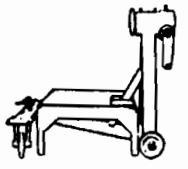
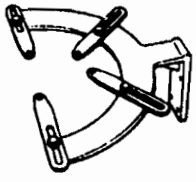
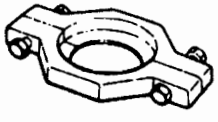
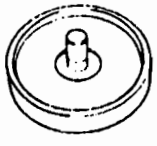
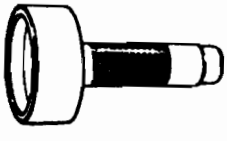
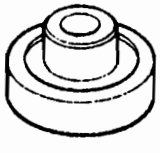
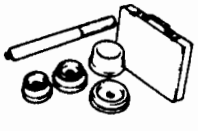
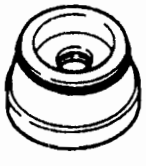
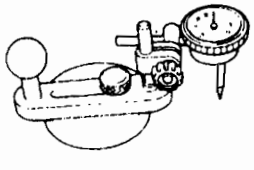
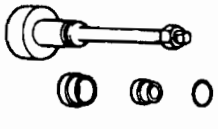
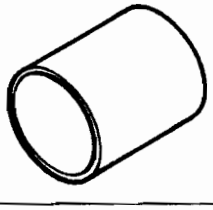
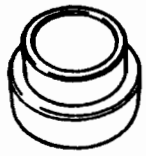
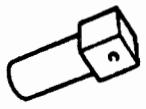
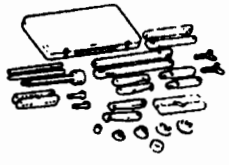
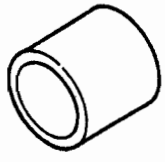
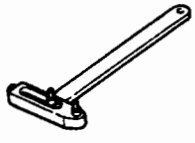
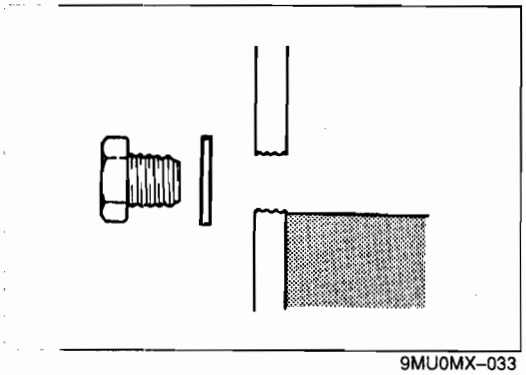
DIFFERENTIAL

PREPARATION
SST

49 0107 680A Engine stand		For disassembly and assembly of differential	49 M005 561 Hanger, differential carrier		For disassembly and assembly of differential
49 0636 145 Puller, fan pulley boss		For removal of bearing inner race (side bearing)	49 N034 213 Installer, rubber bushing		For installation of differential mounting rubber
49 G030 795 Installer, oil seal		For installation of oil seal	49 G030 797 Handle (Part of 49 G030 795)		For installation of bearing outer race
49 B001 795 Installer, oil seal		For installation of oil seal (output shaft)	49 F027 004 Attachment ϕ80		For installation of bearing outer race (rear bearing)
49 F027 0A1 Installer set, bearing		For installation of bearing	49 F027 005 Attachment ϕ62 (Part of 49 F027 0A1)		For installation of bearing outer race (front bearing)
49 F027 0A0 Gauge set, pinion height adjustment		For adjustment of pinion height	49 0727 570 Gauge body, pinion height (Part of 49 F027 0A0)		For adjustment of pinion height
49 8531 565 Pinion model		For adjustment of pinion height	49 8531 567 Collar A (Part of 49 8531 565)		For adjustment of pinion height
49 H027 001 Collar		For adjustment of pinion height	49 0305 555 Gauge block		For adjustment of pinion height

49 D017 2A1 Installer set, bearing 	For installation of bearing	49 F401 337A Attachment C (Part of 49 D017 2A1) 	For installation of bearing inner race (rear bearing)
49 F401 331 Body (Part of 49 D017 2A1) 	For installation of bearing inner race (rear bearing)	49 0259 440 Holder, main shaft 	For prevention of oil leakage
49 G030 338 Attachment E (Part of 49 D017 2A1) 	For installation of bearing inner race (side bearing)	49 S120 710 Holder, coupling flange 	For removal and installation of companion flange
49 0839 425C Puller set, bearing 	For removal and installation of companion flange	49 U027 003 Installer, oil seal 	For installation of oil seal (companion flange)
49 0259 720 Wrench, differential side bearing adjusting nut 	For adjustment of drive pinion and ring gear backlash	—	—

45U0MX–037

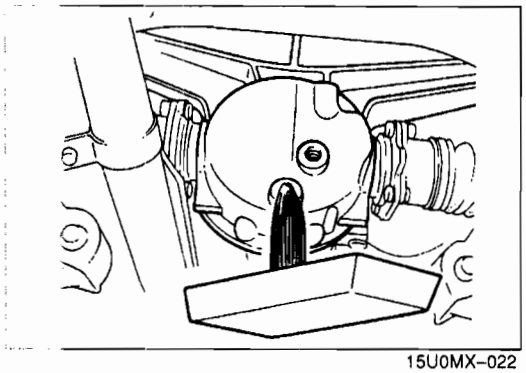

9MU0MX–033

DIFFERENTIAL OIL

Inspection

1. Remove the filler plug.
2. Verify that the oil is at the bottom of the filler plug hole. If it is low, add the specified oil.
3. Install the filler plug.

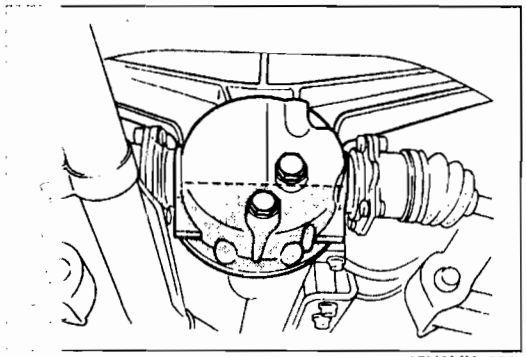
Tightening torque:
39—54 N·m {4.0—5.5 kgf·m, 29—40 ft·lbf}


15U0MX–022

Replacement

1. Remove the filler and drain plugs.
2. Drain the differential oil into a suitable container.
3. Wipe the plugs clean.
4. Install the drain plug and a new washer.

Tightening torque:
39—54 N·m {4.0—5.5 kgf·m, 29—40 ft·lbf}

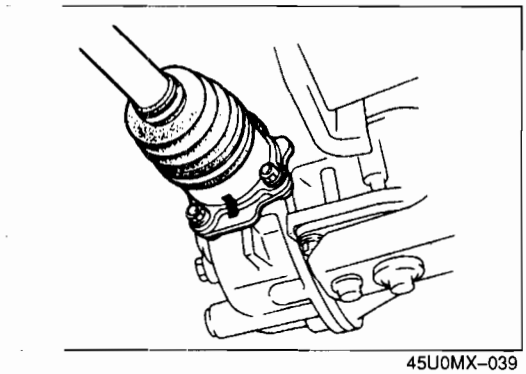

45U0MX–038

5. Add the specified oil from the filler plug until the level reaches the bottom of the plug hole.

Specified oil
Type
Above –18°C {0°F}: API GL–5, SAE 90
Below –18°C {0°F}: API GL–5, SAE 80
Capacity: 1.00 L {1.06 US qt, 0.88 Imp qt}

6. Install the filler plug.

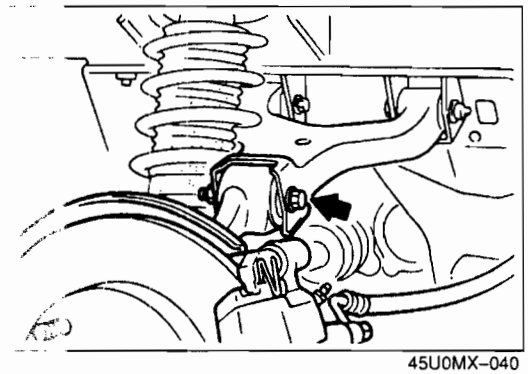
Tightening torque:
39—54 N·m {4.0—5.5 kgf·m, 29—40 ft·lbf}


45U0MX–039

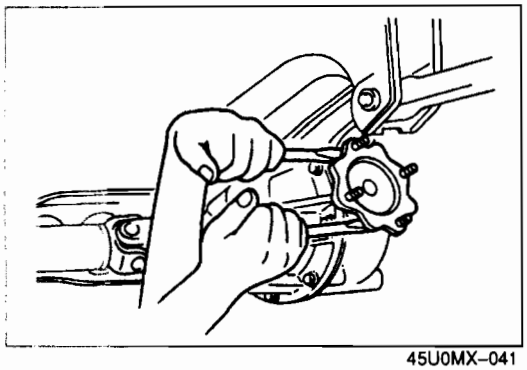
OIL SEAL (OUTPUT SHAFT)

Replacement

1. On level ground, Jack up the vehicle and support it on safety stands.
2. Drain the differential gear oil.
3. Mark the drive shaft and output shaft flanges for proper reassembly.

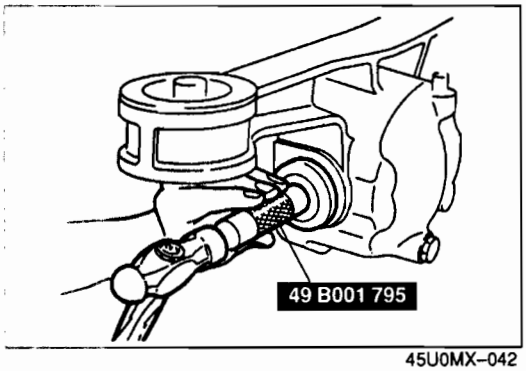

45U0MX–040

4. Remove the upper arm installation bolt and nut.



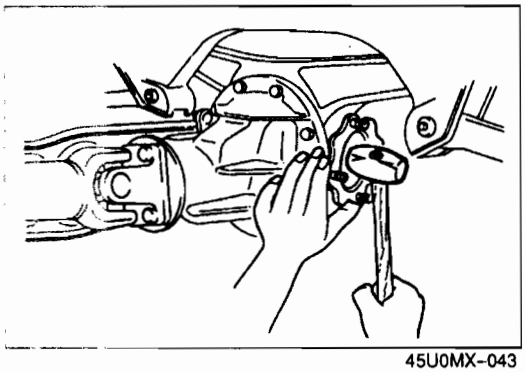
45U0MX-041

5. Separate the driveshaft from the differential and suspend it.
6. Remove the output shaft by using two pry bars as shown in the figure.
7. Remove the oil seal.



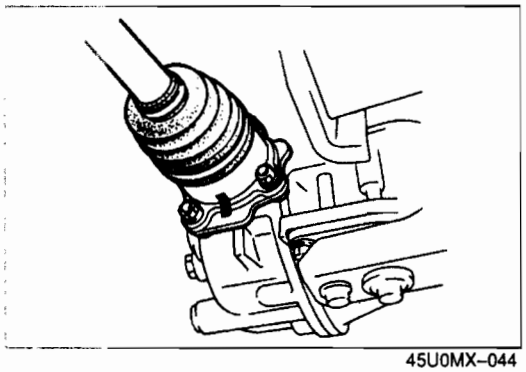
45U0MX-042

8. Apply lithium-based grease to the new oil seal lip and install it by using the **SST**.



45U0MX-043

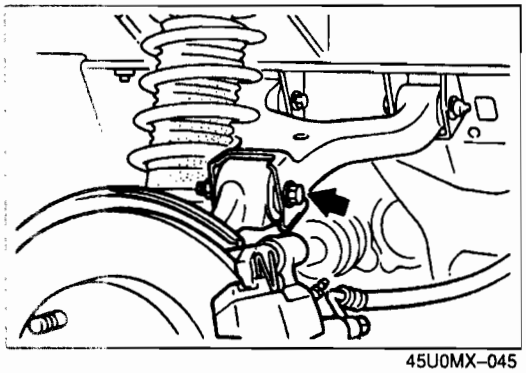
9. Install the new clips.
10. Install the output shaft into the side gears by lightly tapping with a plastic hammer.
11. Verify that the output shaft is hooked into the side gears by pulling it by hand.



45U0MX-044

12. Align the marks and install the drive shaft.

    Tightening torque:
    54—64 N·m {5.5—6.5 kgf·m, 40—47 ft·lbf}



45U0MX-045

13. Install the upper arm installation bolt and nut.

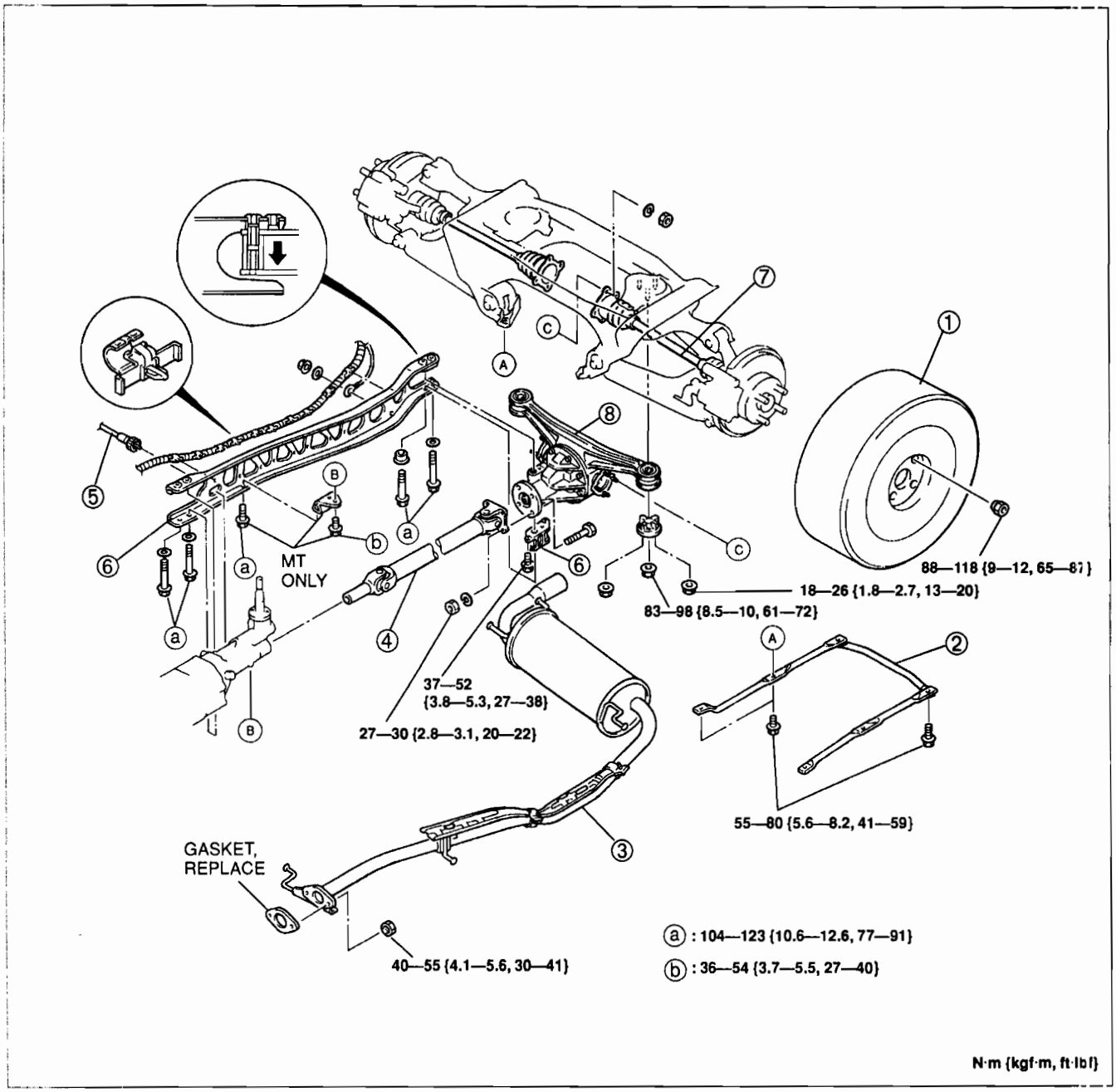
    Tightening torque:
    46—67 N·m {4.7—6.8 kgf·m, 34—49 ft·lbf}

14. Add the specified oil.
15. Adjust the rear wheel alignment. (Refer to section R.)

DIFFERENTIAL, STANDARD; DIFFERENTIAL, TORQUE SENSING LIMITED SLIP ("TORSEN" LSD)

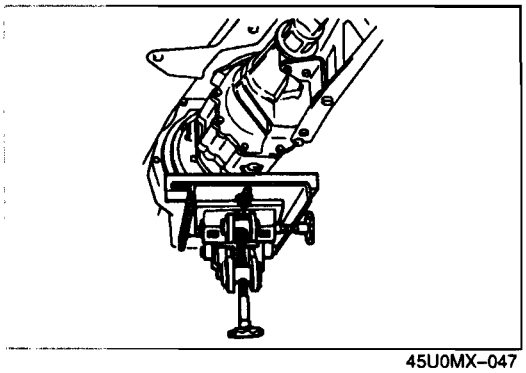
Removal / Installation

1. Drain the differential oil.
2. Remove in the order shown in the figure, referring to **Removal Note**.
3. Install in the reverse order of removal, referring to **Installation Note**.
4. Add the specified oil to the specified level.



45U0MX-046

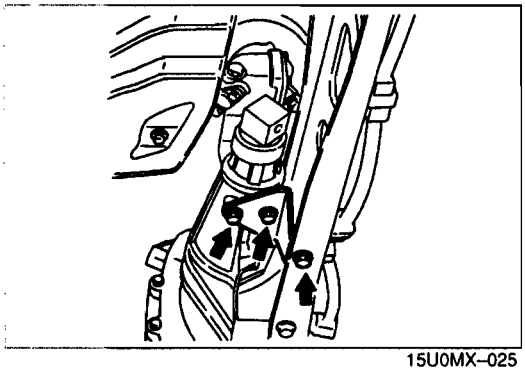
1. Rear wheels
2. Differential mounting pipe
3. Exhaust pipe
4. Propeller shaft
   Service ..... section L
5. Speedometer cable
6. Power plant frame (PPF), Differential mounting spacer
   Removal Note ..... page M–28
   Installation Note ..... page M–30
7. Drive shafts
   Removal Note ..... page M–29
8. Differential
   Removal Note ..... page M–29
   Installation Note ..... page M–30
   Overhaul ..... page M–32



45U0MX-047

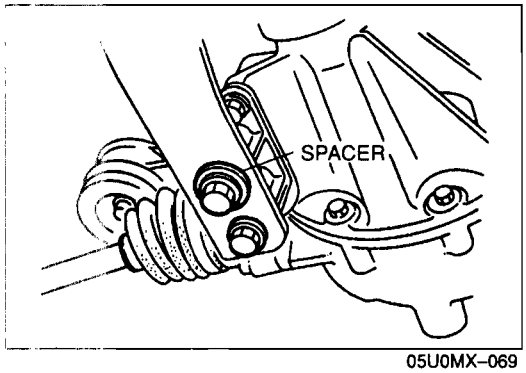
Removal note
Power plant frame (PPF)

1. Disconnect the wire harness from the PPF.
2. Support the transmission with a jack.



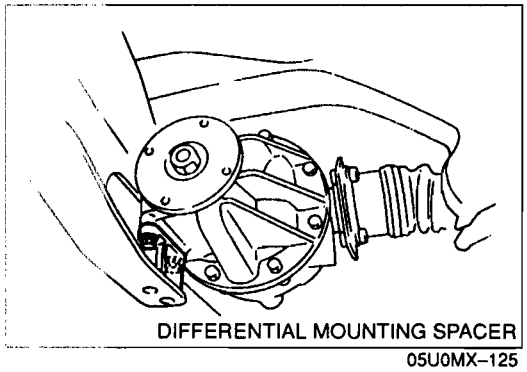
15U0MX-025

3. Remove the power plant frame bracket. (Manual transmission)



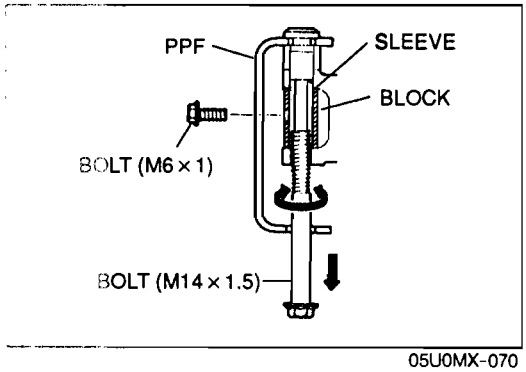
05U0MX-069

4. Remove the differential-side bolts, and pry out the spacer.



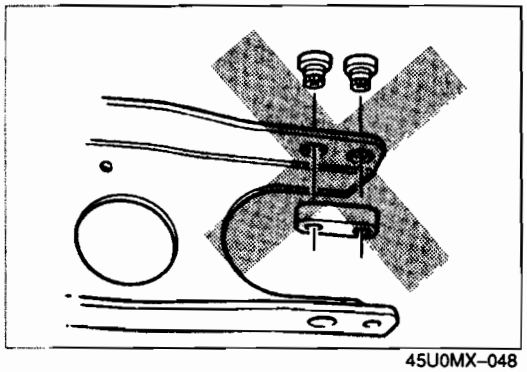
05U0MX-125

5. Remove the differential mounting spacer.

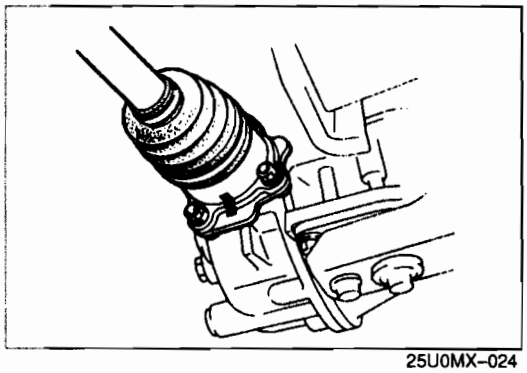


05U0MX-070

6. Turn a bolt (M14 × 1.5) into the sleeve.
7. Twist and pull the bolt downward.
8. Install a bolt (M6 × 1) into the hole in the block to hold the sleeve, and remove the long bolt (M14 × 1.5).
9. Remove the bolt (M6 × 1).

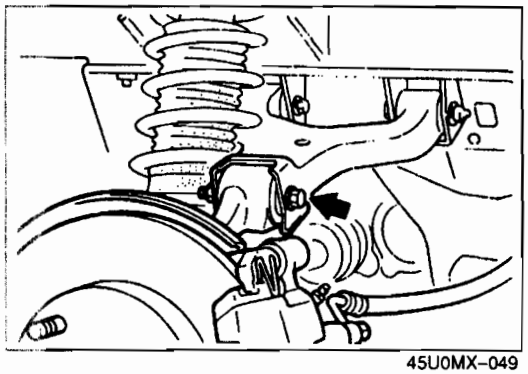

45U0MX-048

10. Remove the transmission-side bolts, and remove the PPF. Do not remove the spacers from the PPF. If they are removed, replace the PPF as an assembly.


25U0MX-024

Drive shaft

Mark the drive shaft and output shaft for proper installation.


45U0MX-049

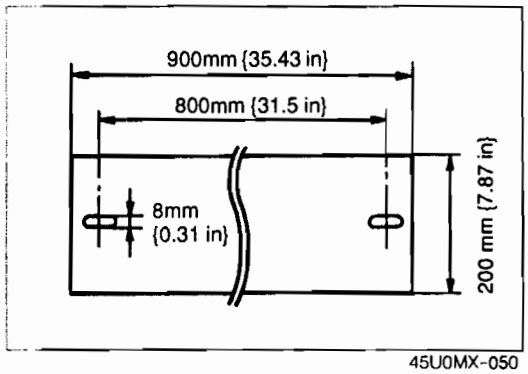
Differential

1. Support the differential with a jack.
2. Lower the differential and move it forward.

Note

- If the drive shaft will not separate easily from the output shaft, remove a bolt and nut from one side of the upper arm.

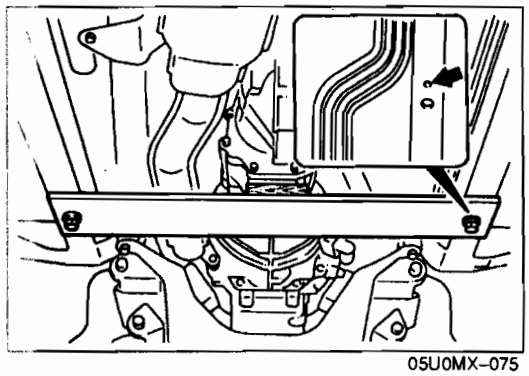
3. Separate the driveshaft from the output shaft.



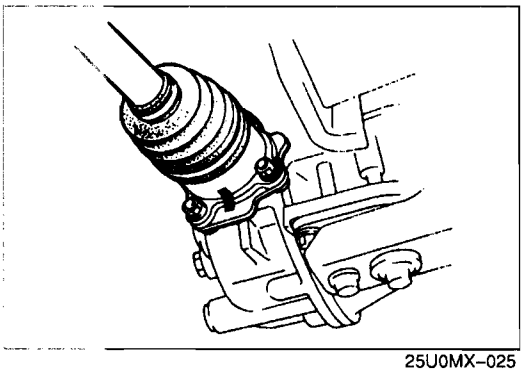
45U0MX-050

4. To prevent damaging the fire wall, crank angle sensor, and engine mount, support the transmission as follows

   (1) Prepare a steel plate (as shown in the figure), a wooden block, bolts (M8 × 1.25), and washers.


05U0MX-075

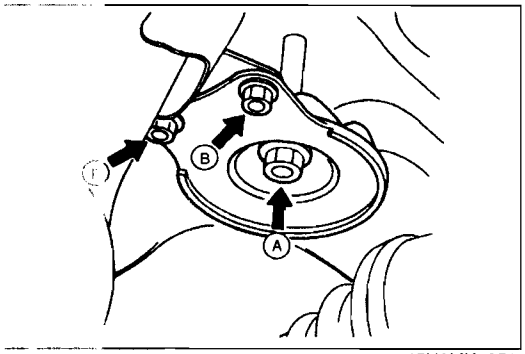
   (2) Install the parts as shown in the figure.



25U0MX-025

Installation note
Differential

1. Connect the drive shaft to the output shaft with the marks aligned.

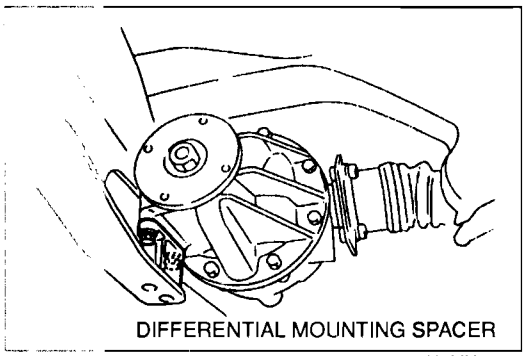


45U0MX-051

2. Install the differential.

Tightening torque
Ⓐ: 83—98 N·m {8.5—10 kgf·m, 61—72 ft·lbf}
Ⓑ: 18—26 N·m {1.8—2.7 kgf·m, 13—20 ft·lbf}

3. Adjust the rear wheel alignment if the upper arm installation bolt and nut were removed. (section R.)



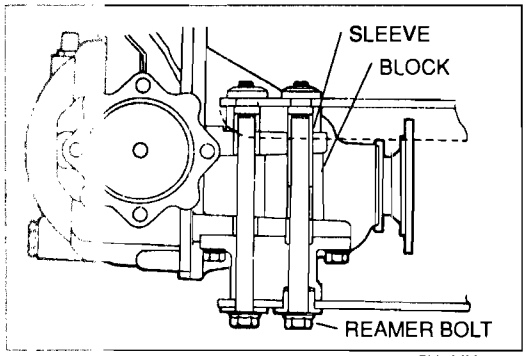
05U0MX-078

Power plant frame (PPF)

1. Install the differential mounting spacer.

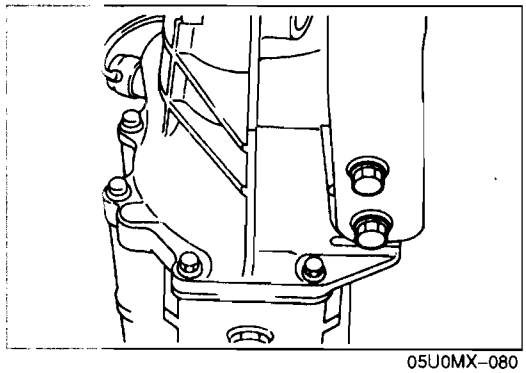
Tightening torque:
37—52 N·m {3.8—5.3 kgf·m, 27—38 ft·lbf}

2. Support the transmission with a jack so that it is level.
3. Position the PPF and snugly tighten the transmission-side bolts by hand.



45U0MX-052

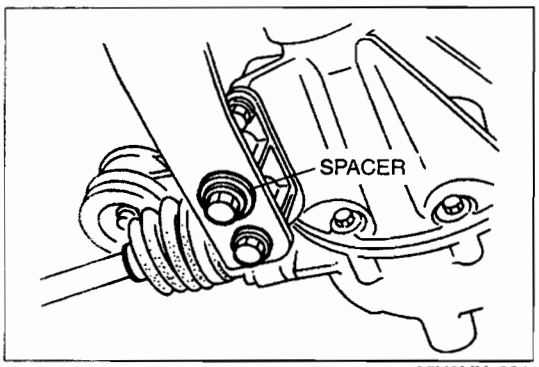
4. Verify that the sleeve is installed into the block.
5. Install the spacer and bolts and snugly tighten them. The reamer bolt should be installed in the forward hole.



05U0MX-080

6. Snugly install the power plant frame bracket.
7. Tighten the transmission-side bolts.

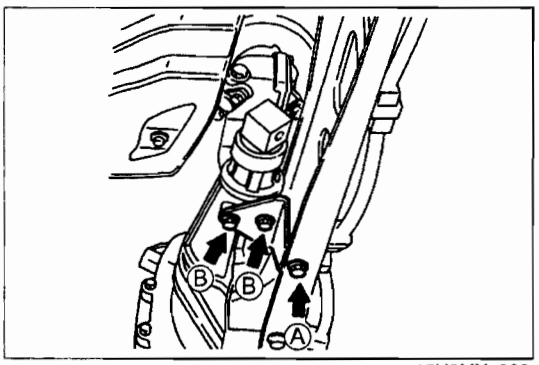
Tightening torque:
104—123 N·m {10.6—12.6 kgf·m, 77—91 ft·lbf}



05U0MX–081

8. Tighten the differential-side bolts.

Tightening torque:
104—123 N·m {10.6—12.6 kgf·m, 77—91 ft·lbf}



15U0MX–026

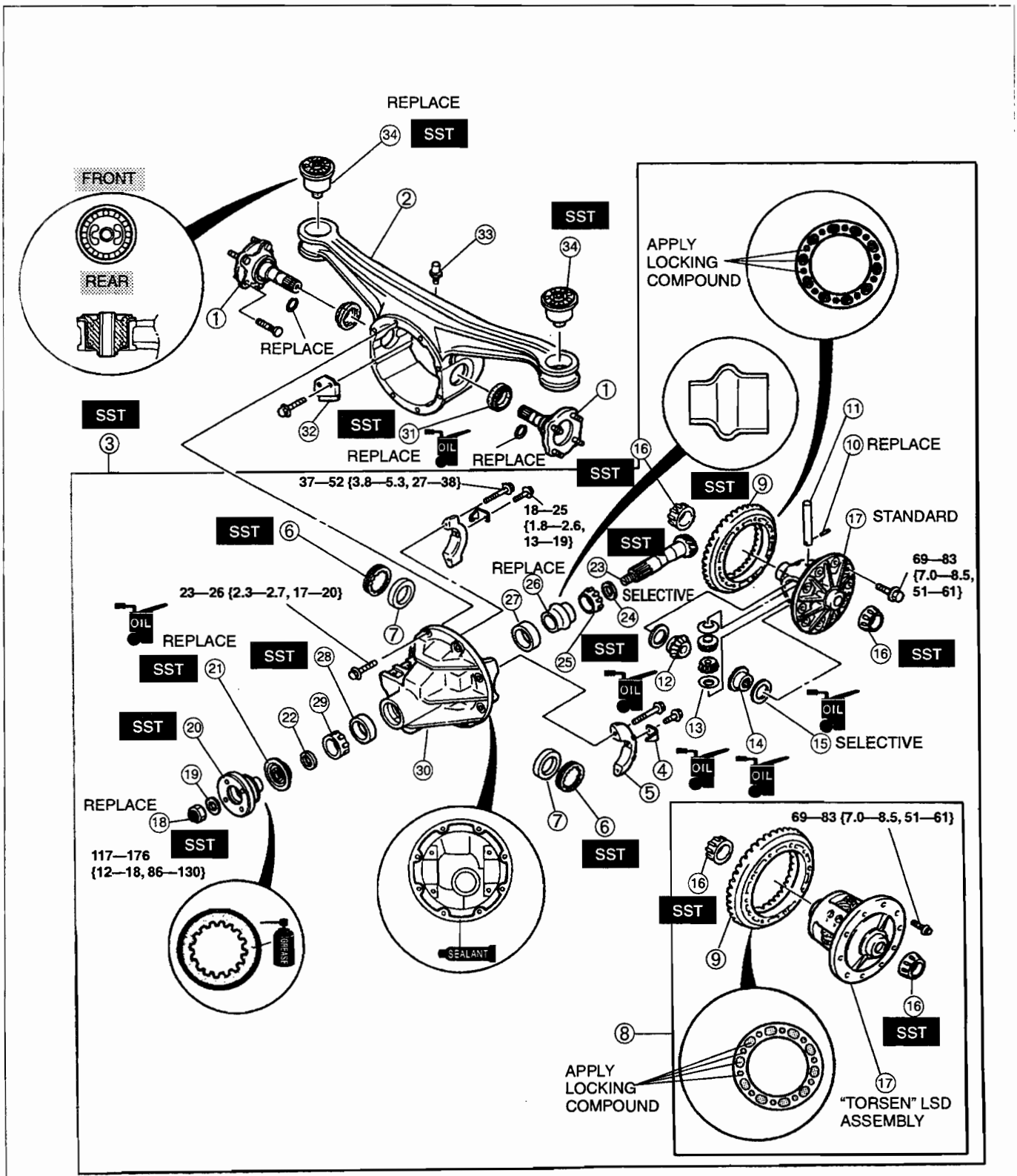
9. Install the power plant frame bracket. (Manual transmission)

Tightening torque
Ⓐ: 104—123 N·m {10.6—12.6 kgf·m, 77—91 ft·lbf}
Ⓑ: 36—54 N·m {3.7—5.5 kgf·m, 27—40 ft·lbf}

10. Remove the jack, and connect the wire harness.

Overhaul

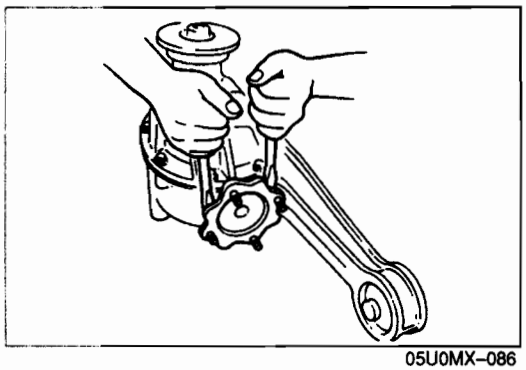
1. Disassemble in the order shown in the figure, referring to **Disassembly Note**.
2. Inspect all parts and repair or replace as necessary.
3. Assemble in the reverse order of disassembly, referring to **Assembly Note**.



N·m {kgf·m, ft·lbf}

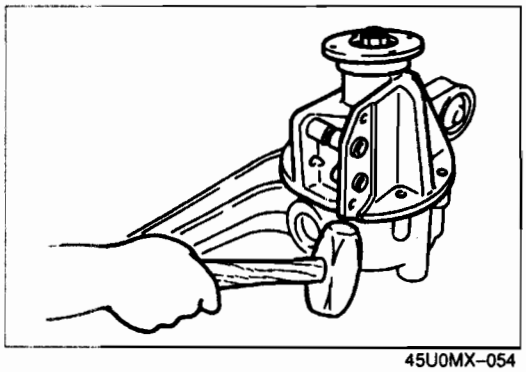
1 Output shafts
   Disassembly Note ..... page M–34
   Assembly Note ..... page M–42
2 Differential case
   Disassembly Note ..... page M–34
   Assembly Note ..... page M–42
3 Differential gear assembly
   Disassembly Note ..... page M–34
4 Lock plates
5 Bearing caps
   Disassembly Note ..... page M–34
   Assembly Note ..... page M–42
6 Adjusting nuts
   Disassembly Note ..... page M–34
7 Bearing outer races (Side bearing)
8 Gear case assembly ("TORSEN" LSD)
9 Ring gear
   Inspect individual gear teeth for wear and cracks
10 Knock pin (Standard)
   Disassembly Note ..... page M–34
11 Pinion shaft (Standard)
12 Pinion gears (Standard)
   Inspect individual gear teeth for wear and cracks
13 Thrust washers (Standard)
14 Side gears (Standard)
   Inspect individual gear teeth for wear and cracks
15 Thrust washers (Standard)
   Assembly Note ..... page M–40
16 Bearing inner races (Side bearing)
   Disassembly Note ..... page M–34
   Inspect for damage and rough rotation
17 Gear case
18 Locknut (Companion flange)
   Disassembly Note ..... page M–35
19. Washer
20. Companion flange
   Disassembly Note ..... page M–35
   Inspect splines for wear and damage
21. Oil seal (Companion flange)
22. Washer
23. Drive pinion
   Disassembly Note ..... page M–35
   Inspect splines for wear and damage
   Inspect individual gear teeth for wear and cracks
24. Spacer
   Assembly Note ..... page M–37
25. Bearing inner race (Front bearing)
   Inspect for damage and rough rotation
   Assembly Note ..... page M–38
26. Collapsible spacer
27. Bearing outer race (Rear bearing)
   Disassembly Note ..... page M–35
   Assembly Note ..... page M–37
28. Bearing outer race (Front bearing)
   Disassembly Note ..... page M–35
   Assembly Note ..... page M–36
29. Bearing inner race (Rear bearing)
   Disassembly Note ..... page M–35
   Inspect for damage and rough rotation
   Assembly Note ..... page M–37
30. Differential carrier
31. Oil seal (Output shaft)
   Assembly Note ..... page M–36
32. Baffle
33. Breather
34. Differential mount
   Disassembly Note ..... page M–36
   Assembly Note ..... page M–36

45U0M0-053



05U0MX–086

Disassembly note
Output shafts
Remove the output shafts with two pry bars as shown in the figure.

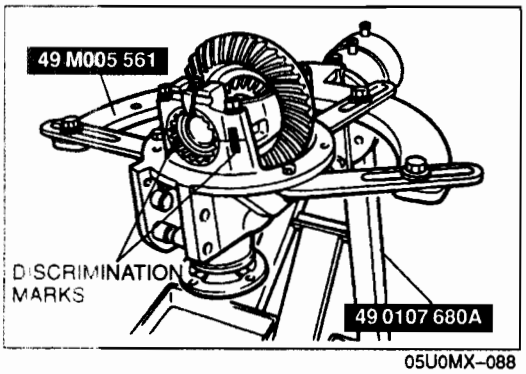


45U0MX–054

Differential case

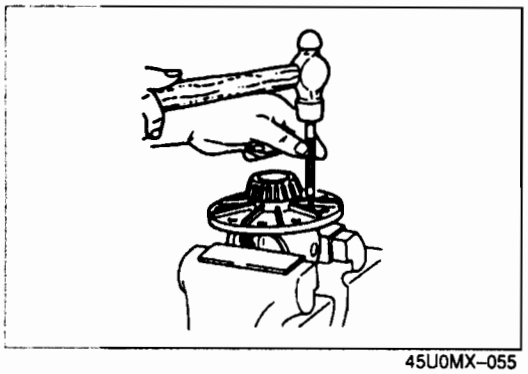
Caution
- **The differential case is made of aluminum, and is therefore easily dented and scratched by metal tools. When separating the differential carrier from the case, use only a plastic hammer at the point shown in the figure.**

Strike the differential carrier with a copper hammer to separate it from the case.



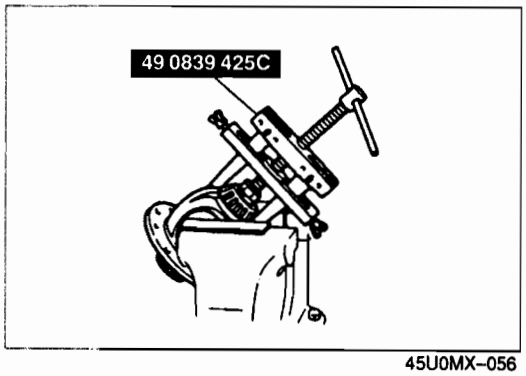
05U0MX–088

Differential gear assembly
Mount the differential gear assembly on the **SST**.
Bearing caps
Mark one bearing cap and the carrier.
Adjusting nuts
Mark one adjusting nuts and the carrier.



45U0MX–055

Knock pin
Secure the gear case in a vise and tap out the knock pin toward the ring gear side.

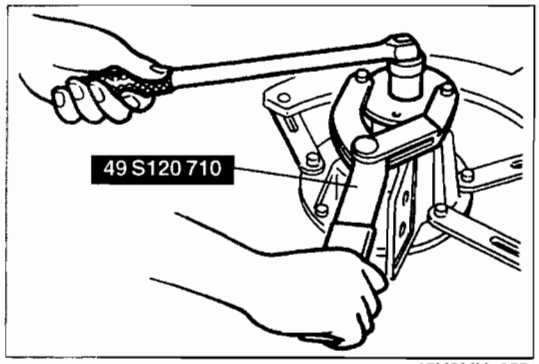


45U0MX–056

Bearing inner races (Side bearing)

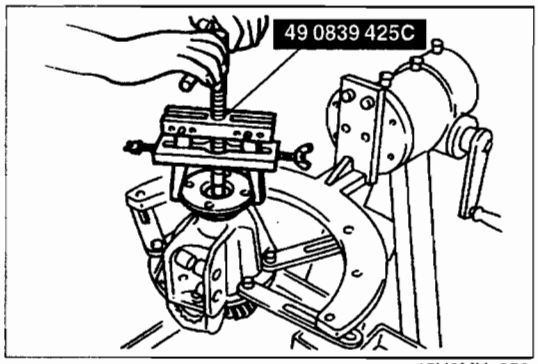
Note
- Mark the bearings so that they can later be reinstalled in the same position.

Remove the bearing inner races (side bearing) from the gear case by using the **SST**.



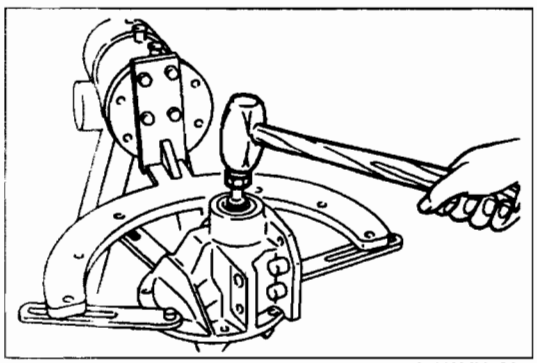
45U0MX–057

Locknut (Companion flange)
Hold the companion flange by using the **SST** and remove the locknut.

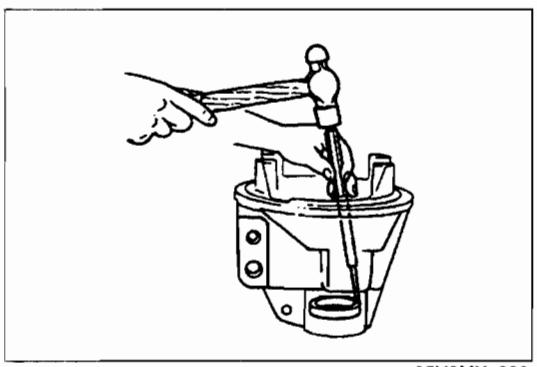


45U0MX–058

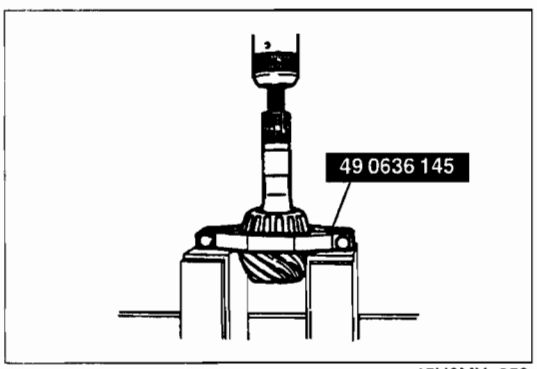
Companion flange
Pull the companion flange off by using the **SST**.


05U0MX–091

Drive pinion
Push out the drive pinion by attaching a miscellaneous locknut to the drive pinion, and tapping it with a copper hammer.

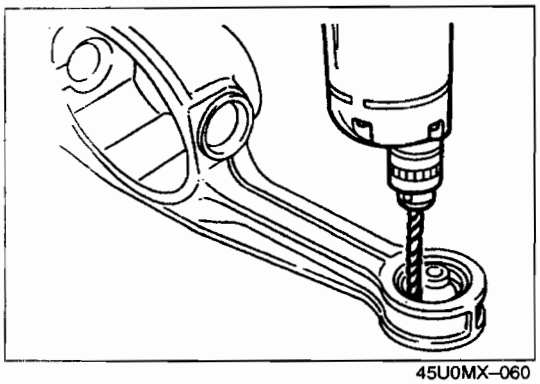

05U0MX–092

Bearing outer races (Front, and rear bearing)
Remove the bearing outer races using the two grooves in the carrier and alternately tapping the sides of the races.



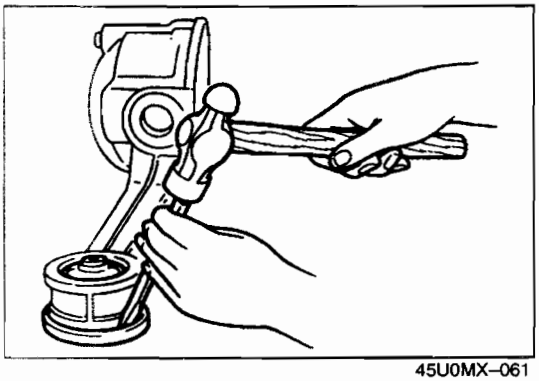
45U0MX–059

Bearing inner race (Rear bearing)
While supporting the drive pinion to keep it from falling, remove the bearing inner race (rear bearing) by using the **SST**.

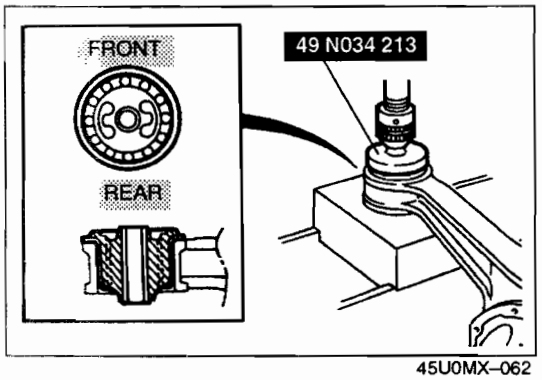

45U0MX–060

Differential mount

1. Drill holes around the differential mount.


45U0MX–061

2. Hit the edge of the differential mount to remove it.



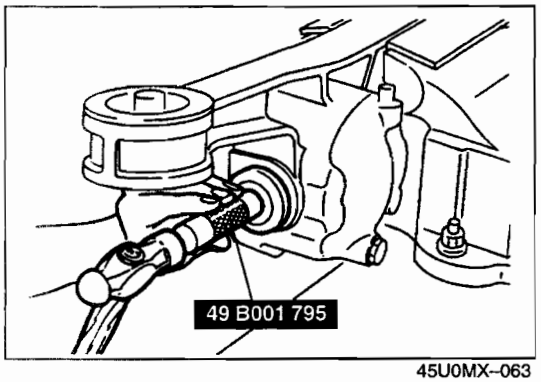
45U0MX–062

Assembly note

Differential mounting rubber

1. Install the new differential mounting rubber as shown in the figure.
2. Press in the differential mounting by using the **SST.**

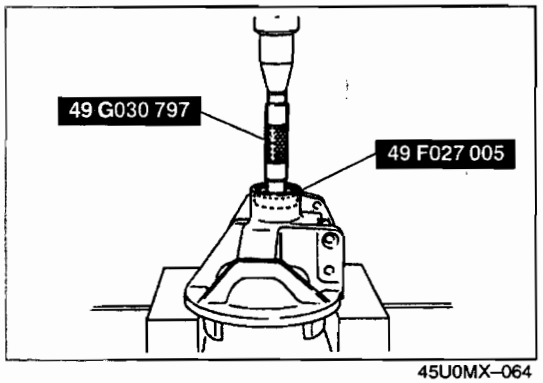
Press force: 19600 N {2000 kgf, 4400 lbf}



45U0MX–063

Oil seal (Output shaft)

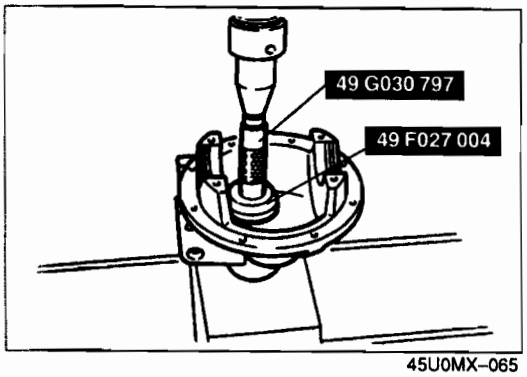
Apply lithium based grease to the new oil seal lip and install it by using the **SST.**



45U0MX–064

Bearing outer race (front bearing)

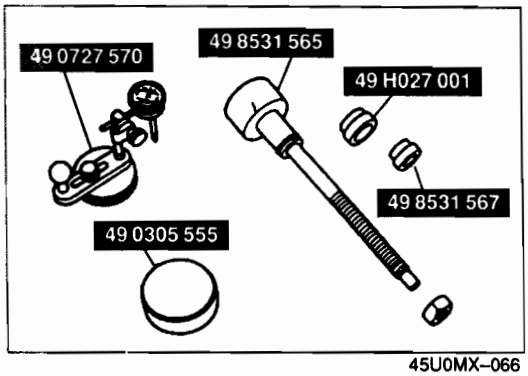
Install the bearing outer race (front bearing) by using the **SST.**



45U0MX–065

Bearing outer race (rear bearing)

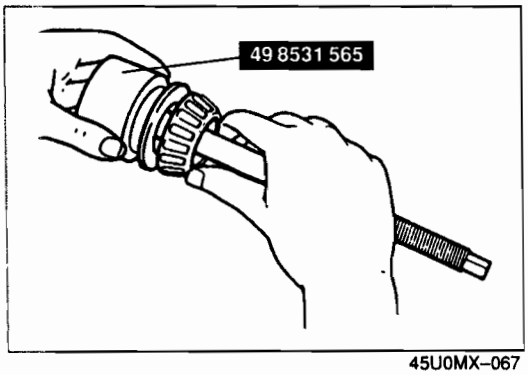
Install the bearing outer race (rear bearing) by using the **SST**.



45U0MX–066

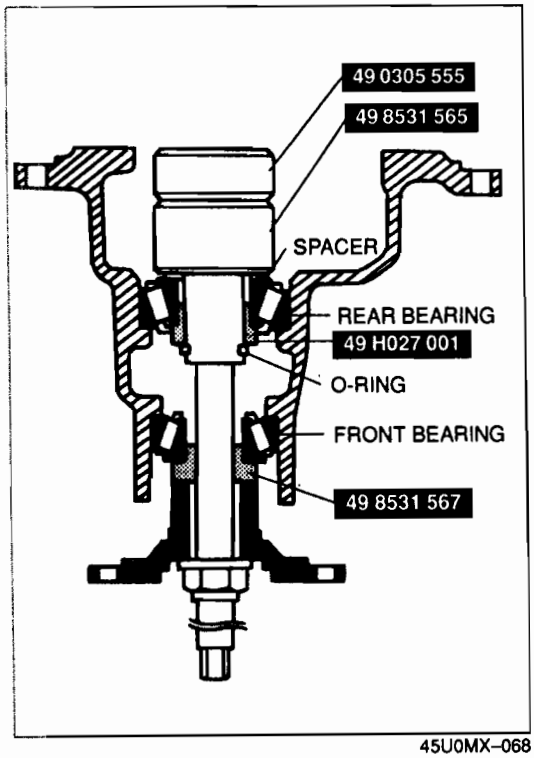
Bearing inner race (rear bearing), Bearing inner race (front bearing), Spacer

1. Adjust the drive pinion height as follows, by using the **SST**.



45U0MX–067

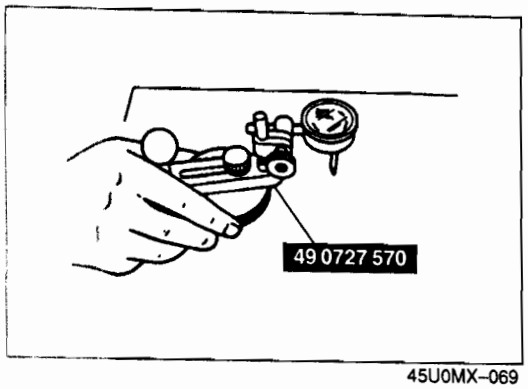
(1) Install the previously-removed spacer onto the **SST** so that the beveled side of the spacer faces the drive pinion. Then install the rear bearing and O-ring on to the **SST**/spacer as shown in the figure.



45U0MX–068

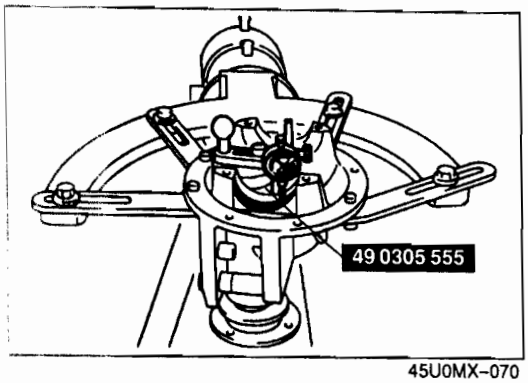
(2) Assemble the spacer, bearing inner race (rear bearing), and **SST**.
Secure the **SST** with the O-ring. Install this assembly in the carrier.
Install the bearing inner race (front bearing), the **SST**, companion flange, washer, and nut.

(3) Tighten the nut just enough so that the companion flange can still be turned by hand.



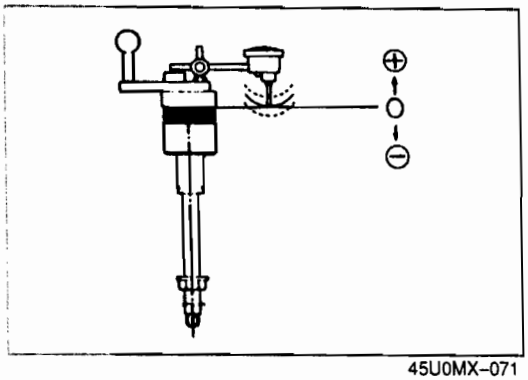
45U0MX-069

(4) Place the **SST** on the surface plate and set the dial indicator to "Zero".



45U0MX-070

(5) Place the **SST** atop the drive pinion model. Set the gauge body atop the gauge block.
(6) Place the feeler of the dial indicator so that it contacts where the bearing inner race (side bearing) is installed in the carrier. Measure the lowest position on the left and right sides of the carrier.



45U0MX-071

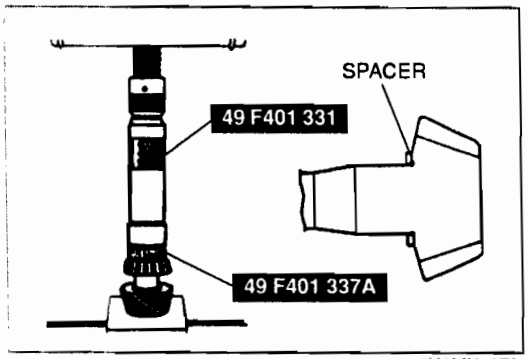
(7) Add the two (left and right) values obtained in step (6) and divide the total by 2.

Specification: 0mm {0 in}

Mark	Thickness	Mark	Thickness
08	3.08mm {0.1213 in}	29	3.29mm {0.1295 in}
11	3.11mm {0.1224 in}	32	3.32mm {0.1307 in}
14	3.14mm {0.1224 in}	35	3.35mm {0.1319 in}
17	3.17mm {0.1248 in}	38	3.38m {0.1331 in}
20	3.20mm {0.1260 in}	41	3.41mm {0.1343 in}
23	3.23mm {0.1271 in}	44	3.44mm {0.1354 in}
26	3.26mm {0.1283 in}	47	3.47mm {0.1366 in}

45U0MX-072

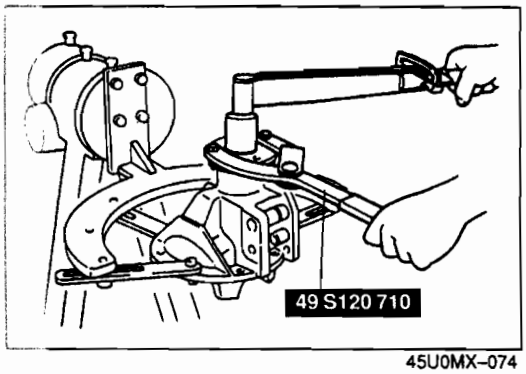
(8) If not within specification, adjust the pinion height by selecting a spacer. Select the spacer of the thickness closest to that necessary. Spacers are available in increments of 0.03mm {0.0012 in}.
(9) Install the spacer, selected in the procedure above, with the beveled side facing the drive pinion.



45U0MX-073

(10) Press the spacer onto the drive pinion until the force required starts to increase sharply.

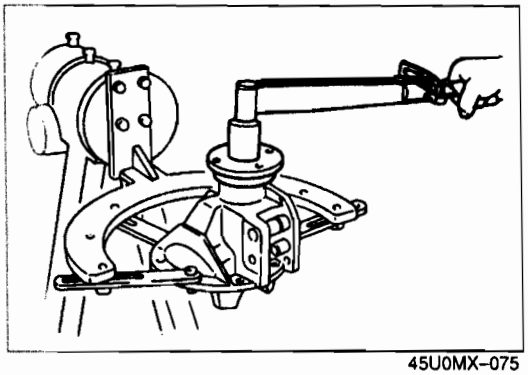
2. Install the spacer.
3. Press the bearing inner race (rear bearing) on with the **SST**.



45U0MX–074

4. Without installing the oil seal, Install the drive pinion, spacer, new collapsible spacer, front bearing, washer, and companion flange to the carrier, and temporarily tighten the locknut by using the **SST**.

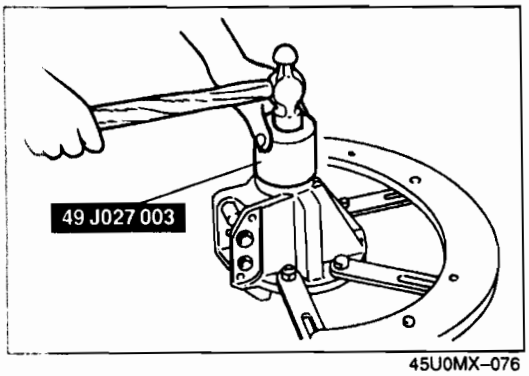
   Tightening torque: 128 N·m {13.0 kgf·m, 94.1 ft·lbf}


45U0MX–075

5. Turn the companion flange several turns by hand to seat the bearing.
6. Measure the drive pinion preload.
   Adjust the preload by tightening the locknut, and record the tightening torque.

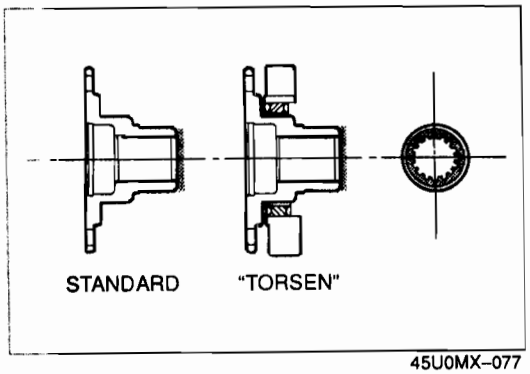
   Preload:
   0.9—1.3 N·m {9—14 kgf·cm, 7.9—12.1 in·lbf}

   Tightening torque:
   128—284 N·m {13.0—29.0 kgf·m, 94.1—209.7 ft·lbf}



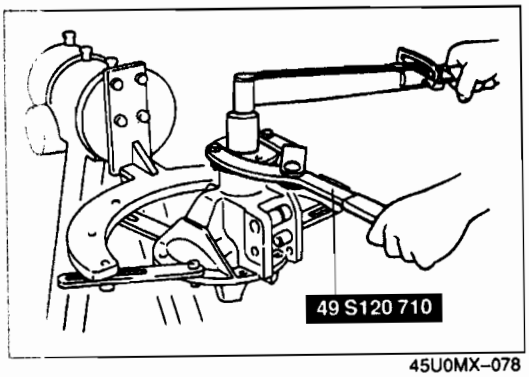
45U0MX–076

7. Remove the locknut, washer, and companion flange.
8. Tap a new oil seal into the differential carrier with the **SST**.



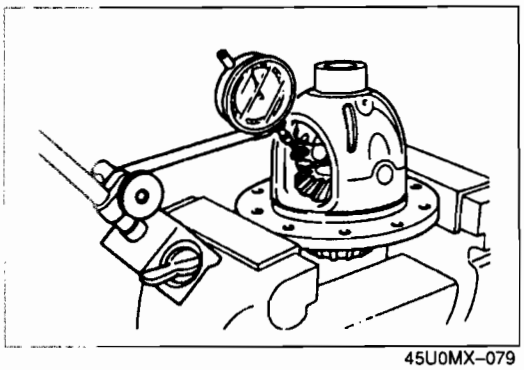
45U0MX–077

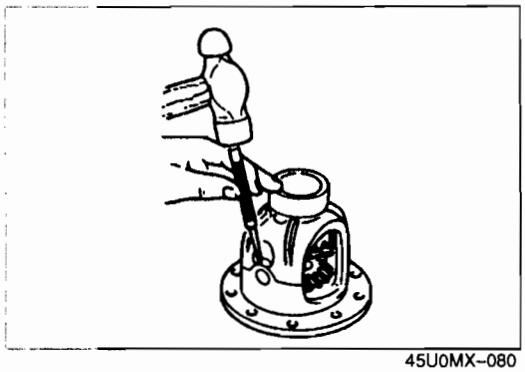
9. Apply a light coat of grease to the end face of the companion flange.

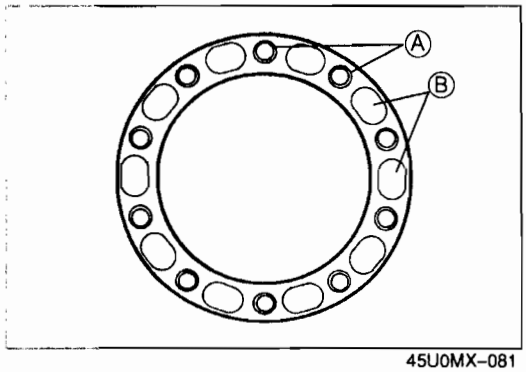


45U0MX–078

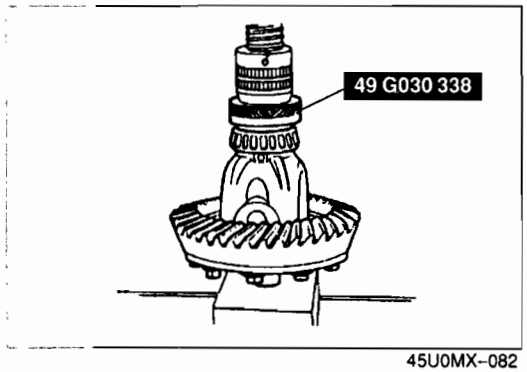
10. Install the companion flange and washer; while holding the flange with the **SST**, and tighten a new locknut to the tightening torque recorded in step 6.


45U0MX-079

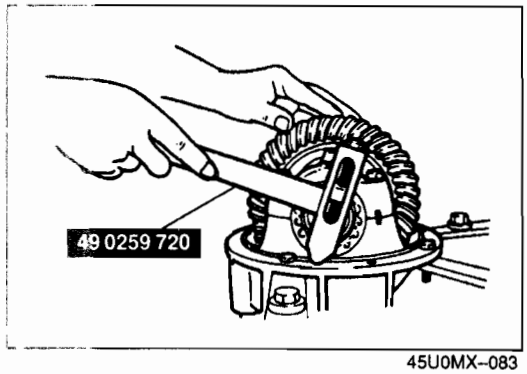

45U0MX-080



45U0MX-081



45U0MX-082



45U0MX-083

Thrust washers (Standard)

1. Adjust the backlash of the side gears and pinion gear as follows. (Standard)
   (1) Set a dial gauge against the pinion gear as shown.
   (2) Secure one of the side gears.
   (3) Move the pinion gear, and measure the backlash at the end of it. If not within specification, replace the differential gear as an assembly. ("TORSEN" LSD)

   Standard backlash: 0—0.1mm {0—0.004 in}

   (4) If the backlash exceeds the standard, use the selectable thrust washers for adjustment.

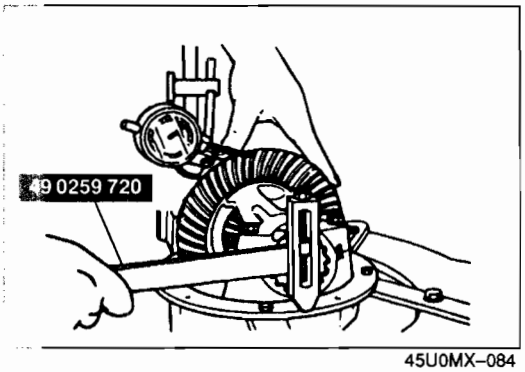
Thrust washer thickness:

Identification mark	Thickness
0	2.00mm {0.0787 in}
0.5	2.05mm {0.0807 in}
1	2.10mm {0.0827 in}
1.5	2.15mm {0.0846 in}
2	2.20mm {0.0866 in}

2. Install the new knock pin to secure the pinion shaft. Stake the pin with a punch to prevent it from coming out of the case.
3. Apply thread-locking compound to bolt threads Ⓐ and points Ⓑ of the gear back face. Apply approximately 0.04 cm^3 {0.04 cc, 0.0024 cu in} of thread-locking compound at each point and bolt thread.
4. Install the ring gear onto the gear case.

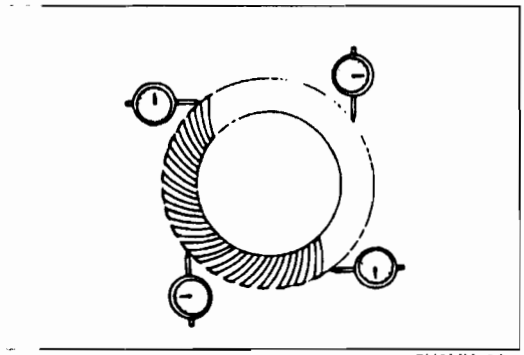
   Tightening torque:
   69—83 N·m {7.0—8.5 kgf·m, 51—61 ft·lbf}

5. Press the bearing inner races (side bearing) on by using the **SST**.
6. Install the differential gear assembly in the carrier.
7. Note the identification marks on the adjusting nuts, and install them on their respective sides.
8. Install the differential bearing caps, making sure that the identification mark on the cap corresponds with the one on the carrier by using the **SST**. Then temporarily tighten the bolts.

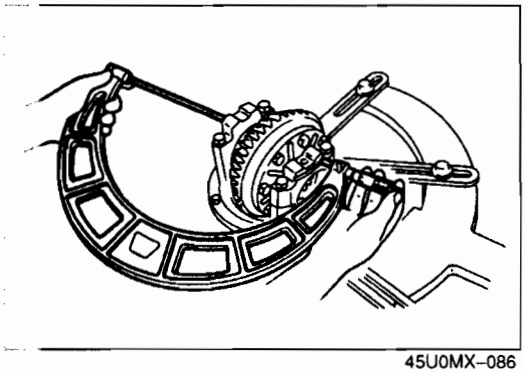


45U0MX-084

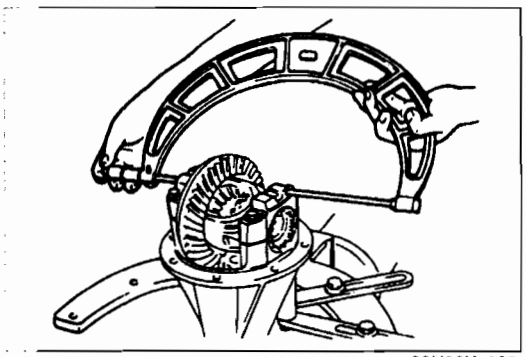
(1) Mark the ring gear at four points at approx. **90°** intervals. Mount a dial indicator to the carrier so that the feeler comes in contact at a right angle with one of the ring gear teeth.
(2) Turn both bearing adjusters equally by using the SST until the backlash is **0.09—0.11mm {0.0036—0.0043 in}**.


45U0MX-085

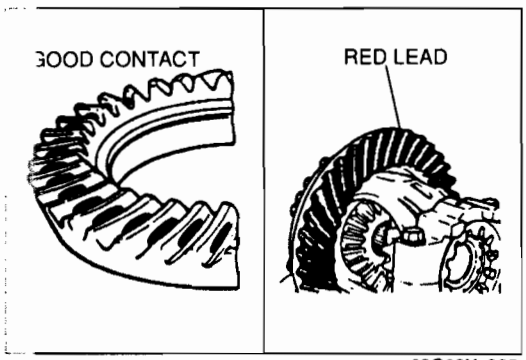
(3) Check the backlash at the three other marked points and make sure the maximum backlash is less than **0.07mm {0.0028 in}**.


45U0MX-086

9. Tighten or loosen the adjusting nuts equally until the distance between the pilot sections on the bearing caps is **185.428—185.50mm {7.3004—7.3031 in}**.
10. Recheck the back lash.

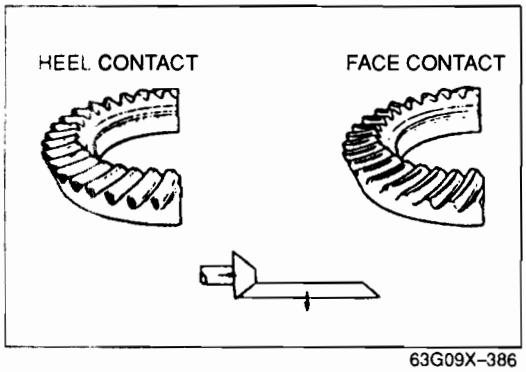

99U09X-025

Inspection and adjustment of teeth contact
1. Coat both surfaces of 6—8 teeth of the ring gear with a thin coat of red lead.
2. While moving the ring gear back and forth by hand, rotate the drive pinion several times and check the tooth contact.
3. If the tooth contact is good, wipe off the red lead.
4. If it is not good, adjust the pinion height, and then adjust the backlash.



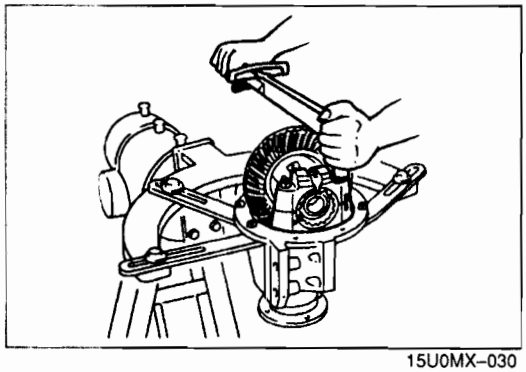
63G09X-385

(1) Toe and flank contact
Replace the spacer with a thinner one to move the drive pinion outward.



63G09X-386

(2) Heel and face contact
Replace the spacer with a thicker one to bring the drive pinion in.

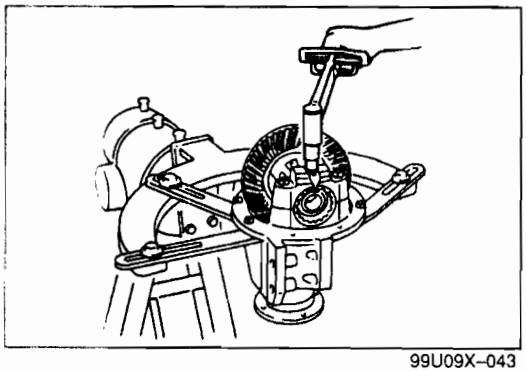


15U0MX-030

Bearing caps

1. Tighten the bearing cap bolts.

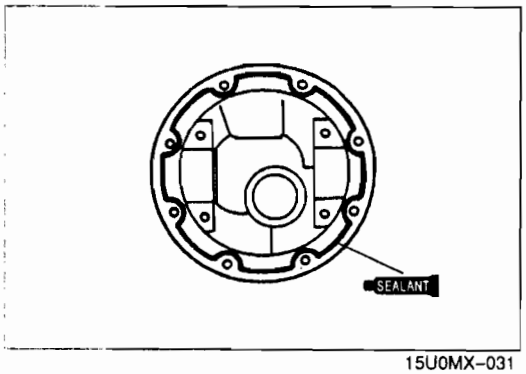
Tightening torque:
37—52 N·m {3.8—5.3 kgf·m, 27—38 ft·lbf}



99U09X-043

2. Install the lock plates on the bearing caps.

Tightening torque:
18—25 N·m {1.8—2.6 kgf·m, 13—19 ft·lbf}

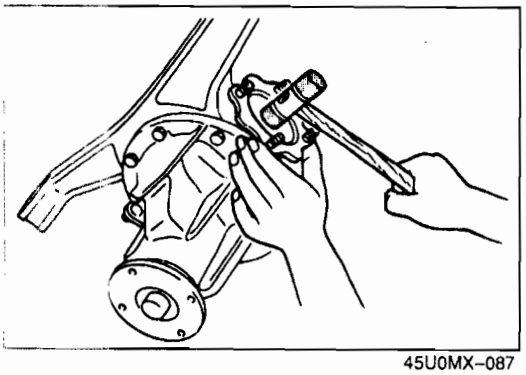


15U0MX-031

Differential case

1. Apply sealant to the housing face.
2. Tighten the bolts.

Tightening torque:
23—26 N·m {2.3—2.7 kgf·m, 17—20 ft·lbf}



45U0MX-087

Output shaft

1. Install a new clip.
2. Install the output shafts into the side gears by lightly tapping them with a plastic hammer.
3. Verify that the output shafts are hooked into the side gears by pulling them by hand.