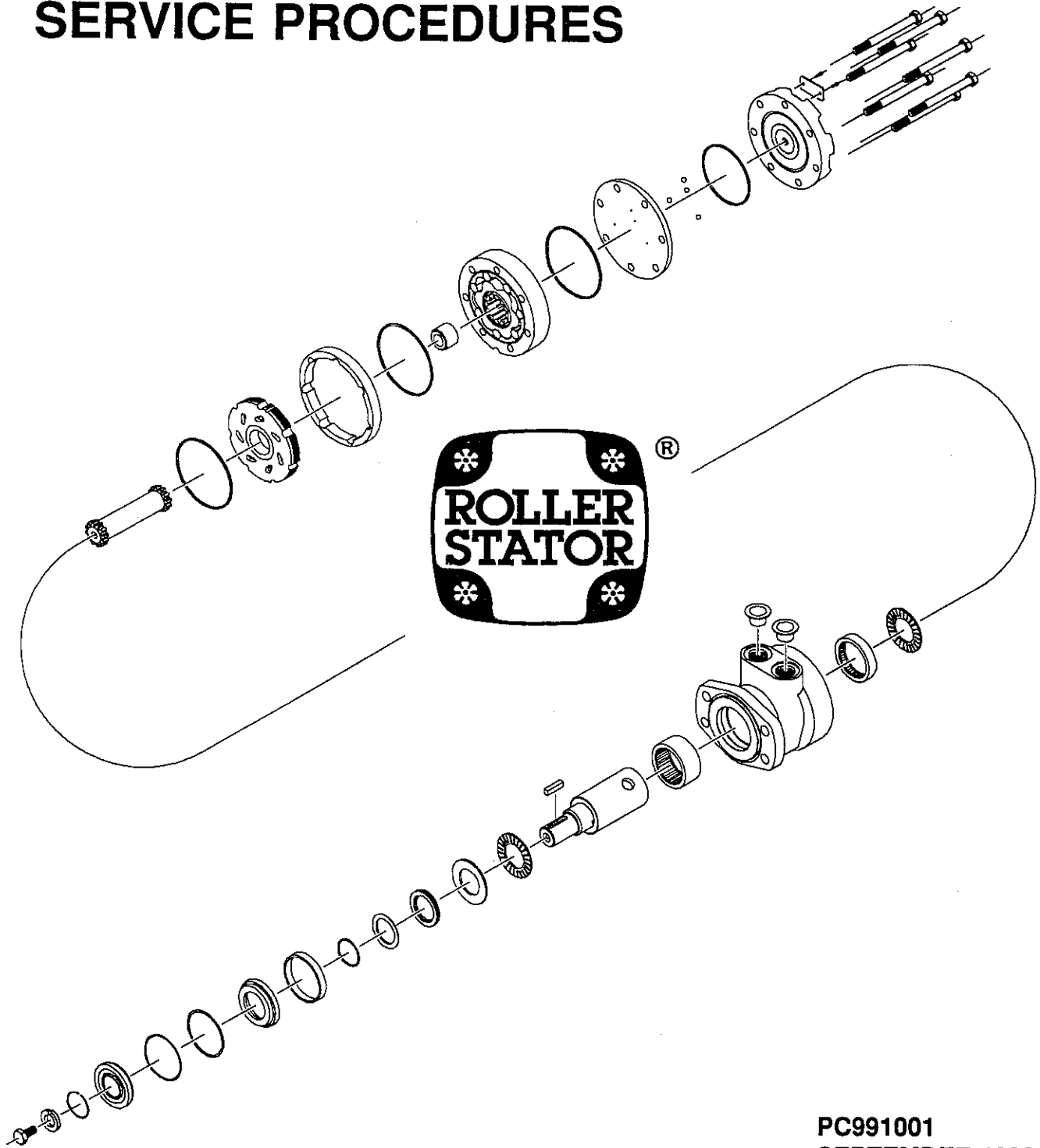


White

HYDRAULICS, INC.

RE SERIES MOTORS SERVICE PROCEDURES



PC991001
SEPTEMBER 1993

INTRODUCTION

IMPORTANT: PLEASE READ THIS SECTION BEFORE ATTEMPTING ANY SERVICE PROCEDURES.

The service procedures given in this section are specifically for any of the **RE Series motors listed below**. The procedures given are designed as a guide for the replacement or exchange of shaft kits and also for the installation of seal kits and are not intended for trouble-shooting purposes. The service procedures given have been presented as clearly and accurately as possible. However, White Hydraulics makes no guarantees that the directions and descriptions are complete or accurate or that following the procedures will result in a properly functioning motor.

All White Hydraulics' motors are of the highest quality and are guaranteed against defects in workmanship and materials for four years from the date of manufacture (a copy of the warranty can be obtained from the distributor or the factory.). However, any disassembly of the motor voids this warranty. If a motor is suspected of having a warranty problem, the motor should not be disassembled, but should be returned to White Hydraulics for analysis and warranty consideration. Before returning motors to the factory, White Hydraulics must be contacted to obtain a Return Authorization number. No returned motors will be accepted at the factory without the RGA number printed on the outside of the box.

Because of the extremely tight tolerances designed into every White Hydraulics' motor, care should be taken to provide a clean work area when servicing a motor. Before the motor is removed from any machinery, all fittings and the area around the fittings should be thoroughly brushed and cleaned to remove all dirt. Care should be taken to insure that no dirt enters the motor through the ports. Once removed from the machinery, the ports should be plugged and the outside of the motor cleaned in preparation for service. White Hydraulics recommends that a new seal kit be installed anytime that the motor is disassembled. Failure to do so could result in leaks when the motor is returned to service.

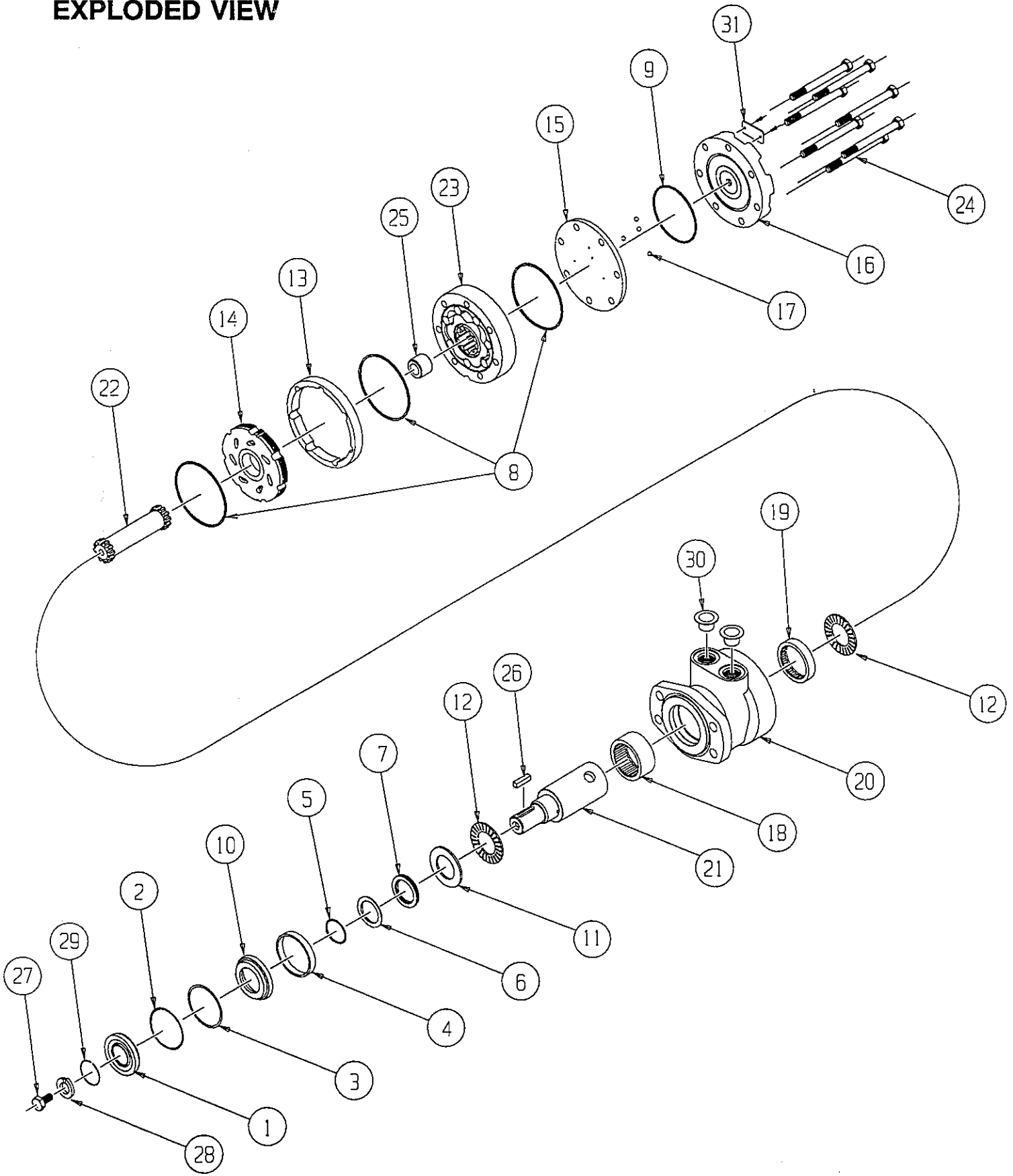
THE SERVICE PROCEDURES IN THIS SECTION ALLOW SERVICE TO BE PERFORMED ON RE SERIES MOTORS WITH THE FOLLOWING HOUSING NUMBERS.

SAE "A" STYLE HOUSINGS- 06,08,16,17,18,19,36,38,48, & 49.

SETBACK STYLE HOUSINGS- 05,07,11,35, & 37.

72mm BEARING HOUSINGS- 09,14,15,22,24,39 & 44.

TYPICAL RE EXPLODED VIEW



RE SERVICE KITS

ROTORS AND RELATED COMPONENTS KITS

WHEN CHANGING MOTOR DISPLACEMENTS, A MATCHING DRIVE LINK KIT AND BOLT SET KIT MUST ALSO BE ORDERED
DRIVE LINK SPACERS ARE INCLUDED IN DRIVE LINK KITS. BUT MAY ALSO BE ORDERED SEPERATELY BY USING THE DRIVE LINK SPACER KIT NUMBER.

EXPLODED VIEW ITEM #	23	23	22	25	24
DISPLACEMENT	STANDARD ROTOR KIT #	FREETURN ROTOR KIT #	DRIVE LINK KIT #	DRIVE LINK SPACER KIT #	BOLT SET KIT #
07	PE087005	PE087008	PE014009	---	PE445006
10	PE137005	PE137011	PE014009	---	PE445006
12	PE167004	PE167011	PE014009	PE018075	PE445012
14	PE147002	PE147004	PE014009	PE018185	PE445014
16	PE227000	PE227004	PE014009	PE018076	PE445014
18	PE247005	PE247011	PE014007	---	PE445018
20	PE207000	PE207004	PE014008	PE018076	PE445026
24	PE307005	PE307011	PE014008	---	PE445024
26	PE357003	PE357005	PE014008	PE018076	PE445026
32	PE407005	PE407011	PE014008	PE018077	PE445032
45	PE607005	PE607011	PE014008	PE018078	PE445045

HOUSING KITS (EXPLODED VIEW ITEM #20)

STANDARD HOUSING KITS INCLUDE THE FRONT BEARING (#18) AND THE REAR BEARING (#19) INSTALLED IN THE HOUSING.
72MM HOUSING KITS INCLUDE THE REAR BEARING INSTALLED IN THE HOUSING AND A 72MM BEARING, SNAP RING AND DUST SEAL

DESCRIPTION	KIT NUMBER	DESCRIPTION	KIT NUMBER
#05- SETBACK W/ 1/2" BSP.F	PE130523	#19- 6-HOLE SAE "A" STYLE W/ 1/2" BSP.F	PE131923
#06- 4-HOLE SAE "A" STYLE W/ 1/2" BSP.F	PE130623	#22- 72MM SETBACK W/ "C" FRONT MT. W/ 7/8" O-RING	PE132228
#07- SETBACK W/ 7/8" O-RING	PE130723	#24- 72MM SETBACK W/ "C" FRONT MT. W/ 1/2" BSP.F	PE132428
#08- 4-HOLE SAE "A" STYLE W/ 7/8" O-RING	PE130823	#35- SETBACK W/ RELIEF PORT W/ 1/2" BSP.F	PE133523
#09- 72MM SETBACK W/ 7/8" O-RING	PE130928	#36- 4-HOLE SAE "A" STYLE W/ RELIEF PORT W/ 1/2" BSP.F	PE133623
#11- SETBACK W/ BRAKE MOUNT W/ 7/8" O-RING	PE131123	#37- SETBACK FLANGE W/ RELIEF PORT W/ 7/8" O-RING	PE133723
#14- 72MM SETBACK W/ 1/2" BSP.F	PE131428	#38- 4-HOLE SAE "A" STYLE W/ RELIEF PORT W/ 7/8" O-RING	PE133823
#15- 72MM SETBACK W/ TURNED PILOT W/ 7/8" O-RING	PE131528	#39- 72MM SETBACK W/ RELIEF PORT W/ 7/8" O-RING	PE133928
#16- 2-HOLE SAE "A" STYLE W/ 7/8" O-RING	PE131623	#44- 72MM SETBACK W/ RELIEF PORT W/ 1/2" BSP.F	PE134428
#17- 2-HOLE SAE "A" STYLE W/ 1/2" BSP.F	PE131723	#48- 6-HOLE SAE "A" STYLE W/ RELIEF PORT W/ 7/8" O-RING	PE134823
#18- 6-HOLE SAE "A" STYLE W/ 7/8" O-RING	PE131823	#49- 6-HOLE SAE "A" STYLE W/ RELIEF PORT W/ 1/2" BSP.F	PE134923

SHAFTS AND RELATED COMPONENTS KITS

SHAFT KITS COME WITH RELATED SHAFT COMPONENTS (i.e. keys, nuts, etc.)
TO ORDER INDIVIDUAL SHAFT COMPONENTS (i.e. keys, nuts, bolts, washers or wire rings) USE THE KIT NUMBER FOR EACH INDIVIDUAL PART.

EXPLODED VIEW ITEM #	21	21	26	NOT SHN.	NOT SHN.	NOT SHOWN	NOT SHOWN
DESCRIPTION	STD. SHAFT KIT #	72MM SHAFT KIT #	KEY KIT #	NUT KIT #	BOLT KIT #	WASHER KIT #	WIRE RING KIT #
6B SPLINE	#02- PE011600	#19- PE011602	---	---	---	---	---
1-1/4" TAPERED	#03- PE011300	#10- PE011302	PE449101	PE449304	---	---	---
1-1/4" STRAIGHT	#04- PE011200	#14- PE011204	PE449102	---	PE449301	PE449302	PE449201
14 TOOTH SPLINE	#05- PE011101	#16- PE011107	---	---	---	---	PE449201
1" STRAIGHT	#06- PE011201	#21- PE011206	PE449100	---	---	---	---
25MM STRAIGHT	#07- PE011109	---	PE449104	---	---	---	---
19 TOOTH SPLINE	#08- PE011102	#15- PE011105	---	---	---	---	PE449201
32MM STRAIGHT	#09- PE011203	#17- PE011205	PE449103	---	---	---	PE449201
15 TOOTH SPLINE	#11- PE011103	---	---	---	---	---	---
1" STRAIGHT EXT.	#13- PE011202	---	PE449100	---	---	---	---
12 TOOTH SPLINE	#18- PE011108	---	---	---	---	---	---
13 TOOTH SPLINE	#32- PE011114	#20- PE011110	---	---	---	---	---

SEAL KIT PE444001

SEAL KIT PE444001 INCLUDES ITEMS #1-11.

MISCELLANEOUS KITS

DESCRIPTION	EXPLODED VIEW ITEM #	KIT #
THRUST BEARING	12	PE018059
FORWARD MANIFOLD (CCW)	14	PE015006
REVERSE MANIFOLD (CW)	14	PE015007
MANIFOLD BOOT	13	PE018041
ENDCOVER	16	PE016001
STEEL BALL	17	PE018048
BALANCE PLATE (4 STEEL BALLS INCLUDED IN KIT)	15	PE012001
72MM BEARING	NOT SHOWN	PE018098
SNAP RING (FOR 72MM HSG.)	NOT SHOWN	PE018141
STD. FRONT BEARING	18	PE018003
STD. REAR BEARING	19	PE018002
DUST SEAL ONLY	1	PE018006
4-PIN SPEED SENSOR	NOT SHOWN	PE018219
2000 PSI RELIEF VALVE	NOT SHOWN	PE018231
3000 PSI RELIEF VALVE	NOT SHOWN	PE018221

DESCRIPTION	EXPLODED VIEW ITEM #	KIT #
DUST SEAL	1	ITEMS #1-9 INCLUDED IN SEAL KIT PE444002
SPLIT WIRE RING	2	
BACKUP SHIM	3	
HIGH PRESSURE SEAL	4	
BACKUP SHIM	5	
TEFLON BACKUP SHIM	6	
SHAFT SEAL	7	
BODY SEAL	8	
ENDCOVER SEAL	9	
SEAL CARRIER	10	ITEMS #10-11 INCLUDED IN SEAL KIT PE444003
THRUST WASHER	11	

FOR SPEED SENSOR KITS, CONSULT THE FACTORY AT (502) 885-1110.

TOOLS REQUIRED FOR DISASSEMBLY PROCEDURES

1. bench vise that opens to at least 6"
2. breaker bar
3. 9/16" socket
4. torque wrench capable of at least 50 ft.lbs.
5. seal puller
6. plastic headed hammer
7. small flat-bladed screwdriver
8. compressed air source and safety blow-off nozzle (optional)
9. petroleum-based solvent
10. permanent marker or paint
11. clear tape
12. clean shop towels
13. STP® or equivalent
14. 400 grit wet/dry sandpaper
15. sanding block

Additional tools needed to service 72mm bearing motors:

16. inside snap-ring pliers
17. long punch
18. bearing grease

SAFETY PRECAUTIONS

White Hydraulics recommends that all safety guidelines included but not limited to those contained in **OSHA 29 CFR Part 1910** (General Industry Standards) be observed when performing any service procedures.

1. Protective goggles or safety glasses should be worn when performing any service procedures.
2. Steel toed shoes or boots should be worn when performing any service procedures.
3. If using compressed air to dry parts, set maximum air pressure at 30 psi or less.
4. Dispose of oily rags or towels in closed containers.
5. Keep all oils and cleaning solvents away from sparks or open flames.
6. Keep all tools dry and clean to prevent hands from slipping off of tool and causing possible injury.
7. Exercise extreme caution when handling machined motor parts.

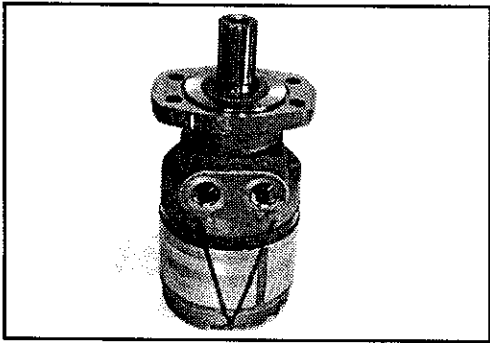
SEAL KIT INSTALLATION

This section contains the service procedures necessary to install a seal kit in most standard White Hydraulics' RE series motors. Standard Re Series motors include those with the SAE "A" style housings and setback housings. For 72mm bearing housings, service begins with step 1, and references to additional steps in Appendix A are given when necessary. The order numbers for each housing style are given below.

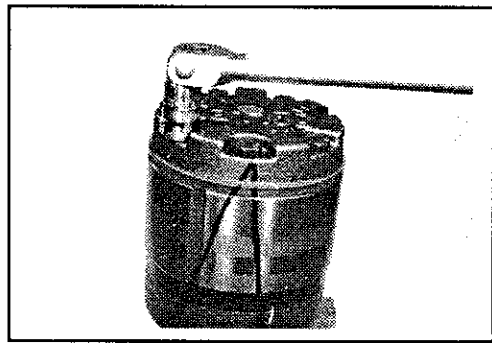
SAE "A" STYLE HOUSINGS- 06,08,16,17,18,19,36,38,48, & 49.

SETBACK STYLE HOUSINGS- 05,07,11,35, & 37.

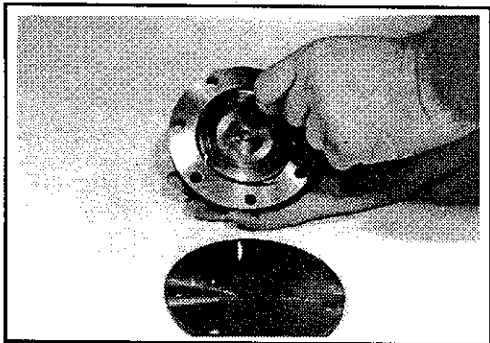
72mm BEARING HOUSINGS- 09,14,15,22,24,39 & 44.



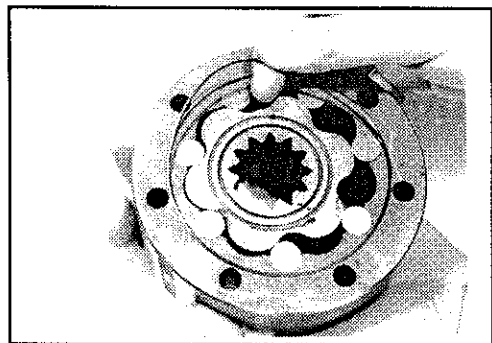
1. Using a marker or paint, make a V-shaped set of lines on the rear assembly of the motor from the housing to the endcover as shown. These lines will aid in part realignment when reassembling the motor. Depending on shaft type, remove any keys or nuts from the shaft.



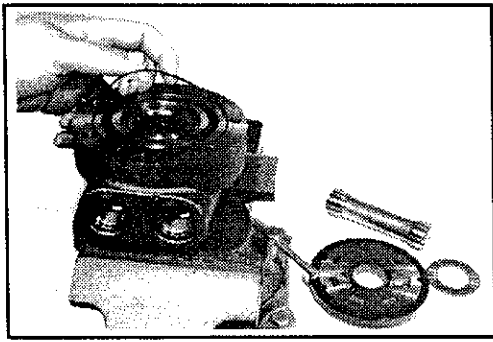
2. With the shaft facing down, securely tighten the motor in a vise by clamping around the ports in the housing. Using a breaker bar and a 9/16" socket, loosen and remove the seven bolts attaching the rear assembly to the housing.



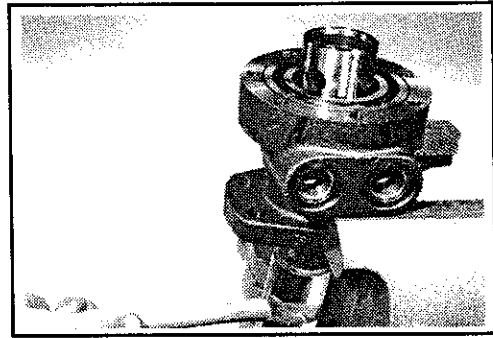
3. Lift the endcover off of the motor and remove and discard the old seal. Remove the balance plate from the motor making sure not to drop the four small steel balls in the balance plate. Lay these components aside.



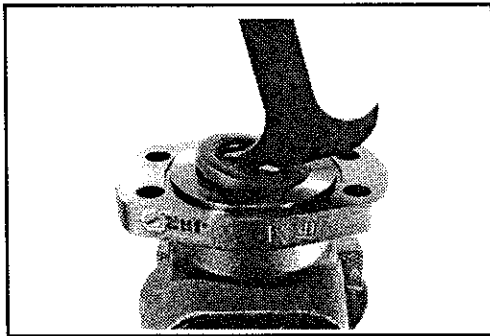
4. Depending upon displacement, there may or may not be a drive link spacer in the motor. If there is, remove it from the center section of the rotor and lay aside. Lift the rotor assembly from the motor making sure not to drop any of the rolls. Remove the old seals from both sides of the rotor and discard. Lay the rotor assembly aside.



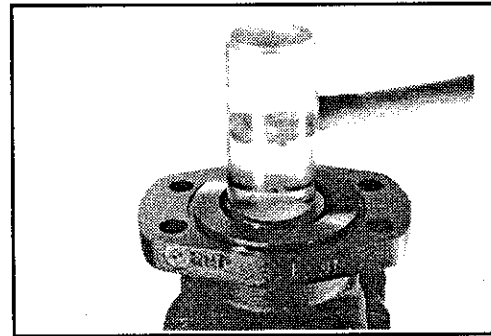
5. Lift the manifold boot and manifold from the motor and lay aside. Remove the drive link from the motor and lay aside. Remove the thrust bearing from the motor and lay aside. Remove the seal from the groove in the housing face and discard.



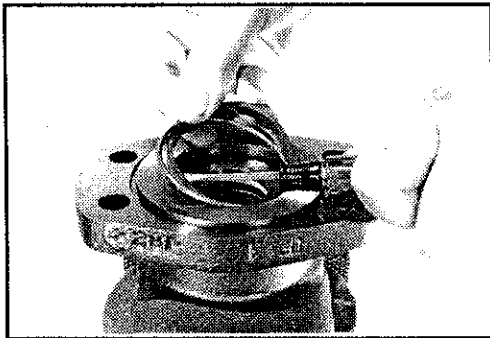
6. Using a plastic headed hammer, tap upwards on the output end of the shaft and force the shaft up through the housing and remove it. Lay the shaft aside.



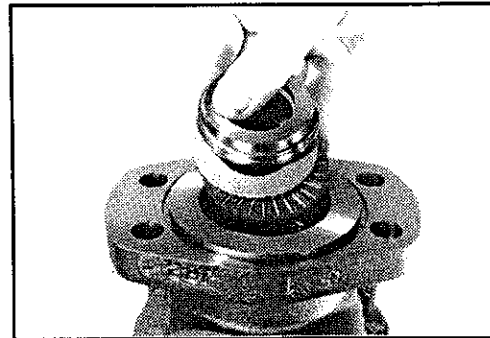
7. Grasping the housing, loosen the vise and rotate the housing 180° and reclamp the housing with the mounting flange side up. Using a seal puller, carefully pull the dust seal from the front face of the motor and discard. For 72mm bearing housings, proceed to step 1 in Appendix A. All others continue to step 8.



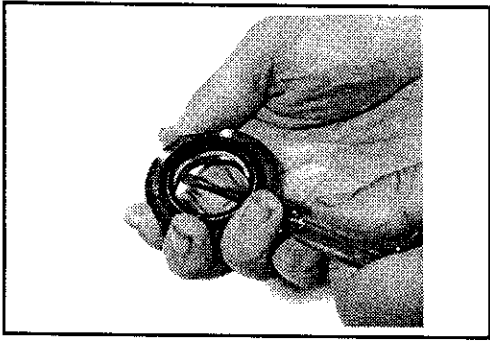
8. Using a plastic headed hammer, lightly tap the seal carrier down until it contacts the needle bearing in the housing.



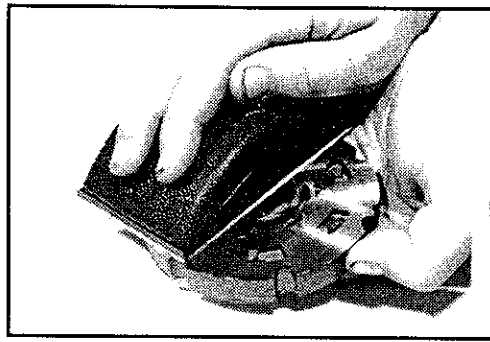
9. Using a small flat-bladed screwdriver, pry the split wire ring from the groove in the front of the housing and discard. Also use the screwdriver to remove the backup shim and high pressure seal from the housing and discard all three items.



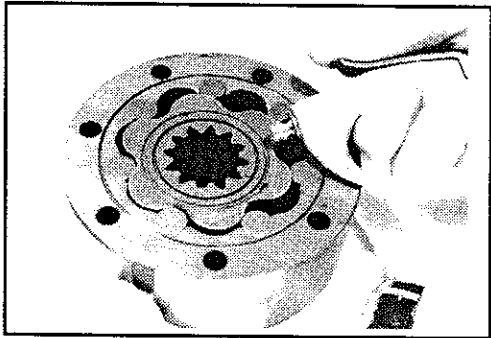
10. Remove the seal carrier, thrust bearing and thrust washer from the housing. If the items are difficult to remove, insert the shaft into the rear of the housing and push the parts out through the front of the housing.



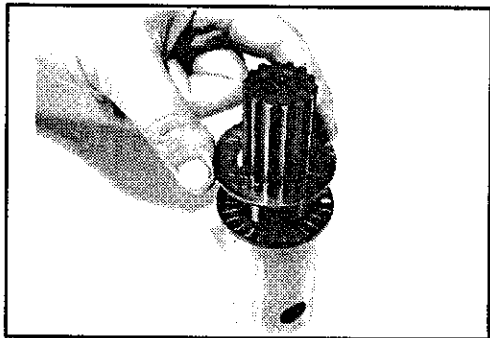
11. If seal kit PE444001 is being used, the seal carrier assembly and thrust washer may be discarded. If seal kit PE444002 is being used, use a small, thin prybar to pry the seals from the seal carrier. Discard the seals and lay the seal carrier and thrust washer aside.



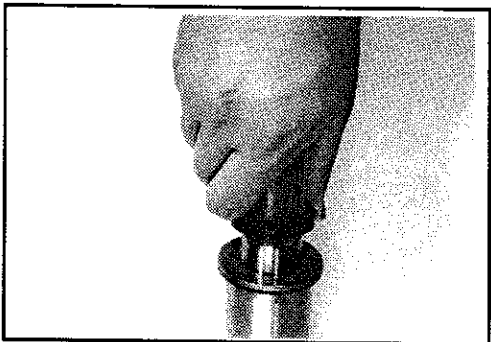
12. Using 400 grit wet/dry sandpaper, a sanding block and an oil based solvent, wet sand all mating surfaces to remove all dirt, grit, paint, nicks and burrs.



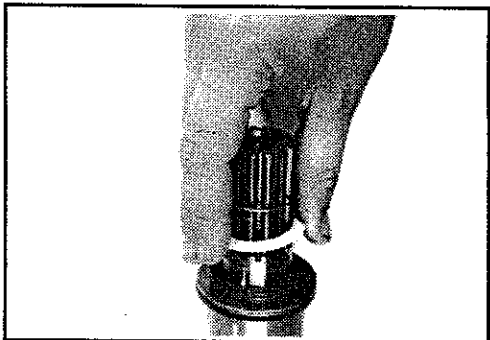
13. At this point, all parts should be cleaned in an oil based solvent. After the parts have been cleaned, use compressed air to carefully dry all parts. Make sure to remove all solvent from the bolt holes in the housing as failure to do so could result in a cracked housing when the bolts are reinstalled.



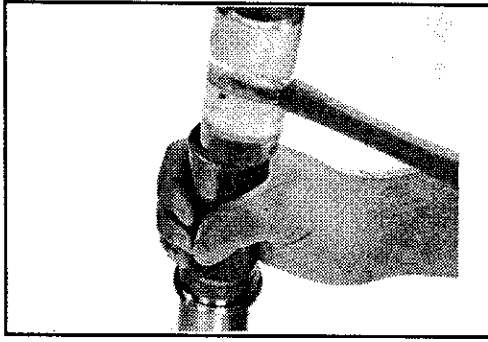
14. Place the shaft on a clean dry surface with the output end of the shaft facing up and apply a light coat of STP® to the seal area of the shaft. Install the thrust bearing and then the thrust washer onto the shaft.



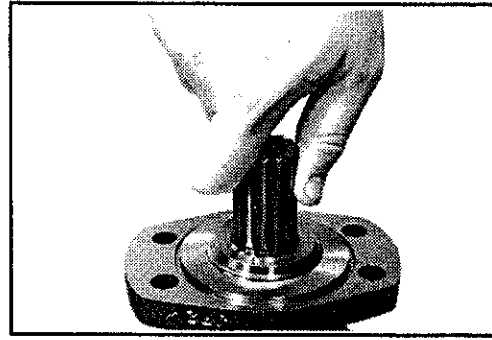
15. Place the plastic installation sleeve (included in seal kits PE444001 AND PE444002) onto the shaft end and push the new shaft seal down onto the shaft. The flat side of the seal should be facing up.



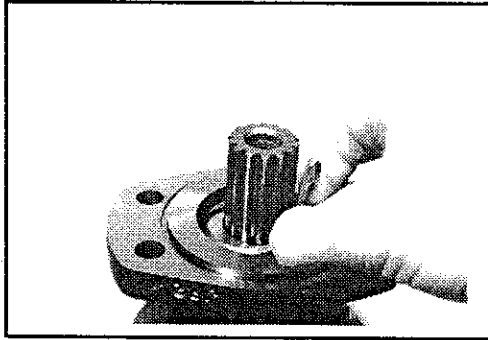
16. Remove the plastic installation sleeve from the shaft and place the white teflon backup seal onto the shaft making sure that the lip on the inside diameter faces the shaft seal. Next, place the new backup shim onto the shaft over the teflon backup seal.



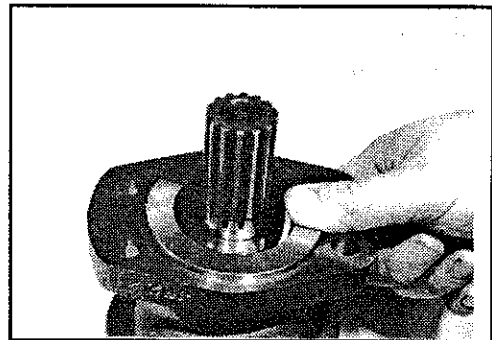
17. Place the seal carrier over the shaft making sure that the side with the recess faces the shaft seal. Center the seal in the recess in the seal carrier and use a press and a sleeve to gently press the seal carrier down until the seal is seated in the seal carrier. A plastic headed hammer and sleeve may be used if necessary. Install wire ring if applicable.



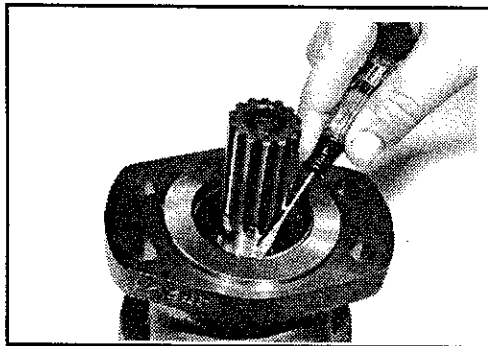
18. On a clean dry surface place the housing, flange side up, onto small blocks to raise it approximately .250 above the work surface. Lower the shaft/seal assembly down into the motor output end up.



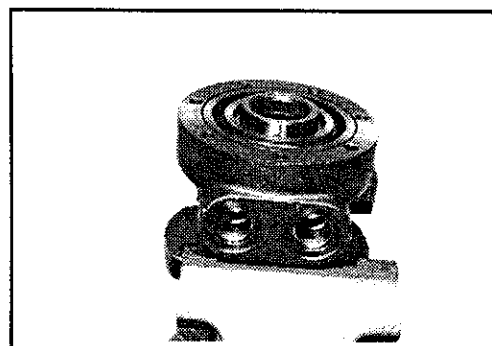
19. After coating the high pressure seal in STP[®], install it in the groove in the front of the housing. To install the large backup shim, squeeze the shim until it bows in the middle (do not fold the shim in half). While maintaining the bow, install it above the high pressure seal in the groove in the housing. (Shim installation continued with step 20.)



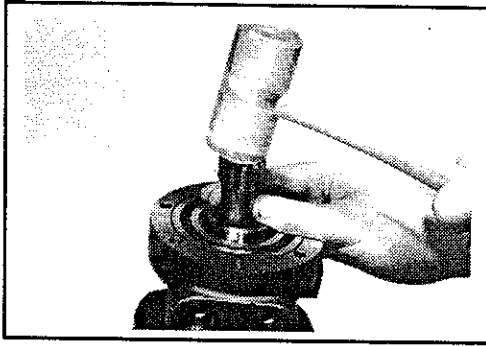
20. A portion of the shim will not want to go into the groove. To this portion of the shim, apply pressure downward and towards the center of the housing to expand the shim into the groove. Use a flat screwdriver to push the remaining portion of the shim into the groove to fully seat the shim.



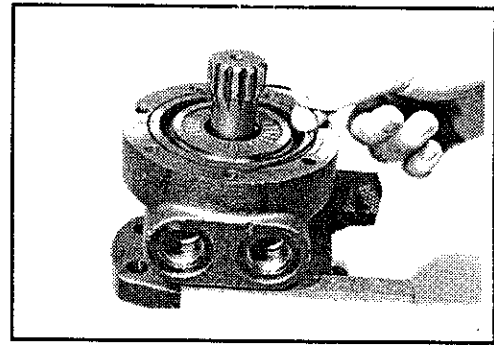
21. Install the split wire ring into the groove in the housing. Run a small screwdriver around the circumference of the split wire ring to make sure it is fully seated in the groove and that the ends are butted together. For 72mm bearing housings, proceed to step 3 in Appendix A. For all other housings, continue to step 22.



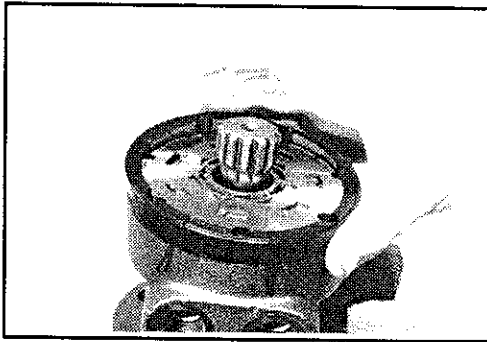
22. Making sure to hold the shaft in the housing, lift the motor from the work surface and clamp the motor in a vise with the shaft end of the motor facing down. The motor should be clamped just below the ports.



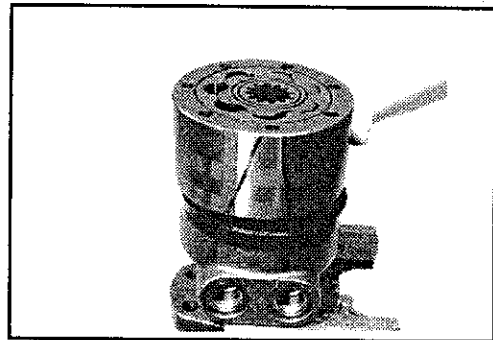
23. Insert the drive link into the shaft end making sure that the end of the drive link with crowned splines is inserted into the splines in the end of the shaft. Use a plastic headed hammer to tap downward on the drive link until the shaft end is approximately .100 inches below the rear housing surface.



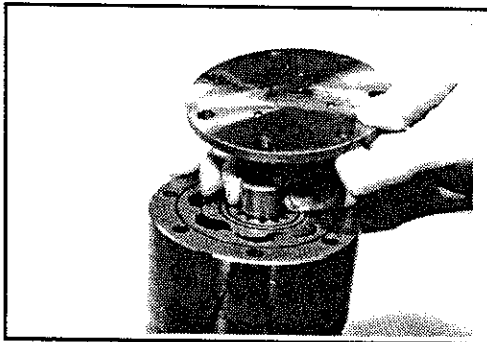
24. Place the thrust bearing over the drive link and onto the shaft end. Lightly coat a new body seal in STP® and place it in the groove in the rear face of the housing.



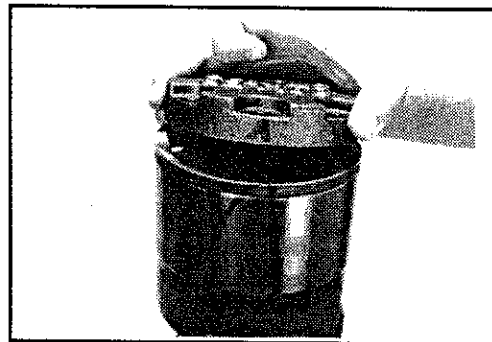
25. Place the manifold onto the housing making sure that the side with only seven holes faces the housing. Using the alignment marks as a guide, place the manifold boot onto the housing.



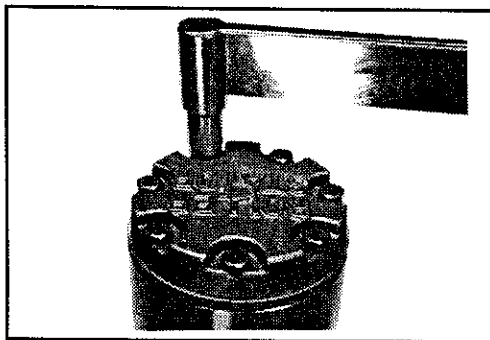
26. Lightly coat two new body seals in STP® and place a new seal in the grooves on both faces of the rotor set. Making sure that the side of the rotor set with the chamfer in the splines faces the manifold, align the marks on the housing and rotor set and place the rotor set onto the housing.



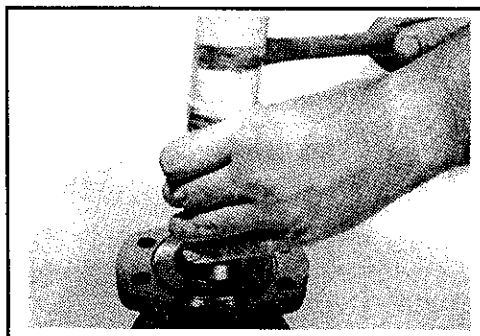
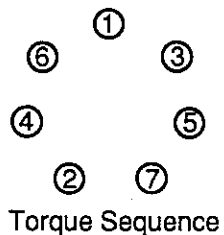
27. If the motor has a drive link spacer, replace it onto the end of the drive link. Using the alignment marks as a guide, place the balance plate onto the motor making sure that the side with the four steel balls faces up.



28. Lightly coat the new endcover seal in STP® and place it in the groove in the endcover. Using the alignment marks as a guide, place the endcover onto the motor.

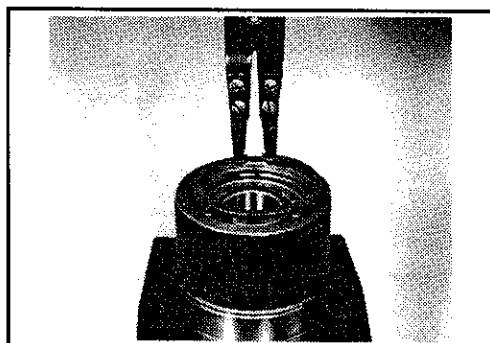


29. Install the seven 3/8-24 bolts and pre-torque to 5-10 ft.lbs using a 9/16" socket and torque wrench. Using the bolt torque sequence shown at right, torque all bolts to 50 ft.lbs.

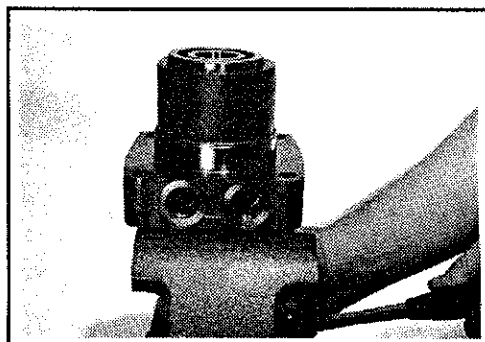


30. Remove the motor from the vise and set on the work surface with the shaft end facing up. Making sure that the flat side of the dust seal faces up, install the dust seal over the shaft and use a sleeve and plastic headed hammer to tap the seal into the front face of the housing. Replace all shaft keys, nuts and wire rings if applicable.

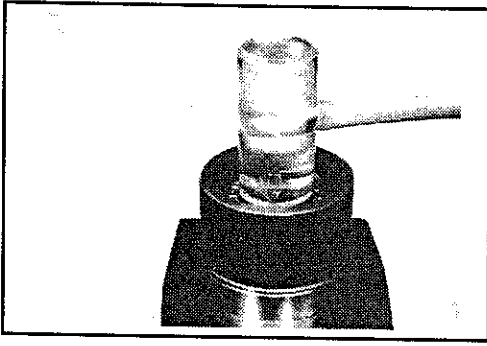
APPENDIX A (RE 72mm Bearing Housing Service Supplement)



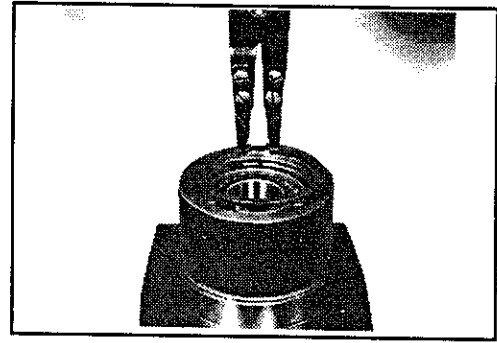
1. Using inside snap ring pliers, remove the snap ring from the groove in the front of the housing and lay aside.



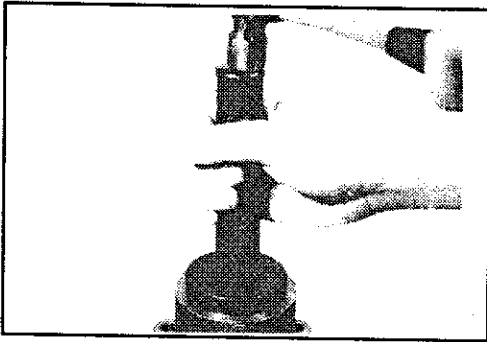
2. From the rear of the housing, use a long punch and a plastic headed hammer to lightly tap the bearing out of the housing. Go to step 8 in standard service procedures and continue.



3. Grease the bearing and install it into the front of the housing making sure that the side with the snap ring against the bearing race faces the seal carrier in the motor. It may be necessary to lightly tap the bearing to seat it in the housing.



4. Using inside snap ring pliers, compress the snap ring and install it against the bearing in the groove in the housing.



5. Lightly coat the dust seal with STP[®] and install it into the front face of the bearing using a ball peen hammer and a sleeve to evenly drive the seal down until seated. Go to step 22 in standard service procedures and continue.