

**SERVICE INSTRUCTIONS FOR THE CE [400 & 401] SERIES MOTORS**

For Use With Seal Kit: 40044200

dimensions: mm [in]

- A)** Remove all shaft components from the shaft, (21), (i.e., keys, wire rings, nuts). To aid in reassembly of the motor, make a "V" shaped set of lines from the endcover to the housing using either paint or a marker. With the shaft facing down, secure the motor in a vise by clamping onto the housing, (8). Loosen and remove the seven bolts, (20), holding the motor assembly together. Remove the endcover, (18), from the motor.
- B)** Remove the balance plate, (16), rotor set, (15), and the manifold, (14), from the motor. Remove all seals from the components and discard. (Caution - when removing the balance plate, do not allow the three check balls, (17), to fall out from the plate.) (Caution - do not allow the rolls to drop out from the rotor set assembly when removing the assembly from the motor.) Remove the manifold from the motor and lay aside. Remove drive link, (13), from the motor and lay aside. Remove the thrust bearing, (12), from the housing and lay aside. From the front of the housing, gently tap the shaft, (21), upward and remove through the rear of the housing.
- C)** Using a slide and hammer type bearing puller, (see Figure 1), remove the rear housing bearing, (11), from the housing. Remove the thrust bearing, (10), and lay aside, remove the thrust washer, (9), and lay aside. Remove the shaft seal, (4), and discard, remove the back-up seal, (3), and discard, remove the metal shim, (2), and discard.

At this point, all parts should be cleaned in an oil-based solvent and dried using compressed air, (for safety, observe all OSHA safety guidelines). All new seals should be lightly coated in clean oil prior to installation.

- D)** Place the integral thrust washer/bearing, (10), onto the shaft. The washer side should be against the shoulder of the shaft. Place a thrust washer, (9), onto the shaft on top of the thrust bearing. Coat the shaft seal, (4), with a light coat of oil and install onto the shaft with the lip side down. Place a light coat of oil on the back-up seal, (3), and place over the coat of oil on the metal back-up shim, (2), and place over the back-up seal.
- E)** With the pilot of the housing placed down, install the output end of the shaft through the rear bore of the housing.
- F)** The rear bearing is now ready to be installed. With the writing side of the bearing facing up, place the bearing, (11), into the housing bore. Using a hand press, the bearing should be pressed into the bore. It is necessary that the bearing be pressed 3,0 - 3,3 [.120 - .130] deep into the bore of the housing to accommodate the width of the thrust bearing.
- G)** Install a thrust bearing, (12), on top of the shaft.
- H)** Install a lightly oiled body seal, (1), into the seal groove in the housing. Make sure that this seal is in the seal groove and protruding approximately 0,2 [.007] over the top of the housing surface. (Caution - if a bump is felt in the seal remove the seal and make sure that there is no grit on the seal or in the seal groove.)
- I)** Install the drive link, (13), into the housing. The proper end of the drive link has a "hat" machined in the top of the drive link on the 120-260 displacement. The drive link is to be placed in the shaft with the hat facing up on these displacements. The 300 displacements and above have a symmetrical head and either end can be put into the motor. Once the drive link has been installed, the shaft can be seated. This is done by bringing the arbor of the hand press down and putting pressure on the drive link. (Caution - do not use excessive pressure as this could deform the thrust bearing and/or bearing races.)
- J)** Place the manifold (14), (seven teardrop hole side down) on the housing. Line the bolt hole notches in the outside diameter of the manifold up with the seven bolt holes in the housing.
- K)** Install two oil coated body seals, (5), one on each side, into the seal grooves of the rotor set, (15). Place the deep groove side of the of the rotor set down on the manifold, (14).
- L)** Place the balance plate, (16), on top of the rotor set with the check balls, (17), up. If the check balls were removed, install three check balls into the countersunk holes on the balance plate, one ball per hole.
- M)** Install an oil coated body seal, (6), into the seal groove of the endcover, (18). Place the endcover onto the motor with the tag holes directly above the housing ports. (Caution - it is very important that the body seal does not fall out of the endcover while being installed. Extra care must be used to insure this doesn't happen.)
- N)** Install the seven bolts, (20), into the motor. Pre-torque bolts to 13,6 Nm [10 ft. lb.]. The final torque on the bolts is to be 69,8 ± 7,5 Nm [51.5 ± 5.5 ft. lb.].

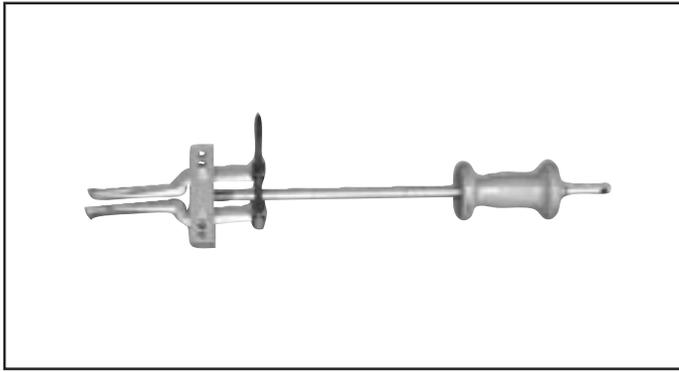
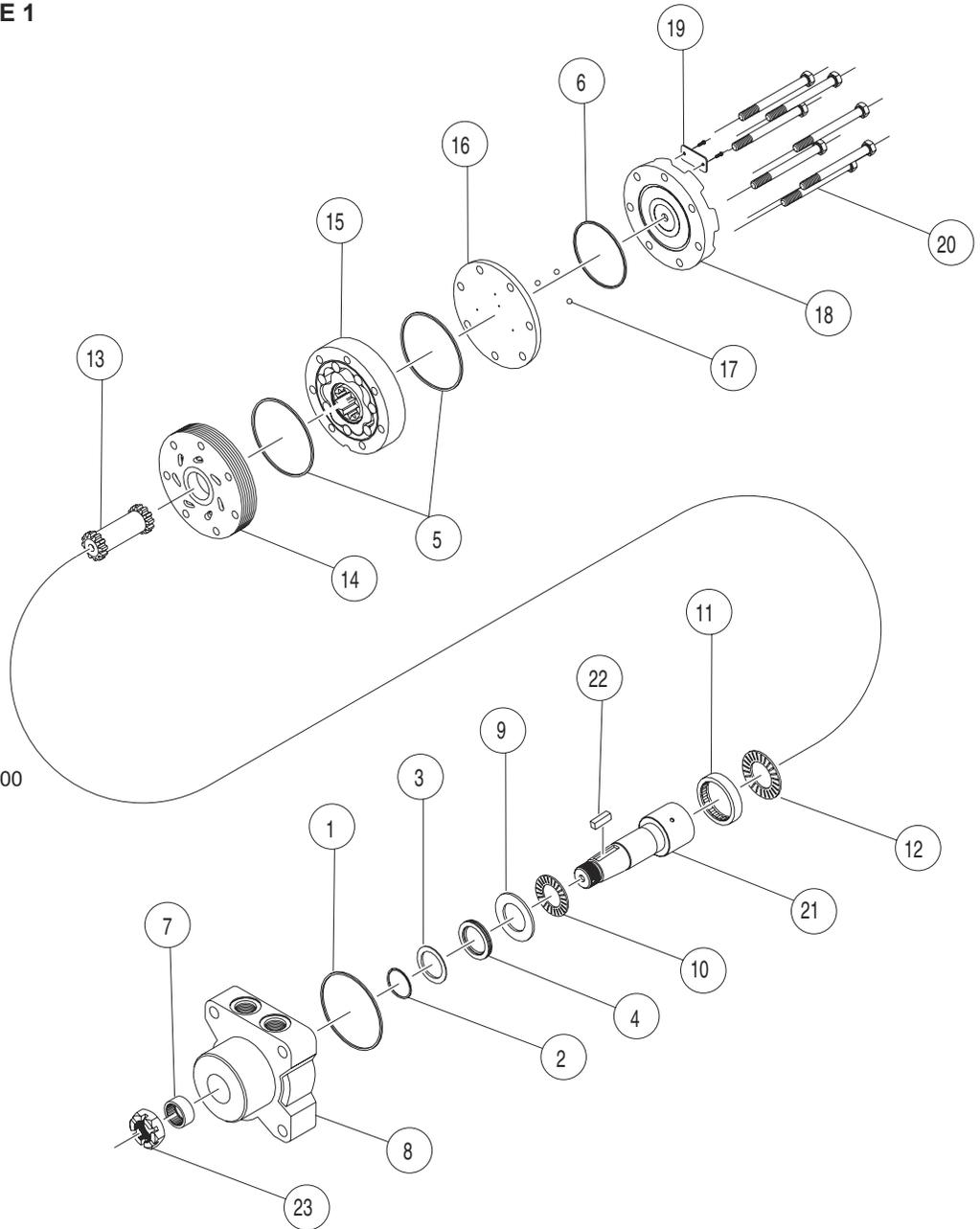


FIGURE 1

- 1. * Housing Seal
- 2. * Metal Back-Up Shim
- 3. * Teflon Back-Up Seal
- 4. * Shaft Seal
- 5. * Body Seals (2)
- 6. * Endcover Seal
- 7. Front Housing Bearing
- 8. Housing
- 9. Thrust Washer
- 10. Front Thrust Bearing
- 11. Rear Housing Bearing
- 12. Thrust Bearing
- 13. Drive Link
- 14. Manifold
- 15. Rotor Assembly
- 16. Balance Plate
- 17. Steel Balls (3)
- 18. Endcover
- 19. I.D. Tag
- 20. Assembly Bolts (7)
- 21. Shaft
- 22. Shaft Key
- 23. Shaft Nut

* Contained In Seal Kit 400444200



**SERVICE INSTRUCTIONS FOR THE CE [410, 411, 420 & 421] SERIES MOTORS**

For Use With Seal Kit: 400444300

dimensions: mm [in]

- A)** Remove all shaft components from the shaft, (22), (i.e., keys, wire rings, nuts). To aid in reassembly of the motor, make a "V" shaped set of lines from the endcover to the housing using either paint or a marker. With the shaft facing down, secure the motor in a vise by clamping onto the housing, (9). Loosen and remove the seven bolts, (21), holding the motor assembly together. Remove the endcover, (19), from the motor.
- B)** Remove the balance plate, (17), rotor set, (16), and the manifold, (15), from the motor. Remove all seals from the components and discard. (Caution - when removing the balance plate, do not allow the three check balls, (18), to fall out of the plate.) (Caution - do not allow the rolls to drop out of the rotor set assembly when removing it from the motor.) Remove drive link, (14), from the motor and lay aside. Remove the thrust bearing, (13), from the housing and lay aside. From the front of the housing, gently tap the shaft, (22), upward and remove through the rear of the housing.
- C)** Using a slide and hammer type bearing puller, (see Figure 1), remove the rear housing bearing, (12), from the housing. Remove the thrust bearing, (11), and lay aside, remove the thrust washer, (10), and lay aside. Remove the shaft seal, (5), and discard, remove the back-up seal, (4), and discard, remove the metal shim, (3), and discard. Turn the housing over and remove the dust seal (1).
- At this point, all parts should be cleaned in an oil-based solvent and dried using compressed air, (for safety, observe all OSHA safety guidelines). All new seals should be lightly coated in clean oil prior to installation.
- D)** Place the integral thrust washer/bearing, (11), onto the shaft. The washer side should be against the shoulder of the shaft. Place a thrust washer, (10), onto the shaft on top of the thrust bearing. Coat the shaft seal, (5), with a light coat of oil and install onto the shaft with the lip side down. Place a light coat of oil on the back-up seal, (4), and place over the shaft seal. Place the metal back-up shim, (3), over the back-up seal.
- E)** With the pilot of the housing placed down, install the output end of the shaft through the rear bore of the housing.
- F)** The rear bearing is now ready to be installed. With the writing side of the bearing facing up, place the bearing, (12), into the housing bore. Using a hand press, the bearing should be pressed into the bore. It is necessary that the bearing be pressed 3,0 - 3,3 [.120 - .130] below the surface of the housing to accommodate the thrust bearing.
- G)** Install a thrust bearing, (13), on top of the shaft.
- H)** Install a lightly oiled body seal, (2), into the seal groove in the housing. Make sure that this seal is in the seal groove and protruding approximately 0,2 [.007] over the top of the housing surface. (Caution - if a bump is felt in the seal, remove the seal and make sure that there is no grit on the seal or in the seal groove.)
- I)** Install the drive link, (14), into the housing. The proper end of the drive link has a "hat" machined in the top of the drive link on the 07-16 displacement. The drive link is to be placed in the shaft with the hat facing up on these displacements. The 18 displacements and above have a symmetrical head and either end can be put into the motor. Once the drive link has been installed, the shaft can be seated. This is done by bringing the arbor of the hand press down and putting pressure on the drive link. (Caution - do not use excessive pressure as this could deform the thrust bearing and/or bearing races.)
- J)** Place the manifold, (15), (seven teardrop hole side down) on the housing. Line the bolt hole notches in the outside diameter of the manifold up with the seven bolt holes in the housing.
- K)** Install two oil coated body seals, (6), one on each side, into the seal grooves of the rotor set, (16). Place the deep groove side of the of the rotor set down on the manifold, (15).
- L)** Place the balance plate, (17), on top of the rotor set with the check balls, (18), up. If the check balls were removed, install three check balls into the countersunk holes in the balance plate, one ball per hole.
- M)** Install an oil coated body seal, (7), into the seal groove of the endcover, (19). Place the endcover onto the motor with the tag holes directly above the housing ports. (Caution - it is very important that the body seal does not fall out of the endcover while being installed. Extra care must be used to insure that this doesn't happen.)
- N)** Install the seven bolts, (20), into the motor. Pre-torque bolts to 13,6 Nm [10 ft. lb.]. The final torque on the bolts is to be 69,8 ± 7,5 Nm [51.5 ± 5.5 ft. lb.].

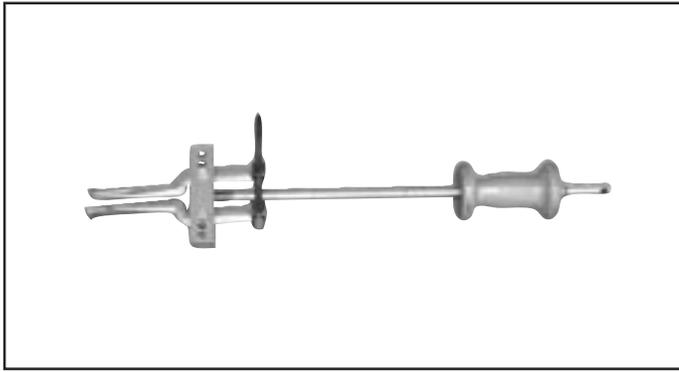
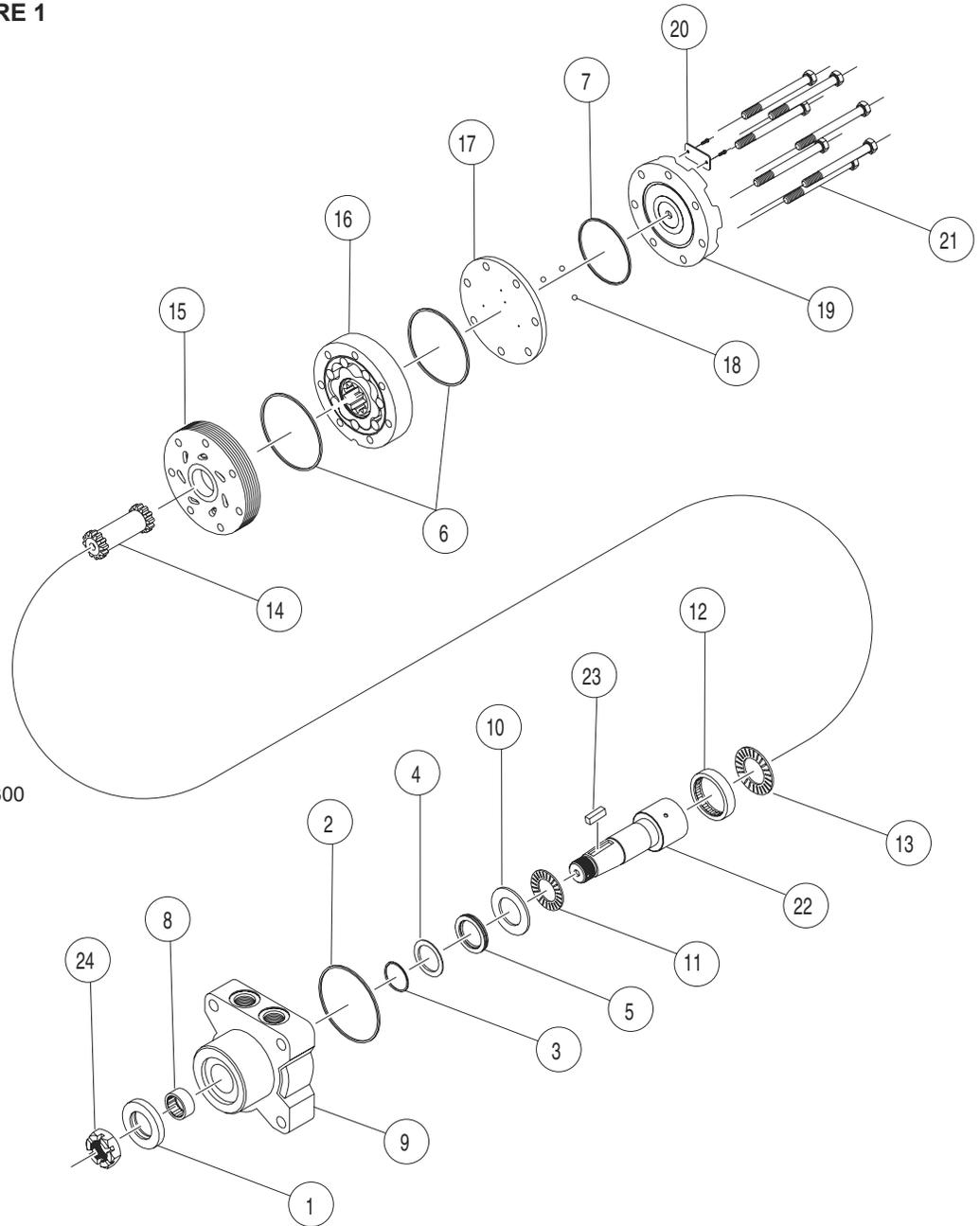


FIGURE 1

- 1. * Dust Seal
- 2. * Housing Seal
- 3. * Metal Back-Up
- 4. * Back-Up Seal
- 5. * Shaft Seal
- 6. * Body Seals (2)
- 7. * Endcover Seal
- 8. Front Housing Bearing
- 9. Housing
- 10. Thrust Washer
- 11. Front Thrust Bearing
- 12. Rear Housing Bearing
- 13. Thrust Bearing
- 14. Drive Link
- 15. Manifold
- 16. Rotor Assembly
- 17. Balance Plate
- 18. Steel Balls (3)
- 19. Endcover
- 20. I.D. Tag
- 21. Assembly Bolts (7)
- 22. Shaft
- 23. Shaft Key
- 24. Shaft Nut

* Contained in Seal Kit 400444300



**SERVICE INSTRUCTIONS FOR THE CE [430 & 431] SERIES MOTORS**

For Use With Seal Kit: 400444250

dimensions: mm [in]

- A)** Remove all shaft components from the shaft, (21), (i.e., keys, nuts). To aid in reassembly of the motor, make a "V" shaped set of lines from the endcover to the housing using either paint or a marker. With the shaft facing down, secure the motor in a vise by clamping the housing, (8). Remove the seven bolts, (20), while holding the motor assembly together. Remove the endcover, (18).
- B)** Remove the balance plate, (16), rotor set, (15), and manifold (14). Remove all body seals and discard. (Caution - when removing the balance plate, do not allow the three check balls, (17), to fall out.) (Caution - do not allow the rolls to drop out of the rotor set assembly when removing the assembly from the motor.) Remove drive link, (13), from the motor. Remove the thrust bearing, (12), from the housing. From the front of the housing, gently tap the shaft, (21), upward and remove through the rear of the housing. Inspect the front bearings and seal for wear and damage. Replace as needed.
- C)** Using a slide hammer type bearing puller, (see Figure 1), remove the rear housing bearing, (11). Remove the thrust bearing, (10), and remove the thrust washers, (9). Remove and discard the shaft seal, (4), the back-up seal, (3), and the metal shim, (2).

Clean all parts in an oil-based solvent and dry using compressed air, (for safety, observe all OSHA safety guidelines). All new seals should be lightly coated in clean oil prior to installation.

- D)** Place thrust washer (9) then bearing, (10), onto the shaft. Place a thrust washer, (9), onto the shaft on top of the thrust bearing. Coat the shaft seal, (4), with a light coat of oil and install onto the shaft with the lip toward the thrust bearing. Use plastic over the keyseat sleeve to avoid seal damage. Place a light coat of oil on the back-up seal, (3), place backup seal on shaft with lip towards shaft seal (2), place shim over shaft onto backup.
- E)** With the pilot of the housing down, install the output end of the shaft through the rear bore of the housing.
- F)** The rear cylinder needle roller housing bearing may now be installed. With the part number side of the bearing facing up, place the bearing, (11), into the housing bore. Using a press and sleeve, press the needle roller bearing into the bore. It is necessary that the bearing be pressed 3,0 - 3,3 [.120 - .130] below the surface of the housing to accommodate the thrust bearing.
- G)** Install a lightly oiled body seal, (1), into the seal groove in the housing. Make sure that this seal is in the seal groove and protruding approximately 0,2 [.007] over the top of the housing surface. (Caution - if a bump is felt in the seal remove the seal and make sure that there is no grit on the seal or in the seal groove.)
- H)** On the 07-16 displacements, the rotor set end of the drive link has a "hat" machined on one end. The drive link goes in the shaft with the hat toward the rotor set. On the 18-45 displacements and above, the drive link is a symmetrical and either end can be put into the shaft. Once the drive link (13) has been installed, the shaft can be seated by bringing the arbor of a hand press down on the drive link. (Caution - do not use excessive pressure as this could deform the thrust bearing and/or bearing races.)
- I)** Install a thrust bearing, (12), on top of the shaft. The thrust bearing should contact the shaft, not the rear cylindrical bearing and should be flush or below the rear surface of the housing.
- J)** Place the manifold, (14), (seven teardrop hole side down) on the housing. Align the bolt holes of the manifold with the bolt holes in the housing.
- K)** Install two oil coated body seals, (5) into the seal grooves of the rotor set, (15), one on each side. Place the chamfer side of the splines of the rotor set toward the manifold, (14).
- L)** Place the balance plate, (16), on top of the rotor set with the side with the three check balls (17), facing up. If the check balls were removed, install three check balls into the countersunk holes on the balance plate, one ball per hole. Do not use balls with visible damage.
- M)** Install an oil coated body seal, (6), into the seal groove of the endcover, (18). Place the endcover onto the motor with the tag holes aligned with the housing ports. (Caution - it is very important that the body seal does not fall out of the endcover while being installed.)
- N)** Install the seven bolts, (20), into the motor. Pre-torque bolts to 13,6 Nm [10 ft. lb.]. The final torque on the bolts is to be 69,8 ± 7,5 Nm [51.5 ± 5.5 ft. lb.].

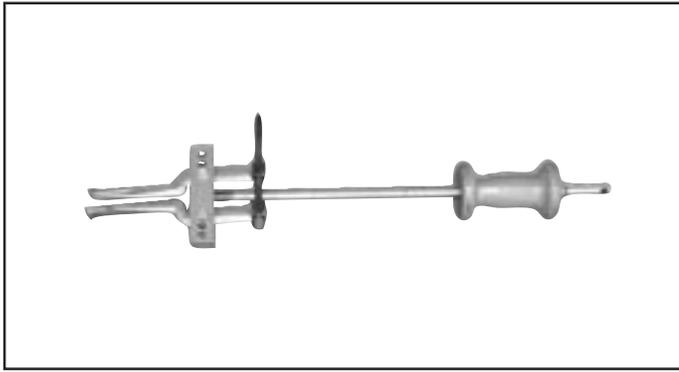


FIGURE 1

- 1. * Housing Seal
- 2. * Metal Back-Up Shim
- 3. * Back-Up Seal
- 4. * Shaft Seal
- 5. * Body Seals (2)
- 6. * Endcover Seal
- 7. Front Housing Bearing
- 8. Housing
- 9. Thrust Washer (2)
- 10. Front Thrust Bearing
- 11. Rear Housing Bearing
- 12. Thrust Bearing
- 13. Drive Link
- 14. Manifold
- 15. Rotor Assembly
- 16. Balance Plate
- 17. Steel Balls (3)
- 18. Endcover
- 19. I.D. Tag
- 20. Assembly Bolts (7)
- 21. Shaft
- 22. Shaft Key
- 23. Shaft Nut

* Contained in Seal Kit 400444250

