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«Group 07: TRANSMISSION»

«Section 07-03: Transmission, Manual--M5R2»

«DIAGNOSIS AND TESTING»

Transmission Noise

Gear Rattle is a repetitive metallic impact or rapping noise which occurs on a manual transmission powertrain when the vehicle is lugging in gear. The rattle noise intensity generally increases with transmission operating temperature and engine torque, and decreases with increasing vehicle speed. Since the gear ratios have been designed to achieve maximum fuel economy, there may be instances when gear rattle is distinctly noticeable under lugging conditions. This, however, is not detrimental to the engine or transmission provided that the gear selected is appropriate for the vehicle speed.

NOTE:

Replacement of transmission components will not correct neutral rollover rattle.

Neutral Rollover Rattle has the same characteristics as gear rattle except that rollover occurs with the engine idling, transmission in NEUTRAL, and the clutch engaged (clutch pedal released). The rollover noise intensity increases with transmission operating temperature and engine torque load resulting from air conditioning and generator. Neutral rollover noise is not detrimental to the engine or transmission. In vehicles where the engine idle speed is below specification or rough, a harsh clattering noise like loose marbles in the transmission may be heard.

Rollover Noise caused by engine torsional vibrations and Clutch Release Bearing Noise are sometimes mistaken for Transmission Bearing Noise. Neutral rollover noise will disappear when the transmission is engaged in gear. Due to a constant running clutch release bearing (used for the hydraulic clutch release mechanism), noise caused by a worn or damaged clutch release bearing will be noticeable with the clutch engaged or disengaged (clutch pedal released or depressed). Transmission service will not eliminate gear rollover noise or clutch release bearing noise.

While verifying the condition, determine whether the noise is gear rollover noise, release bearing or some other transmission related noise.

Gear rollover noise, inherent in manual transmissions, is caused by the constant mesh gears turning at engine idle speed, while the clutch is engaged and the transmission is in NEUTRAL; and release bearing rub are sometimes mistaken for mainshaft bearing noise.

Gear rollover noise will disappear when the clutch is disengaged or when the transmission is engaged in gear.

Release bearing rub will disengage when the clutch is engaged in the event that a bearing is damaged, the noise is more pronounced while engaged in gear under load or coast than in neutral.

TRANSMISSION DIAGNOSIS

Condition(s):

- Transmission Will Not Shift Into One Gear -- All Others OK

Possible Source(s):

- Manual shift linkage damaged or worn.

Action(s) to Take:

- Lubricate, service or replace parts as required.

Possible Source(s):

- Back-up switch ball frozen.

Action(s) to Take:

- If REVERSE is problem, check backup switch for ball frozen in extended position (if so equipped).

Possible Source(s):

- Internal components.

Action(s) to Take:

- Remove transmission. Inspect shift rail and fork system, synchronizer system and gear clutch teeth for restricted travel. Service or replace as required.

Transmission Shifts Hard

Possible Source(s):

- Clutch does not completely release.

Action(s) to Take:

- Refer to «[Section 08-00](#)».

Possible Source(s):

- Transmission fluid low or improper type.

Action(s) to Take:

- Add or change lubricant as required.

Possible Source(s):

- Worn or damaged internal shift mechanism.

Action(s) to Take:

- Remove transmission cover. Check internal shift mechanism by shifting into and out of all gears. Service or replace as required.

Possible Source(s):

- Binding of sliding gears and/or synchronizers.

Action(s) to Take:

- Check for free movement of gears and synchronizers. Service or replace as required.

Possible Source(s):

- Housings and/or shafts out of alignment.

Action(s) to Take:

- Remove transmission and check for binding condition between input shaft and engine crankshaft pilot bearing or bushing. Check flywheel housing alignment. Service or replace as required.

Noisy in Forward Gears. Refer to Transmission Noise

Possible Source(s):

- Lubricant level low, or improper type.

Action(s) to Take:

- Add or refill with specified lubricant.

Possible Source(s):

- Components grinding on transmission.

Action(s) to Take:

- Check for screws, bolts, etc., of body or other components grounding out. Correct as required

Possible Source(s):

- Component housing bolts loose

Action(s) to Take:

- Check torque on transmission to flywheel housing bolts, output shaft flange nut and flywheel housing-to-engine block bolts. Tighten bolts to specification.

Possible Source(s):

- Flywheel housing-to-engine crankshaft alignment.

Action(s) to Take:

- Check and align flywheel housing-to-engine crankshaft.

Possible Source(s):

- Noisy bearings or gears.

Action(s) to Take:

- Remove and disassemble transmission. Inspect input, output and countershaft bearings. Inspect speedometer gear and gear teeth for wear or damage. Replace as required

Gears Clash When Shifting From One Forward Gear to Another

Possible Source(s):

- Engine idle speed too high.

Action(s) to Take:

- Adjust engine idle speed.

Possible Source(s):

- Pilot bearing binding.

Action(s) to Take:

- Remove transmission and check for a binding condition between input shaft and engine crankshaft pilot bearing. Replace as required

Possible Source(s):

- Damaged gear teeth and/or synchronizer.

Action(s) to Take:

- Disassemble transmission. Service or replace as required

Transmission Jumps Out of Gear

Possible Source(s):

- Stiff shift boot. Improper fit of foam isolation pad.

Action(s) to Take:

- Replace shift boot if exceptionally stiff. Replace or rework pad to provide clearance.

Possible Source(s):

- Loose transmission-to-engine mounting bolts or loose levers.

Action(s) to Take:

- Tighten transmission-to-engine block bolts to specification. Loosen all bolts and reseat flywheel housing. Tighten all bolts. Tighten levers if necessary

Possible Source(s):

- Flywheel housing engine crankshaft out of line.

Action(s) to Take:

- Shim or replace housing as required

Possible Source(s):

- Crankshaft pilot bearing worn.

Action(s) to Take:

- Replace bearing.

Possible Source(s):

- Interior components damage.

Action(s) to Take:

- Disassemble transmission. Inspect the synchronizer sleeves for free movement on their hubs. Inspect the synchronizer blocking rings for widened index slots, rounded clutch teeth and smooth internal surface. Check countershaft cluster gear for excessive end play. Check shift forks for worn or loose mounting on shift rails. Check fork pads for excessive wear. Inspect synchronizer sliding sleeve and gear clutch teeth for wear or damage. Service or replace as required.

Possible Source(s):

- Worn gear teeth due to partial engagement.

Action(s) to Take:

- Replace worn or damaged gears.

Transmission is Locked in One Gear. It Cannot Be Shifted Out of That Gear

Possible Source(s):

- Internal components.

Action(s) to Take:

- Remove transmission. Inspect problem gears, shift rails and forks and synchronizer for wear or damage. Service as required

Possible Source(s):

- Loose fork on rail.

Action(s) to Take:

- Check shift rail interlock system.

Transmission Leaks

Possible Source(s):

- Improper amount of lubricant or wrong type.

Action(s) to Take:

- Check level and type. Fill to bottom of filler plug hole.

Possible Source(s):

- Other components leaking.

Action(s) to Take:

- Identify leaking fluid as engine, power steering or transmission. Service as required

Possible Source(s):

- False report.

Action(s) to Take:

- Remove all traces of lubricant on exposed transmission surfaces. Check vent for free breathing. Operate transmission and inspect for new leakage. Service as required

Possible Source(s):

- Seals and gaskets.

Action(s) to Take:

- Inspect for leaks in the following seal and gasket locations:
 - Shift rail cover seal
 - Top cover gasket
 - Input shaft bearing retainer seal
 - Extension housing-to-transmission case seal
 - Shift tower seal
- Service or replace as required

Possible Source(s):

- Improper installation torque

Action(s) to Take:

- Inspect for leaks in the following components:
 - Fifth/Reverse inhibitor assembly
 - Fill plug
 - Drain plug
 - Counter lever assembly fixing bolt
 - Neutral sensing switch
 - Back-up lamp switch
 - Oil trough retaining bolt
 - Reverse idler shaft fixing bolt
 - Speedometer housing O-ring
 - Tighten to specification.
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