# SECTION 3D
## REAR AXLE

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## GENERAL DESCRIPTION AND OPERATION

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<tr>
<td>Gear</td>
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<tr>
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COMPONENT LOCATOR

REAR AXLE ASSEMBLY

1 Axle Shaft/Tube
2 Stabilizer Bar
3 Spring Seat & Spring
4 Upper Arm
5 Shock Absorber
6 Lateral Rod
7 Input Shaft
8 Axle Housing
1 Rear Axle Shaft Assembly  
2 Bracket Assembly  
3 Hub Oil Seal  
4 Bolt  
5 Axle Shaft Tube  
6 Coil Spring Seat (Lower)  
7 Caliper Assembly  
8 Input Shaft/Flange  
9 Rod Mounting Bracket  
10 Wheel Speed Sensor
REAR AXLE SHAFT ASSEMBLY
With disc brake

1 Brake Disc
2 Plug
3 Rear Axle Shaft
4 Nut
5 Washer
6 Parking Brake Cable
7 Parking Brake Lining & Back Plate Assembly
8 Brake Caliper Assembly
9 Spring Washer
10 Bolt
11 Rear Axle Housing
With drum brake

1. Brake Drum
2. Plug
3. Rear Axle Shaft
4. Wheel Bolt
5. Nut
6. Washer
7. Retainer Plate
8. Oil Seal
9. Bearing
10. Snap Ring
11. Snap Ring
12. Oil Seal
13. Brake Shoe & Back Plate Assembly
14. Bolt
15. Rear Axle Housing
ON-VEHICLE SERVICE

AXLE SHAFT ASSEMBLY
(WITH DISC BRAKE)

Removal

1. Remove the tire.

2. Release the parking brake.
3. Remove the fixing pin of parking brake.
4. After detaching the parking brake lever, detach the cable.

5. Remove the two fixing bolt of brake caliper.
   **Notice:** Be careful not to damage the brake oil hose.

6. Remove the brake caliper assembly.
   **Notice:** If replacing the brake pad only, remove the upper fixing bolt of caliper pad and lower it.
7. Remove the brake disc.

8. Remove the four fixing bolt of dust shield cover and then pull out the dust shield cover.

9. Remove the two plastic plug in the axle shaft flange.

10. Remove the four fixing bolts & washers of axle housing flange from the retainer plate.

11. Remove the rear axle drive shaft.
Installation
Clean the detached axle shaft, check the damage or wear.
1. After checking the spline & shaft of rear axle shaft, assemble the shaft into the rear axle housing.

2. Tighten the flange fixing bolts and washers with the retainer plate.
   **Installation Notice**
   
   | Tightening torque | 50 - 65 N·m  |
   |                  | (37 - 48 lb-ft) |

3. Assemble the plastic plug in the rear axle flange and install the dust shield.
   **Installation Notice**
   
   | Tightening torque | 4 - 8 N·m  |
   |                  | (35 - 71 lb-in) |

4. Install the brake disc and caliper assembly.
   **Installation Notice**
   
   | Tightening torque | 85 - 105 N·m |

5. Install the parking brake cable and tire.
AXLE SHAFT ASSEMBLY
(WITH DRUM BRAKE)

Removal
1. Release the parking brake.
2. Remove the tire.

3. Remove the brake drum.
   Notice: Insert the bolt into the service hole, while
   tightening the both side bolts uniformly, remove
   the brake drum.

4. Remove the fixing pin of parking brake.
5. After detaching the cover of parking brake,
   disconnect the cable.

6. After pulling out the two plastic plug of axle shaft
   flange, remove the fixing nuts of inner bracket.
7. Remove the axle shaft.

**Installation**

1. Check the rear axle shaft.
2. Insert the rear axle shaft into the axle housing and tighten the fixing nuts of axle shaft flange.

**Installation Notice**

| Tightening Torque | 50 - 65 N•m  
|-------------------|--------------------------
|                   | (37 - 48 lb-ft)          |

3. Connect the brake cable and install the brake drum.

4. Install the tire and test the braking force.
REAR AXLE HOUSING

Removal
1. Remove the tire.
2. Remove the connecting rod of LCRM assembly & fixing nut of axle housing bracket.

3. Disconnect the brake oil hose & oil line (pipe)
   ① Brake pipe nut.
   ② Brake pipe mounting clip
   ③ 3-way connector
   ④ Brake pipe assembly

4. Detach the air breather.

5. Remove the propeller shaft from rear axle input shaft.
   Notice: Do alignment marks before removing.
6. Pull out the fixing pin of parking brake.
7. After removing the parking brake lever, pull out the cable.

8. Remove the lower arm mounting nuts and remove the lower arm from the axle housing.

9. Detach the lower mounting of shock absorber from the axle housing.

10. Remove the upper arm mounting nuts and remove the upper arm from the axle housing.
11. Remove the stabilizer bar.

12. Remove the lateral rod mounting nut and detach the lateral rod from the axle housing.

13. Lowering the axle slowly, remove the coil spring & spring seat.

14. Lower the axle housing by using the safety jack.

**Installation**

1. Placing the rear axle housing on the assembly position, install both coil springs.
2. Install the lateral rod in axle hosing.  
**Notice:** Do not tighten the nuts completely.  
**Installation Notice**  
| Tightening Torque | 150 - 180 N•m |

3. Install the shock absorber in axle housing.  
**Installation Notice**  
| Tightening Torque | 30 - 45 N•m  
(22 - 33 lb-ft) |

4. Install the stabilizer bar and upper/lower arm in axle housing  
**Installation Notice**  
| Stabilizer bar cap bolt | 30 - 45 N•m  
(22 - 33 lb-ft) |
| Upper arm nut | 150 - 180 N•m |
| Lower arm nut | 150 - 180 N•m |

5. Install the propeller shaft of rear axle side and tighten above the fixing bolts/nuts.  
**Installation Notice**  
| Tightening Torque | 70 - 80 N•m  
(52 - 59 lb-ft) |

6. Install the brake cable, air bleeder hose, oil pipe, LCRV unit in rear axle assembly with assembled completely.  
**Installation Notice**  
| LCRV Mounting Bolt | 12 - 23 N•m  
(9 - 17 lb-ft) |
| Air Breather Hose Bolt | 6 - 8 N•m  
(53 - 71 lb-in) |
| Brake Oil Pipe (M10) | 15 - 19 N•m  
(11 - 14 lb-ft) |

7. Bleeding the air in brake, install the tire.
**Inspection**

1. Check the shaft spline for the wear and damage.

2. Measure the run-out of shaft.
   - Specified value: Within 1.0 mm

3. Measure the run-out of shaft flange.
   - Specified value: Within 0.13 mm

4. Install the axle shaft and measure the clearance of shaft direction.
   - Specified value: Within 0.38 mm
UNIT REPAIR
AXLE ASSEMBLY

1 Drive Pinion Lock Nut .................. 240 - 310 N•m
2 Washer
3 Companion Flange
4 Pinion Oil Seal
5 Bearing Slinger
6 Bearing
7 Shim
8 Shim
9 Bearing Cup
10 Breather Nipple
11 Rear Axle Housing
12 Oil Drain Plug ......................... 28 - 42 N•m
13 Shim
14 Bearing
15 Drive Pinion
16 Bearing Cap

17 Bolt .................. 87 - 124 N•m
18 Bearing
19 Shim
20 Ring Gear
21 Shaft Lock Pin
22 Differential Case
23 Ring Gear Mounting Bolt .......... 75 - 90 N•m
24 Thrust Washer
25 Differential Pinion
26 Thrust Washer
27 Side Gear
28 Differential Shaft
29 Housing Cover
30 Bolt .................. 38 - 46 N•m
31 Oil Filler Plug ......................... 28 - 42 N•m
DIFFERENTIAL GEAR ASSEMBLY

Disassembly

1. Remove the drain plug and drain oil. Reinstall the drain plug.

   **Installation Notice**

   | Tightening Torque | 28 - 42 N·m (21 - 31 lb-ft) |

2. Remove the axle housing cover.
   **Notice:** Clean the cover and housing contact surface.

3. Remove the bearing cap bolts and remove the bearing cap. Pull out the differential carrier assembly.
   **Notice:** Do alignment marks on the bearing cap not to change the caps before removal. When pulling out, be careful to damage the axle housing.

4. Disassemble the parts of differential carrier assembly.
5. Remove the drive pinion lock nut. Disassemble the parts of drive pinion
### Inspection of Ring Gear Tooth Contact Pattern

1. **Normal Contact**
   - Apply gear-marking compound (prussian blue/red lead) on the ring rear teeth. Rotate the ring gear and check the tooth contact pattern.

2. **Abnormal contact**

<table>
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<tr>
<th>Tooth contact pattern</th>
<th>Possible cause</th>
<th>Remedy</th>
</tr>
</thead>
</table>
| 1. Heel contact       | Excessive backlash  
                        | • Noise can be occurred | Adjust backlash  
                        | (Decrease backlash)  
                        | • Select proper shim to move the drive pinion toward the ring gear (toward toe) |
| 2. Toe contact        | Insufficient backlash  
                        | • Tooth can be damaged or broken under heavy load | Adjust backlash  
                        | (Increase backlash)  
                        | • Select proper shim to move the drive pinion against the ring gear (toward heel) |
| 3. Face contact       | Excessive backlash  
                        | • Drive pinion shaft is apart from the ring gear  
                        | • Noise can be occurred | Adjust backlash  
                        | (Increase pinion shim)  
                        | • Move the drive pinion toward the ring gear (toward center of ring gear) |
| 4. Flank contact      | Insufficient backlash  
                        | • Gear contacts on the low flank  
                        | • Gear can be damaged or worn  
                        | • Noise can be occurred | Adjust backlash  
                        | (Decrease pinion shim)  
                        | • Move the ring gear toward the drive pinion (toward ring gear center line) |
**Assembly**

1. Clean all parts and check the followings.
   - Check the ring gear, drive pinion for wear and damage. If damaged, replace it as a set.
   - Check the bearing for sticks, wear, noise and turning resistance.
   - Check the side gear, pinion, pinion shaft and thrust washer for wear and damage.
   - Check the differential carrier for crack and wear (bearing contact surface). Check the gear case for crack.

2. Assemble the drive pinion assembly to the axle housing and then tighten the pinion lock nut.

   **Installation Notice**
   
<table>
<thead>
<tr>
<th>Tightening torque</th>
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</thead>
<tbody>
<tr>
<td>240 - 310 N·m</td>
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</table>

3. Assemble the differential carrier assembly. Align the ring gear to the mark of differential carrier, tighten the fixing bolts.

   **Installation Notice**
   
<table>
<thead>
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<th>Tightening Torque</th>
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<tr>
<td>75 - 90 N·m</td>
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<tr>
<td>(55 - 66 lb-ft)</td>
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4. Measure the backlash of side gear and pinion gear.

<table>
<thead>
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<th>Specified value</th>
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<td>0 - 0.5 mm</td>
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</table>
5. Install the differential carrier assembly into the axle housing. Set up the bearing cap and then tighten the cap bolts.

**Installation Notice**

| Tightening Torque | 48 - 69 N·m (35 - 51 lb-ft) |

**Notice:** Be careful not to change the caps. Be sure to keep the original position of the caps.

6. Measure the backlash of drive pinion and ring gear.

| Specified value | 0.13 - 0.20 mm |

7. Install the axle housing cover. Tighten the fixing bolts.

**Installation Notice**

| Tightening Torque | 39 - 46 N·m (29 - 34 lb-ft) |