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Many thanks to Scott89t2 and www.1300cc.com for scanning this file.

1989 Mazda RX-7 Factory Service Manual

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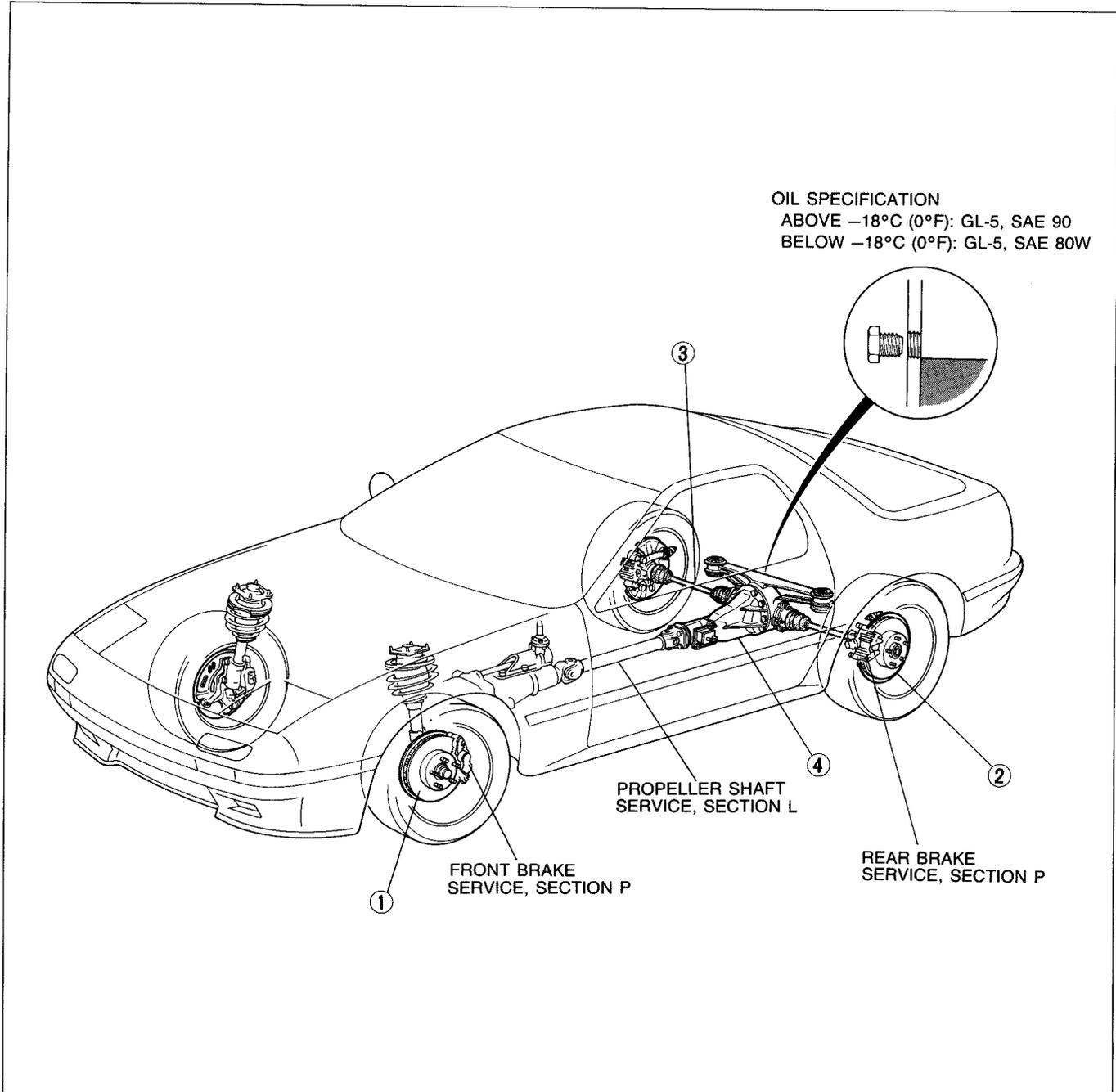
Some parts of the manual may be hard to read or see on the screen, but if you print the pages out it's perfect. Well except for the crookedness ☺.

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FRONT AND REAR AXLE

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OUTLINE

SPECIFICATIONS

Item		Turbo model	Non-Turbo model		
Front axle					
Bearing play axial direction		mm (in)	0 (0)		
Bearing preload	Pull scale reading	N (kg, lb)	3.9—9.8 (0.4—1.0, 0.9—2.2)		
Rear axle					
Bearing end play		mm (in)	0.1 (0.004)		
Differential					
Reduction gear		Hypoid gear			
Differential gear		Straight bevel gear			
Reduction ratio		M/T	4.100		
		A/T	—		
Number of teeth		Hypoid gear			
		Straight bevel gear			
		Ring gear	M/T	41	4.100, 4.300 (Viscous L.S.D.)
		A/T	—	4.100 (Convertible), 3.909	
Drive pinion gear		M/T	10	41, 43 (Viscous L.S.D.)	
		A/T	—	41 (Convertible), 43	
Differential oil		Standard			
		Viscous L.S.D.			
		Grade	API GL-5		
		Viscosity	Above -18°C (0°F)	SAE 90	
			Below -18°C (0°F)	SAE 80W	
		Amount	liters (US qt, Imp qt)	1.3 (1.4, 1.1)	
Differential oil		Standard			
		Viscous L.S.D.			
		Grade	API GL-5		
		Viscosity	Above -18°C (0°F)	SAE 90	
			Below -18°C (0°F)	SAE 80W	
		Amount	liters (US qt, Imp qt)	1.4 (1.5, 1.2)	1.3 (1.4, 1.1)
Driveshaft					
Type		Constant velocity joint			
Length	mm (in)	Turbo	637.5 (25.10)		
		Non-Turbo	646.0 (25.43)		

Viscous L.S.D.: Viscous Limited Slip Differential

97U0MX-003

TROUBLESHOOTING GUIDE

FRONT AXLE

Problem	Possible Cause	Action	Page
Steering wheel vibration	Improperly adjusted wheel bearing	Adjust	M- 6
	Worn or damaged wheel bearing	Replace	M- 8
Pulls or one-sided braking	Improperly adjusted wheel bearing	Adjust	M- 6
	Worn or damaged wheel bearing	Replace	M- 8
Excessive steering wheel play	Improperly adjusted wheel bearing	Adjust	M- 6

97U0MX-004

REAR AXLE

Problem	Possible Cause	Action	Page
Abnormal noise	Bent bearing housing	Replace	—
	Bent driveshaft	Replace	M-14
	Worn or damaged wheel bearing	Replace	M-12
	Worn driveshaft spline	Replace	M-14

97U0MX-005

M TROUBLESHOOTING GUIDE

DIFFERENTIAL (STANDARD)

Problem	Possible Cause	Action	Page
Abnormal noise	Insufficient differential oil	Add oil	M-18
	Incorrect differential oil	Replace	M-18
	Improperly adjusted ring gear backlash	Adjust	M-34
	Poor contact of ring gear teeth	Adjust	M-34
	Worn or damaged side bearing	Replace	M-24
	Worn or damaged ring gear	Replace	M-24
	Worn or damaged drive pinion bearing	Replace	M-24
	Worn or damaged pinion and side gear	Replace	M-24
	Seized side gear and case	Replace	M-24
	Worn side gear spline	Replace	M-24
	Worn pinion shaft	Replace	M-24
	Loose companion flange nut	Tighten	M-33
	Worn thrust washer	Replace	M-34
	Improperly adjusted side gear preload	Adjust	M-34
Improperly adjusted drive pinion gear preload	Adjust	M-34	
Heat buildup	Insufficient differential oil	Add oil	M-18
	Insufficient gear backlash	Adjust	M-34
	Excessive bearing preload	Adjust	M-33
Oil leakage	Excessive differential oil	Remove oil	M-18
	Loose differential carrier	Tighten or repair	M-36
	Worn or damaged oil seal	Replace	M-18,19
No differential operation	Misassembled	Repair	M-24

97U0MX-006

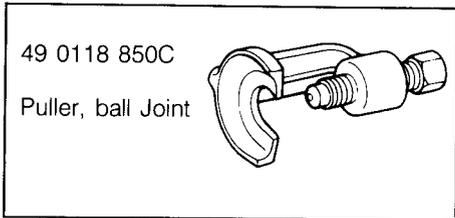
VISCOUS LIMITED SLIP DIFFERENTIAL

Problem	Possible Cause	Action	Page
Abnormal noise	Insufficient differential oil	Add oil	M-18
	Incorrect differential oil	Replace	M-18
	Improperly adjusted ring gear backlash	Adjust	M-34
	Poor contact of ring gear teeth	Adjust	M-34
	Worn or damaged viscous limited slip differential oil seal	Replace	M-26
	Worn or damaged ring gear	Replace	M-24,26
	Worn or damaged drive pinion bearing	Replace	M-24,26
	Loose companion flange nut	Tighten	M-33
	Worn thrust washer	Replace	M-34
Heat buildup	Insufficient differential oil	Add oil	M-18
	Excessive bearing preload	Adjust	M-33
Oil leakage	Excessive differential oil	Remove oil	M-18
	Loose differential carrier	Tighten or repair	M-36
	Worn or damaged oil seal	Replace	M-18,19
No differential operation	Misassembled	Repair	M-24,26

97U0MX-007

FRONT AXLE

PREPARATION SST



49 0118 850C
Puller, ball Joint

97U0MX-008

DISC BRAKE TYPE

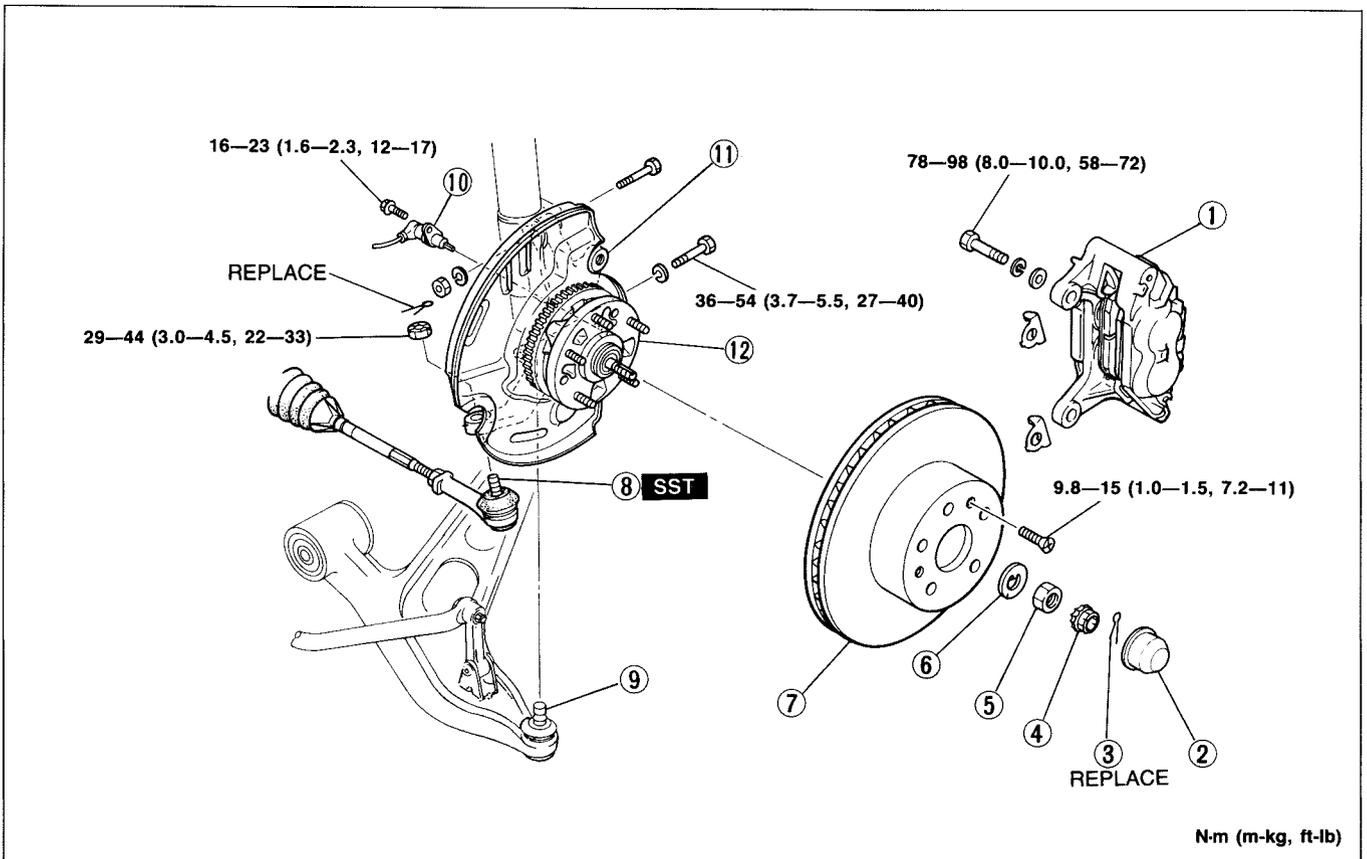
Inspection, Removal and Installation

Inspect wheel bearing play, referring to **Inspection**.

Remove in the order shown in the figure, referring to **Removal Note**.

Inspect all parts, repair or replace as necessary.

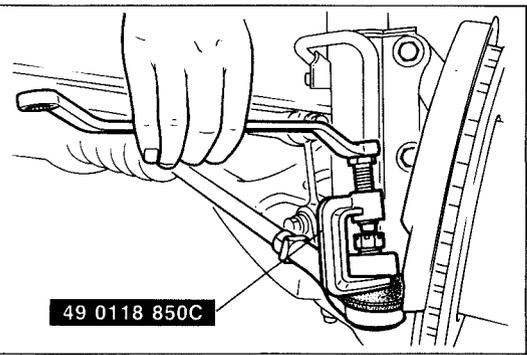
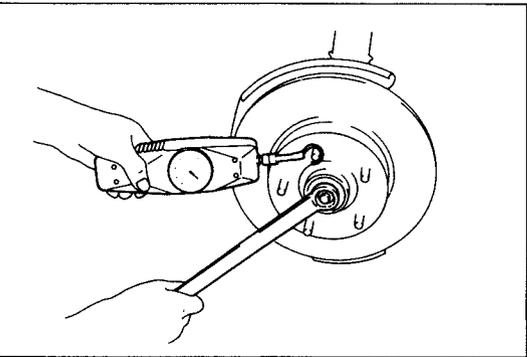
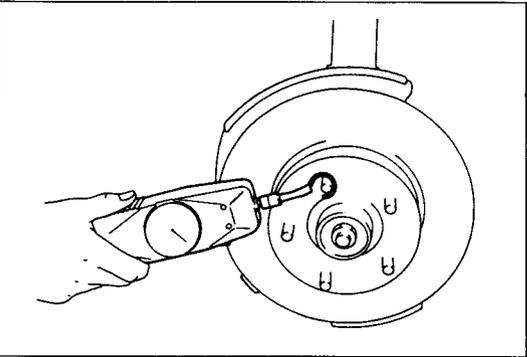
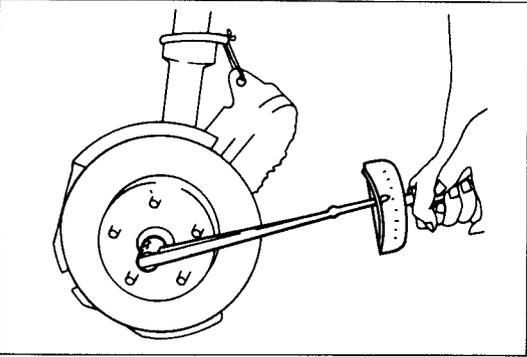
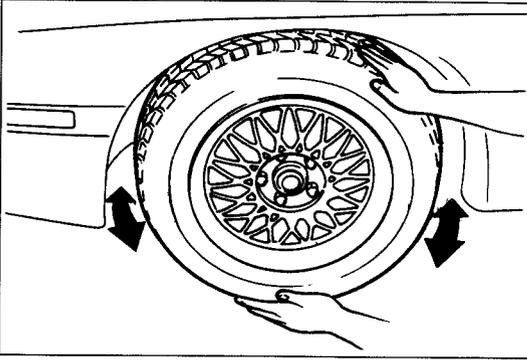
Install in the reverse order of removal, referring to **Installation Note**.



N-m (m-kg, ft-lb)

97U0MX-009

- | | |
|--|---|
| <ul style="list-style-type: none"> 1. Caliper
Service Section P 2. Hub cap 3. Cotter pin 4. Set cover 5. Hub nut
Installation note page M-7 6. Washer 7. Disc plate
Service Section P 8. Tie-rod end
Removal note page M-6 | <ul style="list-style-type: none"> 9. Lower arm ball joint 10. Speed sensor
Installation note page M-7 11. Knuckle spindle
Inspect the knuckle spindle for cracks or damage
Disassembly, Inspection and Assembly page M-8 12. Wheel hub assembly
Inspect for cracks or damage
Disassembly, Inspection and Assembly page M-8 |
|--|---|



Inspection

Wheel bearing play

1. Jack up the vehicle and support it with safety stands. Check if there is noticeable bearing play with the hands held at the top and bottom of the tire.

Wheel bearing play: 0mm (0 in)

2. Check whether the tire rotates smoothly when rotated, and whether there is a rough feeling or abnormal noise from the bearing.
3. Replace the wheel bearing or adjust the wheel bearing preload, if necessary.

Adjustment

1. Remove the wheel and tire.
2. Remove the disc brake caliper assembly, and suspend it with a rope.
3. Remove the hubcap, cotter pin, and set cover.
4. Loosen the locknut.
5. Tighten the locknut and turn the hub 2 or 3 times to seat the bearing.

Tightening torque:

20—29 N·m (2.0—3.0 m·kg, 14—22 ft·lb)

6. Loosen the locknut until it can be turned by hand.
7. Attach a pull scale to a hub bolt and measure the frictional force.

8. Tighten the locknut until the reading (initial turning torque) reaches the specified amount. Insert set cover, and secure with a cotter pin.

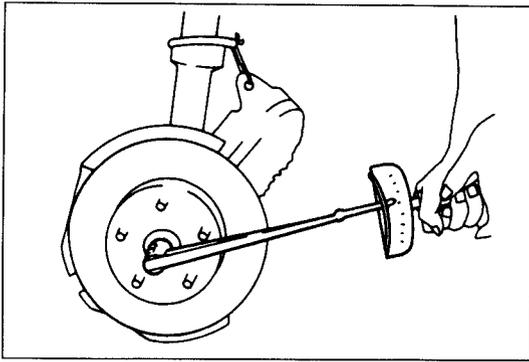
Preload: Frictional force plus

3.9—9.8 N (0.4—1.0 kg, 0.9—2.2 lb)

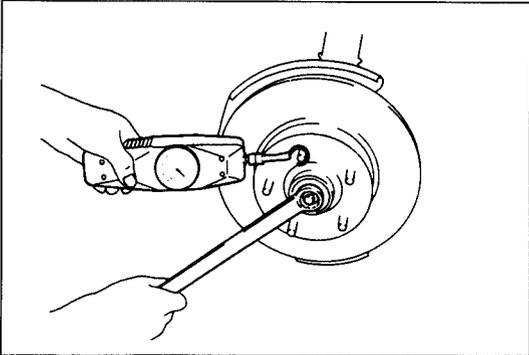
Removal note

Tie-rod end

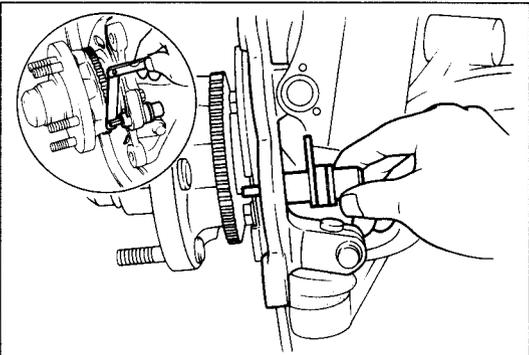
Loosen the nut and disconnect the tie-rod end with the **SST**.



97U0MX-013



97U0MX-014



97U0MX-015

Installation note

Hub nut

Install the hub nut and adjust the bearing preload.

1. Tighten the nut and then turn the hub and plate 2 or 3 times to seat the bearing.

Tightening torque:

20—29 N·m (2.0—3.0 m·kg, 14—22 ft·lb)

2. Loosen the nut until it can be turned by hand.

3. Attach a pull scale to a hub bolt and measure the frictional force.

4. Tighten the locknut until the reading (initial turning torque) reaches the specified amount. Then insert the set cover, and secure with a new cotter pin.

Preload: Frictional force plus

3.9—9.8 N (0.4—1.0 kg, 0.9—2.2 lb)

Speed sensor

Install the speed sensor, and check the clearance between the sensor rotor and speed sensor.

Standard clearance: 0.4—1.0mm (0.016—0.039 in)

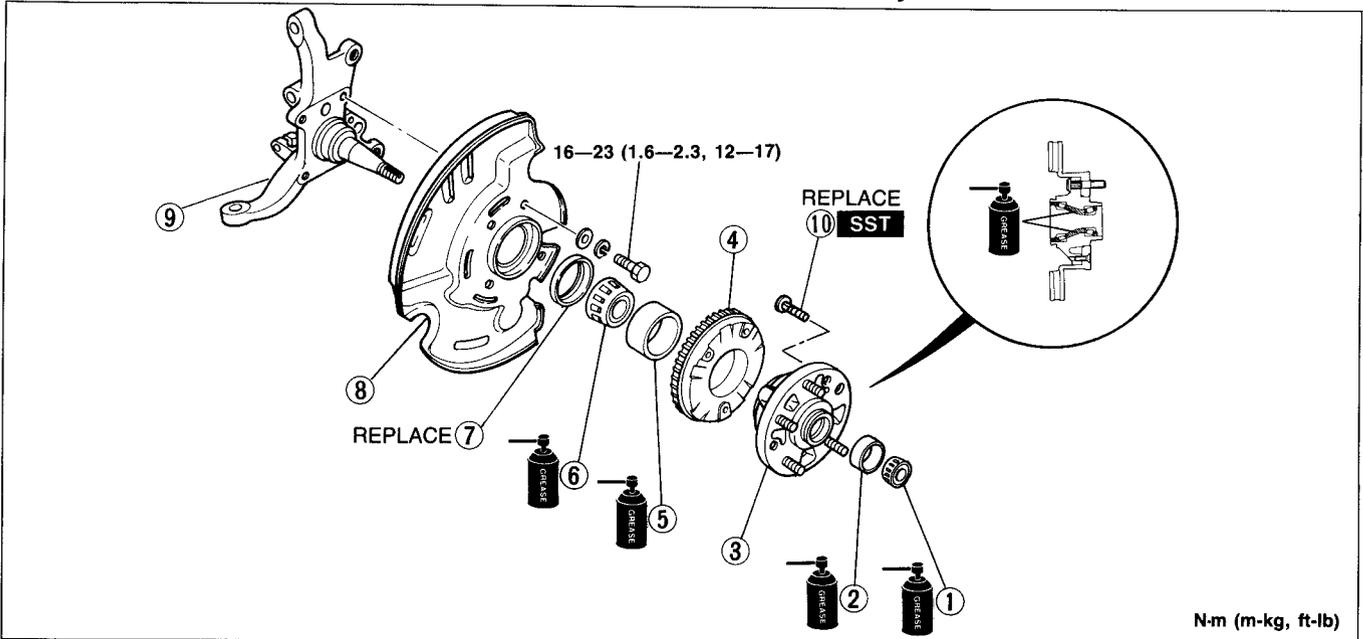
M FRONT AXLE

Disassembly, Inspection and Assembly

Disassemble in the order shown in the figure, referring to **Disassembly Note**.

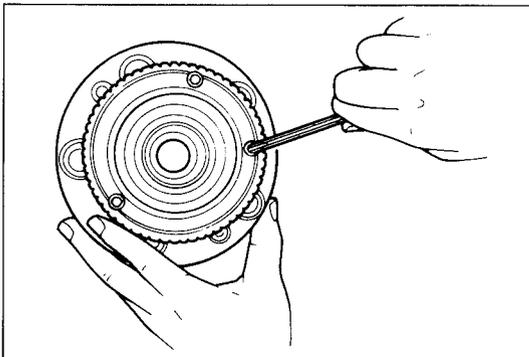
Inspect all parts, repair or replace as necessary.

Assemble in the reverse order of disassembly, referring to **Assembly Note**.



97U0MX-016

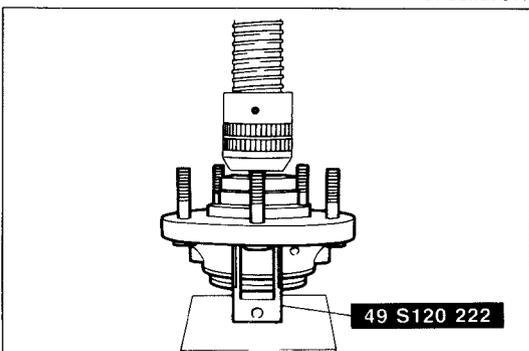
- | | |
|---------------------------------|----------------------------------|
| 1. Bearing (Inner) | 7. Oil seal |
| 2. Bearing (Outer) | Assembly note page M-9 |
| 3. Wheel hub | 8. Dust cover |
| Assembly note page M-9 | Inspect for damage or distortion |
| 4. Sensor rotor (ABS) | 9. Knuckle spindle |
| Disassembly note page M-8 | 10. Hub bolt |
| 5. Bearing (Outer) | Disassembly note page M-8 |
| 6. Bearing (Inner) | |
| Assembly note page M-9 | |
| Inspection page M-9 | |



97U0MX-017

Disassembly note Sensor rotor (ABS)

1. Remove the sensor rotor with an allen wrench.



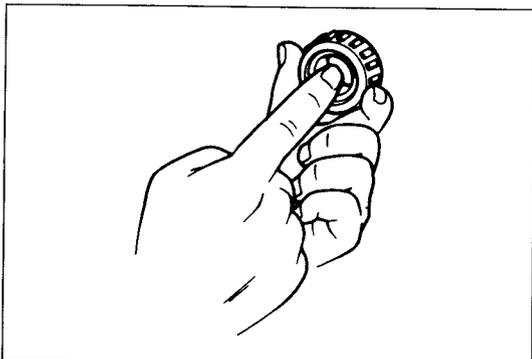
97U0MX-018

Hub bolt

Caution

- a) Do not remove the hub bolts unless necessary.
- b) Do not reuse the removed hub bolts.
- c) Hub bolt replacement of the aluminum hub can be done only once.
If a second replacement is necessary, replace the hub assembly.

2. Remove the hub bolts with the **SST**.



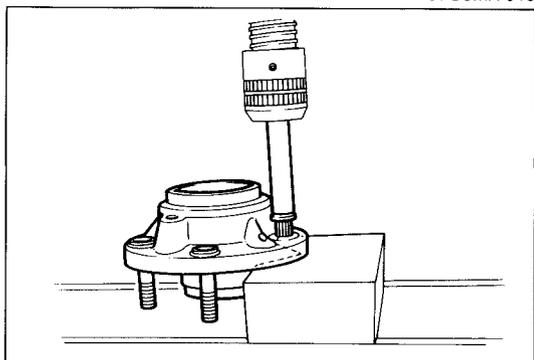
97U0MX-019

Inspection

Check as described below, replace parts if necessary. Check the bearings for wear, damage or seizure.

Caution

If replacement is necessary, replace the inner bearing, outer bearing and front hub.

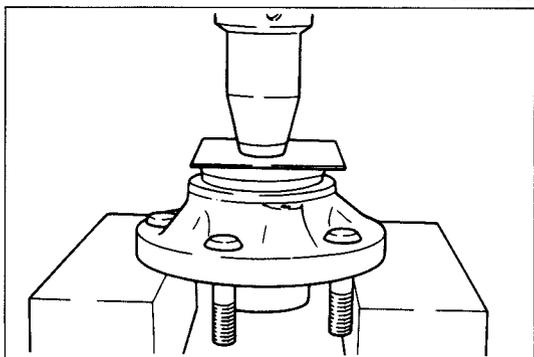


97U0MX-020

Assembly note

Wheel hub

Install the hub bolts with a press.



97U0MX-021

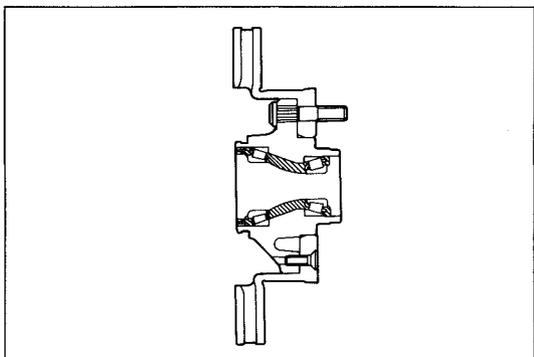
Oil seal, Bearing (inner)

1. Pack the bearing cone and roller assemblies with wheel bearing lithium based grease.

Caution

Install the oil seal so that it is flush with the hub.

2. After inserting the inner bearing in the hub, use a suitable plate to press or drive in the new oil seal.
3. Apply lithium based grease to the oil seal lip.
4. Apply lithium based grease to the shaded areas as shown in the figure.

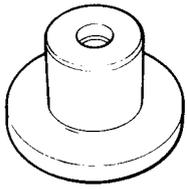
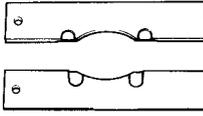
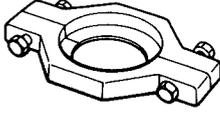
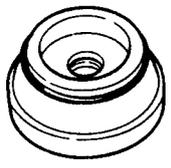
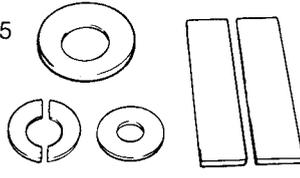
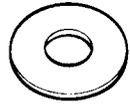


97U0MX-022

M REAR AXLE

REAR AXLE

PREPARATION SST

<p>49 F026 102 Installer, bearing</p> 	<p>49 F026 103 Puller, wheel hub</p> 	<p>49 0636 145 Puller, fan pulley boss</p> 
<p>49 F027 007 Attachment for bearing $\phi 72$</p> 	<p>49 0259 745 Separator, bearing</p> 	<p>49 0259 748 Attachment, bearing separator</p> 

97U0MX-023

DISC BRAKE TYPE

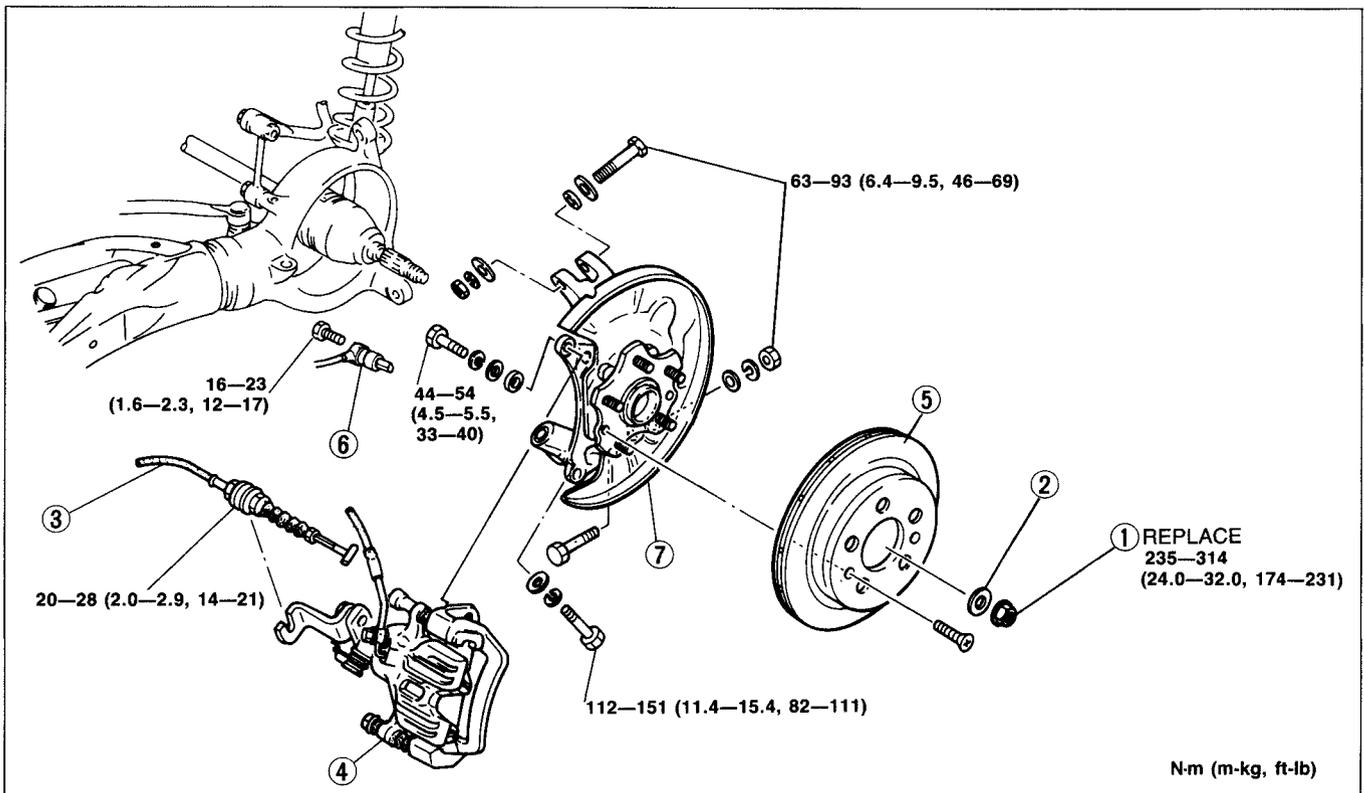
Inspection, Removal and Installation

Inspect wheel bearing play, referring to **Inspection**.

Remove in the order shown in the figure, referring to **Removal Note**.

Inspect all parts, repair or replace as necessary.

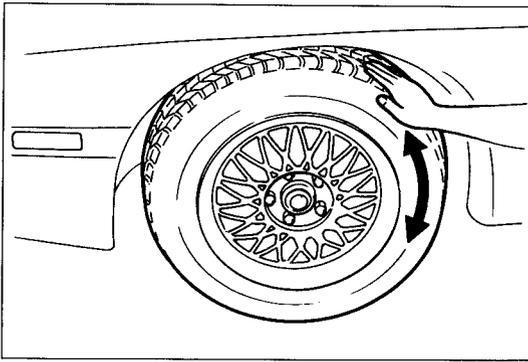
Install in the reverse order of removal.



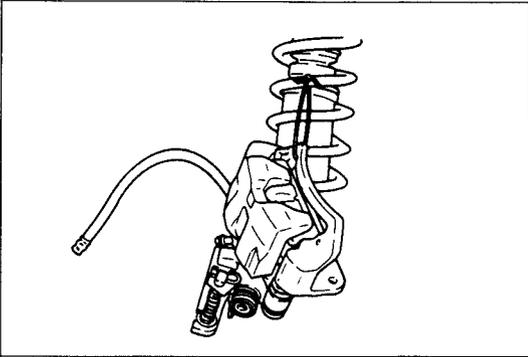
97U0MX-024

- 1. Locknut
- 2. Washer
- 3. Parking brake cable
- 4. Brake caliper assembly
Service..... Section M
- 5. Disc plate
Service..... Section M

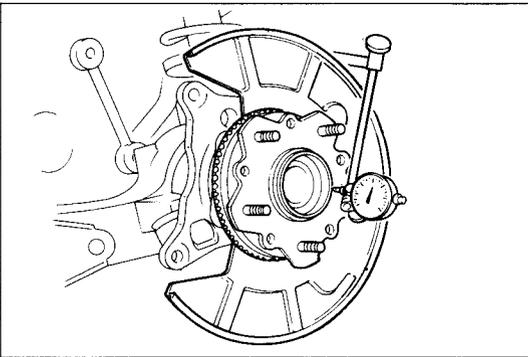
- 6. Speed sensor (ABS)
Installation note..... page M-11
- 7. Triaxial floating hub assembly
Inspect for cracks or damage
Disassembly, Inspection and
Assembly page M-12



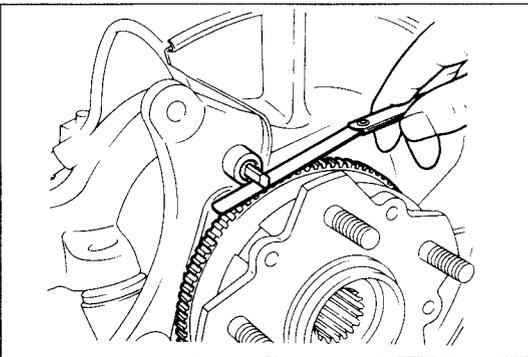
97U0MX-025



97U0MX-026



97U0MX-027



97U0MX-028

Inspection

Wheel bearing play

1. Jack up the rear of the vehicle and support it with safety stands.
2. Check that there is no abnormal noise and that the tire rotates smoothly when rotated by hand.

3. After removing the wheel, remove the brake caliper assembly, and suspend it with a rope.

4. Attach a dial gauge to the wheel hub. Then push and pull the wheel hub by hand in the axial direction, and measure the bearing play of the wheel bearing.
If the bearing play exceeds the specification, replace the wheel bearing.

Maximum wheel bearing play: 0.1mm (0.004 in)

Installation note

Speed sensor (ABS)

Measure the clearance between the speed sensor and the sensor rotor (ABS).

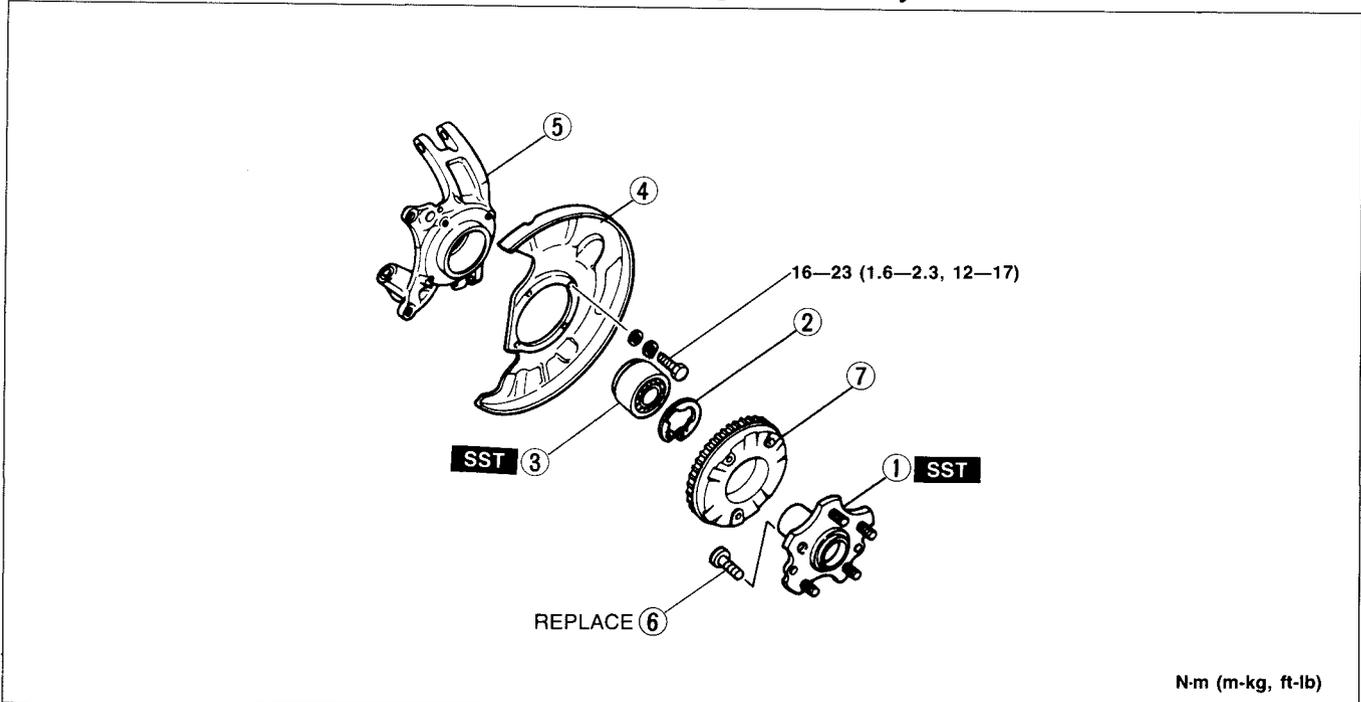
**Standard clearance:
0.4—1.0mm (0.016—0.039 in)**

Disassembly, Inspection and Assembly

Disassemble in the order shown in the figure, referring to **Disassembly Note**.

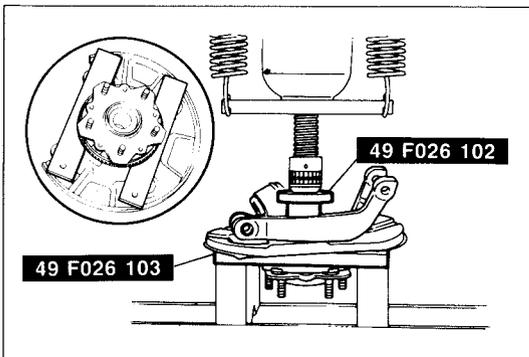
Inspect all parts, repair or replace as necessary.

Assemble in the reverse order of disassembly, referring to **Assembly Note**.



97U0MX-029

- | | |
|---|---|
| <p>1. Wheel hub
Disassembly note page M-12
Inspect for cracks or damage
Assembly note page M-13</p> <p>2. Retaining ring</p> <p>3. Wheel bearing
Disassembly note page M-12
Assembly note page M-13</p> | <p>4. Dust cover
Inspect for damage or distortion</p> <p>5. Toe control hub
Inspect for cracks or damage</p> <p>6. Hub bolt
Disassembly note page M-13
Assembly note page M-13</p> <p>7. Sensor rotor (ABS)</p> |
|---|---|

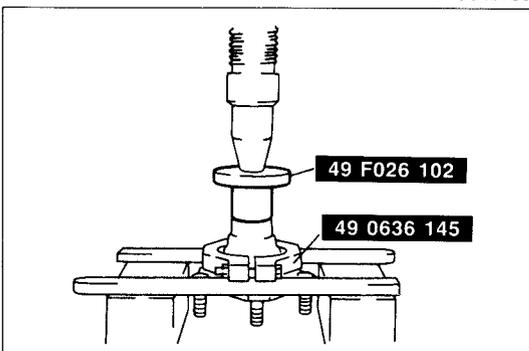


97U0MX-30

Disassembly note

Wheel hub

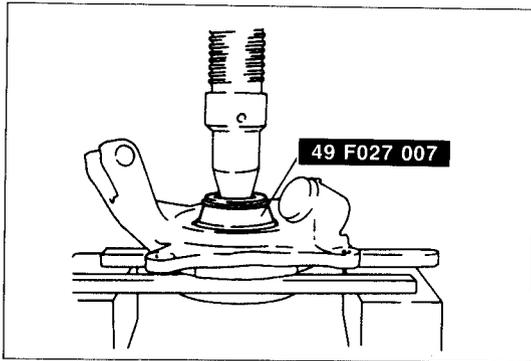
1. Loosen the dust cover.
2. Press the wheel hub with the **SST** to remove it.
3. Remove the sensor rotor (ABS).



97U0MX-031

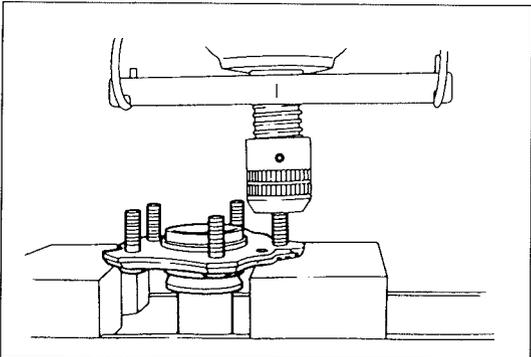
Wheel bearing

1. Press the wheel hub with the **SST** and remove the wheel bearing inner race.



97U0MX-032

2. Remove the retaining ring from the toe control hub using snap ring pliers.
3. Remove the wheel bearing outer race with the **SST**.



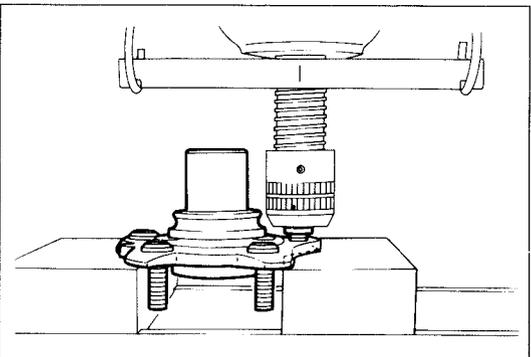
97U0MX-033

Hub bolt

Caution

- a) Do not remove the hub bolts unless necessary.
- b) Do not reuse the hub bolts.

Replace the hub bolts using a press, if necessary.

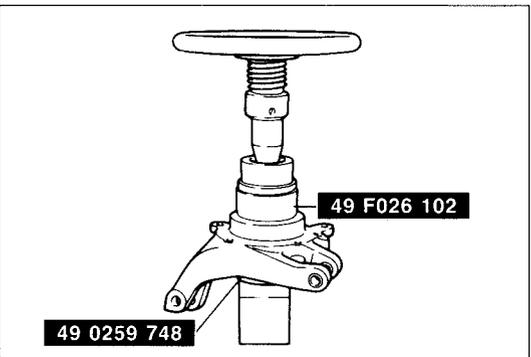


97U0MX-034

Assembly note

Hub bolt

Install the new hub bolts with a press.



97U0MX-035

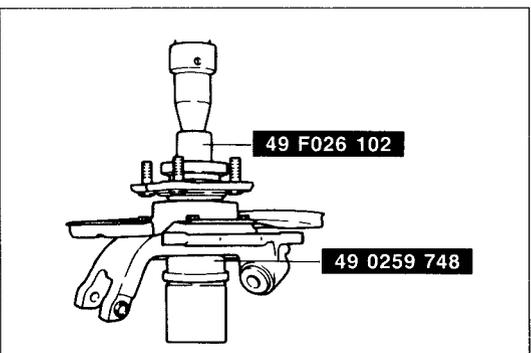
Wheel bearing

1. Press the wheel bearing into the toe control hub with the **SST**.
2. Install the retaining ring using snap-ring pliers.
3. Install the dust cover.

Tightening torque:

16—23 N·m (1.6—2.3 m·kg, 12—17 ft·lb)

4. Install the sensor rotor (ABS).



97U0MX-036

Wheel hub

1. Press the wheel hub in with the **SST**.

DRIVESHAFT

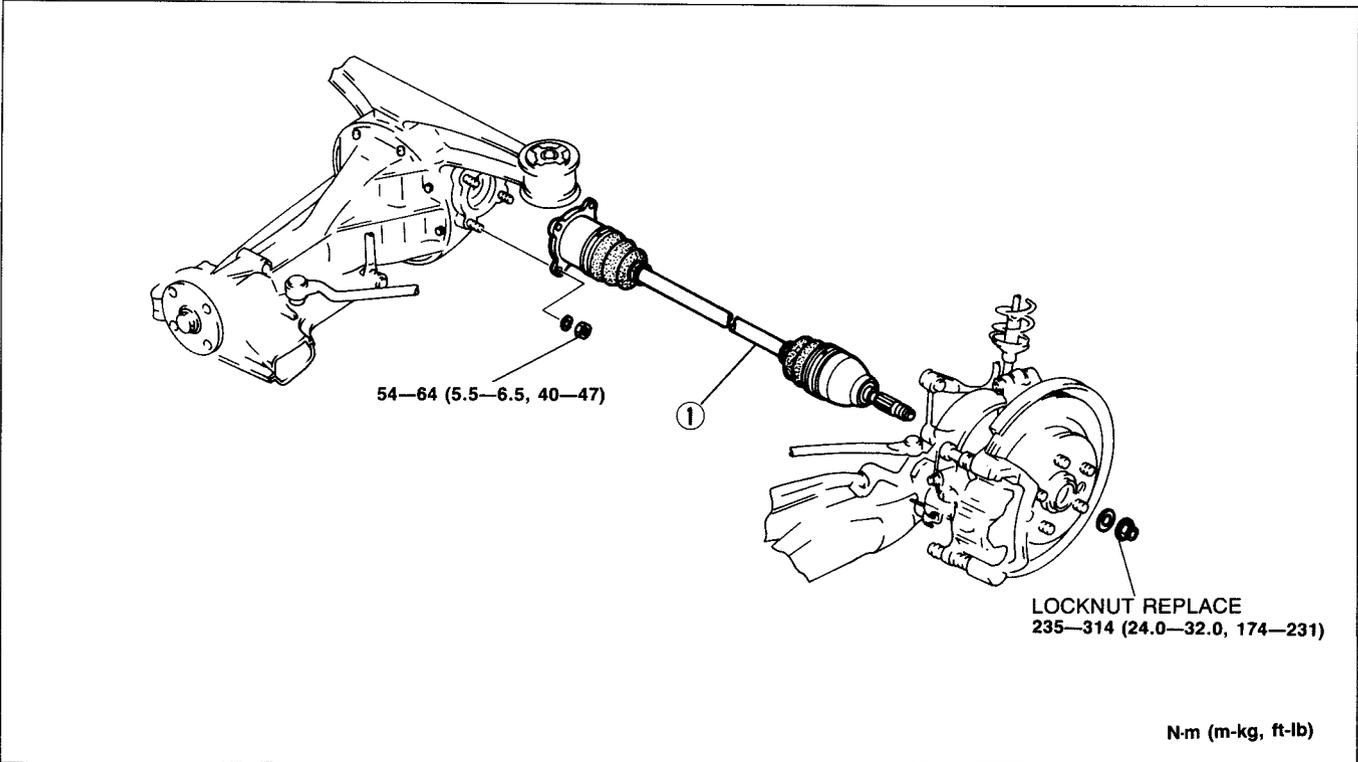
DOUBLE OFFSET JOINT

Inspection, Removal and Installation

Inspect the driveshaft, referring to **Inspection**.

Remove in the order shown in the figure, referring to **Removal Note**.

Install in the reverse order of removal.

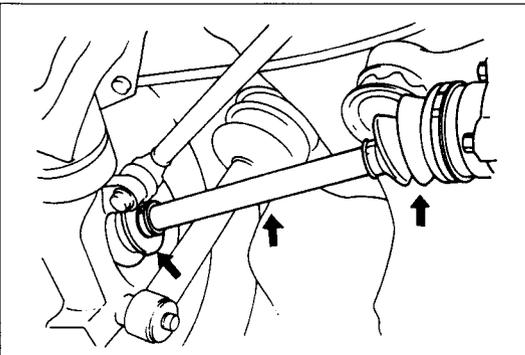


97U0MX-037

1. Driveshaft

Removal note page M-14

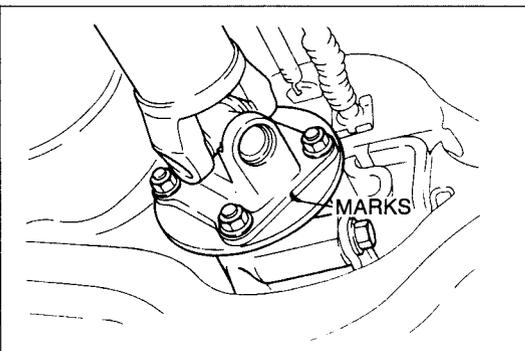
Disassembly, Inspection and Assembly.... page M-15



97U0MX-038

Inspection Driveshaft

1. Check the dust boot on the driveshaft for cracks, damage, leaking grease, or a loose boot band.
2. Check the driveshaft for bending or cracking, or for wear of joints or splines.
Replace the driveshaft if necessary.



97U0MX-039

Removal note Driveshaft

Before removing the driveshaft, put mating marks on the driveshaft and output shaft.

Disassembly, Inspection and Assembly

Disassemble in the order shown in the figure, referring to **Disassembly Note**.

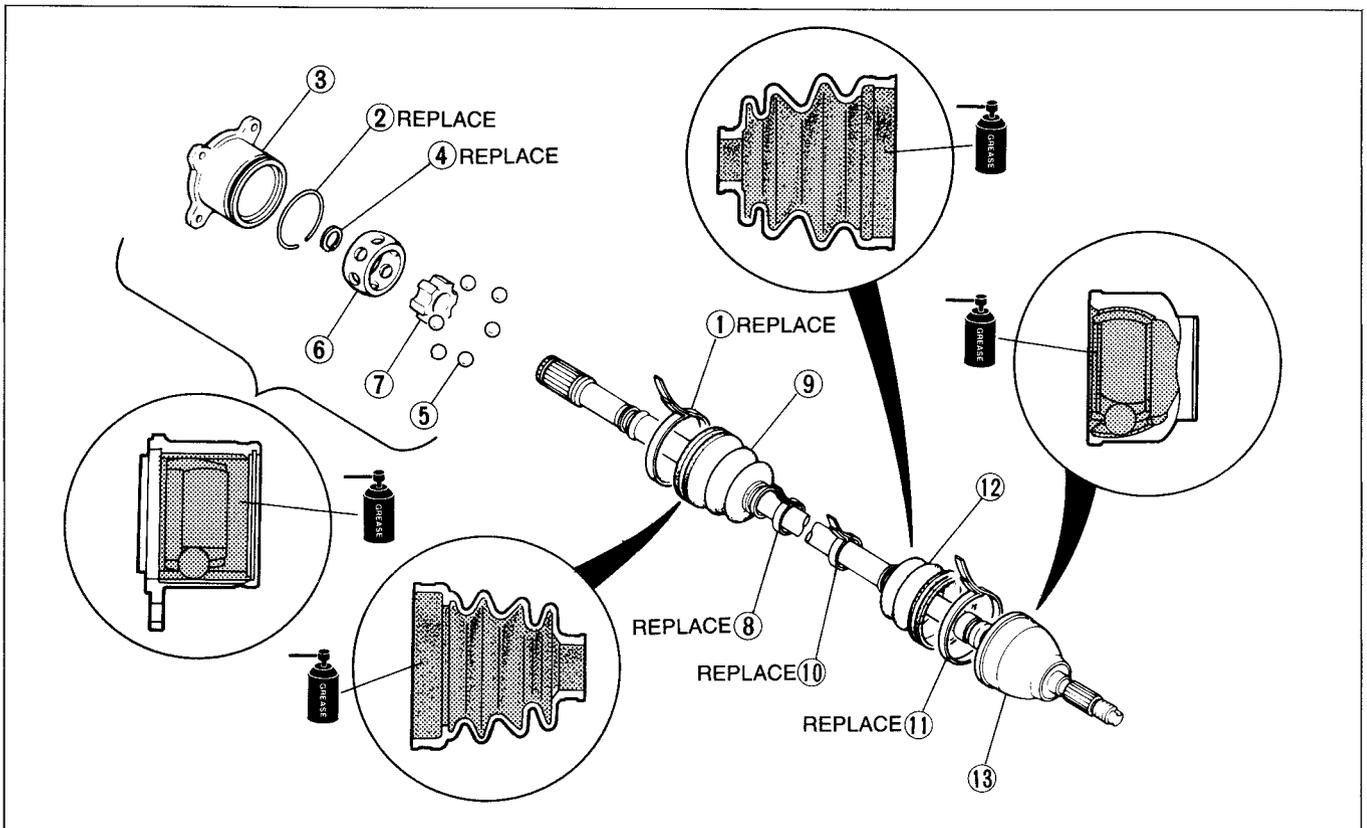
Inspect all parts, repair or replace as necessary.

Assemble in the reverse order of removal, referring to **Assembly Note**.

Caution

- a) Secure the driveshaft in a vise with protective material (such as copper plates) on the vise jaws.
- b) Be careful that dust or other foreign material does not enter the ball joint while the work is being performed.
- c) Do not disassemble the wheel side ball joint.
- d) Do not wash the ball joint unless it is being disassembled.

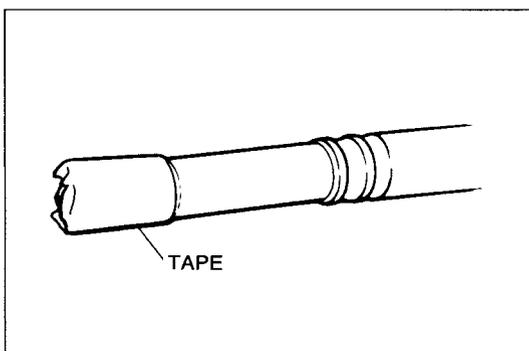
97U0MX-040



97U0MX-041

- 1. Boot band
- 2. Clip
- 3. Outer ring
- 4. Snap ring
- 5. Balls
- 6. Inner ring
- 7. Cage
- 8. Boot band

- 9. Boot
Disassembly note page M-15
Assembly note page M-16
- 10. Boot band
- 11. Boot band
- 12. Boot
- 13. Shaft and ball joint assembly

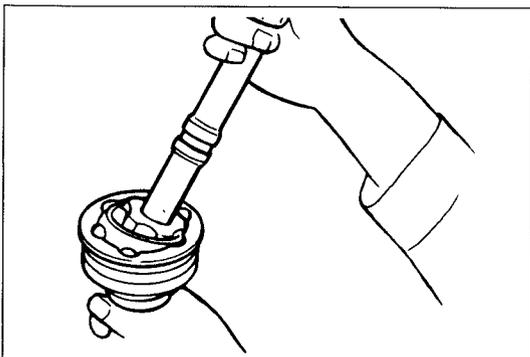


97U0MX-042

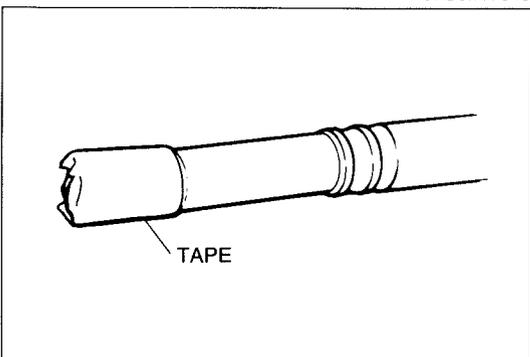
Disassembly note

Boot

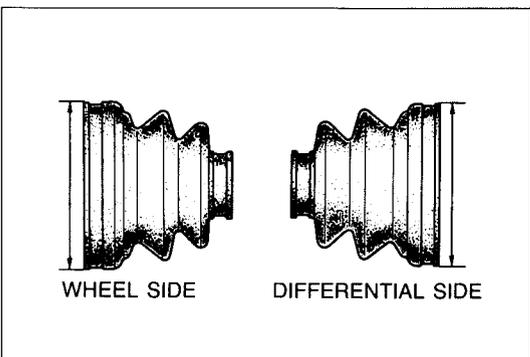
Wrap the splines of the shaft with tape to prevent damage to the boot. Remove the boot.



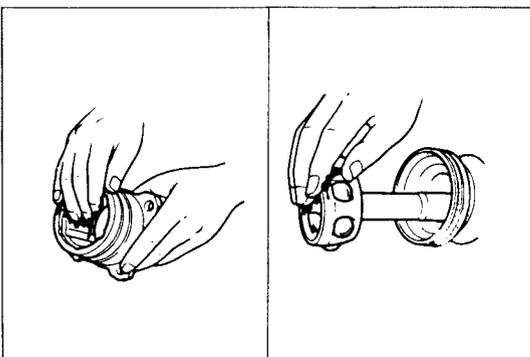
97U0MX-043



97U0MX-044



97U0MX-045



97U0MX-046

Inspection

Check as described below, replace parts if necessary.

1. Check the shaft for bending, twisting, and damage.
2. Check the shaft splines for wear.
3. Check the joint on the differential side for wear, excessive play, corrosion, and damage.
4. Check the joint on the wheel side for excessive play, wear, corrosion, and damage.

Assembly note

Boot

1. Wrap the splines of the wheel side of the shaft with tape and install the boot and a new boot band.

Caution

The wheel side and differential side boots are different, as shown in the figure.

	Wheel side	Differential side
Turbo model	101mm (3.98 in)	100mm (3.94 in)
Non-Turbo model	98.5mm (3.88 in)	95.5mm (3.76 in)

Caution

Do not use any other than the specified grease.

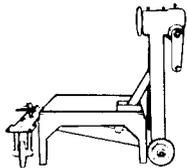
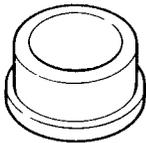
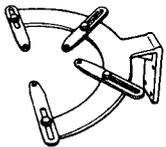
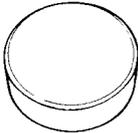
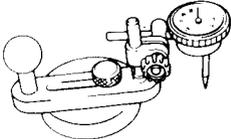
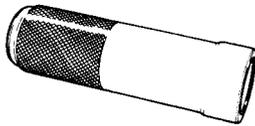
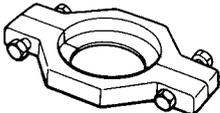
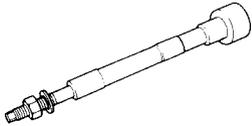
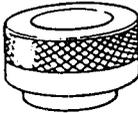
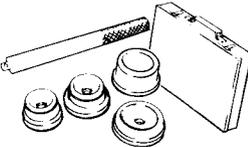
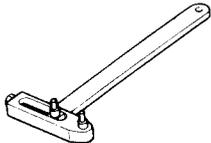
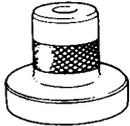
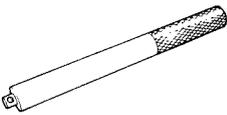
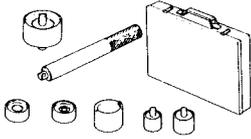
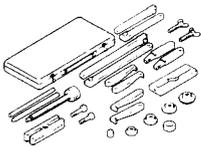
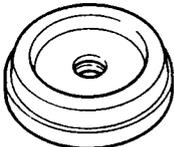
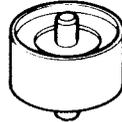
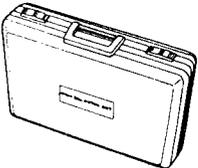
2. Apply molybdenum disulfide grease to the joint.

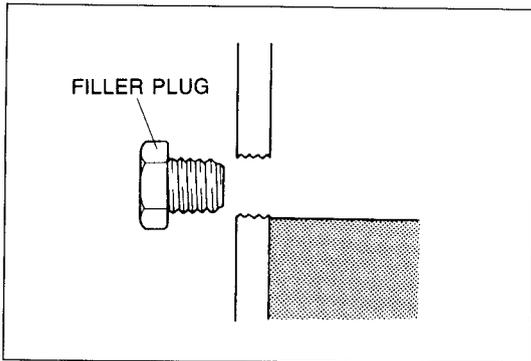
Quantity: Differential side 115 g (4.06 oz)

Wheel side 120 g (4.24 oz)

DIFFERENTIAL

**PREPARATION
SST**

<p>49 0107 680A Engine stand</p> 	<p>49 0305 555 Gauge block (Part of 49 F027 0A0) Non-Turbo model</p> 	<p>49 F027 009 Attachment 68 & 77 (Part of 49 F027 0A1)</p> 
<p>49 M005 561 Hanger, differential carrier</p> 	<p>49 0660 555 Gauge block (Part of 49 F027 0A0) Turbo model</p> 	<p>49 G030 338 Attachment E</p> 
<p>49 S120 710 Holder, coupling, flange</p> 	<p>49 0727 570 Gauge body, pinion height (Part of 49 F027 0A0)</p> 	<p>49 F401 331 Body (Part of 49 D017 2A1)</p> 
<p>49 0636 145 Puller, fan pulley boss</p> 	<p>49 F027 001 Model, drive pinion (Part of 49 F027 0A0)</p> 	<p>49 UB71 525 Installer, bearing</p> 
<p>49 1243 465A Wrench, mainshaft locknut</p> 	<p>49 F027 0A1 Installer set, bearing</p> 	<p>49 0259 720 Wrench, differential side bearing adjust nut</p> 
<p>49 V001 795 Installer, oil seal</p> 	<p>49 F027 003 Handle (Part of 49 F027 0A1)</p> 	<p>49 F028 2A0 Puller & Installer set, rubber bushing</p> 
<p>49 0839 425C Puller set, bearing</p> 	<p>49 F027 004 Attachment 80 (Part of 49 F027 0A1)</p> 	<p>49 F028 206 Mount rubber installer (Part of 49 F028 2A0)</p> 
<p>49 F027 0A0 Gauge set, pinion height adjust</p> 	<p>49 F027 005 Attachment 62 (Part of 49 F027 0A1)</p> 	<p>49 D017 2A1 Installer set, bearing</p> 



9MU0MX-033

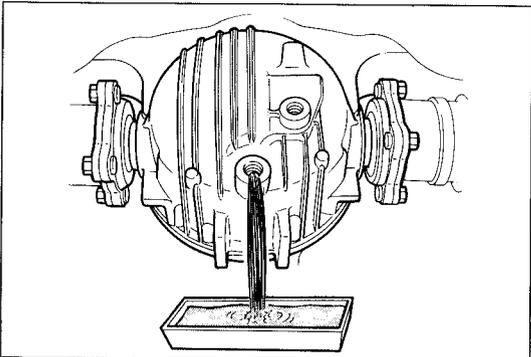
DIFFERENTIAL OIL

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 m·kg, 29—40 ft·lb)



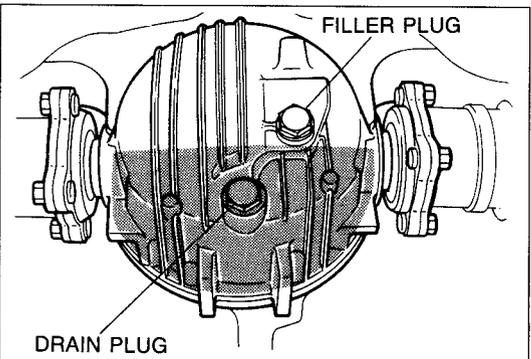
97U0MX-048

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 washer.

Tightening torque:

39—54 N·m (4.0—5.5 m·kg, 29—40 ft·lb)



97U0MX-049

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): GL-5, SAE 90

Below -18°C (0°F): GL-5, SAE 80W

Capacity:

Turbo 1.4 liters (1.5 US qt, 1.2 Imp qt)

Non-Turbo 1.3 liters (1.4 US qt, 1.1 Imp qt)

6. Install the filler plug.

Tightening torque:

39—54 N·m (4.0—5.5 m·kg, 29—40 ft·lb)

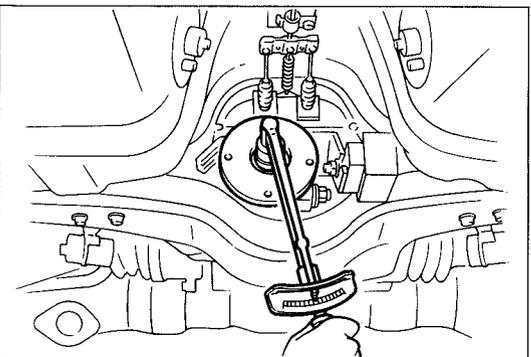
OIL SEAL (COMPANION FLANGE)

Replacement

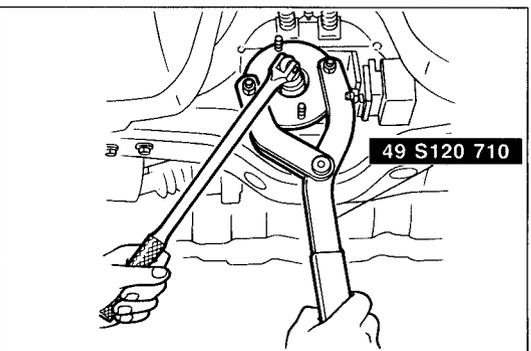
1. Jack up the vehicle and support it with safety stands.
2. Drain the differential oil.
3. Remove the propeller shaft. (Refer to Section L.)

Note

- **Make a notation of the starting torque. At the time of installation tighten the locknut to this value.**
- **Mark the propeller shaft and the companion flange for proper reassembly.**



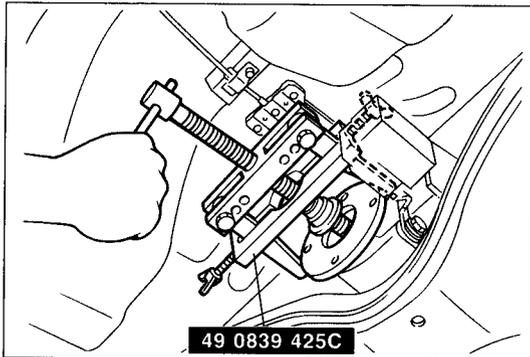
97U0MX-050



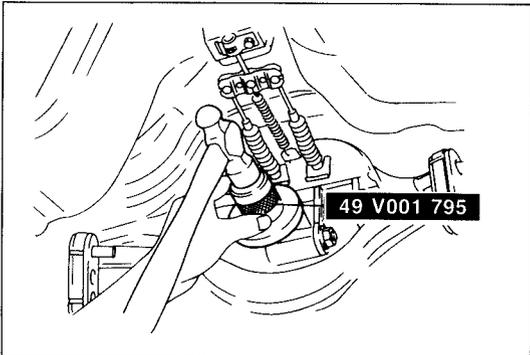
9MU0MX-036

4. Before loosening the flange locknut, measure and record the rotation starting torque of the drive pinion (within range of the drive pinion and ring gear backlash).

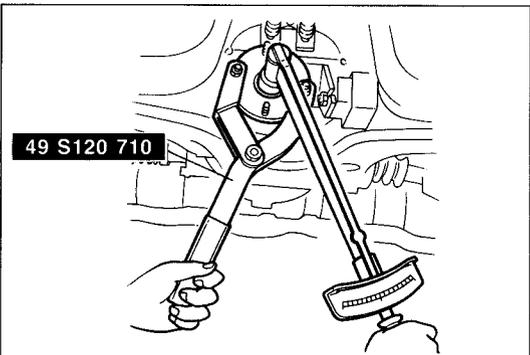
5. Hold the companion flange with the **SST** and remove the locknut.



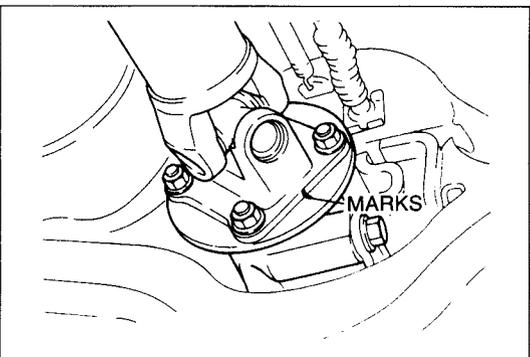
97U0MX-037



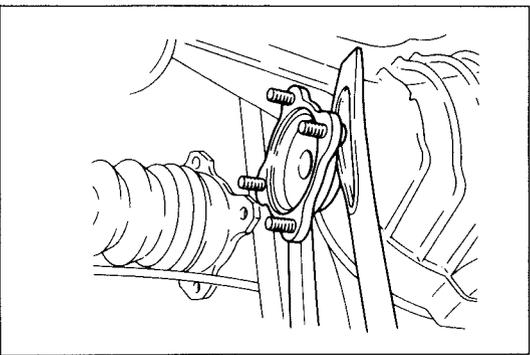
97U0MX-051



97U0MX-052



97U0MX-053



97U0MX-054

6. Remove the companion flange with the **SST**.
7. Remove the oil seal.

8. Apply lithium-base grease to the new oil seal lip and install it with the **SST**.

9. Install and tighten a new locknut using the **SST** to get the starting torque recorded in Step 4.

10. Install the propeller shaft. (Refer to Section L.)
11. Add the specified oil through the oil filler plug hole. (Refer to page M-18.)

OIL SEAL (OUTPUT SHAFT) Replacement

1. Jack up the vehicle and support it with safety stands.
2. Drain the differential gear oil.

Note

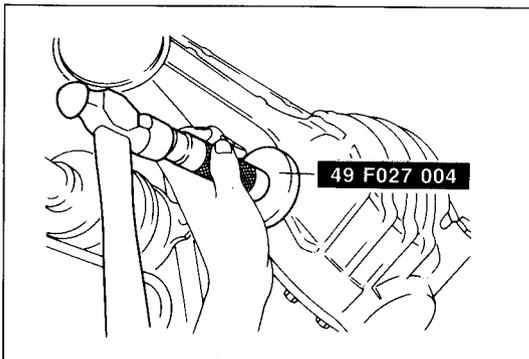
Make the driveshaft and output shaft flanges for proper reassembly.

3. Separate the driveshaft from the differential, and suspend it as shown in the figure.

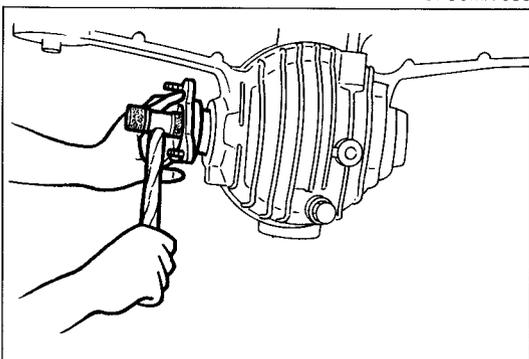
Note

Use caution during the removal operation, because the shaft may suddenly drop.

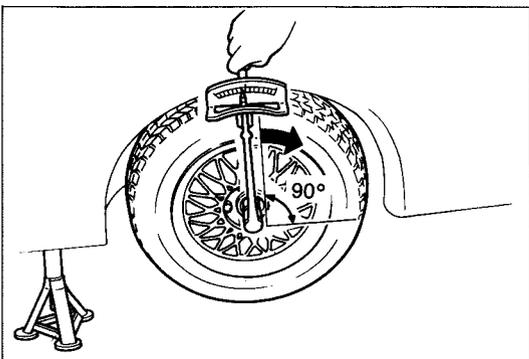
4. Remove the output shaft with two pry bars as shown in the figure.
5. Remove the oil seal.



97U0MX-055



97U0MX-056



97U0MX-057

8. Apply lithium-base grease to the new oil seal lip and install it with the **SST**.

9. Install the output shaft into the side gears by lightly tapping with a plastic hammer.

10. Verify that the output shaft is hooked into the side gears by pulling it by hand.

OPERATION INSPECTION

Viscous Limited Slip Differential

1. Turn off the engine and shift the transmission into reverse.
2. Block the front wheels with wheel chocks.
3. Jack up the rear wheels and support the vehicle with a jack stands.
4. Release the parking brake.
5. Measure the time it takes to turn the wheel 90° while applying the specified torque.

Specified torque: 39 N-m (4.0 m-kg, 29 ft-lb)

Specified time: 4.0 sec. min.

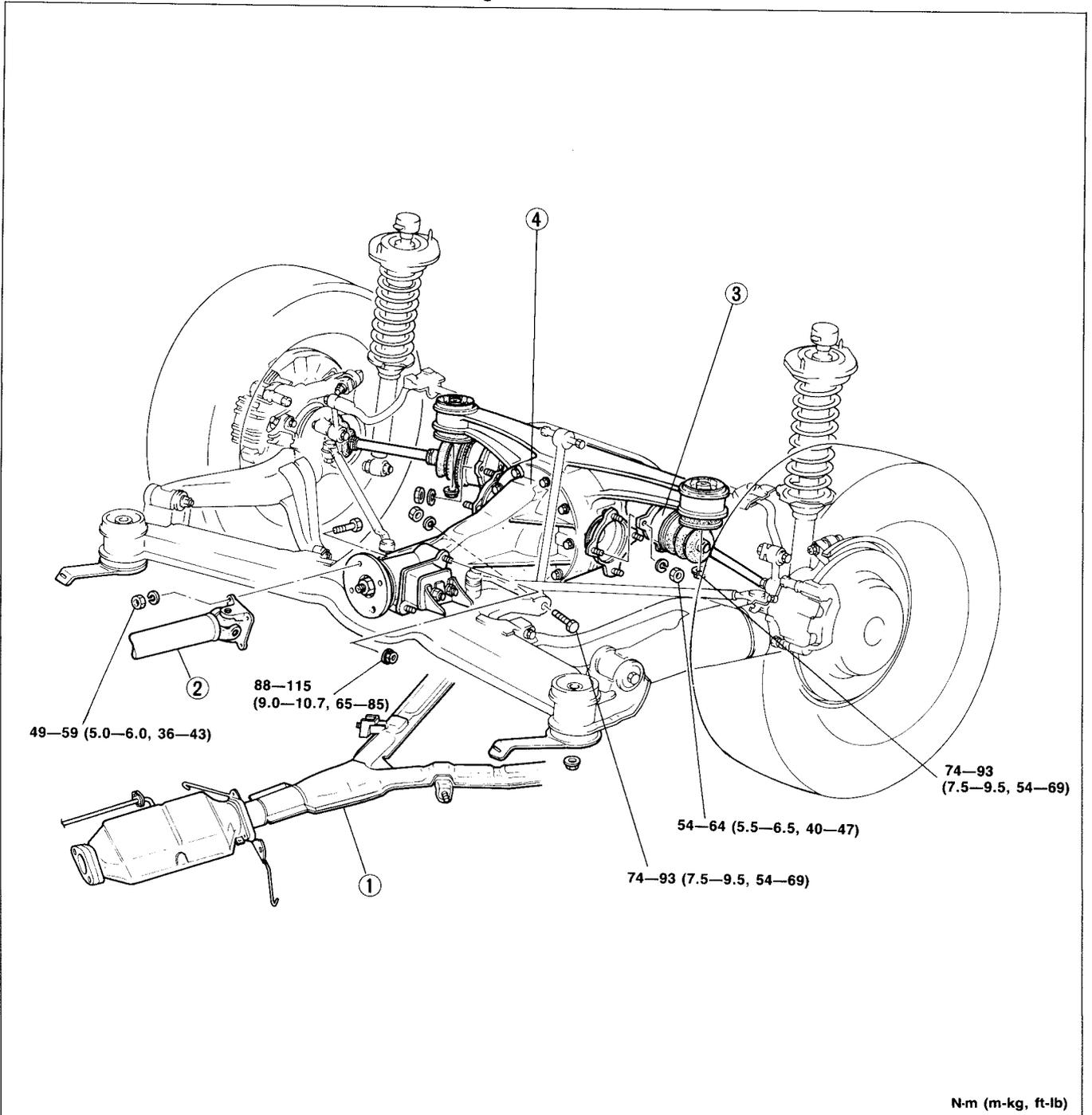
6. If not as specified, replace the viscous limited slip differential and fill the differential with new specified oil. (Refer to page M-18, 24, 26.)

DIFFERENTIAL (STANDARD), VISCOUS LIMITED SLIP DIFFERENTIAL (VISCOUS L.S.D.) Removal and Installation

Note

Drain the differential oil before removal.

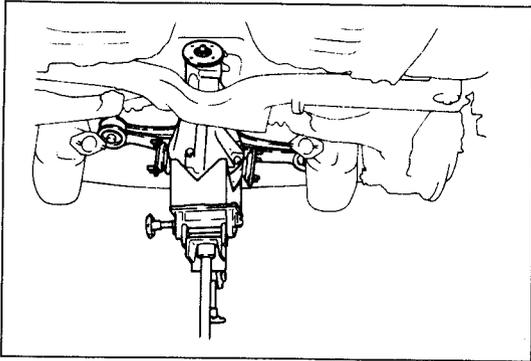
Remove in the order shown in the figure, referring to **Removal Note**.
Install in the reverse order of removal, referring to **Installation Note**.



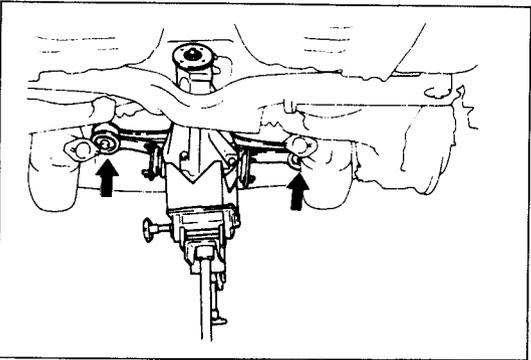
N-m (m-kg, ft-lb)

97U0MX-058

- | | |
|--|---|
| <p>1. Exhaust pipe
Removal Section L
Installation..... Section L</p> <p>2. Propeller shaft
Removal Section L
Installation..... Section L</p> | <p>3. Driveshaft
Removal..... page M-14
Installation page M-14</p> <p>4. Differential (Standard), Viscous L.S.D.
Disassembly, Inspection and
Assembly page M-24</p> |
|--|---|



97UOMX-059



97UOMX-060

Disassembly note

Differential assembly

1. Remove the mounting nut from the left side of the differential member and let the member hang down.
2. Disconnect the sublink assembly.
3. Support the differential assembly with a jack, and remove the differential assembly.

Assembly note

Differential assembly

1. Support the differential assembly with a jack, and install it.
2. Connect the sublink assembly.
3. Install the mounting nut on the left side of the differential member.

Tightening torque:

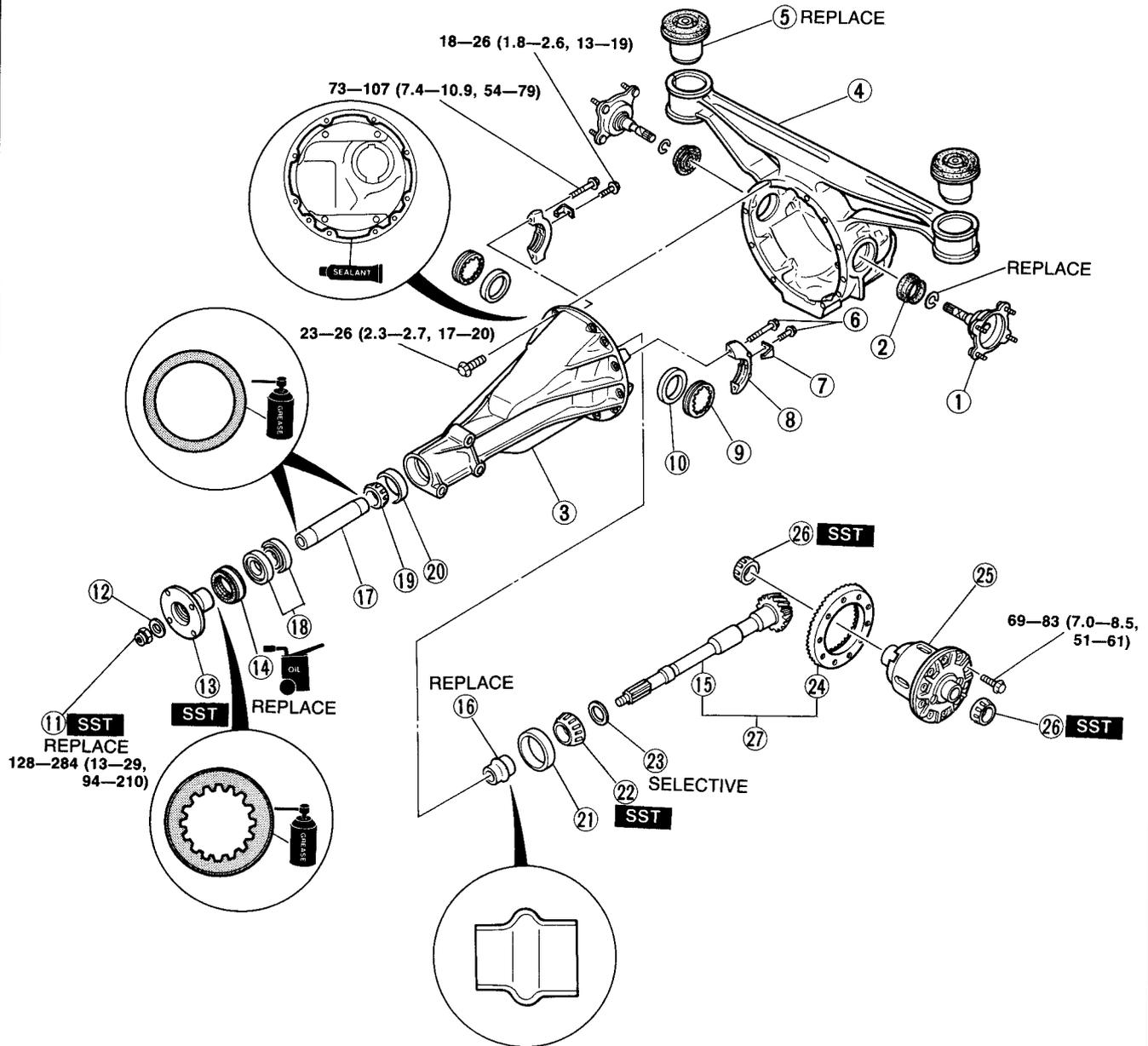
74—93 N·m (7.5—9.5 m·kg, 54—69 ft·lb)

MEMO

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<ul style="list-style-type: none"> 1. Output shaft <ul style="list-style-type: none"> Disassembly note page M-28 Assembly note page M-36 2. Oil seal (Output shaft) <ul style="list-style-type: none"> Assembly note page M-36 3. Differential carrier <ul style="list-style-type: none"> Disassembly note page M-28 Assembly note page M-36 4. Differential case <ul style="list-style-type: none"> Disassembly note page M-28 5. Differential mounting rubber <ul style="list-style-type: none"> Disassembly note page M-28 Assembly note page M-36 6. Bolt 7. Lock plate 8. Bearing cap 9. Adjusting screw 10. Bearing outer race 11. Locknut 12. Washer 13. Companion flange <ul style="list-style-type: none"> Disassembly note page M-29 Inspect splines for wear or damage Assembly note page M-33 14. Oil seal <ul style="list-style-type: none"> Assembly note page M-33 15. Drive pinion <ul style="list-style-type: none"> Disassembly note page M-29 Inspect splines for wear or damage 16. Collapsible spacer <ul style="list-style-type: none"> Inspection page M-30 17. Long collar 18. Ball bearings <ul style="list-style-type: none"> Disassembly note page M-29 Inspect for damage or rough rotation 19. Bearing inner race (Center bearing) <ul style="list-style-type: none"> Disassembly note page M-29 Inspect for damage or rough rotation Assembly note page M-32 	<ul style="list-style-type: none"> 20. Bearing outer race (Center bearing) <ul style="list-style-type: none"> Disassembly note page M-31 Assembly note page M-29 21. Bearing outer race (Rear bearing) <ul style="list-style-type: none"> Disassembly note page M-29 Assembly note page M-30 22. Bearing inner race (Rear bearing) <ul style="list-style-type: none"> Disassembly note page M-30 Inspect for damage or rough rotation Assembly note page M-32 23. Spacer 24. Ring gear <ul style="list-style-type: none"> Inspect teeth for wear or damage Assembly note page M-34 25. Gear case (Standard) 26. Knock pin <ul style="list-style-type: none"> Disassembly note page M-30 Assembly note page M-34 27. Pinion shaft 28. Bearing inner races (Side bearing) <ul style="list-style-type: none"> Disassembly note page M-30 Inspect for damage or rough rotation Assembly note page M-32 29. Thrust washer <ul style="list-style-type: none"> Assembly note page M-34 30. Pinion gears <ul style="list-style-type: none"> Inspect teeth for wear or damage Assembly note page M-34 31. Thrust washer <ul style="list-style-type: none"> Assembly note page M-34 32. Side gear <ul style="list-style-type: none"> Inspect teeth for wear or damage Assembly note page M-34 33. Viscous L.S.D. 34. Final gear set
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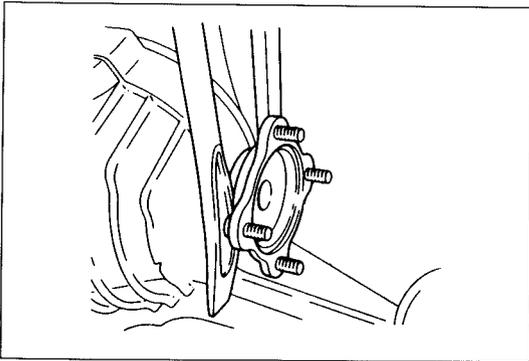
TURBO



N-m (m-kg, ft-lb)

97U0MX-064

<ul style="list-style-type: none"> 1. Output shaft <ul style="list-style-type: none"> Disassembly note page M-28 Assembly note page M-36 2. Oil seal (Output shaft) <ul style="list-style-type: none"> Assembly note page M-36 3. Differential carrier <ul style="list-style-type: none"> Disassembly note page M-28 Assembly note page M-36 4. Differential case <ul style="list-style-type: none"> Disassembly note page M-28 5. Differential mounting rubber <ul style="list-style-type: none"> Disassembly note page M-28 Assembly note page M-36 6. Bolt 7. Lock plate 8. Bearing cap 9. Adjusting screw 10. Bearing outer race 11. Locknut 12. Washer 13. Companion flange <ul style="list-style-type: none"> Disassembly note page M-29 Inspect splines for wear or damage Assembly note page M-33 14. Oil seal <ul style="list-style-type: none"> Assembly note page M-33 15. Drive pinion <ul style="list-style-type: none"> Disassembly note page M-29 Inspect splines for wear or damage 	<ul style="list-style-type: none"> 16. Collapsible spacer <ul style="list-style-type: none"> Inspection page M-30 17. Long collar 18. Ball bearings <ul style="list-style-type: none"> Disassembly note page M-29 Inspect for damage or rough rotation 19. Bearing inner race (Center bearing) <ul style="list-style-type: none"> Disassembly note page M-29 Inspect for damage or rough rotation Assembly note page M-32 20. Bearing outer race (Center bearing) <ul style="list-style-type: none"> Disassembly note page M-31 Assembly note page M-29 21. Bearing outer race (Rear bearing) <ul style="list-style-type: none"> Disassembly note page M-29 Assembly note page M-30 22. Bearing inner race (Rear bearing) <ul style="list-style-type: none"> Disassembly note page M-30 Inspect for damage or rough rotation Assembly note page M-32 23. Spacer 24. Ring gear <ul style="list-style-type: none"> Inspect teeth for wear or damage Assembly note page M-34 25. Viscous L.S.D. 26. Bearing inner races (Side bearing) <ul style="list-style-type: none"> Disassembly note page M-30 Inspect for damage or rough rotation Assembly note page M-32 27. Final gear set
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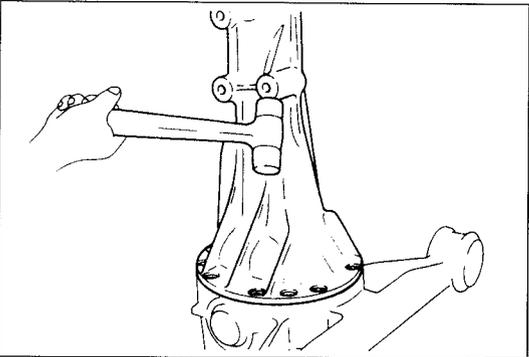


97U0MX-066

Disassembly note

Output shaft

Remove the output shaft with two pry bars as shown in the figure.



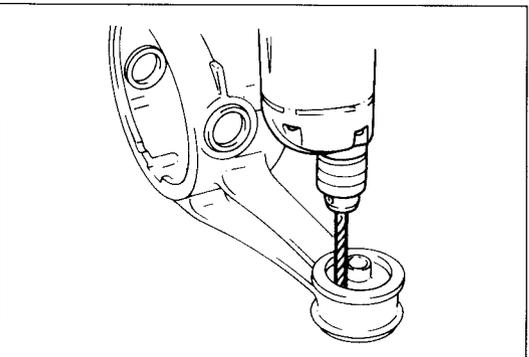
97U0MX-067

Differential case

Caution

Do not strike the aluminum alloy differential case.

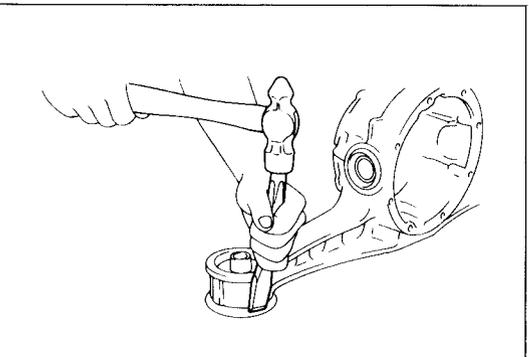
Strike the differential carrier with a copper hammer to separate it from the case.



97U0MX-068

Differential mounting rubber

1. Drill holes around the differential mounting rubber.

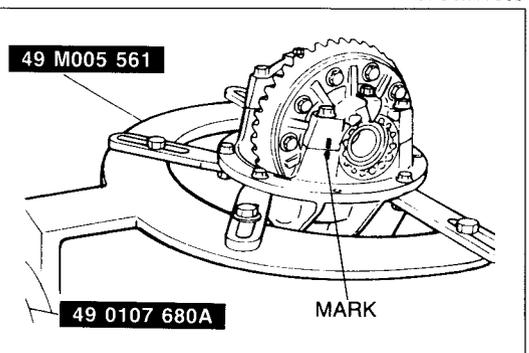


97U0MX-069

Note

Use a new mounting rubber when reassembling.

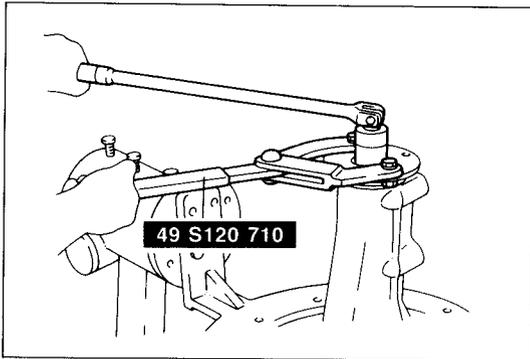
2. Hit the edge of the differential mounting rubber to remove it.



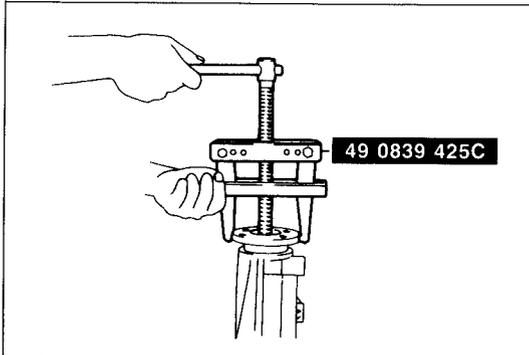
97U0MX-070

Differential carrier

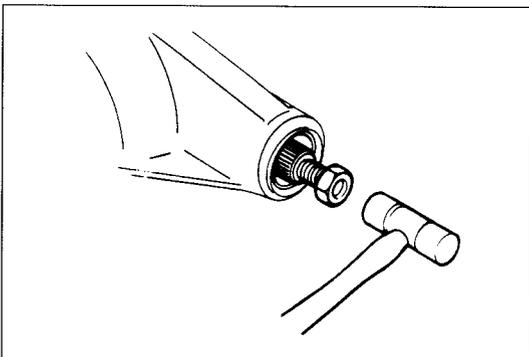
1. Mount the differential carrier on the **SST**.
2. Mark one bearing cap and the carrier.



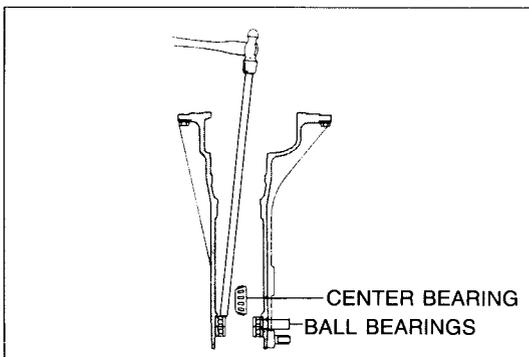
97U0MX-071



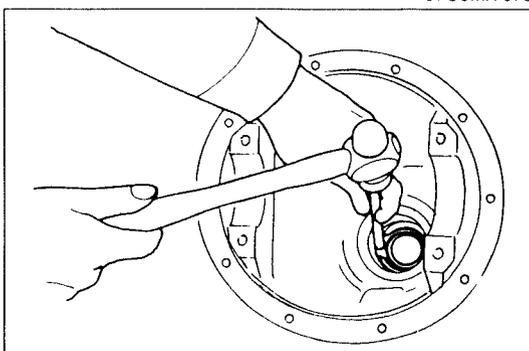
9MU0MX-046



97U0MX-072



97U0MX-073



97U0MX-074

Companion flange

1. Hold the companion flange with the **SST**, and remove the locknut.
2. Remove the companion flange with the **SST**.

Drive pinion

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

Ball bearings, Bearing inner race (Center bearing)

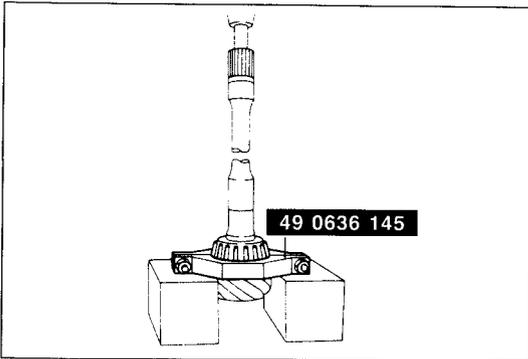
Drive out the ball bearings with a brass drift and hammer. Remove the center bearing.

Bearing outer race (Center bearing), (Rear bearing)

Note

For proper reassembly, identify the bearing outer races.

Remove the bearing outer races by using the two grooves in the carrier and alternately tapping the sides of the races.



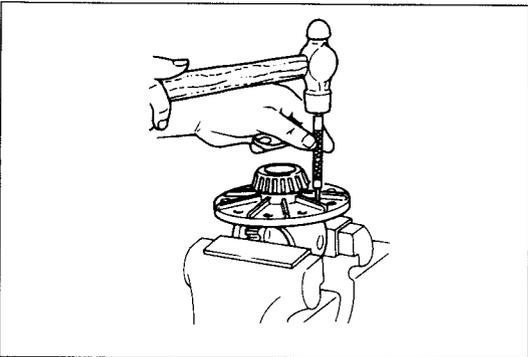
97U0MX-075

Bearing inner race (Rear bearing)

Note

Support the drive pinion by hand so that it will not fall.

Remove the rear bearing with the **SST**.



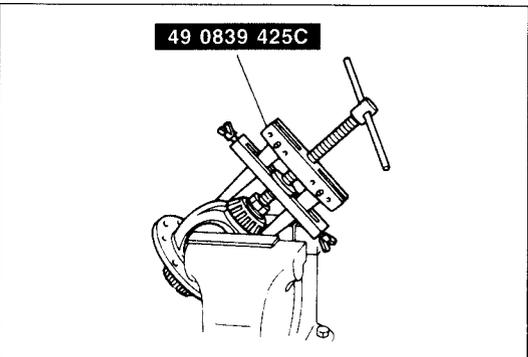
9MU0MX-076

Knock pin

Note

Tap out toward the ring gear side.

Secure the gear case in a vise and remove the knock pin.



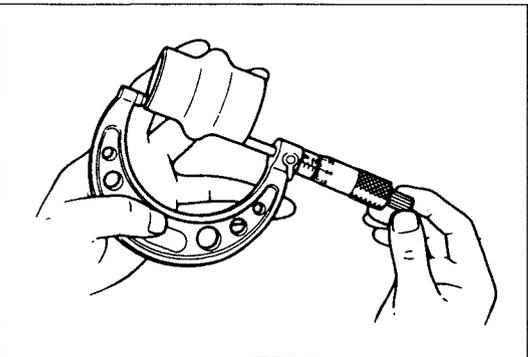
97U0MX-076

Bearing inner races (Side bearing)

Note

Identify the bearings so that they can later be reinstalled in the same position.

Remove the side bearings from the gear case with the **SST**.



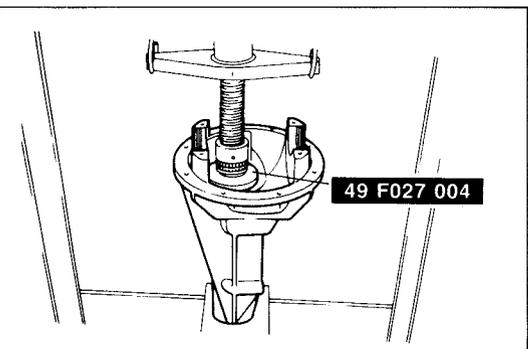
97U0MX-077

Collapsible spacer

Note

There are two type of collapsible spacer are used for RX-7 models.

Non-Turbo: 48.85—49.15mm (1.923—1.935 in)
Turbo : 56.85—57.15mm (2.238—2.250 in)

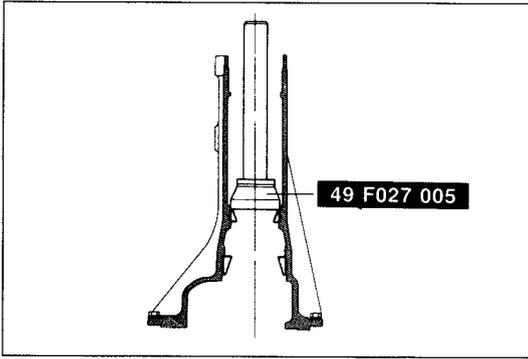


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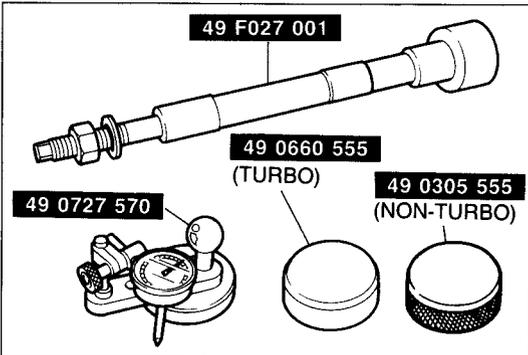
Assembly note

Adjustment of pinion height

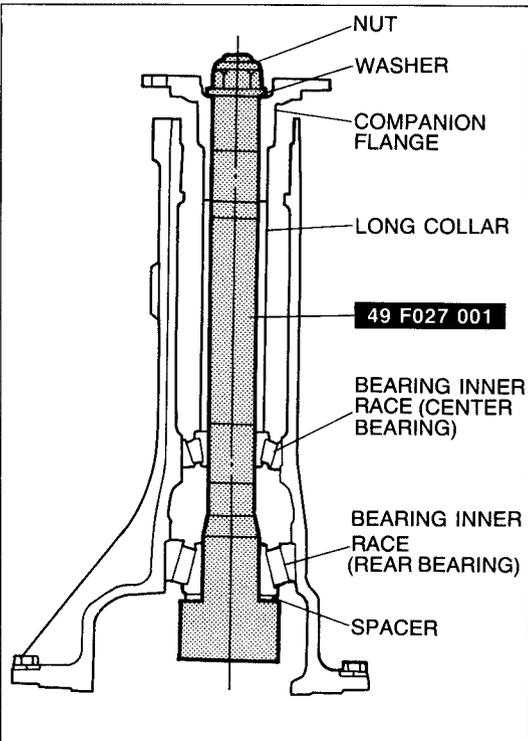
1. Make certain that the differential bearing support bores are free of dirt and burrs.
2. Install the bearing outer race (rear bearing) with the **SST**.



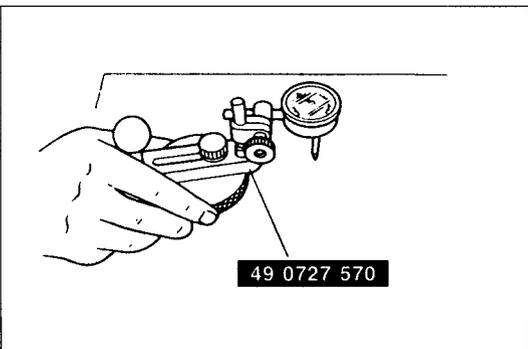
97U0MX-079



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97U0MX-082

3. Install the bearing outer race (center bearing) with the **SST**.

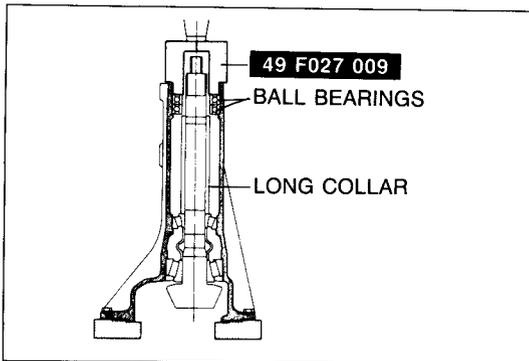
4. Adjust the drive pinion height as follows with the **SST**.

Note

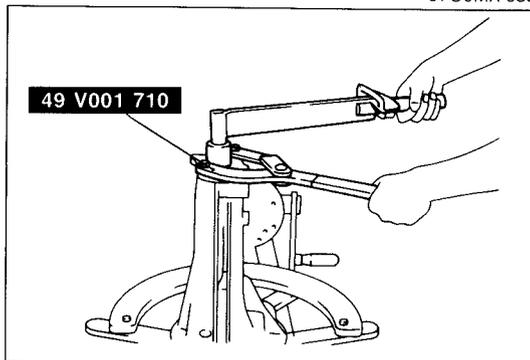
Use the spacer that was removed.

- a) Install the bearing inner race (rear bearing), spacer and **SST**.
- b) Install the bearing inner race (center bearing), long collar, companion flange, washer, and nut.
- c) Tighten the nut just enough so that the **SST** can be turned by hand.

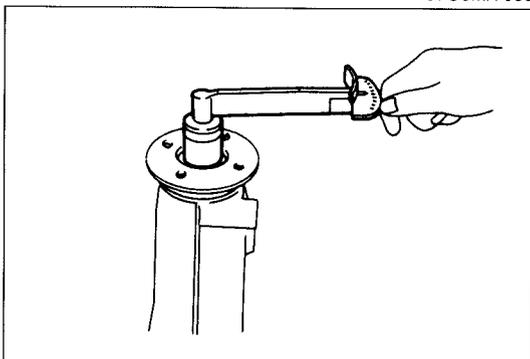
d) Place the **SST** on a surface plate and set the dial indicator to "Zero".



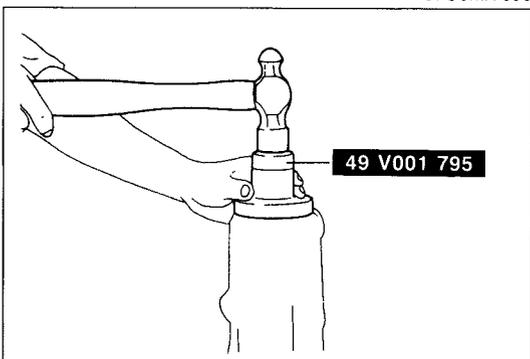
97U0MX-088



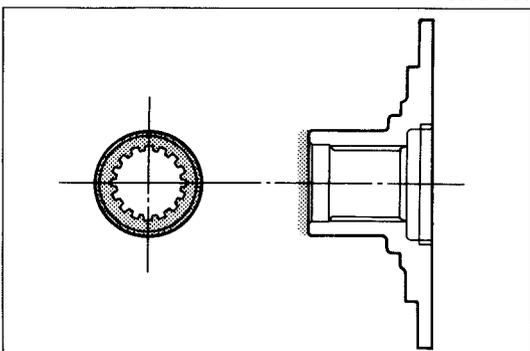
97U0MX-089



97U0MX-090



97U0MX-091



97U0MX-092

5. Apply a light coat of grease to the ends of the long collar. Install the spacer.
6. Support the differential carrier, and press the ball bearing on with the **SST**.

Press force: 2,000—3,000 kg (2—3 ton)

Caution

Do not install the oil seal.

7. Install the companion flange, and tighten the locknut.

Tightening torque: 128 N·m (13 m·kg, 94 ft·lb)

8. Turn the companion flange by hand to seat the bearing.
9. Measure the drive pinion preload. Adjust the preload by tightening the locknut.

Preload:

1.3—1.8 N·m (13—18 cm·kg, 11.3—15.6 in·lb)

Tightening torque:

128—284 N·m (13—29 m·kg, 94—210 ft·lb)

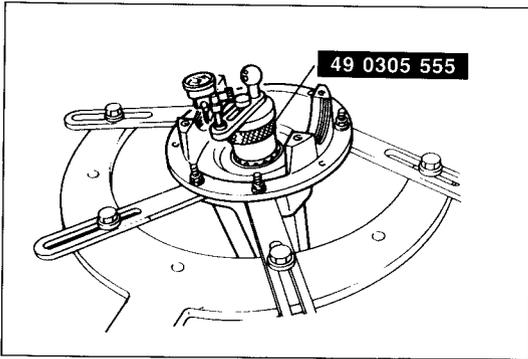
If the specified preload cannot be obtained, replace the collapsible spacer with a new one and check again.

10. Remove the nut, washer and companion flange.
11. Tap a new oil seal into the differential carrier with the **SST**.

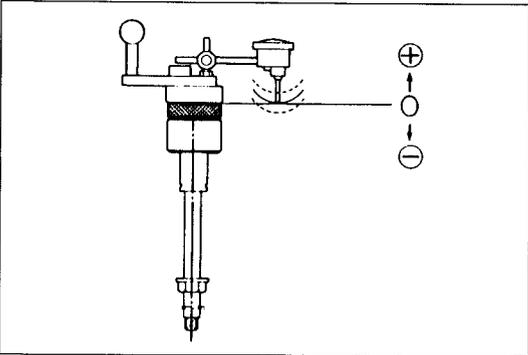
12. Apply a light coat of grease to the end face of the companion flange.
13. Install the companion flange and tighten it to the specified torque.

Tightening torque:

128—284 N·m (13—29 m·kg, 94—210 ft·lb)



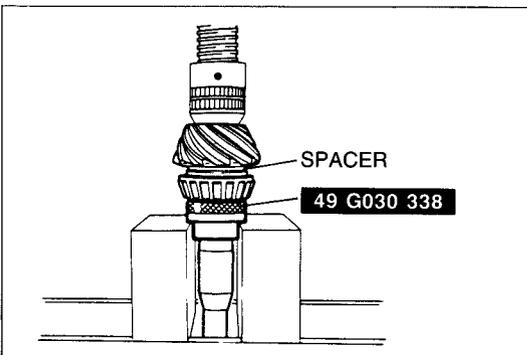
97U0MX-083



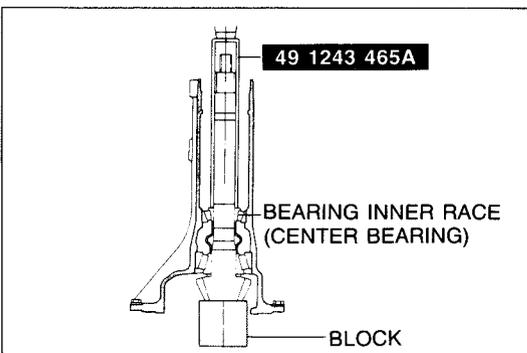
97U0MX-084

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 (0.1236 in)	35	3.35mm (0.1319 in)
17	3.17mm (0.1248 in)	38	3.38mm (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)

97U0MX-085



97U0MX-086



97U0MX-087

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

- g) Add the two (left and right) values obtained in Step f, and divide the total by 2.

Specification: 0mm (0 in)

- h) If it is not within specification, adjust the pinion height by selection of a spacer.

Note

Spacers are available in increments of 0.03mm. Select the spacer thickness that is closest to that necessary.

Adjustment of drive pinion preload

1. Install the spacer.

Note

- a) Press on until the force required suddenly increases.
- b) Install the spacer selected for the pinion height adjustment, being careful that the installation direction is correct.

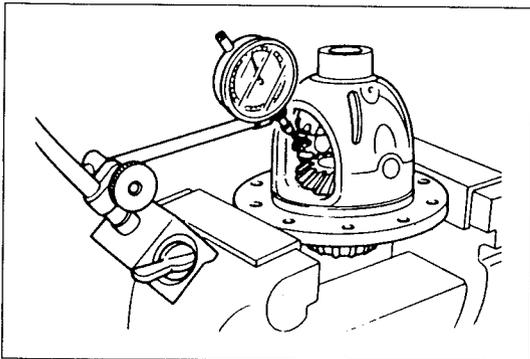
2. Press the bearing inner race (rear bearing) on with the **SST**.

Caution

Do not press to more than 1,000 kg (1 ton), because the collapsible spacer will bend.

3. Install the drive pinion assembly and the collapsible spacer.
4. Press the bearing inner race (center bearing) on with the **SST**.

Press fore: 1,000 kg (1 ton)



97U0MX-093

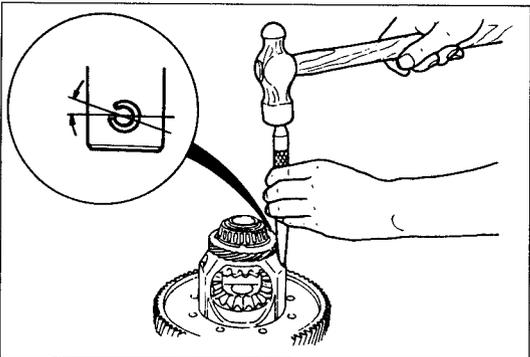
Adjustment of side gear and pinion gear backlash (Standard)

1. Check the backlash of the side gears and pinion gears. Adjust by inserting the proper thickness thrust washer at both sides.

Standard backlash: 0—0.1mm (0—0.004 in)

Thrust washer thickness:

Identification mark	Thickness
0	2.00mm (0.0787 in)
05	2.05mm (0.0807 in)
1	2.10mm (0.0827 in)
15	2.15mm (0.0846 in)
2	2.20mm (0.0866 in)



97U0MX-094

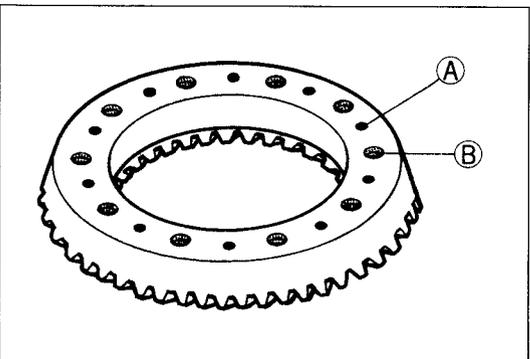
2. Install the knock pin to secure the pinion shaft. Stake the pin with a punch to prevent it from coming out of the case.

Adjustment of drive pinion and ring gear backlash

Note

Apply approx. 0.04 cc (0.0024 cu in) of compound at each point.

1. Apply thread-locking compound to points (A) and (B) around the gear back face.
2. Mount the ring gear onto the gear case.

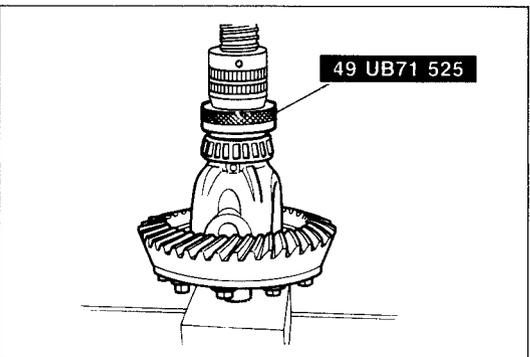


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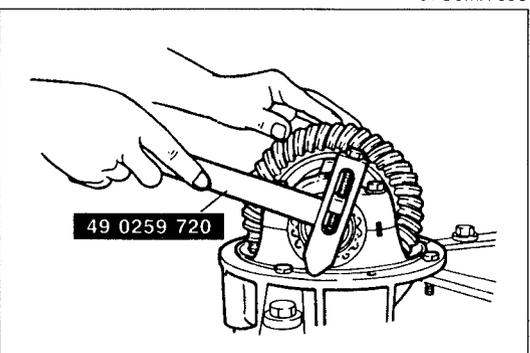
Tightening torque:

69—83 N·m (7.0—8.5 m·kg, 51—61 ft·lb)

3. Press the bearing inner race (side gear) on with the **SST**.

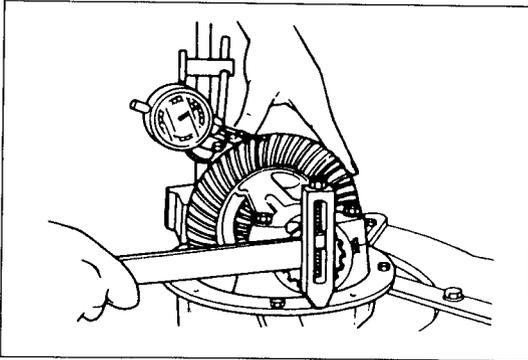


97U0MX-096

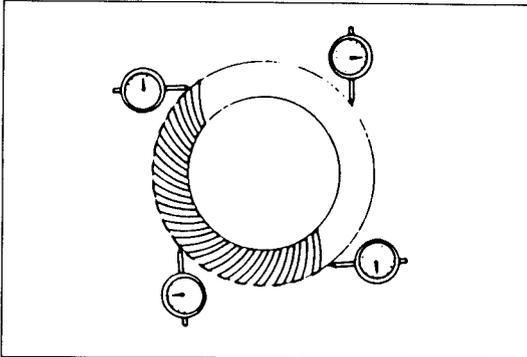


97U0MX-102

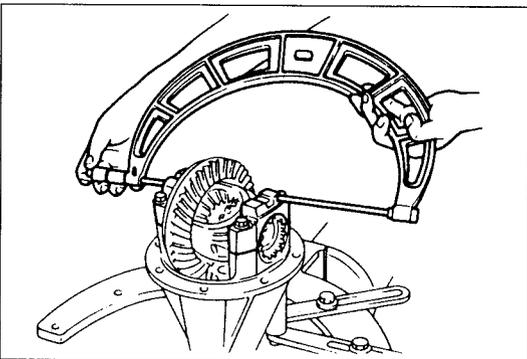
4. Install the differential gear assembly in the carrier.
5. Note the identification marks on the adjusters, and install the adjusters to their respective sides.
6. Install the differential bearing caps, making sure that the identification mark on the cap corresponds with the one on the carrier.



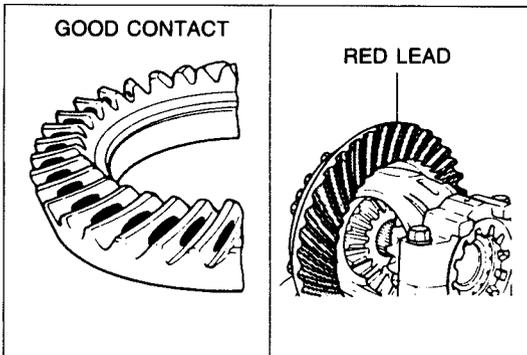
97U0MX-103



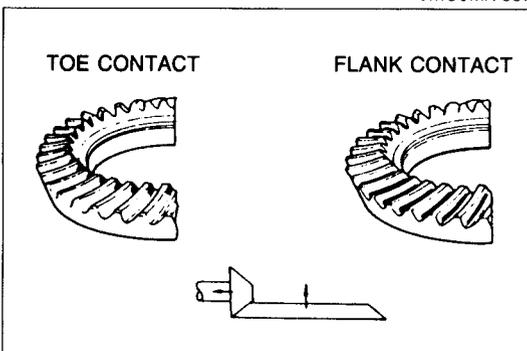
97U0MX-104



97U0MX-097



9MU0MX-067



63G09X-385

7. Mark the ring gear at four points at approx. **90°** intervals. Mount a dial indicator to the carrier so that the feeler comes into contact at a right angle with one of the ring gear teeth.
8. Turn both bearing adjusters equally with the **SST** until the backlash is **0.09—0.11mm (0.0035—0.0043 in)**.

9. Check the backlash at the three other marked points, and make sure the minimum backlash is above **0.05mm (0.0020 in)** and the difference between the maximum and minimum is less than **0.07mm (0.0028 in)**.

10. Tighten the adjusters equally until the distance between the pilot sections on the bearing caps is as specified.

Specified distance:

Non-Turbo 185.43—185.59mm (7.300—7.303 in)
Turbo 204.43—204.50mm (8.048—8.051 in)

Note

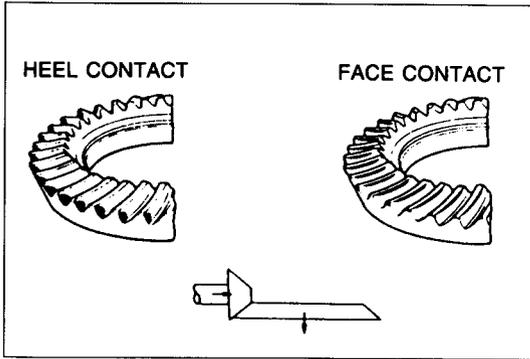
When adjusting the differential bearing preload, be careful not to affect the backlash of the drive pinion and ring gear.

Inspection and adjustment of teeth contact

1. Coat both surfaces of 6—8 teeth of the ring gear with a uniformly 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.

- (1) Toe and flank contact

Replace the spacer with a thinner one to move the drive pinion outward.



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

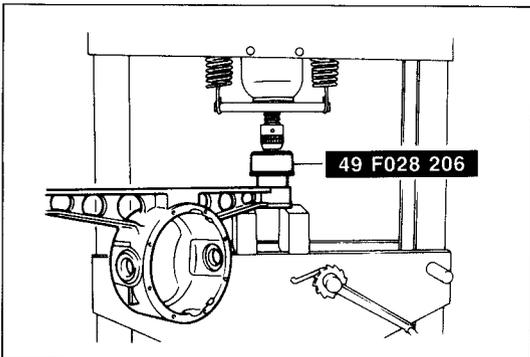
Differential mounting rubber

Note

Install the mounting rubber with the voids in front and rear directions.

Press in the new differential mounting rubber with the **SST**.

Press force: 2,000 kg (2 tons)

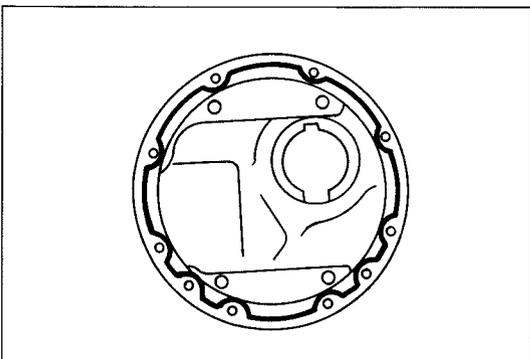


Differential carrier

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

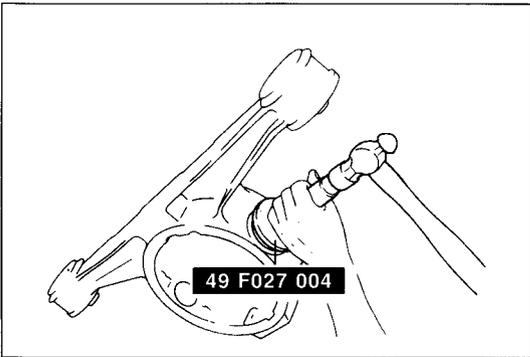
Tightening torque:

23—26 N·m (2.3—2.7 m·kg, 10—20 ft·lb)



Oil seal (Output shaft)

Apply lithium-base grease to the new oil seal lip and install it with the **SST**.



Output shaft

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

