Starter Repair 2200 SRM 106

- **2.** Remove the two screws that hold the solenoid to the drive end housing. Turn the solenoid 1/4 turn and remove it from the starter.
- 3. Remove the two bolts that hold the commutator end frame and the field frame to the drive housing. Make alignment marks on the end frame and on the field frame for easy assembly. Pull the end frame from the field frame. On some models it is necessary to pull the brushes from the holders. Remove the field frame.
- **4.** If used, remove the four screws holding the center bearing plate to the drive end housing.
- 5. Remove the armature from the drive end housing. Tilt the armature to disengage the linkage from the drive clutch. On some models it is necessary to remove the linkage before removing the armature.
- 6. Remove the thrust collar from the armature shaft. Put a metal tube with a 13 mm (0.5 in.) inside diameter over the end of the shaft. See Figure 4. Hit the tube to move the retainer. Remove the snap ring. Remove the drive clutch.
- **7.** Remove the center bearing plate. Remove the seal from the plate.

CLEAN



CAUTION

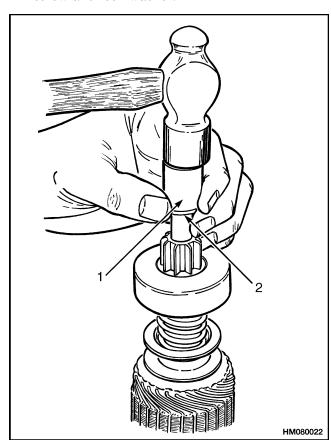
Never use solvent on the drive clutch, armature, or field windings. Use a cloth to clean these parts.

Use solvent to clean all parts of the starter, except the windings and the drive clutch. Dry the parts with compressed air.

ASSEMBLE

- 1. Install a new seal in the center bearing plate. See Figure 2 and Figure 5.
- **2.** Lubricate the armature shaft and the bushings with a silicone lubricant.
- 3. Put the center bearing plate, drive clutch, retainer, snap ring, and thrust washer on the armature shaft. Install the snap ring, thrust washer, and retainer as shown in Figure 5.

- 4. Install the shaft assembly in the drive end housing. Make sure the linkage is engaged in the drive clutch. Install and tighten the four screws for the bearing plate.
- **5.** Install the field frame over the armature. Retract the brush springs and slide the brushes on the commutator.
- **6.** Align the marks and install the thrust washer and the commutator end frame. Install and tighten the through bolts.
- 7. Make sure the solenoid cover is not damaged. Install the plunger spring and the solenoid. Install and tighten the solenoid mount screws. Connect the field coil strap to the "M" terminal with the screw and lock washer.

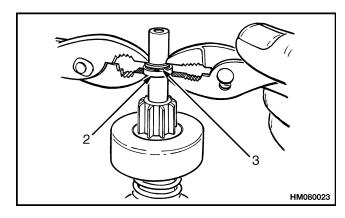


- 1. METAL TUBE, 13 mm (0.5 in.) INSIDE DIAMETER
- 2. RETAINER

Figure 4. Retainer Removal

INSTALL

- 1. Make sure the surfaces of the flywheel housing, the spacer, and the starter are clean and smooth. Install the gaskets or use a sealant (Hyster part number 264159) that forms a gasket between metal parts.
- **2.** Install the capscrews and washers as necessary. Tighten the capscrews.
- **3.** Connect the wires and the cables to the starter according to the labels made during removal.
- **4.** Connect the ground cable to the battery.



- THRUST COLLAR RETAINER
- SNAP RING

Figure 5. Retainer Installation

General Checks and Adjustments

- 1. Before removing the starter, see Figure 6 and Figure 7. Make the following checks:
 - a. Check the voltage of the battery.



CAUTION

Do not operate the starter for more than 30 seconds. Be sure to wait at least two minutes between checks.

- **b.** Check the voltage at the motor terminal of the solenoid while the key switch is in the "START" position. See Figure 6. The voltage must be more than 9 volts for a 12-volt system or more than 18 volts for a 24-volt system.
- **c.** Inspect all the connections to the battery, starter solenoid, key switch, and neutral start switch. Clean and tighten, if necessary.
- d. Check the resistance of the connections with a voltmeter. See Figure 7. Each connection must not have more than a 0.5 volt loss for a 12-volt system or 1.0 loss for a 24-volt system.

- e. Check the voltage at the "S" terminal of the solenoid. It must be more than 7 volts for a 12-volt system or more than 14 volts for a 24-volt system.
- 2. After removing the starter, but before disassembly, make the following checks:
 - a. Check the ring gear (on the flywheel) for damage.



CAUTION

The pinion will move toward the drive end housing when turned in the locked direction. Do not turn it too far or it will lock in the extended position.

- **b.** Check the pinion gear (on the drive clutch) for damage. The pinion must turn in one direction and lock in the other. Replace the complete assembly if any part has damage.
- c. Check the clearance of the armature bushings.
- **d.** Check for cracks in the drive end housing.