MANUAL TRANSMISSION AND DIFFERENTIAL 5-SPEED (5MT)
## 1. General Description

### A: SPECIFICATION

#### 1. MANUAL TRANSMISSION AND DIFFERENTIAL

<table>
<thead>
<tr>
<th>Model</th>
<th>Non-turbo model</th>
<th>Turbo model</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Type</strong></td>
<td></td>
<td>5-forward speeds with synchromesh and 1-reverse</td>
</tr>
<tr>
<td>Transmission gear ratio</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1st</td>
<td>3.454</td>
<td>3.166</td>
</tr>
<tr>
<td>2nd</td>
<td>2.062</td>
<td>1.882</td>
</tr>
<tr>
<td>3rd</td>
<td>1.448</td>
<td>1.296</td>
</tr>
<tr>
<td>4th</td>
<td>1.088</td>
<td>0.972</td>
</tr>
<tr>
<td>5th</td>
<td>0.780</td>
<td>0.738</td>
</tr>
<tr>
<td><strong>Front reduction gear</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Final</td>
<td>Hypoid</td>
<td></td>
</tr>
<tr>
<td>Gear ratio</td>
<td>3.900</td>
<td></td>
</tr>
<tr>
<td><strong>Rear reduction gear</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Transfer</td>
<td>Helical</td>
<td></td>
</tr>
<tr>
<td>Gear ratio</td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td>Final</td>
<td>Hypoid</td>
<td></td>
</tr>
<tr>
<td>Gear ratio</td>
<td>3.900</td>
<td></td>
</tr>
<tr>
<td><strong>Front differential</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type and number of gear</td>
<td>Straight bevel gear (Bevel pinion: 2, Bevel gear: 2)</td>
<td></td>
</tr>
<tr>
<td><strong>Center differential</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Type and number of gear</td>
<td>Straight bevel gear (Bevel pinion: 2, bevel gear: 2 and viscous coupling)</td>
<td></td>
</tr>
<tr>
<td><strong>Transmission gear oil</strong></td>
<td>GL-5</td>
<td></td>
</tr>
<tr>
<td><strong>Transmission gear oil capacity</strong></td>
<td>3.5 ℓ (3.7 US qt, 3.1 Imp qt)</td>
<td></td>
</tr>
</tbody>
</table>
2. TRANSMISSION GEAR OIL

Recommended oil:
GL-5 (75W-90) or equivalent

3. TRANSMISSION CASE ASSEMBLY

Drive pinion shim adjustment

Hypoid gear backlash:
0.13 — 0.18 mm (0.0051 — 0.0071 in)

<table>
<thead>
<tr>
<th>Drive pinion shim</th>
<th>Thickness mm (in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part number</td>
<td>Thickness mm (in)</td>
</tr>
<tr>
<td>32295AA031</td>
<td>0.150 (0.0059)</td>
</tr>
<tr>
<td>32295AA041</td>
<td>0.175 (0.0069)</td>
</tr>
<tr>
<td>32295AA051</td>
<td>0.200 (0.0079)</td>
</tr>
<tr>
<td>32295AA061</td>
<td>0.225 (0.0089)</td>
</tr>
<tr>
<td>32295AA071</td>
<td>0.250 (0.0098)</td>
</tr>
<tr>
<td>32295AA081</td>
<td>0.275 (0.0108)</td>
</tr>
<tr>
<td>32295AA091</td>
<td>0.300 (0.0118)</td>
</tr>
<tr>
<td>32295AA101</td>
<td>0.500 (0.0197)</td>
</tr>
</tbody>
</table>

Selection of main shaft rear plate

<table>
<thead>
<tr>
<th>Main shaft rear plate</th>
<th>Dimension “A” mm (in)</th>
<th>Part number</th>
<th>Mark</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.00 — 4.13</td>
<td>32294AA041</td>
<td>1</td>
<td></td>
</tr>
<tr>
<td>(0.1575 — 0.1626)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.87 — 4.00</td>
<td>32294AA051</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>(0.1524 — 0.1575)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4. DRIVE PINION ASSEMBLY

Preload adjustment of thrust bearing

Starting torque:
0.3 — 0.8 N·m (0.03 — 0.08 kgf·m, 0.2 — 0.6 ft·lb)

<table>
<thead>
<tr>
<th>Adjusting washer No. 1</th>
<th>Part number</th>
<th>Thickness mm (in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>803025051</td>
<td>3.925</td>
<td>(0.1545)</td>
</tr>
<tr>
<td>803025052</td>
<td>3.950</td>
<td>(0.1555)</td>
</tr>
<tr>
<td>803025053</td>
<td>3.975</td>
<td>(0.1565)</td>
</tr>
<tr>
<td>803025054</td>
<td>4.000</td>
<td>(0.1575)</td>
</tr>
<tr>
<td>803025055</td>
<td>4.025</td>
<td>(0.1585)</td>
</tr>
<tr>
<td>803025056</td>
<td>4.050</td>
<td>(0.1594)</td>
</tr>
<tr>
<td>803025057</td>
<td>4.075</td>
<td>(0.1604)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Adjusting washer No. 2</th>
<th>Part number</th>
<th>Thickness mm (in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>803025059</td>
<td>3.850</td>
<td>(0.1516)</td>
</tr>
<tr>
<td>803025054</td>
<td>4.000</td>
<td>(0.1575)</td>
</tr>
<tr>
<td>803025058</td>
<td>4.150</td>
<td>(0.1634)</td>
</tr>
</tbody>
</table>

5. REVERSE IDLER GEAR

Adjustment of reverse idler gear position

Reverse idler gear to transmission case (LH) wall clearance:
6.0 — 7.5 mm (0.236 — 0.295 in)

<table>
<thead>
<tr>
<th>Reverse shifter lever</th>
<th>Part number</th>
<th>Mark</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>32820AA070</td>
<td>7</td>
<td></td>
<td>Further from case wall</td>
</tr>
<tr>
<td>32820AA080</td>
<td>8</td>
<td></td>
<td>Standard</td>
</tr>
<tr>
<td>32820AA090</td>
<td>9</td>
<td></td>
<td>Closer to the case wall</td>
</tr>
</tbody>
</table>

After installing a suitable reverse shifter lever, adjust the clearance using washers.

Reverse idler gear to transmission case wall clearance:
0 — 0.5 mm (0 — 0.020 in)

<table>
<thead>
<tr>
<th>Washer (20.5 × 26 × t)</th>
<th>Part number</th>
<th>Thickness mm (in)</th>
<th>Part number</th>
<th>Thickness mm (in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>803020151</td>
<td>0.4 (0.016)</td>
<td>803020154</td>
<td>1.9 (0.075)</td>
<td></td>
</tr>
<tr>
<td>803020152</td>
<td>1.1 (0.043)</td>
<td>803020155</td>
<td>2.3 (0.091)</td>
<td></td>
</tr>
<tr>
<td>803020153</td>
<td>1.5 (0.059)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
6. SHIFTER FORK AND ROD
Select a suitable shifter fork so that both the coupling sleeve and reverse driven gear are positioned in the center of their synchromesh mechanisms.

**Rod end clearance:**

- **A: 3rd-4th — 5th**
  0.5 — 1.3 mm (0.020 — 0.051 in)
- **B: 1st-2nd — 3rd-4th**
  0.4 — 1.4 mm (0.016 — 0.055 in)

### 7. TRANSFER CASE

#### Neutral position adjustment

<table>
<thead>
<tr>
<th>Adjusting shim</th>
<th>Part number</th>
<th>Thickness mm (in)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>32190AA000</td>
<td>0.15 (0.0059)</td>
</tr>
<tr>
<td></td>
<td>32190AA010</td>
<td>0.30 (0.0118)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Reverse accent shaft</th>
<th>Part number</th>
<th>Mark</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>32188AA130</td>
<td>S</td>
<td>Neutral position is closer to 1st.</td>
</tr>
<tr>
<td></td>
<td>32188AA140</td>
<td>T</td>
<td>Standard</td>
</tr>
<tr>
<td></td>
<td>32188AA150</td>
<td>U</td>
<td>Neutral position is closer to reverse gear.</td>
</tr>
</tbody>
</table>

### Reverse check plate adjustment

<table>
<thead>
<tr>
<th>Reverse check plate</th>
<th>Part number</th>
<th>Mark</th>
<th>Angle</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>32189AA001</td>
<td>0</td>
<td>28°</td>
<td>Arm stops closer to 5th gear.</td>
</tr>
<tr>
<td></td>
<td>32189AA011</td>
<td>1</td>
<td>31°</td>
<td>Arm stops closer to 5th gear.</td>
</tr>
<tr>
<td></td>
<td>33189AA021</td>
<td>2</td>
<td>34°</td>
<td>Arm stops in the center.</td>
</tr>
<tr>
<td></td>
<td>32189AA031</td>
<td>3</td>
<td>37°</td>
<td>Arm stops closer to reverse gear.</td>
</tr>
<tr>
<td></td>
<td>32189AA041</td>
<td>4</td>
<td>40°</td>
<td>Arm stops closer to reverse gear.</td>
</tr>
</tbody>
</table>
8. EXTENSION ASSEMBLY

Preload of the taper roller bearing
(amount of standard protrusion):

0.15 — 0.25 mm (0.006 — 0.010 in)

NOTE:
Be sure that the amount of preload is within
the standard value.

<table>
<thead>
<tr>
<th>Thrust washer (50 × 61 × t)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part number</td>
</tr>
<tr>
<td>803050060</td>
</tr>
<tr>
<td>803050061</td>
</tr>
<tr>
<td>803050062</td>
</tr>
<tr>
<td>803050063</td>
</tr>
<tr>
<td>803050064</td>
</tr>
<tr>
<td>803050065</td>
</tr>
<tr>
<td>803050066</td>
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<tr>
<td>803050067</td>
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<td>803050068</td>
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<td>803050069</td>
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<td>803050074</td>
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<td>803050075</td>
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<tr>
<td>803050076</td>
</tr>
<tr>
<td>803050077</td>
</tr>
<tr>
<td>803050078</td>
</tr>
<tr>
<td>803050079</td>
</tr>
</tbody>
</table>

Thrust washer to center differential side clearance:

0.15 — 0.35 mm (0.0059 — 0.0138 in)

<table>
<thead>
<tr>
<th>Thrust washer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part number</td>
</tr>
<tr>
<td>803036050</td>
</tr>
<tr>
<td>803036054</td>
</tr>
<tr>
<td>803036051</td>
</tr>
<tr>
<td>803036055</td>
</tr>
<tr>
<td>803036052</td>
</tr>
<tr>
<td>803036056</td>
</tr>
<tr>
<td>803036053</td>
</tr>
<tr>
<td>803036057</td>
</tr>
<tr>
<td>803036058</td>
</tr>
</tbody>
</table>

9. FRONT DIFFERENTIAL

Bevel gear to pinion backlash:

0.13 — 0.18 mm (0.0051 — 0.0071 in)

<table>
<thead>
<tr>
<th>Washer (38.1 × 50 × t)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part number</td>
</tr>
<tr>
<td>803038021</td>
</tr>
<tr>
<td>803038022</td>
</tr>
</tbody>
</table>

10. TRANSFER DRIVE GEAR

Snap ring (Outer-30) to ball bearing clearance:

0.01 — 0.15 mm (0.0004 — 0.0059 in)

<table>
<thead>
<tr>
<th>Snap ring (Outer-30)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part number</td>
</tr>
<tr>
<td>805030041</td>
</tr>
<tr>
<td>805030042</td>
</tr>
<tr>
<td>805030043</td>
</tr>
</tbody>
</table>
B: COMPONENT

1. TRANSMISSION CASE

- **(1)** Transmission case ASSY
- **(2)** Gasket
- **(3)** Drain plug
- **(4)** Gasket
- **(5)** Plug
- **(6)** Clamp
- **(7)** Pitching stopper bracket
- **(8)** Oil level gauge (Non-turbo model)
- **(9)** Oil level gauge (Turbo model)
- **(10)** Harness bracket (Non-turbo model)

**Tightening torque:** N·m (kgf-m, ft-lb)

- **T1:** 44 (4.5, 32.5) (Aluminum gasket)
- **T2:** 60 (6.1, 44.3)
- **T3:** 70 (7.1, 51.6) (Copper gasket)
Transmission case tightening torque

<table>
<thead>
<tr>
<th>Bolt No.</th>
<th>Bolt size mm</th>
<th>Tightening torque: N·m (kgf-m, ft-lb)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(5) — (15)</td>
<td>8</td>
<td>25 (2.5, 18.4)</td>
</tr>
<tr>
<td>(1) — (4)</td>
<td>10</td>
<td>39 (4.0, 28.9)</td>
</tr>
<tr>
<td>(16) — (17)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
2. DRIVE PINION ASSEMBLY

(1) Drive pinion shaft
(2) Roller bearing
(3) Washer
(4) Thrust bearing
(5) Needle bearing
(6) Driven shaft
(7) Key
(8) Woodruff key
(9) Drive pinion collar
(10) Needle bearing
(11) Snap ring (Outer) (Non-turbo model)
(12) Washer (Non-turbo model)
(13) Sub gear (Non-turbo model)
(14) 1st driven gear
(15) 1st-2nd synchronizer hub
(16) Ball detent
(17) Reverse driven gear
(18) Outer baulk ring
(19) Synchro cone
(20) Inner baulk ring
(21) 2nd driven gear
(22) 2nd driven gear bushing
(23) 3rd-4th driven gear
(24) Driven pinion shim
(25) Roller bearing
(26) 5th driven gear
(27) Lock washer
(28) Lock nut
(29) Washer
(30) Thrust bearing
(31) Differential bevel gear sleeve
(32) Washer
(33) Lock washer
(34) Lock nut
(35) Inner baulk ring
(36) Synchro cone
(37) Outer baulk ring

Tightening torque: N·m (kgf·m, ft-lb)
T1: 30 (3.1, 22.1)
T2: 120 (12.2, 88.5)
T3: 260 (26.5, 191.8)
3. MAIN SHAFT FOR SINGLE-RANGE

(1) Oil seal  (15) Needle bearing  (25) 5th baulk ring
(2) Needle bearing  (16) 4th gear thrust washer  (26) Baulk lever
(3) Transmission main shaft  (17) Ball bearing (Non-turbo model)  (27) 5th hub & sleeve No. 2
(4) Needle bearing  (18) Taper roller bearing (Turbo model)  (28) Lock washer
(5) 3rd drive gear  (19) 5th needle bearing race (Turbo model)  (29) Lock nut
(6) Inner baulk ring  (20) 5th gear thrust washer (Non-turbo model)
(8) Outer baulk ring  (30) Straight pin
(9) 3rd-4th coupling sleeve  (21) 5th needle bearing race (Non-turbo model)
(10) 3rd-4th synchronizer hub  (22) Needle bearing
(11) 3rd-4th shifting insert key  (23) Main shaft rear plate
(12) 4th baulk ring  (24) 5th drive gear
(13) 4th drive gear
(14) 4th needle bearing race

Tightening torque: N·m (kgf-m, ft-lb)
T: 120 (12.2, 88.5)
4. SHIFTER FORK AND SHIFTER ROD

(1) Shifter arm (8) Ball
(2) 5th shifter fork (9) 3rd-4th fork rod
(3) Straight pin (10) Interlock plunger
(4) Reverse fork rod (11) 1st-2nd fork rod
(5) Checking ball plug (12) 3rd-4th shifter fork
(6) Gasket (13) 1st-2nd shifter fork
(7) Checking ball spring (14) Ball
(15) Spring
(16) Snap ring (Outer)
(17) Reverse fork rod arm
(18) Reverse shifter lever

Tightening torque: N·m (kgf-m, ft-lb)

T: 20 (2.0, 14.8)
5. TRANSFER CASE AND EXTENSION

(1) Oil guide
(2) Gasket
(3) Transfer case
(4) Ball
(5) Reverse accent spring
(6) Gasket
(7) Plug
(8) Oil seal
(9) Snap ring (Inner)
(10) Reverse check plate
(11) Reverse check spring
(12) Reverse return spring
(13) Reverse check cam
(14) Reverse accent shaft
(15) Return spring cap
(16) Return spring
(17) O-ring
(18) Adjusting select shim
(19) Reverse check sleeve
(20) Gasket
(21) Neutral position switch
(22) Gasket
(23) Back-up light switch
(24) Roller bearing
(25) Transfer driven gear
(26) Roller bearing
(27) Adjusting washer
(28) Ball bearing
(29) Center differential
(30) Adjusting washer
(31) Transfer drive gear
(32) Ball bearing
(33) Extension case
(34) Oil seal
(35) Dust cover
(36) Shift bracket
(37) Snap ring

Tightening torque: N·m (kgf·m, ft-lb)

<p>| | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>6.4 (0.65, 4.7)</td>
<td></td>
</tr>
<tr>
<td>T2</td>
<td>9.75 (1.0, 7.2)</td>
<td></td>
</tr>
<tr>
<td>T3</td>
<td>24.5 (2.5, 18.1)</td>
<td></td>
</tr>
<tr>
<td>T4</td>
<td>26 (2.7, 19.2)</td>
<td></td>
</tr>
<tr>
<td>T5</td>
<td>32.3 (3.3, 23.8)</td>
<td></td>
</tr>
<tr>
<td>T6</td>
<td>40 (4.1, 29.5)</td>
<td></td>
</tr>
</tbody>
</table>
6. FRONT DIFFERENTIAL

(1) Drive pinion shaft
(2) Hypoid driven gear
(3) Pinion shaft
(4) Straight pin
(5) Washer
(6) Differential bevel gear
(7) Differential bevel pinion
(8) Roller bearing
(9) Differential case
(10) Oil seal
(11) Differential side retainer
(12) O-ring
(13) Retainer lock plate

Tightening torque: N·m (kgf·m, ft-lb)

T1: 25 (2.5, 18.4)
T2: 62 (6.3, 45.6)
7. TRANSMISSION MOUNTING

(1) Pitching stopper
(2) Spacer
(3) Cushion rubber
(4) Front plate
(5) Transmission cushion rubber
(6) Rear crossmember
(7) Cushion rubber
(8) Center crossmember
(9) Rear plate
(10) Front crossmember
(11) Rear cushion rubber

Tightening torque: N·m (kgf-m, ft-lb)

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>T1</td>
<td>35 (3.6, 25.8)</td>
</tr>
<tr>
<td>T2</td>
<td>50 (5.1, 36.9)</td>
</tr>
<tr>
<td>T3</td>
<td>58 (5.9, 42.8)</td>
</tr>
<tr>
<td>T4</td>
<td>70 (7.1, 51.6)</td>
</tr>
<tr>
<td>T5</td>
<td>140 (14.3, 103.3)</td>
</tr>
</tbody>
</table>
C: CAUTION

- Wear appropriate work clothing, including a cap, protective goggles and protective shoes when performing any work.
- Remove contamination including dirt and corrosion before removal, installation or disassembly.
- Keep the disassembled parts in order and protect them from dust and dirt.
- Before removal, installation or disassembly, be sure to clarify the failure. Avoid unnecessary removal, installation, disassembly and replacement.
- When disassembling the case and other light alloy parts, use a plastic hammer to force it apart. Do not pry apart with screwdrivers or other tools.
- Vehicle components are extremely hot after driving. Be wary of receiving burns from heated parts.
- Use SUBARU genuine gear oil, grease or the equivalent. Do not mix gear oil, grease, etc. of different grades or manufacturers.
- Be sure to tighten fasteners including bolts and nuts to the specified torque.
- Place shop jacks or rigid racks at the specified points.
- Apply gear oil onto sliding or revolving surfaces before installation.
- Replace deformed or damaged snap rings with new parts.
- Before installing O-rings or oil seals, apply sufficient amount of gear oil to avoid damage and deformation.
- Be careful not to incorrectly install or fail to install O-rings, snap rings and other such parts.
- Before securing a part on a vise, place cushioning material such as wood blocks, aluminum plate, or cloth between the part and the vise.
- Avoid damaging the mating surface of the case.
- Before applying liquid gasket, completely remove the liquid gasket.
## D: PREPARATION TOOL

### 1. SPECIAL TOOL

<table>
<thead>
<tr>
<th>ILLUSTRATION</th>
<th>TOOL NUMBER</th>
<th>DESCRIPTION</th>
<th>REMARKS</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="ST-399411700" alt="Image" /></td>
<td>399411700</td>
<td>ACCENT BALL INSTALLER</td>
<td>Used for installing reverse shifter rail arm.</td>
</tr>
<tr>
<td><img src="ST-899524100" alt="Image" /></td>
<td>899524100</td>
<td>PULLER SET</td>
<td>Used for removing and installing the roller bearing (Differential).</td>
</tr>
<tr>
<td><img src="ST-399780104" alt="Image" /></td>
<td>399780104</td>
<td>WEIGHT</td>
<td>Used for measuring preload on the roller bearing.</td>
</tr>
<tr>
<td><img src="ST-498077000" alt="Image" /></td>
<td>498077000</td>
<td>REMOVER</td>
<td>Used for removing the roller bearing of the drive pinion shaft.</td>
</tr>
</tbody>
</table>
### General Description

**MANUAL TRANSMISSION AND DIFFERENTIAL**

<table>
<thead>
<tr>
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<tbody>
<tr>
<td><img src="ST-498077300" alt="Image" /></td>
<td>498077300</td>
<td>CENTER DIFFERENTIAL BEARING REMOVER</td>
<td>Used for removing the center differential cover ball bearing.</td>
</tr>
<tr>
<td><img src="ST-498147001" alt="Image" /></td>
<td>498147001</td>
<td>DEPTH GAUGE</td>
<td>Used for adjusting the main shaft axial end play.</td>
</tr>
<tr>
<td><img src="ST-498247001" alt="Image" /></td>
<td>498247001</td>
<td>MAGNET BASE</td>
<td>• Used for measuring backlash between the side gear and pinion, and the hypoid gear. • Used together with the DIAL GAUGE (498247100).</td>
</tr>
<tr>
<td><img src="ST-498247100" alt="Image" /></td>
<td>498247100</td>
<td>DIAL GAUGE</td>
<td>• Used for measuring backlash between the side gear and pinion, and the hypoid gear. • Used together with the MAGNET BASE (498247001).</td>
</tr>
<tr>
<td><img src="ST-498427100" alt="Image" /></td>
<td>498427100</td>
<td>STOPPER</td>
<td>Used for securing the drive pinion shaft assembly and the driven gear assembly when removing the drive pinion shaft assembly lock nut.</td>
</tr>
</tbody>
</table>
## General Description

### MANUAL TRANSMISSION AND DIFFERENTIAL

<table>
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</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>498937000</td>
<td>TRANSMISSION HOLDER</td>
<td>Used for removing and installing the lock nut of the transmission main shaft.</td>
</tr>
<tr>
<td>ST-498937000</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
|               | 499277100   | BUSHING 1-2 INSTALLER | • Used for installing the 1st driven gear thrust plate and the 1st-2nd driven gear bushing.  
• Used for installing the roller bearing outer race to the differential case. |
| ST-499277100 |             |             |         |
|               | 499277200   | INSTALLER | Used for press-fitting the 2nd driven gear, roller bearings and the 5th driven gear onto the driven shaft. |
| ST-499277200 |             |             |         |
|               | 499757002   | INSTALLER | • Used for installing the snap ring (OUT 25), and ball bearing (25 × 26 × 17).  
• Used for installing the bearing cone of the transfer driven gear (extension core side). |
| ST-499757002 |             |             |         |
|               | 18630AA010  | WRENCH COMPL RETAINER | • Used for removing and installing the differential side retainer.  
• WRENCH ASSEMBLY (499787000) can also be used. |
| ST18630AA010 |             |             |         |
## General Description

### MANUAL TRANSMISSION AND DIFFERENTIAL

#### 5TH DRIVEN GEAR REMOVER
- **Tool Number:** 499857000
- **Description:** Used for removing the 5th driven gear.

#### RACE 4-5 INSTALLER
- **Tool Number:** 499877000
- **Description:** Used for installing the 4th needle bearing race and ball bearing onto the transmission main shaft.
- **Remarks:** Used together with the REMOVER (899714110).

#### DRIVE PINION GAUGE ASSY
- **Tool Number:** 499917500
- **Description:** Used for adjusting the drive pinion shim.

#### HANDLE
- **Tool Number:** 499927100
- **Description:** Used for fitting the transmission main shaft.

#### TRANSMISSION STAND SET
- **Tool Number:** 499937100
- **Description:** Used for disassembling and assembling the transmission.

---

<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="ST-499857000" /></td>
<td>499857000</td>
<td>5TH DRIVEN GEAR REMOVER</td>
<td>Used for removing the 5th driven gear.</td>
</tr>
<tr>
<td><img src="image2.png" alt="ST-499877000" /></td>
<td>499877000</td>
<td>RACE 4-5 INSTALLER</td>
<td>Used for installing the 4th needle bearing race and ball bearing onto the transmission main shaft. Used together with the REMOVER (899714110).</td>
</tr>
<tr>
<td><img src="image3.png" alt="ST-499917500" /></td>
<td>499917500</td>
<td>DRIVE PINION GAUGE ASSY</td>
<td>Used for adjusting the drive pinion shim.</td>
</tr>
<tr>
<td><img src="image4.png" alt="ST-499927100" /></td>
<td>499927100</td>
<td>HANDLE</td>
<td>Used for fitting the transmission main shaft.</td>
</tr>
<tr>
<td><img src="image5.png" alt="ST-499937100" /></td>
<td>499937100</td>
<td>TRANSMISSION STAND SET</td>
<td>Used for disassembling and assembling the transmission.</td>
</tr>
</tbody>
</table>
### General Description

**MANUAL TRANSMISSION AND DIFFERENTIAL**

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</thead>
<tbody>
<tr>
<td>ST-499987003</td>
<td>499987003</td>
<td>SOCKET WRENCH (35)</td>
<td>Used for removing and installing the driven pinion lock nut and main shaft lock nut.</td>
</tr>
<tr>
<td>ST-499987300</td>
<td>499987300</td>
<td>SOCKET WRENCH (50)</td>
<td>Used for removing and installing the driven gear assembly lock nut.</td>
</tr>
<tr>
<td>ST-899714110</td>
<td>899714110</td>
<td>REMOVER</td>
<td>Used for fixing the transmission main shaft, drive pinion and rear drive shaft.</td>
</tr>
<tr>
<td>ST-899864100</td>
<td>899864100</td>
<td>REMOVER</td>
<td>Used for removing transmission main shaft and drive pinion parts.</td>
</tr>
<tr>
<td>ST-899884100</td>
<td>899884100</td>
<td>HOLDER</td>
<td>Used for tightening the lock nut on the sleeve.</td>
</tr>
</tbody>
</table>
## General Description

### MANUAL TRANSMISSION AND DIFFERENTIAL

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<tr>
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</thead>
<tbody>
<tr>
<td><img src="image1" alt="ST-899904100" /></td>
<td>899904100</td>
<td>STRAIGHT PIN REMOVER</td>
<td>Used for removing and installing the straight pin.</td>
</tr>
<tr>
<td><img src="image2" alt="ST-899988608" /></td>
<td>899988608</td>
<td>SOCKET WRENCH (27)</td>
<td>Used for removing and installing the drive pinion lock nut.</td>
</tr>
</tbody>
</table>
| ![ST-398497701](image3) | 398497701 | ADAPTER | • Used for installing roller bearing onto the differential case.  
• Used together with the INSTALLER (499587000). |
| ![ST-499587000](image4) | 499587000 | INSTALLER | Used for installing the driven gears to the driven shaft. |
| ![ST-498057300](image5) | 498057300 | INSTALLER | Used for installing the extension oil seal. |
## General Description

### MANUAL TRANSMISSION AND DIFFERENTIAL

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<tbody>
<tr>
<td>ST-498255400</td>
<td>498255400</td>
<td>PLATE</td>
<td>Used for measuring backlash.</td>
</tr>
</tbody>
</table>
| ST-498077400  | 498077400   | SYNCHRONIZER CONE REMOVER | • Used for removing the synchronizer cone of the main shaft.  
• Used for removing 5th driven gear of the drive pinion shaft. |
| ST41099AC000  | 41099AC000  | ENGINE SUPPORT ASSY | Used for supporting the engine. |
| ST41099AC000  | 398527700   | PULLER ASSY  | Used for removing the extension case roller bearing. |
| ST-398643600  | 398643600   | GAUGE        | Used for measuring the total end play, extension end play and drive pinion height. |
### General Description

#### MANUAL TRANSMISSION AND DIFFERENTIAL

#### 2. GENERAL TOOL

<table>
<thead>
<tr>
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<th>REMARKS</th>
</tr>
</thead>
</table>
| ![ INSTALLER](ST-398177700.png) | 398177700 | INSTALLER | • Used for installing the bearing cone of transfer driven gear (transfer case side).  
• Used for installing the ball bearing of the transfer drive gear. |
| ![ OIL SEAL PROTECTOR](ST28399SA010.png) | 28399SA010 | OIL SEAL PROTECTOR | Used for protecting the oil seal from damage when inserting the front drive shaft. |
| ![ DIFFERENTIAL SIDE OIL SEAL INSTALLER](ST18675AA000.png) | 18675AA000 | DIFFERENTIAL SIDE OIL SEAL INSTALLER | Used for installing the differential side retainer oil seal. |
| ![ STRAIGHT PIN REMOVER](ST-398791700.png) | 398791700 | STRAIGHT PIN REMOVER | Used for installing and removing the straight pin. |

#### TOOL NAME | REMARKS
---|---
Circuit tester | Used for measuring resistance, voltage and current.
TORX® bit T70 | Used for installing and removing the differential gear oil drain plug.
2. Transmission Gear Oil

A: INSPECTION
1) Park the vehicle on a level surface.
2) Turn the ignition switch to OFF, and wait until the engine cools.
3) Remove the oil level gauge and wipe it clean.
4) Reinsert the oil level gauge all the way. Be sure that the oil level gauge is correctly inserted in the proper direction.
5) Pull out the oil level gauge again, and check the oil level. If it is at the lower level or less, add oil through the oil level gauge hole to bring the level up to the upper level.

B: REPLACEMENT
1) Pull out the oil level gauge.
2) Lift up the vehicle.
3) Using the TORX® bit T70, remove the drain plug, and drain the transmission gear oil completely.

CAUTION:
• Immediately after the engine has been running, the transmission gear oil is hot. Be careful not to burn yourself.
• Be careful not to spill the transmission gear oil on the exhaust pipe, to prevent emission of smoke or causing a fire. If differential gear oil is spilled on the exhaust pipe, wipe it off completely.
4) Using the TORX® bit T70, tighten the transmission gear oil drain plug.

NOTE:
• Tighten the drain plug of the transmission gear oil after draining the transmission gear oil.
• Use a new gasket.

Tightening torque:
- 44 N·m (4.5 kgf-m, 32.5 ft-lb) (Aluminum gasket)
- 70 N·m (7.1 kgf-m, 51.6 ft-lb) (Copper gasket)

5) Lower the vehicle.
6) Pour gear oil through the oil level gauge hole.

Recommended gear oil:
- GL-5 (75W-90) or equivalent

Gear oil capacity:
- 3.5  \( \text{qt} \) (3.7 US qt, 3.1 Imp qt)
7) Measure the transmission gear oil level to check that it is within specifications.

CAUTION:
When inserting the oil level gauge into transmission, align the protrusion on the top part of the oil level gauge with the notch in the oil level gauge hole.
3. Manual Transmission Assembly

A: REMOVAL

1) Set the vehicle on a lift.
2) Open the front hood.
3) Disconnect the ground cable from battery.
4) Drain transmission gear oil completely. <Ref. to 5MT-23, REPLACEMENT, Transmission Gear Oil.>
5) Remove the air intake chamber and intake boot.
   (Non-turbo model) <Ref. to IN(H4SO)-7, REMOVAL, Air Intake Chamber.>
6) Remove the air intake chamber stay. (Non-turbo model)
7) Remove the intercooler. (Turbo model) <Ref. to IN(H4DOTC)-11, REMOVAL, Intercooler.>
8) Disconnect the following connector.
   • Non-turbo model
      (A) Neutral position switch connector (Brown)
      (B) Back-up light switch connector (Gray)
   • Turbo model
      (A) Neutral position and back-up light switch connector
      (B) Rear oxygen sensor connector
9) Disconnect the ground cable.
10) Disconnect the engine harness connectors, and then remove the engine hanger rear. (Non-turbo model)

11) Remove the engine hanger. (Turbo model)

12) Remove the starter. <Ref. to SC(H4SO)-6, REMOVAL, Starter.>
13) Remove the operating cylinder from the transmission, and suspend on a wire.

14) Remove the throttle body. (Non-turbo model) <Ref. to FU(H4SO)-13, REMOVAL, Throttle Body.>

15) Remove the pitching stopper.

16) Set the ST.

17) Remove the bolts which hold upper side of transmission to engine.

18) Lift up the vehicle.
19) Remove the front and center exhaust pipes. (Non-turbo model) <Ref. to EX(H4SO)-6, REMOVAL, Front Exhaust Pipe.>
20) Remove the center exhaust pipe. (Turbo model) <Ref. to EX(H4DOTC)-8, REMOVAL, Center Exhaust Pipe.>
21) Remove the rear exhaust pipe and muffler.
   • Non-turbo model <Ref. to EX(H4SO)-10, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H4SO)-12, REMOVAL, Muffler.>
   • Turbo model <Ref. to EX(H4DOTC)-13, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H4DOTC)-15, REMOVAL, Muffler.>

CAUTION:
When removing the exhaust pipes, be careful each exhaust pipe does not drop out.
22) Remove the heat shield cover.

23) Remove the hanger bracket from the right side of transmission.

24) Remove the propeller shaft.  <Ref. to DS-10, REMOVAL, Propeller Shaft.>

25) Remove the gear shift rod and the stay from the transmission.
   (1) Disconnect the stay from the transmission.
   (2) Disconnect the gear shift rod from the transmission.

26) Disconnect the stabilizer link from the front arm.

27) Remove the bolt securing the ball joint of the front arm to the housing, then separate the front arms and the housing.

28) Using a crowbar, remove the left and right front drive shaft from the transmission.
29) Remove the bolts and nuts which hold lower side of transmission to engine.

30) Place the transmission jack under the transmission.

CAUTION:
Always support the transmission case with a transmission jack.

31) Remove the front crossmember and rear crossmember from the vehicle.

32) Tighten the turnbuckle of the ST while lowering the transmission jack to tilt the engine assembly towards the back.

33) Remove the transmission.

NOTE:
Move the transmission jack towards the rear until the main shaft is withdrawn from the clutch disc.

34) Separate the transmission assembly from the transmission cushion rubber.

B: INSTALLATION

1) Replace the differential side retainer oil seal.
   <Ref. to 5MT-34, REPLACEMENT, Differential Side Retainer Oil Seal.>
   ST 18675AA000 DIFFERENTIAL SIDE OIL SEAL INSTALLER

NOTE:
Be sure to replace the differential side retainer oil seal after the removing the front drive shaft.

2) Install the transmission cushion rubber to the transmission, and tighten the bolt (A).

3) Install the transmission cushion rubber to the center crossmember, and tighten the nut (B).

Tightening torque:

   Bolt (A) 35 N·m (3.6 kgf-m, 25.8 ft-lb)
   Nut (B) 35 N·m (3.6 kgf-m, 25.8 ft-lb)

4) Install the transmission onto the engine.
   (1) Lift up the transmission gradually using a transmission jack.
   (2) Engage at the spline section.

NOTE:
Be careful not to hit the main shaft against the clutch cover.

5) Loosen the turnbuckle of the ST while raising the transmission jack to return the engine to its original position.
6) Install the front crossmember and rear cross-member.

**Tightening torque:**
- **T1:** 70 N·m (7.1 kgf-m, 51.6 ft-lb)
- **T2:** 140 N·m (14.3 kgf-m, 103.3 ft-lb)

7) Take out the transmission jack.

8) Tighten the bolts and nuts which hold the lower side of transmission to the engine.

**Tightening torque:**
- 50 N·m (5.1 kgf-m, 36.9 ft-lb)

9) Connect the transmission to the engine.
   - (1) Install the starter. <Ref. to SC(H4SO)-6, INSTALLATION, Starter.>
   - (2) Tighten the bolts which hold the upper side of the transmission to the engine.

**Tightening torque:**
- 50 N·m (5.1 kgf-m, 36.9 ft-lb)

10) Remove the ST.

11) Install the pitching stopper.

**Tightening torque:**
- **T1:** 50 N·m (5.1 kgf-m, 36.9 ft-lb)
- **T2:** 58 N·m (5.9 kgf-m, 42.8 ft-lb)

12) Install the throttle body. (Non-turbo model) <Ref. to FU(H4SO)-13, INSTALLATION, Throttle Body.>

13) Lift up the vehicle.

14) Install the front drive shaft into the transmission.

ST 28399SA010 OIL SEAL PROTECTOR
15) Insert the ball joints of the front arm into the housing, then tighten the installing bolts.

**Tightening torque:**

50 N·m (5.1 kgf-m, 36.9 ft-lb)

16) Attach the stabilizer link to the front arm.

**Tightening torque:**

30 N·m (3.1 kgf-m, 22.1 ft-lb)

17) Attach the gear shift rod and stay.

(1) Attach the gear shift rod to the transmission.

**Tightening torque:**

12 N·m (1.2 kgf-m, 8.9 ft-lb)

18) Install the propeller shaft. <Ref. to DS-11, INSTALLATION, Propeller Shaft.>

19) Install the heat shield cover.

20) Install the hanger bracket to the transmission.

21) Install the rear exhaust pipe and muffler.
- Non-turbo model
  <Ref. to EX(H4SO)-10, INSTALLATION, Rear Exhaust Pipe.> <Ref. to EX(H4SO)-13, INSTALLATION, Muffler.>
- Turbo model
  <Ref. to EX(H4DOTC)-14, INSTALLATION, Rear Exhaust Pipe.> <Ref. to EX(H4DOTC)-16, INSTALLATION, Muffler.>

22) Install the front and center exhaust pipe. (Non-turbo model) <Ref. to EX(H4SO)-7, INSTALLATION, Front Exhaust Pipe.>
23) Install the center exhaust pipe. (Turbo model)  
<Ref. to EX(H4DOTC)-9, INSTALLATION, Center Exhaust Pipe.>
24) Install the under cover. <Ref. to EI-26, INSTALLATION, Front Under Cover.>
25) Install the operating cylinder.

**Tightening torque:**

37 N·m (3.8 kgf-m, 27.5 ft-lb)

26) Install the ground cable.

**Tightening torque:**

13 N·m (1.3 kgf-m, 9.4 ft-lb)

27) Install the engine hanger rear, and then connect the engine harness connector. (Non-turbo model)

28) Install the engine hanger. (Turbo model)

29) Connect the following connectors.
- Non-turbo model

30) Install the air intake chamber stay. (Non-turbo model)

**Tightening torque:**

16 N·m (1.6 kgf-m, 11.6 ft-lb)

31) Install the air intake chamber and intake boot. (Non-turbo model)  
<Ref. to IN(H4SO)-7, INSTALLATION, Air Intake Chamber.>
32) Install the intercooler. (Turbo model) <Ref. to IN(H4DOTC)-12, INSTALLATION, Intercooler.>
33) Connect the battery ground cable to the battery.  
34) Remove the lift arm from vehicle.
4. Transmission Mounting System

A: REMOVAL

1. PITCHING STOPPER
   1) Disconnect the ground cable from battery.
   2) Remove the air intake chamber and intake boot. (Non-turbo model) <Ref. to IN(H4SO)-7, REMOVAL, Air Intake Chamber.>
   3) Remove the intercooler. (Turbo model) <Ref. to IN(H4DOTC)-11, REMOVAL, Intercooler.>
   4) Remove the pitching stopper.

2. CROSSMEMBER AND CUSHION RUBBER
   1) Disconnect the ground cable from battery.
   2) Lift up the vehicle.
   3) Remove the front and center exhaust pipes. (Non-turbo model) <Ref. to EX(H4SO)-6, REMOVAL, Front Exhaust Pipe.>
   4) Remove the center exhaust pipe. (Turbo model) <Ref. to EX(H4DOTC)-8, REMOVAL, Center Exhaust Pipe.>
   5) Remove the rear exhaust pipe and muffler.
      • Non-turbo model <Ref. to EX(H4SO)-10, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H4SO)-12, REMOVAL, Muffler.>
      • Turbo model <Ref. to EX(H4DOTC)-13, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H4DOTC)-15, REMOVAL, Muffler.>
   6) Remove the heat shield cover.

7) Set the transmission jack under the transmission body.

CAUTION:
Always support the transmission case with a transmission jack.

8) Remove the front crossmember and the rear crossmember.

B: INSTALLATION

1. PITCHING STOPPER
   1) Install the pitching stopper.
      Tightening torque:
      T1: 50 N·m (5.1 kgf-m, 36.9 ft-lb)
      T2: 58 N·m (5.9 kgf-m, 42.8 ft-lb)
   2) Install the air intake chamber and intake boot. (Non-turbo model) <Ref. to IN(H4SO)-7, INSTALLATION, Air Intake Chamber.>
   3) Install the intercooler. (Turbo model) <Ref. to IN(H4DOTC)-12, INSTALLATION, Intercooler.>
   4) Connect the battery ground cable to the battery.
Transmission Mounting System

MANUAL TRANSMISSION AND DIFFERENTIAL

2. CROSSMEMBER AND CUSHION RUBBER

1) Install the transmission cushion rubber to the transmission, and tighten the bolt (A).
2) Install the transmission cushion rubber to the center crossmember, and tighten the nut (B).

<table>
<thead>
<tr>
<th>Tightening torque:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Bolt (A)</strong></td>
</tr>
<tr>
<td>35 N·m (3.6 kgf-m, 25.8 ft-lb)</td>
</tr>
<tr>
<td><strong>Nut (B)</strong></td>
</tr>
<tr>
<td>35 N·m (3.6 kgf-m, 25.8 ft-lb)</td>
</tr>
</tbody>
</table>

3) Install the front crossmember and rear crossmember.

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<tr>
<th>Tightening torque:</th>
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<tbody>
<tr>
<td><strong>T1</strong>: 70 N·m (7.1 kgf-m, 51.6 ft-lb)</td>
</tr>
<tr>
<td><strong>T2</strong>: 140 N·m (14.3 kgf-m, 103.3 ft-lb)</td>
</tr>
</tbody>
</table>

4) Remove the transmission jack.
5) Install the heat shield cover.

6) Install the front and center exhaust pipe. (Non-turbo model)
   <Ref. to EX(H4SO)-7, INSTALLATION, Front Exhaust Pipe.>
7) Install the center exhaust pipe. (Turbo model)
   <Ref. to EX(H4DOTC)-9, INSTALLATION, Center Exhaust Pipe.>
8) Install the rear exhaust pipe and muffler.
   • Non-turbo model
   <Ref. to EX(H4SO)-10, INSTALLATION, Rear Exhaust Pipe.>
   <Ref. to EX(H4SO)-13, INSTALLATION, Muffler.>
   • Turbo model
   <Ref. to EX(H4DOTC)-14, INSTALLATION, Rear Exhaust Pipe.>
   <Ref. to EX(H4DOTC)-16, INSTALLATION, Muffler.>
9) Lower the vehicle.
10) Connect the battery ground cable to the battery.

C: INSPECTION

Perform the following inspection procedures and repair or replace faulty parts.

1. PITCHING STOPPER
   Check the pitching stopper for bends or damage. Check that the rubber is not stiff, cracked or otherwise damaged.

2. CROSSMEMBER AND CUSHION RUBBER
   Check crossmember for bends or damage. Check that the cushion rubber is not stiff, cracked, or otherwise damaged.
5. Oil Seal

A: INSPECTION
Check for leakage of gear oil from the oil seal. If there is oil leakage, replace the oil seal with the new part and check the propeller shaft.

B: REPLACEMENT
1) Clean the transmission exterior.
2) Using the TORX® bit T70, remove the drain plug, and drain the transmission gear oil completely.
3) Using the TORX® bit T70, tighten the transmission gear oil drain plug.

NOTE:
Use a new gasket.

Tightening torque:
- 44 N·m (4.5 kgf-m, 32.5 ft-lb) (Aluminum gasket)
- 70 N·m (7.1 kgf-m, 51.6 ft-lb) (Copper gasket)

4) Remove the rear exhaust pipe and muffler.
   • Non-turbo model
     <Ref. to EX(H4SO)-10, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H4SO)-12, REMOVAL, Muffler.>
   • Turbo model
     <Ref. to EX(H4DOTC)-13, REMOVAL, Rear Exhaust Pipe.> <Ref. to EX(H4DOTC)-15, REMOVAL, Muffler.>
   5) Remove the heat shield cover.

6) Remove the propeller shaft. <Ref. to DS-10, REMOVAL, Propeller Shaft.>

7) Using the ST, remove the oil seal.
   ST 398527700 PULLER ASSY

8) Using the ST, install the oil seal.
   ST 498057300 INSTALLER

9) Install the propeller shaft. <Ref. to DS-11, INSTALLATION, Propeller Shaft.>
10) Install the heat shield cover.

11) Install the rear exhaust pipe and muffler.
    • Non-turbo model
      <Ref. to EX(H4SO)-10, INSTALLATION, Rear Exhaust Pipe.> <Ref. to EX(H4SO)-13, INSTALLATION, Muffler.>
    • Turbo model
      <Ref. to EX(H4DOTC)-14, INSTALLATION, Rear Exhaust Pipe.> <Ref. to EX(H4DOTC)-16, INSTALLATION, Muffler.>

12) Pour in the transmission gear oil and check the oil level. <Ref. to 5MT-23, Transmission Gear Oil.>
6. Differential Side Retainer Oil Seal

A: INSPECTION

Check for leakage of gear oil from differential side retainer oil seal part. If there is oil leakage, replace the oil seal with the new part and check the drive shaft.

B: REPLACEMENT

1) Lift up the vehicle.
2) Remove the differential gear oil drain plug using TORX® bit T70, and drain the differential gear oil completely.

3) Replace the gasket with a new part and tighten the differential gear oil drain plug using the TORX® bit T70.

Tightening torque:
- 44 N·m (4.5 kgf-m, 32.5 ft-lb) (Aluminum gasket)
- 70 N·m (7.1 kgf-m, 51.6 ft-lb) (Copper gasket)

4) Remove the front and center exhaust pipes. (Non-turbo model) <Ref. to EX(H4SO)-6, REMOVAL, Front Exhaust Pipe.>
5) Remove the center exhaust pipe. (Turbo model) <Ref. to EX(H4DOTC)-8, REMOVAL, Center Exhaust Pipe.>
6) Separate the front drive shaft from the transmission. <Ref. to DS-25, REMOVAL, Front Drive Shaft.>

7) Remove the differential side retainer oil seal.

NOTE:
- Be sure to replace the differential side retainer oil seal after the procedure of removing front drive shaft from transmission.
- To remove the oil seal, use ST 398527700 PULLER ASSY. When removing the part by using a flat tip screwdriver, be careful not to scratch the differential side retainer.
8) Using the ST, install the differential side retainer oil seal by lightly tapping with a plastic hammer.

ST 18675AA000 DIFFERENTIAL SIDE OIL SEAL INSTALLER

NOTE:
Apply oil to the oil seal lips.

9) Install the front drive shaft. <Ref. to DS-25, INSTALLATION, Front Drive Shaft.>

ST 28399SA010 OIL SEAL PROTECTOR

10) Install the front and center exhaust pipe. (Non-turbo model) <Ref. to EX(H4SO)-7, INSTALLATION, Front Exhaust Pipe.>

11) Install the center exhaust pipe. <Ref. to EX(H4DOTC)-9, INSTALLATION, Center Exhaust Pipe.>

12) Lower the vehicle.

13) Fill the transmission gear oil through the oil level gauge hole. <Ref. to 5MT-23, REPLACEMENT, Transmission Gear Oil.>
7. Switches and Harness

A: REMOval

1. BACK-UP LIGHT SWITCH & NEUTRAL POSITION SWITCH

1) Disconnect the ground cable from battery.
2) Remove the air intake chamber and intake boot. (Non-turbo model) <Ref. to IN(H4SO)-7, REMOVAL, Air Intake Chamber.>
3) Remove the intercooler. (Turbo model) <Ref. to IN(H4DOTC)-11, REMOVAL, Intercooler.>
4) Disconnect the connector back-up light switch & neutral position switch.
   - Non-turbo model

   ![Diagram of neutral position and back-up light switch connector](MT-01648)
   - (A) Neutral position switch connector (Brown)
   - (B) Back-up light switch connector (Gray)

   ![Diagram of neutral position and back-up light switch connector](MT-01659)
   - (A) Neutral position and back-up light switch connector

5) Lift up the vehicle.

6) Remove the back-up light switch & neutral position switch with the harness.
B: INSTALLATION

1. BACK-UP LIGHT SWITCH & NEUTRAL POSITION SWITCH

1) Install the back-up light switch & neutral position switch with the harness.

   **Tightening torque:**
   32.3 N·m (3.3 kgf-m, 23.8 ft-lb)

2) Connect the connectors of back-up light switch & neutral position switch.
3) Install the air intake chamber and intake boot. (Non-turbo model)<Ref. to IN(H4SO)-7, INSTALLATION, Air Intake Chamber.>
4) Install the intercooler. (Turbo model)<Ref. to IN(H4DOTC)-12, INSTALLATION, Intercooler.>
5) Connect the battery ground cable to the battery.

C: INSPECTION

1. BACK-UP LIGHT SWITCH
   Check the back-up light switch. <Ref. to LI-7, INSPECTION, Back-up Light System.>

2. NEUTRAL POSITION SWITCH
   1) Turn the ignition switch to OFF.
   2) Disconnect the connector of neutral position switch.
   3) Measure the resistance between neutral position switch terminals.
      • Non-turbo model

<table>
<thead>
<tr>
<th>Gear shift position</th>
<th>Terminal No.</th>
<th>Specified resistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neutral position</td>
<td>1 and 2</td>
<td>Less than 1 Ω</td>
</tr>
<tr>
<td>Other positions</td>
<td>1 and 2</td>
<td>1 MΩ or more</td>
</tr>
</tbody>
</table>

   • Turbo model

<table>
<thead>
<tr>
<th>Gear shift position</th>
<th>Terminal No.</th>
<th>Specified resistance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Neutral position</td>
<td>1 and 3</td>
<td>Less than 1 Ω</td>
</tr>
<tr>
<td>Other positions</td>
<td>1 and 3</td>
<td>1 MΩ or more</td>
</tr>
</tbody>
</table>

4) Replace faulty parts.
8. Preparation for Overhaul

A: PROCEDURE

1) Clean oil, grease, dirt and dust from the transmission.
2) Using the TORX® bit T70, remove the transmission gear oil drain plug, and drain the transmission gear oil completely.
3) Using the TORX® bit T70, tighten the transmission gear oil drain plug.

NOTE:
Use a new gasket.

*Tightening torque:*
44 N·m (4.5 kgf-m, 32.5 ft-lb) (Aluminum gasket)
70 N·m (7.1 kgf-m, 51.6 ft-lb) (Copper gasket)

4) Attach the transmission to the ST.

ST 499937100 TRANSMISSION STAND

5) Apply oil to rotating parts before assembly.
6) All disassembled parts, if to be reused, should be reinstalled in the original positions and directions.
7) Gaskets, lock washers and lock nuts must be replaced with new parts.
8) Apply liquid gasket to the specified areas to prevent leakage.
9. Transfer Case and Extension Case Assembly

A: REMOVAL

1) Remove the manual transmission assembly from the vehicle. <Ref. to 5MT-24, REMOVAL, Manual Transmission Assembly.>
2) Remove the back-up light switch & neutral position switch. <Ref. to 5MT-35, REMOVAL, Switches and Harness.>
3) Remove the transfer case together with the extension case assembly.
4) Remove the shifter arm.
5) Remove the extension case assembly.

B: INSTALLATION

1) Install the center differential and transfer driven gear into the transfer case.
2) Remove the bearing outer race from the extension case.
3) While holding the bearing outer race horizontally, rotate the driven shaft for ten turns.
4) Measure the height “W” between transfer case and taper roller bearing on the transfer driven gear.
5) Measure depth “X” on bearing insertion part of the extension case.

**NOTE:**
Measure with bearing outer race and thrust washer removed.

6) Calculate the thickness “t” of the thrust washer using following calculation.
\[ t = X - W + (0.15 - 0.25 \text{ mm } (0.006 - 0.010 \text{ in})) \]

7) Select the washer with the nearest value in the following table.

<table>
<thead>
<tr>
<th>Preload of the taper roller bearing (amount of standard protrusion):</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.15 — 0.25 mm (0.006 — 0.010 in)</td>
</tr>
</tbody>
</table>

**NOTE:**
Be sure that the amount of preload is within the standard value.

<table>
<thead>
<tr>
<th>Part number</th>
<th>Thickness mm (in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>803050060</td>
<td>0.50 (0.0197)</td>
</tr>
<tr>
<td>803050061</td>
<td>0.55 (0.0217)</td>
</tr>
<tr>
<td>803050062</td>
<td>0.60 (0.0236)</td>
</tr>
<tr>
<td>803050063</td>
<td>0.65 (0.0256)</td>
</tr>
<tr>
<td>803050064</td>
<td>0.70 (0.0276)</td>
</tr>
<tr>
<td>803050065</td>
<td>0.75 (0.0295)</td>
</tr>
<tr>
<td>803050066</td>
<td>0.80 (0.0315)</td>
</tr>
<tr>
<td>803050067</td>
<td>0.85 (0.0335)</td>
</tr>
<tr>
<td>803050068</td>
<td>0.90 (0.0354)</td>
</tr>
<tr>
<td>803050069</td>
<td>0.95 (0.0374)</td>
</tr>
<tr>
<td>803050070</td>
<td>1.00 (0.0394)</td>
</tr>
<tr>
<td>803050071</td>
<td>1.05 (0.0413)</td>
</tr>
<tr>
<td>803050072</td>
<td>1.10 (0.0433)</td>
</tr>
<tr>
<td>803050073</td>
<td>1.15 (0.0453)</td>
</tr>
<tr>
<td>803050074</td>
<td>1.20 (0.0472)</td>
</tr>
<tr>
<td>803050075</td>
<td>1.25 (0.0492)</td>
</tr>
<tr>
<td>803050076</td>
<td>1.30 (0.0512)</td>
</tr>
<tr>
<td>803050077</td>
<td>1.35 (0.0531)</td>
</tr>
<tr>
<td>803050078</td>
<td>1.40 (0.0551)</td>
</tr>
<tr>
<td>803050079</td>
<td>1.45 (0.0571)</td>
</tr>
</tbody>
</table>

8) Fit the thrust washers on the transfer drive shaft.
9) Install the bearing outer race into the extension case.

10) Measure the depth “S” between transfer case and center differential.

**ST 398643600 GAUGE**

11) Measure the height “T” between the extension case and transfer drive gear.

**ST 398643600 GAUGE**

**NOTE:**
ST thickness [15 mm (0.59 in)]

12) Calculate the thickness “U” of the thrust washer using following calculation.
\[ U = S + T - 30 \text{ mm } (1.18 \text{ in}) \text{ [Thickness of ST]} \]

13) Select a suitable washer in the following table.

<table>
<thead>
<tr>
<th>Standard clearance:</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.15 — 0.35 mm (0.0059 — 0.0138 in)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Thrust washer (50 × 61 × t)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part number</td>
</tr>
<tr>
<td>-------------</td>
</tr>
<tr>
<td>803050060</td>
</tr>
<tr>
<td>803050061</td>
</tr>
<tr>
<td>803050062</td>
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<tr>
<td>803050063</td>
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<td>803050064</td>
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<td>803050065</td>
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<td>803050066</td>
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<tr>
<td>803050067</td>
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<td>803050068</td>
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</tr>
<tr>
<td>803050076</td>
</tr>
<tr>
<td>803050077</td>
</tr>
<tr>
<td>803050078</td>
</tr>
<tr>
<td>803050079</td>
</tr>
</tbody>
</table>

14) Fit the thrust washer onto the center differential.
15) Apply a proper amount of liquid gasket to the transfer case mating surface.

**Liquid gasket:**
*THREE BOND 1215 (Part No. 004403007) or equivalent*

16) Install the extension assembly into the transfer case.

**Tightening torque:**
*40 N·m (4.1 kgf-m, 29.5 ft-lb)*

17) Attach the shifter arm to transfer case.

18) Hang the shifter arm on 3rd-4th fork rod.

(A) Shifter arm  
(B) 3rd-4th fork rod

19) Install the extension case assembly along with the transfer case to the transmission case.

**Tightening torque:**
*24.5 N·m (2.5 kgf-m, 18.1 ft-lb)*
C: DISASSEMBLY

1. TRANSFER CASE
   1) Remove the reverse check sleeve assembly. <Ref. to 5MT-47, REMOVAL, Reverse Check Sleeve.>
   2) Remove the oil guide.

2. EXTENSION CASE
   1) Remove the transfer drive gear assembly. <Ref. to 5MT-42, REMOVAL, Transfer Drive Gear.>
   2) Remove the shift bracket.
   3) Remove the oil seal from the extension case. <Ref. to 5MT-33, Oil Seal.>

D: ASSEMBLY

1. EXTENSION CASE
   1) Using the ST, install the oil seal to the extension case. <Ref. to 5MT-33, Oil Seal.>
      NOTE: Use a new oil seal.
      2) Install the shift bracket to extension case.
      
      Tightening torque:
      24.5 N·m (2.5 kgf-m, 18.1 ft-lb)

2. TRANSFER CASE
   1) Install the oil guide to the transfer case.
      
      Tightening torque:
      6.4 N·m (0.65 kgf-m, 4.7 ft-lb)
      
      NOTE: Use a new installing bolt.
   2) Install the reverse check sleeve assembly to the transfer case. <Ref. to 5MT-47, INSTALLATION, Reverse Check Sleeve.>
10. Transfer Drive Gear

A: REMOVAL
1) Remove the manual transmission assembly from the vehicle. <Ref. to 5MT-24, REMOVAL, Manual Transmission Assembly.>
2) Remove the back-up light switch & neutral position switch. <Ref. to 5MT-35, REMOVAL, Switches and Harness.>
3) Remove the transfer case together with the extension case assembly. <Ref. to 5MT-38, REMOVAL, Transfer Case and Extension Case Assembly.>
4) Remove the extension case assembly.
5) Remove the transfer driven gear.
6) Remove the transfer drive gear.

B: INSTALLATION
1) Install the transfer drive gear.
   Tightening torque:  
   \[
   26 \text{ N·m (2.7 kgf-m, 19.2 ft-lb)}
   \]
2) Install the transfer driven gear.
3) Install the extension case assembly.
4) Install the transfer case and the extension case assembly. <Ref. to 5MT-38, INSTALLATION, Transfer Case and Extension Case Assembly.>
5) Install the back-up light switch and the neutral position switch. <Ref. to 5MT-36, INSTALLATION, Switches and Harness.>
6) Install the manual transmission assembly to the vehicle. <Ref. to 5MT-27, INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY
1) Remove the snap ring.
2) Remove the ball bearing.

D: ASSEMBLY
1) Set the ST against the inner race of the bearing, and install the drive shaft.
   ST 398177700 INSTALLER
   CAUTION:
   Do not apply a load in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).
2) Install the snap ring on the transfer drive shaft.
3) Inspect the clearance between the snap ring and the ball bearing. <Ref. to 5MT-43, INSPECTION, Transfer Drive Gear.>
E: INSPECTION

1) Bearing
Replace the bearings in the following cases.
• In case of broken or rusty bearings
• In case of worn or damaged bearings
• When the bearings fail to turn smoothly or emit noise in rotation after gear oil lubrication.

2) Drive gear
If the drive gear tooth surface and shaft are excessively broken or damaged, replace the drive gear.

3) Measure the clearance between snap ring and inner race of ball bearing with a thickness gauge.

**Clearance:**

\[ 0.01 \text{ — } 0.15 \text{ mm (0.0004 — 0.0059 in)} \]

If the measurement is not within specification, select a suitable snap ring and replace it.

<table>
<thead>
<tr>
<th>Snap ring (Outer-30)</th>
<th>Thickness mm (in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part number</td>
<td>Thickness mm (in)</td>
</tr>
<tr>
<td>805030041</td>
<td>1.53 (0.0602)</td>
</tr>
<tr>
<td>805030042</td>
<td>1.65 (0.0650)</td>
</tr>
<tr>
<td>805030043</td>
<td>1.77 (0.0697)</td>
</tr>
</tbody>
</table>
11. Transfer Driven Gear

A: REMOVAL

1) Remove the manual transmission assembly from the vehicle. <Ref. to 5MT-24, REMOVAL, Manual Transmission Assembly.>
2) Remove the back-up light switch & neutral position switch. <Ref. to 5MT-35, REMOVAL, Switches and Harness.>
3) Remove the transfer case together with the extension case assembly. <Ref. to 5MT-38, REMOVAL, Transfer Case and Extension Case Assembly.>
4) Remove the extension case assembly.
5) Remove the transfer driven gear.

6) Remove bearing outer races from the extension case and transfer case.

B: INSTALLATION

1) Install the bearing outer races to extension case and transfer case.

2) Install the transfer driven gear.

3) Install the transfer case and the extension case assembly. <Ref. to 5MT-38, INSTALLATION, Transfer Case and Extension Case Assembly.>
4) Install the back-up light switch and the neutral position switch. <Ref. to 5MT-36, INSTALLATION, Switches and Harness.>
5) Install the manual transmission assembly to the vehicle. <Ref. to 5MT-27, INSTALLATION, Manual Transmission Assembly.>
C: DISASSEMBLY
1) Using the ST, remove the roller bearing (extension case side).
   ST  498077000 REMOVER

2) Using ST1 and ST2, remove the roller bearing (transfer case side).
   ST1 498077000 REMOVER
   ST2 899864100 REMOVER

D: ASSEMBLY
1) Using the ST, install the roller bearing (extension case side).
   ST1 398177700 INSTALLER
   ST2 899864100 REMOVER

   CAUTION:
   Do not apply a load in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).

2) Using ST, install the roller bearing (transfer case side).
   ST  499757002 INSTALLER

   CAUTION:
   Do not apply a load in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).

E: INSPECTION
1) Bearing
   Replace the bearings in the following cases.
   • In case of broken or rusty bearings
   • In case of worn or damaged bearings
   • When the bearings fail to turn smoothly or emit noise in rotation after gear oil lubrication.

2) Driven gear
   If the driven gear tooth surface and shaft are excessively broken or damaged, replace the driven gear.
12. Center Differential

A: REMOVAL

1) Remove the manual transmission assembly from the vehicle. <Ref. to 5MT-24, REMOVAL, Manual Transmission Assembly.>
2) Remove the back-up light switch & neutral position switch. <Ref. to 5MT-35, REMOVAL, Switches and Harness.>
3) Remove the transfer case together with the extension case assembly. <Ref. to 5MT-38, REMOVAL, Transfer Case and Extension Case Assembly.>
4) Remove the extension case assembly. <Ref. to 5MT-38, REMOVAL, Transfer Case and Extension Case Assembly.>
5) Remove the transfer driven gear. <Ref. to 5MT-44, REMOVAL, Transfer Driven Gear.>
6) Remove the center differential.

B: INSTALLATION

1) Install the center differential into transfer case.
2) Install the transfer driven gear. <Ref. to 5MT-44, INSTALLATION, Transfer Driven Gear.>
3) Install the extension case assembly. <Ref. to 5MT-38, INSTALLATION, Transfer Case and Extension Case Assembly.>
4) Install the transfer case together with the extension case assembly. <Ref. to 5MT-38, INSTALLATION, Transfer Case and Extension Case Assembly.>
5) Install the back-up light switch and the neutral position switch. <Ref. to 5MT-36, INSTALLATION, Switches and Harness.>
6) Install the manual transmission assembly to the vehicle. <Ref. to 5MT-27, INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY

NOTE:
Center differential is a non-disassembled part which should not be disassembled.

Remove the ball bearing using ST.

NOTE:
Do not reuse the ball bearing.

ST 498077300 CENTER DIFFERENTIAL BEARING REMOVER

D: ASSEMBLY

Install the ball bearing into the center differential assembly.

CAUTION:
Do not apply a load in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).

E: INSPECTION

1) Bearing
Replace the bearings in the following cases.
• In case of broken or rusty bearings
• In case of worn or damaged bearings
• When the bearings fail to turn smoothly or emit noise in rotation after gear oil lubrication.
• When bearing has other defects.
2) Center differential
Replace the center differential case assembly if worn or damaged.
13. Reverse Check Sleeve

A: REMOVAL

1) Remove the manual transmission assembly from the vehicle. <Ref. to 5MT-24, REMOVAL, Manual Transmission Assembly.>
2) Remove the transfer case together with the extension case assembly. <Ref. to 5MT-38, REMOVAL, Transfer Case and Extension Case Assembly.>
3) Remove the shifter arm.
4) Remove the plug, gasket, reverse accent spring, and reverse check ball.
5) Remove the reverse check sleeve.

B: INSTALLATION

1) Install the reverse check sleeve.

**Tightening torque:**
6.4 N·m (0.65 kgf-m, 4.7 ft-lb)

2) Reverse check ball, reverse accent spring, gasket and plug to the transfer case.

**Tightening torque:**
9.75 N·m (1.0 kgf-m, 7.2 ft-lb)

3) Attach the shifter arm to the transfer case assembly.
4) Install the transfer case together with the extension case assembly. <Ref. to 5MT-38, INSTALLATION, Transfer Case and Extension Case Assembly.>
5) Install the manual transmission assembly to the vehicle. <Ref. to 5MT-27, INSTALLATION, Manual Transmission Assembly.>
C: DISASSEMBLY

1) Cover the reverse check sleeve with a rag, and remove the snap ring using a screwdriver.

NOTE:
Replace the snap ring with a new part if it is deformed or spring force is weakened.

2) Remove the reverse check plate, reverse check spring, reverse check cam, return spring (5th-Rev), reverse accent shaft, return spring cap and return spring (1st-2nd).

3) Remove the O-ring.

NOTE:
• Visually check the O-ring. Replace if faulty.
• Be careful not to damage the adjusting shim between reverse check sleeve assembly and the case.

D: ASSEMBLY

1) Install the return spring (1st-2nd), return spring cap, reverse accent shaft, reverse check cam, return spring (5th-Rev) and reverse check spring to the reverse check sleeve.

NOTE:
Be sure to position the bent section of reverse check spring to fit in the groove of the check cam.

2) Hook the curved section of the reverse check spring over the reverse check plate.

3) Rotate the cam so that the protrusion of the reverse check cam comes to the opening of the plate.

4) With cam held in that position, install the reverse check plate onto the reverse check sleeve and hold in place with the snap ring.

5) Position the new O-ring in the groove of sleeve.
E: INSPECTION

- Make sure the cutout of the reverse accent shaft is aligned with the opening in the reverse check sleeve.
- Turn the cam by hand to check for smooth rotation.
- Move the cam and shaft all the way toward the plate, and make sure it releases.
If the cam does not return properly, replace the reverse check spring. If the shaft does not return, check for scratches on the inner surface of sleeve. If the sleeve is in good order, replace the spring.

- Select a suitable reverse accent shaft and reverse check plate. <Ref. to 5MT-49, ADJUSTMENT, Reverse Check Sleeve.>

F: ADJUSTMENT

1. NEUTRAL POSITION ADJUSTMENT

1) Shift the gear into 3rd gear position.
2) Because of the return spring, until the arm contacts the stopper the shifter arm will feel lighter moving towards 1st/2nd gear and heavier towards the reverse gear.
3) Make adjustment so that the heavy stroke (reverse side) is a little heavier than the lighter stroke (1st/2nd side).
4) To adjust, remove the bolts holding the reverse check sleeve assembly to the case, and move the sleeve assembly outward, then place an adjustment shim between the sleeve assembly and the case to adjust the clearance.

CAUTION:
Be careful not to damage the O-ring when placing shims.

NOTE:
- When the shim is removed, the neutral position will move closer to reverse; when the shim is added, the neutral position will move closer to 1st gear.
- If it is not possible to adjust the clearance with only shims, replace the reverse accent shaft and re-adjust.

<table>
<thead>
<tr>
<th>Adjusting shim</th>
<th>Thickness mm (in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>32190A000</td>
<td>0.15 (0.0059)</td>
</tr>
<tr>
<td>32190A010</td>
<td>0.30 (0.0118)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Reverse accent shaft</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part number</td>
</tr>
<tr>
<td>--------------</td>
</tr>
<tr>
<td>32188AA130</td>
</tr>
<tr>
<td>32188AA140</td>
</tr>
<tr>
<td>32188AA150</td>
</tr>
</tbody>
</table>
2. REVERSE CHECK PLATE ADJUSTMENT

1) Shift the shifter arm to “5th” and then to reverse to see if the reverse check mechanism operates properly.

2) Also check to see if the arm returns to neutral when released from the reverse position. If the arm does not return properly, replace the reverse check plate.

<table>
<thead>
<tr>
<th>Part number</th>
<th>(A): No.</th>
<th>Angle(θ)</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>32189AA001</td>
<td>0</td>
<td>28°</td>
<td>Arm stops closer to 5th gear.</td>
</tr>
<tr>
<td>32189AA011</td>
<td>1</td>
<td>31°</td>
<td>Arm stops closer to 5th gear.</td>
</tr>
<tr>
<td>32189AA021</td>
<td>2</td>
<td>34°</td>
<td>Arm stops in the center.</td>
</tr>
<tr>
<td>32189AA031</td>
<td>3</td>
<td>37°</td>
<td>Arm stops closer to reverse gear.</td>
</tr>
<tr>
<td>32189AA041</td>
<td>4</td>
<td>40°</td>
<td>Arm stops closer to reverse gear.</td>
</tr>
</tbody>
</table>
14. Transmission Case

A: REMOVAL

1) Remove the manual transmission assembly from the vehicle. <Ref. to 5MT-24, REMOVAL, Manual Transmission Assembly.> 
2) Remove the clutch release lever. <Ref. to CL-13, REMOVAL, Release Bearing and Lever.> 
3) Remove the transfer case together with the extension case assembly. <Ref. to 5MT-38, REMOVAL, Transfer Case and Extension Case Assembly.> 
4) Remove the bearing mounting bolt.
5) Remove the main shaft rear plate.
6) Separate the transmission case into the right and left cases by loosening the coupling bolts and nuts.
7) Remove the drive pinion shaft assembly from the left side of the transmission case.
   NOTE: 
   Use a hammer handle, etc. to remove if too tight.
8) Remove the main shaft assembly for single-range.
9) Remove the front differential assembly.
   NOTE: 
   • Do not confuse the right and left roller bearing outer races.
   • Be careful not to damage the oil seal of retainer.
B: INSTALLATION

1) Wipe off grease, oil and dust on the mating surfaces of transmission cases with cleaning solvent.
2) Install the front differential assembly.
3) Install the main shaft assembly for single-range. Install the transmission case knock pin into the knock pin hole of needle bearing.
4) Install the drive pinion shaft assembly. Install the transmission case knock pin into the roller bearing knock pin hole.
5) Apply liquid gasket, then join the right side and left side of the case together.

Liquid gasket:
THREE BOND 1215 (Part No. 004403007) or equivalent

6) With brackets and clips as shown in the figure, tighten the seventeen bolts.

NOTE:
• Insert the bolts from the bottom and tighten the nuts at the top.
• Put the cases together so that the drive pinion shim and input shaft holder shims are not caught between cases.

Tightening torque:
8 mm bolt
25 N·m (2.5 kgf-m, 18.4 ft-lb)
★ 10 mm bolt
39 N·m (4.0 kgf-m, 28.9 ft-lb)

7) Tighten the ball bearing mounting bolts.

Tightening torque:
30 N·m (3.1 kgf-m, 22.1 ft-lb)

8) Perform backlash adjustment of the hypoid gear and preload measurement of the roller bearing:

NOTE:
Attach the ST on drive pinion assembly.
ST 498427100 STOPPER

9) Place the transmission with the left side of case facing downward, and put ST1 on bearing cup.

10) Screw the retainer assembly from the bottom into left case using ST2. Fit the ST3 on transmission main shaft. Shift the gear into 4th or 5th, and turn the shaft several times. Screw in the retainer while rotating the ST3 until a slight resistance is felt on ST2.

This is the contact point of the hypoid gear and the drive pinion shaft. Repeat the above sequence several times to ensure the contact point.

ST1 399780104 WEIGHT
ST2 18630AA010 WRENCH COMPL RETAINER
ST3 499927100 HANDLE
11) Remove the weight, and screw in the retainer without the O-ring on the upper side, and stop at the point where a slight resistance is felt.

NOTE:
In this condition, the backlash between hypoid gear and drive pinion shaft is zero.

ST 18630AA010  WRENCH COMPL RETAINER

12) Loosen the retainer on the lower side by 3 notches and turn the retainer on the upper side by the same amount in order to apply backlash.
13) Rotate the retainer of the upper side additionally by 1 notch in order to apply preload on taper roller bearing.
14) Tighten temporarily both the upper and lower lock plates, and put marks both the holder and lock plate for later readjustment.

NOTE:
If it is hard to install the lock plates, reverse the sides and install them.
15) Turn the transmission main shaft several times while tapping around the retainer lightly with plastic hammer.
16) Inspect and adjust backlash and tooth contact of the hypoid gear. <Ref. to 5MT-72, INSPECTION, Front Differential Assembly.>

17) After checking the tooth contact of the hypoid gears, remove the lock plate. Then loosen the retainer until the O-ring groove appears. Fit the O-ring into the groove and tighten the retainer into the position where retainer was tightened previously. Install the lock plate.

NOTE:
• Count number of turns while loosening retainer and record it.
• Perform this for both upper and lower retainers.

Tightening torque:
T: 25 N·m (2.5 kgf-m, 18.4 ft-lb)

18) Select the main shaft rear plate. <Ref. to 5MT-58, ADJUSTMENT, Main Shaft Assembly for Single-range.>
19) Install the clutch release lever and bearing. <Ref. to CL-13, INSTALLATION, Release Bearing and Lever.>
20) Install the transfer case together with the extension case assembly. <Ref. to 5MT-38, INSTALLATION, Transfer Case and Extension Case Assembly.>
21) Install the manual transmission assembly to the vehicle. <Ref. to 5MT-27, INSTALLATION, Manual Transmission Assembly.>

C: INSPECTION
Check the transmission case for cracks, damage, or oil leaks.
15. Main Shaft Assembly for Single-range

A: REMOVAL
1) Remove the manual transmission assembly from the vehicle. <Ref. to 5MT-24, REMOVAL, Manual Transmission Assembly.>
2) Remove the transfer case together with the extension case assembly. <Ref. to 5MT-38, REMOVAL, Transfer Case and Extension Case Assembly.>
3) Remove the transmission case. <Ref. to 5MT-51, REMOVAL, Transmission Case.>
4) Remove the drive pinion shaft assembly. <Ref. to 5MT-59, REMOVAL, Drive Pinion Shaft Assembly.>
5) Remove the main shaft assembly for single-range.

B: INSTALLATION
1) Install the needle bearing and oil seal to the front of the transmission single-range main shaft assembly.

NOTE:
- Wrap the clutch splined section with vinyl tape to prevent damage to the oil seal.
- Apply UNILUBE #2 (or equivalent) to the sealing lip of the oil seal.
- Use a new oil seal.
2) Install the transmission case knock pin into the knock pin hole of the needle bearing outer race.

NOTE:
Align the end face of the seal with surface (A) when installing the oil seal.

3) Install the drive pinion shaft assembly. <Ref. to 5MT-59, INSTALLATION, Drive Pinion Shaft Assembly.>
4) Install the transmission case. <Ref. to 5MT-52, INSTALLATION, Transmission Case.>
5) Install the transfer case together with the extension case assembly. <Ref. to 5MT-38, INSTALLATION, Transfer Case and Extension Case Assembly.>
6) Install the manual transmission assembly to the vehicle. <Ref. to 5MT-27, INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY
1) Put vinyl tape around main shaft spline to protect the oil seal from damage. Then pull out the oil seal and needle bearing by hand.
2) Remove the lock nut from transmission main shaft assembly for single range.

NOTE:
Flatten the lock nut tab before removing the lock nut.

ST1 498937000  TRANSMISSION HOLDER
ST2 499987003  SOCKET WRENCH (35)

3) Remove the 5th hub & sleeve No. 2, baulk lever, baulk ring, 5th drive gear & needle bearing.

(A) 5th hub & sleeve No. 2
(B) Baulk ring
(C) 5th drive gear

MT-01517

MT-01518
4) Using ST1 and ST2, remove the rest of the parts.

NOTE:
- When replacing the sleeve & hub, replace them as a set.
- Do not disassemble the sleeve & hub; the aligning position is pre-matched.
- If it is necessary to disassemble, mark the engaging points on the splines beforehand.

ST1 899864100 REMOVER
ST2 899714110 REMOVER

D: ASSEMBLY

1) When the sleeve & hub assemblies have been disassembled, reassemble by aligning the alignment marks.

NOTE:
Position the open ends of the spring 120° apart.

(A) 3rd-4th hub ASSY
(B) 3rd gear side
(C) 5th hub & sleeve No. 2
(D) 5th gear side
2) Install the 3rd drive gear, outer baulk ring, syn- 
chro cone, inner baulk ring, sleeve & hub assembly 
for the 3rd needle bearing, on the transmission 
main shaft.

NOTE:
Align the groove in baulk ring with the shifting in-
sert.

3) Install the 4th needle bearing race onto trans-
mission main shaft using ST1, ST2 and press.

CAUTION:
Do not apply a load in excess of 10 kN 
(1 ton, 1.1 US ton, 1.0 Imp ton).
ST1 899714110 REMOVER 
ST2 499877000 RACE 4-5 INSTALLER

4) Install the baulk ring, needle bearing, 4th drive 
gear and 4th gear thrust washer to the transmission 
main shaft.

NOTE:
Align the baulk ring and gear & hub assembly with 
the key groove.

5) Press-fit the ball bearing into the rear section of 
transmission main shaft using ST1, ST2 and a 
press.

CAUTION:
Do not apply a load in excess of 10 kN 
(1 ton, 1.1 US ton, 1.0 Imp ton).
ST1 899714110 REMOVER 
ST2 499877000 RACE 4-5 INSTALLER

(A) 3rd needle bearing 
(B) 3rd drive gear 
(C) Inner baulk ring 
(D) Synchro cone 
(E) Outer baulk ring 
(F) Sleeve & hub ASSY

(A) Groove 
(B) Face this surface to the 4th gear side.
6) Using the ST1 and ST2, install the 5th gear thrust washer and 5th needle bearing race onto the rear section of transmission main shaft.

**CAUTION:**
Do not apply a load in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).

**NOTE:**
Make sure the thrust washer is oriented in the correct direction.

ST1 899714110 REMOVER
ST2 499877000 RACE 4-5 INSTALLER

7) Install rest of the parts to the rear section of the transmission main shaft.

**CAUTION:**
- Install the baulk lever so that the concave side faces toward the 5th hub.
- Fit the convex portions of baulk ring with the gaps between baulk levers.

8) Tighten the lock nuts to the specified torque using ST1 and ST2.

9) Crimp lock nuts in two locations after tightening.

**Tightening torque:**
120 N·m (12.2 kgf-m, 88.5 ft-lb)
E: INSPECTION
Disassembled parts should be washed clean first with cleaning solvent and then inspected carefully.
1) Bearing
Replace the bearings in the following cases.
- When the bearing balls, outer races and inner races are broken or rusty.
- When the bearing is worn.
- When the bearings fail to turn smoothly or emit noise in rotation after gear oil lubrication.
- When bearing has other defects.
2) Bushing (each gear)
Replace the bushing in following cases.
- When the sliding surface is damaged or abnormally worn.
- When the inner wall is abnormally worn.
3) Gear
Replace gears in the following cases.
- Replace gear with new part if its tooth surfaces are broken, damaged or excessively worn.
- Correct or replace if the cone that contacts the baulk ring is rough or damaged.
- Correct or replace if the inner surface or end face is damaged.
4) Baulk ring
Replace the baulk rings in the following cases.
- When the inner surface and end face are damaged.
- When the ring inner surface is abnormally or partially worn down.
- When the contact surface of synchronizer ring insert is cracked or abnormally worn.
- If the gap between the end faces of the ring and the gear splined part is excessively small, check the clearance (A) while pressing the ring against the cone.

**Clearance (A):**

0.5 mm (0.020 in) or more

5) Shifting insert key
Replace the insert key if deformed, excessively worn or defective in any way.
6) Oil seal
Replace the oil seal if the lip is deformed, hardened, worn or defective in any way.

7) O-ring
Replace the O-ring if the sealing face is deformed, hardened, damaged, worn or defective in any way.
8) Gearshift mechanism
Repair or replace the gearshift mechanism if excessively worn, bent or defective in any way.

F: ADJUSTMENT
Selection of main shaft rear plate:
Using the ST, measure the protrusion amount (A) of ball bearing from transmission main case surface, and select a suitable plate in the following table.

**NOTE:**
Before measuring, tap the end of main shaft with a plastic hammer lightly in order to make the clearance zero between the main case surface and moving flange of bearing.

<table>
<thead>
<tr>
<th>Dimension (A)</th>
<th>Part number</th>
<th>Mark</th>
</tr>
</thead>
<tbody>
<tr>
<td>4.00 — 4.13</td>
<td>32294AA041</td>
<td>1</td>
</tr>
<tr>
<td>(0.1575 — 0.1626)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3.87 — 4.00</td>
<td>32294AA051</td>
<td>2</td>
</tr>
<tr>
<td>(0.1524 — 0.1575)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
16. Drive Pinion Shaft Assembly

A: REMOVAL

1) Remove the manual transmission assembly from the vehicle. <Ref. to 5MT-24, REMOVAL, Manual Transmission Assembly.>
2) Remove the transfer case together with the extension case assembly. <Ref. to 5MT-38, REMOVAL, Transfer Case and Extension Case Assembly.>
3) Remove the transmission case. <Ref. to 5MT-51, REMOVAL, Transmission Case.>
4) Remove the drive pinion shaft assembly.

NOTE:
Use a hammer handle, etc. to remove if too tight.

B: INSTALLATION

1) Remove the front differential assembly.
2) Alignment marks/numbers on hypoid gear set:
The number (A) on top of the drive pinion, and the number on the hypoid driven gear are set numbers for the two gears. Use a pair having the same numbers.
The figure (B) below shows a number for shim adjustment. If no number is shown, the value is zero.

3) Place the drive pinion shaft assembly on transmission main case RH without shim and tighten the bearing mounting bolts.

4) Perform inspection and adjustment of ST.

NOTE:
• Loosen the two bolts and adjust so that the scale indicates 0.5 correctly when the plate end and the scale end are on the same level.
• Tighten the two bolts.

5) Position the ST by inserting the knock pin of ST into the knock hole of transmission case.

6) Slide the drive pinion gauge scale with finger tip and read the value at the point where it matches with the end face of drive pinion.

7) The thickness of shim shall be determined by adding the value indicated on drive pinion to the value indicated on the ST. (Add if the number on drive pinion is prefixed by +, and subtract if the number is prefixed by –.)
8) Select one to three shims in the following table for the value determined as described above, and take the shim(s) which thickness is closest to the said value.

<table>
<thead>
<tr>
<th>Drive pinion shim</th>
<th>Thickness mm (in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>32295AA031</td>
<td>0.150 (0.0059)</td>
</tr>
<tr>
<td>32295AA041</td>
<td>0.175 (0.0069)</td>
</tr>
<tr>
<td>32295AA051</td>
<td>0.200 (0.0079)</td>
</tr>
<tr>
<td>32295AA061</td>
<td>0.225 (0.0089)</td>
</tr>
<tr>
<td>32295AA071</td>
<td>0.250 (0.0098)</td>
</tr>
<tr>
<td>32295AA081</td>
<td>0.275 (0.0108)</td>
</tr>
<tr>
<td>32295AA091</td>
<td>0.300 (0.0118)</td>
</tr>
<tr>
<td>32295AA101</td>
<td>0.500 (0.0197)</td>
</tr>
</tbody>
</table>

9) Install the front differential assembly. <Ref. to 5MT-68, INSTALLATION, Front Differential Assembly.>

10) Set the transmission main shaft assembly for single range and drive pinion shaft assembly in the install location. (When doing so, there will be no clearance between the two when moved all the way to the front). Inspect a suitable 1st-2nd, 3rd-4th and 5th shifter fork so that the coupling sleeve and reverse driven gear are positioned in the center of the synchronizing mechanism. <Ref. to 5MT-65, INSPECTION, Drive Pinion Shaft Assembly.>

11) Install the transmission case. <Ref. to 5MT-52, INSTALLATION, Transmission Case.>

12) Install the transfer case together with the extension case assembly. <Ref. to 5MT-38, INSTALLATION, Transfer Case and Extension Case Assembly.>

13) Install the manual transmission assembly to the vehicle. <Ref. to 5MT-27, INSTALLATION, Manual Transmission Assembly.>

C: DISASSEMBLY

NOTE:
Attach a cloth to the end of driven shaft (on the frictional side of the thrust needle bearing) to prevent damage during disassembly or reassembly.

1) Flatten the tab of the axle nut. Remove the lock nut with ST1, ST2 and ST3.

ST1 899884100 HOLDER
ST2 498427100 STOPPER
ST3 899988608 SOCKET WRENCH (27)

2) Draw out the drive pinion from driven shaft.
Remove the differential bevel gear sleeve, adjusting washer No. 1, adjusting washer No. 2, thrust bearing, needle bearing and drive pinion collar.

(A) Differential bevel gear sleeve
(B) Adjusting washer No. 1 (25 × 37.5 × t)
(C) Thrust bearing (25 × 37.5 × 3)
(D) Adjusting washer No. 2 (25 × 37.5 × 4)
(E) Needle bearing (25 × 30 × 20)
(F) Drive pinion collar
(G) Needle bearing (30 × 37 × 23)
(H) Thrust bearing (33 × 50 × 3)
3) Remove the roller bearing and washer using ST and a press.

NOTE:
Do not reuse the roller bearing.

ST  498077000  REMOVER

4) Flatten the tab of the lock nut. Remove the lock nut using ST1 and ST2.

ST1  499987300  SOCKET WRENCH (50)
ST2  899884100  HOLDER

5) Remove the 5th driven gear using ST.

ST  499857000  5TH DRIVEN GEAR REMOVER

6) Remove the woodruff key.

7) Remove the roller bearing and 3rd-4th driven gear using ST1 and ST2.

ST1  499757002  INSTALLER
ST2  899714110  REMOVER

8) Remove the key.
9) Remove the 2nd driven gear, inner baulk ring, synchro cone and outer baulk ring.

(A) 2nd driven gear
(B) Synchro cone
(C) Inner baulk ring
(D) Outer baulk ring
10) Remove the 1st driven gear, inner baulk ring, synchro cone, outer baulk ring, 2nd gear bushing, gear and hub using ST1 and ST2.

NOTE:
If necessary, use the new gear & hub assembly, when replacing the gear or hub assembly. Because these must engage at the specified point, avoid disassembly as much as possible. If it must be disassembled, mark the engaging point on the spline beforehand.

ST1 499757002 INSTALLER
ST2 899714110 REMOVER

11) Remove the sub gear, washer, and snap ring (outer) for the 1st driven gear. (Non-turbo model)

D: ASSEMBLY
1) Install the sleeve and gear & hub assembly by matching alignment marks.

NOTE:
• After installation, make sure there is no significant gap at both sides of the ball detent.

• Use the new gear & hub assembly, if replacing the gear or hub.

2) Install the washer, snap ring (outer) and sub gear onto the 1st driven gear. (Non-turbo model)
3) Install the 1st driven gear, inner baulk ring, synchro cone, outer baulk ring, gear & hub assembly onto driven shaft.

**NOTE:**
- Take care to install the gear & hub assembly in proper direction.
- Align the baulk ring and gear & hub assembly with the key groove.

4) Install the 2nd driven gear bushing onto the driven shaft using ST1, ST2 and a press.

**CAUTION:**
Do not apply a load in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).

**NOTE:**
- Attach a cloth to the end of the driven shaft to prevent damage.
- When press fitting, align the oil holes of the shaft and bushing

ST1 499277200 INSTALLER  
ST2 499587000 INSTALLER

5) Install the 2nd driven gear, inner baulk ring, synchro cone and outer baulk ring, and insert them onto driven shaft.

6) After installing key on driven shaft, install the 3rd-4th driven gear using an ST and a press.

**CAUTION:**
Do not apply a load in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).

**NOTE:**
Align the groove in baulk ring with the insert.

ST 499277200 INSTALLER

7) Install a set of roller bearings onto the driven shaft using the ST and a press.

**CAUTION:**
Do not apply a load in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).

ST 499277200 INSTALLER
8) Position the woodruff key in groove of the rear of driven shaft. Install the 5th driven gear onto driven shaft using ST and a press.

**CAUTION:**
Do not apply a load in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).

ST 499277200 INSTALLER

9) Install the lock washer. Install the lock nut and tighten to the specified torque using the ST.
ST 499987300 SOCKET WRENCH (50)

**Tightening torque:**
260 N·m (26.5 kgf-m, 191.8 ft-lb)

**NOTE:**
- Crimp the locknut in 2 locations.
- Using a spring scale, check that starting torque of the roller bearing is 0.1 to 1.5 N (0.01 to 0.15 kgf, 0.02 to 0.33 lbf).

10) Install the roller bearing onto the drive pinion shaft.

**NOTE:**
When installing the roller bearing, note its directions (front and rear) because the knock pin hole of outer race is offset.

11) Install the washer using ST1, ST2 and a press.

**CAUTION:**
Do not apply a load in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).

ST1 499277100 BUSHING 1-2 INSTALLER
ST2 499277200 INSTALLER

12) Install the thrust bearing and needle bearing. Install the driven shaft assembly.
13) Install the drive pinion collar, needle bearing, adjusting washer No. 2, thrust bearing, adjusting washer No. 1 and differential bevel gear sleeve in this order.

NOTE:
Be careful to install the spacer in the proper direction.

14) Adjust the thrust bearing preload. <Ref. to 5MT-66, THRUST BEARING PRELOAD, ADJUSTMENT, Drive Pinion Shaft Assembly.>

E: INSPECTION
Disassembled parts should be washed clean first with cleaning solvent and then inspected carefully.
1) Bearing
Replace the bearings in the following cases.
- When the bearing balls, outer races and inner races are broken or rusty.
- When the bearing is worn.
- When the bearings fail to turn smoothly or emit noise in rotation after gear oil lubrication.
- The ball bearing on the rear side of the drive pinion shaft should be checked for smooth rotation before the drive pinion shaft assembly is disassembled. In this case, because a preload is working on the bearing, its rotation feels like it is slightly dragging unlike other bearings.

2) Bushing (each gear)
Replace the bushing in following cases.
- When the sliding surface is damaged or abnormally worn.
- When the inner wall is abnormally worn.

3) Gear
Replace gears in the following cases.
- Replace gear with new part if its tooth surfaces are broken, damaged or excessively worn.
- Correct or replace if the cone that contacts the baulk ring is rough or damaged.
- Correct or replace if the inner surface or end face is damaged.
4) Baulk ring
Replace the baulk rings in the following cases.
• When the inner surface and end face are damaged.
• When the ring inner surface is abnormally or partially worn down.
• When the contact surface of synchronizer ring insert is cracked or abnormally worn.
• If the gap between the end faces of the ring and the gear splined part is excessively small, check the clearance (A) while pressing the ring against the cone.

**Clearance (A):**
0.5 mm (0.020 in) or more

5) Ball detent
Replace the ball detent if deformed, excessively worn or defective in any way.

6) Oil seal
Replace the oil seal if the lip is deformed, hardened, worn or defective in any way.

7) O-ring
Replace the O-ring if the sealing face is deformed, hardened, damaged, worn or defective in any way.

---

**F: ADJUSTMENT**

1. THRUST BEARING PRELOAD

1) Select a suitable adjusting washer No. 1 to so that dimension (H) will be zero in a visual check. Position the washer (18.3 × 30 × 4) and lock washer (18 × 30 × 2) and install lock nut. (18 × 13.5)

2) Using the ST1, ST2 and ST3, tighten the new lock nut to the specified torque.

<table>
<thead>
<tr>
<th>ST1</th>
<th>899884100</th>
<th>HOLDER</th>
</tr>
</thead>
<tbody>
<tr>
<td>ST2</td>
<td>498427100</td>
<td>STOPPER</td>
</tr>
<tr>
<td>ST3</td>
<td>899988608</td>
<td>SOCKET WRENCH (27)</td>
</tr>
</tbody>
</table>

**Tightening torque:**
120 N·m (12.2 kgf-m, 88.5 ft-lb)
3) After removing the ST2, measure the starting torque using torque driver.
ST1 899884100 HOLDER
ST3 899988608 SOCKET WRENCH (27)

Starting torque:
0.3 — 0.8 N·m (0.03 — 0.08 kgf-m, 0.2 — 0.6 ft-lb)

4) If the starting torque is not within the specified limit, select new adjusting washer No. 1 and re-check starting torque.

5) When the specified starting torque cannot be obtained by adjusting washer No. 1, select adjusting washer No. 2 from the following table. Repeat procedures 1) through 4) to adjust starting torque.

6) Recheck that the starting torque is within the specified range, then crimp the lock nut at four positions.

<table>
<thead>
<tr>
<th>Adjusting washer No. 1</th>
<th>Part number</th>
<th>Thickness mm (in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>803025051</td>
<td>3.925</td>
<td>0.1545</td>
</tr>
<tr>
<td>803025052</td>
<td>3.950</td>
<td>0.1555</td>
</tr>
<tr>
<td>803025053</td>
<td>3.975</td>
<td>0.1565</td>
</tr>
<tr>
<td>803025054</td>
<td>4.000</td>
<td>0.1575</td>
</tr>
<tr>
<td>803025055</td>
<td>4.025</td>
<td>0.1585</td>
</tr>
<tr>
<td>803025056</td>
<td>4.050</td>
<td>0.1594</td>
</tr>
<tr>
<td>803025057</td>
<td>4.075</td>
<td>0.1604</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Adjusting washer No. 2</th>
<th>Part number</th>
<th>Thickness mm (in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>803025059</td>
<td>3.850</td>
<td>0.1516</td>
</tr>
<tr>
<td>803025054</td>
<td>4.000</td>
<td>0.1575</td>
</tr>
<tr>
<td>803025058</td>
<td>4.150</td>
<td>0.1634</td>
</tr>
</tbody>
</table>
17. Front Differential Assembly

A: REMOVAL

1) Remove the manual transmission assembly from
   the vehicle. <Ref. to 5MT-24, REMOVAL, Manual
   Transmission Assembly.>
2) Remove the transfer case together with the ex-
   tension case assembly. <Ref. to 5MT-38, REMOV-
   AL, Transfer Case and Extension Case Assembly.>
3) Remove the transmission case. <Ref. to 5MT-
   51, REMOVAL, Transmission Case.>
4) Remove the drive pinion shaft assembly. <Ref.
   to 5MT-59, REMOVAL, Drive Pinion Shaft Assem-
   bly.>
5) Remove the main shaft assembly for single-
   range. <Ref. to 5MT-54, REMOVAL, Main Shaft
   Assembly for Single-range.>
6) Remove the front differential assembly.

NOTE:
• Do not confuse the right and left roller bearing
  outer races.
• Be careful not to damage the oil seal of retainer.

7) Remove the differential side retainers using ST.
   ST 18630AA010 WRENCH COMPL RETAINER

8) Remove the bearing outer race from the trans-
   mission case.
   ST 398527700 PULLER ASSY

B: INSTALLATION

1) Install the differential side retainers using ST.
   ST 18630AA010 WRENCH COMPL RETAINER
2) Install the bearing outer race to the transmission
   case.
3) Install the front differential assembly.

NOTE:
Be careful not to fold the sealing lip of oil seal.

4) Install the main shaft assembly for single-range.
   <Ref. to 5MT-54, INSTALLATION, Main Shaft As-
   sembly for Single-range.>
5) Install the drive pinion shaft assembly. <Ref. to
   5MT-59, INSTALLATION, Drive Pinion Shaft As-
   sembly.>
6) Install the transmission case. <Ref. to 5MT-52,
   INSTALLATION, Transmission Case.>
7) Install the transfer case together with the extension
   case assembly. <Ref. to 5MT-38, INSTALLATION,
   Transfer Case and Extension Case Assembly.>
8) Install the manual transmission assembly to the
   vehicle. <Ref. to 5MT-27, INSTALLATION, Manual
   Transmission Assembly.>
C: DISASSEMBLY

1. DIFFERENTIAL CASE ASSEMBLY

1) Loosen the twelve bolts and remove hypoid driven gear.

2) Drive out the straight pin from differential assembly toward hypoid driven gear side.

ST 899904100 STRAIGHT PIN REMOVER

3) Pull out the pinion shaft, and remove the differential bevel pinion, differential bevel gear and washer.

(A) Pinion shaft
(B) Differential bevel pinion
(C) Differential bevel gear
(D) Washer

4) Using the ST, remove the roller bearing.

ST 899524100 PULLER SET
2. SIDE RETAINER
1) Remove the O-ring.

![Image of O-ring](MT-00279)

2) Remove the oil seal.

NOTE:
- Remove using the flat tip screwdriver.
- Do not reuse the oil seal. Replace the oil seal with a new part.

![Image of oil seal](MT-01445)

D: ASSEMBLY

1. DIFFERENTIAL CASE ASSEMBLY
1) Install the differential bevel gear and differential bevel pinion together with washers, and insert the pinion shaft.

NOTE:
Face the chamfered side of washer toward gear.

![Diagram of differential case assembly](MT-00284)

(A) Differential bevel pinion
(B) Differential bevel gear
(C) Pinion shaft

2) Measure the backlash between differential bevel gear and differential pinion. If backlash is not within specified value, install a suitable washer to adjust.

<Ref. to 5MT-72, BEVEL PINION GEAR BACKLASH, INSPECTION, Front Differential Assembly.>

NOTE:
Be sure the pinion gear teeth contacts adjacent gear teeth during measurement.

ST1 498247001 MAGNET BASE
ST2 498247100 DIAL GAUGE

**Standard backlash**

0.13 — 0.18 mm (0.0051 — 0.0071 in)
3) Align the pinion shaft and differential case with each hole, and drive the straight pin into the holes from the hypoid driven gear using the ST.

**NOTE:**
Lock the straight pin after installing.
ST  899904100 STRAIGHT PIN REMOVER

4) Install the roller bearing to differential case.

**CAUTION:**
Do not apply a load in excess of 10 kN (1 ton, 1.1 US ton, 1.0 Imp ton).

**NOTE:**
Be careful because the roller bearing outer races are used as a set.
ST1  499277100 BUSHING 1-2 INSTALLER
ST2  398497701 ADAPTER

5) Install the hypoid driven gear to the differential case using twelve bolts.

**Tightening torque:**
\[ T: 62 \text{ N·m (6.3 kgf-m, 45.6 ft-lb)} \]

2. **SIDE RETAINER**
1) Install a new oil seal.
ST  18675AA000 DIFFERENTIAL SIDE OIL SEAL INSTALLER

**CAUTION:**
- When press-fitting the oil seal to the side retainer, tap with a plastic hammer etc. to press in.
- Never use a press.

2) Install a new O-ring.

**NOTE:**
Do not stretch or damage the O-ring.
E: INSPECTION

Repair or replace the differential gear in the following cases:

- When the hypoid drive gear and drive pinion shaft tooth surfaces are damaged, excessively worn, or seized.
- When the roller bearing on the drive pinion shaft has a worn or damaged roller path.
- When there is damage, wear or seizure of the differential bevel pinion, differential bevel gear, washer, pinion shaft or straight pin.
- When the differential case has worn or damaged sliding surfaces.

1. BEVEL PINION GEAR BACKLASH

Measure the backlash between differential bevel gear and differential bevel pinion. If backlash is not within specified value, install a suitable washer to adjust. <Ref. to 5MT-73, ADJUSTMENT, Front Differential Assembly.>

NOTE:
Be sure the pinion gear teeth contacts adjacent gear teeth during measurement.

ST1 498247001 MAGNET BASE
ST2 498247100 DIAL GAUGE

Standard backlash

0.13 — 0.18 mm (0.0051 — 0.0071 in)

2. HYPOID GEAR BACKLASH

1) Set the ST1, ST2 and ST3. Insert the needle through transmission oil drain plug hole so that the needle comes in contact with the tooth surface on the right corner, and check the backlash.

ST1 498247001 MAGNET BASE
ST2 498247100 DIAL GAUGE
ST3 498255400 PLATE

2) Install SUBARU genuine axle shafts to both sides, rotate in the inversion direction so that the gauge contacts the tooth surface, and read the dial gauge

Part No. 38415AA100 AXLE SHAFT

Backlash

0.13 — 0.18 mm (0.0051 — 0.0071 in)

NOTE:
If the backlash is outside the specified range, adjust it by turning the side retainer in the right side case.
3. TOOTH CONTACT OF HYPOID GEAR

Check tooth contact of hypoid gear as follows: Apply a thin uniform coat of red lead on both teeth surfaces on 3 or 4 teeth of the hypoid gear. Move the hypoid gear back and forth by turning the transmission main shaft until a definite contact pattern is developed on the hypoid gear, and judge whether face contact is correct. When the contact pattern is not correct, adjust it. <Ref. to 5MT-73, ADJUSTMENT, Front Differential Assembly.>

- Tooth contact is correct.

F: ADJUSTMENT

1. BEVEL PINION GEAR BACKLASH

1) Disassemble the front differential assembly. <Ref. to 5MT-69, DISASSEMBLY, Front Differential Assembly.>
2) Select a different washer from the table and install.

<table>
<thead>
<tr>
<th>Washer</th>
<th>Thickness mm (in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>803038021</td>
<td>0.925 — 0.950 (0.0364 — 0.0374)</td>
</tr>
<tr>
<td>803038022</td>
<td>0.975 — 1.000 (0.0384 — 0.0394)</td>
</tr>
<tr>
<td>803038023</td>
<td>1.025 — 1.050 (0.0404 — 0.0413)</td>
</tr>
</tbody>
</table>

3) Adjust until the standard value is obtained.

**Backlash:**

**Standard**

0.13 — 0.18 mm (0.0051 — 0.0071 in)

2. HYPOID GEAR BACKLASH

Adjust the backlash by turning the holder in the RH side case.

ST 18630AA010 WRENCH COMPL RETAINER

**NOTE:**

Each time side retainer rotates one tooth, backlash changes by 0.05 mm (0.020 in).
3. TOOTH CONTACT OF HYPOID GEAR

1) Adjust until correct teeth contact is obtained.
2) Check tooth contact, and perform the adjustment as follows.

- Tooth contact
  Check item: Tooth contact surface is slightly shifted toward the toe side under a no-load condition. (When driving, it moves towards the heel side.)

- Face contact
  Check item: Backlash is too large.
  Contact pattern

Corrective action: Reduce thickness of pinion height adjusting washer in order to bring the drive pinion closer to driven gear side.

- Flank contact
  Check item: Backlash is too small.
  Contact pattern

Corrective action: Increase the thickness of the pinion height adjusting washer in order to place the drive pinion away from the driven gear.

- Toe contact (inside contact)
  Check item: Teeth contact area is too small.
  Contact pattern

Corrective action: Increase the thickness of pinion height adjusting washer according to the procedure for bringing the drive pinion close to the driven gear.
• Heel contact (outside end contact)

**Check item: Teeth contact area is too small.**

Contact pattern

Corrective action: Reduce the thickness of pinion height adjusting washer according to the procedure for bringing drive pinion away from hypoid driven gear.
18. Reverse Idler Gear

A: REMOVAL

1) Remove the manual transmission assembly from the vehicle. <Ref. to 5MT-24, REMOVAL, Manual Transmission Assembly.>
2) Remove the back-up light switch & neutral position switch. <Ref. to 5MT-35, REMOVAL, Switches and Harness.>
3) Remove the transfer case together with the extension case assembly. <Ref. to 5MT-38, REMOVAL, Transfer Case and Extension Case Assembly.>
4) Remove the transmission case. <Ref. to 5MT-51, REMOVAL, Transmission Case.>
5) Remove the drive pinion shaft assembly. <Ref. to 5MT-59, REMOVAL, Drive Pinion Shaft Assembly.>
6) Remove the main shaft assembly for single-range. <Ref. to 5MT-54, REMOVAL, Main Shaft Assembly for Single-range.>
7) Remove the front differential assembly. <Ref. to 5MT-68, REMOVAL, Front Differential Assembly.>
8) Remove the shifter forks and rods. <Ref. to 5MT-78, REMOVAL, Shifter Fork and Rod.>
9) Pull out the straight pin, and remove the reverse idler gear shaft, washer, reverse idler gear and washer.
10) Remove the reverse shifter lever.

B: INSTALLATION

1) Install the reverse shifter lever, washer, reverse idler gear, washer and reverse idler gear shaft, and secure them with the straight pin.

NOTE:
Be sure to install the reverse idler gear shaft from rear side.

2) Check and adjust clearance between the reverse idler gear and the timing case wall surface. <Ref. to 5MT-76, INSTALLATION, Reverse Idler Gear.> <Ref. to 5MT-77, ADJUSTMENT, Reverse Idler Gear.>
3) Install the shifter forks and rods. <Ref. to 5MT-79, INSTALLATION, Shifter Fork and Rod.>
4) Install the front differential assembly. <Ref. to 5MT-68, INSTALLATION, Front Differential Assembly.>
5) Install the main shaft assembly for single-range. <Ref. to 5MT-54, INSTALLATION, Main Shaft Assembly for Single-range.>
6) Install the drive pinion shaft assembly. <Ref. to 5MT-59, INSTALLATION, Drive Pinion Shaft Assembly.>
7) Install the transmission case. <Ref. to 5MT-52, INSTALLATION, Transmission Case.>
8) Install the transfer case together with the extension case assembly. <Ref. to 5MT-38, INSTALLATION, Transfer Case and Extension Case Assembly.>
9) Install the back-up light switch and the neutral position switch. <Ref. to 5MT-36, INSTALLATION, Switches and Harness.>
10) Install the manual transmission assembly to the vehicle. <Ref. to 5MT-27, INSTALLATION, Manual Transmission Assembly.>
C: INSPECTION

1) Move the reverse shifter rod toward the reverse side. Check the clearance between the reverse idler gear and the timing case wall surface. If out of specification, select the appropriate reverse shifter lever and adjust.

**Clearance A:**

6.0 — 7.5 mm (0.236 — 0.295 in)

2) After installing a suitable reverse shifter lever, shift into neutral. Check the clearance between the reverse idler gear and the timing case wall surface. If out of specification, select the appropriate washer and adjust.

**Clearance:**

0 — 0.5 mm (0 — 0.020 in)

3) Check the reverse idler gear and shaft for damage. Replace if it is damaged.

D: ADJUSTMENT

1) Select the appropriate reverse shifter lever from the table below, and adjust until the clearance between the reverse idler gear and transmission case wall is within specification.

**Clearance A:**

6.0 — 7.5 mm (0.236 — 0.295 in)

2) Select the appropriate washer from the table below, and adjust until the clearance between the reverse idler gear and transmission case wall is within specification.

**Clearance:**

0 — 0.5 mm (0 — 0.020 in)

---

**Reverse shifter lever**

<table>
<thead>
<tr>
<th>Part number</th>
<th>Mark</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>32820AA070</td>
<td>7</td>
<td>Far from case wall</td>
</tr>
<tr>
<td>32820AA080</td>
<td>8</td>
<td>Standard</td>
</tr>
<tr>
<td>32820AA090</td>
<td>9</td>
<td>Closer to case wall</td>
</tr>
</tbody>
</table>

**Washer**

<table>
<thead>
<tr>
<th>Part number</th>
<th>Thickness mm (in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>803020151</td>
<td>0.4 (0.016)</td>
</tr>
<tr>
<td>803020152</td>
<td>1.1 (0.043)</td>
</tr>
<tr>
<td>803020153</td>
<td>1.5 (0.059)</td>
</tr>
<tr>
<td>803020154</td>
<td>1.9 (0.075)</td>
</tr>
<tr>
<td>803020155</td>
<td>2.3 (0.091)</td>
</tr>
</tbody>
</table>
19. Shifter Fork and Rod

A: REMOVAL

1) Remove the manual transmission assembly from the vehicle. <Ref. to 5MT-24, REMOVAL, Manual Transmission Assembly.>
2) Remove the back-up light switch & neutral position switch. <Ref. to 5MT-35, REMOVAL, Switches and Harness.>
3) Remove the transfer case together with the extension case assembly. <Ref. to 5MT-38, REMOVAL, Transfer Case and Extension Case Assembly.>
4) Remove the transmission case. <Ref. to 5MT-51, REMOVAL, Transmission Case.>
5) Remove the drive pinion shaft assembly. <Ref. to 5MT-59, REMOVAL, Drive Pinion Shaft Assembly.>
6) Remove the main shaft assembly for single-range. <Ref. to 5MT-54, REMOVAL, Main Shaft Assembly for Single-range.>
7) Remove the front differential assembly. <Ref. to 5MT-68, REMOVAL, Front Differential Assembly.>
8) Drive out the straight pin by tapping with the ST, and pull out the 5th shifter fork.

9) Remove the plugs, springs and check balls.
10) Drive out the straight pin by tapping with the ST, and pull out the 3rd — 4th fork rod and shifter fork.

NOTE:
When removing the rod, keep other rods in neutral. Also, when pulling out the straight pin, remove it toward the inside of case so that it does not hit against the case.

ST 398791700 STRAIGHT PIN REMOVER

11) Drive out the straight pin by tapping with the ST, and pull out the 1st — 2nd fork rod and shifter fork.

ST 398791700 STRAIGHT PIN REMOVER

12) Remove the reverse fork rod from reverse fork rod arm. Then take out the ball, spring and interlock plunger from the rod. And then remove the rod.

NOTE:
When pulling out the reverse fork rod arm, be careful not to let the ball pop out of arm.

13) Remove the reverse shifter lever.
B: INSTALLATION

1) Install the reverse arm fork spring, ball and interlock plunger to the reverse fork rod arm. Insert the reverse fork rod into the hole of the reverse fork rod arm, and hold it with snap ring (outer) using ST.

NOTE:
Apply grease to plunger to prevent it from falling.
ST 399411700 ACCENT BALL INSTALLER

2) Position the ball, spring and new gasket in the reverse fork rod hole on the left side of transmission case, and tighten the checking ball plug.

3) Install the 1st-2nd fork rod into 1st-2nd shifter fork through the hole on the rear of transmission case.

4) Align the holes in the rod and the fork, and drive the new straight pin into these holes using the ST.

NOTE:
• Set other rods to neutral.
• Make sure the interlock plunger is on the 3rd-4th fork rod side.
ST 398791700 STRAIGHT PIN REMOVER

5) Attach the interlock plunger on 3rd-4th fork rod.

NOTE:
Apply grease to plunger to prevent it from falling.

6) Attach the 3rd-4th fork rod into 3rd-4th shifter fork through the hole on the rear of transmission case.

7) Align the holes in the rod and the fork, and drive the new straight pin into these holes.

NOTE:
• Set the reverse fork rod to neutral.
• Make sure the interlock plunger (before installation) is on the reverse fork rod side.
ST 398791700 STRAIGHT PIN REMOVER

8) Install the 5th shifter fork onto the rear of reverse fork rod. Align the holes in the two parts and drive new straight pin into the specified place.

ST 398791700 STRAIGHT PIN REMOVER

9) Position the balls, check ball springs and new gaskets into holes of the 3rd-4th fork rods and 1st-2nd fork rods, and install the plugs.

Tightening torque:
20 N·m (2.0 kgf-m, 14.8 ft-lb)

10) Install the front differential assembly. <Ref. to 5MT-68, INSTALLATION, Front Differential Assembly.>

11) Install the main shaft assembly for single-range. <Ref. to 5MT-54, INSTALLATION, Main Shaft Assembly for Single-range.>

12) Install the drive pinion shaft assembly. <Ref. to 5MT-59, INSTALLATION, Drive Pinion Shaft Assembly.>

13) Install the transmission case. <Ref. to 5MT-52, INSTALLATION, Transmission Case.>

14) Install the transfer case together with the extension case assembly. <Ref. to 5MT-38, INSTALLATION, Transfer Case and Extension Case Assembly.>

15) Install the back-up light switch and the neutral position switch. <Ref. to 5MT-36, INSTALLATION, Switches and Harness.>

16) Install the manual transmission assembly to the vehicle. <Ref. to 5MT-27, INSTALLATION, Manual Transmission Assembly.>
C: INSPECTION

1) Check the fork and rod for damage. Replace if it is damaged.

2) Gearshift mechanism
Repair or replace the gearshift mechanism if excessively worn, bent or defective in any way.

3) Inspect the clearance between 1st, 2nd driven gear and reverse driven gear. If any clearance is not within specifications, replace the shifter fork as required.

*Clearance (a) and (b): 9.5 mm (0.374 in)*

4) Inspect the clearance between the 3rd, 4th drive gear and the coupling sleeve. If any clearance is not within specifications, replace the shifter fork as required.

*Clearance (a) and (b): 9.3 mm (0.366 in)*

---

**1st-2nd shifter fork**

<table>
<thead>
<tr>
<th>Part number</th>
<th>Mark</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>32804AA060</td>
<td>1</td>
<td>Approaches 1st gear by 0.2 mm (0.008 in).</td>
</tr>
<tr>
<td>32804AA070</td>
<td>—</td>
<td>Standard</td>
</tr>
<tr>
<td>32804AA080</td>
<td>3</td>
<td>Approaches 2nd gear by 0.2 mm (0.008 in).</td>
</tr>
</tbody>
</table>

**3rd-4th shifter fork**

<table>
<thead>
<tr>
<th>Part number</th>
<th>Mark</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>32810AA061</td>
<td>1</td>
<td>Approaches 4th gear by 0.2 mm (0.008 in).</td>
</tr>
<tr>
<td>32810AA071</td>
<td>—</td>
<td>Standard</td>
</tr>
<tr>
<td>32810AA101</td>
<td>3</td>
<td>Approaches 3rd gear by 0.2 mm (0.008 in).</td>
</tr>
</tbody>
</table>
5) Inspect the clearance between 5th drive gear and coupling sleeve. If any clearance is not within specifications, replace the shifter fork as required.

**Clearance (a):**

9.3 mm (0.366 in)

6) Inspect the rod end clearances (A) and (B). If any clearance is not within specifications, replace the rod or fork as required.

**Clearance (A):**

3rd-4th — 5th
0.5 — 1.3 mm (0.020 — 0.051 in)

**Clearance (B):**

1st-2nd — 3rd-4th
0.4 — 1.4 mm (0.016 — 0.055 in)
### 20. General Diagnostic Table

#### A: INSPECTION

#### 1. MANUAL TRANSMISSION

<table>
<thead>
<tr>
<th>Symptom</th>
<th>Possible cause</th>
<th>Corrective action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Gears are difficult to intermesh. NOTE: The cause for difficulty in shifting gears can be classified into two kinds: 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.</td>
<td>(a) Worn, damaged or burred chamfer at internal spline of the sleeve and reverse driven gear</td>
<td>Replace.</td>
</tr>
<tr>
<td></td>
<td>(b) Worn, damaged or burred chamfer of gear spline</td>
<td>Replace.</td>
</tr>
<tr>
<td></td>
<td>(c) Worn or scratched bushings</td>
<td>Replace.</td>
</tr>
<tr>
<td></td>
<td>(d) Incorrect contact or wear between synchronizer ring and gear cone</td>
<td>Correct or replace.</td>
</tr>
<tr>
<td>2. Gear slip-out • Gear slips out when coasting on rough road. • Gear slips out during acceleration.</td>
<td>(a) Defective pitching stopper adjustment</td>
<td>Adjust.</td>
</tr>
<tr>
<td></td>
<td>(b) Loose engine mounting bolts</td>
<td>Tighten or replace.</td>
</tr>
<tr>
<td></td>
<td>(c) Worn fork shifter, broken shifter fork rail spring</td>
<td>Replace.</td>
</tr>
<tr>
<td></td>
<td>(d) Worn or damaged ball bearing</td>
<td>Replace.</td>
</tr>
<tr>
<td></td>
<td>(e) Excessive clearance between splines of synchronizer hub and synchronizer sleeve</td>
<td>Replace.</td>
</tr>
<tr>
<td></td>
<td>(f) Worn tooth step of synchronizer hub (caused by slip-out of 3rd gear)</td>
<td>Replace.</td>
</tr>
<tr>
<td></td>
<td>(g) Worn 1st driven gear and driven shaft</td>
<td>Replace.</td>
</tr>
<tr>
<td></td>
<td>(h) Worn 2nd driven gear and bushing</td>
<td>Replace.</td>
</tr>
<tr>
<td></td>
<td>(i) Worn 3rd drive gear and needle bearing</td>
<td>Replace.</td>
</tr>
<tr>
<td></td>
<td>(j) Worn 4th drive gear and needle bearing</td>
<td>Replace.</td>
</tr>
<tr>
<td></td>
<td>(k) Worn reverse idler gear and bushing</td>
<td>Replace.</td>
</tr>
<tr>
<td>3. Noise emitted from transmission NOTE: 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.</td>
<td>(a) Insufficient or improper lubrication</td>
<td>Lubricate with specified oil or replace.</td>
</tr>
<tr>
<td></td>
<td>(b) Worn or damaged gears and bearings NOTE: 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.</td>
<td>Replace.</td>
</tr>
</tbody>
</table>
## 2. DIFFERENTIAL

<table>
<thead>
<tr>
<th>Symptoms</th>
<th>Possible cause</th>
<th>Corrective action</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Broken differential (case, gear, bearing, etc.)</td>
<td>(a) Insufficient or improper oil</td>
<td>Disassemble the differential and replace broken components. At the same time check other components for any trouble, and replace if necessary.</td>
</tr>
<tr>
<td></td>
<td>(b) Use of vehicle under severe conditions such as excessive load and improper use of the clutch</td>
<td>Readjust the preload and backlash of the bearing, and the contact surface of gear.</td>
</tr>
<tr>
<td></td>
<td>(c) Improper adjustment of taper roller bearing</td>
<td>Adjust.</td>
</tr>
<tr>
<td></td>
<td>(d) Improper adjustment of the drive pinion and the hypoid driven gear</td>
<td>Adjust.</td>
</tr>
<tr>
<td></td>
<td>(e) Excessive backlash of a vehicle under severe operating conditions due to worn differential side gear, washer or differential pinion.</td>
<td>Add recommended oil to the specified level. Do not use vehicle under severe operating conditions.</td>
</tr>
<tr>
<td></td>
<td>(f) Loose hypoid driven gear tightening bolts</td>
<td>Tighten.</td>
</tr>
<tr>
<td></td>
<td>2. Differential and hypoid gear noises</td>
<td>(a) Insufficient oil</td>
</tr>
<tr>
<td></td>
<td>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.</td>
<td>(b) Improper adjustment of hypoid driven gear and drive pinion</td>
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<td></td>
<td>• 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.</td>
<td>(c) Worn teeth of hypoid driven gear and drive pinion</td>
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<td>• Gear noise when coasting: Damaged gears due to misadjusted bearings and incorrect shim adjustment.</td>
<td>(d) Loose roller bearing</td>
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<td>• Bearing noise when driving or coasting: Cracked, broken or damaged bearings</td>
<td>(e) Distorted hypoid driven gear or differential case</td>
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<tr>
<td></td>
<td>• Noise mainly when turning: Noise from differential side gear, differential pinion or differential pinion shaft, etc.</td>
<td>(f) Worn washer and differential pinion shaft</td>
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</tbody>
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