

Section 4

Cleaning, Inspection, Repair or Replacement

4-1. CLEANING

NOTE: Prior to cleaning case cover and magnet assembly, check magnet cemented in case bottom for presence of metal particles. Larger, granular or irregular shaped particles indicate chipping or similar damage. Smaller, powderlike particles indicate uneven or excessive wear. If metal particles are detected, be on the lookout for damage or wear when inspecting rotating parts and those with which they mate.

4-2. GENERAL CLEANING PROCEDURE. Wash parts in mineral spirits or similar cleaning solvent to remove old lubricant and dirt deposits. Use a bristle brush to remove caked-on deposits. Parts that cannot be cleaned by brushing may be scraped but use care not to damage metal surfaces.

4-3. DRYING CLEANED PARTS. Dry parts with low pressure (20 psi 140 kPa max) compressed air. Wiping parts dry could leave lint deposits.

4-4. LUBRICATING BEARINGS. Immediately after cleaning, lubricate bearing cones (20, 24 and 31, figure P-1; 301, figure P-3; and 402, figure P-4) and needle bearings (306, figure P-3; and 404, figure P-4) with transmission lubricant (refer to paragraph 2-4). Spin drying bearings will result in damage. Cover lubricated bearings to protect from dust.

4-5. INSPECTION

4-6. GENERAL INSPECTION PROCEDURES. Visually inspect all parts except o-rings, sealing rings, oil seals and gaskets, which should be replaced with new parts. Inspect for damage or excessive or uneven wear. Reject parts with damage or wear that would affect serviceability of the part. Inspection terms used in this section are as follows:

Burr: Local rise of material forming protruding sharp edge.

Chip: An area from which a small fragment has been broken off or cut.

Crack: Surface break of line nature indicating partial or complete separation of material.

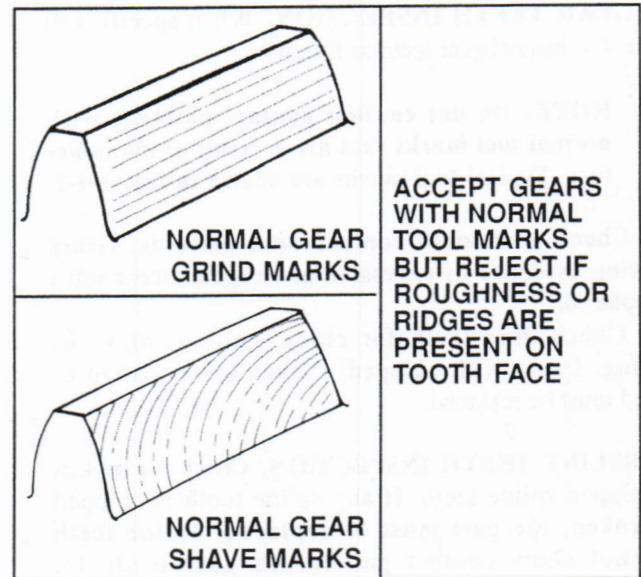


Figure 4-1. Normal Gear Tooth Tool Marks

Excessive wear: Heavy or obvious wear beyond expectations considering conditions of operation.

Indentation: Displacement of material caused by localized heavy contact.

Galling: Breakdown (or build-up) of metal surface due to excessive friction between parts because of lack of lubrication. Particles of the softer material are torn loose and welded to the harder material.

Nick: Local break or notch. Usually displacement of material rather than loss.

Scoring: Tear or break in metal surface from contact under pressure. May show discoloration from heat produced by friction caused by lack of lubrication.

Step wear: Heavy wear that produces a step that can be seen or felt between adjacent contact and non-contact surfaces.

Uneven wear: Condition of localized, unevenly distributed wear. Includes hollows, shiny spots, uneven polish and other visual indications.

4-7. SPECIFIC INSPECTION PROCEDURES. Inspect parts in accordance with Table 4-1 and as specified in the following paragraphs. Index numbers used in Table 4-1 are those assigned to the exploded views in Section P, Parts.

4-8 GEAR TEETH INSPECTION. When specified in Table 4-1, inspect gear teeth as follows:

NOTE: Do not confuse contact patterns with normal tool marks that are a result of manufacture. Typical tool marks are shown in figure 4-1.

a. Check gear tooth contact wear patterns. Gears showing evidence of excessive or irregular wear must be replaced.

b. Check gear teeth for chips, galling, nicks or scoring. Gears with chipped, broken teeth, galled or scored must be replaced.

4-9. SPLINE TEETH INSPECTION. Check for broken or chipped spline teeth. If any spline tooth is chipped or broken, the part must be replaced. Spline teeth will not show contact patterns as gear teeth do. However, they may show evidence of step wear which is cause for replacement.

4-10. PARTS REPLACEMENT

4-11. Parts which fail to pass inspection shall be replaced unless repair procedures specified in the following paragraph, or other obvious minor repair, will restore the part to complete serviceability. If there is any doubt about the serviceability of a part, replace it.

4-12. REMOVING SMALL BURRS. Use a suitable abrasive stone to remove burrs. Be careful to remove only raised material, not base metal.

4-13. ROLLER BEARING REPLACEMENT. If roller bearing cups and cones are replaced, bearings must be reshimmed at assembly.

4-14. SUPERSEDED PARTS. As noted in the parts lists in Section P, some parts in early production transmissions have been superseded. Superseded parts may be reused provided they pass all inspection requirements. Superseded parts are not available for replacement nor are they included in repair kits. If the transmission is being overhauled, replacement of all superseded parts and use of all repair kits is recommended for optimum service.

4-15. EARLY PRODUCTION PARTS. Early production parts may be used only in their original configuration. Early and current production parts can not be intermingled.

4-16. MATCHED SETS. Case cover and magnet assembly (14) and transmission case (46) are a matched set. If either part requires replacement, the complete set as described in Section P must be replaced.

4-17. Three repair kits are available, containing parts which are commonly replaced during repair or overhaul. The kits and their contents are listed in Tables P-1 through P-3. When using kits, replace all applicable parts contained in the kit.

Table 4-1. Inspection

PART (INDEX NO.)	INSPECTION	COMMENTS
All parts (including all springs)	Check for cracks Check for distortion	Replace parts with cracks Replace parts that are bent, distorted out of round or discolored due to heat
All threaded parts [except thread inserts (42)]	Check for stripped, crossed or otherwise damaged threads	Replace parts with threads that cannot be cleaned up using a suitable tap or die
Case cover & magnet assy (14), case (46) and valve & pump housing (222)	Check mating faces for burrs or other damage that would prevent proper seating of mating faces	Remove small burrs per paragraph 4-13. otherwise, replace damaged parts or assemblies *
Case cover & magnet assembly (14) & bearing cups (12 & 13)	Check bearing cups (12 and 13) for chipping, galling, scoring or other damage	Replace damaged bearing cups. If bores in cover for cups are scored or damaged, replace assembly.
Output flange (18)	Check spline per paragraph 4-9	Paragraph 4-9
Bearing cones (20, 24, 31, 301 and 402)	Check rollers and races for chipping, galling, scoring or other damage Make sure bearing cone is lubricated, Slowly rotate rollers, feeling for binding, roughness or flat spots.	Replace damaged bearing cones Replace bearing cones that have damaged or loose rollers
Output gear (26)	Check gear teeth per paragraph 4-8	Paragraph 4-8
Output shaft (27)	Check bearing journals for scoring Check for distortion Check spline per paragraph 4-9	Replace if scored or damaged Replace if bent or out of round Paragraph 4-9
Bearing cups (30)	Check cups for chipping, galling, scoring or other damage	Replace damaged bearing cups
Oil baffle (33)	Check for distortion or damage	Replace if bent or cracked
Suction tube assy (34 or 34A)	Check for distortion or damage Check O-ring gland end for nicks or burrs that would cause leakage	Replace if bent, cracked or if broken welds found Replace if damaged
Breather (36)	Check that breather is open and that cap moves freely	Replace breather if clogged

* Case cover and magnet assembly (14) and case (46) are a matched set. See listing in Section P.

Table 4-1. Inspection (Cont)

PART (INDEX NO.)	INSPECTION	COMMENTS
Case (46) and bearing cups (44 & 45)	<p>Check bearing cups (44 and 45) for chipping, galling, scoring or other damage</p> <p>Check for loose or damaged thread inserts (42)</p>	<p>Replace damaged bearing cups. If bores in case for cups are scored or damaged, replace case *</p> <p>Replace thread inserts. If not repairable, replace assembly</p>
Pump assy (202)	Visually check for damage or excessive wear	Replace damaged pump
Switch assembly (203)	Test switch to be open when plunger depressed; closed when plunger released	Replace damaged switch
Transmission shift lever (207) & ball (208)	Check for distortion, damage or excessive wear	Replace if lever bent or if ball and detent holes are excessively worn
Control valve (211), valve piston (218 or 218A) or washer (219) & mating bores in valve and pump housing (222)	Check for scratches, nicks, burring, scoring or other damage that would cause leakage or binding	Replace damaged parts
Filter and screen assy (220)	Check for damaged or clogged screen	Replace if necessary
Thrust washers (302 and 415)	Check for distortion, scoring or wear	Replace if bent, scored or if step wear is noted
Clutch gear (304 and 403)	<p>Check gear teeth per paragraph 4-8</p> <p>Check splines per paragraph 4-9</p> <p>Check ID for needle bearings</p>	<p>Paragraph 4-8</p> <p>Paragraph 4-9</p> <p>Replace if scored or damaged</p>
Needle bearings (306 and 404)	Check rollers for chipping, galling scoring or other damage	Replace damaged bearings
Clutch disc assys (311 & 409) & discs (312 & 410), backing plates (309 or 309A & 407 or 407A) and clutch plates (310 or 310A & 408 or 408A)	Check mating faces for scoring wear or warping	Replace if scored worn or damaged. Mating faces must be smooth. Clutch discs and plates must be flat

* Case cover and magnet assembly (14) and case (46) are a matched set. See listing in Section P.

Table 4-1. Inspection (Cont)

PART (INDEX NO.)	INSPECTION	COMMENTS
Clutch disc assys (311 & 409) and discs (312 & 410), backing plates (309 or 309A & 407 or 407A) and clutch plates (310 or 310A & 408 or 408A)	Check splines per paragraph 4-9	Paragraph 4-9
Clutch piston assys (319 and 418) and mating sealing surfaces in clutch gear cylinders (315 & 413) and on input and lay shafts (329 & 427)	Check for scratches, nicks, burrs, porosity, scoring or other damage that would cause leakage or binding	Replace damaged parts
Clutch gear cylinders (315 and 413)	Check gears per paragraph 4-8 Check splines per paragraph 4-9	Paragraph 4-8 Paragraph 4-9
Input and lay shafts (329 and 427)	Check splines per paragraph 4-9 Check bearing journals Check for distortion	Paragraph 4-9 Replace if scored or damaged Replace if bent or out of round

* Case cover and magnet assembly (14) and case (46) are a matched set. See listing in Section P.