

GENERAL DIAGNOSTIC

MANUAL TRANSMISSION AND DIFFERENTIAL

22. General Diagnostic

A: INSPECTION

1. MANUAL TRANSMISSION

| Symptom | Possible cause | Remedy |
|---|---|--|
| 1. Gears are difficult to intermesh. NOTE: The cause for difficulty in shifting gears can be classified into two kinds: one is malfunction of the gear shift system and the other is malfunction of the transmission. However, if the operation is heavy and engagement of the gears is difficult, defective clutch disengagement may also be responsible. Check whether the clutch is correctly functioning, before checking the gear shift system and transmission. | (a) Worn, damaged or burred chamfer of internal spline of sleeve and reverse driven gear (b) Worn, damaged or burred chamfer of spline of gears (c) Worn or scratched bushings (d) Incorrect contact between synchronizer ring and gear cone or wear | Replace. Replace. Replace. Correct or replace. |
| 2. Gear slips out. • Gear slips out when coasting on rough road. • Gear slips out during acceleration. | (a) Defective pitching stopper adjustment (b) Loose engine mounting bolts (c) Worn fork shifter, broken shifter fork rail spring (d) Worn or damaged ball bearing (e) Excessive clearance between splines of synchronizer hub and synchronizer sleeve (f) Worn tooth step of synchronizer hub (responsible for slip-out of 3rd gear) (g) Worn 1st driven gear and driven shaft (h) Worn 2nd driven gear and bushing (i) Worn 3rd drive gear and needle bearing (j) Worn 4th drive gear and needle bearing (k) Worn reverse idler gear and bushing | Adjust. Tighten or replace. Replace. Replace. Replace. Replace. Replace. Replace. Replace. Replace. |
| 3. Unusual noise comes from transmission. NOTE: If an unusual noise is heard when the vehicle is parked with its engine idling and if the noise ceases when the clutch is disengaged, it may be considered that the noise comes from the transmission. | (a) Insufficient or improper lubrication (b) Worn or damaged gears and bearings NOTE: If the trouble is only wear of the tooth surfaces, merely a high roaring noise will occur at high speeds, but if any part is broken, rhythmical knocking sound will be heard even at low speeds. | Lubricate or replace with specified oil. Replace. |

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2. DIFFERENTIAL

| Symptom | Possible cause | Remedy |
|---|---|--|
| 1. Broken differential (case, gear, bearing, etc.) NOTE: Abnormal noise will develop and finally it will become impossible to continue to run due to broken pieces obstructing the gear revolution. | (a) Insufficient or improper oil (b) Use of vehicle under severe conditions such as excessive load and improper use of clutch (c) Improper adjustment of taper roller bearing (d) Improper adjustment of drive pinion and hypoid driven gear (e) Excessive backlash due to worn differential side gear, washer or differential pinion vehicle under severe operating conditions. (f) Loose hypoid driven gear clamping bolts | Disassemble the differential and replace broken components and at the same time check other components for any trouble, and replace if necessary. Readjust the bearing preload and backlash and face contact of gears. Adjust. Adjust. Add recommended oil to specified level. Do not use the vehicle under severe operating conditions. Tighten. |
| 2. Differential and hypoid gear noises Troubles of the differential and hypoid gear always appear as noise problems. Therefore noise is the first indication of the trouble. However noises from the engine, muffler, tire, exhaust gas, bearing, body, etc. are easily mistaken for the differential noise. Pay special attention to the hypoid gear noise because it is easily confused with other gear noises. There are the following four kinds of noises. <ul style="list-style-type: none">• Gear noise when driving: If noise increases as vehicle speed increases it may be due to insufficient gear oil, incorrect gear engagement, damaged gears, etc.• Gear noise when coasting: Damaged gears due to maladjusted bearings and incorrect shim adjustment• Bearing noise when driving or when coasting: Cracked, broken or damaged bearings• Noise which mainly occurs when turning: Unusual noise from differential side gear, differential pinion, differential pinion shaft, etc. | (a) Insufficient oil (b) Improper adjustment of hypoid driven gear and drive pinion (c) Worn teeth of hypoid driven gear and drive pinion (d) Loose roller bearing (e) Distorted hypoid driven gear or differential case (f) Worn washer and differential pinion shaft | Lubricate. Check tooth contact. Replace as a set. Readjust the bearing preload. Readjust the hypoid driven gear to drive pinion backlash and check tooth contact. Replace. Replace. |

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MEMO: