

# Shift Shaft

## CLEANING and INSPECTION

1. Clean shift shaft and bushing with solvent and dry with compressed air.
2. Check shift shaft splines on both ends for wear and/or corrosion damage.
3. Inspect shift shaft for groove(s) at shift shaft bushing seal surface.
4. Inspect shift shaft bushing for corrosion damage.
5. Inspect shift shaft bushing oil seal for wear and/or cuts.

*NOTE: Oil seal in shift shaft bushing should be replaced as a normal repair procedure.*

6. Check "E" clip and retaining ring for damage. Replace if damaged.

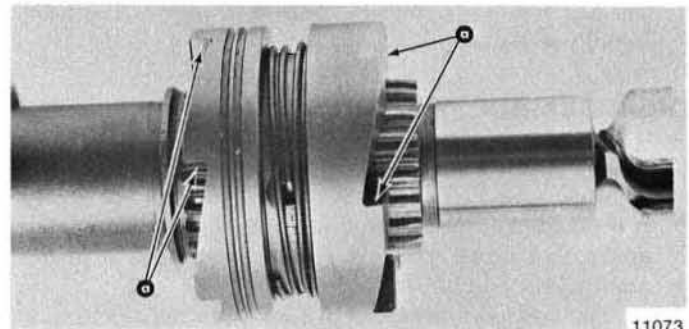
## DISASSEMBLY

1. Remove (and discard) shift shaft bushing oil seal by prying it out or driving it out with a punch and hammer.
2. Remove "E" clip and retaining ring if inspection determines that replacement is required.

# Propeller Shaft

## INSPECTION

1. Clean propeller shaft assembly with solvent and dry with compressed air.
2. Inspect bearing carrier oil seal surfaces for grooves. Run fingernail across seal surface to check for groove. Replace shaft if groove is found.
3. Visually check bearing surfaces of propeller shaft for pitting, grooves, scoring, uneven wear or discoloration (bluish color) from overheating. Replace shaft and corresponding needle bearing if any of the above conditions are found. (Bearing carrier needle bearing contacts propeller shaft just in front of oil seal surface. Forward gear bearing contacts propeller shaft in front of sliding clutch splines.)



a - Clutch "Jaws"

**Figure 3. Sliding Clutch Inspection**

4. Inspect propeller shaft splines for wear and/or corrosion damage.
5. Check propeller shaft for straightness. Use either method, following:

### Balance Wheels

Place propeller shaft on balance wheels, as shown in Figure 1. Rotate propeller shaft and observe propeller end of shaft for "wobble". Replace shaft if any "wobble" is observed.

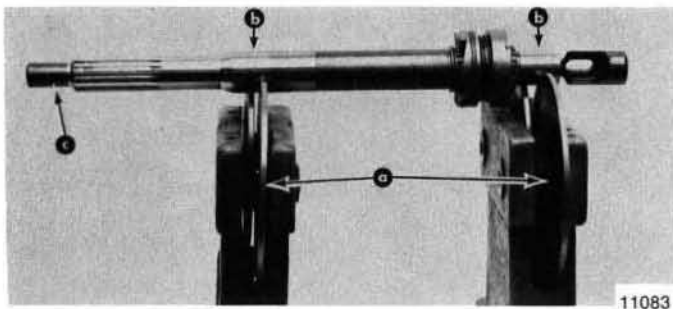
### "Vee" Blocks and Dial Indicator

Position propeller shaft roller bearing surfaces on "vee" blocks. (Figure 2) Mount a dial indicator at front edge of propeller splines ("c" in Figure 2). Rotate propeller shaft. Dial indicator movement of more than .006" (.152mm) (or noticeable "wobble") is reason for replacement.

6. Inspect sliding clutch. Check reverse gear and forward gear clutch "jaws". (Figure 3) Rounded "jaws" indicate one or more of the following:
  - a. Improper shift cable adjustment.
  - b. Improper shift habits of operator(s) (shift from neutral to reverse gear too slowly).
  - c. Engine idle speed too high (while shifting).
7. Check condition of cam follower. If it shows wear (pitting, scoring or rough surface), replace cam follower and shift cam.

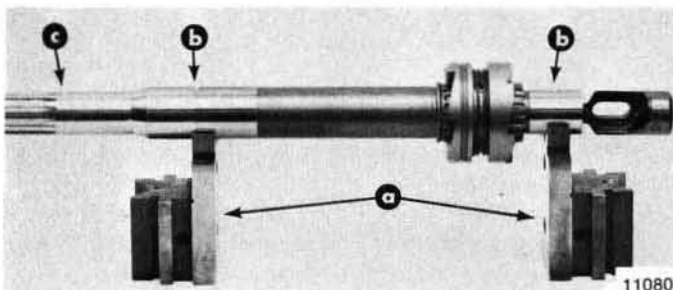
## DISASSEMBLY

1. Remove shift cam from cam follower.
2. Insert a thin blade screwdriver or awl under first coil of cross pin retainer spring and rotate propeller shaft to unwind spring from sliding clutch. (Figure 4) DO NOT overstretch spring.



a - Balance Wheels  
b - Bearing Surfaces  
c - Watch for "Wobble"

**Figure 1. Checking Propeller Shaft Straightness with Balance Wheels**



a - "Vee" Blocks  
b - Bearing Surfaces  
c - Measure with Dial Indicator at This Point

**Figure 2. Checking Propeller Shaft Straightness with "Vee" Blocks**