

# GENERAL DIAGNOSTIC TABLE

## MANUAL TRANSMISSION AND DIFFERENTIAL

### 29. General Diagnostic Table

#### A: INSPECTION

##### 1. MANUAL TRANSMISSION

| Symptom   | Possible cause  | Remedy                                   |
|---|---|--|
| 1. Gears are difficult to intermesh.<br>NOTE:<br>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  | Replace.                                 |
|   | (b) Worn, damaged or burred chamfer of spline of gears  | Replace.                                 |
|   | (c) Worn or scratched bushings  | Replace.                                 |
|   | (d) Incorrect contact between synchronizer ring and gear cone or wear   | Correct or replace.                      |
| 2. Gear slips out.<br>• Gear slips out when coasting on rough road.<br>• Gear slips out during acceleration.  | (a) Defective pitching stopper adjustment   | Adjust.                                  |
|   | (b) Loose engine mounting bolts   | Tighten or replace.                      |
|   | (c) Worn fork shifter, broken shifter fork rail spring  | Replace.                                 |
|   | (d) Worn or damaged ball bearing  | Replace.                                 |
|   | (e) Excessive clearance between splines of synchronizer hub and synchronizer sleeve   | Replace.                                 |
|   | (f) Worn tooth step of synchronizer hub (responsible for slip-out of 3rd gear)  | Replace.                                 |
|   | (g) Worn 1st driven gear, needle bearing and race   | Replace.                                 |
|   | (h) Worn 2nd driven gear, needle bearing and race   | Replace.                                 |
|   | (i) Worn 3rd drive gear and bushing   | Replace.                                 |
|   | (j) Worn 4th drive gear and bushing   | Replace.                                 |
|   | (k) Worn 5th drive gear and bushing   | Replace.                                 |
|   | (l) Worn 6th drive gear and bushing   | Replace.                                 |
| (m) Worn reverse idler gear and bushing   | Replace.  |  |
| 3. Unusual noise comes from transmission.<br>NOTE:<br>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  | Lubricate or replace with specified oil. |
|   | (b) Worn or damaged gears and bearings<br>NOTE:<br>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. | Replace.                                 |

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## 2. DIFFERENTIAL

| Symptom  | Possible cause   | Remedy  |
|--|--|---|
| 1. Broken differential (case, gear, bearing, etc.)<br>NOTE:<br>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   | Replace.  |
|  | (b) Use of vehicle under severe conditions such as excessive load and improper use of clutch | Replace.  |
|  | (c) Improper adjustment of taper roller bearing  | Adjust.   |
|  | (d) Improper adjustment of drive pinion and hypoid driven gear                               | Adjust.   |
|  | (e) Loose hypoid driven gear clamping bolts  | Tighten.  |
| 2. Differential and hypoid gear noises<br>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"> <li>• Gear noise when driving: If noise increases as the vehicle speed increases it may be due to insufficient gear oil, incorrect gear engagement, damaged gears, etc.</li> <li>• Gear noise when coasting: Damaged gears due to maladjusted bearings and incorrect shim adjustment</li> <li>• Bearing noise when driving or when coasting: Cracked, broken or damaged bearings</li> <li>• Noise which mainly occurs when turning: Unusual noise from the differential side gear, differential pinion, differential pinion shaft, etc.</li> </ul> | (a) Insufficient oil   | Lubricate.  |
|  | (b) Improper adjustment of hypoid driven gear and drive pinion                               | Check tooth contact.  |
|  | (c) Worn teeth of hypoid driven gear and drive pinion  | Replace as a set.<br>Readjust bearing preload.                                |
|  | (d) Loose roller bearing   | Readjust hypoid driven gear to drive pinion backlash and check tooth contact. |
|  | (e) Distorted hypoid driven gear or differential case  | Replace.  |
|  | (f) Broken or damaged LSD.   | Replace.  |

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