

# DRIVE SHAFT & FRONT AXLE

**[Return To Main Table of Contents](#)**

GENERAL .....	2
DRIVE SHAFT .....	6
HUB AND KNUCKLE .....	17

## GENERAL SPECIFICATIONS

Drive shaft			
Joint type	1.6 M/T	1.6 A/T	1.8 M/T, A/T
Outer	B.J.	B.J.	B.J.
Inner	D.O.J. (R.H) T.J. (L.H)	T.J.	D.O.J.
Length (Joint to joint)mm (in.)			
Right	366(14.40)	377.5 (14.86)	366(14.40)
Left	694.5 (27.34)	694.5 (27.34)	698 (27.48)
Maximum permissible joint angle			
B.J.	45° or more	45° or more	46° or more
D.O.J.	22° or more (R.H)		22° or more
T.J.	22.5° or more (L-H)	22.5° or more	

B.J. : Birfield joint

D.O.J. : Double offset joint

T.J. : Tripod joint

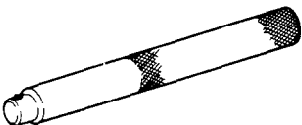
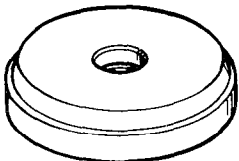
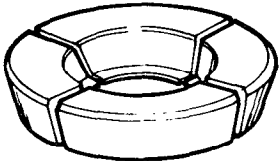
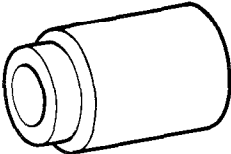
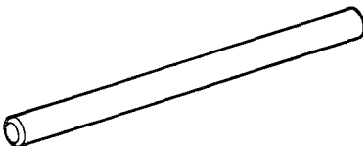
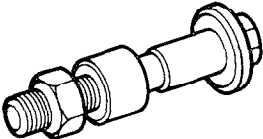
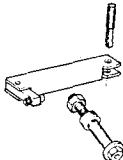
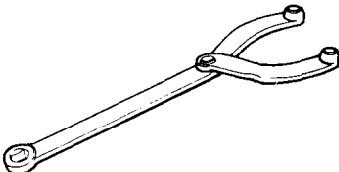
## TIGHTENING TORQUE

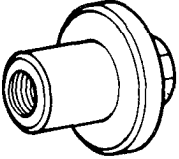

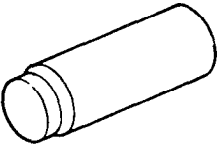
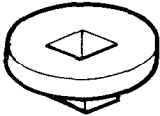
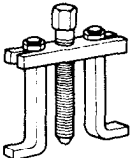
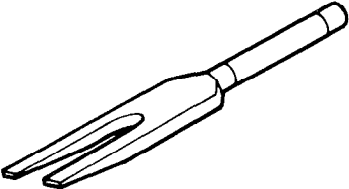
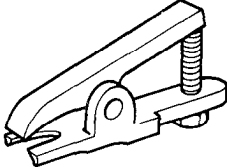
	Nm	kg.cm	lb.ft
Drive shaft nut	200-260	2000-2600	148-192
Knuckle to strut assembly	110-130	1100-1300	81-96
Lower arm ball joint to knuckle	60-72	600-720	44-53
Tie rod end to knuckle	15-34	150-340	11-25

## LUBRICANTS

	Recommended lubricant	Quantity
T.J.-B.J. type drive shaft (For 1.6 A/T, M/T L.H)		
B.J. boot grease	SUNLIGHT SW-2	95±6gr. (Joint : 45 ± 3 gr., Boot : 50 ± 3 gr.)
T.J. boot grease	ONE-LÜBER MK	105±6gr. (Joint : 65 ± 3 gr., Boot : 40 ± 3 gr.)
D.O.J.-B.J. type drive shaft (For 1.6 M/T RH)		
B.J. boot grease	SUNLIGHT SW-2	95±6gr. (Joint : 45 ± 3 gr., Boot : 50 ± 3 gr.)
D.O.J boot grease	SUNLIGHT SD-2	95±6gr. (Joint : 60 ± 3 gr., Boot : 35 ± 3 gr.)
D.O.J.-B.J. type drive shaft (For 1.8 A/T, M/T)		
B.J. boot grease	SUNLIGHT SW-2	115±6gr. (Joint : 60 ± 3 gr., Boot : 55 ± 3 gr.)
D.O.J. boot grease	VALIANT SD-R2	100±6gr. (Joint : 60 ± 3 gr., Boot : 40 ± 3 gr.)

## SPECIAL TOOLS

Tool (Number and Name)	Illustration	Use
09500-21000 Bar		Installation of oil seal and bearing.
09517-21000 Oil seal installer		1) Press fit for the front wheel bearing oil seal. (use with 09500-21000). 2) Press fit for the front wheel bearing outer race. (use with 09500-21000).
09517-21100 Hub bearing remover		Removal of front wheel bearing. (ues with 09532-11000, 09532-11301).
09517-21200 Front axle base		Installation of the front wheel bearing outer race. (use with 09517-21000, 09500-21000).
09517-21400 Drift		Removal of front hub bearing outer race.
09517-21500 Front hub remover and installer		Removal & installation of the front hub. (use with 09517-21600)
09517-21600 Knuckle arm bridge		Removal of the front hub. (use with 09517-21500)
09517-21700 End yoke holder		Holding of the front wheel when installing and removing the front axle shaft.

Tool (Number and Name)	Illustration	Use
09529-21000 wheel alignment gauge attachment		Front wheel alignment for aluminum wheel.
09532-11000 Tapered roller bearing puller		Removal of front wheel bearing. (use with 09532-11301, 09517-21100)
09532-11301 Puller cup		Removal of front wheel bearing. (use with 09517-21100, 09532-11000)
09532-11600 Pre-load socket		Measuring of front wheel bearing preload. (use with 09517-21500, 30 mm socket and torque wrench)
09526-11001 Axle shaft puller		Removal of the drive shaft from the front hub.
09545-21000 Ball joint remover		Removal of the front lower arm ball joint.
09568-31000 Tie rod end puller		Separation of the tie rod end ball joint.

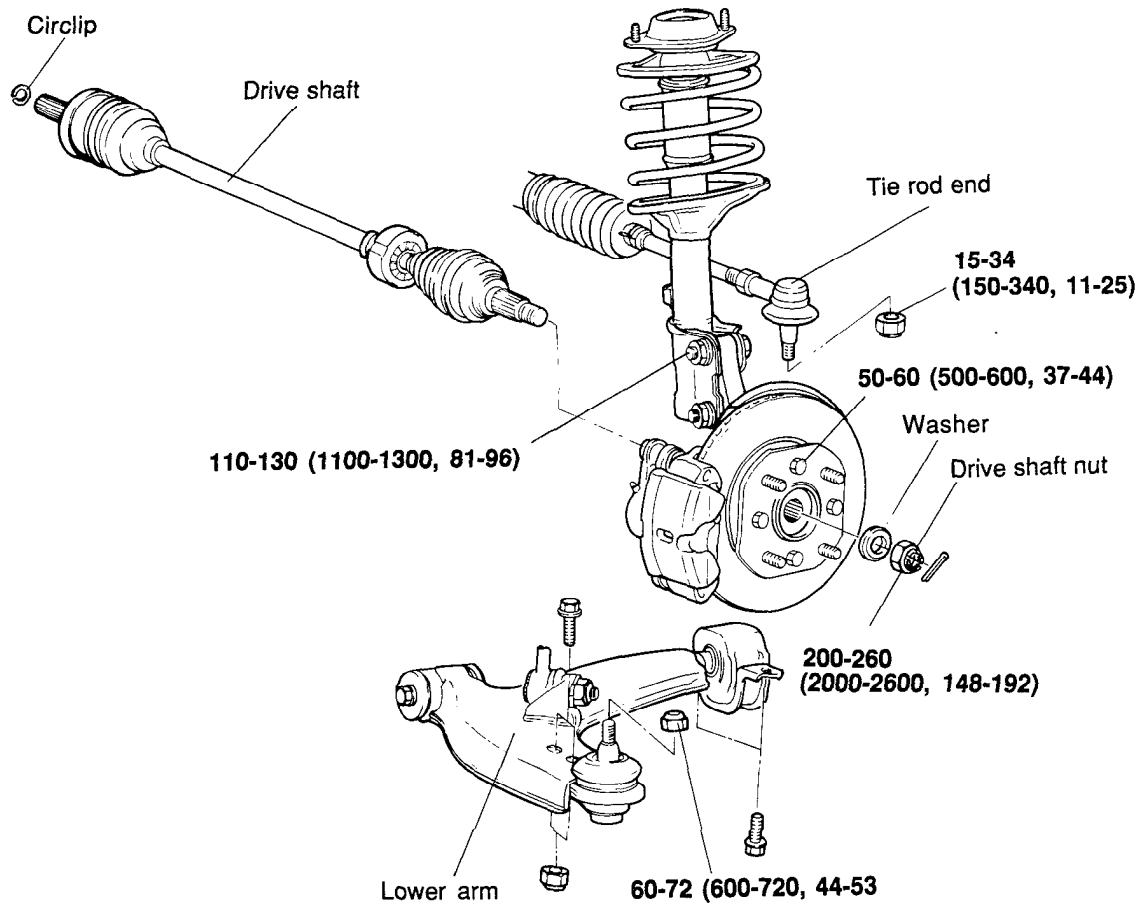
**TROUBLESHOOTING**

Symptom	Probable cause	Remedy
Vehicle pulls to one side	Galling of drive shaft ball joint Wear, rattle or galling of wheel bearing Defective front suspension and steering	Replace Replace Adjust or replace
Vibration	Wear, damage or bending of drive shaft Drive shaft rattle and hub serration Wear, rattle or sintering of wheel bearing	Replace Replace Replace
Shimmy	Improper wheel balance Defective front suspension and steering	Adjust or replace Adjust or replace
Excessive noise	Wear, damage or bending of drive shaft Drive shaft rattle and hub serration Drive shaft rattle and side gear serration Wear, rattle or galling of wheel bearing Loose hub nut Defective front suspension and steering	Replace Replace Replace Replace Adjust or replace Adjust or replace

**WHEEL BEARING TROUBLESHOOTING**

Symptom	Probable cause	Remedy
Bent cage	Cage damage due to improper handling or tool usage.	Replace bearing
Galling	Metal smears on roller end due to overheating, lubricant problem or overloading.	Replace bearing Check seals, check for proper lubrication
Cracked inner race	Race cracked due to improper fit, cocking or poor bearing seats.	Replace bearing
Etching	Bearing surfaces appear gray or grayish black in color with etching of material usually at roller spacing.	Replace bearing Check seals, check for proper lubrication
Brinelling	Surface indentations, on race surface caused by rollers either under impact loading or vibration while the bearing is not rotating.	Replace bearing
Heat discoloration	Heat discoloration is dark blue resulting from overload or no lubricant (Yellow or brown color is normal).	Replace bearing Check seals and other parts
Fatigue spalling	Flaking of surface metal resulting from fatigue.	Replace bearing Clean all related parts.

## COMPONENTS

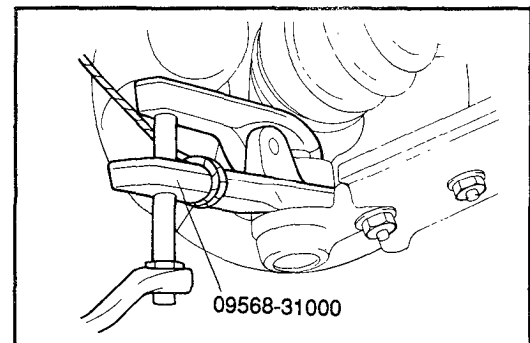


**TORQUE : Nm (kg.cm, lb.ft)**

49J001

## REMOVAL

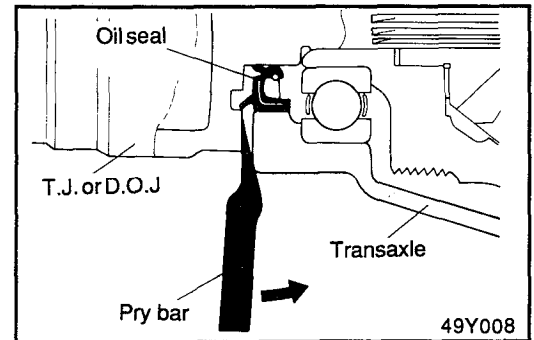
1. Remove the hub caps, and loosen the drive shaft nut.
2. Lift up the vehicle and remove the tires.
3. Remove the lower arm ball joint or its mounting bolts from the lower arm.



4. Detach the tie rod end ball joint connection.
5. Remove the stabilizer bar self locking nut.
6. Drain the transaxle fluid.
7. Insert a pry bar between the transaxle case and joint case (T.J. or D.O.J.), and pry the drive shaft from the transaxle case.

**NOTE**

- 1) Be sure to apply the pry bar to the rib of the transaxle case.
- 2) Do not insert the pry too deep, as this may cause damage to the oil seal. [max. depth : 7 mm (0.28 in.)].



8. Pull out the drive shaft from the transaxle case.

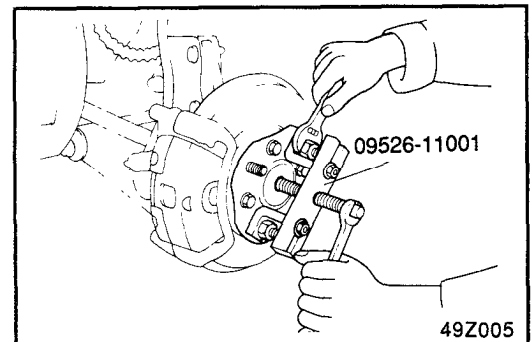
**NOTE**

- 1) Place a shop towel in the hole of the transaxle case to prevent contamination.
- 2) Support the drive shaft properly.
- 3) Replace the retainer ring each time the drive shaft is removed from the transaxle case.

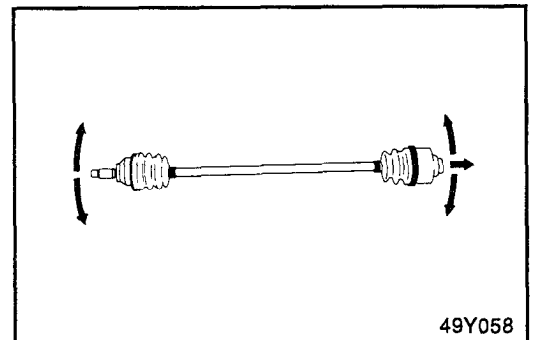
9. Using special tool, force the drive shaft out of the hub.

**NOTE**

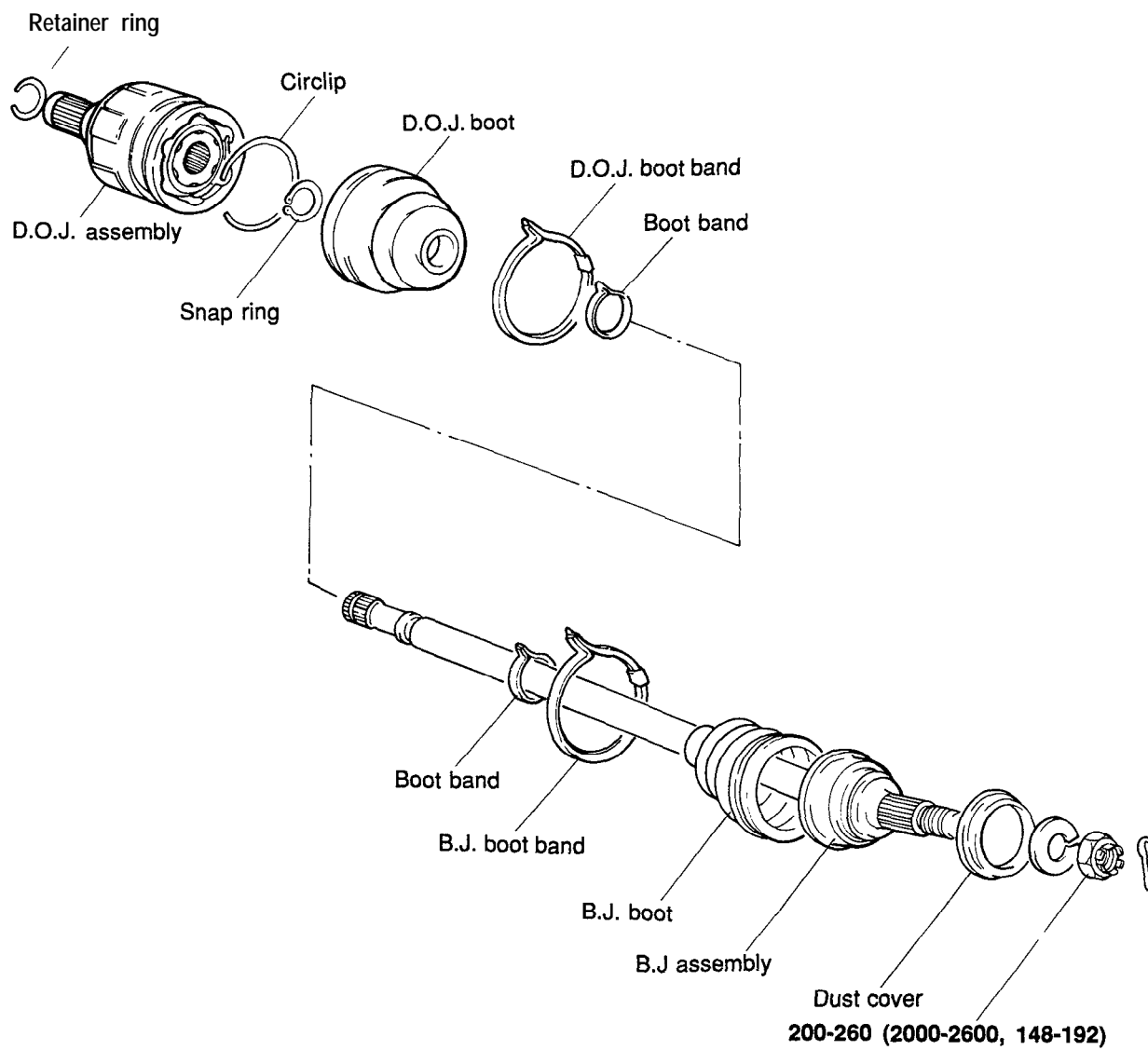
When the drive shaft is forced out, keep the spacer from falling out of place.

**INSPECTION**

1. Check the drive shaft boot for damage and deterioration.
2. Check the ball joints for wear and operating condition.
3. Check the splines for wear and damage.



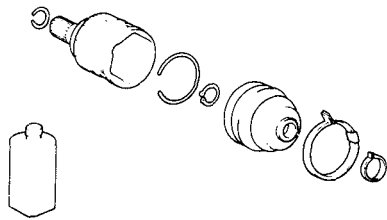
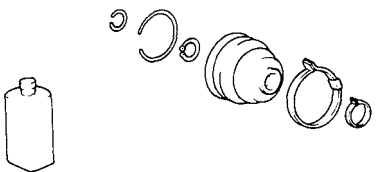
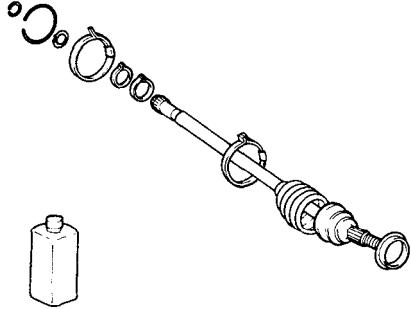
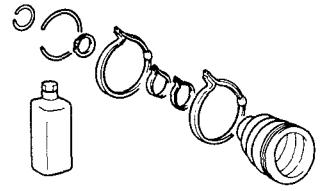
## DISASSEMBLY AND ASSEMBLY (D.O.J.-B.J. TYPE)



TORQUE : Nm (kg.cm, lb.ft)



## REPAIR KITS

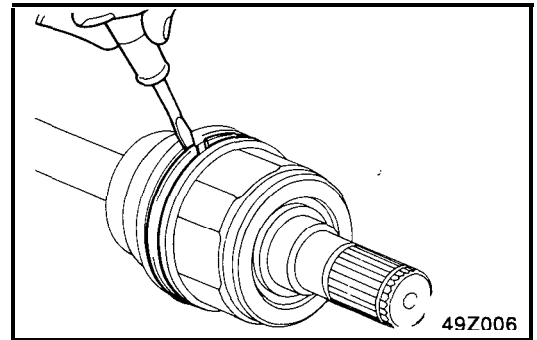
Kit name	Illustration	Contents
Double offset joint kit		<ul style="list-style-type: none"> <li>o Clip (Retainer ring)</li> <li>o D.O.J. assy</li> <li>o Circlip</li> <li>o Snap ring</li> <li>o D.O.J. boot</li> <li>o D.O.J. boot band</li> <li>o Boot band</li> <li>o Grease</li> </ul>
Double offset joint boot kit		<ul style="list-style-type: none"> <li>o Clip (Retainer ring)</li> <li>o Circlip</li> <li>o Snap ring</li> <li>o D.O.J. boot</li> <li>o D.O.J. boot band</li> <li>o Boot band</li> <li>o Grease</li> </ul>
Birfield joint and shaft kit		<ul style="list-style-type: none"> <li>o Clip (Retainer ring)</li> <li>o Circlip</li> <li>o Snap ring</li> <li>o D.O.J. boot band</li> <li>o Boot bands</li> <li>o B.J. boot band</li> <li>o B.J. boot</li> <li>o B.J. assy</li> <li>o Dust cover</li> <li>o Grease</li> </ul>
Birfield joint boot kit		<ul style="list-style-type: none"> <li>o Clip (Retainer ring)</li> <li>o Circlip</li> <li>o Snap ring</li> <li>o D.O.J. boot band</li> <li>o Boot bands</li> <li>o B.J. boot band</li> <li>o B.J. boot</li> <li>o Grease</li> </ul>

**DISASSEMBLY****NOTE**

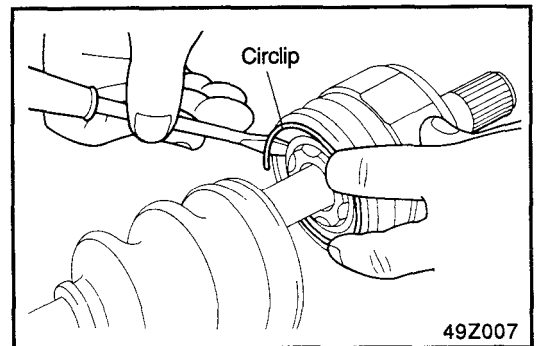
- 1) Do not disassemble the B.J. assembly.
  - 2) The drive shaft joint uses special grease. Do not substitute with another type of grease.
  - 3) The boot band should be replaced with a new one.
1. Remove the D.O.J. boot bands and pull the D.O.J. boot from the D.O.J. outer race.

**NOTE**

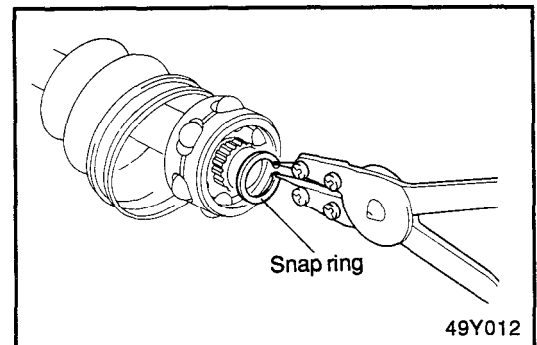
Be careful not to damage the boot.



2. Remove the circlip with a flat-blade screwdriver.



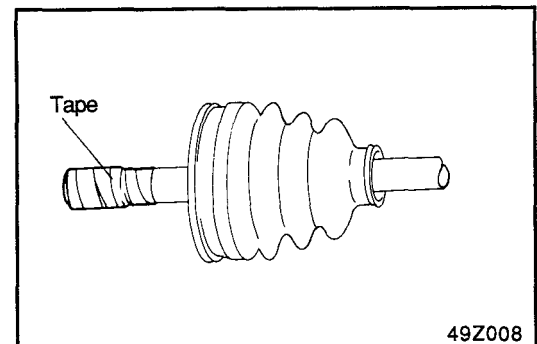
3. Pull out the drive shaft from the D.O.J. outer race.
4. Remove the snap ring and take out the inner race, cage and balls as an assembly.



5. Clean the inner race, cage and balls without disassembling.
6. Remove the B.J. boot bands and pull out the D.O.J. boot and B.J. boot.

**NOTE**

If the boot is to be reused, wrap tape around the drive shaft splines to protect the boot.

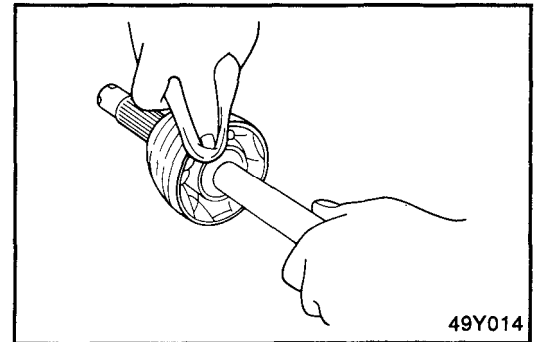


### Inspection after Disassembly

1. Rusted or damaged D.O.J. outer race, inner race, cage and balls.
2. Worn splines.
3. Water, foreign matter or rust in B.J. boot.

#### NOTE

When the B.J. assembly is to be reused, do not wipe away the grease. Check for foreign substances in the grease. If necessary, clean the B.J. assembly and replace grease.



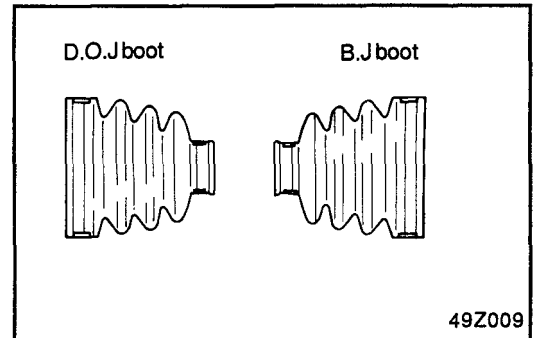
### ASSEMBLY

1. Wrap tape around the drive shaft splines (D.O.J. side) to prevent damage to the boots.
2. Apply grease to the drive shaft and install the boots.

#### Recommended lubricant

B.J. Boot grease ..... Sunlight SW-2

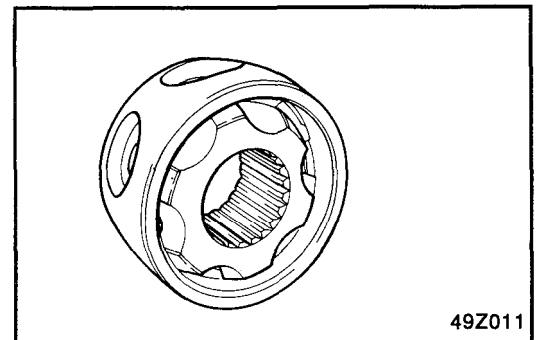
D.O.J. Boot grease ..... [For 1.6 M/T R.H] Sunlight BD-2  
[For 1.8 A/T, M/T] Valiant SD-R2



3. Apply the specified grease to the inner race and cage. Install the cage so that it is offset on the race as shown.

#### NOTE

Use the grease included in the repair kit.



4. Apply the specified grease to the cage and fit the balls into the cage.
5. Install the chamfered side as shown, and then install the inner race onto the drive shaft, and install the snap ring.
6. Apply 60±3gr.(2.1 ± 0.1 oz.) of specified grease to the outer race and install the outer race onto the drive shaft.
7. Apply 35 ± 3 gr. (4.2 ± 0.1 oz.) of specified grease into the D.O.J boot and install the boot.

#### D.O.J. boot grease gr. (oz)

[1.6 M/T- R.H]

Total 95 ± 6 (3.4 ± 0.2)

In the joint ..... 60±3(2.1 ± 0.1)

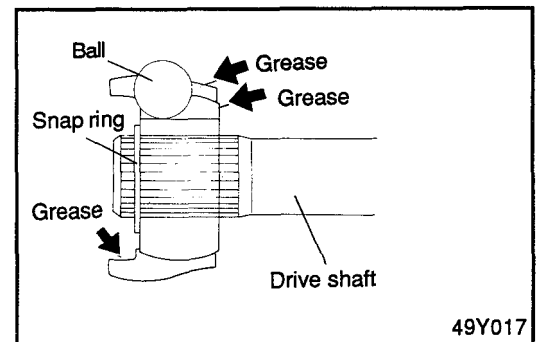
In the boot ..... 35±3(1.2±0.1)

[1.8 A/T, M/T]

Total ..... 100±6(3.5±0.2)

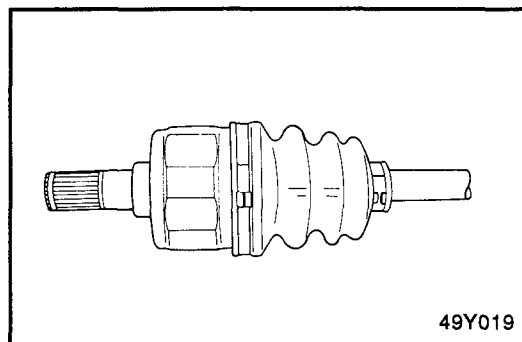
In the joint ..... 60±3(2.1 ± 0.1)

In the boot ..... 40±3(1.4±0.1)

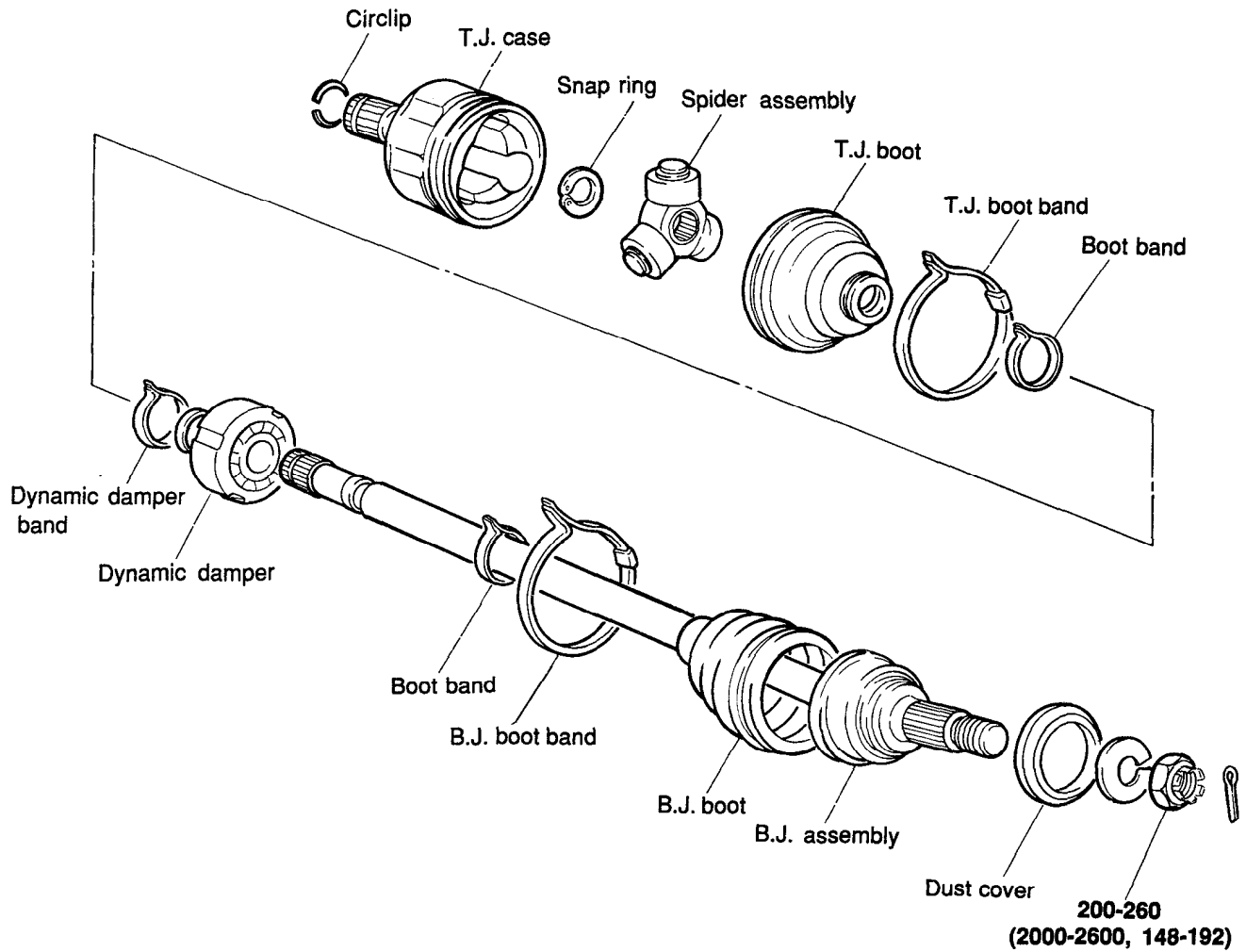


8. Tighten the D.O.J. boot bands.
9. Add to the B.J. as much specified grease as was wiped away at the time of inspection.

10. Install the boots.
11. Tighten the B.J. boot bands.
12. To control the air in the D.O.J. boot, keep the proper distance between the boot bands when they are tightened:



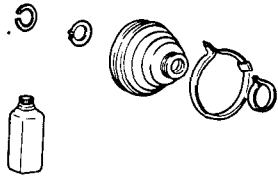
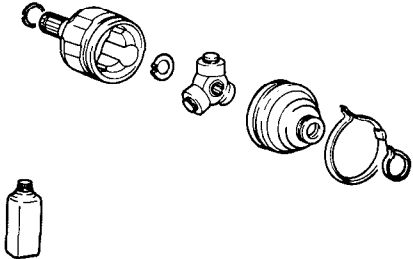
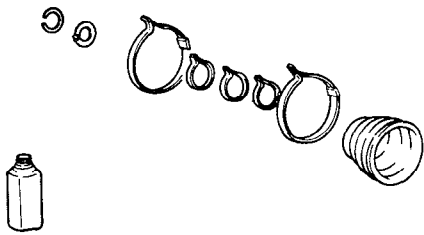
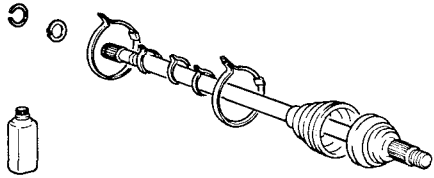
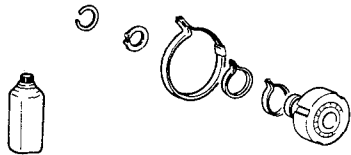
DISASSEMBLY AND ASSEMBLY (T.J.-B.J. TYPE)



TORQUE : Nm (kg.cm, lb.ft)

49J003

## REPAIR KITS

Kit name	Illustration	Contents
T.J. boot kit	 <p>49J004</p>	<ul style="list-style-type: none"> <li>o Circlip</li> <li>o Snap ring</li> <li>o T.J. boot</li> <li>o T.J. boot band</li> <li>o Boot band</li> <li>o Grease</li> </ul>
T.J. joint kit	 <p>49J005</p>	<ul style="list-style-type: none"> <li>o Circlip</li> <li>o T.J. case</li> <li>o Snap ring</li> <li>o Spider assembly</li> <li>o T.J. boot</li> <li>o T.J. boot band</li> <li>o Boot band</li> <li>o Grease</li> </ul>
B.J. boot kit	 <p>49J006</p>	<ul style="list-style-type: none"> <li>o Circlip</li> <li>o Snap ring</li> <li>o T.J. boot band</li> <li>o Boot band</li> <li>o Dynamic damper band</li> <li>o Boot band</li> <li>o B.J. boot</li> <li>o Grease</li> </ul>
B.J. joint and shaft kit	 <p>49J007</p>	<ul style="list-style-type: none"> <li>o Circlip</li> <li>o Snap ring</li> <li>o T.J. boot band</li> <li>o Boot band</li> <li>o Dynamic damper band</li> <li>o Boot band</li> <li>o B.J. boot band</li> <li>o B.J. boot</li> <li>o B.J. assembly</li> <li>o Grease</li> </ul>
Damper kit	 <p>49J008</p>	<ul style="list-style-type: none"> <li>o Circlip</li> <li>o Snap ring</li> <li>o T.J. boot band</li> <li>o Boot band</li> <li>o Dynamic damper band</li> <li>o Dynamic damper</li> <li>o Grease</li> </ul>

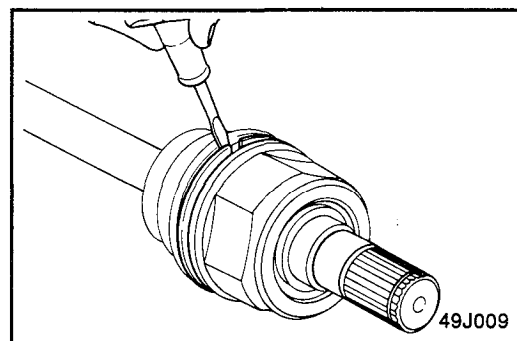
**DISASSEMBLY****NOTE**

- 1) Do not disassemble the spider assembly.
- 2) The drive shaft joint uses special grease. Do not substitute with another type of grease.
- 3) The boot band should be replaced with a new one.

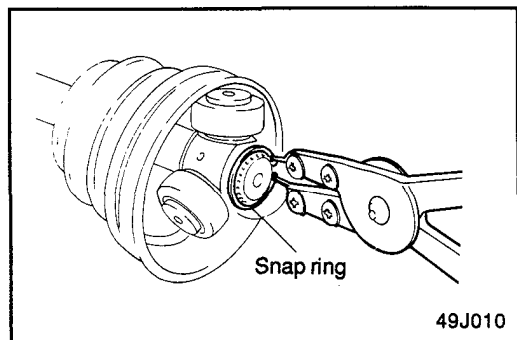
1. Remove the T.J. boot bands and pull the T.J. boot from the T.J. case.

**NOTE**

Be careful not to damage the boot.



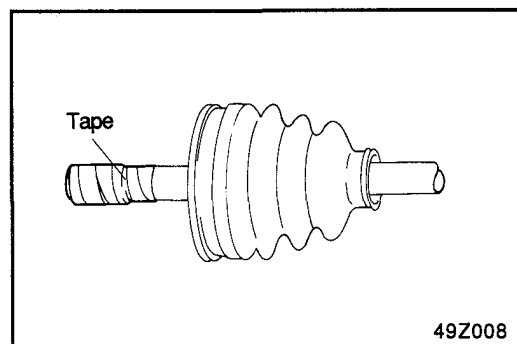
2. Remove the snap ring and spider assembly from the drive shaft.
3. Clean the spider assembly.



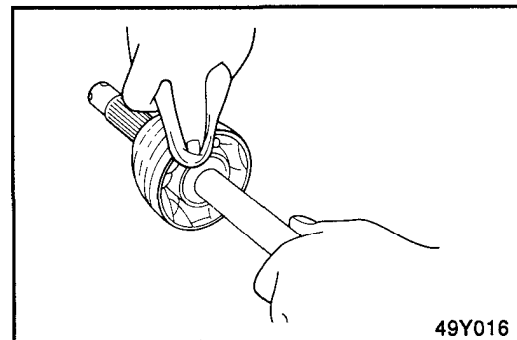
4. Remove the B.J. boot bands and pull out the T.J. boot and B.J. boot.

**NOTE**

If the boot is to be reused, wrap tape around the drive shaft splines to protect the boot.

**Inspection after Disassembly**

1. Check the drive shaft spline part for wear or damage.
2. Check for entry of water and/or foreign material into B.J.
3. Check the spider assembly for roller rotation, wear or corrosion.
4. Check the groove inside T.J. case for wear or corrosion.
5. Check the dynamic damper for damage or cracking.



**ASSEMBLY**

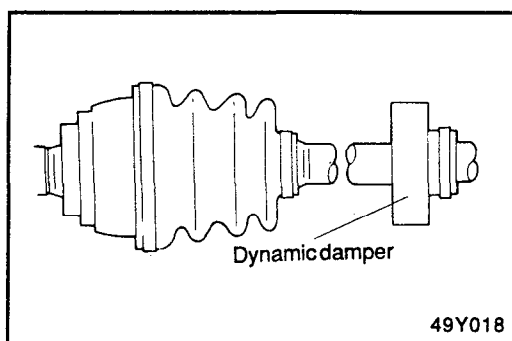
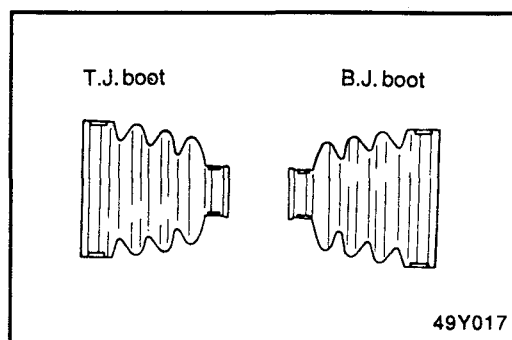
1. Wrap tape around the drive shaft splines (T.J. side) to prevent damage to the boots.
2. Apply grease to the drive shaft and install the boots.

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**Recommended lubricant**

B.J. Boot grease ..... Sunlight SW-2  
 T.J. Boot grease ..... ONE-LÜBER MK

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4. Apply grease into the T.J. boot and install the boot.

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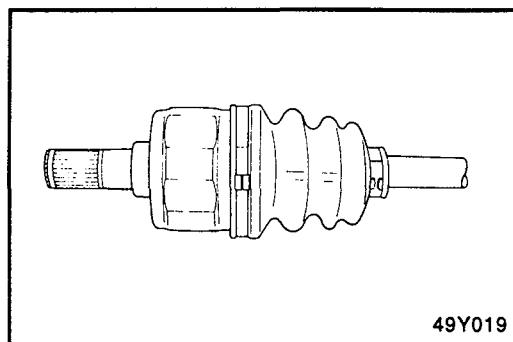
**T.J. boot grease gr. (oz)**

[1.6 A/T, M/T L.H]

Total .....	105±6(3.7±0.2)
In the joint .....	65±3(2.3±0.1)
In the boot.....	40±3(1.4±0.1)

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5. Tighten the T.J. boot bands.
6. Add to the B.J. as much specified grease as was wiped away at the time of inspection.
7. Install the boots.
8. Tighten the B.J. boot bands.
9. To control the air in the T.J. boot, keep the specified distance between the boot bands when they are tightened.

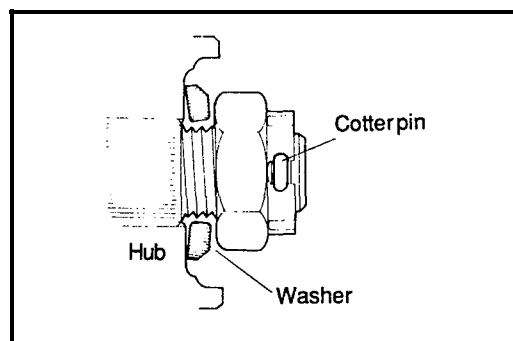
**INSTALLATION**

1. Tighten the following parts to the specified torque.

	Nm (kg.cm, lb.ft)
Drive shaft nut	200-260 (2000-2600, 148-192)
Knuckle to strut assembly	110-130(1100-1300,81-96)
Lower arm ball joint to knuckle	60-72 (600-720,44-53)

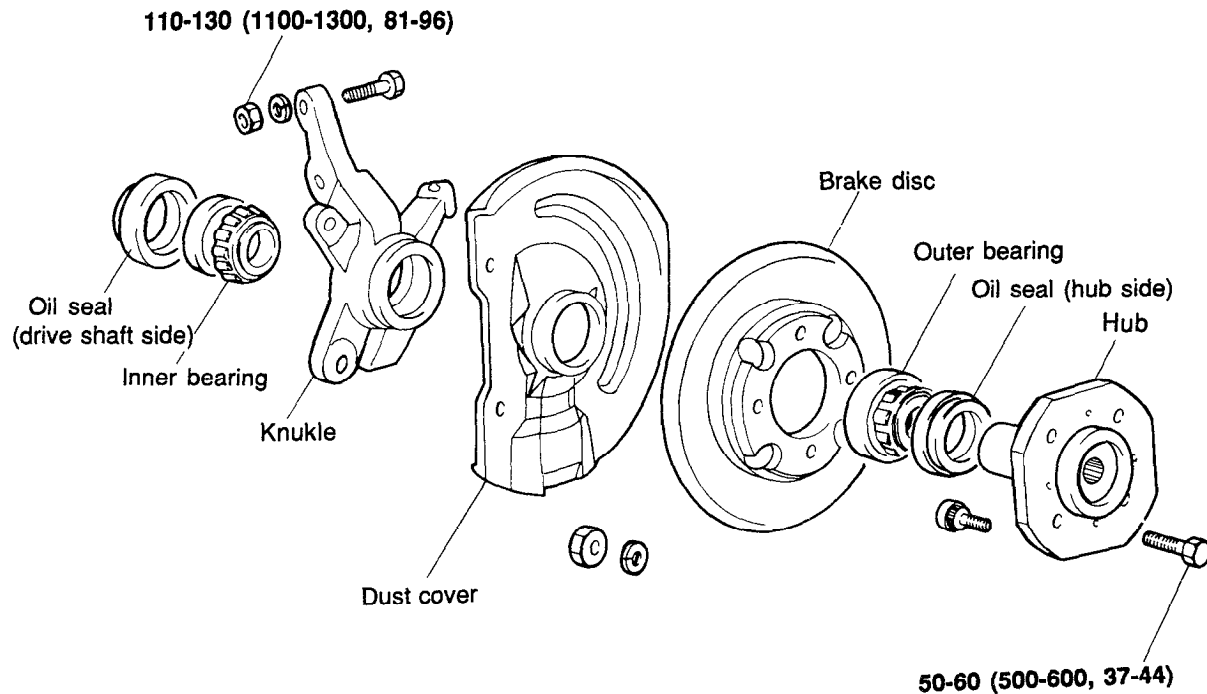
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2. Install a new retainer ring each time the drive shaft is removed from the transaxle.
3. Install the washer under the drive shaft nut as shown in the illustration.





## COMPONENTS



TORQUE : Nm (kg.cm, lb.ft)

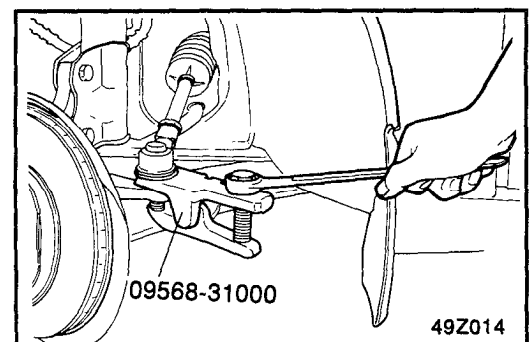
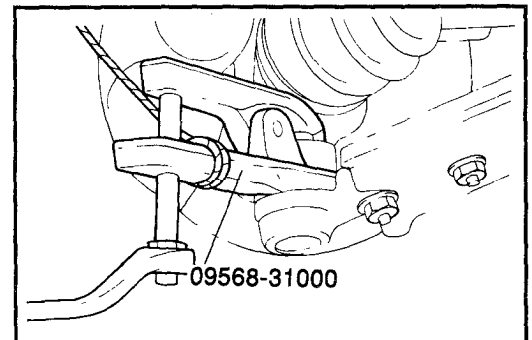
49J011

## REMOVAL

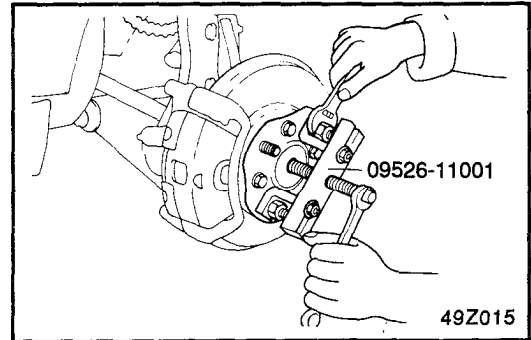
1. Remove the hub caps.
2. Remove the drive shaft nut.
3. Jack up the vehicle and support it with jack stands.
4. Remove the wheel and tire.
5. Remove the front brake assembly from the knuckle and suspend it with a wire.
6. Disconnect the lower arm ball joint from the knuckle using the special tool.
7. Disconnect the tie rod end ball joint from the knuckle using the special tool.

## NOTE

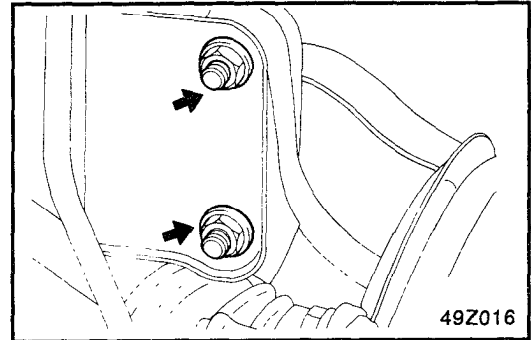
1. Be sure to the the cord of the special tool to the nearby part.
2. Loose the nut, but do not remove it.



8. Disconnect the drive shaft from the hub using the special tool.



9. Remove the hub and knuckle as an assembly from the strut.



## INSPECTION

1. Check the hub for cracks and the splines for wear.
2. Check the oil seal for cracking or damage.
3. Check the brake disc for scoring and damage.
4. Check the steering knuckle for cracks.
5. Check for a defective bearing. (Refer to "Wheel bearing trouble shooting".)

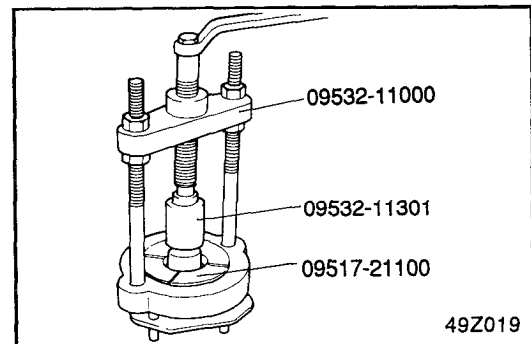
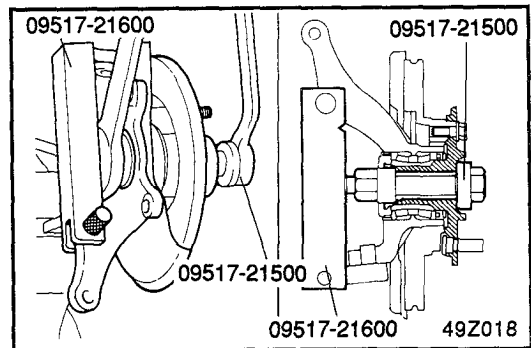
## BEARING REPLACEMENT

1. Install the special tools as illustrated.
2. Remove the hub from the knuckle by turning the special tool.

### NOTE

- 1) Be sure to use the special tool.
- 2) If the hub and knuckle are disassembled by striking with a hammer, the bearing will be damaged.

3. Secure the knuckle in a vise.
4. Remove the brake disc from the hub.
5. Remove the outer bearing inner race from the hub using special tools.



6. Remove the oil seal and inner bearing inner race from the knuckle.
7. Drive out the bearing outer races from the knuckle using the special tool.

**NOTE**

If either the outer or inner race needs replacement, they must be replaced as a set.

8. Apply the specified multipurpose grease to the outside surface of the bearing outer race.

Recommended grease .....  
SAE J310a, multipurpose grease NLGI No.2

9. Install the bearing outer race into the knuckle with special tools.

10. Install the disc to the hub. and torque to specification.

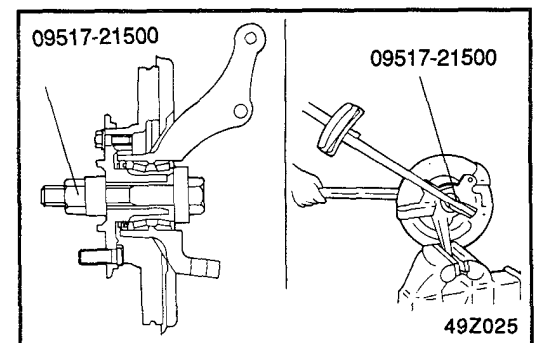
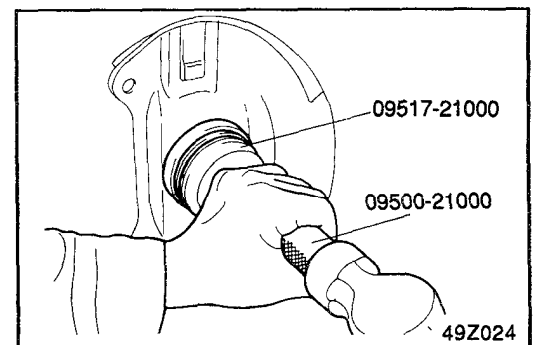
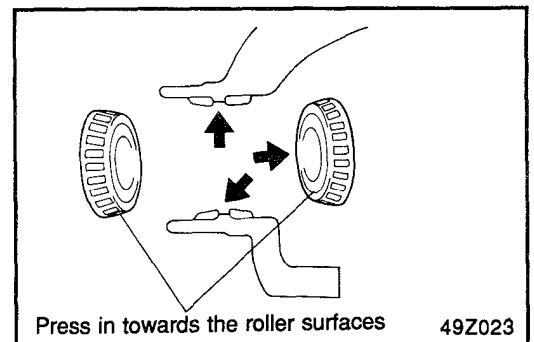
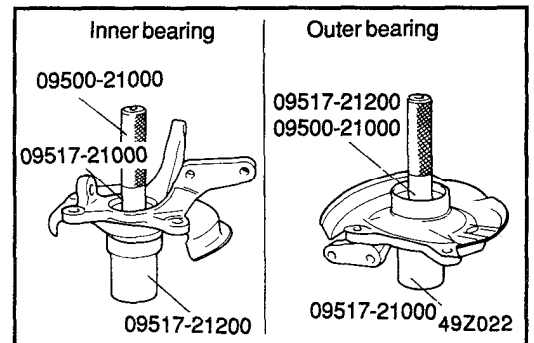
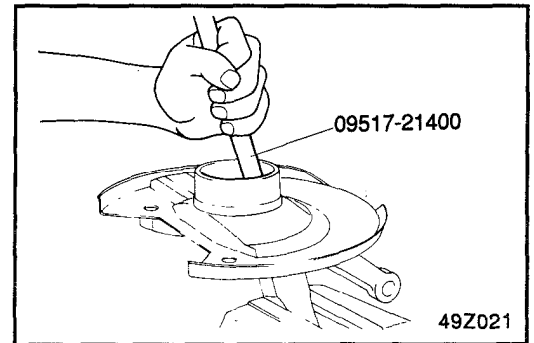
Tightening torque.....  
50-60 Nm (500-600 kg.cm, 36-43 lb.ft)

11. Apply the specified multipurpose grease to the bearings and inside surface of the hub.

12. Place the outside bearing inner race into the knuckle.
13. Drive the oil seal (hub side) into the knuckle with the special tools.
14. Apply the specified multipurpose grease to the lip of the oil seal and to the surfaces of the oil seal which contact the hub.

Recommended grease .....  
SAE J310a, multipurpose grease NLGI No.2

15. Place the inner bearing into the knuckle.
16. Tighten the hub to the knuckle to 235 Nm (2350 kg.cm, 167 lb.ft) with the special tool.
17. Rotate the hub to seat the bearing.



18. Measure the hub bearing starting torque.

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Hubbearing starting torque [Limit] .....  
 1.3 Nm (13 kg.cm, 11 lb.in) or less

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19. If the starting torque is 0 Nm (0 lb.in), measure the hub bearing axial play.

20. If the hub axial play exceeds the limit while the nut is tightened to 235 Nm (2,350 Kg.cm, 167 lb.ft), the bearing, hub and knuckle have not been installed correctly. Repeat the disassembly and assembly procedure.

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Hub bearing axial play [Limit] ..... 0.11 mm (0.0043 in.)

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21. Remove the special tool.  
 22. Apply the specified multipurpose grease to the bearing and to the inside of the knuckle.

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Recommended grease .....  
 SAE J310a, multipurpose grease, NLGI No.2

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23. Drive the oil seal (drive shaft side) into the knuckle until it contacts the bearing outer race using special tools.  
 24. Apply the specified multipurpose grease to the lip of the oil seal.  
 25. Install the parts to the torque specifications.

## INSTALLATION

1. Lower the vehicle to the ground and tighten the knuckle to the lower arm ball joint connecting bolt.
2. Install parts to torque specifications.

