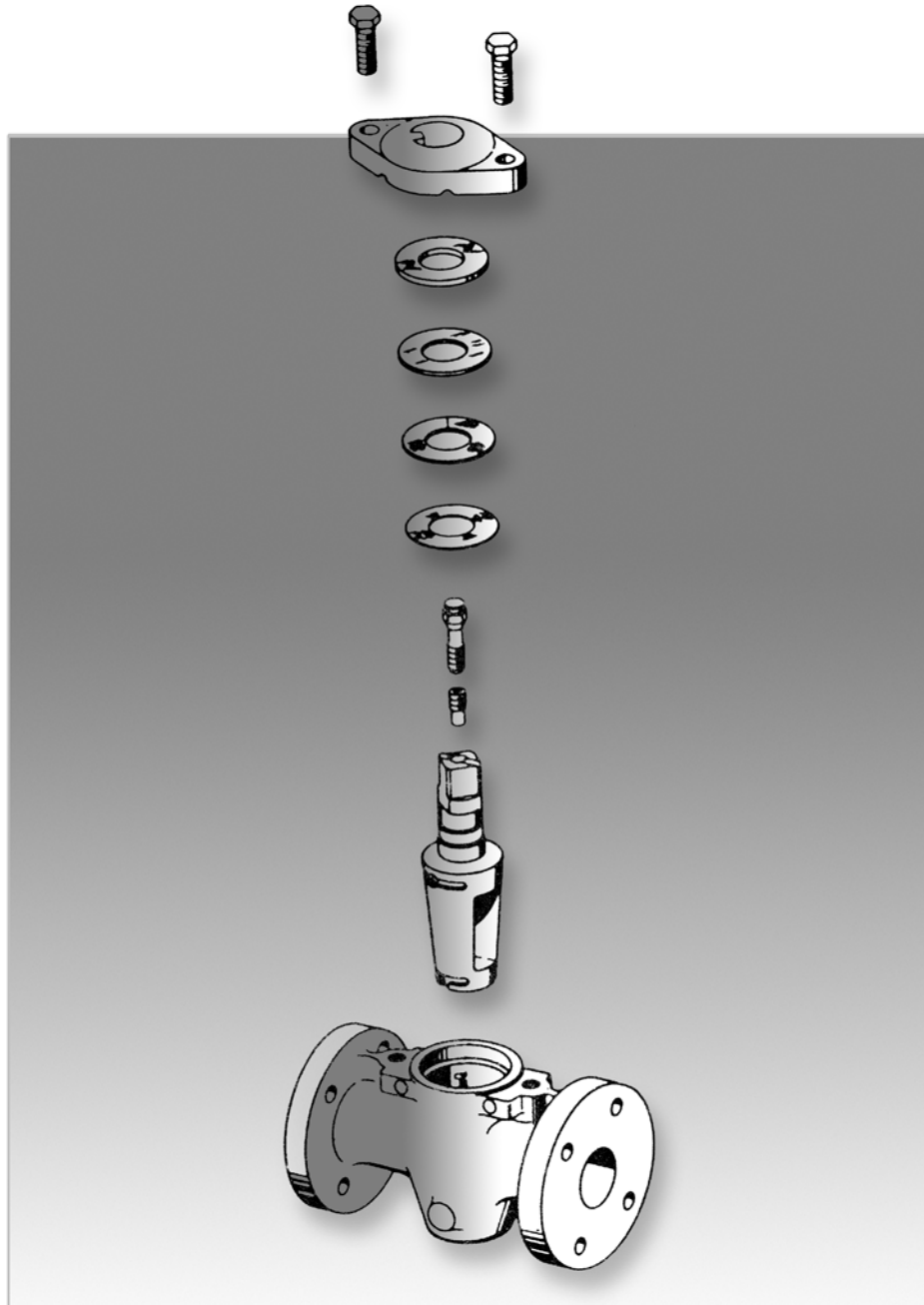


# Nordstrom® and Hypreseal® Plug Valves Repair Manual

**NVAIM2001**  
(Replaces NVI-701)



## General Service Instructions for the Repair & Reconditioning of Nordstrom Valves

Nordstrom Valves are designed so that with proper care and maintenance, they can last the lifetime of the installation and should never require repair. However, if a valve becomes inoperable, be sure before you contemplate repair, that the valve does not require simple sealant or adjustment maintenance. Please request the Maintenance Manual(s) for Nordstrom and Hypreseal Valves and use it to check all

possible points for the maintenance of Valves in the line before using this manual. This manual is designed for use only when valves are obviously damaged or are not operable after all maintenance methods have been tried and it is established that the valve must be removed from the installation.

### HOW TO USE THIS MANUAL

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|--|--|
| <ol style="list-style-type: none"> <li>1. Read thoroughly page 2 through 5 on General Information</li> <li>2. Determine individual valve problem and if it need be removed from the line. If not, see Maintenance Manual</li> <li>3. Remove valve from service.</li> </ol> | <ol style="list-style-type: none"> <li>4. Use Exploded View Drawings as indicated by Valve Type to complete disassembly and accomplish necessary repairs</li> <li>5. See back to order parts if necessary.</li> <li>6. Reassemble valve as indicated by steps with Assembly Drawings.</li> </ol> |
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### ECONOMICS OF VALVE REPAIR

These instructions are intended to serve as a basic guide for reconditioning or repairing Nordstrom Valves. The repair and reconditioning work can be performed by the ordinary high-grade machine shop, having the usual machine tool equipment which is customarily found in maintenance shops.

Whether a used valve justifies repair is an individual matter and should be decided by comparing the probable cost of repair with the cost of purchasing a new valve for replacement. Naturally, the cost of repair will depend upon the amount of work involved and the cost of parts, if any are required.

The reclamation of Nordstrom valves of all sizes and types is usually worthwhile when the condition of the valves is such as to require only cleaning, inspection and reassembly with new packing and gaskets and, possibly, a light relapping operation to eliminate scaly deposits and superficial scoring or pitting.

In other cases, the valve body may require re-boring and fitting an oversize plug, or building up of surfaces with weld metal. Repairs of this extent are economically justified for a great many sizes and types of Nordstrom valves, but should not be undertaken with smaller sizes of the low and medium pressure types. Generally speaking, complete rebuilding of 4 inch and smaller 175 lb WOG or 2 inch and smaller 200, 400, 500 and 800 lb WOG semi-steel valves should not be undertaken. Only general indications can be given since repair costs will vary due to differences in equipment, labor and overhead rates in various shops.

Before any repair is started, it is suggested that costs of non-guaranteed repaired valve performance be considered. Many times valves repaired by other than the original manufacturer can cost more in faulty performance and short life that is necessary. In order to maintain the high standards of performance expected of Nordstrom valves, Nordstrom can refer the user to an Authorized Repair Center.

### Warning

This manual is intended to serve as a guide for training and educational purposes. Before using or working on any Nordstrom valve or other product, the reader should review and fully comply with the Nordstrom and instruction manuals prepared for each Nordstrom valve, and its warning labels, and with the reader's company safety procedures.

If anything in this manual is unclear, contact the Nordstrom Valves, Inc. Customer Service Department for assistance. Nordstrom Valves, Inc. and its employees are in no way responsible for damage to property or for personal injury or death which may result through the use or misuse of any Nordstrom product, publication, audio or visual aids.

## Repair Information Applying to all Nordstrom Valves

There are certain general instructions that apply to all patterns and designs of Nordstrom Valves when repair becomes necessary. The following general procedure should be considered prior to beginning actual repair.

1. **Make certain the plug is free and in the open position before removing the cover.** It may be necessary to inject sealant under pressure, or require a kerosene or a solvent flush directly into the sealant system to accomplish this. Loosen the adjustment cover, but **do not** remove from the body, to assist in freeing the plug.
2. **DO NOT mix plugs and bodies, the stop collars or bolted type adjustment glands between valves. Plugs are mated to the bodies and are not interchangeable.** Stop collars and bolted glands are designed to stop the plug in the proper position.
3. **New gaskets should always be used, whether composition for Standard Patterns or metal rings for Hypreseal Patterns.** If the diaphragm, braided packing ring, fixed adjustments parts, metal packing rings, thrust balls, thrust buttons, etc. are not damaged, it is not necessary to replace them. Re-using the old braided packing ring eliminates the need for a second adjustment to overcome the initial setting.
4. Before reassembling the valve, clean any corrosion, or paint build-up from the stem area of the gland, the stem itself and the cover. **With Standard Pattern valves be careful not to damage the ground-surface area on top of the plug where the diaphragm must make a seal.**
5. **DO NOT use any emery paper, wire brushes, or buffing wheels to clean the plug or mating surface of the body.** See "LAPPING" on page 5.
6. One double-ball Check Valve is found in each Standard Pattern Valve. Two double-ball Check Valves are found in all Hypreseal Patterns. These may be replaced, if necessary, by using a check valve removing tool or a piece of square rod of the proper size as detailed on page 33. Check Valves are in four sizes. The exception is the very old 1" size which used an "H" size stick of sealant. Check valve size can be determined by the sealant stick size or the combination fitting size listed in the valve catalog for each valve. These four sizes are 1/4", 3/8", 1/2", and 3/4". They all have parallel pipe thread.
7. Clean the valve parts thoroughly before reassembling the valve. **DO NOT pre-lubricate the tapered surface of the valve plug, add sealant, or spray it with anything.** The taper fit must be intimate and the plug must seat to be a good valve, anything, including a film of sealant, that will interrupt this fit could put the valve out of adjustment during assembly. **After reassembly, inject sealant and check adjustment for proper operation.**
8. Reassemble the valve with the plug in the "open" position, and without excessive strain on the cover or adjustment member. Standard Pattern-Wrench Operated Valves have indicator marks cast on top of the plug stem parallel with the port openings. Hypreseal Pattern-Wrench Operated Valves have a chamfered corner<sup>6</sup> on the stem, and all gear operated valves have the keyway in the stem parallel with the port openings. Be sure to inject sealant before trying to operate the valve. Check the internal pressure and test the valve for differential leakage and operation. (See Sealant Injection and Adjustment Procedures section, in the maintenance manual.)
9. As briefly mentioned in #2 above, the final step in the assembly of the valve is to check the stopping point of the plug in the "open" position to be sure of its alignment with the port openings and connections with the sealant grooves. If the old stops are re-used, this should automatically fall into place, but if a new part, such as a cover, gland, indicator collar, etc., is used it may be necessary to **add-to or remove-from** the stop lug to insure correct position. The "closed" position is governed by an exact 90° turn clockwise from the open position.
10. **Be sure the valve is completely refilled with sealant after reassembly.** Occasionally, air pressure or an insufficient amount of sealant will temporarily move the plug. Turn the plug several times to be sure the sealant system and reservoir is entirely full.
11. **When ordering replacement parts, or requesting additional information for any Nordstrom Valve, always include the size, figure number, and lot or model number of the valve involved.** This information is available from the nameplate or is stamped on the valve body at the cover flange area. If the lot number is unobtainable, give the order reference or proper age of the valve to obtain prompt service. See "How To Identify Valves page 35.

<sup>6</sup> Chamfered corner is in line with port on all Hypreseals 2" and larger and 1/2" and 3/4", Fig. 3044. All other Hypreseals 1 1/2" and smaller have chamfered corners 90° to port.

## CLEANING AND EXAMINATION

It is recommended that valves with heavy accumulation of dirt, paint and other foreign material first be cleaned before disassembling. Gear operated Hypreseal valves will require removal of the gearing before disassembling the valve proper. On all wrench operated Hypreseal valves and the smaller gear operated Hypreseal valves, having plug stem threads  $1\frac{1}{16}$ -inch outside diameter and smaller, the plug stem is removed by unscrewing it from the top of the valve body. For the larger geared Hypreseal valves, having plug stem threads larger than  $1\frac{1}{16}$ -inch outside diameter, the plug stem is removed by unscrewing it through the taper bore of the valve body.

After complete disassembly of the valve, the parts should be cleaned by using any suitable alkaline or cleaning solvent solution. Corroded areas may require wire brushing or abrasive blasting to remove deposits except on mating surfaces. After thorough cleaning, the tapered seats of both the body and the plug should be carefully examined for corrosion, pitting, scoring, galling or erosion. For plugs having integral shanks, the machined shank diameter and the adjacent shoulder on the plug should also be examined for signs of scoring, galling or corrosion. If such a plug is to be relapped in the body, the shank diameter and adjacent shoulder should be resurfaced, by turning or grinding, before relapping.

The depth and extent of the blemishes in the seating surfaces of both the plug and the body determine the subsequent repair procedures which will be necessary to restore the valve into good operating condition, and are enumerated as follows:—

### CASE NO. 1

Where corrosion or scoring is very shallow, the valve may be salvaged, by relapping the plug in the body, without the necessity of seating surfaces of either the body or the plug. A large majority of Nordstrom Valves may be salvaged in this manner.

### CASE NO. 2

Where corrosion, galling or scoring are of a moderate depth, remachining of the tapered seating surface in the body will be necessary and this will usually require an oversize plug to match the oversizing of the taper bore. Remanufacturing should be considered here.

### CASE NO. 3

Where corrosion, erosion, galling and deep scoring are beyond the conditions in Case No. 2, rebuilding of the worn areas in the body are necessary to restore the tapered seating surface, before remachining of the valve body bore. A new valve should be considered in this case.

from center line. The body casting must be set true to the original bore, and for Hypreseal valves, the body must not only be set true to the original bore, but must also be aligned with the threaded plug stem hole. Eccentricity of the alignment of the threaded plug stem hole with the taper bore in the body must not exceed 0.005 in.; otherwise a binding action will result between the plug stem, equalizer ring and the tang on the plug after the valve is reassembled.

After the correct setup on the body has been made, a trial cut should be taken to check the correctness of the setup and the taper angle. Sufficient cuts must be made to remove all blemishes and the finish cut should produce a clean bore, free from any blemishes and must be smooth, straight and round. The final finish cut must be taken very lightly, and with a fine feed, in order to produce a true taper bore. Accurate work cannot be turned out unless the spindle, tool carriage and ways of the machine are in good condition and properly adjusted to remove "lash". These machining precautions are of particular importance in finish-boring plug valve bodies because of the interrupted cut where the tool passes over the port openings.

After machining the bore, the body should be checked and if any of the sealant grooves or ducts are missing, or greatly reduced in depth, they should be reproduced by either chipping, machining or grinding, and in the same position as in the original bore of the valve body.

Bodies which require rebuilding by welding or brazing of the worn areas prior to remachining, must have the sealant grooves and ducts remachined, where necessary, and in exactly the same position as found in the original bore. Dimensions of these grooves and ducts, together with their proper location, should be taken from the body before welding, or brazing, and remachining, and accurately transferred to the remachined bore.

## REMANCHING VALVE BODIES

The body may be machined, using an engine lathe or vertical boring mill, having a suitable taper attachment or ram, capable of producing a taper angle of  $4\frac{1}{2}$  degrees

## LAPPING

The operation of lapping the body and plug surfaces together with abrasive compound is the final step in producing an intimate fit between the two parts. However, lapping cannot be used to correct deficiencies in previous machine work, which should be as accurate as can be produced by turning and boring methods. Excessive lapping defeats its own purpose, and if the preliminary machine work has been done properly, it should only be necessary to do enough lapping to take out tool and grinding marks and produce a "satin" texture on the taper surfaces.

Before commencement of the lapping operation, all sharp edges of both the body and the plug should be burred, by either filing or using emery cloth. The plug and body should be thoroughly cleaned and free from any dirt or metal particles. Valves may be lapped by hand or an upright drill press may be used. When using a drill press, the body should be secured to either the drill press table or its base and the plug rotated through a floating attachment, connected to the spindle. Sufficient "float" must be provided, in order to prevent the plug from lapping out of round in the body. For the smaller sizes of valves, additional weight on the plug may be required to provide sufficient pressure between the plug and the body during the lapping operation. For the larger sizes of valves, counterbalancing a part of the weight of the plug is usually necessary, in order not to create too much pressure between the plug and the body during the lapping operation.

Experience in lapping will determine whether or not the plug requires weights or counterbalancing to produce the proper lapping action.

The lapping compound may consist of a 220-Grit Aluminum Oxide for steel valves or a 200-Grit Silicon Carbide for iron valves, suspended in a non-lubricating emulsion. During the lapping operation, the plug should be lifted approximately  $\frac{1}{4}$  to  $\frac{1}{2}$  in. out of the body, depending on the size of the plug and the consistency of the lapping compound, after each four or five revolutions. Here again, experience will determine the amount of lift, in order to provide sufficient space between the plug and the body to permit the lapping compound to spread evenly and produce a uniform lapping action.

Lapping is continued until all signs of machining marks disappear and the surface shows a uniform satin finish. After lapping and thorough cleaning of the valve and the plug, rotation of the plug in the body should show an even metal to metal contact, without excessive bright or dark areas. The same requirements as listed for lapping in the drill press also appertain to hand lapping, except that in this latter case, the plug is usually oscillated four or five times between each lifting of the plug out of the body.

The accuracy of the fit between the plug and the body may be checked by blueing the plug into the body and rotating it one or two turns, under a light pressure, and then removing the plug and examining the tapered surfaces. Any mismatching, off-taper or out of roundness can be determined satisfactorily from such a test.

It is essential that the lapping operation be carried on no longer than necessary. Excessive lapping is detrimental to the proper functioning of the valve, as it will produce irregularities in the seating surfaces and may cause the plug to fit too deeply in the valve body. This may result in mismatching of the port openings and circular sealant grooves.

After lapping, the depth of the plug in the body should be checked with the proper charts on pages 28 and 29.

## ASSEMBLY INSTRUCTIONS

### 2-Bolt Cover Type, Wrench Operated

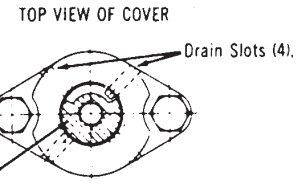
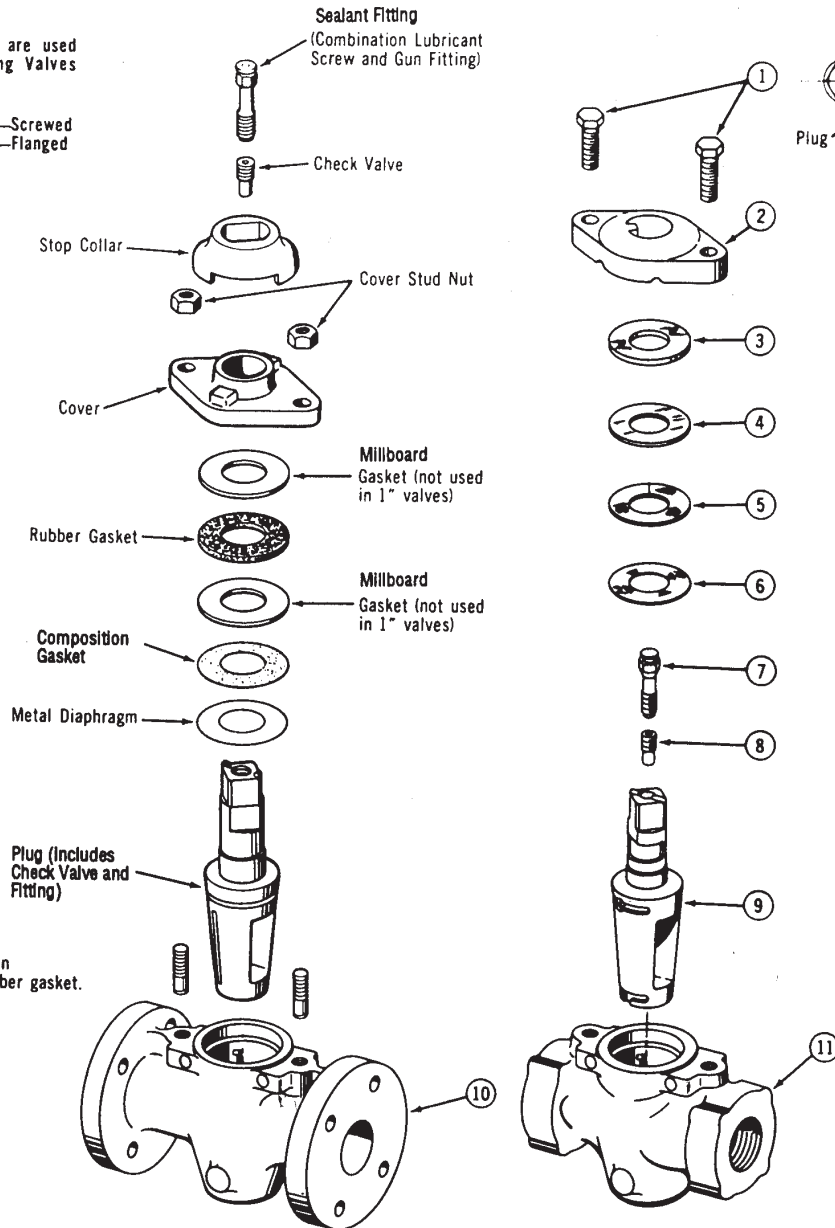
1. Remove old check valve from plug shank, if replacement is required.
2. Assemble new check valve in plug shank sealant screw hole and run firmly in to end of thread depth.
3. Smear the top of the plug with the correct service sealant and assemble in the body; align the ports in the open position.
4. Assemble metal diaphragm.
5. **Assemble sheet gasket**
6. Assemble rubber gasket.
7. Assemble metal packing ring.
8. Assemble cover.
9. Tighten the two cap screws uniformly and firmly.
10. Inject sealant in valve until sealant extrudes at ports; operate the plug to distribute the film of sealant on body and plug seats. Re-inject additional sealant to insure system is full.
11. Check port alignment relative to integral stops on shank of plug and cover, and fit, if necessary.
12. Test for internal and external leakage. Test and adjust for smooth operation when closed against full rated working pressure.

### Component Parts-2-Bolt Cover Type, Wrench Operated

This design is used for 1" through 4" size, 175 lb and 200 lb WOG. Nordstrom Iron Valves, either screwed end Figs. 142 or flanged end Figs. 143, or Steel Body, welded ends Figs. 19431/2. Illustrated below is the old style assembly on the left with a newer style assembly on the right:

Parts Illustrated are used on the following Valves

Iron  
1" - 4" Fig. 142 - Screwed  
1" - 4" Fig. 143 - Flanged



ITEM NO.	PART DESCRIPTION
1.	COVER CAP SCREW
2.	COVER
3.	METAL PACKING RING
4.	RUBBER GASKET
5.	COMPOSITION GASKET
6.	METAL DIAPHRAGM
7.	SEALANT FITTING
8.	CHECK VALVE
9.	PLUG
10.	BODY - FLANGED
11.	BODY - SCREWED

1" valves use 2 composition gaskets on each side of rubber gasket.

## ASSEMBLY INSTRUCTIONS

### Screwed Gland Type, Wrench Operated

### 200-400-500-800 lb. Valves

1. Remove old check valve from plug shank, if replacement is required.
2. Assemble new check valve in plug shank and run into end of thread depth firmly.
3. Smear the top of the plug with the correct service sealant and assemble in the body with dry taper surfaces; align the port in the open position.
4. Assemble metal diaphragm.
5. Assemble Composition.

(See alternate steps—6 thru 11—below for Jewett Packing Type Valves)

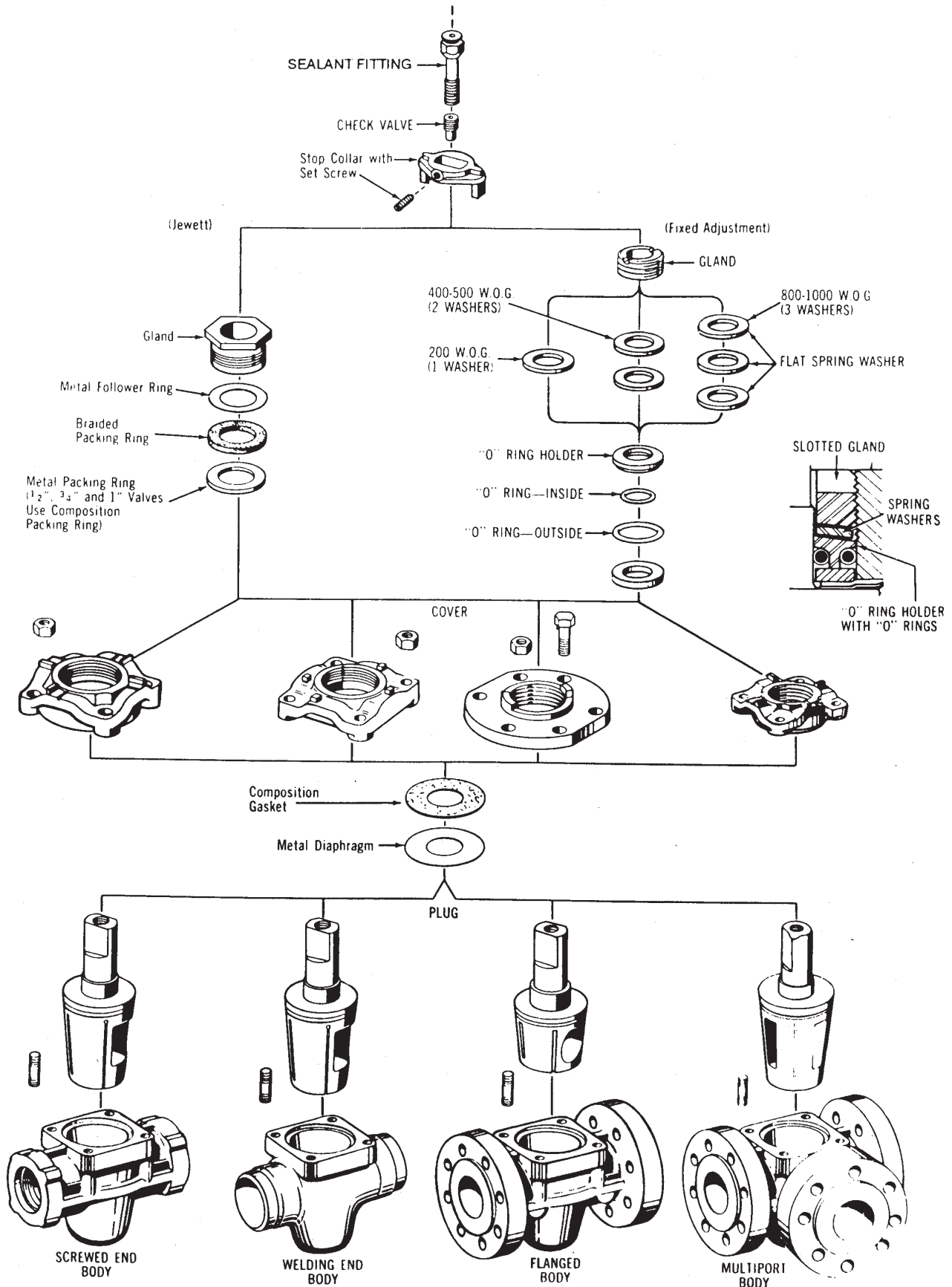
6. Assemble metal packing ring with radius side down.
7. Assemble small O-ring (well oiled).
8. Assemble O-ring holder with bevel face up which contains large O-ring (well oiled).
9. Assemble flat spring washer. When re-assembling a valve or installing a field-conversion kit, care must be used to avoid confusing the spring washers with the packing ring. The spring washers are cadmium plated and are thinner than the packing ring. **Interchanging these parts will render the gland useless.**
10. Assemble the cover which contains gland with plastic seal inserted and started in the cover by two (2) threads. Make sure the assembly shows that the raised bead on top of cover is in line with flow areas. Otherwise, you would have a left-hand operating valve.  
Press downward on the entire cover assembly so as to snap the O-rings in place and make contact with counterbore face.
11. Insert the cap screws and tighten evenly and firmly to effect counterbore seal.
12. Run in gland completely with spanner head wrench compressing springs and back off  $\frac{1}{4}$  turn.
13. Inject sealant until sealant extrudes at port. Rotate plug to distribute film of sealant and re-inject sealant to insure that system is full.
14. Final adjustment of the gland should be made to effect smooth operation of valve when closed to full line pressure.
15. For 800 lb. valves and valves having a stop collar, assemble the stop collar and check the port alignment in the open position, after which, lock the set collar to the shank.

#### Use These Alternate Steps For Jewett Packing Type Valves

6. Assemble the cover, making sure that the raised bead on top of the cover is in line with the flow axis, or "run," of the valve.
7. Tighten the cover cap screws or stud nuts evenly and firmly to effect counter bore seal.
8. Assemble the metal packing ring with the radius side down.
9. Assemble the braided packing ring.
10. Assemble the metal packing washer.
11. Assemble the gland and tighten firmly.  
(Continue with steps 13 thru 15 above)



**Component Parts-Screwed Gland Type, Wrench Operated**



## ASSEMBLY INSTRUCTIONS

### 3 Bolt Triangular Gland, Fixed Adjustment Type

1. Remove the old check valve from plug shank, if replacement is required.
2. Assemble the new check valve in the plug shank and run into end of thread firmly.
3. Partly fill the space between the base of the plug and body with correct service sealant, but make sure that there is not too much of this sealant to prevent plug from seating.
4. Smear the top of the plug with the correct service sealant and assemble in the body; with dry taper surfaces; align the ports in the open position.
5. Paint the gasket face of the body with gasket compound (non-hardening).
6. Assemble the ring gasket (large center hole). Ring gasket is used only in 200 lb. WOG iron valves and ANSI 150 lb. steel valve.
7. "Paint" the top of the ring gasket with a gasket compound (non-hardening) and assemble the metal diaphragm. Be sure top of plug is coated with sealant according to point 4.
8. Assemble the gasket (small center hole) and "paint top" with gasket non-hardening compound.
9. Assemble the cover. Position the cover loosely, using proper number of cap screws.

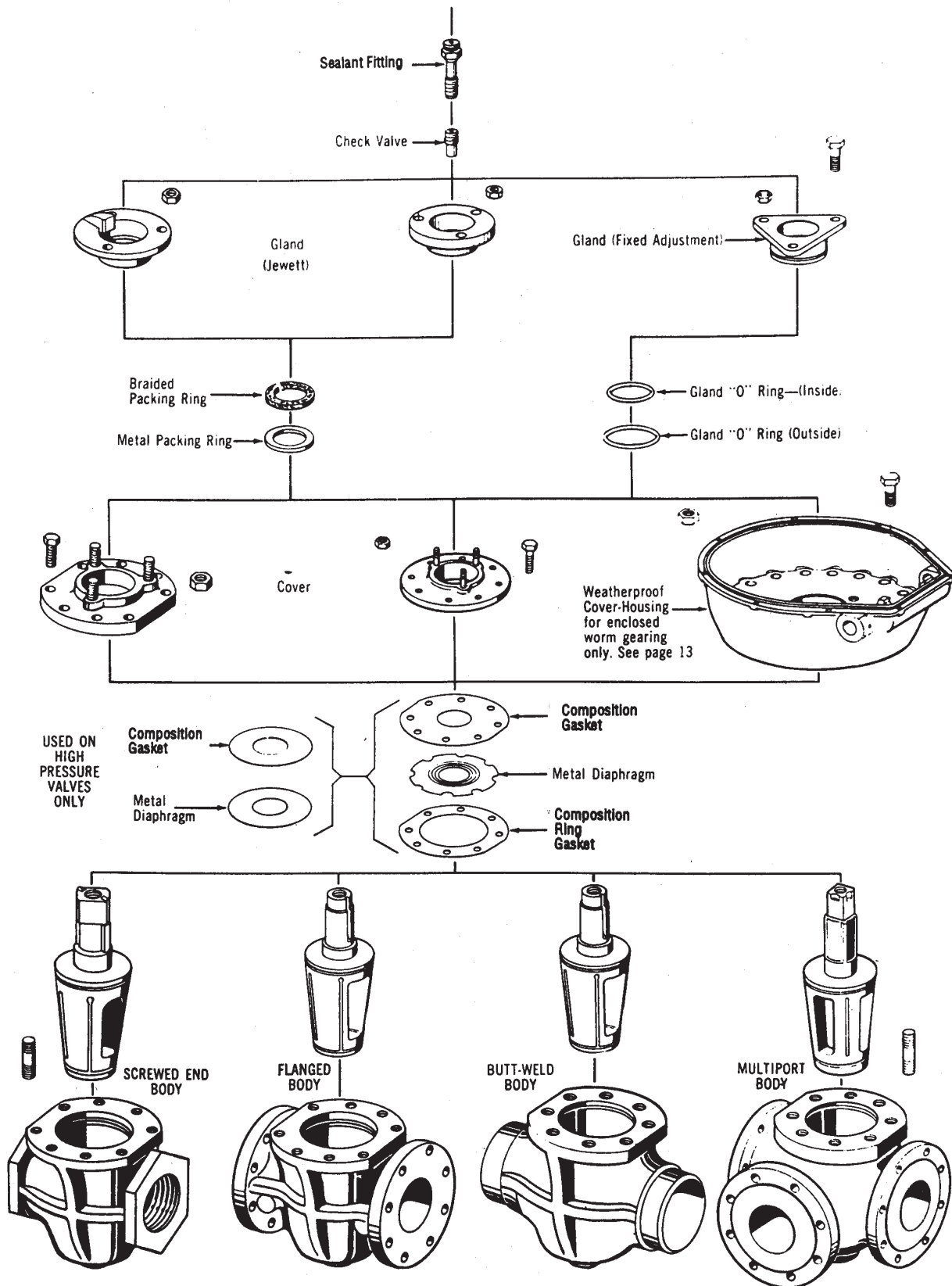
(See alternate steps—10 thru 12—below for Jewett Packing Type Valves)

10. Assemble well oiled O-rings to the gland.
11. Assemble gland to cover (gland will assemble to cover in only on position).
12. Press downward or tap lightly to snap O-rings in place.
13. Tighten cover cap screws firmly to effect joint seal.
14. Tighten gland stud nuts or cap screws firmly to seat plug (approximately 15 ft. lb.)—loosen and re-tighten to approximately 5 to 10 ft. lb.
15. Inject sealant until sealant extrudes at port. Rotate plug to distribute film of sealant. (Adjust gland nuts or cap screws until rotation is possible). Re-inject sealant to insure system is full.
16. Final adjustment of the gland nuts or cap screws should be made to effect smooth operation of valve when closed to full line pressure.

#### Use These Alternate Steps For Jewett Packing Type Valves

10. Assemble the metal packing ring, with the radius side down and center the cover before either assembling the cap screws or tightening the stud nuts. Then tighten firmly.
11. Assemble the braided packing ring.
12. Assemble the gland and tighten the gland stud nuts firmly.  
(Continue with step 15 above)

**Component Parts-3 Bolt Triangular Gland, Fixed Adjustment Type and Round Gland, Jewett Packing Type**



## ASSEMBLY INSTRUCTIONS

### Bolted Gland Type, Worm Gear Operated\*

1. Remove old check valve or check valves from plug shank, if replacement is required.
2. Assemble new check valve, or check valves in plug shank and run into end of thread firmly.
3. Partly fill the space between the base of the plug and body with the correct service sealant, but make sure that there is not too much of this sealant to prevent the plug from seating properly.
4. Smear the top of the plug with the correct service sealant and assemble in the body with dry taper surfaces; align the ports in the open position.
5. Paint the gasket face of the body with a gasket compound (non-hardening).
6. Assemble the composition ring gasket (large center hole). Ring gasket is used only in 200 lb. WOG iron valves and ANSI 150 lb. valves.
7. Paint the top of the ring gasket with a gasket compound (non-hardening) and assemble the metal diaphragm, be sure top of plug is coated with sealant according to point 4.
8. Assemble the composition gasket (small center hole), paint top with gasket non-hardening compound.

(See alternate steps—9 thru 13—below for Jewett Packing Type Valves)

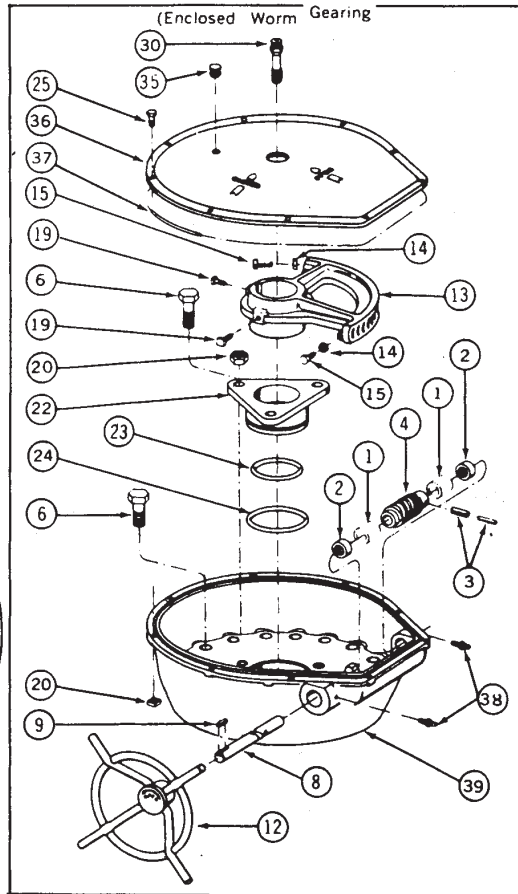
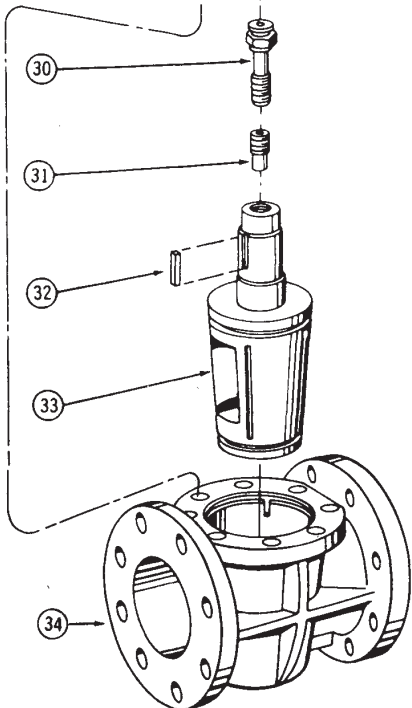
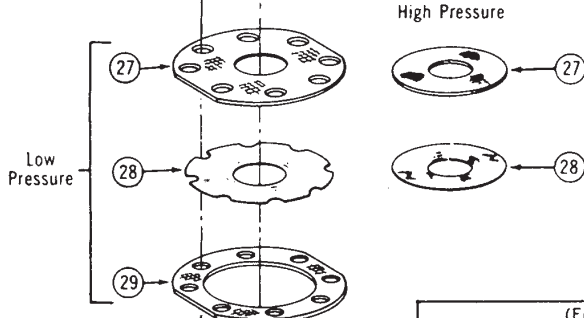
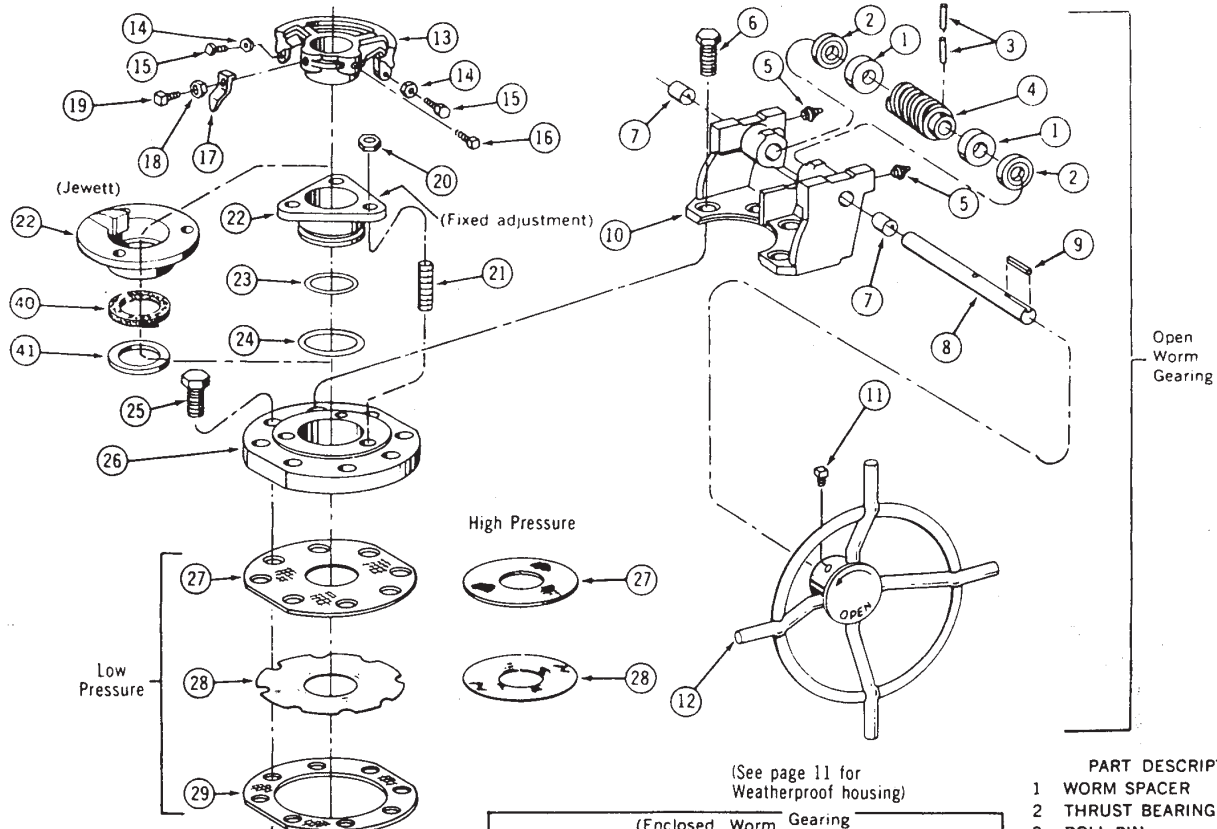
9. Assemble the housing or cover loosely.
10. Assemble well oiled O-rings to the gland.
11. Assemble gland to housing or cover.
12. Press downward on top lightly to snap O-rings in place.
13. Tighten cover or housing cap screws firmly to effect joint seal.
14. Tighten gland stud nuts or cap screws firmly to seat plug (approximately 15 ft. lbs.)—loosen and re-tighten to approximately 5 to 10 ft. lbs.
15. Assemble the worm gear segment and key with the extended hub down, the vertical position being determined by the meshing of the worm with the segment.
16. To assemble the worm and shaft, first assemble the worm shaft through the front bearing, using end of shaft without keyway, facing the valve the front bearing should be to the right otherwise the valve will have the wrong rotation of handwheel.
17. Mount one of the roller thrust bearings on the worm shaft (and one of the worm spacers if needed) and then the worm with roll pin hole outward—see illustration—and then a second worm spacer, if needed, followed by the second roller thrust bearing. Extend the end of shaft into rear bearing hole of housing, approximately flush. Rotate shaft until roll pin hole of worm and shaft are aligned. Then drive in roll pins.
18. Mesh the segment with the worm to equalize vertical movement.
19. Lock the segment to the plug shank by means of set screws and lock nuts.
20. Adjust segment stop set screws to effect positive alignment in relation to stop lug housing.
21. Assemble two (2) Alemite fittings to housing and lubricate with cup grease.
22. Assemble the sealant fitting.
23. Inject sealant until sealant extrudes at ports. Rotate plug to distribute sealant film. Adjust gland nuts or cap screws until rotation is possible. Re-inject sealant to insure system is full.
24. Final adjustment of the gland nuts or cap screws should be made to effect smooth operation of valve when closed to full line pressure.

#### Use These Alternate Steps For Jewett Packing Type Valves

9. Assemble the cover.
10. Assemble the metal packing ring with the radius side down and centralize the cover before either assembling the cap screws or tightening the stud nuts. Then tighten firmly.
11. Assemble gear operating bracket and assemble cover cap screws or stud nuts.
12. Assemble braided packing ring.
13. Assemble gland and tighten gland stud nuts firmly.

\* These instructions pertain to both open and enclosed gearing.

**Component Parts-Bolted Gland Type, Worm Gear Operated**



- PART DESCRIPTION**
- 1 WORM SPACER
  - 2 THRUST BEARING
  - 3 ROLL PIN
  - 4 WORM
  - 5 GREASE FITTING
  - 6 CAPSCREW
  - 7 GEAR BUSHING (OR BRACKET)
  - 8 SHAFT
  - 9 KEY
  - 10 WORM GEAR BRACKET
  - 11 SETSCREW
  - 12 HANDWHEEL
  - 13 WORM GEAR SEGMENT
  - 14 NUT
  - 15 SETSCREW
  - 16 SETSCREW
  - 17 INDICATOR
  - 18 NUT
  - 19 SETSCREW
  - 20 NUT
  - 21 STUD
  - 22 GLAND (FIXED ADJUSTMENT)
  - 23 "O" RING (INSIDE)
  - 24 "O" RING (OUTSIDE)
  - 25 CAPSCREW
  - 26 VALVE COVER
  - 27 COMPOSITION COVER GASKET
  - 28 METAL DIAPHRAGM
  - 29 COMPOSITION COVER GASKET
  - 30 SEALANT FITTING
  - 31 CHECK VALVE
  - 32 KEY
  - 33 VALVE PLUG
  - 34 VALVE BODY
  - 35 RELIEF PLUG
  - 36 HOUSING COVER
  - 37 HOUSING COVER GASKET
  - 38 ALEMITE FITTING
  - 39 WEATHERPROOF WORM GEAR HOUSING
  - 40 BRAIDED ASBESTOS PACKING RING
  - 41 METAL PACKING RING

## ASSEMBLY INSTRUCTIONS

### Bolted Gland Type, Spur Gear Operated

1. Remove old check valve or check valves from plug shank, if replacement is required.
2. Assemble new check valve, or check valves in plug shank and run into end of thread firmly.
3. Partly fill the space between the base of the plug and body with the correct service sealant, but make sure that there is not too much of this sealant, to prevent the plug from seating properly.
4. Smear the top of the plug with the correct service sealant and assemble in the body with dry taper surfaces; align the ports in the open position.
5. Paint the gasket face of the body with a gasket compound (non-hardening).
6. Assemble the braided ring gasket (large center hole). Ring gasket is used only in 200 lb. WOG iron valves and ANSI 150 lb. valves.
7. Paint the top of the braided ring gasket with a gasket compound (non-hardening) and assemble the metal diaphragm, be sure top of plug is coated with sealant according to point 4.
8. Assemble the composition gasket (small center hole), paint top with gasket non-hardening compound.
9. Assemble the cover.  
(See alternate steps—10 thru 14—below for Jewett Packing Type Valves)
10. Assemble well oiled O-rings to the gland.
11. Assemble gland to cover.
12. Press downward or tap lightly to snap O-rings in place.
13. Assemble gear operating bracket and assemble cover cap screws and tighten to effect joint seal.
14. Tighten gland stud nuts down firmly to seat plug (approximately 15 ft. lbs.)—loosen and re-tighten to approximately 5 to 10 ft. lbs.
15. Assemble gear segment with the extended hub down.
16. Check the location of the stops on the segment with the port opening and the keyway in the shank of the plug and the key seat in the segment lug. The stops are correct when the plug port is opened and aligned with the body and the key can be slipped into the key seat of the segment and the keyway of the shank of the plug without requiring fitting.
17. Assemble key in keyway and attach indicator.
18. The top of the segment hub should be flush or slightly below the shoulder on the plug shank. The two set-screws and lock nut can then be tightened.
19. The intermediate gear and pinion is assembled on the pinion pin and the handwheel assembled on the shank of the valve.
20. The gearing should be operated to determine the back-lash and the eccentric pinion pin may be adjusted to provide just enough back-lash without causing binding in either the segment or hand-wheel pinion.
21. Assemble the sealant fitting.
22. Inject sealant until sealant extrudes at ports. Rotate plug to distribute sealant film. Adjust gland stud nuts until rotation is possible. Re-inject sealant to insure system is full.
23. Final adjustment of the gland nuts to effect smooth operation of valve when closed to full line pressure.

#### Use These Alternate Steps For Jewett Packing Type Valves

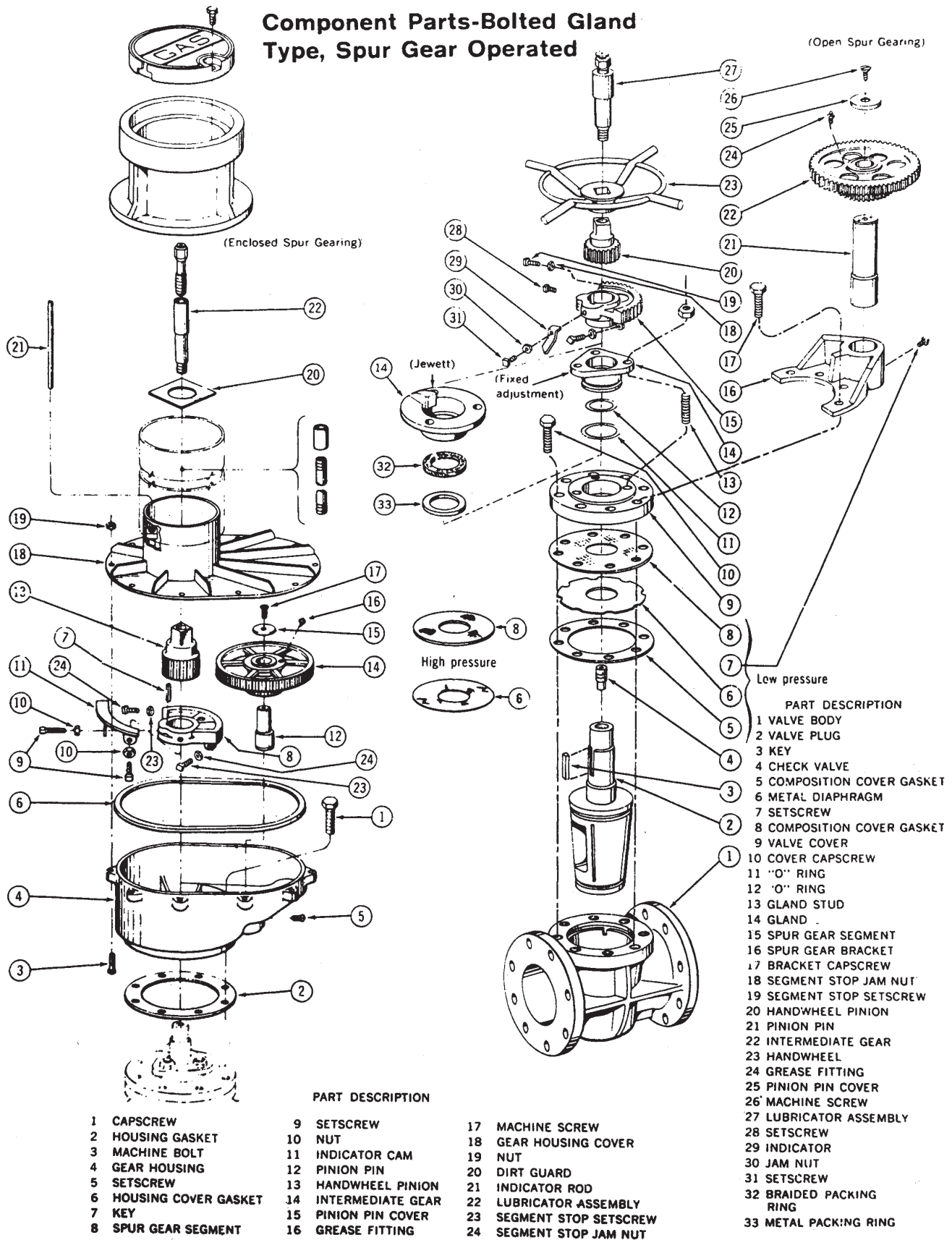
10. Assemble the metal packing ring with the radius side down and centralize the cover before either assembling the cap screws or tightening the stud nuts. Then tighten firmly.
11. Assemble gear operating bracket and assemble cover cap screws or stud nuts.
12. Assemble braided packing ring.
13. Assemble gland and tighten gland stud nuts firmly.
14. Assemble gear segment with the extended hub down.

(Continue with Step 16 above)

#### For Valves With Enclosed Gear Housing—Continue With Following Steps

24. Apply gasket compound (non-hardening) to top lip of lower housing. Fit channel rubber gasket to lip on housing, making sure rubber gasket is cut on a bias.
25. Position cover on housing and secure bolts and nuts to effect seal.
26. Insert dirt guard and indicator rod.

**Component Parts-Bolted Gland Type, Spur Gear Operated**



## Replacement Procedure of V-Ring Stem Packing in Hypreseal Valves 2"-4" Size

1. Before undertaking this repair, be sure that the valve has been properly serviced with sealant and that the plug is properly adjusted and in the full-open or full-closed position. Refer to Illustration A for typical assembly drawing.
2. Remove gearing (For wrench-operated valve, remove indicator wrench head.)
3. Loosen cap screws holding bearing retainer assembly. These should be backed off uniformly approximately  $\frac{1}{4}$  turn at a time until the stem back seats. As the cap screws are backed off, the bearing retainer will rise, allowing the plug stem to seat in the body. (This will occur only in cases when the valve is under line pressure.)
4. Loosen the relief plug. If there is no leakage, or leakage is very slight, it is safe to proceed. Injecting sealant into the valve will help to stop back-seat leakage.
5. Remove cap screws, bearing retainer, bearings and thrust ring.
6. Remove packing injector and the pipe plug opposite the packing injector. This will release the packing pressure and in turn, release the force holding the packing gland against the retaining ring.
7. Remove the retaining ring. In valves from 2" to 4" size, this is a Spiral type snap ring. A thin 8" to 12" screwdriver should be available for this job.
8. Remove the relief plug and insert a  $\frac{1}{4}$ " button-head fitting. Inject sealant through the relief hole to force the V-rings, plastic packing, and packing gland out of the body. An alternate method for removal of the packing gland and top V-rings is to replace the pipe plug and packing injector and inject plastic packing. The top of the packing gland should be observed during these operations to insure that the gland does not cock and stop moving. If this happens, the pressure should be released and the gland realigned. The bottom V-rings will have to be dug out after the gland and top V-rings have been removed if this method is used.
9. Clean all old packing and sealant out of the packing chamber.
10. Place one flat-back ring and two V-rings in body with lips up.
11. Place a small amount of plastic packing on top of the bottom V-rings. This is to keep the lips of the upper V-rings clear of the packing injector hole.
12. Place two V-rings and one flat-back ring in the body with lips down, making sure that the V-rings do not overlap packing-injector hole.
13. Replace packing gland and retaining ring.
14. Replace packing injector and inject plastic packing until it extrudes through the opposite pipe plug hole. Install the pipe plug opposite the packing injector and inject packing until a small amount of pressure builds up between the V-rings to supply initial seal on the V-rings.
15. Replace and tighten the relief plug.
16. Replace thrust ring and thrust bearing. Lubricate bearing thoroughly with good general purpose grease.
17. Replace bearing retainer and cap screws, hand tight only. For wrench operated valves, use a new gasket and new weather seal and make sure that the match lines on bearing retainer and body match up. Proper matching of the marks assures that stop lug on the bearing retainer will be in the proper location.
18. Pull the bearing retainer down by turning the cap screws uniformly, approximately  $\frac{1}{4}$  turn at a time until the bearing retainer is tight against the body.
19. Replace indicator wrench head or gear operator.

### Necessary replacement parts needed for reworking plug stem:

1. Full set of V-rings.
2. Plastic Packing #909
3. Bearing retainer gasket. (Not required for gear operated valves with integral gear flange.)
4. Weather seal. (Not required for gear operated valves.)
5. Retaining ring.
6. Bearing and Races (when separate).
7. Gear Housing Gasket. (Not required for wrench operated valves.)

### Parts recommended, but not necessary, as part of a repair kit:

1. Set of cap screws.
2. Pipe plug.
3. Packing injector.
4. Relief plug.
5. Key.
6. Set screws.



**V-Ring Stem Packing in Hypreseal Valves 2"-4" Size**

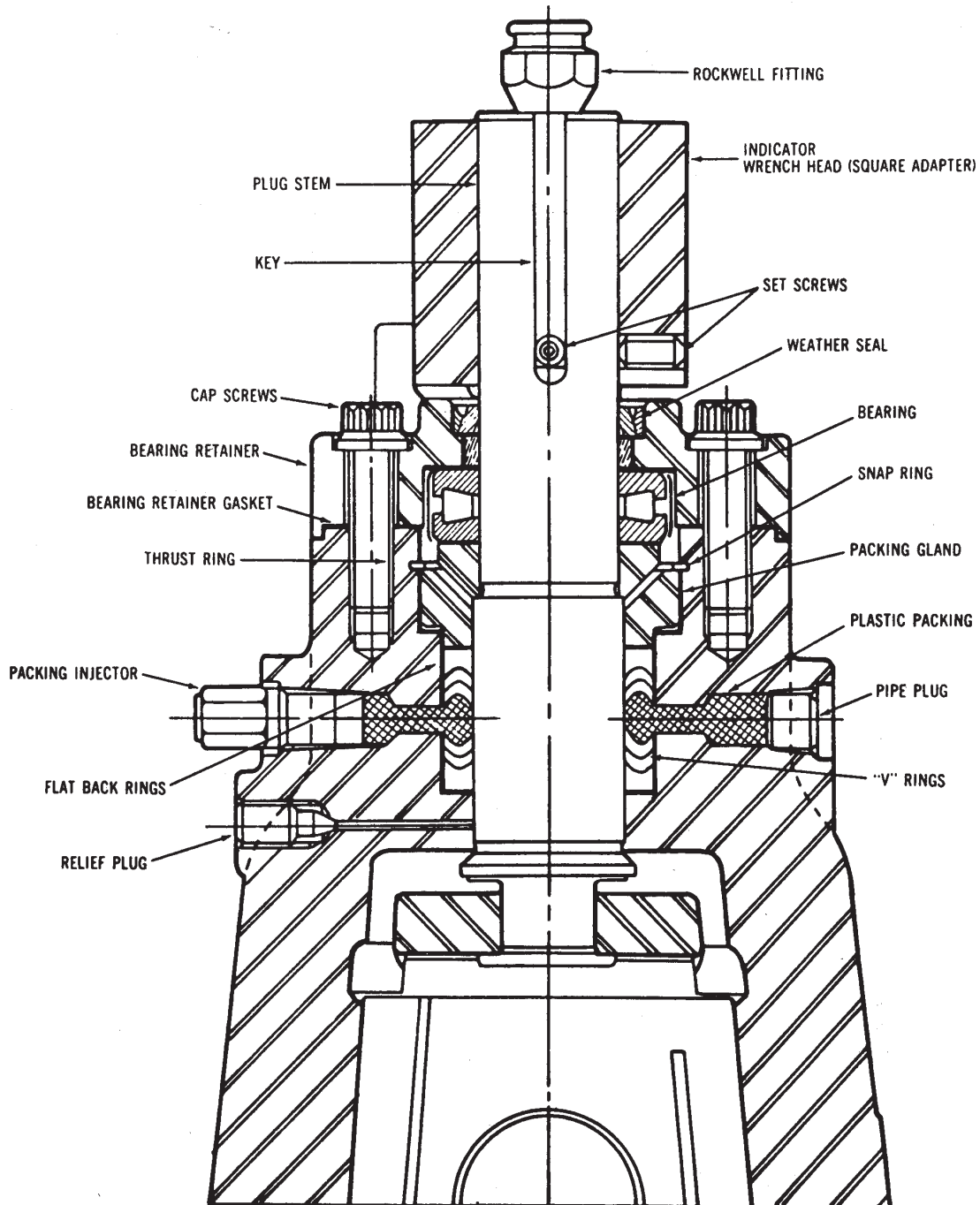


ILLUSTRATION A

## Replacement Procedure of V-Ring Stem Packing in 6" -20" Size Hypreseal Valves

1. Before undertaking this repair, be sure that the valve has been properly serviced with sealant and that the plug is properly adjusted and in the full-open or full-closed position. Refer to Illustration B for typical assembly drawing.
2. Remove gearing.
3. Loosen cap screws #26 holding bearing retainer assembly. These should be backed off uniformly approximately  $\frac{1}{4}$  turn at a time until the stem back seats. As the cap screws are backed off, the bearing retainer will rise, allowing the plug stem to seat in the body. (This will occur only in cases where the valve is under line pressure.)
4. Remove pipe plug #16 and loosen the relief plug #15. If there is no leakage, or leakage is very slight, it is safe to proceed. Injecting sealant into the valve will help to seal off back-seat leakage.
5. Remove cap screws #26, bearing retainer #25A, bearing #24 and thrust ring #23.
6. Remove packing injector #17 and the pipe plug opposite the packing injector. This will release the packing pressure and in turn, release the force holding the packing gland against the retaining ring.
7. Remove the three-piece retaining ring. It may be necessary to drive the packing gland down to release the force holding the retaining ring.
8. Remove gland #21, V-rings #20, and flat back ring #19. Note the two holes in the gland to facilitate its removal. If necessary, sealant or plastic packing can be injected to jack the gland and start it out of the bore.
9. Clean all old packing and sealant out of the packing chamber.
10. Place one flat back ring #19 and two V-rings #20 in body with lips up.
11. Place a small amount of plastic packing on top of the bottom V-rings. This is to keep the lips of the upper V-rings clear of the packing injector hole.
12. Place two V-rings in the body with lips down, making sure that the V-rings do not overlap the packing-injector hole.
13. Replace packing gland and three piece retaining ring.
14. Replace packing injector and inject plastic packing until it extrudes through the opposite pipe plug hole. Install the pipe plug opposite the packing injector and inject packing until the three piece retaining ring is tight against the gland and cannot be removed.
15. Retighten the relief plug #15, and install pipe plug #16.
16. Replace thrust ring and thrust bearing. Lubricate bearing thoroughly with good general purpose grease.
17. Replace bearing retainer and cap screws, hand tight only.
18. Pull the bearing retainer down by turning the cap screws uniformly, approximately  $\frac{1}{4}$  turn at a time until the bearing retainer is tight against the body.
19. Reinstall the gear operator.

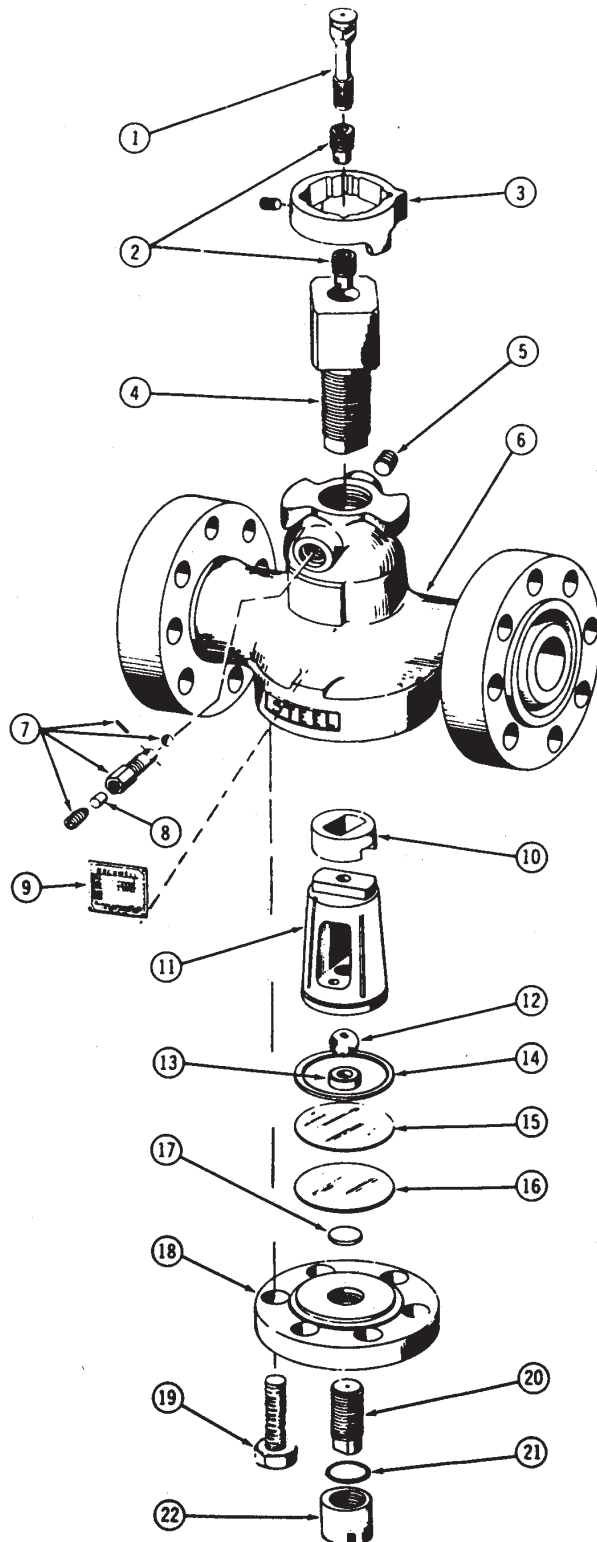


## **ASSEMBLY INSTRUCTIONS**

### **Bolted Bottom Hypreseal, Wrench Operated Threaded Stem**

1. Insert the plug in the body. Parts are marked. Place marks together to match parts properly.
2. Insert the threaded plug stem and screw into the body until the stem touches the tang of the plug. (Replace check valves if necessary.)
3. Unscrew the plug stem three-quarters to one and one-quarter turn from this position. The amount of unscrewing will depend on the location of the flatted corner of the square on the plug stem. This flatted corner should be in line with the longitudinal axis of the valve, representing the flow passage through the valve.
4. Remove the plug and insert the equalizer ring and reinsert the plug with taper surfaces dry. Again match marks on parts for perfect fit.
5. Place the ball in the center of the large end of the plug.
6. Assemble the ball seat on the top of the ball. A small amount of viscous sealant may be used to hold the ball seat in its proper position during assembly.
7. Check the relation of the top of the ball seat with counterbore gasket seat in the body. (See page 30 for dimension)
8. Insert the ring gasket, the thin metal diaphragm and the heavy metal diaphragm, in the order named.
9. Assemble the thrust button in the counter-bore of the cover, using a small amount of sealant to hold in place during assembly.
10. Assemble the cover on the body, making sure that the thrust button remains in its proper location.
11. Tighten the cover stud nuts or cap screws evenly to produce a tight joint, but do not overtighten, as this can cause distortion in the body and affect the operation of the valve.
12. Insert the adjusting screw in the cover and adjust snugly.
13. Insert the packing injector fitting and add packing sticks using the hollow head set-screw to force the plastic packing into the recess in the threaded plug stem hole. Do not use the regular valve sealant for this purpose.
14. Assemble the stop collar on the plug stem and check port alignment in the open position with the stop lugs on the stop collar.
15. When properly aligned, tighten the set-screws.
16. Inject the valve with the proper service sealant until it extrudes from ports. Rotate plugs to smear sealant film on plug and body seats. Reinject.
17. Test for internal and external leakage. Test and adjust for smooth operation when closed against full rated working pressure.
18. Place the ring gasket over the adjusting screw and assemble the adjusting screw cap.

**Component Parts—Bolted Bottom Hypreseal—  
Wrench Operated—Threaded Stem**



**REGULAR (K-3 Model)**

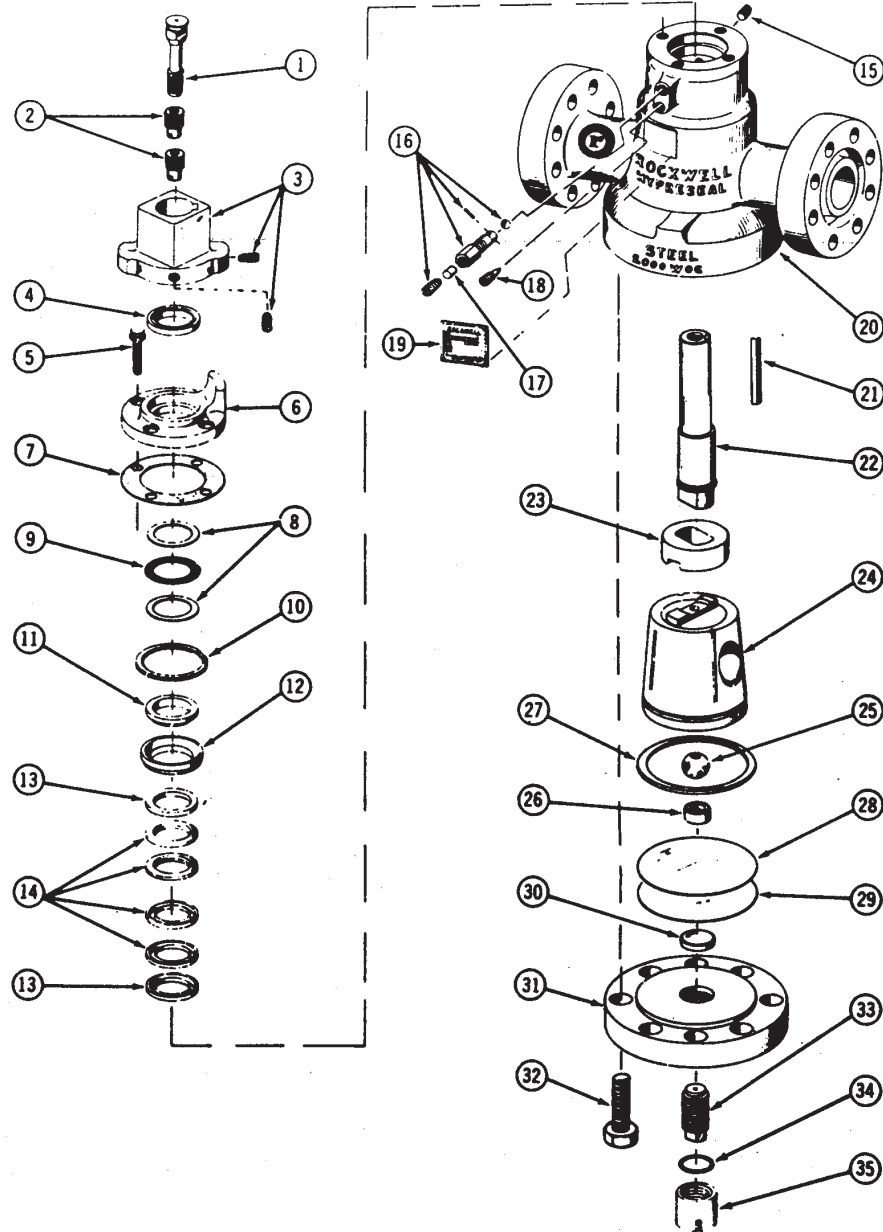
1. SEALANT FITTING
2. CHECK VALVES
3. INDICATOR STOP COLLAR WITH SET SCREW
4. THREADED PLUG STEM
5. SOCKET HEAD PIPE PLUG
6. BODY—FLANGED
7. PACKING INJECTOR ASSEMBLY
8. PLASTIC PACKING
9. NAMEPLATE
10. PLUG EQUALIZER RING
11. PLUG
12. THRUST BALL
13. THRUST BALL SEAT
14. METAL RING GASKET
15. METAL DIAPHRAGM STAINLESS STEEL (THIN)
16. METAL DIAPHRAGM C. R. STEEL (THICK)
17. THRUST BUTTON
18. COVER
19. COVER CAP SCREWS
20. PLUG ADJUSTING SCREW
21. GASKET FOR PLUG ADJUSTING SCREW CAP
22. PLUG ADJUSTING SCREW CAP

## ASSEMBLY INSTRUCTIONS

### Bolted Bottom Hypreseal, Wrench Operated, Threadless Stem

1. Insert plug stem in body from inside taper bore.
2. Assemble equalizer ring and plug in body, making sure that tangs of plug and plug stem are mated with equalizer ring.
3. Place thrust ring, bearing and bearing retainer on plug stem.
4. Check for vertical end play of stem between plug and bearing retainer. With plug seated in the taper bore and the bearing retainer firmly seated on the valve body, the plug stem should be free to move vertically at least  $\frac{1}{32}$ ". This clearance may be increased by machining or grinding the thrust ring, but not until after checking the backseat clearance.
5. Lift up on the plug stem with the bearing retainer free to rise from its position on the valve body. The bearing retainer will usually be lifted  $\frac{1}{8}$ " or more before the plug stem back seats in the body but a minimum of  $\frac{1}{16}$ " is adequate to assure that the back seat will be clear when the valve is assembled and the bearing retainer is bolted in place.
6. Machine or grind the thrust ring if step #4 has indicated inadequate end play of the plug stem. Top and bottom faces of thrust ring must be parallel. Do not remove enough material to reduce the back seat clearance below  $\frac{1}{16}$ ". Repeat steps #4 and #5 after machining thrust ring.
7. Place the ball in the center of the large end of the plug.
8. Assemble the ball seat on the top of the ball. A small amount of viscous sealant may be used to hold the ball seat in its proper position during assembly.
9. Insert the ring gasket, the thin metal diaphragm and the heavy metal diaphragm, in the order named.
10. Assemble the thrust button in the counter-bore of the cover, using a small amount of sealant to hold it in place during assembly.
11. Assemble the cover on the body, making sure that the thrust button remains in its proper location.
12. Tighten the cover nuts or cap screws evenly to produce a tight joint, but do not overtighten, as this can cause distortion in the body and affect the operation of the valve.
13. Insert the adjusting screw in the cover and adjust lightly.
14. Place one flat-back ring and two V-rings in packing chamber with lips up.
15. Place a small amount of plastic packing on top of V-rings. This is to keep the upper V-rings clear of the packing-injector hole.
16. Place two V-rings and one flat-back ring lips down in packing chamber, making sure that lips of V-rings do not overlap the packing hole.
17. Install packing gland and retaining ring.
18. Install packing injector.
19. Inject plastic packing between V-rings until void is filled and packing starts to extrude out of the tapped hole opposite the packing injector.
20. Install pipe plug and inject packing until small amount of pressure builds up between V-rings.
21. Install relief plug.
22. Assemble thrust ring and thrust bearings. Grease bearing thoroughly.
23. Assemble bearing retainer gasket and bearing retainer assembly on body, making sure that match lines on bearing retainers and body match up.
24. Insert bearing-retainer cap screws and tighten uniformly.
25. Assemble indicator wrench head (square adaptor) with key and check port alignment in the open position.
26. When properly aligned, tighten the setscrews.
27. Inject the proper sealant and turn plug.
28. Adjust the adjusting screw until the plug is properly seated.
29. Test for internal and external leakage. Test for smooth operation when closed against full rated working pressure.
30. Place the ring gasket over the screw and screw on the cap.

**Component Parts—Bolted Bottom Hypreseal—  
Wrench Operated—Threadless Stem**



(K-7 Model)

- 1. SEALANT FITTING
- 2. CHECK VALVES
- 3. INDICATOR WRENCH HEAD WITH SET SCREWS
- 4. WEATHER SEAL
- 5. BEARING RETAINER ASSEMBLY CAP SCREW
- 6. BEARING RETAINER ASSEMBLY
- 7. BEARING RETAINER GASKET
- 8. THRUST BEARING RACE
- 9. THRUST BEARING
- 10. GLAND RETAINING RING

- 11. THRUST RING
- 12. PACKING GLAND
- 13. "V"-RING (FLAT BOTTOM)
- 14. "V"-RING
- 15. SOCKET HEAD PIPE PLUG
- 16. PACKING INJECTOR ASSEMBLY
- 17. PLASTIC PACKING (STICK FORM)
- 18. RELIEF PLUG
- 19. NAMEPLATE
- 20. BODY—FLANGED
- 21. WRENCH HEAD KEY
- 22. THREADLESS PLUG STEM
- 23. PLUG EQUALIZER RING
- 24. PLUG (ROUND OPENING)

- 25. THRUST BALL
- 26. THRUST BALL SEAT
- 27. METAL RING GASKET
- 28. METAL DIAPHRAGM STAINLESS STEEL (THIN)
- 29. METAL DIAPHRAGM C. R. STEEL (THICK)
- 30. THRUST BUTTON
- 31. COVER
- 32. COVER CAP SCREWS
- 33. PLUG ADJUSTING SCREW
- 34. GASKET FOR PLUG ADJUSTING SCREW CAP
- 35. PLUG ADJUSTING SCREW CAP

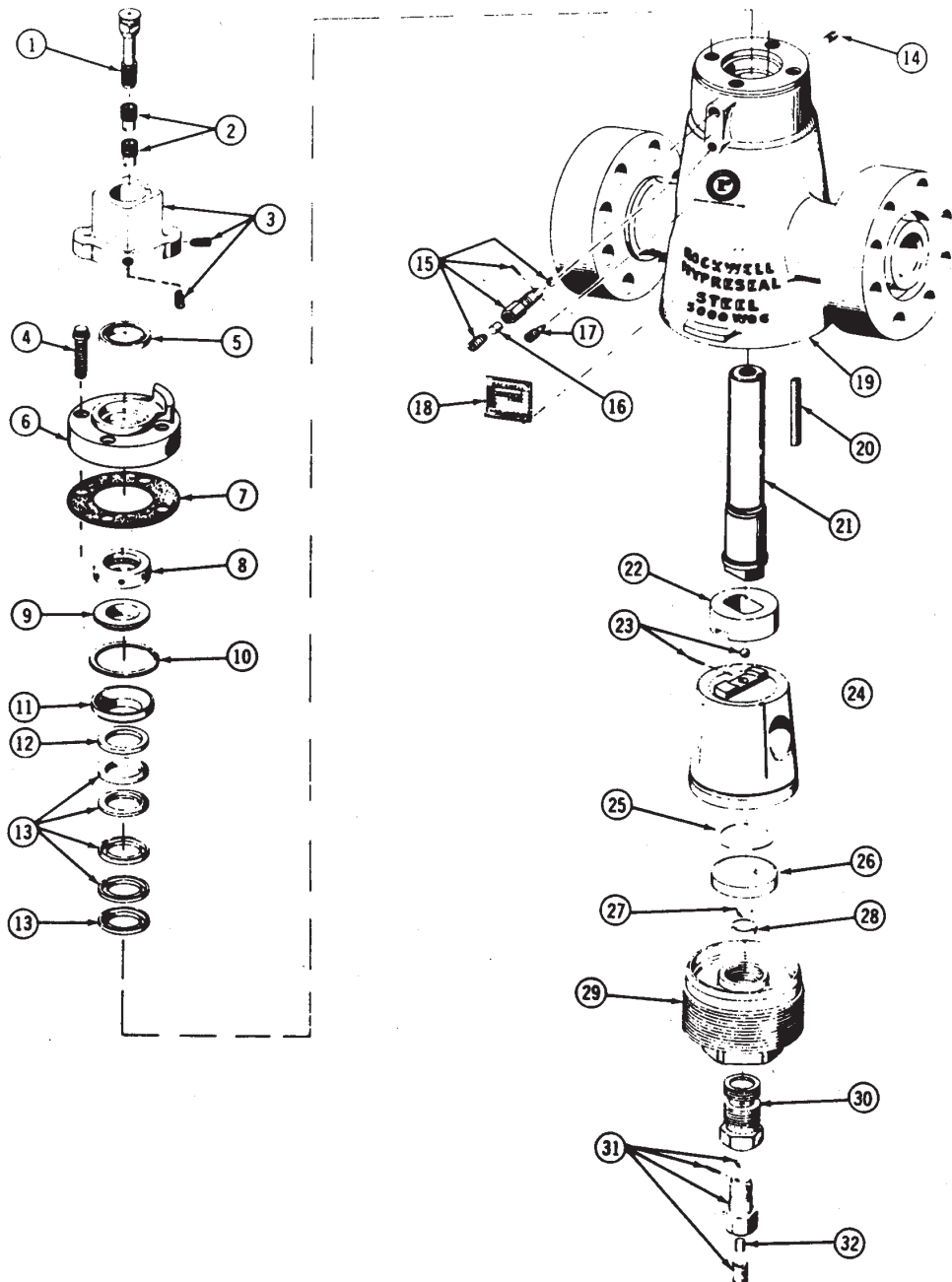
## ASSEMBLY INSTRUCTIONS

### Screwed Bottom Hypreseal, Wrench Operated Threadless Stem

1. Insert plug stem in body from inside taper bore.
2. Assemble equalizer ring and plug in body, making sure that tangs of plug and plug stem are mated with equalizer ring.
3. Place thrust ring, bearing and bearing retainer on plug stem.
4. Check for vertical end play of stem between plug and bearing retainer. With plug seated in the taper bore and the bearing retainer firmly seated on the valve body, the stem should be free to move vertically at least  $\frac{1}{32}$ ". This clearance may be increased by machining or grinding the thrust ring, but not until after checking the backseat clearance.
5. Lift up on the stem with the bearing retainer free to rise from its position on the valve body. The bearing retainer will usually be lifted  $\frac{1}{8}$ " or more before the plug stem back seats in the body, but a minimum of  $\frac{1}{16}$ " is adequate to assure that the back seat will be clear when the valve is assembled and the bearing retainer is bolted in place.
6. Machine or grind the thrust ring if step #4 has indicated inadequate end play of the plug stem. Top and bottom faces of thrust ring must be parallel. Do not remove enough material to reduce the back seat clearance below  $\frac{1}{16}$ ". Repeat steps #4 and #5 after machining thrust ring.
7. Place the spacing washer in the counterbore of the large end of plug.
8. Place the spring disc on top of the spacing washer, with the ball socket facing outward.
9. Place the ball in the socket of the spring disc and assemble the ball seat on top of the ball. A small amount of viscous sealant may be used to hold the ball and seat in proper position during assembly.
10. Lubricate threads and lip of cover with light oil. Assemble screwed bottom cover in body. Tighten securely.
11. Assemble the adjusting screw in the cover and adjust lightly.
12. Place packing sticks in the packing injector of the adjusting screw, using the socket-head set screw to force the plastic packing into the recess around the adjusting screw.
13. Place one flat-back ring and two V-rings in the packing chamber with lips up.
14. Place a small amount of plastic packing on top of V-rings. This is to keep the top V-rings clear of the packing-injector hole.
15. Place two V-rings and one flat-back ring lips down in packing chamber, making sure that the lips of the V-rings do not overlap the packing hole.
16. Install packing gland and retaining ring.
17. Install packing injector.
18. Inject plastic packing between V-rings until void is filled and packing starts to extrude out the tapped hole opposite the packing injector.
19. Install pipe plug and inject plastic packing until a small amount of pressure builds up between the V-rings.
20. Install relief plug.
21. Assemble thrust ring and thrust bearing. Grease bearing thoroughly.
22. Assemble bearing retainer gasket and bearing retainer assembly on body, making sure that the match line on bearing retainer and body match up.
23. Insert bearing-retainer cap screws and tighten uniformly.
24. Assemble indicator wrench head (square adaptor) with key and check port alignment in the open position.
25. When properly aligned, tighten set screws in the indicator wrench head.
26. Inject the proper sealant and turn the plug.
27. Adjust the plug adjusting screw until the plug is seated properly.
28. Test for internal and external leakage. Test for smooth operation when closed against full rated working pressure.



**Component Parts**  
**Screwed Bottom Hypreseal—Wrench Operated—Threadless Stem**



- 1. SEALANT FITTING
- 2. CHECK VALVES
- 3. INDICATOR WRENCH HEAD WITH SET SCREWS
- 4. BEARING RETAINER ASSEMBLY CAP SCREW
- 5. WEATHER SEAL
- 6. BEARING RETAINER ASSEMBLY
- 7. BEARING RETAINER GASKET
- 8. THRUST BEARING
- 9. THRUST RING

- 10. GLAND RETAINING RING
- 11. PACKING GLAND
- 12. "V"-RING (FLAT BACK)
- 13. "V"-RING
- 14. SOCKET HEAD PIPE PLUG
- 15. PACKING INJECTOR ASSEMBLY
- 16. PLASTIC PACKING
- 17. RELIEF PLUG
- 18. NAMEPLATE
- 19. BODY—FLANGED
- 20. WRENCH HEAD KEY
- 21. THREADLESS PLUG STEM

- 22. PLUG EQUALIZER RING
- 23. EQUALIZING CHECK VALVE (BALL AND PIN)
- 24. PLUG (ROUND OPENING)
- 25. METAL RING GASKET
- 26. SPRING DISC
- 27. THRUST BALL
- 28. THRUST BALL SEAT
- 29. LIP SEAL BOTTOM COVER
- 30. PLUG ADJUSTING SCREW
- 31. PACKING INJECTOR ASSEMBLY
- 32. PLASTIC PACKING

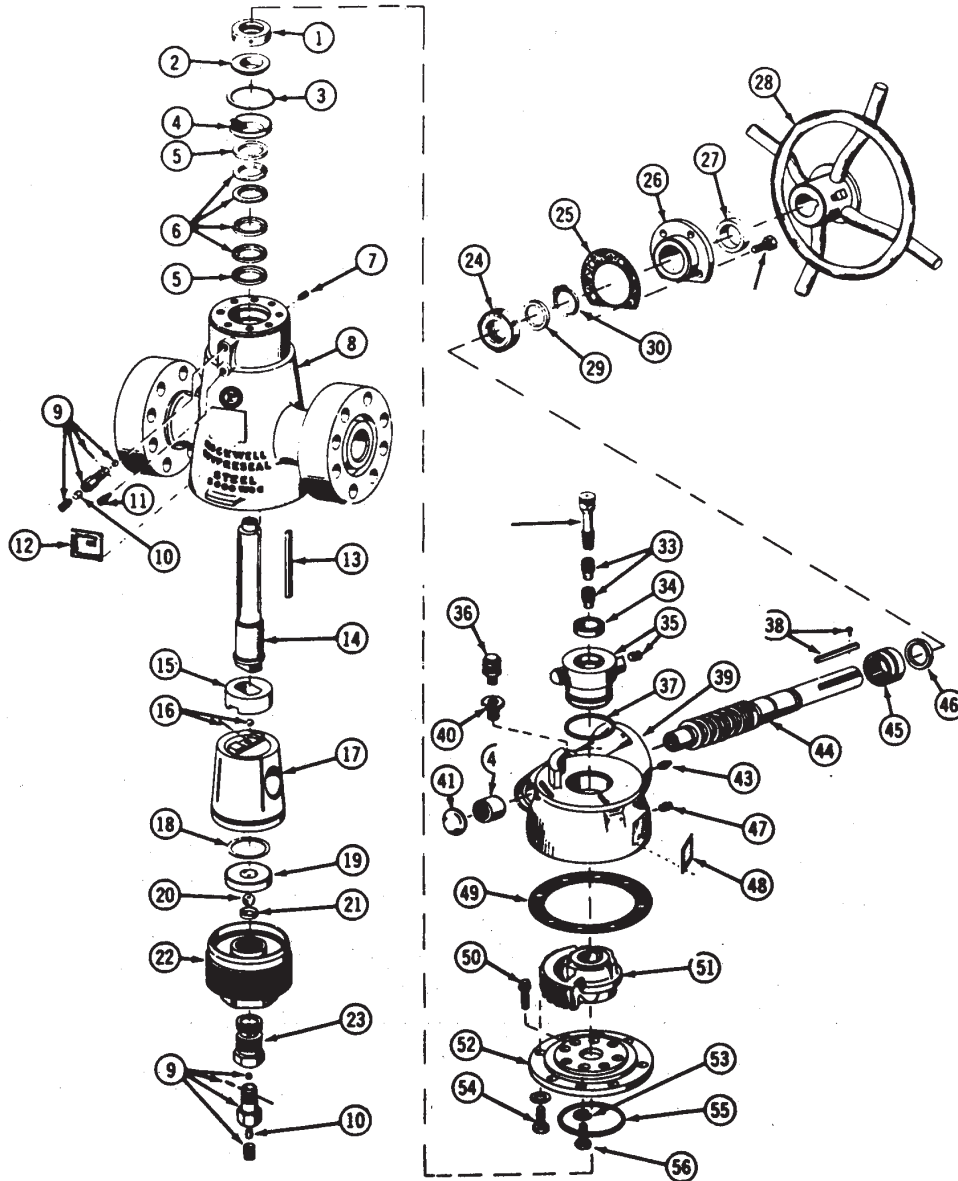
## ASSEMBLY of Hypreseal Worm Gearing

The assembly procedure for gear-operated threadless stem valves is the same as that for wrench-operated valves, except that the assembly and installation of the gear operator takes the place of the assembly of the indicator wrench head. Illustration page 27 shows an exploded view of a valve in which the gear flange serves the dual purpose of bearing retainer and gear flange. In other valves, mainly large sizes, the gear flange is an integral part of the body and the bearing retainer is a separate part. see Illustrations page 19 and 27. The assembly procedure is essentially the same for valves with both types of gear flange.

The following procedure covers the assembly of simple gearing, which is used on all threadless-stem Hypreseals at the present time. All other valve parts should be assembled before the assembly of the gearing is undertaken.

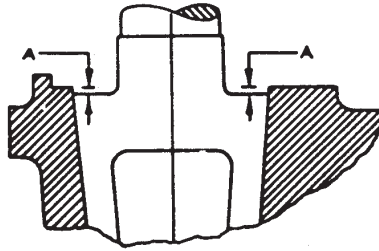
1. Assemble worm gear shaft assembly, composed of worm and shaft, needle bearing, two worm-shaft thrust rings, one thrust bearing, and one retaining ring.
2. Check end-play clearance of thrust rings and thrust bearing between retaining ring and the shoulder of the worm. The total end play is held to 0.004"—.012" by selective assembly at the factory. If the original parts are not reused, it may be necessary to obtain the proper clearance by selection of parts or by machining or grinding one of the thrust rings. (Both faces of the thrust ring must be flat and parallel.)
3. Drive or press the small worm-shaft needle bearing into the gear housing.
4. Place the expansion plug in the counterbore at the end of the worm-shaft bore of the gear housing. Expand the plug by striking its center with a hammer.
5. Install the worm-shaft assembly in the gear housing. It may be necessary to force the large worm-shaft needle bearing into the bore by tapping lightly on the end of the worm shaft.
6. Install worm-shaft seal in thrust plate.
7. Place thrust-plate gasket and thrust plate.
8. Insert thrust plate cap screws and tighten uniformly.
9. Assemble the gasket on the gear housing flange, using a non-setting grease-resistant compound.
10. Align the keyway of the plug stem with the plug in the open position. The keyway should be in line with the longitudinal axis of the valve.
11. Assemble the gear segment and key on the plug stem.
12. Assemble indicator seal O-ring in groove in gear housing.
13. Place the gear housing and worm-shaft assembly on the valve in a position that will allow the worm shaft to clear the gear segment.
14. Rotate the gear housing into position with the axis of the worm shaft 90° to the flow axis of the valve, turning the worm shaft to mesh the gears while positioning the gear housing.
15. Assemble the cap screws and lock washers to hold the gear housing to the valve.
16. Assemble the plug stem seal in indicator.
17. Assemble indicator stop collar on plug stem and check port alignment in the open position.
18. When properly aligned, tighten set screws.
19. Add a suitable gear lubricant to the gear housing.
20. Assemble handwheel key and handwheel.

**Component Parts-Hypreseal Worm Gearing**



- |  |  |   |
|--|--|---|
| <ul style="list-style-type: none"> <li>1. THRUST BEARING</li> <li>2. THRUST RING</li> <li>3. GLAND RETAINING RING</li> <li>4. PACKING GLAND</li> <li>5. "V"-RING (FLAT BACK)</li> <li>6. "V"-RING</li> <li>7. SOCKET HEAD PIPE PLUG</li> <li>8. BODY—FLANGED</li> <li>9. PACKING INJECTOR ASSEMBLY</li> <li>10. PLASTIC PACKING</li> <li>11. RELIEF PLUG</li> <li>12. BODY NAMEPLATE</li> <li>13. WORM GEAR SEGMENT KEY</li> <li>14. PLUG STEM WEATHER SEAL</li> <li>15. PLUG EQUALIZER RING</li> <li>16. BALL AND PIN OF EQUALIZING CHECK VALVE</li> <li>17. PLUG</li> <li>18. SPRING SEAT SPACING WASHER</li> <li>19. SPRING DISC</li> </ul> | <ul style="list-style-type: none"> <li>20. THRUST BALL</li> <li>21. THRUST BALL SEAT</li> <li>22. LIP SEAL BOTTOM COVER</li> <li>23. PLUG ADJUSTING SCREW</li> <li>24. THRUST BEARING</li> <li>25. THRUST PLATE GASKET</li> <li>26. THRUST PLATE</li> <li>27. WORM SHAFT SEAL</li> <li>28. HANDWHEEL</li> <li>29. THRUST RING</li> <li>30. RETAINING RING</li> <li>31. THRUST PLATE CAP SCREWS</li> <li>32. SEALANT FITTING</li> <li>33. CHECK VALVES</li> <li>34. PLUG STEM SEAL</li> <li>35. INDICATOR STOP COLLAR WITH SET SCREW</li> <li>36. RELIEF VALVE</li> <li>37. INDICATOR "O" RING</li> </ul> | <ul style="list-style-type: none"> <li>38. HANDWHEEL KEY AND MACHINE SCREW</li> <li>39. GEAR HOUSING</li> <li>40. HEX PIPE BUSHING</li> <li>41. EXPANSION PLUG</li> <li>42. NEEDLE BEARING</li> <li>43. GREASE FITTING</li> <li>44. WORM AND SHAFT ASSEMBLY</li> <li>45. NEEDLE BEARING</li> <li>46. THRUST RING</li> <li>47. PIPE PLUG</li> <li>48. GEAR HOUSING NAMEPLATE</li> <li>49. GEAR HOUSING GASKET</li> <li>50. GEAR FLANGE CAP SCREWS</li> <li>51. WORM GEAR SEGMENT</li> <li>52. GEAR FLANGE</li> <li>53. LOCK WASHER</li> <li>54. SEAL WASHER</li> <li>55. GEAR FLANGE "O" RING</li> <li>56. HOUSING CAP SCREWS</li> </ul> |
|--|--|---|

**CORRECT PLUG POSITIONS IN BODY**



**TWO-BOLT COVER TYPE**

Pressure Class			SIZE	
			½" to 2"	2½"-3"-4"
ALL	A	Min.	.020	.032
		Max.	.032	.046

**SCREWED GLAND TYPE, REGULAR**

Pressure Class			SIZE			
			½"-¾"-1"	1¼"-1½"	2"-2½"-3"	4"
ALL	A	Min.	.020	.030	.035	.040
		Max.	.032	.045	.050	.060

**SCREWED GLAND TYPE, MULTIPORT**

Pressure Class			SIZE			
			½"-¾"	1"	1¼"-1½"-2"	2½"
ALL	A	Min.	.020	.030	.035	.040
		Max.	.032	.045	.050	.060

**BOLTED GLAND TYPE, REGULAR AND MULTIPORT**

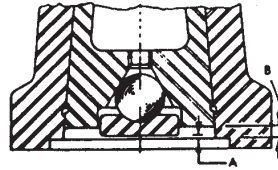
Pressure Class			SIZE		
			4"-5"	6"-8"-10"	12" to 24"
ALL	A	Min.	.062	.094	.125
		Max.	.094	.125	.188

**BOLTED GLAND TYPE, VENTURI**

Pressure Class			SIZE		
			6"-8"	10"-12"-16"	18" to 30"
ALL	A	Min.	.062	.094	.125
		Max.	.094	.125	.188

Note: Dimension "A" minimum is approximate position of plug shoulder before lapping. After lapping, Dimension "A" should not exceed maximum shown above.

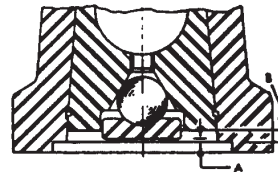
## CORRECT PLUG POSITIONS IN BODY — Continued



HYPRESEAL BOLTED COVER TYPE, REGULAR

Pressure Class		SIZE											
		½"-¾"	1"	1¼"-1½"	2"-2½"	3"-4"	5"-6"	6¾"	7"	8"	10"	12"	
ANSI 150 and ANSI 300	A	Min.		.000	.000	.000	.000	.000			.000	.000	.000
		Max.		.046	.046	.046	.062	.062			.062	.078	.078
	B	Min.		.125	.125	.219	.313	.187			.313	.313	.313
		Max.		.146	.146	.240	.344	.219			.344	.345	.345
ANSI 400	A	Min.					.000	.000			.000	.000	
		Max.					.062	.062			.062	.062	
	B	Min.					.313	.187			.313	.187	
		Max.					.344	.219			.344	.219	
ANSI 600 and ANSI 900	A	Min.	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
		Max.	.046	.046	.046	.046	.062	.062	.062	.062	.062	.078	.078
	B	Min.	.125	.125	.125	.219	.313	.187	.187	.187	.313	.313	
		Max.	.146	.146	.146	.240	.344	.219	.219	.219	.344	.345	
ANSI 1500	A	Min.	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	
		Max.	.046	.046	.046	.046	.062	.062	.062	.062	.062	.078	
	B	Min.	.125	.125	.125	.219	.313	.187	.187	.187	.313	.313	
		Max.	.146	.146	.146	.240	.344	.219	.219	.219	.343	.344	

See note at bottom of page.

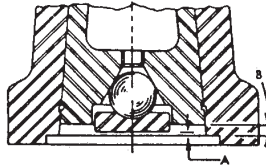


HYPRESEAL BOLTED COVER TYPE, ROUND OPENING

Pressure Class		SIZE											
		1x1½	1½x1½	2x2½ 2½x2½	2x2½	2½x2½ 3x2½	3x3½ 4x3½	4x4½	6x6½ 6¾x6½	7x7½ 7¾x7½	8x7½	8x8	10x10
ANSI 150 ANSI 300 ANSI 400	A	Min.	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
		Max.	.046	.046	.062	.062	.062	.062	.062	.078	.078	.078	.078
ANSI 600 ANSI 900 ANSI 1500	B	Min.	.156	.250	.250	.250	.250	.281	.375	.250	.281	.281	.500
		Max.	.173	.281	.281	.281	.281	.312	.406	.282	.313	.313	.531

Note: Dimensions "A" and "B" minimums are approximate positions of plug and ball seat before lapping. After lapping, Dimensions "A" and "B" should not exceed maximums shown above.

## CORRECT PLUG POSITIONS IN BODY — Continued



HYPRESEAL BOLTED COVER TYPE, VENTURI

Pressure Class			SIZE							
			6"	8"-10"	12"	14"-16"	18"	20"	24"	24"-26"
ANSI 150 ANSI 300 ANSI 400	A	Min.	.000	.000	.000	.000	.000	.000	.000	.000
		Max.	.062	.062	.062	.078	.078	.078	.078	.078
ANSI 600 ANSI 900 ANSI 1500	B	Min.	.125	.156	.187	.125	.625	.469	.438	.438
		Max.	.156	.188	.219	.156	.687	.500	.469	.469

HYPRESEAL BOLTED COVER TYPE, MULTIPORT

Pressure Class			SIZE							
			½"-¾"	1"	1¼"-1½"	2"	2½"	3"	4"	6"-8"
ANSI 150 ANSI 300 ANSI 400	A	Min.	.000	.000	.000	.000	.000	.000	.000	.000
		Max.	.046	.046	.046	.046	.046	.062	.062	.062
ANSI 600 ANSI 900 ANSI 1500	B	Min.	.125	.125	.219	.219	.250	.219	.188	.313
		Max.	.146	.146	.240	.240	.271	.250	.219	.344

See note at bottom of page.



HYPRESEAL SCREWED COVER TYPE, REGULAR

Pressure Class			SIZE								
			½"-¾"-1"	1½"	2"	2½"	3"	4"	5"	6"	8"
5000 WOG	A	Min.	.125	.125	.125	.125	.125	.125	2.656	3.375	4.062
		Max.	.146	.146	.146	.146	.146	.146	2.673	3.392	4.079
7500 WOG and 10000 WOG	A	Min.			.125	.125	.125	.125			
		Max.			.146	.146	.146	.146			

HYPRESEAL SCREWED COVER TYPE, ROUND OPENING

Pressure Class			SIZE						
			2"x2½"	3"x2½"	2½"x2½"	3"x2½"	3½"x2½"	3"x3½"	4"x4½"
5000 WOG and 10000 WOG	A	Min.	.125	.125	.125	.125	.125	.125	.125
		Max.	.146	.146	.146	.146	.146	.146	.146

 Note: Dimension "A" minimum is approximate position of plug shoulder before lapping.  
 After lapping, Dimension "A" should not exceed maximum shown above.

**TEST PRESSURES AND WORKING PRESSURE RATINGS**

NOMINAL DESIGNATION		SIZES	FACTORY TEST PRESSURE		Maximum Working Pressure: Water, Oil, Gas 150 Deg. F. Max.	Maximum Working Pressure: Water, Oil, Gas 450 Deg. F. Max.
WOG	SWP		Air: Under Water	Hydrostatic		
175		4" and smaller	175	350	175	*
200	125	12" and smaller	200	400	200	125
175	125	14" to 24"	175	350	175	125
120		30"	120	240	120	
400	250	All (SWP rating applies only to 12" and smaller.)	250	800	400	250
500	250	All (SWP rating applies only to 12" and smaller.)	250	1000	500	300
800		All	250	1600	800	

Castings for the above iron valves exceed the requirements of Class B of the ASTM Specification A-126-42.

\* Not recommended for use above 250 degrees F.

Test and working pressures are in lbs. per square inch, gage (psig.)

**CARBON STEEL VALVES**

ANSI Primary Service Pressure Rating	Maximum Working Pressure WOG	Hydrostatic Shell Test	Seat Test
150	285	430	320
300	740	1,110	820
400	990	1,490	1,090
600	1,480	2,220	1,630
900	2,220	3,330	2,450
1,500	3,705	5,560	4,080
2,500	6,170	9,260	6,790

Test and working pressures are in pounds per square inch, gage (PSIG).

Rockwell-Nordstrom valve hydrostatic shell tests exceed ANSI minimum requirements

**STANDARD OVERSIZE DIMENSIONS FOR TAPER DIAMETER OF REPLACEMENT PLUGS**

	Valve Size	Plug Sizes																													
		1/2-3/4	1	1 1/4-1 1/2	2	2 1/2	3	4	5	6	8	10	12	14	16	18	20	22	24	26	30										
STANDARD TYPES	IRON	Regular	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	3/16	3/16	3/16	1/4	1/4	3/8	3/8	...	...	...	...	...	...	...	...	...	...	...	...	
		Gate Length	...	...	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	3/16	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
		Venturi	...	...	...	...	...	...	...	...	1/8	1/8	1/8	3/16	3/16	3/16	3/16	1/4	1/4	1/4	3/8	3/8	...	...	...	...	...	...	...	...	
		Multiport	1/8	1/8	1/8	1/8	1/8	1/8	1/8	...	1/8	3/16	3/16	3/16	...	1/4	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
		Round Opening	...	...	...	1/8	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
STANDARD TYPES	STEEL	Regular	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	3/16	3/16	3/16	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
		Gate Length	...	...	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	3/16	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
		Venturi	...	...	...	...	...	...	...	...	1/8	1/8	1/8	3/16	3/16	3/16	3/16	1/4	1/4	1/4	3/8	...	...	...	...	...	...	...	...	...	
		Multiport	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	3/16	3/16	3/16	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
		Round Opening	...	...	...	...	3/16	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
HYPERSEAL	STEEL	Regular	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	1/8	3/16	3/16	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	
		Venturi	...	...	...	...	...	...	...	...	1/8*	1/8*	1/8*	3/16*	3/16*	3/16*	1/4*	1/4*	3/8*	3/8*	...	...	...	...	...	...	...	...	...	...	
		Multiport	1/8	1/8	1/8	1/8	1/8	1/8	...	1/8	3/16	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		Round Opening	...	1/8	1/8	1/8	1/8	3/16	...	3/16*	1/4*	1/4*	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	

Note 1: Replacement plugs are regularly furnished to the standard oversize dimension as shown in the above table.

Plugs requiring less oversize than shown in above table will not be supplied.

Plugs requiring greater oversize than shown in above table are furnished only on special order.

Note 2: \* — For valves with (\*) notation, High Tensile Iron Plugs are furnished.

## REPLACEMENT OF CHECK VALVES

Nordstrom sealant check valves are made in four standard sizes as follows:

FOR VALVES USING SEALANT STICK SIZE	PARALLEL PIPE THREAD SIZE
B	1/4"
C	3/8"
D	1/2"
G	3/4"

Each check valve is an assembly consisting of the body and two steel balls of different sizes. A Hypreseal valve has two check valves, one above the other.

In each case, the check valve fittings are screwed into the valve shank or stem to a position which will just clear the end of the Rockwell fitting when it is screwed all the way in.

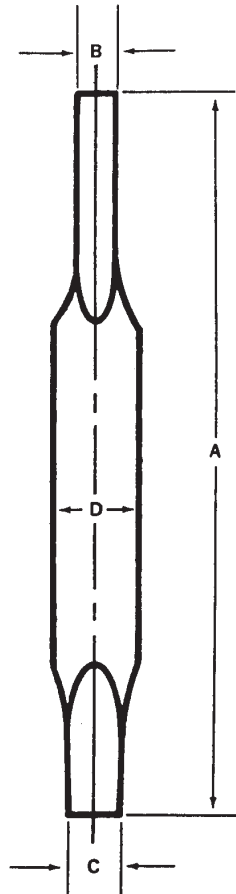
Check valves may be removed by use of a special removing tool which consists of a cylindrical rod with a tapered square section at the lower end and a flattened section at the upper end. This tool is entered into the sealant passage in the valve stem and the lower squared section is driven into the hole at the upper part of the check valve body by tapping it lightly with a hammer. A wrench may then be applied to the upper end of the removing tool and the check valve screwed out.

Check valve removing tools can be furnished on order and should be specified by letter size corresponding to the Sealant Fitting thread size as listed above. (See page 33).



**CHECK VALVE REMOVING TOOL**

(AVAILABLE AS A SERVICE TOOL)



Part Number	Size	Sealant Stick Size	A	B	C (Sq)	D (Dia)
28512	5/16"	A	2 1/8	1/8	.138	1/4
28686	1/4"	B	4 7/16	3/16	.182	3/8
28687	3/8"	C	5 5/8	1/4	.229	1/2
28689	1/2"	D	6 3/4	11/32	.325	11/16
28690	3/4"	G	8 1/8	13/32	.369	13/16
28691	1"	H	10 1/4	9/16	.596	1 1/8

## NORDSTROM SEALANTS

## SUGGESTED FREQUENCY OF SEALANT INJECTION

1. Service whenever opening or closing: valves on all hot services, valves handling corrosive fluids or gases, gas drips or sand drains and valves very infrequently used, such as on domestic gas distribution systems.
2. Service each tour: valves on drilling-mud lines.
3. Service weekly: valves installed in refineries, gasoline plants, compressor plants and processing plants of any nature.
4. Service monthly: valves on gas, crude and products transmission lines.
5. Valves on crude, lube oil or vegetable oils require less frequent attention.

### Types of Nordstrom Sealants

Nordstrom Sealants are available in:  
 (1) Sticks (2) Gun Paks (3) Bulk Form

Not all Sealants are made in all three forms since in some cases to do so would mean reduction of solvent-resisting or chemical-resisting properties; in other cases, satisfactory viscosity or temperature range could not be maintained. See Nordstrom Sealant Catalog for forms in which each individual Sealant is supplied.

Stick Sealants are identified by a letter from "A" to "G" denoting size, and a number indicating type, and are packed in boxes of 24 sticks each as listed herein. The dimension tables in valve catalogs show the size of Sealant sticks required for every valve listed.

For use in high pressure booster type hand guns, most Sealants are available in Gun Paks which are designed to fit the gun barrels. Gun Pak Sealants are packed six to the box.

Several Standard Sealants are available in bulk (spout type) tubes. One tube fits all sizes and types of Nordstrom valves and simplifies inventory problems. Sealant is always kept fresh with no chance for contamination by dirt or grit.

Bulk Sealants in five quart cans and five gallon pails are for use in bucket pumps where larger quantities of Sealants are required. Also available on special order are bulk Sealants in fifty-five gallon drums. This bulk form is regularly supplied in a soft consistency for normal use in pumping equipment. For extreme conditions, such as cold weather, where regular bulk Sealants might be too stiff for ready use, bulk Sealants are available on special order in a special soft consistency for easiest pumping. These special soft Sealants are indicated by the suffix letters "SS" following the formula number, and the formulas in which this consistency is available are specified in the Nordstrom Sealant Catalog.

### SEALANT FITTING

Combination Button Head Fitting Sealant Screw

The Sealant Fitting is adaptable to manual, hand gun or bucket pump application of sealant. No special fittings needed. Sizes to fit any Nordstrom Valve. Equipped with a spring loaded check valve. The fitting is standard on all Nordstrom Valves. It is also available as a separate unit to replace the sealant screw on valves now in service.



For Valves Using Sealant Sticks — Size	Parallel Pipe Thread Size	Cold Rolled Steel For Iron and Steel Valves Part No.	Stainless Steel For Non-Ferrous and Special Metal Valves Part No.
B	1/4"	37415	43012
C	3/8"	37416	43013
D	1/2"	37417	43014
G	3/4"	37418	43015

### HIGH PRESSURE GAUGE

For use with Sealant hand guns and pumps. An essential accessory to indicate when sufficient Sealant pressure has been developed within Nordstrom valves. Gauge needle pulsation goes up by steps until valve is completely filled with Sealant. When Sealant pressure reaches a certain point the gauge needle begins to drop, showing that valve is full. Gauge also indicates valve adjustment and other service required.

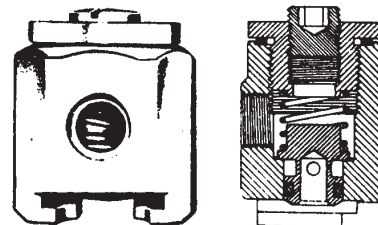


High Pressure Gauge

Oil, Water, Gas and Chemical Services	Formula No. *
<b>GAS</b>	
Dry—temperatures below 200° F	386, 555
Wet—temperatures up to 500° F	950, 555
Hot—temperatures up to 650° F	167
<b>GASOLINE AND MINERAL OILS</b>	
Temperatures up to 300° F	555, 1033
Temperatures up to 500° F	654
Temperatures up to 650° F	921
<b>BUTANE-PROPANE</b>	555, 1033
<b>ACIDS AND CAUSTICS</b>	
Temperatures up to 125° F	147
Temperatures above 125° F	421-921

\* See page 12 for STEM PACKING Formula Nos.

### GIANT BUTTON HEAD COUPLER (with Built-in shut-off)



Coupler shuts off instantly on removal from fitting, preventing all further extrusion of Sealant normally caused by residual pressure in gun or pump hose. Standard equipment with all guns and pumps. Also sold separately.

## HOW TO IDENTIFY VALVES

It is necessary to identify each valve to be repaired by size, type, figure number, lot or model number to obtain proper information for parts and repair.

All valves are marked with this information at manufacture either in the casting or by nameplate.

Valves in the field before 1960 were marked on their castings by lot and heat numbers and were stamped with the figure number. This information was also carried on the nameplates when possible.

Valves after 1960 were marked with lot numbers and five digit date codes, the first two representing the year and the last three the day of the year.

Examples: Valves manufactured January 1, 1963  
would be stamped 63001; December 31,  
1963 would be stamped 63365

All valves manufactured after 1967 will be marked with model numbers. The model number on the nameplate has the manufacture date added to it. Model number only is stamped on the casting.

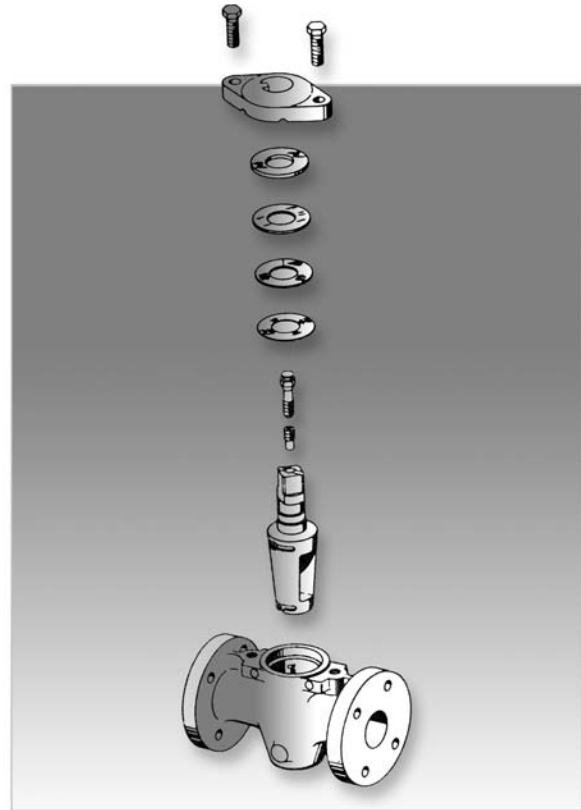
Examples: M5966 means Model 59 made in 1966  
M5967 means Model 59 made in 1967 - on nameplate

### IMPORTANT

All inquires regarding valves in the field should include all indentifying information available. If Figure Number, Lot or Model Numbers for some reason cannot be found, the heat numbers on the castings of steel valves or the manufacturing date will be helpful.

**Around The World, Nordstrom Valves®  
Lubricated Plug Valves Have Worked  
For Over 70 Years —**

**Get The Nordstrom Valves Edge...**  
• Value • Quality • Dependability



### Authorized Distributors

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1-800-225-6989

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or visit [www.flowserve.com](http://www.flowserve.com)

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Telephone: 903-885-4691 or 4693  
FAX: 903-439-3411

Latin America:  
Telephone: 903-439-3407  
FAX: 903-439-3411

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FAX: 903-439-3404



*Nordstrom Valves*

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