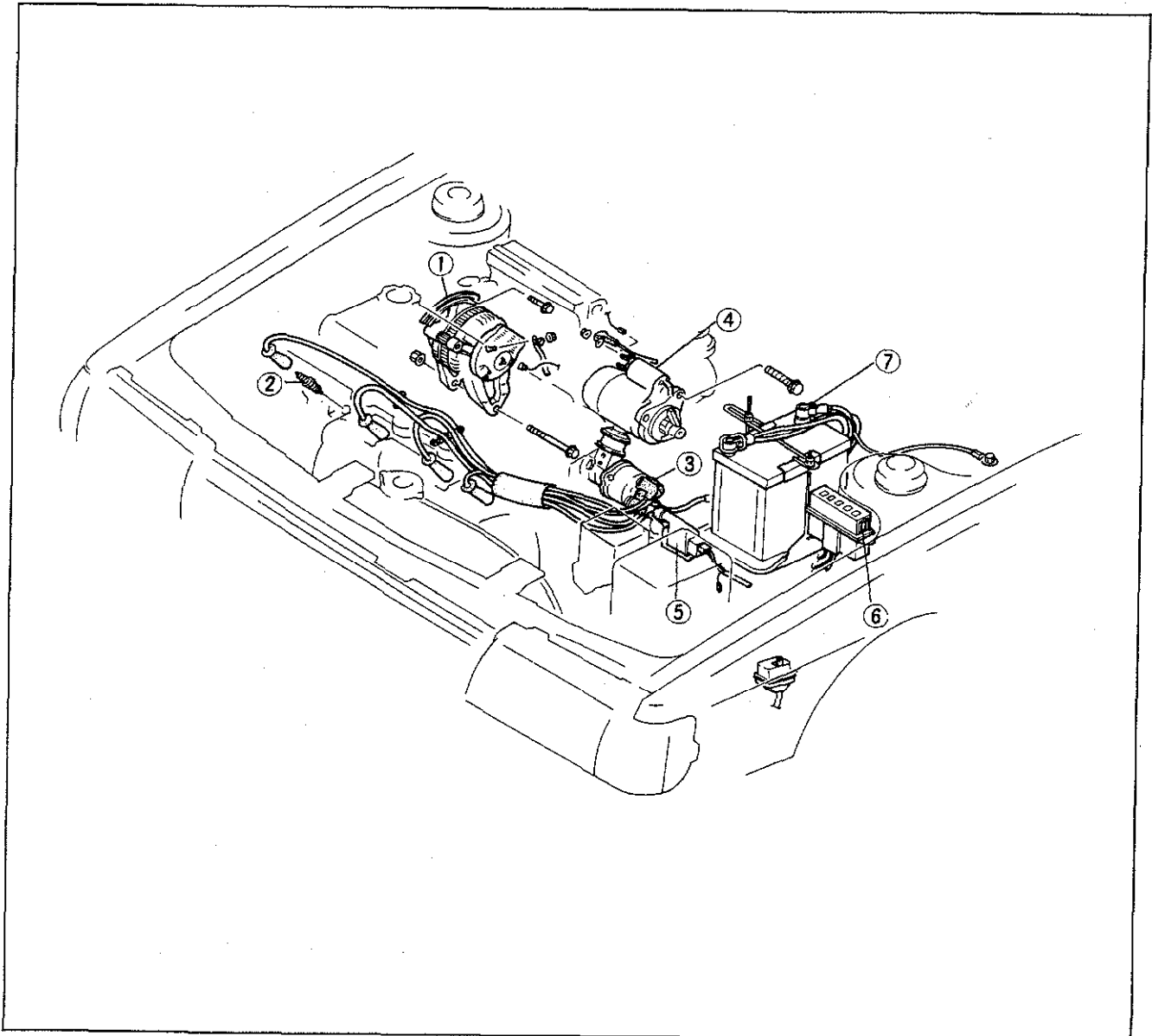


ENGINE ELECTRICAL SYSTEM

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OUTLINE

STRUCTURAL VIEW (NON-TURBO)

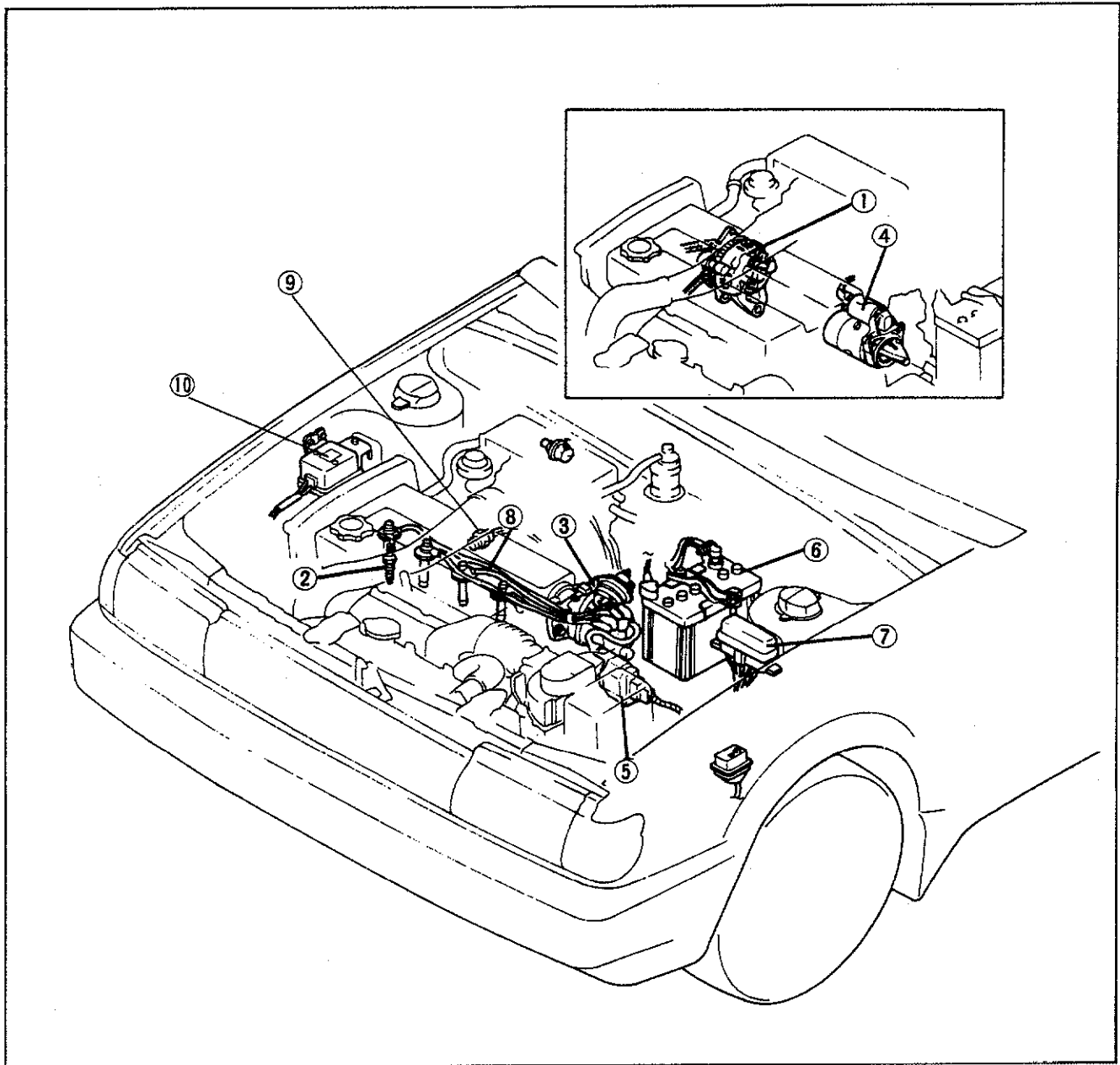


83U05X-002

- 1. Alternator
- 2. Spark plug
- 3. Distributor
- 4. Starter

- 5. Ignition coil
- 6. Main fuse block
- 7. Battery

STRUCTURAL VIEW (TURBO)



83U05X-003

- | | |
|------------------|------------------------|
| 1. Alternator | 6. Battery |
| 2. Spark plug | 7. Main fuse block |
| 3. Distributor | 8. High-tension lead |
| 4. Starter | 9. Knock sensor |
| 5. Ignition coil | 10. Knock control unit |

SPECIFICATIONS

Item		Engine Model	Non-turbo	Turbo
Charging system				
Battery (20 hour rate)	Type		NS40ZAL, 50D20L, 55D23L	
	Voltage	V	12	
	Capacity	Ah	35 (NS40ZAL), 50 (50D20L), 60 (55D23L)	
Level of electrolyte			Between "Upper" and "Lower"	
Safety gravity at 20°C (68°F)	Recharge at		1.20	
	Full charge		1.25—1.27 (NS40ZAL, 50D20L), 1.27—1.29 (55D23L)	
Charging current		A	3.3 (NS40ZAL), 5.0 (50D20L), 6.0 (55D23L)	
Alternator	Type		A-C	
	Voltage-Capacity	V-A	12-60	
Pulley ratio			1 : 2.2	
Load test	Voltage	V	14.1-14.7	
	Current	A	60	
	Speed	rpm	2,500	
Regulator voltage		No load test/ Engine revolution	14.1—14.7/2,500	
Brush	Number		2	
	Length	Standard	16.5 (0.650)	
	mm (in)	Wear limit	8.0 (0.315)	
Starting system				
Starter	Type		Electromagnetic, Pull in	
	Voltage	V	12	
	Output	kW	0.85	
Free running test	Voltage	V	11.5	
	Current	A	60 or less	
	Speed	rpm	6,500	
Brush length	Standard	mm (in)	17 (0.669)	
	Wear limit		11.5 (0.453)	
Ignition system				
Spark plug	DENSO		W16EXR-U11	Q20PR-U11
	NGK		BPR5ES-11	BCPR6E-11
	CHAMPION		RN11YC4	—
Plug gap		mm (in)	1.0—1.1 (0.039—0.043)	
Ignition advance	Ignition timing (at idle)	BTDC	2 ± 1°	
			12 ± 1°	
			(Vacuum hose: disconnected)	
	Approx. 7°		—	
	(Vacuum hose: connected)			
	Centrifugal spark advance (Crank angle/Engine speed)		0°/1,300 rpm 19°/3,500 rpm 19°/5,000 rpm	
Vacuum spark advance (Crank angle/Vacuum)		0°/1,200 rpm 12°/3,500 rpm 12°/5,000 rpm 18°/5,500 rpm		
Positive pressure spark advance (Crank angle/Positive pressure)		A chamber 0°/75 mmHg (2.95 inHg) 28°/450 mmHg (17.72 inHg)		
		B chamber 0°/75 mmHg (2.95 inHg) 5°/150 mmHg (5.91 inHg)		
		0°/60 mmHg (2.36 inHg) 15°/450 mmHg (17.72 inHg)		
		0°/10.64 kPa (0.11 kg/cm ² , 1.54 psi) -5°/53.2 kPa (0.54 kg/cm ² , 7.7 psi)		
Timing mark location		Timing belt cover		
Firing order		1-3-4-2		
Ignition coil				
Secondary coil resistance		kΩ	6—30	
High tension lead resistance		kΩ	16 per 1 m (3.28 ft)	
Distributor				
Type		Full transistor (HEI)		

83U05X-004

TROUBLESHOOTING GUIDE

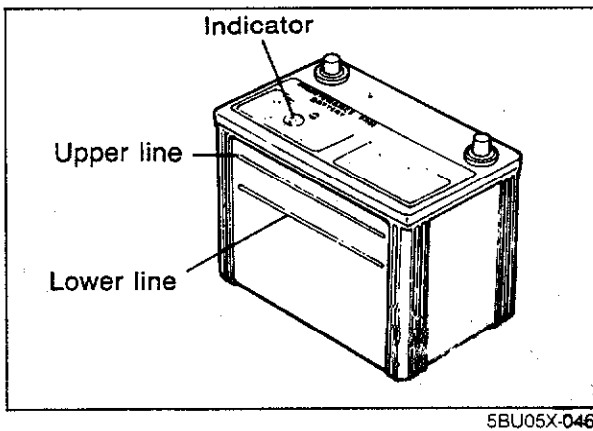
Problem	Probable Cause	Remedy
Starter does not turn, or speed too slow to start the engine.	Battery and related parts Poor contact of battery terminal(s) Poor ground of negative cable Voltage drop caused by discharged battery Insufficient voltage caused by battery malfunction Ignition switch and related parts Poor contact of ignition switch Loose ignition switch wiring or connector Broken wire between ignition switch and magnetic switch Magnetic switch and related parts Loose wiring and/or connectors Burnt magnetic switch contact plate or improper contact Broken wire in magnetic switch pull-in coil Broken wire in magnetic switch holding coil Starting motor and related parts Poor contact of brushes Fatigued brush spring Poor ground of field coil Poor soldering of field coil Commutator malfunction Grounded armature Worn parts	Clean and tighten Clean and repair Recharge Replace Replace Repair Replace Repair or replace Repair Replace Replace Replace Adjust or replace Replace Replace Replace Repair Repair Replace Replace
Starter turns but engine does not start	Insufficient battery capacity Malfunction of spark plug(s) Loose primary wiring Damaged distributor cap or rotor Ignition coil malfunction Knock control unit malfunction	Recharge Clean, adjust, or replace Tighten Replace Replace Replace
Starter motor turns but pinion gear does not engage ring gear	Tip of overrunning clutch pinion worn Fatigued overrunning clutch drive spring Overrunning clutch freewheels Pinion sticking on spline Worn bushing Worn ring gear	Replace Replace Replace Repair or replace Replace Replace

83U05X-005

5 TROUBLESHOOTING GUIDE

Problem	Probable Cause	Remedy
Starter motor turns continuously (does not stop)	Sticking magnetic switch contact plate Short of magnetic switch coil Ignition switch does not return	Replace Replace Replace
Misfiring of engine	Dirty or damaged spark plug(s) Malfunction of wiring, or poor wiring contact Damaged distributor cap Knock control system malfunction	Clean or replace Replace Replace Replace
Discharging of battery	Loose V-belt Grounded or broken stator coil Broken rotor coil Poor contact of brush and slip ring Malfunction of rectifier Malfunction of IC regulator Insufficient battery electrolyte Malfunction of battery electrode (internal short circuit) Poor contact of battery terminal(s) Excessive electrical load	Adjust Replace Replace Clean or replace Replace Replace Adjust Replace Clean and tighten Check
Overcharging of battery	IC regulator malfunction	Replace
Poor acceleration	Incorrect adjustment of ignition timing Distributor malfunction Knock control system malfunction	Adjust Repair or replace Repair or replace
Knocking	Incorrect adjustment of ignition timing Distributor malfunction Knock control system malfunction	Adjust Repair or replace Repair or replace

83U05X-006



BATTERY

INSPECTION

Indicator sign

1. Check the indicator sign on the top of the battery. If the indicator sign is blue, the battery is normal.
2. If the blue indicator sign is not visible, then the electrolyte level of the battery is low and/or the capacity is insufficient.
3. Check whether or not the electrolyte level lies between the upper and lower lines. If low, add distilled water. Do not overfill. If the electrolyte level is acceptable and yet the blue indicator sign is not visible, the battery must be recharged.

Terminal and cable

1. Check the tightness of the terminals to ensure good electrical connections. Clean the terminals and coat them with grease.
2. Inspect for corroded or frayed battery cables.
3. Check the rubber protector on the positive terminal for proper coverage.

Specific gravity of electrolyte at 20°C (68°F)		Charged rate (%)
50D20L NS40ZAL	55D23L	—
1.260	1.280	100
1.220	1.220	75

83U05X-007

RECHARGING

Quick charging

Remove the battery from the vehicle and remove all the vent caps to perform a quick charge (6A or above, but max. 20A).

Slow charging

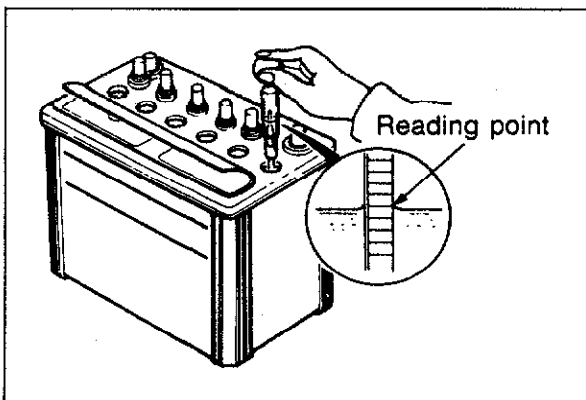
It is not necessary to remove the vent caps to perform a slow charge (under 5A).

Warning

- a) Before performing maintenance or recharging of battery, turn off all accessories and stop the engine.
- b) The negative cable should be removed first and installed last.

Note

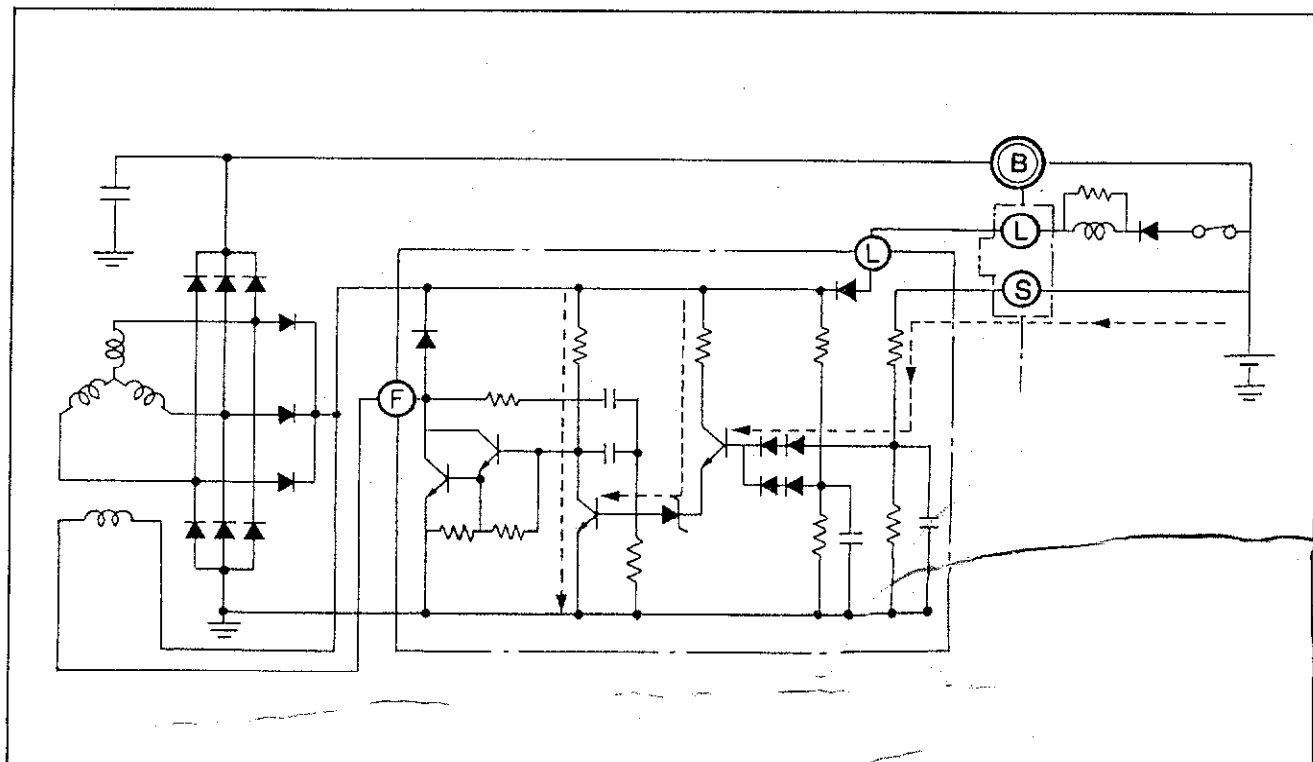
- a) If the indicator sign does not turn blue even after being charged, then measure the specific gravity with a hydrometer. If the specific gravity is under 1.220, charge once more.
- b) If the indicator sign does not turn blue when the specific gravity is normal, the indicator could be defective.



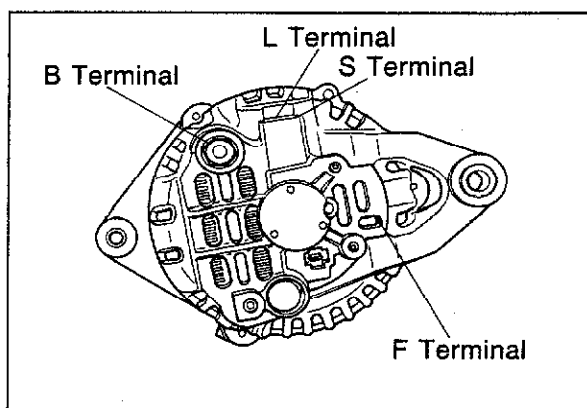
5 ALTERNATOR

ALTERNATOR

CHARGING SYSTEM



5BU05X-048



83U05X-008

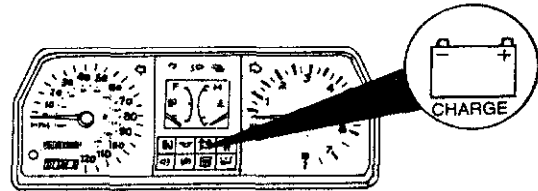
Caution

- a) Be sure battery connections are not reversed, because this will damage the rectifier.
- b) Do not use high-voltage testers, such as a megger, because they will damage the rectifier.
- c) Remember that battery voltage is always applied to the alternator (B) terminal.
- d) Do not ground the (L) terminal while the engine is running.
- e) Do not start the engine while the coupler is disconnected from the (L) and (S) terminals.

TROUBLESHOOTING

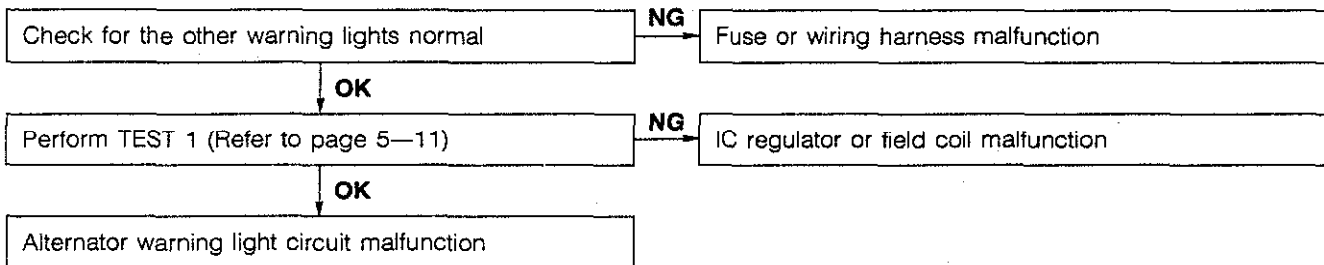
Preliminary Check

1. Check the indicator on the top of the battery. If the indicator is blue, the battery is normal.
2. If the indicator is not blue, the electrolyte level of the battery is low, or capacity is insufficient, or both. (Refer to page 5—7)
Charge the battery until the indicator becomes blue, or replace the battery with a fully charged one.
3. Turn the ignition switch ON, and check that the alternator warning light illuminates.
4. Start the engine, and check that the alternator warning light goes off.



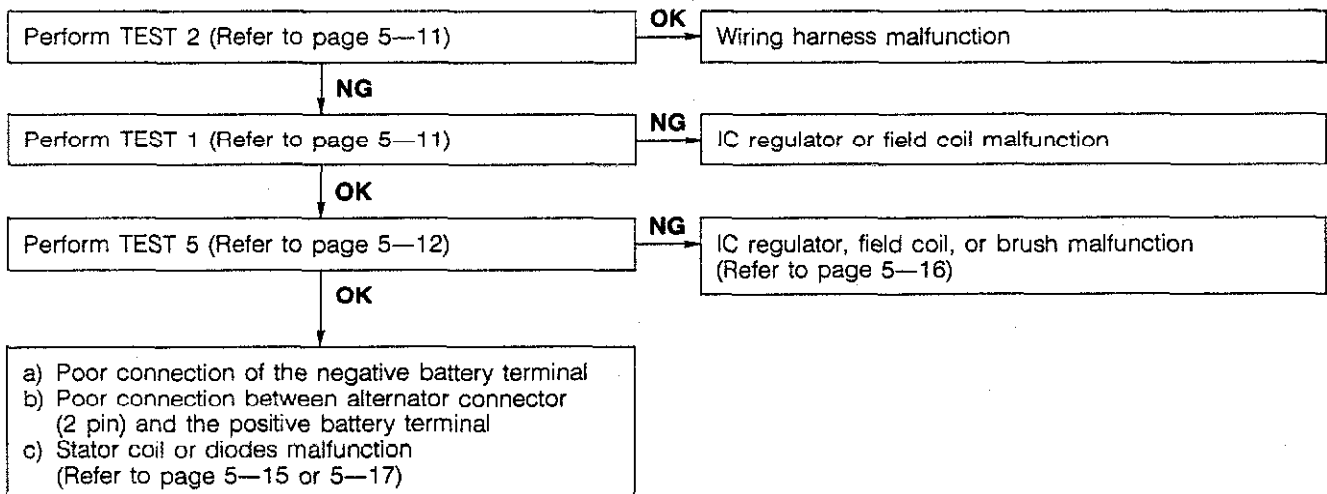
83U05X-023

1. Alternator warning light always not illuminate



73G05X-027

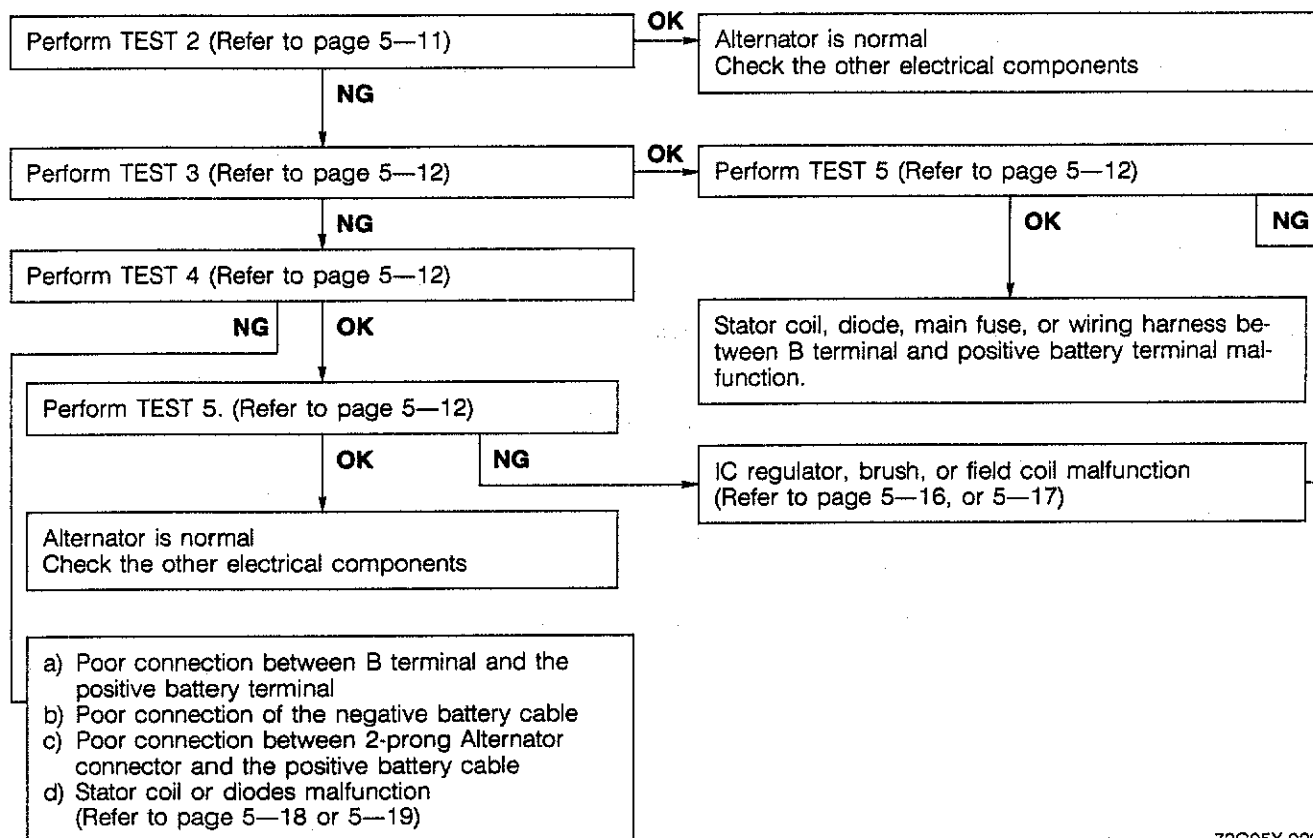
2. Alternator warning light illuminates when engine running



73G05X-028

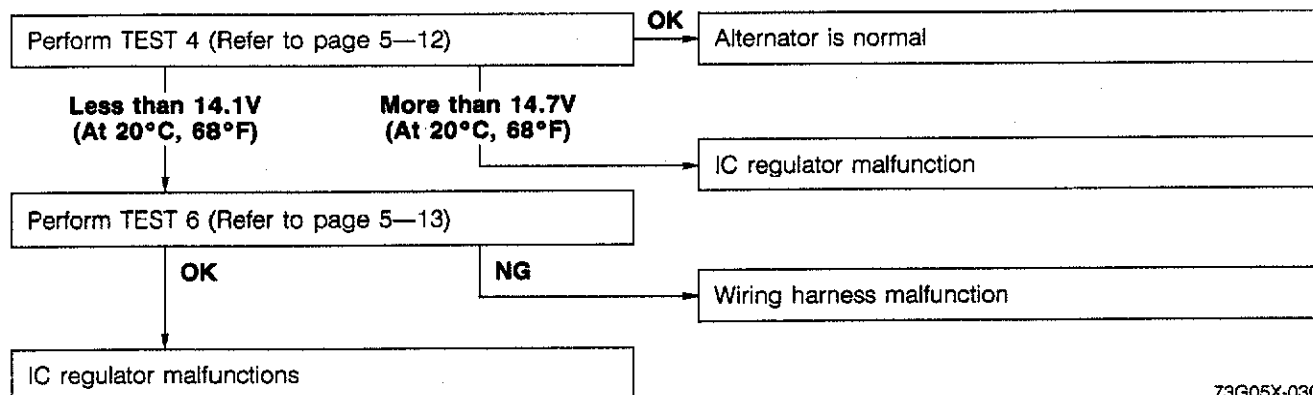
5 ALTERNATOR

3. Alternator warning light operates properly, but battery discharged



73G05X-029

4. Battery overcharged



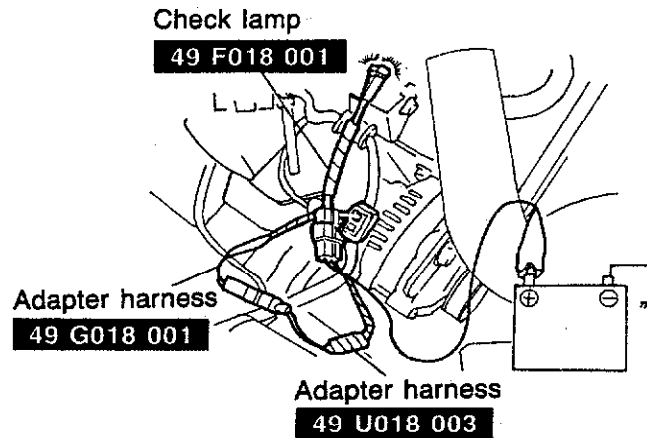
73G05X-030

Warning

Disconnect the negative battery terminal when disconnecting or reconnecting B terminal.

TEST 1

1. Disconnect the alternator connector (2-pin).
2. Connect the **SST**.



3. Connect the red clip of the adapter harness to the battery (+), and check that the red lamp and green lamp illuminate.
4. Start the engine and check that both lamps go off.

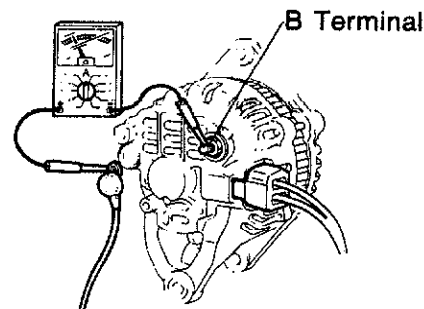
86U05X-010

TEST 2

1. Connect an ammeter (**60A min.**) between the wire and the B terminal.
2. Turn all headlights and accessories on, and depress the brake pedal.
3. Start the engine and check that output current is **60A or more** at **2,500—3,000 rpm** of the engine speed.

Caution

Do not ground the B terminal.

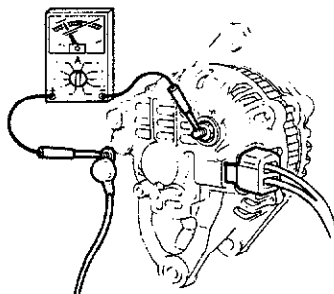


83U05X-024

5 ALTERNATOR

TEST 3

1. Turn all electric loads off and release the brake pedal.
2. Check that output current is **5A or more** at **2,500—3,000 rpm** of the engine speed.

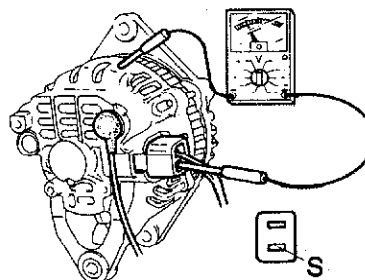


86U05X-013

TEST 4

1. Turn all electric loads off and release the brake pedal.
2. Check that output voltage between S terminal and ground is within specification at **2,500—3,000 rpm** of the engine speed.

Voltage: 14.1—14.7V

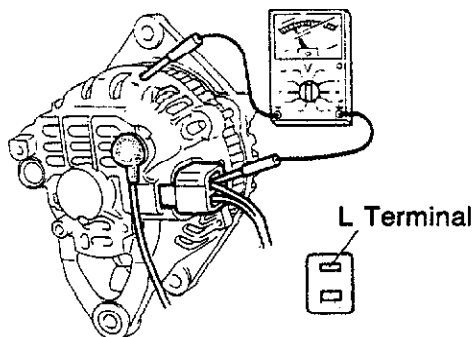


86U05X-072

TEST 5

1. Turn the ignition switch ON.
2. Check that L terminal voltage is within specification.

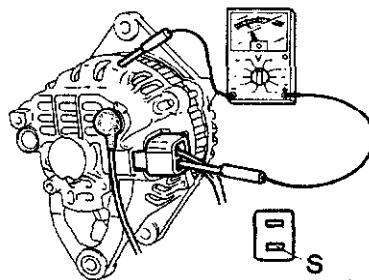
Voltage: 1—5V



86U05X-073

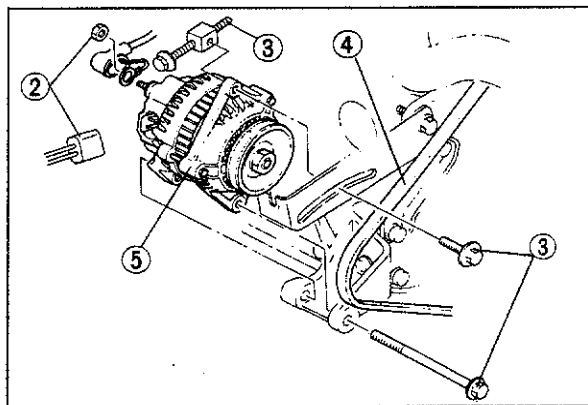
TEST 6

1. Turn the ignition switch ON.
2. Turn all electric loads off and release the brake pedal.
3. Check that voltage between S terminal and ground is battery voltage.



86U05X-074

5 ALTERNATOR



REMOVAL AND INSTALLATION

1. Disconnect the negative battery terminal.
2. Disconnect the wire and connector from the alternator.
3. Remove the bolts.
4. Remove the V-belt
5. Alternator
6. Install in the reverse order of removal.

Tightening torque:

Adjusting bolt: 19—24 N·m
(1.9—2.6 m·kg, 14—19 ft·lb)

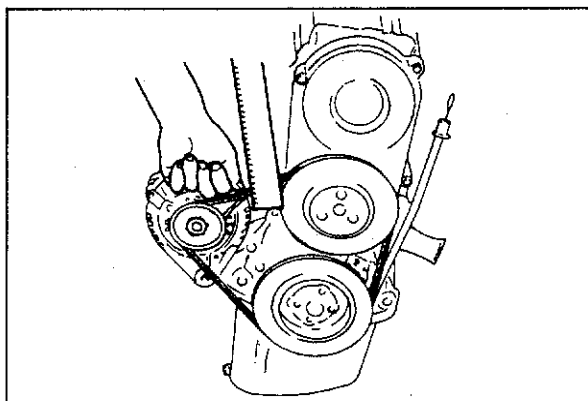
Installation bolt: 37—52 N·m
(3.8—5.3 m·kg, 27—38 ft·lb)

7. Adjust the tension of the V-belt.

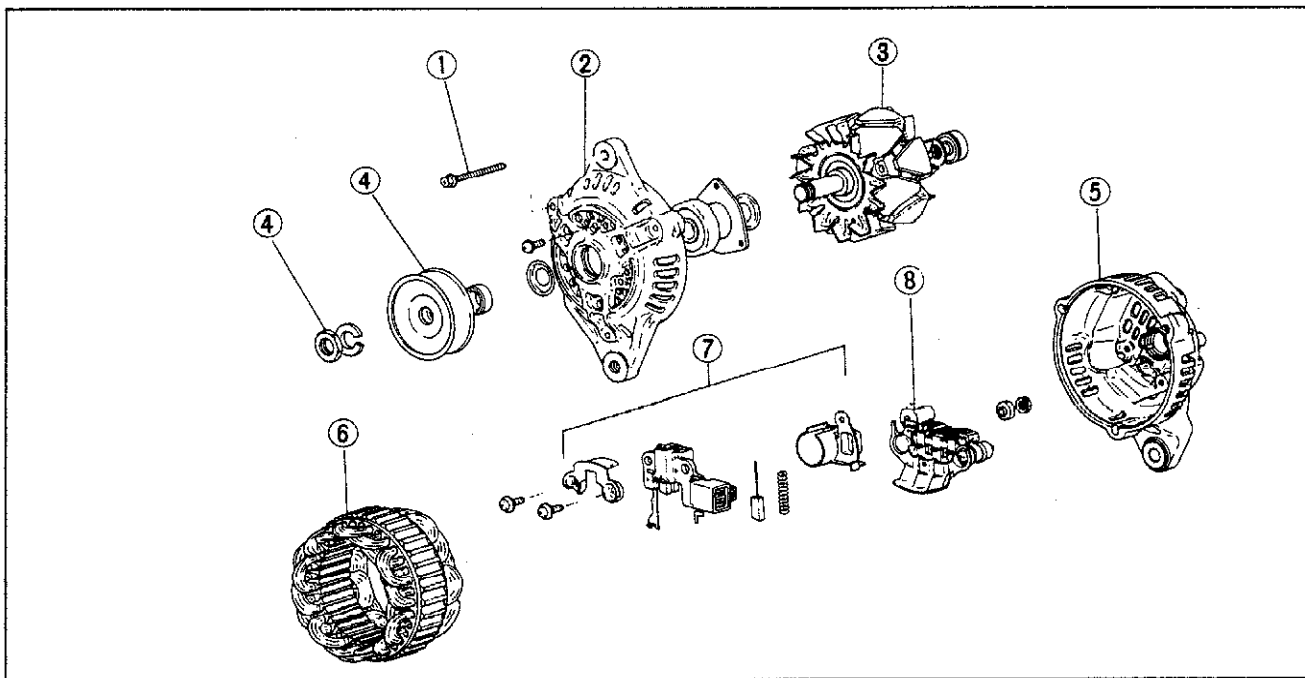
Deflection

New belt: 8—9 mm (0.31—0.35 in)

Used belt: 9—10 mm (0.35—0.39 in)



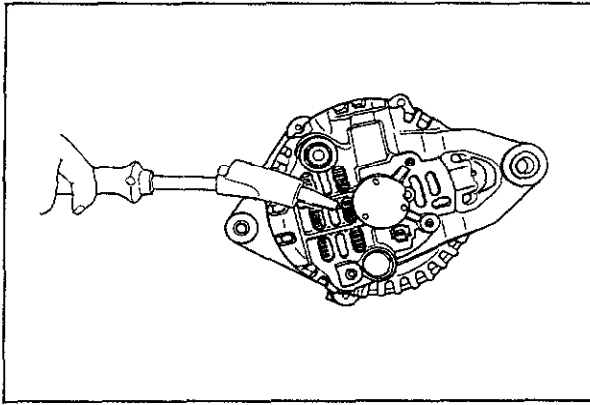
DISASSEMBLY



1. Bolt
2. Front bracket
3. Rotor and fan

4. Lock-nut and Pulley
5. Rear housing
6. Stator

7. Brush-holder assembly
8. Rectifier



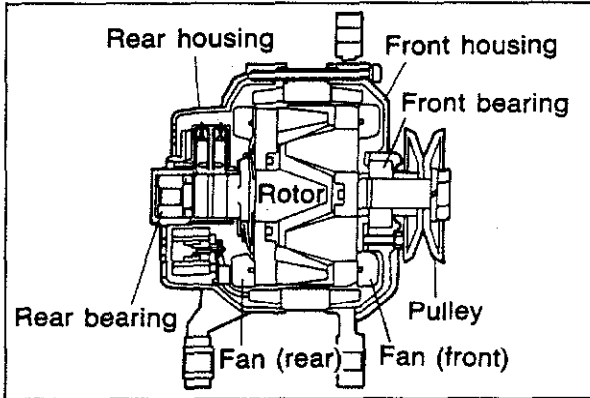
83U05X-012

1. Place a soldering iron (200W class) on the bearing box for **3 or 4 minutes** and heat it to about **50–60°C (122 & 140°F)**.

Next, pull out the three bolts, and then insert a flat-tip screwdriver between the stator and front bracket and separate them.

Note

- a) If the bearing box is not heated, the bearing cannot be pulled out, because the rear bearing and rear bracket fit together very tightly.
- b) Be careful not to force the screwdriver in too far, because the stator may become scratched.

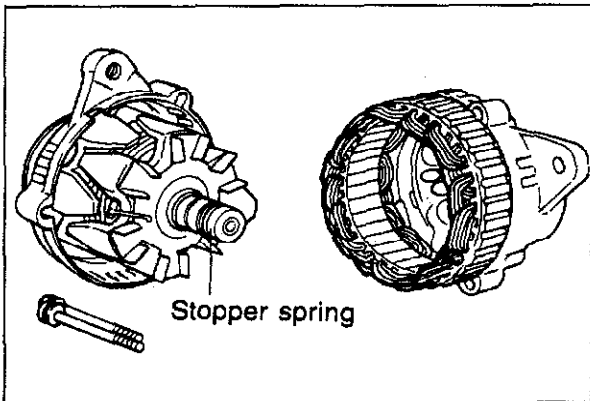


63U05X-999

2. Separate the rear and front sections.

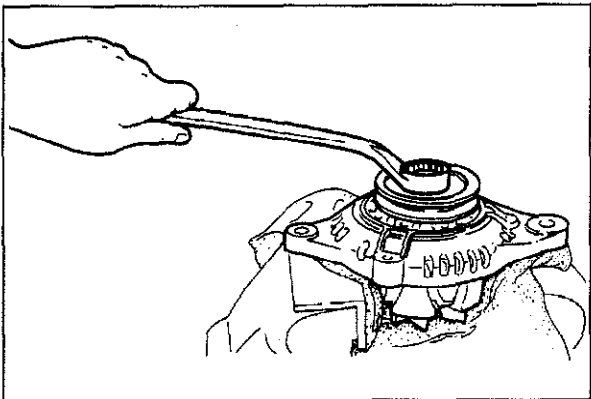
Note

Be careful not to lose the stopper spring that fits around the circumference of the rear bearing.



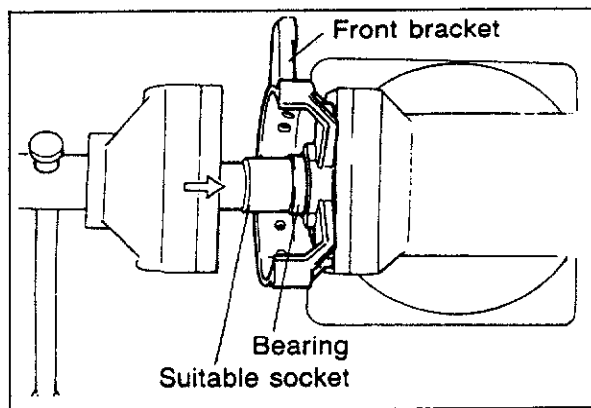
5BU05X-057

3. Place the rotor in a vise and loosen the pulley nut, then disassemble the pulley, rotor and front housing.



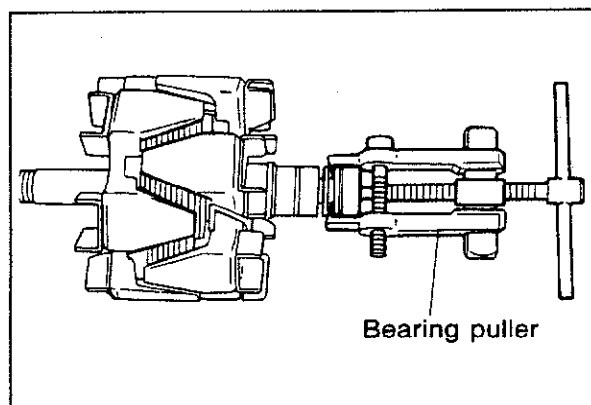
63U05X-016

5 ALTERNATOR



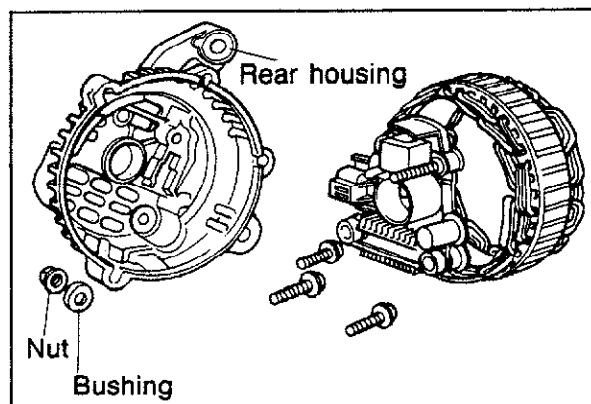
5BU05X-058

4. Replace the front bearing
Using a socket which exactly fits on the outer race of the bearing, carefully press in the bearing. Use a hand press or a vice.



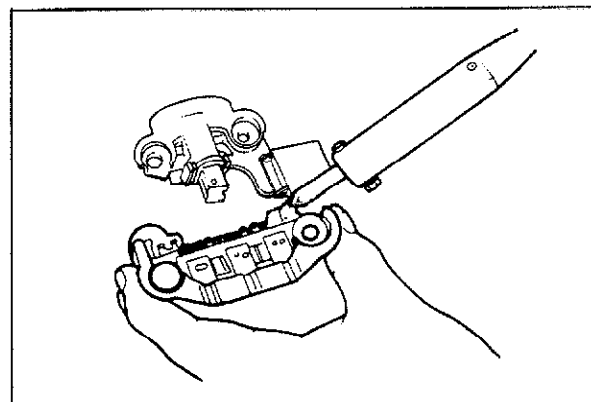
5BU05X-059

5. Replace the rear bearing
The bearing can be pulled off by using a bearing puller.
When it is pressed on, press it on so that the groove at the bearing circumference is at the slip ring side.



5BU05X-060

6. Remove the nut of the B terminal and the insulation bushing.
7. Remove the rectifier holding screws and the brush holder holding screw.
8. Separate the rear bracket and stator.

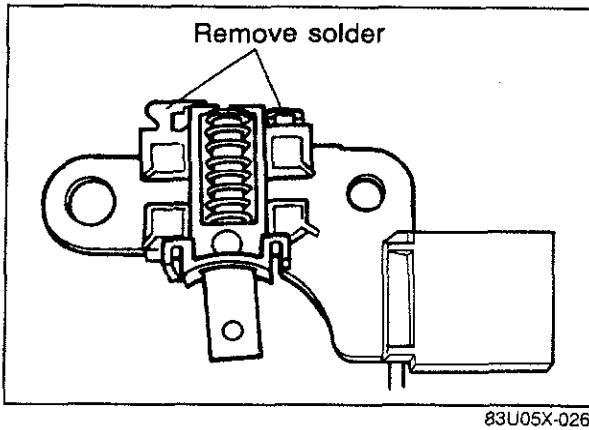


83U05X-025

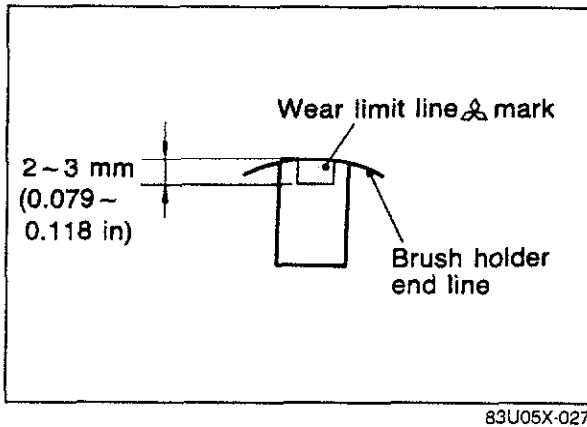
9. Use a soldering iron to remove the solder from the rectifier and the stator leads, and then remove the IC regulator.

Caution

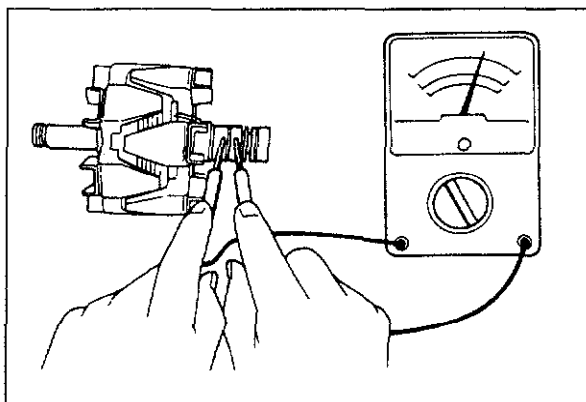
Disconnect quickly, use the soldering iron no more than about 5 seconds because the rectifier may be damaged if it is overheated.



10. Replace the brushes
Remove the solder from the pigtail, and then remove the brush.



11. When soldering the brush, solder the pigtail so that the wear limit line of the brush projects **2—3 mm (0.079—0.118 in)** out from the end of the brush holder.



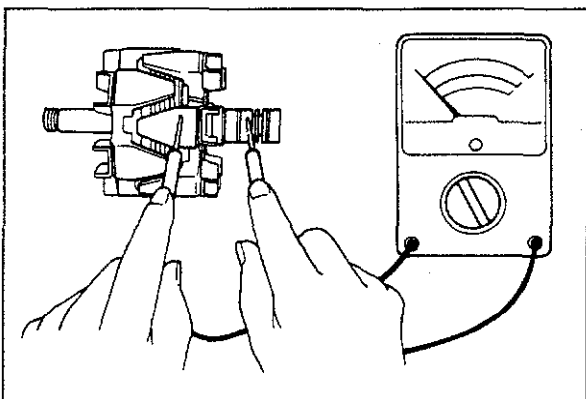
5BU05X-062

INSPECTION

Rotor

1. Wiring damage
 - (1) Measure the resistance between the slip rings by using a circuit tester.
 - (2) If it is not within standard resistance, replace the rotor.

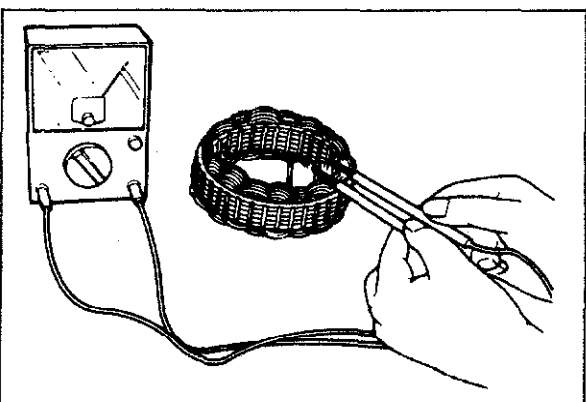
Standard resistance: 2.0—2.6 Ω



5BU05X-063

2. Ground of the rotor coil
 - (1) Check for continuity between the slip ring and the core by using a circuit tester.
 - (2) Replace the rotor if there is continuity.
3. Slip ring surface

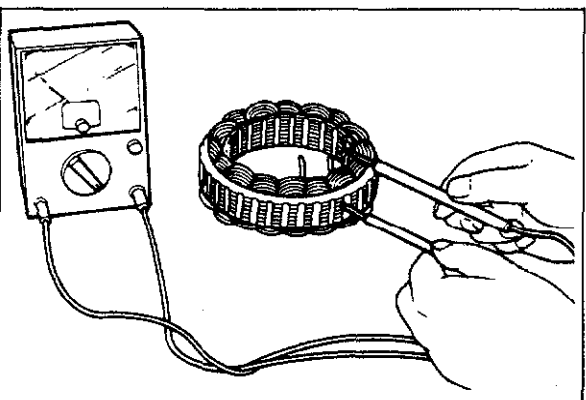
If the slip ring surface is rough, use a lathe or fine sandpaper to repair it.



5BU05X-064

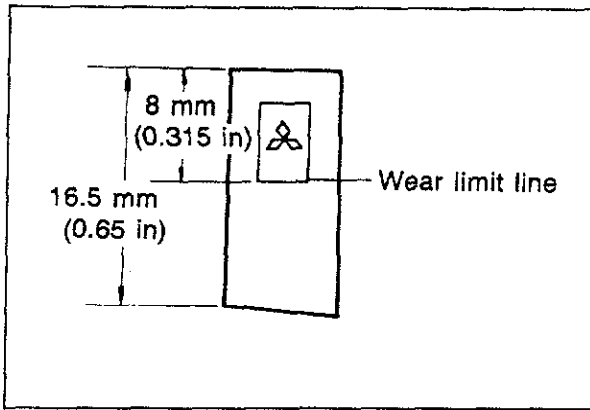
Stator

1. Wiring damage
 - (1) Check for continuity between the stator coil leads by using a circuit tester.
 - (2) Replace the stator if there is no continuity.



5BU05X-065

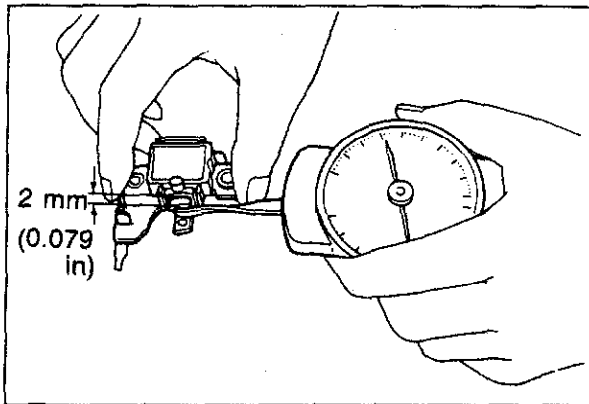
2. Ground of the stator coil
 - (1) Check for continuity between the stator coil leads and the core by using a circuit tester.
 - (2) Replace the stator if there is continuity.



5BU05X-066

Brush

If the brushes are worn almost to or beyond the limit, replace them.



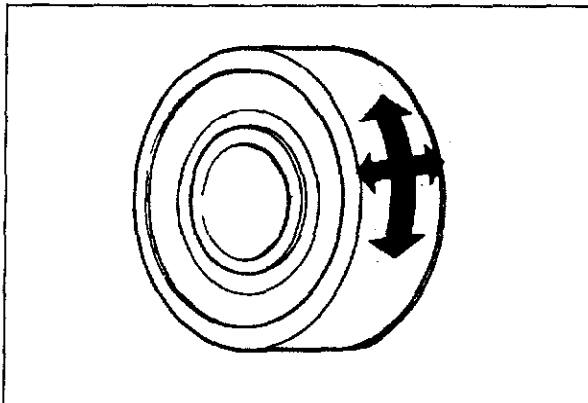
5BU05X-067

Brush spring

Measure the force of the brush spring by using a spring pressure gauge. Replace the spring if the force is **2.0 N(210g, 7.4 oz)** or less. When making the measurement, use the spring pressure gauge to push the brush into the brush holder until the tip projects **2 mm (0.079 in)**, and read the force at that time.

Note

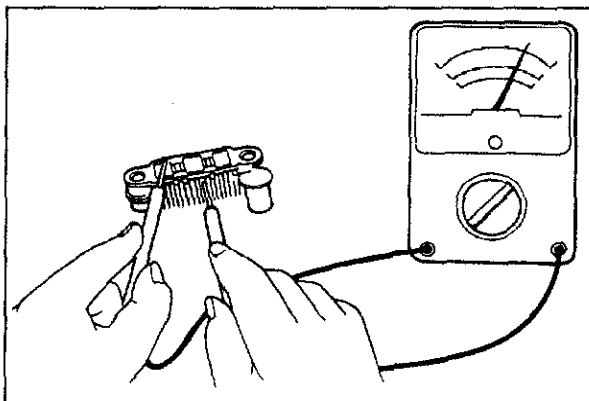
For a new brush the force is **2.9—4.3 N, (300—440g, 10.6 — 15.5 oz).**



5BU05X-068

Bearing

1. Check for abnormal noise, looseness, insufficient lubrication, etc.
2. Replace the bearing(s) if there is any abnormality.



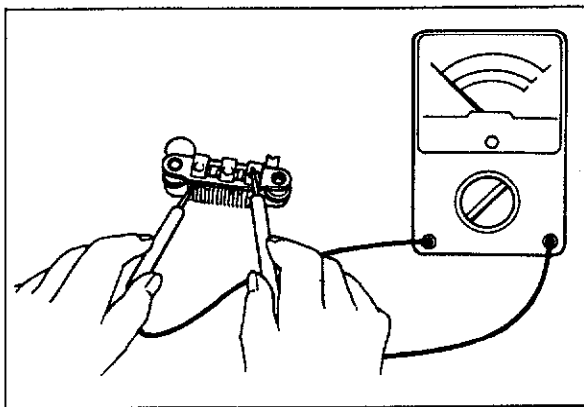
5BU05X-069

Rectifier

1. Positive diode

Check for continuity between the diode lead and the heat sink at the positive side, using an ohmmeter. There should be continuity only in the direction from the diode lead to the heat sink.

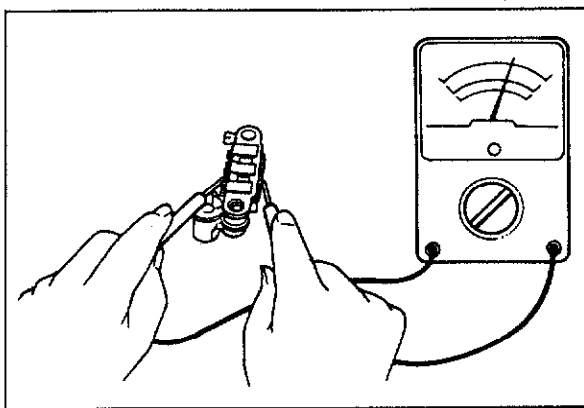
5 ALTERNATOR



5BU05X-070

2. Negative diode

Check for continuity between the diode lead and the heat sink at the negative side. There should be continuity only in the direction from the heat sink to the diode.



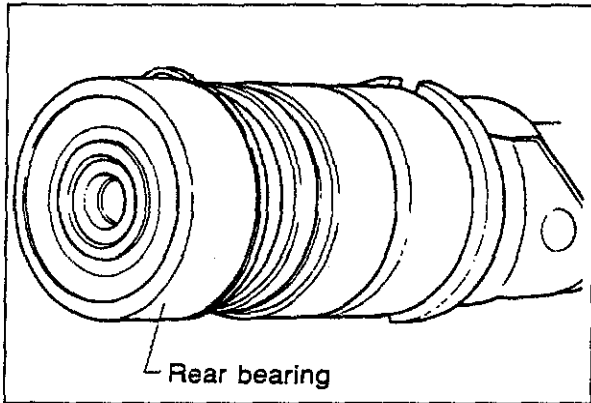
5BU05X-071

3. Trio diode

Check for continuity by using a circuit tester. There should be continuity in one direction only.

ASSEMBLY

Assemble in the reverse order of disassembly. There are no lubrication points.

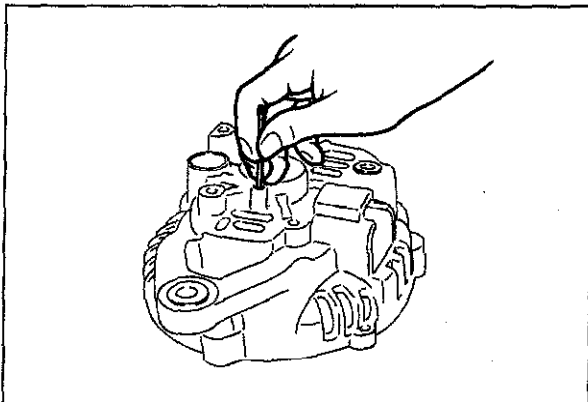


63U05X-018

1. Fit the stopper spring into the eccentric groove of the rear bearing circumference. The protruding part of the spring should fit into the deepest part of the groove. Note that, for easy recognition, the edge of the deepest part of the groove is chamfered.

Note

By fitting the stopper spring in this way, the amount of spring protruding from the groove is lessened so that assembly becomes easier. In addition, no strain is exerted on the spring and thus its stopping effect becomes greater.



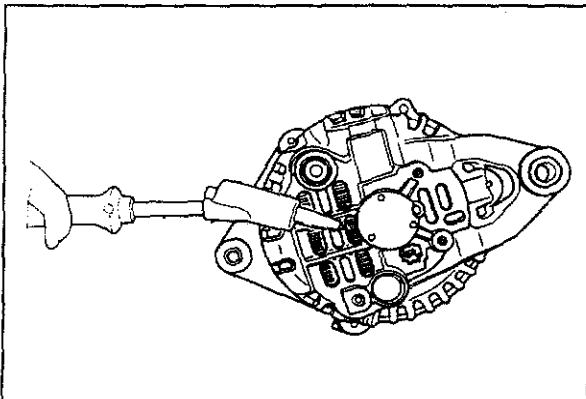
5BU05X-074

2. Brush lifting

Before assembly, use a finger to push the brush into the brush holder, pass a wire (ϕ 2 mm, 40—50 mm [ϕ 0.08 in, 1.6—2.0 in]) through the hole shown in the figure, and secure the brush in position.

Note

Be sure to pull the wire out after assembly is completed.

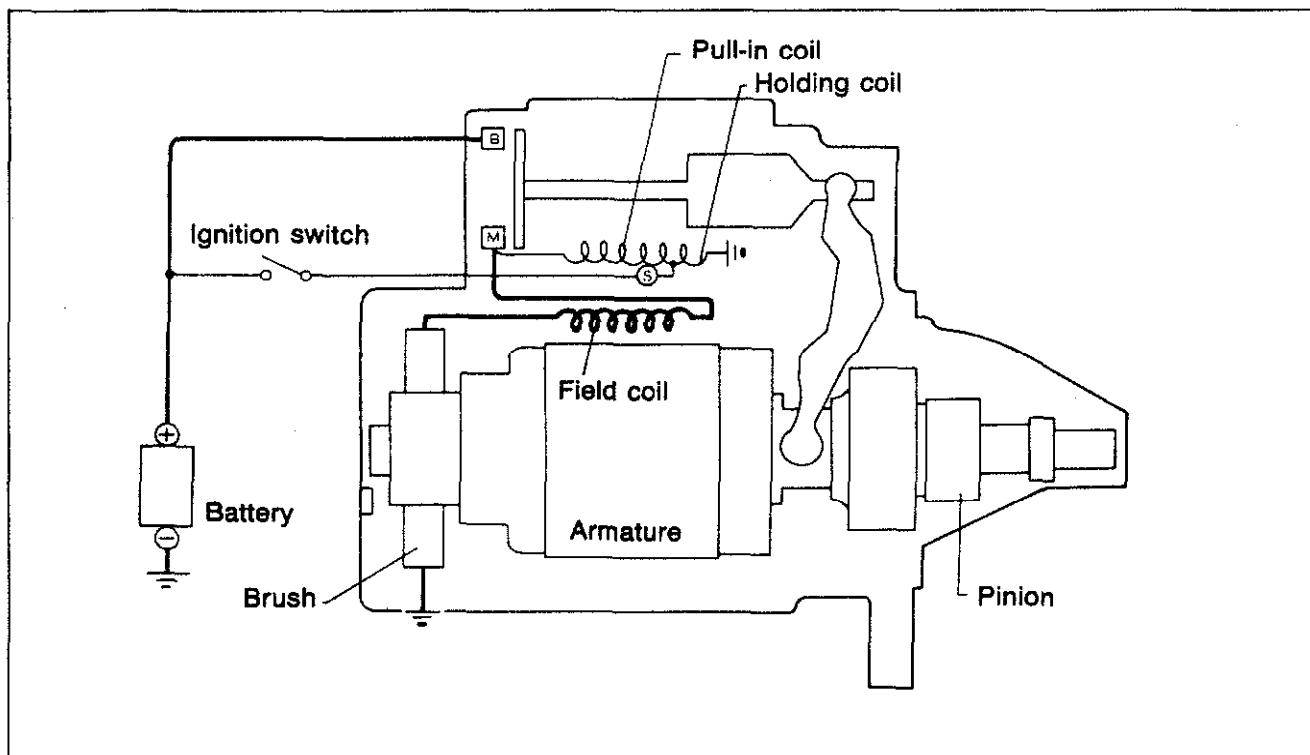


5BU05X-075

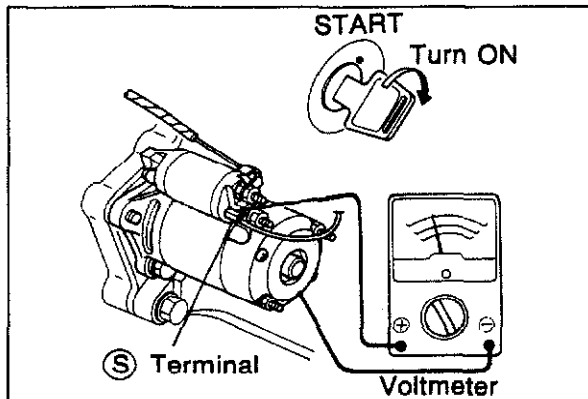
3. When the rear bearing is pressed into the rear bracket, first heat the bracket before pressing it in.
4. After assembly is completed, rotate the pulley manually and check that the rotor turns easily.

STARTER

STARTING SYSTEM CIRCUIT



63U05X-008



63U05X-019

ON-VEHICLE INSPECTION

Before this inspection, measure the specific gravity of the battery. Check that it is fully-charged or nearly fully-charged.

A. If the magnetic switch doesn't function during starting

With the ignition key switch at the start position, measure the voltage between the S terminal and ground. If it is 8V or more, there is a starter malfunction; if it is less than 8V, there is a malfunction in the wiring.

Caution

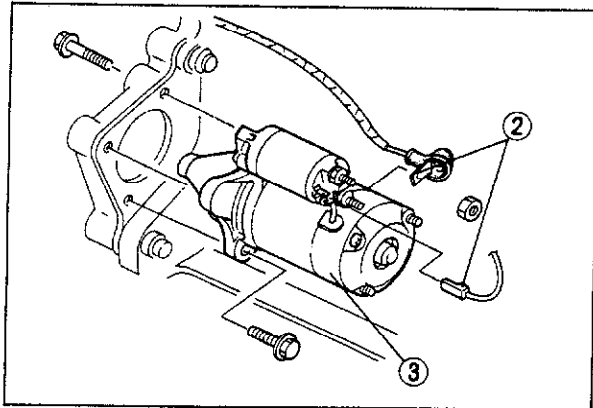
If the magnetic switch is hot, it may not function even though the voltage is 8V or more.

B. If the starter won't crank, or If the cranking speed is slow

The problem may be a malfunction of the starter or in the wiring. Repeat test A above, if voltage is 8V or more, or if headlights dim when starter is operated, remove the starter for detailed inspection.

Note

The cranking speed is greatly affected by the viscosity of the engine oil.



63U05X-020

REMOVAL AND INSTALLATION

Remove as follows:

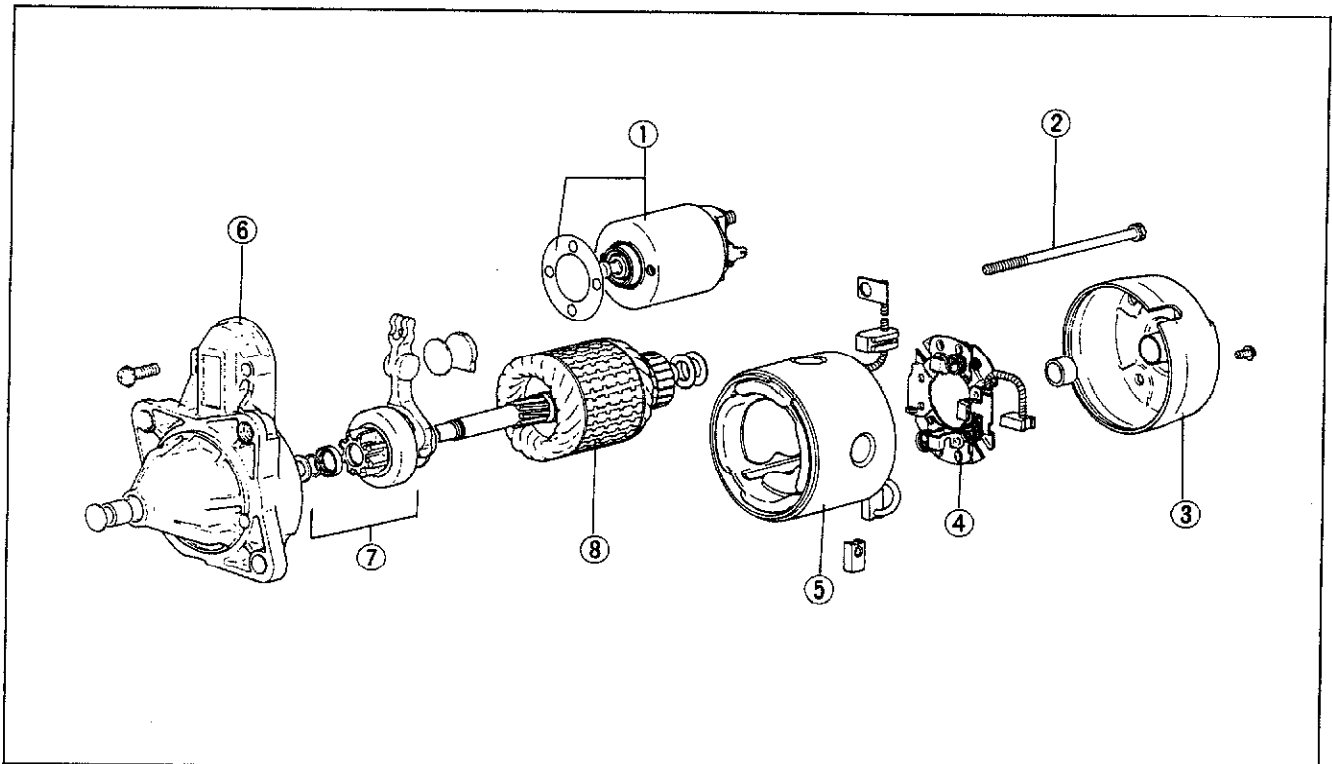
1. Disconnect the negative battery cable.
2. Disconnect the wiring from the starter.
3. Remove the starter.

Install in the reverse order of removal.

**Tightening torque: 31—41 N·m
(3.2—4.7 m·kg, 23—34 ft·lb)**

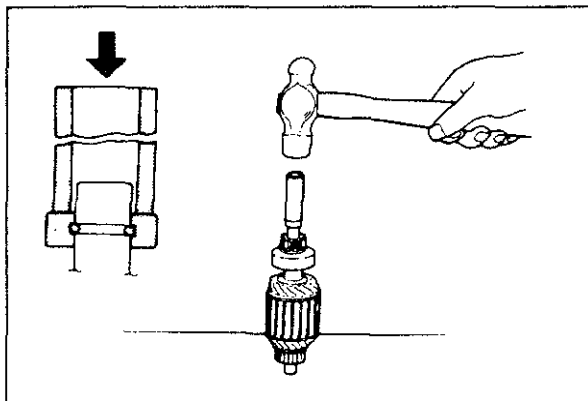
DISASSEMBLY AND ASSEMBLY

Disassemble in the numbered order shown in the figure. Assemble in the reverse order of disassembly.



63U05X-021

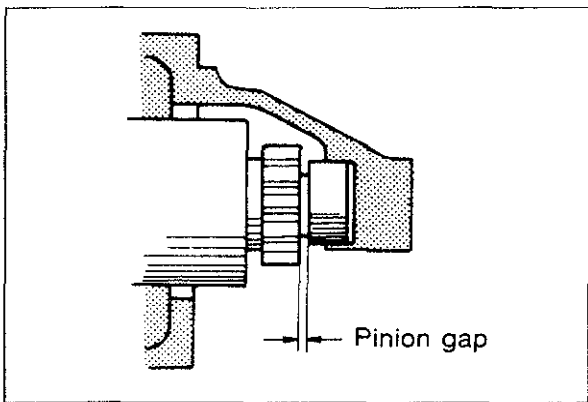
- | | | |
|--------------------|--------------------------------|-----------------|
| 1. Magnetic switch | 4. Brush-holder assembly | 7. Drive pinion |
| 2. Bolt | 5. Yoke | 8. Armature |
| 3. Rear cover | 6. Drive housing (front cover) | |



5BU05X-009

Drive pinion

Remove the stopper for the overrunning clutch by using a pipe as shown in the figure.



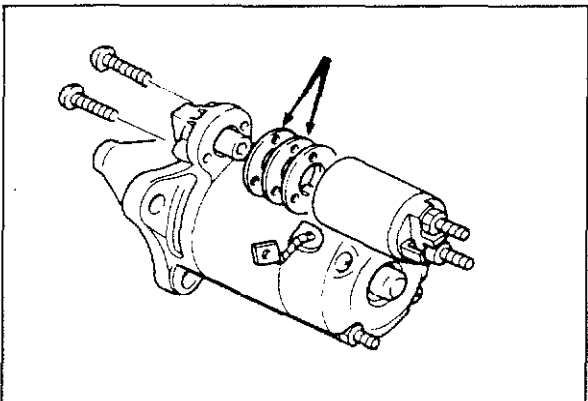
63U05X-022

Adjustment of pinion gap

1. Disconnect the wiring from terminal (M).
2. When the battery is connected between terminal (S) and the starter body, the pinion will eject outward and then stop. Then measure the clearance (pinion gap) between the pinion and the stopper. Do not operate the starter for more than 20 seconds.

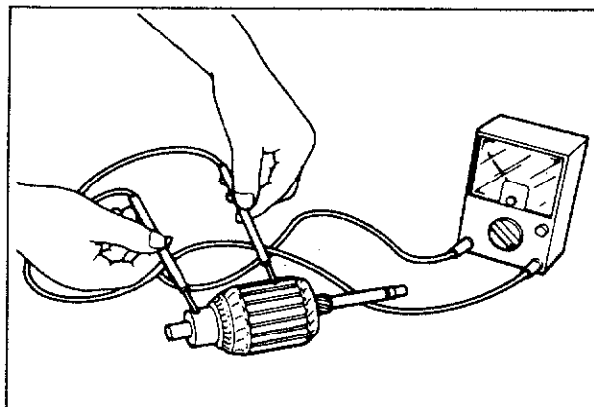
Pinion gap:

0.5—2.0 mm (0.020—0.079 in)



5BU05X-011

3. If the pinion gap is not within the specified range, make adjustment by increasing or decreasing the number of washers between the magnetic switch and the drive housing. The gap will become smaller if the number of washers is increased.



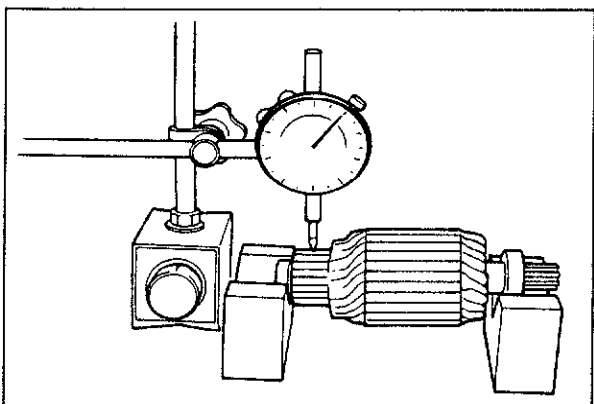
5BU05X-012

INSPECTION

Armature coil

1. Ground of the armature coil

Check for continuity between the commutator and the core by using a circuit tester. Replace the armature if there is continuity.



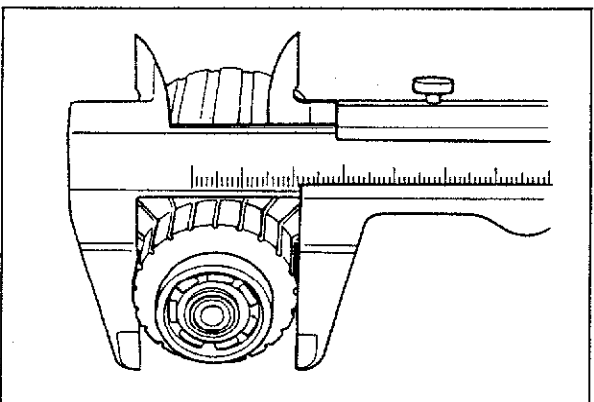
63U05X-023

2. Runout of the commutator

Place the armature on V blocks, and measure the runout by using a dial gauge. If the runout is **0.05 mm (0.002 in)** or more, repair it by using a lathe, or replace the armature.

Note

Before checking, be sure that there is no play in the bearings.



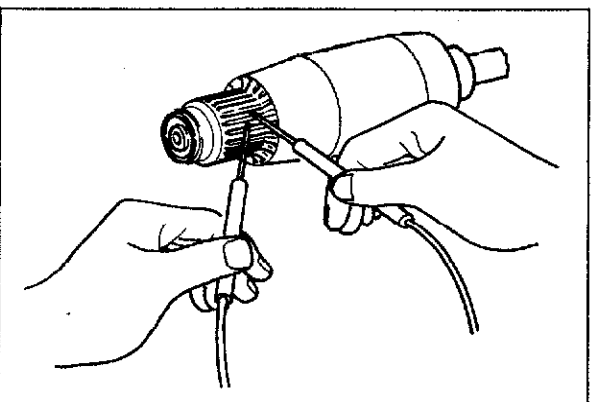
83U05X-013

3. Outer diameter of the commutator

Replace the armature if the outer diameter of the commutator is **31 mm (1.22 in)** or less.

4. Roughness of the commutator surface

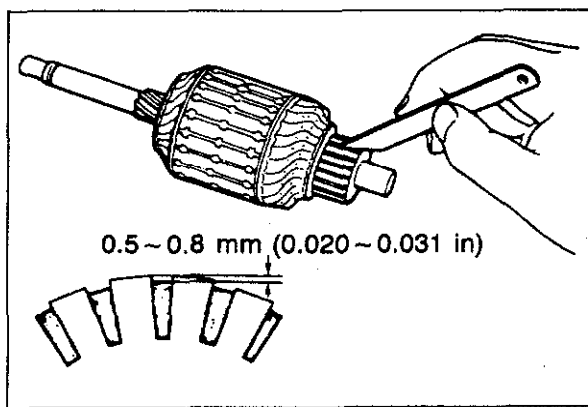
If the commutator surface is dirty, wipe it with a cloth; if it is rough, repair it by using a lathe or fine sandpaper.



83U05X-014

5. Open circuit of the segment check for continuity between each segment of the commutator.

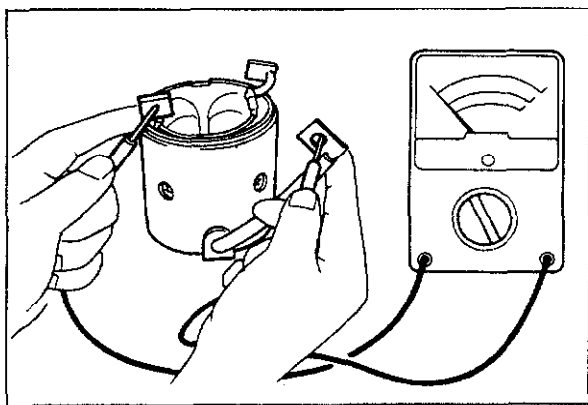
If an open circuit exists between any segment, replace the armature.



83U05X-015

6. Segments

If the depth of the mold between segments is **0.2 mm (0.008 in)** or less, undercut by **0.5 — 0.8 mm (0.020 — 0.031 in)**.



5BU05X-016

Field coil

1. Wiring damage

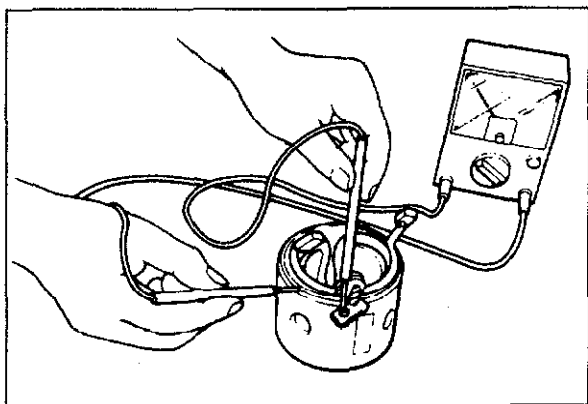
Check for continuity between the connector and brushes by using a circuit tester. Replace the yoke assembly if there is no continuity.

2. Ground of the field coil

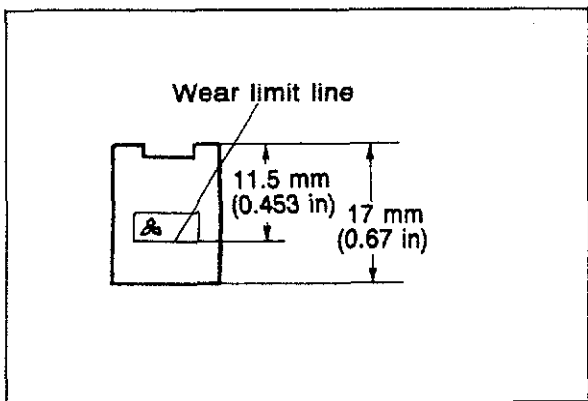
Check for continuity between the connector and yoke by using a circuit tester. Repair, or replace the yoke assembly if there is continuity.

3. Installation of the field coil

Replace the yoke assembly if the field coil is loose.



5BU05X-017

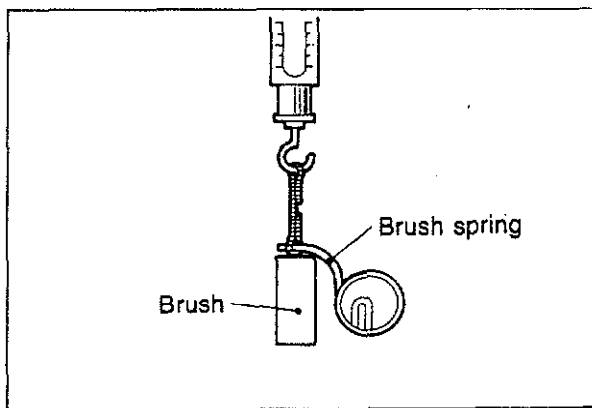


5BU05X-018

Brush and brush holder

1. Brush

If the brushes are worn beyond the wear limit, or if the wear is near the limit, replace the brushes.

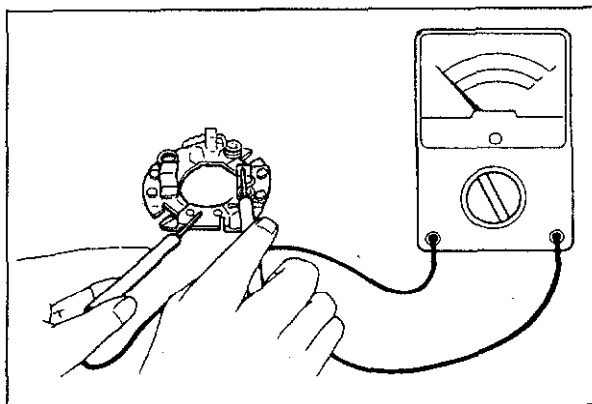


5BU05X-019

2. Brush spring
Measure the force of the brush spring by using a spring balance. Replace the brush spring if the force is **9 N (900g, 31.75 oz)** or less.

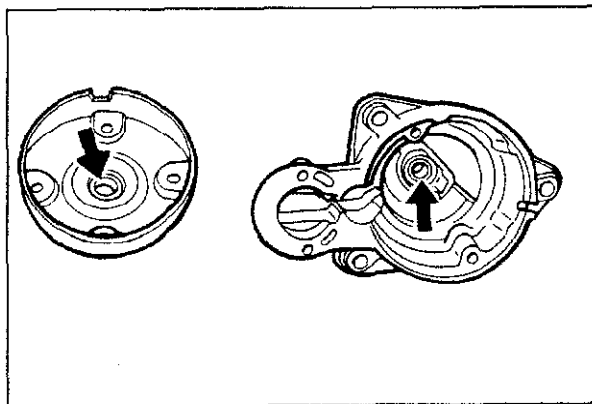
Note

- a) The force is to be measured at the moment the brush spring separates from the brush.
- b) The force must be **14—25 N (1.4—2.6 kg, 3.1 lb—5.7 lb)** for a new brush.



5BU05X-020

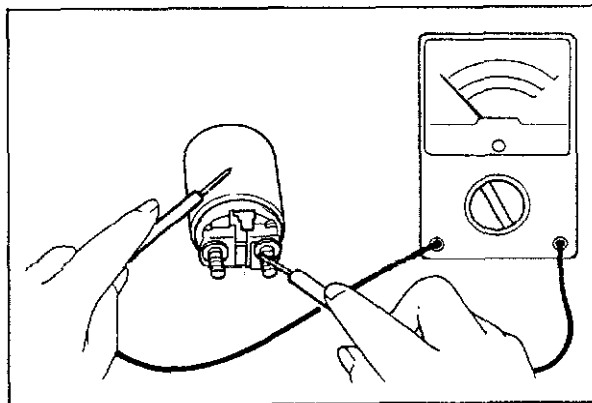
3. Brush holder
Check for continuity between the insulated brush and the plate by using a circuit tester. Repair or replace if there is continuity.
Also check that the brush slides smoothly inside the brush holder.



5BU05X-021

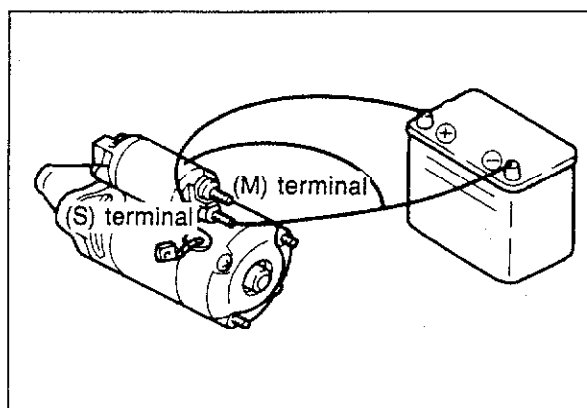
Drive pinion and housing

1. Pinion gear
Check for wear or damage of the pinion gear. Replace if necessary.
If the pinion gear is seriously damaged, also check the flywheel ring gear.
2. Bushing
Check for wear or damage.
Replace if necessary

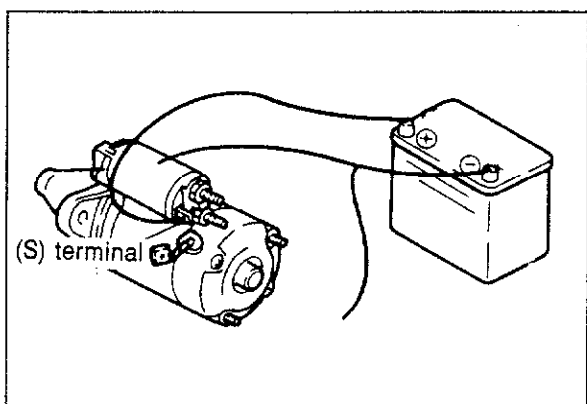


5BU05X-022

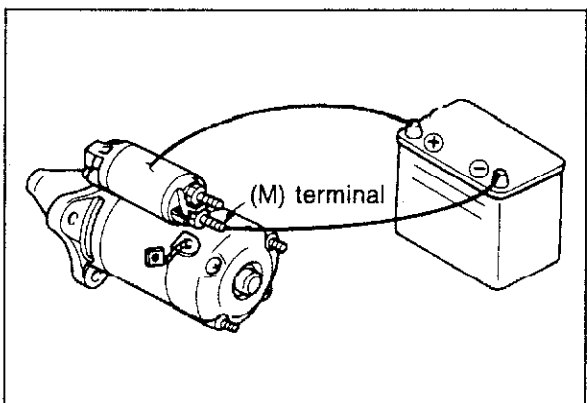
3. Switch coil
Check for continuity between the M terminal and the body by using a circuit tester. Replace the switch if there is no continuity.



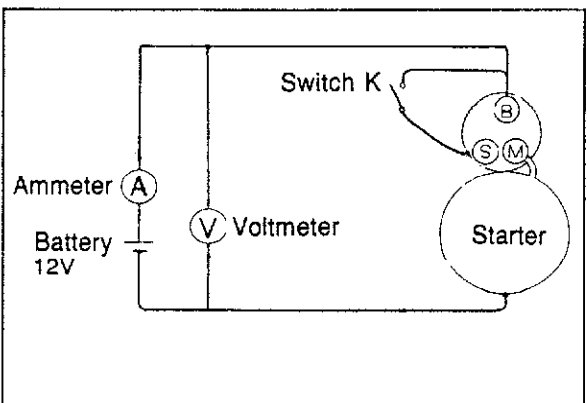
5BU05X-023



5BU05X-024



5BU05X-025



63U05X-024

CHECKING OPERATION

Magnetic switch

Disconnect the terminal M wire, and make the following tests.

Pull-in test

The switch is normal if the pinion ejects outward when the battery is connected as shown in the figure at the left.

Note

Be careful not to apply power continuously for more than 10 seconds.

Hold-in test

After completing the pull-in test, disconnect the wire from terminal M (with the pinion left ejected). The hold-in coil is functioning properly if the pinion does not return.

Return test

1. Connect the battery between terminal M of the magnetic switch and the body, as shown in the figure.
2. Pull the pinion out manually to the pinion stopper position.
3. The pinion should immediately return to its original position when it is released.

No-load test

1. After adjusting the pinion gap, form a test circuit with a voltmeter and an ammeter.

Note

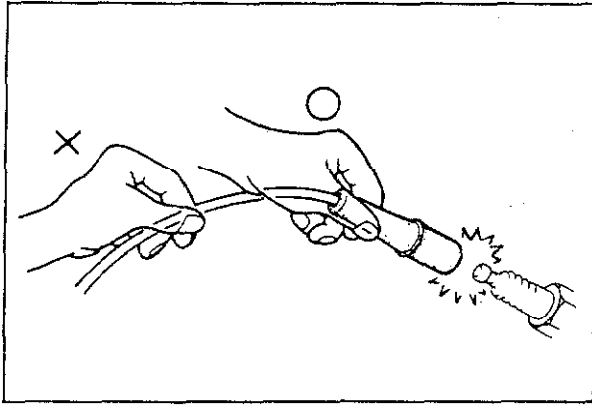
Use heavy cables or wiring to starter and tighten each terminal fully.

2. Close switch "K" to run the starter at about 6500 rpm (gear shaft rpm). If the voltmeter and ammeter show the following values while the starter is running, it is normal.

Battery voltage: 11.5 volts

Current: 60 amperes or less

3. If any abnormality is noted, follow "INSPECTION" procedures to check starter.



58U05X-027

SPARK PLUGS

REMOVAL AND INSTALLATION

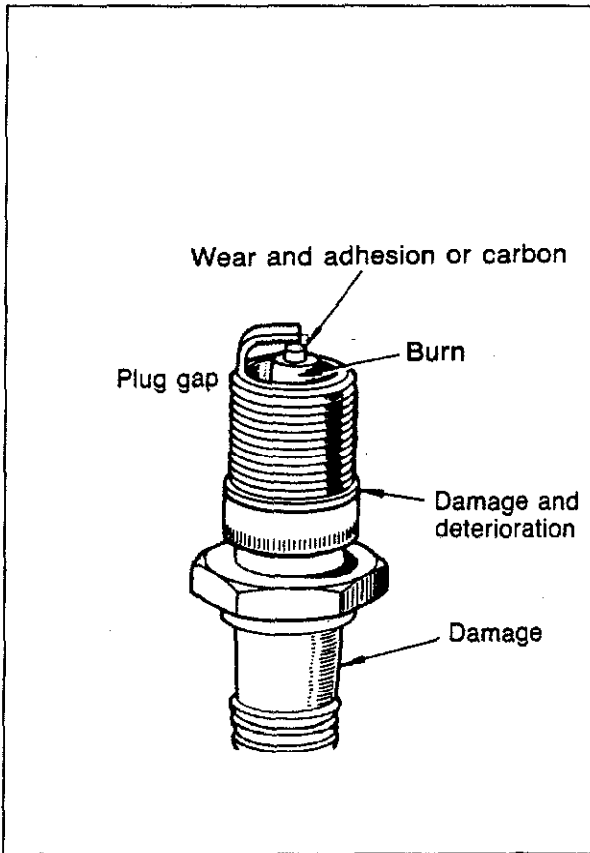
Note the following points:

1. When the spark plug lead is to be pulled off, be sure to pull the boot itself, and not the wire.
2. Tighten the spark plugs to the specified torque.

Spark plug tightening torque:

14—23 N·m

(1.5—2.3 m·kg, 10.8—16.6 ft·lb)



83U05X-028

INSPECTION

Check the following points. If a problem is found, replace the spark plug.

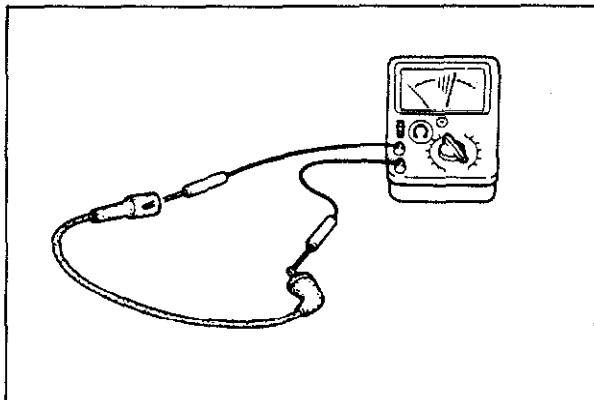
1. Damaged insulation
2. Worn electrodes
3. Carbon deposits

If cleaning is necessary, use a plug cleaner or a wire brush. Clean the upper insulator also.

4. Damaged gasket
5. Burnt spark insulator

If it is black with carbon deposits, either misfiring due to improper proportions of gas and air, or overheating of the plug may have occurred.

Plug gap: 1.0—1.1 mm (0.039—0.043 in)



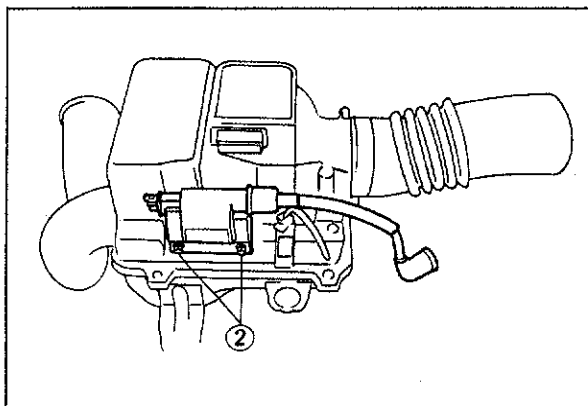
63U05X-026

HIGH-TENSION LEADS

INSPECTION

Use an ohmmeter to measure the resistance.

Resistance: 16 kΩ per 1m (3.28 ft)

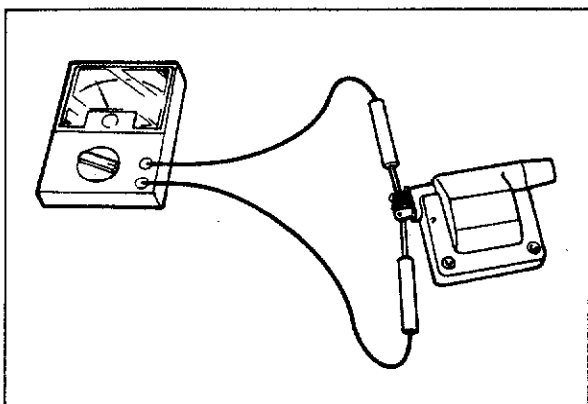


63U05X-013

IGNITION COIL

REMOVAL AND INSTALLATION

1. Disconnect the distributor lead and wires.
2. Remove the two installation bolts.
3. Install in the reverse order of removal.

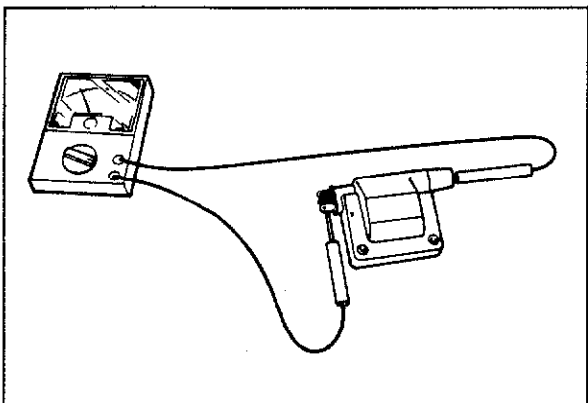


63U05X-027

INSPECTION

Primary coil

Use a ohmmeter and check for continuity in the primary coil. If there is no continuity, replace the coil.

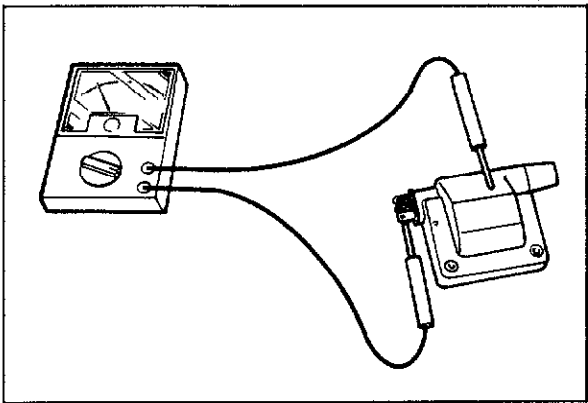


5BU05X-032

Secondary coil

Use a tester to measure the resistance of the secondary coil.

Secondary coil resistance: 6—30 k Ω



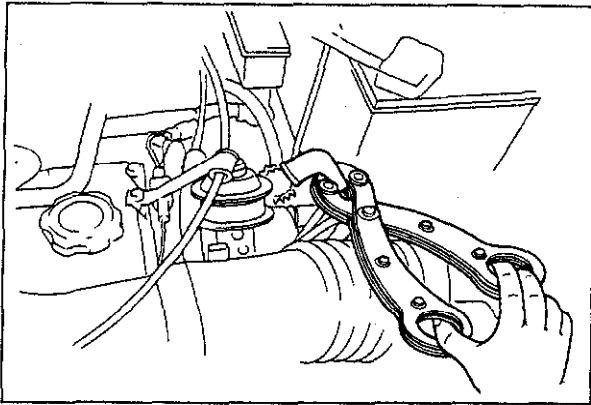
63U05X-028

Insulation of case

Use a 500V megger tester to measure the insulation resistance between the primary terminal and the case. The standard reading is **10 M Ω or more**.

Note

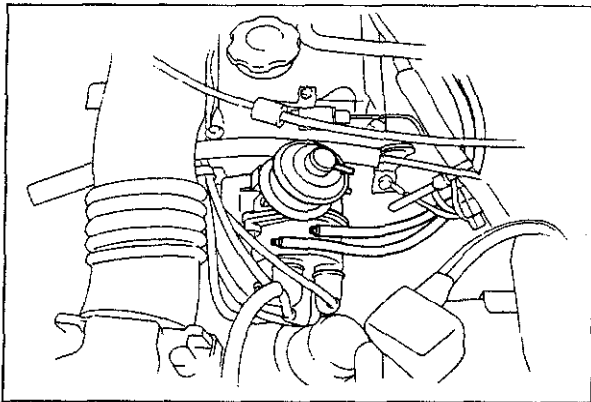
The conventional type of ignition coil (for carburetor) is inspected the same as above.



83U05X-016

DISTRIBUTOR (NON-TURBO)**SPARK TEST**

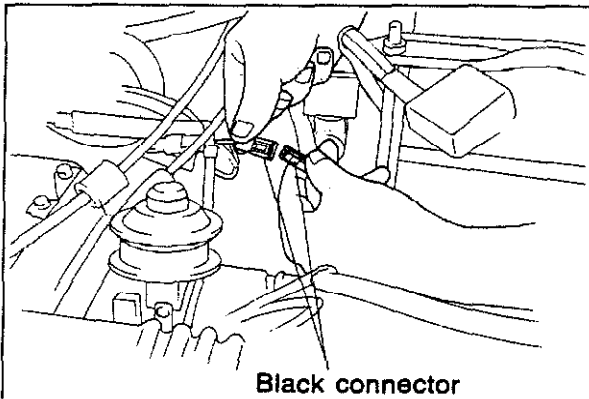
1. Disconnect the distributor lead from distributor.
2. Hold it with insulated pliers and **5—10 mm (0.20—0.39 in)** from a ground.
3. Crank the engine and make sure a strong blue spark is visible.
4. If there is no spark, the ignition coil or pick-up coil may be bad.
Check once again after replacing the ignition coil or pick-up coil.



83U05X-017

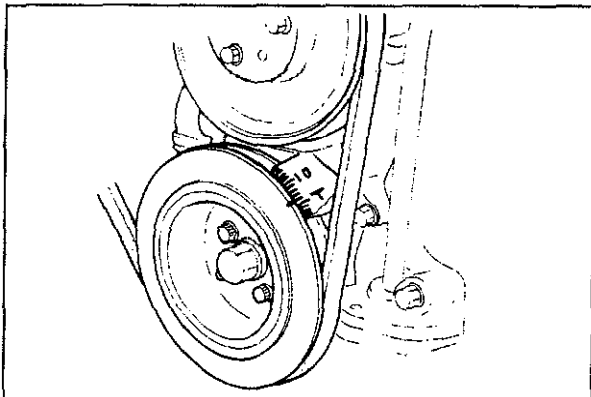
IGNITION TIMING (NON-TURBO)

1. Warm up the engine to the normal operating temperature.
2. Turn all electric loads OFF.
3. Disconnect the vacuum hoses from the vacuum control and plug them.
4. Connect a tachometer and check the idle speed.
Set to specified speed if necessary.

Idle speed:**850 ± 50 rpm**

63U05X-034

5. Disconnect the black connector at the distributor.
6. Connect a timing light.

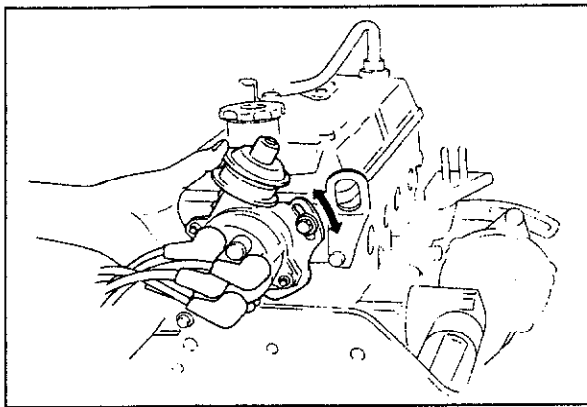


63U05X-035

7. With the timing light, check the ignition timing.

Initial ignition timing: 2 ± 1° BTDC

5 DISTRIBUTOR (NON-TURBO)

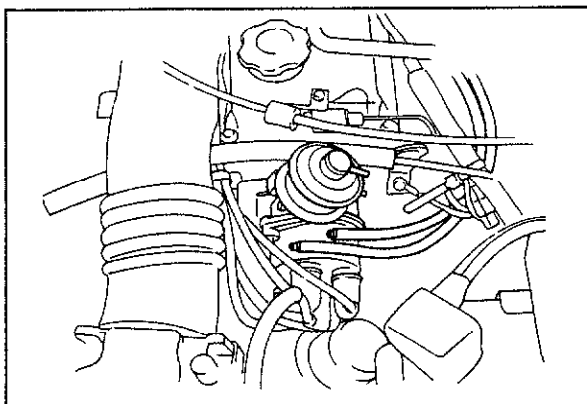


63U05X-036

8. If the ignition timing is not within specification, loosen the distributor body installation bolts and adjust the ignition timing by turning the body.
9. Reconnect the vacuum hoses to the vacuum control and check the ignition timing.

Ignition timing: approx. 7° BTDC

10. Reconnect the black connector.

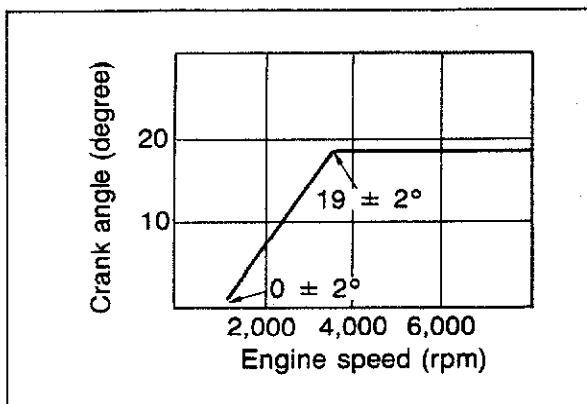


83U05X-018

SPARK ADVANCE CONTROL

Centrifugal

1. Warm up the engine to operating temperature.
2. Check that the idle speed and ignition timing are correct.
3. Disconnect the vacuum hoses from the vacuum control, and plug the ends of the hoses.

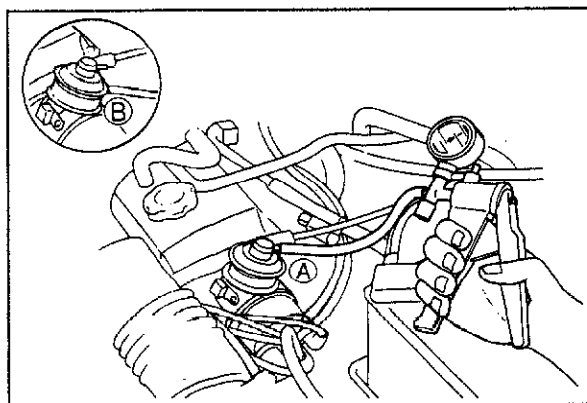


5BU05X-039

4. While gradually increasing the engine speed, use a timing light to check the advance angle on the pulley.

Excess advance..... weak governor spring
(if the governor spring is broken, the advance will rise very high)

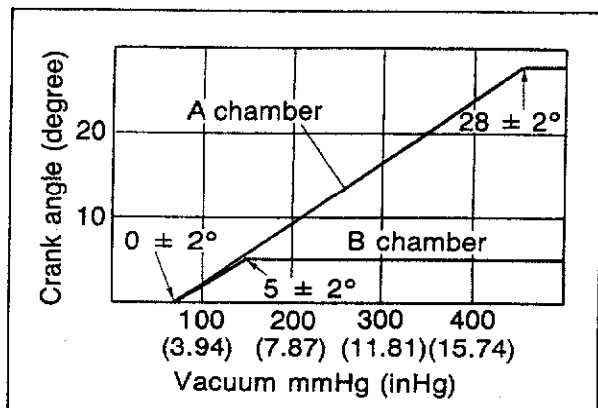
Insufficient advance .. governor weight or cam malfunction



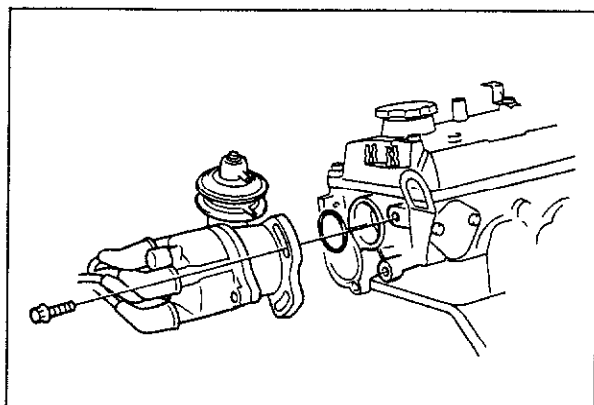
4BG05X-041

Vacuum

1. Warm up the engine to operating temperature.
2. Check that the idle speed and ignition timing are correct.
3. Disconnect the vacuum hoses from the vacuum control, and plug the ends of the hoses.
4. Run the engine at idle.
5. Attach a vacuum pump to the control (A, B) and check by using the timing light while applying vacuum.



63U05X-999



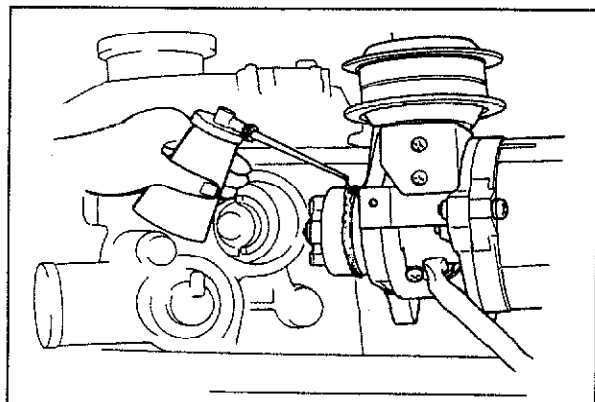
63U05X-042

REMOVAL

1. Remove the high-tension leads.
2. Disconnect the vacuum hose and wiring.
3. Turn the crankshaft so that No. 1 cylinder is at top dead center of compression.
4. Remove the distributor.

Note

Do not turn the crankshaft after the distributor has been removed.



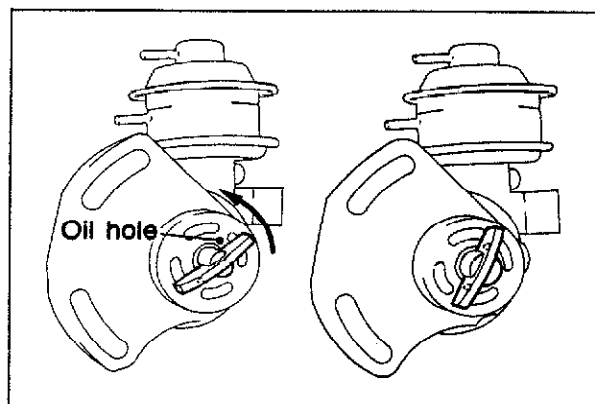
63U05X-043

INSTALLATION

Install in the reverse order of removal.

Note the following points:

1. Coat the O-ring with engine oil.
2. Check that the No. 1 cylinder is at top dead center.



63U05X-044

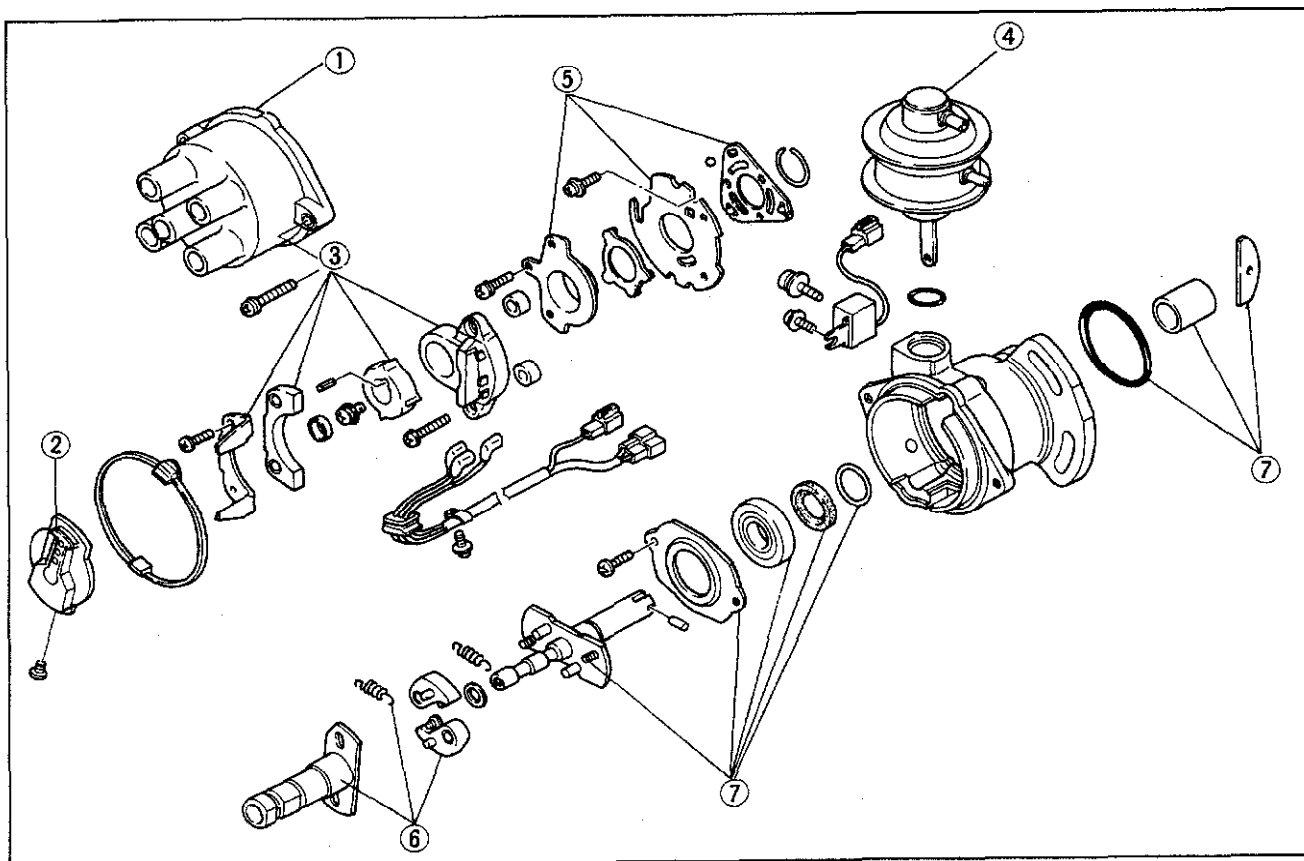
3. Align the distributor blade with the small oil holes, then install the distributor.
4. Adjust the ignition timing after installation.

5 DISTRIBUTOR (NON-TURBO)

DISASSEMBLY AND ASSEMBLY

1. Disassemble in the numbered order shown in the figure.
2. Assemble in the reverse order of disassembly.

63U05X-045

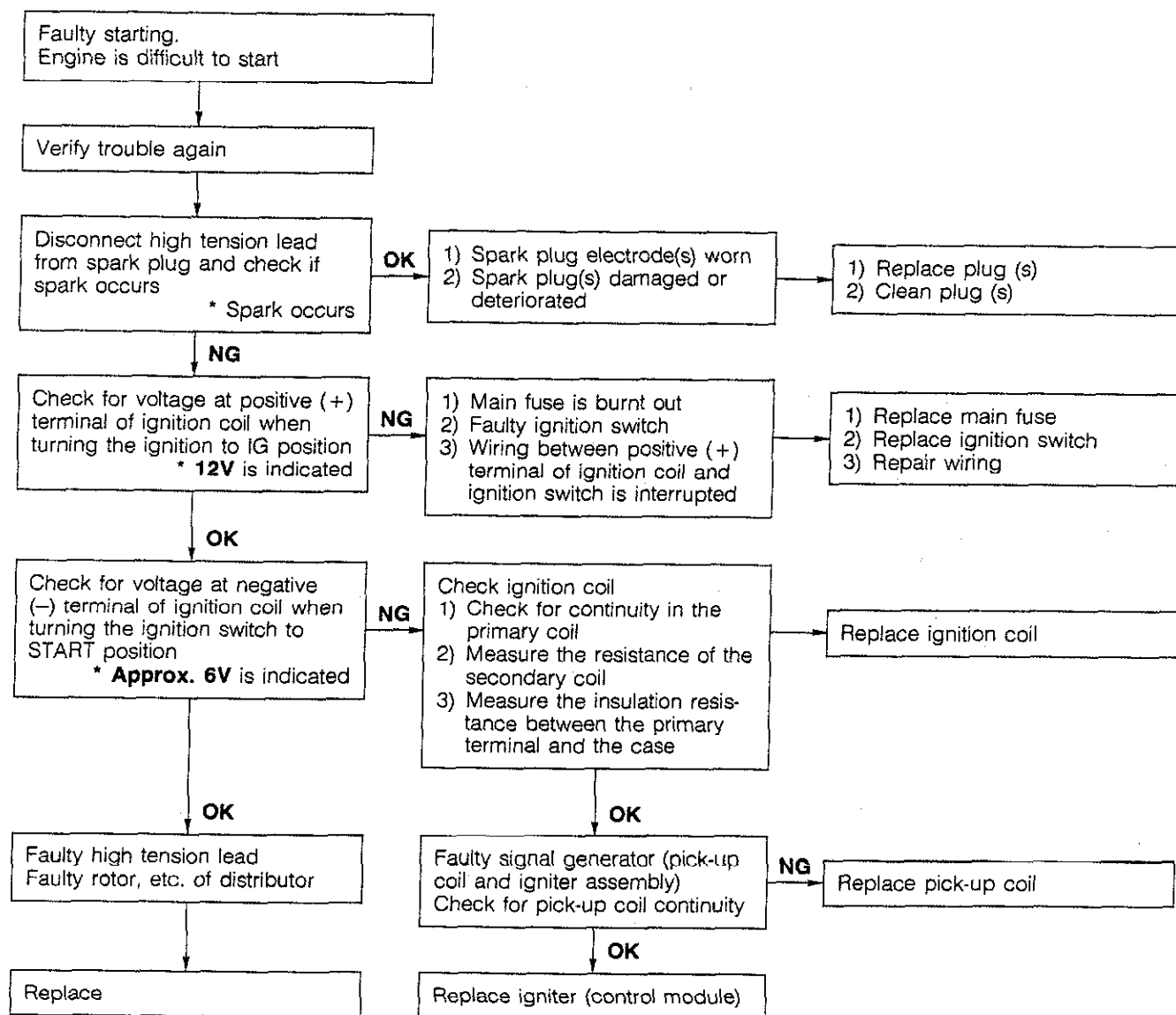


63U05X-046

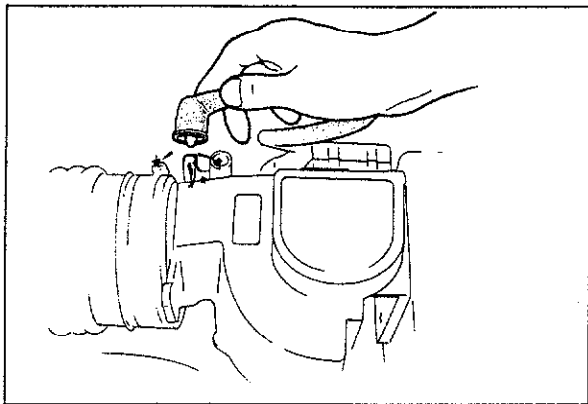
1. Cap
2. Rotor
3. Pick-up set
4. Vacuum control unit

5. Breaker plate assembly
6. Governor set
7. Shaft assembly

H.E.I. TROUBLESHOOTING



83U05X-029

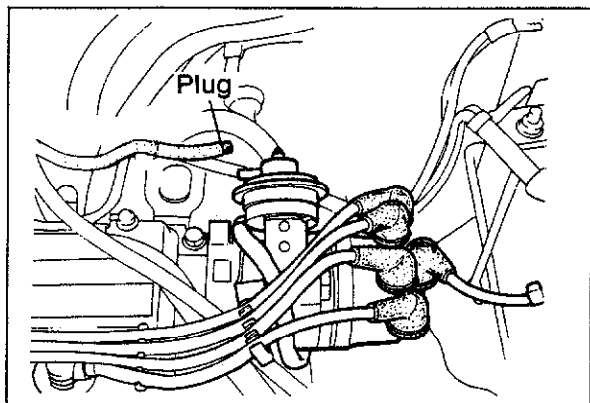


83U05X-019

DISTRIBUTOR (TURBO)

SPARK TEST

1. Disconnect the distributor lead from the distributor.
2. Hold the lead approx. **5—10 mm (0.20—0.39 in)** from a ground.
3. Crank the engine and check for a strong blue spark.
4. If there is no spark, check the ignition coil and pick-up coil.



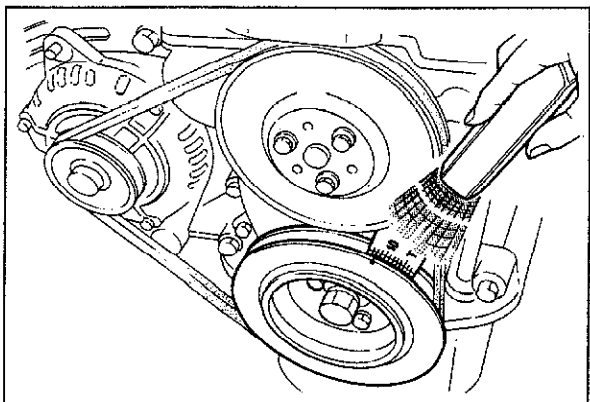
83U05X-020

IGNITION TIMING

1. Warm up the engine to operating temperature.
2. Turn all electric loads OFF.
3. Disconnect the vacuum hose from the vacuum control unit and plug the hose.
4. Connect a tachometer to the engine and check the idle speed.

Idle speed: 850 ± 50 rpm

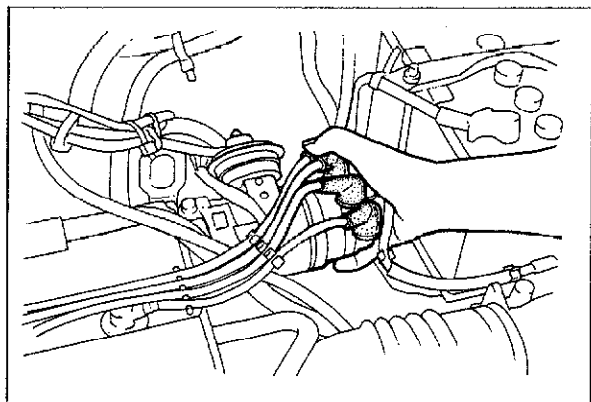
5. Connect a timing light to the engine.



83U05X-030

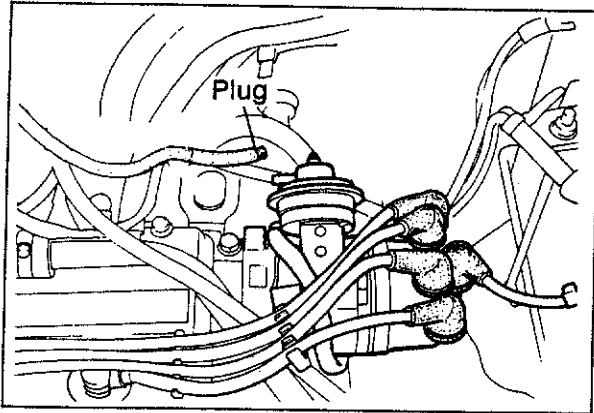
6. Check the ignition timing.

Initial ignition timing: 12 ± 1° BTDC



63G05X-349

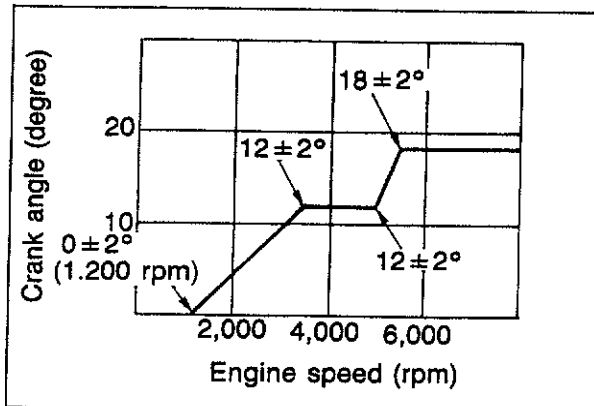
7. If the ignition timing is not within specification, loosen the distributor body installation bolts and adjust.



63G05X-350

SPARK ADVANCE CONTROL**Centrifugal**

1. Warm up the engine to operating temperature.
2. Check that the idle speed and ignition timing are correct.
3. Disconnect the vacuum hose from the vacuum control unit, and plug the hose.

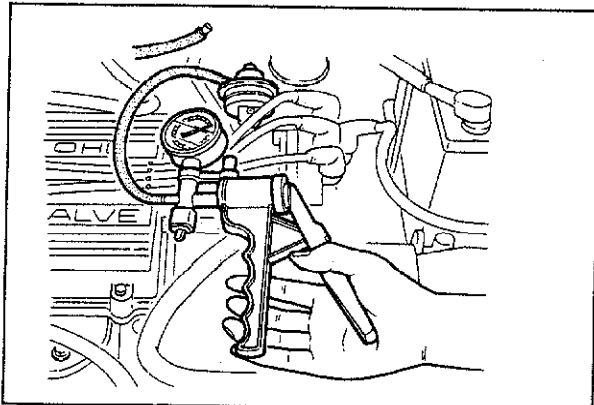


5BU05X-039

4. While gradually increasing the engine speed, use a timing light to check the timing advance.

Excess advance..... weak governor spring
(if the governor spring is broken, the advance will rise very high)

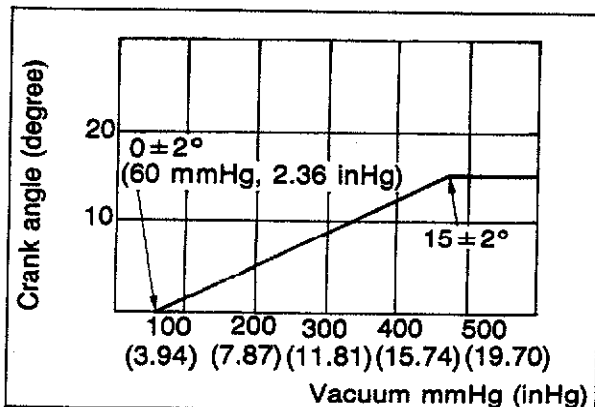
Insufficient advance .. governor weight or cam malfunction



63G05X-351

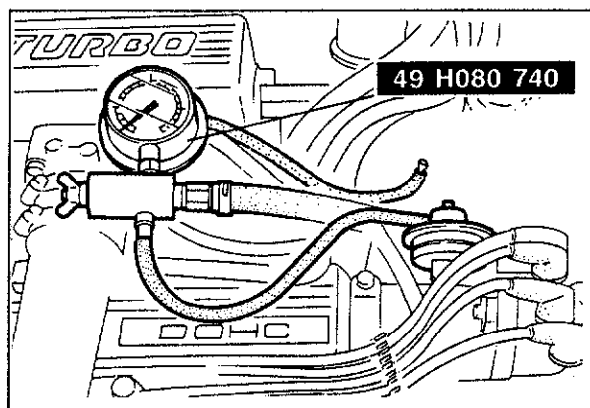
Vacuum

1. Warm up the engine to operating temperature.
2. Check that the idle speed and ignition timing are correct.
3. Disconnect the vacuum hose from the vacuum control unit, and plug the hose.
4. Connect a vacuum pump to the vacuum control unit and check by using the timing light while applying vacuum.



63G05X-352

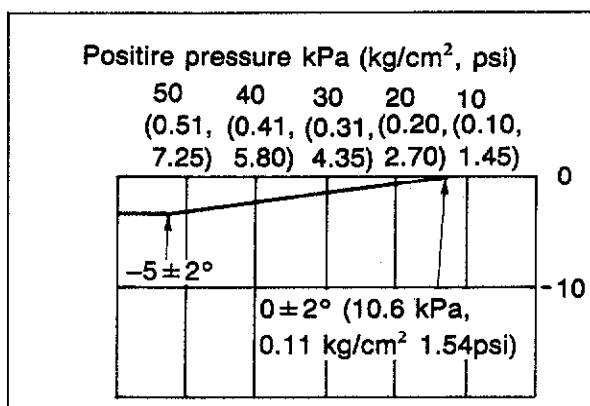
5 DISTRIBUTOR (TURBO)



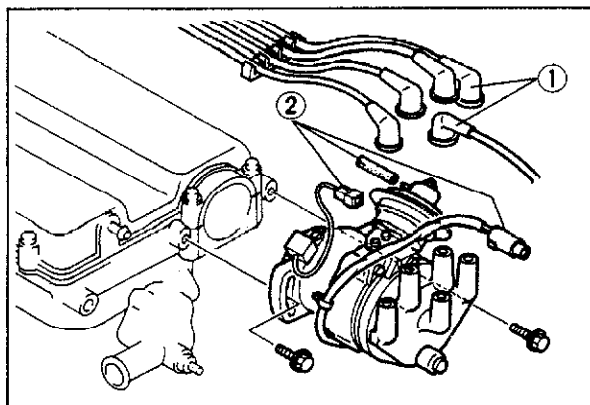
63G05X-353

Positive Pressure (Boost)

1. Warm up the engine to operating temperature.
2. Check that the idle speed and ignition timing are correct.
3. Disconnect the vacuum hose from the vacuum control, and plug the hose.
4. Connect the **SST** to the vacuum control.
5. Apply compressed air gradually by turning the adjusting screw and check that the ignition timing retards.



63G05X-352



63U05X-042

REMOVAL

1. Remove the high-tension leads.
2. Disconnect the vacuum hoses and wiring connectors.
3. Turn the crankshaft so that No. 1 cylinder is at top dead center of compression.
4. Remove the distributor.

Note

Do not turn the crankshaft after the distributor has been removed.

INSTALLATION

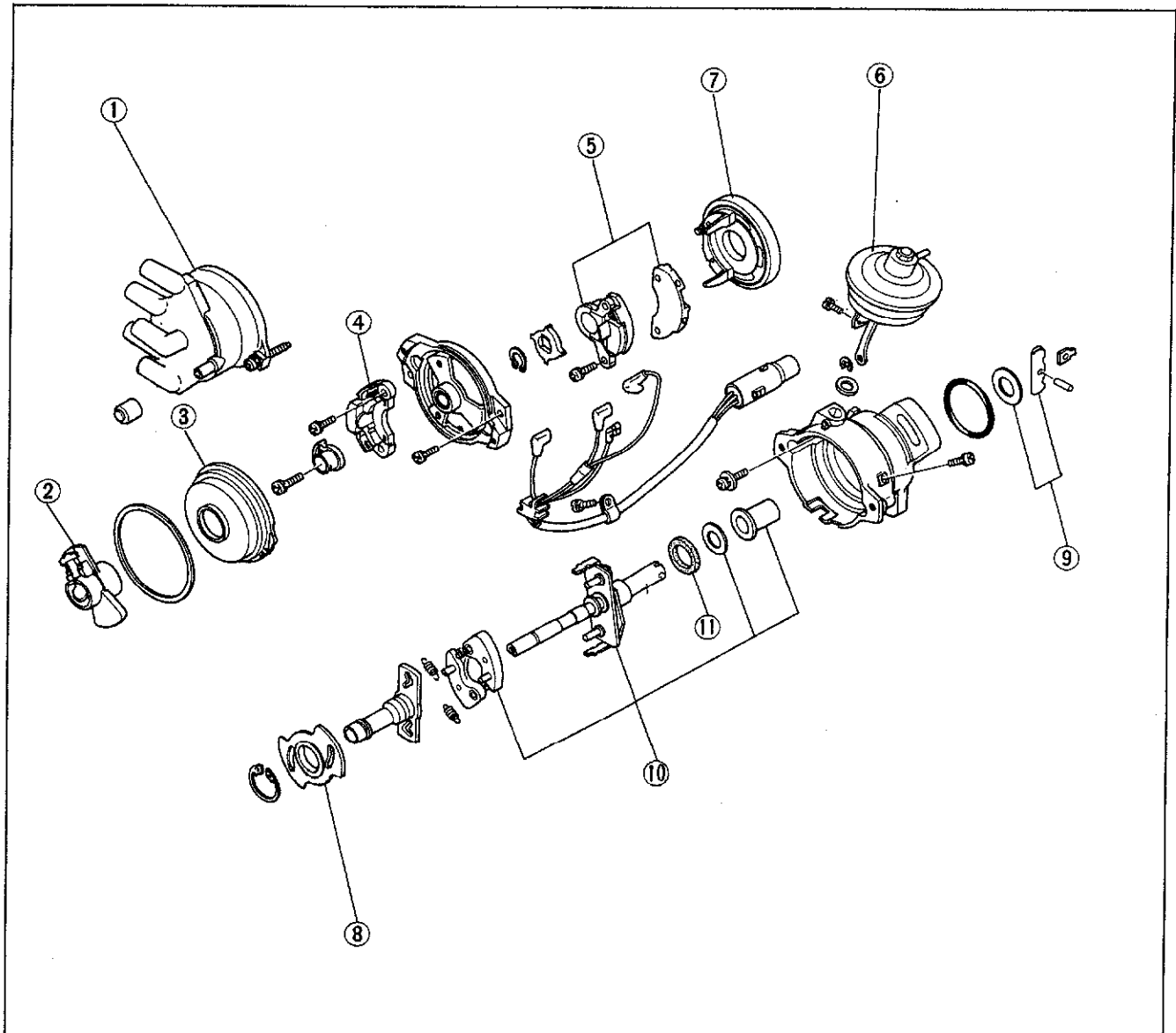
1. Coat the O-ring with engine oil.
2. Check that No. 1 cylinder is at top dead center.
3. Align the distributor blade with the grooved matching mark on the body, then install the distributor. Adjust the ignition timing after installation and tighten the retaining bolts.

63G05X-354

DISASSEMBLY AND ASSEMBLY

1. Disassemble in the numbered order shown in the figure.
2. Assemble in the reverse order of disassembly.

63U05X-045

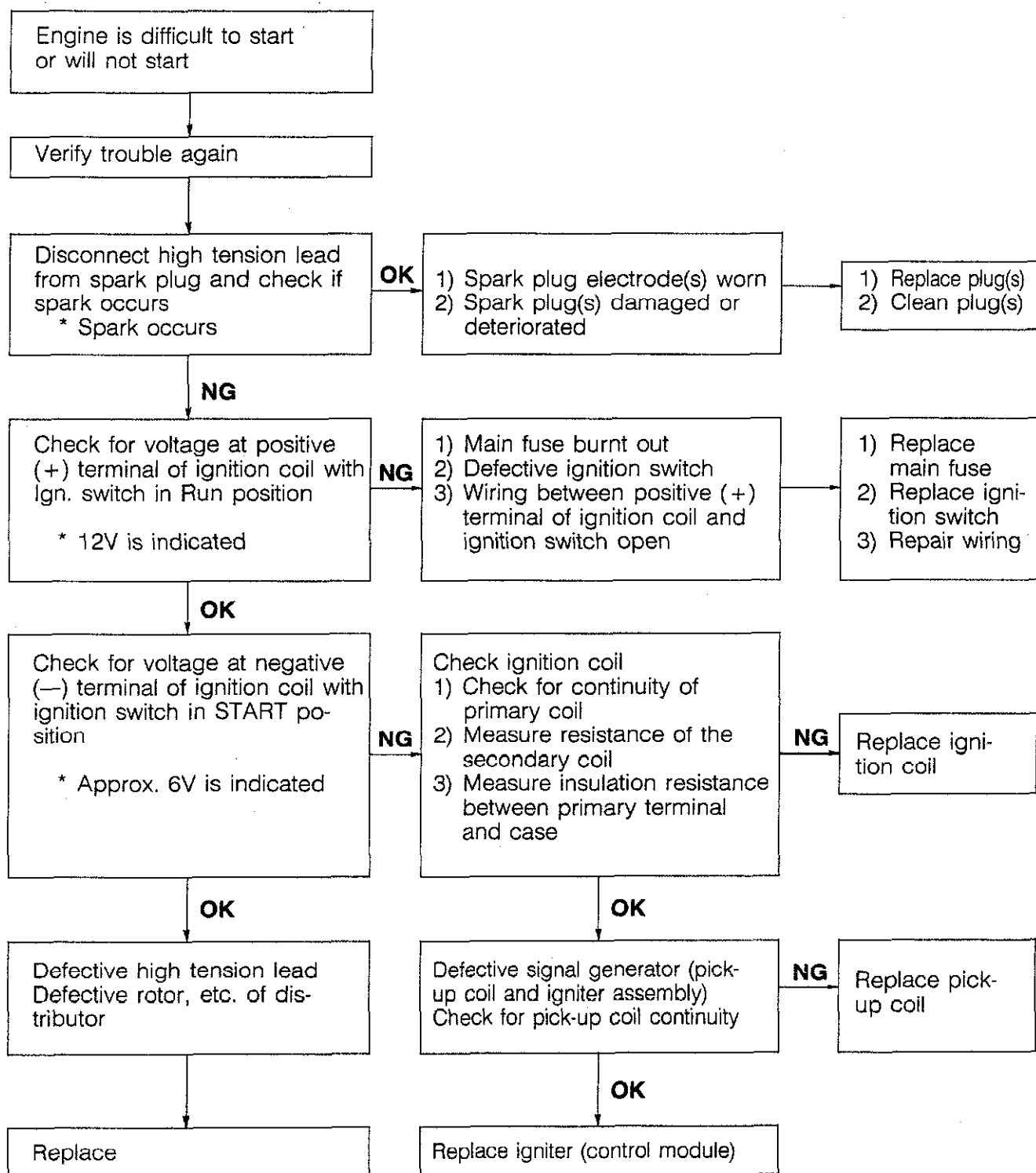


63G05X-355

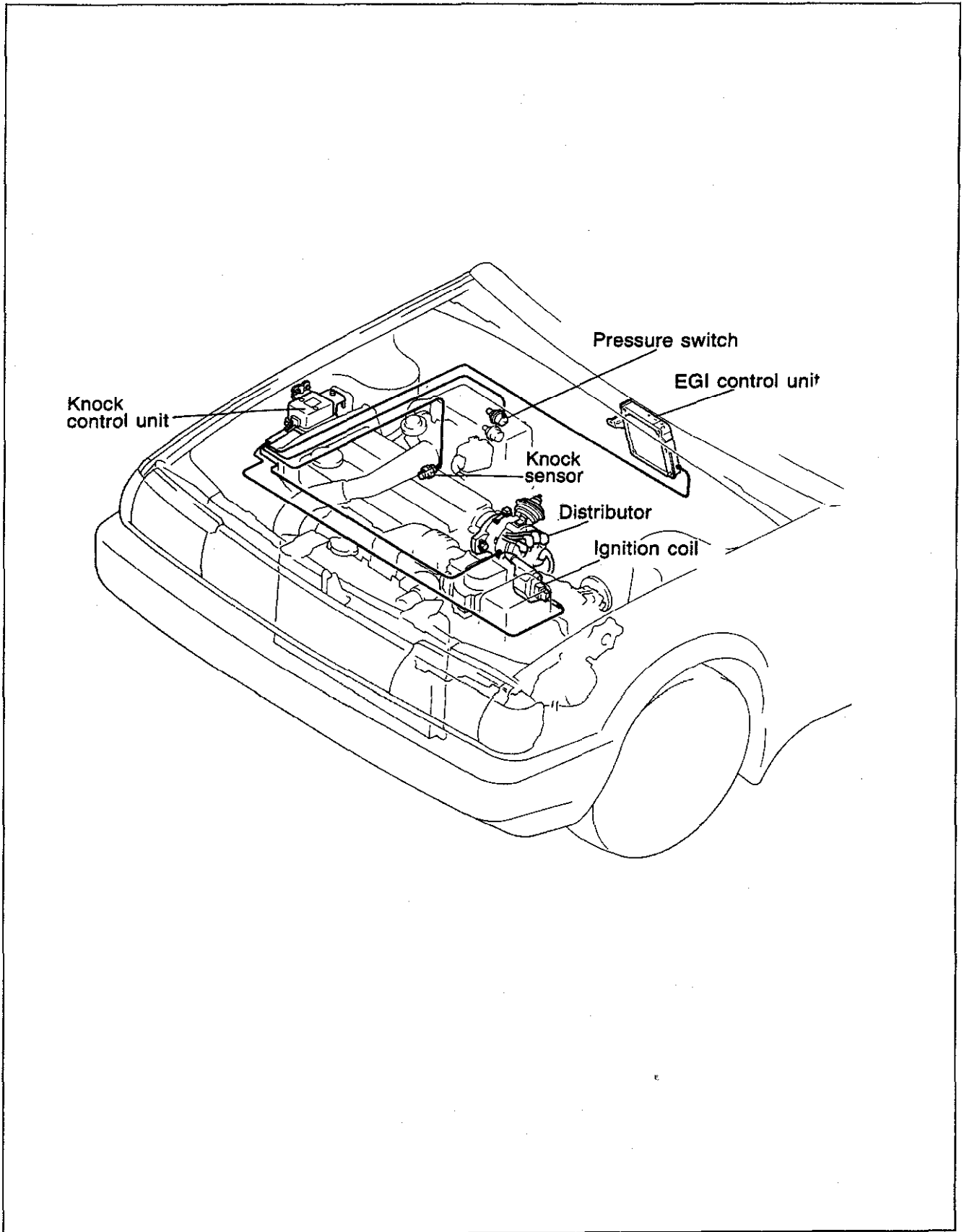
- | | | |
|--------------------------|-----------------------------|------------------|
| 1. Cap | 5. Pick-up coil and igniter | 9. Coupling set |
| 2. Rotor | 6. Vacuum control unit | 10. Governor set |
| 3. Cover | 7. Breaker | 11. Oil seal |
| 4. Signal rotor and unit | 8. Plate | |

5 DISTRIBUTOR (TURBO)

H.E.I. TROUBLESHOOTING (TURBO)

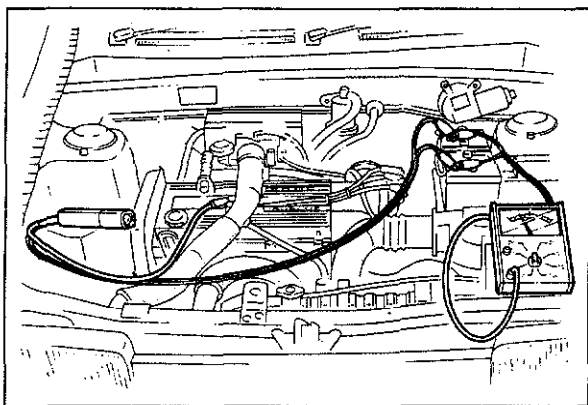


KNOCK CONTROL SYSTEM (TURBO)



63G05X-357

5 KNOCK CONTROL SYSTEM

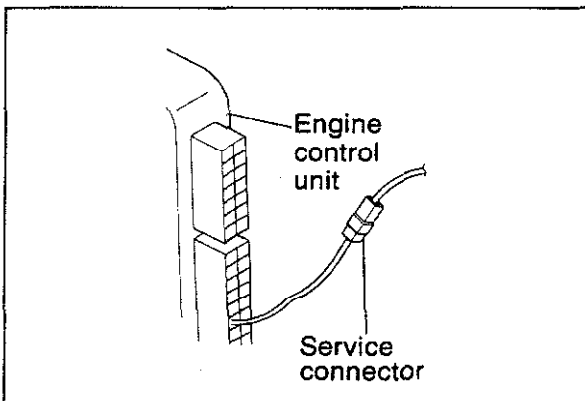


83U05X-032

INSPECTION OF RETARD FUNCTION

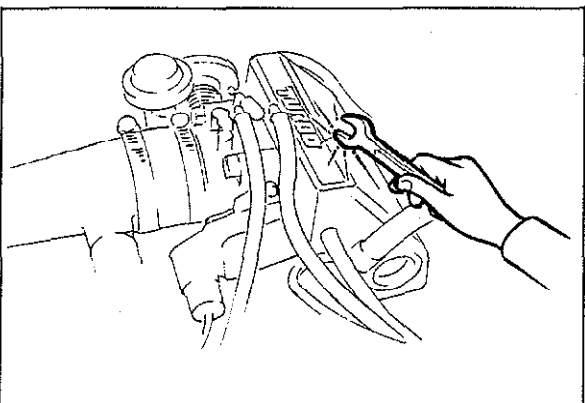
1. Warm up the engine to operating temperature.
2. Connect a tachometer and a timing light to the engine.
3. Run at idle and check that the ignition timing is within specification.

Specification: $12 \pm 1^\circ$ BTDC



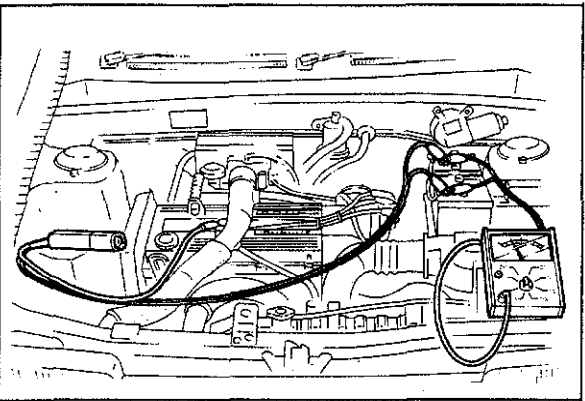
83U05X-022

4. Disconnect the service connector.



83U05X-033

5. Tap the intake manifold assembly with a wrench as shown in the figure, and check that the ignition timing retards.
6. Stop tapping the surge tank bracket and confirm that the ignition timing returns to specification.

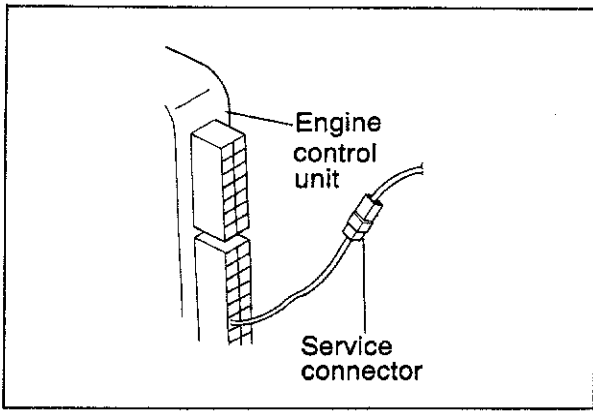


83U05X-034

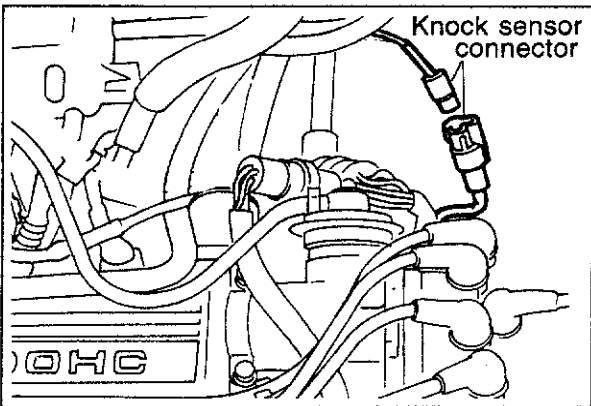
INSPECTION OF FAIL SAFE FUNCTION

1. Warm up the engine to operating temperature.
2. Attach a tachometer and a timing light to the engine.
3. Run at idle and check that the ignition timing is within specification.

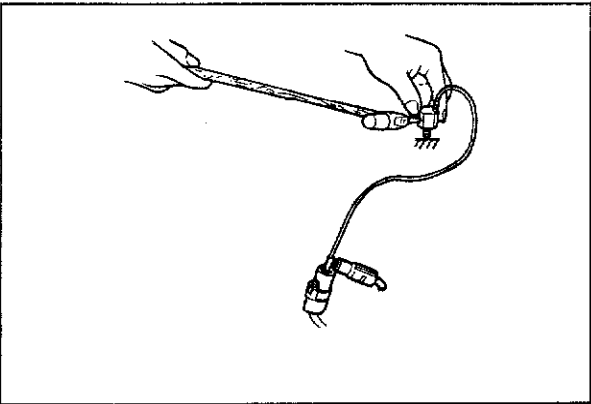
Specification: $12 \pm 1^\circ$ BTDC



83U05X-035



83U05X-036



56U05X-088

4. Disconnect the service connector.

5. Disconnect the knock sensor connector and check that the ignition timing retards.

6. Reconnect the knock sensor connector and confirm that the ignition timing returns to specification.

Specification: $12 \pm 1^\circ$ BTDC

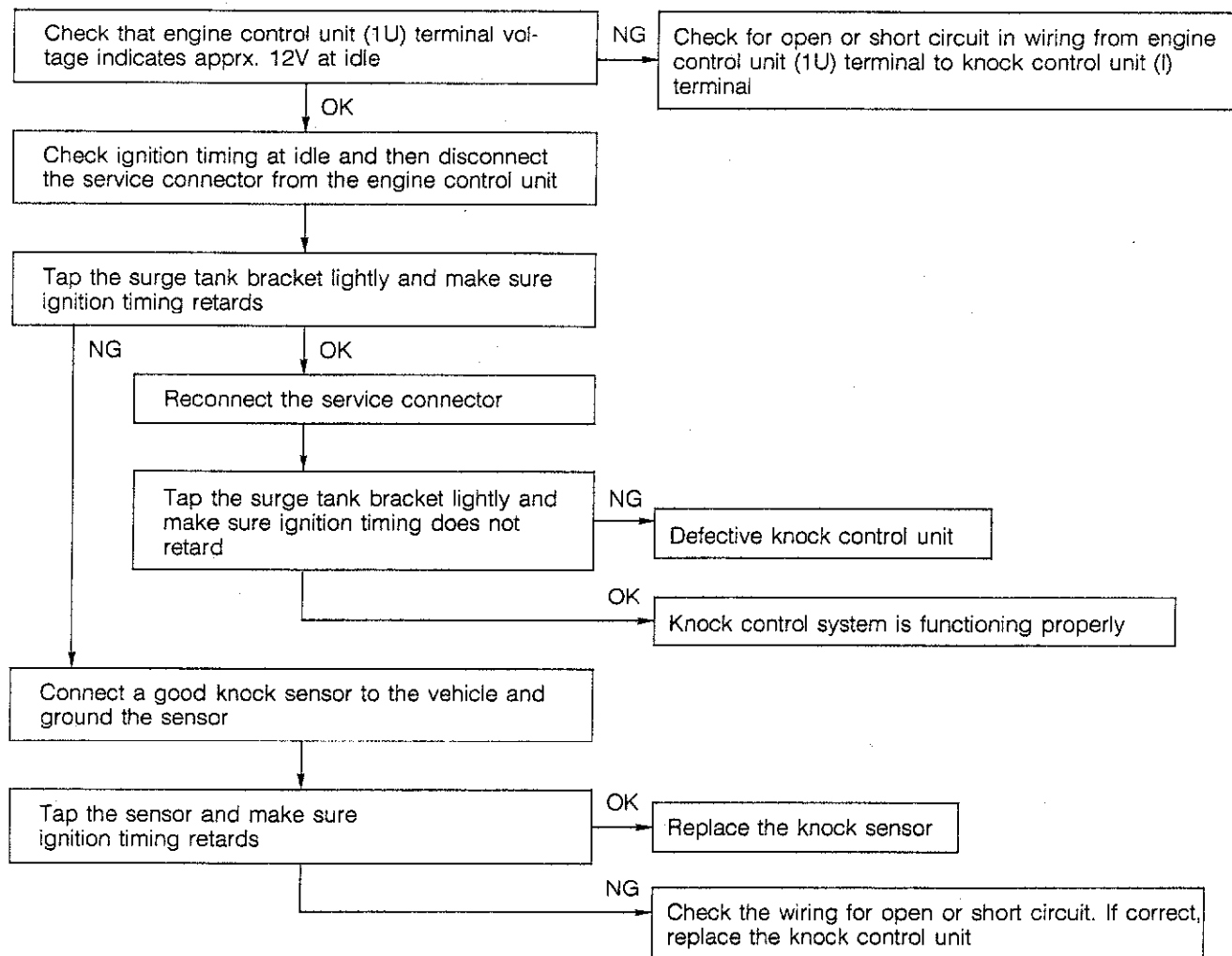
INSPECTION OF KNOCK SENSOR

1. Check the retard function.
2. If the ignition timing does not retard, go to next step.
3. Disconnect the knock sensor connector.
4. Connect a good knock sensor to the vehicle and ground the sensor.
5. Tap the sensor and make sure the ignition timing retards.
6. If the retard operates, replace the knock sensor.

5 KNOCK CONTROL SYSTEM

TROUBLESHOOTING

This troubleshooting is made for devices concerning with the knock control system. Therefore, this troubleshooting should be performed after first checking the distributor (pick-up coil, spark advances, etc.), the ignition coil, the spark plugs, and the high-tension leads.



83U05X-037

CLUTCH

CABLE type

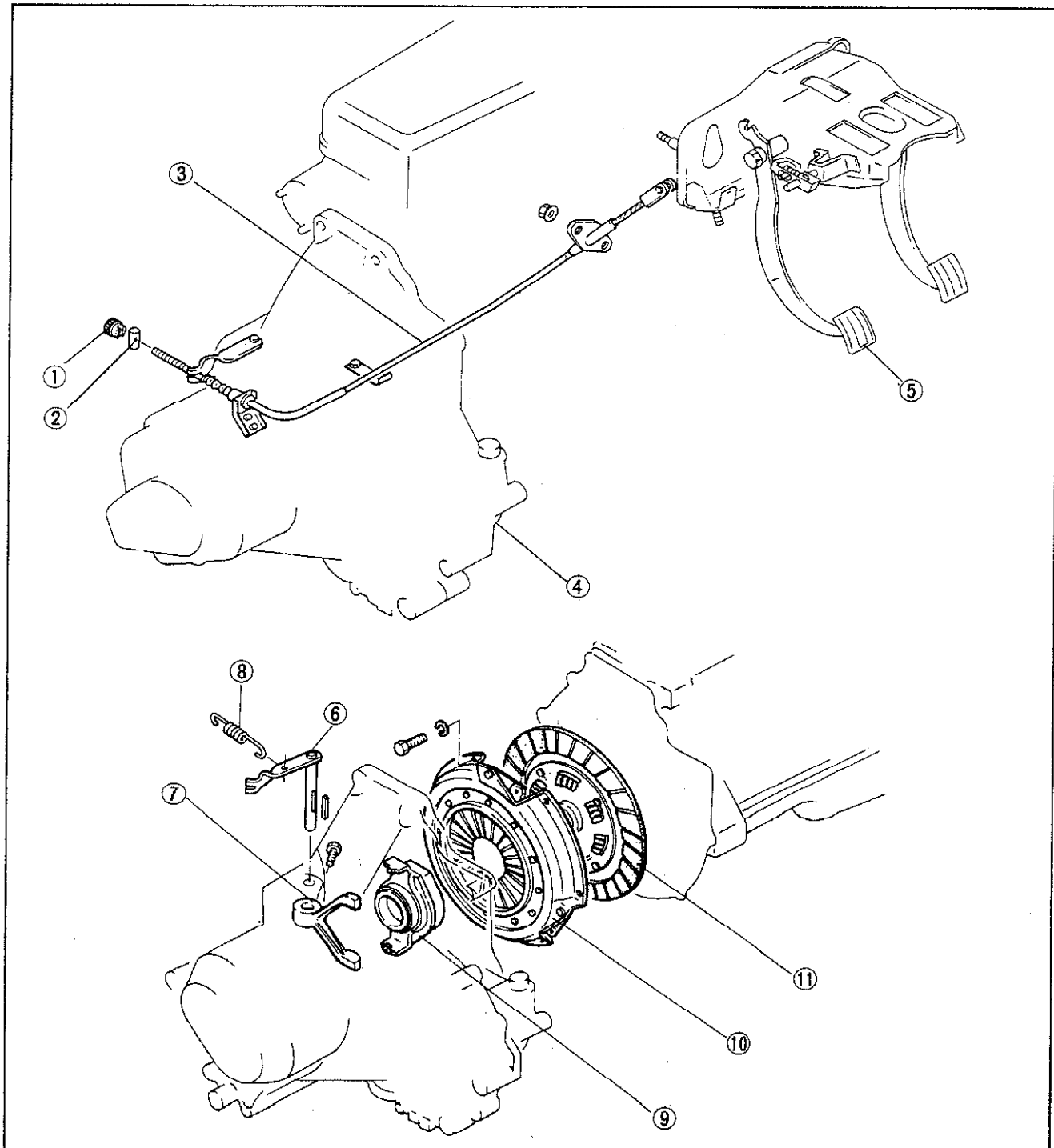
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HYDRAULIC type

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OUTLINE

STRUCTURAL VIEW 2WD



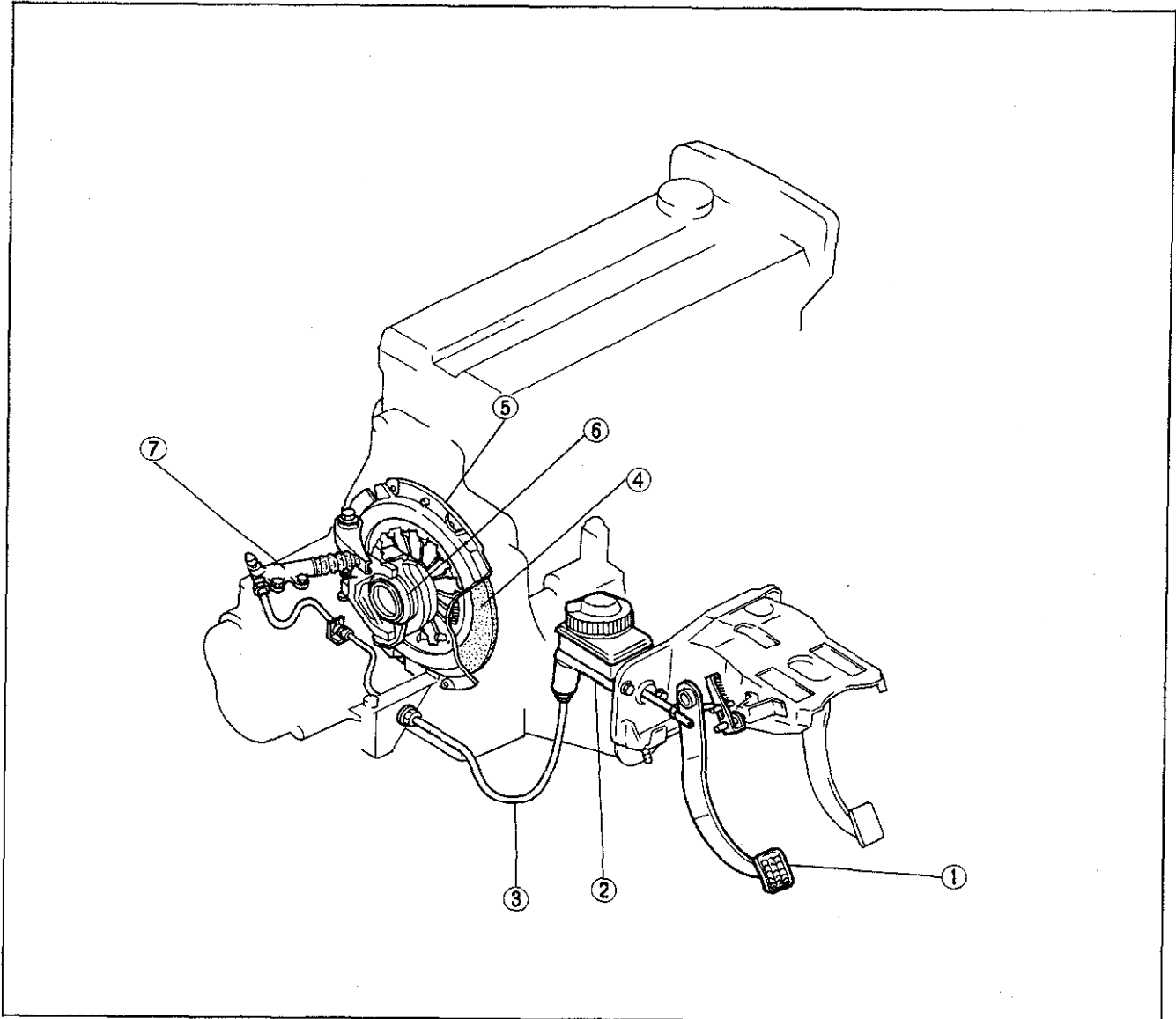
83U06X-002

1. Adjusting nut
2. Pin
3. Clutch cable
4. Transaxle
5. Clutch pedal
6. Release lever

7. Release fork
8. Return spring
9. Release bearing
10. Clutch cover
11. Clutch disc

OUTLINE

STRUCTURAL VIEW 4WD



83U06X-003

- 1. Clutch pedal
- 2. Master cylinder
- 3. Pipe
- 4. Clutch disc

- 5. Clutch cover
- 6. Release bearing
- 7. Release cylinder

6 TROUBLESHOOTING GUIDE

SPECIFICATIONS

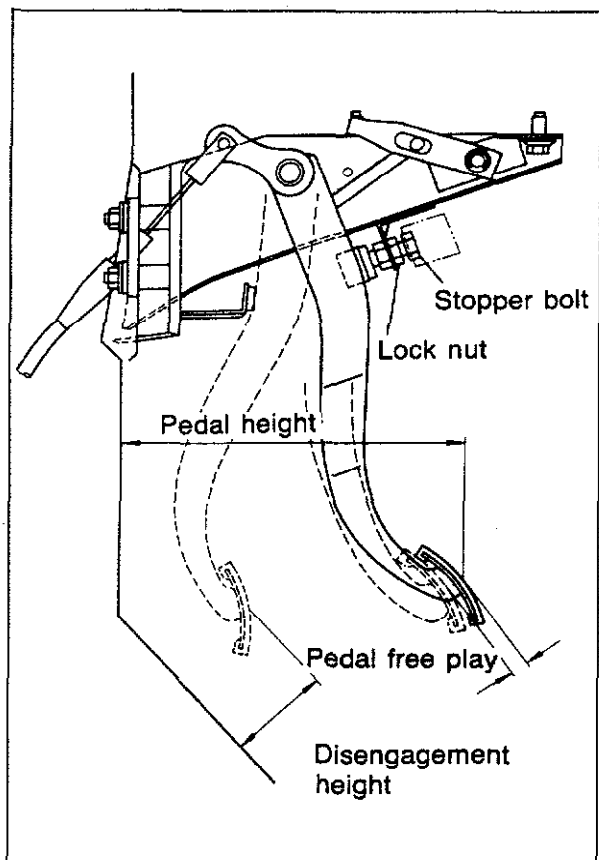
Engine model			B6 EGI	B6 DOHC	
				2WD	4WD
Clutch control			Cable		Hydraulic
Clutch cover	Set load	N (kg, lb)	3277 (334, 735)	4316 (440, 968)	
Clutch disc	Outer diameter mm (in)		190 (7.48)	225 (8.86)	
	Inner diameter mm (in)		132 (5.20)	150 (5.91)	
	Thickness	Pressure plate side mm (in)	3.5 (0.138)	4.1 (0.161)	
		Flywheel side mm (in)	3.5 (0.138)		
Clutch pedal	Type		Suspended		
	Pedal ratio		6.2	5.96	
	Full stroke mm (in)		145 (5.71)		
	Height mm (in)		214.5 (8.44)		229 (9.02)
Master syylinder inner diameter		mm (in)	—	—	15.87 (0.63)
Release cylinder inner diameter		mm (in)	—	—	19.05 (0.75)
Clutch fluid			—	—	SAE J1703a or FMVSS116, DOT-3 or DOT-4

83U06X-004

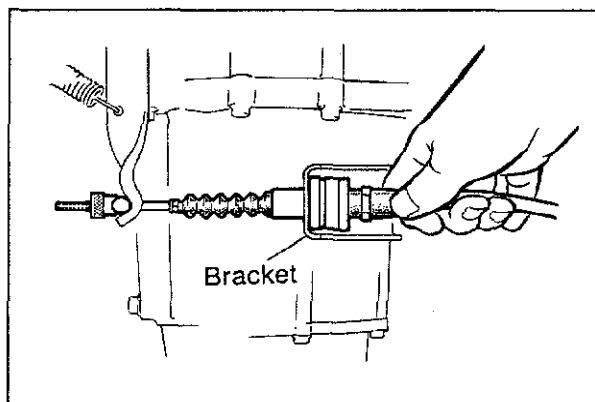
TROUBLESHOOTING GUIDE

Problem	Possible Cause	Remedy
Slipping	Clutch disc facing worn excessively Clutch disc facing surface hardened, or oil on surface Pressure plate damaged Diaphragm spring damaged or weakened Insufficient clutch pedal play Clutch pedal sticking Flywheel damaged	Replace Repair or replace Repair or replace Replace Adjust Repair or replace Repair or replace
Faulty disengagement	Excessive run-out or damaged of clutch disc Clutch disc splines rusted or worn Oil on facing Diaphragm spring weakened Excessive clutch pedal play Insufficient clutch fluid Leakage of clutch fluid	Replace Remove rust, or replace Repair or replace Replace Adjust Add fluid Repair or replace
Clutch vibrates when starting	Oil on facing Torsion spring weakened Clutch disc facing hardened or damaged Clutch disc facing rivets loose Pressure plate damaged or excessive run-out Flywheel surface hardened or damaged Loose or worn engine mount	Repair or replace Replace Repair or replace Replace Replace Repair or replace Tighten or replace
Clutch pedal sticking	Pedal shaft not properly lubricated	Lubricate or replace
Abnormal noise	Clutch release bearing damaged Poor lubrication of release bearing sleeve Torsion spring weakened Excessive crankshaft end play Pilot bearing worn or damaged Worn pivot points of release fork	Replace Lubricate or replace Replace Repair Replace Repair or replace

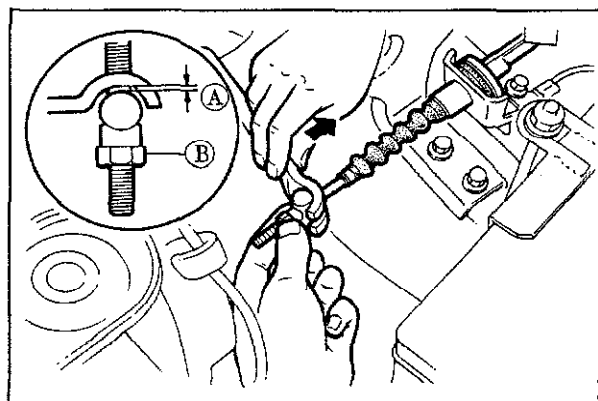
63G06X-304



83U06X-005



83U06X-006



83U06X-007

[Cable type] ON-VEHICLE MAINTENANCE

PEDAL HEIGHT

Inspection

Measure the distance from the upper center of the pedal pad to the firewall and ensure the distance is within specification.

Pedal height: $214.5 \pm 5 \text{ mm}$ ($8.44 \pm 0.20 \text{ in}$)

Adjustment

To adjust the pedal height, loosen locknut and turn clutch switch.

Note

Remove the cover under the dashboard before carrying out this operation.

PEDAL FREEPLAY

Inspection

Depress the pedal lightly by hand and measure the freeplay, ensure that it is within specification.

Pedal freeplay: 9—15 mm (0.35—0.59 in)

Adjustment

1. Depress the clutch pedal seven times.
2. Straighten the clutch cable in the clutch cable bracket.

3. Depress the release lever and pull the pin away from the lever, then adjust clearance (A) by turning adjust nut (B).

Clearance: $2 \pm 0.5 \text{ mm}$ ($0.079 \pm 0.01 \text{ in}$)

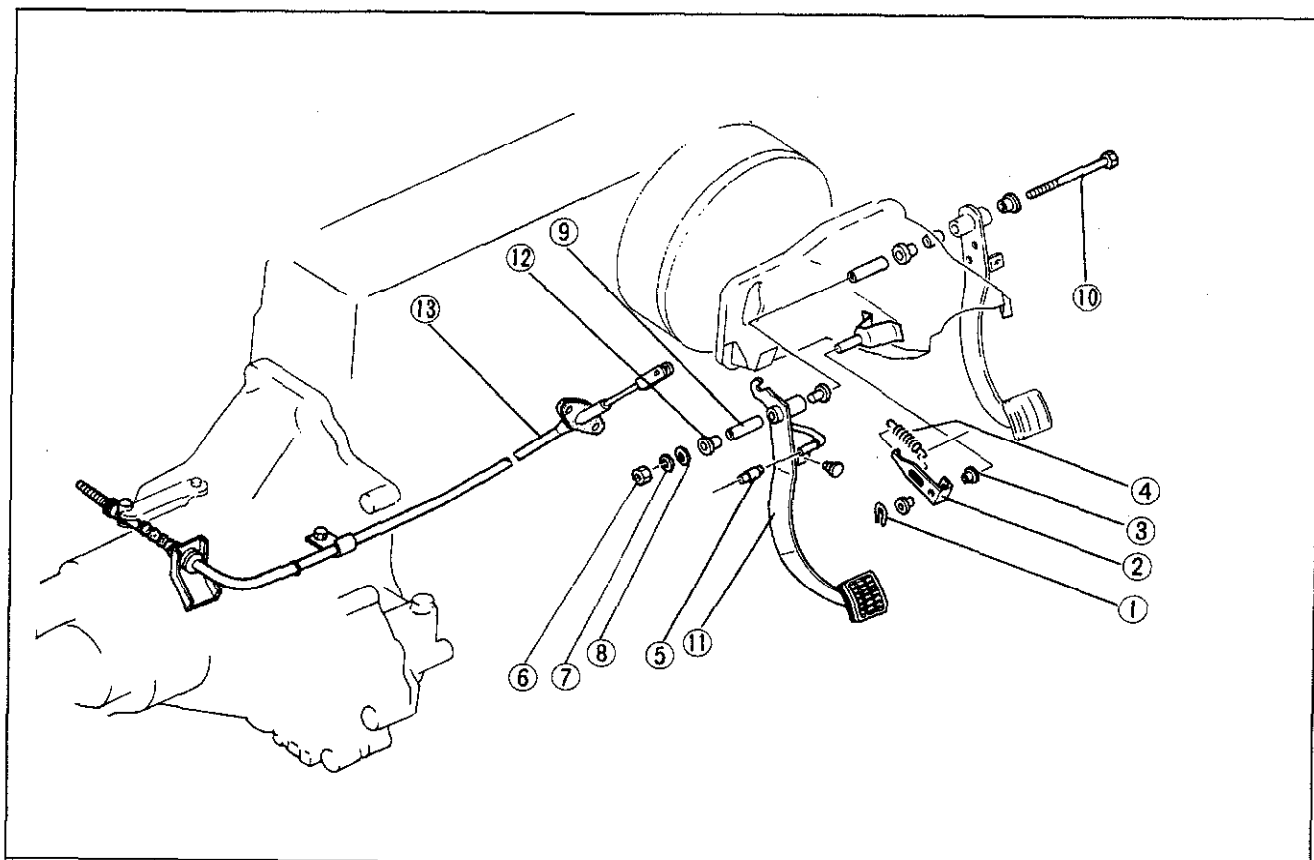
4. After adjustment, ensure that when the clutch is disengaged, the distance between the floor and the upper center of the pedal pad is within specification.

Disengagement height:
85 mm (3.3 in) min.

CLUTCH PEDAL

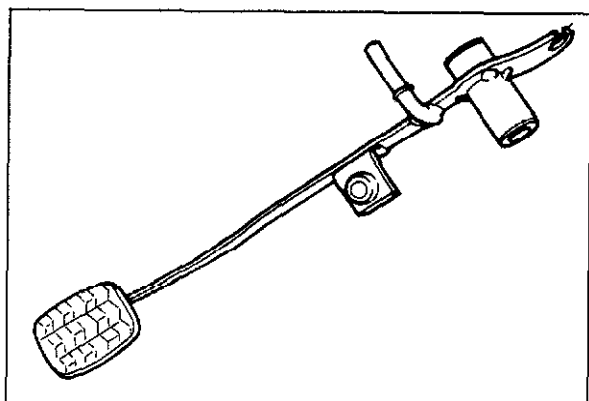
REMOVAL

1. Remove the dashboard under cover and blower duct.
2. Remove the parts in the numbered sequence shown in the figure.



63U06X-007

- | | | |
|-------------------|------------------|------------------|
| 1. Retaining ring | 5. Bushing | 9. Spacer |
| 2. Lever | 6. Nut | 10. Through bolt |
| 3. Bushing | 7. Spring washer | 11. Clutch pedal |
| 4. Return spring | 8. Flat washer | 12. Bushing |
| | | 13. Clutch cable |

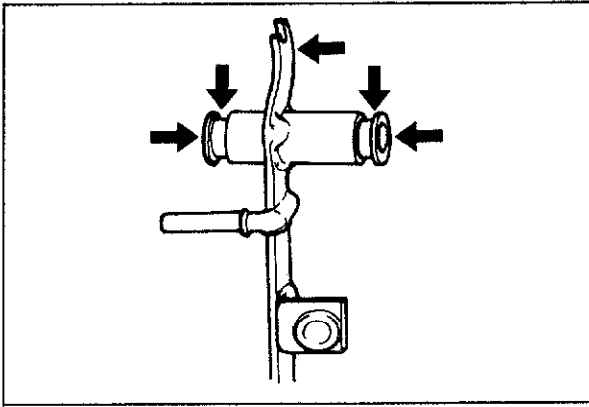


63U06X-008

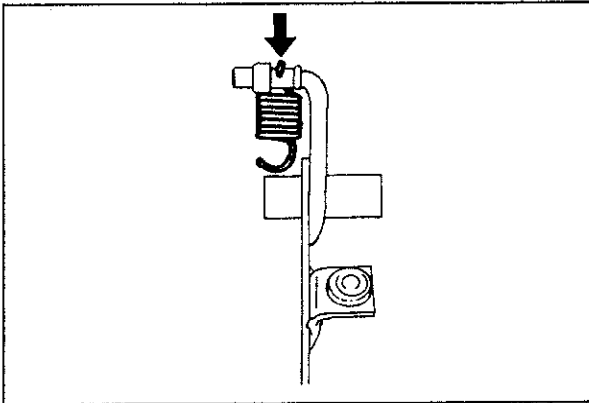
INSPECTION

Check the following, repair or replace if necessary:

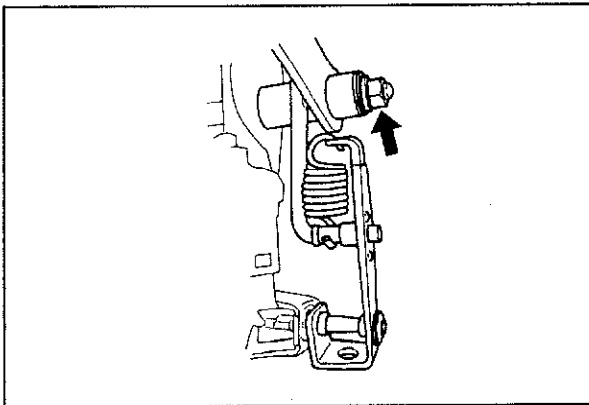
1. Worn or damaged pedal bushing
2. Twisted or bent pedal
3. Worn or damaged pedal pad



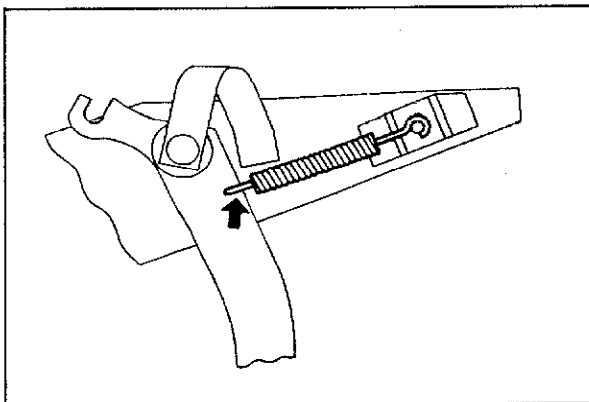
63U06X-009



63U06X-010



63U06X-011



83U06X-016

INSTALLATION

Install in the reverse order of removal and note the following:

1. Apply lithum grease to the inner and outer surfaces of the pedal bushing, pedal cable and hook unit.

2. Install the return spring to the bushing and apply lithum grease.

Note

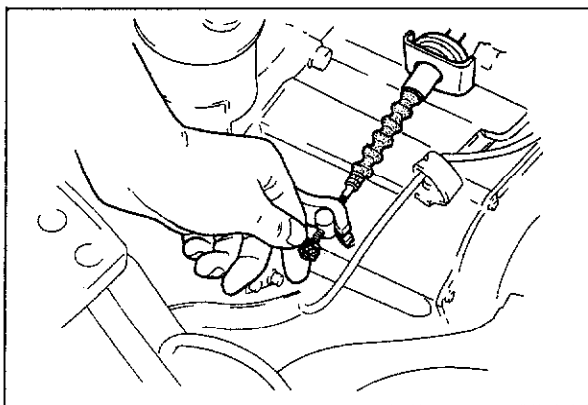
Install spring in position shown.

3. Install the clutch pedal and tighten the nut.

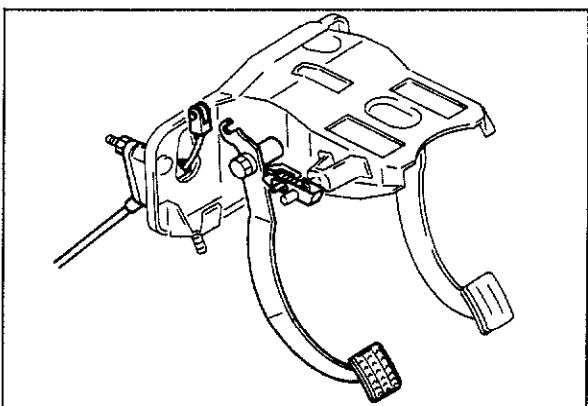
Tightening torque

20—35 N·m (2.0—3.5 m·kg, 14.5—25.3 ft·lb)

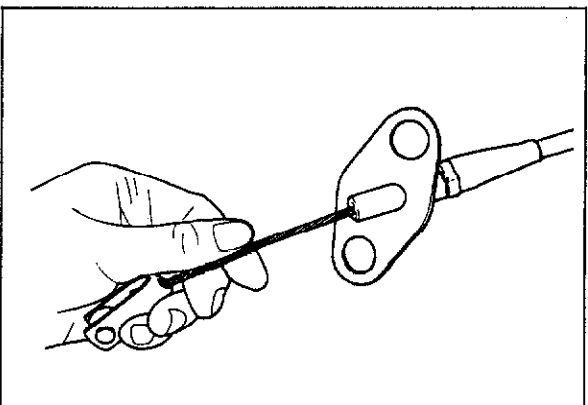
4. After installation, adjust the pedal height and pedal freeplay.
(Refer to Page 6—5)



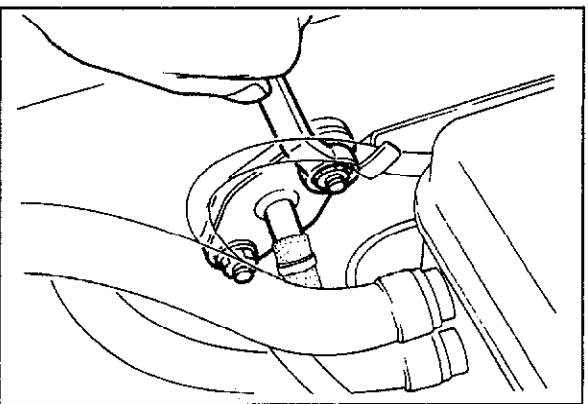
63U06X-013



63U06X-014



63U06X-015



83U06X-017

CLUTCH CABLE

REMOVAL

1. Remove the adjusting nut and pin
2. Remove the clutch cable bracket.
3. Disconnect the cable from the pedal assembly.
4. Remove the cable from the engine compartment side.

INSPECTION

Check the following, and replace if necessary:

1. Damage to the inner or outer cable
2. Function of the cable

INSTALLATION

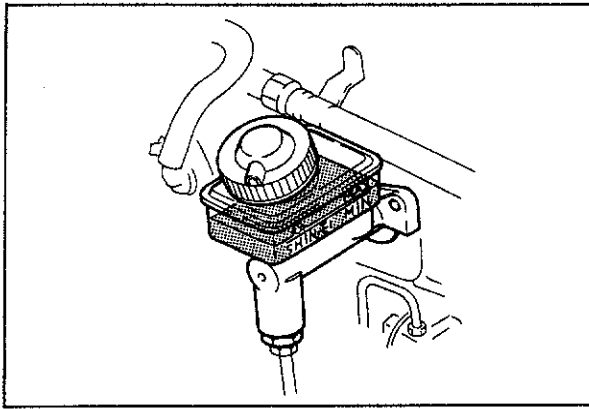
Install in the reverse order of removal and note the following:

1. Apply lithium grease to the pedal cable hook and the joint between the release lever and pin.
2. Install the clutch cable bracket.

Tightening torque

16—23 N·m (1.6—2.3 m·kg, 12—17 ft·lb)

3. Adjust the pedal freeplay (Refer to Page 6—5)



83U06X-009

[Hydraulic type] ON-VEHICLE MAINTENANCE

FLUID LEVEL

1. Clean the area around the reservoir and the reservoir cap.
2. Check the fluid level. If the level is near or below the "MIN" mark, add brake fluid to the "MAX" mark.

Fluid specification:

DOT-3 or DOT-4

(FMVSS 116, or SAEJ1703a)

INSPECTION AND ADJUSTMENT

CLUTCH PEDAL HEIGHT

Inspection

Measure the distance from the upper surface of the pedal pad to the firewall, after removing the carpet.

Standard height:

229 \pm 5 mm (9.02 \pm 0.20 in)

Adjustment

1. Adjust the clutch pedal height by loosening lock nut (A) and turning clutch switch (B).
2. After the adjustment, tighten lock nut (A).

CLUTCH PEDAL PLAY

Inspection

Depress the clutch pedal lightly by hand and measure the free play.

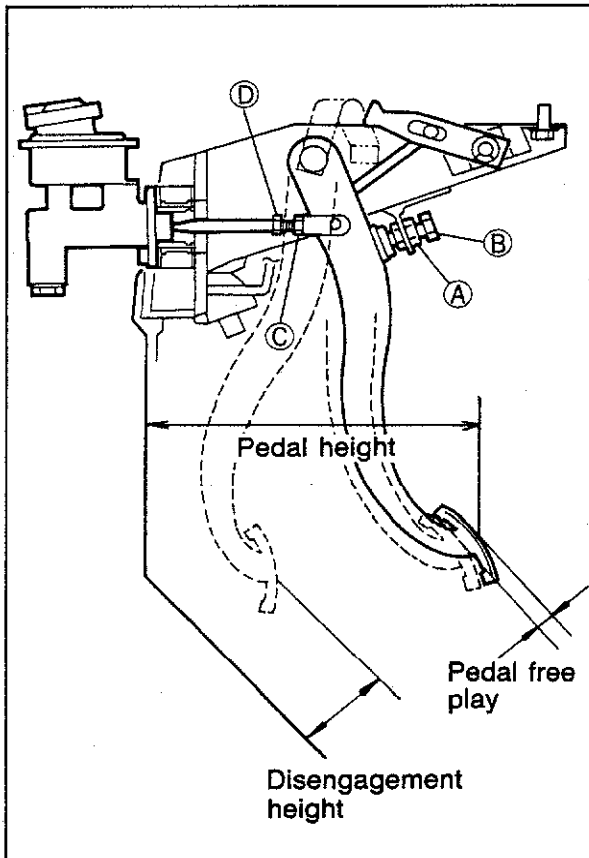
Standard play: 0.6—3.0 mm (0.02—0.12 in)

Adjustment

1. Adjust the free play by loosening lock nut (C) and turning push rod (D).
2. After adjustment, tighten lock nut (C).
3. Check that the distance from the floor to the center of the upper surface of the pedal pad is correct when the clutch is fully disengaged. If it is not within specification, readjust.

Disengagement height:

82 mm (3.23 in) min.



83U06X-018

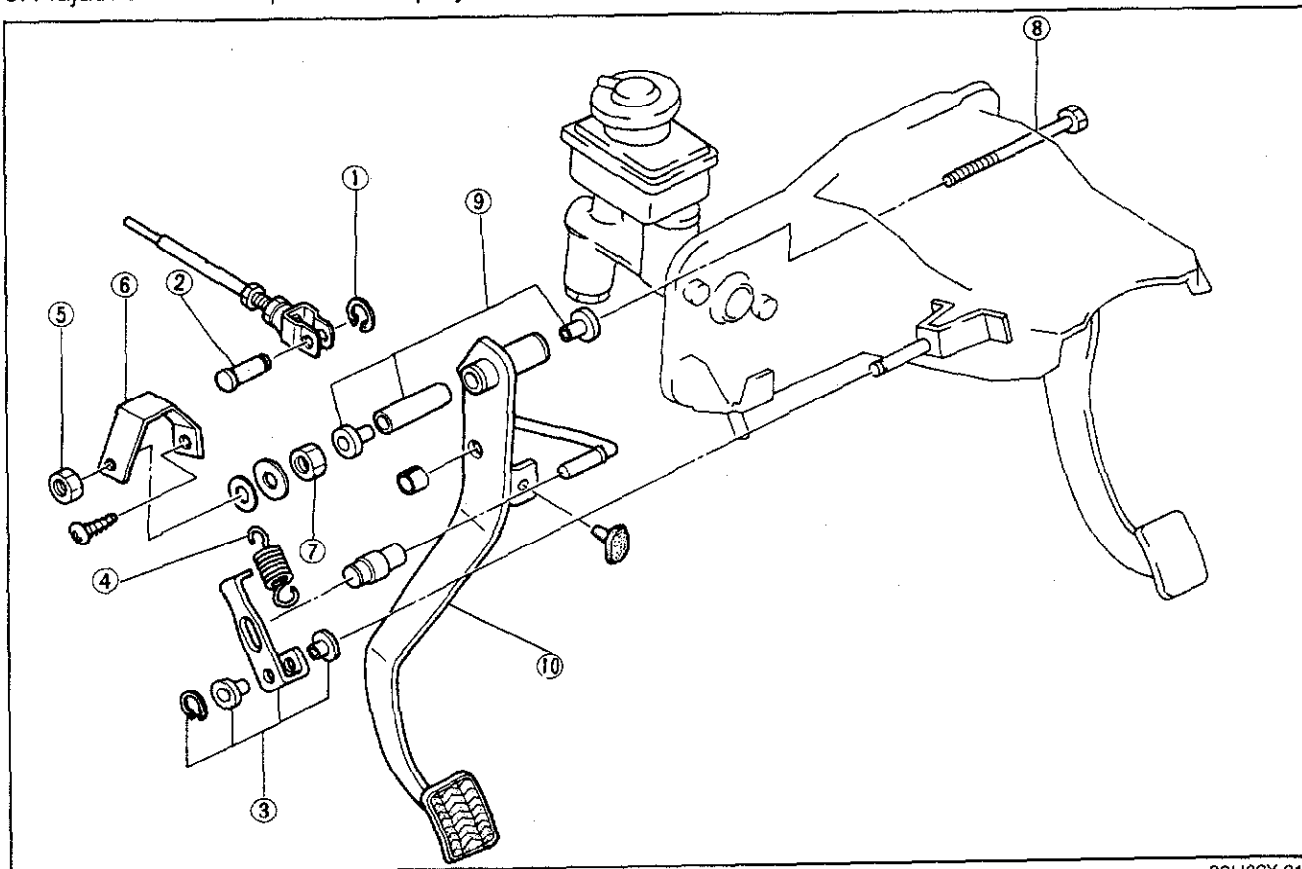
6 CLUTCH PEDAL

CLUTCH PEDAL

REMOVAL AND INSTALLATION

1. Remove the parts in the sequence shown in the figure.
2. Install in the reverse order of removal.
3. Adjust the clutch pedal free play.

67U06X-006



83U06X-019

1. Clip
2. Push rod
3. Clip, bushing and washer
4. Spring
5. Nut

6. Cover
7. Nut
8. Bolt
9. Bushing and washer
10. Clutch pedal

Caution

Apply grease (lithium base, NLGI No. 2) to the bushings and pivot points.

INSPECTION

Check the following, parts replace if necessary.

1. Worn or damaged bushings.
2. Twisted or bent clutch pedal.
3. Worn or damaged pedal pad.

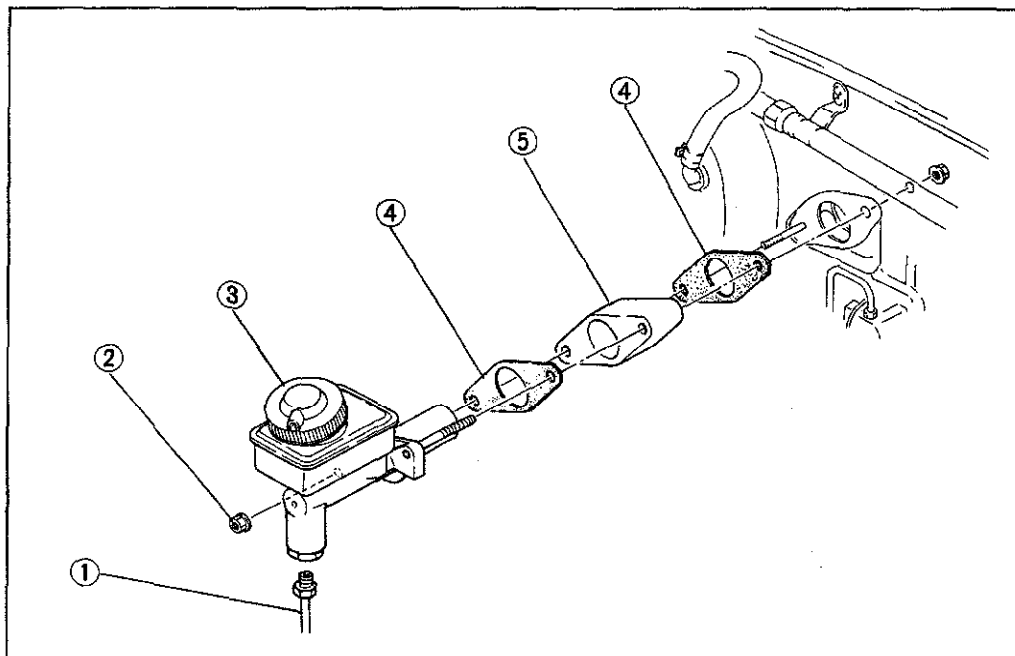
4BG06X-121

MASTER CYLINDER

REMOVAL AND INSTALLATION

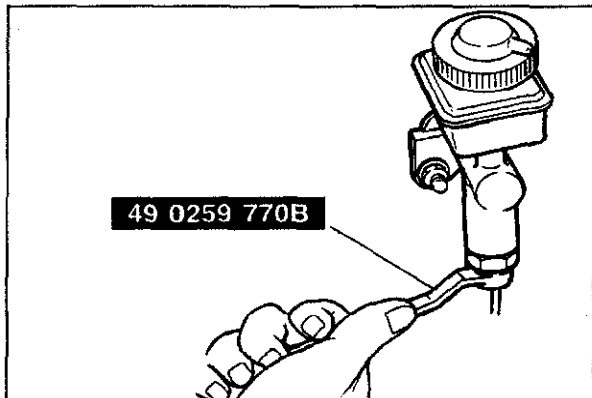
1. Remove the parts in the sequence shown in the figure.
2. Install in the reverse order of removal.
3. After installation, perform air bleeding.

67U06X-008



1. Clutch pipe
2. Nut
3. Master cylinder
4. Gasket
5. Spacer

67U06X-009



83U06X-020

Clutch Pipe

Use **SST** to disconnect and connect the clutch pipe.

Caution

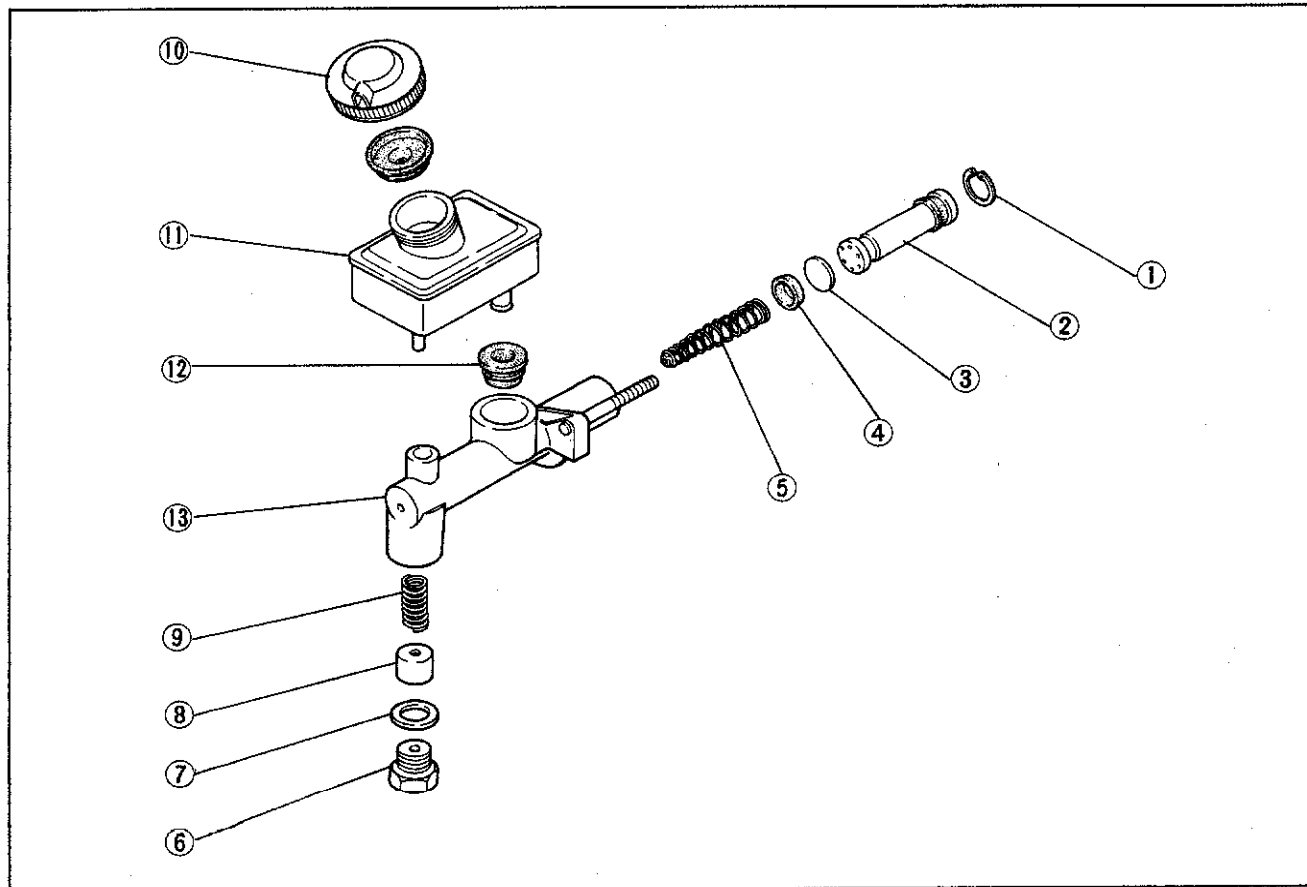
Clutch fluid will damage painted surfaces. Use a container or rags to collect the fluid. If fluid does get on a painted surface, wipe it off immediately.

6 MASTER CYLINDER

DISASSEMBLY AND ASSEMBLY

1. Disassemble the parts in the sequence shown in the figure.
2. Assemble in the reverse order of removal.
3. Disassemble and assemble in a clean location free from dirt and dust.
4. Use clutch fluid to wash the inner parts.

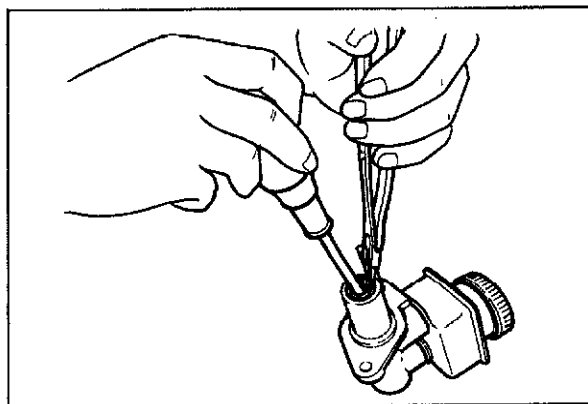
67U06X-012



83U06X-021

1. Snap ring
2. Piston and secondary cup assembly
3. Protector
4. Primary cup
5. Return spring
6. Joint bolt
7. Gasket

8. One-way valve piston
9. One-way valve spring
10. Cap
11. Reservoir
12. Bushing
13. Cylinder body



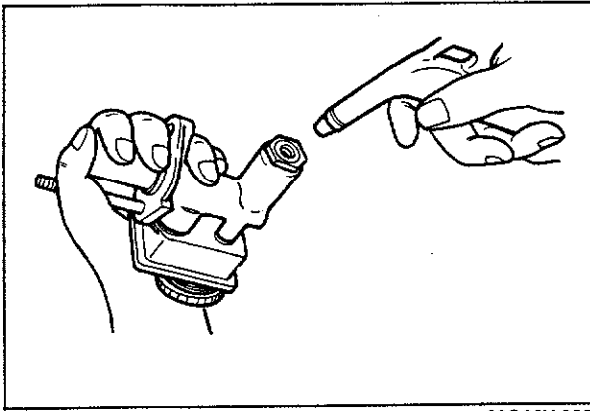
4BG06X-010

Snap Ring

Press down on the piston and remove the snap ring with snap ring pliers.

Caution

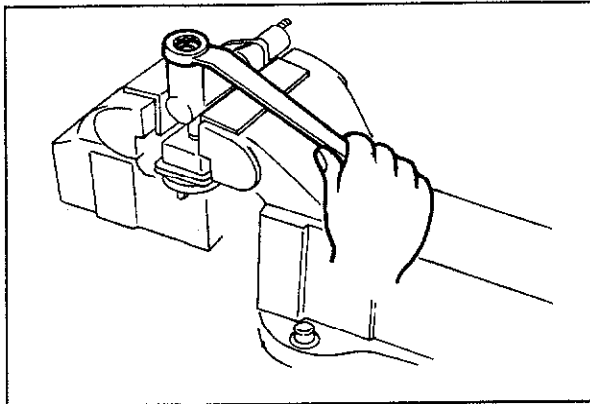
Do not damage push rod contact surface of piston.



63G06X-309

Piston and Secondary Cup Assembly

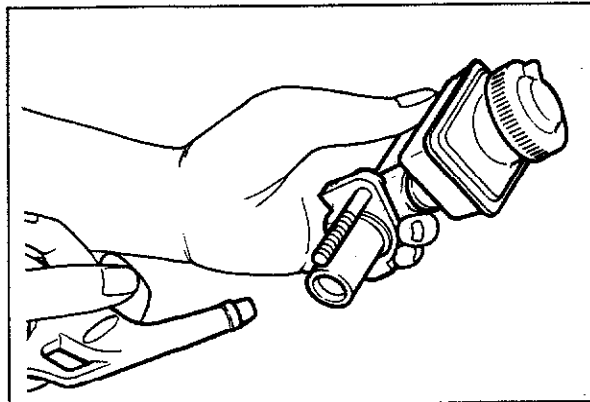
Remove the piston and secondary cup assembly by compressed air.



63G06X-310

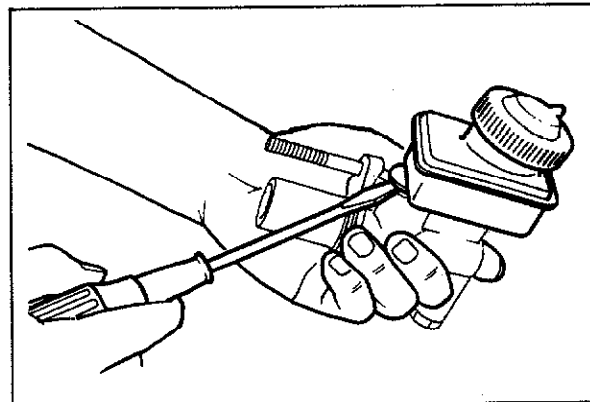
One-way Valve

1. Remove the joint bolt.



63G06X-311

2. Remove the one-way valve piston and spring by compressed air.

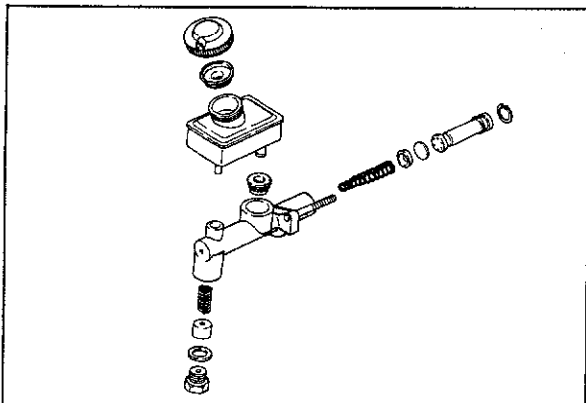


63G06X-312

Reservoir

Pry the reservoir off the body.

6 MASTER CYLINDER

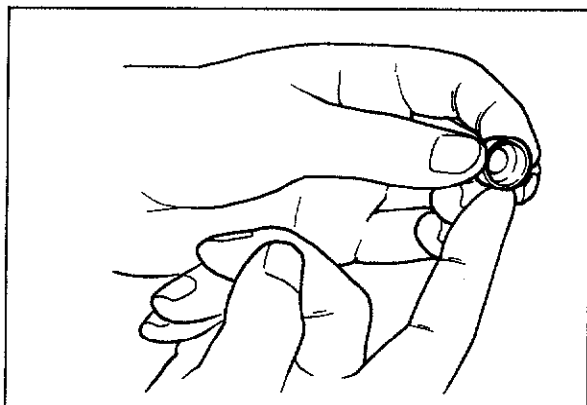


63G06X-313

INSPECTION

After cleaning each part, check the following parts, replace if necessary. Note that rubber parts should be cleaned with brake fluid.

1. Wear or damage to master cylinder bore and piston.
2. Weakness of return spring.
3. Wear or damage to primary or secondary cups.



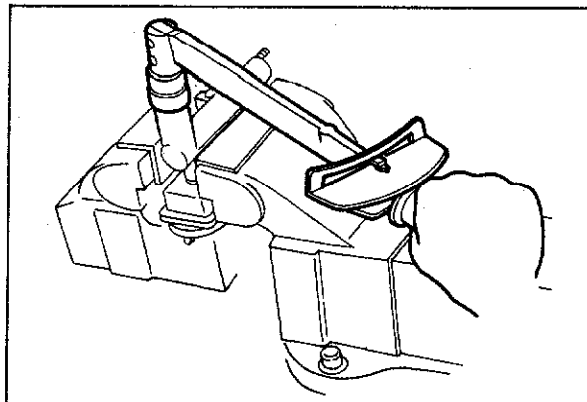
63G06X-314

ASSEMBLY

Assemble the clutch master cylinder in the reverse order of disassembly.

Note

- a) Before assembling, coat the edges of the piston and cups with clean brake fluid.
- b) After assembling, fill the cylinder with new brake fluid and operate the piston with a screwdriver until fluid is ejected from the outlet.



63G06X-315

Joint bolt tightening torque:

83—113 N·m

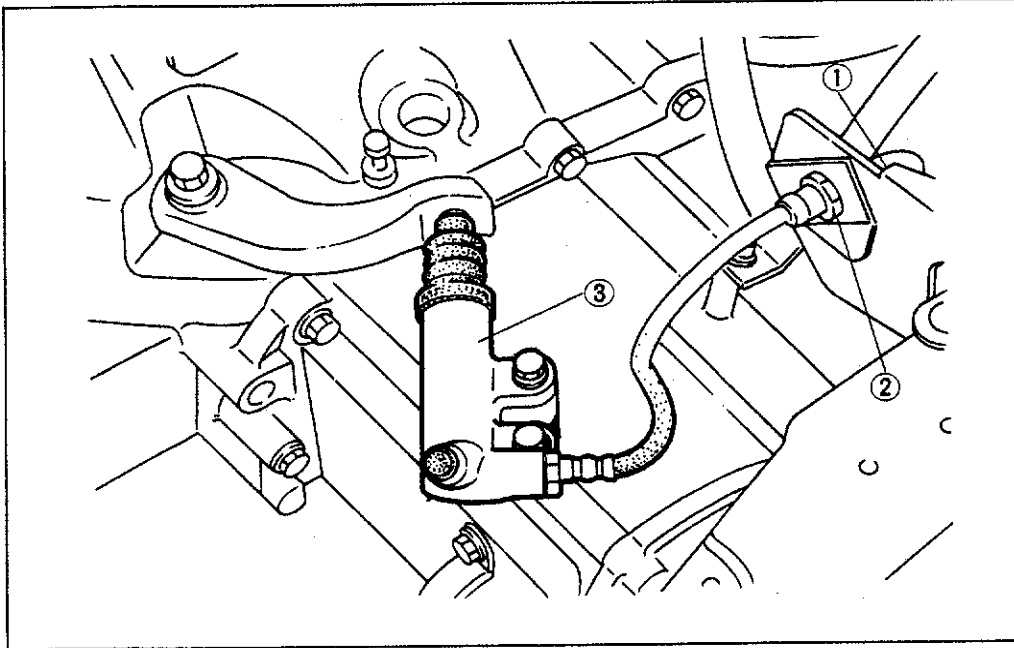
(8.5—11.5 m·kg, 61—83 ft·lb)

RELEASE CYLINDER

REMOVAL AND INSTALLATION

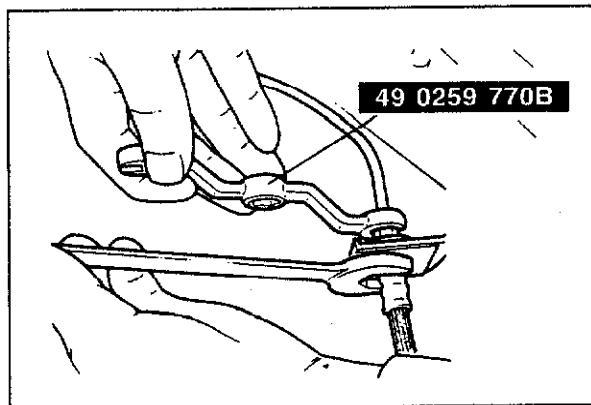
1. Remove the parts in the sequence shown in the figure.
2. Install in the reverse order of removal.
3. After installation, perform air bleeding.

67U06X-016



1. Clutch pipe
2. Clip
3. Release cylinder

67U06X-017



83U06X-022

Flare Nut

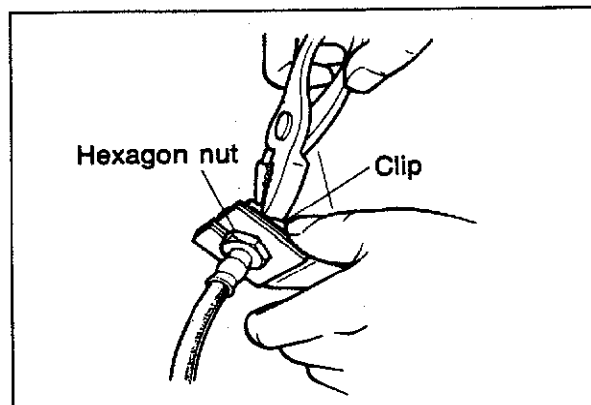
Use **SST** to loosen and tighten the flare nut of the clutch pipe.

Note

After disconnecting the clutch pipe, plug it to avoid fluid leakage.

Caution

Clutch fluid will damage painted surfaces. Use a container or rags to collect the fluid. If fluid does get on a painted surface, wipe it off immediately.



67U06X-019

Clip

When assembling, insert the clip between the bracket and flare nut of the clutch pipe.

Caution

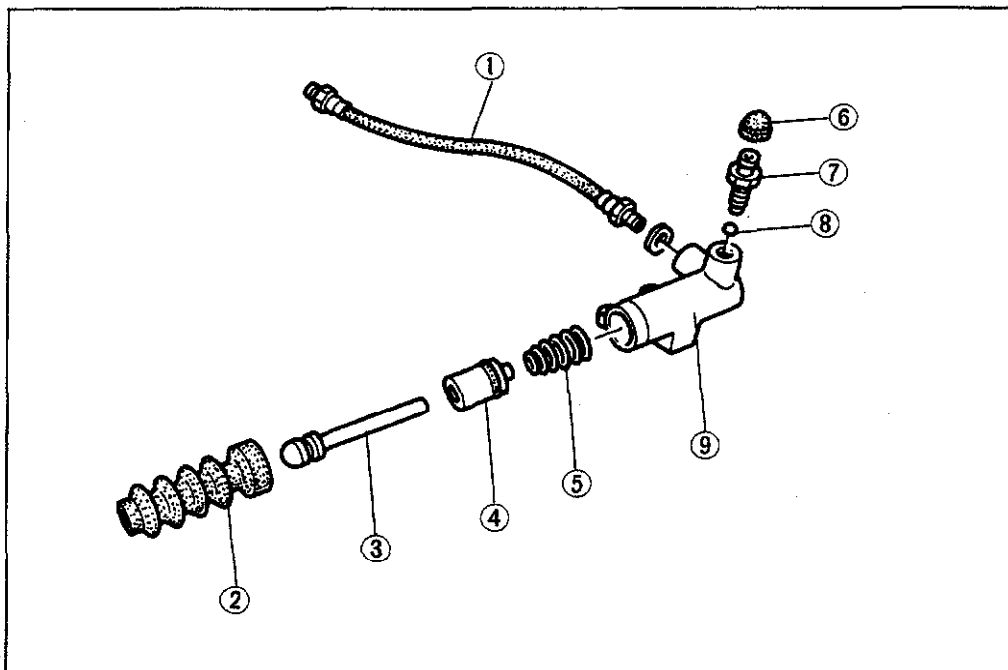
- a) The hexagon nut must seat correctly into the hexagonal groove of the bracket.
- b) The flexible hose must not be twisted.

6 RELEASE CYLINDER

DISASSEMBLY, INSPECTION AND ASSEMBLY

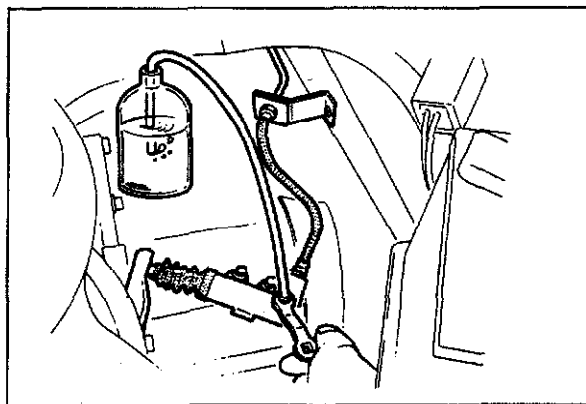
1. Disassemble the parts in the sequence shown in the figure.
2. Assemble in the reverse order of removal.
3. Disassemble and assemble in a clean location free from dirt and dust.
4. Use brake fluid to wash the inner parts.
5. To inspect, refer to master cylinder section.

63G06X-316



83U06X-023

1. Flexible hose
2. Boot
3. Push rod
4. Piston and cap assembly
5. Return spring
6. Bleeder cap
7. Bleeder plug
8. Steel ball
9. Release cylinder



4BG06X-015

AIR BLEEDING

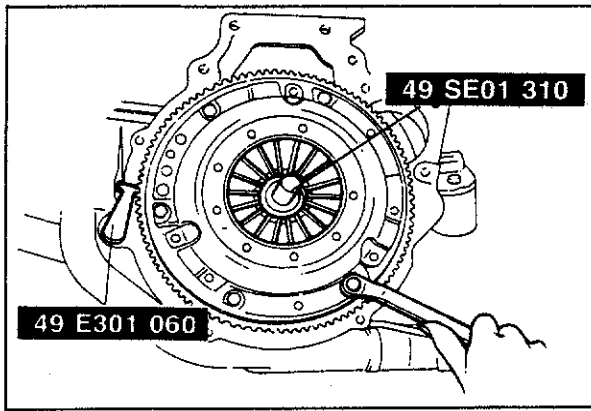
The clutch hydraulic system must be bled to remove air which has entered when the pipes are disconnected for repairs, etc. This bleeding is done as described below.

Caution

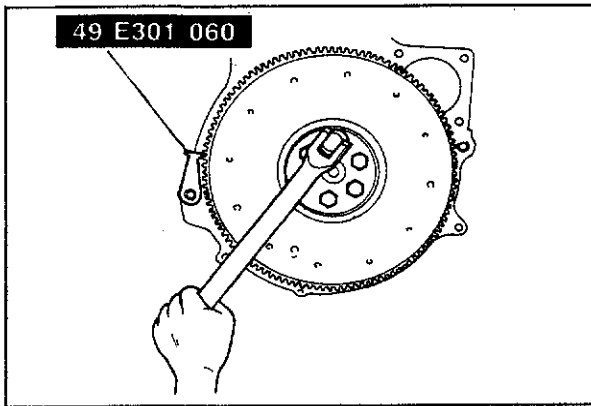
- a) The fluid in the reservoir tank must be maintained at the 3/4 level or higher during air bleeding.
- b) Be careful not to spill clutch fluid onto a painted surface

1. Remove the bleeder cap and attach a vinyl tube to the bleeder plug.
2. Place the other end of the vinyl tube in a container.
3. Slowly pump the clutch pedal several times.
4. While the clutch pedal is pressed, loosen the bleeder screw to let fluid and air escape. Then tighten the bleeder screw.
5. Repeat steps 3 and 4 until there are no more air bubbles in the fluid.
6. Check for correct clutch operation.

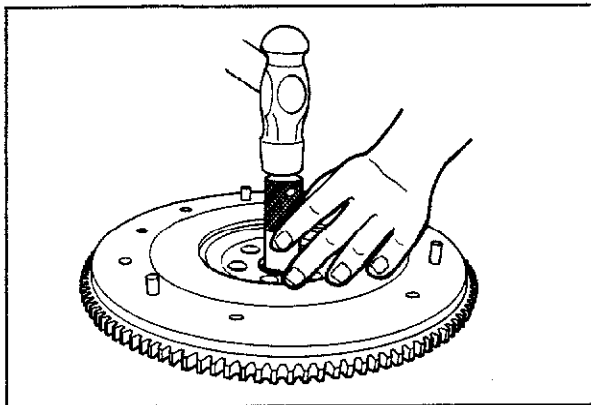
83U06X-024



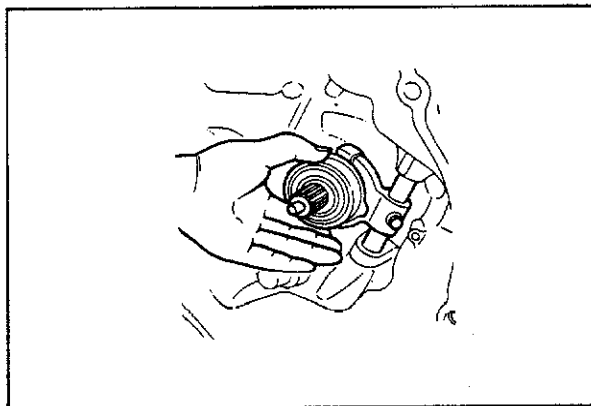
83U06X-010



63U06X-018



63U06X-019



63U06X-020

CLUTCH AND FLYWHEEL

REMOVAL

1. Remove the transaxle (Refer to Section 7A).
2. For removing the clutch cover and clutch disc, use the **SST**.

Note

To avoid dropping the disc, use the clutch disc centering tool (49 SE01 310).

3. Remove the flywheel mounting bolts, and then remove the flywheel.

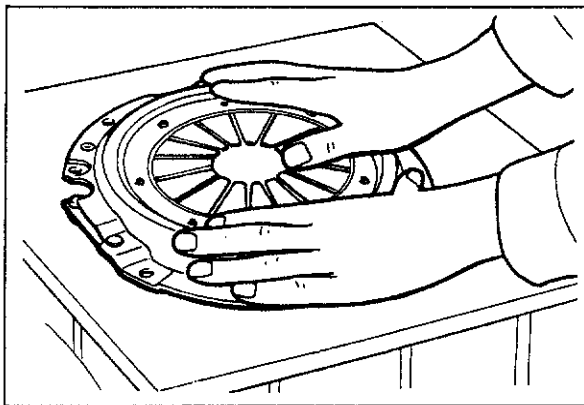
4. Remove the pilot bearing from the flywheel with a suitable rod and a hammer.

Note

Do not remove the bearing if it is not necessary.

5. Remove the return spring and release bearing.
6. Remove the bolt holding the release fork and release lever together.
7. Remove the release fork and set key by pulling the release lever out of the case.

6 CLUTCH AND FLYWHEEL



63U06X-021

INSPECTION

Check the following parts, and repair or replace if necessary:

Clutch Cover

1. Contact surface of the clutch disc for scoring, cracks, or discoloration.

Note

Minor scratches or discoloration should be removed with sandpaper.

2. Diaphragm spring for damage, or damage to the cover.

Clutch Disc

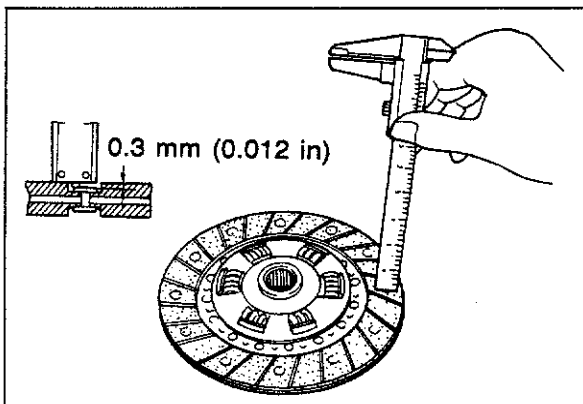
1. Facing surface for hardening or presence of oil.

Note

Use sandpaper if the trouble is minor.

2. Loose facing rivets.
3. Worn clutch disc.
Measure the depth to the rivet heads with a slide caliper.

Depth: 0.3 mm (0.012 in) min.

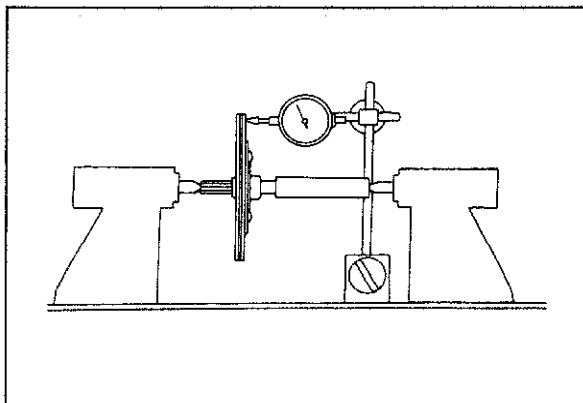


83U06X-011

4. Run-out of clutch disc.

Lateral run-out limit: 0.7 mm (0.027 in)
Vertical run-out limit: 1.0 mm (0.039 in)

5. Wear or rust on the splines.
Remove any minor rust.



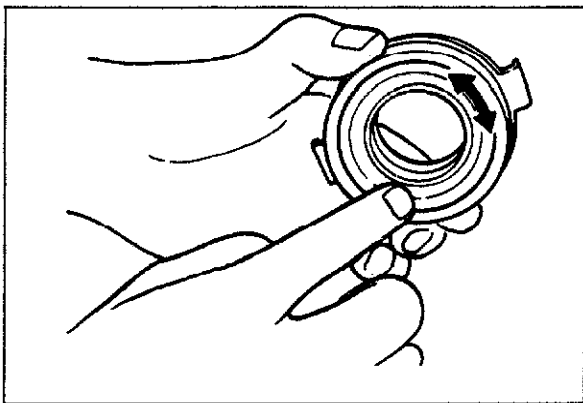
4BG06X-109

Clutch Release Bearing

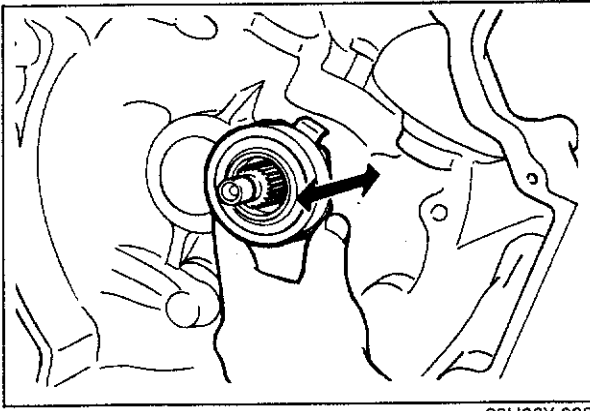
1. Turn the bearing both directions and check for any binding or abnormal noise.
2. Worn or damaged diaphragm spring or release fork contact surface.

Note

The clutch release bearing is a sealed bearing and must not be washed.

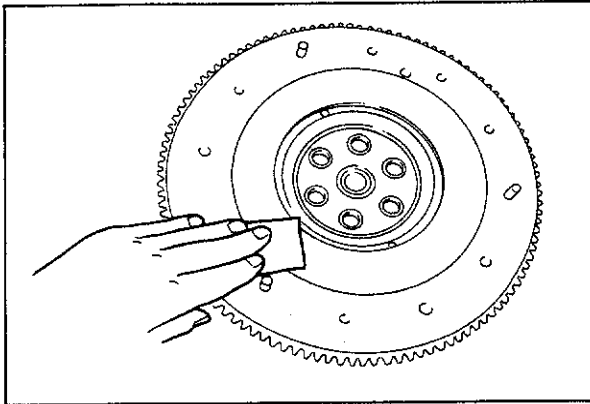


83U06X-012



63U06X-025

3. Sliding condition of bearing.
Install the bearing on the clutch housing extension and check for smooth movement.



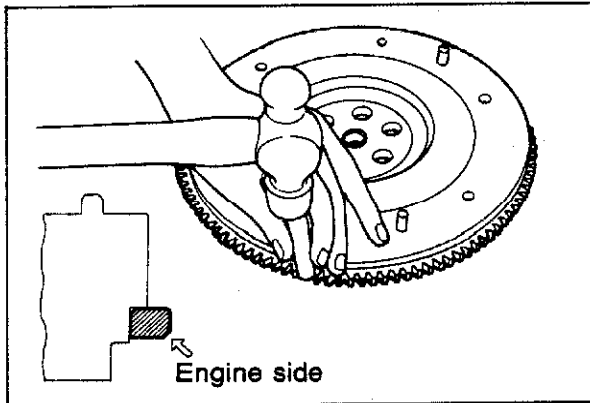
86U06X-025

Flywheel

1. Surface marks, scoring or discoloration of clutch disc contact surface.

Note

If problem is minor, repairs can be made by cleaning with sandpaper.



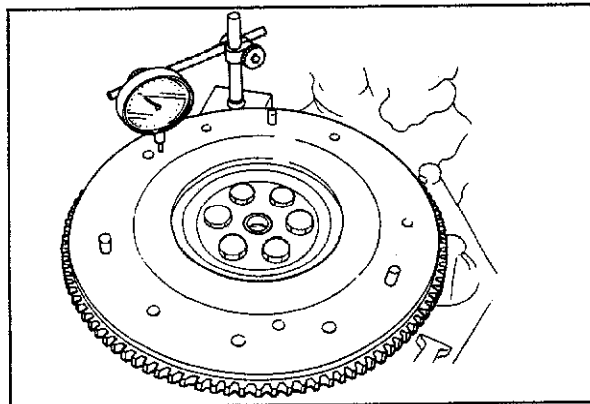
83U06X-013

2. Damaged or worn ring gear teeth.
If necessary, replace the ring gear as follows:

- (1) Heat the ring gear with a blowtorch, and then tap around the gear to remove it from the flywheel.
- (2) Heat the new ring gear to 250—300°C (480—570°F), and then fit it onto the flywheel.

Note

The bevelled side of the ring gear must face toward the engine side.



4BG06X-030

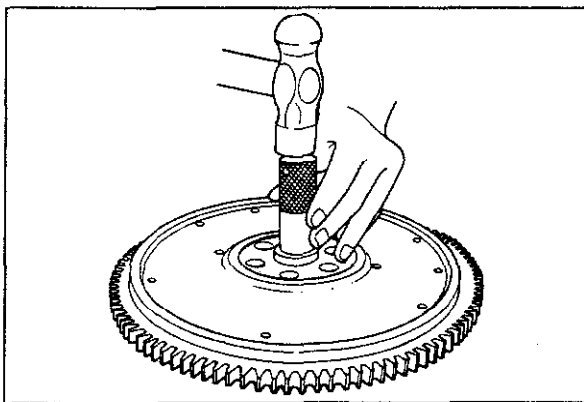
3. Deflection of flywheel
(1) To measure, set a dial gauge on the clutch disc contact surface, and then turn the flywheel.

Deflection limit: 0.2 mm (0.008 in)

- (2) If the deflection exceeds the limit, repair by grinding.

Grinding limit: 0.5 mm (0.020 in)

6 CLUTCH AND FLYWHEEL

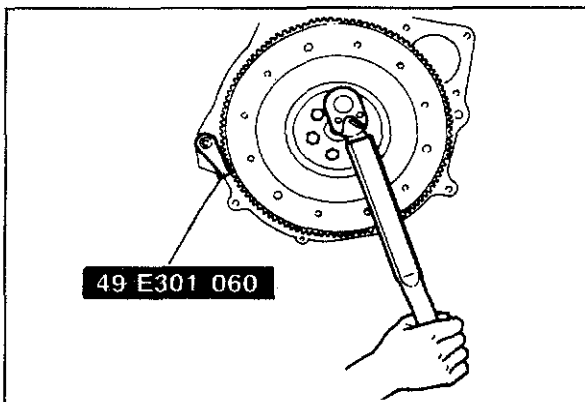


63U06X-029

INSTALLATION

Install in the reverse order of removal and note the following:

1. Install the pilot bearing in the flywheel with a suitable rod and a hammer.



83U06X-014

2. After installing the flywheel, attach the **SST** and tighten the flywheel installation bolts.

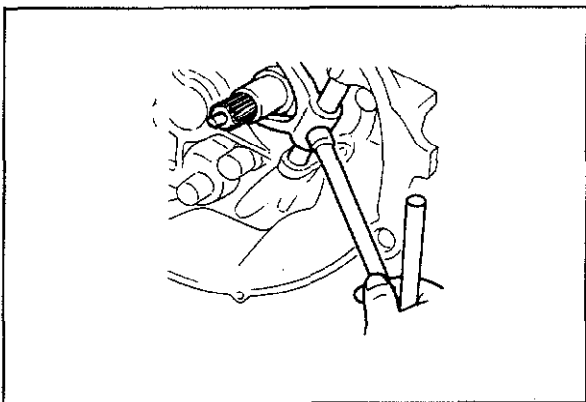
Tightening torque

96—103 N·m (9.8—10.5 m·kg, 71—75 ft·lb)

Note

If reinstalling flywheel bolts clean threads to remove old sealant, apply new sealant and tighten to specification.

If old sealant can not be removed replace bolts.

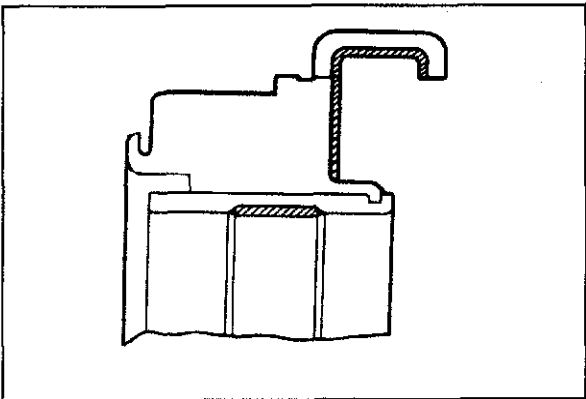


63U06X-031

3. Install the release lever and apply a coating sealant the bolt.

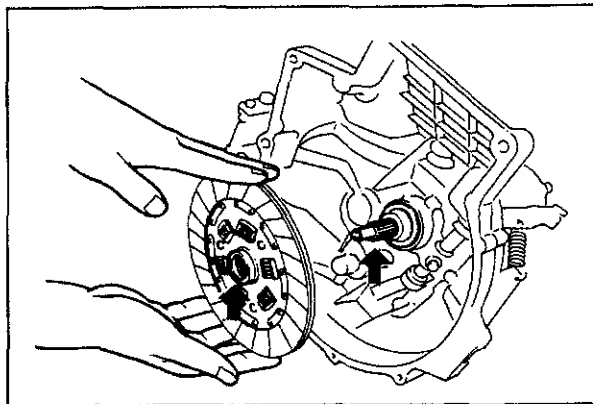
Tightening torque

7.8—10.8 N·m (0.8—1.1 m·kg, 5.8—8.0 ft·lb)



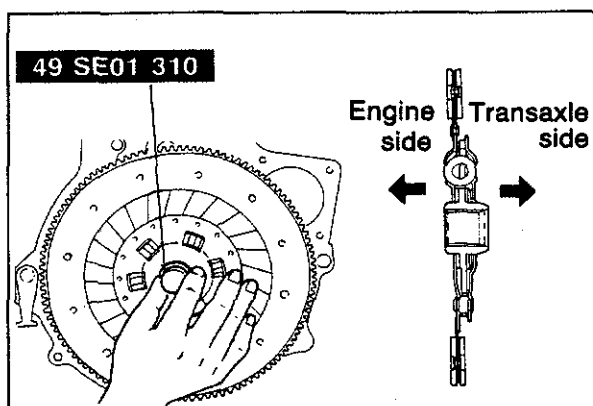
63U06X-032

4. Apply clutch grease (Mori White TA No. 2 or equivalent organic molybdenum grease) to the shaded areas of the release bearing.



63U06X-033

5. Clean the clutch disc splines and primary shaft splines, then apply clutch grease. (Mori White TA No. 2 or equivalent organic molybdenum grease)

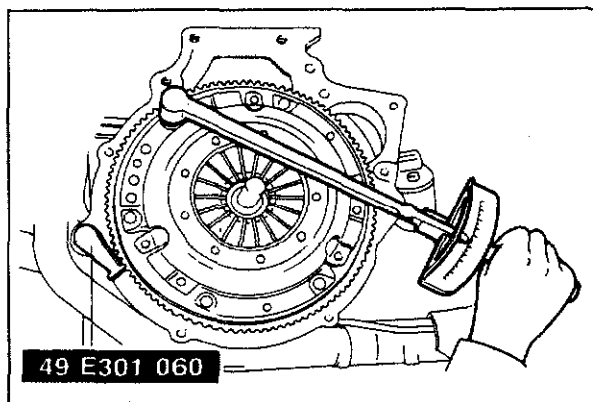


83U06X-015

6. Install the clutch disc by using the **SST**.

Note

Install the clutch so that it faces in the direction shown in the figure.



83U06X-026

7. Tighten the pressure plate gradually, diagonally and evenly. Use the **SST**.

Tightening torque

18—26 N·m (1.8—2.6 m·kg, 13.0—20.3 ft·lb)

MANUAL TRANSAXLE 2WD

F-type (Non-Turbo)

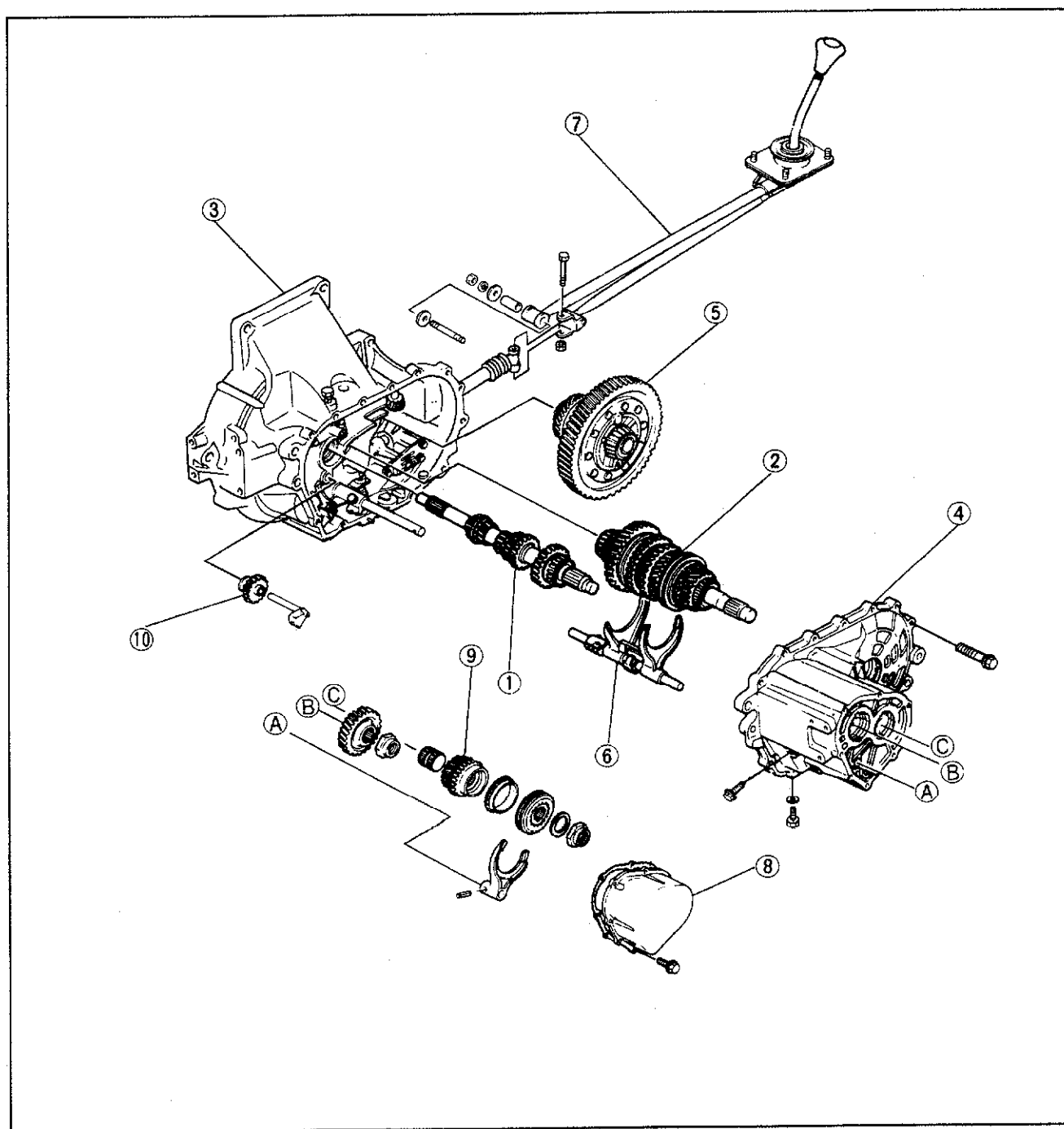
OUTLINE	7A— 2
STRUCTURAL VIEW	7A— 2
CROSS-SECTIONAL VIEW	7A— 4
SPECIFICATIONS	7A— 6
TROUBLESHOOTING GUIDE	7A— 7
ON-VEHICLE MAINTENANCE	7A— 8
TRANSAXLE OIL	7A— 8
DRIVESHAFT OIL SEALS	7A— 9
REMOVAL	7A—12
DISASSEMBLY	7A—15
STEP 1	7A—15
STEP 2	7A—19
STEP 3	7A—22
DIFFERENTIAL	7A—25
INSPECTION	7A—26
ASSEMBLY	7A—30
DIFFERENTIAL	7A—30
STEP 1	7A—32
STEP 2	7A—42
STEP 3	7A—44
INSTALLATION	7A—78
TRANSAXLE CONTROL	7A—81
REMOVAL	7A—81
INSPECTION	7A—82
INSTALLATION	7A—82

G-type (Turbo)

OUTLINE	7A— 3
STRUCTURAL VIEW	7A— 3
CROSS-SECTIONAL VIEW	7A— 5
SPECIFICATIONS	7A— 6
TROUBLESHOOTING GUIDE	7A— 7
ON-VEHICLE MAINTENANCE	7A— 8
TRANSAXLE OIL	7A— 8
DRIVESHAFT OIL SEALS	7A— 9
REMOVAL	7A—12
DISASSEMBLY	7A—49
STEP 1	7A—49
STEP 2	7A—52
STEP 3	7A—54
DIFFERENTIAL	7A—56
INSPECTION	7A—58
ASSEMBLY	7A—62
INSTALLATION	7A—78
TRANSAXLE CONTROL	7A—81
REMOVAL	7A—81
INSPECTION	7A—82
INSTALLATION	7A—82

OUTLINE (F-type)

STRUCTURAL VIEW

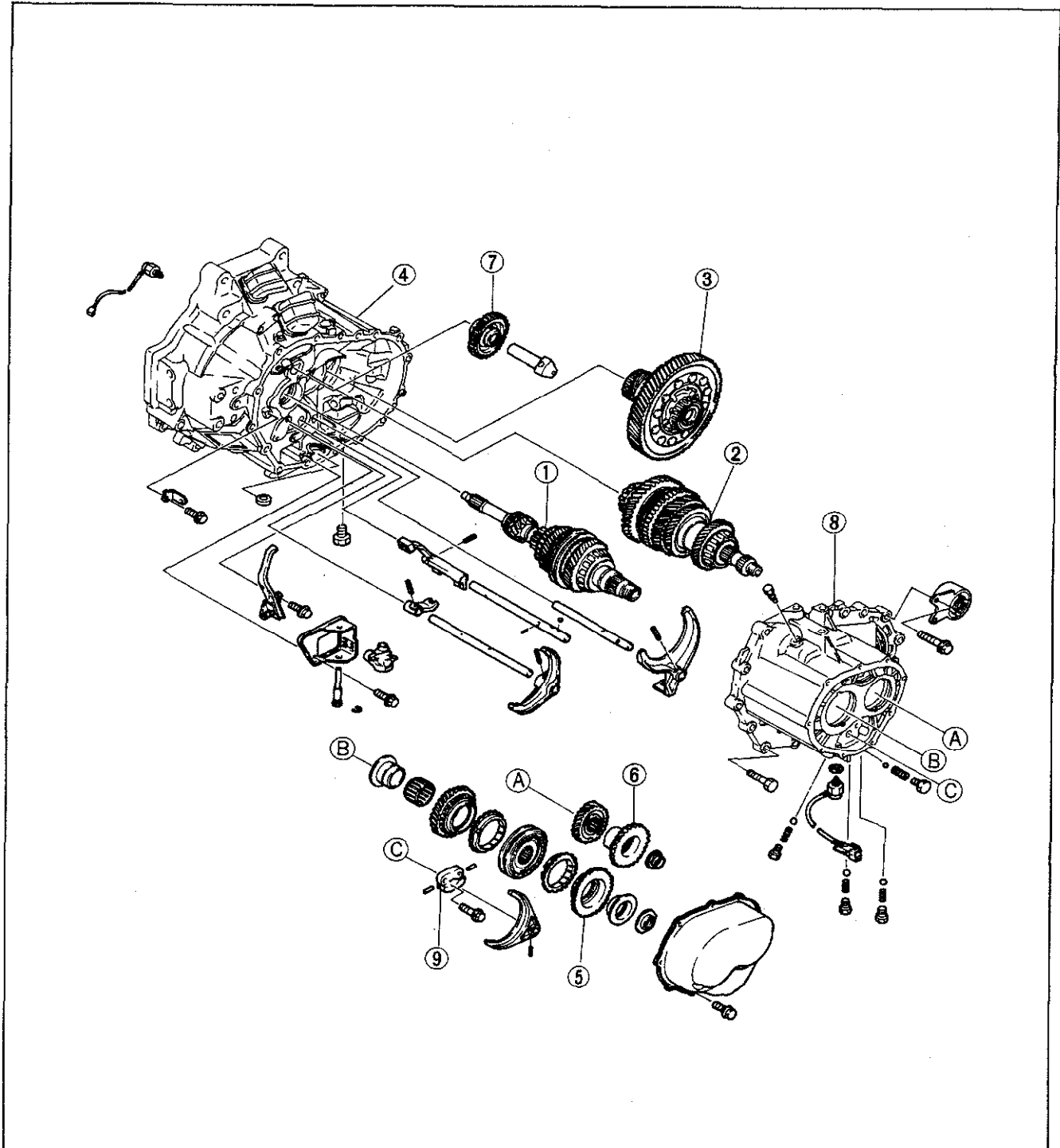


83U07A-002

- | | | |
|----------------------------------|--------------------------------------|-------------------------------|
| 1. Primary shaft gear assembly | 3. Clutch housing | 7. Transaxle control assembly |
| 2. Secondary shaft gear assembly | 4. Transaxle case | 8. Rear cover |
| | 5. Differential assembly | 9. 5th gear |
| | 6. Shift fork and shift rod assembly | 10. Reverse idle gear |

OUTLINE (G-type)

STRUCTURAL VIEW

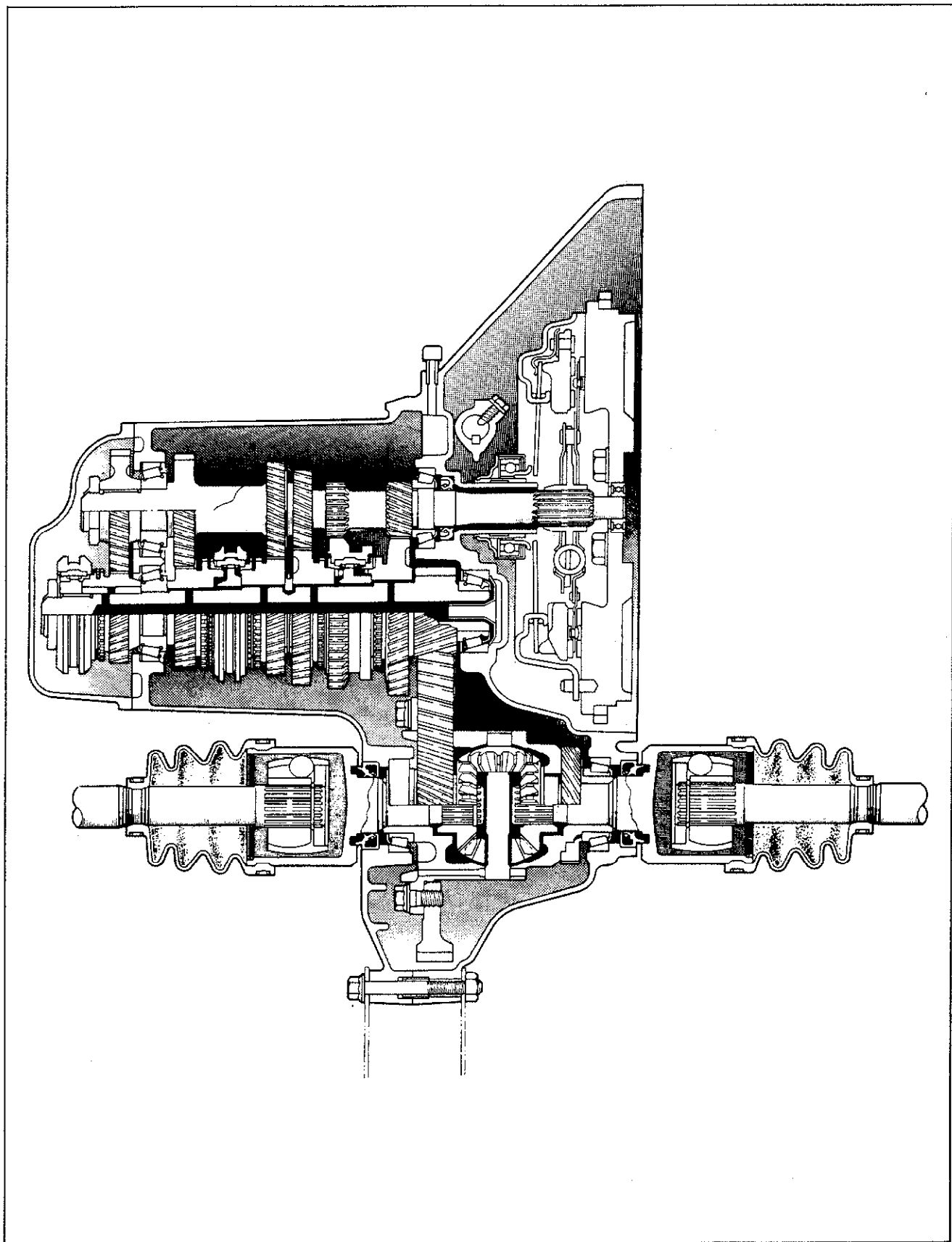


86U07A-046

- 1. Primary shaft gear assembly
- 2. Secondary shaft gear assembly
- 3. Differential assembly
- 4. Clutch housing

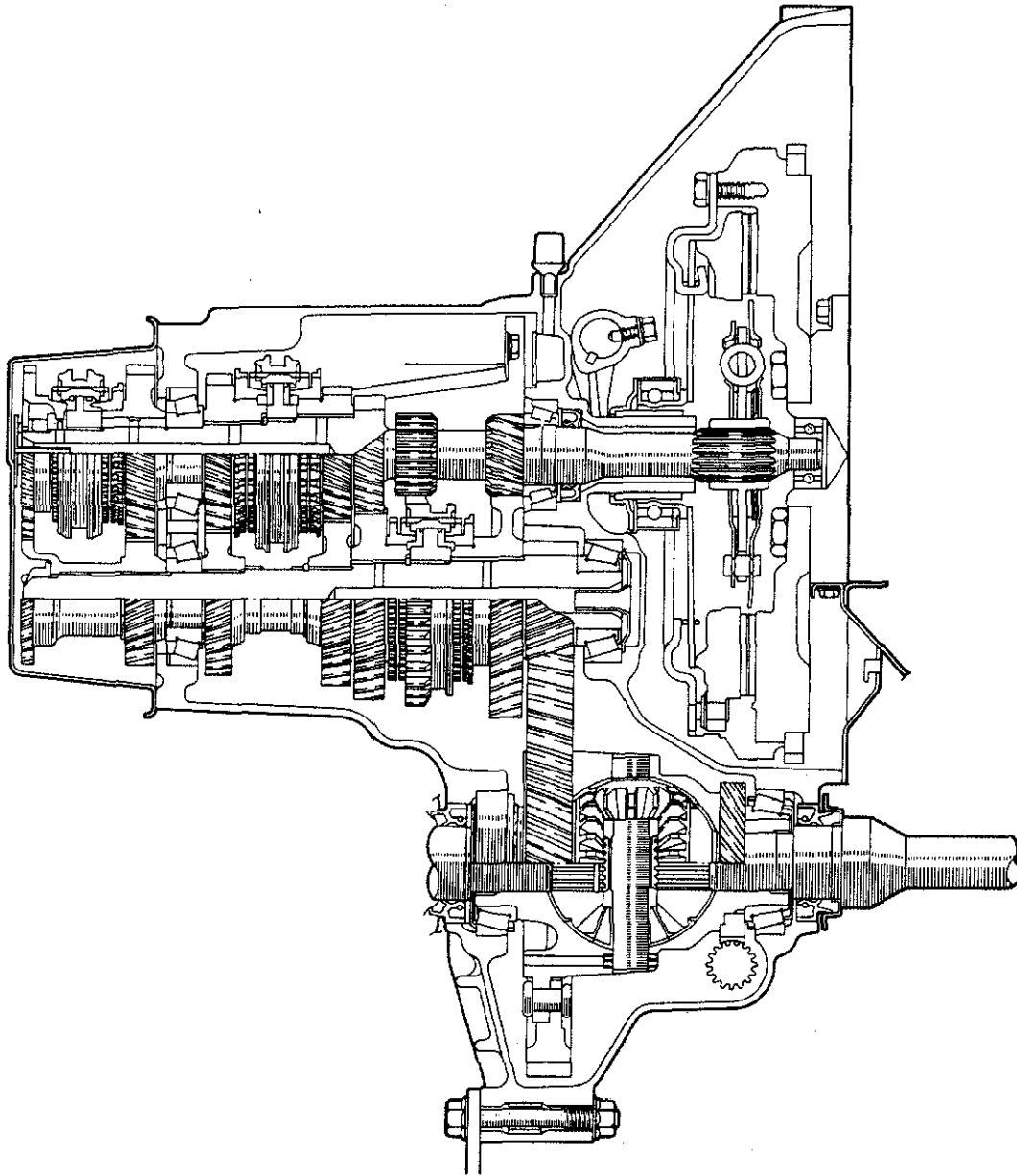
- 5. Primary reverse synchronizer gear
- 6. Secondary reverse synchronizer gear
- 7. Reverse idle gear
- 8. Transaxle case

CROSS-SECTIONAL VIEW (F-type)



83U07A-003

CROSS-SECTIONAL VIEW (G-type)



83U07A-047

SPECIFICATIONS

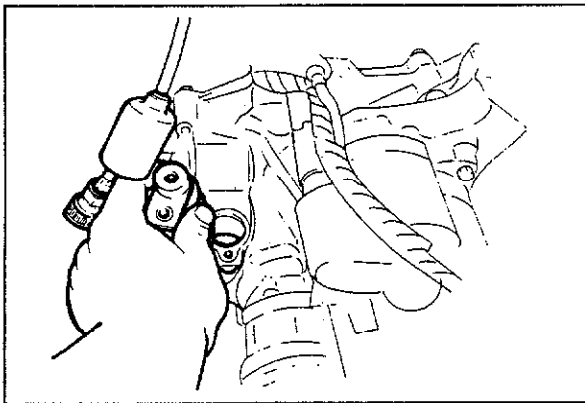
Item		Transaxle model	F-type (non-turbo)	G-type (turbo)
Transaxle control			Floor shift	
Synchromesh system	Forward		Synchromesh	
	Reverse		Selective sliding	Selective sliding and synchromesh
Gear ratio	First		3.416	3.307
	Second		1.842	1.833
	Third		1.290	1.233
	Fourth		0.918	0.970
	Fifth		0.731	0.795
	Reverse		3.214	3.166
Final gear ratio			4.105	3.850
Speedometer gear ratio			0.88	
Oil	Type		API: GL-4 or GL-5 SAE80W-90 or SAE90 Above -18°C (0°F) ATF: M2C33-F or DEXRON-II	ATF: DEXRON-II API: GL-4 or GL-5 SAE80W-90 or SAE-90
	Capacity liters (US qt, Imp qt)		3.2 (3.4, 2.8)	3.35 (3.55, 2.96)

83U07A-005

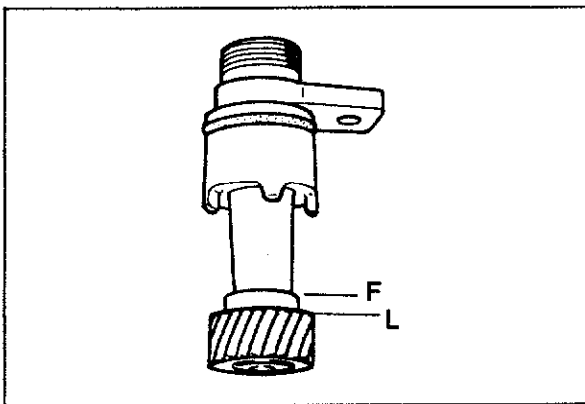
TROUBLESHOOTING GUIDE

Problem	Probable Cause	Remedy
Change lever won't shift smoothly, or is hard to shift	Seized change lever ball Seized change control rod joint Bent change control rod	Replace Replace Replace
Too much play in change lever	Worn change control rod bushing Weak change lever ball spring Worn change lever ball bushing	Replace Replace Replace
Difficult to shift	Bent change control rod No grease in transaxle control Insufficient oil Deterioration of oil quality Wear or play of shift fork or shift rod Worn synchronizer ring Worn synchronizer cone of gear Bad contact of synchronizer ring and cone of gear Excessive longitudinal play of gears Worn bearing Worn synchronizer key spring Excessive primary shift gear bearing preload Improperly adjusted change guide plate	Replace Lubricate with grease Add oil Replace with oil of specified quality Replace Replace Replace Replace Replace Adjust or replace Replace Adjust Adjust
Won't stay in gear	Bent change control rod Worn change control rod bushing Weak change lever ball spring Improperly installed extension bar Worn shift fork Worn clutch hub Worn clutch hub sleeve Worn secondary shaft gear Worn sliding surface of gear Worn steel ball sliding groove of control end Weak spring pressing against steel ball Excessive gear backlash Worn bearing Improperly installed engine mount	Replace Replace Replace Tighten Replace Replace Replace Replace Replace Replace Replace Replace Replace Replace Tighten
Abnormal noise	Insufficient oil Deterioration of oil quality Worn bearing Worn secondary shaft gear Worn sliding surface of gear Excessive gear backlash Damaged gear teeth Foreign material in gears Damaged differential gear, or excessive backlash	Add oil Replace with oil of specified quality Adjust or replace Replace Replace Replace Replace Replace Replace Repair or replace

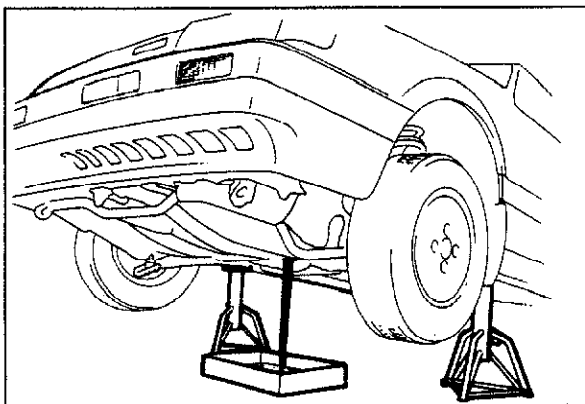
83U07A-006



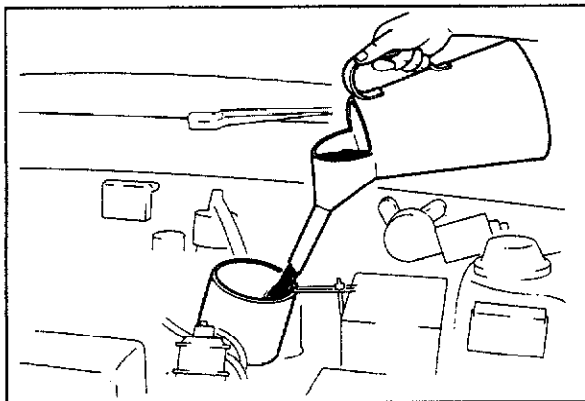
63U07A-006



63U07A-007



83U07A-007



83U07A-008

ON-VEHICLE MAINTENANCE

TRANSAXLE OIL

Inspection

1. Park the vehicle on a level area.
2. Remove the speedometer cable dust cover, and disconnect the cable from the speedometer driven gear.
3. After removing the bolt, pull the gear case to remove it from the housing. (Insert a flat-tipped screwdriver between the speedometer gear case and the clutch housing, and use it to pry the gear case loose if necessary.)
4. Check whether the oil level is between the "F" and "L".
5. If not, add the necessary amount of the specified oil through the gear case hole.

Replacement

1. Park the vehicle on a level area.
2. Remove the speedometer driven gear. (See "Inspection" section above.)
3. Remove the drain plug, and drain the oil.
4. Replace the drain plug, and add the necessary amount of the specified oil through the speedometer gear case hole.

Tightening torque :

39—59 N·m (4.0—6.0 m·kg, 29—43 ft·lb)

Specified oil

Type:

F-type MTX

Above -18°C(0°F):

API Service GL-4 or GL-5
(SAE 90 or 80W-90)

Below -18°C(0°F):

ATF M2C33-F or DEXRON-II.

G-type MTX

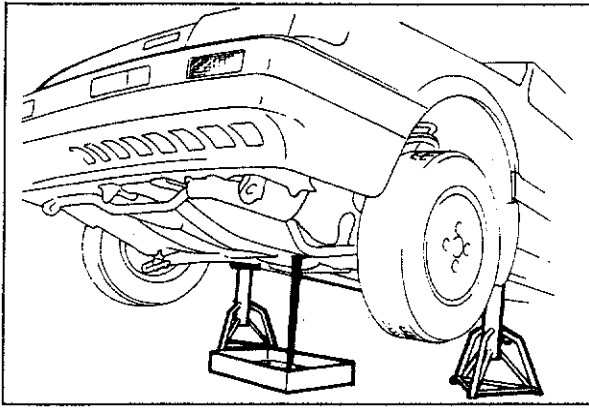
ATF DEXRON-II

API: GL-4 or GL-5
SAE80W-90 or SAE 90

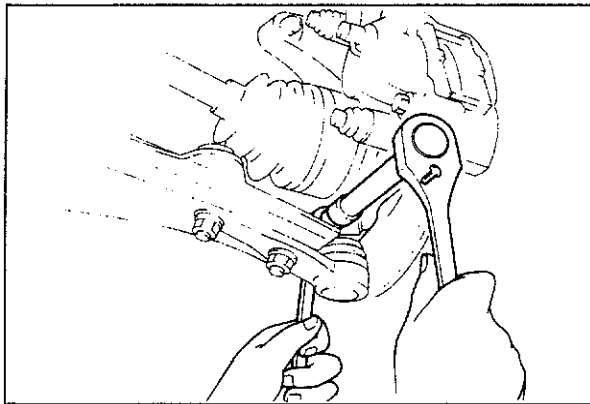
Capacity:

F-type MTX 3.2 liters
(3.4 US qt, 2.8 Imp qt)

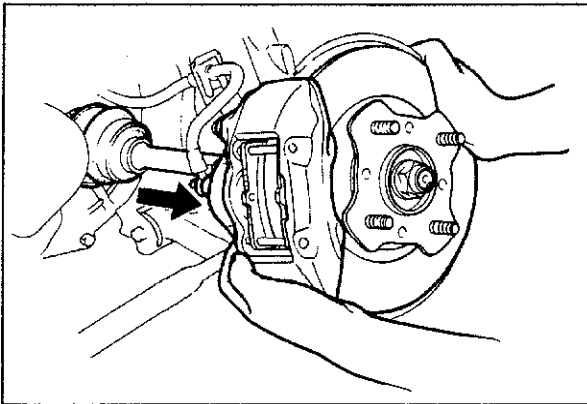
G-type MTX 3.35 liters
(3.55 US qt, 2.96 Imp qt)



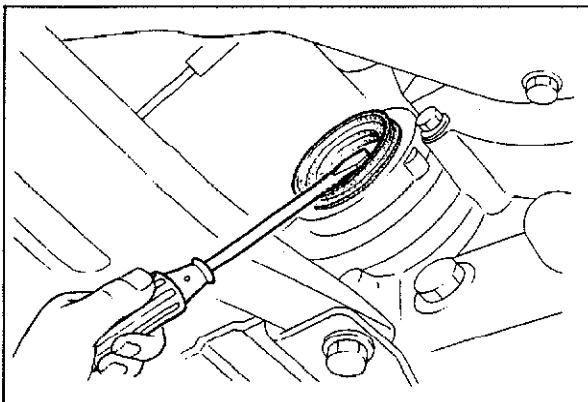
63U07A-010



63U07A-011



63U07A-012



63U07A-013

DRIVESHAFT OIL SEALS

Replacement

Jack up the vehicle, support it on safety stands, and then drain the transaxle oil. Next, use the following procedure to replace the driveshaft oil seals:

1. Remove the front wheel(s).
2. Remove the undercover.
3. Remove the side cover.
4. Separate the front stabilizer from the lower arm.

5. Remove the pinch bolt and pull the lower arm downward. Separate the knuckle from the lower arm.

Caution

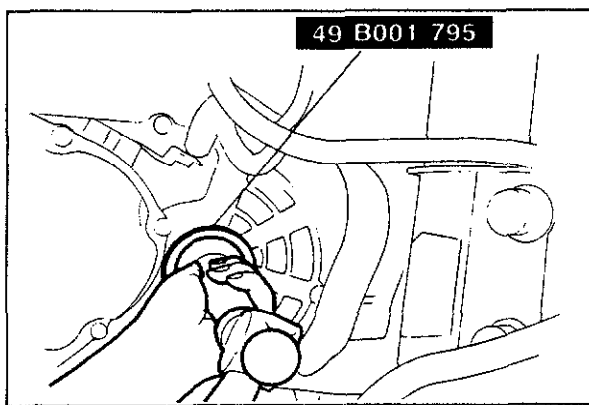
Be careful not to damage the ball joint dust boot.

6. Separate the driveshaft by pulling the front hub outward. Make sure not to use too much force at once, increase the force gradually.

Note

- a) Make sure not to allow the drive shaft ball joint to be bent to its maximum extent.
- b) Support the driveshaft using string, wire etc.

7. Remove the oil seal with a flat-tipped screwdriver.

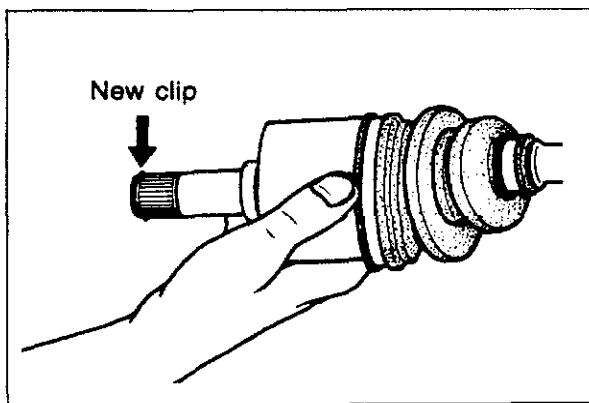


83U07A-048

8. Tap the new oil seal into the transaxle case with the **SST**.

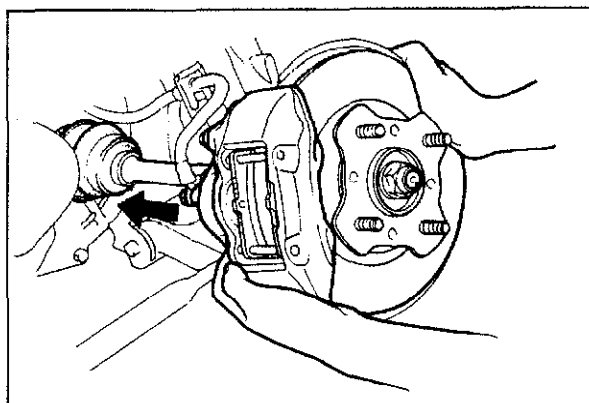
Caution

- a) Tap in until the oil seal installer contacts the case.
- b) Coat the oil seal lip with transaxle oil.



63U07A-015

9. Replace the driveshaft end clip with a new one. Insert the clip with the gap at the top of the groove.

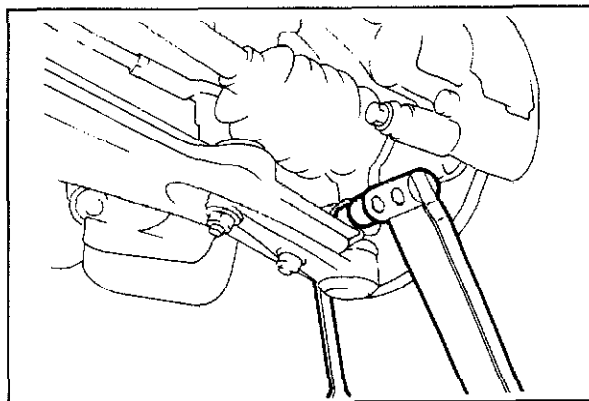


63U07A-016

10. Install the driveshaft, as follows:
- (1) Pull the front hub outward, and then fit the driveshaft into the transaxle.
 - (2) Insert the driveshaft into the transaxle by pushing on the wheel hub assembly.

Caution

- a) Be careful not to damage the oil seal.
- b) After installation is finished, pull the front hub slowly outward to check that the driveshaft is held securely by the clip.

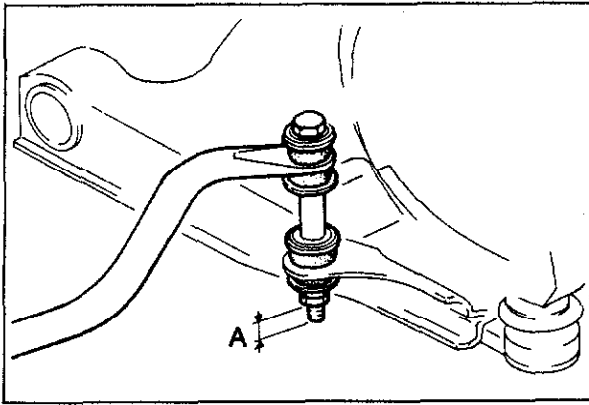


63U07A-017

11. Install the lower arm ball joint to the knuckle, and tighten the clinch bolt.

Tightening torque:

43—54 N·m (4.4—5.5 m·kg, 32—40 ft·lb)



63U07A-018

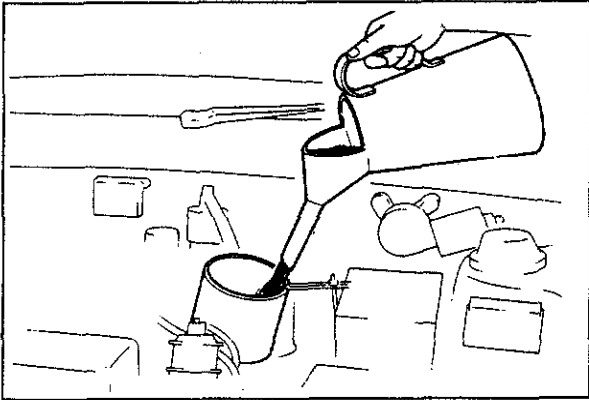
12. Adjust and tighten the front stabilizer bolt.

Tightening torque:

12—18 N·m (1.2—1.8 m·kg, 9—13 ft·lb)

Dimension A:

10.8 mm (0.43 in)



63U07A-019

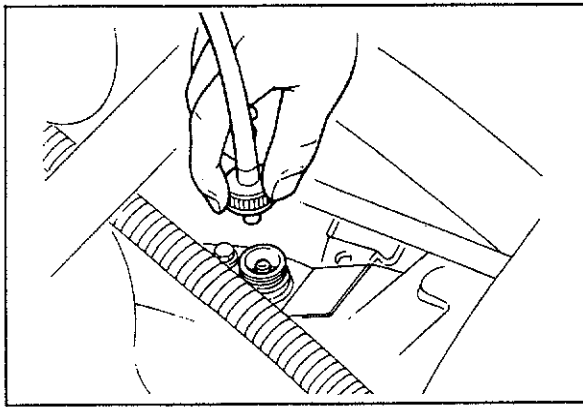
13. Install the side cover.

14. Install the undercover.

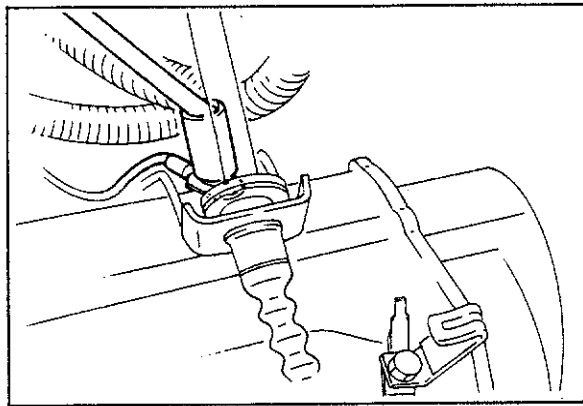
15. Mount the front wheel(s).

16. Remove the safety stands.

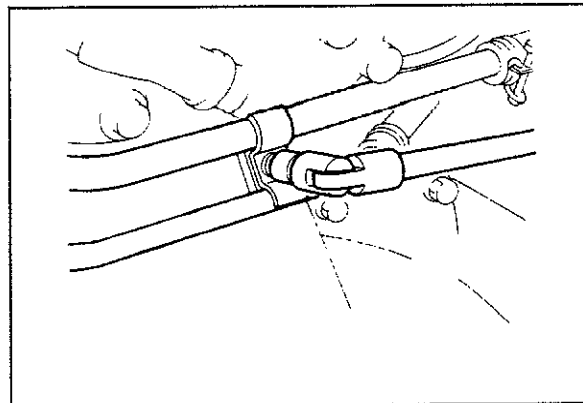
17. Add the correct quantity of the specified transaxle oil.



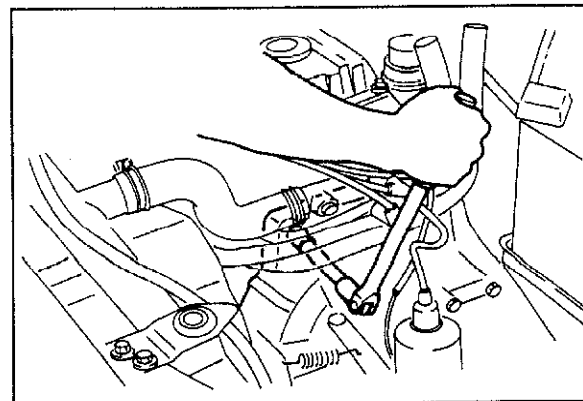
83U07A-049



63U07A-021



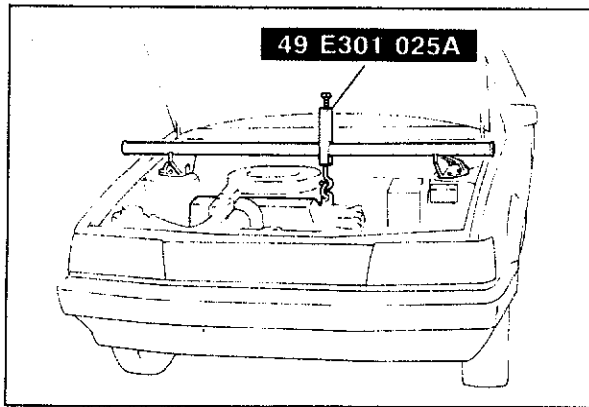
63U07A-022



83U07A-050

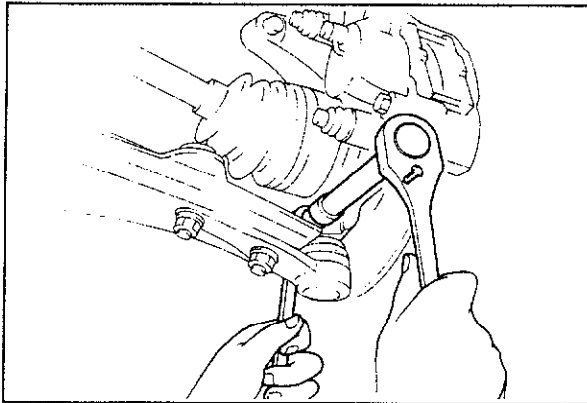
REMOVAL

1. Disconnect the battery negative cable.
2. Remove the air cleaner.
3. Loosen the front wheel lug nuts.
4. Disconnect the speedometer cable from the transaxle.
5. Disconnect the clutch cable from the release lever, and remove the clutch cable bracket mounting bolts.
6. Remove the ground wire installation bolt.
7. Remove water pipe bracket.
8. Remove the secondary air pipe and E.G.R. pipe bracket.
9. Remove the wire harness clip.
10. Disconnect the coupler for the neutral switch and the back-up light switch.
11. Disconnect the body ground connector.
12. Remove the two upper transaxle to engine mounting bolts.



83U07A-051

13. Mount the **SST** to the engine hanger.
14. Jack up the vehicle and support it with safety stands at the specified positions.
15. Drain the transaxle oil.
16. Remove the front wheels.
17. Remove the undercover and side covers.
18. Remove the front stabilizer.

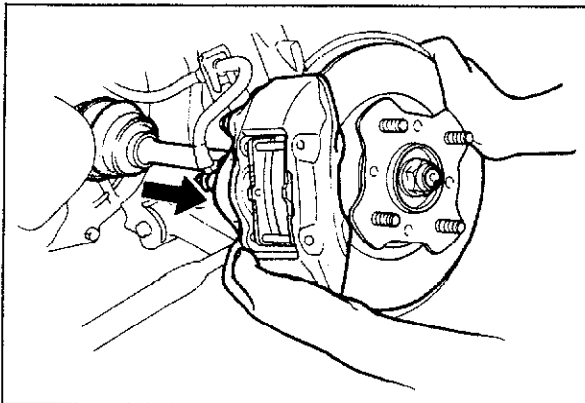


63U07A-025

19. Remove the lower arm ball joints and the knuckle clinch bolts, pull the lower arms downward, and separate the lower arms from the knuckles.

Caution

Be careful not to damage the ball joint dust boot.

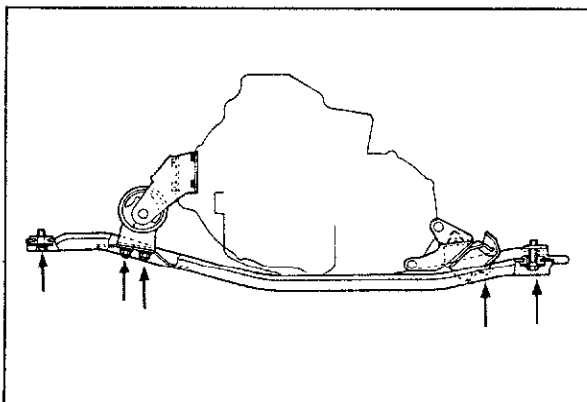


63U07A-026

20. Separate the driveshaft by pulling the front hub outward. Make sure not to use too much force at once, increase the force gradually.

Note

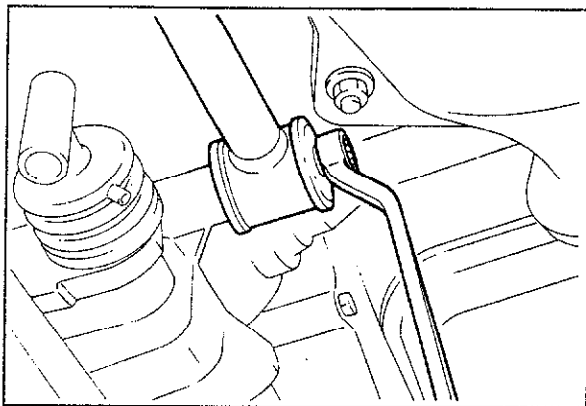
- a) Make sure not to allow the driveshaft ball joint to be bent to its maximum extent.
- b) Support the driveshaft using wire, string etc.



63U07A-027

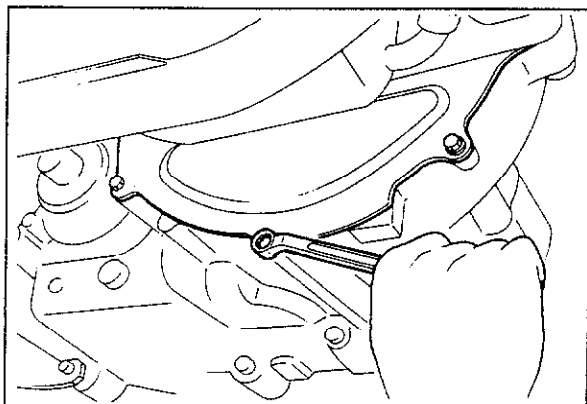
21. Remove the crossmember.

7A REMOVAL



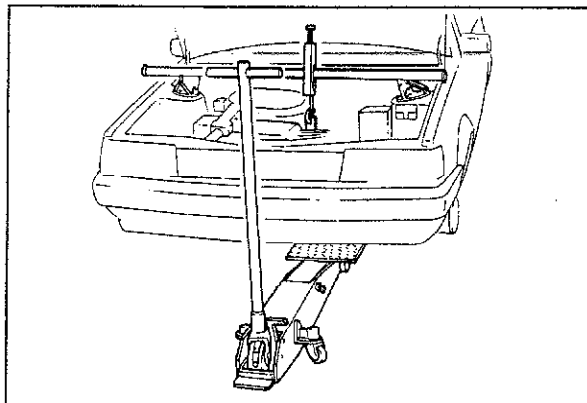
63U07A-028

- 22. Separate the change control rod from the transaxle.
- 23. Remove the extension bar from the transaxle.
- 24. Remove the wires from the starter motor, and remove the starter motor.



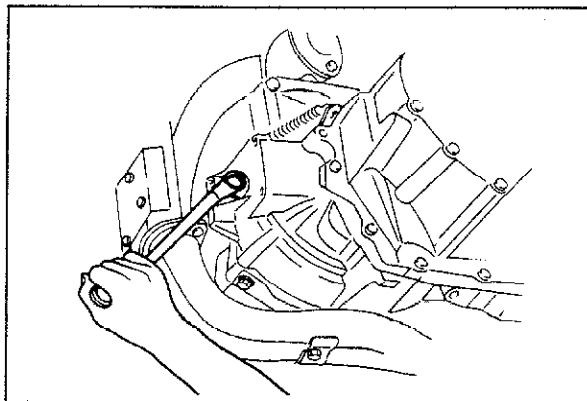
63U07A-029

- 25. Remove the end plate.
- 26. Lean the engine toward the transaxle side by loosening the engine support hook bolt.



63U07A-030

- 27. Support the transaxle with a jack.



63U07A-031

- 28. Remove the No. 2 engine bracket.
- 29. Remove the remaining transaxle mounting bolts.
- 30. Remove the transaxle.

[F-type] DISASSEMBLY

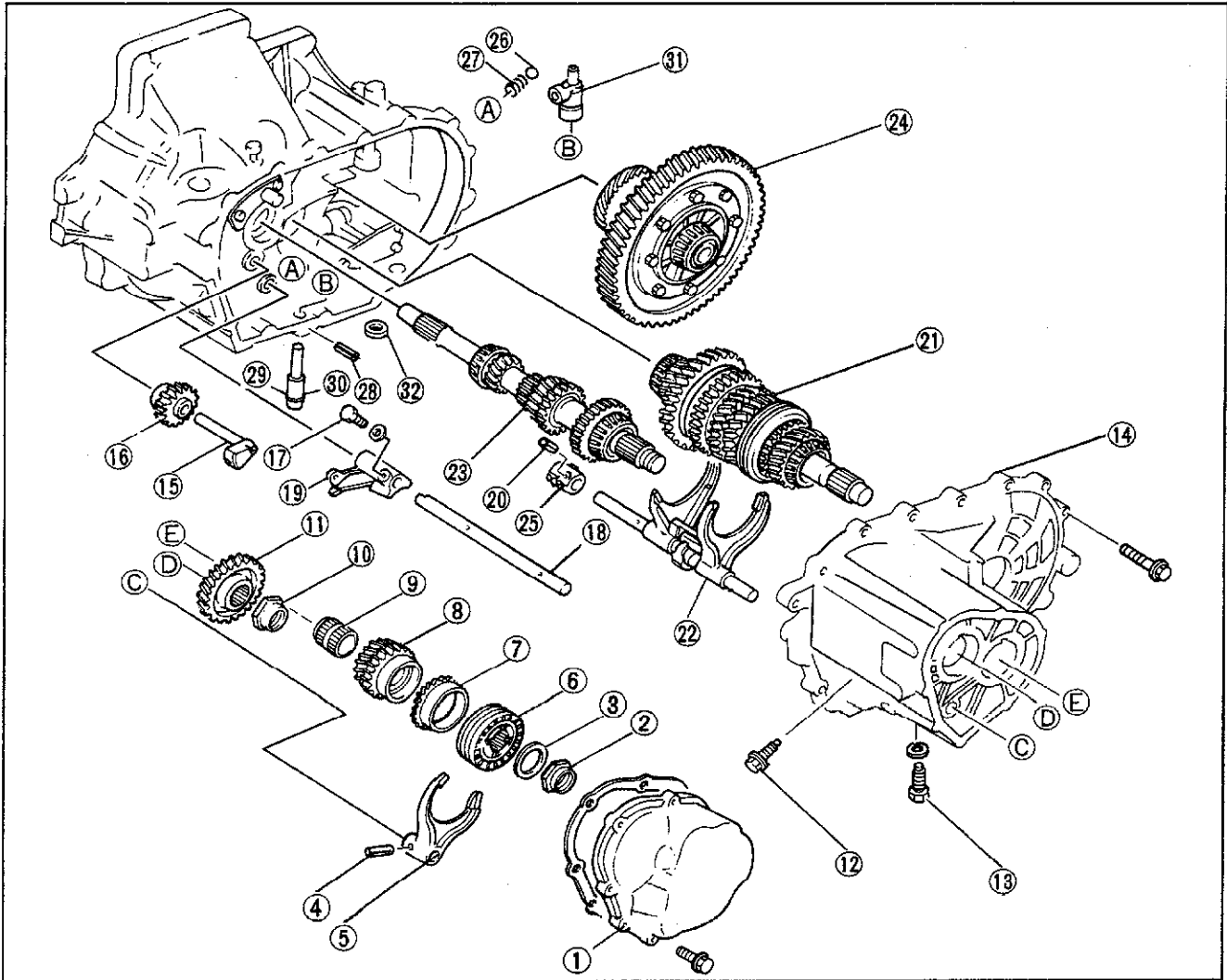
DISASSEMBLY-STEP 1

Disassemble in the numbered order shown in the figure.

Note

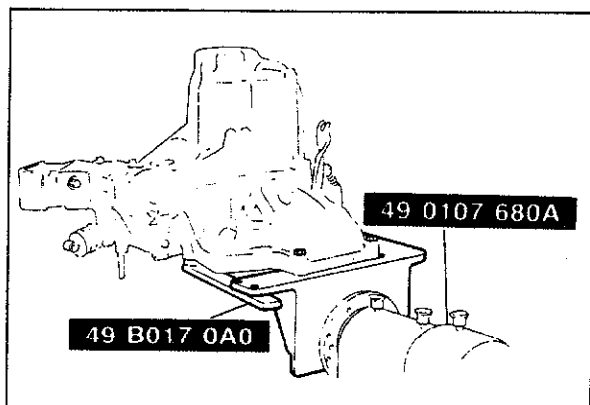
1—11 apply to 5 speed only. (Commence disassembly of 4 speed by removing transaxle case.)

83U07A-052



63U07A-033

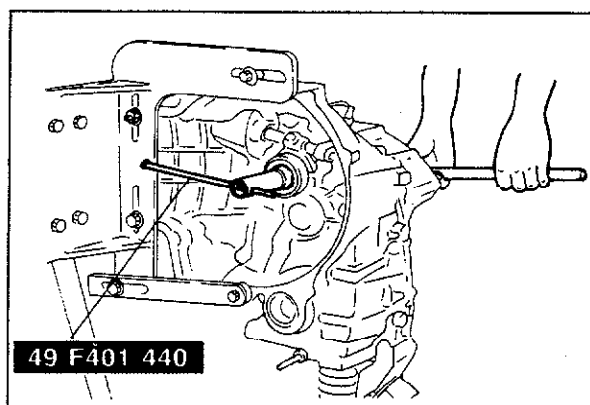
- | | | |
|------------------------|-----------------------------------|---------------------------------|
| 1. Rear cover | 12. Lock bolt | 22. Shift fork assembly |
| 2. Lock nut | 13. Guide bolt | 23. Primary shaft gear assembly |
| 3. Stopper plate | 14. Transaxle case | 24. Differential assembly |
| 4. Spring pin | 15. Reverse idle shaft | 25. Control end |
| 5. Shift fork | 16. Reverse idle gear | 26. Steel ball |
| 6. Clutch hub assembly | 17. Lock bolt | 27. Spring |
| 7. Synchronizer ring | 18. Shift rod (5th and reverse) | 28. Spring pin |
| 8. 5th gear | 19. Gate | 29. Crank lever shaft |
| 9. Gear sleeve | 20. Spring pin | 30. O-ring |
| 10. Lock nut | 21. Secondary shaft gear assembly | 31. Crank lever assembly |
| 11. Primary gear | | 32. Magnet |



83U07A-053

Transaxle

Position the **SST**, and mount the transaxle on the hanger.



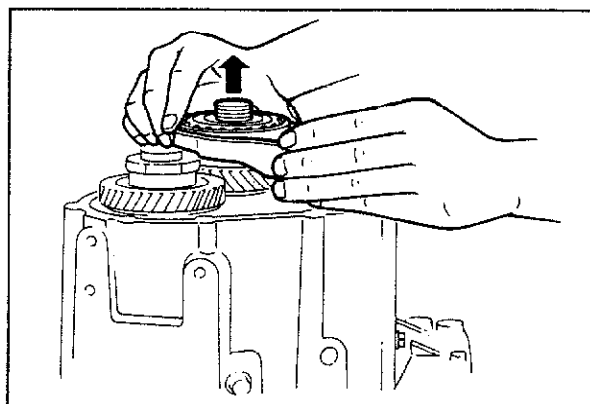
83U07A-054

Lock Nut

Lock the primary shaft with the **SST**, and remove the lock nut.

Note

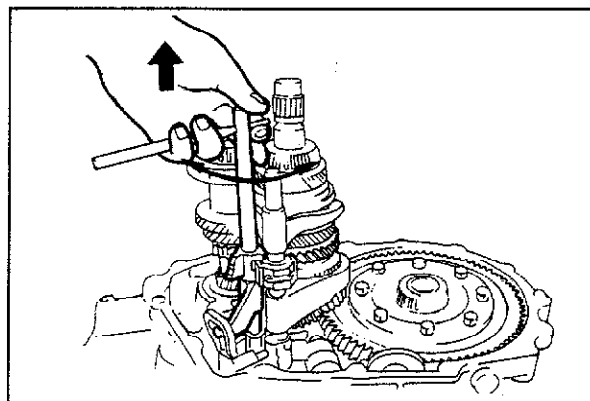
Shift to 1st or 2nd.



63U07A-036

Shift Fork (5th)

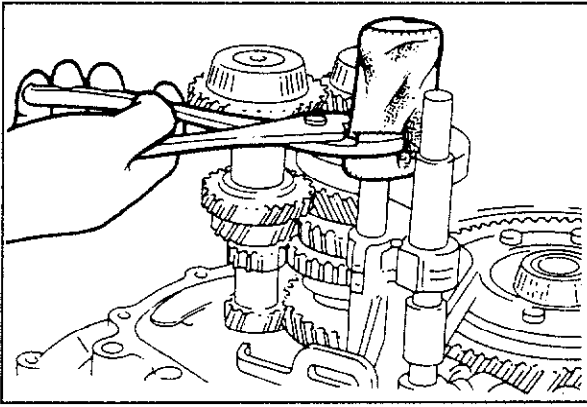
Remove the shift fork (5th) together with the clutch hub assembly.



63U07A-037

Shift rod (5th and reverse)

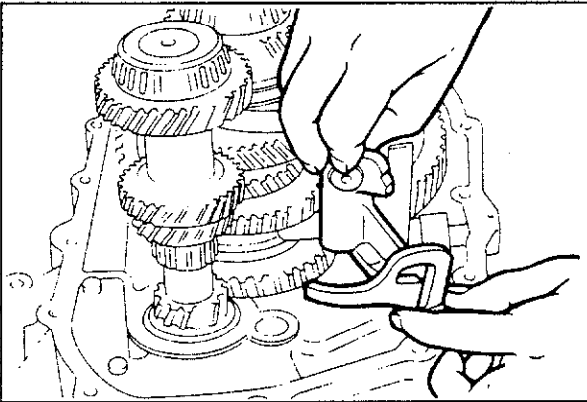
1. Insert a pin punch or suitable rod into the spring pin hole of the shift rod.
2. Pull out the shift rod while turning the pin punch or the rod (5 speed).



73U07A-505

Reverse Shift Rod

To remove the reverse shift rod, wrap it with a cloth and turn it with pliers while pulling out.



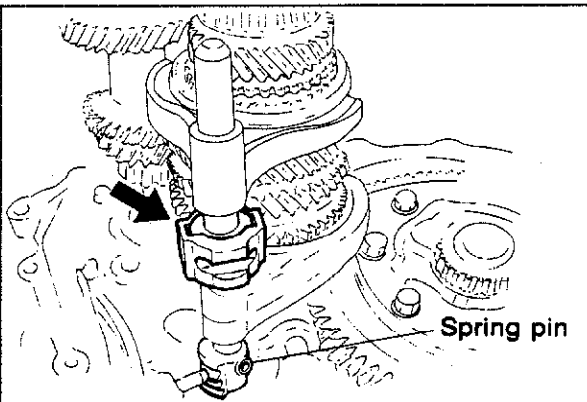
73U07A-506

Gate

Remove the gate by lifting it out together with the reverse lever.

Note

Before removing the gate, place the transaxle in neutral.

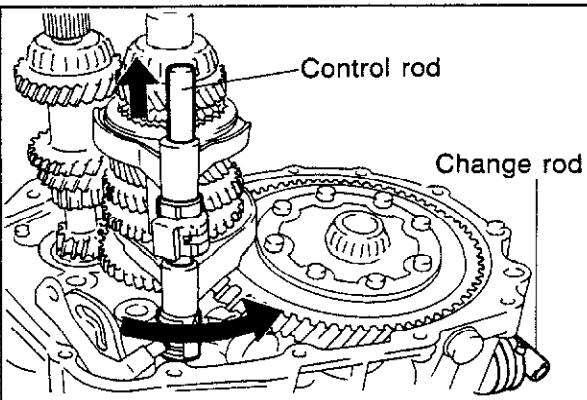


63U07A-040

Spring Pin

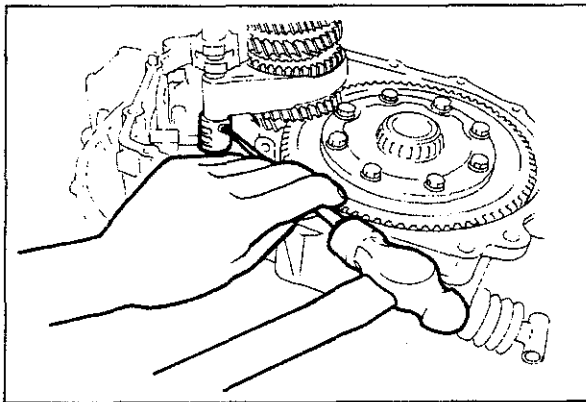
The spring pin used for attaching the control rod and control end can easily be removed by the following procedure:

1. Make sure the transaxle is in neutral and the interlock sleeve and control lever are in the position as shown in the figure.



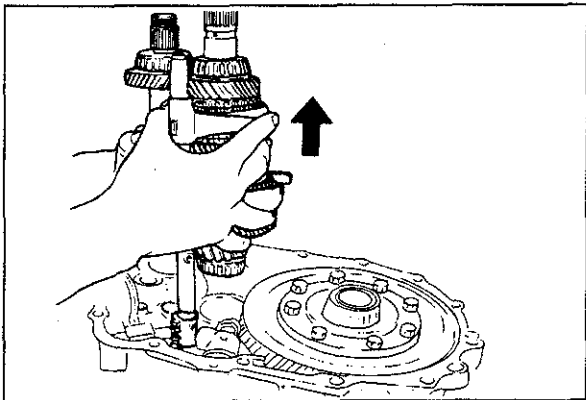
63U07A-041

2. Move the change rod to turn the control rod counter clockwise.
3. Hold the change rod in the turned position and push inward on it to raise the control rod upward.



63U07A-042

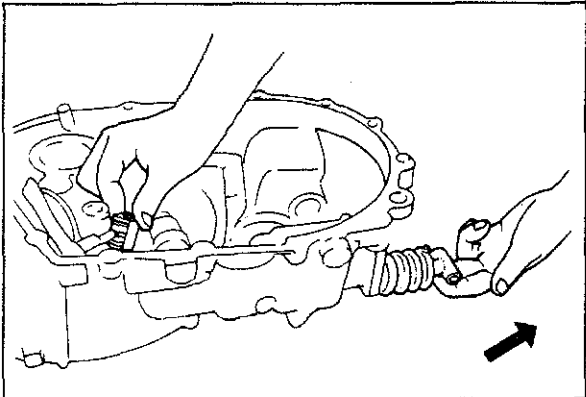
4. Remove the spring pin with a pin punch.



63U07A-043

Primary Shaft Gear Assembly, Secondary Shaft Gear Assembly and Shift Fork Assembly

Lift the primary shaft, secondary shaft and shift fork assemblies out as a unit.



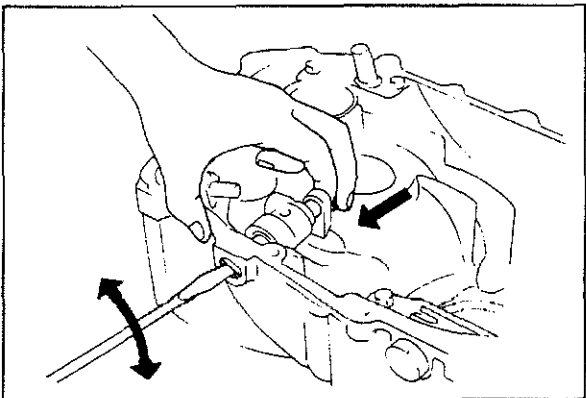
63U07A-044

Control End

Pull the change rod rearward and remove the control end and ball and spring.

Caution

Be careful not to lose the ball and spring.



63U07A-045

Crank Lever Shaft

Turn the lever with a screwdriver while pushing the lever out of the housing, and remove.

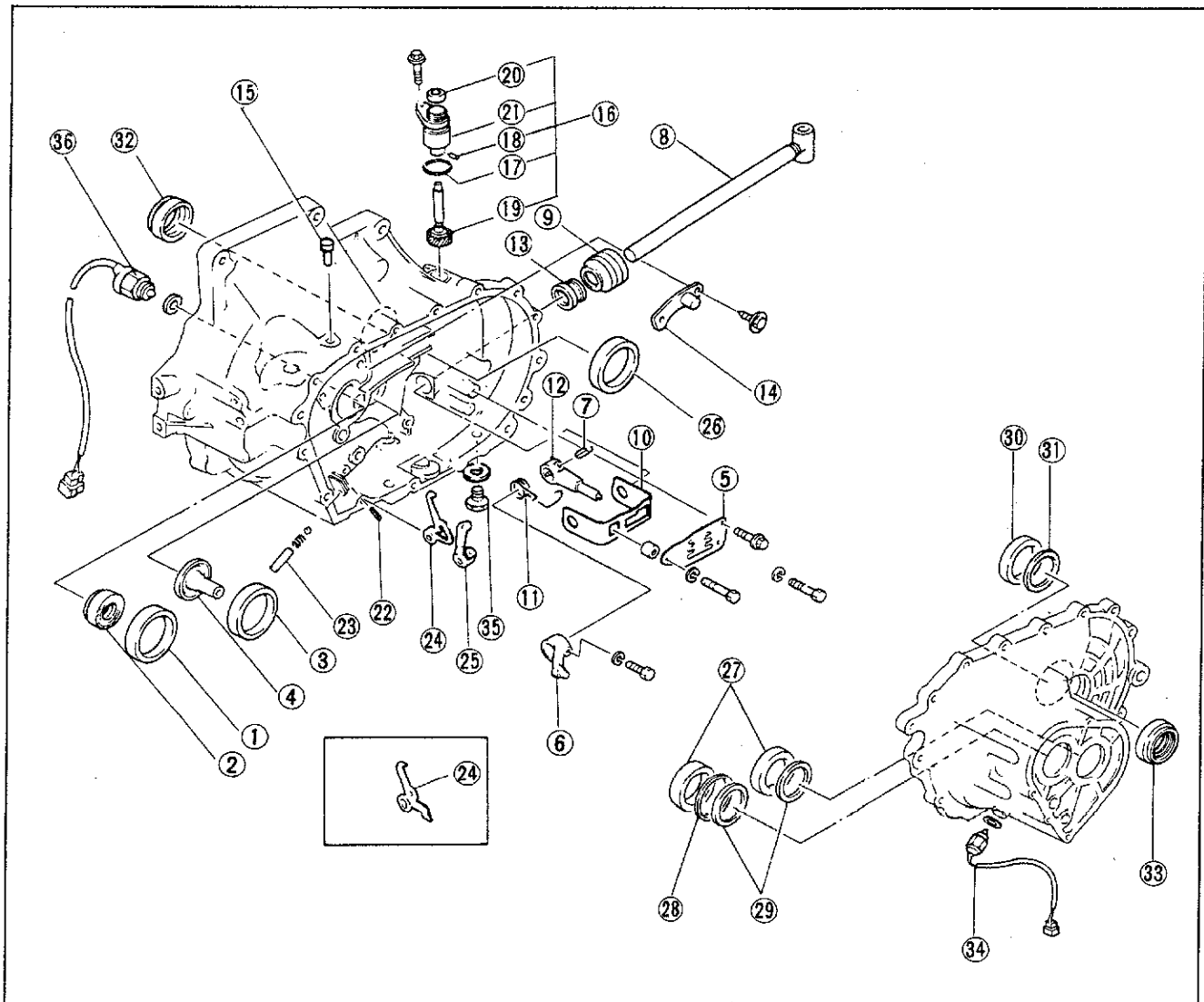
DISASSEMBLY-STEP 2

Disassemble in the numbered order shown in the figure.

Note

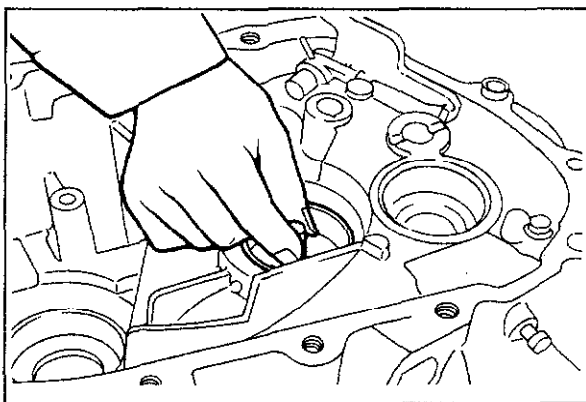
10, 11, and 25 are for 5 speed only.

63U07A-046



63U07A-047

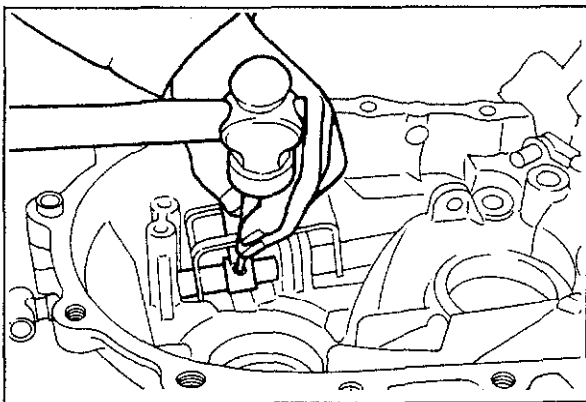
- | | | |
|-----------------------|--------------------------------------|--------------------------|
| 1. Bearing outer race | 13. Oil seal | 25. Lever set spring |
| 2. Oil seal | 14. Breather cover | 26. Bearing outer race |
| 3. Bearing outer race | 15. Breather | 27. Bearing outer race |
| 4. Funnel | 16. Speedometer driven gear assembly | 28. Diaphragm spring |
| 5. Guide plate | 17. O-ring | 29. Adjustment shim |
| 6. Change arm | 18. Spring pin | 30. Bearing outer race |
| 7. Spring pin | 19. Driven gear | 31. Adjustment shim |
| 8. Change rod | 20. Oil seal | 32. Oil seal |
| 9. Boot | 21. Gear case | 33. Oil seal |
| 10. Reverse gate | 22. Spring pin | 34. Back-up light switch |
| 11. Spring | 23. Reverse lever shaft | 35. Drain plug |
| 12. Selector | 24. Reverse lever | 36. Neutral switch |



63U07A-048

Bearing Outer Race (secondary shaft gear)

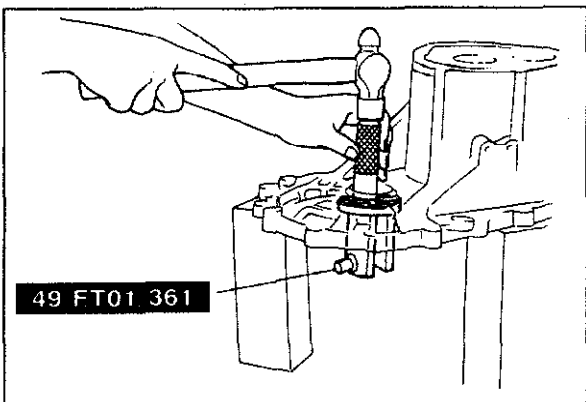
Remove the bearing outer race by lifting the funnel and the race out together.



63U07A-049

Spring pin

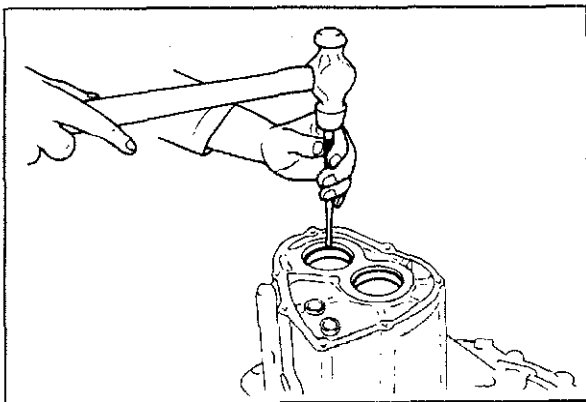
For removing the selector attaching pin, match the pin's position with the removing groove, then tap the pin out with a pin punch and hammer.



83U07A-055

Bearing Outer Race (differential, clutch housing and transaxle case)

Remove the bearing outer races with the **SST** and hammer. Do not remove the oil seals, unless replacement is necessary due to damage.



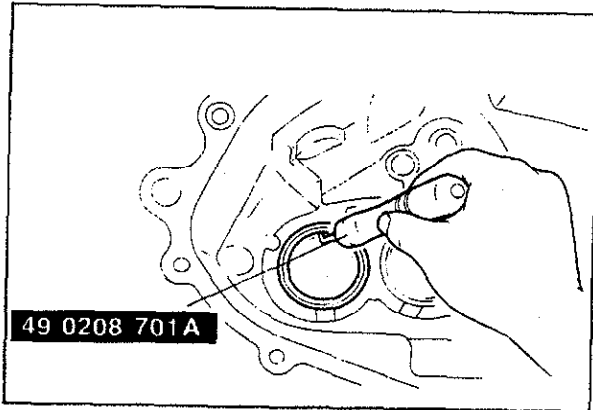
63U07A-051

Bearing Outer Race (5th gear, transaxle case)

Remove both of the bearing outer races with a brass rod positioned on the race by means of the grooves in the case.

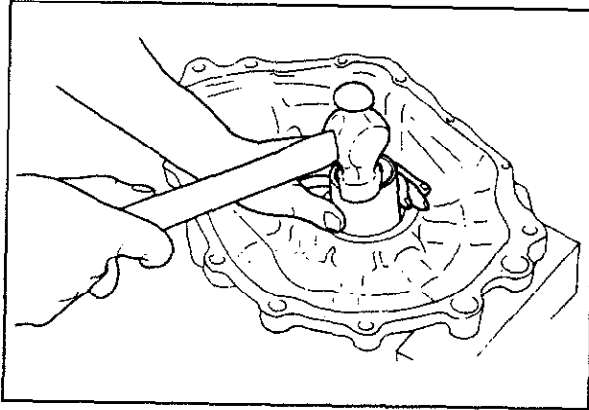
Note

Remove the races gradually and evenly.



83U07A-056

Bearing Outer Race (4th gear, transaxle case)
Remove the bearing outer races gradually with the **SST** or a screwdriver with a bent end.



63U07A-053

Oil Seal (differential)

Check the oil seals and if necessary replace them.
Use a pipe of the proper size to tap the seal out.

Note

Remove the oil seal gradually and evenly.

DISASSEMBLY-STEP 3

Disassemble in the numbered order shown in the figure.

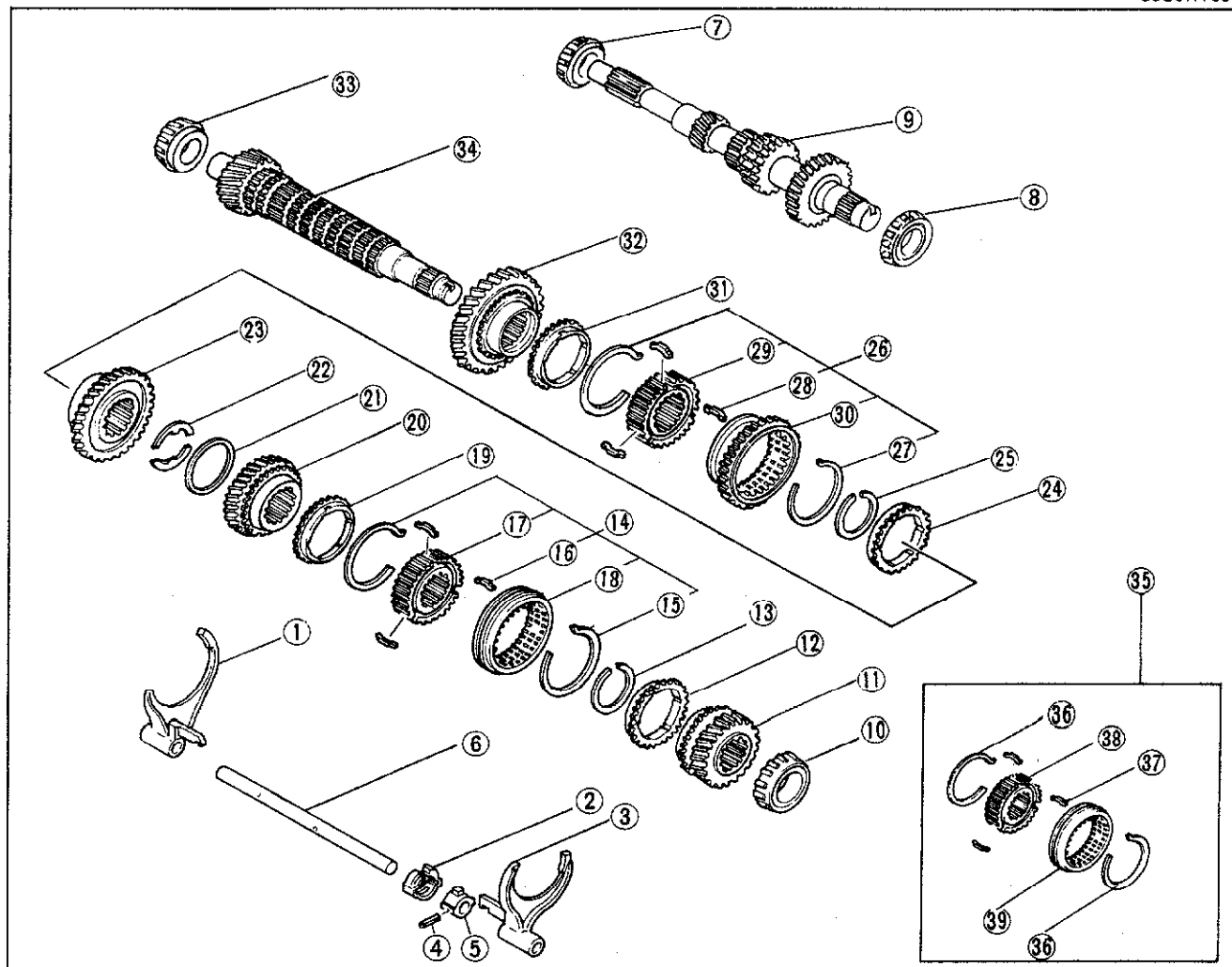
Note

a) 35—39 are for 5 speed only.

b) Do not disassemble the bearing inner races (except the 4th gear end (10) of the secondary shaft gear assembly) unless necessary. Replace them with new races whenever they are disassembled.

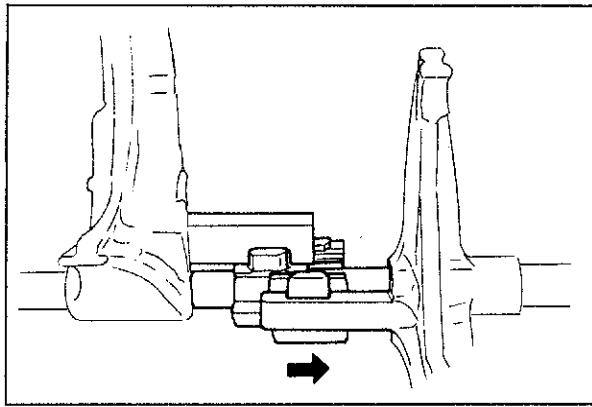
c) Before disassembly, check the thrust clearance of all gears. (Refer to page 7A—34)

83U07A-057



63U07A-055

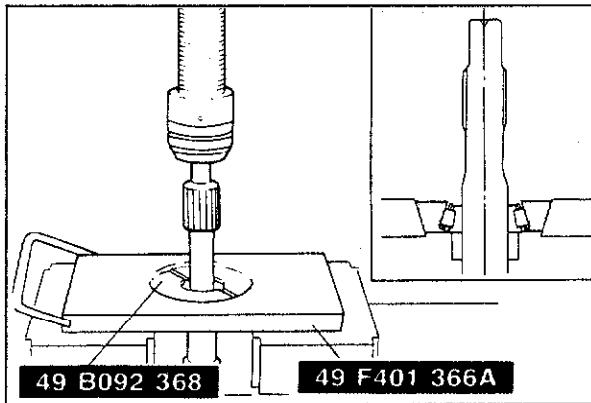
- | | | |
|---------------------------------|---|--------------------------------------|
| 1. Shift fork (1st - 2nd gears) | 14. Clutch hub assembly (3rd - 4th gears) | 27. Synchronizer spring |
| 2. Interlock sleeve | 15. Synchronizer spring | 28. Synchronizer key |
| 3. Shift fork (3rd - 4th gears) | 16. Synchronizer key | 29. Clutch hub |
| 4. Spring pin | 17. Clutch hub | 30. Clutch hub sleeve (reverse gear) |
| 5. Control lever | 18. Clutch hub sleeve | 31. Synchronizer ring |
| 6. Control rod | 19. Synchronizer ring | 32. 1st gear |
| 7. Bearing inner race | 20. 3rd gear | 33. Bearing inner race |
| 8. Bearing inner race | 21. Ring | 34. Secondary shaft gear |
| 9. Primary shaft gear | 22. Thrust washer | 35. Clutch hub assembly (5th gear) |
| 10. Bearing inner race | 23. 2nd gear | 36. Synchronizer spring |
| 11. 4th gear | 24. Synchronizer ring | 37. Synchronizer key |
| 12. Synchronizer ring | 25. Retaining ring | 38. Clutch hub |
| 13. Retaining ring | 26. Clutch hub assembly (1st - 2nd gears) | 39. Clutch hub sleeve |



63U07A-056

Shift Fork Assembly

Disassemble the 1st - 2nd shift fork, interlock sleeve and 3rd - 4th shift fork after setting them as shown in the figure. Slide the 3rd - 4th shift fork and interlock sleeve off the shaft.

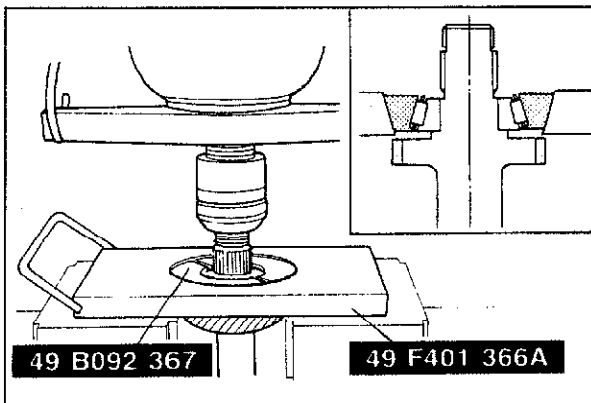


83U07A-058

Bearing Inner Race (1st gear end of primary shaft gear)

Press the bearing inner race from the shaft with the SST.

Caution
Hold the shaft with one hand so that it does not fall.

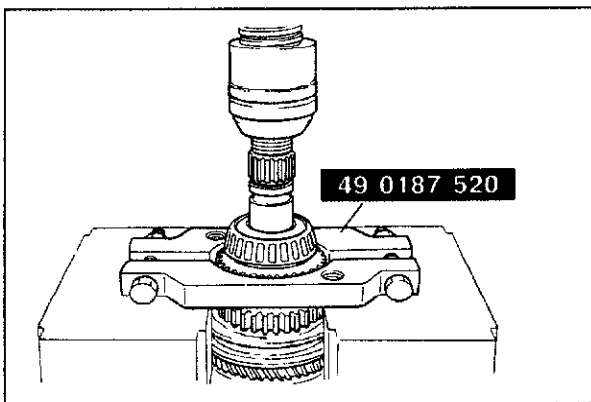


83U07A-059

Bearing Inner Race (4th gear end of primary shaft gear)

Press the bearing inner race from the shaft with the SST.

Caution
Hold the shaft with one hand so that it does not fall.



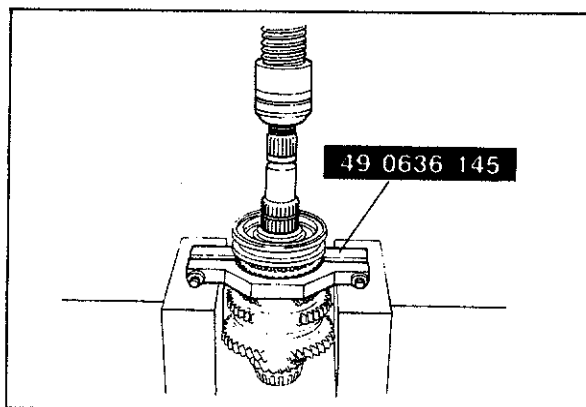
83U07A-060

Bearing Inner Race and 4th Gear (secondary shaft gear assembly)

Remove the bearing inner race and the 4th gear with the SST.

Piston the puller between the two sets of gear teeth on the 4th gear.

Caution
Hold the shaft with one hand so that it does not fall.



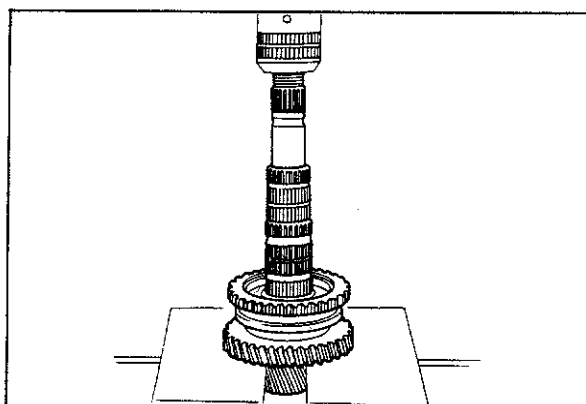
83U07A-061

Clutch Hub Assembly (3rd - 4th gear)

Set the **SST** onto the 3rd gear, between the two sets of teeth, and then, by using a press, remove the clutch hub assembly together with the gear.

Caution

Hold the shaft with one hand so that it does not fall.



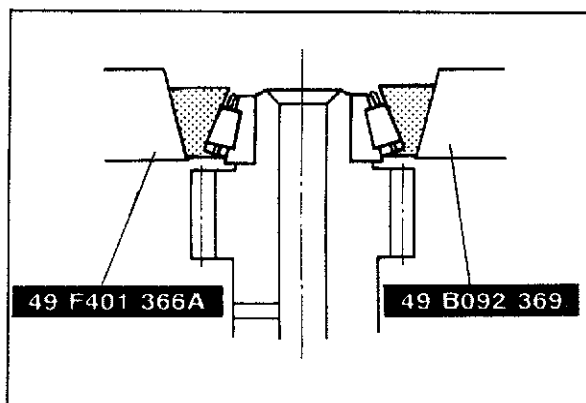
63U07A-071

Clutch Hub Assembly (1st - 2nd gear)

Support the 1st gear and press it and the clutch hub assembly off the secondary shaft.

Caution

Hold the shaft with one hand so that it does not fall.



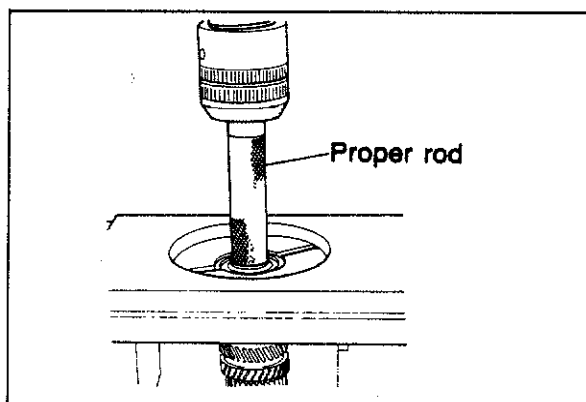
83U07A-062

Bearing Inner Race (drive pinion end of secondary shaft gear)

Remove the bearing inner race from the shaft with the **SST**.

Caution

Hold the shaft with one hand so that it does not fall.



63U07A-900

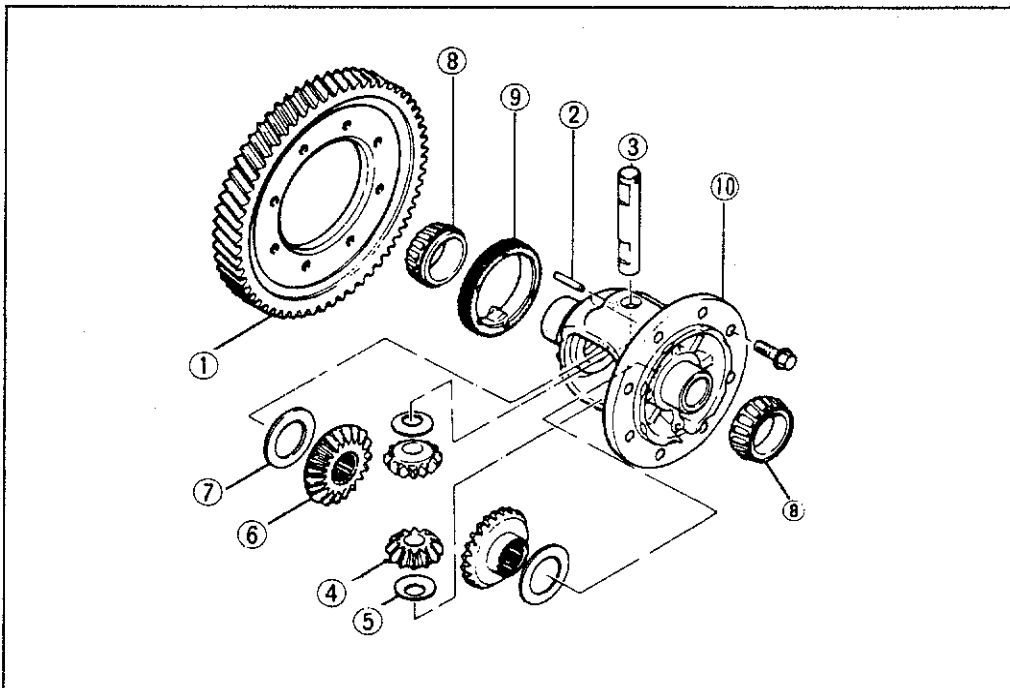
DIFFERENTIAL

Disassemble the differential in the numbered order shown in the figure.

Caution

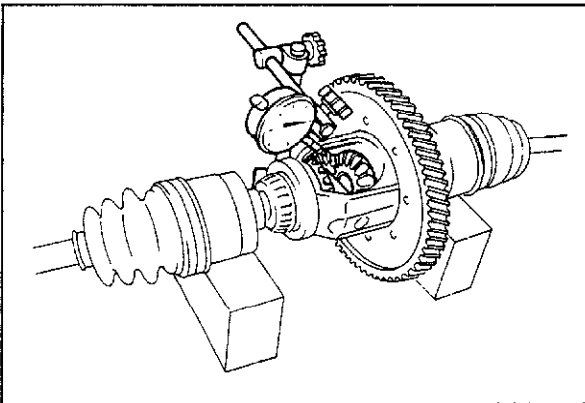
If any of the bearing inner races are removed (with bearing remover) replace with a new one.

63U07A-060



63U07A-061

1. Ring gear
2. Knock-pin
3. Pinion shaft
4. Pinion gear
5. Thrust washer
6. Side gear
7. Thrust washer
8. Side bearing inner race
9. Speedometer drive gear
10. Gear case

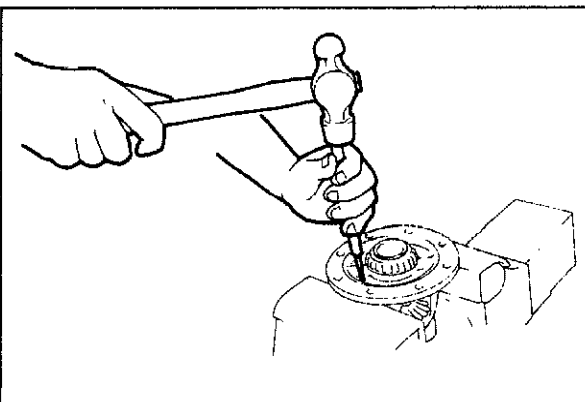


83U07A-063

Backlash

Before disassembly, check the backlash of side gears and pinion gears. (Refer to page 7A—31)

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



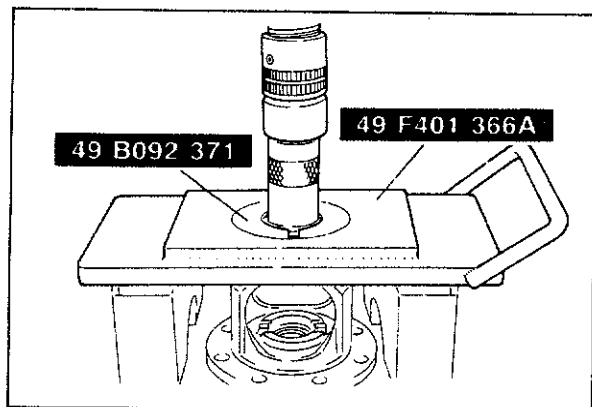
73U07A-510

Knock-pin

To remove the knock-pin from the pinion shaft, place the gear case on a vise and knock the pin out with a 4 mm diameter rod, and hammer.

Note

Insert the rod into the knock-pin hole from the ring gear mounting surface side.



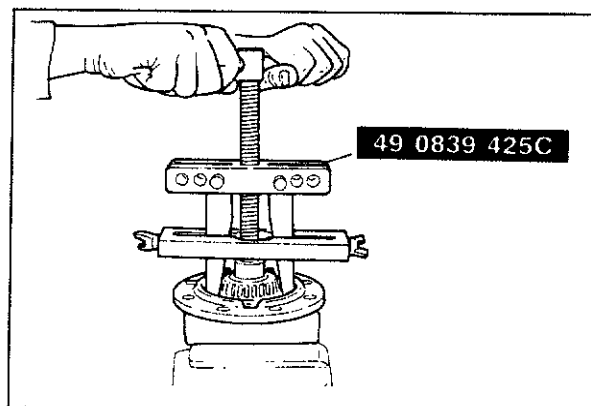
83U07A-064

Side Bearing Inner Race (side opposite the ring gear)

Remove the bearing inner race from the gear case by using the **SST**.

Caution

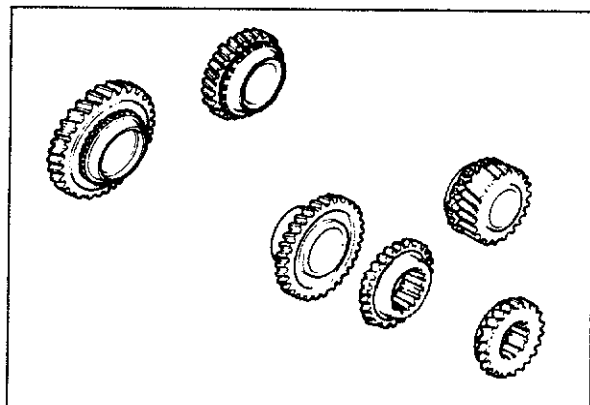
Hold the gear case with one hand so that it does not fall.



83U07A-065

Side Bearing Inner Race (ring gear side)

Remove the side bearing inner race by using a combination of parts from the **SST**.



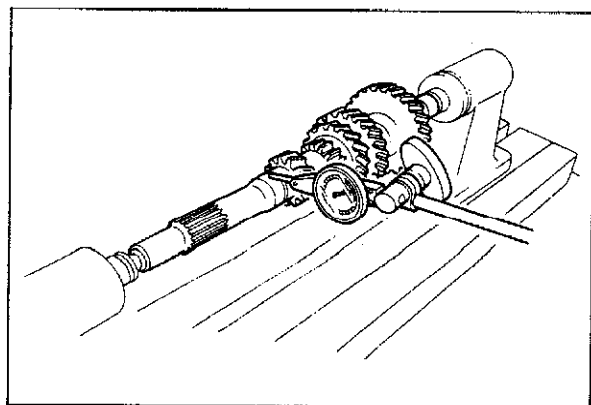
63U07A-064

INSPECTION

Check the following parts, and replace if necessary.

1st, 2nd, 3rd, 4th, and 5th gears

1. Worn or damaged synchronizer cone.
2. Worn or damaged hub sleeve coupling.
3. Worn or damaged teeth.
4. Worn or damaged inner surface or end surface of gears.



83U07A-066

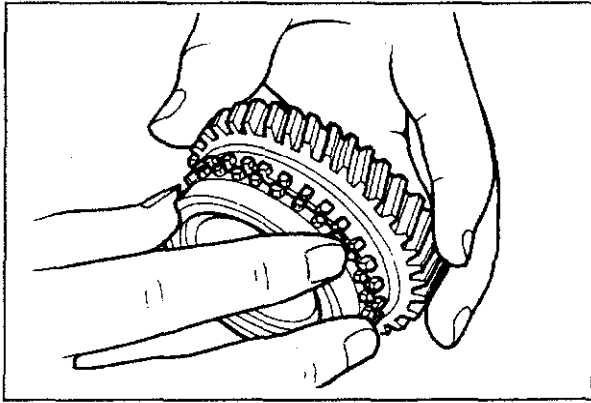
Primary Shaft Gear and Primary Gear (5 speed)

1. Worn teeth.
2. Primary shaft gear run-out.

Standard run-out : 0.05 mm (0.002 in)

Note

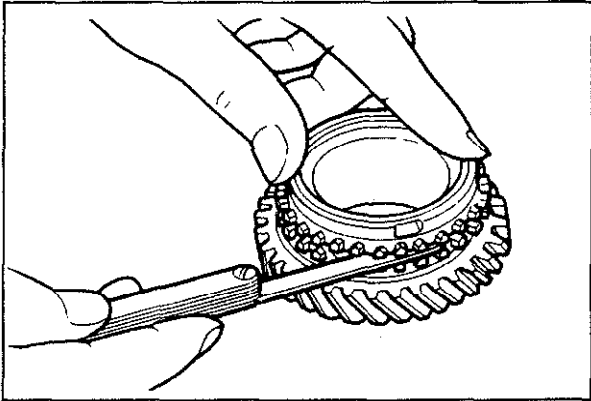
If the shaft gear is replaced, adjust the bearing preload. (Refer to Page 7A—36)



63U07A-066

Synchronizer Ring

1. Engagement with gear.
2. Worn or damaged teeth.
3. Worn or damaged tapered surface.



63U07A-067

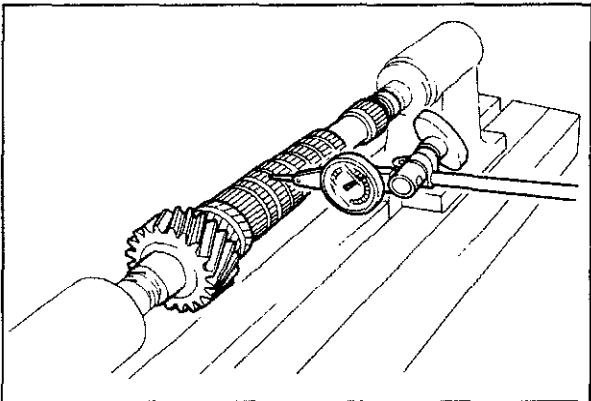
4. Clearance from the side of gear.

Standard: 1.5 mm (0.059 in)

Limit: 0.8 mm (0.031 in)

Caution

- a) Press the synchronizer ring uniformly against the gear and measure around the circumference.
- b) If the measured value is less than the limit, replace the synchronizer ring or gear.

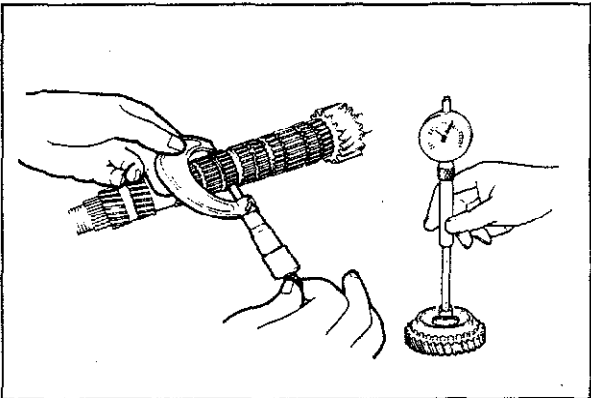


63U07A-068

Secondary Shaft Gear

1. Worn or damaged gear contact surface.
2. Worn or damaged splines.
3. Worn teeth.
4. Clogged oil passage.
5. Secondary shaft gear run-out.

Standard run-out: 0.015 mm (0.0006 in)



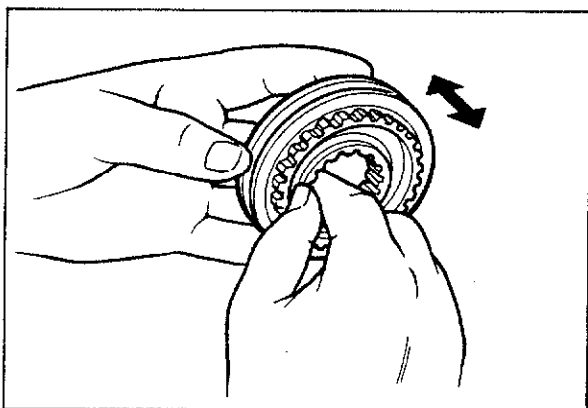
63U07A-069

6. Oil clearance between secondary gear shaft and gears.

Standard: 0.03—0.08 mm (0.001—0.003 in)

Caution

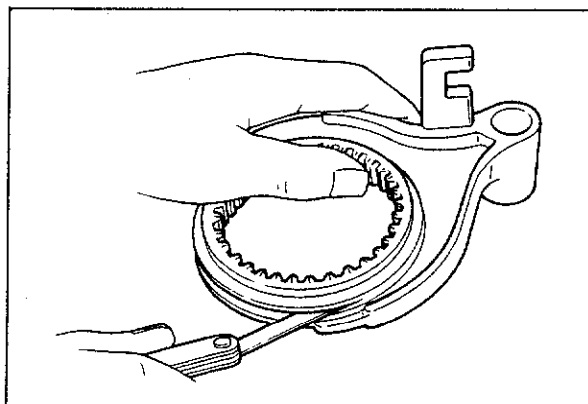
If the shaft gear is replaced, adjust the bearing preload.



63U07A-070

Clutch Hub

1. Worn or damaged splines.
2. Worn or damaged synchronizer key groove.
3. Worn end surface.
4. Operation of the hub sleeve when it is installed.

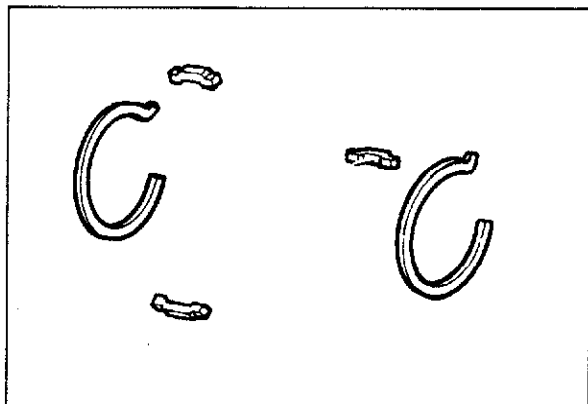


63U07A-071

Clutch Hub Sleeve

1. Worn or damaged hub splines.
2. Worn or damaged sleeve fork groove.
3. Clearance between sleeve and shift fork.

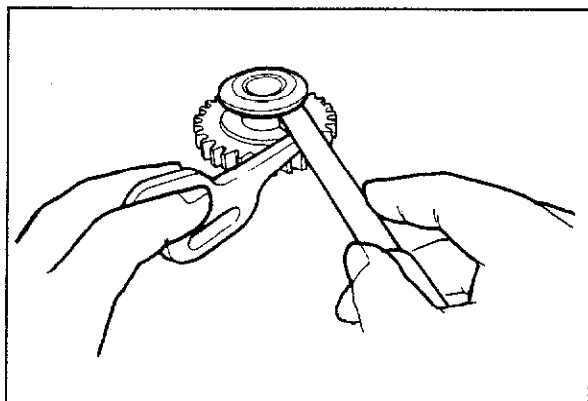
Standard: 0.2—0.458 mm (0.008—0.018 in)
Limit: 0.5 mm (0.020 in)



63U07A-072

Synchronizer Key and Spring

1. Worn key.
2. Bent spring.

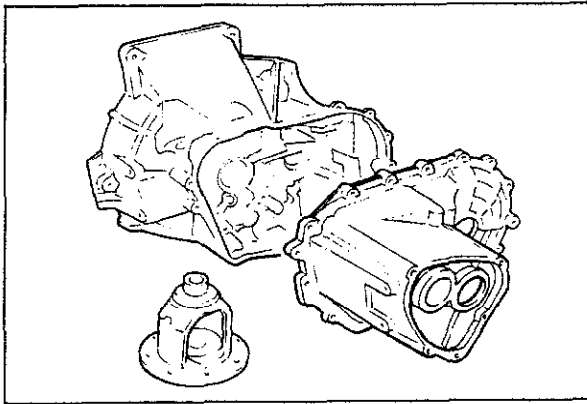


63U07A-073

Reverse Idle Gear

1. Worn or damaged bushing.
2. Worn or damaged teeth.
3. Worn or damaged release lever coupling groove.
4. Clearance between sleeve and reverse lever.

Standard: 0.095—0.318 mm (0.004—0.013 in)
Limit: 0.5 mm (0.020 in)



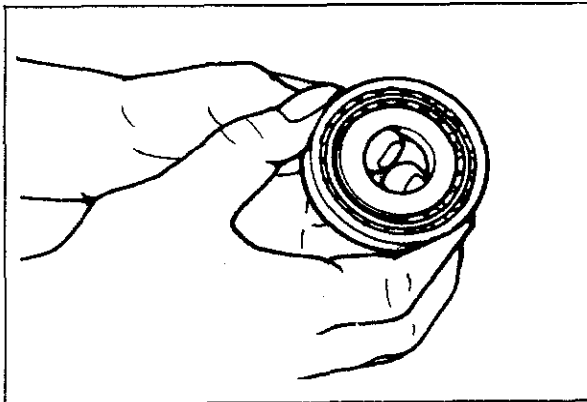
63U07A-074

Clutch Housing, Transaxle Case, Rear Cover, and Differential Gear Case

Cracks or damage.

Caution

If the clutch housing, transaxle case, or differential gear case is replaced, adjust the bearing preload of the shaft gears and the preload of the differential side bearings.



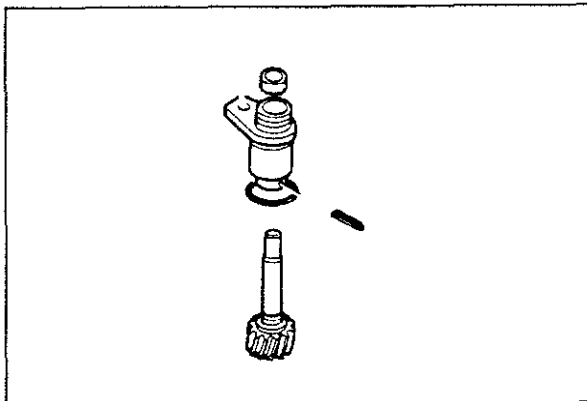
63U07A-075

Bearing

1. Roughness or noise while turning
2. Worn or damaged outer race or rollers

Caution

- a) Replace the bearing, the outer race, and the inner race as a unit.
- b) If the bearing is replaced, adjust the preload.



63U07A-076

Speedometer Driven Gear Assembly

1. Worn or damaged teeth.
2. Worn or damaged O-ring.

Ring Gear Speedometer Drive Gear

Worn or damaged teeth.

Oil Seal

Damaged or worn lip.

ASSEMBLY

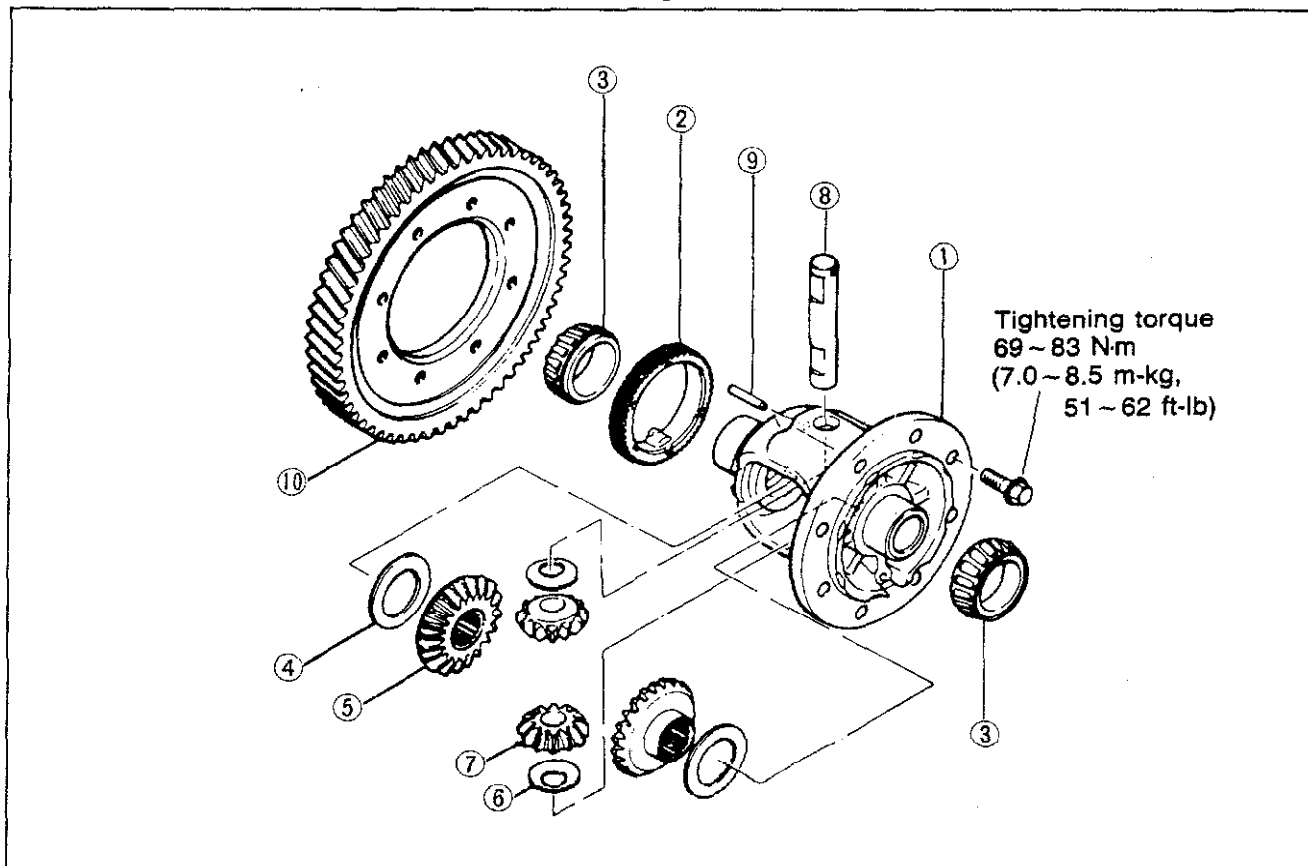
Note

- Wash all parts.
- Apply oil to all friction surfaces.
- Use new spring pins and retaining rings.

DIFFERENTIAL

Assemble in the numbered order shown in the figure.

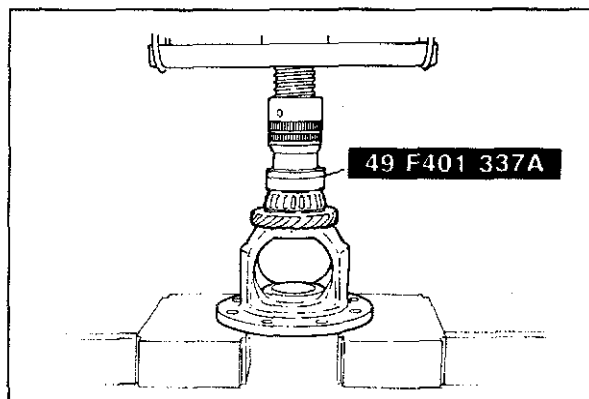
63U07A-077



63U07A-078

- Gear case
- Speedometer drive gear
- Side bearing inner race
- Thrust washer
- Side gear

- Thrust washer
- Pinion gear
- Pinion shaft
- Knock-pin
- Ring gear



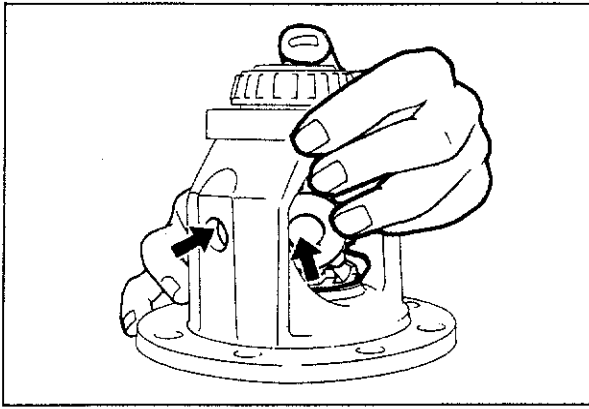
83U07A-067

Side Bearing Inner Race

Install the side bearing inner race by the **SST**, as shown in the figure.

Note

Press to 19,620N (2,000 kg, 4,400 lb)



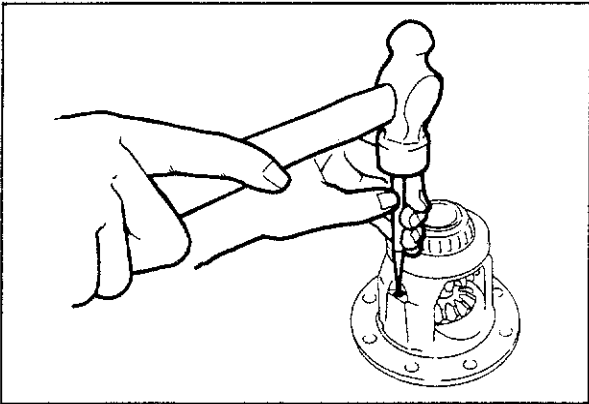
63U07A-080

Side Gear and Pinion Gear

After installing thrust washers on the side gears, place the two side gears into the gear case at the same time, turn them back on the pinion gear and install them into the gear case.

Note

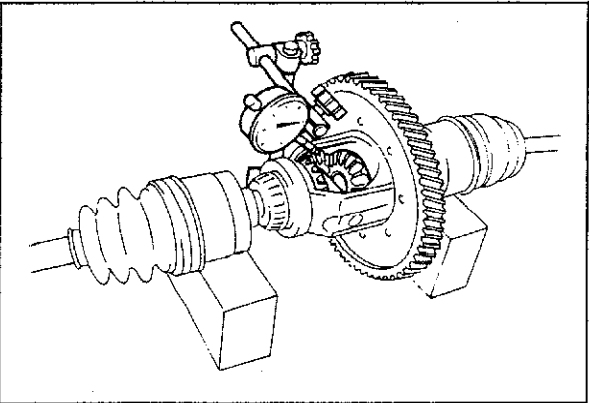
The pinion gears and pinion shaft hole must be aligned.



63U07A-081

Knock-pin

After installing the knock pin, make a crimp so that the pin cannot come out of the gear case.



63U07A-082

Backlash of Side Gear and Pinion Gear

Check and adjust by the following procedures:

1. Install the left and right driveshafts on the differential assembly.
2. Support the driveshafts on V-blocks, as shown in the figure.
3. Measure the backlash of both pinion gears.

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

Identification mark	Thickness
0	2.0 mm (0.079 in)
1	2.1 mm (0.083 in)
2	2.2 mm (0.087 in)

63U07A-083

4. If the backlash is more than the standard, adjust by selecting a thrust washer from the table to go between the case and side gears.

Note

Use thrust washers with the same thickness on each side as much as possible.

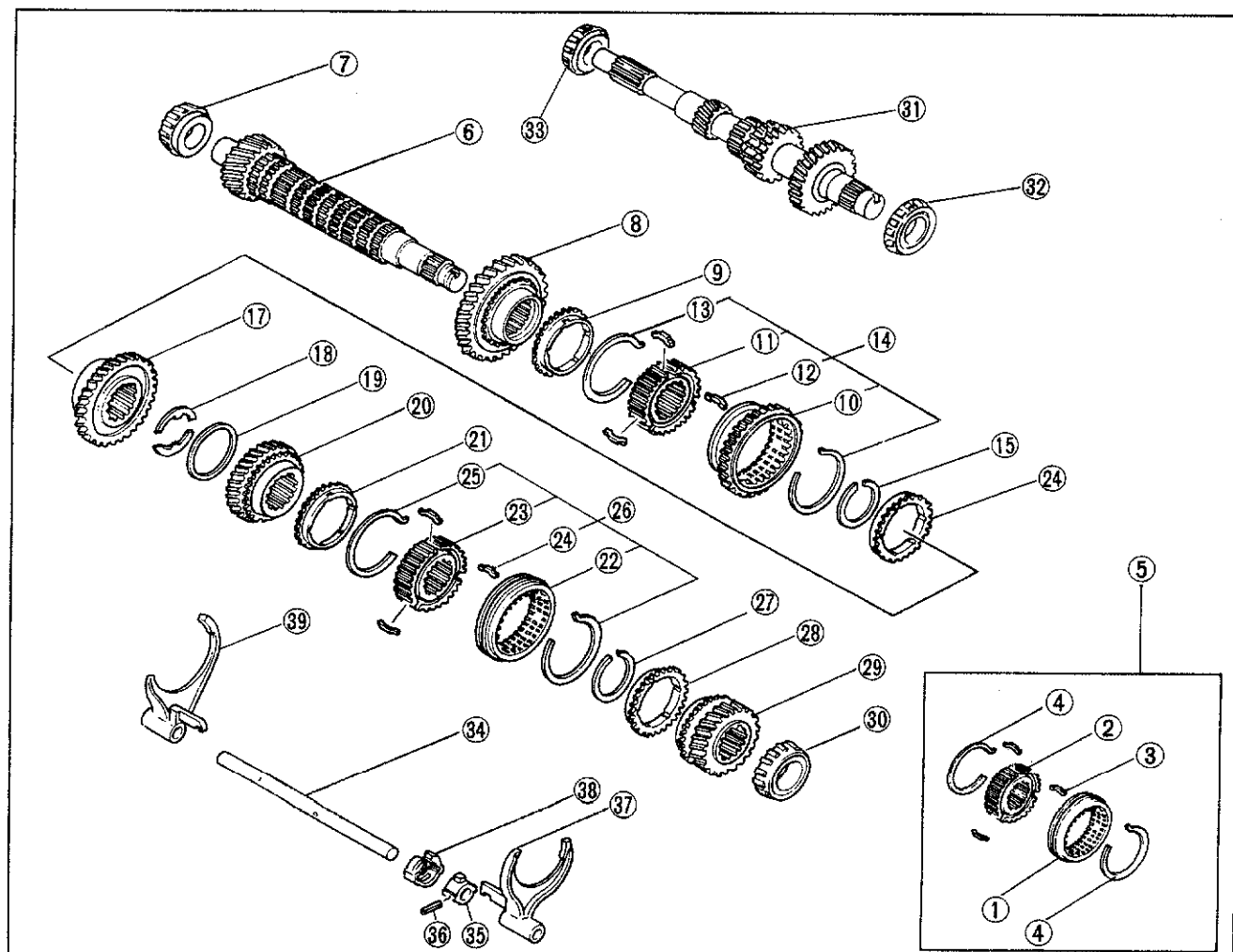
ASSEMBLY-STEP 1

Assemble in the numbered order shown in the figure.

Note

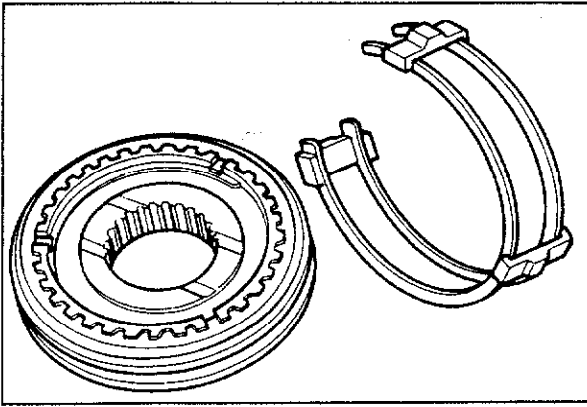
1—5 are for 5 speed only. During assembly, check the thrust clearance of each gear.
(Refer to Page 7A—34)

83U07A-068



63U07A-065

- | | | |
|--------------------------------------|---|----------------------------------|
| 1. Clutch hub sleeve | 14. Clutch hub assembly (1st - 2nd gears) | 27. Retaining ring |
| 2. Clutch hub | 15. Retaining ring | 28. Synchronizer ring |
| 3. Synchronizer key | 16. Synchronizer ring | 29. 4th gear |
| 4. Synchronizer spring | 17. 2nd gear | 30. Bearing inner race |
| 5. Clutch hub assembly (5th) | 18. Thrust washer | 31. Primary shaft gear |
| 6. Secondary shaft gear | 19. Ring | 32. Bearing inner race |
| 7. Bearing inner race | 20. 3rd gear | 33. Bearing inner race |
| 8. 1st gear | 21. Synchronizer ring | 34. Control rod |
| 9. Synchronizer ring | 22. Clutch hub sleeve | 35. Control lever |
| 10. Clutch hub sleeve (reverse gear) | 23. Clutch hub | 36. Spring pin |
| 11. Clutch hub | 24. Synchronizer key | 37. Shift fork (3rd - 4th gears) |
| 12. Synchronizer key | 25. Synchronizer spring | 38. Interlock sleeve |
| 13. Synchronizer spring | 26. Clutch hub assembly (3rd - 4th gears) | 39. Shift fork (1st - 2nd gears) |



63U07A-086

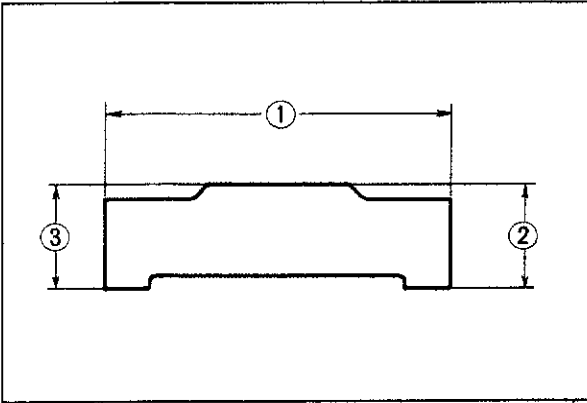
Clutch Hub Assembly

Install the synchronizer key-spring in the clutch hub by placing the hook in its groove. This holds the three synchronizer keys in place.

Caution

The synchronizer keys for the 5th gear are to be installed in one direction.

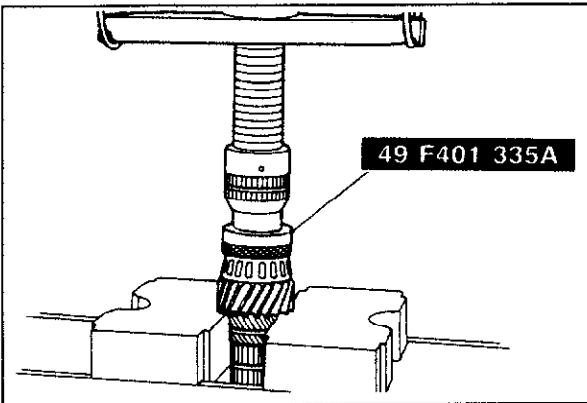
The wider side face of the synchronizer key must be install to reverse gear direction.



83U07A-095

	①	②	③
1st-2nd	19 (0.7480)	4.25 (0.1673)	4.25 (0.1673)
3rd-4th	17 (0.6693)	4.25 (0.1673)	4.25 (0.1673)
5th-Rev.	17 (0.6639)	4.25 (0.1673)	5.55 (0.2185)

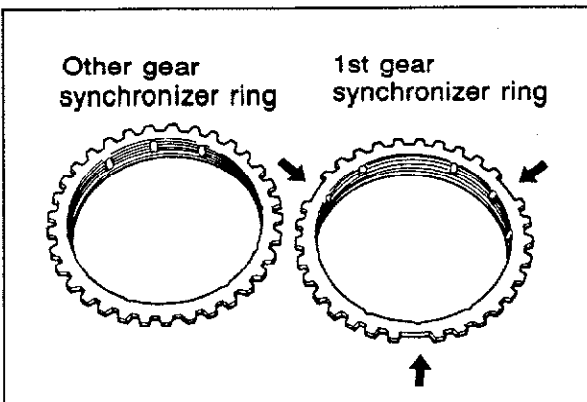
mm (in)



83U07A-096

Bearing Inner Race (drive pinion end of secondary shaft gear)

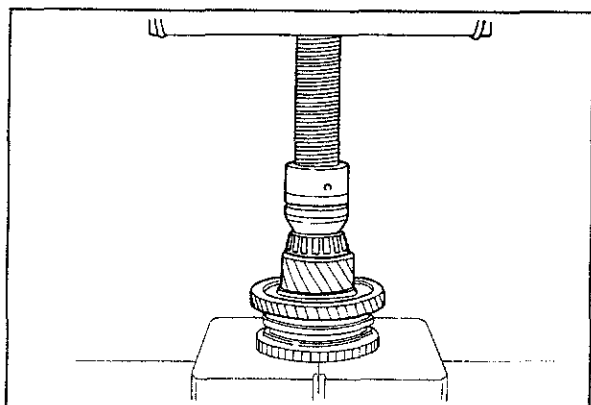
Install the drive pinion end inner race on the secondary shaft gear with **SST** and a press, as shown in the figure.



63U07A-088

1st Gear Synchronizer Ring

The 1st synchronizer ring is different from the other synchronizer rings



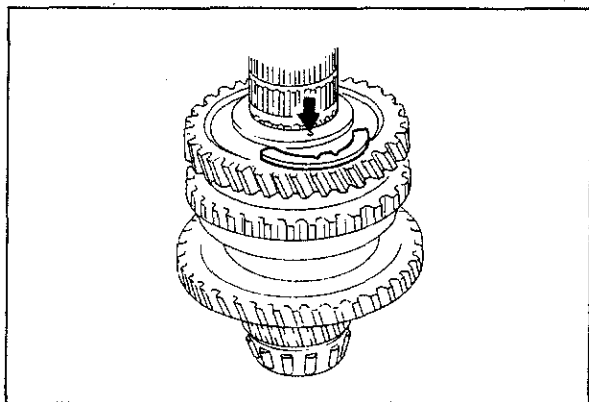
63U07A-090

Retaining Ring

Install the retaining ring with snap ring pliers.

Note

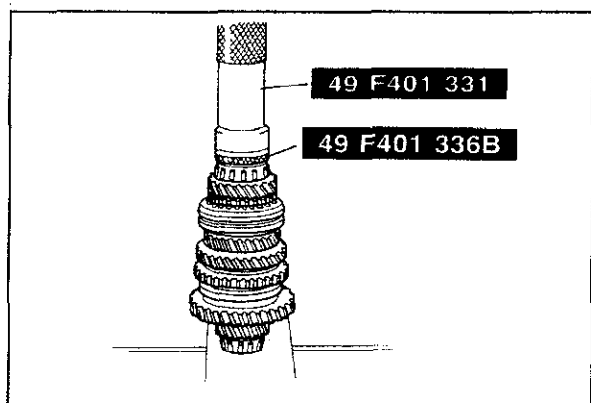
Make sure that the ring is seated properly in the groove.



63U07A-091

Thrust Washer

Install the thrust washer tangs into the holes in the groove.



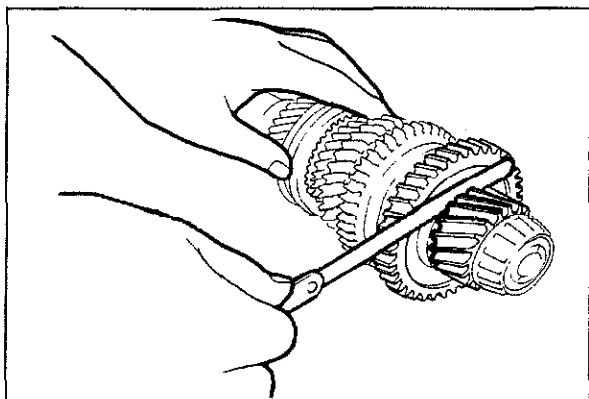
83U07A-069

Bearing Inner Race (4th gear end of secondary shaft gear)

Press the inner race on the end of the secondary shaft with SST.

Note

Press to 19,620N (2,000 kg, 4,400 lb)



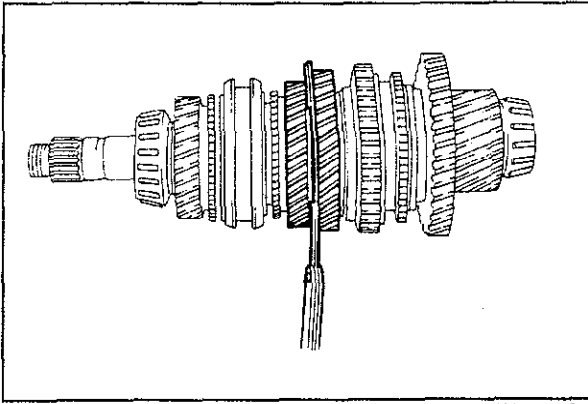
63U07A-093

Thrust Clearance of 1st Gear

Measure the clearance between the 1st gear and the differential drive gear on the secondary shaft.

Standard: 0.14—0.37 mm (0.006—0.015 in)

Limit: 0.42 mm (0.017 in)



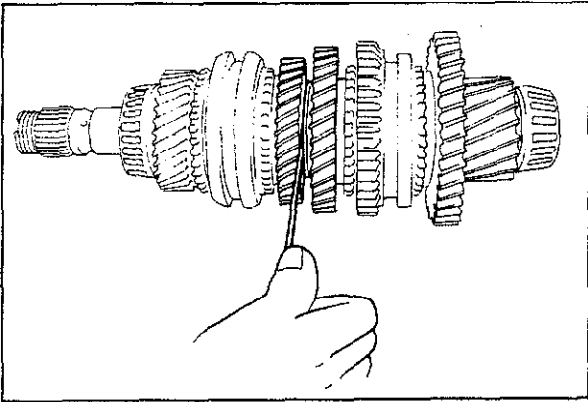
63U07A-094

Thrust Clearance of 2nd Gear

Measure the clearance between the 2nd gear and the thrust washer.

Standard: 0.245—0.580 mm (0.010—0.023 in)

Limit: 0.63 mm (0.025 in)



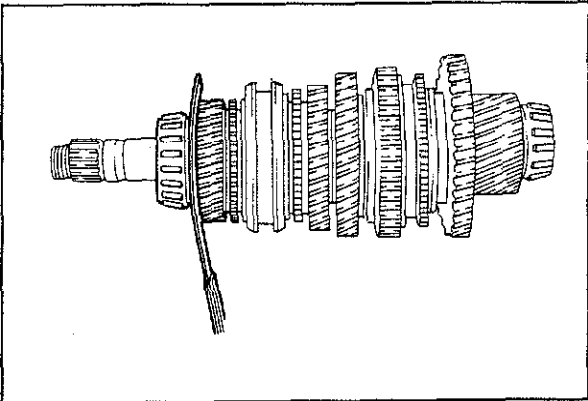
63U07A-095

Thrust Clearance of 3rd Gear

Measure the clearance between the 3rd gear and the thrust washer.

Standard: 0.095—0.38 mm (0.004—0.015 in)

Limit: 0.43 mm (0.017 in)



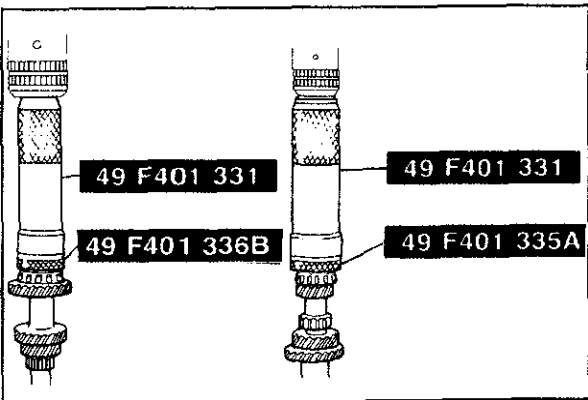
63U07A-096

Thrust Clearance of 4th Gear

Measure the clearance between the 4th gear and the bearing inner race.

Standard: 0.09—0.4 mm (0.004—0.016 in)

Limit: 0.45 mm (0.018 in)



83U07A-070

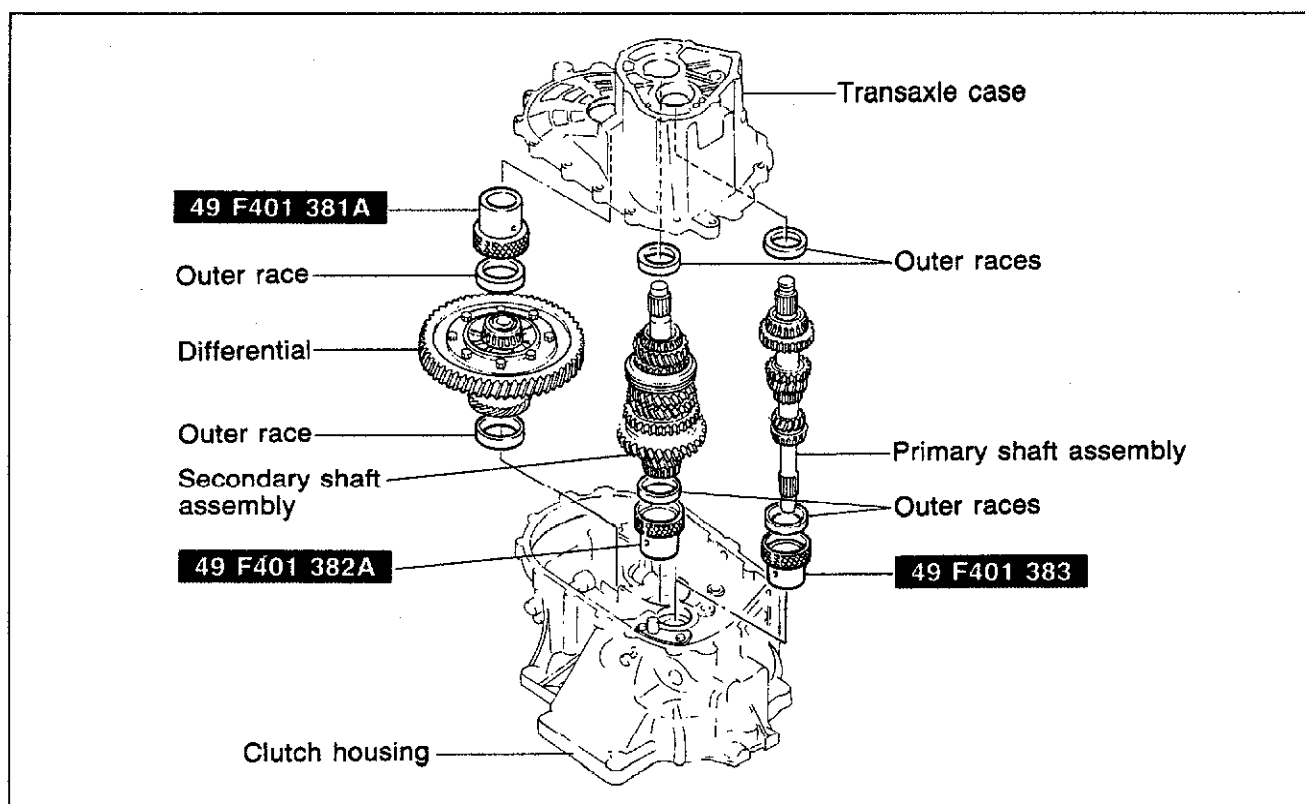
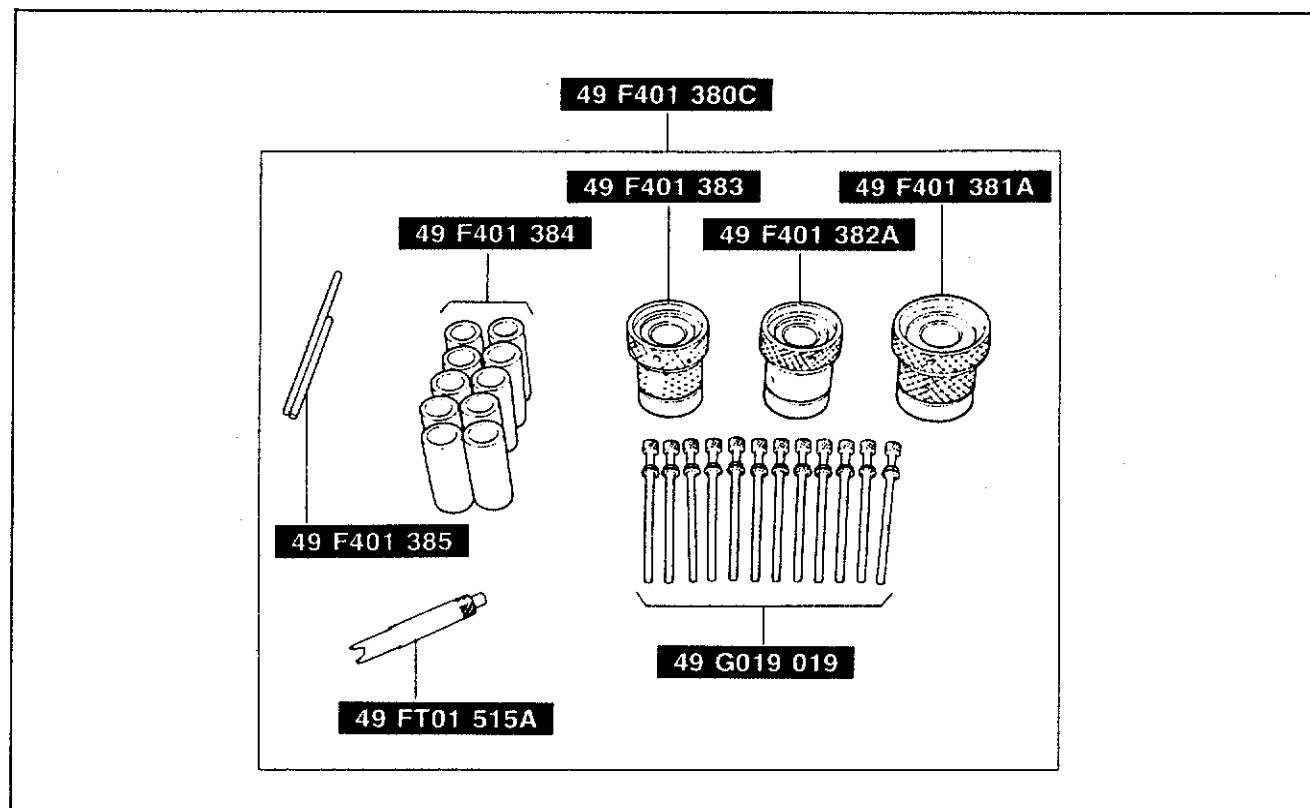
Bearing Inner Race (primary shaft)

Press the inner race on the end of the primary shaft (4th gear end) with **SST**.

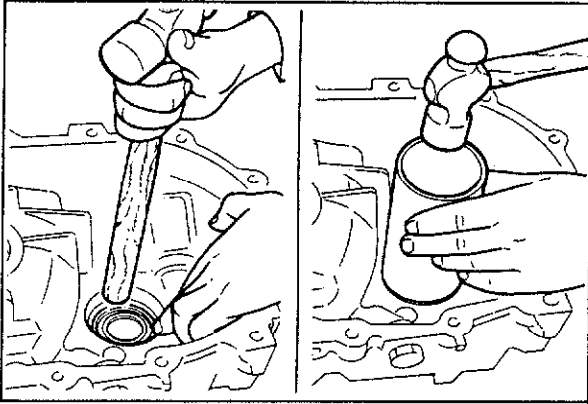
Press the inner race on the opposite end of the primary shaft (1st gear end) with **SST**.

Bearing Preload

Adjust the bearing preload by selecting adjustment shim(s).

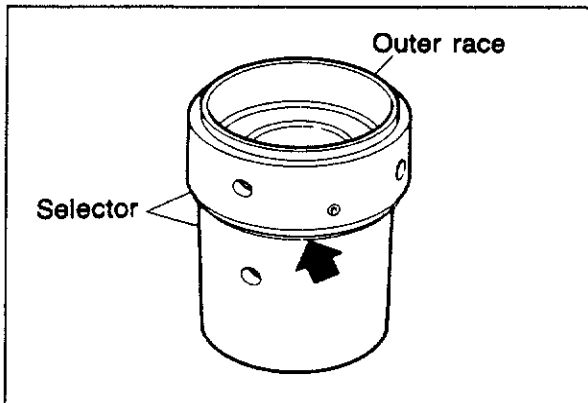


83U07A-071



83U07A-072

1. Install the primary and secondary shaft bearing outer races into the transaxle case (shims removed).
2. After mounting the clutch housing onto the transaxle hanger, install the differential bearing outer race into the clutch housing.
Next, position a piece of pipe against the outer race and tap in with a hammer until it contacts the clutch housing.

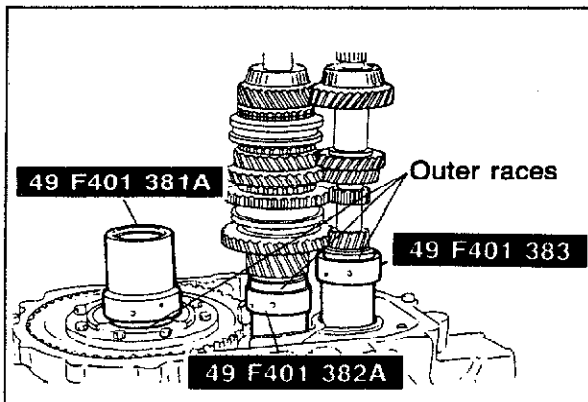


83U07A-097

3. As shown in the figure, put the outer races into the **SST** for primary (49 F401 383), for secondary (49 F401 382A).

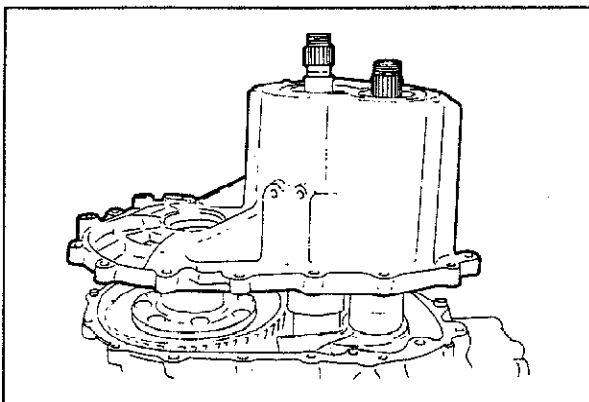
Caution

Turn the **SST** to eliminate the gap indicated by the arrow in the figure.



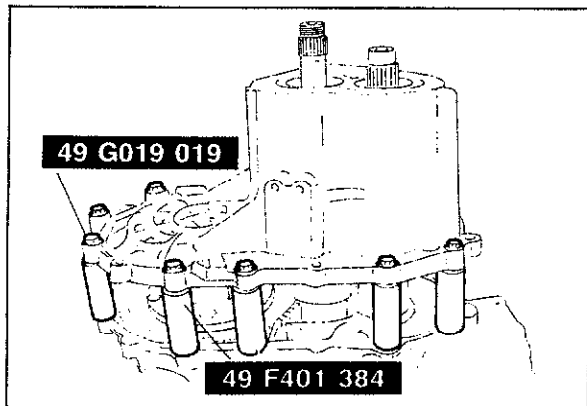
83U07A-073

4. Set the differential assembly into the clutch housing, and then mount the assembled **SST** and bearing outer race on the differential.
Mount the assembled selectors and bearing outer races for the primary and secondary shaft into the clutch housing.
Mount both shaft gear assemblies as shown in the figure.



63U07A-103

5. Mount the transaxle case to the shafts and the differential selector, as shown in the figure.



83U07A-074

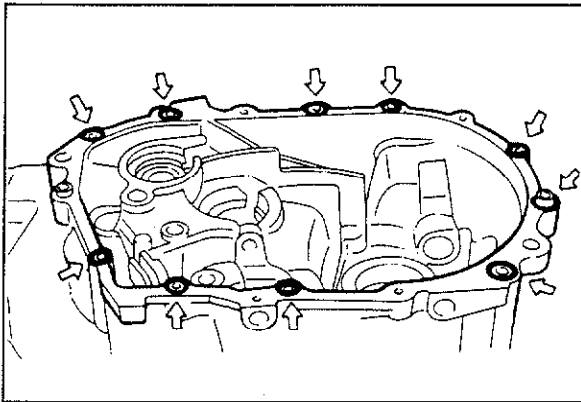
6. Set the **SST** between the transaxle case and the clutch housing, and install the **SST**, and tighten to the specified torque.

Tightening torque:

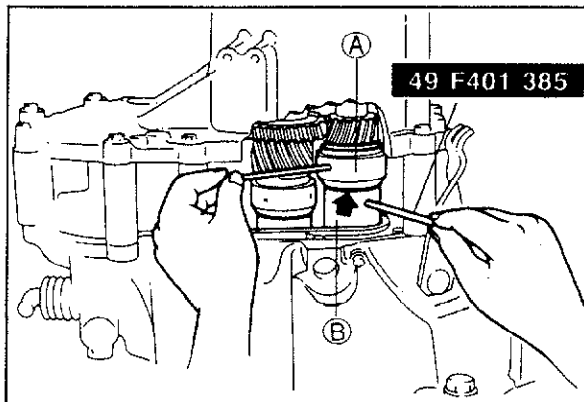
18—20 N·m (1.8—2.0 m·kg, 13—14 ft·lb)

Caution

Install the collars at the positions shown in the figure.



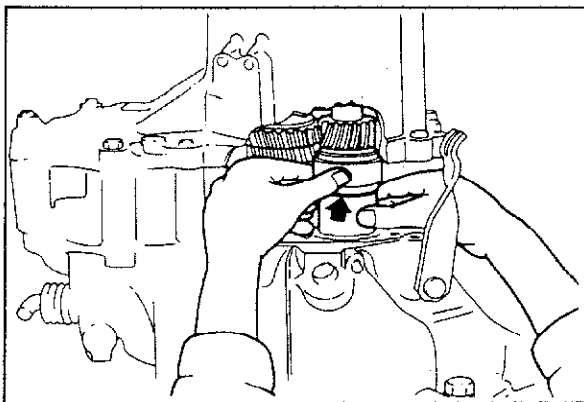
63U07A-105



83U07A-075

7. To seat the bearings, mount the **SST** on parts (A) and (B) of the selector, and then turn the selector so the gap shown by the arrow in the figure is widened.

Move the bar by hand until the selector can no longer be turned, and then turn it in the reverse direction until the gap (arrow) is eliminated.

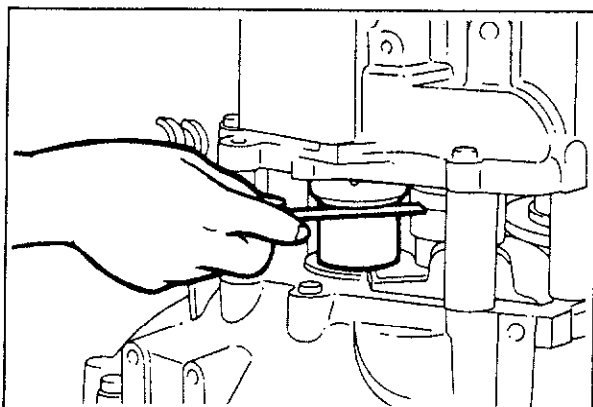


63U07A-107

8. Manually expand the selector for both shafts until the selector no longer turns.

Caution

Make sure that each shaft gear turns smoothly.



63U07A-108

9. Use a thickness gauge to measure the gap in the selector for both gears.

Caution

Measure the gap around the entire circumference of the selector.

Part No.	Thickness
99963 5120	0.20 mm (0.008 in)
99963 5125	0.25 mm (0.010 in)
99963 5130	0.30 mm (0.012 in)
99963 5135	0.35 mm (0.014 in)
99963 5140	0.40 mm (0.016 in)
99963 5145	0.45 mm (0.018 in)
99963 5150	0.50 mm (0.020 in)
99963 5155	0.55 mm (0.022 in)

63U07A-109

10. Select an appropriate adjustment shim.

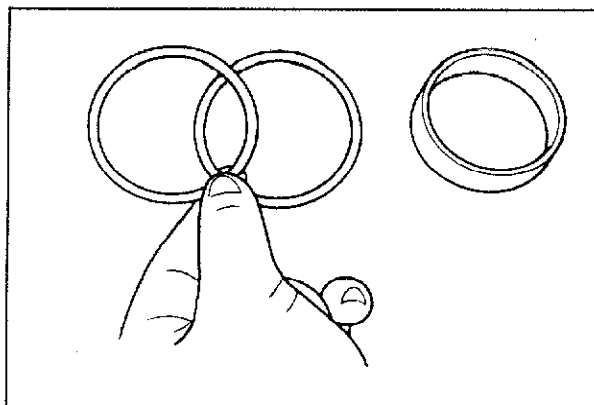
- (1) The shim to be used for the primary shaft gear should be selected by referring to the table and selecting the shim which is nearest (on the large side) to the value obtained, by subtracting the thickness of the diaphragm spring which goes between the shim and the race, from the measured value of the gap in the selector.

Example: 0.94 mm (0.0370 in)

0.94 mm (0.0370 in) — 0.70 mm (0.0276 in)
[Diaphragm spring]

= 0.24 mm (0.009 in)

So the nearest shim (on the large side) to 0.24 mm (0.009 in) is 0.25 mm (0.010 in).



63U07A-110

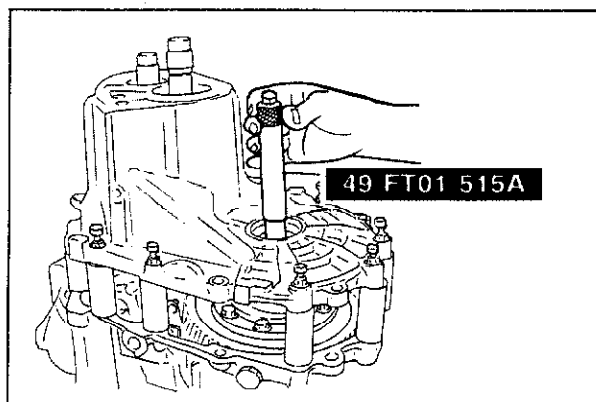
- (2) The shim to be used for the secondary shaft gear should be selected by referring to the table and selecting the shim which is nearest (on the large side) to the measured value of the gap in the selector.

Example: 0.39 mm (0.0154 in)

So the nearest shim (on the large side) to 0.39 mm (0.0154 in) is 0.40 mm (0.016 in).

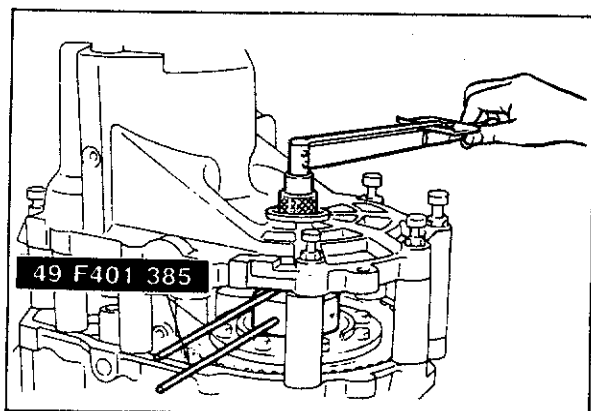
Caution

The number of shims to be used must not be more than two.



83U07A-076

11. Install the **SST**.

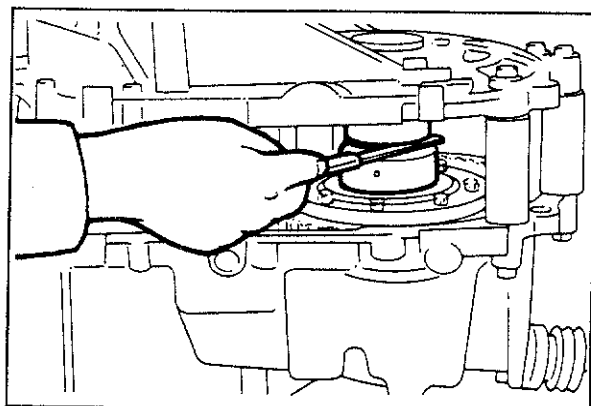


83U07A-077

12. Adjust the selector with the **SST** until the preload specification is obtained.

Preload:

0.5—0.75 N·m (5—7.6 cm·kg, 4.3—6.6 in·lb)



63U07A-113

13. Use a thickness gauge to measure the gap in the selector for the differential.

Caution

Measure the gap around the entire circumference of the selector

Part No.	Thickness
99963 5110	0.10 mm (0.004 in)
99963 5115	0.15 mm (0.006 in)
99963 5120	0.20 mm (0.008 in)
99963 5125	0.25 mm (0.010 in)
99963 5130	0.30 mm (0.012 in)
99963 5135	0.35 mm (0.014 in)
99963 5130	0.40 mm (0.016 in)
99963 5145	0.45 mm (0.018 in)
99963 5150	0.50 mm (0.020 in)
99963 5155	0.55 mm (0.022 in)
99963 5160	0.60 mm (0.024 in)
99963 5165	0.65 mm (0.026 in)
99963 5170	0.70 mm (0.028 in)
99963 5175	0.75 mm (0.030 in)
99963 5180	0.80 mm (0.032 in)
99963 5185	0.85 mm (0.034 in)
99963 5190	0.90 mm (0.036 in)

63U07A-114

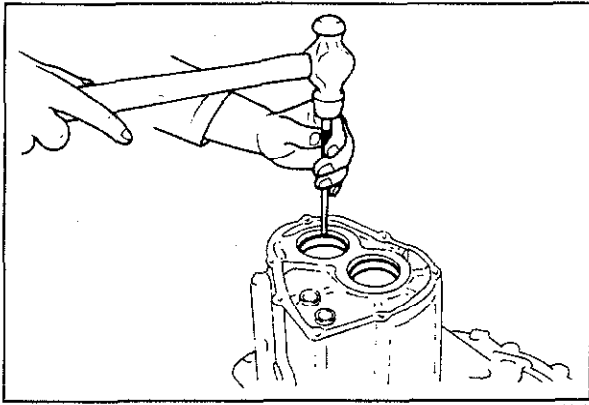
14. Select an appropriate adjustment shim to be used for the differential. It should be selected by referring to the table and selecting the shim which is nearest (on the large side) to the largest measured value of the gap in the selector.

Example: 0.54 mm (0.021 in)

So the nearest shim (on the large side) to 0.54 mm (0.021 in) is 0.55 mm (0.022 in).

Caution

The number of shims to be used must not be more than three.



83U07A-078

15. Remove the **SST**, and then remove the transaxle case. Remove the shaft gears, selectors, and the differential.
16. Remove the bearing outer races for both shafts from the transaxle case.
Leave the differential side bearing outer race in the clutch housing.

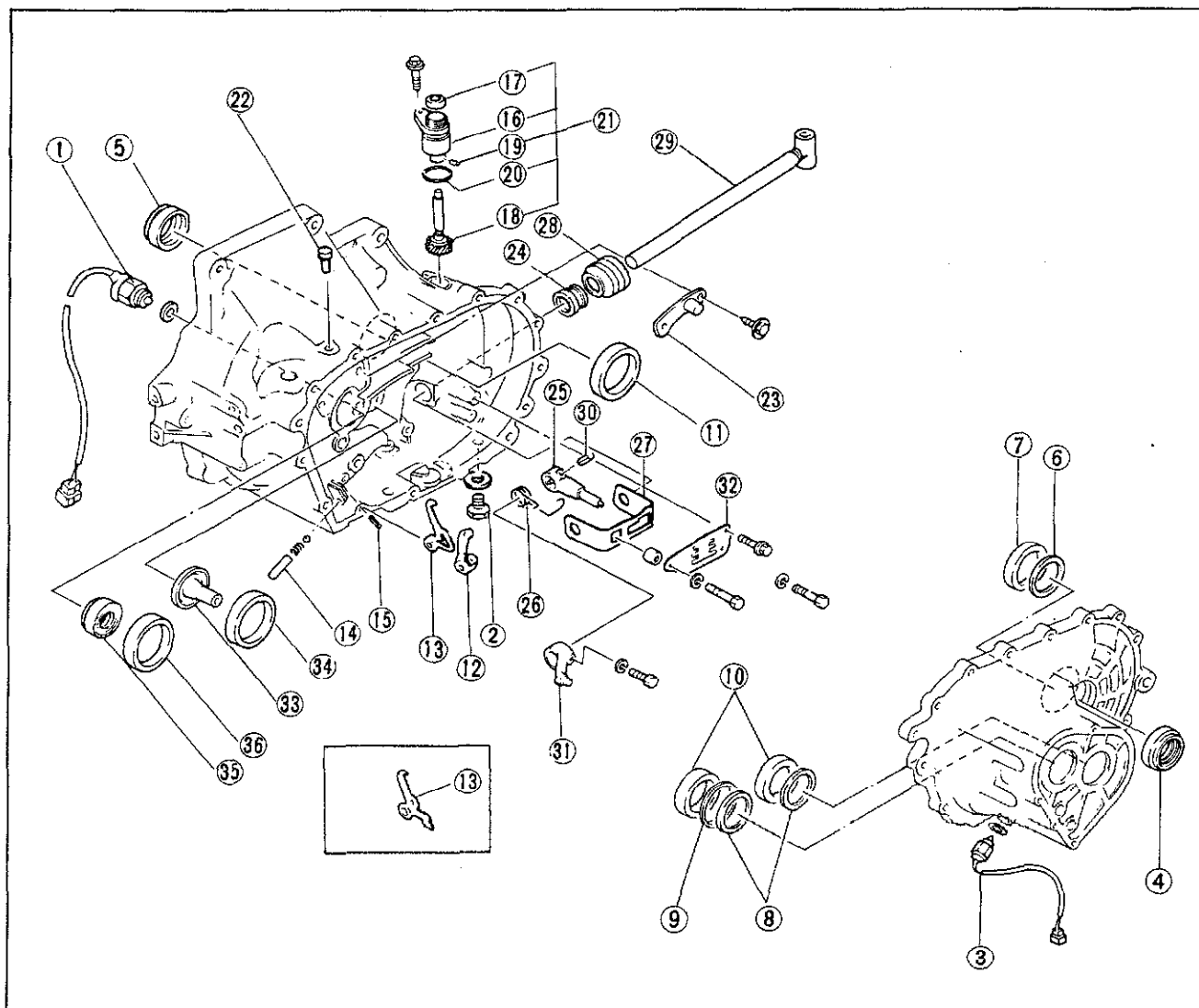
ASSEMBLY-STEP 2

Assemble in the numbered order shown in the figure.

Note

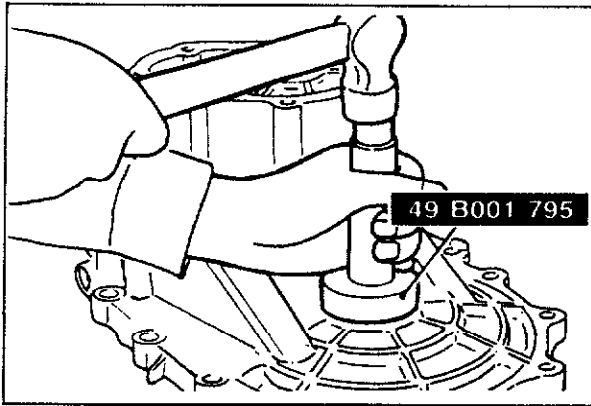
12, 26 and 27 are applicable to the 5 speed only.

63U07A-116



63U07A-117

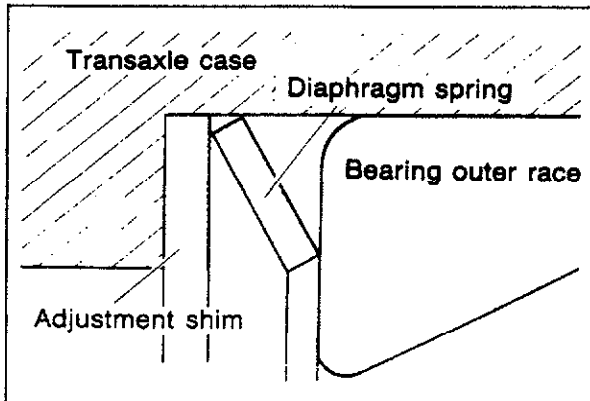
- | | | |
|-------------------------|--------------------------------------|------------------------|
| 1. Neutral switch | 13. Reverse lever | 25. Selector |
| 2. Drain plug | 14. Reverse lever shaft | 26. Spring |
| 3. Back-up light switch | 15. Spring pin | 27. Reverse gate |
| 4. Oil seal | 16. Gear case | 28. Boot |
| 5. Oil seal | 17. Oil seal | 29. Change rod |
| 6. Adjustment shim | 18. Driven gear | 30. Spring pin |
| 7. Bearing outer race | 19. Spring pin | 31. Change arm |
| 8. Adjustment shim | 20. O-ring | 32. Guide plate |
| 9. Diaphragm spring | 21. Speedometer driven gear assembly | 33. Funnel |
| 10. Bearing outer race | 22. Breather | 34. Bearing outer race |
| 11. Bearing outer race | 23. Breather cover | 35. Oil seal |
| 12. Lever set spring | 24. Oil seal | 36. Bearing outer race |



83U07A-079

Oil Seal (differential)

Tap the differential oil seals into the transaxle case with the **SST**.



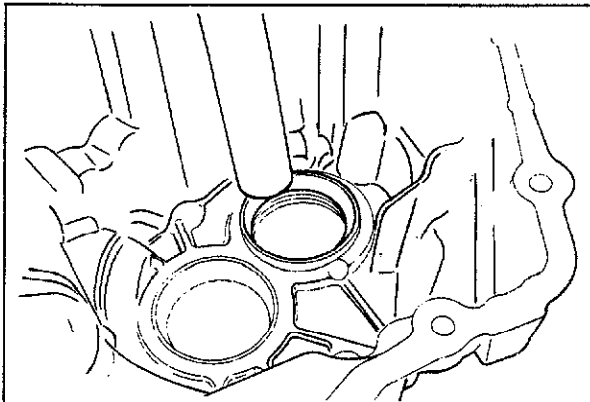
63U07A-119

Bearing Outer Race

1. Install the selected adjustment shims and the diaphragm spring into the transaxle case.

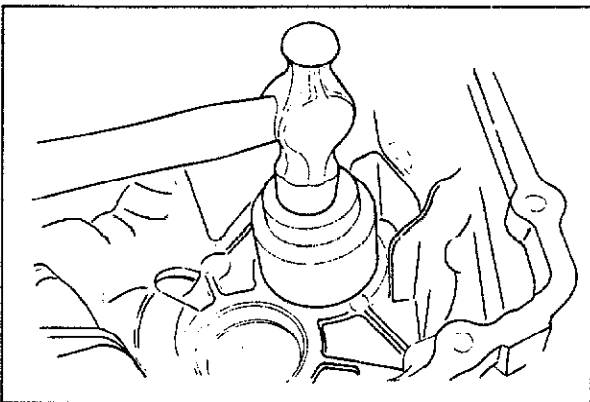
Caution

Install the diaphragm spring as shown in the figure.



63U07A-120

2. Install the bearing outer races into the transaxle case and clutch housing.



63U07A-121

3. Use a suitable pipe and a hammer to tap the outer races in until they are seated.

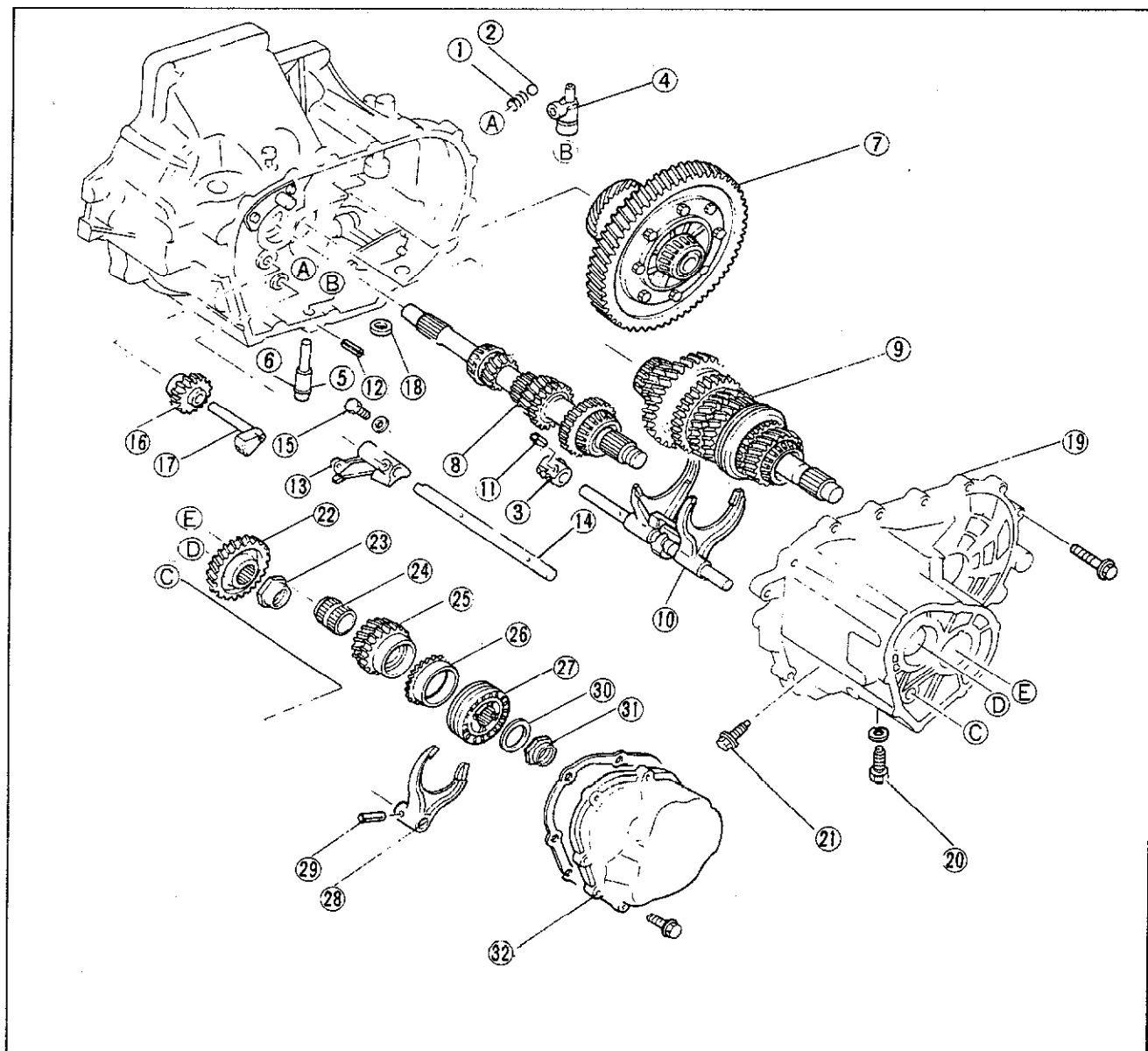
ASSEMBLY-STEP 3

Assemble in the numbered order shown in the figure.

Note

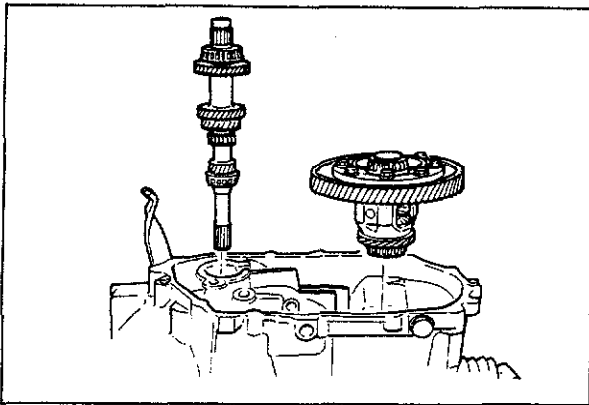
22—32 are applicable only to the 5 speed.

63U07A-122



63U07A-123

- | | | |
|----------------------------------|---------------------------------|-------------------------|
| 1. Spring | 10. Shift fork assembly | 22. Primary gear |
| 2. Steel ball | 11. Spring pin | 23. Lock nut |
| 3. Control end | 12. Spring pin | 24. Gear sleeve |
| 4. Crank lever assembly | 13. Gate | 25. 5th gear |
| 5. O-ring | 14. Shift rod (5th and reverse) | 26. Synchronizer ring |
| 6. Crank lever shaft | 15. Lock bolt | 27. Clutch hub assembly |
| 7. Differential assembly | 16. Reverse idle gear | 28. Shift fork |
| 8. Primary shaft gear assembly | 17. Reverse idle shaft | 29. Spring pin |
| 9. Secondary shaft gear assembly | 18. Magnet | 30. Stopper plate |
| | 19. Transaxle case | 31. Lock nut |
| | 20. Guide bolt | 32. Rear cover |
| | 21. Lock bolt | |



63U07A-124

Bearing Preload

Check the primary shaft gear and the differential bearing preload.

Note

a) Confirm that the correct adjustment shims were selected.

b) If the bearing preload is not within the standard range, adjust again.

1. Install the primary shaft gear and the differential into the clutch housing.
2. Install the transaxle case, and tighten to the specified torque.

Tightening torque:

18—26 N·m (1.8—2.6 m·kg, 13—19 ft·lb)

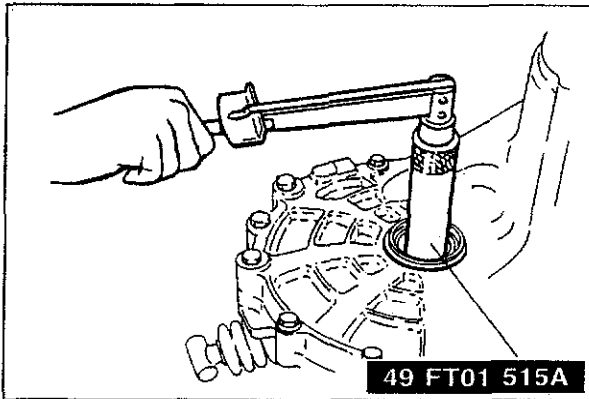
3. Install the **SST**.
4. Measure the preload.

Preload:

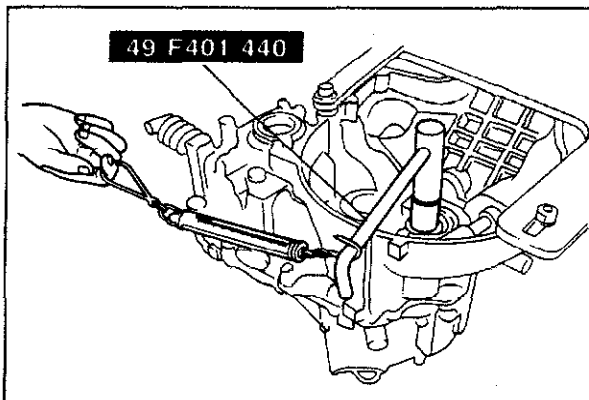
0.03—0.75 N·m

(0.3—7.6 cm·kg, 0.26—6.6 in·lb)

5. Remove the adapter and the attachment.



83U07A-080



83U07A-081

6. With the transaxle facing in the direction shown in the figure, install the **SST** to the primary shaft gear. Hook the spring scale to the holder and measure the preload.

Preload:

0.10—0.34 N·m

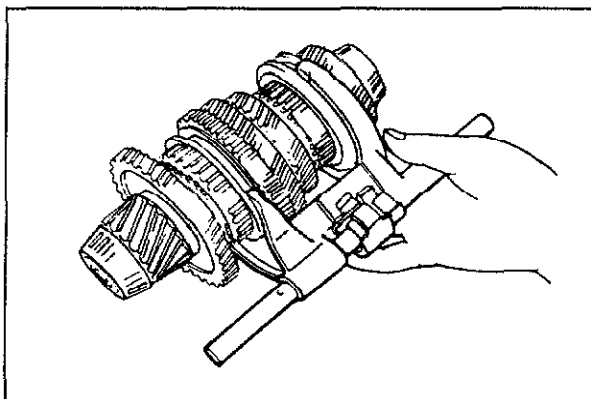
(1.0—3.5 cm·kg, 0.87—3.0 in·lb)

Spring scale reading:

0.54—1.84 N (54—190 g, 0.12—0.41 lb)

Note

Extend the handle fully and hook the pull scale to the end of the handle.



63U07A-127

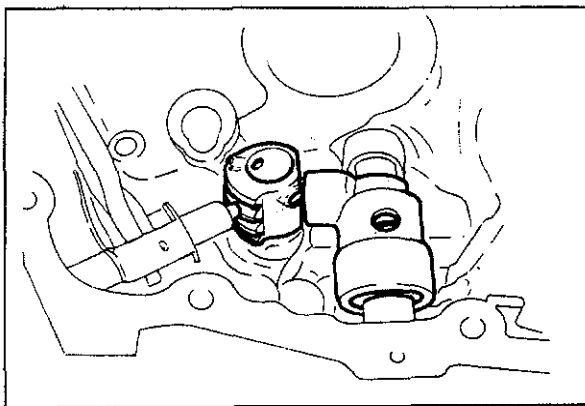
Shaft Gear and Shift Fork Assembly

Install the primary shaft gear, secondary shaft gear, and shift fork assembly according to the following procedures:

1. Install the shift fork assembly on the secondary shaft gear assembly.

Note

Be careful of the rod direction.



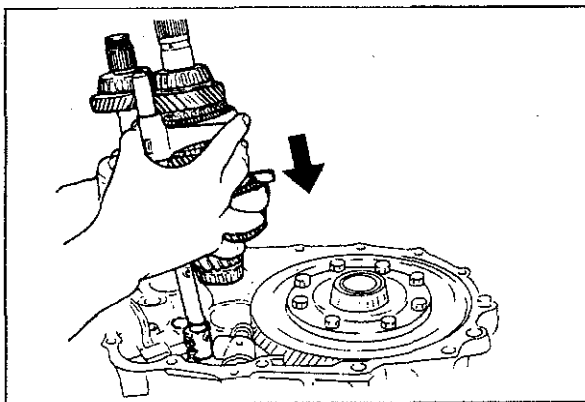
63U07A-128

2. Assemble the control end, ball, spring, and crank lever to the clutch housing as shown in the figure.

Caution

Be careful not to lose the ball and spring.

3. Install the differential assembly.

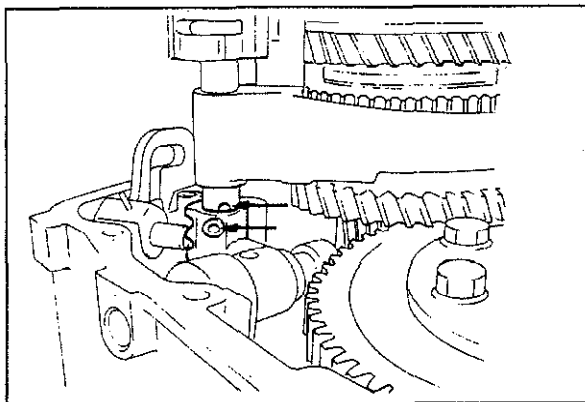


63U07A-129

4. Unite the primary shaft gear, secondary shaft gear and shift fork assembly. Install the control rod into the control end as the unit is lowered into place.

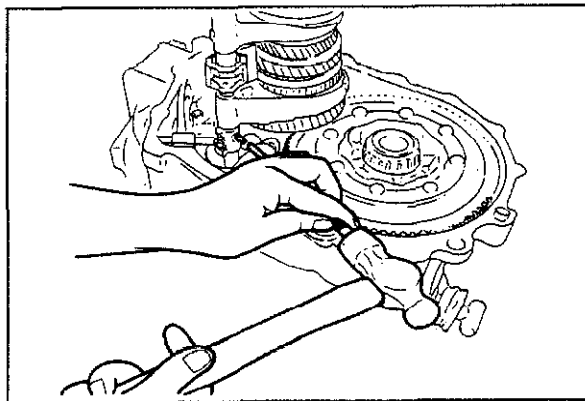
Note

Keep the assembly nearly vertical while installing it.



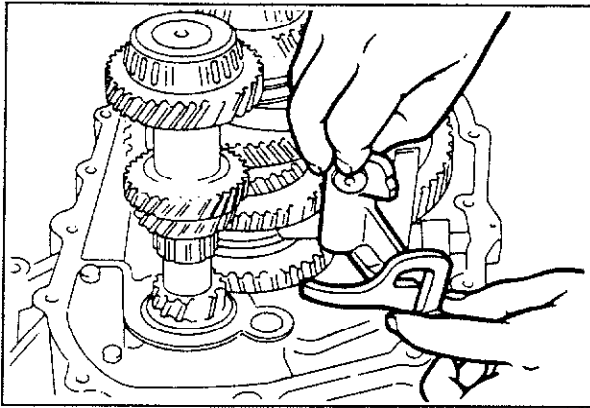
63U07A-130

5. Align the holes in the control rod and the control end.



63U07A-131

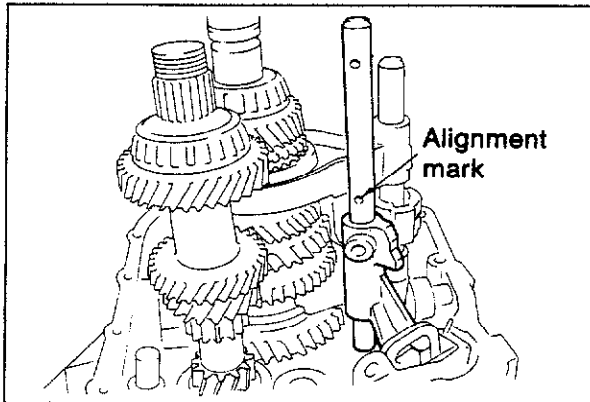
6. Tap the spring pin in with a pin punch and hammer.



83U07A-098

Gate

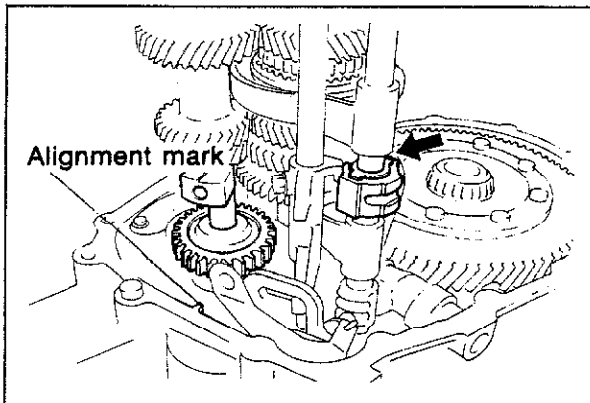
Raise the reverse lever and install the gate in its groove and guide pin.



63U07A-133

Shift Rod (5th and reverse)

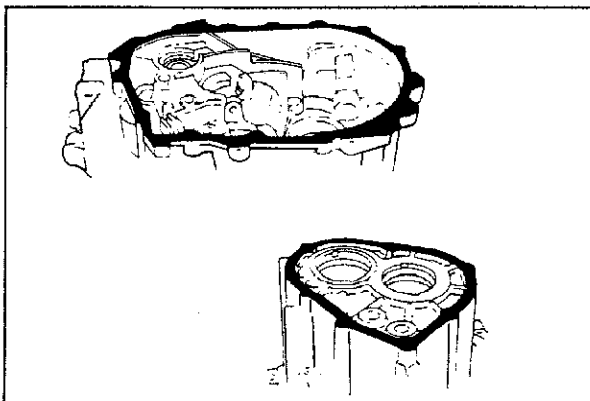
When installing the shift rod (5th and reverse), make sure that the alignment mark on the rod is in the correct position.



63U07A-134

Interlock Sleeve and Reverse Idle Shaft

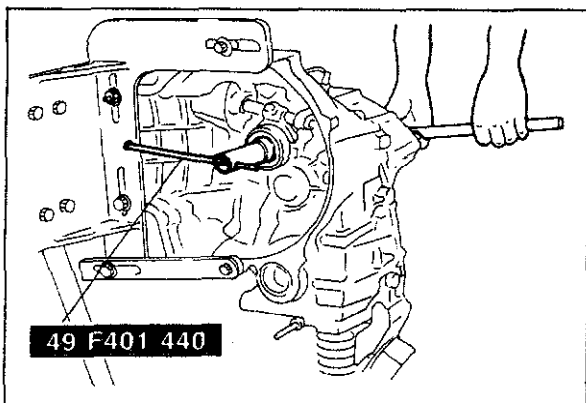
Before installing the transaxle case, make sure the control lever (arrow) is kept flush with the surface of the end of the interlock sleeve. Point the threaded hole of the reverse idle shaft toward the alignment mark of the clutch housing.



63U07A-135

Sealant

Coat sealant sparingly onto the matching surfaces of the case and housing, and the case and rear cover.



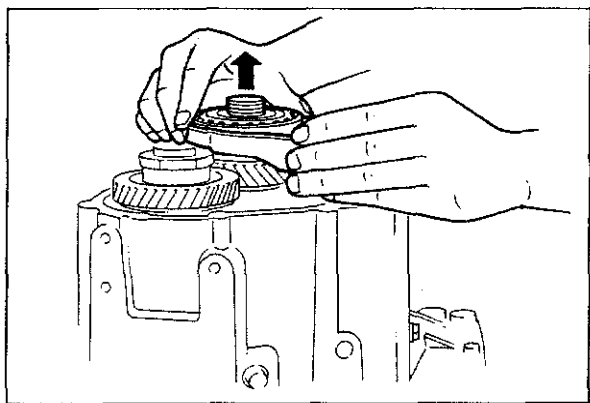
83U07A-082

Lock Nut (primary gear)

Lock the shaft with the **SST** before tightening the locknut. Use a new locknut and tighten it to the specified torque. Stake the locknut to the groove in the primary shaft.

Tightening torque:

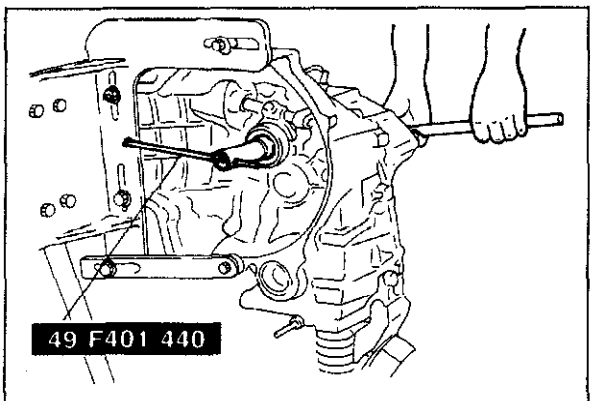
128—206 N·m (13—21 m·kg, 94—152 ft·lb)



63U07A-136

Shift Fork (5th gear)

Install the shift fork together with the clutch hub assembly.



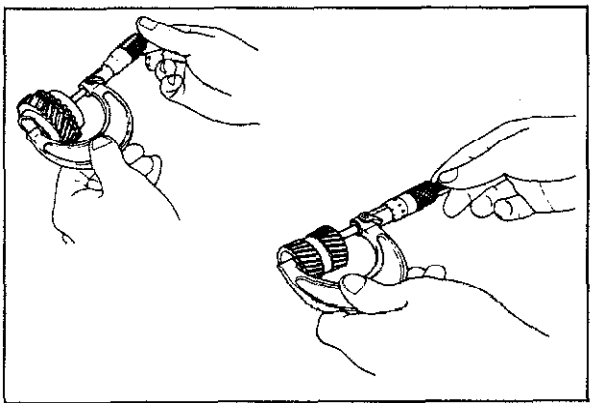
83U07A-083

Lock Nut (5th clutch hub)

Put the transaxle in 1st or 2nd gear and lock the primary shaft with the **SST** and tighten the locknut on the secondary shaft to the specified torque. Stake the locknut to the groove in the secondary shaft.

Tightening torque:

127—206 N·m (13—21 m·kg, 94—152 ft·lb)



63U07A-138

5th Gear End Play

Measure the width of both the gear sleeve and the 5th gear.

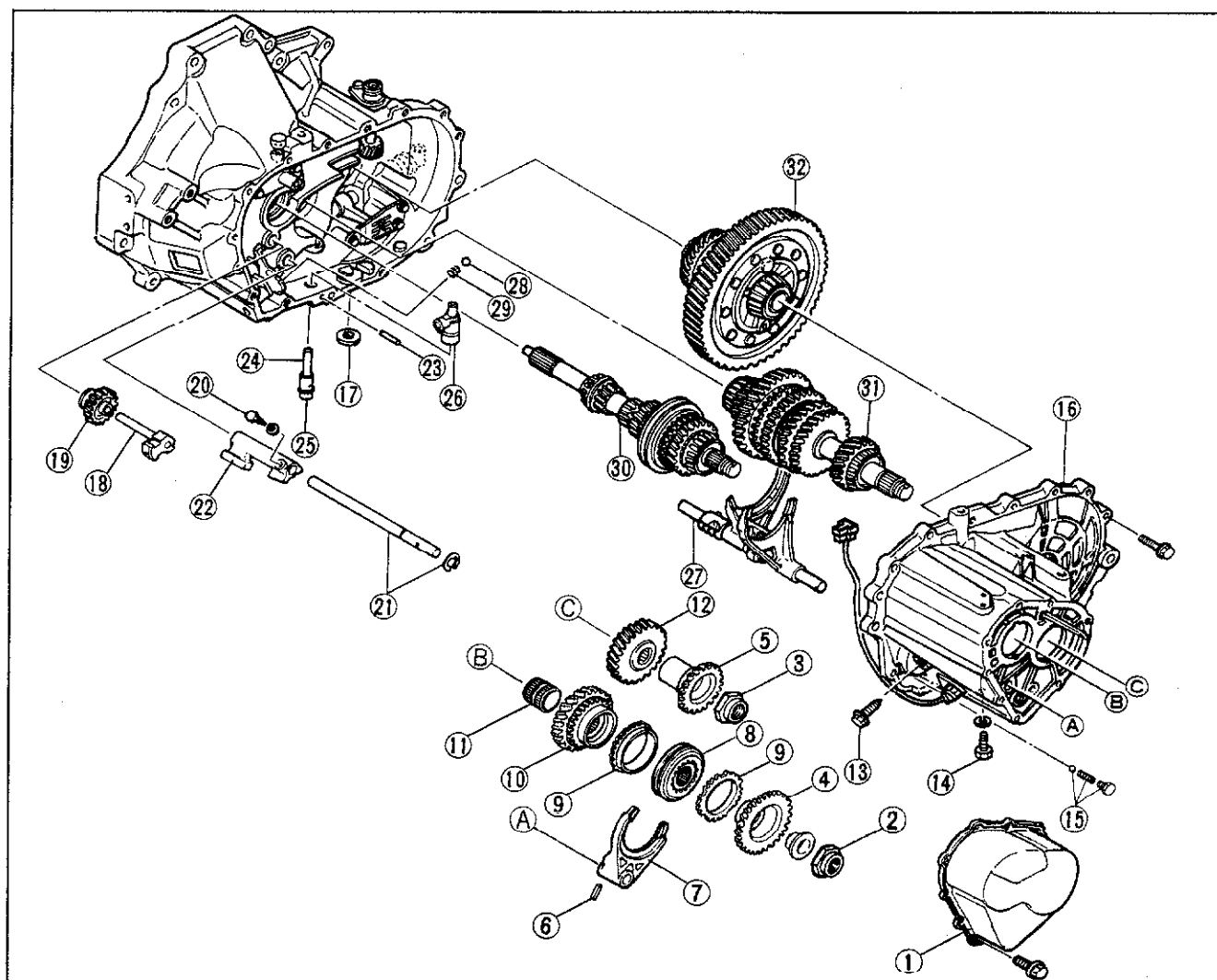
The 5th gear end play equals the difference between the gear sleeve and the 5th gear.

Standard: 0.15—0.262 mm (0.006—0.010 in)
Limit: 0.31 mm (0.012 in)

G-type DISASSEMBLY

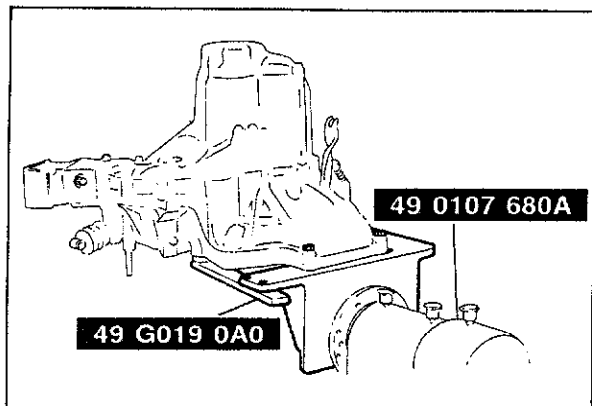
DISASSEMBLY—STEP 1

Disassemble in the sequence shown in the figure.



83U07A-010

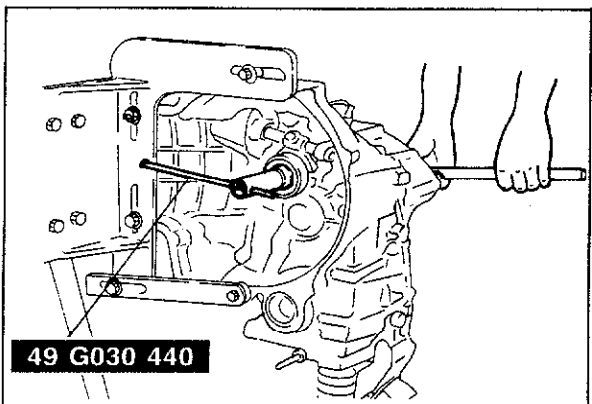
- | | | |
|--|--|---|
| 1. Rear cover | 13. Lock bolt | 25. O-ring |
| 2. Lock nut | 14. Guide bolt | 26. Crank lever assembly |
| 3. Lock nut | 15. Lock bolt, and ball and spring | 27. Shift fork and shift rod assembly |
| 4. Primary reverse synchronizer gear | 16. Transaxle case assembly | 28. Steel ball |
| 5. Secondary reverse synchronizer gear | 17. Magnet | 29. Spring |
| 6. Spring pin | 18. Reverse idle shaft | 30. Primary shaft gear assembly |
| 7. Shift fork | 19. Reverse idle gear | 31. Secondary shaft gear assembly |
| 8. Clutch hub assembly | 20. Lock bolt | 32. Ring gear and differential assembly |
| 9. Synchronizer ring | 21. Shift rod (5th and reverse) and clip | |
| 10. 5th gear | 22. Gate | |
| 11. Gear sleeve | 23. Pin | |
| 12. Secondary 5th gear | 24. Crank lever shaft | |



86U07A-084

Transaxle

Position the **SST**, and mount the transaxle on the hanger.



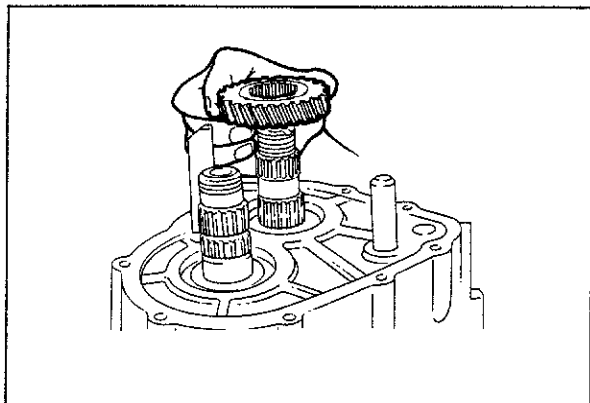
86U07A-085

Lock Nut

Lock the primary shaft using the **SST**, and remove the lock nut.

Note

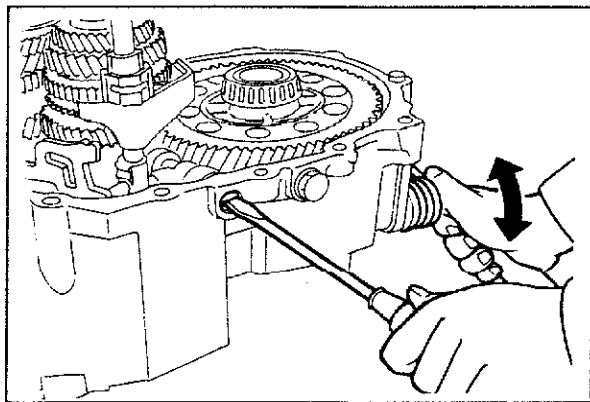
- a) Turn the transaxle on its side.
- b) Shift to 1st or 2nd gear.



73G07A-026

Secondary 5th Gear

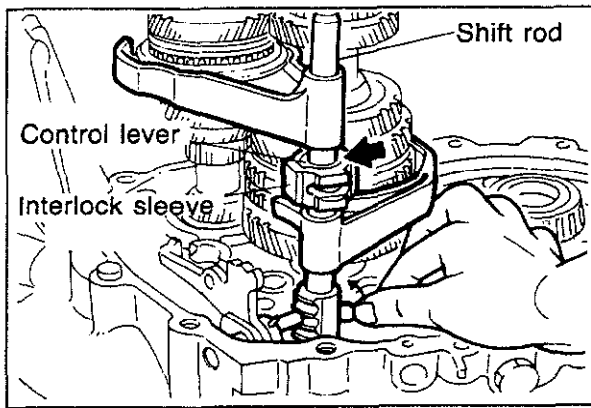
Remove the secondary 5th gear.



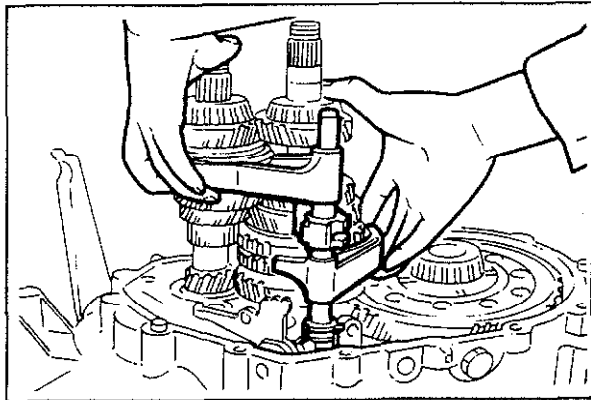
76U07A-042

Crankshaft Lever Shaft

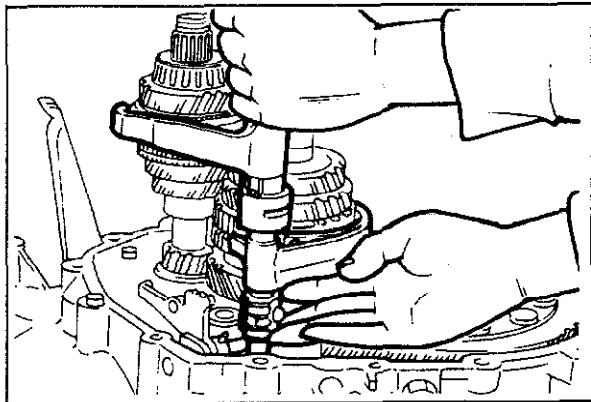
The crankshaft lever shaft can be removed by moving the change rod in the direction shown in the figure while turning the shaft with a flat-tipped screwdriver.



76U07A-226



76U07A-044



76U07A-227

Shift Fork and Shift Rod Assembly

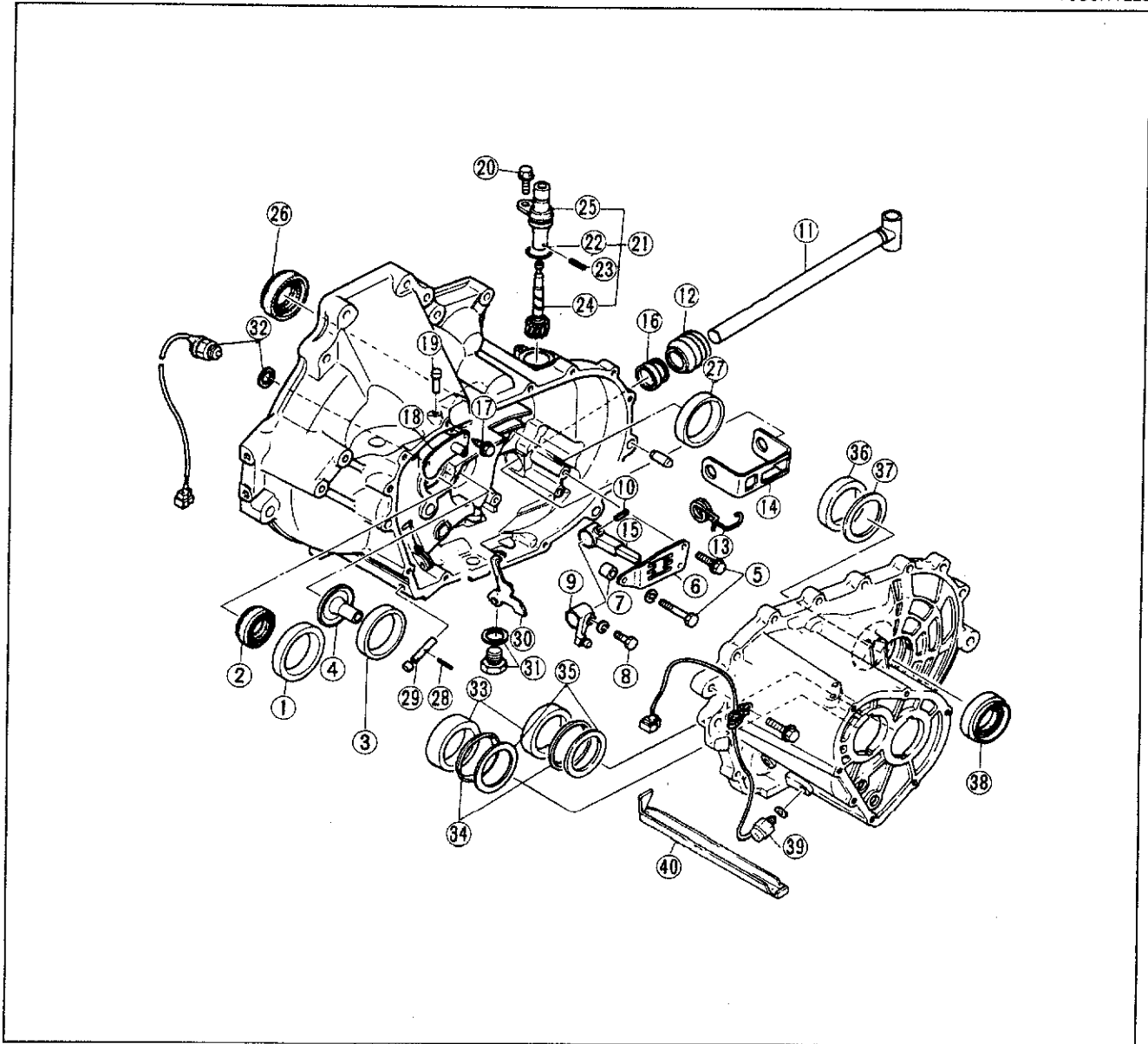
The shift fork and shift rod assembly can be removed as follows:

1. Align the ends of the interlock sleeve and of the control lever, then turn the shift rod counter-clockwise.
2. While holding the 1st - 2nd shift fork with one hand and the 3rd - 4th shift fork with the other, raise them both at the same time and shift each of the clutch hub sleeves.
3. Lift the control end and remove the steel ball, and, at the same time, remove the shift rod from the clutch housing.
4. Separate the shift rod and shift fork assembly from each of the clutch hub sleeves.

DISASSEMBLY—STEP 2

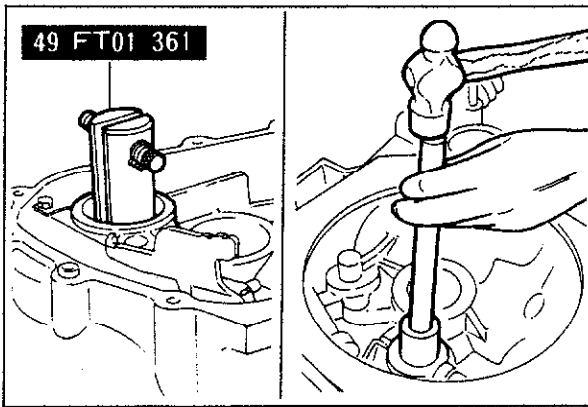
Disassemble in the sequence shown in the figure.

76U07A-228



76U07A-229

- | | | |
|-----------------------|--------------------------------------|-------------------------------|
| 1. Bearing outer race | 15. Selector | 28. Spring pin |
| 2. Oil seal | 16. Oil seal | 29. Reverse lever shaft |
| 3. Bearing outer race | 17. Bolts | 30. Reverse lever |
| 4. Funnel | 18. Bleeder cover | 31. Drain plug and washer |
| 5. Bolts | 19. Bleeder | 32. Neutral switch and gasket |
| 6. Guide plate | 20. Bolt | 33. Bearing outer race |
| 7. Pipe | 21. Speedometer driven gear assembly | 34. Diaphragm spring |
| 8. Bolt | 22. O-ring | 35. Adjust shim |
| 9. Change arm | 23. Spring pin | 36. Bearing outer race |
| 10. Spring pin | 24. Driven gear | 37. Adjust shim |
| 11. Change rod | 25. Gear case | 38. Oil seal |
| 12. Boot | 26. Oil seal | 39. Back-up light switch |
| 13. Spring | 27. Bearing outer race | 40. Oil passage |
| 14. Reverse gate | | |



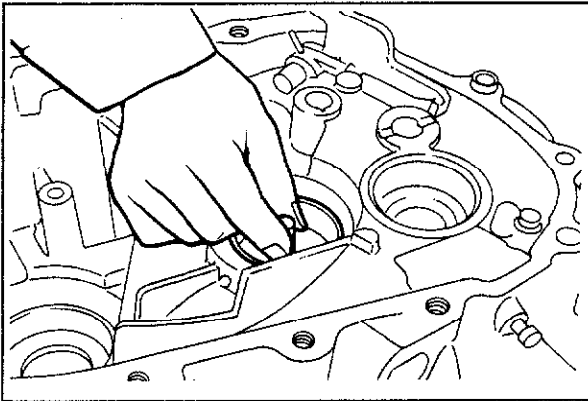
83U07A-012

Bearing Outer Race (on engine side of primary shaft)

Mount the **SST**, then reverse the clutch housing and use a piece of pipe to tap out the bearing outer race through the primary shaft hole.

Caution

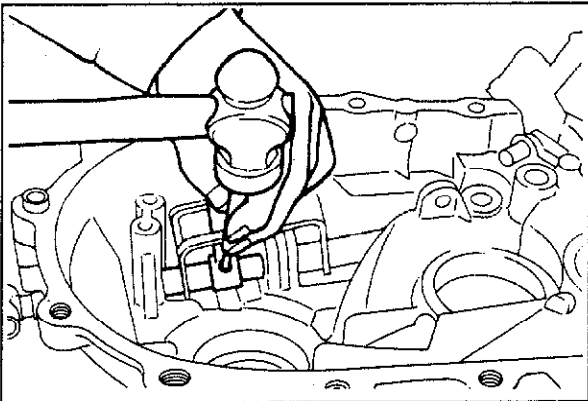
Before the bearing outer race comes all the way out, tap with lighter strokes and hold it to prevent it from falling.



76U07A-049

Bearing Outer Race (between secondary shaft and engine)

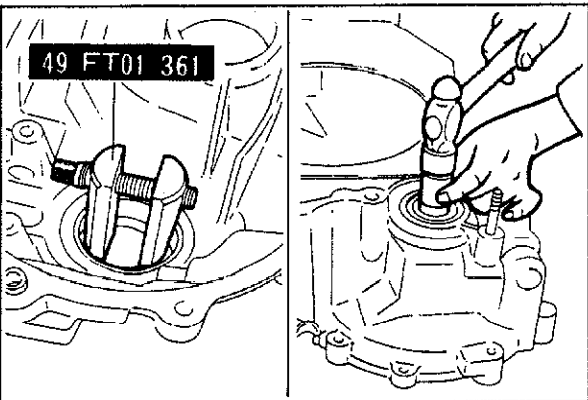
Remove the bearing outer race by lifting out the funnel and the race together.



76U07A-231

Spring Pin

Align the groove for removal of the clutch housing pin with the position of the spring pin, then tap the pin out using a pin punch.



83U07A-013

Bearing Outer Race (differential side)

Mount the **SST**, then use a piece of pipe to tap out the bearing outer race through the driveshaft hole.

Caution

Before the bearing outer race comes all the way out, tap with lighter strokes and hold it to prevent it from falling.

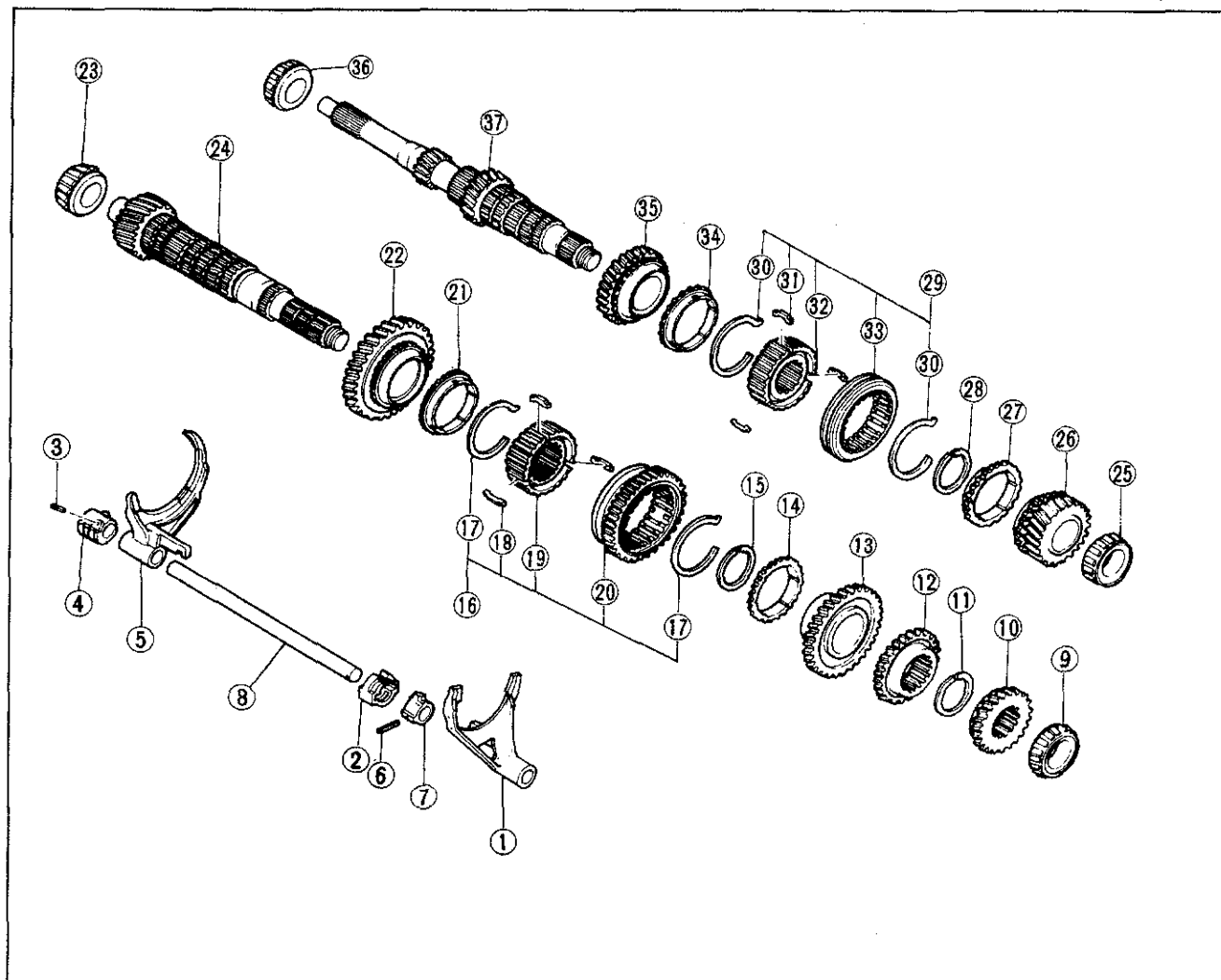
DISASSEMBLY—STEP 3

Disassemble in the sequence shown in the figure.

Note

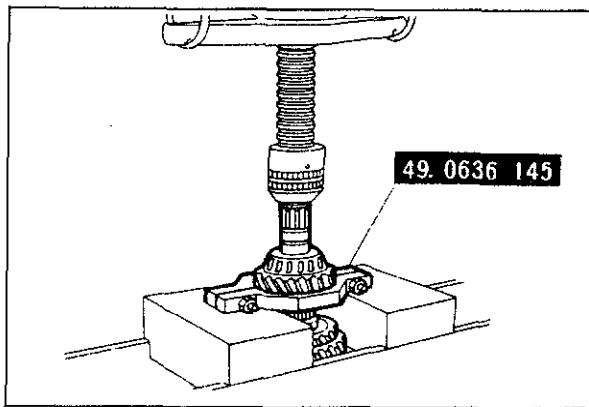
Replace the bearing inner race with a new one.

76U07A-233



83U07A-014

- | | | |
|-----------------------------------|--------------------------------------|---|
| 1. Shift fork (3rd and 4th gears) | 13. 2nd gear | 26. 4th gear |
| 2. Interlock sleeve | 14. Synchronizer ring | 27. Synchronizer ring |
| 3. Spring pin | 15. Retaining ring | 28. Retaining ring |
| 4. Control end | 16. Clutch hub assembly | 29. Clutch hub assembly (3rd and 4th gears) |
| 5. Shift fork (1st and 2nd gears) | 17. Synchronizer spring | 30. Synchronizer spring |
| 6. Spring pin | 18. Synchronizer keys | 31. Synchronizer keys |
| 7. Control lever | 19. Clutch hub | 32. Clutch hub |
| 8. Control rod | 20. Clutch hub sleeve (reverse gear) | 33. Clutch hub sleeve |
| 9. Bearing outer race | 21. Synchronizer ring | 34. Synchronizer ring |
| 10. 4th gear | 22. 1st gear | 35. 3rd gear |
| 11. Retaining ring | 23. Bearing inner race | 36. Bearing inner race |
| 12. 3rd gear | 24. Secondary shaft | 37. Primary shaft |
| | 25. Bearing inner race | |



83U07A-015

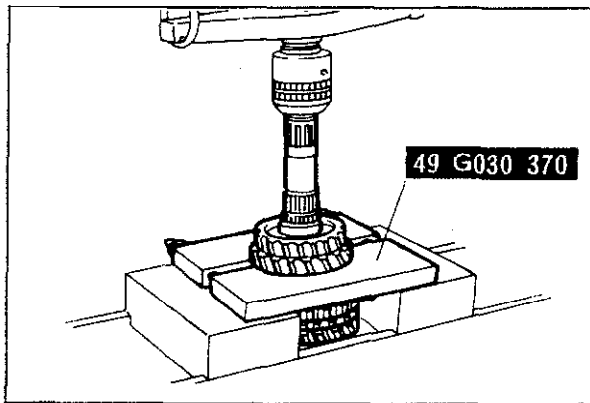
(SECONDARY SHAFT)

Bearing Outer Race and 4th Gear

Press off the bearing outer race together with 4th gear using the **SST** on 4th gear.

Caution

Hold the shaft with one hand so that it doesn't fall.



83U07A-016

3rd Gear

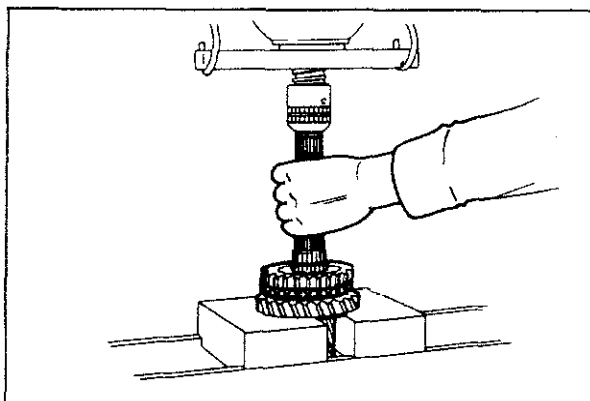
Press off 3rd gear together with 2nd gear using the **SST** on 2nd gear as shown.

Note

The clutch hub sleeve must be meshed with 1st gear.

Warning

Hold the shaft with one hand so that it doesn't fall.



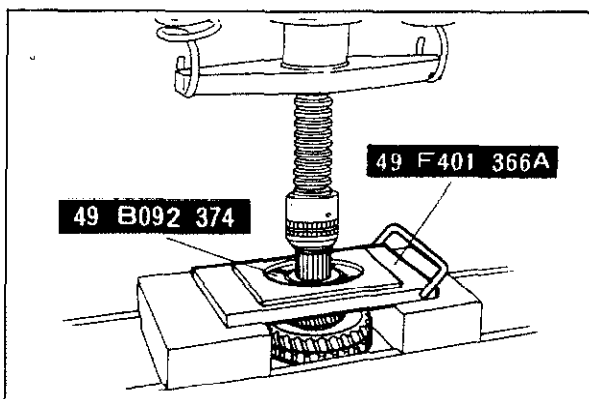
83U07A-017

Clutch Hub Assembly (1st and 2nd gears)

Press off the 1st and 2nd clutch hub assembly by pushing against 1st gear. Remove it with the gears intact.

Caution

Hold the shaft with one hand so that it doesn't fall.



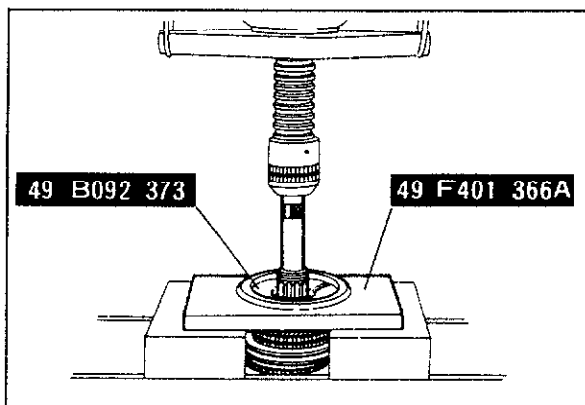
83U07A-018

Bearing Inner Race (drive gear side)

Press the bearing inner race from the shaft using the **SST**.

Caution

Hold the shaft with one hand so that it doesn't fall.



83U07A-019

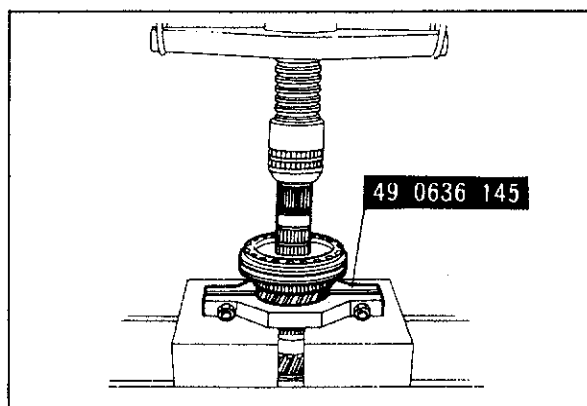
(PRIMARY SHAFT)

Bearing Inner Race (4th gear side)

Press the bearing inner race from the shaft using the SST.

Caution

Hold the shaft with one hand so that it doesn't fall.



83U07A-020

Clutch Hub Assembly (3rd and 4th gears)

Set the SST onto the 3rd gear, and press off the clutch hub assembly together with the gear.

Caution

Hold the shaft with one hand so that it doesn't fall.

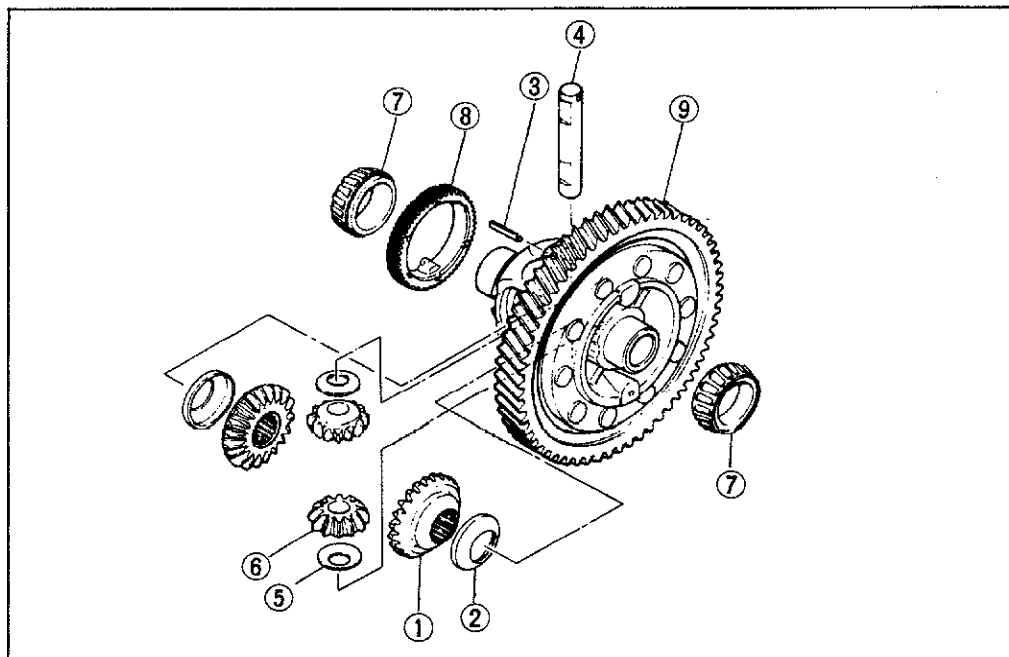
DIFFERENTIAL

Disassemble in the sequence shown in the figure.

Note

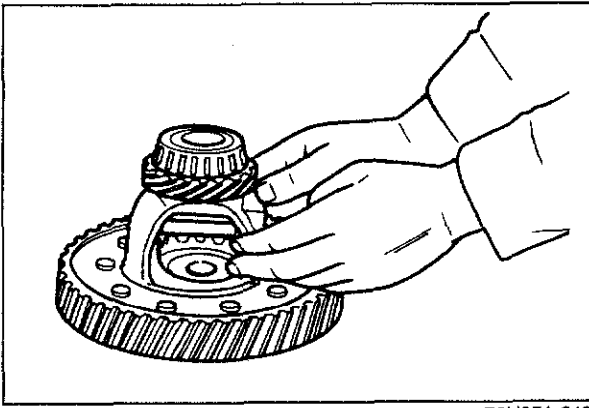
Replace the bearing inner race with a new one.

83U07A-021



1. Side gears
2. Thrust washers
3. Spring pin
4. Pinion shaft
5. Thrust washers
6. Pinion gears
7. Side bearings
8. Speedometer drive gear
9. Ring gear and gear case assembly

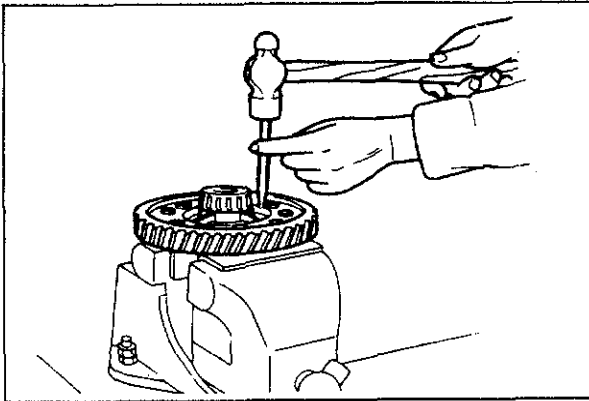
73G07A-007



76U07A-243

Side gear

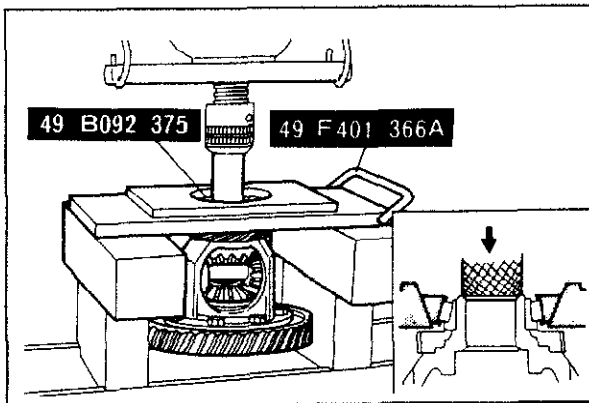
Remove the side gear from the gear case, turning it backward on top of the pinion gear.



76U07A-063

Spring pin

With the gear case secured in a vice, use a pin punch to tap out the spring pin.



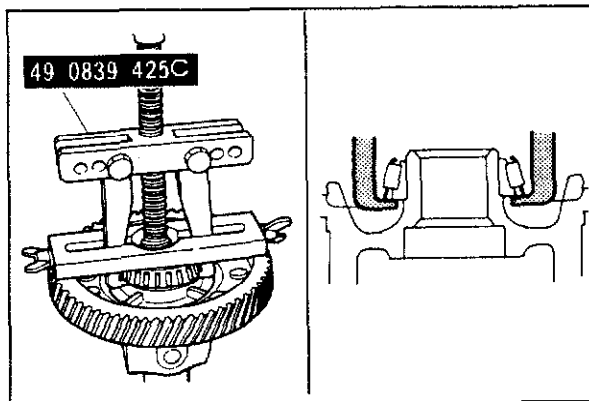
83U07A-022

Side bearing inner race (side opposite the ring gear)

Remove the bearing inner race from the gear case using the **SST**.

Caution

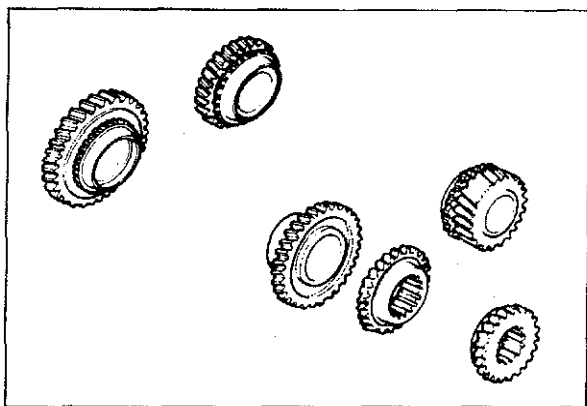
Hold the gear case with one hand so that it doesn't fall.



83U07A-066

Side bearing inner race (ring gear side)

Remove the side bearing inner race using a combination of parts from the **SST**.



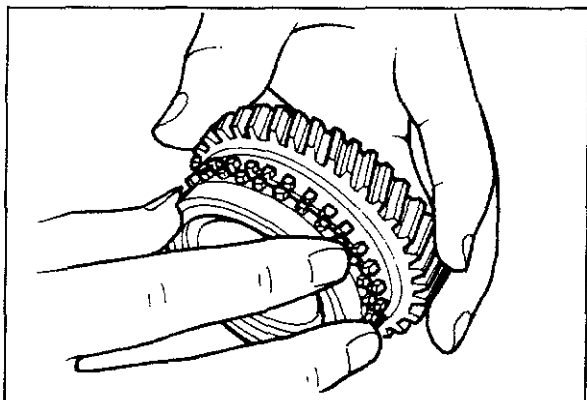
76U07A-244

INSPECTION

Check the following parts, replace if necessary.

1st, 2nd, 3rd, 4th, and 5th Gears

1. Worn or damaged synchronizer cone.
2. Worn or damaged hub sleeve coupling.
3. Worn or damaged teeth.
4. Worn or damaged inner surface or end surface of gears.



76U07A-245

Primary Shaft Gear and Primary Gear (5-speed)

1. Worn teeth.
2. Worn or damaged sliding parts of each gear.
3. Worn or damaged spline.
4. Clogged oil passage.

Note

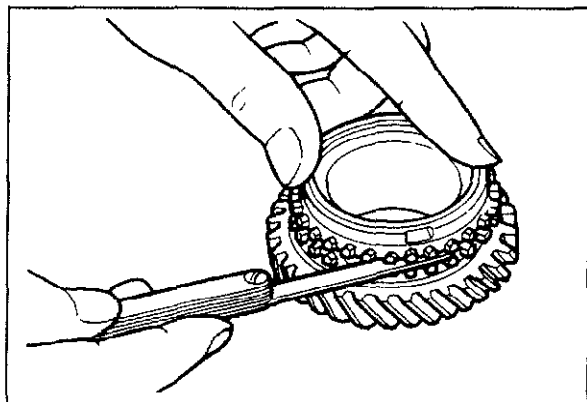
When the shaft gear is replaced, adjust the bearing preload.

Synchronizer Ring

1. Engagement with gear.

Caution

If meshing is not good, coat the gear and the synchronizer ring contact surfaces with compound and repair by lapping.



76U07A-246

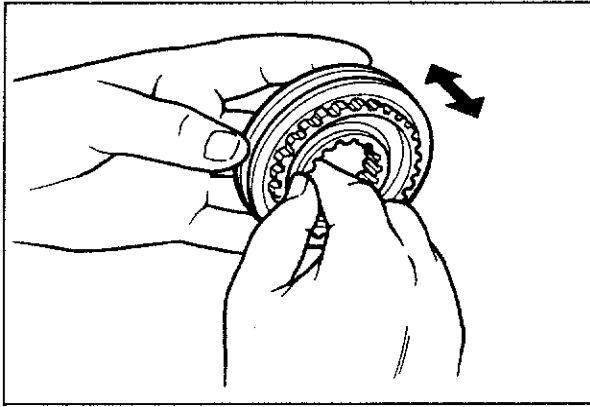
2. Worn or damaged spline.
3. Worn or damaged tapered surface.
4. Clearance from the side of gear.

Standard: 1.5 mm (0.0591 in)

Min: 0.8 mm (0.0315 in)

Caution

- a) Press the synchronizer ring uniformly against the gear and measure the overall circumference.
- b) If the measured value is less than min., replace the synchronizer ring or gear.



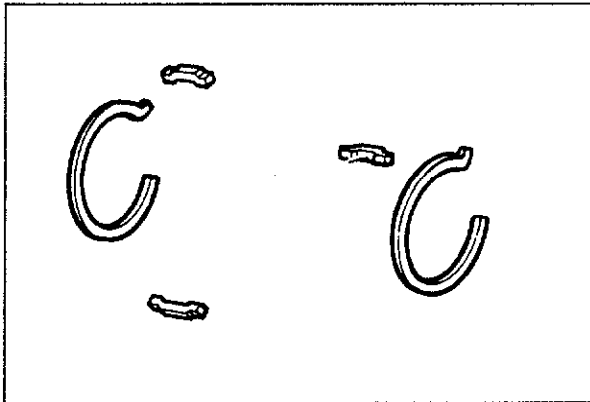
83U07A-023

Secondary Shaft Gear

1. Worn or damaged gear sliding parts.
2. Worn or damaged splines.
3. Worn teeth.
4. Clogged oil passage.

Note

If the shaft gear is replaced, adjust the bearing preload.



83U07A-024

Clutch Hub

1. Worn or damaged sleeve sliding surface.
2. Worn or damaged synchronizer key groove.
3. Worn end surface.
4. Operation of the hub sleeve when it is installed.

Clutch Hub Sleeve

1. Worn or damaged hub sliding surface.
2. Worn or damaged sleeve fork groove.

Synchronizer Key and Spring

1. Worn key.
2. Weak or bent spring.

Reverse Idle Gear

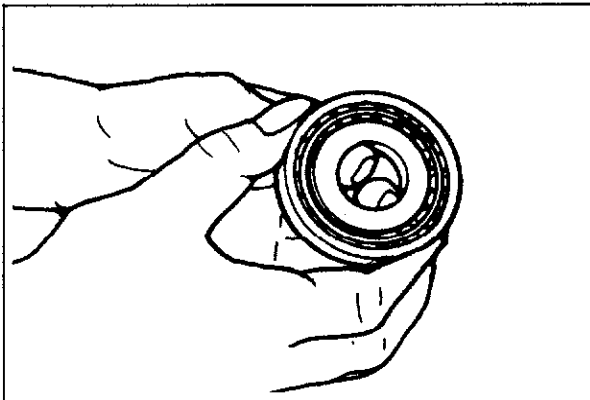
1. Worn or damaged bushing.
2. Worn or damaged teeth.
3. Worn or damaged release lever coupling groove.

Clutch housing, Transaxle case, Rear cover, and Differential Gear Case

1. Cracks or damage.

Note

If the clutch housing, transaxle case, or differential gear case are replaced, adjust the bearing preload of each shaft gear and the preload of the differential side bearing.



83U07A-025

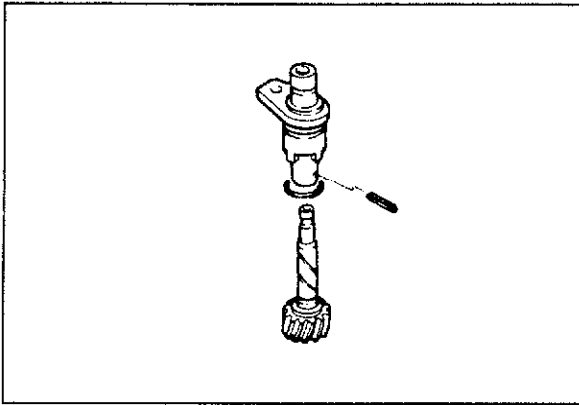
Bearing

1. Roughness or noise while turning.
2. Worn or damaged outer race or roller.

Note

a) Replace the bearing, the outer race, and the inner race as a unit.

b) If the bearing is replaced, adjust the preload.



76U07A-250

Ring Gear and Speedometer Drive Gear

1. Worn or damaged teeth.

Note

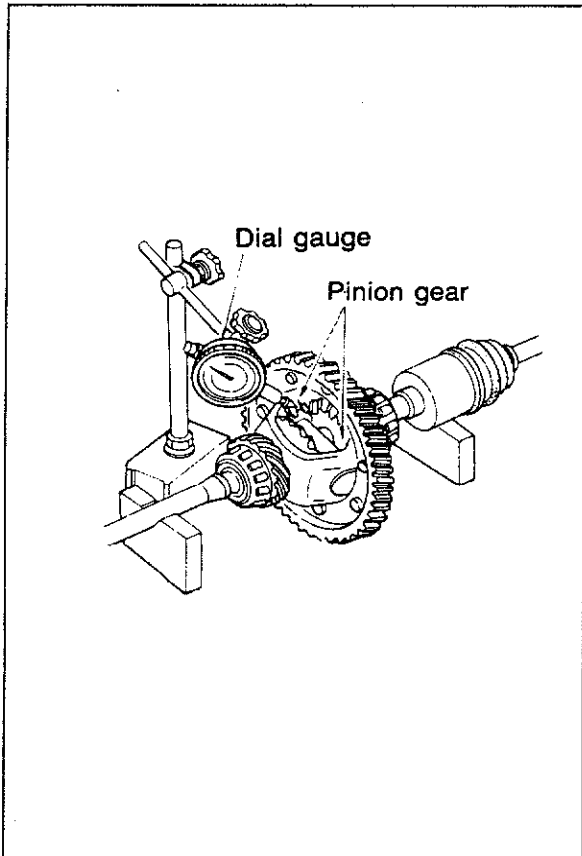
If the ring gear is faulty, replace the entire ring gear and gear case assembly.

Oil Seal

1. Deformed, damaged, or worn lip.

Speedometer Driven Gear Assembly

1. Worn or damaged teeth.
2. Worn or damaged O-ring.



76U07A-251

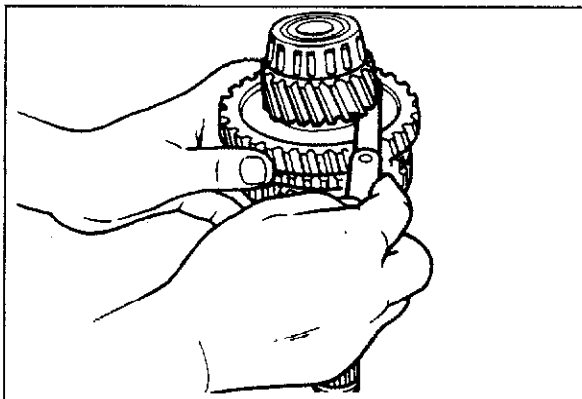
Backlash of Side Gear and Pinion Gear

Check and adjust using the following procedure.

1. Install the driveshaft and the joint shaft onto the differential assembly.
2. Support the shafts on V-blocks as shown.
3. Measure the backlash of both pinion gears.

Backlash: 0—0.1 mm (0—0.0039 in)

4. If the backlash exceeds specification, replace all the thrust washers with new ones.



76U07A-252

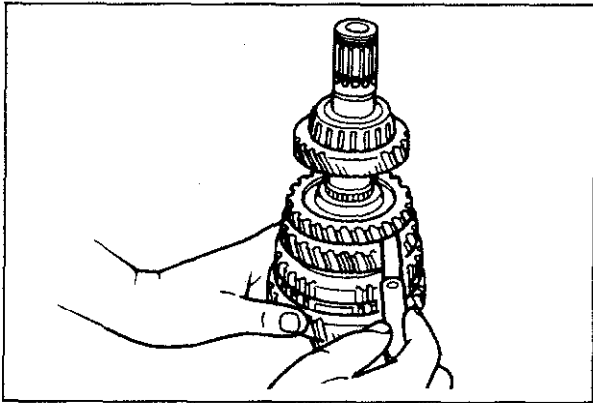
Thrust Clearance of 1st, 2nd, 3rd, and 4th Gears

Note

Measure either before disassembling the shaft gear assembly or while assembling it.

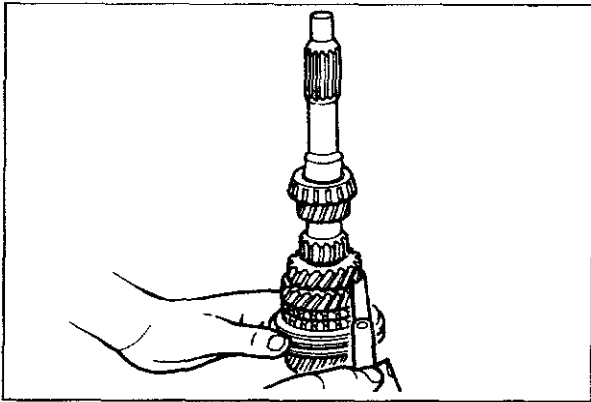
1. Measure the clearance between 1st gear and the differential drive gear on the secondary shaft.

Standard: 0.05—0.28 mm (0.0020—0.0110 in)
Max: 0.33 mm (0.019 in)



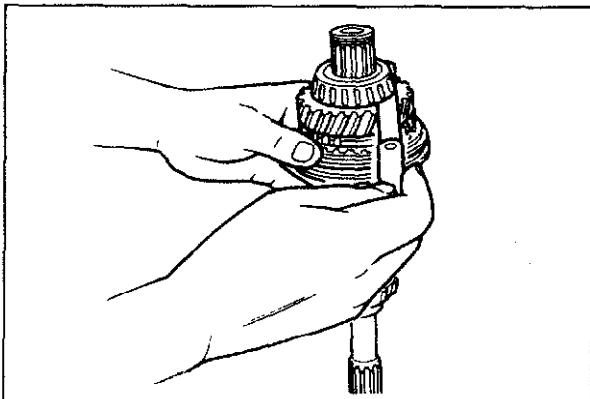
76U07A-253

2. Measure the clearance between 2nd gear and 3rd gear.

Standard:**0.175—0.455 mm (0.0069—0.0179 in)****Max: 0.505 mm (0.0199 in)**

76U07A-254

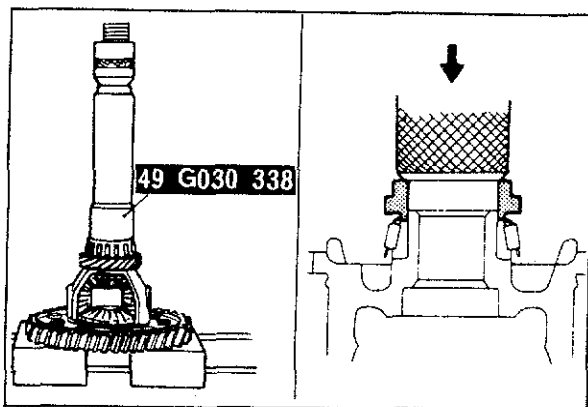
3. Measure the clearance between 3rd gear and 2nd gear.

Standard: 0.05—0.20 mm (0.0020—0.0079 in)**Max: 0.25 mm (0.0098 in)**

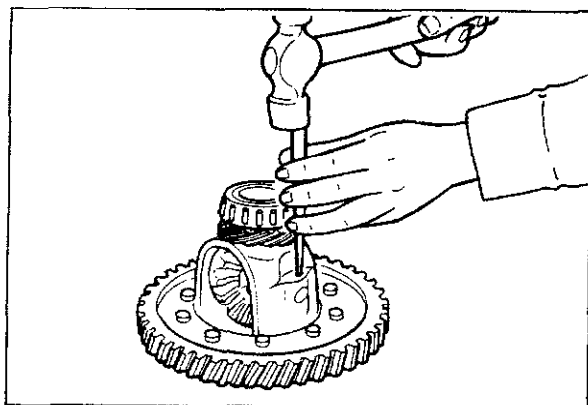
76U07A-255

4. Measure the clearance between 4th gear and the bearing inner race.

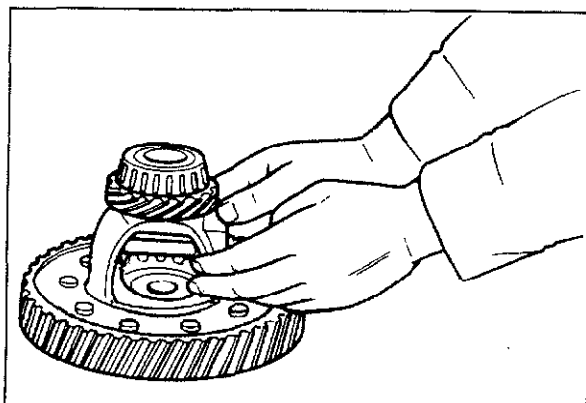
Standard:**0.165—0.365 mm (0.0064—0.0144 in)****Max: 0.415 mm (0.0163 in)**



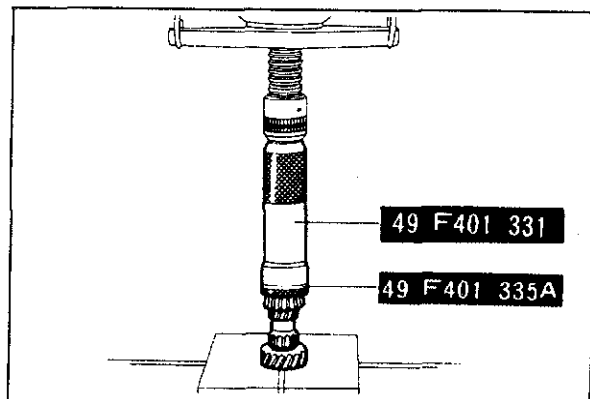
83U07A-026



76U07A-257



76U07A-080



83U07A-027

ASSEMBLY

Caution

- Clean each part before installing it.
- Before installation, coat sliding surfaces of the bearings and gears with transaxle oil.
- Be sure to use new spring pins and retaining rings.

Differential

- Install the speedometer drive gear into the gear case.
- Support the ring gear, and press on the side bearing inner race using **SST**.

Note

Press on until there is no gap between the bearing and the gear case.

- Install the thrust washer onto the pinion gear, then install both into the gear case and install the pinion shaft.
- Tap the spring pin into the gear case from the speedometer gear side.

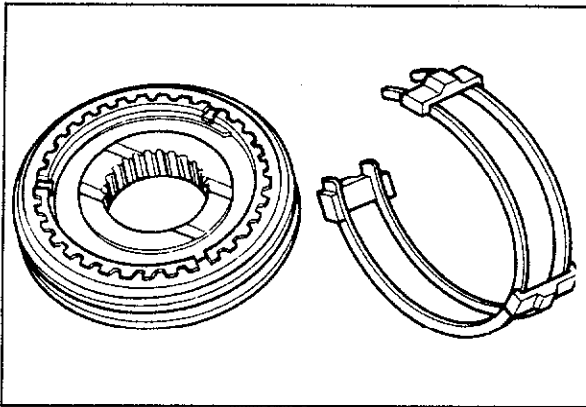
- After installing thrust washers onto the side gears, place the two side gears into the gear case at the same time, turn them back on the pinion gear and install them into the gear case.

Primary Shaft Gear

- Support 2nd gear, then press on the bearing outer race (engine side) using the **SST**.

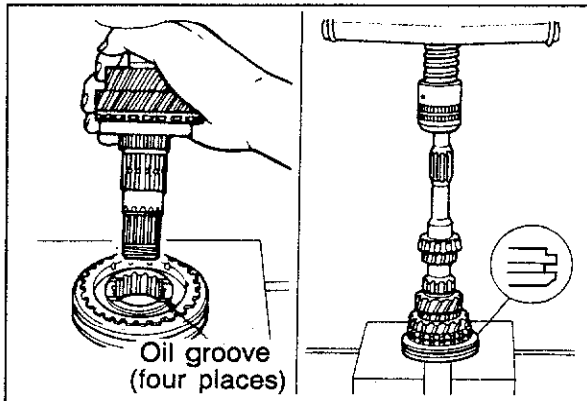
Note

Press on until there is no gap between the primary shaft and the bearing.



76U07A-082

2. Install the clutch hub and 3 synchronizer keys into the clutch hub sleeve (3rd and 4th gears).
3. Fit the hook of the synchronizer key spring into the clutch hub groove for the hook, and install the 3 synchronizer keys so that they are held down.
4. Install 3rd gear onto the shaft gear.



73G07A-008

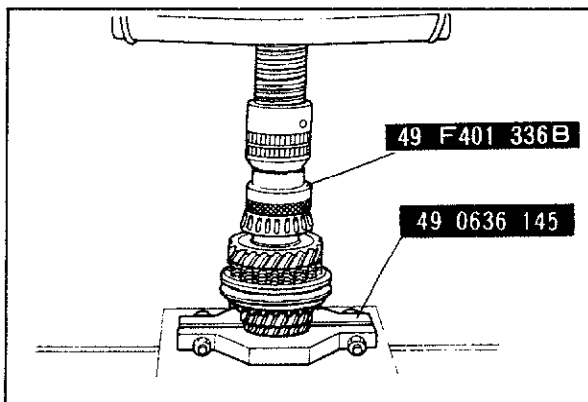
5. Install the synchronizer ring onto the clutch hub assembly.
6. Place the clutch hub assembly so that it faces in the direction shown in the figure and press on the shaft gear.

Note

Install the clutch hub sleeve as shown.

Caution

Begin pressing only after confirming that the splines of the shaft gear and the clutch hub are properly positioned, and press until the force applied reaches 19.620 N (4,409 lb).

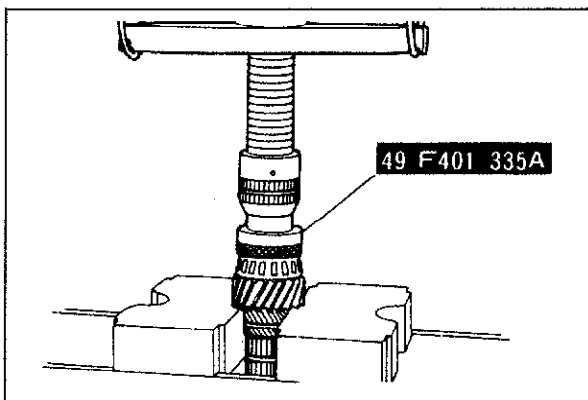


83U07A-028

7. Install the retaining ring, the synchronizer ring, and 4th gear onto the shaft gear in that order.
8. Install the 2nd gear using the SST.

Note

Press on until there is no gap between the shaft and the bearing.



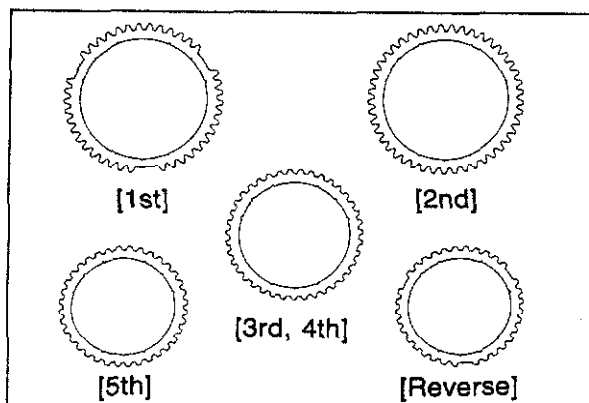
83U07A-029

Secondary Shaft Gear

1. Support the drive gear, and press on the bearing inner race using SST.

Note

Press on until there is no gap between the shaft and the bearing.

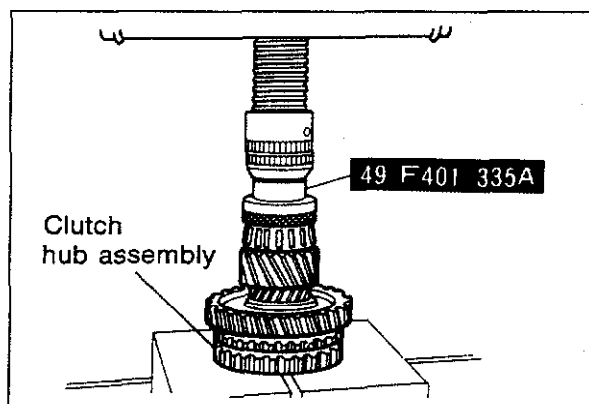


76U07A-086

2. Install the clutch hub and the 3 synchronizer keys into the clutch hub sleeve (1st and 2nd gears).
3. Fit the hook of the synchronizer key spring into the clutch hub groove for the hook, and install the 3 synchronizer keys so that they are held down.
4. Install 1st gear onto the shaft gear.

Note

The styles and size of the synchronizer rings are different as shown in the illustration.

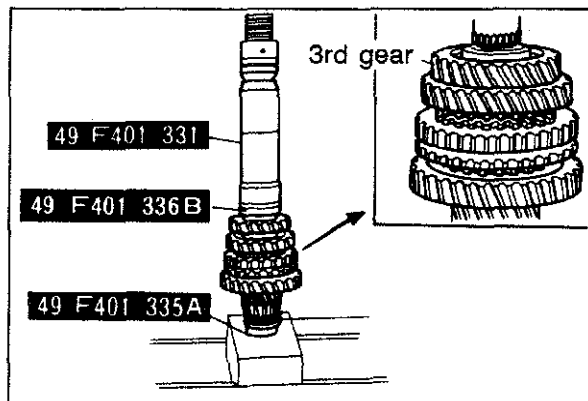


83U07A-030

5. Install the synchronizer ring onto the clutch hub assembly.
6. Place the clutch hub assembly so that it faces in the direction shown in the figure and press in the shaft gear.
7. Press the clutch hub assembly onto the shaft gear using **SST**.

Note

Begin pressing only after confirming that the splines of the shaft gear and the clutch hub are properly positioned, and press until the force applied reaches 19,620 N (4,409 lb).



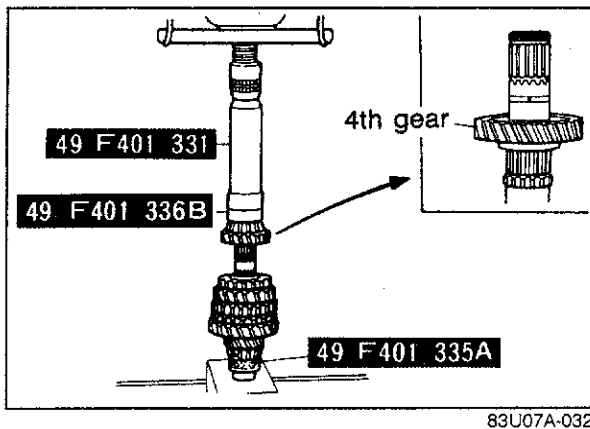
83U07A-031

8. Install the retaining ring, the synchronizer ring, and 2nd gear onto the shaft gear in that order.
9. Support the bearing inner race of the shaft gear using **SST**.
10. Press 3rd gear onto the shaft gear using the **body** (49 F401 331) and **attachment B** (49 F401 336B) of the **bearing installer**.

Note

- a) Install 3rd gear so that it faces in the direction shown in the figure.
- b) Press only after confirming that the splines of the shaft gear and 3rd gear are properly positioned, and press until the force applied reaches 29,430 N (6,614 lb).

11. Install the retaining ring onto the shaft gear.



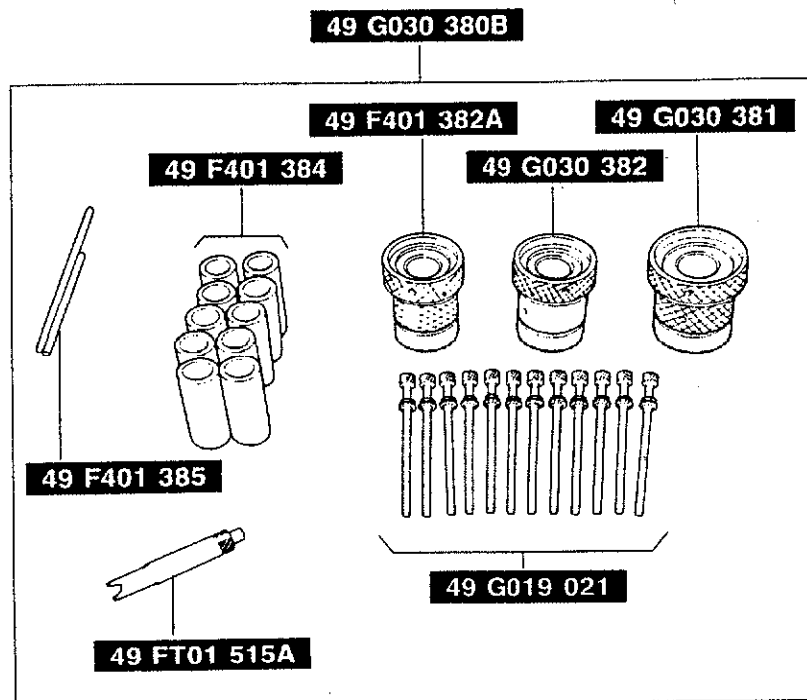
12. Support the bearing inner race of the shaft gear using **SST**.
13. Install 4th gear and the bearing inner race onto the shaft gear.
14. Position the **SST** in place on the bearing inner race, and press on the bearing inner race and 4th gear at the same time.

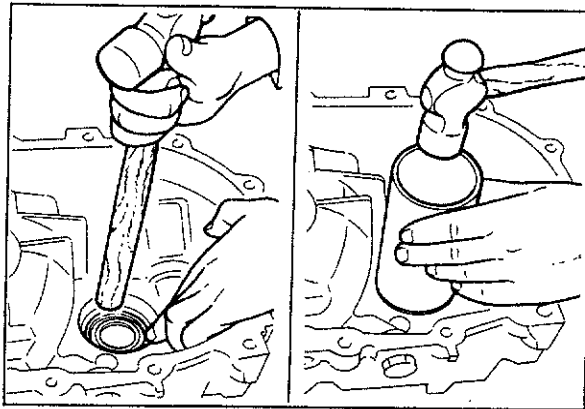
Note

- a) Install 4th gear so that it faces in the direction shown in the figure.
- b) Begin pressing only after confirming that the splines of the shaft gear and 4th gear are properly aligned, and press in until there is no gap between the shaft and the bearing inner race.

Bearing Preload

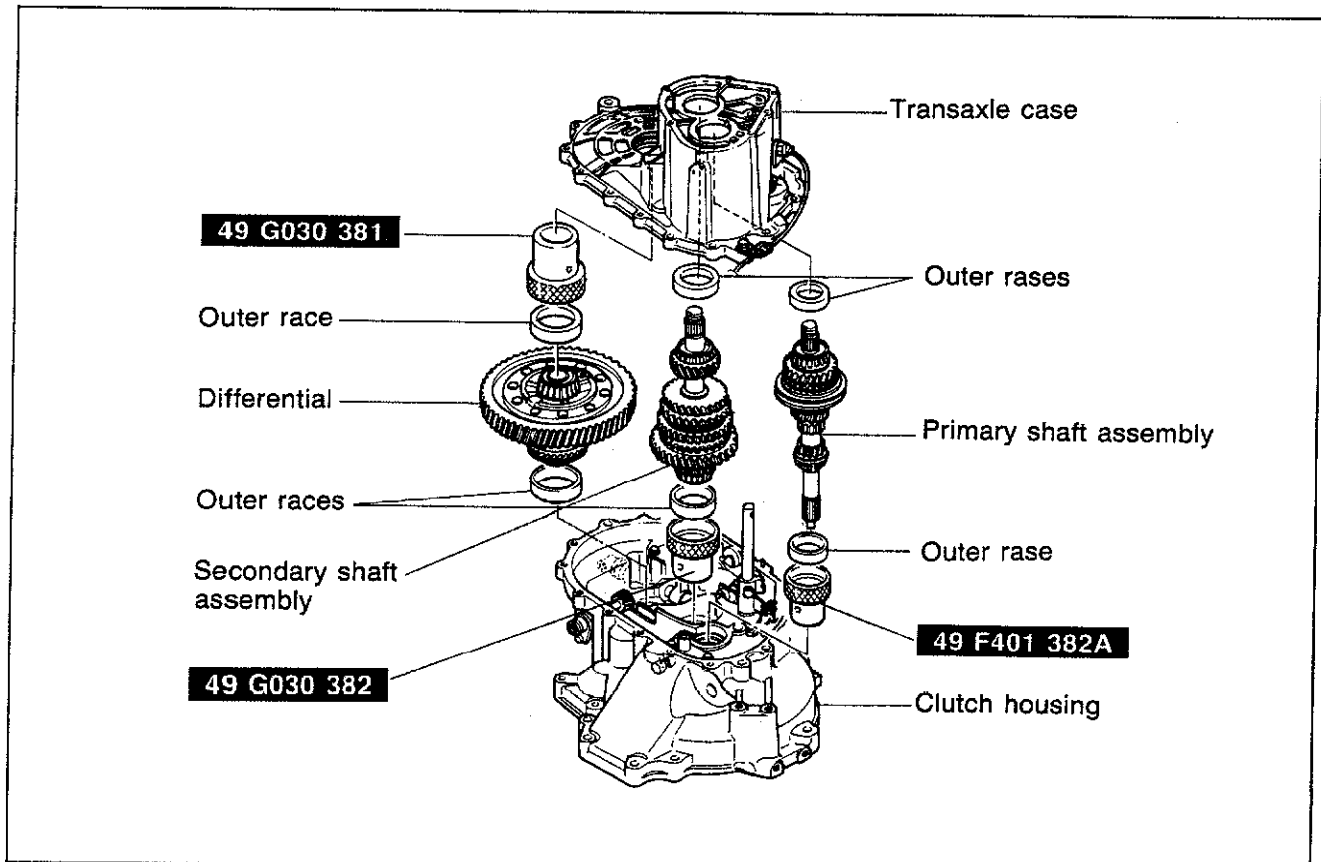
Adjust the bearing preload through the use of adjust shim(s).



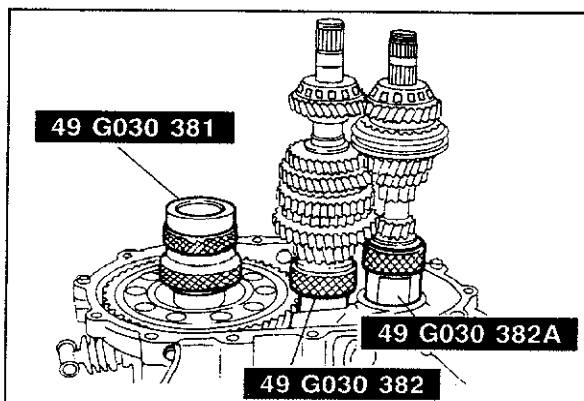


83U07A-087

1. Install the primary and secondary bearing outer races into the transaxle case (shims removed).
2. Mount the clutch housing on the transaxle hanger, and install the differential bearing outer race with brass drift until it is flush with the clutch housing.
3. Position a piece of pipe [outer diameter 68 mm (2.68 in) or less] against the differential bearing outer race and tap with a hammer until it contacts the clutch housing.

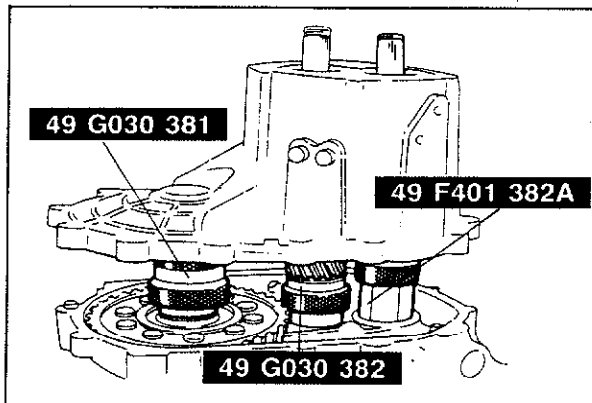
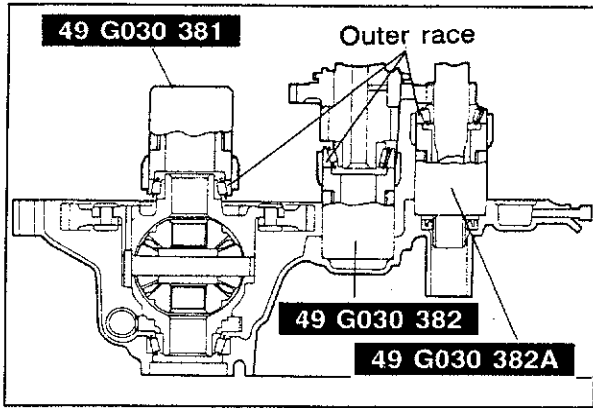


83U07A-033



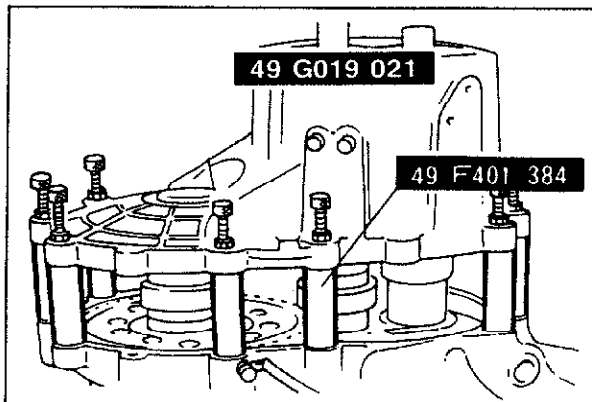
83U07A-095

4. Install the outer races into the **SST**.
5. Mount the differential assembly to the clutch housing, and mount the assembled selector and bearing outer race on the differential.
6. Mount the assembled selector and bearing outer race for primary and for secondary shaft into the clutch housing.
7. Mount both shaft gear assemblies as shown.



76U07A-267

8. Mount the transaxle case to the shafts and the differential selector as shown.



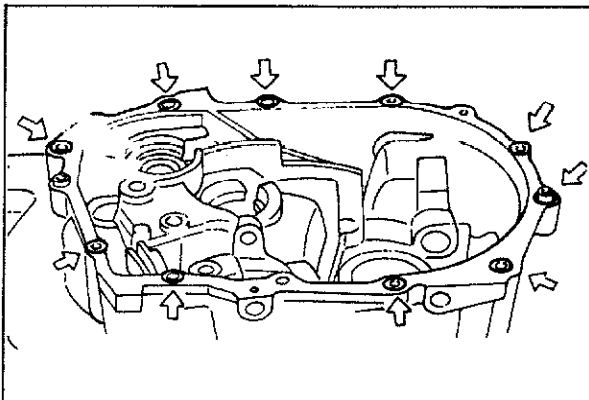
83U07A-088

9. Set the **SST** between the transaxle case and the clutch housing, then install the **SST** and tighten to the specified torque.

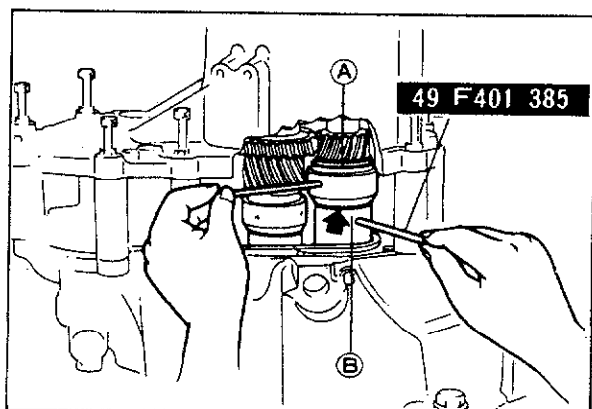
Tightening torque:

18—20 N·m (1.8—2.0 m·kg, 13—14 ft·lb)

Note
Install the collars at the positions shown in the figure.

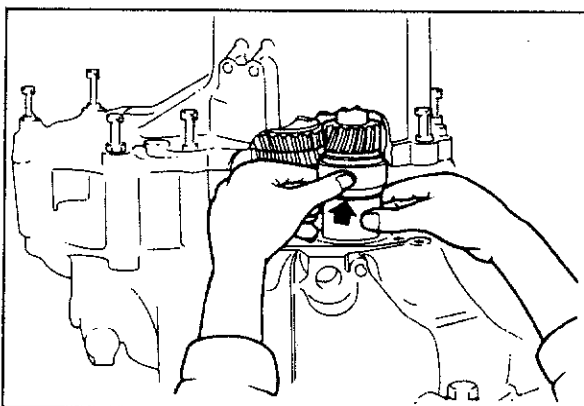


83U07A-034



83U07A-089

10. To seat the bearings, mount the **SST** on parts (A) and (B) of the selector, and turn the selector so the gap shown by the arrow in the figure is widened.
11. Move the bar by hand until the selector can no longer be turned, and turn it in the reverse direction until the gap is eliminated.

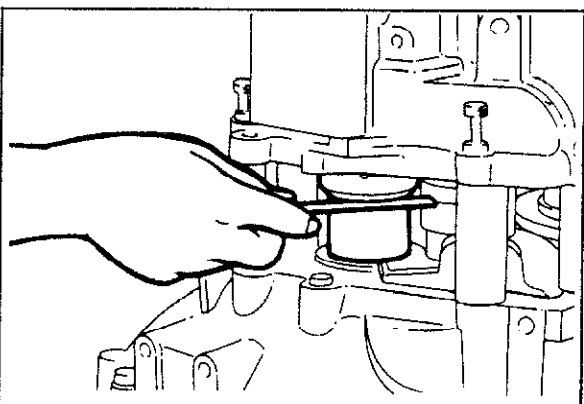


83U07A-035

12. Manually expand the selector without the bars for both shafts until the selector no longer turns.

Note

Make sure that each shaft gear turns smoothly.



83U07A-036

13. Use a feeler gauge to measure the gap in the selector at each shaft gear.

Note

Measure the gap around the entire circumference of the selector.

14. Select an appropriate adjust shim.

- (1) The shim to be used at the **primary shaft** gear side should be selected by referring to the table and selecting the shim which is nearest (on the thin side) to the value obtained by subtracting the thickness of the diaphragm spring [**0.70 mm (0.0276 in)**] from the largest measured value (A).

Example:

(A) = 0.94 mm (0.037 in)

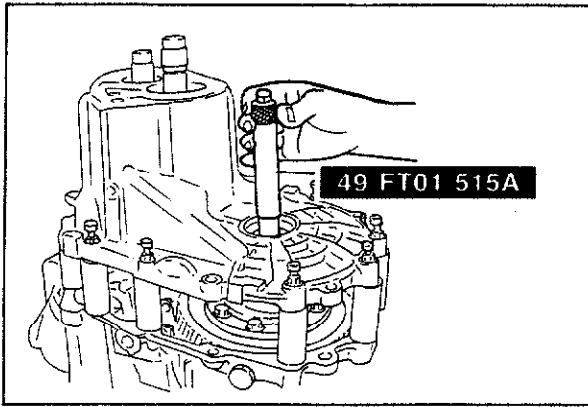
$$0.94 \text{ mm (0.0370 in)} - 0.70 \text{ mm (0.0276 in)} = 0.24 \text{ mm (0.0094 in)}$$

So the nearest shim (on the thin side) to 0.24 mm (0.0094 in) is 0.20 mm (0.0079 in).

- (2) The shim to be used at the **secondary shaft** gear side should be selected by referring to the table and selecting the shim which is nearest (on the thin side) to the value obtained by subtracting the thickness of the diaphragm spring [**0.70 mm (0.0276 in)**] from the largest measured value (B).

Thickness	
0.20 mm (0.0079 in)	0.50 mm (0.0197 in)
0.25 mm (0.0098 in)	0.55 mm (0.0217 in)
0.30 mm (0.0118 in)	0.60 mm (0.0236 in)
0.35 mm (0.0138 in)	0.65 mm (0.0256 in)
0.40 mm (0.0157 in)	0.70 mm (0.0276 in)
0.45 mm (0.0177 in)	

83U07A-037



83U07A-038

Example:

$$(B) = 0.94 \text{ mm (0.037 in)}$$

$$0.94 \text{ mm (0.037 in)} - 0.70 \text{ mm (0.0276 in)}$$

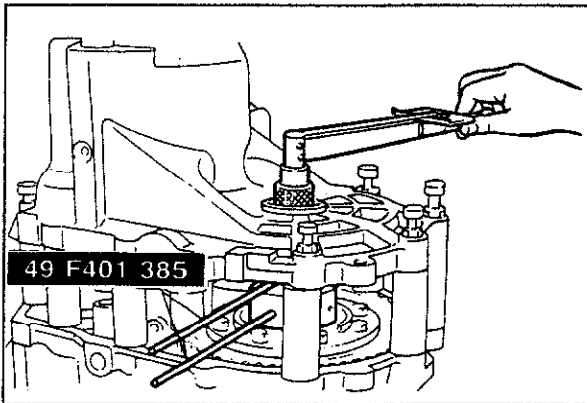
$$= 0.24 \text{ mm (0.0094 in)}$$

So the nearest shim (on the thick side) to 0.24 mm (0.0094 in) is 0.25 mm (0.0098 in).

Note

The number of shims used must not be more than two.

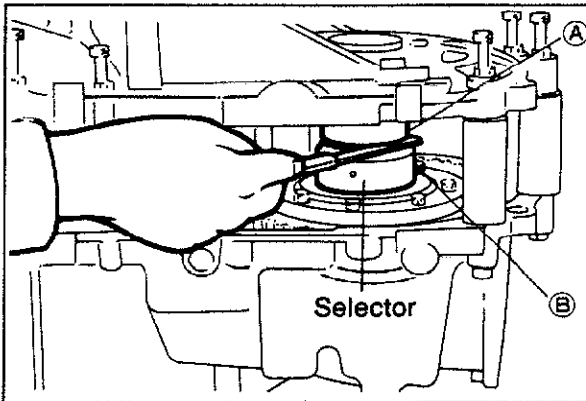
15. Install the **SST**.



83U07A-090

16. Adjust the selector with the **SST** until the preload specification is obtained.

Preload: 0.5 N·m (5 cm-kg, 4.3 in-lb)



83U07A-039

17. Measure the clearance between (A) and (B) with a feeler gauge.

18. Add **0.15 mm (0.0059 in)** to the measured clearance and select the combination of shims closest in value to that measurement.

See the table below for available shim sizes.

Note

a) Measure the gap around the entire circumference of the selector

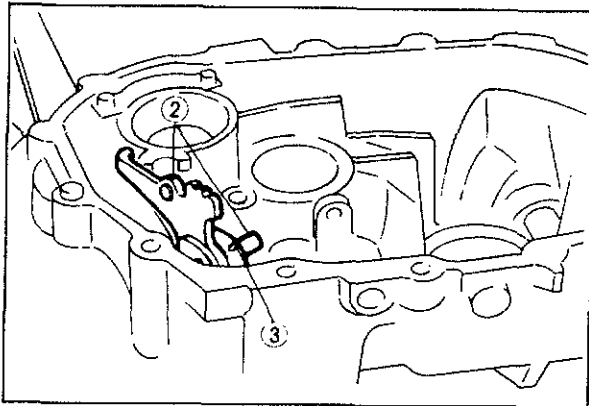
b) The number of shims used must not be more than three.

Thickness	
0.1 mm (0.0039 in)	0.9 mm (0.0354 in)
0.2 mm (0.0079 in)	1.0 mm (0.0394 in)
0.3 mm (0.0118 in)	1.1 mm (0.0433 in)
0.4 mm (0.0157 in)	1.2 mm (0.0472 in)
0.5 mm (0.0197 in)	0.12 mm (0.0047 in)
0.6 mm (0.0236 in)	0.14 mm (0.0055 in)
0.7 mm (0.0276 in)	0.16 mm (0.0063 in)
0.8 mm (0.0315 in)	

83U07A-040

19. Remove the **SST**, and remove the transaxle case. Remove the shaft gears, selectors, and the differential.

20. Remove the bearing outer races for both shafts from the transaxle case. Leave the differential side bearing outer race in the clutch housing.



76U07A-105

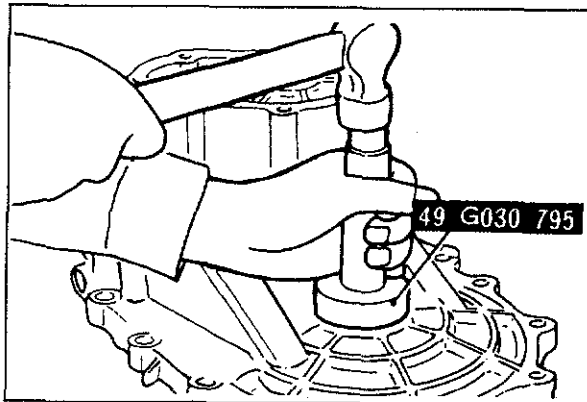
Clutch Housing

1. Install the drain bolt and washer.
2. Install the reverse lever, and secure it with the reverse lever shaft.

Note

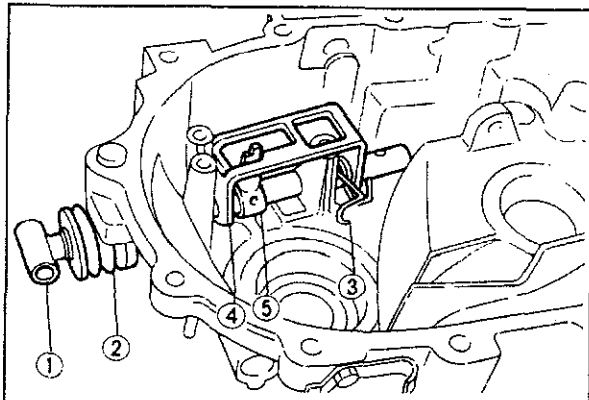
Align the shaft with the spring pin coupling hole in the clutch housing.

3. Tap in a new spring pin.



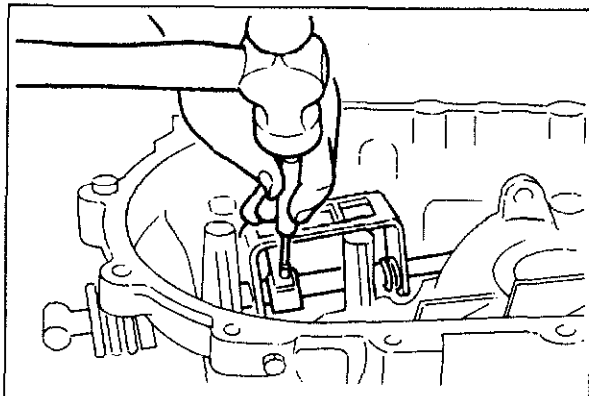
83U07A-091

4. Tap in the oil seal (differential side) using the **SST**.
5. Install the bleeder.
6. Install the bleeder cover.
7. Install the oil seal (change rod side).



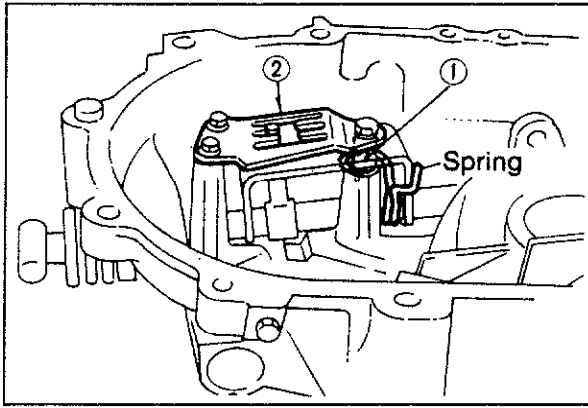
76U07A-275

8. Install the change rod (1), the boot (2), the spring (3), the reverse gate (4), and the selector (5), as shown.

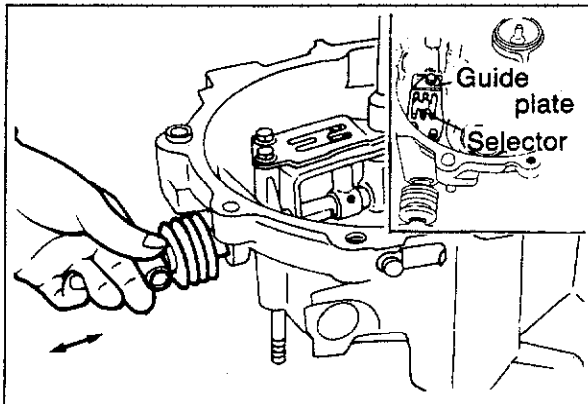


76U07A-276

9. Align the change rod and spring pin coupling hole in the selector, then tap in a new spring pin.



76U07A-109



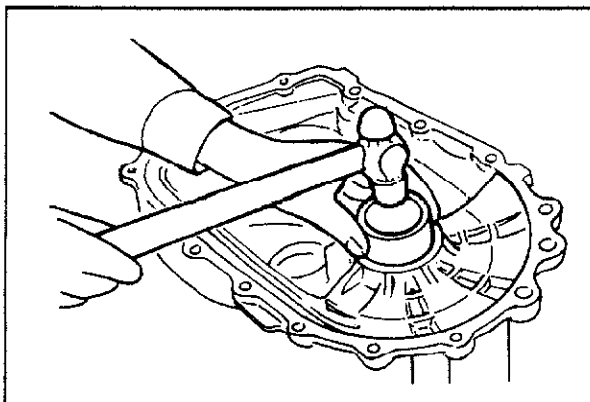
76U07A-277

10. Install the pipe (1) and the guide plate (2), and temporarily tighten the bolts.

Note

Set the spring as shown.

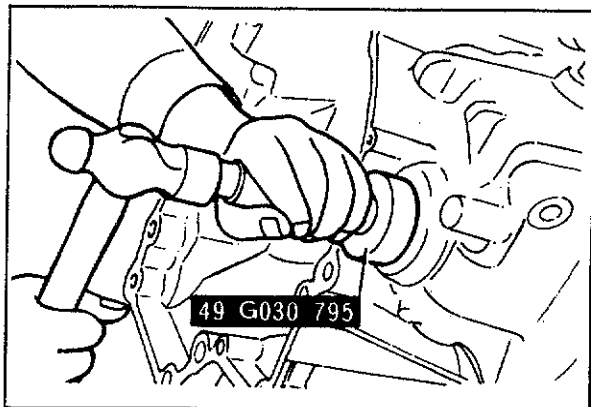
11. Install the change arm onto the change rod, and secure it with the bolt.
Install the shift control rod and detent ball and spring, and select neutral position.
12. Install the crankshaft lever and the crankshaft lever shaft, and secure the shaft to the housing with the pin.
13. Push and pull the change rod and move the guide plate so that the selector moves smoothly in the grooves of the guide plate. Then tighten the guide plate mounting bolts.
14. Remove the control rod, ball, spring and pin.
Remove the crankshaft lever shaft and the crankshaft lever.
15. Install the funnel and the bearing outer race into the secondary shaft gear bearing bore of the clutch housing.
16. Install the oil seal and the bearing inner race into the primary shaft gear bearing bore of the clutch housing.



76U07A-278

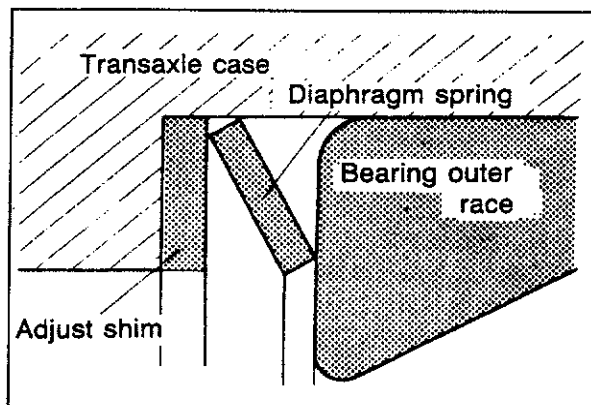
Transaxle Case

1. Install the oil passage and tighten the bolt.
2. Install the back-up light switch.
3. Install the selected adjust shim into the differential side bearing bore of the transaxle case.
4. Tap the bearing outer race with a hammer handle until it is flush with the end of the transaxle case.
5. Tap in the outer races until the edges contact the clutch housing, using a piece of pipe (outer diameter **68 mm (2.68 in)** or less) and a hammer.



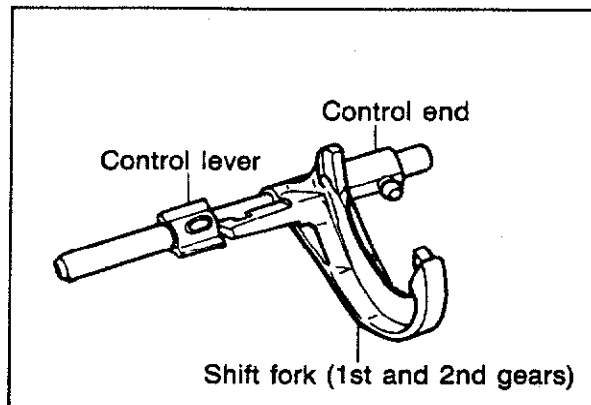
83U07A-096

6. Tap in the oil seal using the **SST**.



73G07A-014

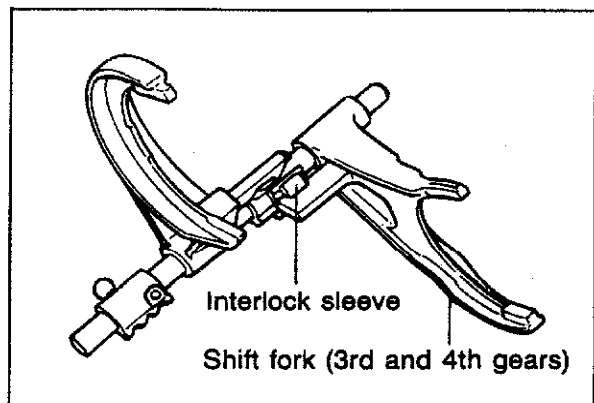
7. Install the previously selected adjustment shims and the diaphragm springs in the direction shown in the figure, and install the bearing outer races.



76U07A-114

Shift Fork and Shift Rod

1. Install the control lever onto the control rod, align each of the spring pin coupling holes, and tap in new spring pins.
2. Install the shift fork (1st and 2nd gears) and the control end onto the control rod so that they face in the direction shown in the figure, align the control end and the spring pin hole in the rod, and tap in the new spring pin.

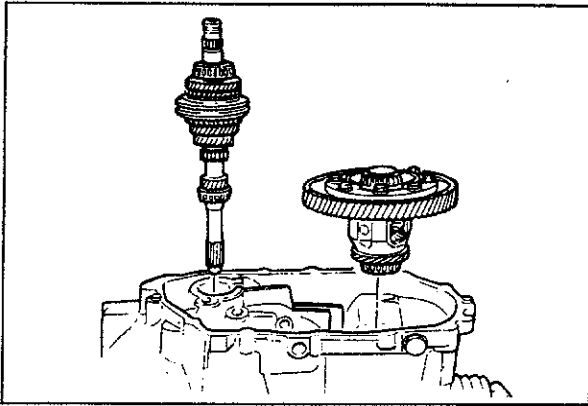


73G07A-015

3. Assemble the shift fork (1st and 2nd gears), the interlock sleeve and the shift fork (3rd and 4th gears).

Note

The dot on the interlock sleeve must face toward the 3rd gear and the shift fork.



73G07A-016

Bearing Preload

Check the shaft gears and the differential bearing preload.

Note

- a) Check that the correct adjust shims were selected.
- b) If the bearing preload is not within specification, adjust again.

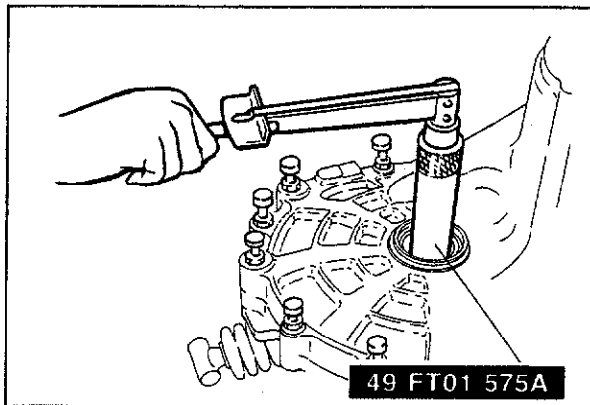
1. Set the primary shaft gear and the differential into the clutch housing.
2. Install the transaxle case, and tighten to the specified torque.

Tightening torque: 37—52 N·m
(3.8—5.3 m·kg, 27—38 ft·lb)

3. Install the **SST**.
4. Measure the preload.

Preload: 1.4—2.0 N·m
(14—20 cm·kg, 12.2—17.5 in·lb)

5. Remove the **SST**.



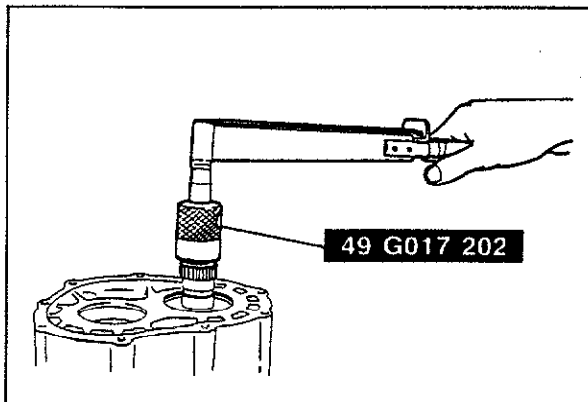
83U07A-100

6. With the transaxle facing in the direction shown in the figure, install the **SST** to the primary shaft gear.
7. Measure the preload.

Preload: 0.1—0.25 N·m
(1.0—2.5 cm·kg, 0.87—2.18 in·lb)

Note

Extend the handle fully and hook the pull scale to the end of the handle.



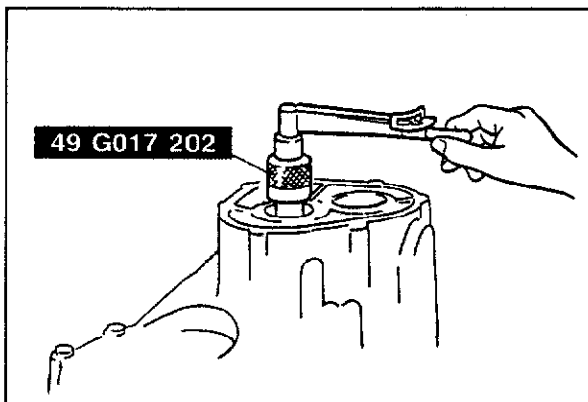
83U07A-101

8. Remove the **SST**, transaxle case, primary shaft gear and differential.
9. Install the secondary shaft gear and transaxle case then tighten to the specified torque.

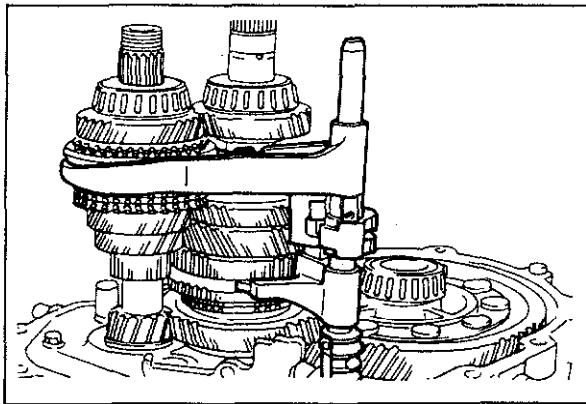
Tightening torque: 18—26 N·m
(1.8—2.7 m·kg, 13.0—18.8 ft·lb)

10. Check the secondary shaft preload with the **SST**.

Preload: 0.2—0.4 N·m
(2.0—4.0 cm·kg, 1.7—3.4 in·lb)

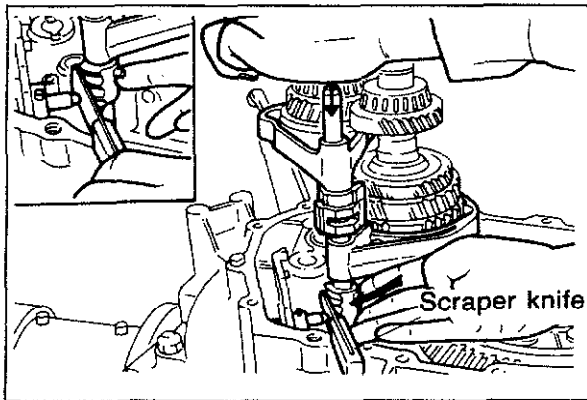


86U07A-101



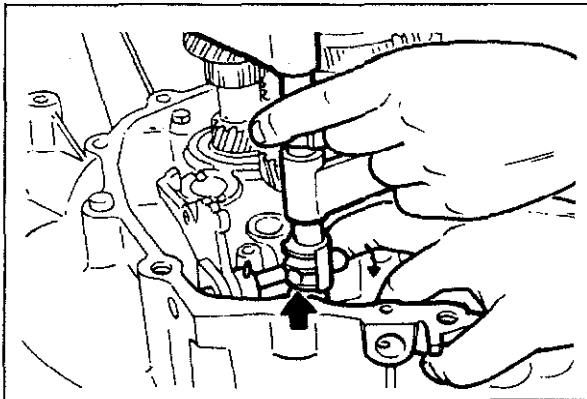
73G07A-020

1. Remove the transaxle case and shaft gears.
2. Shift the clutch hub sleeve (secondary shaft gear) to 2nd gear and the clutch hub sleeve (primary shaft gear) to 4th gear.
3. Position the shift fork and shift rod assembly as shown and install the shift fork into each hub sleeve.



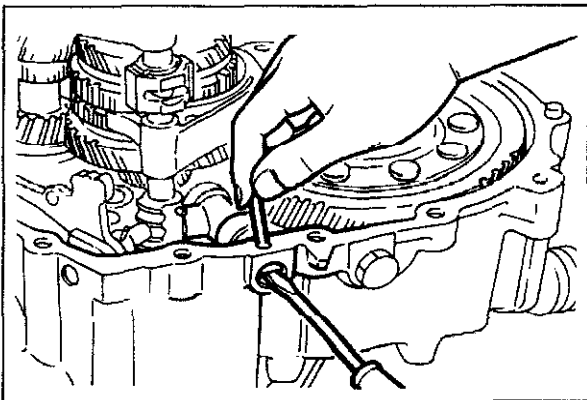
76U07A-284

4. Insert the spring seat and spring into the reverse lever shaft, install the steel ball, and place a scraper knife so that it contacts the steel ball.
5. With the edge of the control end against the knife, when the control end is pushed in the direction of the arrow in the figure so that the ball goes into the shaft, the rod will at the same time line up with the shift rod coupling hole in the clutch housing.



76U07A-119

6. Set each clutch hub sleeve to the neutral position, and tap the shift rod from above so that the steel ball goes into the center groove (of the 3 grooves in the control end).
7. Pull the ball part of the control end forward so that the steel ball goes into the detent in the groove.

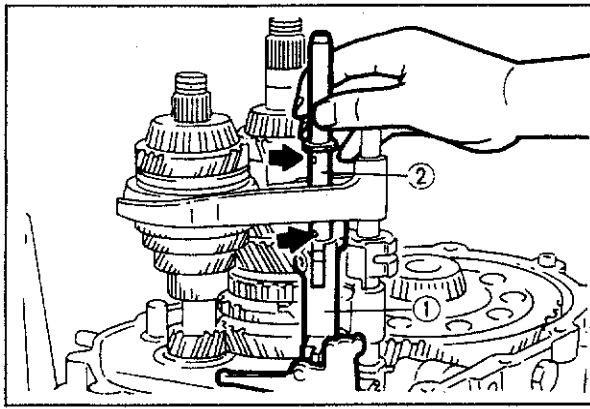


76U07A-285

8. Fit the crank lever in between the change arm and the control end, and connect the crank lever shaft to the crank lever.
9. Align the pin holes of the crank lever shaft and the clutch housing, and insert the pin.

Caution

Use a new O-ring for the crank lever shaft.

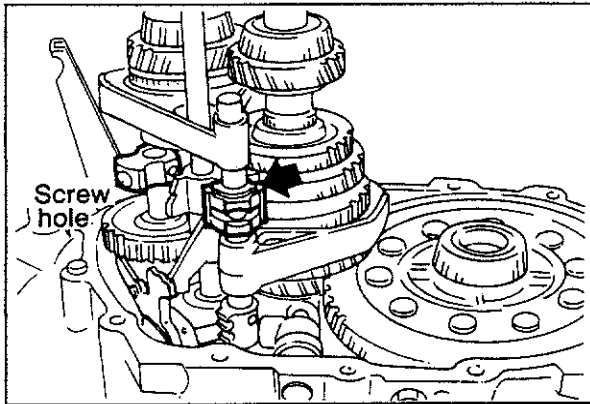


76U07A-121

- 10 Install the gate (1) and the shift rod (2), and tighten the gate mounting bolt.

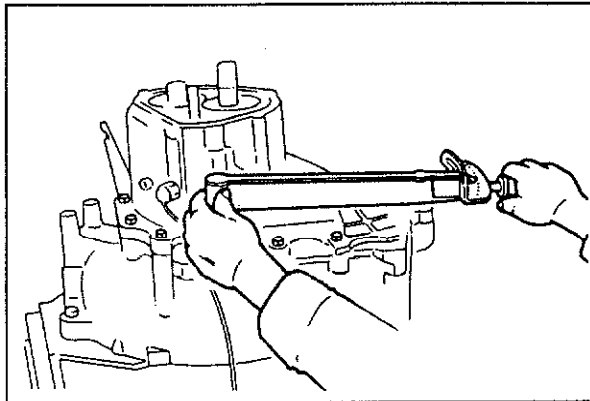
Note

The mark (indicated by the arrow in the figure) and the gate mounting bolt hole must be in the same direction.



76U07A-122

- 11 Install the reverse idle gear and the reverse idle shaft.
12. Connect the magnet to the clutch housing.
13. Align the end of the interlock sleeve with the control lever indicated by the arrow, and, at the same time, face the reverse idle shaft screw hole in the direction shown in the figure.



73G07A-031

14. Apply a thin coat of sealant to the contact surfaces of the clutch housing and transmission case, tighten the transaxle case installation bolts to the specified torque.

Tightening torque:

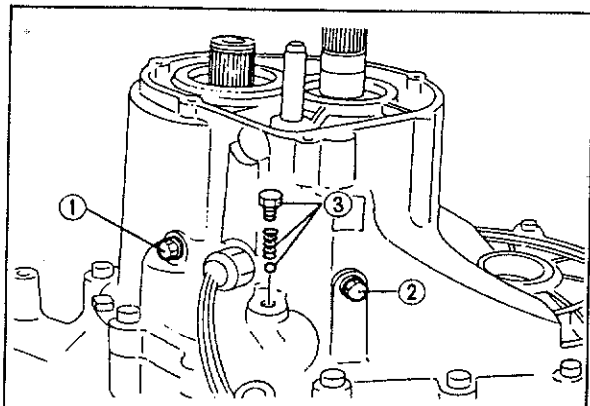
37—52 N·m (3.8—5.3 m·kg, 27—38 ft·lb)

Caution

a) Apply sealant after cleaning the contact surfaces of the clutch housing and transaxle case.

b) Insert the preload adaptor (49 G030 455) into the driveshaft coupling hole.

If this is not done, the side gear will turn on the pinion gear within the differential gear case, and it might become necessary to disassemble the transaxle again. Leave this adaptor inserted until installation of the driveshaft.



83U07A-092

5th Gear and Rear Cover

1. Install the lock bolt (1) and the guide bolt (2), and install the ball, spring and the lock bolt (3).

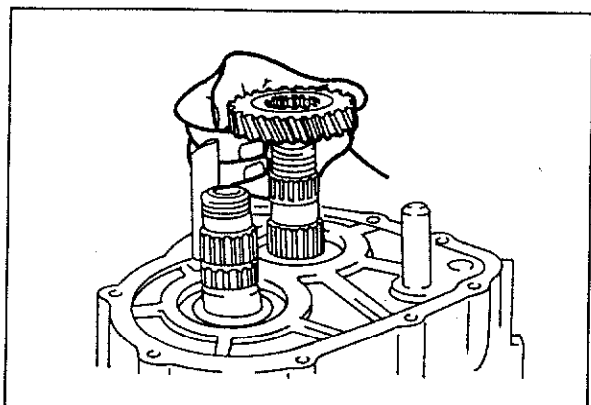
Caution

After installation, move the change rod to check that the gear change operation is smooth.

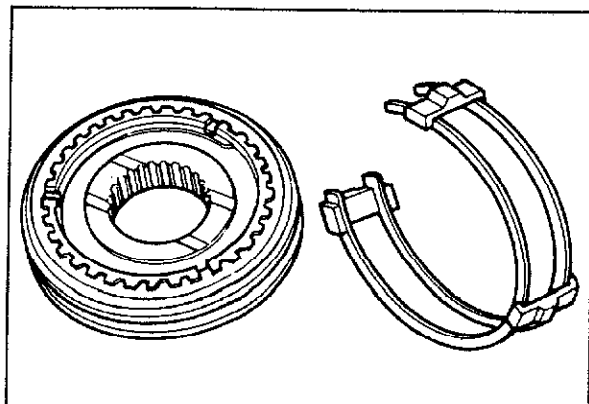
Tightening torque:

- ① 18—26 N·m
(1.8—2.6 m·kg, 13—19 ft·lb)
- ② 9—14 N·m
(90—140 cm·kg, 78—162 in·lb)
- ③ 15—21 N·m
(150—210 cm·kg, 173—242 in·lb)

2. Position the secondary 5th gear on the secondary shaft gear in the direction shown in the figure.

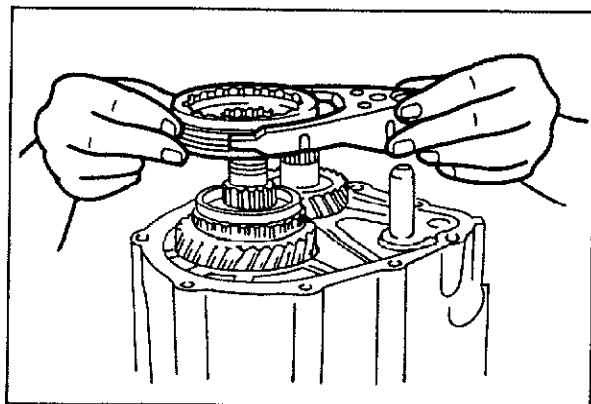


73G07A-022



76U07A-126

3. Install the clutch hub and the 3 synchronizer keys to the clutch hub sleeve (5th gear).
4. Insert the hook part of the synchronizer key spring into the groove for the hook in the clutch hub.
5. Install the spring so that the 3 synchronizer keys are secured.

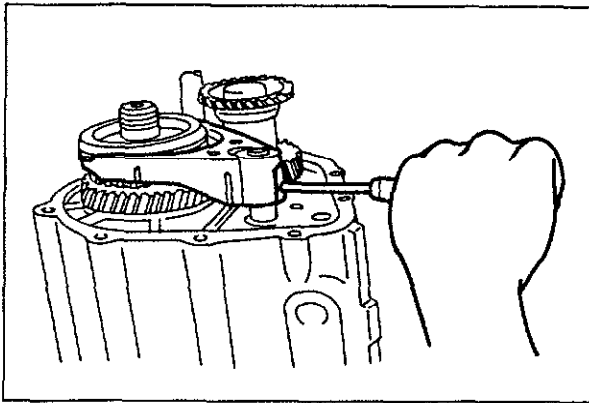


73G07A-023

6. Install the gear sleeve onto the primary shaft gear, then connect the 5th gear and synchronizer ring.
7. Install the shift fork to the clutch hub assembly, and install them together as shown.

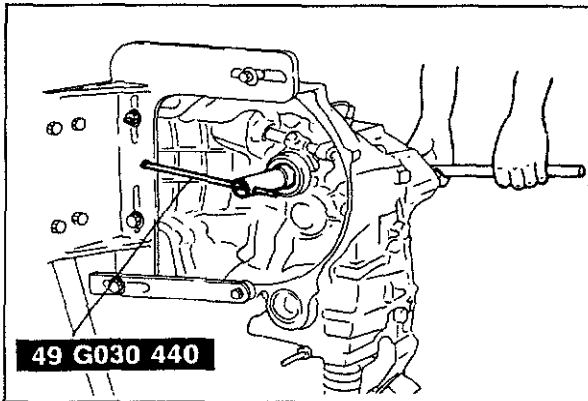
Caution

Install the clutch hub assembly and shift fork so that they face in the direction indicated in the figure.



73G07A-024

8. Align the shift fork and shift rod spring pin holes, tap in the spring pin, and install the synchronizer ring and the reverse synchronizer gears.

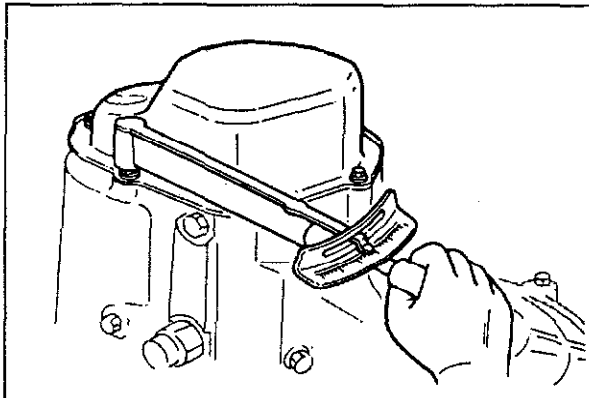


83U07A-093

9. Lock the shaft gear using the **SST**, then tighten the primary shaft gear and the secondary shaft gear lock nuts to the specified torque.
10. Remove the shaft holder, then stake the lock nut to the groove.

Caution
Shift to 1st or 2nd gear.

Tightening torque: 128—196 N·m
(13.0—20.0 m·kg, 94—145 ft·lb)



76U07A-290

11. Coat the surface of the transaxle case which faces the rear cover with sealant, then install the rear cover and tighten the bolts to the specified torque.

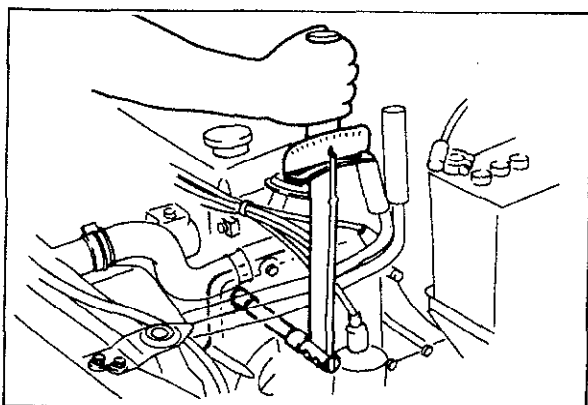
Tightening torque:
8—11 N·m (0.8—1.1 m·kg, 69—95 in·lb)

Caution
Before coating with sealant, clean the contact surfaces of the rear cover and the transaxle case.

12. Temporarily install the speedometer driven gear.

Caution
Before tightening the driven gear into the transaxle, connect the transaxle to the engine and supply the necessary amount of transaxle oil.

13. Move the change rod to check the shifting operations, then remove the transaxle from the **transaxle hanger**.



83U07A-094

INSTALLATION

Install in the reverse order of removal and be careful of the following:

Transaxle

Apply a thin coat molybdenum disulphide grease to the spine of the primary shaft gear. Tighten the transaxle mounting bolts to the specified torque.

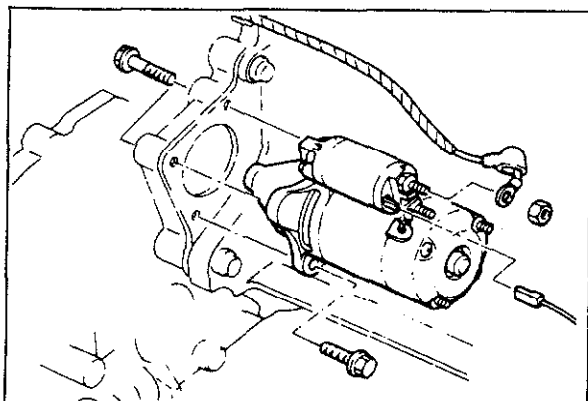
Tightening torque:

Upper bolts

63—89 N·m (6.5—9.1 m·kg, 47—66 ft·lb)

Lower bolts

63—89 N·m (6.5—9.1 m·kg, 47—66 ft·lb)



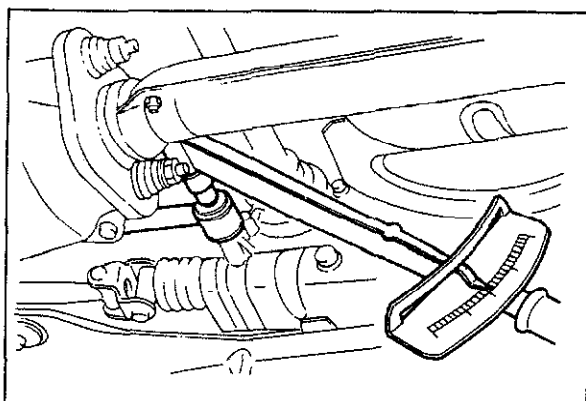
63U07A-140

Starter

Tighten the starter to the specified torque.

Tightening torque:

31—46 N·m (3.2—4.7 m·kg, 23—34 ft·lb)



63U07A-141

Extension Bar and Change Control Rod

Install the extension bar and the change control rod, and tighten them to the specified torque.

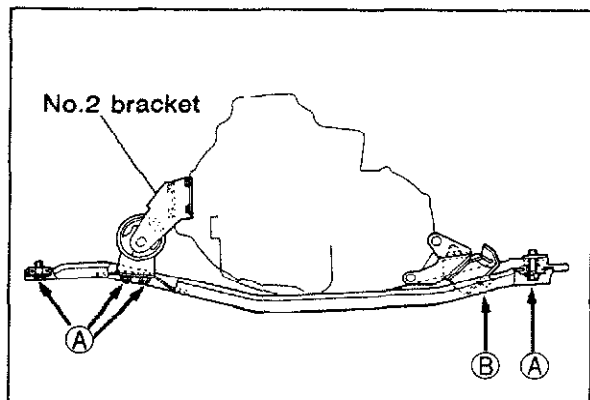
Tightening torque

Extension bar:

31—46 N·m (3.2—4.7 m·kg, 23—34 ft·lb)

Change control rod:

16—22 N·m (1.6—2.3 m·kg, 12—17 ft·lb)



63U07A-142

Crossmember

After tightening the engine mounting rubber No. 2 bracket to the transaxle, install the crossmember and tighten to the specified torque.

Tightening torque

No. 2 bracket:

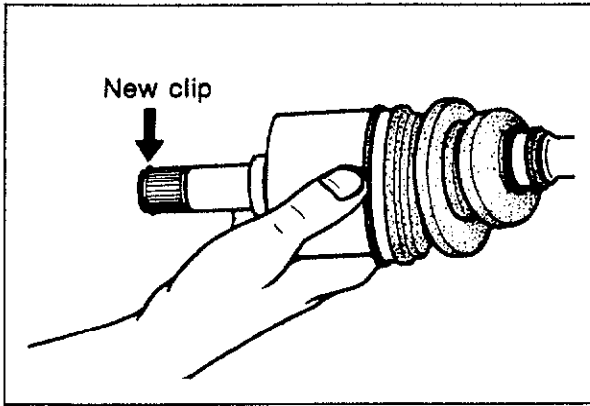
37—52 N·m (3.8—5.3 m·kg, 27—38 ft·lb)

A: 64—89 N·m

(6.5—9.1 m·kg, 47—66 ft·lb)

B: 28—46 N·m

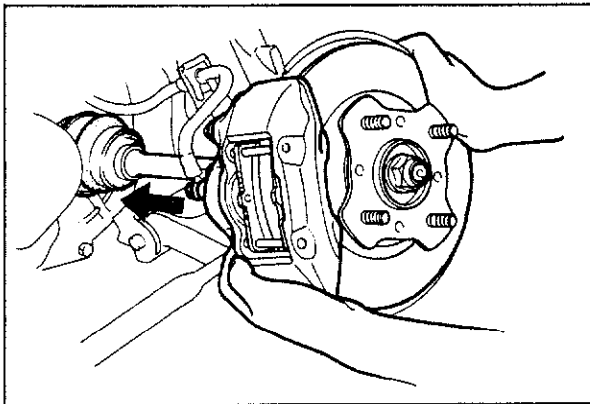
(2.9—4.7 m·kg, 20—34 ft·lb)



63U07A-143

Clip

Replace the clip at the end of the driveshaft with a new one. Insert the clip with gap to the top of the groove.



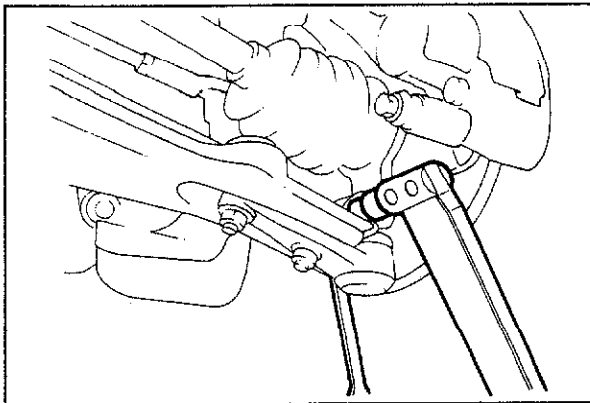
63U07A-114

Driveshaft

Fit the driveshaft to the side gear, and push it into the transaxle by pushing in on the front hub.

Caution

- a) When installing the driveshaft, be careful not to damage the oil seal.
- b) After installation, pull the front hub outward to confirm that the driveshaft is securely held by the clip.



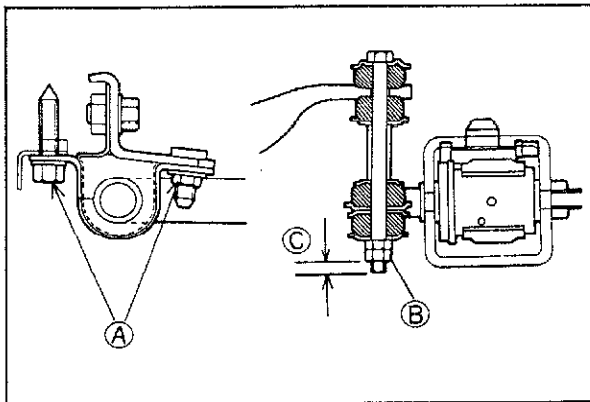
63U07A-145

Ball Joint

Install the lower arm ball joint to the knuckle, and then tighten the bolt.

Tightening torque:

43—54 N·m (4.4—5.5 m·kg, 32—40 ft·lb)



63U07A-146

Stabilizer

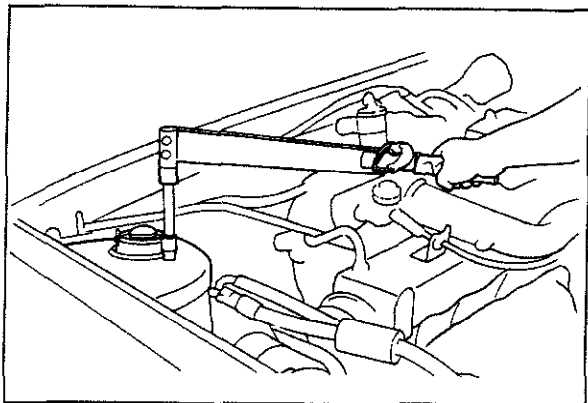
Install and adjust the front stabilizer.

Tightening torque

A: 31—44 N·m
(3.2—4.5 m·kg, 23—33 ft·lb)

B: 12—81 N·m
(1.2—1.8 m·kg, 9—13 ft·lb)

Dimension C: 10.8 mm (0.43 in)



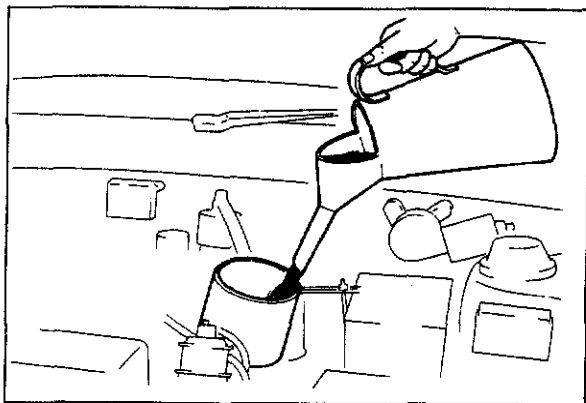
63U07A-147

Mounting Block

Remove the engine support, and tighten the mounting block installation nuts to the specified torque.

Tightening torque:

23—29 N·m (2.3—3.0 m·kg, 17—22 ft·lb)



63U07A-148

Transaxle Oil

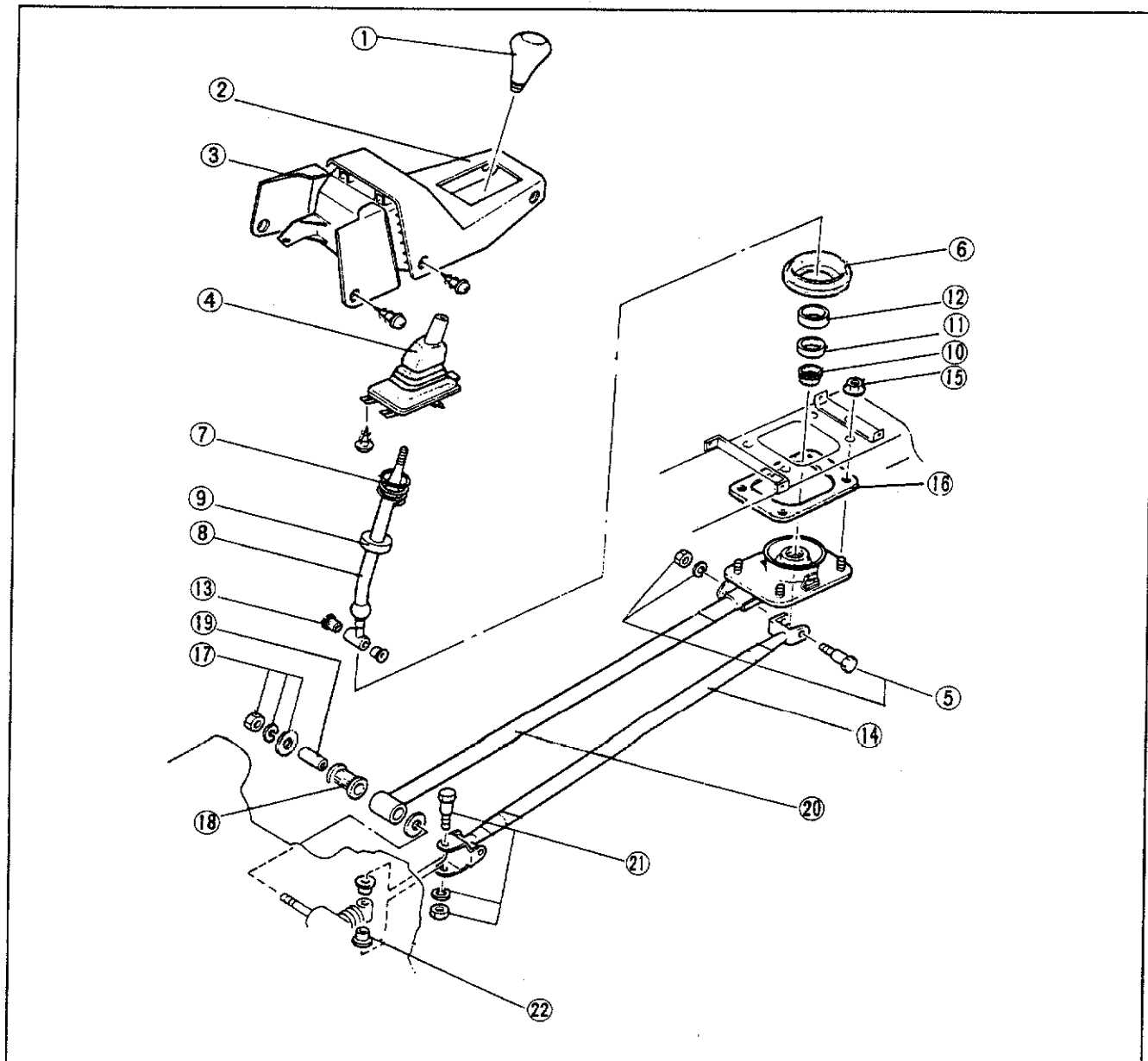
1. Add the specified amount of the specified transaxle oil through the speedometer driven gear installation hole.
2. Road test the vehicle and check the transaxle for proper operation and check for oil leaks.

TRANSAXLE CONTROL

REMOVAL

After jacking up the vehicle and supporting it with safety stands, remove the parts in the numbered order shown in the figure.

63U07A-149

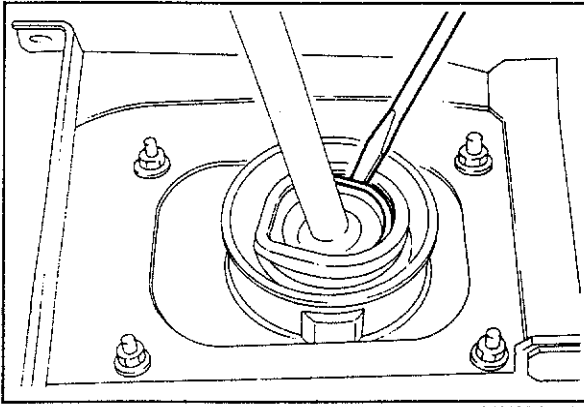


63U07A-150

1. Change lever knob
2. Center console
3. Side wall
4. Change boot
5. Bolt and nut
6. Mounting rubber
7. Spring

8. Change lever
9. Ball seat (upper)
10. Boot
11. Holder
12. Ball seat (lower)
13. Bushing
14. Change control rod

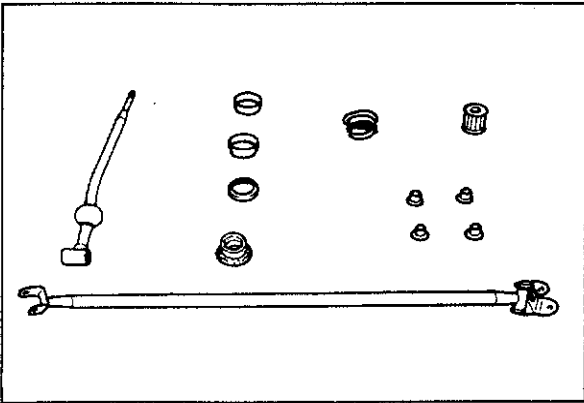
15. Self locking nut
16. Seal rubber
17. Nut and washer
18. Bushing
19. Spacer
20. Extension bar
21. Bolt and nut
22. Bushing



63U07A-151

Spring

Remove the spring by prying on the hooked part of the spring with a screwdriver.

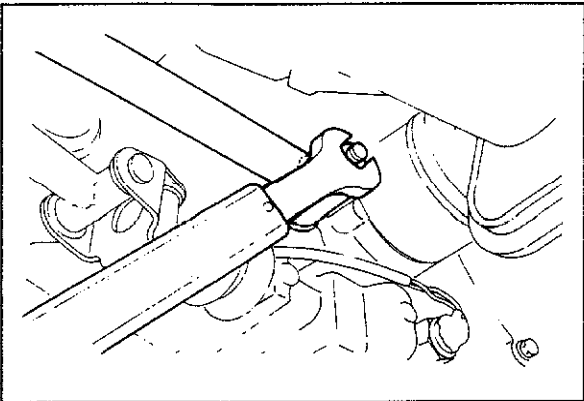


63U07A-152

INSPECTION

Check the following, and replace if necessary:

1. Bent control rod.
2. Wear, damage, or malfunction of any joint.
3. Damaged change lever ball.
4. Weak spring.
5. Wear or damage of bushing.



63U07A-153

INSTALLATION

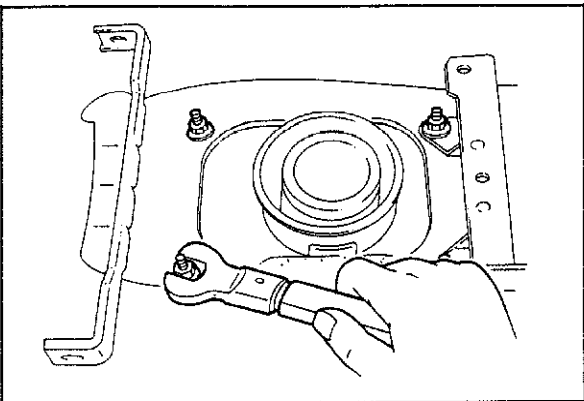
Install in the reverse order of removal and note the following:

Extension Bar

First, install the extension bar to the floor, and then install it onto the transaxle.

Tightening torque:

31—46 N·m (3.2—4.7 m·kg, 23—34 ft·lb)



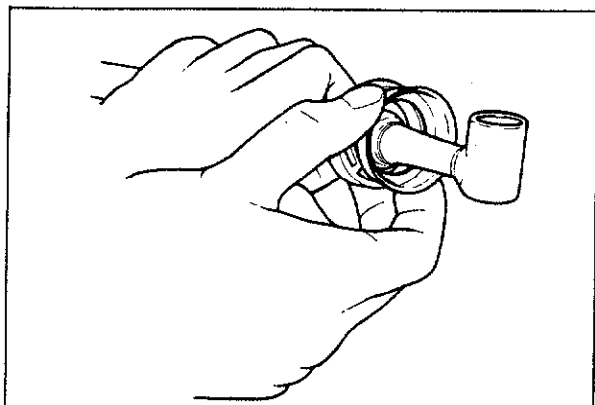
63U07A-154

Self Locking Nut

Tighten the self locking nuts to the specified torque.

Tightening torque:

7—10 N·m (70—100 cm·kg, 61—87 in·lb)



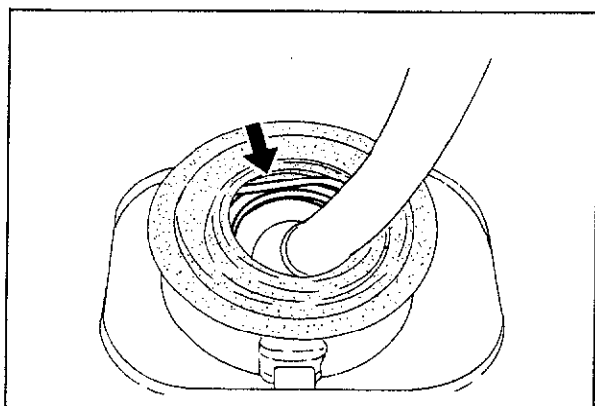
63U07A-155

Change Lever Ball

Apply a coating of grease to the ball seat surface, and install the upper and lower ball seat, holder, and boot.

Note

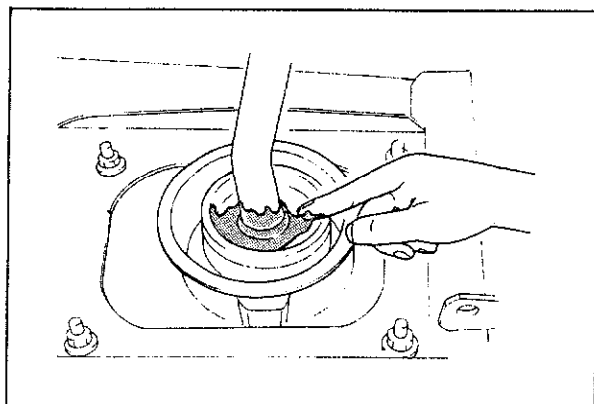
Also apply grease to all joints.



63U07A-156

Spring

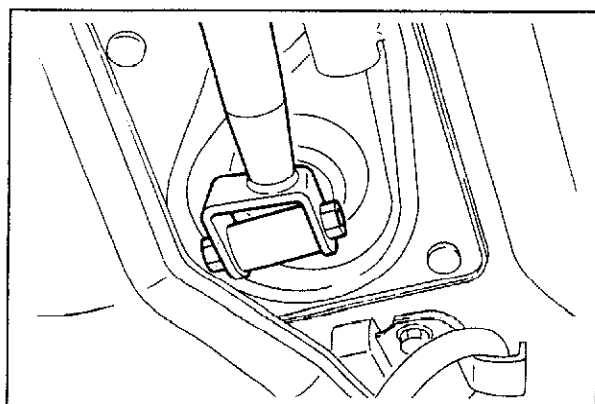
Make sure that the hooked part of spring is properly seated in the bracket groove, as shown in the figure.



63U07A-157

Bracket Cavity

Put grease in the bracket cavity.



63U07A-158

Change Control Rod

Install the change control rod so that its relationship with the change lever is as shown in the figure.

Tightening torque:

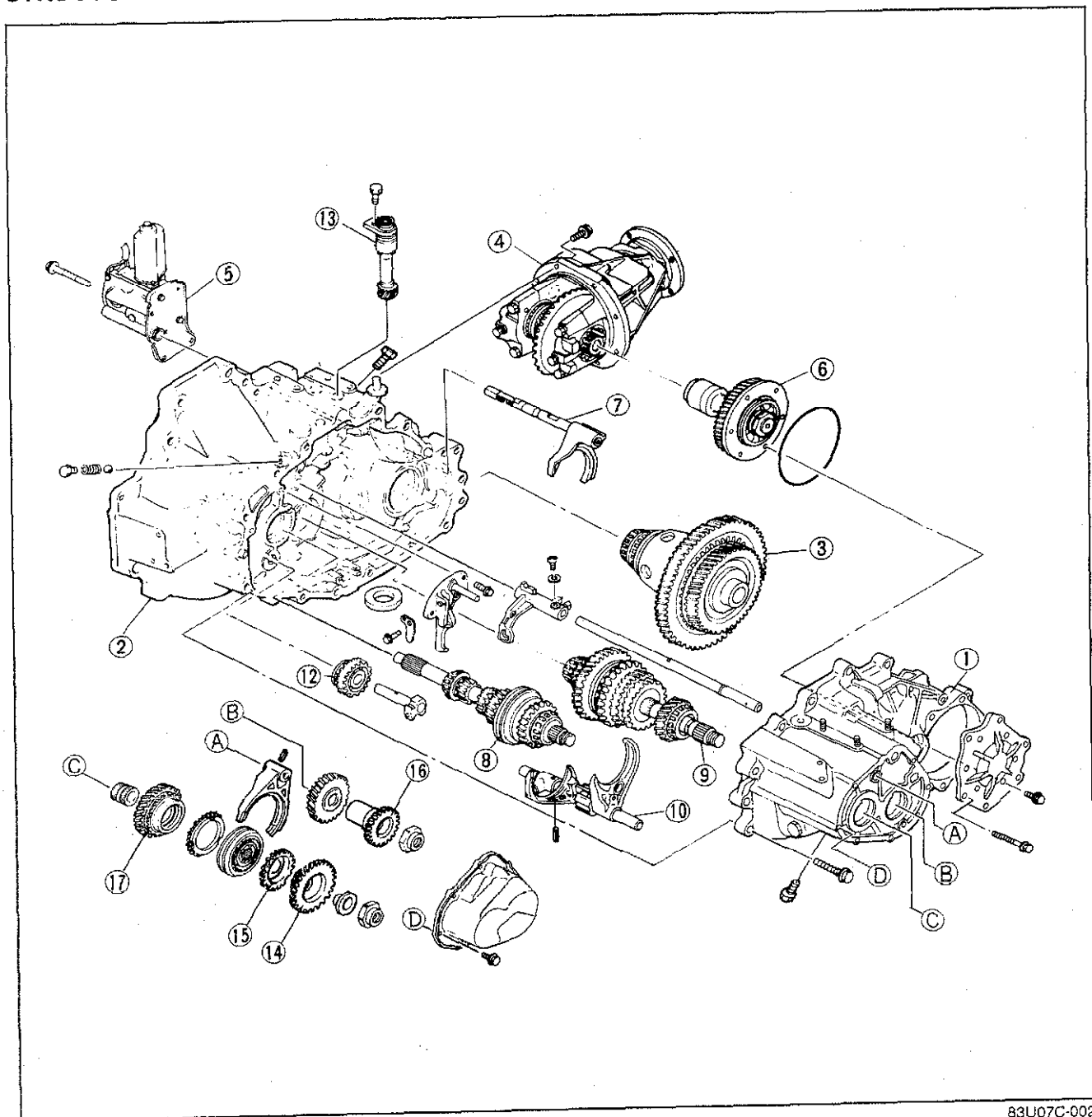
16—22 N·m (1.6—2.3 m·kg, 12—17 ft·lb)

MANUAL TRANSAXLE 4WD

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OUTLINE

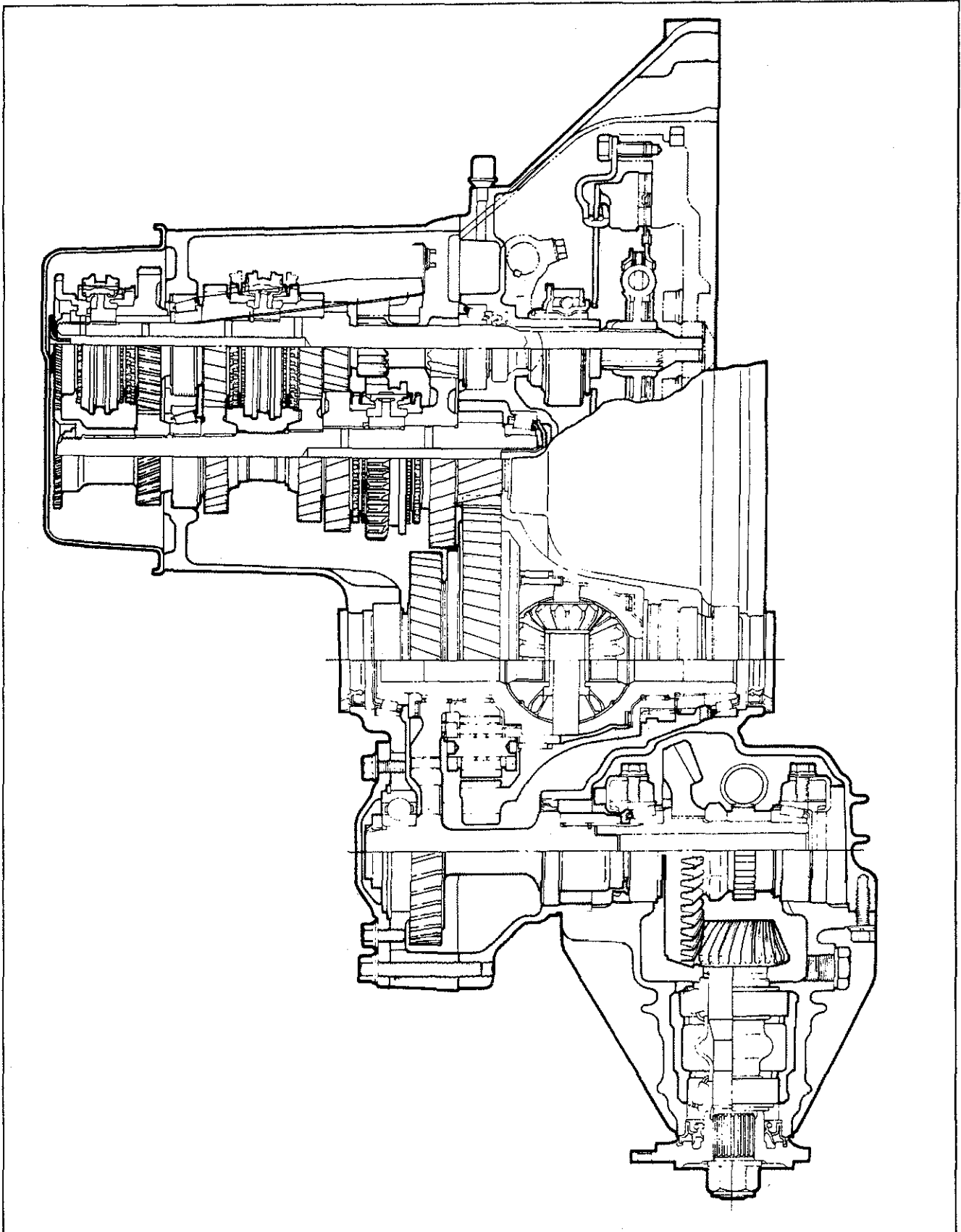
STRUCTURAL VIEW



83U07C-002

- | | |
|---|---|
| 1. Transaxle case | 9. Secondary shaft gear assembly |
| 2. Clutch housing | 10. Shift fork and shift rod assembly |
| 3. Center differential | 11. 5th gear |
| 4. Transfer carrier | 12. Reverse idle gear |
| 5. Center differential lock assembly | 13. Speedometer driven gear |
| 6. Idle gear | 14. Primary reverse synchronizer gear |
| 7. Center differential lock shift fork assembly | 15. Synchronizer ring |
| 8. Primary shaft gear assembly | 16. Secondary reverse synchronizer gear |
| | 17. 5th gear |

CROSS-SECTIONAL VIEW



63G07C-003

SPECIFICATIONS

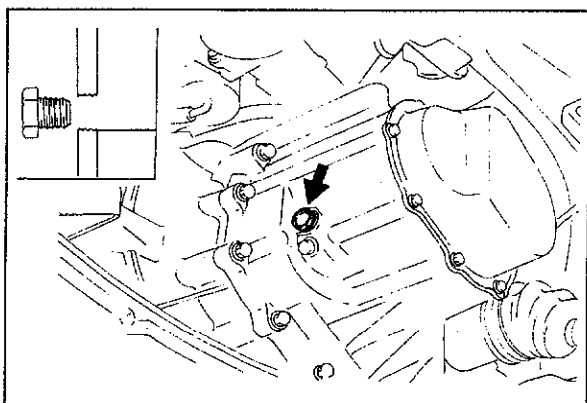
Item		Engine model	B6 DOHC
Transaxle control			Floor shift
Synchronesh system			Forward ... Synchronesh, Reverse ... Selective sliding and synchronesh
Gear ratio		First	3.307
		Second	1.833
		Third	1.233
		Fourth	0.970
		Fifth	0.795
		Reverse	3.166
Front final gear ratio			4.105
Speedometer gear ratio			1.045
Oil	Transaxle	Type	ATF: DEXRON-II API: GL-4 or GL-5 SAE 80W-90 or SAE 90 (Above -18°C (0°F))
		Capacity	3.6 liters (3.8 US qt, 3.2 Imp qt)
	Transfer carrier	Type	API: GL-5 Above 0°F: SAE 90 Below 0°F: SAE 80W
		Capacity	0.5 liter (0.53 US qt, 0.44 Imp qt)

83U07C-003

TROUBLESHOOTING GUIDE

Problem	Probable Cause	Remedy
Shift lever won't shift smoothly, or is hard to shift	Seized shift lever ball Seized shift control rod joint Bent shift control rod	Replace Replace Replace
Too much play in shift lever	Worn shift control rod bushing Weak shift lever ball spring Worn shift lever ball bushing	Replace Replace Replace
Difficult to shift	Bent shift control rod No grease in transaxle control Insufficient oil Deterioration of oil quality Wear or play of shift fork or shift rod Worn synchronizer ring Worn synchronizer cone of gear Bad contact of synchronizer ring and cone of gear Excessive longitudinal play of gears Worn bearing Worn synchronizer key spring Excessive primary shaft gear bearing preload Improperly adjusted change guide plate	Replace Lubricate with grease Add oil Replace with oil of specified quality Replace Replace Replace Replace Replace Adjust or replace Replace Adjust Adjust
Won't stay in gear	Bent shift control rod Worn shift control rod bushing Weak shift lever ball spring Improperly installed extension bar Worn shift fork Worn clutch hub Worn clutch hub sleeve Worn secondary shaft gear Worn sliding surface of gear Worn steel ball detent of control end Weak spring pressing against steel ball Excessive gear backlash Worn bearing Improperly installed engine mount	Replace Replace Replace Tighten Replace Replace Replace Replace Replace Replace Replace Replace Replace Tighten
Abnormal noise	Insufficient oil Deterioration of oil quality Worn bearing Worn secondary shaft gear Worn sliding surface of gear Excessive gear backlash Damaged gear teeth Foreign material in gears Damaged differential gear, or excessive backlash	Add oil Replace with oil of specified quality Adjust or replace Replace Replace Replace Replace Replace Replace Repair or replace

63G07C-005



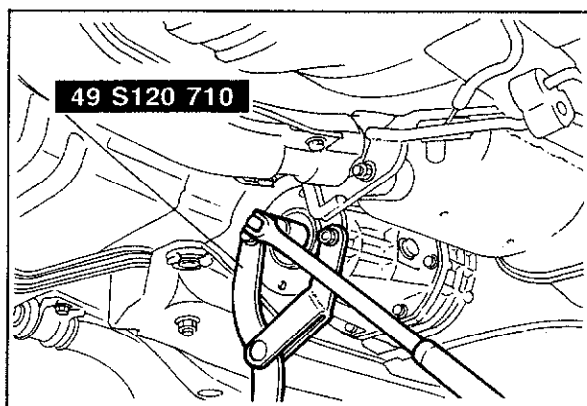
63G07C-006

ON-VEHICLE MAINTENANCE

TRANSAXLE AND TRANSFER CARRIER OIL

Remove the oil-supply port plug. Check if the oil level is near the opening.

If the level is low, add the specified oil.



83U07C-042

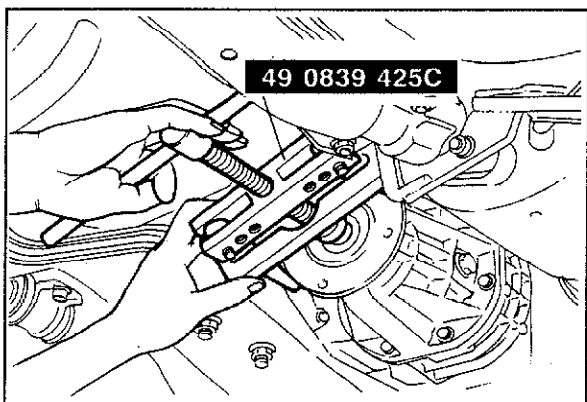
OIL SEAL (Transfer Carrier) Replacement

1. Remove the drain plug and oil.
2. Remove the propeller shaft.
3. Before loosening the lock nut, measure the rotation starting torque of the drive pinion.

Note

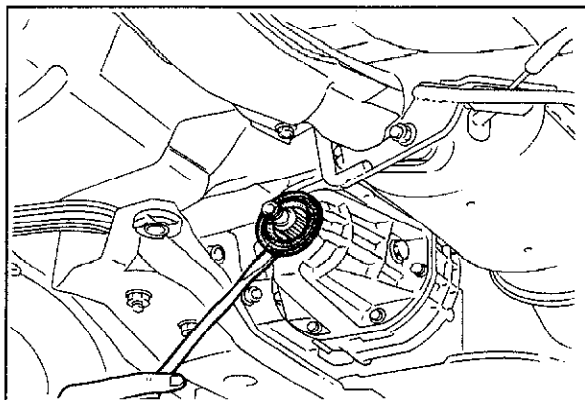
Make a notation of this torque, at the time of installation, tighten the lock nut to this value.

4. Remove the lock nut with the **SST**.
5. Remove the companion flange with the **SST**.

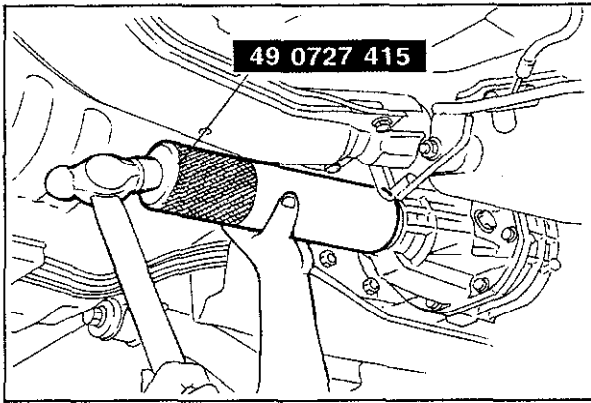


83U07C-043

6. Remove the oil seal.



63G07C-009

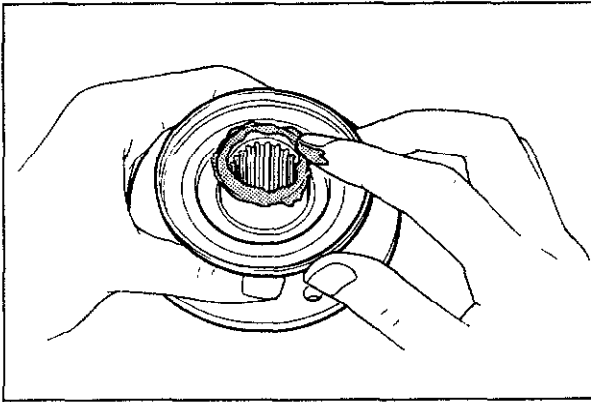


83U07C-044

7. Install the new oil seal with the **SST**.

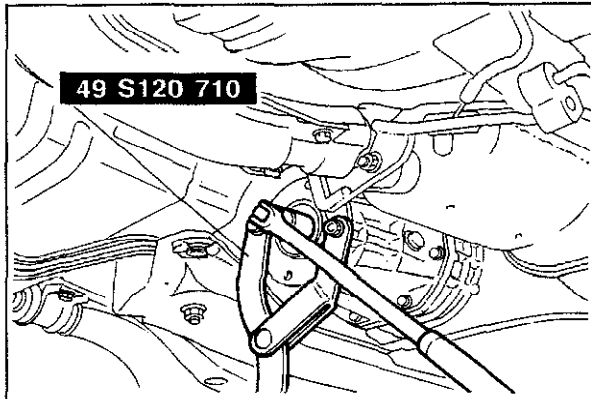
Note

Coat the seal with differential oil.



83U07C-045

8. Coat companion flange seal surface with differential oil and install the washer and companion flange.

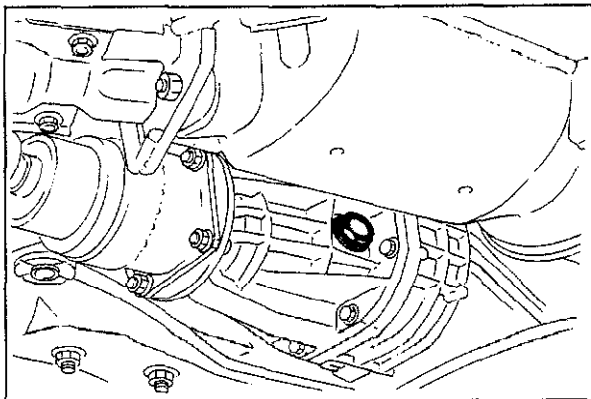


83U07C-046

9. Tighten the bolt with the **SST**.

Note

Check the drive pinion preload.

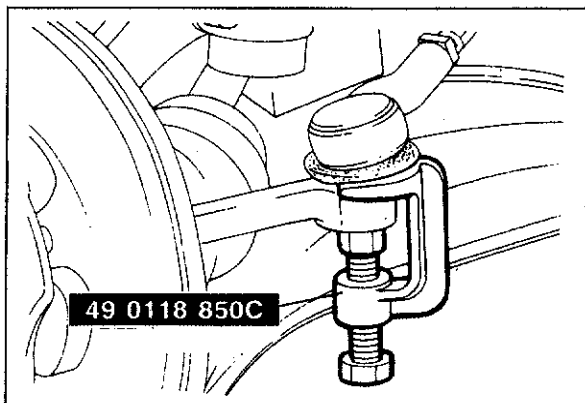


83U07C-047

10. Install the drain plug and add the specified oil.

Tightening torque:

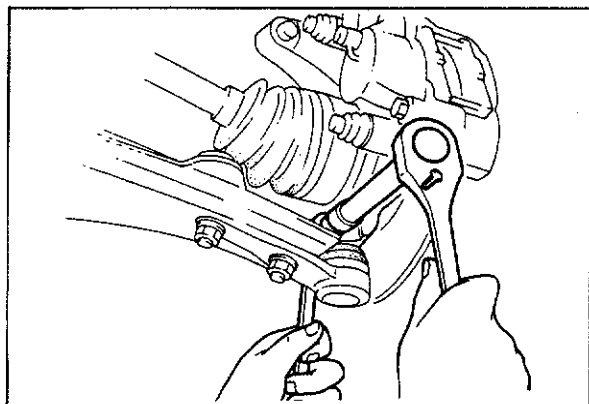
39—59 N·m (4—6 m·kg, 29—43 ft·lb)



83U07C-048

OIL SEAL (Transaxle)

1. Remove the tie-rod end from the knuckle with the SST.

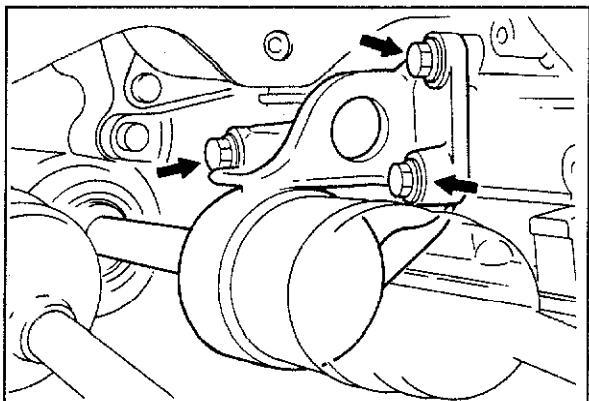


83U07C-049

2. Remove the clinch bolt and pull the lower arm downward. Separate the knuckle from the lower arm ball-joint.

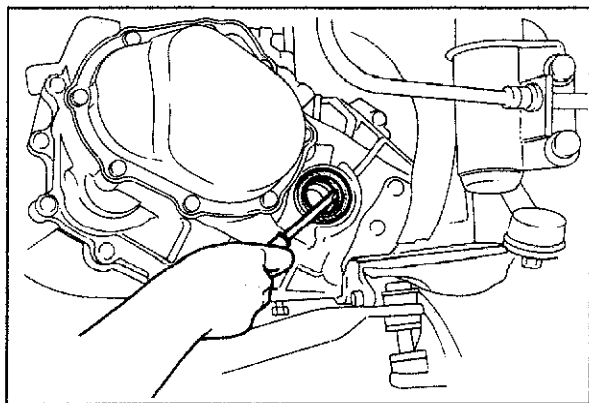
Note

Be careful not to damage the ball-joint dust boot.



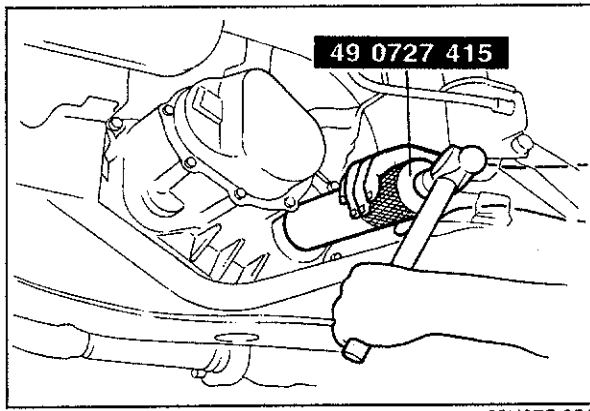
83U07C-050

3. Remove the drain plug and oil.
4. Remove the joint shaft bolts.
5. Remove the wheel hub and shaft.



63G07C-018

6. Remove the oil seal.

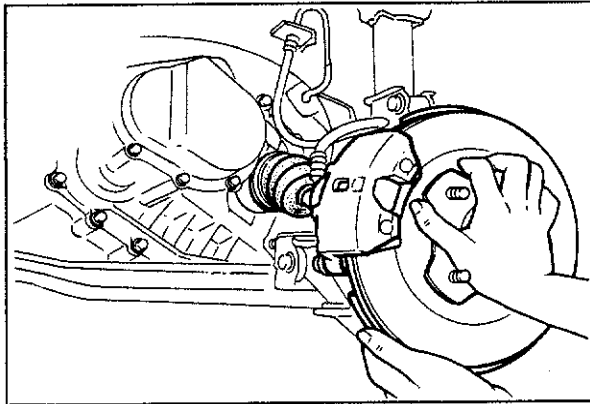


83U07C-051

7. Install the new oil seal with the **SST**.

Note

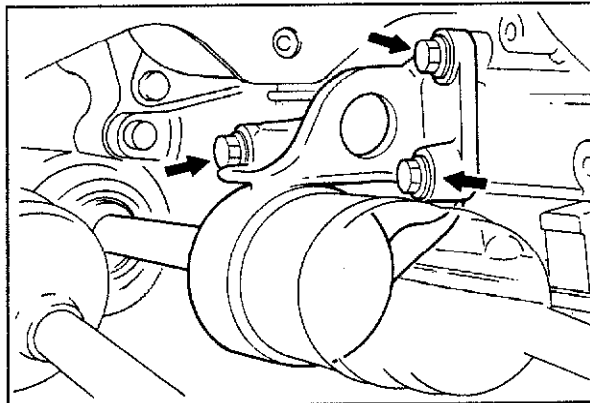
Coat transaxle oil on oil seal.



83U07C-052

8. Fit a new clip on driveshaft.

9. Install the driveshaft to transaxle and transfer carrier.

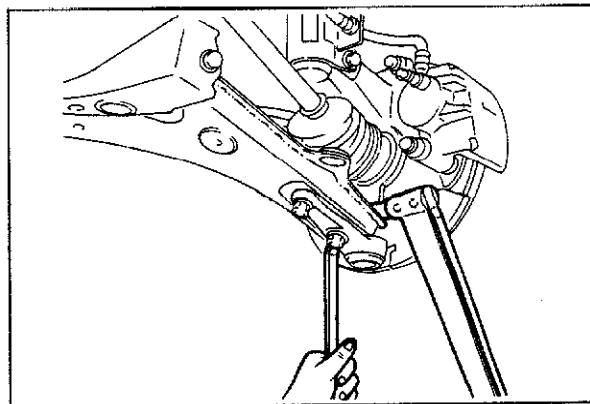


83U07C-053

10. Install the joint shaft.

Tightening torque:

42—62 N·m (4.3—6.3 m·kg, 31—46 ft·lb)

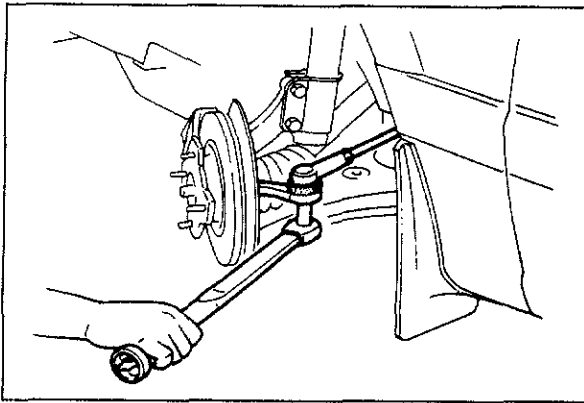


83U07C-054

11. Install the lower arm ball-joint to the knuckle and tighten.

Tightening torque:

43—54 N·m (4.4—5.5 m·kg, 32—40 ft·lb)

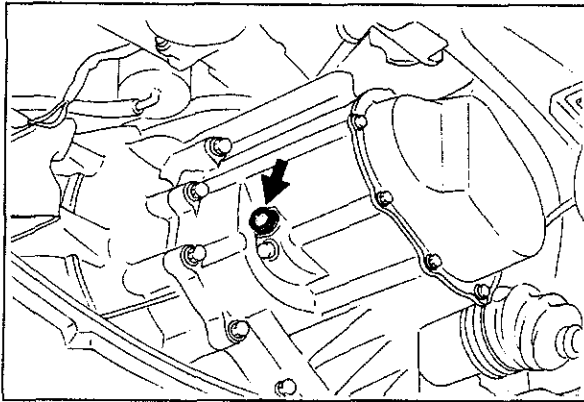


83U07C-055

12. Install the tie-rod end to the knuckle and tighten it.

Tightening torque:

29—44 N·m (3.0—4.5 m·kg, 22—33 ft·lb)



83U07C-056

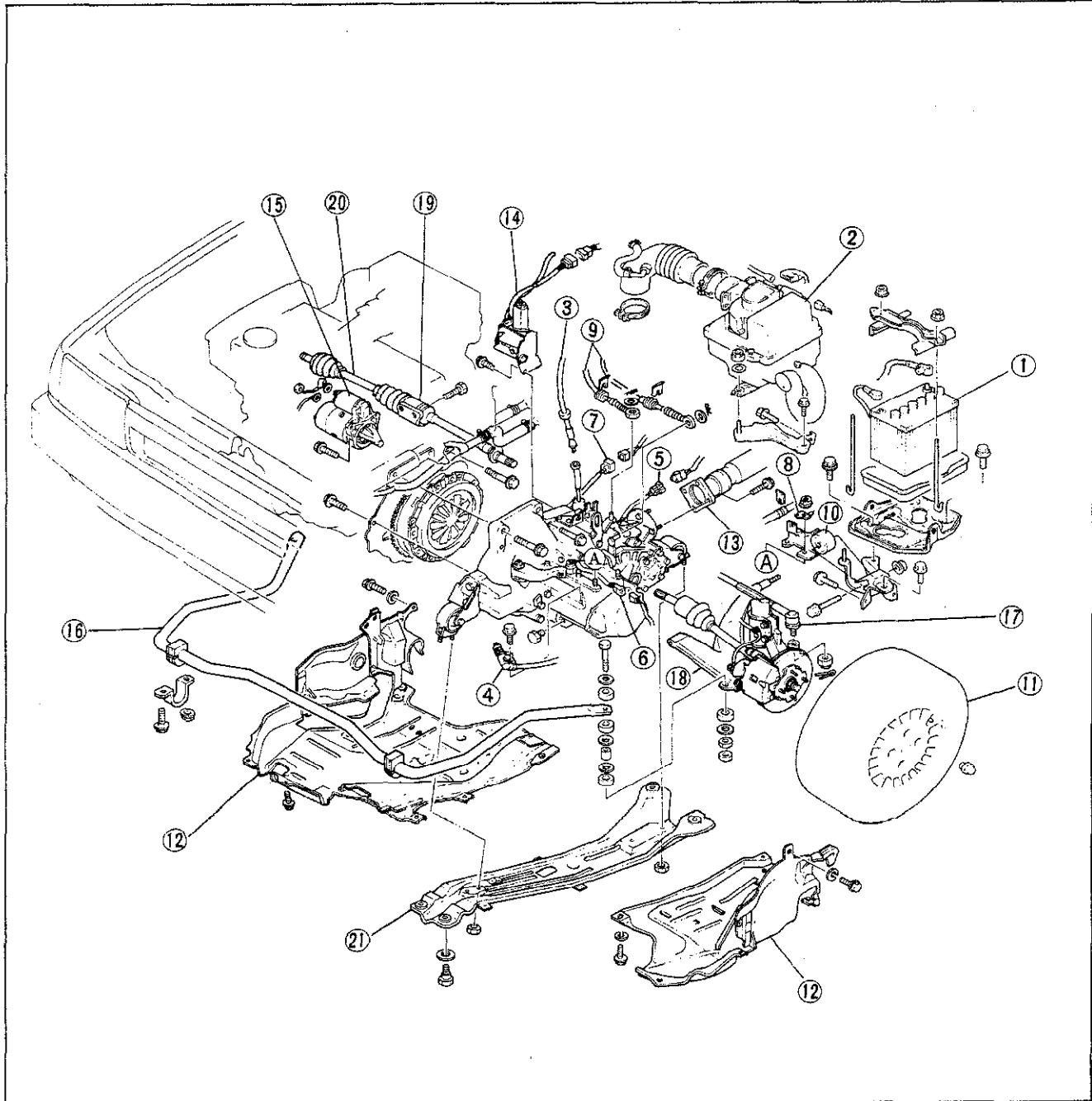
13. Install the drain plug and add the specified oil from oil-supply port plug.

**Tightening torque: 39—54 N·m
(4.0—5.5 m·kg, 29—40 ft·lb)**

REMOVAL

Remove in the sequence shown in the figure.

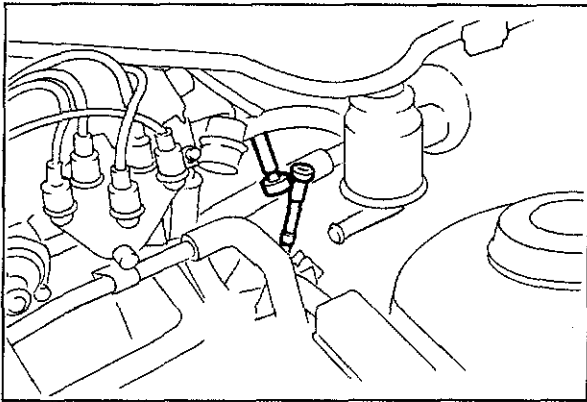
63G07C-301



63G07C-026

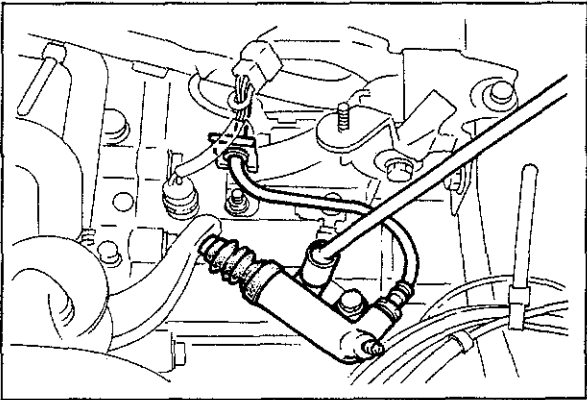
- | | | |
|---|---------------------------------------|---------------------|
| 1. Battery | 8. Body ground | 15. Starter |
| 2. Air cleaner | 9. Control cable | 16. Stabilizer |
| 3. Speedometer cable | 10. Mount bracket No. 4 | 17. Tie-rod end |
| 4. Clutch release cylinder | 11. Tire and wheel | 18. Lower arm |
| 5. Neutral switch | 12. Side cover and undercover | 19. Joint shaft |
| 6. Backup lamp switch | 13. Propeller shaft | 20. Driveshaft |
| 7. Center differential lock sensor switch | 14. Center differential lock assembly | 21. Mounting member |

7C REMOVAL



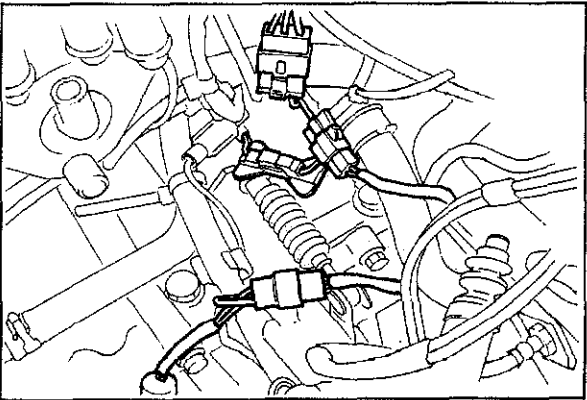
63G07C-027

1. Disconnect the speedometer cable in the center.



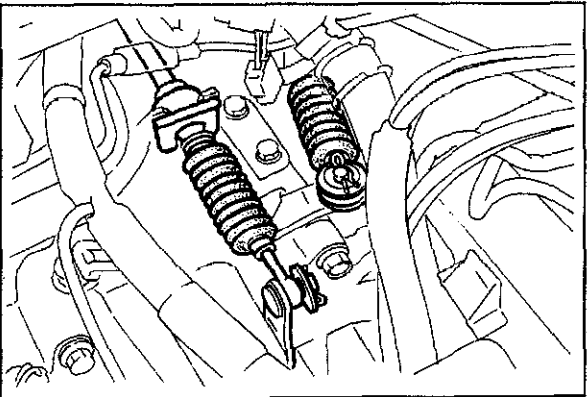
83U07C-057

2. Remove the bolt and clip, and remove the clutch release cylinder.



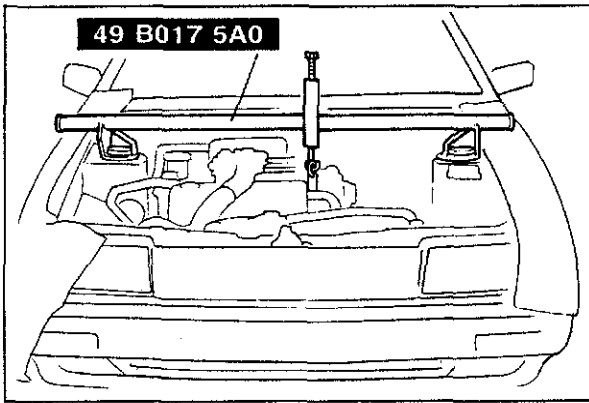
83U07C-058

3. Disconnect the neutral switch, backup lamp switch, differential lock sensor switch, and differential lock motor connector.
4. Remove the body ground.



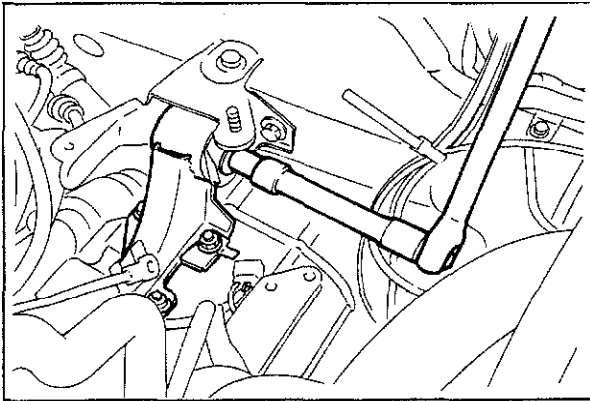
63G07C-030

5. Remove the pin and cable.
6. Remove the clip and cable.



83U07C-059

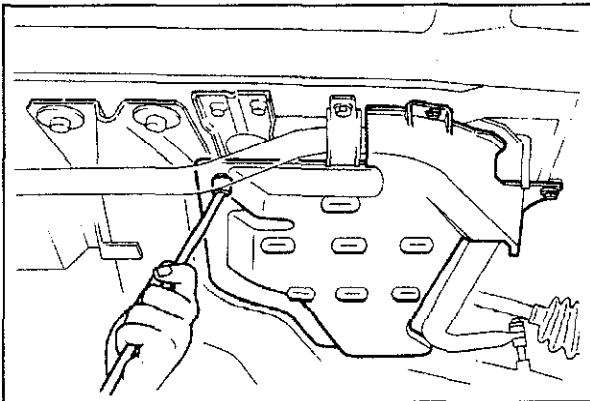
7. Mount the **SST** to the engine hanger.



63G07C-032

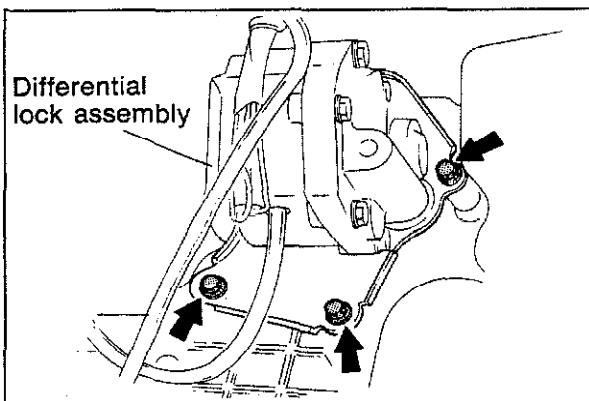
8. Remove mount bracket No. 4.

9. Remove the wheels.



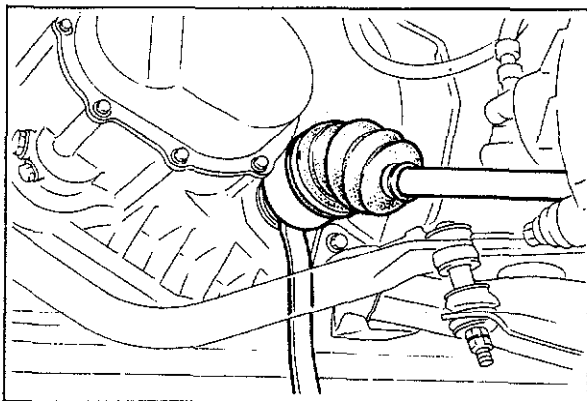
63G07C-033

10. Remove the side cover and undercover.



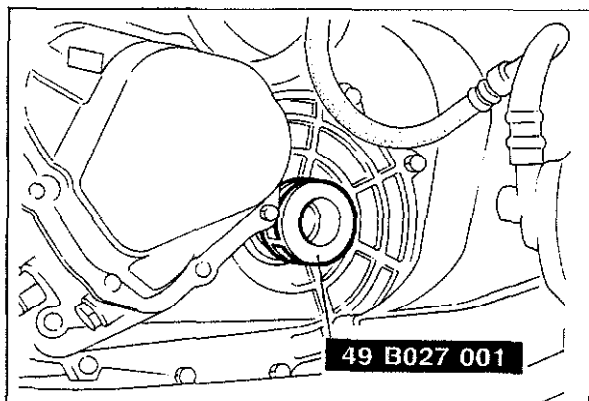
83U07C-060

11. Remove the oil filter, differential lock assembly, starter and stabilizer.



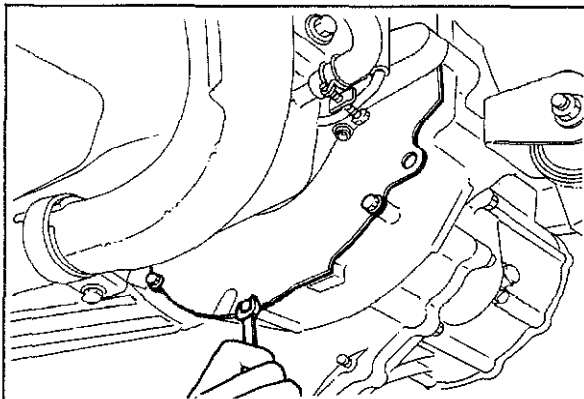
83U07C-061

12. Remove the tie-rod end and lower arm.
13. Remove the driveshaft.



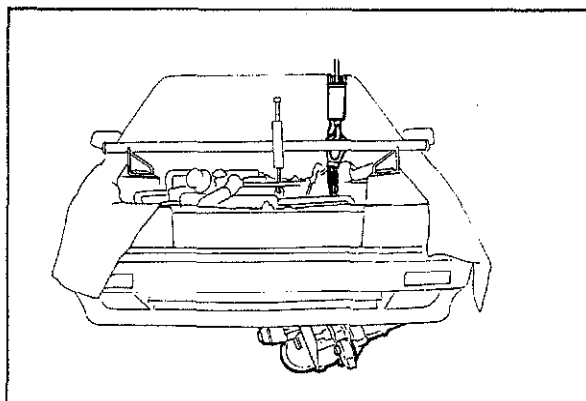
83U07C-062

14. Insert the **SST** to hold the side gear.



63G07C-037

15. Remove the end plate bolts.



63G07C-038

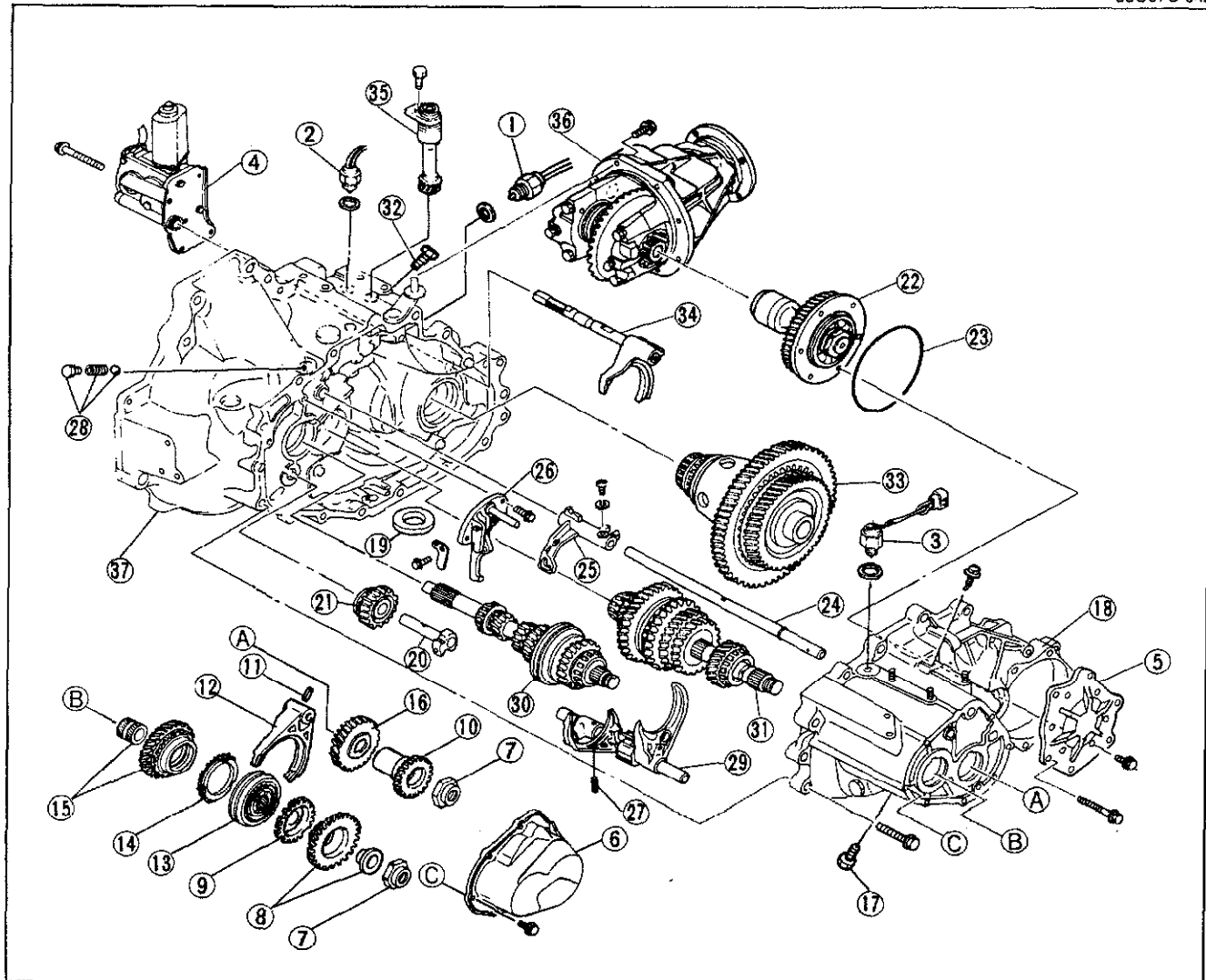
16. Use an engine hoist and remove the transaxle and transfer carrier.

DISASSEMBLY

DISASSEMBLY-STEP 1

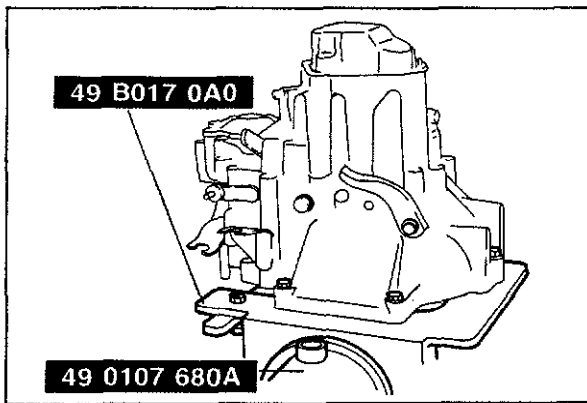
Disassemble in the sequence shown in the figure.

83U07C-042



83U07C-004

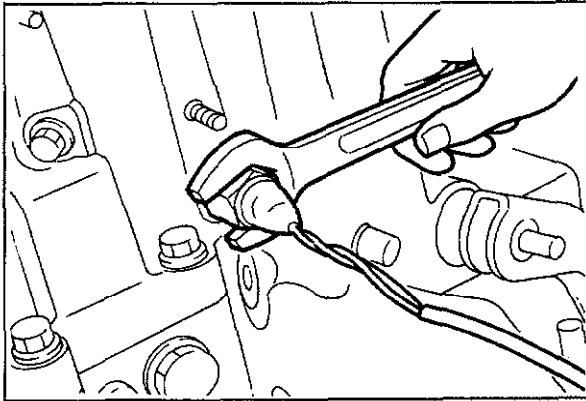
- | | | |
|--|------------------------------|--|
| 1. Neutral switch | 12. Shift fork | 27. Spring pin |
| 2. Center differential lock switch | 13. Clutch hub assembly | 28. Ball, spring and bolt |
| 3. Backup lamp switch | 14. Synchronizer ring | 29. Shift fork and shift rod assembly |
| 4. Center differential lock assembly | 15. 5th gear and gear sleeve | 30. Primary shaft gear assembly |
| 5. Side cover | 16. Secondary 5th gear | 31. Secondary shaft gear assembly |
| 6. Rear cover | 17. Bolt | 32. Bolt |
| 7. Lock nut (s) | 18. Transaxle case | 33. Center differential assembly |
| 8. Primary reverse synchronizer gear and gear sleeve | 19. Magnet | 34. Center differential lock shift fork assembly |
| 9. Synchronizer ring | 20. Reverse idle shaft | 35. Speedometer driven gear |
| 10. Secondary reverse synchronizer gear | 21. Reverse idle gear | 36. Transfer carrier assembly |
| 11. Spring pin | 22. Idle gear | 37. Clutch housing |
| | 23. "O" ring | |
| | 24. Shift rod | |
| | 25. Shift gear | |
| | 26. Reverse lever support | |



83U07C-063

Transaxle

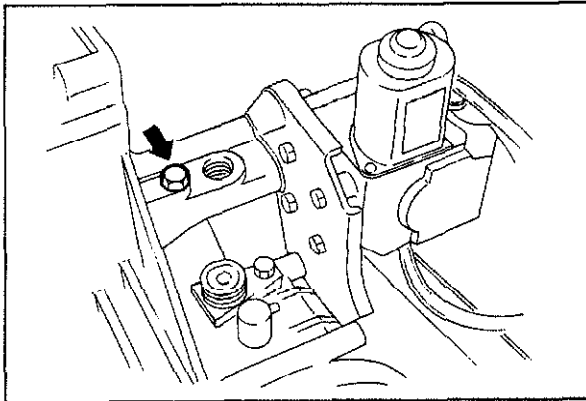
Position the **SST** and mount the transaxle on the **SST**.



63G07C-041

Switch

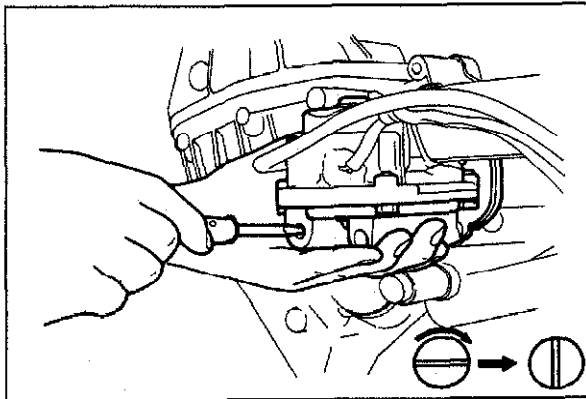
Remove the neutral switch, center differential lock sensor switch and backup lamp switch.



63G07C-042

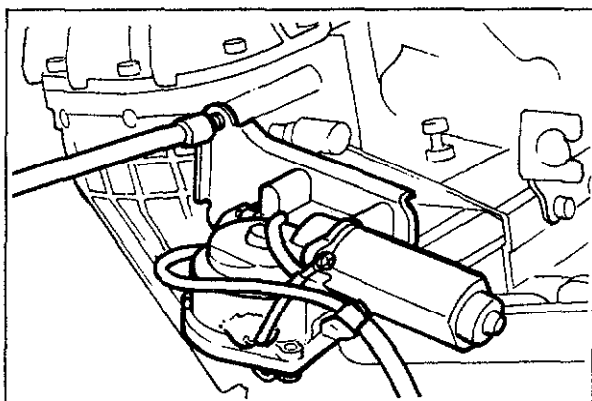
Center Differential Lock Assembly

1. Remove the bolt.



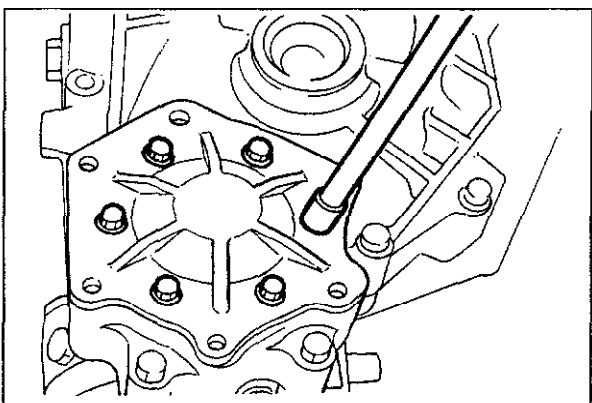
63G07C-043

2. Turn the differential lock shift rod 90° clockwise with flat-tipped screwdriver.



63G07C-044

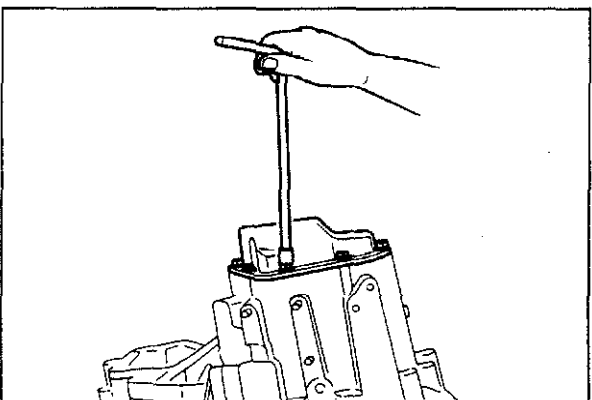
3. Remove the differential lock assembly.



63G07C-045

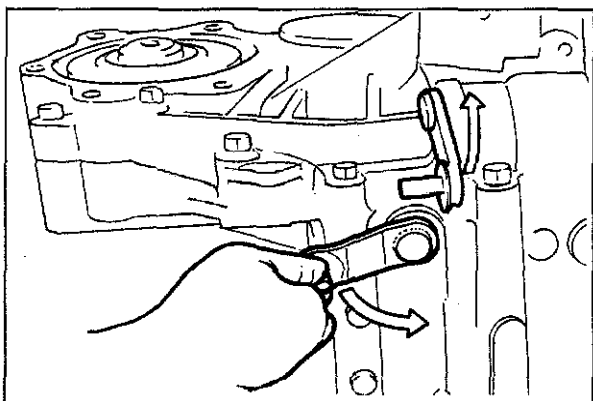
Cover

1. Remove the side cover.



63G07C-046

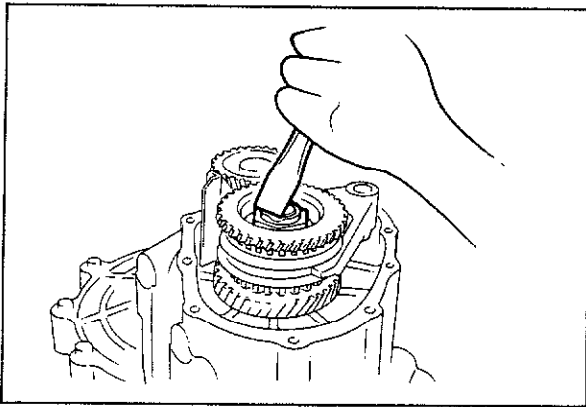
2. Remove the rear cover.



63G07C-047

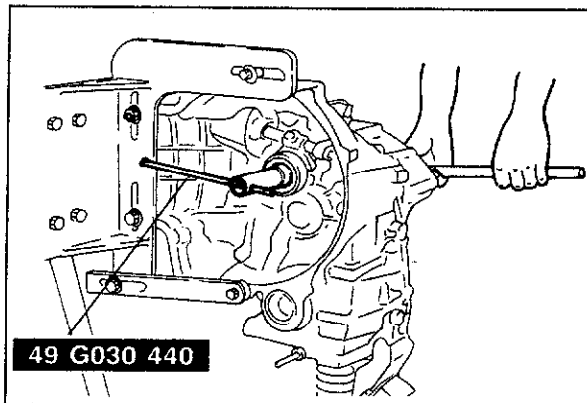
5th Gear

1. Shift the lever into 1st gear.



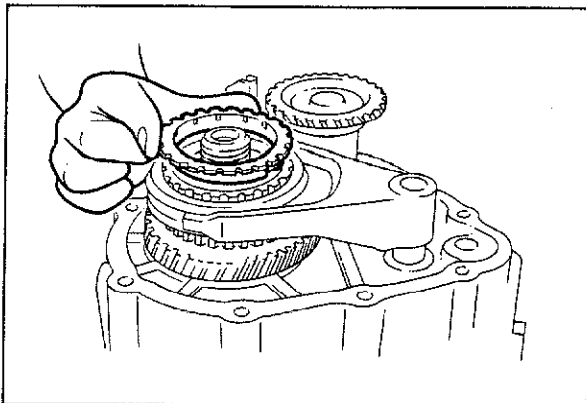
83U07C-005

2. Uncrimp the tab of the lock nuts.



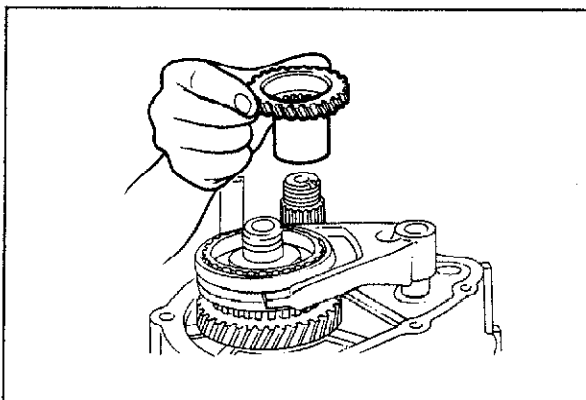
83U07C-006

3. Lock the primary shaft with the **SST**, and remove the lock nuts.



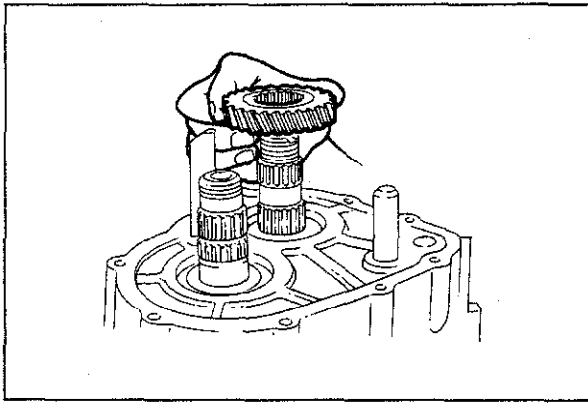
83U07C-007

4. Drive the spring pin out and remove the primary reverse synchronizer gear, gear sleeve and synchronizer ring.



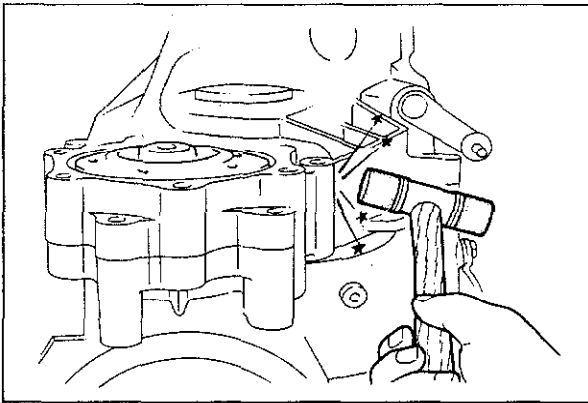
83U07C-008

5. Remove the secondary reverse synchronizer gear.
6. Remove the shift fork and clutch hub assembly.
7. Remove the synchronizer ring, the 5th gear and gear sleeve.



83U07C-009

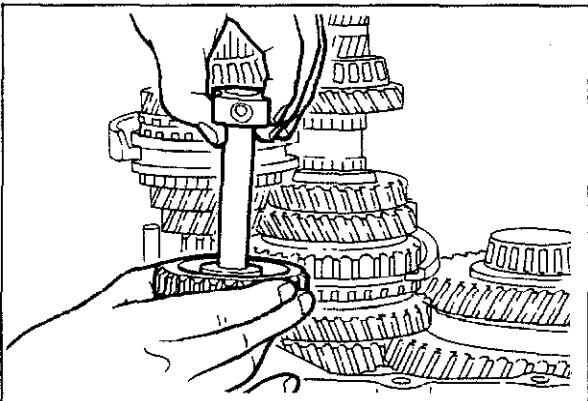
7. Remove the secondary 5th gear.



63G07C-053

Transaxle Case

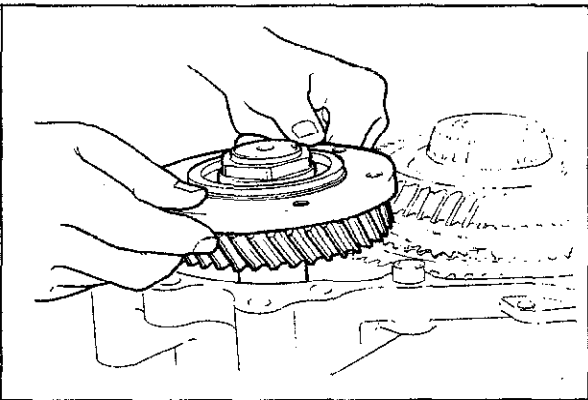
1. Remove the idle gear shaft mount bolt and inter lock sleeve mount bolt.
2. Disconnect the idle gear from the transaxle case by tapping lightly with a plastic hammer.
3. Remove the transaxle case.
4. Remove the magnet.



63G07C-054

Reverse Idle Gear

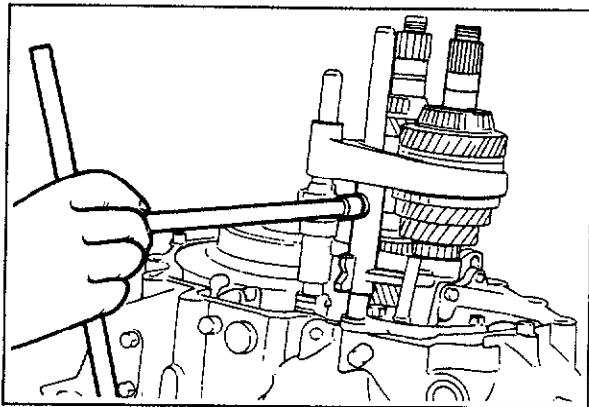
Remove the reverse idle shaft and reverse idle gear.



63G07C-055

Idle Gear

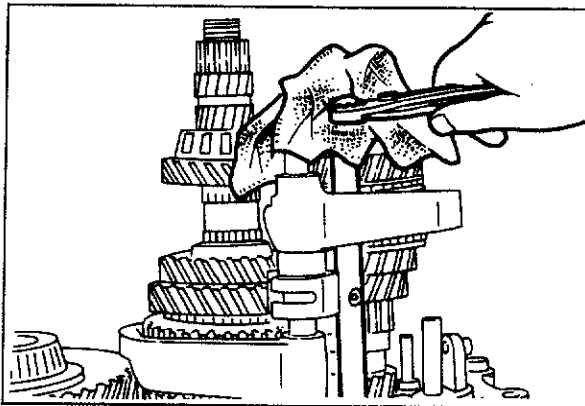
Remove the idle gear and "O" ring.



63G07C-056

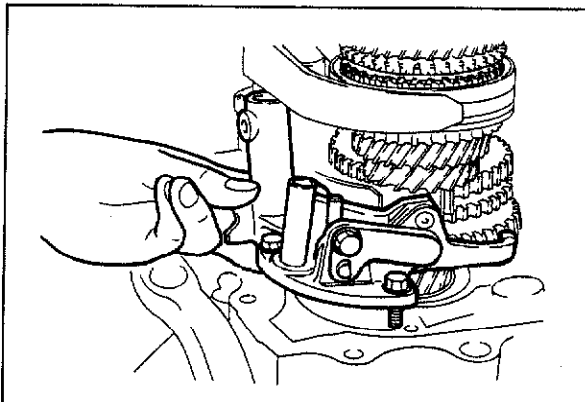
Primary Shaft Gear Assembly, Secondary Shaft Gear Assembly and Shift Fork Assembly

1. Remove the set bolt.



63G07C-057

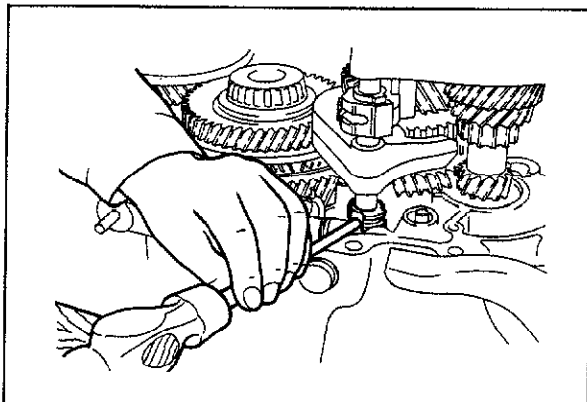
2. To remove the reverse shift rod, wrap it with a cloth and turn it with pliers while pulling out.



63G07C-058

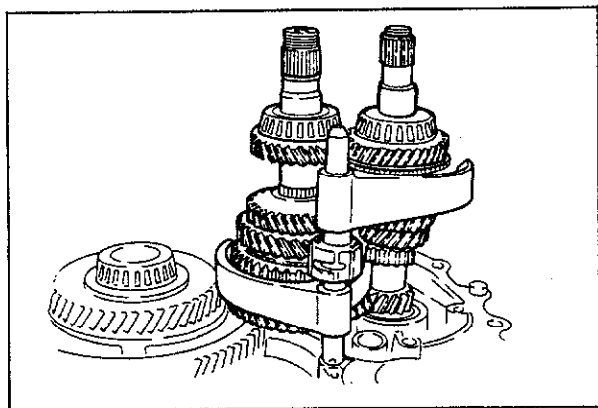
3. Remove the shift gate and reverse lever support assembly.

4. Remove the bolt, spring and ball.



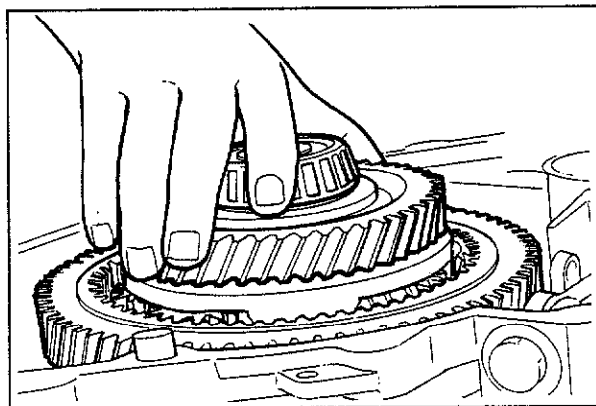
63G07C-059

5. Remove the spring pin.



63G07C-060

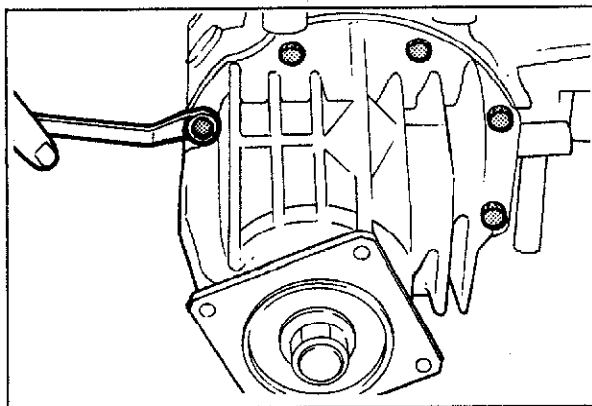
6. Lift the primary shaft, secondary shaft and shift fork assemblies out as a unit.



63G07C-061

Center Differential

1. Remove the set bolt and remove the center differential assembly.
2. Remove the center differential lock shift fork.



63G07C-062

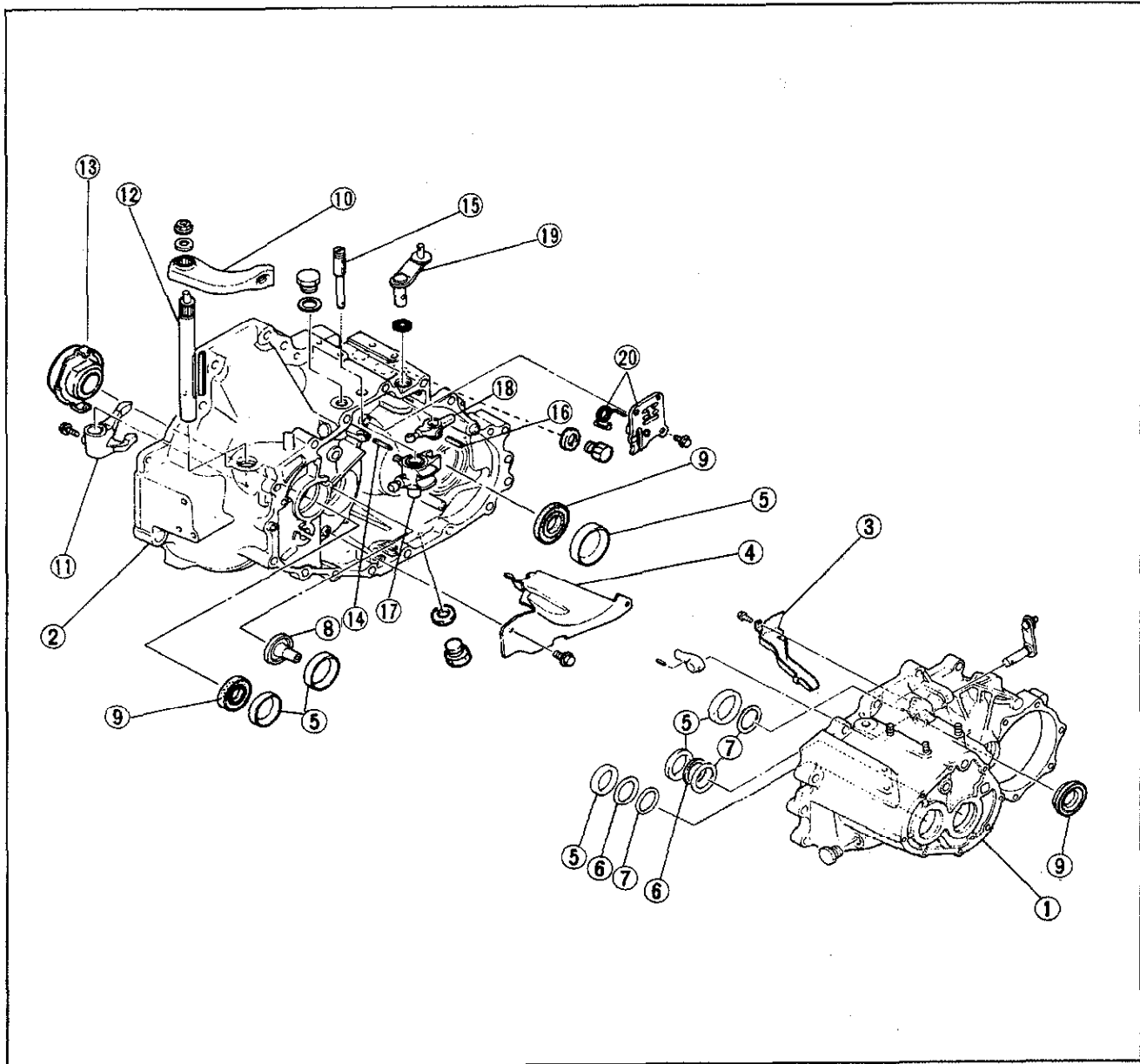
Transfer Carrier

1. Remove the speedometer driven gear.
2. Remove the transfer carrier.

DISASSEMBLY-STEP 2

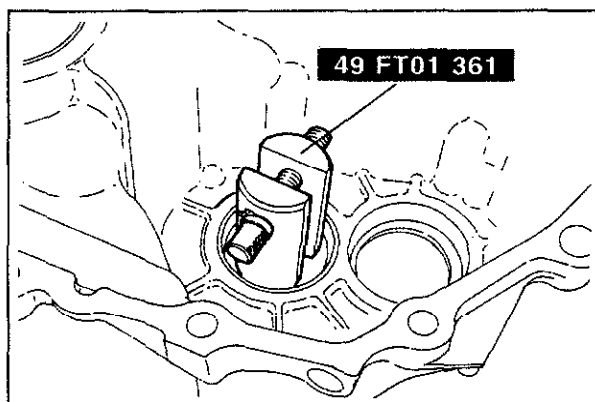
Disassemble in the sequence shown in the figure.

63G07C-303



83U07C-010

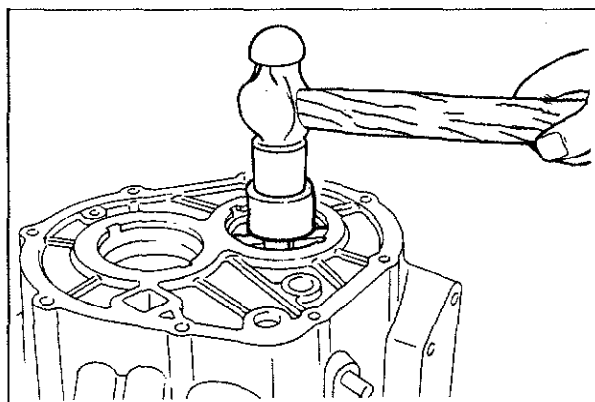
- | | |
|-----------------------|---------------------------|
| 1. Transaxle case | 11. Clutch release fork |
| 2. Clutch housing | 12. Clutch release shaft |
| 3. Oil passage | 13. Clutch release collar |
| 4. Baffle plate | 14. Spring pin |
| 5. Bearing outer race | 15. Crank lever shaft |
| 6. Diaphragm spring | 16. Spring pin |
| 7. Washer(s) | 17. Crank lever |
| 8. Funnel | 18. Inner shift lever |
| 9. Oil seal | 19. Select lever |
| 10. Clutch lever | 20. Base plate assembly |



83U07C-064

Bearing Outer Race

1. Install the **SST**.

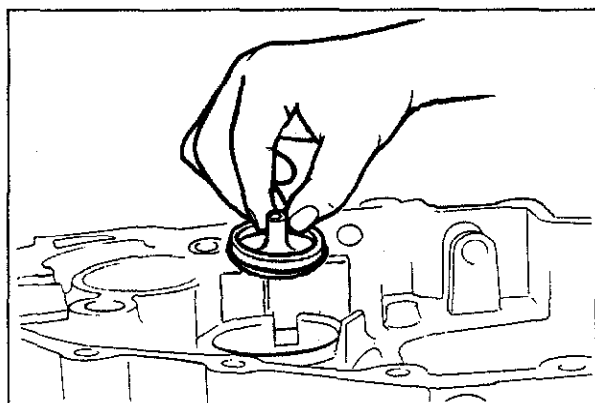


63G07C-065

2. Remove the bearing outer races.

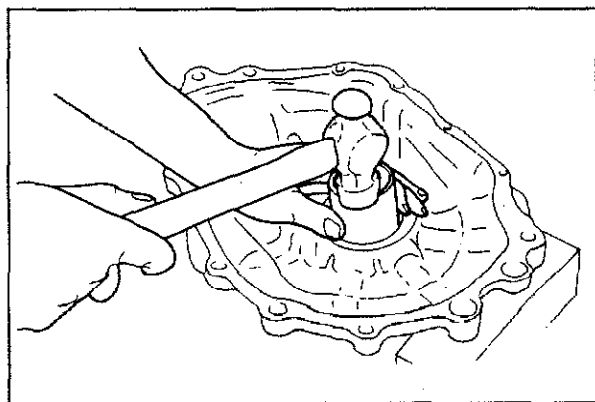
Note

Do not remove the oil seals, unless replacement is necessary due to damage.



63G07C-066

3. Remove the bearing outer race by lifting the funnel and the race out together.



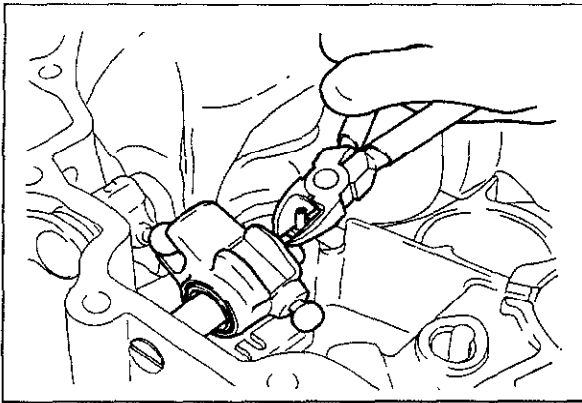
63G07C-067

Oil Seal

Check the oil seals and if necessary replace them. Use a pipe of the proper size to tap the seal out.

Note

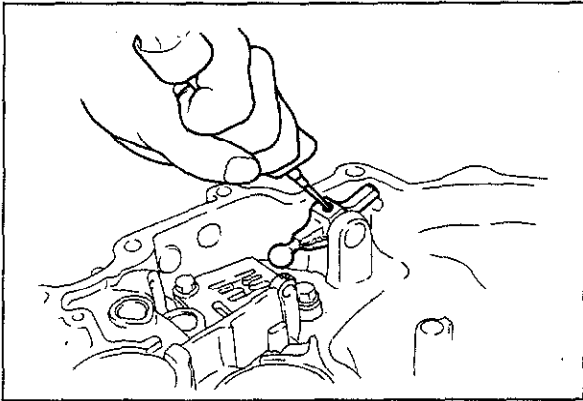
Remove the oil seal gradually and evenly.



63G07C-068

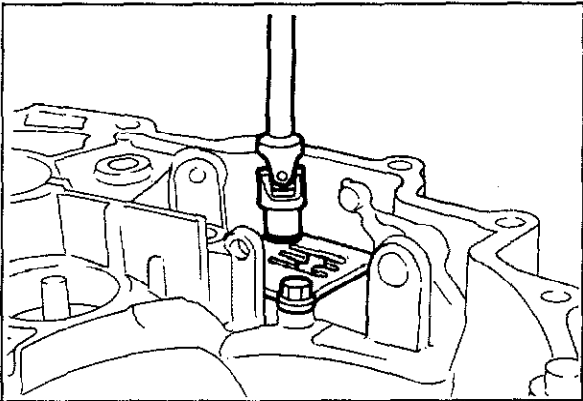
Clutch Housing

1. Remove the spring pin and crank lever.



63G07C-069

2. Remove the spring pin and inner shift lever.



63G07C-070

3. Remove the base plate.

DISASSEMBLY-STEP 3

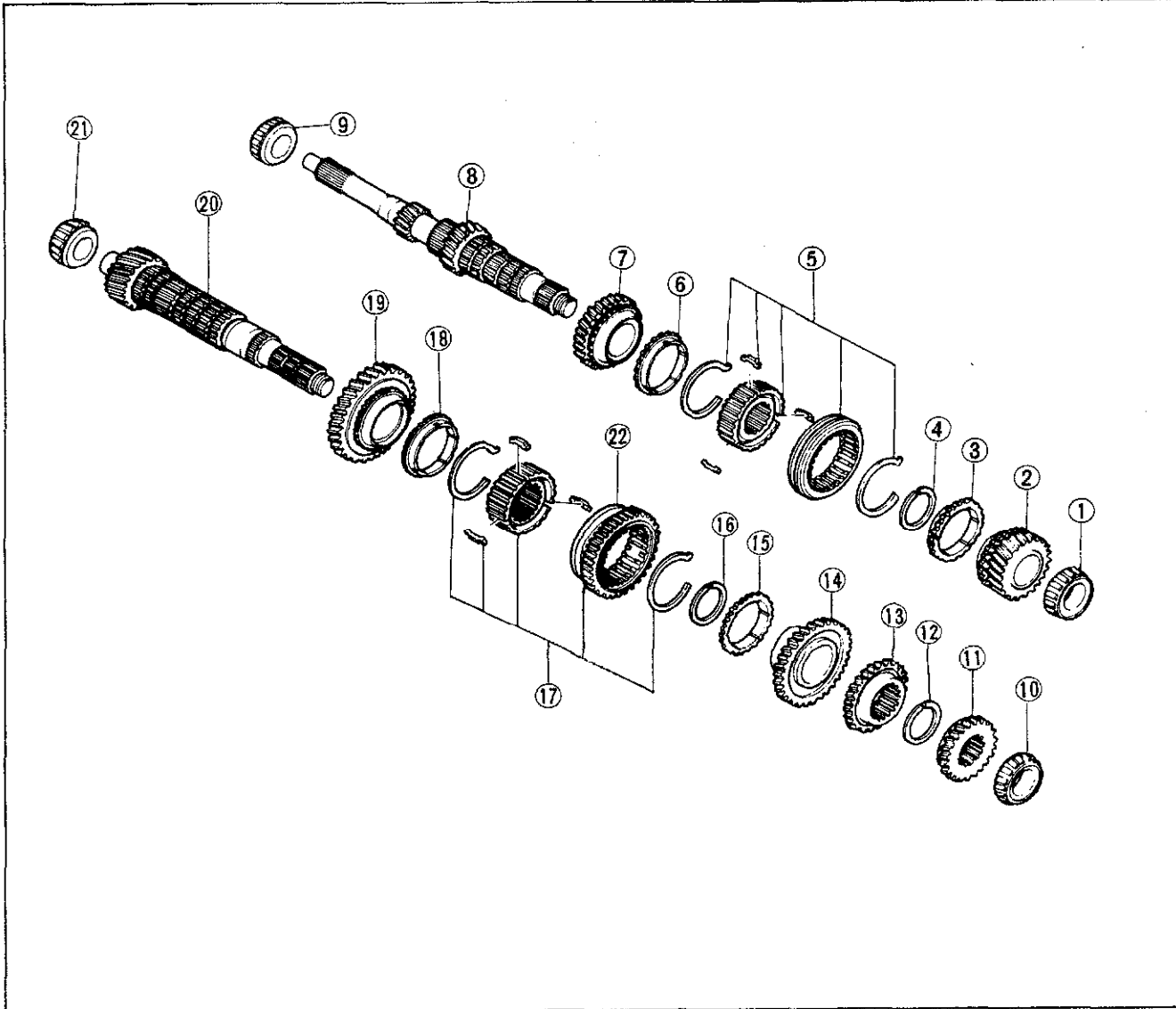
Disassemble in the sequence shown in the figure.

Note

a) Do not disassemble the bearing inner races (except the secondary 4th gear end ⑩ of the secondary shaft gear assembly and the 4th gear end ① of the primary shaft gear assembly) unless necessary. Replace them with new races whenever they are disassembled.

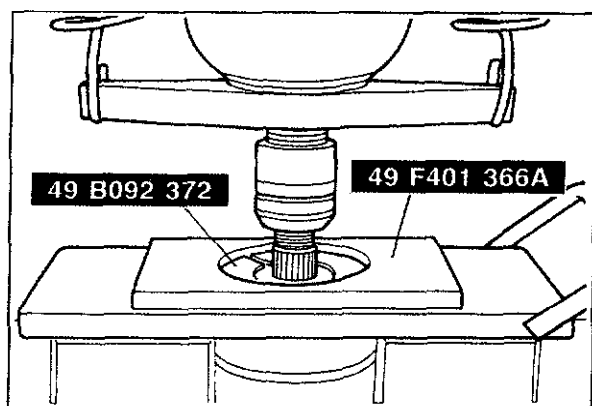
b) Before disassembly, check the thrust clearance of all gears. (Refer to page 7C—62)

63G07C-304



63G07C-071

- | | | |
|------------------------|------------------------|--------------------------|
| 1. Bearing inner race | 8. Primary shaft gear | 15. Synchronizer ring |
| 2. 4th gear | 9. Bearing inner race | 16. Retaining ring |
| 3. Synchronizer ring | 10. Bearing inner race | 17. Clutch hub assembly |
| 4. Retaining ring | 11. Secondary 4th gear | 18. Synchronizer ring |
| 5. Clutch hub assembly | 12. Retaining ring | 19. 1st gear |
| 6. Synchronizer ring | 13. Secondary 3rd gear | 20. Secondary shaft gear |
| 7. 3rd gear | 14. 2nd gear | 21. Bearing inner race |
| | | 22. Reverse gear |



83U07C-065

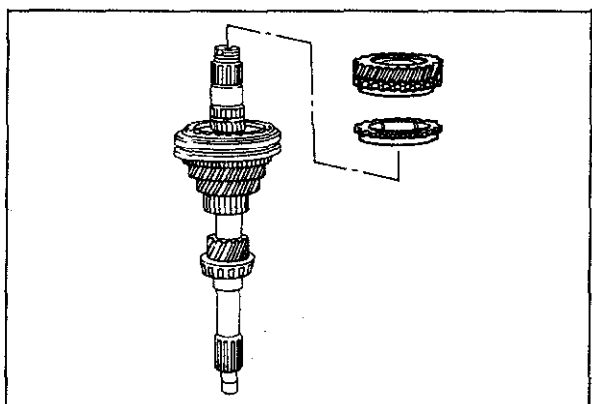
(PRIMARY SHAFT GEAR)

Bearing Inner Race (4th gear end of primary shaft gear)

Press the bearing inner race from the shaft with the **SST** and a press.

Caution

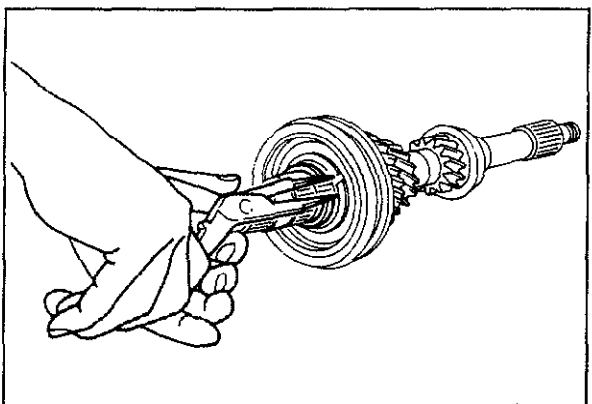
Hold the shaft with one hand so that it does not fall.



63G07C-073

4th Gear

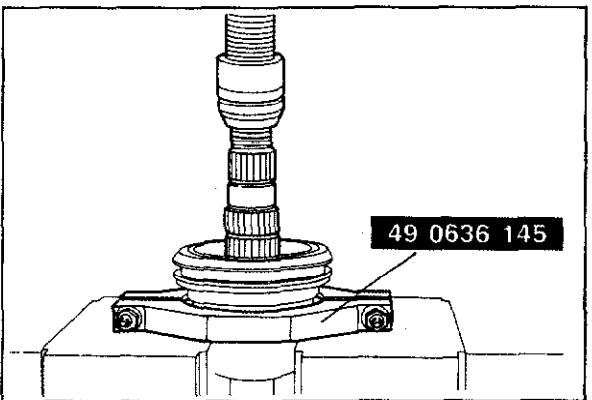
Remove the 4th gear and synchronizer ring.



63G07C-074

Clutch Hub Assembly (3rd-4th gear)

1. Remove the retaining ring.

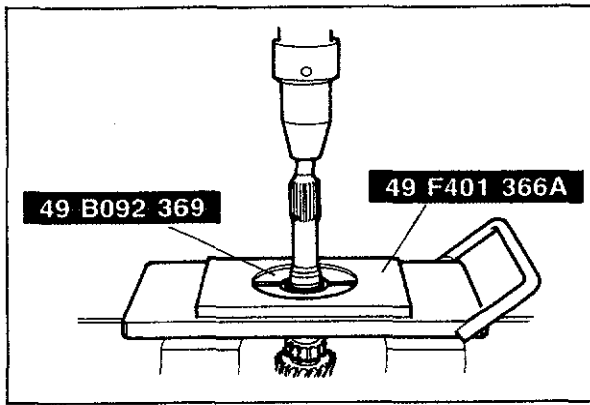


83U07C-066

2. Set the **SST** onto the 3rd gear, and then, using a press, remove the clutch hub assembly and 3rd gear.

Caution

Hold the shaft with one hand so that it does not fall.



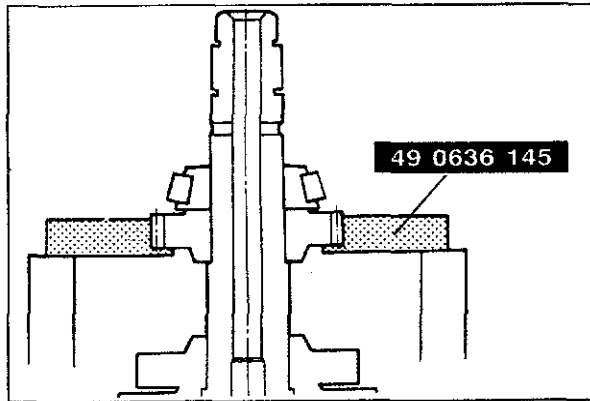
83U07C-067

Bearing Inner Race (1st gear end of primary shaft gear)

Press the bearing inner race from the shaft with the **SST** and a press.

Caution

Hold the shaft with one hand so that it does not fall.

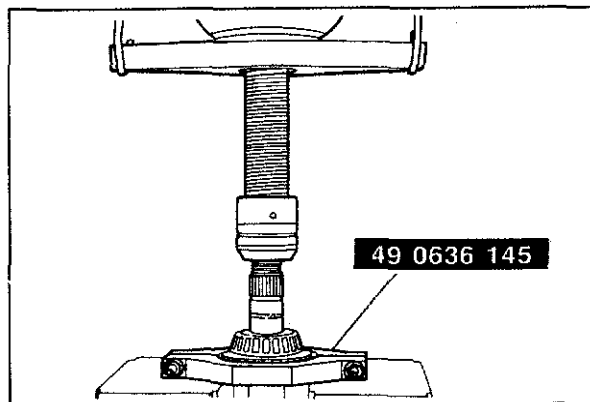


83U07C-068

(SECONDARY SHAFT GEAR)

Bearing Inner Race and Secondary 4th Gear

1. Set the **SST** onto the secondary 4th gear.

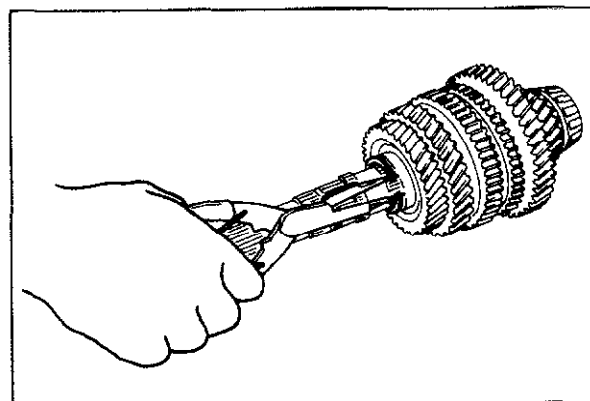


63G07C-078

2. Remove the bearing inner race and the secondary 4th gear.

Caution

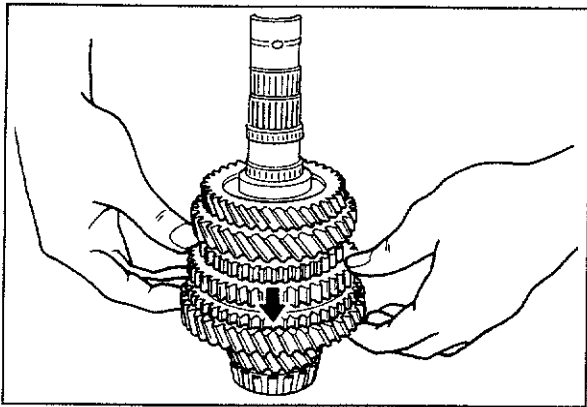
Hold the shaft with one hand so that it does not fall.



63G07C-079

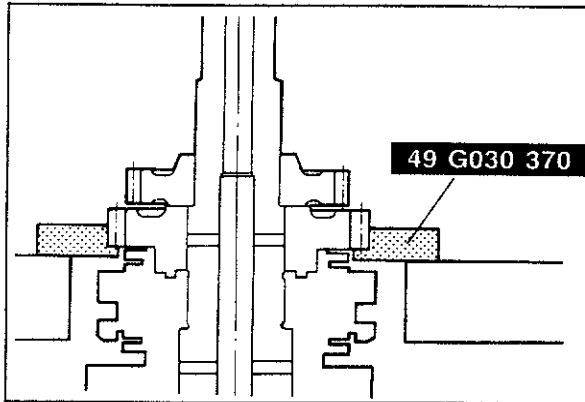
2nd Gear and Secondary 3rd Gear

1. Remove the retaining ring.



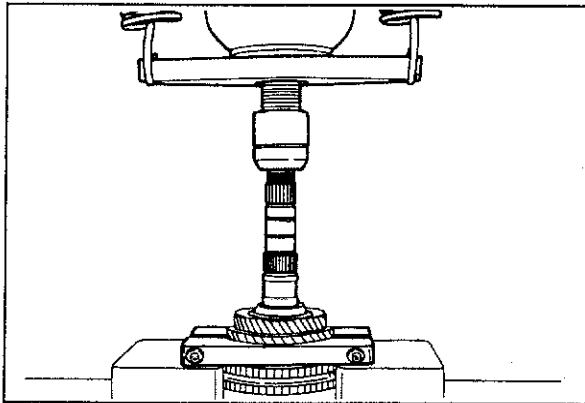
63G07C-080

2. Shift the clutch hub sleeve into 1st gear.



83U07C-069

3. Set the **SST** onto the 2nd gear.



63G07C-082

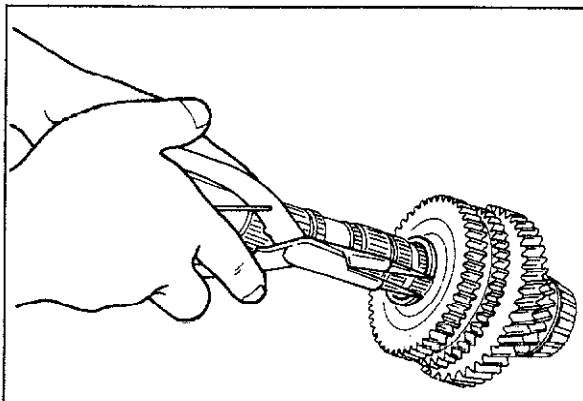
4. Remove the 2nd gear and secondary 3rd gear with a press.

Caution

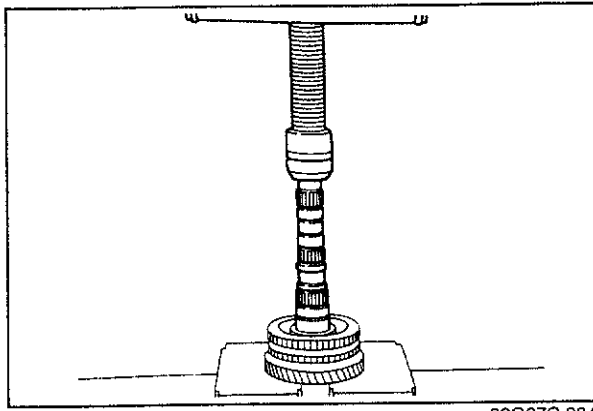
Hold the shaft with one hand so that it does not fall.

Clutch Hub Assembly and 1st Gear

1. Remove the retaining ring.



63G07C-083

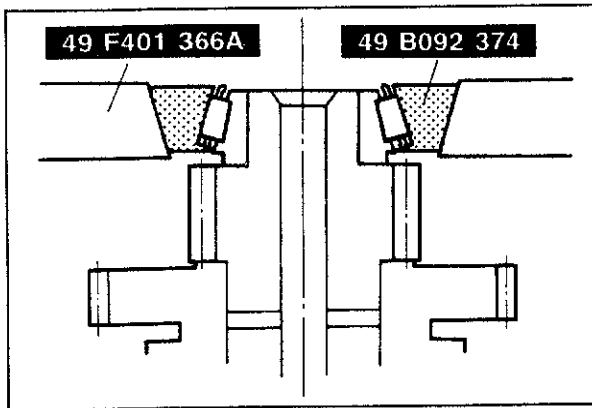


63G07C-084

2. Support the 1st gear and remove the clutch hub assembly and 1st gear with a press.

Caution

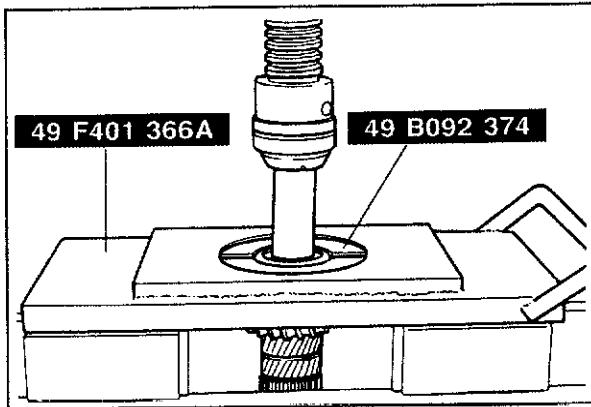
Hold the shaft with one hand so that it does not fall.



83U07C-070

Bearing Inner Race

Remove the bearing inner race from the shaft with the **SST** and press against the shaft with a proper rod.



63G07C-086

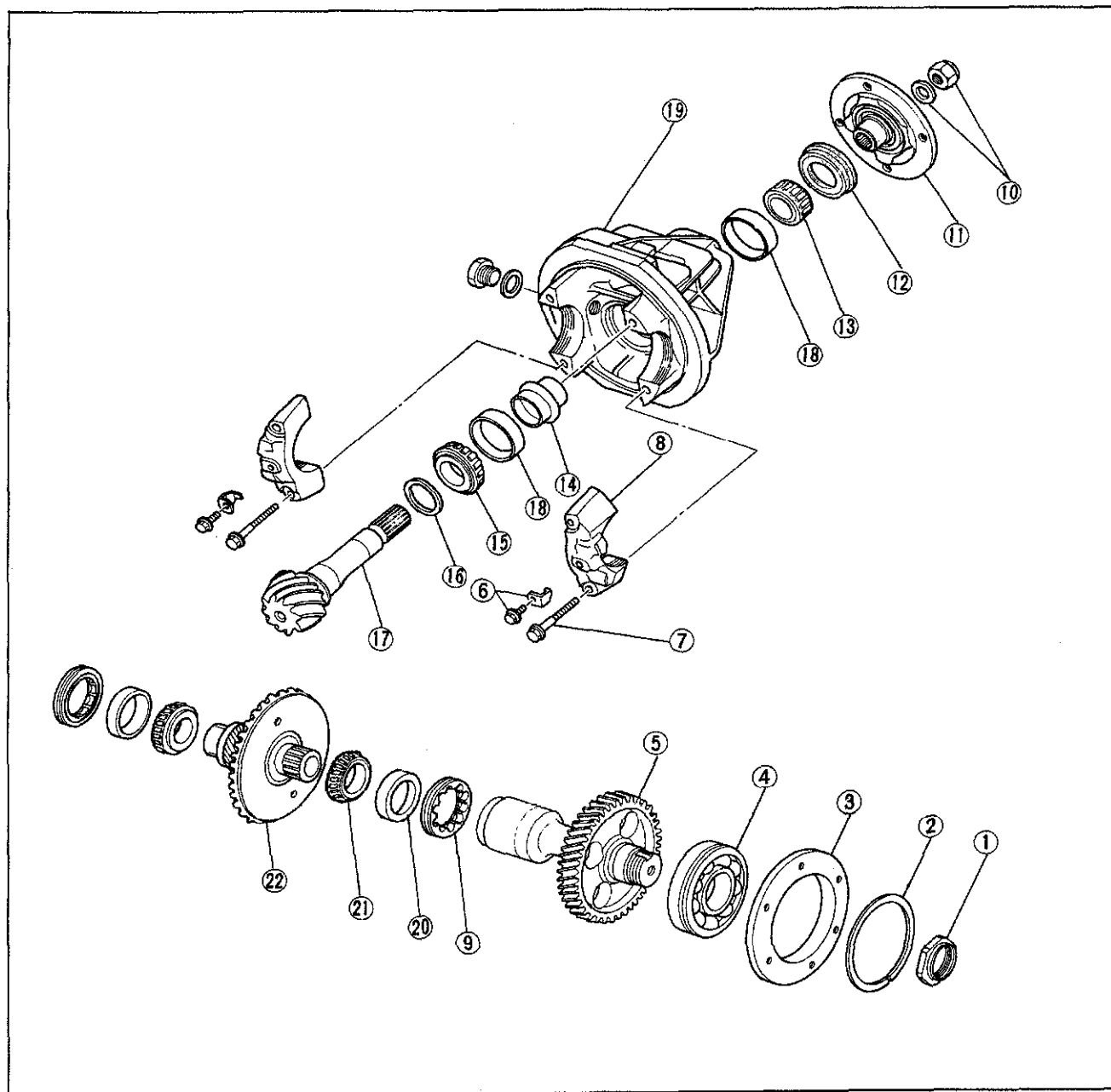
Caution

Hold the shaft with one hand so that it does not fall.

DISASSEMBLY-STEP 4

Disassemble in the sequence shown in the figure.

63G07C-305

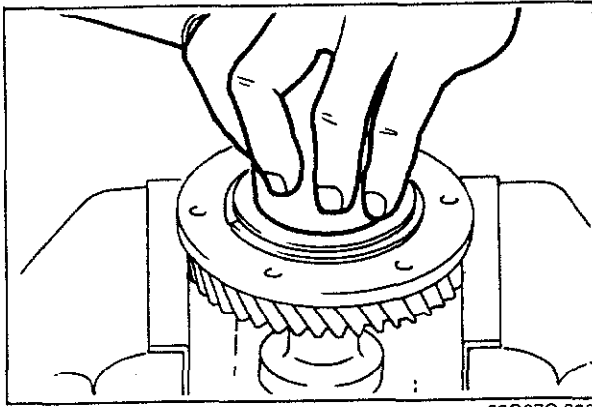


63G07C-087

1. Lock nut
2. Retaining ring
3. Side cover (B)
4. Bearing
5. Idle gear
6. Lock plate and bolt
7. Bolt

8. Bearing cap
9. Adjustment screw
10. Washer and lock nut
11. Companion flange
12. Oil seal
13. Bearing inner race
14. Collapsible spacer

15. Bearing inner race
16. Spacer
17. Drive pinion
18. Bearing outer race
19. Transfer carrier
20. Bearing outer race
21. Bearing inner race
22. Differential gear



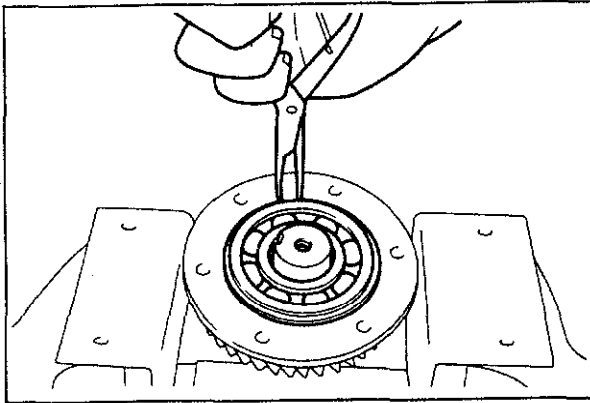
63G07C-088

Idle Gear

1. Secure the idle gear in a vise.
2. Uncrimp the tab of the lock nut.
3. Remove the lock nut.

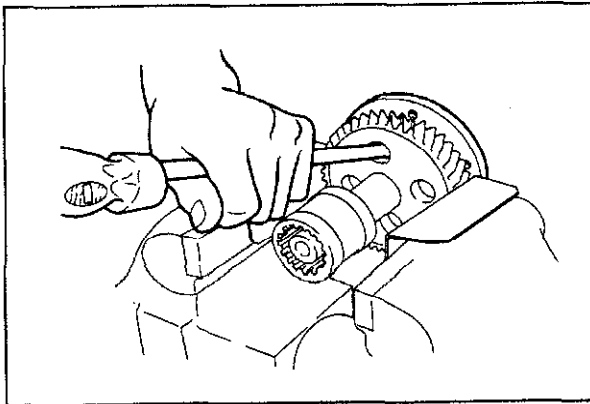
Note

Use pads in the vise



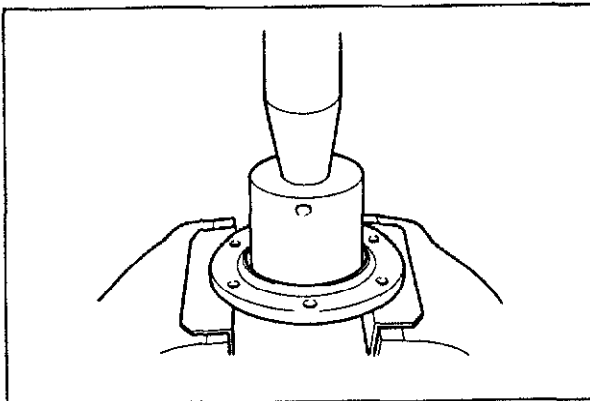
63G07C-089

4. Remove the retaining ring.



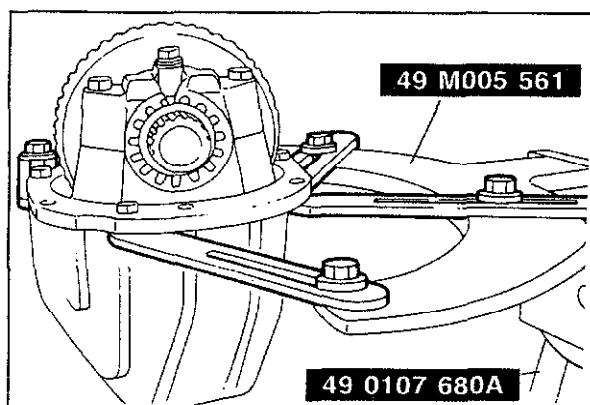
63G07C-090

5. Tap the bearing and remove the side cover (B) and bearing.



63G07C-091

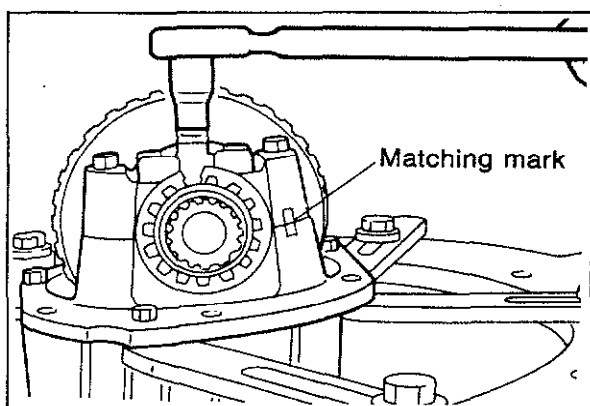
6. Remove the bearing from the side cover (B) using a suitable pipe.



83U07C-071

Transfer Carrier

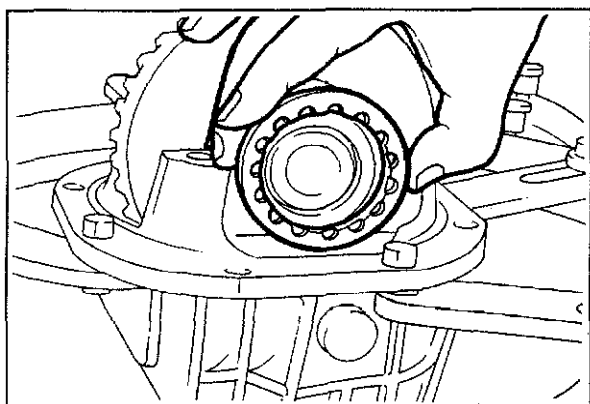
1. Position the **SST** and mount the transfer carrier.



63G07C-093

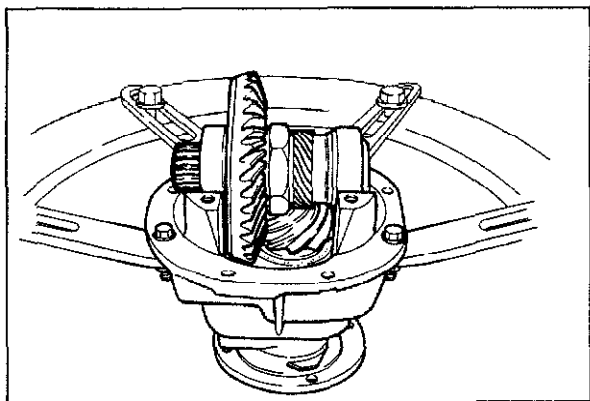
Adjustment Screw

1. Make matching marks on the carrier and caps.
2. Remove the bolts, lock plates and the bearing caps.



63G07C-094

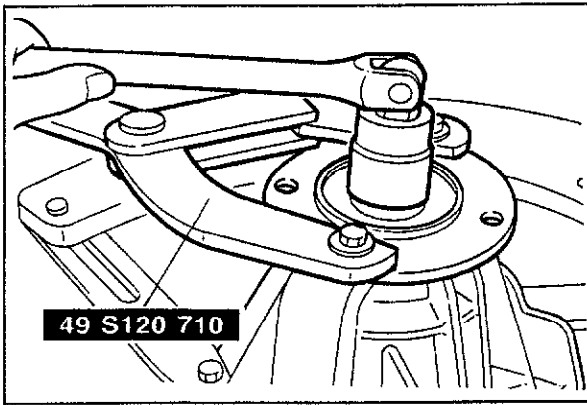
3. Remove the adjustment screw.



63G07C-095

Differential Gear

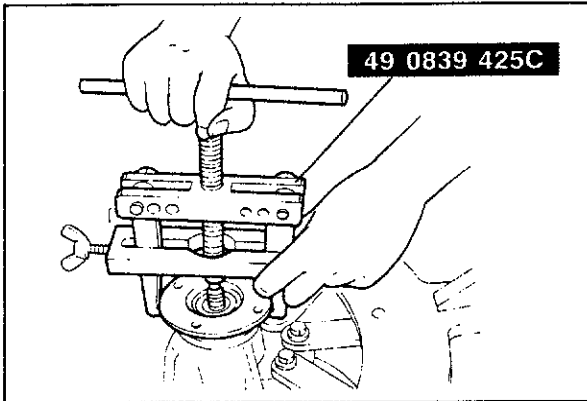
1. Remove the differential gear.



83U07C-072

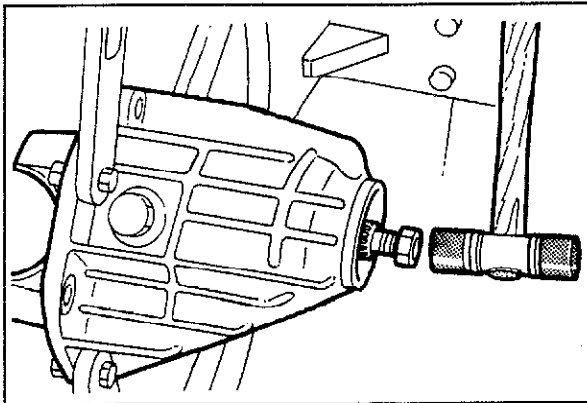
Drive Pinion

1. Remove the lock nut with the **SST**.



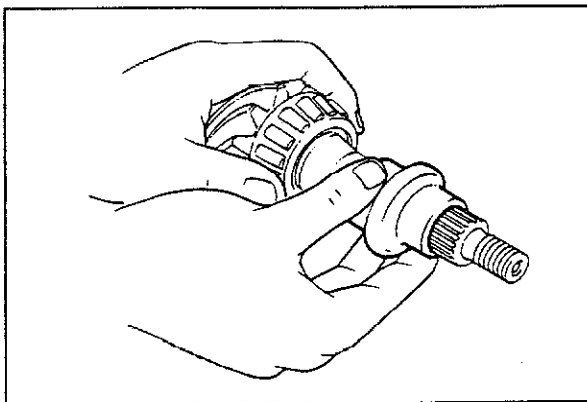
83U07C-073

2. Remove the companion flange with the **SST**.



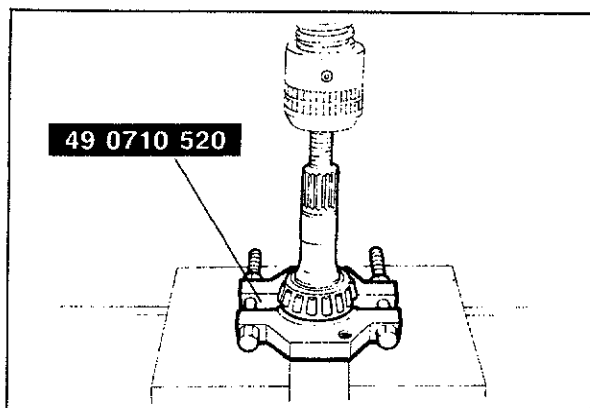
63G07C-098

3. Push the drive pinion out by attaching a miscellaneous lock nut to the drive pinion, and tapping it with a copper hammer.



63G07C-099

4. Remove the collapsible spacer.



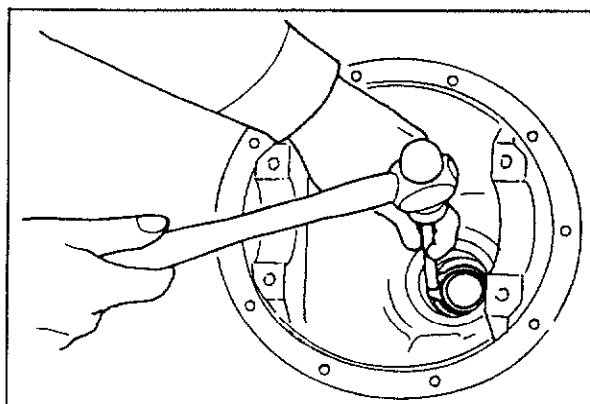
83U07C-074

5. Remove the bearing with the **SST**.

Caution

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

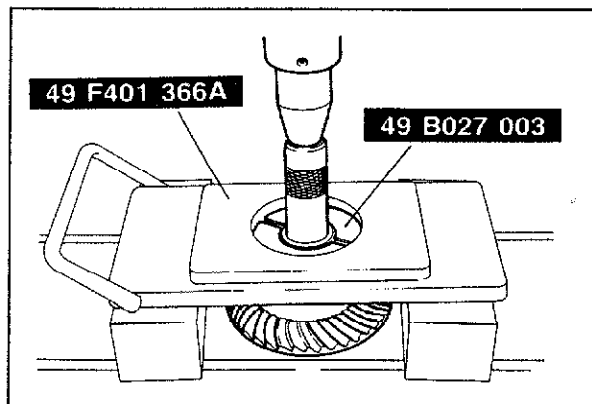
6. Remove the spacer.



63G07C-101

Bearing Outer Race (Carrier)

1. Using a brass drift and hammer drive out the bearing.
2. Remove the bearing outer races by using the two grooves in the carrier and tapping the races alternately.



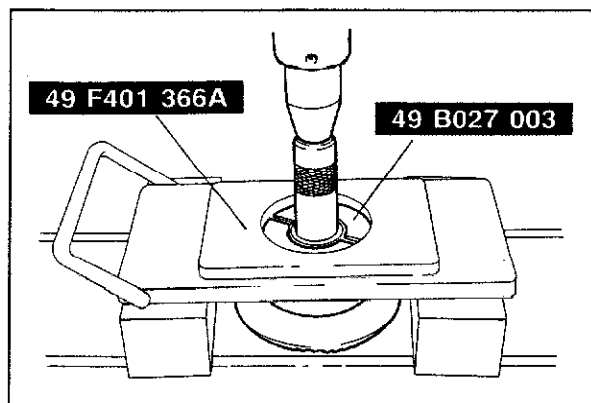
83U07C-011

Bearing Inner Race (Differential gear)

1. Remove the bearing inner race with the **SST**.

Note

Do not disassemble the bearing inner race unless necessary.



83U07C-012

2. Remove the bearing inner race with the **SST**.

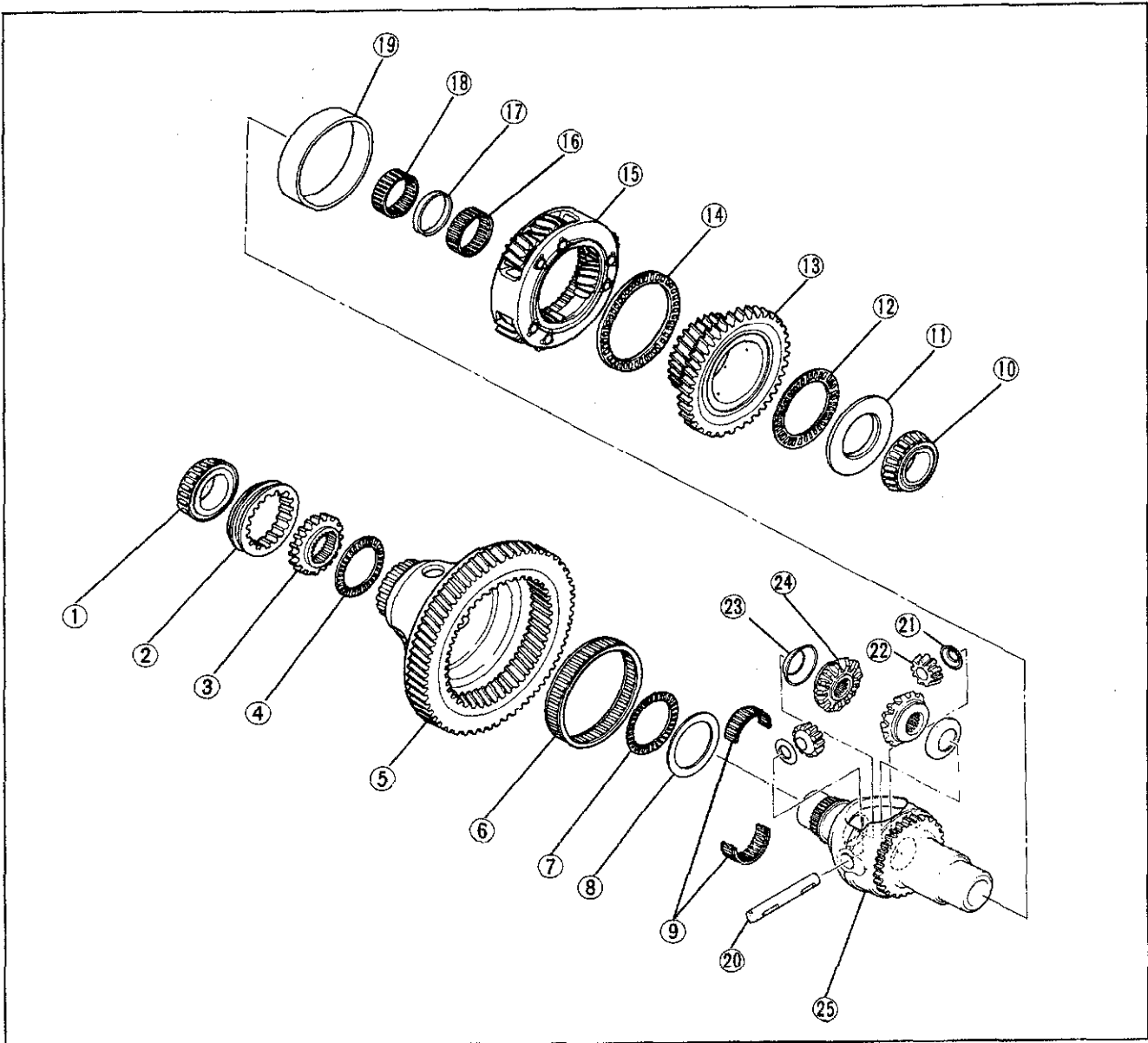
Note

Do not disassemble the bearing inner race unless necessary.

DISASSEMBLY-STEP 5

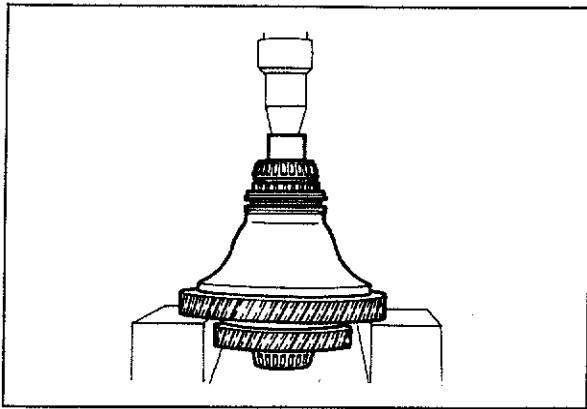
Disassemble in the sequence shown in the figure.

63G07C-306



63G07C-139

- | | |
|------------------------------------|-----------------------------------|
| 1. Bearing inner race | 13. Sun gear |
| 2. Differential lock gear sleeve | 14. Gear case needle bearing |
| 3. Differential lock hub | 15. Planetary carrier |
| 4. Gear case needle bearing | 16. Gear case needle bearing |
| 5. Ring gear case | 17. Spacer |
| 6. Gear case needle bearing | 18. Gear case needle bearing |
| 7. Gear case needle bearing | 19. Differential gear case sleeve |
| 8. Differential lock thrust washer | 20. Pinion shaft |
| 9. Gear case needle bearing | 21. Washer |
| 10. Bearing inner race | 22. Pinion gear |
| 11. Thrust washer | 23. Washer |
| 12. Gear case needle bearing | 24. Side gear |
| | 25. Differential gear case |



63G07C-105

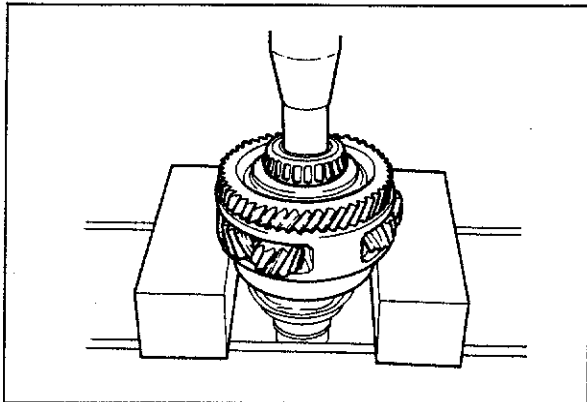
Center Differential

1. Remove the bearing inner race from the center differential with a suitable pipe.

Caution

Hold the center differential with one hand so that it does not fall.

2. Remove the differential lock gear sleeve, differential lock hub and gear case needle bearing.
3. Remove the gear case needle bearings and differential lock thrust washer.



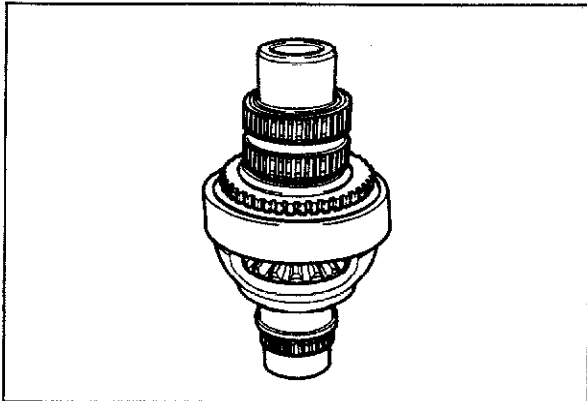
63G07C-107

4. Remove the bearing inner race using a press, then remove the washer, gear case needle bearing, sun gear, planetary carrier and gear case needle bearing.

Note

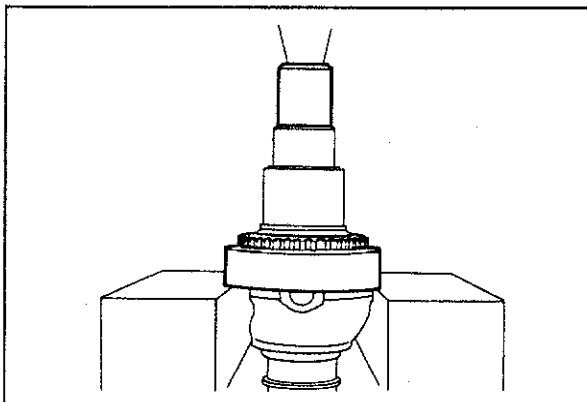
Do not disassemble the planetary carrier assembly.

5. Remove the gear case needle bearings and spacer.

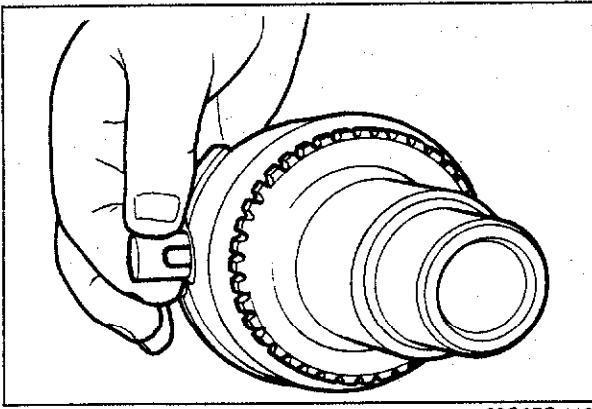


63G07C-108

6. Remove the differential gear case sleeve.



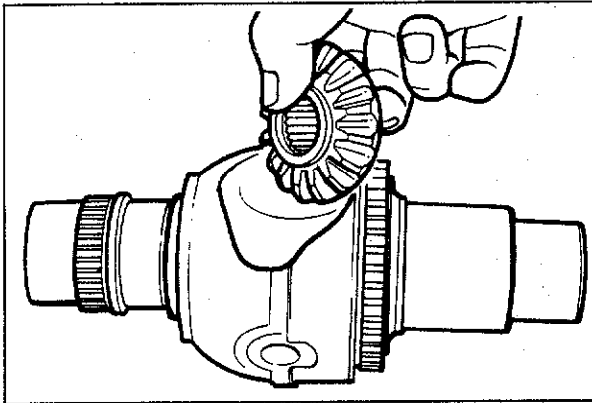
63G07C-109



63G07C-110

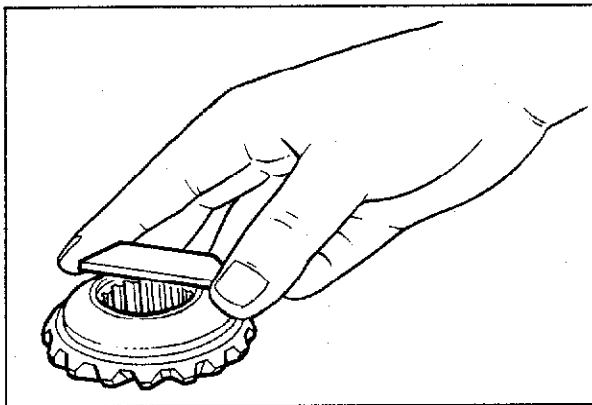
Front Differential

1. Remove the pinion shaft.



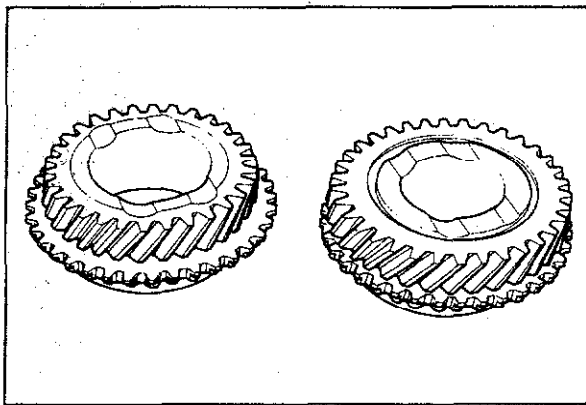
63G07C-111

2. Remove the side gears and pinion gears.



63G07C-112

3. Remove the washers.



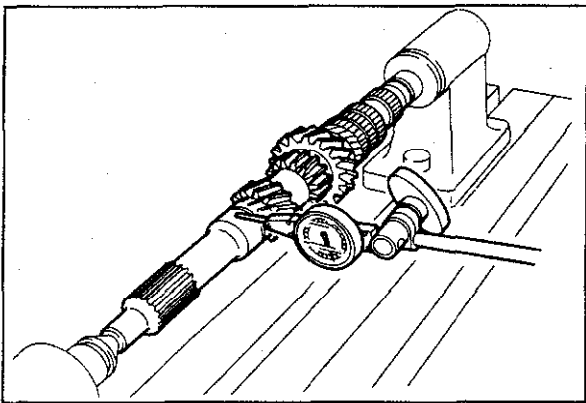
63G07C-113

INSPECTION

Check the following parts, replace if necessary.

1st, 2nd, 3rd, 4th, and 5th gears.

1. Worn or damaged synchronizer cone.
2. Worn or damaged hub sleeve coupling.
3. Worn or damaged teeth.
4. Worn or damaged inner surface or end surface of gears.



63G07C-114

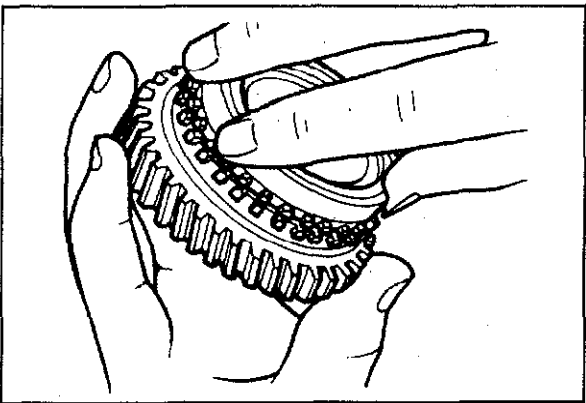
Primary Shaft Gear

1. Worn teeth.
2. Primary shaft gear run-out.

Maximum run-out: 0.03 mm (0.001 in)

Note

If the shaft gear is replaced, adjust the bearing preload. (Refer to Page 7C—65)



63G07C-115

Synchronizer Ring

1. Engagement with gear.
2. Worn or damaged teeth.
3. Worn or damaged tapered surface.

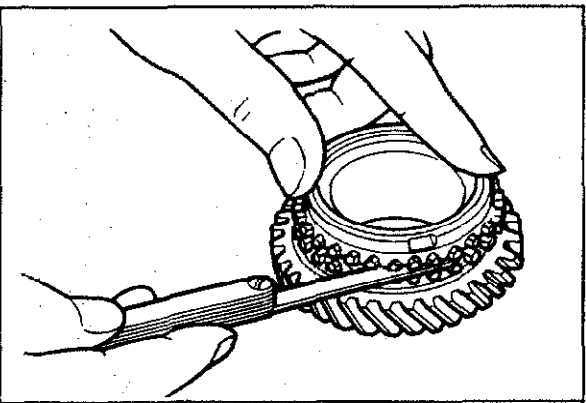
4. Clearance from the side of gear.

Standard: 1.5 mm (0.059 in)

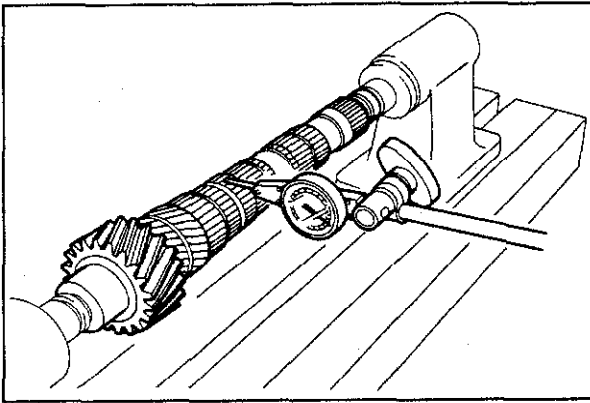
Minimum: 0.8 mm (0.031 in)

Note

- a) Press the synchronizer ring uniformly against the gear and measure around the circumference.
- b) If the measured value is less than the minimum replace the synchronizer ring or gear.



63G07C-116

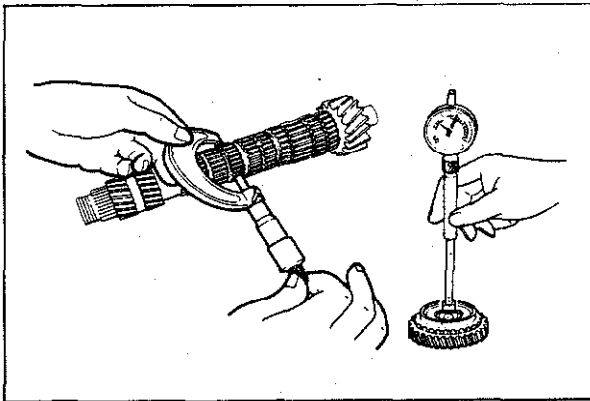


63G07C-117

Secondary Shaft Gear

1. Worn or damaged gear contact surface.
2. Worn or damaged splines.
3. Worn teeth.
4. Clogged oil passage.
5. Secondary shaft gear run-out.

Maximum run-out: 0.03 mm (0.001 in)



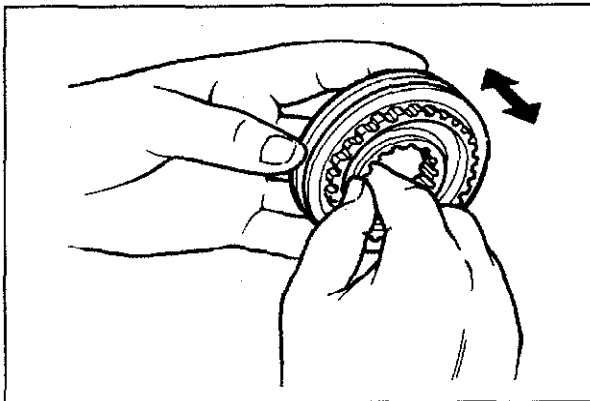
83U07C-013

6. Oil clearance between the gear shaft and gears.

Standard: 0.03—0.08 mm (0.001—0.003 in)

Note

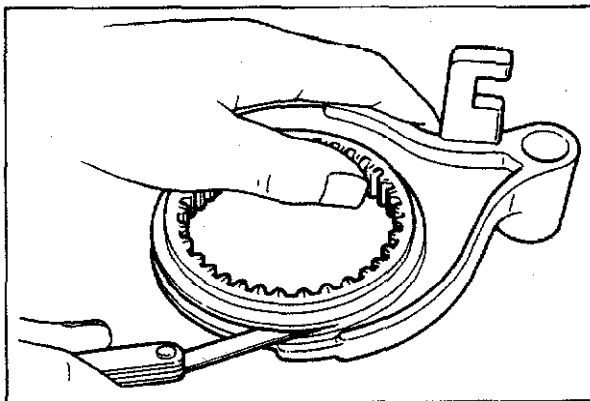
If the shaft gear is replaced, adjust the bearing preload.



63G07C-119

Clutch Hub

1. Worn or damaged splines.
2. Worn or damaged synchronizer key groove.
3. Worn end surface.
4. Operation of the hub sleeve when it is installed.



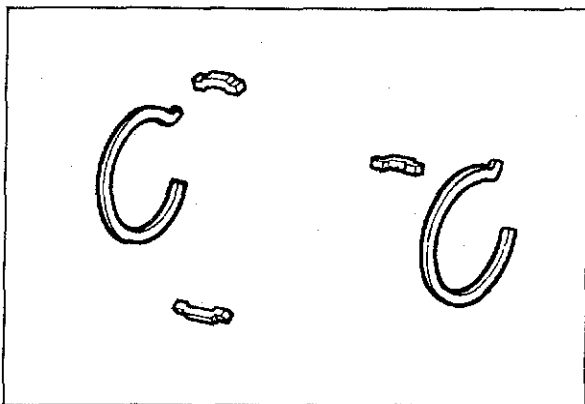
83U07C-075

Clutch Hub Sleeve

1. Worn or damaged hub splines.
2. Worn or damaged sleeve fork groove.
3. Clearance between sleeve and shift fork.

Standard: 0.2—0.4 mm (0.008—0.016 in)

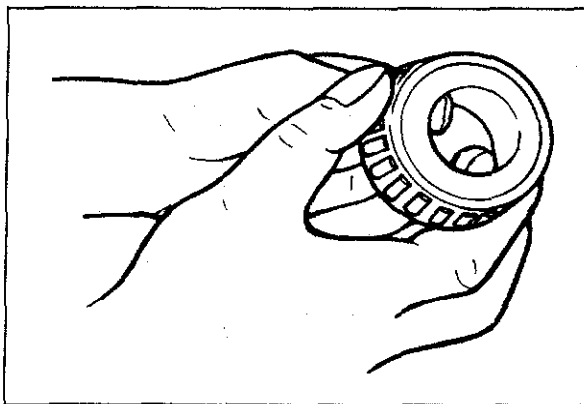
Maximum: 0.5 mm (0.020 in)



63G07C-121

Synchronizer Key and Key Spring

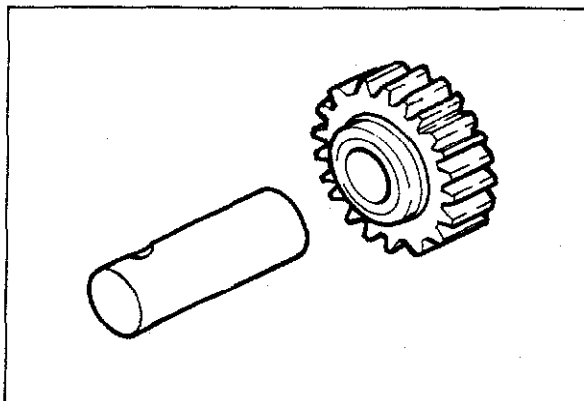
1. Worn key.
2. Fatigued or damaged spring.



63G07C-122

Bearing

1. Roughness or noise while turning.
2. Damaged bearing
3. Worn bearing.



63G07C-123

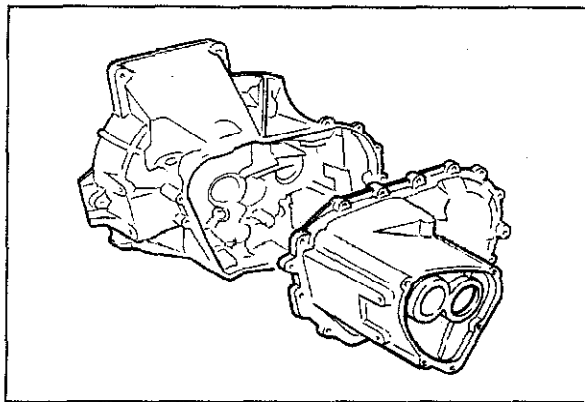
Reverse Idle Gear and Shaft

1. Worn or damaged gear.
2. Worn shaft.

Standard clearance:

0.1—0.32 mm (0.004—0.013 in)

Maximum: 0.5 mm (0.02 in)



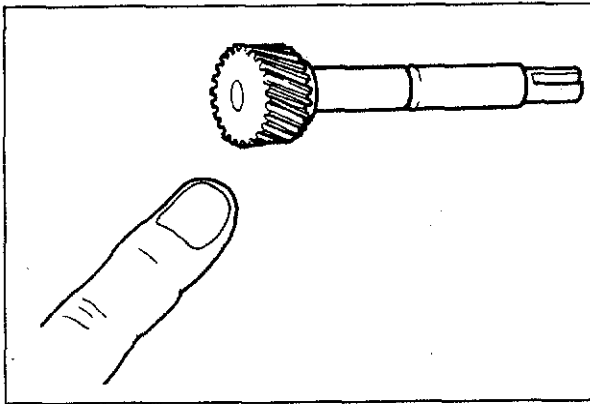
63G07C-124

Clutch Housing and Transaxle Case

Cracks or damage.

Note

If the clutch housing or transaxle case is replaced, adjust the bearing preload of the shaft gears and the preload of the differential side bearings.



63G07C-125

Speedometer Driven Gear Assembly

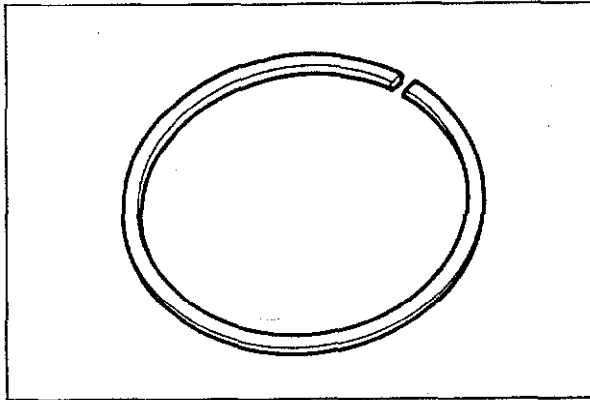
1. Worn or damaged teeth.
2. Worn or damaged "O" ring.

Ring Gear Speedometer Drive Gear

Worn or damaged teeth.

Oil Seal

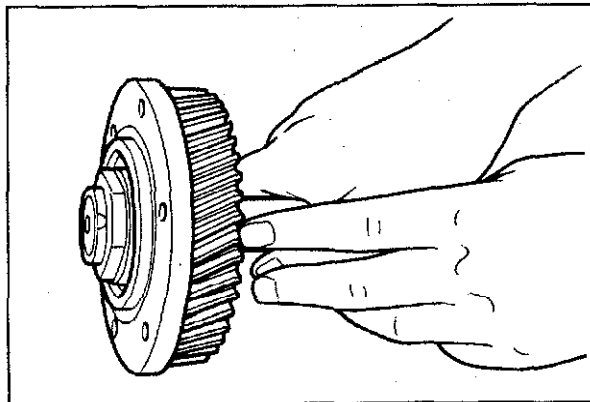
Damaged or worn lip.



63G07C-126

Retaining Ring

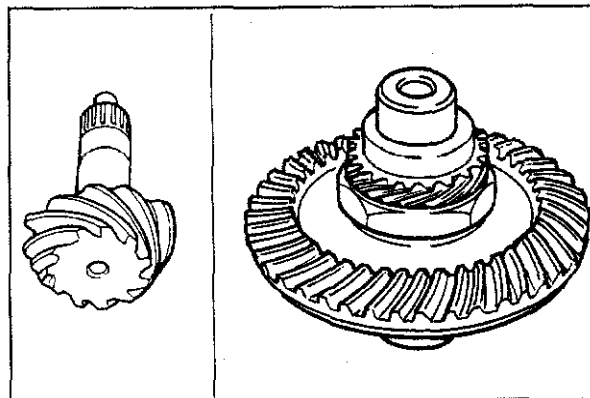
Bent ring.



63G07C-127

Idle Gear

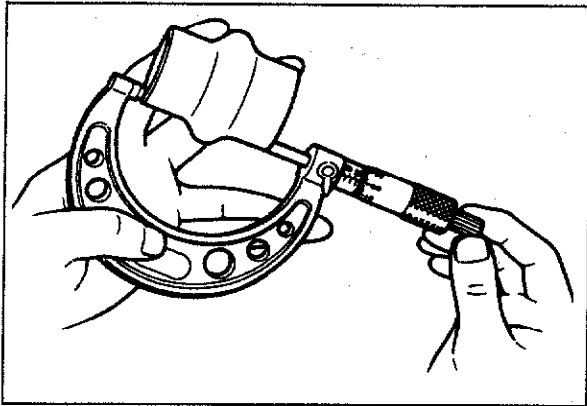
Worn or damaged teeth.



63G07C-128

Drive Pinion and Ring Gear

Poor contact, wear or damage.



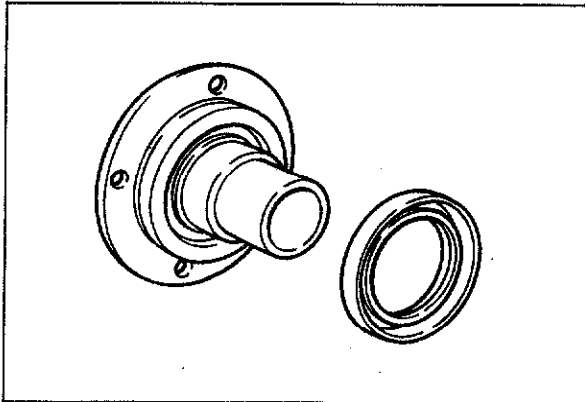
63G07C-129

Collapsible Spacer

Measure the length of the collapsible spacer.

Standard length:

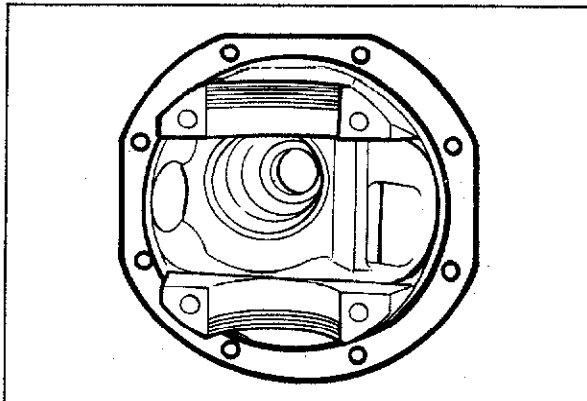
43.35—43.65 mm (1.701—1.719 in)



67U09X-105

Companion Flange and Oil Seal

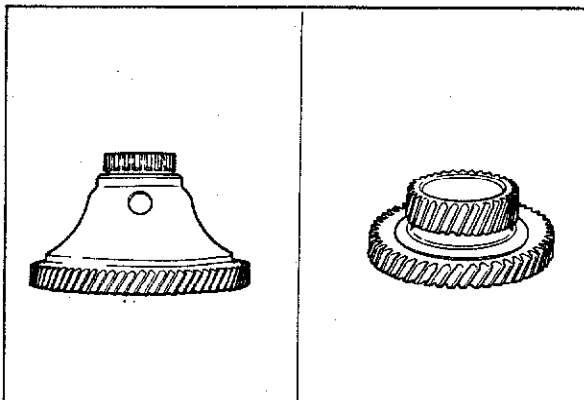
1. Check the oil seal for wear or damage.
2. Check the companion flange for cracks, worn splines, or rough oil seal contact surface.



63G07C-130

Transfer Carrier

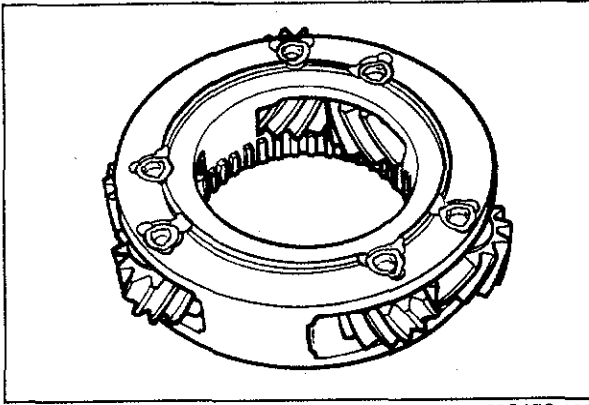
Cracks or damage.



63G07C-131

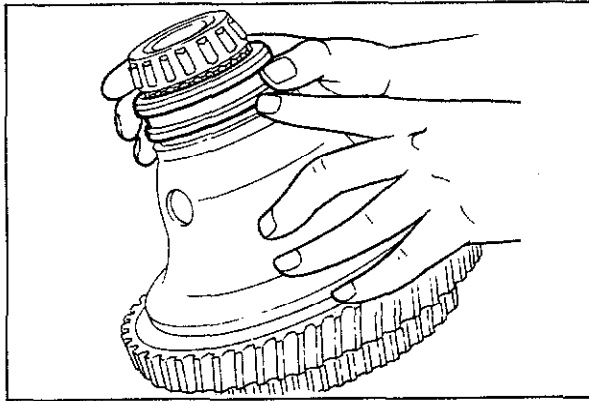
Ring Gear Case and Sun Gear

Worn or damaged.



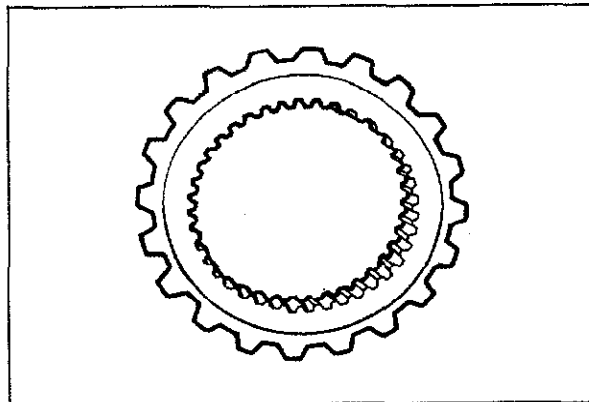
63G07C-132

Planetary Carrier Assembly
Engagement with pinion gears.



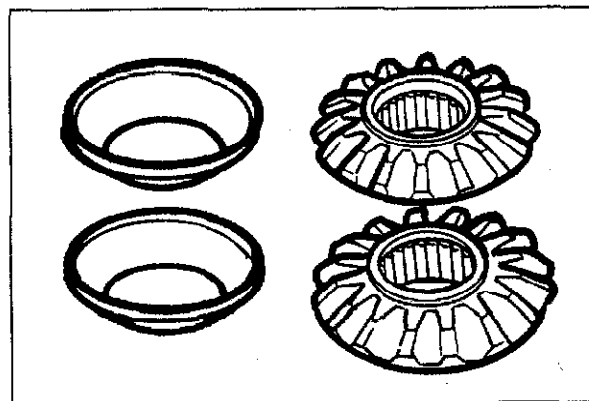
63G07C-133

Differential Lock Gear Sleeve
Worn or damaged.



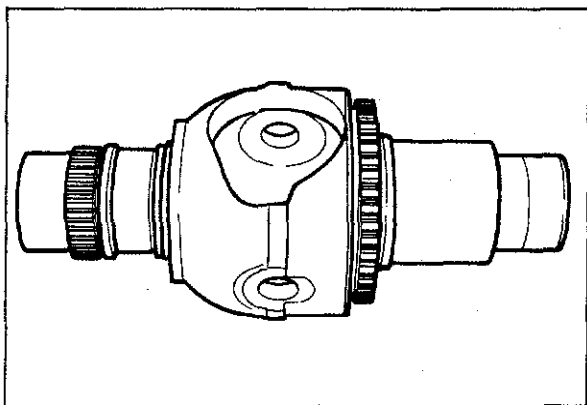
63G07C-134

Differential Lock Hub
Worn or damaged.



63G07C-135

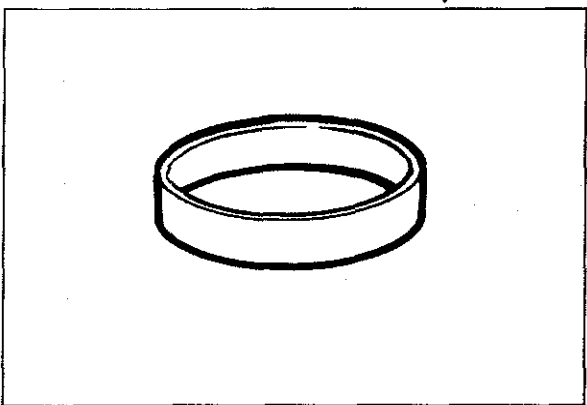
Side Gear, Pinion Gear and Washer
Worn or damaged.



63G07C-136

Differential Gear Case

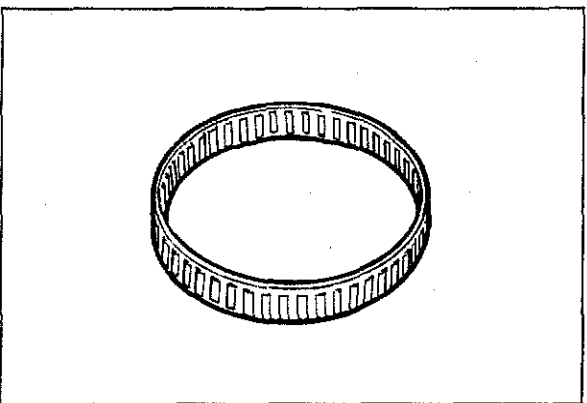
Worn or damaged.



63G07C-137

Differential Gear Case Sleeve

Worn or damaged.



63G07C-138

Gear Case Needle Bearing

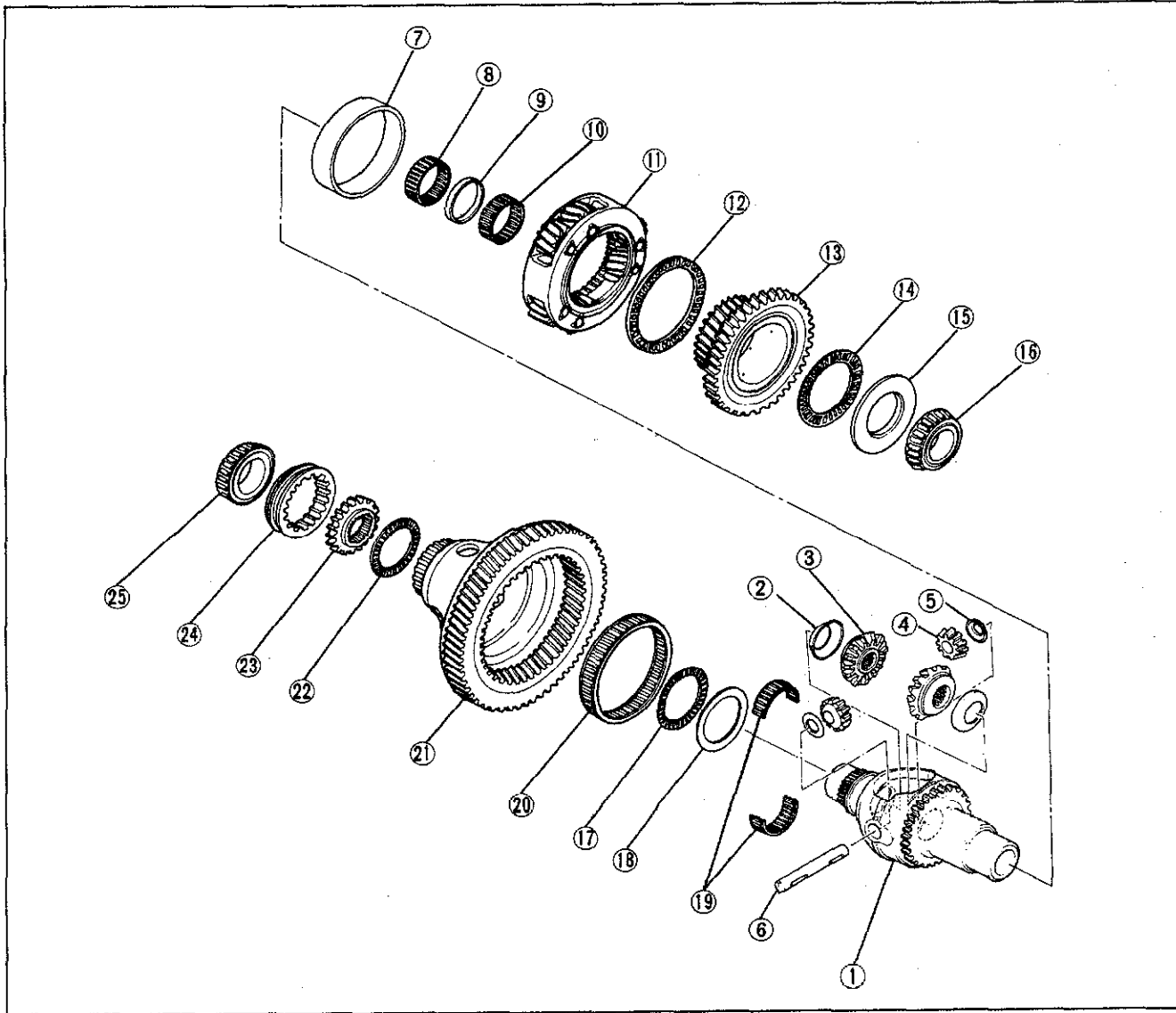
Worn or damaged.

ASSEMBLY

ASSEMBLY-STEP 1

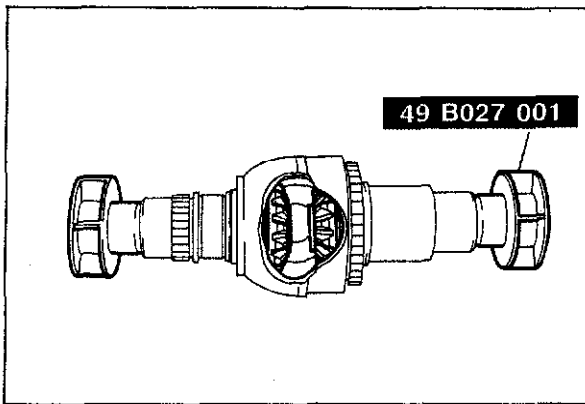
Assemble in the sequence shown in the figure.

83U07C-014



63G07C-104

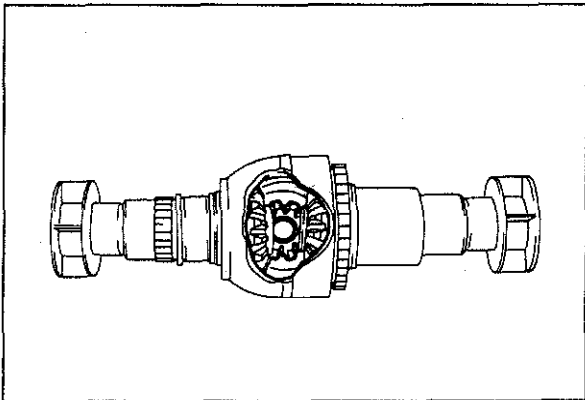
- | | |
|----------------------------------|-------------------------------------|
| 1. Differential gear case | 14. Gear case needle bearing |
| 2. Washer | 15. Thrust washer |
| 3. Side gear | 16. Bearing inner race |
| 4. Pinion gear | 17. Gear case needle bearing |
| 5. Washer | 18. Differential lock thrust washer |
| 6. Pinion shaft | 19. Gear case needle bearing |
| 7. Differential gear case sleeve | 20. Gear case needle bearing |
| 8. Gear case needle bearing | 21. Ring gear case |
| 9. Spacer | 22. Gear case needle bearing |
| 10. Gear case needle bearing | 23. Differential lock hub |
| 11. Planetary carrier | 24. Differential lock gear sleeve |
| 12. Gear case needle bearing | 25. Bearing inner race |
| 13. Sun gear | |



83U07C-076

Front Differential

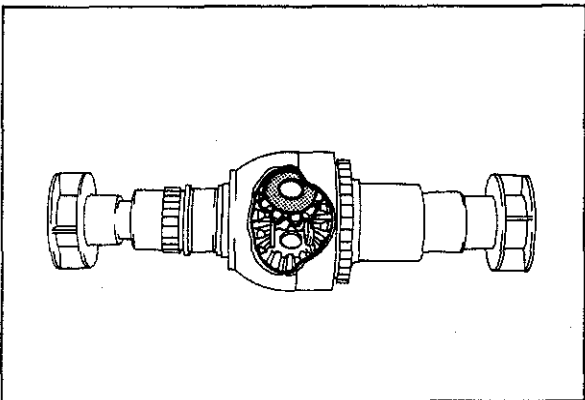
1. Install the side gears and washers, and fix them with the **SST**.



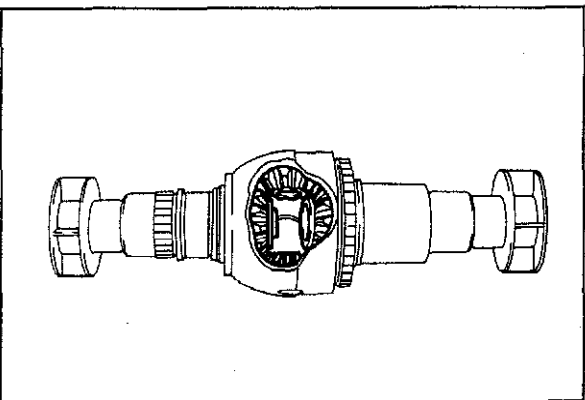
2. Install a pinion gear and turn it 180°.

Note

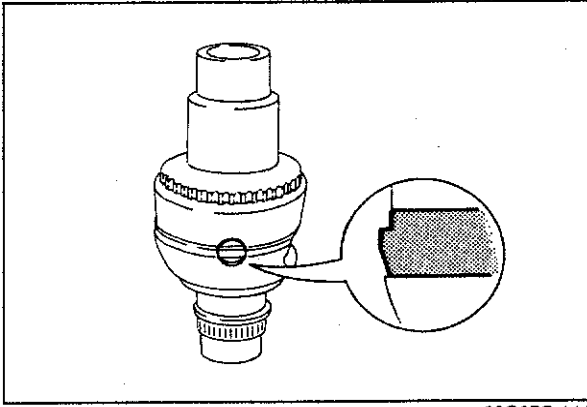
Do not install the washer at this time.



3. Install the other pinion gear and washer.
4. Turn the pinion gear and washer 150°.
5. Install the washer on opposite pinion gear.

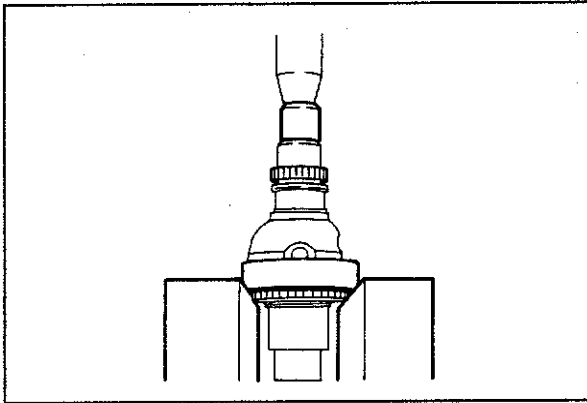


6. Align the pinion shaft holes of the pinion gears with the differential gear case.



63G07C-144

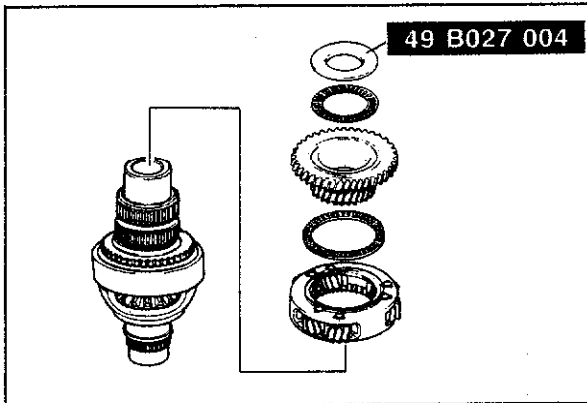
7. Insert the pinion shaft.



63G07C-145

Center Differential

1. Install the differential gear case sleeve.



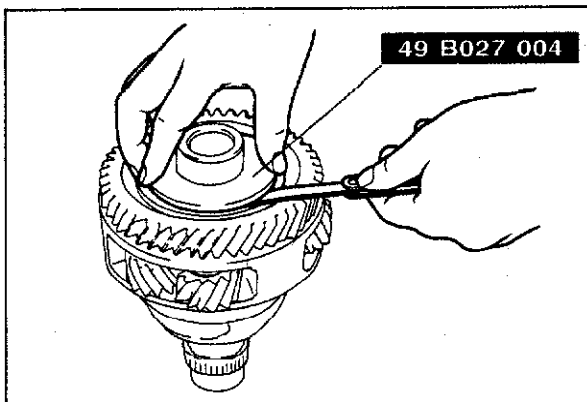
83U07C-077

2. Install the gear case needle bearings and spacer.
3. Install the planetary carrier assembly, gear case needle bearing, sun gear, gear case needle bearing and the **SST**.

Note

Apply transaxle oil to the needle bearings.

Measuring plate thickness: 4.3 mm (0.169 in)



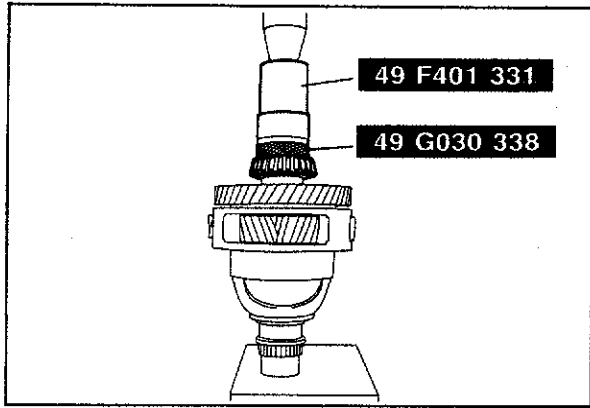
83U07C-078

4. Measure the clearance between the **SST** and gear case needle bearing.
If the clearance is not within specification, select the proper washer.

Standard: 0.1—0.3 mm (0.004—0.012 in)

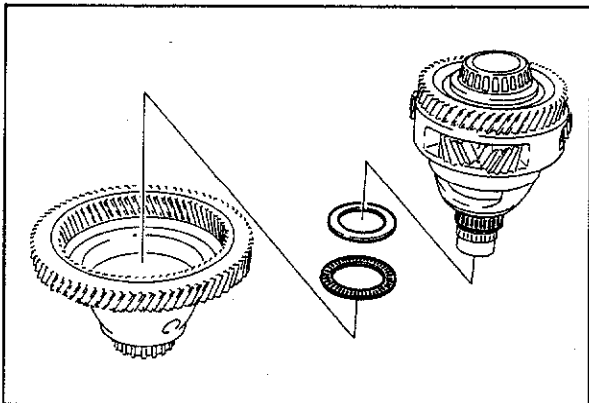
Available washer thickness:

3.5 mm (0.138 in) 3.7 mm (0.146 in)
3.9 mm (0.154 in) 4.1 mm (0.161 in)
4.3 mm (0.169 in)



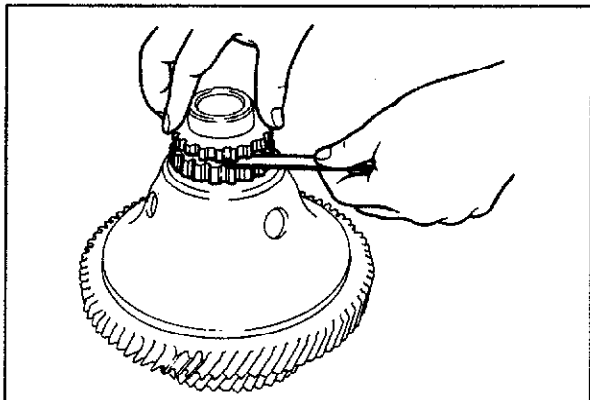
83U07C-079

5. Install the washer and the bearing inner race with the **SST**.



63G07C-149

6. Install the gear case needle bearings and differential lock thrust washer.



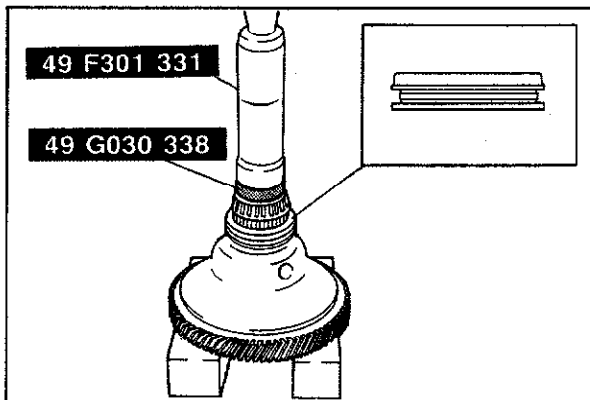
63G07C-150

7. Install the differential lock gear sleeve, differential lock hub and gear case needle bearing.
8. Measure the clearance between the differential lock hub and the gear case needle bearing. If the clearance is not within specification, select the proper differential lock thrust washer.

Standard: 0.15—0.30 mm (0.006—0.012 in)

Available washer thickness:

1.20 mm (0.047 in) 1.35 mm (0.053 in)
1.50 mm (0.059 in) 1.65 mm (0.065 in)
1.80 mm (0.071 in)



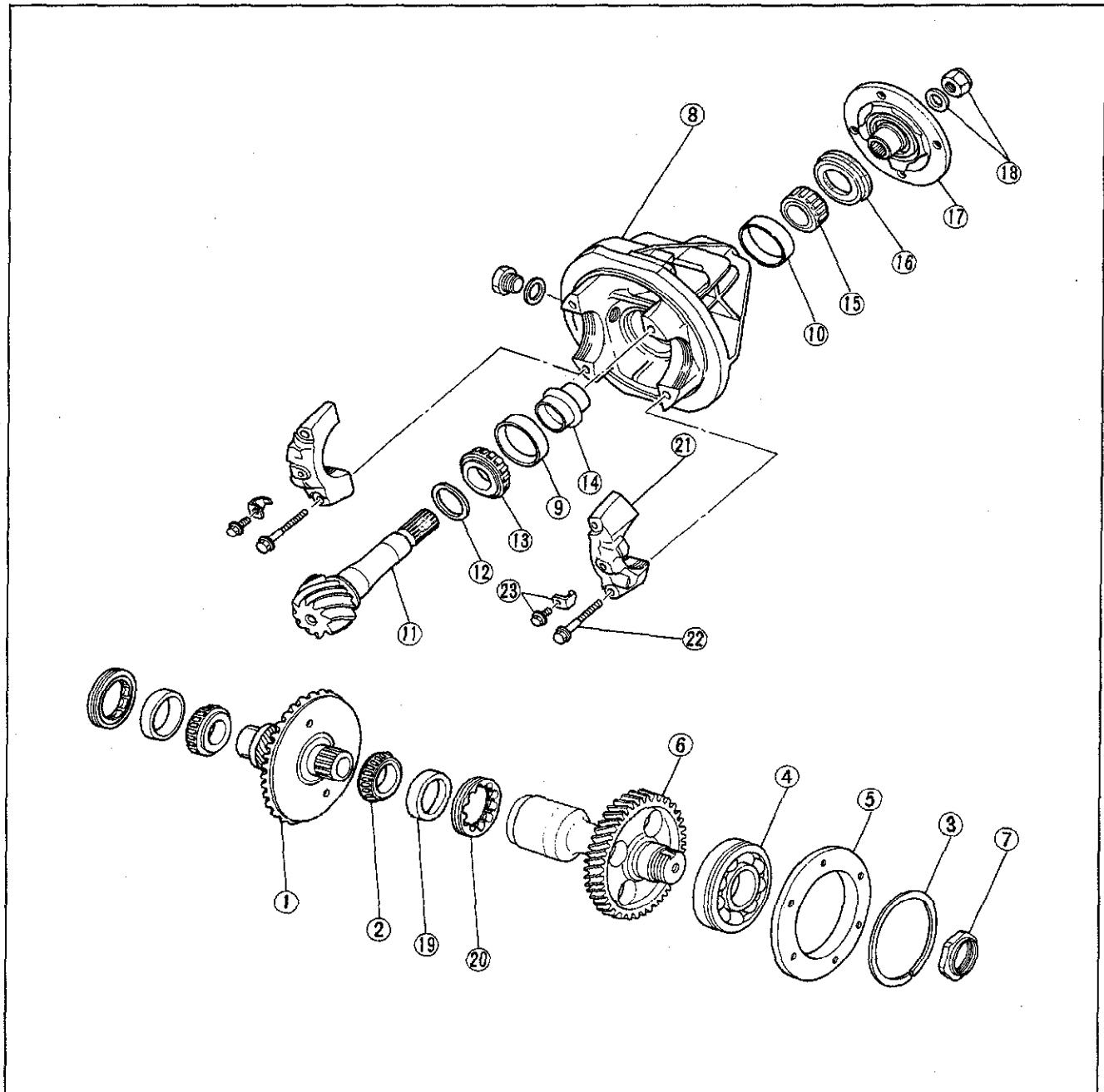
83U07C-015

9. Install the bearing inner race using a press and the **SST**.

ASSEMBLY-STEP 2

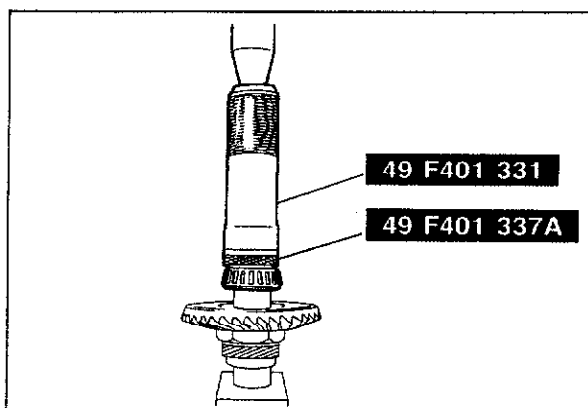
Assemble in the sequence shown in the figure.

63G07C-307

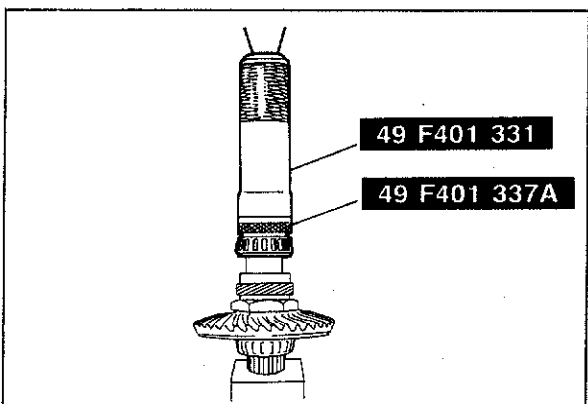


63G07C-152

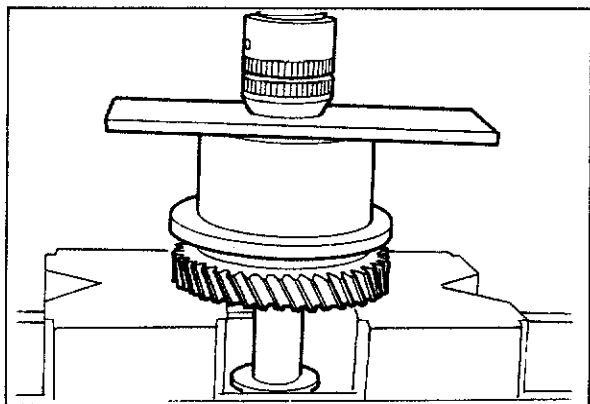
- | | | |
|-----------------------|------------------------|-------------------------|
| 1. Differential gear | 9. Bearing outer race | 17. Companion flange |
| 2. Bearing inner race | 10. Bearing outer race | 18. Washer and lock nut |
| 3. Retaining ring | 11. Drive pinion | 19. Bearing outer race |
| 4. Bearing | 12. Spacer | 20. Adjustment screw |
| 5. Side cover (B) | 13. Bearing inner race | 21. Bearing cap |
| 6. Idle gear | 14. Collapsible spacer | 22. Bolt |
| 7. Lock nut | 15. Bearing inner race | 23. Lock plate and bolt |
| 8. Transfer carrier | 16. Oil seal | |



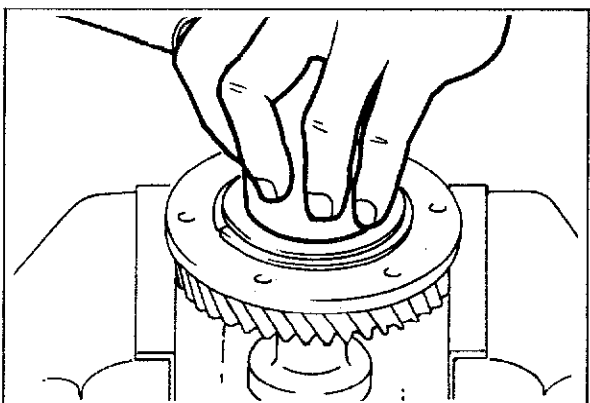
63G07C-153



63G07C-154



63G07C-155



63G07C-156

Bearing Inner Race (Differential gear)

1. Install the bearing inner race to the differential gear.

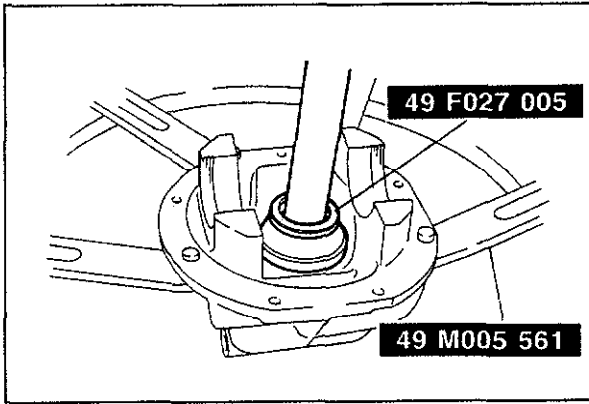
2. Install the bearing inner race to the differential gear.

Idle Gear

1. Install the retaining ring to the bearing.
2. Install the side cover (B) and bearing to the idle gear using a press.

3. Use a new lock nut, tighten it and crimp it.

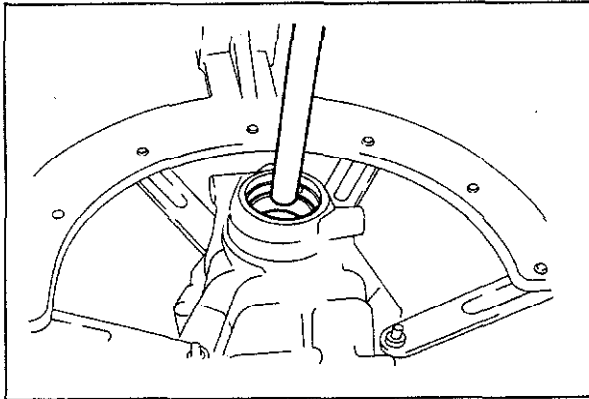
**Tightening torque: 127—206 N·m
(13—21 m·kg, 94—152 ft·lb)**



83U07C-080

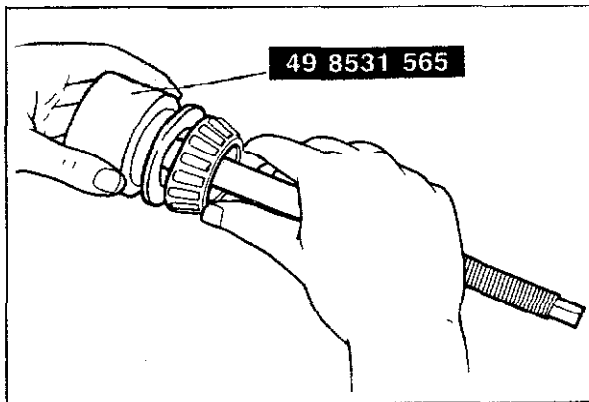
Adjustment of Pinion Height

1. Mount the transfer carrier on the **SST**.
2. Install the bearing outer race with the **SST**.



63G07C-158

3. Install the bearing outer race using a brass drift.

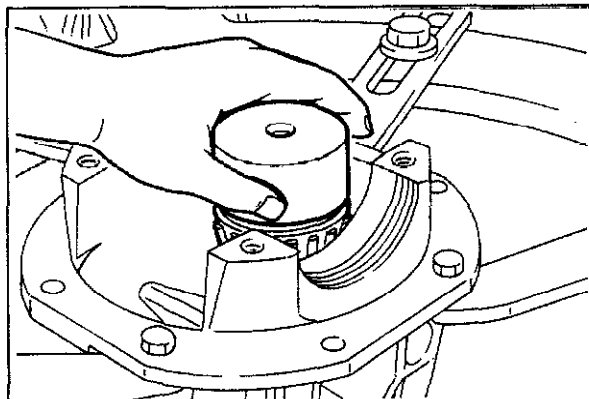


83U07C-081

4. Install the spacer and bearing inner race to the **SST**.

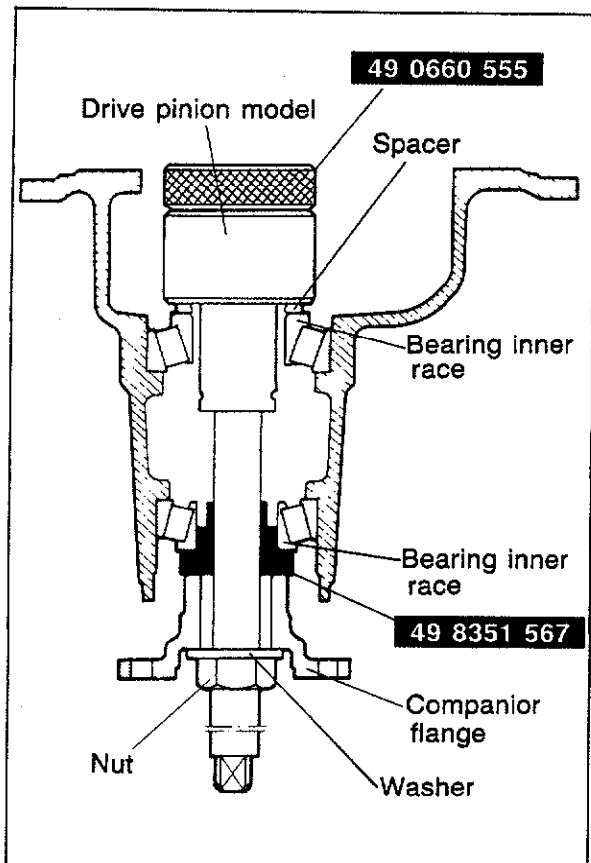
Note

Use the spacer which was removed.



63G07C-160

5. Install the drive pinion model to transfer carrier.

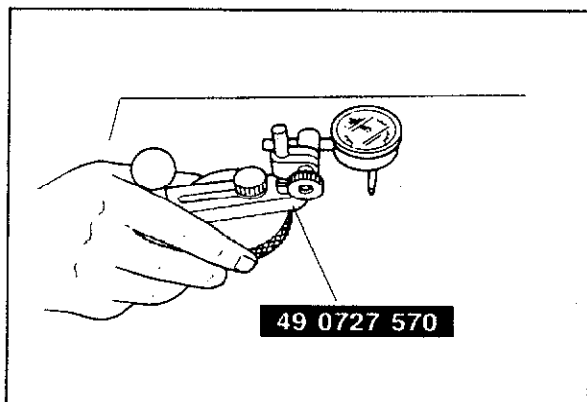


83U07C-082

6. Install the bearing inner race, companion flange, washer, nut and the **SST** to the drive pinion model.

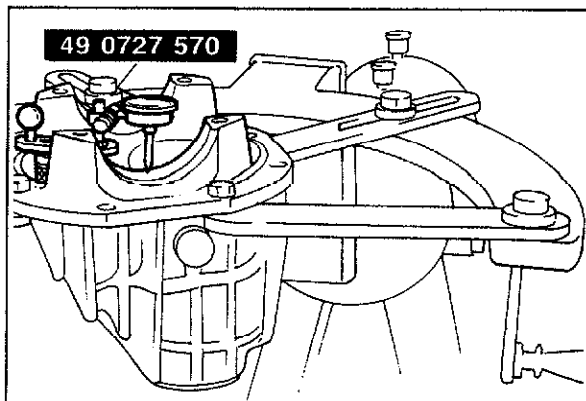
Note

- a) Use the nut which was removed.
- b) Tighten the nut enough so that the drive pinion model can still be turned by hand.



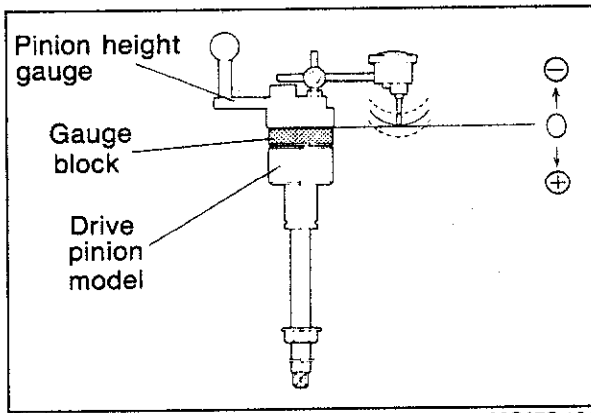
83U07C-083

7. Place the **SST** on the surface plate and set the dial indicator to "Zero".



83U07C-084

- 8. Set the **SST** on top of the gauge block.
- 9. Place the measure probe of the dial indicator so that it contacts the area where the side bearing is installed in the carrier, and measure the lowest position. Measure both the left and the right sides.



63G07C-164

10. Add the two (left and right) values obtained by the measurements taken in step 9, and then divide the total by 2.

Specification: 0 mm (0 in)

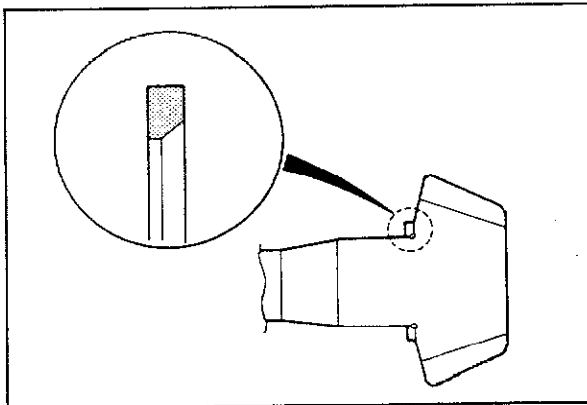
Mark	Thickness	Mark	Thickness
08	3.08 mm (0.1213 in)	29	3.29 mm (0.1295 in)
11	3.11 mm (0.1224 in)	32	3.32 mm (0.1307 in)
14	3.14 mm (0.1236 in)	35	3.35 mm (0.1319 in)
17	3.17 mm (0.1248 in)	38	3.38 mm (0.1331 in)
20	3.20 mm (0.1260 in)	41	3.41 mm (0.1343 in)
23	3.23 mm (0.1271 in)	44	3.44 mm (0.1354 in)
26	3.26 mm (0.1283 in)	47	3.47 mm (0.1366 in)

63G07B-165

11. If it is not to the specification, adjust the pinion height by selection of a spacer.

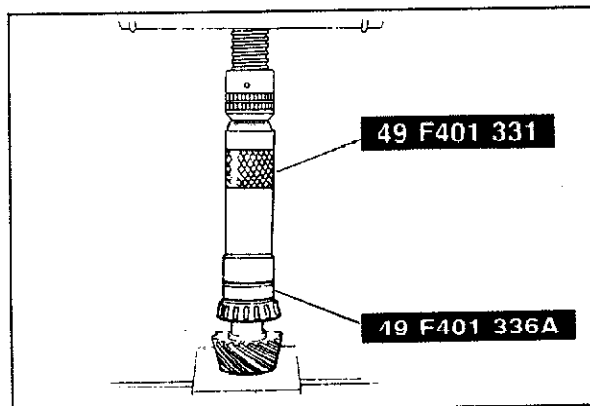
Note

The spacer thicknesses are available in 0.03 mm (0.001 in) steps. Select the spacer thickness that is closest to that necessary.



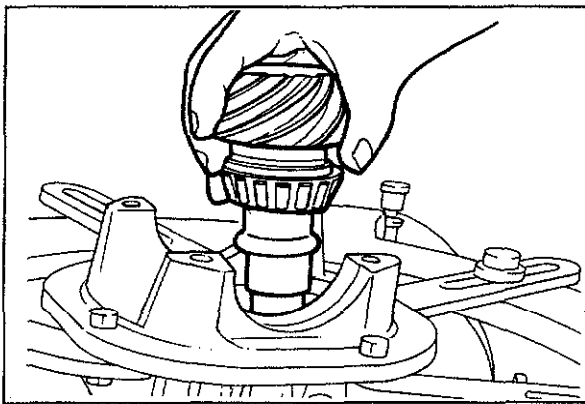
63G07C-166

12. Install the spacer to the drive pinion.



83U07C-085

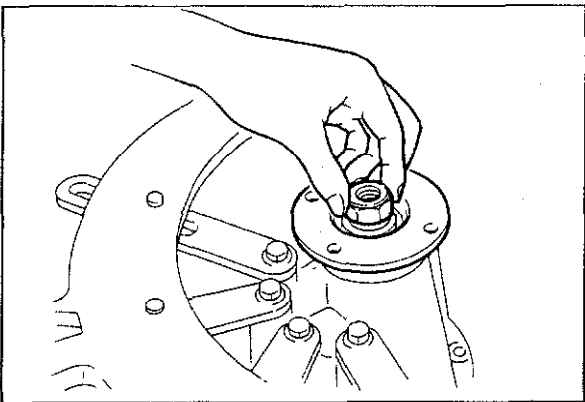
13. Press the bearing inner race on with the **SST**.



63G07C-168

Adjustment of Drive Pinion Preload

1. Install the collapsible spacer.
2. Install the drive pinion assembly

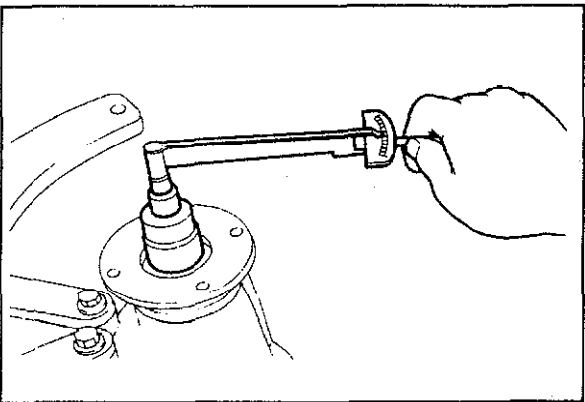


63G07C-169

3. Install the bearing inner race and companion flange and tighten the lock nut.

Note

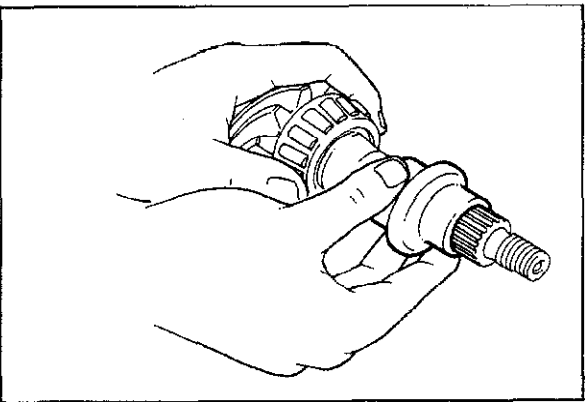
Do not install the oil seal.



63G07C-170

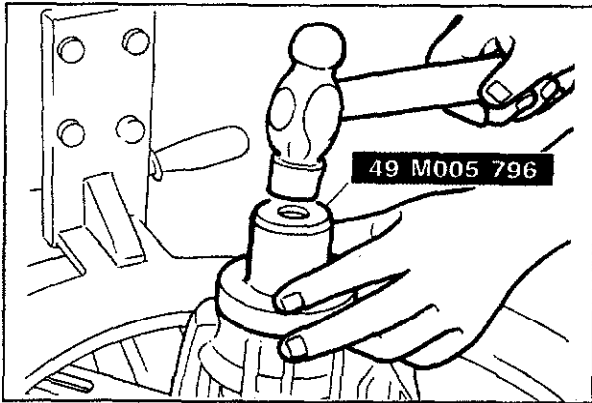
4. Turn the companion flange by hand to seat the bearing.
5. Measure the drive pinion preload.

**Preload: 1—1.6 N·m
(10—16 cm·kg, 8.7—13.9 in·lb)**



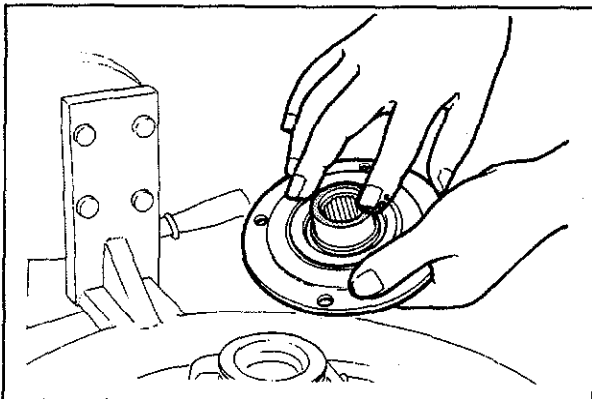
63G07C-171

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



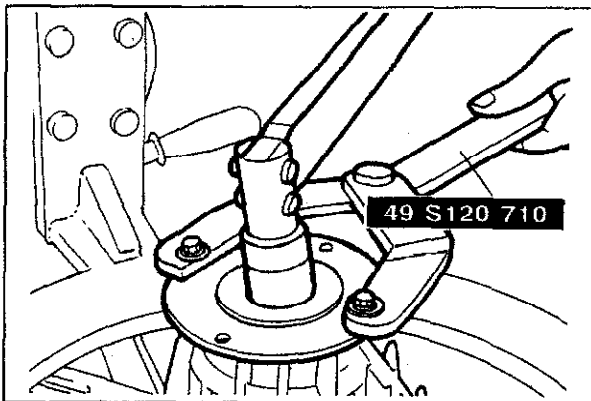
83U07C-066

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



63G07C-173

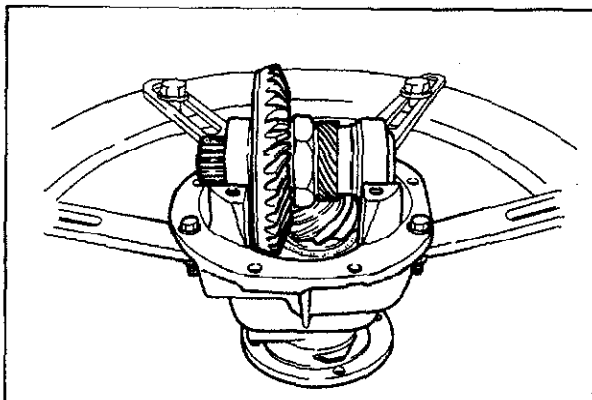
9. Coat companion flange with oil.
10. Install the companion flange and washer.



83U07C-087

11. Install and tighten a new lock nut with the **SST**.

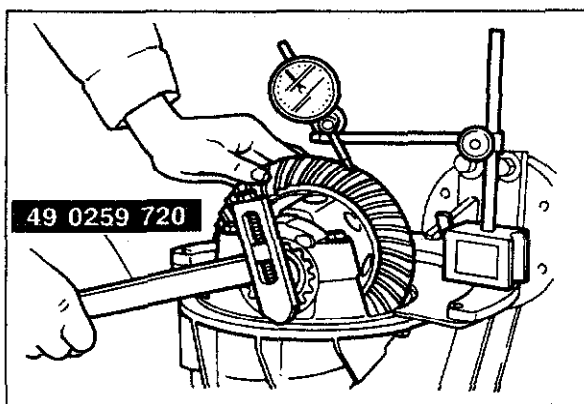
**Tightening torque: 118—177 N·m
(12—18 m·kg, 87—130 ft·lb)**



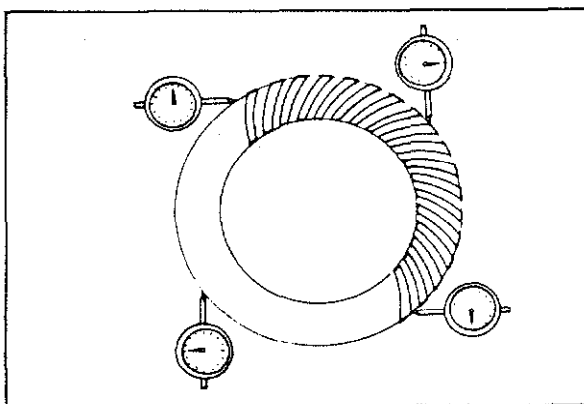
63G07C-175

Adjustment of Backlash

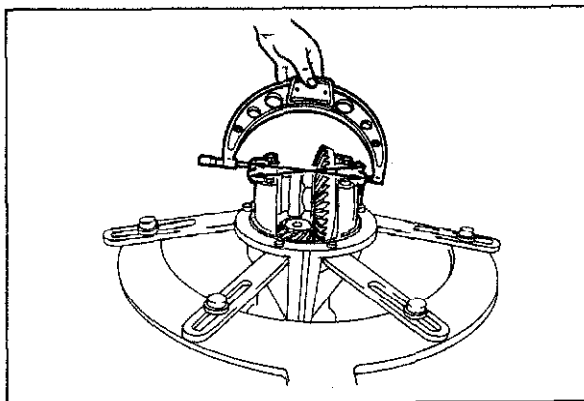
1. Position the idle gear assembly in the carrier.



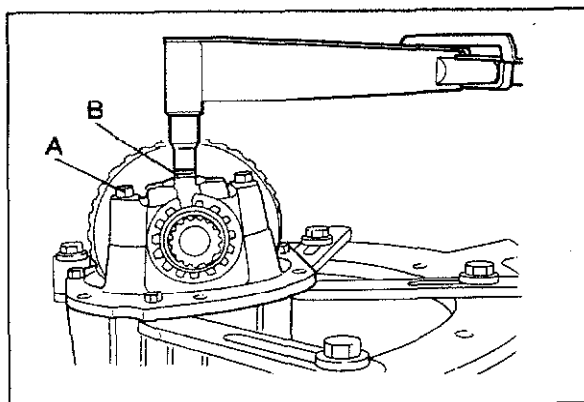
63G07C-176



83U07C-088



63G07C-178



83U07C-089

2. Install the differential bearing caps making sure that the matching marks on the caps correspond with those on the carrier.
3. Loosely tighten the bearing cap bolts on each side and adjust the backlash.
4. Mark the ring gear at four points at approx. 90° intervals on the ring gear and mount a dial indicator to the carrier so that the feeler comes in contact at a 90° angle with one of the ring gear teeth.

5. Turn both adjustment screws equally until the backlash is within specifications with the **SST**.

**Standard backlash: 0.09—0.11 mm
(0.0035—0.0043 in)**

6. After adjusting the backlash, tighten the adjustment screws equally until the distance between the pilot sections on the bearing caps becomes as specified distance.

Specification:
144.17—144.24 mm (5.6760—5.6787 in)

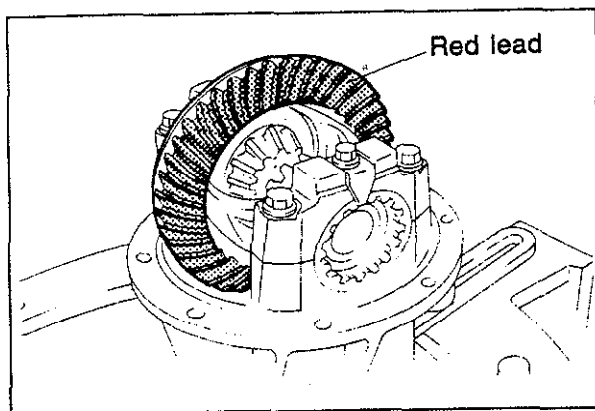
Note

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

7. Tighten the bearing cap bolts to the specified torque.

Tightening torque:
A 37—52 Nm (3.8—5.3 m-kg, 27—38 ft-lb)
B 18—26 Nm (1.8—2.6 m-kg, 13—19 ft-lb)

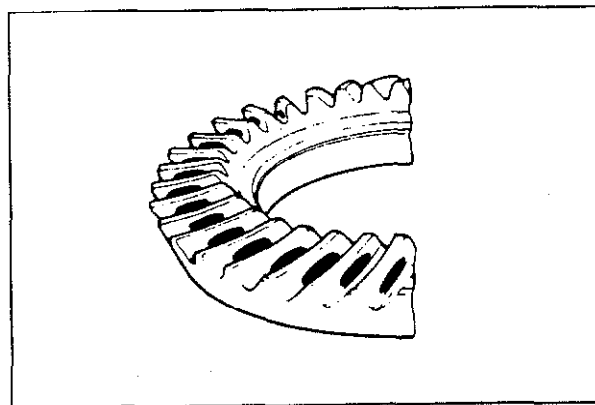
8. Install the lock plates on the bearing caps to prevent the adjustment screws from loosening.



63G07C-180

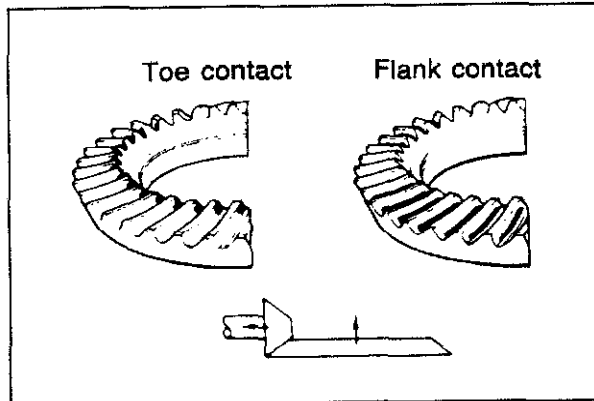
Inspection and Adjustment of Tooth Contact

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



63G07C-181

3. If the tooth contact is correct, wipe off the red lead.

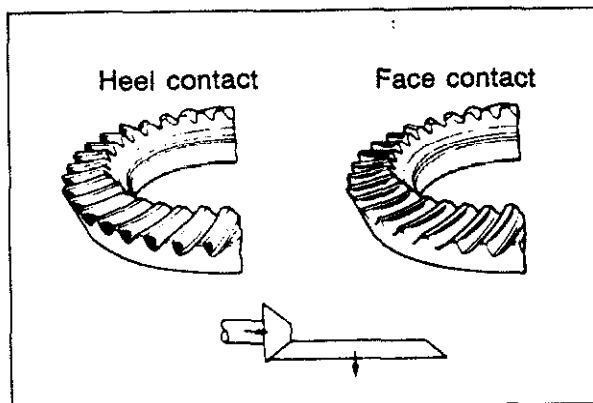


63G07C-182

4. If it is not correct, adjust the pinion height, and then adjust the backlash.

(1) Toe and flank contact

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



63G07C-183

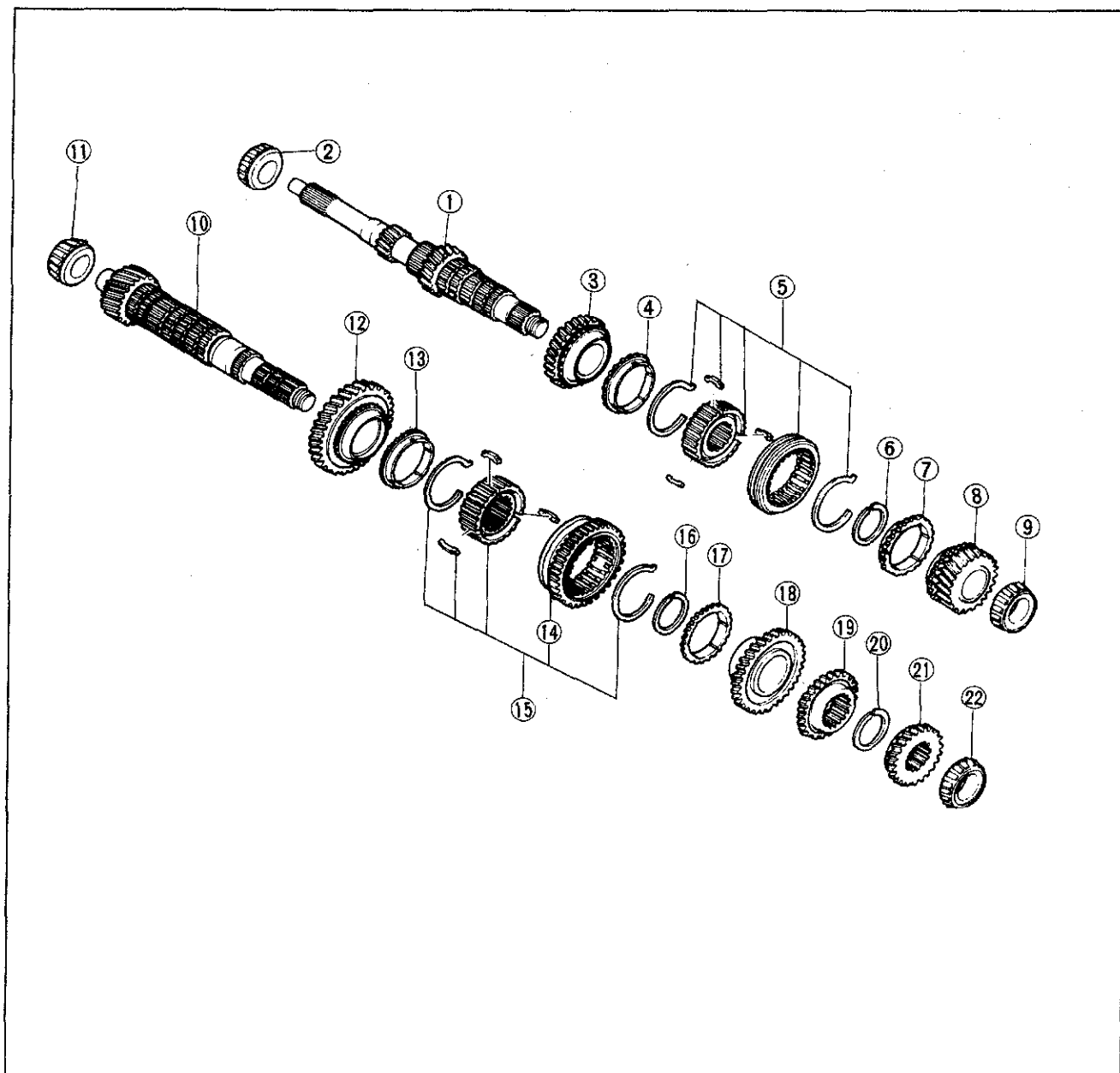
(2) Heel and face contact

Replace the spacer with a thicker one, and bring the drive pinion closer in.

ASSEMBLY-STEP 3

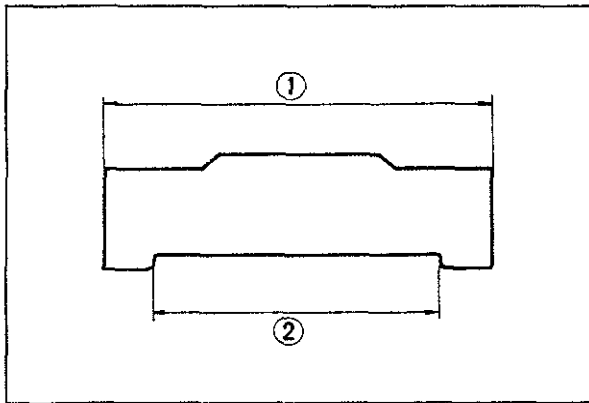
Assemble in the sequence shown in the figure.

63G07C-308



63G07C-184

- | | |
|--------------------------|-------------------------|
| 1. Primary shaft gear | 12. 1st gear |
| 2. Bearing inner race | 13. Synchronizer ring |
| 3. 3rd gear | 14. Reverse gear |
| 4. Synchronizer ring | 15. Clutch hub assembly |
| 5. Clutch hub assembly | 16. Retaining ring |
| 6. Retaining ring | 17. Synchronizer ring |
| 7. Synchronizer ring | 18. 2nd gear |
| 8. 4th gear | 19. Secondary 3rd gear |
| 9. Bearing inner race | 20. Retaining ring |
| 10. Secondary shaft gear | 21. Secondary 4th gear |
| 11. Bearing inner race | 22. Bearing inner race |



63G07C-185

Synchronizer Key

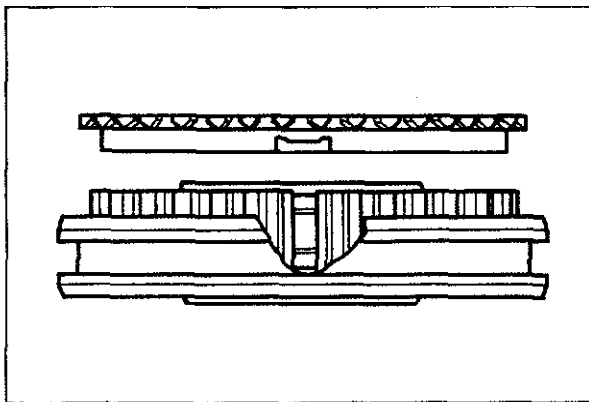
Note

There are two (2) types of synchronizer key.

Standard dimension:

mm (in)

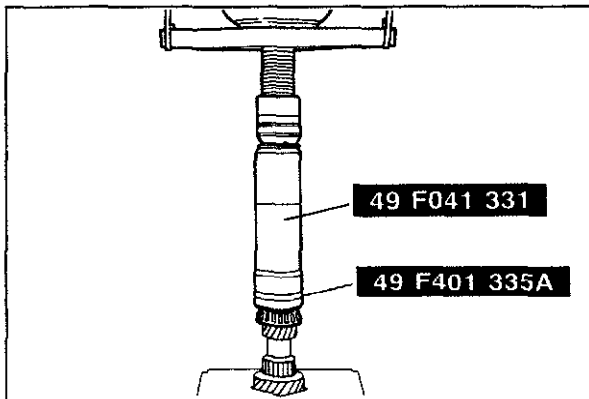
	①	②
1st and 2nd	19 (0.7480)	14.2 (0.5591)
3rd and 4th 5th and rev.	17 (0.6693)	12.2 (0.4803)



7707A-050

Note

Align the synchronizer ring groove and clutch hub key when installing.

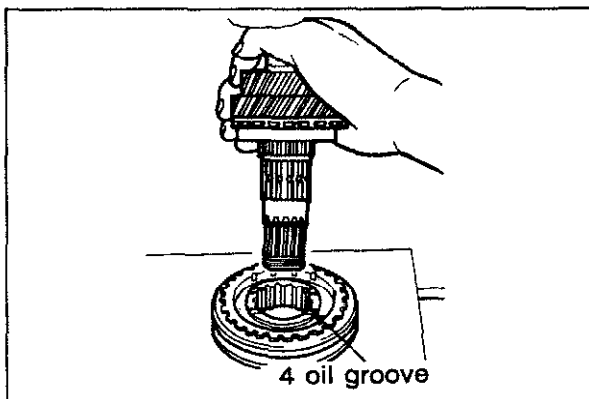


83U07C-090

(PRIMARY SHAFT GEAR)

Bearing Inner Race

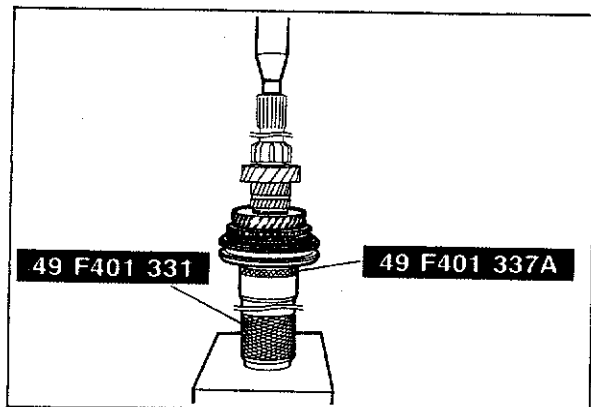
1. Install the bearing inner race with the **SST**.



63G07C-187

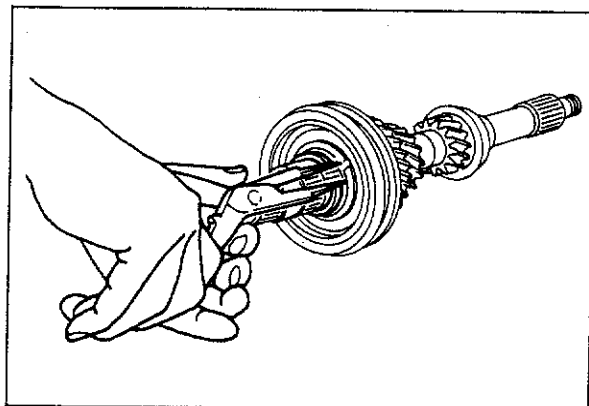
Clutch Hub Assembly (3rd-4th gear)

1. Install 3rd gear and synchronizer ring.
2. Set the clutch hub assembly as shown in the figure.



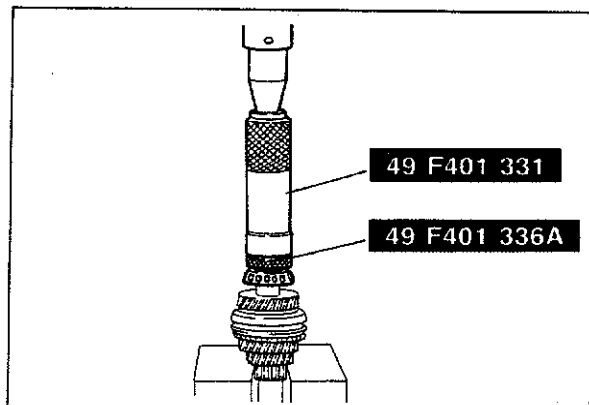
83U07C-091

3. Install the clutch hub assembly with the **SST**.



63G07C-189

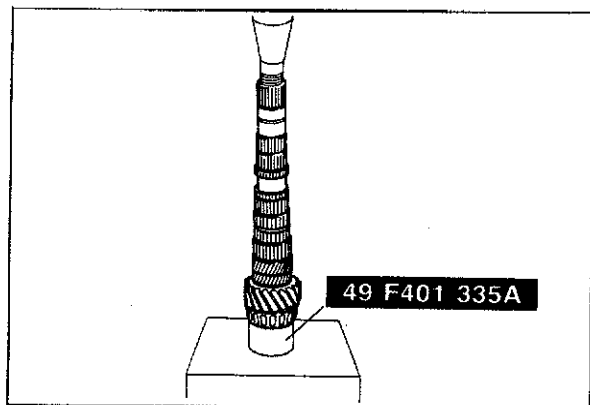
4. Install the retaining ring.



83U07C-092

4th Gear

1. Install the 4th gear and synchronizer ring.
2. Install the bearing inner race with the **SST**.

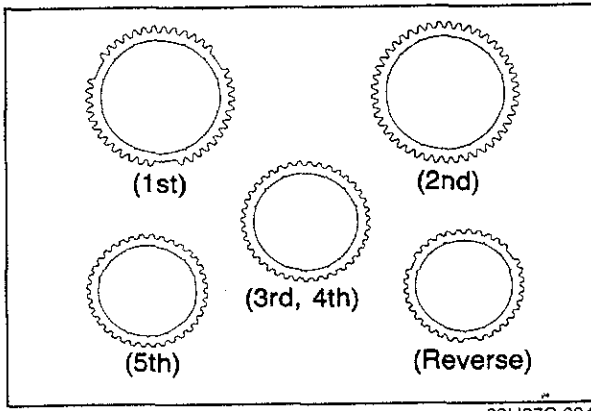


83U07C-093

(SECONDARY SHAFT GEAR)

Bearing Inner Race

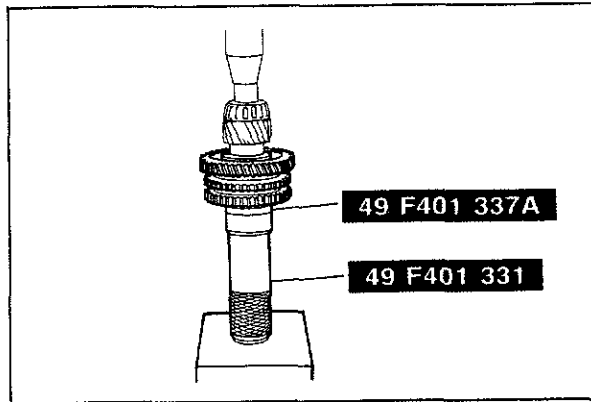
Install the bearing inner race with the **SST**.



83U07C-094

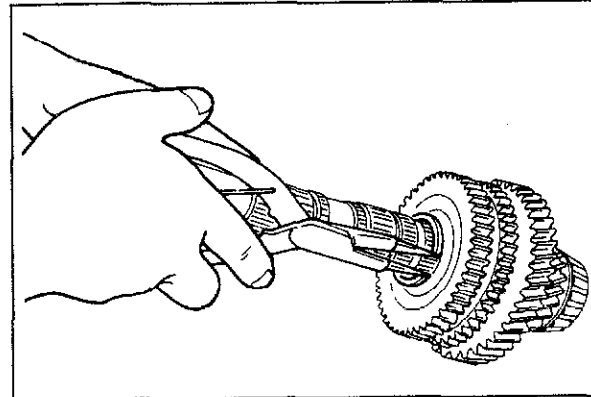
Note

The styles and size of the synchronizer rings are different as shown in the illustration.



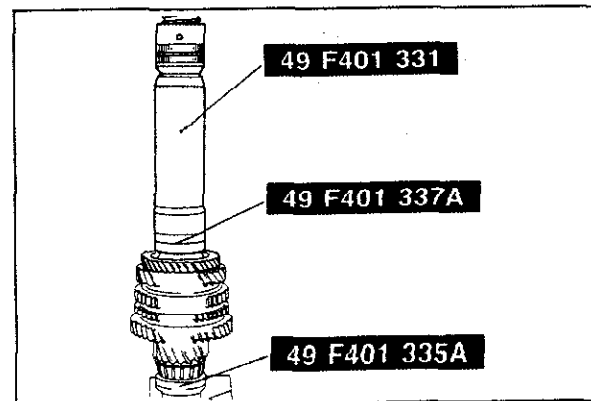
83U07C-095

1. Install the 1st gear and synchronizer ring.
2. Install the clutch hub assembly with the **SST**.



63G07C-194

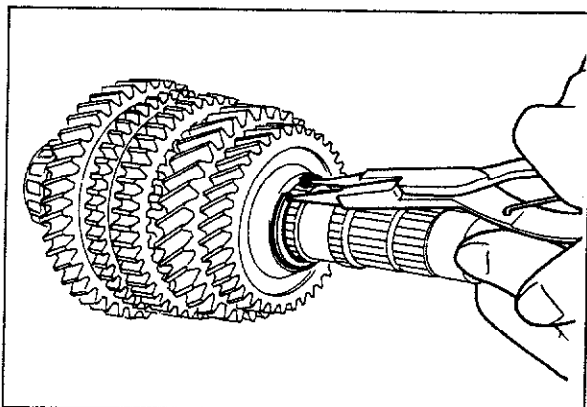
3. Install the retaining ring.



63G07C-195

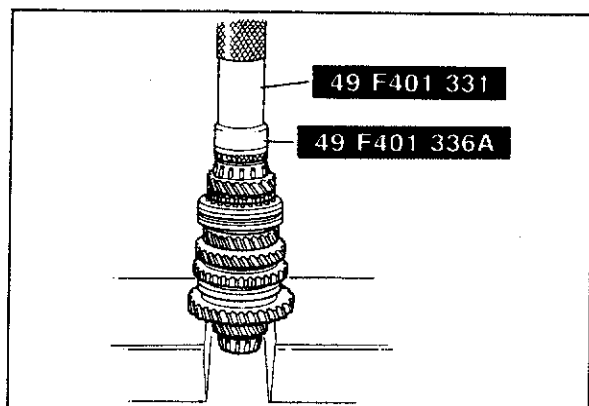
2nd Gear

1. Install the synchronizer ring and 2nd gear.
2. Install the secondary 3rd gear.



63G07C-196

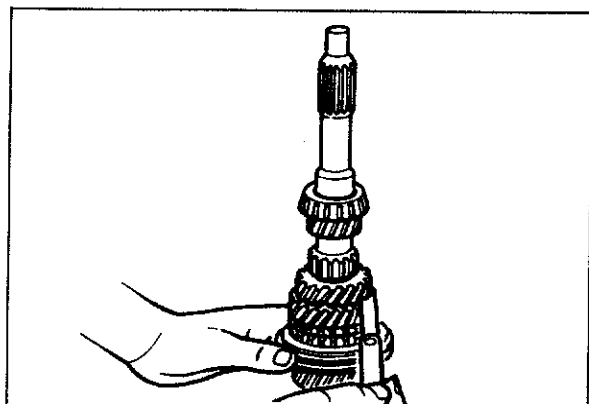
3. Install the retaining ring.



63G07C-197

Secondary 4th Gear

1. Install the secondary 4th gear.
2. Install the bearing inner race.



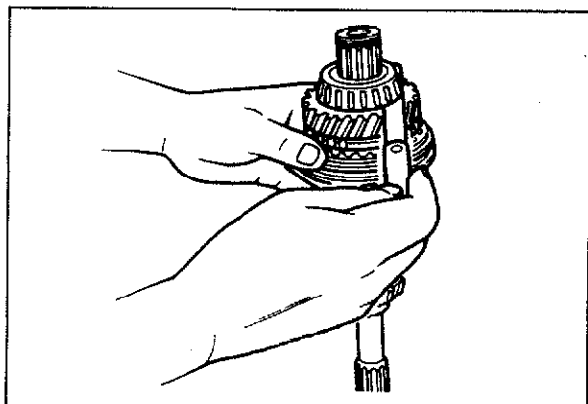
63G07C-198

Thrust Clearance of 3rd Gear

Measure the clearance between the 3rd gear and the primary shaft gear.

Standard: 0.050—0.200 mm (0.002—0.008 in)

Maximum: 0.250 mm (0.039 in)



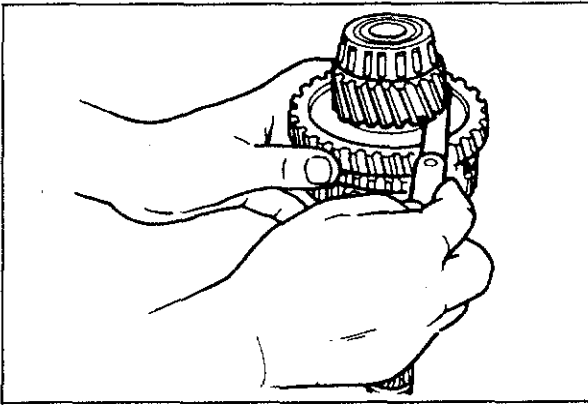
63G07C-199

Thrust Clearance of 4th Gear

Measure the clearance between the 4th gear and the bearing inner race.

Standard: 0.165—0.365 mm (0.006—0.014 in)

Maximum: 0.415 mm (0.0163 in)



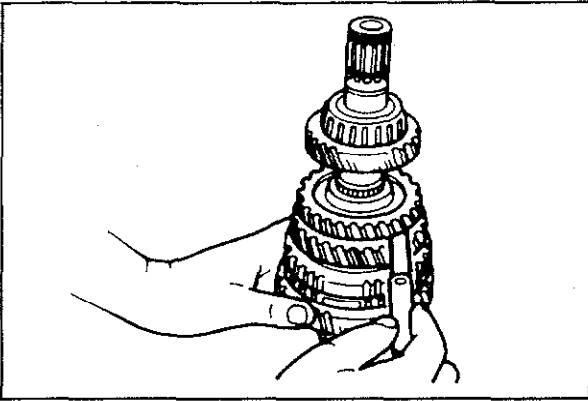
63G07C-200

Thrust Clearance of 1st Gear

Measure the clearance between the 1st gear and the differential drive gear on the secondary shaft.

Standard: 0.050—0.280 mm (0.002—0.011 in)

Maximum: 0.330 mm (0.013 in)



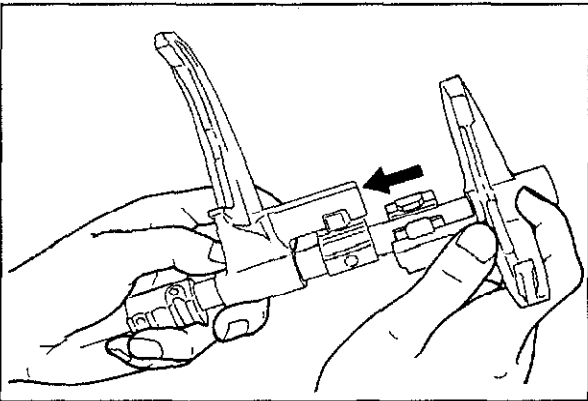
63G07C-201

Thrust Clearance of 2nd Gear

Measure the clearance between the 2nd gear and the secondary 3rd gear.

Standard: 0.175—0.455 mm (0.007—0.018 in)

Maximum: 0.505 mm (0.0199 in)



63G07C-202

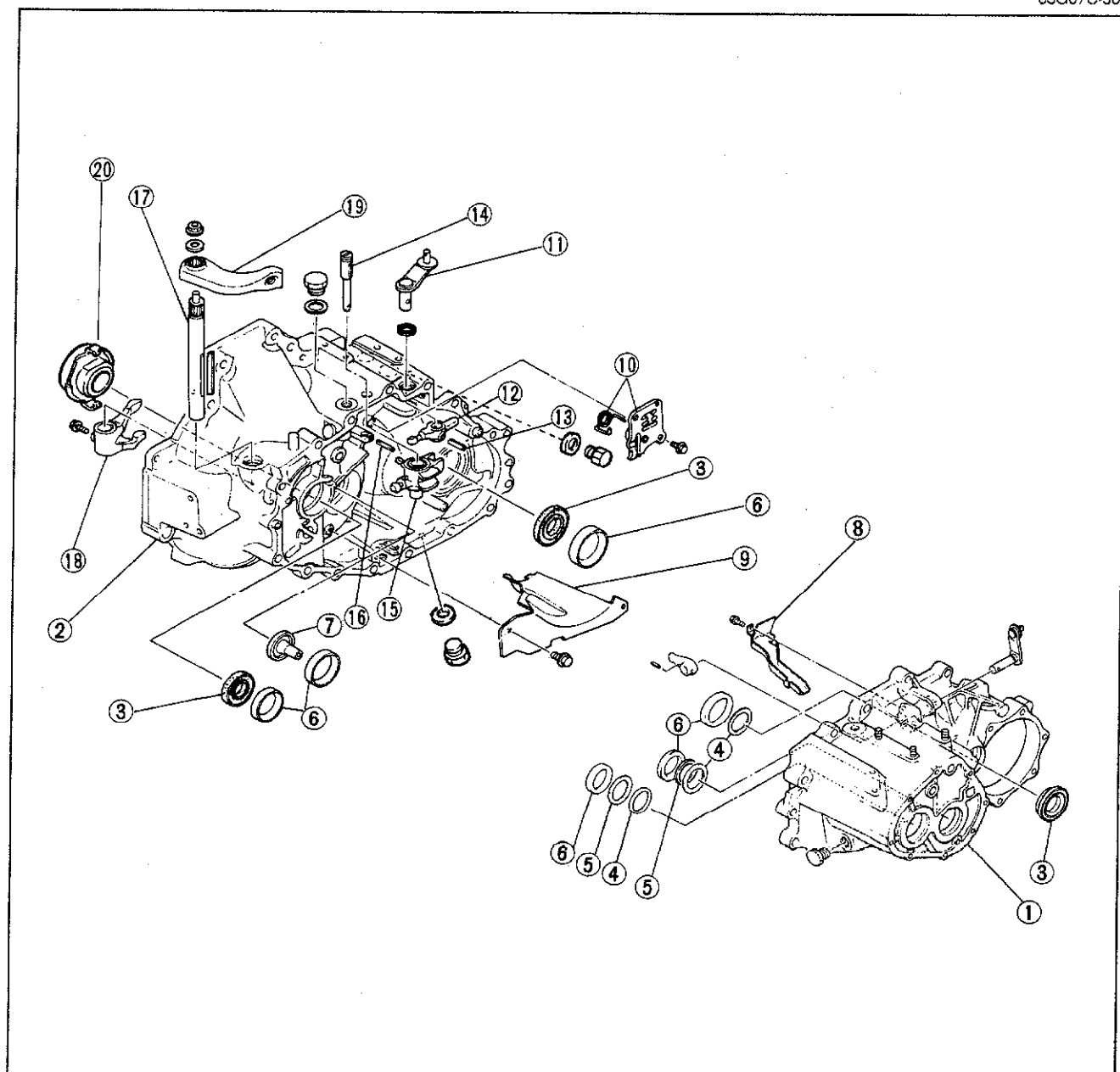
Shift Fork

Install both shift forks and the interlock sleeve as in the figure.

ASSEMBLY-STEP 4

Assemble in the sequence shown in the figure.

63G07C-309

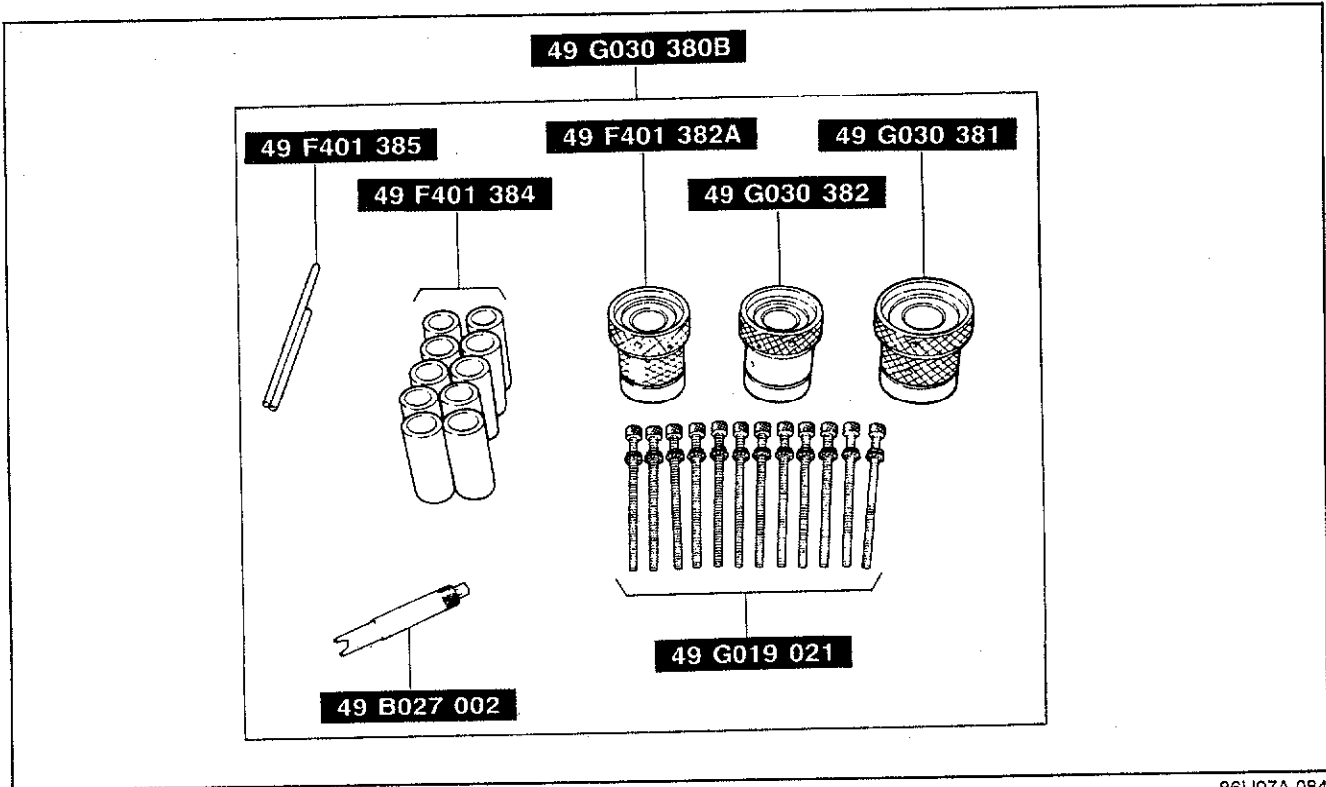


83U07C-016

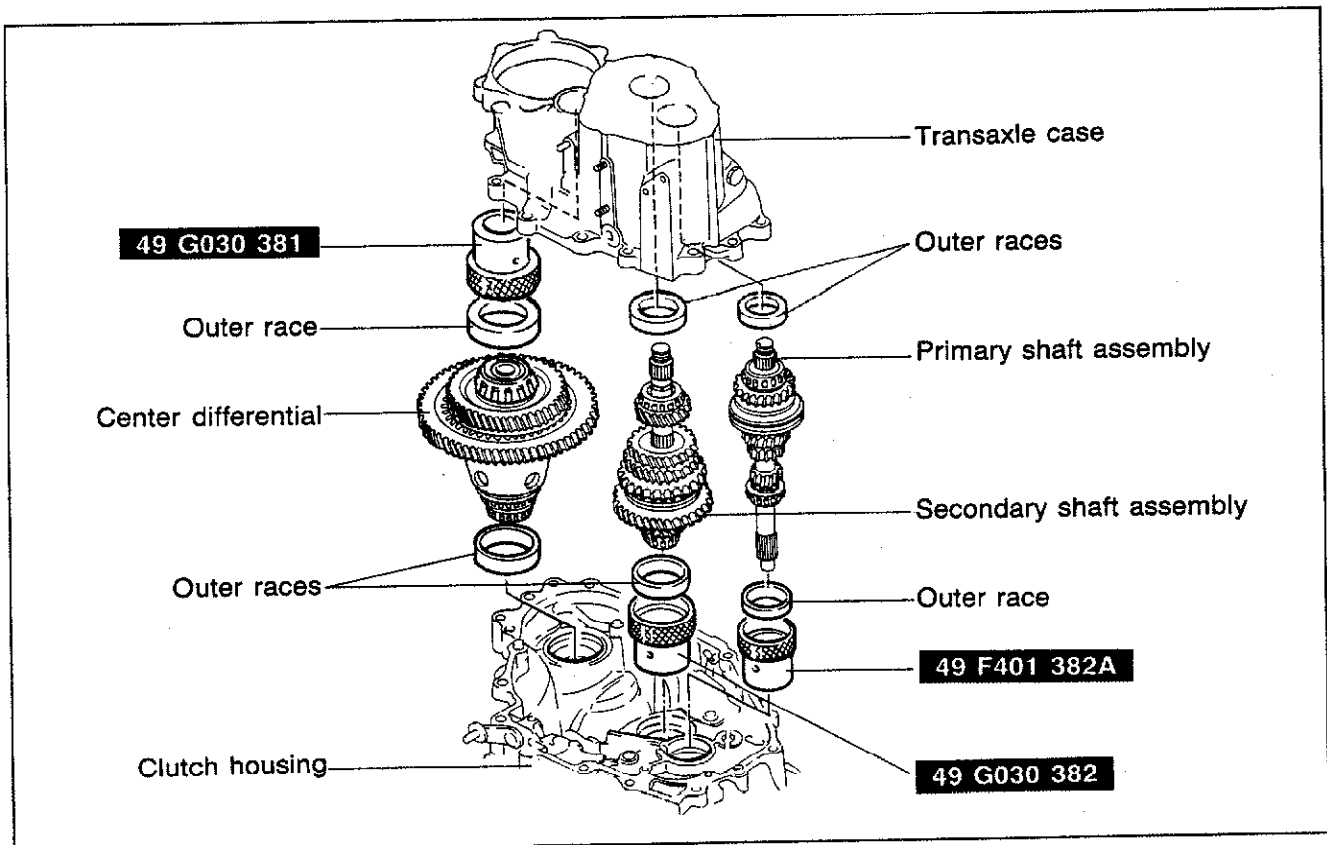
- | | |
|-------------------------|---------------------------|
| 1. Transaxle case | 11. Select lever |
| 2. Clutch housing | 12. Inner shift lever |
| 3. Oil seal | 13. Spring pin |
| 4. Washer(s) | 14. Crank lever shaft |
| 5. Diaphragm spring | 15. Crank lever |
| 6. Bearing outer race | 16. Spring pin |
| 7. Funnel | 17. Clutch release shaft |
| 8. Oil passage | 18. Clutch release fork |
| 9. Baffle plate | 19. Clutch lever |
| 10. Base plate assembly | 20. Clutch release collar |

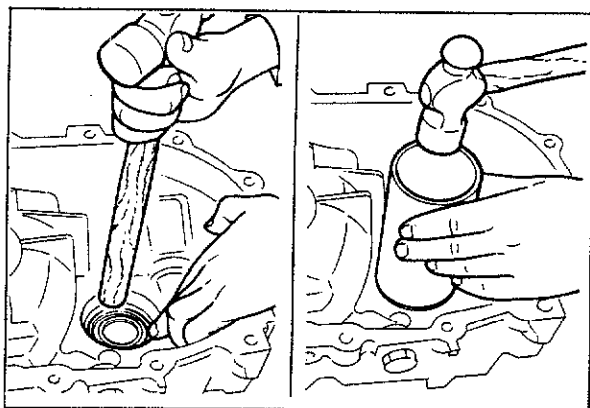
Bearing preload

Adjust the bearing preload by selecting and installing the proper adjust shim (s).



86U07A-084

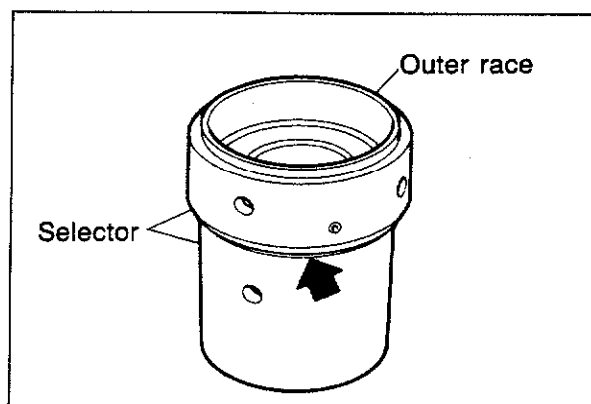




83U07C-096

1. Install the primary and secondary shaft bearing outer races into the transaxle case (shims removed).
2. After mounting the clutch housing onto the transaxle hanger, tap in the differential bearing outer race with a hammer handle until it is flush with the end of the clutch housing.

Next, position a piece of pipe against the outer race and tap in with a hammer until it contacts the clutch housing.



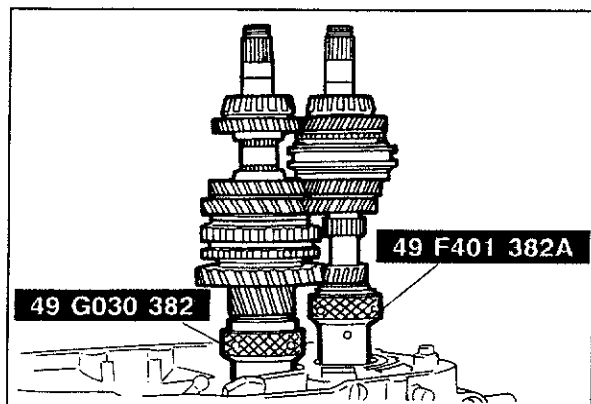
83U07C-097

Primary and Secondary Shaft Gear

1. As shown in the figure, put the outer races into the **SST**.

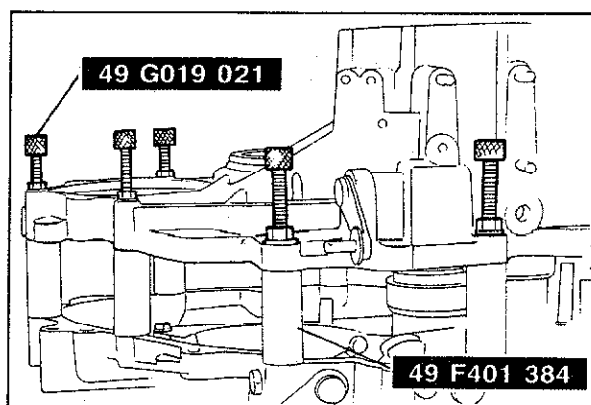
Note

Turn the selector to eliminate the gap indicated by the arrow in the figure.



83U07C-098

2. Set the **SST** in place.
3. Mount the primary and secondary shaft gear assemblies to the **SST**.

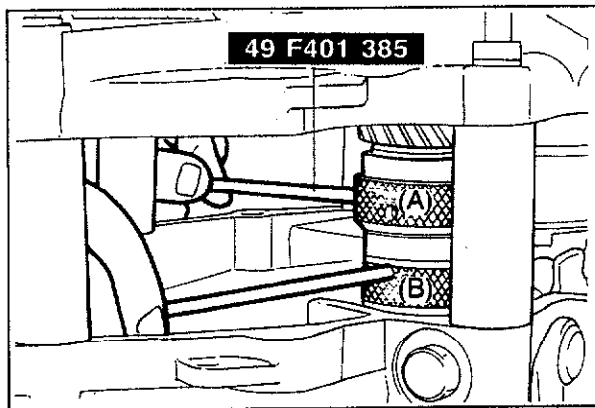


83U07C-099

4. Set the **SST** between the transaxle case and the clutch housing, and install the **SST**, and tighten to the specified torque.

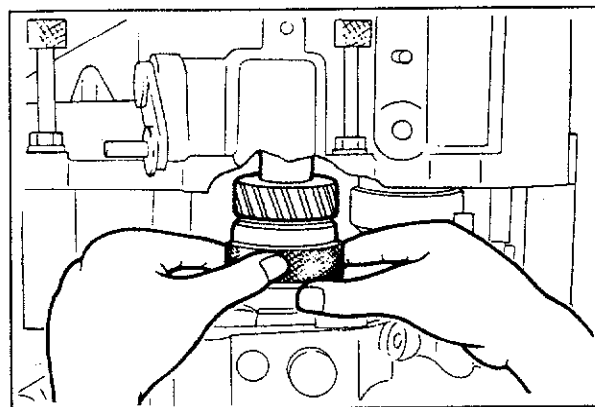
Tightening torque:

37—52 N·m (3.8—5.3 m·kg, 27—38 ft·lb)



83U07C-100

5. To seat the bearings, mount the **SST** on parts (A) and (B) of the selector, and then turn the selector so the gap is widened. Move the bar by hand until the selector can no longer be turned, and then turn it in the reverse direction until the gap is eliminated.

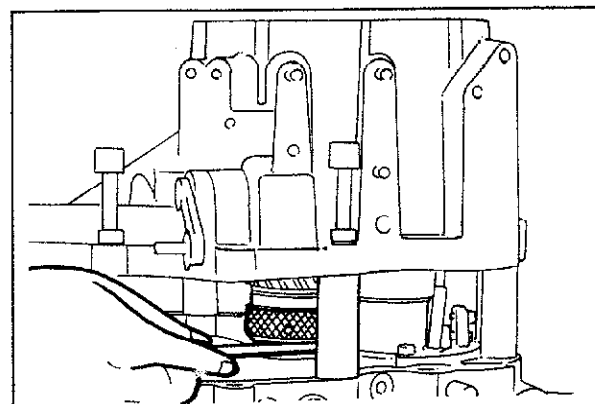


63G07C-210

6. Manually expand the selector for both shafts until the selector no longer turns.

Note

Make sure that each shaft turns smoothly.



63G07C-211

7. Use a thickness gauge to measure the gap of the selector for both gears.

Note

Measure the gap around the entire circumference of the selector.

8. Select an appropriate adjustment shim.
 - (1) The shim to be used for the primary shaft gear should be selected by referring to the table and selecting the shim which is nearest (on the thin side) to the value obtained, by subtracting the thickness of the diaphragm spring which goes between the shim and the race, from the measured value of the gap in the selector.

Example: 0.94 mm (0.0370 in)

0.94 mm (0.0370 in) — 0.70 mm (0.0276 in)
[Diaphragm spring]

= 0.24 mm (0.009 in)

So the nearest shim (on thin side) to 0.24 mm (0.009 in) is 0.20 mm (0.008 in).

Thickness mm (in)
0.20 (0.008)
0.25 (0.010)
0.30 (0.012)
0.35 (0.014)
0.40 (0.016)
0.45 (0.018)
0.50 (0.020)
0.55 (0.022)
0.60 (0.024)
0.65 (0.026)
0.70 (0.028)

83U07C-018

- (2) The shim to be used for the secondary shaft gear should be selected by referring to the table and selecting the shim which is nearest (on the thick side) to the value obtained, by subtracting the thickness of the diaphragm spring which goes between the shim and the race, from the measured value of the gap in the selector.

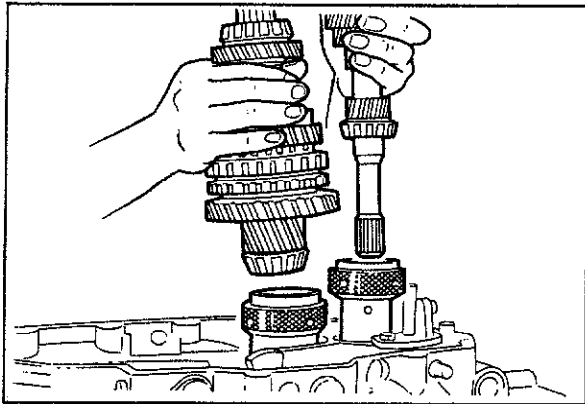
Example: 0.94 mm (0.0370 in)
0.94 mm (0.0370 in) — 0.70 mm (0.0276 in)
[Diaphragm spring]
= 0.24 mm (0.009 in)
So the nearest shim (on thick side) to 0.24 mm
(0.009 in) is 0.25 mm (0.010 in).

Note

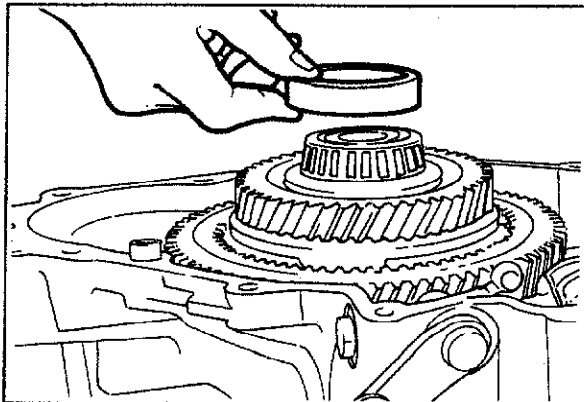
The number of shims used must not be more than two.

83U07C-043

9. Remove the **SST** and then remove the transaxle case, shaft gears and selectors.
10. Remove the bearing outer races for both shafts from the transaxle case.



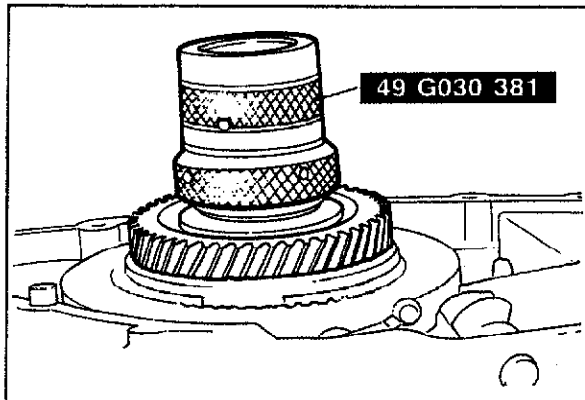
83U07C-101



63G07C-214

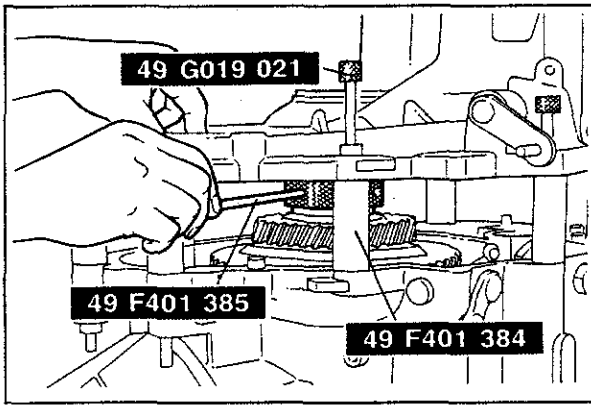
Center Differential

1. Install the center differential and bearing outer race.



83U07C-102

2. Set the **SST** in place.



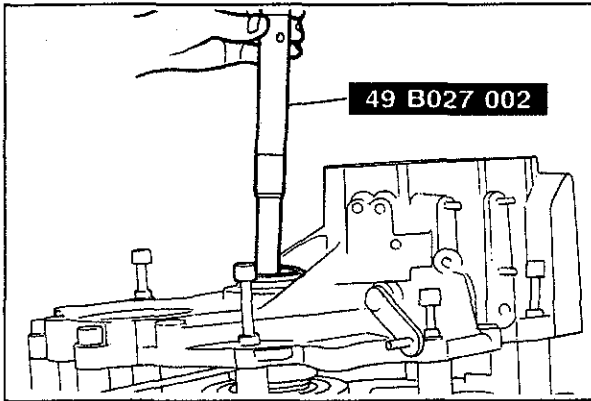
83U07C-103

3. Set the **SST** between the transaxle case and the clutch housing, and install the **SST**, and tighten to the specified torque.

Tightening torque:

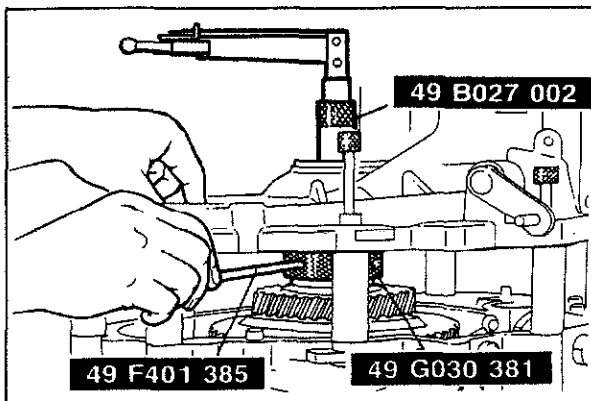
37—52 N·m (3.8—5.3 m·kg, 27—38 ft·lb)

4. To seat bearings turn the **SST** so the gap is widened.



83U07C-104

5. Insert the **SST**.

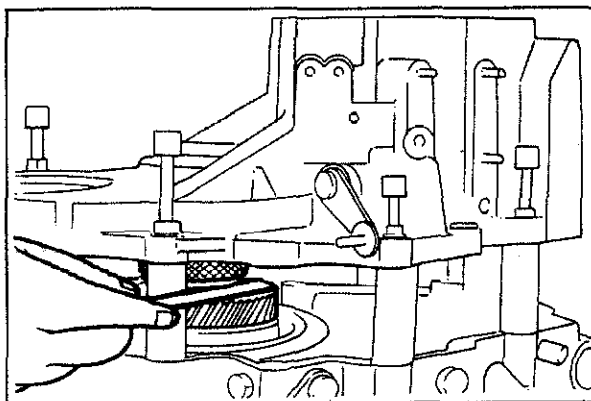


83U07C-105

6. Expand the **SST** until preload specification is obtained.

Preload: 0.3—1.2 N·m

(3—12 cm·kg, 2.6—10.4 in·lb)



63G07C-219

7. Use a thickness gauge to measure the gap in the selector for both gears.

Note

Measure the gap around the entire circumference of the selector.

Thickness mm (in)
0.1 (0.004)
0.2 (0.008)
0.3 (0.012)
0.4 (0.016)
0.5 (0.020)
0.6 (0.024)
0.7 (0.028)
0.8 (0.032)
0.9 (0.036)
1.0 (0.040)
1.1 (0.044)
1.2 (0.048)

83U07C-106

8. Select an appropriate adjustment shim to be used for the differential. It should be selected by referring to the table and selecting the shim which is nearest (on thick side) to the largest measured value of the gap in the selector.

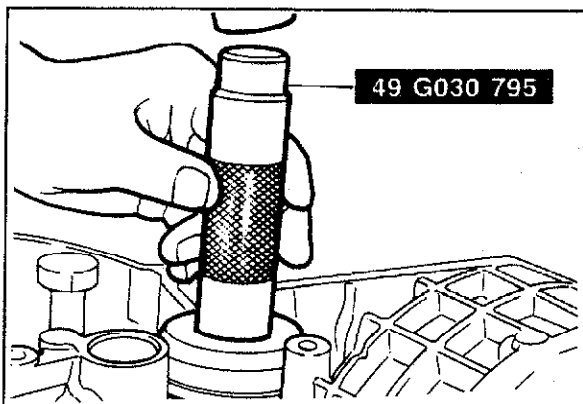
Example: 0.54 mm (0.021 in)

So the nearest shim (on thick side) to 0.54 mm (0.021 in) is 0.6 mm (0.014 in).

Note

The number of shims to be used must not be more than three.

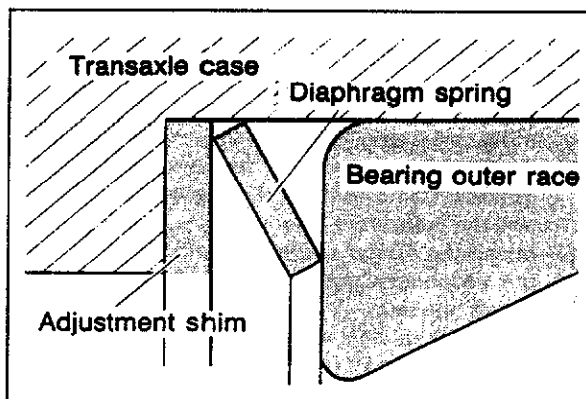
9. Remove the **SST** and then remove transaxle case.
10. Remove the selector, bearing outer race and front and center differential.



83U07C-019

Oil Seal

Tap the new oil seals into the transaxle case and clutch housing with the **SST**.



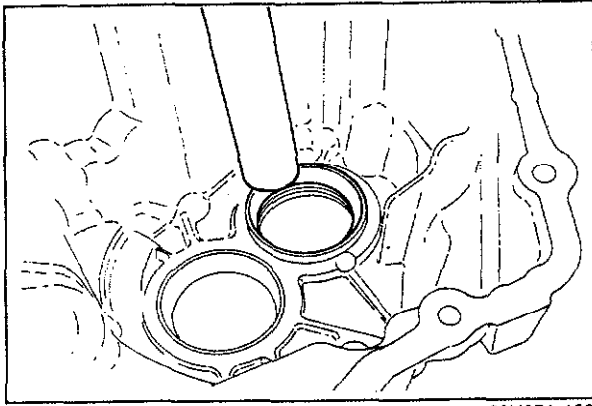
83U07C-020

Bearing Outer Race

1. Install the selected adjustment shims and the diaphragm springs into the transaxle case.

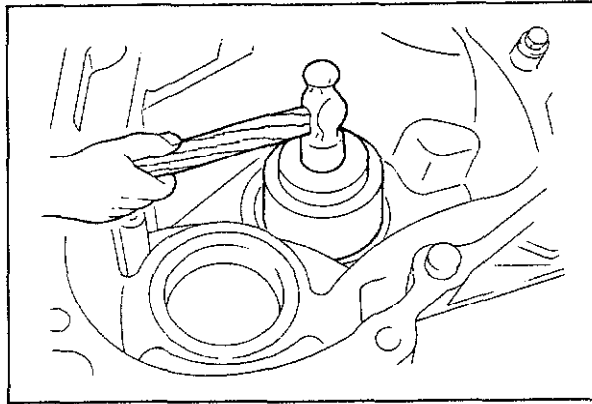
Note

Install the diaphragm spring as shown in the figure.



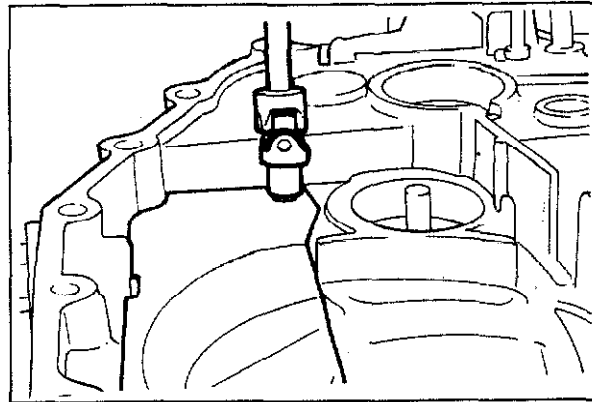
63U07A-120

2. Install the bearing outer races into the transaxle case and clutch housing.



63U07A-121

3. Use a suitable pipe and a hammer to tap the outer races in until they are seated.

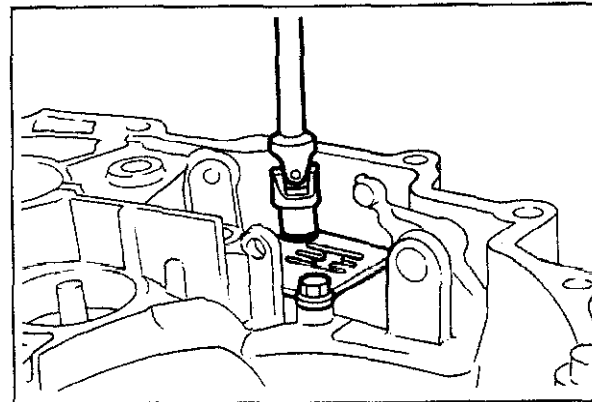


63G07C-223

Baffle Plate and Oil Passage

1. Install the baffle plate and oil passage.

**Tightening torque: 7.9—10.8 N·m
(0.8—1.1 m·kg 5.79—7.96 ft·lb)**

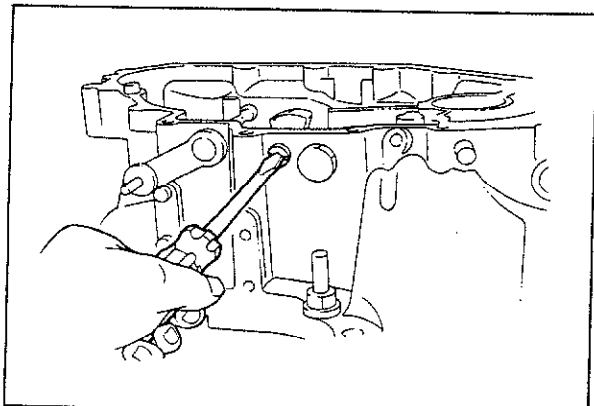


63G07C-224

Base Plate Assembly

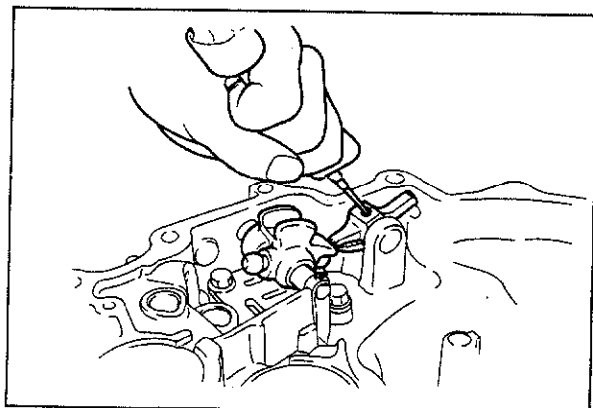
1. Install the base plate spring and base plate.

**Tightening torque: 18.6—25.5 N·m
(1.9—2.6 m·kg 13.74—18.81 ft·lb)**



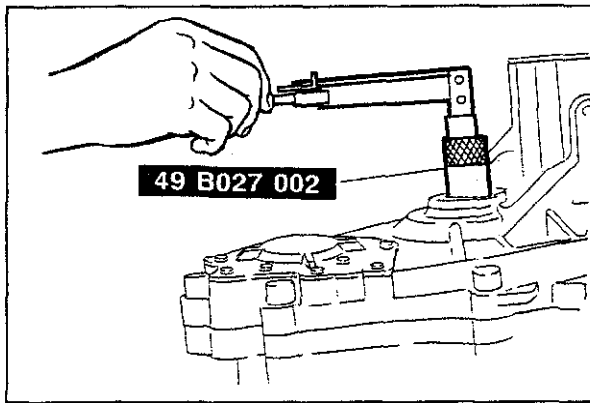
63G07C-225

2. Install the crank lever shaft and crank lever.
3. Install the spring pin.

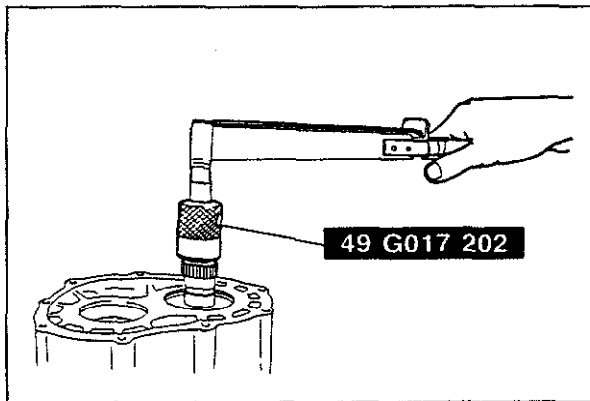


63G07C-226

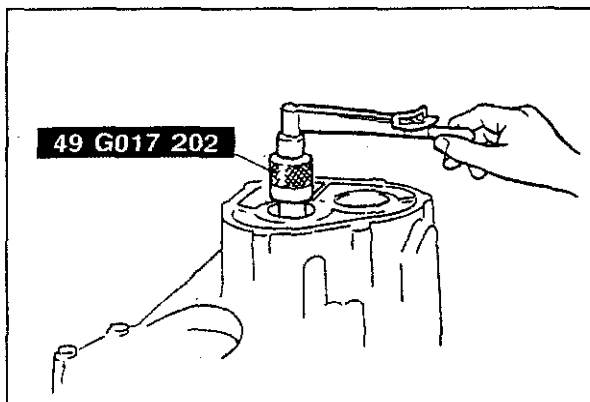
4. Install the inner shift lever to shift lever assembly and then install them to crank lever assembly.
5. Install the spring pin.



83U07C-021



83U07C-022



83U07C-023

Bearing Preload

Check the shaft gears and the differential bearing preload.

Note

- a) Check that the correct adjust shims were selected.
- b) If the bearing preload is not within specification, adjust again.

1. Set the primary shaft gear and the center differential assembly into the clutch housing.
2. Install the transaxle case, and tighten to the specified torque.

**Tightening torque: 37—52 N·m
(3.8—5.3 m·kg, 27—38 ft·lb)**

3. Connect the **SST** and install it through the driveshaft hole.
4. Hook a spring scale to the attachment and measure the preload.

Note

Extend the handle fully and hook the pull scale to the end of the handle.

**Preload: 1.4—2.0 N·m
(14—20 cm·kg, 12.2—17.5 in·lb)**

5. Remove the **SST**.
6. Connect the **SST** to the primary shaft gear.
7. Check the primary shaft preload.

**Preload: 0.10—0.25 N·m
(1.0—2.5 cm·kg, 0.87—2.18 in·lb)**

8. Remove the **SST**, transaxle case, primary shaft gear and center differential assembly.
9. Install the secondary shaft gear and transaxle case then tighten to the specified torque.

**Tightening torque: 37—52 N·m
(3.8—5.3 m·kg, 27—38 ft·lb)**

10. Check the secondary shaft preload with the **SST**.

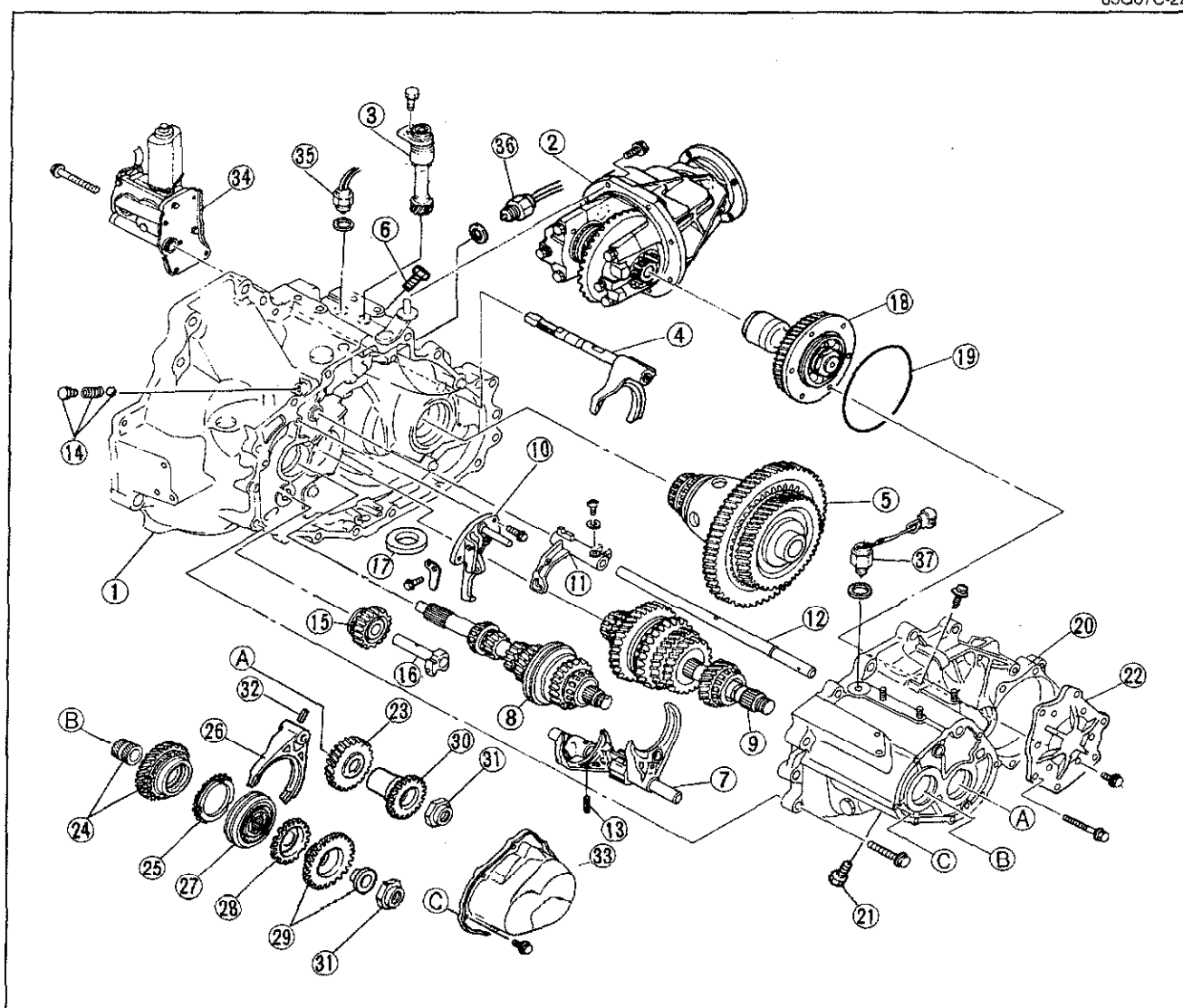
**Preload: 0.2—0.4 N·m
(2.0—4.0 cm·kg, 1.7—3.5 in·lb)**

11. Remove the **SST**, transaxle case and secondary shaft gear.

ASSEMBLY-STEP 5

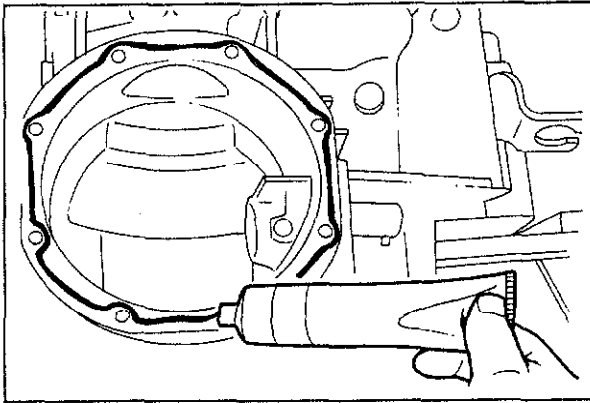
Assemble in the sequence shown in the figure.

63G07C-227



83U07C-024

- | | | |
|---|------------------------------|---|
| 1. Clutch housing | 12. Shift rod | 27. Clutch hub assembly |
| 2. Transfer carrier assembly | 13. Spring pin | 28. Synchronizer ring |
| 3. Speedometer driven gear | 14. Ball, spring and bolt | 29. Primary reverse synchronizer gear and gear sleeve |
| 4. Center differential lock shift fork assembly | 15. Reverse idle gear | 30. Secondary reverse synchronizer gear |
| 5. Center differential assembly | 16. Reverse idle shaft | 31. Lock nut(s) |
| 6. Bolt | 17. Magnet | 32. Spring pin |
| 7. Shift fork and shift rod assembly | 18. Idle gear | 33. Rear cover |
| 8. Primary shaft gear assembly | 19. "O" ring | 34. Center differential lock motor |
| 9. Secondary shaft gear assembly | 20. Transaxle case | 35. Center differential lock switch |
| 10. Reverse lever support | 21. Bolt | 36. Neutral switch |
| 11. Shift gate | 22. Side cover | 37. Backup lamp switch |
| | 23. Secondary 5th gear | |
| | 24. Gear sleeve and 5th gear | |
| | 25. Synchronizer ring | |
| | 26. Shift fork | |



63G07C-230

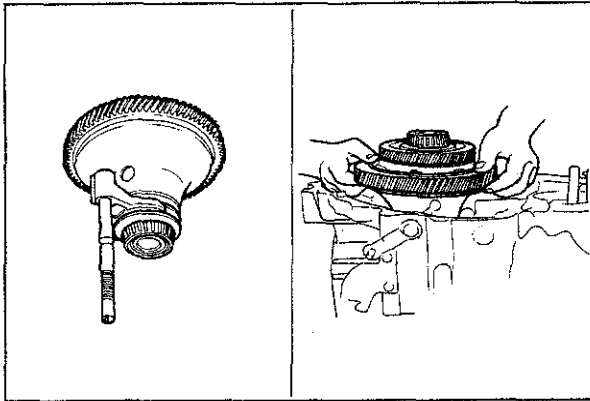
Transfer Carrier

1. Coat both surfaces with sealant.
2. Install the transfer carrier assembly.

Tightening torque: 25—30 N·m
(2.5—3.1 m·kg, 18.1—22.4 ft·lb)

Note

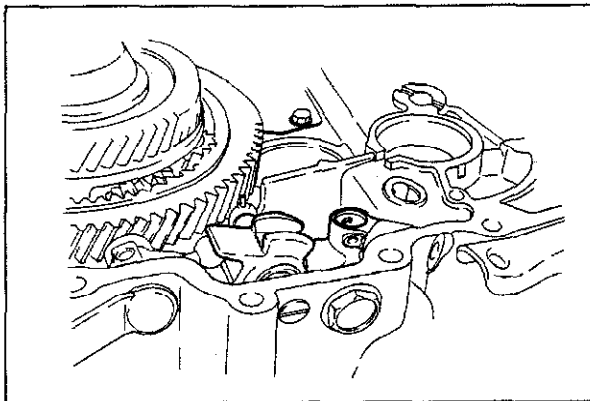
Before coating with sealant, clean the contact surfaces.



63G07C-229

Front Differential Assembly

1. Assemble the center differential lock shift fork assembly to the center differential assembly, and install the center differential assembly into the clutch housing.
2. Install the set bolt.

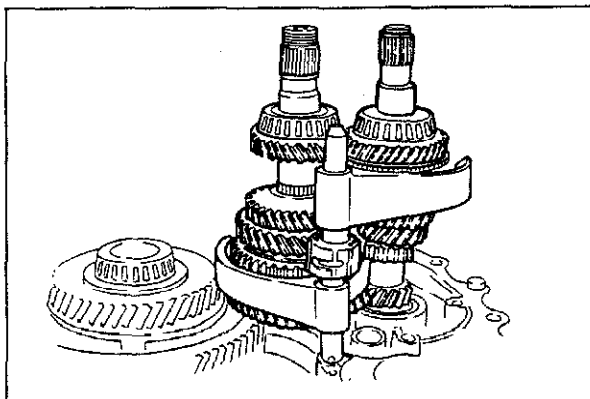


63G07C-231

Shaft Gear and Shift Fork Assembly

Install the primary shaft gear, secondary shaft gear, and shift fork assembly according to the following procedures:

1. Set the control end in place.

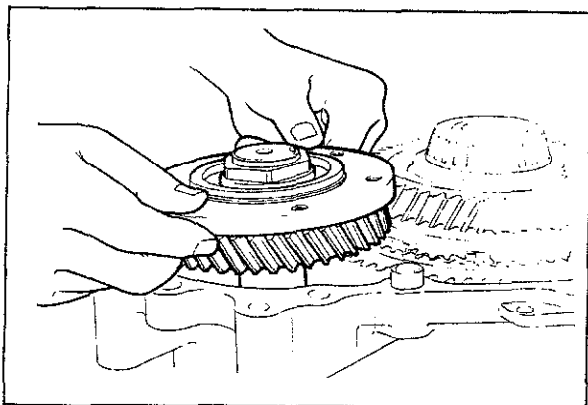


63G07C-232

2. Install the shift fork assembly on the secondary shaft gear assembly.
3. Unite the primary shaft gear, secondary shaft gear and shift fork assembly. Install the control rod into the control end as the unit is lowered into place.

Note

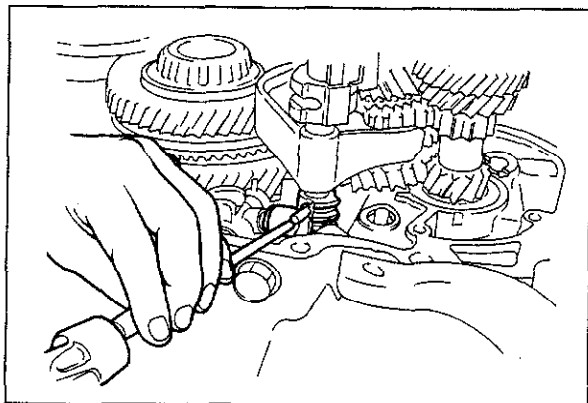
Keep the assembly nearly vertical while installing.



83U07C-025

Idle Gear

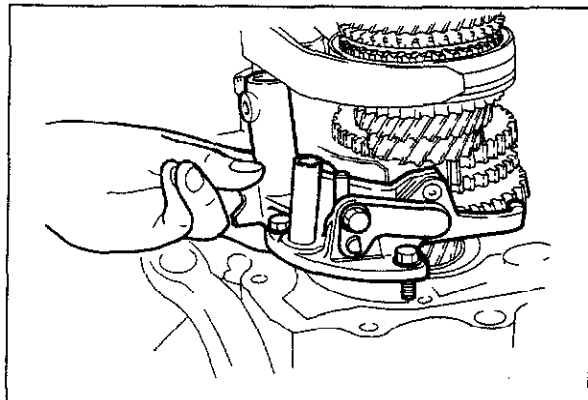
Install the idle gear.



83U07C-026

Control End

Tap the spring pin in with a pin punch and hammer.

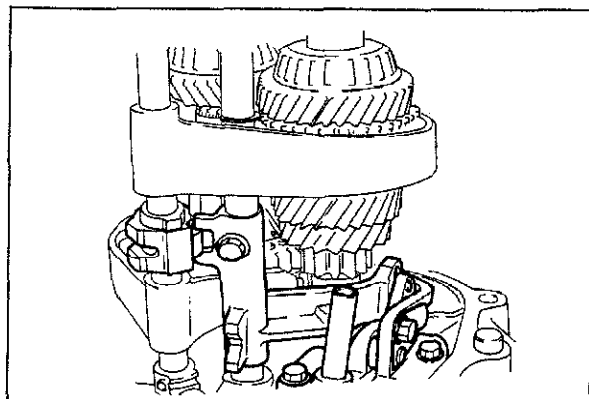


83U07C-027

Reverse Lever Support and Shift Gate

1. Install the reverse lever support and shift gate.
2. Install the shift rod (5th/reverse)

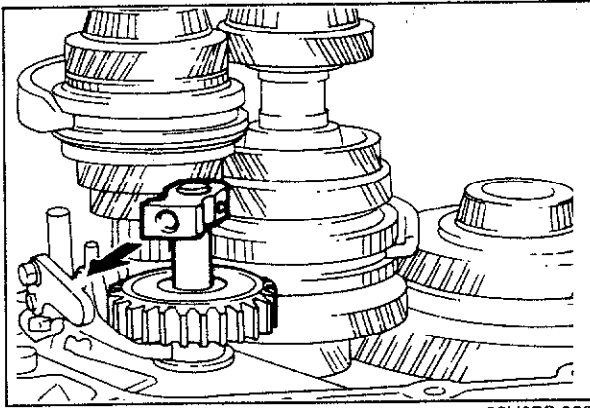
**Tightening torque: 11.8—15.7 N·m
(1.2—1.6 m·kg, 8.7—11.6 ft·lb)**



83U07C-028

3. Assemble the shift gate and install the shift rod then align the control lever and shift gate.
4. Tighten the set bolt.

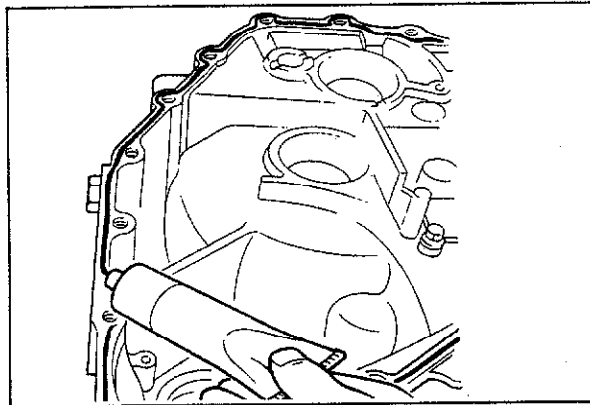
**Tightening torque: 11.8—15.7 N·m
(1.2—1.6 m·kg, 8.7—11.6 ft·lb)**



83U07C-029

Reverse Idle Shaft

Set the reverse idle shaft in the direction shown.



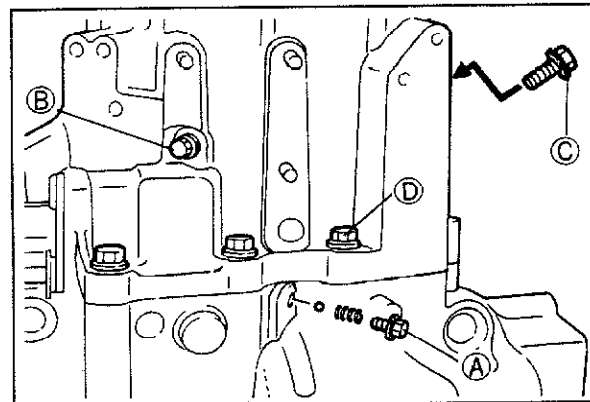
83U07C-030

Transaxle Case

1. Install the magnet.
2. Coat both surfaces with sealant.

Note

Before coating with sealant, clean the contact surfaces.



83U07C-031

3. Install the transaxle case.
4. Install the detent ball, spring and bolt (A), set bolts (B), (C) and case bolt (D).

Note

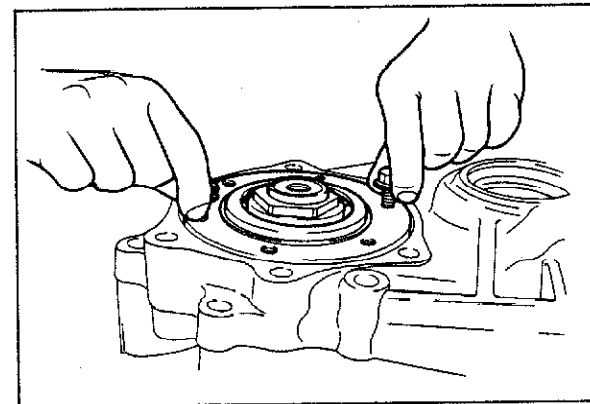
Coat the threads of (A) (B) (C) bolts with sealant before installing.

Tightening torque:

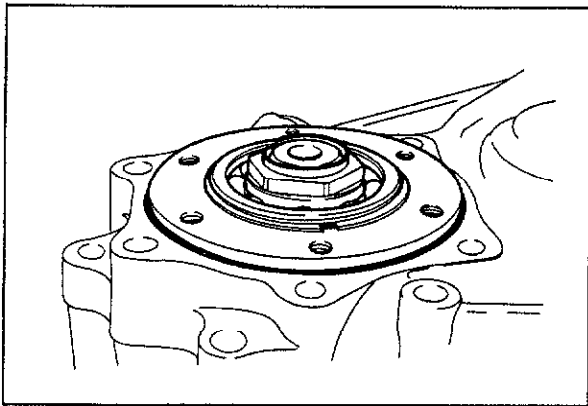
- (A) : 15—21 N·m
(1.5—2.1 m·kg, 11—15 ft·lb)
- (B) : 9—14 N·m
(90—140 cm·kg, 78—122 in·lb)
- (C) : 19—26 N·m
(1.9—2.6 m·kg, 14—19 ft·lb)
- (D) : 37—52 N·m
(3.8—5.3 m·kg, 27—38 ft·lb)

Side Cover

1. Lift the idle gear slightly.

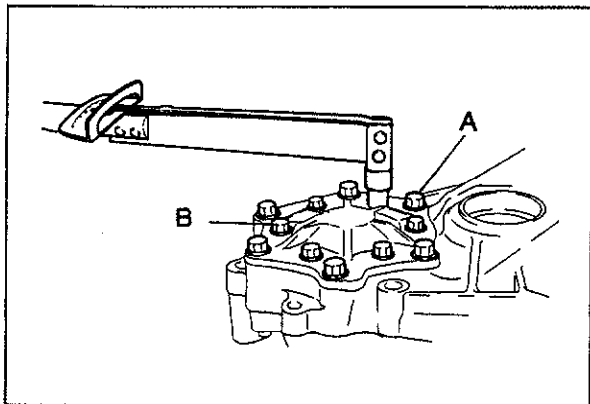


83U07C-032



63G07C-241

2. Install the "O" ring.



63G07C-242

3. Coat the side cover and clutch housing with sealant.

Note

Before coating with sealant, clean the contact surfaces.

4. Install the side cover.

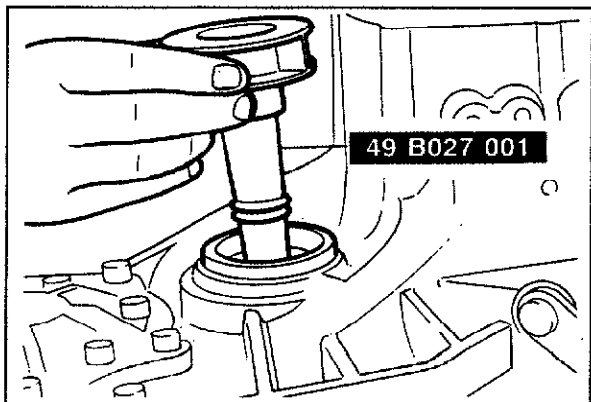
Tightening torque:

A. 37—52 N·m
(3.8—5.3 m·kg, 27.5—38.3 ft·lb)

B. 19—25 N·m
(1.9—2.6 m·kg, 14—19 ft·lb)

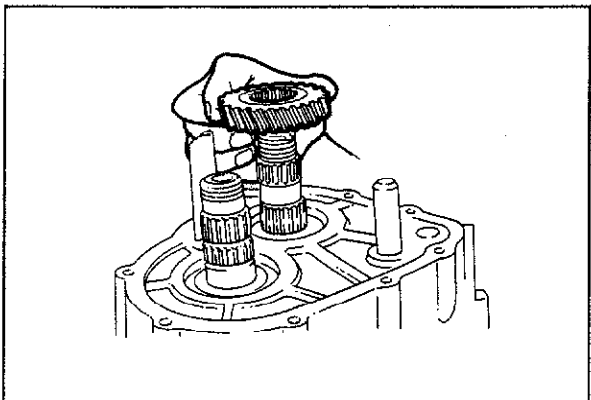
5th Gear

1. Install the **SST** to hold the side gear.

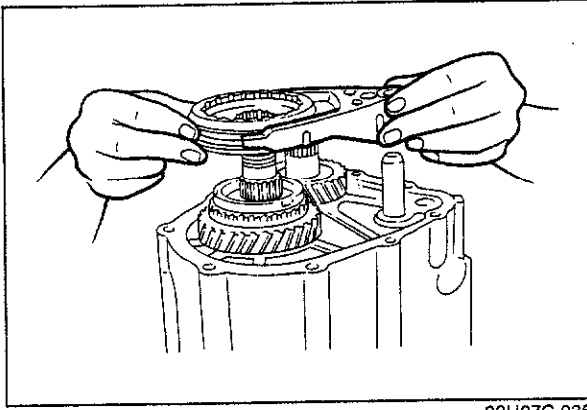


83U07C-033

2. Install the secondary 5th gear.

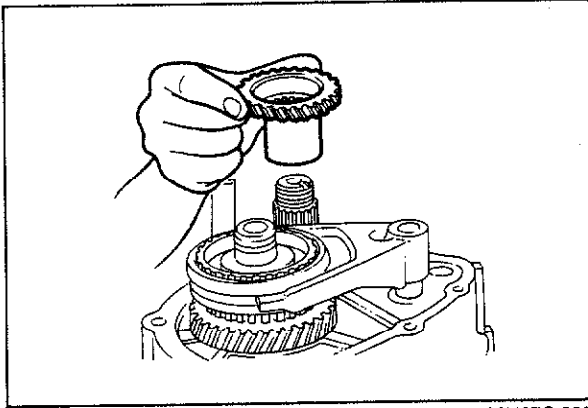


83U07C-034



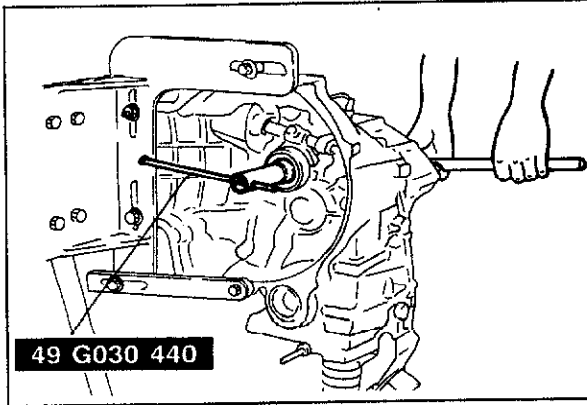
83U07C-035

3. Install the gear sleeve, the 5th gear and synchronizer ring.
4. Install the shift fork together with clutch hub assembly.



83U07C-036

5. Install the synchronizer ring.
6. Install the gear sleeve and reverse synchronizer gears.

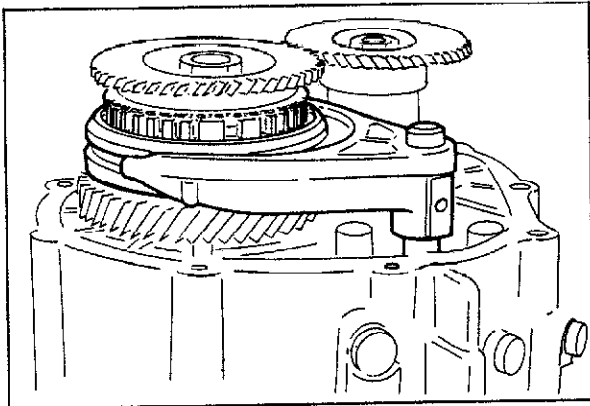


83U07C-037

7. Shift the lever into 1st gear.
8. Lock the primary shaft with the **SST**.
9. Use new lock nuts and tighten it to the specified torque.

Tightening torque:
127—206 N·m (13—21 m·kg, 94—152 ft·lb)

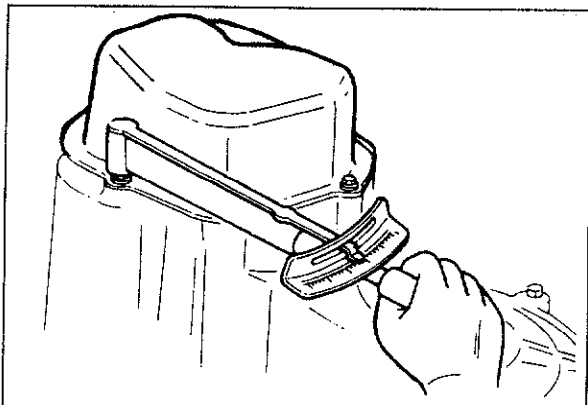
10. Stake the lock nuts to the groove.



83U07C-038

11. Shift to neutral and install the spring pin.

Note
After installation, move the shift rod to check to be sure that the gear change operation is smooth.



83U07C-039

Rear Cover

1. Coat the transaxle case and rear cover with sealant.

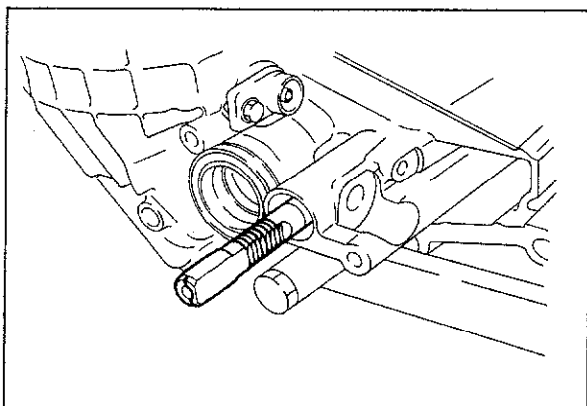
Note

Before coating with sealant, clean the contact surfaces.

2. Install the rear cover.

Tightening torque:

8—11 N·m (80—110 cm·kg, 69—95 in·lb)



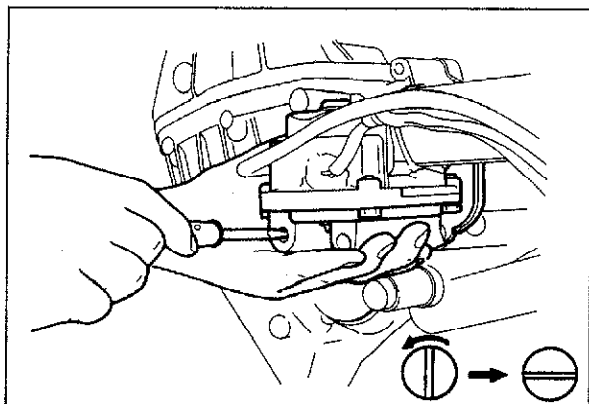
63G07C-258

Center Differential Lock Assembly

1. Position the center differential lock shift rod as shown in the figure.
2. Install the center differential lock assembly.

Tightening torque:

19—25 N·m (1.9—2.6 m·kg, 14—19 ft·lb)



83U07C-040

3. Turn the rod 90° counterclockwise with a flat-tipped screwdriver.
4. Install the bolts.

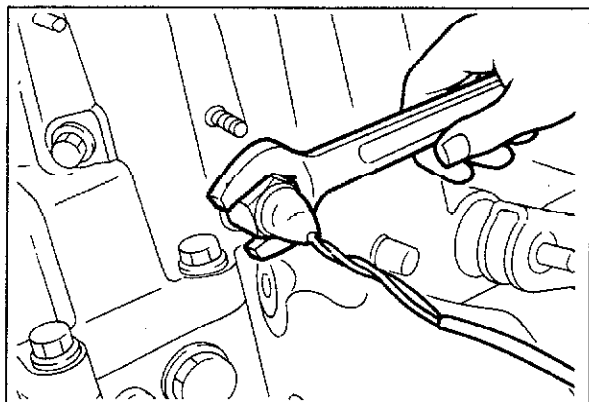
Tightening torque:

9—14 N·m (90—140 cm·kg, 78—122 ft·lb)

5. Install the differential lock switch.

Tightening torque:

20—29 N·m (2—3 m·kg, 14—22 ft·lb)



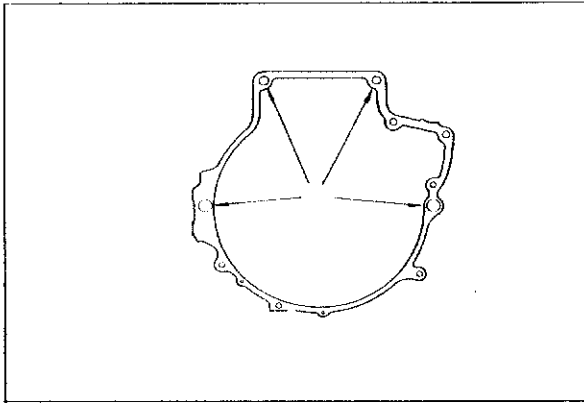
63G07C-257

Switch

Install the neutral switch and backup lamp switch.

Tightening torque:

20—29 N·m (2—3 m·kg, 14—22 ft·lb)



63G07C-261

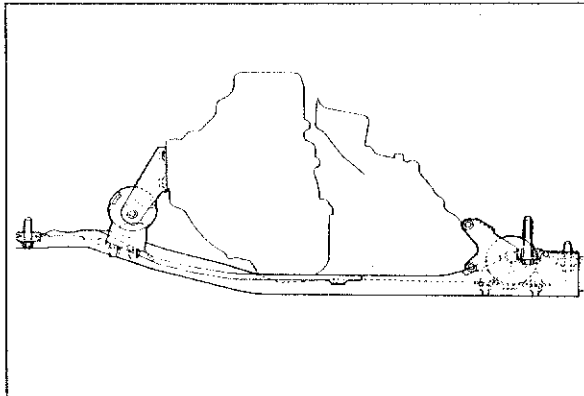
INSTALLATION

Install in the reverse order of removal and be careful of the following.

Transaxle and Transfer

Tighten the bolts.

**Tightening torque: 89—117 N·m
(9.1—11.9 m·kg, 66—86 ft·lb)**

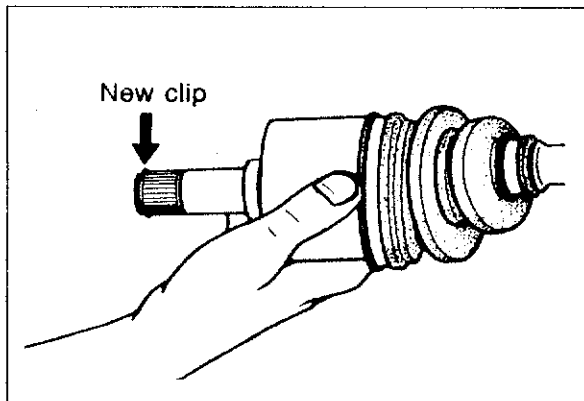


63G07C-262

Crossmember

Install the crossmember.

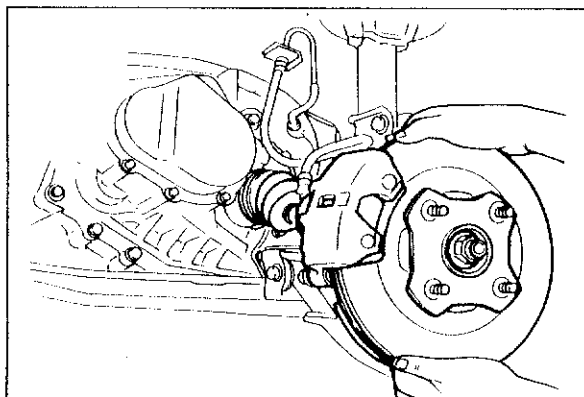
**Tightening torque: 64—89 N·m
(6.5—9.1 m·kg, 47—66 ft·lb)**



63U07A-143

Clip

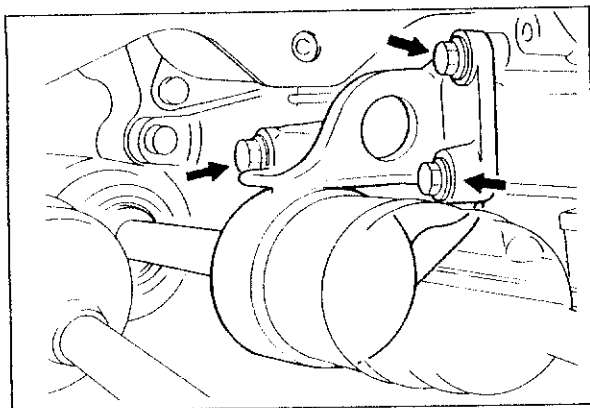
Replace the clip at the end of the driveshaft with a new one. Insert the clip with gap to the top of the groove.



63G07C-263

Driveshaft

1. Install driveshaft to transaxle.

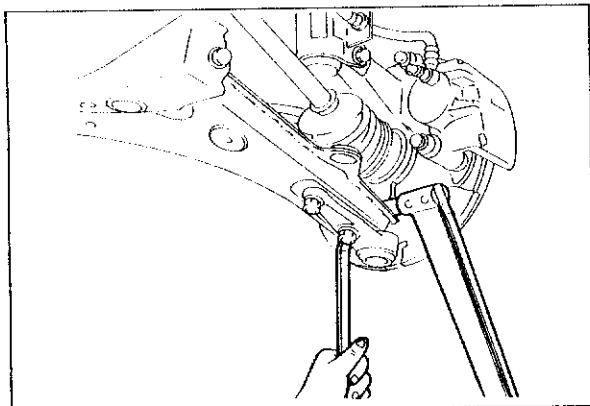


63G07C-264

2. Install joint shaft.

Tightening torque:

42—62 N·m (4.3—6.3 m·kg, 31—46 ft·lb)



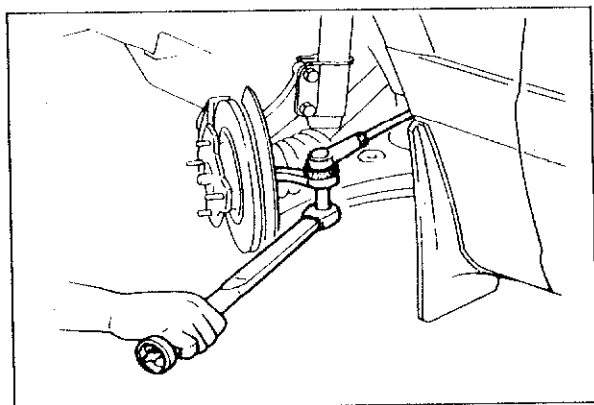
63G07C-265

Lower Arm

Install the lower arm ball-joint to the knuckle and the tighten the bolt.

Tightening torque:

43—54 N·m (4.4—5.5 m·kg, 32—40 ft·lb)



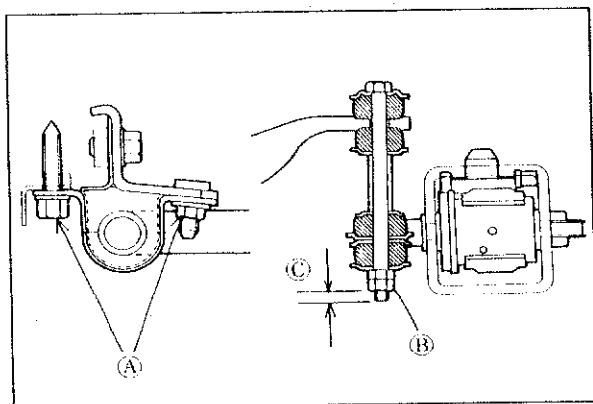
63G07C-266

Tie-rod End

Install tie-rod end to knuckle.

Tightening torque:

29—44 N·m (3.0—4.5 m·kg, 22—33 ft·lb)



63G07C-267

Stabilizer

Install and adjust the front stabilizer.

Tightening torque:

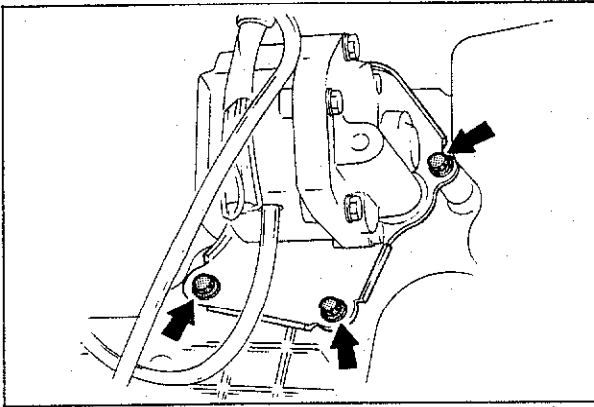
Ⓐ : 31—44 N·m

(3.2—4.5 m·kg, 23—33 ft·lb)

Ⓑ : 12—18 N·m

(1.2—1.8 m·kg, 9—13 ft·lb)

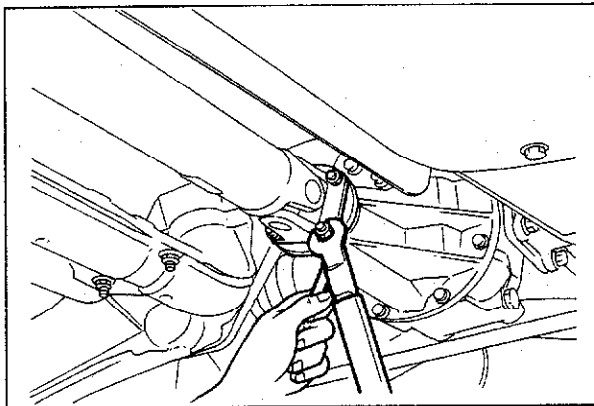
Dimension Ⓒ : 8.8 mm (0.35 in)



63G07C-268

Starter and Center Differential Lock Assembly.

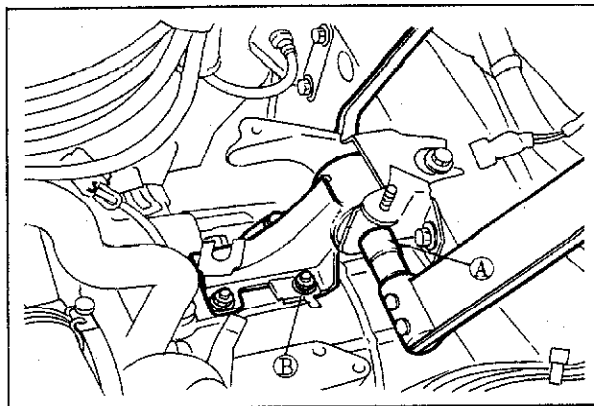
1. Install the starter.
2. Install the center differential lock assembly.



63G07C-269

Propeller Shaft

1. Install the propeller shaft.
2. Install the side cover and undercover (right side).



63G07C-270

Wheel

1. Install the wheels.

Tightening torque:

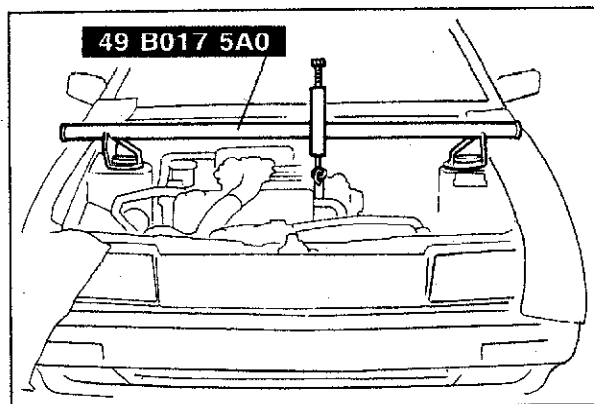
88—118 N·m (9—12 m·kg, 65—87 ft·lb)

2. Install mount bracket No. 4.

Tightening torque:

Ⓐ : 50—61 N·m
(5.1—6.2 m·kg, 37—45 ft·lb)

Ⓑ : 19—26 N·m
(1.9—2.6 m·kg, 14—19 ft·lb)



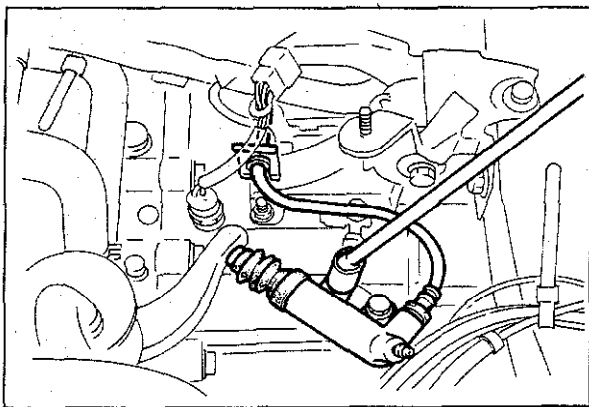
63G07C-271

Mounting Block

Remove the engine support, and tighten the mounting block installation nuts to the specified torque.

Tightening torque:

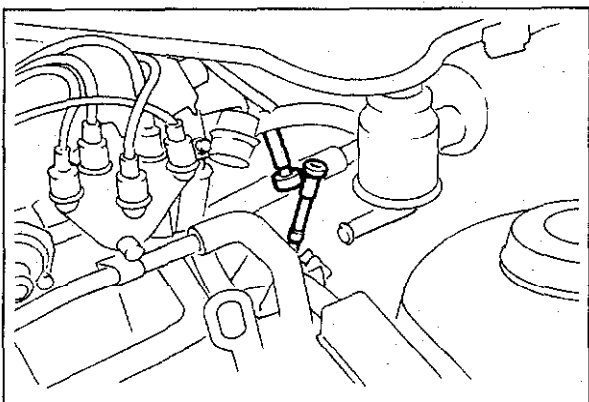
23—29 N·m (2.3—3.0 m·kg, 17—22 ft·lb)



63G07C-272

Clutch Release Cylinder

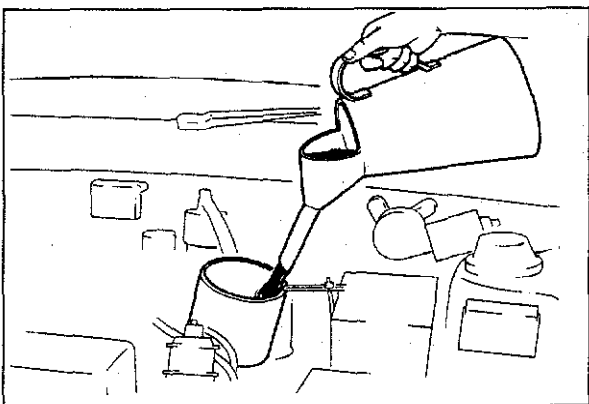
1. Set the hose in the bracket and install clip.
2. Install the clutch release cylinder.



63G07C-273

Speedometer Cable

1. Connect the speedometer cable.
2. Install the air cleaner.



63G07C-274

Transaxle Oil

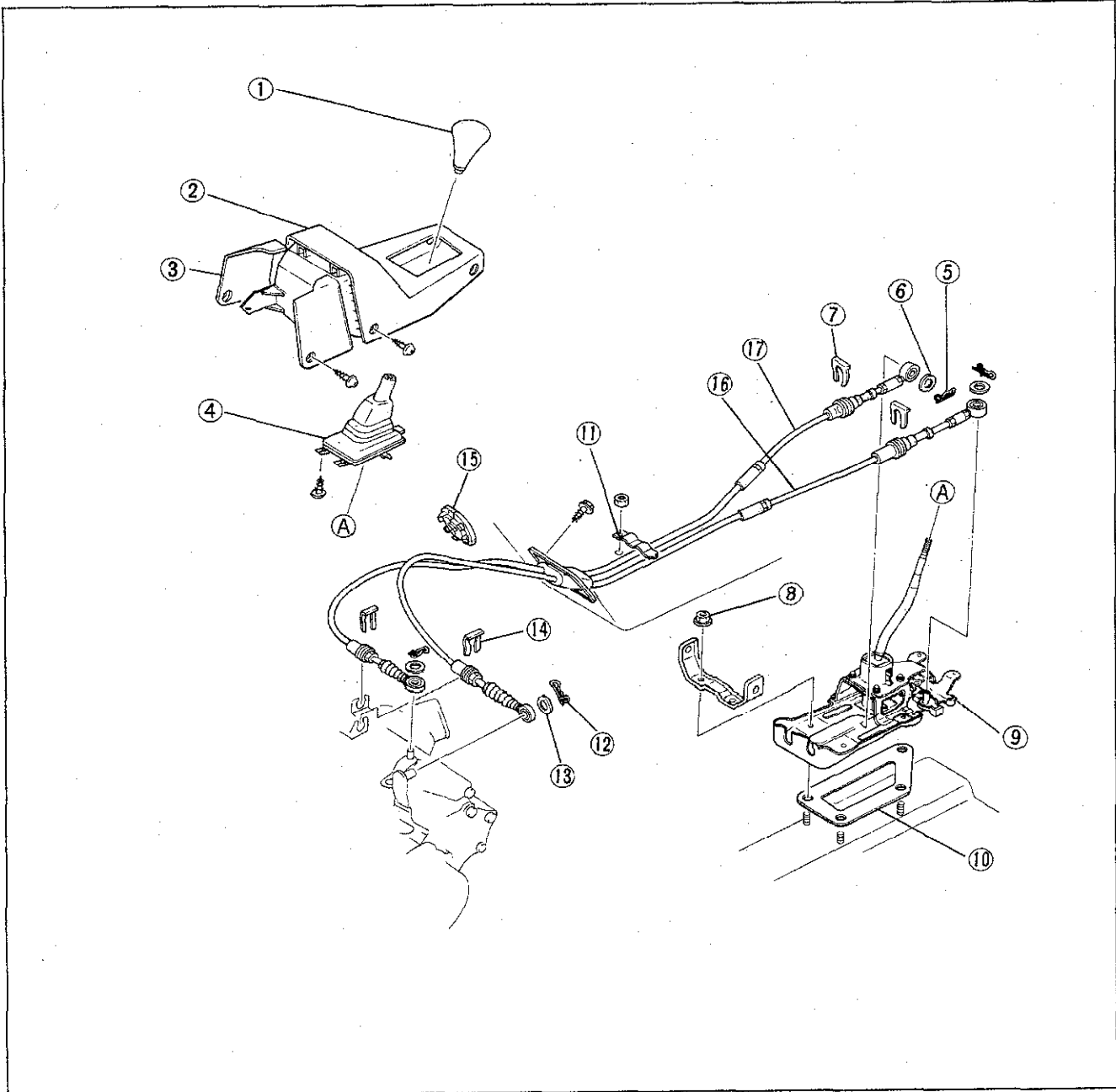
1. Add the specified amount of the specified transaxle oil through the speedometer driven gear installation hole.
2. Road test the vehicle and check the transaxle and transfer carrier for proper operation and check for oil leaks.

TRANSAXLE CONTROL-1

REMOVAL AND INSTALLATION

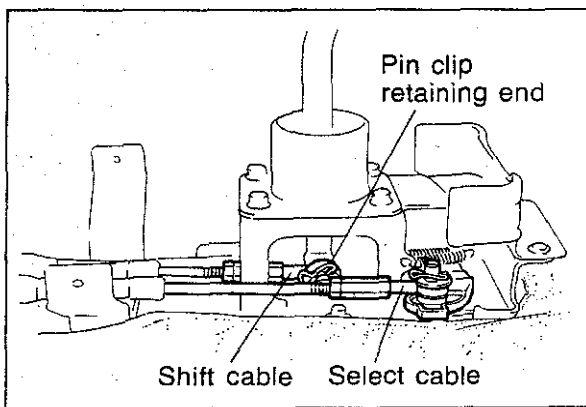
1. Jack up the vehicle and support it with safety stands.
2. Remove the parts in the sequence shown in the figure.
3. Install in the reverse order of removal.

63G07C-275

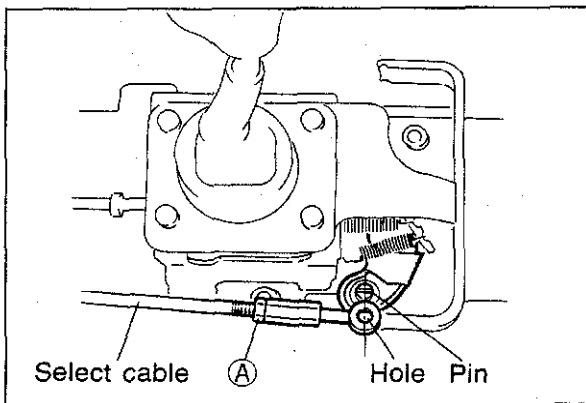


63G07C-278

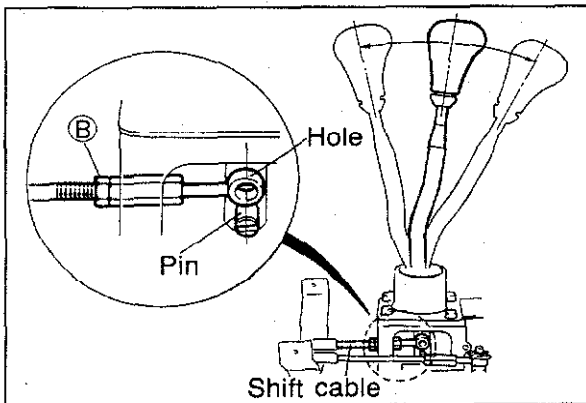
- | | | |
|---------------------|-------------------------|------------------|
| 1. Shift lever knob | 7. Clip | 12. Pin |
| 2. Center console | 8. Nut | 13. Flat washer |
| 3. Side wall | 9. Shift lever assembly | 14. Clip |
| 4. Shift lever boot | 10. Rubber seat | 15. Dust cover |
| 5. Pin | 11. Cable clip | 16. Select cable |
| 6. Flat washer | | 17. Shift cable |



83U07C-041



73G07C-008



73G07C-009

Shift Lever Position Adjustment

1. Set the transaxle shift lever to neutral position.
2. Check that the shift and select levers on the transaxle are in the neutral position.
3. Remove the console.
4. Disconnect the shift and select cables from levers.

Note

Replace the pin clips with a new one. If it re-used, check the retaining end of it for deformation.

5. Check that the select cable end hole aligns perfectly with the select lever pin.
6. If not aligned, loosen nut (A), and turn the adjust nut to align.

7. Position the transaxle shift lever at the center of its front-to-rear stroke.
8. Check that the shift cable end hole aligns perfectly with shift lever pin.
9. If not aligned, loosen nut (B), and turn the adjust nut to align.
10. Connect the shift and select cables, and tighten nuts (A) and (B).

**Tightening torque: 6.9—9.8 N·m
(70—100 cm·kg, 61—87 in·lb)**

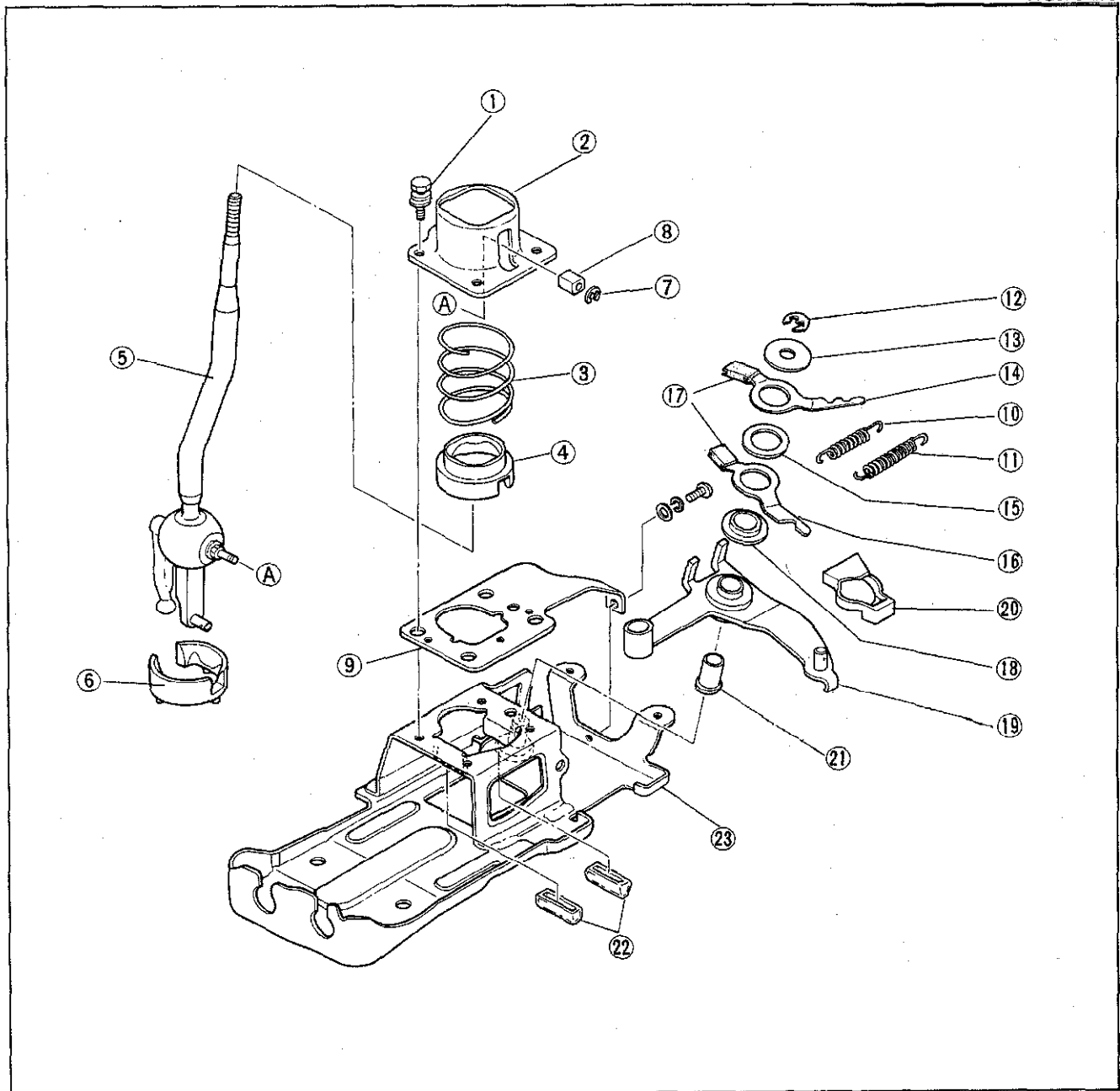
11. Secure the cables with the flat washers and spring clips.

TRANSAXLE CONTROL-2

REMOVAL AND INSTALLATION

1. Remove the part in the sequence shown in the figure.
2. Install in the reverse order of removal.

63G07C-279



63G07C-279

- | | | |
|--------------------|--------------------|-------------------------|
| 1. Bolt | 9. Support plate | 17. Select stopper |
| 2. Ball seat cover | 10. Return spring | 18. Bushing |
| 3. Spring | 11. Assist spring | 19. Select lever |
| 4. Ball seat No. 2 | 12. Retaining ring | 20. Crank lever sleeve |
| 5. Shift lever | 13. Washer | 21. Stopper rubber |
| 6. Ball seat No. 1 | 14. Lever No. 1 | 22. Shift stopper |
| 7. Retaining ring | 15. Plate | 23. Shift lever bracket |
| 8. Cover | 16. Lever No. 2 | |

PROPELLER SHAFT

OUTLINE	8— 2
OUTLINE OF CONSTRUCTION	8— 2
STRUCTURAL VIEW	8— 2
SPECIFICATIONS	8— 3
TROUBLESHOOTING GUIDE	8— 3
ON-VEHICLE CHECK	8— 4
PROPELLER SHAFT	8— 5
REMOVAL	8— 5
DISASSEMBLY	8— 6
INSPECTION	8— 8
ASSEMBLY	8— 9
INSTALLATION	8—12

63G08X-300

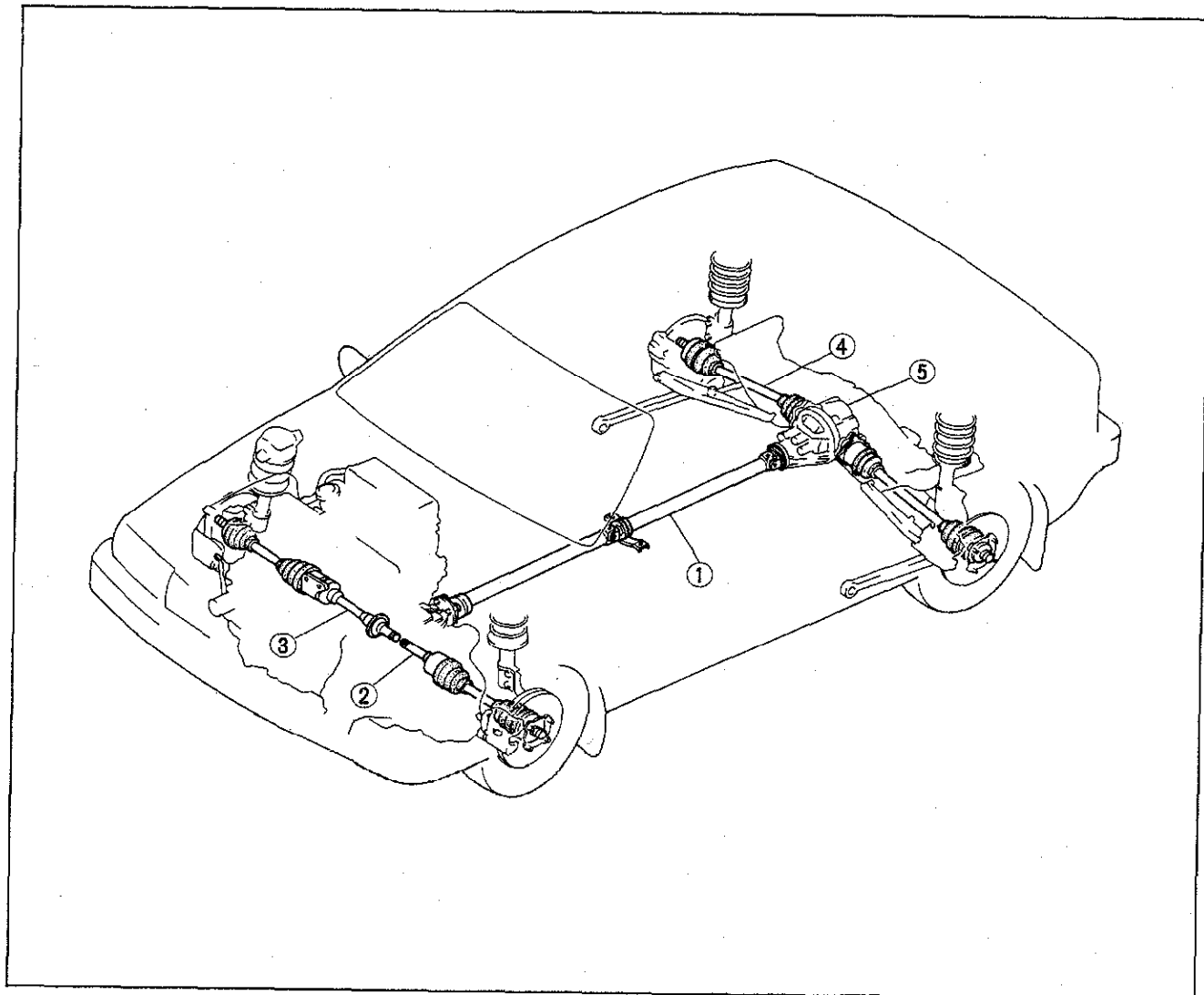
OUTLINE

OUTLINE OF CONSTRUCTION

Standard universal joints are installed on the propeller shaft.

63G08X-301

STRUCTURAL VIEW



83U08X-001

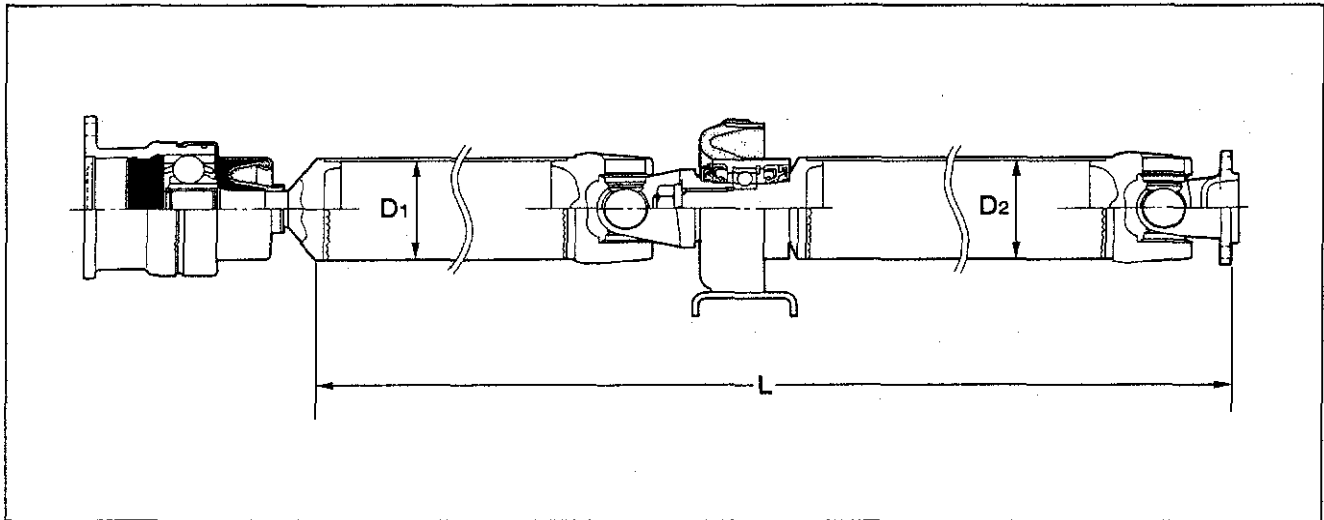
- 1. Propeller shaft
- 2. Driveshaft (front)
- 3. Joint shaft

- 4. Driveshaft (rear)
- 5. Rear differential

SPECIFICATIONS

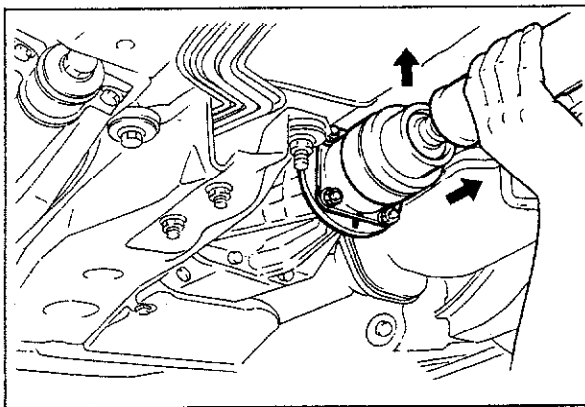
Length	mm (in)	L	1788 (70.39)
Outer diameter	mm (in)	D1	57 (2.24)
		D2	65 (2.56)

63G08X-303

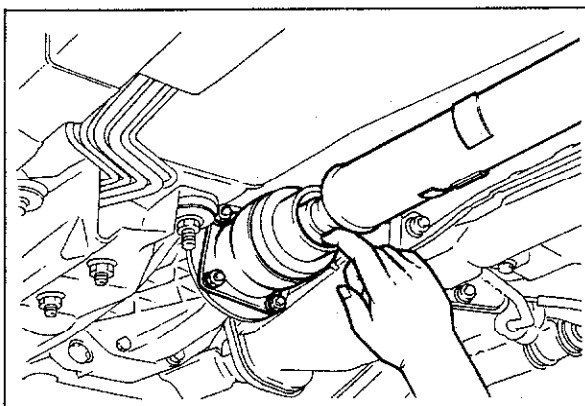
**TROUBLESHOOTING GUIDE**

Problem	Possible Cause	Remedy
Vibration	Bent propeller shaft Left/right universal joint snap rings not symmetrical Loosen yoke installation	Replace Adjust Tighten
Noise	Worn or damaged universal joint bearing Universal joint snap ring missing Loose yoke installation	Replace Repair Tighten

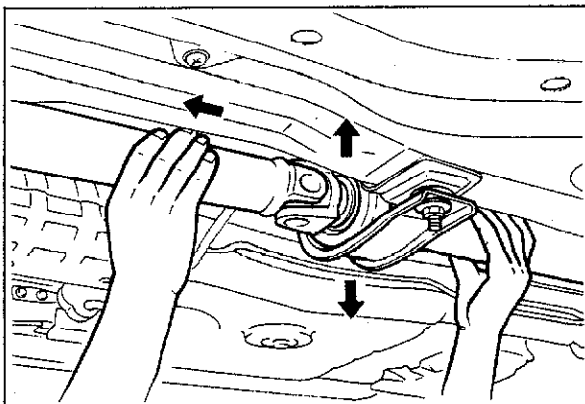
63G08X-304



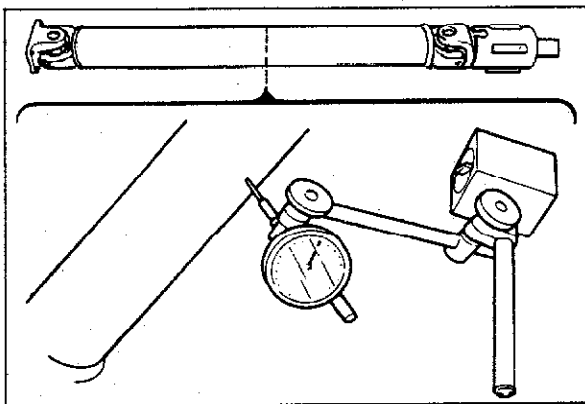
63G08X-305



63G08X-306



63G08X-307



63G08X-308

ON-VEHICLE CHECK

Check the following points. If a problem is found replace the necessary part.

1. Check for backlash by moving the parts as shown in the figure.
2. Check for looseness of bolts and nuts, and tighten if necessary.

3. Check for cracks or damage of dust boot.

4. Check for backlash of center bearing.

5. Check for runout of propeller shaft.

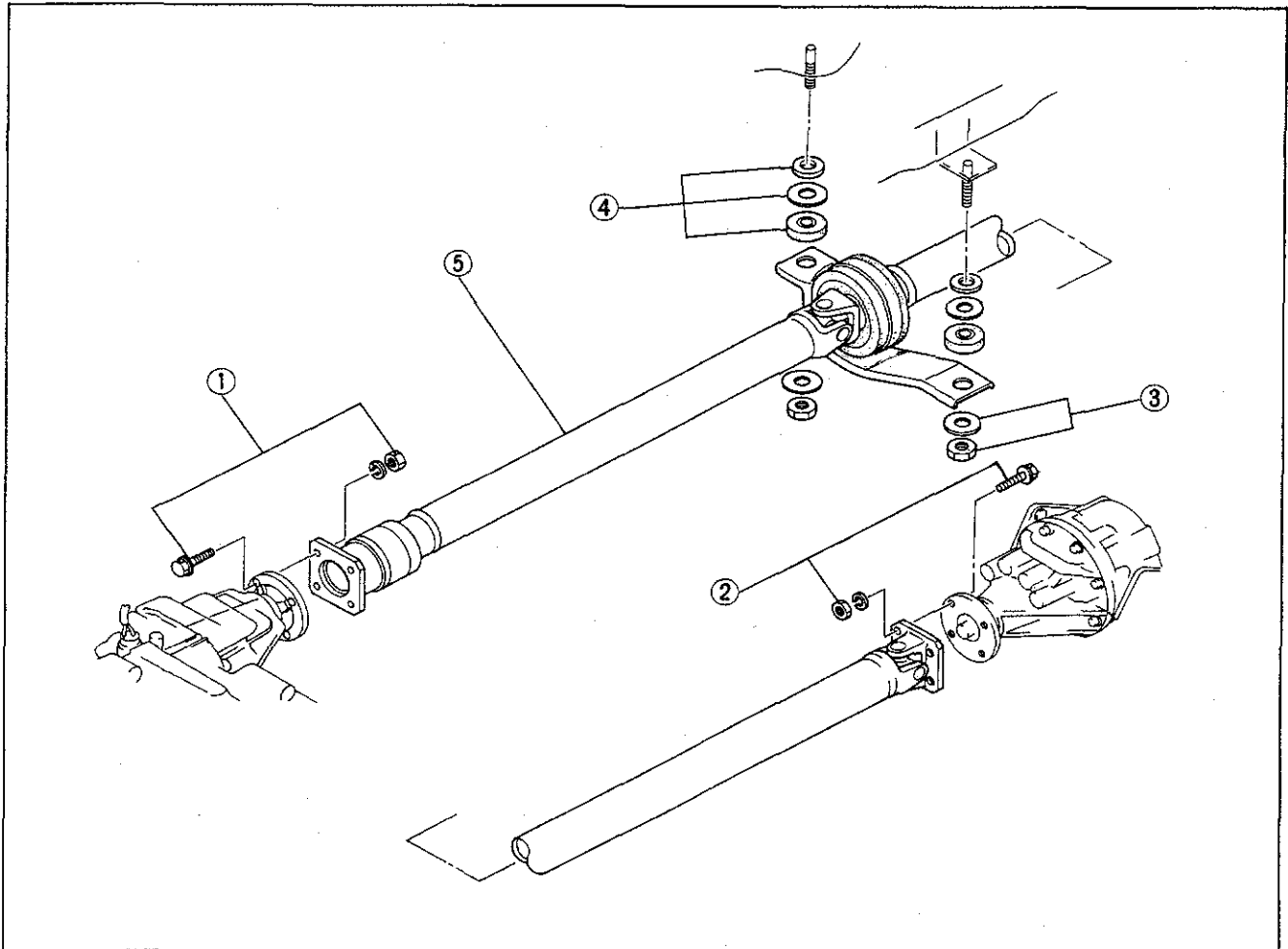
Runout limit: 0.4 mm (0.016 in)

PROPELLER SHAFT

REMOVAL

1. Jack up the vehicle and support it on safety stands.
2. Remove the parts in the sequence shown in the figure.

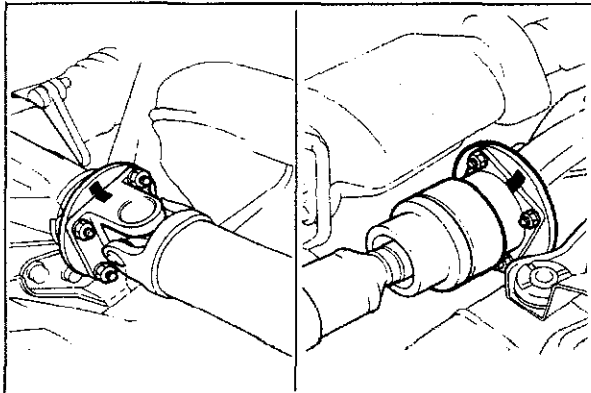
63G08X-309



63G08X-309

1. Bolts and nuts (front)
2. Bolts and nuts (rear)
3. Nuts and washers

4. Bushings washers and shims
5. Propeller shaft



63G08X-310

Propeller Shaft

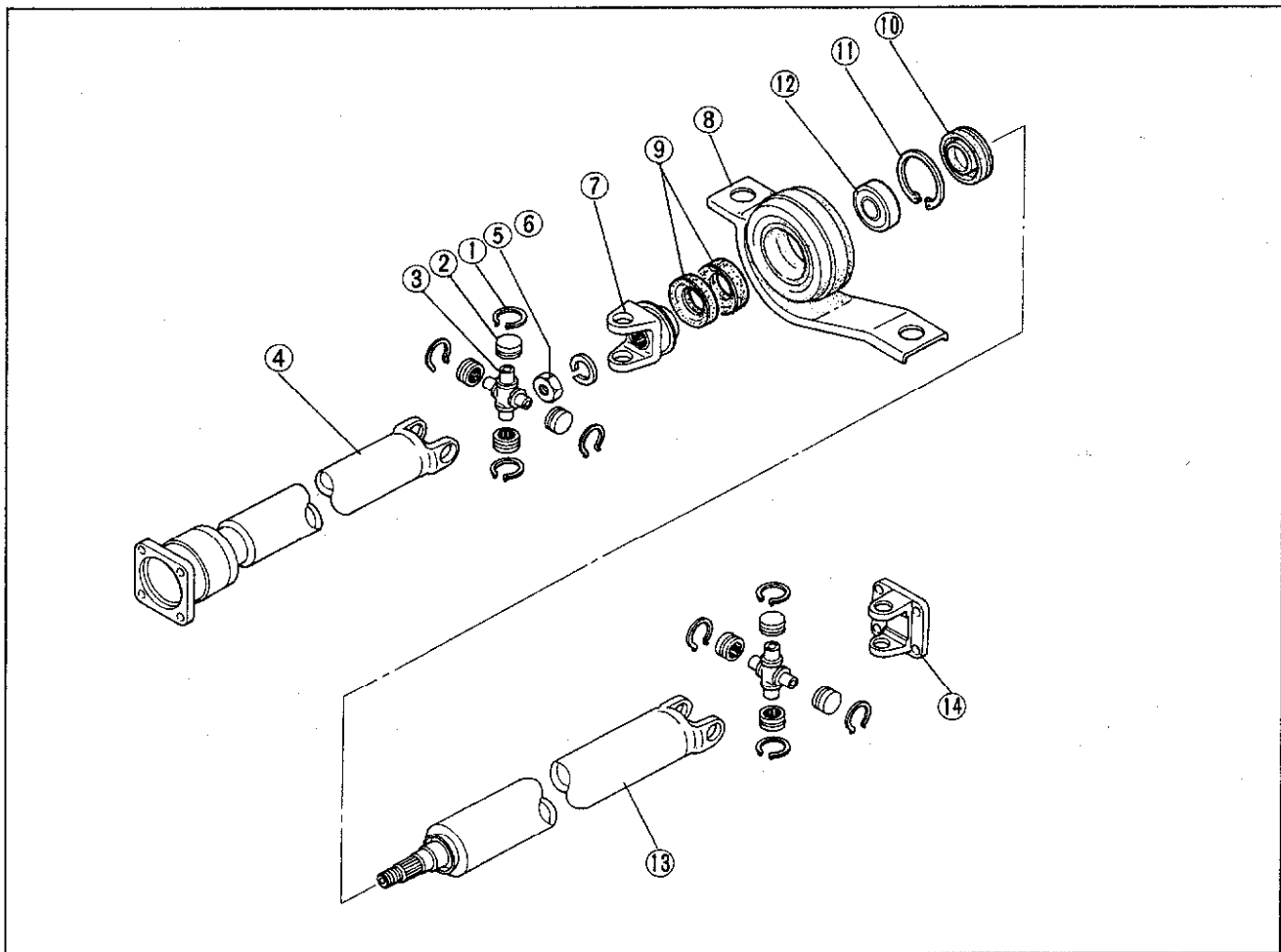
Before removing the propeller shaft, put matching marks on the flanges. Use the marks of proper reinstallation.

8 DISASSEMBLY

DISASSEMBLY

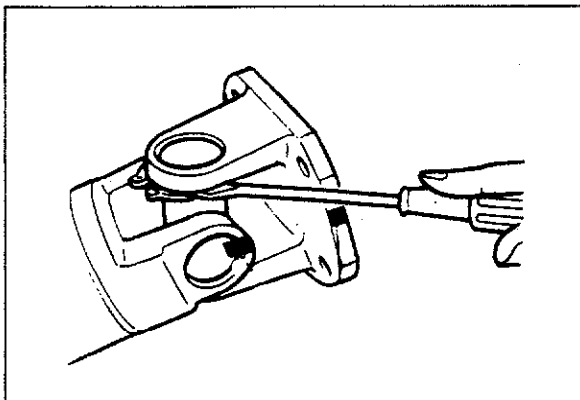
Disassemble the parts in the sequence shown in the figure.

63G08X-311



63G08X-312

- | | | |
|--------------------------|------------------------------------|--------------------------|
| 1. Snap ring | 6. Washer | 10. Dust seal (rear) |
| 2. Bearing | 7. Center yoke | 11. Snap ring |
| 3. Spider | 8. Center bearing support
ass'y | 12. Bearing |
| 4. Front propeller shaft | 9. Dust seal (front) | 13. Rear propeller shaft |
| 5. Lock nut | | 14. Rear yoke |



63G08X-313

Yoke

1. Place the propeller shaft in a vise.

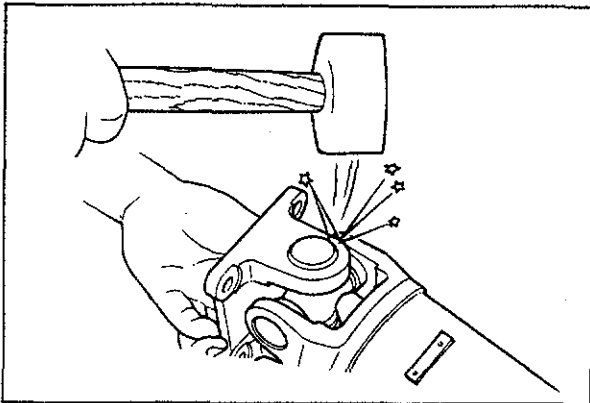
Caution

Use pads in the vise so as not to damage the propeller shaft.

2. Make matching marks on the propeller shaft, spider and yoke.

Caution

If the propeller shaft, spider and yoke are not correctly combined when assembled, vibration may result.



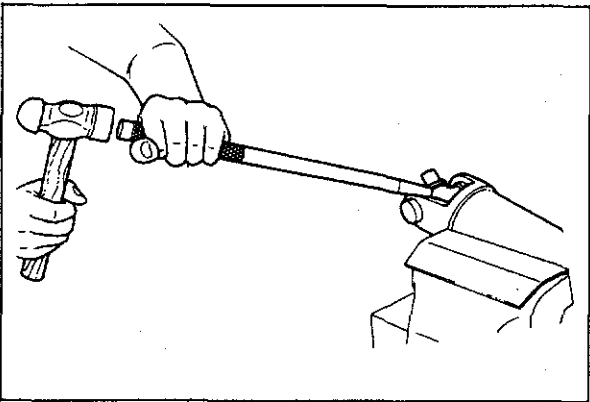
63G08X-314

3. Remove all snap rings using a flat-tip screwdriver.

Caution

The snap rings cannot be re-used.

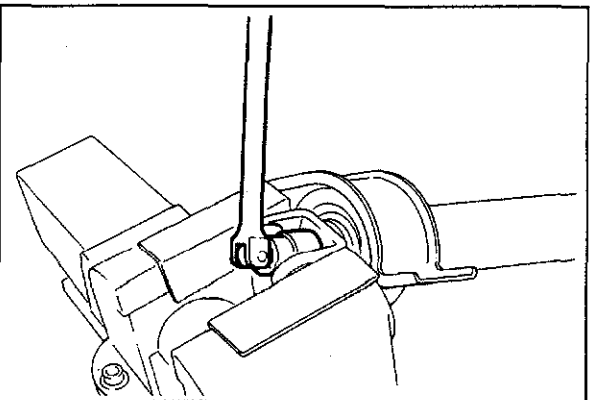
4. Remove the bearings by lightly tapping the yoke with a brass hammer as shown in the figure.
5. Remove the yoke.



63G08X-315

Spider

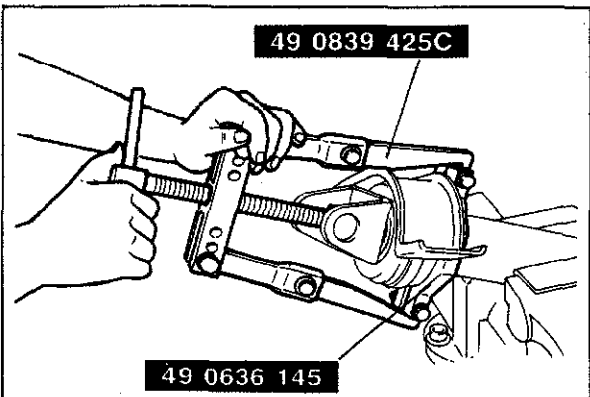
1. Remove the bearings as shown in the figure.
2. Remove the spider.



63G08X-316

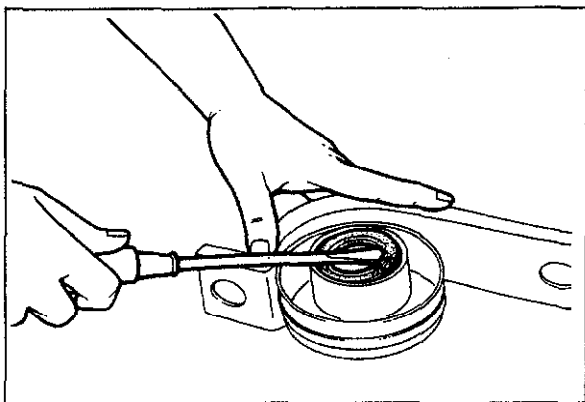
Center Yoke

1. Make mating marks on the yoke and shaft.
2. Remove the lock nut.



83U08X-002

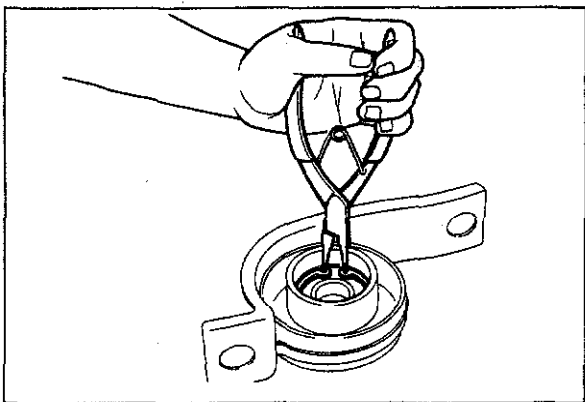
3. Remove the center yoke and center bearing support assembly using SST.



63G08X-318

Dust Seal

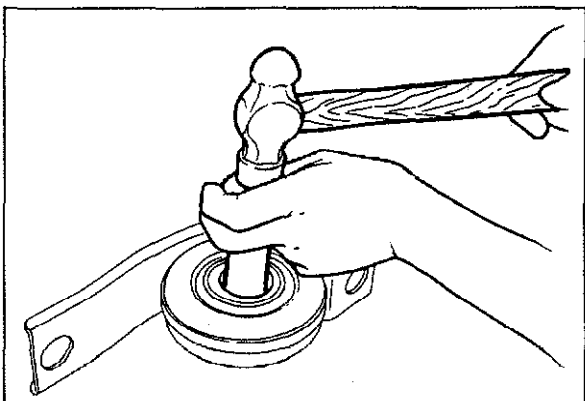
Remove the dust seals.



63G08X-319

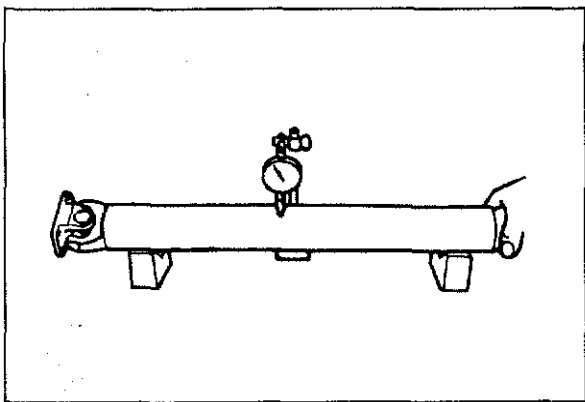
Bearing

1. Remove the snap ring using snap ring pliers.



63G08X-320

2. Remove the bearing using suitable pipe.



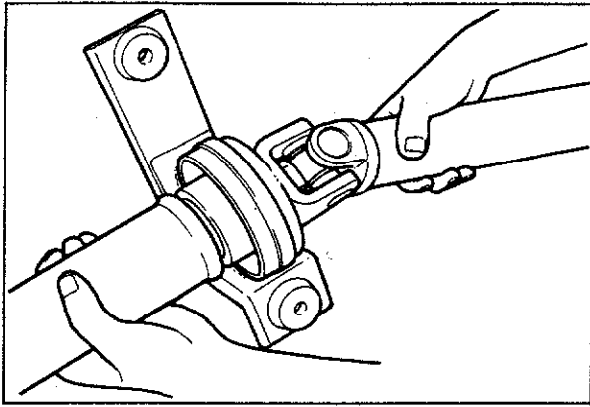
63G08X-321

INSPECTION

Check the following points. If a problem is found replace the necessary part.

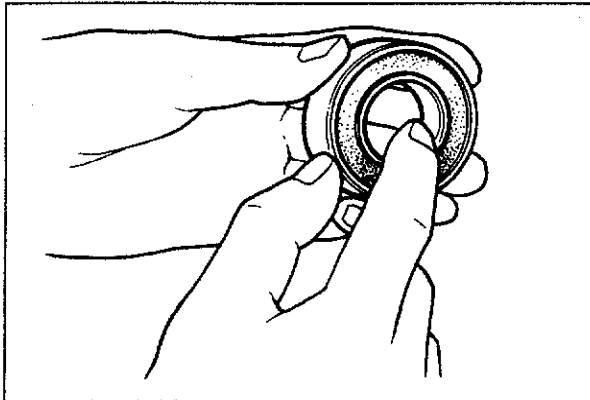
1. Runout of propeller shaft .

Runout limit: 0.4 mm (0.016 in)



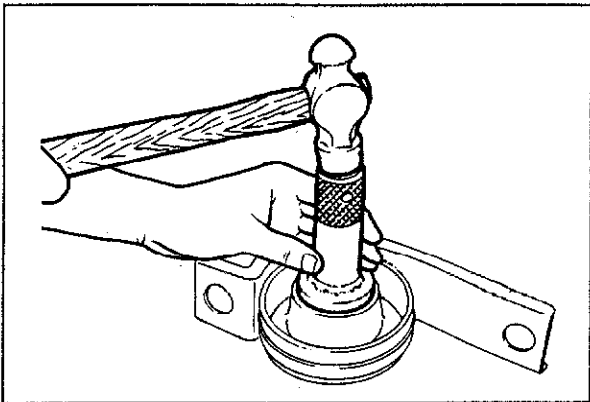
83U08X-003

2. Axial and perpendicular backlash of the universal joint.
3. Condition of universal joint operation.



63G08X-323

4. Turn the bearing while applying force in both directions to the inner race and check for binding or abnormal noise.



63G08X-324

ASSEMBLY

Assemble in the reverse order of disassembly.

Bearing

1. Install the bearing using suitable pipe.
2. Install the snap ring using snap ring pliers.

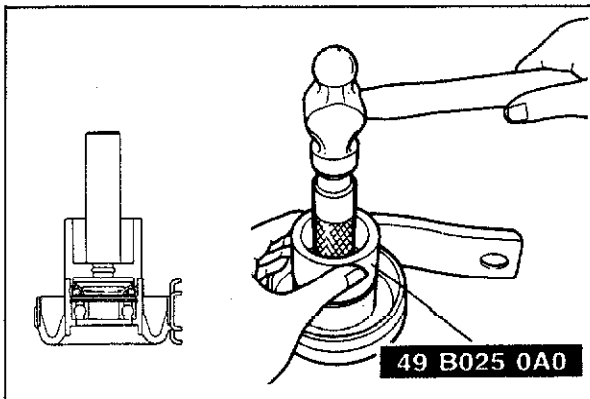
Dust Seal

1. Install the dust seal (rear and front side) using **SST**.

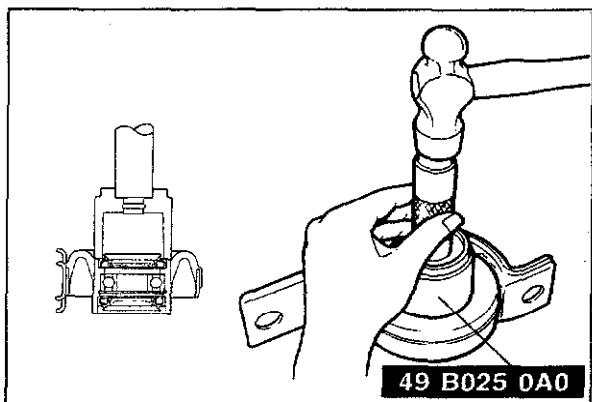
Note

Apply a coat of grease to the lip.

(Rear seal)

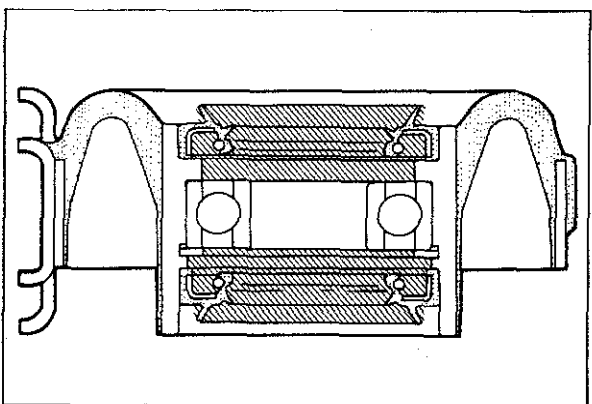


83U08X-004



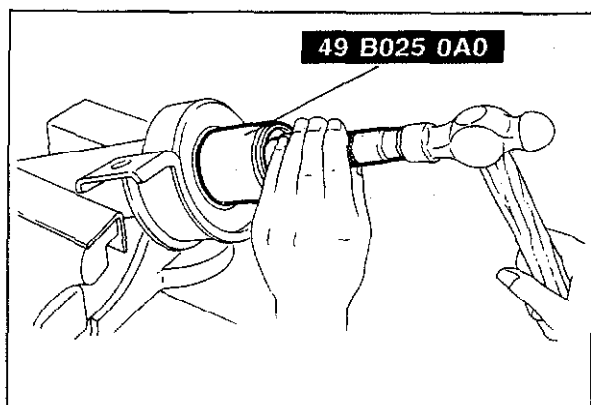
63G08X-326

(Front seal)



63G08X-327

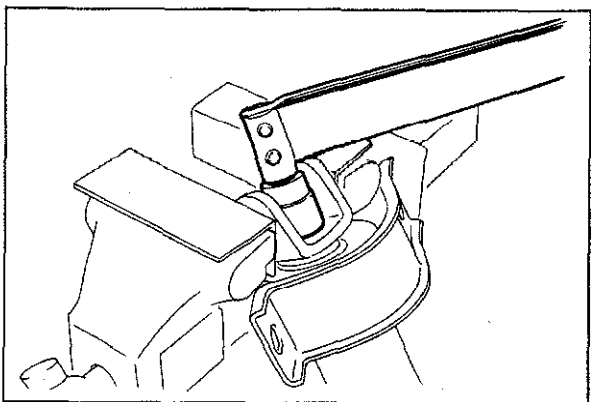
2. Apply grease (lithium base, NLGI No. 2) to the area indicated by the oblique lines.



83U08X-005

Center Bearing Support Assembly

Install the center bearing support assembly using SST.

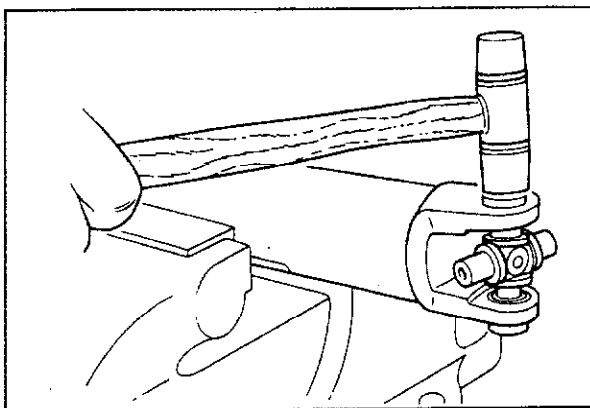


63G08X-329

Center Yoke

1. Align the matching marks on the yoke and shaft.
2. Install the center yoke.

**Tightening torque: 157—177 N·m
(16—18 m·kg, 116—130 ft·lb)**



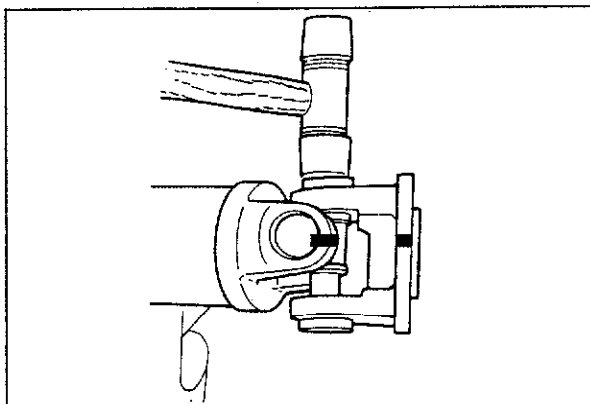
63G08X-330

Spider

1. Before assembly, coat the inside of the bearing cup and roller and the grease hole of the spider with grease (lithium base, NLGI No. 2).
2. While in a vise, set 2 bearings in the propeller shaft, and tap them in using a plastic hammer.

Caution

Align the propeller shaft and spider matching marks.



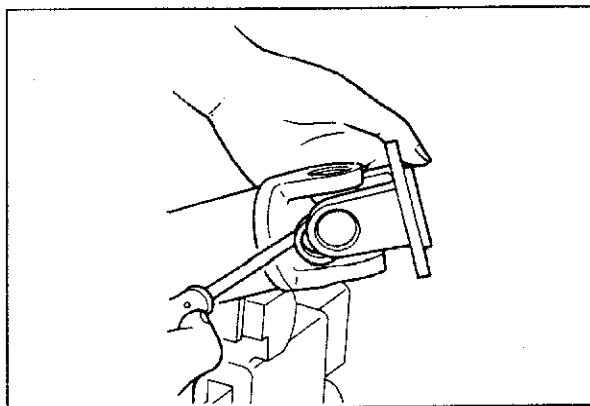
63G08X-331

Center Yoke

1. Place the center yoke on the propeller shaft and tap the bearing into the center yoke using a plastic hammer.

Caution

Align the spider and yoke mating marks.



63G08X-332

2. Install new snap rings.

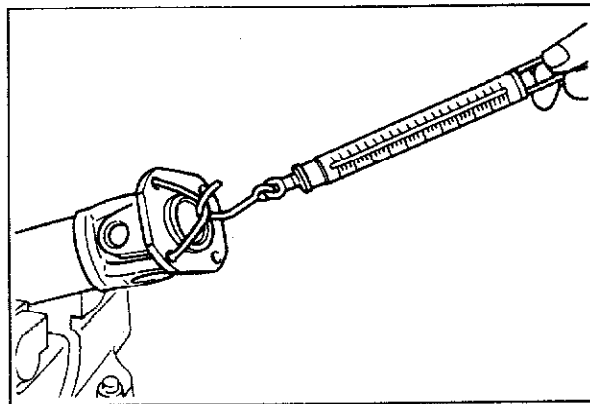
Caution

- a) The snap rings cannot be re-used.
- b) All 4 snap rings must be the same thickness.
- c) Check that each snap ring fits correctly into the groove.
- d) Select the snap rings so that the universal joint starting torque will be as specified.

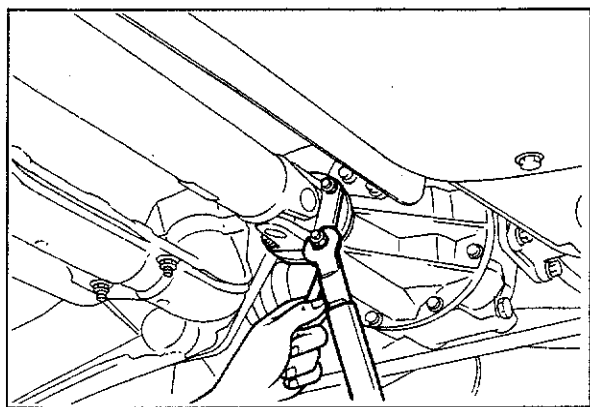
**Starting torque: 0.294—0.784 N·m
(3—8 cm·kg, 2.6—6.9 in·lb)**

Snap ring thicknesses (9 types)

1.22 mm (0.0480 in)	1.28 mm (0.0504 in)	1.34 mm (0.0528 in)
1.24 mm (0.0488 in)	1.30 mm (0.0512 in)	1.36 mm (0.0535 in)
1.26 mm (0.0496 in)	1.32 mm (0.0520 in)	1.38 mm (0.0543 in)



63G08X-333



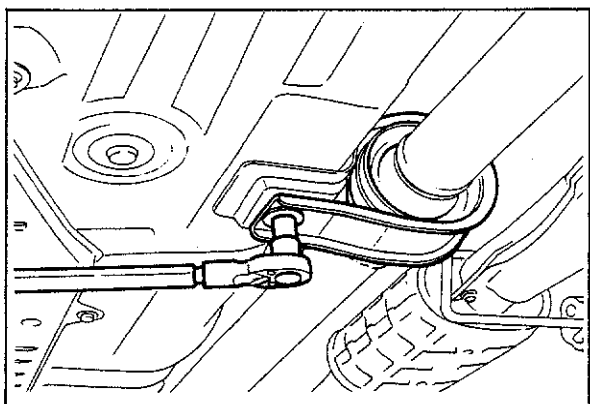
63G08X-334

INSTALLATION

Install in the reverse order of removal.

1. Align the matching marks on the companion flange of differential and yoke.
2. Install the rear of propeller shaft.

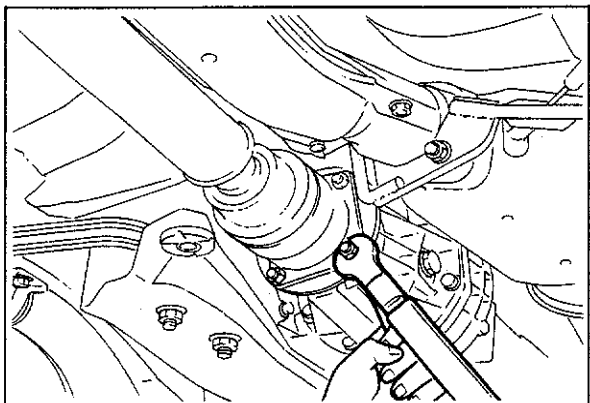
**Tightening torque: 27—30 N·m
(2.8—3.1 m·kg, 20—22 ft·lb)**



63G08X-335

3. Install the center bearing support assembly.

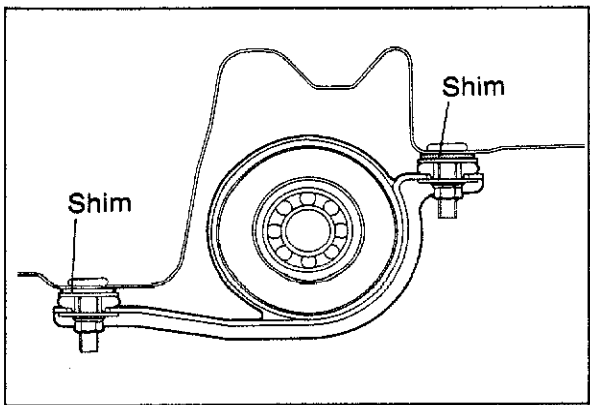
**Tightening torque: 37—52 N·m
(3.8—5.3 m·kg, 27—38 ft·lb)**



63G08X-336

4. Align the mating marks on the companion flange of the transfer unit and yoke, and install the front of propeller shaft.

**Tightening torque: 27—30 N·m
(2.8—3.1 m·kg, 20—22 ft·lb)**



63G08X-337

5. Check that the front and rear propeller shafts are aligned. If not, adjust the height of center bearing support with shims.

Shim thicknesses

1.6 mm (0.0630 in)	4.5 mm (0.1772 in)
3.2 mm (0.1260 in)	6.0 mm (0.2362 in)

Note:
Both shims must be the same thickness.

FRONT AND REAR AXLES

2WD/4WD

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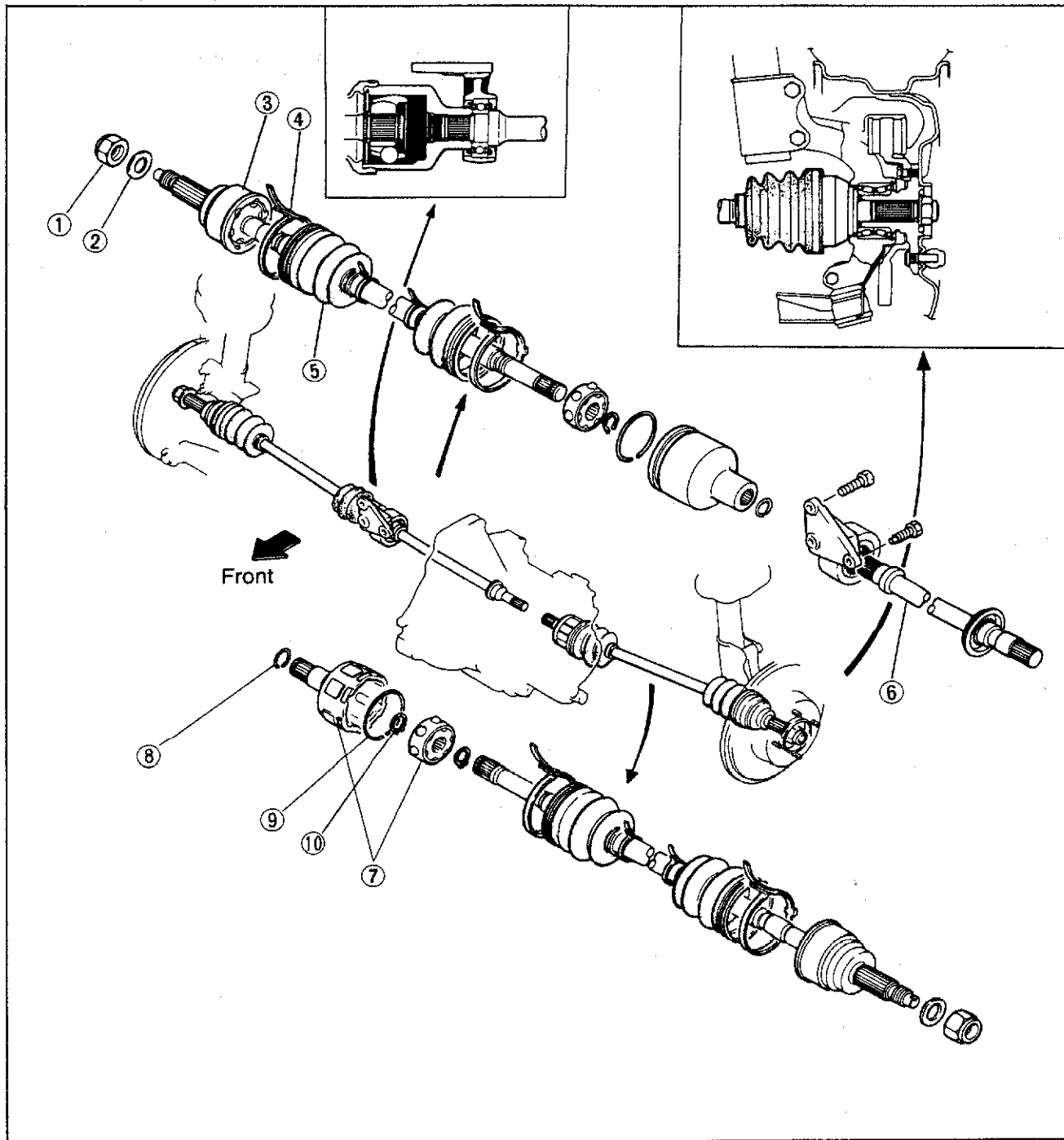
4WD

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83U09X-001

2WD/4WD OUTLINE

STRUCTURAL VIEW Driveshaft (Turbo)

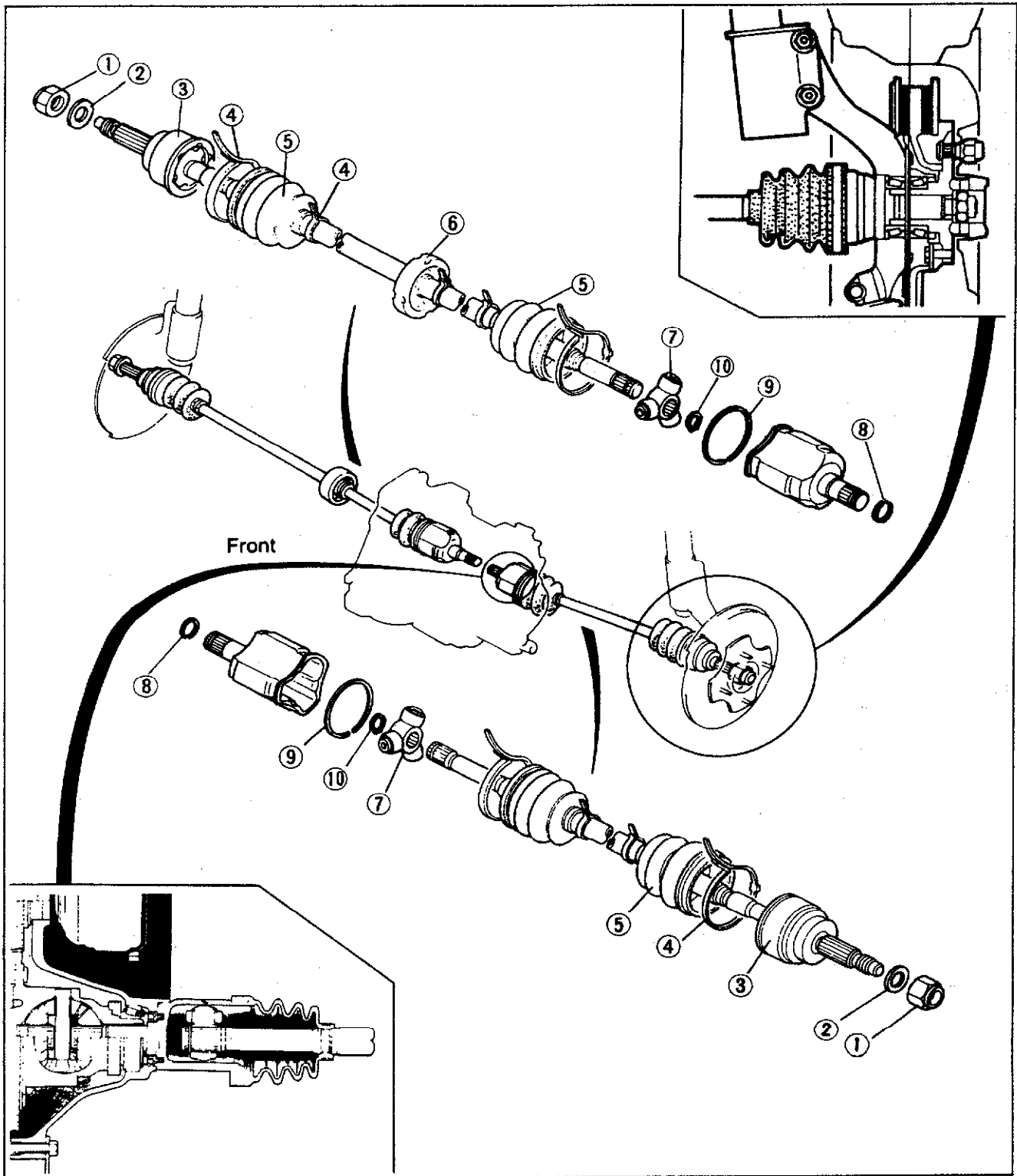


83U09X-002

1. Locknut
2. Washer
3. Ball joint (wheel side)
4. Boot band
5. Boot

6. Dynamic damper (right side only)
7. Ball joint assembly (differential side)
8. Clip
9. Clip
10. Snap ring

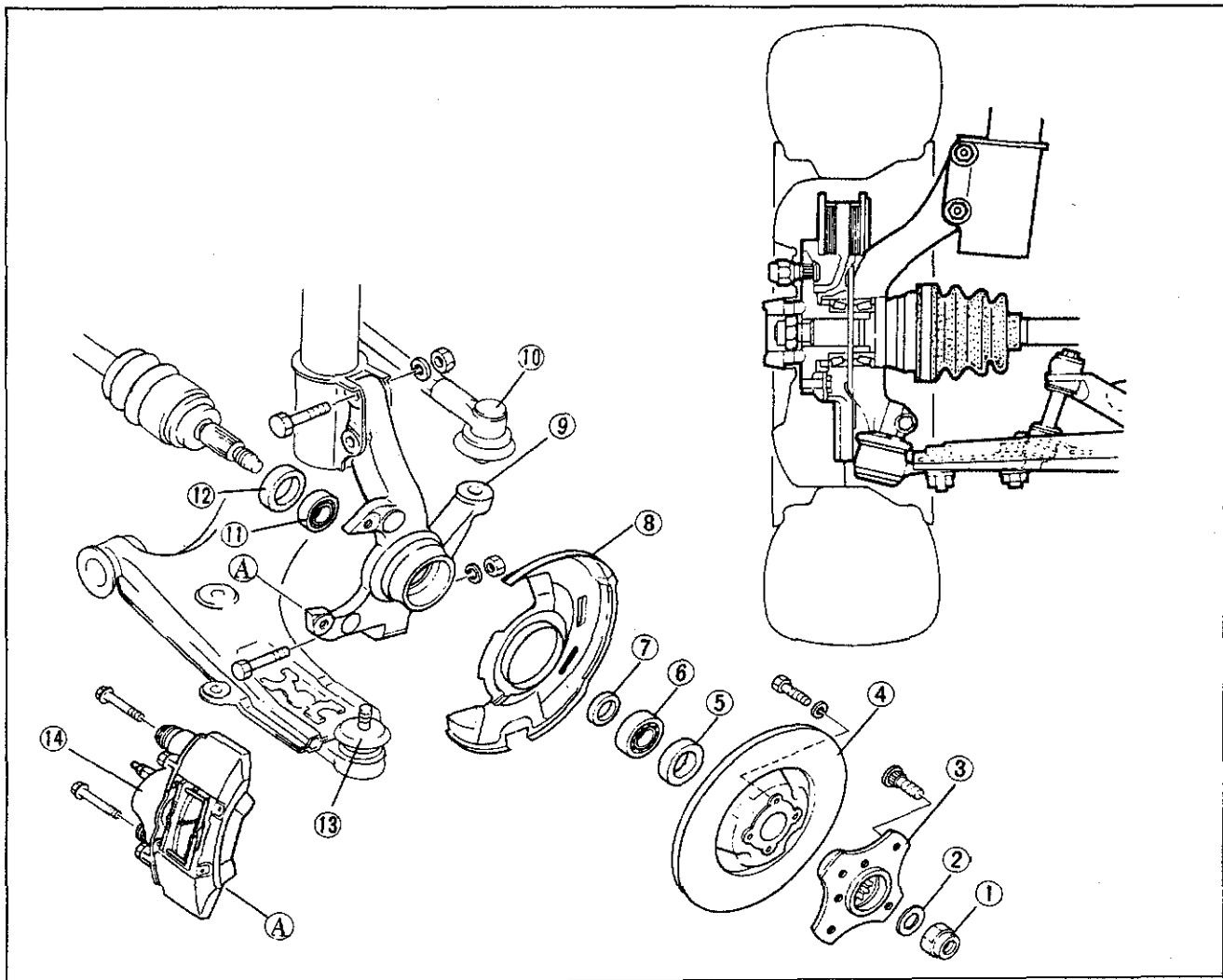
Driveshaft (Non-Turbo)



83U09X-003

- | | |
|----------------------------|--------------------------------------|
| 1. Locknut | 6. Dynamic damper (right side only) |
| 2. Washer | 7. Tri-pod joint (differential side) |
| 3. Ball joint (wheel side) | 8. Clip |
| 4. Boot band | 9. Clip |
| 5. Boot | 10. Snap ring |

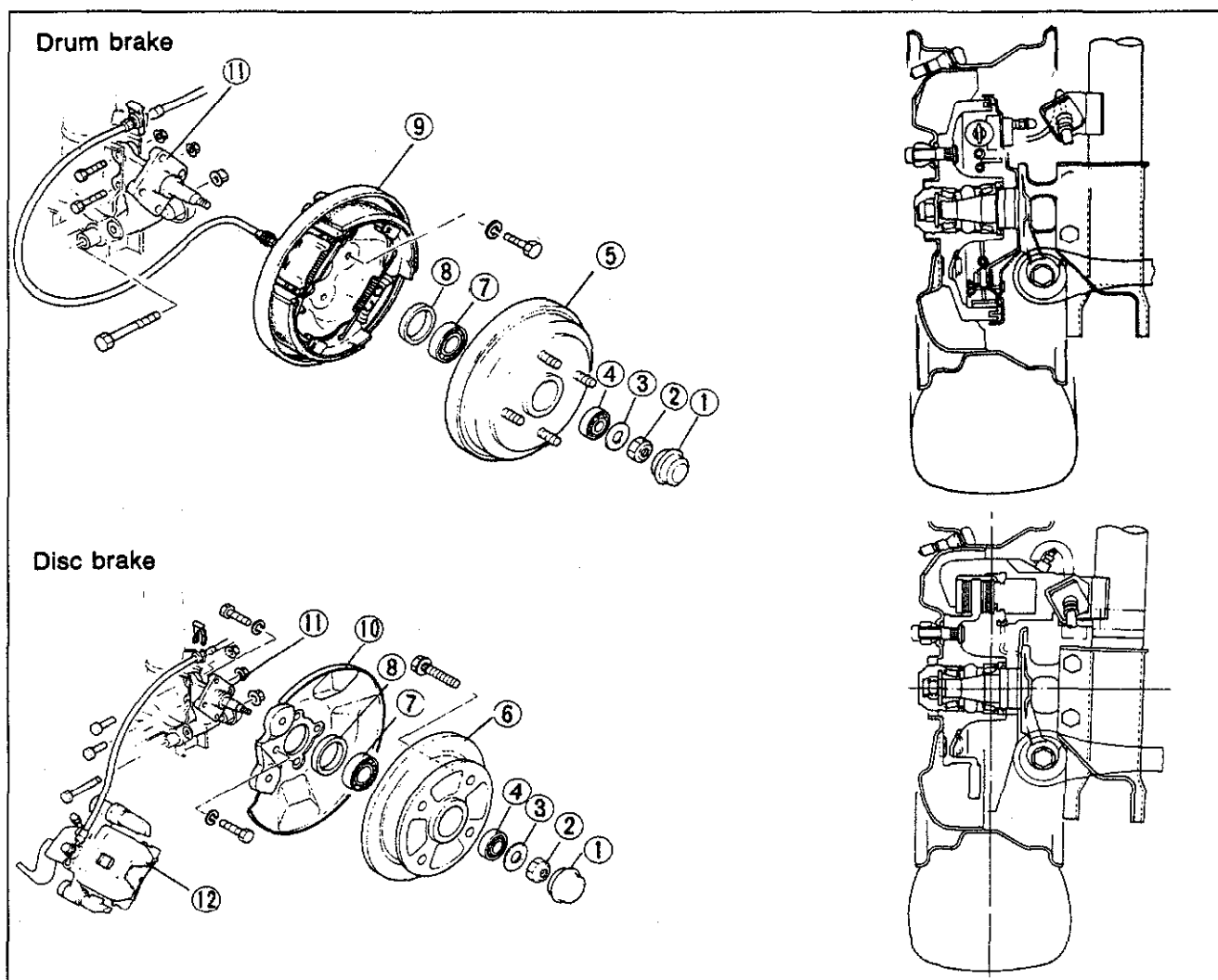
Front Axle



63U09X-004

- | | | |
|-------------------|------------------------|------------------------------|
| 1. Lock nut | 6. Outer wheel bearing | 11. Inner wheel bearing |
| 2. Washer | 7. Spacer | 12. Inner oil seal |
| 3. Wheel hub | 8. Dust cover | 13. Lower arm ball joint |
| 4. Disc plate | 9. Knuckle | 14. Caliper and pad assembly |
| 5. Outer oil seal | 10. Tie-rod end | |

Rear Axles



63U09X-005

- | | | |
|--------------------------|--------------------------|------------------------------|
| 1. Hub cap | 5. Brake drum | 9. Back plate |
| 2. Lock nut | 6. Disc plate | 10. Dust cover |
| 3. Washer | 7. Wheel bearing (inner) | 11. Spindle |
| 4. Wheel bearing (outer) | 8. Oil seal | 12. Caliper and pad assembly |

SPECIFICATIONS

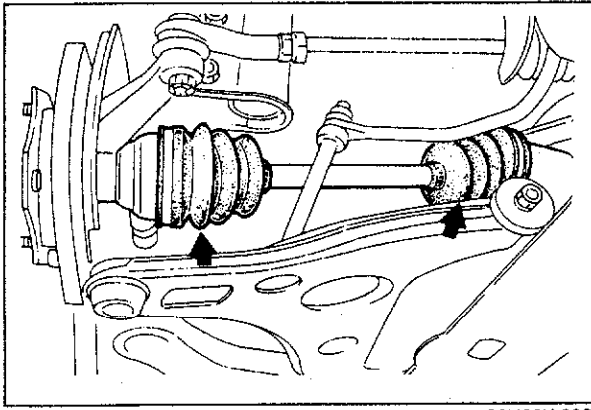
Engine type			B6 EGI	B6 DOHC	
Item				2WD	4WD
Length of driveshaft	ATX	Right side mm (in)	907.7 (35.74)	—	—
		Left side mm (in)	628.7 (24.75)	—	—
	MTX	Right side mm (in)	907.5 (35.73)	561.0 (22.09)	564.0 (22.20)
		Left side mm (in)	628.5 (24.74)	614.0 (24.17)	629.0 (24.76)
Driveshaft diameter mm (in)			22.0 (0.87)	22.5 (0.89)	21.0 (0.83)
Length of jointshaft mm (in)			—	386.9 (15.23)	384.9 (15.15)

83U09X-004

TROUBLESHOOTING GUIDE

Problem	Possible Cause	Remedy
Faulty operation of driveshaft	Broken ball joint Broken tri-pod joint Worn or seized joint	Replace Replace Replace
Abnormal noise from driveshaft	Insufficient grease in joint or spline Excessive backlash on spline Worn joint	Replenish or replace Replace Replace
Steering wheel pulls. (While driving on a straight and level road, the steering wheel pulls toward either right or left side)	Incorrect front wheel bearing preload adjustment Bent steering linkage Fatigued coil spring Lower arm bushing worn or damaged Bent knuckle arm Bent lower arm or loose mounting Incorrect toe-in adjustment Improper tire air pressure Unevenly worn tires (difference in wear between left and right tires) Brake dragging	Adjust or replace Refer to Section 10 Refer to Section 13 Refer to Section 13 Replace Refer to Section 13 Refer to Section 13 Refer to Section 12 Refer to Section 12 Refer to Section 11
Unstable handling	Incorrect wheel bearing preload adjustment Bent steering linkage Joint in steering system worn or damaged Incorrect steering pinion preload adjustment Fatigued coil spring Faulty shock absorbers Lower arm bushing worn or damaged Incorrect toe-in adjustment (front or rear) Improper tire air pressure Wheels bent or unbalanced	Adjust or replace Refer to Section 10 Refer to Section 10 Refer to Section 10 Refer to Section 13 Refer to Section 13 Refer to Section 13 Refer to Section 13 Refer to Section 12 Refer to Section 12
Excessive steering wheel play	Faulty front wheel bearing Incorrect steering pinion preload adjustment Rack and pinion worn Joint in steering system worn or damaged Lower arm bushing worn or damaged	Adjust Refer to Section 10 Refer to Section 10 Refer to Section 10 Refer to Section 13
Tires excessively worn or worn unevenly	Incorrect wheel bearing preload adjustment (excessively loose) Incorrect toe-in adjustment Improper tire air pressure Unbalanced wheel(s)	Adjust Refer to Section 13 Refer to Section 12 Refer to Section 12
Abnormal noise from axle	Faulty wheel bearing	Replace

83U09X-005



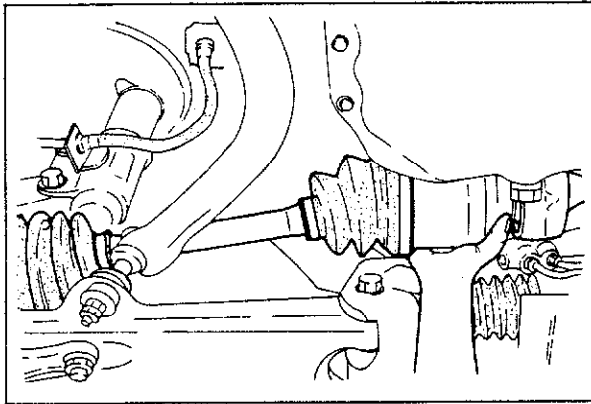
83U09X-006

ON-VEHICLE MAINTENANCE

DRIVESHAFT

Boot

Check the boots on the driveshaft for cracks, damage, leaking grease or loose boot bands. If any damage is found, replace the boot.

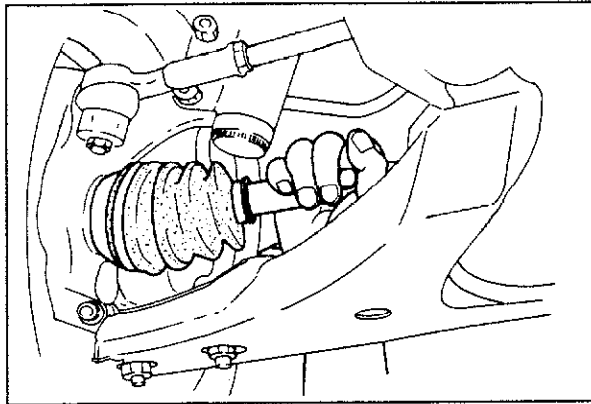


83U09X-007

Spline Looseness

Turn the driveshaft by hand and make sure the spline and joint are not excessively loose.

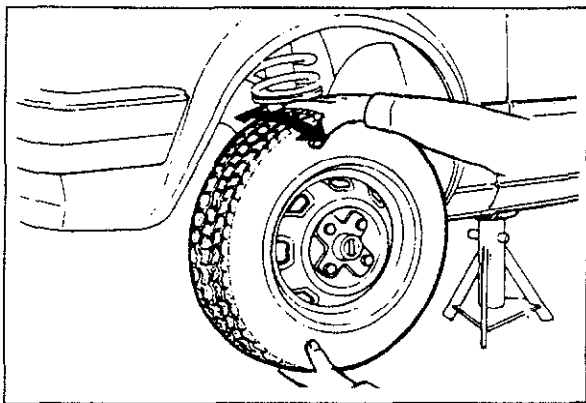
If damage is found or joint is loose, replace or repair.



83U09X-008

Twisted or Cracked

Make sure the driveshaft is not twisted or cracked. Replace if necessary.

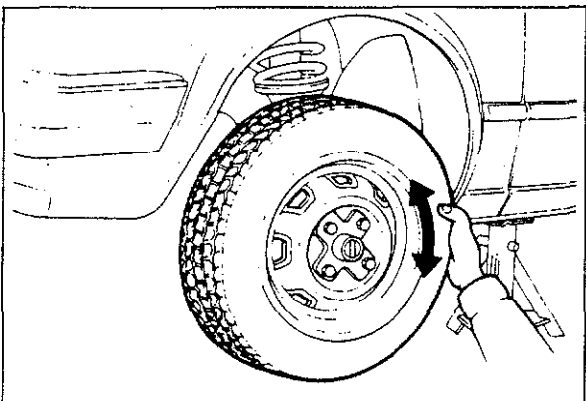


63U09X-011

FRONT AXLE Wheel Bearing End Play

1. Raise the front of the vehicle and check for loose front wheel bearings by rocking the tires at the top and bottom.

End play: 0 mm (0 in)



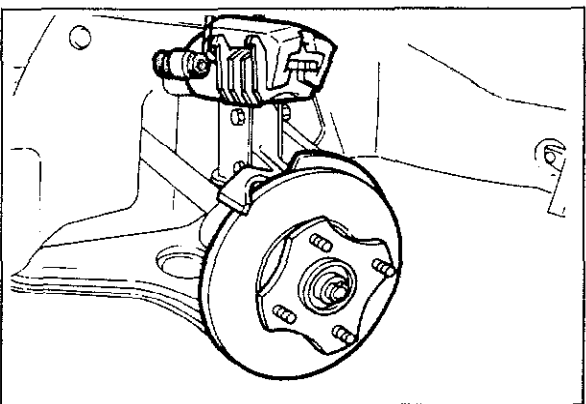
83U09X-009

2. Spin the tire quickly by hand and make sure the tire turns smoothly with no abnormal noise from the bearing.

Note

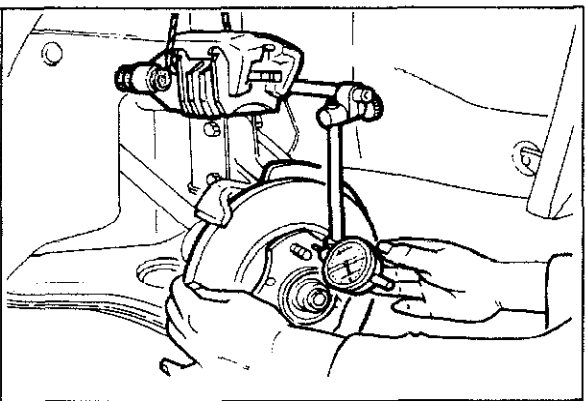
Take care not to be confused by the looseness of the lower arm ball joint.

If any abnormal looseness or noise is found, disassemble the hub and knuckle and adjust the preload.



63U09X-013

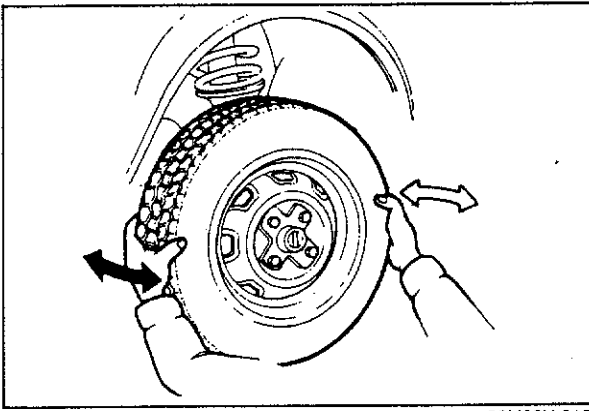
3. Remove the wheel, and remove the front disc brake assembly and hang it from the shock absorber.



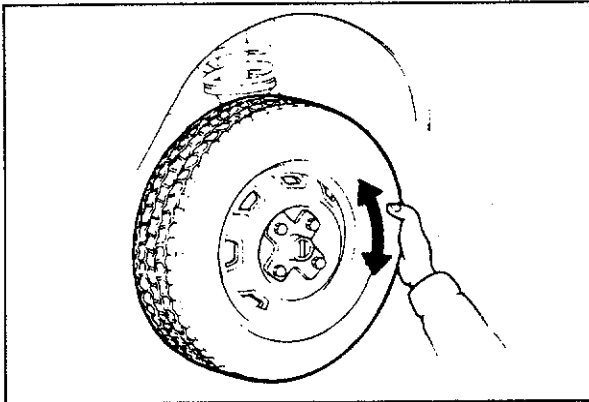
83U09X-010

4. Set a dial gauge against the wheel hub, then push and pull the wheel hub in the axial direction and measure the axial play of the wheel bearing. If the play exceeds the specified limit, adjust the preload or replace the bearing.

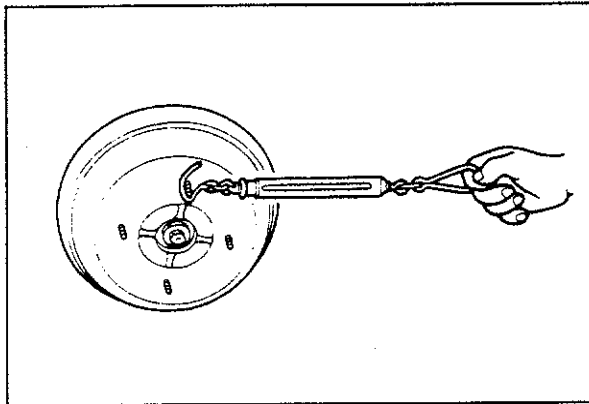
Axial play: 0 mm (0 in)



63U09X-015



83U09X-011



83U09X-012

REAR AXLE

Wheel Bearing End Play

1. Jack up the rear of the vehicle and support it with safety stands. Rock the tire by hand and confirm that there is no bearing play.

Wheel bearing axial play: 0 mm (0 in)

2. Spin the tire quickly by hand, and confirm that it spins smoothly and that there is no abnormal noise from the bearing.
If any problem is found, adjust or replace the bearing.

Bearing Preload

1. Remove the wheel and tire.
2. Hook a spring scale on a hub bolt and measure the torque at which the hub begins to rotate.

Note

Make sure the brakes are not dragging.

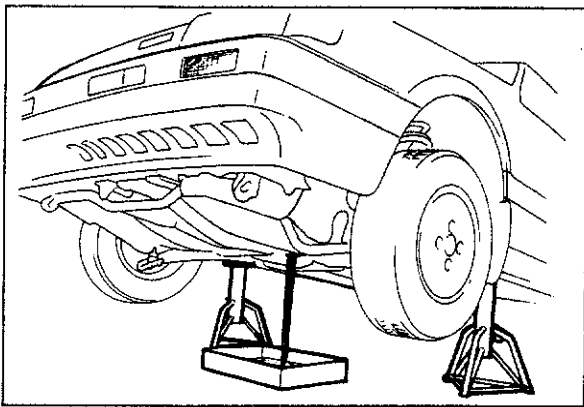
Bearing preload (Rotation starting torque):

0.15—0.49 N·m

(1.5—5 cm·kg, 0.11—0.36 ft·lb)

2.6—8.5 N (0.26—0.87 kg, 0.57—1.91 lb)

If the preload is not within specification, adjust it.

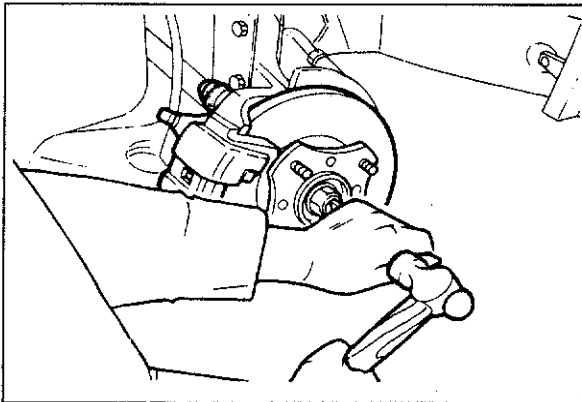


63U09X-018

DRIVESHAFT

REMOVAL

1. Jack up the front of the vehicle and support it with safety stands.
2. Drain the transaxle oil.
3. Remove the front wheels.
4. Remove the side covers.

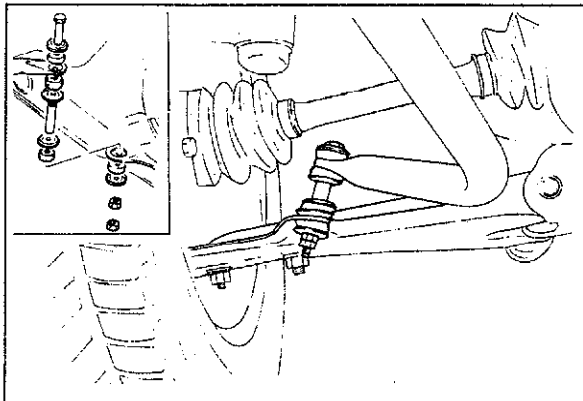


63U09X-019

5. Raise the nut tab and loosen the driveshaft lock-nut, but do not remove it.

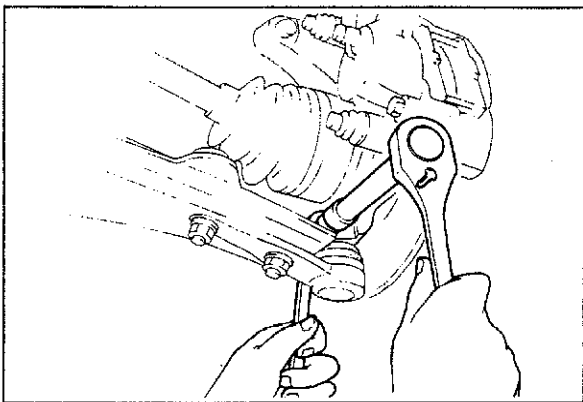
Note

When loosening the nut, lock the hub by applying the brakes.



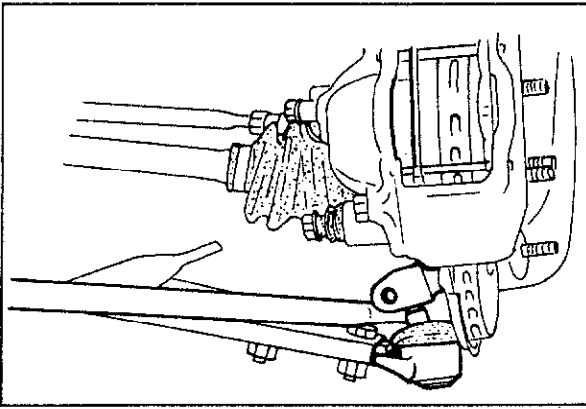
63U09X-020

6. Remove the stabilizer bar control link from the lower arm (only MTX).



63U09X-021

7. Remove the clamp bolt and nut.

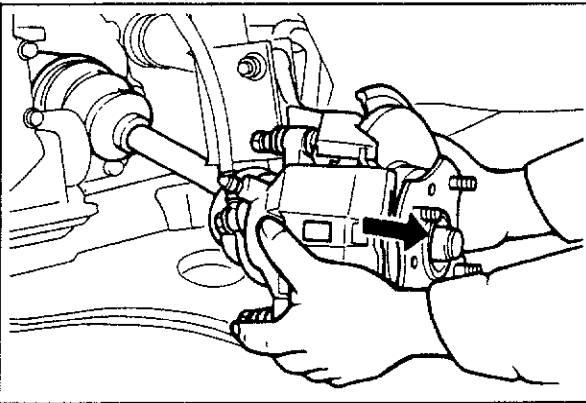


63U09X-022

8. Pry down the lower arm and disconnect the ball joint.

Note

Be careful not to damage the ball joint dust boot.



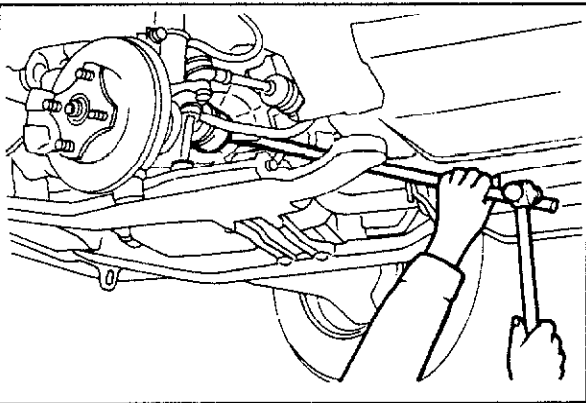
63U09X-023

9. Separate the driveshaft from the transaxle.

MTX

Separate the shaft by pulling the hub outward. Make sure not to use too much force at once, increase the force gradually. (If the shaft is pulled out too quickly, the oil seal may be damaged.)

If it is difficult to separate, do as follows:

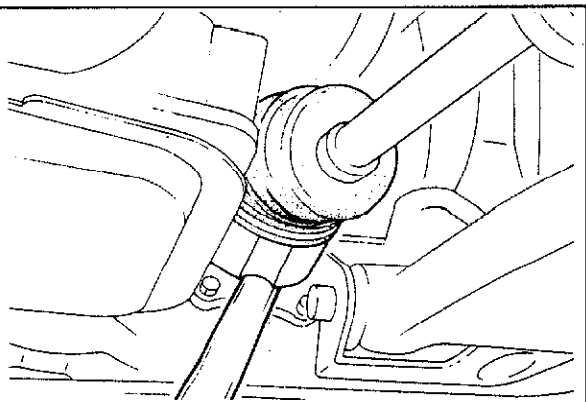


63U09X-024

Insert a bar between the driveshaft and the transaxle case as shown in the figure, lightly tap the end of the bar.

Note

Do not insert the bar too far in between the shaft and the case; doing so might damage the lip of the oil seal.



63U09X-025

ATX

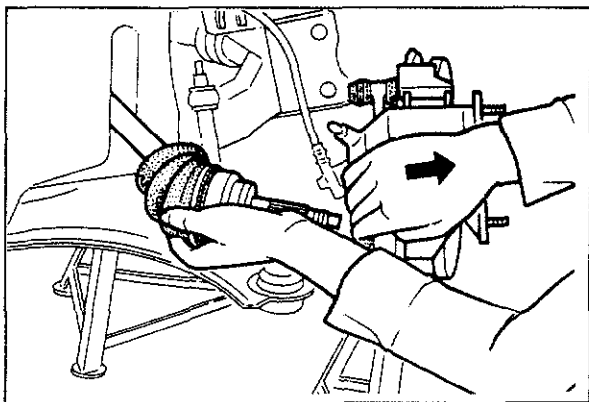
Do not pull the hub outward as for the MTX.

Insert a bar between the drive shaft and the bearing housing, and tap the end of the bar.

Note

Do not insert the bar too far in between the shaft and the housing; doing so might damage the lip of the oil seal.

9 DRIVESHAFT

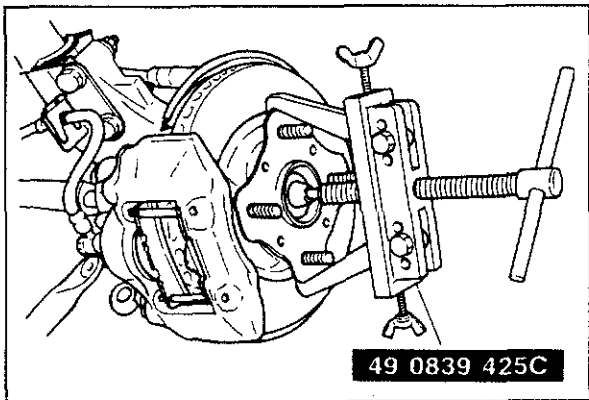


83U09X-026

10. Remove the driveshaft lock nut.
11. Pull the driveshaft out of the wheel hub.

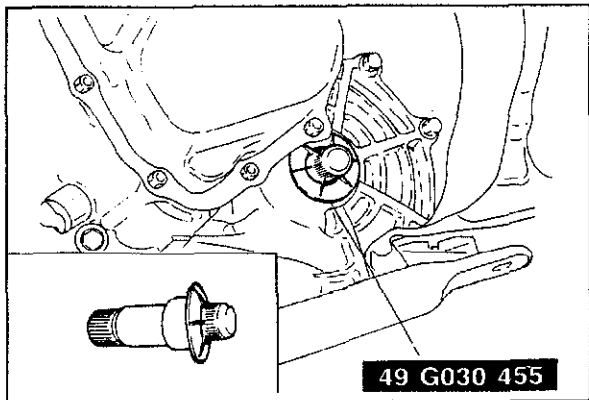
Note

Be especially careful not to damage the oil seal at this time.



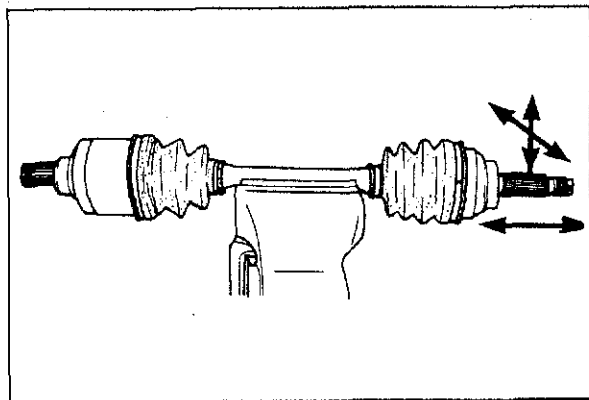
83U09X-024

If the driveshaft is stuck to the front hub and cannot be removed, use the **SST** to push the shaft out.



83U09X-025

12. Pull the driveshaft out of the transaxle.
13. After removing the driveshaft, install the **SST** the transaxle, thus preventing dirt from getting into the transaxle.



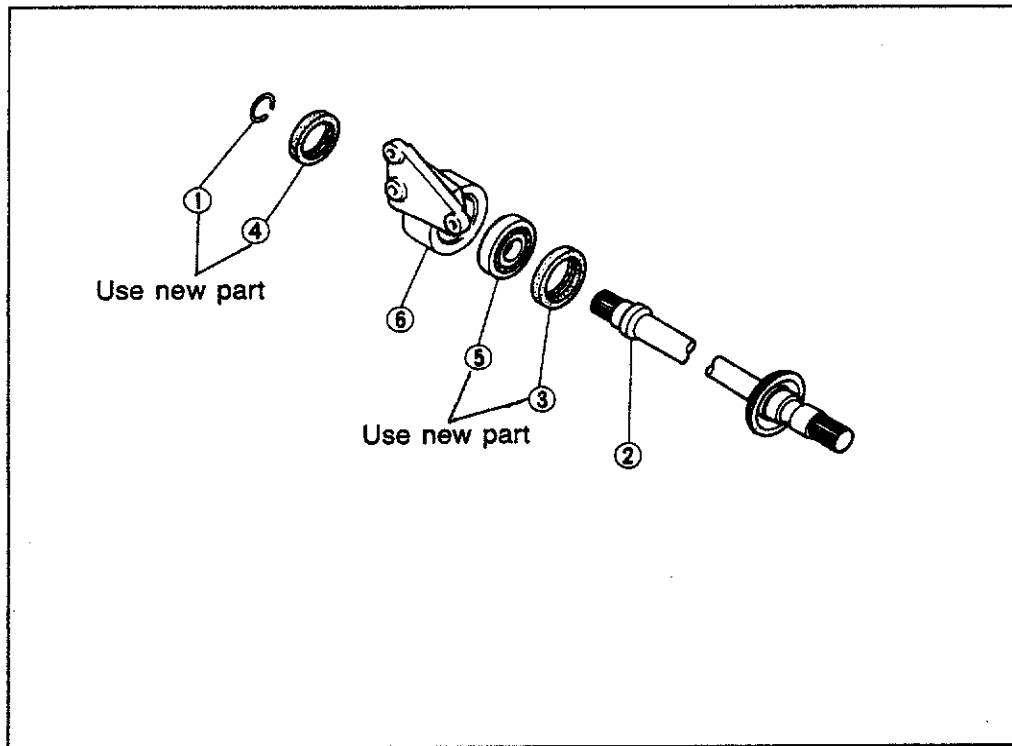
83U09X-013

14. Before disassembling the driveshaft, make sure the joint moves smoothly in the direction indicated by the arrows.
If a problem is found, replace the parts.

JOINTSHAFT

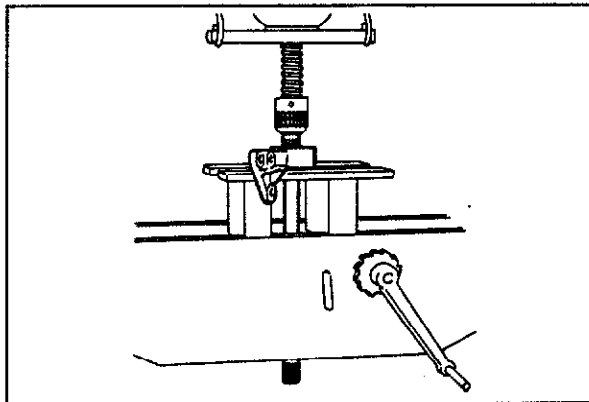
Disassembly and Assembly

Disassemble in the sequence shown in the figure.



1. Clip
2. Joint shaft
3. Oil seal
4. Oil seal
5. Bearing
6. Bracket

83U09X-014



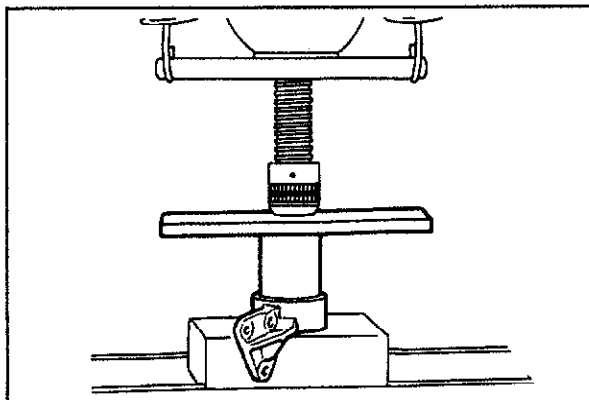
63G09X-312

Jointshaft

Support the bearing and remove the jointshaft, using a press.

Caution

Hold the shaft by hand, do no let it drop.



63G09X-313

Bearing

Support the bracket and remove the bearing using a press.

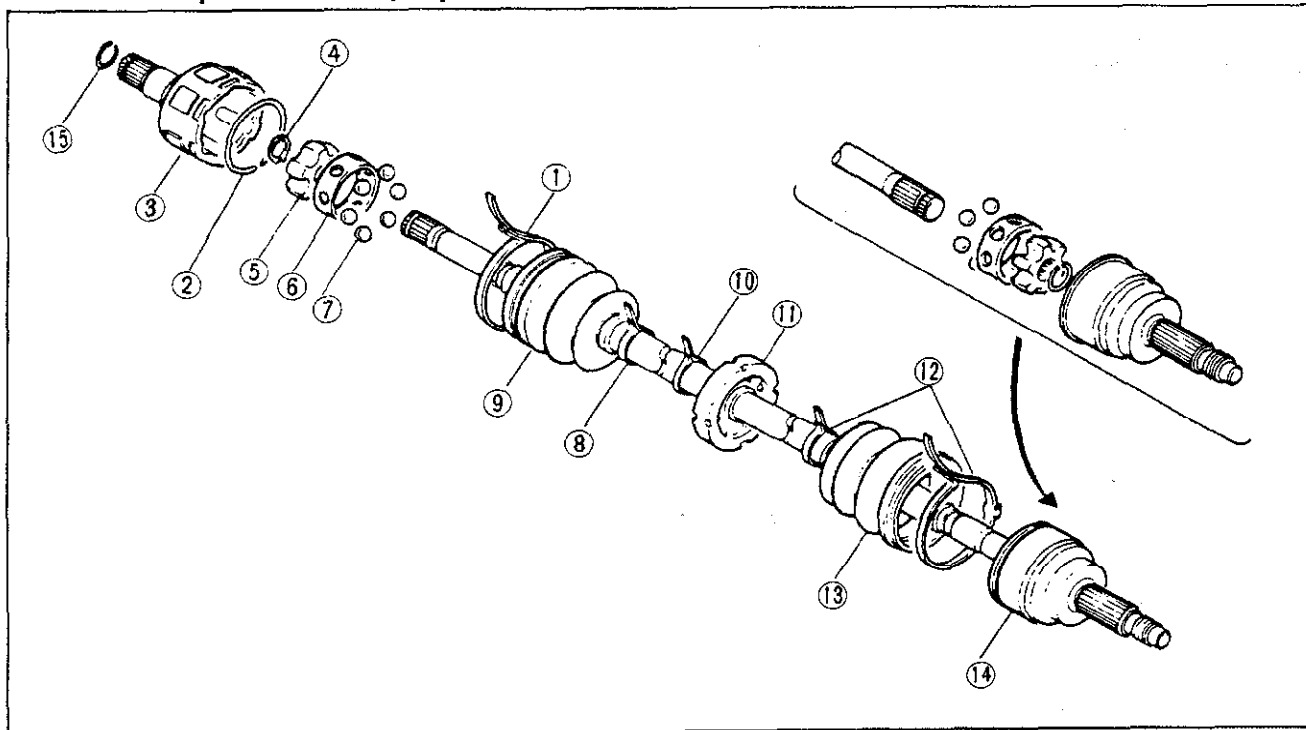
9 DRIVESHAFT

DISASSEMBLY (Turbo)

Disassemble in the order shown.

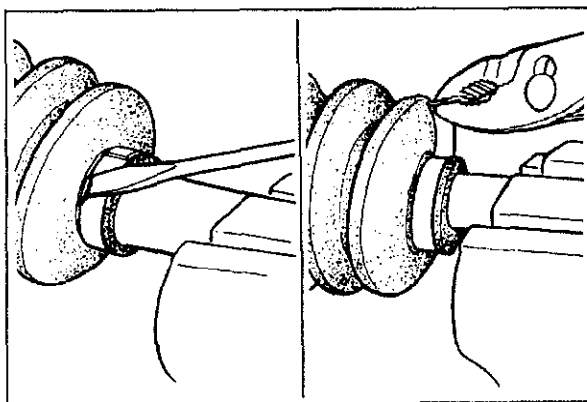
Note

- a) Clamp the shaft in a vice. Use wood in the vice to avoid damage.
- b) Do not allow dust or foreign matter to enter the joint during disassembly or assembly.
- c) Do not disassemble the ball joint at the wheel side. Do not wipe off the grease if there is no problem.
- d) Do not remove the clip which is used to secure the outer ring to the ball joint at the differential side if there is no problem.
If the clip is removed, replace it with a new one.



53G09X-005

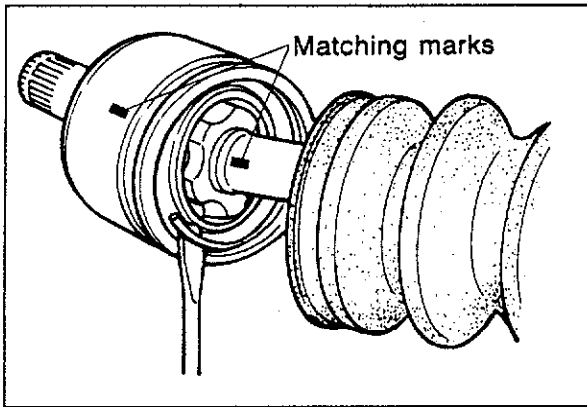
- | | |
|--|--------------------------------------|
| 1. Boot band | 8. Boot band |
| 2. Clip (for locking the ball joint at the differential side outer ring) | 9. Boot |
| 3. Outer ring | 10. Boot band (right side only) |
| 4. Snap ring | 11. Dynamic damper (right side only) |
| 5. Inner ring | 12. Boot band |
| 6. Cage | 13. Boot |
| 7. Ball | 14. Shaft and ball joint assembly |
| | 15. Clip |



63U09X-032

Boot Band

To remove the boot band, pry up the locking clip with a screwdriver and then raise the end of the band.



63U09X-033

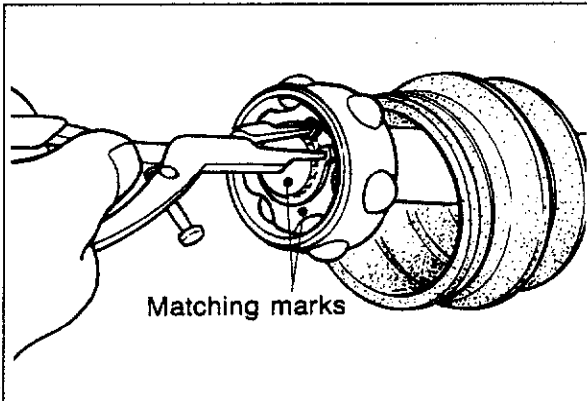
Clip

1. Make matching marks on the drive shaft and outer ring.

Note

Mark with paint, do not use a punch.

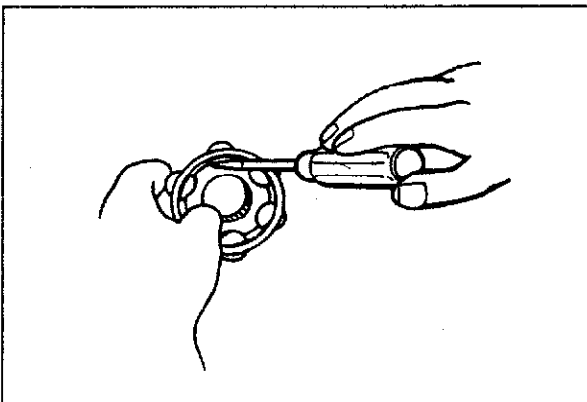
2. Remove the clip with a flat-tipped screwdriver.



63U09X-034

Snap Ring

1. Use a punch and make matching marks on the driveshaft end and inner ring.
2. Remove the snap ring with snap ring pliers.

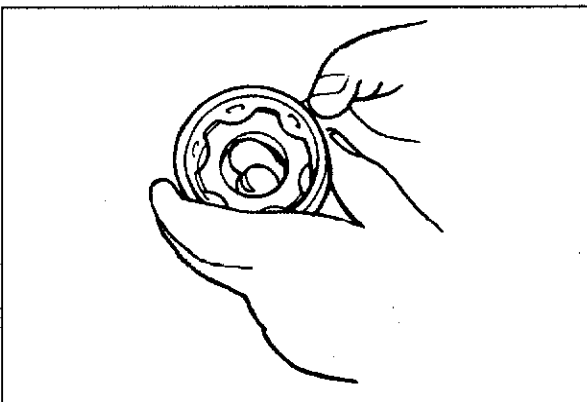


63U09X-035

Balls, Inner ring, and Cage

Disassemble in the following order:

1. Insert a flat-tipped screwdriver between the inner ring and the cage to remove the balls.



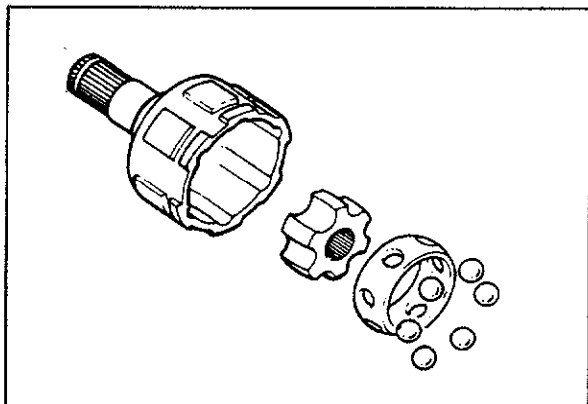
63U09X-036

2. Make matching marks on the inner ring and cage.

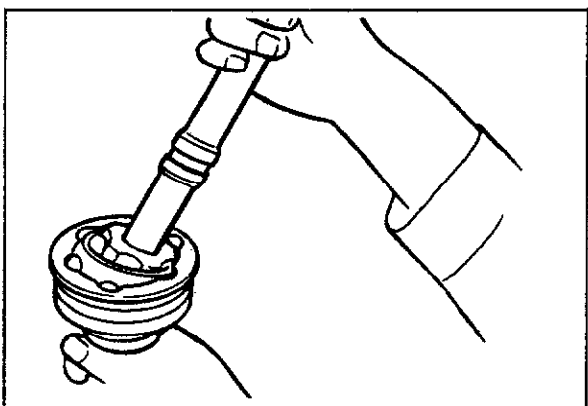
Note

Mark with paint, do not use a punch.

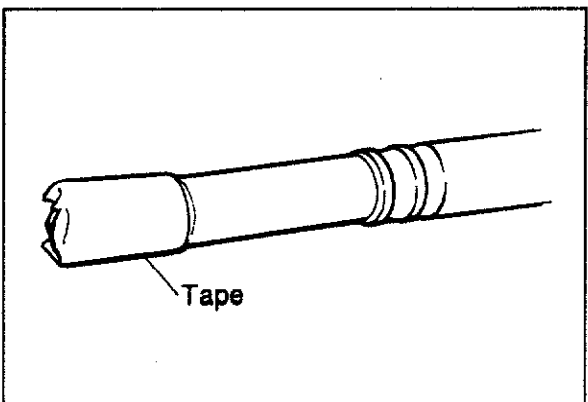
3. Turn the cage approximately 30 degrees, and then pull it away from the inner ring.



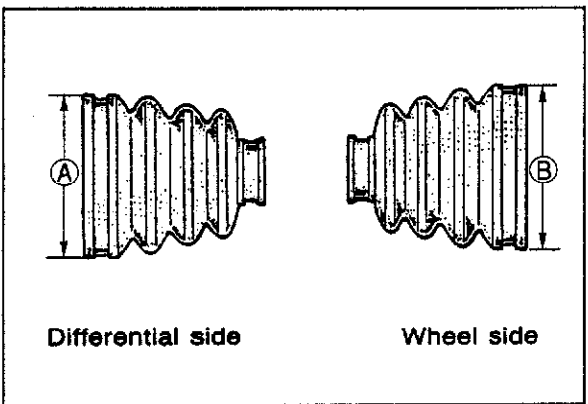
83U09X-015



63U09X-038



83U09X-016



63U09X-040

INSPECTION (Turbo)

Wash the disassembled parts, check and replace all damaged parts.

Inspect for:

1. Twisted, bent or damaged shaft.
2. Worn or scored splines.
3. Worn, rusted or damaged ball joint.
4. Excessive looseness, seizure or rust in the ball joint.
5. Inspect the boots for cracks, damage or deterioration.

ASSEMBLY (Turbo)

Assemble in the reverse order of disassembly and note the following:

Note

Install dynamic damper on right hand side driveshaft before assembling joint to driveshaft.

Ball Joint

1. Apply the specified grease (molybdenum disulfide) to the joint. Do not use any other type of grease.

Note

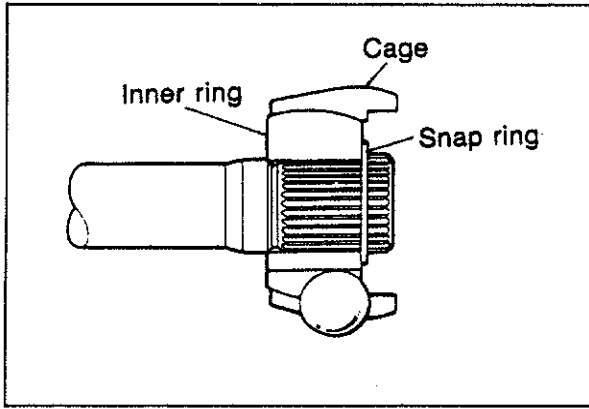
The color of this grease is black, and it is supplied in the boot kit and joint kit.

2. Before putting the boot onto the shaft, put tape on the shaft splines.
3. The shape of the ball joint boots at the wheel side and the differential side differ, so be careful not to install incorrectly.

mm (in)

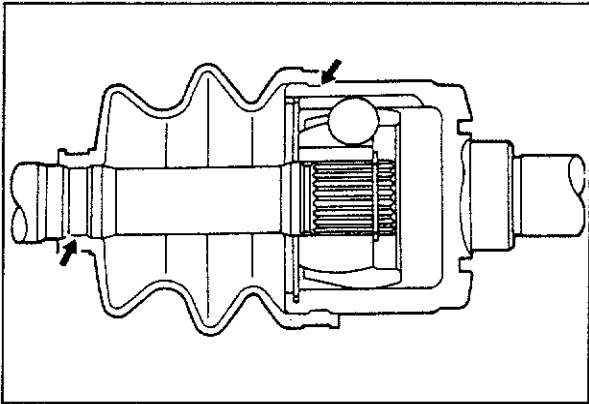
	A	B
Non-Turbo	83.6 (3.29)	90.4 (3.56)
Turbo	95.5 (3.76)	92.4 (3.64)

4. Fill the ball joint at the wheel side with the same amount of specified grease that had been wiped off.



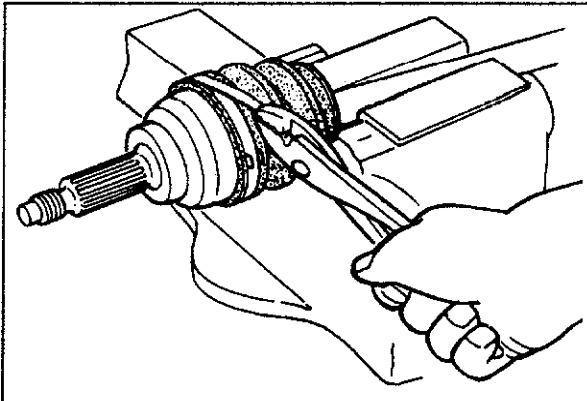
63U09X-041

5. Align the matching marks, then install the cage and inner ring on the shaft.
6. Install the snap ring.



63U09X-042

7. Carefully fit the boot to the grooves in the shaft and outer ring.



63U09X-043

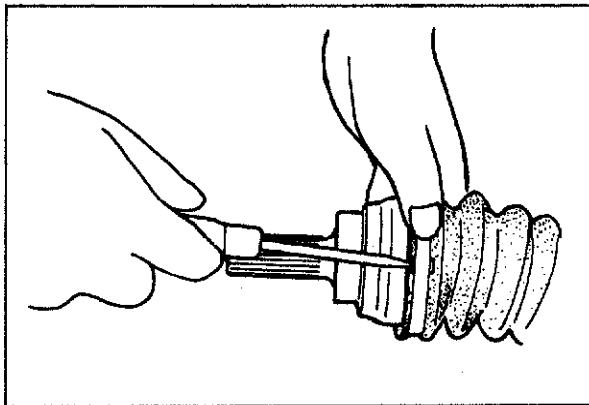
Boot Band

Tighten the boot band according to the following procedure:

Note

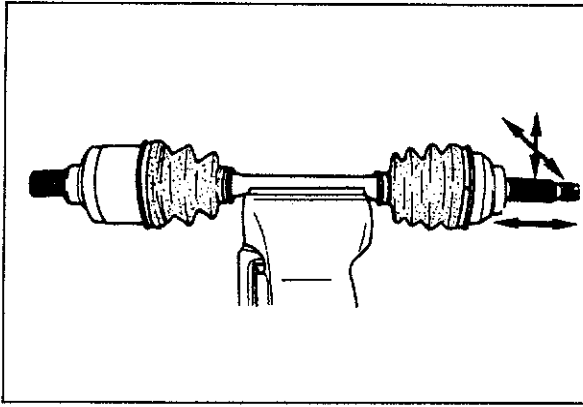
- a) Always use a new band.
- b) The band should be folded in the direction opposite to the forward revolving direction of the driveshaft.

1. Fold the band back by pulling on the end of the band with pliers.



63U09X-044

2. Lock the end of the band by bending the locking clip.



63U09X-045

After assembling the driveshaft, check the following parts:

1. Make sure the joint parts move smoothly in the direction indicated by the arrows.
2. Check for grease leaks or cracks in the boots.

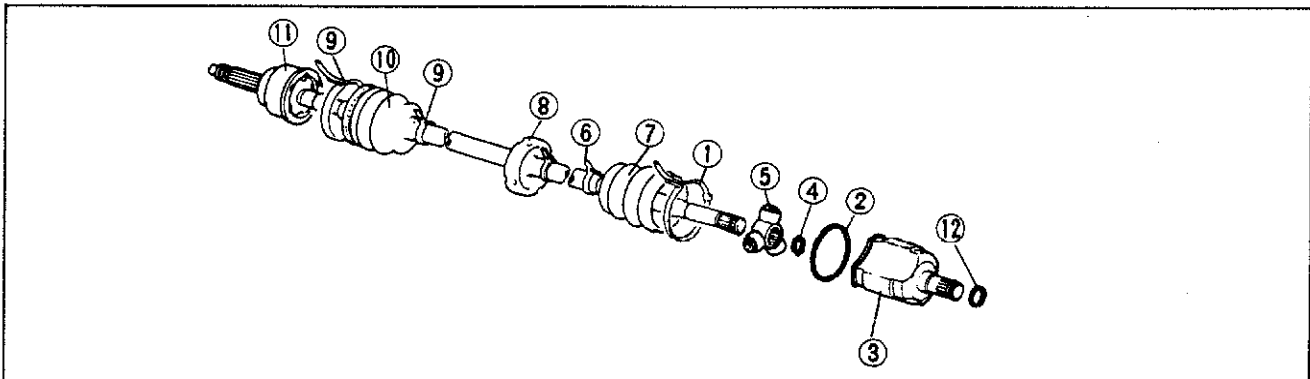
DISASSEMBLY (Non-Turbo)

Disassemble in the order shown below.

Note

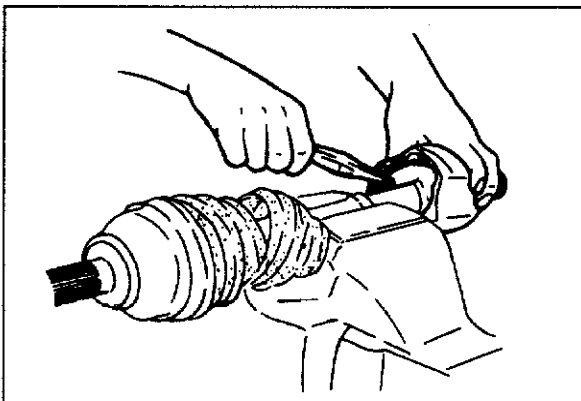
- a) Clamp the shaft in a vice. Use wood in the vice to avoid damage.
- b) Do not allow dust or foreign matter to enter the joint during disassembly or assembly.
- c) Do not disassemble the ball joint at the wheel side. Do not wipe off the grease if there is no problem.
- d) Do not remove the clip which is used to secure the outer ring to the ball joint at the differential side if there is no problem.
If the clip is removed, replace it with a new one.

63U09X-017



63U09X-047

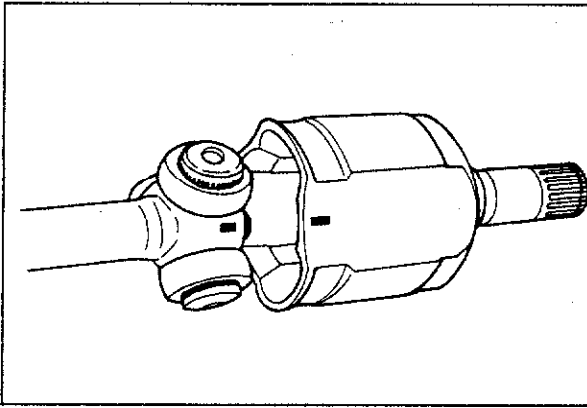
- | | | |
|------------------|-------------------------------------|---|
| 1. Boot band | 6. Boot band | 10. Boot |
| 2. Clip | 7. Boot | 11. Shaft and ball joint assembly |
| 3. Outer ring | 8. Dynamic damper (right side only) | 12. Clip (for locking the ball joint at the differential side outer ring) |
| 4. Snap ring | 9. Boot band | |
| 5. Tri-pod joint | | |



63G09X-004

Clip

Remove the boot and then remove the clip with pliers.



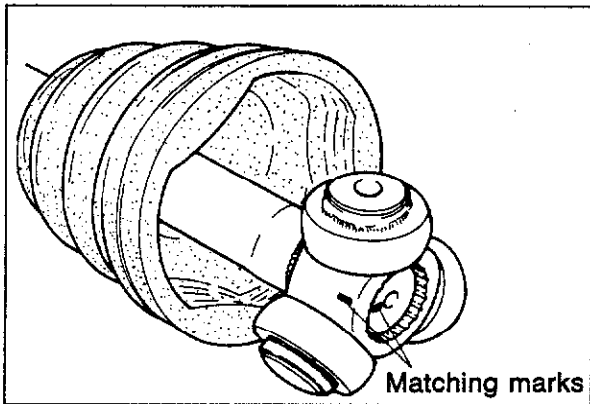
63U09X-049

Outer Ring

Make matching marks on the tri-pod joint and outer ring.

Note

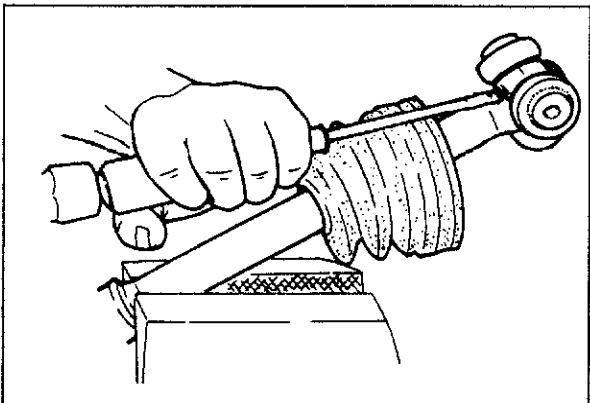
Mark with paint, do not use a punch.



63U09X-050

Tri-pod Joint

1. Remove the snap ring.
2. Make matching marks on the driveshaft end and tri-pod joint.

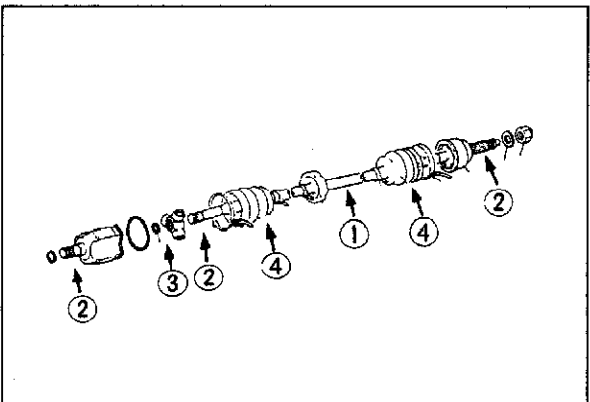


63U09X-051

3. Tap the boss with a hammer and rod to remove the tri-pod joint.

Caution

Do not tap on the rollers.

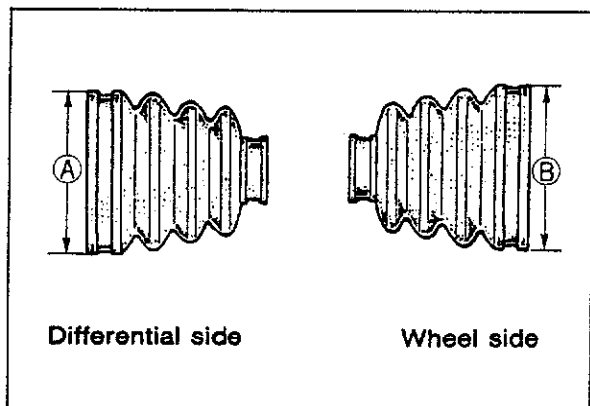


83U09X-018

INSPECTION (Non-Turbo)

Check the following parts:

1. Twisted or cracked driveshaft.
2. Worn splines.
3. Excessively loose joint.
4. Cracked or damaged boots.



83U09X-026

ASSEMBLY (Non-Turbo)

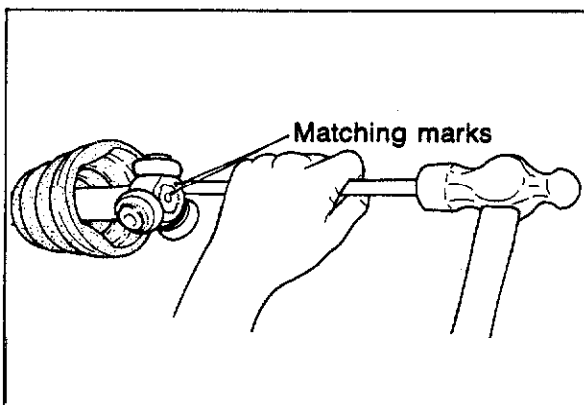
Assemble in the reverse order of disassembly and note the following:

Boot

The shape of the ball joint boots at the wheel side and the differential side differ, so be careful not to install incorrectly.

Ⓐ : 83.6 mm (2.39 in)

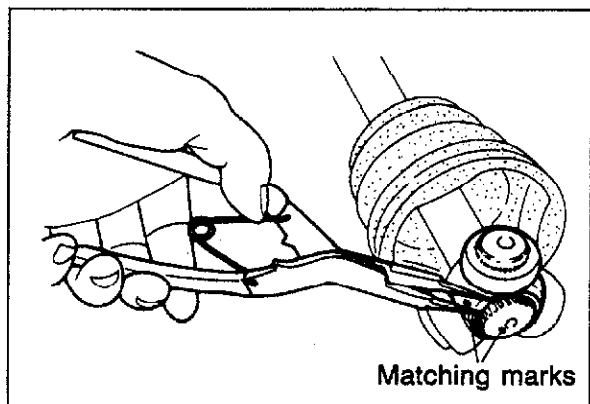
Ⓑ : 90.4 mm (3.56 in)



83U09X-027

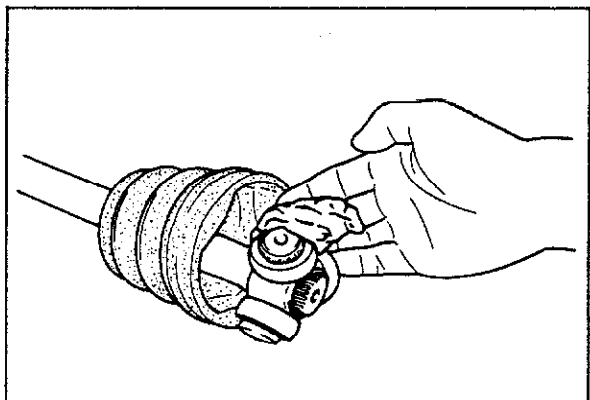
Tri-pod Joint

1. Before inserting the boot onto the shaft put tape on the shaft splines.
2. Align the matching marks and install the tri-pod joint with a rod and a hammer.



63U09X-055

3. Install the snap ring with snap ring pliers.

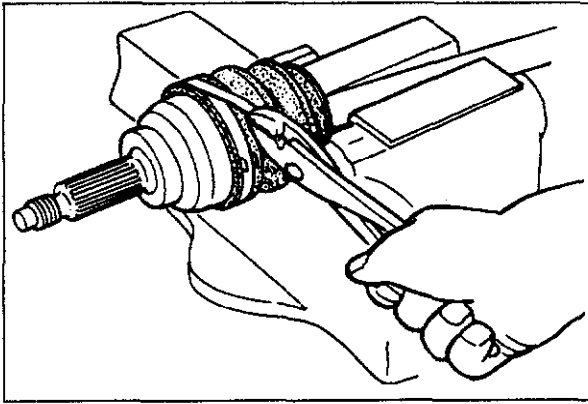


63U09X-056

4. Apply the specified grease (lithum) to the joint. Do not use any other type of grease.

Note

The color of this grease is yellow, and it is supplied in the boot kit and joint kit.



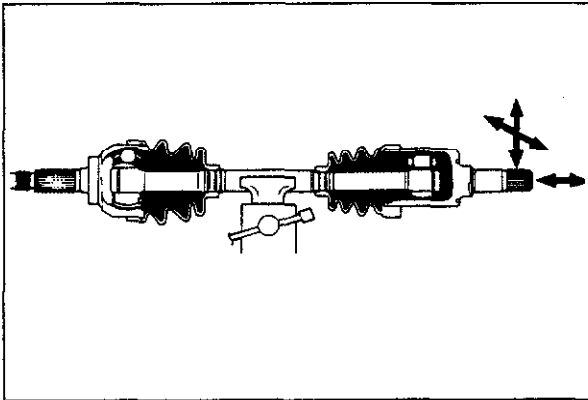
63U09X-057

Boot Band

1. Fold the band back by pulling on the end of the band with pliers.
2. Lock the end of band by bending the locking clip.

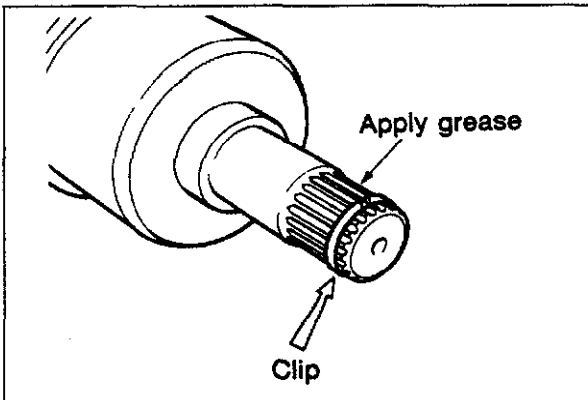
Note

- a) Always use a new band.
- b) The band should be folded in the direction opposite to the forward revolving direction of the driveshaft.



63U09X-058

- After assembling the driveshaft, check the following:
1. Make sure the joint parts move smoothly in the directions indicated by the arrows.
 2. Check the boots for grease leaks or damage.



83U09X-020

INSTALLATION

Install in the reverse order of removal and be careful of the following points:

Note

MTX and ATX are the same procedure.

Dynamic Damper

Make sure the dynamic damper position is as shown in the figure.

Note

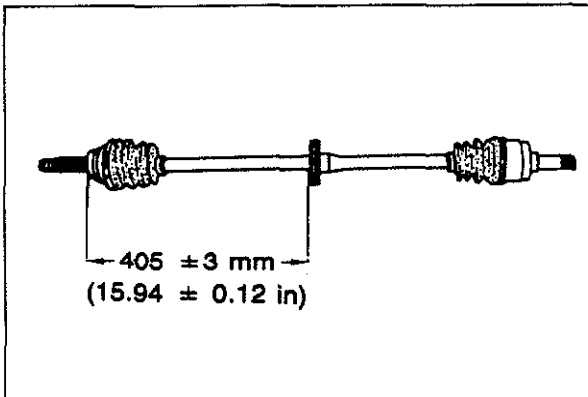
When measuring the distance the ball joint is fully pushed toward the driveshaft.

Clip

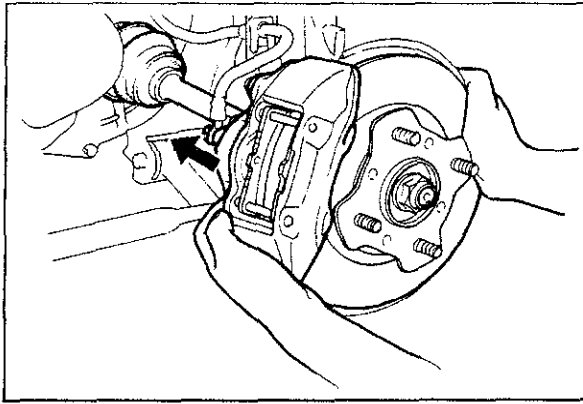
Before inserting the driveshaft into the transaxle, make sure the oil seals are free of any scratches. If there are any problems, replace the oil seal. (Refer to Section 7A)

Note

The clip should be replaced with a new one.



63U09X-060



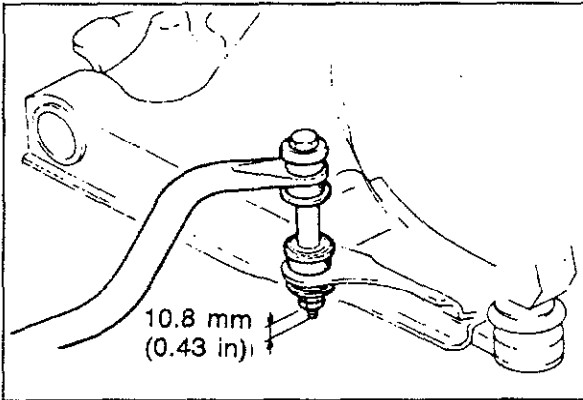
63U09X-061

Driveshaft

When the driveshaft and the joint shaft are installed to the transaxle, be very careful not to damage the oil seal.

Note

After installation, pull the front hub outward to check that the driveshaft does not come out.



63U09X-062

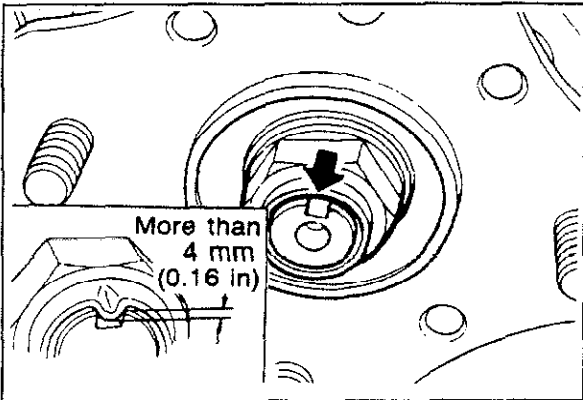
Stabilizer

The nut should be locked with **10.8 mm (0.43 in)** of the threaded part of the stabilizer bar control link exposed.

Tightening torque:

12—18 N·m

(1.2—1.8 m·kg, 8.7—13.0 ft·lb)



63U09X-063

Driveshaft Locknut:

Use a new driveshaft locknut, tighten and, stake the locknut, ensuring that it seats into the groove in the driveshaft.

Note

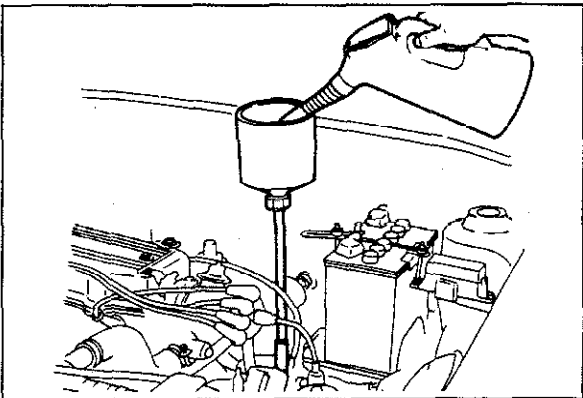
- a) Do not stake the nut with a pointed tool.
- b) Make sure the wheel hub can be turned smoothly by hand.

Driveshaft locknut:

157—235 N·m (16—24 m·kg, 16—174 ft·lb)

Knuckle to lower arm ball joint:

43—54 N·m (4.4—5.5 m·kg, 32.5—39.8 ft·lb)



63U09X-064

Transaxle

Be sure to use the specified grade and quantity of transaxle oil.

(Refer to Section 7)

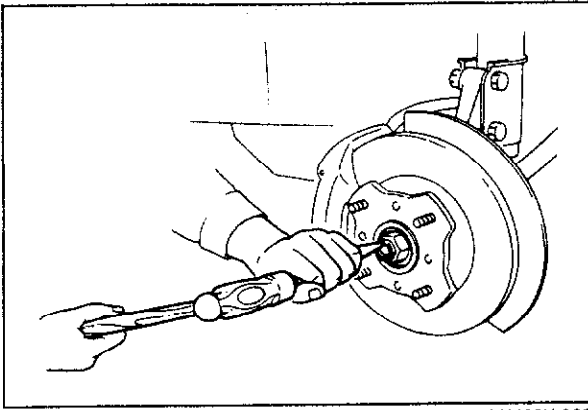
FRONT AXLE

REMOVAL

1. Raise the front of the vehicle and support it with safety stands.
2. Remove the wheel.
3. Raise the nut tab and remove the driveshaft locknut.

Note

When loosening the nut, lock the hub by applying the brakes.

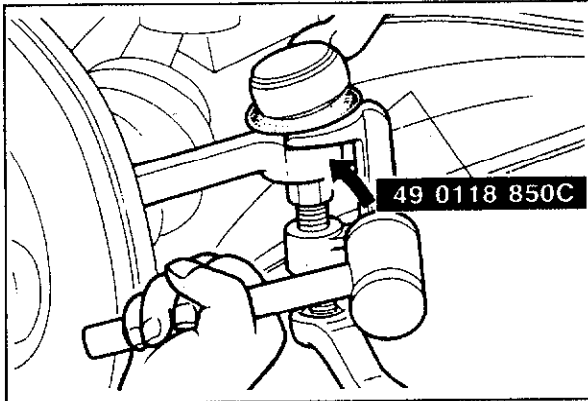


63U09X-065

4. Remove the split pin from the tie-rod end locknut.
5. Separate the tie-rod end from the knuckle with the SST.

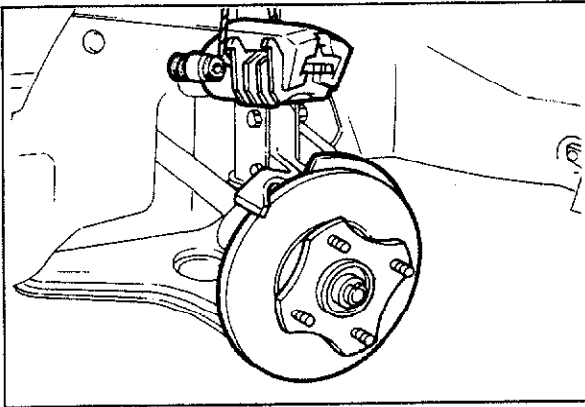
Note

If it is difficult to separate, tap the knuckle and ball joint with a hammer.



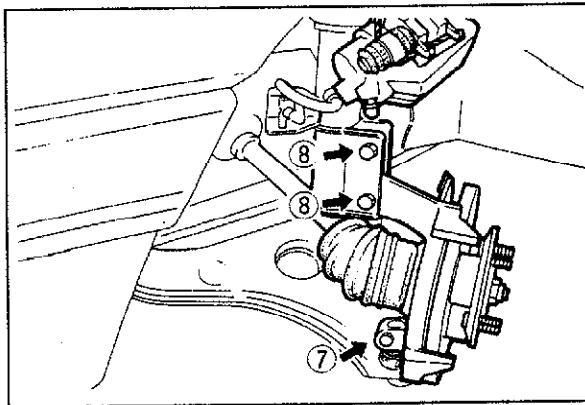
83U09X-028

6. Remove the caliper assembly from the knuckle, and hang it from the shock absorber.



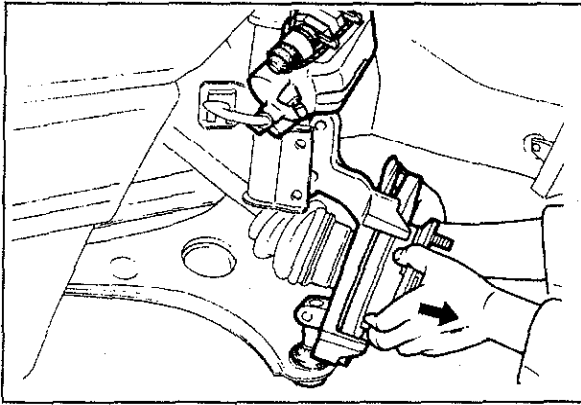
63U09X-067

7. Remove the clamp bolt and nut, and push the lower arm downward to separate the knuckle and the ball joint.
8. Remove the bolts and nuts which couple the knuckle and the shock absorber.



63U09X-068

9 FRONT AXLE



83U09X-029

9. Separate the front hub and the knuckle from the driveshaft.
If the driveshaft can not be separated from the front hub, use **SST**.

Note

Be careful not to damage the oil seal.

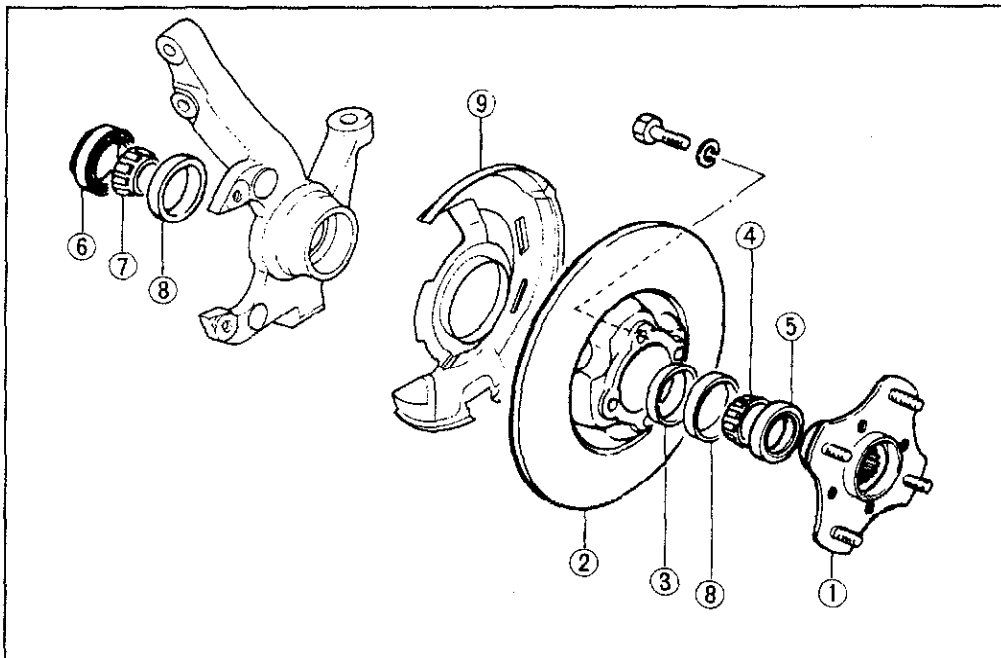
DISASSEMBLY

Disassemble in the order shown in the figure.

Note

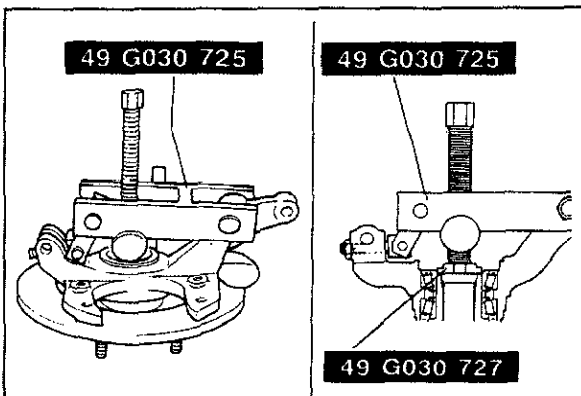
- a) Do not remove the dust cover, unless necessary for repairs.
- b) Do not confuse the inner bearing with the outer bearing.

63U09X-070



63U09X-071

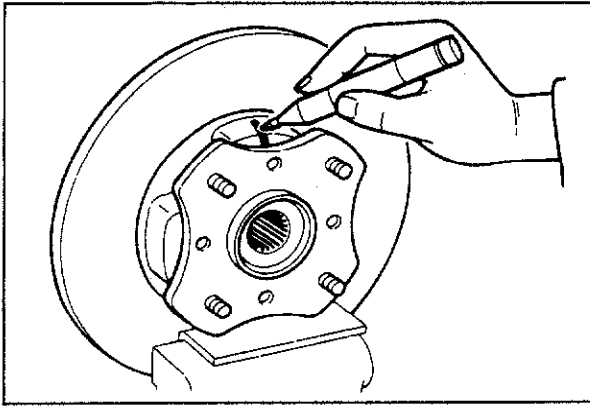
1. Wheel hub
2. Disc plate
3. Spacer
4. Outer bearing inner race
5. Outer oil seal
6. Inner oil seal
7. Inner bearing inner race
8. Bearing outer race
9. Dust cover



83U09X-030

Wheel Hub

Remove the wheel hub with **SST**.



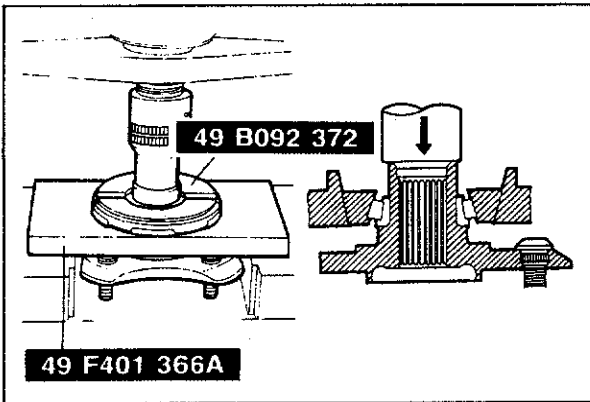
63U09X-073

Disc Plate

After making matching marks on the disc plate and the wheel hub, disassemble the plate and the hub.

Note

Use copper plates when clamping the disc plate in the vise.



83U09X-031

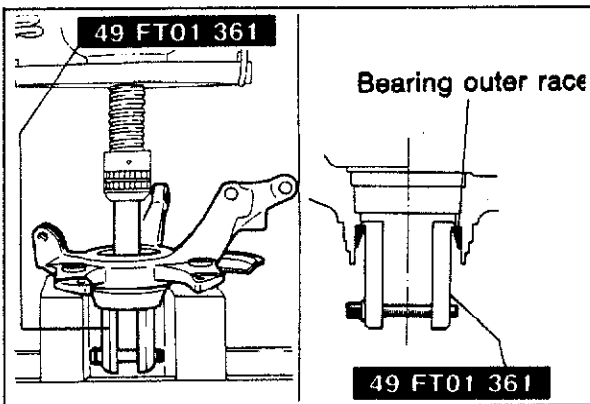
Wheel Bearing

1. Remove the outer bearing inner race with **SST**.

Note

Hold the hub to prevent it from falling.

2. Remove the outer oil seal from the front hub.



83U09X-032

3. Remove the bearing outer race with **SST** and a press.

Note

- a) Do not remove the bearing unless it is necessary.
- b) Remove the race gradually and carefully.

INSPECTION

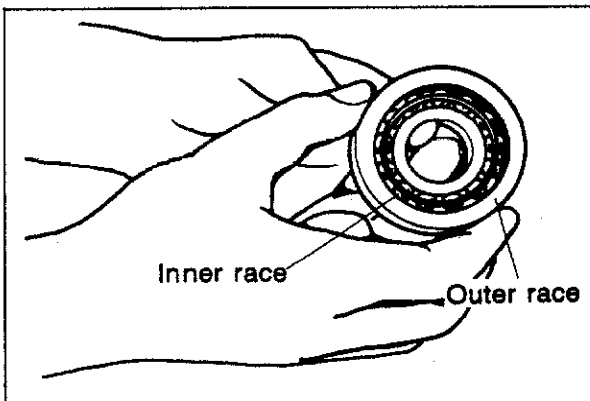
Wash the disassembled parts before inspecting. Replace any damaged parts. Minor rust should be removed with fine sandpaper.

Inspect for:

1. Abnormal wear damage or seizure of bearing.

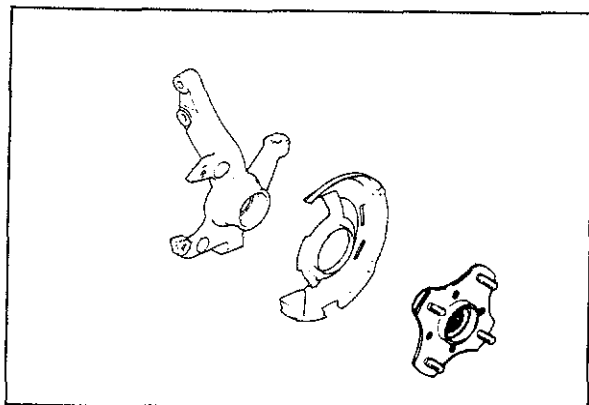
Note

Replace the bearing as a set (inner and outer races).



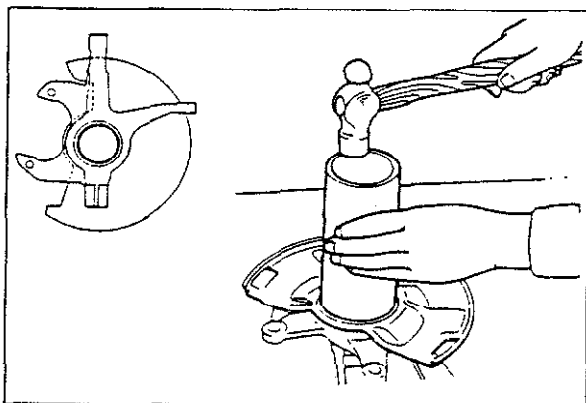
63U09X-076

9 FRONT AXLE



63U09X-077

2. Cracks or damage of the knuckle. Scoring or rust of the bearing bore.
3. Damaged dust cover or poor fit with knuckle.
4. Cracks or damage of the hub. Scoring or rust of the bearing bore. Wear at the oil seal's contact surface.



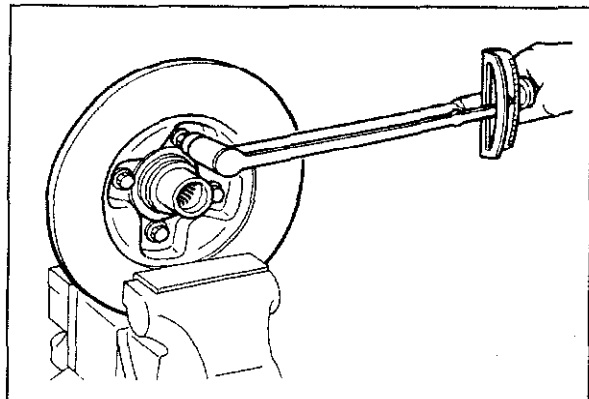
83U09X-033

ASSEMBLY

Assemble in the reverse order of disassembly and note the following:

Dust Cover

Press-fit the dust cover with a pipe and a hammer.



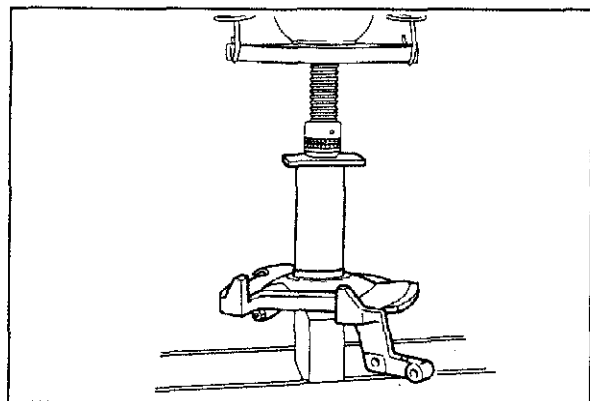
63U09X-079

Disc Plate

Align the disc plate and wheel hub matching marks, assemble the plate and the hub, and tighten the mounting bolts.

Tightening torque:

44—54 N·m (4.5—5.5 m·kg, 33—40 ft·lb)



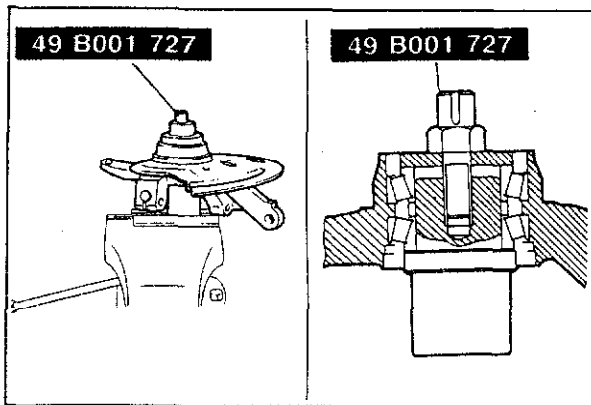
63U09X-080

Bearing Outer Race

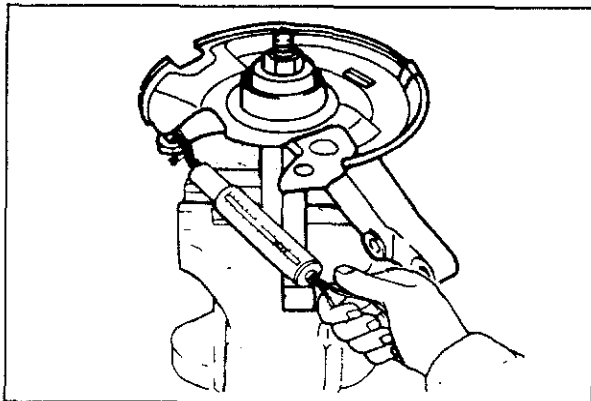
Place a suitable pipe [outer diameter 65—67 mm (2.56—2.64 in)] against the wheel bearing outer race and press the bearing into the knuckle.

Note

Press in until the edge of the race contacts the knuckle.



83U09X-034



83U09X-035

Bearing Preload

Adjust the bearing preload according to the following procedures.

1. Insert the bearing and spacer into the knuckle and attach **SST**.

Note

Use the removed spacer.

2. Measure the bearing preload after the **SST** is tightened.

Tightening torque:

196 N·m (20 m·kg, 145 ft·lb)

Bearing preload (Rotation starting torque)

0.25—1.18 N·m

(2.5—12.0 cm·kg, 2.17—10.42 in·lb)

As measured at caliper mounting hole of knuckle

13 inch wheel

2.4—11.4 N (0.24—1.16 kg, 0.53—2.55 lb)

14 inch wheel

2.2—10.6 N (0.22—1.07 kg, 0.48—2.35 lb)

Note

When tightening, torque in steps of 49 N·m (5.0 m·kg, 36.2 ft·lb) each time.

3. If the preload is not within specification, adjust it.
4. Use the table and select the proper spacer to adjust the preload.

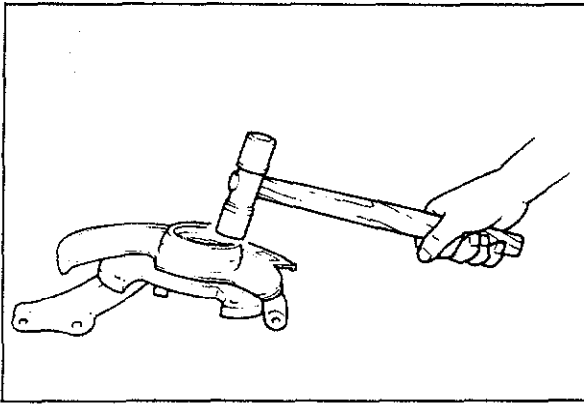
Note

Increase the spacer thickness when the preload is too high and decrease it when the preload is too low. When a spacer is changed by 1 rank, the preload changes 0.2 to 0.4 N·m (2.0 to 4.0 cm·kg, 1.7 to 3.5 in·lb). The marking is stamped on the outer periphery of the spacer.

Stamped mark	Thickness
1	6.285 mm (0.2474 in)
2	6.325 mm (0.2490 in)
3	6.365 mm (0.2506 in)
4	6.405 mm (0.2522 in)
5	6.445 mm (0.2538 in)
6	6.485 mm (0.2554 in)
7	6.525 mm (0.2570 in)
8	6.565 mm (0.2586 in)
9	6.605 mm (0.2602 in)
10	6.645 mm (0.2618 in)
11	6.685 mm (0.2634 in)
12	6.725 mm (0.2650 in)
13	6.765 mm (0.2666 in)
14	6.805 mm (0.2682 in)
15	6.845 mm (0.2698 in)
16	6.885 mm (0.2714 in)
17	6.925 mm (0.2730 in)
18	6.965 mm (0.2746 in)
19	7.005 mm (0.2762 in)
20	7.045 mm (0.2778 in)
21	7.085 mm (0.2794 in)

83U09X-083

9 FRONT AXLE



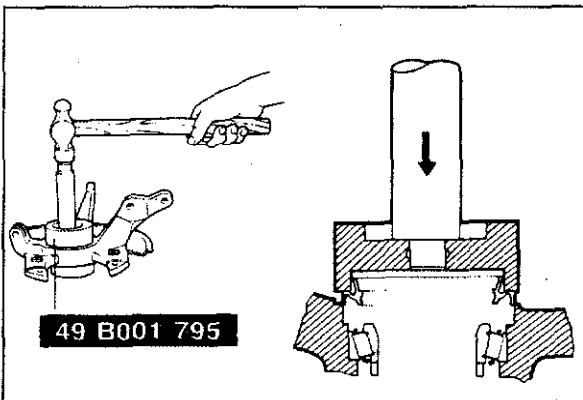
63U09X-084

Oil Seal

Install the outer oil seal with a plastic hammer.

Note

- a) Use a new oil seal and apply grease to the lip of the seal.
- b) Make sure the oil seal is installed flush with the knuckle.

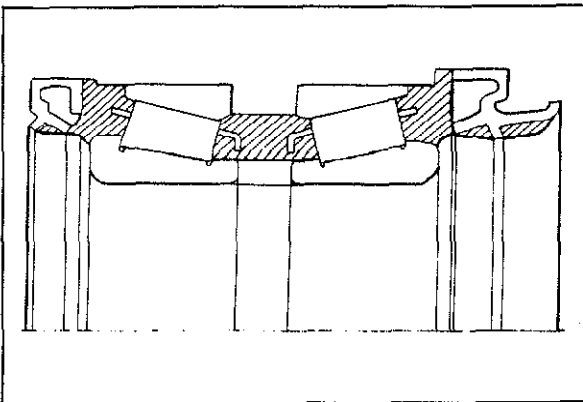


83U09X-036

Install the inner oil seal with **SST** and a hammer.

Note

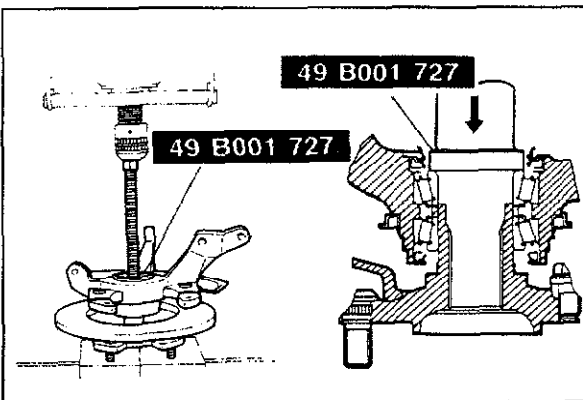
- a) Use a new oil seal and apply grease to the lip of the seal.
- b) Make sure the oil seal is installed flush with the knuckle.



63U09X-086

Grease

Completely fill the shaded area in the figure with lithium grease (**NLGI No. 2** or equivalent).

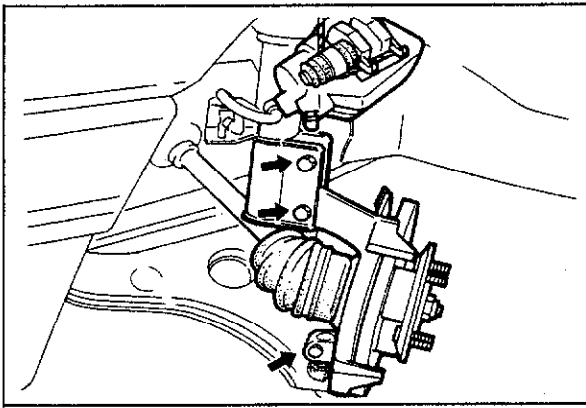


83U09X-037

Wheel Hub

When press-fitting the wheel hub into the knuckle (with the bearing and oil seal), use **SST** and press-fit with a press.

Press to 24,500 N (2,500 kg, 5,500 lb)



63U09X-088

INSTALLATION

Install in the reverse order of removal and note the following:

1. Mount the front hub and knuckle to the driveshaft, and then mount the knuckle to the lower arm ball joint and to the shock absorber. Tighten the mounting bolts and nuts.

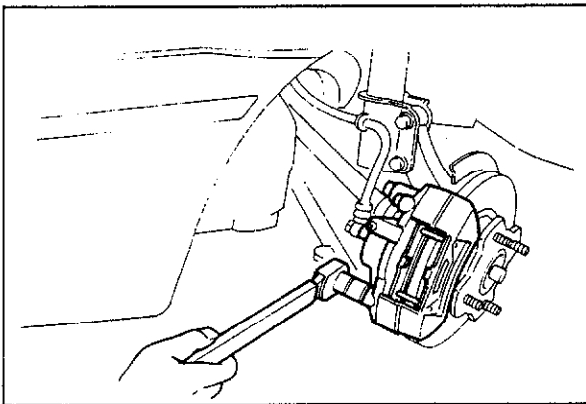
Tightening torque:

Knuckle to shock absorber

93—117 N·m (9.5—11.9 m·kg, 69—86 ft·lb)

Knuckle to lower arm ball joint

43—54 N·m (4.4—5.5 m·kg, 32—40 ft·lb)

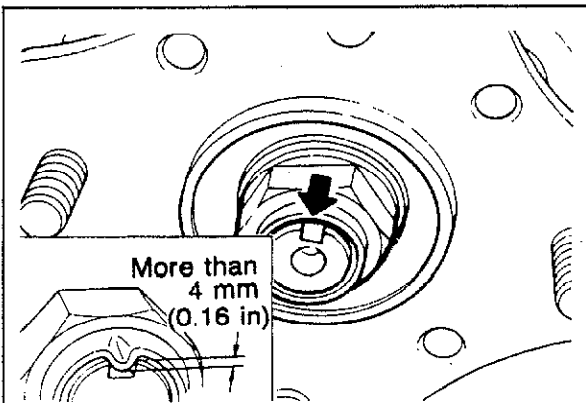


63U09X-089

2. Install the disc brake caliper assembly.

Tightening torque:

39—49 N·m (4.0—5.0 m·kg, 29—36 ft·lb)



63U09X-090

3. Use a new driveshaft locknut, tighten it to the specified torque and stake it into the groove securely.

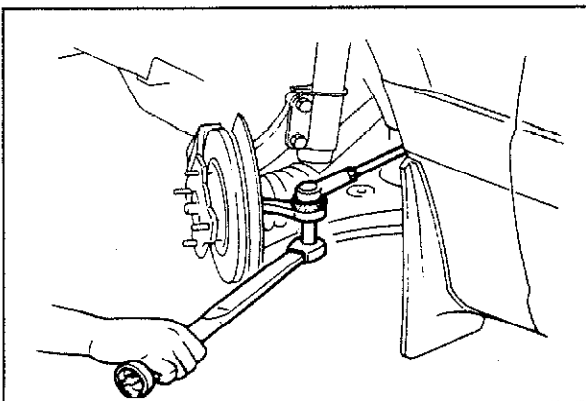
Tightening torque:

157—235 N·m

(16.0—24.0 m·kg, 116—174 ft·lb)

Note

- a) Do not use a pointed tool for staking.
- b) Make sure the wheel hub turns freely by hand.



63U09X-091

4. Install the tie-rod end to the knuckle and tighten the nut.

Tightening torque:

29—44 N·m (3.0—4.5 m·kg, 22—33 ft·lb)

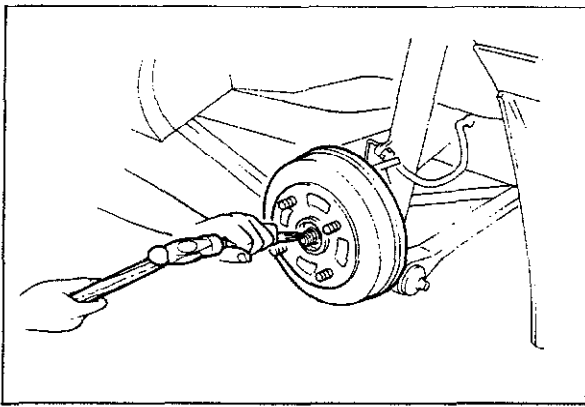
Note

Use a new split pin.

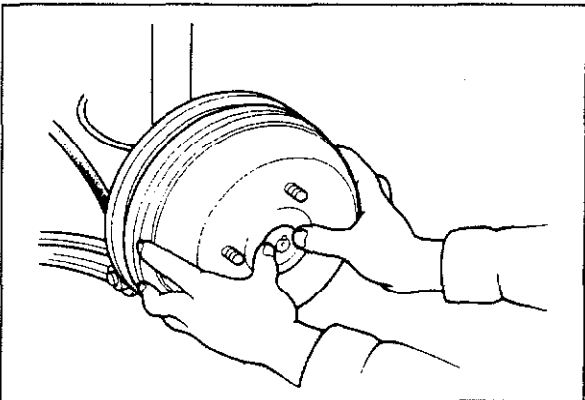
5. Install the wheel and tighten the wheel lug nuts.

Tightening torque:

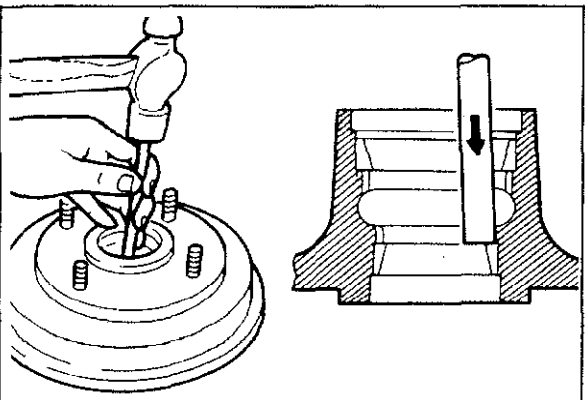
88—118 N·m (9.0—12.0 m·kg, 65—87 ft·lb)



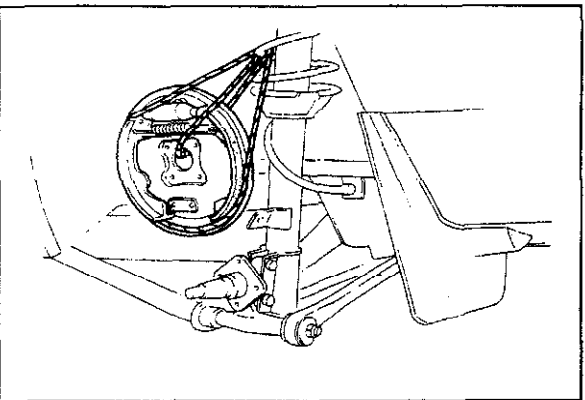
63U09X-092



63U09X-093



63U09X-094



63U09X-095

REAR AXLE

REMOVAL

Drum Brake

1. Raise the rear of the vehicle and support it with safety stands.
2. Remove the following parts:
 - (1) Wheel and tire
 - (2) Hubcap
 - (3) Locknut

Caution

- a) Raise the nut tab to loosen the locknut.
- b) To remove the right side rear locknut, turn it clockwise.

- (4) Brake drum

Note

If it is difficult to remove the brake drum increase the shoe clearance.
(Refer to Section 11)

- (5) Oil seal
- (6) Bearing inner race

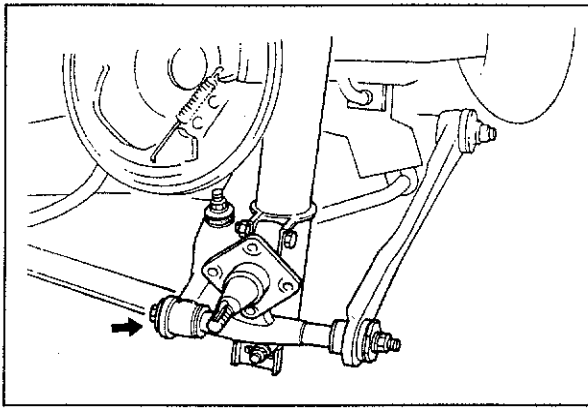
- (7) Bearing outer race

Note

- a) Check the bearing races and disassemble only if necessary.
- b) Set a brass rod on the race through the grooves (four locations) in the hub and remove the race with a hammer.

Rear hub spindle

1. Remove the brake line clip.
2. Remove the back plate and brake assembly and hang it from the shock absorber.

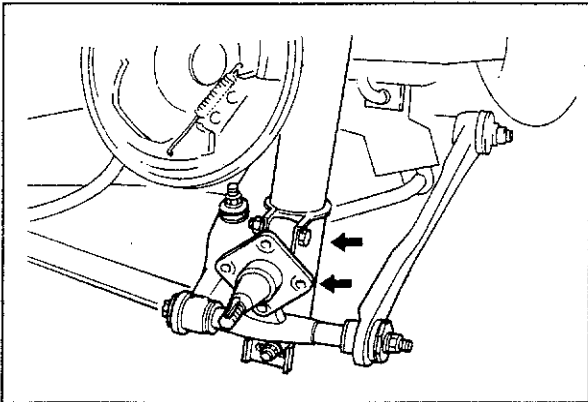


63U09X-096

3. Remove the lateral link through bolt.

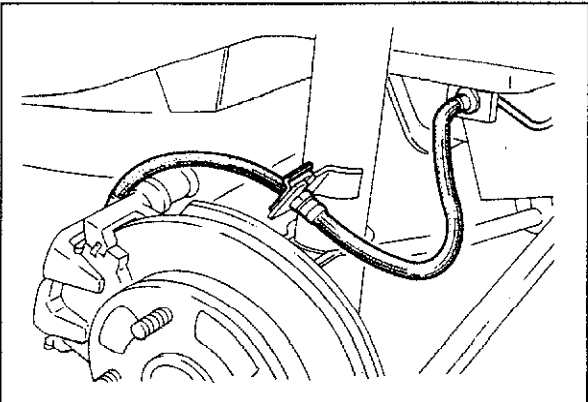
Note

This bolt should be removed after loosening the hub spindle to shock absorber through bolts and it can be easily removed by lifting up on the hub spindle.



63U09X-097

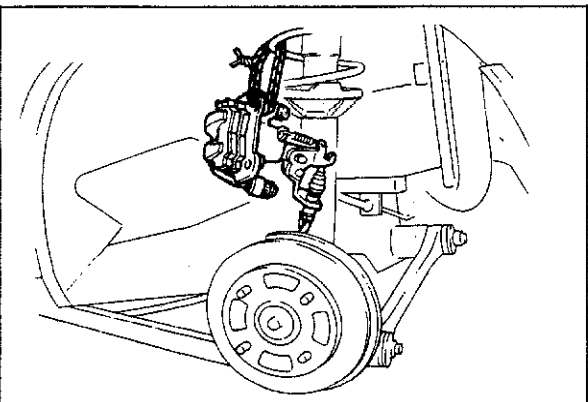
4. Remove the hub spindle to shock absorber through bolts.
5. Remove the hub spindle.



63U09X-098

Disc Brake

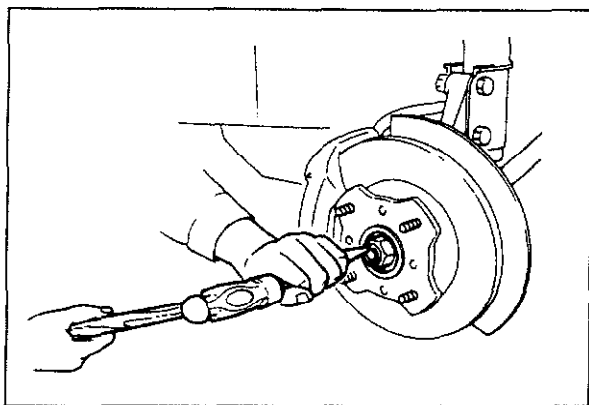
1. Jack up the rear of the vehicle and support it with safety stands.
2. Remove the following parts:
 - (1) Wheel and tire
 - (2) Hub cap
 - (3) Brake line from the shock absorber



63U09X-099

- (4) Remove the caliper assembly from the knuckle, and hang it from the shock absorber.

9 REAR AXLE



83U09X-021

(5) Locknut

Caution

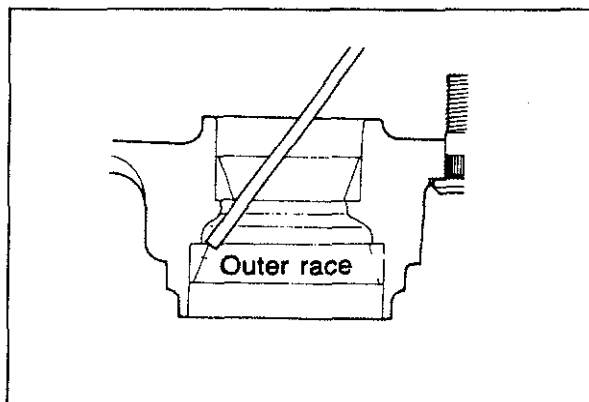
- a) Raise the nut tab to loosen the locknut.
- b) To remove the right side rear locknut, turn it clockwise.

(6) Dust cover

(7) Lateral link through bolt

(8) Hub spindle to shock absorber through bolts

(9) Hub spindle

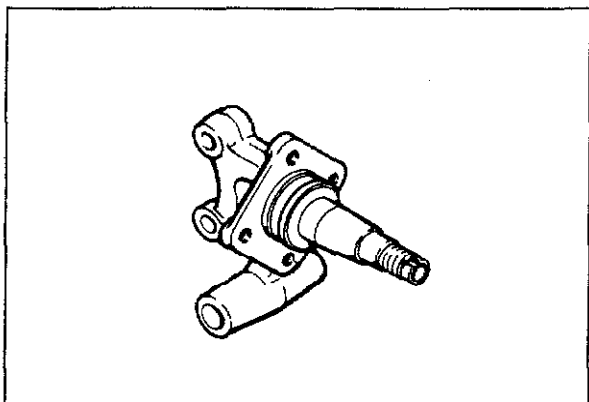


63U09X-101

(10) Rear axle hub

Note

- a) Do not disassemble the bearing if it is not necessary.
- b) Set a brass rod on the race through the grooves in the hub and remove the race with a hammer.



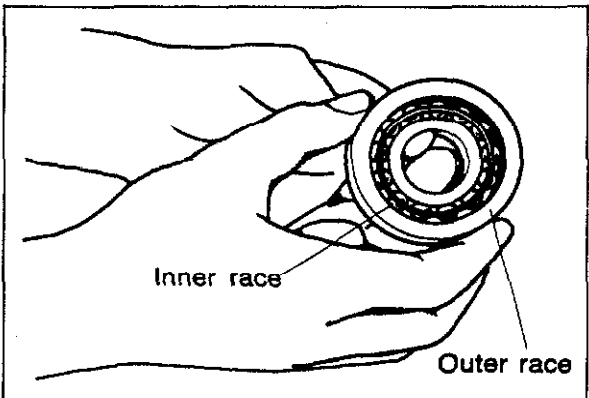
63U09X-102

INSPECTION

Rear Hub Spindle

Check the following and, if there is any problem replace the rear hub spindle.

1. Cracks or damage.
2. Wear or rust on the oil seal contact surface.



63U09X-103

Bearing

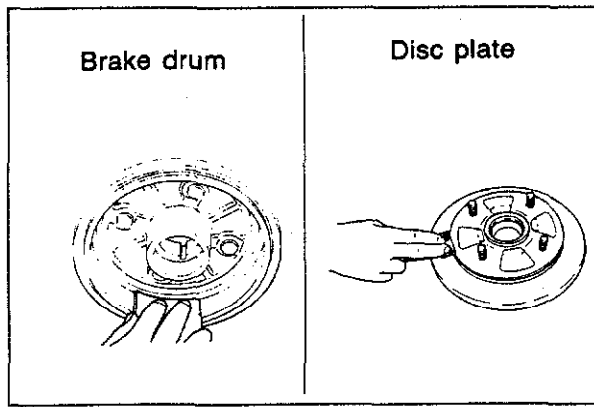
Wash all parts, check the following and replace if necessary.

1. Abnormal wear, damage or seizure of bearing.

Note

Replace the bearing as a set (inner and outer races).

2. Damaged hub grease cap



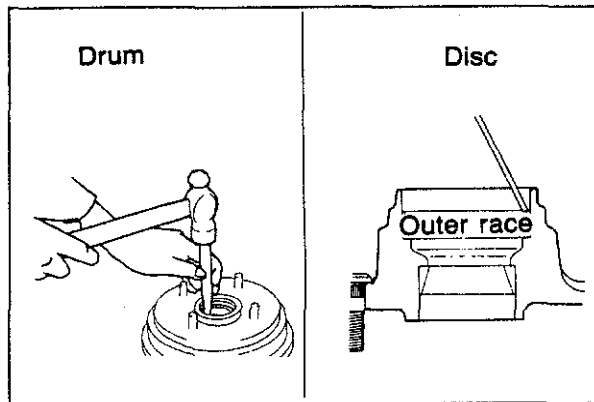
63U09X-104

Disc Plate or Brake Drum

Wear or damage to brake drum or disc plate.

Note

Remove minor rust with sandpaper.



63U09X-105

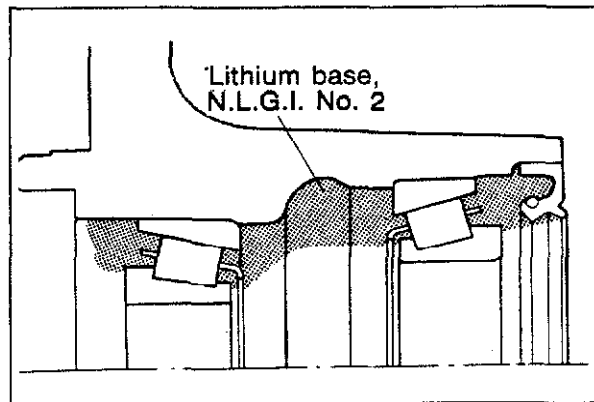
INSTALLATION

Install in the reverse order of removal and note the following:

1. To install bearing outer race, use a hammer and a brass rod.

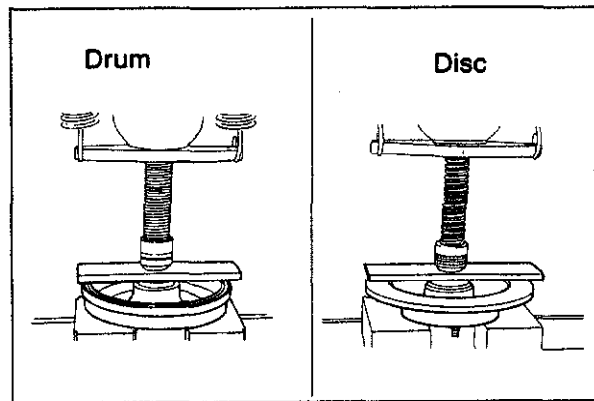
Note

Tap in until the outer race is fully seated in the hub.



63U09X-106

2. Completely fill the area shaded in the figure with lithium grease (**NLGI No. 2** or equivalent).



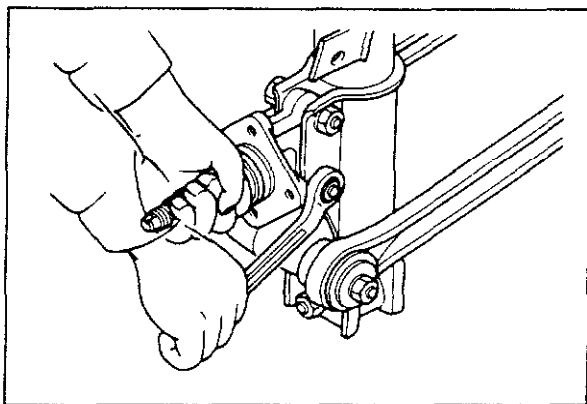
63U09X-107

3. Install the bearing inner race and oil seal.

Note

a) Use a new oil seal, and coat the lip with grease after installation.

b) Do not hit the oil seal directly with a hammer; be sure to use a flat plate to press it in.



63U09X-108

- The lateral link through bolt should be tightened (final tightening) after the installation work is completed and the jack is removed.

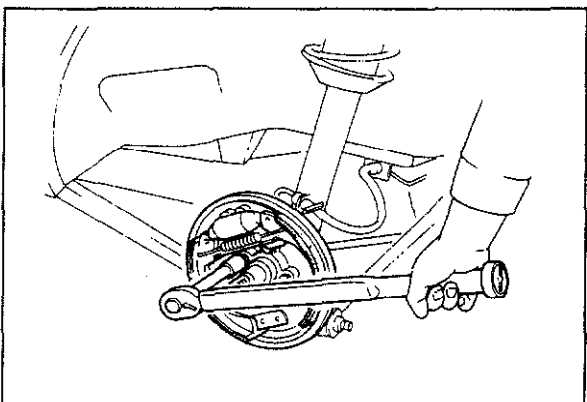
Tightening torque:

Hub spindle to shock absorber

93—117 N·m (9.5—11.9 m·kg, 69—86 ft·lb)

Lateral link through bolt

93—117 N·m (9.5—11.9 m·kg, 69—86 ft·lb)



63U09X-109

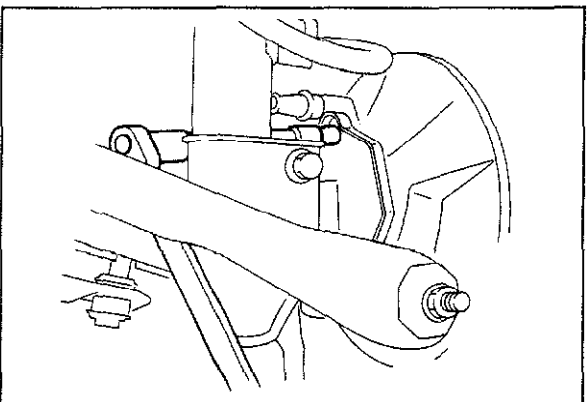
Brake

Drum brake

- Install the back plate and brake assembly to the hub spindle.

Tightening torque:

45—67 N·m (4.6—6.8 m·kg, 33—49 ft·lb)



63U09X-110

Disc brake

- Install the dust cover on the hub spindle.

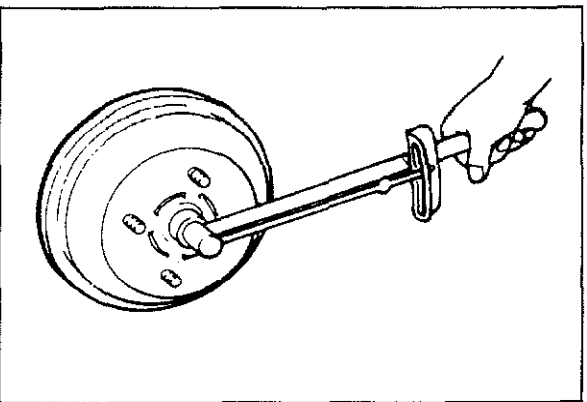
Tightening torque:

45—67 N·m (4.6—6.8 m·kg, 33—49 ft·lb)

- Install the caliper assembly.

Tightening torque:

49—69 N·m (5.0—7.0 m·kg, 36—51 ft·lb)



63U09X-111

Bearing Preload

Adjust the bearing preload according to the following procedures:

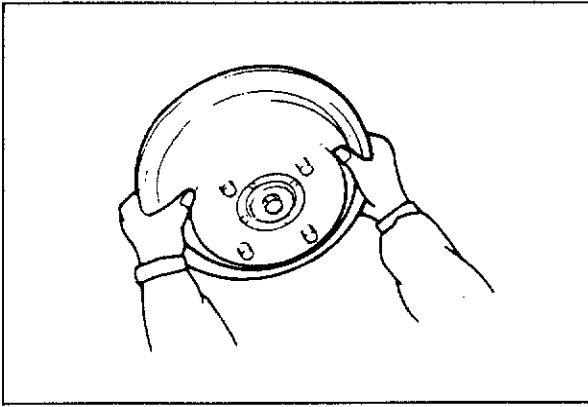
- Tighten the locknut.

Tightening torque:

25—29 N·m (2.5—3.0 m·kg, 18.1—21.7 ft·lb)

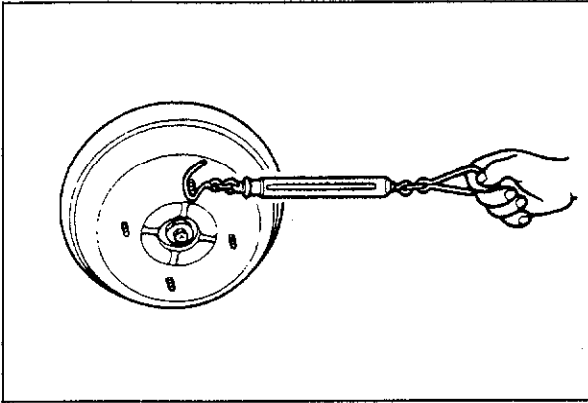
Note

Use a new locknut.



63U09X-112

2. Turn the wheel hub a few times to seat the bearing properly.



53G09X-009

3. Loosen the locknut slightly until it can be turned by hand.
4. Hook a spring scale to measure the oil seal drag.
5. Pull the spring scale squarely. Take the oil seal drag value when the wheel hub starts to turn and record it.
6. Add the oil seal drag value in the previous step to the specified value of **2.6—8.5 N (0.26—0.87 kg, 0.6—1.9 lb)**. This is regarded as the standard bearing preload.

Bearing preload (Rotation starting torque)

0.15—0.49 N·m

(1.5—5 cm·kg, 1.30—4.34 in·lb)

7. Turn the locknut slowly until the standard bearing preload (determined in step 6) is obtained.

Locknut

Stake the locknut to the groove in the rear spindle.

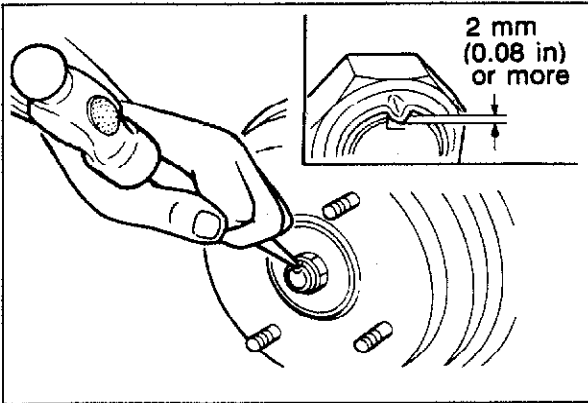
Note

Do not use a pointed tool for staking.

Tighten the wheel lug nuts.

Tightening torque:

88—118 N·m (9.0—12.0 m·kg, 65—87 ft·lb)



63U09X-114

9 OUTLINE

4WD OUTLINE

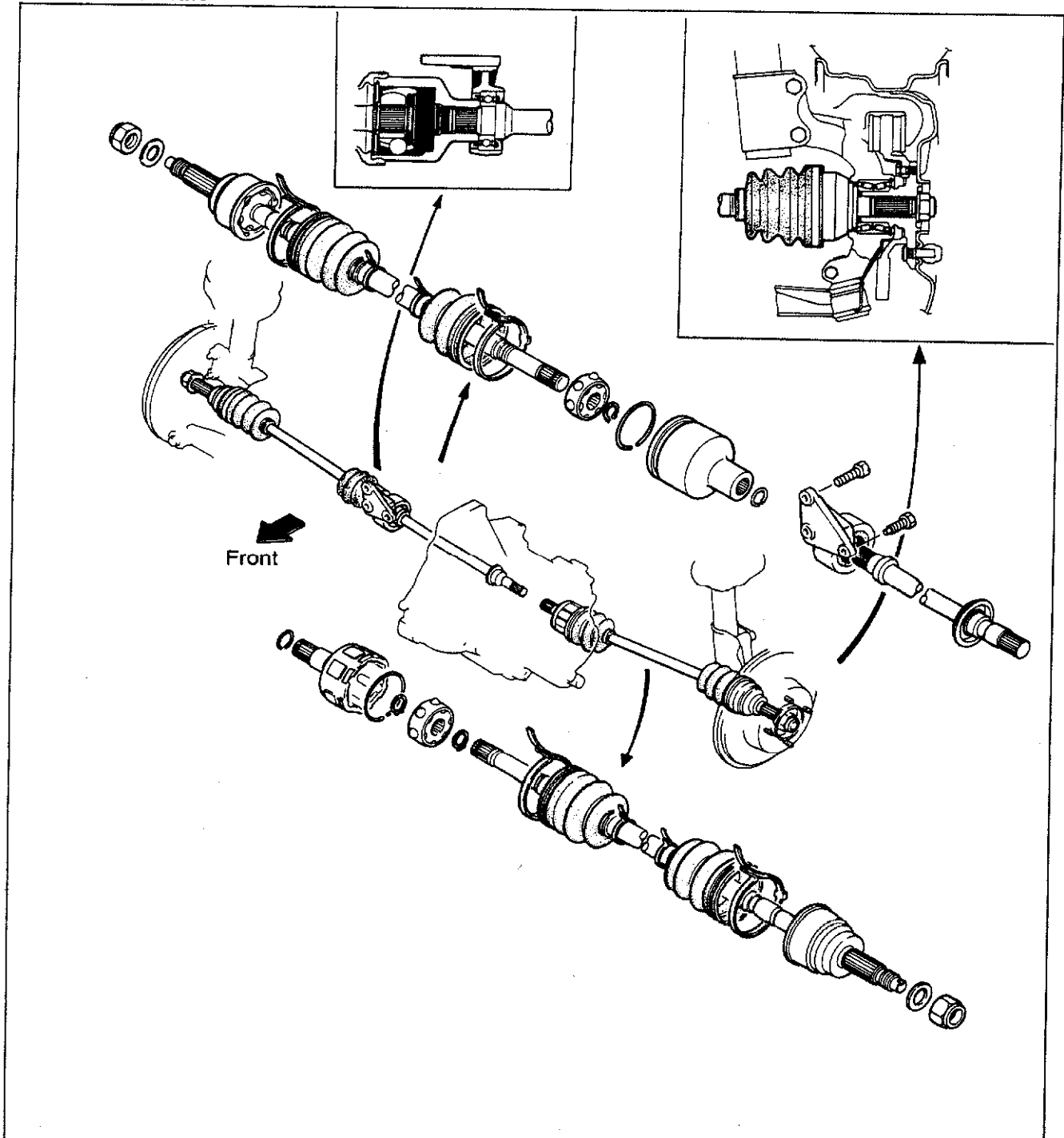
OUTLINE OF CONSTRUCTION

4-wheel-drive (4WD) is used the newly established parts for 4WD are as follows:

- The jointshaft of front driveshaft
- The rear differential
- The rear driveshaft

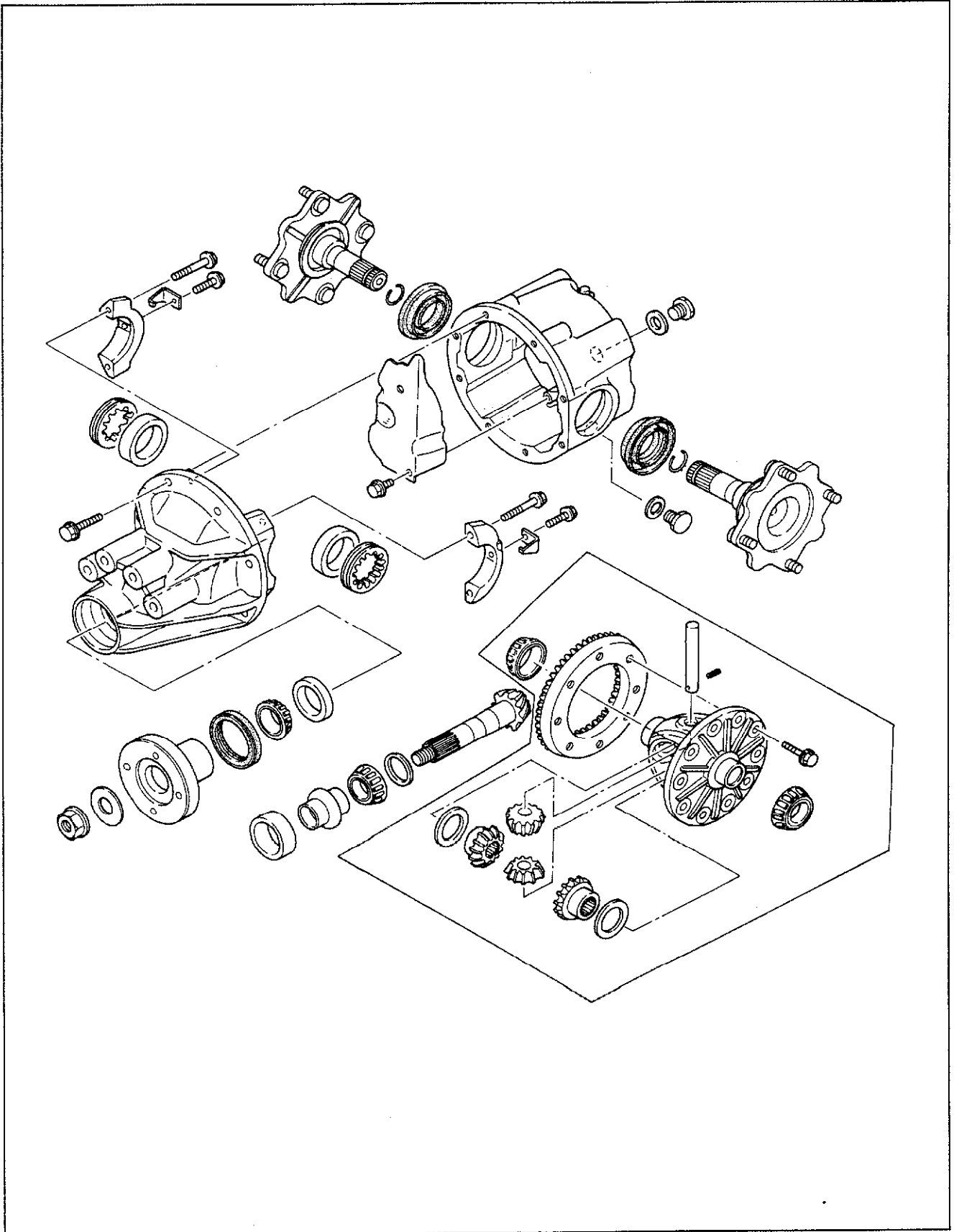
83U09X-022

STRUCTURAL VIEW Front Driveshaft



63G09X-302

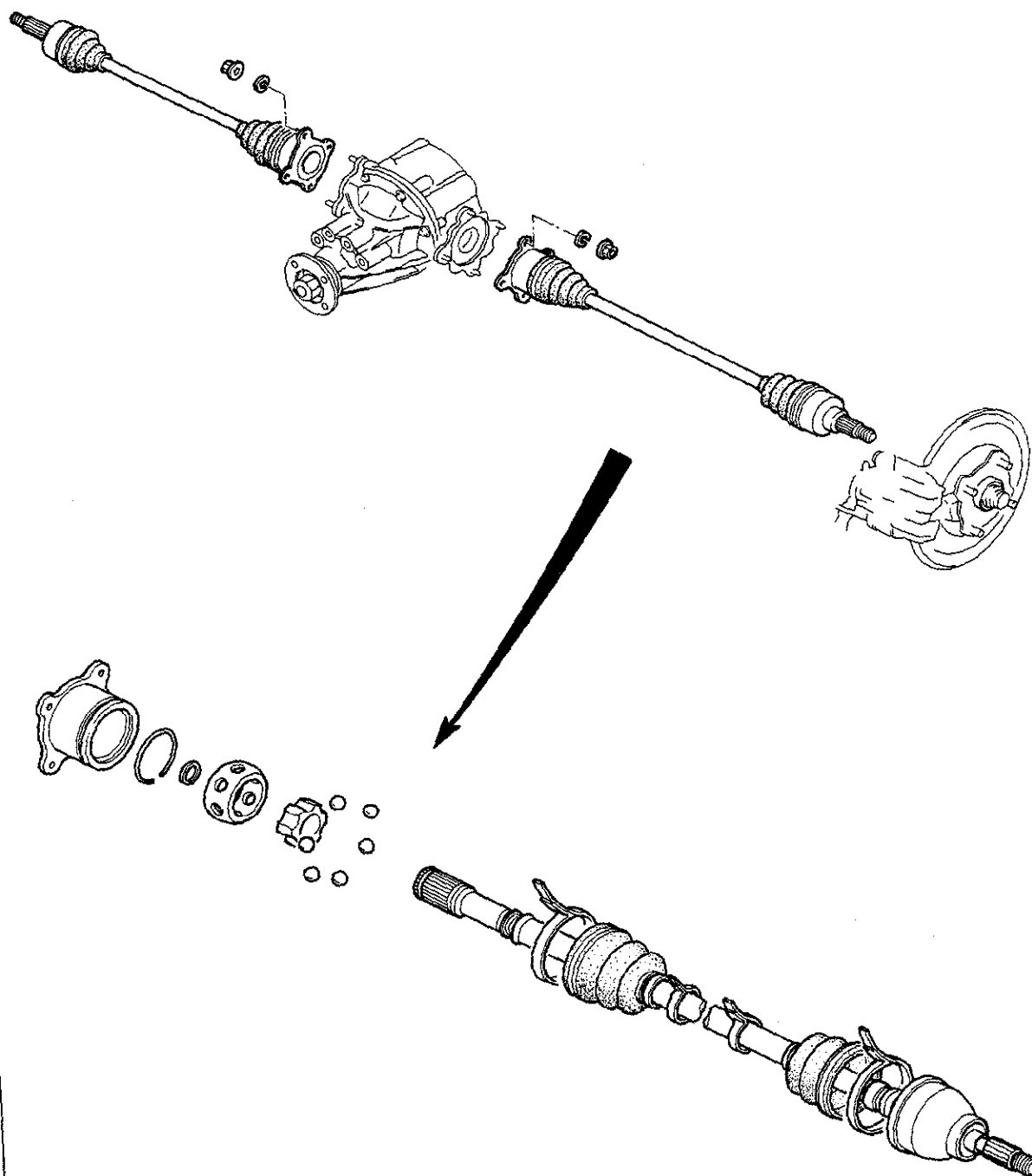
Rear Differential



63G09X-303

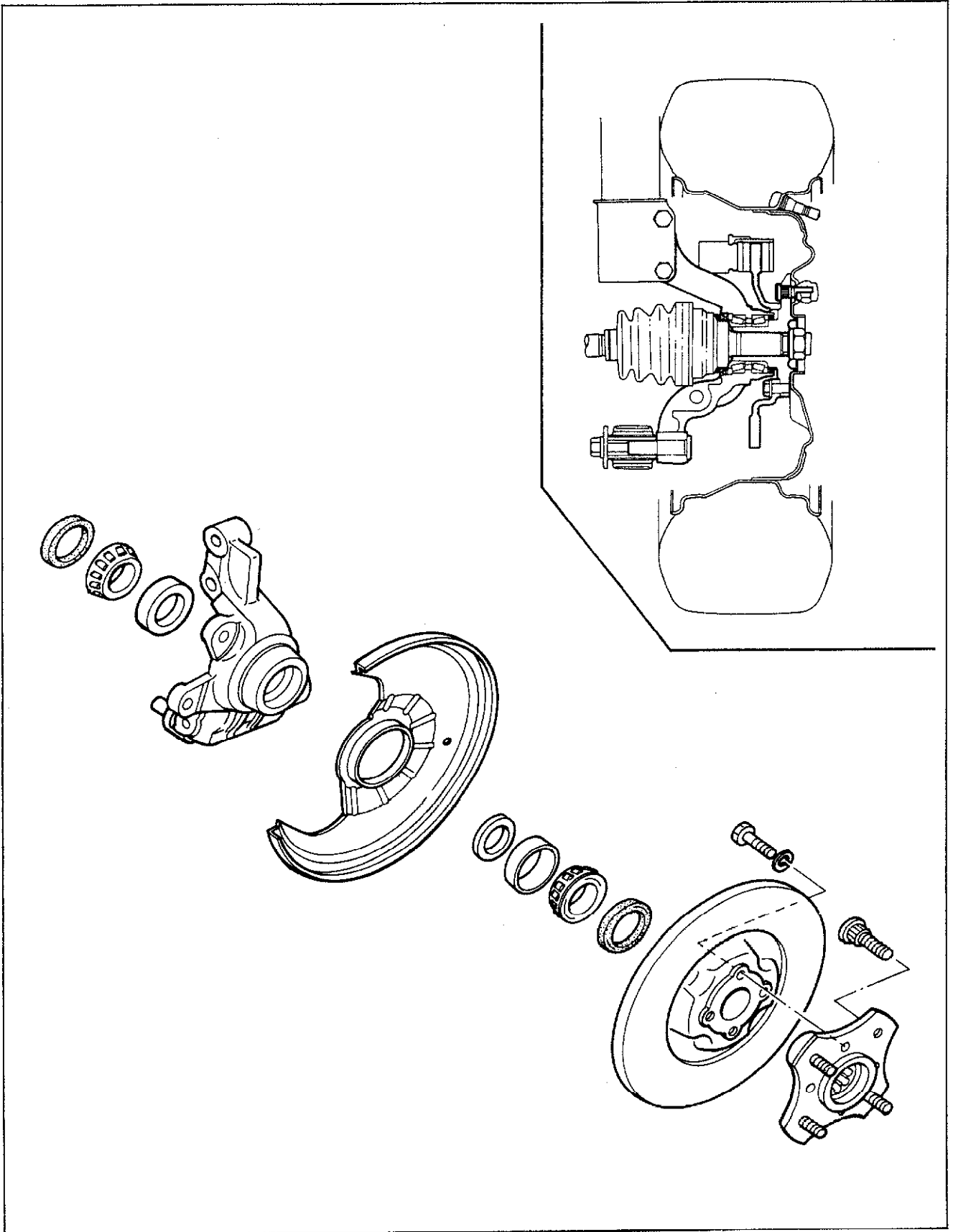
9 OUTLINE

Rear Driveshaft



63G09X 304

Rear Axle



63G09X-305

9 TROUBLESHOOTING GUIDE

SPECIFICATIONS

Front axle		
Bearing play — axial direction	mm (in)	0 (0)
Bearing preload	Pull scale reading N (kg, lb)	2.0—8.8 (0.2—0.9, 0.4—2.0)
Rear axle		
Bearing end play	mm (in)	0
Rear differential		
Reduction gear		Hypoid gear
Differential gear		Straight bevel gear
Reduction ratio		3.909
Number of teeth	Ring gear	43
	Drive pinion gear	11
Oil	Grade	API Service GL-5
	Viscosity	SAE 90 or 80W-90
	Amount: liter (US qt, Imp qt)	0.65 (0.69, 0.57)
Rear driveshaft		
Type		Constant velocity joint

83U09X-023

TROUBLESHOOTING GUIDE

FRONT AXLE

Problem	Possible Cause	Remedy
Steering wheel vibration	Improperly adjusted wheel bearing Worn or damaged wheel bearing	Adjust Replace
Pulls or one-sided braking	Improperly adjusted wheel bearing Worn or damaged wheel bearing	Adjust Replace
Excessive steering wheel play	Improperly adjusted wheel bearing	Adjust

63G09X-307

REAR AXLE

Problem	Possible Cause	Remedy
Abnormal noise	Bent bearing housing Bent driveshaft Worn or damaged wheel bearing Worn driveshaft spline	Replace Replace Replace Replace
Oil leakage	Worn or damaged oil seal	Replace

63G09X-308

REAR DIFFERENTIAL

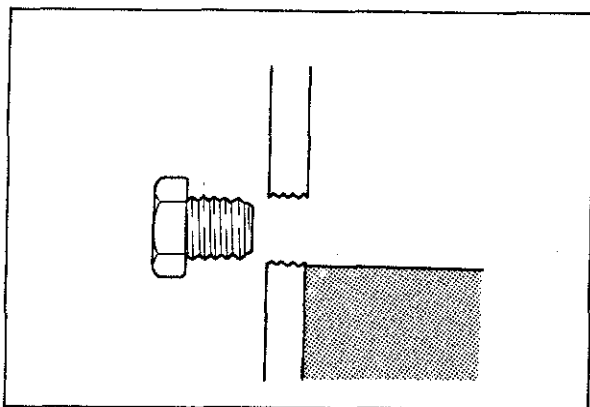
Problem	Possible Cause	Remedy
Abnormal noise	Insufficient differential oil Incorrect differential oil Improperly adjusted ring gear backlash Poor contact of ring gear teeth Worn or damaged side bearing Worn or damaged ring gear Worn or damaged drive pinion bearing Worn or damaged pinion and side gear Seizure of side gear and case Worn side gear spline Worn pinion shaft Loose companion flange nut Worn thrust washer Improperly adjusted side bearing preload Improperly adjusted drive pinion bearing preload Worn output shaft spline	Add oil Replace Adjust Adjust Replace Replace Replace Replace Replace Replace Replace Tighten Replace Adjust Adjust Replace
Heat build-up	Insufficient differential oil Insufficient gear backlash Excessive bearing preload	Add oil Adjust Adjust
Oil leakage	Excessive differential oil Clogged air breather Loose tightened differential carrier Worn or damaged oil seal	Remove oil Repair Tighten or repair Replace
No differential operation	Misassembled	Repair

63G09X-309

FRONT DRIVESHAFT

Problem	Possible Cause	Remedy
Abnormal noise from driveshaft	Incorrect synchronization Worn or seized joint Insufficient grease in joint or spline Excessive backlash on spline Damaged or worn ball bearing	Replace Replace Replenish or replace Replace Replace
Grease leakage from boot	Damaged or broken boot Loose boot band Excessive grease	Replace Replace Repair

63G09X-310



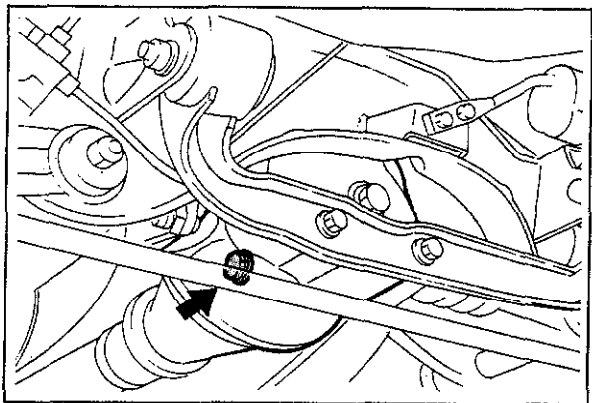
63G09X-314

REAR DIFFERENTIAL

ON-VEHICLE CHECK

Checking Rear Differential Oil Level

Remove the oil fill plug.
Check that the oil level is near the port.
If the level is low, add the specified oil.

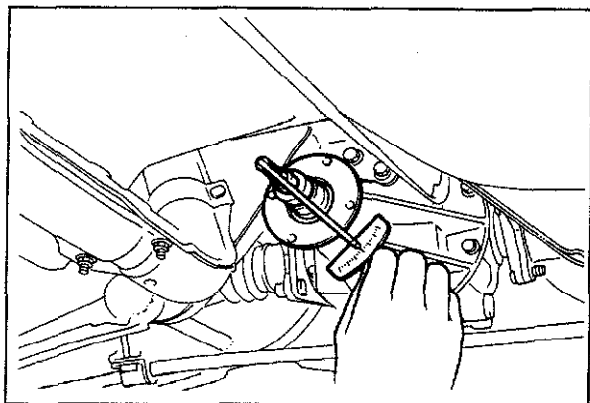


63G09X-315

ON-VEHICLE MAINTENANCE

Replacement of Oil Seals (Companion Flange and Output Shaft)

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



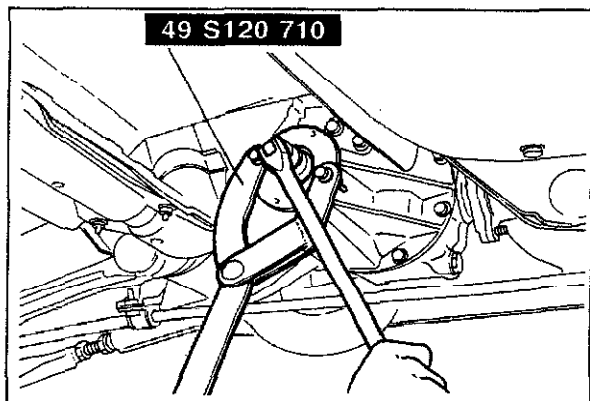
63G09X-316

Companion flange oil seal

1. Remove the propeller shaft. (Refer to Section 8)
2. Before loosening the lock nut, measure the rotation starting torque of the drive pinion (within the range of the drive pinion and ring gear backlash).

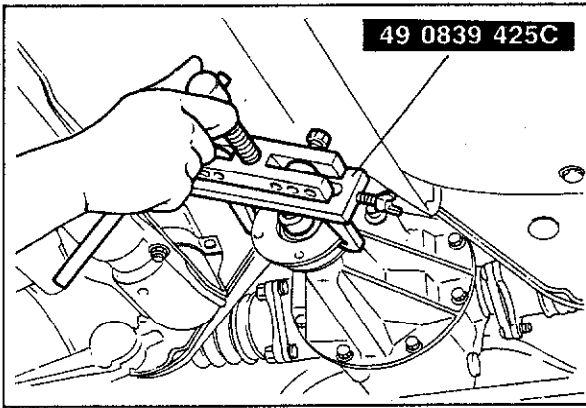
Note

Make a notation of this torque, at that time of installation, tighten the lock nut to set this value.



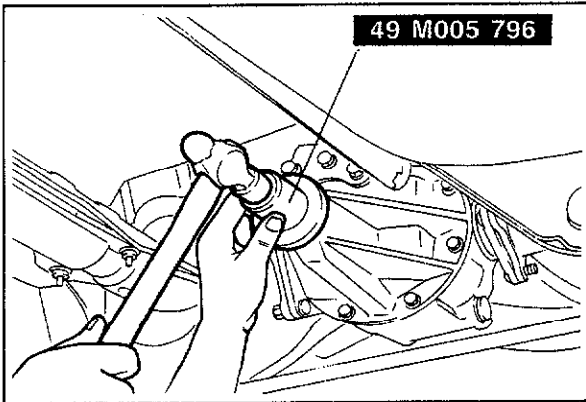
83U09X-038

3. Hold the companion flange with the **SST** and remove the lock nut.



83U09X-039

- Remove the companion flange using **SST**.

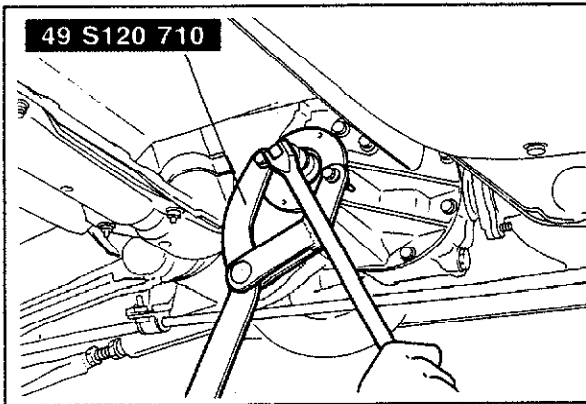


83U09X-040

- Replace the oil seal.
To install the oil seal using the **SST**.

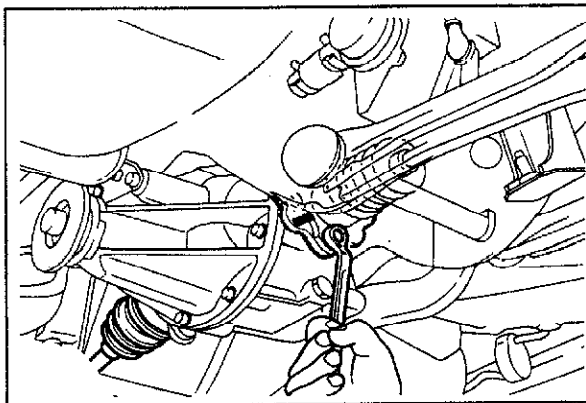
Note

Apply a thin coat of grease (lithium base, NLGI No. 2) to the oil seal lip.



63G09X-320

- Install the companion flange and tighten the lock nut to get the specified starting torque (above step 2).
- Install the propeller shaft.

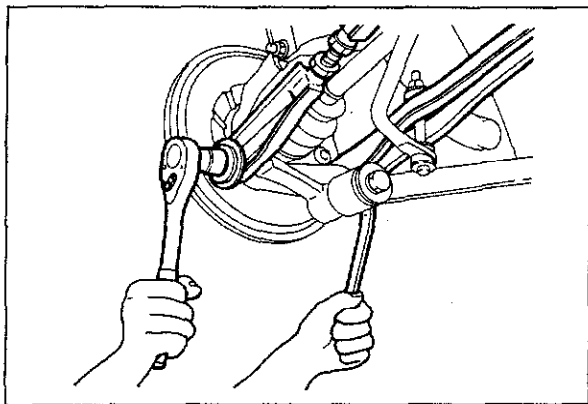


63G09X-321

Output shaft oil seal

- Put mating marks on the output shaft and driveshaft and remove the bolts and nuts.

9 REAR DIFFERENTIAL

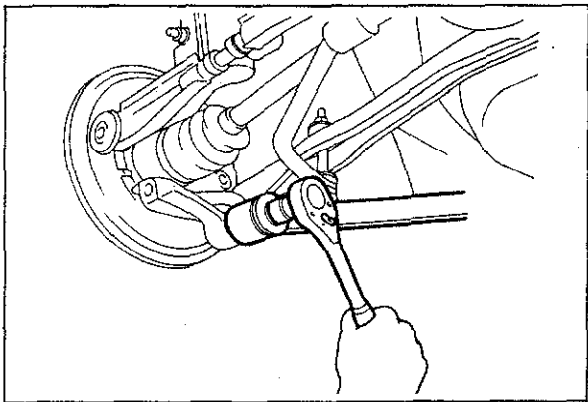


63G09X-322

2. Remove the lateral link.

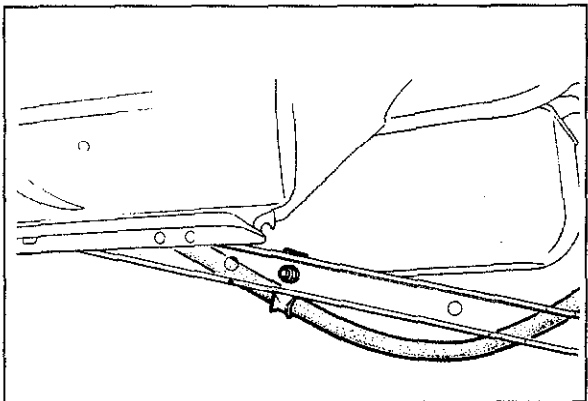
Caution

Be careful that when disconnect the bolt and nut, the lateral link will be bounded.



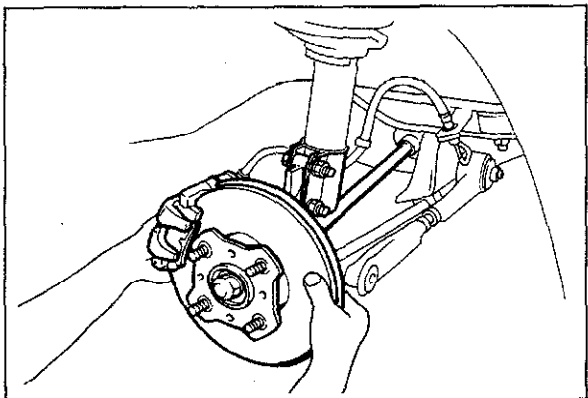
63G09X-323

3. Remove the trailing link.



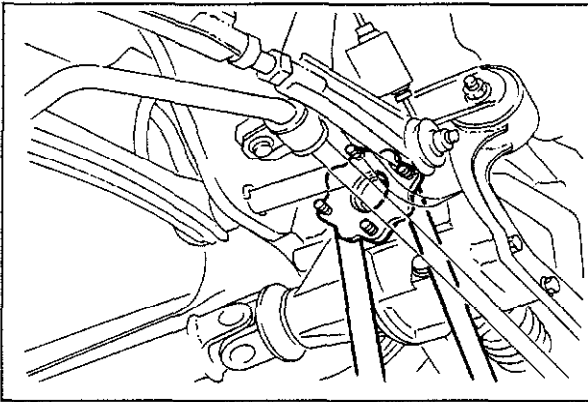
63G09X-324

4. Remove the parking brake cable from trailing link.



63G09X-325

5. Pull the wheel hub out and separate the driveshaft from the output shaft.

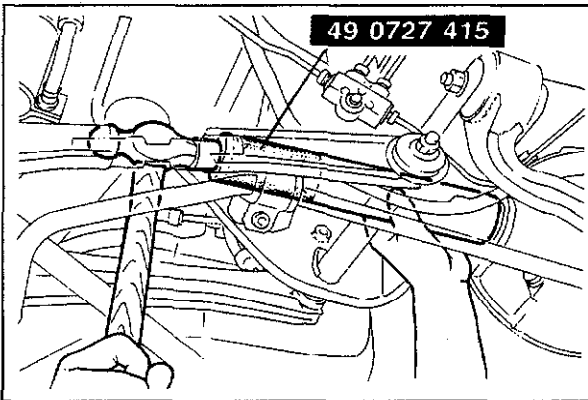


63G09X-326

6. Insert two pry bars between the differential case and the output shaft, remove the output shaft by applying pressure evenly to the pry bars.

Note

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

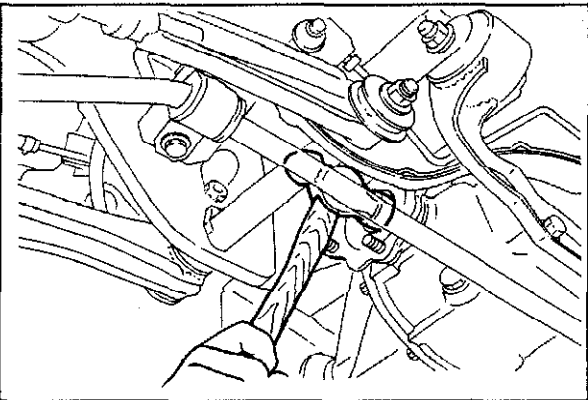


83U09X-041

7. Replace the oil seal, using the SST.

Note

Apply a thin coat of grease (lithium base, NLGI No. 2) to the oil seal lip.

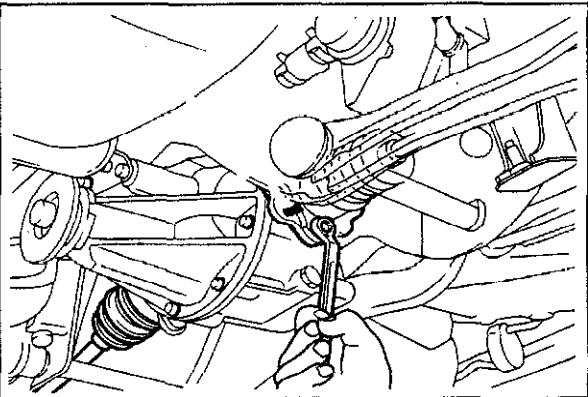


63G09X-328

8. Install the output shaft.

Note

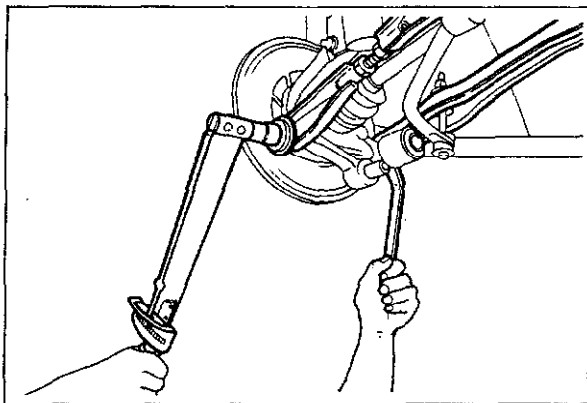
Replace the output shaft clip with a new clip.



63G09X-329

9. Align the mating marks on the driveshaft and output shaft, and reinstall the driveshaft.
10. Install the parking brake cable.

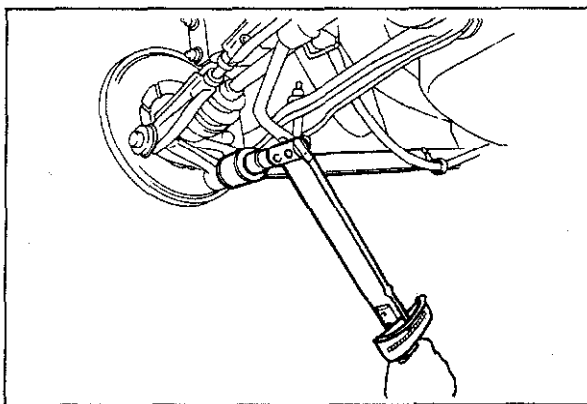
9 REAR DIFFERENTIAL



63G09X-330

11. Install the lateral link.

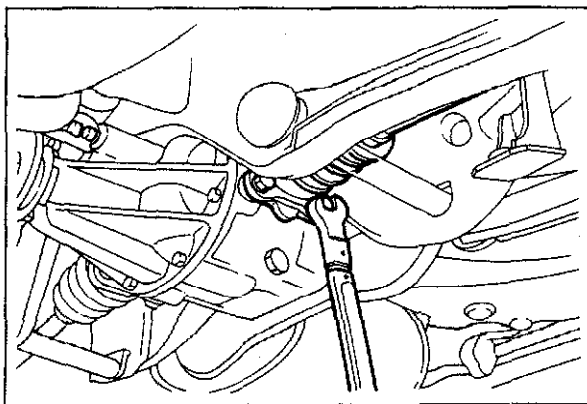
Tightening torque:
63—75 N·m (6.4—7.6 m·kg, 46—55 ft·lb)



63G09X-331

12. Install the trailing link.

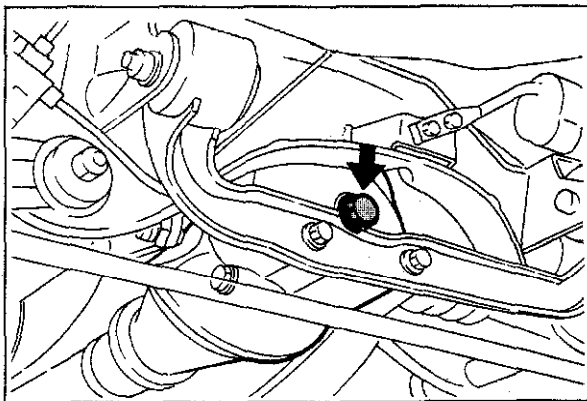
Tightening torque:
93—117 N·m (9.5—11.9 m·kg, 69—86 ft·lb)



63G09X-332

13. Tighten the driveshaft.

Tightening torque:
49—59 N·m (5.0—6.0 m·kg, 36—43 ft·lb)



63G09X-333

14. Fill the differential with the correct grade and quantity of oil.

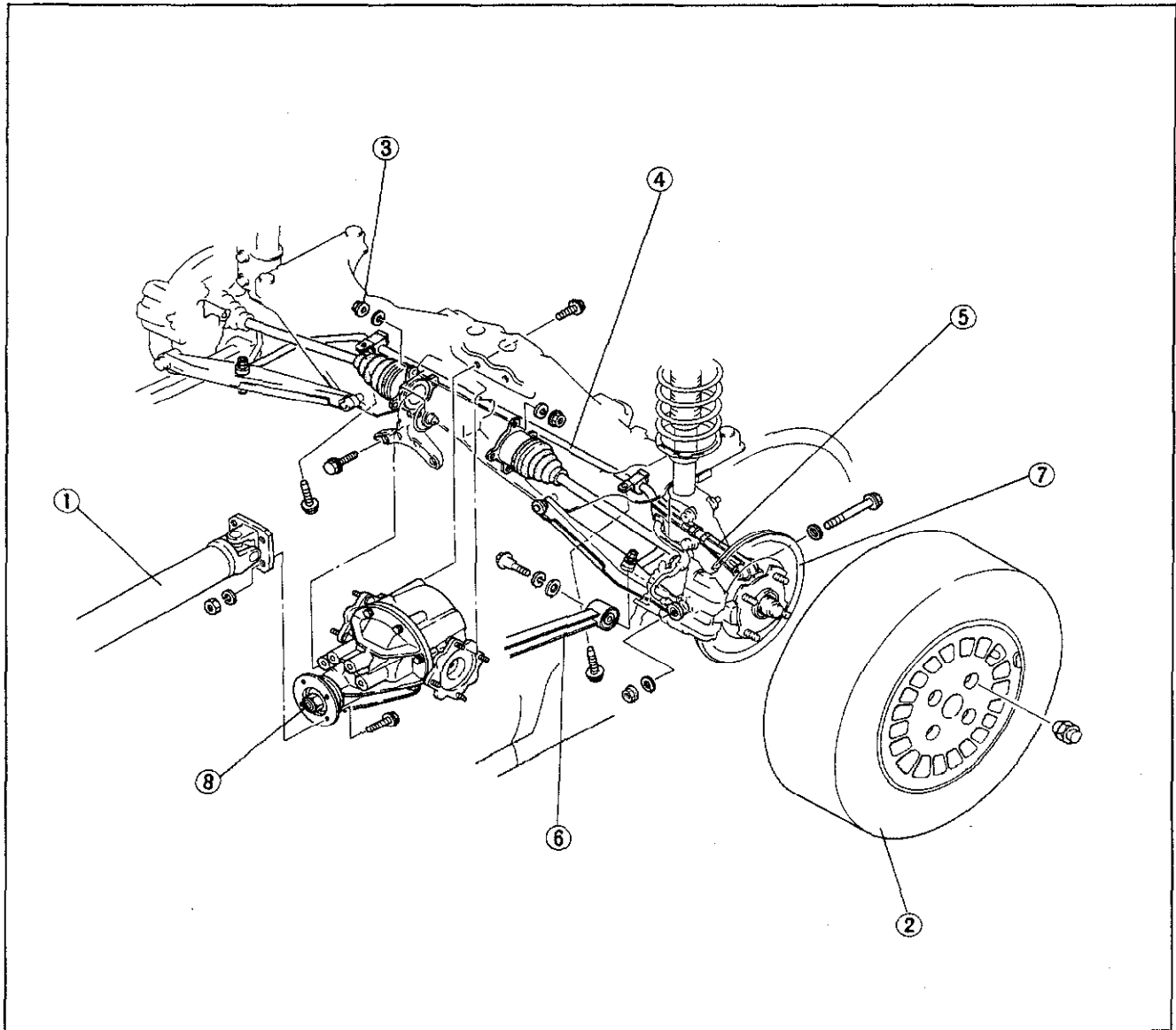
15. Tighten the oil fill plug.

Tightening torque:
39—54 N·m (4.0—5.5 m·kg, 29—40 ft·lb)

REMOVAL

1. Jack up the rear of the vehicle and support it with safety stands.
2. Drain the differential gear oil.
3. Remove the parts in the sequence shown in the figure.

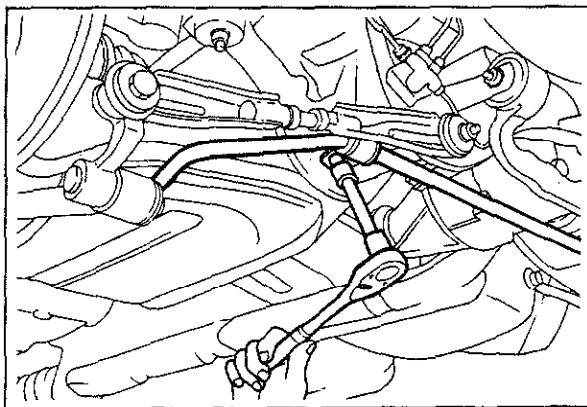
83U09X-042



63G09X-335

- | | |
|--------------------|------------------|
| 1. Propeller shaft | 5. Lateral link |
| 2. Wheel | 6. Trailing link |
| 3. Nut | 7. Wheel hub |
| 4. Stabilizer | 8. Differential |

9 REAR DIFFERENTIAL

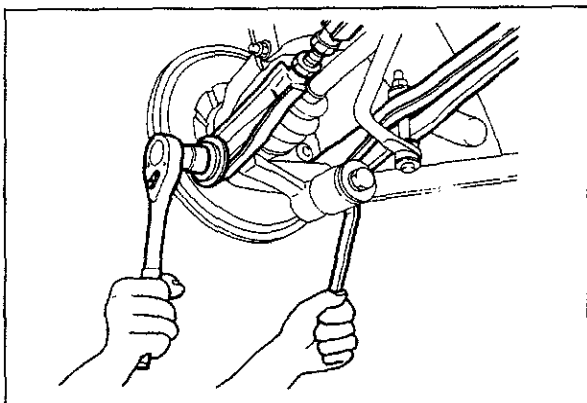


63G09X-336

1. Remove the propeller shaft (Refer to Section 8).
2. Remove the wheels
3. Put mating marks on the output shaft and driveshaft, then remove the nut.
4. Remove the stabilizer from crossmember.

Caution

Never remove the both ends of the stabilizer.



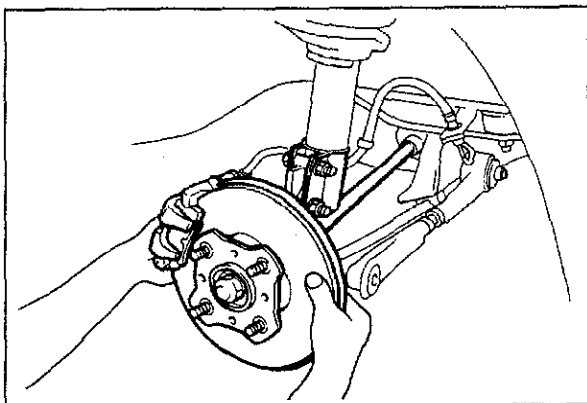
63G09X-337

5. Remove the lateral link.

Caution

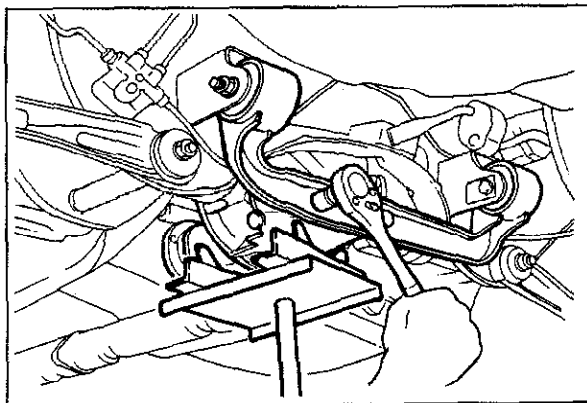
Be careful that when disconnect the bolt and nut, the lateral link will be bounded.

6. Remove the trailing link.



63G09X-338

7. Pull the wheel hub out, and separate the driveshaft from the output shaft.



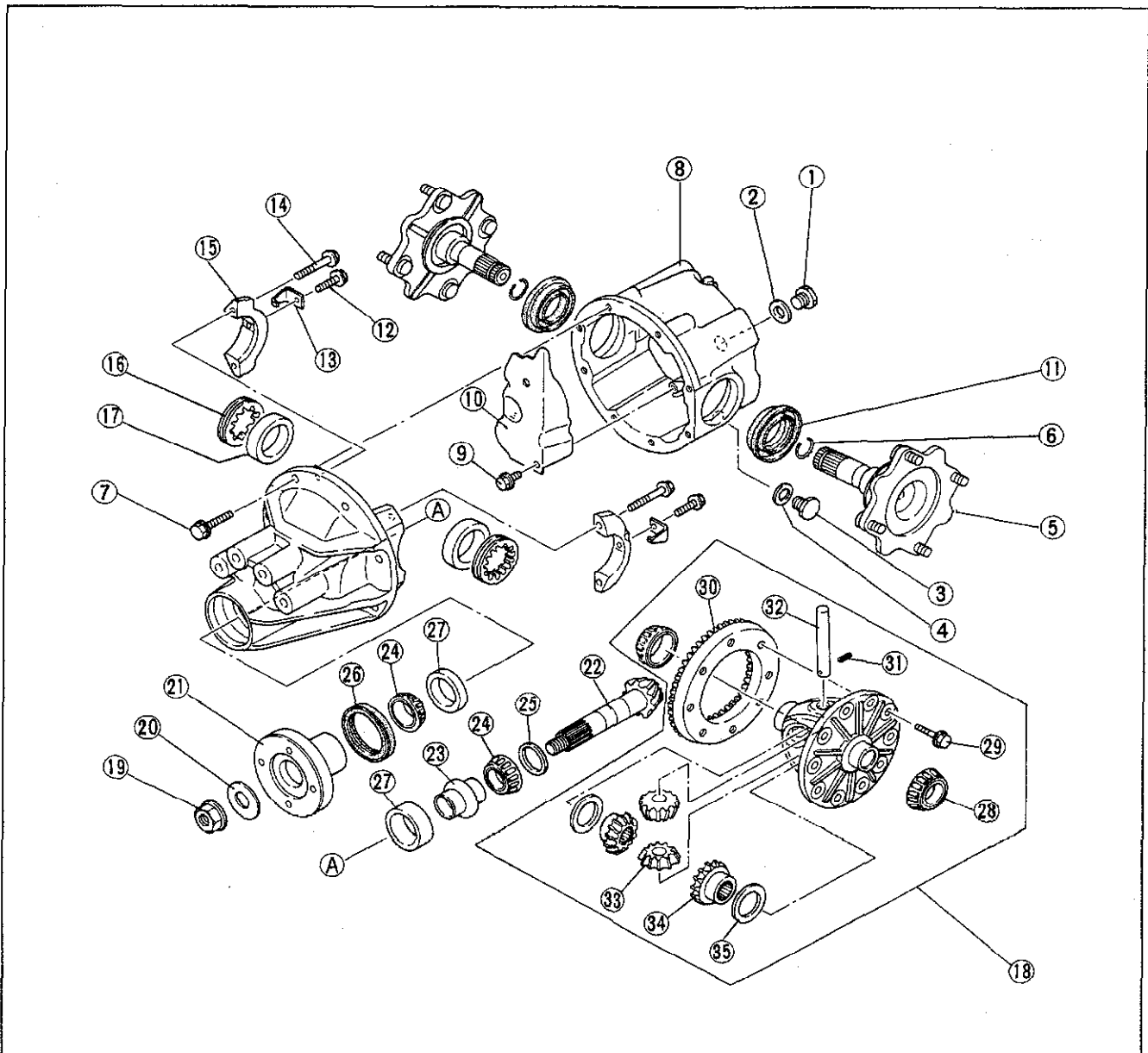
63G09X-339

8. Support the differential assembly with a jack, remove the assembly.

DISASSEMBLY

Disassemble in the sequence shown in the figure.

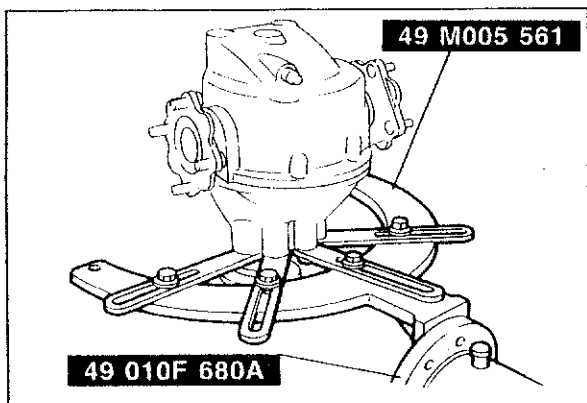
63G09X-340



63G09X-341

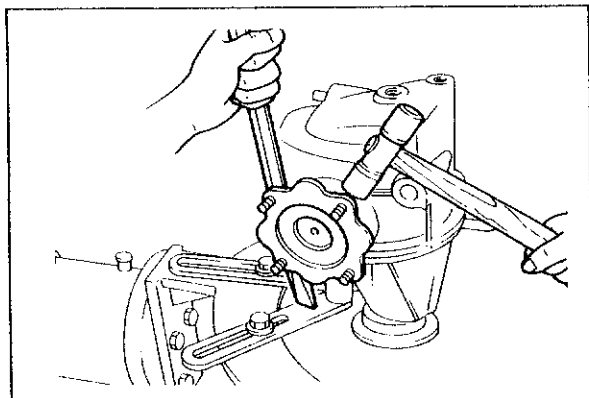
- | | | |
|-------------------------|-----------------------------|------------------------|
| 1. Oil fill plug | 13. Lock plate | 25. Spacer |
| 2. Gasket | 14. Bolt | 26. Oil seal |
| 3. Magnet plug | 15. Bearing cap | 27. Bearing outer race |
| 4. Gasket | 16. Adjust screw | 28. Bearing inner race |
| 5. Output shaft | 17. Bearing outer race | 29. Bolt |
| 6. Clip | 18. Differential gear ass'y | 30. Ring gear |
| 7. Bolt | 19. Lock nut | 31. Knock pin |
| 8. Differential housing | 20. Washer | 32. Pinion shaft |
| 9. Bolt | 21. Companion flange | 33. Pinion gear |
| 10. Baffle plate | 22. Drive pinion | 34. Side gear |
| 11. Oil seal | 23. Collapsible spacer | 35. Thrust washer |
| 12. Bolt | 24. Bearing inner race | |

9 REAR DIFFERENTIAL



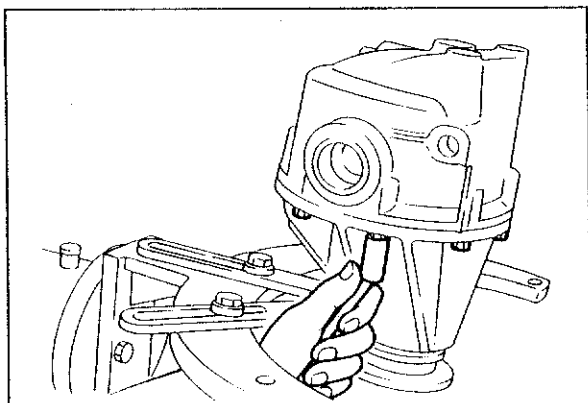
83U09X-043

Mount the differential gear assembly on the **SST**.



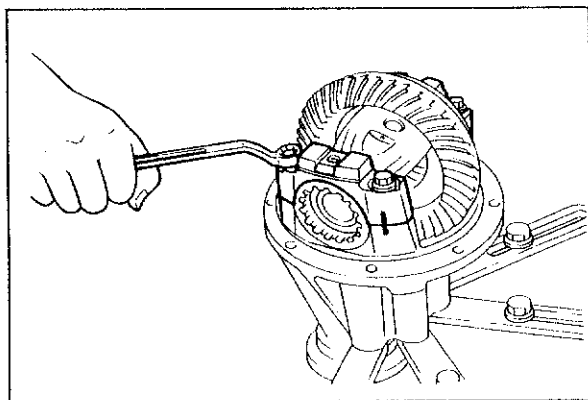
Output Shaft

Tap the output shaft with a plastic hammer as shown in the figure to remove.



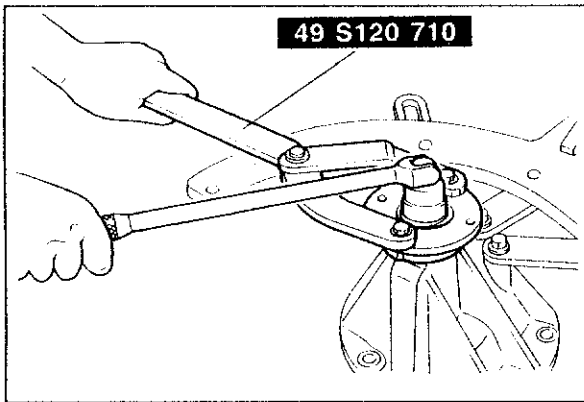
Differential Housing

Remove the differential housing.



Bearing Cap

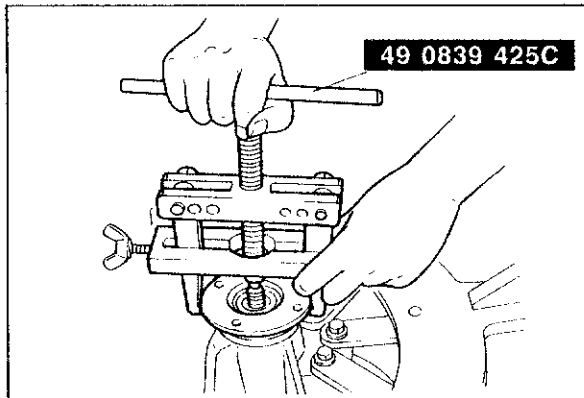
Mark the carrier one bearing cap and adjuster for proper reassembly.



83U09X-044

Lock Nut

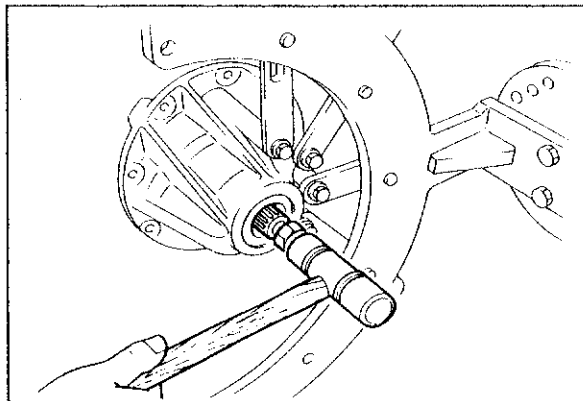
Hold the companion flange with the **SST** and remove the lock nut.



83U09X-045

Companion Flange

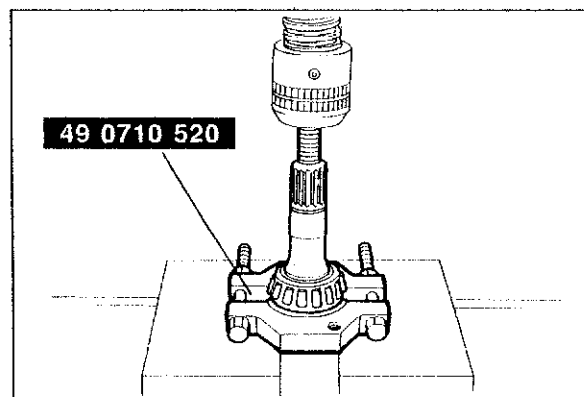
Pull the companion flange off using the **SST**.



63G09X-349

Drive Pinion

Push the drive pinion out by attaching a miscellaneous lock nut to the drive pinion, and tapping it with a brass hammer.



83U09X-046

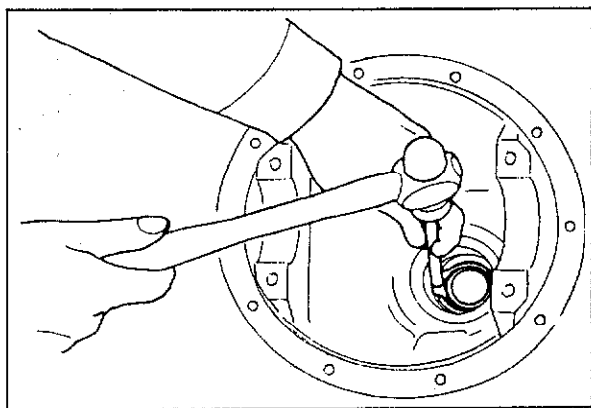
Rear Bearing

Remove the bearing using the **SST**.

Note

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

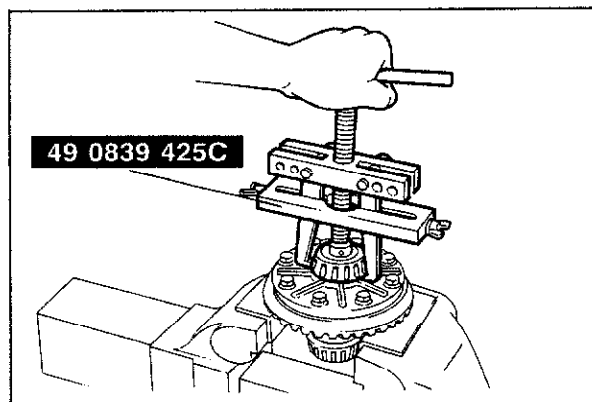
9 REAR DIFFERENTIAL



63G09X-351

Bearing Outer Race

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



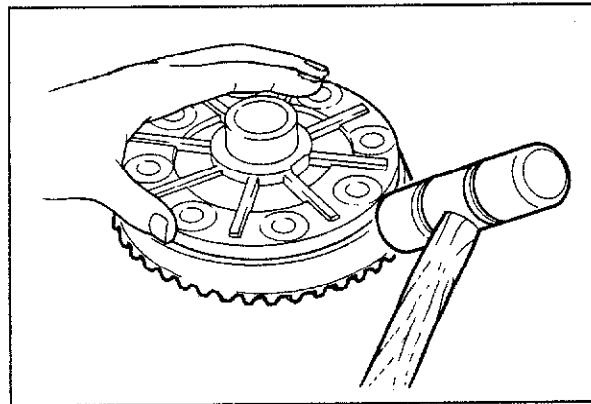
83U09X-047

Side Bearing

Using parts in the **SST**, remove the side bearings from the gear case.

Caution

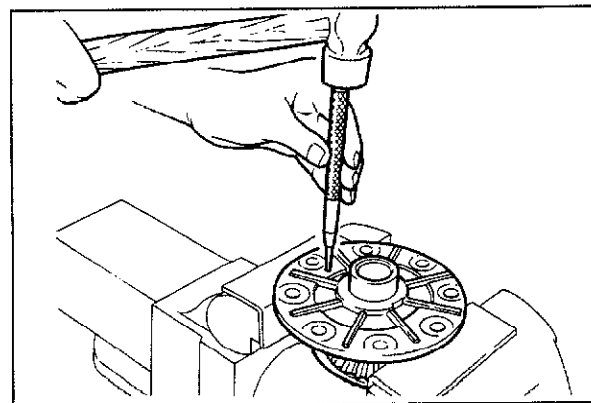
Identify each one of the bearings so that they can later be re-installed in the same position.



63G09X-353

Ring Gear

Remove the ring gear using a plastic hammer.



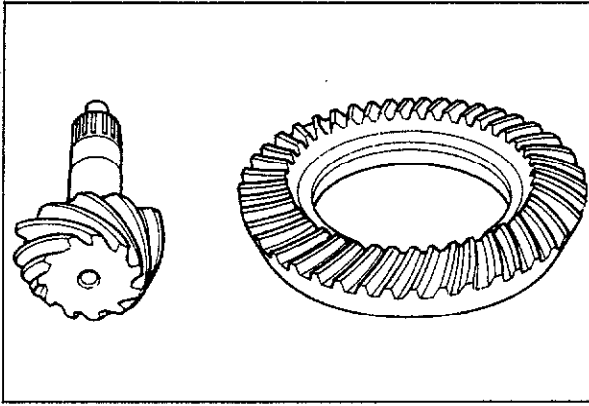
63G09X-354

Knock Pin

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

Caution

Insert the punch from the knock pin hole opposite the ring gear side.



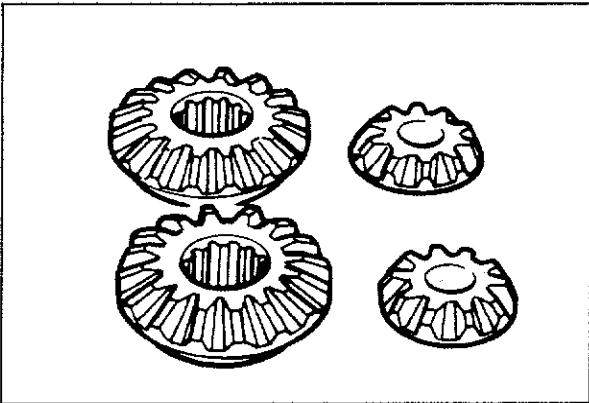
63G09X-355

INSPECTION

Check the following points, if a problem is found, replace the part.

Drive Pinion and Ring Gear

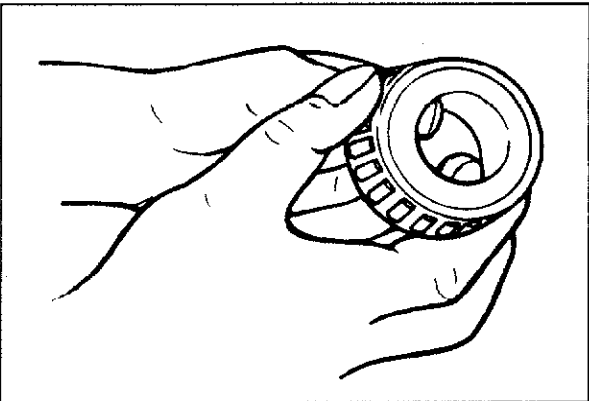
Poor contact, wear or damage.



63G09X-356

Differential Gear

1. Check the differential side gears and pinion gears for cracks, chipped teeth or damage.
2. Check the differential bearings and pinion bearings for wear, flaking or damage.



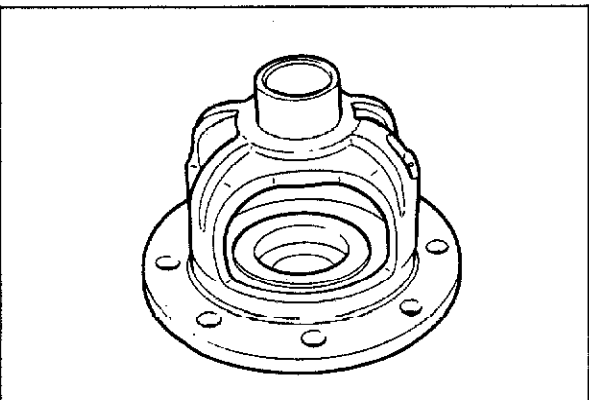
63G09X-357

Bearing

Check the bearings for wear, damage or seizure.

Caution

If replacement is necessary, replace the bearings as a set.

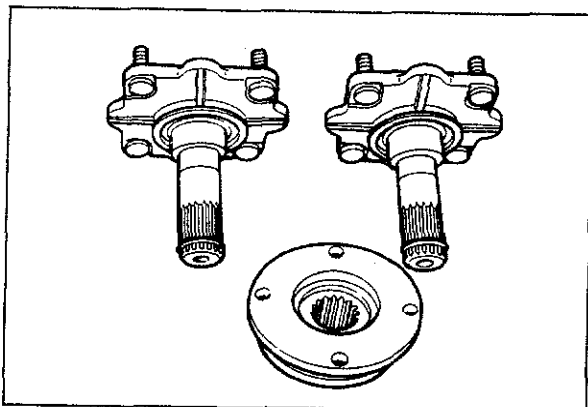


63G09X-358

Gear Case

Check for cracks, damage and wear.

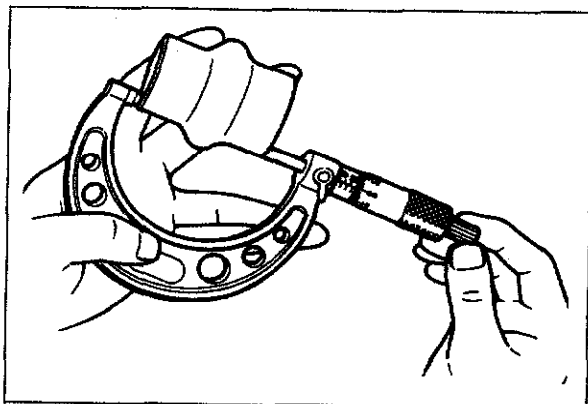
9 REAR DIFFERENTIAL



63G09X-359

Companion Flange and Output Shaft

Check for worn splines, damage and cracks.



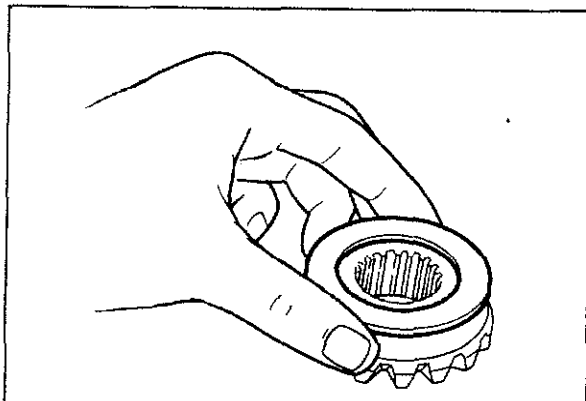
83U09X-048

Collapsible Spacer

Measure the length of the collapsible spacer.

Standard length:

43.35—43.65 mm (1.707—1.719 in)



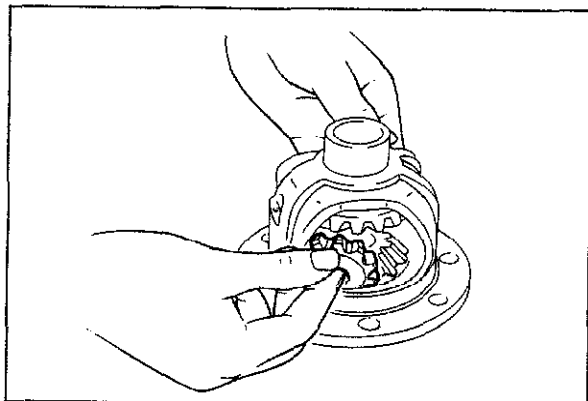
63G09X-361

ASSEMBLY

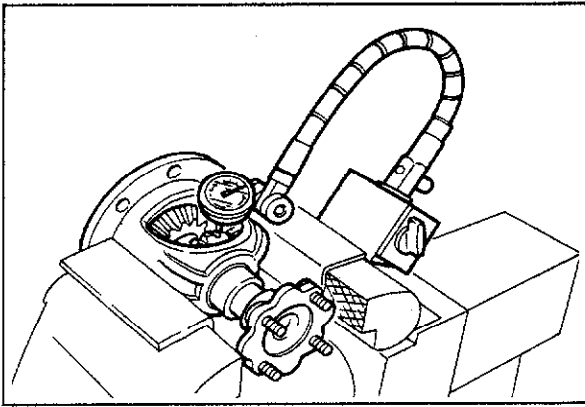
Assemble in the reverse order of disassembly.

Side Gear and Pinion Gear

1. Install the thrust washers on the side gears and install them in the gear case.
2. Through the openings of the gear case, insert the pinion gears exactly **180** degrees opposite each other.
3. Rotate the gears **90** degrees so that the pinion gears align with the pinion shaft holes in the gear case.
4. Insert the pinion shaft.
5. Insert the output shaft.



63G09X-362



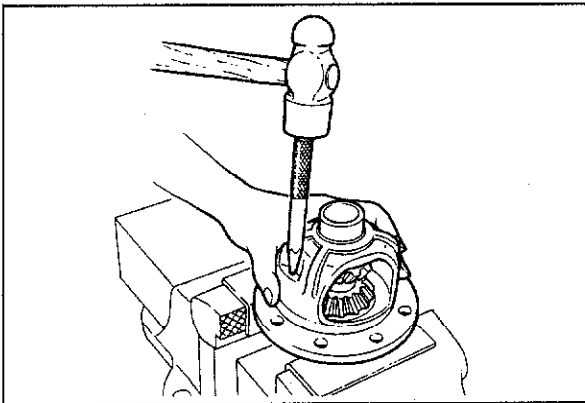
67G09X-363

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

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

Thrust washer thickness:

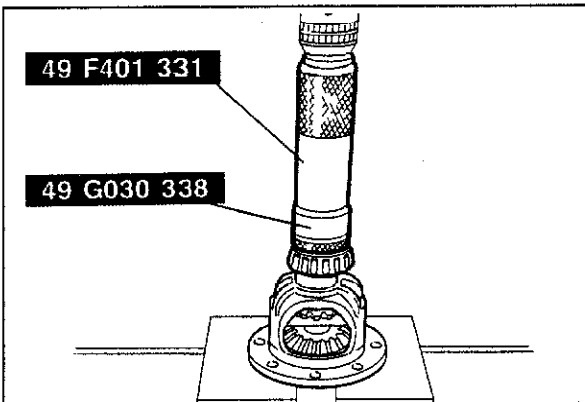
Identification mark	Thickness
0	2.00 mm (0.0787 in)
1	2.10 mm (0.0827 in)
2	2.20 mm (0.0866 in)



63G09X-364

Knock Pin

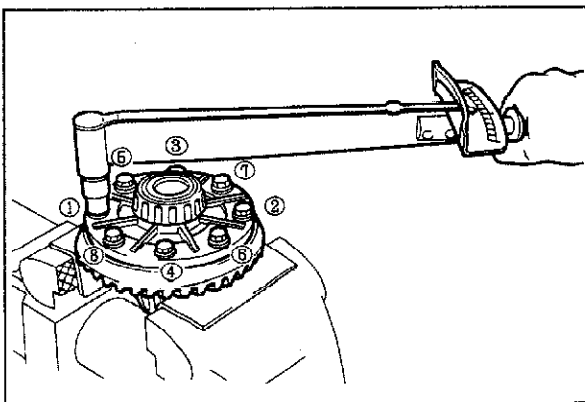
Install the knock pin to secure the pinion shaft. Stake the knock pin into position with a punch to prevent it from coming out.



83U09X-049

Side Bearing

Press the side bearing on using the **SST**.



63G09X-366

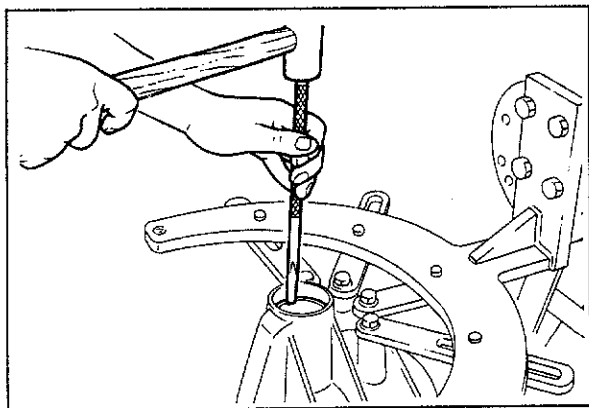
Ring Gear

Install the ring gear to the gear case.

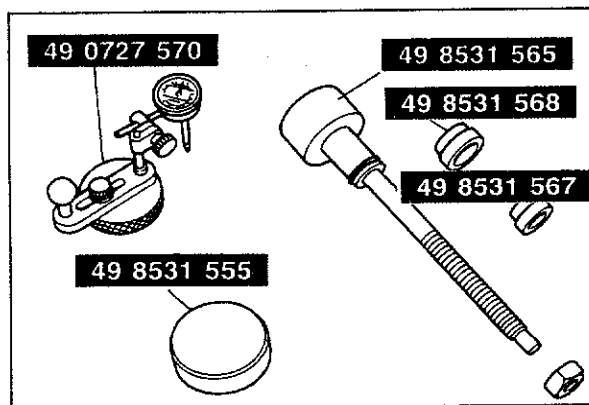
Tightening torque:

69—83 N·m (7.0—8.5 m·kg, 51—61 ft·lb)

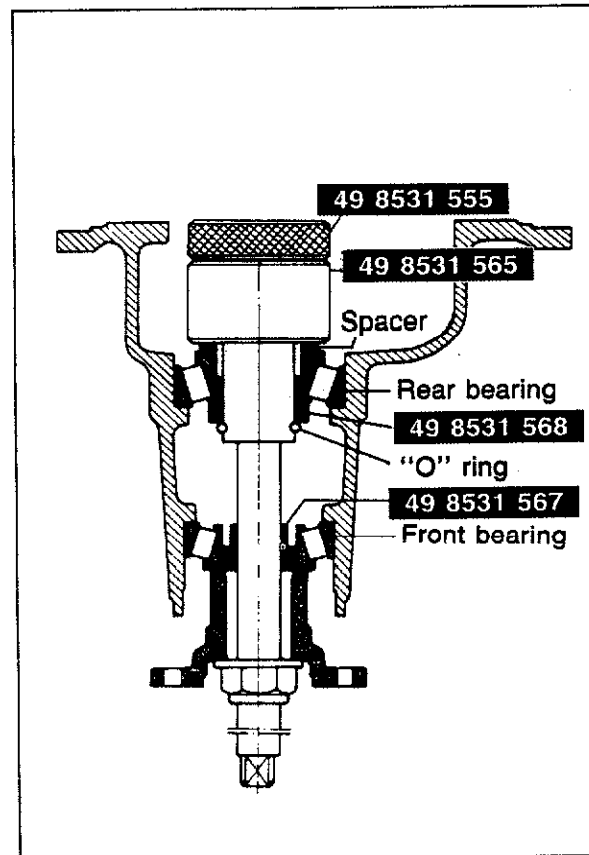
9 REAR DIFFERENTIAL



63G09X-367



83U09X-050



83U09X-051

Adjustment of Pinion Height

1. Install the front and rear bearing outer races using a brass drift and a hammer.

2. Adjust drive pinion height as follows using the **SST**.

3. Fit the spacer, rear bearing, and **SST**. Secure the collar with the "O" ring. Then install this to the carrier.

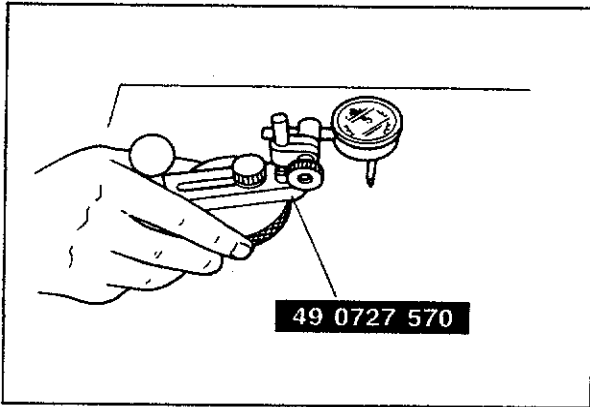
4. Attach the front bearing, **SST**, companion flange, washer, and nut to the drive pinion model.

Note

a) Use the same spacer and nut which were removed at disassembly.

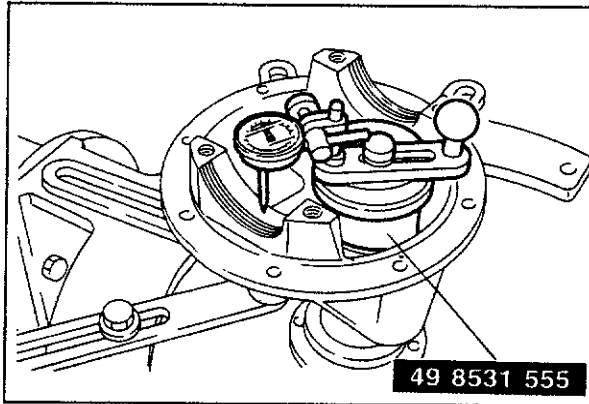
b) Be sure to install collars A and B in the correct position and facing in the correct direction.

5. Tighten the nut to the extent that the drive pinion model can be turned by hand.



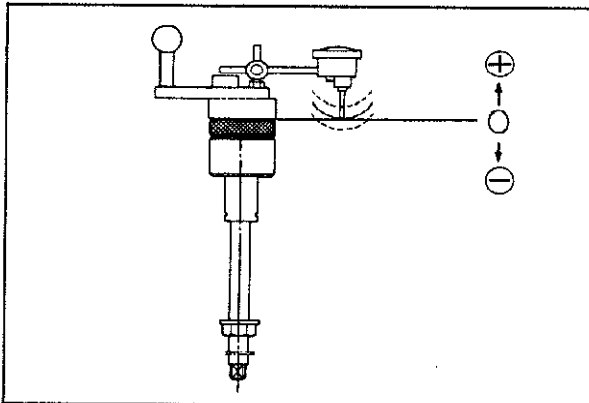
63G09X-370

6. Place the **SST** on the surface plate and set the dial indicator to "Zero".



83U09X-052

7. Place the **SST**.
8. Place the feeler of the dial indicator so that it contacts where the side bearing is installed in the carrier. Measure the lowest position on both the left and the right sides.



63G09X-372

9. Add the two (left and right) values obtained by the measurements taken in step 8 and divide the total by 2.

Standard: 0 mm (0 in)

Mark	Thickness	Mark	Thickness
08	3.08 mm (0.1213 in)	29	3.29 mm (0.1295 in)
11	3.11 mm (0.1224 in)	32	3.32 mm (0.1307 in)
14	3.14 mm (0.1236 in)	35	3.35 mm (0.1319 in)
17	3.17 mm (0.1248 in)	38	3.38 mm (0.1331 in)
20	3.20 mm (0.1260 in)	41	3.41 mm (0.1343 in)
23	3.23 mm (0.1271 in)	44	3.44 mm (0.1354 in)
26	3.26 mm (0.1283 in)	47	3.47 mm (0.1366 in)

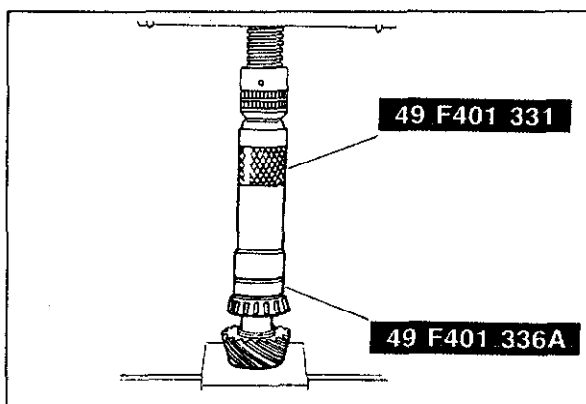
63G09X-373

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

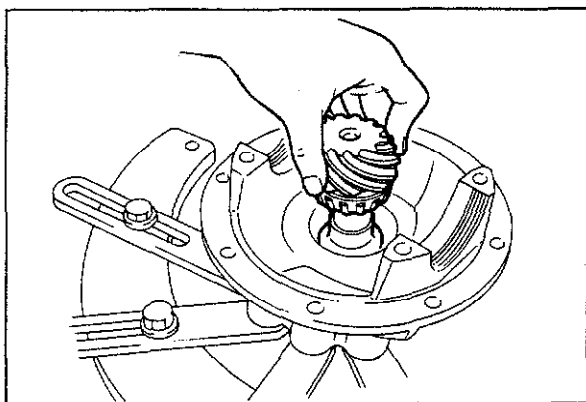
Note

The spacer thicknesses are available in 0.03 mm. Select the spacer thickness that is closest to that necessary.

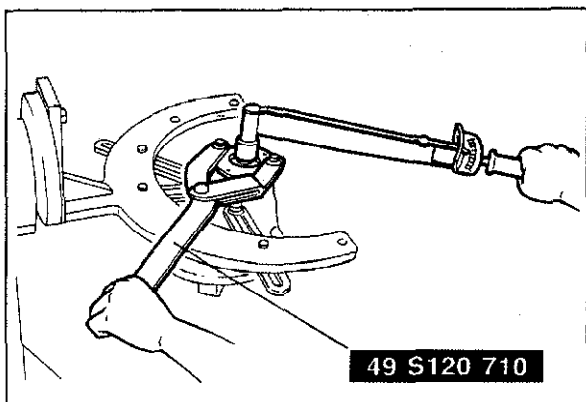
9 REAR DIFFERENTIAL



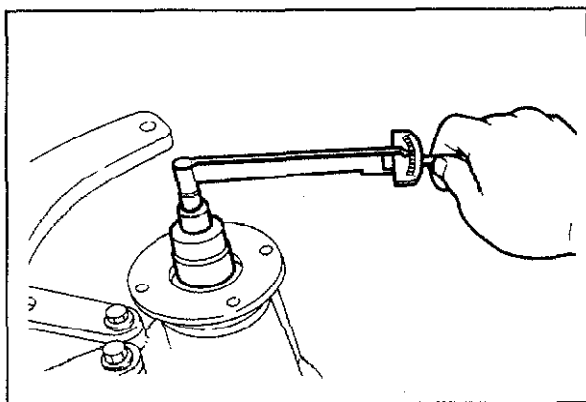
83U09X-053



63G09X-375



63G09X-376



63G09X-377

Adjustment of Drive Pinion Preload

1. Install the spacer.
2. Press the rear bearing on by using the **SST**.

Caution

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

3. Install the collapsible spacer.
4. Install the drive pinion assembly.

5. Install the companion flange, and tighten the lock nut.

Caution

Do not install the oil seal.

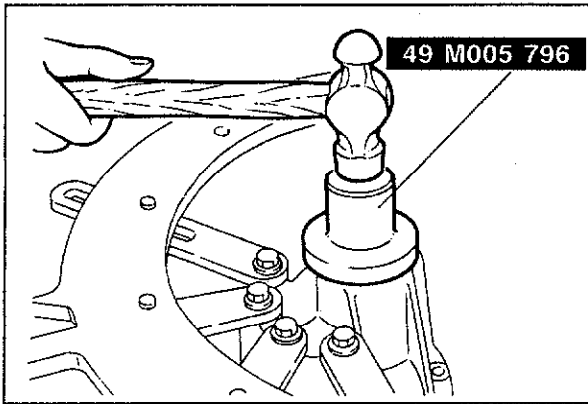
Tightening torque:

118—177 N·m (12—18 m·kg, 87—130 ft·lb)

6. Turn the companion flange by hand to seat the bearing.
7. Measure the drive pinion preload.
If the specified preload can not be obtained, replace the collapsible spacer with a new one and check again.

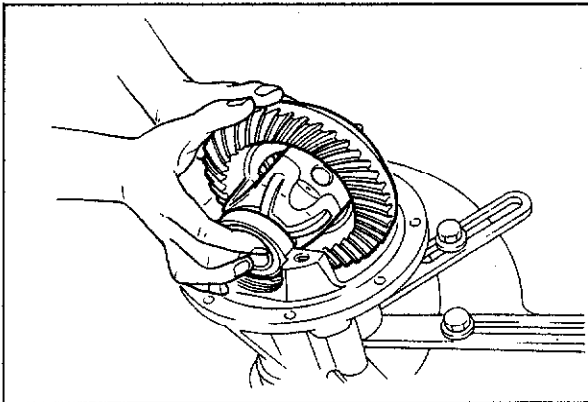
Preload: 0.3—0.7 N·m

(3—7 cm·kg, 2.6—6.1 in·lb)



83U09X-054

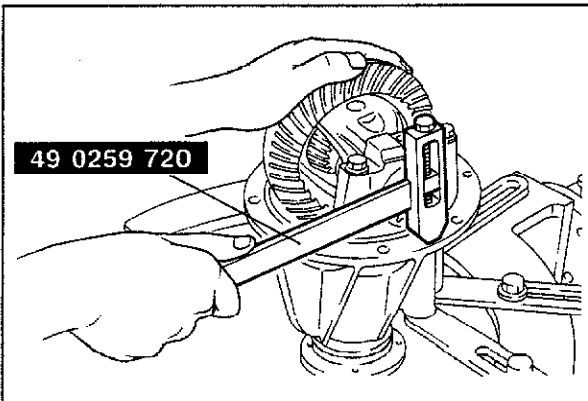
8. Remove the nut, washer and companion flange.
9. Tap the oil seal into the differential carrier using the **SST**.



63G09X-379

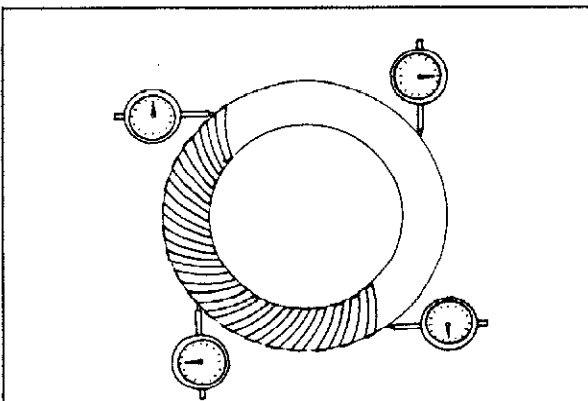
Adjustment of Backlash

1. Install the differential gear assembly in the carrier.
2. Note the identification marks on the adjusters and install the adjusters to their respective side.
3. Install the differential bearing caps making sure that the identification marks on the caps correspond with those on the carrier.



83U09X-055

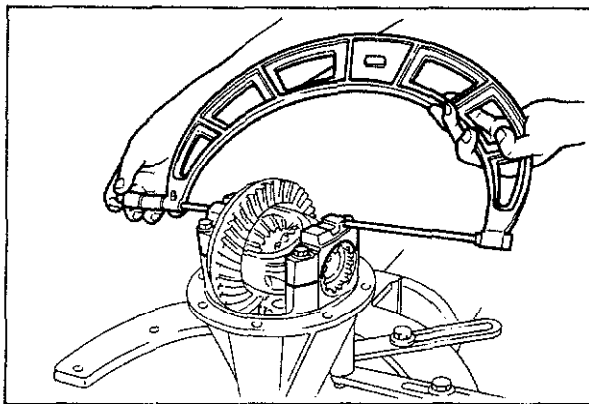
4. Mark the ring at four points at approx. 90° intervals. Mount a dial indicator to the carrier so that the feeler comes in contact at a right angle with one of the ring gear teeth.
5. Turn both bearing adjusters equally until the backlash is **0.15—0.17 mm (0.0059—0.0067 in)** using the **SST**.



63G09X-381

6. Check the backlash at the three other marked points and make sure that the minimum backlash is above **0.05 mm (0.002 in)**, and the difference between the maximum and minimum backlash is less than **0.07 mm (0.0028 in)**.

9 REAR DIFFERENTIAL

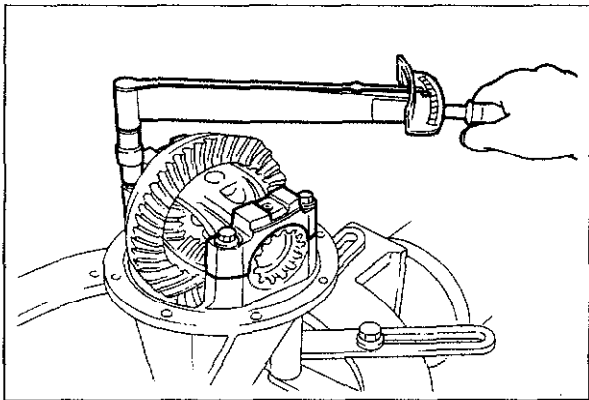


83U09X-056

7. Tighten the adjusters equally until the distance between the pilot sections on the bearing caps is **150.14—150.20 mm (5.9110 —5.9134 in)** as shown in the figure.

Note

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



63G09X-383

8. Tighten the bearing cap bolts.

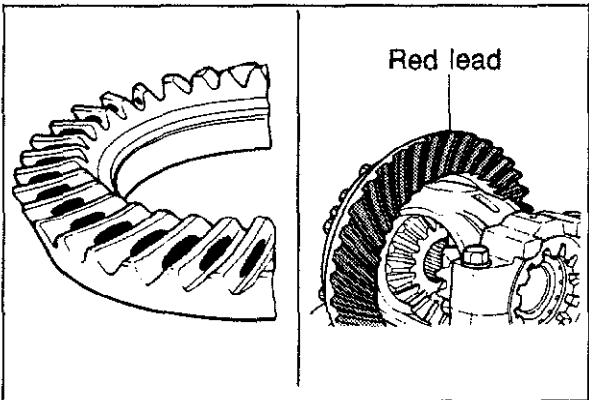
Tightening torque:

37—52 N·m (3.8—5.3 m·kg, 27—38 ft·lb)

9. Install the adjuster lock plates on the bearing caps to prevent the adjusters from loosening.

Tightening torque:

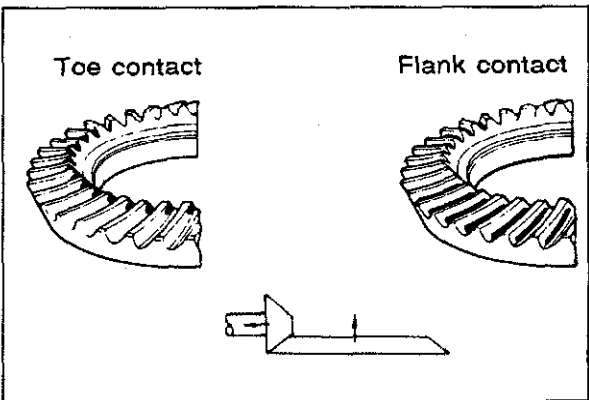
19—26 N·m (1.9—2.6 m·kg, 14—19 ft·lb)



63G09X-384

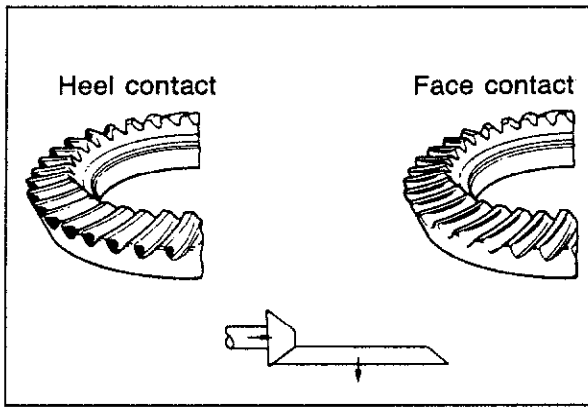
Inspection and Adjustment of Teeth Contact

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



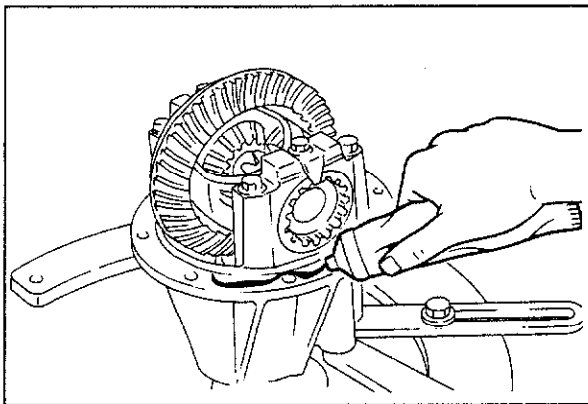
63G09X-385

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



63G09X-386

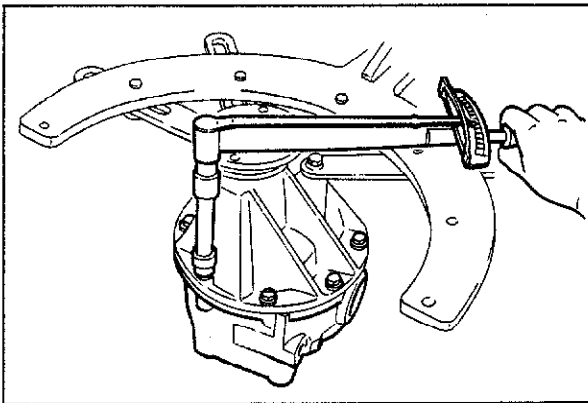
- (2) Heel and face contact
Replace the spacer with a thicker one to bring the drive pinion in.



63G09X-387

Differential Housing

1. Coat both surfaces with a sealing compound.

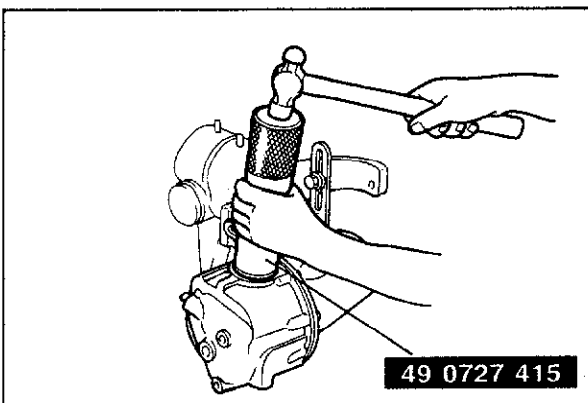


63G09X-388

2. Install the differential housing.

Tightening torque:

23—26 N·m (2.3—2.7 m·kg, 17—20 ft·lb)

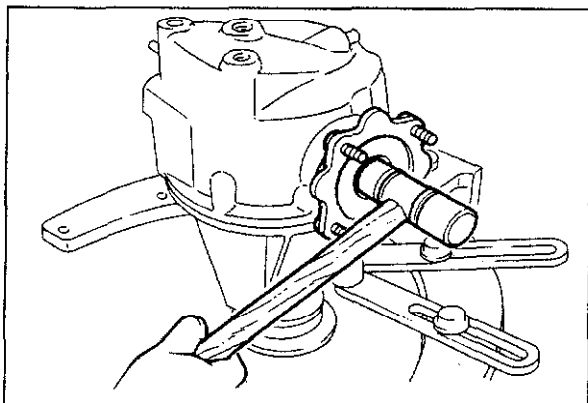


83U09X-057

Oil Seal

Install a new oil seal using the **SST**.

9 REAR DIFFERENTIAL



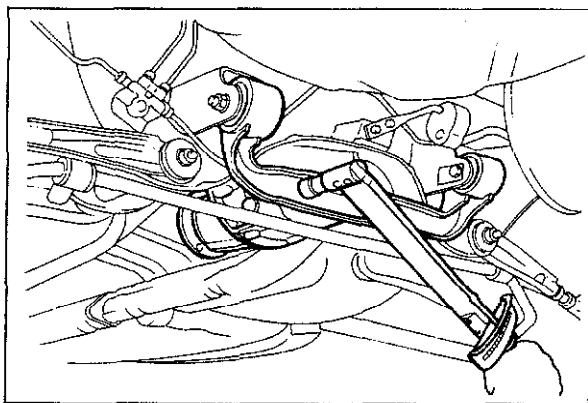
63G09X-390

Output Shaft

Install the output shaft.

Note

Replace the output shaft clip with a new clip.



63G09X-391

INSTALLATION

1. Install the differential assembly.

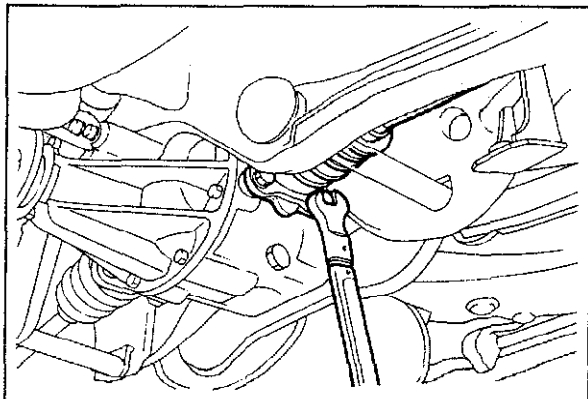
Tightening torque:

Front: 45—68 N·m

(4.6—6.9 m·kg, 33—50 ft·lb)

Rear: 108—131 N·m

(11.0—13.4 m·kg, 80—97 ft·lb)

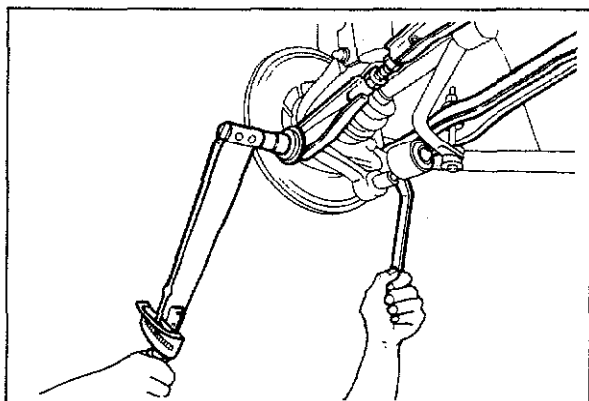


63G09X-392

2. Align the mating marks on the driveshaft and output shaft, then install the driveshaft.

Tightening torque:

49—59 N·m (5.0—6.0 m·kg, 36—43 ft·lb)

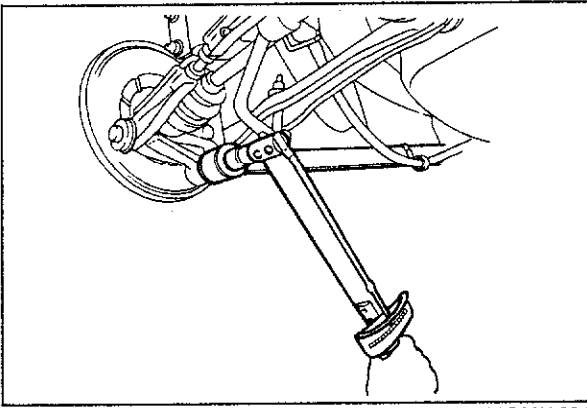


63G09X-393

3. Install the lateral link.

Tightening torque:

63—75 N·m (6.4—7.6 m·kg, 46—55 ft·lb)

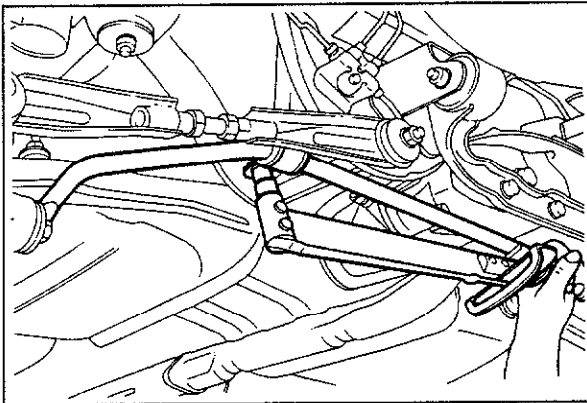


63G09X-394

4. Install the trailing link.

Tightening torque:

93—117 N·m (9.5—11.9 m·kg, 69—86 ft·lb)

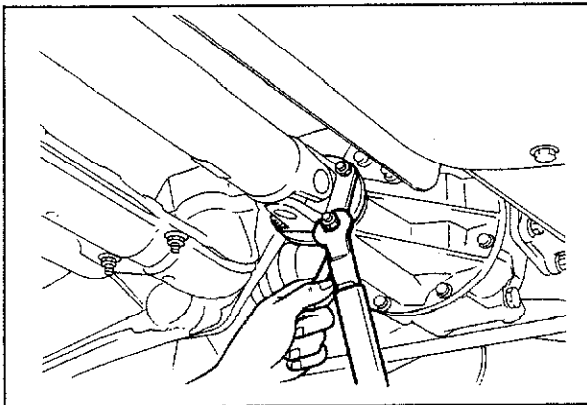


63G09X-395

5. Install the stabilizer.

Tightening torque:

12—18 N·m (1.2—1.8 m·kg, 9—13 ft·lb)



63G09X-396

6. Install the propeller shaft.

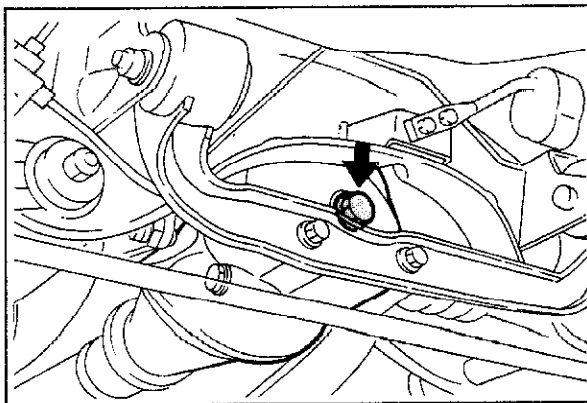
Tightening torque:

27—30 N·m (2.8—3.1 m·kg, 20—22 ft·lb)

7. Install the tires.

Tightening torque:

88—118 N·m (9—12 m·kg, 65—87 ft·lb)



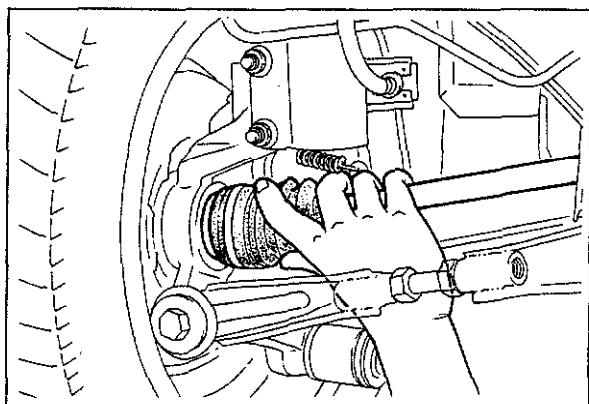
63G09X-397

8. Fill the differential with the correct grade and quantity of oil.

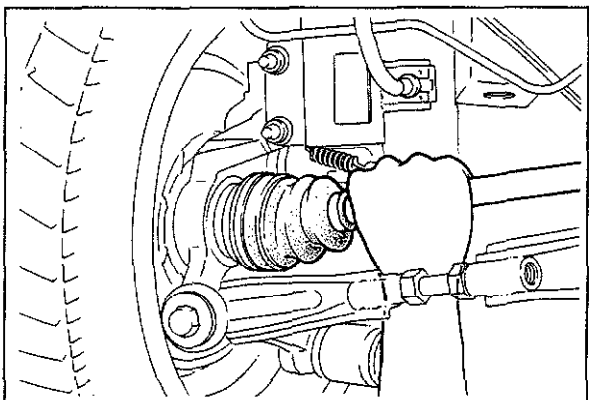
9. Tighten the oil fill plug.

Tightening torque:

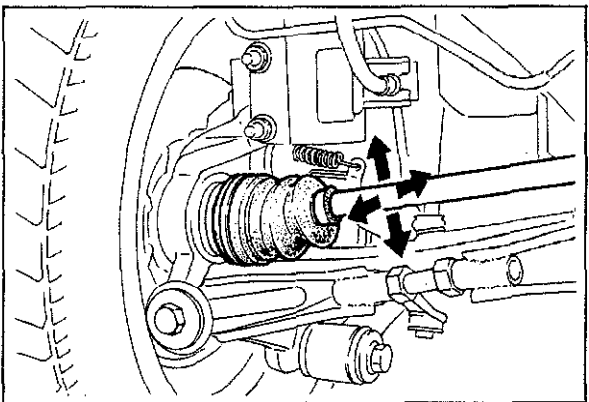
39—54 N·m (4.0—5.5 m·kg, 29—40 ft·lb)



63G09X-398



63G09X-399



63G09X-400

REAR DRIVESHAFT

ON-VEHICLE CHECK

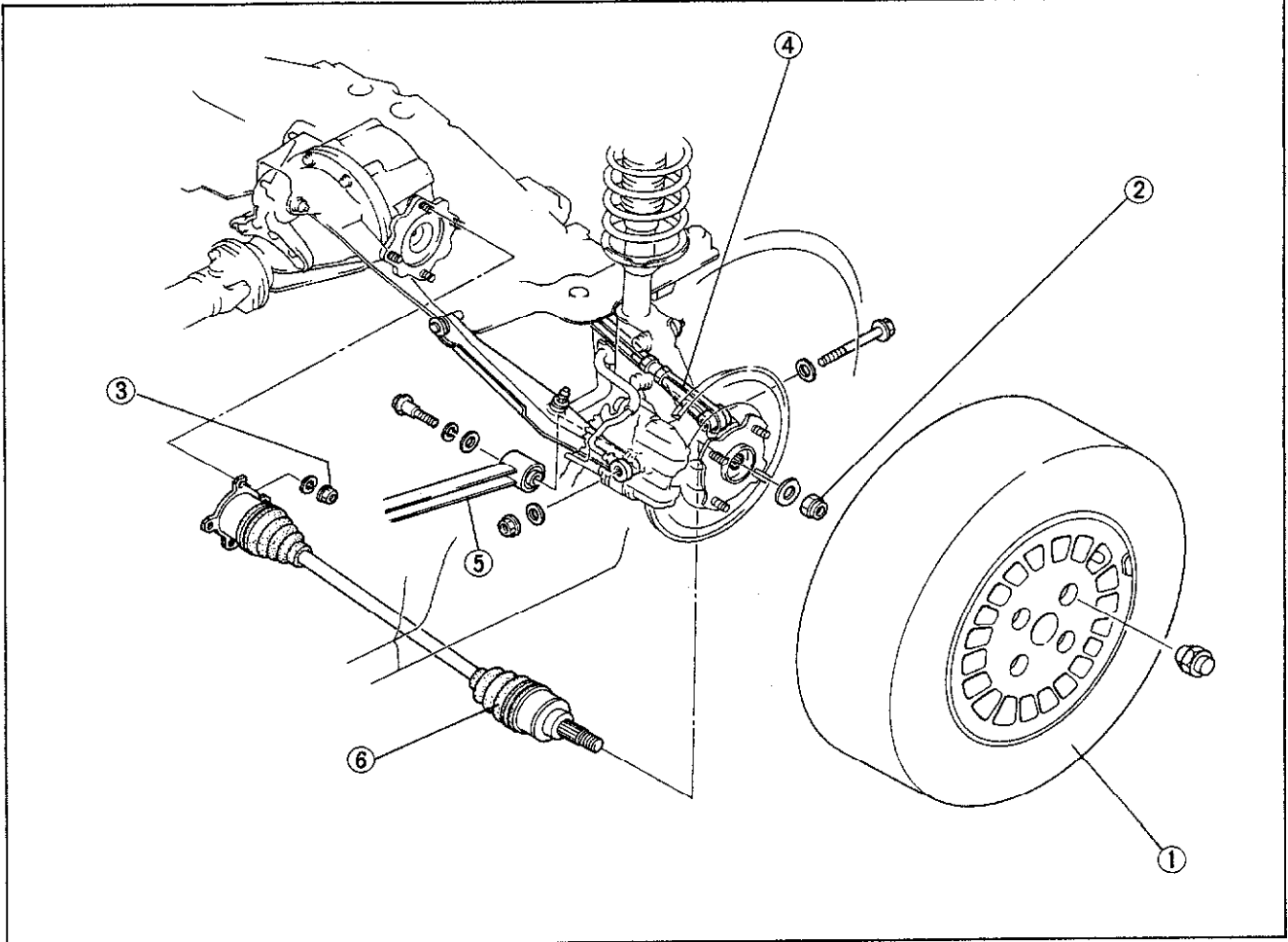
Check the following points, if a problem is found, replace the part.

1. Check the dust boot on the driveshaft for cracks, damage, leaking grease, or a loose boot band.
2. Check the driveshaft bearing for cracking, and wear of the splines.
3. Check the joint for wear by moving as shown in the figure.

REMOVAL AND INSTALLATION

1. Jack up the rear of the vehicle and support it with safety stands.
2. Remove the parts in the sequence shown in the figure.
3. Install in the reverse order of removal.

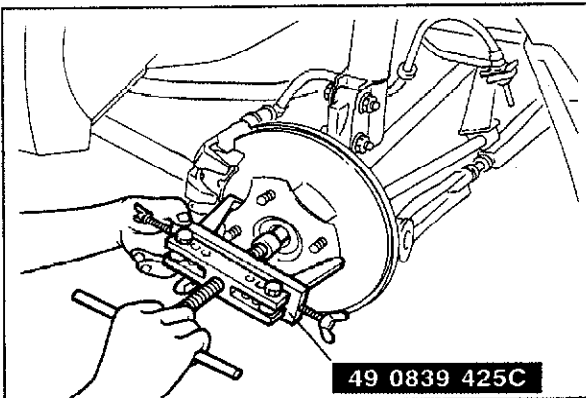
63G09X-401



63G09X-402

1. Tire
2. Lock nut
3. Nut

4. Lateral link
5. Trailing link
6. Driveshaft



49 0839 425C

83U09X-058

Wheel Hub

If the driveshaft is stuck to the wheel hub, use the **SST** to push the driveshaft out.

9 REAR DRIVESHAFT

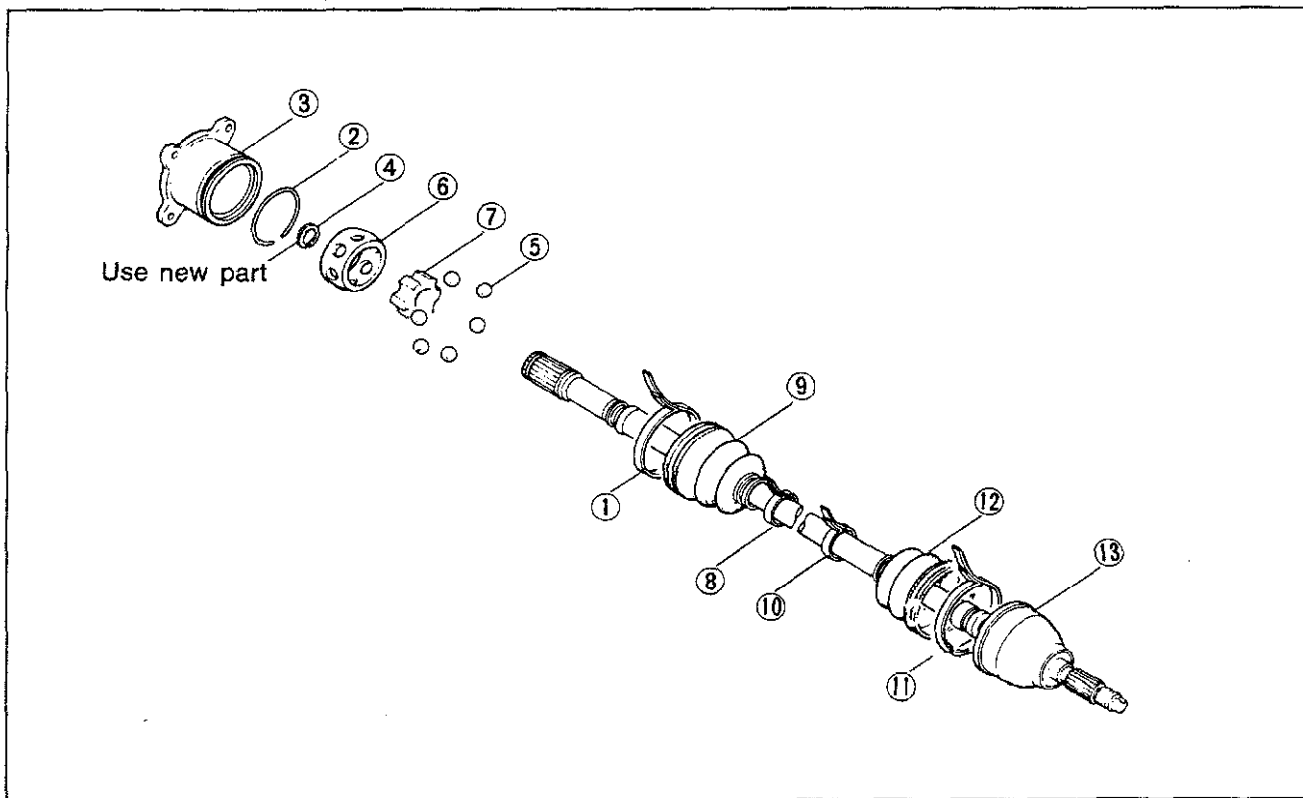
DISASSEMBLY AND ASSEMBLY

1. Disassemble in the sequence shown in the figure.
2. Assemble in the reverse order of removal.

Caution

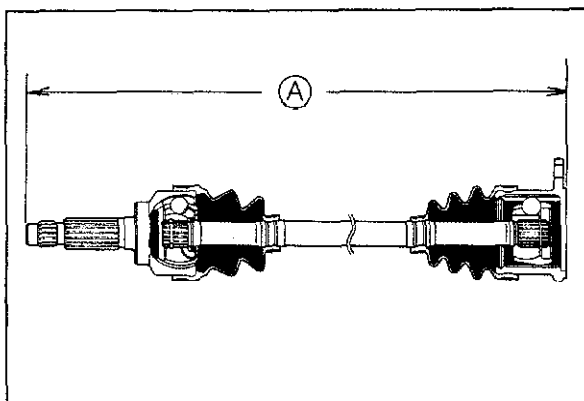
- a) Secure the joint in a vise with protective material (such as copper plates) on the vise jaws.
- b) Be careful that dust or other foreign material does not enter the joint while the work is being performed.
- c) Do not disassemble the wheel side ball joint.
- d) Do not wash the joint unless it is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

63G09X-404



63G09X-405

- | | | |
|---------------|---------------|-----------------------------------|
| 1. Boot band | 6. Inner ring | 11. Boot band |
| 2. Clip | 7. Cage | 12. Boot |
| 3. Outer ring | 8. Boot band | 13. Shaft and ball joint assembly |
| 4. Snap ring | 9. Boot | |
| 5. Balls | 10. Boot band | |



63G09X-406

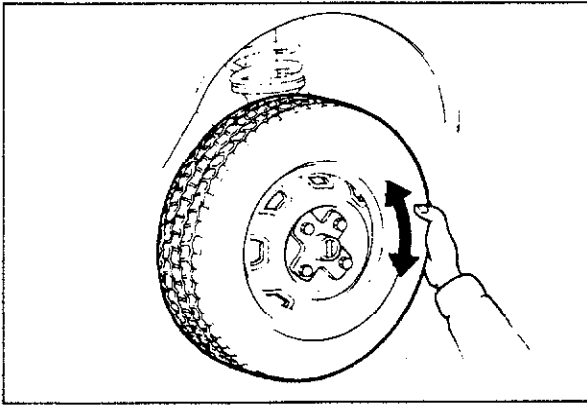
Standard length A:

Right side: 651.3 mm (25.64 in)

Left side: 681.3 mm (26.82 in)

Note

The wheel side and differential side boots are different.



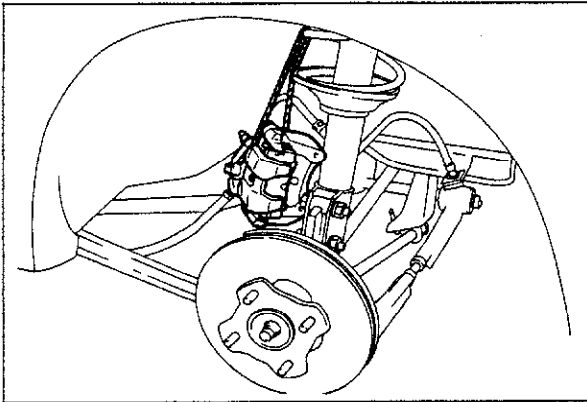
63G09X-407

REAR AXLE

ON-VEHICLE CHECK

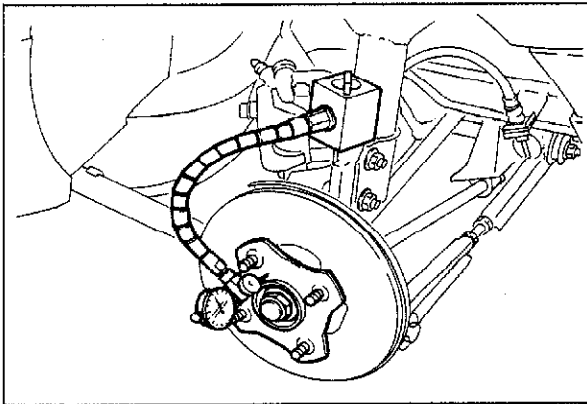
Wheel Bearing Play

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.



63G09X-408

3. Remove the caliper assembly, and support it from the shock absorber.



63G09X-409

4. Set a dial gauge against the axle flange. Then push and pull the axle hub by hand in the axial direction, and measure the end play of the wheel bearing.
If the end play exceeds the specification, adjust the wheel bearing.

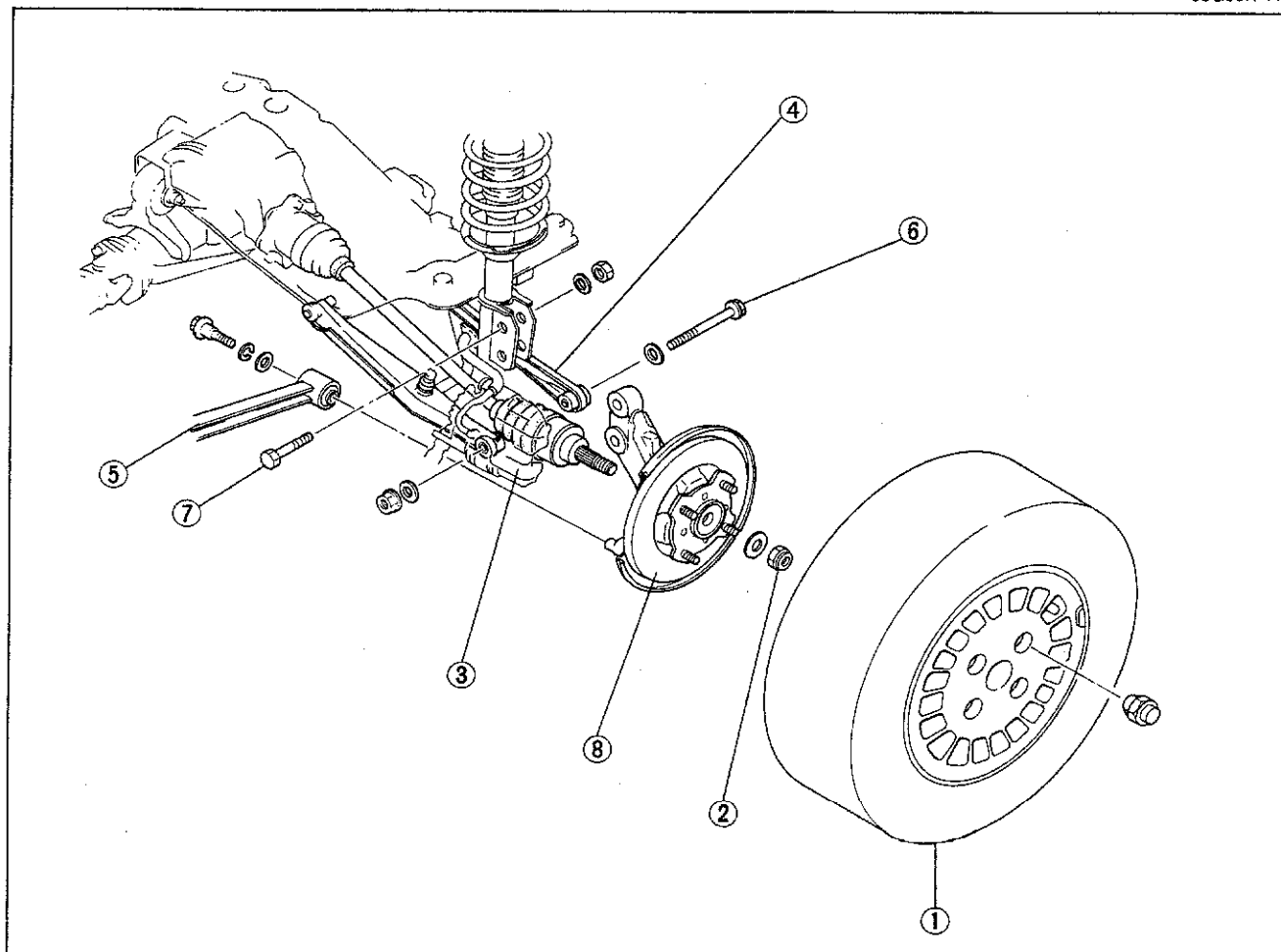
End play: 0 mm (0 in).

9 REAR AXLE

REMOVAL AND INSTALLATION

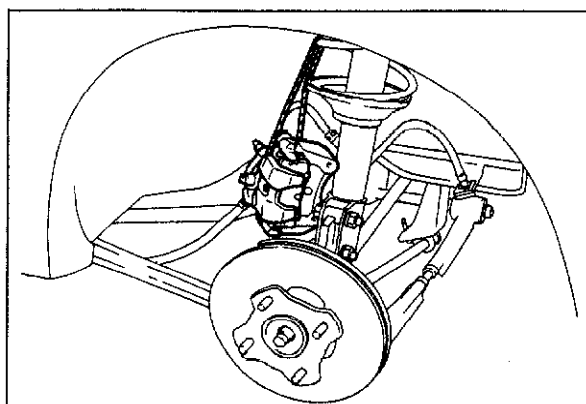
1. Jack up the rear of the vehicle and support it with safety stands.
2. Remove the parts in the sequence shown in the figure.
3. Install in the reverse order of removal.

63G09X-410



63G09X-411

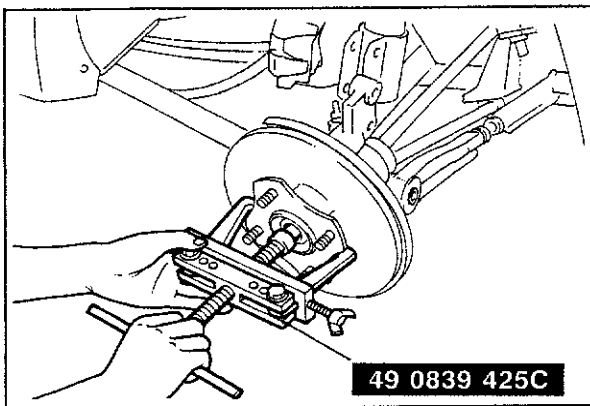
- | | |
|--------------------------|-----------------------------|
| 1. Tire | 5. Trailing link |
| 2. Lock nut | 6. Bolt |
| 3. Disc caliper assembly | 7. Bolt |
| 4. Lateral link | 8. Hub and knuckle assembly |



63G09X-412

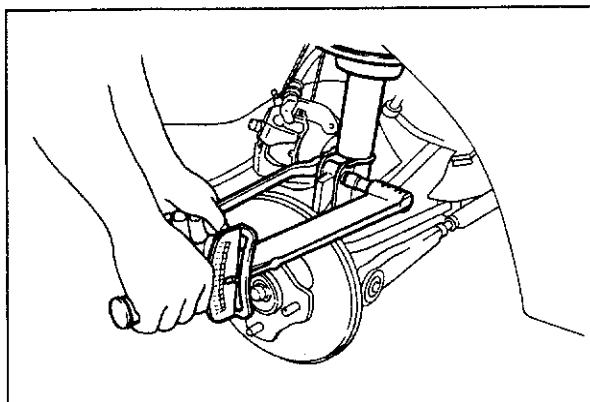
Removal Note

1. Remove the disc caliper assembly from the knuckle, and suspension it from the shock absorber.



83U09X-059

2. If the driveshaft is stuck to the wheel hub, use the **STT** to push the driveshaft out.



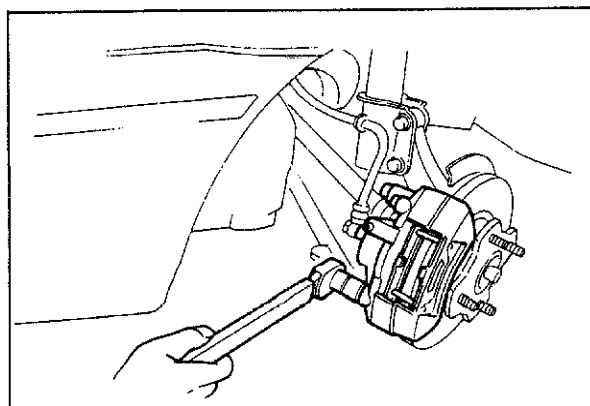
63G09X-414

Installation Note

1. Tighten the shock absorber through bolt.

Tightening torque:

78—117 N·m (8.0—11.9 m·kg, 58—86 ft·lb)

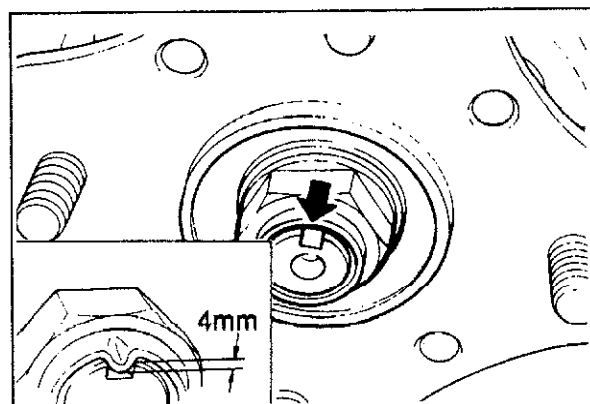


63G09X-415

2. Tighten the disc caliper assembly.

Tightening torque:

49—69 N·m (5.0—7.0 m·kg, 36—51 ft·lb)



63G09X-416

3. Tighten the lock nut, and stake the lock nut to the groove in the spindle.

Tightening torque:

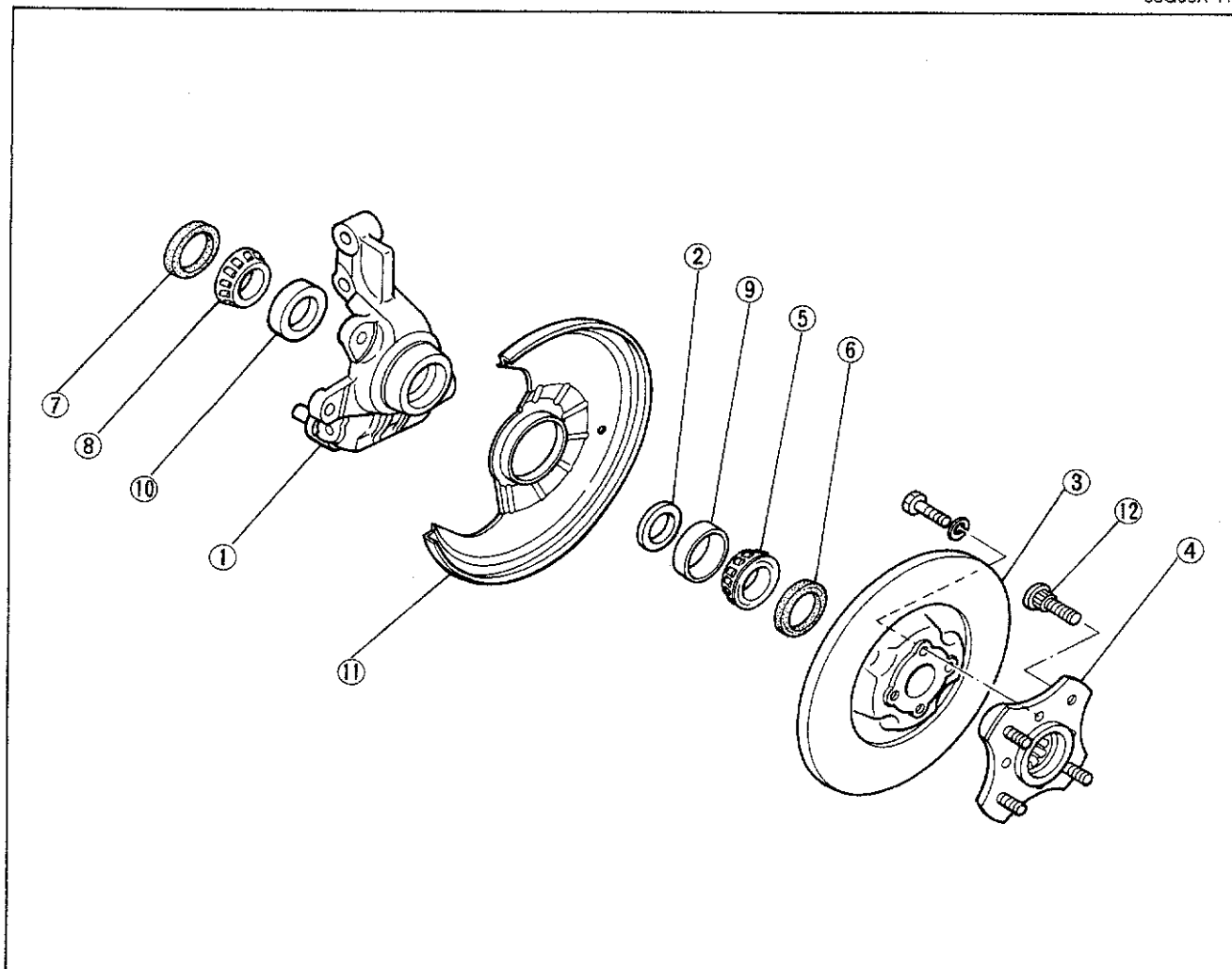
**157—235 N·m
(16—24 m·kg, 116—174 ft·lb)**

9 REAR AXLE

DISASSEMBLY

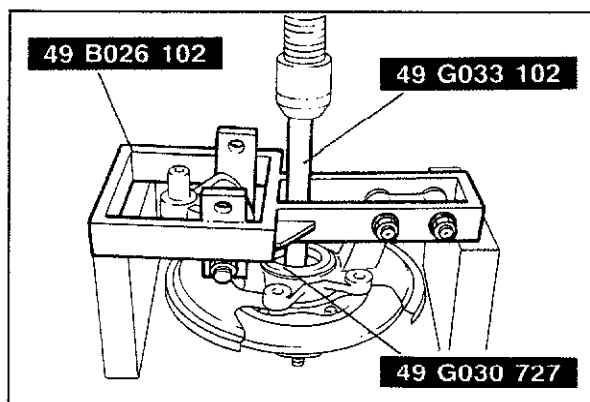
Disassemble in the sequence shown in the figure.

63G09X-417



63G09X-418

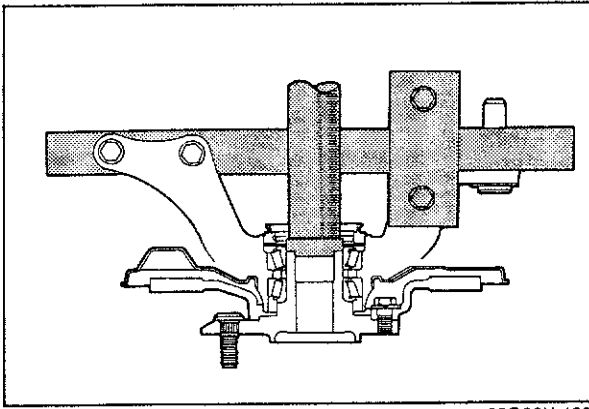
- | | |
|---------------------|--------------------------------|
| 1. Knuckle | 7. Oil seal (Inner) |
| 2. Spacer | 8. Bearing (Inner) |
| 3. Disc plate | 9. Bearing outer race (Outer) |
| 4. Wheel hub | 10. Bearing outer race (Inner) |
| 5. Bearing (Outer) | 11. Dust cover |
| 6. Oil seal (Outer) | 12. Wheel lug bolt |



83U09X-060

Knuckle

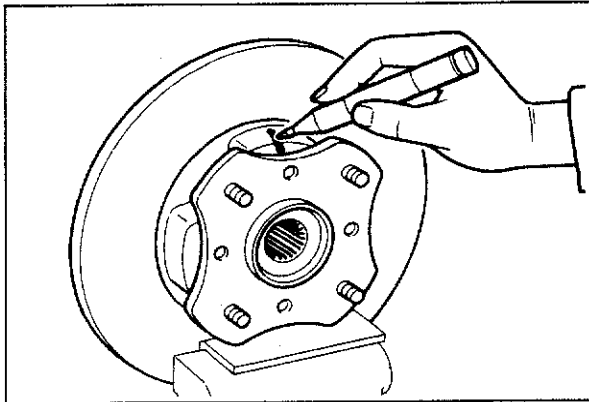
1. Remove the wheel hub and disc plate from the knuckle using the **SST** and a press.



63G09X-420

Note

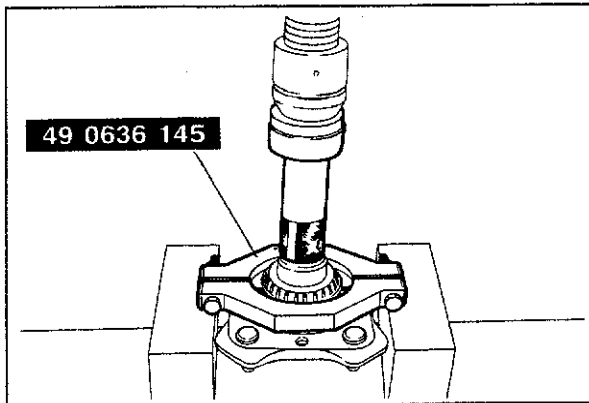
Support the wheel hub and disc plate by hand to prevent it from falling.



63G09X-421

Wheel Hub

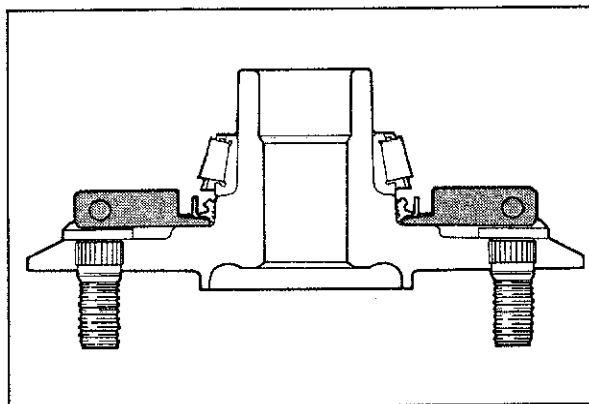
Put mating marks on the disc plate and the wheel hub then remove the wheel hub.



83U09X-061

Bearing and Oil Seal (Outer)

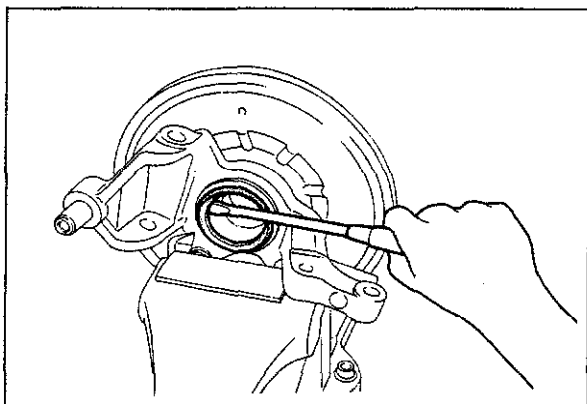
Set the SST between the oil seal and wheel hub, and remove the bearing and oil seal together.



63G09X-423

Note

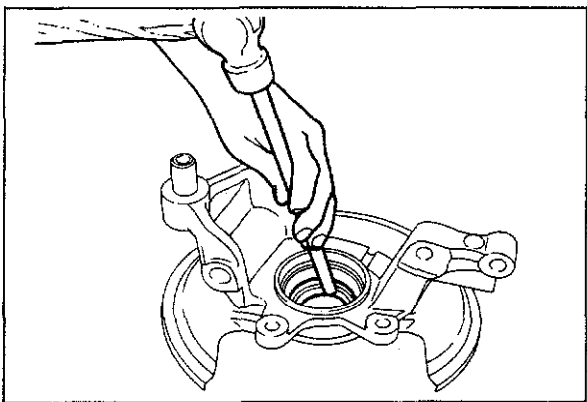
Support the wheel hub by hand to prevent it from falling.



63G09X-424

Oil Seal (Inner)

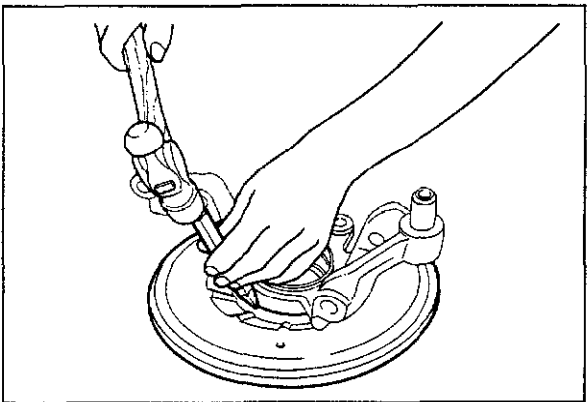
Remove the oil seal using a screwdriver.



63G09X-425

Bearing Outer Race (Inner and Outer)

Remove the bearing outer race by tapping the races alternately.



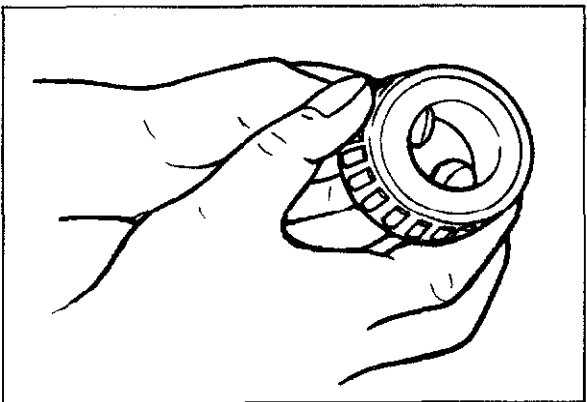
63G09X-426

Dust Cover

Remove the dust cover.

Note

Never remove the dust cover from the knuckle except when replacing it.



63G09X-427

INSPECTION

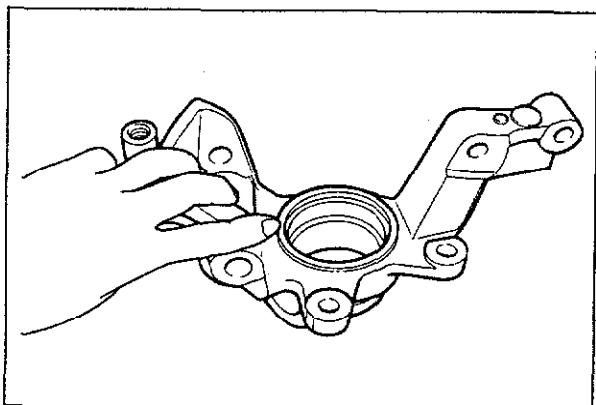
Check the following points, if a problem is found, replace the part.

Bearing

Check the bearing for wear, damage or binding.

Caution

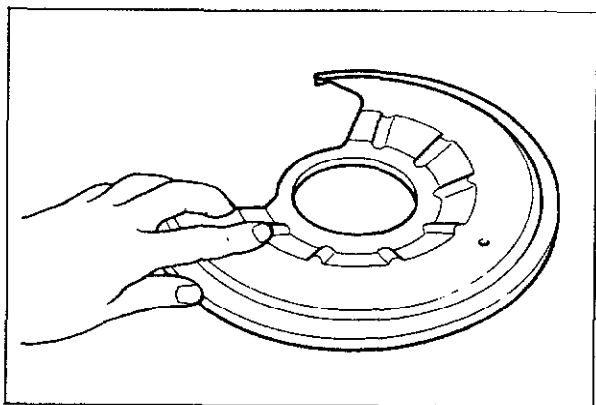
If replacement is necessary, replace the bearing and outer race as a set.



63G09X-428

Knuckle

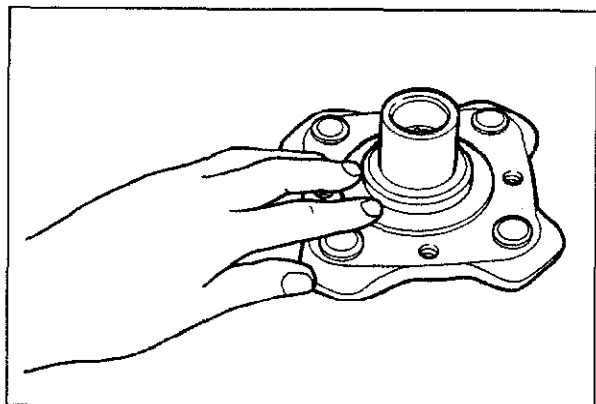
Check the knuckle for cracking or damage.



63G09X-429

Dust Cover

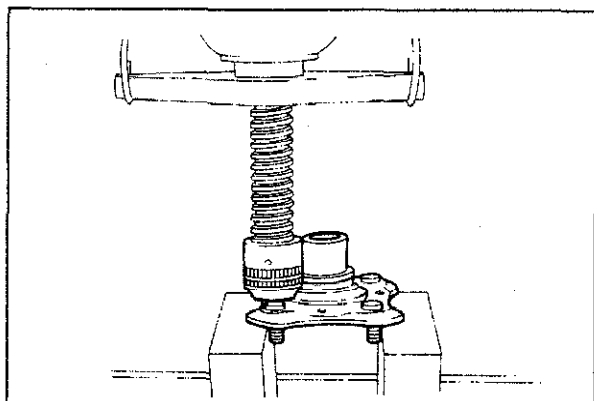
Check the dust cover for deformation or damage.



63G09X-430

Wheel Hub

Check the wheel hub for cracking or damage.



63G09X-431

ASSEMBLY

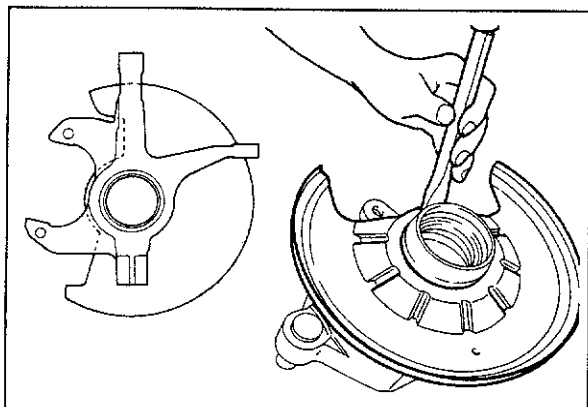
Assemble in the reverse order of removal.

Wheel Lug Bolt

Remove and replace the wheel lug bolt using press.

Caution

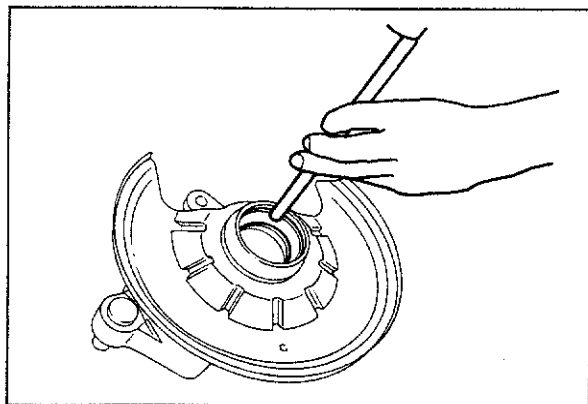
Do not re-use the wheel lug bolts once they have been removed.



63G09X-432

Dust Cover

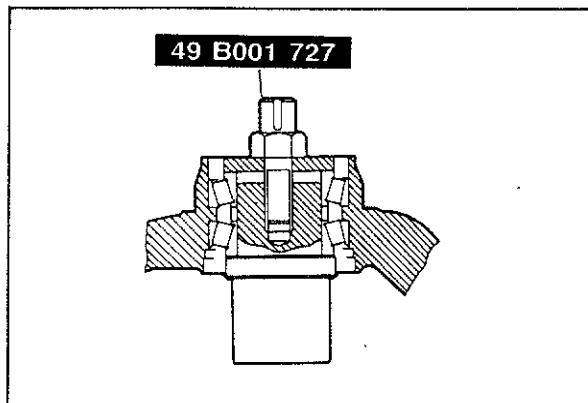
Install the dust cover as shown in the figure.



63G09X-433

Bearing Outer Race (Inner and Outer)

Tap the bearing outer race with a brass drift and hammer.



83U09X-062

Bearing (Inner and Outer)

Adjustment of bearing preload

1. Install the inner bearing, spacer and outer bearing, and set the **SST** as shown in the figure.

Note

Use the same spacer which was removed at disassembly.

2. Measure the bearing preload with the spacer selector tightened to specified torque.

Tightening torque:

1.96 N·m (20 cm·kg, 17.4 in·lb)

Preload: 0.20—0.78 N·m

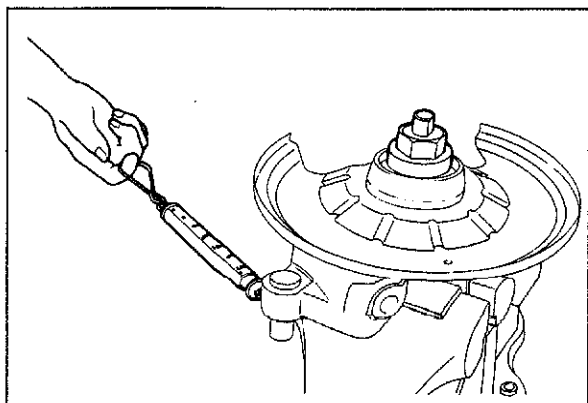
(2—8 cm·kg, 1.74—6.94 in·lb)

Balance scale:

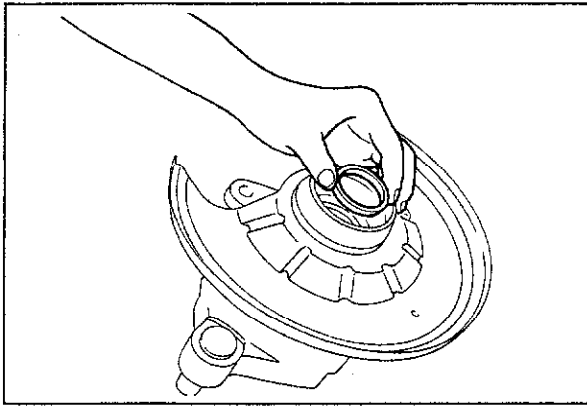
2.26—8.63 N (230—880g, 0.51—1.94 lb)

Note

Hook the balance scale as shown.



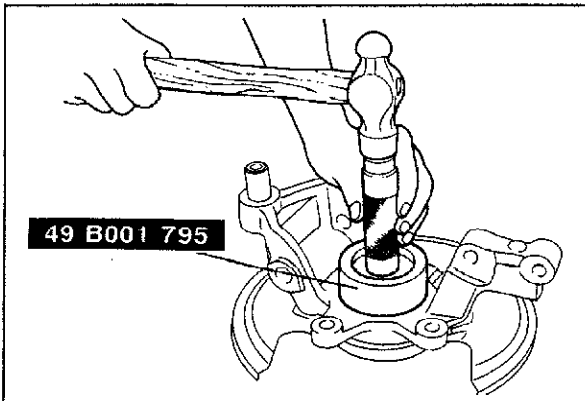
63G09X-435



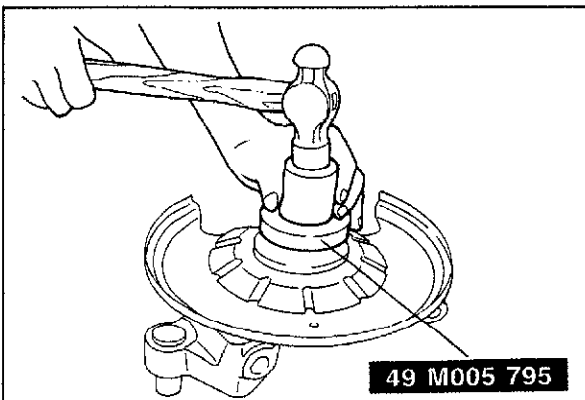
63G09X-436

Mark	Thickness mm (in)	Mark	Thickness mm (in)
1	6.29 (0.2476)	12	6.73 (0.2650)
2	6.33 (0.2492)	13	6.77 (0.2665)
3	6.37 (0.2508)	14	6.81 (0.2681)
4	6.41 (0.2524)	15	6.85 (0.2697)
5	6.45 (0.2539)	16	6.89 (0.2713)
6	6.49 (0.2555)	17	6.93 (0.2728)
7	6.53 (0.2571)	18	6.97 (0.2744)
8	6.57 (0.2587)	19	7.01 (0.2760)
9	6.61 (0.2602)	20	7.05 (0.2776)
10	6.65 (0.2618)	21	7.09 (0.2791)
11	6.69 (0.2634)		

63G09X-437



83U09X-063



83U09X-064

- If not within specification, adjust the bearing preload by selection of a spacer.

Note

a) If bearing preload is excessive, use a thicker spacer.

If bearing preload is less than specified, use a thin spacer.

b) If the spacer is thinner changed by one (1) rank, the bearing preload is changed by 0.20—0.39 N·m (2—4 cm·kg, 1.74—3.47 in·lb)

- Install the bearing (inner).
- Install the oil seal (inner) using the SST.

Note

Apply a thin coat of grease (lithium base, NLGI No. 2) to the oil seal lip.

- Install the spacer.

Note

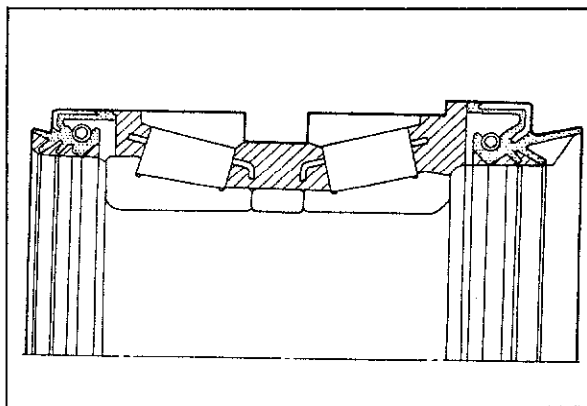
Install the spacer selected for the bearing preload adjustment.

- Install the bearing (outer).
- Install the oil seal (outer) using the SST.

Note

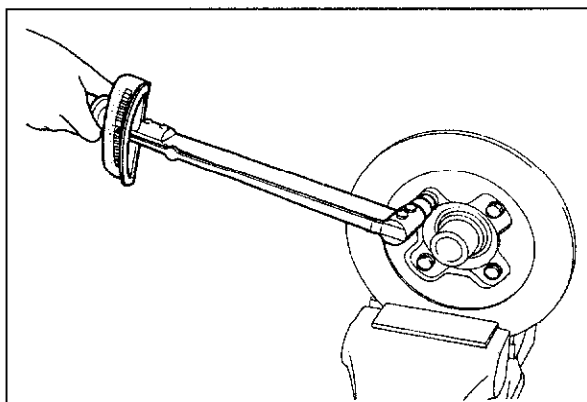
Apply a thin coat of grease (lithium base, NLGI No. 2) to the oil seal lip.

9 REAR AXLE



63G09X-440

9. Apply grease (lithium base, NLGI No. 2) to the area indicated by the oblique lines.



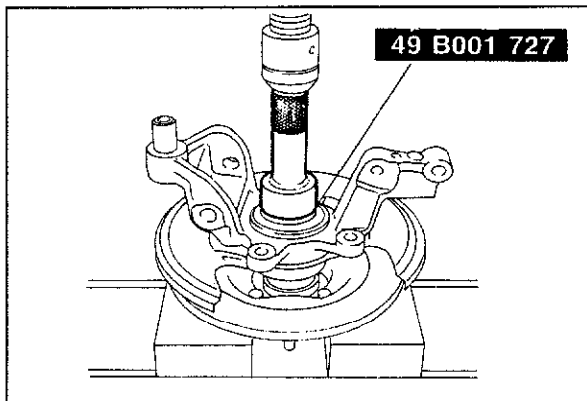
63G09X-441

Wheel Hub

Align the mating marks of the wheel hub and the disc plates and tighten.

Tightening torque:

44—54 N·m (4.5—5.5 m·kg, 33—40 ft·lb)



83U09X-065

Knuckle

Install the knuckle using the SST.

Press force: 3,000 kg (3 tons)

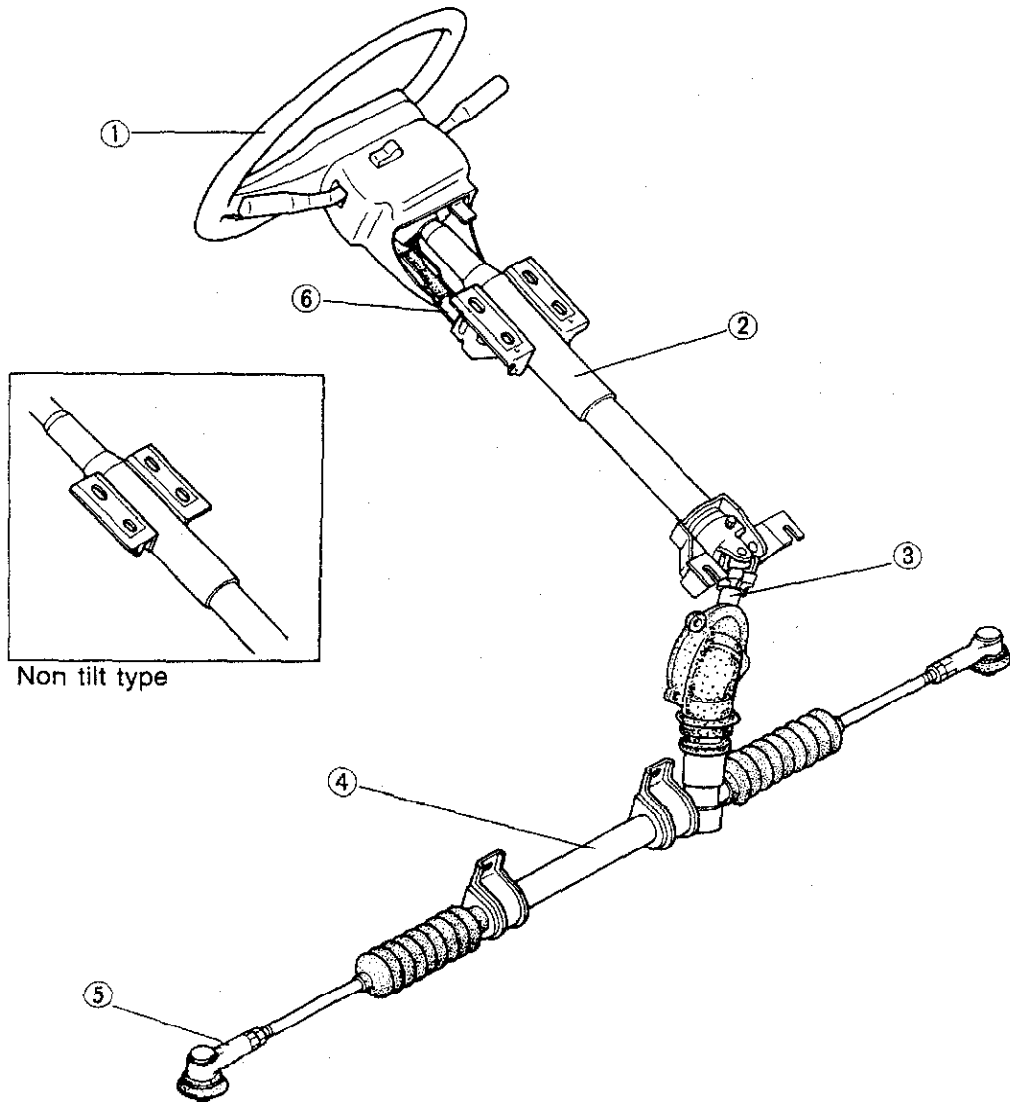
STEERING SYSTEM

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OUTLINE

STRUCTURAL VIEW

Manual Steering



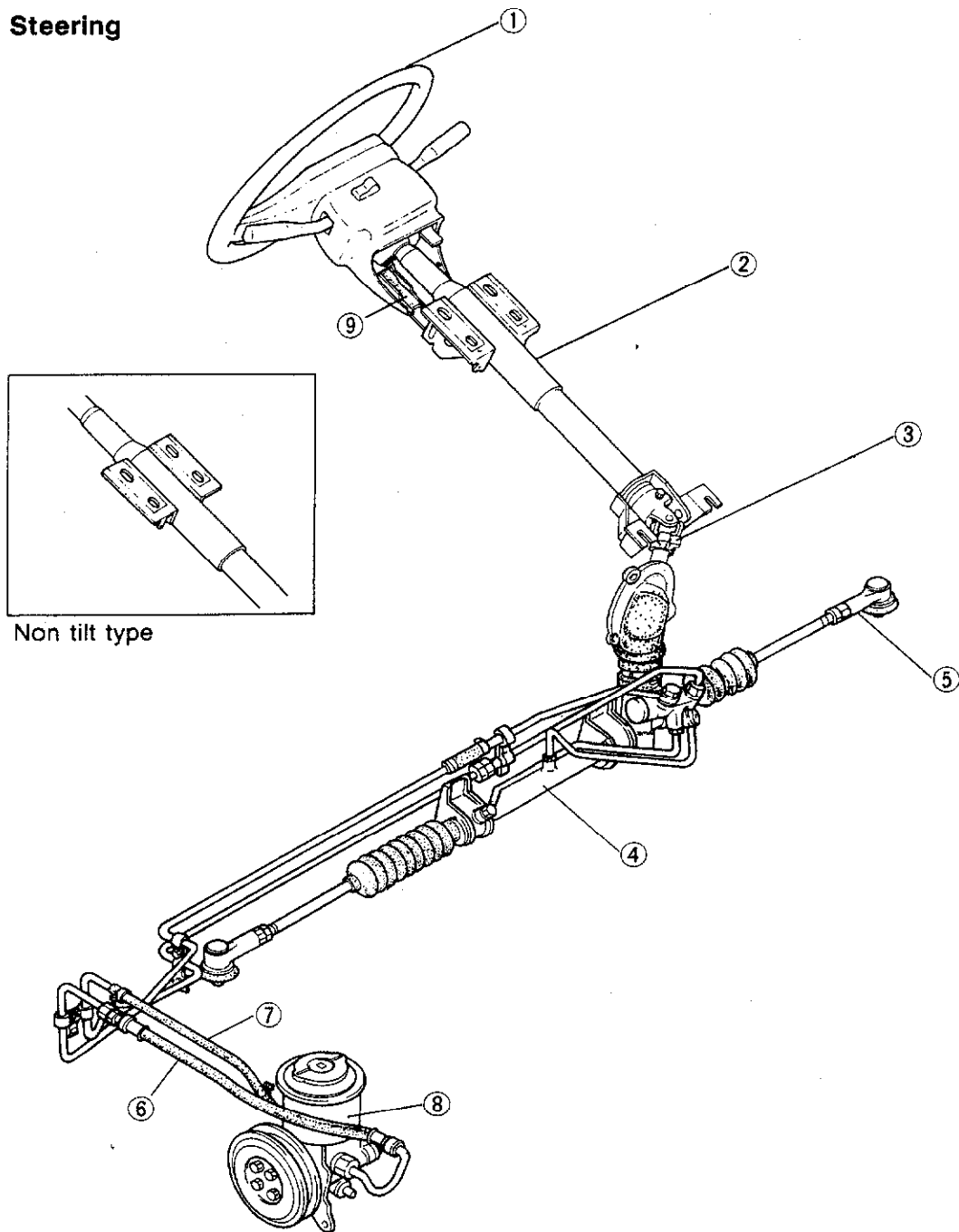
63U10X-002

1. Steering wheel
2. Steering shaft

3. Intermediate shaft
4. Steering gear

5. Tie-rod end
6. Tilt steering lock lever

Power Steering



63U10X-003

1. Steering wheel
2. Steering shaft
3. Intermediate shaft

4. Steering gear
5. Tie-rod end
6. Pressure hose

7. Return hose
8. Oil pump
9. Tilt steering lock lever

SPECIFICATIONS

Item		Model	2WD		4WD
			M/S	P/S	P/S
Steering wheel	Outer diameter	mm (in)	380 (14.5)		
	Lock-to-lock		3.6 (CGR) 4.2 (VGR)	3.2	2.9
Steering shaft and joint	Type		Collapsible		
	Joint type		Cross joint		
	Tilt stroke	mm (in)	18.6 (0.73)		
Steering gear	Type		Rack and pinion		
	Gear ratio		(∞) (infinite)		
	Rack stroke	mm (in)	136 (5.35)		140 (5.51)
Oil	Capacity liter (US qt, Imp qt)		—	0.6 (0.63, 0.53)	0.6 (0.63, 0.53)
	Type		—	ATF DEXRON II or M2C33-F	
Wheel alignment	Maximum steering angle	Inner	40°00' ± 2°		39°00' ± 2°
		Outer	33°00' ± 2°		31°00' ± 2°
	Toe-in	mm (in)	2 ± 3 (0.08 ± 0.12)		
	Camber angle		0°50' ± 30'		1°00' ± 30'
	Caster angle		1°35' ± 45'		1°45' ± 45'
	King-pin angle		12°20'		12°05'
	Caster trail	mm (in)	10.0 (0.39)		8.3 (0.33)

CGR : Constant Gear Ratio
VGR : Variable Gear Ratio
83U10X-002

TROUBLESHOOTING GUIDE

MANUAL STEERING

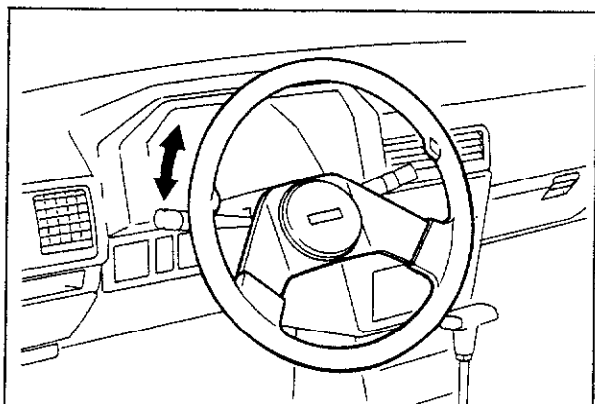
Problem	Possible Cause	Remedy	Page
Steering "heavy" (Vehicle jacked up, both wheels off ground)	Poor lubrication, presence of foreign material, or abnormal wear of ball joint	Lubricate or replace	10—15
	Stuck or damaged ball joint	Replace	10—15
	Improperly adjusted steering pinion preload	Adjust	10—35, 43
	Damaged steering gear	Replace	10—21
	Worn or damaged rubber mount	Replace	10—21
	No grease in steering gear	Lubricate	—
	Malfunction of steering-shaft joint	Replace	10—17
Steering wheel pulls to one side	Damaged steering linkage	Replace	10—21
	Incorrect adjustment of front wheel bearing preload	Adjust	—
	Fatigued front springs	Replace	—
	Damaged knuckle arm	Replace	—
	Incorrect wheel alignment (toe-in)	Adjust	10—12
	Incorrect tire air pressure	Adjust	—
	Abnormal tire wear	Replace	—
	Worn or damaged stabilizer and/or lower arm bushing	Replace	—
	Deformed or loose lower arm	Replace or tighten	—
Unstable driving	Damaged steering linkage	Replace	10—21
	Worn or damaged joint of steering system	Replace	10—17
	Improperly adjusted steering pinion preload	Adjust	10—35, 43
	Incorrect adjustment of front wheel bearing preload	Adjust	—
	Fatigued front spring	Replace	—
	Malfunction of shock absorber	Replace	—
	Incorrect wheel alignment (toe-in)	Adjust	10—12
	Incorrect tire pressure	Adjust	—
	Wheels are deformed or out of balance	Repair or replace	—
	Worn or damaged stabilizer and/or lower arm bushing	Repair	—
Steering wheel vibrates	Incorrect adjustment of wheel bearing preload or worn wheel bearing	Adjust or replace	10—35, 43
	Damaged steering linkage	Replace	10—21
	Worn or damaged joint of steering system	Replace	10—17
	Improperly adjusted steering pinion preload	Adjust	10—35, 43
	Incorrect wheel alignment (toe-in)	Adjust	10—12
	Incorrect tire air pressure	Adjust	—
	Unevenly worn tires	Replace	—
	Depth of tire tread different between left and right tires	Replace	—
	Wheels deformed or out of balance	Repair or replace	—
	Malfunctioning or loose shock absorbers	Replace or tighten	—
	Worn or damaged rubber mount	Replace	10—21
	Worn or damaged stabilizer and/or lower arm bushing	Replace	—
Excessive steering wheel play	Worn rack and pinion gear	Replace	10—27, 37
	Worn or damaged joint of steering system	Replace	10—17
	Incorrect adjustment of front wheel bearing preload	Adjust	—
	Worn or damaged lower-arm bushing	Replace	—
Abnormal noise from steering system	Loose or worn steering linkage	Tighten or replace	10—21
	Worn joint of steering system	Replace	10—17

83U10X-003

POWER STEERING

Problem	Possible Cause	Remedy	Page
Steering wheel movement is "heavy"	Loose or damaged belt	Adjust or replace	10—8
	Low fluid level, or air in fluid	Supply fluid, or bleed air	10—10
	Crimped pipe or hose, or twisted hose	Replace	—
	Insufficient tire pressure	Adjust	—
	Improperly adjusted wheel alignment	Adjust	10—12
	Linkage ball-joint does not operate smoothly	Repair or replace	10—21, 23
	Steering shaft is contacting something	Repair or replace	10—17
Poor steering wheel return	Incorrect tire pressure	Adjust	—
	Improperly adjusted wheel alignment	Adjust	10—12
	Linkage ball-joint does not operate smoothly	Repair or replace	10—15
	Steering shaft is over tight or restricted or bent	Replace	—
Required steering effort is uneven	Loose belt	Adjust	10—8
	Steering shaft is restricted; loose installation bolt(s)	Repair or tighten	10—17
	Steering linkage does not operate smoothly	Repair or replace	10—21, 23
	Malfunction of steering gear	Replace	10—21, 23
Steering wheel pulls to one side	Incorrect tire pressure	Adjust	—
	Improper preload adjustment, or wear of wheel bearing	Adjust or replace	—
	Improperly adjusted wheel alignment	Adjust	10—12
	Malfunction of steering gear	Replace	10—21, 23
Fluid leakage	Problem at hose coupling	Repair or replace	—
	Damaged or clogged hose	Replace	—
	Damaged oil tank	Replace	10—60
	Overflow	Bleed air, or adjust fluid level	10—10
	Malfunction of oil pump	Replace	10—59
	Malfunction of gear box	Replace	10—21, 23
Abnormal noise	Loose oil pump	Tighten	10—59
	Loose steering gear	Tighten	10—21, 23
	Loose oil pump bracket	Tighten	10—59
	Loose oil pump pulley bolt	Tighten	10—59
	Belt either loose or too tight	Adjust	10—8
	Air intake	Bleed air	10—10
	Malfunction inside steering gear	Replace	10—21, 23
	Malfunction of oil pump	Replace	10—59
	Obstruction near steering column or pressure hose	Repair or replace	—
	Play or looseness of steering linkage	Tighten, adjust, or replace	10—21, 23

83U10X-004



63U10X-007

ON-VEHICLE MAINTENANCE

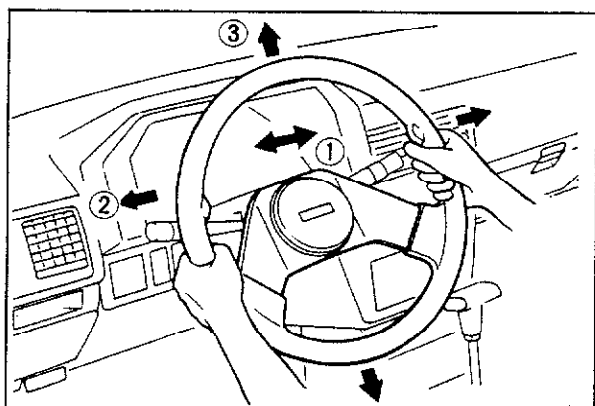
STEERING WHEEL PLAY

With the wheels in the straight-ahead position, gently turn the steering wheel to the left and right and check if the play is within the standard range.

Play: 0—30 mm (0—1.18 in)

Note

If the play exceeds the standard range, either the steering joints are worn or the backlash of the steering gear is excessive.



5BU10X-612

LOOSENESS OR PLAY OF STEERING WHEEL

Move the steering wheel in the directions ①, ② and ③ to check for column bearing wear, steering-shaft joint play, steering wheel looseness, or column looseness.

STEERING WHEEL EFFORT

Manual Steering

1. Jack up the vehicle. Move the steering wheel to the straight-ahead position.
2. Measure the steering wheel effort by connecting a pull scale to the outer circumference of the steering wheel.

Steering wheel effort:

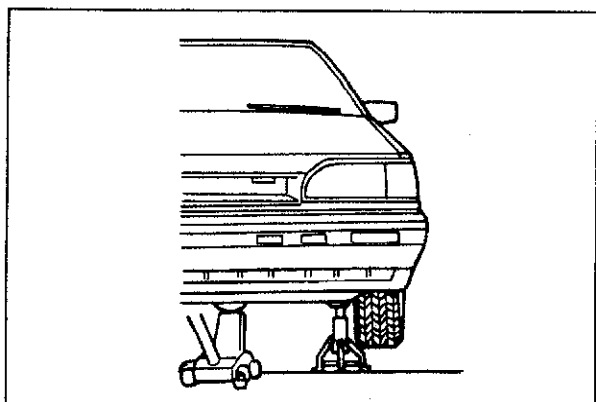
5—20 N (0.5—2.0 kg, 1—5 lb)

[during one turn of the steering wheel]

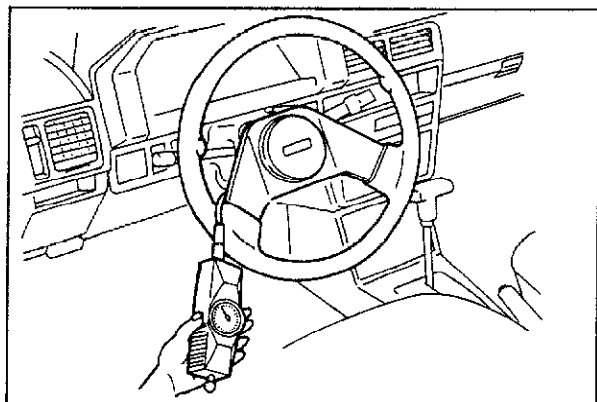
Note

Measure after turning the steering wheel to the left and right 5 times or more.

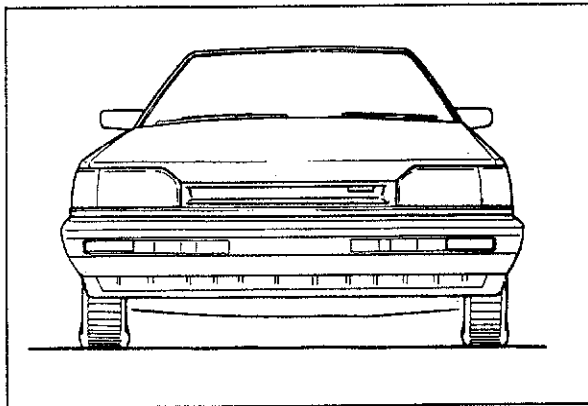
3. If the measured value exceeds the standard range, check the following points; rotation-starting torque of the pinion, rotation torque of each ball-joint, and seizure of each joint.



63U10X-008



63U10X-009

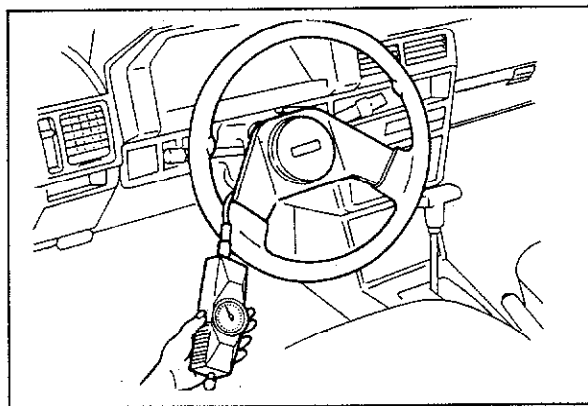


83U10X-005

Power Steering

Check in the following order:

1. With the vehicle on a hard level surface, move the steering wheel to put the wheels in the straight-ahead position.
2. Start the engine and warm the power steering fluid to **50—60°C (122—140°F)**.



78U10X-010

3. Attach a pull scale to the outer circumference of the steering wheel. Then, starting with the wheels in the straight-ahead position, check the steering effort required to turn the steering wheel to the left and to the right.

**Steering wheel effort: 40 N (4.1 kg, 9 lb) or less
[during one turn of the steering wheel]**

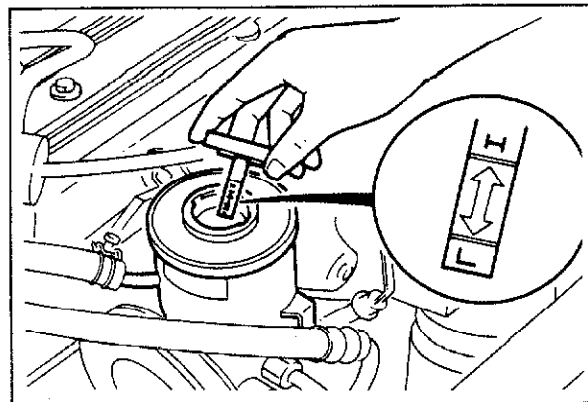
4. If measured value exceeds standard value range, check the following: fluid level, air in system, fluid leakage at hose or connections, function of oil pump and gear box, and tire pressure.

POWER STEERING FLUID LEVEL

Check the power steering fluid level, and add fluid to the specified level if necessary.

Caution

Use only specified power steering fluid.



78U10X-013

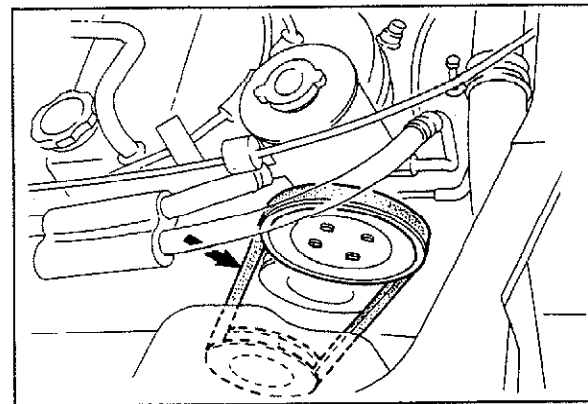
LOOSE OR DAMAGED OIL PUMP BELT Inspection

Check the oil pump belt for looseness or damage. To check the oil pump belt tension, apply moderate pressure 98 N (10 kg, 22 lb) midway between the pulleys.

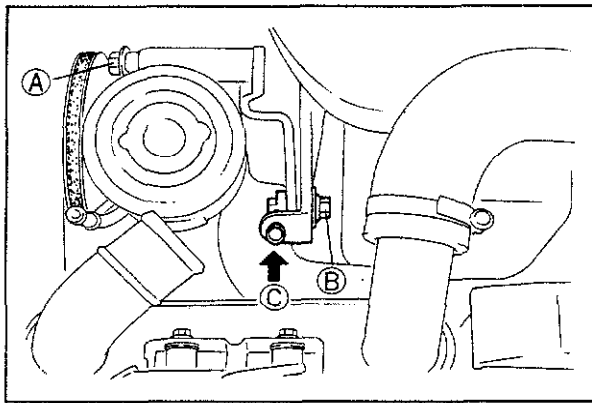
Deflection:

New belt 8—9 mm (0.31—0.35 in)

Used belt 9—10 mm (0.35—0.39 in)



83U10X-006



83U10X-007

Adjustment

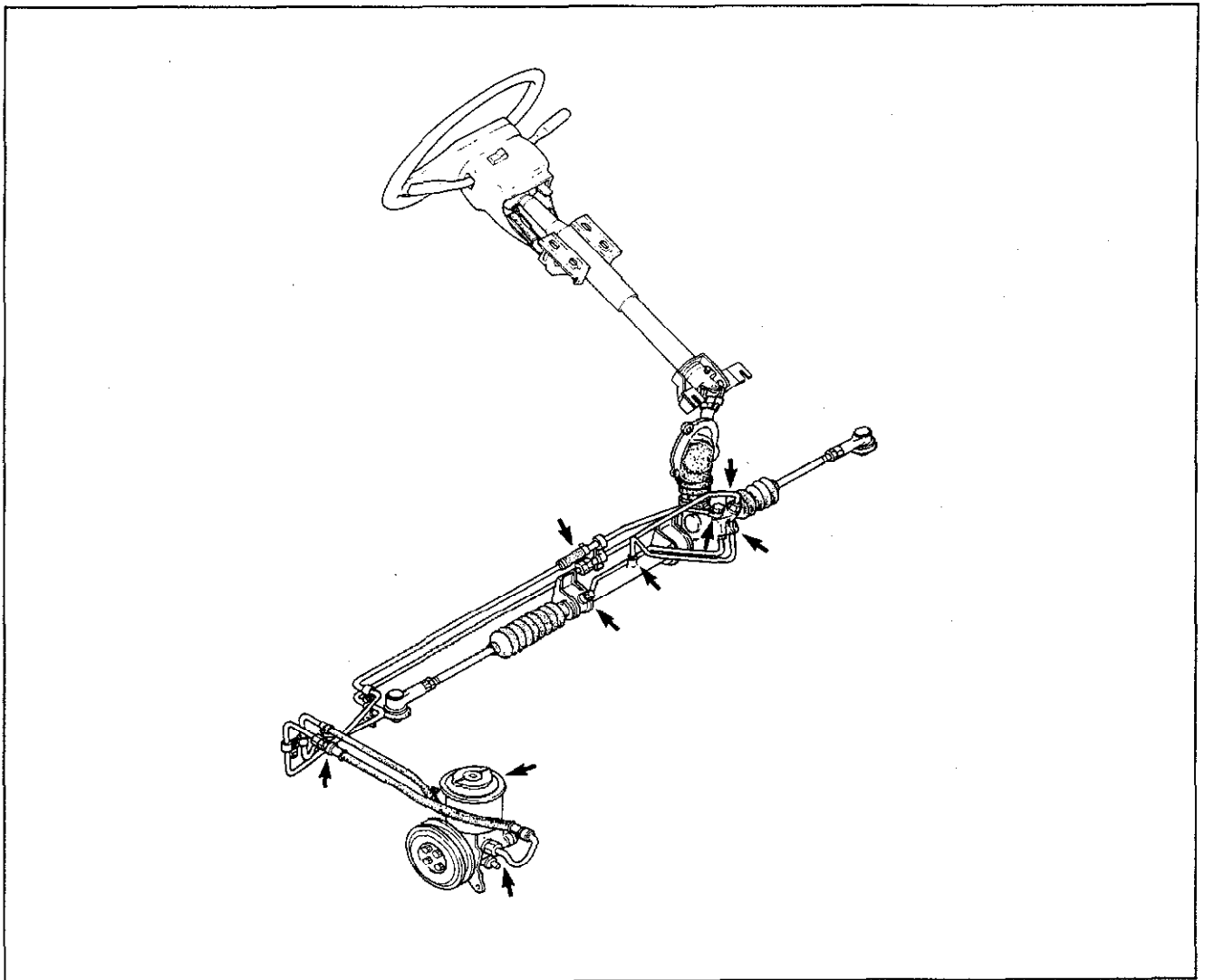
1. Loosen bolt (A).
2. Loosen nut (B).
3. Turn adjusting bolt (C) and adjust the belt tension.
4. After adjustment, tighten bolt (A) and nut (B).

Bolt (A) tightening torque:**36—54 N·m****(3.7—5.5 m·kg, 27—40 ft·lb)****Nut (B) tightening torque:****31—46 N·m****(3.2—4.7 m·kg, 23—34 ft·lb)****LEAKAGE OF POWER STEERING FLUID**

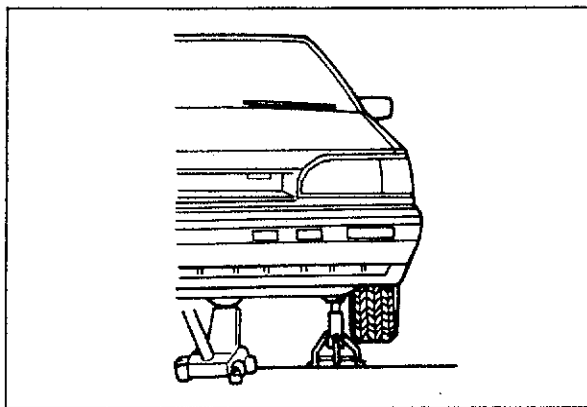
Check for fluid leakage in the places shown by arrows below.

Note

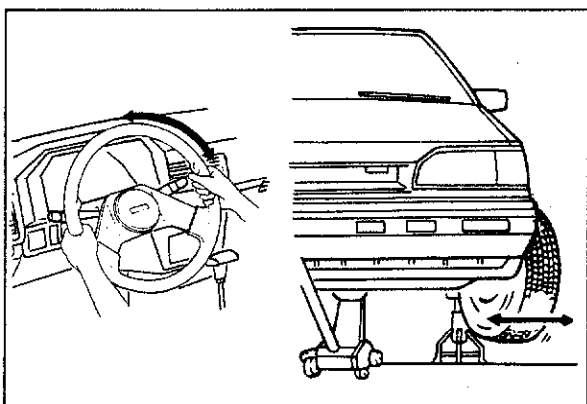
Start the engine, and check for fluid leakage after turning the steering wheel completely to the left and right to apply fluid pressure. Do not, however, keep the steering wheel in the fully turned position for more than 15 seconds.



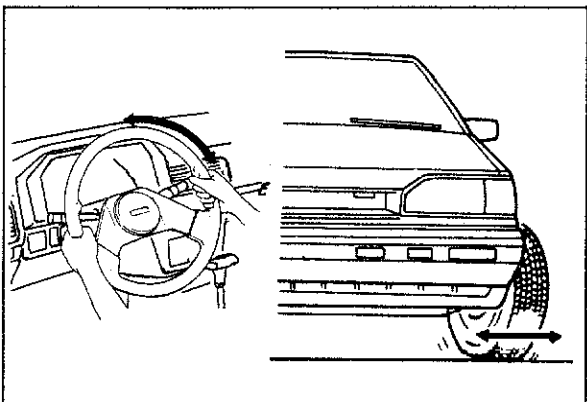
7BU10X-017



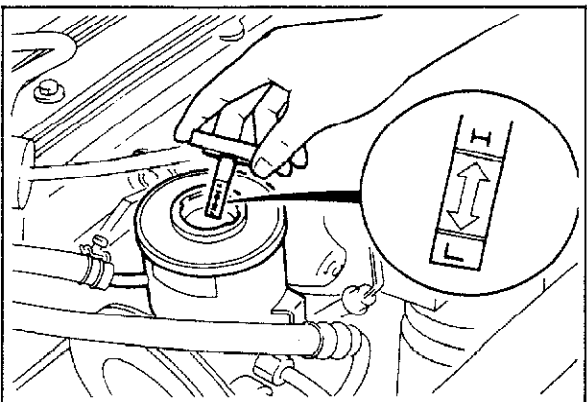
63U10X-014



63U10X-015



78U10X-021



78U10X-022

INSPECTION AND ADJUSTMENT

BLEEDING OF POWER STEERING SYSTEM

1. Jack up the front of the vehicle.

2. Check and add fluid if necessary. Turn the steering wheel fully left and right several times.

3. Recheck the fluid and add as required. Let the vehicle down.

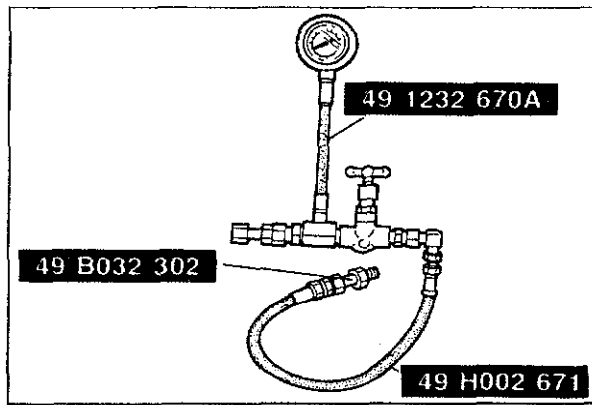
4. Start the engine and run at idle speed. Turn the steering wheel again fully left and right several times. If a noise is heard in the oil line, air is still present.

5. Put the wheels in the straight-ahead position, and turn off the engine. The fluid level in the pump should not increase; if it does, air is present. Repeat item 4 if necessary.

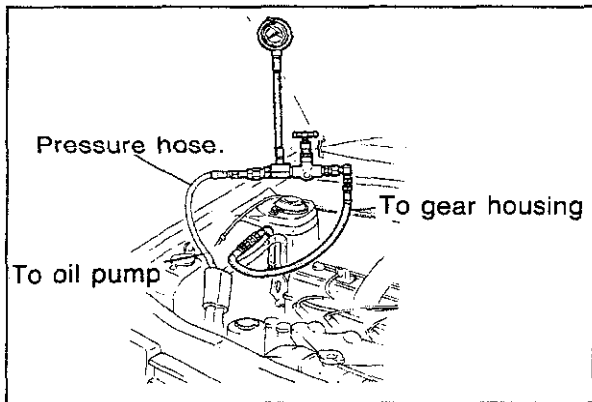
6. Recheck the fluid level, and inspect for leaks.

Caution

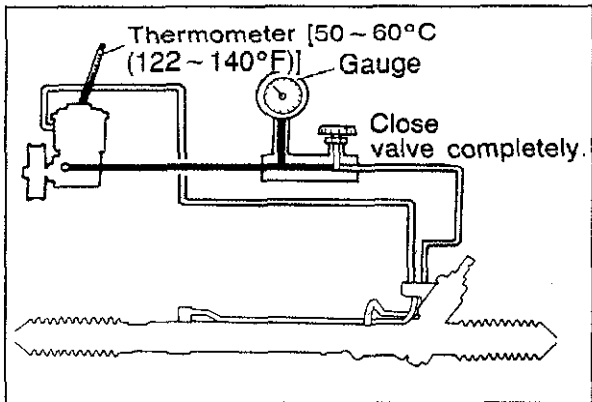
If the air bleeding is incomplete, raise the oil temperature to about 50—80°C (122—176°F) (the oil temperature will rise when the steering wheel is turned clockwise and counter-clockwise), stop the engine, and perform the operation as in item 4 in 5 to 10 minutes. Air can be completely bled by repeating this operation a couple of times.



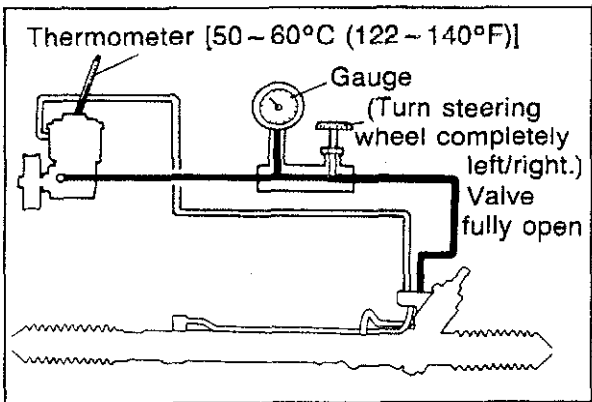
83U10X-008



83U10X-009



83U10X-010



83U10X-011

POWER STEERING PRESSURE

1. Disconnect the high-pressure hose of the gear housing side, and attach the **SST** so that the valve is connected to the gear housing side.

**Tightening torque: 39—49 N·m
(4.0—5.1 m·kg, 29—36 ft·lb)**

2. Bleed the air from the system.
3. After opening the gauge valve completely, start the engine and turn the steering wheel fully left and right to raise the fluid temperature to **50—60°C (122—140°F)**.
4. To measure the fluid pressure generated by the oil pump, close the gauge valve completely and increase the engine rpm to **1000—1500 rpm**.

Oil pump fluid-pressure

6,867 ±⁴⁹¹₂₄₅ kPa (70 ±⁵_{2.5} kg/cm² 995 ±⁷¹₃₆ psi)

Warning

If the valve is left closed for more than 15 seconds, the fluid temperature will increase excessively and adversely affect the oil pump.

If the fluid pressure is low, replace the oil pump assembly.

5. To measure the fluid pressure generated at the gear housing, first open the gauge valve completely, increase the engine rpm to **1,000—1,500 rpm**, and then turn the steering wheel all the way to the left and right.

Warning

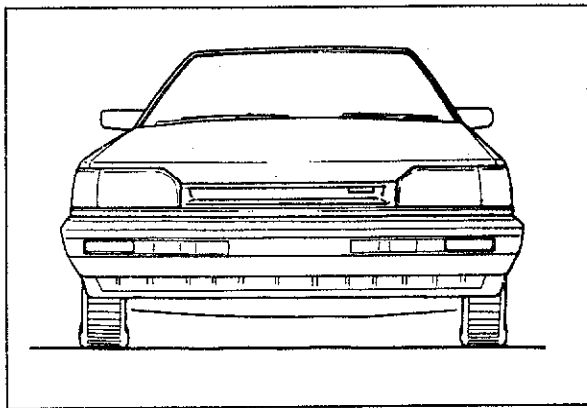
If the steering wheel is kept in the fully turned position for more than 15 seconds, the fluid temperature will rise excessively.

Gear housing fluid-pressure limit

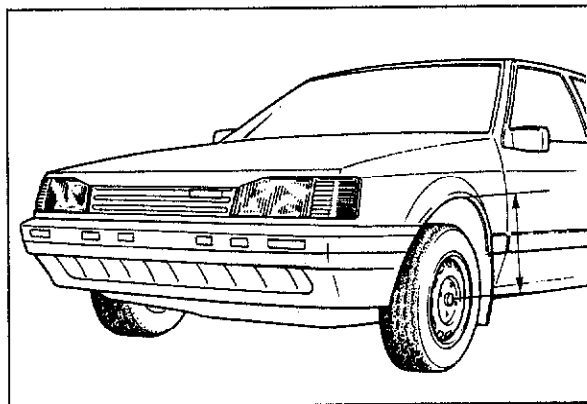
6,867 ±⁴⁹¹₂₄₅ kPa (70 ±⁵_{2.5} kg/cm² 995 ±⁷¹₃₆ psi)

If the fluid pressure is low, repair or replace the gear box.

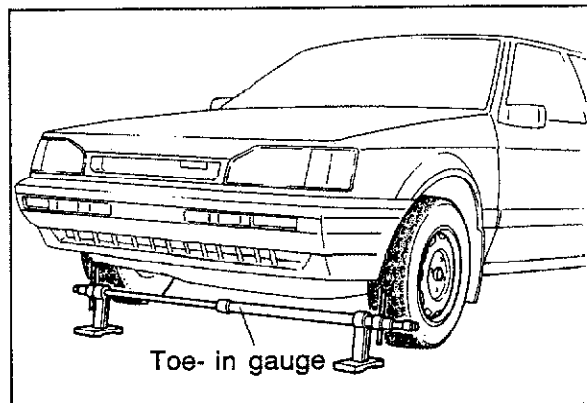
6. After removing the gauge set, tighten the high-pressure hose to the specified torque.
7. Bleed the air from the system. (Refer to page 10—10.)



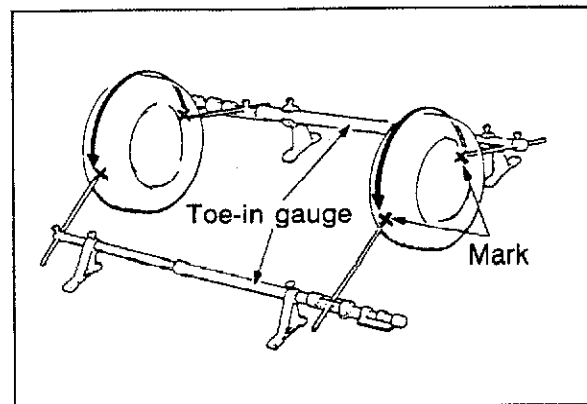
63U10X-022



63U10X-023



83U10X-012



83U10X-013

FRONT WHEEL ALIGNMENT

Pre-inspection

1. Check the tire inflation and set to the recommended pressure if necessary.
2. Inspect the front wheel bearing play and correct if necessary.
3. Inspect the wheel and tire run out.
4. Inspect the ball joints and steering linkage for any excessive looseness.
5. The vehicle must be on level ground and have no luggage or passenger load.

6. The difference in height from the center of the wheel to the fender brim between the left and right sides should be within **15 mm (0.59 in)**.

Toe-in Inspection

1. Raise the front end of the vehicle until the wheels clear the ground.
2. Turn the wheels by hand, mark a line in the center of each tire tread by using a scribing block.
3. Place the front wheels in the straight-ahead position and lower the vehicle.

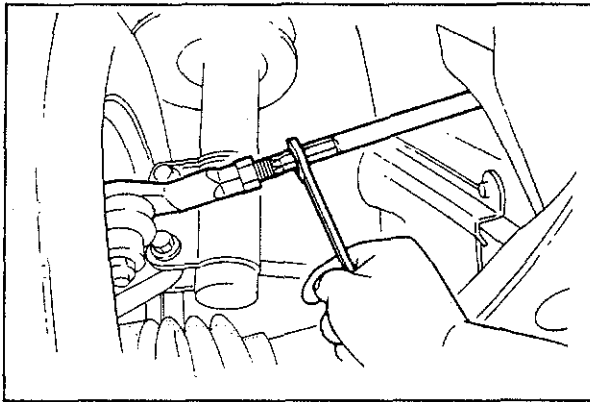
4. Measure the distance between the marked lines at the front and rear of the wheels.

Both measurements must be taken at equal distances from the ground.

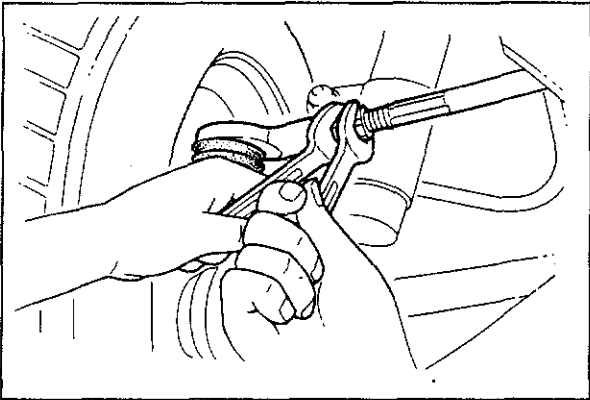
If the distance between the wheels at the rear is greater than that at the front by $2 \pm 3 \text{ mm}$ ($0.08 \pm 0.12 \text{ in}$), it is correct.

Toe-in

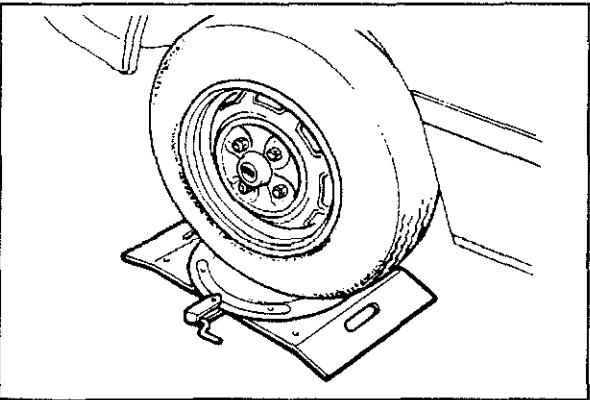
$2 \pm 3 \text{ mm}$ ($0.08 \pm 0.12 \text{ in}$)



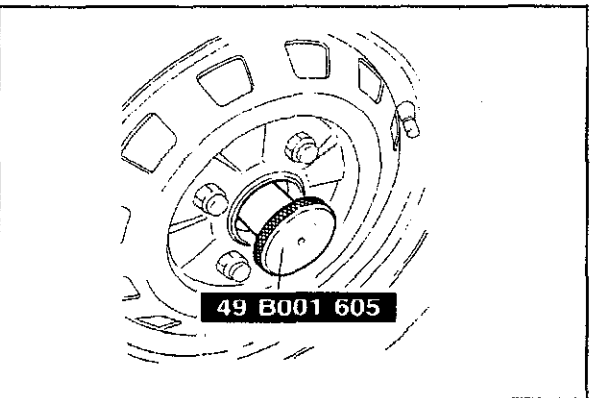
63U10X-025



83U10X-014



83U10X-015



63U10X-028

Adjustment

To adjust the toe-in, loosen the left and right tie-rod lock nuts, and turn the tie-rods by the same amount.

Caution

1. The left and right tie-rods are both right threaded, so, to increase the toe-in, turn the right tie-rod toward the front of the vehicle, and turn the left tie-rod by the same amount toward the rear.
2. One turn of the tie-rod (both sides) changes the toe-in by about 6 mm (0.24 in).
3. Adjust the toe-in after adjusting the steering angle.

Tighten the tie-rod lock nuts to the specified torque.

Tightening torque

- 2WD: 34—39 N·m
(3.5—4.0 m·kg, 25—29 ft·lb)
4WD: 34—50 N·m
(3.5—5.1 m·kg, 25—37 ft·lb)

Steering Angle(Maximum Angle to the Left and Right)

Inspection

The steering angle is measured by placing the front wheels on a turning-radius gauge.

Steering angle:

	2WD	4WD
Inner	40°00' ± 2°	39°00' ± 2°
Outer	33°00' ± 2°	31°00' ± 2°

Adjustment

The steering angle is adjusted by loosening the tie-rod lock nuts and turning the tie-rods.

Caution

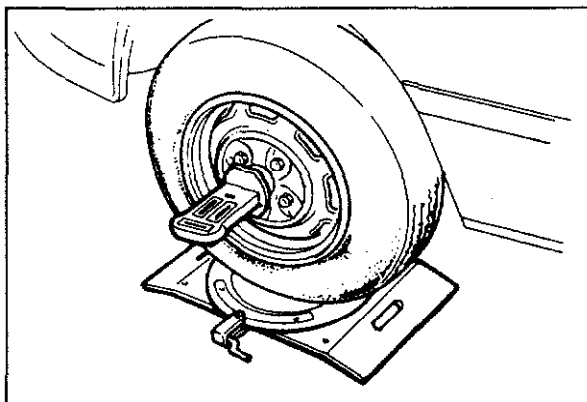
Adjust so that left and right steering is the same and the steering wheel is centered in the straight ahead position.

Camber and Caster

Inspection

The camber and caster are measured by placing the front wheels on a turning-radius gauge.

1. Jack up the vehicle and remove the wheel cap and wheel hub nut. Then attach the SST to the wheel hub as shown in the figure.

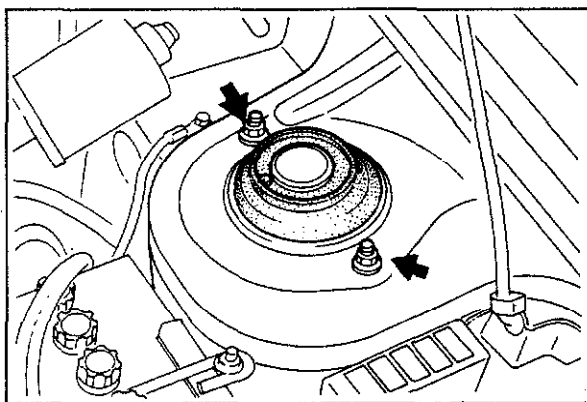


83U10X-016

2. Attach the caster/camber gauge to the adapter, and then measure the camber and caster.

	2WD	4WD
Camber angle	$0^{\circ}50' \pm 30'$	$1^{\circ}00' \pm 30'$
Caster angle	$1^{\circ}35' \pm 45'$	$1^{\circ}45' \pm 45'$

Left/right difference:
Camber: 30' or less
Caster: 40' or less



83U10X-017

Adjustment

Note

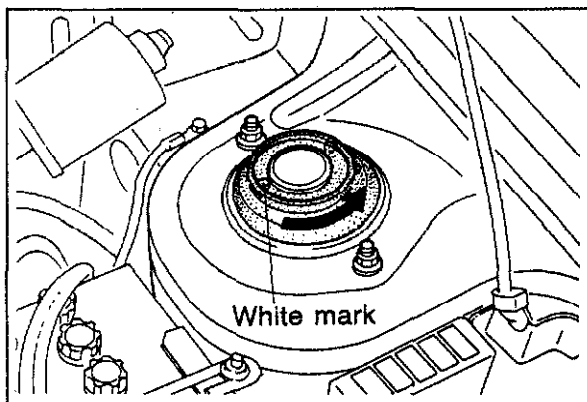
The camber is adjustable by 28' to either negative or positive side, the caster is not adjustable.

1. Jack up the front of the vehicle and support it with safety stands.
2. Open the hood.
3. Remove the two nuts mounting the shock absorber mounting block to the fender.
4. Push the mounting block downward, turn it 180°, mount it on the fender again and tighten it to the specified torque.

Tightening torque: 23—29 N·m
(2.0—3.0 m·kg, 14—22 ft·lb)

Note

When the white mark on the mounting block is rotated from the engine side to the outside, the camber change is negative.

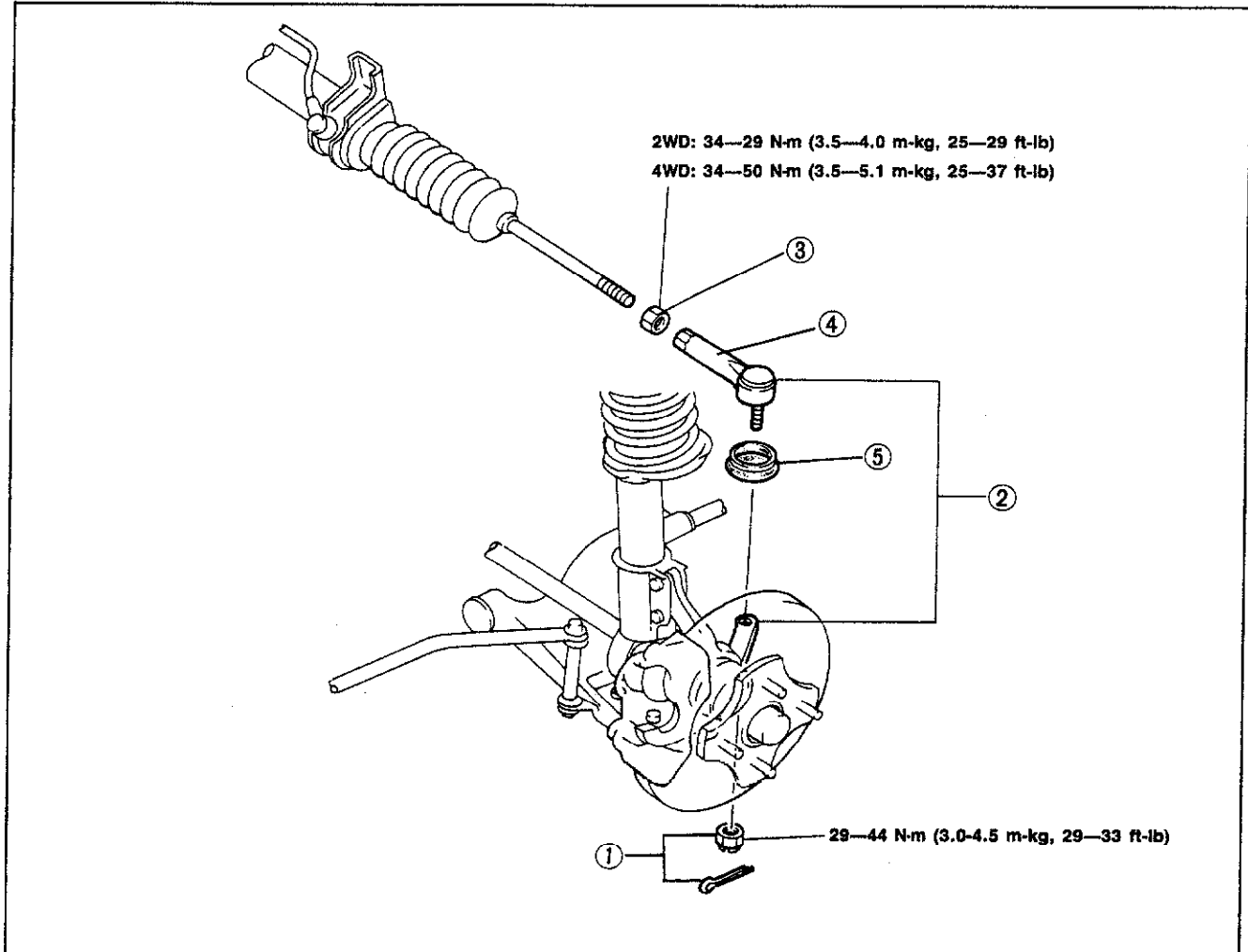


83U10X-018

TIE-ROD END BOOT

REMOVAL AND INSTALLATION

1. Jack up the front of the vehicle and support it with safety stands.
2. Remove in the sequence shown in the figure.
3. Install in the reverse order of removal.

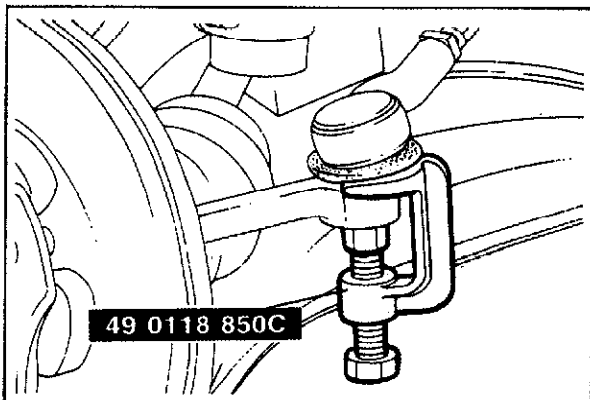


83U10X-019

1. Cotter pin and nut
2. Tie-rod end/knuckle

3. Locknut
4. Tie-rod end

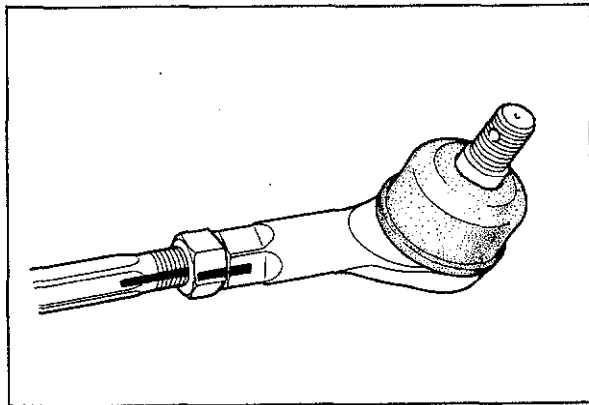
5. Boot



83U10X-020

Tie-rod End/Knuckle

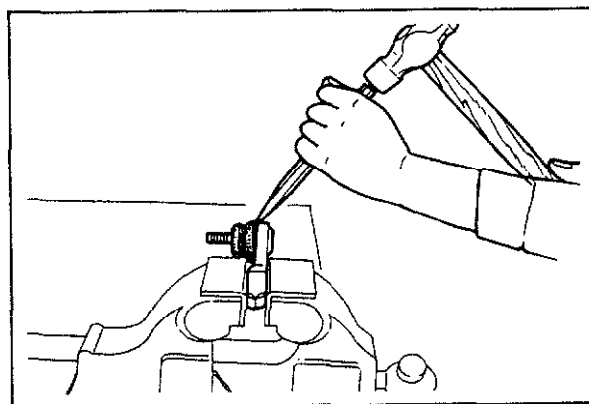
Separate the tie-rod end from the knuckle with the SST.



63U10X-034

Locknut

Before loosening the locknut from the tie-rod end, make a mark for reference during installation. Tighten the nut to that mark during installation.



63U10X-035

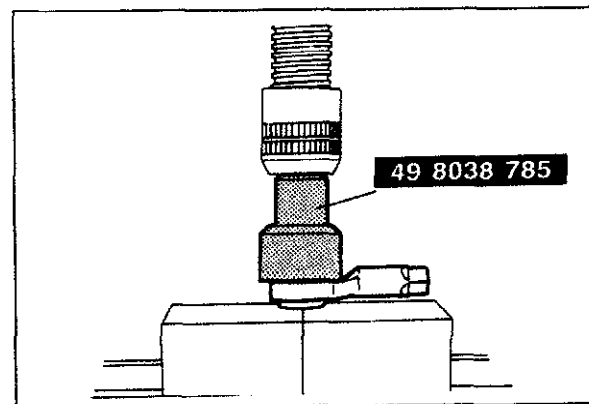
Boot

Removal

1. Secure the tie-rod end in a vise.
2. Place a chisel against the boot and hold it at the angle shown in the figure.
3. Remove the boot by tapping the chisel with a hammer.

Caution

Be careful not to scar the part where the boot is attached to the tie-rod end.



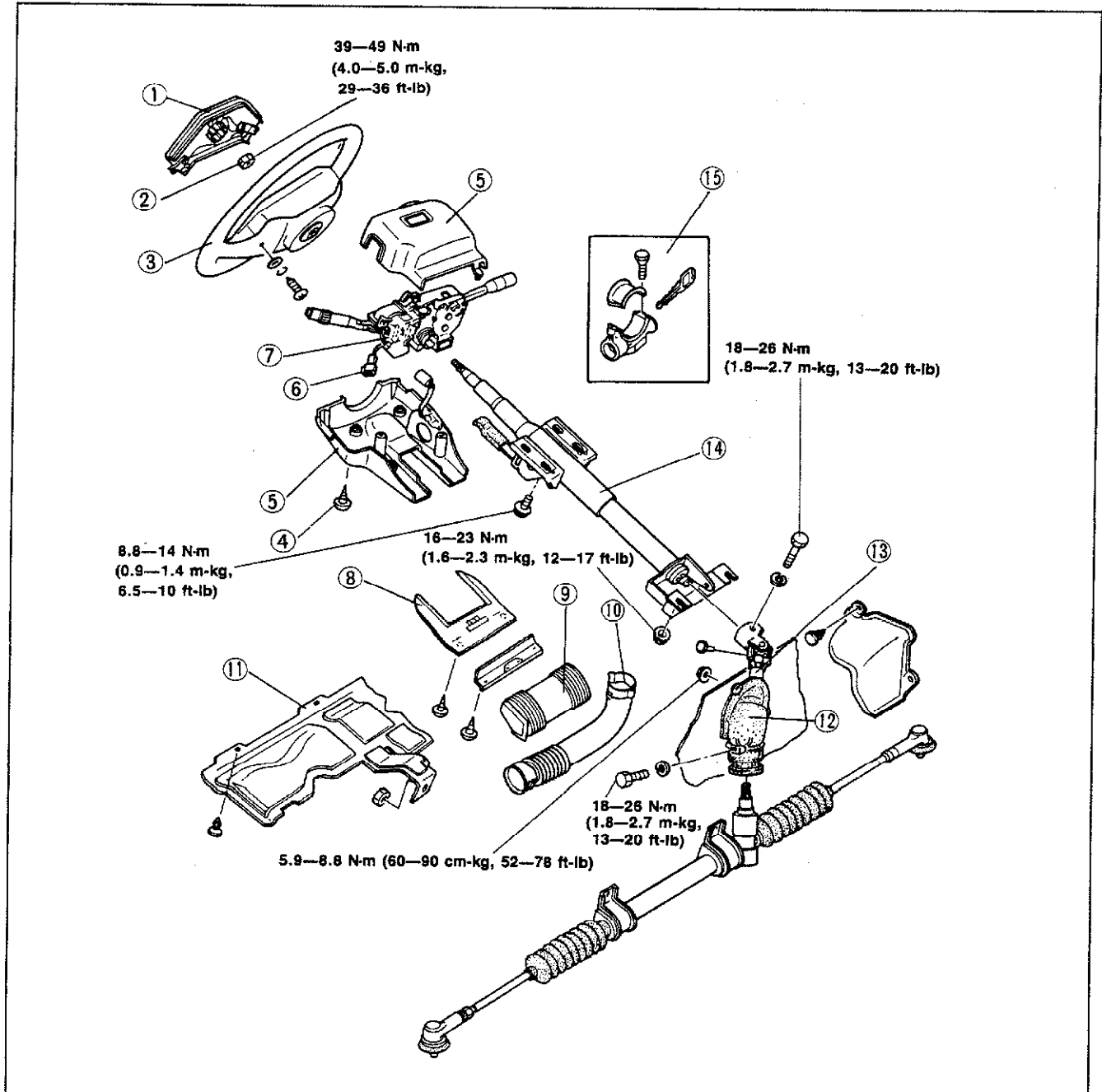
83U10X-021

Installation

1. Insert a small amount of grease (lithium base, NLGI No. 2) into the new boot and set it onto the **SST**.
2. Install the boot to the tie-rod end using a press.

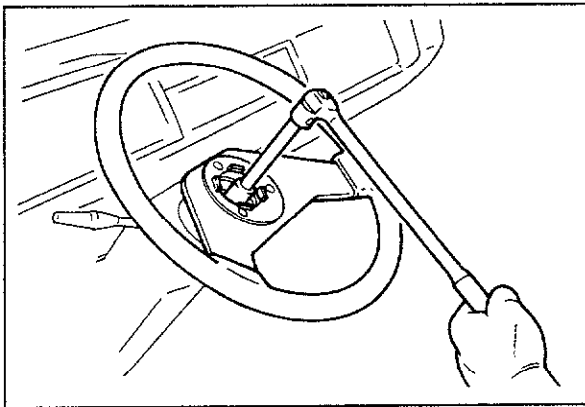
STEERING WHEEL AND COLUMN**REMOVAL AND INSTALLATION**

1. Jack up the vehicle and support it with safety stands.
2. Disconnect the battery negative cable.
3. Remove in the sequence shown in the figure.
4. Install in the reverse order of removal.

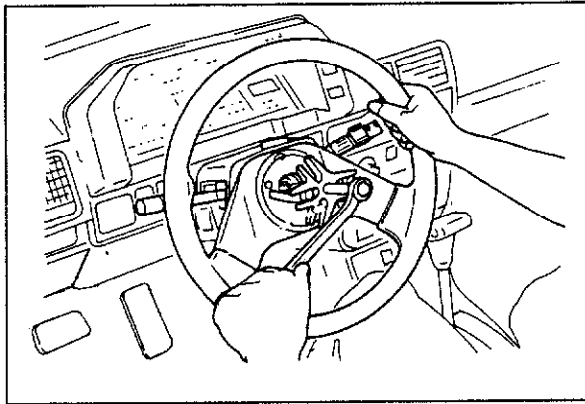


83U10X-022

- | | | |
|-------------------|-----------------------|------------------------|
| 1. Horn cap | 6. Harness couplers | 11. Under cover |
| 2. Lock nut | 7. Combination switch | 12. Dust boot |
| 3. Steering wheel | 8. Lower panel | 13. Intermediate shaft |
| 4. Screw | 9. Lower louver | 14. Steering shaft |
| 5. Column cover | 10. Demister duct | 15. Steering lock |



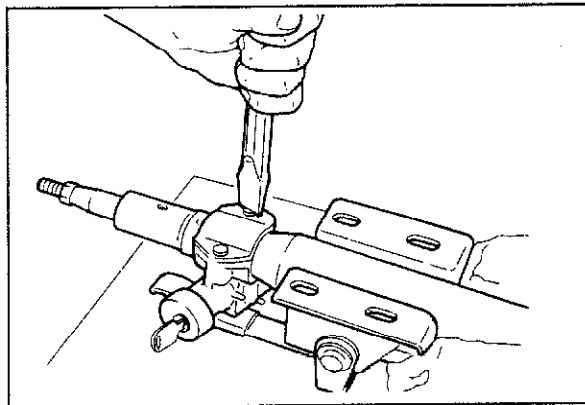
83U10X-023



83U10X-024

Steering Wheel

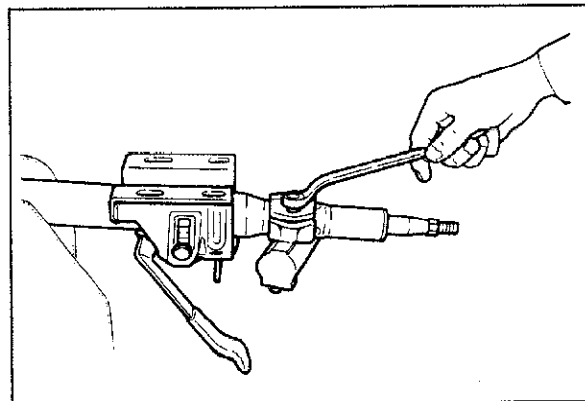
1. Remove the horn cap by removing the screws, and remove the locknut.
2. The steering wheel must be removed using a suitable puller.



63U10X-040

Steering Lock

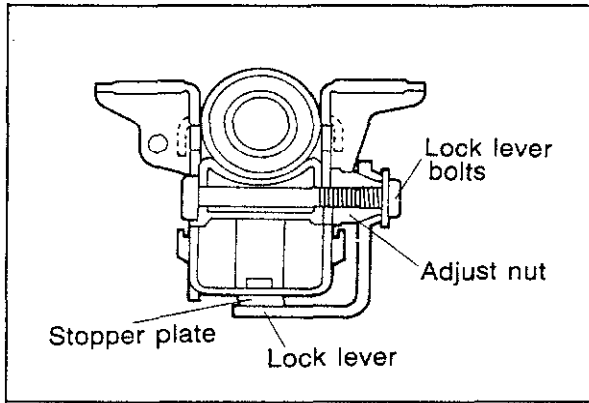
1. Use a chisel to make a groove in the head of the steering-lock installation screw. Remove the screw by using a flat-tipped screwdriver, and then remove the steering lock.
2. After installing the steering lock to the jacket, use new steering lock mounting screws, and screw them in until the neck of the screw breaks off.



63U10X-041

Caution

Tighten the steering lock mounting screws while checking the lock operation.

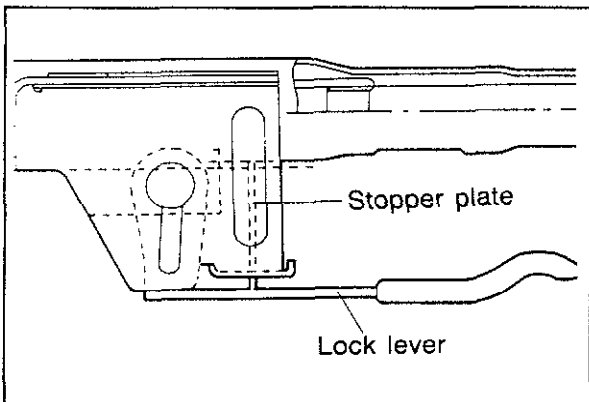


63U10X-042

Tilt Steering Lock Lever Adjustment

1. When installing, lift the steering column to the highest position and tighten the adjust nut.

Tightening torque: 5—9 N·m
(0.5—0.9 m·kg, 3.6—6.5 ft·lb)

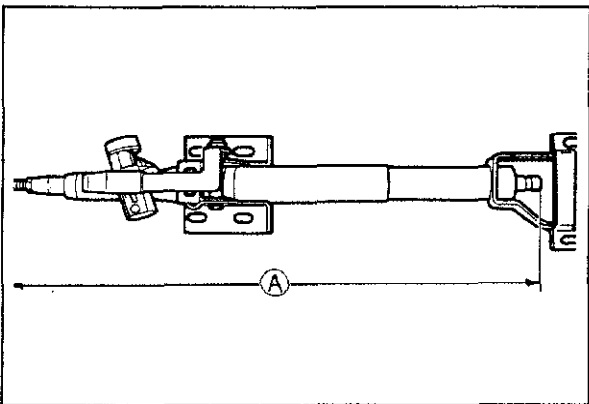


63U10X-043

2. Install and set the steering lock lever so that it touches the stopper plate, and then tighten the lock lever bolt.

Tightening torque: 18—27 N·m
(1.8—2.7 m·kg, 13.0—19.5 ft·lb)

3. Check that the lock lever operates smoothly and locks securely.



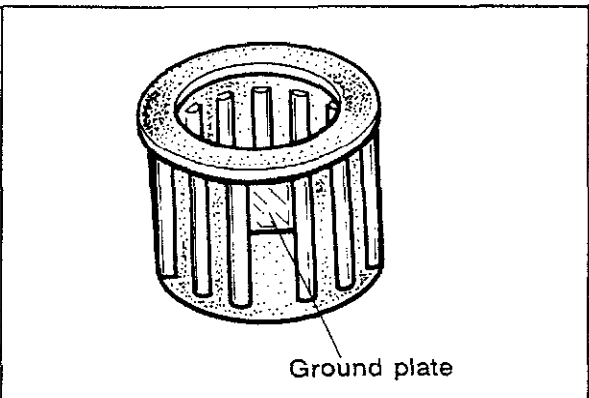
63U10X-044

INSPECTION

Check the following points, replace parts if necessary.

1. Dimensions of steering column

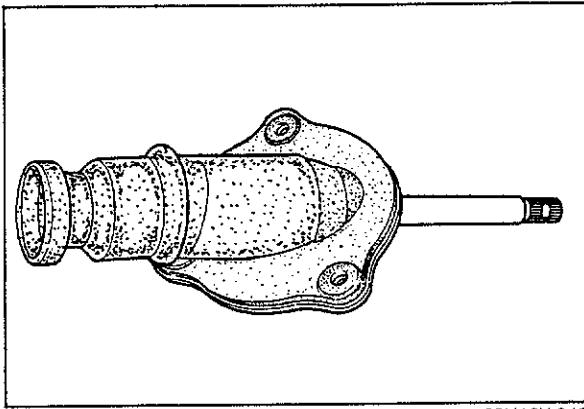
Standard dimensions (A):
607 ± 1 mm (23.89 ± 0.039 in)



63U10X-045

2. Wear of column bearing
3. Ground plate for damage and tension

10 STEERING WHEEL AND COLUMN

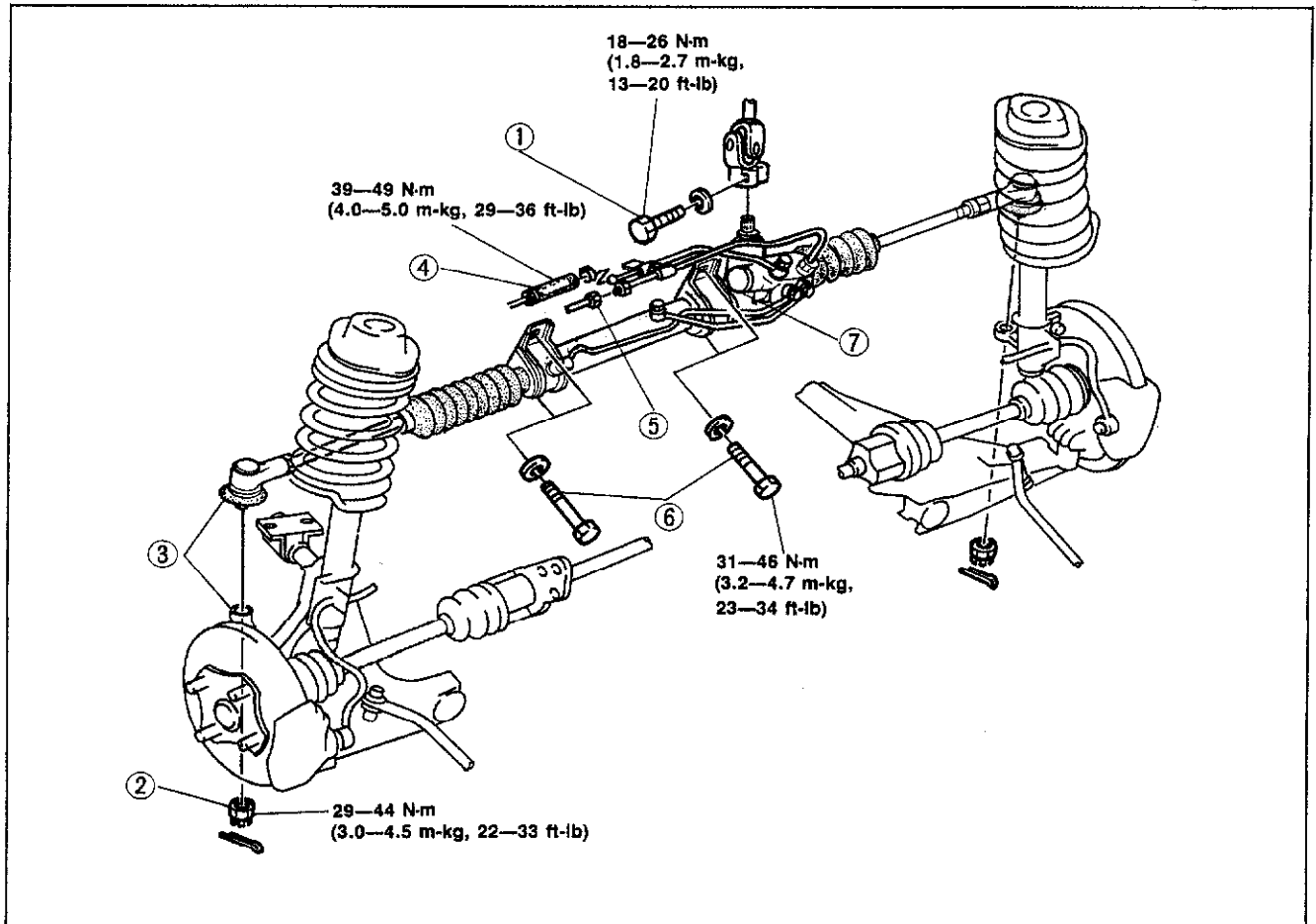


63U10X-046

- 4. Joint for excessive play
- 5. Dust boot for damage

STEERING GEAR AND LINKAGE**REMOVAL AND INSTALLATION (2WD)**

1. Loosen the front wheel lug nuts.
2. Jack up the vehicle and support it with safety stands.
3. Disconnect the battery negative cable.
4. Remove the wheels.
5. Remove the under cover.
6. Remove the parts in the sequence shown in the figure.
7. Install in the reverse order of removal.
8. After installation, add the power steering fluid and bleed air, then check for fluid leakage.



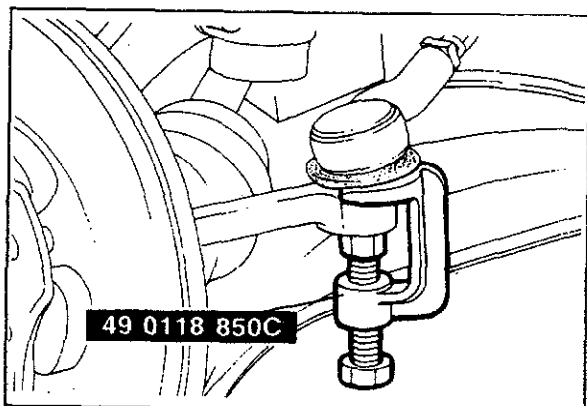
83U10X-025

1. Bolt
2. Nut and cotter pin
3. Knuckle arm/tie-rod connection

4. Return hose (Power steering)
5. Pressure pipe (Power steering)

6. Bolts
7. Steering gear and linkage

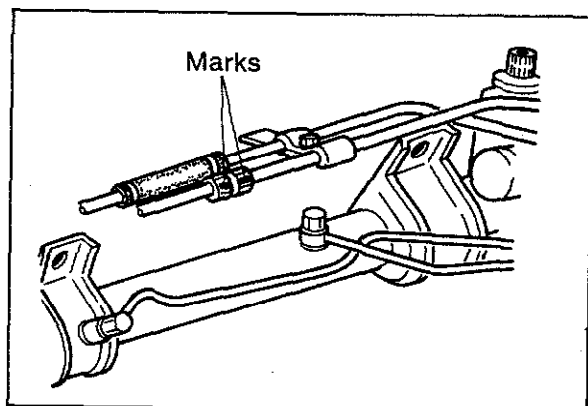
10 STEERING GEAR AND LINKAGE



83U10X-026

Tie-rod end

Separate the left and right tie-rod ends from the knuckle with the **SST**.



73G10X-011

Oil Pipes

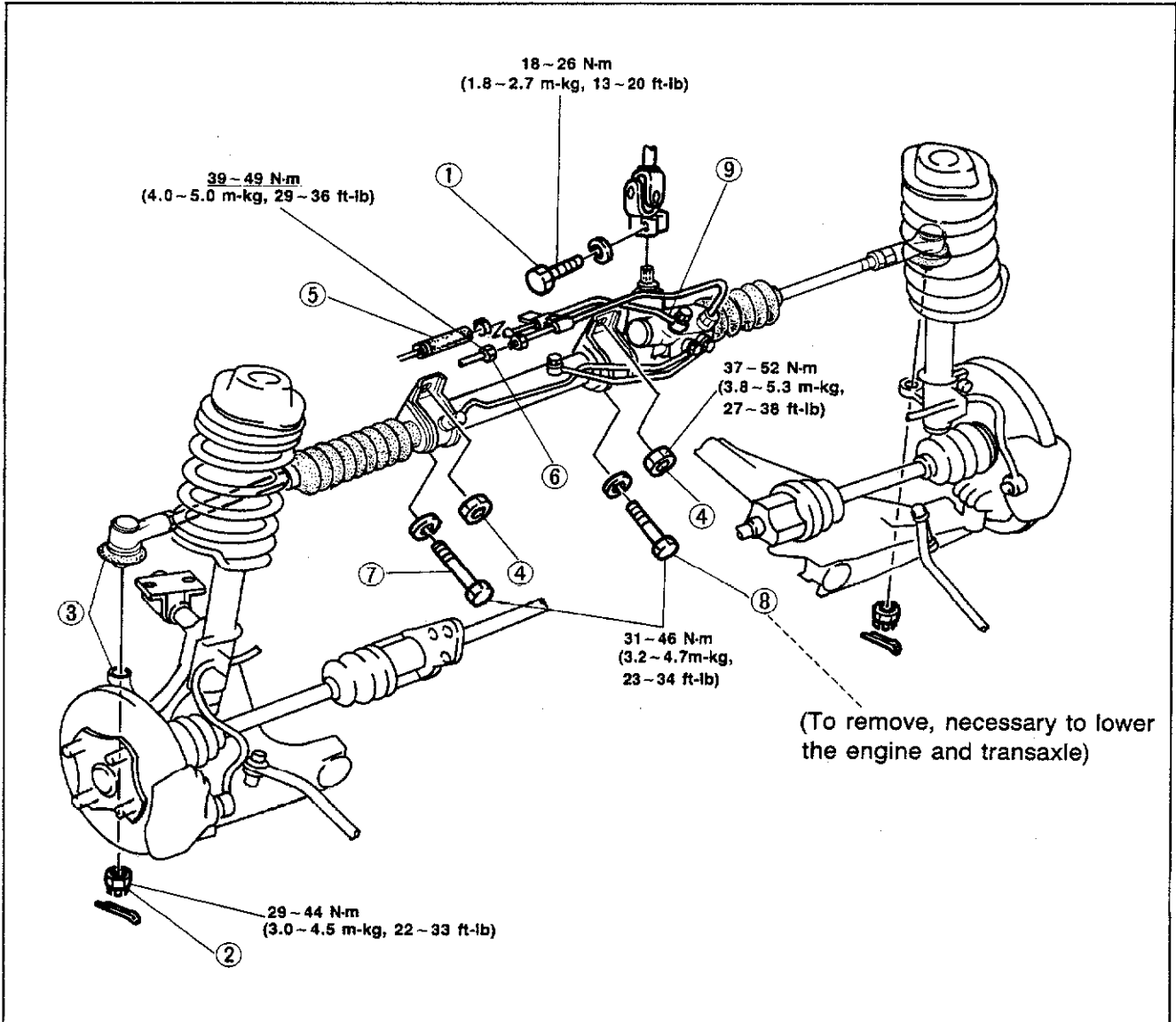
Make marks on the pressure pipe nuts for proper reinstallation, and then disconnect it.

Note

Power steering fluid will leak out when the pressure pipe or the return hose is disconnected, so prepare a suitable container for it to drain into.

REMOVAL AND INSTALLATION (4WD)

1. Loosen the front wheel lug nuts.
2. Jack up the front of the vehicle and support it with safety stands.
3. Remove the wheels.
4. Remove the bonnet.
5. Remove the battery, battery tray, and carrier.
6. Remove the under covers.
7. Remove in the sequence shown in the figure.
8. Install in the reverse order of removal.
9. After installation, add power steering fluid and bleed air, then check for fluid leakage.



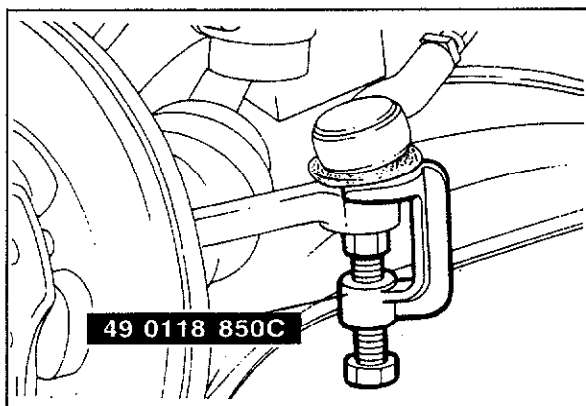
83U10X-027

1. Bolt
2. Nut and cotter pin
3. Knuckle arm/tie-rod

4. Nut
5. Return hose
6. Pressure pipe

7. Bolt (right)
8. Bolt (left)
9. Steering gear and linkage

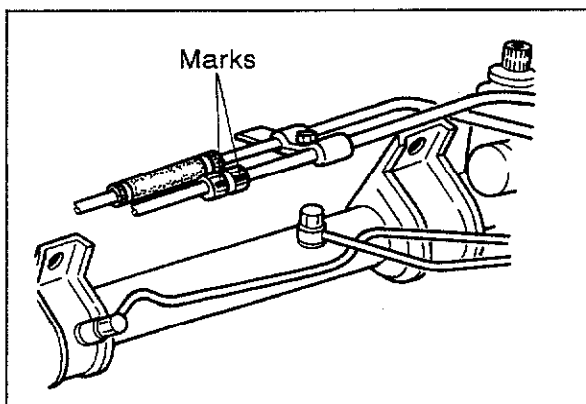
10 STEERING GEAR AND LINKAGE



83U10X-026

Tie-rod end

Separate the left and right tie-rod ends from the knuckle with the **SST**.



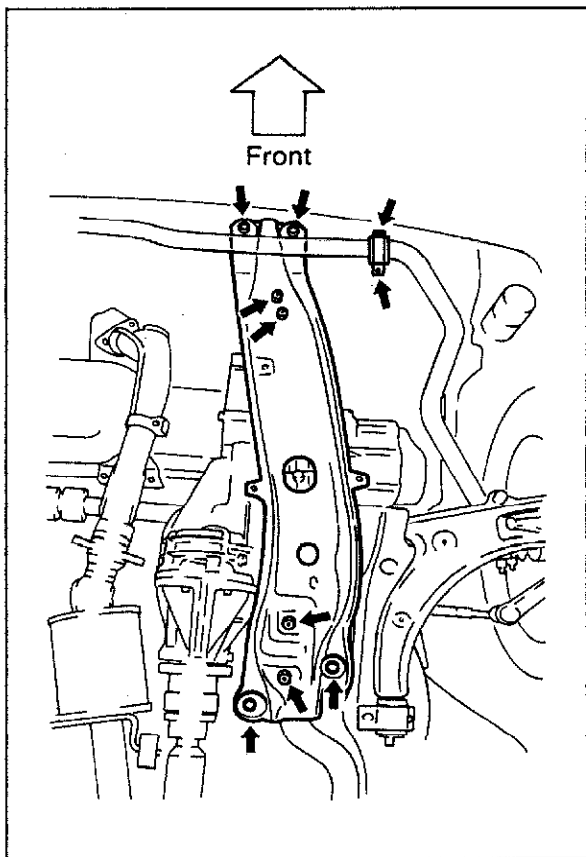
73G10X-011

Oil Pipes

Make marks on the pressure pipe nuts for proper reinstallation, and then disconnect it.

Note

Power steering fluid will leak out when the pressure pipe or the return hose is disconnected, so prepare a suitable container for it to drain into.

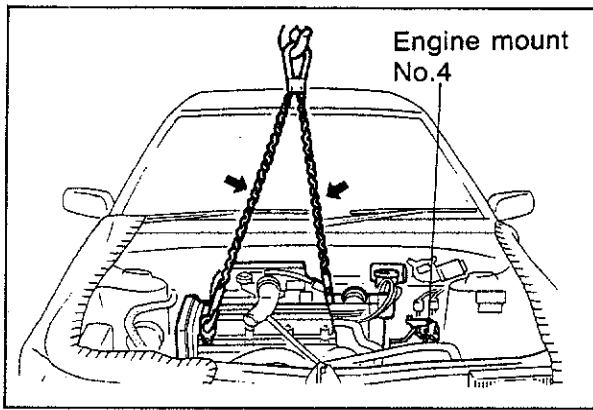


83U10X-028

Mounting Nut (lower left)

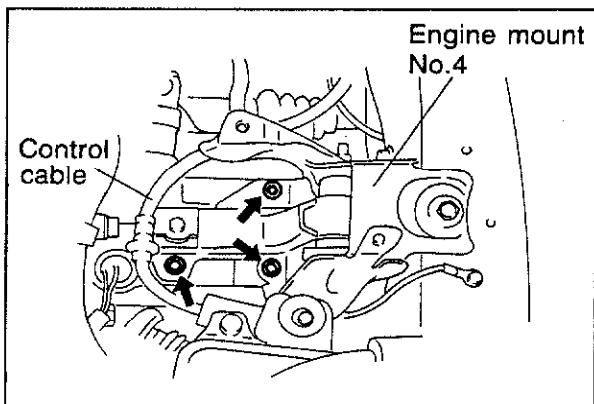
To remove, proceed in the following order.

1. Loosen the stabilizer mounting bracket nut and bolt.
2. Remove the engine mount member.



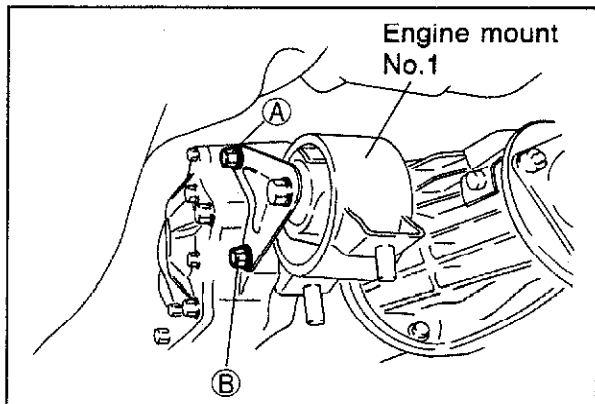
73G10X-013

3. Hook a chain and engine hoist to the engine and transaxle, and put slight tension on the chain.



73G10X-014

4. Remove the transmission control cable clip.
5. Remove the nuts mounting the transfer unit to engine mount No.4.



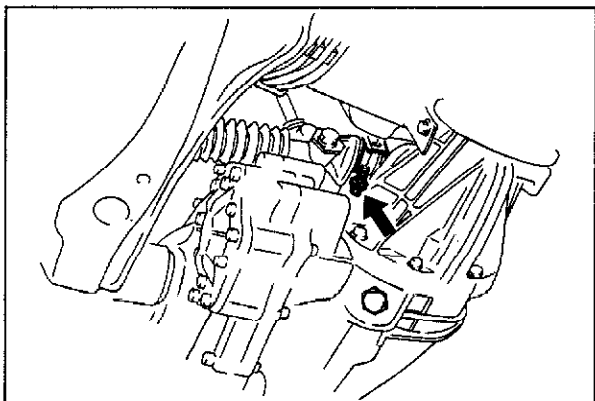
73G10X-015

6. Lower the engine gradually until bolt (A) can be removed.

Caution

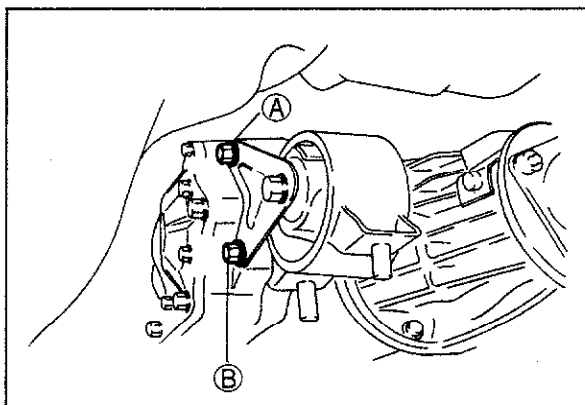
Do not lower the engine too much because it will damage the driveshaft boots.

7. Remove bolts (A) and (B) and remove engine mount No.1.



73G10X-016

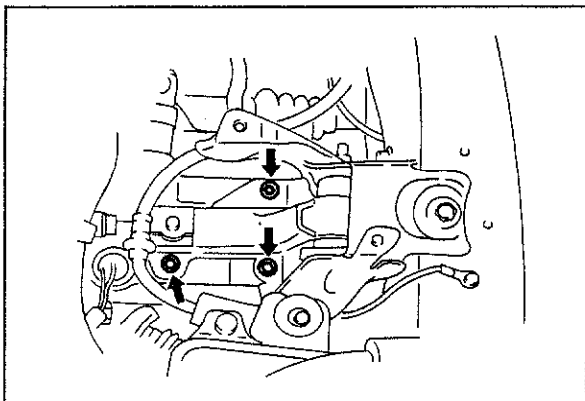
8. Remove the lower left mounting bolt.



83U10X-029

Tightening Engine Mount No.2 to Transfer

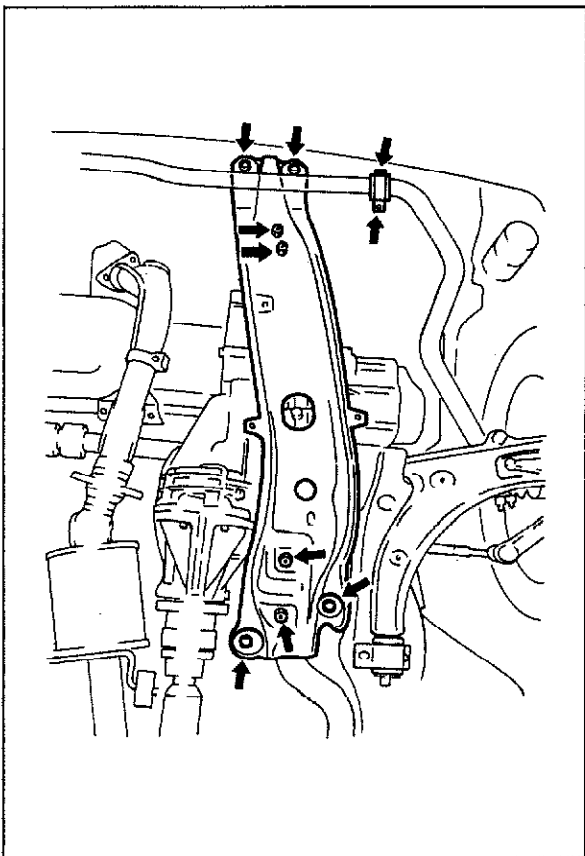
Bolt **A** and **B** tightening torque:
37—52 N·m
(3.8—5.3 m·kg, 27—38 ft·lb)



73G10X-019

Engine Mount No.4 to Transfer

Tightening torque:
19—25 N·m
(1.9—2.6 m·kg, 14—19 ft·lb)



73G10X-020

Engine Mount No.1 and No.2 to Engine Mount Member

Tightening torque:
64—89 N·m
(6.5—9.1 m·kg, 47—66 ft·lb)

Engine Mount Member to Body

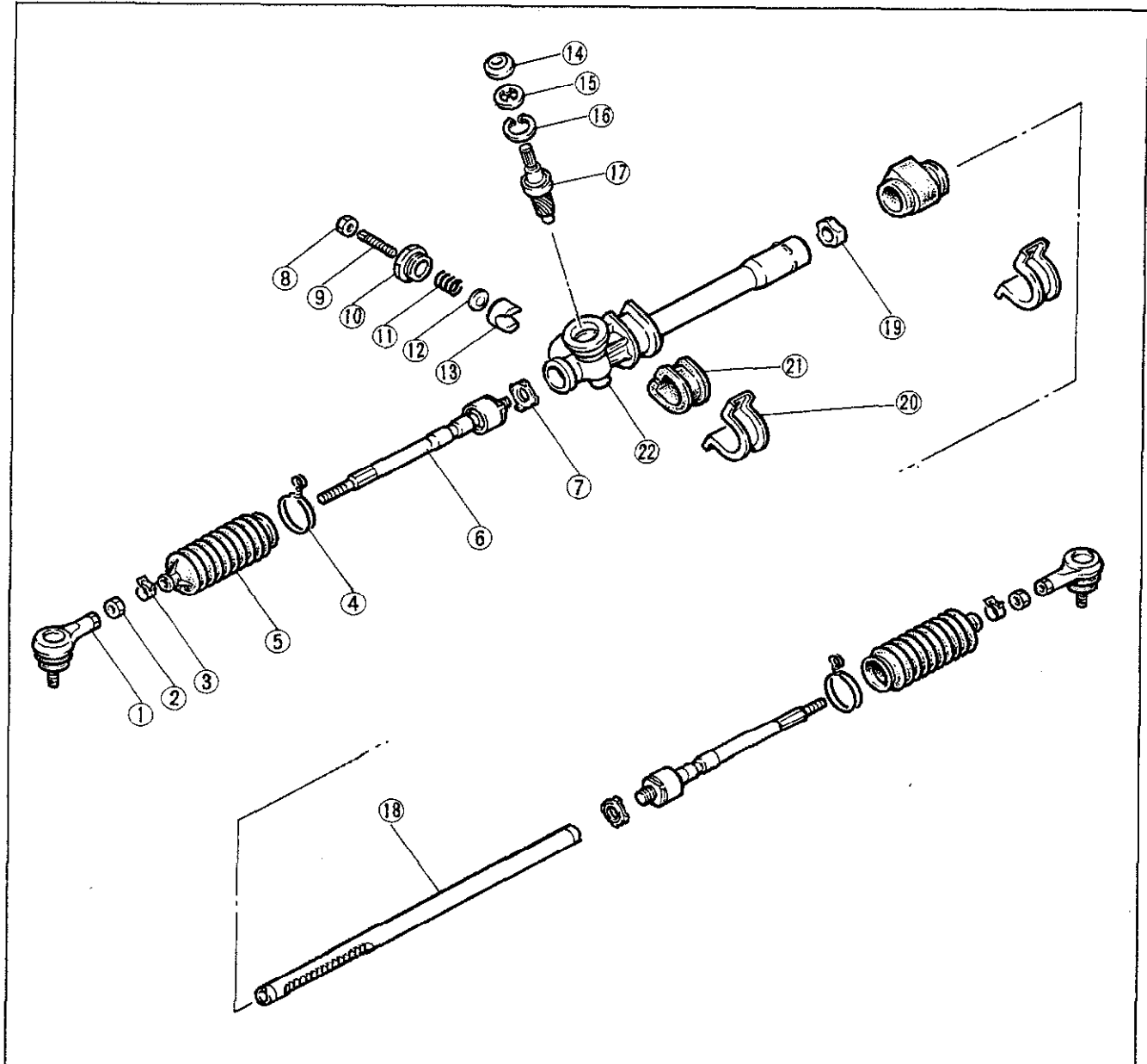
Tightening torque:
64—89 N·m
(6.5—9.1 m·kg, 47—66 ft·lb)

Stabilizer Bracket

Nut and bolt tightening torque:
31—46 N·m
(3.2—4.7 m·kg, 23—34 ft·lb)

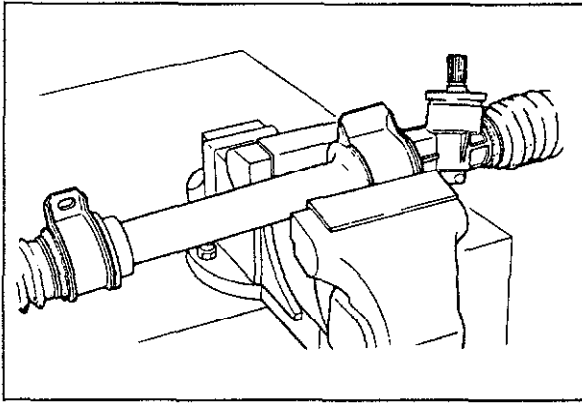
DISASSEMBLY (MANUAL STEERING, CONSTANT GEAR RATIO TYPE)

Disassemble in the sequence shown in the figure.



83U10X-030

- | | | |
|-----------------------------|------------------|----------------------|
| 1. Tie-rod end (left/right) | 8. Locknut | 15. Stop ring |
| 2. Nuts (left/right) | 9. Adjust Bolt | 16. Snap ring |
| 3. Boots clip (left/right) | 10. Adjust cover | 17. Pinion |
| 4. Boot wire (left/right) | 11. Yoke spring | 18. Rack |
| 5. Boot (left/right) | 12. Spacer | 19. Bushing |
| 6. Tie-rod (left/right) | 13. Support yoke | 20. Mounting bracket |
| 7. Washer (left/right) | 14. Dust cover | 21. Rubber mount |
| | | 22. Gear housing |



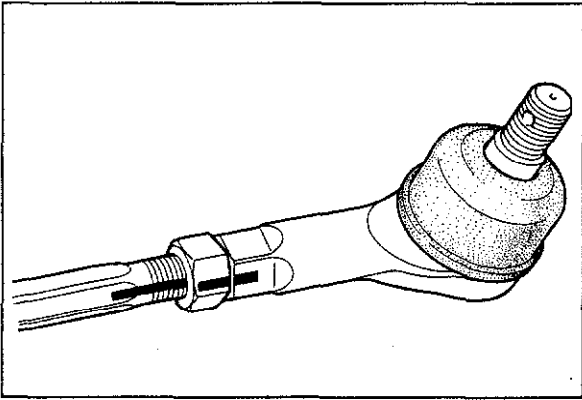
63U10X-049

Steering gear and linkage

Secure the mounting of the removed gear and linkage in a vise.

Caution

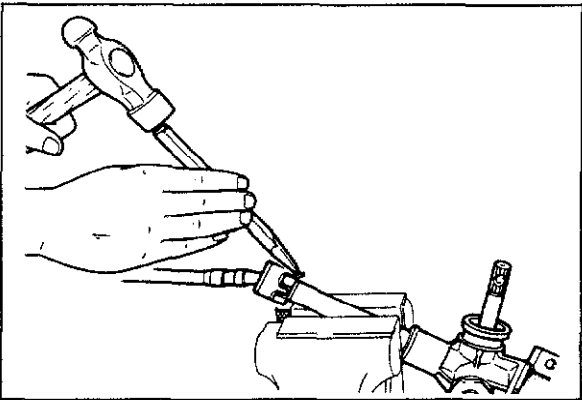
Be sure to insert a soft, protective material (such as copper plates) between the part and the jaws of the vise.



63U10X-050

Tie-rod ends

Before removing the tie-rod ends, make a mark on the threaded part of the tie-rods to use as a guide for installation.

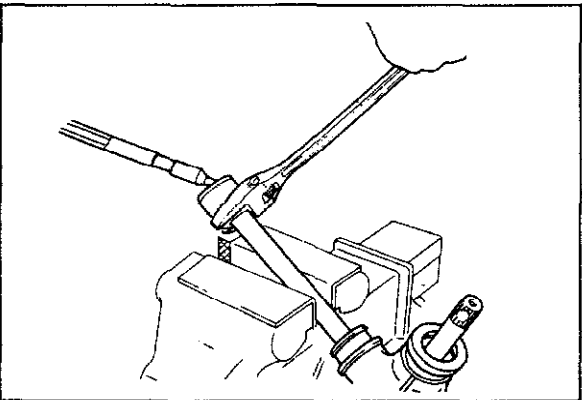


63U10X-051

Tie-rods

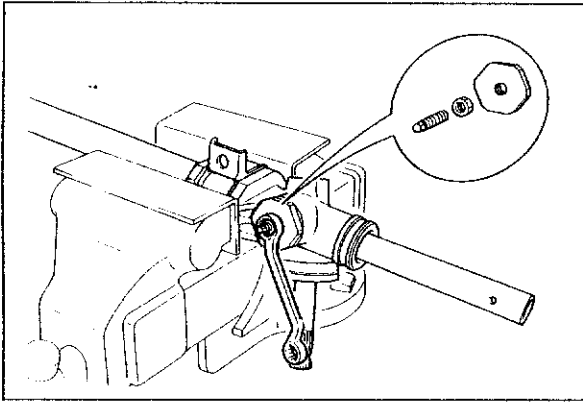
When removing each of the tie-rods from the rack, proceed as follows:

1. Un-crimp the washer as shown in the figure.



63U10X-052

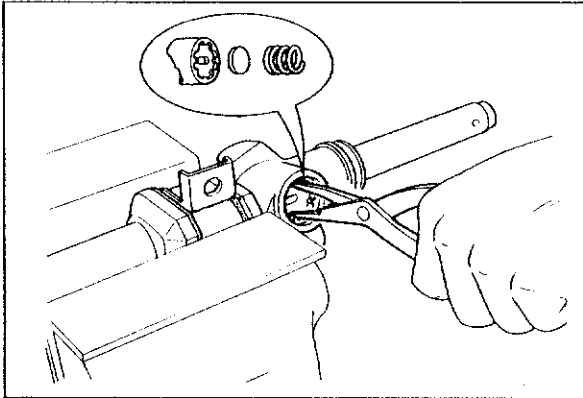
2. Using an adjustable wrench on the notch of the rack gear and an open-end wrench, at the tie-rod, turn the tie-rod, and separate the tie-rod and rack.



83U10X-031

Adjust Cover

Remove the locknut and remove the adjust bolt and the adjust cover.

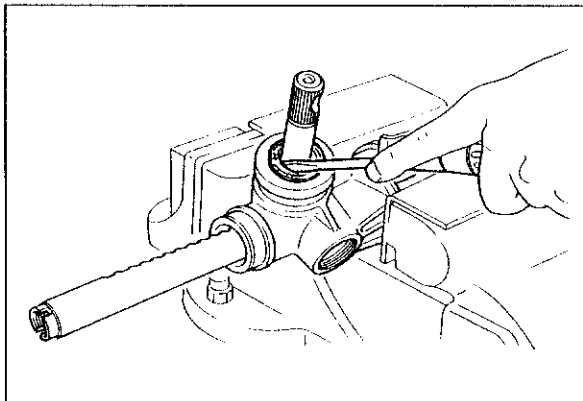


73U10X-004

Support Yoke

Remove the parts in the following order:

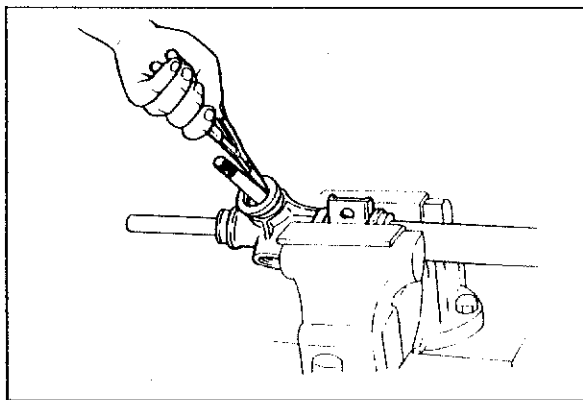
- (1) Yoke spring
- (2) Spacer
- (3) Support yoke



73U10X-005

Stop ring

1. Remove the oil seal using a small flat-tipped screw driver.
2. Remove the stop ring.

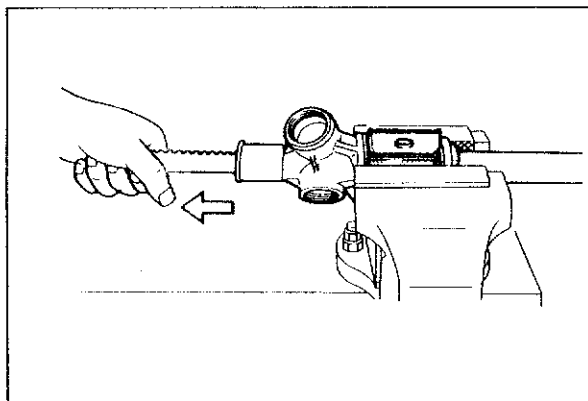


73U10X-006

Pinion Shaft Assembly

Remove the snap ring and remove the pinion shaft assembly from the gear housing.

10 STEERING GEAR AND LINKAGE



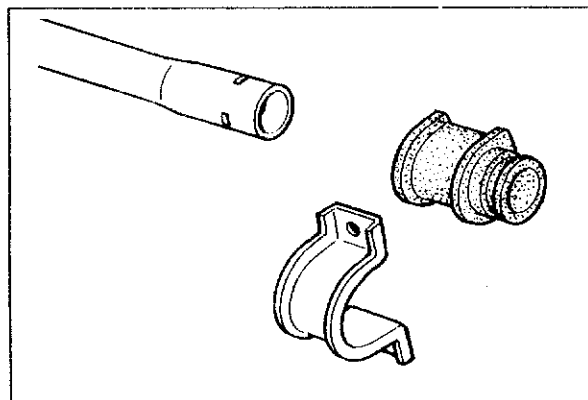
63U10X-056

Rack

Remove the rack by taking it out in the direction indicated by the arrow.

Caution

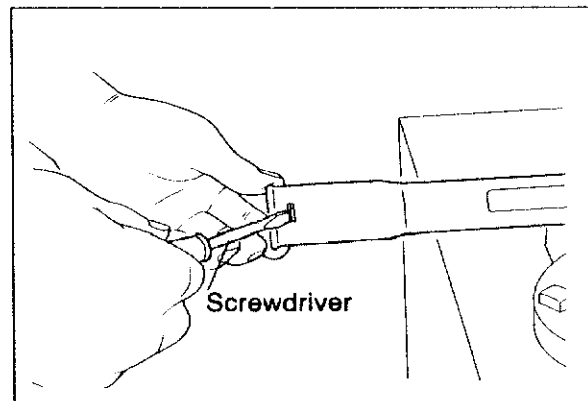
If the rack is taken out in the opposite direction, the inside surface of the rack bushing might be damaged by the edge of the rack gear.



83U10X-032

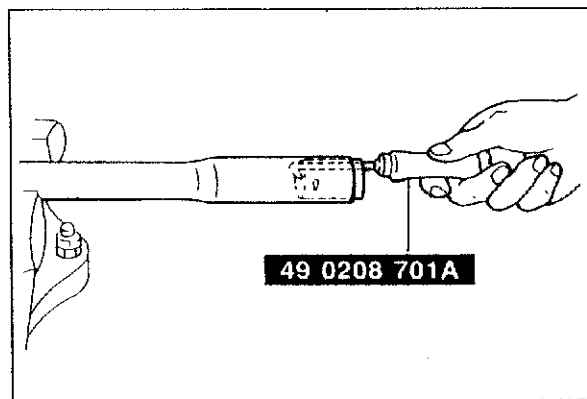
Bushing

1. Remove the rubber mount from the housing.



63U10X-059

2. Unlock the bushing from the housing by pushing against each of the three lock points with a flat blade screwdriver.

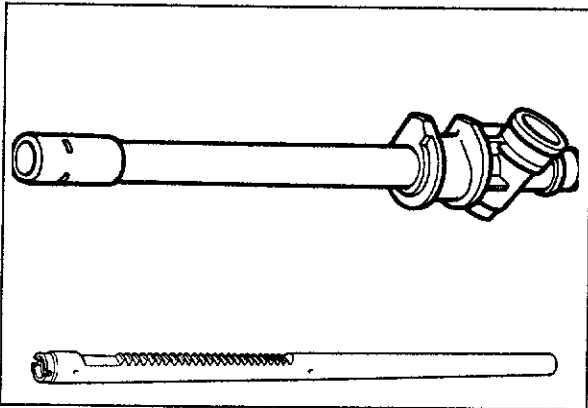


83U10X-033

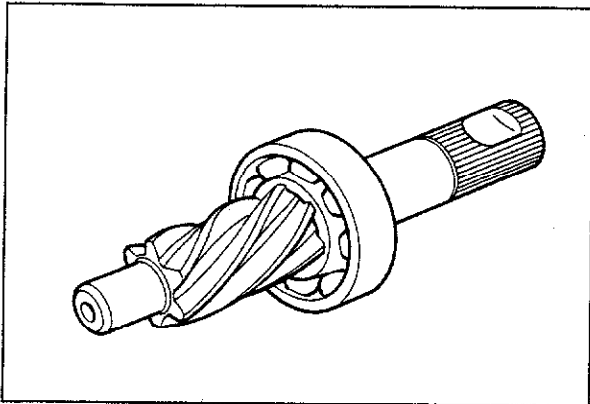
3. Remove the bushing with the **SST**.

Note

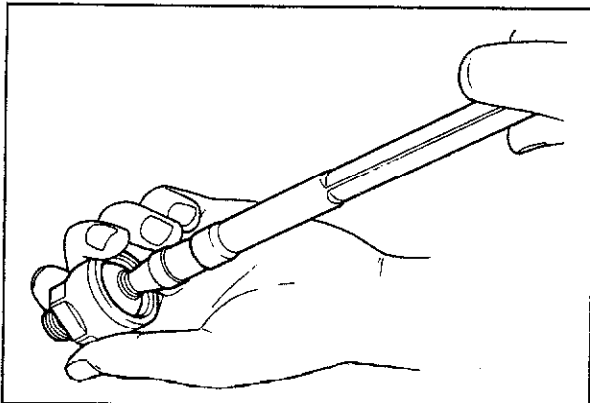
After removing the bushing, clean the inside of the housing.



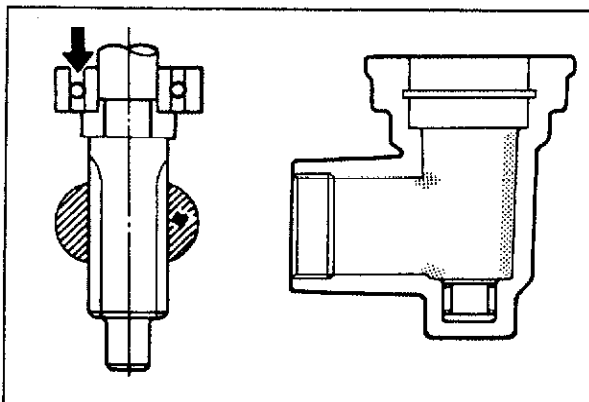
63U10X-061



63U10X-062



63U10X-063



73G10X-026

INSPECTION

Check the following points, replace the part if necessary.

1. Cracking, damage, or deterioration of boots
2. Cracking, worn teeth, or damage of rack and pinion
3. Looseness, abnormal noise, or poor operation of bearings.

4. Worn rack bushing inside the gear housing

Caution

a) If replacement is necessary, replace the entire gear housing assembly.

b) Abnormal noise or rough movement of the bearing

c) If pinion bearing replacement is necessary, replace the pinion and bearing as an assembly.

5. Wear of contact surface of pressure pad which contacts rack
6. Cracking or deformation of gear housing
7. Looseness or tie-rod ball-joint operation
8. Bent tie-rods or tie-ends
9. Damage to tie-rods or tie-rod ends.

ASSEMBLY

Assemble in the following order.

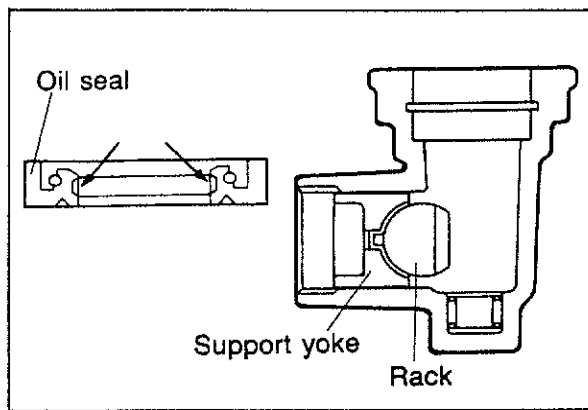
1. Fill or coat with grease.

Before assembly, coat (or fill) the following parts with grease (lithium base, NLGI No.2).

Amount: about 30g (1.06 oz)

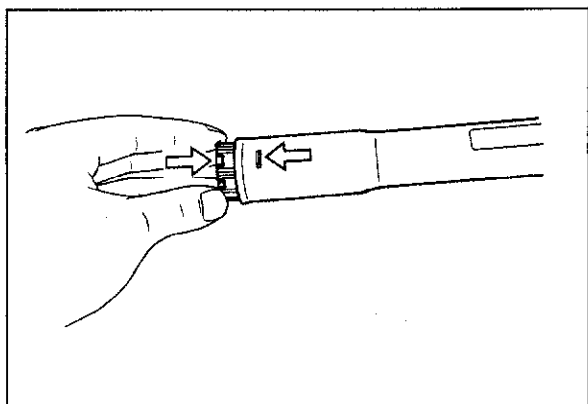
- (1) Pinion bearing and teeth
- (2) Inside the gear housing

10 STEERING GEAR AND LINKAGE



63U10X-066

- (3) Oil seal lip
- (4) Support yoke and rear surface

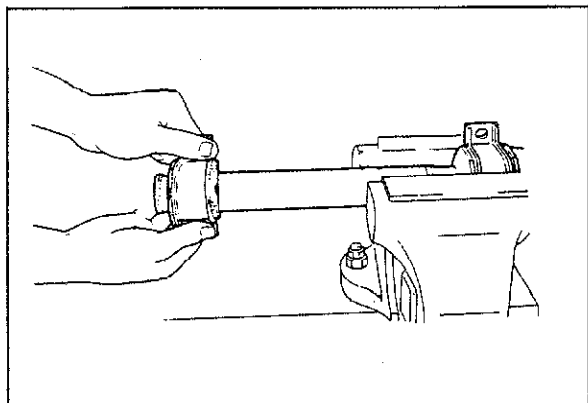


63U10X-067

- 2. Installation of rack bushing
Install the rack bushing to the rack housing so that the convex part of the rack bushing lines up with the slit of the rack housing.

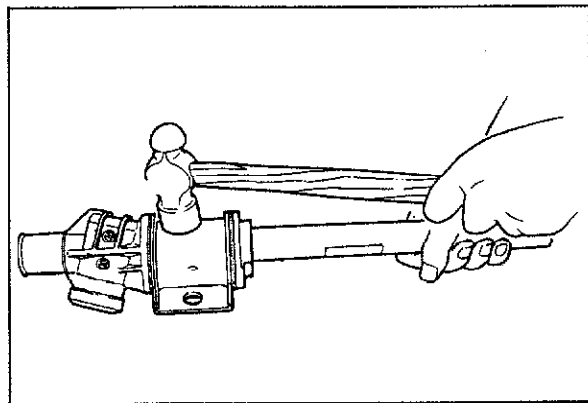
Note

Apply grease (lithium base, NLGI No.2) to the inside of the bushing.



83U10X-034

- 3. Push the rubber mount on until it just contacts the end of the housing.

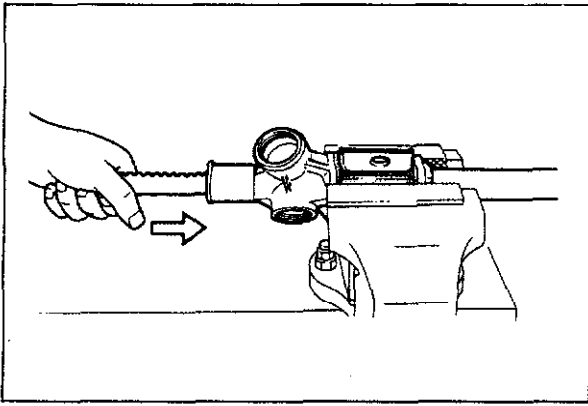


63U10X-077

- 4. Attach the rubber mount to the column.

Caution

- a) Be sure that the direction of insertion and the alignment are correct.
- b) Be sure that the mount is aligned with the end of the column.
- c) If the rubber mount is difficult to install, apply soapy water to the inside of the mount.

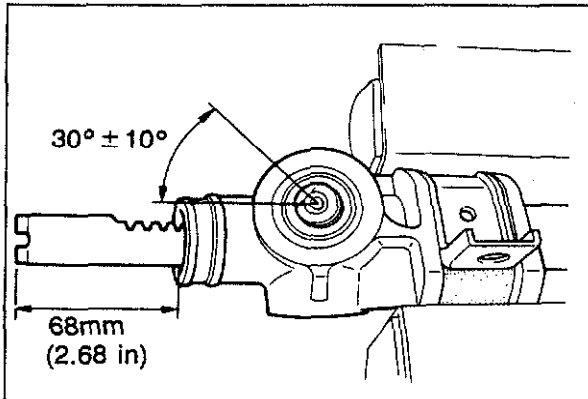


63U10X-069

5. Carefully install the rack in the direction of the arrow.

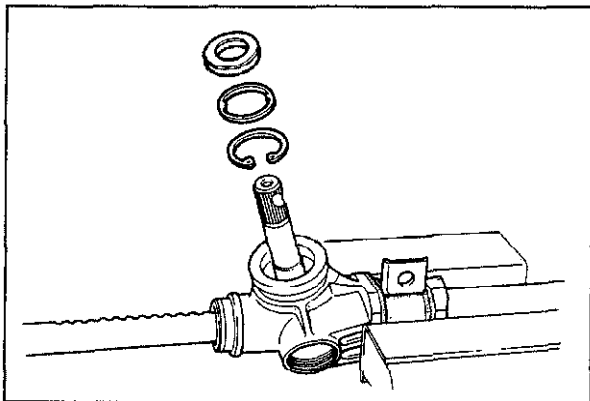
Caution

If the rack is installed from the opposite direction, the inner surface of the rack bushing might be damaged by the edge of the rack gear.



73U10X-007

6. Install the pinion shaft with the notch on the serration positioned as shown in the figure when the rack is positioned at the center of the rack housing.



73G10X-028

7. Install the oil seal as follows:

- (1) Install the snap ring

Caution

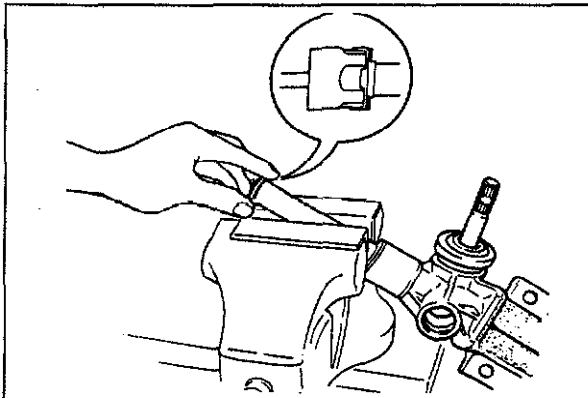
a) Use a new snap ring.

b) The snap ring tapered side must face upward when installing.

- (2) Install the stop ring.

- (3) Apply a coat of grease to the oil seal lips.

- (4) Install the oil seal by pushing it by hand.

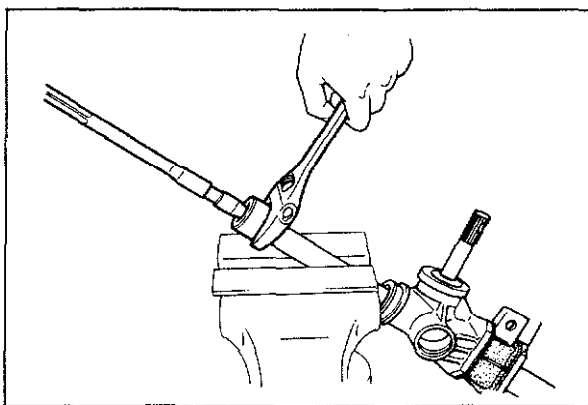


73G10X-029

8. Attach new washers to the left and right tie-rods, and then screw them onto the rack.

Caution

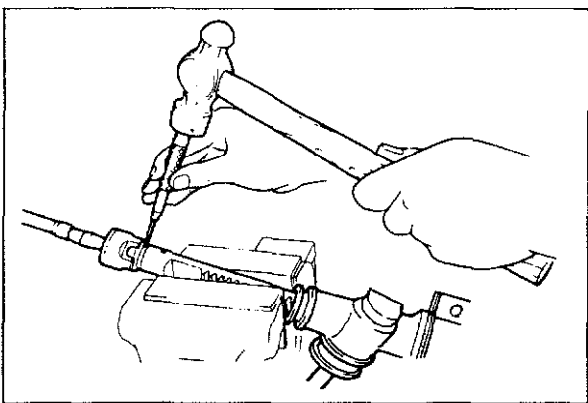
Be sure that the washers face in the correct direction.



73G10X-030

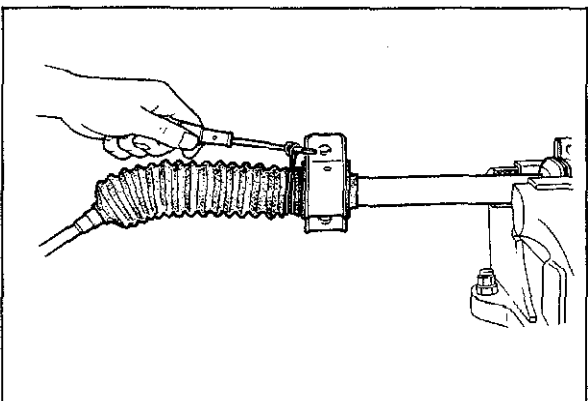
9. Using a wrench, tighten the left and right tie-rods to the specified torque.

**Tightening torque: 80—100 N·m
(8—10 m·kg, 58—72 ft·lb)**



73G10X-031

10. Align the washer with the rack groove, and crimp the washer.

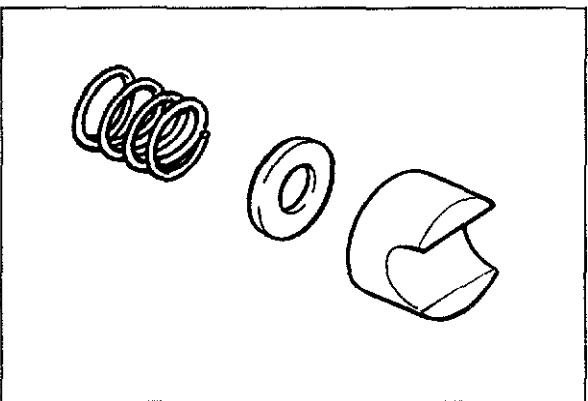


73G10X-032

11. Install the boot, and then wrap a new wire two times around it and twist it 4 or 4.5 times.

Caution

Check that the boot is not twisted or dented.

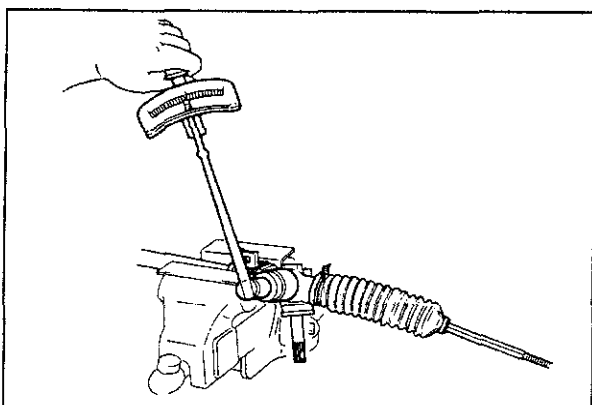


73G10X-033

12. Install the support yoke, spacer and yoke spring.

Caution

Install so that the support yoke correctly contacts the rack.

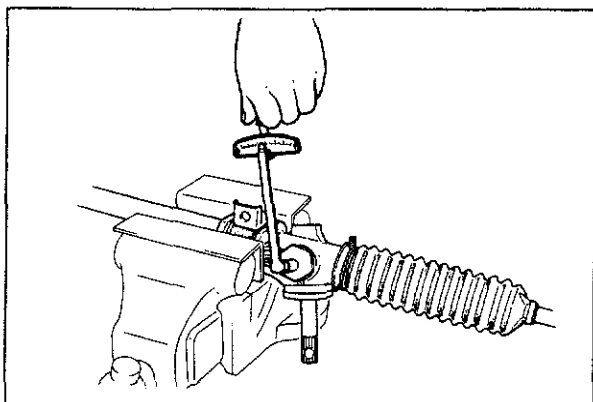


73G10X-034

13. Install the adjust cover as follows:
 - (1) Apply a coat of sealant to the threads of the adjust cover.
 - (2) Install the adjust cover.

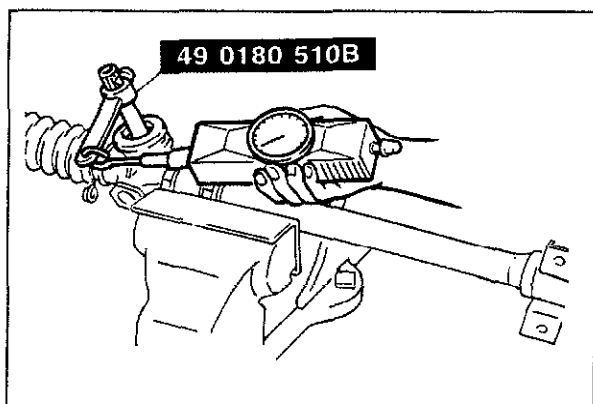
Tightening torque:

39—59 N·m (4.0—6.0 m·kg, 29—43 ft·lb)



73G10X-035

- (3) After tightening the adjust bolt to a torque of **1 N·m (10 cm·kg, 8.7 in·lb)**, loosen it **10°—40°** from that position.



83U10X-036

- (4) Measure the pinion torque with the **SST** and a pull-scale.

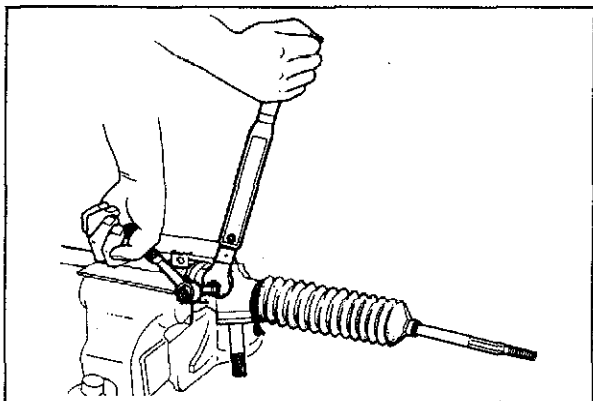
Pinion torque:

**Neutral position $\pm 90^\circ$ 0.9—1.3 N·m
(9—13 cm·kg, 7.81—11.28 in·lb)**

**Pull-scale reading: 900—1300 g
(31.7—45.9 oz)**

**Any other position 1.5 N·m or less
(15 cm·kg, 13.02 in·lb or less)**

**Pull-scale reading: 1500 g or less
(52.9 oz or less)**



73G10X-037

- (5) If the pinion torque is not within the standard range, readjust the pinion torque by adjusting the adjust bolt.
- (6) Tighten the locknut and secure the adjust bolt.

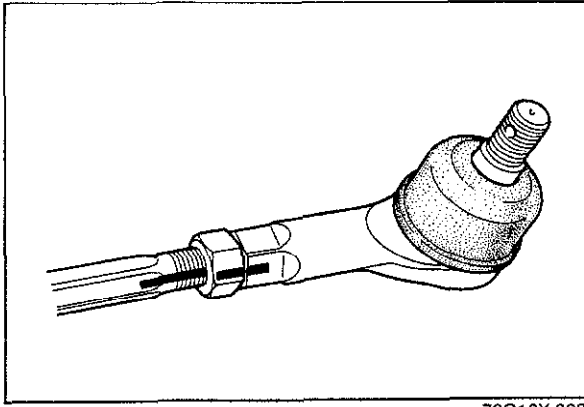
Tightening torque: 10—15 N·m

(1.0—1.5 m·kg, 7.2—10.8 ft·lb)

Caution

Do not allow the adjust bolt to turn with the locknut.

10 MANUAL STEERING GEAR AND LINKAGE



73G10X-038

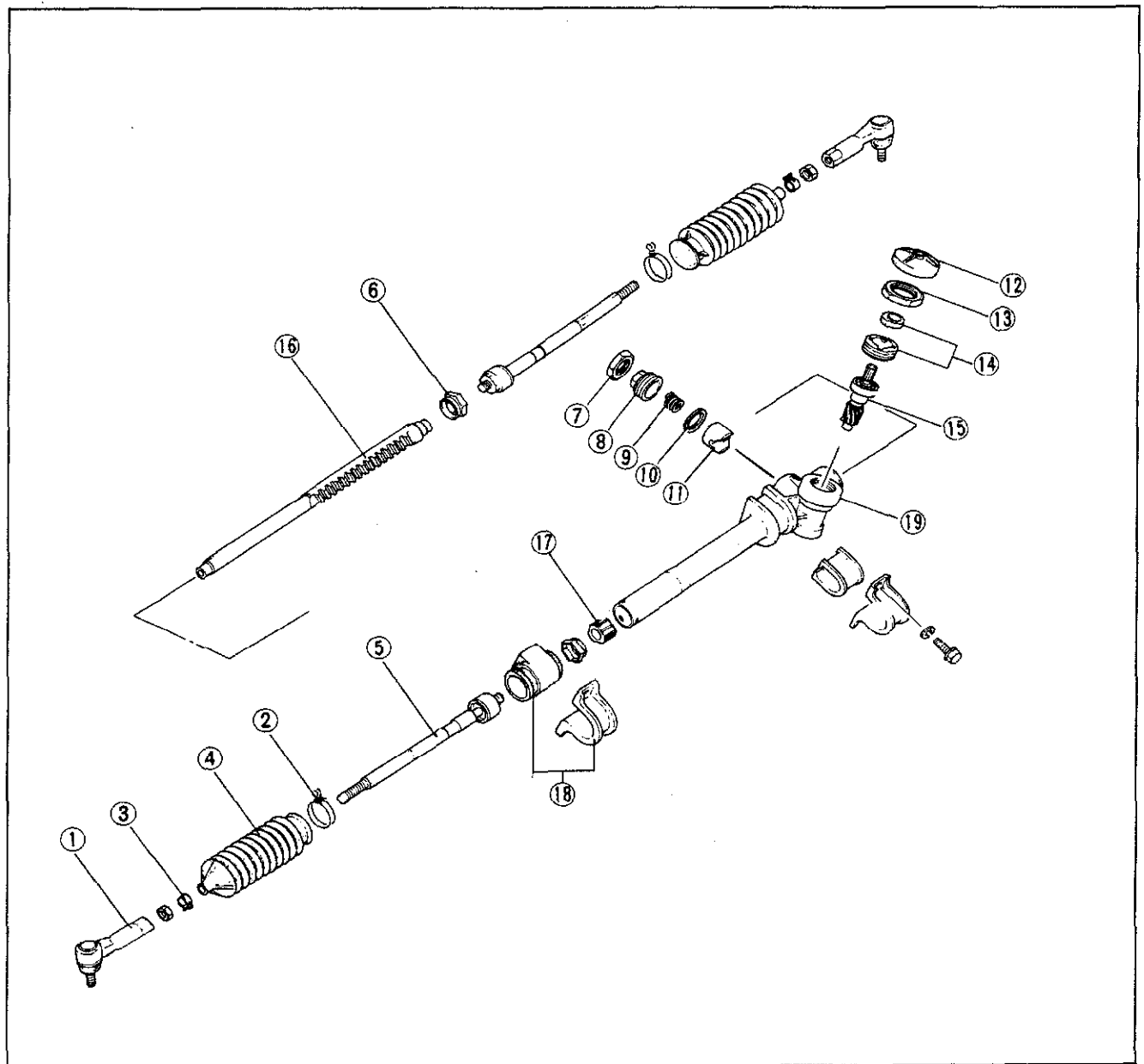
14. Install the tie-rod ends and align them with the marks made before disassembly.

DISASSEMBLY (MANUAL STEERING, VARIABLE GEAR RATIO TYPE)

Disassemble in the numbered sequence shown in the figure.

Note

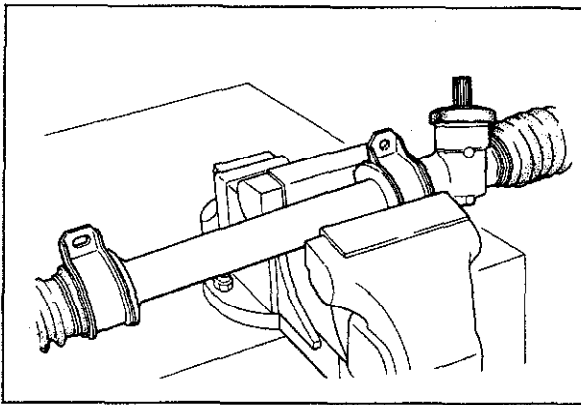
Before disassembling, drain the gear oil and clean thoroughly.



83U10X-036

- | | | |
|------------------------------|------------------------------|--|
| 1. Tie-rod ends (left/right) | 8. Adjust cover | 15. Bearing and pinion |
| 2. Boot wires (left/right) | 9. Spring | 16. Rack |
| 3. Boot clips (left/right) | 10. Pressure pad plate | 17. Bushing |
| 4. Boot (left/right) | 11. Pressure pad | 18. Mounting brackets and rubber mountings |
| 5. Tie-rod (left/right) | 12. Dust cover | 19. Gear housing |
| 6. Washers (left/right) | 13. Locknut | |
| 7. Locknut | 14. Pinion plug and oil seal | |

10 STEERING GEAR AND LINKAGE



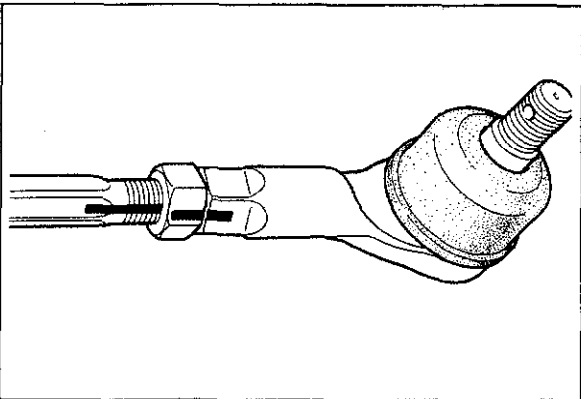
63U10X-086

Steering gear and linkage

Secure the mounting part of the removed gear and linkage in a vise.

Caution

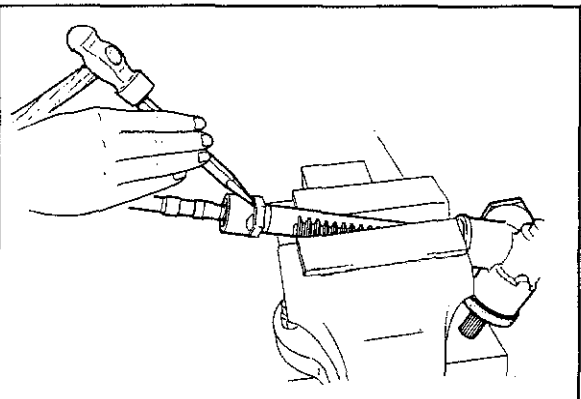
Be sure to insert a soft, protective material between the part and the jaws of the vise.



63U10X-087

Tie-rod ends

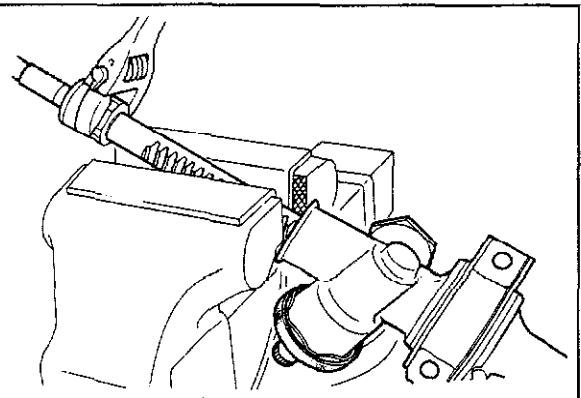
Before removing the tie-rod ends, make a mark on the threaded part of the tie-rods to use as a guide for installation.



63U10X-088

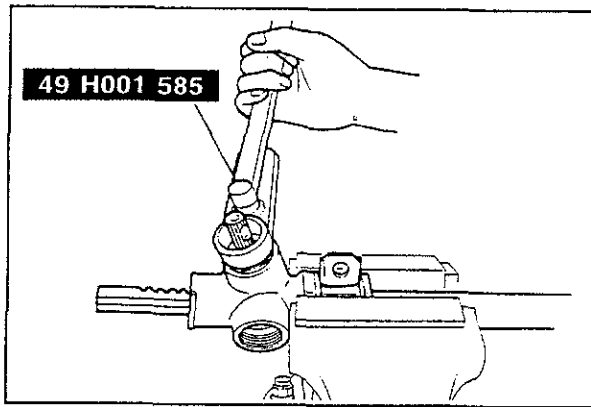
Tie-rods

1. Uncrimp the locking washer.



63U10X-089

2. After wrapping the rack in a rag and securing it in a vise, remove the tie rod from the rack.



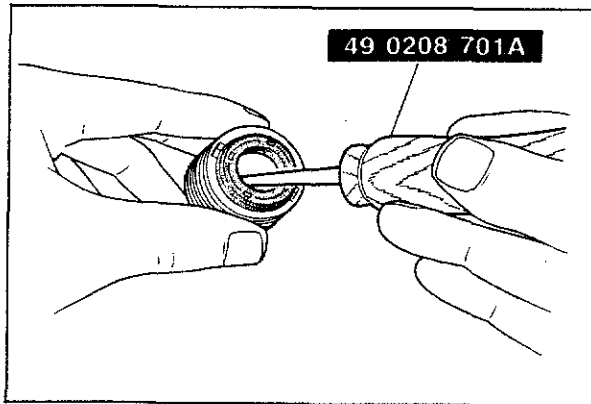
83U10X-037

Pinion plug

The pinion plug is removed with the **SST**.

Caution

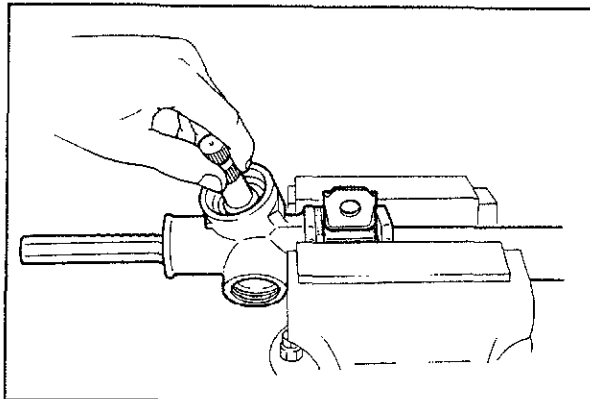
When installing the pinion plug, apply a coat of sealant to the threads.



83U10X-038

Pinion plug oil seal

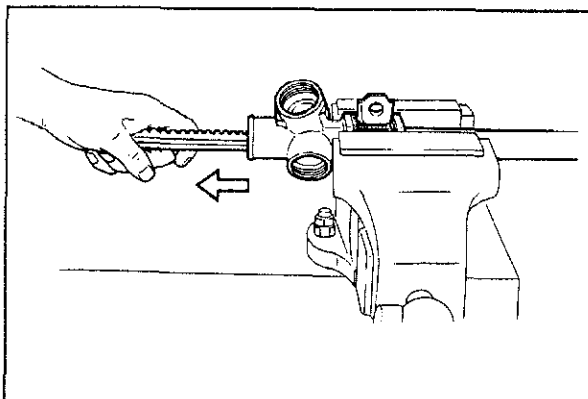
Remove the oil seal from the pinion plug with the **SST**.



63U10X-092

Pinion

Gently grasp the serrated part of the pinion, and pull it out.



63U10X-093

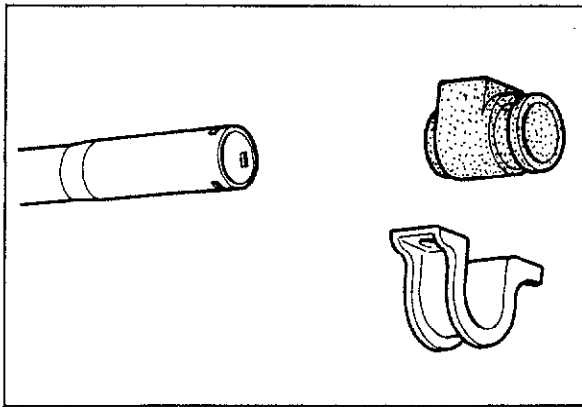
Rack

Remove the rack by taking it out in the direction indicated by the arrow.

Caution

If the rack is taken out in the opposite direction, the inside surface of the rack bushing might be damaged by the edge of the rack gear.

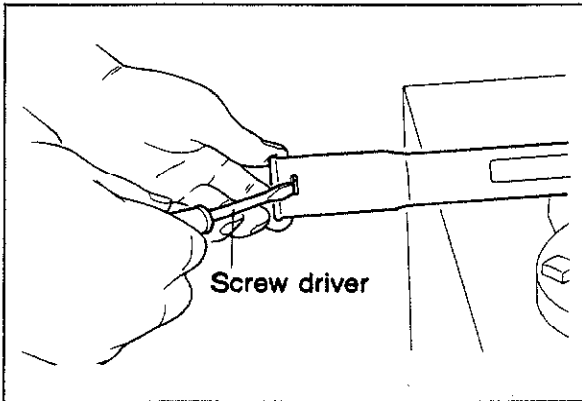
10 STEERING GEAR AND LINKAGE



63U10X-094

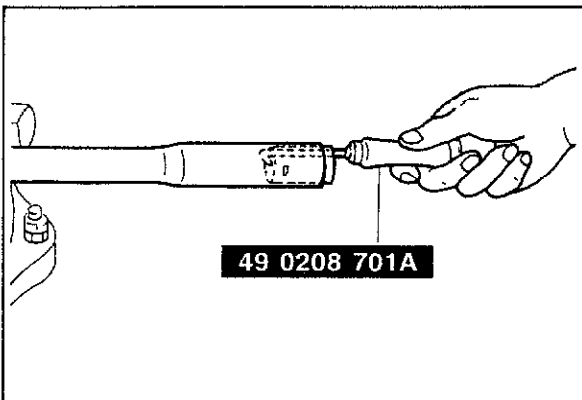
Bushing

1. Remove the mounting rubber from the housing.



63U10X-095

2. Unlock the bushing from the housing by pushing against each of the three lock points with a flat blade screwdriver.

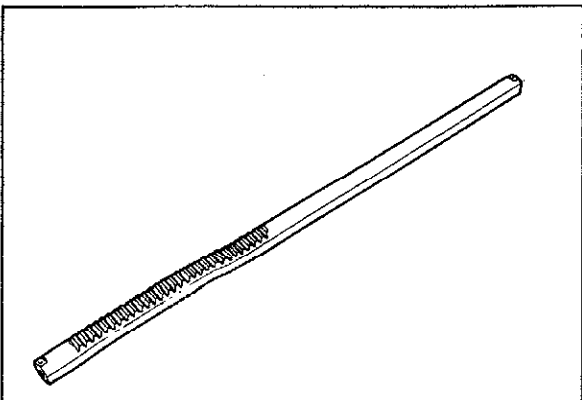


83U10X-039

3. Remove the bushing with **SST**.

Note

After removing the bushing, clean the inside of the housing.

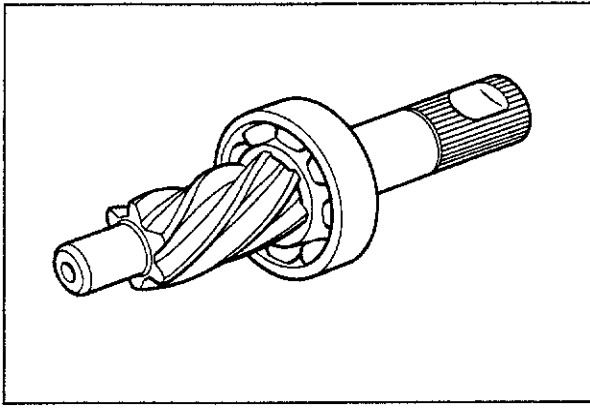


63U10X-097

INSPECTION

Check the following points, replace the part if a problem is found.

1. Cracking, damage, or deterioration of boots
2. Cracking, worn teeth, or damage to rack and pinion
3. Looseness, abnormal noise, or poor bearing operation inside the gear housing

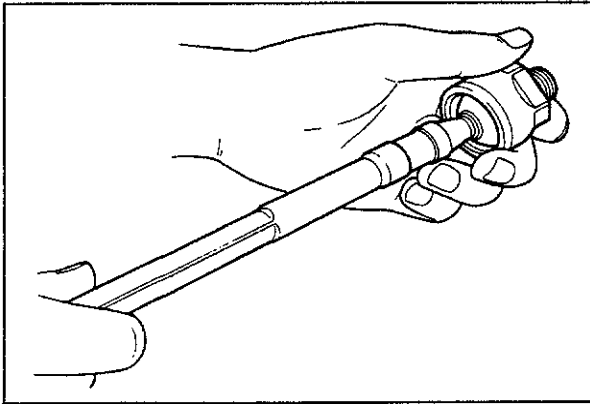


63U10X-098

4. Worn rack bushing inside the gear housing. Wear, normal noise, or rough movement of the bearing on the pinion shaft.

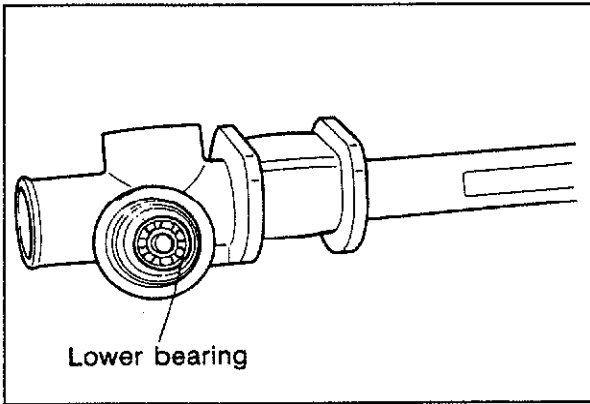
Caution

- a) If replacement is necessary, replace the entire gear housing assembly.
- b) Abnormal noise or rough movement of the bearing.
- c) If replacement is necessary, replace the entire pinion and bearing assembly.



63U10X-099

5. Wear of sliding surface of pressure pad which contacts rack
6. Cracking or deformation of gear housing
7. Looseness or lack of smoothness in tie-rod ball-joint operation
8. Bent tie-rods or tie-rod ends
9. Damage to tie-rods or tie-rod ends.



63U10X-100

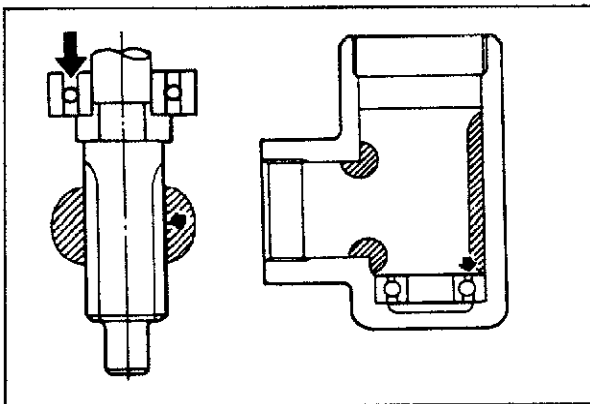
ASSEMBLY

Assemble in the order described below.

1. Press in the lower bearing.

Caution

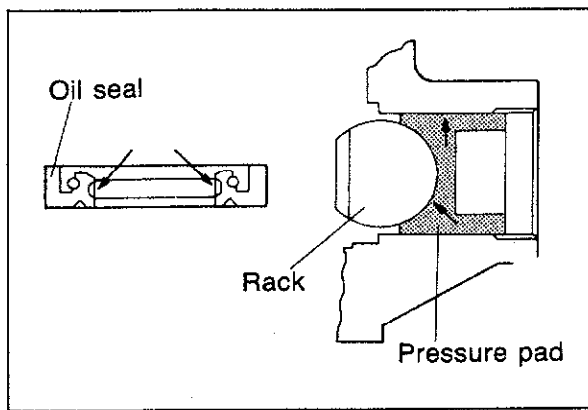
Before pressing it in, fill the bearing with grease (lithium base, NLGI No. 2).



63U10X-101

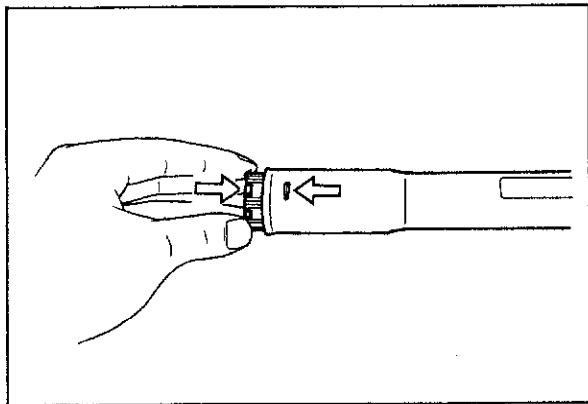
2. Fill or coat with grease.
Before assembly, coat (or fill) the following parts with grease (lithium base, NLGI No. 2):
(1) Pinion bearing and teeth
(2) Inside the gear housing

10 STEERING GEAR AND LINKAGE



63U10X-102

- (3) Oil seal lip
- (4) Pressure pad sliding part and rear surface

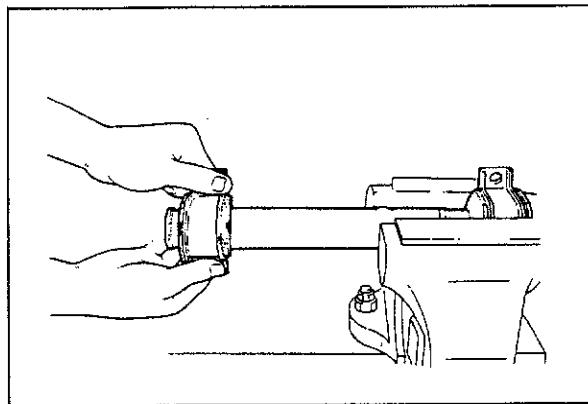


63U10X-103

3. Installation of rack bushing.
Install the rack bushing to the rack housing so that the convex part of the rack bushing lines up with the slit of the rack housing. Align the three lock points and tap in with the old bushing and a piece of wood.

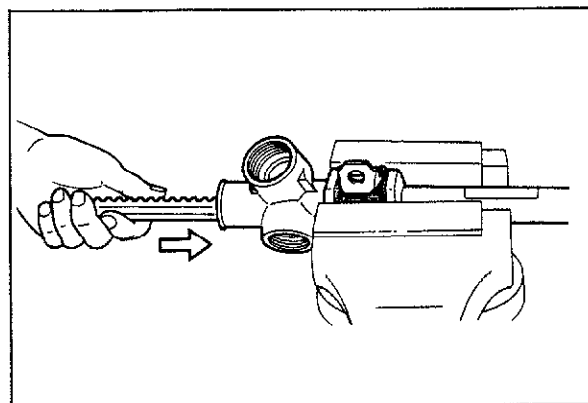
Note

Apply grease (lithium base, NLGI No. 2) to the inside of the bushing.



63U10X-104

4. Push the mounting rubber on until it just contacts the end of the housing.

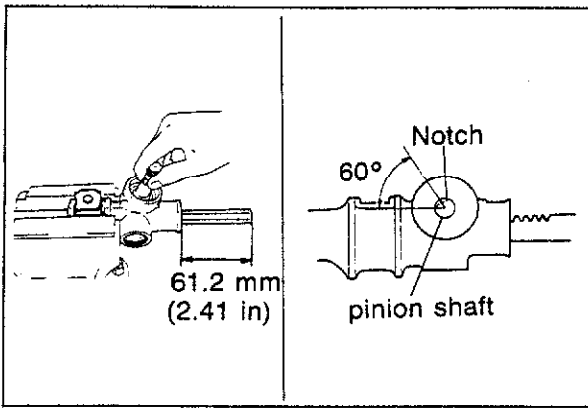


63U10X-105

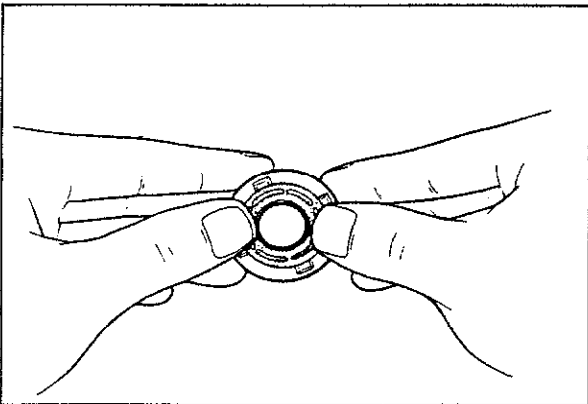
5. Carefully install the rack in the direction of the arrow.

Caution

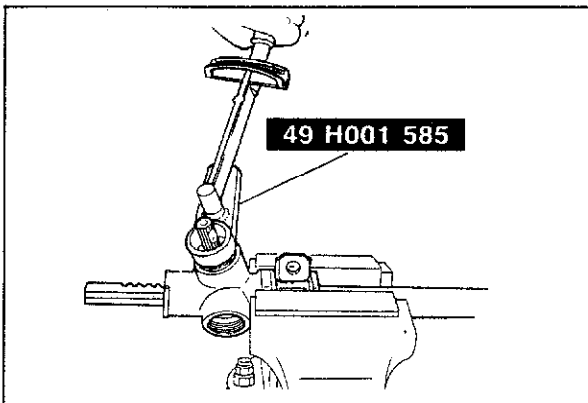
If the rack is installed from the opposite direction, the inner surface of the rack bushing might be damaged by the edge of the rack gear.



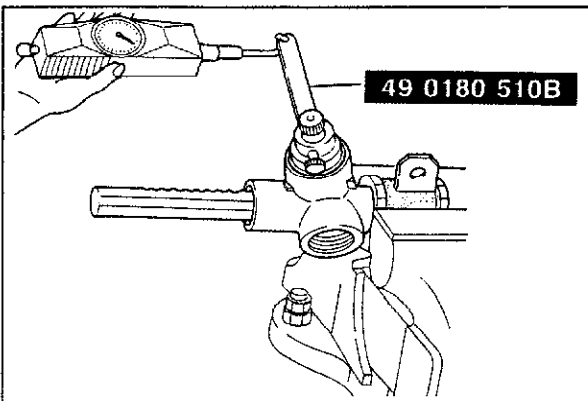
63U10X-106



63U10X-107



83U10X-040



83U10X-041

6. Install the pinion shaft with the notch on the serration positioned as shown in the figure when the rack is positioned at the center of the rack housing.

7. Install the upper bearing.
8. Push the oil seal in to the pinion plug, and then install the pinion plug with the oil seal onto the pinion shaft.
9. Install the pinion plug.

10. Adjust the pinion torque to be 0.2 N·m (2 cm·kg, 1.74 in·lb) by adjusting the pinion plug. Check with the **SST**.
11. Install the lock nut with the **SST**.

Tightening torque: 70—90 N·m
(7.0—9.0 m·kg, 50.6—65.1 ft·lb)

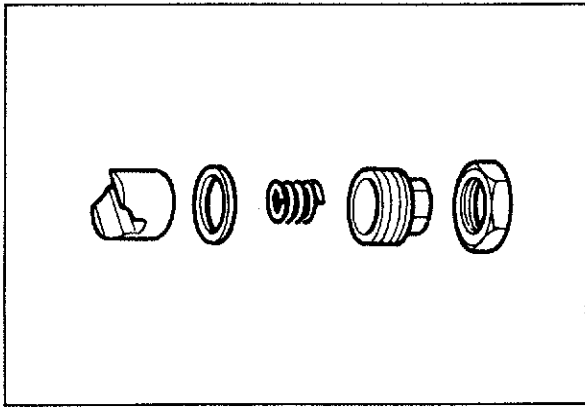
12. Recheck the pinion torque. If it is not correct readjust as in (10).

Tightening torque: 0.15—0.25 N·m
(1.5—2.5 cm·kg, 1.3—2.2 in·lb)

Caution

- a) Before measuring the torque, rotate the pinion to the left and right so that the bearing is seated.
- b) If the **SST** and a spring balance are used for the measurement, the reading of the pull scale should be about 150—250 g (5.3—8.8 oz).

10 STEERING GEAR AND LINKAGE

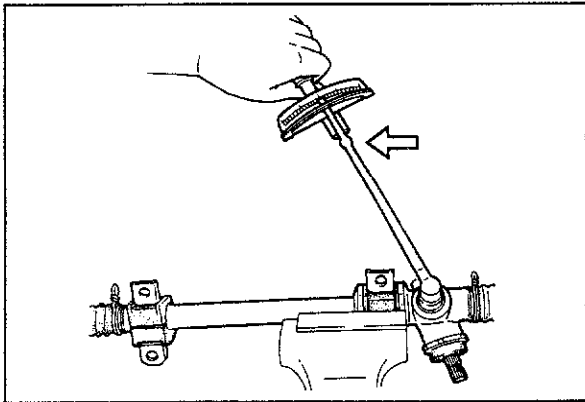


63U10X-111

13. Install the pressure pad, spring, adjustment cover and lock nut.

Caution

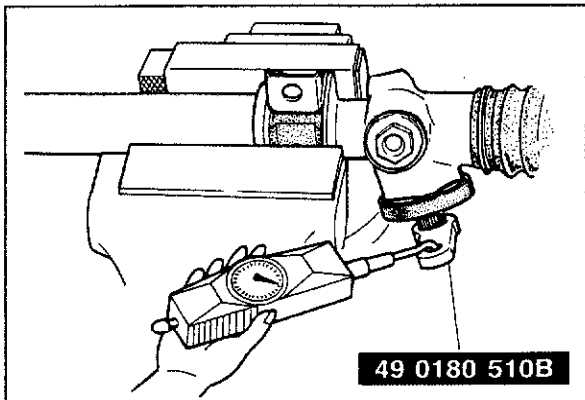
- a) Install so that the pressure pad correctly contacts the rack.
- b) Apply a coat of sealant to the threads of the adjustment cover.



63U10X-112

14. After tightening the adjustment cover to a torque of **5 N·m (50 cm·kg, 7.2 ft·lb)** loosen it about **15°** from that position. And then tighten the lock nut securely.

Lock nut tightening torque: 60—75 N·m (6.0—7.5 m·kg, 43.4—54.2 ft·lb)

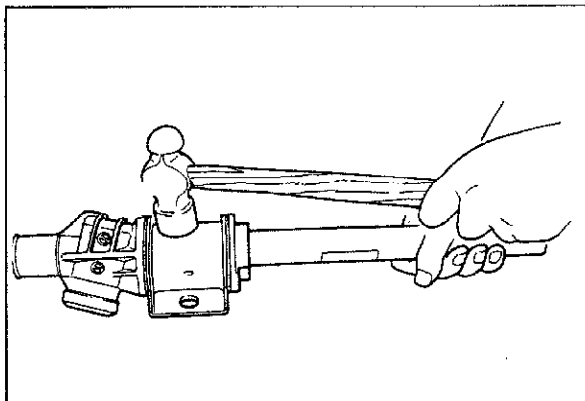


83U10X-042

15. Measure the pinion torque.
Measure the pinion torque with the **SST**.

Pinion torque:

Neutral position $\pm 90^\circ$ 1.0—1.4 N·m (10—14 cm·kg, 0.87—1.21 in·lb)
[Pull scale reading: 1,000—1,400 g (35.3—49.4 oz)]
Any other position 2.3 N·m or less (23 cm·kg, 19.96 in·lb or less)
[Pull scale reading: 2,300 g or less (81.13 oz or less)]

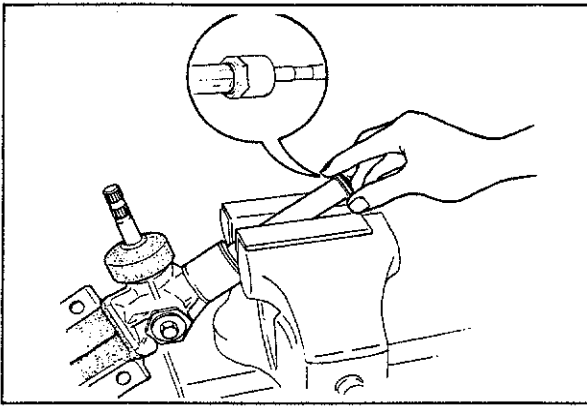


63U10X-114

16. Attach the rubber mount to the column.

Caution

- a) Be sure that the direction of installation and the alignment are correct.
- b) If the rubber mount is difficult to install, apply soapy water to the inside of the mount.

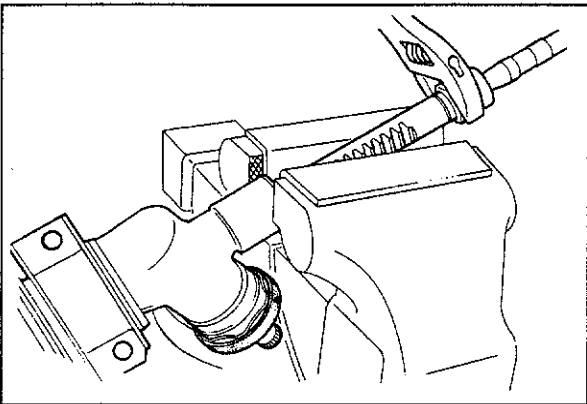


63U10X-115

17. Attach new washers to the left and right tie-rods, and then screw them onto the rack.

Caution

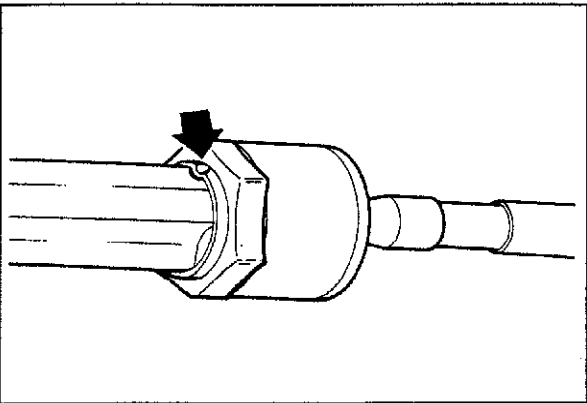
Be sure that the washers face in the proper direction.



63U10X-116

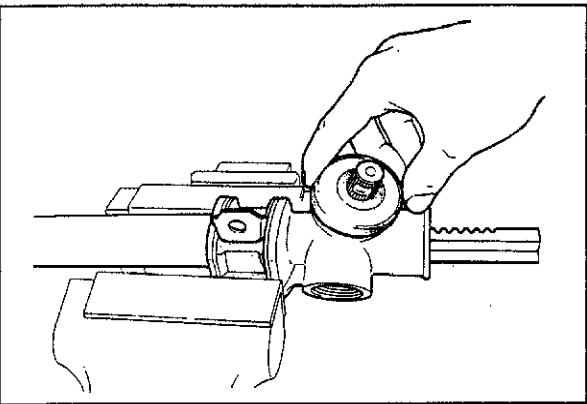
18. Using a wrench, tighten the left and right tie-rods to the specified torque.

**Tightening torque: 80—100 N·m
(8—10 m·kg, 58—72 ft·lb)**



63U10X-117

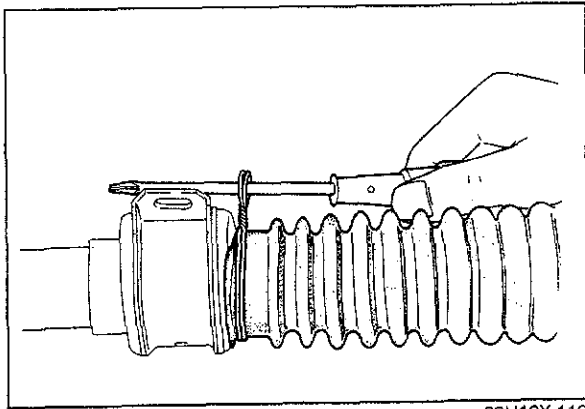
19. Align the washer with the rack groove, and then crimp the washer.



63U10X-118

20. Insert the dust cover to the pinion groove.

10 STEERING GEAR AND LINKAGE

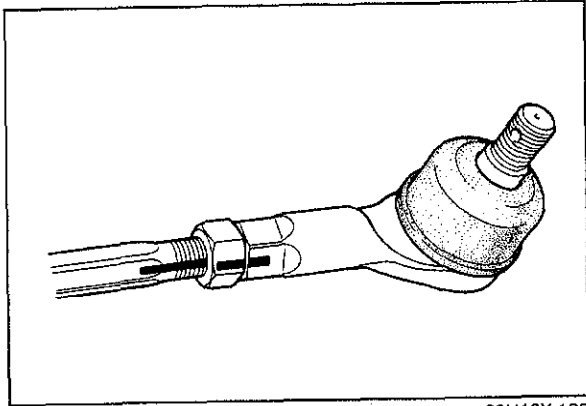


63U10X-119

21. Install the new boot, and then wrap a new wire two times around it and twist it 4 or 4.5 times.

Caution

Be sure that the boot is not twisted or dented.



63U10X-120

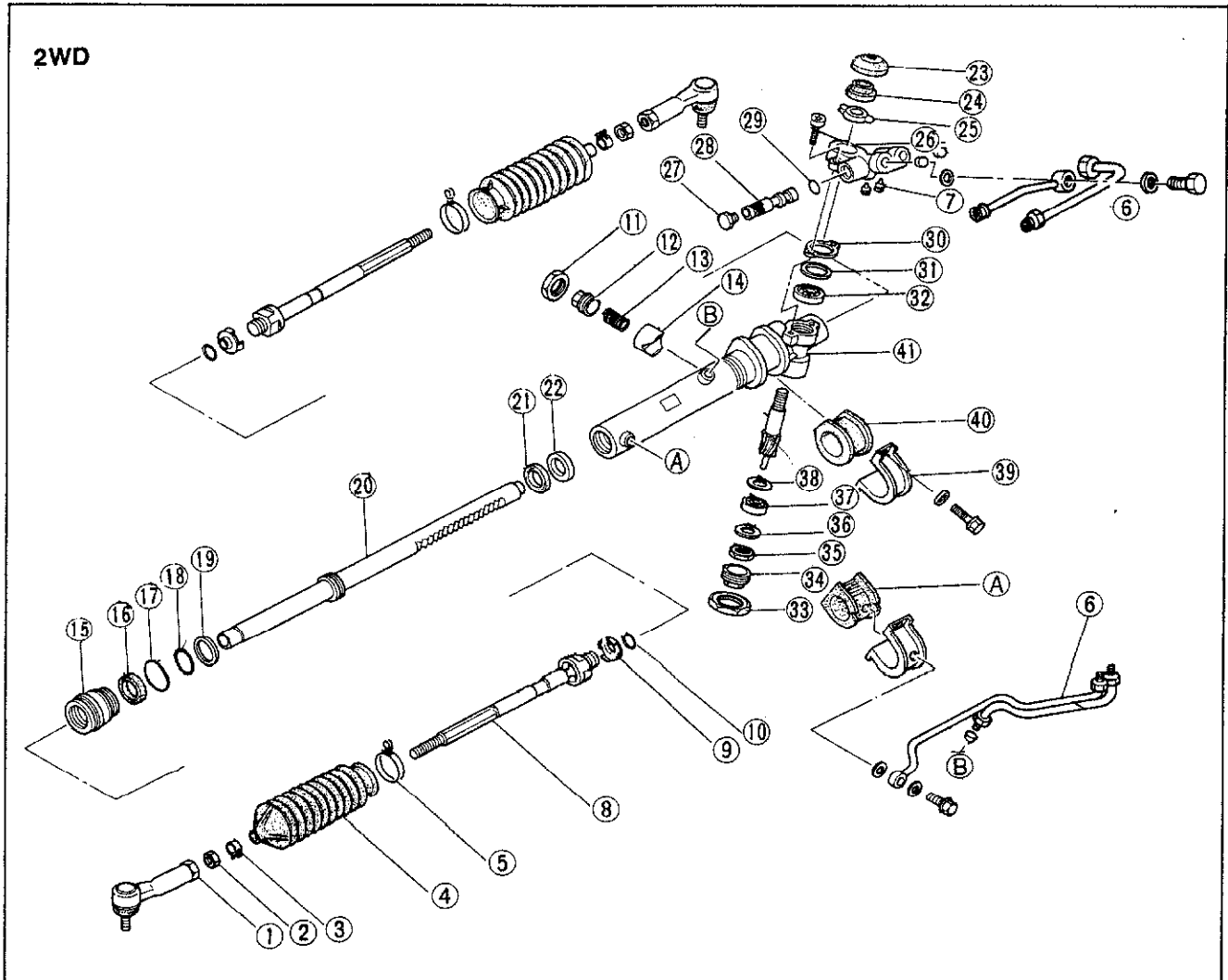
22. Install the tie-rod ends and align them with the marks made before disassembly.

DISASSEMBLY (POWER STEERING)

Disassemble in the sequence shown in the figure.

Caution

- a) In order to prevent the entrance of dirt, all disassembly and assembly should be done in a clean area.
- b) Before disassembly, plug the openings of all pipe installation fittings, and then remove all external grease and dirt from the gear and linkage.

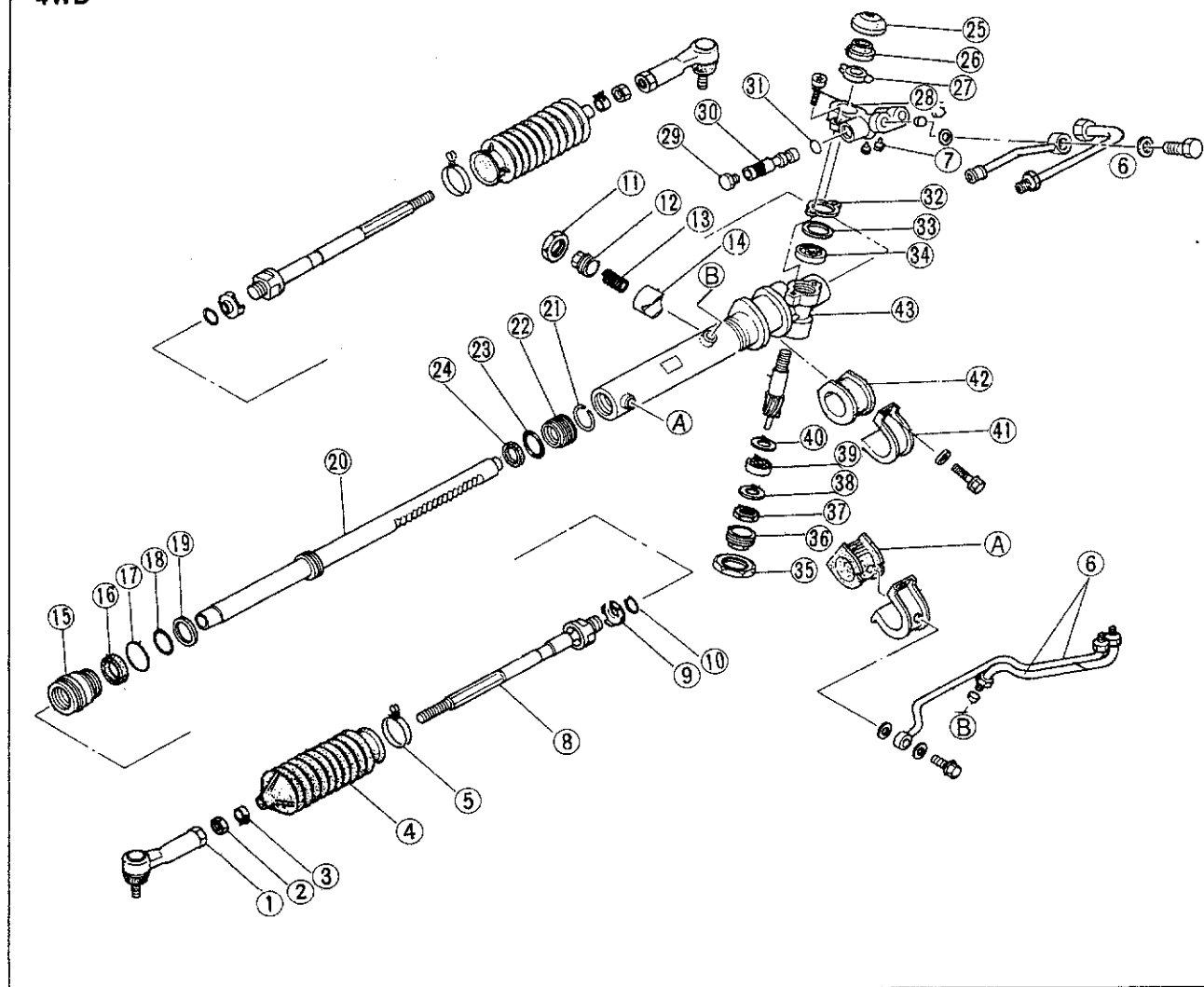


83U10X-043

- | | | |
|--------------------------|------------------------|---------------------------|
| 1. Tie-rod end | 15. Outer box | 29. "O" ring |
| 2. Tie-rod end locknut | 16. Oil seal | 30. Gasket |
| 3. Boot band | 17. "O" ring | 31. Spacer |
| 4. Boot | 18. "O" ring | 32. Bearing |
| 5. Boot wires | 19. Seal ring | 33. Housing cover locknut |
| 6. Oil pipes | 20. Rack | 34. Housing cover |
| 7. Seal | 21. Oil seal | 35. Lower bearing locknut |
| 8. Tie-rod | 22. Inner guide | 36. Thrust washer |
| 9. Washer | 23. Dust cover | 37. Lower bearing |
| 10. Damper ring | 24. Oil seal | 38. Pinion shaft |
| 11. Adjust cover locknut | 25. Lever | 39. Mounting bracket |
| 12. Adjust cover | 26. Valve case | 40. Mounting rubber |
| 13. Spring | 27. Control valve bolt | 41. Gear housing |
| 14. Rack support | 28. Control valve | |

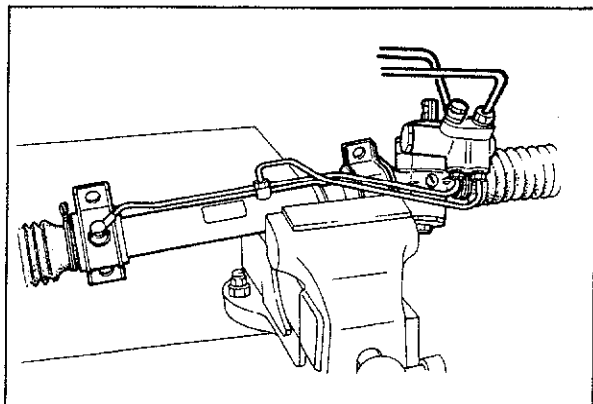
10 STEERING GEAR AND LINKAGE

4WD



83U10X-044

- | | | |
|--------------------------|------------------------|---------------------------|
| 1. Tie-rod end | 16. Oil seal | 31. "O" ring |
| 2. Tie-rod end locknut | 17. "O" ring | 32. Gasket |
| 3. Boot ban | 18. "O" ring | 33. Spacer |
| 4. Boot | 19. Seal ring | 34. Bearing |
| 5. Boot wires | 20. Rack | 35. Housing cover locknut |
| 6. Oil pipes | 21. Snap ring | 36. Housing cover |
| 7. Seal | 22. Inner guide | 37. Lower bearing locknut |
| 8. Tie-rod | 23. "O" ring | 38. Thrust washer |
| 9. Washer | 24. Oil seal | 39. Lower bearing |
| 10. Damper ring | 25. Dust cover | 40. Pinion shaft |
| 11. Adjust cover locknut | 26. Oil seal | 41. Mounting bracket |
| 12. Adjust cover | 27. Lever | 42. Mounting rubber |
| 13. Spring | 28. Valve case | 43. Gear housing |
| 14. Rack support | 29. Control valve bolt | |
| 15. Outer box | 30. Control valve | |



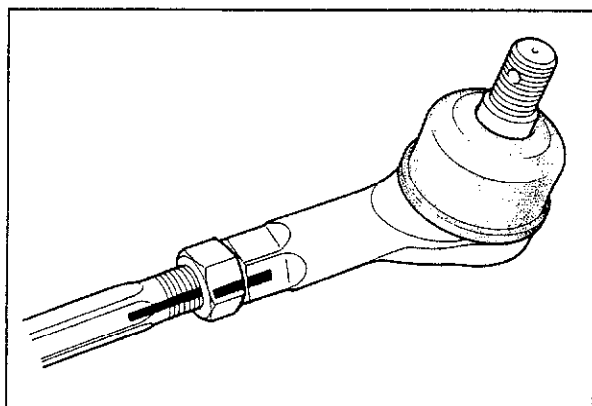
63U10X-122

Steering gear and linkage

Secure the mount part of the removed gear and linkage in a vise.

Caution

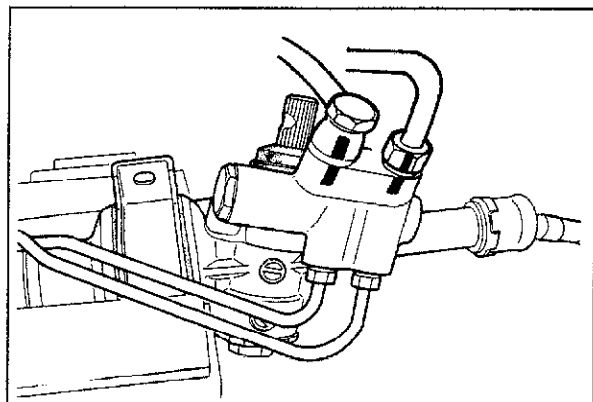
Be sure to insert protective material (such as copper plates) between the part and the jaws of the vise.



63U10X-123

Tie-rod ends

Before removing the tie-rod ends, make a mark on the threaded parts as a guide for installation.



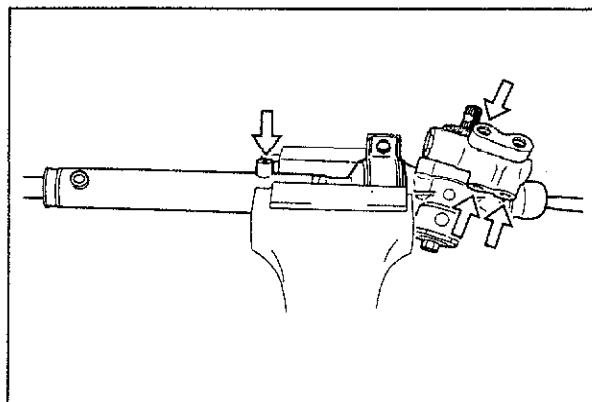
63U10X-124

Oil pipe

1. Make matching marks on the pressure pipe and the return pipe and the valve case, and then remove the pipes.

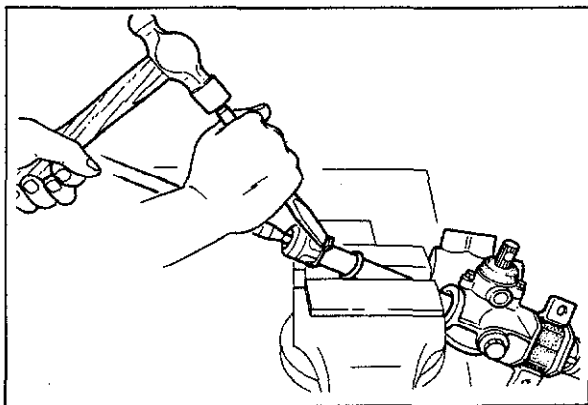
Note

The matching marks help make sure the pipes are reinstalled in the correct position.



83U10X-045

2. Remove the washers in the pressure pipe and the return pipe with the **SST**.



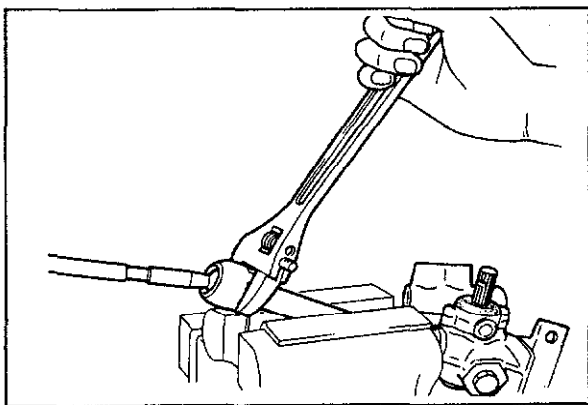
83U10X-046

Tie-rods

1. Slide the damper ring toward the valve housing.
2. Un-crimp the washer as shown in the figure.

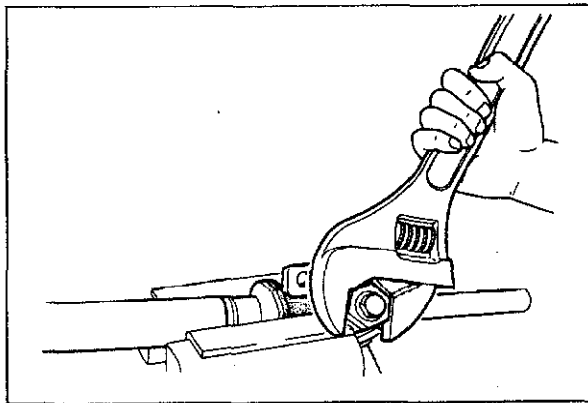
Caution

Do not damage the tie-rod or rack.



63U10X-127

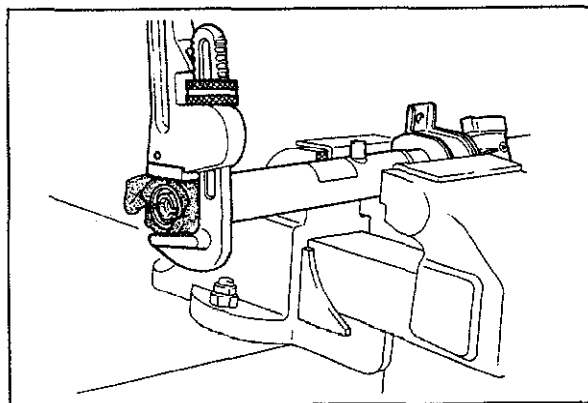
3. Remove the tie-rod from the rack.



63U10X-128

Lock nut and adjust cover

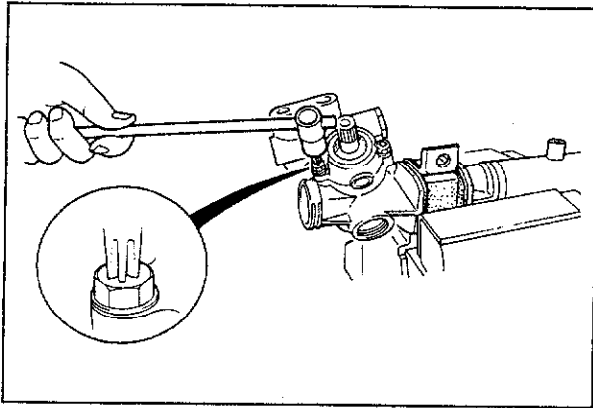
Loosen the lock nut and remove the adjusting cover, the spring and the pressure pad.



63U10X-129

Outer box

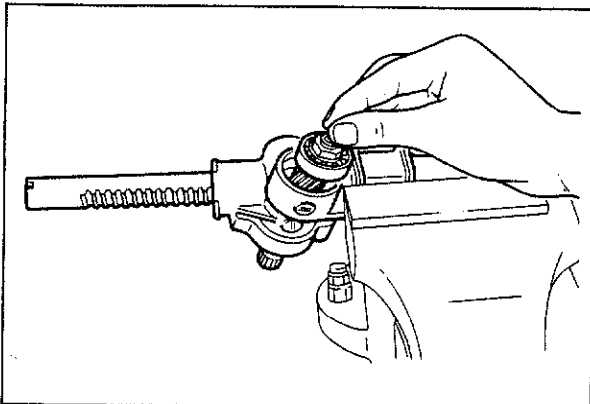
Protect the outer box with cloth, and then remove the outer box with a pipe wrench.



63U10X-130

Valve case assembly

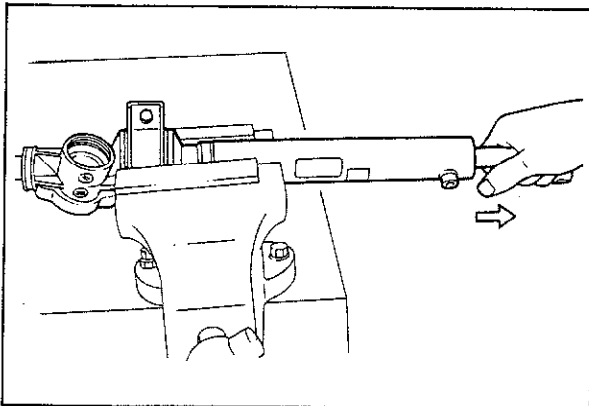
Remove the valve case assembly with a torx driver.



63U10X-131

Pinion shaft assembly

Pull the pinion shaft assembly out from the lower bearing side.



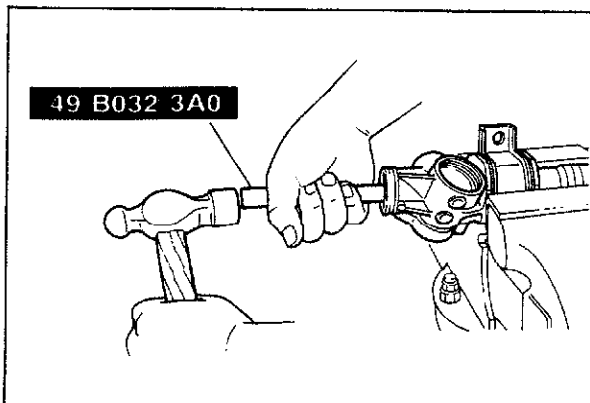
63U10X-132

Rack

Remove the rack by taking it out in the direction indicated by the arrow.

Caution

If the rack is taken out in the opposite direction, the inside surface of the rack bushing might be damaged by the edge of the rack gear.



83U10X-047

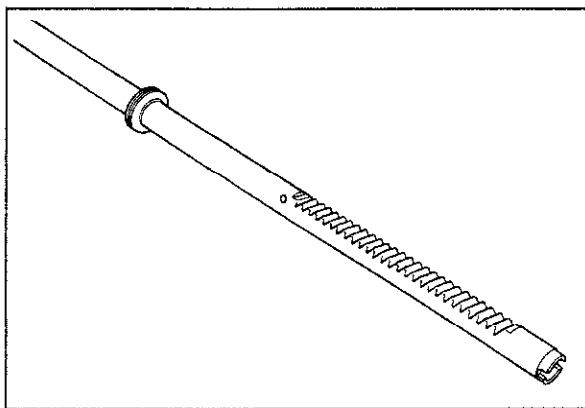
Inner guide

Remove the inner guide and the oil seal from the rack housing with the SST.

Caution

Do not damage the inner guide or the rack housing.

10 STEERING GEAR AND LINKAGE

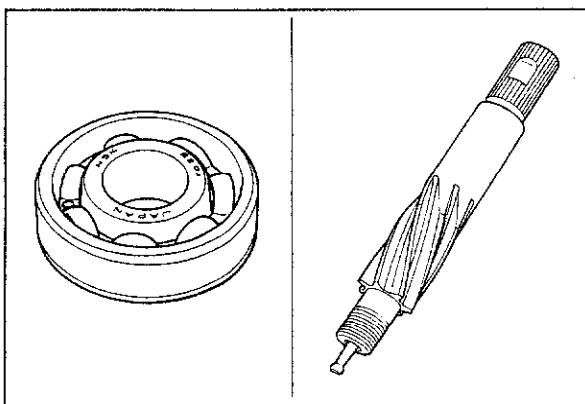


63U10X-134

INSPECTION

Check the following points, replace the part if a problem is found.

1. Cracking, damage, or deterioration of boots
2. Cracking, worn teeth, or damage of rack and pinion
3. Looseness, abnormal noise, or poor operation of bearings.



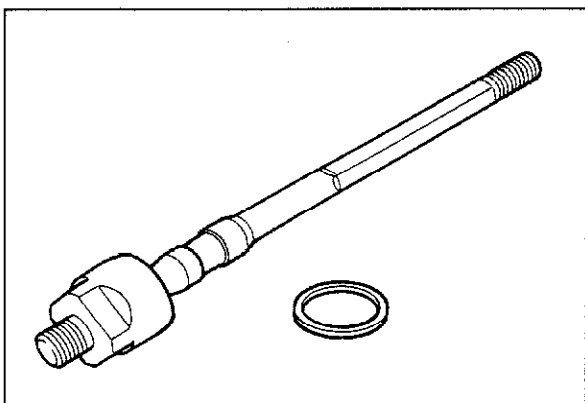
63U10X-135

4. Worn rack bushing inside the gear housing

Caution

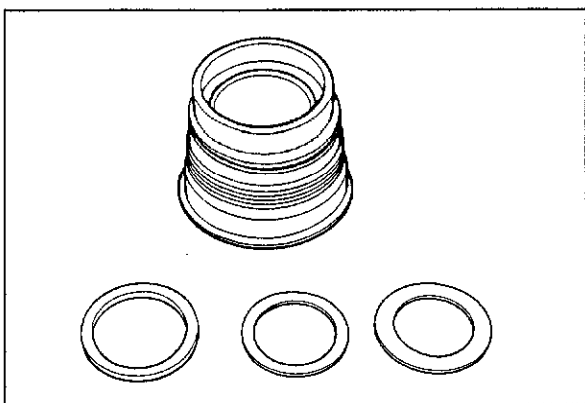
a) If replacement is necessary, replace the entire gear housing assembly.

b) If replacement of the pinion bearing is necessary, replace the pinion and bearing as an assembly.



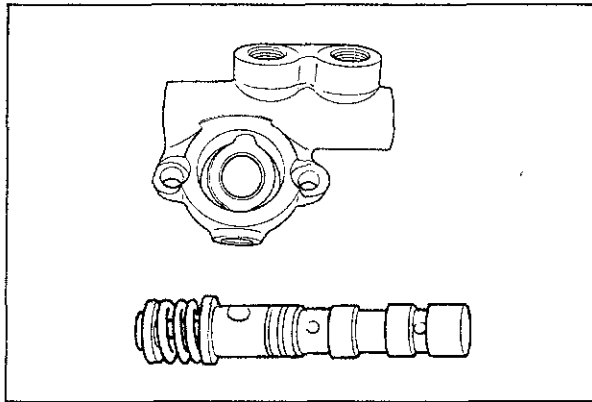
63U10X-136

5. Wear of sliding surface of pressure pad.
6. Cracking or deformation of gear housing
7. Looseness or lack of smoothness in tie-rod ball-joint operation
8. Bent tie-rods or tie-rod ends
9. Damage to tie-rods or tie-rod ends.



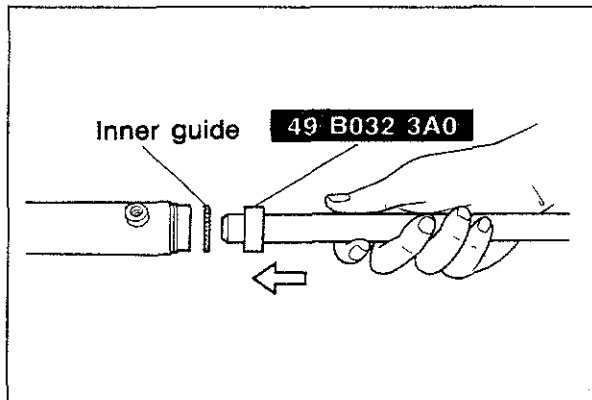
63U10X-137

10. Check the bushing of the outer box for wear.



63U10X-138

11. Check the lever for wear or damage.
12. Check the spherical face of the lever and the collar for wear and damage.
13. Check the control valve for oil leakage.



83U10X-048

ASSEMBLY

Assemble in the following order.

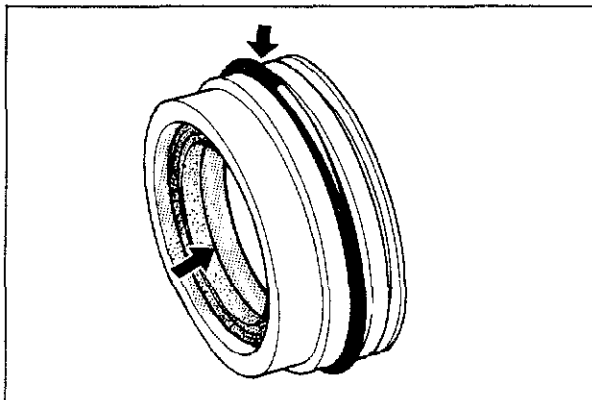
1. Install the inner guide in the following order.

2WD:

- (1) Apply A.T.F. to the inner guide.
- (2) Push the oil seal and the inner guide in to the rack housing with the **SST** as far as they will go.

Caution

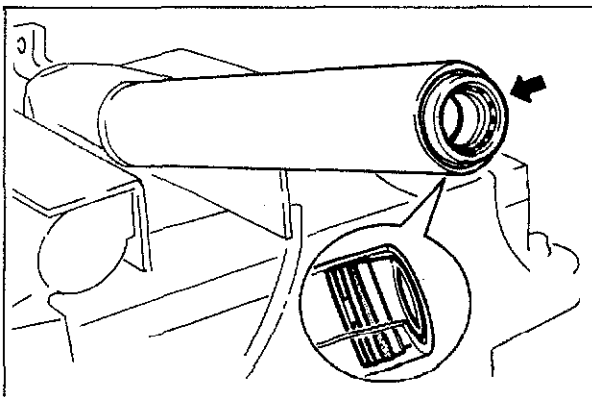
Do not damage the inner surface of the rack housing.



83U10X-049

4WD:

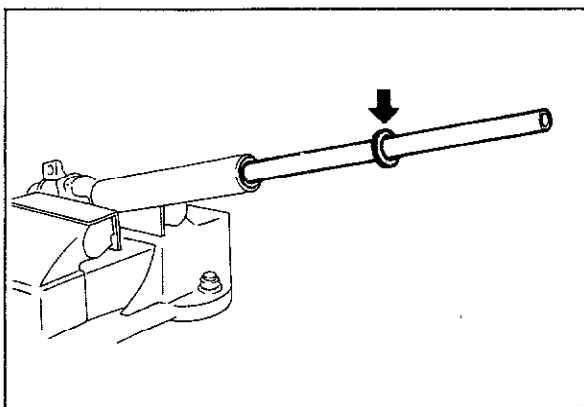
- (1) Install the oil seal, "O" ring, snap ring to the inner guide.
- (2) Coat the oil seal and the "O" ring with A.T.F..



83U10X-050

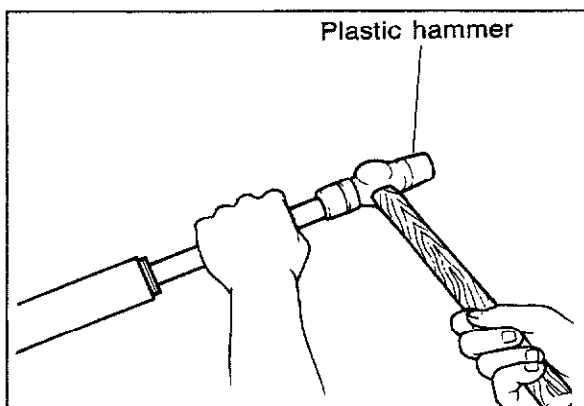
- (3) Push the inner guide assembly into the threaded end of the rack housing by hand.

10 STEERING GEAR AND LINKAGE



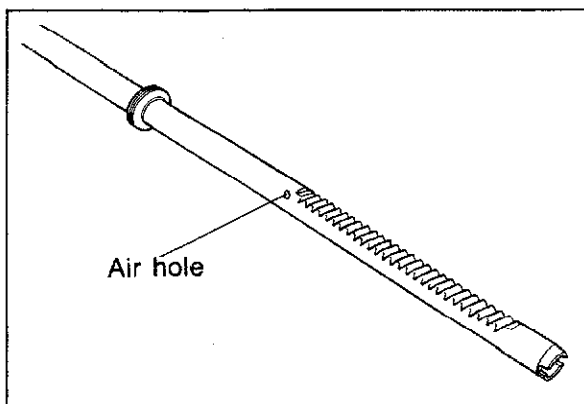
83U10X-051

- (4) Slide the rack into the housing until the ring indicated by the arrow touches the inner guide.



83U10X-052

- (5) Push the inner guide into position in the housing by tapping on the rack end with a plastic hammer as far as it will go.

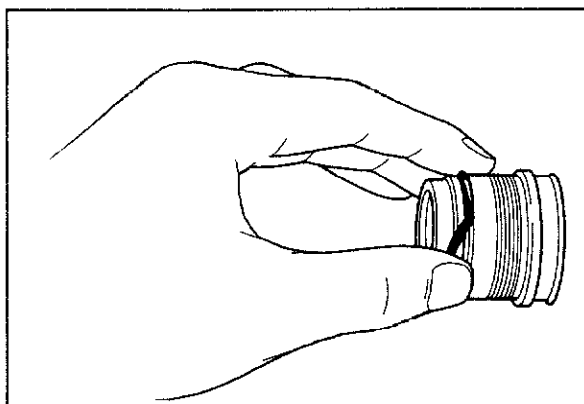


63U10X-140

2. Apply grease to the rack teeth. Cover the rack teeth with vinyl to protect the seals and install the rack.

Caution

Do not plug the air hole of the rack with grease. Remove the vinyl after installing the rack.



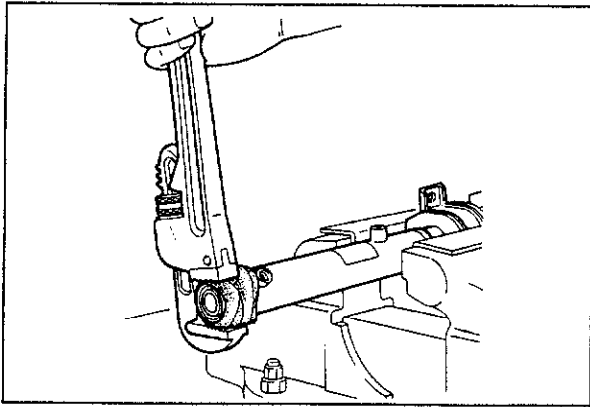
83U10X-053

3. Install the seal ring, O-rings and oil seal to the outer box.

Note

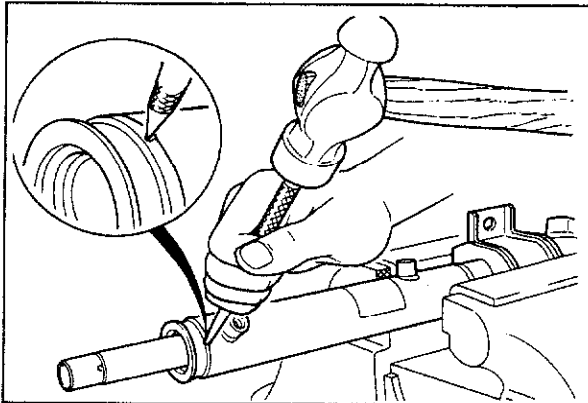
Coat the seals and O-rings with ATF

4. Install the outer box in the rack housing.



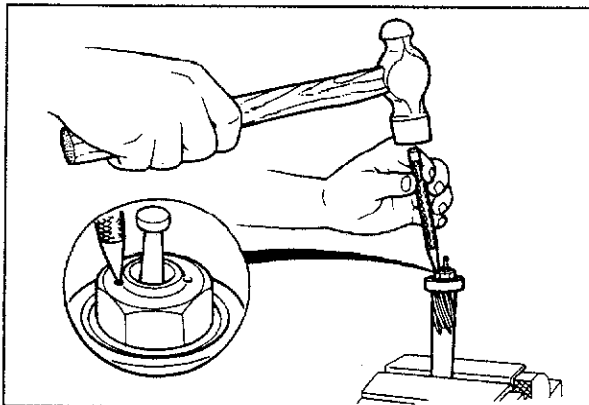
83U10X-054

5. Protect the outer box with cloth, and then tighten the outer box to the rack housing using a pipe wrench.



83U10X-055

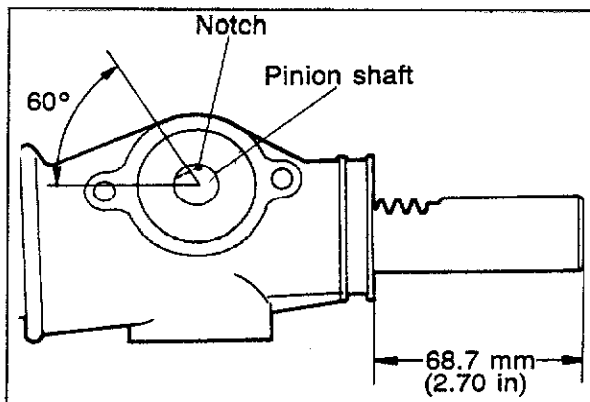
6. Stake the outer box to the rack housing by using a punch.



83U10X-056

7. Install the lower bearing on the pinion shaft, fit the lower bearing by tightening the nut and then stake the nut to the pinion shaft.

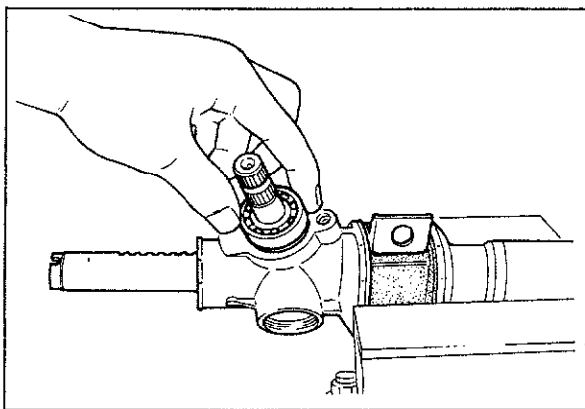
**Tightening torque: 40—50 N·m
(4—5 m·kg, 28.9—36.2 ft·lb)**



83U10X-057

8. Install the pinion shaft with the notch on the serration positioned as shown in the figure when the rack is positioned at the center of the rack housing.

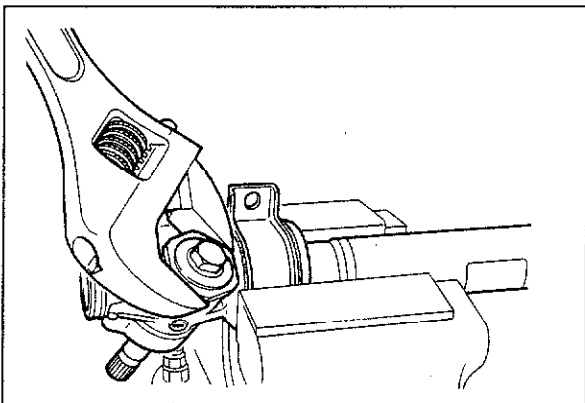
10 STEERING GEAR AND LINKAGE



83U10X-058

9. Apply grease to the pinion and upper bearing and then install them.
10. Torque the housing cover, then loosen it 10°—20°.

Tighten torque 5—9 N·m
(50—90 cm·kg, 4.3—7.8 in·lb)



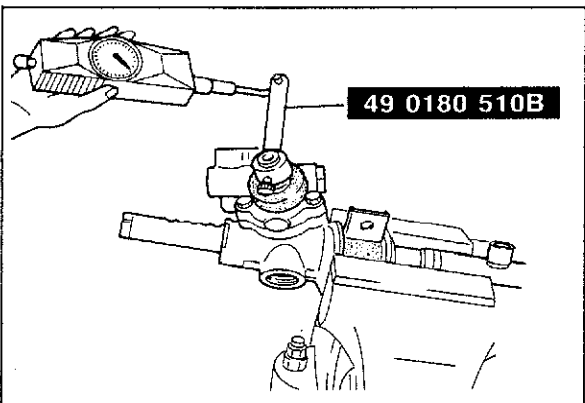
83U10X-059

11. Lock the housing cover by tightening the lock nut.

Tightening torque: 40—50 N·m
(4—5 m·kg, 28.9—36.2 ft·lb)

12. Install the adjustment cover to the gear housing and tighten the adjustment cover, then loosen the cover by 45°.

Tightening torque: 4.5—5.5 N·m
(45—55 cm·kg, 39.1—47.7 in·lb)



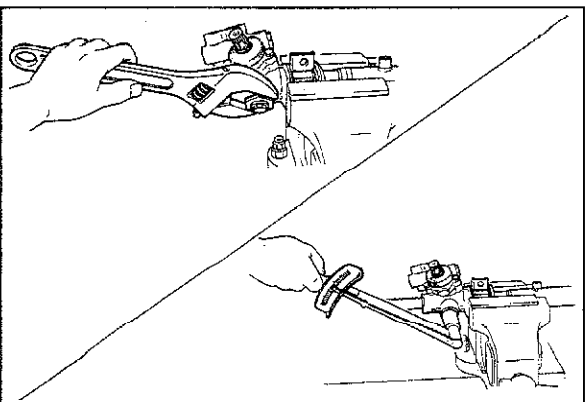
83U10X-060

13. Measure the pinion torque using the **SST**.

Standard pinion torque:
0.6—1.5 N·m (6—15 cm·kg, 0.52—1.3 in·lb)

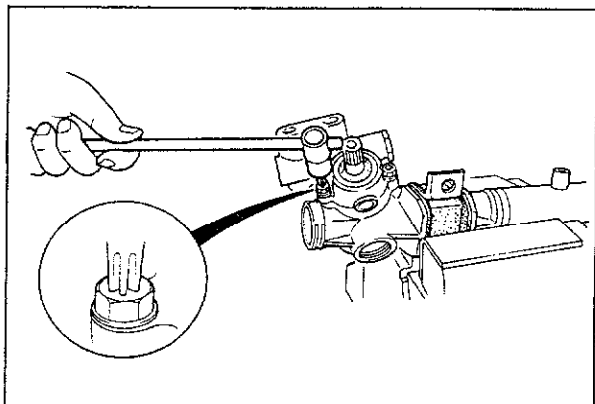
Pull scale: 600—1,500 g (21.2—53.0 oz)

14. If the pinion torque is not within the standard range, readjust the pinion torque by adjusting the cover.



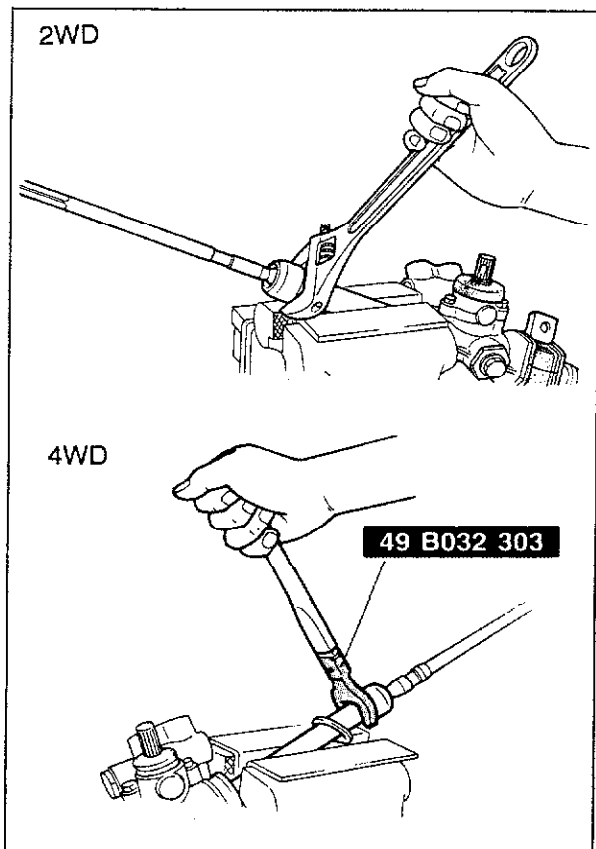
83U10X-061

15. Lock the cover by tightening the lock nut.



83U10X-062

16. Install the valve case to the gear housing by using a torx driver.



83U10X-063

17. Set the rack in a vise and install new damper ring and washer. Tighten the tie-rod.

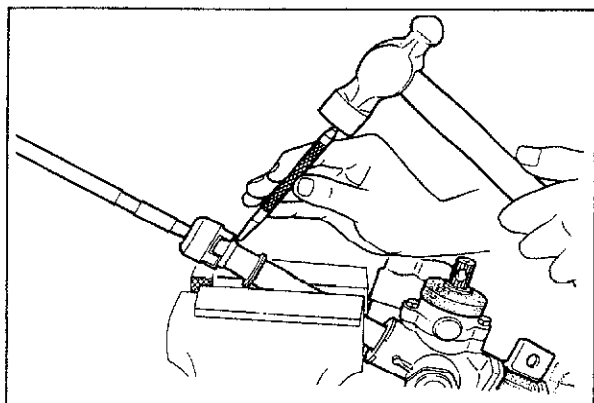
Note

- a) Mount copper plates in a vise.
b) Use the SST for 4WD.

Tightening torque:

60—80 N·m

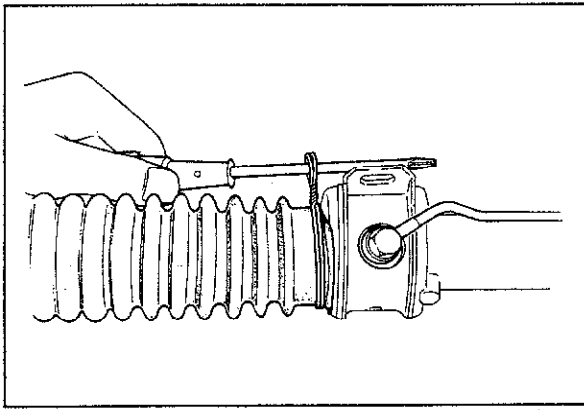
(6.0—8.0 m·kg, 43—58 ft·lb)



83U10X-064

18. Stake the washer in two places by using a punch. Fit the damper ring in the washer.

10 STEERING GEAR AND LINKAGE

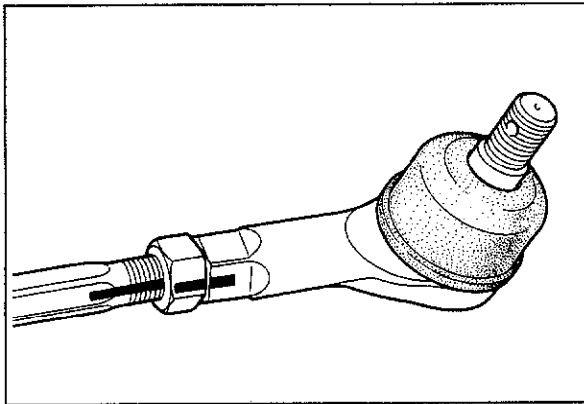


83U10X-065

19. Install the boot, and then wrap a new wire around it two times and twist the wire 4 or 4.5 times.

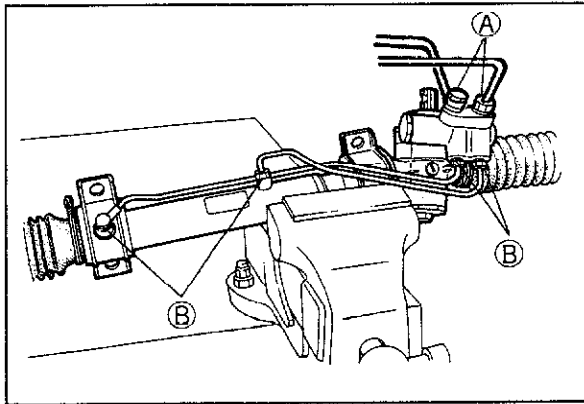
Caution

Be sure that the boot is not twisted or dented.



83U10X-066

20. Install the tie-rod ends and align them with the marks made before disassembly.



83U10X-067

21. Install the oil pipes.

Tightening torque:

Bolt and nut (A)

39—49 N·m (4.0—5.0 m·kg, 29—36 ft·lb)

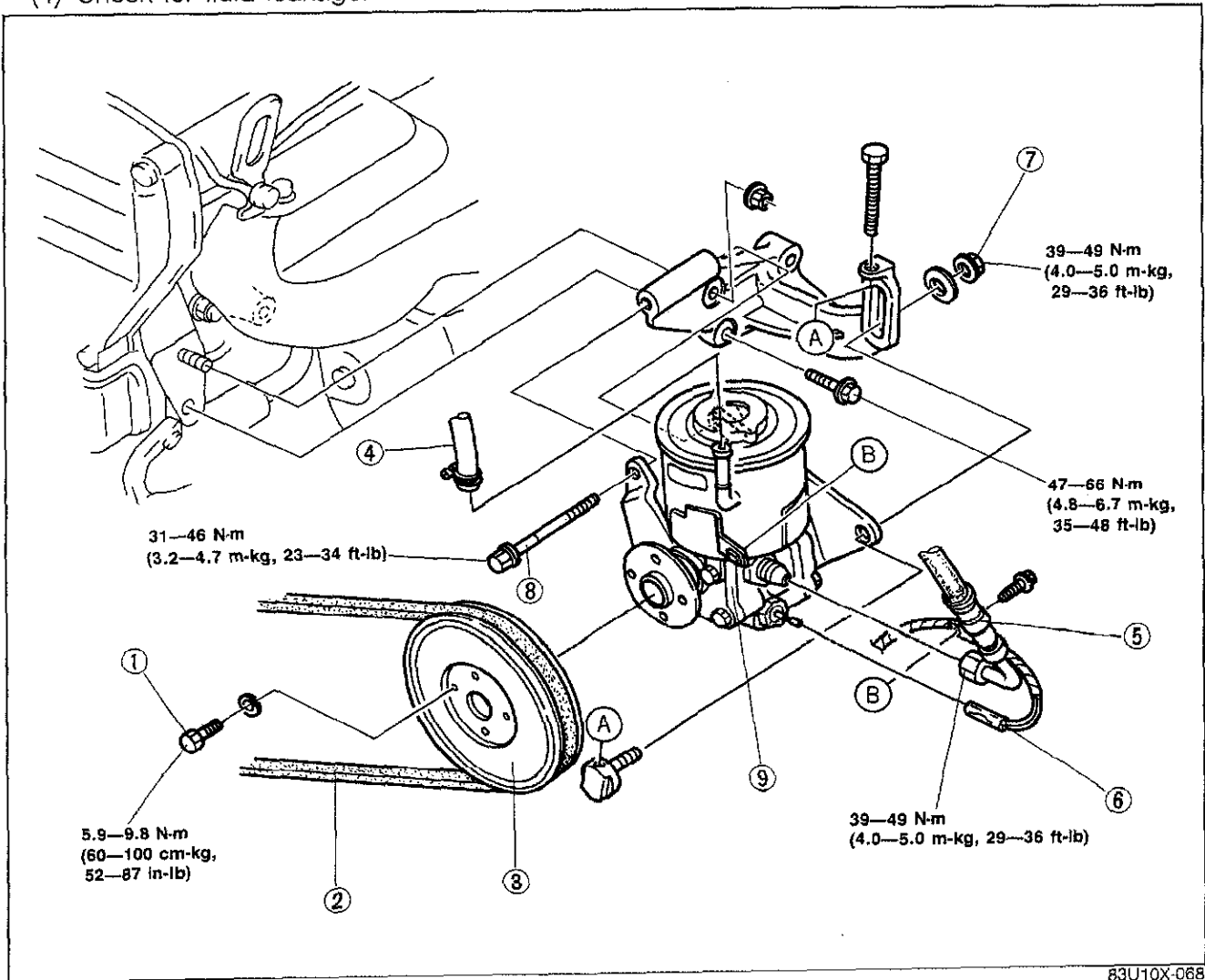
Bolt and nut (B)

20—29 N·m (2.0—3.0 m·kg, 14—22 ft·lb)

OIL PUMP

REMOVAL AND INSTALLATION

1. Jack up the front of the vehicle and support it with safety stands.
2. Remove in the sequence shown in the figure.
3. Install in the reverse order of removal.
4. After installation:
 - (1) Check the belt deflection (Refer to page 10—8)
 - (2) Fill the reserve tank with the specified fluid.
 - (3) Bleed air from the system. (Refer to page 10—10)
 - (4) Check for fluid leakage.



83U10X-068

1. Bolt
2. Oil pump belt
3. Oil pump pulley
4. Return hose
5. Pressure hose

6. Oil pressure switch
7. Nut
8. Bolt
9. Oil pump

Note

The power steering fluid will leak out when the return hose or the pressure hose is disconnected, so prepare a suitable container for it to drain into.

83U10X-069

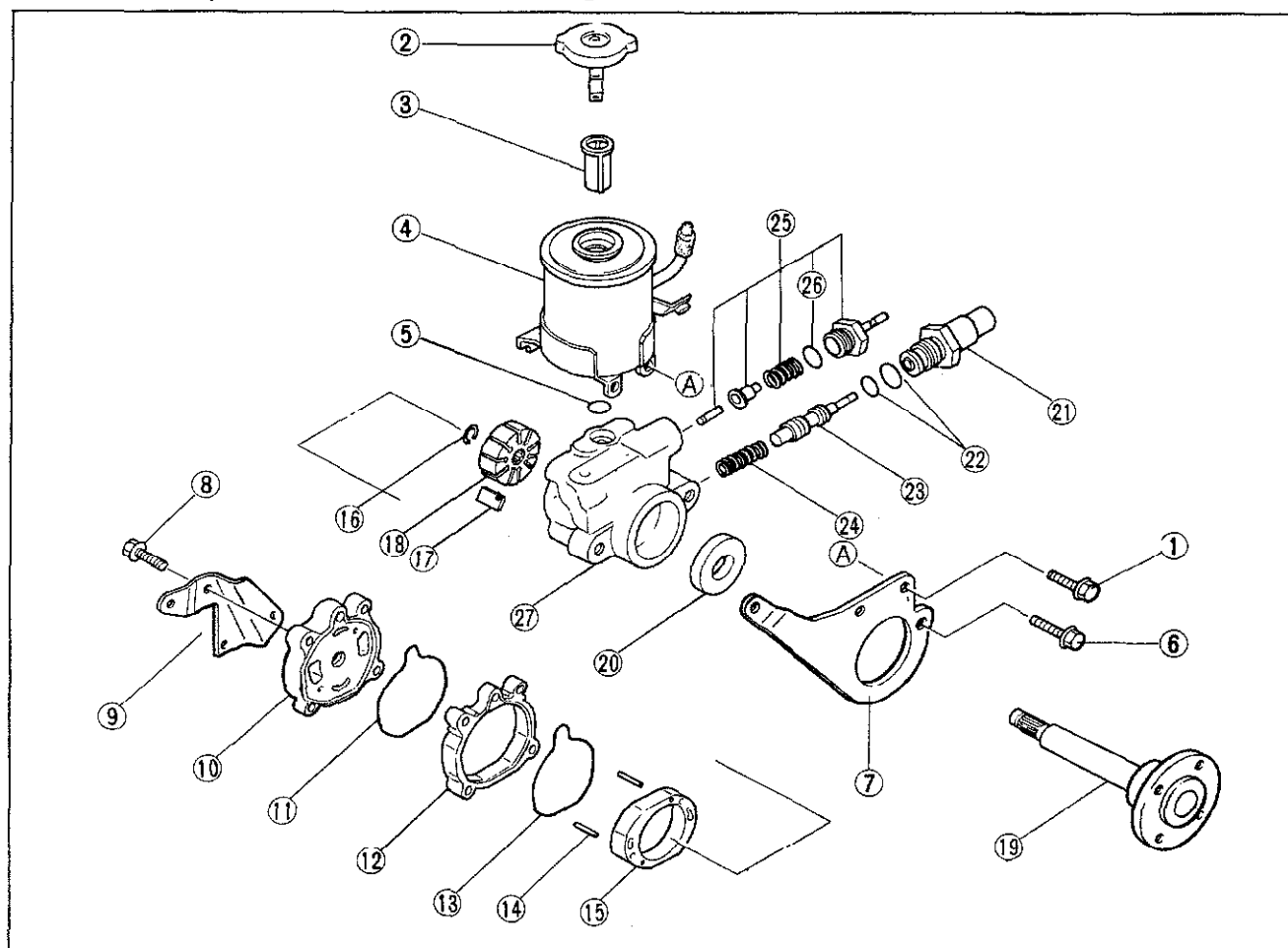
10 OIL PUMP

DISASSEMBLY AND ASSEMBLY

1. Disassemble in the numbered order shown in the figure.
2. Assemble in the reverse order of disassembly.

Note

- a) In order to prevent the entry of dirt, disassemble and assemble in a clean area.
- b) Before disassembly, plug the pipe installation hole, and then remove all oil and dirt from the outside surfaces of the oil pump.
- c) Before assembly, apply specified power steering fluid to the vanes, rotor, and control valve. Also apply grease (lithium base, NLGI No.2) to the lip of the oil seal.
- d) Use a new seal kit when assembling.



73G10X-042

- | | | |
|--------------------|-----------------------|-------------------------|
| 1. Bolt | 10. Pump body, rear | 19. Pump shaft assembly |
| 2. Oil level gauge | 11. O-ring | 20. Oil seal |
| 3. Oil strainer | 12. Pump body, center | 21. Connector |
| 4. Oil tank | 13. O-ring | 22. O-ring |
| 5. O-ring | 14. Dowel pin | 23. Control valve |
| 6. Bolt | 15. Cam ring | 24. Spring |
| 7. Front bracket | 16. Snap ring | 25. Oil pressure switch |
| 8. Bolt | 17. Vane | 26. O-ring |
| 9. Rear bracket | 18. Rotor | 27. Pump body, front |