

# General Diagnostic Table

## MANUAL TRANSMISSION AND DIFFERENTIAL

### 20. General Diagnostic Table

#### A: INSPECTION

##### 1. MANUAL TRANSMISSION

| Symptoms   | Possible cause  | Corrective action                          |
|--|---|--|
| 1. Gears are difficult to intermesh.<br><b>NOTE:</b><br>The cause for difficulty in shifting gears can be classified into two types: One is a defective gear shift system and the other is defective transmission. However, if the operation is heavy and engagement of the gears is difficult, a 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 at internal spline of the sleeve  | Replace.                                   |
|  | (b) Gear spline wear, damage, dents   | Replace.                                   |
|  | (c) Worn or scratched bushings  | Replace.                                   |
|  | (d) Incorrect contact or wear between synchronizer ring and gear cone   | Repair or replace.                         |
| 2. Gear slip-out<br>• Gear slips out when coasting on rough road.<br>• Gear slips out during acceleration.   | (a) Loose engine mounting bolts   | Tighten or replace.                        |
|  | (b) Worn fork shifter or broken shifter fork rail spring  | Replace.                                   |
|  | (c) Worn or damaged ball bearing  | Replace.                                   |
|  | (d) Excessive clearance between splines of synchronizer hub and synchronizer sleeve   | Replace.                                   |
|  | (e) Synchronizer hub tooth step wear  | Replace.                                   |
|  | (f) Worn 1st driven gear and driven shaft   | Replace.                                   |
|  | (g) Worn 2nd driven gear and bushing  | Replace.                                   |
|  | (h) Worn 3rd drive gear and needle bearing  | Replace.                                   |
|  | (i) Worn 4th drive gear and needle bearing  | Replace.                                   |
|  | (j) Worn 5th drive gear and needle bearing  | Replace.                                   |
|  | (k) Worn 6th drive gear and needle bearing  | Replace.                                   |
|  | (l) Worn reverse idler gear and needle bearing  | Replace.                                   |
| 3. Noise emitted from transmission<br><b>NOTE:</b><br>If a noise is heard when the vehicle is parked with its engine idling and if a noise ceases when the clutch is disengaged, it may be considered that the noise is coming from the transmission.  | (a) Insufficient or improper lubrication  | Lubricate with recommended oil or replace. |
|  | (b) Worn or damaged gears and bearings<br><b>NOTE:</b><br>If the trouble is only wear of the gear teeth surfaces, only a high whirring noise will occur at high speeds, but if any part is broken, rhythmical clicking sounds will be heard even at low speeds. | Replace.                                   |

# General Diagnostic Table

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## 2. DIFFERENTIAL

| Symptoms   | Possible cause   | Corrective action  |
|--|--|--|
| <p>1. Broken differential (case, gear, bearing, etc.)</p> <p>NOTE:<br/>Noise will occur, and eventually the differential will not be able to operate due to broken pieces obstructing the gear revolution.</p>   | (a) Insufficient or improper oil   | Disassemble the differential and replace broken components. At the same time check other components for any trouble, and replace if necessary. |
|  | (b) Use of vehicle under severe conditions such as excessive load or improper use of the clutch  | Readjust the preload and backlash of the bearing, and the contact surface of gear.   |
|  | (c) Improper adjustment of taper roller bearing  | Adjust.  |
|  | (d) Improper adjustment of the drive pinion and the hypoid driven gear   | Adjust.  |
|  | (e) Excessive backlash of a vehicle under severe operating conditions due to worn differential side gear, washer or differential pinion. | Add recommended oil to the specified level. Do not use vehicle under severe operating conditions.  |
|  | (f) Loose hypoid driven gear clamping bolts  | Tighten.   |
| <p>2. Differential and hypoid gear noises</p> <p>Troubles of the differential and hypoid gear always appear as noise problems. Therefore noise is the first indication of 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.</p> <ul style="list-style-type: none"> <li>• Gear noise when driving:<br/>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:<br/>Damaged gears due to misadjusted bearings and incorrect shim adjustment.</li> <li>• Bearing noise when driving or coasting:<br/>Cracked, broken or damaged bearings</li> <li>• Noise mainly when turning:<br/>Noise from differential side gear, differential pinion or differential pinion shaft, etc.</li> </ul> | (a) Insufficient oil   | Add recommended oil to the specified level.  |
|  | (b) Improper adjustment of hypoid driven gear and drive pinion   | Check the tooth contact.   |
|  | (c) Worn teeth of hypoid driven gear and drive pinion  | Replace as a set.<br>Readjust the bearing preload.   |
|  | (d) Loose roller bearing   | Readjust the backlash of the hypoid driven gear to drive pinion, and check the tooth contact.  |
|  | (e) Distorted hypoid driven gear or differential case  | Replace.   |
|  | (f) Worn washer and differential pinion shaft  | Replace.   |

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# CLUTCH SYSTEM

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