ball thrust washer [22] and spacer [30] are now free. Do not remove pins [19] from bearing plates [9].
13. Carefully pry out the seat ring assembly [6] from both closures [2] and remove seat ring springs [31] from the closures. Remove buttonhead grease fittings [50] and check valves [51] from closures for inspection and cleaning.
14. Disassemble seat ring as follows:
 - a. Remove outer o-rings [33] [36].
 - b. Carefully remove snap ring from seat.

V-V design only.

NOTE: Do not scratch it or over bend. Make sure that position of snap ring opening is marked on seat.

- c. Remove seat inner o-ring.

INSPECTION AND CLEANING

1. Wipe off metal parts with soft cloth, using petroleum solvent. Remark parts if necessary.
2. Inspect metal parts for damage or burrs on all moving surfaces.
3. Replace defective parts

NOTE: O-rings are made to stretch with a certain tension around metal shoulder. Any stretching or swelling of o-ring may cause cutting on re-assembly. Do not reuse o-rings unless their dimensions are carefully checked against new parts.

LUBRICATION

1. Do not lubricate the dry DU bearings [28] and ball thrust washer [22].
2. Lubricate all moving surfaces with silicone lubricant Dow Corning DC 111.

RE-ASSEMBLY

1. Place both closures on a clean, solid surface. Be careful not to damage sealing surface on flanged closure.
2. Install check valves [51] and buttonhead grease fittings [50] into the sealant passages of closures. Surfaces must be clean and dry.
 - a. Apply sealant to the threads.
 - b. Fill lubrication cavities, through the grease fittings with recommended sealant until sealant just appears in the seat ring recess. This process serves to lubricate the check valves, assuring pressure tightness.
3. Replace body o-ring [32] over shoulder on closure. Retain in place with silicone lubricant.
4. Re-assemble seat rings
 - a. Place seat ring on flat, clean, solid surface.
 - b. Insert seat inner o-ring and hold it in with snap ring taking care not to damage oring and to keep proper orientation of the snap ring in the seat ring. Follow markings made during disassembly.
(See Figure 3)
 - c. Replace outer seat ring o-rings [33] [36], lubricating them with silicone lubricant.

5. Insert springs [31] in the closure [2] and position seat ring in the closure, paying attention to correct alignment.
6. Seat ring assembly must be pressed into the closure recess. This may be done by using the ball as a press.

CAUTION: Be sure pressure is applied evenly, seat rings must be properly aligned or ball will bind and valve will leak.

7. Place ball onto wood block so end trunnions are accessible with clearance for bearing plates [9].
 - a. On lower trunnion, place thrust washer [22] with a spacer [30].
 - b. Locate the bearing plates on the ball trunnions with lifting eye bolts installed.

8. Using eye bolts in bearing plates lift ball into position over seat assembly in closure.

NOTE: Seat snap ring opening should be on upper stem side.

9. Lower ball into seat ring while rotating bearing plates [9] so that pins [19] fit into matching holes in closure. Remove lifting eye bolts.

10. Lift body over ball. Be sure to lower body evenly.

11. Lower other closure over body studs with the bearing plate pins [19] seating into matching closure holes. Be sure to lower end closure evenly.

12. Replace all body/closure nuts [40]. Tighten at least 4 nuts evenly spaced on each closure.

13. Turn valve assembly upright.

14. Insert stem [5] through hole in top of the body. If parts are all properly aligned, stem will enter and fit freely. Be sure keyway is in proper position to receive operator.

15. Re-assemble Gland Plate [10]
 - a. Install stem seal o-ring [34], lubricating them with silicone lubricant (Dow Corning DC-III or equal).
 - b. Install grease fitting [49].
 - c. Install gland plate o-rings [35], lubricating them with silicone lubricant (Dow Corning DC-III or equal).

16. Install thrust washer [25] over stem [5].

17. Lubricate stem sealing surfaces with thin film of silicone lubricant (DC-111 or equal).

18. Install gland plate [10] so bolt holes line up with holes in top of body and secure gland plate with cap screws [43] tightened evenly all around.

19. Replace stem packing [72].

20. Replace gland bushing [11].

21. Finish tightening body/closure nuts [40] with wrench evenly all around.

22. Replace adapter plate [12] over gland plate [10] and secure with cap screws [44].

23. Replace key [20] in valve stem [5] and secure it with cap screw [46].

24. Replace operator (observing the reference marks on operator, adapter plate, and body), and secure to adapter plate.

TESTING FOR LEAKAGE

1. Close valve fully.
2. Admit 50 - 100 psi air pressure into body cavity through top relief valve port [52]. Lock off body pressure.
3. If body pressure falls steadily, apply soap solution to ball/seat circumference, closure flange to body interface and to grease fitting in gland plate and around stem. Release pressure, disassemble and repair area of leakage.
4. Vent air pressure from the body.
5. Replace plug [52] or vent valve (optional) in the body.

INSTALLATION OF WORM

GEAR OPERATION

Before mounting the worm gear operator on the valve, grease the valve stem. Check the key to assure it is the correct length and fits the key slot without excessive play. Check for burrs and scratches and polish to provide smooth sliding surfaces.

Match position of valve to position of operator. If valve is "OPEN" then operator must in "OPEN" position. Lower the operator over the stem and bolt down to the adapter plate.

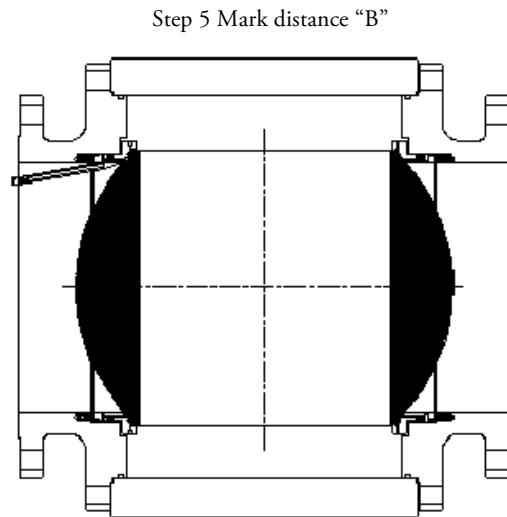
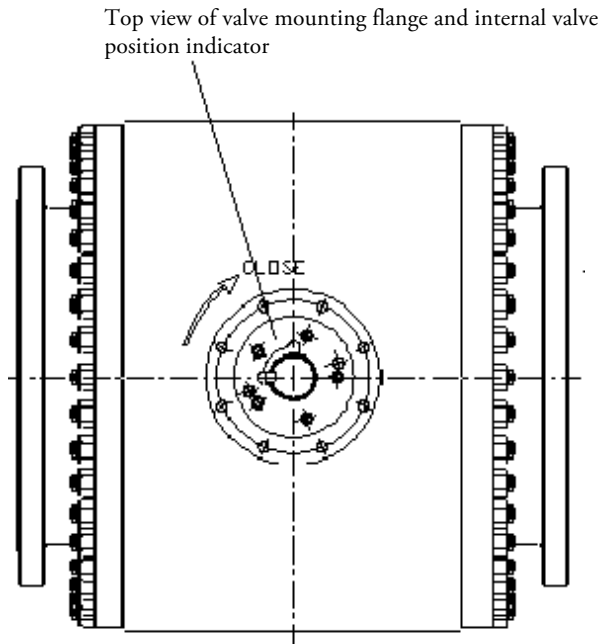
Tighten bolts securely.

Note: If operator fits tightly over stem, do not force down using the bolts. This will lock up the ball resulting in excessive torque. The valve external stop is designed as a visual indicator of the ball open and closed position only. The gear operator stops must be set

as the actual valve stop position to prevent damage to the key and adapter plate slot.

After the operator has been installed the operator stops can be set as follows:

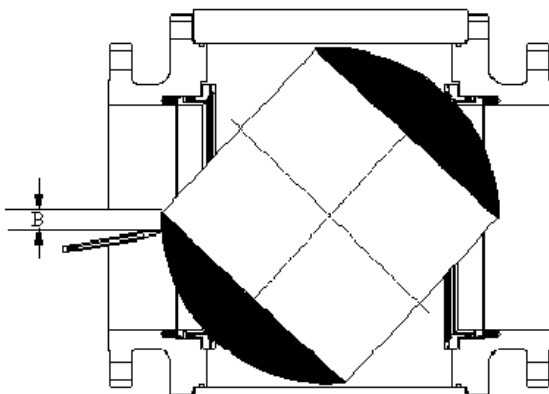
7. Turn the CLOSED operator stop screw until it can go no further. Tighten the lock nut.



OFF STREAM (VALVE REMOVED FROM SERVICE)

1. Back off lock nuts and stop screws on both sides of the operator.
2. Turn the operator handwheel counterclockwise until the bore of the ball lines up visually with the bore of the seat.
3. Turn the OPEN operator stop screw until it can go no further. Tighten the lock nut.
4. Turn the operator handwheel clockwise until the ball is about half closed.
5. From the table (pg 8), find the distance "B" for the size of the ball. Measure this distance from the ball bore at the horizontal centerline. Make a pencil mark at this point.
6. Continue to turn valve towards the closed position until the pencil mark is flush with the bore of the seat.

Step 6 Pencil mark flush with bore



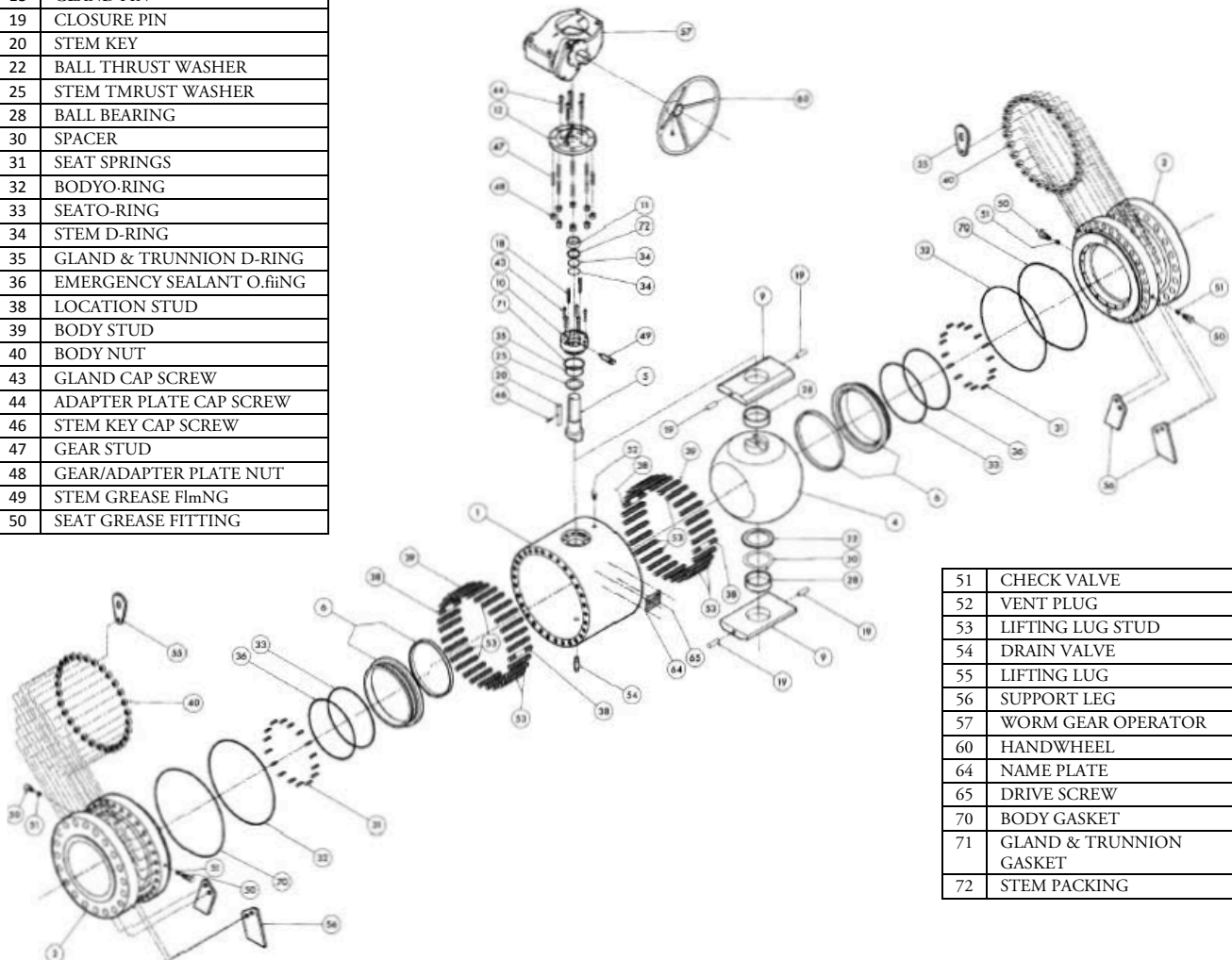
Nominal Valve Bore	"B" Distance (in inches)	Tolerance
4	0.28	± 0.06
6	0.30	± 0.06
8	0.32	± 0.06
10	0.38	± 0.06
12	0.74	± 0.06
14	0.84	± 0.06
16	0.58	± 0.06
18	0.57	± 0.06
20	0.74	± 0.06
24	0.83	± 0.06

PARTS LIST FOR LARGE DIAMETER VALVES

1	BODY
2	CLOSURE/FLANGED END
4	BALL
5	STEM
6	SEAT RING SUB ASSEMBLY
9	BEARING RETAINER
10	GLAND
11	BUSHING
12	ADAPTER PLATE
18	GLAND PIN
19	CLOSURE PIN
20	STEM KEY
22	BALL THRUST WASHER
25	STEM TMRUST WASHER
28	BALL BEARING
30	SPACER
31	SEAT SPRINGS
32	BODYO-RING
33	SEATO-RING
34	STEM D-RING
35	GLAND & TRUNNION D-RING
36	EMERGENCY SEALANT O.ring
38	LOCATION STUD
39	BODY STUD
40	BODY NUT
43	GLAND CAP SCREW
44	ADAPTER PLATE CAP SCREW
46	STEM KEY CAP SCREW
47	GEAR STUD
48	GEAR/ADAPTER PLATE NUT
49	STEM GREASE Fitting
50	SEAT GREASE FITTING

14" & UP CLASS 150-1500
10" & UP CLASS 2500

Assemblies are illustrations only. Parts may vary according to design



51	CHECK VALVE
52	VENT PLUG
53	LIFTING LUG STUD
54	DRAIN VALVE
55	LIFTING LUG
56	SUPPORT LEG
57	WORM GEAR OPERATOR
60	HANDWHEEL
64	NAME PLATE
65	DRIVE SCREW
70	BODY GASKET
71	GLAND & TRUNNION GASKET
72	STEM PACKING