

CHASSIS

SECTION CH

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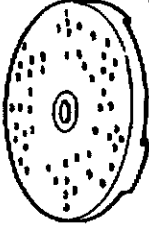
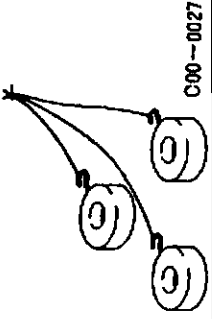
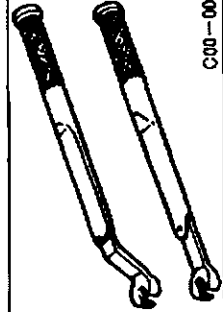
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C1 CLUTCH

OPERATION PRECAUTIONS

- Use genuine Nissan brake fluid NR-3 (No. 2500) for the clutch fluid.
- Never use the clutch fluid a second time.
- Do not allow clutch fluid to contact external painted surfaces of other equipment.
- Use special service tool (CG9431 0000) for the clutch tube installation.
- Use clean clutch fluid to clean the parts such as master cylinder, operating cylinder and tubes.
- Never use gasoline or solvents because they may damage rubber parts.

SPECIAL SERVICE TOOLS

Tool name Tool number	Description
Base plate ST2005 0010	 C00-0026
Distance piece ST2005 0100	 C00-0027
Diaphragm adjustment wrench ST2005 0204	 C00-0028
Diaphragm nut torque wrench GG9431 0000	 C00-0002
Vacuum hand pump EG15130 0000	 C00-0053

Clutch cover inspection

Same as above

Same as above

Clutch pipe installation

Clutch booster and check valve inspection

C1 CLUTCH

1. Summary

Description		Engine		RB26DETT
Clutch cover	Model			C240S
	Installation weight	kg (lb)		750 (1,654)
Clutch disk	Model			240TBL
	Facing material			NN63
	Torsional characteristic			1 level
Master cylinder size		Inner diameter mm (in)		15.87 (5/8)
Operating cylinder size		Inner diameter mm (in)		19.05 (3/4)
Separation pipe				Attached
Thrust spring				—
Assist spring				Attached
Clutch release bearing adjustment core type				Non-self-aligning core
Master-Vac.	Booster			CM19C
	Diaphragm inner diameter mm (in)			78.7 (3.098)

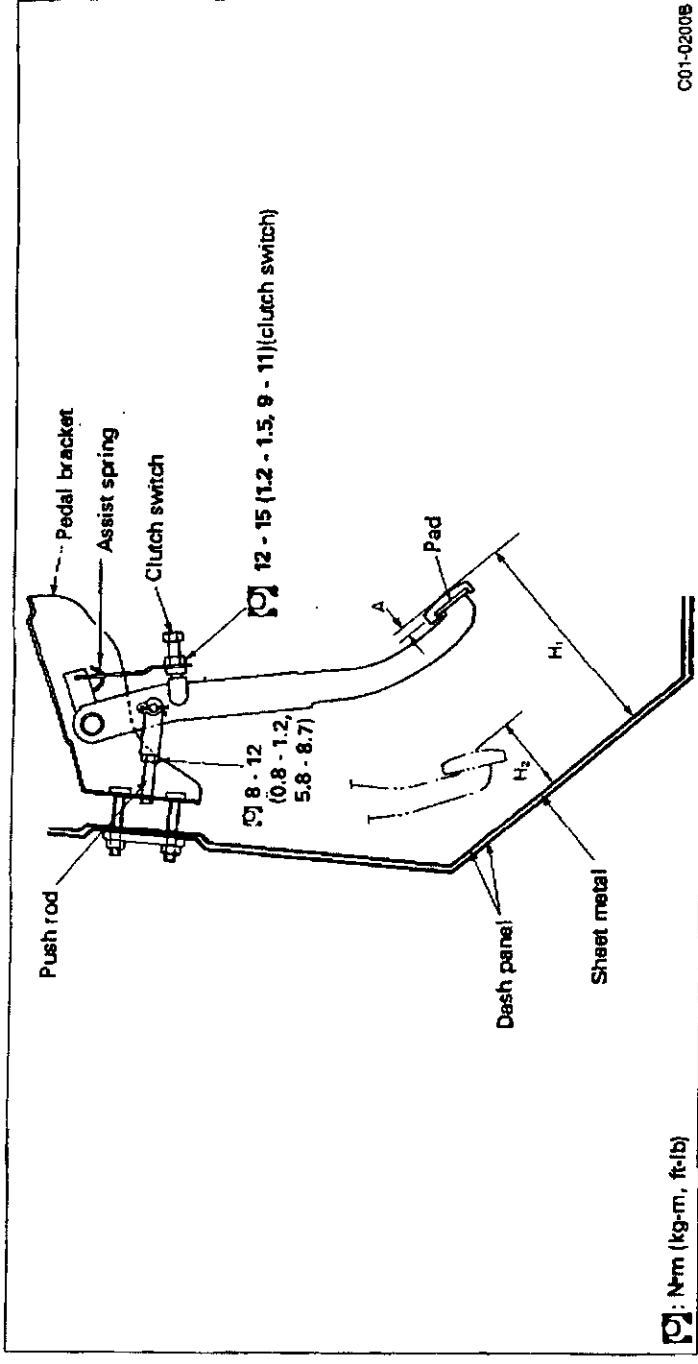
Inspection reference values

Description		Engine		RB26DETT
Pedal mm (in)	Pedal height			171.7 - 181.7 (6.76 - 7.16)
	Pedal play (clevis play)			5 - 12 (0.20 - 0.47) [1 - 3 (0.04 - 0.12)]
	Clearance from floor when fully depressed			81 (3.19)
Disk mm (in)	Model			240TBL
	Wear limit (rivet head depth)			0.3 (0.012)
	Diameter runout limit			1.0/230 (0.039/9.06)
Cover mm (in)	Model			C240S
	Diaphragm spring lever height			37.5 - 39.5 (1.476 - 1.555)
	Diaphragm spring unevenness limit			0.5 (0.020) max.
Booster vacuum leak [Vacuum; 66.7 kPa (500 mmHg, 19.69 inHg)]		kPa (mmHg, inHg)		3.3 (25, 0.98) max. in 15 seconds
Check valve load leak [Vacuum; 66.7 kPa (500 mmHg, 19.69 inHg)]		kPa (mmHg, inHg)		1.3 (10, 0.39) max. in 15 seconds

C1 CLUTCH

2. On-vehicle Inspection and Adjustment

2-1 CLUTCH PEDAL ADJUSTMENT

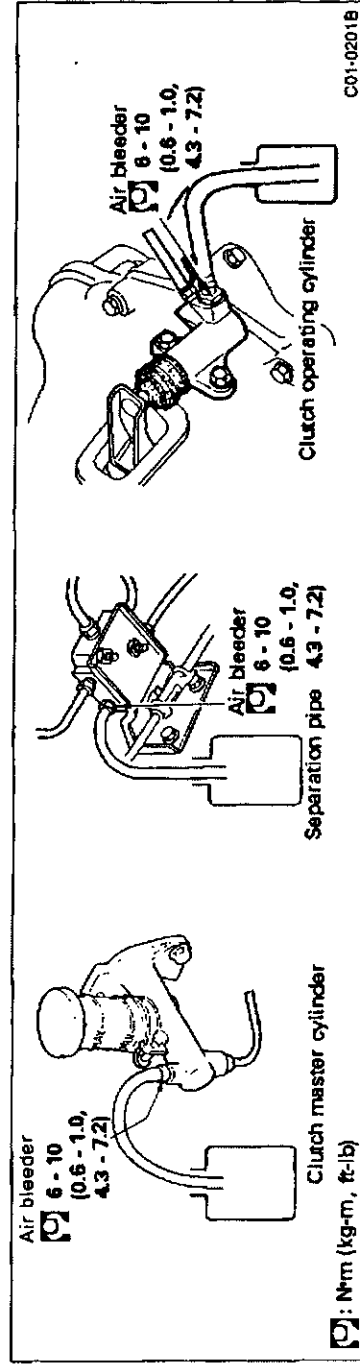


Adjustment

- Adjust the pedal height (H) with pedal stopper.
- Adjust the pedal free play (A) with master cylinder push rod. Then tighten lock nut.

Unit: mm (in)	
Description	Engine RB26DETT
Pedal height: H ₁ (from clevis)	171.5 - 181.7 (6.75 - 7.15)
Play from pedal pad center: A [clevis play]	5 - 12 (0.20 - 0.47) [1 - 3 (0.04 - 0.12)]
Clearance from floor when fully depressed: H ₂	81 (3.19)

2-2 AIR BLEEDING



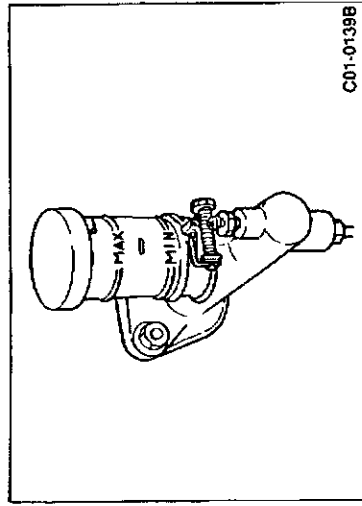
For vehicles equipped with separation pipe, bleed the separation pipe first and then bleed operating cylinder.

C1 CLUTCH

2. On-vehicle Inspection and Adjustment (Cont'd)

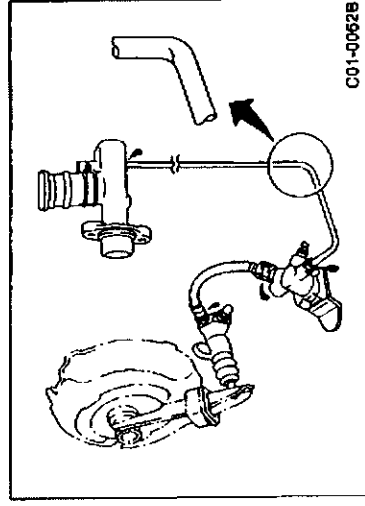
Bleeding procedure

1. Top up master cylinder reservoir with recommended brake fluid.
2. Connect a transparent vinyl tube to air bleeder valve.
3. Fully depress clutch pedal several times.
4. With clutch pedal depressed, open bleeder valve to release air.
5. Close bleeder valve.
6. Repeat steps 3 through 5 above until clear brake fluid without bubbles comes out of air bleeder valve.



2-3 CLUTCH FLUID INSPECTION

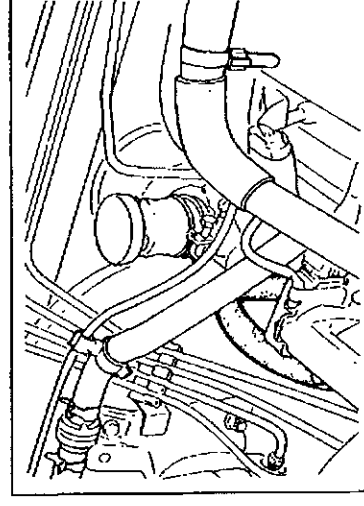
- Check that clutch fluid is between MAX-MIN levels of reservoir tank.
- Make sure there are no leaks around reservoir tank.



2-4 LEAKING, DAMAGE AND INSTALLATION INSPECTION

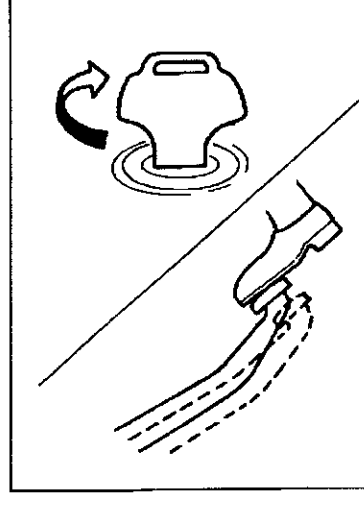
Check the following items.

- Check hoses, tubes and connections for leakage, damage twisting and deformations.
- Check that there are no leaks from any part when clutch pedal is pressed.



2-5 VACUUM PIPE INSPECTION (vehicles equipped with RB26DETT)

- Check hose tube and connections for leaking, twisting and deformations.
- Check that clamps and connections are not loose.
- Check that Arrow on E-mark of check valve is positioned facing the engine side.



2-6 BOOSTER FUNCTION INSPECTION (vehicles equipped with RB26DETT engine)

Procedures

1. Let engine idle approx. 1 minute, apply load to booster and turn ignition switch OFF.
2. When engine is stopped, press clutch pedal several times. After making sure pressure changes, continue pressing clutch pedal down and start engine. Check if there is any change in pedal pressure. (A change in pressure is normal.)

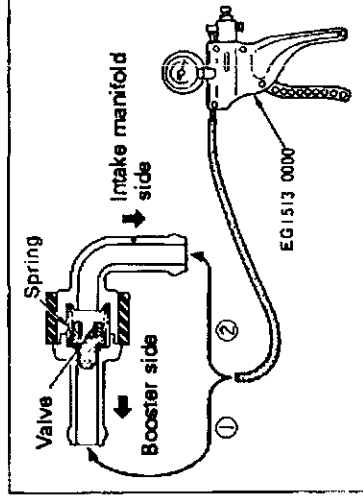
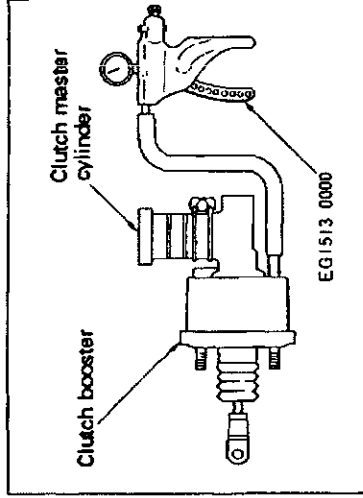
C1 CLUTCH

2. On-vehicle Inspection and Adjustment (Cont'd) 2-7 BOOSTER SEALING INSPECTION (vehicles equipped with RB26DETT engine)

- Connect the hand vacuum pump (special service tool) as shown in the figure and perform measurement.

Measurement value:

Maximum decrease of 3.3 kPa (25 mmHg, 0.98 inHg) within 15 sec from initial pressure of -66.7 kPa (-500 mmHg, -19.60 inHg).



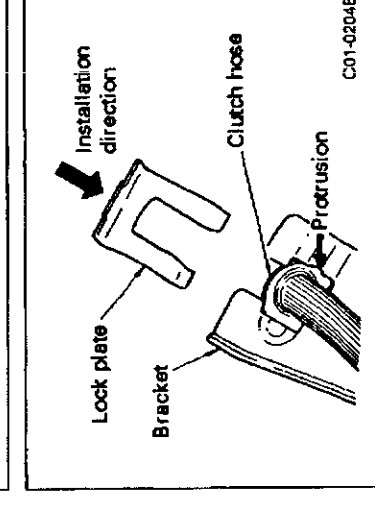
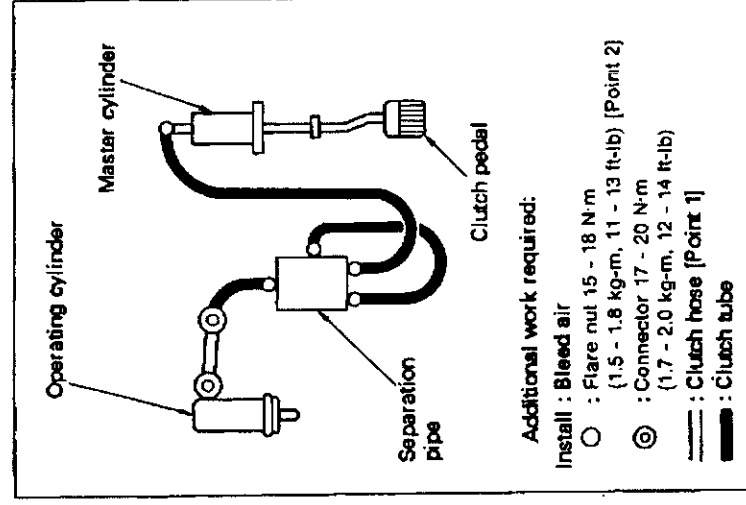
2-8 CHECK VALVE INSPECTION (RB26DETT engine)

- Use a vacuum pump (special service tool) to perform the inspection.

Attached to booster side (1)	Maximum decrease of 1.3 kPa (10 mmHg, 0.39 inHg) within 15 sec from initial vacuum pressure of -66.7 kPa (-500 mmHg, -19.69 inHg).
Attached to engine (2)	No load is applied.

3. Component Parts Removal and Installation, Assembly and Disassembly

3-1 CLUTCH PIPING REMOVAL AND INSTALLATION



[Point 1] Clutch hose installation

- Install hose from cylinder body. Position plate as shown in the figure and secure.

CAUTION:

- The hose and hose bracket must be aligned and with protrusion and assembled as shown in figure.
- After assembly, make sure the hose is not twisted, or bent and does not interfere with other parts.

C1 CLUTCH

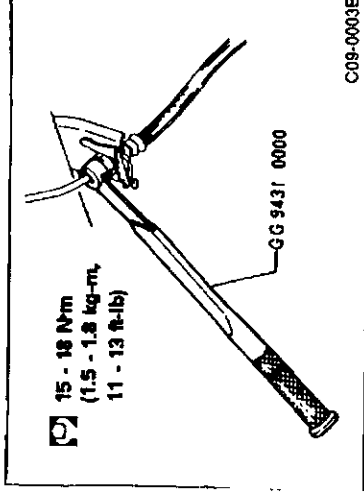
3. Component Parts Removal and Installation, Assembly and Disassembly (Cont'd)

[Point 2] Flare nut removal and installation

- Use a flare nut wrench to remove flare nuts. Use a flare nut torque wrench (special service tool) for installation. Be careful not to damage flare nut or clutch tube.

Flare nut tightening torque:

15 - 18 N·m (1.5 - 1.8 kg-m, 11 - 13 ft - lb)



3-2 Separation pipe removal and installation

Removal

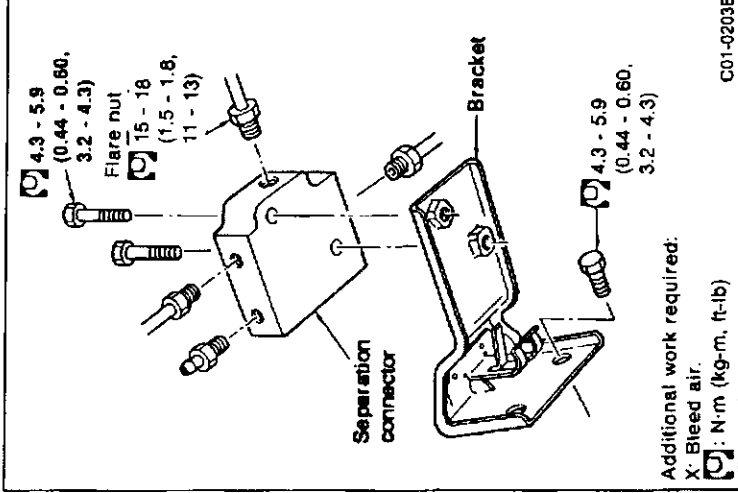
- Use a flare nut wrench to remove clutch tube piping. Next remove bracket bolt.

Installation

- Tighten bracket to torques shown in figure.
- Use flare nut torque wrench (special service tool) to tighten clutch tube piping to specified torque.

CAUTION:

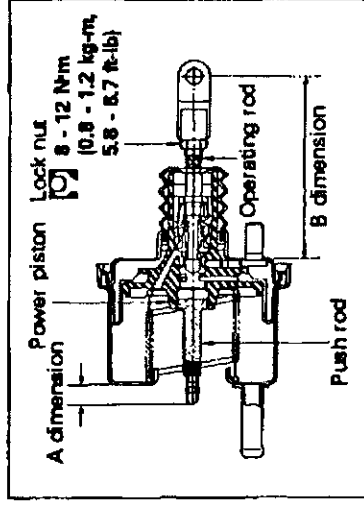
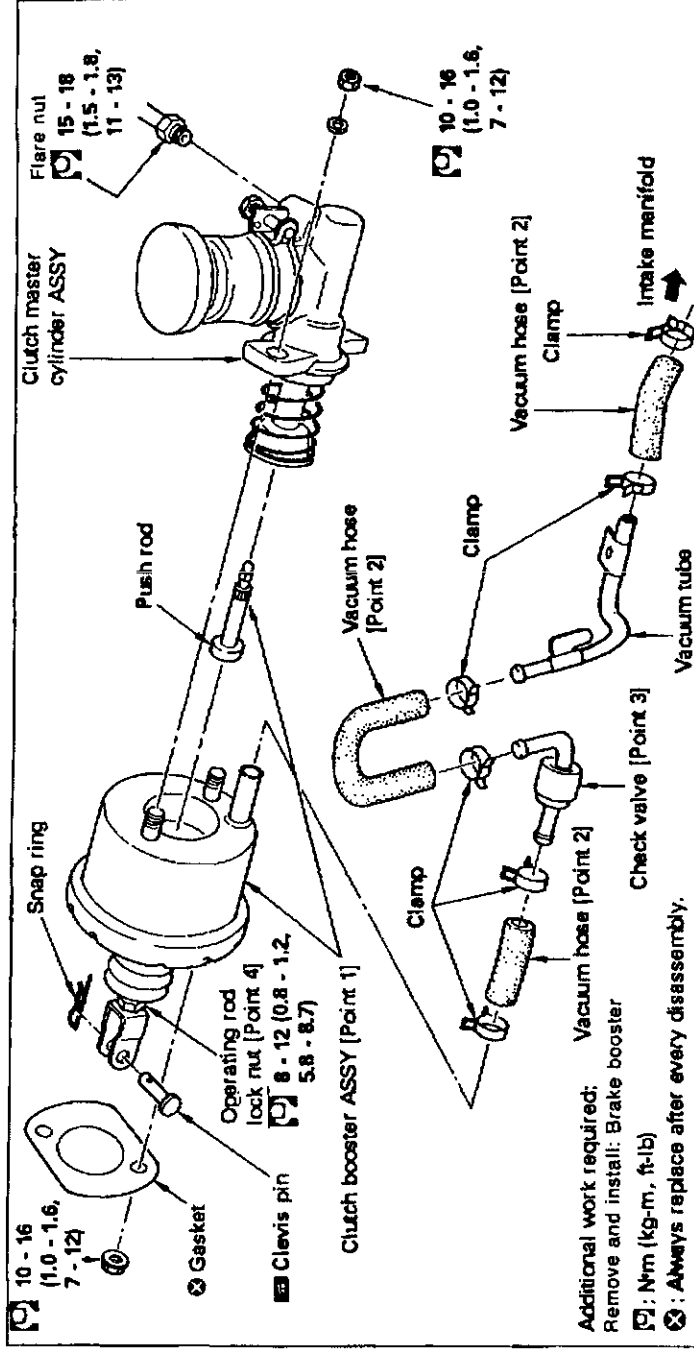
Always bleed air from system after installation.



C1 CLUTCH

3. Component Parts Removal and Installation, Assembly and Disassembly (Cont'd)

3-3 BOOSTER AND VACUUM PIPING REMOVAL AND INSTALLATION



[Point 1] Booster removal and installation

CAUTION:

Disassemble booster from master cylinder. Do not allow booster operating rod to make a stroke.

- Be careful not to scratch reservoir tank and body during removal and installation.
- When installing master cylinder in booster, make sure push rod is installed in power piston as shown in figure. Check that dimension A in figure conforms to specified values indicated below and then install master cylinder.

CAUTION:

To prevent booster push rod from being pressed in, position unit so rod faces up and then install master cylinder.

A dimension standard value:

9.6 mm (0.378 in)

- Loosen operating rod lock nut and adjust operating rod so B dimension conforms to specified length.

B dimension standard value:

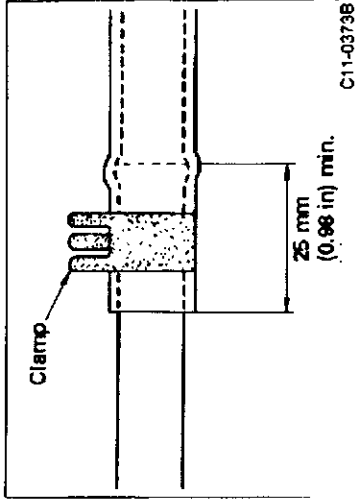
94 mm (3.70 in)

- After adjusting operating rod to standard value, tighten lock nut temporarily. After unit is installed, adjust pedal height and tighten lock nut to specified torque.

C1 CLUTCH

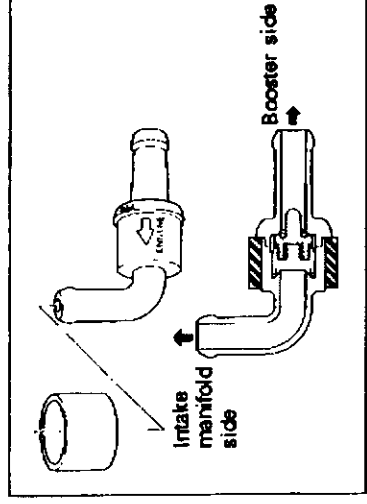
3. Component Parts Removal and Installation, Assembly and Disassembly (Cont'd)

- Always bleed air from system after master cylinder is removed or to complete installation.



[Point 2] Vacuum hose assembly

- Insert more than 25 mm (0.98 in) of the hose.
- Do not use lubrication oil during assembly.



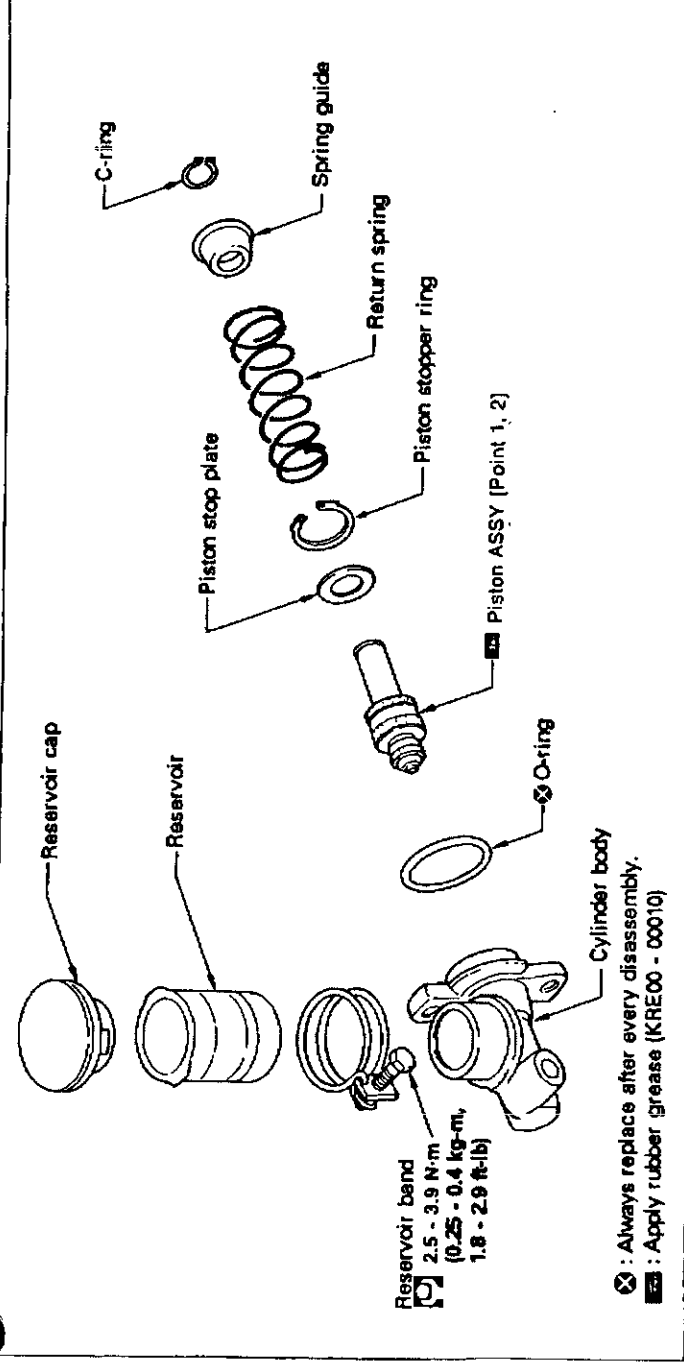
[Point 3] Check valve assembly

- Position the check valve so valves faces engine (vacuum pump) in the direction of the arrow shown in figure.

C1 CLUTCH

3. Component Parts Removal and Installation, Assembly and Disassembly (Cont'd)

MASTER CYLINDER ASSEMBLY AND DISASSEMBLY



[Point 1] Piston ASSY removal

- Remove the C-ring. Press the spring guide to prevent the spring from flying out and remove the piston ASSY.

[Point 2] Piston ASSY installation

- The piston cup must be exchanged with the piston ASSY.

CAUTION:

- (1) Apply a thin coat of Nissan rubber grease to the sliding part of the cylinder piston and cap. (Only use genuine Nissan products.)
- (2) Check direction of piston cup before assembly.

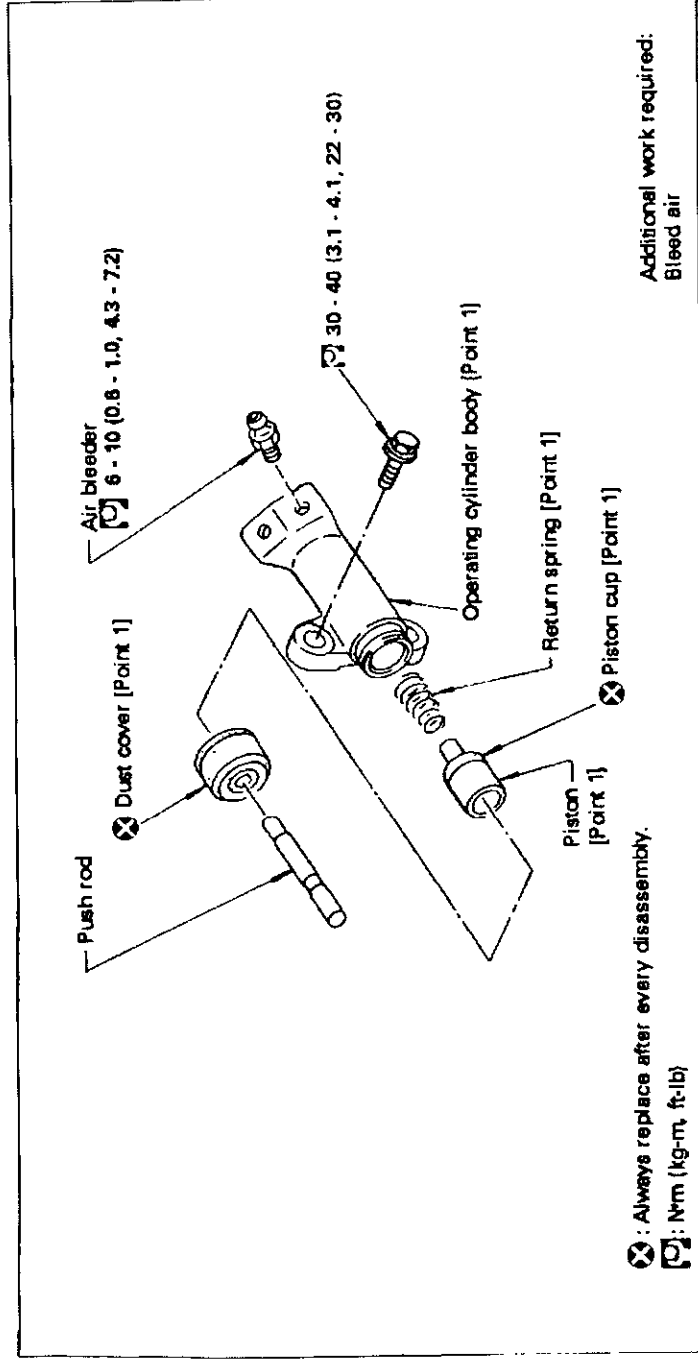
[Point 3] Part inspection

- Check the following items and replace as necessary.
- Rubbing surface of cylinder head and piston for uneven wear, rust or damage
- Piston and piston cup, for wear or damage.
- Return spring, for wear or damage.
- Reservoir tank wear or damage

C1 CLUTCH

3. Component Parts Removal and Installation, Assembly and Disassembly (Cont'd)

3-5 OPERATING CYLINDER REMOVAL AND INSTALLATION, ASSEMBLY AND DISASSEMBLY



[Point 1] Part inspection

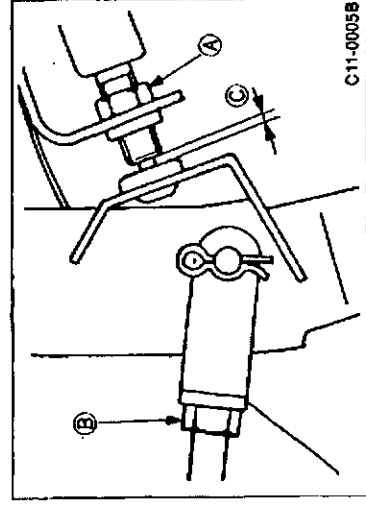
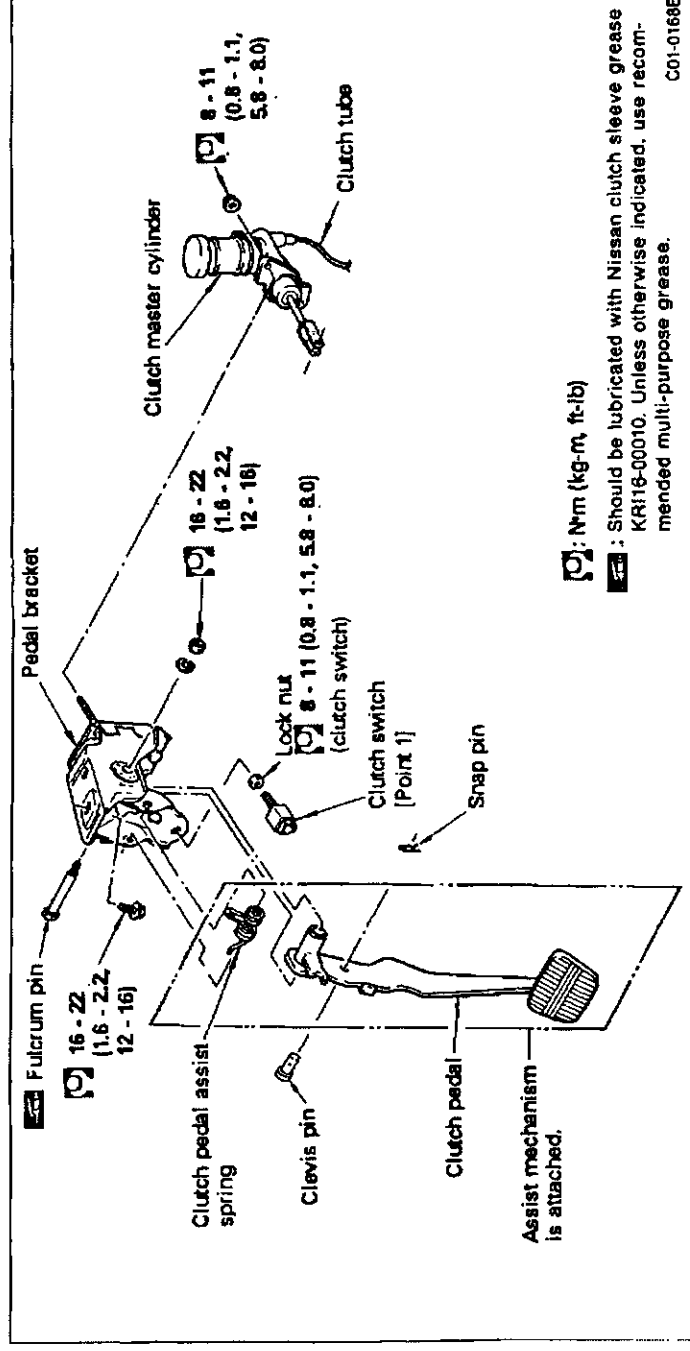
Inspect the following parts and replace as necessary.

- Piston and piston cup for wear, damage or deterioration.
- Piston springs, for wear or damage.
- Check dust cover for cracks, deformation or damage.
- Check inner cylinder for scratches or foreign matter.

C1 CLUTCH

3. Component Parts Removal and Installation, Assembly and Disassembly (Cont'd)

3-6 CLUTCH PEDAL REMOVAL AND INSTALLATION, ASSEMBLY AND DISASSEMBLY



[Point 1] Clutch switch adjustment (for vehicles equipped with ASCD and SUPER HICAS)

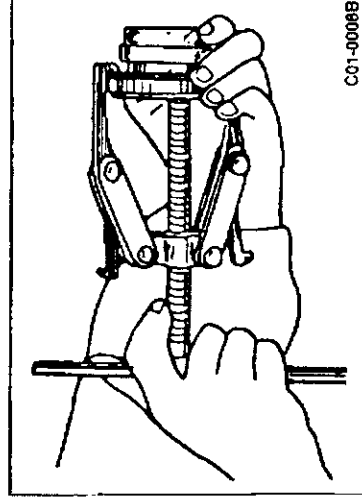
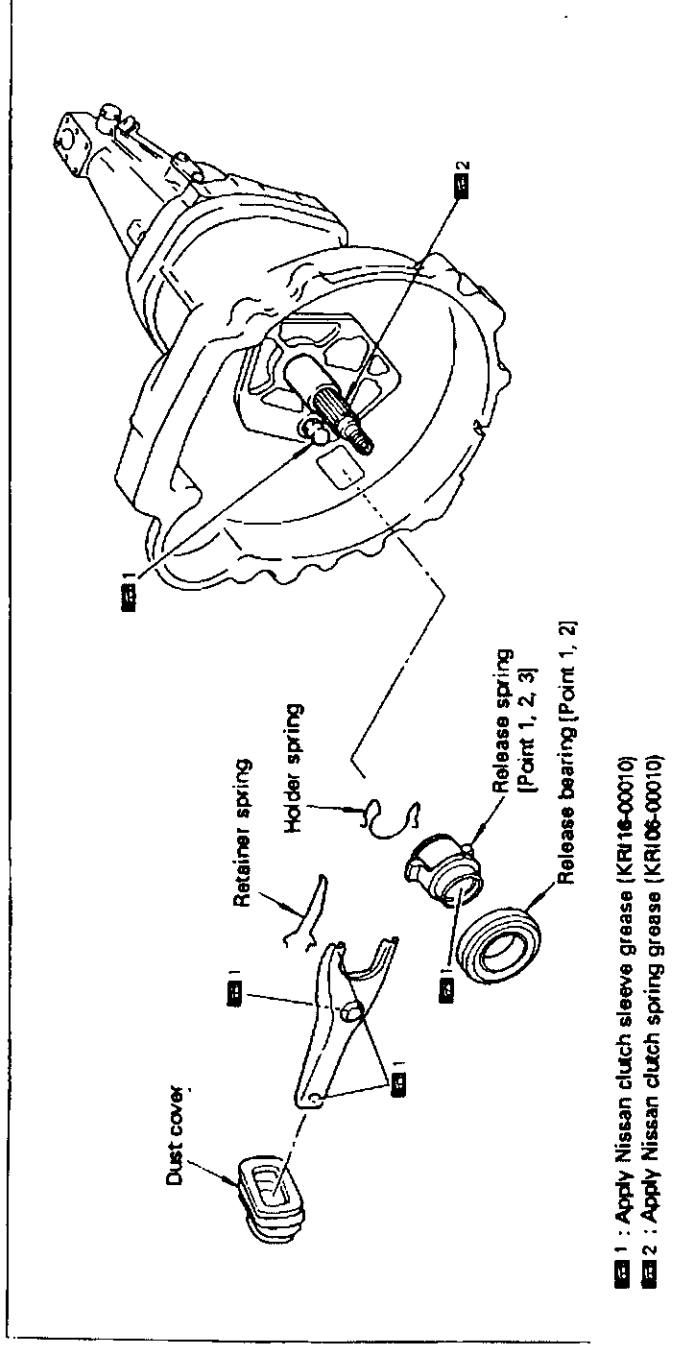
1. Loosen clutch switch lock nut (A).
2. Loosen push rod lock nut (B) and turn push rod. Adjust pedal to specified height and tighten lock nut.
3. Turn the switch so there is a clearance of 0.3 to 1.0 mm (0.012 to 0.039 in) between stopper rubber and end of clutch switch screw. Tighten lock nut to specified torque.

Lock nut tightening torque	Ⓐ 12 - 15 (1.2 - 1.5, 9 - 11)
	Ⓑ 8 - 12 (0.8 - 1.2, 5.8 - 8.7)
Clearance	Ⓒ 3 - 10 (0.3 - 1.0, 2.2 - 7.2)

C1 CLUTCH

3. Component Parts Removal and Installation, Assembly and Disassembly (Cont'd)

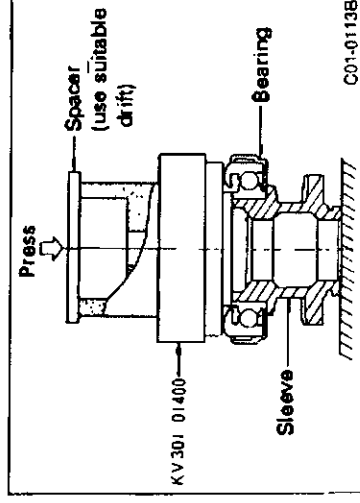
3-7 CLUTCH RELEASE MECHANISM REMOVAL AND INSTALLATION



[Point 1] Release bearing removal and installation

Removal

- Use a puller as shown in figure on left to remove bearing.
(Position a suitable drift on the sleeve.)



Installation

- Use the release bearing drift (special service tool) as shown in the figure to install the bearing.

CAUTION:

A drift must be used to press against the inner race.

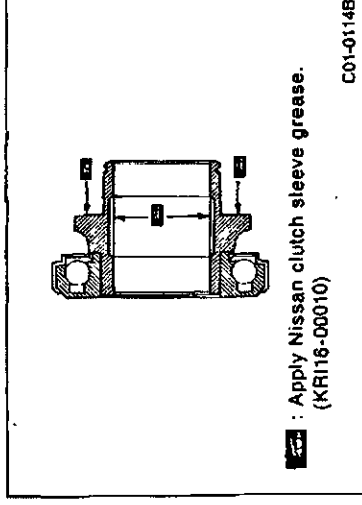
C1 CLUTCH

3. Component Parts Removal and Installation, Assembly and Disassembly (Cont'd)

[Point 2] Inspection

Check the following items and replace if necessary.

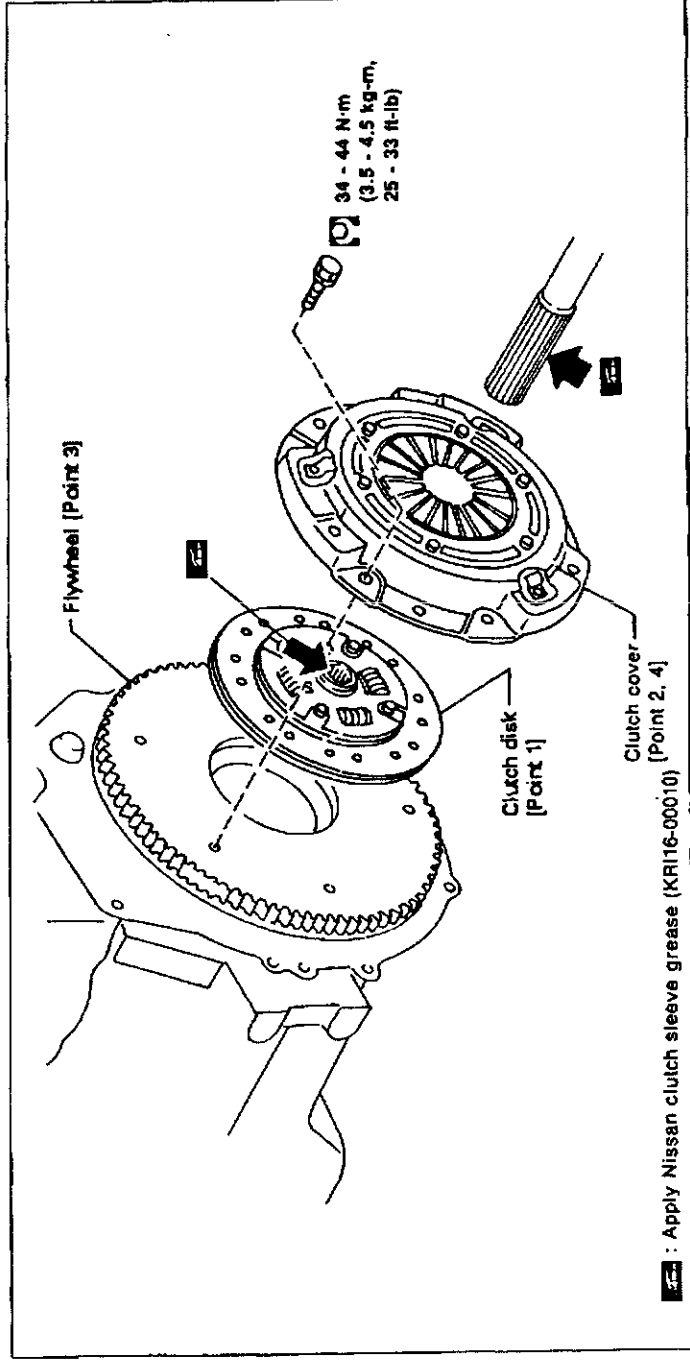
- Release bearing, to see that it rolls freely and is free from noise, cracks, pitting or wear
- Release sleeve and withdrawal lever rubbing surface, for wear rust or damage.



[Point 3] Lubrication

- Lubricate locations indicated by arrow with Nissan clutch sleeve grease (KRI16-00010).

3-8 CLUTCH COVER INSPECTION AND DISK, INSPECTION AND ADJUSTMENT



C1 CLUTCH

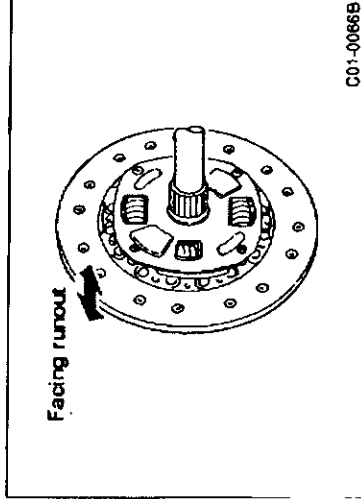
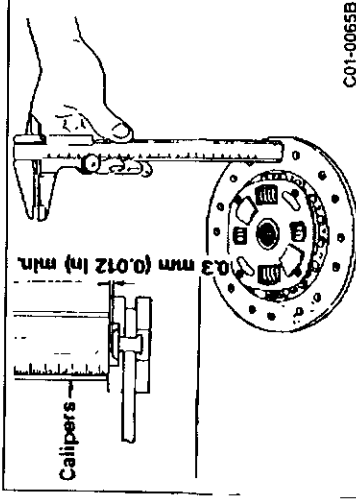
3. Component Parts Removal and Installation, Assembly and Disassembly (Cont'd)

[Point 1] Clutch disk inspection

- Use calipers to measure the depth of facing surface to the rivet head. If wear exceeds specification limit, replace clutch disc.

Facing wear limit (depth to rivet head)	mm (in)	0.3 (0.012) min
--	---------	-----------------

C01-0065B



C01-0066B

- If the surface runout or spline backlash (from hub center) exceeds specified limit, adjust or replace disk.

Description	Engine	RB26DETT
Facing runout/measurement part position mm (in)	1.0 (0.039) max./230 (9.06) dia.	

[Point 2] Clutch cover inspection

- Use the base plate (special service tool) and distance piece (special service tool) to measure the diaphragm spring lever height (dimension H). Replace the cover ASSY if it does not conform to the standard dimensions.

Lever set height (dimension H) standard:

37.5 - 39.5 mm (1.476 - 1.555 in)

Base plate	ST2005-0010
Distance piece	ST2005-0100

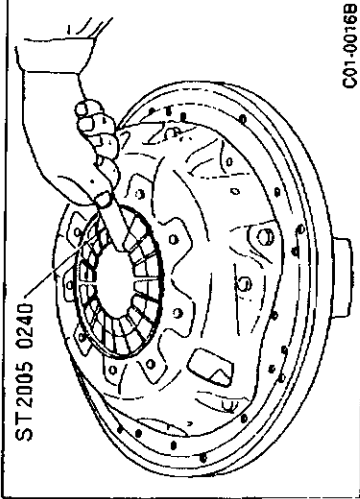
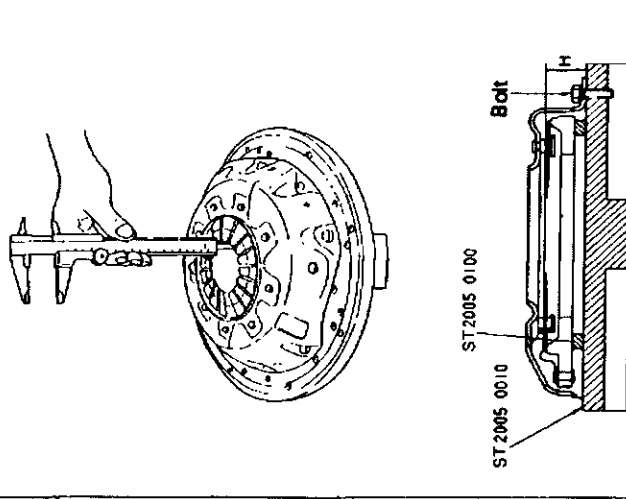
CAUTION:

In vehicles equipped with the RB26DETT engine, place 0.3 mm (0.012 in) thickness gauge in distance piece (ST2005 0010), place it on clutch cover and measure the distance.

Clutch cover tightening torque:

34 - 44 N·m (3.5 - 4.5 kg-m, 25 - 33 ft-lb)

C01-0015B



C01-0016B

- Adjust unevenness of diaphragm spring with diaphragm adjustment wrench (special service tool).

Diaphragm spring unevenness limit:

0.5 mm (0.020 in) max.

CAUTION:

The correction can only be performed if it is within allowable limit before the lever set height adjustment is performed.

- Check thrust ring for wear or damage. Replace if necessary.

C1 CLUTCH

3. Component Parts Removal and Installation, Assembly and Disassembly (Cont'd)

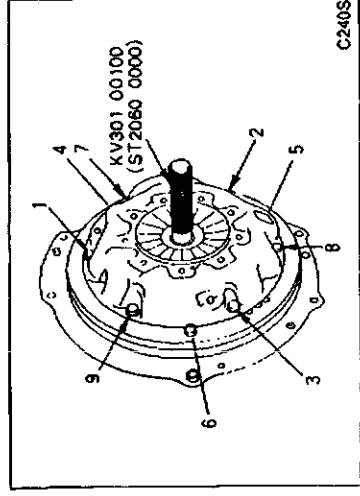
Bend damage: A chattering sound is produced when cover is shaken vertically.

Wear: A slightly cracked sound is produced if rivets are struck lightly with hammer.

- Check pressure plate and clutch disc contact surface for slight burns or discoloration. Repair pressure plate with emery paper.
- Check pressure plate and clutch disc contact surface for deformation or damage. Replace if necessary.

[Point 3] Flywheel Inspection

- Check contact surface of flywheel for slight burns or discoloration. Repair flywheel with emery paper.



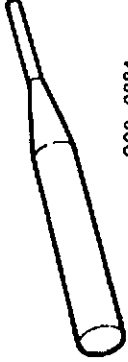
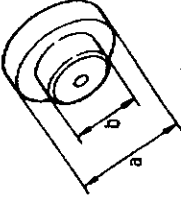
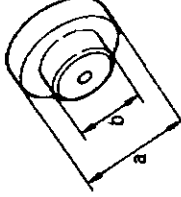
[Point 4] Clutch disk and cover installation

- Apply recommended grease (KRI06-00010) to contact surface of clutch disc spline.
- Too much lubricant may damage clutch disk facing and pressure plate surface.
- Use clutch disk alignment tool (special service tool) before tightening clutch cover bolts.
- Tighten bolts in sequence shown in figure.

OPERATION PRECAUTIONS

- Only use genuine Nissan gear oil MP-G special GL-4 75W-90 for the transmission.
- Never reuse transmission oil.
- Make sure no dirt, debris or foreign matter enters the transmission during assembly or disassembly.
- Use a torque wrench to tighten bolts and nuts to specified torque.

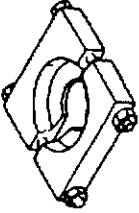
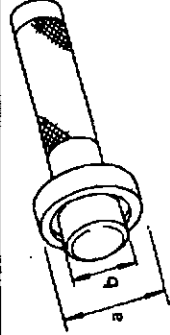
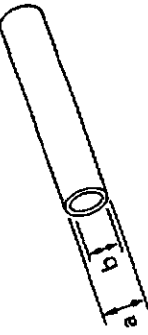
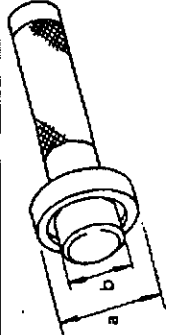
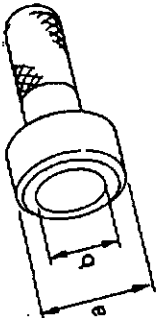
SPECIAL SERVICE TOOLS

Tool name Tool number	Description
Pin punch KV321 01100 6 mm (0.24 in)	 Striking lever and striking arm assembly and disassembly
Drift ST3532 2000 Drift bar ST3532 5000	 a: 39 mm (1.54 in) dia. b: 31 mm (1.22 in) dia. Mainshaft and rear end bearing removal
Drift ST3532 1000 Drift bar ST3532 5000	 a: 49 mm (1.93 in) dia. b: 41 mm (1.61 in) dia. Mainshaft and rear end bearing removal

a: Outer diameter of drift
b: Inner diameter of drift

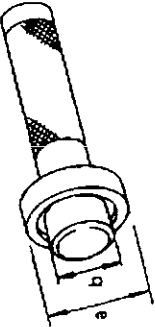
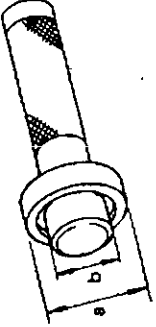
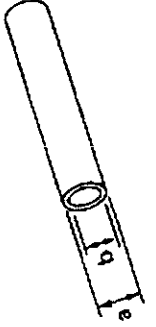
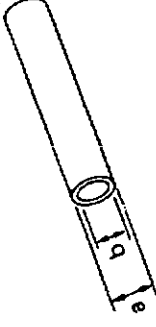
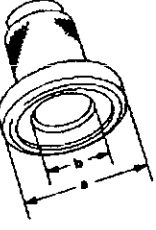
C2 MANUAL TRANSMISSION

*: Special service tool or commercial equivalent

Tool number Tool name	Description
ST23540000* Pin punch	Removing and installing retaining pin 
ST30031000* Puller	Removing 1st & 2nd synchronizer assembly Removing counter gear rear thrust bearing Removing main drive bearing 
ST33290001* Puller	Removing rear oil seal 
ST33230000* Drift	Removing mainshaft and counter gear  a: 51 mm (2.01 in) dia. b: 28.5 (1.122 in) dia.
ST2350000* Drift	Removing counter gear front bearing (Use with KV38100300.)  a: 34 mm (1.34 in) dia. b: 28 mm (1.10 in) dia.
KV38100300* Drift	Removing counter gear front bearing (Use with ST2350000.) Installing counter gear rear bearing  a: 54 mm (2.13 in) dia. b: 32 mm (1.26 in) dia.
ST30720000* Drift	Removing mainshaft front bearing. Installing mainshaft front bearing.  a: 77 mm (3.03 in) dia. b: 55.5 mm (2.185 in) dia.

a: Outer diameter of drift
b: Inner diameter of drift

C2 MANUAL TRANSMISSION

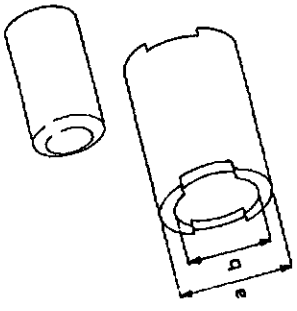
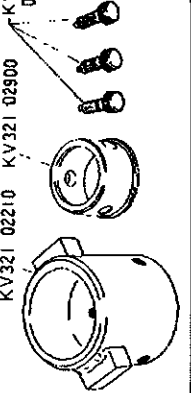
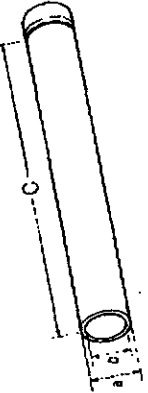
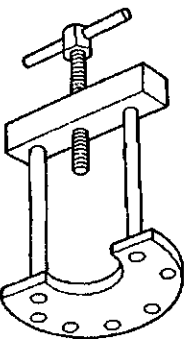
Tool number Tool name	Description
ST33210000* Drift	 Installing counter gear front bearing Installing front cover oil seal a: 44 mm (1.73 in) dia. b: 24.5 mm (0.965 in) dia.
ST3320000* Drift	 Removing and installing counter gear and rear end bearing a: 37 mm (1.46 in) dia. b: 22 mm (0.87 in) dia.
ST30613000* Drift	 Installing main drive gear bearing a: 72 mm (2.83 in) dia. b: 48 mm (1.89 in) dia.
ST37750000* Drift	 Removing counter gear rear bearing Installing O.D. gear bushing Installing reverse cone Installing reverse counter gear Installing counter gear rear end bearing a: 40 mm (1.57 in) dia. b: 31 mm (1.22 in) dia.
ST2452000* Drift	 Installing reverse hub Installing mainshaft rear bearing a: 45 mm (1.77 in) dia. b: 36 mm (1.42 in) dia.
ST33400001* Drift	 Installing rear oil seal a: 60 mm (2.36 in) dia. b: 47 mm (1.85 in) dia.

a: Outer diameter of drift
b: Inner diameter of drift

* : Special service tool or commercial equivalent

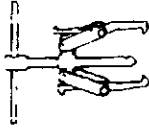
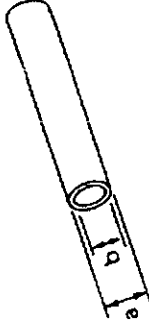
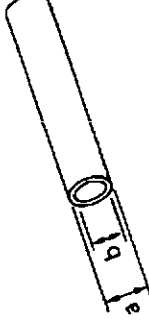
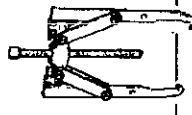
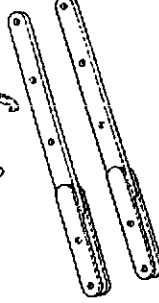
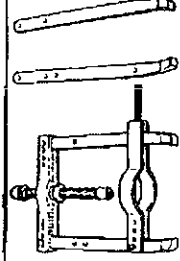
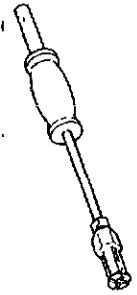
C2 MANUAL TRANSMISSION

*: Special service tool or commercial equivalent

Tool number Tool name	Description
ST36730000* Drift	Installing sub-gear on reverse idler gear  a: 50 mm (1.97 in) dia. b: 39 mm (1.54 in) dia.
Spacer hook KV321 02210 Spacer KV321 02900 Bolt KV321 02230	Removing 5th gear bushing (Use with HT72350000.)  KV321 02210 KV321 02900 KV321 02230
Drift KV321 02700	Installing 5th gear Installing mainshaft rear bearing Installing reverse gear bushing Installing reverse hub  a: 48.6 mm (1.913 in) dia. b: 41.6 mm (1.638 in) dia. c: 410 mm (16.14 in) dia.
Drift KV321 02800	Installing sub-gear snap ring  a: 41.0 mm (1.614 in) dia. b: 35.5 mm (1.398 in) dia.
Bearing puller ST2247 0000	Removing reverse gear and reverse hub  a: Outer diameter of drift b: Inner diameter of drift

C2 MANUAL TRANSMISSION

COMMERCIAL SERVICE TOOLS

Tool name Tool number	Description
Transmission jack	Engine support during transmission removal and installation
Engine sling tool	
Puller HT235 0000	 Removing counter gear rear end bearing Removing mainshaft rear bearing Removing reverse gear synchronizer hub Removing reverse counter gear
Drift	 Installing sub-gear snap ring
Drift	 a: 44.5 mm (1.752 In) dia. b: 38.5 mm (1.516 In) dia. Installing O.D. main gear Installing reverse gear bushing
Puller HT723 4000	 Removing reverse gear bushing (Use with HT726 1000.)
Joint HT726 1000	 Removing reverse gear bushing (Use with HT723 4000.)
Puller HT726 0000	 Removing 5th gear
Blind bearing puller BL600	 Removing striking rod side ball bearing

a: Outer diameter of drift
b: Inner diameter of drift

C2 MANUAL TRANSMISSION

1. Summary

Specifications

Engine		RB26DETT
Description		
Model		FS5R30A
Model No. (Note 1)		05U10
Gear ratio	1st gear	3.214
	2nd gear	1.925
	3rd gear	1.302
	4th gear	1.000
	5th gear	0.752
	Reverse gear	3.369
Main drive gear		23
Number of gear teeth	1st gear	31
	2nd gear	30
	3rd gear	29
	5th gear	24
	Reverse gear	30
	Drive gear	31
	1st gear	13
	2nd gear	21
	3rd gear	30
	5th gear	43
Transmission switch	Reverse gear	12
	Reverse idler gear	22
	Neutral	Attached
Total length	mm (in) (Note 2)	825 (24.61)
Recommended oil and quantity	ℓ (Imp qt)	Nissan gear oil MP-G special GL-4 #75-90 approx. 4.1 (3-5/8)

Note: 1. The model number is indicated in the last five digits of the part number (32010 XXXXX).

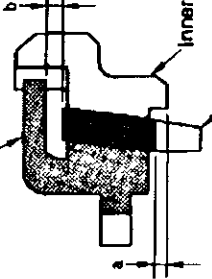
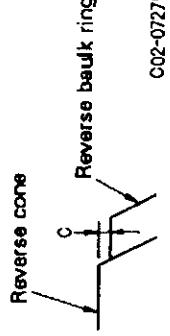
2. The total length indicates length from front edge of clutch case to rear edge of OD cover.

C2 MANUAL TRANSMISSION

1. Summary (Cont'd)

Inspection standard values

Unit: mm (in)

Description	Standard value												
End play													
1st gear													
2nd gear													
3rd gear	0.23 - 0.33 (0.0091 - 0.0130)												
5th gear													
Reverse gear	0.11 (0.0043) max.												
Reverse idler gear	0.33 - 0.43 (0.0130 - 0.0169)												
Counter gear	0.10 - 0.25 (0.0039 - 0.0098)												
Baulk ring clearance 1st, 4th, 5th gear	1.05 - 1.30 (0.0413 - 0.0512) [Usage limit value: 0.7 (0.028) max.]												
2nd, 3rd gear	Clearance a: 0.6 - 1.10 (0.0236 - 0.0433) Clearance b: 0.70 - 0.90 (0.0276 - 0.0354) [Usage limit value: 0.2 (0.008) max.]												
	 Outer baulk ring Inner baulk ring Synchronizer cone C02-0726B												
Reverse cone — baulk ring clearance height	Clearance C: -0.10 to 0.35 (-0.0039 to 0.0138) [Usage limit value: 0.7 (0.028)]												
	 Reverse cone Reverse baulk ring C02-0727B												
Main drive gear snap ring	End play standard value: 0.1 (0.004) max.												
	<table border="1"> <thead> <tr> <th>Thickness</th><th>Part number</th></tr> </thead> <tbody> <tr> <td>1.89 (0.0744)</td><td>32204 01G00</td></tr> <tr> <td>1.98 (0.0780)</td><td>32204 01G01</td></tr> <tr> <td>2.05 (0.0807)</td><td>32204 01G02</td></tr> <tr> <td>2.12 (0.0835)</td><td>32204 01G03</td></tr> <tr> <td>2.19 (0.0862)</td><td>32204 01G04</td></tr> </tbody> </table>	Thickness	Part number	1.89 (0.0744)	32204 01G00	1.98 (0.0780)	32204 01G01	2.05 (0.0807)	32204 01G02	2.12 (0.0835)	32204 01G03	2.19 (0.0862)	32204 01G04
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Mainshaft (front) snap ring	End play standard value: 0.1 (0.004) max.												
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C2 MANUAL TRANSMISSION

1. Summary (Cont'd)

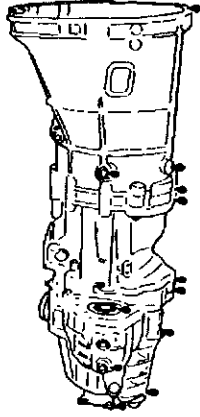
Unit: mm (in)

Description	Standard value																																		
 Mainshaft C ring (rear)	End play standard value: 0.1 (0.004) max. <table border="1"> <thead> <tr> <th>Thickness</th><th>Part number</th></tr> </thead> <tbody> <tr><td>2.63 (0.1035)</td><td>32348 01G15</td></tr> <tr><td>2.70 (0.1063)</td><td>32348 01G00</td></tr> <tr><td>2.77 (0.1091)</td><td>32348 01G01</td></tr> <tr><td>2.84 (0.1118)</td><td>32348 01G02</td></tr> <tr><td>2.91 (0.1146)</td><td>32348 01G03</td></tr> <tr><td>2.98 (0.1173)</td><td>32348 01G04</td></tr> <tr><td>3.05 (0.1201)</td><td>32348 01G05</td></tr> <tr><td>3.12 (0.1228)</td><td>32348 01G06</td></tr> <tr><td>3.19 (0.1256)</td><td>32348 01G07</td></tr> <tr><td>3.26 (0.1283)</td><td>32348 01G08</td></tr> <tr><td>3.33 (0.1311)</td><td>32348 01G09</td></tr> <tr><td>3.40 (0.1339)</td><td>32348 01G10</td></tr> <tr><td>3.47 (0.1366)</td><td>32348 01G11</td></tr> <tr><td>3.54 (0.1394)</td><td>32348 01G12</td></tr> <tr><td>3.61 (0.1421)</td><td>32348 01G13</td></tr> <tr><td>3.68 (0.1449)</td><td>32348 01G14</td></tr> </tbody> </table>	Thickness	Part number	2.63 (0.1035)	32348 01G15	2.70 (0.1063)	32348 01G00	2.77 (0.1091)	32348 01G01	2.84 (0.1118)	32348 01G02	2.91 (0.1146)	32348 01G03	2.98 (0.1173)	32348 01G04	3.05 (0.1201)	32348 01G05	3.12 (0.1228)	32348 01G06	3.19 (0.1256)	32348 01G07	3.26 (0.1283)	32348 01G08	3.33 (0.1311)	32348 01G09	3.40 (0.1339)	32348 01G10	3.47 (0.1366)	32348 01G11	3.54 (0.1394)	32348 01G12	3.61 (0.1421)	32348 01G13	3.68 (0.1449)	32348 01G14
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 Reverse idler thrust washer	End play standard value: 0.1 (0.004) max. <table border="1"> <thead> <tr> <th>Thickness</th><th>Part number</th></tr> </thead> <tbody> <tr><td>1.97 (0.0776)</td><td>32284 01G10</td></tr> <tr><td>2.07 (0.0815)</td><td>32284 01G11</td></tr> </tbody> </table>	Thickness	Part number	1.97 (0.0776)	32284 01G10	2.07 (0.0815)	32284 01G11																												
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2. On-Vehicle Inspection and Adjustment

2-1 OIL LEAK INSPECTION

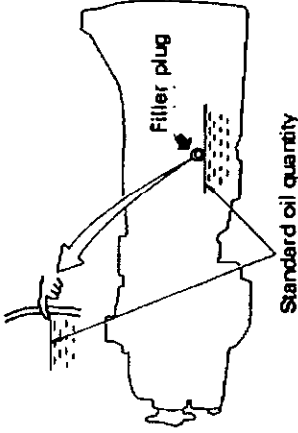
- If there are oil leaks from any transmission part, remove transmission ASSY from vehicle and change oil.



C02-0756B

2-2 OIL QUANTITY INSPECTION

- Check oil quantity through filler plug hole.
- Use only genuine Nissan gear oil MP-G special GL-4 75W-90.



C02-0757B

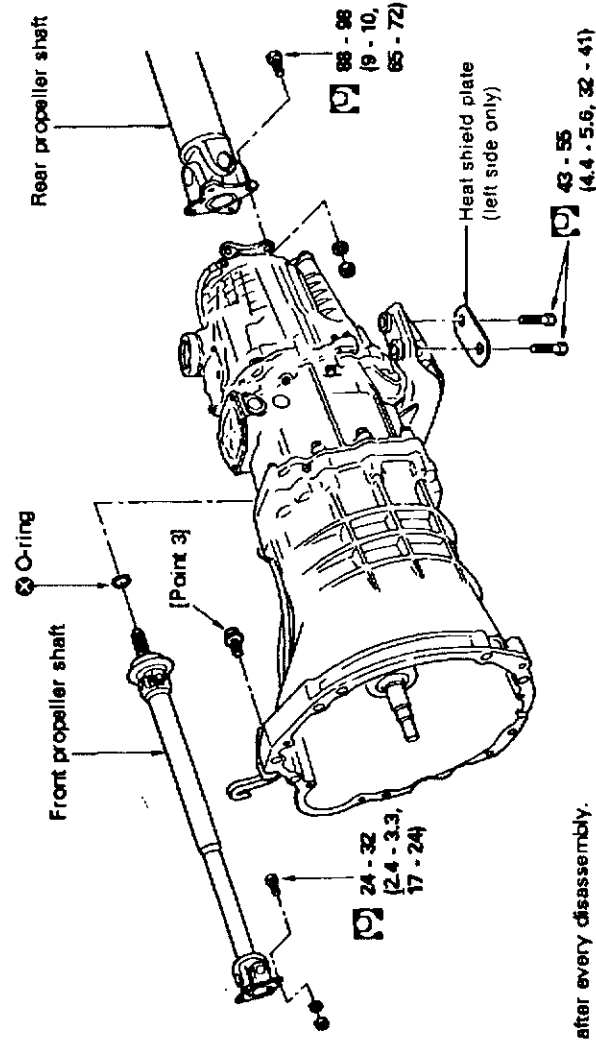
3. Transmission Removal and Installation, Assembly and Disassembly

3-1 REMOVAL AND INSTALLATION

Additional work required:

Use jack to support transmission during removal and installation.

- Drain and refill:
- Transmission oil
- Transfer oil
- Remove and install:
- Speedometer cable
- Propeller shaft
- Clutch operating cylinder
- Starter motor ASSY
- Control lever [Point 1]
- Reverse lamp switch and neutral switch wiring
- Exhaust pipe [Point 2]
- E-TS hydraulic unit air bleeder [Point 4]



: Nm (kg-m, ft-lb)

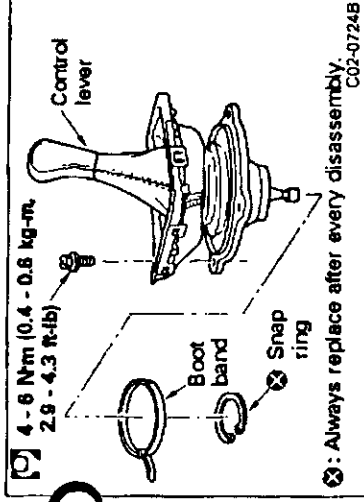
: Always replace after every disassembly.

C2 MANUAL TRANSMISSION

3. Transmission Removal and Installation, Assembly and Disassembly (Cont'd)

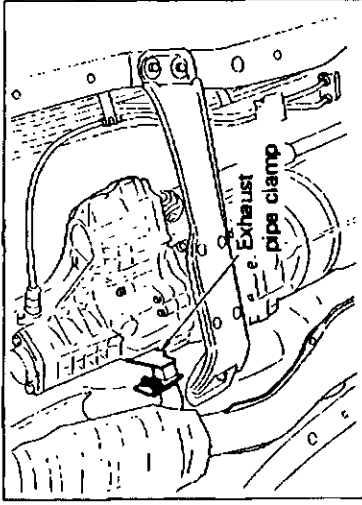
[Point 1] Control lever removal

- Remove control lever finisher and control lever dust boot.
- Remove snap ring from transmission control cover. Next, remove control lever.



[Point 2] Exhaust pipe clamp removal

- Remove exhaust pipe clamp.
- Consider operability in front end of transmission and detach exhaust manifold and front exhaust pipe.



[Point 3] Transmission bolts

Vehicles equipped with RB26DETT engine

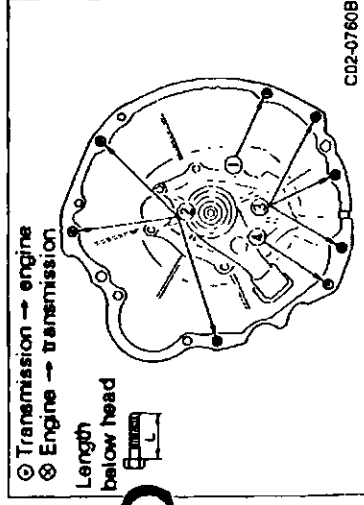
Bolt No.	Description	Tightening torque N·m (kg-m, ft-lb)	Bolt length below head mm (in)
①		39 - 49 (4.0 - 5.0, 29 - 36)	60 (2.36)
②		39 - 49 (4.0 - 5.0, 29 - 36)	60 (2.36)
③		29 - 39 (3.0 - 4.0, 22 - 29)	40 (1.57)
④*		29 - 39 (3.0 - 4.0, 22 - 29)	50 (1.97)

The * symbol indicates bolts tightened by nuts.

Note: The figure on left shows transmission when viewed from engine side.

[Point 4] ETS hydraulic system air bleeding

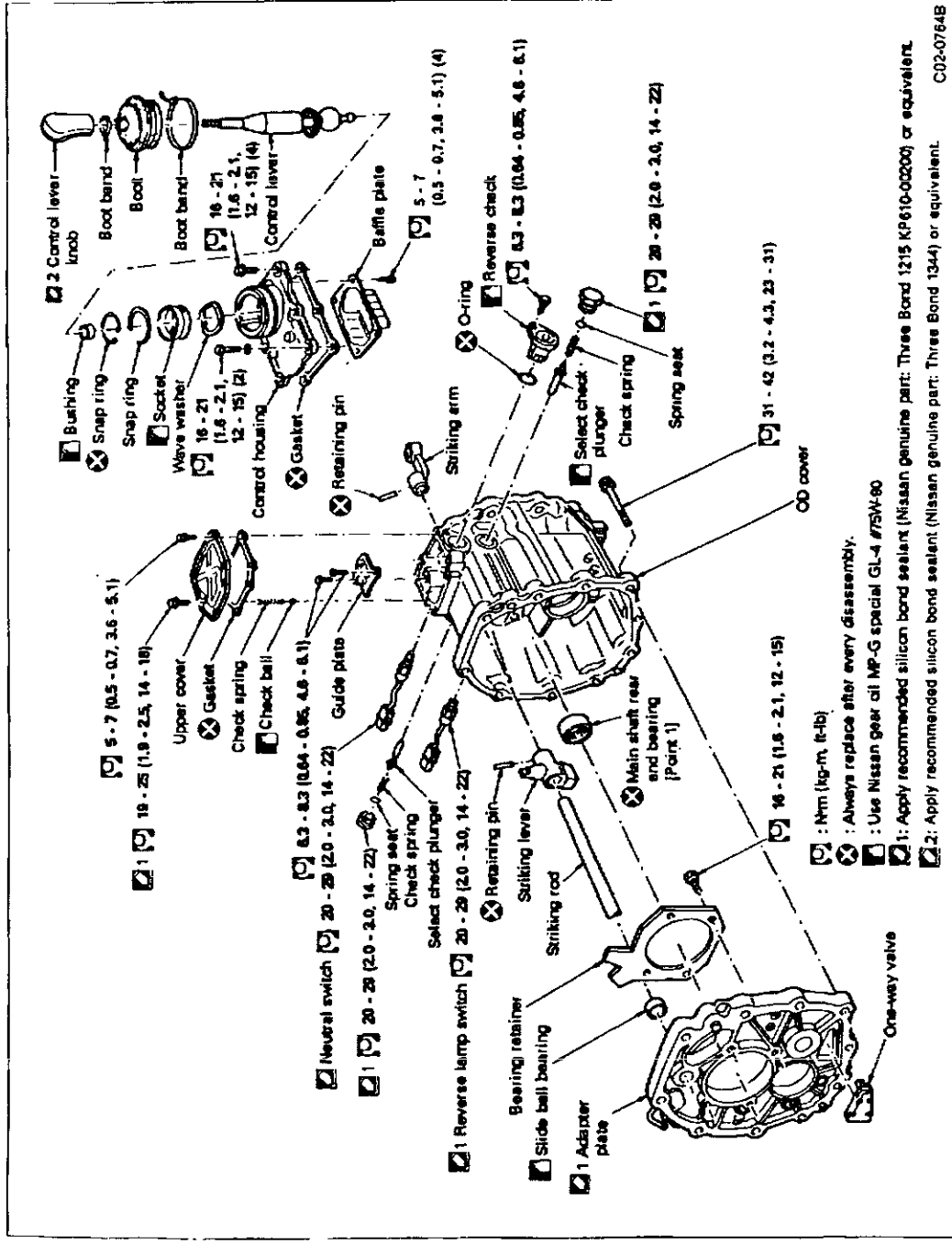
- Refer to "C3, 4, 4-4 HYDRAULIC UNIT AND RESERVOIR TANK, [Point 3]" for air bleeding procedures.



C2 MANUAL TRANSMISSION

3. Transmission Removal and Installation, Assembly and Disassembly (Cont'd)

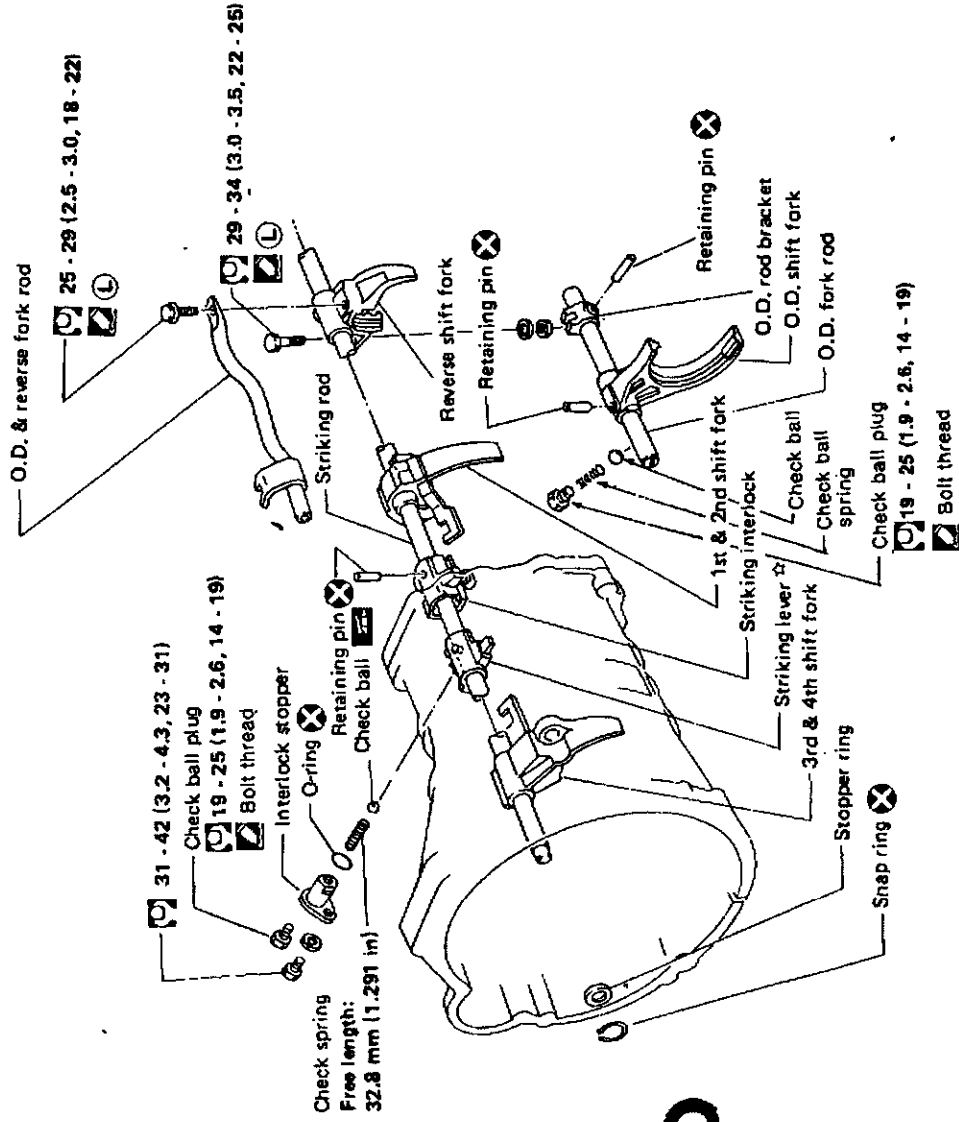
Case and shift control components



C2 MANUAL TRANSMISSION

3. Transmission Removal and Installation, Assembly and Disassembly (Cont'd)

Shift control components



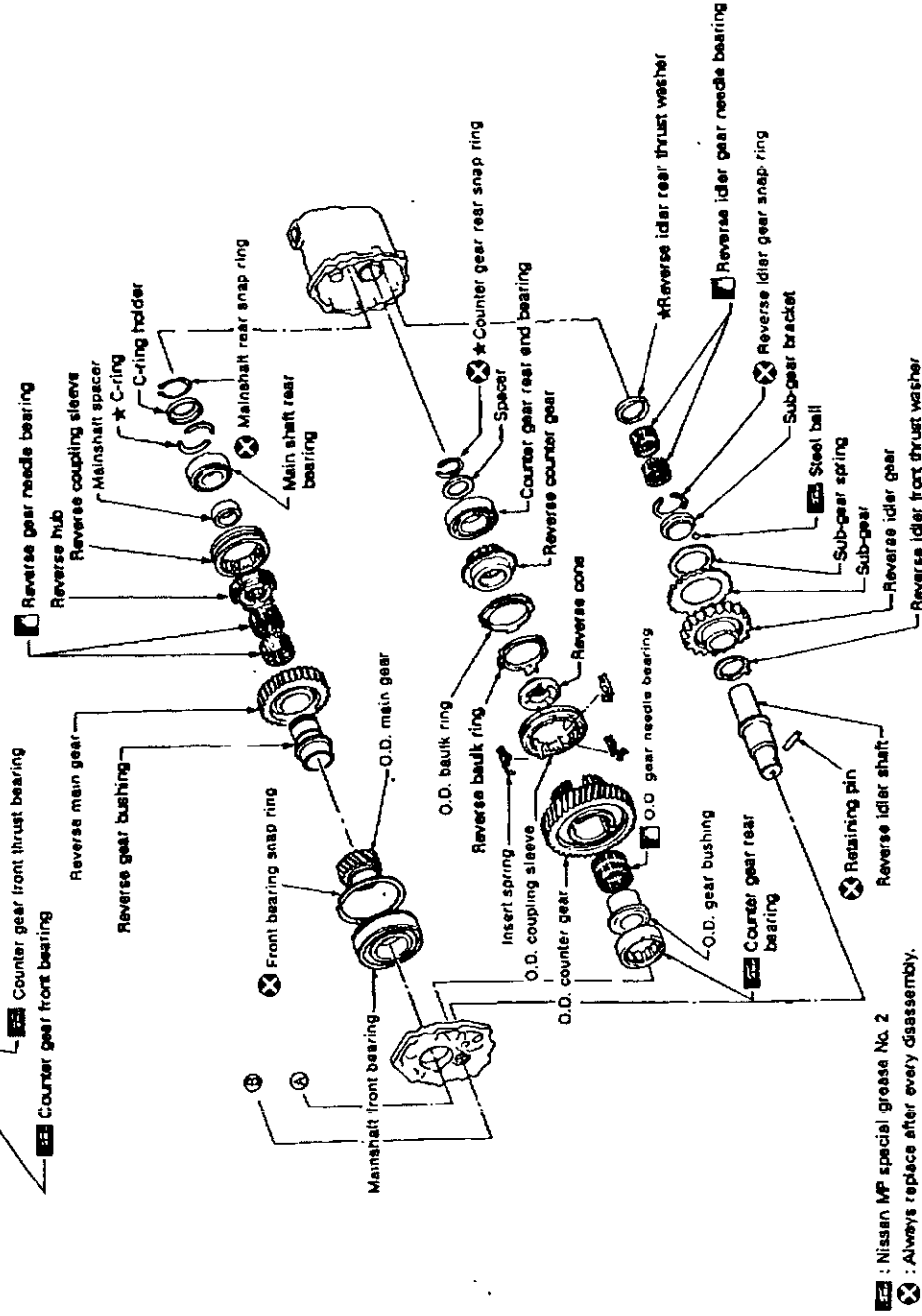
Ⓜ : N·m (kg·m, ft·lb)

Ⓜ : Apply recommended sealant (Nissan genuine part: KP610-00250) or equivalent.

Ⓜ : Apply locking sealant.

☆ : Pay attention to its direction.

3. Transmission Removal and Installation, Assembly and Disassembly (Cont'd)

[illegible]

 : Use Nissan gear oil MP-G special GL-4 75W-90.

3. Transmission Removal and Installation, Assembly and Disassembly (Cont'd)

Guide plate

Front

6.3 - 8.3 N·m
(0.64 - 0.85 kg-m
4.6 - 6.1 ft-lb)

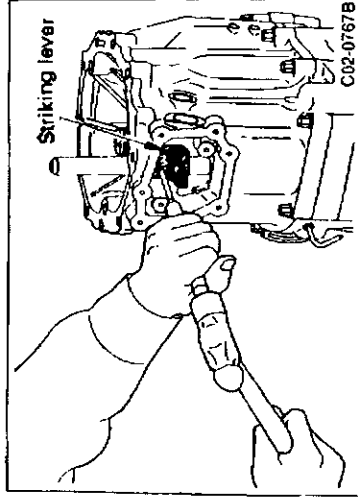
- Remove upper cover and gasket. Remove return spring and check ball from rear extension.
- Remove reverse check, select check plunger and spring.
- Remove neutral switch and reverse lamp switch.

- CH-32

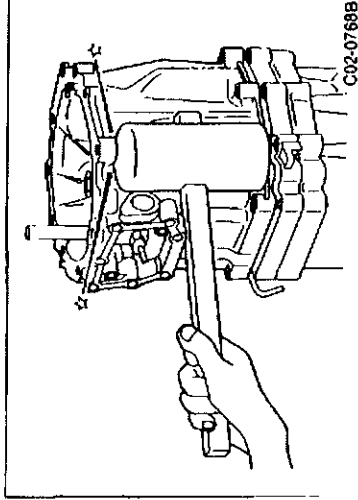
C2 MANUAL TRANSMISSION

3. Transmission Removal and Installation, Assembly and Disassembly (Cont'd)

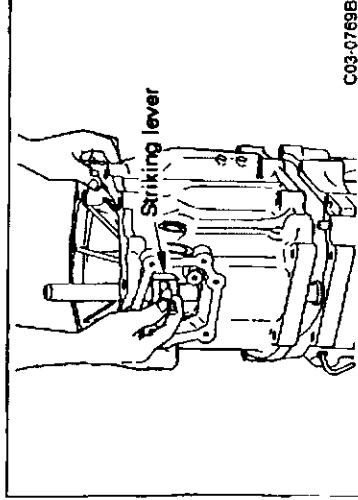
- Use a pin punch (special service tool) to strike the striking lever retaining pin and remove pin.



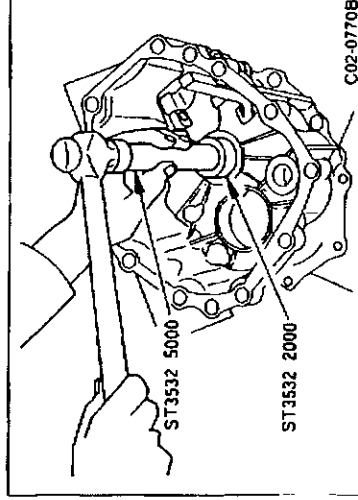
- Remove OD cover bolts. Tap cover with rubber hammer to separate it.



- Remove OD cover and striking lever as a set.

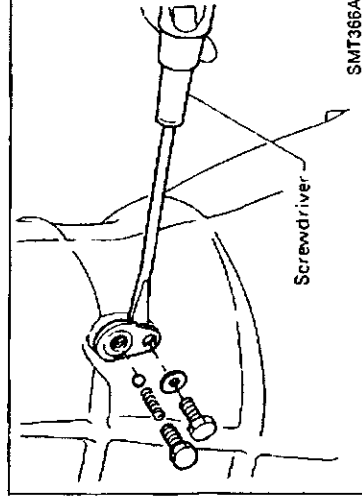


- Use drift (special service tool) to remove mainshaft rear end bearing.



CASE COMPONENTS DISASSEMBLY

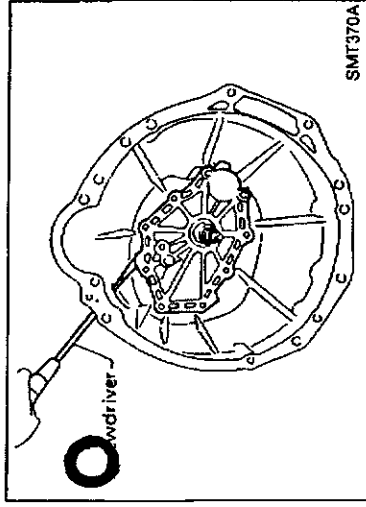
1. Remove check ball plug, check spring and check ball. Then remove interlock stopper.
If interlock assembly is removed as a unit, the check ball can fall into transmission case.



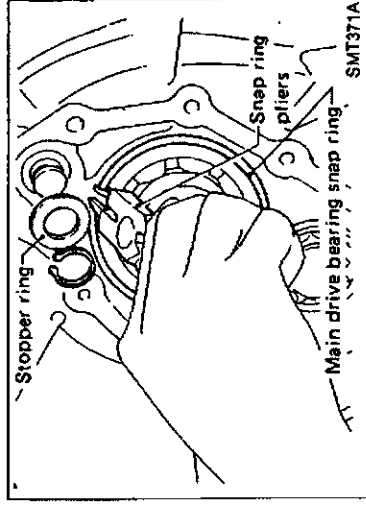
C2 MANUAL TRANSMISSION

3. Transmission Removal and Installation, Assembly and Disassembly (Cont'd)

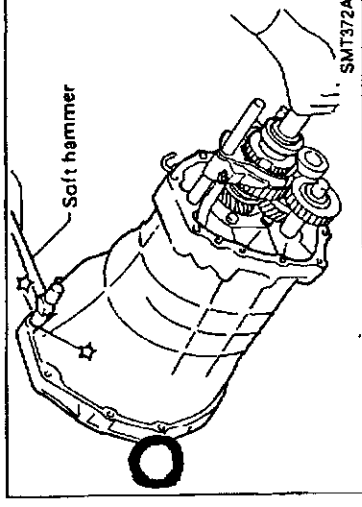
2. Remove front cover and gasket.



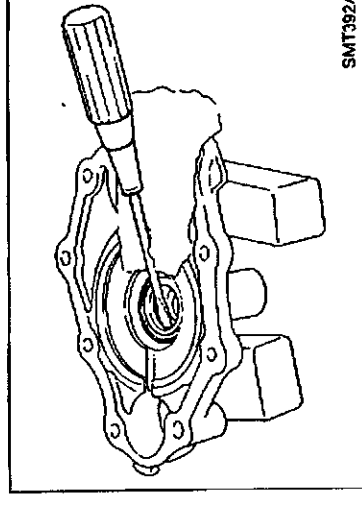
3. Remove stopper ring and main drive bearing snap ring.



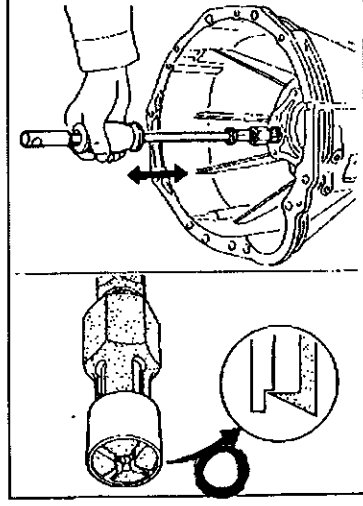
4. Remove transmission case by tapping lightly.



5. Remove front cover oil seal.



6. Remove slide ball bearing.
 - Use screwdriver to remove the ball of the slide ball bearing and inner race.
 - Set blind bearing puller on inset part of thrust ball bearing outer race as shown in the figure and remove race.
 - Remove the adapter plate and rear extension slide ball bearing the same way.

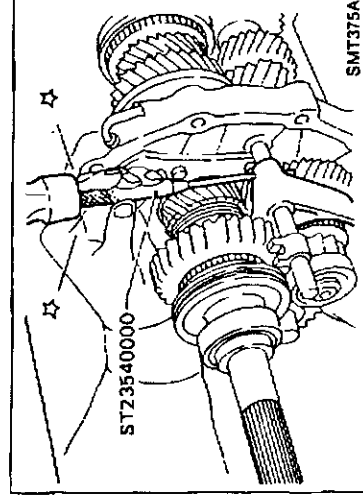
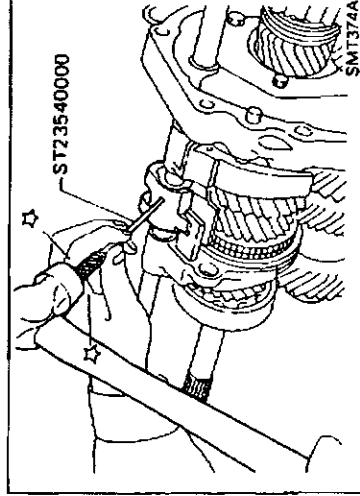
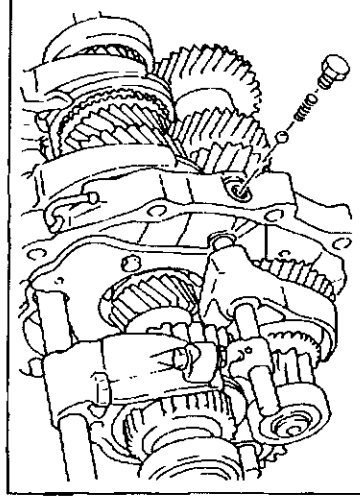
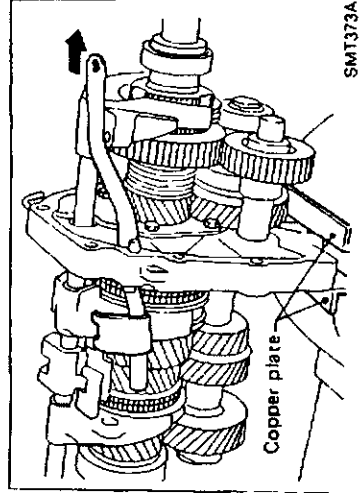


C2 MANUAL TRANSMISSION

3. Transmission Removal and Installation, Assembly and Disassembly (Cont'd)

SHIFT CONTROL COMPONENTS DISASSEMBLY

1. Mount adapter plate on vise.
2. Remove O.D. & reverse fork rod.



3. Remove check ball plug, check ball and return spring.

4. Drive out retaining pin from striking lever.
5. While pulling out striking rod, remove striking lever and striking interlock. Then remove 1st & 2nd, 3rd & 4th and reverse shift fork.

6. Drive out retaining pin from O.D. shift fork.
7. Pull out O.D. fork rod and then remove O.D. shift fork.

C2 MANUAL TRANSMISSION

3. Transmission Removal and Installation, Assembly and Disassembly (Cont'd)

GEAR COMPONENTS DISASSEMBLY

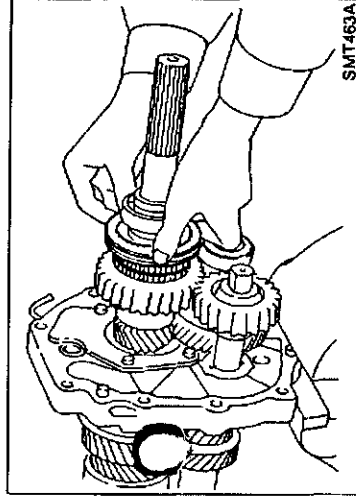
1. Before removing gears and shafts, measure each gear end play.

Gear	End play mm (in)
1st main gear	0.23 - 0.33 (0.0091 - 0.0130)
2nd main gear	0.23 - 0.33 (0.0091 - 0.0130)
3rd main gear	0.23 - 0.33 (0.0091 - 0.0130)
O.D. counter gear	0.23 - 0.33 (0.0091 - 0.0130)
Reverse main gear	0.33 - 0.43 (0.0130 - 0.0169)

- If not within specification, disassemble and check contact surface of gear to hub, washer, bushing, needle bearing and shaft.

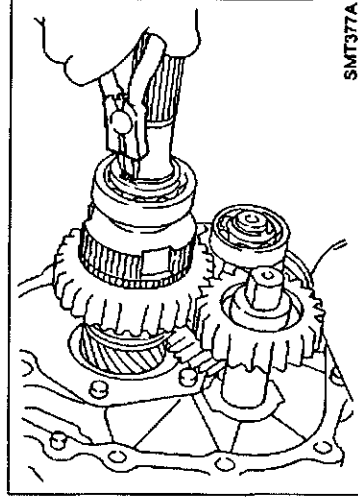
2. Remove rear side components on mainshaft and counter gear.

- a. Remove reverse coupling sleeve.

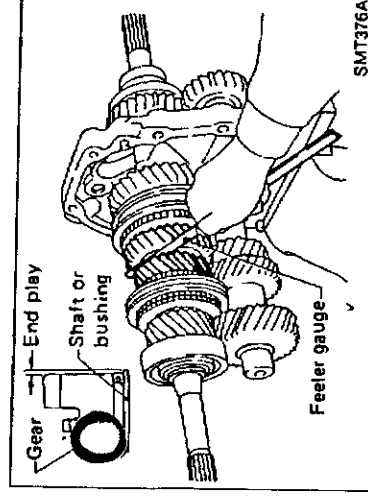
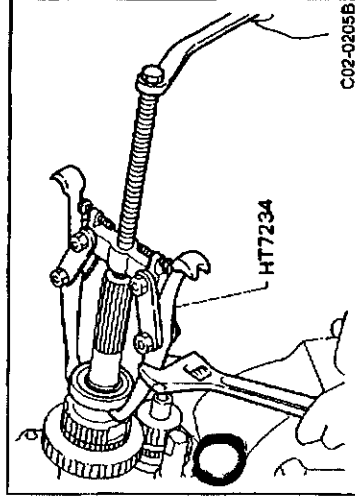


- b. Remove mainshaft rear snap ring and counter gear rear snap ring.

- c. Remove C-ring holder and mainshaft C-rings from mainshaft. Use punch and hammer to remove C-rings.



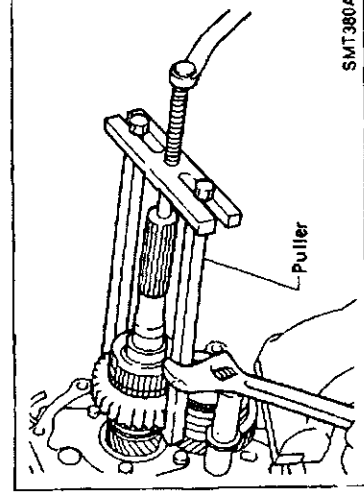
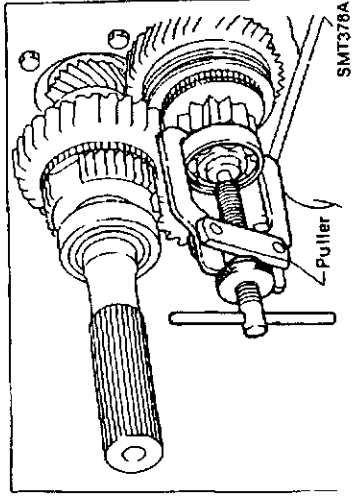
- d. Use puller to remove mainshaft rear bearing.



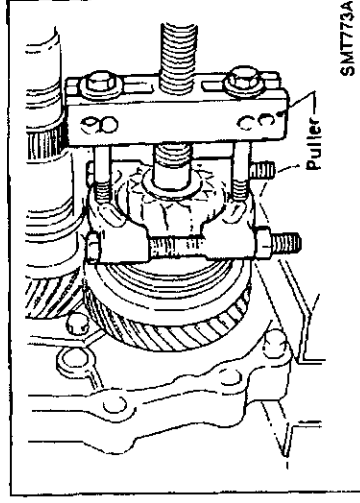
C2 MANUAL TRANSMISSION

3. Transmission Removal and Installation, Assembly and Disassembly (Cont'd)

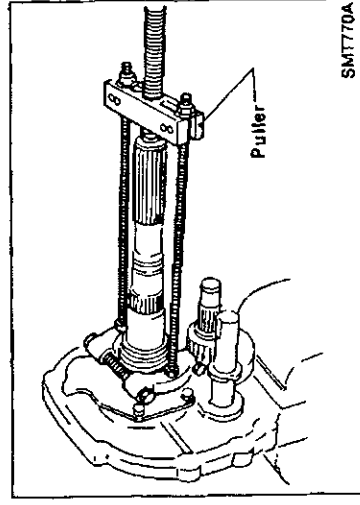
- e. Pull out counter gear rear end bearing.
- f. Remove reverse idler gear and reverse idler thrust washers.



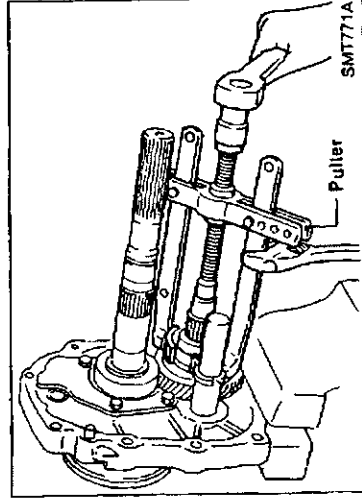
- g. Pull out reverse main gear together with mainshaft spacer and reverse synchronizer hub. Then remove reverse gear needle bearings.



- h. Pull out reverse counter gear.
- i. Remove O.D. coupling sleeve together with O.D. baulk ring, reverse baulk ring and spring inserts.



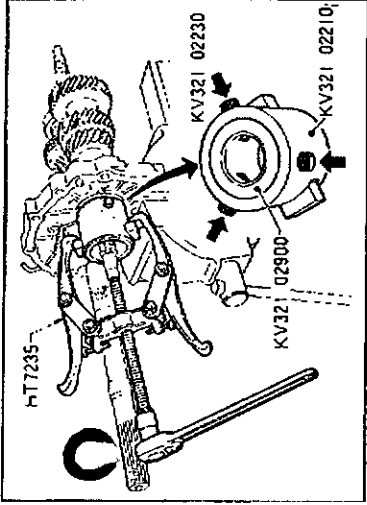
- j. Pull out reverse gear bushing.



- k. Pull out O.D. counter gear together with reverse cone.

C2 MANUAL TRANSMISSION

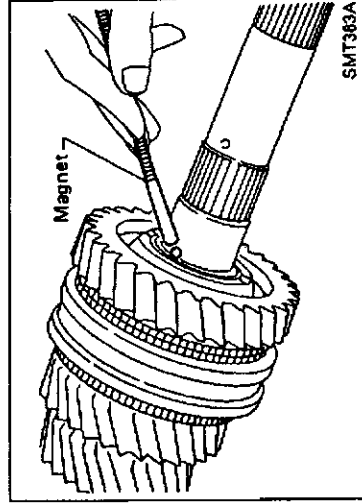
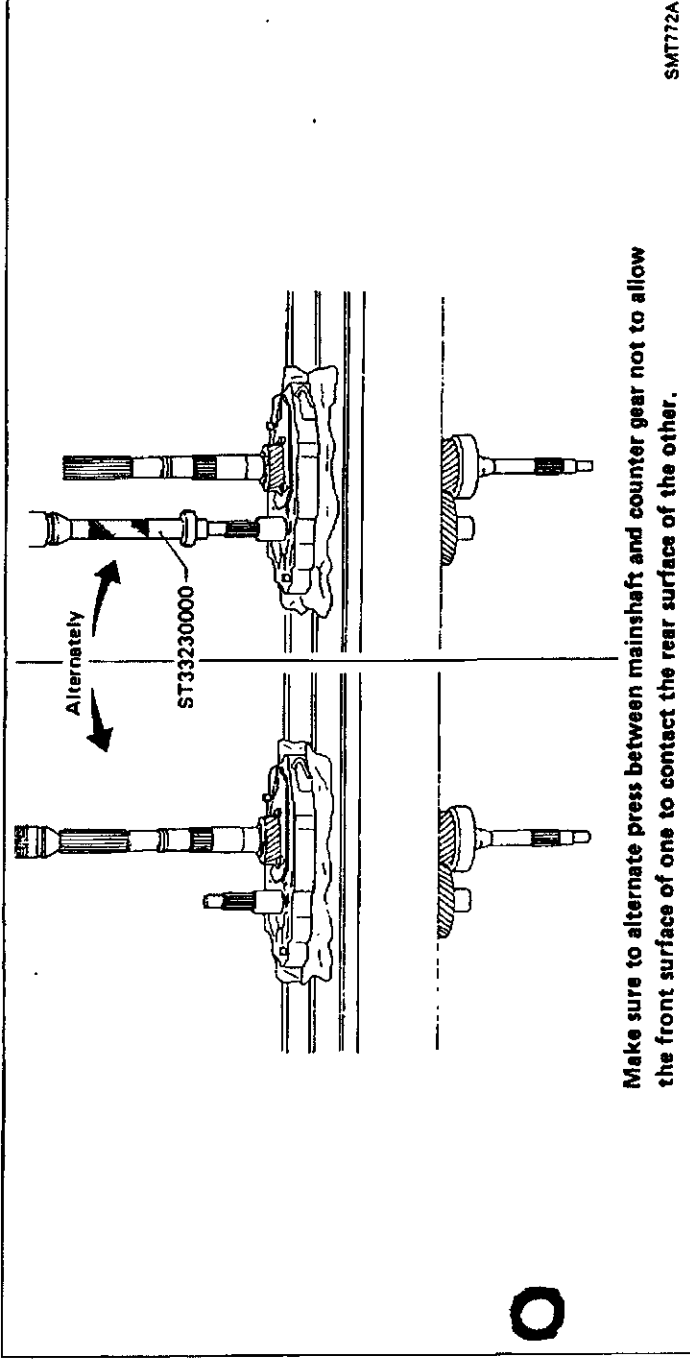
3. Transmission Removal and Installation, Assembly and Disassembly (Cont'd)



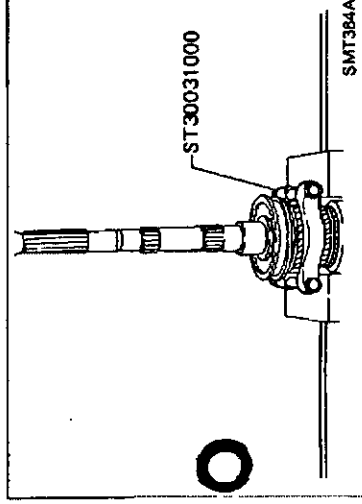
3. Remove 5th gear bushing, mainshaft ASSY, main drive gear ASSY and counter gear.
Set the bushing hook (special service tool) in the 5th gear bushing and use gear puller to remove 5th gear bushing.

CAUTION:

- Position the bushing hook (special service tool) with 3 spacers.**
4. Press out mainshaft and counter gear alternately.



5. Remove front side components on mainshaft.
 - a. Remove 1st gear washer and steel ball.
 - b. Remove 1st main gear and 1st gear needle bearing.

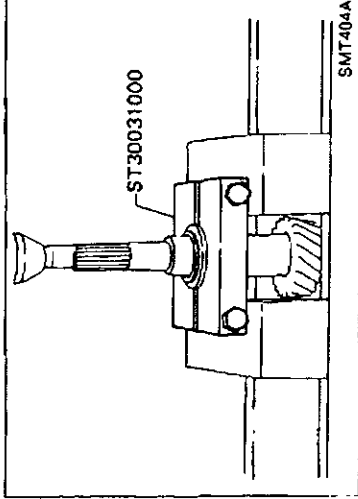
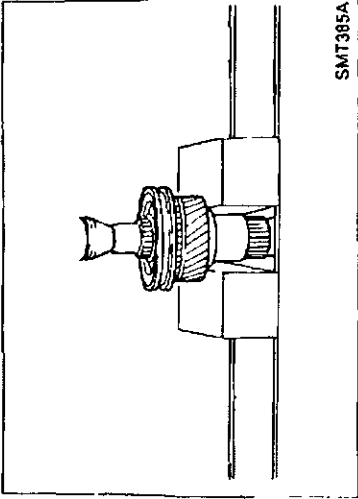


- c. Press out 2nd main gear together with 1st gear bushing and 1st & 2nd synchronizer assembly.
- d. Remove mainshaft front snap ring.

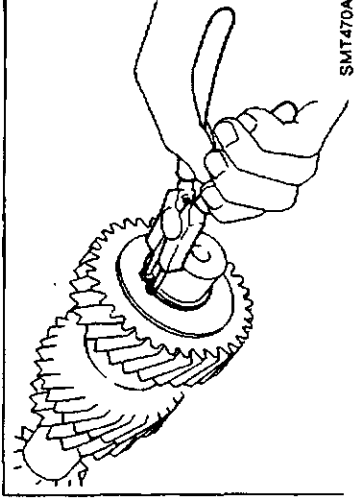
C2 MANUAL TRANSMISSION

3. Transmission Removal and Installation, Assembly and Disassembly (Cont'd)

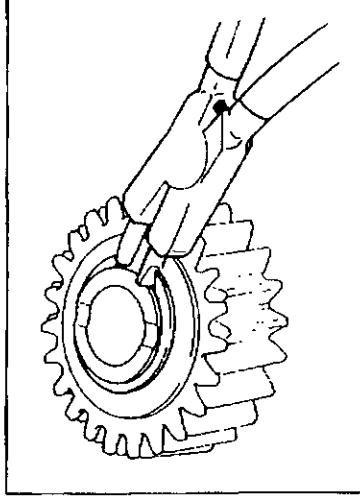
- e. Press out 3rd main gear together with 3rd & 4th synchronizer assembly and 3rd gear needle bearing.



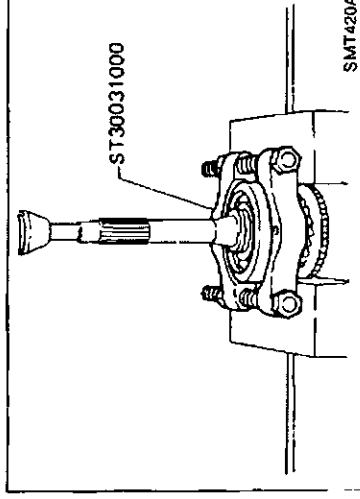
6. Remove front side components on counter gear.
 - a. Remove counter gear rear thrust bearing.



- b. Remove sub-gear components.



- c. Reverse idler sub-gear disassembly
Remove snap ring and detach sub-gear from reverse idler gear.



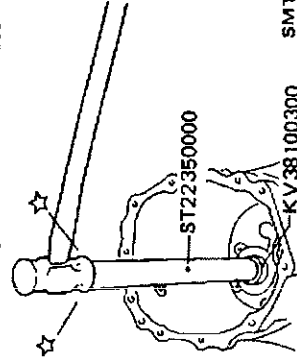
7. Remove main driver gear bearing.
 - a. Remove main drive gear snap ring and spacer.
 - b. Press out main drive gear bearing.

C2 MANUAL TRANSMISSION

3. Transmission Removal and Installation, Assembly and Disassembly (Cont'd)

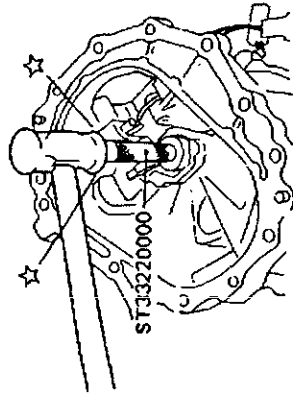
8. Remove bearings from case components.

Counter gear front bearing in transmission case



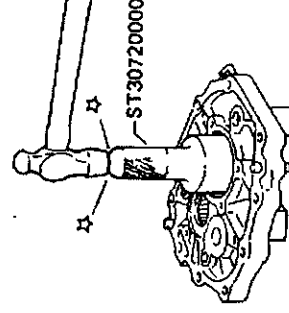
SMT388A

Counter gear rear end bearing in O.D. gear case



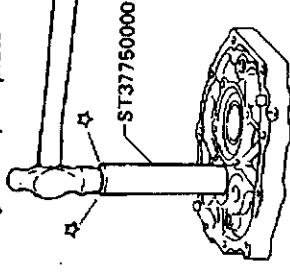
SMT390A

Mainshaft front bearing in adapter plate

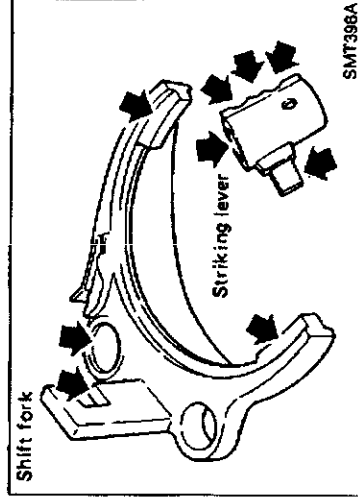


SMT396A

Counter gear rear bearing in adapter plate

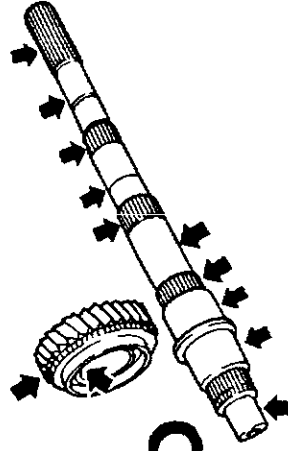


SMT394A



SMT396A

Mainshaft and gear



SMT386A

SHIFT CONTROL COMPONENTS INSPECTION

- Check contact surface and sliding surface for wear, scratches, projections or other damage.

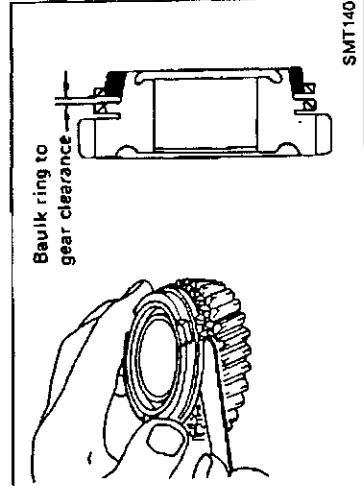
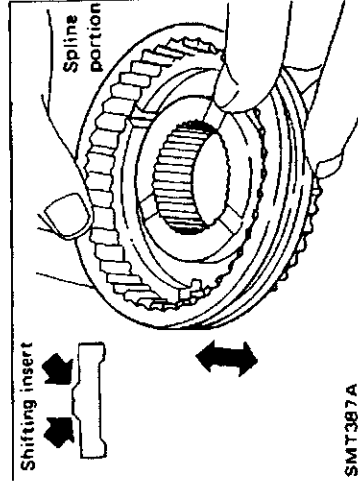
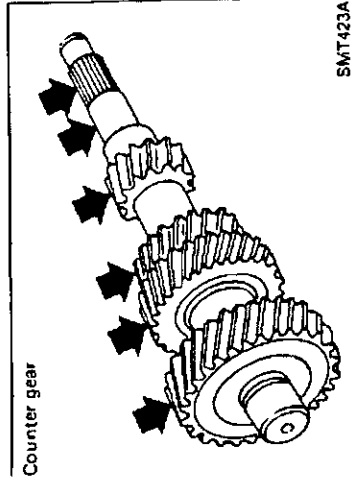
GEAR COMPONENTS INSPECTION

Gears and shafts

- Check shafts for cracks, wear or bending.
- Check gears for excessive wear, chips or cracks.

C2 MANUAL TRANSMISSION

3. Transmission Removal and Installation, Assembly and Disassembly (Cont'd)



Synchronizers

- Check spline portion of coupling sleeves, hubs and gears for wear or cracks.
- Check baulk rings for cracks or deformation.
- Check shift inserts for wear or deformation.
- Check insert springs for deformation.

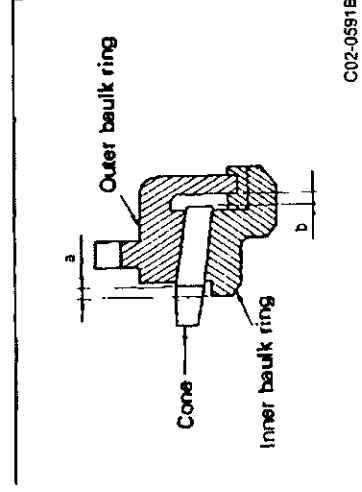
Clearance between baulk ring and gear

- a. 1st, main drive & O.D. gear

	Standard	Wear limit
1st	1.05 - 1.3 (0.0413 - 0.0512)	0.7 (0.028)
Main drive	1.05 - 1.3 (0.0413 - 0.0512)	0.7 (0.028)
O.D.	1.05 - 1.3 (0.0413 - 0.0512)	0.7 (0.028)

Unit: mm (in)

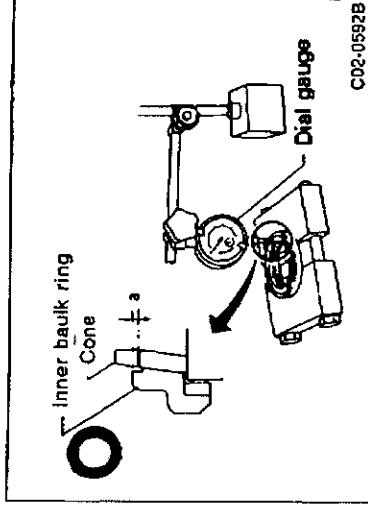
If the clearance is smaller than the wear limit, replace baulk ring.



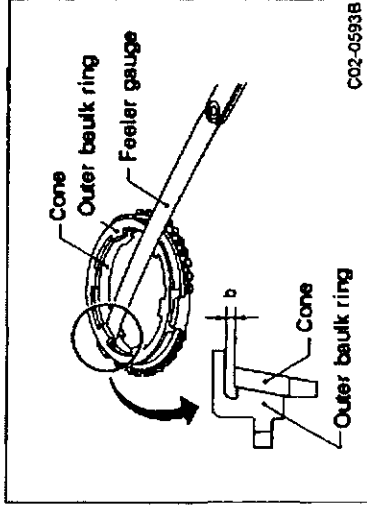
- b. 2nd and 3rd gear
- The outer baulk ring, cone and inner baulk ring are a set and must maintain dimensions described below. If replacement is necessary, replace all three parts as an entire new set and then assemble.
 - Clearance measurement.
 - Measure clearance "a" and "b".

3. Transmission Removal and Installation, Assembly and Disassembly (Cont'd)

- Use a dial gauge to measure clearance dimension "a".
- Measure the part in two opposite locations and calculate average value.



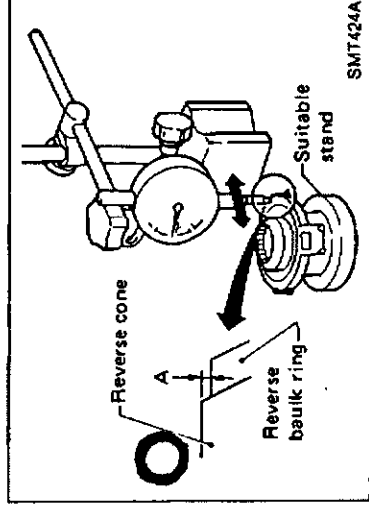
- Use feeler gauge to measure clearance "b".
- Measure the part in two adjacent locations and determine the average value.



Part	New value	Wear limit
Clearance a	0.65 - 1.1 (0.0256 - 0.0433)	0.2 (0.008) max.
Clearance b	0.7 - 0.9 (0.028 - 0.035)	0.2 (0.008) max.

Unit: mm (in)

- Measure wear of reverse baulk ring. (1st, main drive and O.D. gear)
 - Place baulk ring in position on reverse cone.
 - While holding baulk ring against reverse cone as far as it will go, measure dimension "A" with dial indicator.



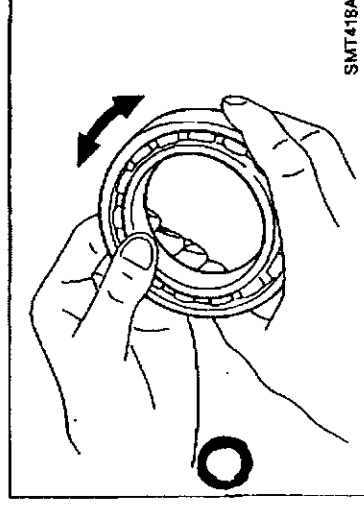
	Standard	Wear limit
Dimension "A"	-0.1 to 0.35 (-0.0039 to 0.0138)	0.7 (0.028)

Unit: mm (in)

- c. If dimension "A" is larger than the wear limit, replace baulk ring.

Bearings

- Make sure bearings roll freely and are free from noise, cracks, pitting or wear.

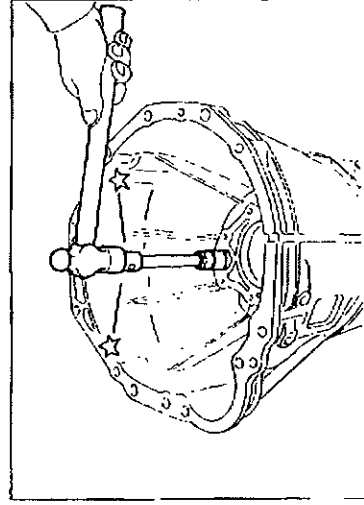
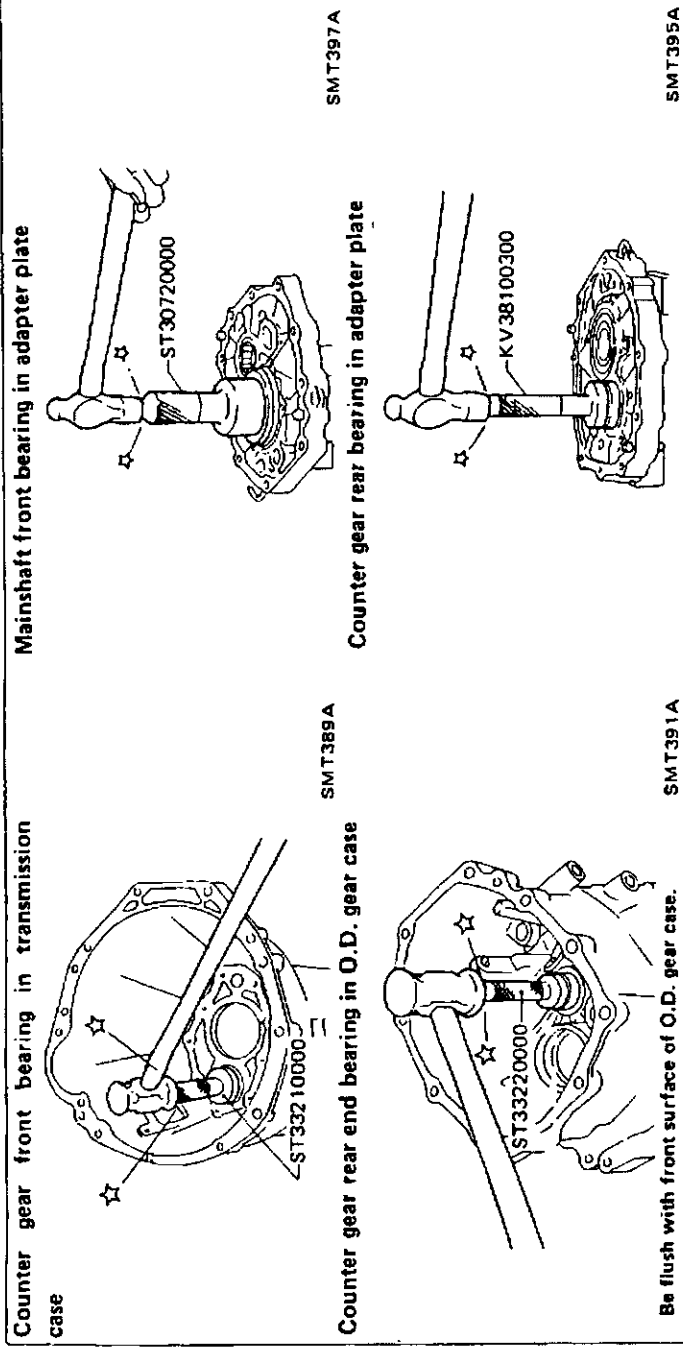


C2 MANUAL TRANSMISSION

3. Transmission Removal and Installation, Assembly and Disassembly (Cont'd)

GEAR COMPONENTS ASSEMBLY

1. Install bearings into case components.



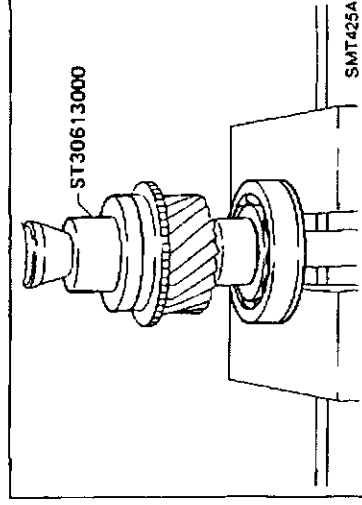
Slide ball bearing

- Use a drift [26 mm (1.02 in) outer diameter] to install the slide ball bearing flush in the case.

CAUTION:

Place a 19-mm (0.75 in) socket on the drift.

- Use the same method to install the adapter plate and rear extension slide ball bearing.



2. Install main drive gear bearing.
 - a. Press main drive gear bearing.
 - b. Install main drive gear spacer.

C2 MANUAL TRANSMISSION

3. Transmission Removal and Installation, Assembly and Disassembly (Cont'd)

- c. Select proper main drive gear snap ring to minimize clearance of groove.

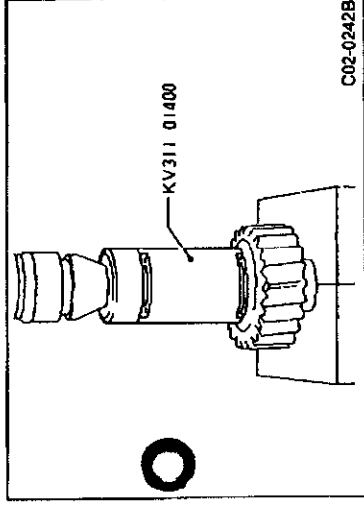
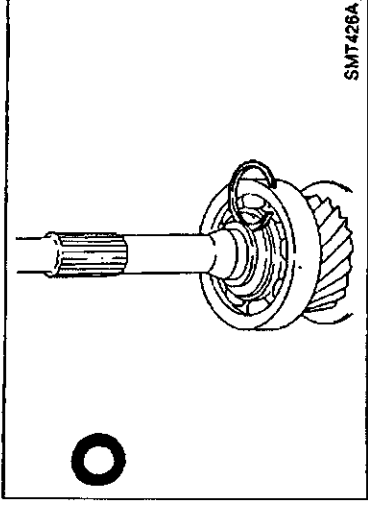
Allowable groove clearance:

0 - 0.1 mm (0 - 0.004 in)

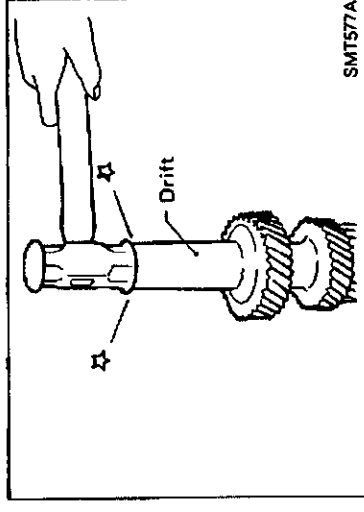
Main drive gear snap ring

Thickness mm (in)	Part number
1.89 (0.0744)	32204-01G00
1.98 (0.0780)	32204-01G01
2.05 (0.0807)	32204-01G02
2.12 (0.0835)	32204-01G03
2.19 (0.0862)	32204-01G04

- d. Install selected snap ring on main drive gear

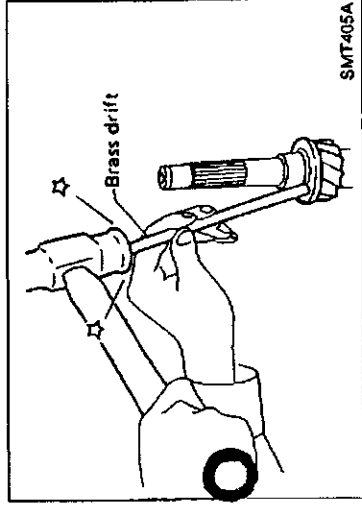


3. Install components on counter gear
- a. Reverse idler sub-gear assembly
- Assemble sub-gear on reverse idler gear as shown in figure. Use drift (special service tool) to press-fit snap ring.



- b. Install sub-gear components.

When installing sub-gear snap ring, tap sub-gear snap ring into position on counter gear.



- c. Install counter gear rear thrust bearing.

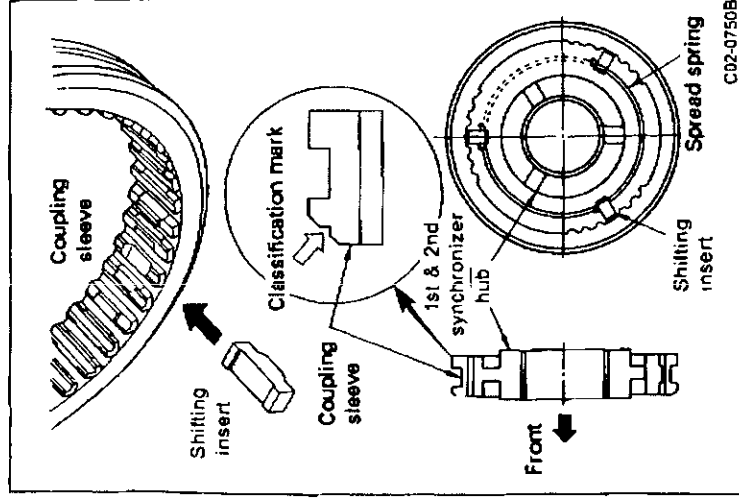
C2 MANUAL TRANSMISSION

3. Transmission Removal and Installation, Assembly and Disassembly (Cont'd)

4. Install front side components on mainshaft.
 - a. 1st & 2nd synchronizer ASSY assembly
- Assemble coupling sleeve, shifting insert and spread spring on 1st & 2nd synchronizer hub.

CAUTION:

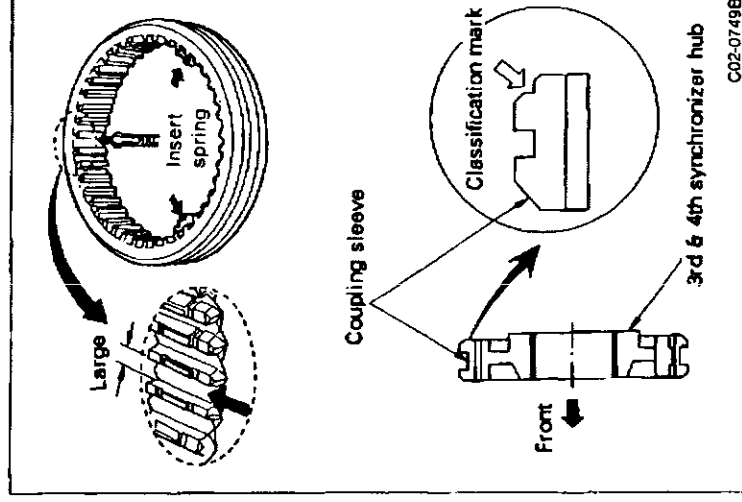
- (1) Position spread spring end (side bent at angle) so it is engaged in inside groove.
- (2) Make sure the front and rear spread spring are not engaged in the same shifting insert.
- (3) Install the shifting insert in the position of the indentation in the coupling sleeve as shown in the figure.
- (4) Assemble the coupling sleeve with the groove facing the front.
- (5) Move hub and coupling sleeve by hand to make sure they move smoothly.



- b. 3rd & 4th synchronizer ASSY assembly
- Assemble coupling sleeve and insert spring in 3rd & 4th synchronizer hub as shown in the figure.

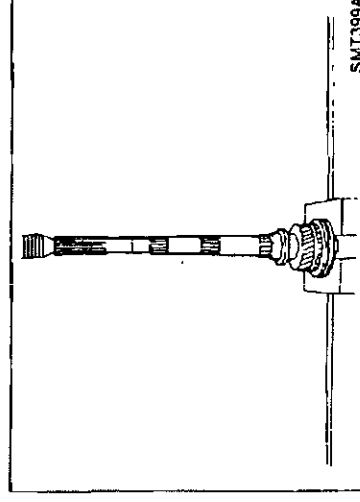
CAUTION:

- (1) Assemble insert spring in groove of coupling sleeve as shown in figure.
- (2) Install synchronizer hub in direction indicated in figure.
- (3) Assemble coupling sleeve with groove facing the rear side.
- (4) Move hub and coupling sleeve by hand and check that they move smoothly.



- c. Press on 3rd & 4th synchronizer assembly together with 3rd main gear and 3rd gear needle bearing.

Pay attention to direction of synchronizer assembly.



C2 MANUAL TRANSMISSION

3. Transmission Removal and Installation, Assembly and Disassembly (Cont'd)

- d. Select proper snap ring to minimize clearance of groove.

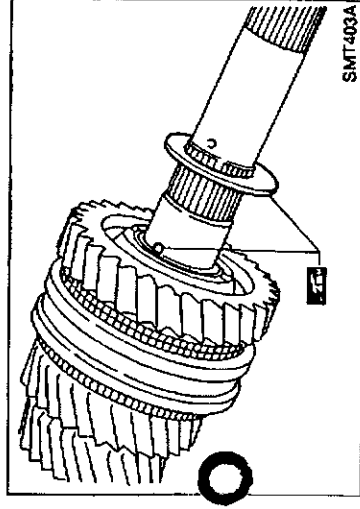
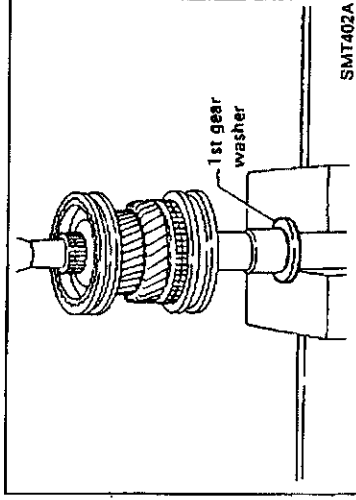
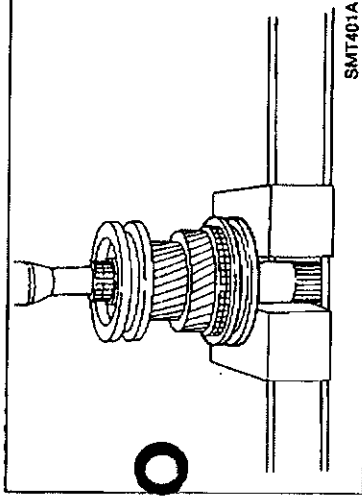
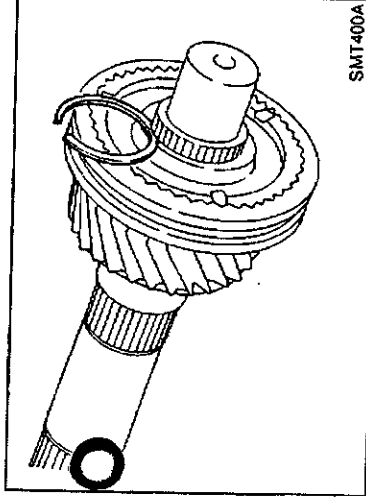
Allowable clearance of groove:

0 - 0.1 mm (0 - 0.004 in)

Mainshaft front snap ring

Thickness mm (in)	Part number
1.89 (0.0744)	32204-01G00
1.98 (0.0780)	32204-01G01
2.06 (0.0807)	32204-01G02
2.12 (0.0835)	32204-01G03
2.19 (0.0862)	32204-01G04

- e. Install selected snap ring on mainshaft.



- f. Press on 1st & 2nd synchronizer assembly together with 2nd main gear and 2nd gear needle bearing.

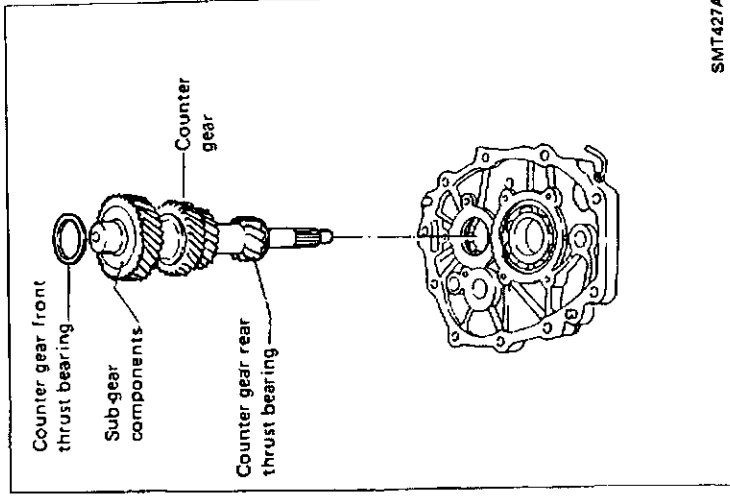
- g. Press on 1st gear bushing using 1st gear washer.
h. Install 1st main gear and needle bearing.

- i. Install steel ball and 1st gear washer.
Apply multi-purpose grease to steel ball and 1st gear washer before installing.

C2 MANUAL TRANSMISSION

3. Transmission Removal and Installation, Assembly and Disassembly (Cont'd)

5. Select proper counter gear front bearing shim when replacing transmission case, counter gear, counter gear thrust bearing or sub-gear components.
 - a. Install counter gear with sub-gear components, counter gear front and rear thrust bearing on adapter plate.
 - b. Remove counter gear front bearing shim from transmission case.
 - c. Place adapter plate and counter gear assembly in transmission case (case inverted).



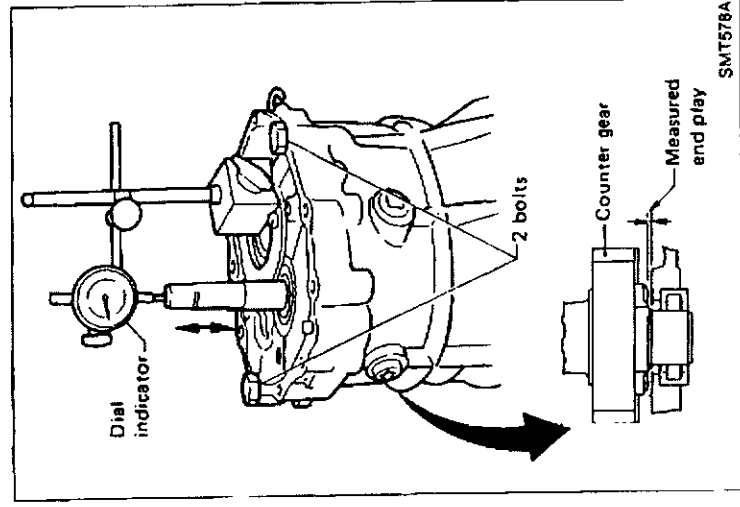
- d. Tighten adapter plate to transmission case with 2 bolts.
- e. Place dial indicator on rear end of counter gear.
- f. Move counter gear up and down and measure dial indicator deflection.
- g. Select proper shim using table below as a guide.

Counter gear end play:

0.10 - 0.25 mm (0.0039 - 0.0098 in)

Table for selecting proper counter gear front bearing shim

Dial indicator deflection mm (in)	Thickness of correct washer mm (in)	Part number
0.93 - 1.02 (0.0366 - 0.0402)	0.88 (0.0346)	32218-01G11
1.03 - 1.12 (0.0406 - 0.0441)	0.96 (0.0378)	32218-01G12
1.13 - 1.22 (0.0445 - 0.0480)	1.04 (0.0409)	32218-01G13
1.23 - 1.32 (0.0484 - 0.0520)	1.12 (0.0441)	32218-01G14
1.33 - 1.42 (0.0524 - 0.0559)	1.28 (0.0504)	32218-01G15
1.43 - 1.52 (0.0563 - 0.0598)	1.36 (0.0535)	32218-01G16
1.53 - 1.62 (0.0602 - 0.0638)	1.44 (0.0567)	32218-01G17

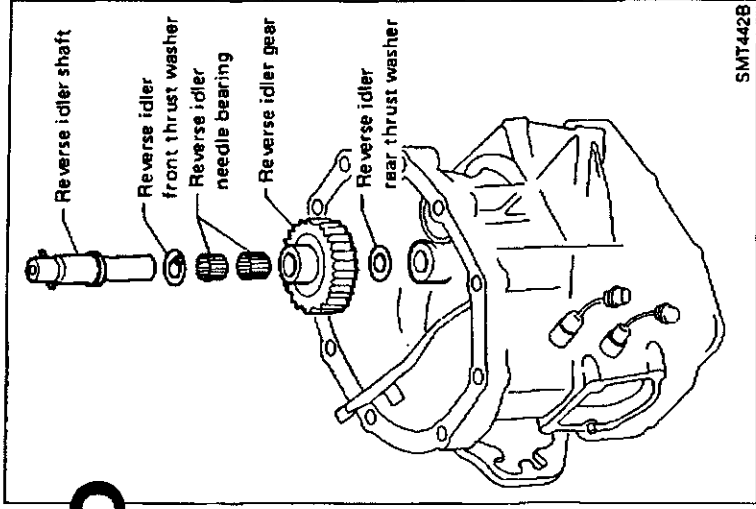


3. Transmission Removal and Installation, Assembly and Disassembly (Cont'd)

6. Select proper reverse idler rear thrust washer when replacing O.D. gear case, reverse idler gear, reverse idler shaft or reverse idler thrust washer.
 - a. Install reverse idler gear, reverse idler needle bearings, reverse idler thrust washers and reverse idler shaft into O.D. gear case.

When replacing reverse idler rear washer, install either A or B. Reverse idler rear thrust washer

	Thickness mm (in)	Part number
A	1.97 (0.0776)	32284-01G10
B	2.07 (0.0815)	32284-01G11

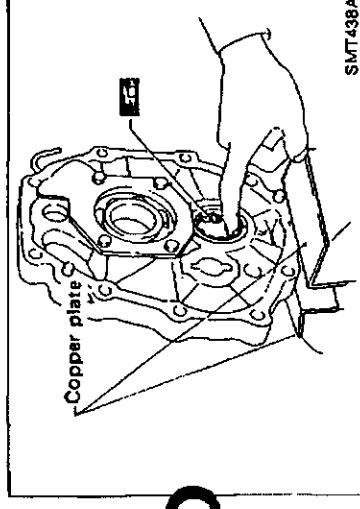
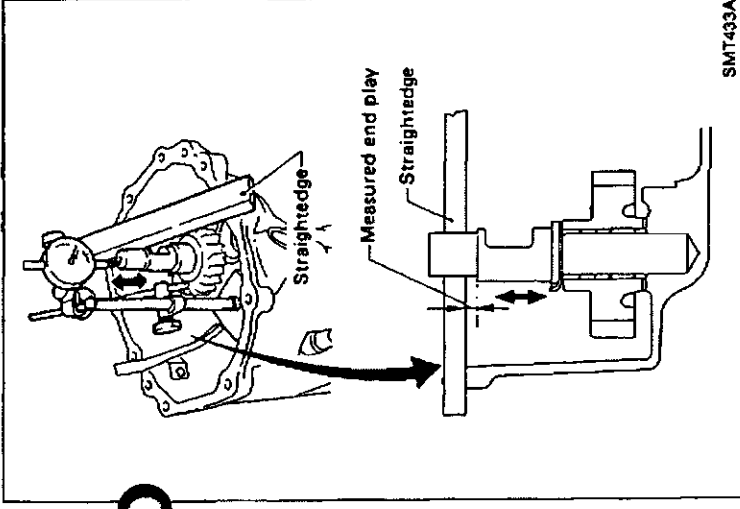


- b. Place dial indicator on front end of reverse idler shaft.
- c. Put straightedge on front surface of O.D. gear case as a stopper for reverse idler shaft.
- d. Move reverse idler shaft up and down and measure reverse idler gear end play.

Reverse idler gear end play:

0.30 - 0.53 mm (0.0118 - 0.0209 in)

- e. If not within specification, replace reverse idler rear thrust washer with the other (A or B) and check again.

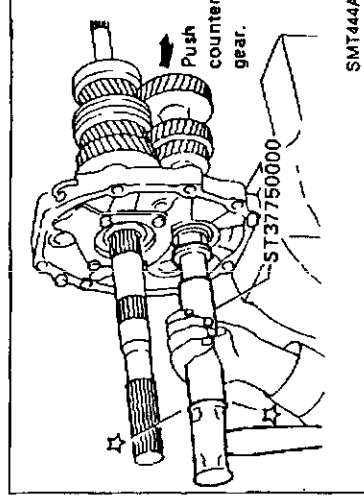
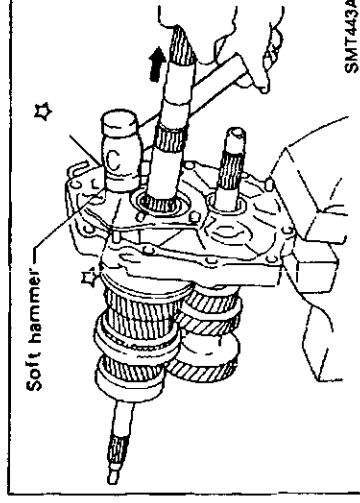
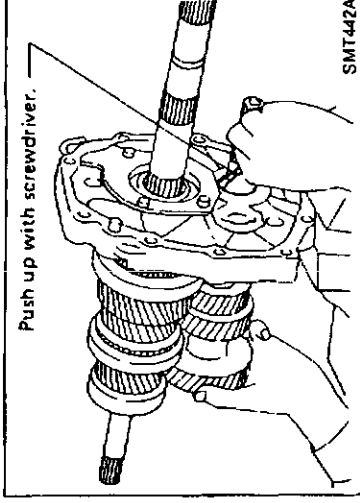
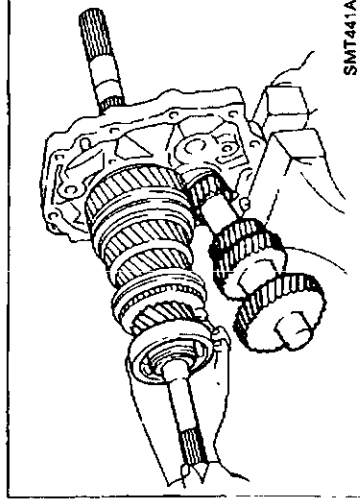
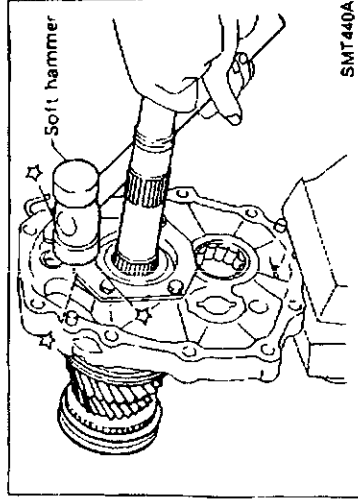


7. Install mainshaft and counter gear on adapter plate and main drive gear on mainshaft.
 - a. Mount adapter plate on vise and apply multi-purpose grease to counter gear rear bearing.

C2 MANUAL TRANSMISSION

3. Transmission Removal and Installation, Assembly and Disassembly (Cont'd)

- b. Install mainshaft partially on mainshaft front bearing. To enable counter gear installation, do not install mainshaft completely.



- c. Install counter gear on counter gear rear bearing and install main drive gear, pilot bearing and spacer on mainshaft.

When installing counter gear into counter gear rear bearing, push up on upper roller of counter gear rear bearing with screwdriver.

- d. Install mainshaft and counter gear completely by tapping rear side of adapter plate and pulling mainshaft.

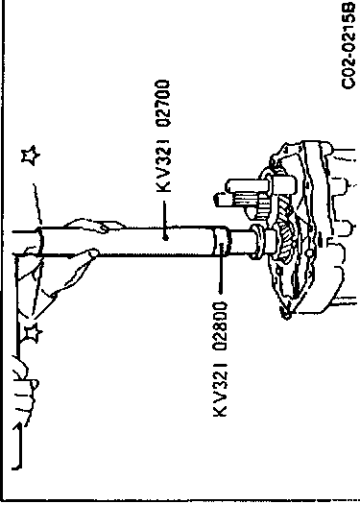
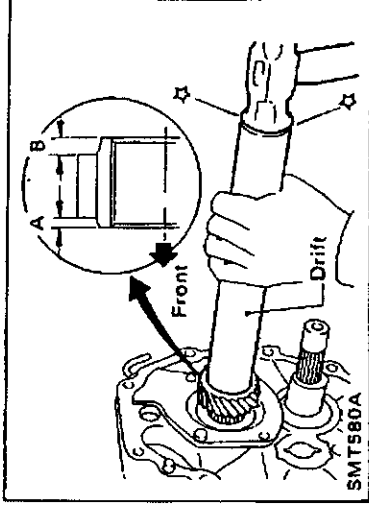
8. Install rear side components on mainshaft and counter gear.
 - a. Install O.D. gear bushing while pushing on the front of counter gear.

3. Transmission Removal and Installation, Assembly and Disassembly (Cont'd)

- b. Install O.D. main gear

Pay attention to direction of O.D. main gear (B is wider than A as shown at left)

- c. Install adapter plate with gear assembly into transmission case.
d. Install O.D. gear needle bearing and then install O.D. counter gear and reverse idler shaft.

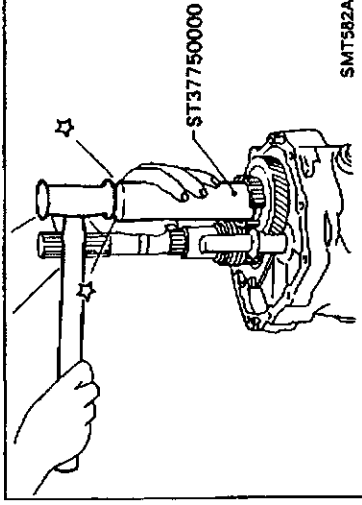


- e. Install reverse gear bushing

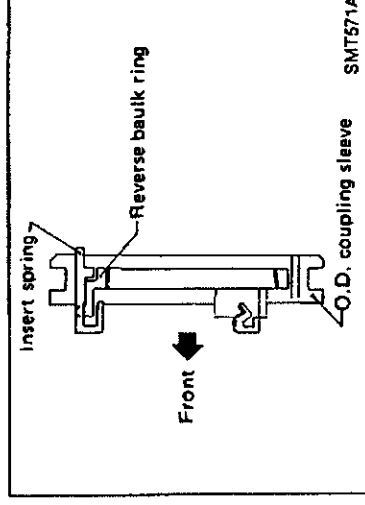
- Install steel ball in mainshaft.
- Use a drift (special service tool) and install reverse gear bushing.

CAUTION:

Align steel ball in reverse gear bushing indentation and press-fit to install.

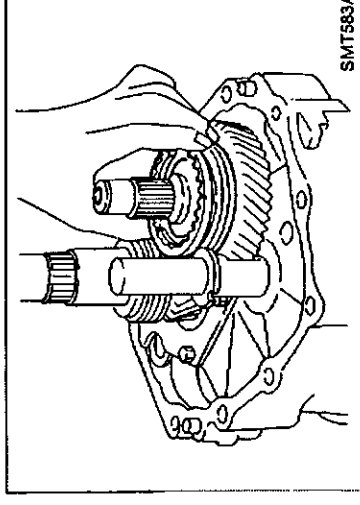


- f. Install reverse cone.



- g. Install insert springs and reverse baulk ring on O.D. coupling sleeve. Then install them and O.D. baulk ring on O.D. counter gear.

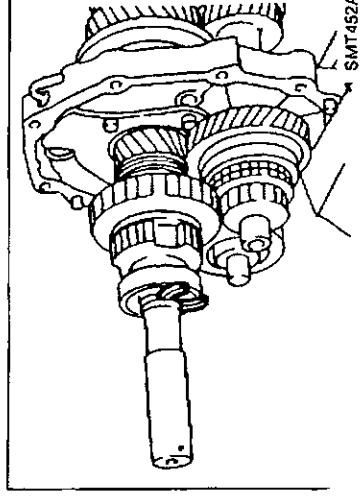
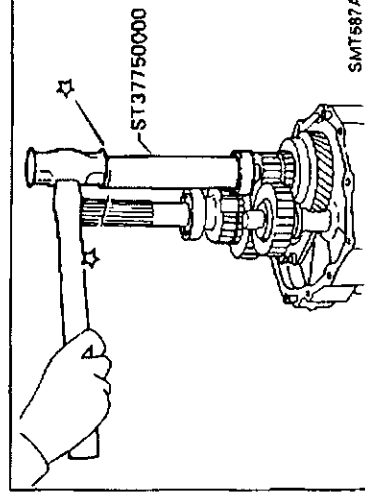
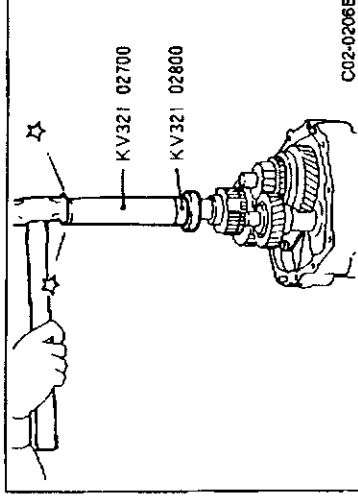
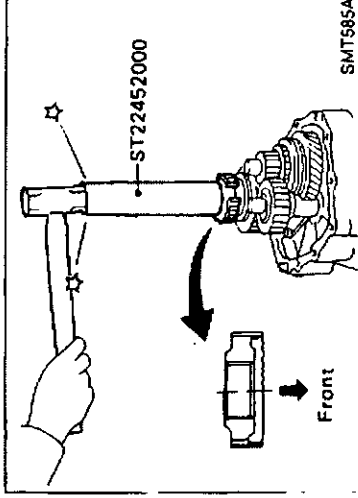
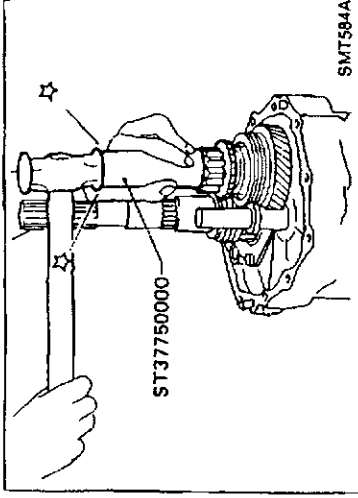
Pay attention to direction of O.D. coupling sleeve.



C2 MANUAL TRANSMISSION

3. Transmission Removal and Installation, Assembly and Disassembly (Cont'd)

- h. Install reverse counter gear.
- i. Install reverse gear needle bearing and then install reverse main gear, reverse idler gear and reverse idler thrust washers.



- j. Install reverse hub.
Pay attention to its direction.

- k. Use drift (special service tool) to install mainshaft spacer and mainshaft rear gear bearing.

- l. Install counter gear rear end bearing.
- m. Separate adapter plate from transmission case and mount adapter plate on vice again.

C2 MANUAL TRANSMISSION

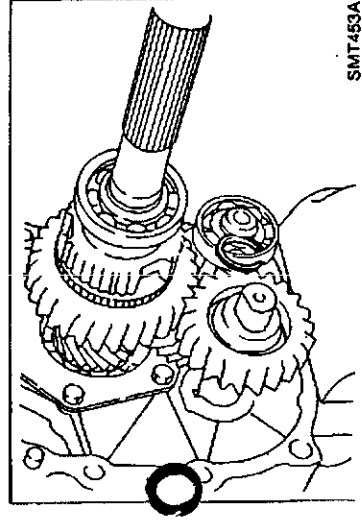
3. Transmission Removal and Installation, Assembly and Disassembly (Cont'd)

- n. Select proper mainshaft C-ring to minimize clearance of groove.

**Allowable clearance of groove:
0 - 0.1 mm (0 - 0.004 in)**

Thickness mm (in)	Part Number	Thickness mm (in)	Part Number
2.63 (0.1035)	32348-01G15	3.19 (0.1256)	32348-01G07
2.70 (0.1063)	32348-01G00	3.26 (0.1283)	32348-01G08
2.77 (0.1091)	32348-01G01	3.33 (0.1311)	32348-01G09
2.84 (0.1118)	32348-01G02	3.40 (0.1339)	32348-01G10
2.91 (0.1146)	32348-01G03	3.47 (0.1366)	32348-01G11
2.98 (0.1173)	32348-01G04	3.54 (0.1394)	32348-01G12
3.05 (0.1201)	32348-01G05	3.61 (0.1421)	32348-01G13
3.12 (0.1228)	32348-01G06	3.68 (0.1449)	32348-01G14

- o. Install selected C-ring, C-ring holder and mainshaft rear snap ring.



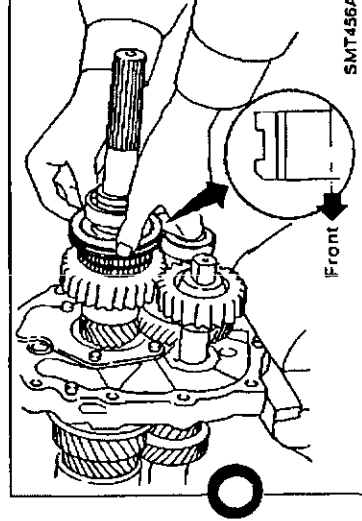
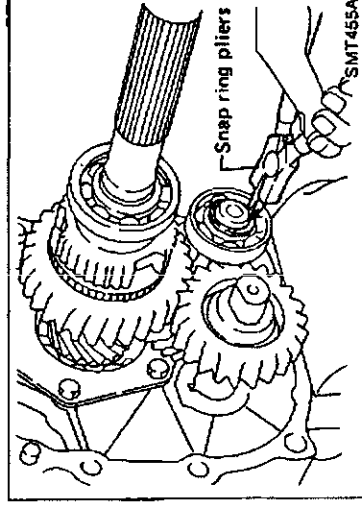
- p. Install spacer and then select proper counter gear rear snap ring to minimize clearance of groove.

**Allowable clearance of groove:
0 - 0.1 mm (0 - 0.004 in)**

Counter gear rear snap ring

Thickness mm (in)	Part number
1.26 (0.0496)	32236-01G08
1.32 (0.0520)	32236-01G00
1.38 (0.0543)	32236-01G01
1.44 (0.0567)	32236-01G02
1.50 (0.0591)	32236-01G03
1.56 (0.0614)	32236-01G04
1.62 (0.0638)	32236-01G05
1.68 (0.0661)	32236-01G06
1.74 (0.0685)	32236-01G07

- q. Install selected counter gear rear snap ring.



- r. Install reverse coupling sleeve.

Pay attention to its direction.

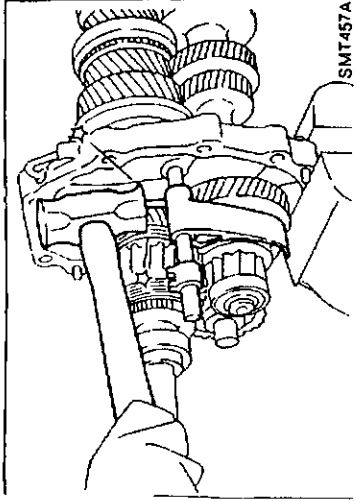
- s. Measure each gear end play as a final check. Refer to "DISASSEMBLY".

C2 MANUAL TRANSMISSION

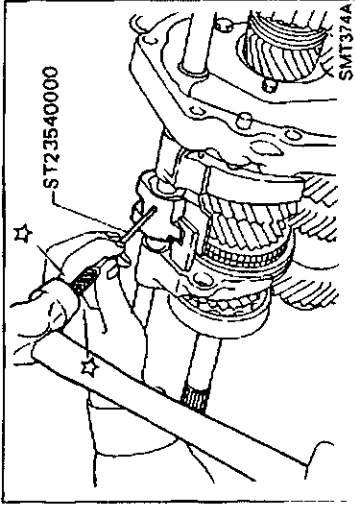
3. Transmission Removal and Installation, Assembly and Disassembly (Cont'd)

SHIFT CONTROL COMPONENTS ASSEMBLY

1. Install O.D. fork rod and O.D. shift fork. Then install retaining pin into O.D. shift fork.
2. Install 1st & 2nd, 3rd & 4th and reverse shift fork in coupling sleeve.



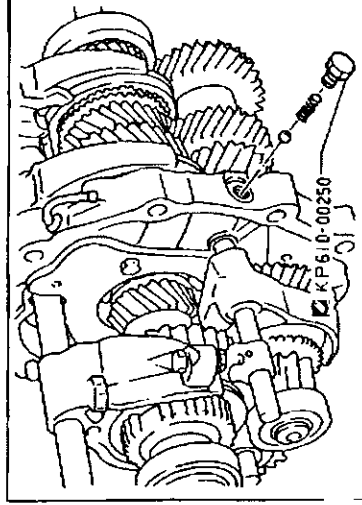
3. Install striking rod into hole of shift forks, striking lever and interlock and then install retaining pin into striking lever.
Make sure that striking rod moves smoothly.



- Install 5th & reverse fork rod in reverse fork.
- Install check ball, return spring and check ball plug.

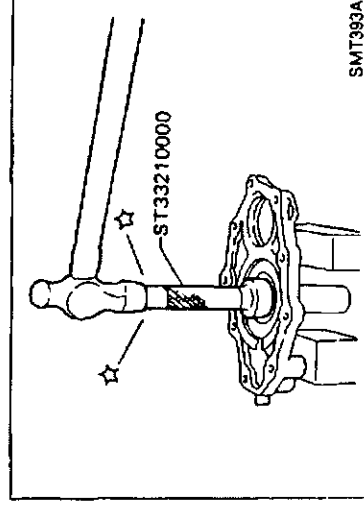
CAUTION:

- (1) Coat check ball plug screw with sealing material.
- (2) Make sure that striking rod moves smoothly.

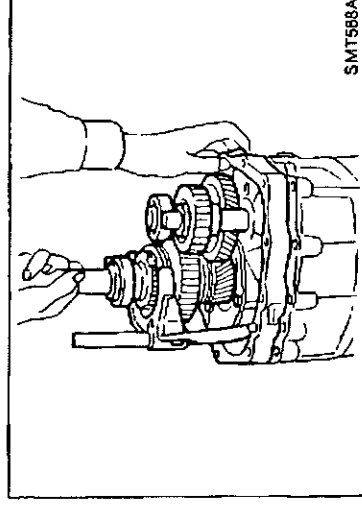


CASE COMPONENTS ASSEMBLY

1. Install front cover oil seal.
Apply multi-purpose grease to seal lip.
2. Install selected counter gear front bearing shim into transmission case.
Apply multi-purpose grease.
3. Apply sealant to mating surface of transmission case.



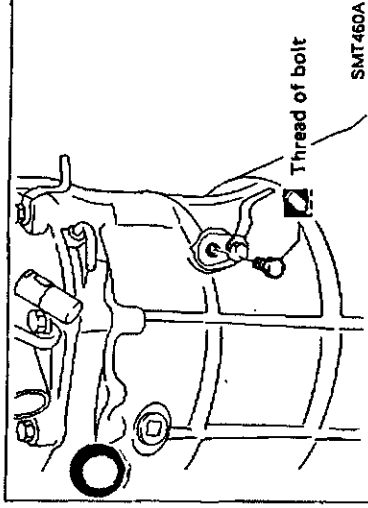
4. Install gear assembly in transmission case.
5. Install check spring and check ball into interlock stopper.
Apply multi-purpose grease to check ball.



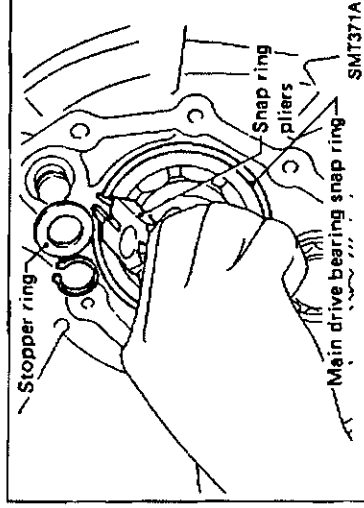
3. Transmission Removal and Installation, Assembly and Disassembly (Cont'd)

6. Install interlock stopper assembly and then tighten check ball plug.

Apply sealant to thread of check ball plug.



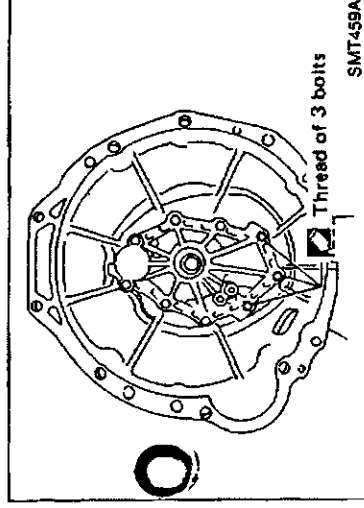
7. Install stopper ring and main drive bearing snap ring.



8. Install front cover and gasket.

Apply sealant to thread of 3 bolts shown left.

9. Apply sealant to mating surface of adapter plate.

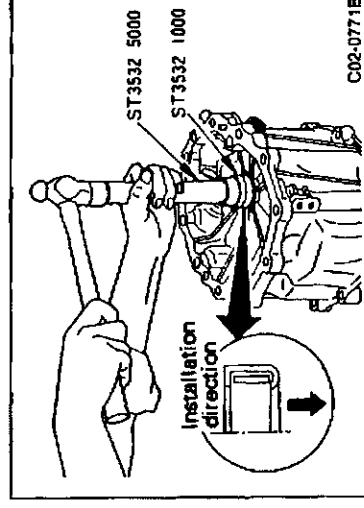


REAR EXTENSION ASSEMBLY

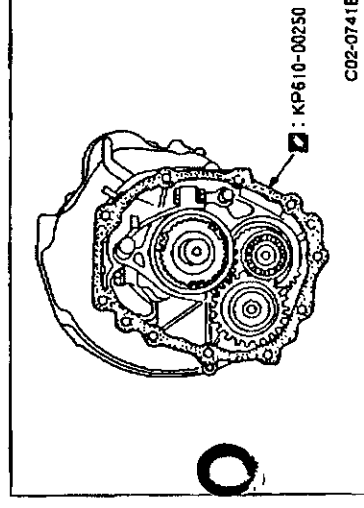
- Use a drift to align mainshaft rear end bearing in case end surface and install in O.D. cover.

CAUTION:

Press-fit bearing in direction shown in left figure so bearing end surface is even with case end.



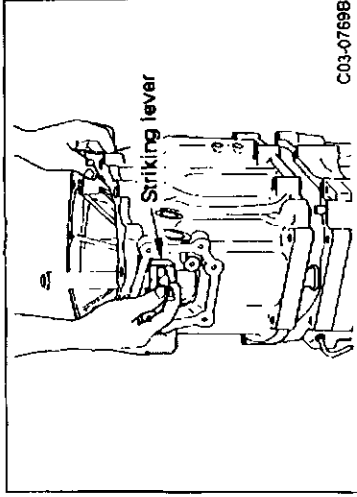
- Coat O.D. cover mating surface with sealant.



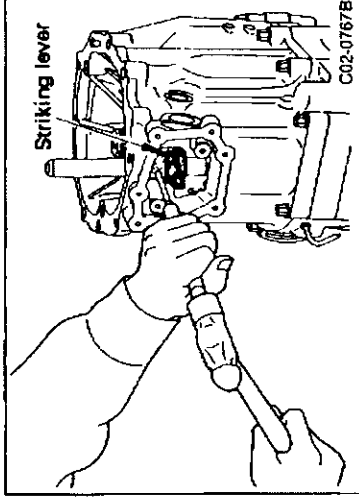
C2 MANUAL TRANSMISSION

3. Transmission Removal and Installation, Assembly and Disassembly (Cont'd)

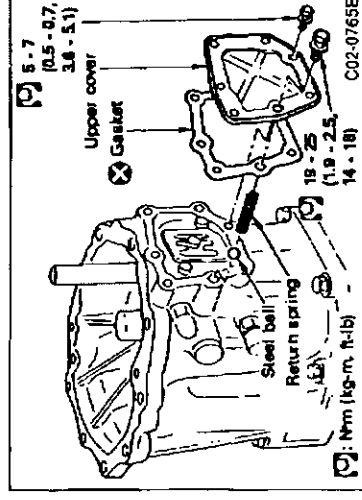
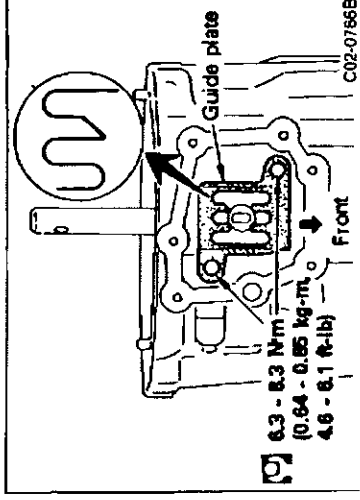
- Install striking lever and rear extension at same time as shown in figure.



- Use pin punch (special service tool) to install retaining pin in striking lever.



- Align guide plate installation direction and tighten bolts to specified torque.



- Install reverse check, select check plunger and spring.

CAUTION:

Coat threads of select check plug with sealant.

- Install neutral switch and reverse lamp switch.

CAUTION:

Coat threads of each switch with sealant.

- Assemble return spring and check ball. Install upper cover and gasket.

CAUTION:

Coat return spring bolts with sealant.

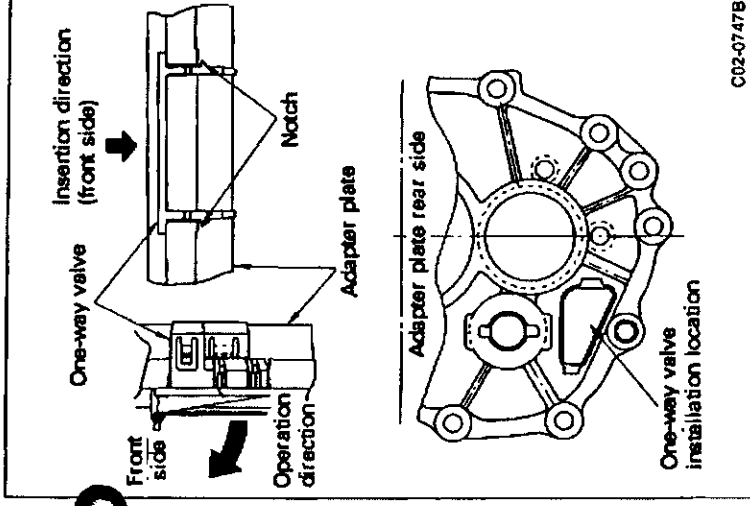
3. Transmission Removal and Installation, Assembly and Disassembly (Cont'd)

One-way valve installation

- Insert the one-way valve in the front of the adapter plate so the notches on both sides engage.

CAUTION:

After installing the one-way valve, check that valve operates as shown in figure.

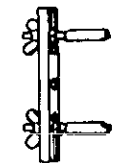
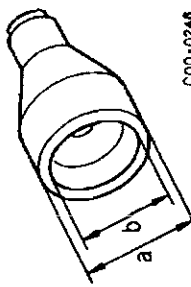
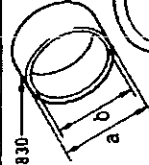
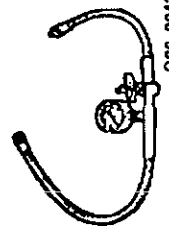
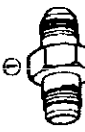
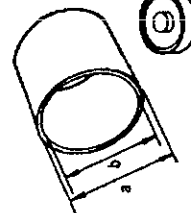


C3 ELECTRICAL CONTROL TORQUE SPLIT 4WD SYSTEM (ATTESSA E-TS)

OPERATION PRECAUTIONS

- Only use genuine Nissan special power steering fluid for the E-TS operation fluid.
- Only use automatic transmission fluid D for the transfer lubrication fluid.
- Never reuse the E-TS operation oil or transfer fluid.
- Do not allow dust or foreign matter to enter the system when installing or removing hydraulic unit, piping or transfer unit.
- Use a torque wrench to tighten bolts and nuts.

SPECIAL SERVICE TOOL0S

Tool name Tool number	Description
Oil seal puller ST3329 0001	   C00-0138
Drift ST2786 2000	 C00-0246
Drift KV401 048S0 KV401 04810 KV401 04820 KV401 04830 KV401 04840 KV401 04850	   C00-0267
Oil pressure gauge KV481 03500 (former ST2909 1000)	 C00-0042
Oil pressure gauge adapter KV481 00410 ① KV481 00410-1 ② KV481 00400-2	  C00-0238
Drift KV401 047S0 KV401 04710 KV401 04720-1 KV401 04720-2 KV401 04730	   C00-0160

Removing front and rear oil seals of transfer unit

Installing transfer unit front oil seal

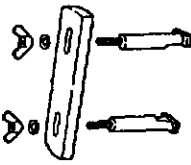
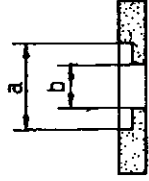
Installing rear oil seal of transfer unit.

Oil pump pressure inspection

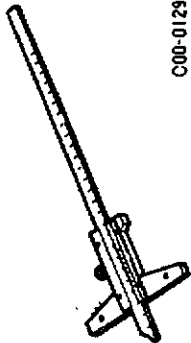
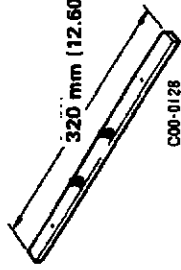
Same as above

Front and rear wheels sensor rotor removal and installation

C3 ELECTRICAL CONTROL TORQUE SPLIT 4WD SYSTEM (ATTESSA E-TS)

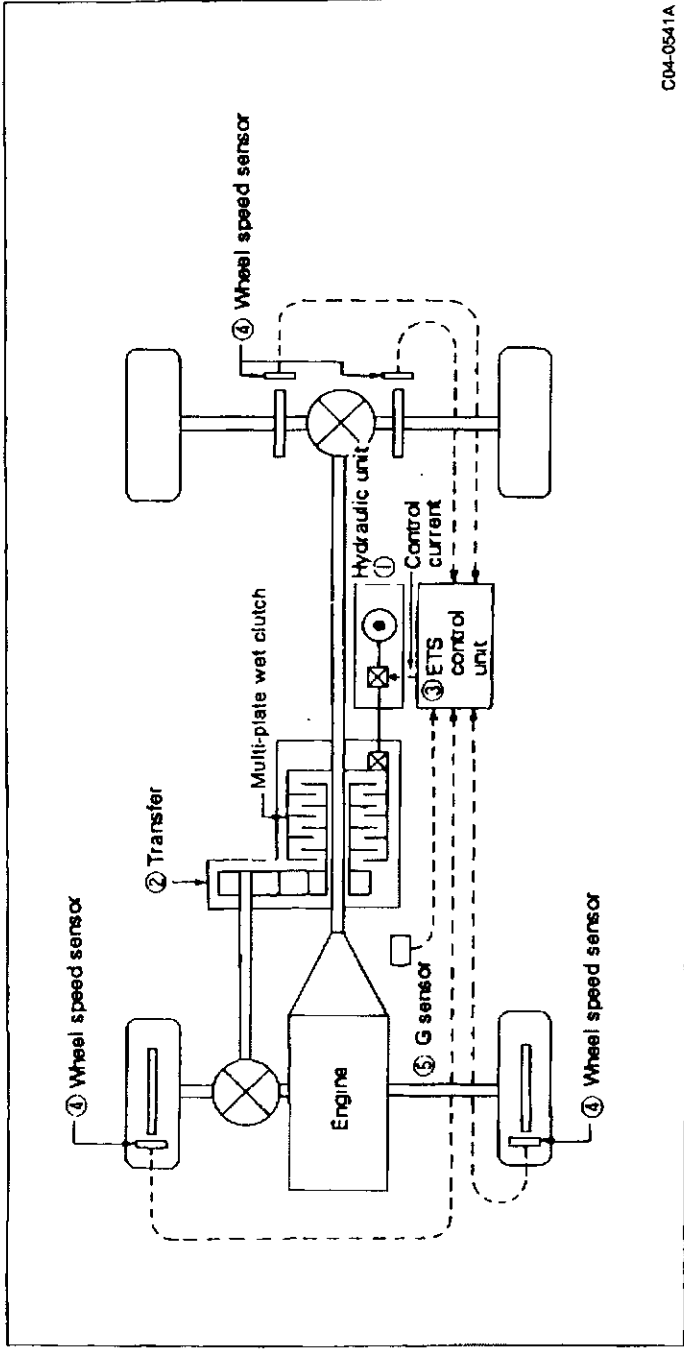
Tool name Tool number	Description
Pin punch KV321 01100 6 mm (0.24 in)	Striking arm and striking lever removal and installation  C00-0084
Spring compressor KV311 01100	Clutch drum snap ring removal and installation  C00-0268
Bearing replacer ST3006 1000	Release bearing removal  C00-0269

COMMERCIAL SERVICE TOOLS

Tool name Tool number	Description
Depth gauge (calipers type) SG9229	Clutch hub end play measurement  C00-0129
Span GG9230 0320 320 mm (12.60 in)	Clutch hub end play measurement  C00-0128
Depth gauge (micrometer type)	Oil pump side clearance measurement
Flange wrench HT7278	Companion flange removal
Puller HT7235	Front drive sprocket, spacer, companion flange removal

C3 ELECTRICAL CONTROL TORQUE SPLIT 4WD SYSTEM (ATTESSA E-TS)

1. Summary



Specifications

Hydraulic control	Hydraulic power	Electric pump (proportional electromagnetic pressure reduction is equipped internally).
	Control pressure	0 - 1,569 kPa (0 - 16 kg/cm ² , 0 - 228 psi)
	Operation oil	Nissan special power steering fluid
	Engine specifications	RB26DETT
Transfer	Transmission specifications	M/T
	Model No. (33100)	05U00
	Model	ETX13A
	Front wheel control system	Torque-split by wet multi-plate clutch
	Lubrication system	Oil pump
	Speedometer pinion gear (drive/driven)	6/20
	Oil type and volume	ℓ (Imp qt) Nissanmatic fluid D [approx. 1.8 (1-5/8)]

C3 ELECTRICAL CONTROL TORQUE SPLIT 4WD SYSTEM (ATTESSA E-TS)

1. Summary (Cont'd)

Inspection standard values

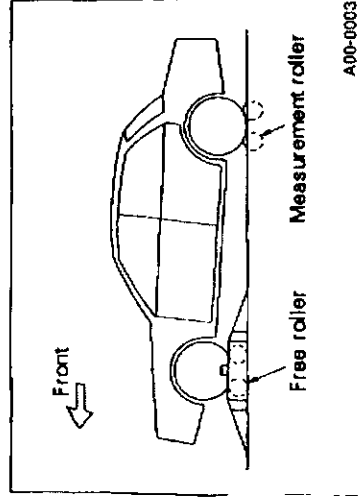
Transfer

Description	Unit: mm (in)	
	Standard value	
Clutch hub end play	0.2 - 0.35 (0.0079 - 0.0138)	
Multi-plate clutch end play	0.2 - 0.5 (0.008 - 0.020)	
Pump inner and outer gear side clearance	0.02 - 0.04 (0.0008 - 0.0016)	

Clutch hub bearing shim	Shim thickness	
	Part number	
	33112 05U04	0.40 (0.0157)
	33112 05U05	0.50 (0.0197)
	33112 05U00	0.60 (0.0236)
	33112 05U01	0.70 (0.0276)
	33112 05U02	0.80 (0.0315)
	33112 05U03	0.90 (0.0354)
	33112 05U06	1.00 (0.0394)

Retainer plate	Retainer plate thickness	
	Part number	
	31537 05U00	4.8 (0.189)
	31537 05U01	5.0 (0.197)
	31537 05U02	5.2 (0.205)
	31537 05U03	5.4 (0.213)
	31537 05U04	5.6 (0.220)
	31537 05U05	5.8 (0.228)
	31537 05U06	6.0 (0.236)
	31537 05U07	6.2 (0.244)
	31537 05U08	6.4 (0.252)
	31537 05U09	6.6 (0.260)
	31537 05U10	6.8 (0.268)
	31537 05U11	7.0 (0.276)

Pump gear (Use set of inner and outer gears which are the same thickness.)	Part number		Gear thickness
	Inner gear	Outer gear	
	31346 05U02	31347 05U02	6.98 (0.2748)
	31346 05U01	31347 05U01	6.99 (0.2752)
	31346 05U00	31347 05U00	7.00 (0.2756)



2. On-vehicle Inspection and Adjustment

2-1 4WD FUNCTION INSPECTION

- Move the car so the front and rear wheels are positioned on the free rollers.
- In vehicles equipped with M/T, set selector in 2nd gear and release clutch in 2nd gear at low speed so a speed of 20 km/h (12 MPH) is reached.
- Check speed of all four wheels visually. Make sure front and rear wheels are moving at approximately the same speed.

CAUTION:

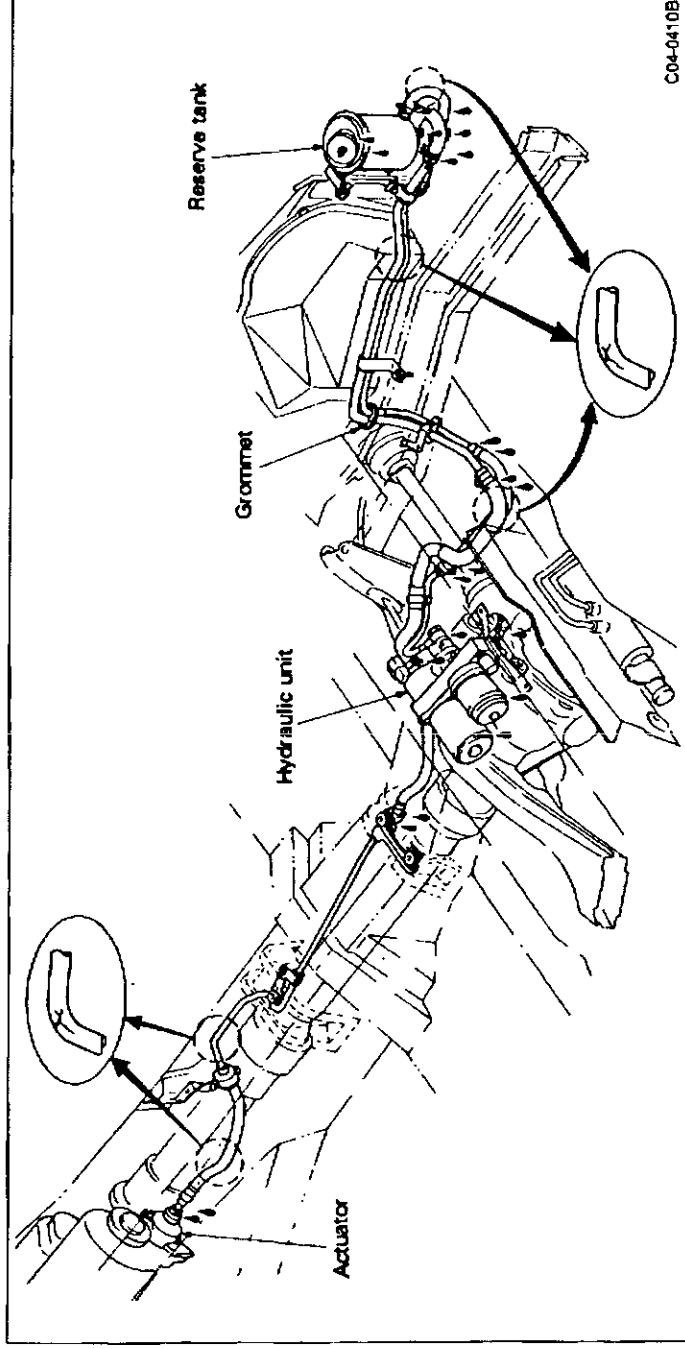
Perform inspection when vehicle is in 2WD mode. Refer to "3. ETS Troubleshooting" when front wheel speed is noticeably slower than rear wheel speed (the front wheels may move slowly due to the oil viscosity in the transfer unit even in the 2WD mode).

2-2 OIL LEAK INSPECTION

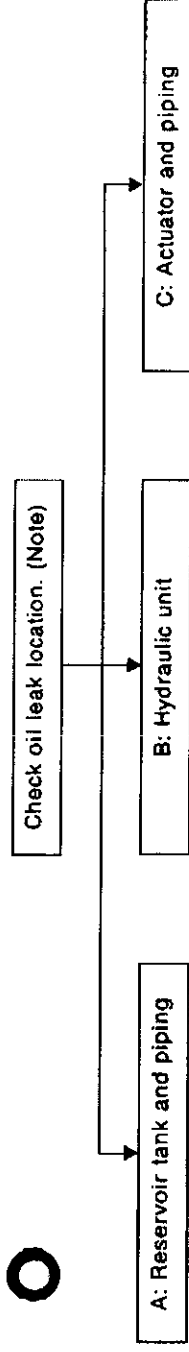
Operation precautions

- ① Determine the type of oil where the leak occurs. (The ETS operation oil uses genuine Nissan power steering fluid special.)
- ② When location of the oil leak is not clear, clean the area with white gasoline and check the oil leak location again. (Do not clean the hydraulic unit or harness connectors directly with white gasoline or other cleaning solvent. If the white gasoline or solvents contact any of these parts, wipe it off immediately.)
- ③ Check parts of related systems during repair. Replace defective parts as necessary.
- ④ Replace the entire hydraulic unit ASSY if oil leaks occur because the unit cannot be disassembled.

(1) Leak Inspection



2. On-vehicle Inspection and Adjustment (Cont'd)



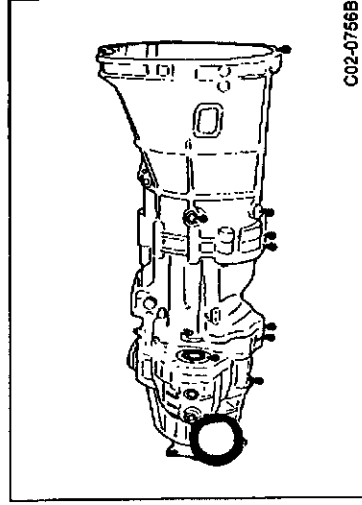
Note: When the leak location is unclear, clean the area with white gasoline and check leak location again.

Oil leak location	A: Reservoir tank and piping	B: Hydraulic unit	C: Actuator and piping
Service description (replacement part)	- Reservoir tank ASSY - Tube and hose	Hydraulic unit ASSY	- Actuator ASSY - Tubes and hoses
Parts requiring inspection	Reservoir tank cap damage	Air bleeder damage	- Air bleeder damage - Transfer oil quantity (mixed with oil leak from actuator)
Service procedures	(Note 1) Remove from vehicle. Replace part. Install in vehicle. Bleed air, check oil level. Check for oil leaks. (Note 2)		



NOTE 1: Refer to "4-4 HYDRAULIC UNIT AND RESERVOIR TANK" for installation and removal procedures.

NOTE 2: Refer to "[Point 3] Air bleeding" in "4-4 HYDRAULIC UNIT AND RESERVOIR TANK" for air bleeding and oil level inspection.

**(2) Transfer**

- When there is an oil leak at either front or rear oil seal, replace parts as necessary with unit installed in vehicle.
- When there is oil leak at actuator, leave unit in vehicle and replace parts as necessary.
- When there are oil leaks in other locations, remove transfer ASSY from vehicle and replace parts as necessary.

C3 ELECTRICAL CONTROL TORQUE SPLIT 4WD SYSTEM (ATTESSA E-TS)

2. On-vehicle Inspection and Adjustment (Cont'd)

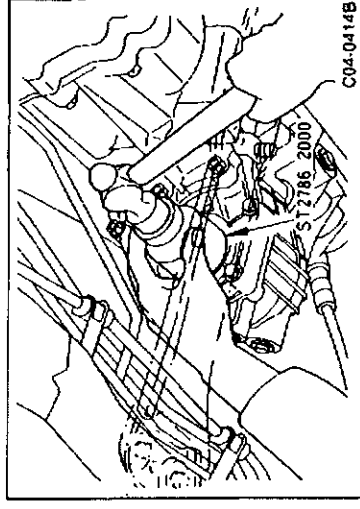
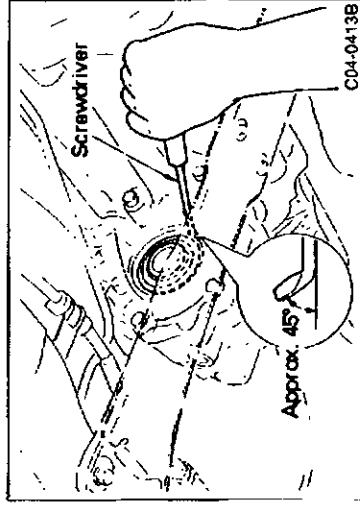
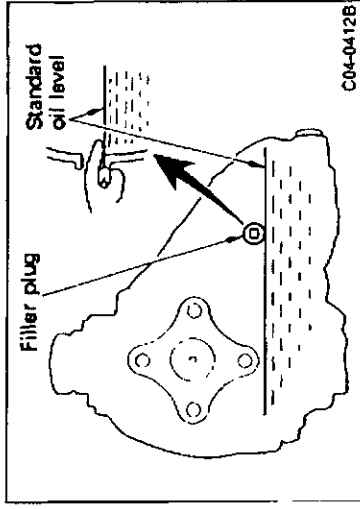
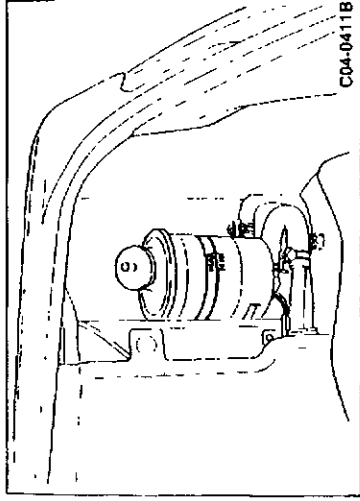
2-3 OIL LEVEL INSPECTION

(1) Hydraulic unit

- Set ignition switch ON and check that oil level is between MAX-MIN in reservoir tank.

CAUTION:

- (1) Reservoir tank is installed inside trunk on right side.
- (2) If ignition switch is turned OFF for a long period of time, the oil in accumulator may return to reservoir tank, causing volume to exceed MAX level. For this reason, the oil level must be checked when the ignition switch is ON.
- (3) Only use genuine Nissan Power Steering Fluid Special.
 - There must be no oil leaks around reservoir tank.



2-4 TRANSFER OIL SEAL REPLACEMENT

(1) Front oil seal replacement

Removal

- Drain oil from transfer case.
- Remove clutch operating cylinder.
- Remove front propeller shaft.
- Place end of screwdriver at 45° angle and turn in metal part of oil seal evenly on diagonal line as shown in figure to remove seal.

Installation

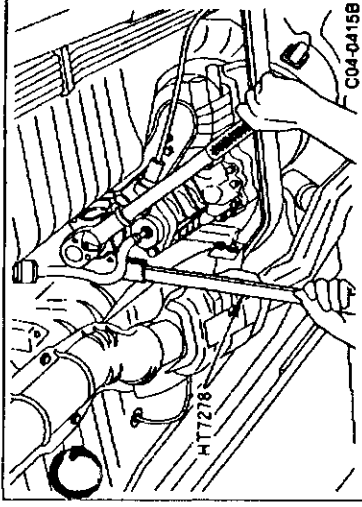
- Use a drift (special service tool) and tap the end of a suitable sized socket to insert seal.
- Install propeller shaft and tighten bolts and nuts to specified torque.

Front propeller shaft tightening torque:

24 - 32 N·m (2.4 - 3.3 kg-m, 17 - 24 ft-lb)

C3 ELECTRICAL CONTROL TORQUE SPLIT 4WD SYSTEM (ATTESSA E-TS)

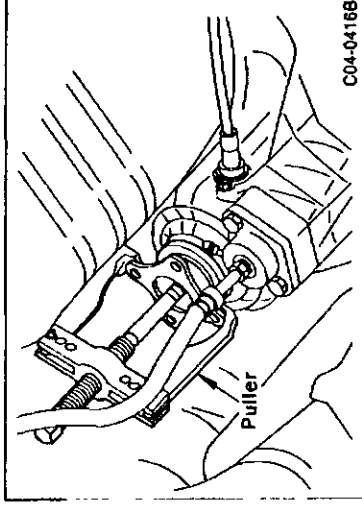
2. On-vehicle Inspection and Adjustment (Cont'd)



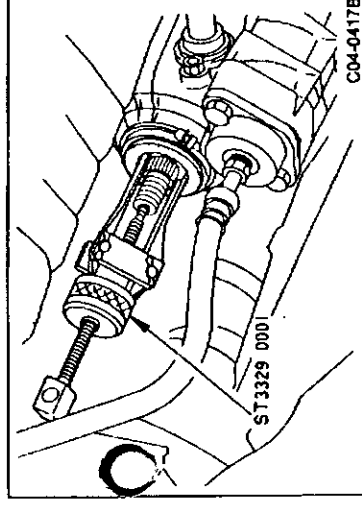
(2) Rear oil seal replacement

Removal

- Remove rear propeller shaft.
- Attach flange wrench (HT7278) to companion flange and remove flange nut.

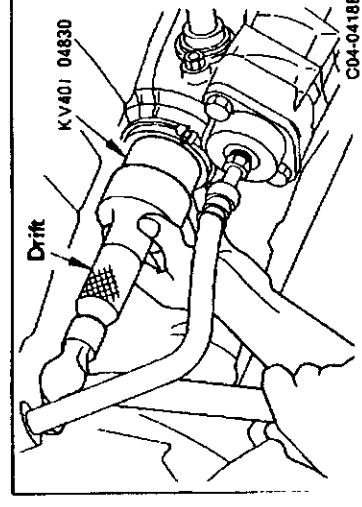


- Set gear puller (commercial service tool) on companion flange and remove flange.



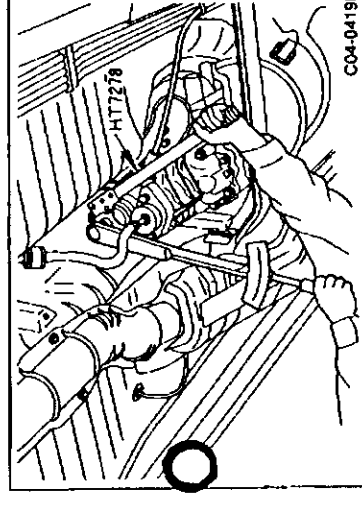
- Attach oil seal puller (special service tool) and remove transfer rear oil seal.

Reference: Use KV381 054S0 in oil seal puller ASSY.



Installation

- Use drift (special service tool) and install oil seal in case end.



- Install companion flange. Use flange wrench (HT7278) to tighten nut to specified tightening torque.

CAUTION:

- (1) If oil seal sliding part of companion flange has scratches in axle direction, replace companion flange.
- (2) The flange nut must be replaced after each disassembly. Use a new part and tighten to specified torque.

Companion flange nut tightening torque:

226 - 324 N·m (23.0 - 33.0 kg-m, 166 - 239 ft-lb)

- Install propeller shaft and tighten bolts and nuts to specified torque.

C3 ELECTRICAL CONTROL TORQUE SPLIT 4WD SYSTEM (ATTESSA E-TS)

2. On-vehicle Inspection and Adjustment (Cont'd)

Propeller shaft tightening torque:

Flange

88 - 98 N·m (9.0 - 10.0 kg-m, 65 - 72 ft-lb)

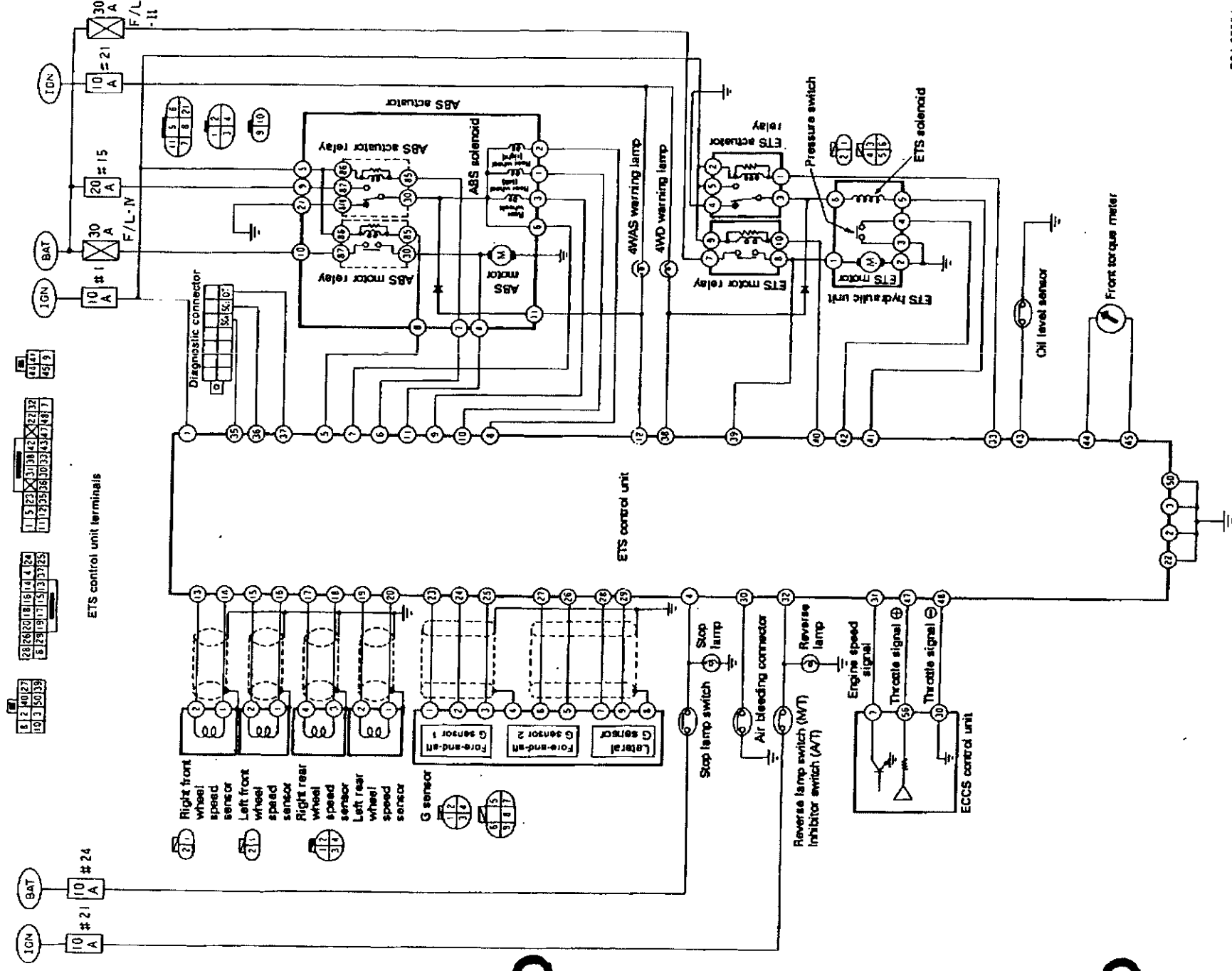
Constant velocity joint section

64 - 74 N·m (6.5 - 7.5 kg-m, 47 - 54 ft-lb)

3. Troubleshooting

3-1 ELECTRICAL SYSTEM TROUBLESHOOTING

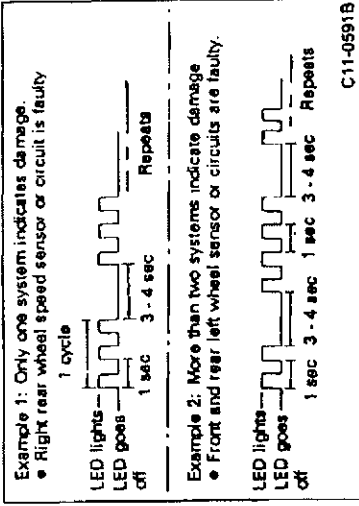
(1) Circuit diagram



3. Troubleshooting (Cont'd)

(a) Self-diagnosis procedures

- If ETS system is normal, the 4WD warning lamp lights when ignition switch is turned ON. The lamp turns off within 1 second after engine starts.
 - If warning lamp does not go off, LED lamp in the ETS control unit below the rear parcel shelf will flash to indicate the abnormal position.
 - The warning lamp lights and LED light flashes continuously when ignition switch is not turned OFF even after damaged area is corrected. For this reason, turn ignition switch OFF one time after repair is completed and then check self-diagnosis results again.
- When more than two systems are faulty, the LED will flash a set number of times to indicate each problem location.



Number of LED flashes	Damage location	Detection cycle		Warning lamp		Flow chart (Note 3)
		Engine start time	Driving	4WAS	4WD	
1	Right front wheel speed sensor or circuit	○ (Note 1)	○	○	○	A
2	Left front wheel speed sensor or circuit	○ (Note 1)	○	○	○	B
3	Right rear wheel speed sensor or circuit	○ (Note 1)	○	○	○	C
4	Left rear wheel speed sensor or circuit	○ (Note 1)	○	○	○	D
5	ABS right front wheel actuator solenoid or circuit	○	○	○		.
6	ABS left front wheel actuator solenoid or circuit	○	○	○		.
7	ABS rear wheel actuator solenoid or circuit	○	○	○		.
8	ABS actuator motor, motor relay or circuit	○	○	○		.
9	ABS actuator relay or circuit	○	○	○		.
10	ETS control unit power supply or circuit	○	○	○		.
11	Fore-and-aft G sensor 1 or circuit	○	○	○	○	E
12	Fore-and-aft G sensor 2 or circuit	○	○	○	○	F
13	Fore-and-aft G sensor 1, fore-and-aft G sensor 2	○	○	○	○	G
14	G sensor power supply 1 or circuit	○	○	○	○	H
15	G sensor power supply 2 or circuit	○	○	○	○	I
16	Lateral G sensor or circuit	○	○	○	○	J
17	Air bleed connector or circuit		○		○ (Note 2)	K
18	ETS pressure switch or circuit	○	○		○	L
19	ETS motor, motor relay or circuit	○	○		○	M

C

C3 ELECTRICAL CONTROL TORQUE SPLIT 4WD SYSTEM (ATTESSA E-TS)

3. Troubleshooting (Cont'd)

Number of Lamp flash	Damage location	Detection cycle		Warning lamp		Flow chart (Note 3)
		Engine start time	Driving	4WAS	4WD	
20	ETS solenoid or circuit	○	○		○	N
21	Throttle sensor or circuit	○	○		○	○
22	ETS oil level switch or circuit	○	○		○	P
23	—	—	—	—	—	—
24 or con- tinually ON or OFF	ETS control unit, ground or circuit	○	○	○	○	Q

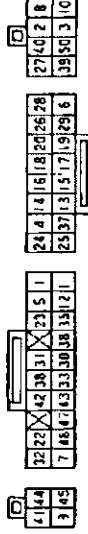
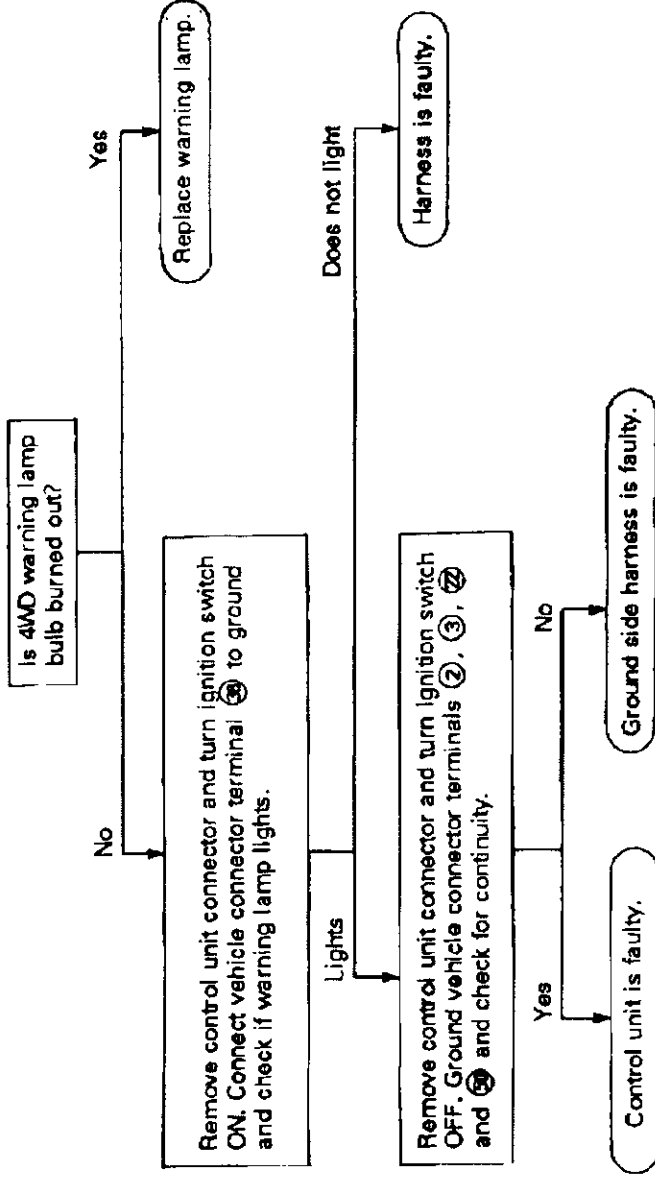
Note: (1) Detection may not be possible due to sensor short circuit problem.
 (2) 4WD warning lamp lights during driving but normal control is possible.
 (3) Refer to "C10 Brakes, 3. Troubleshooting" for items indicated by an asterisk (*).

C3 ELECTRICAL CONTROL TORQUE SPLIT 4WD SYSTEM (ATTESSA E-TS)

3. Troubleshooting (Cont'd)

(b) When warning lamp display is abnormal

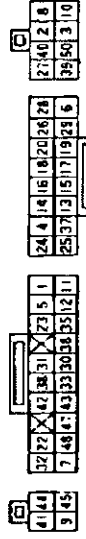
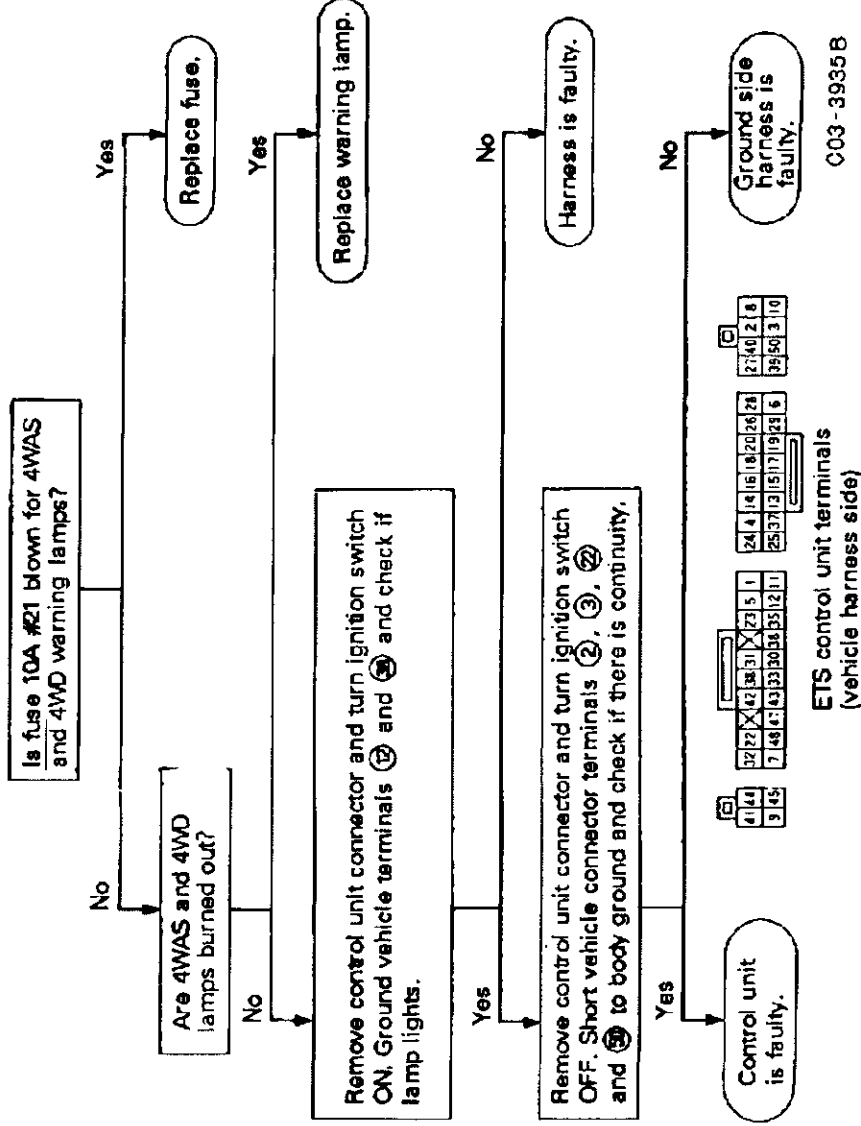
A. Ignition switch is ON (before starting engine) but 4WD warning lamp does not light.



ETS control unit terminals
(vehicle harness side)

C03 - 3934 B

B. Ignition switch is ON (before starting engine) but 4WAS warning lamp and 4WD warning lamp do not light.



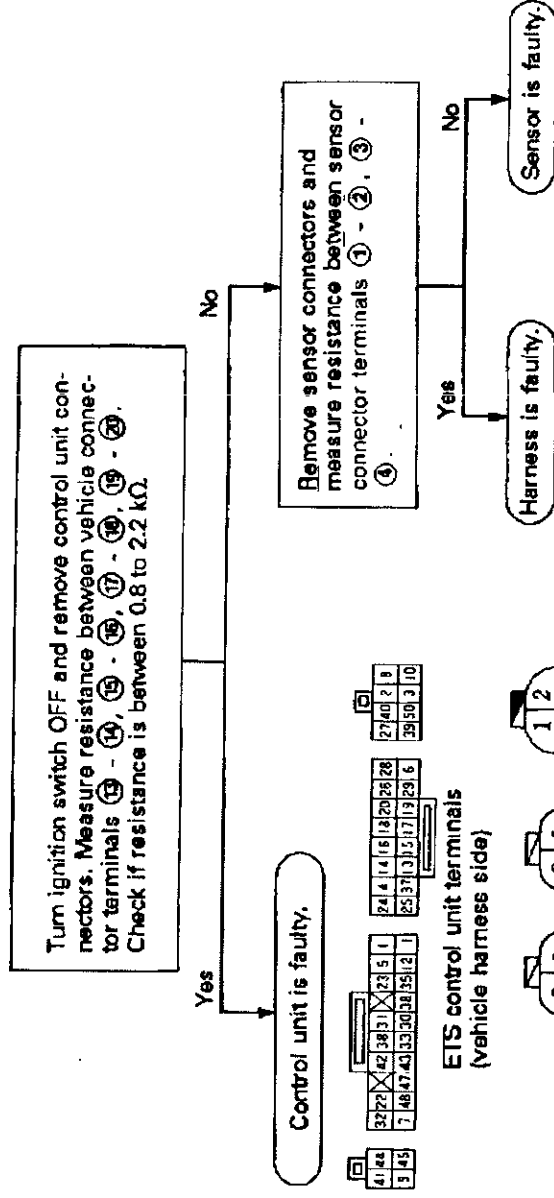
ETS control unit terminals
(vehicle harness side)

C03 - 3935 B

3. Troubleshooting (Cont'd)

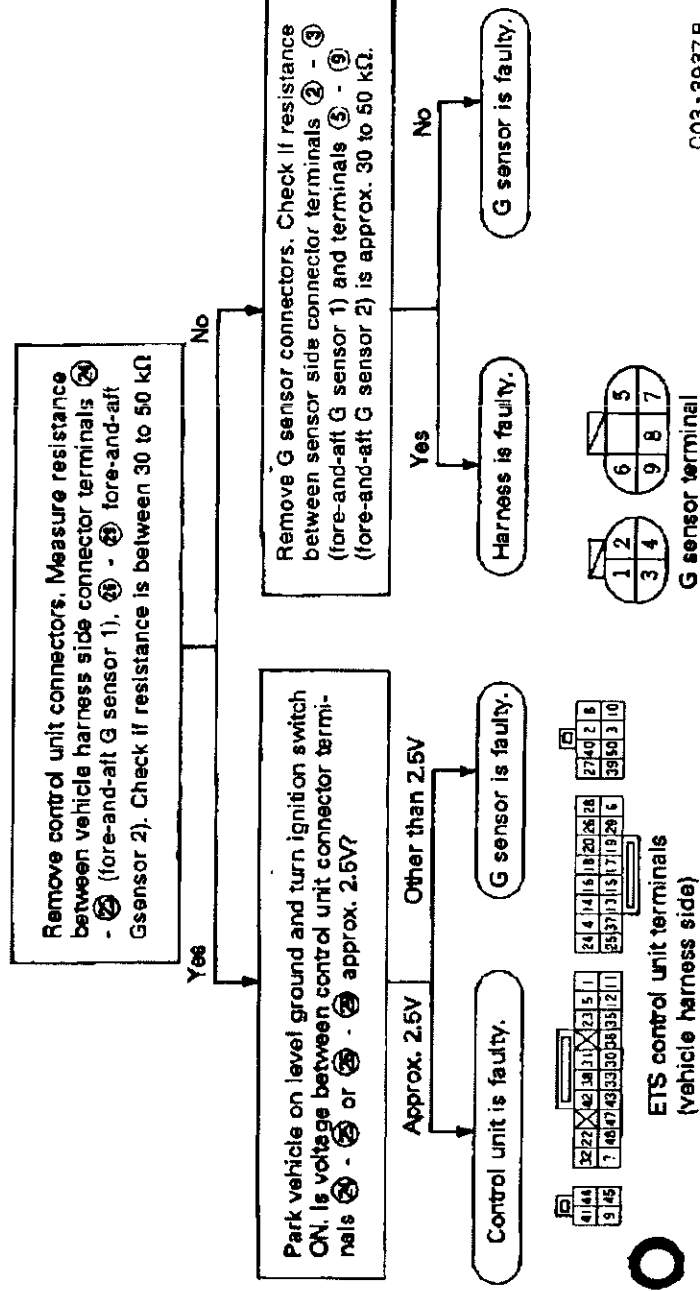
(3) Troubleshooting flowchart

- Right front wheel sensor or circuit problem (LED flashes 1 time)
- Left front wheel sensor or circuit problem (LED flashes 2 times)
- Right rear wheel sensor or circuit problem (LED flashes 3 times)
- Left rear wheel sensor or circuit problem (LED flashes 4 times)



C03-3936B

- Fore-and-aft G sensor 1 or circuit problem (LED flashes 11 times)
- Fore-and-aft G sensor 2 or circuit problem (LED flashes 12 times)
- Fore-and-aft G sensor 1, 2 or circuit problem (LED flashes 13 times)

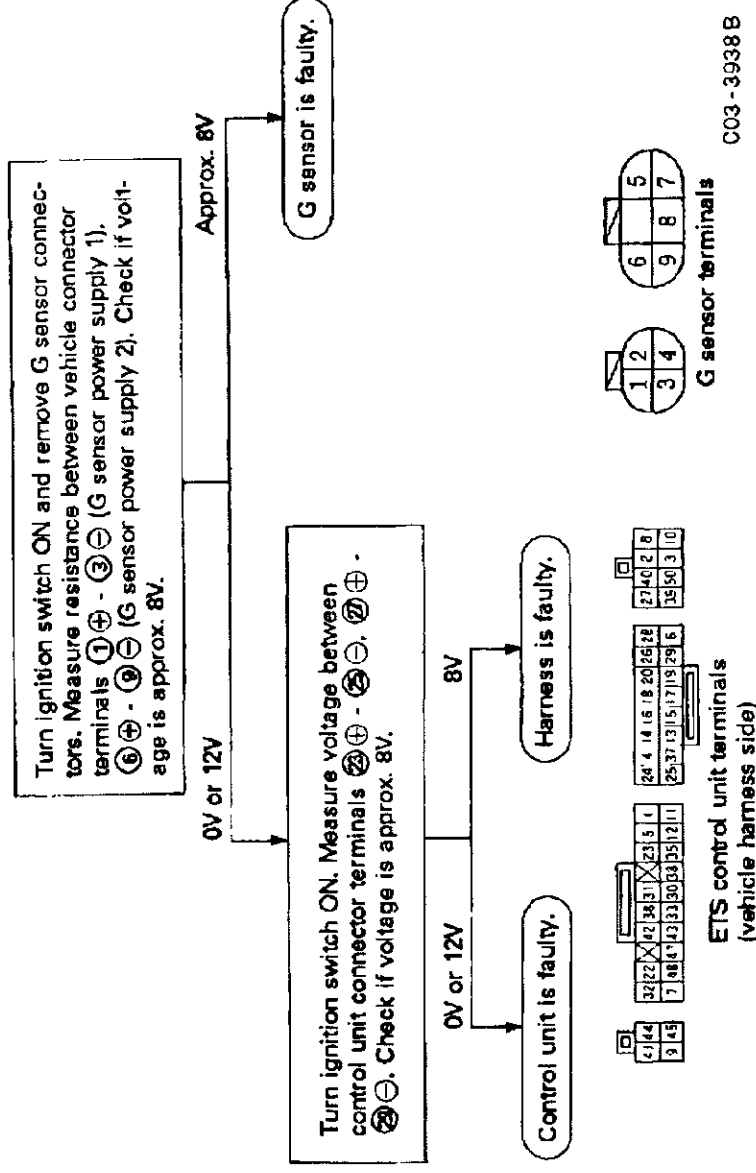


C03-3937B

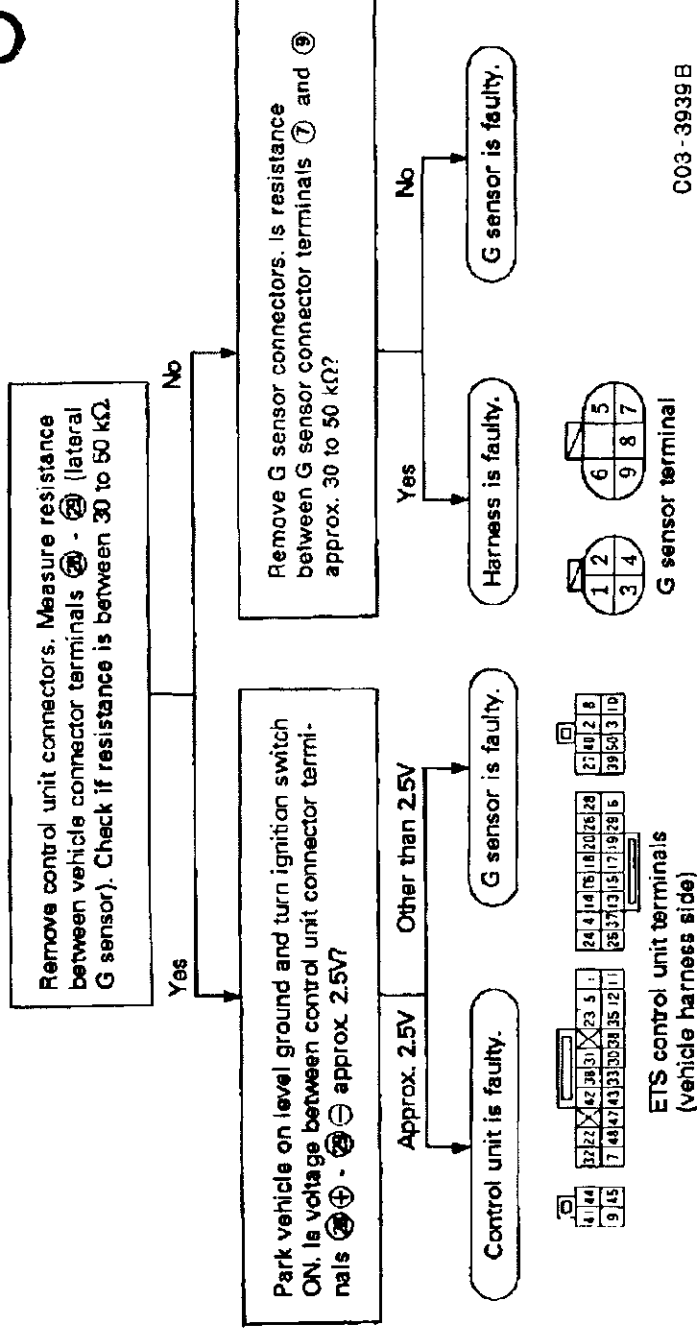
C3 ELECTRICAL CONTROL TORQUE SPLIT 4WD SYSTEM (ATTESSA E-TS)

3. Troubleshooting (Cont'd)

- H. G sensor power circuit 1 or circuit problem (LED flashes 14 times)
G sensor power circuit 2 or circuit problem (LED flashes 15 times)



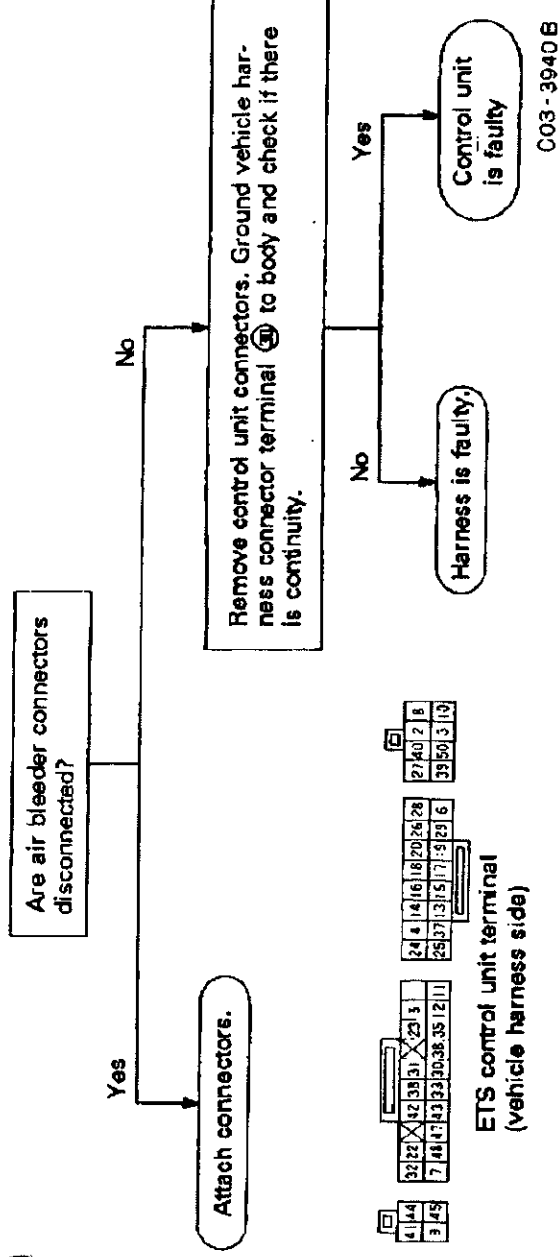
- J. Lateral G sensor or circuit problem (LED flashes 16 times)**



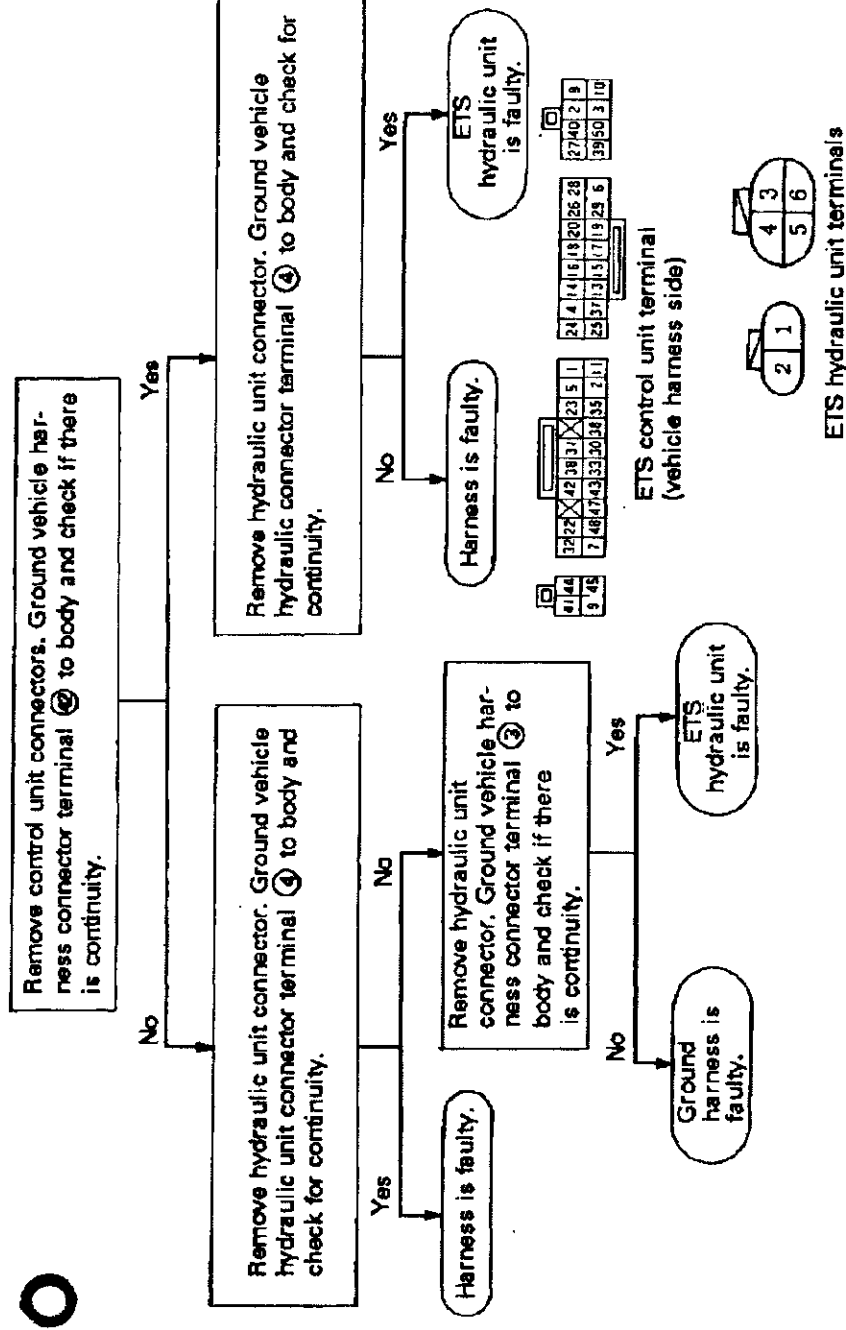
C3 ELECTRICAL CONTROL TORQUE SPLIT 4WD SYSTEM (ATTESSA E-TS)

3. Troubleshooting (Cont'd)

K. Air bleeder connector and circuit (LED flashes 17 times)

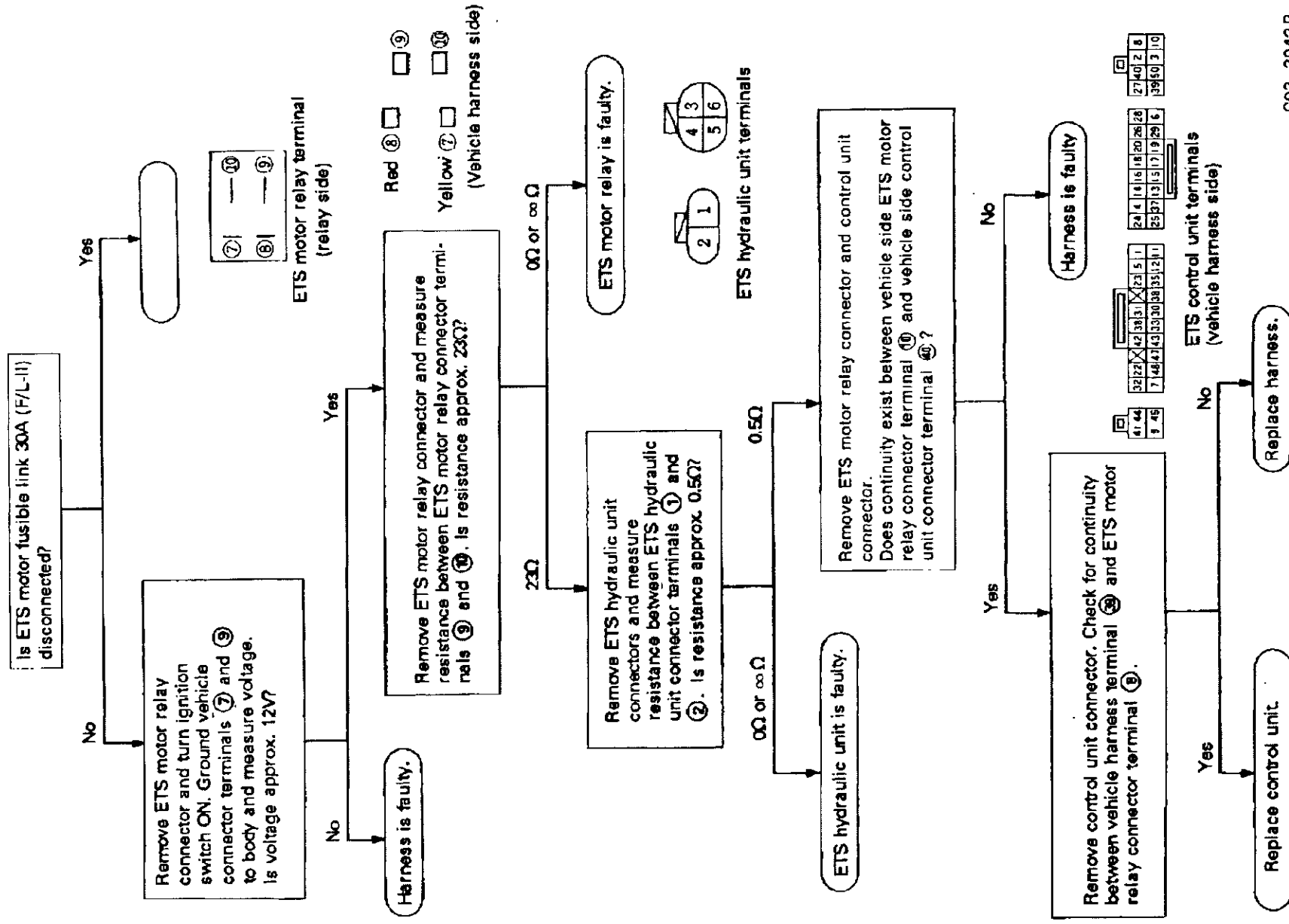


L. Pressure switch and circuit (LED flashes 18 times)



3. Troubleshooting (Cont'd)

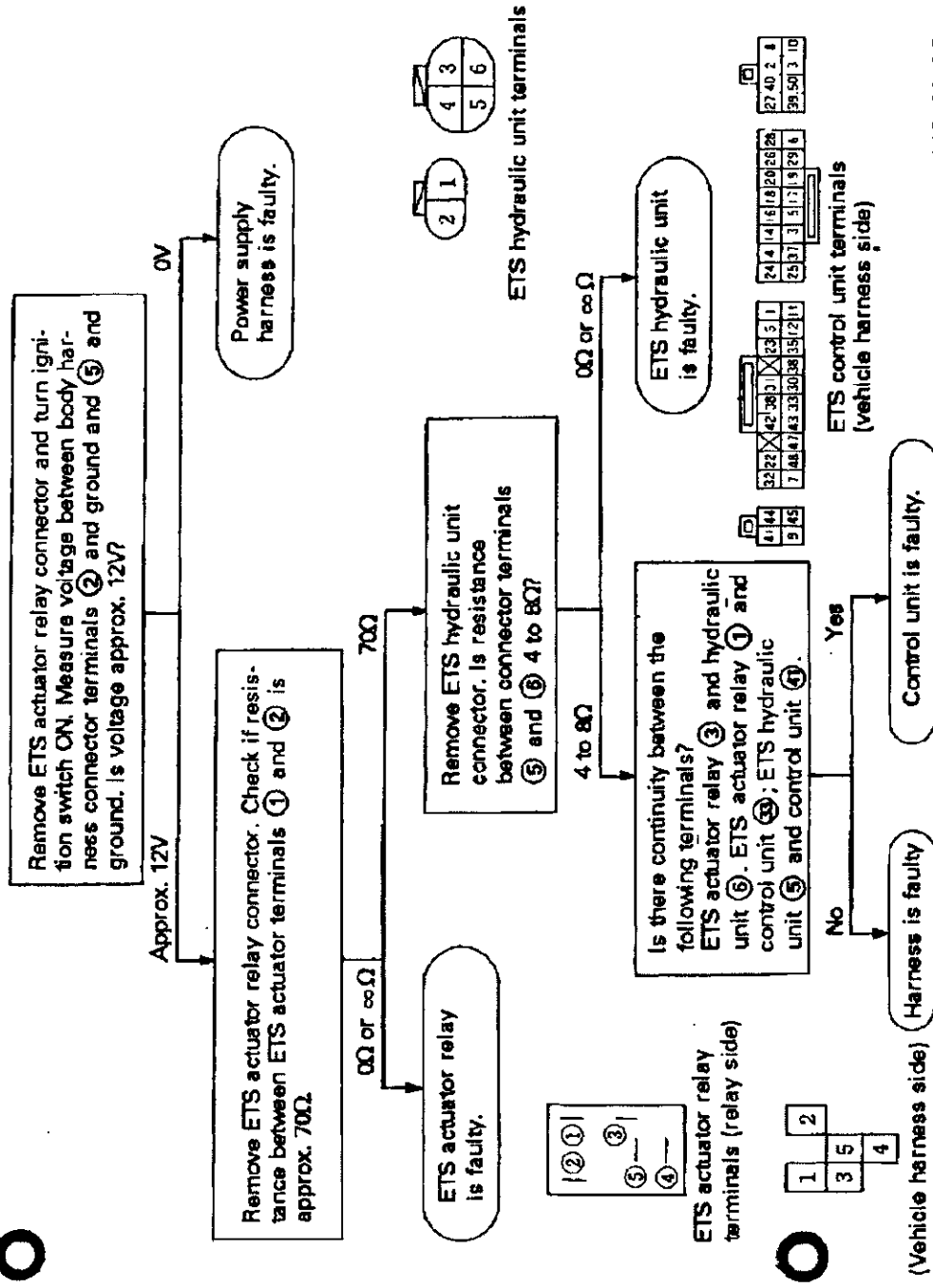
M. ETS motor, motor relay and circuit problem (LED flashes 19 times)



C3 ELECTRICAL CONTROL TORQUE SPLIT 4WD SYSTEM (ATTESSA E-TS)

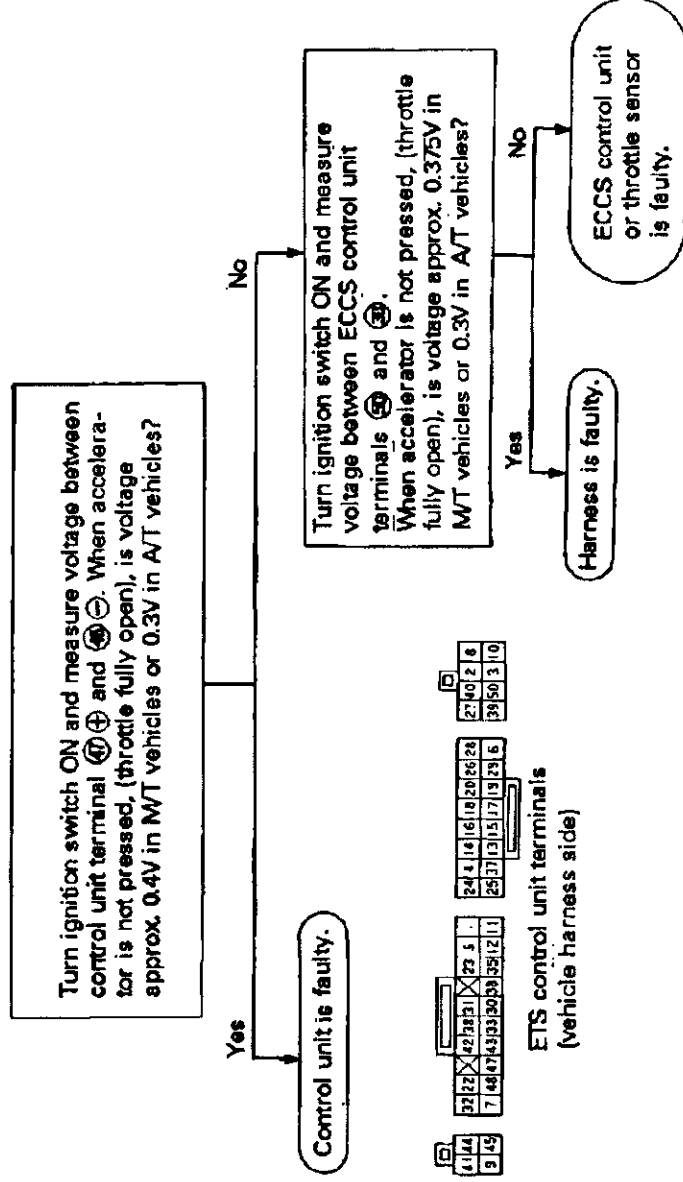
3. Troubleshooting (Cont'd)

N. ETS solenoid and circuit problems (LED flashes 20 times)



C03-3943B

O. Throttle sensor and circuit problems (LED flashes 21 times)

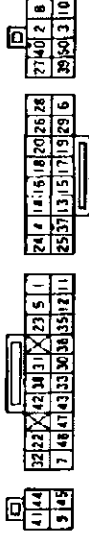
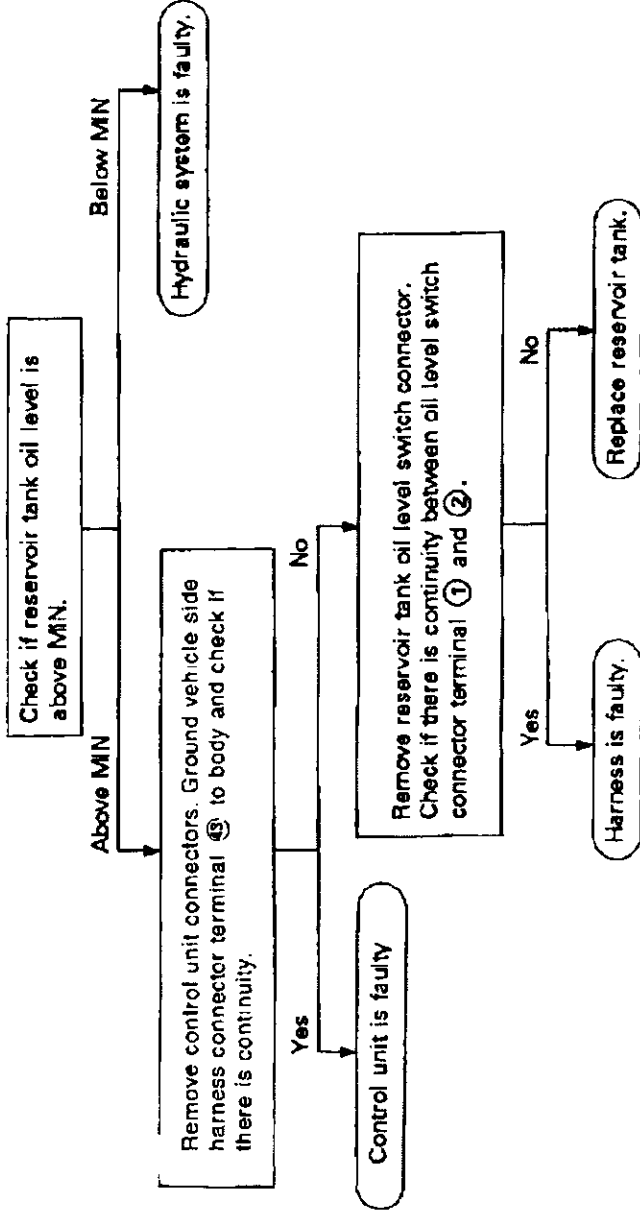


C03-3944B

C3 ELECTRICAL CONTROL TORQUE SPLIT 4WD SYSTEM (ATTESSA E-TS)

3. Troubleshooting (Cont'd)

P. Oil level sensor and circuit (LED flashes 22 times)

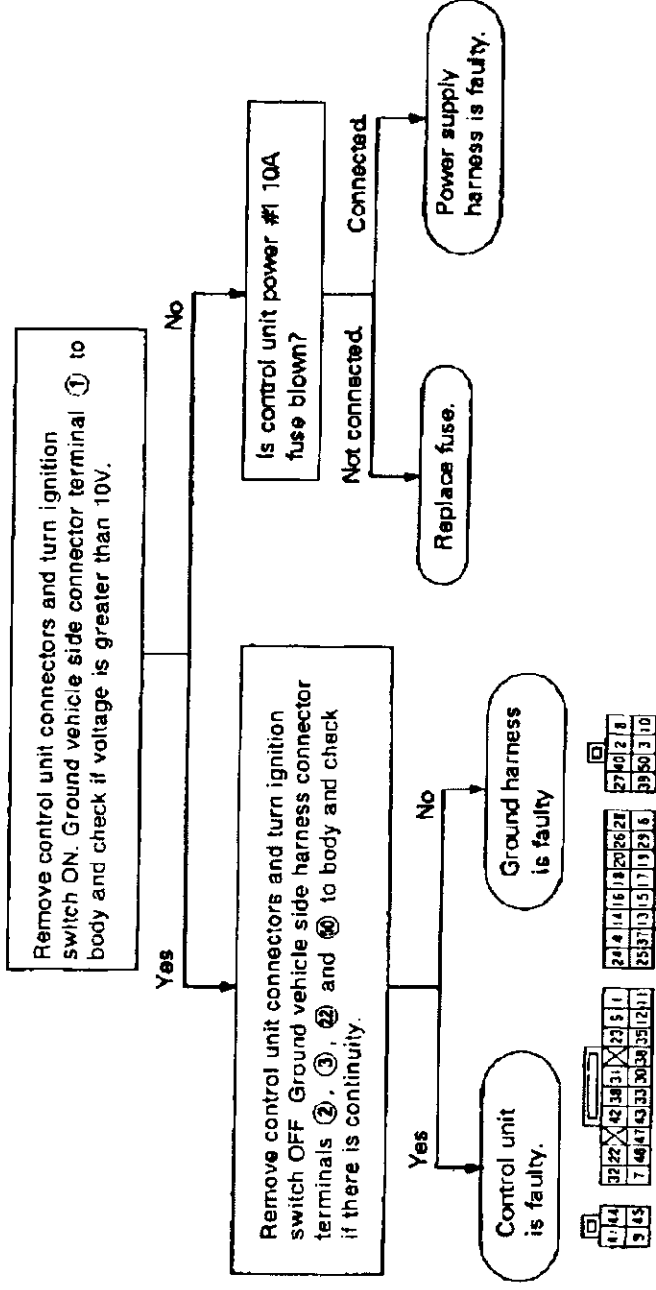


ETS control unit terminals
(vehicle harness side)



Oil level switch
C03-3945 B

Q. ETS control unit and ground circuit (LED flashes 24 times)



ETS control unit terminals
(vehicle harness side)

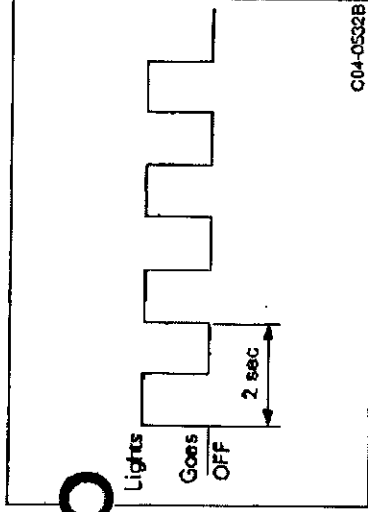
C03-3946 B

C3 ELECTRICAL CONTROL TORQUE SPLIT 4WD SYSTEM (ATTESSA E-TS)

3. Troubleshooting (Cont'd)

R. 4WD warning lamp flashes

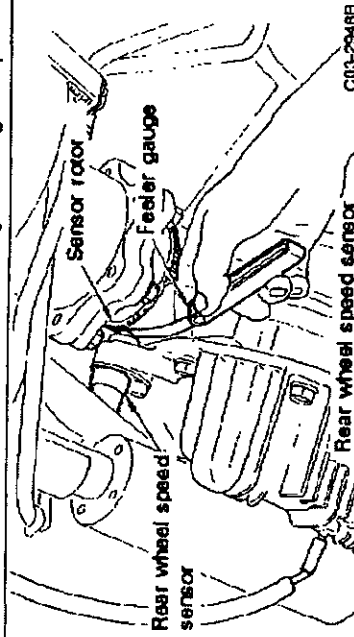
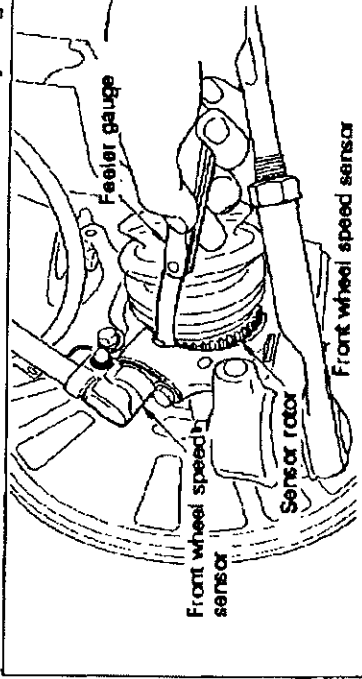
If the 4WD warning lamp flashes every 2 sec while driving, this indicates that there is a large difference in tire diameter between front and rear wheels. Replace tires with standard size tires so all four tire dimensions are the same.



(4) Part inspection

① Speed sensor installation and inspection

- Check that all parts are installed securely. Tighten any loose parts to specified tightening torque.



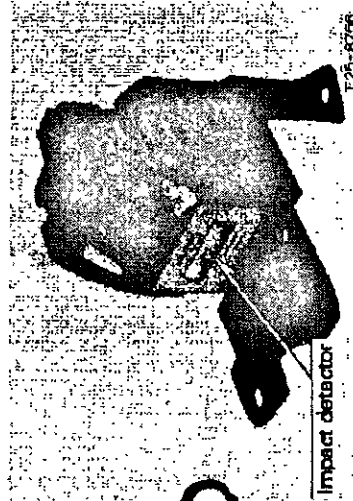
- Measure clearance between sensor and rotor as shown in figure. Check if clearance conforms to following values.

	Clearance standard value mm (in)
Front wheel speed sensor	0.27 - 0.75 (0.0106 - 0.0295)
Rear wheel speed sensor	0.6 - 0.93 (0.0236 - 0.0366)

- Make sure there are no cracks or damage in rotor gear.
- Replace sensor rotor if there is any problem.

CAUTION:

Replace rear side sensor rotor in matched set with companion flange.



② G sensor inspection

- If G sensor has received an impact, the impact detector shown in the figure will turn red.
- If impact detector turns red, replace G sensor.

③ Air bleeding

- Refer to "4-4 HYDRAULIC UNIT AND RESERVOIR TANK" in "4. Removal and Installation, Assembly and Disassembly" for air bleeding procedures.

C3 ELECTRICAL CONTROL TORQUE SPLIT 4WD SYSTEM (ATTESSA E-TS)

3. Troubleshooting (Cont'd)

④ Part inspection locations



ETS control unit



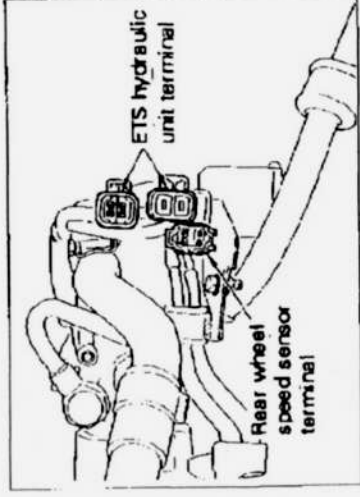
Right and left front wheel speed sensors



G sensor



ETS fusible link



Hydraulic unit



Air bleed connector



ETS motor relay and ETS actuator relay



ETS fuse

C3 ELECTRICAL CONTROL TORQUE SPLIT 4WD SYSTEM (ATTESSA E-TS)

3. Troubleshooting (Cont'd)

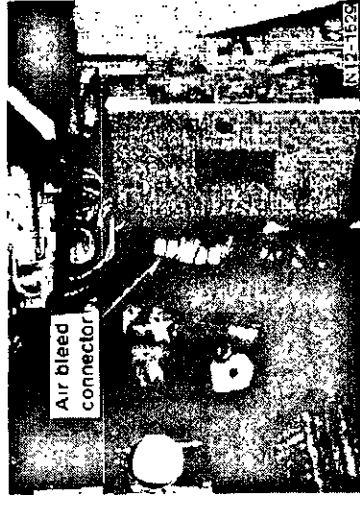
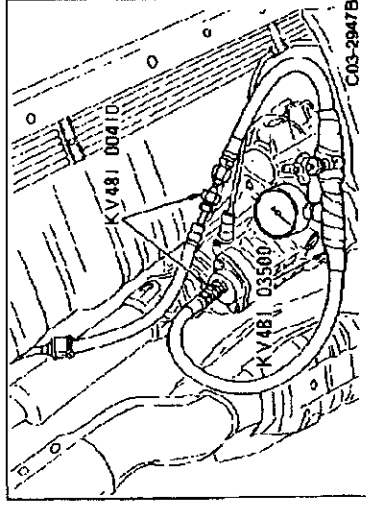
3-3 HYDRAULIC SYSTEM TROUBLESHOOTING

(1) Preparation for troubleshooting

The hydraulic unit transmits hydraulic control during driving by commands from ETS control unit. The judgement if the ETS hydraulic unit operates normally is made when vehicle is stopped. Hydraulic pressure is generated by ON/OFF operation of the air bleeding switch (right side of passenger seat dashboard) used for air bleeding operation. The applied power can be checked by measuring the power.

CAUTION:

The hydraulic system inspection cannot be performed during driving.



(2) Inspection

Lift the vehicle and remove hydraulic hose and transfer unit from ETS hydraulic unit. Use special service tool (KV481 00410) for connector as shown in figure. Install power steering pressure gauge and open valve all the way.

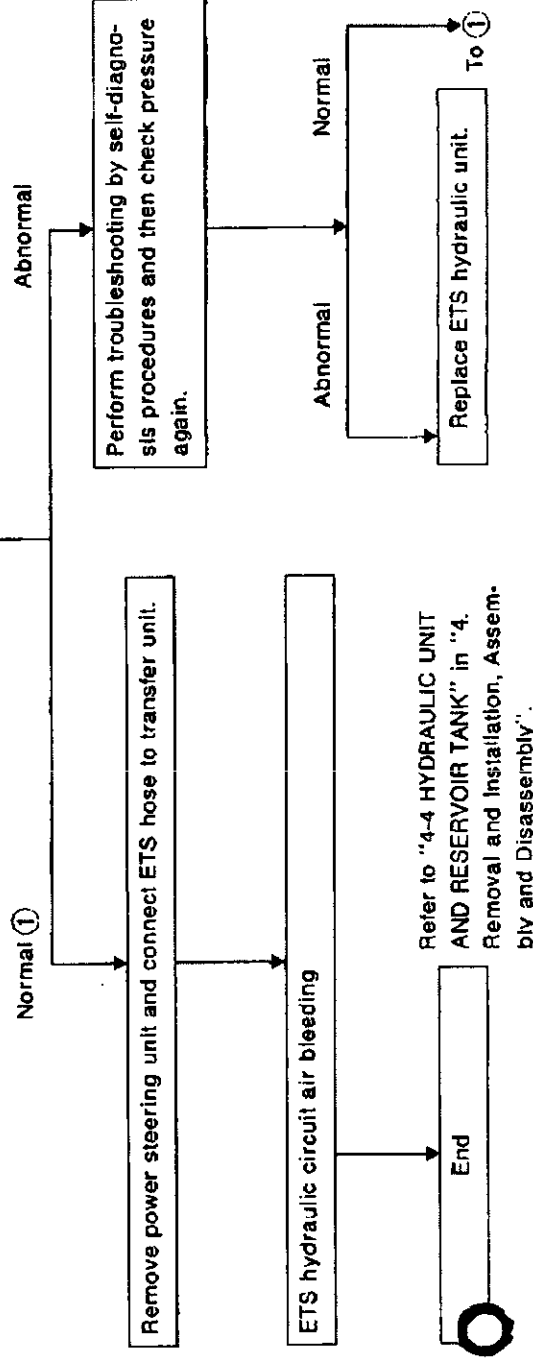
Perform air bleeding of ETS hydraulic circuit.

Note 1: Refer to "4-4 HYDRAULIC UNIT AND RESERVOIR TANK" in "4. Removal and Installation, Assembly and Disassembly".

Turn ignition switch to ON. (Do not start engine.)

Move air bleed switch (ON ↔ OFF). Check that hydraulic pressure is 294 to 490 kPa (3 to 5 kg/cm², 43 to 71 psi) when engaged and 0 kPa (0 kg/cm², 0 psi) when not engaged.

Note 2: Do not engage air bleed switch for more than 10 seconds because heat is generated and fail-safe will operate when ETS motor is run continuously.

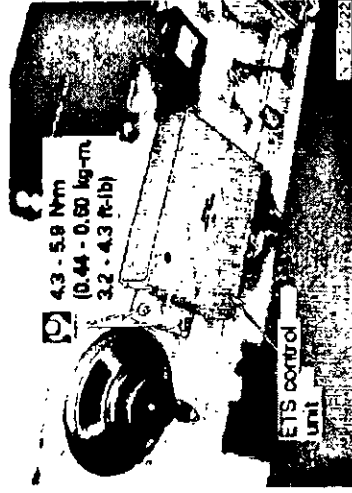


4. Removal and Installation, Assembly and Disassembly

4-1 ETS CONTROL UNIT

(1) ETS control unit removal and installation

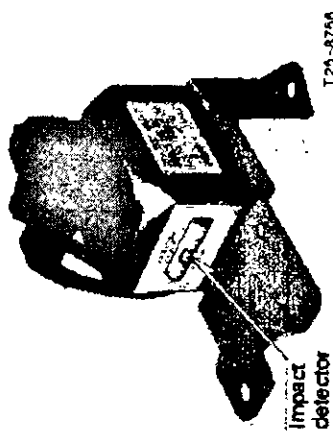
- The ETS control unit is installed under the rear parcel shelf in the trunk.
- The body ground is connected to the top side of rear parcel shelf.



4-2 G SENSOR

(1) Installation precautions

- Be especially careful not to drop or hit G sensor since it is sensitive to impact. If the unit is subjected to impact do not use it if the impact detector turns red as shown in figure.



(2) G sensor removal and installation

- The G sensor is installed under sensor console.

CAUTION:

- (1) Observe precautions described above when removing and installing sensor.
- (2) The G sensor cannot be disabled.

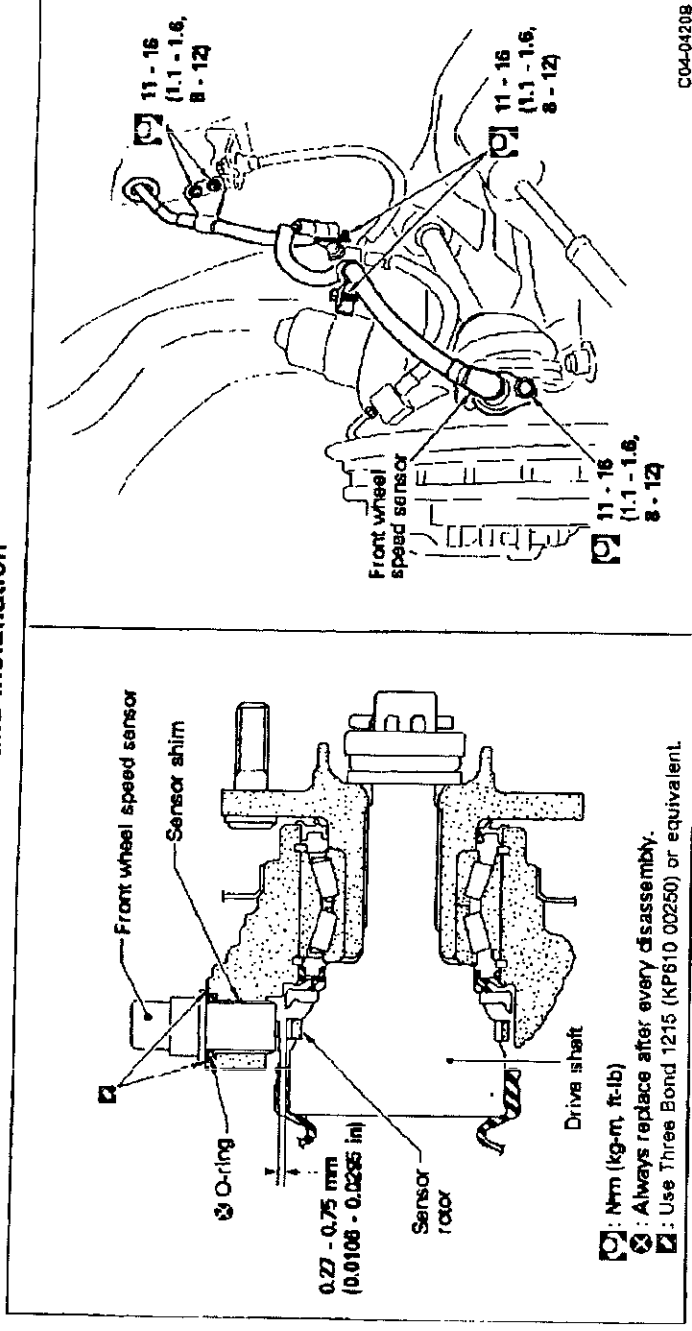


C3 ELECTRICAL CONTROL TORQUE SPLIT 4WD SYSTEM (ATTESSA E-TS)

4. Removal and Installation, Assembly and Disassembly (Cont'd)

4-3 SPEED SENSOR

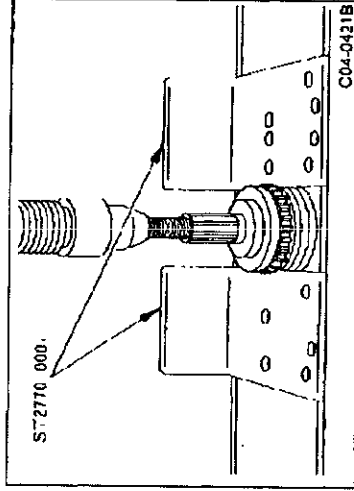
(1) Front wheel speed sensor removal and installation



[Point 1] Front wheel sensor rotor removal and installation

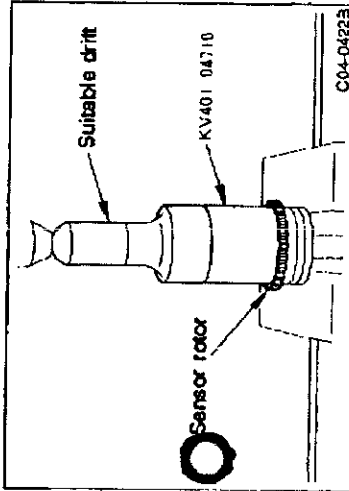
CAUTION:

Because center rotor is connected to the drive shaft, remove drive shaft before removing or installing center rotor. Refer to C6 DRIVE SHAFT, 3-1 REMOVAL AND INSTALLATION.



Removal

- For steering gear assembly and disassembly, position attachment (special service tool) or 15-mm (0.59 in) thick support against center rotor and remove with dust shield as a single unit.



Installation

- Position drift (special service tool) against center rotor and press-fit bearing.

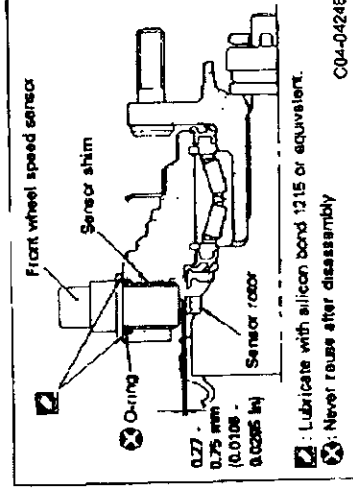
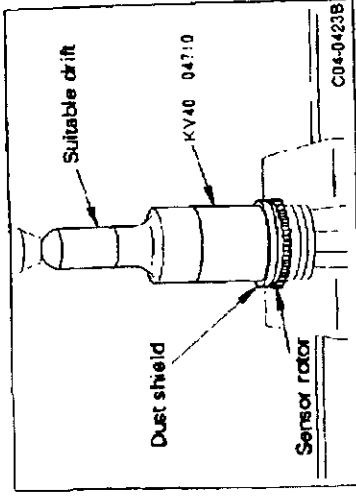
CAUTION:

Be careful not to damage rotor during removal and installation.

C3 ELECTRICAL CONTROL TORQUE SPLIT 4WD SYSTEM (ATTESSA E-TS)

4. Removal and Installation, Assembly and Disassembly (Cont'd)

- Set drift (special service tool) against dust shield as shown in figure and press-fit to install.

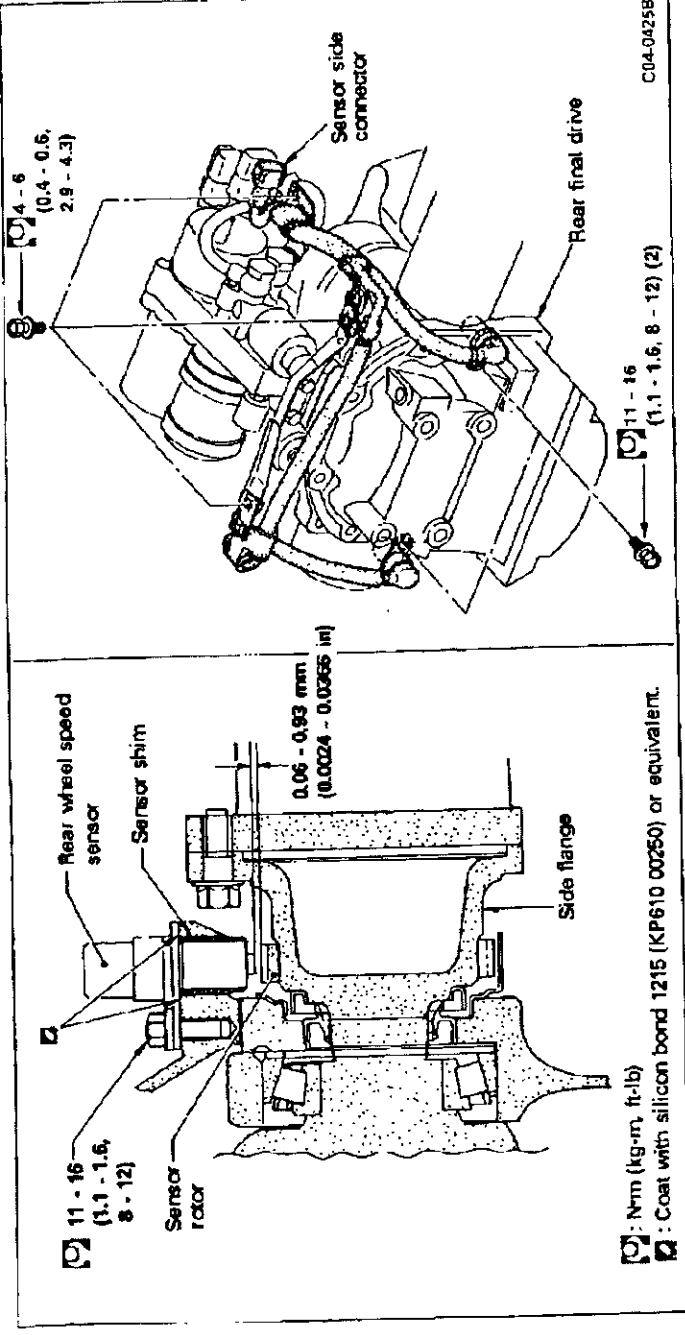


[Point 2] Front wheel speed sensor installation

- Install sensor shims in knuckle spindle.
- Install O-ring in front wheel speed sensor.
- Coat entire knuckle spindle mating surface with sealant (silicon bond 1215 [KP210 00200]). Install front wheel speed sensor and tighten to specified torque.

Front wheel speed sensor tightening torque:
11 - 16 N·m (1.1 - 1.6 kg-m, 8 - 12 ft-lb)

(2) Rear wheel speed sensor removal and installation



[11 - 16 (1.1 - 1.6, 8 - 12)] : N·m (kg-m, ft-lb)
[0.06 - 0.93 mm (0.0024 - 0.0366 in)] : Coat with silicon bond 1215 (KP610 00250) or equivalent.

4. Removal and Installation, Assembly and Disassembly (Cont'd)

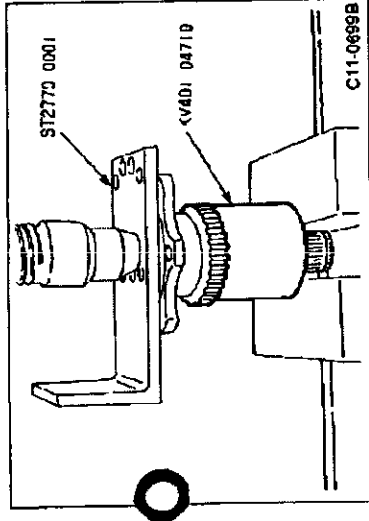
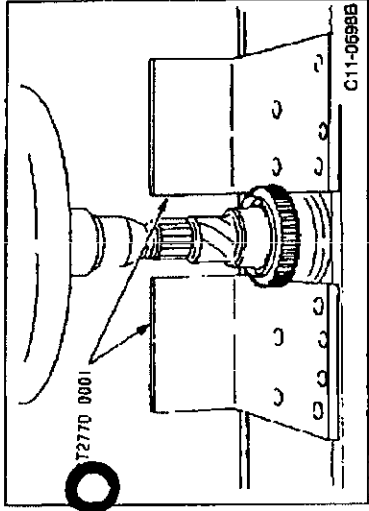
[Point 1] Rear wheel sensor rotor removal and installation

CAUTION:

Remove or install sensor rotor after removing side flange because it is installed in side flange. Refer to C6 DRIVE SHAFT, 3-1 REMOVAL AND INSTALLATION for removal and installation procedures.

Removal

- Position attachment (special service tool) for steering gear assembly and disassembly or 15-mm (0.59 in) thick support against sensor rotor and remove with dust shield as a single unit.

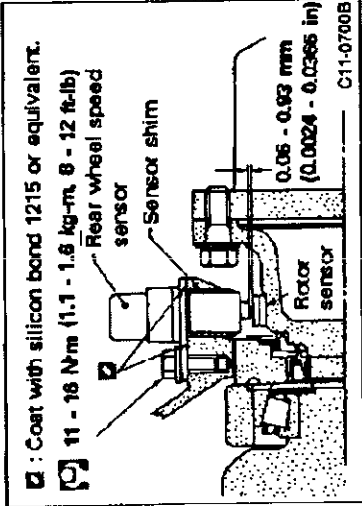


Installation

- Position drift (special service tool) on sensor rotor as shown in figure and press-fit rotor to install it.

[Point 2] Rear wheel speed sensor installation

- Install sensor shim in differential case.
- Coat mating surfaces of differential case with sealant (silicon bond 1215 or equivalent). Install rear wheel speed sensor and tighten to specified torque.



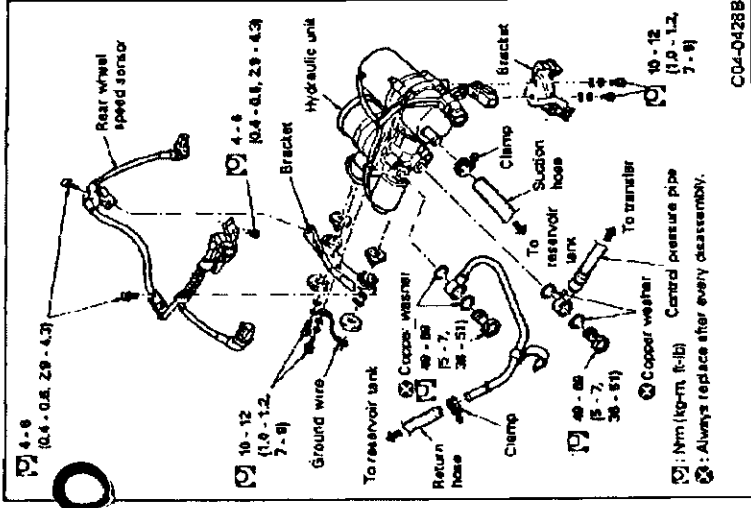
4. Removal and Installation, Assembly and Disassembly (Cont'd)

[Point 2] Hydraulic unit assembly and disassembly

- Remove bracket and rear wheel speed sensor and pipe from hydraulic unit as shown in figure.

CAUTION:

The hydraulic unit cannot be taken apart.



[Point 3] Air bleeding

Precautions

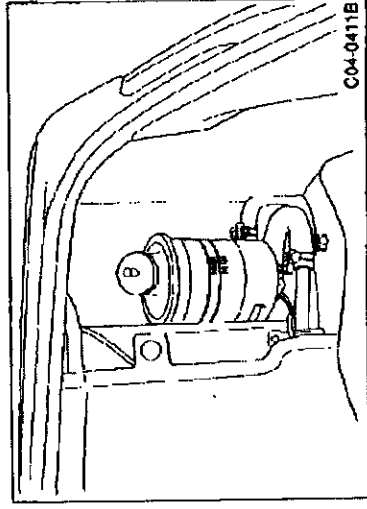
- Only use genuine Nissan special power steering fluid.
- Make sure all piping connections are tightened securely.
- The reservoir tank is located inside trunk. To avoid oil spill during operation, remove carpet and spread rags in trunk.
- Pay attention to the reservoir tank oil level during operation. Be careful not to allow air to enter from the suction side and replenish as necessary.

Air bleeding procedures

- ① Fill the reservoir tank with oil approx. 30 mm (1.18 in) above MAX line.

CAUTION:

Be careful not to spill any oil inside the trunk.

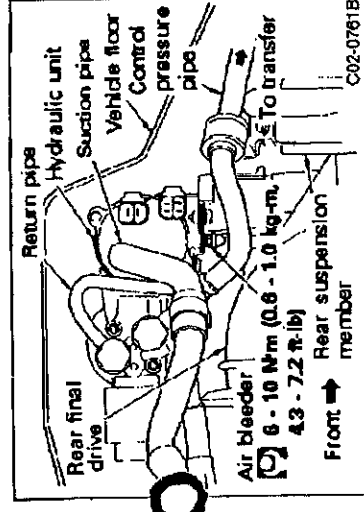


- ② Open the air bleeder in hydraulic unit (installed above rear differential) and remove all air in suction pipe. When air bleeder stops discharging air, close air bleeder and tighten to specified torque.

Reference: If the air bleeder is opened, oil flows into the suction pipe due to the gravity.

CAUTION:

When oil remains inside reservoir tank, it is not necessary to perform the operation described above.

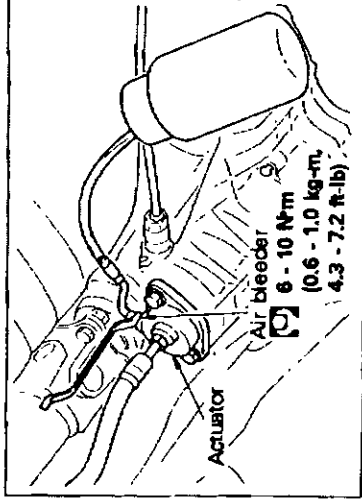


4. Removal and Installation, Assembly and Disassembly (Cont'd)

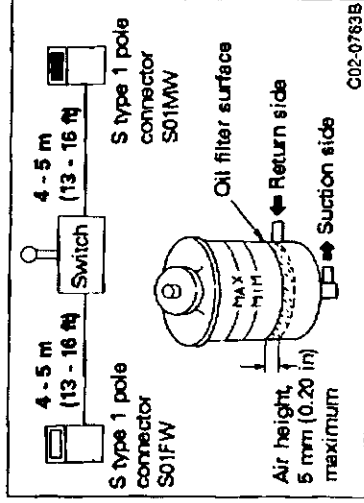


- ③ Turn ignition switch ON.
- ④ Remove the air bleeder connector (lower dash side) shown in the figure.

Reference: If the connection line is disconnected, the air bleed mode is set, pump motor operates and fixed hydraulic pressure is supplied to the transfer actuator.



- ⑤ Open and close the air bleeder on actuator side of transfer quickly, 1 second each time. To bleed air from system, repeat operation until no more air is discharged. When air bleeding is completed, tighten air bleeder to specified torque.



- ⑥ Connect air bleeder connector intermittently, turn pump ON and OFF and bleed air from reservoir tank return side.

CAUTION:

After air bleeding is completed, a maximum air level height of 5 mm (0.20 in) is allowable.

Reference: The retaining clip for the connector may be damaged or proper connection may not be possible, make an air bleed switch as shown in figure to perform operation.

- ⑦ Connect air bleeder connector. Fill or drain reservoir tank so oil volume is at MAX line.

CAUTION:

Turn ignition switch ON before adjusting oil level.

- ⑧ Turn ignition switch OFF to complete air bleed operation.

C3 ELECTRICAL CONTROL TORQUE SPLIT 4WD SYSTEM (ATTESSA E-TS)

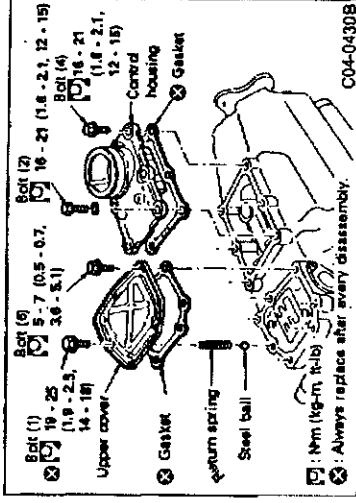
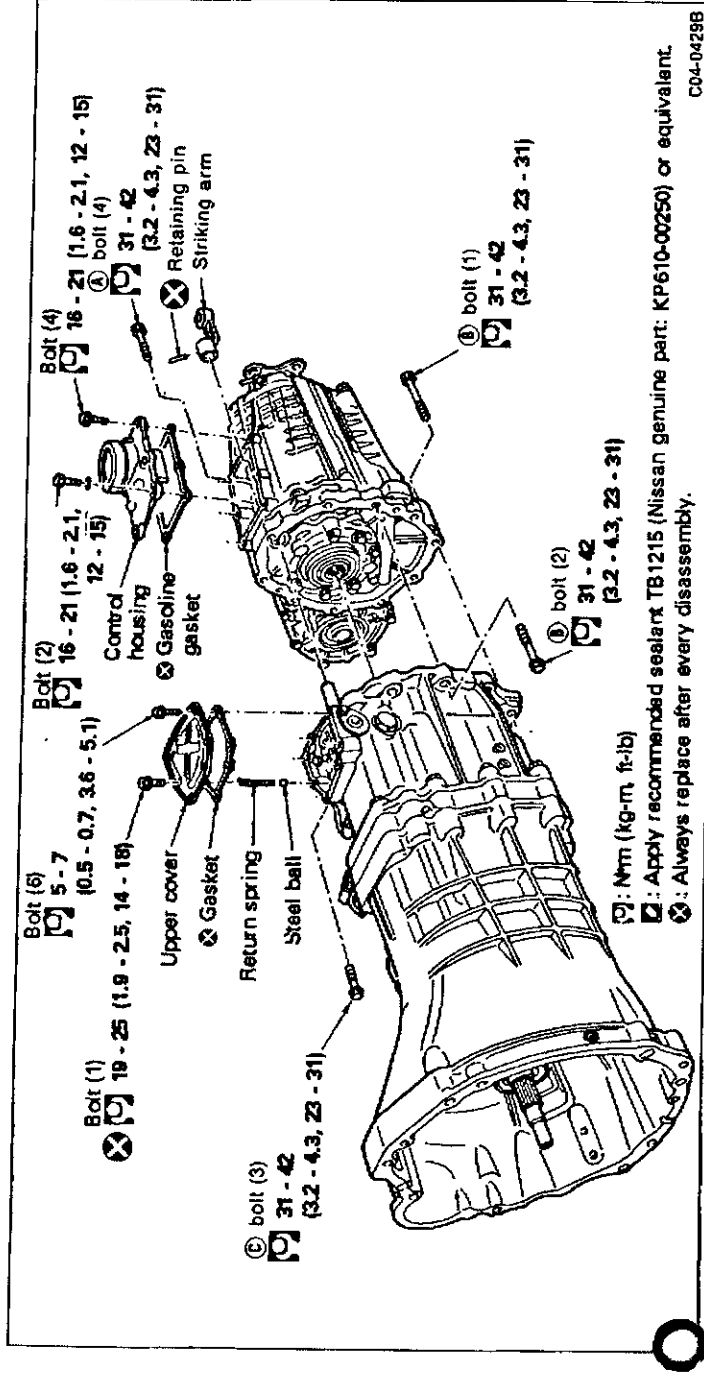
4. Removal and Installation, Assembly and Disassembly (Cont'd)

4-5 TRANSFER

Removal and installation

The transfer unit and transmission should be removed and installed as a single unit. Refer to C2 MANUAL TRANSMISSION, 3-1 REMOVAL AND INSTALLATION.

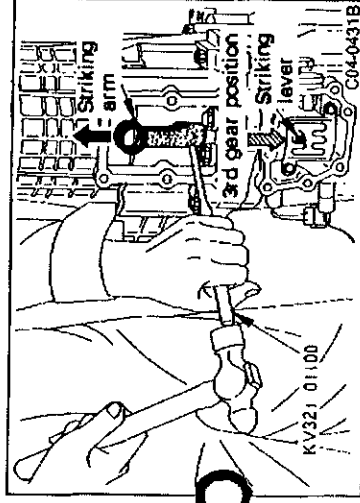
(2) Disassembly from transmission



[Point 1] Transfer disassembly

Removal

- Remove upper cover from transmission. Remove return spring and steel ball from OD case.
- Remove control housing and gasket from transfer unit.



- Pull striking arm in direction of arrow mark (3rd gear position) shown in the figure. Use pin punch (special service tool) to remove retaining pin from striking arm by tapping striking arm until it can be removed.

CAUTION:

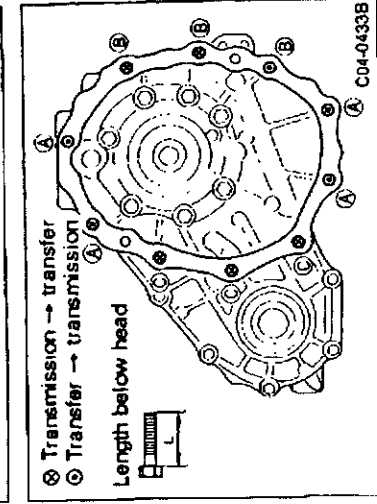
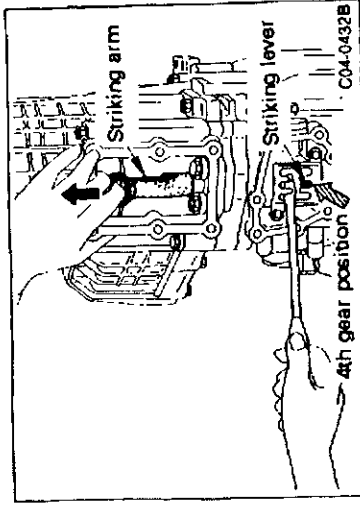
If retaining pin is tapped out completely, the retaining pin will fall in the transfer unit.

C3 ELECTRICAL CONTROL TORQUE SPLIT 4WD SYSTEM (ATTESSA E-TS)

4. Removal and Installation, Assembly and

Disassembly (Cont'd)

- Insert a screwdriver in 4th gear position and press striking lever in direction of arrow. When lever is secured, remove striking arm.

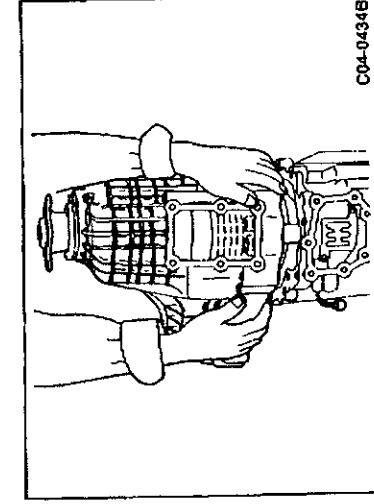


- There are three types of bolts in transfer unit. Remove bolts in sequence indicated in figure. If necessary, tap bolts with rubber hammer to loosen them.

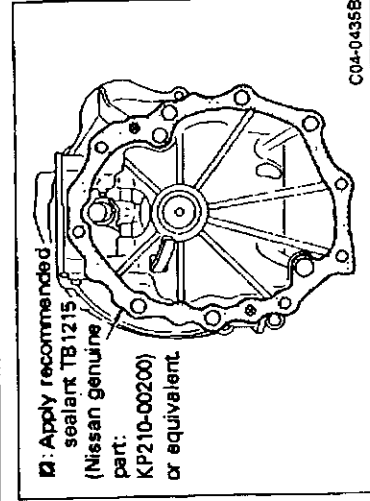
Bolt	Description	Tightening torque N·m (kg-m, ft-lb)	Length below head mm (in)
A		31 - 42	75 (2.95)
B		(3.2 - 4.3, 23 - 31)	45 (1.77)
C			40 (1.57)

CAUTION:

- The transmission surface shown in the figure is viewed from transmission side.
- Do not loosen the M8 bolts at this point because they hold the transmission case together. (The transfer unit bolts are all M10 bolts.)
- Do not scratch or damage front case or transmission mating surfaces.



- Remove transfer unit in upright position and do not tilt.



D: Apply recommended sealant TB1215 (Nissan genuine part: KP210-00200) or equivalent.

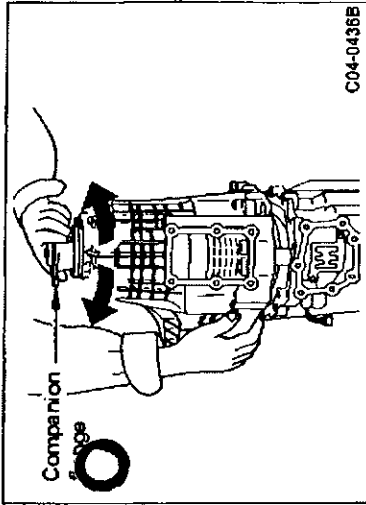
[Point 2] Transfer unit installation

- Apply recommended sealant TB1215 (Nissan genuine part: KP210-00200) or equivalent to mating surface and transmission.

CAUTION:

- OD case must be coated with sealant.
- Coat striking lever end with Nissan MP special grease before installation.

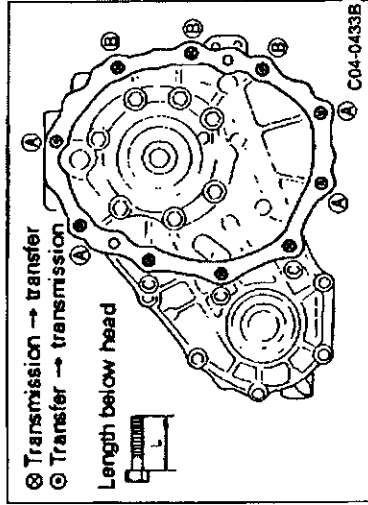
4. Removal and Installation, Assembly and Disassembly (Cont'd)



- Rotate companion flange in both directions to align transmission main drive shaft and transfer unit mainshaft serration and install transfer unit.

CAUTION:

Be careful not to damage oil seal with the transmission striking rod.

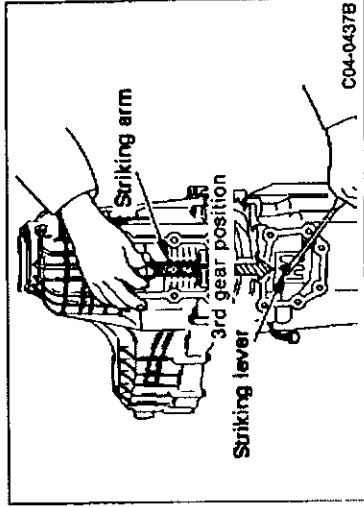


- There are three types of bolts in transfer unit. Remove bolts in sequence indicated in figure.

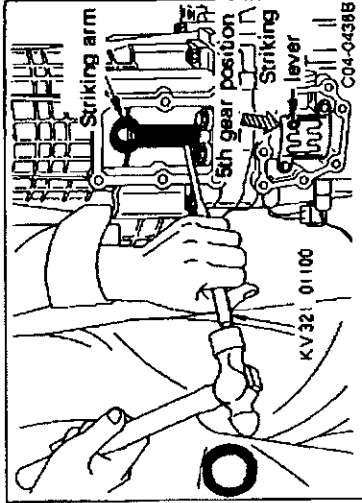
Bolt	Description	Tightening torque N·m (kg·m, ft·lb)	Length below head mm (in)
A		31 - 42	75 (2.95)
B		(3.2 - 4.3, 23 - 31)	45 (1.77)
C			40 (1.57)

CAUTION:

The figure shows the transfer installation surface viewed from transmission side.



- Press in striking rod, set 4th gear position and install striking arm in striking rod.
- Use screwdriver and set striking lever in 3rd gear and align striking arm with striking rod retaining pin installation hole position.



- Use screwdriver and set striking lever in 5th gear position.
- Use pin punch (special service tool) to install retaining pin in striking arm.

4. Removal and Installation, Assembly and

Disassembly (Cont'd)

- Install spring and check ball in transmission. Install upper cover and gasket.

CAUTION:

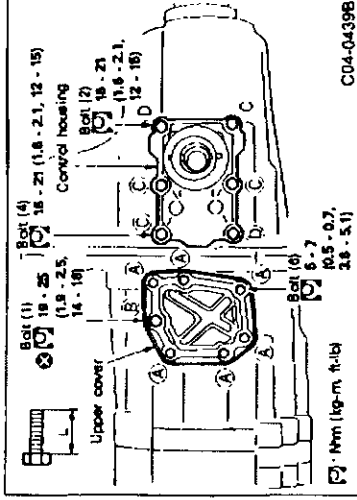
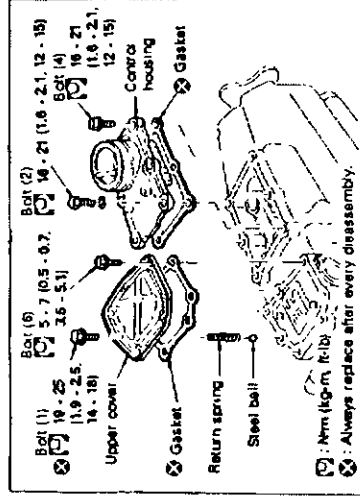
Always replace return spring installation bolt after every disassembly.

- Install control housing and gasket in transfer unit.

CAUTION:

Control housing position is set by ⑩ bolts (2).

Bolt	Description	Tightening torque N·m (kg·m, ft·lb)	Length below head mm (in)
A		5 - 7 (0.5 - 0.7, 3.6 - 5.1)	16 (0.63)
B		19 - 25 (1.9 - 2.5, 14 - 18)	17 (0.67)
C		16 - 21 (1.6 - 2.1, 12 - 15)	25 (0.98)
D			30 (1.18)

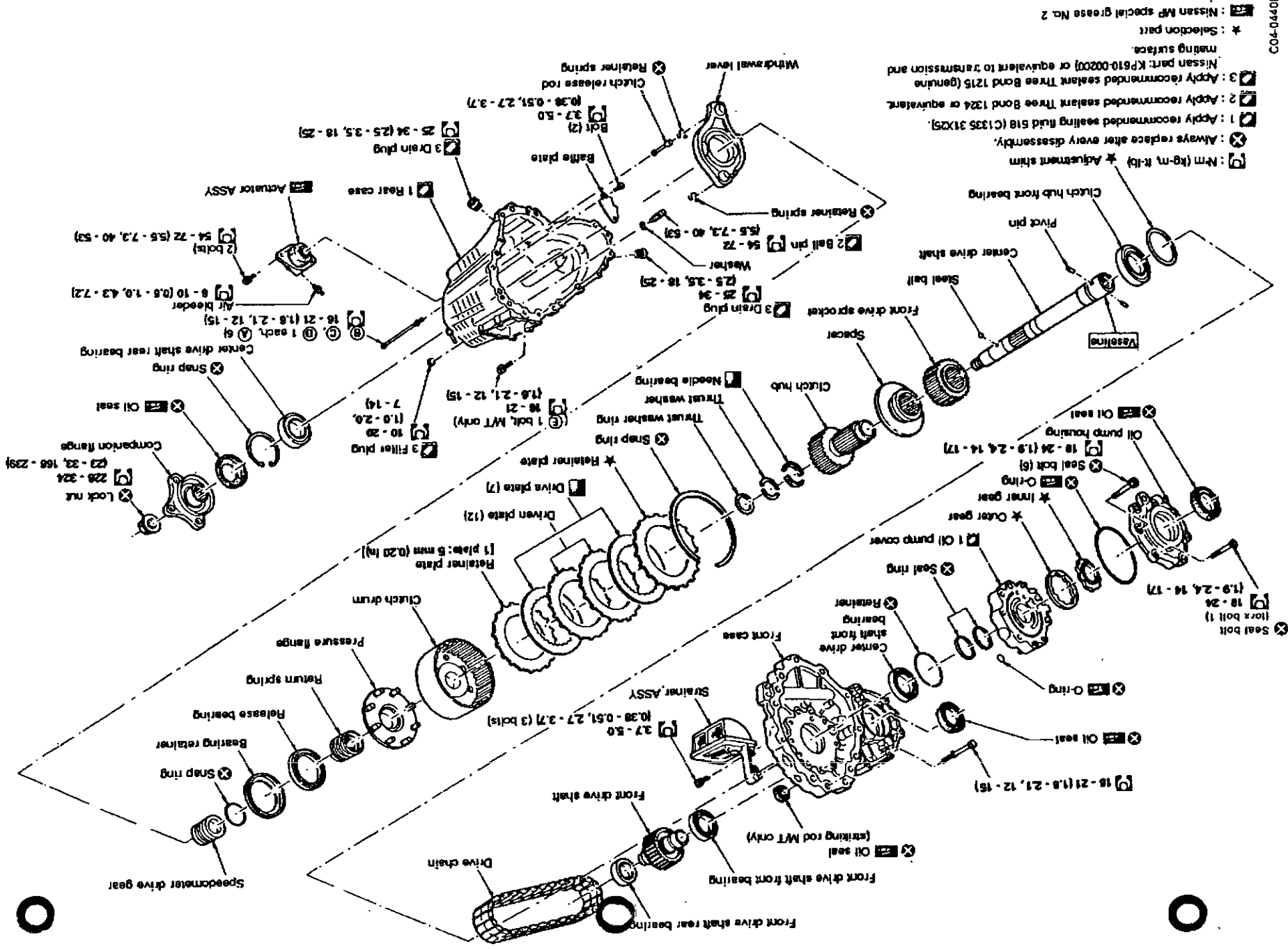


(3) Transfer removal and installation, assembly and disassembly

Assembly and disassembly precautions

- Operations should be performed in a clean environment and preferably in a dust-free room.
- Before starting, use steam or white gasoline to remove any debris or foreign matter from outside of unit to prevent it from entering unit during assembly and disassembly.
(Do not allow steam to enter the transfer unit. Do not wash rubber surfaces with gasoline.)
- Visually inspect all assembly parts for damage, deformation, abnormal wear and replace faulty parts as necessary.
- Always replace O-rings and oil seals after disassembly.
- Use paper rags to clean dirt off internal mechanisms.
- Use a bare hands or vinyl gloves in assembly or disassembly operations.
- Do not allow lint or cloth fibers from rags or gloves to contact the parts.
- Always follow the specified tightening torque. Coat all new parts with Nissan multi-fluid D or Vaseline.
- Coat oil pump, front case and rear case mating surfaces with sealant fluid 518 (part number C1335 31X25).

4. Removal and Installation, Assembly and Disassembly (Cont'd)



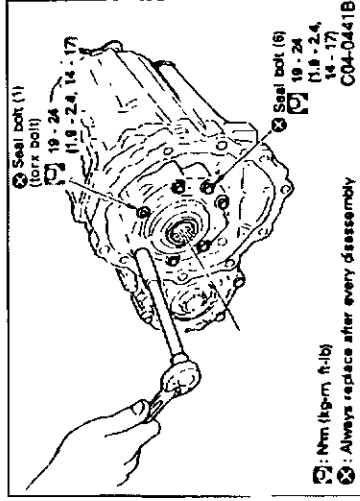
4. Removal and Installation, Assembly and

Disassembly (Cont'd)

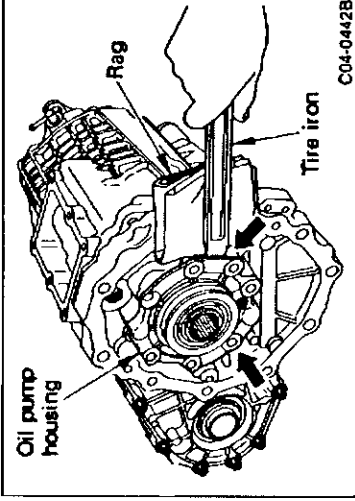
① Removal

Oil pump removal

- Remove the seven bolts (1 torx bolt).



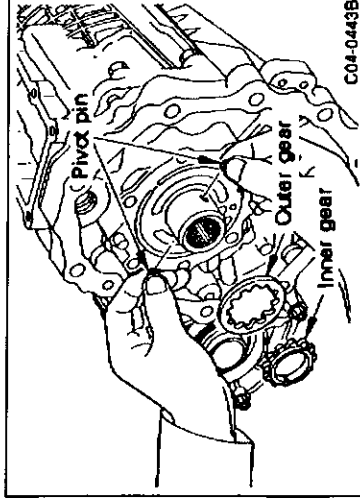
Ⓜ: Nm (kg-m, ft-lb)
ⓧ: Always replace after every assembly



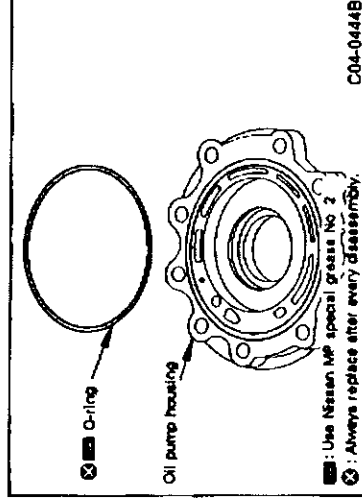
- Use a tire iron or large screwdriver and pry in direction of arrow to remove the housing.

CAUTION:

Wrap rags around tire iron to prevent scratching front of case.

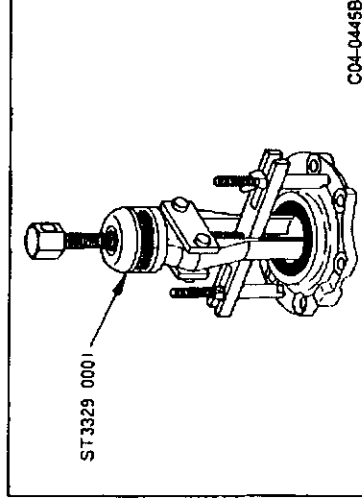


- Remove inner and outer gear and detach pivot pin from mainshaft.



Ⓜ: Use Nissan MP special grease No. 2
ⓧ: Always replace after every disassembly

- Remove O-ring from housing.



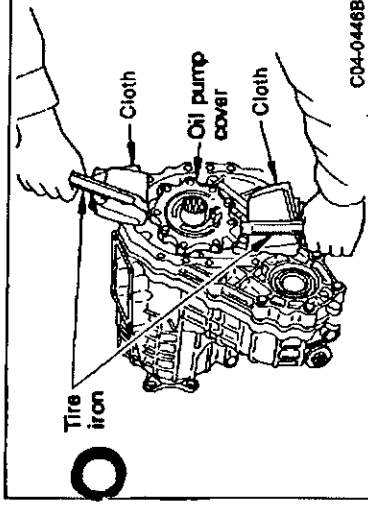
- Use oil seal puller (special service tool) as shown in figure and remove oil seal from housing.

4. Removal and Installation, Assembly and Disassembly (Cont'd)

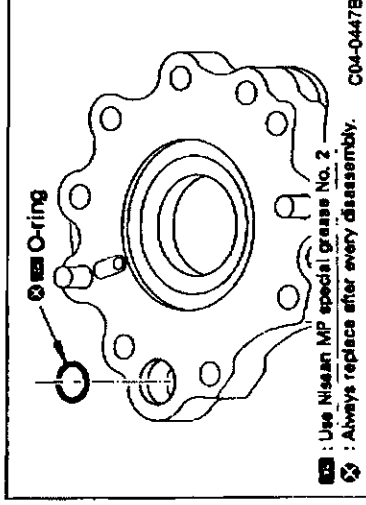
- Wrap cloth around tire irons and pry cover as shown in figure to remove cover.

CAUTION:

Wrap cloth around tire irons to prevent scratching front case.

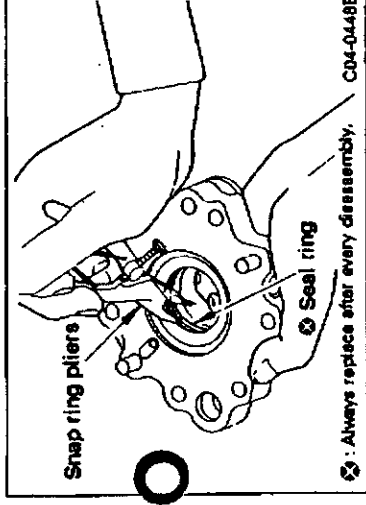


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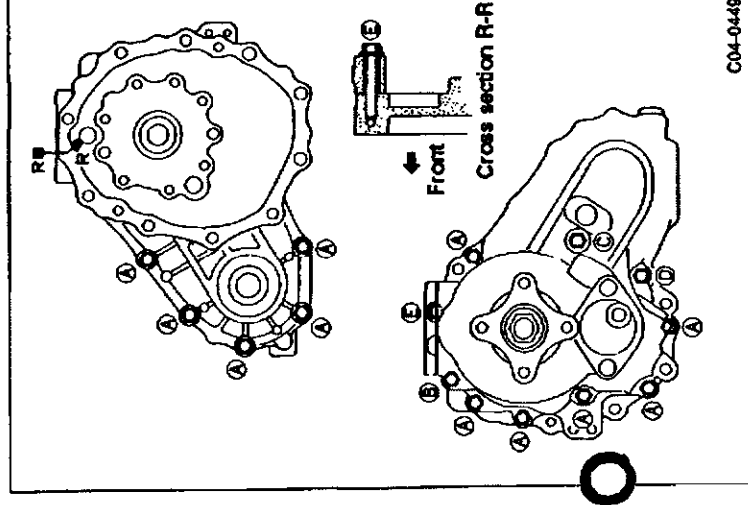
⚠ : Use Nissan MP special grease No. 2
⚠ : Always replace after every disassembly.

C04-0447B



⚠ : Always replace after every disassembly.

C04-0448B



C04-0449B

Front case removal

- Remove bolts from positions indicated in figure.

Bolt	Description	Tightening torque N·m (kg·m, ft·lb)	Length from head mm (in)
A (11 bolts)		16 - 21 (1.6 - 2.1, 12 - 15)	45 (1.77)
B (1 bolt)			165 (6.50)
C (1 bolt)			120 (4.72)
D (1 bolt)			100 (3.94)
E (1 bolt)			45 (1.77)

C3 ELECTRICAL CONTROL TORQUE SPLIT 4WD SYSTEM (ATTESSA E-TS)

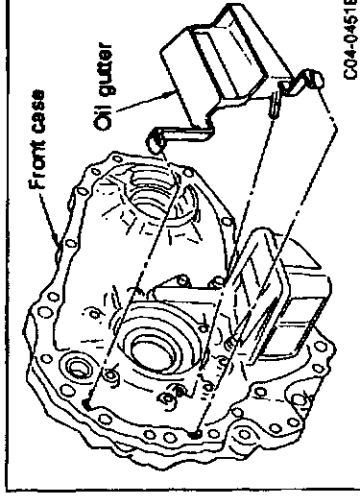
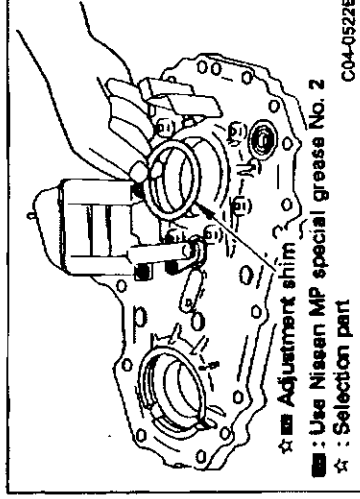
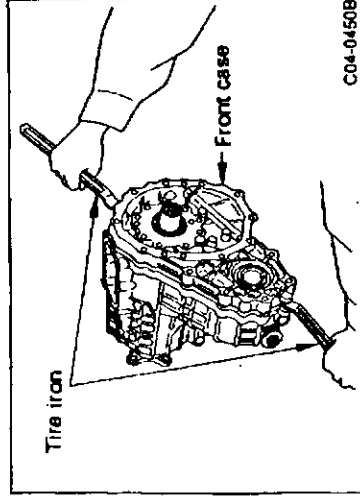
4. Removal and Installation, Assembly and

Disassembly (Cont'd)

- Use a tire iron and remove front case as shown in figure.

CAUTION:

Be careful not to scratch front and rear surface of case.

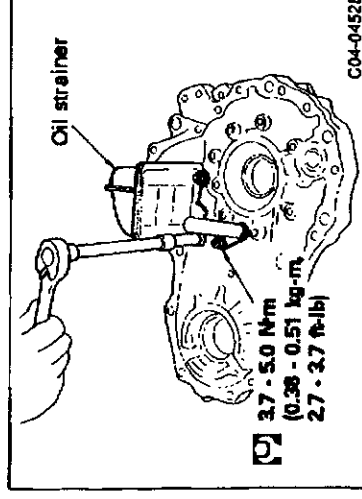


Oil gutter removal

- Remove oil gutter from front case.

CAUTION:

Be careful not to damage pawls.

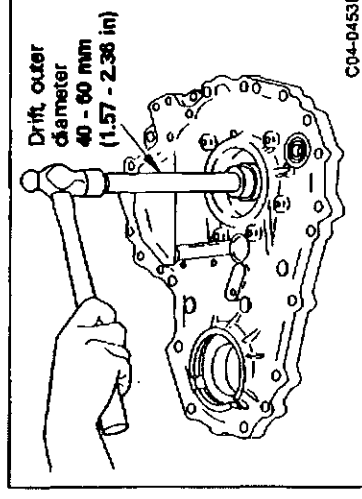


Oil strainer removal

- Remove three bolts and detach oil strainer.

CAUTION:

Do not damage screen.



Center drive shaft front bearing removal

- Use drift with outer diameter 40 to 60 mm (1.57 to 2.36 in) to tap out front bearing from center drive shaft.

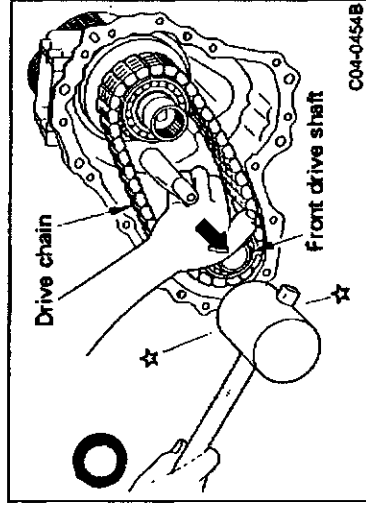
4. Removal and Installation, Assembly and Disassembly (Cont'd)

Front drive shaft and drive chain removal

- Hold front drive shaft as shown in figure, and tap rear case with wooden hammer and remove chain and drive shaft together.

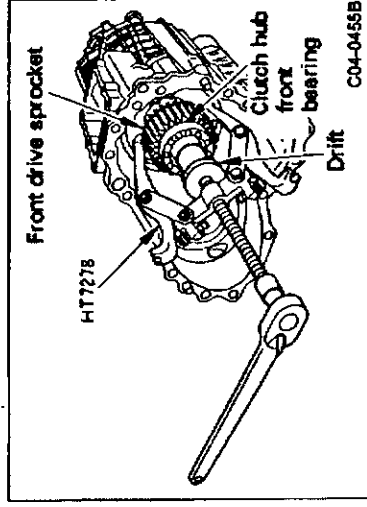
CAUTION:

Do not hit chain with wooden hammer. This may damage drive chain.



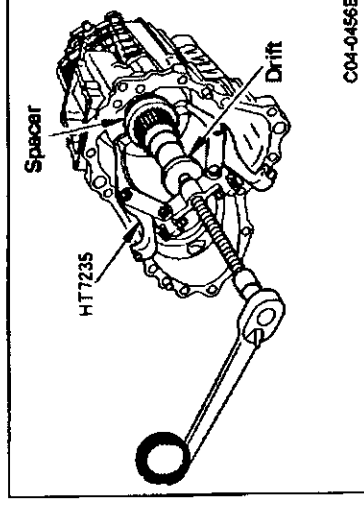
Front drive sprocket and clutch hub front bearing removal

- Position suitable drift on center drive shaft. Use a puller and remove clutch hub front bearing together with front drive sprocket.



Spacer

- Position suitable drift on center drive shaft and use puller to remove spacer.

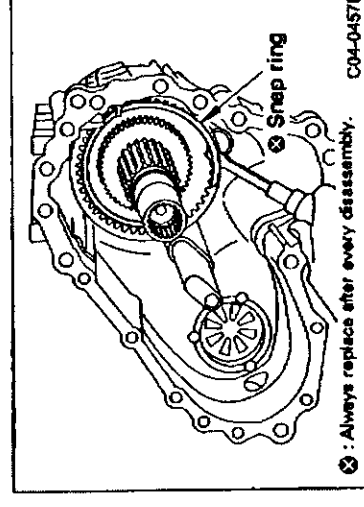


Clutch plate removal

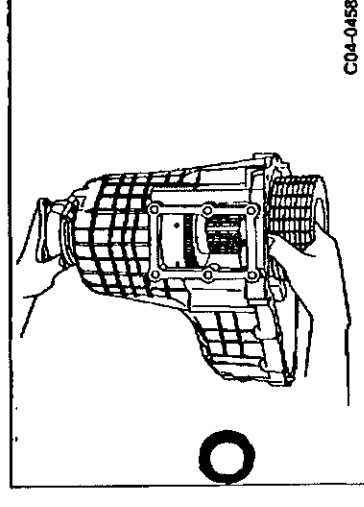
- Use screwdriver and remove snap ring as shown in figure.

CAUTION:

Replace snap ring after every disassembly.



- Raise rear case as shown in figure and remove plate from clutch drum.



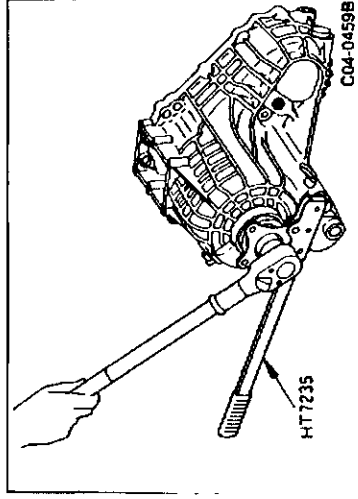
C3 ELECTRICAL CONTROL TORQUE SPLIT 4WD SYSTEM (ATTESSA E-TS)

4. Removal and Installation, Assembly and

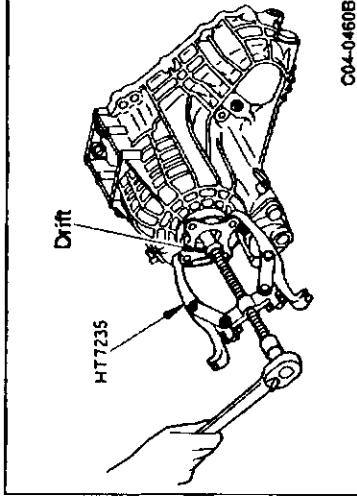
Disassembly (Cont'd)

Center drive shaft removal

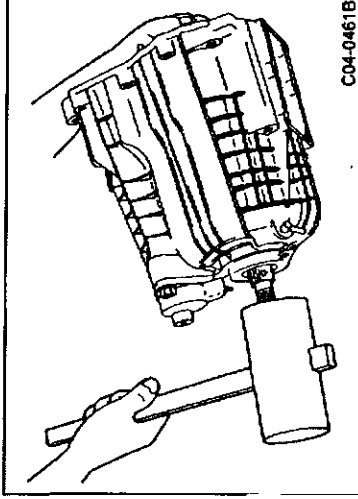
- Place flange wrench on companion flange and remove lock nut.



- Position suitable drift on center drive shaft and use puller to remove companion flange.

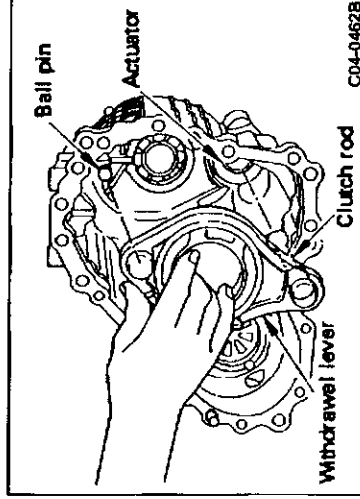


- Use wooden hammer to tap center drive shaft and remove unit.

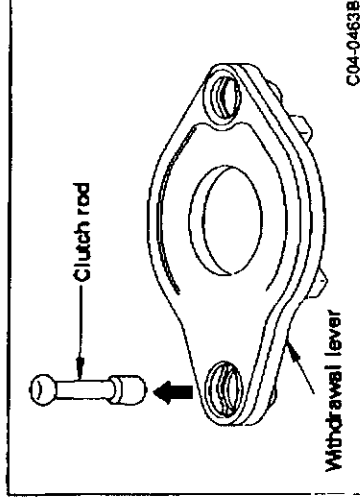


Withdrawal lever removal

- Remove withdrawal lever from ball pin in rear case and detach it by hand.



- Remove clutch release rod from withdrawal lever.

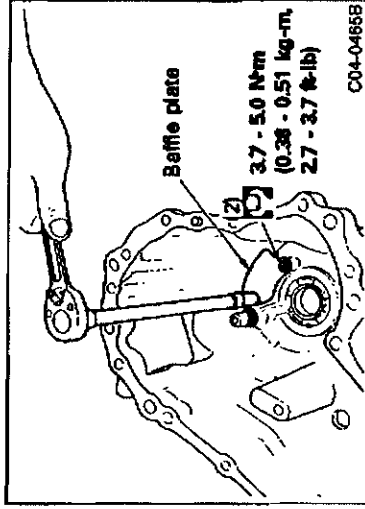
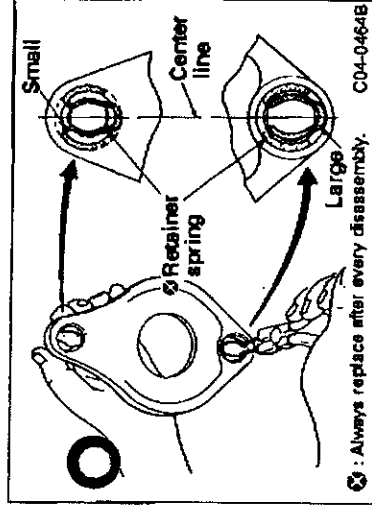


4. Removal and Installation, Assembly and Disassembly (Cont'd)

- Use snap ring pliers to remove retainer spring.

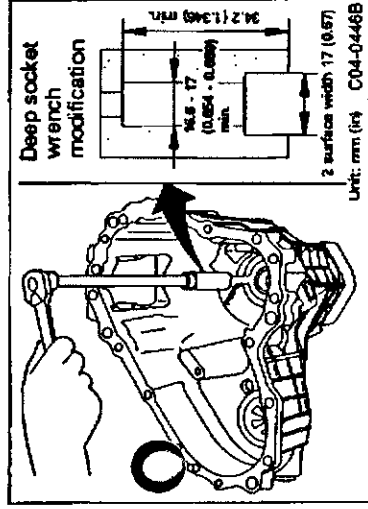
CAUTION:

Replace retainer spring after every disassembly.



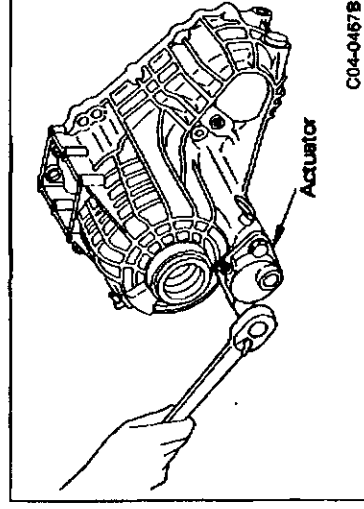
Baffle plate removal

- Remove two bolts and detach baffle plate.



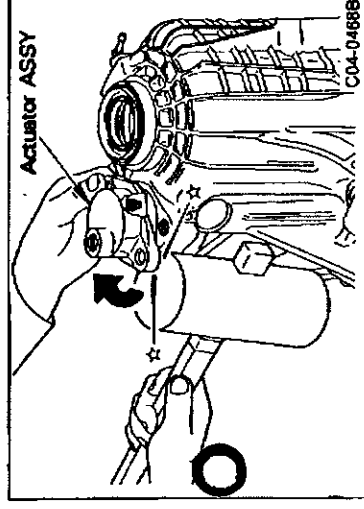
Ball pin removal

- Use deep socket wrench with two surface 17 mm (0.67 in) as shown in figure to remove ball pin.



Actuator removal

- Remove the two bolts and detach bracket.



- Turn actuator to position shown in the figure and tap with wooden hammer to remove.

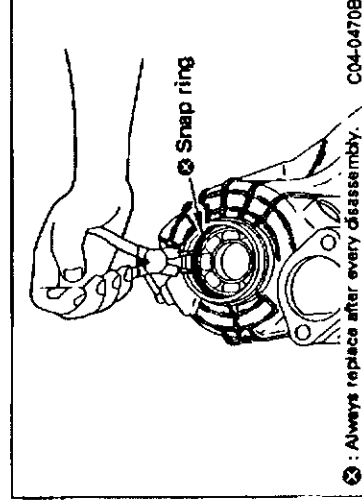
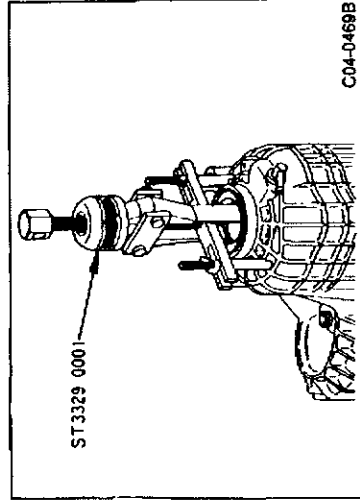
CAUTION:

Be careful not to scratch actuator boot.

4. Removal and Installation, Assembly and Disassembly (Cont'd)

Companion flange oil seal removal

- Use oil seal puller (special service tool) to remove oil seal.

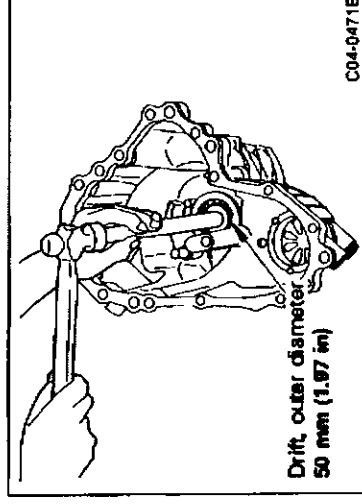


Center drive shaft rear bearing removal

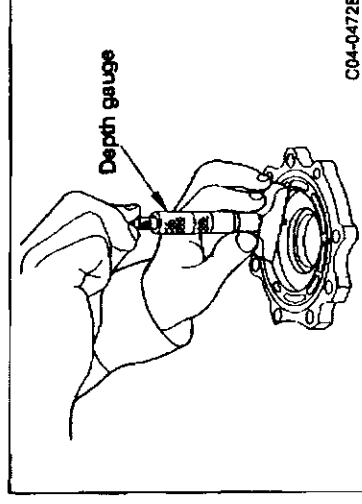
- Use snap ring pliers to remove snap ring.

CAUTION:

Replace snap ring after every disassembly.



- Use drift with 50 mm (1.97 in) outer diameter to remove bearing.



② Assembly and disassembly

③ Oil pump

Disassembly inspection

Check side clearance of inner and outer gear.

- Use depth gauge to measure housing depth as shown in figure.
- Select a set of inner and outer gears which conform to gear and housing clearances indicated below.

Clearance standard:

0.02 - 0.04 mm (0.0008 - 0.0016 in)

Inner gear and outer gears

Gear thickness mm (in)	Part number	
	Inner gear	Outer gear
6.98 (0.2748)	31346 05U02	31347 05U02
6.99 (0.2752)	31346 05U01	31347 05U01
7.00 (0.2756)	31346 05U00	31347 05U00

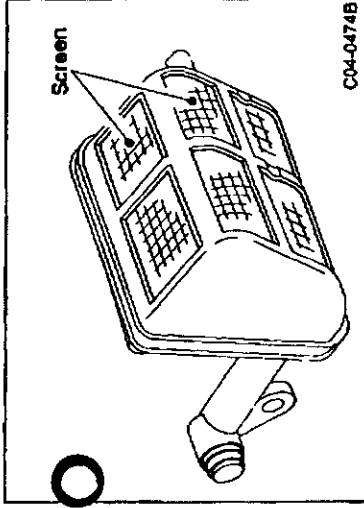
4. Removal and Installation, Assembly and Disassembly (Cont'd)

Oil strainer inspection

- Check for scratches or damage to oil strainer screen and body.

CAUTION:

Wash screen section well and remove all metallic deposits and foreign matter.

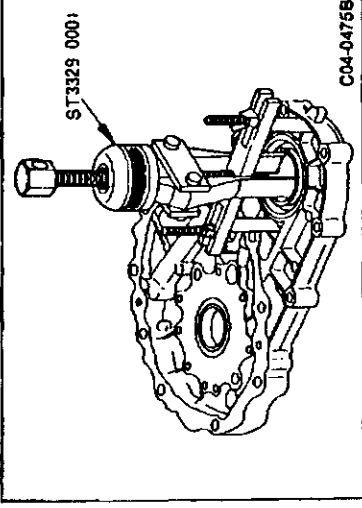


⑥ Front case

Front drive shaft oil seal removal and installation

Removal

- Position oil seal puller (special service tool) and remove seal as shown in figure.

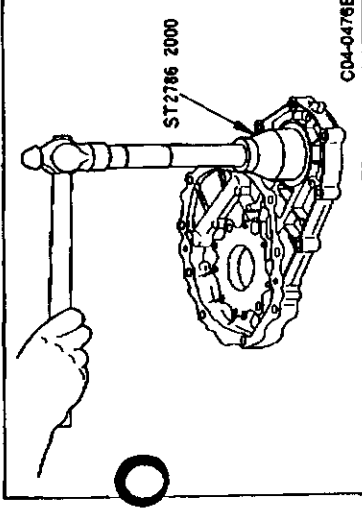


Installation

- Use a drift (special service tool) and install oil seal flush with case surface.

CAUTION:

Apply a thin coat of grease (Nissan MP special grease No. 2) to oil seal lip.



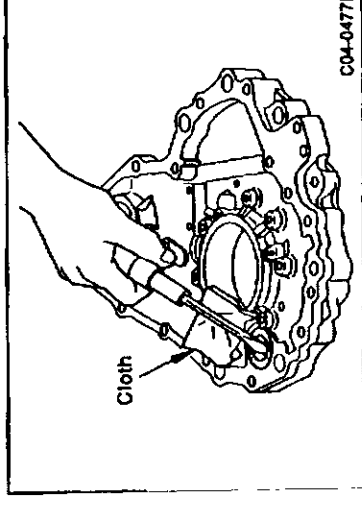
Striking rod oil seal (M/T only) removal and installation

Removal

- Use screwdriver to remove oil seal.

CAUTION:

Be careful not to scratch front case with screwdriver.

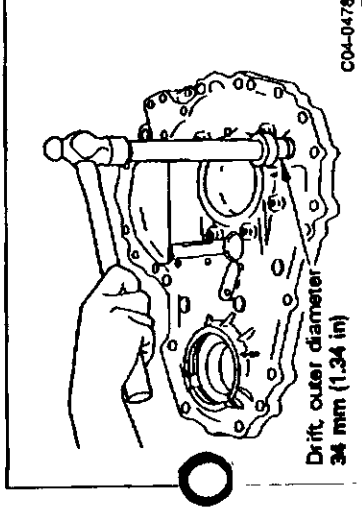


Installation

- Use suitable drift with outer diameter 34 mm (1.34 in) and install oil seal flush with case.

CAUTION:

Apply a thin coat of grease (Nissan MP special grease No. 2) to oil seal lip.

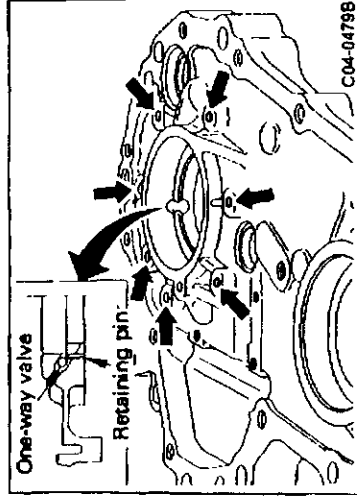


4. Removal and Installation, Assembly and

Disassembly (Cont'd)

Disassembly inspection

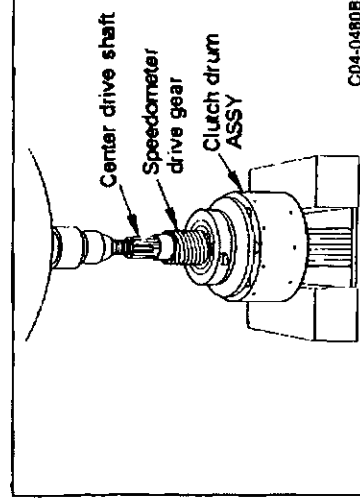
- Check that front case one-way valve has not seized.
- Wash front case to remove any sealant that adheres to screws because oil pump bolts (7 locations shown in figure) are seal bolts.



Center drive shaft

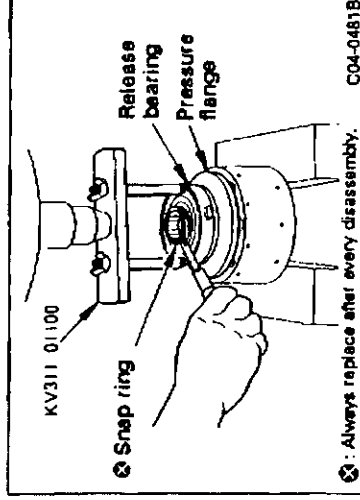
Clutch drum ASSY and speedometer drive gear removal

- Set center drive shaft in press as shown in figure and separate clutch drum ASSY and speedometer drive gear.

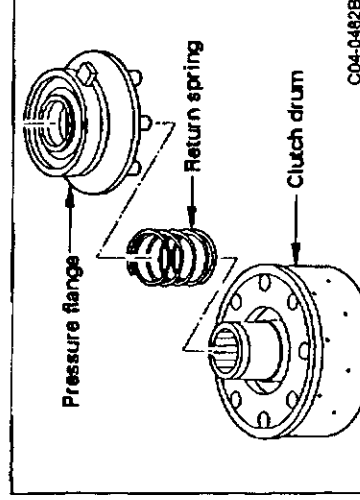


Pressure flange removal

- Position spring compressor (special service tool), press in release bearing retainer and use screwdriver to remove snap ring.

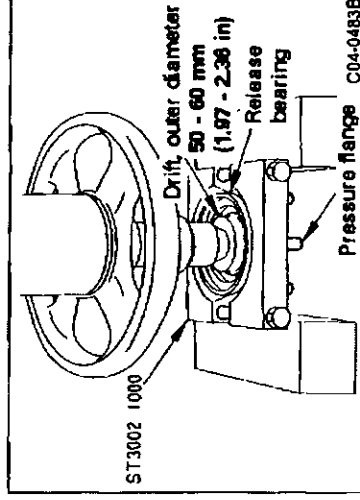


- Remove pressure flange and return spring from clutch drum.



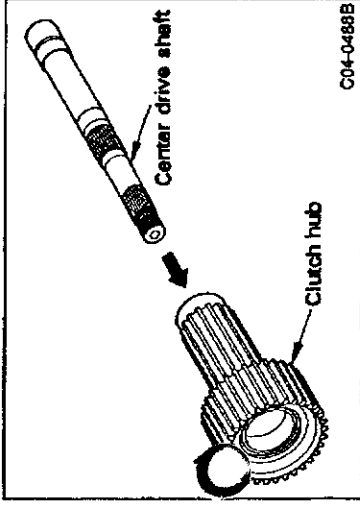
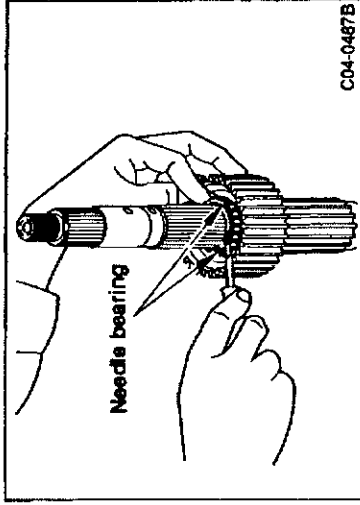
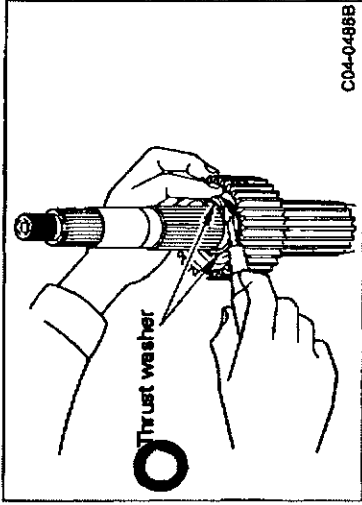
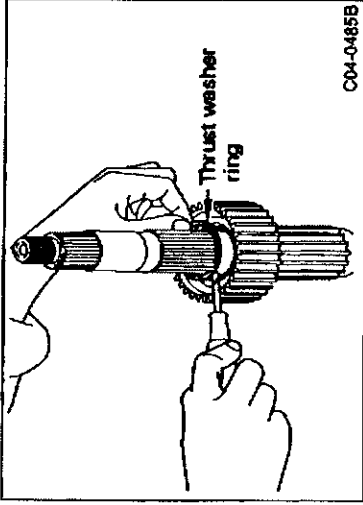
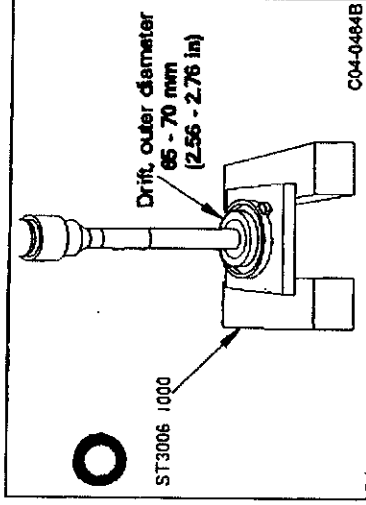
Release bearing removal

- Set bearing replacer on release bearing retainer and use drift with 50 to 60 mm (1.97 to 2.36 in) outer diameter to press out bearing.



4. Removal and Installation, Assembly and Disassembly (Cont'd)

- Set bearing replacer (special service tool) on bearing retainer as shown in figure and use drift with outer diameter 65 to 70 mm (2.56 to 2.76 in) to remove bearing.



Clutch hub removal

- Use screwdriver to remove thrust washer ring.

- Use screwdriver to remove thrust washer.

- Use screwdriver as shown in figure to separate needle bearing assemblies into two parts and remove them.

CAUTION:

- (1) Press clutch hub down to separate needle bearings.
- (2) Be careful not to scratch needle bearings.

- Remove clutch hub from center drive shaft.

4. Removal and Installation, Assembly and

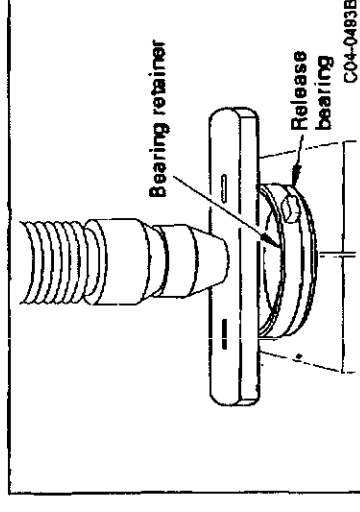
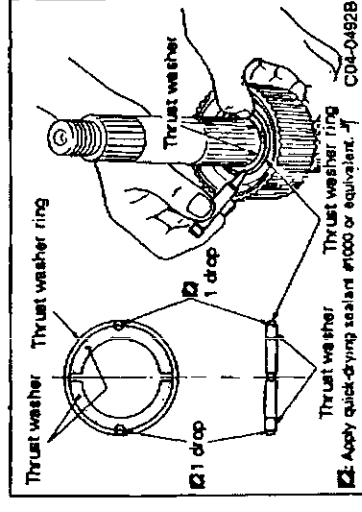
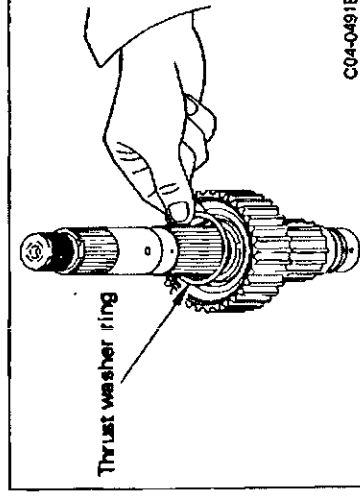
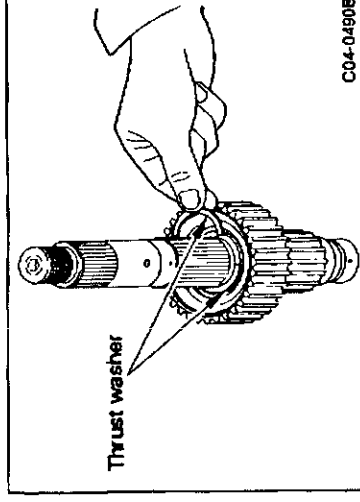
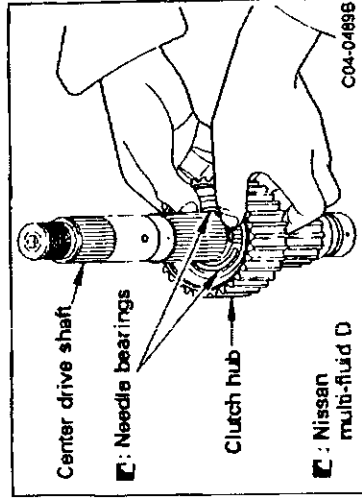
Disassembly (Cont'd)

Clutch hub installation

- Assemble clutch hub on center drive shaft. Press clutch hub down as shown in figure to increase center drive shaft clearance and install needle bearings.

CAUTION:

- (1) First coat needle bearings with Nissan Multi-fluid D and then assemble.
 - (2) When assembling needle bearings, be especially careful not to bend, twist or deform bearings.
- Install thrust washer in center drive shaft groove.



- While raising clutch hub, apply a drop of quick-drying sealant #1000 in clearance of thrust washer and thrust washer ring to secure assembly. At this time, be careful that thrust washer ring is not higher than thrust washer surface level.

CAUTION:

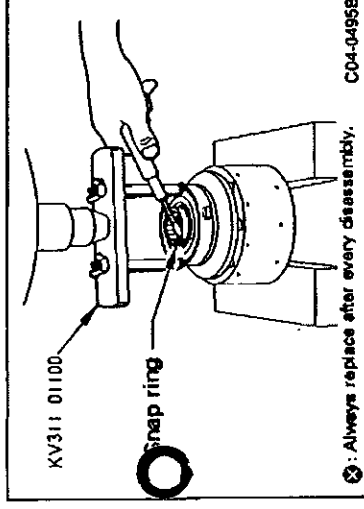
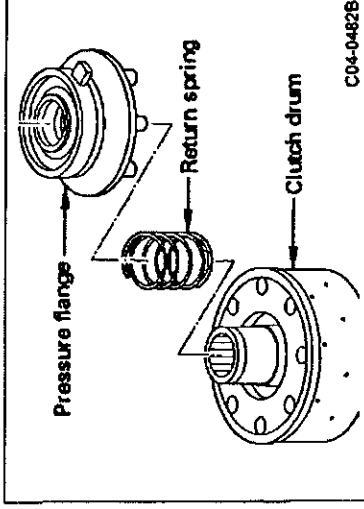
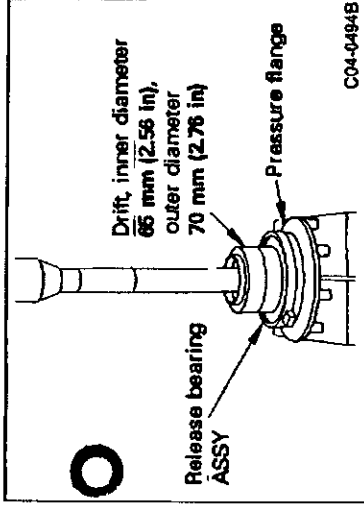
- (1) If thrust washer is higher than thrust washer, the thrust washer ring may fall off when pressure is applied to clutch drum.
- (2) Be careful not to apply an excessive amount of quick-drying sealant to prevent needle bearings from seizing.

Release bearing ASSY Installation

- Set bearing retainer on release bearing. Position plate as shown in figure and press-fit to install.

4. Removal and Installation, Assembly and Disassembly (Cont'd)

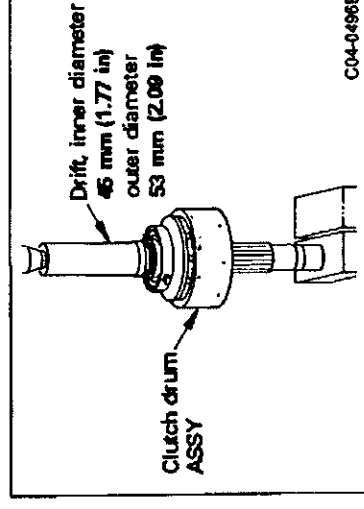
- Place release bearing ASSY on pressure flange. Set drift, with inner diameter 65 mm (2.56 in), outer diameter 70 mm (2.76 in) on release bearing and press-fit to install.



- Set spring compressor (special service tool) as shown in figure. Insert bearing retainer on press and use screwdriver to install snap ring.

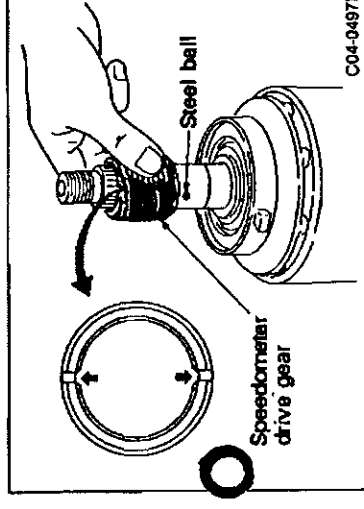
CAUTION:

The eight protrusions on pressure flange must be aligned with the eight indentations on clutch drum.



Clutch drum ASSY installation

- Set clutch drum ASSY on center drive shaft rear side. Use drift with 45 mm (1.77 in) inner diameter and 53 mm (2.09 in) outer diameter and press-fit assembly.



Speedometer drive gear installation

- Assemble steel balls in center drive shaft in positions shown in figure. Align notches (grooves) in speedometer drive gear with steel balls and assemble.

CAUTION:

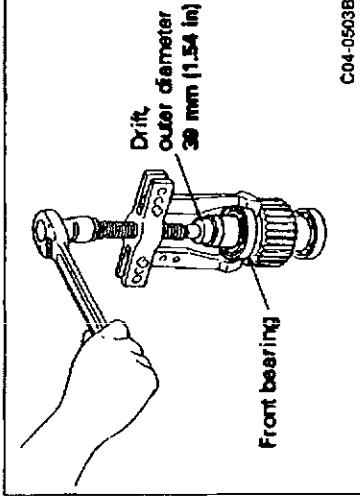
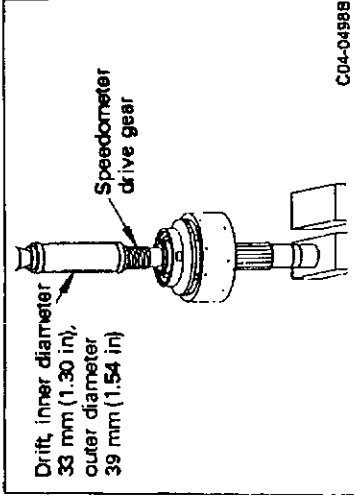
The notches in speedometer drive gear should face up.

C3 ELECTRICAL CONTROL TORQUE SPLIT 4WD SYSTEM (ATTESSA E-TS)

4. Removal and Installation, Assembly and

Disassembly (Cont'd)

- Set drift with 33 mm (1.30 in) inner diameter and 39 mm (1.54 in) outer diameter on drive gear and install on press.



Front bearing removal and installation

Removal

- Set drift with outer diameter 39 mm (1.54 in) on bearing and use puller to remove bearing.

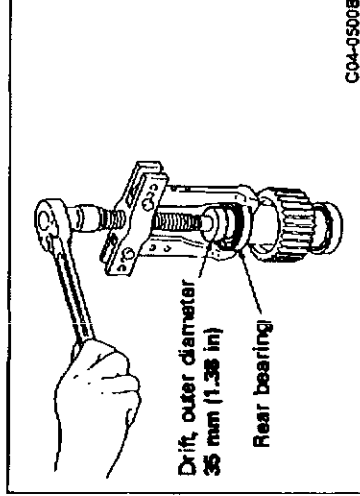
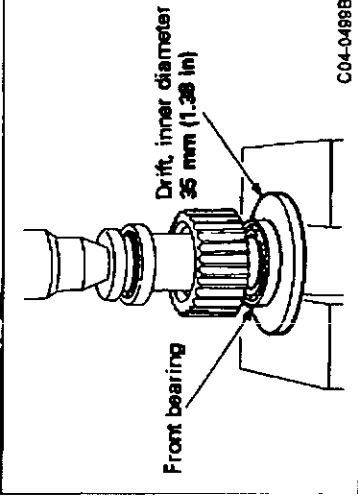
CAUTION:

Be careful not to scratch sliding surface of front oil seal.

③ Front drive shaft

Installation

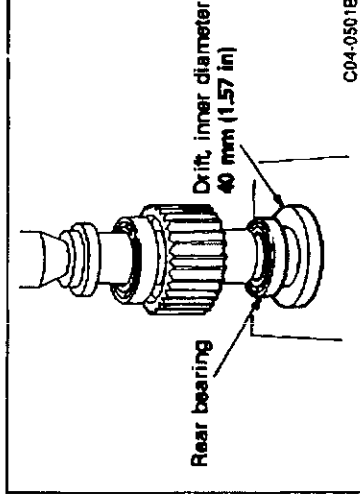
- Set drift with inner diameter 35 mm (1.38 in) on bearing and press to install bearing.



Rear bearing removal and installation

Removal

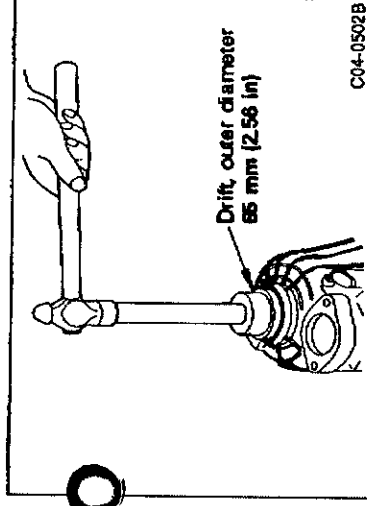
- Set drift with outer diameter 35 mm (1.38 in) and use puller to remove bearing.



Installation

- Set drift with inner diameter 40 mm (1.57 in) on bearing and use press to install.

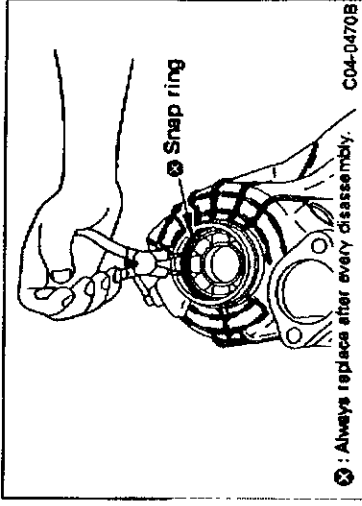
4. Removal and Installation, Assembly and Disassembly (Cont'd)



③ Installation

Center shaft rear bearing installation

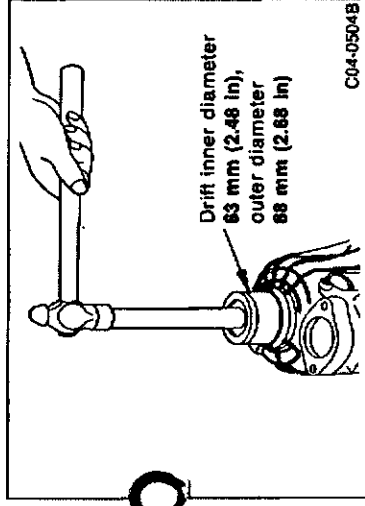
- Use drift with 65 mm (2.56 in) maximum outer diameter and press-fit bearing.



- Use snap ring pliers to install snap ring.

CAUTION:

Replace snap ring after every disassembly.



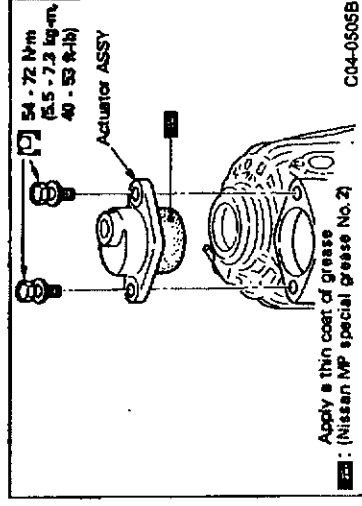
Companion flange oil seal installation

- Use drift with 63 mm (2.48 in) inner diameter and 68 mm (2.68 in) outer diameter and install seal flush with case.

CAUTION:

Apply a thin coat of grease (Nissan MP special grease No. 2 to oil seal lip.

Reference: Use drift KV401 04830.



Actuator installation

- Apply a thin coat of grease (Nissan MP special grease No. 2) to actuator boot and install in rear case.
- Tighten bolts to specified tightening torque.

CAUTION:

Do not scratch actuator boot.

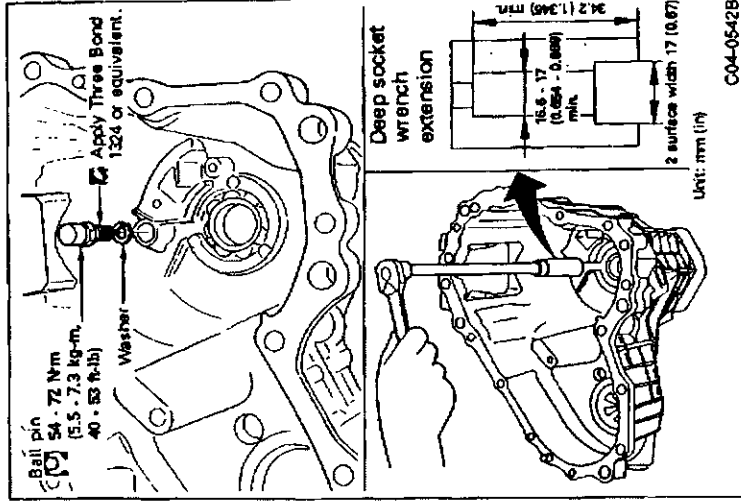
C3 ELECTRICAL CONTROL TORQUE SPLIT 4WD SYSTEM (ATTESSA E-TS)

4. Removal and Installation, Assembly and

Disassembly (Cont'd)

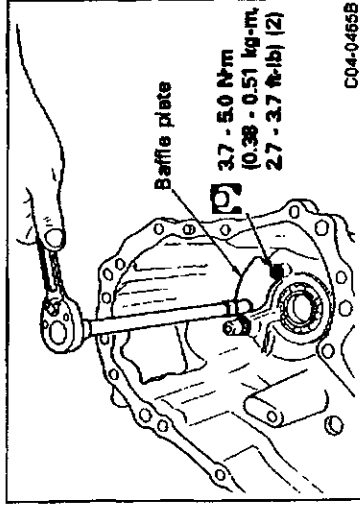
Ball pin installation

- Coat ball pin screw with sealant (Three Bond 1324 or equivalent). Use deep socket wrench for removal (refer to figure) and tighten to specified torque.



Baffle plate installation

- Install baffle plate on rear case as shown in figure. Tighten two bolts to specified tightening torque.

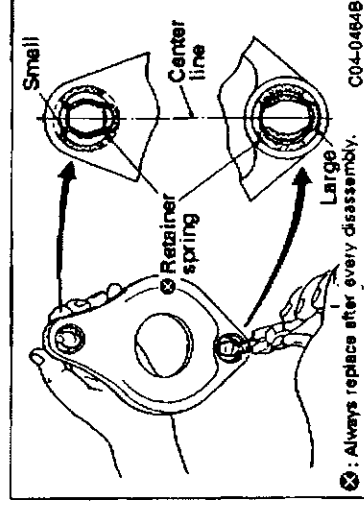


Withdrawal lever installation

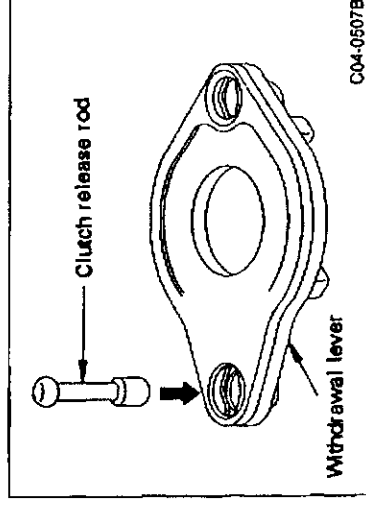
- Use snap ring pliers to install retainer spring as shown in figure.

CAUTION:

Align installation direction of spring retainer as shown in figure and install.



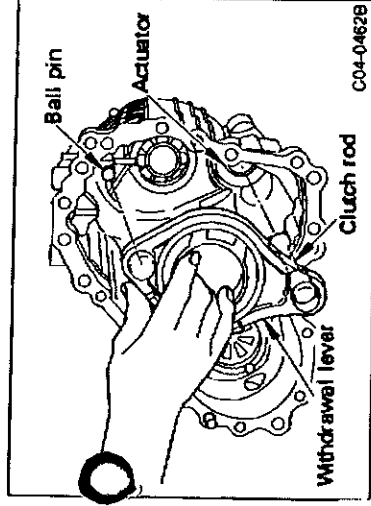
- Install clutch release rod as shown in figure.



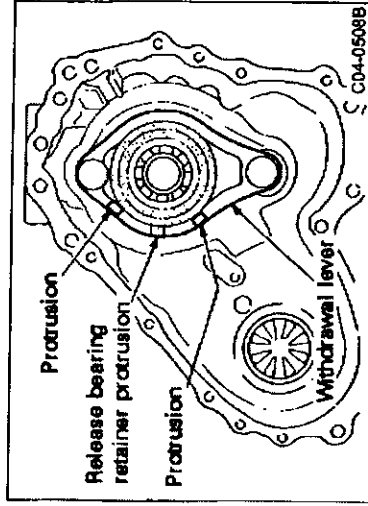
C3 ELECTRICAL CONTROL TORQUE SPLIT 4WD SYSTEM (ATTESSA E-TS)

4. Removal and Installation, Assembly and Disassembly (Cont'd)

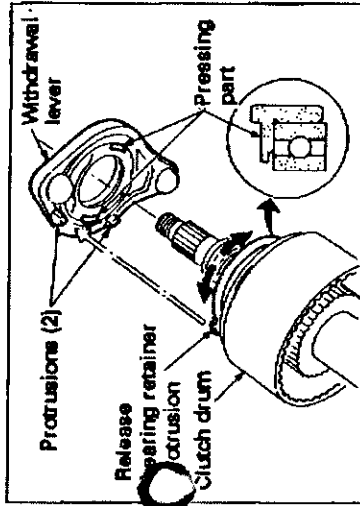
- Insert clutch release rod below withdrawal lever in actuator piston. Press spring retainer in ball pin.



- #### Center drive shaft installation
- Align release bearing retainer protrusion in gap between withdrawal lever protrusions (2 locations) as shown in figure. Press in center drive shaft.

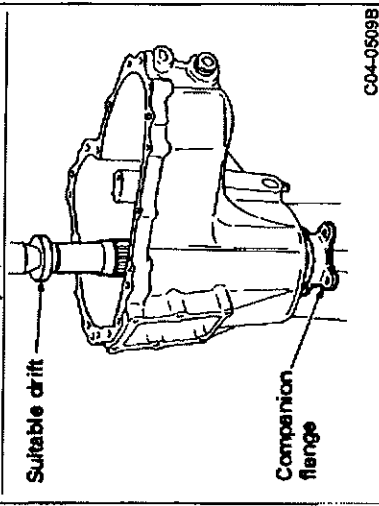


- Install center drive shaft in rear case.
- Assemble companion flange in center drive shaft as shown in figure. Place suitable drift and set in press.
- Align bearing retainer protrusions of center drive shaft with withdrawal lever protrusions (2 locations) and gradually press-fit together. Rotate bearing retainer manually to left and right to check that it contacts withdrawal lever protrusions (2 locations). Press in center drive shaft.



CAUTION:

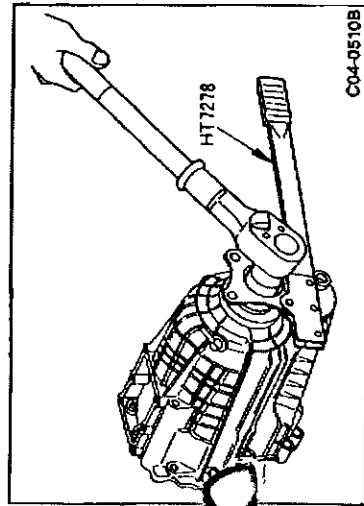
Press withdrawal lever in straight ahead, making sure it is not inclined. If lever is pressed in at inclined angle, the contact point of withdrawal lever will ride above outside of release bearing retainer and selection of clutch drum retaining plate will not be correct.



- Place companion flange wrench in companion flange as shown in figure and tighten lock nut to specified tightening torque.

CAUTION:

- (1) Replace lock nut after every disassembly.
- (2) Make sure sliding parts of companion flange oil seal are not scratched or worn.



C3 ELECTRICAL CONTROL TORQUE SPLIT 4WD SYSTEM (ATTESSA E-TS)

4. Removal and Installation, Assembly and

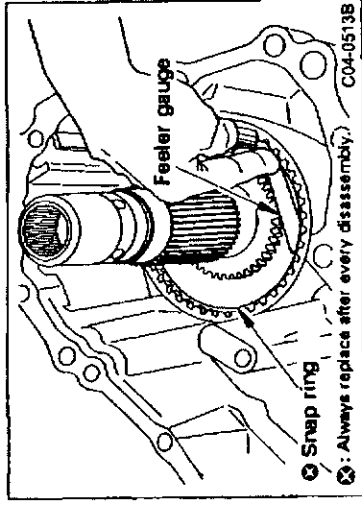
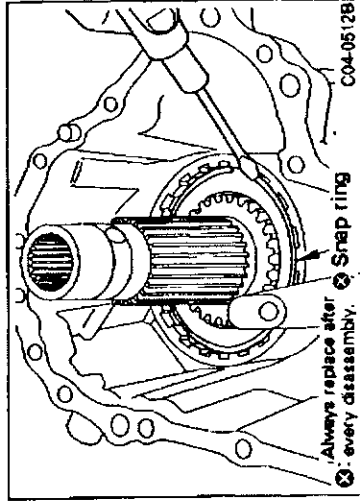
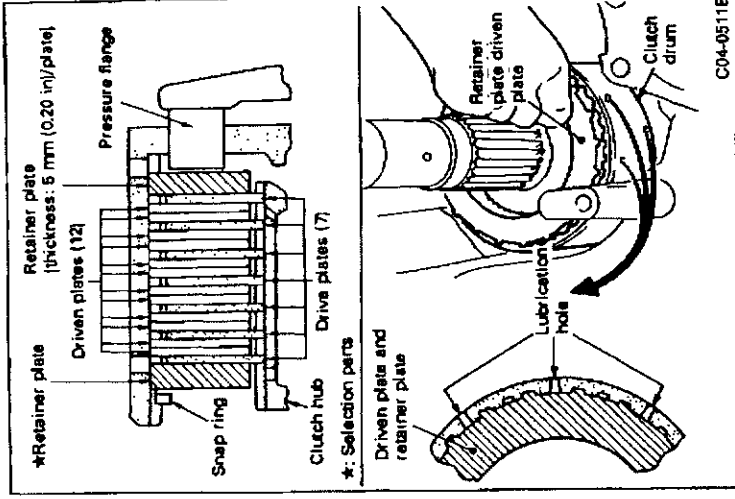
Disassembly (Cont'd)

Clutch plate installation

- Make sure clutch plate is assembled correctly in sequence indicated in figure.

CAUTION:

- (1) Assemble clutch drum so lubrication holes are not aligned with gear teeth positions of driven plate and retainer plate.
- (2) After assembling one retainer plate that is 5 mm (0.20 in) thick, install driven plate with drive plate.



Gap measurement and retainer plate selection

- Use feeler gauge to measure gap between retainer plate and snap ring as shown in figure. If clearance is not within specification range in following chart, select thicker retainer plate to obtain correct clearance.

Inspection standard values

Standard value:

0.2 - 0.5 mm (0.008 - 0.020 in)

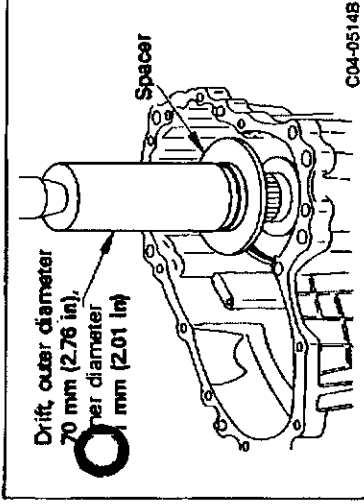
Thickness mm (in)	Part number	Thickness mm (in)	Part number
4.8 (0.189)	31537 05U00	6.0 (0.236)	31537 05U06
5.0 (0.197)	31537 05U01	6.2 (0.244)	31537 05U07
5.2 (0.205)	31537 05U02	6.4 (0.252)	31537 05U08
5.4 (0.213)	31537 05U03	6.6 (0.260)	31537 05U09
5.6 (0.220)	31537 05U04	6.8 (0.268)	31537 05U10
5.8 (0.228)	31537 05U05	7.0 (0.276)	31537 05U11

4. Removal and Installation, Assembly and

Disassembly (Cont'd)

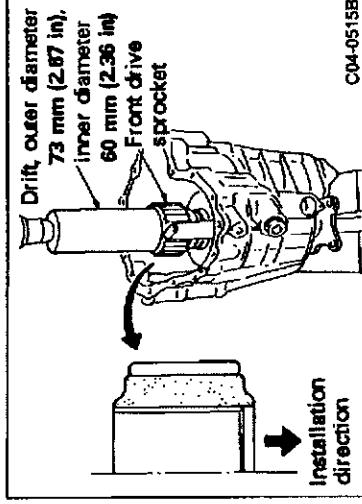
Spacer installation

- Place drift with 70 mm (2.76 in) outer diameter and 51 mm (2.01 in) inner diameter on spacer and install on press.



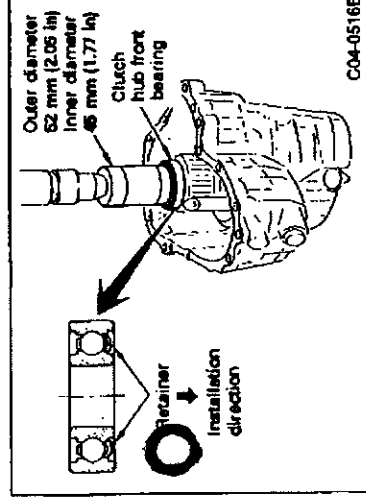
Front drive sprocket installation

- Align installation direction as shown in figure and place drift with 73 mm (2.87 in) outer diameter and 60 mm (2.36 in) inner diameter and press-fit spacer to install.



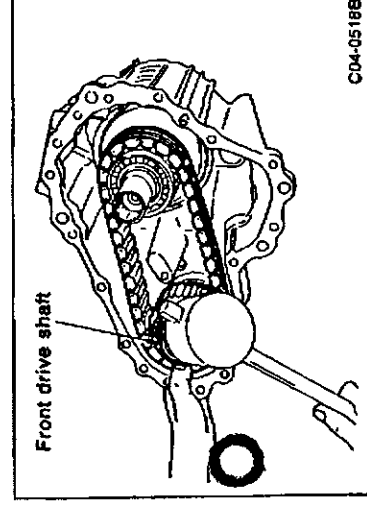
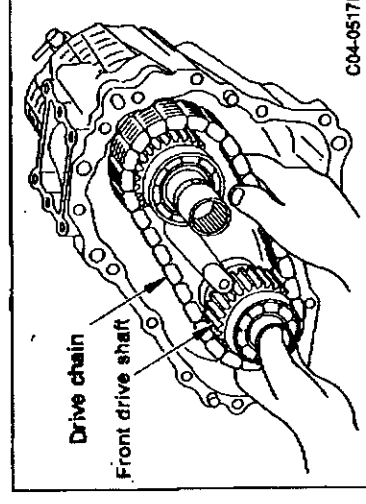
Clutch hub front bearing installation

- Align installation direction as shown in figure. Use drift with 52 mm (2.05 in) outer diameter and 45 mm (1.77 in) inner diameter and press-fit bearing.



Front drive shaft and drive chain installation

- Attach drive chain on front drive shaft. Align front drive sprocket gears as shown in figure then assemble temporarily.



- Align front drive shaft in rear case. Raise front drive shaft and tap with hammer to install.

CAUTION:

- (1) Do not scratch front drive shaft (circumferential friction part) when tapping with wooden hammer.
- (2) Lubricate front propeller shaft engagement spline of front drive shaft with Nissan special grease No. 2.

C3 ELECTRICAL CONTROL TORQUE SPLIT 4WD SYSTEM (ATTESSA E-TS)

4. Removal and Installation, Assembly and

Disassembly (Cont'd)

Clutch hub end play adjustment

- Use depth gauge and V-block to measure T_1 dimension (adjustment shim thickness) shown in figure. Adjust end play to standard value indicated below.

Inspection standard value

End play standard value:

0.2 - 0.35 mm (0.0079 - 0.0138 in)

- Place V-block and depth gauge in front case as shown in figure. Measure dimension A to clutch hub front bearing surface.

- Place V-block and depth gauge in rear case as shown in figure. Measure dimension B to clutch hub front bearing surface.

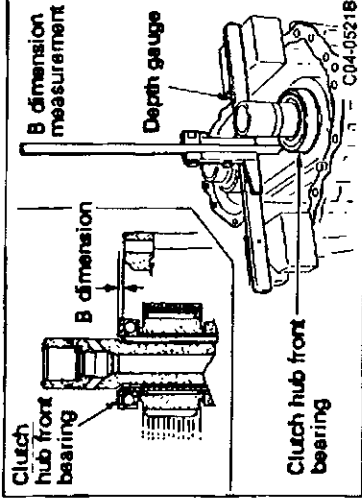
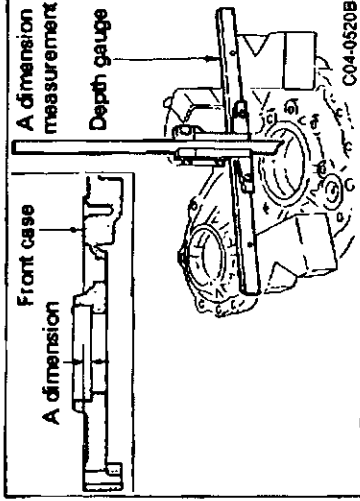
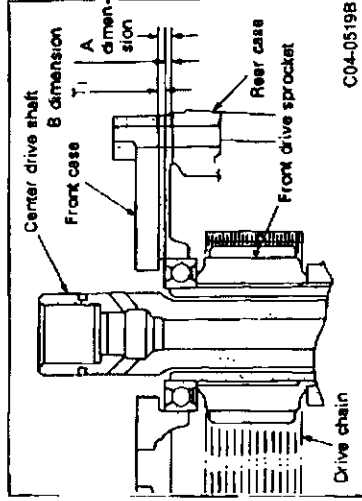
- Use following equation to calculate adjustment shim thickness.

$$T_1 \text{ (shim thickness)} = A - B - \text{standard value}$$

Unit: mm

Adjustment shims

Thickness mm (in)	Part number	Thickness mm (in)	Part number
0.4 (0.016)	33112 05U04	0.8 (0.031)	33112 05U02
0.5 (0.020)	33112 05U05	0.9 (0.035)	33112 05U03
0.6 (0.024)	33112 05U00	1.0 (0.039)	33112 05U06
0.7 (0.028)	33112 05U01		



C3 ELECTRICAL CONTROL TORQUE SPLIT 4WD SYSTEM (ATTESSA E-TS)

4. Removal and Installation, Assembly and

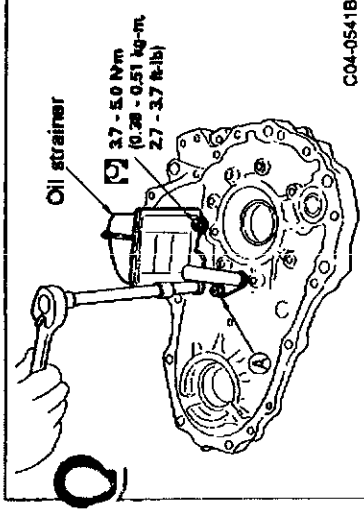
Disassembly (Cont'd)

Oil strainer installation

- Install oil strainer in front case as shown in figure. Tighten bolts to specified tightening torque.

CAUTION:

Tighten bolt **A** first to prevent incorrect installation due to strainer deformation.

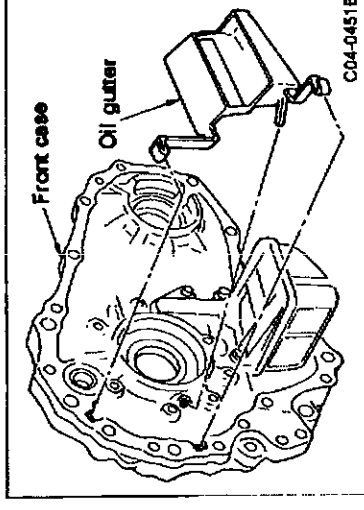


Oil gutter installation

- Align two pawls and tube in front case as shown in figure and assemble securely.

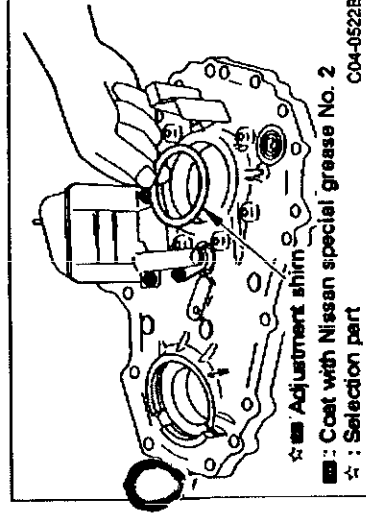
CAUTION:

Do not damage pawls.

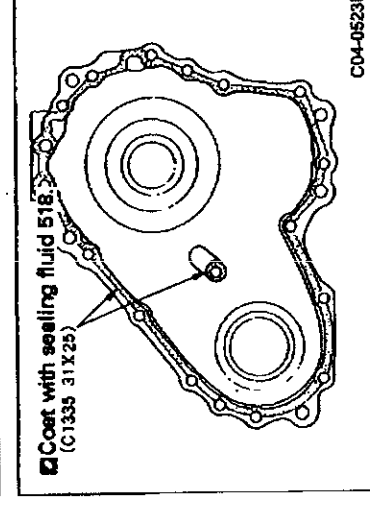


Front case installation

- Coat selected adjustment shim with Nissan MP special grease No. 2 and install it on clutch hub front bearing mating surface.



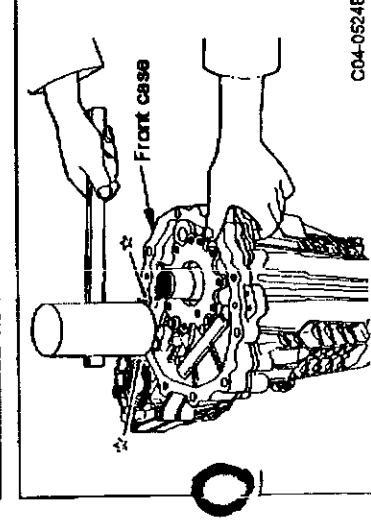
- Coat entire circumference of rear case installation surface as shown in figure on left with sealant (sealing fluid 518 [part number C1335 31X25] or equivalent).



- Align front case with drive shaft and center drive shaft in rear case and tap with wooden hammer to install.

CAUTION:

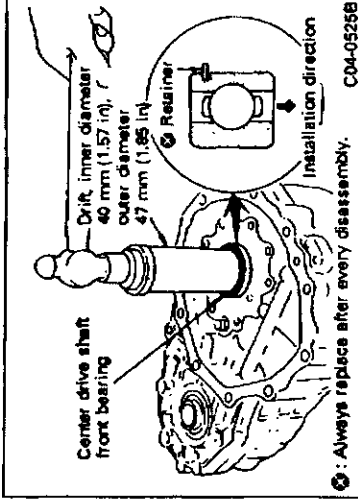
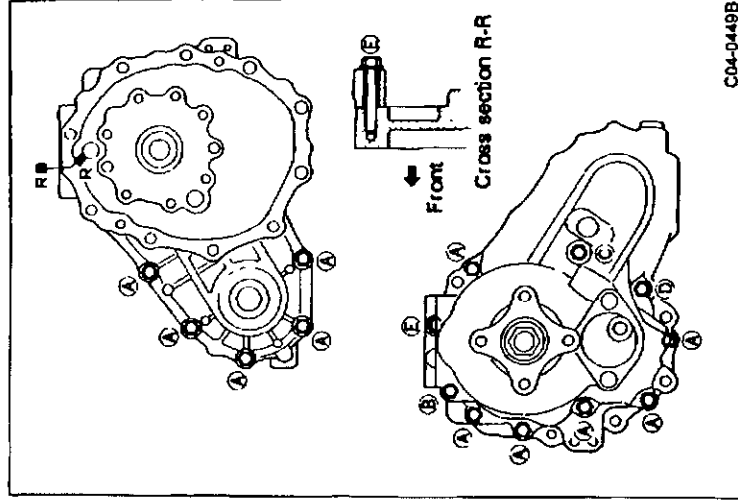
Do not damage front case or transmission installation surface.



4. Removal and Installation, Assembly and Disassembly (Cont'd)

- Install front cover bolts as shown in figure and tighten to specified tightening torque.

Bolt	Description	Tightening torque N·m (kg-m, ft-lb)	Length from head mm (in)
A (11 bolts)	16 - 21 (1.6 - 2.1, 12 - 15)		45 (1.77)
B (1 bolt)			165 (6.50)
C (1 bolt)			120 (4.72)
D (1 bolt)			100 (3.94)
E (1 bolt)			45 (1.77)

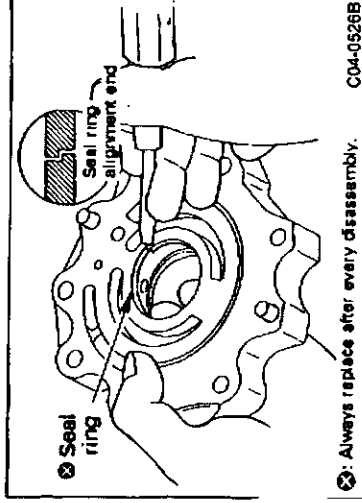


Center drive shaft front bearing Installation

- Use suitable drift with 40 mm (1.57 in) inner diameter and 47 mm (1.85 in) outer diameter and press bearing retainer flush with end of case.

CAUTION:

The retainer must be pressed straight into case without binding.

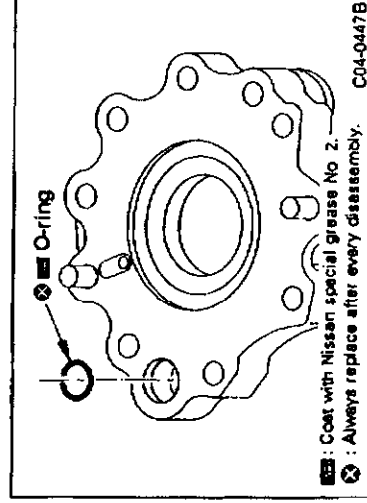


Oil pump installation

- Use screwdriver and install seal ring in groove of oil pump cover.

CAUTION:

- Position seal ring alignment ends as shown in figure.
- Replace seal ring after every disassembly.



- Coat O-ring with Nissan special grease No. 2 and install in oil strainer of oil pump cover.

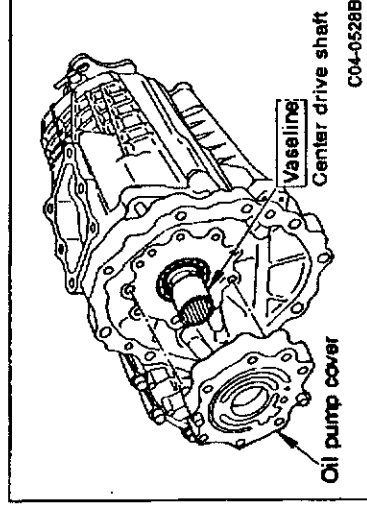
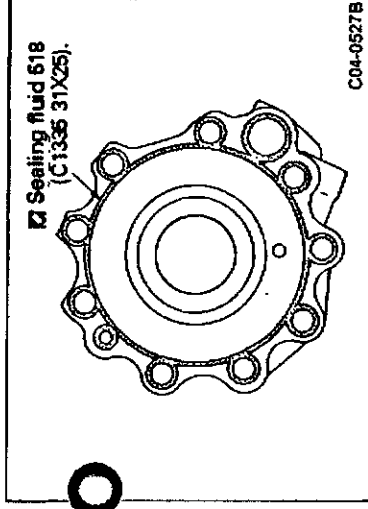
CAUTION:

Always replace O-ring after every disassembly.

C3 ELECTRICAL CONTROL TORQUE SPLIT 4WD SYSTEM (ATTESSA E-TS)

4. Removal and Installation, Assembly and Disassembly (Cont'd)

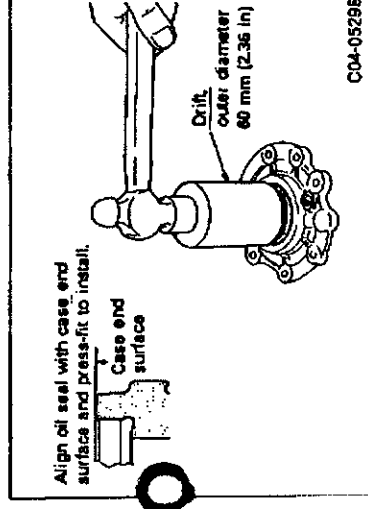
- Coat entire circumference of cover mating surface with sealant (sealing fluid 518 <Part number C1335 31X25>).



- Coat center drive shaft with Vaseline in position shown in figure. Install oil pump cover in front case.

CAUTION:

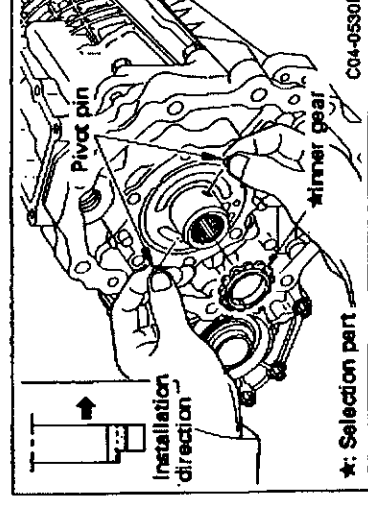
Do not scratch center drive shaft with oil pump cover seal ring.



- Use drift with 60 mm (2.36 in) outer diameter and insert oil seal.

CAUTION:

Coat oil seal lip with grease (Nissan MP special grease No. 2).



- Install two pivot pins in center drive shaft then install inner gear.

4. Removal and Installation, Assembly and

Disassembly (Cont'd)

- Install outer gear in oil pump housing.

CAUTION:

Inner gear must be aligned with inner gear installation direction.

- Coat O-ring with grease (Nissan MP special grease No. 2) and install in oil pump housing.

CAUTION:

Replace O-ring after every disassembly.

- Assemble housing temporarily. Rotate companion flange as shown in figure, align inner and outer gear position and install housing. Tighten six bolts and one torx bolt to specified tightening torque.

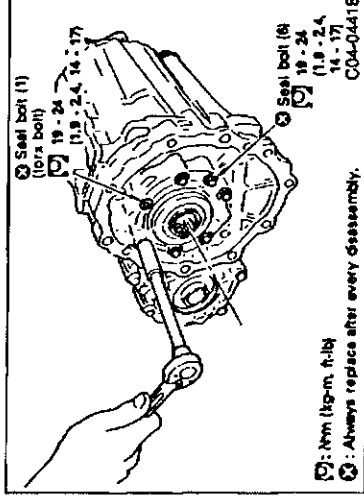
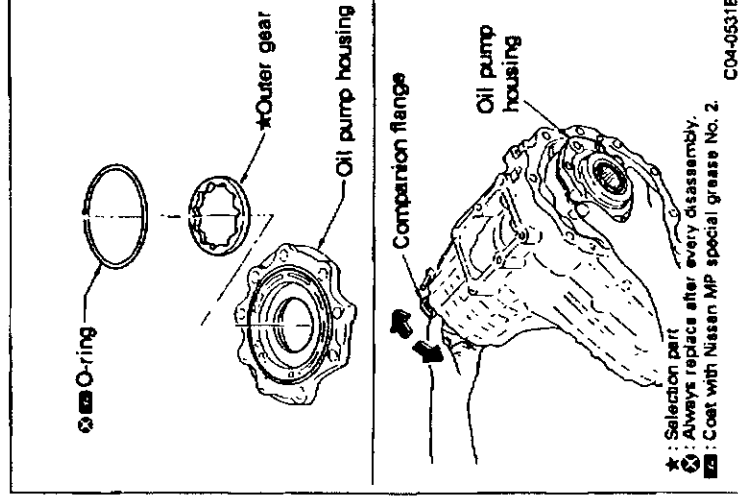
CAUTION:

- (1) There are two knock pins in cover. Align housing side pin holes and then assemble.
- (2) Use tap to coat the bolt holes on case side with sealant.
- (3) Replace bolts and screws after every disassembly.

- Tighten seven bolts (including 1 torx bolt) to specified torque.

CAUTION:

Do not reuse installation bolts because these are seal bolts.

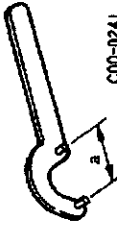
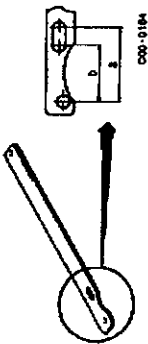
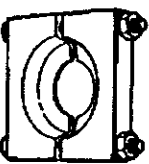


C4 PROPELLER SHAFT

OPERATION PRECAUTIONS

- Use torque wrench to tighten nuts and bolts to specified torque.
- When model 3F80A-VL107 propeller shaft removal and installation or shipping is performed, be sure boot of constant velocity joint is not folded or bent. Protect the boot completely since it may be damaged (scratched or cracked).

SPECIAL SERVICE TOOLS

Part name Part number	Description
Flange wrench ST3154 0000 a ≒ 63 mm (2.48 in)	 C00-0241 Rear propeller shaft 1st and 2nd propeller shaft separation
Cam sprocket wrench KV101 09900 a ≒ 100 mm (3.94 in) b ≒ 54 mm (2.13 in)	 C00-0104 Companion flange removal
Bearing replacer ST3003 1000 	 C00-0014 Center bearing removal

1. Summary

The journal cannot be disassembled from the 2S56 model propeller shaft. The journal and constant velocity joint cannot be disassembled from the 3F80A-VL107 model propeller shaft. This section describes the removal and installation of 3F80A-VL107 from the vehicle and center bearing removal and installation.

Specifications

Front

	Engine	RB26DET
	Transmission	M/T
Description		
Model number		2S56A
Length	mm (in)	629 (24.76)
Outer diameter	mm (in)	31.8 + 40 (1.252 + 1.576)
Journal bearing form		Shell type (cannot be disassembled)

C4 PROPELLER SHAFT

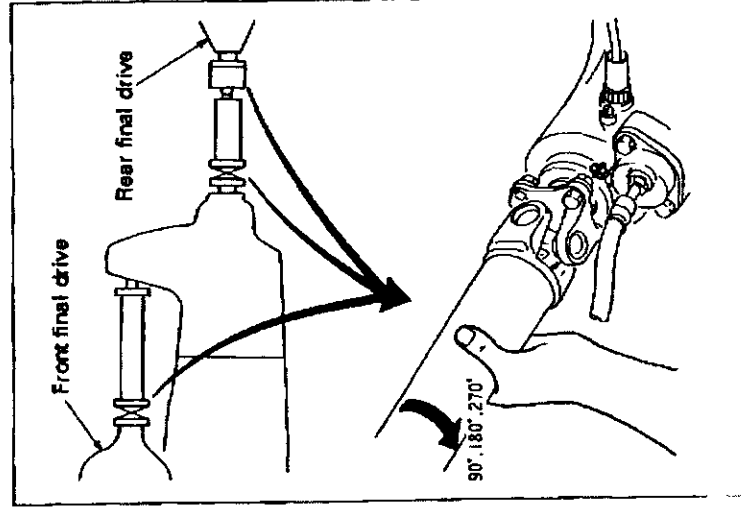
1. Summary (Cont'd)

Rear

Description		Engine	RB26DET
Model			3F80A-VL107
Length	mm (in)	1st tube	392 (15.43)
		2nd tube	597 (23.50)
Outer diameter	mm (in)	1st tube	75.2 (2.961)
		2nd tube	75.2 (2.961)
Journal bearing type		Shell type (cannot be disassembled)	

Inspection standard values

Description		Part	Front propeller shaft	Rear propeller shaft
Journal bearing axial play		Model	2S56A	3F80A-VL107
Play distance	mm (in)			0 (0)
			0.6 (0.024) max.	
Tightening torque N·m (kg-m, ft-lb)	Front propeller shaft - front final drive		24 - 32 (2.4 - 3.3, 17 - 24)	—
	Transfer unit - rear propeller shaft (1st tube)		—	88 - 98 (9.0 - 10, 65 - 72)
	Rear propeller shaft (1st tube) - center flange		—	64 - 74 (6.5 - 7.5, 47 - 54)
	Rear propeller shaft (2nd tube) - rear final drive		—	64 - 74 (6.5 - 7.5, 47 - 54)



2. On-vehicle Inspection

2-1 PROPELLER SHAFT PLAY INSPECTION

Perform the following procedures for propeller shaft play inspection and repair.

- Remove undercoating and dirt from propeller shaft. Perform driving test to check for propeller play.
- If propeller shaft play is detected, separate propeller shaft and final drive. Move companion flange to offset position of 90°, 180°, 270° (rear final drive is 60°, 120°, 180°, 240°, 300°) and install again.
- Check propeller shaft play in each position by driving test. If propeller shaft play is detected after performing these procedures, replace propeller shaft ASSY.

C4 PROPELLER SHAFT

2. On-vehicle Inspection (Cont'd)

2-2 PROPELLER SHAFT VISUAL INSPECTION AND CENTER BEARING INSPECTION

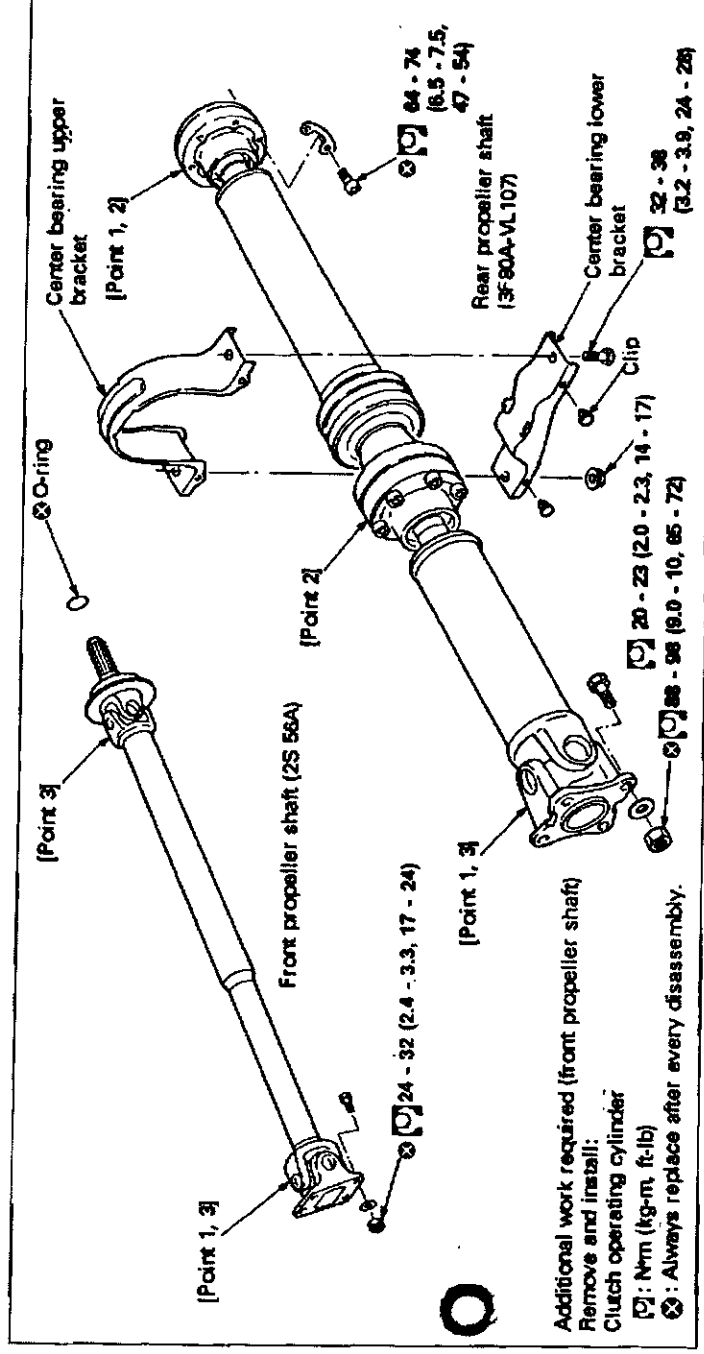
- Inspect propeller shaft surface for dents or cracks. If damaged, replace propeller shaft assembly.
- If center bearing is noisy or damaged, replace center bearing.

2-3 CONSTANT VELOCITY JOINT INSPECTION

- Check constant velocity joint boot for wear, damage or grease leaks and replace if necessary.

3. Propeller Shaft Removal and Installation, Assembly and Disassembly

3-1 REMOVAL AND INSTALLATION



C4 PROPELLER SHAFT

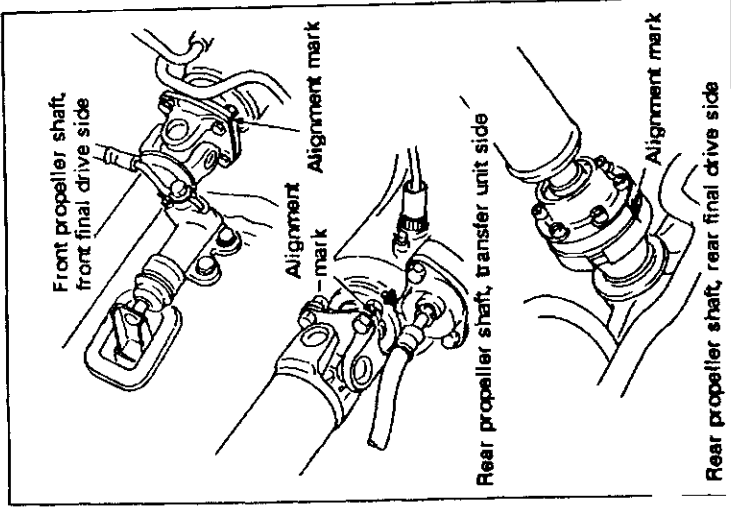
3. Propeller Shaft Removal and Installation, Assembly and Disassembly (Cont'd)

[Point 1] Propeller shaft removal

- Make alignment marks on companion flange before separating connection parts of propeller shaft and final drive and transfer unit as shown in figure.

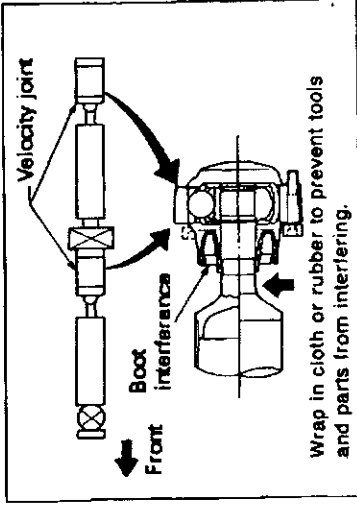
CAUTION:

Use paint to indicate alignment marks. Do not scratch parts.



[Point 2] Rear propeller shaft ASSY removal and installation precautions

- When propeller shaft removal and installation or shipping is performed, be sure constant velocity joint is not folded or bent. Protect the boot completely since it may be damaged (scratched or cracked).

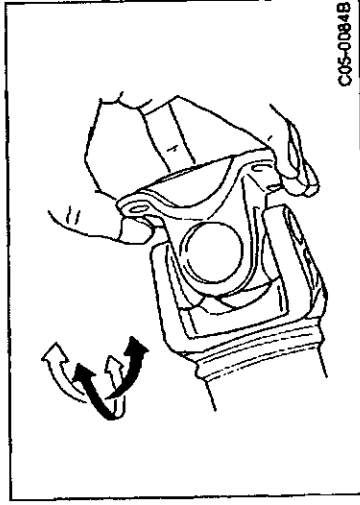


[Point 3] Journal bearing axial play inspection

- Secure the yoke in positions indicated in figure on left and check direction of journal axial play. If play exceeds standard value, replace propeller shaft ASSY.

Axial direction play limit:

0 mm (0 in)

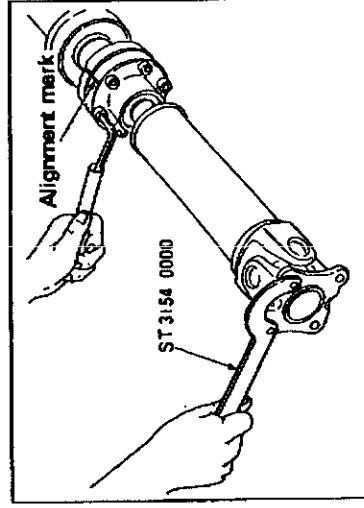
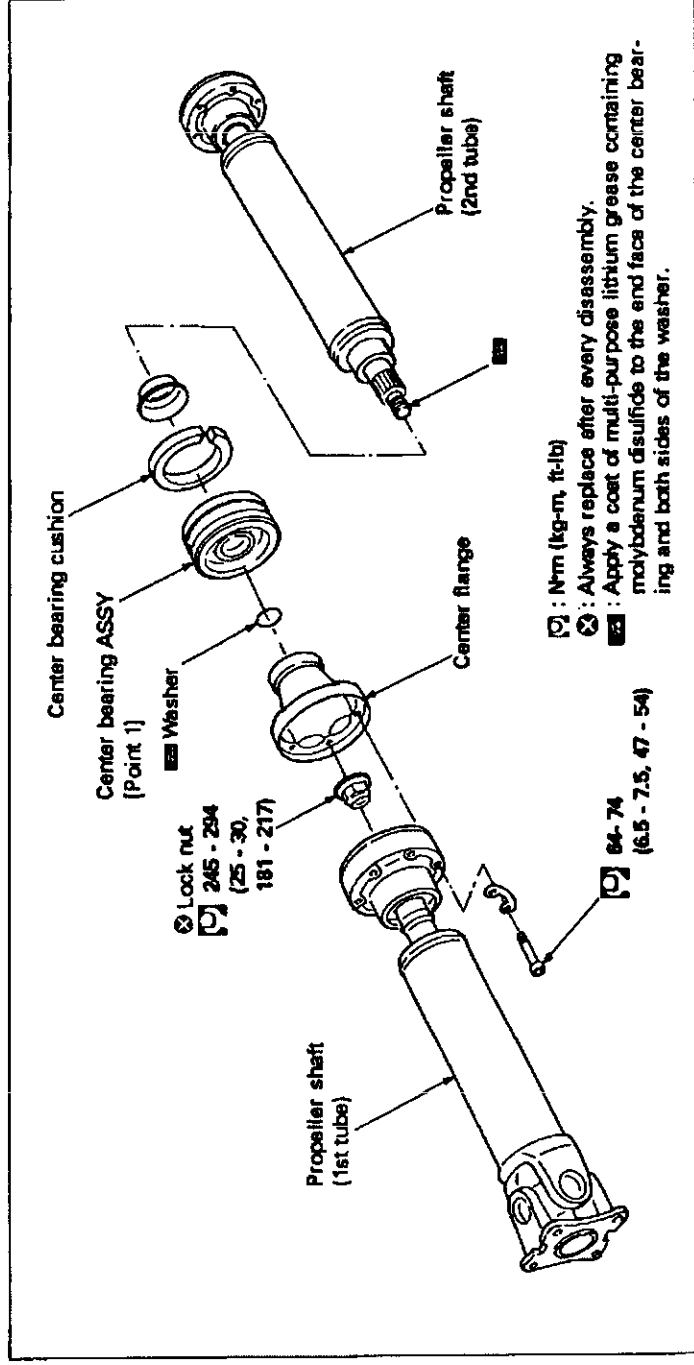


C4 PROPELLER SHAFT

3. Propeller Shaft Removal and Installation, Assembly and Disassembly (Cont'd)

3-2 ASSEMBLY AND DISASSEMBLY

describes the assembly and disassembly of 3F80A-VL107 propeller shaft center bearing removal and installation.



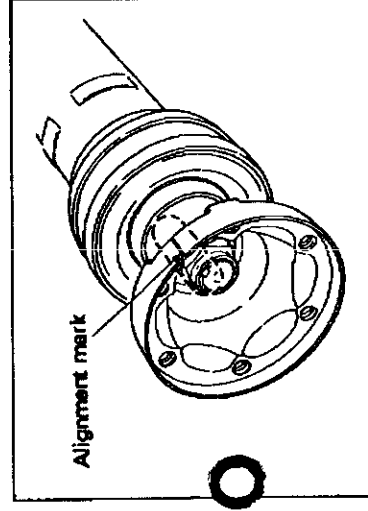
[Point 1] Center bearing removal and installation

Removal

- Make alignment marks on flange and separate 1st and 2nd tubes.

CAUTION:

- (1) At assembly, position alignment marks and then connect parts.
- (2) Paint alignment marks. Do not scratch parts.



- Make alignment marks on flange and shaft.

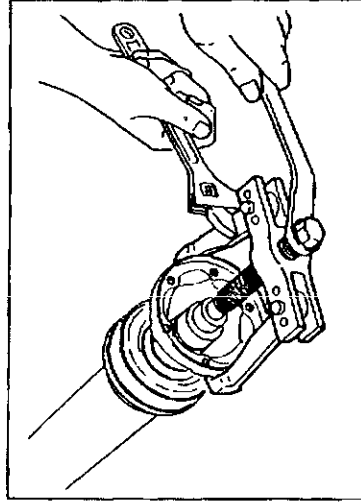
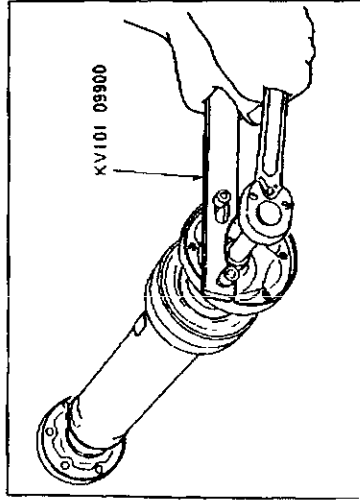
CAUTION:

- (1) At assembly, position alignment marks and then connect parts.
- (2) Paint alignment marks. Do not scratch parts.

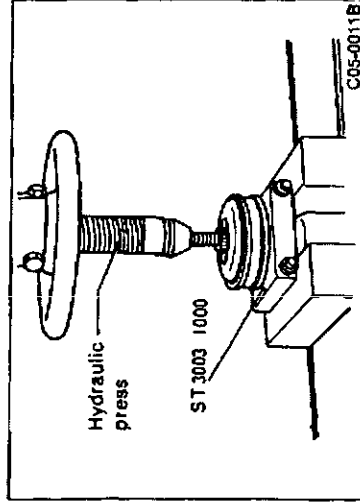
C4 PROPELLER SHAFT

3. Propeller Shaft Removal and Installation, Assembly and Disassembly (Cont'd)

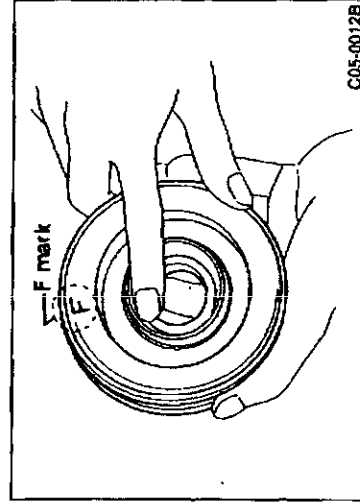
- Use special service tool for propeller shaft bolts and remove lock nuts.



- Use puller to remove companion flange.



- Use special service tool and hydraulic press to remove center bearing.

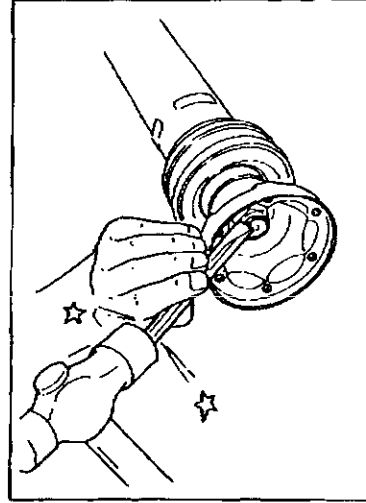


Installation

- Install center bearing with side marked "F" facing front of vehicle.

CAUTION:

Apply a coat of multi-purpose lithium grease (KRI06-00010) containing molybdenum disulfide to the end face of the center bearing and both sides of the washer.



- Tighten lock nut to specified tightening torque and then caulk securely.

CAUTION:

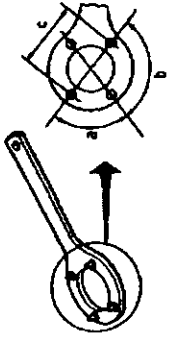
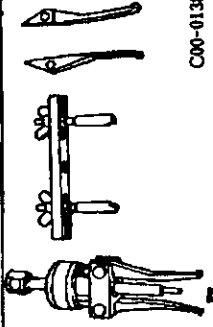
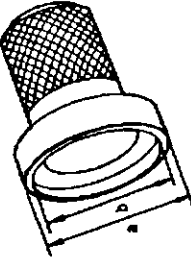
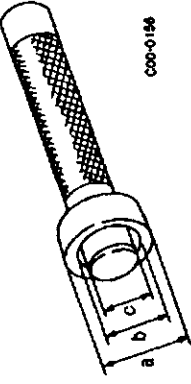
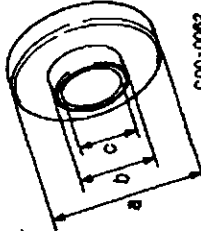
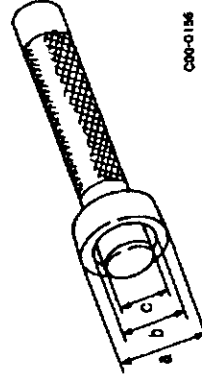
Replace lock nuts after every disassembly.

C5 FINAL DRIVE

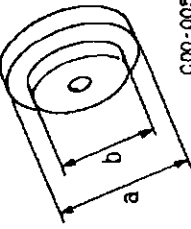
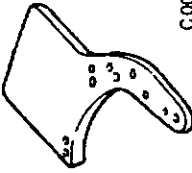
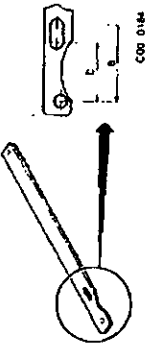
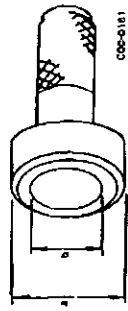
OPERATION PRECAUTIONS

- The transmission must always be jacked from the bottom for removal and installation.
Do not reuse gear oil.
- During removal, installation or disassembly, in final drive or front final drive, do not allow dust, debris or foreign matter to enter the oil pan.
- Use torque wrench to tighten bolts and nuts to specified tightening torque.

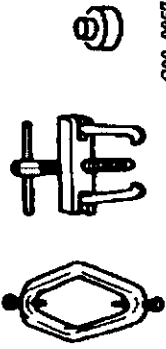
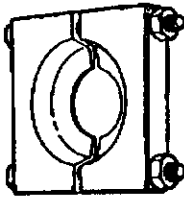
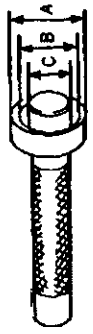
SPECIAL SERVICE TOOLS

Tool name Tool number	Description
Flange wrench ST3153 0000	 a: 80° b: 100° c: 70 mm (2.76 in) Companion flange removal
Oil seal puller ST3329 0001	 Oil seal removal
Drift ST3340 0001	 a: 60 mm (2.36 in) dia. b: 47 mm (1.85 in) dia. Side shaft bearing installation Companion flange, side shaft oil seal installation
Drift KV381 00300	 a: 54 mm (2.13 in) dia. b: 46 mm (1.81 in) dia. c: 32 mm (1.26 in) dia. Right side oil seal installation
Drift ST3672 3000	 a: 70 mm (2.76 in) dia. b: 40 mm (1.57 in) dia. c: 29 mm (1.14 in) dia. Side retainer, side shaft installation
Drift ST3322 0000	 a: 32 mm (1.26 in) dia. b: 31.5 mm (1.240 in) dia. c: 21.5 mm (0.846 in) dia. Side shaft bearing removal

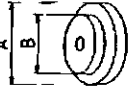
C5 FINAL DRIVE

Tool name Tool number	Description
Drift ST3061 3000	a: 72 mm (2.83 in) dia. b: 48 mm (1.89 in) dia.  C00-0059 Left side oil seal installation
Drift bar ST3061 1000	 C00-0058 Drive pinion bearing outer race installation Side oil seal installation Side bearing outer seal installation
Adapter setting plate ST2381 0001	 C00-0246 Side shaft side retainer disassembly
Cam sprocket wrench KV101 09900	 a: 100 mm (3.94 in) dia. b: 54 mm (2.13 in) dia. Companion flange nut removal and installation
Preload gauge ST3127 S000	 C00-0039 Drive pinion rotation resistance measurement
Drift ST3072 0000	 a: 77 mm (3.03 in) dia. b: 55.5 mm (2.185 in) dia. C00-0181 Oil seal installation

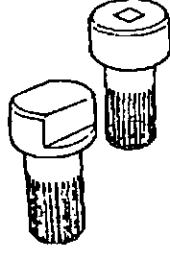
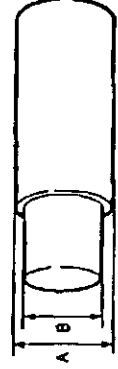
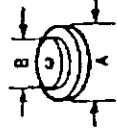
C5 FINAL DRIVE

Tool name Tool number	Description
 Drive pinion oil seal installation Side shaft oil seal installation (retainer side) KV301 00500 ST302 0000	 A: 77 mm (3.03 in) dia. B: 55 mm (2.17 in) dia. C00-0055
Outer race puller ST3329 0001	 C00-0054
Puller set ST3306 S001	 C00-0057
Puller ST3003 1000 	 C00-0030
Drift bar ST3532 5000	 C00-0058
Drift ST3081 2000	 A: 62 mm (2.44 in) dia. B: 40 mm (1.57 in) dia. C00-0059
Drift ST3323 2000	 A: 51 mm (2.01 in) dia. B: 41 mm (1.61 in) dia. C: 28 mm (1.10 in) dia. C00-0156
Drift ST3532 1000 	 A: 49 mm (1.93 in) dia. B: 41 mm (1.61 in) dia. C00-0059

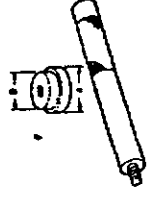
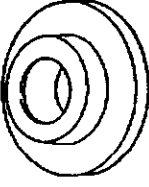
C5 FINAL DRIVE

Tool name Tool number	Description
Drift ST3062 1000	Side bearing outer race installation A: 79 mm (3.11 in) dia. B: 59 mm (2.32 in) dia. 
Pin punch KV311 00300	Pinion mate shaft lock pin removal and installation C00-0059 
Inner race adapter ST3003 2000	Drive pinion bearing installation Side shaft and retainer installation C00-0084 A: 80 mm (3.15 in) dia. B: 38 mm (1.50 in) dia. C: 31 mm (1.22 in) dia. 
	C00-0082

COMMERCIAL SERVICE TOOLS

Tool name Tool number	Description
Drift ST3090 1000	Installing drive pinion rear bearing 
Side flange dummy KV381 051S0	Checking side gear backlash 
Drift ST337 10000	Removing drive pinion A: 30 mm (1.18 in) dia. B: 23 mm (0.91 in) dia. 
Drift ST3306 1000	Removing drive pinion A: 38 mm (1.50 in) dia. B: 28.5 mm (1.122 in) dia. 

C5 FINAL DRIVE

Tool name Tool number	Description
 S123 0000	Installing side bearing A: 51 mm (2.01 in) dia. B: 41 mm (1.61 in) dia. C: 28 mm (1.10 in) dia. 
Drift ST3340 0001	Installing side oil seal A: 60 mm (2.36 in) dia. B: 47 mm (1.85 in) dia. 
Drift KV351 02200	Installing drive pinion bearing outer A: 90 mm (3.54 in) dia. B: 55.3 mm (2.177 in) dia. 
Differential flange tool HT7278	Companion flange nut removal and installation
Torque wrench	Tightening nuts and bolts
Puller	Companion flange removal
 Gauge test indicator	Hypoid gear backlash measurement, drive gear rear face play measurement, companion flange play measurement
Depth gauge	Side shaft end play calculation
	Name
	Application
	Prevents drive gear bolts from loosening
Preparation equipment	• Side retainer installation hole • Carrier case cover • Drain, filler plug
Oil	LSD GL-5 80W-90 (Rear) GL5-85W-90 (Front) Nissan gear oil hypoid Lubrication oil

CAUTION:

Gear oil is used at high pressure. Use of non-recommended oils may result in abnormal wear or overheating of gear surfaces.

C5 FINAL DRIVE

1. Summary

This section describes the removal and installation, assembly and disassembly of parts from the side shaft in the front of vehicle. The engine and oil pan are removed and installed as a single unit. Refer to B. Engine, B-Oil Pan Removal and Installation.

1-1 SPECIFICATIONS

(1) Front final drive (F160)

Item		Engine Transmission	RB26DETT
Model number			M/T
Final gear ratio			F160
Differential model			4.111
Number of gear teeth	Drive gear/drive pinion	2-pinion	
	Side gear/pinion mate gear	37/9	
Drive pinion adjustment spacer			16/10
Oil and volume		ℓ (imp qt)	Solid
			Nissan gear oil hypoid GL-5 85W-90 [approx. 1.0 (7/8)]

(2) Rear final drive [R200 (mechanical LSD)]

Item		Engine Transmission	RB26DETT
Model number			M/T
Final gear ratio			R200 (mechanical LSD)
Differential type			4.111
Number of gear teeth	Drive gear/drive pinion	4-pinion	
	Side gear/pinion mate gear	37/9	
Drive pinion adjustment spacer			16/10
Oil and quantity		ℓ (imp qt)	Solid
			Nissan gear oil hypoid LSD GL-5 80W-90 [approx. 1.5 (1-3/8)]

C5 FINAL DRIVE

1. Summary (Cont'd)

1-2 INSPECTION STANDARD VALUES

Front final drive (F160)

Item		Standard value
Ring gear rear surface runout Companion flange deflection	mm (in)	Deflection limit 0.05 (0.0020) max.
Drive pinion total preload N·m (kg-m, ft-lb)	Drive pinion preload (P)	Oil seal installation
	Total preload	Side shaft installation
Tightening torque N·m (kg-m, ft-lb)	Drive pinion nut	167 - 196 (17 - 20, 123 - 145)
	Ring gear	93 - 113 (9.5 - 11.5, 69 - 83)
	Side retainer	16 - 19 (1.6 - 1.9, 12 - 14)
	Side shaft	16 - 21 (1.6 - 2.1, 12 - 15)
Side gear rear surface clearance	mm (in)	0.05 - 0.15 (0.0020 - 0.0059)
Side gear thrust washer		

Thickness mm (in)	Part number	Thickness mm (in)	Part number
0.68 - 0.71 (0.0268 - 0.0280)	38424 W1010	0.86 - 0.89 (0.0339 - 0.0350)	38424 W1016
0.71 - 0.74 (0.0280 - 0.0291)	38424 W1011	0.89 - 0.92 (0.0350 - 0.0362)	38424 W1017
0.74 - 0.77 (0.0291 - 0.0303)	38424 W1012	0.92 - 0.95 (0.0362 - 0.0374)	38424 W1018
0.77 - 0.80 (0.0303 - 0.0315)	38424 W1013	0.95 - 0.98 (0.0374 - 0.0386)	38424 W1019
0.80 - 0.83 (0.0315 - 0.0327)	38424 W1014	0.98 - 1.01 (0.0386 - 0.0398)	38424 W1020
0.83 - 0.86 (0.0327 - 0.0339)	38424 W1015	1.01 - 1.04 (0.0398 - 0.0409)	38424 W1021

T₁: Side bearing adjusting shim (side retainer side)

Thickness mm (in)	Part number	Thickness mm (in)	Part number
0.35 (0.0138)	38453 03V60	0.80 (0.0315)	38453 03V69
0.40 (0.0157)	38453 03V61	0.85 (0.0335)	38453 03V70
0.45 (0.0177)	38453 03V62	0.90 (0.0354)	38453 03V71
0.50 (0.0197)	38453 03V63	0.95 (0.0374)	38453 03V72
0.55 (0.0217)	38453 03V64	1.00 (0.0394)	38453 03V73
0.60 (0.0236)	38453 03V65	1.05 (0.0413)	38453 03V74
0.65 (0.0256)	38453 03V66	1.10 (0.0433)	38453 03V75
0.70 (0.0276)	38453 03V67	1.15 (0.0453)	38453 03V76
0.75 (0.0295)	38453 03V68		

T₂: Side bearing adjusting washer (carrier case side)

Thickness mm (in)	Part number	Thickness mm (in)	Part number
1.93 - 1.97 (0.0760 - 0.0776)	38453 03V00	2.33 - 2.37 (0.0917 - 0.0933)	38453 03V08
1.98 - 2.02 (0.0780 - 0.0795)	38453 03V01	2.38 - 2.42 (0.0937 - 0.0953)	38453 03V09
2.03 - 2.07 (0.0799 - 0.0815)	38453 03V02	2.43 - 2.47 (0.0957 - 0.0972)	38453 03V10
2.08 - 2.12 (0.0819 - 0.0835)	38453 03V03	2.48 - 2.52 (0.0976 - 0.0992)	38453 03V11
2.13 - 2.17 (0.0839 - 0.0854)	38453 03V04	2.53 - 2.57 (0.0996 - 0.1012)	38453 03V12
2.18 - 2.22 (0.0858 - 0.0874)	38453 03V05	2.58 - 2.62 (0.1016 - 0.1031)	38453 03V13
2.23 - 2.27 (0.0878 - 0.0894)	38453 03V06	2.63 - 2.67 (0.1035 - 0.1051)	38453 03V14
2.28 - 2.32 (0.0898 - 0.0913)	38453 03V07		

C5 FINAL DRIVE

1. Summary (Cont'd)

Item		Standard value	
		mm (in)	
Backlash drive gear-drive pinion gear		0.13 - 0.18 (0.0051 - 0.0071)	
Pinion height adjusting washer			
Thickness mm (in)	Part number	Thickness mm (in)	Part number
3.09 (0.1217)	38154 U1500	3.39 (0.1335)	38154 U1510
3.12 (0.1228)	38154 U1501	3.42 (0.1346)	38154 U1511
3.15 (0.1240)	38154 U1502	3.45 (0.1358)	38154 U1512
3.18 (0.1252)	38154 U1503	3.48 (0.1370)	38154 U1513
3.21 (0.1264)	38154 U1504	3.51 (0.1382)	38154 U1514
3.24 (0.1276)	38154 U1505	3.54 (0.1394)	38154 U1515
3.27 (0.1287)	38154 U1506	3.57 (0.1406)	38154 U1516
3.30 (0.1299)	38154 U1507	3.60 (0.1417)	38154 U1517
3.33 (0.1311)	38154 U1508	3.63 (0.1429)	38154 U1518
3.36 (0.1323)	38154 U1509	3.66 (0.1441)	38154 U1519
Pinion bearing preload		N·m (kg-m, ft-lb)	0.8 - 1.1 (0.08 - 0.11, 0.6 - 0.8)
Pinion bearing adjustment spacer (solid)			
Thickness mm (in)	Part number	Thickness mm (in)	Part number
56.2 (2.213)	38130 21000	56.8 (2.236)	38133 21000
56.4 (2.220)	38131 21000	57.0 (2.244)	38134 21000
56.6 (2.228)	38132 21000	57.2 (2.252)	38135 21000
Pinion bearing adjusting washer			
Thickness mm (in)	Part number	Thickness mm (in)	Part number
2.30 - 2.32 (0.0906 - 0.0913)	38141 09400	2.46 - 2.48 (0.0969 - 0.0976)	38133 09400
2.32 - 2.34 (0.0913 - 0.0921)	38140 09400	2.48 - 2.50 (0.0976 - 0.0984)	38132 09400
2.34 - 2.36 (0.0921 - 0.0929)	38139 09400	2.50 - 2.52 (0.0984 - 0.0992)	38131 09400
2.36 - 2.38 (0.0929 - 0.0937)	38138 09400	2.52 - 2.54 (0.0992 - 0.1000)	38130 09400
2.38 - 2.40 (0.0937 - 0.0945)	38137 09400	2.54 - 2.56 (0.1000 - 0.1008)	38129 09400
2.40 - 2.42 (0.0945 - 0.0953)	38136 09400	2.56 - 2.58 (0.1008 - 0.1016)	38128 09400
2.42 - 2.44 (0.0953 - 0.0961)	38135 09400	2.58 - 2.60 (0.1016 - 0.1024)	38127 09400
2.44 - 2.46 (0.0961 - 0.0969)	38134 09400		
Side shaft axial end play		mm (in)	0 - 0.1 (0 - 0.004)
Side retainer adjusting shim			
Thickness mm (in)	Part number	Thickness mm (in)	Part number
0.06 - 0.12 (0.0031 - 0.0047)	38233 03V01	0.37 - 0.43 (0.0146 - 0.0169)	38233 03V04
0.16 - 0.22 (0.0071 - 0.0087)	38233 03V02	0.46 - 0.54 (0.0181 - 0.0213)	38233 03V05
0.27 - 0.33 (0.0106 - 0.0130)	38233 03V03		

C5 FINAL DRIVE

1. Summary (Cont'd)

(2) Rear final drive [R200 (mechanical LSD)]

Item	Final drive	
	Engine	R200 (mechanical LSD)
RB26DET		
Ring gear rear runout		Runout limit 0.05 (0.020) max.
Companion flange runout	mm (in)	
Drive pinion total preload	N·m (kg-m, ft-lb)	1.4 - 3.1 (0.14 - 0.32, 1.0 - 2.3)
Side bearing preload	N·m (kg-m, ft-lb)	0.3 - 1.5 (0.03 - 0.15, 0.2 - 1.1)
Pinion nut tightening torque	N·m (kg-m, ft-lb)	186 - 294 (19 - 30, 137 - 217)
Ring gear bolt tightening torque	N·m (kg-m, ft-lb)	177 - 196 (18 - 20, 130 - 145)

Item	Standard value
Side gear rear surface clearance	R200 (mechanical LSD)
	Non-adjustable

Side bearing preload adjusting washer selection calculation equation

T_1 : Left side (drive gear rear side) washer thickness

$$T_1 = (A - C + D + E + G) \times 0.01 + 2.07$$

T_2 : Right side (drive gear, gear tooth side) washer thickness

$$T_2 = (B - D + F) \times 0.01 + 2.07$$

A: Housing mark [Standard value: 117 mm (4.61 in)] Note 1

B: Housing mark [Standard value: 65 mm (2.56 in)] Note 1

C: Differential case mark [Standard value: 128 mm (5.04 in)] Note 1

D: Differential case mark [Standard value: 97 mm (3.82 in)] Note 1

E: Bearing mark [Standard value: 21 mm (0.83 in)] Note 2

F: Bearing mark [Standard value: 21 mm (0.83 in)] Note 2

Spacer mark [Standard value: 8.1 mm (0.319 in)] Note 2

1: Printed mark indicated following value marked by alphabet is based on standard value of O. It is added to actual measured value in 0.01 increments.

For example: A2 mark indicates 117.02 mm (4.61 in).

Note 2: Printed Indicates following value marked by alphabet is based on standard value of O. It is subtracted from actual measured value in 0.01 increments.

For example: The E3 mark indicates 20.97 mm (0.8256 in).

C5 FINAL DRIVE

1. Summary (Cont'd)

T₁, T₂: Side bearing preload adjusting washer R200 (mechanical LSD)

Thickness mm (in)	Part number	Thickness mm (in)	Part number
2.00 (0.0787)	38453 N3100	2.35 (0.0925)	38453 N3107
2.05 (0.0807)	38453 N3101	2.40 (0.0945)	38453 N3108
2.10 (0.0827)	38453 N3102	2.45 (0.0965)	38453 N3109
2.15 (0.0846)	38453 N3103	2.50 (0.0984)	38453 N3110
2.20 (0.0866)	38453 N3104	2.55 (0.1004)	38453 N3111
2.25 (0.0886)	38453 N3105	2.60 (0.1024)	38453 N3112
2.30 (0.0906)	38453 N3106	2.65 (0.1043)	38453 N3113

Backlash drive gear - drive pinion gear mm (in) 0.13 - 0.18 (0.0051 - 0.0071)

Pinion height adjusting washer R200 (mechanical LSD)

Thickness mm (in)	Part number	Thickness mm (in)	Part number
3.09 (0.1217)	38154 P6017	3.39 (0.1335)	38154 P6027
3.12 (0.1228)	38154 P6018	3.42 (0.1346)	38154 P6028
3.15 (0.1240)	38154 P6019	3.45 (0.1358)	38154 P6029
3.18 (0.1252)	38154 P6020	3.48 (0.1370)	38154 P6030
3.21 (0.1264)	38154 P6021	3.51 (0.1382)	38154 P6031
3.24 (0.1276)	38154 P6022	3.54 (0.1394)	38154 P6032
3.27 (0.1287)	38154 P6023	3.57 (0.1406)	38154 P6033
3.30 (0.1299)	38154 P6024	3.60 (0.1417)	38154 P6034
3.33 (0.1311)	38154 P6025	3.63 (0.1429)	38154 P6035
3.36 (0.1323)	38154 P6026	3.66 (0.1441)	38154 P6036

Drive pinion bearing preload

N·m (kg-m, ft-lb) 1.1 - 1.7 (0.11 - 0.17, 0.8 - 1.2)

Drive pinion preload adjusting washer spacer R200 (mechanical LSD)

Thickness mm (in)	Part number	Thickness mm (in)	Part number
45.6 (1.795)	38165 10V05	46.5 (1.831)	38165 10V00
45.9 (1.807)	38165 10V06	46.8 (1.843)	38165 10V01
46.2 (1.819)	38165 10V07		

Drive pinion preload adjusting washer R200 (mechanical LSD)

Thickness mm (in)	Part number	Thickness mm (in)	Part number
3.81 (0.1500)	38125 61001	3.97 (0.1563)	38133 61001
3.83 (0.1508)	38126 61001	3.99 (0.1571)	38134 61001
3.85 (0.1516)	38127 61001	4.01 (0.1579)	38135 61001
3.87 (0.1524)	38128 61001	4.03 (0.1587)	38136 61001
3.89 (0.1531)	38129 61001	4.05 (0.1594)	38137 61001
3.91 (0.1539)	38130 61001	4.07 (0.1602)	38138 61001
3.93 (0.1547)	38131 61001	4.09 (0.1610)	38139 61001
3.95 (0.1555)	38132 61001		

LSD friction plate

Thickness mm (in)	Part number
1.75 (0.0689)	38432 N9000
1.85 (0.0728)	38432 N9001

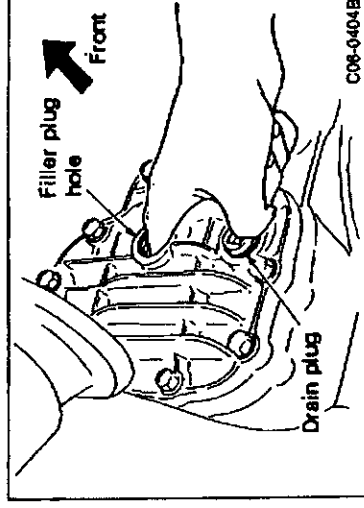
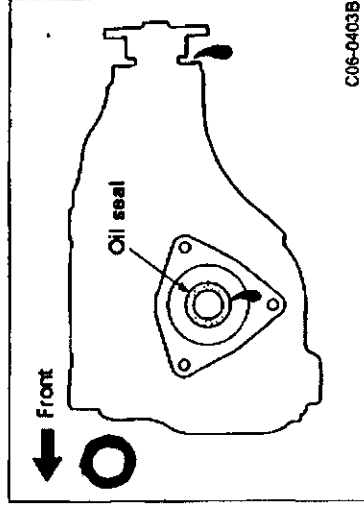
NOTE: Pinion bearing preload and total preload refer to values measured when oil seals are install.

2. On-vehicle Inspection and Preparation

(1) Front final drive (F160)

[Point 1] Oil leak inspection

- Replace oil seal with unit in vehicle if oil leaks from seal.



[Point 2] Oil level inspection

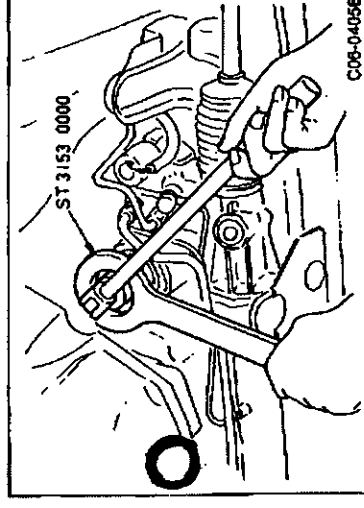
- Check oil level from filler plug hole.
- Use recommended Nissan gear oil hypoid GL-5 85W-90.

CAUTION:

When installing filler plug and drain plug, apply silicon bond TB1215 (KP210 00200) to thread surface. Tighten to following tightening torque.

Tightening torque:

25 - 34 N·m (2.5 - 3.5 kg-m, 18 - 25 ft-lb)

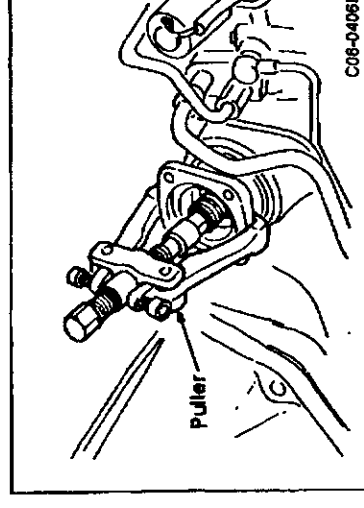


[Point 3] Rear oil seal replacement

- Use flange wrench (special tool) to remove drive pinion nut.

CAUTION:

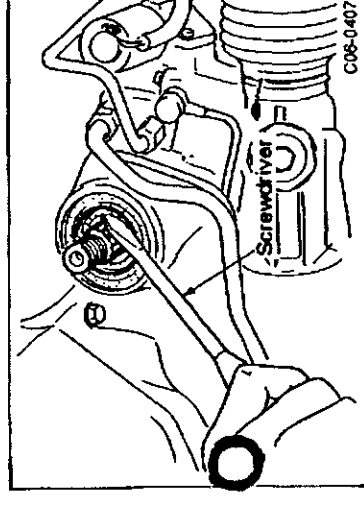
Replace drive pinion nut after every disassembly.



- Remove companion flange using puller.
- Check companion flange seal surface for wear and replace if worn.

CAUTION:

Do not repair companion flange with sandpaper or use again.



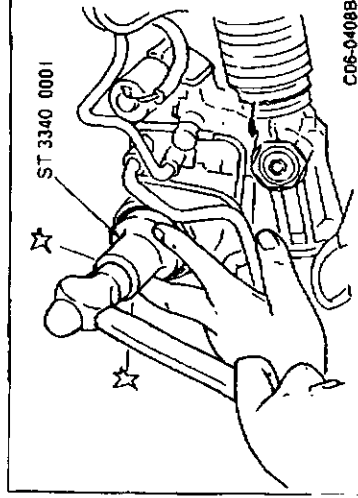
- Use screwdriver to remove oil seal.

CAUTION:

Never reuse oil seal.

C5 FINAL DRIVE

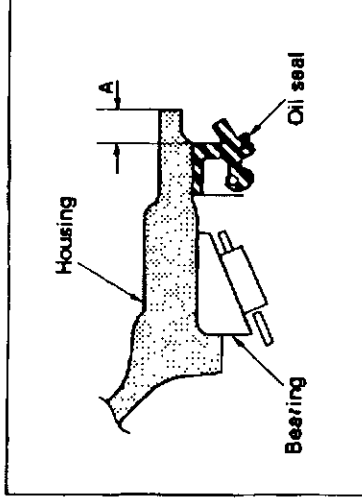
2. On-vehicle Inspection and Preparation (Cont'd)



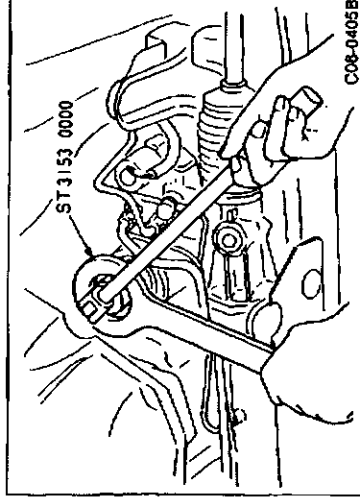
- Use suitable drift (special service tool) and install seal in position shown in figure.

CAUTION:

- (1) Do not install the oil seal at an angle.
- (2) Coat the sliding surface of the oil seal lip with MP special grease No. 2.



A: 2.0 ± 0.2 mm (0.079 ± 0.008 in)



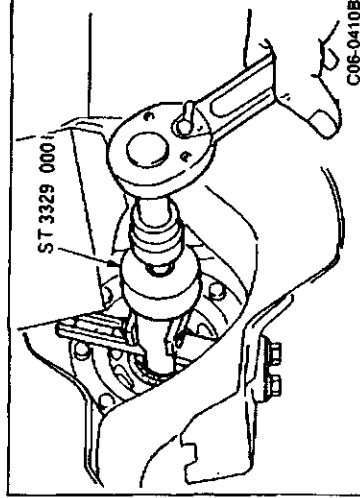
- Use flange wrench (special service tool) to tighten drive pinion nut to specified torque.

Tightening torque:

167 - 196 N·m (17 - 20 kg·m, 123 - 145 ft·lb)

CAUTION:

Always use new drive pinion nut. Coat nut screws and seat with Nissan gear oil hypoid GL-5 85W-90.



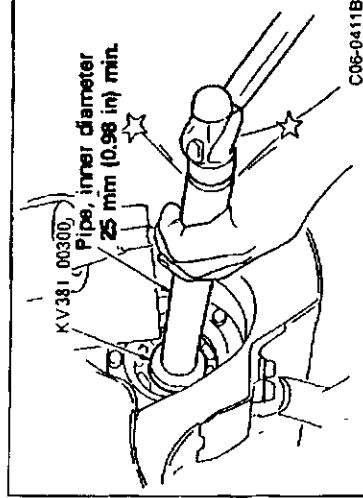
[Point 4] Side oil seal replacement

⑧ Right oil seal

- Remove oil seal using oil seal puller (special service tool).

CAUTION:

Never reuse the oil seal.



- Insert drift (special service tool) on pipe with 25 mm (0.98 in) inner diameter on lip and press seal flush with case.

CAUTION:

- (1) Do not install seal at angle.
- (2) Coat sliding lip surface of oil seal with MP special grease No. 2.

C5 FINAL DRIVE

2. On-vehicle Inspection and Preparation (Cont'd)

① Left oil seal

- Use oil seal puller (special service tool) to remove drive shaft (refer to C6 DRIVE SHAFT, 3 Drive Shaft Removal and Installation) and side shaft.

CAUTION:

Never reuse oil seal.

- Use drift (special service tool) and install oil seal flush with CASE.

CAUTION:

(1) Do not install seal at angle.

(2) Coat sliding lip surface of oil seal with **MP special grease No. 2.**

[Point 5] Side shaft end play inspection

- Turn side shaft two or three times. Check for abnormal noise or improper rotation and then measure end play.
- Set dial gauge on side shaft and move in axial direction to measure end play. If end play exceeds standard value adjust with shims. Refer to 3-2 (2) Front final drive side shaft assembly and disassembly.

End play standard value:

0 - 0.1 mm (0.004 in)

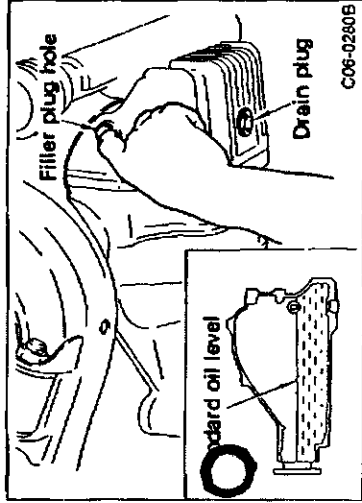
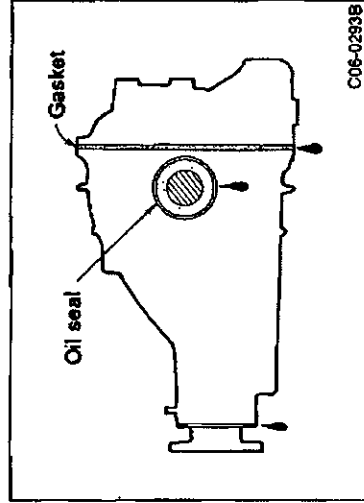
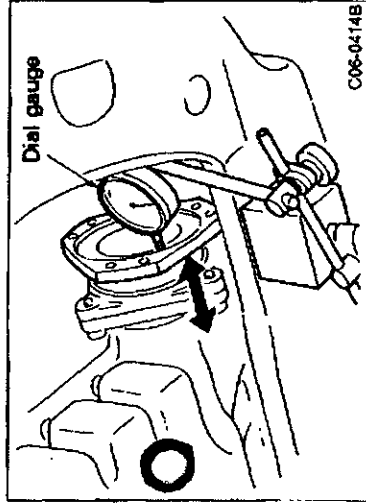
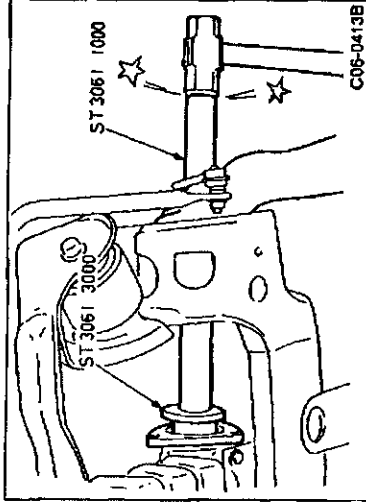
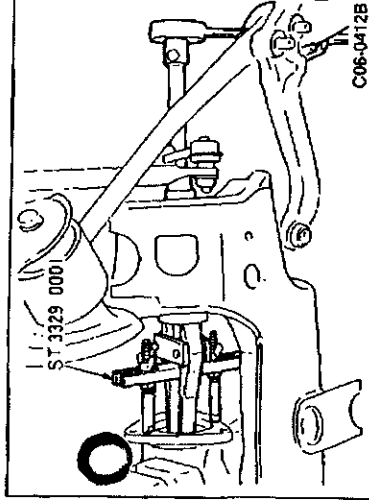
(2) Rear final drive [R200 (Mechanical LSD)]

[Point 1] Oil leak inspection

- When there is leak from oil seal, replace without removing final drive from vehicle.
- When there is leak from gasket, remove differential assembly from vehicle and replace gasket.

[Point 2] Oil level inspection

- Check oil level from filler plug hole.



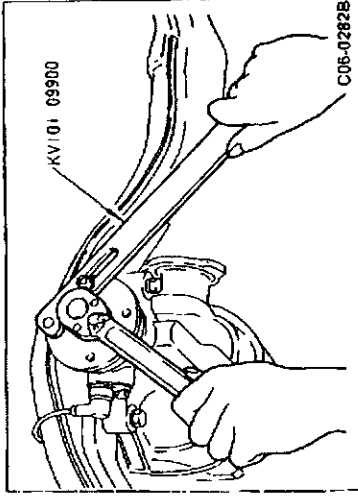
C5 FINAL DRIVE

2. On-vehicle Inspection and Preparation

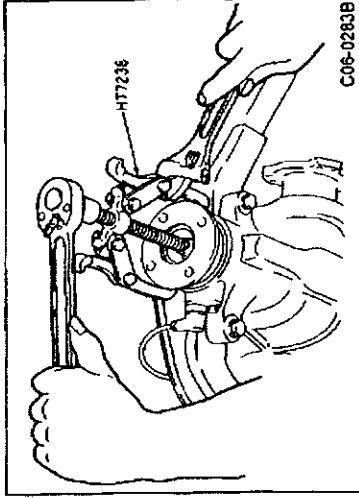
(Cont'd)

[Point 3] Front oil seal replacement

- Before oil seal replacement, measure drive pinion total preload.
- Use cam sprocket wrench (special service tool) to remove drive pinion nut.



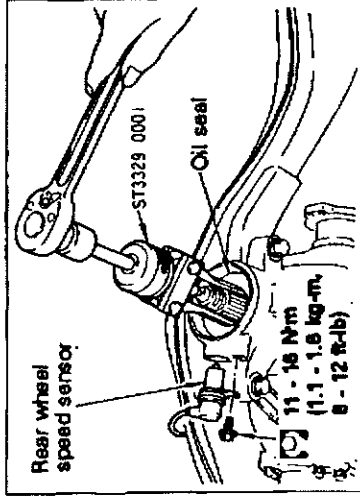
- Use puller to remove companion flange.



- Use oil seal puller (special service tool) to remove oil seal from gear carrier housing.

CAUTION:

Remove rear wheel speed sensor before removing oil seal.

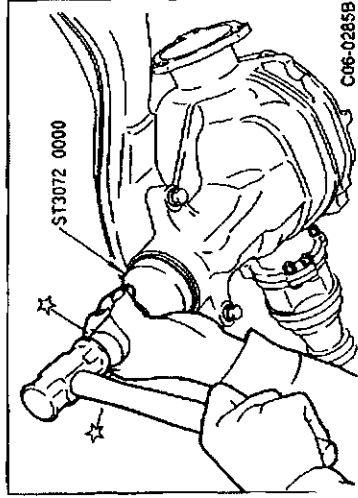


- Install oil seal using drift (special service tool).

CAUTION:

(1) Do not install seal at angle.

(2) Coat sliding surface of oil seal lip with MP special grease No. 2.

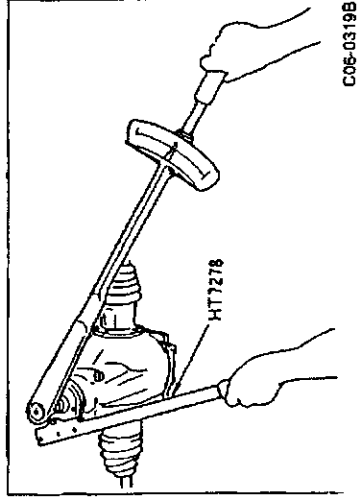


- Tighten drive pinion to torque indicated below.

Drive pinion tightening torque:

186 - 294 N·m (19 - 30 kg·m, 137 - 217 ft·lb)

- Adjust drive pinion total preload to same value before oil seal replacement.



C5 FINAL DRIVE

2. On-vehicle Inspection and Preparation

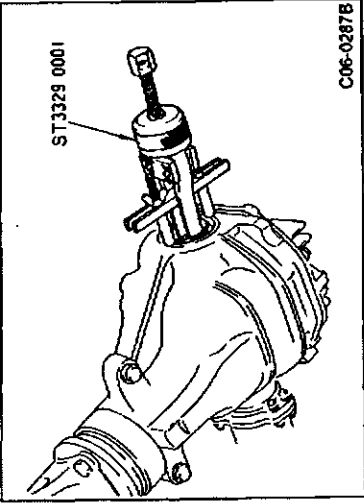
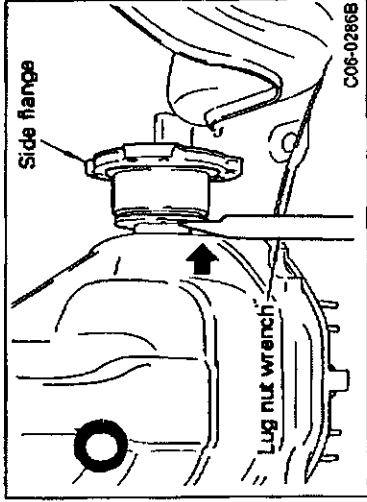
(Cont'd)

[Point 4] Side flange oil seal replacement

- Remove drive shaft (refer to C6 DRIVE SHAFT, 3 Drive Shaft Removal and Installation). Insert lug nut wrench into notch as lever and remove circlip.
- Circlip removal value

R200 (right & left)	Final drive side
---------------------	------------------

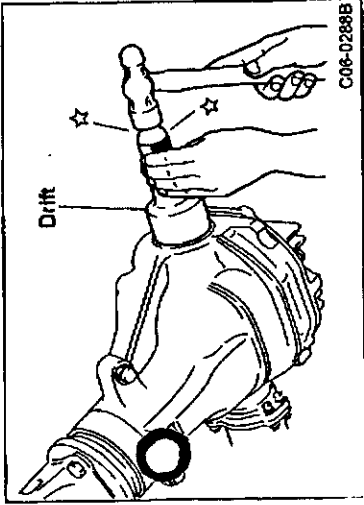
- Use oil seal puller (special service tool) to remove oil seal.



- Use drift (inner diameter 42.5 mm (1.673 in) , outer diameter 70 mm (2.76 in) to install oil seal.

CAUTION:

- (1) Do not install seal at angle.
- (2) Coat sliding surface of oil seal lip with MP special grease No. 2.



C5 FINAL DRIVE

3. Final Drive Removal and Installation, Assembly and Disassembly

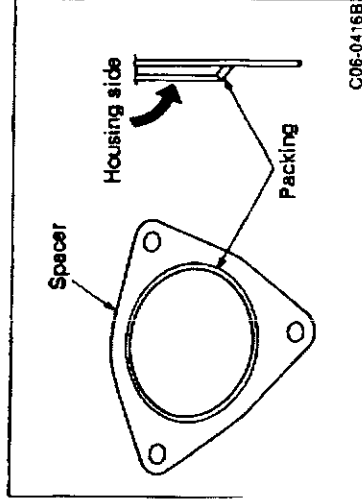
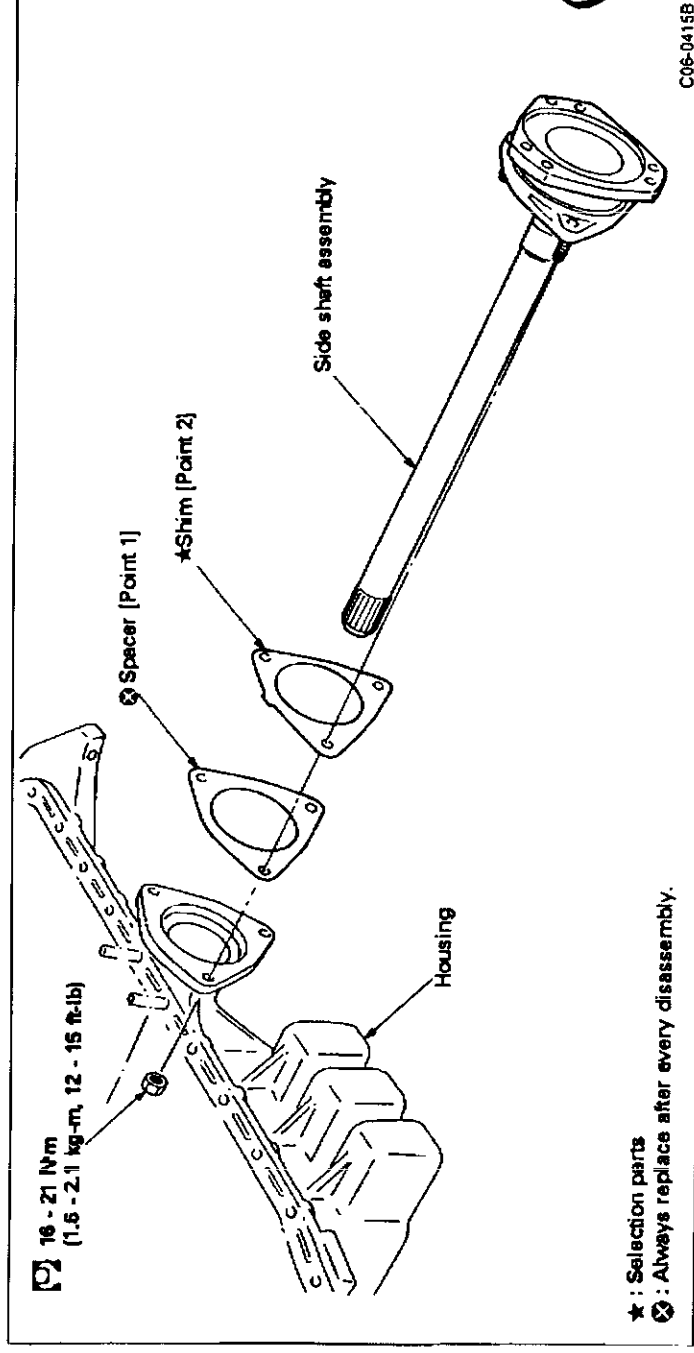
3-1 REMOVAL AND INSTALLATION FROM VEHICLE

(1) Front final drive (F160)

① F160 final drive removal and installation

Remove and install front final drive (F160), engine and oil pan as a single unit (refer to section B oil pan removal and installation).

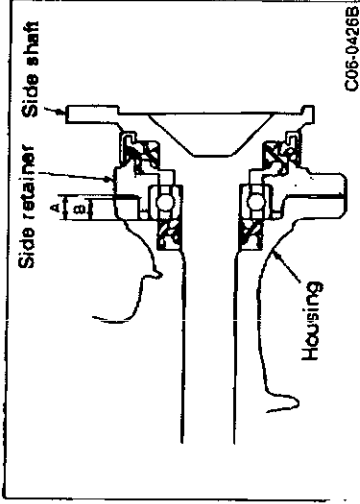
② Side shaft removal and installation



[Point 1] Spacer installation

- Install spacer so packing side faces final drive housing side.

CAUTION:
Never reuse spacer.



[Point 2] Side shaft bearing end play measurement

- Measure dimensions A and B shown in figure to calculate side shaft bearing end play.

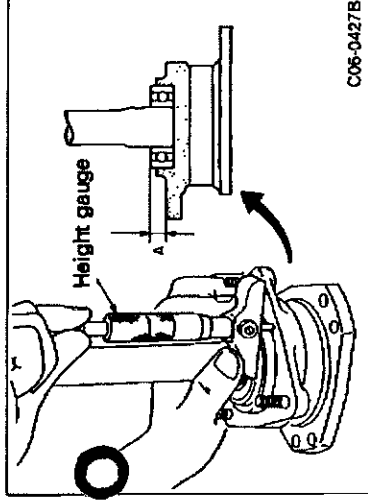
C5 FINAL DRIVE

3. Final Drive Removal and Installation, Assembly and Disassembly (Cont'd)

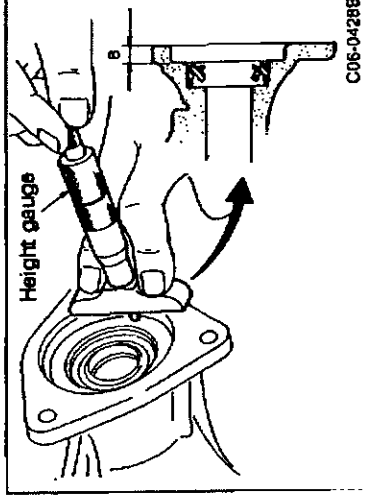
- Measure dimension A as shown in figure.

CAUTION:

Measure bearing on outer race side.



- Measure dimension B as shown in figure.



Side shaft bearing adjusting shim selection

- Use the following equation to calculate shim size required to obtain standard end play value.

End play:

$$0 - 0.1 \text{ mm } (0 - 0.004 \text{ in})$$

$$T \text{ (shim thickness)} = A - B$$

Adjustment Shims

Thickness mm (in)	Part number
0.1 (0.004)	38233 03V01
0.2 (0.008)	38233 03V02
0.3 (0.012)	38233 03V03
0.4 (0.016)	38233 03V04
0.5 (0.020)	38233 03V05

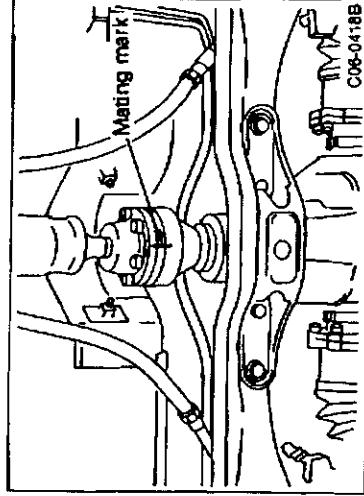
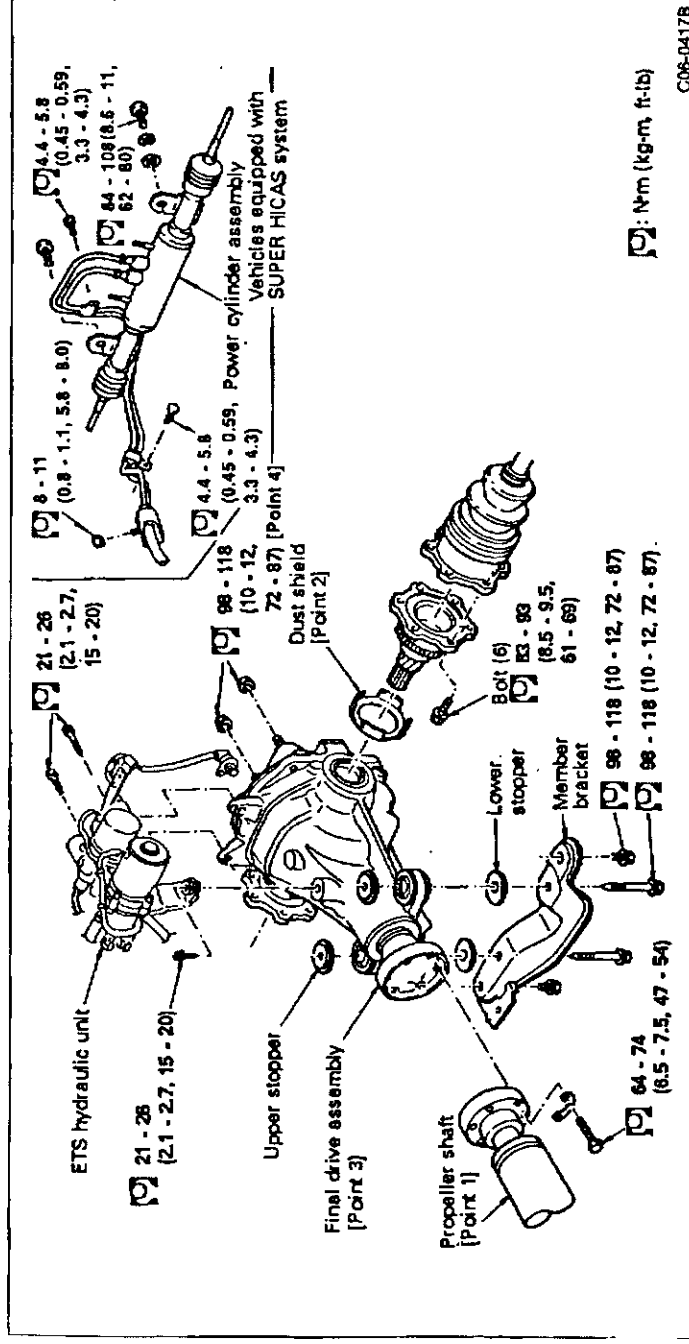
Side shaft end play inspection

- Install side shaft in vehicle and check end play. Refer to 2-5 SIDE SHAFT END PLAY INSPECTION for procedures.

C5 FINAL DRIVE

3. Final Drive Removal and Installation, Assembly and Disassembly (Cont'd)

(2) Rear final drive [R200 (mechanical LSD)]

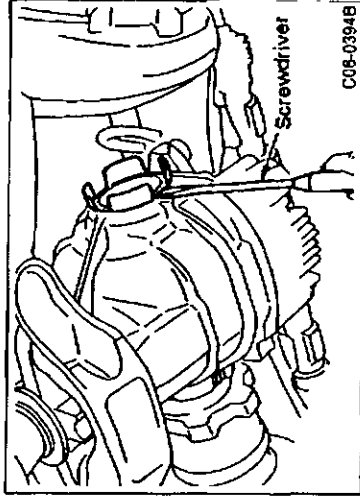


[Point 1] Propeller shaft and drive shaft separation

- Paint mating mark on companion flange before separating propeller shaft and final drive.
- Remove bolt from drive shaft and side flange and separate them.

CAUTION:

Use paint to make mating marks. Do not scratch the parts.



[Point 2] Dust shield removal and installation

Removal

- Use screwdriver to remove dust shield as shown in figure.

C5 FINAL DRIVE

3. Final Drive Removal and Installation, Assembly and Disassembly (Cont'd)

Installation

- Assembly is the reverse of disassembly.

CAUTION:

Pay attention to following points when installing power cylinder.

- (1) Part (F) on the left side of power cylinder determines position. Install part (F) first and then install power cylinder.

Power cylinder bolt tightening torque:

84 - 108 N·m (8.6 - 11 kg-m, 62 - 80 ft-lb)

- (2) Install nut ⑥ for piping first.

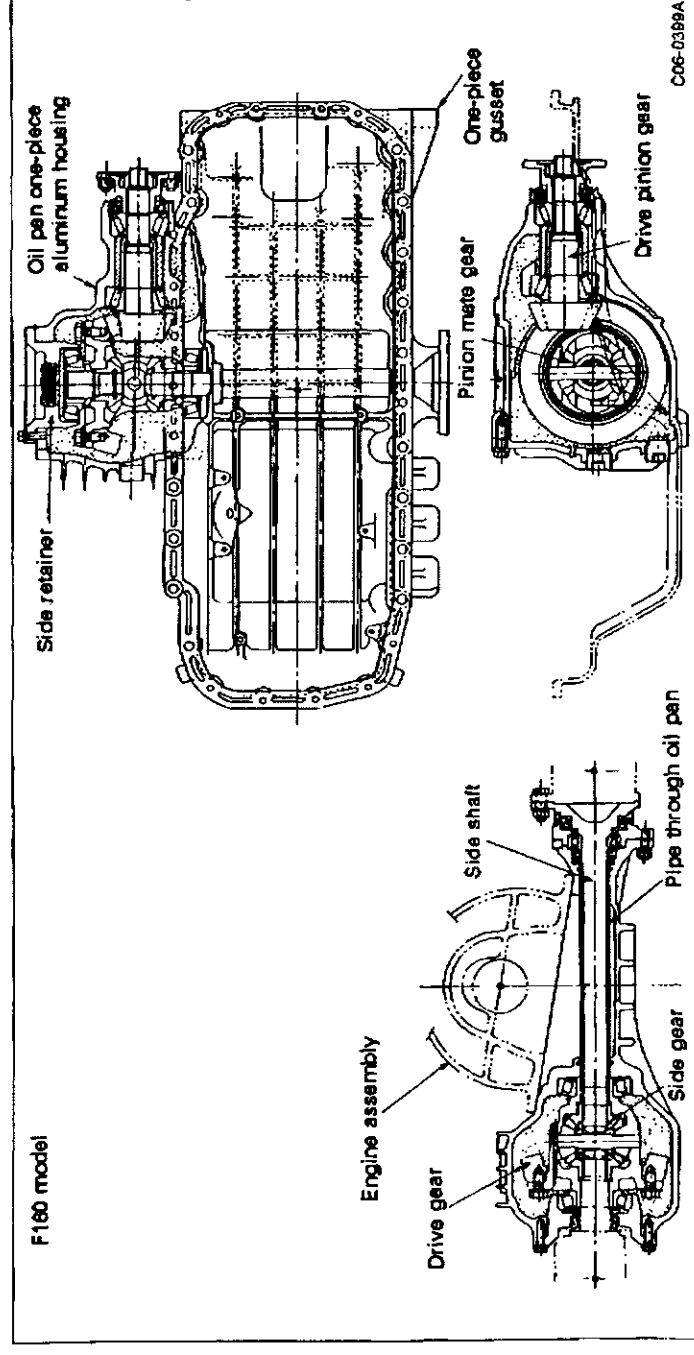
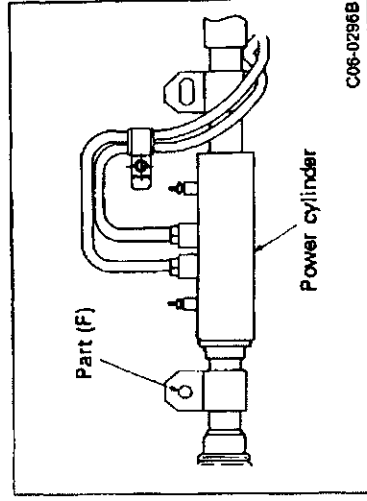
- (3) After installing nut, make sure rear suspension toe-in distance conforms to specification range indicated below. If toe-in distance does not conform, make adjustment. Refer to C8 REAR SUSPENSION AND AXLE, 2-4 WHEEL ALIGNMENT INSPECTION AND ADJUSTMENT for adjustment procedures.

Standard distance:

2.0 $\begin{smallmatrix} +2.0 \\ -2.5 \end{smallmatrix}$ mm (0.079 $\begin{smallmatrix} +0.079 \\ -0.098 \end{smallmatrix}$ in)

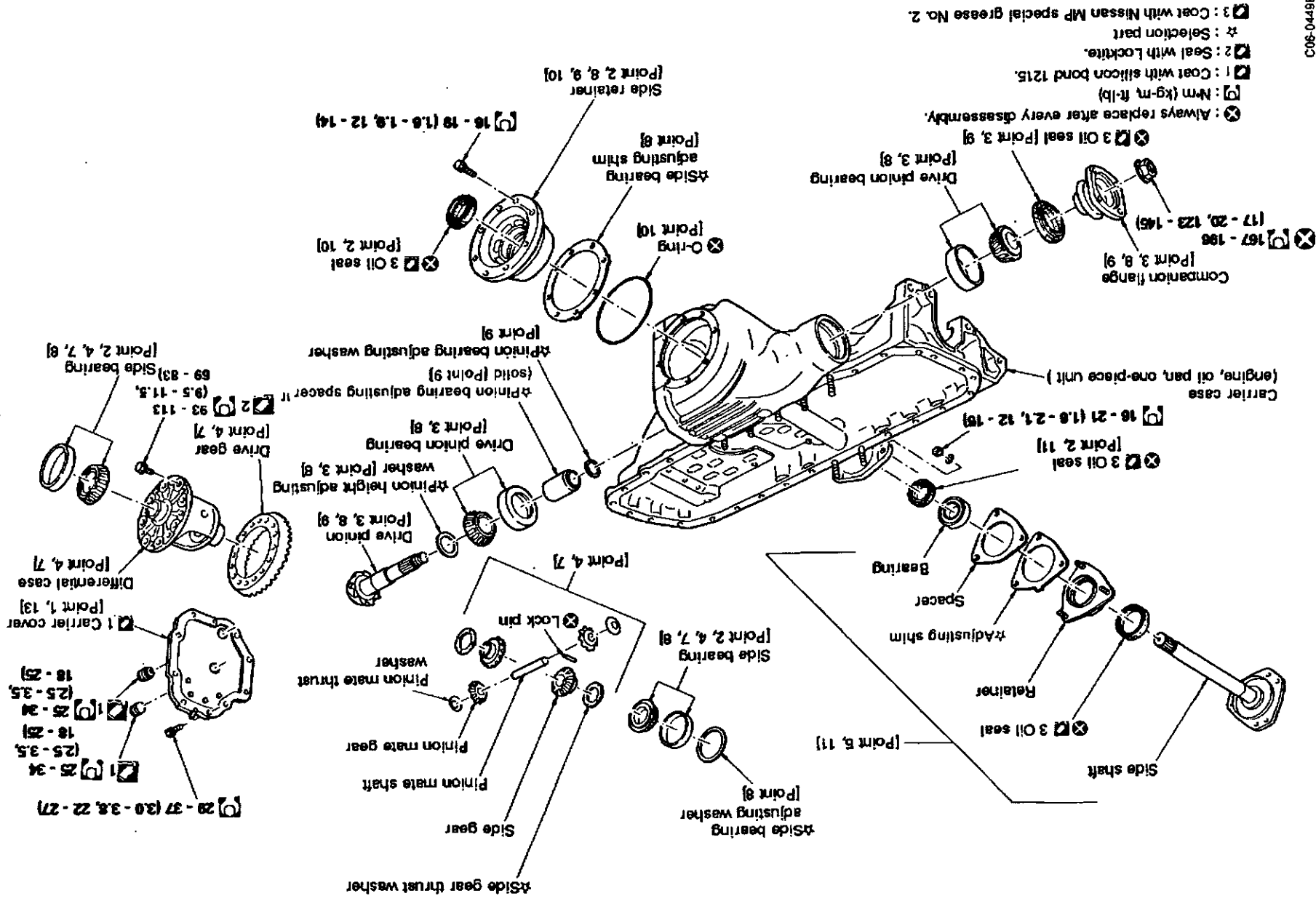
3-2 FINAL DRIVE ASSEMBLY AND DISASSEMBLY

(1) Front final drive (F160)



C5 FINAL DRIVE

3. Final Drive Removal and Installation, Assembly and Disassembly (Cont'd)



C5 FINAL DRIVE

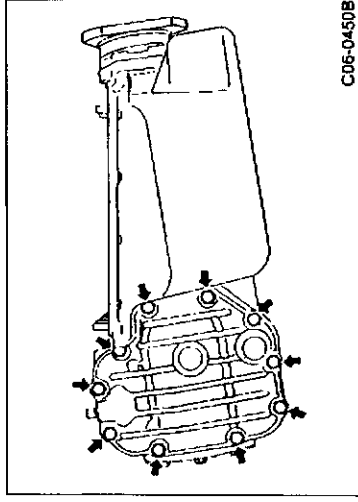
3. Final Drive Removal and Installation, Assembly and Disassembly (Cont'd)

[Point 1] Inspection before disassembly

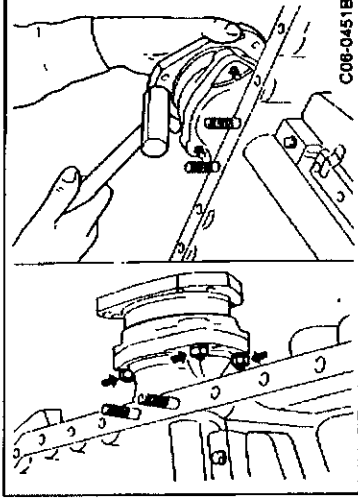
- Drain oil.
- Remove carrier cover.

CAUTION:

If carrier case is worn or cracked, replace unit assembly.



- Remove side shaft assembly nut.
- While tapping with plastic hammer, remove side shaft assembly from carrier case.



a Total preload inspection

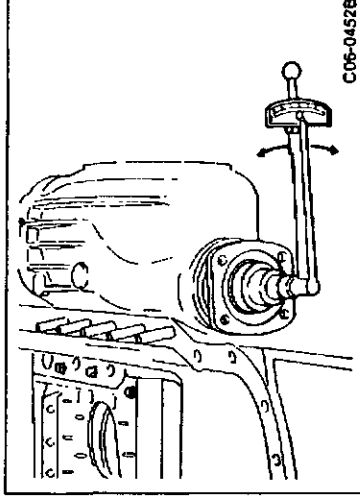
- Turn companion flange a few times. Use preload gauge to measure total preload.

Total preload standard:

1.6 - 2.2 N·m (0.16 - 0.22 kg-m, 1.2 - 1.6 ft-lb)

- If torque preload is not within the specification range, adjust pinion bearing preload and side bearing preload.

Excess preload:	• Use lower drive pinion spacer and thinner washer. • Use thicker side bearing retainer shim.
Insufficient preload:	• Use longer drive pinion spacer and thicker washer. • Use thinner side bearing retainer shim.



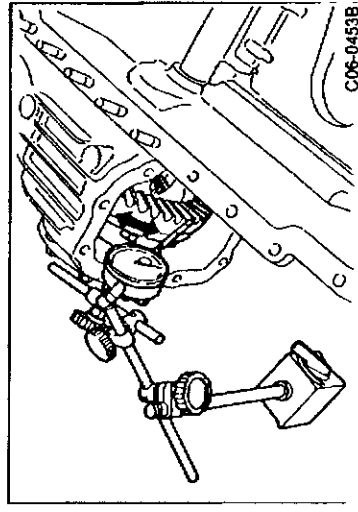
b Hypoid gear and backlash inspection

- Position dial gauge on drive gear surface and measure backlash.

Backlash standard value:

0.13 - 0.18 mm (0.0051 - 0.0071 in)

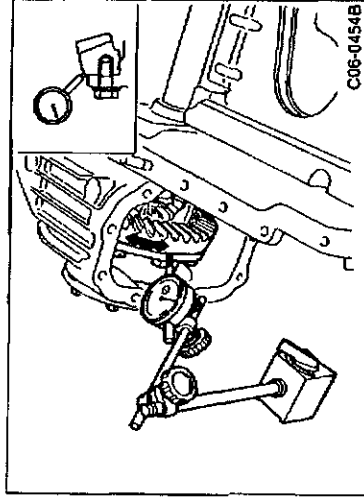
- If backlash is not within the specification range, adjust by increasing or decreasing side bearing washer (carrier case side) thickness.



C5 FINAL DRIVE

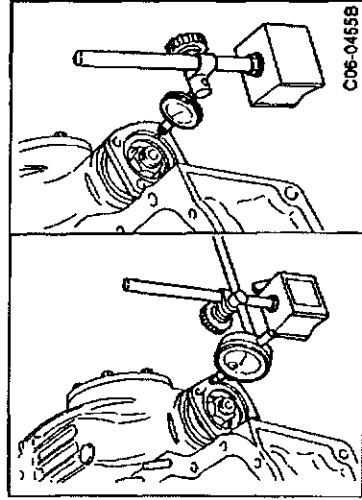
3. Final Drive Removal and Installation, Assembly and Disassembly (Cont'd)

Excess backlash:	Use thinner side bearing washer (carrier case side).
Insufficient backlash:	Use thicker side bearing washer (carrier case side).



c Drive gear runout inspection

- Position dial gauge on drive gear rear surface. Turn drive gear a few times and measure runout.
Runout limit:
0.05 mm (0.0020 in) max.
- If runout is not within the specification range, check drive gear contact condition (foreign matter between drive gear and differential case, differential case or drive gear deformation, etc.).
- If drive gear is worn or deformed, replace hypoid gear assembly. If there is differential case deformation, replace case.



d Companion flange runout inspection

- Position dial gauge on companion flange surface (inside propeller shaft surface bolt holes) and measure runout.
Runout limit:
0.05 mm (0.0020 in) max.
- Set test indicator inside companion flange (inner lower surface) and measure runout.
Runout limit:
0.05 mm (0.0020 in) max.

CAUTION:

If surface is rusted, remove rust before measuring surface.

- If runout is not within the specification range, rotate positions of both companion flange and drive pinion 90° to minimize runout.
- If runout is still not within the specification range even after rotating relative positions of flange and drive pinion, replace companion flange.
- If runout is still not within the specification range even after replacing companion flange, the pinion bearing and drive pinion gear tooth contact pattern may be incorrect or the pinion bearing may be faulty.



C5 FINAL DRIVE

3. Final Drive Removal and Installation, Assembly and Disassembly (Cont'd)

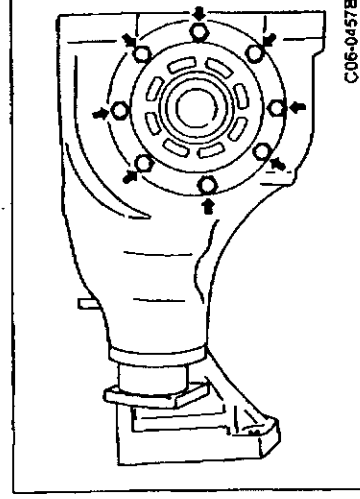
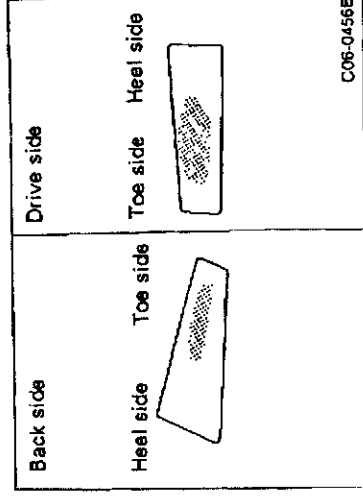
Ⓑ Hypoid gear mesh inspection

- Apply a light coat of powdered titanium oxide and oil on equivalent to drive gear teeth. Rotate gear slowly in both directions a few times and check gear tooth contact pattern.
- Check gear contact pattern on both drive side (acceleration) and back side (deceleration).

CAUTION:

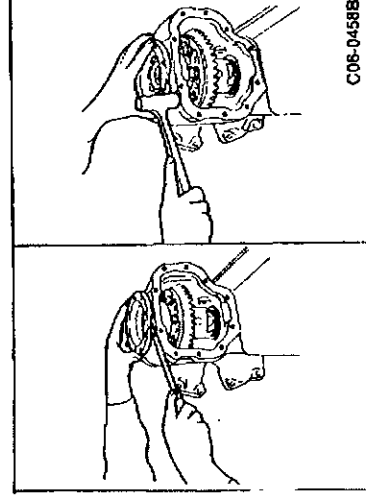
Refer to h. Hypoid gear tooth contact inspection for details on applying powdered titanium oxide and gear tooth contact inspection.

- If gear tooth contact is faulty, increase or decrease height washer thickness to adjust position.

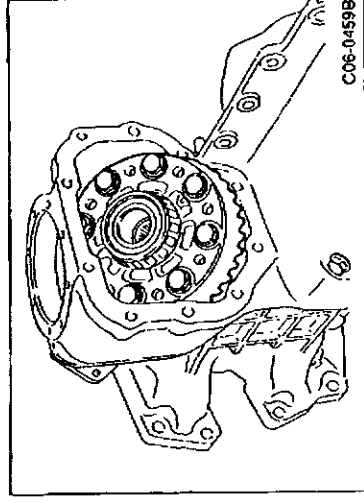


[Point 2] Drive gear and differential case assembly removal

- Remove side retainer bolts.



- Insert screwdriver in side retainer notch and raise retainer.
- While removing side retainer, tap gear case with plastic hammer and remove retainer.



- Remove differential case assembly from carrier case.

CAUTION:

Be careful not to scratch carrier cover during removal.

C5 FINAL DRIVE

3. Final Drive Removal and Installation, Assembly and Disassembly (Cont'd)

- Use puller (special service tool) and remove side bearing and outer race.

CAUTION:

Remove side bearing and adjusting washer together in carrier case side.

- Make an identification mark on outer race to prevent incorrect assembly of left and right sides.

- Use puller (special service tool) to remove oil seal.

[Point 3] Drive pinion assembly removal

- Use flange wrench and remove pinion lock nut.

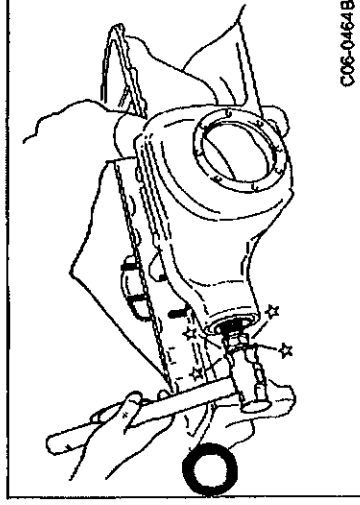
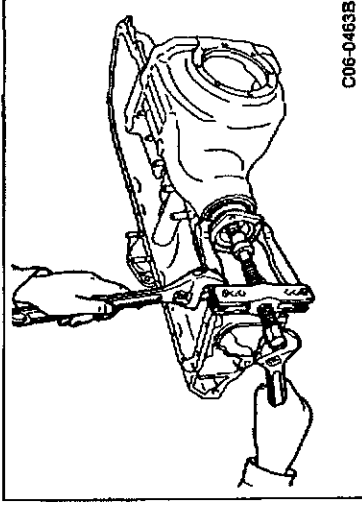
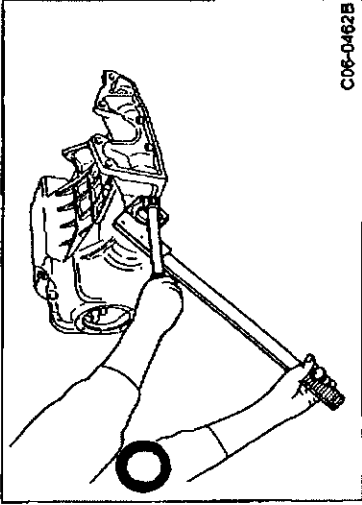
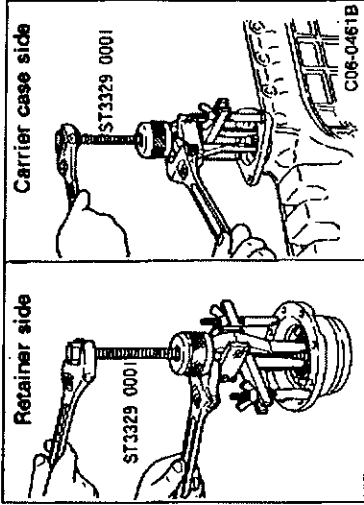
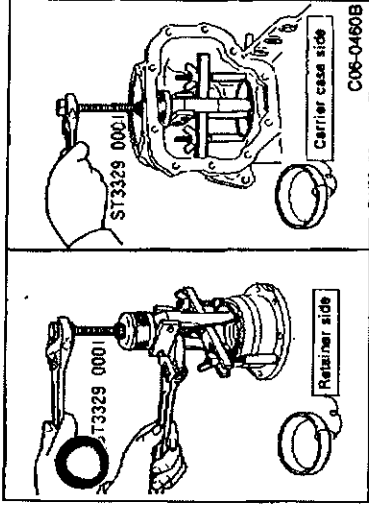
- Use puller to remove companion flange.

- Install pinion lock nut on drive pinion.

CAUTION:

Set pinion lock nut even on drive pinion to prevent damage to pinion threads.

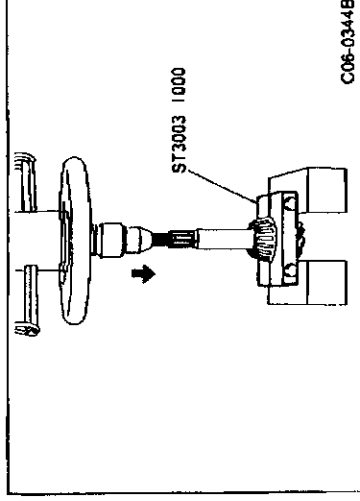
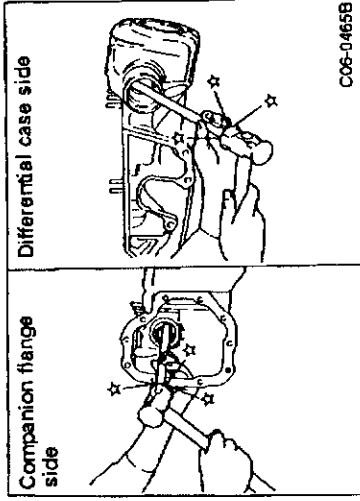
- Using copper hammer, remove drive pinion from carrier case.



C5 FINAL DRIVE

3. Final Drive Removal and Installation, Assembly and Disassembly (Cont'd)

- Use a brass shaft and tap bearing outer race evenly to remove race from carrier case.
- Remove bearing and oil seal together in companion flange side.



- Use bearing replacer (special service tool) and remove drive pinion and differential case side bearings.

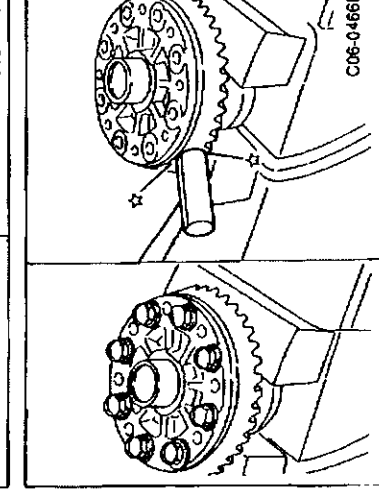
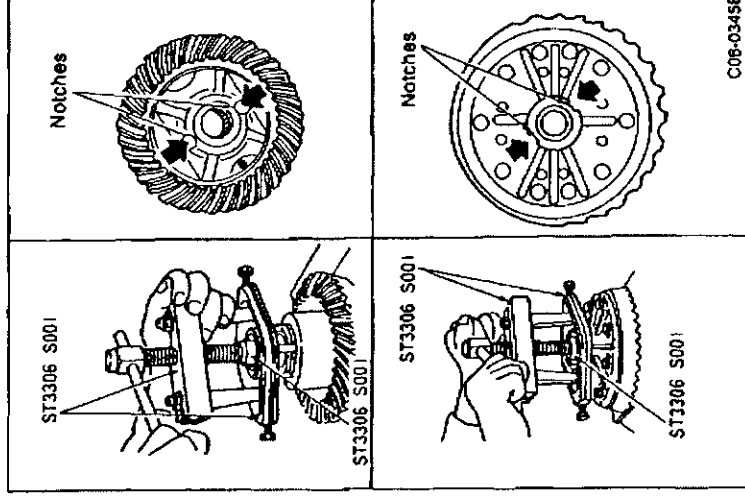
[Point 4] Differential case disassembly

a Side bearing removal

- Set differential case assembly in vise. Using puller set (special service tool), remove side bearing.

CAUTION:

- (1) When placing unit in vise, always use copper plates to prevent side bearing and drive gear from being scratched.
- (2) Do not remove side bearing except for replacement.



b Drive gear removal

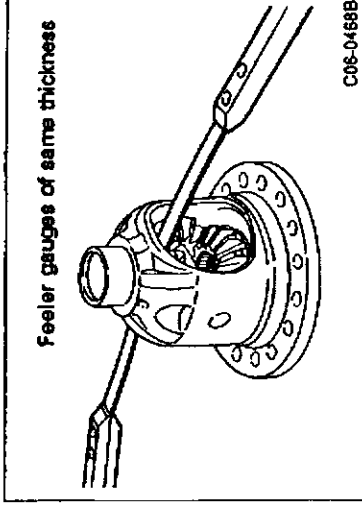
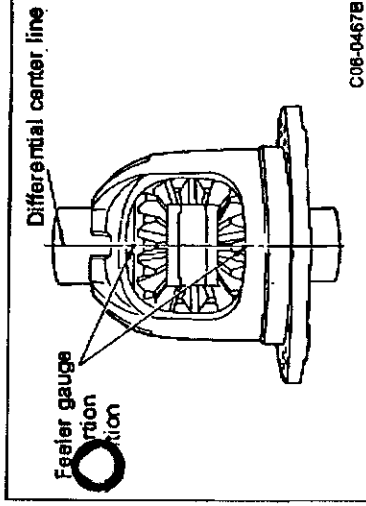
- Remove differential case bolts.
- Tap side of drive gear with plastic hammer and remove drive gear.

C5 FINAL DRIVE

3. Final Drive Removal and Installation, Assembly and Disassembly (Cont'd)

③ Side gear surface clearance inspection

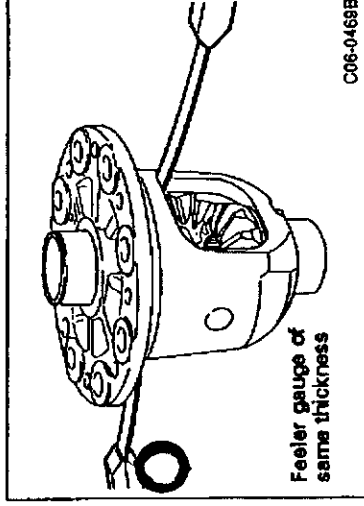
- Clean thoroughly to prevent side gear, side gear thrust washer and differential case from being coated with gear oil.
- Position differential case upright to enable side gear measurement.



- Insert feeler gauges of same thickness from both sides in rear surface of side gear to prevent side gear from falling and then measure clearance.
- Rotate side gear, measure clearance in three locations and calculate average value.

Side gear rear clearance:

0.15 mm (0.0059 in) max. (Gear must rotate without resistance.)



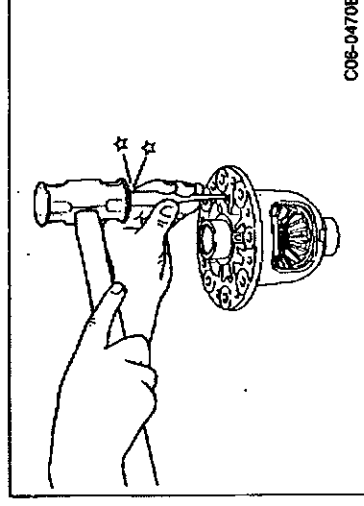
- Turn differential case upside down and measure side gear clearance on opposite side in same manner.

Side gear rear clearance:

0.15 mm (0.0059 in) max. (Gear must rotate without resistance.)

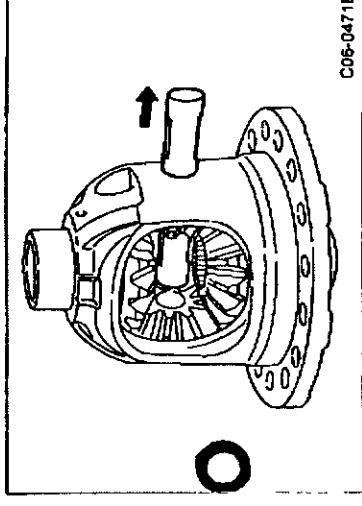
If side gear clearance is not within specification, select proper thrust washer thickness to adjust clearance.

Excess rear clearance:	Use thicker thrust washer.
Insufficient rear clearance:	Use thinner thrust washer.



④ Disassembly

- Use pin punch (special service tool) to remove pinion mate shaft lock pin.

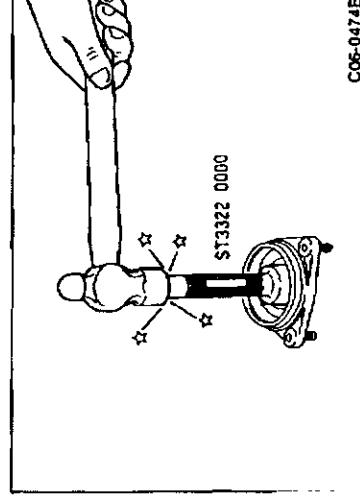
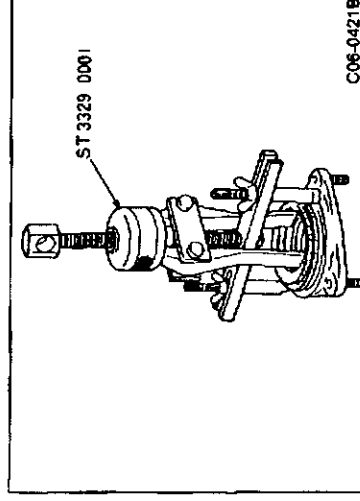
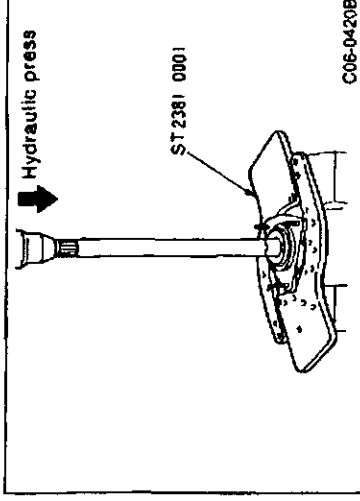
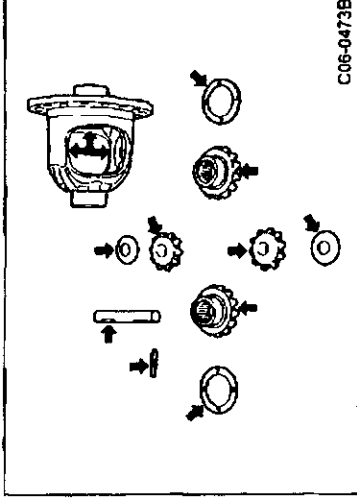
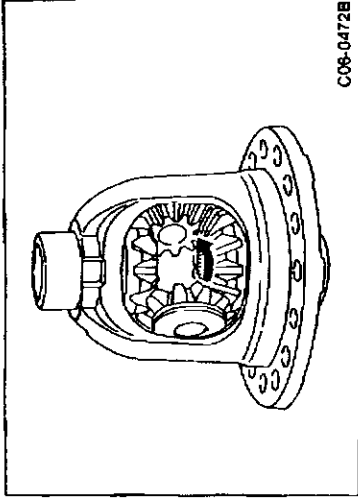


- Remove pinion mate shaft.

C5 FINAL DRIVE

3. Final Drive Removal and Installation, Assembly and Disassembly (Cont'd)

- Rotate pinion mate gear. Remove pinion mate gear and pinion mate thrust washer, side gear and side gear thrust washer from differential case.



- Refer to [Point 6] (described later) for inspection procedures of side gear, side gear thrust washer, pinion mate shaft, pinion mate gear, pinion mate thrust washer and differential case.

[Point 5] Side shaft assembly disassembly

- Use hydraulic press and remove side shaft from retainer.

- Use hydraulic puller (special service tool) and remove oil seal from retainer.

- Use drift (special service tool) and remove bearing from retainer.

C5 FINAL DRIVE

3. Final Drive Removal and Installation, Assembly and Disassembly (Cont'd)

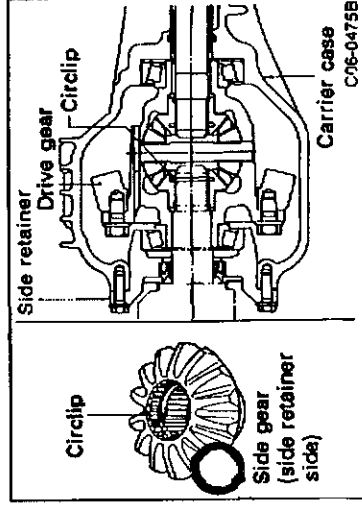
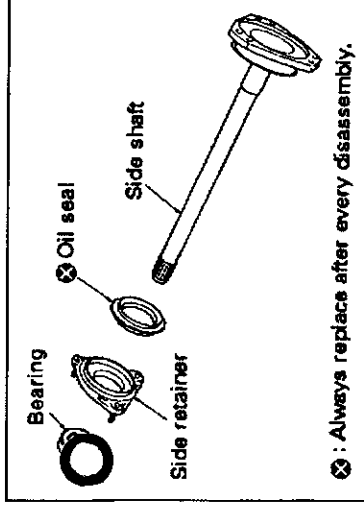
- Clean disassembled parts in suitable solvent and blow dry with compressed air. Repair or replace worn or scratched parts as follows.

Item	Processing
Side shaft	• Replace oil seal if seal lip contact surface is worn [approx. 0.1 mm (0.004 in)] or exhibits heat deformation.
Retainer	• Replace if worn, scratched or cracked.
Bearing	• Rotate bearing by hand and check for wear, scratches, pitting or flaking. Replace bearing if noisy or damaged or rotation is not smooth.
Oil seal	• Always replace with new seal after removal. Replace if there is lip wear, fatigue, damage or other problem.

[Point 6] Part inspection

- Clean disassembled parts in suitable solvent and blow dry with compressed air. Check for wear, scratches or other damage and replace as indicated below.

Item	Processing
Hypoid gear	• Check cause of abnormal gear tooth contact and correct during assembly. • If wear is excessive, replace gears which cannot be adjusted as sets. • If gears are cracked, scratched or damaged replace as set.
 ng	• Check for wear, scratches, pitting, rust or flaking. Rotate bearing by hand and replace as necessary.
Side gear and pinion mate gear	• Check for wear, scratches, or other damage on gear surface and replace as necessary.
Side gear and pinion mate gear thrust washer	• Check for wear, seizing, scratches, or other damage and replace as necessary.
Oil seal	• Always replace with new seal after removal. Replace if there is lip wear, fatigue or other problem.
Differential case	• Replace case if sliding parts are cracked or worn.
Companion flange	• Replace seal if seal lip contact surface is worn [approx. 0.1 mm (0.004 in)] or exhibits fatigue.



[Point 7] Differential case assembly

- Assemble thrust washer in side gear.

Note:

Make sure thrust washer used in assembly is same washer or thickness as disassembled washer.

- Coat sliding parts of differential case, gears and thrust washer with gear oil.
- Assemble side gear and thrust washer, pinion mate gear and thrust washer in differential case.

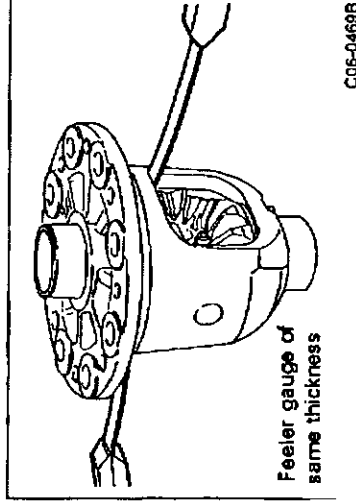
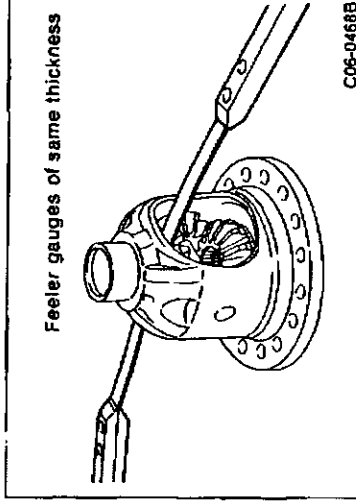
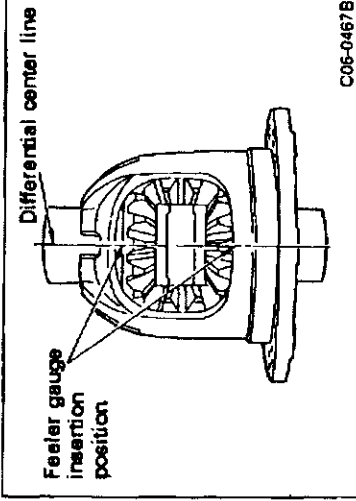
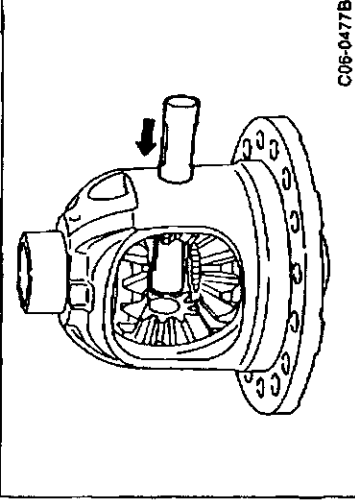
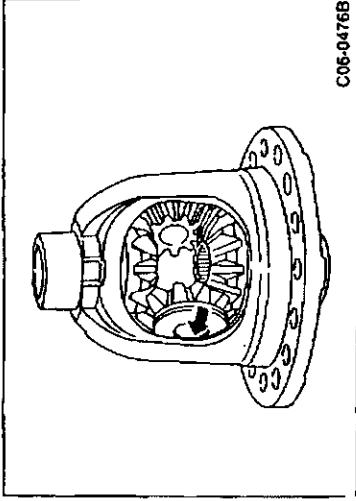
C5 FINAL DRIVE

3. Final Drive Removal and Installation, Assembly and Disassembly (Cont'd)

CAUTION:

Assemble side gear with circlip in side retainer side.

- Align two pinion mate gears in diagonal position. Rotate gears and install in differential case.



- Align differential case lock pin hole and shaft lock pin hole and assemble pinion mate shaft.

- Place differential case so side gear to be measured faces up.

- Insert feeler gauges of same thickness from both sides in rear surface of side gear to prevent side gear from falling and then measure clearance.
- Rotate side gear, measure clearance in three locations and calculate average value.
- Select side gear thrust washer so clearance is within specification shown below.

Side gear rear clearance:

0.15 mm (0.0059 in) max. (Gear must rotate without resistance.)

- Turn differential case upside down and measure side gear clearance on opposite side in same manner.
- If rear clearance is not within specification, select proper thrust washer thickness to adjust clearance.

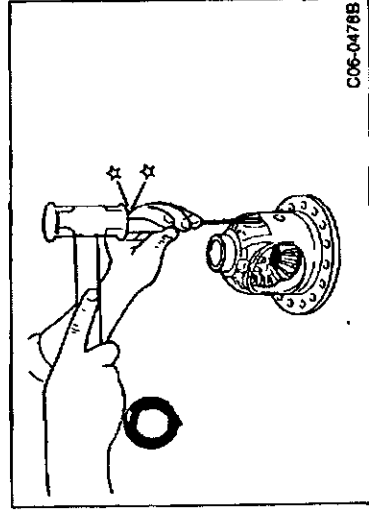
Excess rear clearance:	Use thicker thrust washer.
Insufficient rear clearance:	Use thinner thrust washer.

C5 FINAL DRIVE

3. Final Drive Removal and Installation, Assembly and Disassembly (Cont'd)

Side gear thrust washers

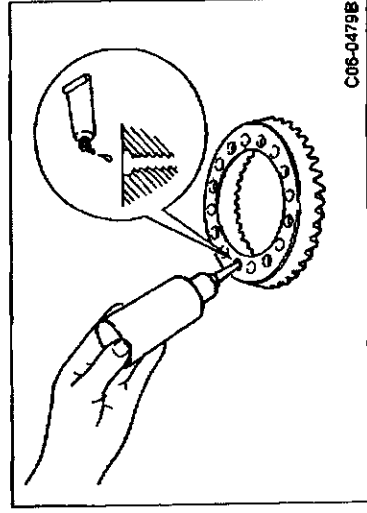
Thickness mm (in)	Part number	Thickness mm (in)	Part number	Thickness mm (in)	Part number
0.68 - 0.71 (0.0268 - 0.0280)	38424 W1010	0.80 - 0.83 (0.0315 - 0.0327)	38424 W1014	0.92 - 0.95 (0.0362 - 0.0374)	38424 W1018
0.71 - 0.74 (0.0280 - 0.0291)	38424 W1011	0.83 - 0.86 (0.0327 - 0.0339)	38424 W1015	0.95 - 0.98 (0.0374 - 0.0386)	38424 W1019
0.74 - 0.77 (0.0291 - 0.0303)	38424 W1012	0.86 - 0.89 (0.0339 - 0.0350)	38424 W1016	0.98 - 1.01 (0.0386 - 0.0398)	38424 W1020
0.77 - 0.80 (0.0303 - 0.0315)	38424 W1013	0.89 - 0.92 (0.0350 - 0.0362)	38424 W1017	1.01 - 1.04 (0.0398 - 0.0409)	38424 W1021



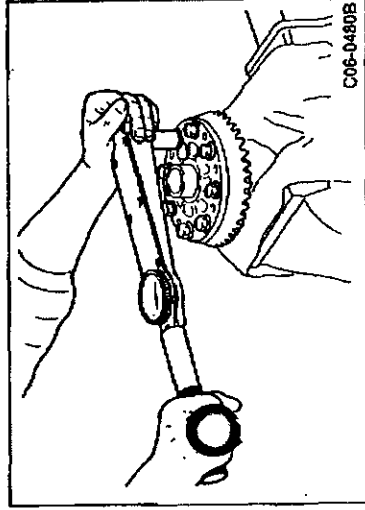
- Use pin punch (special service tool) to insert lock pin in pinion mate shaft.

CAUTION:

Always replace lock pin with new part after every disassembly.



- Coat drive gear threads with one or two drops of Locktite.



- Install drive gear in differential case.
- Coat bolt seat with rust preventative oil and tighten bolts evenly in criss-cross sequence.

Tightening torque:

93 - 113 N·m (9.5 - 11.5 kg-m, 69 - 83 ft-lb)

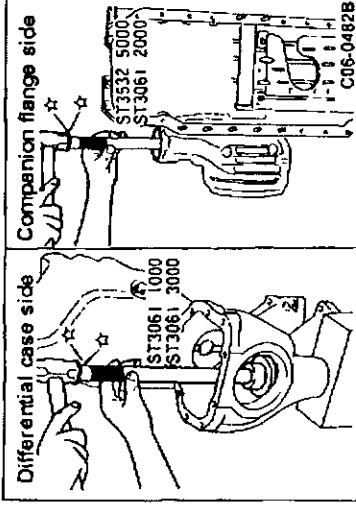
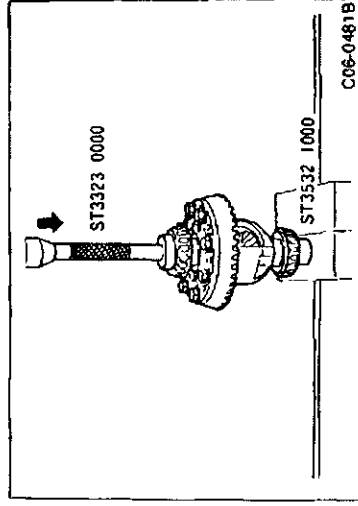
C5 FINAL DRIVE

3. Final Drive Removal and Installation, Assembly and Disassembly (Cont'd)

- Use drift (special service tool) and press-fit side bearing in differential case.

CAUTION:

Use hammer to start bearing installation. Set differential case and bearing in vertical position and press-fit bearing.



[Point 8] Hypoid gear contact and backlash inspection

a Pinion bearing outer race installation

- Use drift (special service tool) to install pinion bearing outer race in carrier case.

CAUTION:

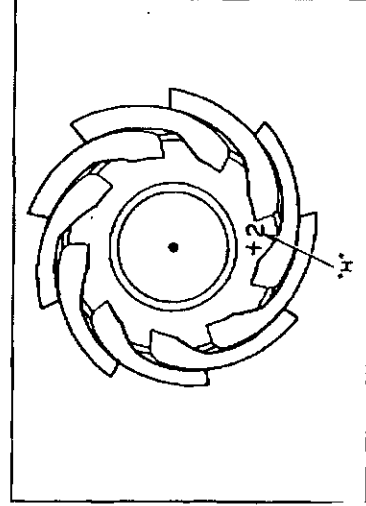
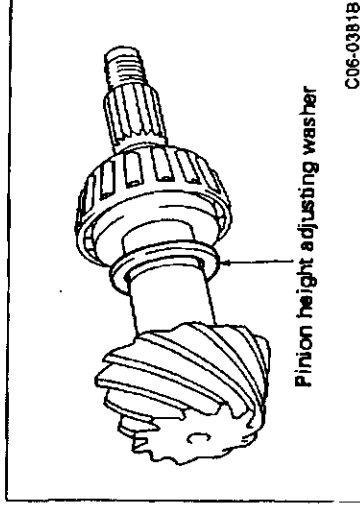
Press-fit outer race straight into carrier case and not at an angle.

b Pinion height adjusting washer installation (temporary installation)

- Assemble height adjusting washer on drive pinion.

CAUTION:

Make sure height adjusting washer used for assembly is same washer or same thickness as washer that was removed.



c Gear set replacement washer selection

- When replacing hypoid gear set, calculate processing error correction value for new and former drive pinion and select suitable washer.

- Processing error correction

$$T = T_0 + (t_1 - t_2)$$

T: Thickness of washer to be installed

T₀: Thickness of removed washer

t₁: Former drive pinion head number

(Processing error is expressed in unit of 1/100 mm)

t₂: New drive pinion head number

(Processing error is expressed in unit of 1/100 mm)

Calculation example:

$$\text{If } T_0 = 3.21 \quad t_1 = +2 \quad t_2 = -1$$

$$\text{Then: } T = 3.21 + [(2 \times 0.01) - (-1 \times 0.01)] = 3.24$$

- Install washer temporarily on drive pinion.

Pinion height adjusting washers

Thickness mm (in)	Part number	Thickness mm (in)	Part number
3.09 (0.1217)	38154 U1500	3.39 (0.1335)	38154 U1510
3.12 (0.1228)	38154 U1501	3.42 (0.1348)	38154 U1511
3.15 (0.1240)	38154 U1502	3.45 (0.1358)	38154 U1512
3.18 (0.1252)	38154 U1503	3.48 (0.1370)	38154 U1513
3.21 (0.1264)	38154 U1504	3.51 (0.1382)	38154 U1514
3.24 (0.1276)	38154 U1505	3.54 (0.1394)	38154 U1515
3.27 (0.1287)	38154 U1506	3.57 (0.1406)	38154 U1516
3.30 (0.1299)	38154 U1507	3.60 (0.1417)	38154 U1517
3.33 (0.1311)	38154 U1508	3.63 (0.1428)	38154 U1518
3.36 (0.1323)	38154 U1509	3.66 (0.1441)	38154 U1519

C5 FINAL DRIVE

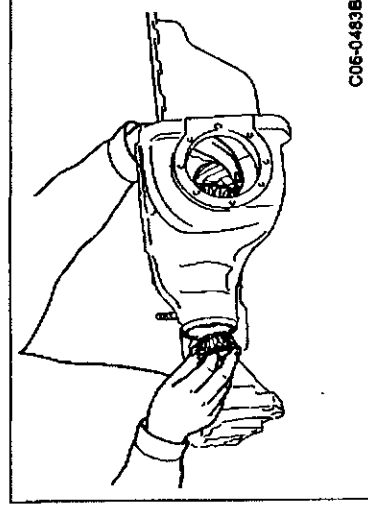
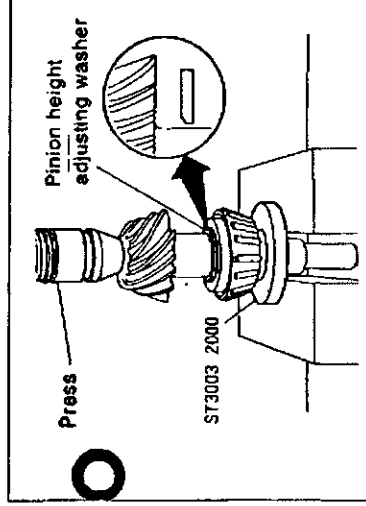
3. Final Drive Removal and Installation, Assembly and Disassembly (Cont'd)

d Pinion bearing installation

- Use drift (special service tool) and install bearing.

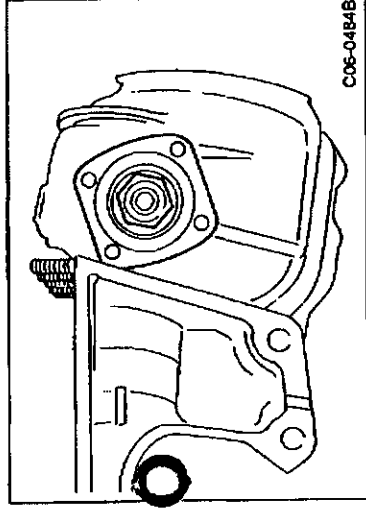
CAUTION:

Make sure washer is facing correct direction.

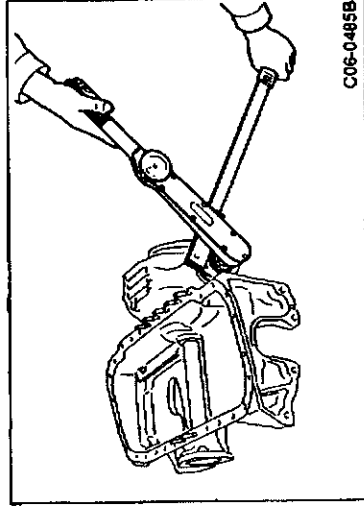


e Drive pinion and bearing installation

- Coat bearing with gear oil.
- Assemble drive pinion and bearing in carrier case without spacer and adjusting washer.



- Install companion flange without oil seal.
- Coat drive pinion threads and pinion nut seat with rust-preventative oil and install nut temporarily.



- Tighten pinion lock nut to specified preload torque.

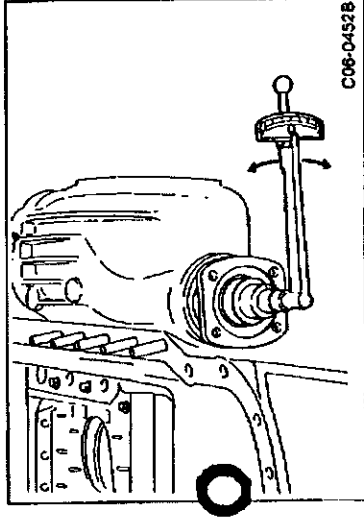
Pinion bearing preload standard value

(without oil seal installed):

0.7 - 1.0 N·m (0.07 - 0.10 kg-m, 0.5 - 0.7 ft-lb)

CAUTION:

Tighten pinion lock nut in 5° to 10° increments while preload is measured because spacer is not inserted. Do not tighten excessively.



C5 FINAL DRIVE

3. Final Drive Removal and Installation, Assembly and Disassembly (Cont'd)

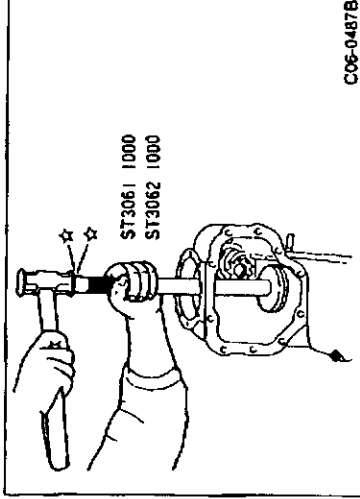
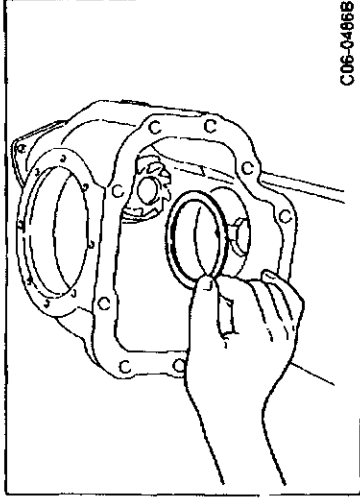
① Differential case installation

- Install side bearing adjusting washer (carrier case side) in carrier case.

CAUTION:

Make sure adjusting washer used for assembly is same washer or same thickness as washer that was removed. Otherwise, use washer indicated below.

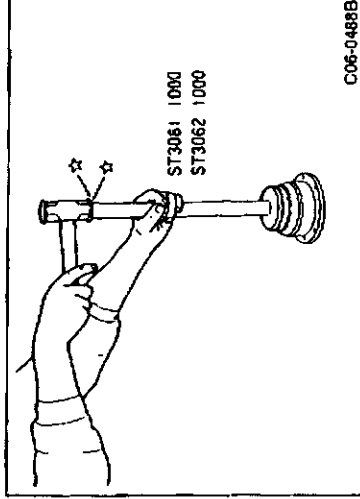
Thickness mm (in)	Part number
2.00 (0.0787)	38453 03V01



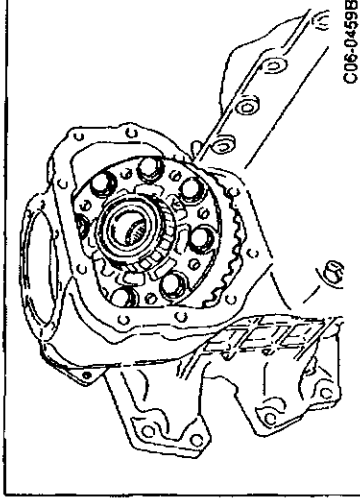
- Use drift (special service tool) and install side bearing outer race (carrier side) in differential case.

CAUTION:

Do not tap with excessive force.



- Use drift (special service tool) and install side bearing outer race in side retainer.



- Coat bearing with gear oil.
- Install differential case assembly in carrier case.

CAUTION:

Do not scratch carrier cover surface.

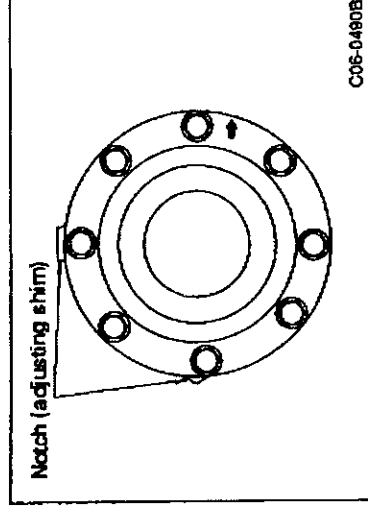
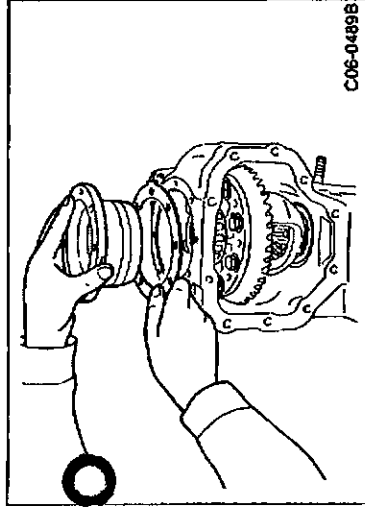
C5 FINAL DRIVE

3. Final Drive Removal and Installation, Assembly and Disassembly (Cont'd)

- Assemble side bearing adjusting shim in side retainer.

CAUTION:

Make sure adjusting shim used for assembly is same shim or same thickness as shim that was removed.



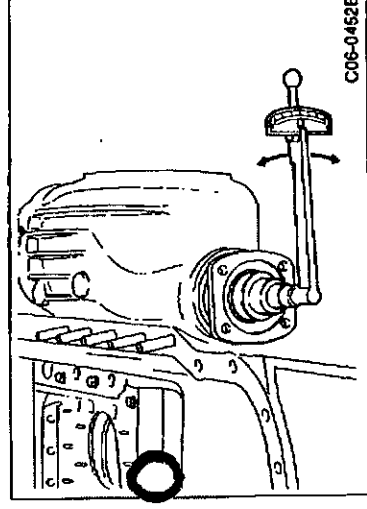
- Install side bearing adjusting shims so they face the two notches on top and rear of carrier case.
- Install side retainer in direction of arrow facing front of carrier case.

Tightening torque:

16 - 19 N·m (1.6 - 1.9 kg-m, 12 - 14 ft-lb)

CAUTION:

Do not install O-ring.



Ⓐ Total preload measurement

- Rotate companion flange more than 20 times. Measure preload with preload gauge.

Total preload standard value

(without oil seal installed):

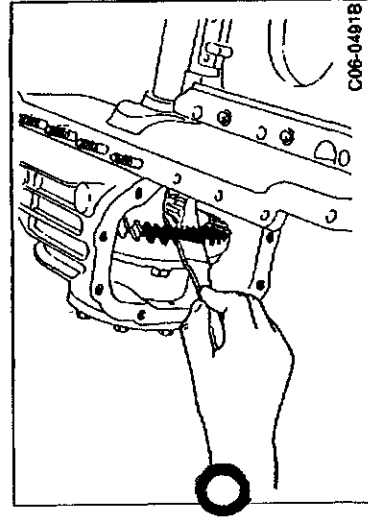
1.5 - 2.1 N·m (0.15 - 0.21 kg-m, 1.1 - 1.5 ft-lb)

- If preload torque is not within specification range, adjust by selecting suitable shim thickness for side retainer.

Excessive preload:	Use thicker shim.
Insufficient preload:	Use thinner shim.

Side bearing adjusting shim (side retainer side)

Thickness mm (in)	Part number	Thickness mm (in)	Part number	Thickness mm (in)	Part number
0.35 (0.0138)	38453 03V60	0.65 (0.0256)	38453 03V66	0.95 (0.0374)	38453 03V72
0.40 (0.0157)	38453 03V61	0.70 (0.0276)	38453 03V67	1.00 (0.0394)	38453 03V73
0.45 (0.0177)	38453 03V62	0.75 (0.0295)	38453 03V68	1.05 (0.0413)	38453 03V74
0.50 (0.0197)	38453 03V63	0.80 (0.0315)	38453 03V69	1.10 (0.0433)	38453 03V75
0.55 (0.0217)	38453 03V64	0.85 (0.0335)	38453 03V70	1.15 (0.0453)	38453 03V76
0.60 (0.0236)	38453 03V65	0.90 (0.0354)	38453 03V71		



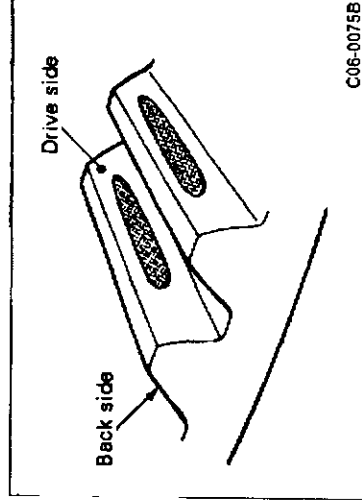
ⓑ Gear tooth contact inspection

- Coat both sides of drive gear tooth surface with titanium oxide.
Rotate drive gear and drive pinion and check gear tooth contact pattern.

C5 FINAL DRIVE

3. Final Drive Removal and Installation, Assembly and Disassembly (Cont'd)

- Check drive gear tooth contact in four locations, on the drive side (acceleration side) and back side (deceleration).



Gear tooth contact pattern standard

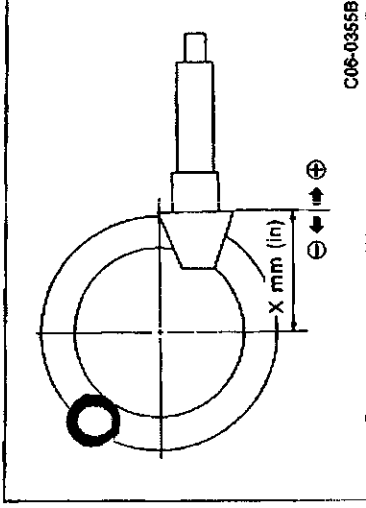
Contact pattern			Pinion height adjusting washer selection value mm (in)	Adjustment
Back side	Drive side			
Toe contact 	Heel contact 	Heel contact Toe contact 	+ 0.15 (+ 0.0059)	Necessary
Toe contact 	Heel contact 	Heel contact Toe contact 	+ 0.12 (+ 0.0047)	↑
Toe contact 	Heel contact 	Heel contact Toe contact 	+ 0.09 (+ 0.0035)	↑
Toe contact 	Heel contact 	Heel contact Toe contact 	+ 0.06 (+ 0.0024)	Unnecessary
Toe contact 	Heel contact 	Heel contact Toe contact 	+ 0.03 (+ 0.0012)	↑
Toe contact 	Heel contact 	Heel contact Toe contact 	0 (0)	↑
Toe contact 	Heel contact 	Heel contact Toe contact 	-0.03 (-0.0012)	↑
Toe contact 	Heel contact 	Heel contact Toe contact 	-0.06 (-0.0024)	↑
Toe contact 	Heel contact 	Heel contact Toe contact 	-0.09 (-0.0035)	Necessary
Toe contact 	Heel contact 	Heel contact Toe contact 	-0.12 (-0.0047)	↑
Toe contact 	Heel contact 	Heel contact Toe contact 	-0.15 (-0.0059)	↑

C5 FINAL DRIVE

3. Final Drive Removal and Installation, Assembly and Disassembly (Cont'd)

① Tooth contact adjustment

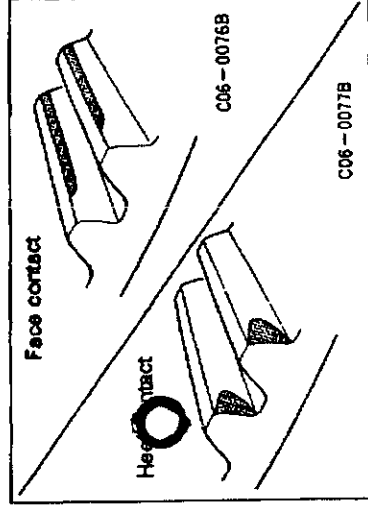
- If tooth contact is not correct, change pinion height adjusting washer thickness to adjust pinion height [X mm (in) in figure].



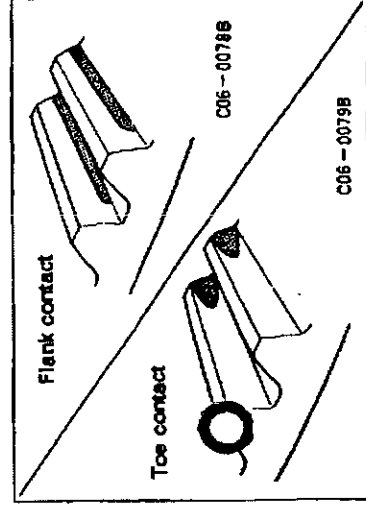
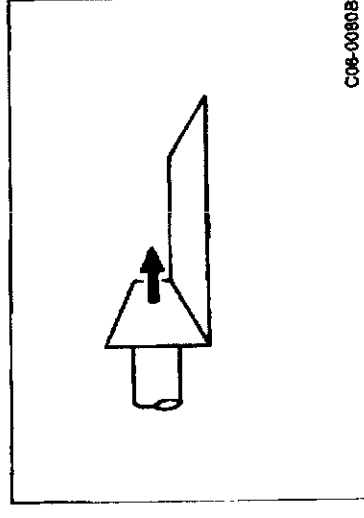
C06-0355B

Pinion height adjusting washer

Thickness mm (in)	Part number	Thickness mm (in)	Part number	Thickness mm (in)	Part number
3.09 (0.1217)	38154 U1500	3.30 (0.1299)	38154 U1507	3.51 (0.1382)	38154 U1514
3.12 (0.1228)	38154 U1501	3.33 (0.1311)	38154 U1508	3.54 (0.1394)	38154 U1515
3.15 (0.1240)	38154 U1502	3.36 (0.1323)	38154 U1509	3.57 (0.1406)	38154 U1516
3.18 (0.1252)	38154 U1503	3.39 (0.1335)	38154 U1510	3.60 (0.1417)	38154 U1517
3.21 (0.1264)	38154 U1504	3.42 (0.1346)	38154 U1511	3.63 (0.1429)	38154 U1518
3.24 (0.1276)	38154 U1505	3.45 (0.1358)	38154 U1512	3.66 (0.1441)	38154 U1519
3.27 (0.1287)	38154 U1506	3.48 (0.1370)	38154 U1513		



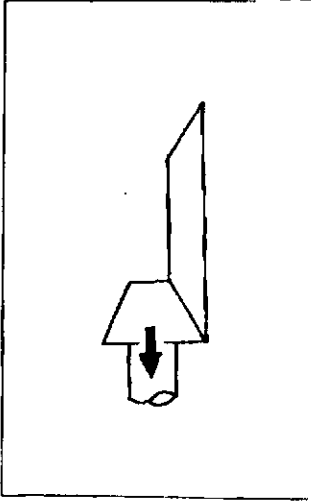
- If face contact or heel contact occur, increase pinion height adjusting washer thickness to move drive pinion closer to drive gear.



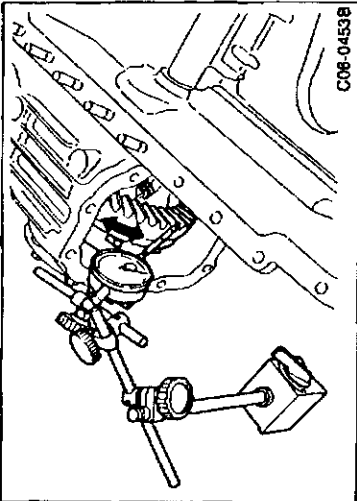
- If flank contact or toe contact occur, decrease pinion height adjusting washer thickness to move drive pinion away from drive gear.

C5 FINAL DRIVE

3. Final Drive Removal and Installation, Assembly and Disassembly (Cont'd)



C06-0081B



C06-0453B

Side bearing adjusting washer (Carrier case side)

Thickness mm (in)	Part number	Thickness mm (in)	Part number	Thickness mm (in)	Part number
1.95 (0.0768)	38453 03V00	2.25 (0.0886)	38453 03V06	2.55 (0.1004)	38453 03V12
2.00 (0.0787)	38453 03V01	2.30 (0.0906)	38453 03V07	2.60 (0.1024)	38453 03V13
2.05 (0.0807)	38453 03V02	2.35 (0.0925)	38453 03V08	2.65 (0.1043)	38453 03V14
2.10 (0.0827)	38453 03V03	2.40 (0.0945)	38453 03V09		
2.15 (0.0846)	38453 03V04	2.45 (0.0965)	38453 03V10		
2.20 (0.0866)	38453 03V05	2.50 (0.0984)	38453 03V11		

- Place dial gauge on drive gear face and measure backlash.

Backlash standard value:

0.13 - 1.18 mm (0.0051 - 0.0465 in)

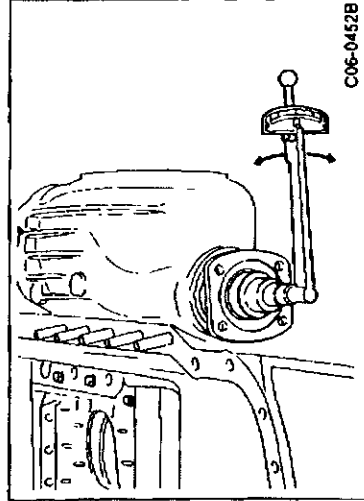
- If backlash is not within specification range, change thickness of carrier case side bearing adjusting washer to adjust.

Excess backlash:

Use thicker washer.

Insufficient backlash:

Use thinner washer.



C06-0452B

Side bearing adjusting washer (Carrier case side)

Thickness mm (in)	Part number	Thickness mm (in)	Part number	Thickness mm (in)	Part number
0.35 (0.0138)	38453 03V60	0.65 (0.0256)	38453 03V66	0.95 (0.0374)	38453 03V72
0.40 (0.0157)	38453 03V61	0.70 (0.0276)	38453 03V67	1.00 (0.0394)	38453 03V73
0.45 (0.0177)	38453 03V62	0.75 (0.0295)	38453 03V68	1.05 (0.0413)	38453 03V74
0.50 (0.0197)	38453 03V63	0.80 (0.0315)	38453 03V69	1.10 (0.0433)	38453 03V75
0.55 (0.0217)	38453 03V64	0.85 (0.0335)	38453 03V70	1.15 (0.0453)	38453 03V76
0.60 (0.0236)	38453 03V65	0.90 (0.0354)	38453 03V71		

① Total preload measurement

- Rotate companion flange more than 20 times. Use preload gauge to measure preload.

Total preload standard value

(without oil seal):

1.5 - 2.1 N·m (0.15 - 0.21 kg-m, 1.1 - 1.5 ft-lb)

- If preload is not within specification range, adjust by selecting suitable adjusting shim thickness.

Excess preload:

Use thicker shim.

Insufficient preload:

Use thinner shim.

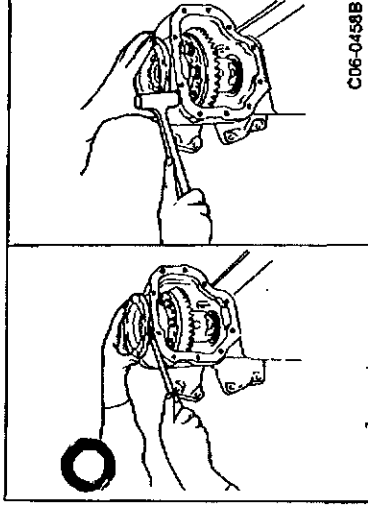
C5 FINAL DRIVE

3. Final Drive Removal and Installation, Assembly and Disassembly (Cont'd)

[Point 9] Drive pinion and preload adjustment

Ⓐ Differential case assembly removal

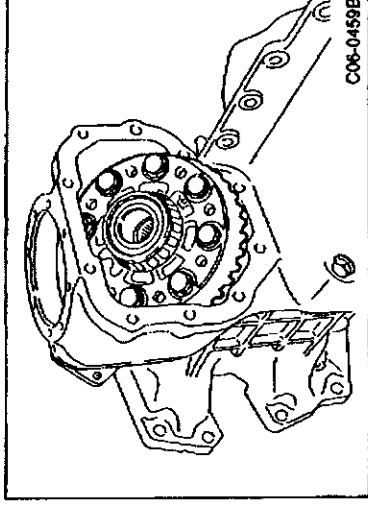
- Insert screwdriver in side retainer notch and raise retainer.
- While pulling side retainer, tap gear lightly with plastic hammer and remove retainer.



- Remove differential case assembly.

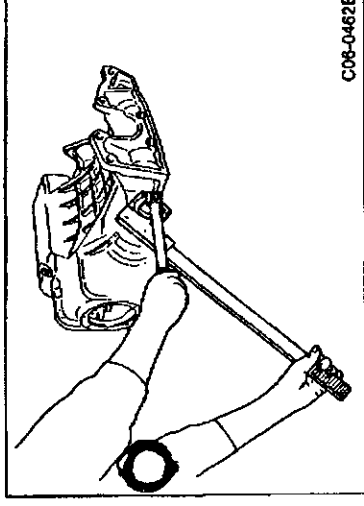
CAUTION:

Do not scratch carrier case surface.

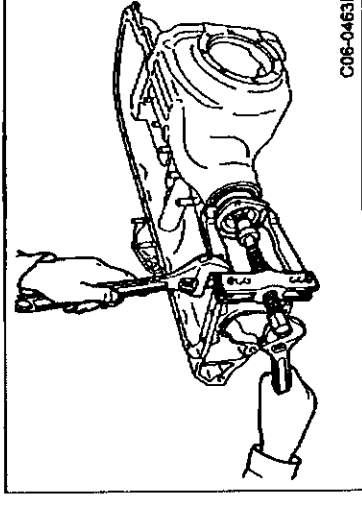


Ⓑ Drive pinion assembly removal

- Use flange wrench and remove pinion lock nut.



- Use puller (special service tool) and remove companion flange.

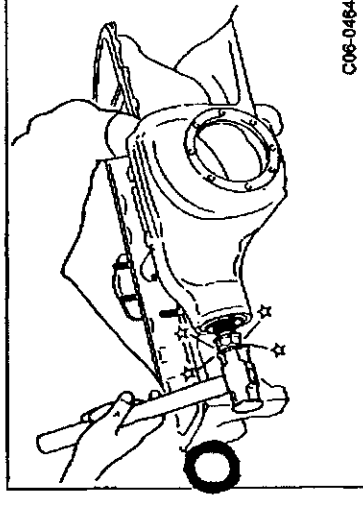


- Install pinion lock nut in drive pinion.

CAUTION:

Set drive pinion and pinion lock nut even to avoid damaging drive pinion threads.

- Use copper hammer and remove drive pinion from carrier case.



C5 FINAL DRIVE

3. Final Drive Removal and Installation, Assembly and Disassembly (Cont'd)

- Assemble adjusting spacer and washer on drive pinion and install in carrier case.

Note:

Spacer and washer must be same length and thickness as parts removed at disassembly.

- Coat bearing with gear oil.
- Assemble drive pinion and bearing in carrier case.

- Install companion flange without oil seal.
- Coat drive pinion threads and pinion nut seat with rust-preventative oil and tighten nut temporarily.

- Rotate companion flange and fit bearing.
- Use preload gauge, measure preload and tighten nut.
- When tightening to specified torque, select spacer and washer to set standard preload.

First use a long spacer and thick washer. Gradually, exchange for shorter spacer and thinner washer.

Drive pinion tightening torque:

167 - 196 N·m (17 - 20 kg-m, 123 - 145 ft-lb)

Pinion bearing preload standard value:

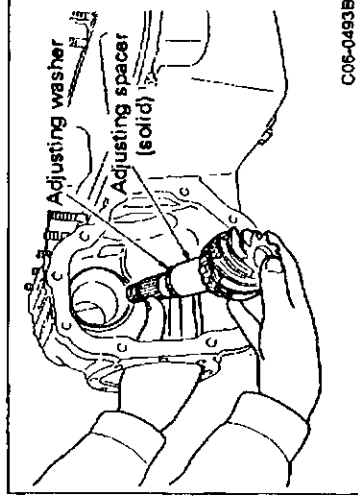
0.7 - 10.8 N·m (0.07 - 1.10 kg-m, 0.5 - 8.0 ft-lb)

If longer spacer and thicker washer are used: the preload increases.

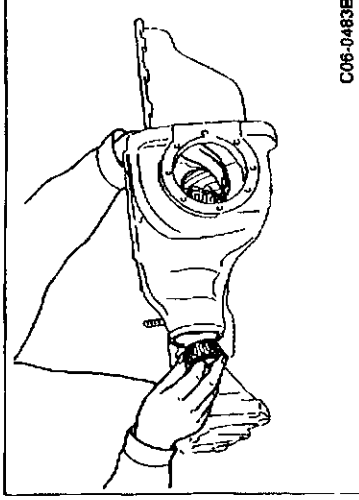
If shorter spacer and thinner washer are used: the preload decreases.

CAUTION:

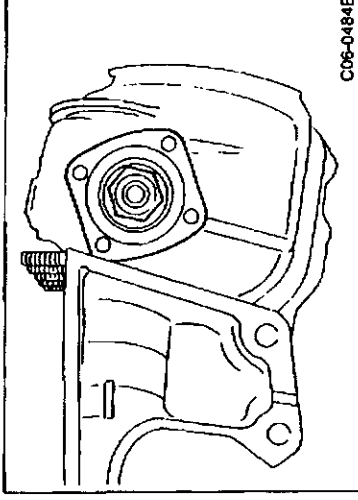
Do not increase preload excessively.



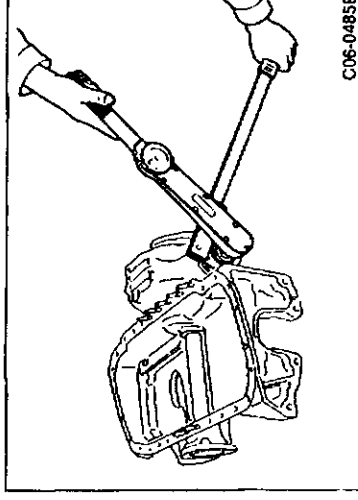
C06-0493B



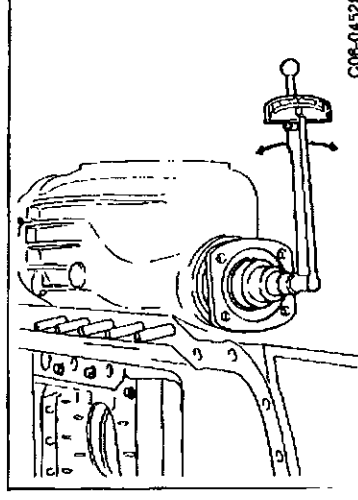
C06-0483B



C06-0484B



C06-0485B



C06-0452B

C5 FINAL DRIVE

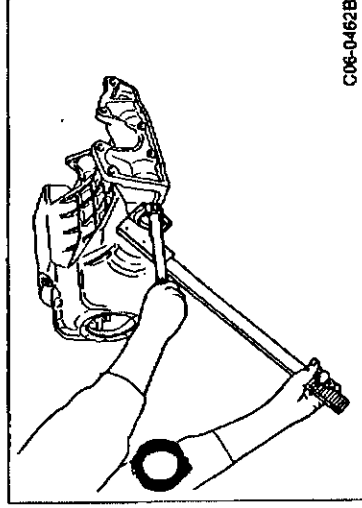
3. Final Drive Removal and Installation, Assembly and Disassembly (Cont'd)

Pinion bearing adjusting spacer (solid)

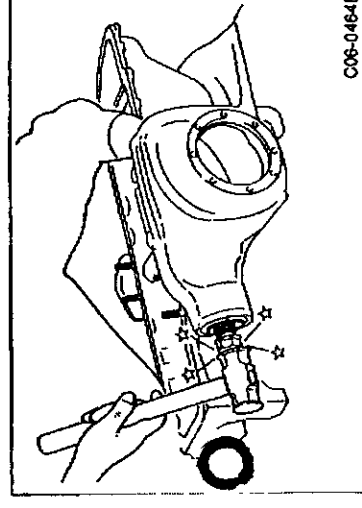
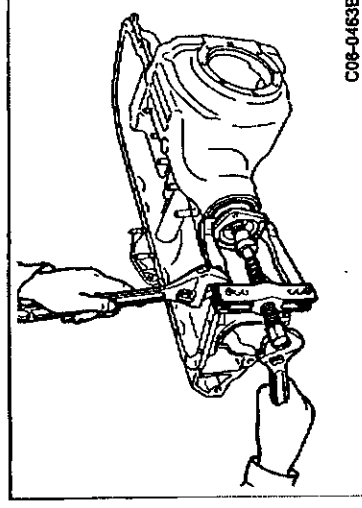
Thickness mm (in)	Part number	Thickness mm (in)	Part number	Thickness mm (in)	Part number
56.2 (2.213)	38130 21000	56.6 (2.228)	38132 21000	57.0 (2.244)	38134 21000
56.4 (2.220)	38131 21000	56.8 (2.236)	38133 21000	57.2 (2.252)	38135 21000

Pinion bearing adjusting washer

Thickness mm (in)	Part number	Thickness mm (in)	Part number	Thickness mm (in)	Part number
2.59 (0.1020)	38127 09400	2.47 (0.0972)	38133 09400	2.35 (0.0925)	38139 09400
2.57 (0.1012)	38128 09400	2.45 (0.0965)	38134 09400	2.33 (0.0917)	38140 09400
2.55 (0.1004)	38129 09400	2.43 (0.0957)	38135 09400	2.31 (0.0909)	38141 09400
2.53 (0.0996)	38130 09400	2.41 (0.0949)	38136 09400		
2.51 (0.0988)	38131 09400	2.39 (0.0941)	38137 09400		
2.49 (0.0980)	38132 09400	2.37 (0.0933)	38138 09400		



- If the specified preload (by adjusting spacer, adjusting washer selection) is set at specified torque, remove drive pinion one time.
- Use puller (special service tool) and remove companion flange.



- Install pinion lock nut in drive pinion.

CAUTION:

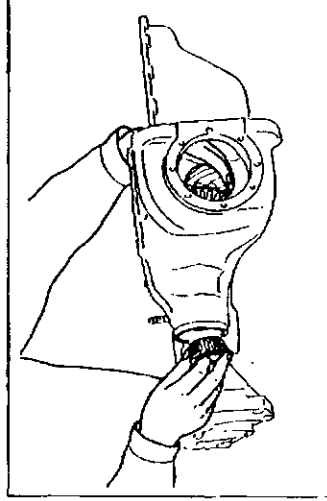
Set drive pinion and pinion lock nut even to avoid damaging drive pinion threads.

- Use copper hammer and remove drive pinion from carrier case.

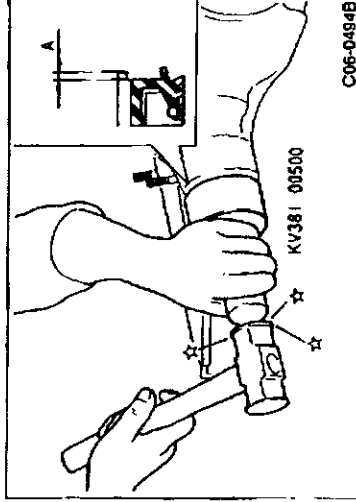
C5 FINAL DRIVE

3. Final Drive Removal and Installation, Assembly and Disassembly (Cont'd)

- Coat bearing with gear oil.
- Assemble drive pinion and selected adjusting spacer and washer in carrier case. Install bearing in case.



C06-0483B

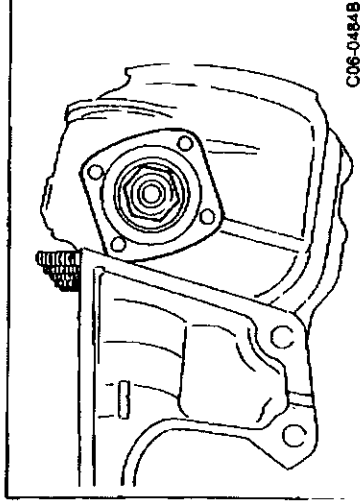


C06-0494B

- Coat oil seal lip with Nissan MP special grease No. 2.
- Use drift (special service tool) and install oil seal to position of dimension A shown in figure on left.

Dimension A:

1.8 - 2.2 mm (0.071 - 0.087 in)

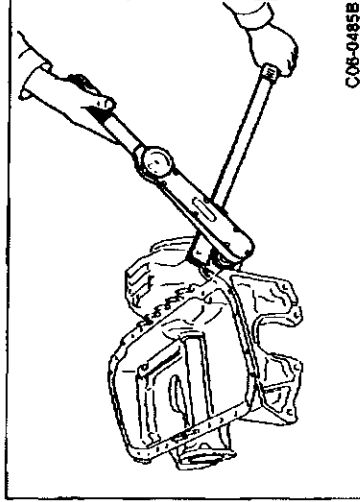


C06-0484B

- Install companion flange.
- Coat drive pinion threads and pinion nut seat with rust-preventative oil and install new nut.

CAUTION:

Replace pinion nut with new part after every disassembly.



C06-0485B

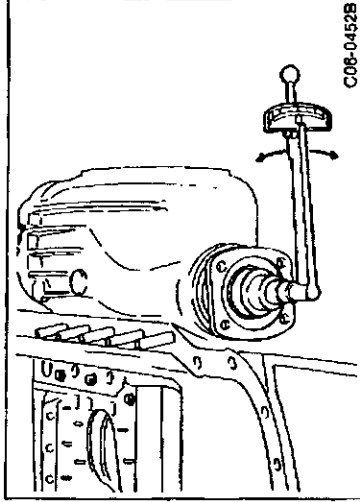
- Turn companion flange more than 20 times to fit bearing.
- Tighten drive pinion to specified torque.

Drive pinion tightening torque:

167 - 196 N·m (17 - 20 kg-m, 123 - 145 ft-lb)

CAUTION:

Do not over-tighten.



C06-0452B

- Use preload gauge and measure preload.
Pinion bearing preload standard value
(with oil seal installed):
0.8 - 1.1 N·m (0.08 - 0.11 kg-m, 0.6 - 0.8 ft-lb)

C5 FINAL DRIVE

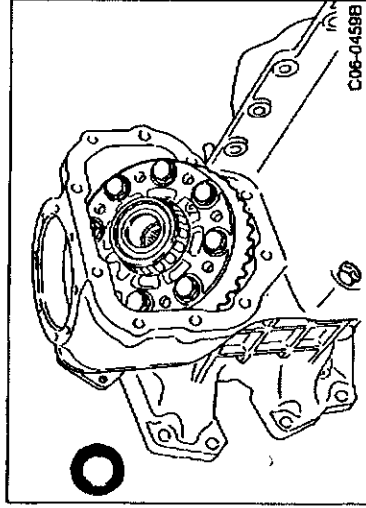
3. Final Drive Removal and Installation, Assembly and Disassembly (Cont'd)

[Point 10] Differential case assembly installation

- Coat side bearing with gear oil. Install differential case assembly in carrier case.

CAUTION:

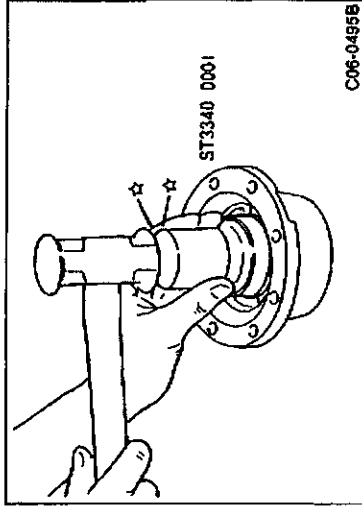
Do not scratch carrier case surface.



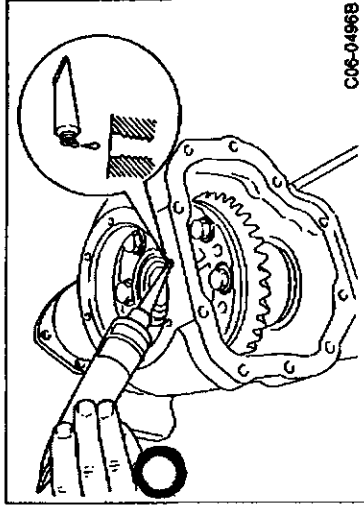
- Coat oil seal lip with Nissan MP special grease No. 2.
- Set drift (special service tool) in side retainer and install oil seal.

CAUTION:

After tightening bolt, wipe off extra liquid gasket inside case.



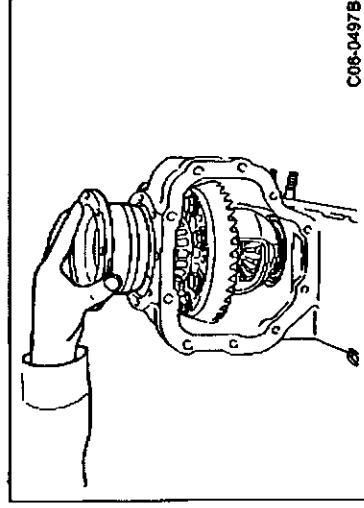
- Coat carrier case side retainer hole (through holes) with liquid gasket (silicon bond 1215 or equivalent).



- Install selected side bearing adjusting shim and O-rings in side retainer. Assemble and install them in carrier case.

CAUTION:

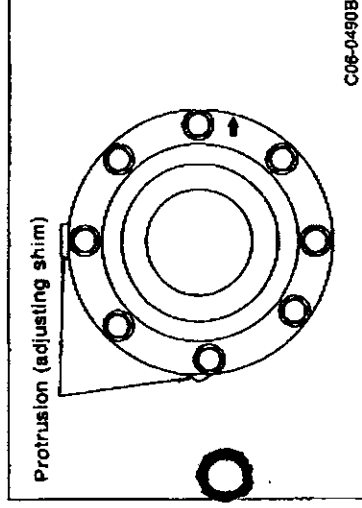
Coat O-ring with gear oil and assemble after adjusting shim in carrier case side.



- Position adjusting shim so that the two protrusions face upper and rear side of carrier case and then install shim.
- Position side retainer facing front of carrier case (direction of arrow in figure) and install.

Tightening torque:

16 - 19 N·m (1.6 - 1.9 kg-m, 12 - 14 ft-lb)

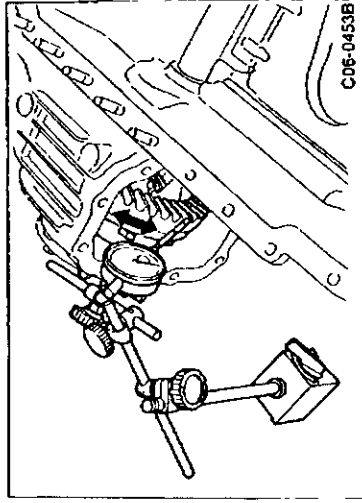


C5 FINAL DRIVE

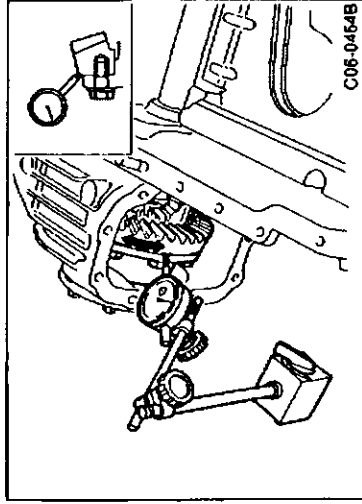
3. Final Drive Removal and Installation, Assembly and Disassembly (Cont'd)

[Point 11] Inspection after assembly

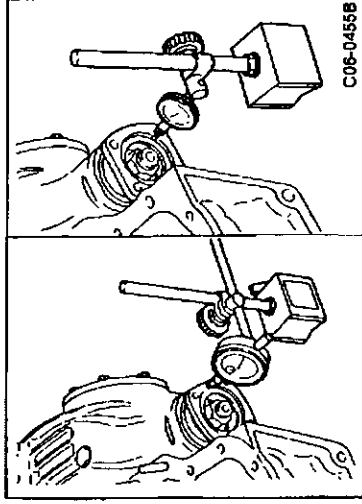
- Rotate drive pinion and drive gear a number of times. Set dial gauge on drive gear surface and measure backlash.
- **Backlash standard value:**
0.13 - 0.18 mm (0.0051 - 0.0071 in)
- If backlash is not within specification range, select suitable side bearing washer thickness (carrier case side) to adjust.



Excessive backlash:	Use thinner side bearing carrier case side washer.
Insufficient backlash:	Use thicker side bearing carrier case side washer.



- Inspect drive gear runout.
Runout standard value:
0.05 mm (0.0020 in) max.
- Set dial gauge on drive gear rear surface. Rotate drive gear and measure runout.
- If runout is not within specification limit, inspect drive gear contact pattern (foreign matter between drive gear and differential case, deformation, etc.).
- If drive gear is deformed, replace hypoid assembly. If differential case is deformed, replace case.



- Inspect companion flange runout.
Runout limit value:
0.05 mm (0.0020 in) max.
- Set dial gauge on companion flange surface (inside propeller shaft installation surface bolt hole) and measure runout.
- Set test indicator on inside of companion flange (inside lower surface) and measure runout.
- If runout exceeds specification limit, rotate relative positions of companion flange and drive pinion 90° and check if runout decreases.
- If runout still is not within specification range even if the relative position is changed, replace companion flange.
- If companion flange is replaced and runout is still not within specification range, the problem may be due to poor contact between pinion bearing and drive pinion or faulty pinion bearing.

C5 FINAL DRIVE

3. Final Drive Removal and Installation, Assembly and Disassembly (Cont'd)

- Rotate companion flange more than 20 times. Use preload gauge to measure total preload.

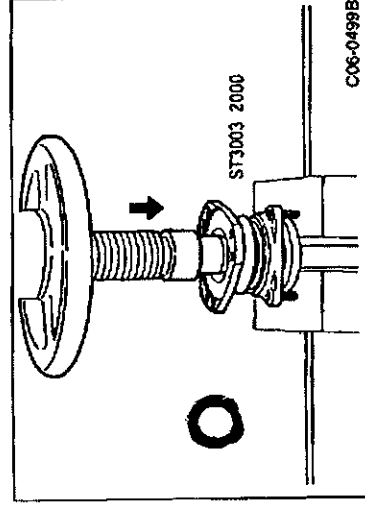
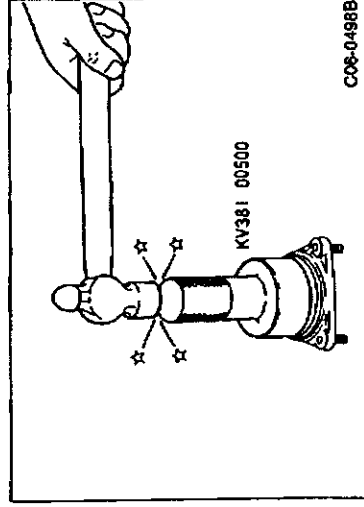
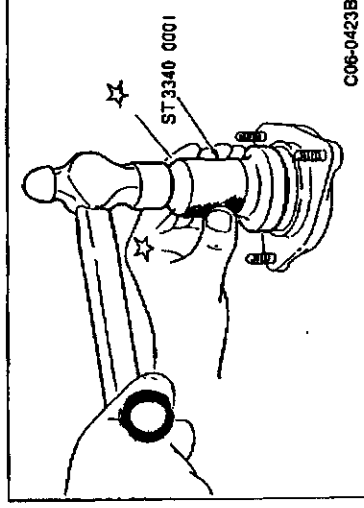
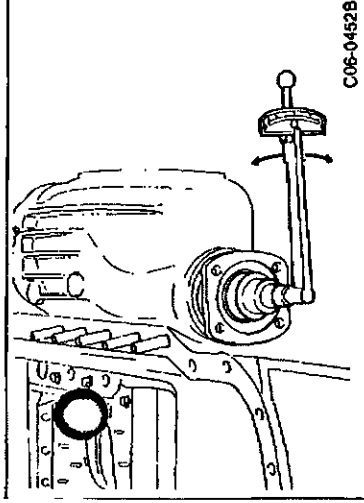
Total preload standard value

(with oil seal installed):

1.6 - 2.2 N·m (0.16 - 0.22 kg-m, 1.2 - 1.6 ft-lb)

- If the preload is not within specification range, adjust pinion bearing preload and side bearing preload.

Excessive preload:	• Use shorter drive pinion spacer and thinner washer. • Use thicker side bearing retainer shim.
Insufficient preload:	• Use longer drive pinion spacer and thicker washer. • Use thinner side bearing retainer shim.



[Point 12] Side shaft assembly Installation

- Use drift (special service tool) to install bearing in retainer.

CAUTION:

Do not install bearing on inclined angle.

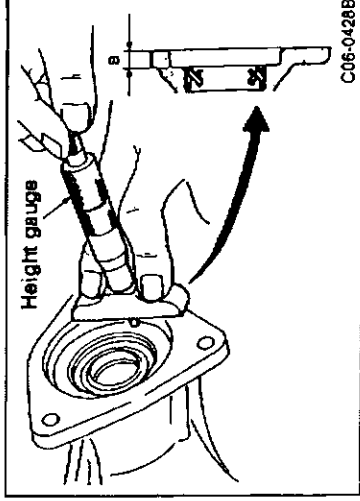
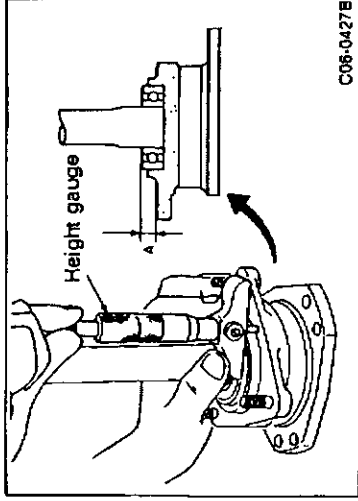
- Coat oil seal lip with Nissan MP special grease No. 2.
- Use drift (special service tool) and install oil seal in retainer.

- Use drift (special service tool) and install side shaft in retainer.

C5 FINAL DRIVE

3. Final Drive Removal and Installation, Assembly and Disassembly (Cont'd)

- Measure dimension A in side shaft to calculate side shaft end play.



- Measure dimension B in carrier case.

- Select adjusting shim so axial end play is within specification range indicated below.

Axial end play standard value (A - B):
0 - 0.1 mm (0 - 0.004 in)

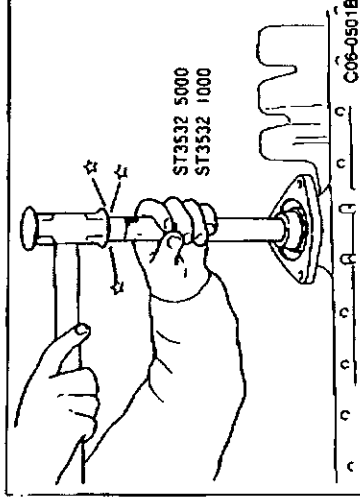
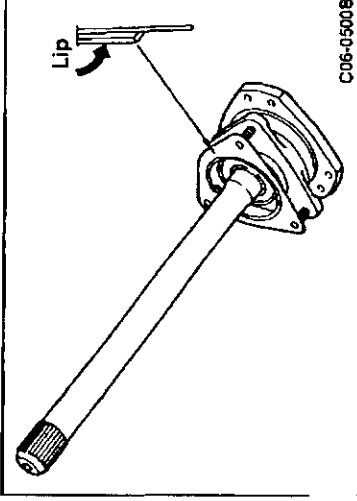
Side retainer adjusting shim

Thickness mm (in)	Part number	Thickness mm (in)	Part number
0.1 (0.004)	38233 03V01	0.4 (0.016)	38233 03V04
0.2 (0.008)	38233 03V02	0.5 (0.020)	38233 03V05
0.3 (0.012)	38233 03V03		

- Assemble selected adjusting shim and spacer in side shaft.

CAUTION:

Assemble adjusting shim in retainer and spacer in carrier case with lip (projection) facing carrier case side before installation.

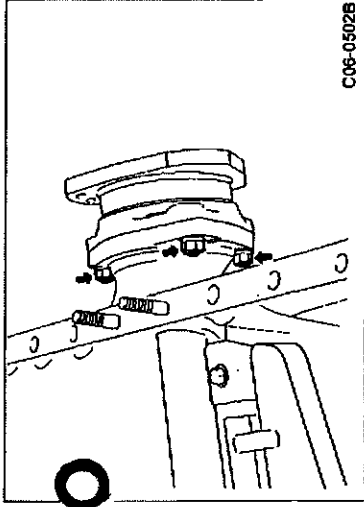


- Coat oil seal lip with Nissan MP special grease No. 2.
- Use drift (special service tool) and install oil seal in carrier case.

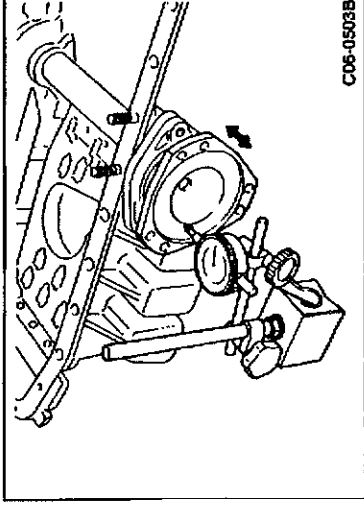
C5 FINAL DRIVE

3. Final Drive Removal and Installation, Assembly and Disassembly (Cont'd)

- Install side shaft assembly in carrier case.
Tightening torque:
16 - 21 N·m (1.6 - 2.1 kg-m, 12 - 15 ft-lb)



- Measure axial end play.
Axial end play standard value:
0 - 0.1 mm (0 - 0.004 in)

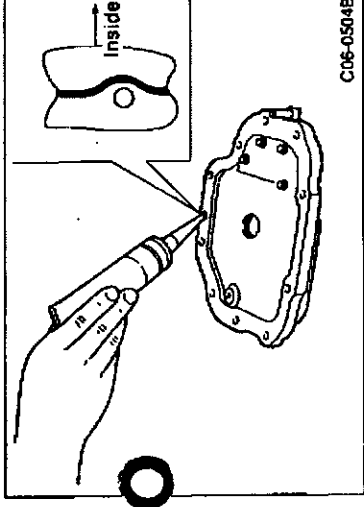


[Point 13] Carrier cover installation

- Apply a thin coat of liquid gasket (silicone bond 1215 or equivalent) to installation surface bolt holes of carrier cover and carrier case.

CAUTION:

Remove all traces of old liquid gasket from mating surfaces with a scraper. Wipe off any other oil, dust or foreign matter from mating surfaces.



- Install carrier cover in carrier case.

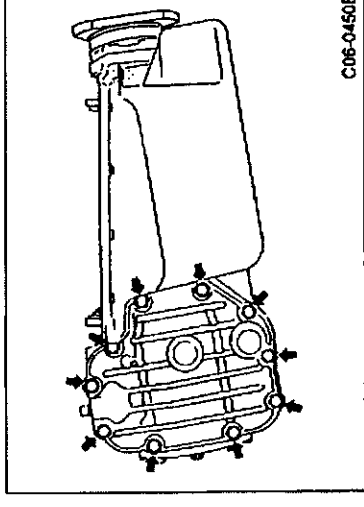
Tightening torque:

- 29 - 37 N·m (3.0 - 3.8 kg-m, 22 - 27 ft-lb)
- Apply a thin coat of liquid gasket (silicon bond 1215 or equivalent) to drain plug and filler plug and install in carrier case cover.

Drain plug tightening torque	25 - 34 N·m (2.5 - 3.5 kg-m, 18 - 25 ft-lb)
Filler plug tightening torque	

Note:

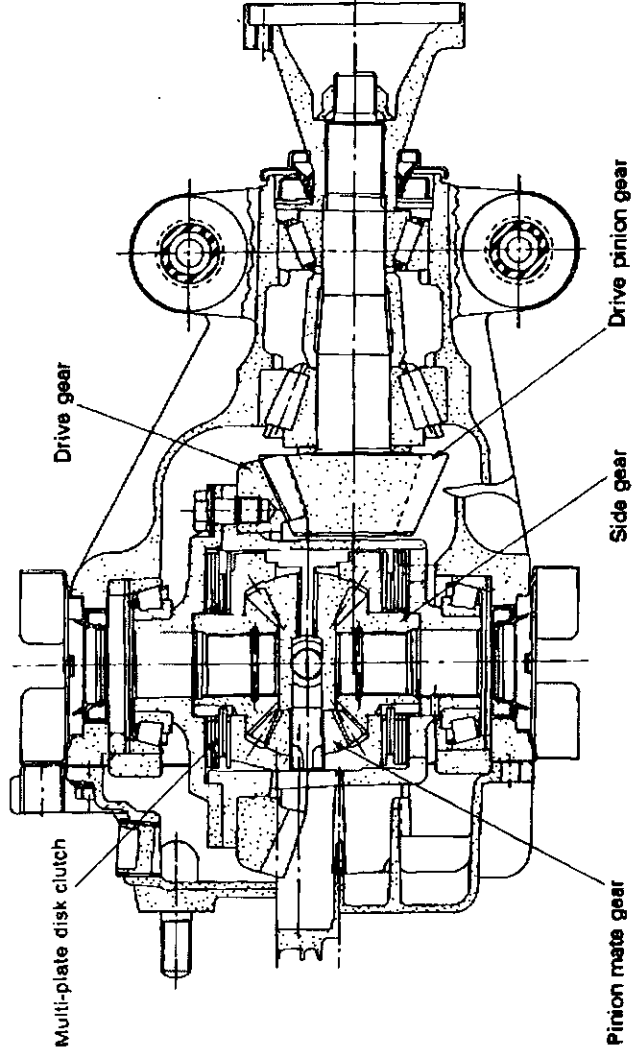
Final drive must be filled with gear oil after installation in vehicle. Refer to the 1-1. SPECIFICATION for the oil volume.



C5 FINAL DRIVE

3. Final Drive Removal and Installation, Assembly and Disassembly (Cont'd)

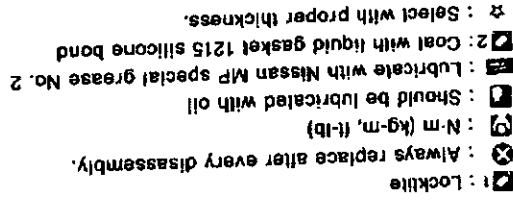
(2) Rear final drive [R200 (mechanical LSD)]



Model R200 (with LSD)

C06-0400A

3. Final Drive Removal and Installation, Assembly and Disassembly (Cont'd)



C5 FINAL DRIVE

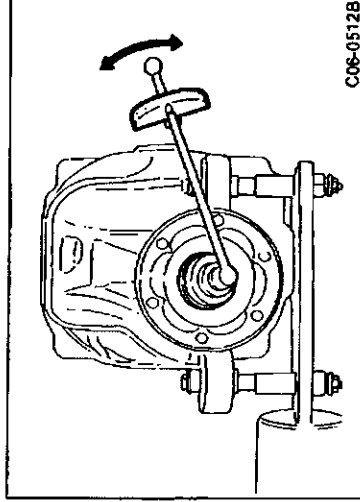
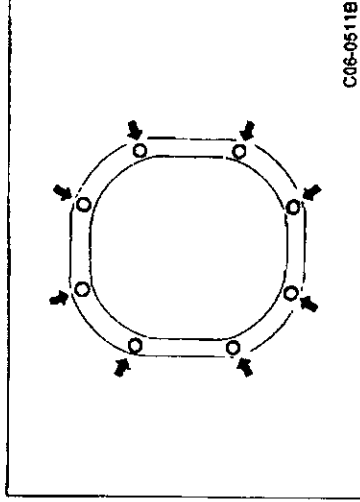
3. Final Drive Removal and Installation, Assembly and Disassembly (Cont'd)

[Point 1] Inspection before disassembly

- Secure attachment on unit assembly.
- Drain oil from gears.
- Remove gear case cover.

CAUTION:

If carrier case is faulty, replace unit assembly.

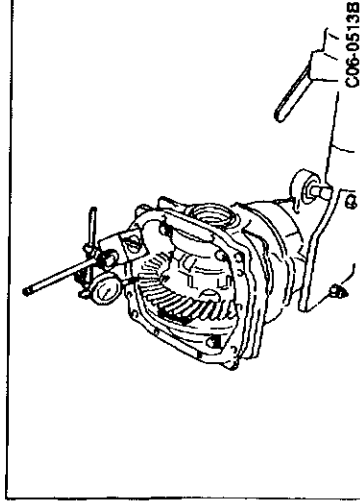


a) Total preload inspection

- Rotate companion flange more than 20 times. Measure total preload with preload gauge.
Total preload standard value: (With oil seal)
1.4 - 3.1 N·m (0.14 - 0.32 kg-m, 1.0 - 2.3 ft-lb)
- If preload is not within specification range, adjust pinion bearing preload and side bearing preload.

Collapsible spacer

Excessive preload:	• Use longer drive pinion spacer and thicker washer. • Use thinner side bearing washer.
Insufficient preload:	• Use shorter drive pinion spacer and thinner washer. • Use thicker side bearing washer.



b) Hypoid gear and backlash inspection

- Set dial gauge on drive gear face and measure backlash.
Backlash standard value:
0.13 - 0.18 mm (0.0051 - 0.0071 in)
- If the backlash is not within specification range, adjust side washer thickness by moving equally in both directions.

Excessive backlash:	- Use thicker drive gear rear washer. - Use thinner drive gear tooth surface side washer.
Insufficient backlash:	- Use thinner thickness drive gear rear side washer. - Use thicker drive gear tooth surface side washer.

C5 FINAL DRIVE

3. Final Drive Removal and Installation, Assembly and Disassembly (Cont'd)

Ⓒ Drive gear rear surface runout inspection

- Place dial gauge on rear surface of drive gear. Turn drive gear and measure runout.

Runout limit:

0.05 mm (0.0020 in) max.

- If runout exceeds limit, check drive gear assembly condition (foreign matter jammed between drive gear and differential case, deformation of differential case or drive gear, etc.).
- If drive gear is faulty, replace hypoid gear assembly. If differential case is faulty, replace case.

Ⓓ Companion flange runout inspection

- Place dial gauge on companion flange (propeller shaft installation surface) and measure runout.

Runout limit:

0.05 mm (0.0020 in) max.

- Set test indicator inside companion flange (inner lower surface) and measure runout.

Runout limit:

0.05 mm (0.0020 in) max.

CAUTION:

If measurement surface is rusted, remove rust before measurement.

- If runout exceeds specification limit, rotate relative positions of companion flange and drive pinion 90° and find minimum value.
- If runout still is not within specification range even if the relative position is changed, replace companion flange.
- If companion flange is replaced and runout is still not within specification range, the problem may be due to poor contact between pinion bearing and drive pinion or faulty pinion bearing.

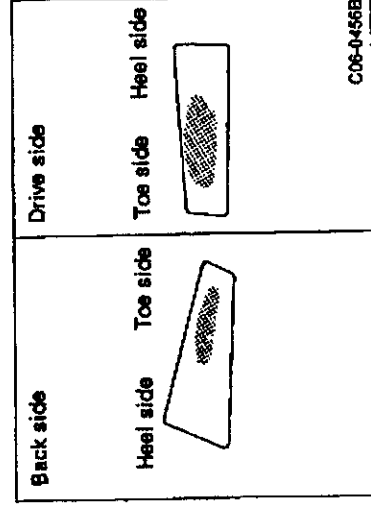
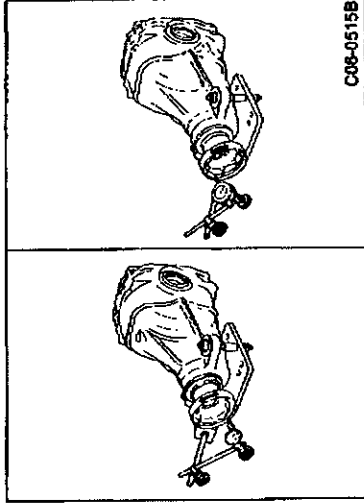
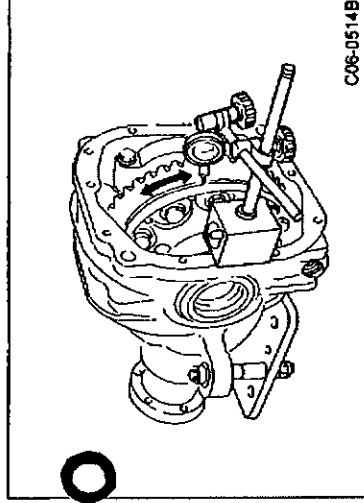
Ⓔ Hypoid gear tooth contact inspection

- Clean drive gear and hypoid gear teeth. Apply a light mixture of powdered titanium oxide and oil (or equivalent compound) to 4 locations on drive gear. Rotate hypoid gear and check gear tooth contact pattern.
- Check gear tooth contact pattern on drive side (acceleration) and back side (deceleration) of gears.

CAUTION:

Refer to Ⓐ Hypoid drive gear tooth contact pattern for details on using powdered titanium mixture.

- If gear tooth contact pattern is incorrect, select suitable washer to adjust gear height.



C5 FINAL DRIVE

3. Final Drive Removal and Installation, Assembly and Disassembly (Cont'd)

[Point 2] Drive gear and differential case assembly removal

- Check for painted mark used to align side bearing cap and carrier case. If there is no mark, paint mark in correct location.

CAUTION:

The bearing cap and carrier case are assembled as a single unit. Be especially careful not to assemble incorrectly. Paint mating marks and do not scratch surfaces.

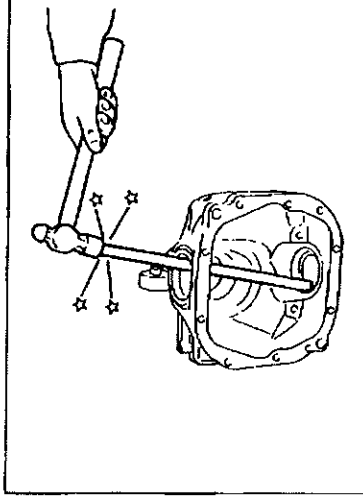
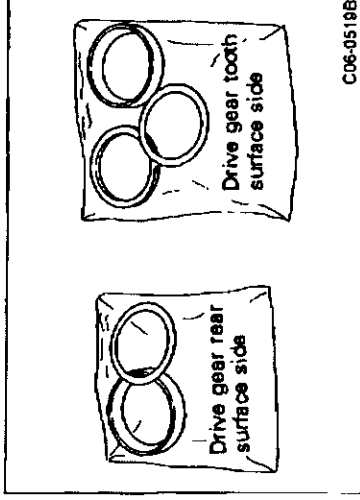
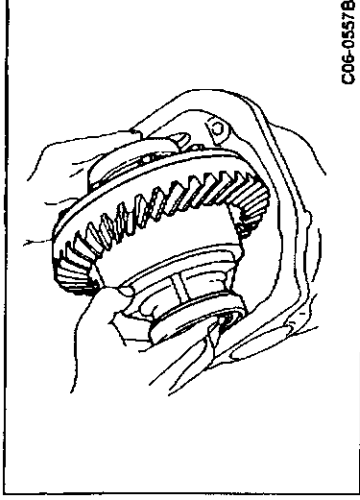
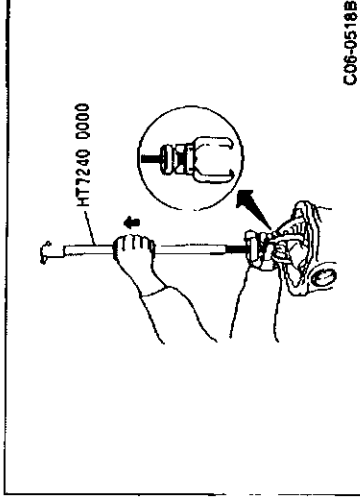
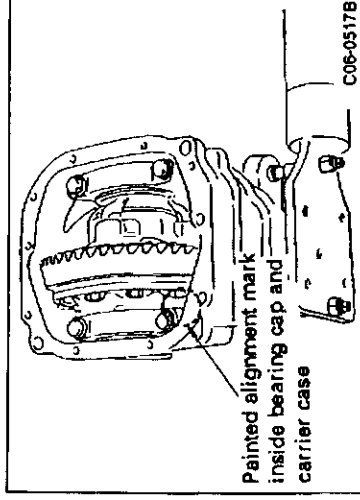
- Remove bearing cap bolts. Tap bearing caps lightly with plastic hammer and remove.
- Using slide hammer (commercial service tool) separate differential case assembly and carrier case.

- Remove differential case assembly together with side bearing outer race.

- Separate side bearing outer race, adjusting washers and bearing spacers by front surface and gear tooth surface when they are stored.
- The bearing spacer installation position varies by hypoid gear and gear ratio.

Gear ratio	Installation position
3.916 min.	Drive gear rear side

- Use brass shaft to remove oil seal from carrier case.

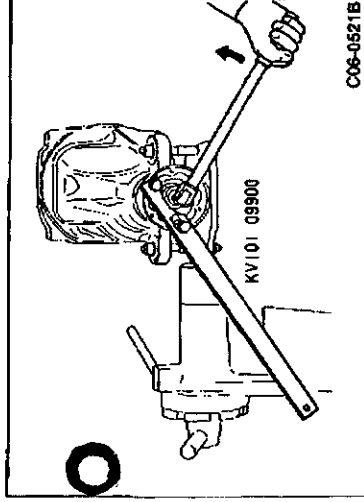


C5 FINAL DRIVE

3. Final Drive Removal and Installation, Assembly and Disassembly (Cont'd)

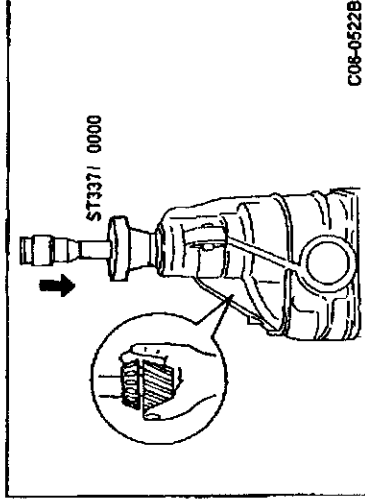
[Point 3] Drive pinion assembly removal

- Using cam sprocket wrench (special service tool), remove pinion lock nut.

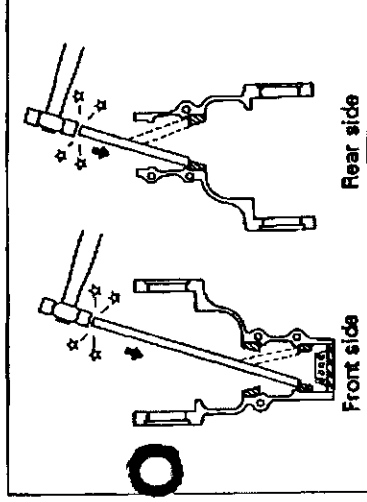


- Use drift (special service tool) to remove drive pinion assembly.

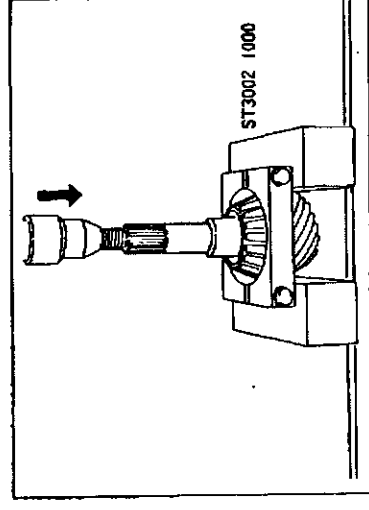
CAUTION:
Do not allow drive pinion to fall.



- Use brass shaft and tap evenly to remove outer bearing race.
- Remove bearing and oil seal together from front side.



- Using bearing replacer (special service tool), remove rear pinion bearing from drive pinion.



C5 FINAL DRIVE

3. Final Drive Removal and Installation, Assembly and Disassembly (Cont'd)

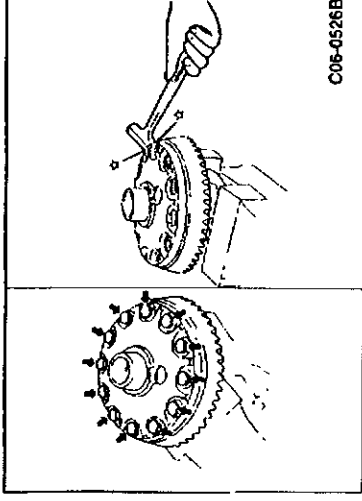
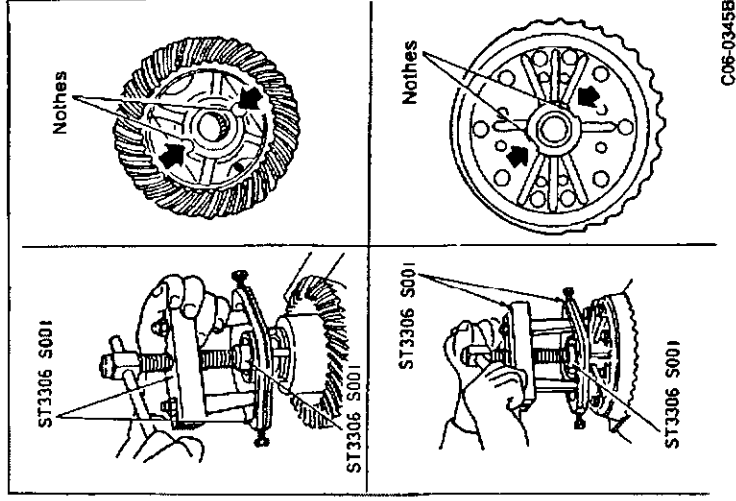
[Point 4] Differential case disassembly

③ Side bearing removal

- Secure differential case assembly in vice. Using side puller set (special service tool), remove side bearing from differential case.

CAUTION:

- (1) Place copper plates on sides of bearing and drive to prevent scratches when securing case assembly in vise.
- (2) Do not remove any other parts except when replacing side bearings.



④ Drive gear removal

- Remove bolts from drive gear.
- Tap side of drive gear with plastic hammer to remove drive gear.

⑤ Part inspection

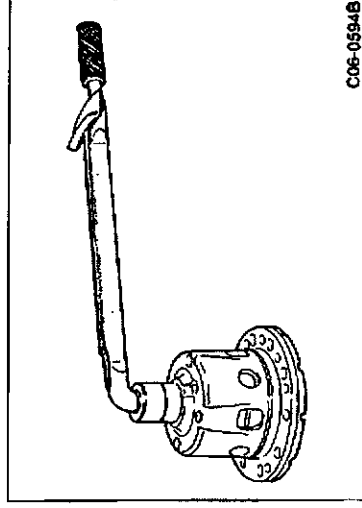
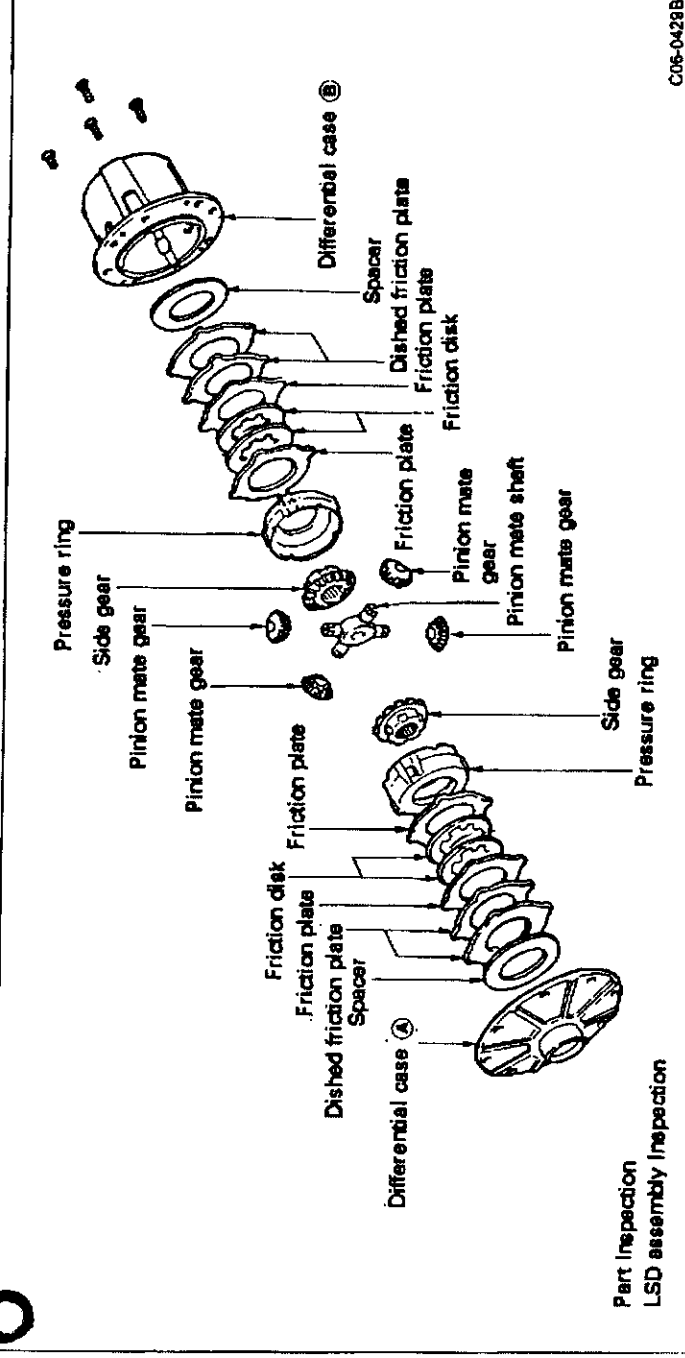
- Clean disassembled parts thoroughly and inspect for wear, damage and other abnormalities. Perform the following operations for non-standard conditions.

Item	Operation
Hypoid gear	• If gear tooth contact is incorrect, determine cause and adjust so contact is correct. • If gear tooth surface is worn, cracked or seized, replace gear set.
Bearing	• Rotate by hand to check for seizing, separation, wear and rust. Replace bearings as a matched set of inner or outer races if there is abnormal noise or other damage.
Oil seal	• Always replace after every disassembly. • Replace if lip is worn, sealing power is reduced or there is other damage.
Companion flange	• Replace if oil seal lip contact surface is worn [approx. 0.1 mm (0.004 in)] or damaged.

C5 FINAL DRIVE

3. Final Drive Removal and Installation, Assembly and Disassembly (Cont'd)

[Point 5] LSD (Limited Slip Differential) assembly and disassembly

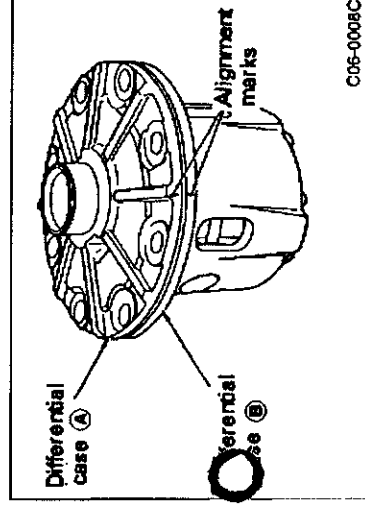


③ Inspection before disassembly

- Using Side Flange Dummy (special service tool), measure sliding torque.

Sliding torque	25 - 34 N·m (2.5 - 3.5 kg-m, 18 - 25 ft-lb)
----------------	---

- If sliding torque is outside specifications, disassemble and check parts.



① Differential case removal and installation

Removal

- Loosen screws in diagonal sequence and remove.

Installation

- Align marks on differential case (A) and (B) as shown in figure.
- Tighten bolts diagonally in several stages.

C5 FINAL DRIVE

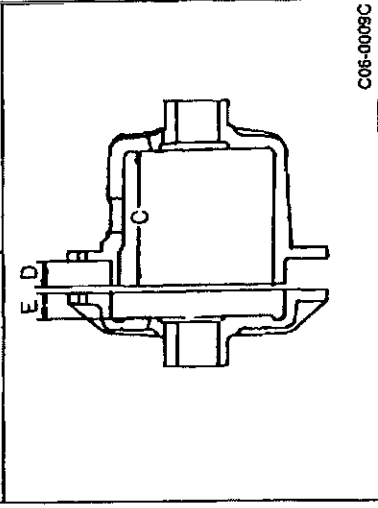
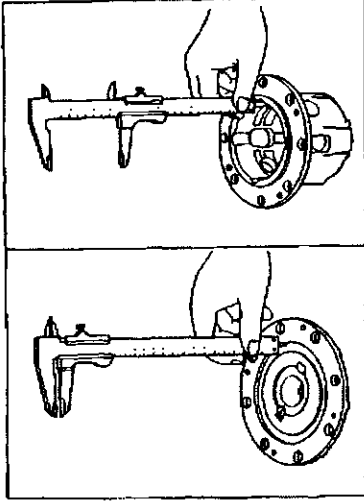
3. Final Drive Removal and Installation, Assembly and Disassembly (Cont'd)

© Friction disk selection

- Before assembling differential case, select friction disk to adjust axial direction clearance of mechanical parts in case.
- Use the following method to select parts.
- Measure differential case depth as shown in figure. Use the following equation to calculate dimension "A".

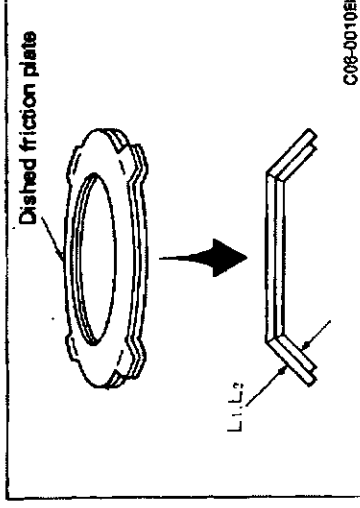
$$A = C + E - D$$

A: Differential case depth



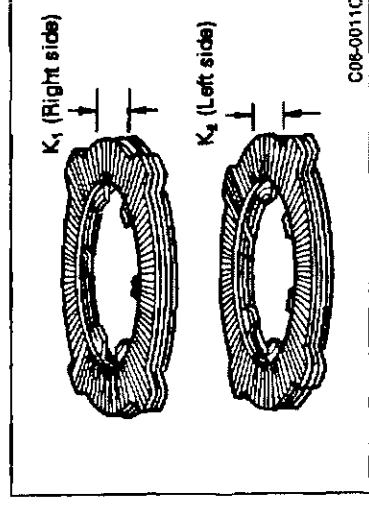
- Measure the total layered thickness of the two dished friction plates as shown in figure on left.

Right side: L_1
 Left side: L_2



- Measure the total layered thickness of the two friction plates and one spacer as shown in figure on left.

Right side: K_1
 Left side: K_2



- Compare the left and right total thickness of the dished friction plates, friction plate, friction disk and spacer. Change assembly alignment if difference of left and right thicknesses is not within specification.

Difference of left and right: $B = (L_1 + K_1) - (L_2 + K_2)$
Left-right difference limit:
 0.05 mm (0.0020 in)

C5 FINAL DRIVE

3. Final Drive Removal and Installation, Assembly and Disassembly (Cont'd)

- Assemble pinion mate shaft, pressure ring, friction disk, friction plate and spacer. Measure total width of assembled parts.
Assembly dimension: F

CAUTION:

Do not include the thickness of dished friction plates in these measurements.

- Use the following equation to determine axial clearance from the dimension of differential case depth and friction plate assembly.

$$\text{Axial clearance: } S = A - (F + L_1 + L_2)$$

Axial clearance specification:

$$0.05 - 0.20 \text{ mm (0.0020 - 0.0079 in)}$$

- Select suitable friction disk to adjust axial clearance within specification.

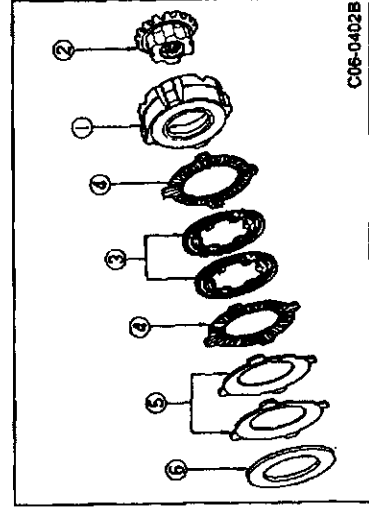
Friction plate types

Thickness mm (in)	Part number
1.75 (0.0689)	38432 N9000
1.85 (0.0728)	38432 N9001

- Check the left-right difference of the friction plate types. Change the assembly alignment if the difference of left and right thicknesses is not within specification.

CAUTION:

Be careful not to mix the left and right sides of the friction plates after selection.



① Plate assembly

- Be careful not to mistake the assembly direction and sequence of any plate.

- ① Pressure ring
- ② Side gear
- ③ Friction disk
- ④ Friction plate
- ⑤ Dish friction plate
- ⑥ Spacer

CAUTION:

Coat each part with recommended Nissan gear oil hypoid GL-5 80W-90LS.

C5 FINAL DRIVE

3. Final Drive Removal and Installation, Assembly and Disassembly (Cont'd)

Ⓔ Part inspection

- Clean disassembled parts with proper solvent, dry with compressed air and check as follows.

Dished friction plate

- Make sure there is no seizing or discoloration on friction surface (left figure ①). Replace if necessary because damage may cause abnormal lock performance.
- Make sure there are no bumps or damage on outer protrusion (left figure ②). Correct with oil stone or replace if necessary.
- Check friction distance with micrometer. Replace plate if wear exceeds limit.

Friction distance = outer protrusion ② thickness – outer friction surface ① thickness

CAUTION:

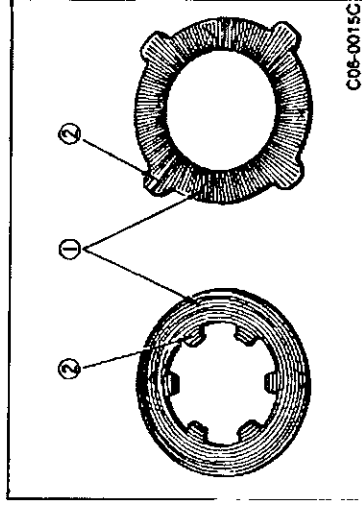
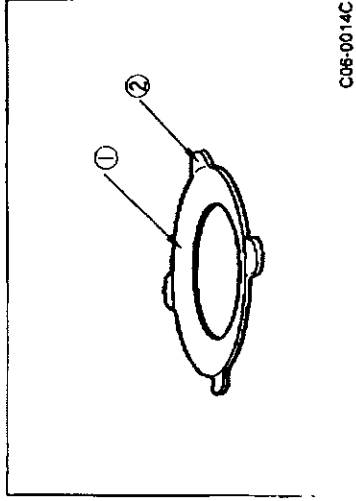
Measure at four opposite angles.

Wear limit:

0.1 mm (0.004 in)

CAUTION:

The inside section of friction sliding surface does not wear abnormally due to strong contact force applied to spring force of the dished friction plate.



Friction plate and friction disk

- Check for seizing or discoloration on friction surface (left figure ①) and replace if necessary.
 - Make sure there are no bumps or damage on outer protrusion (left figure ②). Correct with oil stone or replace if necessary.
 - Check friction distance with micrometer. Replace plate if wear exceeds limit.
- Inspection items are the same as for dished friction plate.

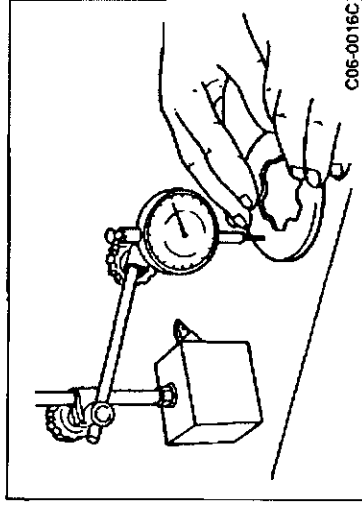
Wear limit:

0.1 mm (0.004 in)

- Use dial gauge and check for distortion.

Distortion limit:

Total runout 0.08 mm (0.0031 in)

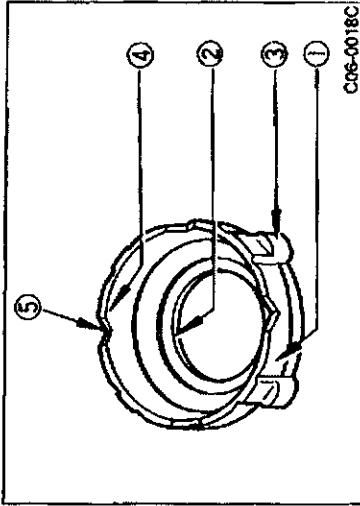
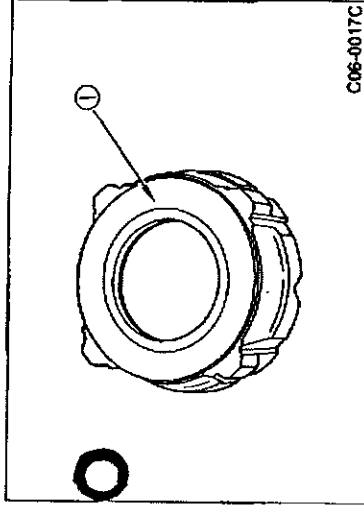


C5 FINAL DRIVE

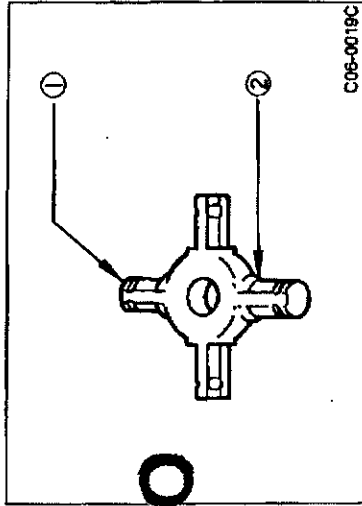
3. Final Drive Removal and Installation, Assembly and Disassembly (Cont'd)

Pressure ring

- Check the contact surface of the friction disk (left figure ①) for dents, damage, or heat discoloration color. Replace if heat discoloration is evident. Use an oil stone to correct small dents or damage. Replace if correction is not possible.

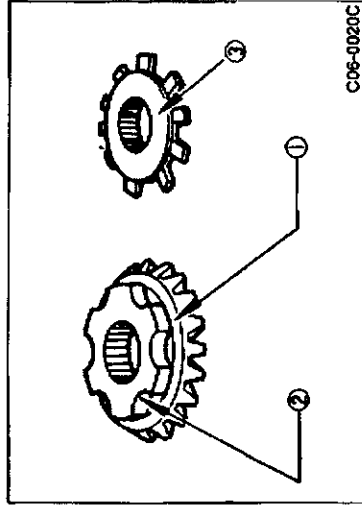


- Check for wear or damage to contact sliding part of the mechanism (described below).
 - ① Differential case connection part
 - ② Side gear contact part
 - ③ Outer protrusion
 - ④ Pinion mate gear contact part
 - ⑤ V-shaped groove



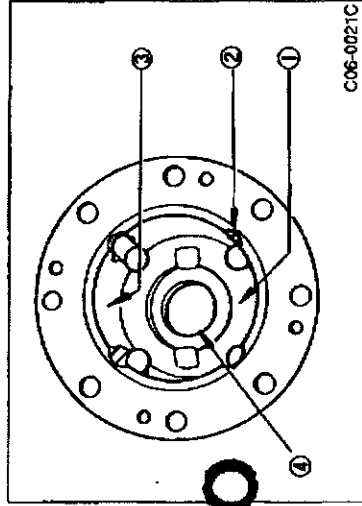
Pinion mate shaft

- Check cams (left figure ①) for wear or damage. Check shaft (left figure ②) for abnormal wear or heat discoloration and replace if necessary.



Side gear and pinion mate gear

- Inspect following parts and correct light damage with oil stone. Replace if there is abnormal wear or heat discoloration.
 - ① Pressure ring sliding contact surface (left figure ①) for abnormal wear or heat discoloration.
 - ② Groove part (left figure ②) for damage or abnormal wear.
 - ③ Rear side (left figure ③) for abnormal wear.



Differential case

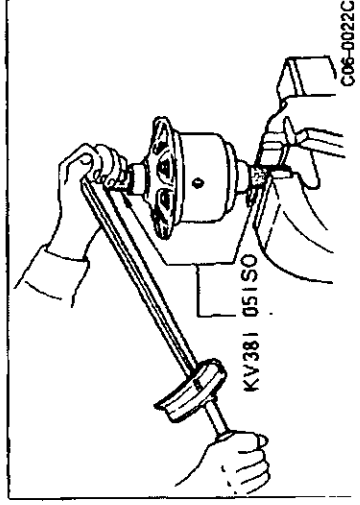
- Inspect parts described below for damage, abnormal wear and heat discoloration. Replace as necessary.
 - ① Spacer contact surface (left figure ①) for abnormal wear or heat discoloration.
 - ② Groove part (left figure ②) for damage or abnormal wear.
 - ③ Pressure ring contact surface (left figure ③) for damage, abnormal wear or heat discoloration.

C5 FINAL DRIVE

3. Final Drive Removal and Installation, Assembly and Disassembly (Cont'd)

Spacer

- Check pressure ring and differential case contact surfaces for damage, heat discoloration or abnormal wear.



① LSD assembly inspection

- After LSD assembly is assembled, check rotary motion torque and make sure transmitted torque is correct.
- Using dummy rear acceleration shaft (special service tool) and measure rotational torque with torque wrench.

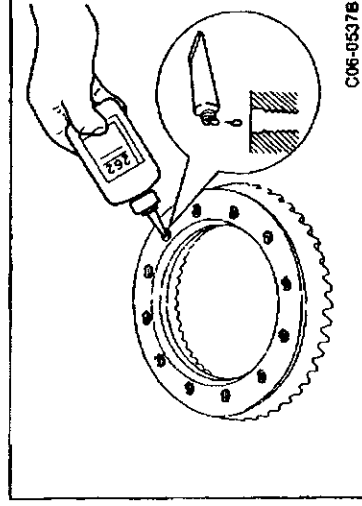
Rotational torque standard value:

25 - 34 N·m (2.5 - 3.5 kg-m, 18 - 25 ft-lb)

Note:

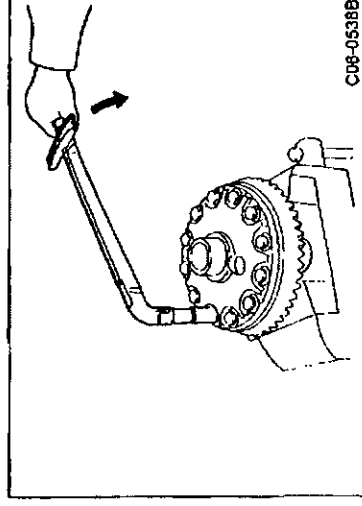
After measurement rotation is smooth, lubricate each sliding part with recommended Nissan gear oil hypoid GL-5 80W-90LS to ensure proper smoothness. Measure rotational torque again at initial rotation after lubrication.

- If rotational torque is not within specification range, inspect friction plate and friction disk and assemble again.



[Point 6] Differential case assembly

- Apply 1 - 2 drops of Locktite to drive gear threads.



- Assemble drive gear and differential case.
- Coat gear oil to bolt seat and tighten bolts in criss-cross sequence.

Tightening torque:

177 - 196 N·m (18.0 - 20.0 kg-m, 130 - 145 ft-lb)

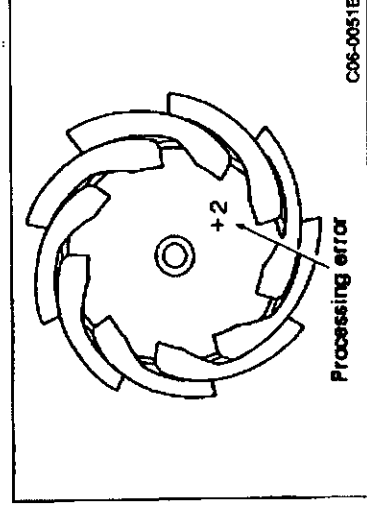
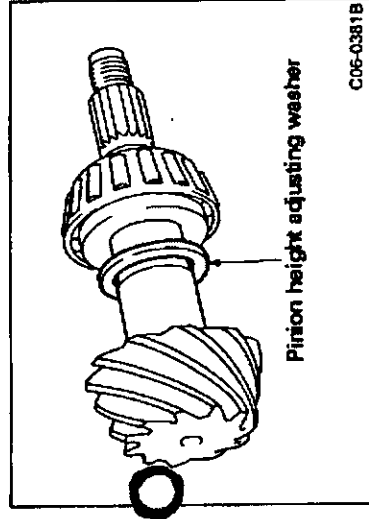
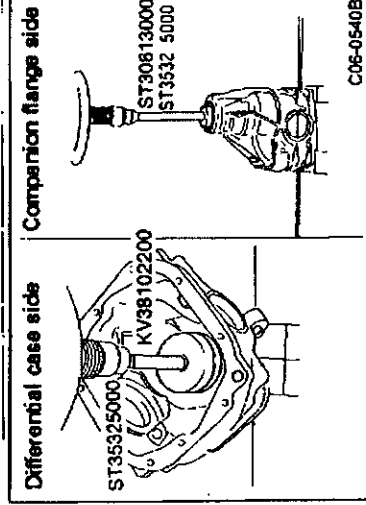
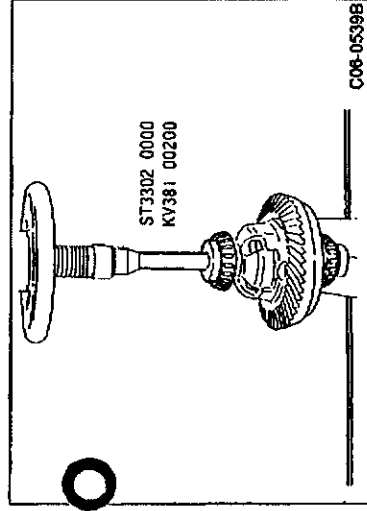
C5 FINAL DRIVE

3. Final Drive Removal and Installation, Assembly and Disassembly (Cont'd)

- Use drift (special service tool) and press-fit side bearing in differential case.

CAUTION:

Tap bearing lightly with hammer to start press-fit operation. Make sure bearing is perpendicular to differential case and press-fit bearing.



Thickness mm (in)	Part number	Thickness mm (in)	Part number
3.09 (0.1217)	38154 P6017	3.38 (0.1335)	38154 P6027
3.12 (0.1228)	38154 P6018	3.42 (0.1348)	38154 P6028
3.15 (0.1240)	38154 P6019	3.45 (0.1358)	38154 P6029
3.18 (0.1252)	38154 P6020	3.48 (0.1370)	38154 P6030
3.21 (0.1264)	38154 P6021	3.51 (0.1382)	38154 P6031
3.24 (0.1276)	38154 P6022	3.54 (0.1394)	38154 P6032
3.27 (0.1287)	38154 P6023	3.57 (0.1406)	38154 P6033
3.30 (0.1299)	38154 P6024	3.60 (0.1417)	38154 P6034
3.33 (0.1311)	38154 P6025	3.63 (0.1429)	38154 P6035
3.36 (0.1323)	38154 P6026	3.66 (0.1441)	38154 P6036

[Point 7] Hypoid gear tooth contact inspection and backlash inspection

⑧ Pinion bearing outer race installation

- Using drift (special service tool), install pinion bearing outer race in carrier case.

CAUTION:

Tap outer race lightly with hammer to start press-fit operation. Making sure outer race is perpendicular to carrier case and press-fit bearing.

⑨ Pinion height adjusting washer installation (temporary assembly)

- Assemble height washer in drive pinion.

CAUTION:

Assemble height washer that was removed. When using new part, make sure it is the same thickness as when it was disassembled.

⑩ Gear set replacement washer selection

- When hypoid gear set is replaced, perform processing error correction using measurement of old and new drive pinions and select suitable washer.

- Processing error correction

$$T = T_0 + (t_1 - t_2)$$

T = Washer thickness that must be assembled

T_0 = Thickness of removed washer

t_1 : Head number of old drive pinion

[The processing error is indicated in units of $100 \times 1/100$ mm.]

t_2 : Head number of new drive pinion

[The processing error is indicated in units of $100 \times 1/100$ mm.]

Calculation example:

If: $T_0 = 3.21$, $t_1 = +2$ and $t_2 = -1$

$T = 3.21 + [(2 \times 0.01) - (-1 \times 0.01)] = 3.24$ mm

- Assemble temporary adjusting washer (3.24 mm) in drive pinion.

C5 FINAL DRIVE

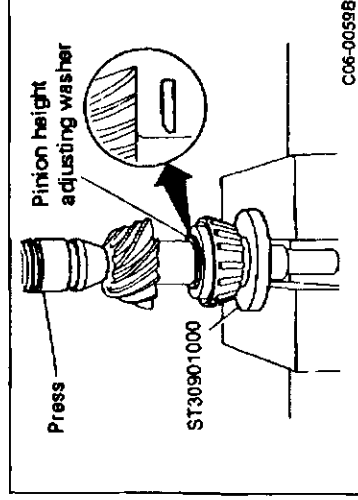
3. Final Drive Removal and Installation, Assembly and Disassembly (Cont'd)

d Pinion bearing installation

- Using drift (special service tool), install pinion bearing.

CAUTION:

Make sure not to change washer direction.

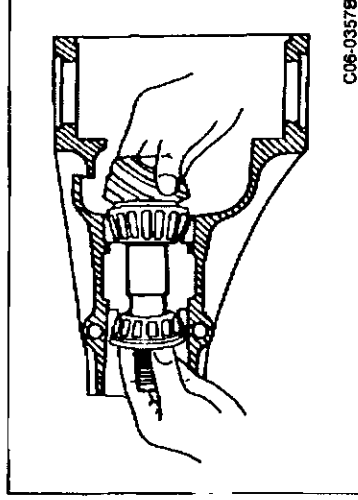


e Drive pinion and pinion bearing installation

- Coat bearing with gear oil.
- Assemble drive pinion and pinion bearing (front side) in carrier case.

CAUTION:

Do not assemble solid spacer and pinion bearing adjusting washer.



- Install companion flange.

CAUTION:

Do not install oil seal.

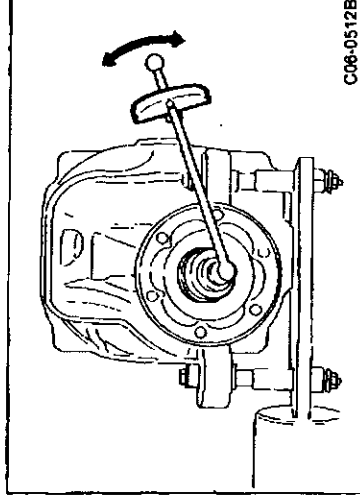
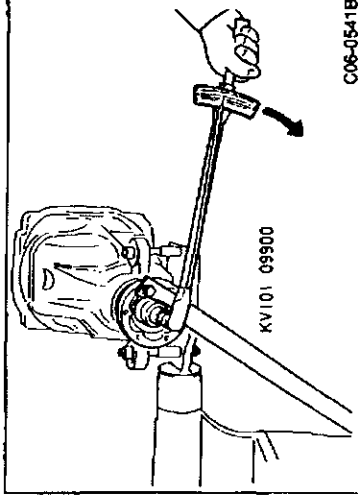
- Coat drive pinion threads and pinion nut seat with oil. Temporarily install pinion nut.
- Tighten pinion nut to standard preload.

Pinion bearing preload standard value:

1.0 - 1.6 N·m (0.10 - 0.16 kg-m, 0.7 - 1.2 ft-lb)

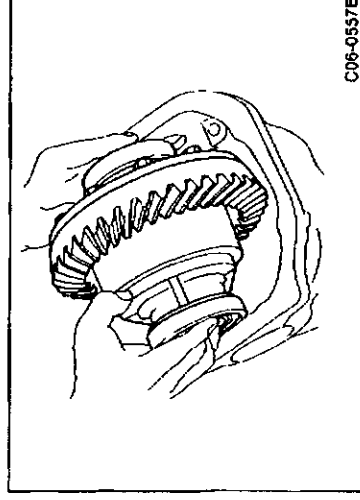
CAUTION:

Tighten pinion nut in 50 - 100 increments during measurement because it does not enter spacer. Do not tighten nut with excessive force.



f Differential case installation

- Coat bearing with gear oil.
- Assemble differential case assembly and side bearing outer race together in carrier case.



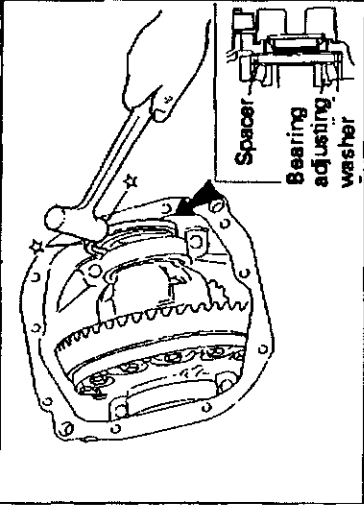
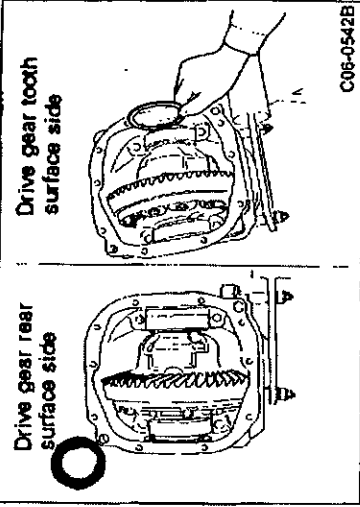
C5 FINAL DRIVE

3. Final Drive Removal and Installation, Assembly and Disassembly (Cont'd)

- Install drive gear rear surface side and tooth side washer.

CAUTION:

If washer that was removed is assembled again it must be the same thickness as it was before unit was disassembled. Do not confuse the rear side and gear side of washer.



- Install bearing between bearing outer race and adjusting washer.

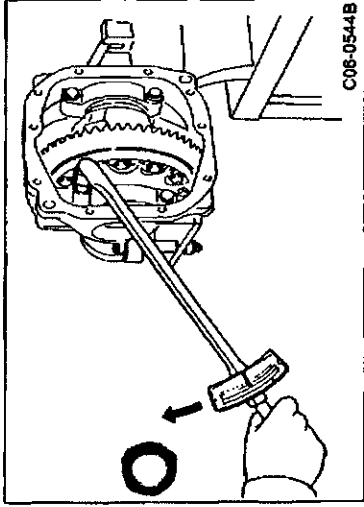
CAUTION:

Use plastic hammer to tap rounded spacer surfaces lightly during assembly.

Spacer

Thickness mm (in)	Part number
8.1 (0.319)	38454 40P00

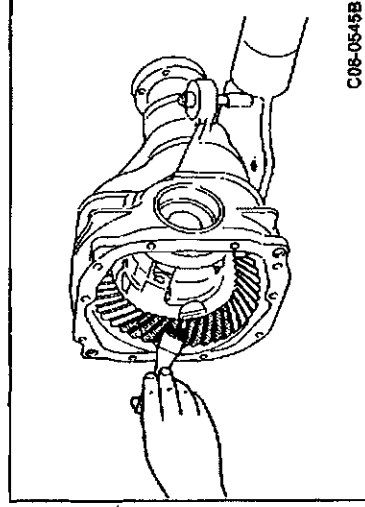
Spacer installation position: Drive gear rear side



- Align mating marks, assemble bearing cap and tighten bolts.

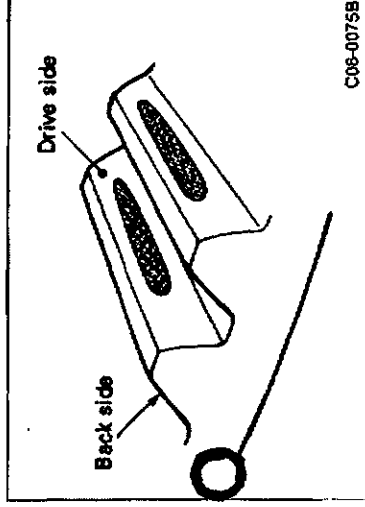
Tightening torque:

88 - 98 N·m (9 - 10 kg-m, 65 - 72 ft-lb)



g Gear tooth contact inspection

- Clean drive gear teeth. Apply a light mixture of powdered titanium oxide and oil or equivalent to both sides of drive gear. Rotate drive pinion gear and drive pinion and check gear tooth contact pattern.



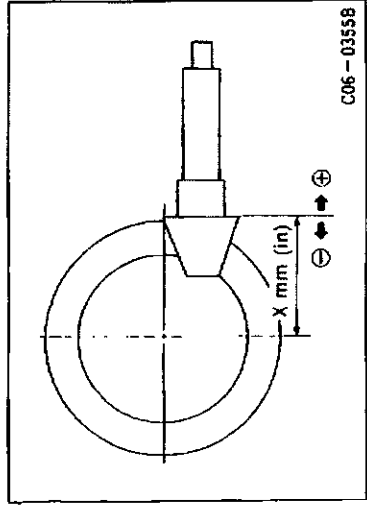
- Check gear tooth contact pattern in four locations on both surfaces of drive side (acceleration) and back side (deceleration) gears.

C5 FINAL DRIVE

3. Final Drive Removal and Installation, Assembly and Disassembly (Cont'd)

Gear tooth contact pattern chart

Contact pattern				Pinion height adjusting washer selection value mm (in)	Adjustment	Resulting problem
Drive side		Back side				
Heel side	Toe side	Toe side	Heel side	+0.09 (+0.0035)	Necessary	Cause noise and scoring sound at all speeds.
Heel side	Toe side	Toe side	Heel side	+0.06 (+0.0024)	↑	Causes noise during acceleration.
Heel side	Toe side	Toe side	Heel side	+0.03 (+0.0012)	Unnecessary	
Heel side	Toe side	Toe side	Heel side	0 (0)	↑	
Heel side	Toe side	Toe side	Heel side	-0.03 (-0.0012)	↑	Causes noise at fixed speeds and during deceleration.
Heel side	Toe side	Toe side	Heel side	-0.06 (-0.0024)	Necessary	Causes noise and scoring sound at all speeds.
Heel side	Toe side	Toe side	Heel side	-0.09 (-0.0035)	↑	

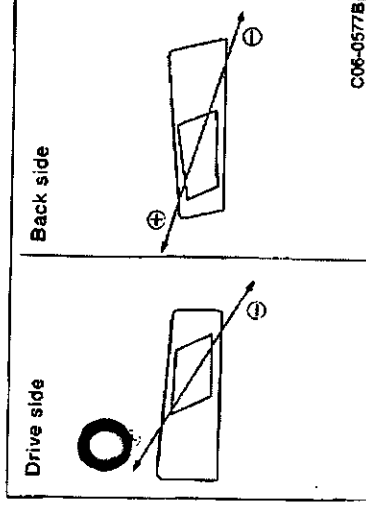


- If gear tooth contact pattern is incorrect, select pinion height adjusting washer of suitable thickness to adjust pinion height [X mm (in) figure.]

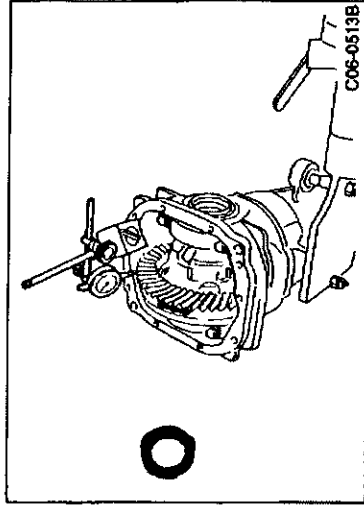
C5 FINAL DRIVE

3. Final Drive Removal and Installation, Assembly and Disassembly (Cont'd)

Pinion height adjusting washer



Thickness mm (in)	Part number	Thickness mm (in)	Part number
3.09 (0.1217)	38154 P6017	3.39 (0.1335)	38154 P6027
3.12 (0.1228)	38154 P6018	3.42 (0.1346)	38154 P6028
3.15 (0.1240)	38154 P6019	3.45 (0.1358)	38154 P6029
3.18 (0.1252)	38154 P6020	3.48 (0.1370)	38154 P6030
3.21 (0.1264)	38154 P6021	3.51 (0.1382)	38154 P6031
3.24 (0.1276)	38154 P6022	3.54 (0.1394)	38154 P6032
3.27 (0.1287)	38154 P6023	3.57 (0.1406)	38154 P6033
3.30 (0.1299)	38154 P6024	3.60 (0.1417)	38154 P6034
3.33 (0.1311)	38154 P6025	3.63 (0.1429)	38154 P6035
3.36 (0.1323)	38154 P6026	3.66 (0.1441)	38154 P6036



- Set dial gauge on drive gear surface and measure backlash.

Backlash standard value:

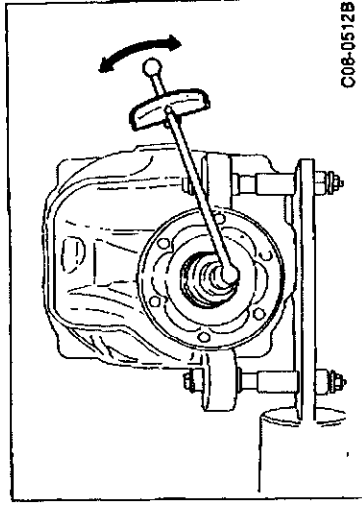
0.13 - 0.18 mm (0.0051 - 0.0071 in)

- If backlash is not within specification range, move side bearing adjusting washers of same thickness (carrier case side) to adjust.

Excessive backlash:	Use thicker drive gear rear side washer. Use thinner drive gear tooth side washer.
Insufficient backlash:	Use thinner drive gear rear side washer. Use thicker drive gear tooth side washer.

C5 FINAL DRIVE

3. Final Drive Removal and Installation, Assembly and Disassembly (Cont'd)



- Rotate companion flange more than 20 times. Measure total preload with preload gauge.

Side bearing preload standard value:

0.3 - 1.5 N·m (0.03 - 0.15 kg-m, 0.2 - 1.1 ft-lb)

Pinion bearing preload standard value:

1.8 - 2.6 N·m (0.18 - 0.27 kg-m, 1.3 - 2.0 ft-lb)

Total preload standard value (Without oil seal):

1.3 - 3.0 N·m (0.13 - 0.31, 0.9 - 2.2 ft-lb)

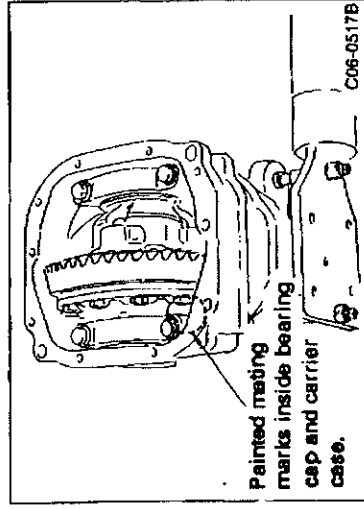
- If preload is not within specification range, move adjusting washers of same thickness on both sides to adjust preload.

Excessive preload: Use thinner adjusting washer.

Insufficient preload: Use thicker adjusting washer.

Side bearing adjusting washers

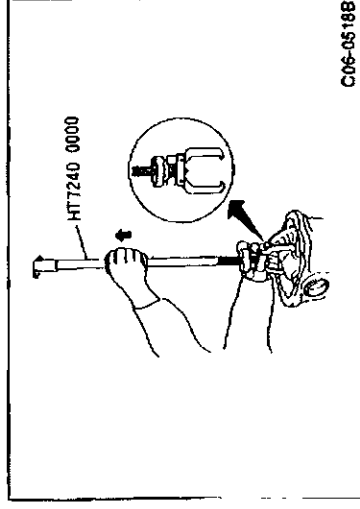
Thickness mm (in)	Part number	Thickness mm (in)	Part number	Thickness mm (in)	Part number
2.00 (0.0787)	38453 N3100	2.25 (0.0886)	38453 N3105	2.50 (0.0984)	38453 N3110
2.05 (0.0807)	38453 N3101	2.30 (0.0906)	38453 N3106	2.55 (0.1004)	38453 N3111
2.10 (0.0827)	38453 N3102	2.35 (0.0925)	38453 N3107	2.60 (0.1024)	38453 N3112
2.15 (0.0846)	38453 N3103	2.40 (0.0945)	38453 N3108	2.65 (0.1043)	38453 N3113
2.20 (0.0866)	38453 N3104	2.45 (0.0965)	38453 N3109		



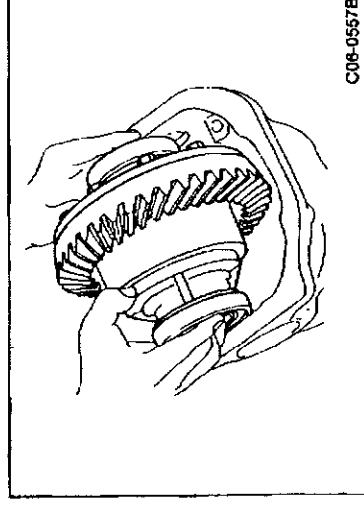
[Point 8] Drive pinion preload adjustment

a Differential case assembly removal

- Remove bearing cap bolts. Tap bearing caps lightly with plastic hammer and remove.



- Using sliding hammer (commercial service tool), separate differential case assembly and carrier case.



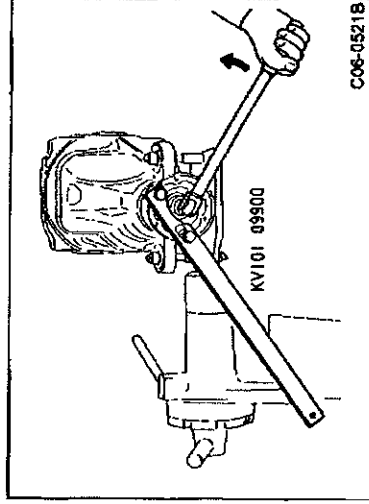
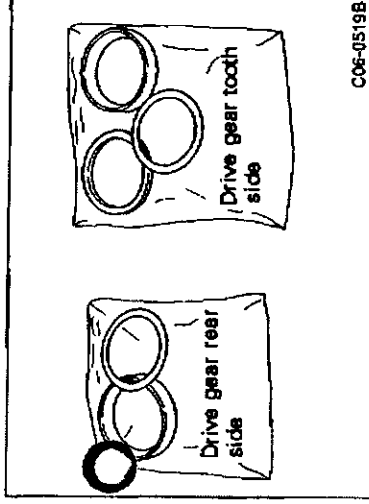
- Remove differential case assembly together with side bearing outer race.

C5 FINAL DRIVE

3. Final Drive Removal and Installation, Assembly and Disassembly (Cont'd)

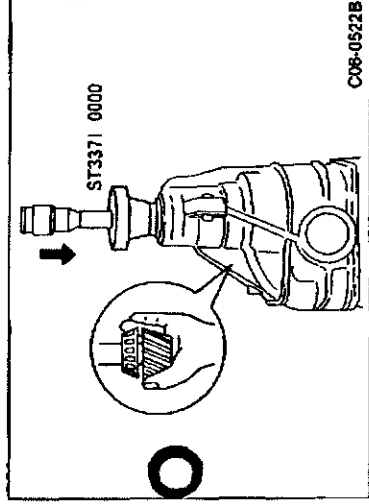
- Carefully arrange bearing outer race, adjusting washers and spacers into separate groups of rear side and gear tooth side parts.

Gear ratio	Installation position
4.000 min.	Drive gear rear side



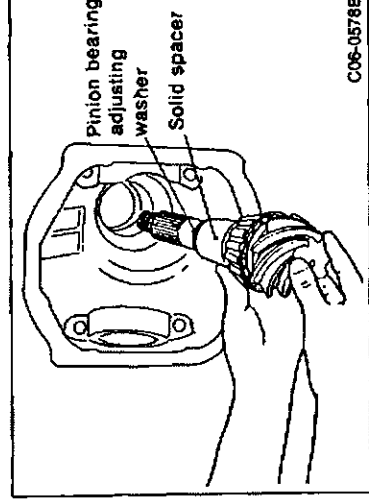
b Drive pinion assembly removal

- Using cam sprocket wrench (special service tool), remove pinion lock nut.



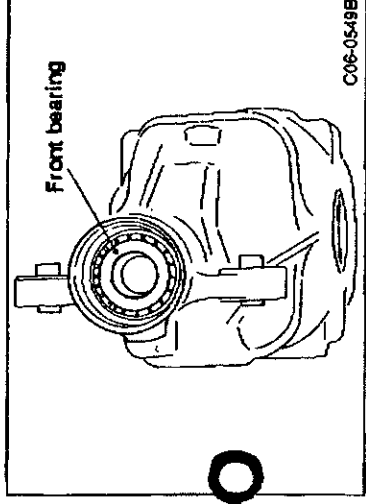
- Using drift (special service tool), remove drive pinion assembly.

CAUTION:
Do not let drive pinion fall.



c Drive pinion assembly installation

- Install solid spacer and adjusting washer (which were used before disassembly) on drive pinion or spacer of same length and washer of same thickness that were originally used.



- Apply a light coat of oil to front bearing and install in carrier case.

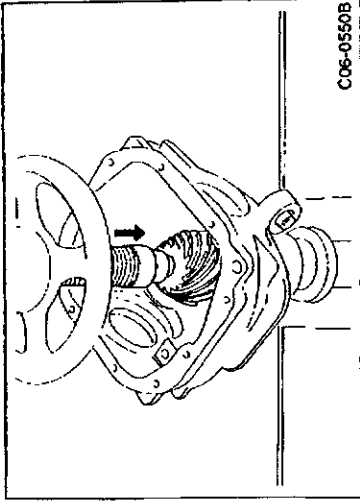
C5 FINAL DRIVE

3. Final Drive Removal and Installation, Assembly and Disassembly (Cont'd)

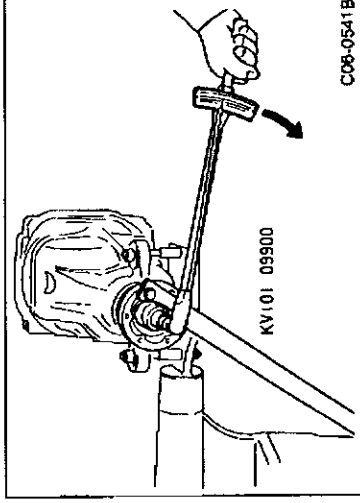
- Install drive pinion assembly with companion flange in carrier case.

CAUTION:

Do not assemble oil seal.



C06-0550B



KV101 09900

C06-0541B

- Apply a light coat of oil to pinion nut seat and drive pinion threads and install nut.
- Rotate companion flange more than 20 times and make sure bearing spins smoothly.
- Tighten drive pinion nut while measuring preload using preload gauge.
- When specified torque is reached, select suitable spacer and washer to ensure specified pinion bearing preload is obtained.

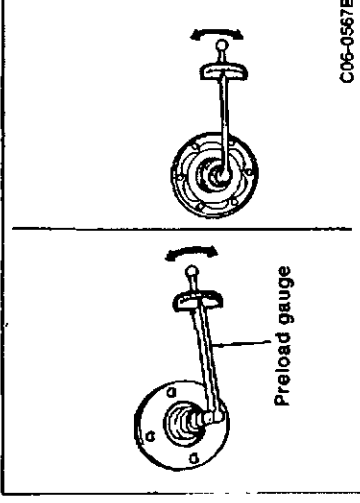
Use longer spacer and thicker washer first, then change to shorter and thinner ones until specified preload is obtained.

Drive pinion tightening torque:

186 - 294 N·m (19 - 30 kg-m, 137 - 217 ft-lb)

Specified pinion bearing preload (w/o oil seal):

1.0 - 1.6 N·m (0.10 - 0.16 kg-m, 0.7 - 1.2 ft-lb)



Preload gauge

C06-0567B

Excessive preload:

Use longer spacer and thicker washer

Insufficient preload:

Use shorter spacer and thinner washer

CAUTION:

Do not apply excess preload to pinion bearing.

Pinion bearing adjusting spacers

Thickness mm (in)	Part number	Thickness mm (in)	Part number	Thickness mm (in)	Part number
46.5 (1.831)	38165 10V00	45.6 (1.795)	38165 10V05	46.2 (1.819)	38165 10V07
46.8 (1.843)	38165 10V01	45.9 (1.807)	38165 10V06		

Pinion bearing adjusting washers

Thickness mm (in)	Part number	Thickness mm (in)	Part number	Thickness mm (in)	Part number
3.80 (0.1496)	38125 61001	3.90 (0.1535)	38130 61001	4.00 (0.1575)	38135 61001
3.82 (0.1504)	38126 61001	3.92 (0.1543)	38131 61001	4.02 (0.1583)	38136 61001
3.84 (0.1512)	38127 61001	3.94 (0.1551)	38132 61001	4.04 (0.1591)	38137 61001
3.86 (0.1520)	38128 61001	3.96 (0.1559)	38133 61001	4.06 (0.1598)	38138 61001
3.88 (0.1528)	38129 61001	3.98 (0.1567)	38134 61001	4.08 (0.1606)	38139 61001

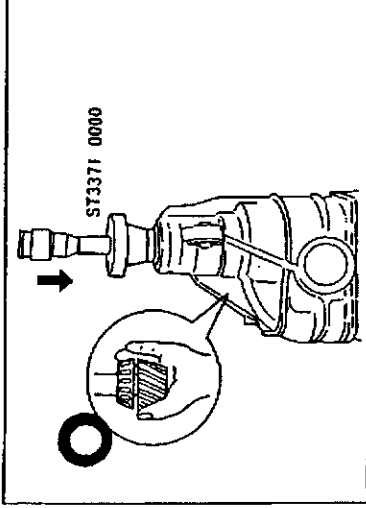
C5 FINAL DRIVE

3. Final Drive Removal and Installation, Assembly and Disassembly (Cont'd)

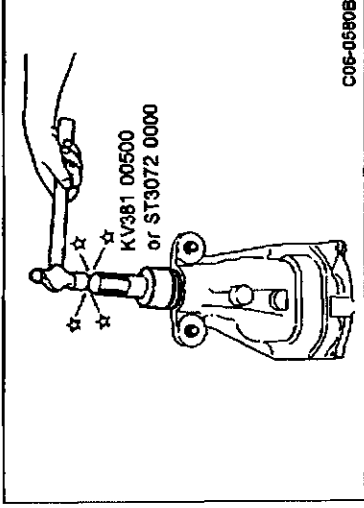
- When specified bearing preload is obtained at specified drive pinion torque (using solid spacer and adjusting washer), extract drive pinion.

CAUTION:

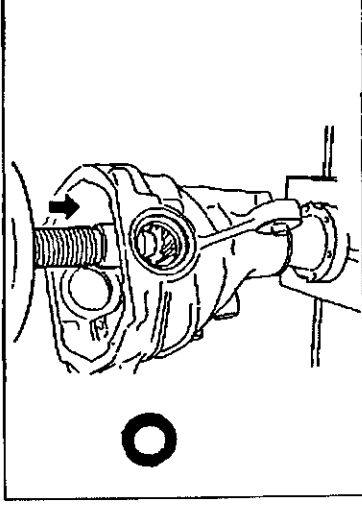
Be careful not to drop drive pinion.



- Coat oil seal lip with Nissan MP special grease No. 2.
- Using drift (special service tool), install oil seal in carrier case.



- Apply gear oil to pinion bearing.
- Install drive pinion assembly (with suitable spacer and adjusting washer installed) and companion flange in carrier case as a unit.



- Apply a coat of rust-preventive oil to drive pinion threads and pinion nut seat.

CAUTION:

Discard old pinion nut; replace with new one.

- Rotate companion flange more than 20 times until it wears in.
- Tighten drive pinion to specifications.

Drive pinion tightening torque:

186 - 294 N·m (19 - 30 kg·m, 137 - 217 ft·lb)

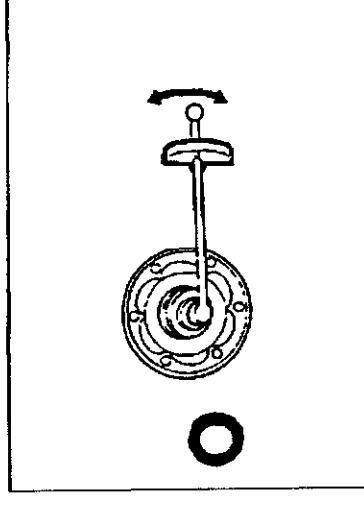
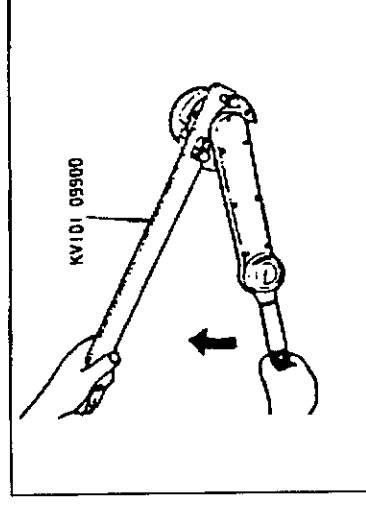
CAUTION:

Do not tighten drive pinion excessively.

- Measure preload with preload gauge.

Pinion bearing standard preload (w/oil seal) :

1.1 - 1.7 N·m (0.11 - 0.17 kg·m, 0.8 - 1.2 ft·lb)

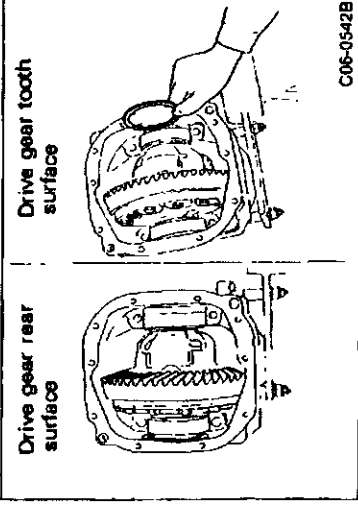
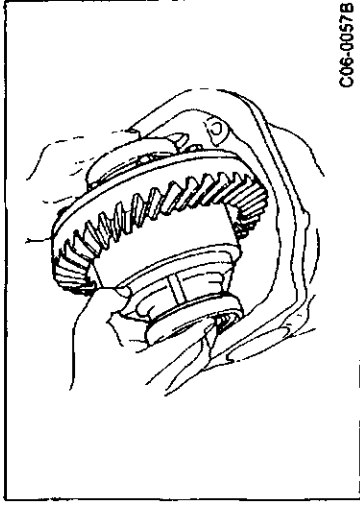


C5 FINAL DRIVE

3. Final Drive Removal and Installation, Assembly and Disassembly (Cont'd)

[Point 9] Differential case assembly installation

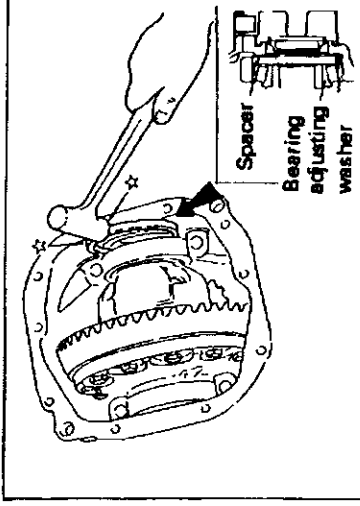
- Coat bearing with gear oil.
- Install differential case assembly together with bearing outer race in carrier case.



- Install drive gear rear side and tooth side selected washers.

CAUTION:

Do not interchange rear and tooth side washers by mistake.



- Install spacer between bearing outer race and adjusting washer.

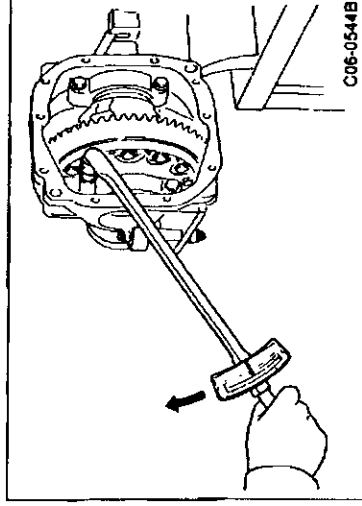
CAUTION:

Use plastic hammer and tap outside of spacer evenly to install.

Spacer

Thickness mm (in)	Part number
8.1 (0.319)	38454 N3100

Spacer installation position: Drive gear rear side



- Align mating marks, install bearing cap and tighten bolts.

Tightening torque:

88 - 98 N·m (9 - 10 kg-m, 65 - 72 ft-lb)

C5 FINAL DRIVE

3. Final Drive Removal and Installation, Assembly and Disassembly (Cont'd)

[Point 10] Inspection after assembly

Ⓐ Total preload inspection

- Turn companion flange more than 20 times. Use preload gauge and measure total preload.

Side bearing preload standard value:

0.3 - 1.5 N·m (0.03 - 0.15 kg·m, 0.2 - 1.1 ft-lb)

Pinion bearing preload standard value (without oil seal):

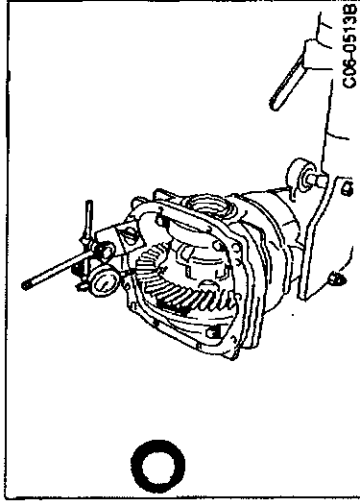
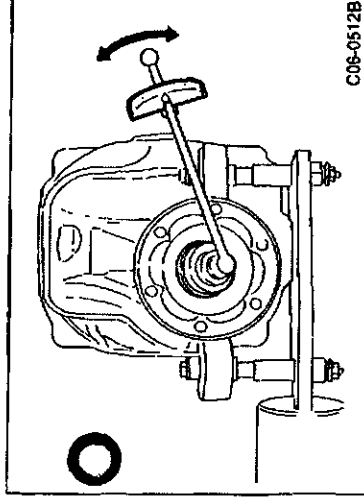
1.1 - 1.7 N·m (0.11 - 0.17 kg·m, 0.8 - 1.2 ft-lb)

Total preload standard value:

1.4 - 3.1 N·m (0.14 - 0.32 kg·m, 1.0 - 2.3 ft-lb)

- If torque preload is not within the specification range, move side bearing adjusting washers of same thickness on both sides to adjust preload.

Excess preload:	• Use thinner side bearing washer.
Insufficient preload:	• Use thicker side bearing washer.



Ⓑ Hypoid gear and backlash inspection

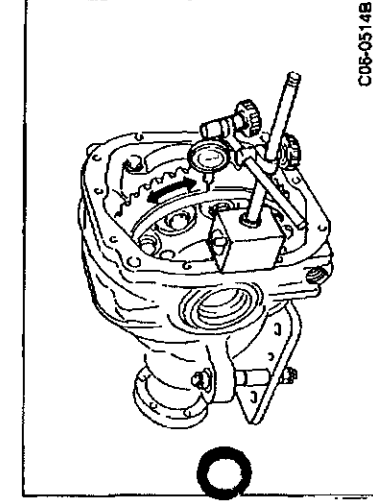
- Position dial gauge on drive gear surface and measure backlash.

Backlash standard value:

0.13 - 0.18 mm (0.0051 - 0.0071 in)

- If backlash is not within the specification range, adjust by increasing or decreasing side bearing washer thickness the same amount on both sides.

Excess backlash:	• Use thicker drive gear rear side washer and thinner drive gear tooth side washer.
Insufficient backlash:	• Use thinner drive gear rear side washer and thicker drive gear tooth side washer.



Ⓒ Drive gear rear surface runout inspection

- Place dial gauge on rear surface of drive gear. Turn drive gear and measure runout.

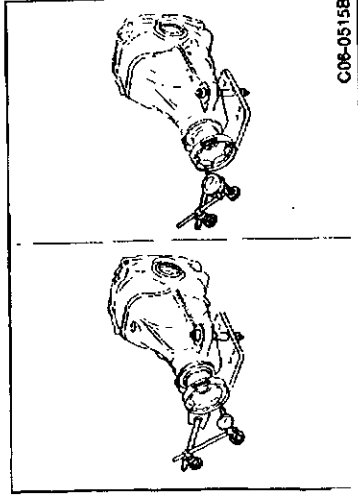
Runout limit:

0.05 mm (0.0020 in) max.

- If runout exceeds limit, check drive gear assembly condition (foreign matter jammed between drive gear and differential case, deformation of differential case, etc.).
- If drive gear is faulty, replace hypoid gear assembly. If differential case is deformed, replace case.

C5 FINAL DRIVE

3. Final Drive Removal and Installation, Assembly and Disassembly (Cont'd)



① Companion flange runout inspection

- Place dial gauge on companion flange (propeller shaft installation surface) and measure runout.

Runout limit:

0.05 mm (0.0020 in) max.

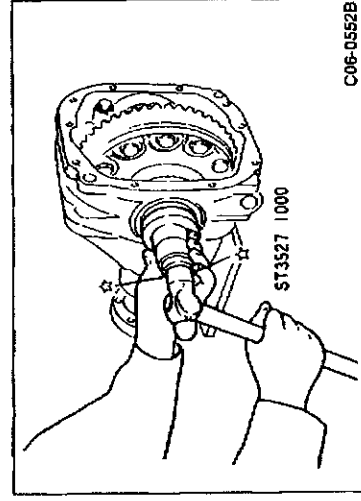
- Set test indicator inside companion flange (inner lower surface) and measure runout.
- Place paint mark on maximum outward runout of companion flange.

Runout limit:

0.05 mm (0.0020 in) max.

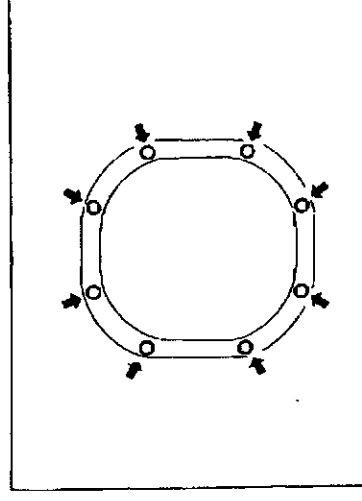
CAUTION:

- If measurement surface is rusted, remove rust before measurement.
- Make sure old paint is cleaned away before placing new mark.
- If runout exceeds specification limit, rotate relative positions of companion flange and drive pinion 90° and check if runout decreases.
- If runout still is not within specification range even if the relative position is changed, replace companion flange.
- If companion flange is replaced and runout is still not within specification range, the problem may be due to poor contact between pinion bearing and drive pinion or faulty pinion bearing.



[Point 11] Side oil seal installation

- Coat oil seal lip with Nissan MP special grease No. 2.
- Using drift (special service tool), install oil seal in carrier case.



[Point 12] Installation of carrier case cover, drain plug and filler plug

- Install carrier case cover with gasket in place.

Tightening torque:

39 - 49 N·m (4 - 5 kg-m, 29 - 36 ft-lb)

- Apply liquid gasket (Three Bond 1215 or equivalent) to drain and filler plugs and install plugs.

Drain plug tightening torque:

59 - 98 N·m (6 - 10 kg-m, 43 - 72 ft-lb)

Filler plug tightening torque:

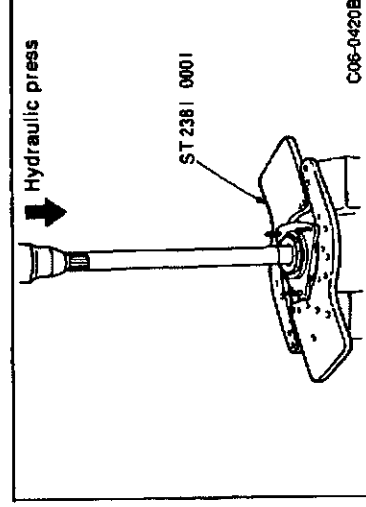
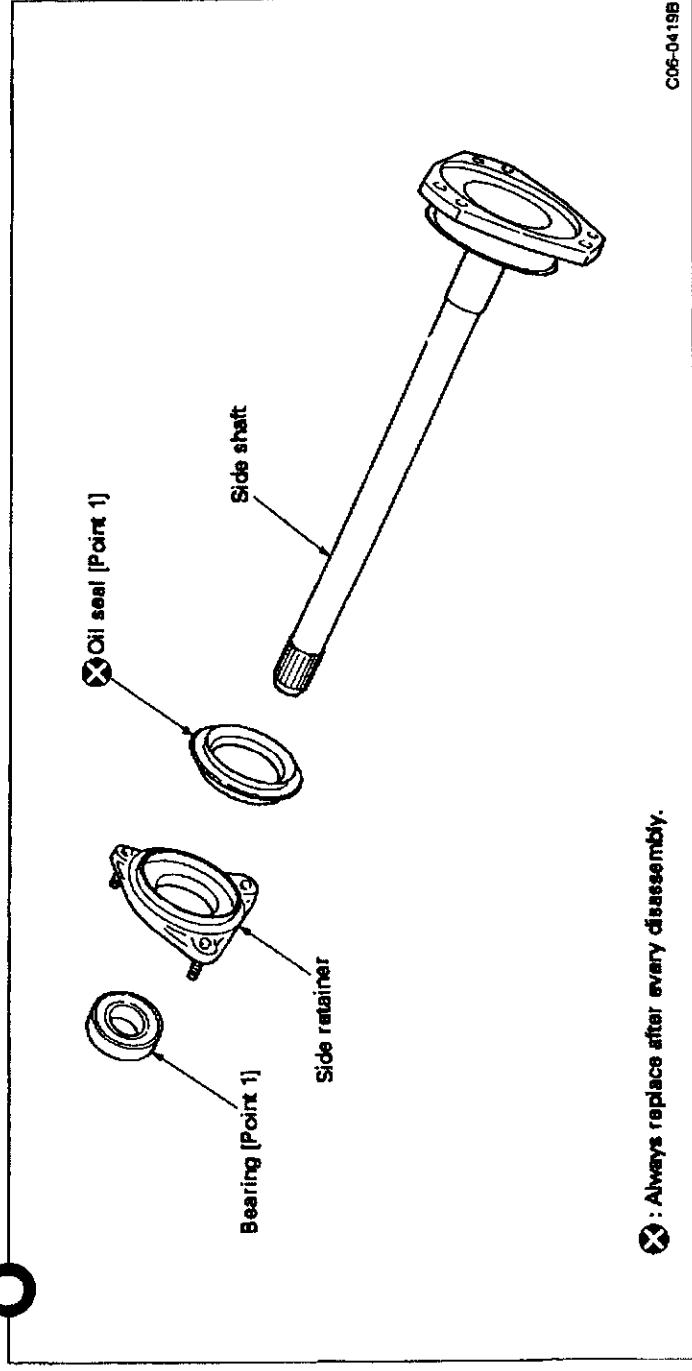
59 - 98 N·m (6 - 10 kg-m, 43 - 72 ft-lb)

CH-191

C5 FINAL DRIVE

3. Final Drive Removal and Installation, Assembly and Disassembly (Cont'd)

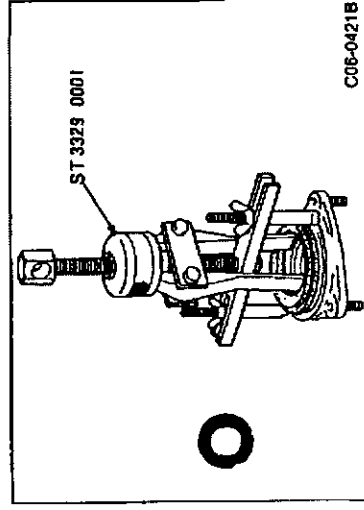
(2) Front final drive side shaft assembly and disassembly



[Point 1] Side shaft bearing and oil seal removal and installation

Removal

- Using two adapter setting plates and hydraulic press as shown in left figure, separate side retainer and side shaft.

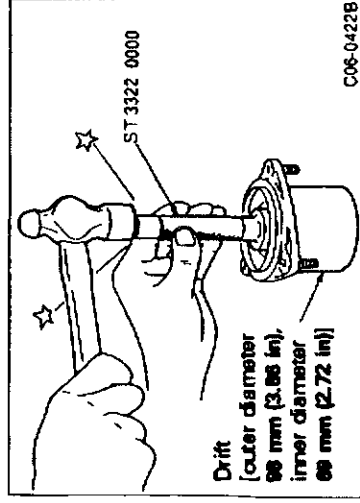


- Using oil seal puller (special service tool), remove oil seal.
- CAUTION:**
Always replace oil seal after every disassembly.

C5 FINAL DRIVE

3. Final Drive Removal and Installation, Assembly and Disassembly (Cont'd)

- Place drift [outer diameter 98 mm (3.86 in), inner diameter 69 mm (2.72 in)] on bottom side and remove bearing with drift (special service tool) [outer diameter 32 mm (1.26 in)].

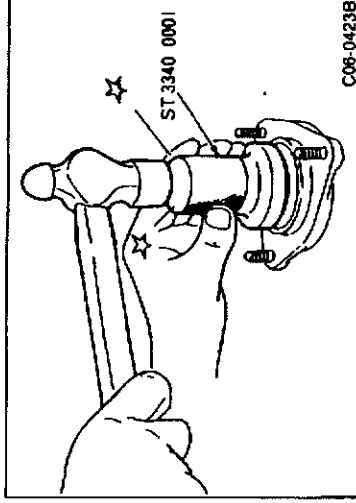


Installation

- Use drift (special service tool) as shown in figure, and press-fit bearing until it is even with lower surface of side retainer.

CAUTION:

Do not install bearing at angle.

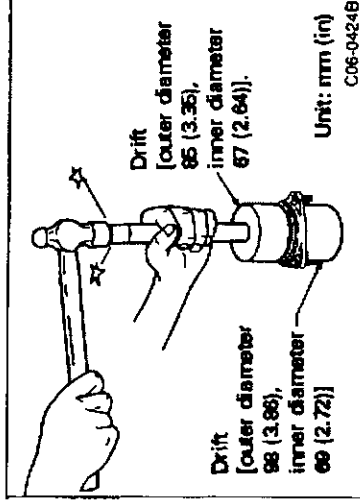


- Place drift [outer diameter 98 mm (3.86 in), inner diameter 69 mm (2.72 in)] on bottom and use drift [outer diameter 85 mm (3.35 in), inner diameter 67 mm (2.64 in)] to press-fit oil seal even with side retainer.

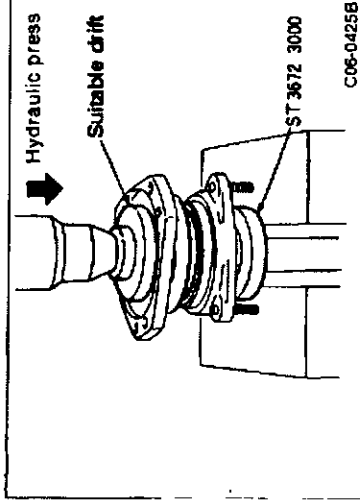
CAUTION:

(1) Do not install oil seal at an inclined angle.

(2) Apply MP special grease No. 2 to oil seal lip sliding surface.



- Place suitable drift (special service tool) against side shaft and press-fit shaft on retainer.

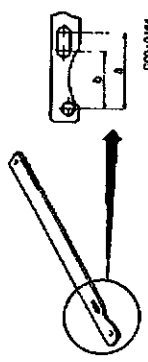
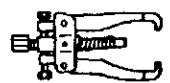
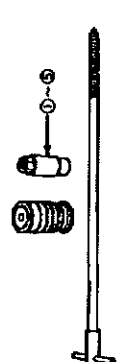


C6 DRIVE SHAFT

OPERATION PRECAUTIONS

- Use torque wrench to tighten nuts and bolts.

Tools required

Name	Description	Application	Remarks
Special service tool	Flange wrench KV401 04000 	Wheel hub lock nut removal and installation	Already described
Pitman arm puller HT7256 0000	 C00-0231	Side rod removal	Nis-salco
Drive shaft joint puller HT7255 Attachment HT7255 1000 ① M20 x 1.0 ② M20 x 1.5 ③ M22 x 1.0 ④ M22 x 1.5 ⑤ M24 x 1.5	 C00-0214	Fixed joint removal	
Regular tools	Note: The sliding hammer gear puller HT7240 that was previously described can be used for the drive shaft joint puller slide hammer.		

1. Summary

Specifications

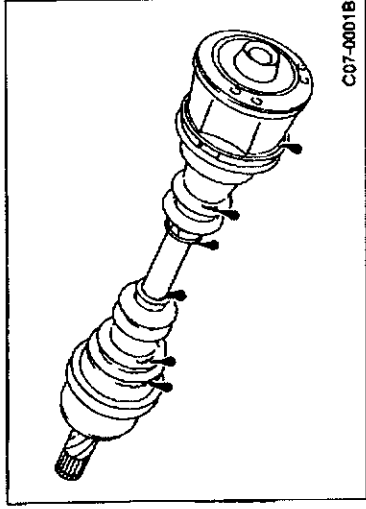
Item	Location		Front	Rear
	Final drive type		F160	R200 mechanical LSD (RB26DET)
Middle tube diameter	Model number		Z80T70C (right) Z80T82F (left)	B100D100
			25 (0.98)	30 (1.18)
Dimension between joint L	mm (in)		25 (0.98)	30 (1.18)
			323 (12.72)	440 (17.32)
Maximum length M	mm (in)		408 (16.06)	398 (15.67)
			448.1 (17.64)	561.1 (22.09)
Differential insertion length ℓ	mm (in)		513.7 (20.22)	519.1 (20.44)
			90 (3.54)	93 (3.66)
			—	101 (3.98)

C6 DRIVE SHAFT

1. Summary (Cont'd)

Inspection specifications

Description		Location		Front		Rear
		Model number		Z80T70C (right)	Z80T82F (left)	B100D100
Grease quantity	g (oz)	Wheel hub joint		Approx. 120 (4.23)		Approx. 180 (6.35)
		Final drive joint		Approx. 190 (6.70)	Approx. 155 (5.47)	Approx. 190 (6.70)
Boot installation length	mm (in)	Wheel hub joint		90.5 - 92.5 (3.563 - 3.642)		102 (4.02)
		Final drive joint		95.5 - 97.5 (3.760 - 3.839)	95 - 97 (3.74 - 3.82)	103.5 (4.07)
Drive shaft installation bolt tightening torque		N·m (kg-m, ft-lb)		—		83 - 93
Axial play (wheel hub joint)		mm (in)		(2.8 - 3.8, 20 - 27)		(8.5 - 9.5, 61 - 69)
				1 (0.04) max.		



C07-0001B

2. On-vehicle Inspection

Check boot and drive shaft for damage, wear and grease leaks.

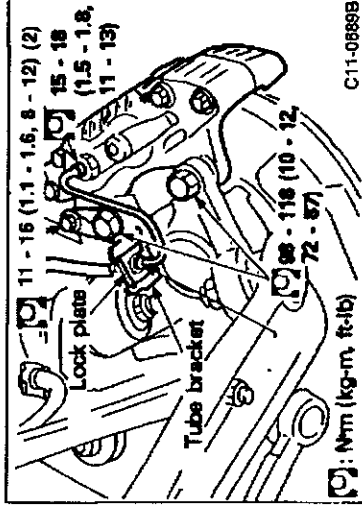
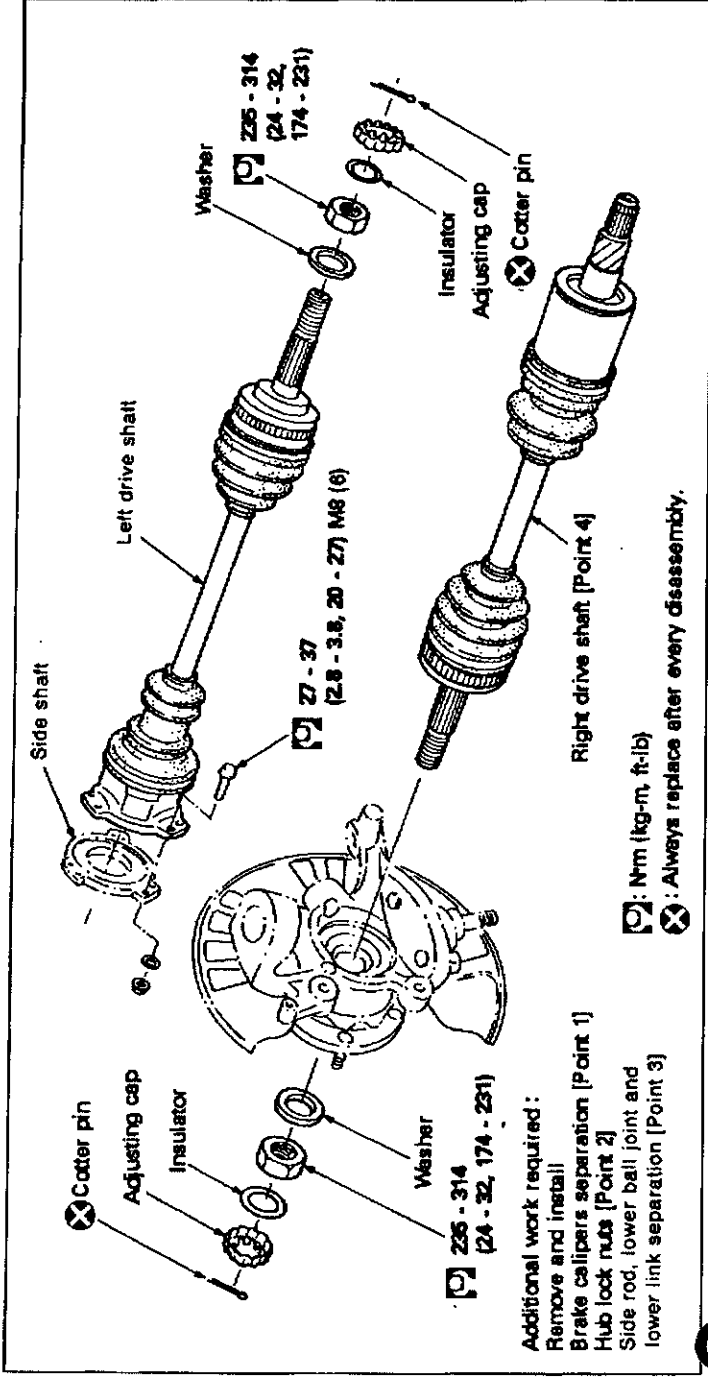
- Check boot and drive shaft for damage, wear and grease leaks. Replace parts as necessary.

C6 DRIVE SHAFT

3. Drive Shaft Removal and Installation, Assembly and Disassembly

3-1 REMOVAL AND INSTALLATION

(1) Front drive shaft

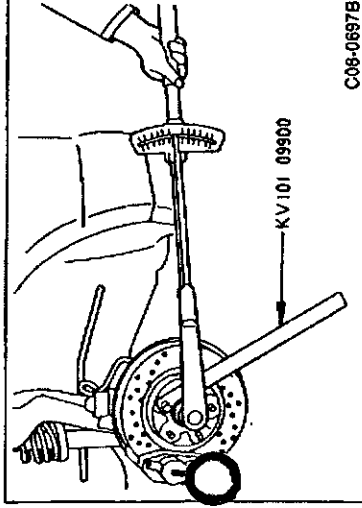


[Point 1] Brake caliper assembly separation

- Remove brake hose bracket lock plate and separate brake hose. Remove caliper assembly from disk rotor and attach to strut.

CAUTION:

Do not damage brake hose.



[Point 2] Hub lock nut removal and installation

Removal

- Using hub lock nut wrench (special service tool), lock hub and loosen front hub lock nut.

Installation

- Install drive shaft and hub assembly in vehicle. Tighten lock nut to torque indicated below.

Tightening torque:

235 - 314 N-m (24 - 32 kg-m, 174 - 231 ft-lb)

C6 DRIVE SHAFT

3. Drive shaft Removal and Installation, Assembly and Disassembly (Cont'd)

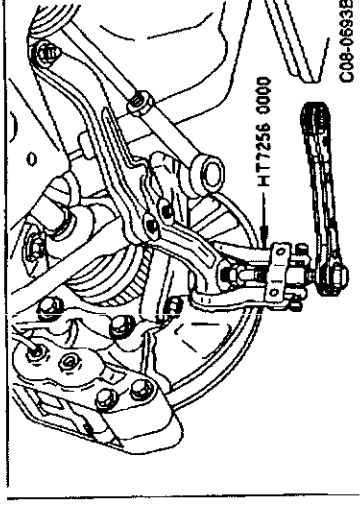
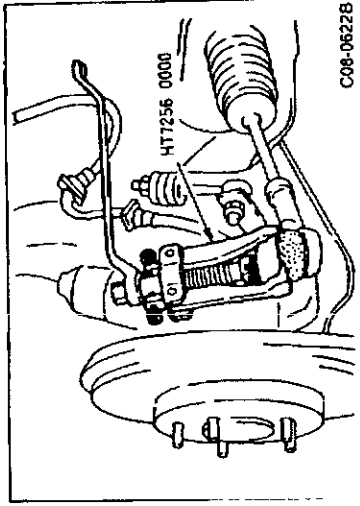
[Point 3] Tie-rod, suspension lower ball joint and lower link separation

- Using Pitman arm puller (commercial service tool), separate tie-rod and suspension lower ball joint.

CAUTION:

Be careful when removing ball joint because the knuckle is made of aluminum and scratches easily. Use Pitman arm puller and do not tap knuckle.

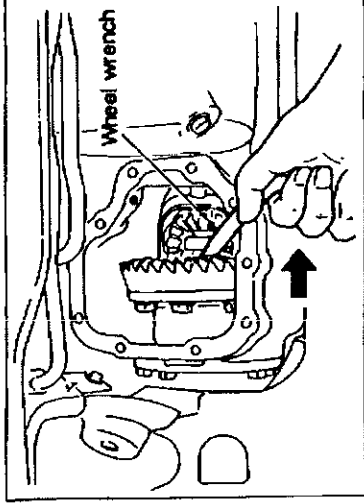
- Using Pitman arm puller (commercial service tool), separate suspension lower ball joint and lower link.



[Point 4] Right drive shaft removal and installation

Removal

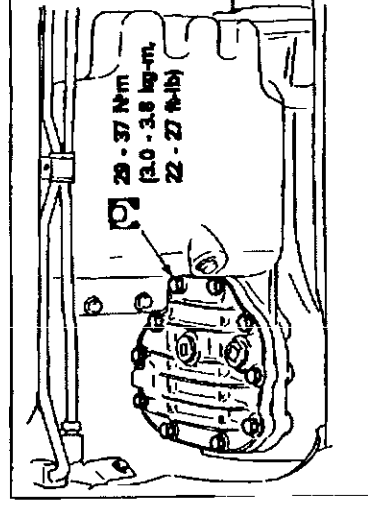
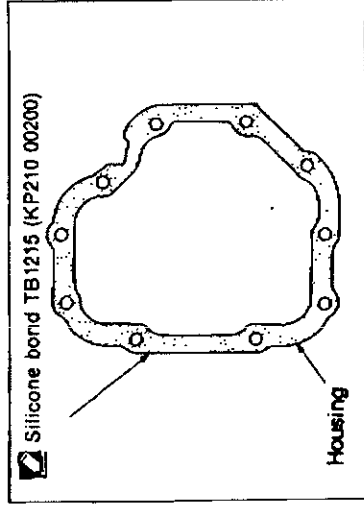
- Drain oil from front final drive and remove rear cover. Use wheel wrench as lever and remove shaft.



☑ Silicone bond TB1215 (KP210 00200)

Installation

- Insert drive shaft in final drive. Apply silicon bond sealant TB1215 (KP210 00200) to rear cover sealing surfaces.

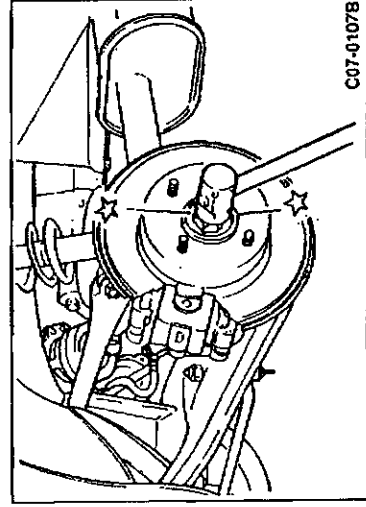
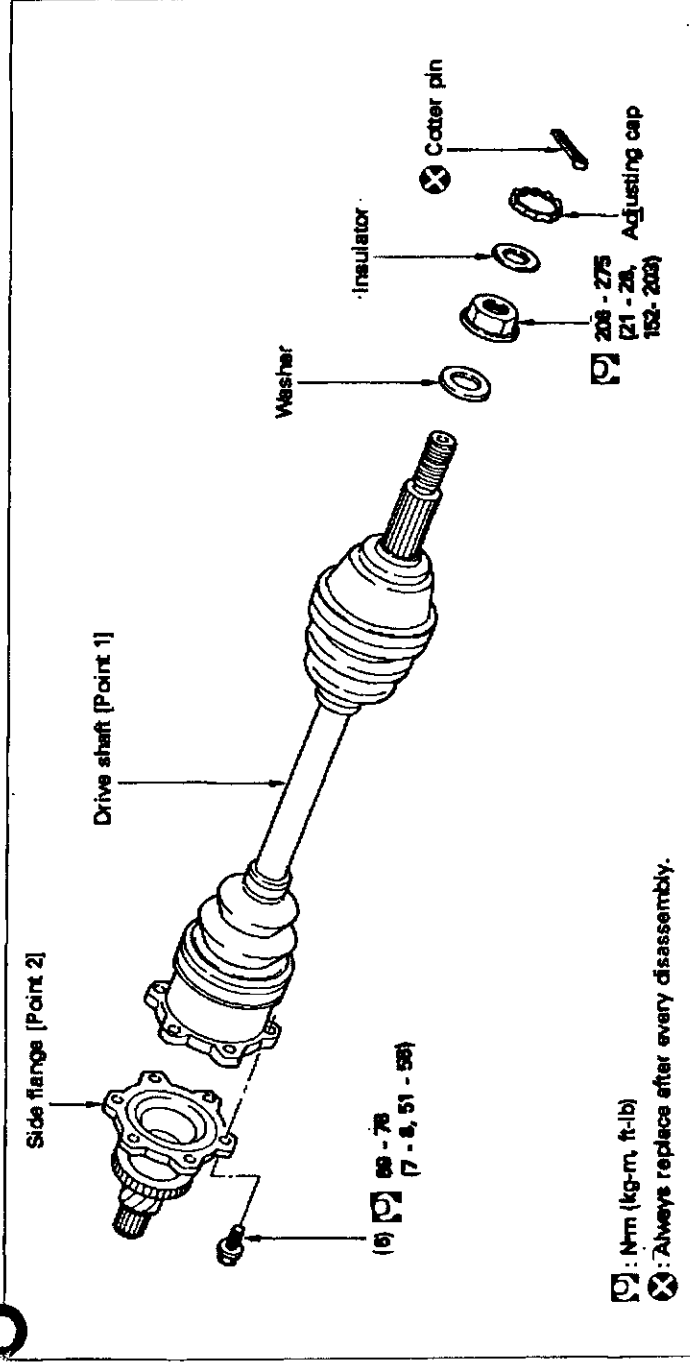


- Tighten differential cover to specified torque.
Differential cover tightening torque:
29 - 37 N·m (3.0 - 3.8 kg-m, 22 - 27 ft-lb)
- Fill oil from filler plug hole. Use Nissan gear oil hypoid GL-5 85W90.

C6 DRIVE SHAFT

3. Drive shaft Removal and Installation, Assembly and Disassembly (Cont'd)

(2) Rear drive shaft



[Point 1] Drive shaft removal and installation

Removal

- Remove side flange bolts and separate drive shaft.
- Tap drive shaft with copper hammer as shown in figure and remove.

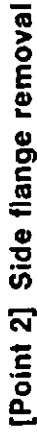
CAUTION:

Attach nut to prevent drive shaft threads from being damaged.

Installation

- Insert drive shaft in wheel hub side and temporarily tighten hub lock nuts.
- Tighten side flange bolts to specified torque.
- Tighten hub lock nut to specified torque.

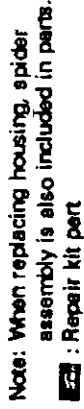
3. Drive shaft Removal and Installation, Assembly and Disassembly (Cont'd)



- **Circlip installation position**

F160 model	Right	Final drive side
	Left	None
R200 (mechanical LSD)	Right	Final drive side
	Left	Final drive side

Front drive shaft (Models Z80T70C, Z80T82F)

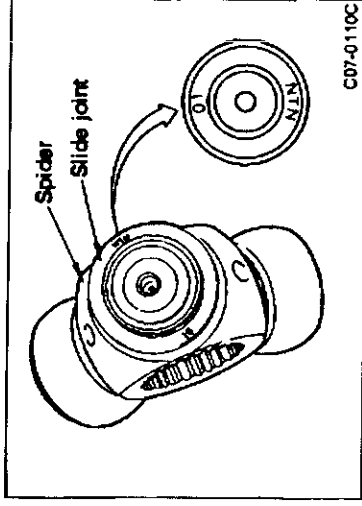


C6 DRIVE SHAFT

3. Drive shaft Removal and Installation, Assembly and Disassembly (Cont'd)

Part inspection

Part name	Inspection and operation
Shaft	● Check drive shaft for runout, cracks and damage. Replace if necessary.
Housing	● If housing roller surface is scratched or worn, check entire spider assembly. Replace housing and spider assembly as set if necessary.
Spider assembly	● If rollers are pitted or scored in rotation direction, replace spider assembly. ● If serrated parts are deformed or scored, also inspect drive shaft. If worn or damaged, replace both spider assembly and drive shaft. ● If rollers are scratched or worn, inspect housing. If worn or damaged, replace both spider assembly and housing.
Boot and band	● Replace if cracked. CAUTION: After removing boot band, always replace with new part.
Other	● Replace if deformed or damaged.



Assembly

- When replacing only spider assembly, select part with same identification number inscribed on slide joint as indicated in following charts. After selecting correct part, assemble unit.

CAUTION:

When replacing housing, replace as set with spider assembly. Z80T70C (Right side)

Identification mark	Part number
01	39720 51E01
02	39720 51E02
03	39720 51E03

Z80T82F (Left side)

Identification mark	Part number
10	39720 10V10
11	39720 10V11
12	39720 10V12

C6 DRIVE SHAFT

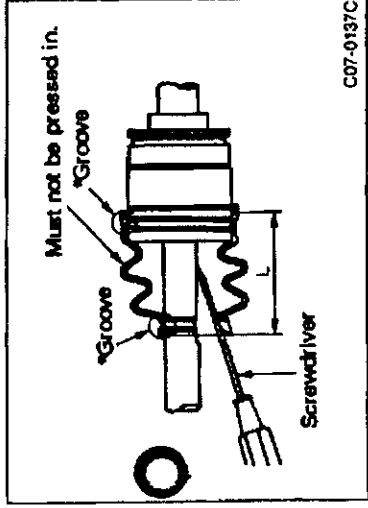
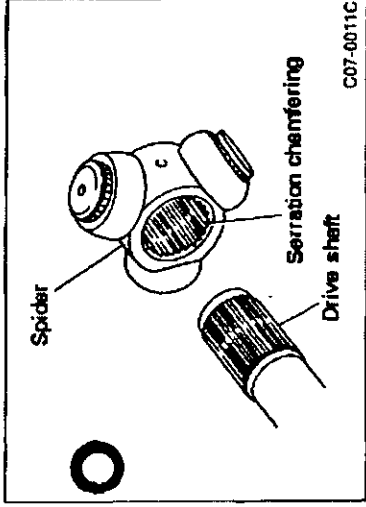
3. Drive shaft Removal and Installation, Assembly and Disassembly (Cont'd)

- When installing spider assembly, align mating marks and install shaft.
- Secure spider assembly with snap ring.

CAUTION:

- (1) Before installing spider assembly, mount boot on shaft.
 - (2) Position insertion direction as shown in figure.
- Apply repair kit grease to spider and sliding parts. Insert parts in housing and apply remaining grease in quantities indicated below.

Model	Grease quantity g (oz)
Z80T70C	Approx. 190 (6.70)
Z80T82F	Approx. 155 (5.47)

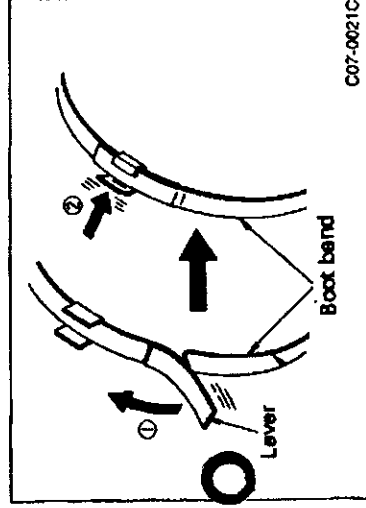


- Install boot securely in grooves (parts indicated by *) as shown in figure.
- Set boot length (L) as indicated below. Insert screwdriver in small diameter side, adjust inner and outer pressure of boot to avoid deformation.

CAUTION:

- (1) If boot installation length is shorter than indicated below it may cause boot to break or split.
- (2) Be careful not to touch the inside surface of boot with end of screwdriver.

Model	Installation length L mm (in)
Z80T70C	95.5 - 97.5 (3.760 - 3.839)
Z80T82F	95 - 97 (3.74 - 3.82)



- Secure boot band on large and small diameter side of boot.
- CAUTION:**
Rotate joint and make sure boot installation position does not change. If position moves, install new boot band.

C6 DRIVE SHAFT

3. Drive shaft Removal and Installation, Assembly and Disassembly (Cont'd)

[Point 3] Slide joint assembly and disassembly (Model B100D100)

CAUTION:

Replace joint assembly if parts are worn or damaged.

Disassembly

- Remove boot band.

CAUTION:

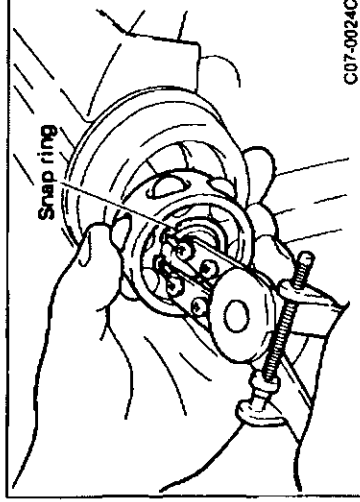
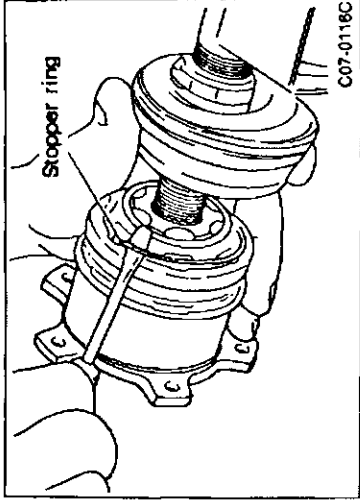
Always replace boot band with new part after disassembly.

- Remove stopper ring and remove slide joint housing.

CAUTION:

(1) Always replace stopper ring with new part after disassembly.

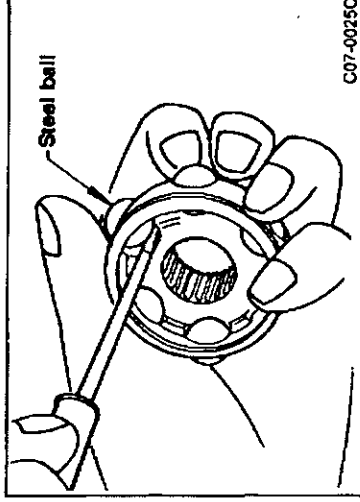
(2) Stopper ring is used for slide stopper. Remove ring before removing slide joint housing.



- Remove snap ring and detach ball cage and steel ball assembly.
- Remove boot.

CAUTION:

If boot is cracked and foreign matter is mixed with grease inside, disassemble and inspect ball cage and steel ball assembly.



The ball cage and steel ball assembly should only be disassembled to clean the grease. If the steel balls or other parts are worn or damaged, replace joint assembly.

- Use screwdriver to remove steel balls one at a time.
- Remove inner race from large side of ball cage.

CAUTION:

When removing steel balls, do not scratch surface of steel balls and inner race contact surface.

C6 DRIVE SHAFT

3. Drive shaft Removal and Installation, Assembly and Disassembly (Cont'd)

Disassembly inspection

- Clean parts and inspect following items.

Part name	Inspection and operation
Shaft	● Check shaft for runout, cracks and damage. ● Check threads for damage.
Joint assembly	● Check joint rotation and abnormal play in axial direction. ● Check foreign matter inside joint.
Outer race	● Check ball contact surface damage or abnormal wear. ● Check for deformation of boot installation.
Ball cage	● Check for damage or abnormal wear in sliding parts.
Steel ball	● Check for damage or abnormal wear.
Inner race	● Check ball contact surface for scratches or abnormal wear. ● Check for damage in serration holes. (Check shaft serration holes at same time.)

Assembly

- Using drift [outer diameter 78 mm (3.07 in), inner diameter 72 mm (2.83 in)], press-fit plug.
- Insert inner race in large diameter side of ball cage.
- Apply grease to cage pocket and assemble 6 balls in cage. At this time, rotate inserted cage one-half pitch (one-half the width of one drive shaft spline) to position inner race on axis correctly and then install.

CAUTION:

The inner race can be installed in either direction.

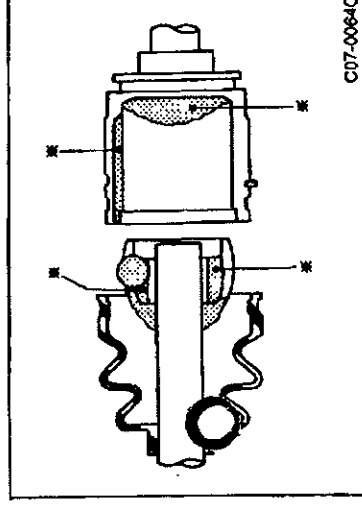
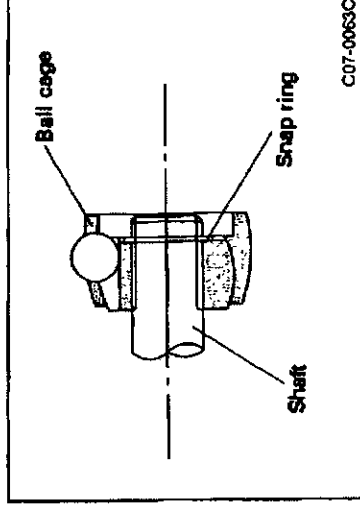
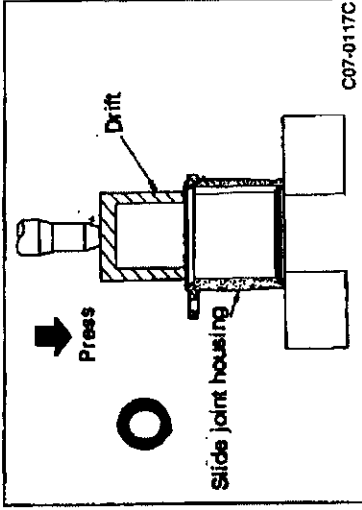
- Install new boot on shaft. Install ball cage and steel ball assembly.

CAUTION:

- (1) Install boot on shaft before assembling steel ball assembly.
 - (2) The ball cage installation direction is shown in figure. Be careful to position cage in correct direction.
- Secure ball cage and steel ball assembly with snap ring.

- Apply repair kit grease to slide joint housing (* part) in quantity indicated below.

Grease quantity:
190 g (6.70 oz)



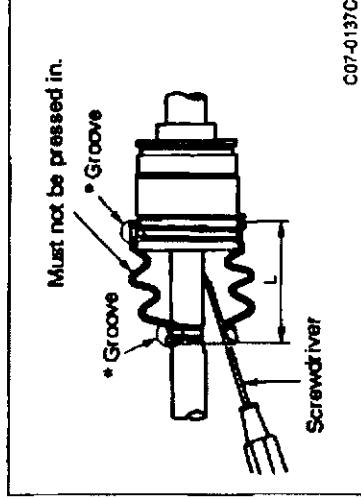
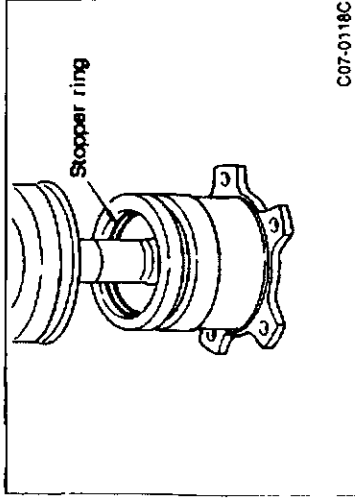
C6 DRIVE SHAFT

3. Drive shaft Removal and Installation, Assembly and Disassembly (Cont'd)

- Install stopper ring in slide joint housing.

CAUTION:

After installation, pull shaft out and make sure slide joint assembly and stopper ring engage correctly.



- Install boot securely in grooves (parts indicated by *) as shown in figure.

CAUTION:

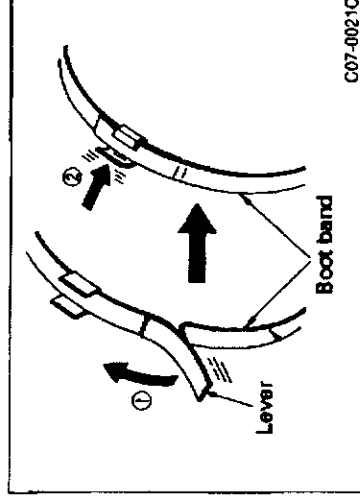
Remove grease attached to boot installation surface (parts indicated by * in figure). Grease on surface may cause boot to slip off.

- Set boot length (L) as indicated below. Insert screwdriver in small diameter side, adjust inner and outer pressure of boot to avoid deformation.

CAUTION:

- (1) If boot installation length is shorter than dimension indicated below it may cause boot to break or split.
- (2) Be careful not to touch the inside surface of boot with end of screwdriver.

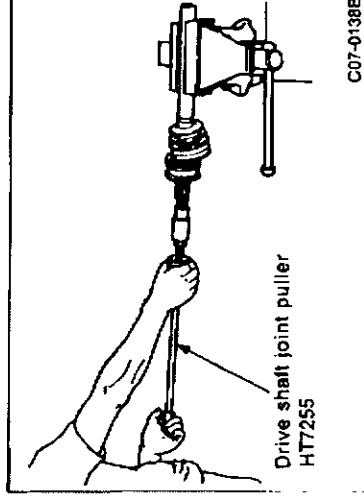
Installation length L:
103.5 mm (4.07 in)



- Secure large and small side of boot with new boot band.

CAUTION:

Rotate joint and make sure boot installation position does not change. If position moves, install boot band one more time.



[Point 4] Fixed joint assembly and disassembly (Models Z80T70C, Z80T82F, B100D100)

CAUTION:

Replace joint assembly if parts are worn or damaged.

Disassembly

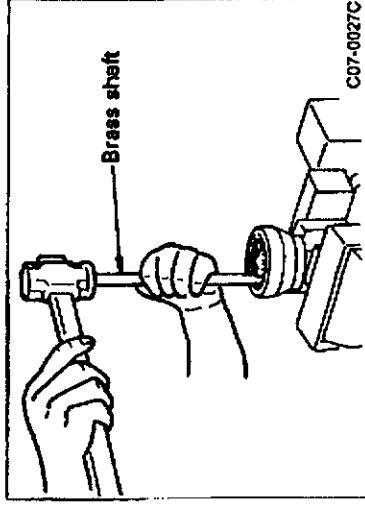
- Remove boot band and remove boot from housing.
- Using drive shaft joint puller, remove housing assembly from shaft.

C6 DRIVE SHAFT

3. Drive shaft Removal and Installation, Assembly and Disassembly (Cont'd)

CAUTION:

- (1) Screw drive shaft joint puller more than 30 mm (1.18 in) into housing threads.
- (2) If removal of housing assembly has been attempted more than five times and assembly cannot be detached, replace drive shaft assembly.

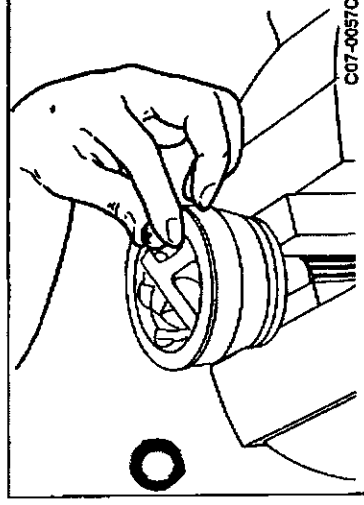


- Remove circlip and snap ring from shaft.
- Secure fixed joint assembly in vise.

CAUTION:

Place copper or aluminum plates on side of assembly to prevent damage before tightening vise.

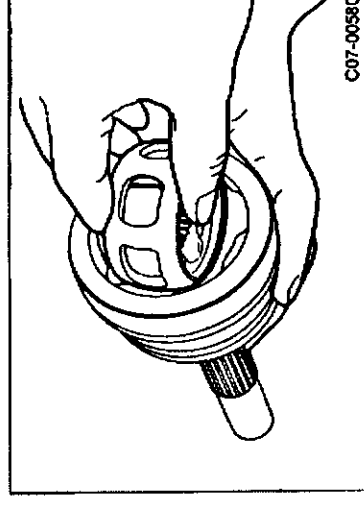
- Clean off old grease.
- Using brass shaft, rotate ball cage and remove steel balls from small holes in cage.



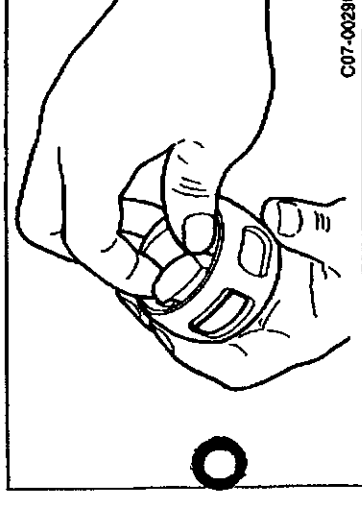
- After steel balls in four small holes have been removed, then remove steel balls from two large holes.

CAUTION:

The ball cage may break if steel balls are removed from large holes first.



- Align outer race protrusion in large hole of ball cage. Remove ball cage and inner race from outer race at same time.



- Align inner race protrusion in large hole of ball cage and remove inner race from chamfered side of ball cage.

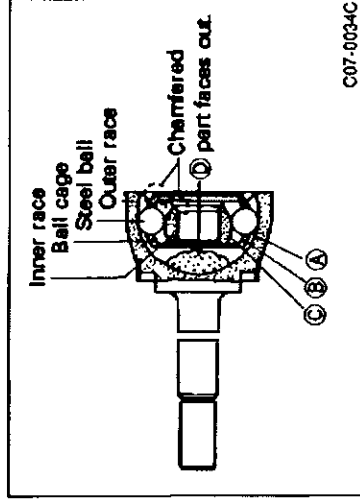
C6 DRIVE SHAFT

3. Drive shaft Removal and Installation, Assembly and Disassembly (Cont'd)

Disassembly inspection

- Clean parts and check following items.

Part	Description
Fixed joint assembly	• Joint rotational condition, abnormal play in axial direction
	• Foreign matter inside joint
Outer race	• Damage or abnormal wear in ball contact surface
	• Damage to drive shaft threads
	• Boot installation deformation
Ball cage	• Damage or abnormal wear in sliding surfaces
Steel balls	• Damage or abnormal wear
Inner race	• Damage or abnormal wear to ball contact surface
	• Damage to serration holes (Check drive shaft serration holes at same time.)



Assembly

- Coat outer race ball contact surface, ball cage sliding parts, inner race ball contact surface with repair kit grease.
- Install inner race in ball cage.

CAUTION:

Check that the installation direction of the inner race and ball cage (refer to figure) is correct.

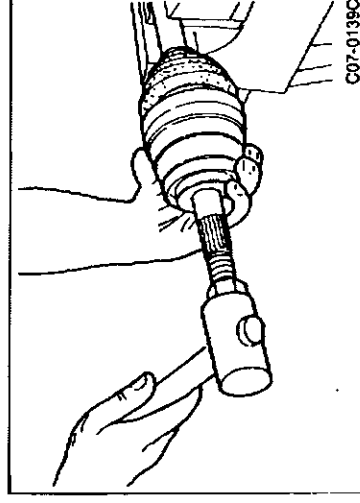
- Install ball cage and inner race in outer race.
- Install steel balls in ball cage.

CAUTION:

Install steel balls in reverse sequence of disassembly. First install steel balls in the two large holes and then install remaining balls one at a time in the four small holes.

- Insert repair kit grease from inner race serration holes.

Part	Grease quantity g (oz)
Outer race ball contact surface (A)	Approx. 10 (0.35) each, total 30 (1.06)
Ball cage sliding parts (B)	
Inner race ball contact surface (C)	
Inner race serration holes (D)	30 (1.06)



- Install boot with new boot band on drive shaft.
- Install snap ring and circlip on drive shaft.
- Install nut on fixed joint assembly and tap with wooden hammer to press-fit on drive shaft.

CAUTION:

Circlip must be inserted in shaft groove securely.

C6 DRIVE SHAFT

3. Drive shaft Removal and Installation, Assembly and Disassembly (Cont'd)

- Apply remaining repair kit grease to inside of housing from large opening of boot.

Model	Grease quantity g (oz)
Z80T70C	Approx. 120 (4.23)
Z80T82F	Approx. 120 (4.23)
B100D100	Approx. 180 (6.35)

CAUTION:

Remove grease from fixed joint boot installation surface (locations indicated by * in figure). The boot may come off if there is grease on the boot installation surface.

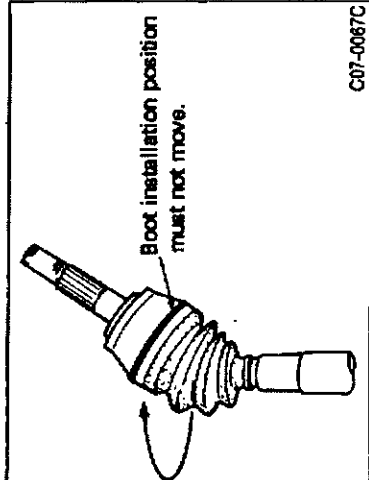
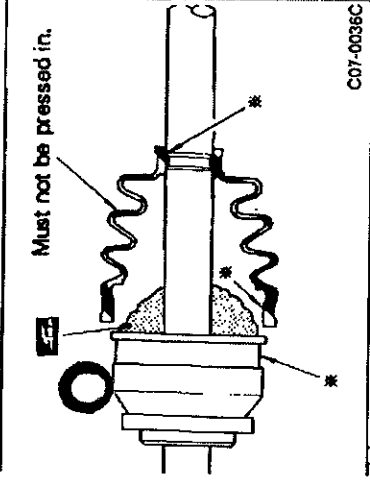
- Install boot securely in grooves (locations indicated in figure).
- Set boot length (L) as indicated below and secure with boot band.

CAUTION:

- (1) If boot installation length is shorter than dimension indicated below it may cause boot to break or split.
- (2) Be careful not to touch the inside surface of boot with end of screwdriver.

Model	Installation length mm (in)
Z80T70C	90.5 - 92.5 (3.563 - 3.642)
Z80T82F	90.5 - 92.5 (3.563 - 3.642)
B100D100	102 (4.02)

- Check boot installation. Rotate joint as shown in figure and check that boot installation position does not move. If position moves, install boot band one more time.

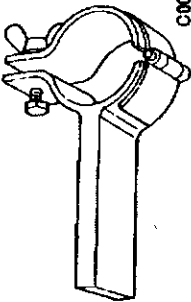
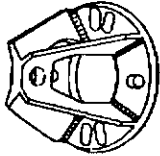
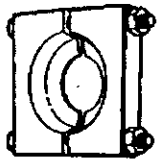
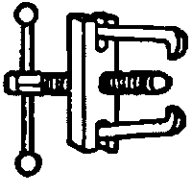
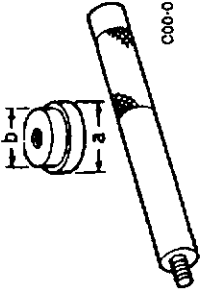


C7 FRONT SUSPENSION AND AXLE

OPERATION PRECAUTIONS

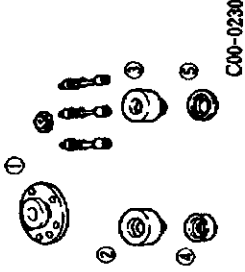
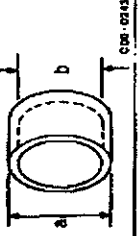
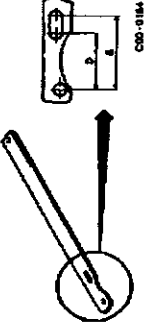
- When installing each rubber bushing, final tightening must be carried out with vehicle on ground in unladen condition. Clean off all oil from rubber parts thoroughly because it may lower durability.
- Use flare wrench to remove brake piping. Use flare torque wrench (special service tool: GG9431 0000) to remove brake piping.
- Use flare nut wrench for removal and installation of steering piping flare nuts.
- Check wheel alignment when servicing suspension parts.

Required tools

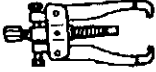
Name		Description	Remark
Brake tube torque wrench GG9431 0000	 C00-0002	Tightening brake tube flare nuts	
Strut attachment ST3565 2000	 C00-0004	Removing coil springs	
Slide hammer ST3623 0000	 C00-0010	Removing hub outer bearings	
Attachment KV401 04100	 C00-0104	Same as above	Already described
Bearing replacer ST3003 1000	 C00-0014	Same as above	
Bearing puller ST3305 1001	 C00-0203	Same as above	
Drift ST3070 1000 Drift bar ST3532 5000 a: 61.5 mm (2.421 in) dia. b: 41 mm (1.61 in) dia.	 C00-0132	Removing wheel (unit) bearing outer race	

Special
service
tools

C7 FRONT SUSPENSION AND AXLE

	Name	Description	Remark
Special service tools	Drift KV401 5110 a: 48 mm (1.89 in) dia. b: 40 mm (1.57 in) dia.	Wheel hub and outer bearing installation 	
	Drift ST3340 0001 a: 60 mm (2.36 in) dia. b: 47 mm (1.85 in) dia.	- Installing knuckle spindle and wheel hub - Removing and installing tension rod bushings 	
	Drift KV401 04710 a: 76.2 mm (3.000 in) dia. b: 68 mm (2.68 in) dia.	Removing and installing tension rod bushings Installing wheel (unit) bearing outer race 	
	CCK gauge attachment KV991 040S0 ① KV991 04010 Plate assembly ② KV991 04020 Adapter A [outer diameter 72 mm (2.83 in)] ③ KV991 04030 Adapter B [outer diameter 65 mm (2.56 in)] ④ KV991 04040 Adapter C [outer diameter 57 mm (2.24 in)] ⑤ KV991 04050 Adapter D [outer diameter 53.4 mm (2.102 in)]	Inspecting and measuring wheel alignment 	Already described
	Drift KV401 05220 a: 75 mm (2.95 in) dia. b: 62 mm (2.44 in) dia.	Installing wheel (unit) bearing outer race 	
	Flange wrench KV101 09900 a: 100 mm (3.94 in) b: 54 mm (2.13 in)	Tightening wheel bearing lock nut 	

C7 FRONT SUSPENSION AND AXLE

	Name		Description	Remark
Commer- cial ser- vice tools	Spring compressor HT7178 0000	 C00-0007	Removing and installing coil springs	Already described
	Pitman arm puller HT7256 0000	 C00-0231	Removing side rod and lower ball joint	
	Ball joint remover HT7275 0000	 C00-0006	Removing suspension lower ball joint bolts	
	Turning radius gauge (IM2355) Alignment gauge (IM2360) Toe-in gauge Side slip tester		Measuring wheel alignment	—
Measure- ment tools				

C7 FRONT SUSPENSION AND AXLE

1. Summary

Specifications

Description	Engine		RB26DETT
Suspension type	Multi-link independent suspension		
Wheel alignment (unladen vehicle)	Toe-in	mm (in)	1 ± 1 (0.04 ± 0.04)
	Camber	(°)	-0°55' ± 45'
	Caster	(°)	3°40' ± 45'
	King pin inclination angle	(°)	15°25' ± 45'
	Side slip (reference)	mm (in)	-5 to 5 (-0.20 to 0.20)
Shock absorber	Damping force [at 0.3 m (1.0 ft)/s] N (kg, lb)	Extension side	1,746 (178, 392)
		Compression side	500 (51, 112)
Coil spring	Spring constant	N/mm (kg/mm, lb/in)	23.5 (2.4, 134)
	Free length right/left	mm (in)	405 (15.94)
	Coil average diameter	mm (in)	110 (4.33) [low side 80 (3.15)]
	Line diameter	mm (in)	12.3 (0.484)
	Number of active coils		7.92
Tension rod diameter		mm (in)	20 (0.79)
Stabilizer outer diameter (non-solid)		mm (in)	20 (0.79)

Operation specifications

Description		Standard Value	
Wheel alignment		Refer to "Specifications "	
Steering angle (°)	Inner wheel	38° ^{+1°} _{-3°}	
	Outer wheel	31°	
Wheel bearing lock nut tightening torque		N·m (kg-m, ft-lb)	235 - 314 (24 - 32, 174 - 231)
Wheel bearing axial end play		mm (in)	0.05 (0.0020) max.
Toe pre-adjustment side rod length		mm (in)	126.5 (4.98)
Lower link ball joint and suspension lower ball joint	Description	Lower link ball joint	Suspension lower ball joint
	Swing torque (spring balance conversion value)	N (kg, lb)	8.8 - 63.7 (0.9 - 6.5, 2.0 - 14.3)
	Sliding torque	N·m (kg-m, ft-lb)	0.5 - 3.4 (0.05 - 0.35, 0.4 - 2.5)
	Axial end play	mm (in)	0 (0)
	Tightening torque	N·m (kg-m, ft-lb)	96 - 120 (9.8 - 12.2, 71 - 88)

C7 FRONT SUSPENSION AND AXLE

2. On-vehicle Inspection and Preparation

2-1 FRONT SUSPENSION AND AXLE INSPECTION

- Shake left and right front tires. Check tires, wheel bearing and king pin bearings for looseness. Rotate tire by hand and check for abnormal noise.
- Replace if there is looseness or damage.

CAUTION:

There may be a small amount of play in the upper link but this is not abnormal.

- If there is axial play in locations other than upper link, check axle end play.

End play standard value:

0.05 mm (0.0020 in) max.

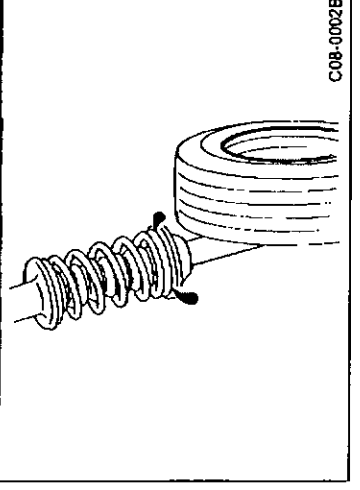
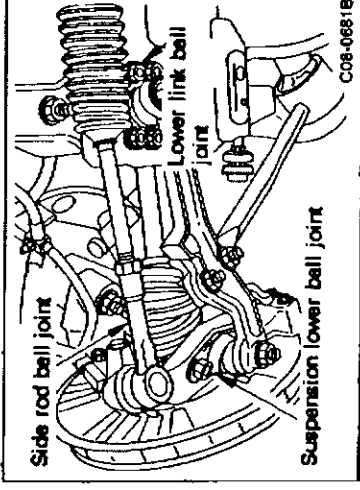
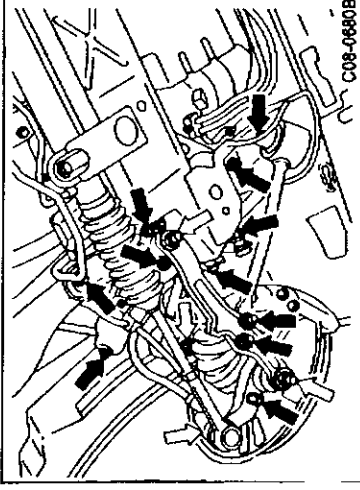
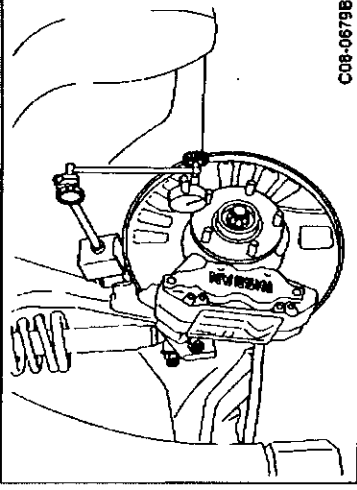
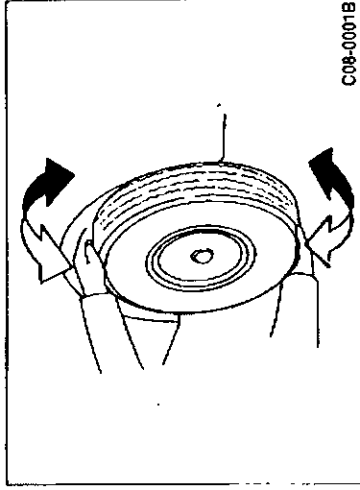
- The normal preload adjustment is not necessary because a unit bearing is used.
- If problem is found in inspection, disassemble and analyze problem to determine cause.

- Check suspension parts (↙) for looseness and make sure cotter pins (↘) are inserted.

- Check ball joints for grease leaks and dust cover for damage.

2-2 SHOCK ABSORBER OIL LEAK INSPECTION

- Check shock absorber for oil leakage.
- Check for fatigue, damage or deformation.
- The front shock absorber cannot be disassembled. Replace entire shock absorber assembly if necessary.



C7 FRONT SUSPENSION AND AXLE

2. On-vehicle Inspection and Preparation (Cont'd)

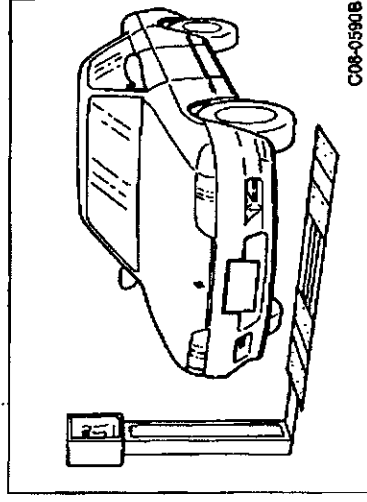
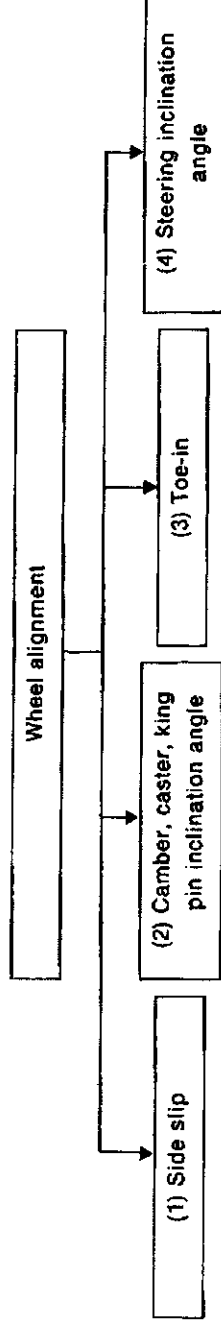
2.3 WHEEL ALIGNMENT INSPECTION AND ADJUSTMENT

Operation inspection

- Is tire wear and inflation pressure normal? (Refer to C9 WHEELS AND TIRES.)
- Is wheel bearing axial end play normal?
- Is there deformation in load wheel?
- Is there looseness in suspension ball joint and lower link ball joint?
- Is shock absorber operation normal?
- Are axle and suspension parts loose or damaged?
- Is vehicle posture normal?
- Is there damage, cracks or deformation in suspension link?
- Is vehicle unladen*?

* Fuel, radiator coolant and engine oil full. Spare tire, jack, hand tools and mats in designated positions.

Operation procedures



(1) Side slip distance inspection

- Check side slip distance. If it is within standard specification, wheel alignment can be considered to be normal.

CAUTION:

This can only be considered only when operational vertical stability is incorrect and there are no abnormalities in pre-operational inspection.

Front side slip distance standard value:

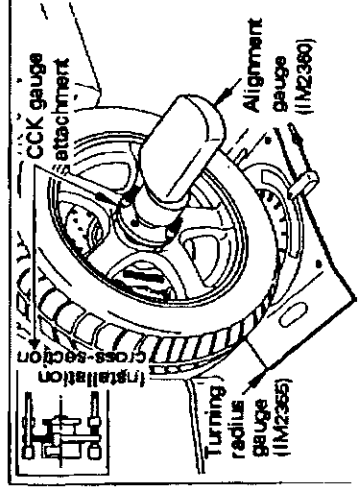
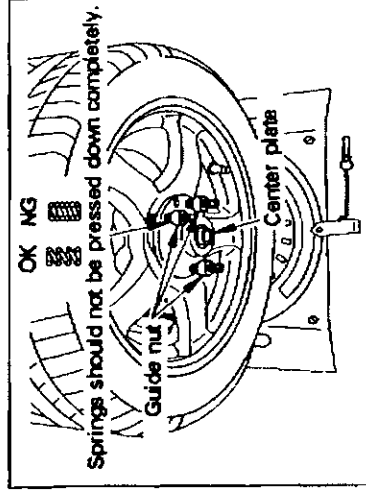
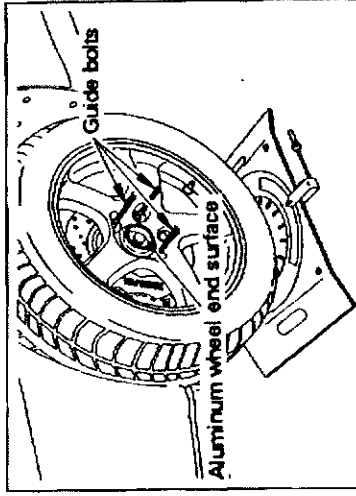
-5 to 5 mm (-0.20 to 0.20 in)

C7 FRONT SUSPENSION AND AXLE

2. On-vehicle Inspection and Preparation (Cont'd)

(2) Camber, caster, king pin angle inspection and measurement

If vehicles equipped with aluminum road wheels or if the alignment gauge installation surface (hub end) is more concave than road wheels, then use the CCK gauge attachment (special service tool: KV991 040S0) to perform the operations described below.



Set turning radius gauge on front wheels with vehicle on level ground.

Set rear wheels on stand that is same height as turning radius gauge.

Remove the wheel nuts and center caps. Screw the guide bolts on hub bolts as shown in figure.

Install adapter B on attachment.

Note 1: Screw nuts until adapter is mounted securely on attachment.

Tighten guide nuts uniformly until adapter is seated securely on aluminum wheel end surface.

Note 2: Do not tighten nuts until springs are pressed completely down.

Set alignment gauge on CCK gauge attachment and perform measurement.

Description	Specification
Camber	-0°55' ± 45'
Caster	RB26DETT: 3°40' ± 45'
King pin angle	15°25' ± 45'

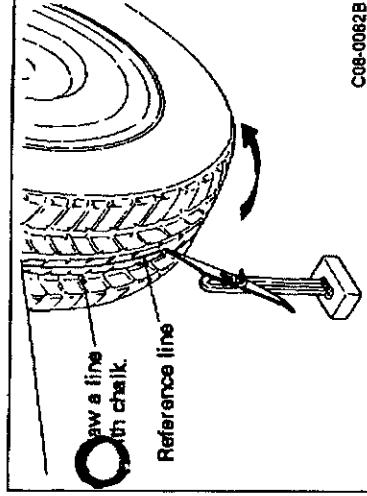
Measure toe-in.

C7 FRONT SUSPENSION AND AXLE

2. On-vehicle Inspection and Preparation

(Cont'd)

(3) Toe-in inspection and adjustment



Jack up front of vehicle and set on stands. Draw a base line on tread surface of tires with chalk.

After lowering front of vehicle, move it up and down to eliminate friction.

Set steering wheel in straight-ahead position.

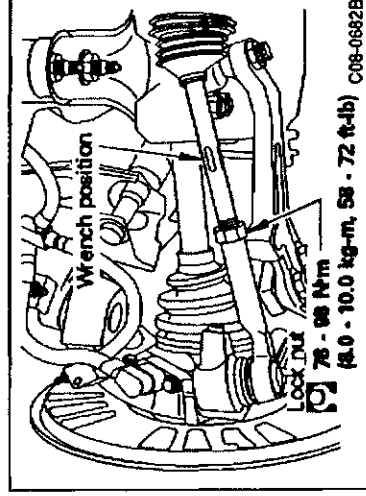
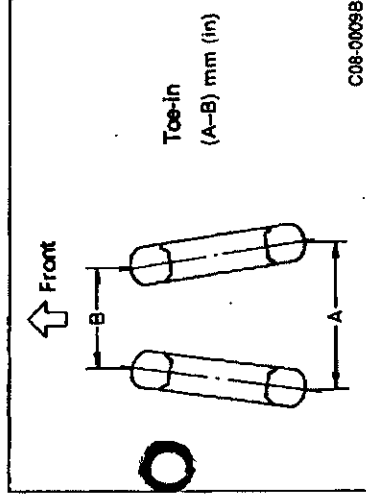
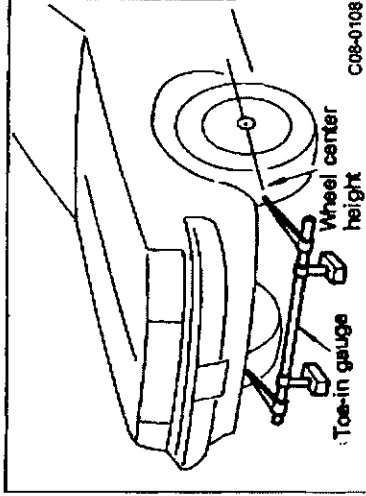
Adjust toe-in gauge to wheel center height and measure distance from standard line.

Measure dimensions A and B at same height as hub center as shown in figure and calculate toe-in.
Toe-in = A - B mm (in)

Toe-in standard value: 1 ± 1 mm
(0.04 ± 0.04 in)

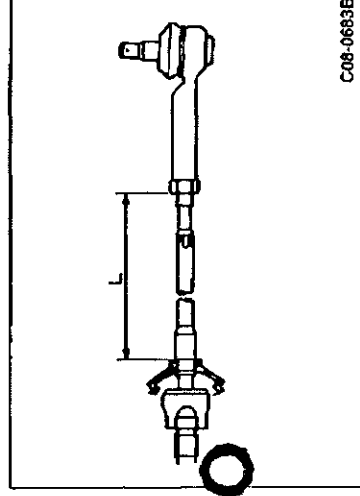
When toe-in is out of specification

Loosen lock nut as shown in figure. Adjust toe-in by varying the length of steering tie-rods.



CAUTION:

- (1) When adjusting steering tie-rods, turn the tie-rods the same distance forwards or backwards.
- (2) When replacing tie-rods, set the length to the specification indicated below and adjust toe-in.
- (3) When tightening lock nuts, secure tie rod with another wrench.
- (4) After adjustment, the tie-rod outer ball socket must face straight ahead.



Tie-rod standard length "L" dimension: 126.5 mm (4.98 in)

C7 FRONT SUSPENSION AND AXLE

2. On-vehicle Inspection and Preparation

(Cont'd)

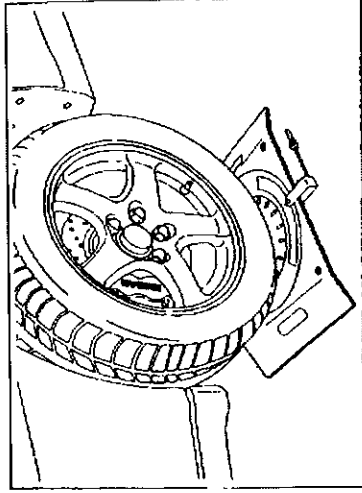
(4) Front wheel turning angle

- Set wheels in straight-ahead position and then move vehicle forward until front wheels rest on turning radius gauge properly. Rotate steering wheels all the way right and left and measure turning angle.

Standard value	Inner wheel	Outer wheel
	38° +1° -3°	32°

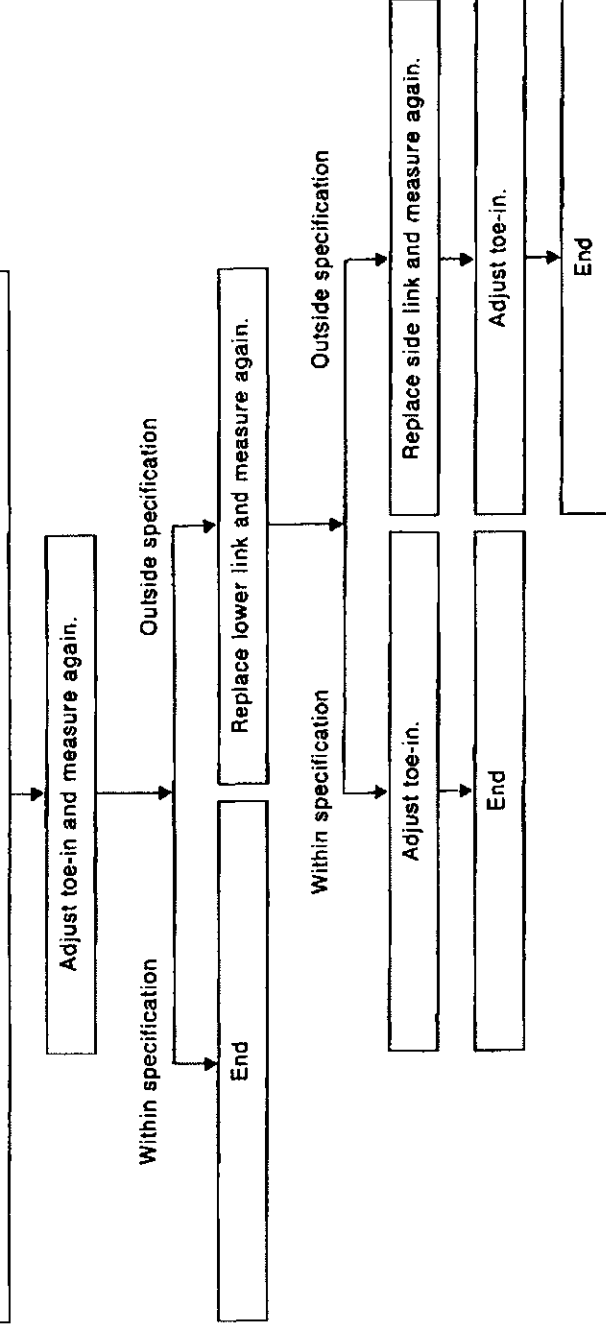
CAUTION:

Turning angle is set by the stroke length of steering gear, and cannot be adjusted.



(5) Trouble diagnosis

Camber angle, caster angle and king pin inclination angles are not within specification range.



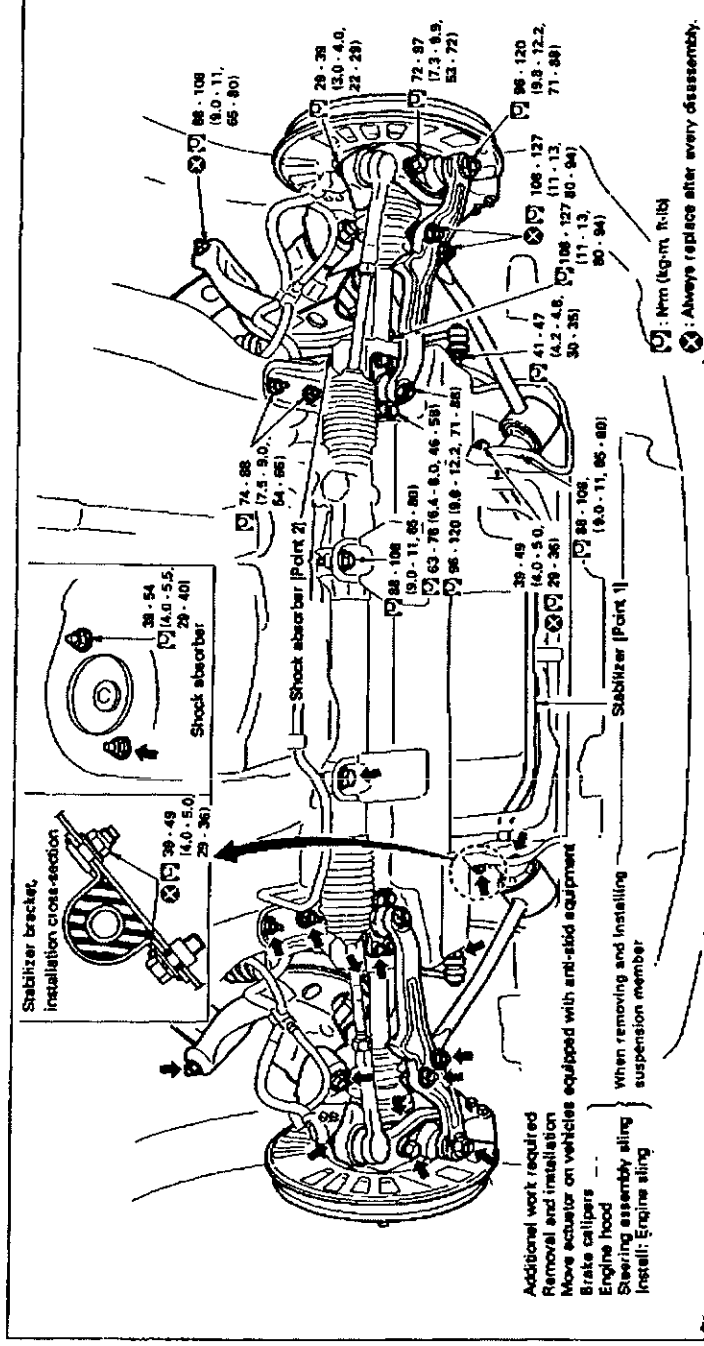
Item	Specification
Camber	-0°55' ± 45'
Caster	RB26DETT: 3°40' ± 45'
King pin angle	15°25' ± 45'

C7 FRONT SUSPENSION AND AXLE

FRONT SUSPENSION

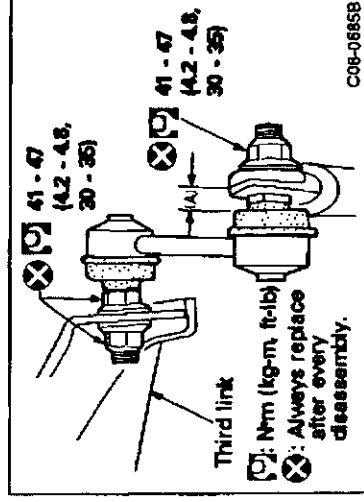
3. Part Removal and Installation, Assembly and Disassembly

(1) Removal and installation from vehicle



CAUTION:

- (1) When tightening links, first tighten temporarily and then tighten again under unladen condition*.
- * Fuel, radiator coolant and engine oil full. Spare tire, jack, hand tools and mats in designated positions.
- (2) Do not press brake pedal while brake caliper assembly is removed.

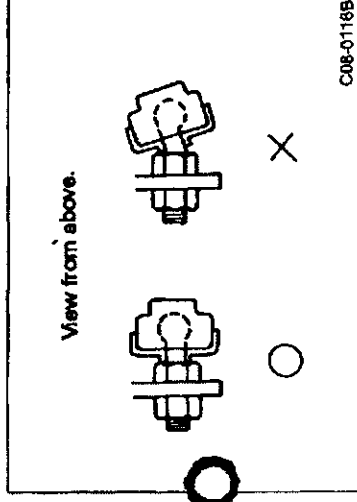


[Point 1] Stabilizer Installation

- The stabilizer uses a pillow-ball type connecting rod system. Observe following precautions when setting ball joint position during assembly.

CAUTION:

The distance "A" must be set so pillow-ball and connecting rod are perpendicular to stabilizer bar as shown in figure.



- Apply torque to inner nut on third link side and then tighten.
- Insert seating nut in lock hole on stabilizer side and tighten.

C7 FRONT SUSPENSION AND AXLE

3. Part Removal and Installation, Assembly and Disassembly (Cont'd)

[Point 2] Shock absorber assembly removal and installation

Removal

- Remove shock absorber fixing nuts from body when shock is extended.

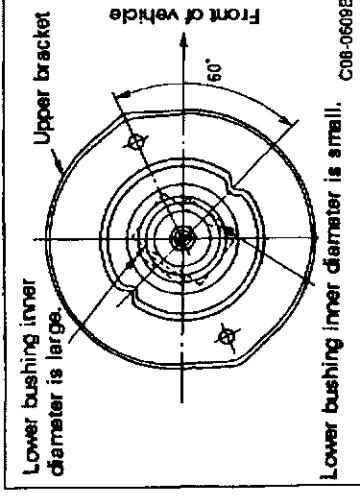
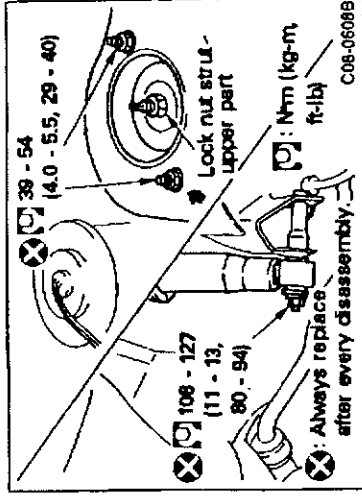
CAUTION:

Do not remove piston rod lock nut.

- Remove nuts from lower part of shock absorber (installed in third link).

Installation

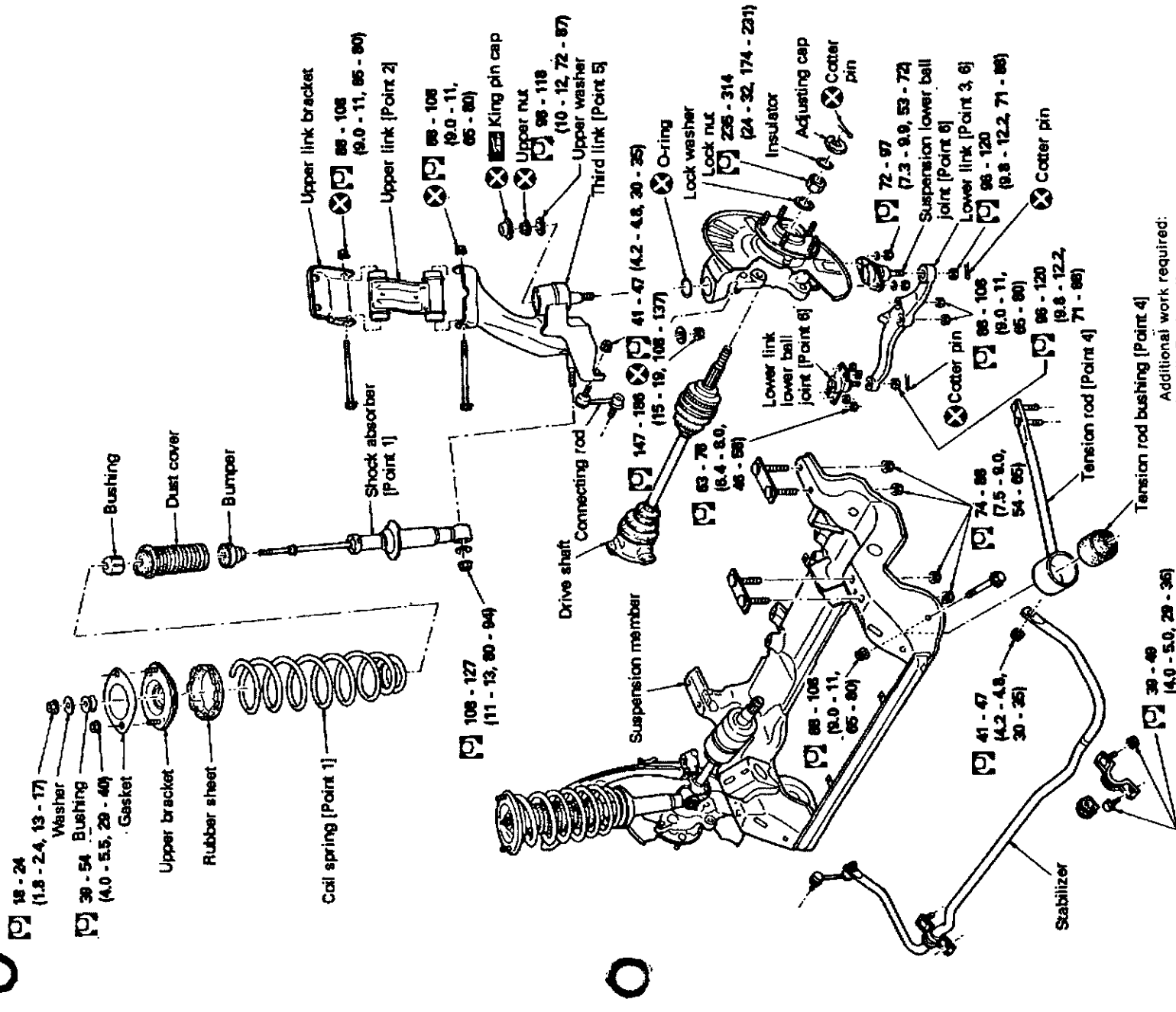
- Position small diameter side of shock absorber lower bushing so it faces front of vehicle. Assembly is reverse of disassembly sequence.
(The figure is cross-section of left shock absorber viewed from above.)



C7 FRONT SUSPENSION AND AXLE

3. Part Removal and Installation, Assembly and Disassembly (Cont'd)

(2) Assembly and disassembly



- After installing each suspension part, check and adjust wheel alignment.

• All bushings and washers have a specified direction. Pay attention to direction during installation.

• Be careful not to get grease and oil on bushing.

• When tightening tension rods, the vehicle must be in

unladen condition with wheels on ground for final tightening.

• The knuckle spindle is made of aluminum and electrical

corrosion will occur where it contacts other metallic

objects. Apply bitumen wax after assembly and disassembly.

Tension rod bushing [Point 4]

Additional work required:

Install: Engine sling

Remove and install:

Engine mount nuts

Engine hood

Separate brake hoses and tube

Inspect all parts [Point 6]

⊗ : N·m (kg-m, ft-lb)

⊗ : Always replace after every disassembly.

⊗ : Apply Nissan MP special grease No. 2.

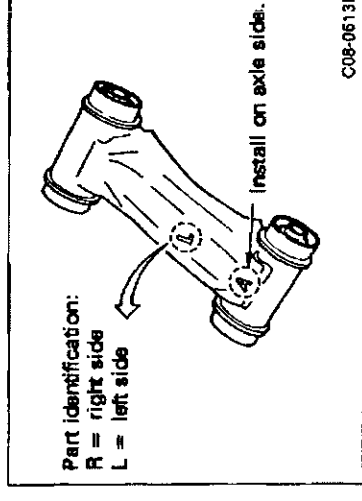
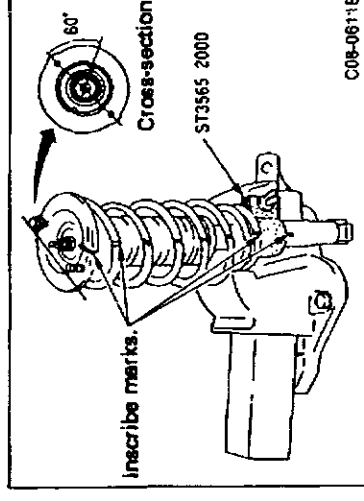
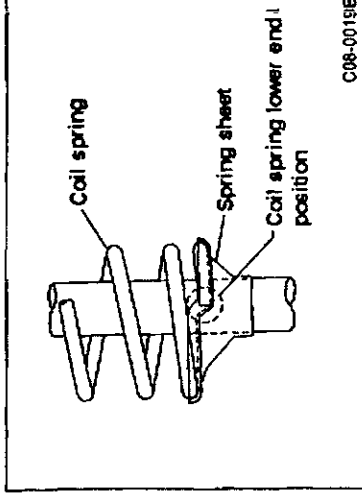
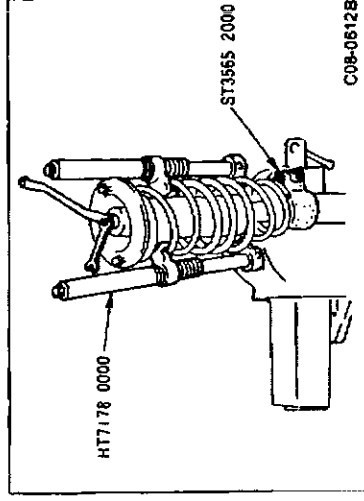
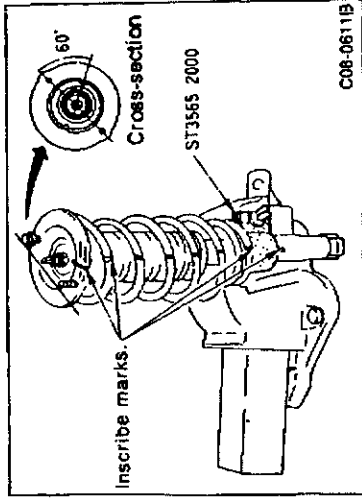
C7 FRONT SUSPENSION AND AXLE

3. Part Removal and Installation, Assembly and Disassembly (Cont'd)

[Point 1] Coil spring removal and installation

Removal

- Before removal, inscribe mating marks on shock absorber and coil spring as shown in figure.



- Secure attachment (special service tool) to shock absorber assembly and place in vise.
- Use a spring compressor (commercial service tool) and compress coil spring.
- Do not damage piston rod. Remove piston rod lock nut as shown in figure.

CAUTION:

Compress coil spring. Check that coil spring is free between upper sheet and lower sheet and remove piston rod lock nut.

Installation

- Pay attention to vertical direction and assemble spring.

CAUTION:

Make sure the small diameter spring end faces down and large diameter end is on top.

- Check that spring is seated securely in spring seat. Position spring so upper side (body side) and lower side (third link side) are at 60° angle as shown in figure.

CAUTION:

If the angle is not correct the shock absorber cannot be installed in vehicle.

[Point 2] Upper link installation

- Check that directional marks are positioned correctly for upper link installation. Always install upper link with 'A' side facing axle and unmarked side facing body.

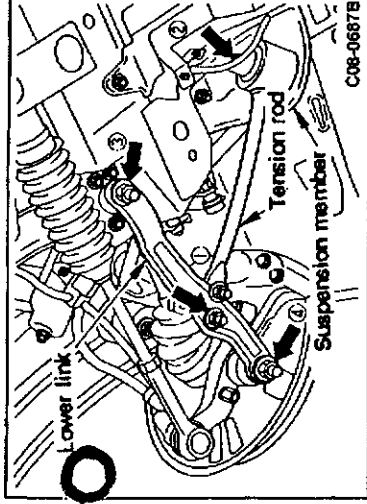
CAUTION:

Upper link bushing cannot be disassembled.

C7 FRONT SUSPENSION AND AXLE

3. Part Removal and Installation, Assembly and Disassembly (Cont'd)

[Point 3] Lower link and tension rod removal and installation and assembly sequence

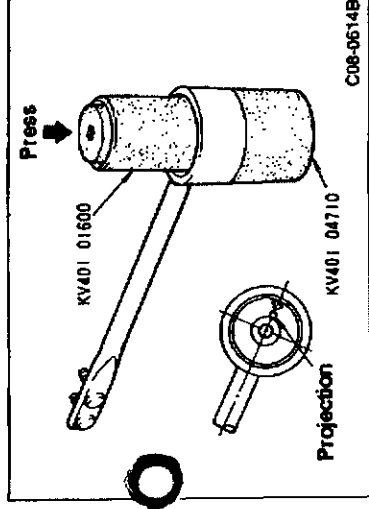


Removal

- Loosen nuts at positions indicated by arrow marks in figure.

Installation

- When suspension is not compressed (rebound):
 - ① Temporarily tighten lower link and tension rod.
 - ② Temporarily tighten tension rod bushing and front suspension member connection.
 - ③ Temporarily tighten lower link and suspension member lower ball joint connection.
 - ④ Temporarily tighten lower link and suspension lower ball joint connection.
- When vehicle is unladen, tighten nuts to specified torque in sequence ②, ③, ①, ④.



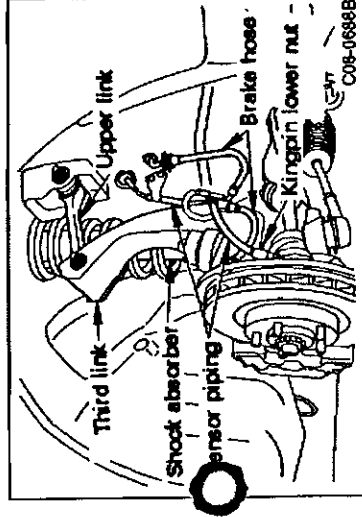
[Point 4] Tension rod bushing replacement

- To replace tension rod bushing, place drift [inner diameter 66 mm (2.60 in), outer diameter 75 mm (2.95 in)] below rod and drift [inner diameter 25 to 55 mm (0.98 to 2.17 in), outer diameter 62 mm (2.44 in)] on top and remove or install in press.
- Align bushing arrow mark in opposite direction from rod and then assemble.
Reference: Use the following special service tools.
Upper drift: KV401 01600
Lower drift: KV401 04710

[Point 5] Third link inspection and removal and installation

Inspection

- The kingpin bearing installed in third link usually does not require maintenance. Do not disassemble bearing unless there is a problem.



Removal

- Remove shock absorber.
- Remove brake hoses. Remove speed sensor piping in vehicles equipped with anti-skid system.
- Loosen kingpin lower nut.
- Loosen third link and upper link connections and remove.

C7 FRONT SUSPENSION AND AXLE

3. Part Removal and Installation, Assembly and Disassembly (Cont'd)

Installation

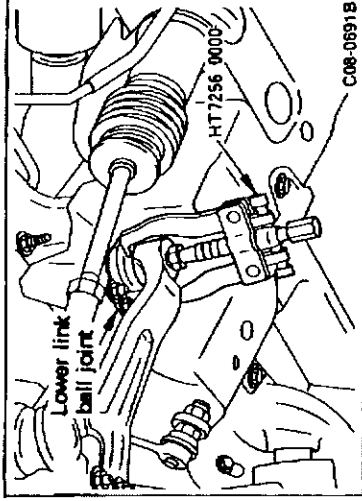
- Insert third link and kingpin assembly in knuckle spindle and tighten lower nuts to specified torque.
- Connect third link and upper link.
- Install brake hoses. Install speed sensor piping in vehicles equipped with anti-skid system.
- Install shock absorber.

King pin lower nut tightening torque:

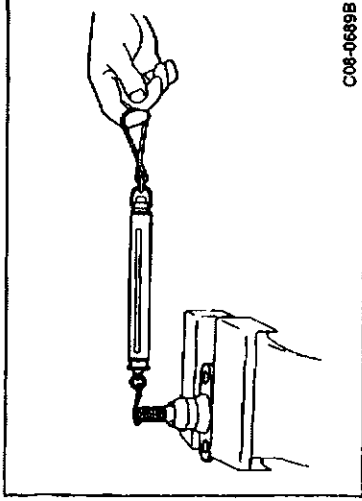
147 - 186 N·m (15 - 19 kg·m, 108 - 137 ft·lb)

[Point 6] Inspection

- ① Coil spring
 - Replace if cracked or deformed.
- ② Front suspension member
 - Replace if cracked or deformed.
- ③ Third link
 - If third link is cracked or deformed, replace kingpin bearing assembly.
- ④ Lower link
 - Replace if cracked or deformed.



- ⑤ Suspension lower and lower link ball joints
 - Use Pitman arm puller (commercial service tool) to separate suspension lower ball joint and lower the lower link ball joint from lower link as shown in figure.



Swing torque inspection

Specification (spring balance reading): N (kg, lb)

Suspension lower ball joint

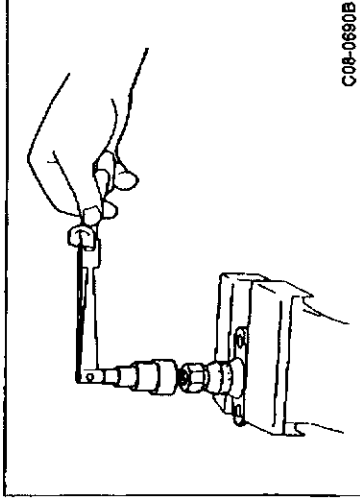
6.9 - 50.0 (0.7 - 5.1, 1.5 - 11.2)

Lower link lower ball joint

8.8 - 63.7 (0.9 - 6.5, 2.0 - 14.3)

CAUTION:

Swing more than 10 times by hand before measurement.
Measure the spring balance at height of ball stud cotter pin ball.



Sliding torque inspection

Specification: N·m (kg·m, ft·lb)

Suspension lower ball joint

0.5 - 3.4 (0.05 - 0.35, 0.4 - 2.5)

Lower link lower ball joint

0.5 - 3.4 (0.05 - 0.35, 0.4 - 2.5)

CAUTION:

Swing more than 10 times by hand before measurement.

C7 FRONT SUSPENSION AND AXLE

3. Part Removal and Installation, Assembly and Disassembly (Cont'd)

Axial end play inspection

Specification: mm (in)

Suspension lower ball joint 0 (0)

Lower link lower ball joint 0 (0)

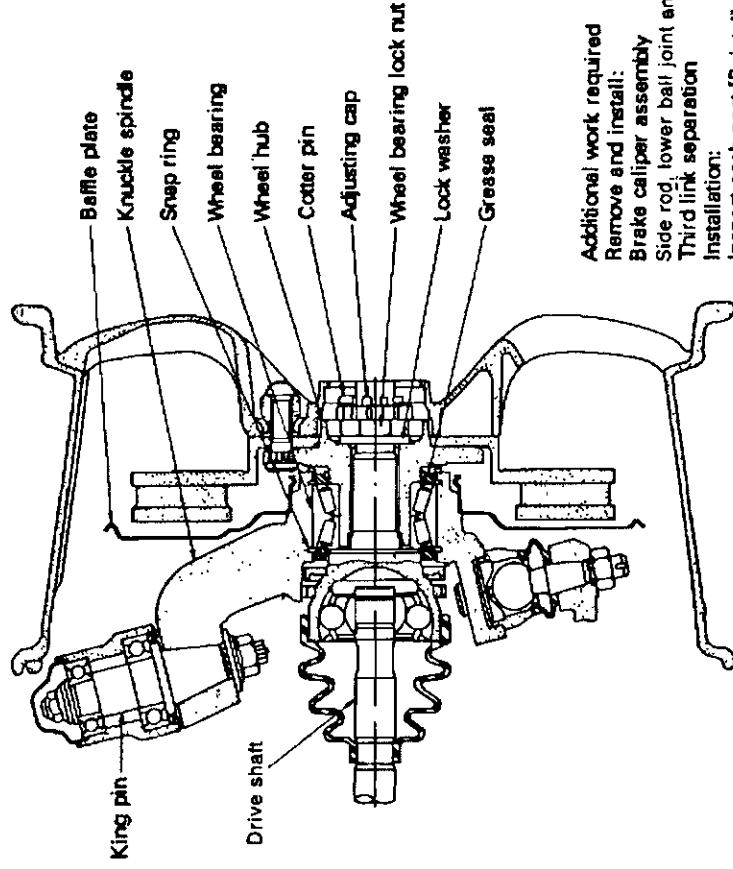
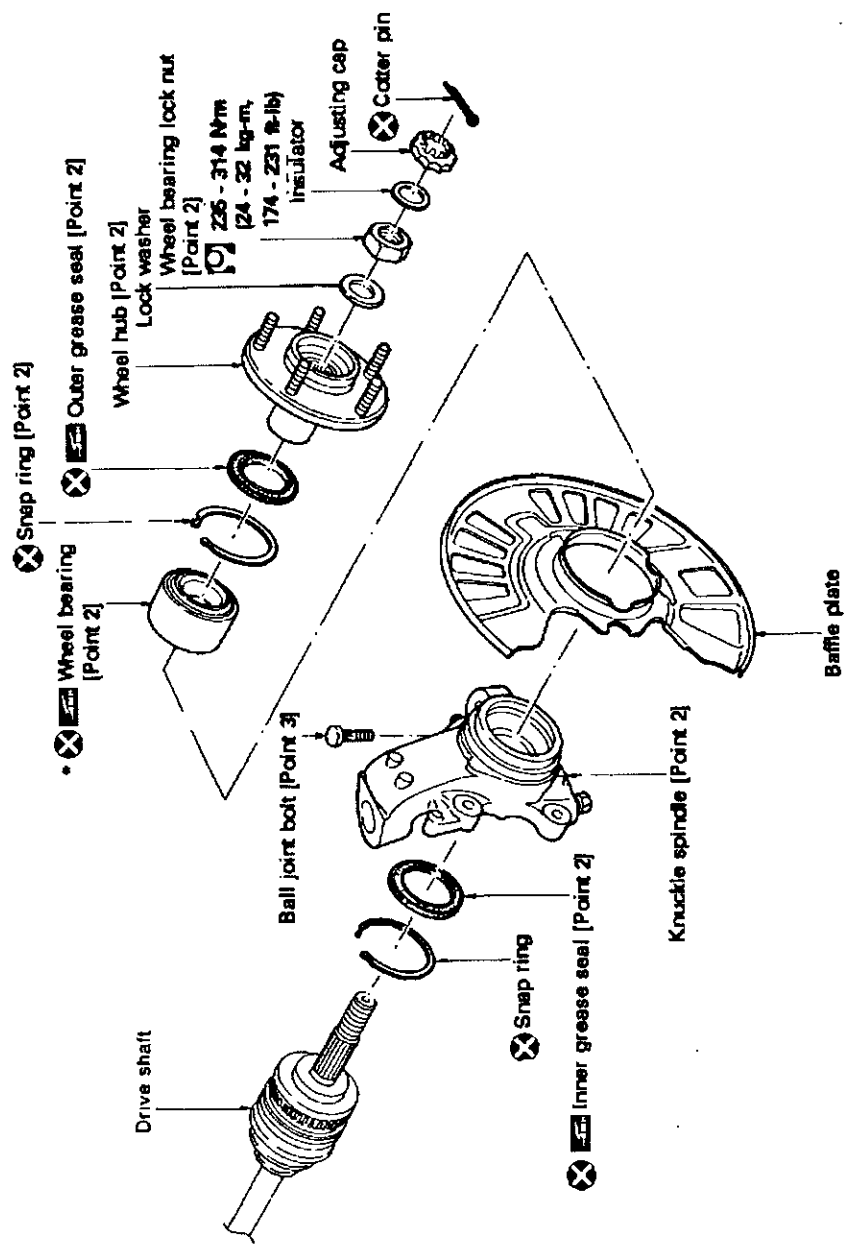
- If measurement value is outside standard specification range, replace ball joints.

C7 FRONT SUSPENSION AND AXLE

3. Part Removal and Installation, Assembly and Disassembly (Cont'd)

3-2 FRONT AXLE

(1) Removal and installation, assembly and disassembly



⊗ : Always replace after every disassembly.

⊞ : Apply Nissan MP special grease No. 2.

*: Replace as set.

Additional work required
Remove and install:
Brake caliper assembly
Side rod, lower ball joint and lower link separation [Point 1]
Third link separation
Installation:
Inspect each part [Point 4]

CH-225

C7 FRONT SUSPENSION AND AXLE

3. Part Removal and Installation, Assembly and Disassembly (Cont'd)

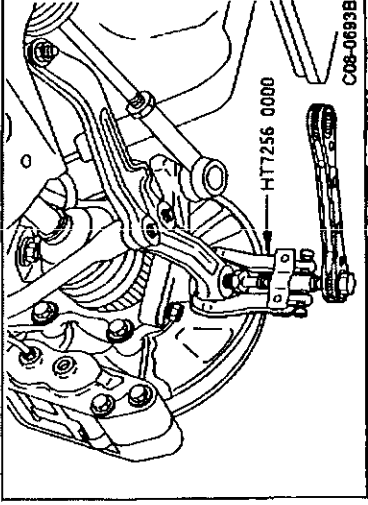
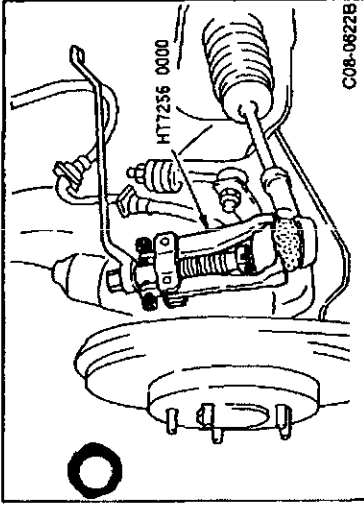
[Point 1] Separation of side rod, lower ball joint and lower link

- Place Pitman arm puller (commercial service tool) as shown in figure and separate side rod and suspension lower ball joint.

CAUTION:

The knuckle spindle is made of aluminum and scratches easily. Pay attention not to tap when using Pitman arm puller for removal.

- Use Pitman arm puller (commercial service tool) to separate suspension lower ball joint and lower link.

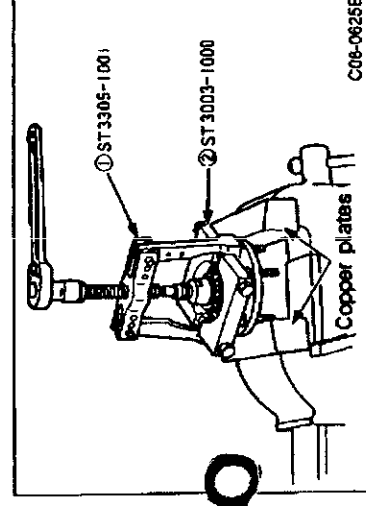
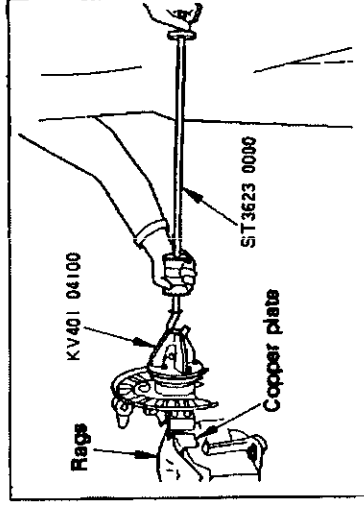


[Point 2] Wheel bearing removal and installation

- The wheel bearing usually does not require measurement. If any of the following problems are noted, replace wheel bearing assembly (including grease seal and snap ring).
- ① Wheel bearing makes growling noise during vehicle operation.
 - ② When bearing lock nut is tightened to specified torque, wheel bearing drags or turns roughly when hub is turned by hand.
 - ③ When bearing is removed from hub.

Removal

- Protect knuckle hub with copper plates and rags and secure it in vise.
- Place attachment (special service tool) on knuckle hub bolts. Use sliding hammer (special service tool) to separate knuckle spindle.



- ① Place bearing puller (special service tool), ② bearing replacer (special service tool) as shown in figure. Tighten on wheel hub and remove outer bearing.

C7 FRONT SUSPENSION AND AXLE

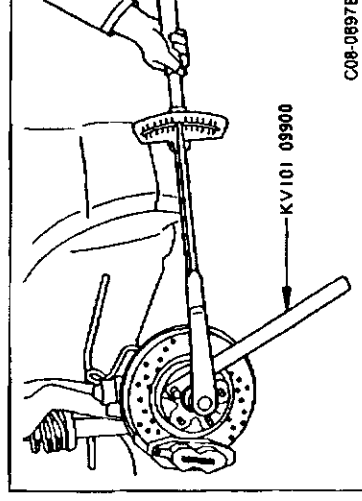
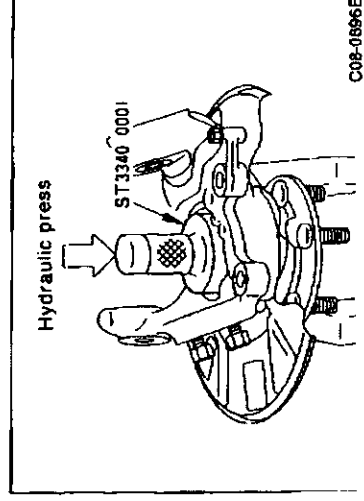
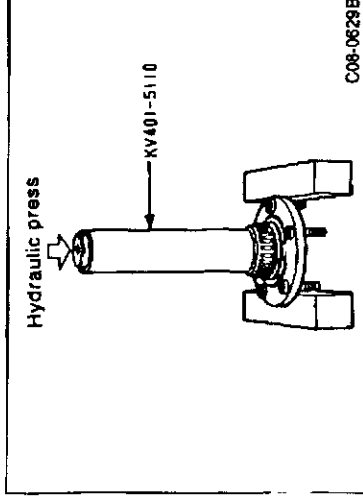
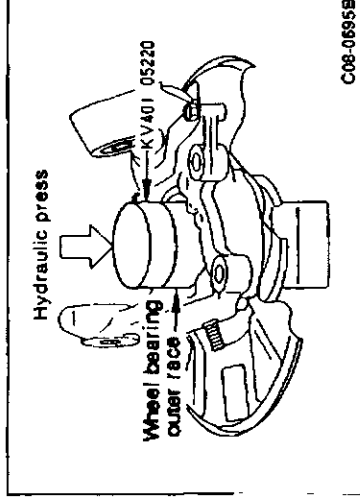
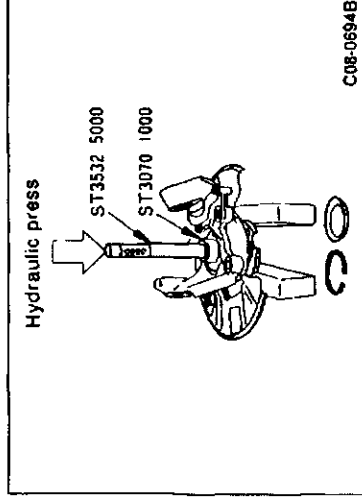
3. Part Removal and Installation, Assembly and Disassembly (Cont'd)

- Remove inner grease seal with screwdriver.

CAUTION:

Do not scratch knuckle spindle.

- Remove snap ring with snap ring pliers.
- Place drift (special service tool 61.5 mm dia.) against drift bar (special service tool) as shown in figure. Press out inner bearing and remove bearing outer race.



Installation

- Install new snap ring securely in groove on outside of knuckle spindle.
- Place wheel bearing outer race horizontally on knuckle spindle and press-fit with drift (special service tool). Stop insertion when bearing contacts snap ring on outer side.
- Install new snap ring securely in groove on inside of knuckle spindle. Install inner and outer bearings and inner and outer grease seals inside wheel.

- Place wheel hub horizontally on block.
- Place drift [special service tool: inner diameter 46 mm (1.81 in), outer diameter 60 mm (2.36 in)] on knuckle spindle as shown in figure and press-fit assembly.

- Assemble drive shaft and install in vehicle.
- Tighten lock nuts to specified torque.
Lock nut standard torque:
 235 - 314 N·m (24 - 32 kg-m, 174 - 231 ft-lb)
- Insert cotter pins and bend to secure.

C7 FRONT SUSPENSION AND AXLE

3. Part Removal and Installation, Assembly and Disassembly (Cont'd)

[Point 3] Suspension lower ball joint bolt removal and installation

Removal

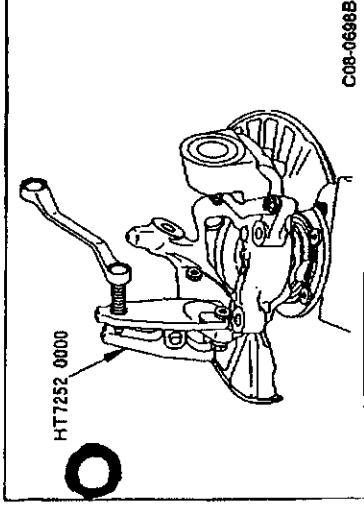
- The length below bolt head is serrated just like hub bolts. Use ball joint remover (commercial service tool) and remove bolts.

CAUTION:

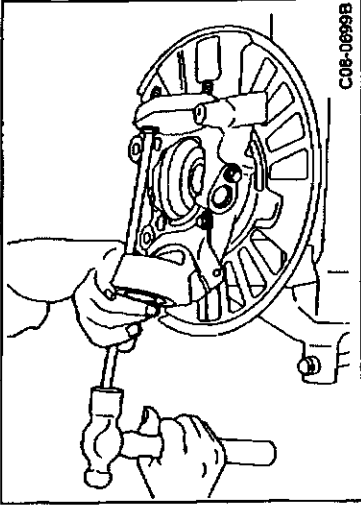
Do not scratch knuckle spindle when pounding out bolts with hammer.

Installation

- Align serration of bolt below head with knuckle spindle serration hole and tap in with brass shaft.



C08-0698B



C08-0699B

[Point 4] Inspection

- Inspect all parts and replace if the following problems are noted.
 - ① Wheel bearing is damaged, seized, rusted or does not turn easily.
 - ② Front hub is cracked. (Check with dyeing test damage detection method.)
 - ③ Knuckle spindle is deformed, dented, cracked (check with dyeing test damage detection method) or threads are damaged.

C8 REAR SUSPENSION AND AXLE

Tools required

Name		Application	Remark
Special service tool	Drift KV401 04710 a: 76.2 mm (3.000 in) dia. b: 68 mm (2.68 in) dia.	 C00-0195	Axle housing dust seal removal and installation
	Drift ST2786 1000 a: 52 mm (2.44 in) dia. b: 52 mm (2.05 in) dia.	 C00-0195	Axle housing bushing (shock absorber) removal and installation

Already described

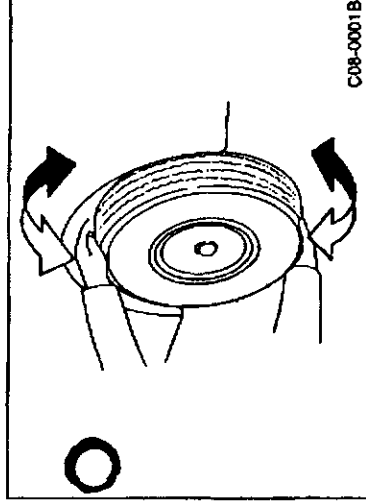
1. Summary

Specifications

Description	Engine		RB260ETT
Suspension type			Multi-link independent suspension
Wheel alignment (unladen vehicle)	Toe-in	mm (in)	2 ± 2 (0.08 ± 0.08)
	Camber	mm (in)	-1°05' ± 30'
	Side slip distance (reference)	mm (in)	-5 to 5 (-0.20 to 0.20)
Shock absorber	Damping force [at 0.3 m (1.0 ft)/s]		1,108 (113, 249)
		Expansion side Compression side	402 (41, 90)
Coil spring	Spring constant	N/mm (kg/mm, lb/in)	26.5 (2.7, 151)
	Free length	mm (in)	345 (13.58)
	Coil center diameter	mm (in)	100 (3.94) [lower side 90 (3.54)]
	Wire diameter	mm (in)	11.8 (0.465)
	Number of active coils		7.29
Stabilizer outer diameter (non-solid)		mm (in)	25.4 (1.000)

Inspection specifications

Item	Specification	
Wheel alignment	Refer to "Specifications".	
Wheel bearing lock nut tightening torque	N·m (kg-m, ft-lb)	206 - 275 (21 - 28, 152 - 203)
Wheel bearing axial end play	mm (in)	0 (0)
Suspension ball joint	Swing torque (spring balance conversion)	7.8 - 54.9 (0.8 - 5.6, 1.8 - 12.3)
	Sliding torque	0.5 - 3.4 (0.05 - 0.35, 0.4 - 2.5)
	Axial end play	0 (0)
	Tightening torque	78 - 93 (8.0 - 9.5, 58 - 69)



2. On-vehicle Inspection and Preparation

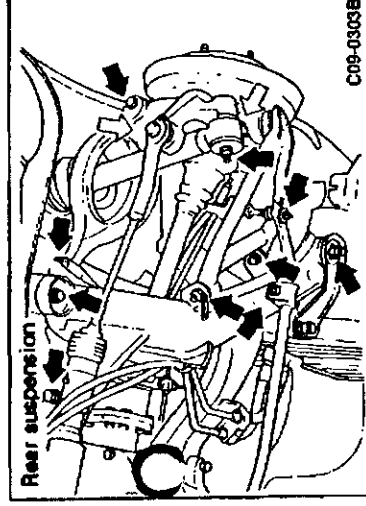
2-1 REAR SUSPENSION AND AXLE INSPECTION AND ADJUSTMENT

Inspection

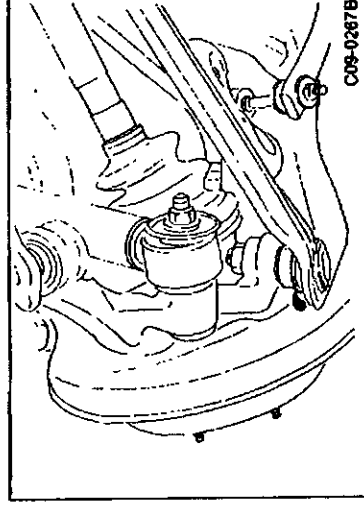
- Check axle and suspension parts for looseness, wear or damage. Shake each rear wheel and check for noise and excessive play.

Adjustment

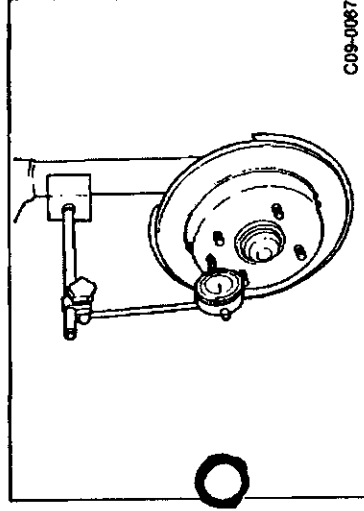
- If loose, retighten to specified torque.
- Replace all damaged parts.



- Tighten rear suspension parts (↕) and check if cotter pins (↔) are inserted.



- Check ball joints for grease leakage and dust cover for cracks or other damage.



2-2 WHEEL BEARING INSPECTION

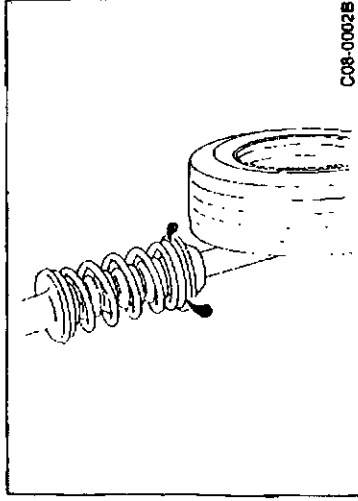
- If there is any axial end play, tighten wheel nuts to specified torque and check axle end play again.
End play standard value: 0 mm (0 in)
- A unit bearing is used so no preload adjustment is normally required.
- If any problem is noted, check axle.

C8 REAR SUSPENSION AND AXLE

2. On-vehicle Inspection and Preparation (Cont'd)

2-3 SHOCK ABSORBER INSPECTION

- Check shock absorber for grease leakage.
- Check for fatigue, cracks, deformation or other damage.
- The shock absorber cannot be disassembled. Replace entire unit if necessary.

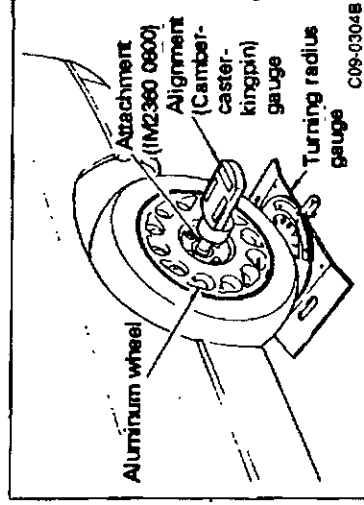
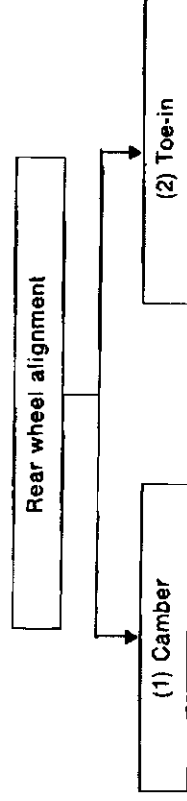


2-4 WHEEL ALIGNMENT INSPECTION AND ADJUSTMENT

Inspection before operation

- Check tires for wear or improper inflation. Refer to C9 ROAD WHEEL AND TIRES.
- Check if wheel bearing axial end play is within specification.
- Check wheels for deformation.
- Check suspension ball joint for play.
- Check if shock absorbers operate properly.
- Check axle and suspension for looseness or deformation.
- Check if vehicle posture is normal.
- Check suspension link for damage, cracks or deformation.
- Check that vehicle is unladen*.
- * (Unladen: Fuel, radiator coolant and engine oil full. Spare tire, jack, hand tools and mats in designated positions.

Operation sequence



(1) Camber inspection and adjustment

Move vehicle so rear wheels rest on turning radius gauge correctly and check that vehicle is horizontal.

Raise front wheels on stand so they are the same height as rear wheels.

Attach alignment gauge to wheel and measure camber. (Note)

Note: The same attachment can be used for both the front and rear wheels.

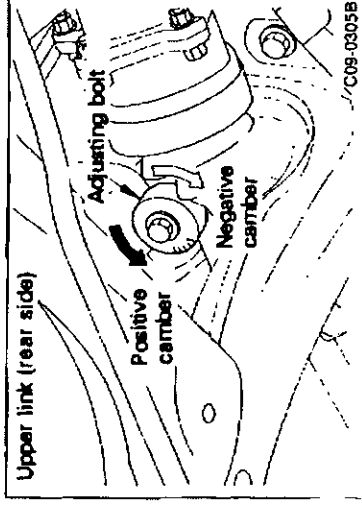
Specification:

if camber is not within specification: Camber: $-0^{\circ}55' \pm 30'$

Adjust camber.

Turn adjusting bolt on upper link (rear side) suspension member to adjust camber.

Adjustment must always be made after camber and toe-in adjustment.

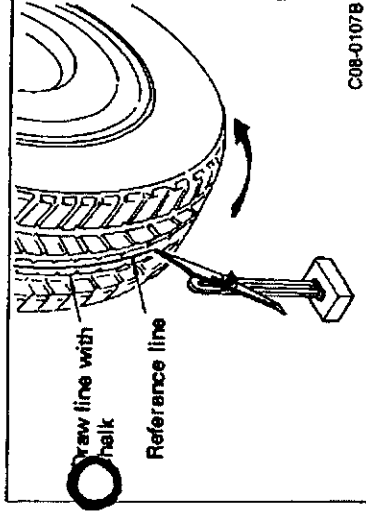


C8 REAR SUSPENSION AND AXLE

2. On-vehicle Inspection and Preparation

(Cont'd)

(2) Toe-in inspection and adjustment



Jack up rear of vehicle and draw a base line on the tread.

After lowering rear of vehicle, move it up and down to eliminate friction.

Set toe-in gauge at same height as wheel center and measure reference line distance.

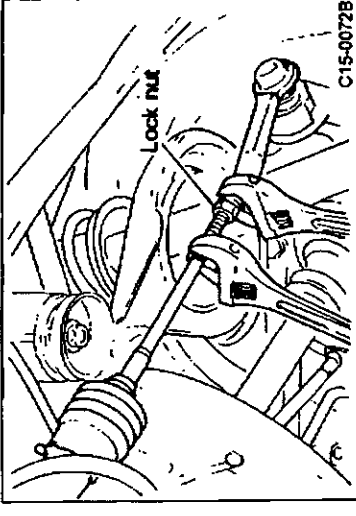
Measure dimensions A and B as shown in figure and calculate toe-in.
 $\text{Toe-in} = A - B \text{ mm (in)}$

Toe-in standard value:
 $2 \pm 2 \text{ mm (0.08} \pm 0.08 \text{ in)}$

If not within specification:

Turn lower link (rear side) suspension member (adjusting bolt) to adjust toe-in.

For models equipped with SUPER HICAS system, loosen lock nut and turn power cylinder lower link toe adjustment rod as shown in figure to adjust toe-in.

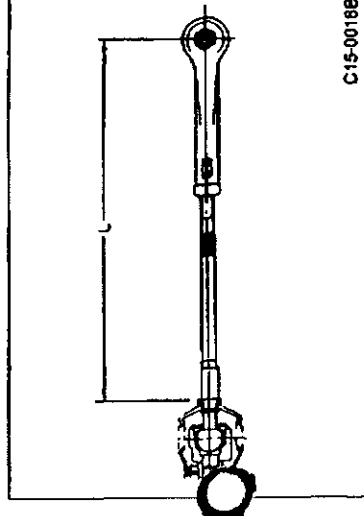
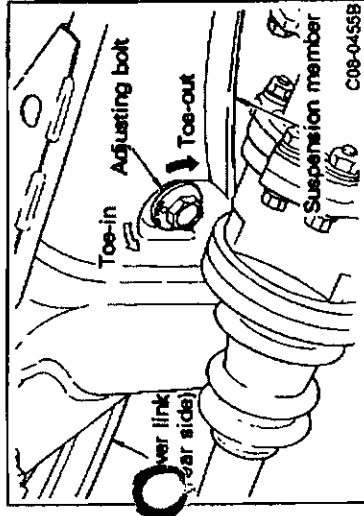
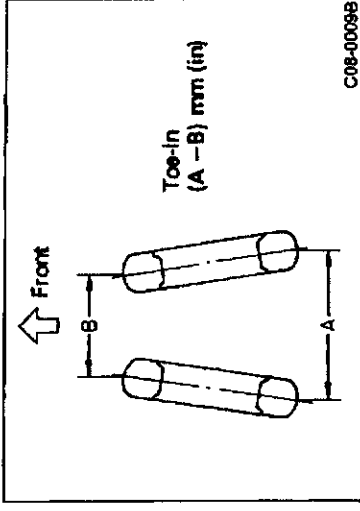


CAUTION:

- (1) When adjusting lower link, turn left and right rods same distance.
- (2) When replacing lower link rod, set rod length as indicated below to adjust toe-in.

For models equipped with SUPER HICAS system, set power cylinder lower link length to following specification before toe-in adjustment.

Lower link standard dimension (L) :
309.4 mm (12.18 in)

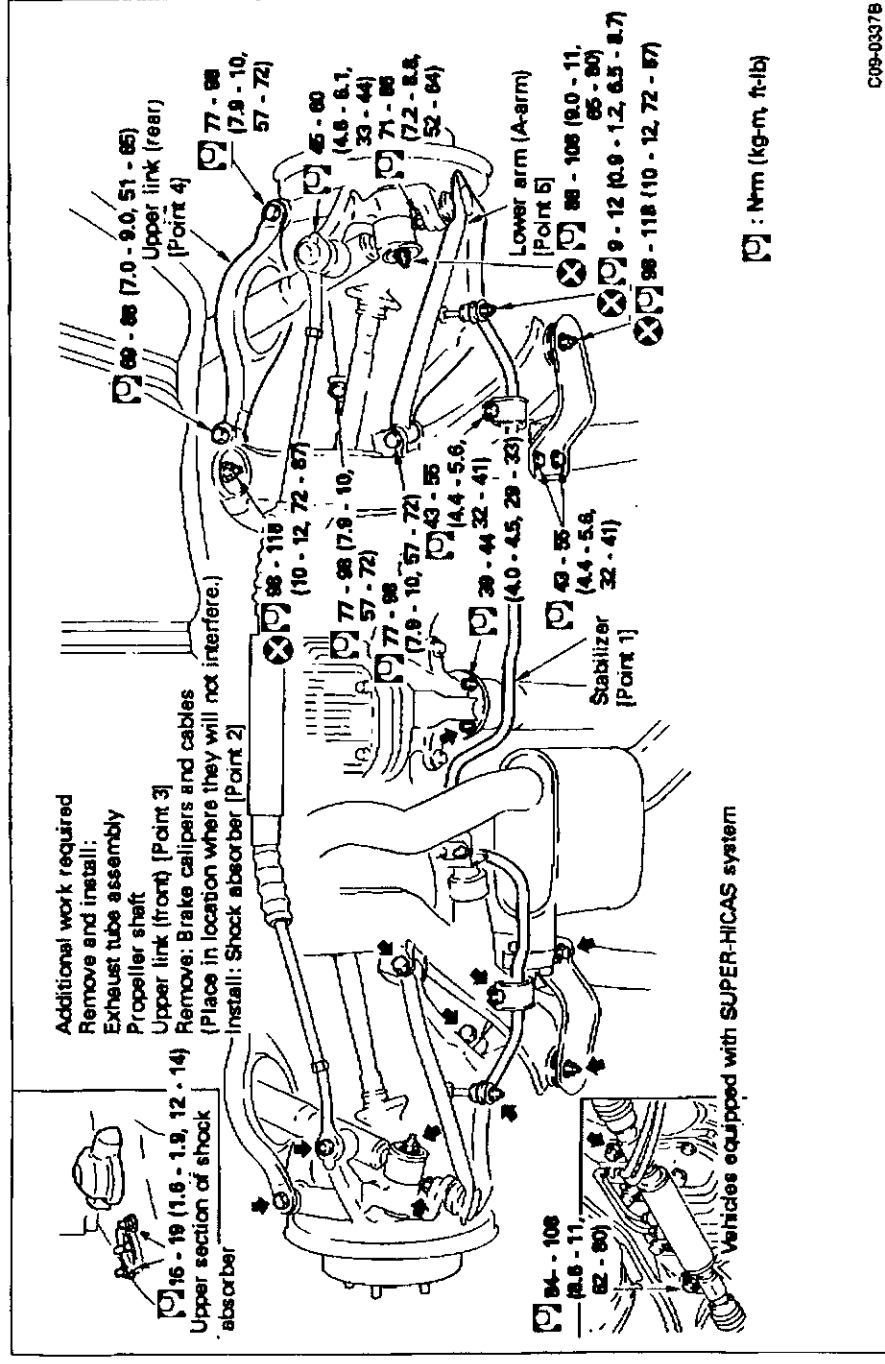


C8 REAR SUSPENSION AND AXLE

3. Removal and Installation, Assembly and Disassembly

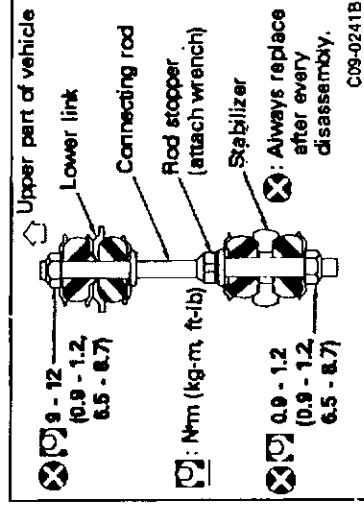
3-1 REAR SUSPENSION

(1) Removal and installation from vehicle



CAUTION:

- (1) Tighten links temporarily on vehicle and then tighten again with vehicle in unladen condition.
- (2) Do not press on brake pedal when brake caliper assembly and brake drum are removed.



[Point 1] Stabilizer installation

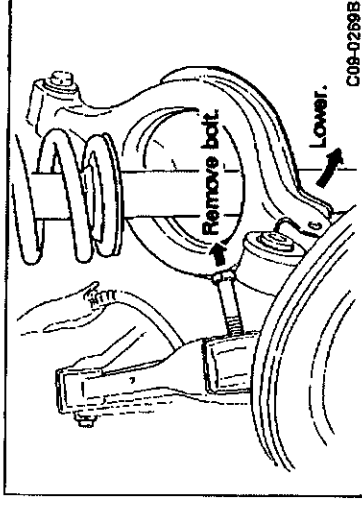
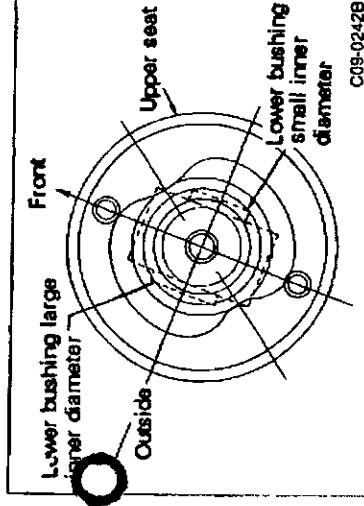
- Assemble stabilizer on connecting rods as shown in figure.

C8 REAR SUSPENSION AND AXLE

3. Removal and Installation, Assembly and Disassembly (Cont'd)

[Point 2] Rear shock absorber installation

- Install shock absorber with large inner diameter lower bushing side facing outside of vehicle. (The figure on left is a cross-section of left side shock absorber viewed from above.)



[Point 3] Upper link (front) removal and installation

Removal

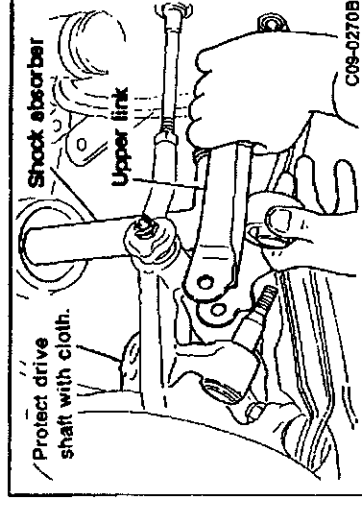
- To remove upper link (front), first remove bolts from upper link (rear) rear housing then remove bolts from upper link (front) rear housing.
- Remove suspension member.

CAUTION:

Do not remove link bushing from link.

Installation

- Assembly is reverse sequence from disassembly.



[Point 4] Upper link (rear) removal and installation

Removal

- Remove lower side of rear shock absorber.
- Remove bolts from upper link (rear) (on both rear housing and suspension member).
- Press shock absorber towards inside of vehicle and lower it without touching rear housing.

CAUTION:

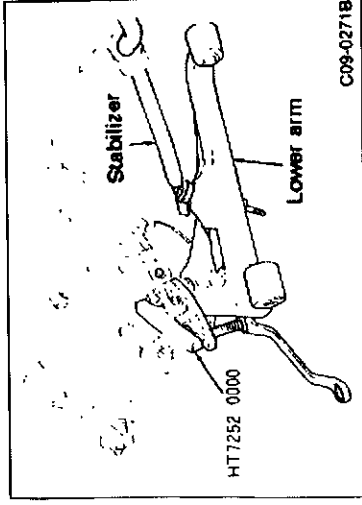
Place cloth on drive shaft boot to protect it from damage during removal and installation.

Installation

- Assembly is the reverse sequence from disassembly.

C8 REAR SUSPENSION AND AXLE

3. Removal and Installation, Assembly and Disassembly (Cont'd)



[Point 5] Lower arm (A arm) removal and installation

Removal

- Remove lower side of stabilizer connecting rod and bracket.
- Remove drive shaft.
- Remove suspension member bolts.
- Use ball joint remover (commercial service tool) to for rear housing separation.

CAUTION:

- (1) Do not damage ball joint boot.
- (2) Do not remove link bushing from link.

Installation

- Assembly is the reverse sequence from disassembly.

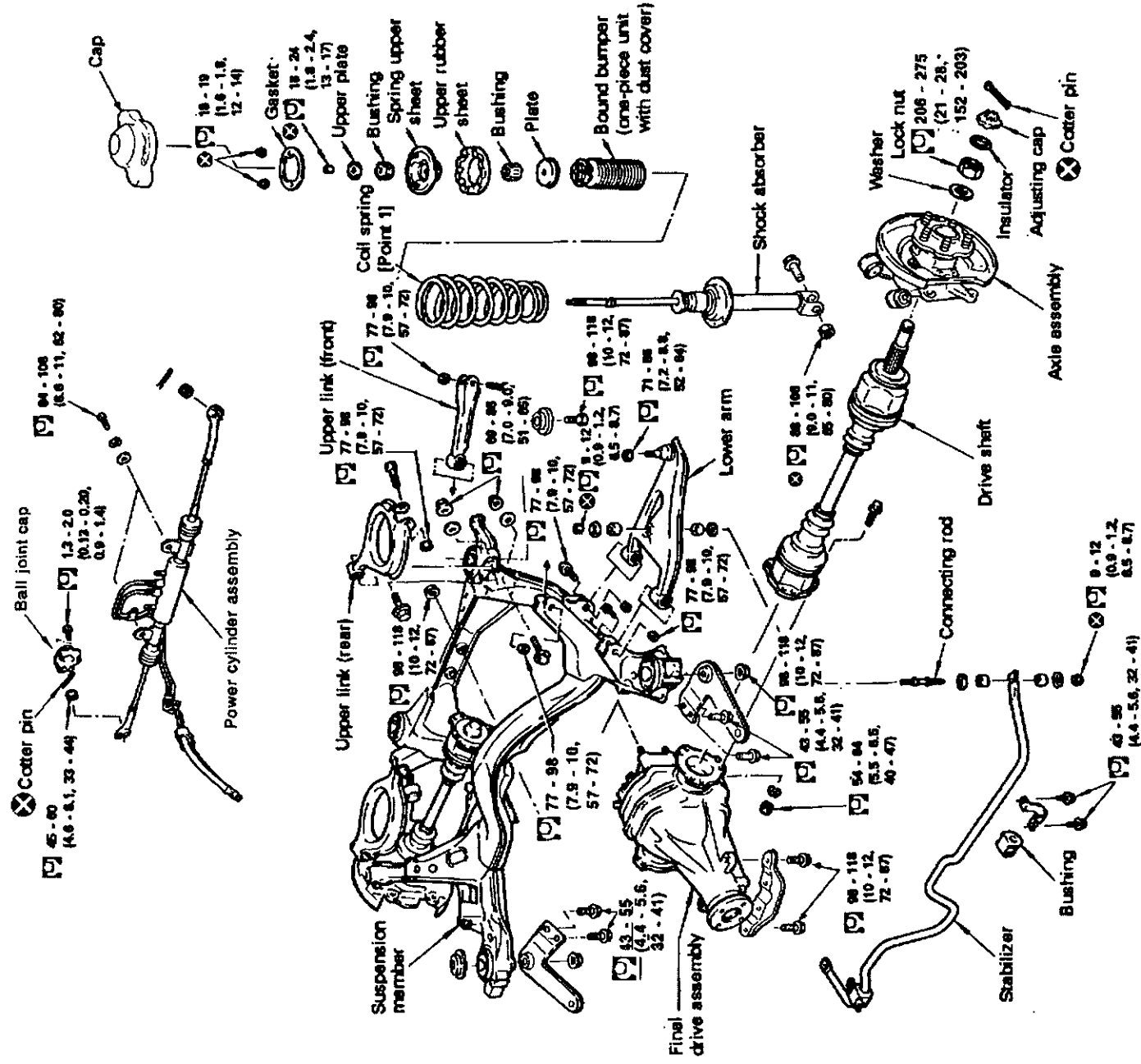
CAUTION:

Check wheel alignment after link removal and installation.

C8 REAR SUSPENSION AND AXLE

3. Removal and Installation, Assembly and Disassembly (Cont'd)

(2) Rear suspension disassembly



- After installing each suspension part, check and adjust wheel alignment
- Make sure bushing and washer are installed in correct direction.
- Do not let grease or oil contact bushing.
- When stabilizer and link are installed, tighten parts with vehicle on level ground in unbiased condition.
- Do not replace suspension side bushing of upper link and lower arms (link). Only replace axle bushing when necessary.
- The suspension member insulator cannot be disassembled.

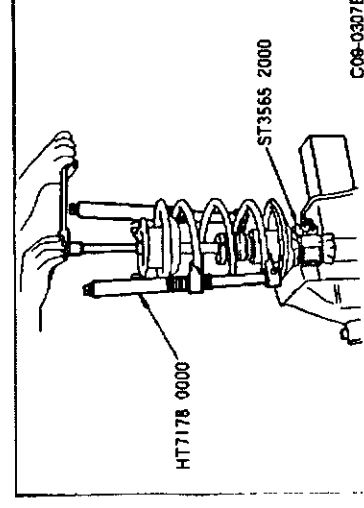
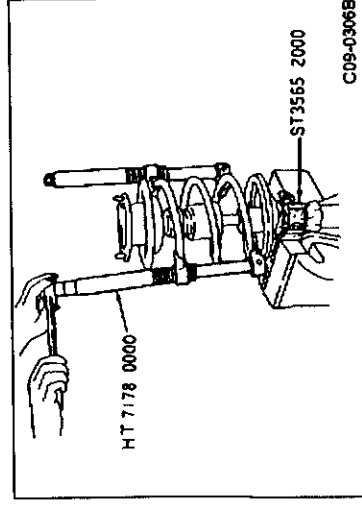
Additional work required
Install: Exhaust tube assembly
Propeller shaft
Parking brake cable
Brake calipers
Inspect each part [Point 2]
⊗ : Always replace after every disassembly.
□ : N·m (kg-m, ft-lb)

3. Removal and Installation, Assembly and Disassembly (Cont'd)

[Point 1] Coil spring removal and installation

Removal

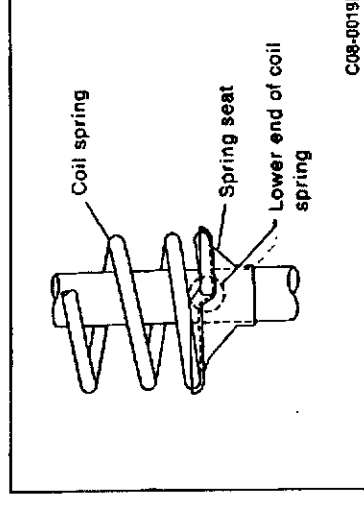
- Install attachment (special service tool) to strut assembly and secure in vice.
- Using spring compressor (commercial service tool), compress coil spring.



- Remove piston rod lock nut without damaging piston rod.
- CAUTION:**
Compress coil spring. Make sure it is free between the upper sheet and lower sheet and then remove piston rod lock nut.

Installation

- Check that spring is set securely in spring sheets and gradually loosen spring compressor (commercial service tool).



[Point 2] Inspection

① Coil spring

- Check for cracks and deformation and replace if necessary.

② Rear suspension member

- If suspension member is cracked or deformed or member insulator is damaged, replace member assembly.

③ Upper and lower links

- If upper and lower links are deformed or cracked or bushing is damaged, replace each link.

④ Suspension lower ball joint

- Measure ball joint swing torque, sliding torque and axial end play. The measurements are the same as for the front suspension lower.

3. Removal and Installation, Assembly and Disassembly (Cont'd)

3-2 REAR AXLE REMOVAL AND INSTALLATION, ASSEMBLY AND DISASSEMBLY

Vehicles equipped with SUPER HICAS system

18 - 24

(1.8 - 2.4,

13 - 17)

Seal cover

Lower link ball joint [Point 7]

Axle housing

Wheel bearing lock nut

206 - 275

(21 - 28, 152 - 203)

Lock washer

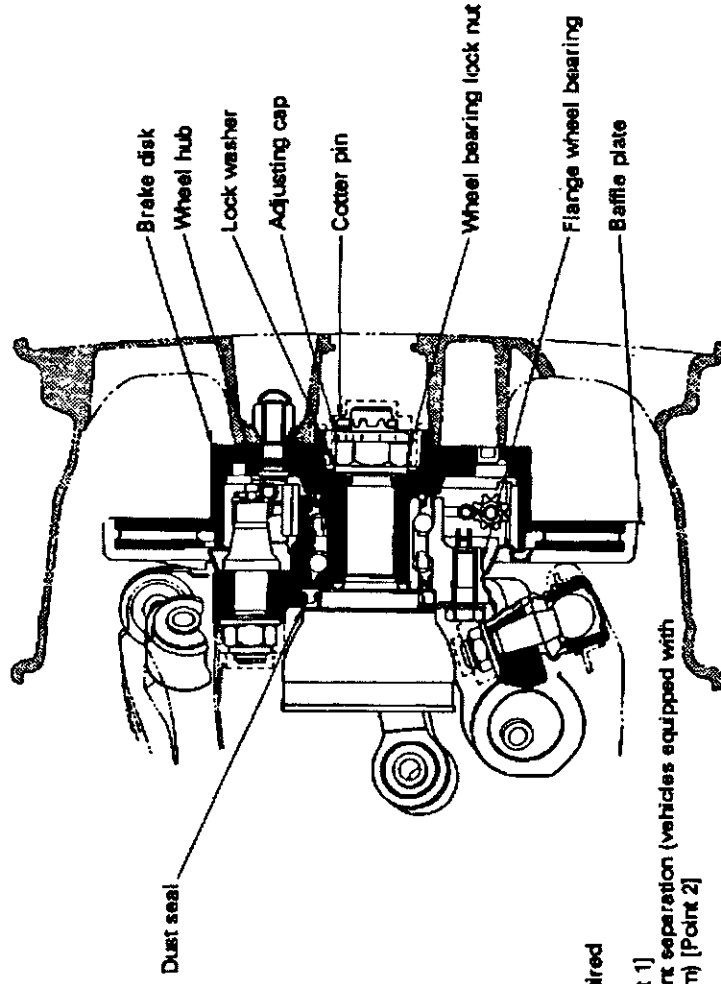
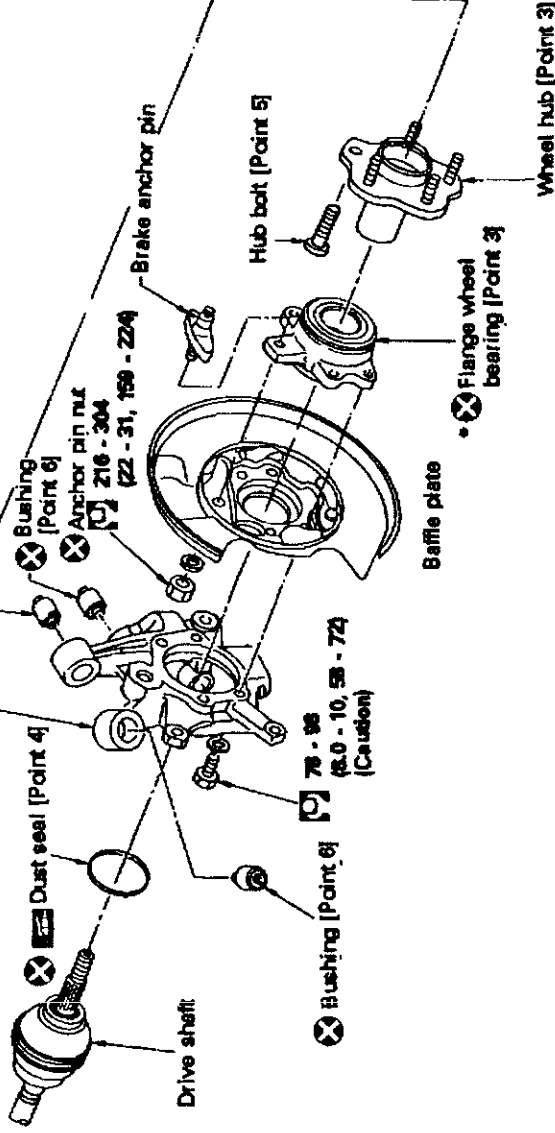
Bushing [Point 6]

Axle housing [Point 6, 7]

Insulator

Adjusting cap

Cotter pin



Additional work required

Remove and install:

Brake calipers [Point 1]

Axle housing ball joint separation (vehicles equipped with SUPER HICAS system) [Point 2]

Shock absorber unit

Inspect all installed parts [Point 8]

[N] : Nm (kg-m, ft-lb)

[X] : Always replace after every disassembly.

[I] : Apply Nissan MP special grease No. 2

[R] : Replace as set

CAUTION:

(1) Tighten bolts in criss-cross pattern 2-3 separate times.

(2) Conditions are same as for NES standard bolts. Pay attention not to make mistakes because strength varies.

C09-0355B

C8 REAR SUSPENSION AND AXLE

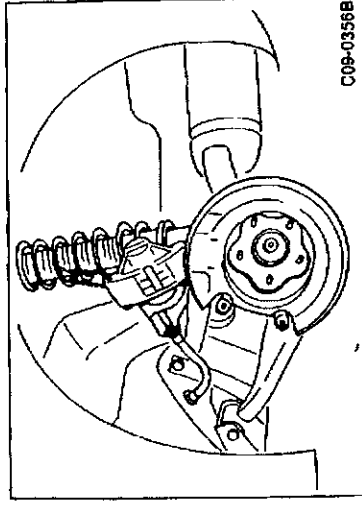
3. Removal and Installation, Assembly and Disassembly (Cont'd)

[Point 1] Brake caliper separation

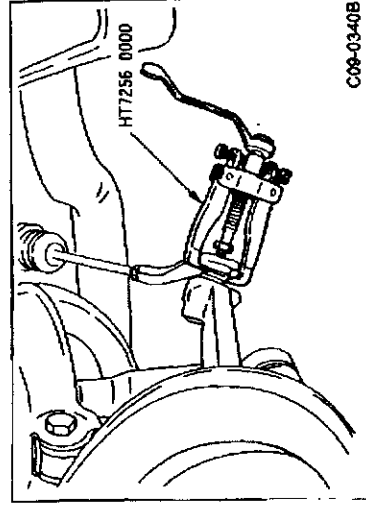
- Remove caliper from axle housing. Set it where it will not cause interference. (It is not necessary to remove brake cable.)

CAUTION:

Do not press brake pedal while brake caliper assembly is removed.



C09-0356B



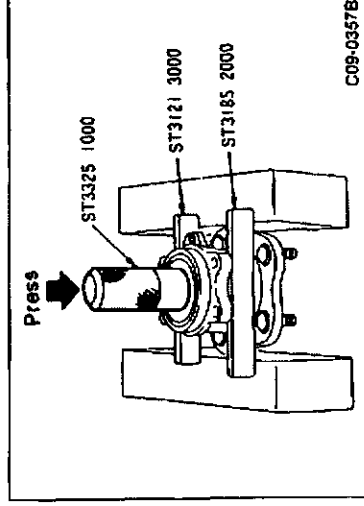
C09-0340B

[Point 2] Lower link and ball joint separation

- Use Pitman arm puller (commercial service tool) to separate axle housing ball joint and lower link.

[Point 3] Wheel bearing removal and installation

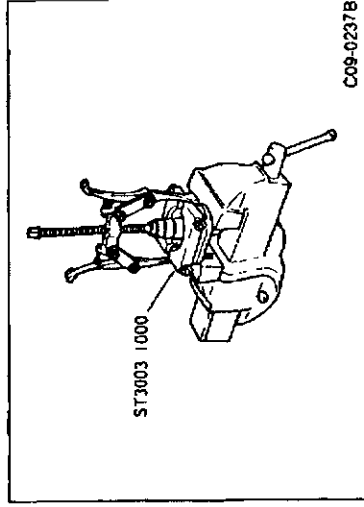
- Wheel bearing with flange does not require maintenance. If any of the following symptoms are noted, replace wheel bearing assembly (including inner and outer grease seals.)
 - ① Wheel bearing makes growing noise during operation.
 - ② Wheel bearing drags or turns roughly when hub is turned by hand after bearing lock nut is tightened to specified torque.
 - ③ After wheel bearing is removed from hub.



C09-0357B

Removal

- Separate wheel bearing with flange and wheel hub from axle housing and wheel hub assembly.
- Set wheel bearing in press as shown in figure. Use drift (special service tool) to remove bearing.
- Replace bearing assembly with new unit. Do not reuse old bearing.



C09-0237B

- Set bearing replacer (special service tool) on inner race remaining on hub as shown in figure. Using puller (commercial service tool), remove inner race.

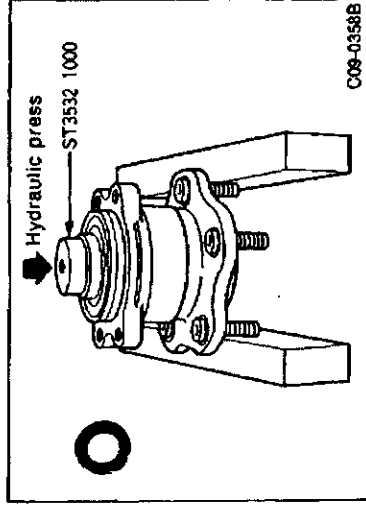
CAUTION:

- (1) Never use the inner race remaining on hub again.
- (2) Discard old wheel bearing assembly. Replace with new part. (The grease seal is not available as an individual part).

3. Removal and Installation, Assembly and Disassembly (Cont'd)

Installation

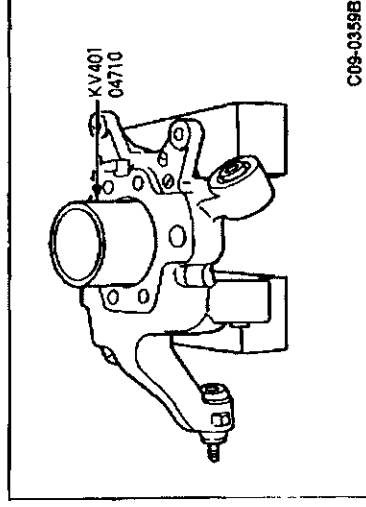
- Leave hub on block, and position drift (special service tool) and wheel bearing on flange as shown in figure. Use hydraulic press to press-fit bearing.



[Point 4] Axle housing dust seal removal and installation

Removal

- Using drift (special service tool) and hammer, press out dust seal.

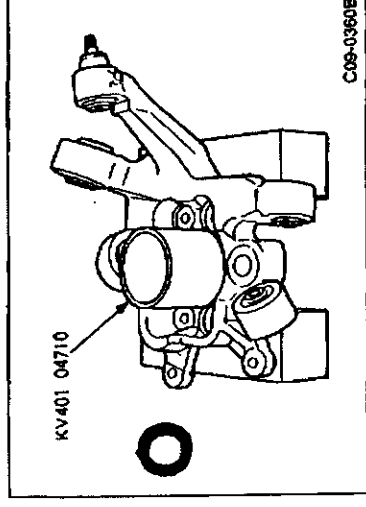


Installation

- Using drift (special service tool), press-fit dust seal with hydraulic press.

CAUTION:

Coat dust seal lip with Nissan MP special grease No. 2.



[Point 5] Hub bolt replacement

Removal

- To replace hub bolts, first remove brake caliper assembly, disk rotor and brake shoes. Operation can then be performed on vehicle.

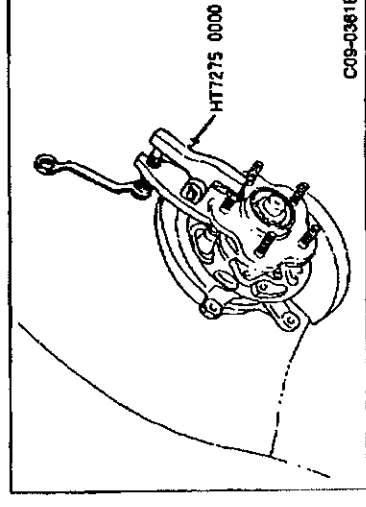
CAUTION:

Do not remove hub and wheel bearing.

- Use ball joint remover (commercial service tool) as shown in figure.

CAUTION:

Do not hit hub bolts with hammer. (This will apply impact to wheel bearings.)



C8 REAR SUSPENSION AND AXLE

3. Removal and Installation, Assembly and Disassembly (Cont'd)

Installation

- To press-fit hub bolts, insert washers as shown in figure and tighten bolts.
- When replacing a single hub bolt, use new bolt with same identification number.

Hub bolt identification number	43222 06R61
--------------------------------	-------------

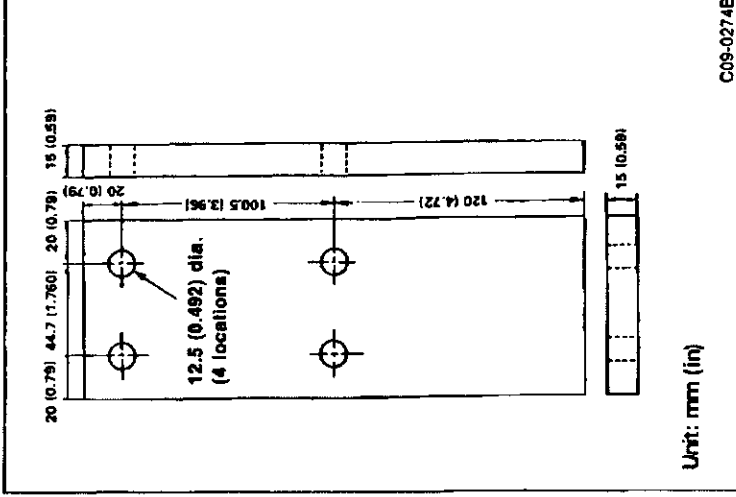
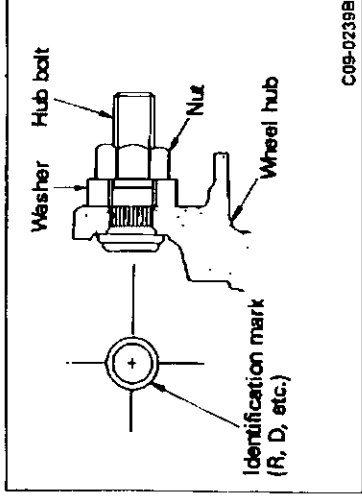
CAUTION:

After replacing hub bolt, check that disk runout is 0.07 mm (0.0028 in) maximum.

[Point 6] Axle housing bushing removal and installation

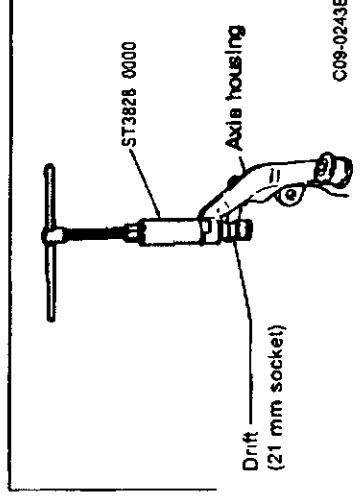
Bushing removal and installation precautions

- Do not secure axle housing mechanical unit directly in vise. Protect housing with wood panels or rags before tightening vise.
- Install attachment described in previous operation.



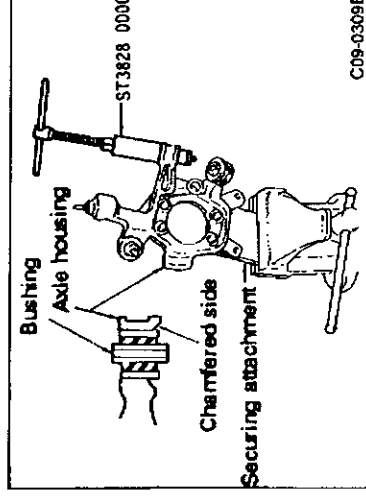
Removal

- Attach drift and socket (21 mm) on outer shell of as shown in figure and use arm bushing remover (special service tool) to remove bushing.



Installation

- Make sure that axle housing bore is free from scratches or deformities before pressing bushing into it.
- Lubricate bushing with detergent.
- Set arm bushing remover (special service tool), insert from direction of axle housing bore chamfering and press-fit bushing flush with end surface.



C8 REAR SUSPENSION AND AXLE

3. Removal and Installation, Assembly and Disassembly (Cont'd)

Axle housing bushing (shock absorber) removal and installation

Removal

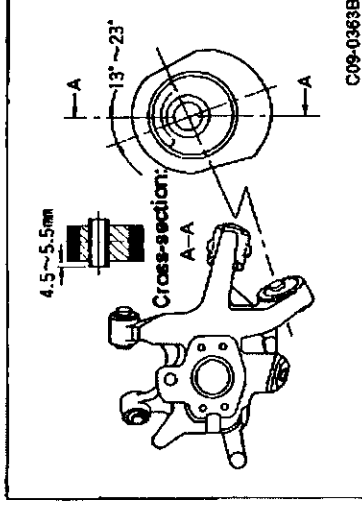
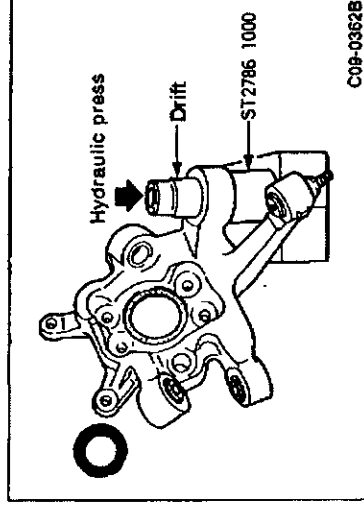
- Set drift (special service tool) on lower side of axle housing as shown in figure. Set drift [inner diameter 37 mm (1.46 in), outer diameter 45 mm (1.77 in)] on upper side and press out bushing.

CAUTION:

Check bushing position before removal.

Installation

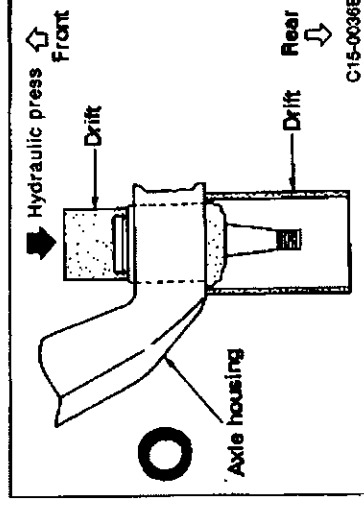
- Install bushing using same tools as for removal. Assembly is reverse sequence from disassembly.



[Point 7] Axle housing and lower link ball joint separation

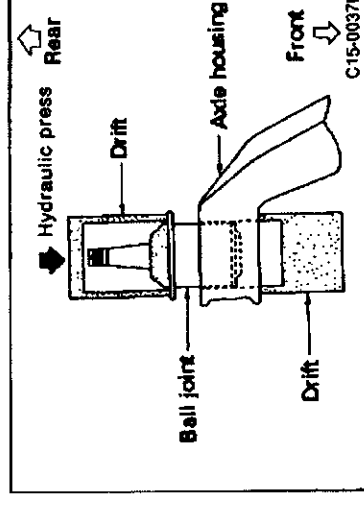
Removal

- Remove ball joint seal cover.
- Set drift [inner diameter 37 mm (1.46 in), outer diameter 40 mm (1.57 in)] on rear side of axle housing as shown in figure. Set drift [inner diameter 23 mm (0.91 in), outer diameter 27 mm (1.06 in)] on front side of axle housing as shown in figure and press out ball joint.



Installation

- Set drift [inner diameter 29 mm (1.14 in), outer diameter 35 mm (1.38 in)] on rear side of axle housing as in removal. Set drift [inner diameter 31 mm (1.22 in), outer diameter 41 mm (1.61 in)] on front side of axle housing and press-fit ball joint.
- Install seal cover.



[Point 8] Inspection

- Inspect all parts and replace if following items are noticed.
 - ① Check ball bearings for damage, seizing, rust and rotation.
 - ② Check wheel hub for cracks. (Use dyeing damage analysis method.)
 - ③ Check axle housing for dents, deformities and cracks. (Use dyeing damage analysis method.)

C9 WHEELS AND TIRES

1. Summary

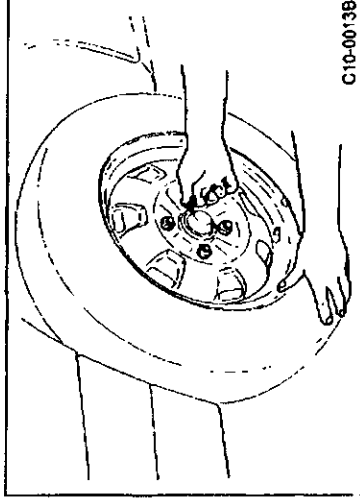
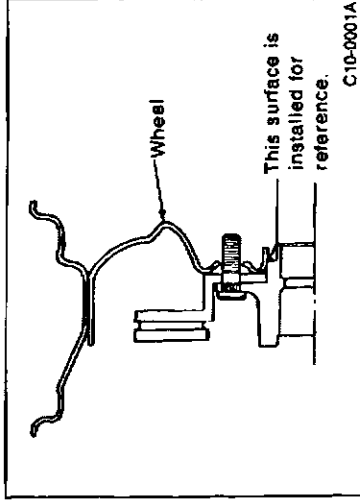
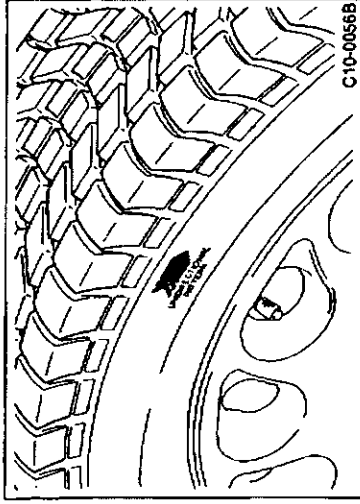
Specifications

Wheels					Remarks	
Rim size	Material (color)	Offset mm (in)	Hub bolts P C.D. mm (in) x num- ber of bolts	Hub hole diameter mm (in)		
16 x 8 JJ 16 x 6 1/2JJ (for snow)	Aluminum (silver)	30 (1.18)	114.3 (4.50) x 5	66 (2.60)	Suitable tire size 225/50R16 92V 205/55R16 88V (for snow)	Models equipped with RB26DETT
16 x 4T (spare tire for emergency use)	Steel (yellow)	20 (0.79)			T125/90D16	Models equipped with RB26DETT

2. Wheels

2-1 INSTALLATION ON VEHICLE

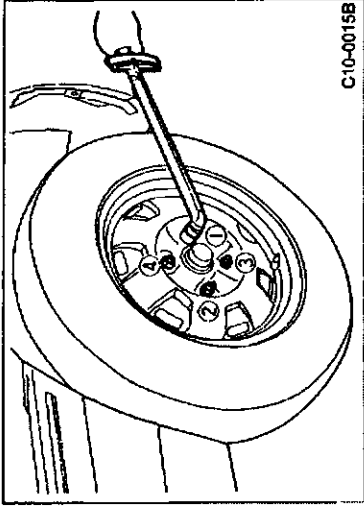
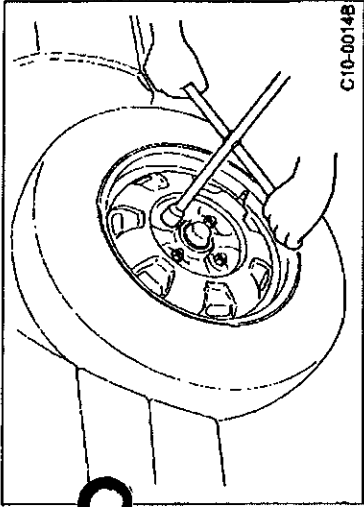
- An arrow mark on tire as shown in figure indicates that a directional tread is used. The tire must be mounted so turns in the indicated direction.
 - Place holes in middle of wheel (hub holes) on bolts and tighten to install.
 - Tighten lug nuts by hand.
- CAUTION:**
The tapered side of the lug nut must face the wheel.
- Rotate tire by hand and tighten again by hand.



C9 WHEELS AND TIRES

2. Wheels (Cont'd)

- While rotating tire and changing position, tighten with tool (If wheel is loose, tighten slightly less than specified torque until wheel does not move.)



- Lower vehicle to ground and tighten to specified torque. (Tighten wheel evenly in criss-cross pattern 2 - 3 times.)

Wheel tightening torque:

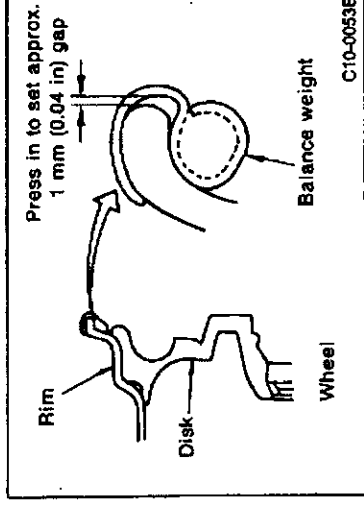
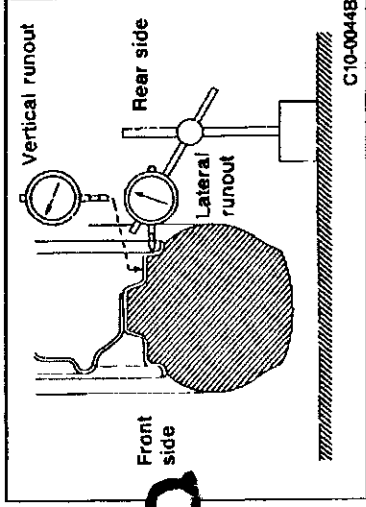
98 - 118 N·m (10 - 12 kg·m, 72 - 87 ft·lb)

CAUTION:

When using straight cone to balance wheels, check that vertical installation position on vehicle is the same when set or balancer.

- Check wheel runout.

	Lateral runout limit	Vertical runout limit
Steel wheel	0.8 mm (0.031 in) max.	0.5 mm (0.020 in) max.
Aluminum wheel	0.3 mm (0.012 in) max.	



2-2 WHEEL BALANCE ADJUSTMENT

- Use straight cone type attachment to adjust the wheel balance.
- Be sure to attach cone to rear side of aluminium and steel wheels at this time with wheel balancer.
- When using regular taper cone to adjust steel wheel, support wheel from front.

CAUTION:

- (1) Always use genuine Nissan balance weights.
- (2) Always use plastic coated balance weights for aluminium wheels.
- (3) Do not reuse balance weights.
- (4) Always use plastic hammer to hit weights.

Unit: g (o.

Allowable remaining unbalance amount	Dynamic (on ear)	10 (0.35) max. (one side)
	Static (on ear)	20 (0.71) max.
Balance weight maximum correction amount	Steel wheel	60 (2.12)
	Aluminum wheel	60 (2.12)

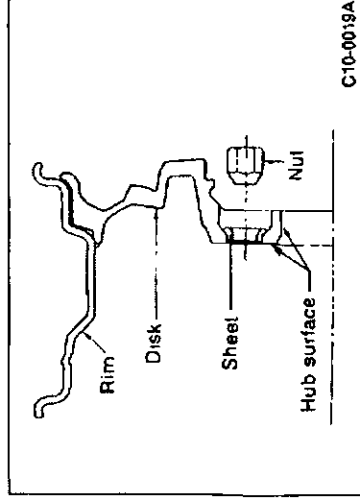
C9 WHEELS AND TIRES

2. Wheels (Cont'd)

2-3 ALUMINUM ROAD WHEEL INSTALLATION

PRECAUTIONS

- Nissan aluminum wheels are specifically designed for a particular vehicle and should not be used on other vehicles.
- Use genuine Nissan taper nuts because the steel sheet is press-fitted in the wheel disk holes.
- Always balance wheels before use. Only use genuine Nissan plastic coated weights for wheel balancing.
- Be careful during balancing because aluminum wheels scratch easily. Do not use abrasive cleanser or wire brush to clean off dirt. Only use neutral detergent for cleaning.
- Avoid using high-speed car washing equipment.
- After driving on roads which have salt deposits to prevent icing and roads close to the ocean, wash off accumulated dirt with water.
- Wash off back side of wheel when tires are exchanged or washing bottom of vehicle.
- Wipe off dirt and foreign matter from hub surface before installing wheels.
- Never coat wheels, nut threads or nut seats with oil.
- Do not drive on sharp objects, curbs or sidewalks.



3. Tires

3-1 TIRE INFLATION PRESSURE AND WEAR LIMITS

- The tire inflation pressure are indicated for cold tire conditions [after parking for more than three hours or driving less than 1.6 km (1 mile)].
- Check tire pressure once a month or before driving long distances.

CAUTION:

The tire pressure rises to 29 kPa (0.3 kg/cm², 4 psi) during driving. Do not remove air to lower tire pressure immediately after driving.

Tire size	Inflation pressure kPa (kg/cm ² , psi)	
	Front wheels	Rear wheels
205/55R16 88V	216 (2.2, 31)	216 (2.2, 31)
225/50R16 92V	226 (2.3, 33)	226 (2.3, 33)
T125/90D16	412 (4.2, 60)	412 (4.2, 60)

CAUTION:

The tire inflation pressure is the same for high-speed driving as it is for normal driving.

Tread wear limit:

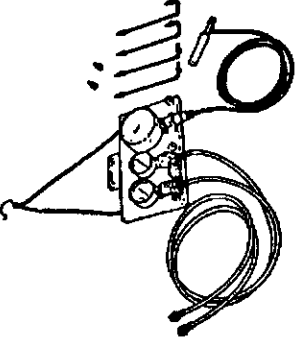
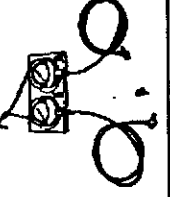
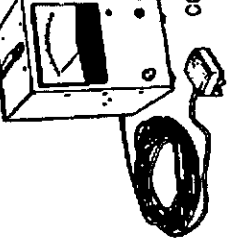
Remaining groove depth 1.6 mm (0.063 in)

C10 BRAKES

PRECAUTIONS

- Recommended brake fluid is brake fluid NR-3 (No. 2500). Never reuse drained brake fluid.
- Be careful not to splash brake fluid on painted areas because it may cause paint damage. If brake fluid is splashed on painted areas, wipe it off immediately.
- For safety reasons, if any brake fluid leak is discovered, disassemble parts and replace as necessary.
- Use brake tube torque wrench (special service tool) to loosen or tighten brake pipe flare nuts.

SPECIAL SERVICE TOOLS

Tool name Tool number	Description	
Brake tube torque wrench GG9431 0000		• Removing and installing brake tube piping
Booster tester set KV991 01950 KV991 01910 KV991 01920 KV991 01930 KV991 01940 KV991 01850 EG1521		• Measuring booster pressure • Measuring brake fluid pressure
Brake fluid pressure gauge KV991 V0010		• Measuring brake fluid pressure
Pedal pressure gauge IM2182		• Measuring brake pedal pressure force

C10 BRAKES

1. Summary

Specifications

Description		Anti-lock braking system		Engine	RB26DETT
Main brake	Front	Model number			Equipped
		Disc outer diameter/thickness	mm (in)	296/32 (11.65/1.26)	OPZ25VR
		Pad dimension (length x width x thickness)	mm (in)	116 x 50 x 10 (4.57 x 1.97 x 0.39)	
		Cylinder inner diameter	mm (in)	40.4 x 2 (1.591 x 2)	
		Pad material		AP50H	
	Rear	Pad wear warning equipment			Equipped
		Brake model			OPZ11VB
		Disc outer diameter thickness	mm (in)	297/18 (11.69/0.71)	
		Pad dimension (length x width x thickness)	mm (in)	71.8 x 36.5 x 11.5 (2.827 x 1.437 x 0.453)	
		Cylinder inner diameter	mm (in)	38.1 (1.500)	
Parking brake		Pad material			AP50
		Pad wear warning equipment			Equipped
		Model number			DS17HD
		Drum inner diameter	mm (in)	172 (6.77)	
		Lining dimension (length x width x thickness)	mm (in)	154.1 x 25.0 x 3.0 (6.07 x 0.984 x 0.118)	
Master cylinder		Lining material			AKD201
		Lining gap adjustment dimension			Manual adjustment
		Cylinder inner diameter	mm (in)	25.40 (1)	
Power booster	Booster	Model number			M215T (JKC)
		Diaphragm diameter	mm (in)	205 + 230 (8.07 + 9.06)	
Rear control equipment		Model number			Proportioning valve (one-piece, contained in master cylinder)
		Split point	kPa (kg/cm ² , psi)	1,961 (20, 284)	
		Reducing ratio		0.4	
Recommended brake fluid		Nissan brake fluid NR-3 (No. 2500)			

C10 BRAKES

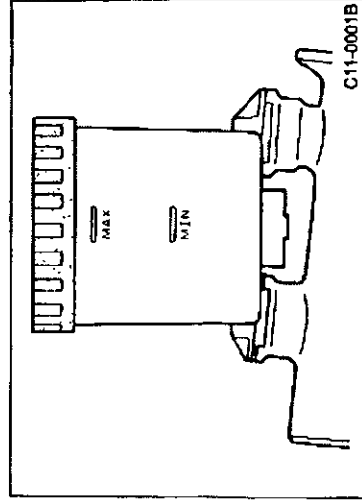
1. Summary (Cont'd)

Inspection and adjustment

Description		Specification
 Brake pedal	Free height (above floor)	M/T: 172.5 - 182.5 (6.79 - 7.19)
	Depressed [under force of 490N (50 kg, 110 lb)] with engine running (measured from top of dash panel)	85 (3.35) max.
	Clevis pin play (measured at pedal upper surface)	1 - 3 (0.04 - 0.12)
	Play	3 - 11 (0.12 - 0.43)
	Stop lamp switch screw end and pedal stopper clearance	0.3 - 1.0 (0.012 - 0.039)
Brake application conditions [Depressed force 883 N (90 kg, 198 lb)] OPZ25VR model + OPZ11VB Note: (1) The indicated values are intended for reference to determining control force after inspection preparation. (2) The term "after preparation" means the condition of braking ten times [speed 40 to 50 km/h → 0 km/h (25 to 31 MPH → 0 MPH)] with a deceleration force of 0.2 to 0.3 G for break-in after replacing lining and pad replacement, or after cleaning and sandpaper lapping of drums and shoes. (0.2 to 0.3 G indicates a control force stronger than normal braking.)		
 Brake booster	Booster vacuum leak [at force of 66.7 kPa (500 mmHg, 19.69 inHg)]	3.3 (33.25, 0.98) in 15 sec
	Check valve vacuum leak [at force of 66.7 kPa (500 mmHg, 19.69 inHg)]	1.3 (13.10, 0.39) in 15 sec
 Brake drum	Pad wear limit minimum thickness	2 (0.08)
	Brake disk wear limit minimum thickness	30 (1.18)
	mm (in)	16 (0.63)
	Brake disk runout limit	0.07 (0.0028)
 Brake drum	Lining wear limit minimum thickness	1.5 (0.059)
	Drum wear limit (inner diameter)	173 (6.81)
 Parking brake	Pedal stroke [under force of 196 N (20 kg, 44 lb)] (notches)	6 - 8
	Number of notches when brake warning lamp lights (notches)	1 max.

Description		Control units after preparation (Note 2)
Each wheel	Tough test + right	Front axle 80% min of axle weight
	Left	Rear axle 2542 N (500 kg, 980 lb) min.
Drum	Depressed left	8% min of axle weight
	Depressed right	8% min of axle weight
Total		8.142 N (800 kg, 1,750 lb) min.

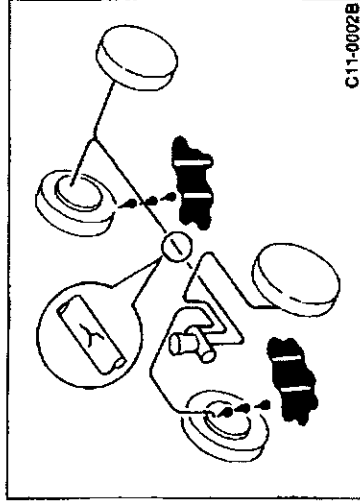
C10 BRAKES



2. On-vehicle Inspection

2-1 CHECKING BRAKE FLUID LEVEL

- Check fluid level in reservoir tank. It should be between Max. and Min. lines on reservoir tank.
- If fluid level is extremely low, check brake system for leaks.



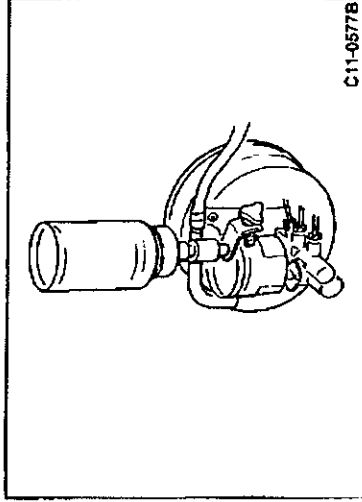
2-2 CHECKING BRAKE SYSTEM

- Check brake lines (tubes and hoses) for leaks, damage, twisting, deterioration or other damage.
- Check if connections and clamps are loose.

Flare nut tightening torque:

15 - 18 N·m (1.5 - 1.8 kg-m, 11 - 13 ft-lb)

- Fully depress brake pedal with force of 785 N (80 kg, 176 lb) for approximately 5 seconds with engine running and check for leaks.



2-3 CHANGING BRAKE FLUID AND AIR BLEEDING

(1) Standard vehicles

- Change brake fluid and air bleeding in the following order.
 - ① Clean inside reservoir tank and fill with new brake fluid.
 - ② Open left rear air bleeder valve.
 - ③ Fully depress brake pedal. Allow pedal to return and depress again after 2 - 3 seconds and repeat this operation.
 - ④ Close rear left wheel air bleeder valve.
 - ⑤ Bleed air from calipers in following order.
Rear right wheel → front left wheel → front right wheel

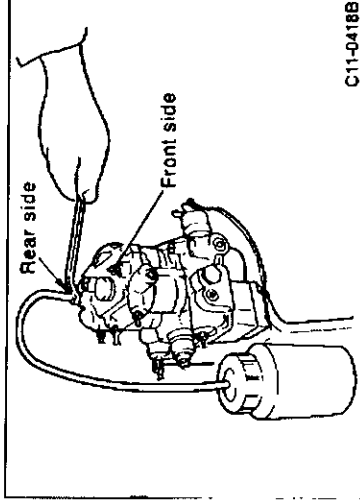
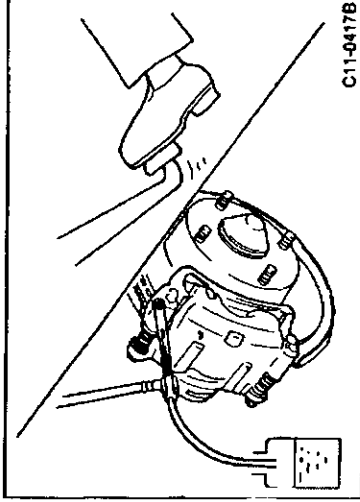
CAUTION:

- (1) Connect a transparent vinyl tube to air bleeder and be careful fluid does not spill on body.
- (2) Make sure reservoir is filled with brake fluid at all times during air bleeding operation.

- Tighten air bleeder valve to specified torque.

Tightening torque:

7 - 9 N·m (0.7 - 0.9 kg-m, 5.1 - 6.5 ft-lb)



(2) Vehicles equipped with anti-lock braking systems (ABS)

- In vehicles equipped with ABS, bleed air from the following locations in the indicated sequence after performing the procedures described for vehicles with standard brake systems.
Front side actuator bleeder valve → Rear side air bleeder

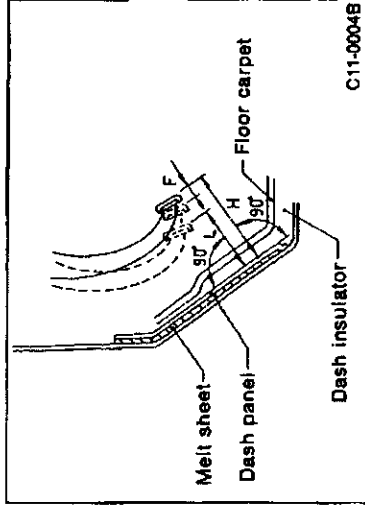
CAUTION:

- (1) Air bleeding must be performed after the battery terminal is removed in vehicles equipped with ABS.

C10 BRAKES

2. On-vehicle Inspection (Cont'd)

- (2) Carefully monitor reservoir brake fluid level during bleeding. Make sure it is more than half-full at all times because air entering brake system may cause operation failure in vehicles equipped with ABS.
- Tighten air bleeder valve to specified torque.
Tightening torque:
7 - 9 N·m (0.7 - 0.9 kg-m, 5.1 - 6.5 ft-lb)



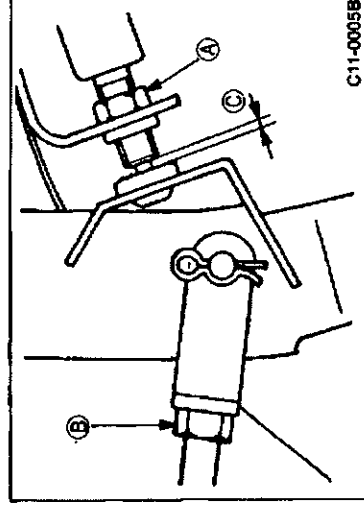
2-4 BRAKE PEDAL INSPECTION AND ADJUSTMENT

Inspection

		Unit: mm (in)
Free pedal height "H"	M/T: 172.5 - 182.5 (6.79 - 7.19 in)	
Clevis play "F" (from upper pedal surface)	1 - 3 (0.04 - 0.12)	
Depressed pedal height "L"		
Under force or 490 N (50 kg, 110 lb) with engine running	85 (3.35)/min.	

When brake pedal is operated, make sure it does not scrap or move abnormally.

- Adjust pedal height as necessary.

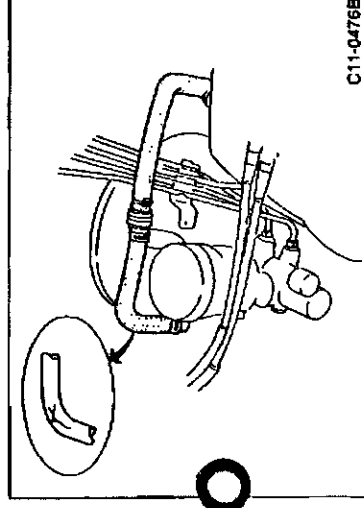


Adjustment

- ① Loosen stop lamp switch lock nut **A**.
- ② Loosen push rod lock nut **B**, rotate push rod, adjust pedal to specified height and tighten lock nut.
- ③ Rotate switch so clearance **C** between stopper rubber and stop lamp switch thread end is 0.3 to 1.0 mm (0.012 to 0.039 in) and tighten lock nut.

Lock nut tightening torque:

- ① 12 - 15 N·m (1.2 - 1.5 kg-m, 9 - 11 ft-lb)
- ② 16 - 22 N·m (1.6 - 2.2 kg-m, 12 - 16 ft-lb)



2-5 VACUUM PIPING INSPECTION

- Apply vacuum to hoses, tubes and connections and make sure there are no scratches, damage or deformation.
- Check that all clamps are tight.
- Check the arrow on check valve E-mark faces engine side.

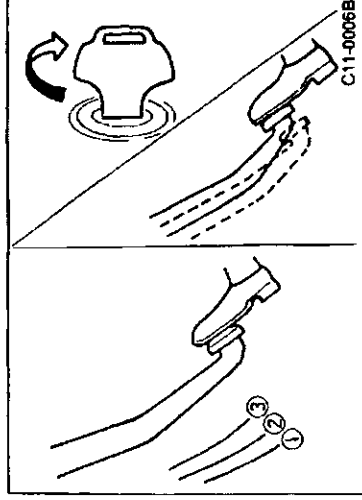
C10 BRAKES

2. On-vehicle Inspection (Cont'd)

2-6 BOOSTER OPERATING CHECK

Operation procedure

- ① Idle engine for approximately one minute. Apply vacuum booster and turn ignition switch OFF.
- ② Depress brake several times with normal pressure and check for any change in pedal stroke. (A slight change is normal.)
- ③ Depress brake pedal and check that there is no change in pedal height. Turn on engine in this condition and check that pedal goes down. (Moving down is normal.)



2-7 BOOSTER FUNCTION INSPECTION

Operation procedures

- ① Install special service tools (booster tester set: KV991 019S0, pedal pressure gauge: IM2182) in vehicle.
- ② Start engine and measure vacuum. Stop engine when vacuum reaches 66.7 kPa (500 mmHg, 19.69 inHg).
- ③ Measure lowest vacuum pressure when brake does not operate.
- ④ Measure lowest vacuum pressure when brake is under full load [pedal pressure 245 N (25 kg, 55 lb)].

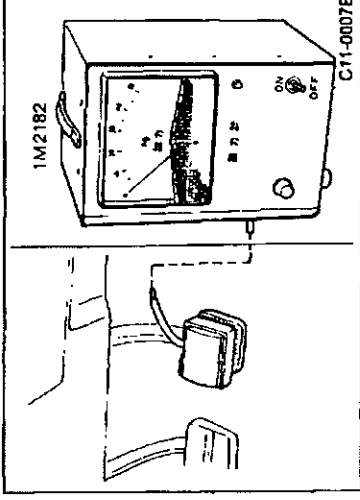
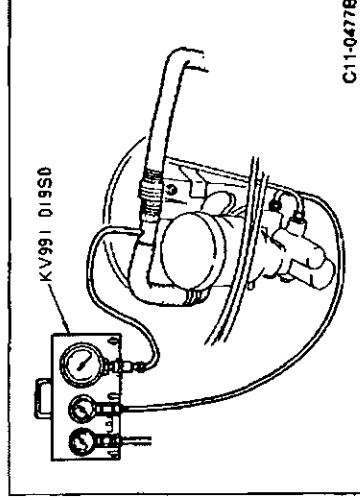
Specification value (③, ④):

Lowest vacuum level for 15 sec at maximum force of 13.3 kPa (25 mmHg, 0.98 inHg)

- ⑤ Set load in booster to 0 kPa (0 mmHg, 0 inHg) and measure generated hydraulic pressure.
- ⑥ Start engine and measure generated hydraulic pressure when idling [at force of 66.7 kPa (500 mmHg, 69 in Hg)]

CAUTION:

- (1) Measure hydraulic pressure on front side.
- (2) Always bleed air from system after measure is completed.



Specification [⑤ : Vacuum 0 kPa (0 mmHg, 0 inHg)]

Pedal pressure N (kg, lb)	Hydraulic pressure kPa (kg/cm ² , psi)	
	M215T	
98 (10, 22)	0 (0, 0)	
196 (20, 44)	392 (4, 57)	
294 (30, 66)	1,177 (12, 171)	

Specification [⑥ : Vacuum 66.7 kPa (500 mmHg, 19.69 inHg)]

Pedal pressure N (kg, lb)	Hydraulic pressure kPa (kg/cm ² , psi)	
	M215T	
49 (5, 11)	686 (7, 100)	
98 (10, 22)	2,158 (22, 313)	
147 (15, 33)	3,825 (39, 555)	

C10 BRAKES

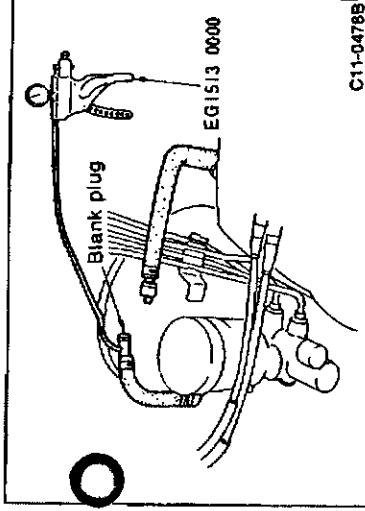
2. On-vehicle Inspection (Cont'd)

2-8 BOOSTER AIRTIGHTNESS

- Attach hand vacuum pump (special service tool) as shown in figure.

Specification:

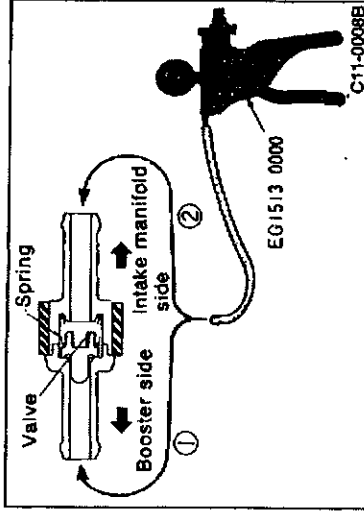
When -66.7 kPa (-500 mmHg , -19.69 inHg) vacuum lowers for 15 sec at maximum of 3.3 kPa (25 mmHg , 0.98 inHg)



2-9 CHECK VALVE INSPECTION

- Check vacuum with a vacuum pump.

Connect to booster side ①	Vacuum should exist when -66.7 kPa (-500 mmHg , -19.69 inHg) vacuum lowers for 15 sec at maximum of 3.3 kPa (25 mmHg , 0.98 inHg).
Connect to engine side ②	Vacuum should not exist.



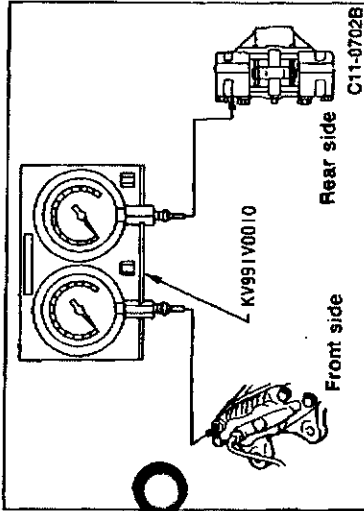
2-10 REAR CONTROL EQUIPMENT FUNCTION INSPECTION

- Use brake fluid pressure gauge (special service tool) to measure front and rear brake fluid pressure.

CAUTION:

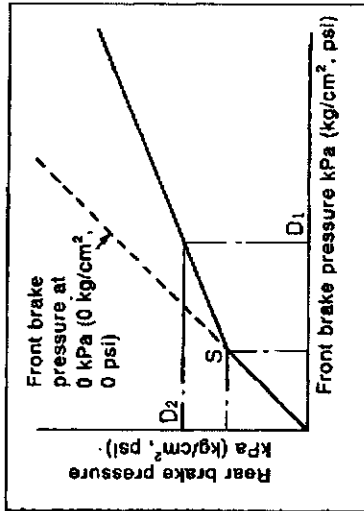
Bleed air after measurement is completed.

- The front and rear brake fluid pressure is set to a 1 : 1 ratio at the split point (S). Check that the rear brake fluid pressure is reduced according to the following specifications.
- D_2 indicates the rear brake pressure hydraulic pressure when the front brake pressure is added to D_1 .



Specifications

Engine	RB26DETT	kPa (kg/cm ² , psi)
S (split point)	1,765 - 2,550 (18 - 26, 256 - 370)	
D_1 (front brake pressure)	5,394 (55, 782)	
D_2 (rear brake pressure)	3,138 - 3,923 (32 - 40, 455 - 569)	



Reference: Rear brake fluid pressure D_2 is determined as follows.

$$D_2 = LP + S$$

$$L (\text{reducing ratio}) = 0.4$$

$$S (\text{split point}) = 1,961 \pm 68 \text{ kPa} (20 \pm 2 \text{ kg/cm}^2, 284 \pm 25 \text{ psi})$$

$$P (\text{additional pressure from split point}) = 3,432 \text{ kPa} (35 \text{ kg/cm}^2, 498 \text{ psi})$$

$$D_2 = 0.4 \times 35 + 20 \pm 2 = 3,138 - 3,923 \text{ kPa} (32 - 40 \text{ kg/cm}^2, 455 - 569 \text{ psi})$$

C10 BRAKES

2. On-vehicle Inspection (Cont'd)

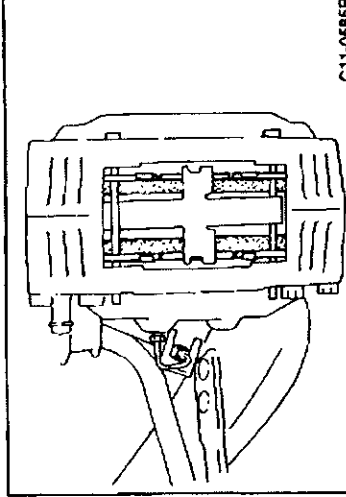
2-11 DISK PAD THICKNESS INSPECTION

OPZ25VR models

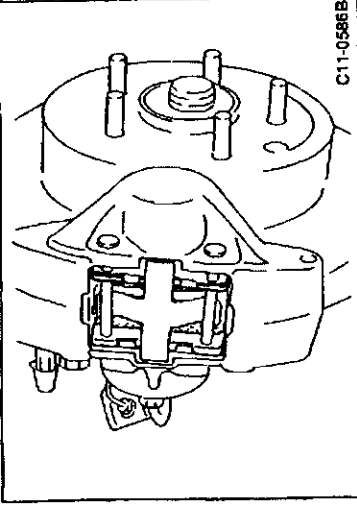
- Check pad thickness at middle hole in cylinder body as shown in figure.

Model	OPZ25VR
Wear limit thickness	2 mm (0.08 in)
Reference: new part thickness	10 mm (0.39 in)

C11-0586B



C11-0586B



OPZ11VB models

- Check pad thickness at middle hole in cylinder body as shown in figure.

Model	OPZ11VB
Wear limit thickness	2 mm (0.08 in)
Reference: new part thickness	11.5 mm (0.453 in)

2-12 DISC ROTOR INSPECTION

(1) Disc thickness inspection

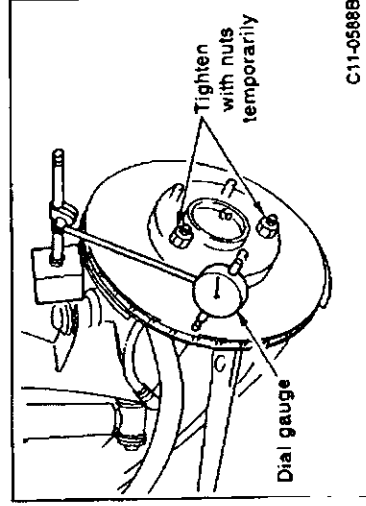
- After removing caliper assembly, check following items.
- Check disc rotor for wear or damage.
- Measure disk thickness.

Front

Model	OPZ25VR
Wear limit thickness	30 mm (1.18 in)
Reference: New part thickness	32 mm (1.26 in)

Rear

Model	OPZ11VB
Wear limit thickness	16 mm (0.63 in)
Reference: New part thickness	18 mm (0.71 in)



C11-0588B

(2) Disk rotor runout inspection

- Make sure that front axial end play is less than 0.03 mm (0.0012 in) before measuring disk surface runout.
- Secure rotor on axle and measure runout.

CAUTION:

Secure rotor to wheel hub with two nuts in criss-cross direction.

Measurement location	Check within 10 mm (0.39 in) from outside edge of rotor.
Runout limit	0.07 mm (0.0028 in)

C10 BRAKES

2. On-vehicle Inspection (Cont'd)

2-13 BRAKE DRUM INSPECTION

Check following items.

- Check for cracks or damage.
- Check for scoring, partial wear or stepped wear inside of drum.
- Measure inside of drum.

Model	DS17HD
Wear limit	173 mm (6.81 in) diameter
Reference: new part inner diameter	172 mm (6.77 in) diameter

2-14 BRAKE SHOE INSPECTION

Check following items when installing brake drum.

- Check lining for abnormal wear, damage or separation.
- Check that assembly for loose conditions.
- Measure lining thickness.

Model	DS17HD
Wear thickness limit	1.5 mm (0.059 in)
Reference: New part thickness	3.0 mm (0.118 in)

- Check wheel cylinder for leakage.

2-15 PARKING BRAKE INSPECTION AND ADJUSTMENT

Check and adjust following items.

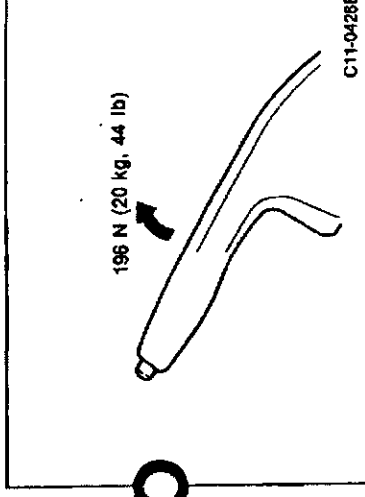
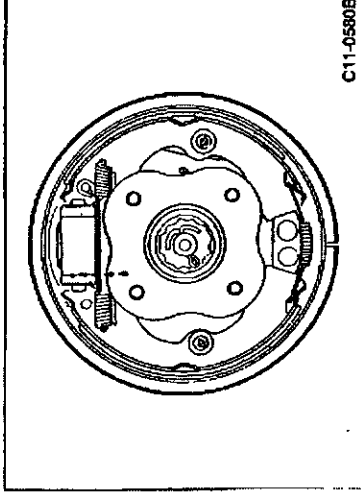
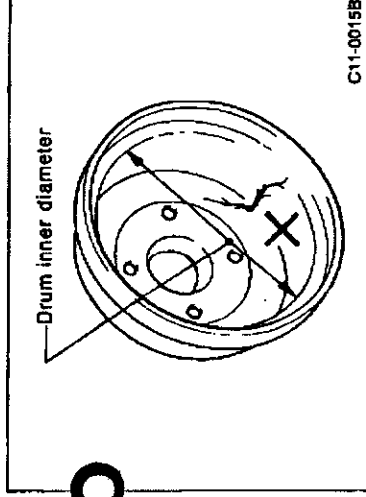
- Make sure that parking brake lever operates smoothly.
- Check rods and cables for cracks, wear, deformation and rust.
- Check clamps and connections for looseness.
- Check that brake warning lamp lights within one notch.
- The catch operates within a specified number of notches when an operating force of 196 N (20 kg, 44 lb) is applied. Adjust rear shoe clearance if brake does not engage with specified number of notches. Adjust cable so brake engages at specified number of notches.

Specified number of notches:

6 - 8 notches

CAUTION:

If the cable and notch adjustment is made without adjusting shoe clearance, the rear brake may not engage.



C10 BRAKES

2. On-vehicle Inspection (Cont'd)

(1) Shoe clearance adjustment

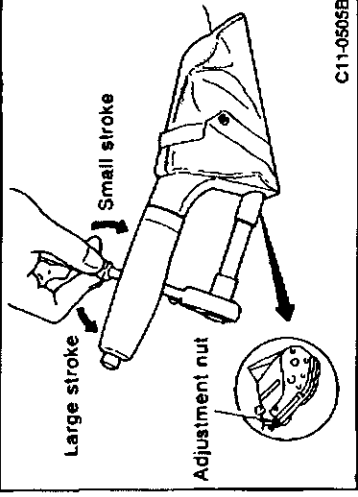
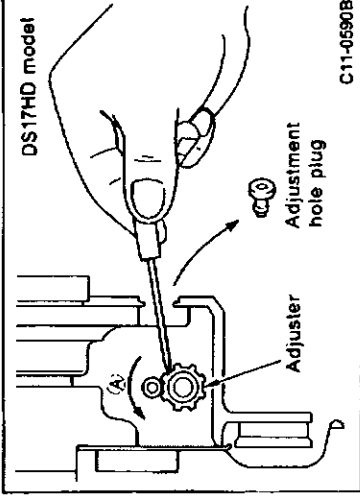
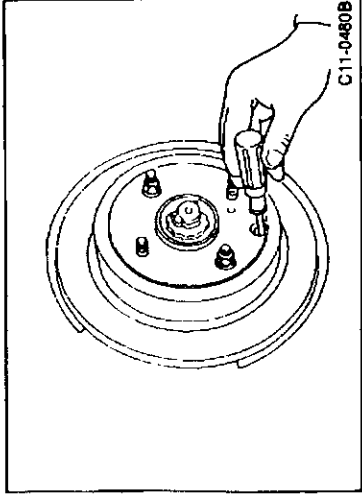
Return lever completely. When cable is adequately loose (Refer to (2) Cable adjustment), adjust rear shoe clearance.

Model DS17HD

- Install wheel.
- Use suitable nuts (M12 x 1.25) so disk is installed securely as shown in figure and attach disk rotor to hub.
- Remove disc adjustment hole plug from disc. Use screwdriver and turn adjuster in direction **A** shown in figure until disc locks. After disc locks turn adjuster five or six notches in opposite direction.
- Turn rotor and make sure brakes do not engage. Install stroke adjustment hole plug.

CAUTION:

After adjusting shoe clearance, always adjust lever by cable so brake engages at specified number of notches.



(2) Cable adjustment

After adjusting rear shoe clearance, adjust cable when rear brake is not engaged.

- Raise lever 4 - 5 notches.
- Insert ratchet wrench (use taped socket) in lever opening and turn self-locking adjustment nut to adjust lever stroke.
- Operate lever 3 - 4 times and adjust stroke so lever engages within specified number of notches.
- Return lever completely and make sure there is no drag between shoes and brake drum when rotating disc rotor.

(3) Breaking-in parking brake DS17HD model shoes

Perform following procedures if braking is inadequate after replacing DS17HD parking brake, shoes and disc rotor.

Operation

- ① Adjust parking brake control lever to specified number of notches.
[Refer to (1) Shoe clearance adjustment and (2) Cable adjustment.]
- ② Break-in parking brake by driving vehicle as follows.
 - Drive forward at approximately 35 km/h (22 MPH).
 - Depress parking brake pedal with a force of approx. 88 N (9 kg, 20 lb).
 - While depressing the pedal, continue to drive the vehicle forward 100 m (328 ft).
 - Repeat this procedure three more times. [Total distance is approximately 300 m (984 ft).]
- ③ Perform parking brake stroke inspection. Adjust if brake engagement has changed from specified number of notches.

C10 BRAKES

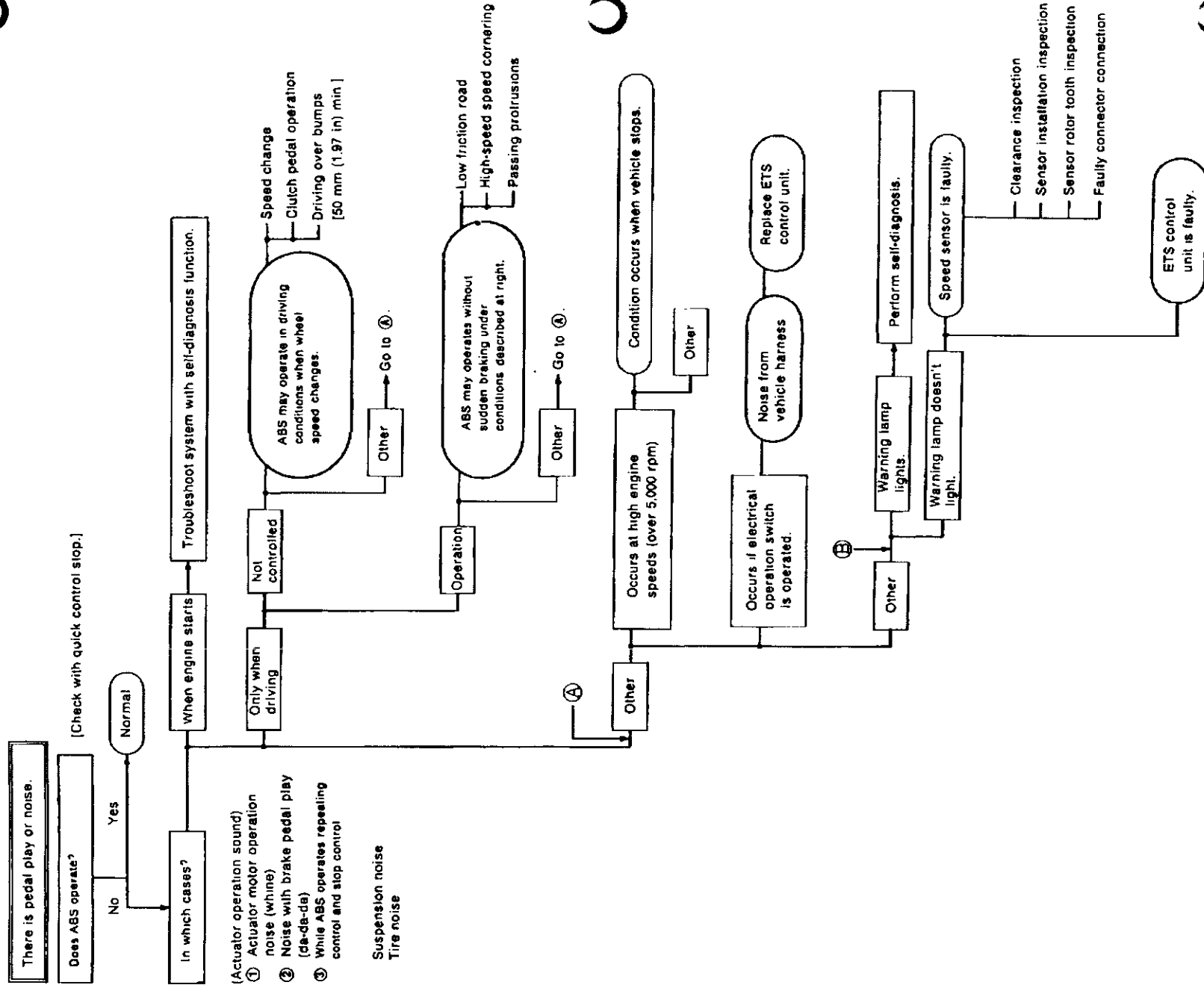
2. On-vehicle Inspection (Cont'd)

CAUTION:

- (1) Perform break-in operation in a location with good visibility and at a distance from other vehicles.
- (2) Allow unit to cool off 5 min after each break-in procedure to prevent linings from overheating.
- (3) Do not perform the break-in procedure too many times because it may cause uneven or premature wear.

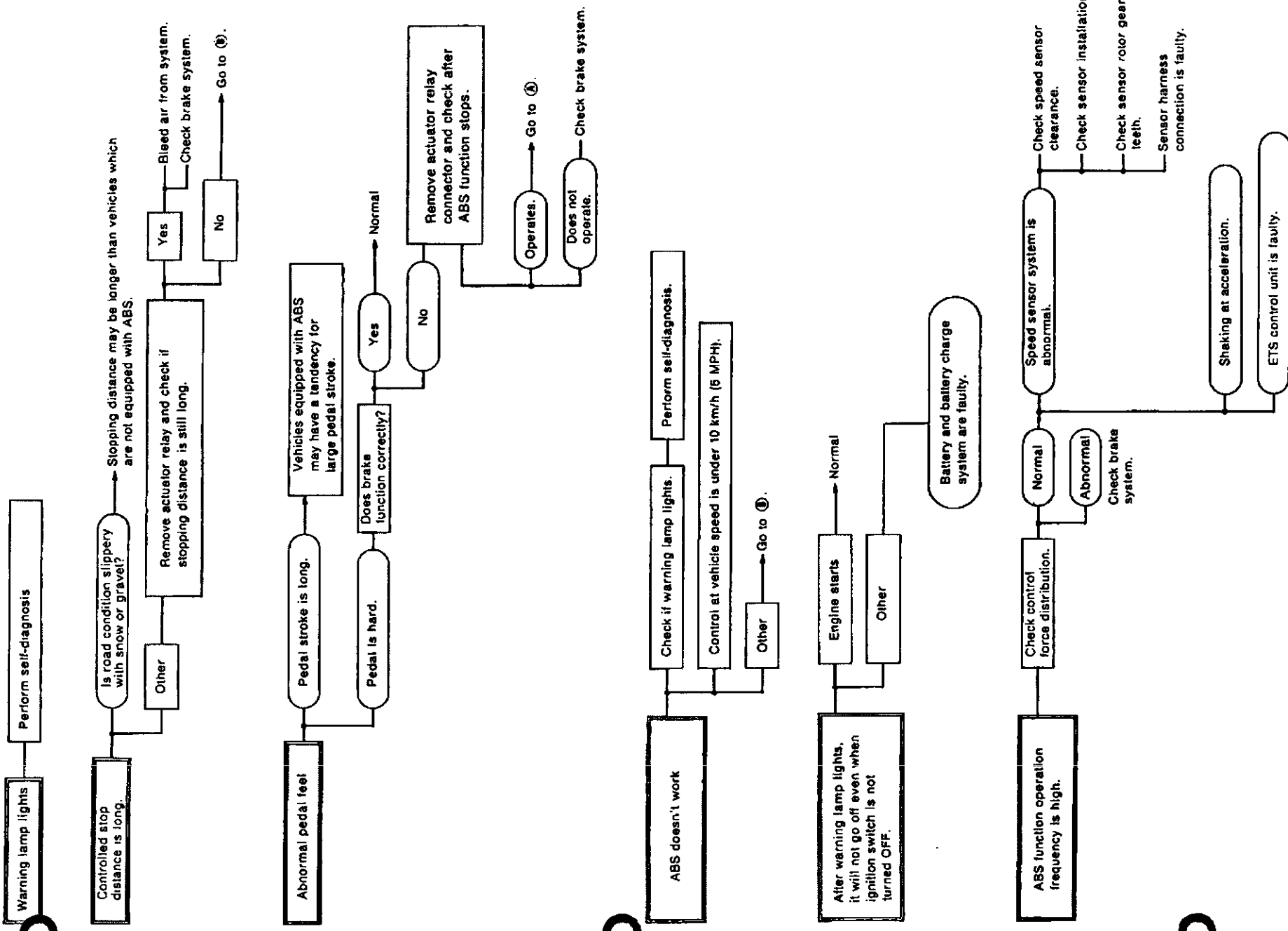
3. Trouble Diagnosis (Anti-Lock Braking System)

3-1 TROUBLESHOOTING



C10 BRAKES

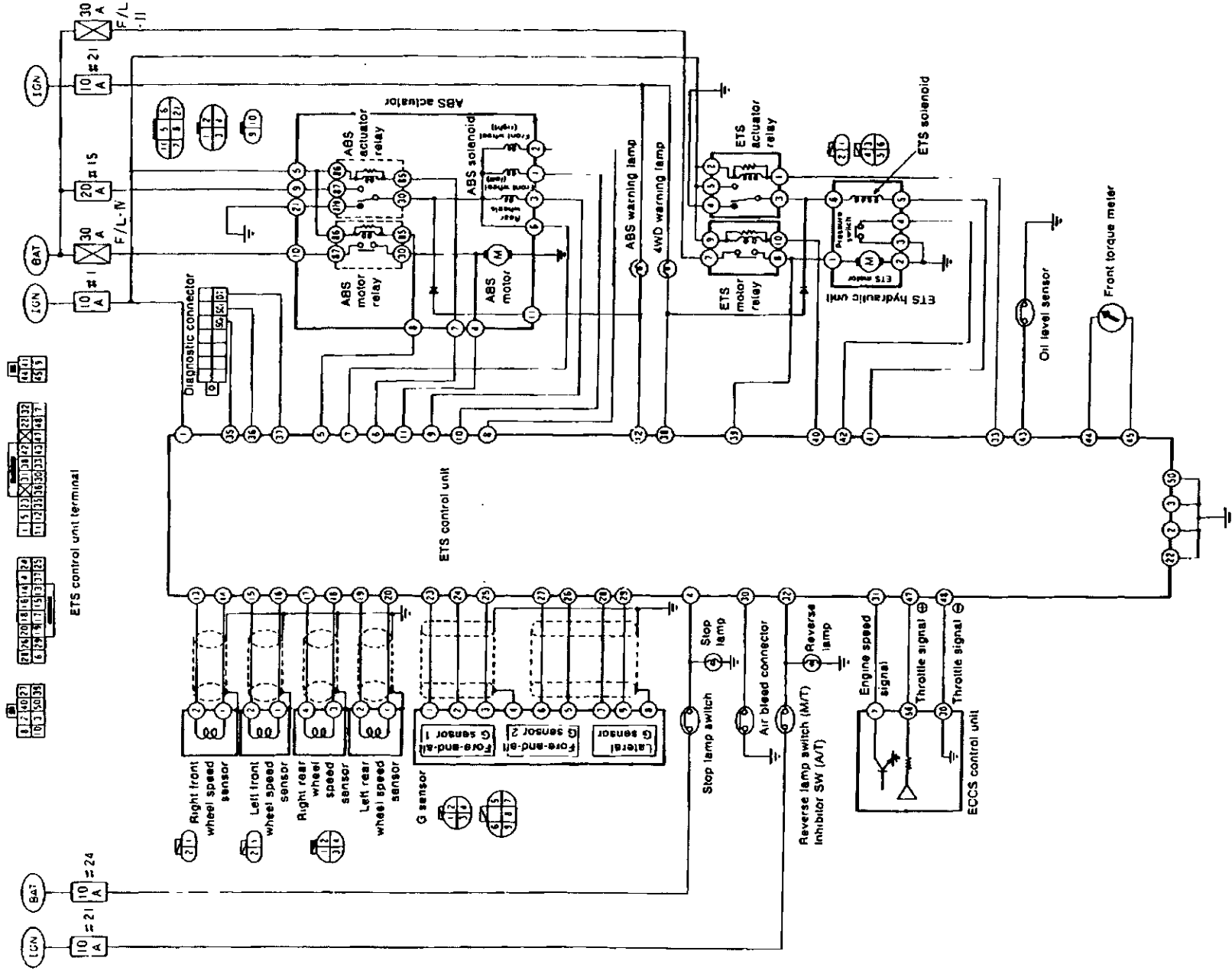
3. Trouble Diagnosis (Anti-Lock Braking System) (Cont'd)



3. Trouble Diagnosis (Anti-Lock Braking System) (Cont'd)

3-2 INSPECTION PREPARATION

(1) Circuit diagram



3. Trouble Diagnosis (Anti-Lock Braking System) (Cont'd)

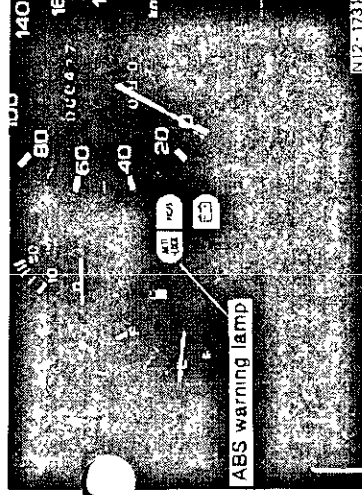
(2) Trouble diagnosis by self-diagnosis

① When CONSULT is not used



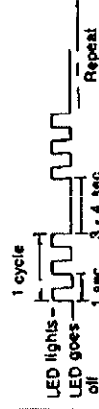
② Self-diagnosis description

- If ABS is normal, the ABS warning lamp lights when ignition switch is ON and goes off within one second after engine starts. When the warning lamp does not go out, abnormal conditions are indicated by the number of times the LED flashes in the ETS control unit below the rear parcel shelf.
- Warning lamp lights or LED flashes to indicate connection condition after damage repair when ignition switch is not turned OFF. Be sure to turn ignition switch OFF one time after repair for this reason and then perform self-diagnosis again. If two or more systems malfunction, all faulty systems are displayed sequentially and displayed by number of LED flashes.



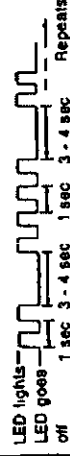
Example 1: One system malfunctions.

- Front right speed sensor or circuit is damaged.



Example 2: Two or more systems malfunction.

- Front left wheel speed sensor or circuit and left rear wheel speed sensor or circuit malfunction.



C10 BRAKES

3. Trouble Diagnosis (Anti-Lock Braking System) (Cont'd)

Problems are classified by the following code numbers.

Number of LED flashes	Malfunction location	Detection cycle		Warning lamp		Flow chart (Note 3)
		Engine starts	During driving	ABS	ETS	
1	Front right wheel speed sensor circuit	○ (Note 1)	○	○	○	•
2	Front left wheel speed sensor circuit	○ (Note 1)	○	○	○	•
3	Rear right wheel speed sensor circuit	○ (Note 1)	○	○	○	•
4	Rear left wheel speed sensor circuit	○ (Note 1)	○	○	○	•
5	ABS front right side actuator solenoid valve circuit	○	○	○		A
6	ABS front left side actuator solenoid valve circuit	○	○	○		B
7	ABS rear actuator solenoid valve circuit	○	○	○		C
8	ABS actuator motor and motor relay circuit	○	○	○		D
9	ABS actuator relay and circuit	○	○	○		E
10	ETS control unit power supply circuit	○	○	○		F
11	Fore-and-aft G sensor 1 circuit	○	○	○	○	•
12	Fore-and-aft G sensor 2 circuit	○	○	○	○	•
13	Fore-and-aft rear G sensor 1 and G sensor 2 circuit	○	○	○	○	•
14	G sensor power supply 1 circuit	○	○	○	○	•
15	G sensor power supply 2 circuit	○	○	○	○	•
16	Lateral G sensor circuit	○	○	○	○	•
17	Air bleeding connector circuit		○		○ (Note 2)	—
18	ETS pressure switch circuit	○	○		○	—
19	ETS motor, motor relay circuit	○	○		○	—
20	ETS solenoid circuit	○	○		○	—
21	Throttle sensor circuit	○	○		○	—
22	ETS reservoir tank oil level sensor circuit	○	○		○	—
23	—	—	—		—	—
24 Or stays ON or stays OFF	ETS control unit, ground circuit	○	○	○	○	•

Note: 1) Detection may not be possible if there is sensor short-circuit malfunction.

2) During driving, 4WD warning lamp lights during normal control.

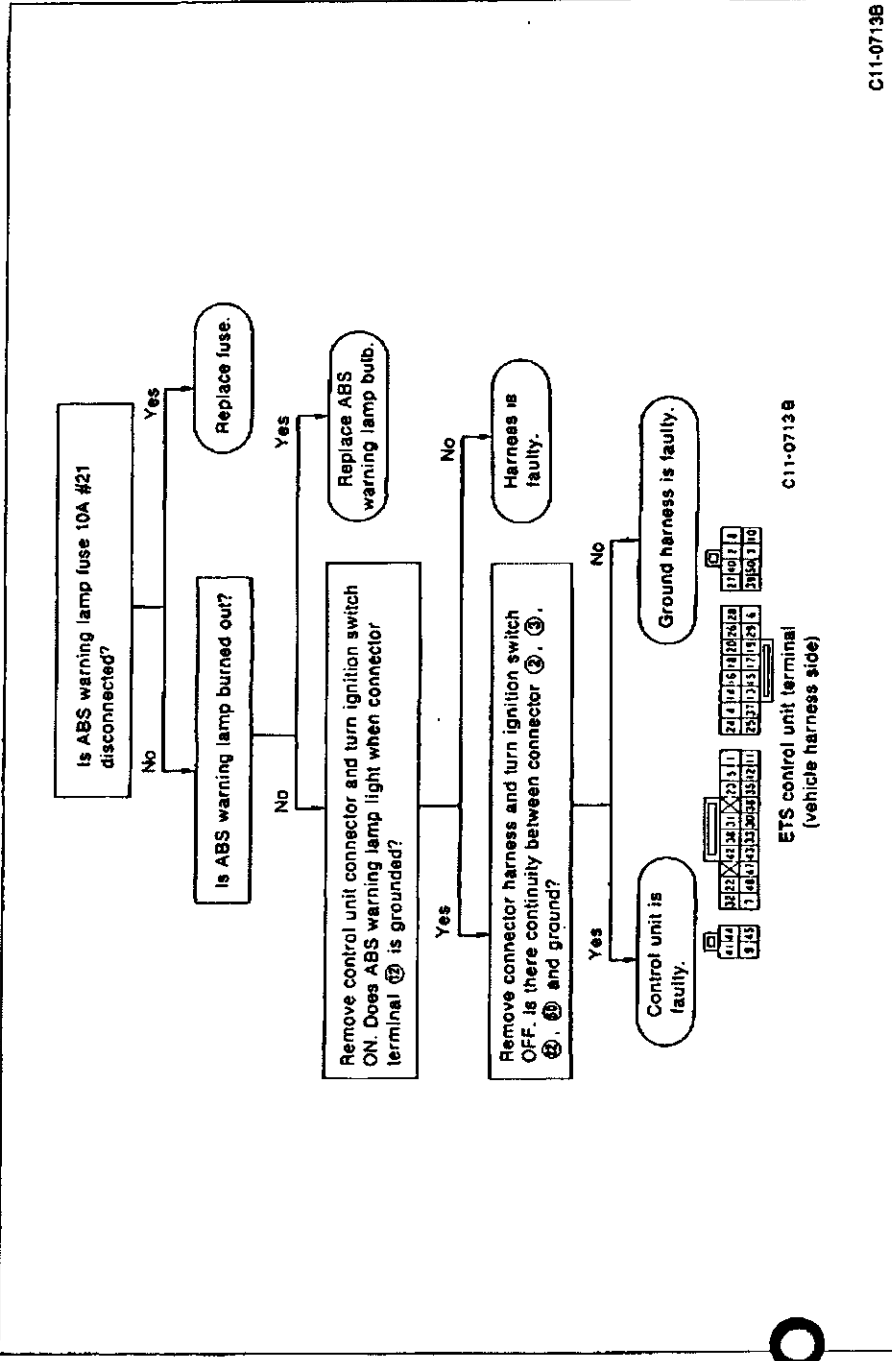
3) Refer to C3 Electrical control torque split 4WD system, 3. Troubleshooting for items marked *.

C10 BRAKES

3. Trouble Diagnosis (Anti-Lock Braking System) (Cont'd)

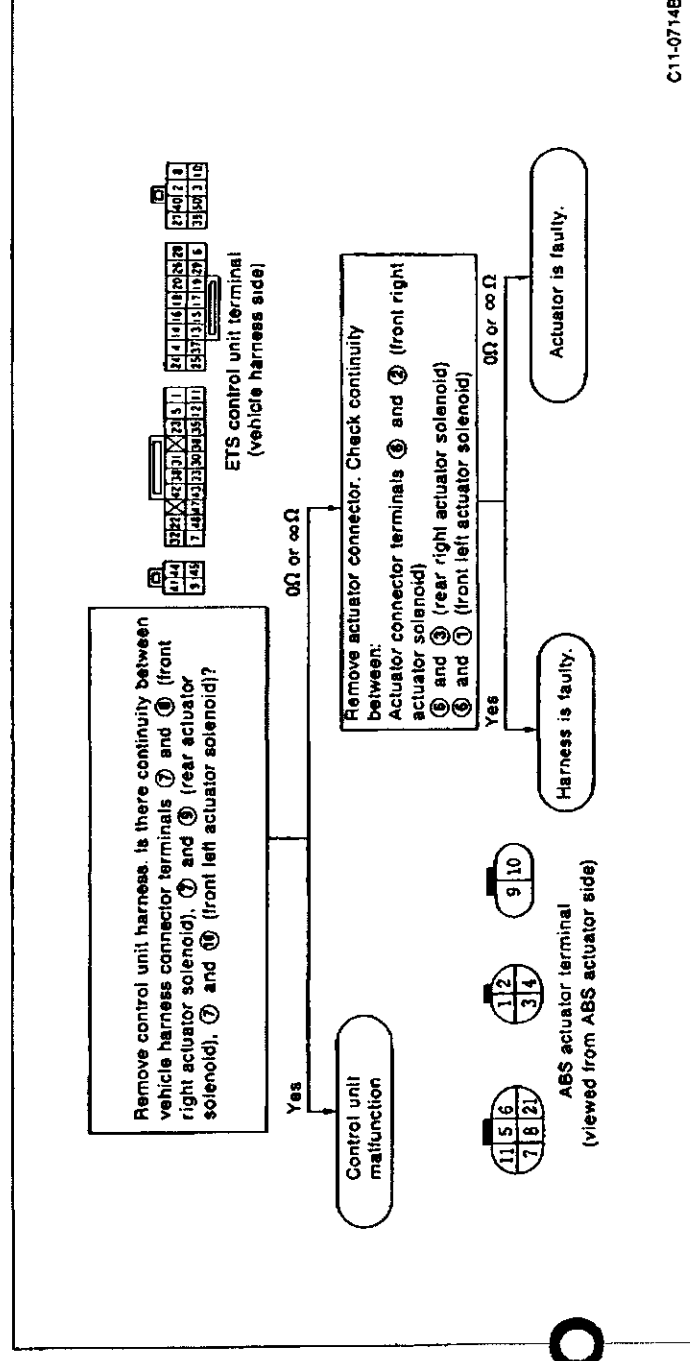
(3) Diagnostic procedure

ABS warning lamp does not light when ignition switch is in ON position (before engine starts).



(2) Malfunction indicated by self-diagnosis

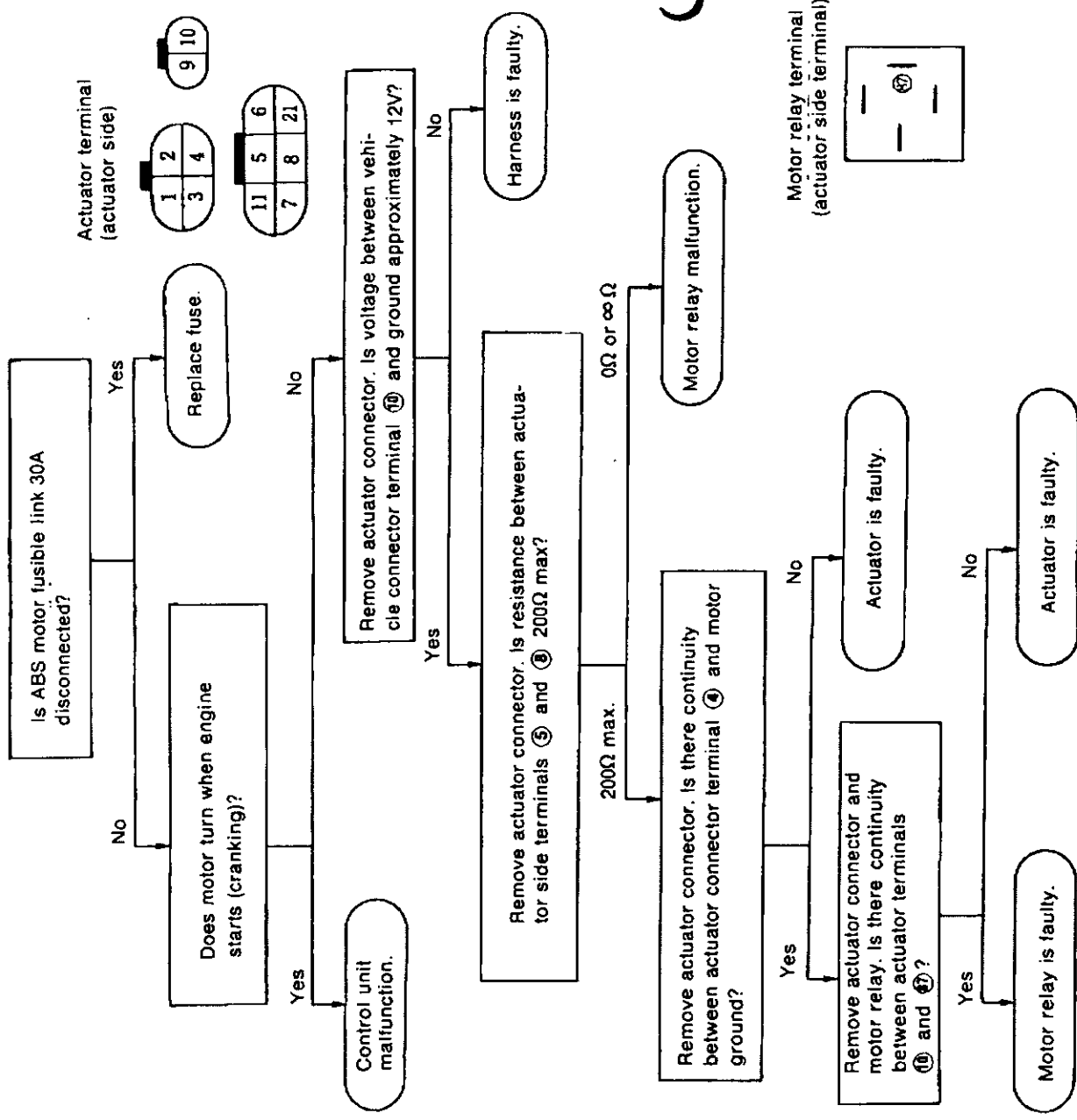
- A. Front right actuator solenoid valve circuit malfunction (LED flashes 5 times)
- B. Front left actuator solenoid valve circuit malfunction (LED flashes 6 times)
- C. Rear actuator solenoid valve circuit malfunction (LED flashes 7 times)



C10 BRAKES

3. Trouble Diagnosis (Anti-Lock Braking System) (Cont'd)

D. ABS motor, motor relay and circuit malfunction (LED flashes 8 times)

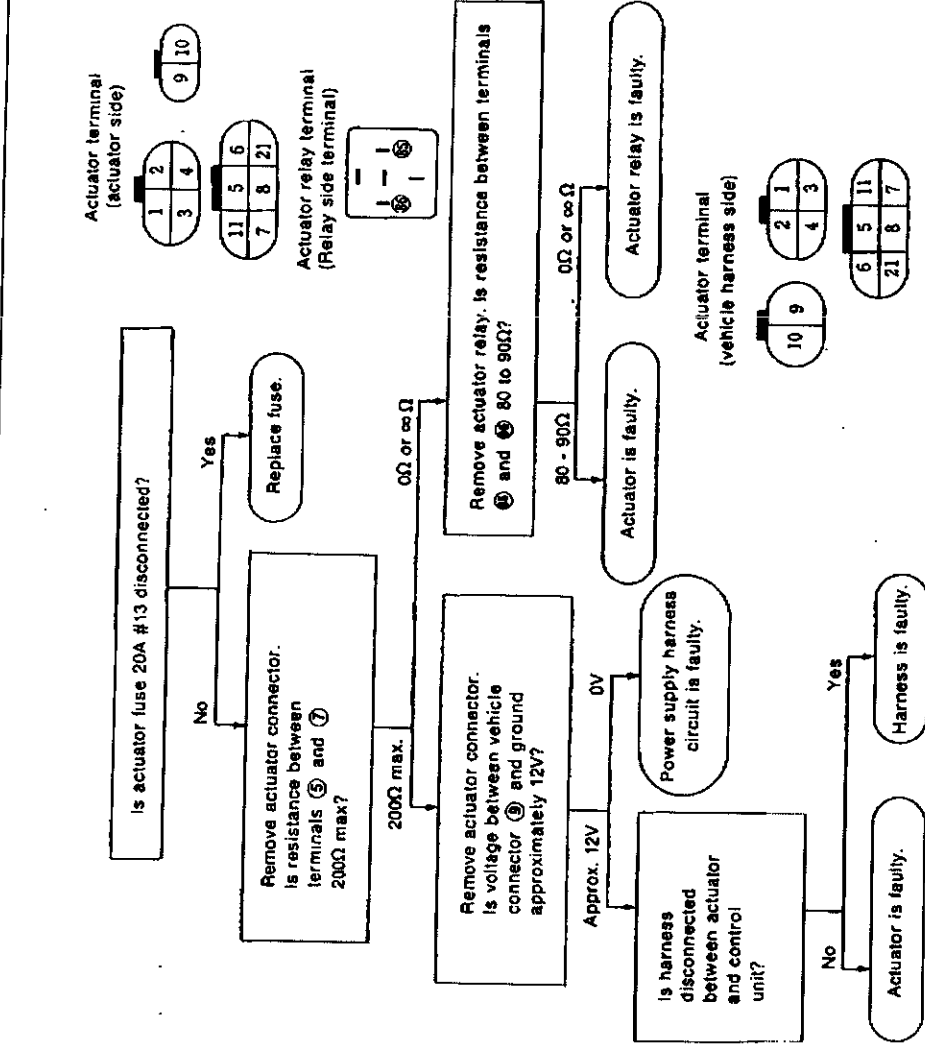


C11-07158

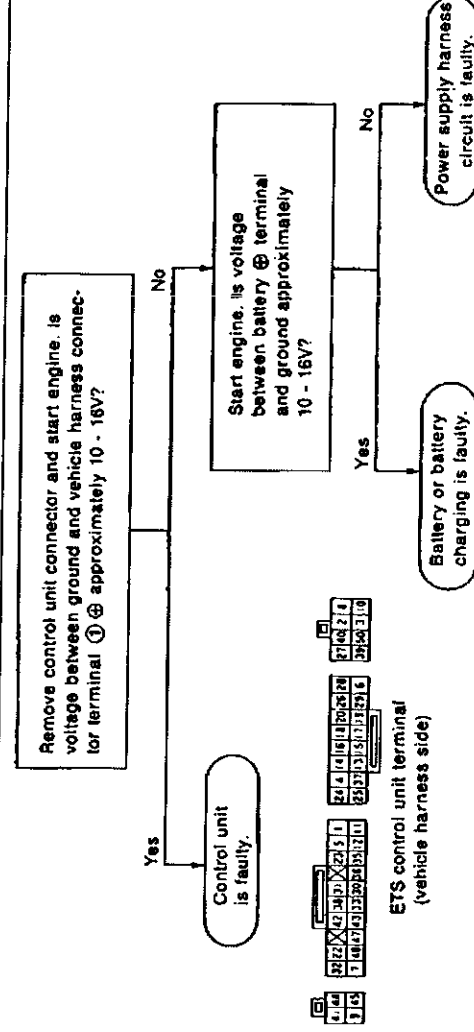
C10 BRAKES

3. Trouble Diagnosis (Anti-Lock Braking System) (Cont'd)

E. Actuator relay circuit malfunction (LED flashes 9 times)



F. ETS control unit power supply circuit malfunction (LED flashes 10 times)

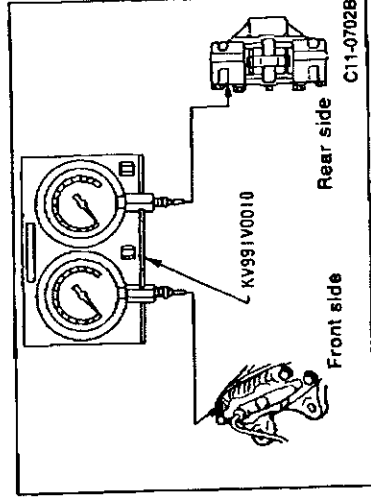


C10 BRAKES

3. Trouble Diagnosis (Anti-Lock Braking System) (Cont'd)

3-3 DAMAGE INSPECTION

- For items ①, ② and ③, refer to "C3 ELECTRICAL CONTROL TORQUE SPLIT 4WD SYSTEM DAMAGE INSPECTION".
- ① Check speed sensor installation.
- ② Check speed sensor clearance.
- ③ Check sensor rotor or G sensor.
- ④ Check front suspension and axle (wheel hub play).
 - Refer to "C3 ELECTRICAL CONTROL TORQUE SPLIT 4WD SYSTEM, 3-3 DAMAGE INSPECTION".
 - Check that there is no wheel hub play. If there is hub play, refer to "C7 FRONT SUSPENSION AND AXLE, 2-1 FRONT SUSPENSION AND AXLE INSPECTION".
- ⑤ Rear suspension and axle inspection
 - Check that there is no wheel hub play. If there is hub play, refer to "C8 REAR SUSPENSION AND AXLE, 2-1 REAR SUSPENSION AND AXLE INSPECTION".



⑥ Control split inspection

- Use brake fluid pressure gauge (special service tool) as shown in figure and measure front brake and rear brake pressure.
- Refer to 2-2 CHECKING BRAKE SYSTEM. The inspection procedures are the same.

⑦ Brake system inspection

- Check that the brake system is not leaking or clogged. Replace parts as necessary.

⑧ Air bleeding

- Refer to 2-3 CHANGING BRAKE FLUID AND AIR BLEEDING.

C10 BRAKES

3. Trouble Diagnosis (Anti-Lock Braking System) (Cont'd)

3-4 COMPONENT PARTS LOCATION



ETS control unit



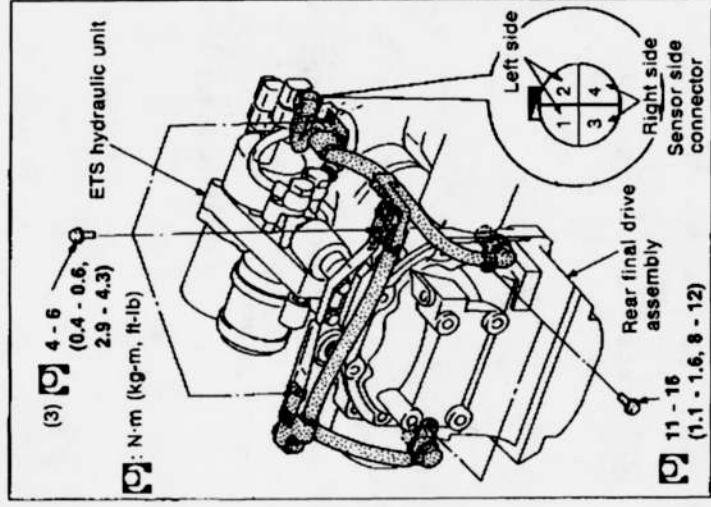
Front left speed sensor



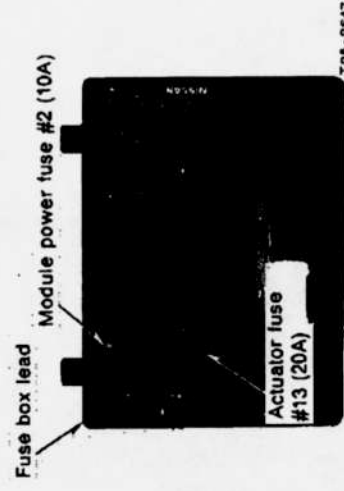
Actuator



Front right speed sensor



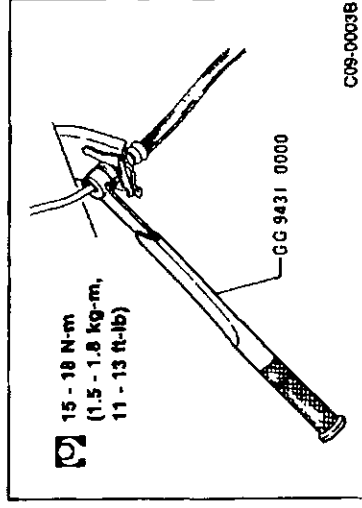
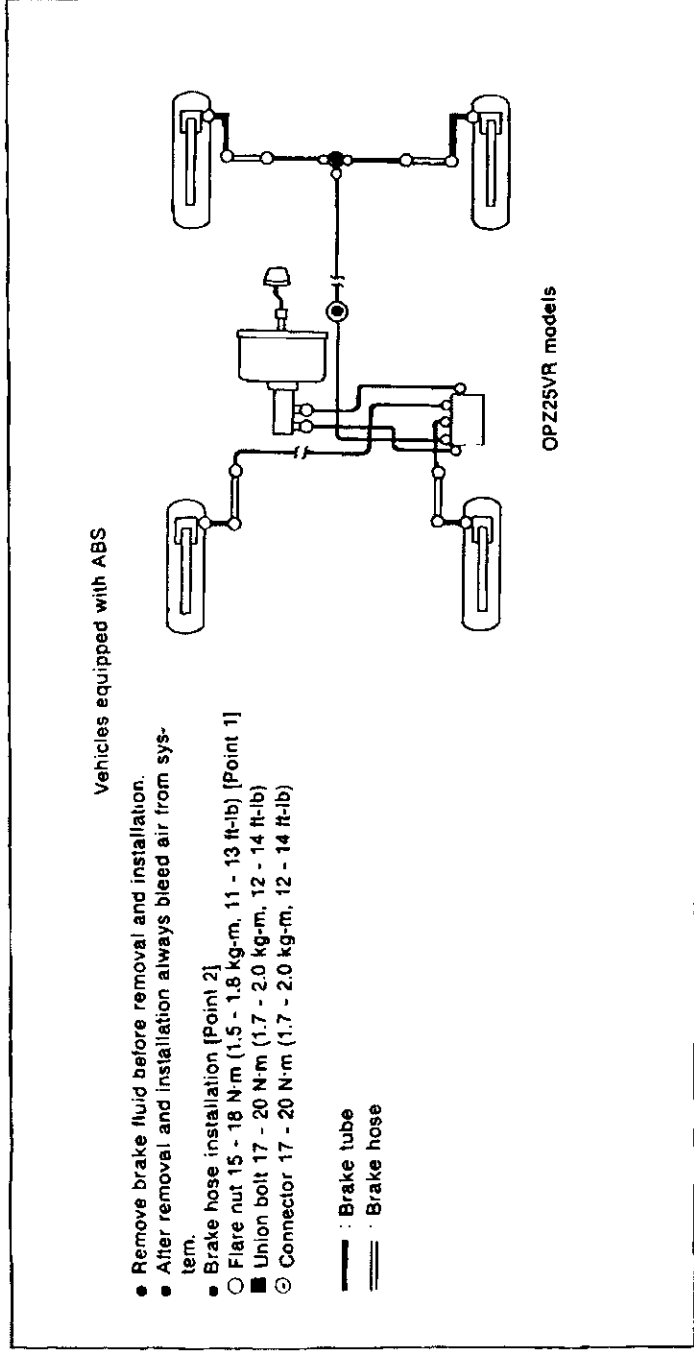
Rear speed sensor



ABS fusible link

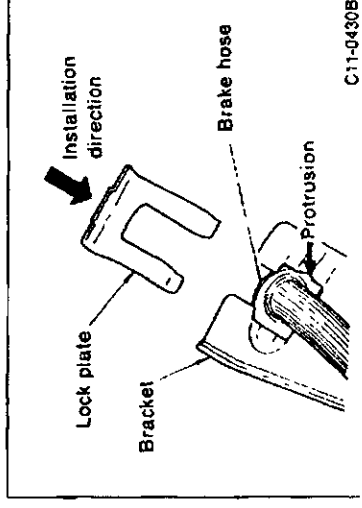
4. Removal and Installation, Assembly and Disassembly

4-1 BRAKE PIPING



[Point 1] Flare nut removal and installation

- Use a flare nut wrench to remove flare nuts. Use a flare nut torque wrench (special service tool) to tighten flare nuts. Be careful not to scratch or damage brake pipes or flare nuts.



[Point 2] Brake hose installation

- The left and right front brake hoses are the same for all models.
- Assemble hose from cylinder body. Align lock plate direction as shown in figure and secure.

CAUTION:

- Align protrusions on each hose with the hose bracket.
- After installation check that hose is not twisted or bent and does not interfere with other parts.

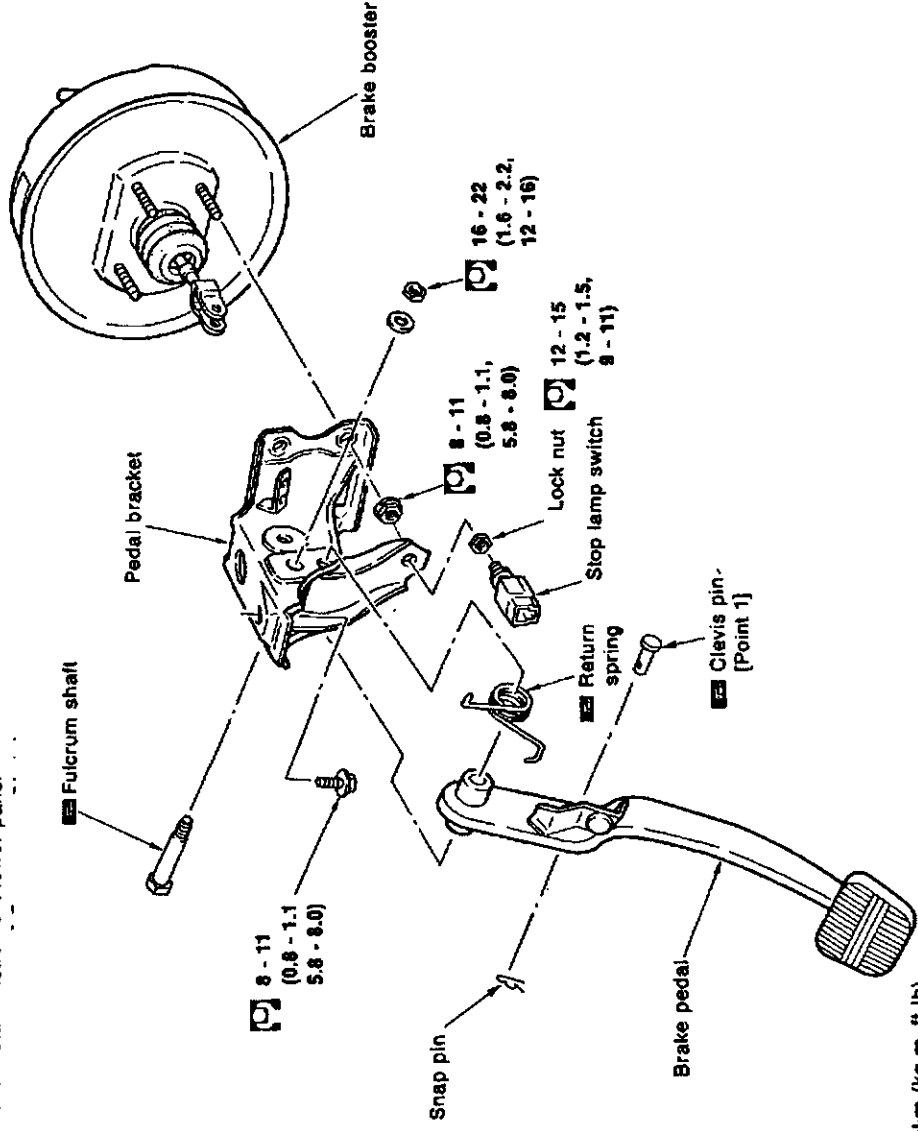
C10 BRAKES

4. Removal and Installation, Assembly and Disassembly (Cont'd)

2 BRAKE PEDAL BRACKET REMOVAL AND INSTALLATION, ASSEMBLY AND DISASSEMBLY

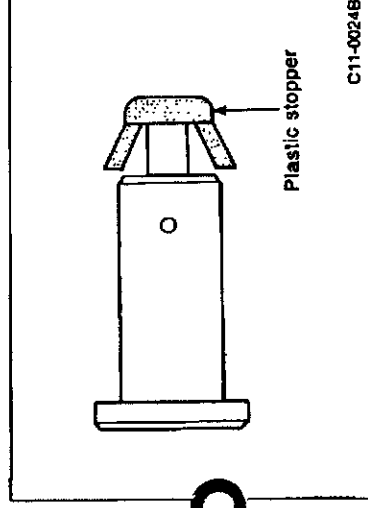
Additional work required

Remove and install: Instrument lower panel



: N·m (kg-m, ft-lb)

: Nissan MP special grease No. 2



C11-0024B

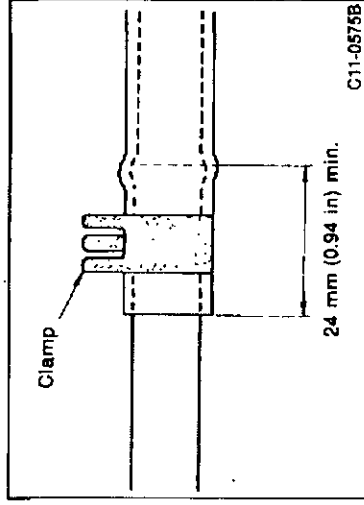
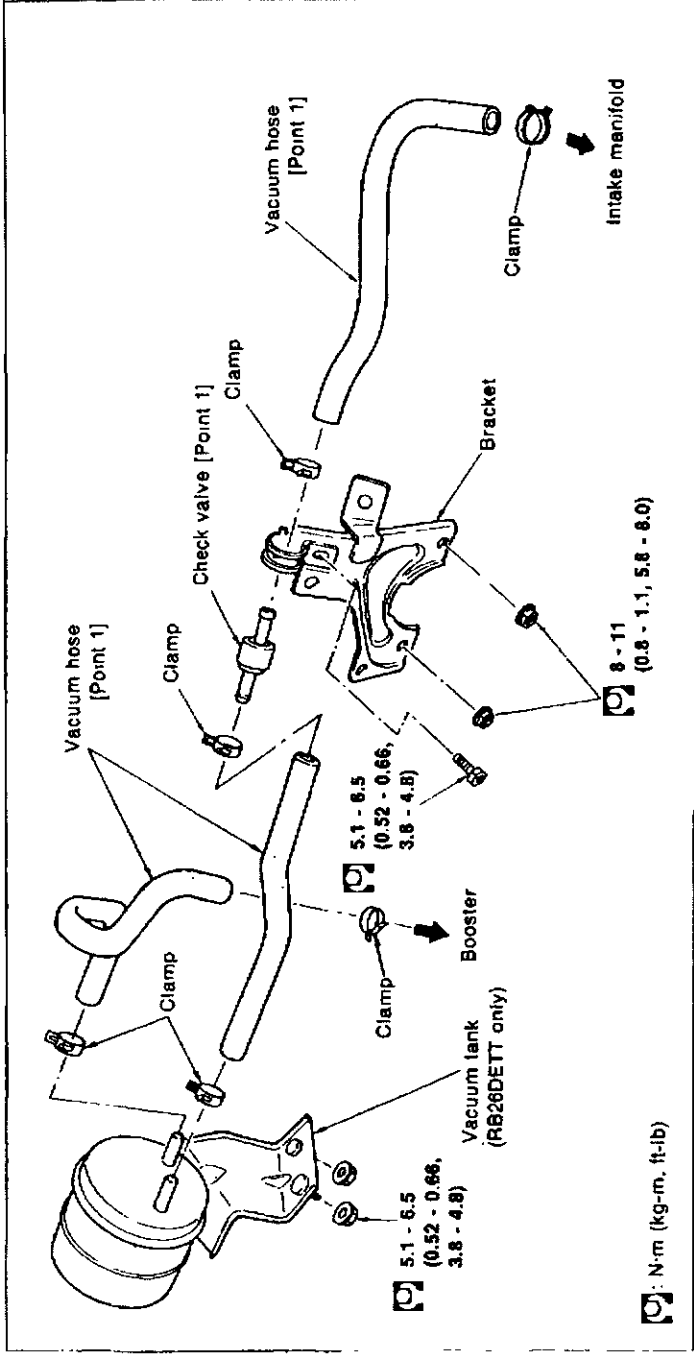
[Point 1] Clevis pin removal and installation

- Check that plastic stopper on end of clevis pin is not damaged or deformed. Replace if necessary.
- Insert clevis pin from right side as shown in figure. Install securely with snap pin.

C10 BRAKES

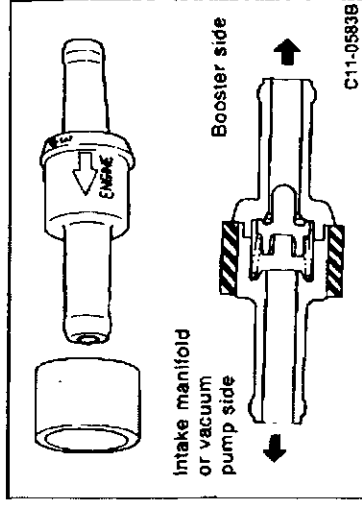
4. Removal and Installation, Assembly and Disassembly (Cont'd)

4-3 VACUUM PIPE REMOVAL AND INSTALLATION (vehicles equipped with RB26DETT engine)



[Point 1] Vacuum hose installation

- Insert hose at least 24 mm (0.94 in).
- Do not use lubrication oil to install hose.



[Point 2] Check valve installation

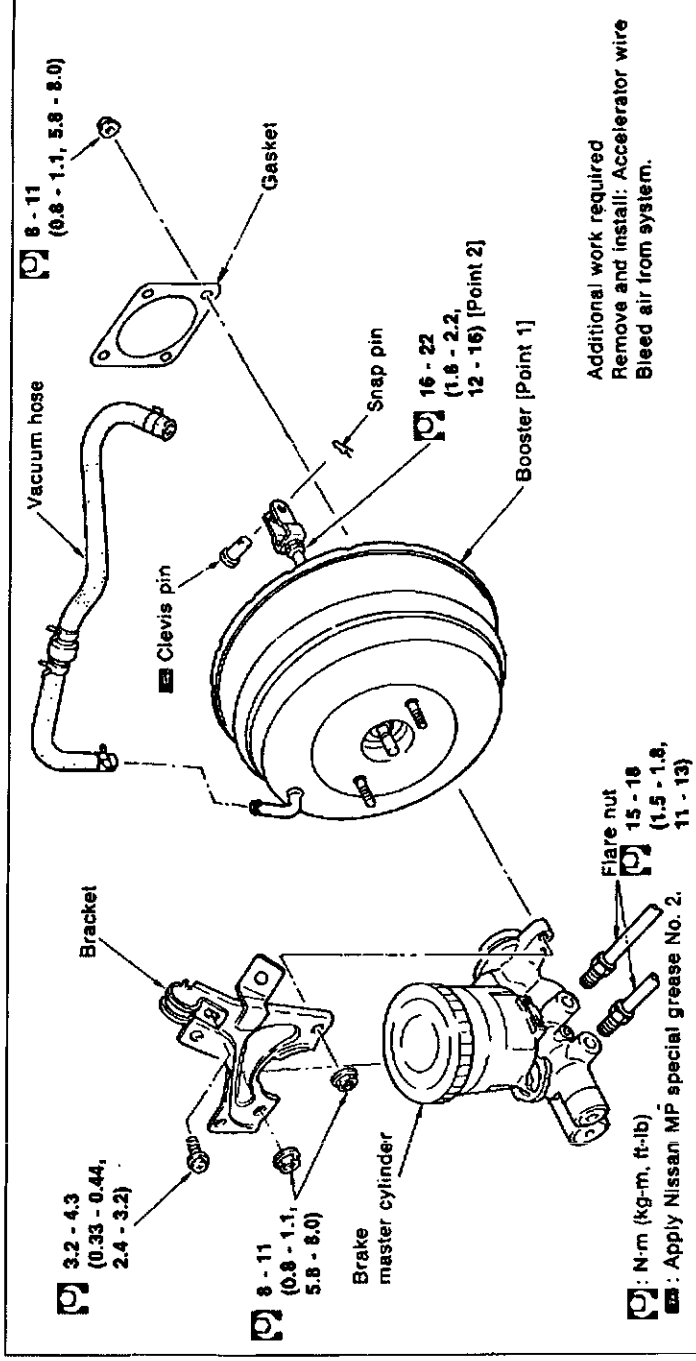
- Assemble check valve with arrow mark facing engine side (intake manifold side).

C10 BRAKES

4. Removal and Installation, Assembly and Disassembly (Cont'd)

1-4 MASTER CYLINDER AND BOOSTER

(1) Removal and installation



[Point 1] Booster removal and installation

Removal

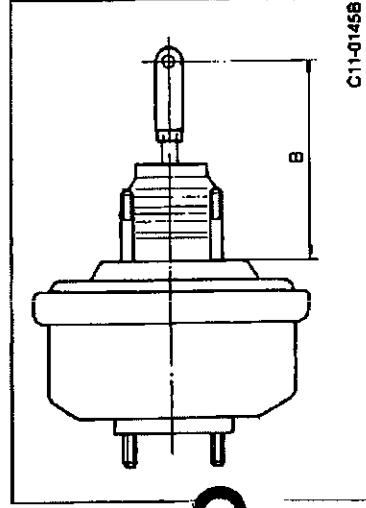
- Separate master cylinder and brake tube.
- Remove snap pin and clevis pin.
- Remove pedal bracket and nuts (4) and remove from engine compartment.

Installation

- Assembly is the reverse of disassembly.
- After installing booster, temporarily tighten master cylinder. Install brake tubes and then tighten master cylinder bolts to specified torque.

CAUTION:

Be careful not to scratch reservoir tank or body during removal and installation.



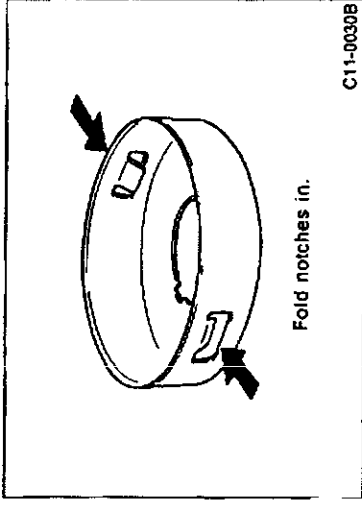
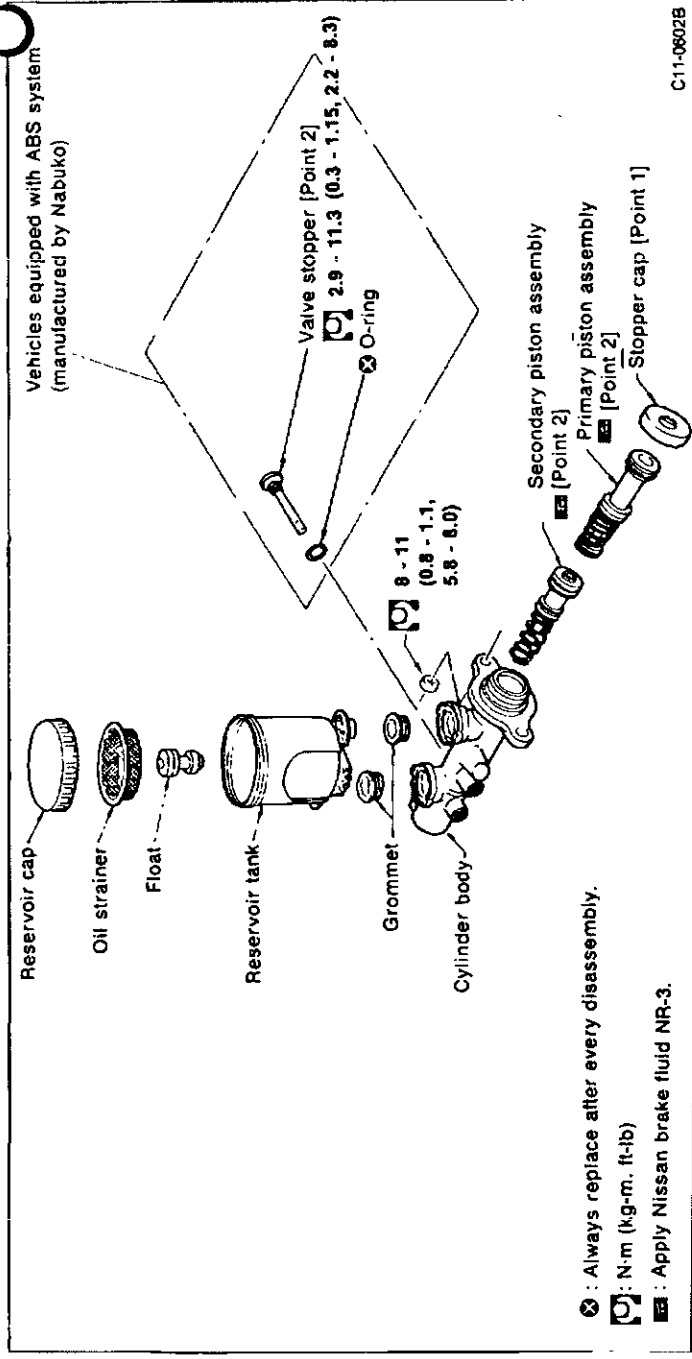
[Point 2] Operating rod standard dimension adjustment

- Loosen lock nut and adjust operating rod so dimension B is standard length.
B dimension specification length:
142 - 149 mm (5.59 - 5.87 in)
- After adjustment, temporarily tighten lock nut. After installation in vehicle, adjust pedal height and play. Tighten lock nut to specified torque.

C10 BRAKES

4. Removal and Installation, Assembly and Disassembly (Cont'd)

(2) Master cylinder assembly and disassembly



[Point 1] Stopper cap installation

- If notches are bent or deformed replace stopper cap.
- Fold notches in and insert cap.

C10 BRAKES

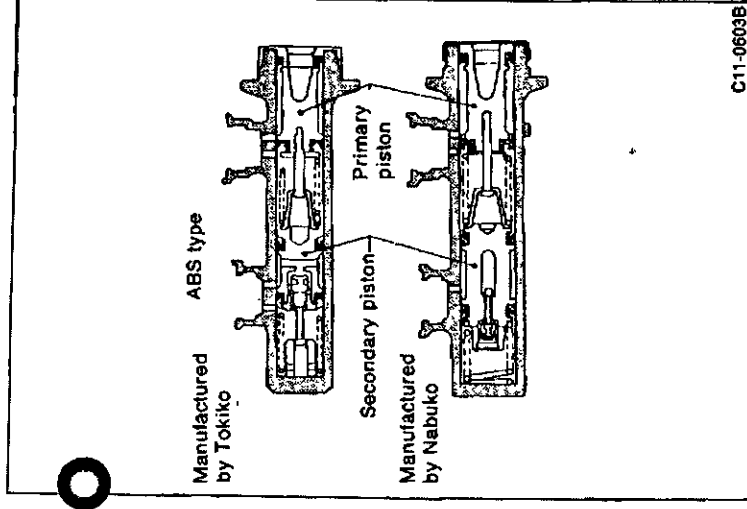
4. Removal and Installation, Assembly and Disassembly (Cont'd)

[Point 2] Inner kit assembly installation

- Always replace assembly with inner kit.
- Check cup direction and install.
- While pressing primary piston with Phillips screwdriver, install valve stopper.

CAUTION:

Do not wash with mineral oil because it may deform or damage rubber parts.



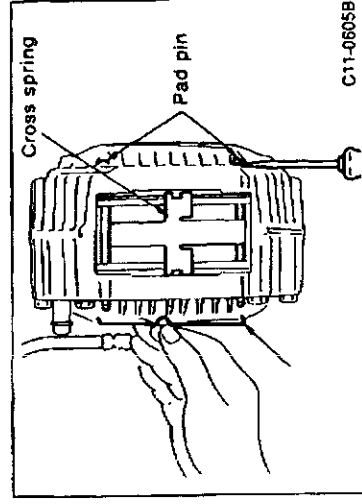
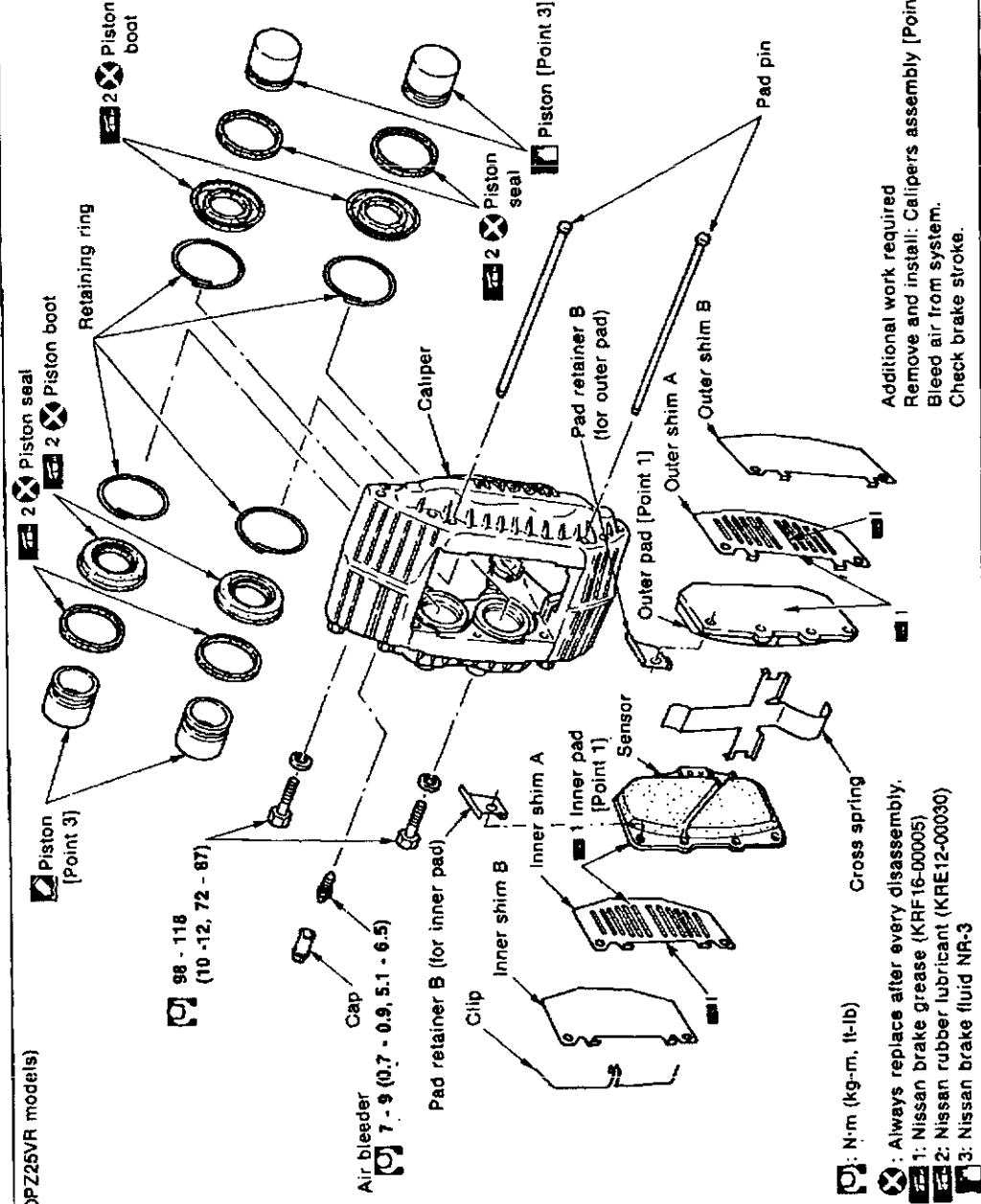
C10 BRAKES

4. Removal and Installation, Assembly and Disassembly (Cont'd)

4-5 FRONT BRAKE

(1) Caliper assembly removal and installation, assembly and disassembly (OPZ25VR model)

(OPZ25VR models)



[Point 1] Pad removal and installation

Removal

- Remove clip from pad pins.
- While pressing cross spring, remove pad pins.

CAUTION:

Check pad pins and clips for fatigue, deformation, damage or rust. Replace with new parts if necessary.

C10 BRAKES

4. Removal and Installation, Assembly and Disassembly (Cont'd)

- Use pliers to remove pads when attached to shims.

CAUTION:

Check calipers and piston boot for damage, rust and deformation. Replace parts as necessary.

- Remove shim and pad retainer from pads.

CAUTION:

If the shim or shim cover are rusted or rubber coat is peeled, replace with new part.

Pad replacement

- If pad thickness does not exceed wear limit indicated below, compress inner and outer pistons to install new pads.

Inspection specifications

Model		OPZ25VR
Wear limit	mm (in)	2 (0.08)
(Reference) New pad thickness	mm (in)	11.5 (0.453)

- Install old inner pad as shown in figure to prevent piston from popping out.
- Release air bleeder and use pliers to compress two outer pistons simultaneously. Place wood on outside to prevent scratching calipers.

CAUTION:

- (1) Connect vinyl tube to air bleeder and be careful not to get brake fluid on body.
 - (2) When pressing piston into calipers, change pressure position of outer pliers so piston does not jam in cylinder.
 - (3) Temporarily tighten wheel nuts so disc does not incline.
- Remove old inner pad and install new outer pad as shown in figure so outside piston does not pop out.
 - Place wood on outer side as described above. Use pliers to compress two inner pistons simultaneously.
 - Tighten air bleeder.
 - Remove new outer pad to compress inner and outer pistons and complete operation.

CAUTION:

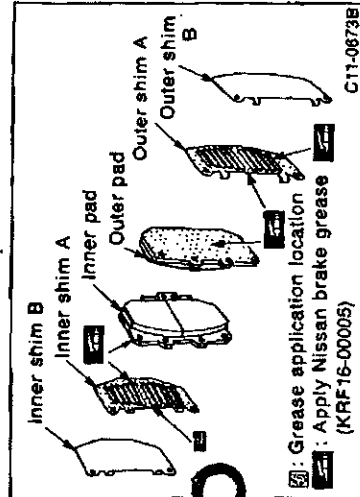
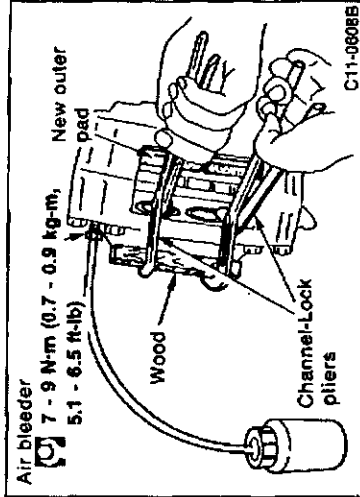
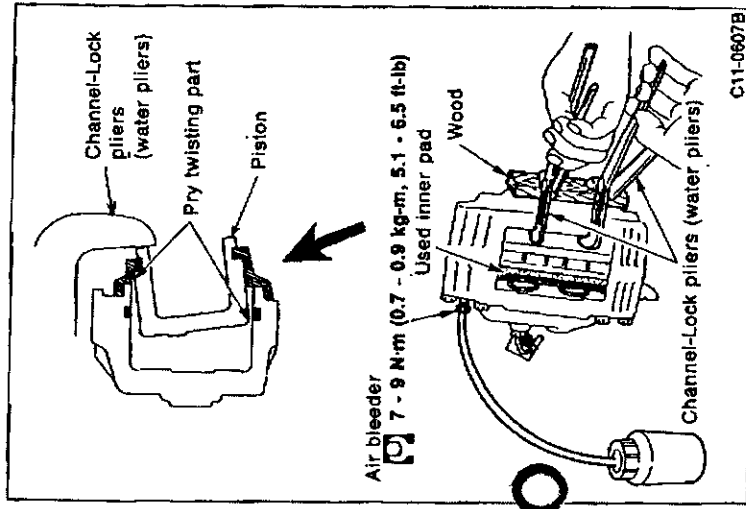
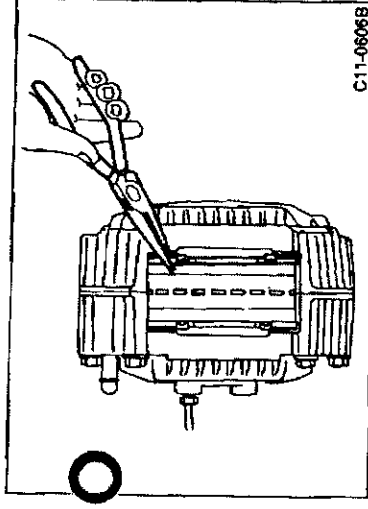
- (1) After replacing brake pads, bleed air from system.
- (2) Replace pads as a set on both left and right wheels at the same time.

Installation

- Apply a uniform coat of Nissan brake grease [approx. 0.7 to 10 g (0.025 to 0.353 oz)] to rear metal surface of inner and outer pads and to both sides of shim A.

CAUTION:

- (1) Wipe off excess brake grease so it does not adhere to pad friction surface or caliper installation surface.
- (2) Install shims A and B in sequence shown in figure.



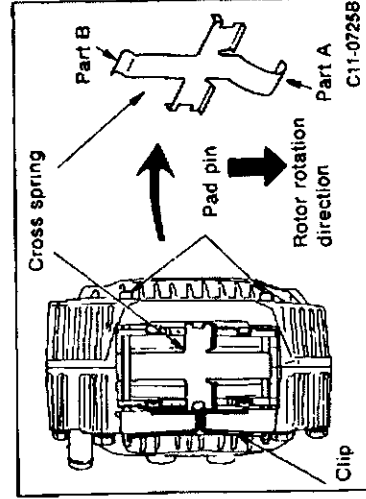
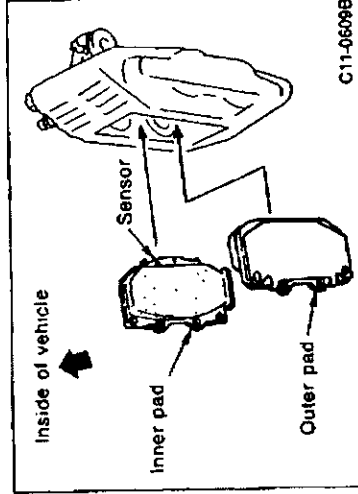
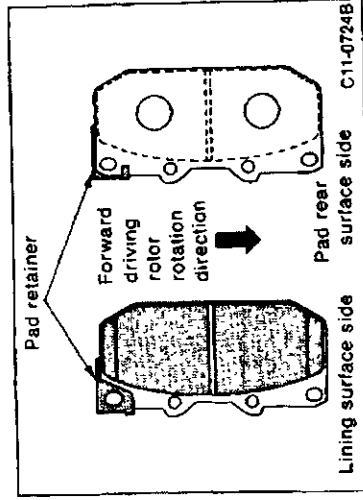
C10 BRAKES

4. Removal and Installation, Assembly and Disassembly (Cont'd)

- Assemble inner and outer pad so pad retainer faces opposite side of forward driving disc rotation direction (see side of installed calipers).

CAUTION:
Omission or incorrect assembly of pad retainer may cause abnormal brake noise.

- Assemble pad so sensor faces inside of vehicle.



- Insert lower pad pin securely from outer cylinder side through lower pad hole to inner cylinder side.
- Set part A of cross spring on lower pad pin as shown in figure. Press part B in and insert upper pad pin from outer cylinder side to inner cylinder side and secure with cross spring.

CAUTION:
If the cross spring installation direction and position are incorrect it may cause squeaking or abnormal noise.

- Insert clip securely in small hole in the end of upper pad pin.
- Rotate pad pin and insert clip in the small hole in the end of pad pin. Next, insert curved projection in middle of clip into hole in middle of inner cylinder.

CAUTION:

- If clip assembly is incorrect, the pad pin or pad itself may fall out during driving causing braking malfunction.
- When replacing pads with new parts, bleed air from system.

[Point 2] Caliper removal and installation

CAUTION:

- Do not remove four caliper inner and outer sides. Do not tighten these bolts.
- The caliper and knuckle housing are manufactured of aluminum alloy and are softer than steel. Be sure to use a half-seat washer for the caliper washer to prevent scratching the installation surface.

C10 BRAKES

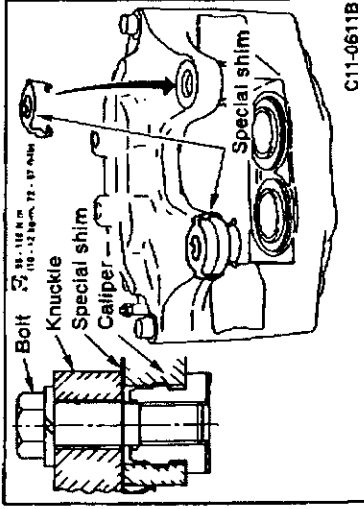
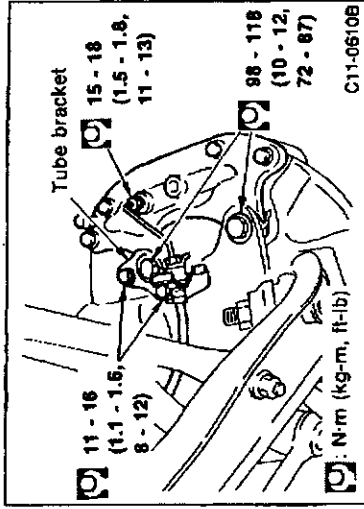
4. Removal and Installation, Assembly and Disassembly (Cont'd)

Removal

- Remove brake tube and tube bracket.
- Remove mounting bolts and remove calipers.

CAUTION:

Suspend caliper assembly with wire to prevent brake hose from stretching.



Installation

- Install special shims on both sides of caliper as shown in figure. Next, install knuckle housing.

CAUTION:

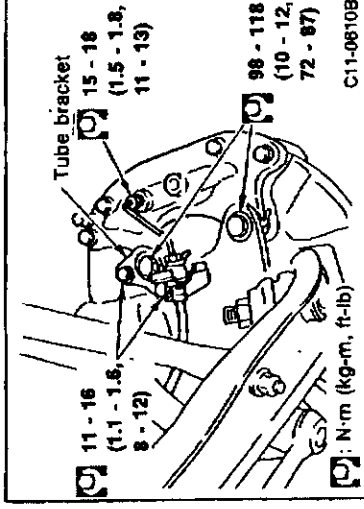
(1) The caliper and knuckle housing are manufactured of aluminum alloy and are softer than steel. Be especially careful not to damage the seating surface during installation because this may cause bolt looseness or abnormal operation noise.

(2) Make sure there is no water or oil on knuckle housing and caliper installation surface or threads, bolts and washers.

- Install calipers as shown in figure and tighten mounting bolts to specified torque.
- Install brake tube and tube bracket and tighten to specified torque.

CAUTION:

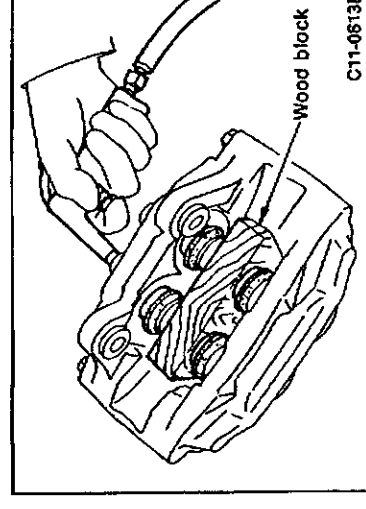
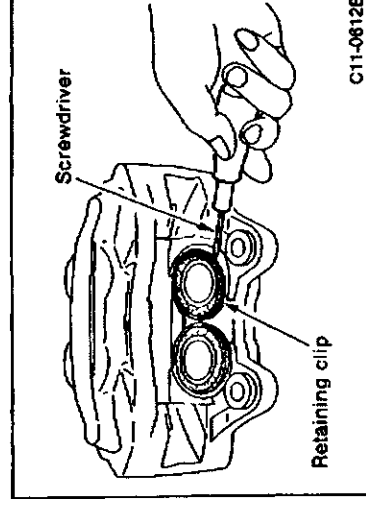
Check that brake tubes are not twisted or bent.



[Point 3] Piston removal and installation

Removal

- Remove retaining ring with screwdriver.



- Insert wood block as shown in figure, blow compressed air into brake tube installation hole and to push out piston and boot. Adjust air so four pistons all extend the same distance from calipers.

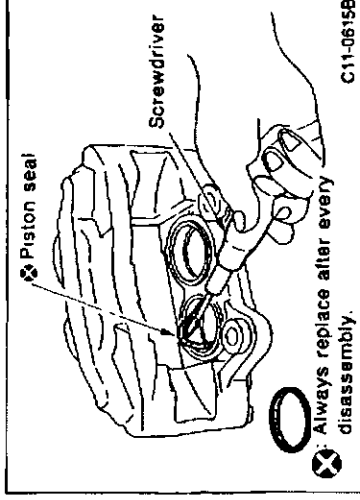
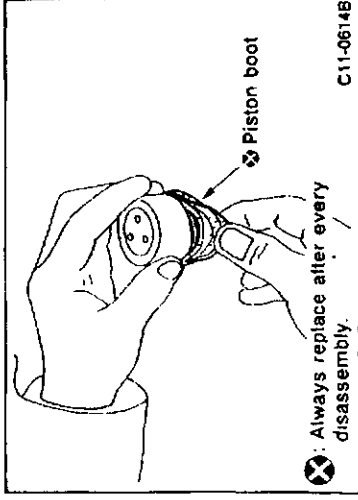
CAUTION:

(1) Be careful so brake fluid does not spray out.
(2) When pressing out piston with compressed air, be careful so fingers are not pinched between wood and piston.

C10 BRAKES

4. Removal and Installation, Assembly and Disassembly (Cont'd)

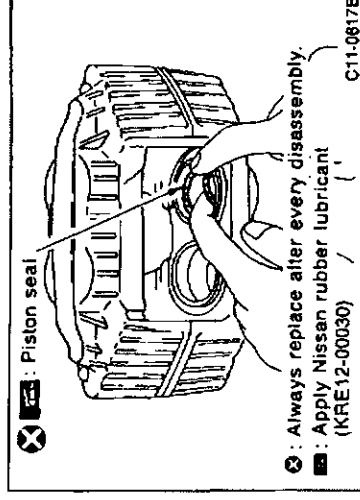
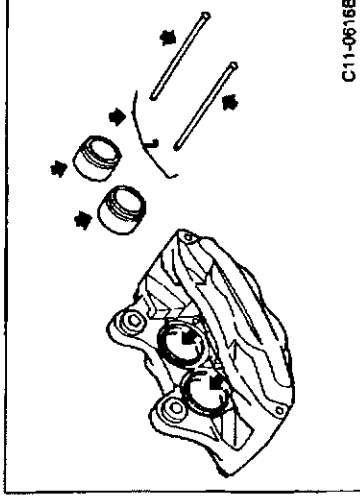
- Remove piston boot from piston.



- Remove piston seal with screwdriver.
- CAUTION:**
- (1) Be careful not to scratch or score inside of cylinder with screwdriver.
 - (2) Do not remove the four mounting bolts on the inner and outer side of caliper. Do not tighten bolts either.

Disassembly inspection

- Check inside surface of cylinder and piston for damage, wear or rust. If any of these conditions are observed, replace parts as necessary.
- If there is leakage from aligned surface of cylinder bore or other problem, replace caliper assembly.
- Check pad pin, cross spring, clip and shim for damage, deformation or rust. Replace if any of these conditions are noted.



Installation

- Apply Nissan rubber lubricant to piston seal and install cylinder body.

C10 BRAKES

4. Removal and Installation, Assembly and Disassembly (Cont'd)

- Attach piston boot to rear of piston and install correctly in piston groove. (Apply rubber lubricant to boot before installing piston.)
- Insert piston in cylinder body by hand. Install cylinder lip correctly in piston boot groove.

CAUTION:

When pressing piston, change pressure position on piston to prevent insertion at incorrect angle.

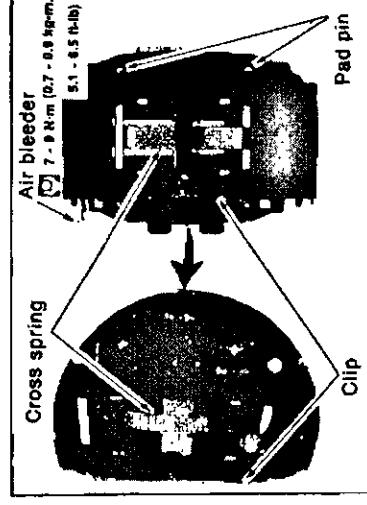
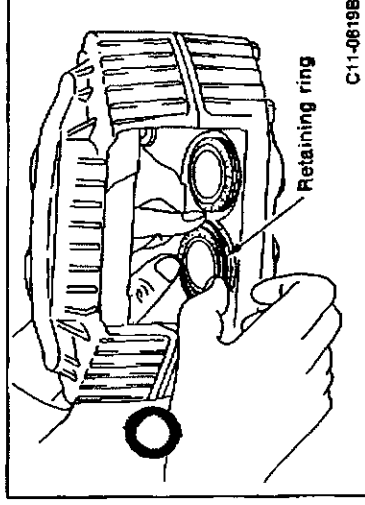
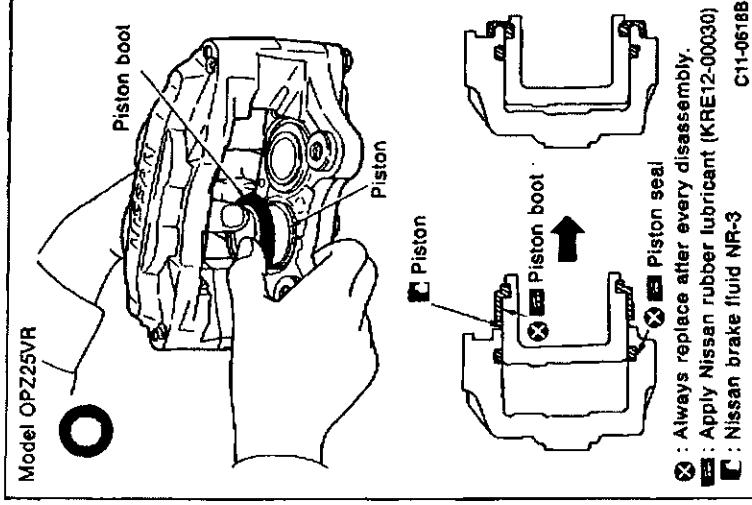
- Secure piston boot with retaining ring.

[Point 4] Misalignment Inspection

- Assemble pad and bleed air from brakes. Press on brake pedal with approximately 196 N (20 kg, 44 lb) of force for 5 seconds.
- Release brake pedal, turn disc 10 times and check for misalignment or binding.

CAUTION:

- (1) The pad and disc must be dry.
- (2) The wheel bearing must be normal.

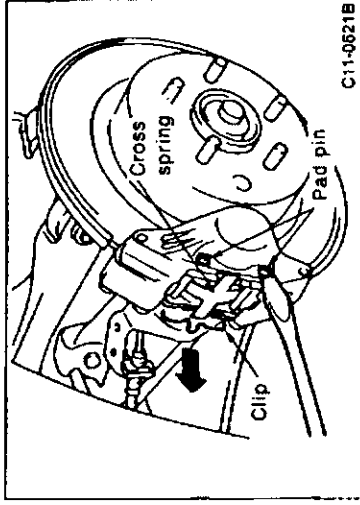
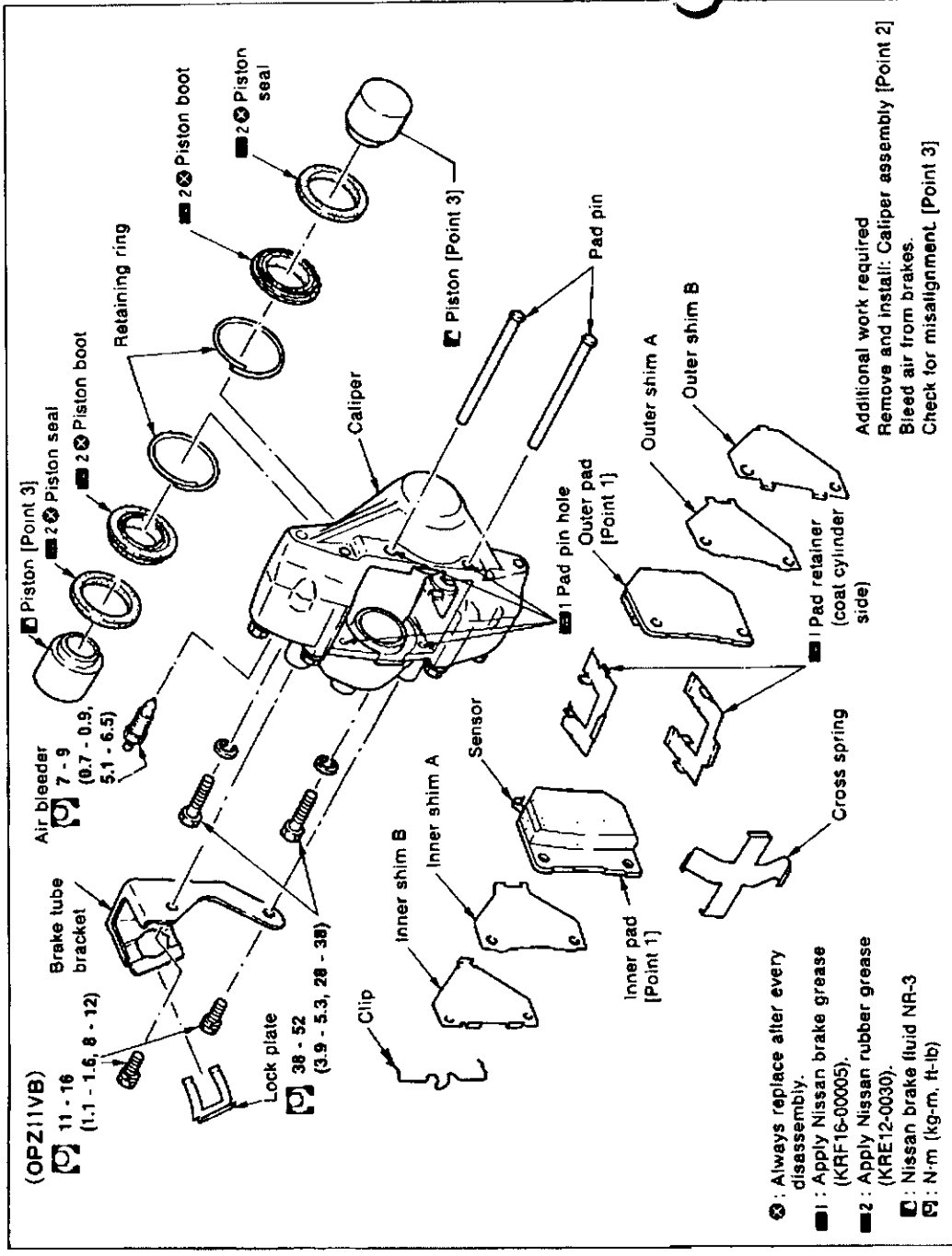


C10 BRAKES

4. Removal and Installation, Assembly and Disassembly (Cont'd)

4-6 REAR BRAKE

- (1) Disc brake caliper assembly removal and installation, assembly and disassembly (model OPZ11VB)



[Point 1] Pad removal and installation

Removal

- Remove clip from pad pin.
- While pressing cross spring by hand, remove pad pin.

CAUTION:

Check pad pin and clip for fatigue, damage and rust. If any of these conditions are observed, replace with new part.

C10 BRAKES

4. Removal and Installation, Assembly and Disassembly (Cont'd)

- Remove pad from calipers with shims attached.

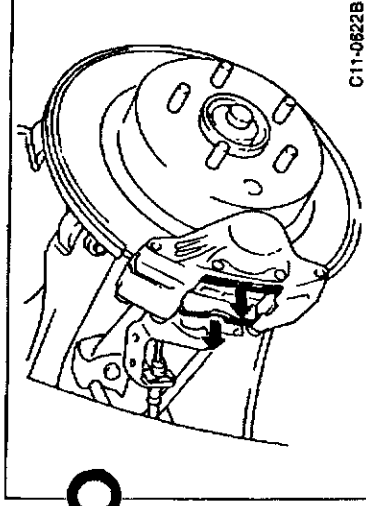
CAUTION:

Check calipers and piston for fatigue, damage and rust. If any of these conditions are observed, replace with new part.

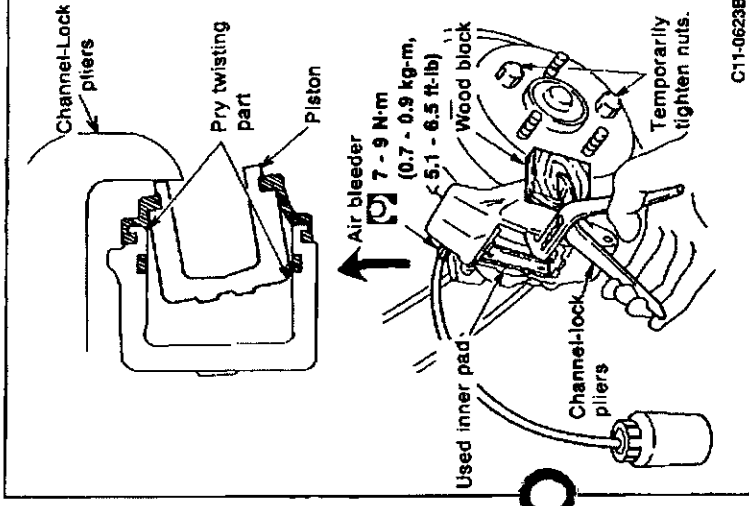
- Remove shims and shim cover from pad.

CAUTION:

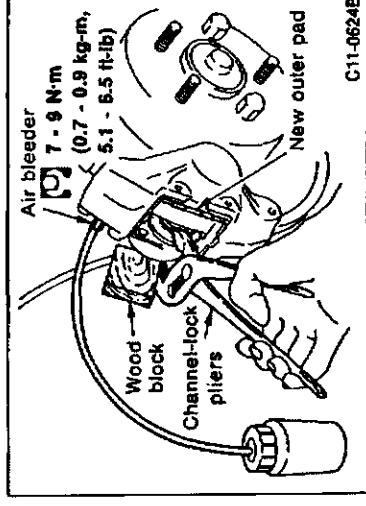
If there is rust or a rubber peeling coat on shim and shim cover, replace with new parts.



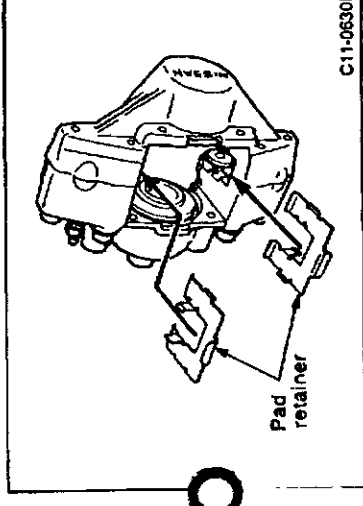
C11-0622B



C11-0623B



C11-0624B



C11-0630B

Pad replacement

- If pad thickness exceeds wear limit indicated below, compress inner and outer pistons to install new pads.

Inspection specifications

Model	mm (in)	OPZ11VB
Wear limit	mm (in)	2 (0.08)
(Reference) New pad thickness	mm (in)	11.5 (0.453)

- Install old inner pad as shown in figure to prevent piston from popping out.
- Release air bleeder and use pliers to compress two outer pistons simultaneously. Place wood block on outside to prevent scratching calipers.

CAUTION:

- Connect vinyl tube to air bleeder and be careful not to get brake fluid on body.
- When pressing piston into calipers, change pressure position of outer pliers so piston does not jam in cylinder.
- Temporarily tighten wheel nuts in criss-cross pattern so disc does not incline.

- Remove old inner pad and install new outer pad as shown in figure so outside piston does not pop out.
- Place wood on outer side as described above. Use pliers to compress two inner pistons simultaneously.
- Tighten air bleeder.
- Remove new outer pad to compress inner and outer pistons and complete operation.

CAUTION:

- After replacing brake pads, bleed air from system.
- Replace pads as a set on both left and right wheels at the same time.

- Remove pad retainer from caliper.

C10 BRAKES

4. Removal and Installation, Assembly and Disassembly (Cont'd)

Installation

- Apply a uniform coat of Nissan brake grease to cylinder body side surface of pad retainer.

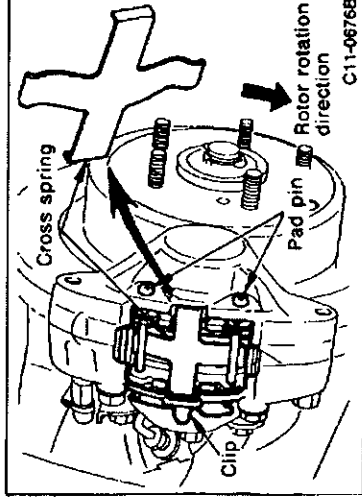
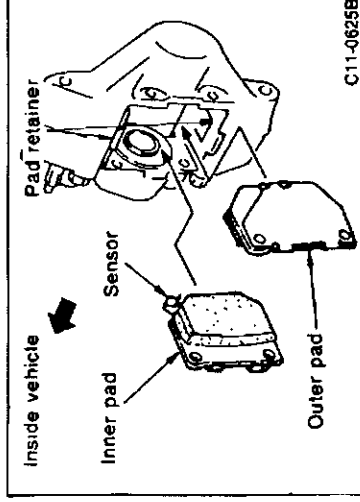
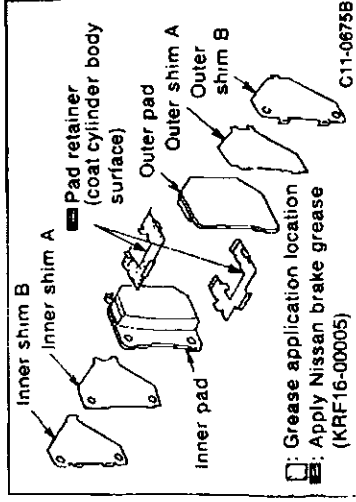
CAUTION:

- (1) Wipe off excess brake grease so it does not adhere to pad wear surface or caliper installation surface.
- (2) Install shims A and B in sequence shown in figure.
- (3) Apply grease to contact area between pad retainer and cylinder body because it may rust.

- Install pad retainer in caliper.
- Assemble pad so sensor faces inside of vehicle.

CAUTION:

Omission or incorrect assembly of pad retainer may cause abnormal brake noise.



- Insert lower pad pin securely from outer cylinder side through lower pad hole to inner cylinder side.
- Set cross spring on lower pad pin as shown in figure. Insert upper pad pin from outer cylinder side to inner cylinder side and secure with cross spring.

CAUTION:

If the cross spring installation direction and position are incorrect it may cause squeaking or abnormal noise.

- Using Phillips screwdriver (+), rotate pad pin and insert clip in the small hole in the end of pad pin.

CAUTION:

- (1) If clip assembly is incorrect, the pad pin or pad itself may fall out during driving causing braking malfunction.
- (2) When replacing pads with new parts, bleed air from system.

[Point 2] Caliper removal and installation

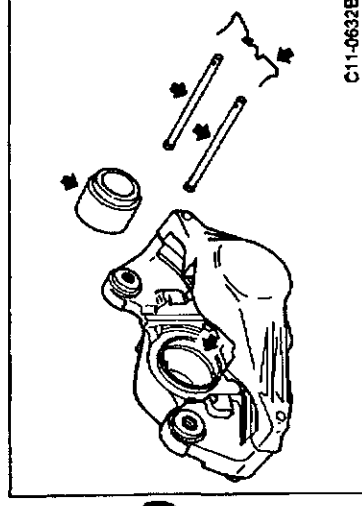
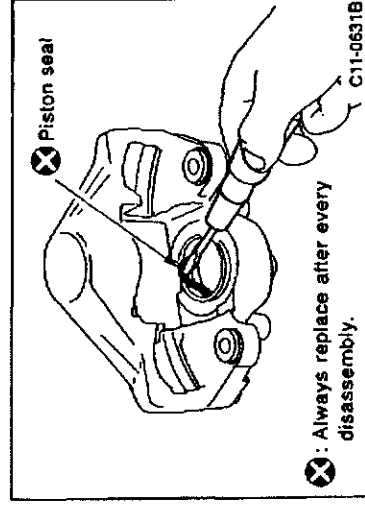
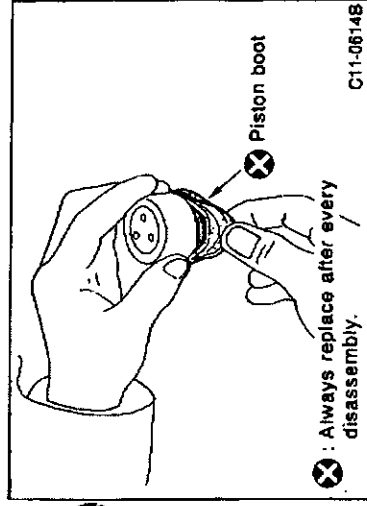
CAUTION:

- (1) Do not remove the four caliper inner nuts. Do not tighten these nuts.
- (2) The caliper and knuckle housing are manufactured of aluminum alloy and are softer than steel. Be sure to use a half-seat washer for the caliper washer to prevent scratching the installation surface.

C10 BRAKES

4. Removal and Installation, Assembly and Disassembly (Cont'd)

- Remove piston boot from piston.

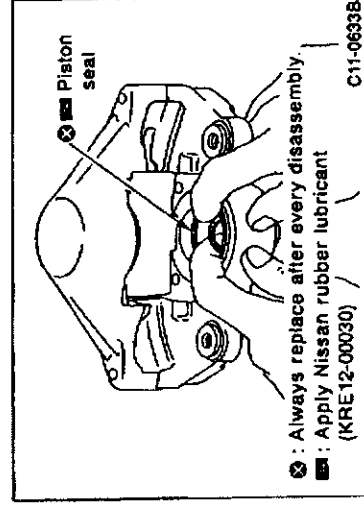


Disassembly inspection

- Check inner surface of cylinder for damage, wear or rust. If any of these conditions are noted, replace parts as necessary.
- If there is leakage from cylinder body mating surface or any other problem, replace caliper assembly.
- Check pad pin, pad retainer, cross spring, clip and shims for damage, deformation or rust. If any of these conditions are noted, replace parts as necessary.

Installation

- Apply a coat of Nissan rubber lubricant to piston seal and install in cylinder.



C10 BRAKES

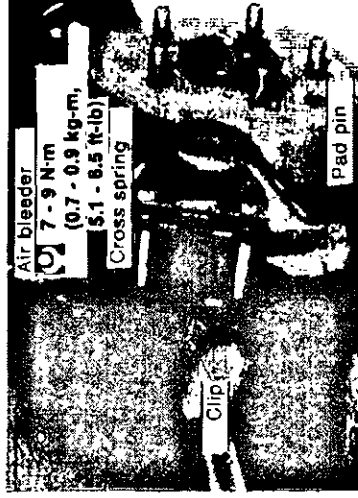
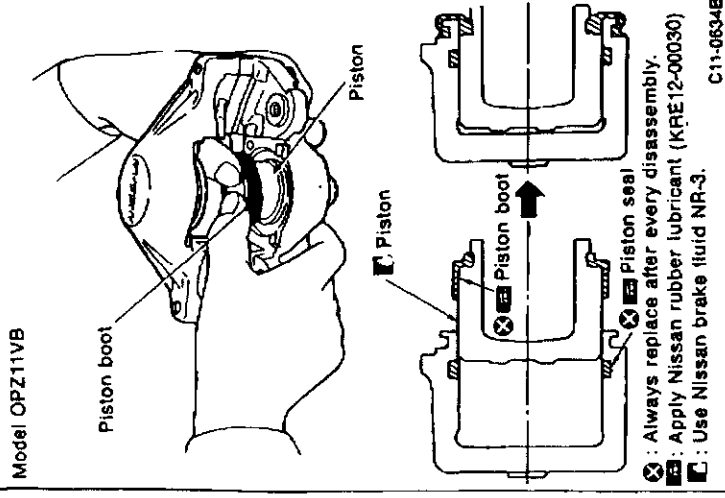
4. Removal and Installation, Assembly and Disassembly (Cont'd)

- Attach piston boot to rear of piston and install correctly in piston groove. (Apply Nissan rubber lubricant to boot before installing piston.)
- Insert piston in cylinder body by hand. Install cylinder lip correctly in piston boot groove.

CAUTION:

When pressing piston, change pressure position on piston to prevent insertion at incorrect angle.

- Secure piston boot with retaining ring.



[Point 4] Misalignment inspection

- Install pad and bleed air from brakes. Press on pedal with 196 N (20 kg, 44 lb) for force of 5 sec.
- Release brake pedal and turn disc rotor 10 times. Check for misalignment at this time.

CAUTION:

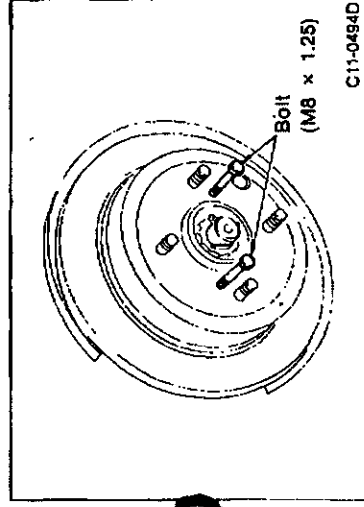
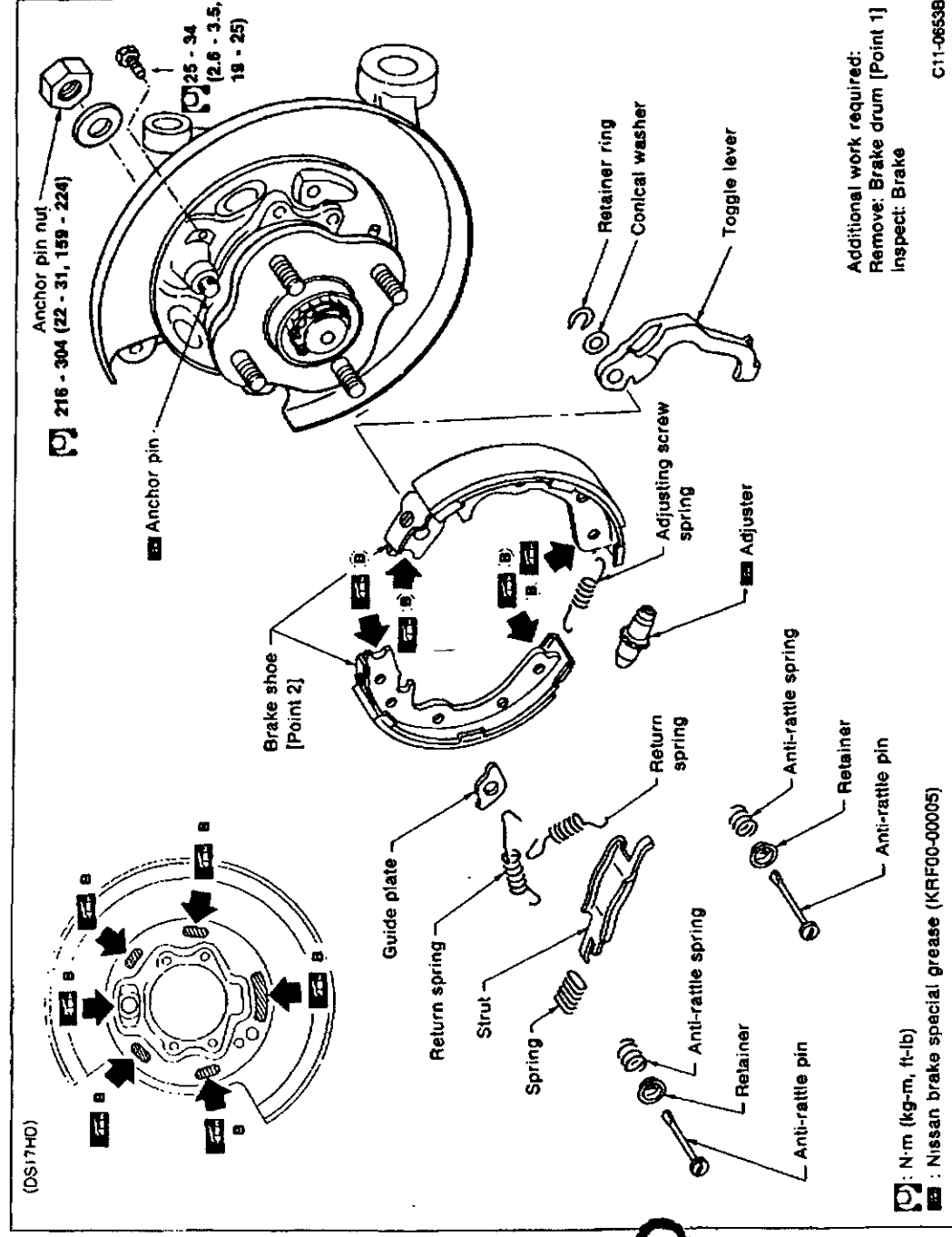
- (1) Pad and disc must be dry.
- (2) Wheel bearings must be in normal condition.

C10 BRAKES

4. Removal and Installation, Assembly and Disassembly (Cont'd)

(2) Drum brake removal and installation, assembly and disassembly

Model DS17HD



[Point 1] Brake drum removal

- Remove caliper assembly.
- Make sure parking brake lever and pedal are released completely.
- If drum is hard to remove, tighten two bolts gradually to free drum.

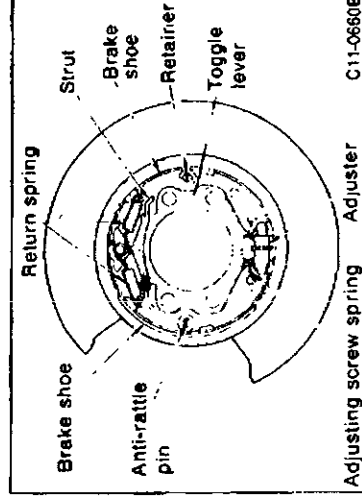
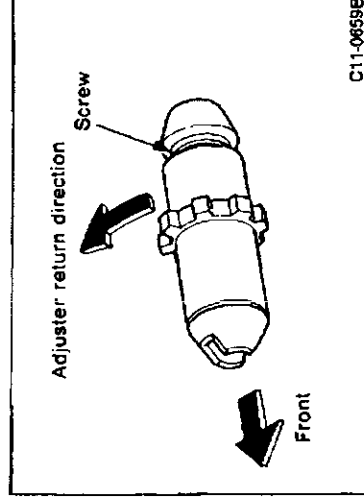
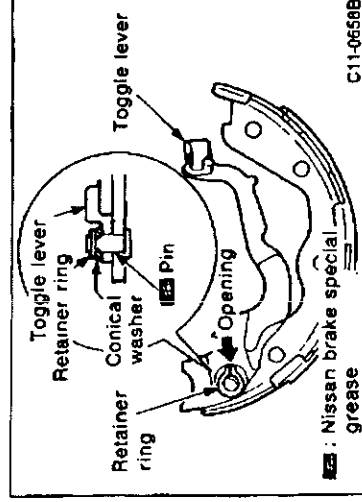
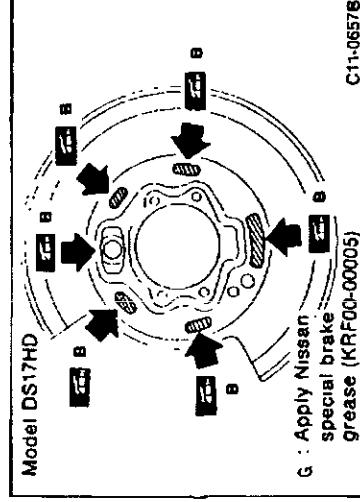
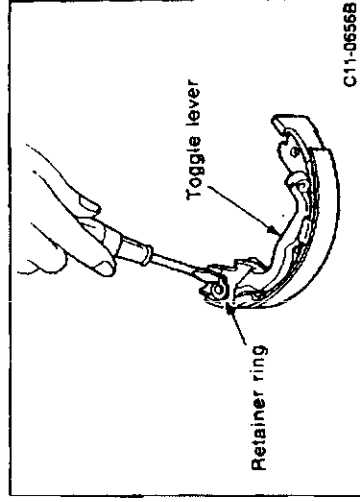
CAUTION:

Drum and baffle plate dust is collected in dust collector. Do not blow off with compressed air.

C10 BRAKES

4. Removal and Installation, Assembly and Disassembly (Cont'd)

- Use screwdriver and remove retainer ring and toggle lever.



Installation

- Apply Nissan brake special grease to areas indicated by (a) in figure and then assemble.

- Apply a coat of Nissan brake special grease to sliding part of toggle lever and install shoe as shown in figure.

CAUTION:

Caulk retainer ring opening unit connection.

- Turn screws of adjuster to rear side because left and right installation direction is different. Assemble adjuster so the screws widen if turned in direction of arrow.

CAUTION:

- (1) When adjuster is disassembled, coat screw with Nissan brake special grease.
- (2) Assemble adjuster in compressed condition.

- After assembly, check that each part is installed correctly.

CAUTION:

Return spring is assembled from leading shoe side.

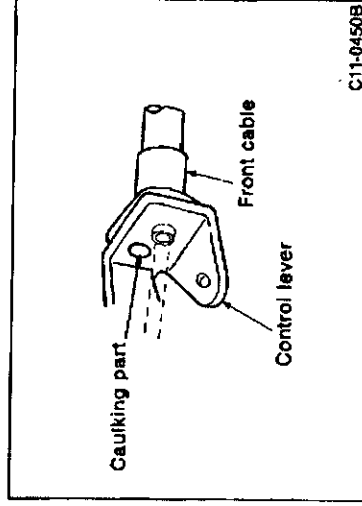
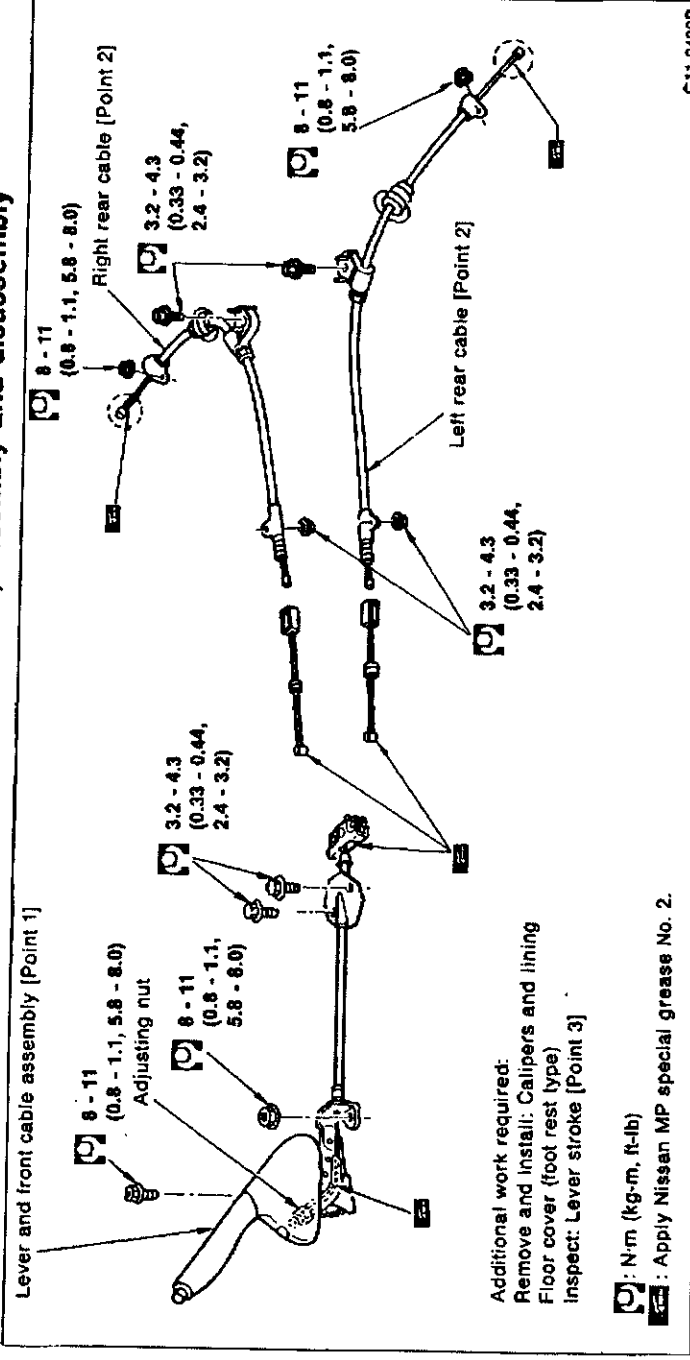
- Measure inside diameter of drum. Widen adjuster so outer diameter from middle of shoe to inner side of drum is less than 0.35 to 0.55 mm (0.0138 to 0.0217 in).
- Adjust disc rotor with wheel nut to adjust shoe clearance. Refer to "2. On-vehicle Inspection, 2-15 PARKING BRAKE INSPECTION AND ADJUSTMENT" for adjustment procedures.

C10 BRAKES

4. Removal and Installation, Assembly and Disassembly

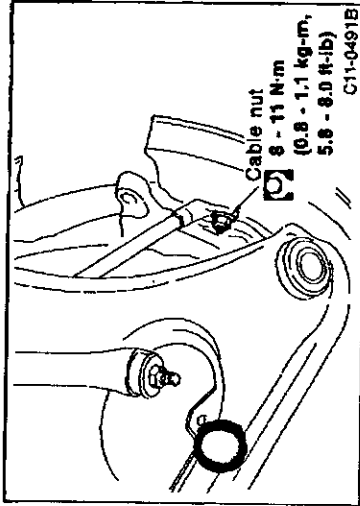
4-7 PARKING BRAKE

(1) Control lever and cable removal and installation, assembly and disassembly



[Point 1] Lever and front cable assembly

- Knock off caulking from control lever with hammer as shown in figure and replace with new part.



[Point 2] Rear cable removal and installation

Removal

- Remove caliper and disc.
- Remove cable nuts as shown in figure, and separate brake lining.

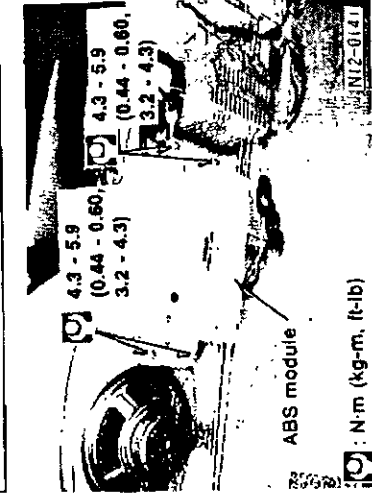
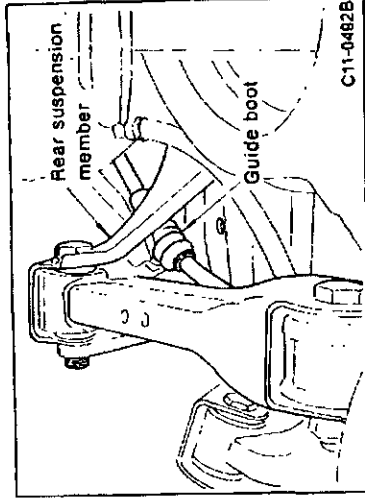
C10 BRAKES

4. Removal and Installation, Assembly and Disassembly (Cont'd)

- Remove rear cable bolt. Pry off guide boot in middle of suspension member so it is free and then remove guide.

Installation

- Assembly is the reverse of disassembly.



4-8 ELECTRICAL CONTROL 4WD ABS MODULE REMOVAL AND INSTALLATION

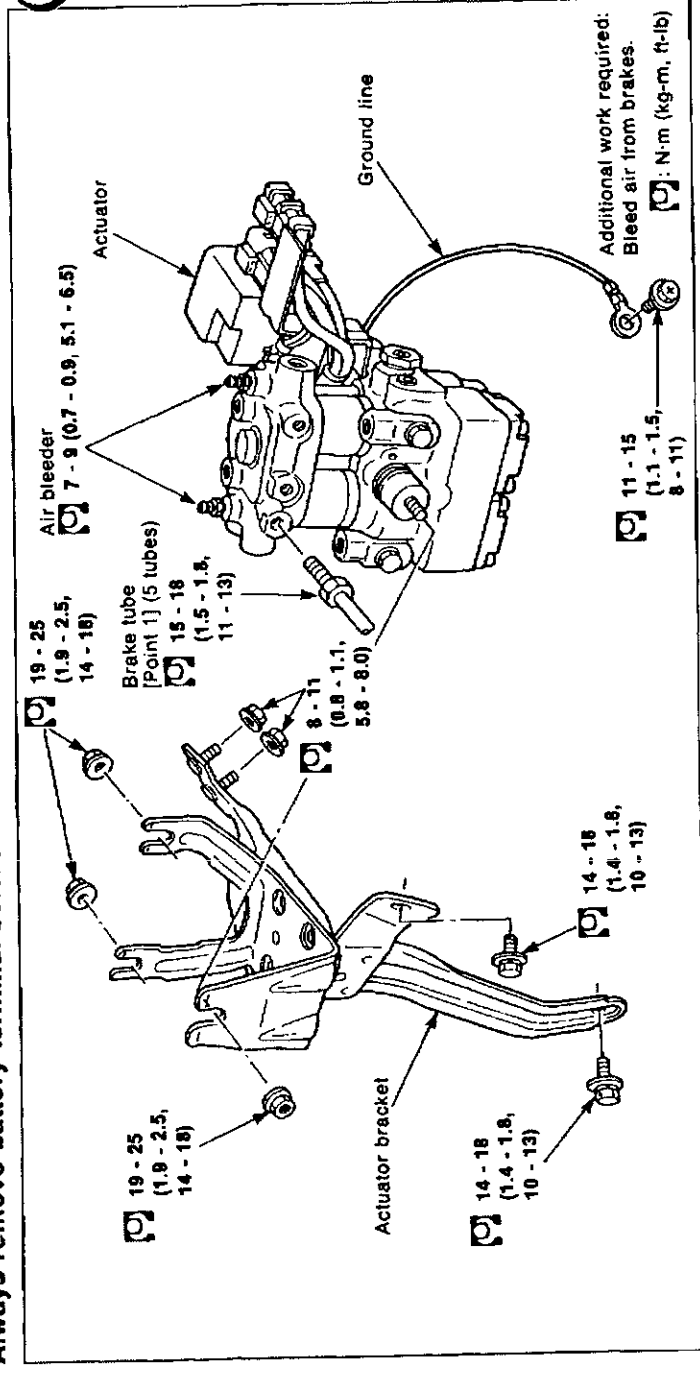
(1) ABS module removal and installation

- The module is installed in the bottom of rear parcel shelf in trunk.
- The ground is installed in the top of the rear parcel shelf.

(2) Actuator removal and installation

CAUTION:

Always remove battery terminal before actuator removal and installation.



C10 BRAKES

4. Removal and Installation, Assembly and Disassembly (Cont'd)

[Point 1] Brake tube removal and installation

Removal

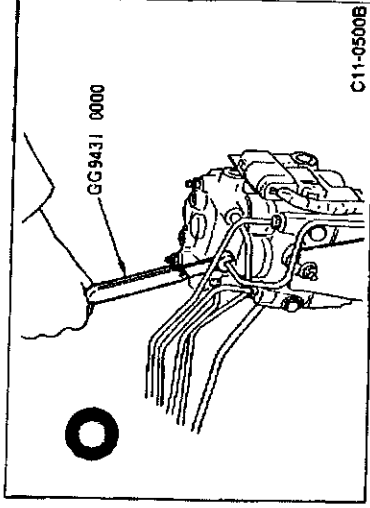
- Use brake flare nut wrench and remove brake tube flare nuts.

Installation

- Using brake tube torque wrench (special service tool) as shown in figure, install brake pipes. Be careful not to damage pipes or flare nuts.

CAUTION:

Refer to 2-3 CHANGING BRAKE FLUID AND AIR BLEEDING for air bleeding procedures.



C11 STEERING

PRECAUTIONS

The disassembly and repair of power steering gear and pump is performed for oil leakage, noise and abnormal steering power.

(1) Part replacement

Oil leak repair is not only the replacement of leak location oil seals and O-rings. The parts specified in this manual are always replaced as kit or entire assembly. Never reuse parts as this may cause fluid leaks.

(2) Protection against foreign matter

Power steering gear and oil pump are precision hydraulic mechanisms and all disassembly should be performed in a clean work area. It is important to prevent the internal parts from becoming contaminated by dirt or other foreign matter.

- ① Perform assembly and disassembly operations in a vise with copper plates to protect the secured parts. Use nylon cloth or paper towels to clean the parts. Do not use common shop rags because they can leave lint, dust or metallic powder on gears or in the pump housing. Do not wear gloves and perform all operations with clean, bare hands.
- ② Wash disassembled parts (except rubber parts) with white gasoline and dry off with compressed air or paper towels to remove all oil.

CAUTION:

Never use cloth rags.

Do not wash rubber parts with white gasoline. Clean off with compressed air or paper towels.

- ③ Store disassembled parts (including new rubber parts) on a work bench where they will not be scratched or damaged.

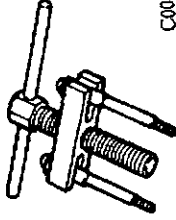
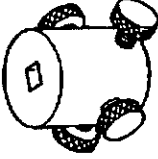
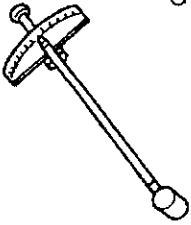
- ④ Before assembly, wash mating surfaces of each part again (except rubber parts) with white gasoline. Dry with compressed air (or paper towels) and store in a parts rack so they can be reinstalled in their proper positions and sequence.

When an operation must be interrupted, indicate "disassembly" and cover parts with a clean cover.

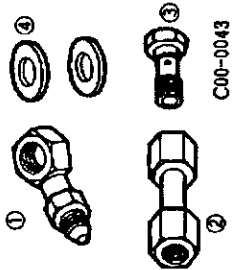
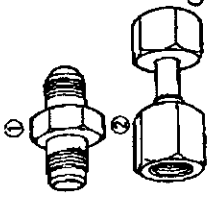
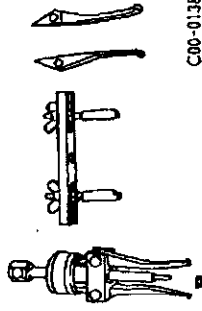
CAUTION:

A special dust-proof area is not required but all assembly and disassembly should be done in a clean work area. It is important to prevent the internal parts from being contaminated by dirt or other foreign matter.

SPECIAL SERVICE TOOLS

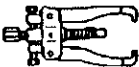
Tool name Tool number	Description
Steering wheel puller ST2718 0001	 C00-0036 Removing steering wheel
Torque adapter KV481 3400	 C00-0040 Measuring steering gear pinion rotating torque
Preload gauge ST3127 S000	 C00-0039 Measuring steering gear pinion rotation torque and ball joint sliding torque.

C11 STEERING

Tool name Tool number	Description
Oil pressure gauge KV481 03500 (former ST2909 1000)	 C00-0042
Pressure gauge adapter KV481 02500 ① KV481 02500-01 (I-joint) ② KV481 02500-02 (flare joint) ③ KV481 02500-03 (bolt) ④ KV481 02500-04 (washer)	 C00-0043
Pressure gauge adapter KV481 00410 ① KV481 00400-1 ② KV481 00400-2	 C00-0238
Oil seal puller 3329 0001	 C00-0138
Teflon ring correction tool KV481 04400	 C00-0142
Wrench KV481 04300	 C00-0143

C11 STEERING

COMMERCIAL SERVICE TOOLS

Tool name Tool number	Description	
Pitman arm puller HT7256 0000	 C00-0231	Removing tie-rod
		Gear housing transfer quantity inspection
Measurement tools	Dial gauge	Checking ball joint swing torque
	Spring balance	

C11 STEERING

1. Summary

Specifications

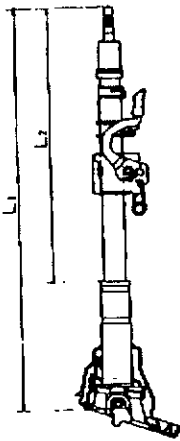
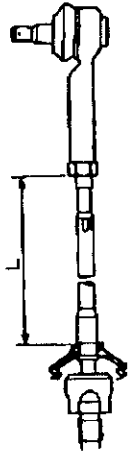
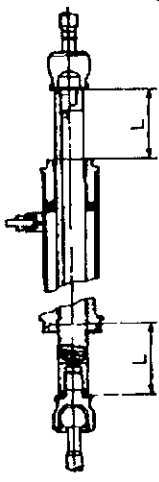
Description	Steering control system		Engine	RB26DETT
	Twin orifice power steering system			
Steering wheel	Outer diameter	mm (in)	370 (14.57)	
	Number of turns (lock to lock)		2.6	
Steering column	Model		Collapsible (steel ball type)	
	Tilt distance	mm (in)	30 (1.18)	
	Telescope distance	mm (in)	35 (1.38)	
Steering gear	Model		Rack and pinion	
	Model number		PR26SE (Rotary valve twin-orifice)	
	Part number (49001)		05U00	
Pump	Model		Fixed injection type	
	Part number (49110)		05U00 (RB26DETT)	
	Inner wheel		38°±1°	
Maximum steering angle (°)	Outer wheel		31°	
	Operation oil		Nissan power steering fluid	

Inspection specifications

Description	Standard value			
Steering wheel play	mm (in)	0 - 35 (0 - 1.38)		
Steering wheel standard torque	N·m (kg-m, ft-lb)	10 (1.0, 7) max.		
Gear housing movement	mm (in)	±2 (±0.08) max.		
Power steering belt tension adjustment value [when 98 N (10 kg, 22 lb) of force is applied]	mm (in)	Slack dis-	Adjustment	Adjustment
		tance	value	limit
		Engine		
		RB26DETT	8 - 10	10 - 11
		models	(0.31 - 0.39)	(0.39 - 0.43)
				16 (0.63)
Nissan power steering fluid				
Operation oil	Steering gear		PR26SE	
	Fluid capacity		ℓ (Imp qt)	Approx. 0.9 (3/4)

C11 STEERING

1. Summary (Cont'd)

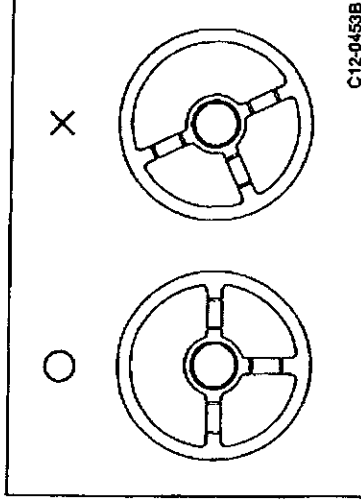
Description	Standard value			
	Description	Steering gear		PR26SE
Steering gear pinion rotation torque and rack sliding force	Pinion rotational torque N·m (kg-m, ft-lb)	Measured one full turn from neutral position	Average value	0.8 - 1.3 (0.08 - 0.13, 0.6 - 0.9)
			Maximum variation	0.4 (0.04, 0.3 max.)
	Other than above	Other than above	Maximum value	1.9 (0.19, 1.4 max.)
			Maximum variation	0.6 (0.06, 0.4 max.)
	Rack sliding force	N (kg, lb)	Average value	167 - 226 (17 - 23, 37 - 51)
Note: Numeric values indicate performance when unit is not filled with specified fluid.				
Steering column length mm (in)	 $L_1 = 685.5 - 720.5$ (26.99 - 28.37) $L_2 = 423.4 - 458.4$ (16.67 - 18.05)			
	C12-0641C			
Tie-rod length mm (in)	 PR26SE model $L = 126.5$ (4.98)			
	C08-0683B			
Rack neutral position mm (in)	 PR26SE model $L = 66.5$ (2.618)			
	C12-0423B			
Tie-rod ball joint	Description	Ball joint		Outer socket
		Inner socket		
	Sliding torque	N·m (kg-m, ft-lb)	—	0.3 - 2.9 (0.03 - 0.3, 0.2 - 2.2)
	Swinging torque	N·m (kg-m, ft-lb)	1 - 9 (0.1 - 0.9, 0.7 - 6.5)	
	Axial end play [axial load 490 N (50 kg, 110 lb)]	mm (in)	0 (0)	0.5 (0.020) max.

C11 STEERING

2. On-vehicle Inspection and Adjustment

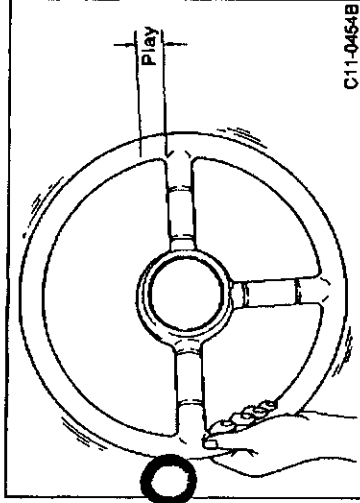
2-1 MAXIMUM STEERING WHEEL PLAY INSPECTION (Inspect with wheels at turning angle.)

- Refer to C7 Front Suspension and Axle.



2-2 STEERING WHEEL NEUTRAL POSITION INSPECTION

- Set wheels straight-ahead and visually check that steering wheel play from neutral position.
- If it is not within specification, remove steering wheel and reinstall it correctly so it is in neutral position.
- If the neutral position is between two serrated teeth loosen tie-rod lock nut and move tie-rod in the opposite direction by the same amount on both left and right sides to compensate for error in the neutral position.



2-3 STEERING WHEEL PLAY INSPECTION

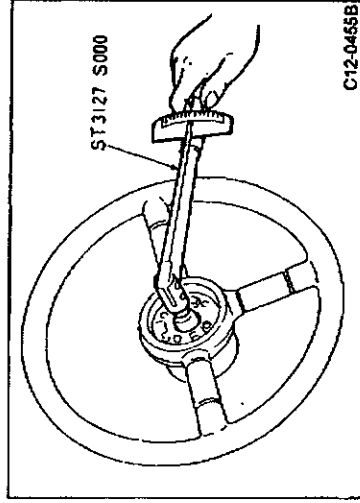
- Set tires in straight-ahead position. Start engine and turn steering wheel lightly. Measure distance until wheels start to move and check if it is within specified range.

Play distance specification value:

0 - 35 mm (0 - 1.38 in)

CAUTION:

Measure outside of steering wheel to determine play distance.

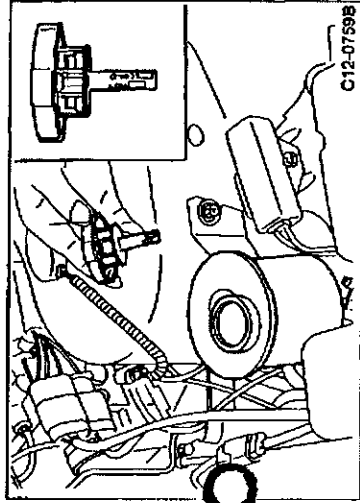


2-4 STEERING WHEEL STANDARD TORQUE INSPECTION

- Set vehicle on flat, dry paved road when power steering unit is warm (engine is warmed up). Measure steering wheel rotational torque with preload gauge (special service tool) when engine is running.
- Measure left and right turns.

Standard torque (dry, paved road):

10 N·m (1.0 kg-m, 7 ft-lb) max.



2-5 FLUID LEVEL INSPECTION

- The fluid level should be within the marks in level gauge. Do not overfill because fluid will drip from cap.
- Check that level gauge has HOT and COLD ranges as shown in figure.

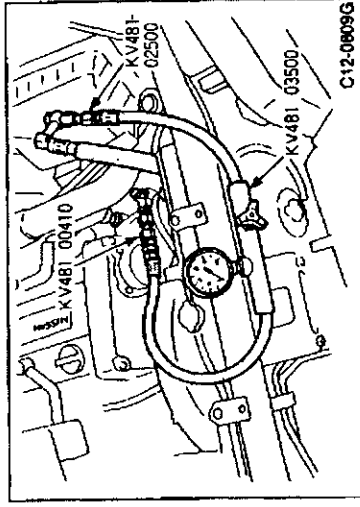
HOT	50 - 80°C (122 - 176°F)
COLD	0 - 30°C (32 - 86°F)

C11 STEERING

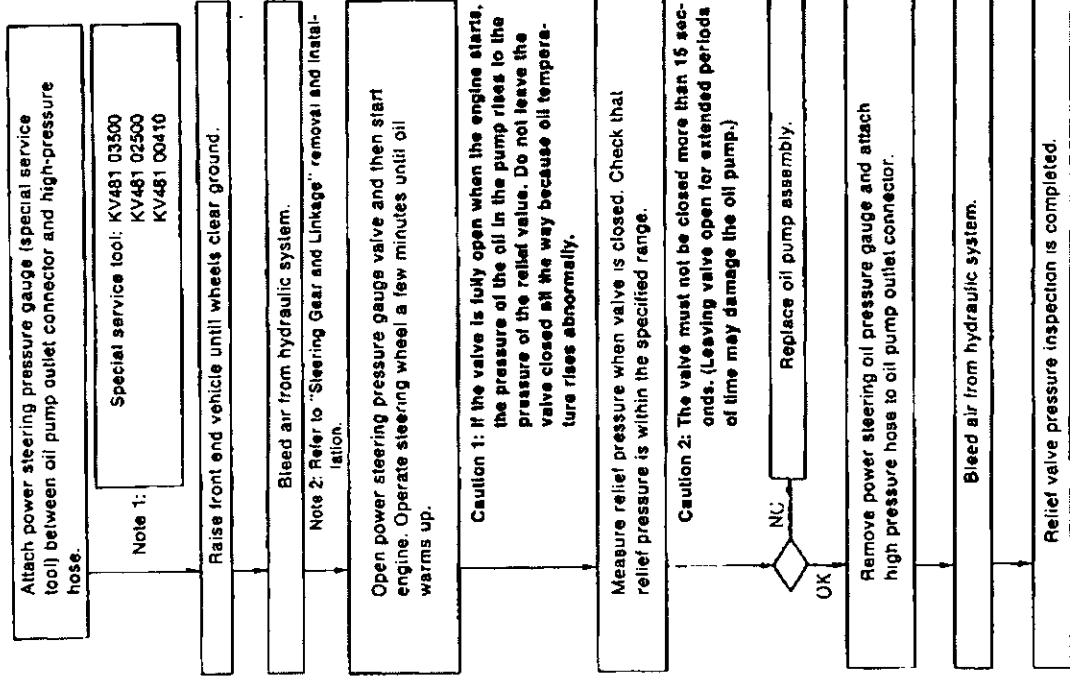
2. On-vehicle Inspection and Adjustment (Cont'd)

CAUTION:

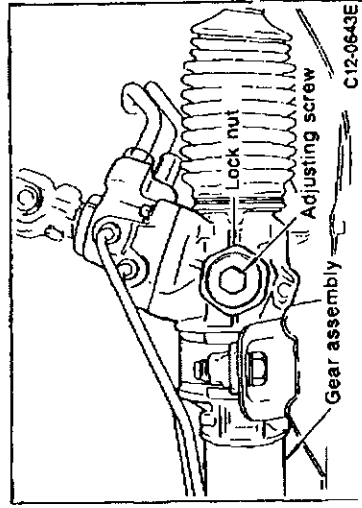
- (1) Never reuse steering fluid which has been removed.
- (2) Do not mix Nissan Steering Fluid and Nissan Special Steering Fluid.
- (3) Never use Nissan matic C or D fluid.



2-6 OIL PUMP RELIEF PRESSURE INSPECTION



Steering model number	Relief hydraulic specification kPa (kg/cm ² , psi)
PR26SE models	5,884 - 6,865 (60 - 70, 853 - 995)



2-7 ADJUSTING SCREW INSPECTION

- Perform operation test described below on level road. If any abnormality is noted, check adjusting screw and return it to normal position.

① Linearity

- a) Place wheels in straight-ahead position and remove hands from wheel. Check if wheel can maintain straight-ahead position.
- b) If wheel cannot be placed in straight-ahead position, loosen adjusting screw.

C11 STEERING

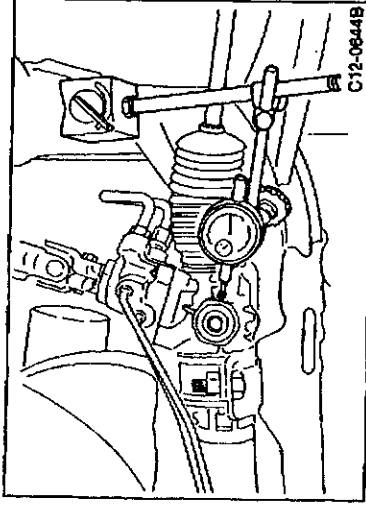
2. On-vehicle Inspection and Adjustment (Cont.)

② Restoration

- Turn the steering wheel slightly (approx. 20° - 30°) at release wheel. Check that steering wheel returns to neutral position.
- If return motion is poor, loosen adjusting screw slightly.

CAUTION:

The adjusting screw range is $\pm 90^\circ$. After adjustment, remove lock nut again and remove dust and debris from seal material. Coat the lock nut with sealant (silicon bond TB1111B or equivalent) and tighten lock nut to specified torque.



2-8 GEAR HOUSING MOVEMENT INSPECTION

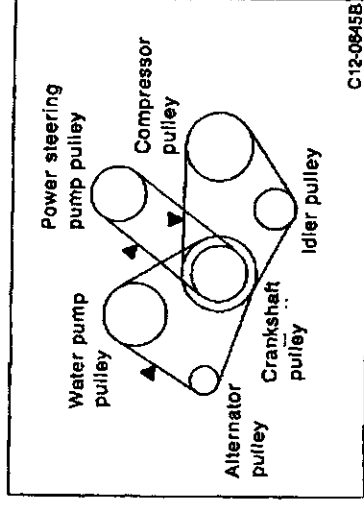
- The steering gear housing operation during stationary turns varies according to the elastic deformation of insulator. The movement limit is indicated below.

Gear housing movement limit:

± 2 mm (± 0.08 in) (on dry, paved road)

Note: This movement is the distance the gear housing moves when 49 N (5 kg, 11 lb) of force is applied to the end of steering wheel with wheels set in straight-ahead position. (Ignition switch is OFF at this time.)

- If movement is not within specification range, check gear assembly mount bracket and replace mount insulator if necessary.



2-9 BELT TENSION INSPECTION AND ADJUSTMENT

Belt tension inspection

- Inspect belt tension when engine is cold.
- Apply 98 N (10 kg, 22 lb) of force at positions indicated by arrow marks (▲) in figure and measure belt slack distance.

Specification

Slack distance Engine	New part	Adjusted	Unit: mm (in)	
			Tension limit	
RB26DET models	8 - 10 (0.31 - 0.39)	10 - 11 (0.39 - 0.43)	16 (0.63)	

Belt tension adjustment

- Adjust belt slack if it is less than specification (too tight) or greater than specification (too loose).

C11 STEERING

2. On-vehicle Inspection and Adjustment (Cont'd)

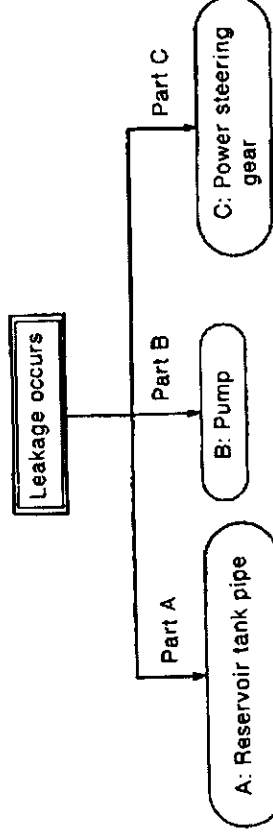
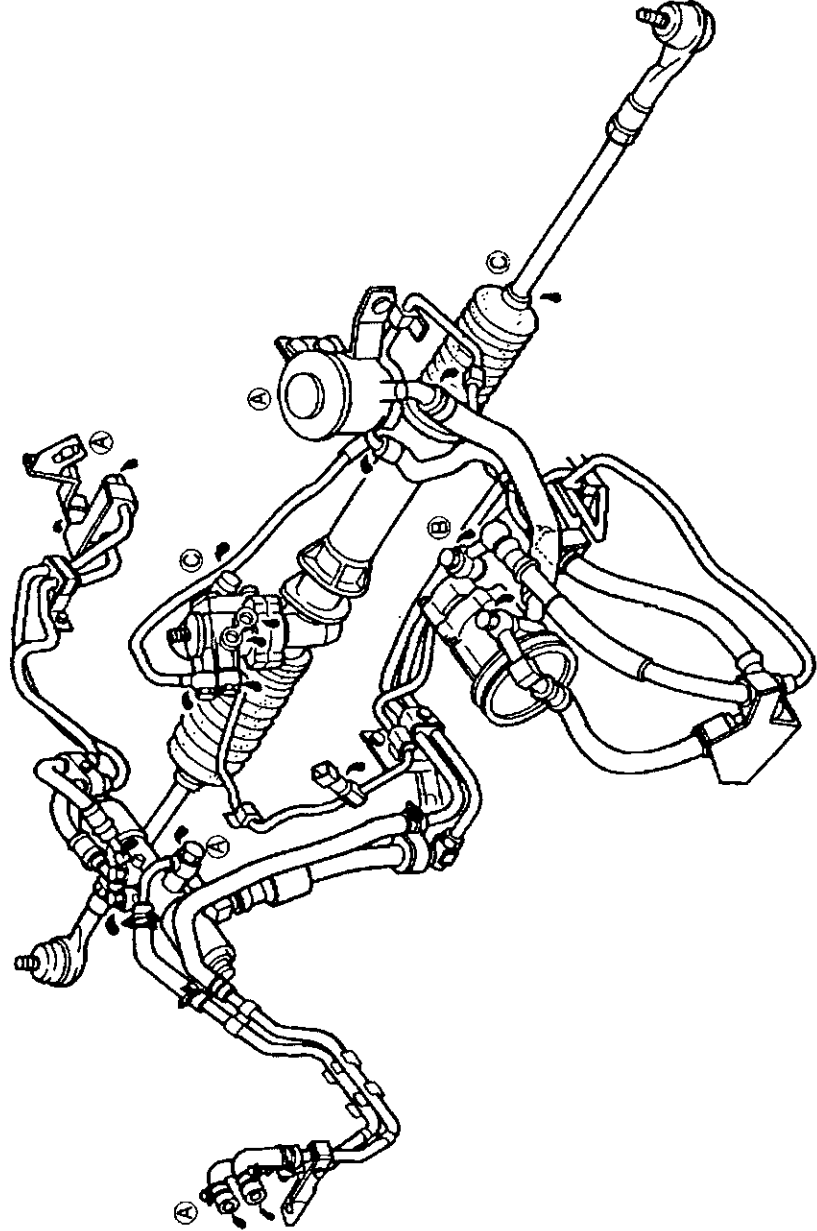
2-10 LEAKAGE INSPECTION

Precautions

- ① Check type of oil at leakage location. (Power steering fluid is red.)
- ② When leakage location is not clear, wash area with white gasoline or other solvent. (In vehicles equipped with electrically controlled power steering, do not wash harnesses or connectors directly with white gasoline or solvent. Wipe fluid off with rags immediately if fluid is attached.) Check leak positions again.
- ③ When repairing parts, check related parts thoroughly and replace defective parts as necessary.

(1) Leakage position inspection

PR26SE model power steering



C12-06918

C11 STEERING

2. On-vehicle Inspection and Adjustment (Cont'd)

(2) Leaks from part ① (Reservoir tank or pipes)

Leak position	● Reservoir tank cap	● Low-pressure pipe α clamp	● Other
Repair description (replacement parts)	● Reservoir tank cap	● Low-pressure hose ● α clamp	● Tube ● High pressure hose ● Reservoir tank
Related parts requiring inspection	● Reservoir tank	● Tube ● Reservoir tank	—

Check the seals of related parts for scratches, dents or other damage. (Note)
If these conditions exist, replace other parts at same time.

Check oil level. If quantity is excessive, reduce it to adequate level.
If oil level is correct, replace parts as necessary.

If there are no cracks or other damage to low-pressure hose and α clamp positions have shifted and can be retightened, reposition α clamps and tighten again.
Otherwise, replace parts as necessary.

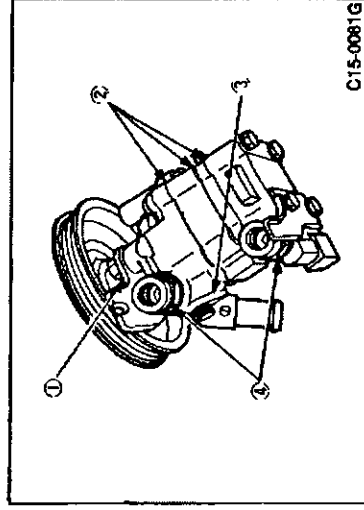
Replace appropriate parts in leak locations.

Bleed air from system, inspect oil level and operational force.

Check for leaks.

Preparation procedures

Note: The standard for replacing related parts is if a fingernail scrapes or catches in a scratch.



C15-0081G

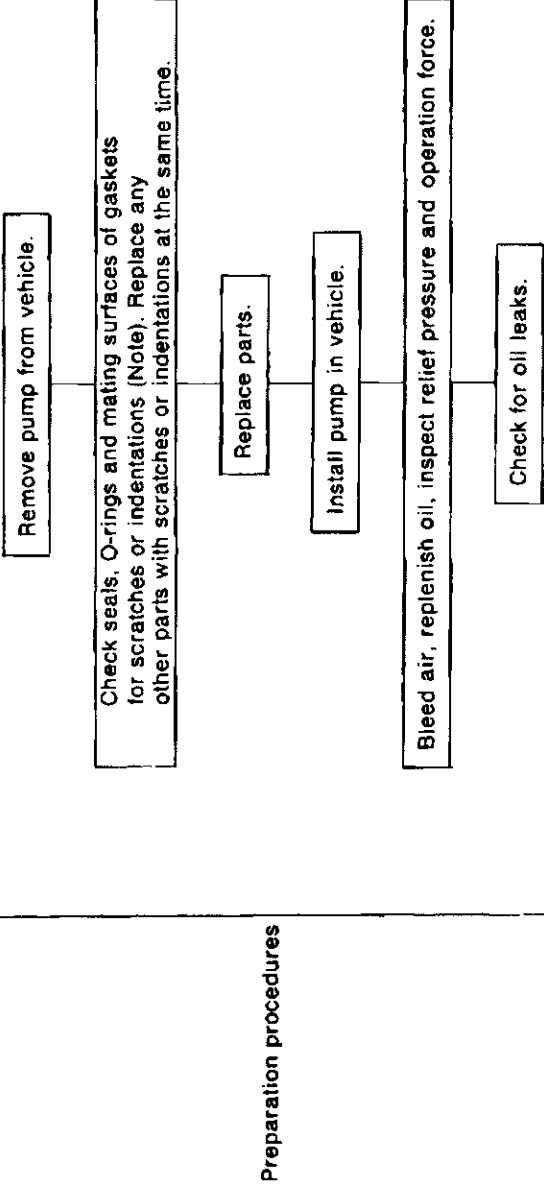
(3) Oil leak from part ② (pump)

Oil pump leak repair is separated into four types of repair depending on the leak location. Perform the suitable repair procedure for the leak location.

C11 STEERING

2. On-vehicle Inspection and Adjustment (Cont'd)

Leak location	① Drive shaft oil seal	② Housing	③ Inlet connector	④ Outlet connector
Preparation description (replacement parts)	[Kit] • Oil seal • Snap ring • Inner O-ring • Outer O-ring • Gasket • O-ring (inlet connector)	• O-ring (inlet connector) • Front housing • Rear housing	• O-ring (inlet connector) • Inlet connector • Front housing	• O-ring (2) (flow control valve) • Outlet connector • Front housing • Rear housing
Related parts requiring inspection	• Drive shaft			



Note: The standard for replacing related parts is if a fingernail scrapes or catches in a scratch.

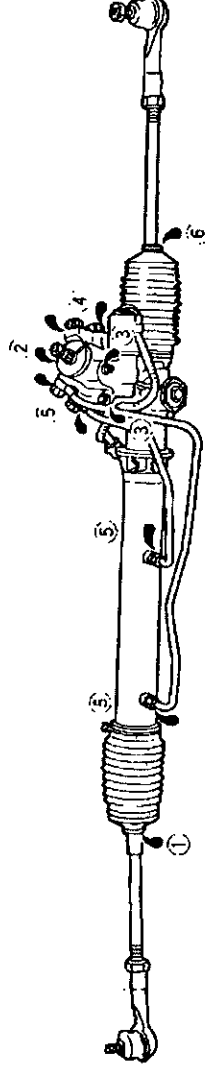
C11 STEERING

2. On-vehicle Inspection and Adjustment (Cont'd)

(4) Oil leak from part ④ (steering gear)

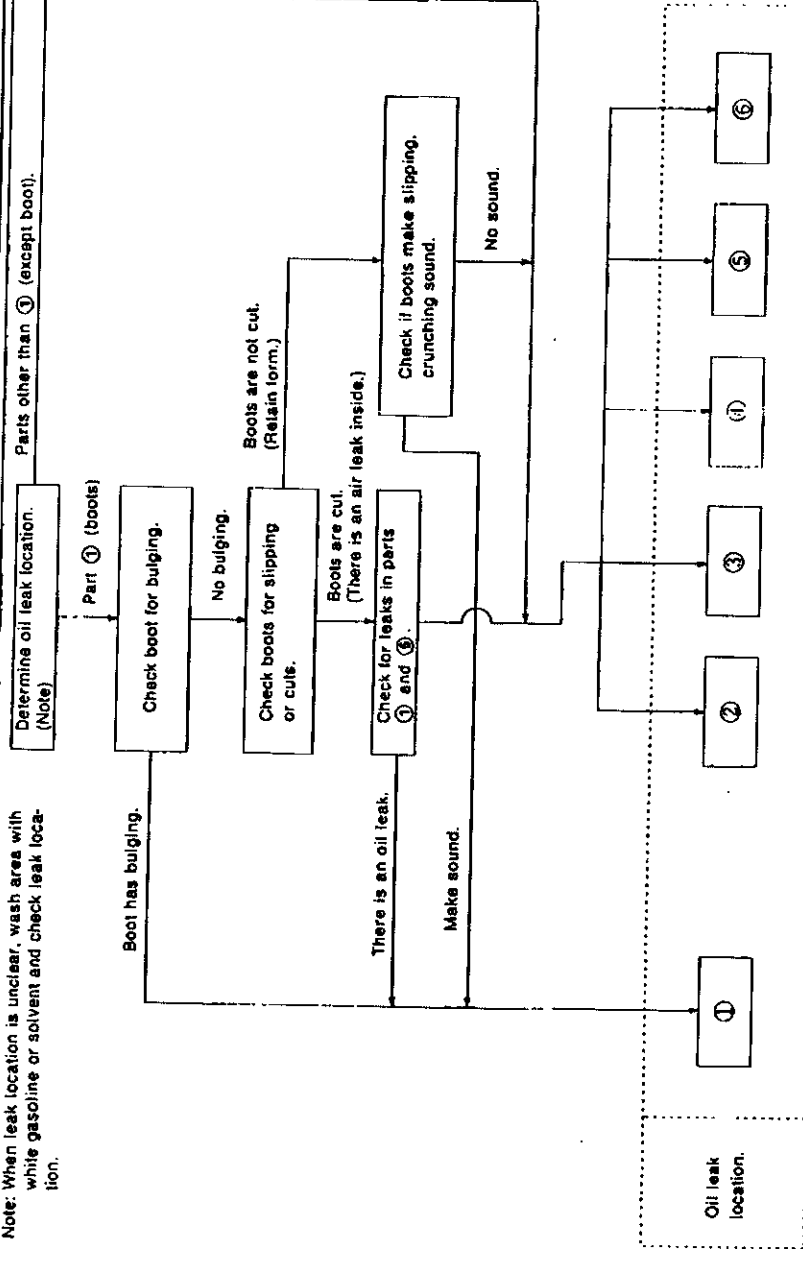
Model PR26SE power steering

(Model PR26SE)



Note: Adjusting screw is included in ⑤.

Note: When leak location is unclear, wash area with white gasoline or solvent and check leak location.



C15-0043E

C11 STEERING

2. On-vehicle Inspection and Adjustment (Cont'd)

Oil leak location	① Dust boot	② Upper rear housing	③ Rear housing and gear housing mating surfaces	④ Power steering high- and low-pressure and HICAS low-pressure side connections.	⑤ Cylinder tube connections (rear housing side and gear housing side)	⑥ Dust boot
Installation check items on vehicle	—	—	Bolt tightening torque 20 - 24 N·m (2.0 - 2.4 kg-m, 14 - 17 ft-lb)	Pipe tightening torque Power steering side PR26SE High-pressure side: 30 - 35 N·m (3.1 - 3.6 kg-m, 22 - 26 ft-lb) Low-pressure side: 36 - 40 N·m (3.7 - 4.1 kg-m, 27 - 30 ft-lb) HICAS High-pressure side: 29 - 39 N·m (3.0 - 4.0 kg-m, 22 - 29 ft-lb) Low-pressure side: 29 - 39 N·m (3.0 - 4.0 kg-m, 22 - 29 ft-lb)	Cylinder tube tightening torque: 29 - 39 N·m (3.0 - 4.0 kg-m, 22 - 29 ft-lb) Cylinder tube union bolt tightening torque: 20 - 29 N·m (2.0 - 3.0 kg-m, 14 - 22 ft-lb)	—
Preparation description (replacement parts)	● Rack oil seal (Note 1) ● O-ring (cylinder end assembly)	Gear housing assembly		● Pipes (tube sheet in port)		Gear housing assembly
Related parts requiring replacement	Gear housing assembly	—		Gear housing assembly		—
Preparation procedures	Remove pump from vehicle. Check seals, O-rings, gaskets and mating surfaces of related parts for scratches or indentations (Note). Replace any parts with scratches or indentations at same time. Replace parts. Install pump in vehicle. Bleed air, replenish oil, inspect relief pressure and operation force. Check for oil leaks.					

Note:

(1) Make sure there is no peeling around rack oil seal. If there is peeling, also replace gear housing.

(2) The standard for replacing related parts is if a fingernail scrapes or catches in a scratch.

C11 STEERING

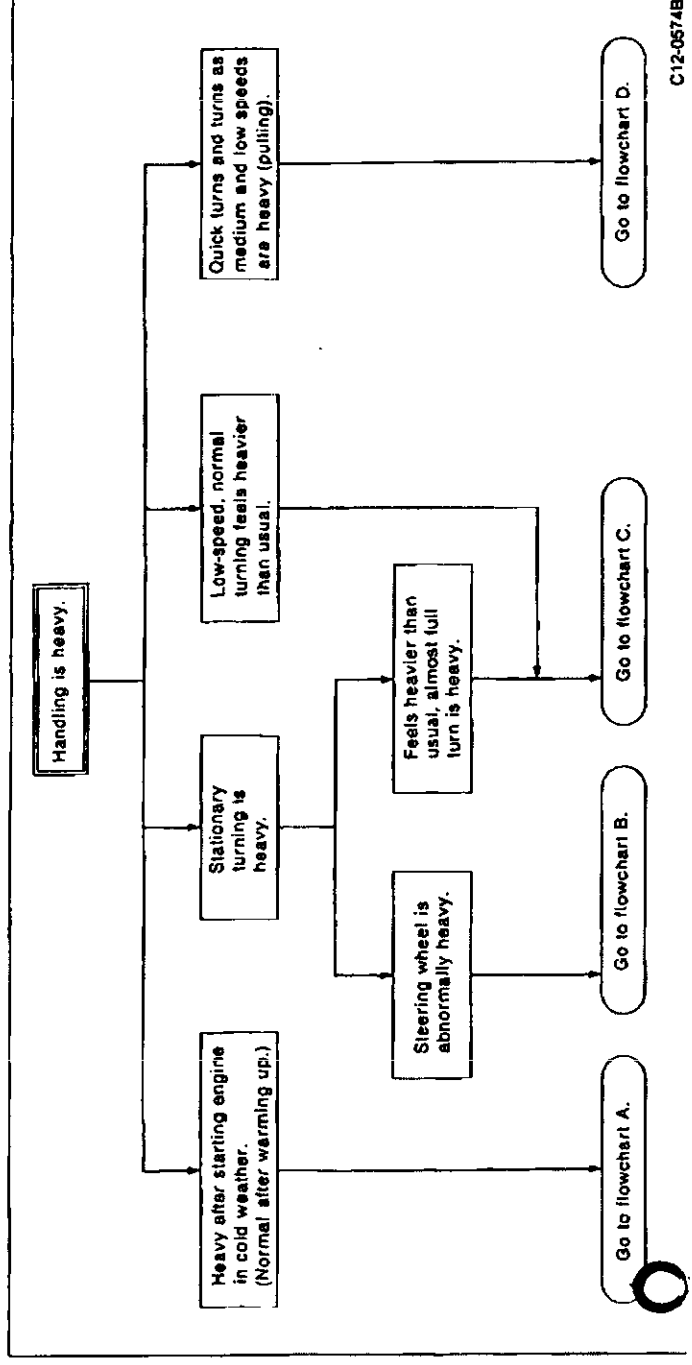
2. On-vehicle Inspection and Adjustment (Cont'd)

2-11 STEERING FORCE INSPECTION

(1) Precautions before inspection

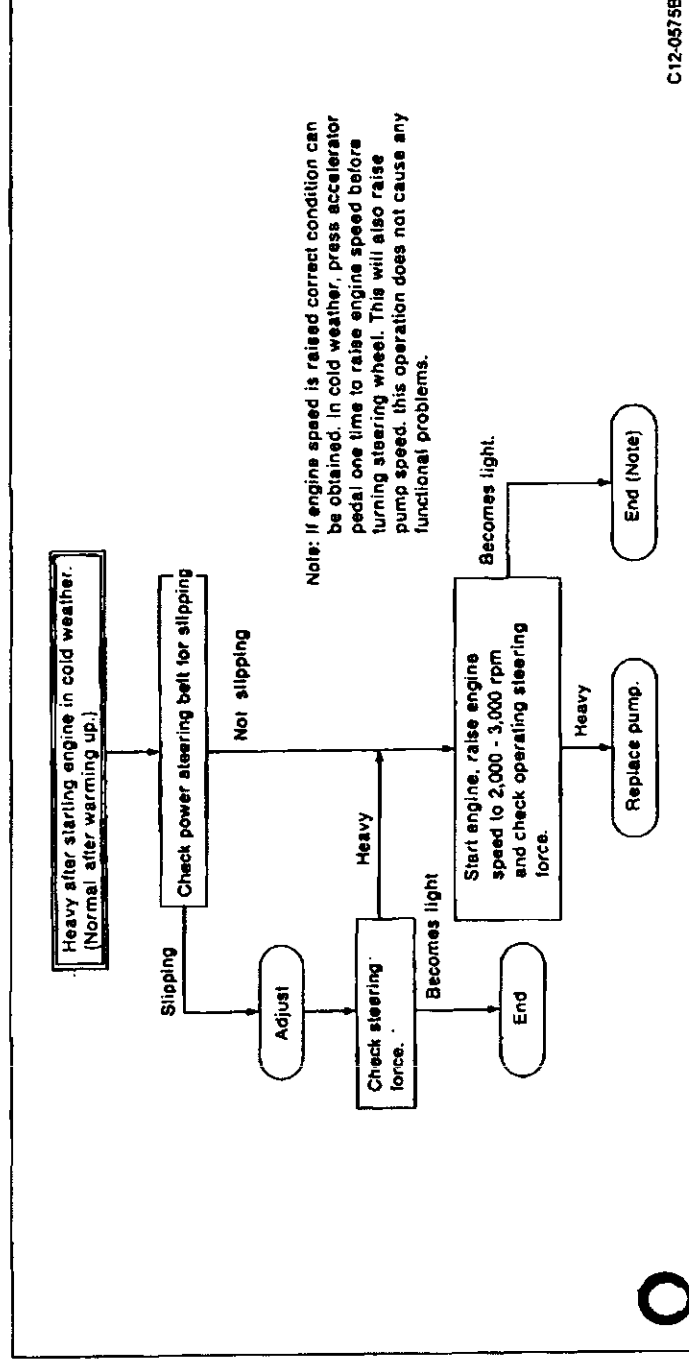
- ① Check the tire air pressure and size correct? Is the steering wheel a genuine part?
- ② Is the wheel offset correct? (Check if wheel spacers are present.)
- ③ Is wheel alignment correct?
- ④ Has the suspension been modified? Has the vehicle weight been increased?

(2) Problem classification



(3) Damage diagnosis flowchart (entire vehicle)

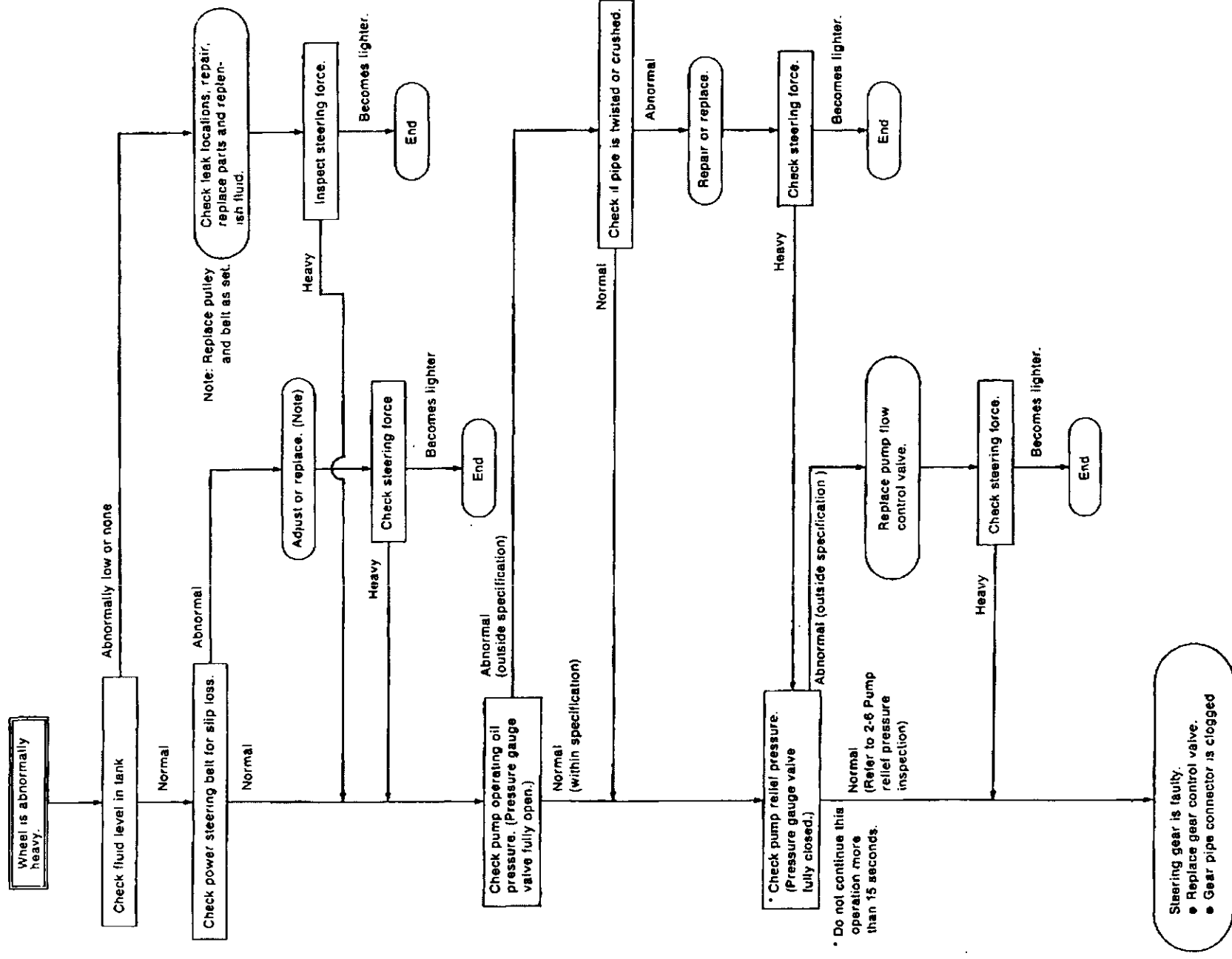
① Flowchart A



C11 STEERING

2. On-vehicle Inspection and Adjustment (Cont'd)

② Flowchart B



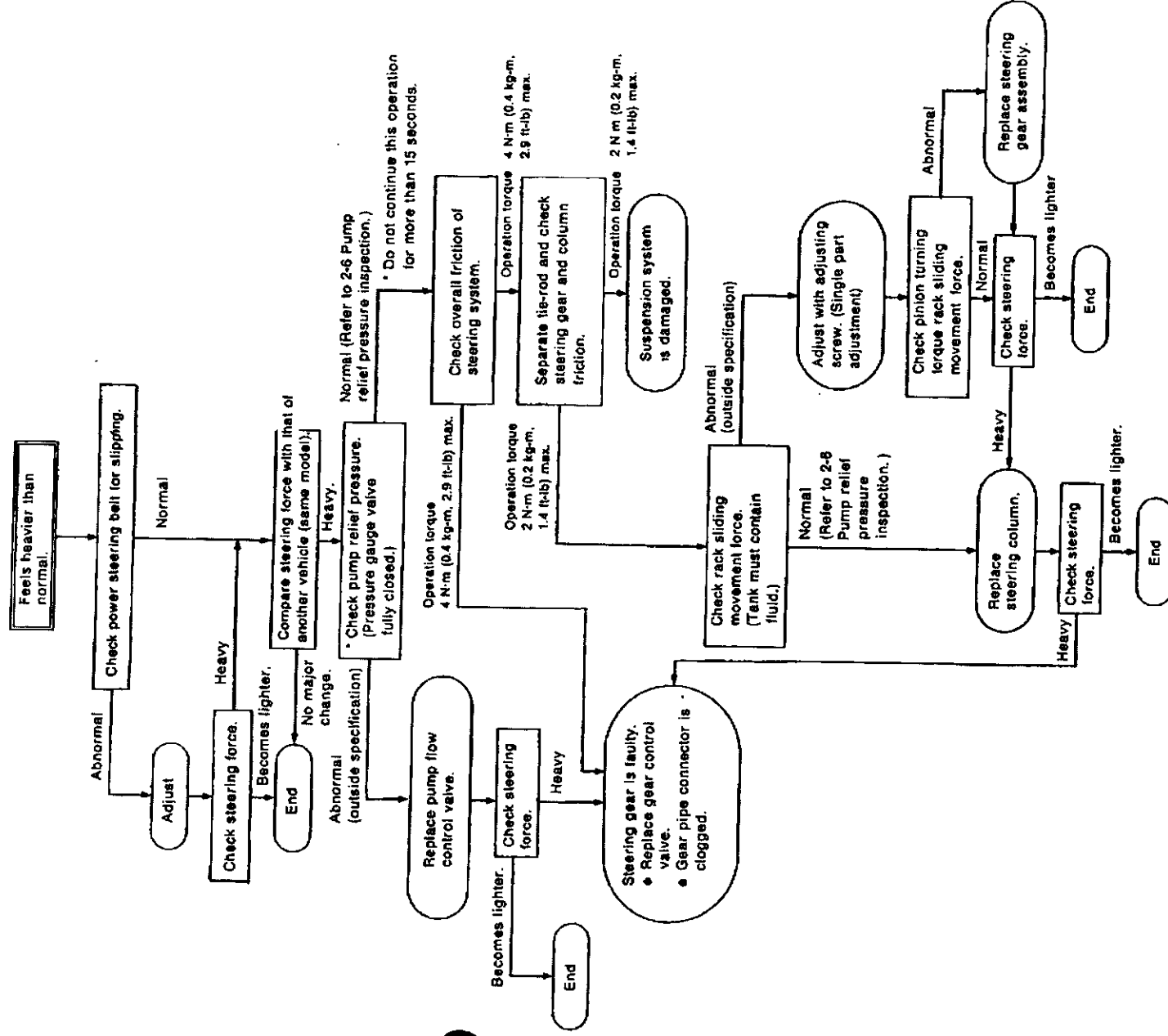
C11 STEERING

2. On-vehicle Inspection and Adjustment (Cont'd)

③ Flowchart C

Verification items

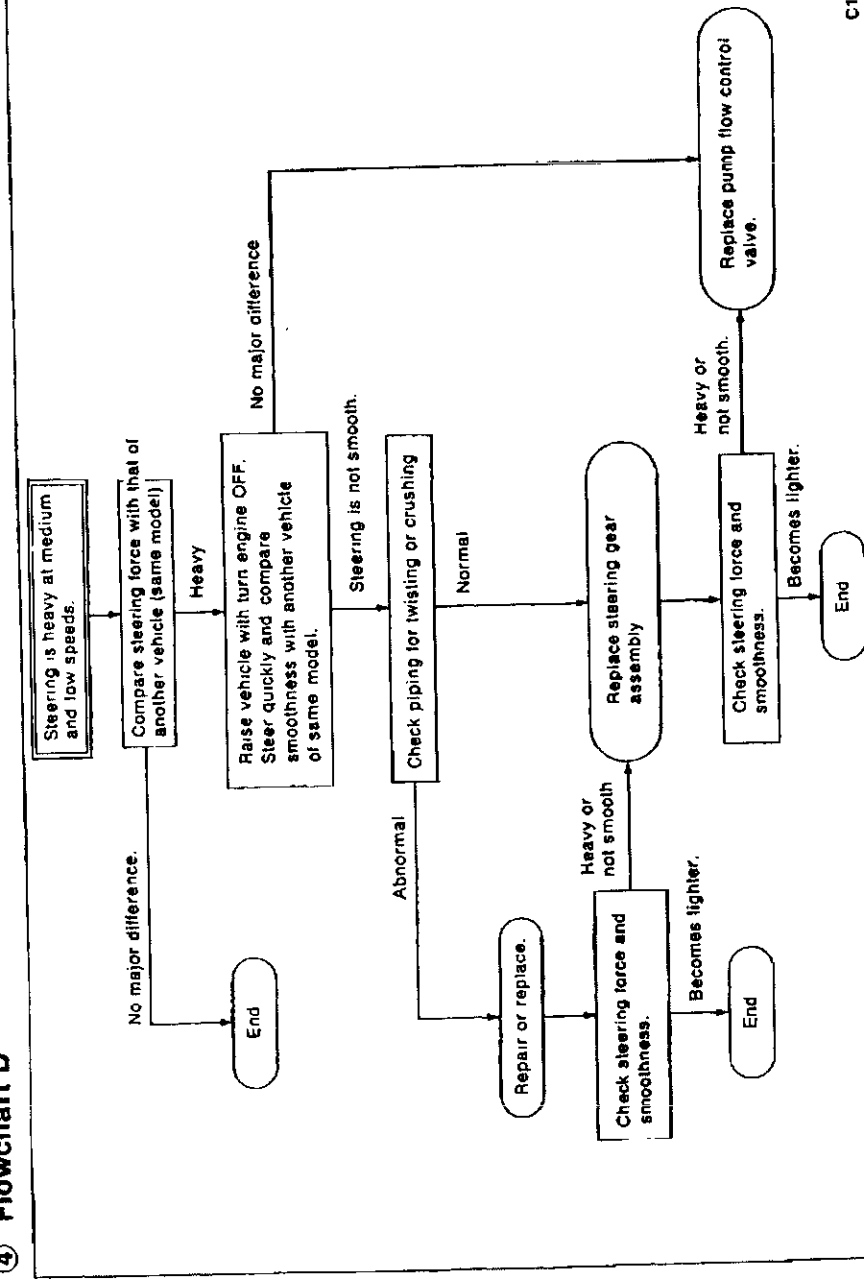
- Is the tire air pressure and size correct? Is the steering wheel a genuine part?
- Is the wheel offset correct? (Check if wheel spacers are present.)
- Is wheel alignment correct?
- Has the suspension been modified? Has the vehicle weight been increased?
- Steering column wheel cover and rubber coupling do not grip.



C11 STEERING

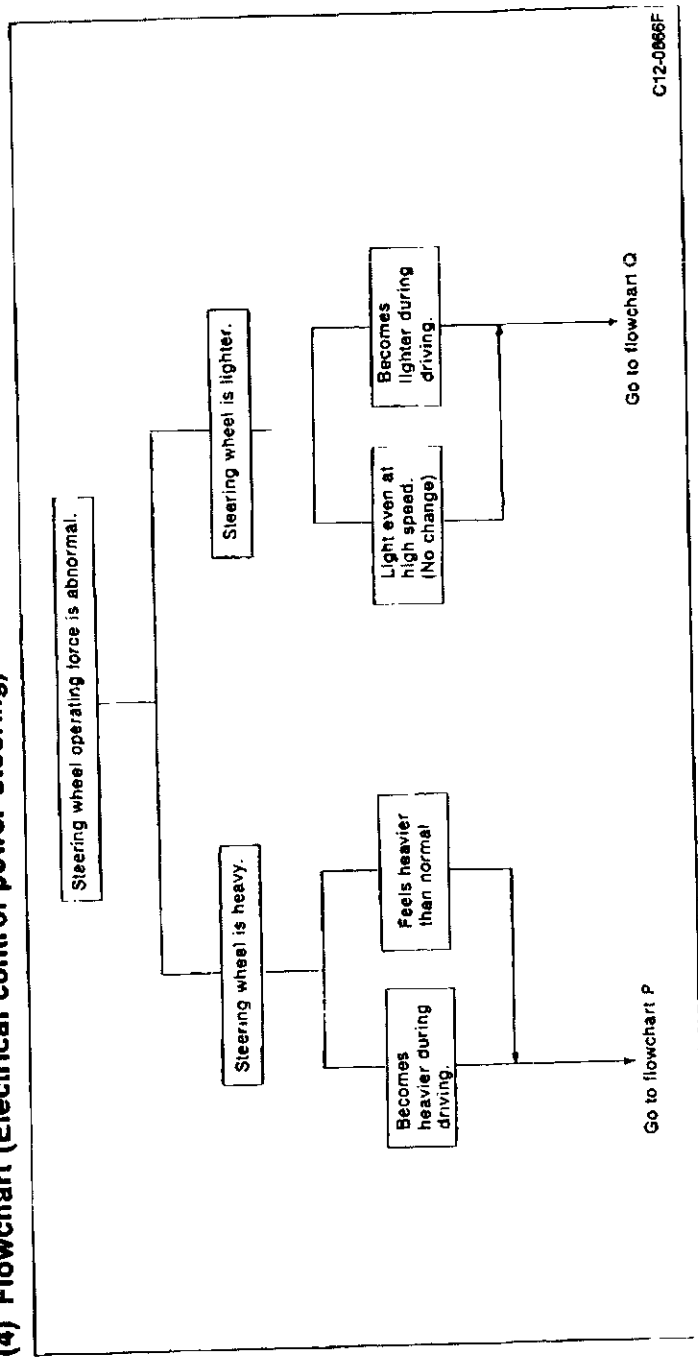
2. On-vehicle Inspection and Adjustment (Cont'd)

④ Flowchart D



C12-0578B

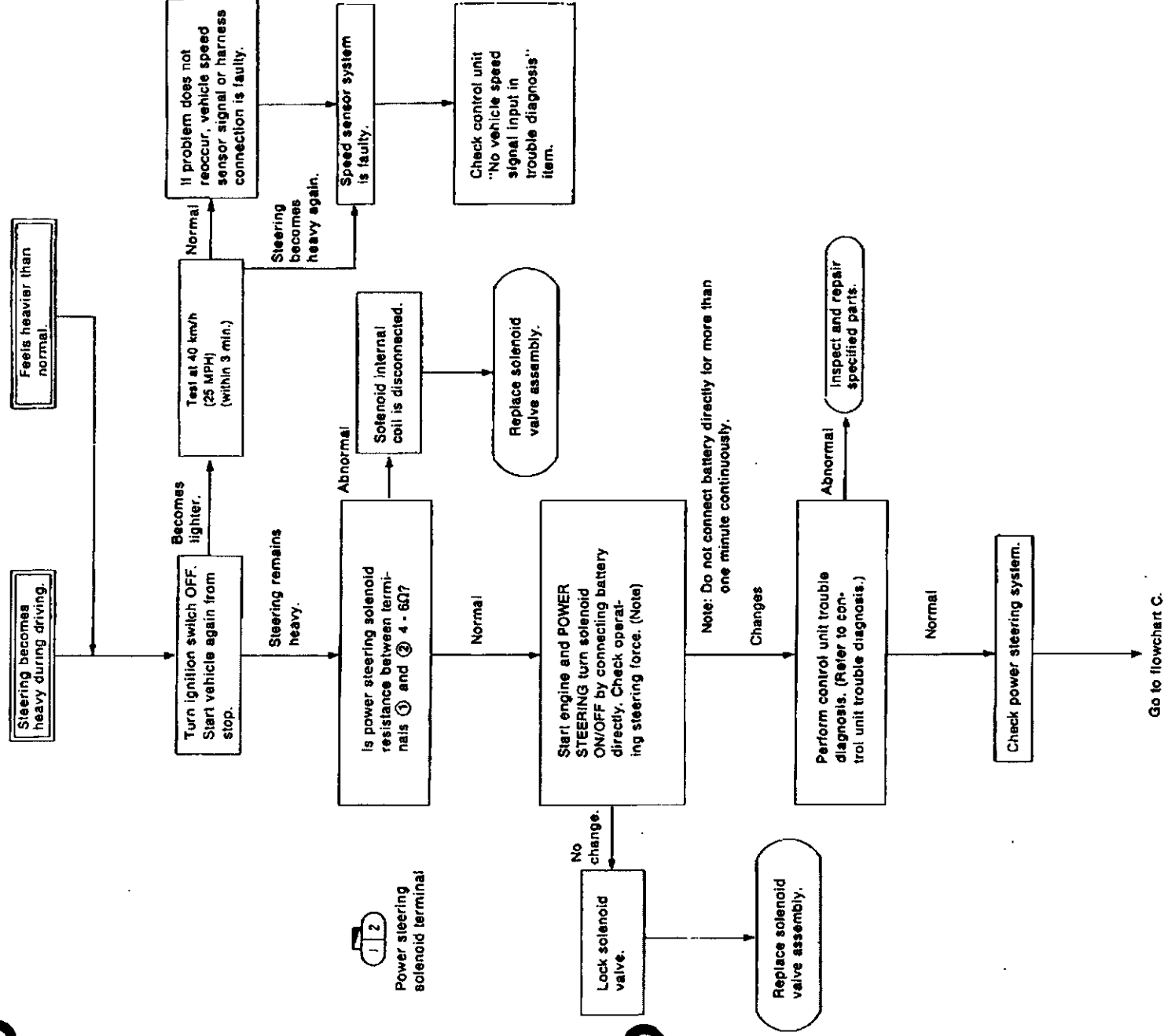
(4) Flowchart (Electrical control power steering)



C12-0866F

2. On-vehicle Inspection and Adjustment (Cont'd)

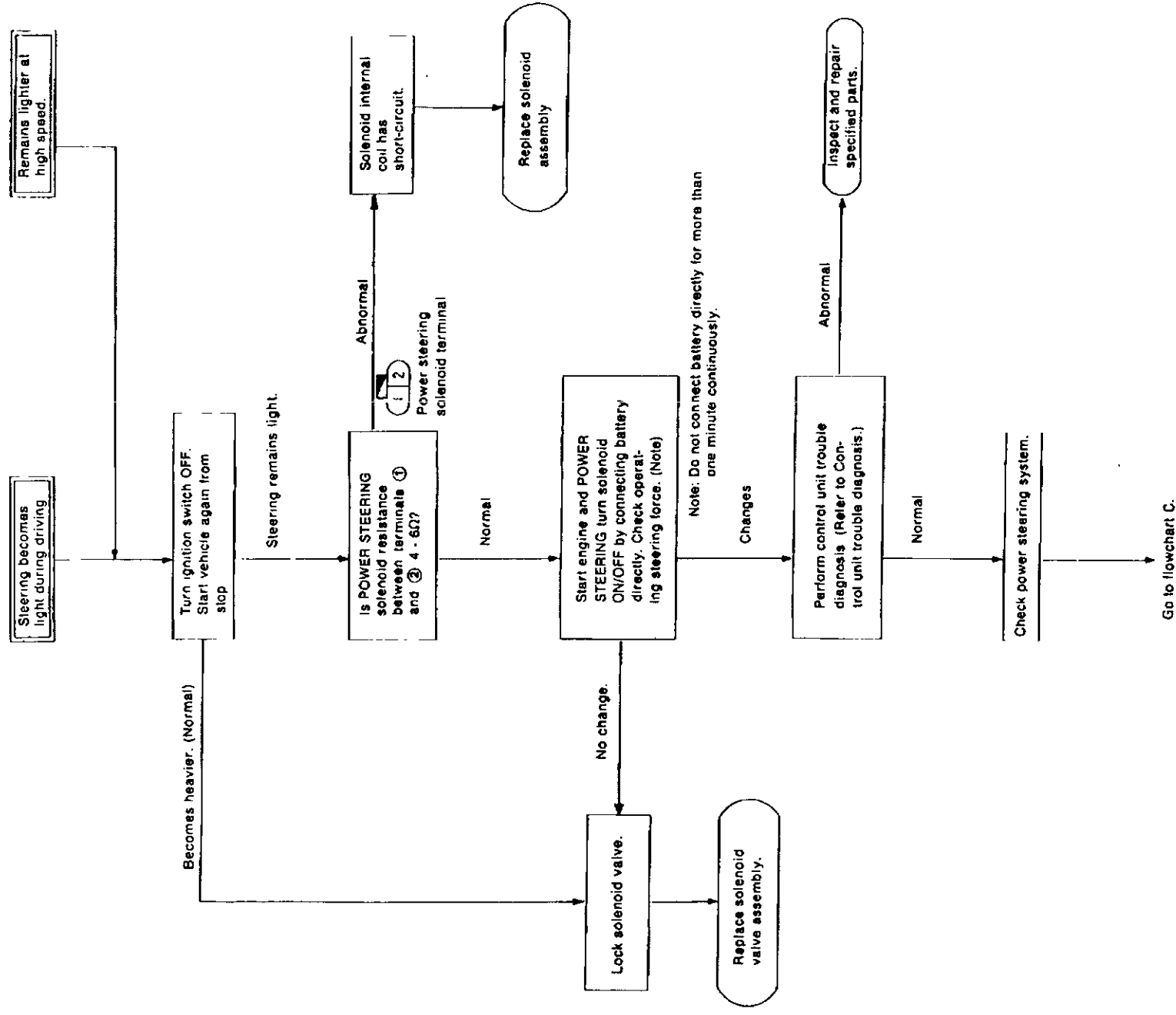
① Flowchart P



C11 STEERING

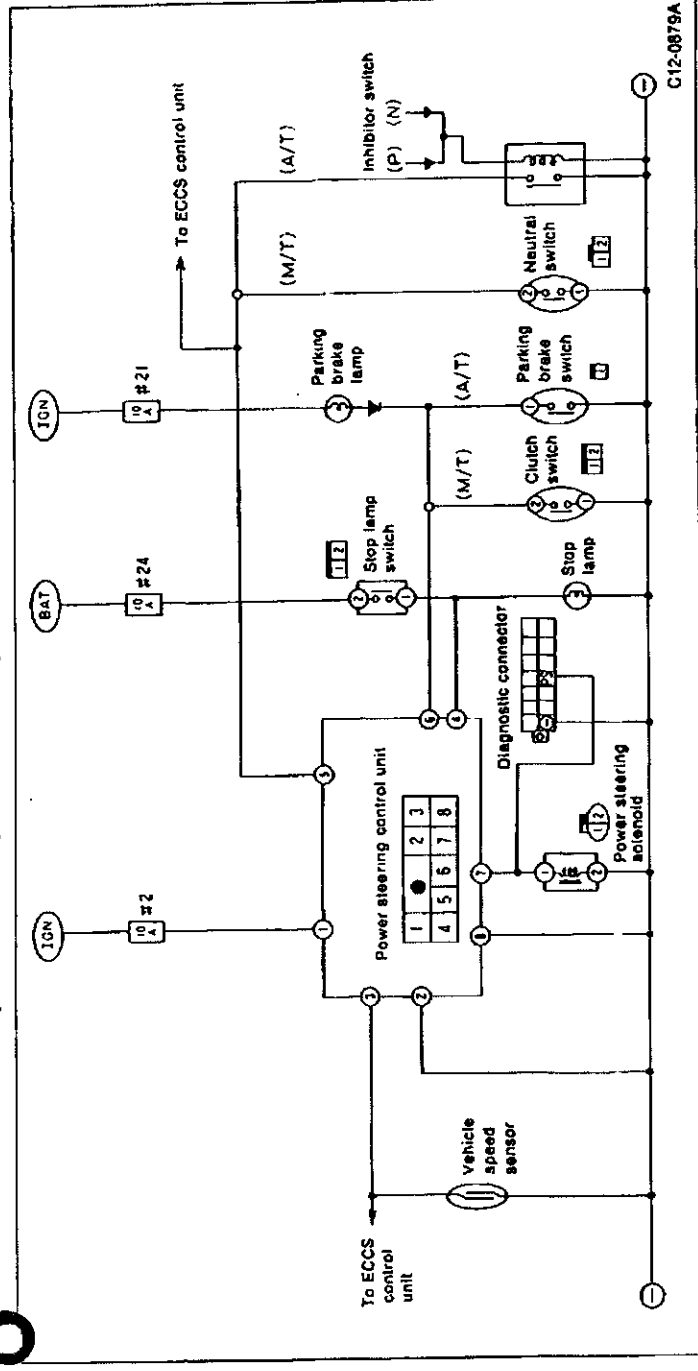
2. On-vehicle Inspection and Adjustment (Cont'd)

② Flowchart Q



3. Control Unit Trouble Diagnosis

3.1 CIRCUIT DIAGRAM (Refer to Super HICAS system circuit diagram.)



3-2 DAMAGE DIAGNOSIS

Precautions

Before starting to diagnose the power steering system ensure that:

<Vehicle stopped>

1. Power steering components (gears, oil pump, pipes, etc.) are free from leakage and that oil level is correct.
2. Tires are inflated to specified pressure and are of specified size, and that steering wheel is a genuine part.
3. Wheel size is adjusted properly.
4. Suspension utilizes the original design and is free of modifications which increase vehicle weight.

<Vehicle in operation>

1. Understand the trouble symptoms. (5W1H)
2. Engine is operating properly.

C11 STEERING

3. Control Unit Trouble Diagnosis (Cont'd)

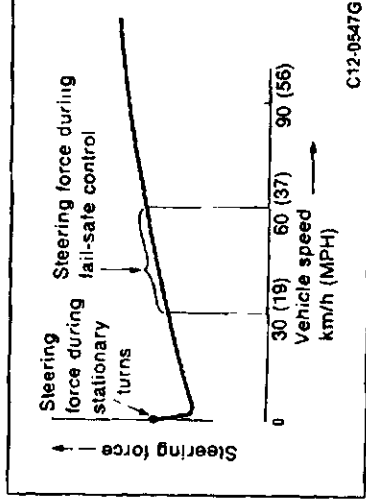
(1) Steering is heavy during stationary turning.

① Preliminary knowledge helpful in conducting diagnoses

The power steering system is a twin-orifice type, which uses a vehicle-speed sensing, electronic control design. Valve sensitivity is controlled in response to vehicle speed to achieve optimum steering effort. When a vehicle-speed signal is not input to the power steering control unit for more than approximately 10 seconds, a fail-safe system activates to maintain the steering effort at a level similar to that experienced during operation at a vehicle speed of 30 to 60 km/h (19 to 37 MPH).

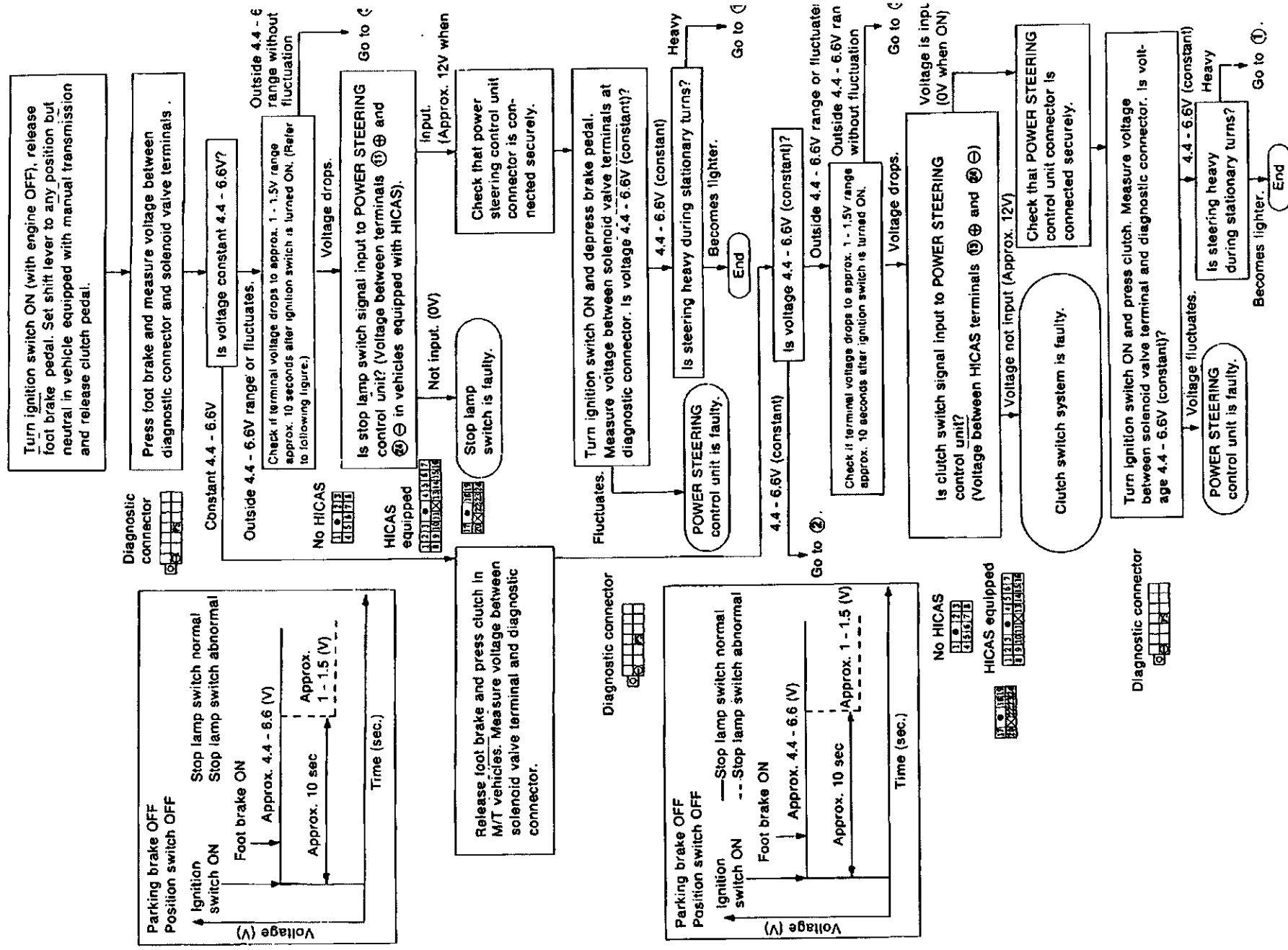
Consequently, if a foot-brake signal, parking brake or transmission position signal, or neutral in signal a vehicle equipped with manual transmission are not input to the POWER STEERING control unit, the steering system is maintained in a "fail-safe" control state. When this happens, a symptom referred to a "heavy steering during stationary turns" sometimes occurs.

Note: Normal operation refers to a driving condition in which the foot brake pedal and parking brake lever are released, and the shift lever is any position other than neutral or clutch pedal is released in a vehicle equipped with manual transmission.



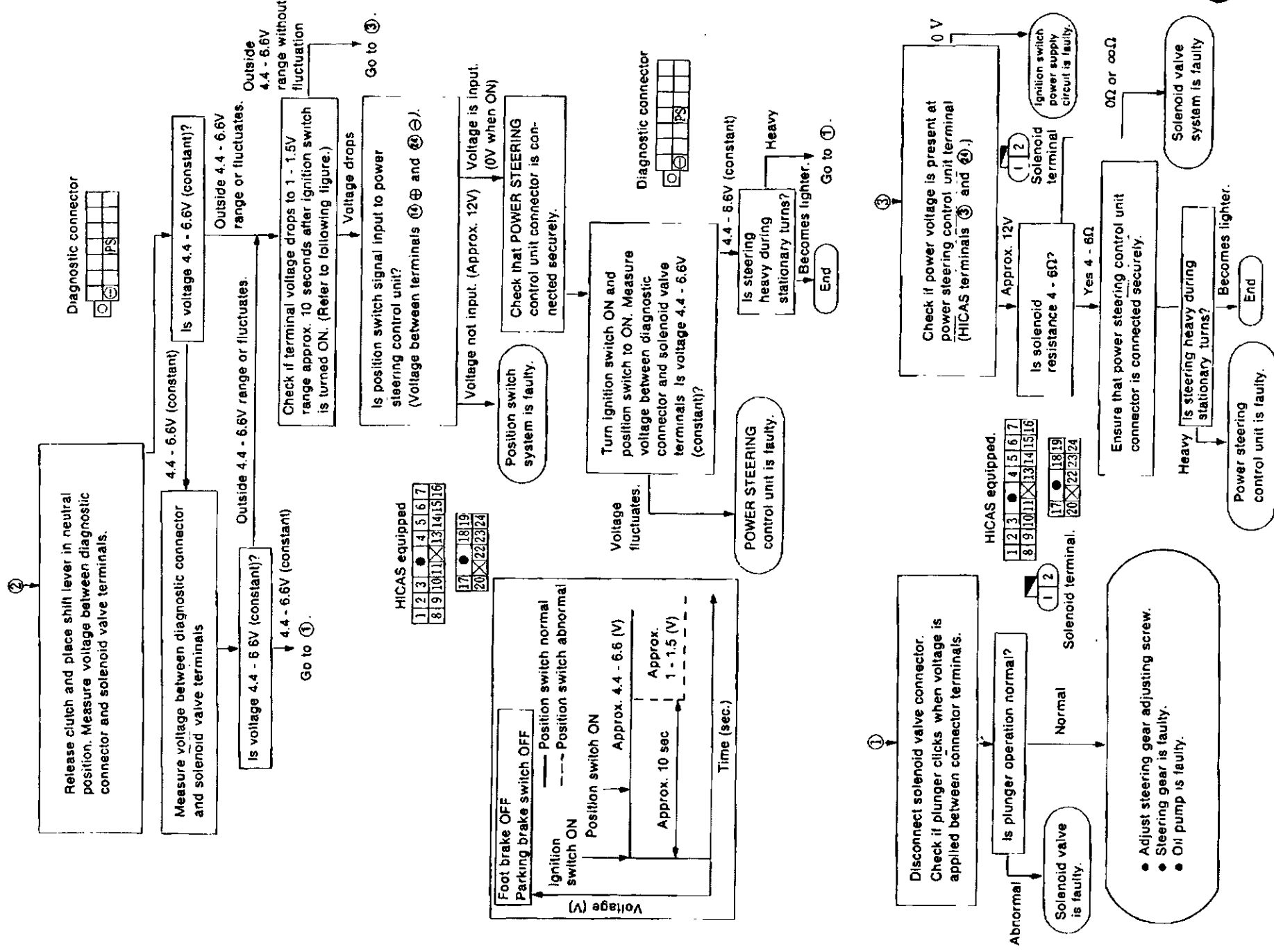
3. Control Unit Trouble Diagnosis (Cont'd)

② Flow chart ("Heavy steering during stationary turns")



C11 STEERING

3. Control Unit Trouble Diagnosis (Cont'd)

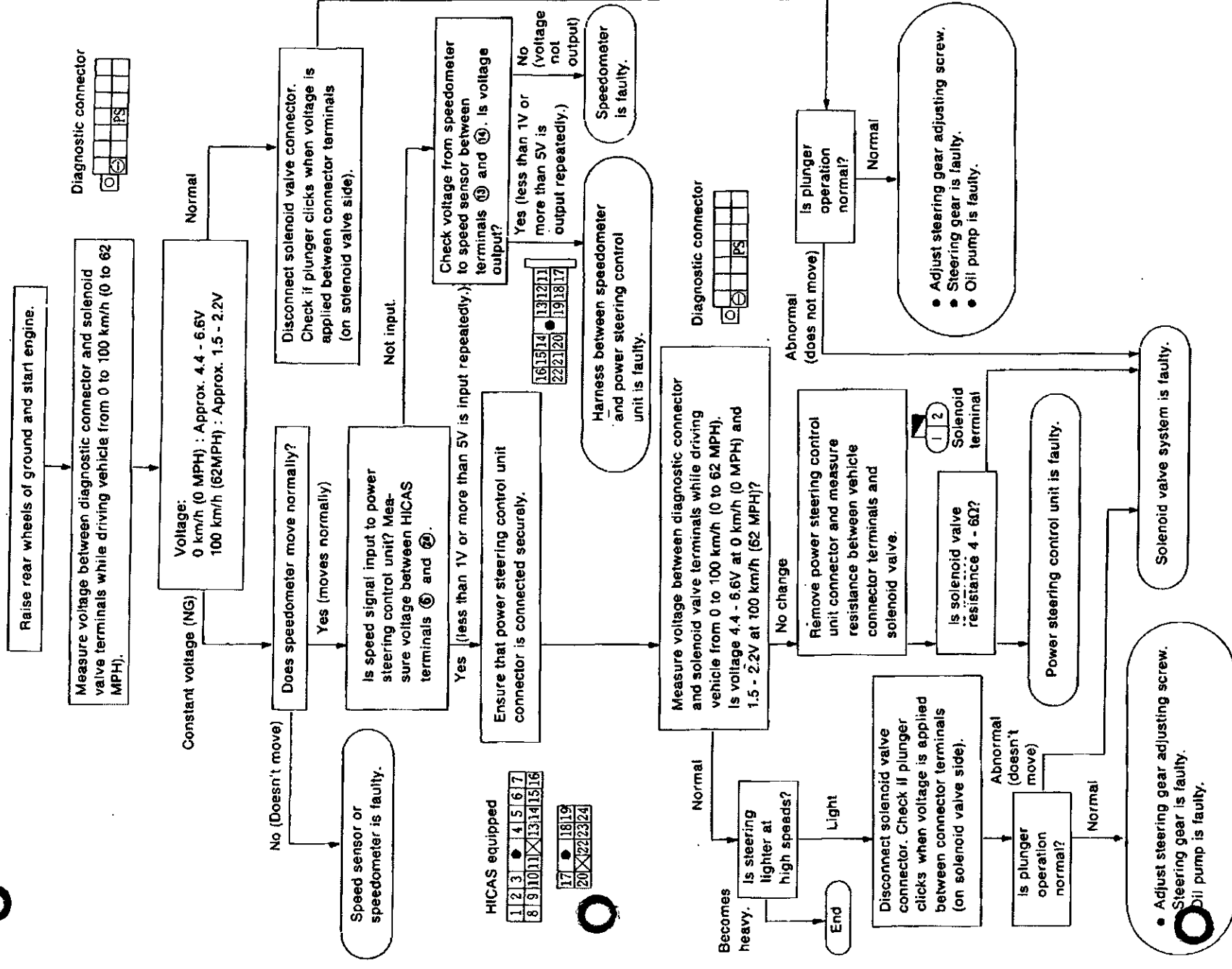


C11 STEERING

3. Control Unit Trouble Diagnosis (Cont'd)

2) Light steering operation during high-speed driving

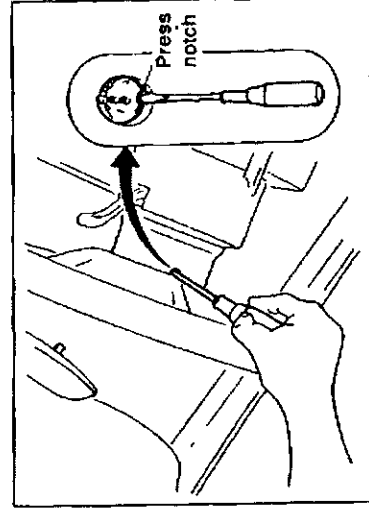
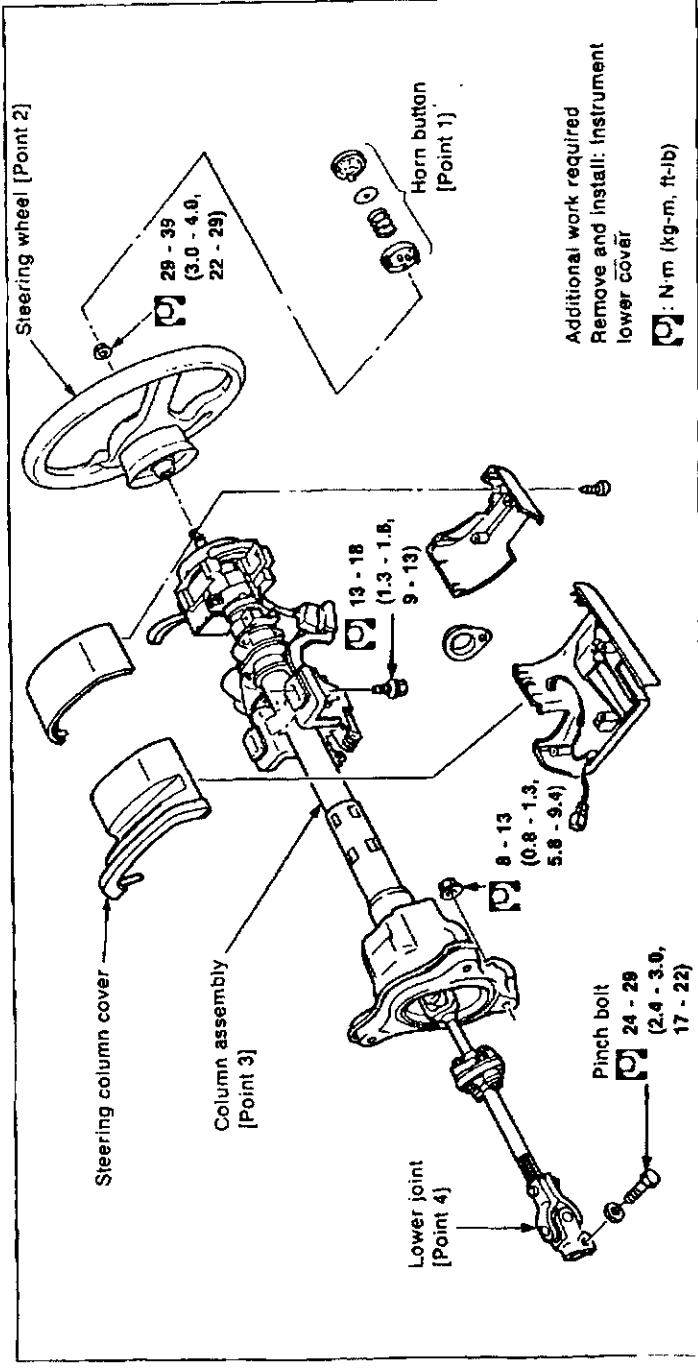
① Flowchart



C11 STEERING

4. Removal and Installation, Assembly and Disassembly

4-1 STEERING WHEEL AND STEERING COLUMN ASSEMBLY REMOVAL AND INSTALLATION

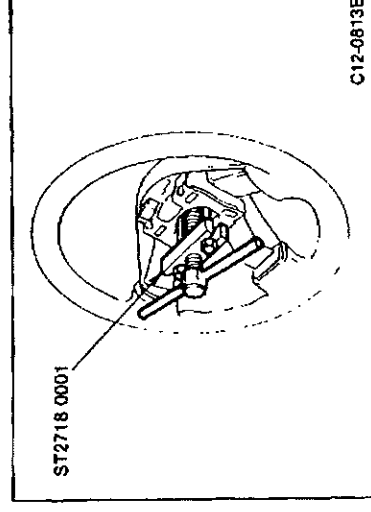


[Point 1] Horn button removal

- Press horn button notch from hole under steering wheel with screwdriver and remove horn button as shown in figure.

CAUTION:

- Pay attention not to scratch steering wheel and horn pad.
- Remove horn without placing unnecessary tension on wiring.



[Point 2] Steering wheel removal and installation

Removal

- Always use steering wheel puller (special service tool) to remove steering wheel.

CAUTION:

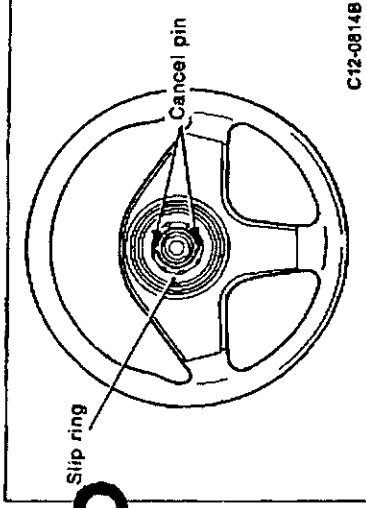
Do not tap steering wheel or apply undue stress to steering column shaft (especially in axial direction).

C11 STEERING

4. Removal and Installation, Assembly and Disassembly (Cont'd)

Installation

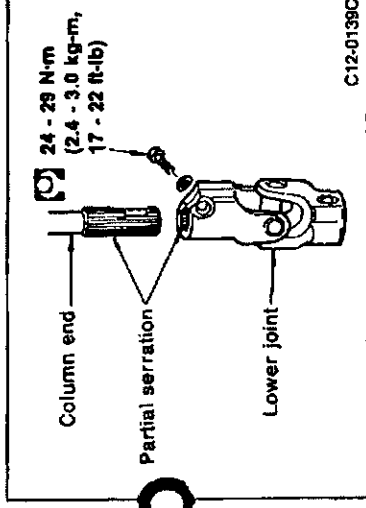
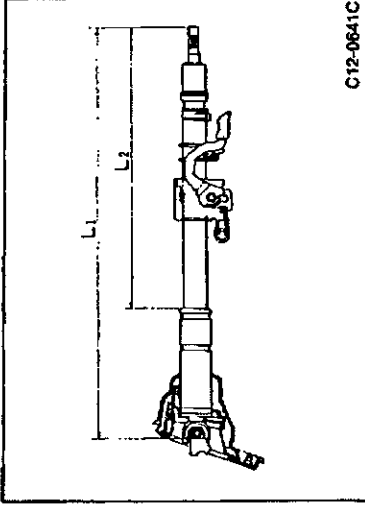
- When installing steering wheel, apply multi-purpose body grease (spray type: KRH05-00030) to entire surface of turn signal cancel pin and horn contact slip ring.



[Point 3] Column standard dimension measurement

- Measure dimension L_1 (standard value). Replace column assembly if measurement is outside specification range.
- Refer to the following specification values for vehicles equipped with telescopic wheels.

Description	mm (in)	Telescopic wheel
L_1	mm (in)	685.5 - 720.5 (26.99 - 28.37)
L_2	mm (in)	423.4 - 458.4 (16.67 - 18.05)



[Point 4] Lower joint assembly

- Align position where serration is incomplete (Note) in lower joint and steering column and install shaft.
- Note: Lower joint has a projecting portion in serration. Steering column fits into serration indentation.**
- Align pinch bolt to shaft notch part on gear side and column side correctly and insert securely. After fingertightening tighten to specified torque.

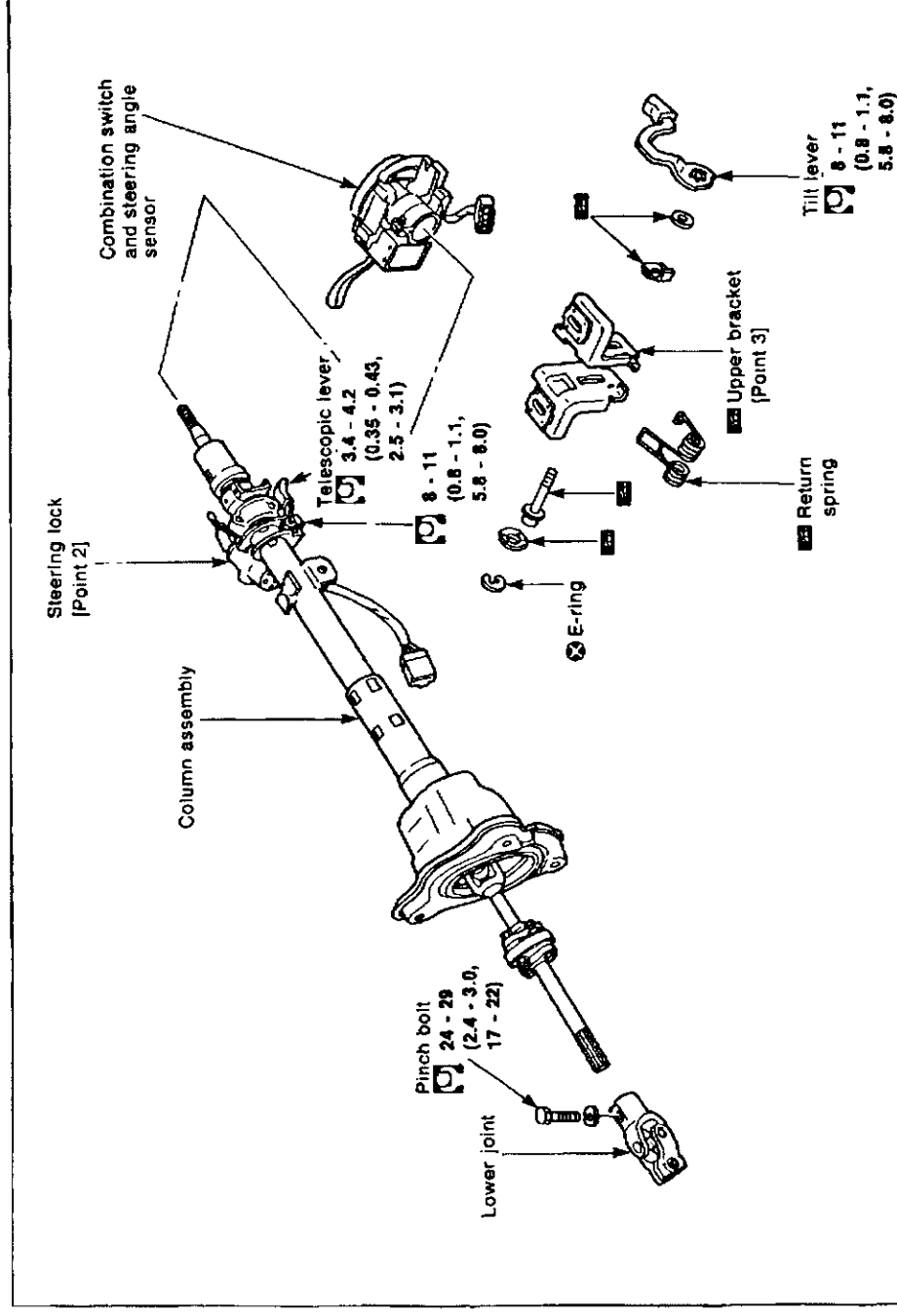
[Point 5] Installation inspection

- After installing steering column, turn steering wheel to make sure it moves smoothly, without any noise or excessive force. Also check that the number of turns from the straight ahead position to left and right locking points are equal. Be sure that the steering wheel is in a neutral position when driving straight ahead.

C11 STEERING

4. Removal and Installation, Assembly and Disassembly (Cont'd)

(2) Assembly and disassembly

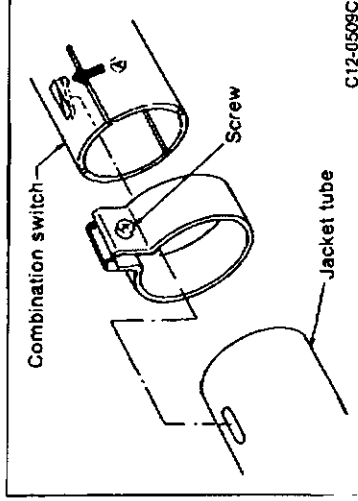


- Ⓐ : N·m (kg-m, ft-lb)
- Ⓑ : Nissan MP special grease No. 2
- ⓧ : Always replace after every disassembly.

C12-0815C

[Point 1] Combination switch removal

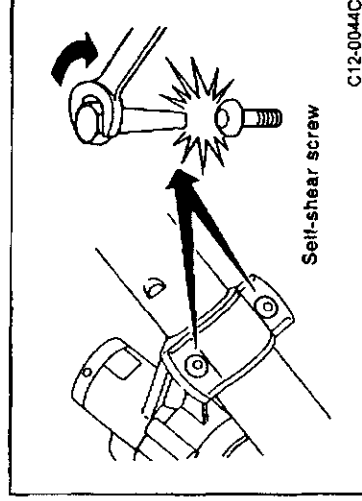
- To remove combination switch from jacket tube, first loosen screw. While prying notch Ⓐ on inside of switch with screwdriver, remove switch.



C12-0509C

[Point 2] Steering lock installation

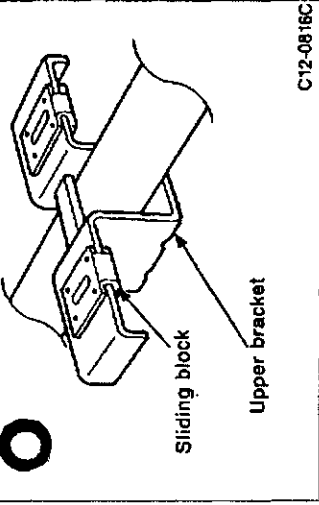
- Align positioning boss on steering lock with hole in jacket tube and tap bracket with self-shear screw to secure.
- Tighten self-shear screw and then cut off screw heads.



C12-0044C

C11 STEERING

4. Removal and Installation, Assembly and Disassembly (Cont'd)

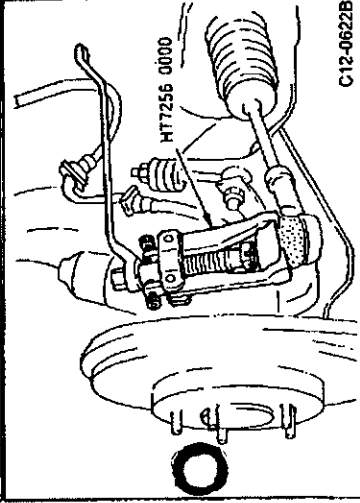
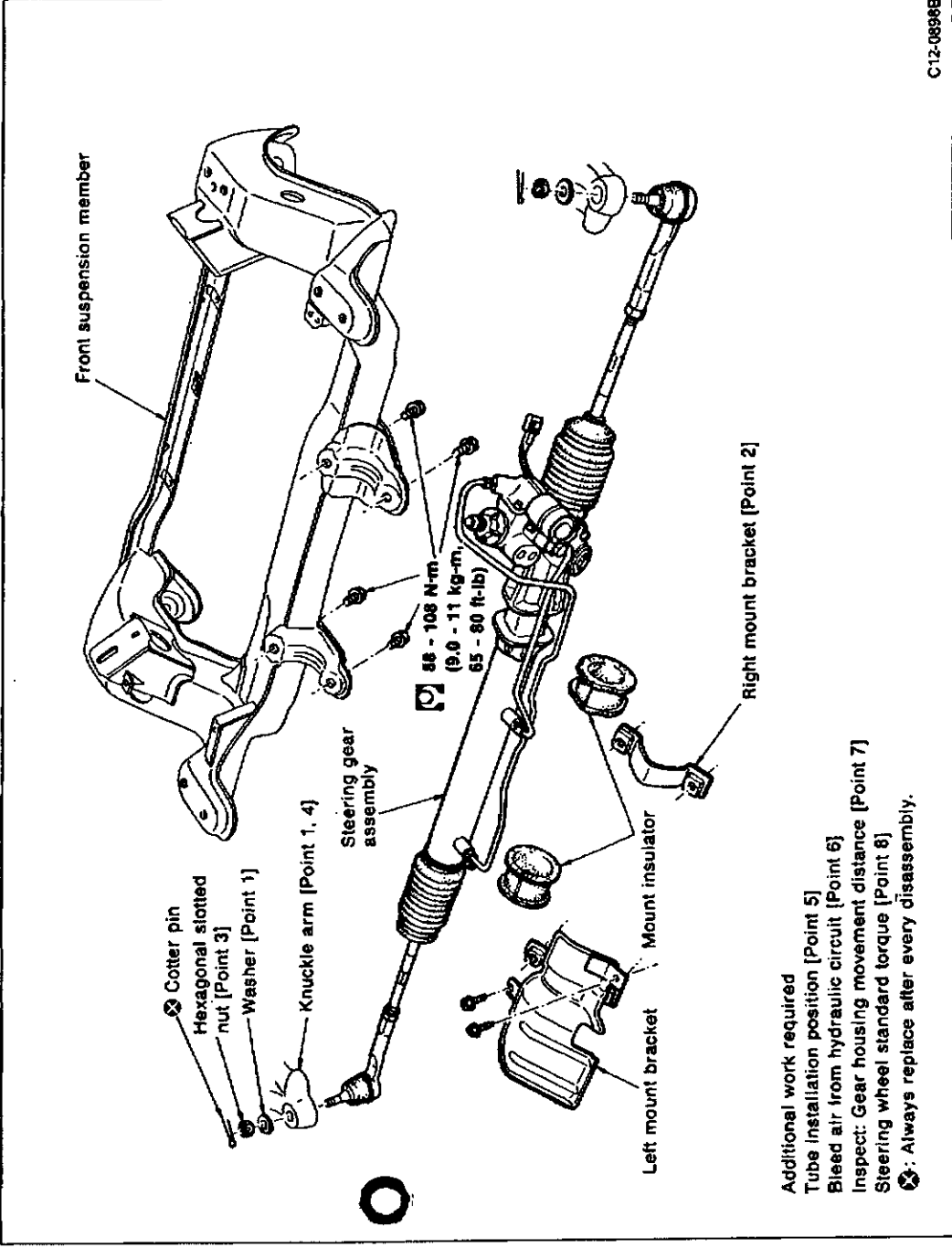


[Point 3] Upper bracket inspection

- Upper bracket and sliding block are set in plastic molding as shown in figure.
- If sliding block is falling off, replace upper bracket assembly.

4-2 STEERING GEAR AND LINKAGE

(1) Removal and installation



[Point 1] Knuckle arm separation

- Use Pitman arm puller (commercial service tool) to remove knuckle arm.

CAUTION:

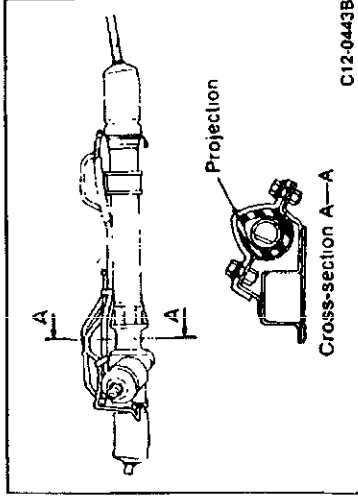
Do not scratch dust boot of tie-rod ball joint.

C11 STEERING

4. Removal and Installation, Assembly and Disassembly (Cont'd)

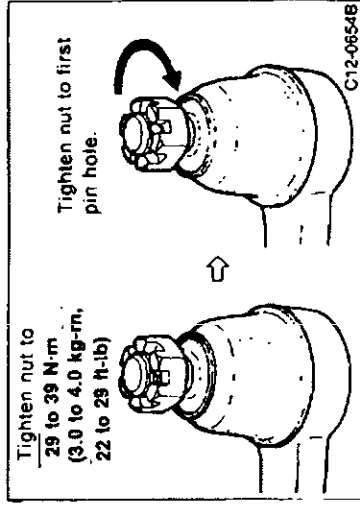
[Point 2] Gear mount bracket and mount insulator installation

- Perform alignment securely since right side bracket and insulator have projection as shown in figure.
- Coat mount bolt with machine oil or equivalent.
- To install bracket, initially tighten nuts to 78 N·m (8.0 kg-m, 58 ft-lb) and then tighten to specified torque.



[Point 3] Hexagonal slotted nut tightening

- Tighten nut to specified torque [29 to 39 N·m (3.0 to 4.0 kg-m, 22 to 29 ft-lb)]. Then tighten further to align nut groove with first pin hole so cotter pin can be installed. Tightening torque must not exceed 49 N·m (5.0 kg-m, 36 ft-lb).
- After tightening, check that knuckle arm and ball joint socket are parallel.

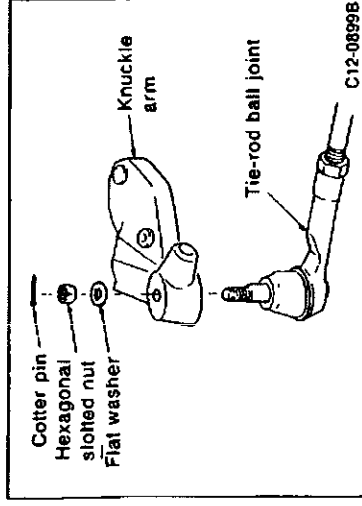


[Point 4] Knuckle arm installation

- When assembling tie-rod ball joint in knuckle arm, insert flat washer before hexagonal slotted nut because knuckle arm is made of aluminum.

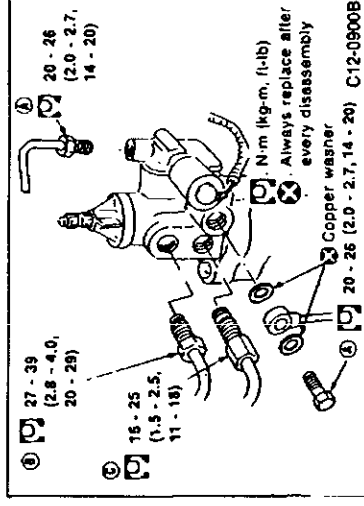
CAUTION:

Do not tap knuckle arm to assemble because it is made of aluminum. Be careful not to scratch knuckle arm during assembly.



[Point 5] Tube installation position

- Assemble tubes carefully in correct installation positions shown in figure.
- ① Cylinder pipe (rear housing to gear housing)
- ② Power steering low-pressure pipe (rear housing to reservoir tank)
- ③ Power steering high-pressure pipe (power steering to rear housing)



C11 STEERING

4. Removal and Installation, Assembly and Disassembly (Cont'd)

[Point 6] Hydraulic circuit air bleeding

- Perform the procedures described on the left to bleed the air from the hydraulic system.
- The presence of any of the following conditions indicate that air bleeding is not completed. Bleed the system again

- ① Air bubbles are formed in the reservoir tank.
- ② The pump makes a sound like bouncing gravel.
- ③ The pump makes loud growling noises.

Note: The sound of fluid flow from gear valve and pump can be heard during heavy steering during stationary turns or slow steering. This sound does not affect steering performance or durability.

CAUTION:

Perform air bleeding of power steering system before starting engine.

[Point 7] Gear housing movement inspection

- Refer to "2. On-vehicle Inspection and Adjustment".

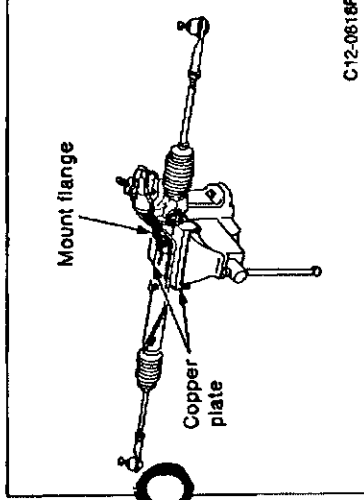
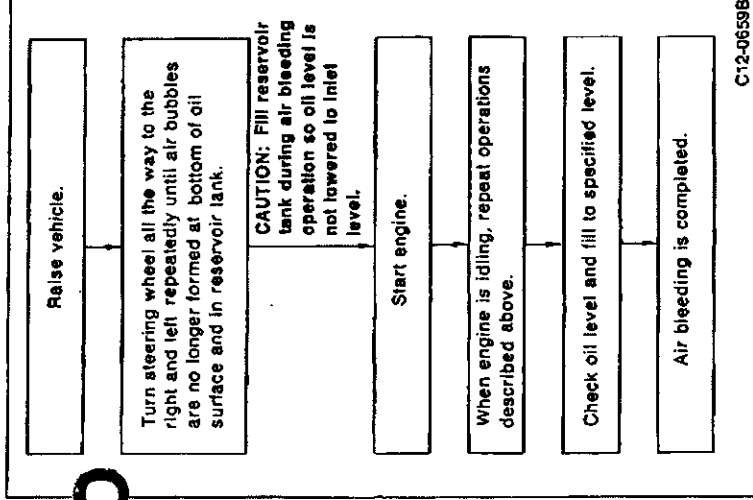
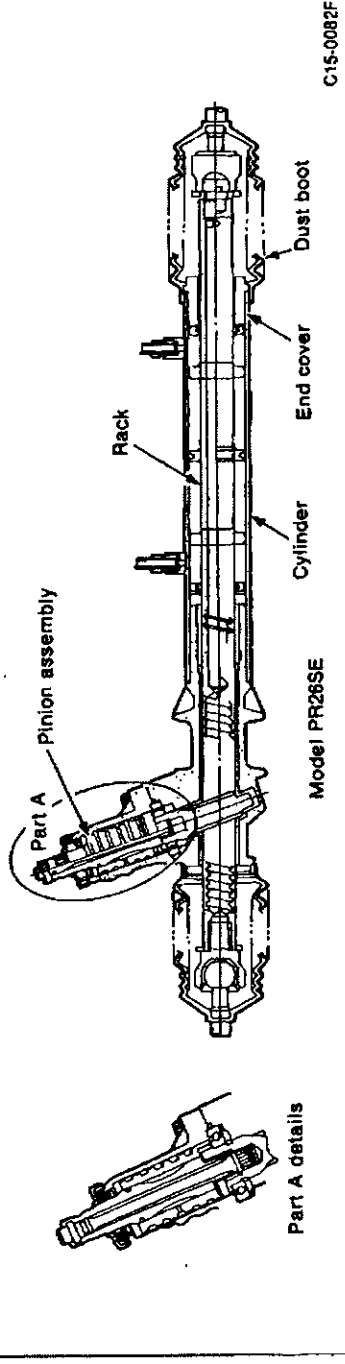
[Point 8] Steering wheel standard torque inspection

- Refer to "2. On-vehicle Inspection and Adjustment."

(2) Assembly and disassembly precaution

- Secure mounting flange in vice (use copper plates) to assemble and disassemble steering gear.
- Wash dirt on steering gear off with white gasoline or solvent oil vent. Be careful not to get the white gasoline or solvent oil the ports, harness or connectors for outlet and return.
- Do not reuse O-ring, oil seal (universal joint packing) or copper washer. Always replace with new parts after every disassembly.
- If inner surface of rear housing assembly or gear housing assembly and rack is scratched or damaged, replace gear housing assembly.

(3) PR26SE power steering gear cross-section



[illegible][illegible]

C11 STEERING

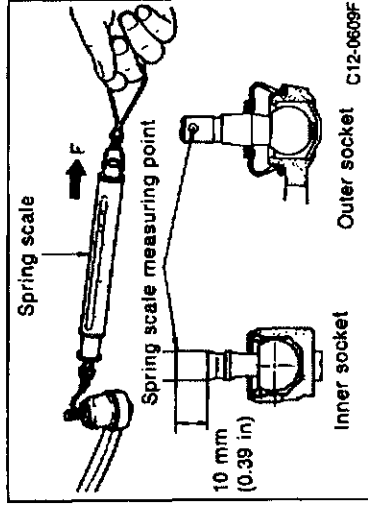
4. Removal and Installation, Assembly and Disassembly (Cont'd)

[Point 1] Securing steering gear main unit

- Secure gear housing mount in vise for steering gear assembly and disassembly.

CAUTION:

Insert copper plates in sides of vise to avoid scratching housing.



[Point 2] Tie-rod ball joint inspection

Swinging force inspection

- Place spring scale on measurement points indicated in figure. Check that value when ball stand starts moving is within specification indicated below. If value is outside specification range, replace outer socket and inner socket.
- Make sure dust boot of inner and outer socket is not twisted.

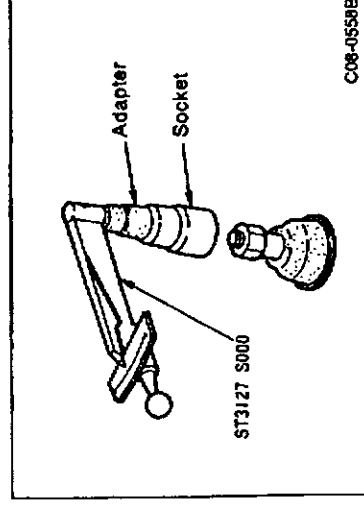
Specification values at measurement points shown in figure:

Inner socket

16.7 - 147.1 N (1.7 - 15 kg, 3.7 - 33.1 lb)

Outer socket

4.9 - 46.1 N (0.5 - 4.7 kg, 1.1 - 10.4 lb)

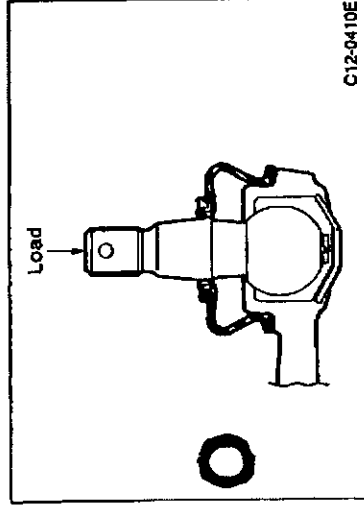


Sliding torque inspection

- Using preload gauge (special service tool), check that torque is within specification limit indicated below. If torque is outside specification, replace outer socket.

Outer socket sliding torque:

0.3 - 2.9 N·m (0.03 - 0.3 kg·m, 0.2 - 2.2 ft·lb)



Axial end play inspection

- Apply load of 490 N (50 kg, 110 lb) to axis of ball stud and measure stud play with dial gauge. If play is outside specification indicated below, replace inner and outer socket.

Inner socket:

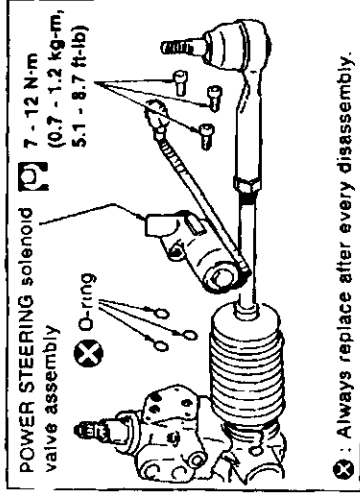
0 mm (0 in)

Outer socket:

0.5 mm (0.020 in) max.

C11 STEERING

4. Removal and Installation, Assembly and Disassembly (Cont'd)

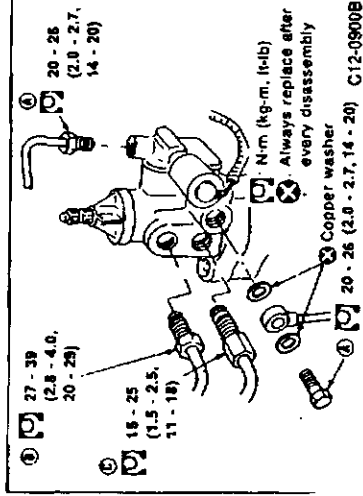


[Point 3] Power steering solenoid valve replacement

- The power steering solenoid valve is an integral unit and cannot be disassembled. If replacement is necessary, replace entire assembly.
- Replace O-rings (3) at assembly. (Non-reusable part)

CAUTION:

- (1) Do not remove the power steering solenoid valve screw because it cannot be disassembled. (It does not adjust the steering force.)
- (2) When replacing assembly, be careful not to allow dirt, debris or foreign matter to adhere to assembly.



[Point 4] Rear housing pipe Installation position

- Assemble pipes carefully in correct installation positions shown in figure.

CAUTION:

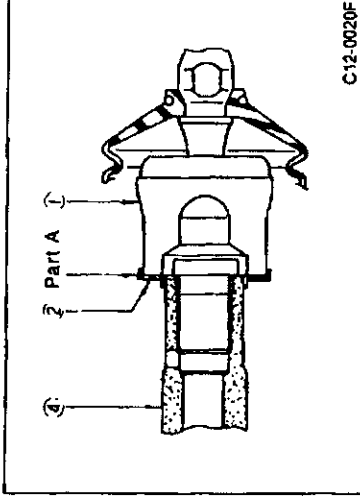
Pay close attention because certain parts vary in the 2WD model.

- ① Cylinder pipe (rear housing to gear housing)
- ② Power steering low-pressure pipe (rear housing to reservoir tank)
- ③ Power steering high-pressure pipe (power steering to rear housing)

[Point 5] Inner socket assembly and disassembly

Disassembly

- Move the caulking (④ 4 locations) of the lock plate ②, loosen socket and separate from rack ④.
- Remove lock plate ②.

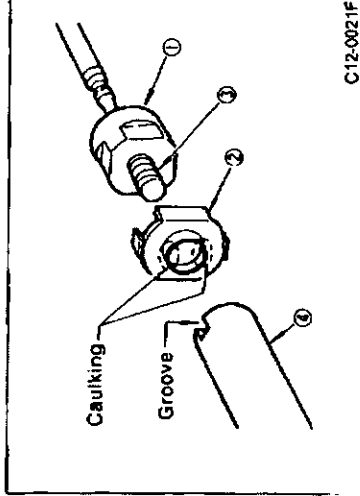


Assembly

- Set lock plate ② on tie-rod inner socket ①.
- Apply sealant (Three Bond 1324) to threads of inner socket ③. Screw into socket ① into rack ④ and tighten to specified torque.
- Caulk lock plate at two locations on groove side of rack.

CAUTION:

Wipe off any debris on lock plate so it will not adhere to the boot.



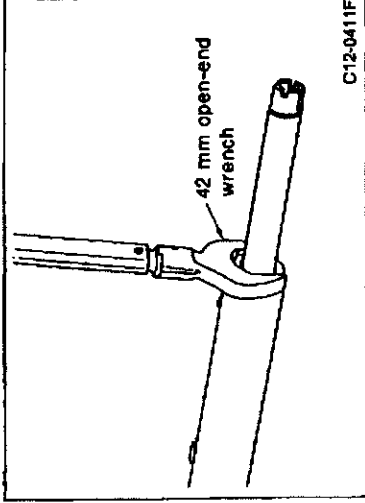
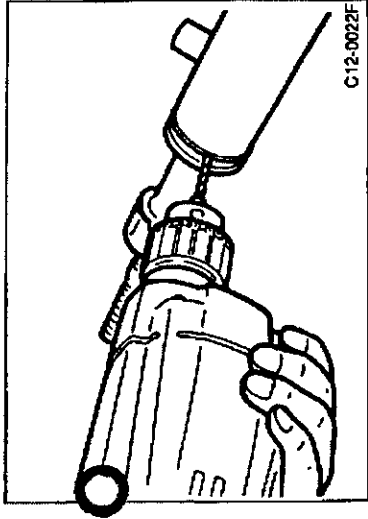
C11 STEERING

4. Removal and Installation, Assembly and Disassembly (Cont'd)

[Point 6] End cover removal and installation

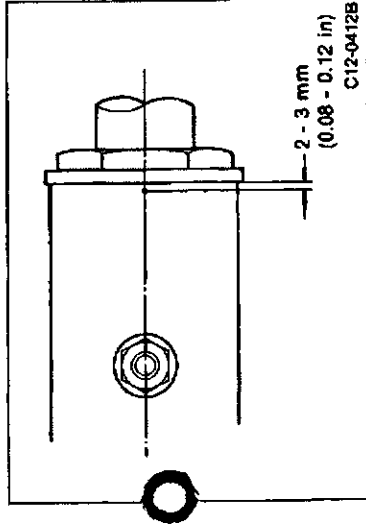
Removal

- Drill staked position of gear housing end with 3.0 mm drill until the staking is eliminated.
- Remove end cover assembly with 42 mm open-end wrench.



Installation

- Tighten end cover.
Fasten end cover assembly to gear housing with staking to prevent looseness as shown in figure.



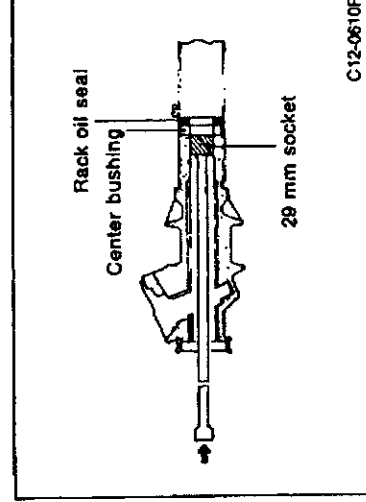
[Point 7] Center bushing and rack oil seal removal and installation

Removal

- Turn pinion housing side and remove center bushing and rack oil seal at same time using 29-mm tape-wrapped socket and extension bar (length of 2 pieces is approx. 500 mm (19.69 in)).

CAUTION:

Do not scratch pinion housing or cylinder inner surface.



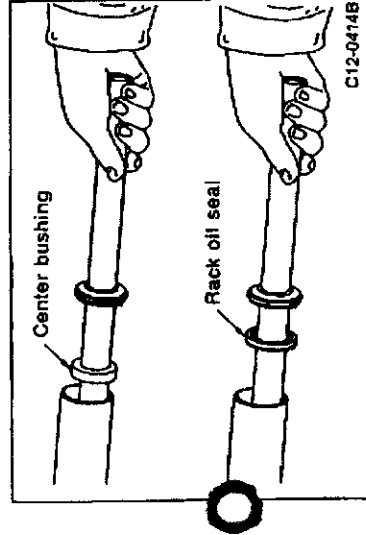
Inner side installation

- Use rack to install.
- Install center bushing and rack oil seal (inner) separately.

CAUTION:

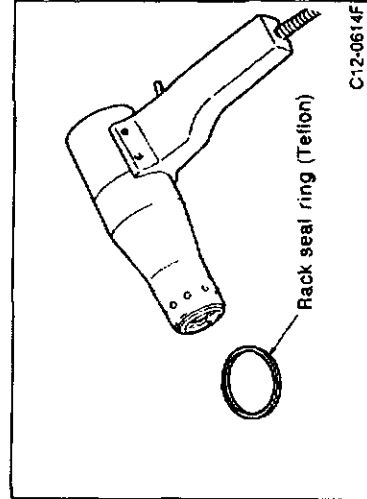
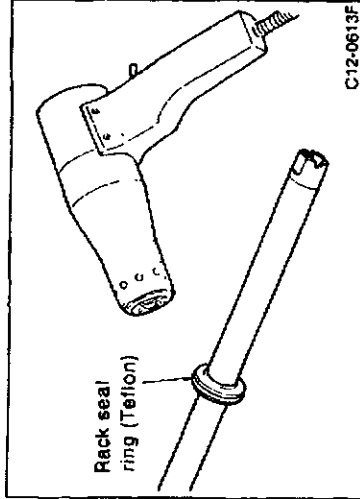
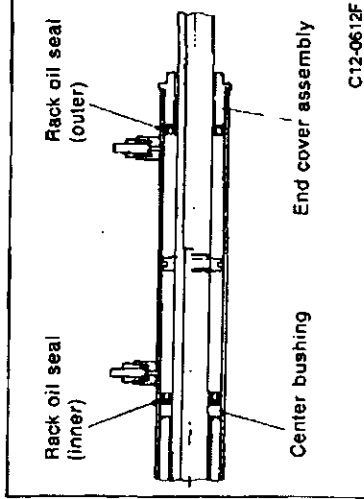
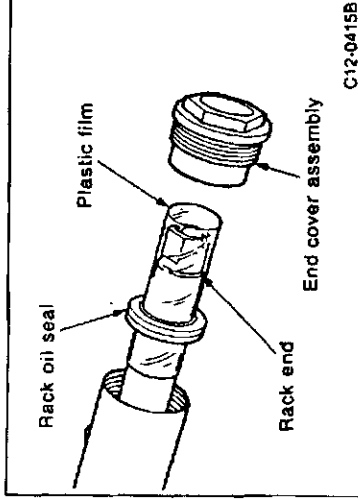
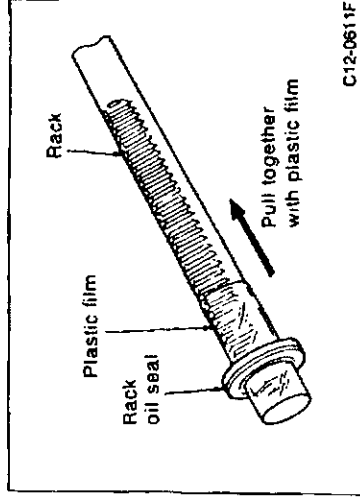
(1) Do not scratch rack end surface.

(2) To prevent scratching rack oil seal (inner), wrap the gear teeth of rack with protective plastic film, size: 70 x 100 mm (2.76 x 3.94 in) and insert oil seal above the wrapped sheet. Pull rack gears together with protective sheet until it passes.



C11 STEERING

4. Removal and Installation, Assembly and Disassembly (Cont'd)



Outer side installation

- Use end cover assembly to install outer side.

CAUTION:

To prevent scratching oil seal, wrap end of rack in a protective plastic film, size: 70 x 100 mm (2.76 x 3.94 in) and insert oil seal. Pull plastic film out together with oil seal.

Rack oil seal direction

- Make sure inner and outer side lips of rack oil seal are facing correct direction and install seal.

[Point 8] Rack Teflon ring removal and installation

Removal

- Using a heat gun, heat rack seal ring (made of Teflon) to approximately 40°C (104°F).
- Remove Teflon rack seal ring. Be careful not to scratch rack.
- Replace O-ring and Teflon ring with new parts at same time.

Installation

- Using a heat gun, heat rack seal ring (made of Teflon) to approximately 40°C (104°F) and install on rack by hand.

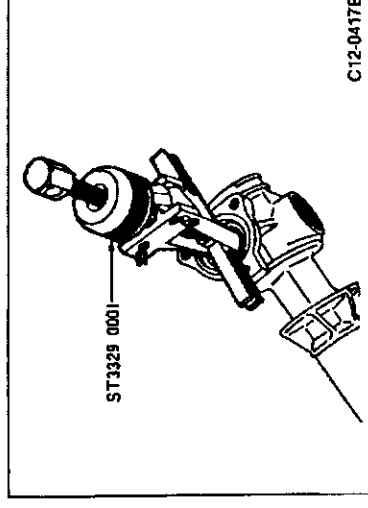
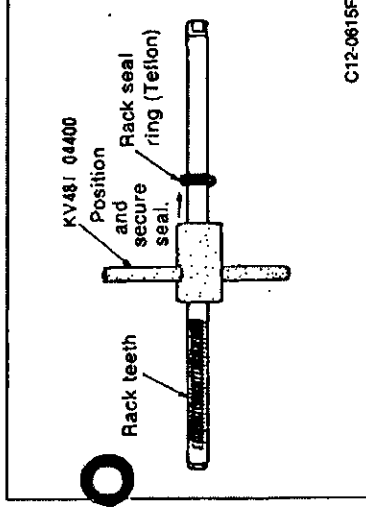
C11 STEERING

4. Removal and Installation, Assembly and Disassembly (Cont'd)

- Use seal ring correction tool (special service tool), compress periphery of rack seal ring (made of Teflon) to position and secure it on rack.

CAUTION:

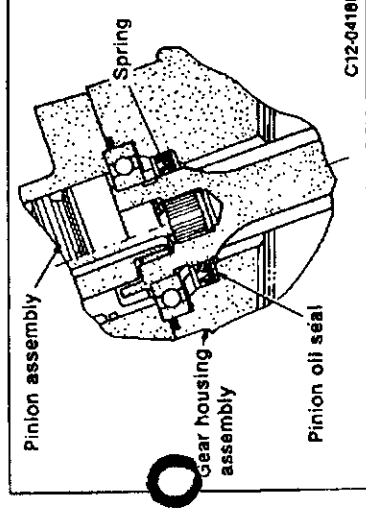
Always insert the tool from the rack gear side.



[Point 9] Pinion oil seal removal and installation

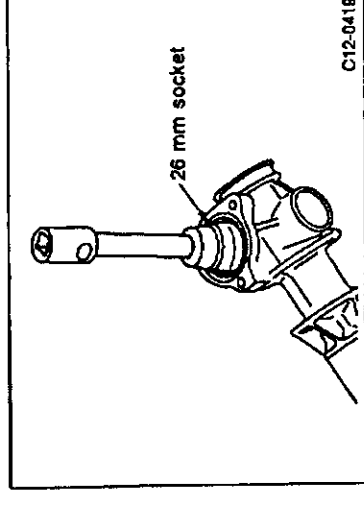
Removal

- Using oil seal puller (special service tool), remove oil seal from gear housing.

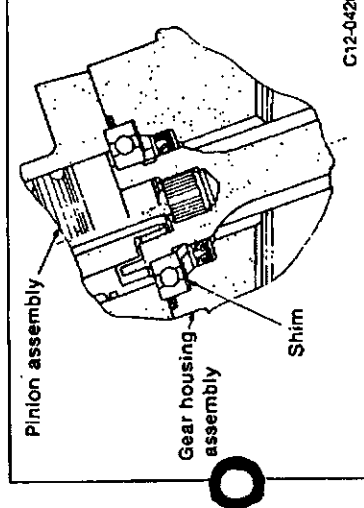


Installation

- Assemble oil seal with spring facing up as shown in figure.



- Use appropriate sized drift and press in oil seal in gear housing.
Reference: A 26-mm socket can also be used.



[Point 10] Shim selection

- Assemble unit with the same number of shims that were disassembled, whether replacement of pinion assembly gear housing and rear housing is necessary or not.

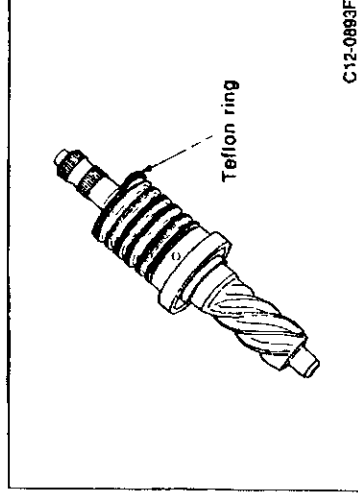
C11 STEERING

4. Removal and Installation, Assembly and Disassembly (Cont'd)

[Point 11] Pinion Teflon ring removal and installation

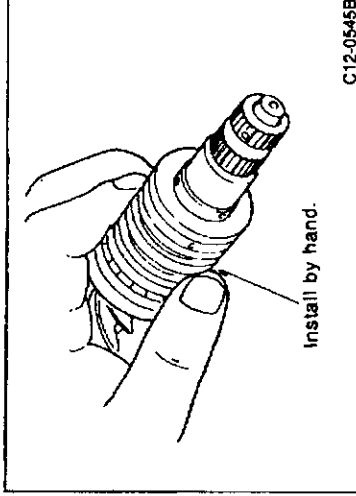
Removal

- Install Teflon ring on pinion assembly.
- Be careful not to damage pinion oil seal.
- Do not reuse Teflon ring.



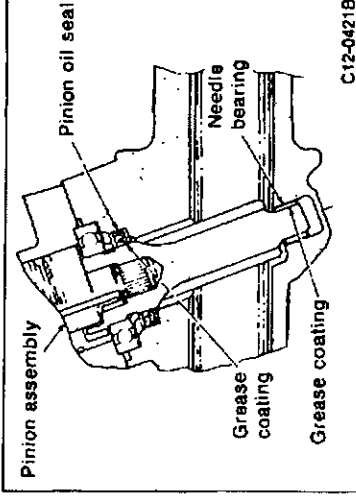
Installation

- Using a heat gun, heat pinion seal ring to approximately 40°C (104°F) before installing it onto pinion gear assembly.
- Make sure pinion seal ring is properly settled in valve groove.



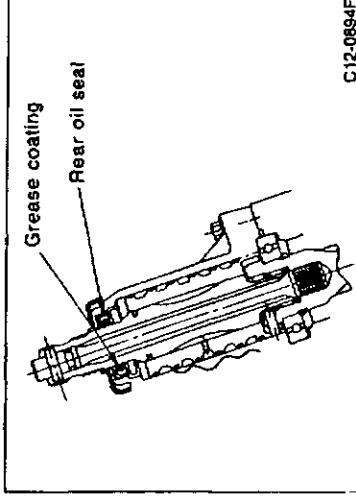
[Point 12] Needle bearing grease coating

- When assembling pinion assembly in gear housing, apply a coat of Nissan MP special grease No. 2 to needle bearing roller and pinion oil seal lip.



[Point 13] Rear oil seal grease coating

- Apply coat of Nissan MP special grease No. 2 to rear oil seal lip before assembling rear housing as shown in figure.

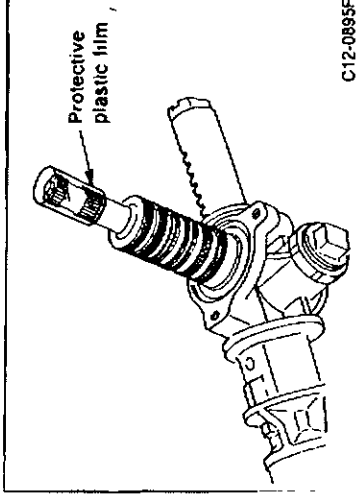


[Point 14] Rear housing assembly installation

- Protect rear oil seal from damage by serration part of pinion assembly by wrapping it assembly serration in a protective plastic film, 50 x 70 mm (1.97 x 2.76 in)].

CAUTION:

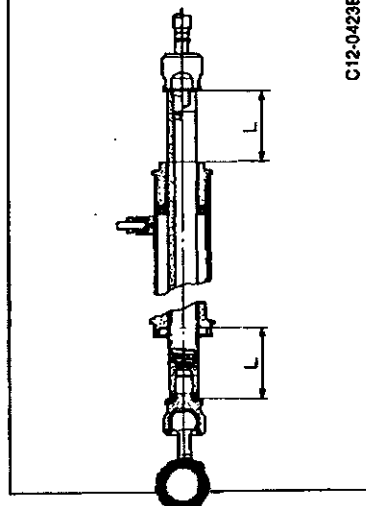
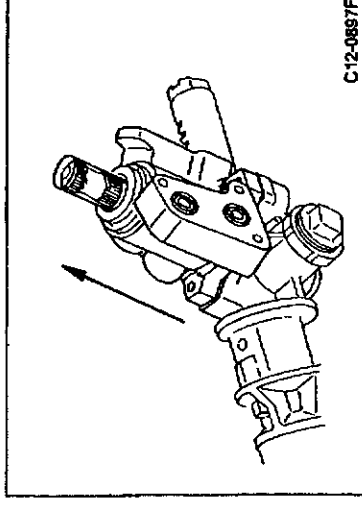
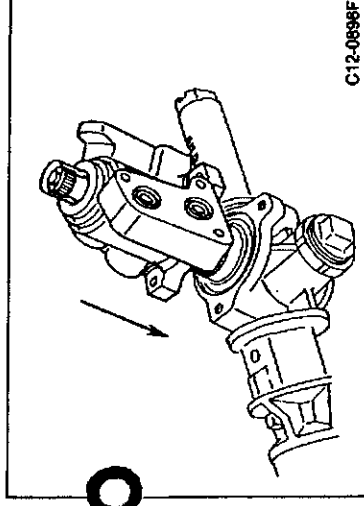
If protective film is wrapped on bearing insertion surface the housing cannot be assembled.



C11 STEERING

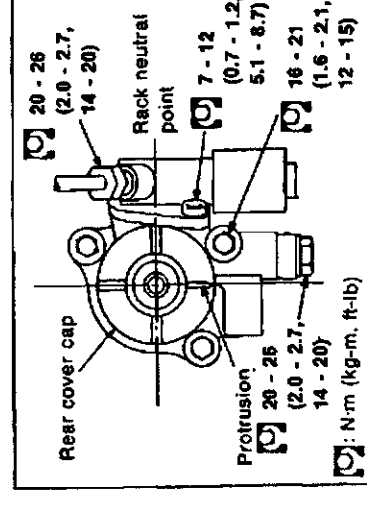
4. Removal and Installation, Assembly and Disassembly (Cont'd)

- Install rear housing assembly straight ahead.
- Insert rear housing assembly in pinion assembly and then remove protective plastic film.

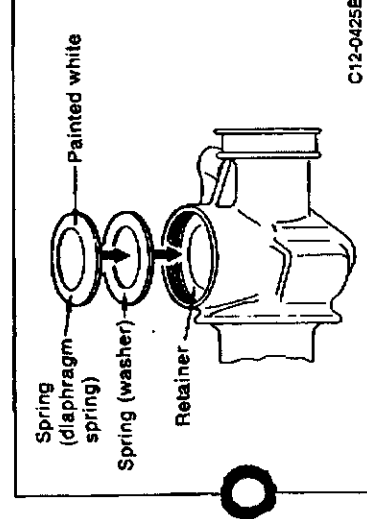


[Point 15] Rear housing cover installation

- Position rack as shown in figure, and determine neutral position.
L dimension:
66.5 mm (2.618 in)



- Install rear cover cap so that protrusion of rear housing cover is positioned as shown in figure.



[Point 16] Spring (diaphragm spring) installation

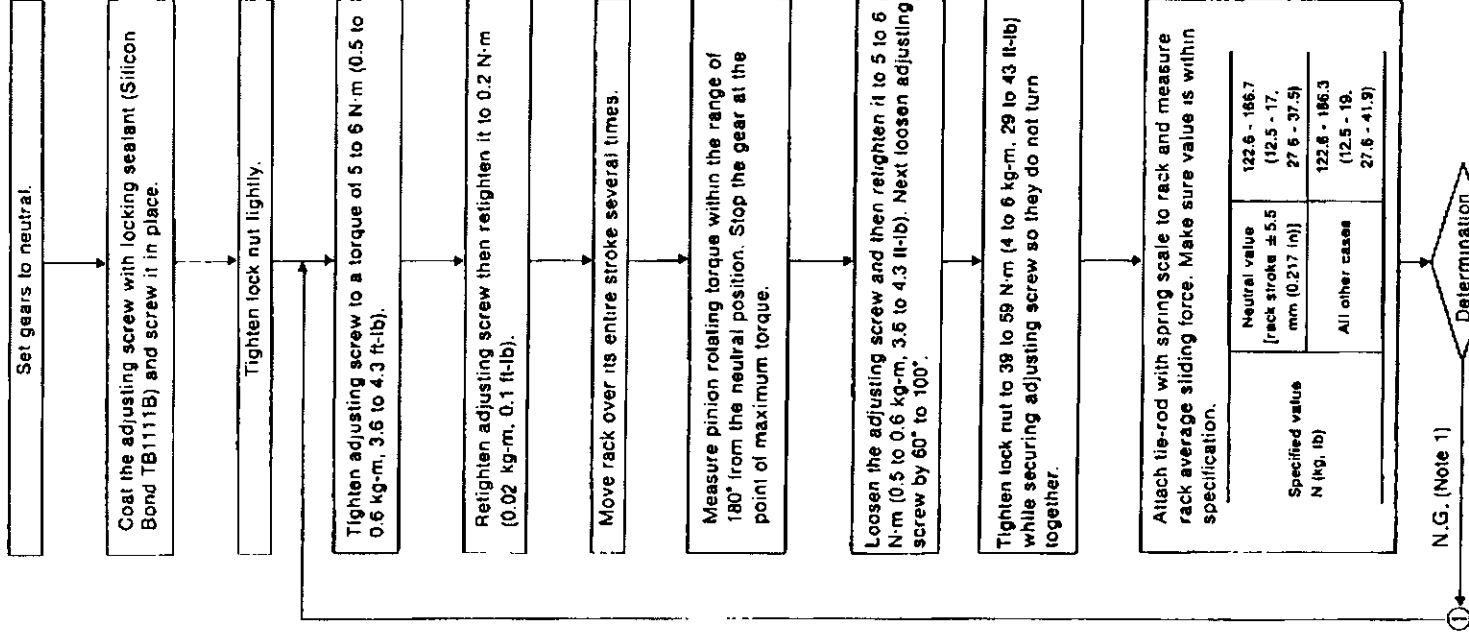
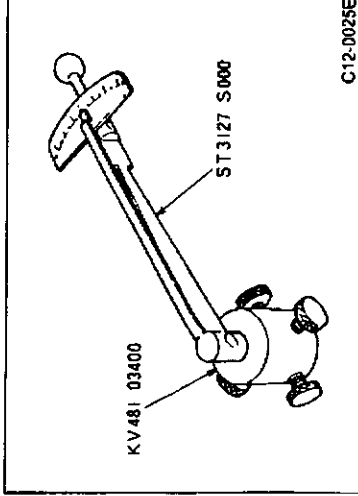
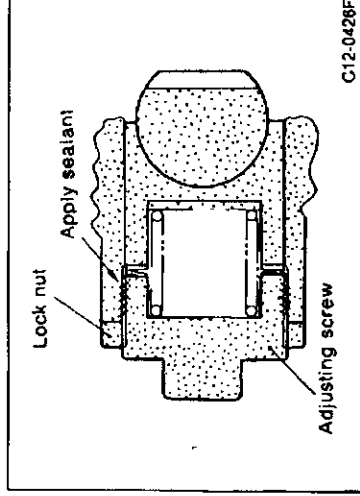
- Always install retainer, spring washer, washer and diaphragm spring in this order.
- Make sure convex end (painted white) of diaphragm spring faces outward when installing.

C11 STEERING

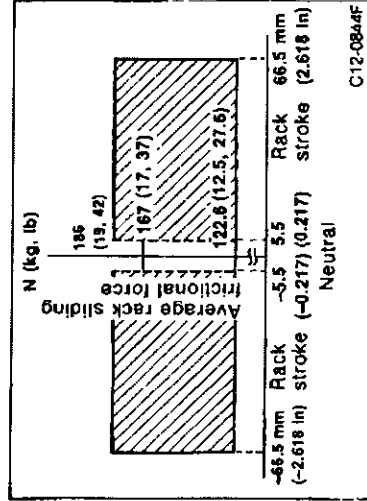
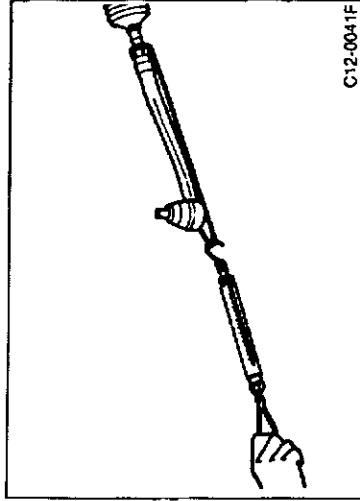
4. Removal and Installation, Assembly and Disassembly (Cont'd)

[Point 17] Adjusting screw adjustment

③ Steering gear assembly adjustment (without fluid in gears)

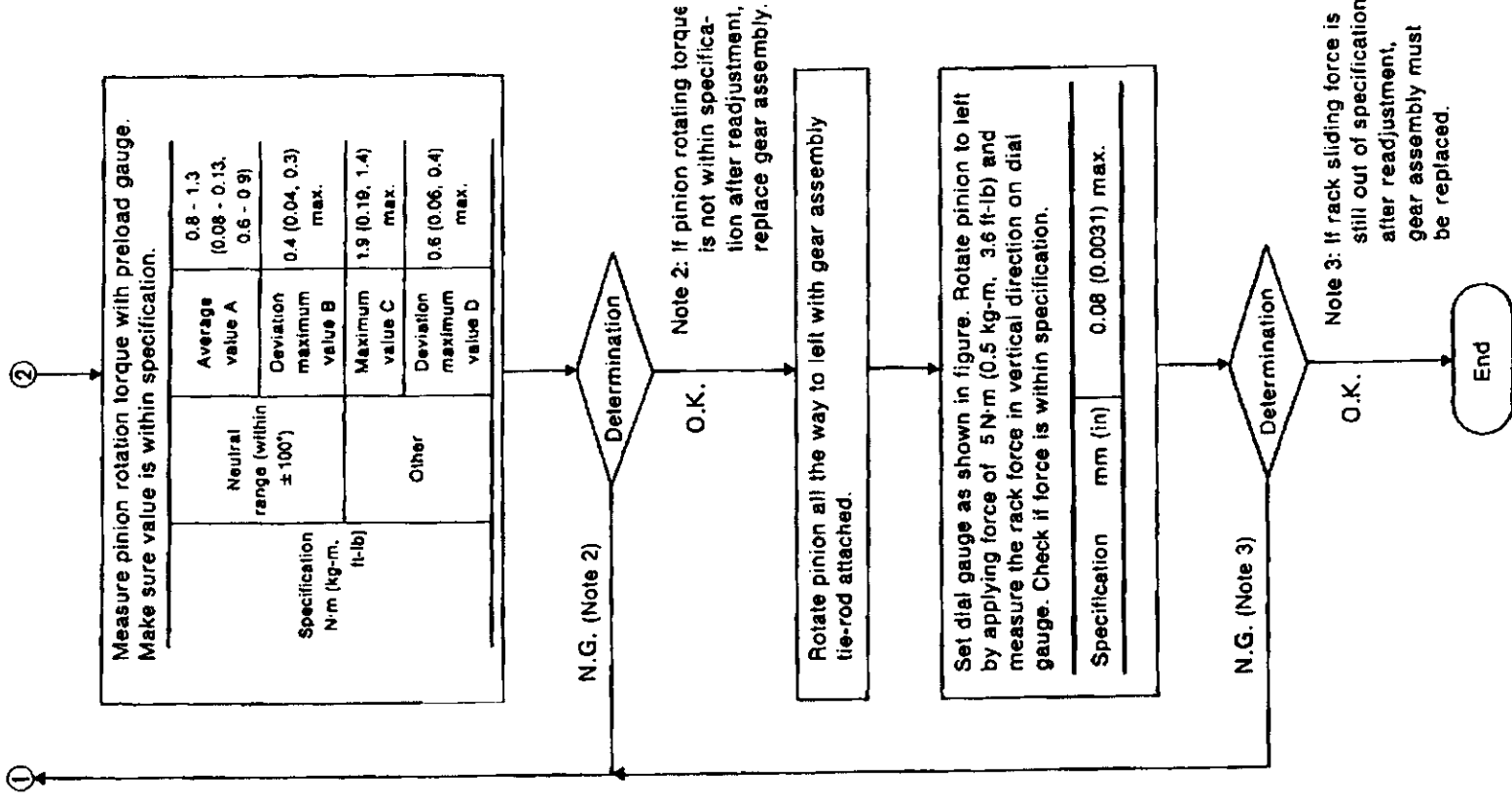
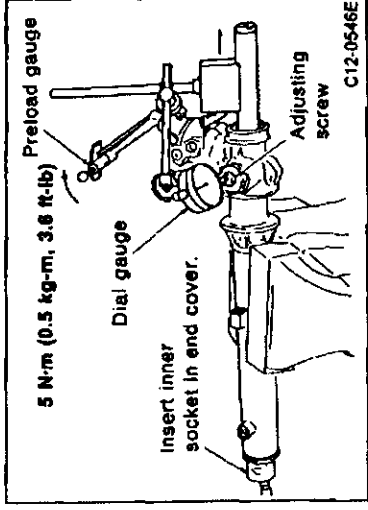
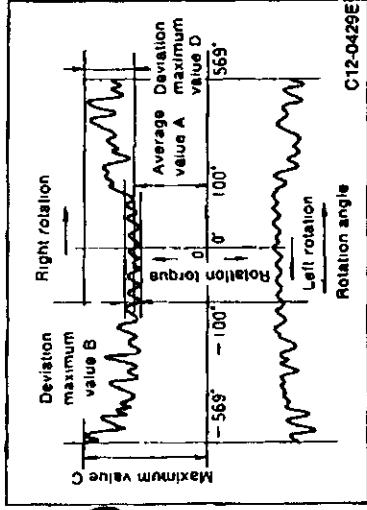


Note 1: If the sliding force is still out of specification even after readjustment, the steering gear is damaged and should be replaced.



C11 STEERING

4. Removal and Installation, Assembly and Disassembly (Cont'd)



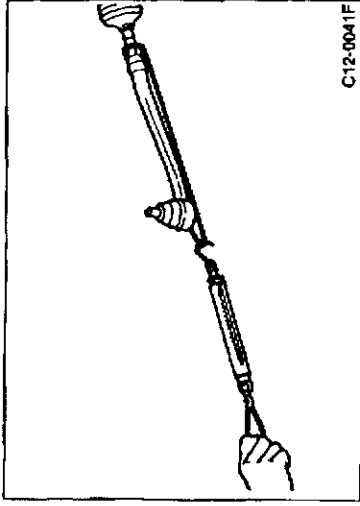
C11 STEERING

4. Removal and Installation, Assembly and Disassembly (Cont'd)

⑥ Steering gear assembly, on-vehicle inspection (filled with gear oil)

- After adjusting steering gear as described in previous section, assemble in vehicle and perform following inspection.

Separate steering column lower joint, steering gear, tie-rod and knuckle arm.

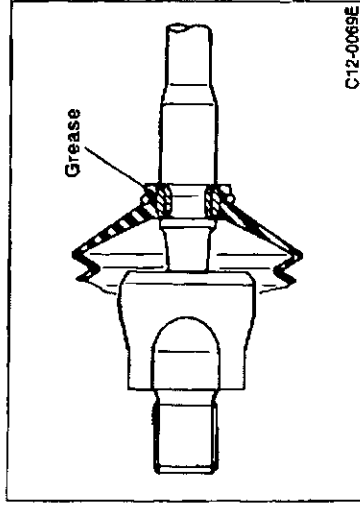
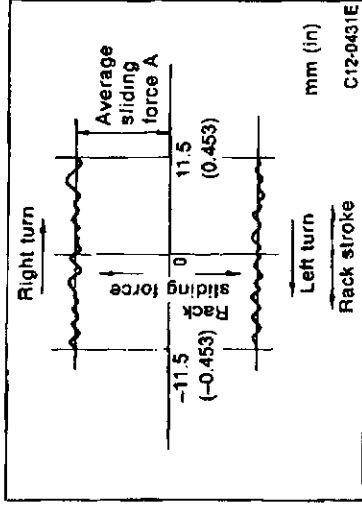
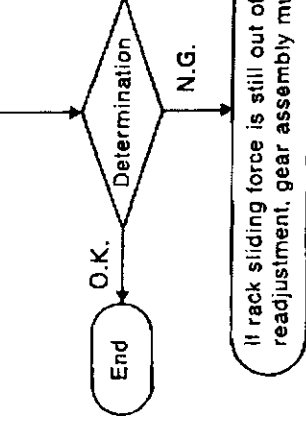


While pulling tie-rod slowly in the ± 11.5 mm (± 0.453 in) range from the neutral position, make sure rack sliding force (Note 4) is within specification.

Average rack sliding force A	284 N (29 kg, 64 lb) max.
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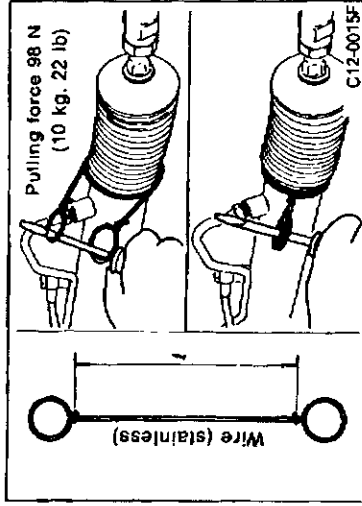
Note 4: Measure rack sliding force under following conditions.

- Engine speed:
Approx. 1,000 rpm
- Temperature:
Approx. 55°C (122°F)
- Rack speed:
Approx. 3.5 mm/sec
(0.138 in/sec)



[Point 18] Dust boot and clamp installation

- Before installing boot, coat the contact surfaces between boot and tie-rod with grease.

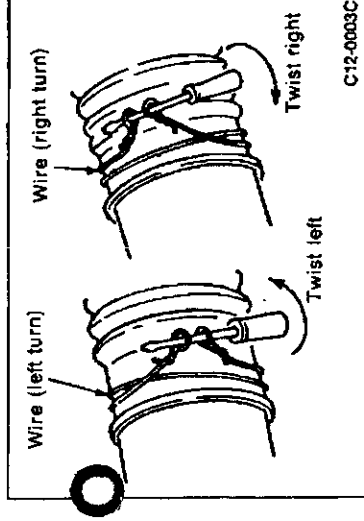


- The boot clamps are only located on large diameter side in two positions.
- The housing side and cylinder end side both have a length (ℓ) of 396 mm (15.59 in).
- To install, wrap boot clamp around boot groove twice. Tighten clamp by twisting rings at both ends 4 to 4-1/2 turns with screwdriver while pulling with a force of approx. 98 N (10 kg, 22 lb).

C11 STEERING

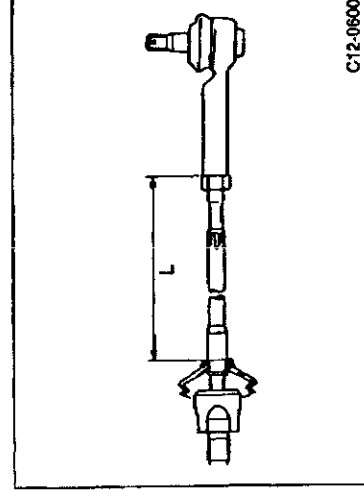
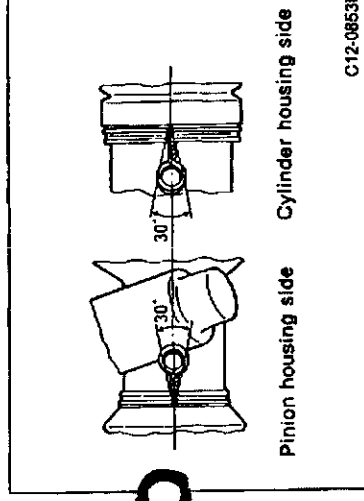
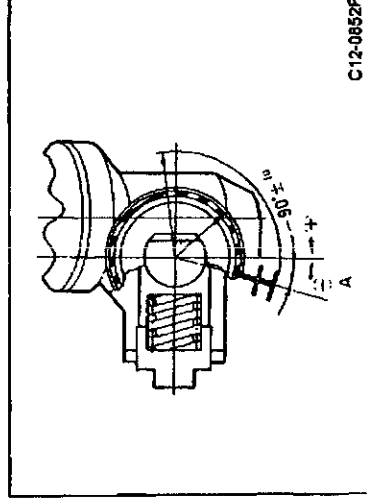
4. Removal and Installation, Assembly and Disassembly (Cont'd)

- Twist boot clamp in the direction shown in the figure at left.



- Install boot clamp so that clamped portion will be behind the gear when gear housing is attached to the vehicle. (This will prevent interference with other parts.)
- After twisting clamp 4 to 4-1/2 times, bend it diagonally so it does not contact boot.

Angle A:
-80° to -100°



[Point 19]

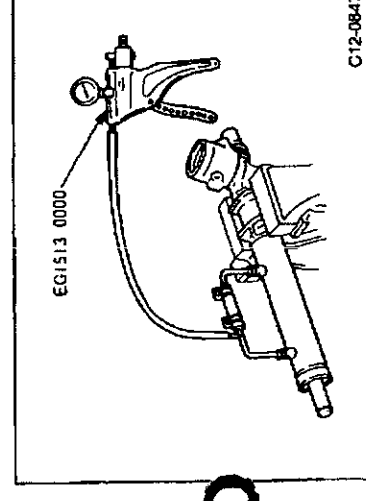
- Set tie-rod length (dimension L) to following specification and tighten lock nut.

Specification:

126.5 mm (4.98 in)

CAUTION:

Always adjust toe-in after completing this operation. This dimension may change after toe-in adjustment.



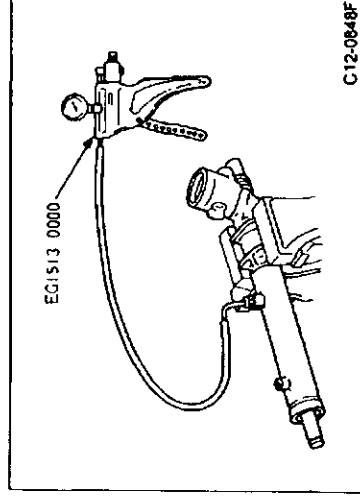
[Point 20] Rack oil seal, Teflon seal and ring seal inspection

- After assembling steering rack, check sealing as shown in figure.
- Connect vacuum hand pump (special service tool) to tube as shown in figure. Apply vacuum pressure of 53.3 kPa (401 mmHg, 15.75 inHg) for approx. 30 sec and check that there is no needle deflection.

C11 STEERING

4. Removal and Installation, Assembly and Disassembly (Cont'd)

- To check rack seal ring (Teflon) and O-ring sealing, connect gauge to pinion side port as shown in figure. Apply vacuum pressure of 53.3 kPa (400 mmHg, 15.75 inHg) for approx. 60 sec and check that there is no needle deflection.



4-3 OIL PUMP, OIL TANK AND HYDRAULIC TUBES

Refer to C12 SUPER HICAS for power steering pump procedures.

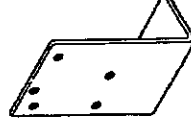
C12 SUPER HICAS

PRECAUTIONS

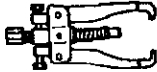
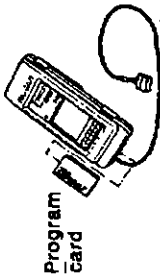
The final tightening of rubber bushings should be performed when vehicle is empty and on the ground. Wipe off any oil adhering to part surfaces because it reduces durability.

- Check wheel alignment when preparing suspension parts.
- Use flare nut wrench for removal and installation of steering pipe and power system flare nuts.
- Always adjust front and rear toe-in after power cylinder assembly removal and installation.

SPECIAL SERVICE TOOLS

Tool name Tool number	Description	
Pin punch KV321 01100	 C00-0084	Removing fail-safe valve tube seat
Attachment ST2770 0001	 C00-0144	Assembling and disassembling power steering pump

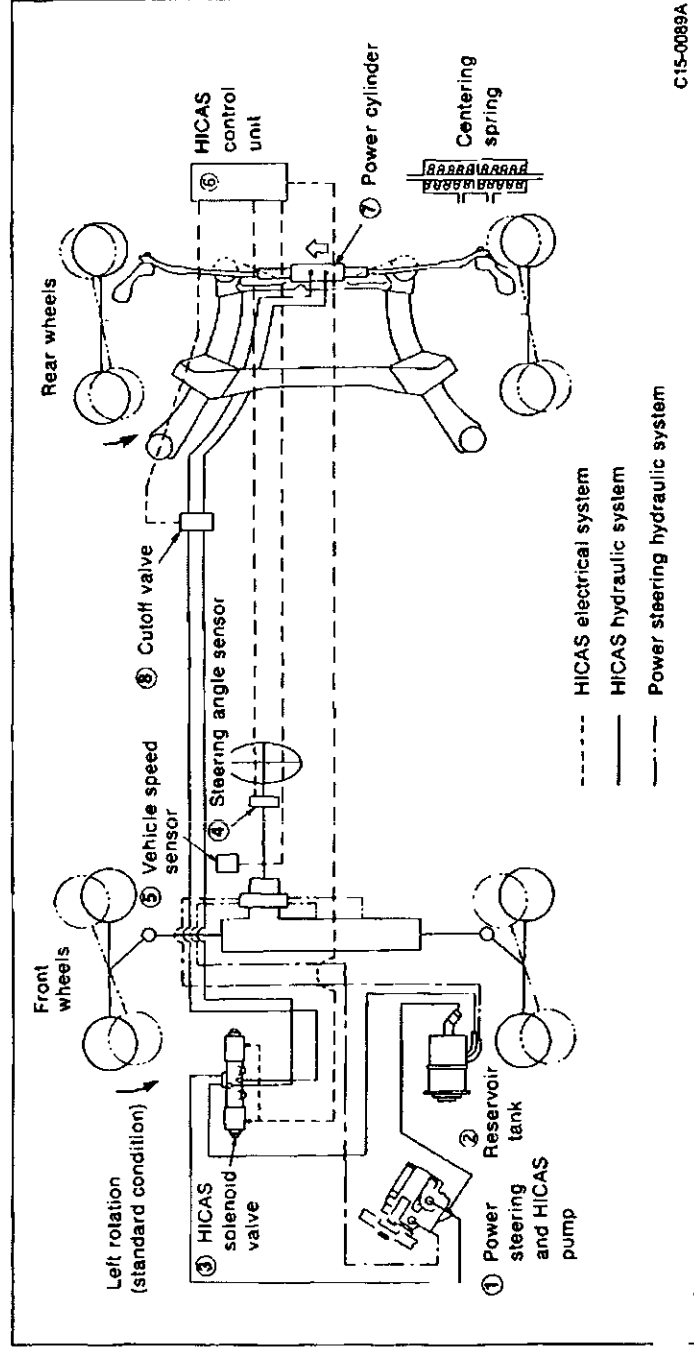
COMMERCIAL SERVICE TOOLS

Tool name Tool number	Description
Pitman arm puller HT7256 0000	 C00-0231 Removing power cylinder outer link
CONSULT EG1180 0000	 Program Card C00-0239 Control unit input/output (I/O) signal inspection

1. Summary

This section describes SUPER HICAS trouble diagnosis procedures. Refer to C7 FRONT SUSPENSION AND AXLE, C8 REAR SUSPENSION AND AXLE and C11 STEERING for further descriptions of other suspension and steering preparation operations.

System diagram



C12 SUPER HICAS

1. Summary (Cont'd)

Detail	Engine		RB26DETT	
	Suspension		Front	Rear
Suspension type	Multi-link independent suspension			
Wheel alignment (empty vehicle)	Toe-in	mm (in)	1 ± 1 (0.04 ± 0.04)	2 ± 2 (0.08 ± 0.08)
	Camber	(°)	-0°55' ± 45'	-1°05' ± 30'
	Caster	(°)	3°40' ± 45'	—
	King pin inclination angle	(°)	15°25' ± 45'	—
Shock absorber	Side slip (reference)	mm (in)	-5 to 5 (-0.20 to 0.20)	
	Damping force [0.3 m (1.0 ft/s)]	Expansion	1,746 (176, 392)	1,108 (113, 249)
	N·m (kg-m, ft-lb)	Compression	500 (51, 112)	402 (41, 90)
Coil spring	Spring constant	N/mm (kg/mm, lb/in)	23.5 (2.4, 134)	26.5 (2.7, 151)
	Free length	mm (in)	405 (15.94)	345 (13.58)
	Coil center diameter	mm (in)	110 (4.33) [low side 80 (3.15)]	100 (3.94) [low side 90 (3.54)]
	Wire diameter	mm (in)	12.3 (0.484)	11.8 (0.465)
	Number of active coils		7.92	7.29
Power cylinder	Inner diameter	mm (in)	60 (2.36)	
	Stroke	mm (in)	± 3 ± 0.1 (± 0.118 ± 0.004)	
	Spring rigidity (Static)	kg-s/mm	450 ± 22.5	
	Part number (55710)		05U10 (RB26DETT)	
Pump	Type		Fixed injection volume	
	Part number (49110)		05U00 (RB26DETT)	
Tension rod outer diameter		mm (in)	20 (0.79)	—
Stabilizer outer diameter		mm (in)	20 (0.79)	25.4 (1.000)
Maximum steering angle	(°)	Inner wheel	38°+1°-3°	1° [Stroke: 3 mm (0.12 in)]
		Outer wheel	32°	1° [Stroke: 3 mm (0.12 in)]

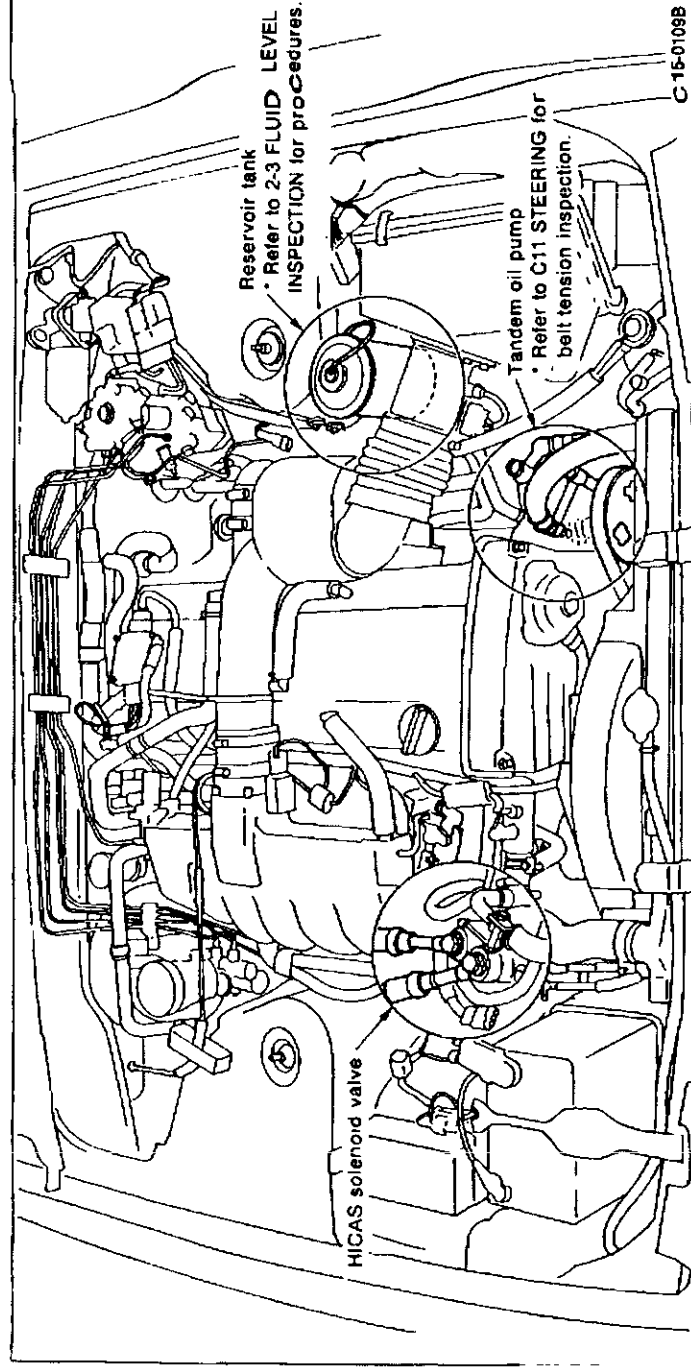
Inspection specifications

Description	Specification	
Rear housing ball joint	Description	Ball joint
	Sliding torque	N·m (kg-m, ft-lb) 0.3 - 29 (0.03 - 0.3, 0.2 - 2.2)
	Swinging torque (spring scale conversion value)	N (kg, lb) 6.9 - 68.6 (0.7 - 7.0, 1.5 - 15.4)
	Axial end play	mm (in) 0 (0)
	Tightening torque	N·m (kg-m, ft-lb) 45 - 60 (4.6 - 6.1, 33 - 44)
Operation oil	Nissan power steering fluid	

C12 SUPER HICAS

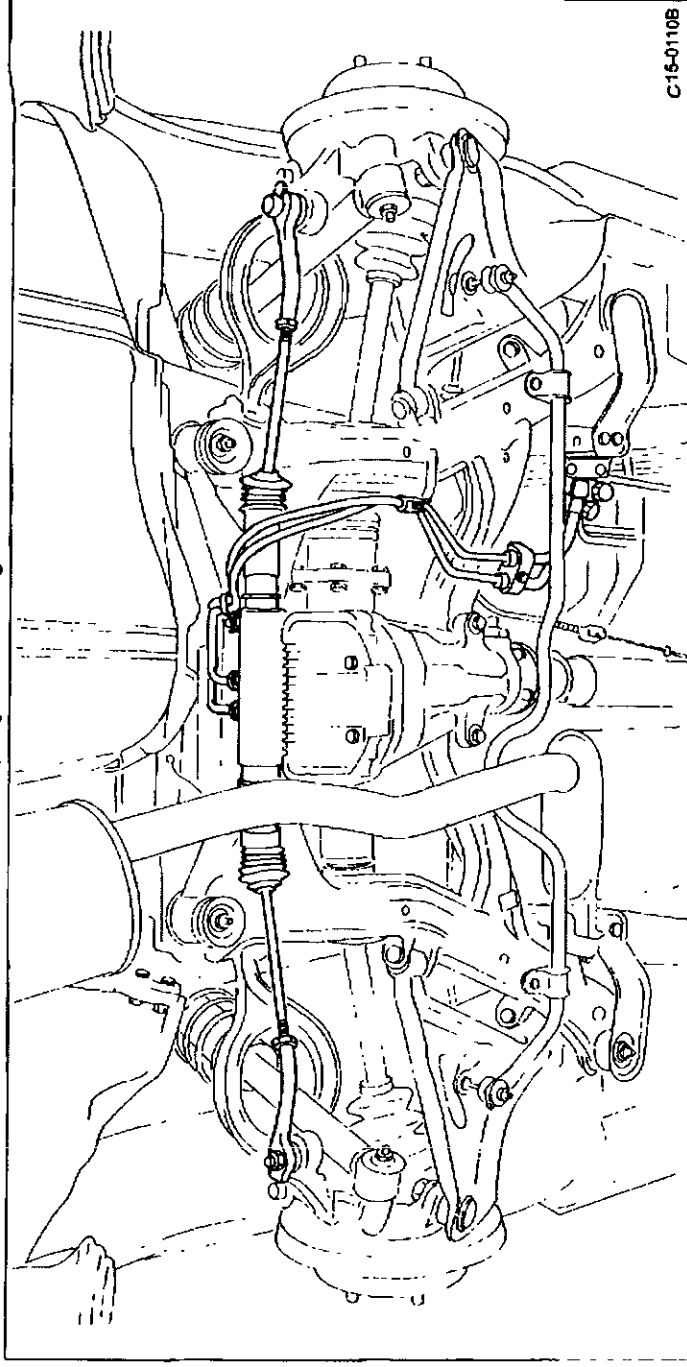
2. On-vehicle Inspection and Adjustment

2-1 INSTALLATION INSPECTION



(1) Engine compartment

- Check the installation of each part and piping and wiring conditions.



(2) Rear undercarriage

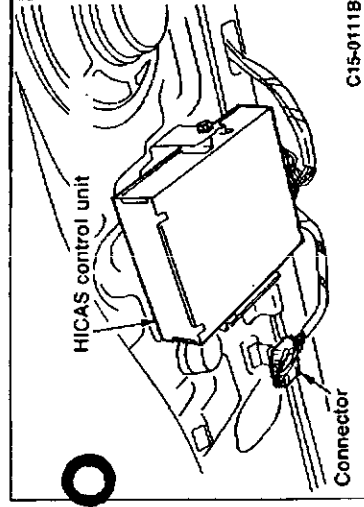
- Check installation of each part and pipe condition.
- Check that rubber parts (boots, insulators, etc.) are not cracked or damaged.
- Check installation condition of suspension parts.

C12 SUPER HICAS

2. On-vehicle Inspection and Adjustment (Cont'd)

(3) Rear parcel (trunk)

- Check wiring harness connector condition of HICAS control unit in the middle of rear parcel in trunk.



2-2 WHEEL ALIGNMENT INSPECTION AND ADJUSTMENT

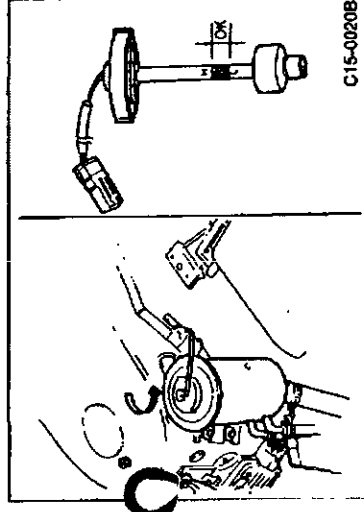
- Refer to C7 FRONT SUSPENSION AND AXLE; C8 REAR SUSPENSION AND AXLE for wheel alignment inspection and adjustment procedures.

2-3 FLUID LEVEL INSPECTION

- Maintain the fluid level so that the lower surface of the float is maintained between the "L" and "H" marks on the gauge rod. The fluid level should be checked when the engine is stopped and the fluid temperature is normal.

CAUTION:

- (1) Never reuse fluid that has been removed.
- (2) Never use any other oil except the recommended type of power steering fluid.

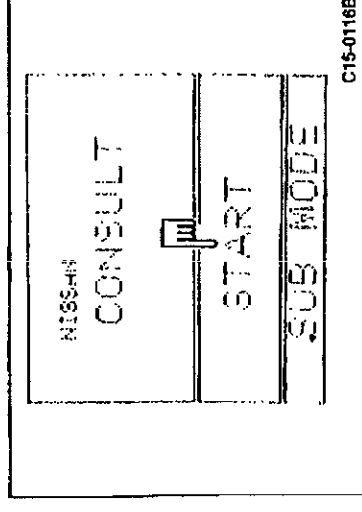


2-4 SYSTEM OPERATION INSPECTION

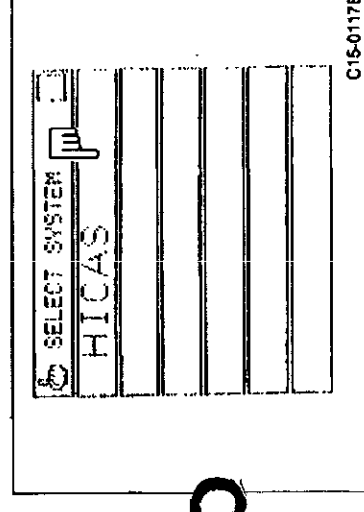
(1) When CONSULT is used:

Perform the following procedures. (2-man operation)

- ① Have a helper sit in the driver's seat and raise vehicle. (Use a two-pole lift or a center pole lift so that all four wheels are free to rotate.)
- ② Connect CONSULT unit to diagnostic connector and start engine.
- ③ Touch "START" on CONSULT display.



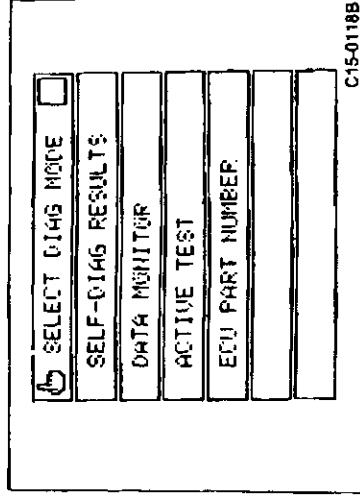
④ Touch "HICAS".



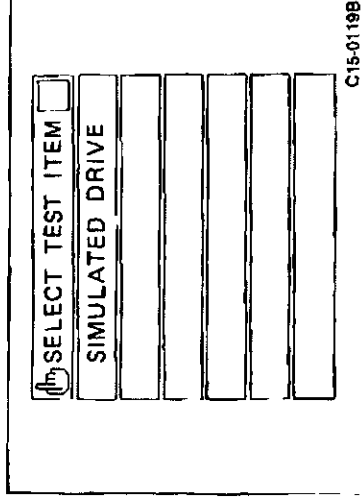
C12 SUPER HICAS

2. On-vehicle Inspection and Adjustment (Cont'd)

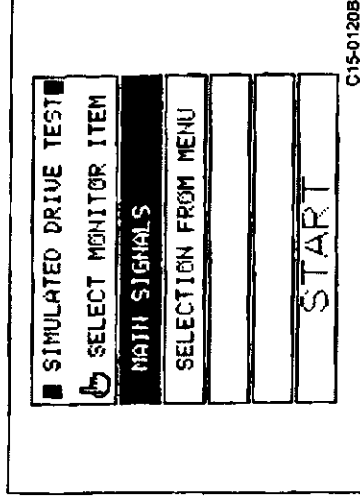
- ⑤ Touch "ACTIVE TEST".



- ⑥ Touch "SIMULATED DRIVE".



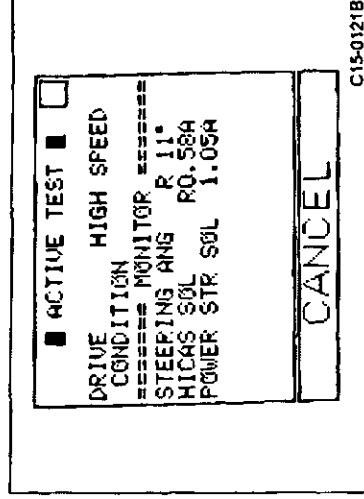
- ⑦ Touch "START" when MAIN SIGNALS display is reversed.



- ⑧ Touch "START". (high-speed mode set)

CAUTION:

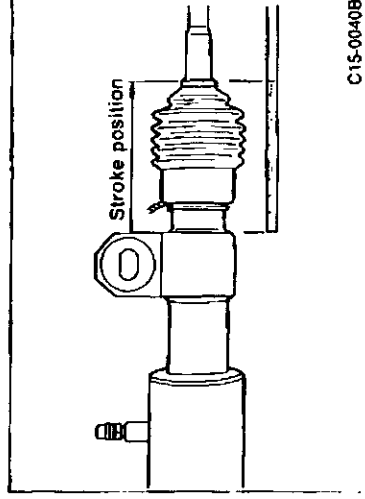
After simulated drive condition has continued for 5 minutes, it will automatically cancel and CONSULT unit will then show "TEST IS INTERRUPTED TO AVOID OIL TEMP RISE" display. To cancel this mode during self-diagnosis, simply touch "CANCEL".



- ⑨ Operate engine at speeds greater than 2,000 rpm, and turn steering wheel 180° in one direction from the neutral position. Measure extension value of one power cylinder rod and retraction value of the other. Then, turn steering wheel 180° in the other direction from the neutral position and measure extension value of one cylinder rod and retraction value of the other. Determine strokes of respective power cylinders by adding (measured) extension and retraction values.

CAUTION:

Measure rod strokes in as short a period of time as possible.



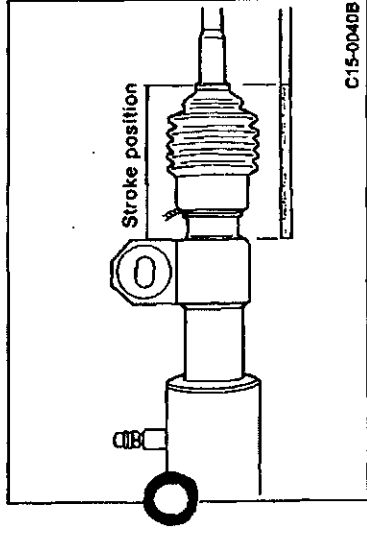
2. On-vehicle Inspection and Adjustment (Cont'd)

Specifications mm (in)	When turned to the right: 3 mm (0.12 in)	Left rod: extended, Right rod: retracted
	When turned to the left : 3 mm (0.12 in)	Left rod: retracted, Right rod: extended
	Total stroke: 6 mm (0.24 in)	—

 (2) When CONSULT is not used:

Perform the following operations. (2-man operation)

- ① Have a helper sit in the driver's seat and raise vehicle.
(Use a 2-pole lift or a center pole lift so that the four wheels are free to rotate.)
- ② Turn ignition switch OFF.
- ③ Start engine. Turn steering wheel from left to right (at least 20° from the neutral position) 5 times or more, then depress foot brake pedal at least 5 times all within 10 seconds after ignition switch has been turned "ON".
- ④ Set steering wheel to a point approximately 10° from the neutral position and check to ensure that rear wheels turn to the left and right alternately.



- ⑤ Operate engine at speed greater than 2,000 rpm, and turn steering wheel 180° in one direction from the neutral position. Measure extension value of one power cylinder rod and retraction value of the other. Then, turn steering wheel 180° in the other direction from the neutral position and measure extension value of one cylinder rod and retraction value of the other. Determine strokes of respective power cylinders by adding (measured) extension and contraction strokes.

CAUTION:

Measure rod strokes in as short a period of time as possible. Turn ignition switch OFF and cancel self-diagnosis.

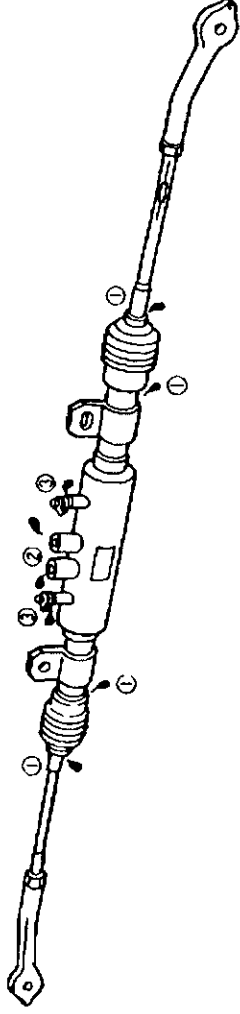
Specifications mm (in)	When turned to the right: 3 mm (0.12 in)	Left rod: extended, Right rod: retracted
	When turned to the left : 3 mm (0.12 in)	Left rod: retracted, Right rod: extended
	Total stroke: 6 mm (0.24 in)	—

2-5 FLUID LEAK INSPECTION LOCATIONS

- Refer to C11 STEERING, 2. On-vehicle Inspection and Adjustment for descriptions of SUPER HICA: power steering fluid leak inspection locations.
- This section describes the leak inspection locations for the SUPER HICAS power cylinder.

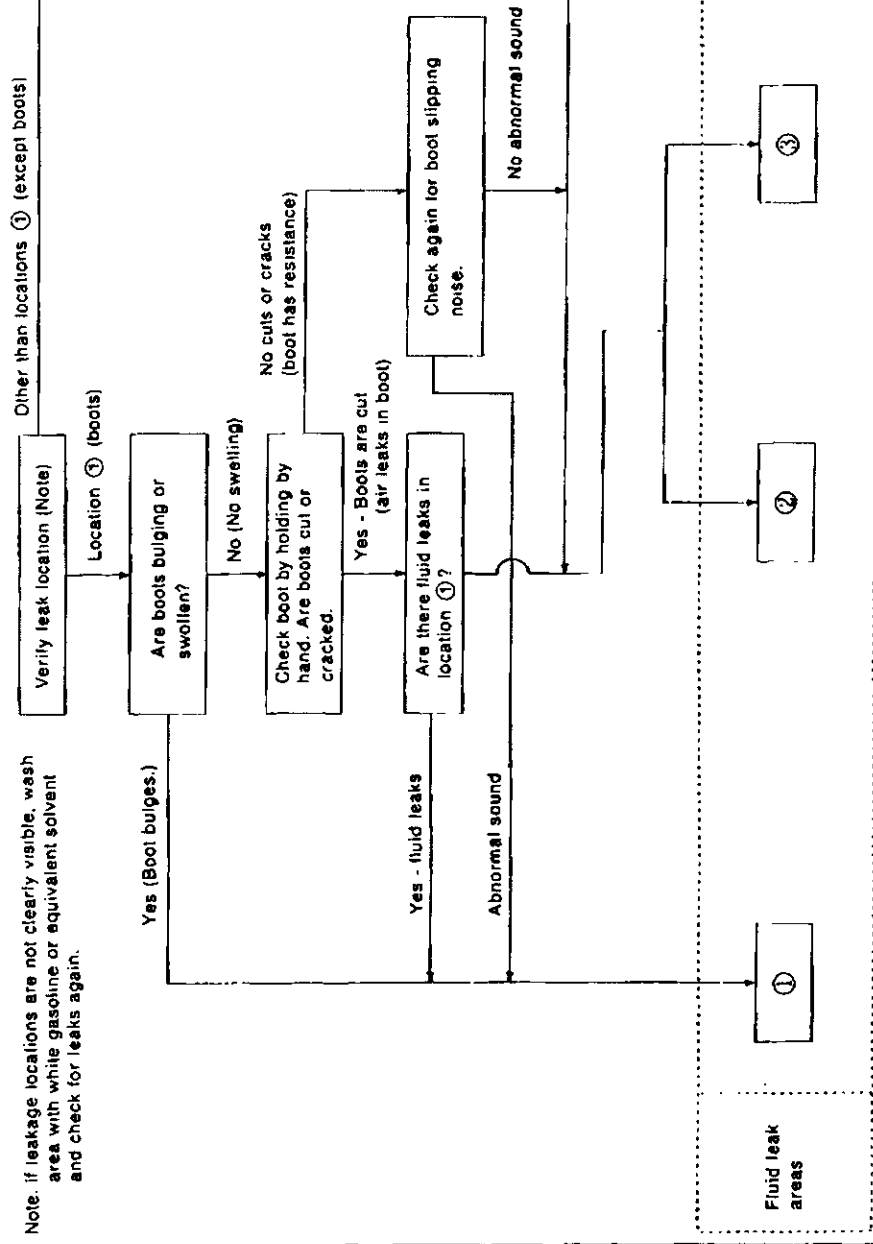
C12 SUPER HICAS

2. On-vehicle Inspection and Adjustment (Cont'd)



C15-0044B

Note: If leakage locations are not clearly visible, wash area with white gasoline or equivalent solvent and check for leaks again.



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C12 SUPER HICAS

2. On-vehicle Inspection and Adjustment (Cont'd)

Fluid leak location	① Dust boot	② Power cylinder tube connections	③ Power cylinder air bleeder
On-vehicle inspection locations	—	Power steering tube tightening torque ● Right port side: 39 - 49 N·m (4.0 - 5.0 kg-m, 29 - 36 ft-lb) ● Left port side: 39 - 49 N·m (4.0 - 5.0 kg-m, 29 - 36 ft-lb)	Air bleeder tightening torque ● Right side: 6 - 8 N·m (0.6 - 0.8 kg-m, 4.3 - 5.8 ft-lb) ● Left side: 6 - 8 N·m (0.6 - 0.8 kg-m, 4.3 - 5.8 ft-lb)
Preparation description (parts requiring replacement)	Power cylinder assembly	Tubes	(Air bleeder)
Related parts requiring inspection	—	Power cylinder assembly	
Preparation procedures	Remove power cylinder from vehicle. Check contact surfaces inside the power cylinder assembly port and air bleeder for scratches, indentations or damage. Replace parts as necessary. Install power cylinder in vehicle. Bleed air and inspect oil level. Inspect for fluid leakage.		

2-6 AIR BLEEDING

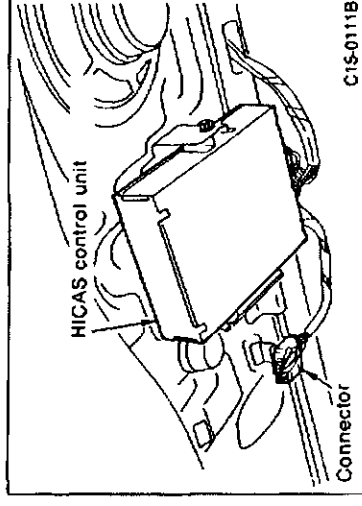
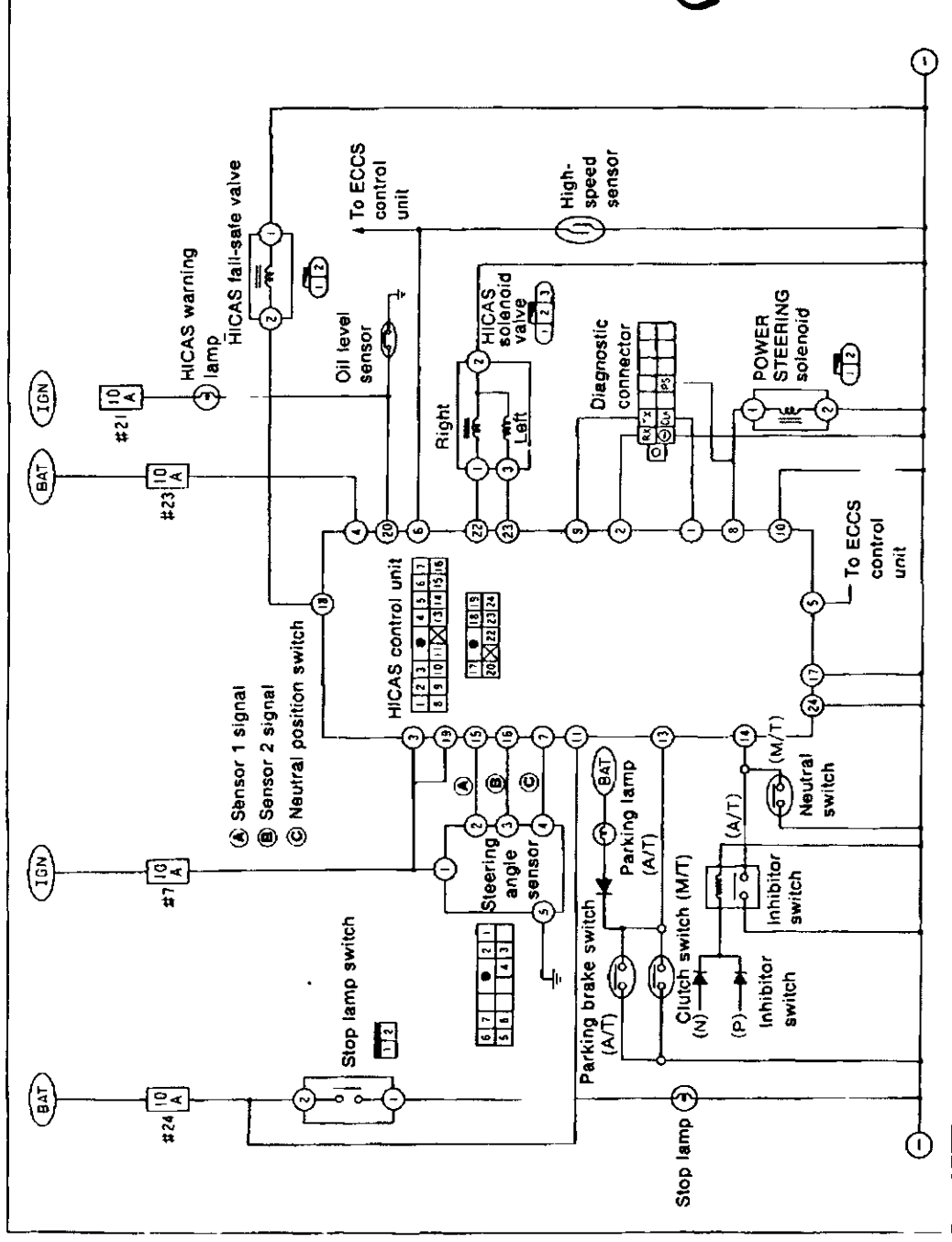
- Refer to "4-1 POWER CYLINDER AND LOWER LINK", ① Removal and installation for description HICAS system air bleeding procedures.

C12 SUPER HICAS

3. Trouble Diagnoses

3-1 ELECTRICAL SYSTEM INSPECTION PREPARATION

(1) Circuit diagram and control unit installation position



HICAS control unit installation position

- The unit is located below the rear parcel shelf.

C12 SUPER HICAS

3. Trouble Diagnoses (Cont'd)

(2) Trouble diagnosis when CONSULT is used

① Self-diagnostic items

Diagnostic Item	Description	Remarks
CAR SPEED SENSOR [No signal] (- a)	No vehicle speed signal is entered after vehicle has been operated above a certain speed.	
CAR SPEED SENSOR [SIG-SUDDEN TURN] (- b)	Vehicle speed signal changes abruptly during operation.	
STEERING ANGLE SEN [NO ANG SIGNAL] (- a)	Steering angle has not changed while driving at a speed of at least 60 km/h (37 MPH).	
STEERING ANGLE SEN [NO NEUT SIGNAL] (- b)	Neutral (ON) signal is not entered after vehicle has been driven.	
STEERING ANGLE SEN [NEUT SIG-360° OFF] (- c)	Neutral (ON) signal is not entered even after steering wheel has been turned at least 360°.	
STEERING ANGLE SEN [NEUT SIG-30° ON] (- d)	- Neutral (OFF) signal is not entered even after steering wheel has been turned at least 50°. - Neutral (ON) signal is continuously shown at steering angle of at least 30°.	
FAILSAFE VALVE [ABNORMAL SIGNAL]	Output terminal voltage is abnormal due to broken or shorted HICAS fail-safe valve circuit.	
HICAS SOLENOID-R [ABNORMAL SIGNAL]	Output terminal voltage is abnormal due to broken or shorted HICAS solenoid (RH) circuit.	
HICAS SOLENOID-L [ABNORMAL SIGNAL]	Output terminal voltage is abnormal due to broken or shorted HICAS solenoid (LH) circuit.	
POWER STEERING SOL [ABNORMAL SIGNAL]	Output terminal voltage is abnormal due to broken or shorted power steering solenoid circuit.	

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3. Trouble Diagnoses (Cont'd)

② Data monitoring items

○ : Standard △ : Optional selection

Diagnostic item	Monitor item selection		Remarks
	All signals	Selection from menu	
CAR SPEED (km/h or MPH)	○	△	
STEERING ANG (R/L°)	○	△	Abnormal value is shown before straight-ahead position ("0") is set and after battery is disconnected and reconnected.
NEUTRAL SIG (ON/OFF)	○	△	
STOP LAMP SW (ON/OFF)	○	△	
PKB/CLUTCH SW (ON/OFF)	○	△	Clutch switch signal in M/T vehicles, parking brake switch signal in A/T vehicles.
NEUTRAL SW (ON/OFF)	○	△	Neutral switch signal in M/T vehicles, inhibitor relay (N or P position) in A/T vehicles.
ENG REV (OVER 1,500) or (UNDER 1,500)	○	△	Engine speed greater than/less than 1,500 rpm is shown.
HICAS SOL (R/L A)	○	△	Controlled current flow from control unit to HICAS solenoid and direction of current control are shown.
POWER STR SOL (A)	○	△	Controlled current flow from control unit to power steering is shown.
FAILSAFE/V (ON/OFF)	○	△	ON (when connected) or OFF (when disconnected) is shown.
FAILSAFE (CUT/NON)	○	△	NON (fail-safe valve ON) refers to "normal" condition. CUT (fail-safe valve OFF) when "fail-safe" condition is shown.
WARNING LAMP (ON/OFF)	○	△	Illumination control of control unit HICAS warning lamp is shown.
■ VOLTAGE (V)		△	Voltage measured with voltage probes is shown.
■ PULSE (msec, Hz or %)		△	Value measured with pulse probes is shown. If pulse cannot be measured, "■" is shown. "■" is also shown at left of final data until measurement results are determined.

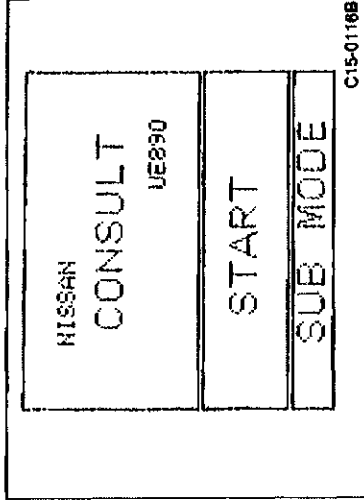
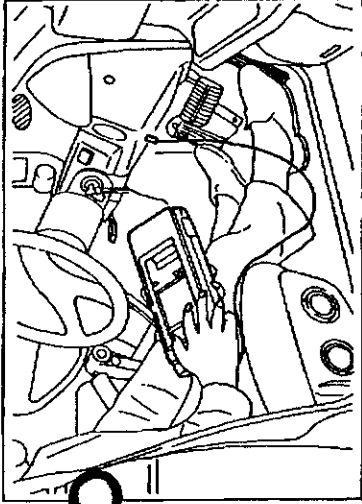
C12 SUPER HICAS

3. Trouble Diagnoses (Cont'd)

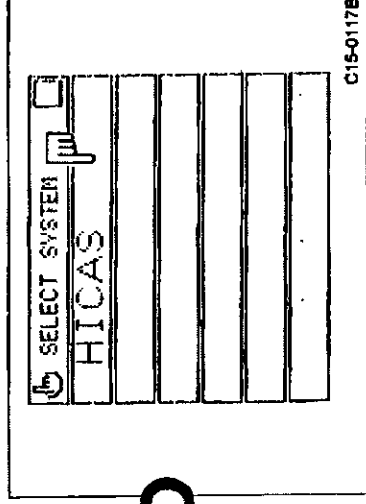
(3) Trouble diagnosis by self-diagnosis

① Self-diagnosis (When CONSULT is used)

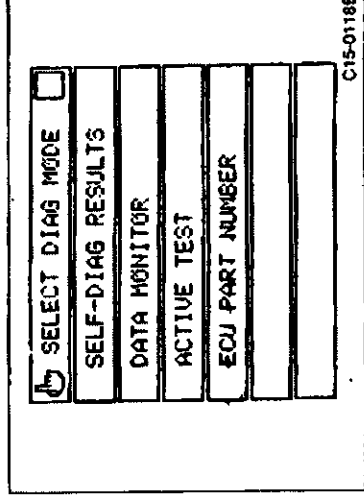
- Turn ignition switch OFF.
- Connect CONSULT unit to diagnostic connectors. (Diagnostic connectors are located in fuse block.)



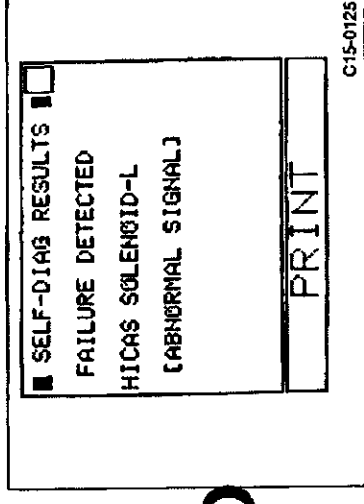
- Start engine.
- Touch "START" on CONSULT display.



- Touch "HICAS".



- Touch "SELF-DIAG RESULTS".



- Self-diagnostic results are shown on display.

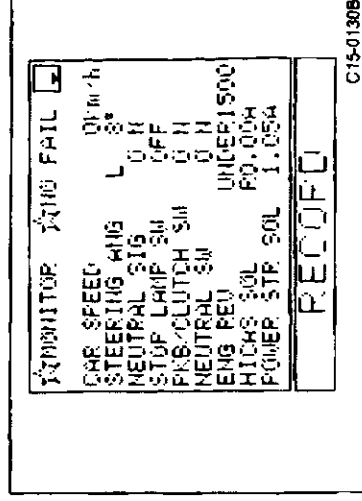
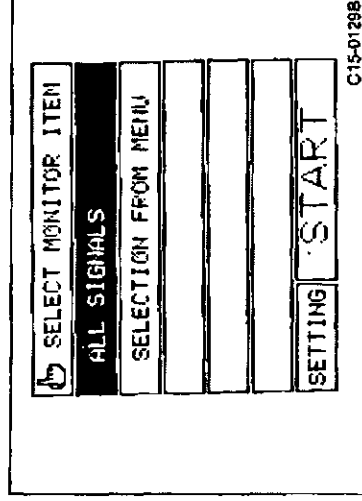
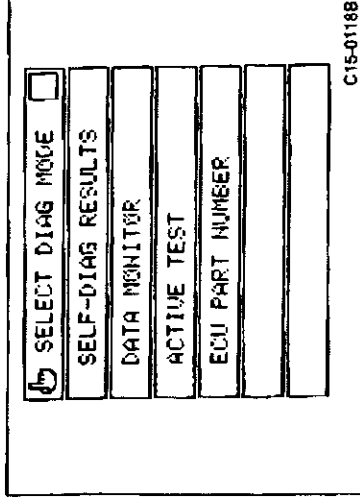
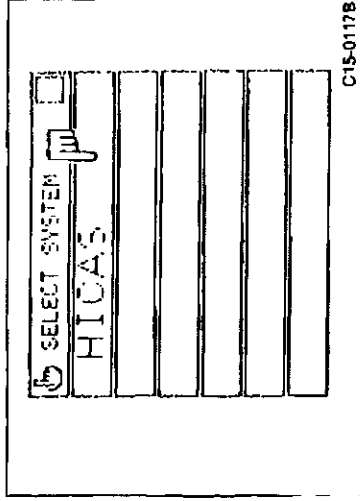
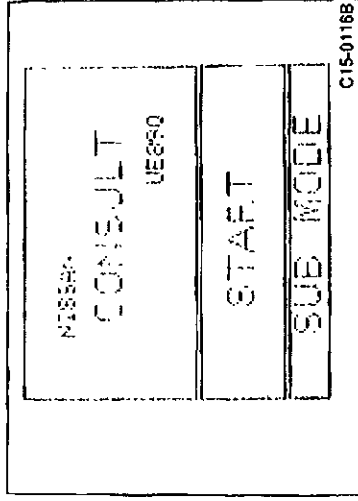
C12 SUPER HICAS

3. Trouble Diagnoses (Cont'd)

For reference:

Recording input/output signals using data monitor function.

- Start engine.
- Touch "START" (on CONSULT display).



- Touch "HICAS".

- Touch "DATA MONITOR".

- Check to ensure that the ALL SIGNALS display is reversed. Touch "START".

- Touch "RECORD" to record data. Make sure that ON-OFF signal is produced when signal is entered from each sensor while monitoring.

CAUTION:

To cancel data recording during operation, touch "CANCEL".

3. Trouble Diagnoses (Cont'd)

② Self-diagnosis (When CONSULT is not used) Self-diagnosis procedures

③ Input starting conditions for self-diagnosis.

- 1) Turn ignition switch "OFF".
- 2) M/T vehicles: Set shift lever in neutral.
A/T vehicles: Set shift lever to "P" or "N".
- 3) Immediately start engine.
- 4) Turn steering wheel from left to right (at least 20° from the neutral position) 5 times or more, then depress foot brake pedal at least 5 times, all within 10 seconds after ignition switch has been turned "ON".

④ Input self-diagnosis item.

- 1) Depress and release foot brake pedal.
- 2) Turn steering wheel from left to right (at least 20°) from the neutral position.
- 3) M/T vehicles: Depress clutch and move shift lever to any gear other than neutral and then return clutch and shift lever to original position.
A/T vehicles: Disengage and engage parking brake lever. Move shift lever to any position other than Neutral or Parking and return it to Parking.
- 4) Move car at least 2 to 3 meters (7 to 10 ft) forward and proceed at an indicated speed of at least 2 km/h (1 MPH) in self-diagnosis mode.

⑤ Self-diagnosis items

- (1) RH solenoid output
- (2) LH solenoid output
- (3) Fail-safe valve output
- (4) Power steering solenoid output
- (5) Vehicle speed signal.
-  Steering angle signal.
- (6) Steering angle neutral signal
- (8) (A/T) parking brake signal, (M/T) clutch signal
- (9) (A/T) inhibitor signal, (M/T) neutral signal

⑥ Self-diagnosis display pattern

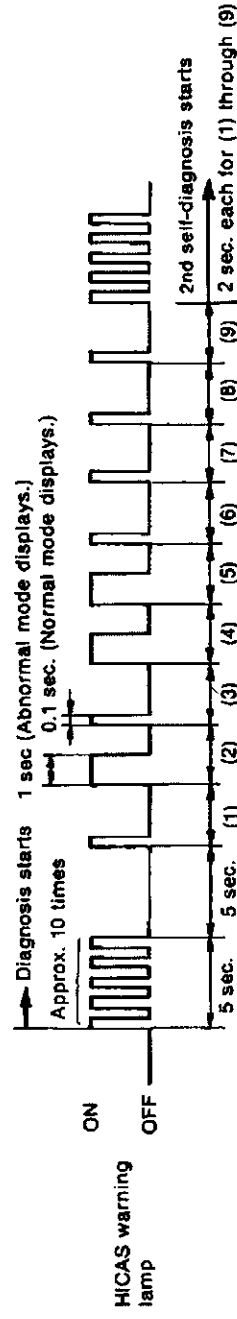
- 1) When all systems are normal:
HICAS flashes at 0.25 sec (4 Hz) intervals.
- 2) If fail-safe system was operated (fail-safe valve is operating) when ignition switch was OFF for the last time, fail-safe items will be displayed in numerical order in modes indicated. After all items are displayed, display is repeated again.

Example:

The warning lamp displays abnormal mode (1 sec. ON) in following sequence: (2) HICAS solenoid LH, (4) power steering solenoid and (5) vehicle speed sensor.

CAUTION:

After this display is shown, when Ignition key is turned OFF the next display is ⑥.



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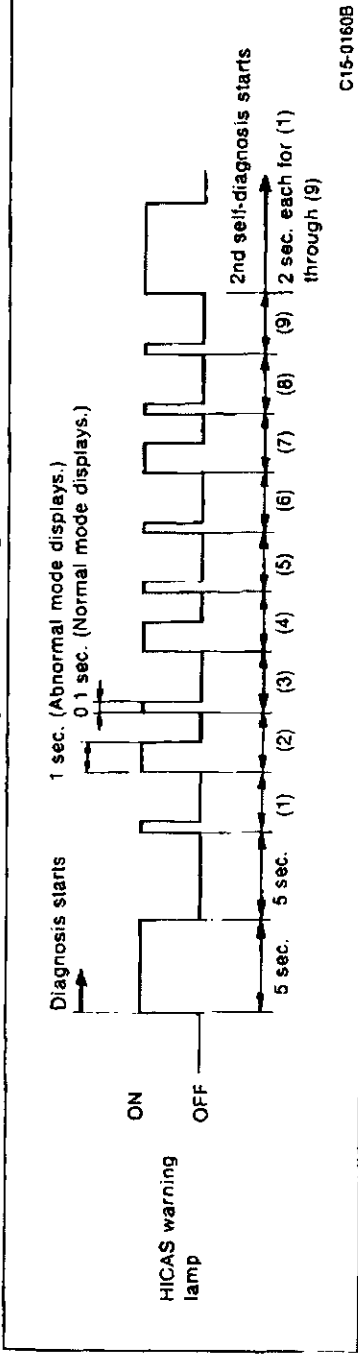
C12 SUPER HICAS

3. Trouble Diagnoses (Cont'd)

- 3) If fail-safe system was not operated when ignition switch was OFF for the last time, display will show self-diagnosis results in numerical sequence in modes indicated below. After all self-diagnosis results are shown and display is repeated again.

Example:

The warning lamp displays abnormal mode (1 sec. ON) in following sequence: (2) HICAS solenoid LH, (4) power steering solenoid and (7) Steering angle neutral signal.



③ Canceling the self-diagnosis function

The three methods for canceling the self-diagnosis are described below.

- The self-diagnosis system is canceled by turning ignition switch "OFF".
- The self-diagnosis system is canceled by a vehicle speed of 30 km/h (19 MPH) or over.
- After the self-diagnosis has been operated for approximately 5 minutes, the self-diagnosis system will be automatically canceled.

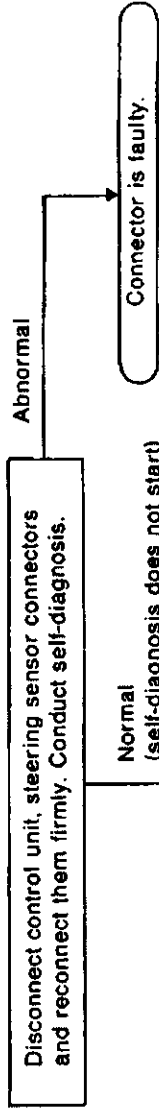
3. Trouble Diagnoses (Cont'd)

(4) Diagnostic procedures

A. When self-diagnosis function is not used:

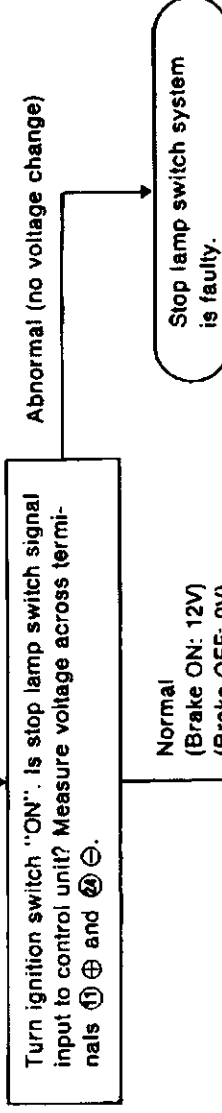


1	2	3	●	4	5	6	7	
8	9	10	11	12	13	14	15	16

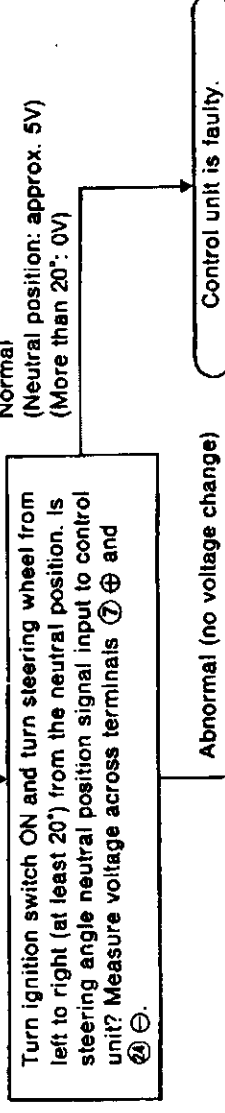


17	●	18	19	
20	✕	22	23	24

Control unit terminal

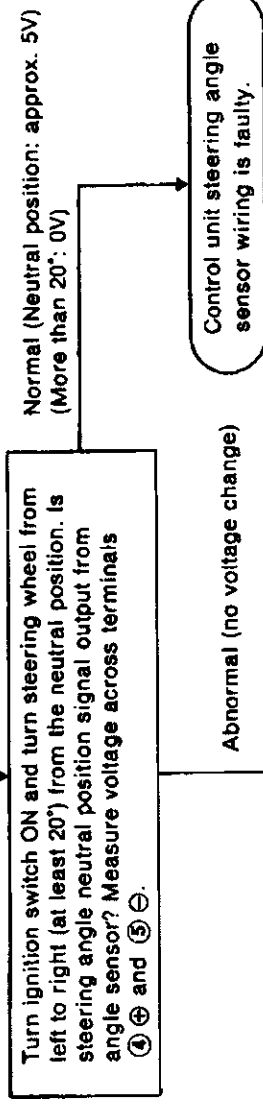


Normal
(Neutral position: approx. 5V)
(More than 20°: 0V)

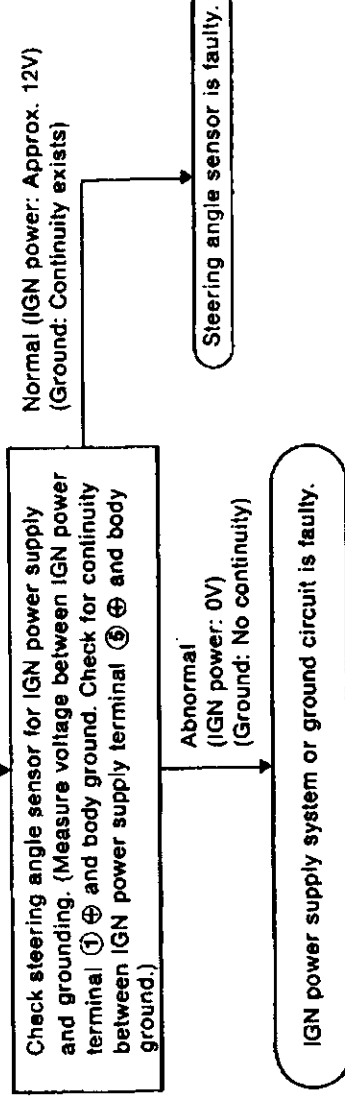


6	7	●	2	1
5	8	9	4	3

Steering angle sensor terminal



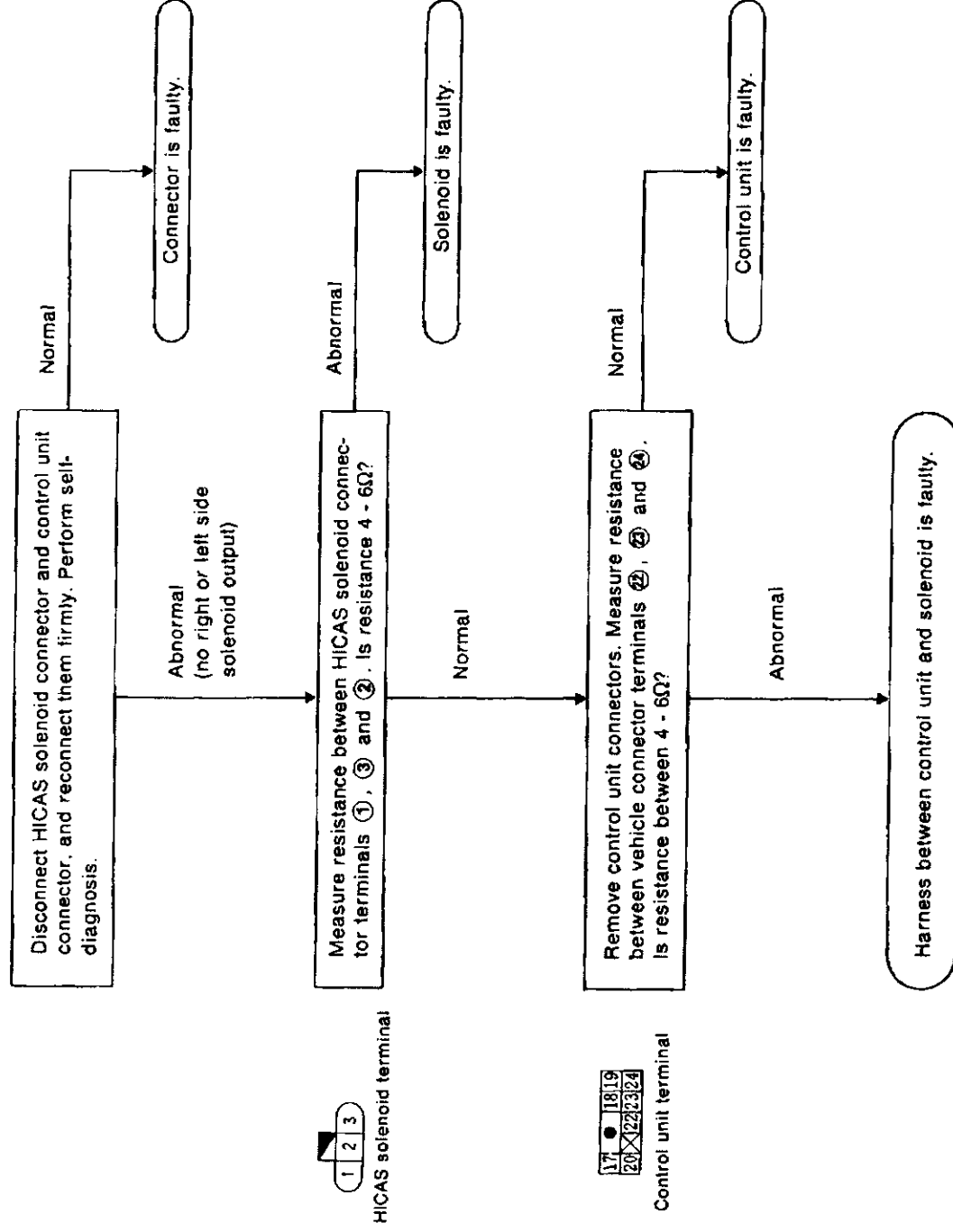
Normal (IGN power: Approx. 12V)
(Ground: Continuity exists)



C12 SUPER HICAS

3. Trouble Diagnoses (Cont'd)

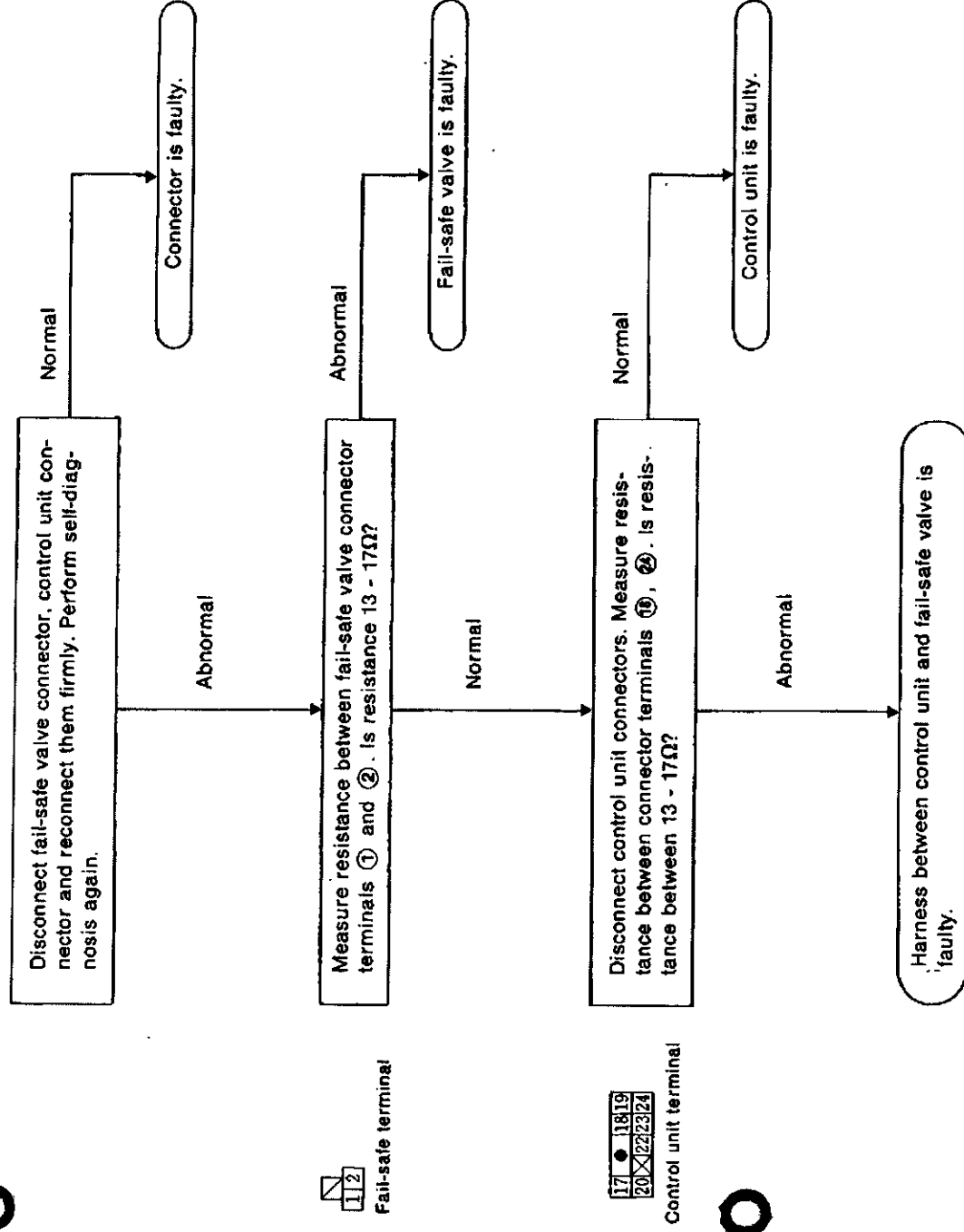
B. HICAS solenoid (right and left) output is not present. [Ⓒ Self-diagnosis items (1) and (2)]



C12 SUPER HICAS

3. Trouble Diagnoses (Cont'd)

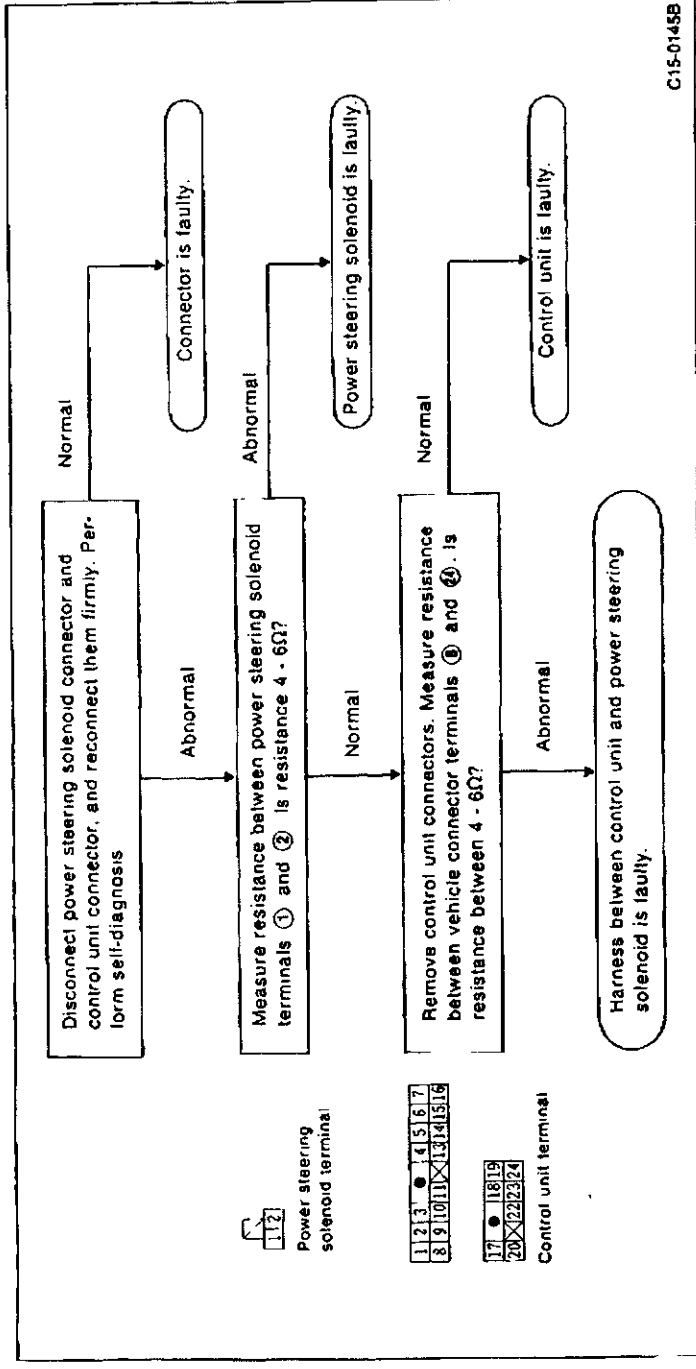
C. Fail-safe output is not present. [Ⓒ Self-diagnosis items (3)]



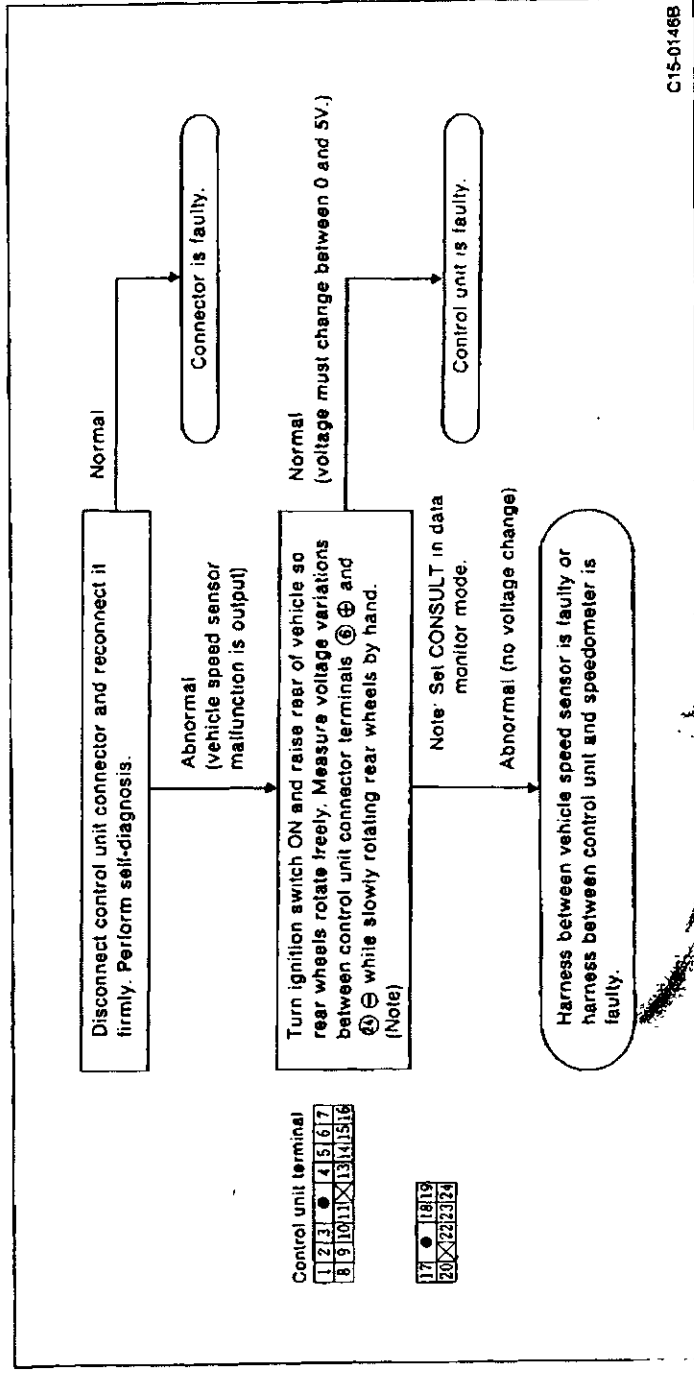
C12 SUPER HICAS

3. Trouble Diagnoses (Cont'd)

D. Power steering solenoid output is not present. [① Self-diagnosis items (4)]

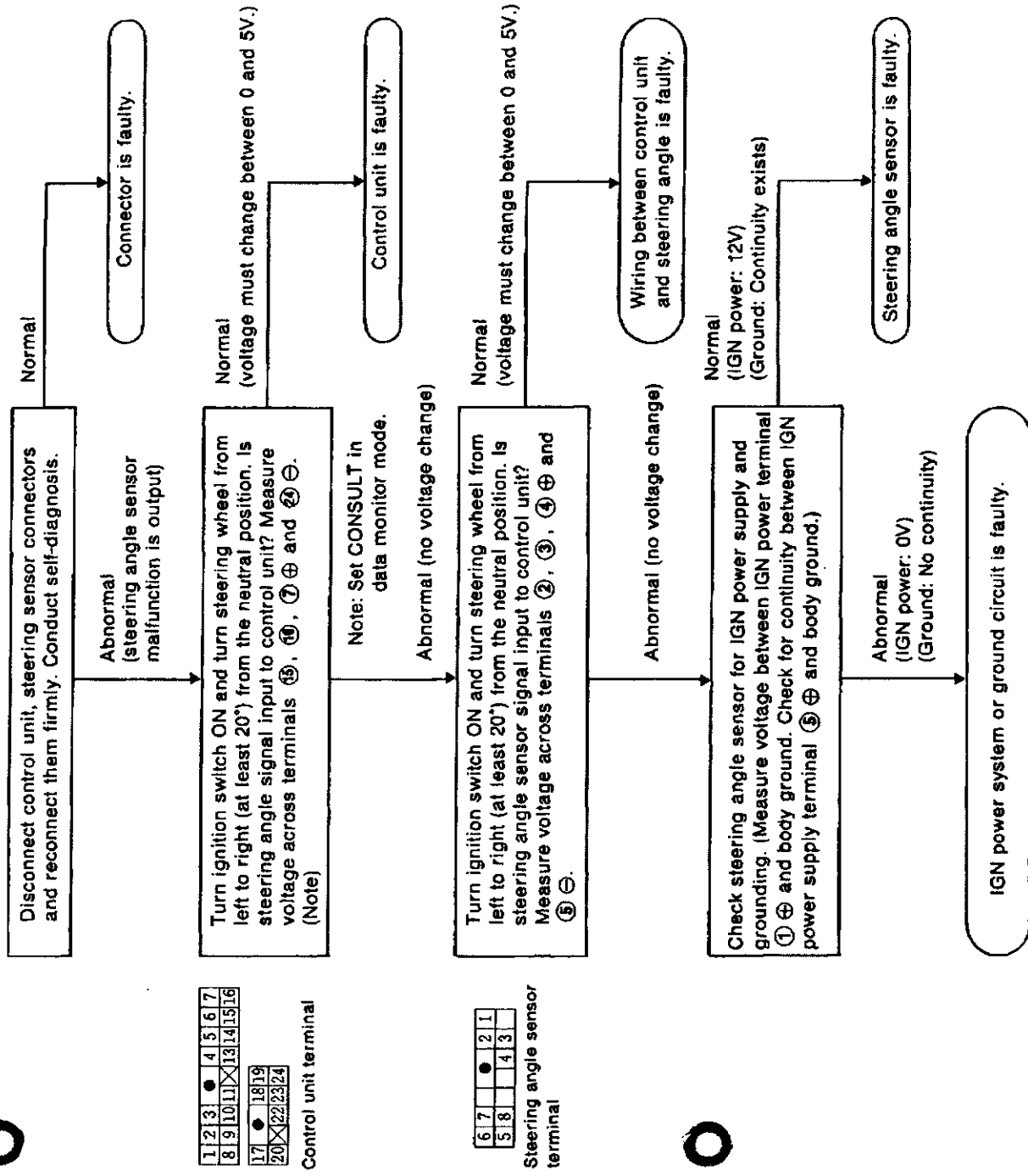


E. Vehicle speed signal is not present. [Self-diagnosis procedure (5)]



3. Trouble Diagnoses (Cont'd)

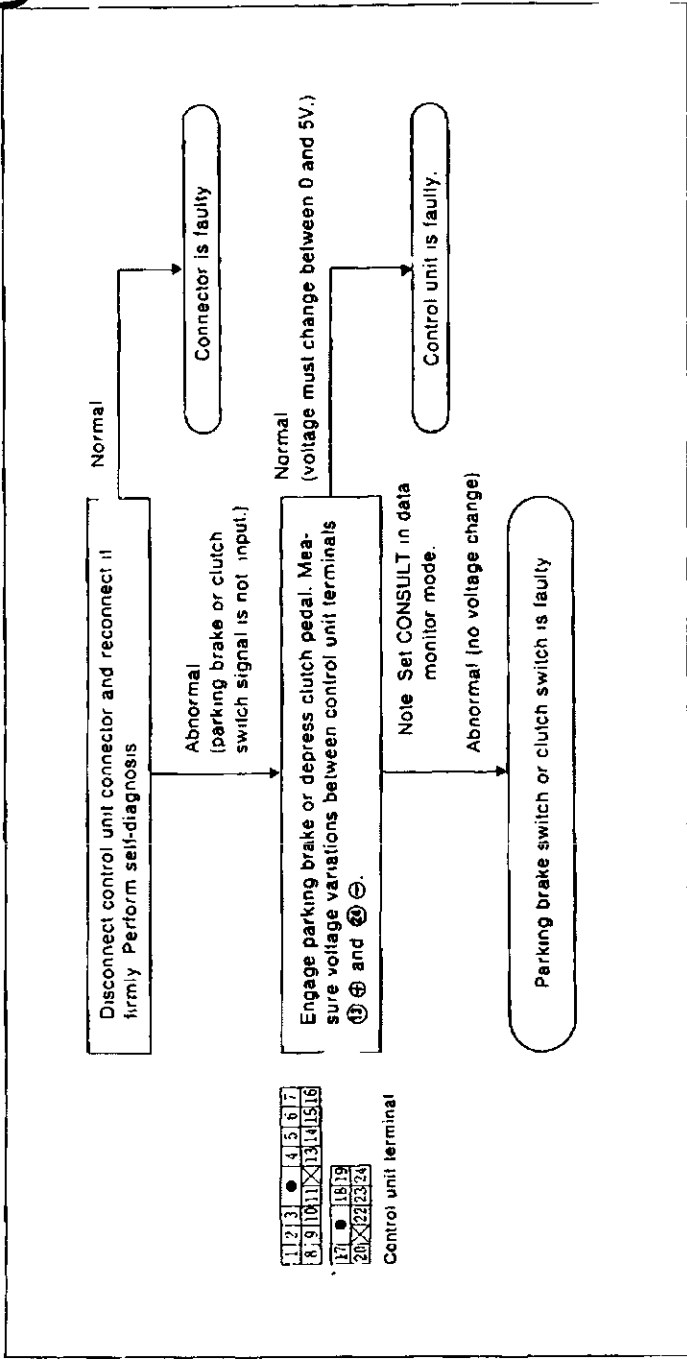
F. Steering angle signal is not present. [Ⓒ Self-diagnosis items (6) and (7)]



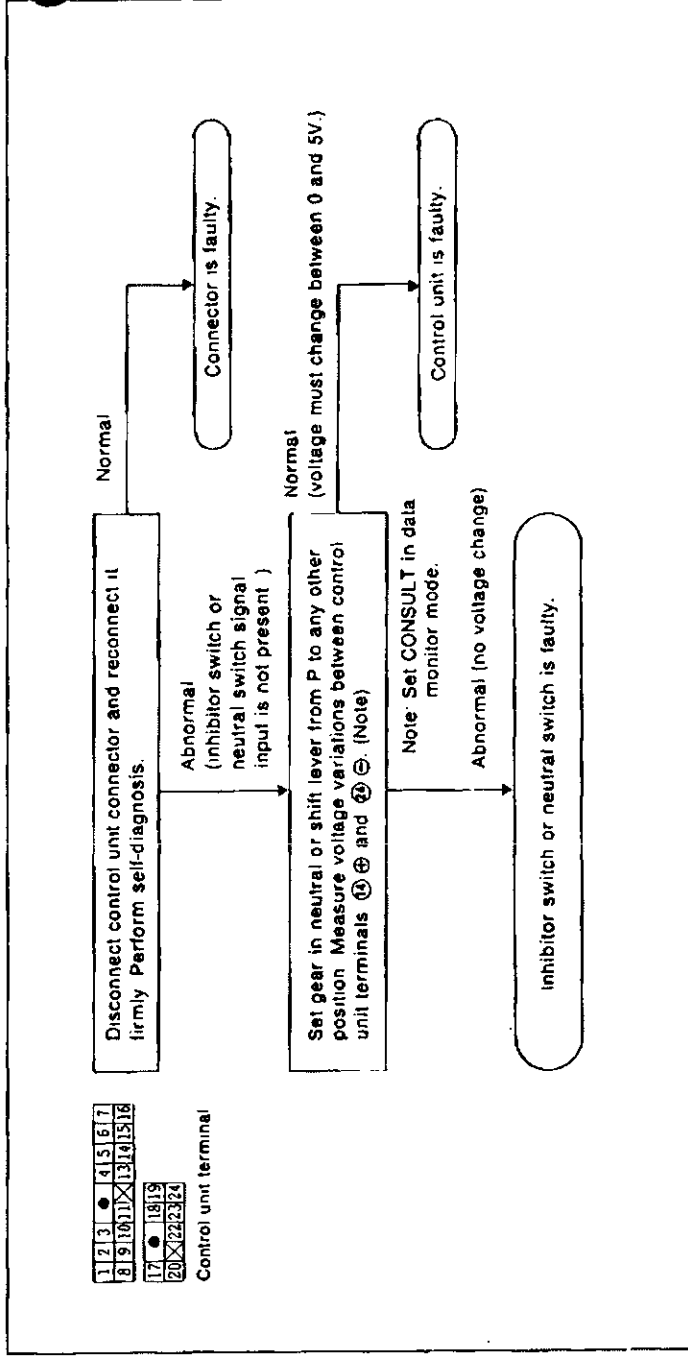
C12 SUPER HICAS

3. Trouble Diagnoses (Cont'd)

G. Parking brake (A/T) or clutch switch (M/T) input is not present. [㉔ Self-diagnosis items (8)]



H. Inhibitor switch (A/T) or neutral switch (M/T) input is not present. [㉕ Self-diagnosis items (9)]



C12 SUPER HICAS

3. Trouble Diagnoses (Cont'd)

(5) Control unit inspection table

The standard value (voltage) measured with an analog tester in contact with the control unit terminal shown below.

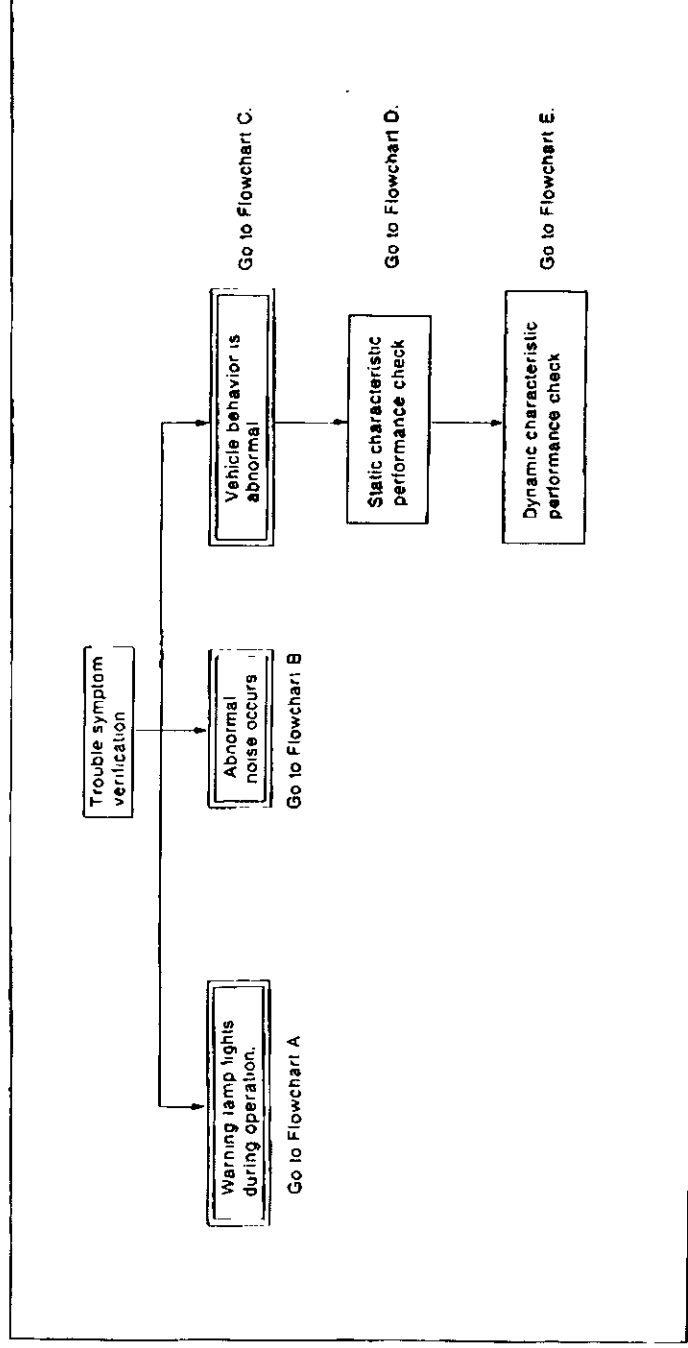
Terminal No.		Standard Value	Application
⊕	⊖		
①		—	Service support CLK input
②		—	Service support RX output
③		Ignition switch ON: Approx. 12V Ignition switch in other position: 0V	IGN power supply
④		Approx. 12V	Battery power supply
⑤		—	Number of ECCS revolution signals
⑥		Rear wheel rotating 0V ↔ greater than 5V (approx.) intermittent	Vehicle speed signal
⑦		Approx. 5V (neutral position)	Steering neutral position sensor
⑧		Solenoid resistance value 4 - 6Ω	Resistance of power steering solenoid
⑨		—	Service support TX output
⑩		Brake ON: Approx. 12V Brake OFF: 0V	Stop lamp switch signal
⑪		Parking brake engaged or clutch pedal depressed: Approx. 5V	(A/T) Parking brake signal (M/T) Clutch signal
⑫	⑩ or ⑫	Gear in N, or shift lever in any position other than parking: Approx. 5V	(A/T) Inhibitor signal (M/T) Neutral signal
⑬		Steering wheel turned 0 ↔ approx. 5V, Intermittent	Steering angle sensor 1 signal
⑭		—	Steering angle sensor 2 signal
⑮		—	(Reserved for future switch input function.)
⑯		Solenoid resistance 13 - 17Ω	Fail-safe valve resistance
⑰		Ignition switch ON: Approx. 12V Ignition switch in other position: 0V	IGN power supply
⑱		—	HICAS warning lamp
⑲		Solenoid resistance 4 - 6Ω	HICAS solenoid (R.H.)
⑳		Solenoid resistance 4 - 6Ω	HICAS solenoid (L.H.)

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3. Trouble Diagnoses (Cont'd)

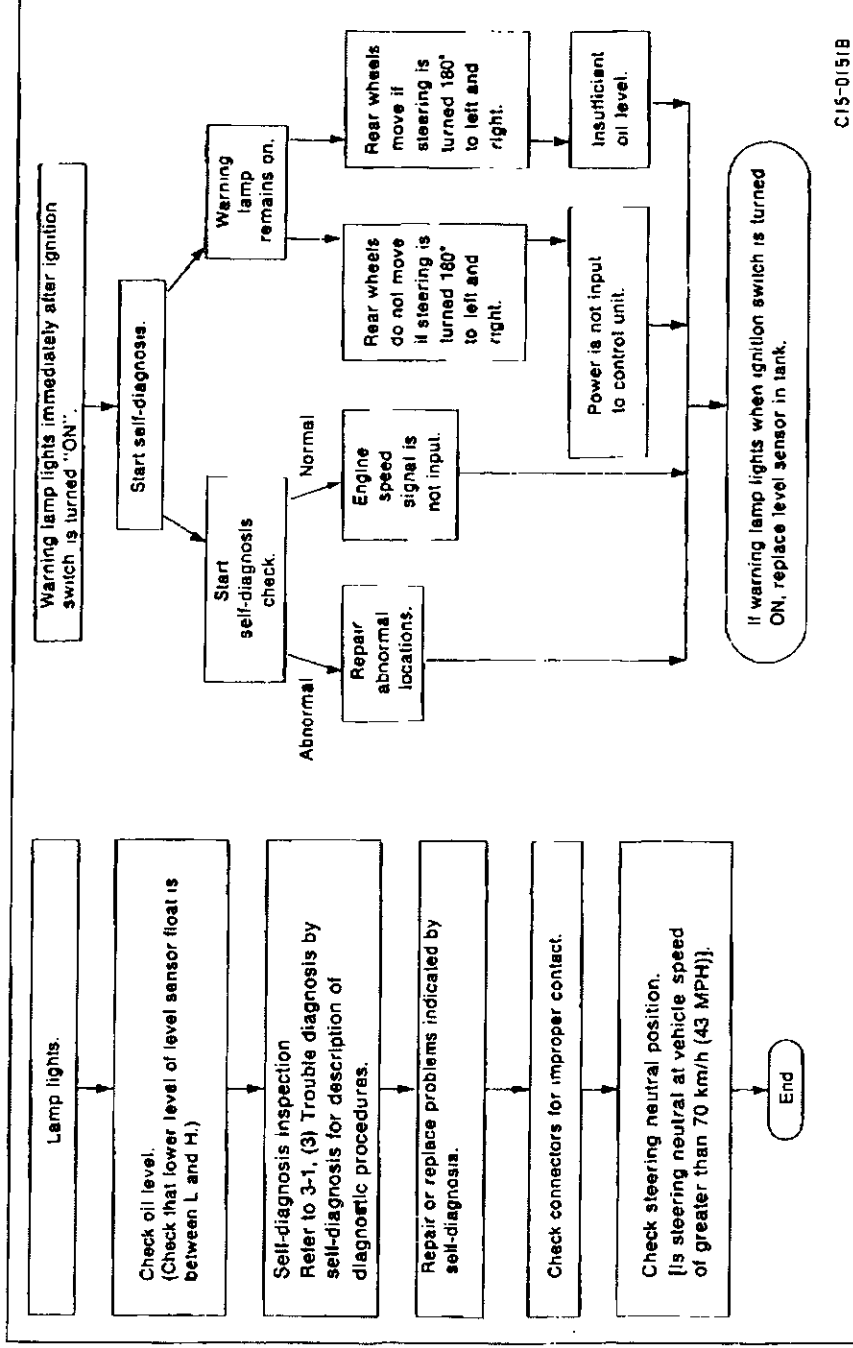
3-2 HYDRAULIC SYSTEM TROUBLE DIAGNOSIS

(1) Diagnosis flowchart



(2) Damage symptom flowchart

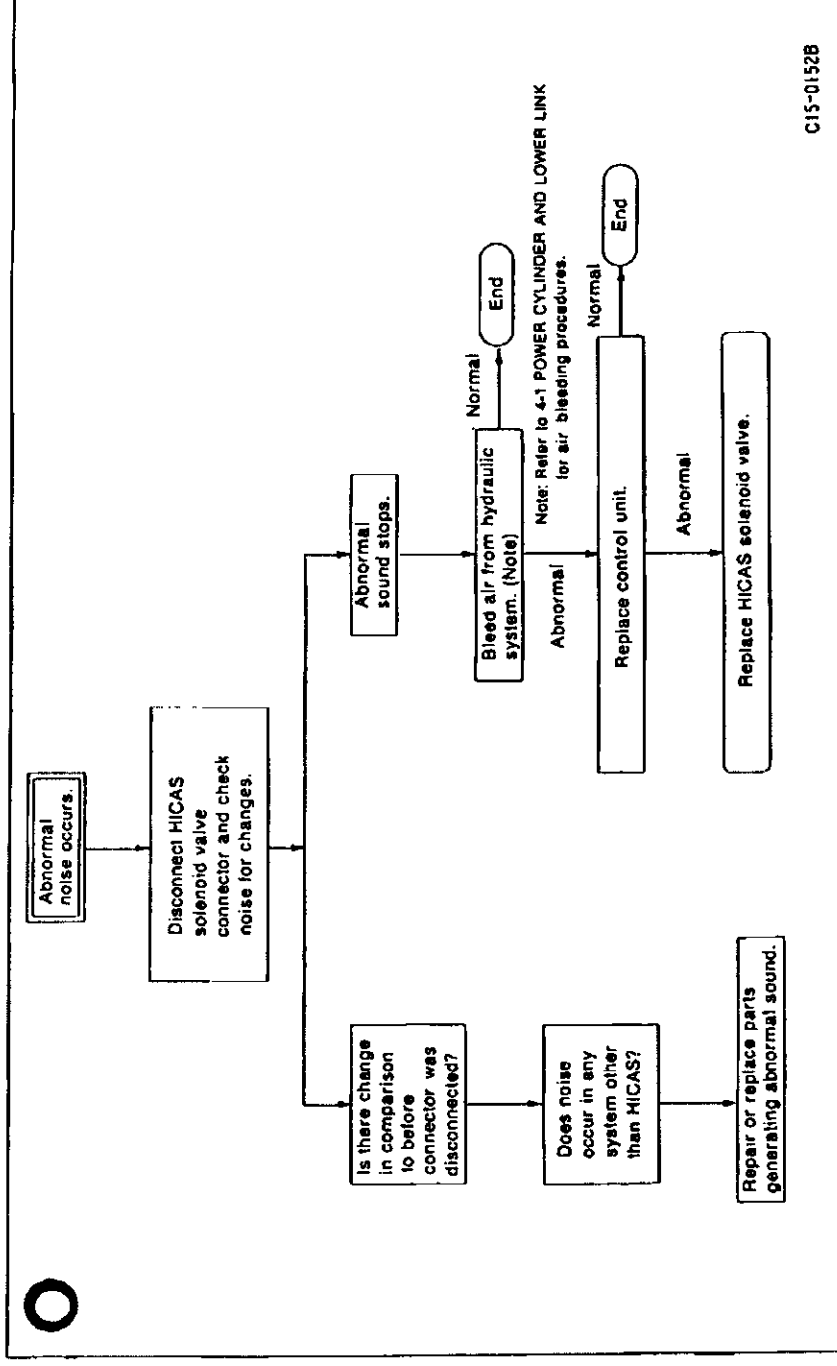
A. Warning lamp lights during operation



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3. Trouble Diagnoses (Cont'd)

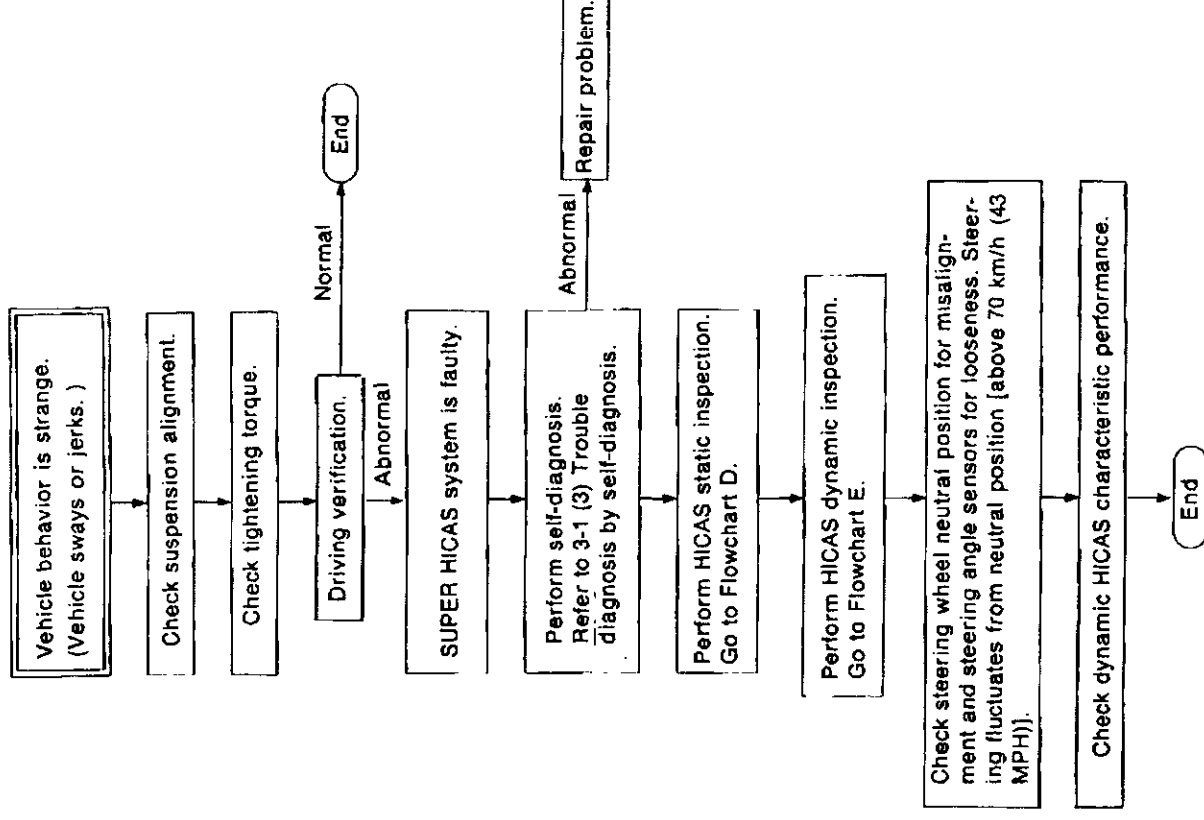
B. Abnormal sound is present.



C12 SUPER HICAS

3. Trouble Diagnoses (Cont'd)

C. Vehicle behavior is abnormal.

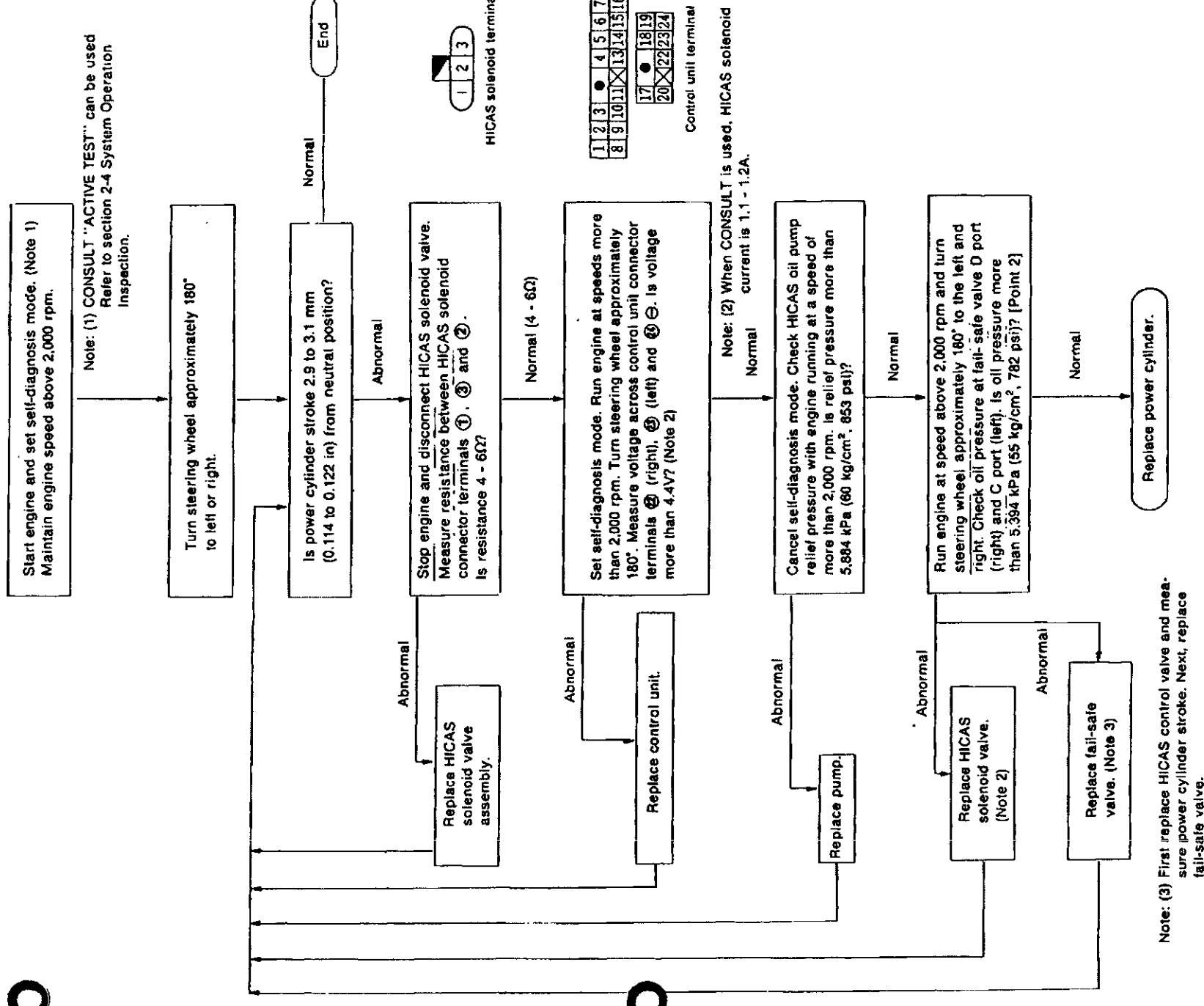


C15-0153B

C12 SUPER HICAS

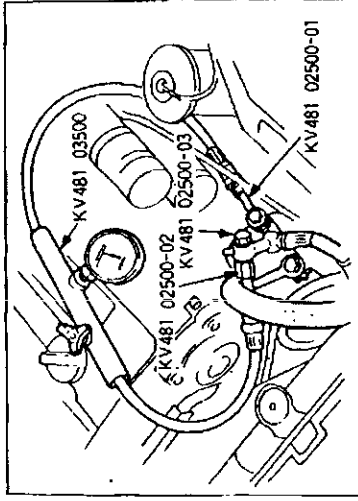
3. Trouble Diagnoses (Cont'd)

D. Static HICAS characteristic performance check



3. Trouble Diagnoses (Cont'd)

[Point 1] HICAS pump relief hydraulic inspection



- Connect power steering pressure gauge adaptor (I-type joint) and power steering pressure gauge (special service tool) to HICAS outlet nozzle connector of power steering pump (tandem type).
- Set the power steering pressure gauge adaptor (flare joint) (special service tool) in HICAS high-pressure hose removed from power steering pump. (Note 1)

Raise vehicle.

Bleed air from hydraulic circuit.

Note 2: Refer to "Power steering gear and linkage removal and installation".

Open power steering pressure gauge valve fully and start engine. Move wheel to left and right to heat oil.

Note 1: If the valve is left fully closed while engine is running, the pressure in oil pump rises to relief pressure limit. Do not turn valve fully closed for extended periods because pressure rises to an abnormal level.

Relief pressure limit:
5,884 kPa (60 kg/cm², 853 psi)

Measure relief pressure when valve is fully closed and check that it does not exceed indicated specification limit.

Note 2: Valve must be opened after a maximum of 15 seconds. (If oil temperature rises, it may damage oil pump.)

Normal

Abnormal

Replace oil pump assembly.

Remove power steering oil pressure gauge. Install high-pressure hose in oil pump outlet connector.

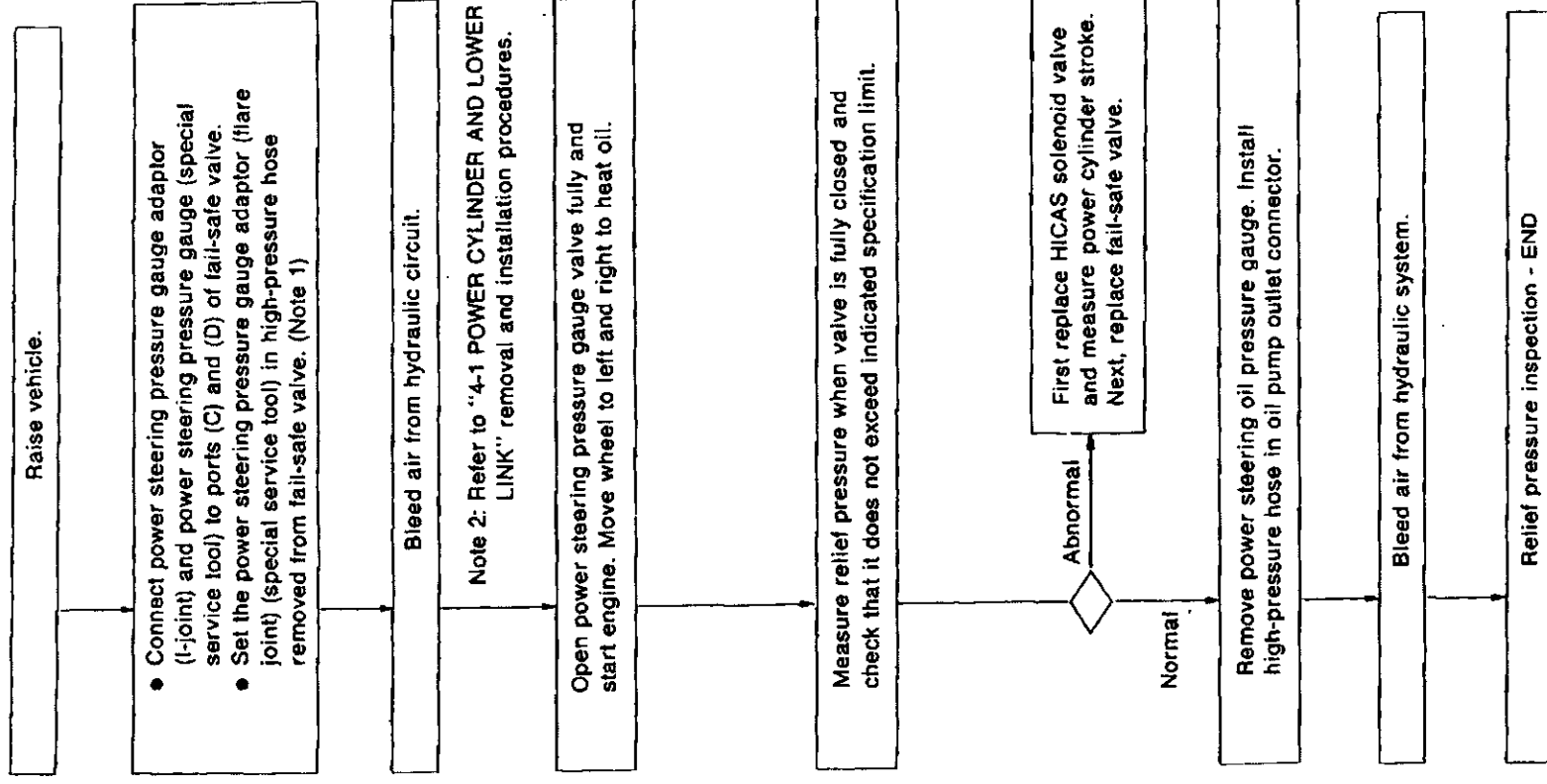
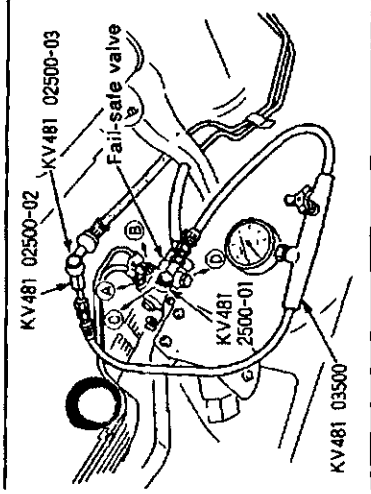
Bleed air from hydraulic system.

Relief pressure inspection - END

C12 SUPER HICAS

3. Trouble Diagnoses (Cont'd)

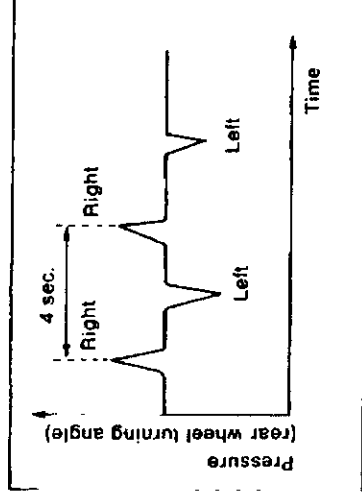
[Point 2] HICAS solenoid valve and fail-safe valve inspection (relief pressure inspection)



Relief pressure limit:
5,394 kPa (55 kg/cm², 782 psi)

3. Trouble Diagnoses (Cont'd)

E. Dynamic characteristic inspection



Check pipe and connector joints for indentations or clogging. Replace with new parts as necessary. Bleed air thoroughly. (Note)

Note: Refer to "4-1 POWER CYLINDER AND LOWER LINK" for air bleeding procedures.

Start engine and set self-diagnosis mode. Maintain engine at speed above 2,000 rpm.

Set steering wheel in neutral position and check that rear wheels move in pulse to left and right. (Refer to figure.)

Measure power cylinder stroke to one side for rear wheel pulsation. Is stroke distance greater than 2.0 mm (0.079 in)?

Normal

End

Abnormal

Replace HICAS solenoid valve.

Measure power cylinder stroke to one side for rear wheel pulsation. Is stroke distance greater than 2.0 mm (0.079 in)?

Normal

End

Abnormal

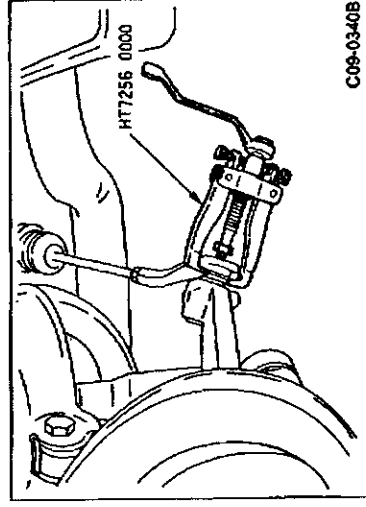
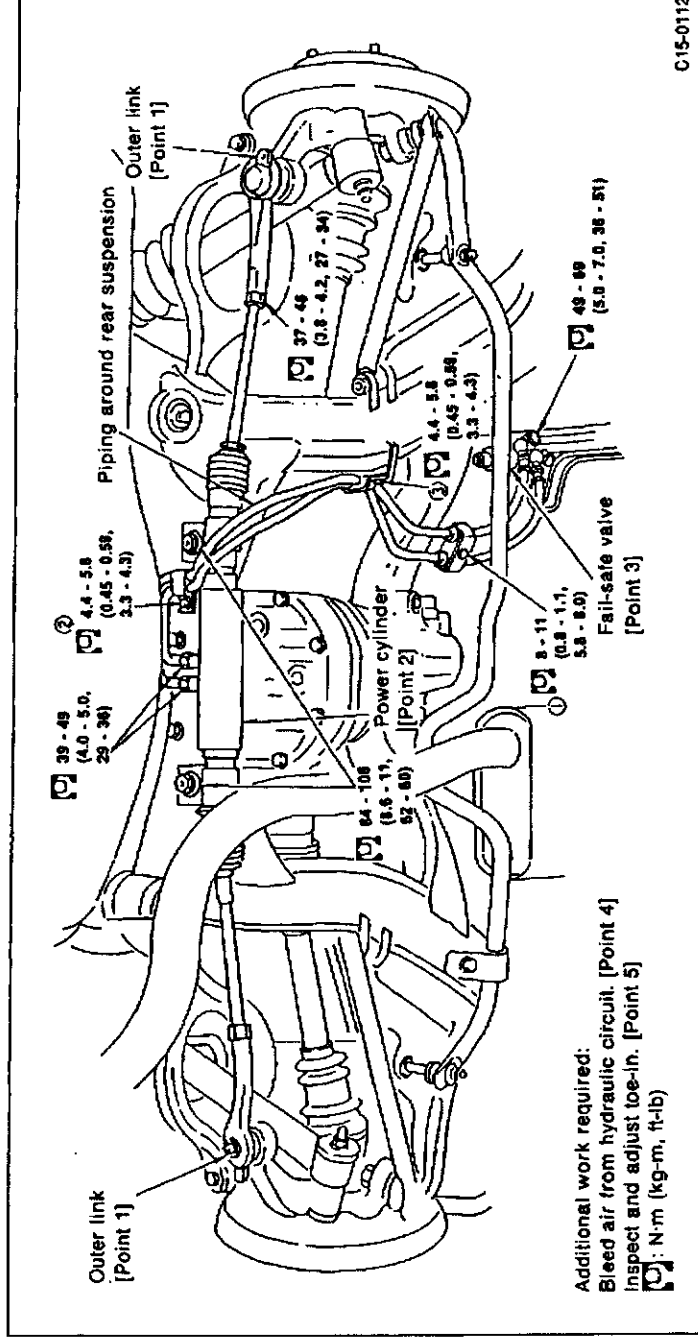
Replace power cylinder.

C12 SUPER HICAS

4. Removal and Installation, Assembly and Disassembly

1 POWER CYLINDER AND LOWER LINK

① Removal and installation

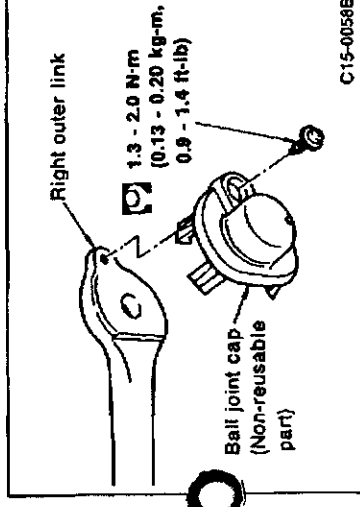


[Point 1] Outer link and ball joint separation

- Using Pitman arm puller (commercial service tool), separate power cylinder outer arm link and axle housing ball joint.

CAUTION:

- Install ball joint cap only in right outer link. (Refer to figure.)
- Replace non-reusable parts with new parts after disassembly.



4. Removal and Installation, Assembly and Disassembly (Cont'd)

[Point 2] Power cylinder assembly removal and installation

Removal

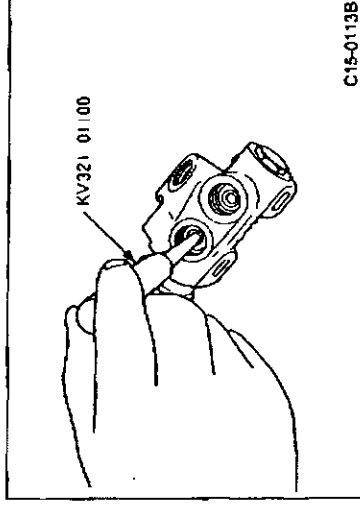
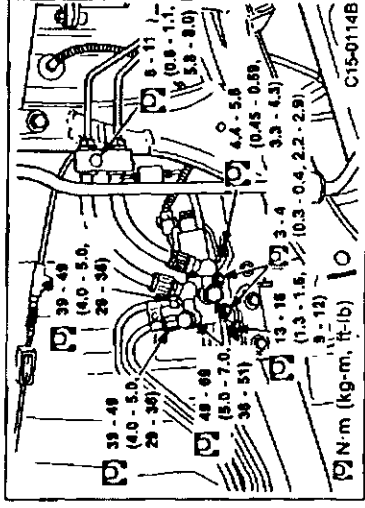
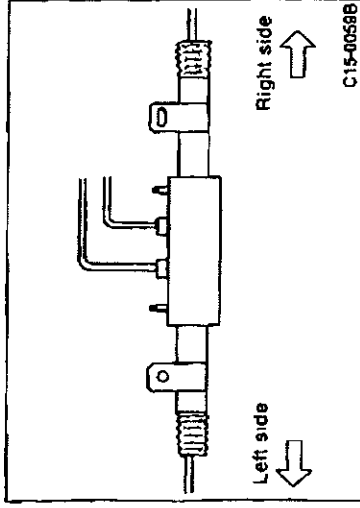
- Remove piping around power cylinder, outer link and rear suspension with assembly.

CAUTION:

When removing piping, cover openings so dust, debris and foreign matter cannot enter (especially in pipe connections).

Installation

- When replacing any of the piping surrounding the power cylinder, outer link and rear suspension, attach disassembled parts to suspension members.
- The piping removal and installation sequence is (1), (2), (3) as shown in figure on the preceding page.



- When the power cylinder is installed on suspension member, wipe off all oil, debris and foreign matter from power cylinder side bracket and suspension member contact surfaces. Install bracket left side as reference to determine position of long hole on right side.

[Point 3] Fail-safe valve removal and installation

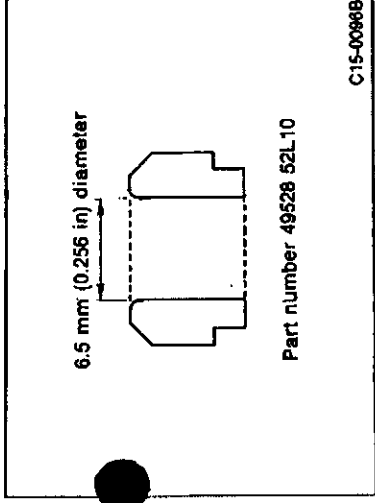
CAUTION:

- (1) Blow out pipes and ports with compressed air before installation to prevent entry of dirt, dust and foreign matter.
 - (2) Perform operations in periphery of piping connections (especially in tube sheet removal and installation) with bare hands, being careful not to allow oil, dust or debris to adhere to the hands.
 - (3) Always replace tube sheets that have been removed after every disassembly.
- After removing piping around rear suspension, always blow off piping and fail-safe valve with compressed air.
 - Use pin punch (special service tool) to replace tube sheet as shown in figure on left, because scratches or cracks inside tube sheet in fail-safe valve can cause fluid leakage.

C12 SUPER HICAS

4. Removal and Installation, Assembly and Disassembly (Cont'd)

- Assemble tube sheet in port fail-safe valve as shown in figure.



C12 SUPER HICAS

4. Removal and Installation, Assembly and Disassembly (Cont'd)

[Point 4] Air bleeding hydraulic circuit

Air bleeding of HICAS system (power cylinder)

CAUTION:

Air bleeding of HICAS system must be performed after the air bleeding of power steering has been completed.

(1) When using CONSULT

- Connect CONSULT unit to vehicle diagnostic connector.
- Have a helper sit in driver's seat and raise vehicle.

Reference: Use a two-pole lift or a center pole lift so that the four wheels are free to rotate.

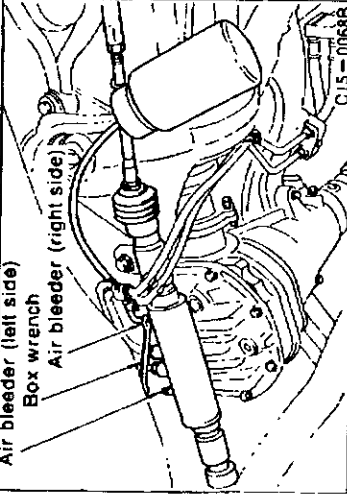
Start engine and maintain idle. Loosen left and right air bleeder valves above power cylinder and release oil until there are no more air bubbles.

Tighten left and right air bleeder valves.

- Start engine again.
- Touch "START" on CONSULT display. (Screen will change.)
- Touch "HICAS", "ACTIVE TEST", "SIMULATED DRIVE" and "START" in this order.

CAUTION: After touching "START", check that MAIN SIGNALS is displayed in reverse.

Touch "HIGH-SPEED SET".



* When engine is idling, turn steering wheel 180° from neutral position to right. Open air bleeder on right side of power cylinder gradually, bleed air from circuit and tighten bleeder again. Then return steering wheel to neutral position.

* When engine is idling, turn steering wheel 180° from neutral position to left. Open air bleeder on left side of power cylinder gradually, bleed air from circuit and tighten bleeder again. Then return steering wheel to neutral position.

- Touch "CANCEL" on CONSULT screen and turn ignition switch OFF.

The procedures marked with an asterisk (*) should be repeated until air bubbles no longer occur. Fill reservoir during operation to prevent fluid level from lowering to suction inlet level.

4. Removal and Installation, Assembly and Disassembly (Cont'd)

(2) When CONSULT is not used



Have a helper sit in driver's seat and raise vehicle.

Reference: Use a two-pole lift or a center pole lift so that the four wheels are free to rotate.

Start engine and maintain idle. Loosen left and right air bleeder valves above power cylinder and release oil until there are no more air bubbles.

Tighten left and right air bleeder valves.

Input self-diagnosis item.

- Turn ignition switch OFF.
- Turn steering wheel from neutral to left and right (at least 20° in each direction) 5 times or more while depressing brake pedal at least 5 times, all within 10 seconds after ignition switch has been turned "ON".

Set steering wheel in neutral position (within 10° left and right), and check that both rear wheels are being steered respectively.

* When engine is idling, turn steering wheel 180° from neutral position to right. Open air bleeder on right side of power cylinder gradually, bleed air from circuit and tighten bleeder again. Then return steering wheel to neutral position.

* When engine is idling, turn steering wheel 180° from neutral position to left. Open air bleeder on left side of power cylinder gradually, bleed air from circuit and tighten bleeder again. Then return steering wheel to neutral position.

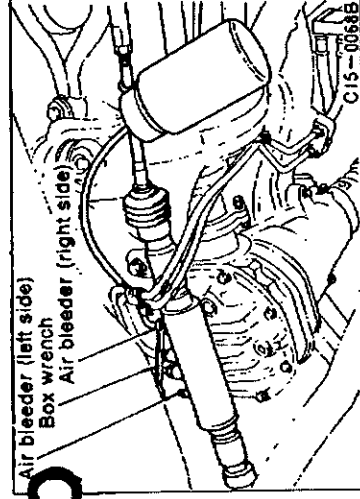
Turn ignition switch OFF to cancel self-diagnosis.

The procedures marked with an asterisk (*) should be repeated until air bubbles no longer occur. Fill reservoir during operation to prevent fluid level from lowering to suction inlet level.

C15-01568

[Point 5] Toe-in distance inspection and adjustment

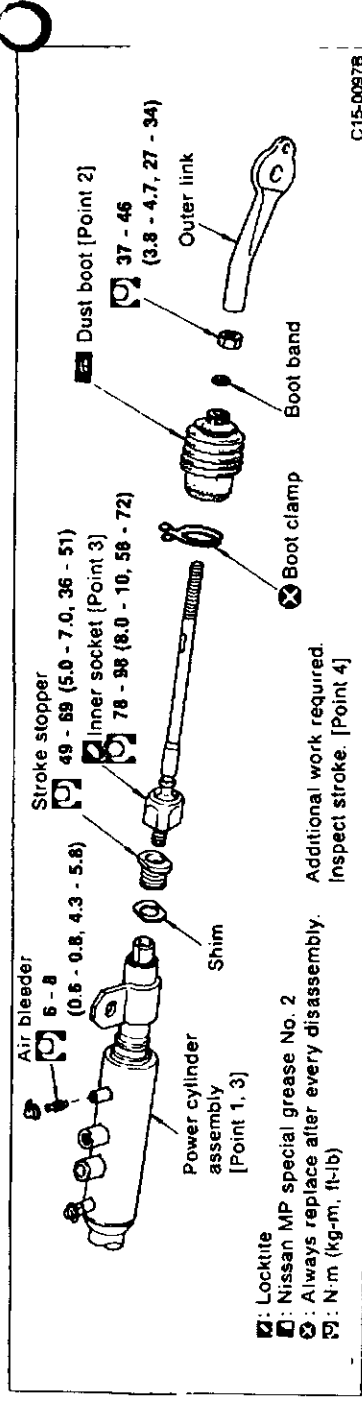
- After installing power cylinder and lower link assembly, perform toe-in inspection and check that distance is within specification.
- If value is outside specification, adjust toe-in.



C12 SUPER HICAS

4. Removal and Installation, Assembly and Disassembly (Cont'd)

② Assembly and disassembly

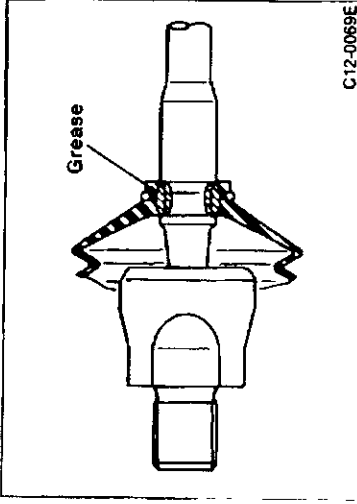


C15-00978

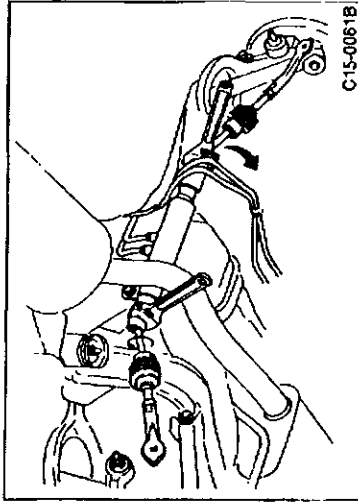
[Point 1] Power cylinder disassembly

CAUTION:

- (1) Blow off piping and ports before operation to prevent dust and foreign matter from entering area.
- (2) Perform operations in periphery of piping connections (especially in tube sheet removal and installation) with bare hands, being careful not to allow oil, dust or debris to adhere to the hands.
- Do not disassemble any parts other than those shown in above figure (disassembly figure). Only disassemble pipes and inner sockets.



C12-0069E



C15-0061B

[Point 3] Power cylinder inner socket removal and installation

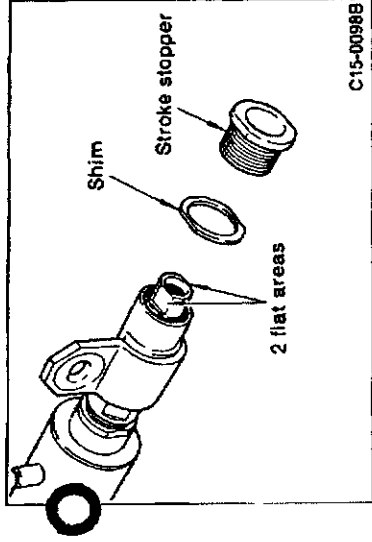
- Remove and install inner socket with power cylinder assembly installed in vehicle.
- ##### Removal
- Separate tie-rod from rear axle.
 - Remove boot clamp from dust boot. Move left and right dust boots to outer link side.
 - Attach tool to socket of left and right inner ball joints. Turn in direction that loosens both sides and remove loosened lower link assembly.

CH-369

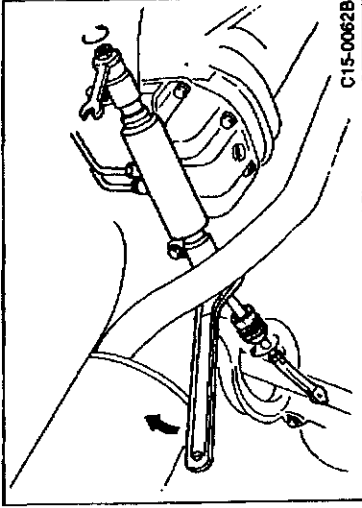
C12 SUPER HICAS

4. Removal and Installation, Assembly and Disassembly (Cont'd)

- Loosen and remove stroke stopper from removed lower link assembly.

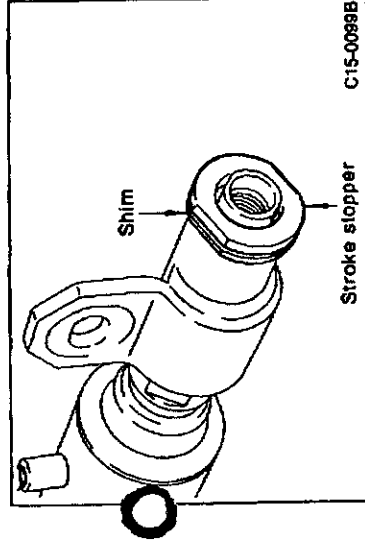


- Attach wrench to the two flat areas on rod end from side stroke stopper that was removed from and turn to tighten Loosen lower link assembly on opposite side and remove

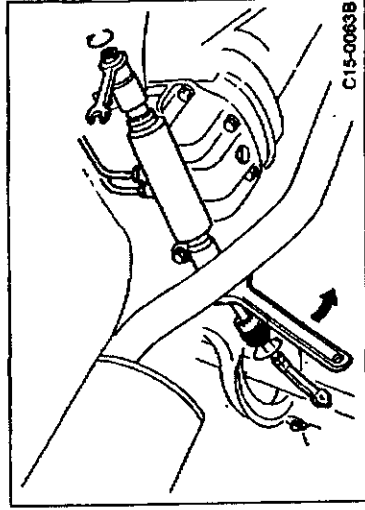


Installation

- Install stroke stopper and shim on assembled side of lower link assembly.



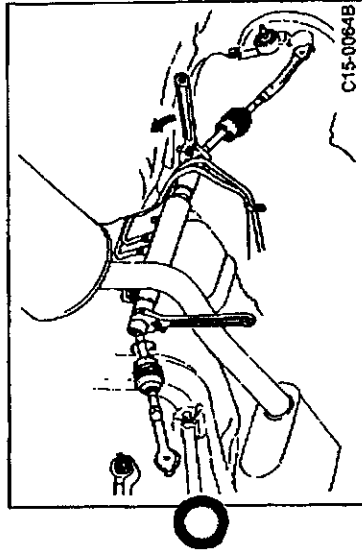
- Apply a coat of Locktite to inner ball joint screw. Attach wrench to the two flat surfaces on piston rod opposite from assembly side and turn to tighten. Install lower link assembly.



- After installing stroke stopper and shim on opposite side, install lower link assembly. Attach wrench to inner ball joint on opposite side and turn to tighten. Tighten to specified torque.

Inner socket tightening torque:

78 - 98 N·m (8.0 - 10 kg-m, 58 - 72 ft-lb)



C12 SUPER HICAS

4. Removal and Installation, Assembly and Disassembly (Cont'd)

[Point 4] Stroke Inspection

- After assembling shim and stroke stopper, check clearance between inner socket and stroke stopper.

Clearance: 3 ± 0.1 mm (0.118 ± 0.004 in)

4. Removal and Installation, Assembly and Disassembly (Cont'd)

10

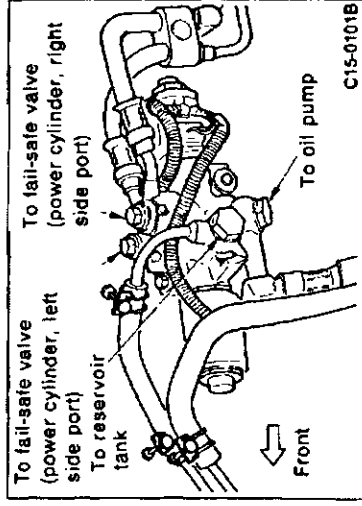
C12 SUPER HICAS

4. Removal and Installation, Assembly and Disassembly (Cont'd)

[Point 1] HICAS solenoid valve piping removal and installation

CAUTION:

- (1) Handle pipes with bare hands and pay attention to prevent dust or foreign matter from adhering.
- (2) Be careful not to install pipes in incorrect location or sequence during assembly.



Removal

- Remove HICAS solenoid valve connector and pipe clamp bracket.
- Remove power steering fluid from vehicle side centralized pipe connection.
- Remove HICAS solenoid valve pump port, tank port and power cylinder port on right side and flare nuts and union bolts on left side. Remove bolts from HICAS solenoid valve mount.

CAUTION:

- (1) **Never disassemble HICAS solenoid valve or fail-safe valve.** This part cannot be disassembled because if the lock nuts on the fixed part of the HICAS valve solenoid are loosened, the pressure adjustment distance will vary.
- (2) Cover caps of removed pipes and hoses with plugs to prevent dust and foreign matter from entering.

Installation

- Temporarily tighten flare nuts and union bolts and tighten HICAS solenoid valve mount bolts. Secure tube clamp bracket and tighten port union bolts.

[Point 2] Fluid tank fluid level inspection

- Refer to "2. On-vehicle inspection and Adjustment" for inspection procedures.

[Point 3] Air bleeding fluid circuit

- Refer to "4-1 POWER CYLINDER AND LOWER LINK ① Removal and installation" for a description of air bleeding procedures for HICAS system.

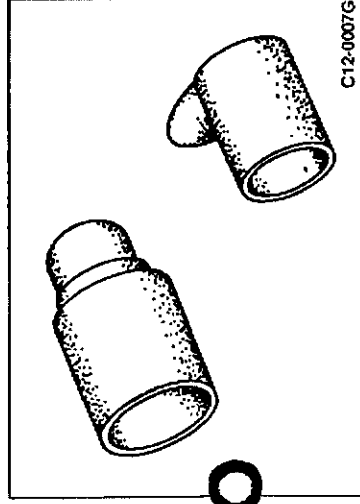
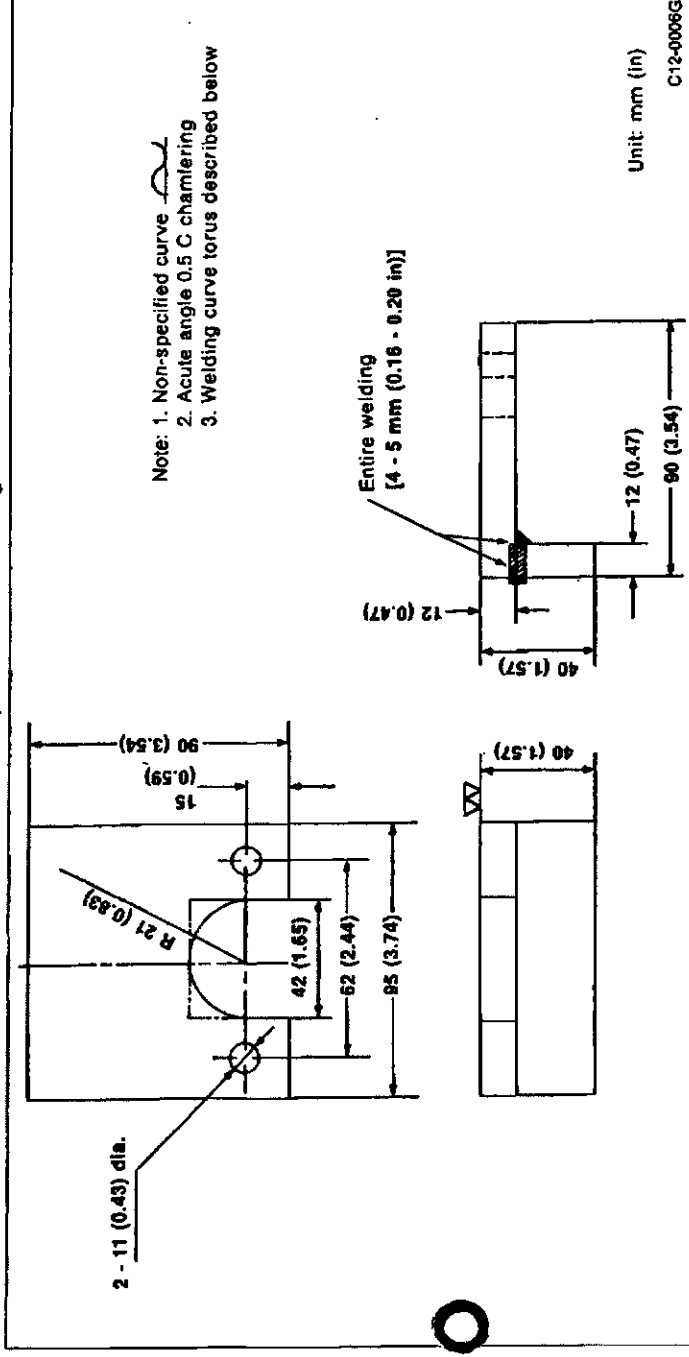
C12 SUPER HICAS

4. Removal and Installation, Assembly and Disassembly (Cont'd)

(2) Power steering pump removal and installation, assembly and disassembly

Assembly and disassembly precautions

- ① If oil pump and tank assembly and disassembly is required, perform the following procedures for removal and installation from vehicle.
 - Indicate oil leakage locations with a white marking pen.
 - Remove oil and cap openings.
 - Loosen pulley nut before loosening belts. Tighten tension on all belts before installation.
- ② **Attachment preparation**
 - Prepare the following attachments.



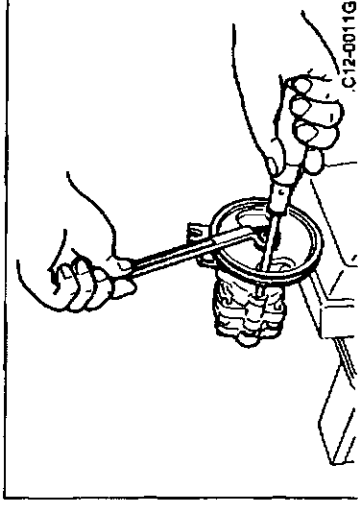
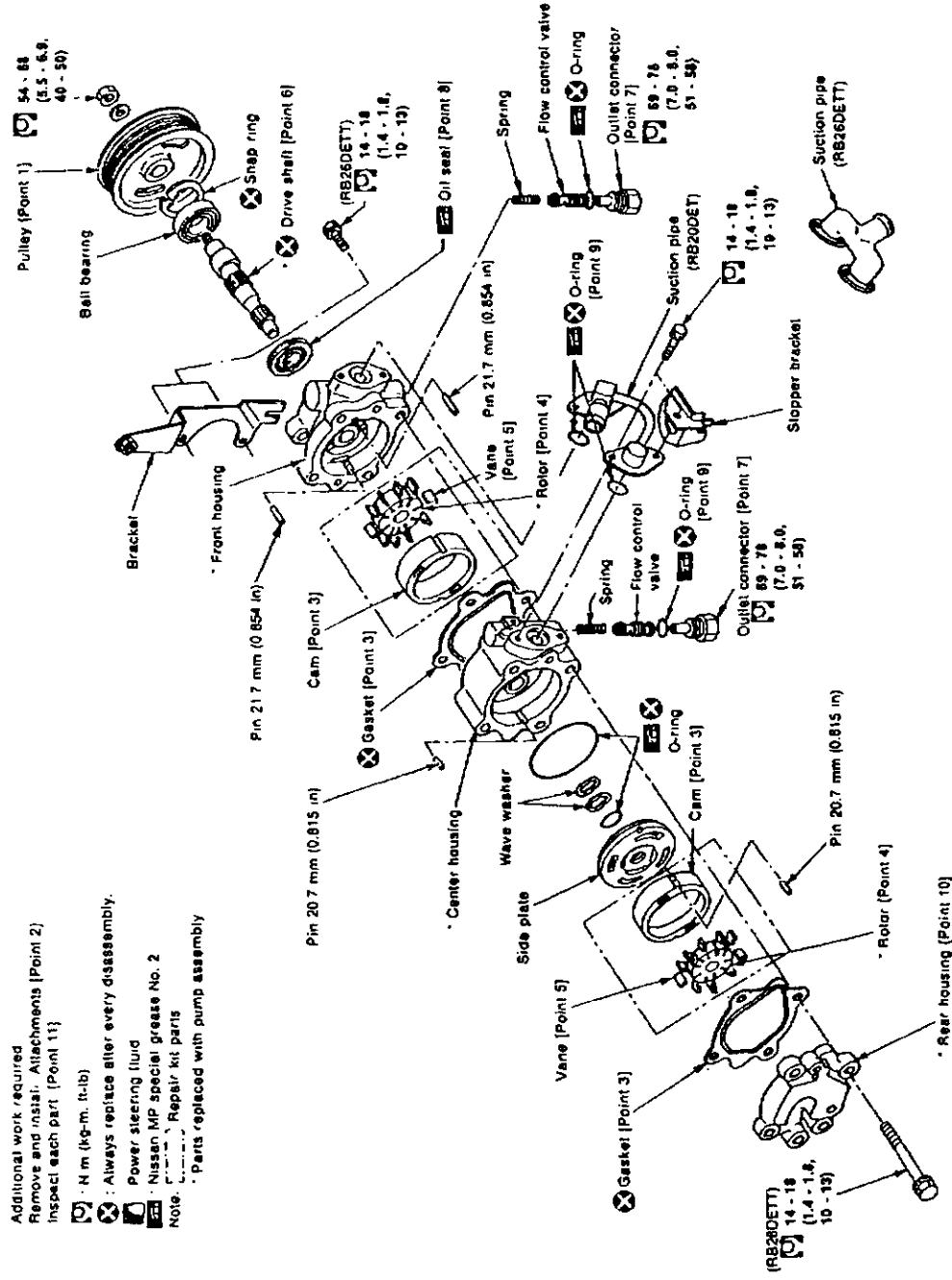
- Wash off grease on oil pump with white gasoline. Cover openings in outlet port, return ports to prevent white gasoline from entering. Be careful not to drop white gasoline on oil seal of drive shaft.
- Never reuse any O-ring, oil seal, snap ring, or washer (copper). Always replace with new part after every use. (New parts are contained in repair kits.)
- Replace entire assembly if front and rear housing, drive shafts, rotor, cam and flow control valve are scratched, dented or scored.

C12 SUPER HICAS

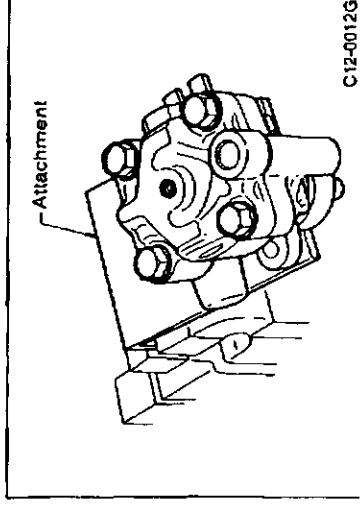
4. Removal and Installation, Assembly and Disassembly (Cont'd)

③ Power steering pump disassembly (Model 05U00)

- Additional work required
 Remove and install: Attachments [Point 2]
 Inspect each part [Point 11]
 [M] 4 m (kg-m, ft-lb)
 [X] Always replace after every disassembly.
 [P] Power steering fluid
 [N] Nissan MP special grease No. 2
 [R] Repair kit parts
 Note: Parts replaced with pump assembly



- Loosen in unit if pulley nut cannot be loosened when pump is installed in vehicle.
- Secure bracket in vise.
- Place Phillips head screwdriver in pulley hole and through front housing bolt hole to secure pulley and loosen pulley nut.
- Inscribe mating marks on front side of pulley to prevent incorrect pulley alignment and then remove pulley.



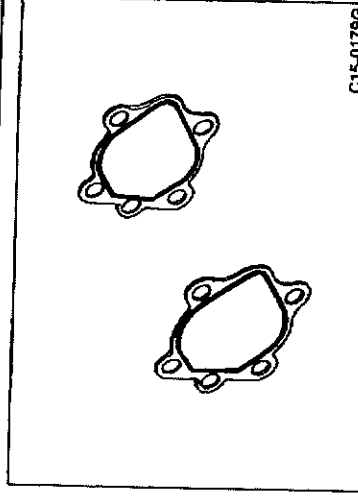
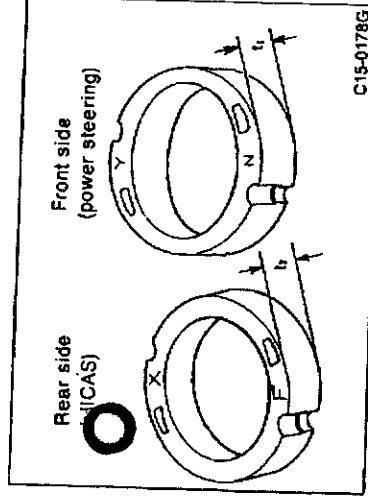
- Secure attachment in vise.
- Install front housing in attachment.

C12 SUPER HICAS

4. Removal and Installation, Assembly and Disassembly (Cont'd)

[Point 3] Cam and gasket installation

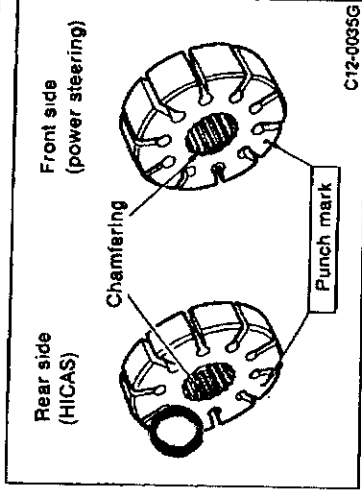
- Install the thicker side of cam ($t_1 > t_2$) facing front side.



- Check gasket alignment, and install one each at front housing and center housing and center housing and rear housing.

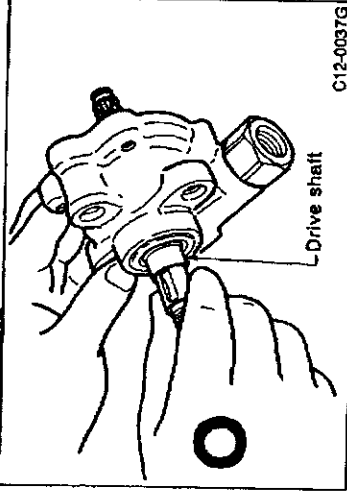
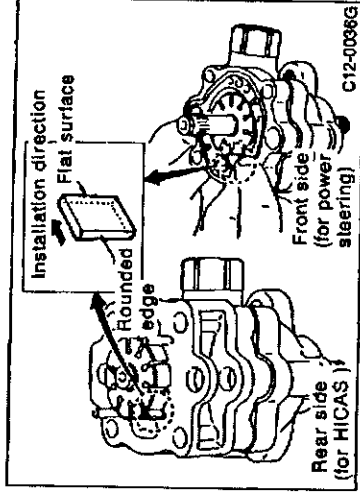
[Point 4] Rotor Installation

- Install rotor so the chamfered side of spline is faces rear housing side and side without chamfering faces front housing side. (Otherwise, install rotor so the punch mark side faces rear housing side and side without punch mark faces front housing side.)



[Point 5] Vane installation

- Assemble so rounded end faces cam surface.



[Point 6] Drive shaft removal and installation

- Pull shaft straight out slowly to remove.

CAUTION:

Be careful not to scratch bushing inside front cover or oil seal.

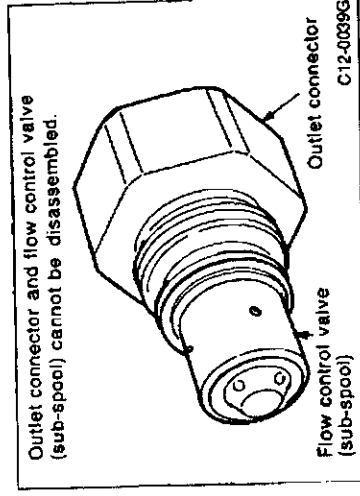
- Coat drive shaft with power steering fluid and press in slowly to install.
- Press into bottom, pull out 15 mm (0.59 in) and then slowly press in again.

C12 SUPER HICAS

4. Removal and Installation, Assembly and Disassembly (Cont'd)

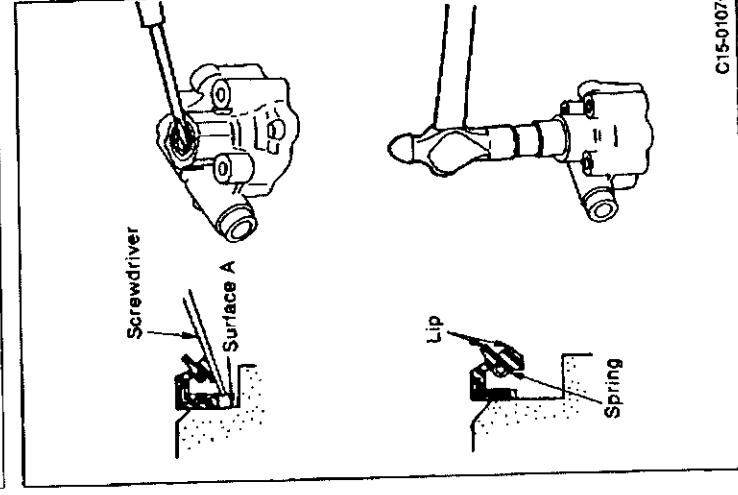
CAUTION:

Replace oil pump assembly carefully to prevent scratching drive shaft and bushing.



[Point 7] Outlet connector removal

- Outlet connector is installed inside front control valve (sub-spool). Be careful not to drop or deform during removal.
- Do not disassemble outlet connector and flow control valve.



[Point 8] Oil seal removal and installation

- Pay attention not to scratch sliding surface of oil seal during removal and installation.
- Use a screwdriver wrapped in tape to remove seal.

CAUTION:

(1) Insert screwdriver in position shown in figure.

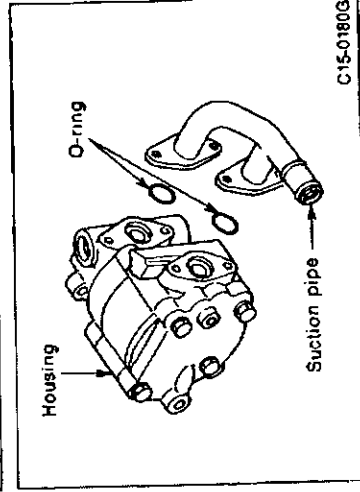
(2) Do not scratch surface A (oil seal installation mating surface) shown in figure.
If this surface is scratched, replace entire oil pump assembly.

- Use a taped 22-mm box wrench for installation.

CAUTION:

Check that oil seal is positioned straight and lightly tap seal into end of front housing with hammer to install.

- After installation, apply a thin coat of Nissan MP special grease No. 2 around oil seal lip.
- Touch spring with finger to check that it is installed in correct position.



[Point 9] O-ring installation

- Coat O-rings with power steering fluid.
- Install O-rings inside groove in housing.

C12 SUPER HICAS

4. Removal and Installation, Assembly and Disassembly (Cont'd)

[Point 10] Rear housing installation

- Secure front housing in attachment. Position cam, rotor center housing, cam, rotor and rear housing and install.
- Tighten bolts in diagonal sequence. First tighten each bolt to approximately half of specified torque and then tighten again to final torque.

Rear housing installation bolt tightening torque:

RB26DETT

31 - 42 N·m (3.2 - 4.3 kg-m, 23 - 31 ft-lb)

[Point 11] Inspection

- Do not reuse removed rubber parts (O-rings, oil seal and snap rings) or washers (copper). (Replace with parts in repair kit.)
- Replace pump assembly if the following parts are scratched or damaged.
 - ① Front housing and center housing mating surfaces
 - ② Rear housing and cam center housing mating surfaces
 - ③ Front housing oil seal
 - ④ Flow control valve
 - ⑤ Drive shaft
 - ⑥ Rotor

