1992-94 AUTOMATIC TRANSMISSIONS

Nissan RE4F04A & RE4F04V Electronic Controls & Overhaul

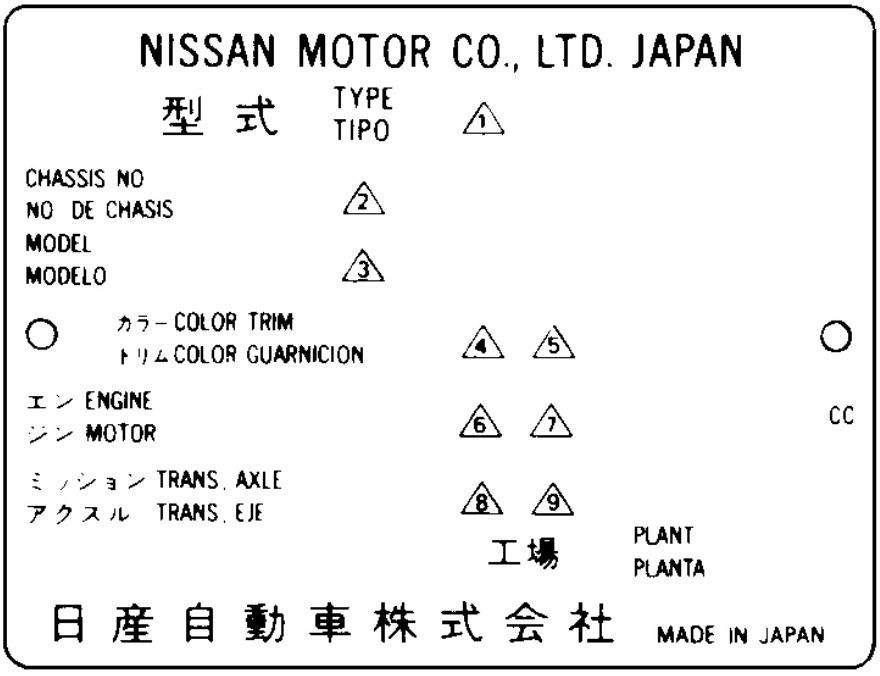
APPLICATION

TRANSMISSION APPLICATIONS

Vehicle Model	Transmission Model
Altima (1993-94)	RE4F04A/V
Maxima (VE30DE Engine, 1992-94)	RE4F04V
Quest (1993-94)	RE4F04A

IDENTIFICATION

On Maxima, transaxle model is located on vehicle identification plate in engine compartment area. See **Fig. 1**. Information is not available from manufacturer for Altima and Quest. On all models, transaxle number is stamped on transaxle above axle shaft. See **Fig. 2**.



1. Type
2. Vehicle Identification Number (Chassis Number)
3. Model
4. Body Color Code
5. Trim Color Code
6. Engine Model
7. Engine Displacement
8. Transaxle Model
9. Axle Model

93C22576

Fig. 1: Identification Plate Information (Maxima)
Courtesy of NISSAN MOTOR CO., U.S.A.

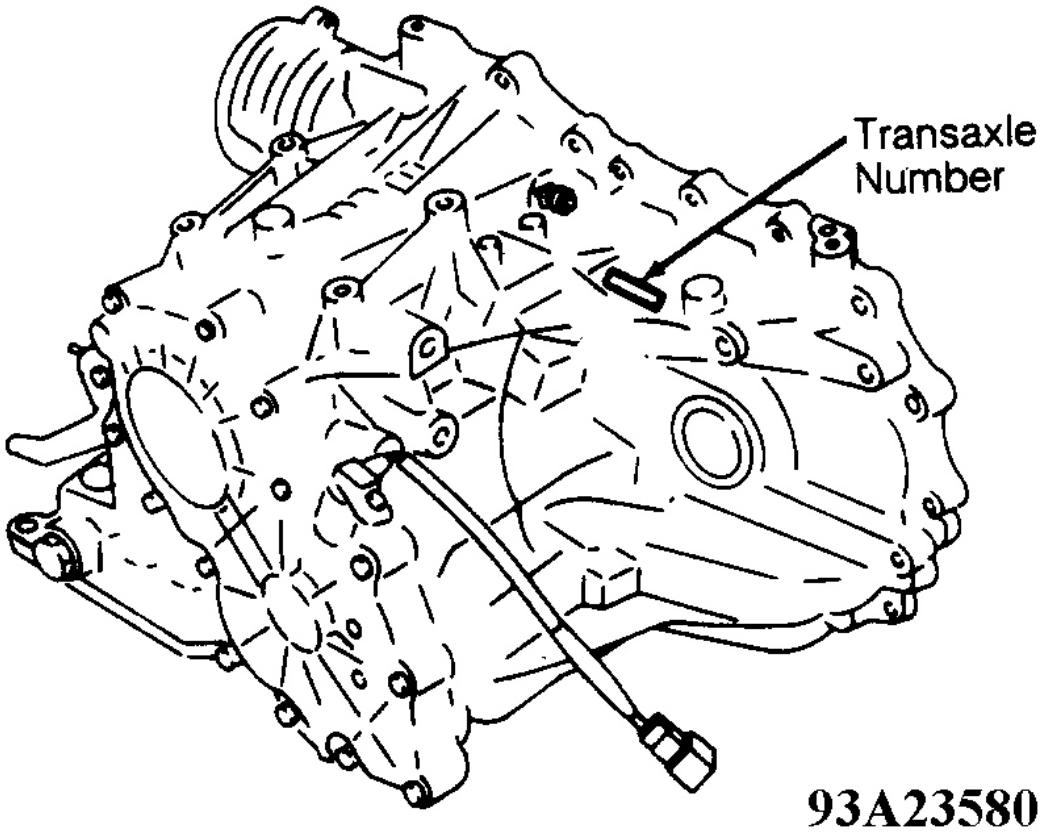
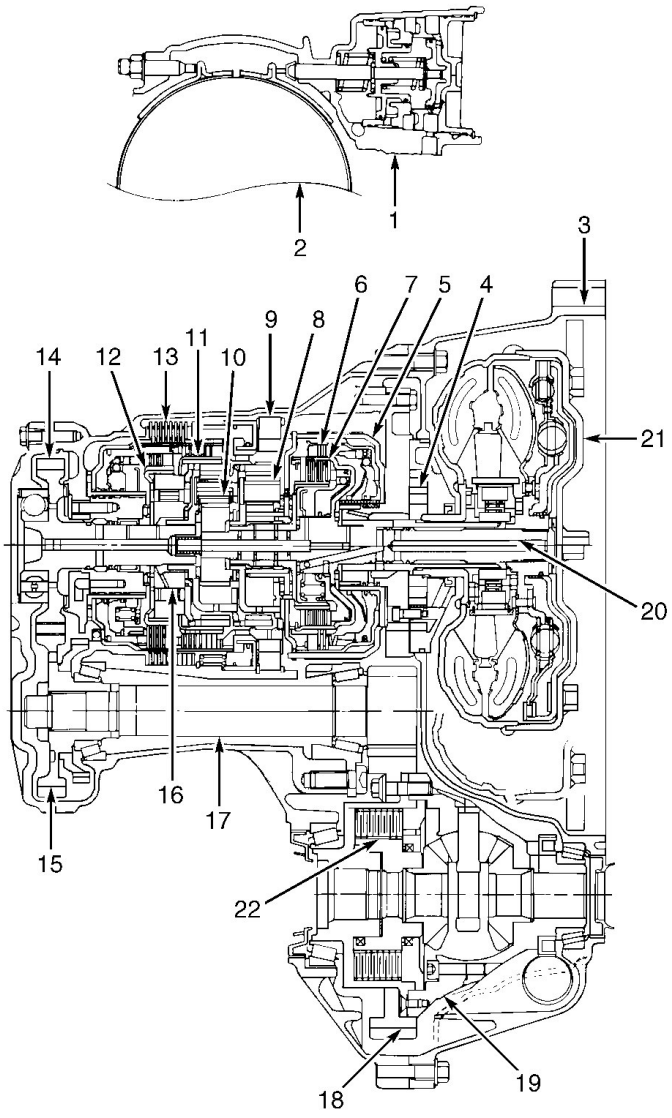


Fig. 2: Locating Transaxle Number
Courtesy of NISSAN MOTOR CO., U.S.A.

DESCRIPTION

Transaxle consists of 4 main units: automatic transaxle, torque converter, differential assembly and Automatic Transaxle Control Unit (ATCU). ATCU electrically controls shifting functions. Automatic transaxle consists of forward clutch, forward one-way clutch, high clutch, low and reverse brake, overrun clutch, reverse clutch, brake band servo, accumulators and control valve assembly. See **Fig. 3**. Transaxle incorporates a limited slip differential with viscous coupling.



1. Band Servo Piston
2. Reverse Clutch Drum
3. Converter Housing
4. Oil Pump
5. Brake Band
6. Reverse Clutch
7. High Clutch
8. Front Planetary Gear
9. Low One-Way Clutch
10. Rear Planetary Gear
11. Forward Clutch
12. Overrun Clutch
13. Low-Reverse Brake
14. Output Gear
15. Idler Gear
16. Forward One-Way Clutch
17. Reduction Gear
18. Ring Gear
19. Differential Assembly
20. Input Shaft
21. Torque Converter
22. Viscous Coupling

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Fig. 3: Identifying Transaxle Component Locations
Courtesy of NISSAN MOTOR CO., U.S.A.

LUBRICATION & ADJUSTMENTS

See the appropriate TRANSMISSION SERVICING - A/T article in the AUTOMATIC TRANS SERVICING section. Refer to the following menu:

- For Altima, see: **TRANSMISSION SERVICING - A/T**
- For Maxima, see: **TRANSMISSION SERVICING - A/T**
- For Quest, see: **TRANSMISSION SERVICING - A/T**

ON-VEHICLE SERVICE

CONTROL VALVE ASSEMBLY

Removal & Installation

1. Drain ATF. Remove oil pan and gasket. Remove oil strainer. Remove control valve assembly by removing bolts and disconnecting wiring harness connector. See **Fig. 4** Accumulators may be removed by applying compressed air (if necessary).
2. To install, set manual valve in neutral position and align with manual plate. Install control valve assembly and tighten bolts to 62-80 INCH lbs (7-9 N.m). Ensure bolts are installed in correct locations. See **CONTROL VALVE ASSEMBLY BOLT IDENTIFICATION** table. To complete installation, reverse removal procedure.

CONTROL VALVE ASSEMBLY BOLT IDENTIFICATION (1)

Identification	In. (mm)
"A"	1.713 (43.50)
"B"	1.30 (33.00)
"C"	1.57 (40.00)
(1) See **Fig. 4** for control valve bolt locations.	

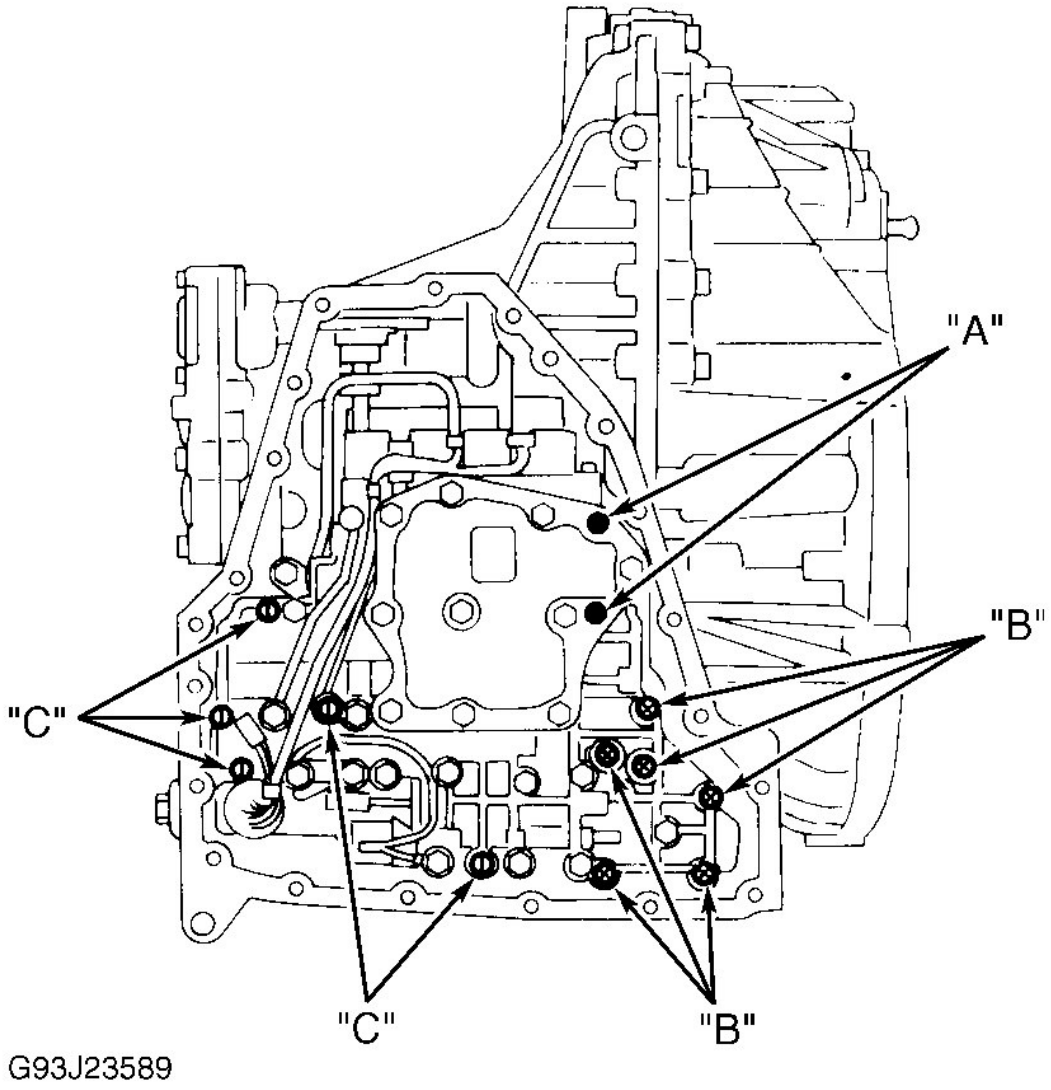


Fig. 4: Removing & Installing Control Valve Assembly
Courtesy of NISSAN MOTOR CO., U.S.A.

DIFFERENTIAL SIDE OIL SEAL REPLACEMENT

Remove drive shaft assembly. See appropriate AXLE SHAFT - FRONT article. Refer to the following menu. Using appropriate puller, remove oil seal. Apply ATF to NEW oil seal. Install NEW oil seal and reinstall drive shaft assembly.

- For Altima, see: **AXLE SHAFTS**
- For Maxima, see: **AXLE SHAFTS**
- For Quest, see: **AXLE SHAFTS**

INHIBITOR SWITCH ADJUSTMENT

See the appropriate TRANSMISSION SERVICING - A/T article in the AUTOMATIC TRANS SERVICING section. Refer to the following menu:

- For Altima, see: **TRANSMISSION SERVICING - A/T**
- For Maxima, see: **TRANSMISSION SERVICING - A/T**
- For Quest, see: **TRANSMISSION SERVICING - A/T**

OIL COOLER FLUSHING PROCEDURE

Vehicles with tube type transaxle fluid cooler may be cleaned by using cleaning solvent and compressed air. Cooler lines must also be flushed to remove any foreign material. Vehicles with fin type transaxle fluid cooler cannot be cleaned. Replace radiator (radiator incorporates transaxle cooler), and flush cooler lines to remove any foreign material.

TROUBLE SHOOTING

NOTE: Always check fluid level and linkage. Fluid level should be checked using HOT range on dipstick at fluid temperatures of 122-176°F (50-80°C) after vehicle has been driven approximately 5 minutes after initial warm-up. Use caution not to overfill. Ensure all computer control systems are operating properly before diagnosing shifting problems.

SYMPTOM DIAGNOSIS

Engine Will Not Start In "P" Or "N"

Defective ignition switch or starter. Inhibitor switch or control linkage misadjusted.

Engine Starts In Range Other Than "P" Or "N"

Inhibitor switch or control linkage misadjusted.

Transaxle Noise In "P" Or "N"

Incorrect fluid level or line pressure, throttle sensor misadjusted, incorrect revolution or speed sensor signal, damaged torque converter or oil pump.

Park Will Not Engage Or Disengage

Control linkage misadjusted or defective parking components.

Vehicle "Creeps" In "N"

Control linkage misadjusted, damaged forward clutch, low-one way clutch or reverse clutch.

Vehicle Will Not Move In "R"; Okay In "D", "2" & "1"

Control linkage misadjusted, incorrect line pressure, damaged line pressure solenoid, control valve assembly, reverse clutch, forward clutch, high clutch, overrun clutch or low and reverse brake.

Vehicle Brakes When Shifted To "R"

Incorrect fluid level or line pressure, control linkage misadjusted, damaged line pressure solenoid, control valve assembly, high clutch, forward clutch, overrun clutch or brake band.

Excessive Shift Shock From "N" To "D"

Engine idle RPM or throttle sensor misadjusted, incorrect line pressure, fluid temperature or engine RPM signal, damaged N-D accumulator or forward clutch.

Vehicle Will Not Move In "D" & "2"; Okay In "1" & "R"

Control linkage misadjusted, damaged low one-way clutch.

Vehicle Will Not Move Or Slips In "D", "1" & "2"

Incorrect fluid level or line pressure, damaged line pressure solenoid, control valve assembly, N-D accumulator, reverse clutch, high clutch, forward clutch or the low one-way clutch. Refer to the **CLUTCH & BAND APPLICATION** table.

Slips On Acceleration

Incorrect fluid level or line pressure, control linkage or throttle sensor misadjusted, damaged line pressure solenoid, control valve assembly, forward clutch, reverse clutch, N-D accumulator, low and reverse brake, torque converter or oil pump.

Excessive "Creep"

Incorrect engine idle RPM.

No "Creep"

Incorrect fluid level or line pressure, damaged control valve assembly, torque converter, oil pump or forward clutch.

No 1-2 Upshift

Inhibitor switch or control linkage misadjusted, damaged control valve assembly, brake band or shift solenoid "A", incorrect revolution or speed sensor signal.

No 2-3 Upshift

Inhibitor switch or control linkage misadjusted, incorrect revolution or speed sensor signal, damaged control valve assembly, shift solenoid "B", high clutch or brake band.

No 3-4 Upshift

Inhibitor switch or control linkage misadjusted, incorrect revolution, speed or fluid temperature sensor signal, damaged shift solenoid "A" or brake band.

Upshift Points Too High In All Gears

Throttle sensor misadjusted, incorrect revolution or speed sensor signal, damaged shift solenoid "A" or "B".

Shifts From 1st To 3rd; Skips 2nd

Incorrect fluid level, damaged brake band or leaking 3-R accumulator.

Shifting Into "R", "D", "2", Or "1" Kills Engine

Incorrect engine idle RPM or line pressure, damaged control valve assembly, lock-up solenoid or torque converter.

Excessive Shock During 1-2 Upshift

Incorrect line pressure, throttle sensor misadjusted, incorrect revolution or fluid temperature sensor signal, damaged shift solenoid "A", control valve assembly or brake band, binding or leaking 3-R accumulator .

Excessive Shock During 2-3 Upshift

Incorrect line pressure, throttle sensor misadjusted, damaged high clutch, brake band, control valve assembly or shift solenoid "A".

Excessive Shock During 3-4 Upshift

Incorrect line pressure, throttle sensor misadjusted, damaged control valve assembly, brake band or overrun clutch.

Slips During 1-2 Upshift

Incorrect fluid level or line pressure, throttle sensor misadjusted, damaged control valve assembly, 3-R accumulator or brake band.

Slips During 2-3 Or 3-4 Upshift

Incorrect fluid level or line pressure, throttle sensor misadjusted, damaged control valve assembly, high clutch or brake band.

Extremely High Or Low Lock-Up

Throttle sensor misadjusted, incorrect revolution or speed sensor signal, damaged control valve assembly or lock-up solenoid.

Vehicle Will Not Move In Any Range

Incorrect fluid level or line pressure, control linkage misadjusted, damaged line pressure solenoid, torque converter, oil pump, high clutch, low and reverse brake, brake band or parking components. See the **CLUTCH & BAND APPLICATION** table.

CLUTCH & BAND APPLICATION

Selector Lever Position	Elements In Use
"D" (Drive) (1)	
First Gear	Forward Clutch, (2) Forward One-Way Clutch (3) (4) Overrun Clutch & (2) Low One-Way Clutch
Second Gear	Band Servo (2nd Apply), Forward Clutch, (2) Forward One-Way Clutch & (3) (4) Overrun Clutch
Third Gear	Band Servo ((5) 2nd Apply & 3rd Release), Forward Clutch, (2) Forward One-Way Clutch, High Clutch & (3) (4) Overrun Clutch
Fourth Gear	Band Servo ((6) 2nd & 4th Apply, 3rd Release), Forward Clutch, High Clutch & Lock-up
"2" (Intermediate)	
First Gear	Forward Clutch, (2) Forward One-Way Clutch (2) Low One-Way Clutch & Overrun Clutch
Second Gear	Band Servo (2nd Apply), Forward Clutch, (2) Forward One-Way Clutch & Overrun Clutch
"1" (Low)	
First Gear	Forward Clutch, (2) Forward One-Way Clutch Low-Reverse Brake, Overrun Clutch
Second Gear	Band Servo (2nd Apply), Forward Clutch (2) Forward One-Way Clutch & Overrun Clutch
"R" (Reverse)	Low-Reverse Brake & Reverse

	Clutch
"N" Or "P" (Neutral Or Park)	All Clutches & Bands Released Or Ineffective

(1) Transaxle will not shift to 4th gear when overdrive switch is in OFF position.

(2) Operates during progressive acceleration.

(3) Operates when overdrive switch is in OFF position.

(4) Operates when throttle opening is less than 1/16.

(5) Oil pressure is applied to both 2nd apply and 3rd release side of band servo piston. Brake band does not contract because oil pressure area on release side is greater than apply side.

(6) Oil pressure is applied to 4th apply side in 3rd gear, and brake band contracts.

TESTING

ROAD TEST

Preliminary Checks

Fluid level should be checked using HOT range on dipstick at fluid temperatures of 122-176°F (50-80°C) after vehicle has been driven approximately 5 minutes after initial warm-up. COLD range on dipstick is for reference only. Fluid level must be checked and adjusted using HOT range. Ensure the following procedures are followed:

- Check fluid level with vehicle on level surface and parking brake set.
- Check fluid level with engine running and selector lever in PARK.
- If fluid level is at low side of either range, add fluid.
- Check fluid condition.
- Check for fluid leakage at cases, pan, etc.

Check Before Engine Is Started

1. Park vehicle on flat surface. Set transmission mode switch to AUTO position, move selector lever to "P" position. Turn ignition switch to ON position. Power indicator light should come on for about 2 seconds.
2. Set transmission mode switch to POWER position. POWER indicator light should come on. Set transmission mode switch to COMFORT position. COMFORT indicator light should come on. Set overdrive switch to OFF position. Overdrive OFF indicator light should come on.
3. Move selector lever to "D" position and depress and release accelerator pedal quickly. POWER indicator light should come on forabout 3 seconds.

Check With Engine Idling

1. With engine idling, move selector to "D", "2", "1", or "R" position. With parking brake off, verify PARK engagement by pushing vehicle backward or forward. Apply parking brake. Move selector to "N"

position. Vehicle should not roll.

2. Apply foot brake. Move selector lever to "R" position. Release parking brake for several seconds. Vehicle should creep backward with parking brake released. Repeat to verify operation of forward gear positions.

Road Test Procedure

1. Park vehicle on flat surface and set transmission mode switch to AUTO position. Set overdrive switch to ON position. Move selector lever to "P" position and start engine.
2. Move selector lever to "D" position. Depress accelerator pedal halfway. Vehicle should start from 1st gear. Verify 1-2, 2-3 and 3-4 upshifts occur at specified speed. See **SHIFT SPEED SPECIFICATIONS** tables. Also See **Fig. 5**-**Fig. 6**.
3. Lock-up occurs at speeds relative to throttle opening in D4. To verify lock-up speeds, see **LOCK-UP SPEED SPECIFICATIONS** table. Lock-up condition should be maintained for more than 30 seconds. Lock-up state is released upon deceleration. Confirm transmission mode switch is in AUTO position, overdrive switch is in ON position and selector lever is in "D" position.
4. Accelerate vehicle to approximately 25 MPH using half-throttle. Release accelerator pedal and then quickly depress pedal to floor. Transaxle should downshift from 4th to 2nd. Release accelerator and verify 2-3, and 3-4 upshifts. Check shift points and specified speeds. Refer to the **SHIFT SPEED SPECIFICATIONS** tables. Also refer to the **Fig. 5**-**Fig. 6**.
5. Confirm transmission mode switch is in AUTO position, overdrive switch is in ON position and selector lever is in "D" position. Accelerate vehicle to 4th gear using half-throttle. Release accelerator and switch overdrive to OFF position. Verify 4-3 downshift.
6. While still in 3rd gear, move selector lever from "D" to "2" position. Downshift should occur and deceleration should occur by engine braking. While still in 2nd gear, move selector lever from "2" to "1" position. Downshift should occur and deceleration should occur by engine braking.

LOCK-UP SPEED SPECIFICATIONS

LOCK-UP SPEED SPECIFICATIONS (1)

Application	MPH
Altima	
Comfort Pattern	
Lock-Up ON in 4th	65-70
Lock-Up OFF in 4th	33-38
Power Pattern	
Lock-Up ON in 4th	67-72
Lock-Up OFF in 4th	33-38
Maxima	
Comfort Pattern	
Lock-Up ON in 4th	60-65
Lock-Up OFF in 4th	39-44
Power Pattern	
Lock-Up ON in 4th	66-71
Lock-Up OFF in 4th	39-44

Quest	
Comfort Pattern	
Lock-Up ON in 4th	41-46
Lock-Up OFF in 4th	39-44
Power Pattern	
Lock-Up ON in 4th	41-46
Lock-Up OFF in 4th	39-44
(1) With 1/4 throttle opening.	

SHIFT SPEED SPECIFICATIONS TABLES

ALTIMA SHIFT SPEED SPECIFICATIONS (COMFORT PATTERN)

Application	Full Throttle MPH	Half Throttle MPH
1st-2nd	39-43	26-31
2nd-3rd	71-76	48-53
3rd-4th	111-116	77-82
4th-3rd	109-114	47-52
3rd-2nd	65-70	25-30
2nd-1st	25-30	3-8

ALTIMA SHIFT SPEED SPECIFICATIONS (POWER PATTERN)

Application	Full Throttle MPH	Half Throttle MPH
1st-2nd	39-43	28-33
2nd-3rd	71-76	52-57
3rd-4th	111-116	83-88
4th-3rd	109-114	53-58
3rd-2nd	65-70	32-37
2nd-1st	25-30	3-8

MAXIMA SHIFT SPEED SPECIFICATIONS (COMFORT PATTERN)

Application	Full Throttle MPH	Half Throttle MPH
1st-2nd	39-43	25-30
2nd-3rd	71-76	46-51
3rd-4th	111-116	70-75
4th-3rd	108-113	49-54
3rd-2nd	63-68	23-28
2nd-1st	32-37	5-10

MAXIMA SHIFT SPEED SPECIFICATIONS (POWER PATTERN)

Application	Full Throttle MPH	Half Throttle MPH
1st-2nd	39-43	29-34

2nd-3rd	71-76	53-58
3rd-4th	111-116	84-89
4th-3rd	108-113	53-58
3rd-2nd	63-68	34-39
2nd-1st	32-37	5-10

QUEST SHIFT SPEED SPECIFICATIONS (COMFORT PATTERN)

Application	Full Throttle MPH	Half Throttle MPH
1st-2nd	35-40	22-27
2nd-3rd	62-67	39-44
3rd-4th	102-108	63-68
4th-3rd	98-103	40-45
3rd-2nd	56-61	23-28
2nd-1st	26-31	5-10

QUEST SHIFT SPEED SPECIFICATIONS (POWER PATTERN)

Application	Full Throttle MPH	Half Throttle MPH
1st-2nd	35-40	23-28
2nd-3rd	62-67	45-50
3rd-4th	102-108	73-78
4th-3rd	98-103	49-54
3rd-2nd	56-61	25-30
2nd-1st	26-31	5-10

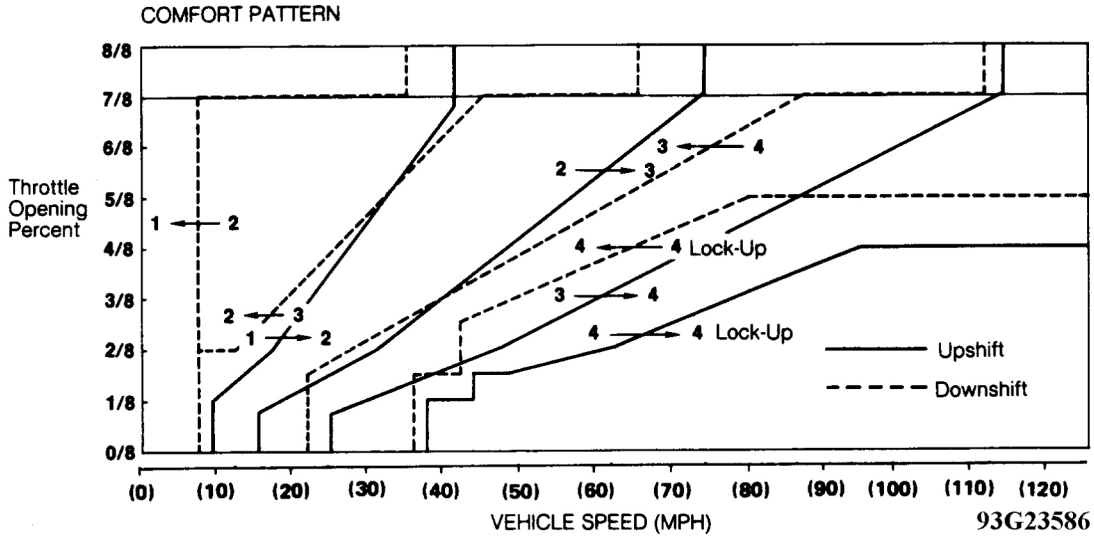


Fig. 5: Shift Speed Charts (Maxima Is Shown; Others Are Similar)
Courtesy of NISSAN MOTOR CO., U.S.A.

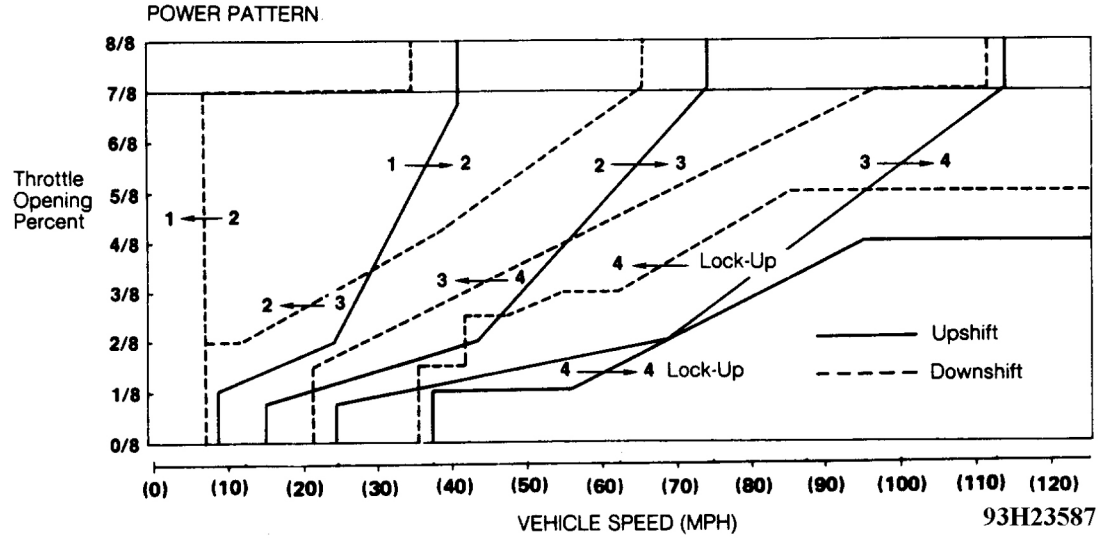


Fig. 6: Shift Speed Charts (Maxima Is Shown; Others Are Similar)
Courtesy of NISSAN MOTOR CO., U.S.A.

STALL SPEED TEST

Stall Speed Test Procedure

1. Check engine and transaxle fluid levels. Ensure engine and transaxle are at normal operating temperatures. Set parking brake and block wheels.
2. Install tachometer so it is visible to driver. Start engine, apply foot brake and move selector lever to "D" position. Accelerate to wide-open throttle gradually while applying foot brake. Note engine stall speed and release accelerator pedal immediately. See the **STALL SPEED SPECIFICATIONS** table.
3. Place selector lever in "N" position and run engine at idle for one minute to allow transaxle to cool. Repeat stall speed test procedure in "2", "1" and "R" positions, allowing transaxle to cool between each test.

CAUTION: DO NOT hold wide-open throttle for more than 5 seconds during test.

Stall Speed Test Results

1. If stall speed is low in all positions, possible causes are: insufficient engine performance or faulty torque converter one-way clutch.
2. If stall speed is high in all positions, possible causes are: low and reverse brake slipping, faulty low one-way clutch or hydraulic circuit for line pressure control.
3. If stall speed is high in "R" position only, possible causes are: reverse clutch slipping or low and reverse brake slipping.
4. If stall speed is high in "D", "2" and "R" positions, but okay in "1" position, possible causes are: reverse

clutch, forward clutch, forward one-way clutch or low one-way clutch.

5. If stall speed is high in "D", "2" and "1" positions, but okay in "R" position, possible causes are: forward clutch, overrun clutch or forward one-way clutch.
6. If stall speed is high in "D" and "2" positions, but okay in "1" and "R" positions, possible causes are: forward clutch, low one-way clutch and overrun clutch.

NOTE: Condition of high clutch and brake band cannot be confirmed by stall speed test.

STALL SPEED SPECIFICATIONS

Application	Stall Speed
Altima	
California	2150-2450
Except California	2100-2400
Maxima	1850-2150
Quest	1800-2100

HYDRAULIC PRESSURE TESTS

NOTE: Always replace pressure plugs. Plugs are self-sealing type.

Line Pressure Test

1. Check transaxle and engine fluid levels. Warm engine and transaxle to operating temperature. Drive vehicle approximately 10 minutes before testing.
2. Install pressure gauge to line pressure port. See **Fig. 7**. Set parking brake and block wheels. Continue to press brake fully while line pressure and stall speed tests are performed. Start engine and measure line pressure at idle and at stall speed. Refer to the **LINE PRESSURE SPECIFICATIONS** table.

NOTE: When measuring line pressure at stall speed, follow stall speed test procedure.

LINE PRESSURE SPECIFICATIONS TABLES

LINE PRESSURE SPECIFICATIONS (1993)

Application	psi (kg/cm^2)
Altima	
At Idle (1)	
In "D", "2" & "1"	73 (5.1)
In "R"	112 (7.9)
At Stall Speed (1)	
In "D", "2" & "1"	146 (10.3)
In "R"	228 (16.0)
Maxima	

At Idle	
In "D", "2" & "1"	109 (7.7)
In "R"	171 (12)
At Stall Speed	
In "D", "2" & "1"	178 (12.5)
In "R"	284 (20)
Quest	
At Idle	
In "D", "2" & "1"	73 (5.1)
In "R"	112 (7.9)
At Stall Speed	
In "D", "2" & "1"	178 (12.5)
In "R"	284 (20)
(1) This specification has been revised by the manufacturer in Nissan Technical Service bulletin number **NTB93-095A** .	

LINE PRESSURE SPECIFICATIONS (1994)

Application	**psi (kg/cm^2)**
Altima	
At Idle (1)	
In "D", "2" & "1"	73 (5.1)
In "R"	112 (7.9)
At Stall Speed (1)	
In "D", "2" & "1"	146 (10.3)
In "R"	228 (16.0)
Maxima	
At Idle	
In "D", "2" & "1"	73 (5.1)
In "R"	124 (8.7)
At Stall Speed	
In "D", "2" & "1"	159 (11.2)
In "R"	270 (19)
Quest	
At Idle	
In "D", "2" & "1"	73 (5.1)
In "R"	112 (7.9)
At Stall Speed	
In "D", "2" & "1"	158 (11.1)
In "R"	245 (17.2)
(1) This specification has been revised by the manufacturer in Nissan Technical Service bulletin number	

NTB93-095A .

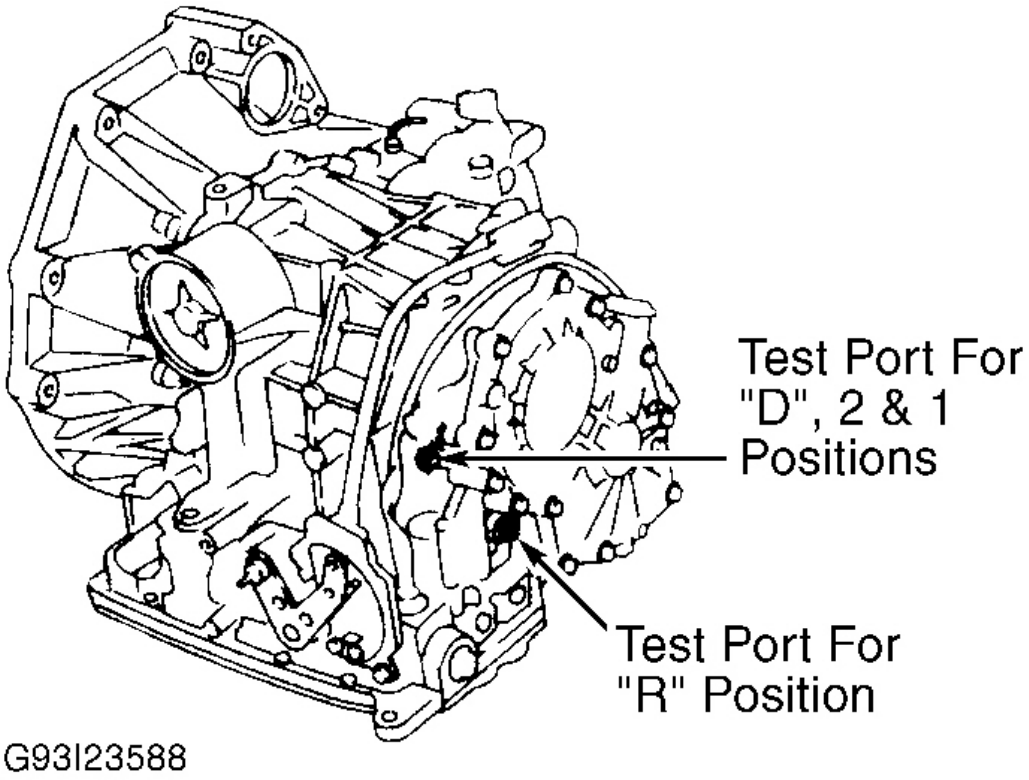


Fig. 7: Identifying Hydraulic Pressure Test Ports
Courtesy of NISSAN MOTOR CO., U.S.A.

Line Pressure Test Results

1. If line pressure is low at idle in all positions, possible causes are: oil pump wear, control piston damage, pressure regulator valve or plug sticking, spring for pressure regulator valve damaged, fluid pressure leakage between oil strainer and pressure regulator valve.
2. If line pressure is low at idle in a particular shift position, possible causes are: fluid pressure leakage between manual valve and a particular clutch. If line pressure is low in "R" and "1" position, but is normal in "D" and "2" position, fluid leakage exists at or around low-reverse brake circuit.
3. If line pressure is high at idle, possible causes are: throttle sensor misadjusted, fluid temperature sensor damaged, line pressure solenoid sticking or shorted, pressure regulator or plug, or modifier valve sticking.
4. If line pressure is low at stall speed, possible causes are: throttle sensor misadjusted, line pressure solenoid sticking or shorted, pressure regulator or plug, modifier valve or pilot valve sticking.

ELECTRONIC SELF-DIAGNOSTICS

NOTE: Driveability problems that may appear to be transmission related may be caused by a faulty engine component. Engine related fault codes MUST be repaired before diagnosing transmission. See ENGINE PERFORMANCE section. Failure to diagnose and repair engine fault codes prior to transmission diagnosis may result in incorrect diagnosis or component repair.

SELF-DIAGNOSTIC PROCEDURE

NOTE: Perform self-diagnosis with engine at normal operating temperature.

1. Ensure engine is at normal operating temperature. Turn ignition switch to OFF position. Set transmission mode switch to AUTO position, overdrive switch to ON position, and selector lever to "P" position. Turn ignition switch to ON position, but **DO NOT** start engine. POWER indicator light should come on for 2 seconds.
2. Turn ignition switch to OFF position and move selector lever to "D" position. Set overdrive switch to OFF position. Turn ignition switch to ON position, but **DO NOT** start engine. Move selector lever to "2" position. Set overdrive switch to ON position, move selector lever to "1" position, and set overdrive switch to OFF position.
3. Depress accelerator pedal to floor and release pedal. Record POWER indicator light flashes and refer to SELF-DIAGNOSTIC CODES charts. See **Fig. 8**-**Fig. 11**.

NOTE: The term "Judgement Flicker" refers to light flashes of the POWER indicator light. For additional wiring diagram information, See WIRING DIAGRAMS.

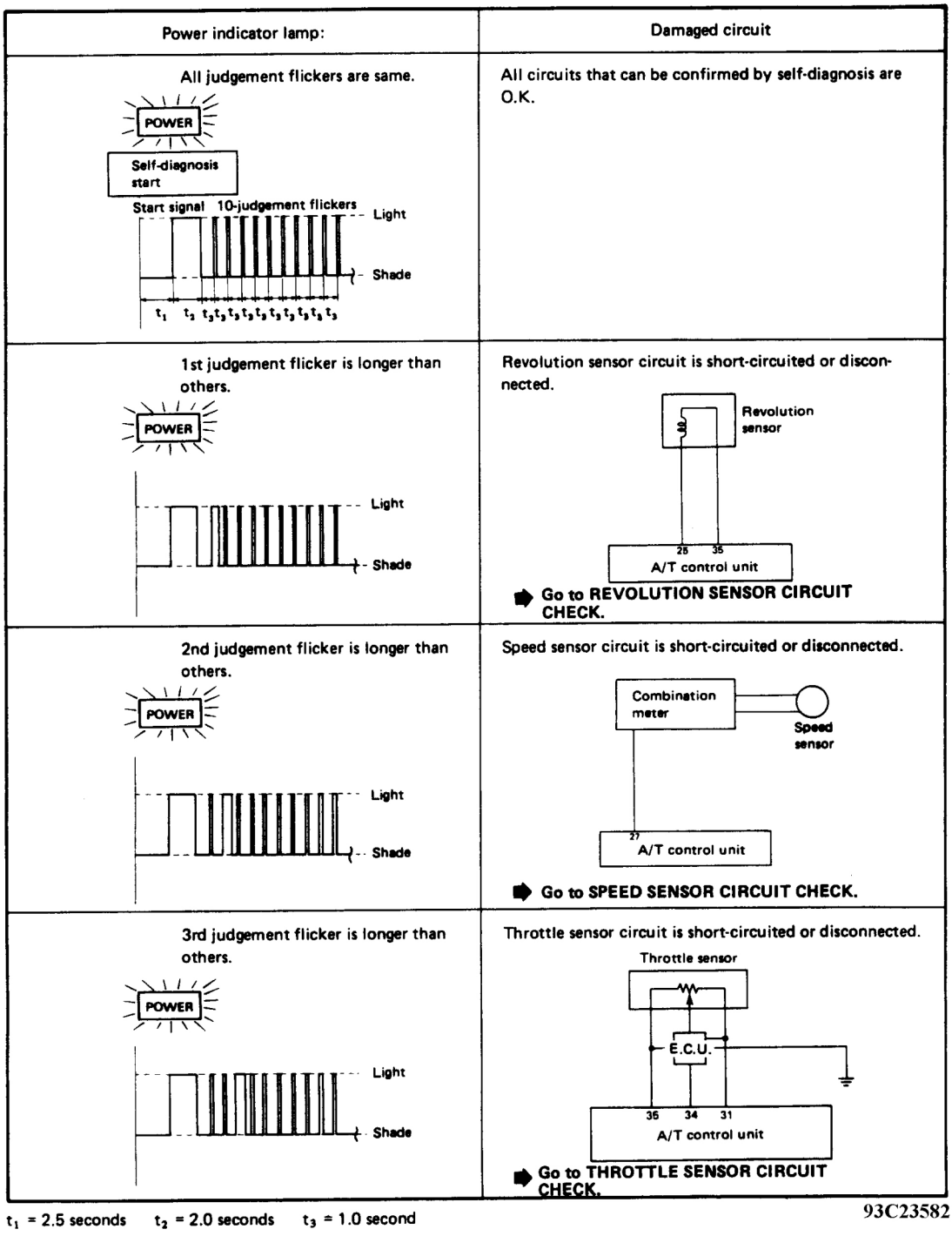


Fig. 8: Identifying Transaxle Self-Diagnostic Codes (1 Of 4)
Courtesy of NISSAN MOTOR CO., U.S.A.

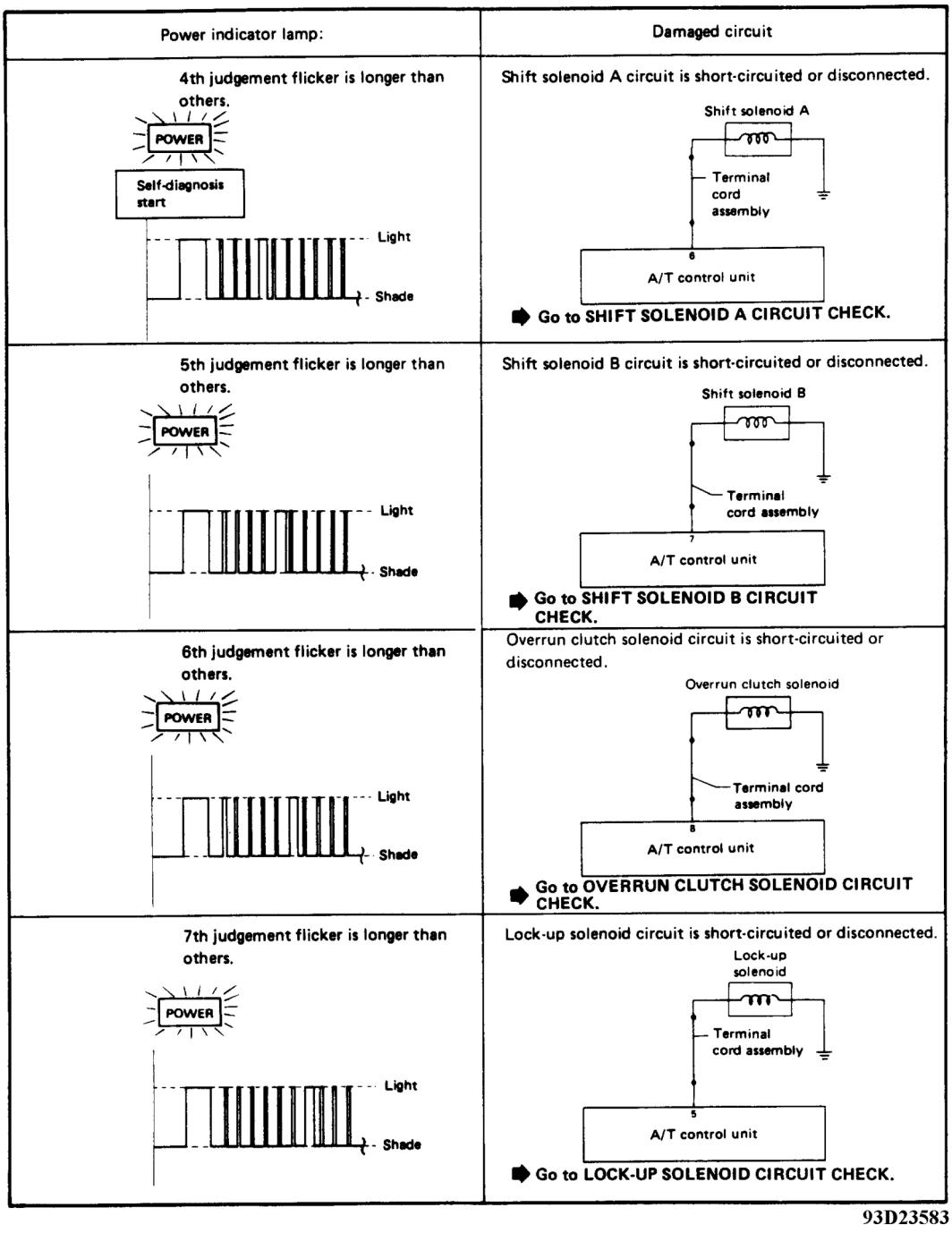


Fig. 9: Identifying Transaxle Self-Diagnostic Codes (2 Of 4)
Courtesy of NISSAN MOTOR CO., U.S.A.

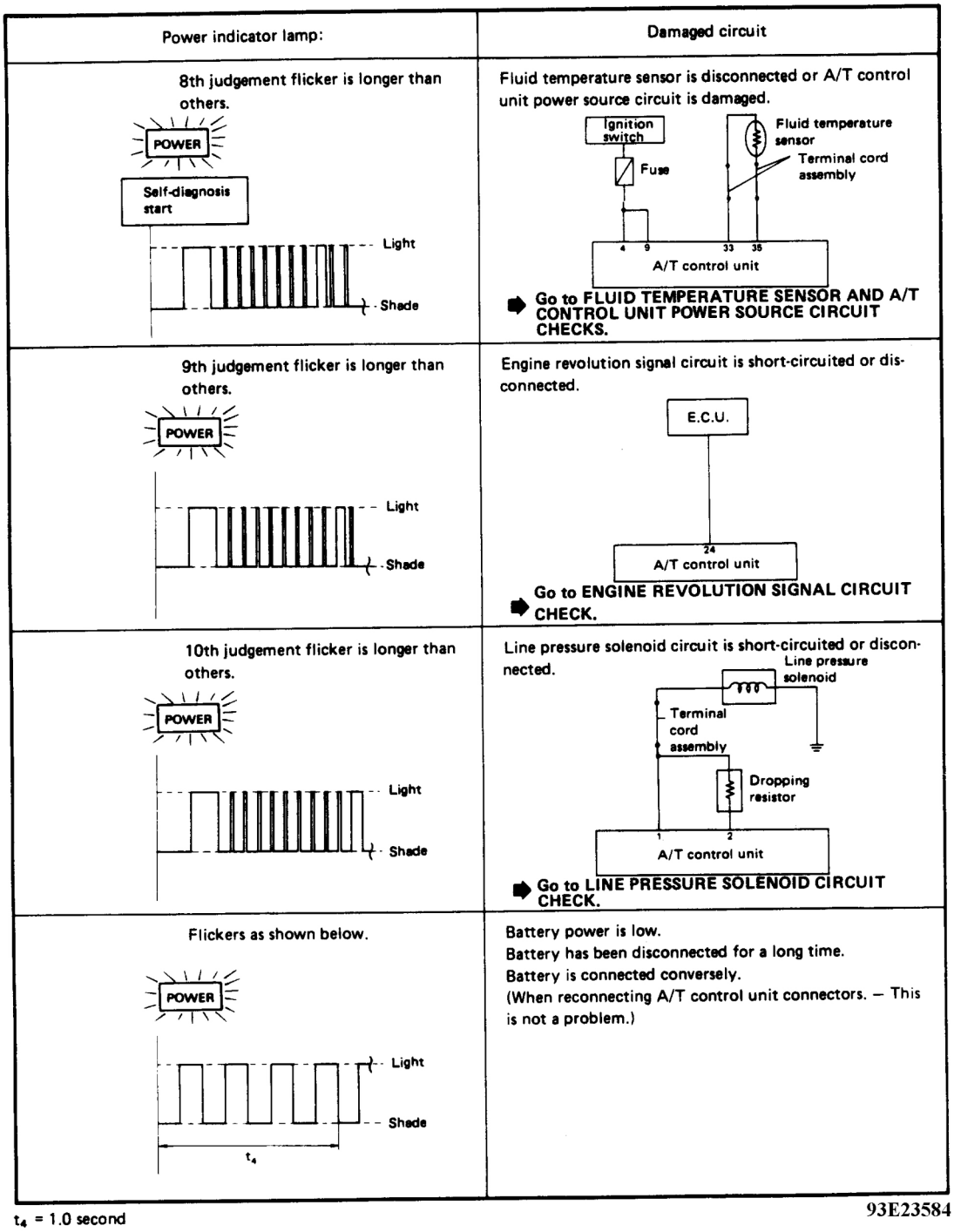


Fig. 10: Identifying Transaxle Self-Diagnostic Codes (3 Of 4)
Courtesy of NISSAN MOTOR CO., U.S.A.

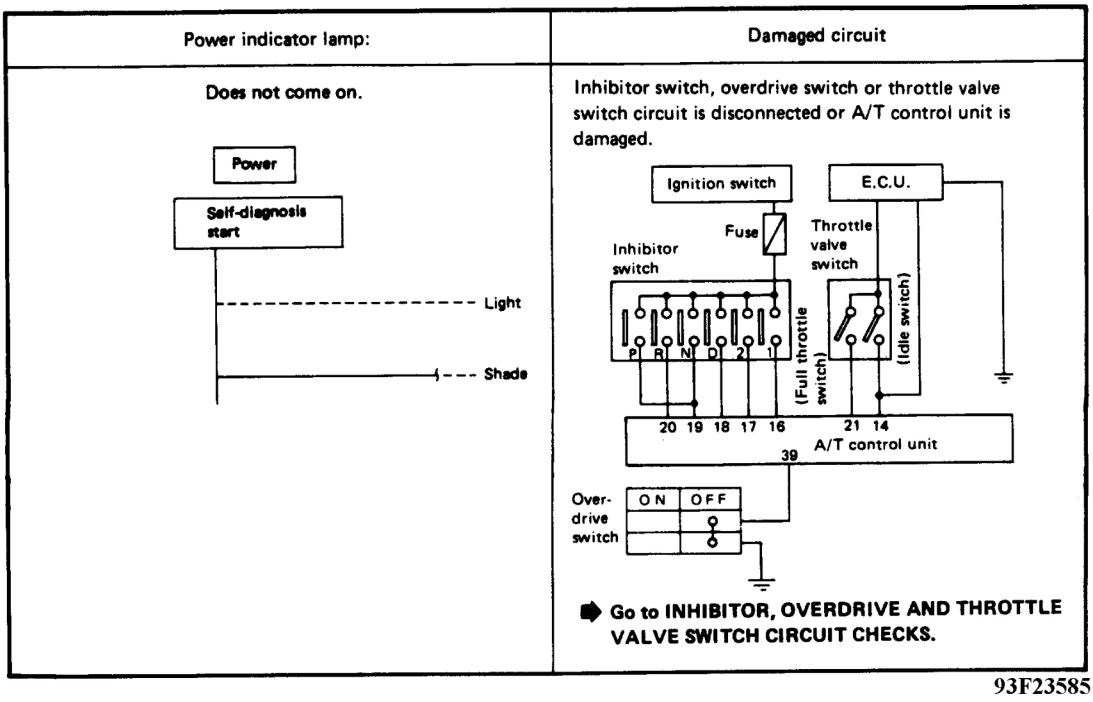


Fig. 11: Identifying Transaxle Self-Diagnostic Codes (4 Of 4)
Courtesy of NISSAN MOTOR CO., U.S.A.

ELECTRONIC COMPONENT & CIRCUIT TESTS

NOTE: If the following circuit tests do not give results as described, check wiring circuit between specified components to correct circuit malfunction. Repair as necessary. For wiring diagram information, see WIRING DIAGRAM.

ATCU POWER SOURCE TEST

With ignition switch in ON position, and engine off, check voltage between ATCU terminals No. 4, 9 and ground. Battery voltage should be present. If voltage is not as specified, repair circuit(s) as necessary.

ENGINE REVOLUTION SIGNAL CIRCUIT TEST

With ignition switch in ON position, and engine off, check voltage between ATCU terminal No. 24 and ground. Voltage should be 0.9-4.5 volts. If voltage is not as specified, repair circuit as necessary.

FLUID TEMPERATURE SENSOR TEST

1. Check resistance between fluid temperature sensor terminals. Resistance should be 2500 ohms at 68°F (20°C), and 300 ohms at 176°F (80°C). If resistance is not as specified, replace sensor.
2. Disconnect solenoid harness connector in engine compartment. Check resistance between terminals No.

33 and 35 when transaxle is cold. See **FLUID TEMPERATURE SENSOR DIAGNOSIS** table. Check voltage between ATCU terminal No. 33 and ground, while warming up transaxle. If resistance and voltage is not as specified, repair circuit as necessary.

FLUID TEMPERATURE SENSOR DIAGNOSIS

Terminal	Temperature	Resistance	Voltage
33 To 35	Cold (1)	2500 Ohms	N/A
33 To Ground	Warming Up (2)	N/A	1.5-.5

(1) Cold 68°F (20°C).

(2) Cold 68°F (20°C); Hot 176°F (80°C).

INHIBITOR SWITCH CIRCUIT TEST

Check voltage between ATCU terminals No. 16, 17, 18, 19, 20 and ground, while moving selector lever through each gear position. Battery voltage should be present at specified terminal when selector lever is in specified position. See **INHIBITOR SWITCH VOLTAGE** table.

INHIBITOR SWITCH VOLTAGE

Gear Position	Terminal No.
"P" & "N"	19
"R"	20
"D"	18
"2"	17
"1"	16

LINE PRESSURE SOLENOID TEST

1. Check resistance between solenoid assembly connector terminal No. 4 (Red wire) and ground. Solenoid resistance should be 3.2 ohms. If resistance is not as specified, replace solenoid.
2. With ignition switch in OFF position, disconnect solenoid harness connector in engine compartment. Check resistance between solenoid harness connector terminal No. 1 and ground. Resistance should be 2.5-5 ohms. If resistance is not as specified, repair circuit as necessary.
3. Disconnect ATCU connector and check resistance between solenoid harness connector terminal No. 1 and ATCU terminal No. 2. Resistance should be 11.2-12.8. If resistance is not as specified, check resistance of dropping resistor, located under air cleaner. Resistance should be 11.2-12.8 ohms. Replace resistor as necessary.
4. Check resistance between solenoid harness connector terminal No. 1 and ATCU terminal No. 1. Resistance should be approximately zero ohms. If resistance is not as specified, repair circuit as necessary.

LOCK-UP SOLENOID TEST

1. Check resistance between solenoid assembly connector terminal No. 5 (Blue wire) and ground.

Resistance should be 13.4 ohms. If resistance is not as specified, replace solenoid.

2. With ignition switch in OFF position, disconnect solenoid harness connector in engine compartment. Check resistance between solenoid terminal No. 5 and ground. Resistance should be 2.5-5 ohms. If resistance is not as specified, repair circuit as necessary.
3. Disconnect ATCU connector and check resistance between ATCU terminal No. 5 and solenoid harness connector terminal No. 5. Resistance should be approximately zero ohms. If resistance is not as specified, repair circuit as necessary.

OVERDRIVE SWITCH TEST

1. Check continuity between terminal No. 1 (Green/Yellow wire) and terminal No. 2 (Black wire) at overdrive switch. Continuity should exist with switch in OFF position. Continuity should not exist with switch in ON position. Replace switch as necessary.
2. Turn ignition to ON position. Check voltage between ATCU terminal No. 39 and ground while overdrive switch is in ON position. Battery voltage should be present. With overdrive switch in OFF position, one volt or less should be present. If voltage is not as specified, repair circuit as necessary.

OVERRUN CLUTCH SOLENOID TEST

1. Check resistance between solenoid assembly connector terminal No. 3 (Gray) and ground. Resistance should be 20-30 ohms. If resistance is not as specified, replace solenoid as necessary.
2. With ignition switch in OFF position, disconnect solenoid harness connector in engine compartment. Check resistance between solenoid terminal No. 8 and ground. Resistance should be 20-30 ohms. If resistance is not as specified, repair circuit as necessary.
3. Disconnect ATCU connector. Check resistance between terminal No. 8 of sensor harness connector and ATCU terminal No. 8. Resistance should be approximately zero ohms. If resistance is not as specified, repair circuit as necessary.

REVOLUTION SENSOR TEST

1. Check resistance between White and Black wire terminals at revolution sensor. Resistance should be 500-650 ohms. If resistance is not as specified, replace sensor.
2. Revolution sensor is a voltage generating sensor and should be tested using a voltmeter set on AC scale. Check voltage between ATCU terminal No. 25 and ground while driving vehicle. Voltage should rise gradually relative to vehicle speed. At zero MPH, voltage should not be present. If voltage is not as specified, repair circuit as necessary.

SHIFT SOLENOID "A" TEST

1. Check resistance between solenoid assembly connector terminal No. 2 (Green wire) and ground. Resistance should be 20-30 ohms. If resistance is not as specified, replace solenoid.
2. With ignition switch in OFF position, disconnect solenoid harness connector in engine compartment. Check resistance between solenoid harness connector terminal No. 6 and ground. Resistance should be 20-30 ohms. If resistance is not as specified, repair circuit as necessary.
3. Disconnect ATCU connector. Check resistance between terminal No. 6 of sensor harness connector and ATCU terminal No. 6. Resistance should be approximately zero ohms. If resistance is not as specified,

repair circuit as necessary.

SHIFT SOLENOID "B" TEST

1. Check resistance between solenoid assembly connector terminal No. 1 (Yellow wire) and ground. Resistance should be 20-30 ohms. If resistance is not as specified, replace solenoid.
2. With ignition switch in OFF position, disconnect solenoid harness connector in engine compartment. Check resistance between solenoid harness connector terminal No. 7 and ground. Resistance should be 20-30 ohms. If resistance is not as specified, repair circuit as necessary.
3. Disconnect ATCU connector. Check resistance between terminal No. 7 of sensor harness connector and ATCU terminal No. 7. Resistance should be approximately zero ohms. If resistance is not as specified, repair circuit as necessary.

SPEED SENSOR CIRCUIT TEST

Check voltage between ATCU terminal No. 27 and ground while driving 1-2 MPH for 3 ft. (1m) or more. Voltage should vary from 0-5 volts. If voltage is not as described, check for continuity in wiring harness between ATCU and speed sensor. Check for poor ground circuit.

THROTTLE SENSOR CIRCUIT TEST

Check voltage between ATCU terminals No. 34 and 35 while depressing accelerator pedal slowly. At closed throttle, .2-.6 volt should be present. At wide open throttle, 2.9-3.9 volts should be present. Voltage rises relative to throttle valve opening.

THROTTLE VALVE SWITCH CIRCUIT

Checking Idle Switch Circuit

Check voltage between ATCU terminal No. 14 and ground while depressing accelerator slowly. When depressing accelerator pedal to wide open throttle, one volt or less should be present. When releasing accelerator pedal, 8-15 volts should be present.

Checking Full Throttle Switch Circuit

Check voltage between ATCU terminal No. 21 and ground while depressing accelerator slowly. When depressing accelerator pedal to wide open throttle, 8-15 volts should be present. When releasing accelerator pedal, one volt or less should be present.

SHIFT LOCK SYSTEM TESTING

Detention Switch (Altima)

1. Disconnect 9-pin shift lock harness connector, located below shift lever on left rear side. Check for continuity between shift lock harness connector, terminal No. 5 (Red/Blue wire) and terminal No. 6 (Black wire).
2. When selector lever is in Park and selector lever button is released, continuity should not exist. Continuity

should exist for all other conditions. If continuity is not as specified, replace detention switch, located below shift lever at left front side.

Shift Lock Solenoid (Altima)

Disconnect 9-pin shift lock harness connector, located below shift lever on left rear side. Connect fused jumper wire from positive battery terminal to terminal No. 8(Blue/Black wire) at shift lock harness connector. Connect jumper wire from negative battery terminal to terminal No. 9 (Black wire) at shift lock harness connector. Shift lock solenoid should operate. Replace solenoid if necessary.

Shift Lock Control Module (Altima)

1. Check voltage at specified terminals of 8-pin shift lock control module connector, located to right of hood release handle. If voltage is not as specified, check appropriate component, connector or wiring harness and repair as necessary.
2. With ignition switch in ON position, check voltage between shift lock control module terminal No. 1 (Brown Wire) and terminal No. 8 (Black Wire). Battery voltage should exist. Voltage should not exist under any other conditions. If voltage is not as specified, check fuse No. 25(10-amp) in fuse block.
3. Check for voltage between shift lock control module terminal No. 2 (Red/Yellow wire) and terminal No. 8. Battery voltage should exist under all conditions. If voltage is not as specified, check fuse No. 18 (15-amp) in fuse block.
4. With ignition switch in ON position, selector lever in Park, and brake pedal applied, check for voltage between shift lock control module terminal No. 4 (Blue/Black wire) and terminal No. 8. Battery voltage should exist. Voltage should not exist under any other conditions. If voltage is not as specified, check shift lock solenoid.
5. Check for voltage between shift lock control module terminal No. 5 (Red/Green wire) and terminal No. 8. With brake pedal applied, battery voltage should exist. With brake pedal released, voltage should not exist. If voltage is not as specified, check stoplight switch.
6. Check for voltage between shift lock control module terminal No. 6 (Red/Blue wire) and terminal No. 8. When ignition key is inserted into key cylinder, selector lever is in Park and selector lever button is pushed, battery voltage should exist. When selector lever is set to any other position except Park, battery voltage should exist. Voltage should not exist under any other conditions. If voltage is not as specified, check detention switch.

Detention Switch (Key) Maxima

1. Disconnect 6-pin shift lock harness connector, located below and to rear of shift lever. Check for continuity between shift lock harness connector terminal No. 11(Yellow/Blue wire) and terminal No. 12 (White/Blue wire).
2. When selector lever is in Park and selector lever button is released, continuity should not exist. Continuity should exist for all other conditions. If continuity is not as specified, replace detention switch.

Detention Switch (Shift) Maxima

1. Disconnect 6-pin shift lock harness connector, located below and to rear of shift lever. Check for continuity between shift lock harness connector terminal No. 5 (Pink wire) and terminal No. 11 (Yellow/Blue wire).

2. When selector lever is in Park and selector lever button is released, continuity should not exist. Continuity should exist for all other conditions. If continuity is not as specified, replace detention switch.

Key Lock Solenoid (Maxima)

Disconnect key lock solenoid connector, located below ignition switch on steering column. Connect fused jumper wire from battery positive terminal to Blue/Black wire at key lock solenoid connector. Connect jumper wire from battery negative terminal to Blue wire at key lock solenoid connector. Key lock solenoid should operate. Replace solenoid if necessary.

Key Switch (Maxima)

Disconnect key switch connector, located at base of steering column. Check for continuity between Yellow/Blue wire and Orange wire. Continuity should exist when key is inserted into key cylinder. Continuity should not exist when key is removed from key cylinder. If continuity is not as specified, replace key switch.

Shift Lock Solenoid (Maxima)

Disconnect 6-pin shift lock harness connector, located below and to rear of shift lever. Connect fused jumper wire from positive battery terminal to terminal No. 1 (Black wire) at shift lock harness connector. Connect jumper wire from negative battery terminal to terminal No. 9 (Light Blue wire) at shift lock harness connector. Shift lock solenoid should operate. Replace solenoid if necessary.

Shift Lock Control Unit (Maxima)

1. Check voltage between specified terminals of 12-pin shift lock control unit connector, located behind right side kick panel. If voltage is not as specified, check appropriate component, connector or wiring harness and repair as necessary.
2. Turn ignition switch to ON position. Check voltage between shift lock control unit connector terminal No. 1 (Light Blue wire) and terminal No. 9 (Black wire) when selector lever is in Park and brake pedal is applied. Battery voltage should exist. Voltage should not exist under any other conditions. If voltage is not as specified, check shift lock solenoid operation.
3. Check voltage between shift lock control unit connector terminal No. 3 (Red/White wire) and terminal No. 9. With brake pedal applied, battery voltage should exist. With brake pedal released, voltage should not exist. If voltage is not as specified, check stoplight switch.
4. Check voltage at shift lock control unit connector terminal No. 4 (Pink wire) and terminal No. 9. Battery voltage should exist under all conditions. If battery voltage is not present, check 10-amp fuse in fuse block.
5. Check voltage between shift lock control unit connector terminal No. 5 (Pink wire) and terminal No. 9. When ignition key is inserted into key cylinder, selector lever is in Park and selector lever button is pushed, battery voltage should exist. When selector lever is set to any other position except Park, and selector lever button is not pushed, battery voltage should exist. Voltage should not exist under any other conditions. If voltage is not as specified, check detention switch (shift).
6. Turn ignition switch to ON position. Check voltage between shift lock control unit connector terminal No. 6 (Green wire) and terminal No. 9. Battery voltage should exist. Voltage should not exist under any other conditions. If voltage is not as specified, check 10-amp fuse in fuse block.

7. Check voltage between shift lock control unit connector terminal No. 8 (Blue wire) and terminal No. 10 (Blue/Black wire). When ignition switch is turned from LOCK, OFF or ACC position to ON position, battery voltage should exist. Voltage should not exist under any other conditions. If voltage is not as specified, check key lock solenoid operation.
8. Check voltage between shift lock control unit connector terminal No. 8 (Blue wire) and terminal No. 10 (Blue/Black wire). When selector lever is in Park, and ignition switch is turned from ON to LOCK, OFF or ACC position with selector lever button released, battery voltage should exist. Voltage should not exist under any other conditions. If voltage is not as specified, check key lock solenoid operation.
9. Check voltage between shift lock control unit connector terminal No. 9, and terminal No. 11 (Yellow/Blue wire). Battery voltage should exist when ignition key is inserted into key cylinder. Voltage should not exist under any other conditions. If voltage is not as specified, check key switch operation.
10. Check voltage between shift lock control unit terminal No. 9 and terminal No. 12 (White/Blue wire). When ignition key is inserted into key cylinder, selector lever is in Park and selector lever button is pushed, battery voltage should exist. When selector lever is set to any other position except Park and selector lever button is not pushed, battery voltage should exist. Voltage should not exist under any other conditions. If voltage is not as specified, check detention switch (key).

NOTE: On Maxima, if selector lever cannot be moved from Park, even if ignition switch is in ON position and brake pedal is applied, move selector lever from Park while pushing shift lock release button, located at base of selector lever. When ignition key cannot be removed, even if selector lever is in Park, push emergency button, located at ignition switch, to remove key.

Shift Lock System (Quest)

NOTE: If selector lever cannot be moved from Park, even if ignition switch is in ON position and brake pedal is applied, turn ignition switch to OFF position (unlocked). Lever can be moved in this position. Test information for shift lock relay is not available from manufacturer.

1. Check voltage between each terminal of shift lock solenoid connector (located on left side of steering shaft, near lower column bracket) and ground with ignition switch and brake pedal in specified positions.
2. With ignition switch in ON position and brake pedal applied, battery voltage should exist at terminal No. 1 (Light Green/Red wire) and terminal No. 3 (Red/Green or Yellow/Black wire). Voltage should not exist at terminal No. 2 (Black wire). With ignition switch in ON position and brake pedal released, battery voltage should exist at terminal No. 1. Voltage should not exist at terminals No. 2 and 3.
3. With ignition switch in OFF position (unlocked) and brake pedal applied, battery voltage should exist at terminal No. 3. Voltage should not exist at terminals No. 1 and 2. With ignition switch in OFF position (unlocked) and brake pedal released, voltage should not exist at any solenoid connector terminal.
4. If voltage is not as described in previous steps, check and repair stoplight switch, shift lock relay (located below glove box), wiring harness or connector as necessary.

REMOVAL & INSTALLATION

TRANSMISSION

See the appropriate TRANSMISSION REMOVAL & INSTALLATION - A/T article in the AUTOMATIC TRANS SERVICING section. Refer to the following menu:

- For Altima, see: **TRANSMISSION REMOVAL & INSTALLATION - A/T**
- For Maxima, see: **TRANSMISSION REMOVAL & INSTALLATION - A/T**
- For Quest, see: **TRANSMISSION REMOVAL & INSTALLATION - A/T**

TORQUE CONVERTER

1. Torque converter is a sealed unit and cannot be disassembled for service. Replace torque converter if damaged. Check converter one-way clutch using flat-blade screwdriver and suitable wire. See **Fig. 12**.
2. Hook wire into groove of bearing support unitized with one-way clutch outer race. While holding bearing support with wire, rotate one-way clutch spline using screwdriver. Ensure inner race rotates clockwise only. If inner race rotates in both directions, replace torque converter.

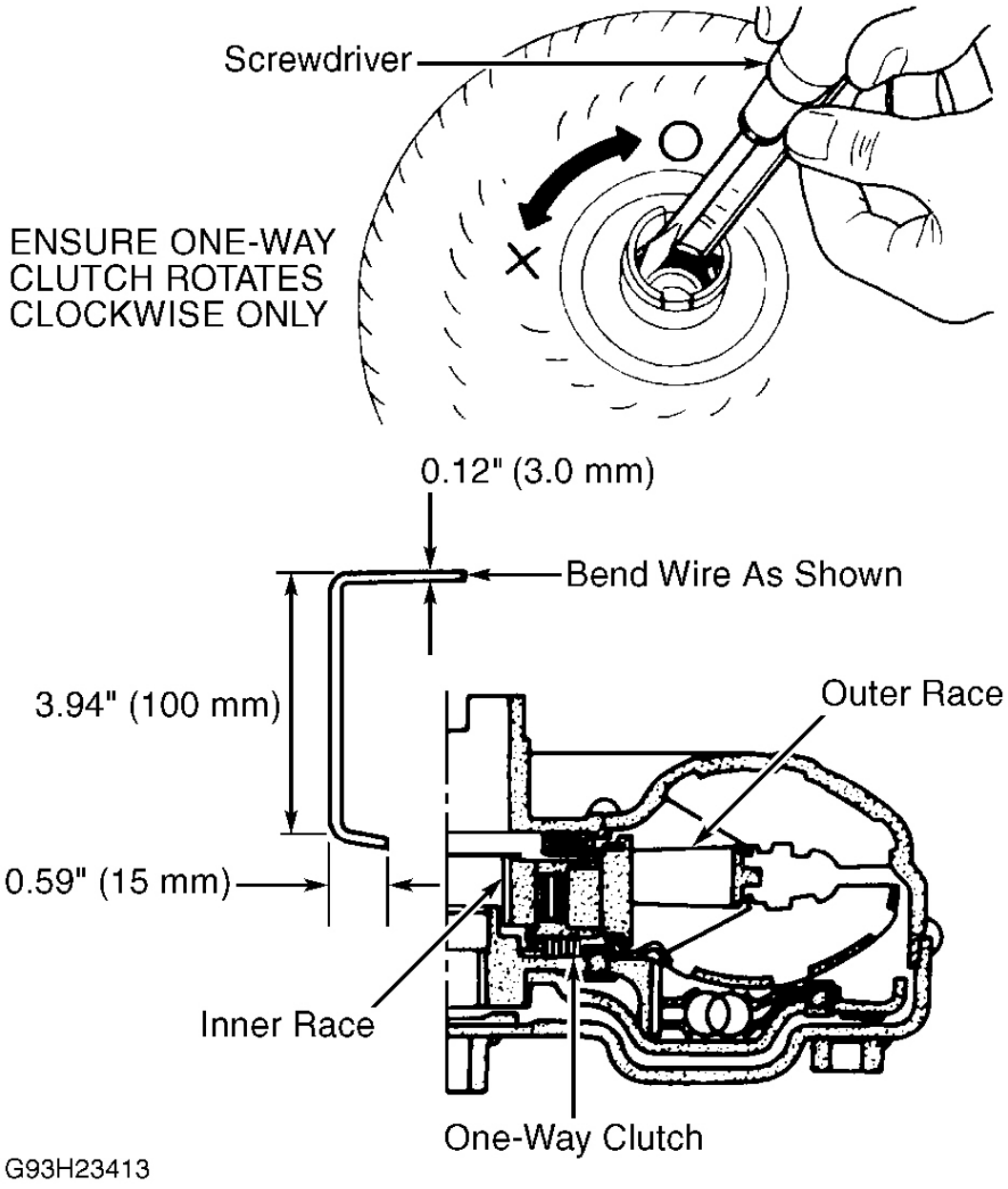


Fig. 12: Checking Torque Converter One-Way Clutch
Courtesy of NISSAN MOTOR CO., U.S.A.

TRANSAXLE DISASSEMBLY

1. Remove drain plug and drain fluid. Remove torque converter. Check torque converter one-way clutch. Remove dipstick and dipstick tube. Remove oil cooler tube. Set manual lever to "P" position. Remove inhibitor switch. Remove oil pan and gasket. See **Fig. 15**. **DO NOT** reuse oil pan bolts.

2. Remove control valve assembly bolts. See **Fig. 4**. Remove clip from terminal body. Push terminal body into transaxle case and remove solenoid harness. Remove manual valve from control valve assembly. Remove return spring from 3-R accumulator piston. Using compressed air, remove 3-R accumulator piston. See **Fig. 13**.
3. Remove "O" rings from 3-R accumulator piston. Using compressed air, remove N-D accumulator piston and return spring. See **Fig. 13**. Remove "O" rings from N-D accumulator piston. Check accumulator pistons and contact surface of transaxle case for damage. Check accumulator return springs free length and diameter. See the **ACCUMULATOR SPRING SPECIFICATIONS** table.

ACCUMULATOR SPRING SPECIFICATIONS

Application	In. (mm)
N-D Accumulator Spring	
Free Length	1.713 (43.50)
Outer Diameter	1.163 (27.00)
3-R Accumulator Spring	
Free Length	2.067 (52.50)
Outer Diameter	.803 (20.40)

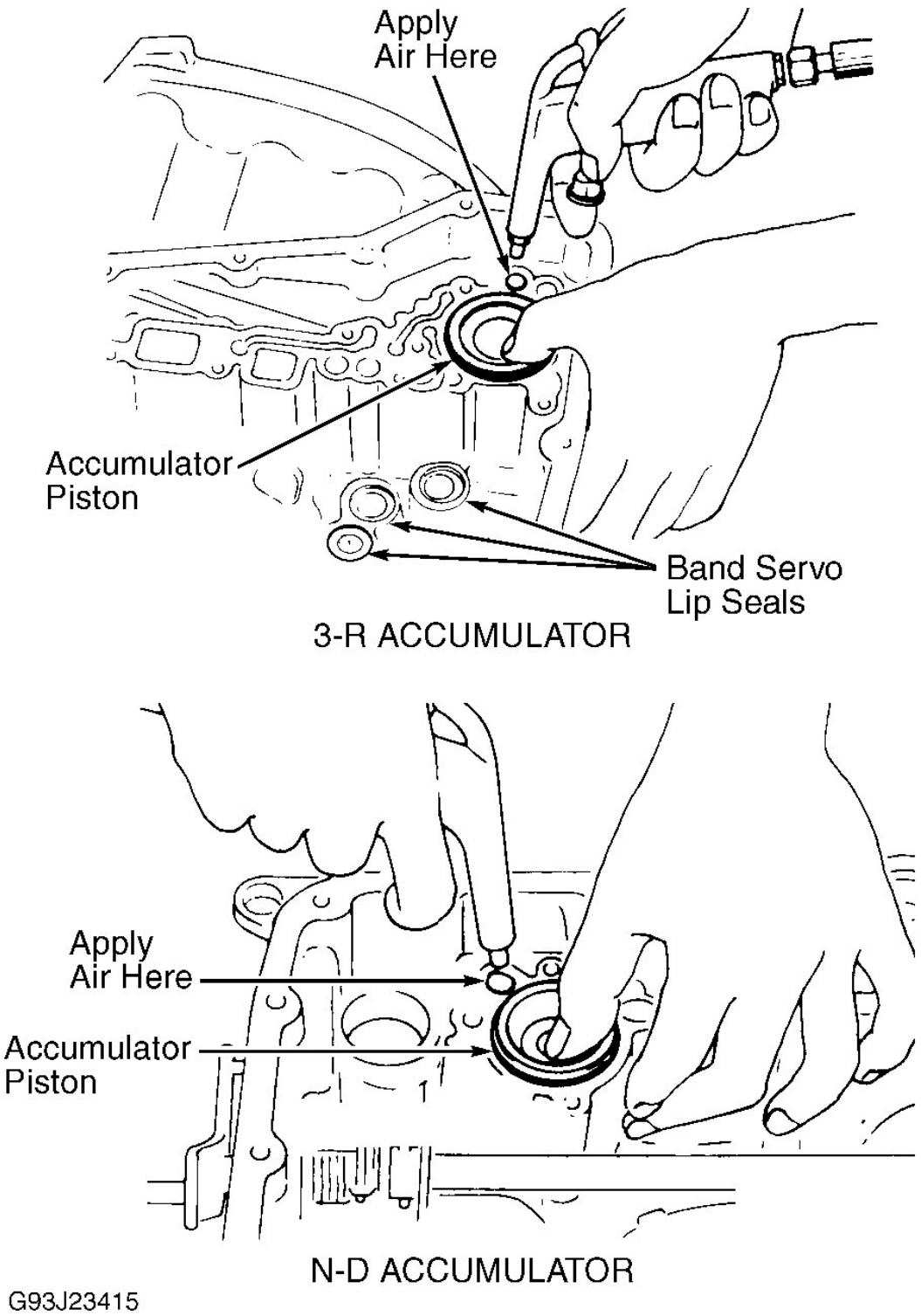


Fig. 13: Removing N-D & 3-R Accumulator Pistons

Courtesy of NISSAN MOTOR CO., U.S.A.

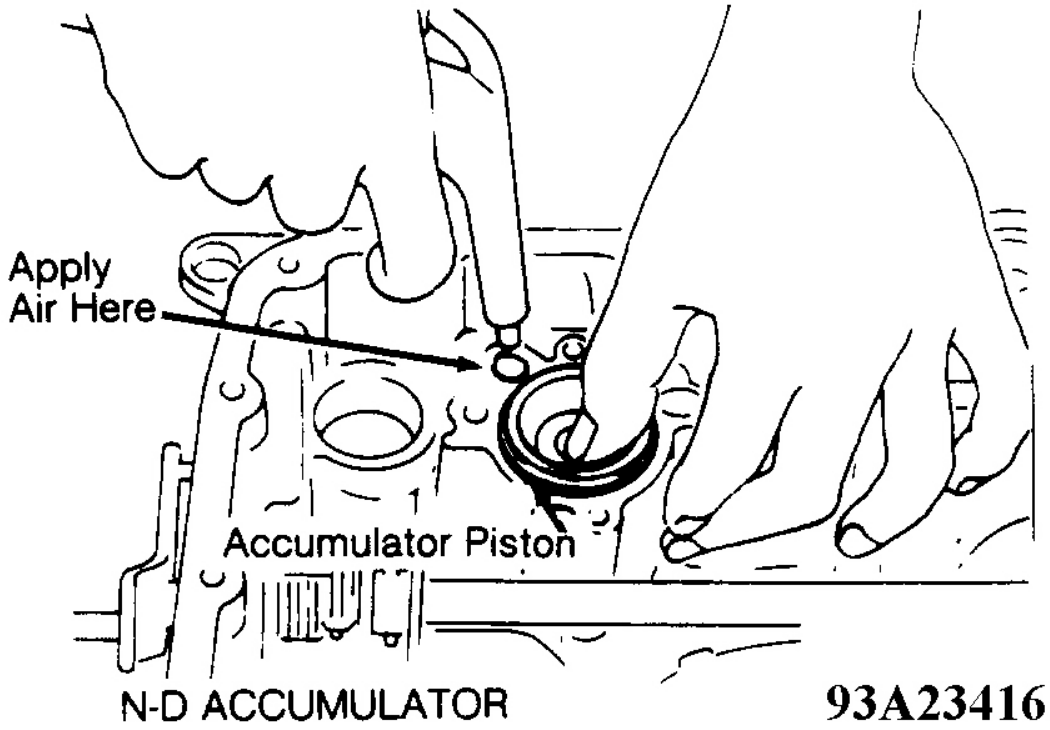


Fig. 14: Removing N-D & 3-R Accumulator Pistons
Courtesy of NISSAN MOTOR CO., U.S.A.

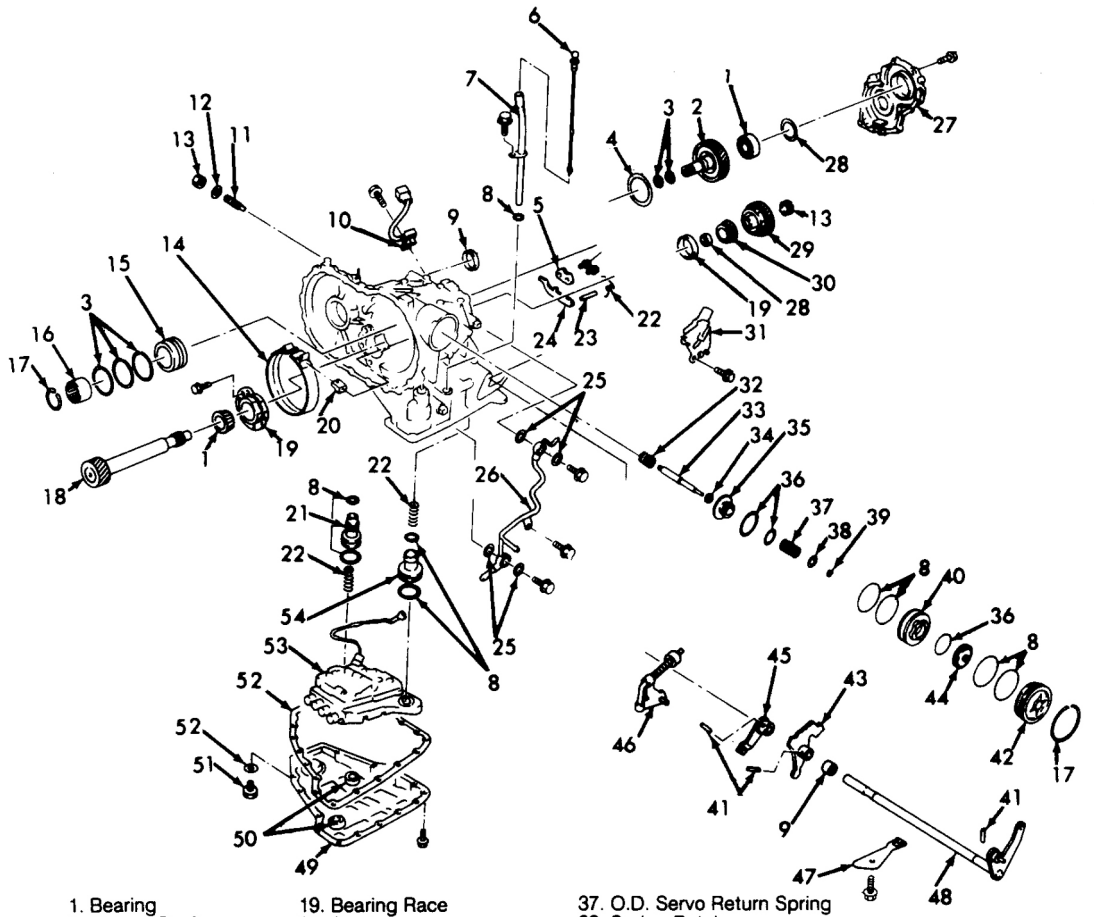


Fig. 15: Exploded View Of Transaxle Case Components
Courtesy of NISSAN MOTOR CO., U.S.A.

4. Remove 4 lip seals from transaxle case. Remove tube and sleeve. Remove converter housing bolts. Remove converter housing by tapping housing with soft-faced hammer. Remove "O" ring from differential oil port.
5. Remove differential assembly from transaxle case. Use appropriate puller to remove differential side bearing outer race from transaxle case and converter housing. Remove differential side bearing adjustment shim from transaxle case.
6. Using a hammer and screwdriver, remove oil seal from converter housing, being careful not to damage

converter housing. Remove oil tube from converter housing. Remove "O" ring from input shaft. See **Fig. 16**. Remove oil pump assembly bolts and remove oil pump assembly, baffle and gasket from transaxle case. Remove thrust washer and bearing race from oil pump assembly. Loosen anchor end pin lock nut, then back off anchor end pin.

7. Remove brake band and strut from transaxle case. When removing brake band, insert wire clip into brake band ends for support. To prevent brake lining from cracking or peeling, **DO NOT** stretch brake band. Check brake band facing for damage, cracks, wear or burns. Remove high clutch (with input shaft assembly), reverse clutch and front sun gear. Remove high clutch from reverse clutch. See **Fig. 19**.
8. Remove needle bearing from high clutch drum. Remove high clutch hub and needle bearing from high clutch drum. Remove front sun gear and needle bearing from high clutch drum. Remove bearing race from front sun gear. Check all components for damage or wear.
9. Remove needle bearing from transaxle case. Apply compressed air to transaxle case to check low and reverse brake operation. See **Fig. 17**. Remove snap ring. Using a bent wire, remove low one-way clutch from transaxle case. See **Fig. 18**. Remove snap ring and front planetary carrier with low-reverse brake piston and spring retainer.
10. Remove low and reverse brake spring retainer. Ensure low one-way clutch rotates counterclockwise only. Remove needle bearing, low and reverse brake piston and spring retainer from front planetary carrier. See **Fig. 17**. Check all components for damage or wear.
11. Remove rear planetary carrier from transaxle case. Remove rear sun gear from rear planetary carrier. Note direction of rear sun gear prior to removal. Remove needle bearings from rear planetary carrier. Check all components for damage or wear.
12. Using a feeler gauge, check clearance between pinion washer and appropriate planetary carrier. Clearance between pinion washer and planetary carrier should be .008-.027" (.20-.70 mm), with allowable limit of .031" (.80 mm). If clearance is not as specified, replace appropriate planetary carrier.
13. Remove rear internal gear and forward clutch hub from transaxle case. Remove overrun clutch hub from transaxle case. Remove needle bearing from overrun clutch hub and check bearing for damage or wear. Remove forward clutch assembly from transaxle case. Remove needle bearing from transaxle case. Remove side cover bolts and side cover. See **Fig. 20**.

NOTE: Output shaft assembly may be removed with side cover. DO NOT drop output shaft assembly. DO NOT reuse side cover bolts.

14. Tap side cover with soft-faced hammer to remove from output shaft (if necessary). Remove adjusting shim. Remove needle bearing. Set manual lever to "P" position to lock idler gear. Using a hammer and pin punch, unlock idler gear lock nut. Remove idler gear lock nut.

NOTE: DO NOT reuse idler gear lock nut.

15. Using appropriate puller, remove idler gear from transaxle case. Remove reduction gear and remove adjusting shim from reduction gear. Remove return spring from parking shaft. Remove parking shaft and parking pawl from transaxle case. Check parking shaft and pawl for wear or damage.
16. Note direction of parking actuator support and remove actuator support from transaxle case. Inspect actuator support for wear or damage. Using a hammer and screwdriver, remove side oil seal from transaxle case. Remove manual shaft components from transaxle case. See **MANUAL SHAFT ASSEMBLY** under COMPONENT DISASSEMBLY & REASSEMBLY.

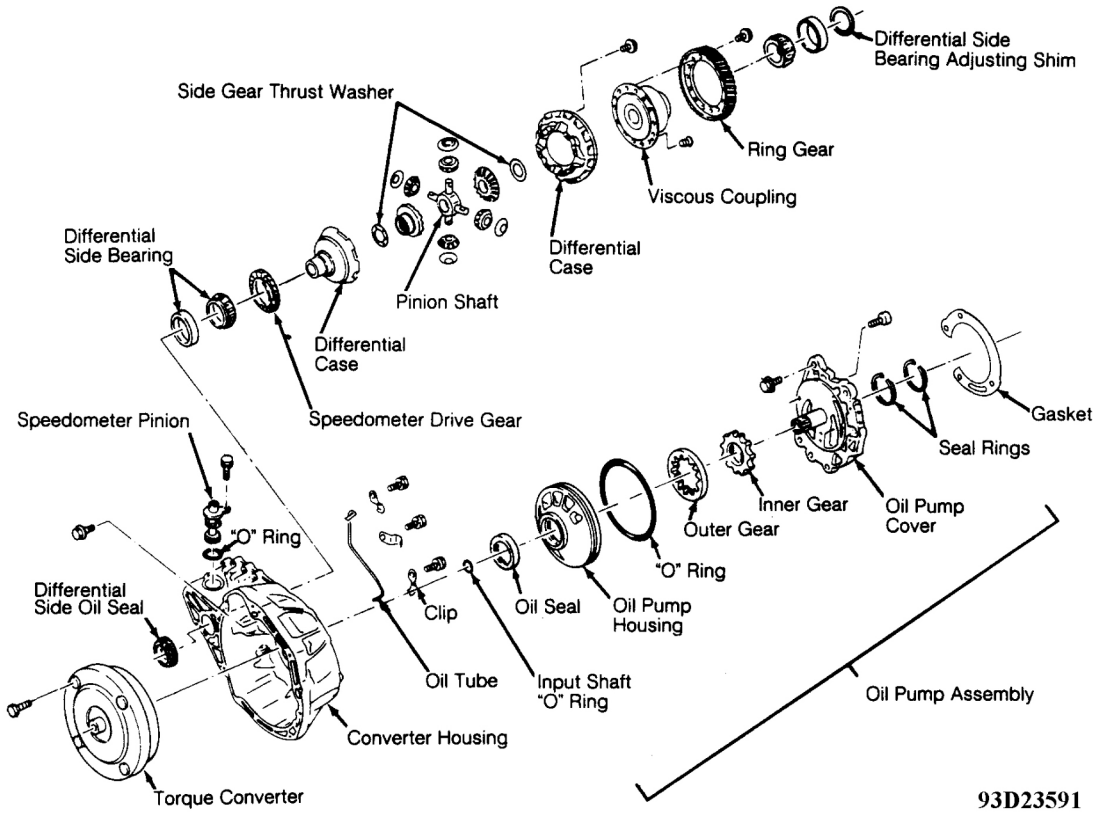


Fig. 16: Exploded View Of Torque Converter Housing & Differential Components (RE4F04V Is Shown; RE4F04A Is Similar)
Courtesy of NISSAN MOTOR CO., U.S.A.

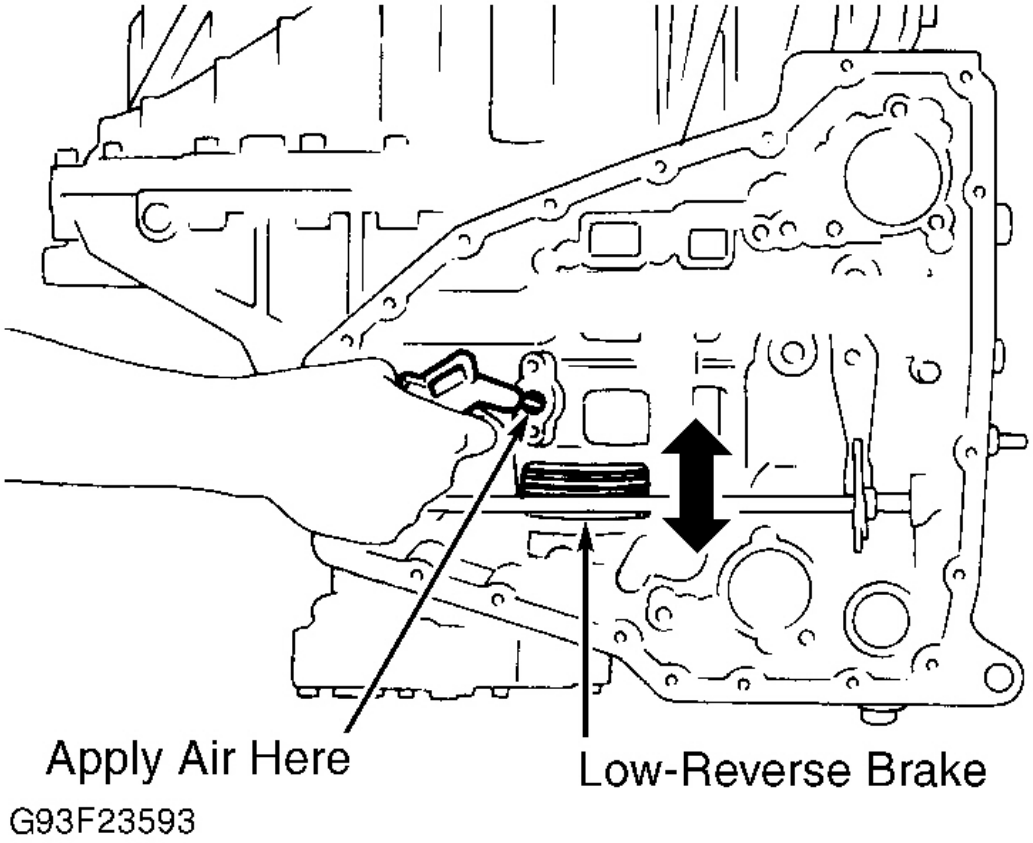


Fig. 17: Checking Low-Reverse Brake Operation
Courtesy of NISSAN MOTOR CO., U.S.A.

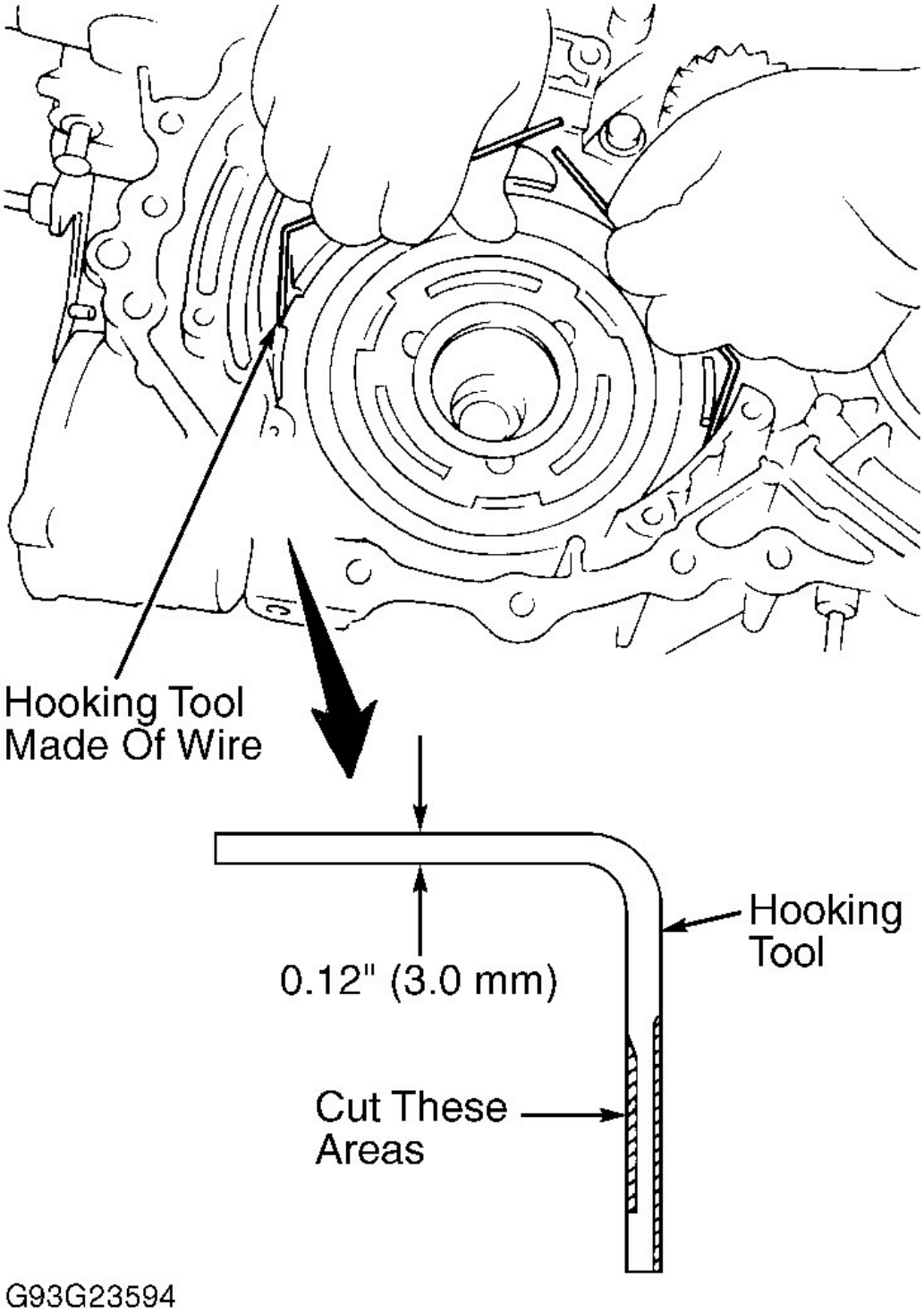
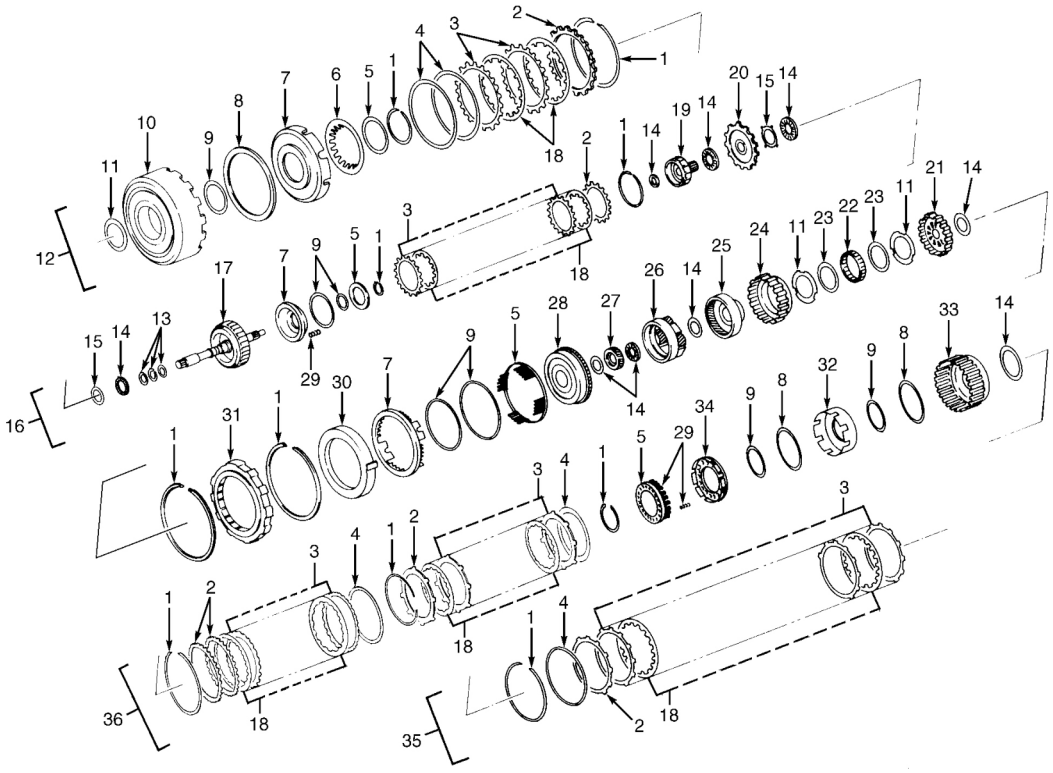


Fig. 18: Removing Low-One Way Clutch

Courtesy of NISSAN MOTOR CO., U.S.A.



1. Snap Ring
2. Retaining Plate
3. Driven Plate
4. Dish Plate
5. Spring Retainer
6. Retainer Spring
7. Piston
8. Oil Seal
9. "D" Ring
10. Reverse Clutch Drum
11. Thrust Washer
12. Reverse Clutch Assembly
13. Seal Ring
14. Needle Bearing
15. Bearing Race
16. High Clutch Assembly
17. High Clutch Drum
18. Drive Plate
19. High Clutch Hub
20. Front Sun Gear
21. Overrun Clutch Hub
22. Forward One-Way Clutch
23. End Bearing
24. Forward Clutch Hub
25. Rear Internal Gear
26. Rear Planetary Carrier
27. Rear Sun Gear
28. Front Planetary Carrier
29. Return Spring
30. Retainer
31. Low One-Way Clutch
32. Forward Clutch Piston
33. Forward Clutch Drum
34. Overrun Clutch Piston
35. Low & Reverse Brake Assembly
36. Forward & Overrun Clutch Assembly

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Fig. 19: Exploded View Of Forward Clutch, High Clutch, Low-Reverse Brake, Overrun Clutch & Reverse Clutch Assemblies
Courtesy of NISSAN MOTOR CO., U.S.A.

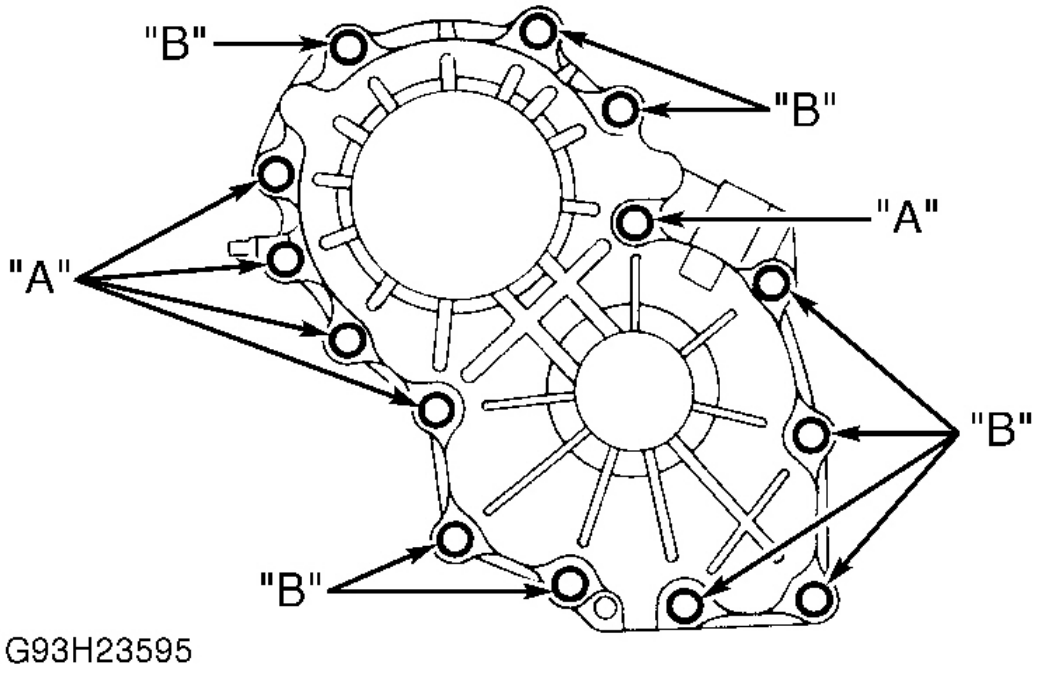


Fig. 20: Identifying Side Cover Bolt Locations
Courtesy of NISSAN MOTOR CO., U.S.A.

COMPONENT DISASSEMBLY & REASSEMBLY

OIL PUMP

Disassembly

Remove seal rings. Remove oil pump cover bolts in a crisscross pattern and remove oil pump cover. See **Fig. 21**. Remove inner and outer gears from oil pump housing, noting direction of inner gear prior to removal. Remove "O" ring from oil pump housing. See **Fig. 22**. Pry out oil pump housing oil seal.

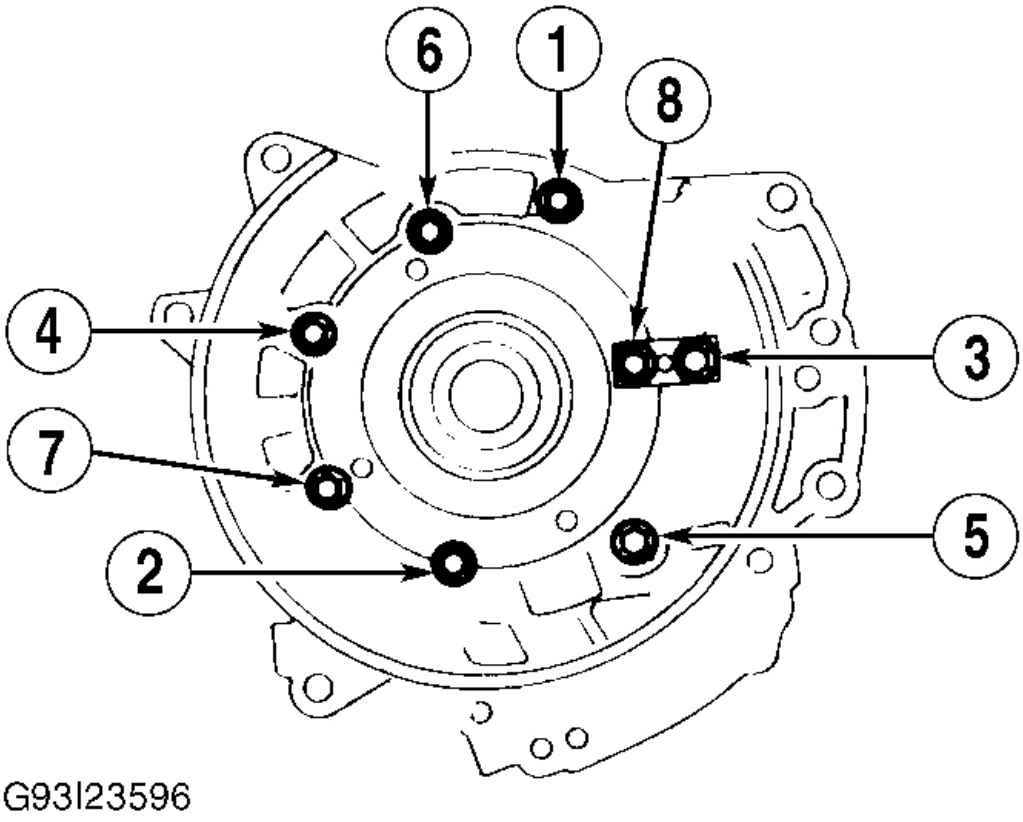


Fig. 21: Removing & Installing Oil Pump Cover
Courtesy of NISSAN MOTOR CO., U.S.A.

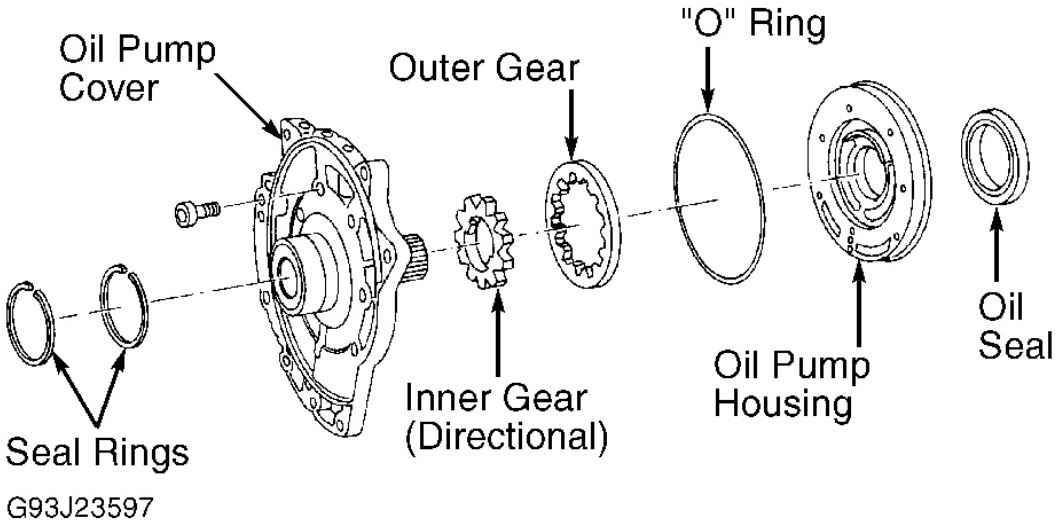


Fig. 22: Exploded View Of Oil Pump Assembly
Courtesy of NISSAN MOTOR CO., U.S.A.

Inspection

1. Inspect oil pump housing, oil pump cover and inner and outer gear for wear or damage. Using a dial indicator, measure side clearance between end of oil pump housing and inner and outer gears in at least 4 places along their circumferences. Specified clearance should be .001-.002" (.03-.05 mm). See **Fig. 23**.
2. If clearance is less then specified, replace inner and outer gears as a set. Ensure clearance is as specified. Gears are available in thicknesses of .4713-.4717" (11.970-11.980 mm), .4717-.4720" (11.980-11.990 mm) and .4720-.4724" (11.990-12.00 mm). If clearance is greater than specified, replace oil pump assembly, except oil pump cover.
3. Using a feeler gauge, measure clearance between outer gear and oil pump housing. Specified clearance should be .004-.007" (.11-.18 mm). If clearance is not as specified, replace oil pump assembly, except oil pump cover.
4. Install NEW seal rings onto oil pump cover. Measure clearance between seal ring and ring groove. Specified clearance should be .0014-.0069" (.036-.176 mm). If clearance is not as specified, replace oil pump cover.

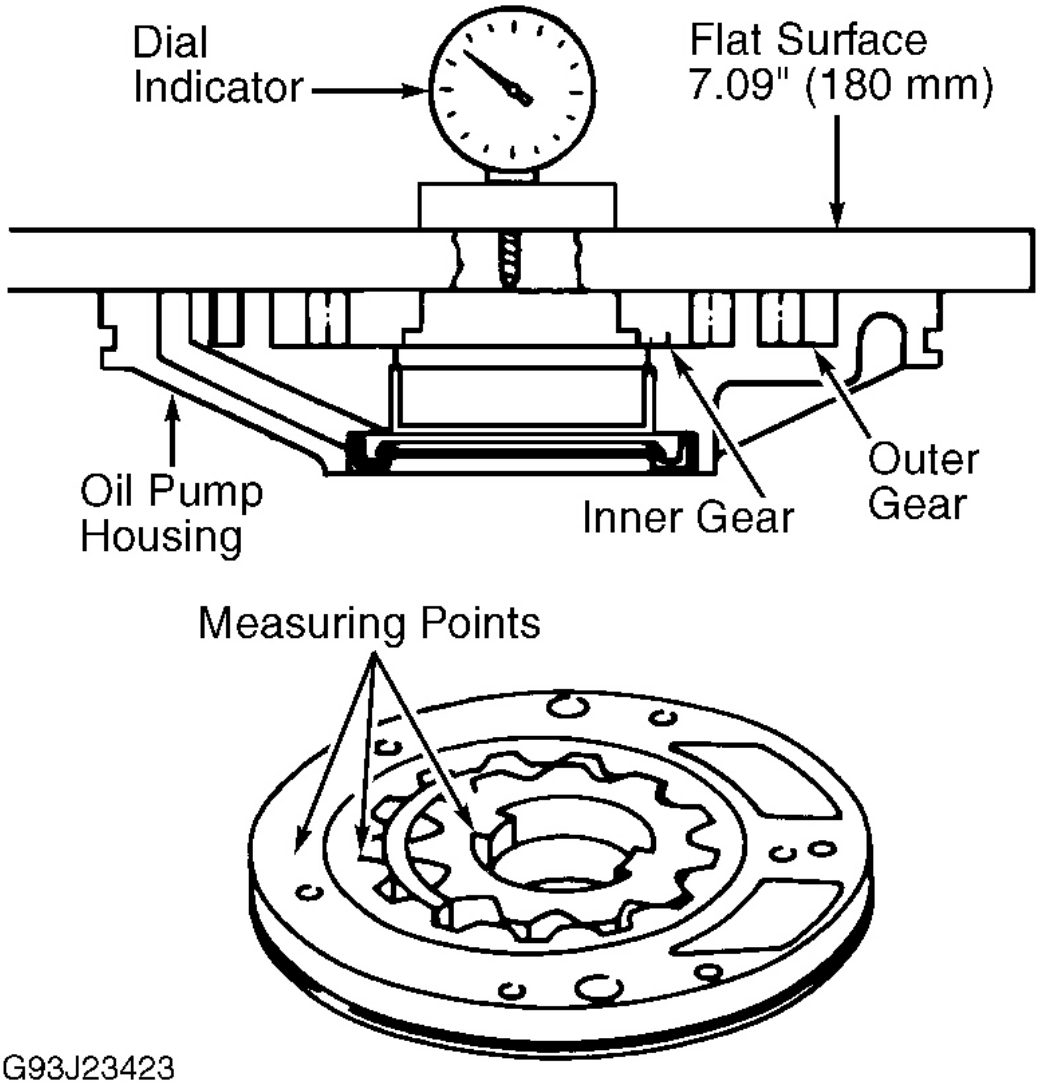


Fig. 23: Measuring Oil Pump Side Clearance
Courtesy of NISSAN MOTOR CO., U.S.A.

Reassembly

1. Using appropriate adapter, install NEW oil seal on oil pump housing. Apply ATF to NEW "O" ring and install "O" ring on oil pump housing. Install inner and outer gears on oil pump housing. Ensure inner gear is installed in same direction as removed.
2. Wrap oil pump splines with masking tape to protect oil seal. Position oil pump cover on oil pump housing, then remove masking tape. Tighten bolts in a crisscross pattern to 62-97 INCH lbs. (7-11 N.m). See **Fig. 21**.
3. Pack ring groove with petroleum jelly, then carefully install NEW seal rings (if necessary). Connect seal

ring hooks. **DO NOT** spread gap of seal ring excessively while installing as ring may become deformed.

CONTROL VALVE ASSEMBLY

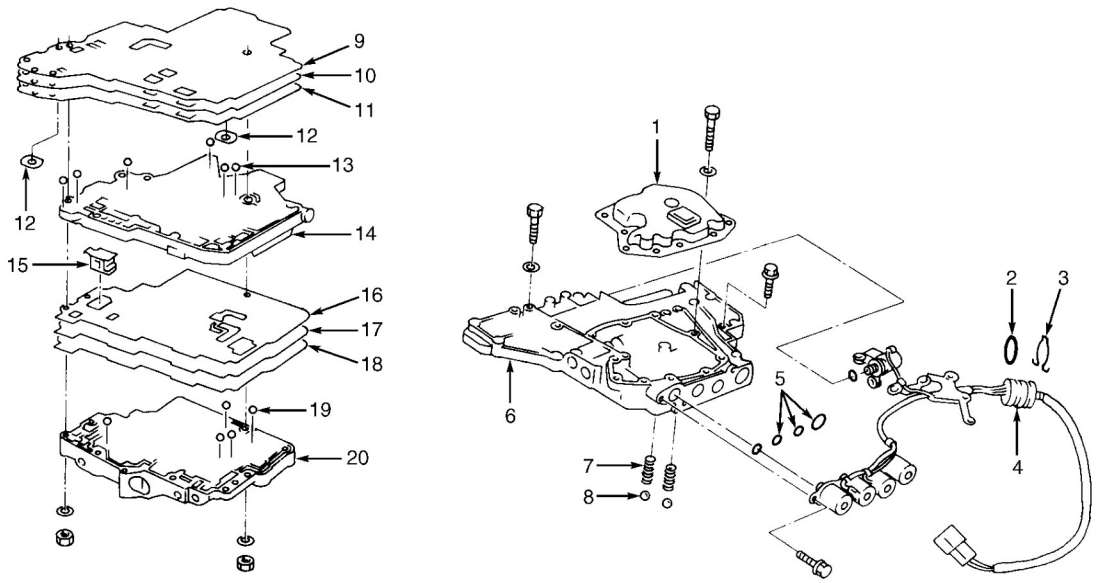
Disassembly

1. Disassemble upper, inter and lower valve bodies. See **Fig. 24**. Note bolt length, number of bolts and location. Refer to the **VALVE BODY BOLT IDENTIFICATION** table.

VALVE BODY BOLT IDENTIFICATION (1)

Identification	Length - In. (mm)	No. Of Bolts
"A"	.531 (13.50)	6
"B"	2.283 (58.00)	3
"C"	1.575 (40.00)	6
"D"	2.598 (66.00)	11
"E"	1.299 (33.00)	2
"F"	3.071 (78.00)	2
(1) See **Fig. 25** for bolt location.		

2. Remove bolts "A", "D" and nut "F", and remove oil strainer from control valve assembly. Remove solenoid assembly and line pressure solenoid from control valve assembly. Remove "O" rings from solenoids and harness terminal body. Place upper valve body face down. Remove bolts "B", "C" and "F".
3. Remove inter valve body from lower valve body. Turn lower valve body over and remove accumulator support plate. Remove bolts "E", separating plate and separating gasket from lower valve body. See **Fig. 24**. Remove check balls and relief valve springs from lower valve body. **DO NOT** lose check balls or relief valve springs.
4. Remove inter valve body with separating plate and separating gasket from upper valve body. Ensure steel balls are properly positioned in upper and inter valve bodies, then remove balls from valve bodies. **DO NOT** lose steel balls.



1. Oil Strainer
2. "O" Ring
3. Clip
4. Terminal Body
5. "O" Rings
6. Lower Valve Body
7. Relief Valve Spring
8. Check Ball
9. Lower Separating Gasket
10. Separating Plate
11. Lower Inter-Separating Gasket
12. Support Plate
13. Steel Balls (6)
14. Inter-Valve Body
15. Pilot Filter
16. Upper Inter-Separating Gasket
17. Separating Plate
18. Upper Separating Gasket
19. Steel Balls (5)
20. Upper Valve Body

G93A23598

Fig. 24: Exploded View Of Control Valve Assembly
Courtesy of NISSAN MOTOR CO., U.S.A.

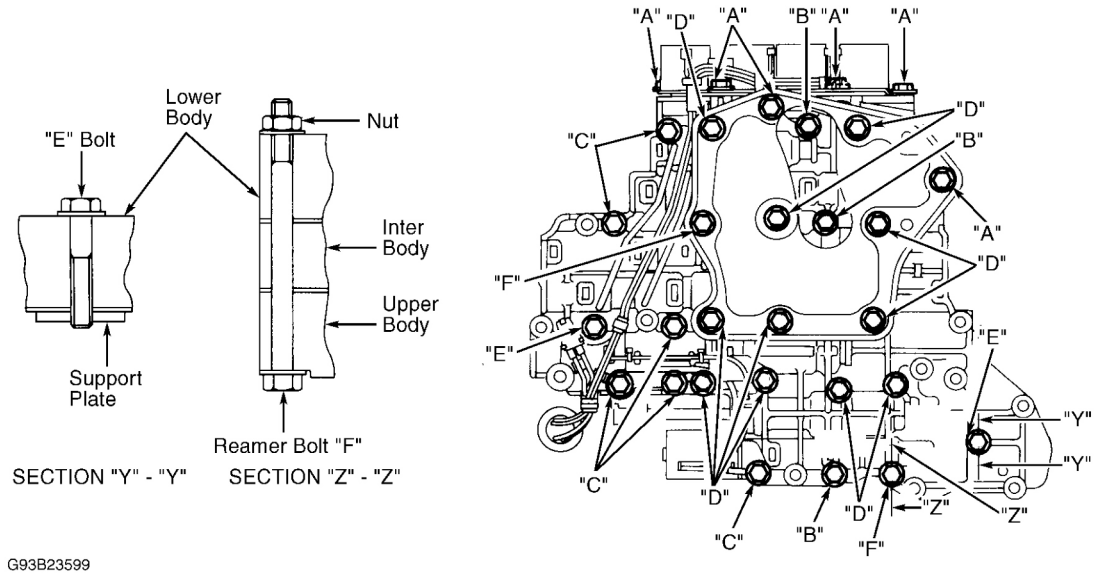


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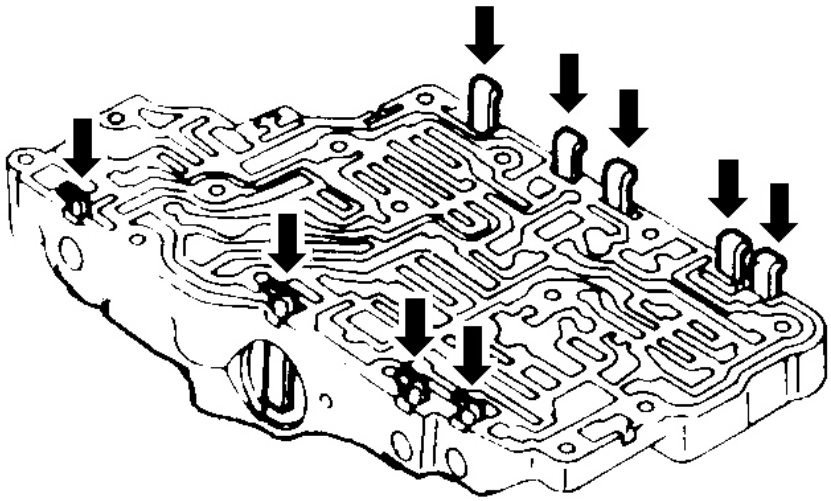
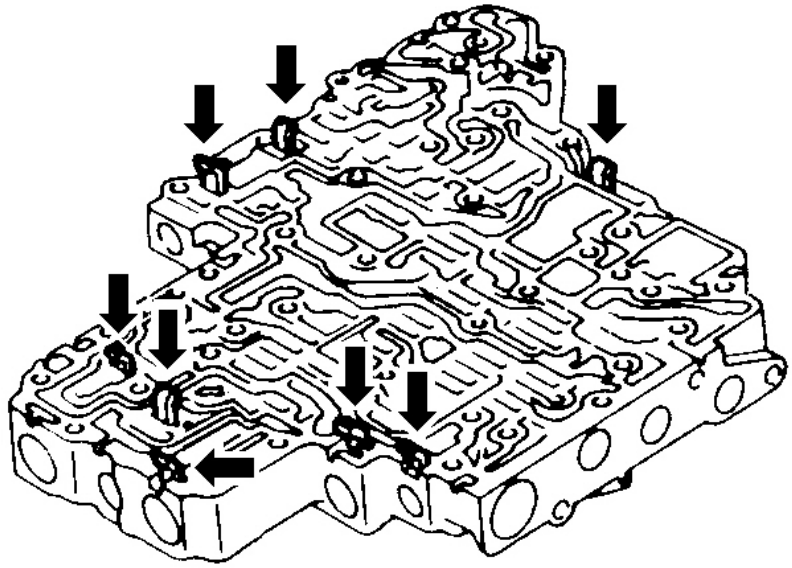
Fig. 25: Identifying Control Valve Assembly Bolt Locations
Courtesy of NISSAN MOTOR CO., U.S.A.

Inspection

Ensure retainer plates are properly positioned in lower and upper valve bodies. See **Fig. 26**. **DO NOT** lose retainer plates. Check oil strainer for damage. Inspect shift solenoids "A" and "B", line pressure solenoid, lock-up solenoid and overrun clutch solenoid. Check oil cooler relief valve springs for damage or deformation. Measure spring free length and outer diameter. Free length should be .670" (17.02 mm), and diameter should be .315" (8.00 mm). Replace springs if not as specified.



UPPER VALVE BODY



LOWER VALVE BODY

G93E23600

Fig. 26: Identifying Retainer Plate Locations (Number May Vary)
Courtesy of NISSAN MOTOR CO., U.S.A.

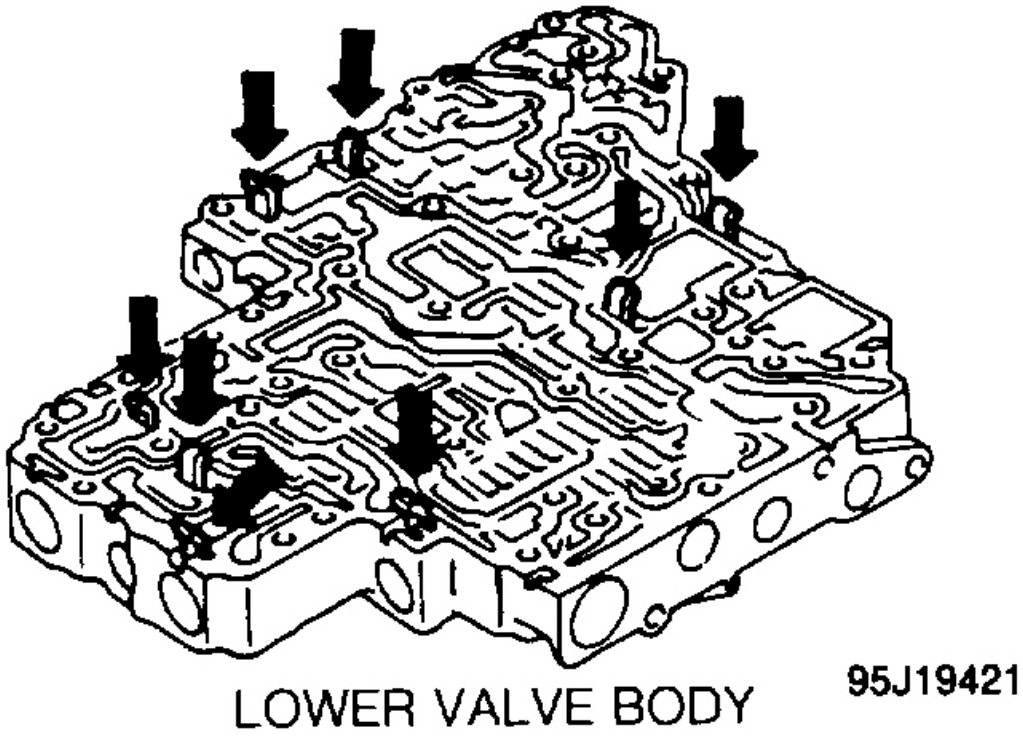
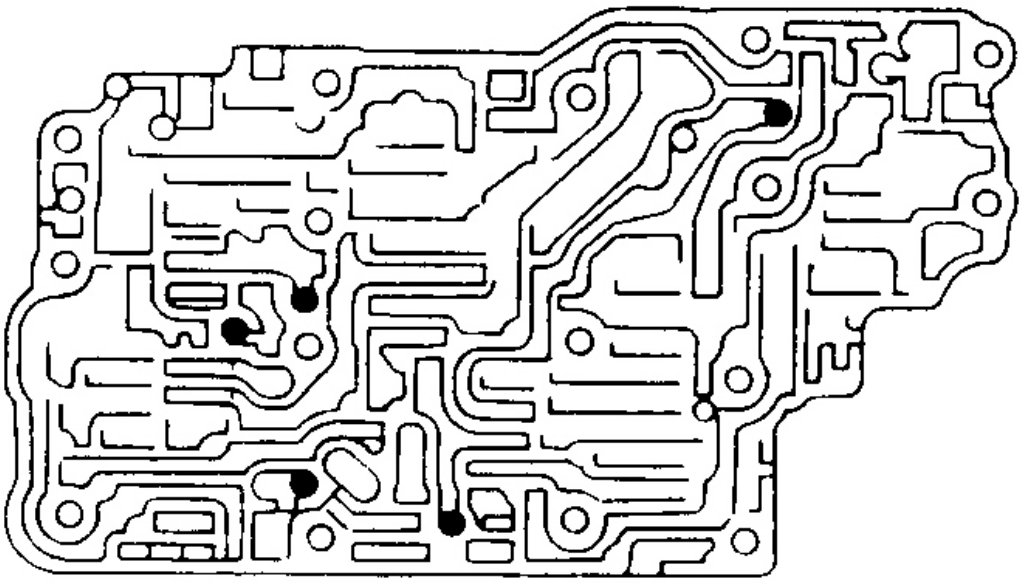


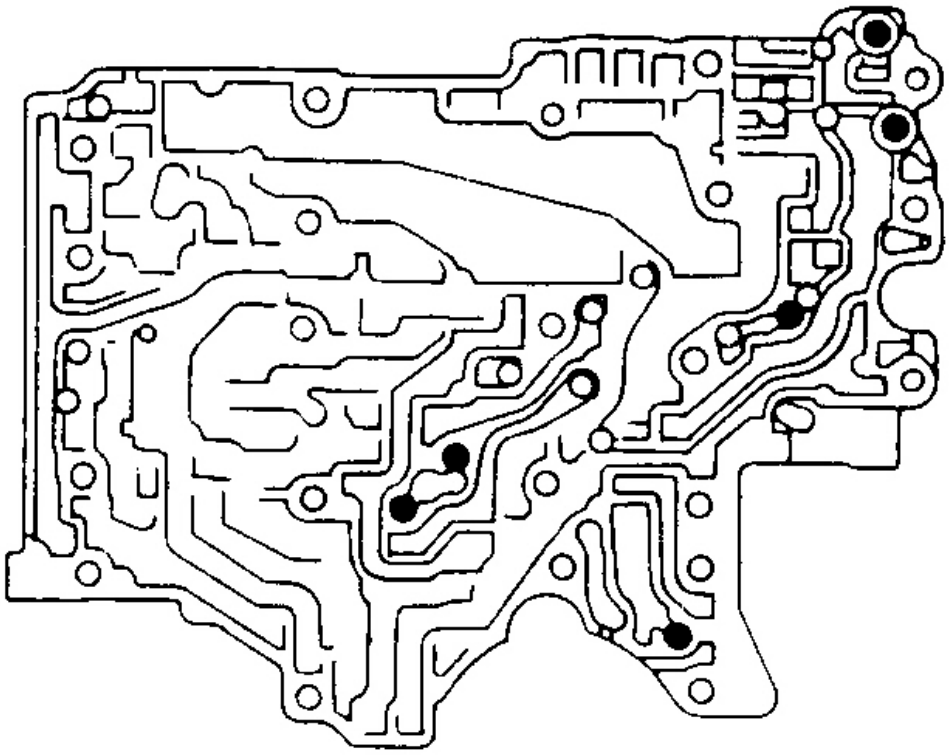
Fig. 27: Identifying Retainer Plate Locations (Number May Vary)
Courtesy of NISSAN MOTOR CO., U.S.A.

Reassembly

1. Place oil circuit of upper valve body face up. Install steel balls in proper positions. See **Fig. 28**. Install upper separating gasket, upper inter separating gasket and upper separating plate. Install reamer bolts "F" from bottom of upper valve body. Install separating gaskets and separating plates as a set on upper valve body, using reamer bolts as a guide.
2. Install pilot filter. Place lower valve body with inter valve body side face up. Install steel balls in proper positions. See **Fig. 28**. Install inter valve body on upper valve body, using reamer bolts "F" as a guide. **DO NOT** lose steel balls. Install check balls and relief valve springs in proper positions in lower valve body. Install lower separating gasket, inter separating gasket and lower separating plate. See **Fig. 24**.
3. Install support plate bolts "E" from bottom of lower valve body. Install separating gaskets and separating plate as a set on lower valve body using bolts "E" as a guide. Temporarily install support plates on lower valve body. Install lower valve body on inter valve body using reamer bolts "F" as a guide. See **Fig. 25**. Tighten bolts snug.
4. Install "O" rings on solenoids and harness terminal connector. Apply ATF to "O" rings prior to installation. Install and snug bolts "B". Install solenoid assembly and line pressure solenoid to lower valve body. Install oil strainer. Tighten all bolts to 62-80 INCH lbs. (7-9 N.m).



UPPER VALVE BODY



LOWER VALVE BODY

G93G23602

Fig. 28: Identifying Steel Ball Locations
Courtesy of NISSAN MOTOR CO., U.S.A.

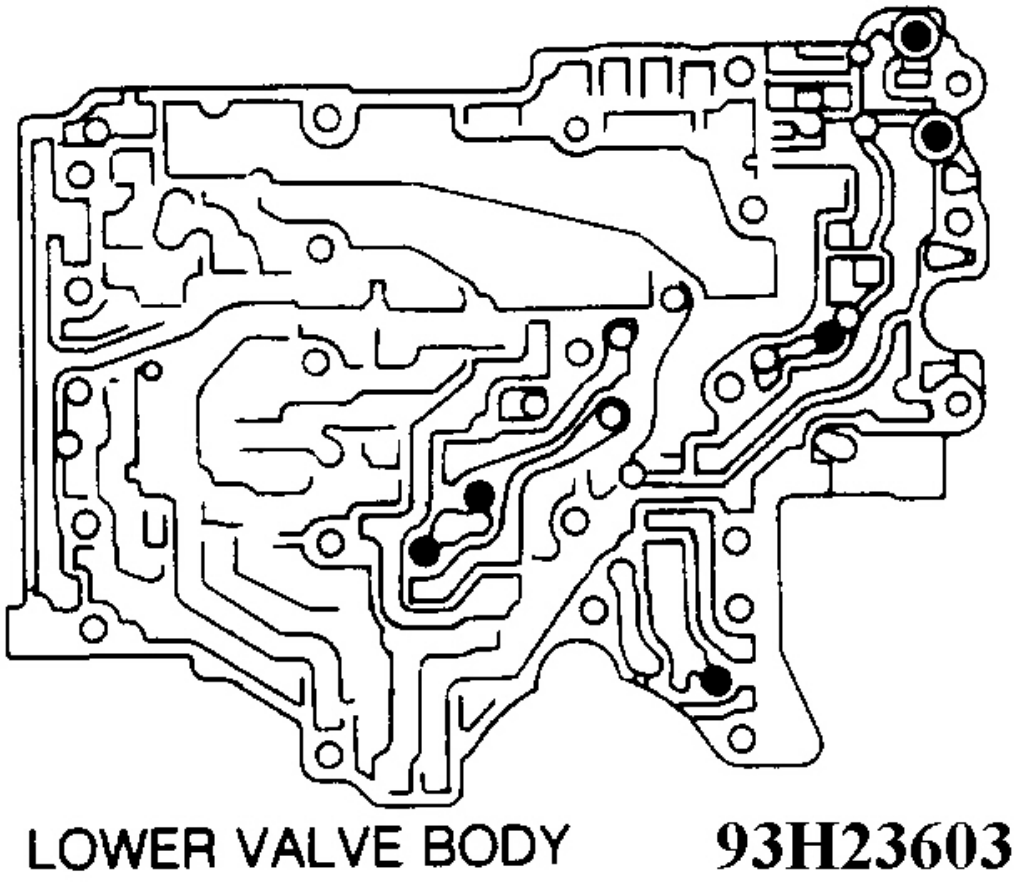


Fig. 29: Identifying Steel Ball Locations
Courtesy of NISSAN MOTOR CO., U.S.A.

CONTROL VALVE UPPER BODY

NOTE: Number of retainer plates varies with model and year of vehicle. See Fig. 26 for typical retainer plate locations.

Disassembly

1. Using a screwdriver, pry out retainer plates. Remove retainer plates while holding spring, plugs and sleeves. Remove plug slowly to prevent internal parts from jumping out.
2. Place mating surface of valve body face down and remove internal parts. If valve is hard to remove,

lightly tap valve body with soft-faced hammer. **DO NOT** use a magnet to remove valves. **DO NOT** drop or damage valves or sleeves.

Inspection

Measure valve spring free length and outer diameter. See the **UPPER VALVE BODY SPRING IDENTIFICATION** table. Also check for deformation or damage. Replace valve springs if deformed or fatigued. Check sliding surfaces of valves, sleeves and plugs.

UPPER VALVE BODY SPRING IDENTIFICATION (1)

Spring No.	Length In. (mm)	Diameter In. (mm)
1	1.417 (36.00)	.319 (8.10)
2	0.807 (20.50)	.276 (7.00)
3 (1994 Maxima)	1.941 (49.30)	.772 (19.60)
3 (All Others)	2.047 (52.00)	.772 (19.60)
4	1.063 (27.00)	.276 (7.00)
5	1.476 (37.50)	.272 (6.90)
6 (1994 Maxima)	1.555 (39.50)	.433 (11.00)
6 (All Others)	1.220 (31.00)	.354 (9.00)
7	1.555 (39.50)	.433 (11.00)
8	1.201 (30.50)	.260 (6.60)

(1) See **Fig. 30** for spring locations.

Reassembly

1. Lay control valve body face down when installing valves. **DO NOT** stand valve body on edge. Lubricate valves and control valve body with ATF prior to installation. Install control valves by sliding valves into appropriate bores. **DO NOT** scratch or damage valve body. Wrap shaft of small screwdriver with vinyl tape and insert valves into their bores using screwdriver as necessary.
2. Install 1-2 accumulator valve, then align 1-2 accumulator retainer plate with 1-2 accumulator valve from opposite side of control valve body. Install return spring, 1-2 accumulator piston and plug. See **Fig. 30**. While pushing plug or return spring, install retainer plates. See the **UPPER BODY RETAINER PLATE IDENTIFICATION** table for retainer plate dimensions.

UPPER BODY RETAINER PLATE IDENTIFICATION (1)

Application	(2) Length "B" In. (mm)
Lock-Up Control & Sequence Valves	1.102 (28.00)
Torque Converter Relief, Pilot, 1st Reducing & 2-3 Timing Valves	.846 (21.50)
1-2 Accumulator & Piston Valves	1.516 (38.50)
Overrun Clutch Reducing Valve	.945 (24.00)

(1) See **Fig. 26** for retainer plate locations.

(2) Length "A" for all valves is .236" (6.0 mm). All valves use type "A" retainer plate. See **Fig. 31**.

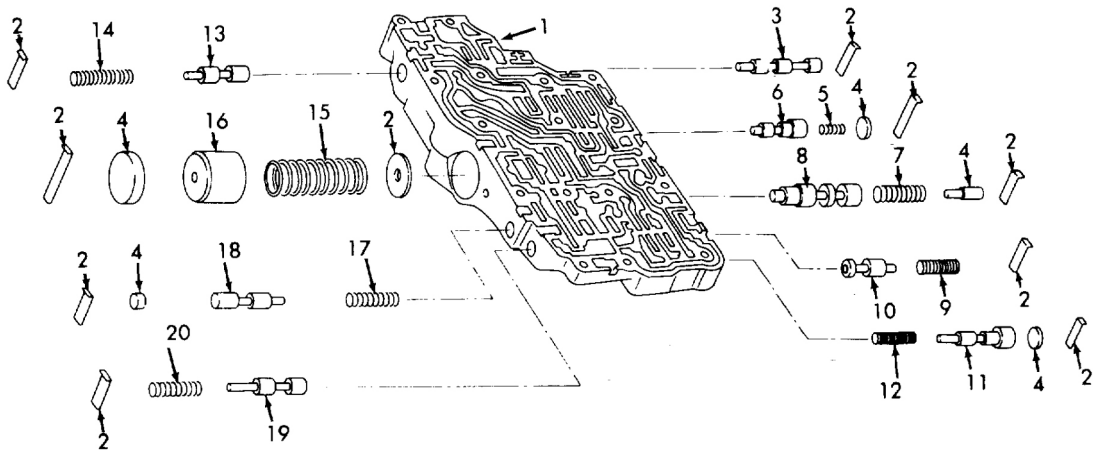


Fig. 30: Exploded View Of Control Valve Upper Body
Courtesy of NISSAN MOTOR CO., U.S.A.

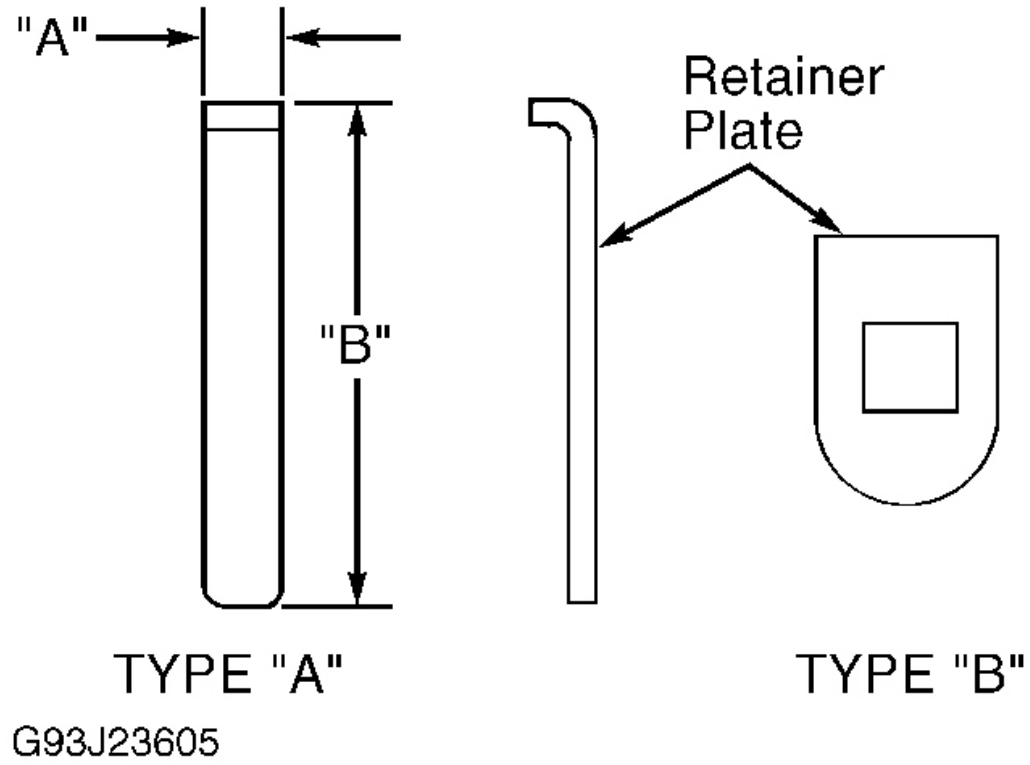


Fig. 31: Measuring Retainer Plate Dimensions
Courtesy of NISSAN MOTOR CO., U.S.A.

CONTROL VALVE LOWER BODY

NOTE: Number of retainer plates varies with model and year of vehicle. See Fig. 26 for typical retainer plate locations.

Disassembly

Using a screwdriver, pry out retainer plates. Remove retainer plates while holding spring, plugs and sleeves. Remove plug slowly to prevent internal parts from jumping out. Place mating surface of valve body face down and remove internal parts. If valve is hard to remove, lightly tap body with soft-faced hammer. **DO NOT** use a magnet to remove valves. **DO NOT** drop or damage valves or sleeves.

Inspection

Measure valve spring free length and outer diameter. See **LOWER VALVE BODY SPRING IDENTIFICATION** table. Also check for deformation or damage. Replace valve springs if deformed or fatigued. Check sliding surfaces of valves, sleeves and plugs.

LOWER VALVE BODY SPRING IDENTIFICATION (1)

Spring No.	Length In. (mm)	Diameter In. (mm)
1	.906 (23.00)	.262 (6.65)
2	1.772 (45.00)	.591 (15.00)
3	.854 (21.70)	.276 (7.00)
4	.866 (22.00)	.256 (6.50)
5 & 6	.854 (21.70)	.276 (7.00)
7	1.201 (30.50)	.386 (9.80)
8	1.260 (32.00)	.272 (6.90)
9	.669 (17.00)	.421 (10.70)

(1) See **Fig. 32** for spring locations.

Reassembly

1. Lay control valve body face down when installing valves. **DO NOT** stand valve body on edge. Lubricate valves and control valve body with ATF prior to installation. Install control valves by sliding valve into appropriate bore. **DO NOT** scratch or damage valve body.
2. Wrap shaft of small screwdriver with vinyl tape and insert valves into their bores using screwdriver as necessary. While pushing the plug or return spring, install the retainer plates. Refer to the **LOWER BODY RETAINER PLATE IDENTIFICATION** table for retainer plate dimensions.

LOWER BODY RETAINER PLATE IDENTIFICATION (1)

Application	Length "A" In. (mm)	Length "B" In. (mm)
Accumulator Shift Valve	.236 (6.00)	.768 (19.50)
All Other Valves (2)	.236 (6.00)	1.102 (28.00)

(1) See **Fig. 26** for retainer plate locations.

(2) Shift Valve "B" not applicable. All valves use type "A" retainer plate except shift valve "B" (Type "B"). See **Fig. 31**.

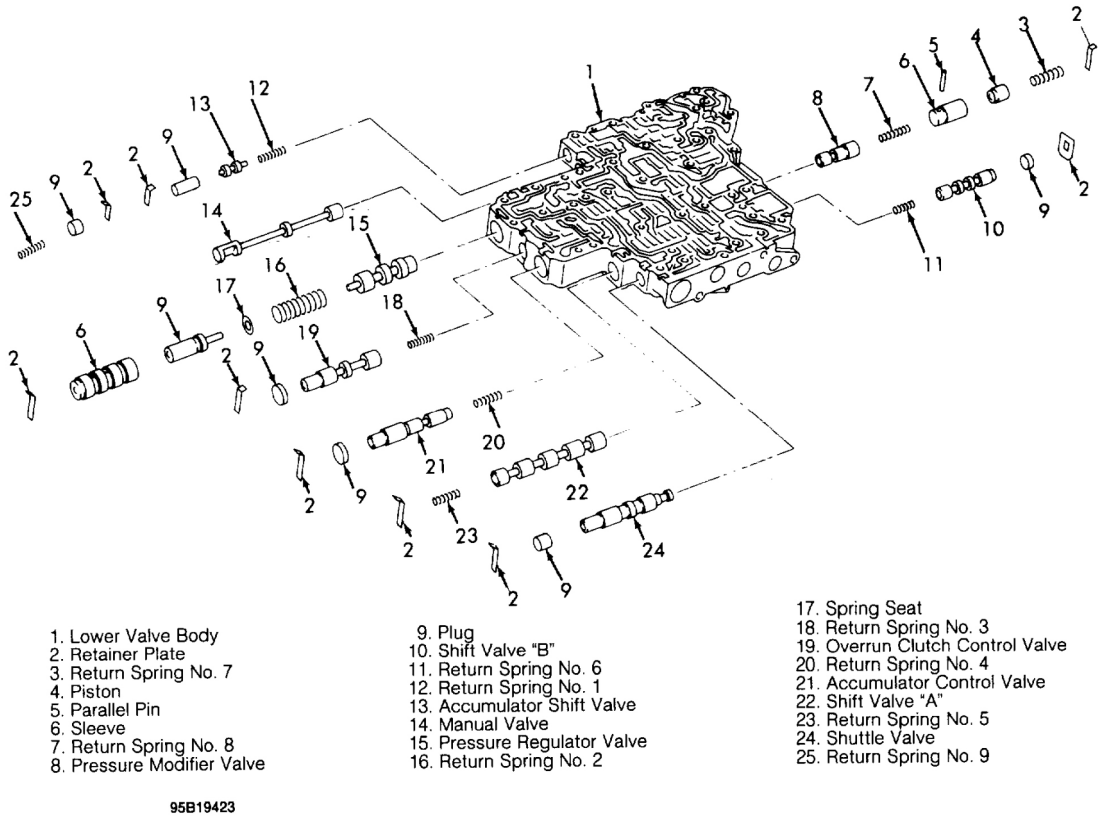


Fig. 32: Exploded View Of Control Valve Lower Body
Courtesy of NISSAN MOTOR CO., U.S.A.

REVERSE CLUTCH

Disassembly

Remove snap ring from reverse clutch assembly. Remove drive plates, driven plates, retaining plate, and dish plates. See **Fig. 17**. Record number of plates for reassembly reference. Remove snap ring from reverse clutch drum while compressing springs. Remove spring retainer and return spring. Remove piston from reverse clutch drum by turning piston clockwise. Remove "D" ring and oil seal from piston.

Inspection

Check dish plate and return springs for deformation, fatigue or damage. Inspect drive plate facing for burns, cracks or damage. Dish plate thickness should be .121" (3.08 mm). On Altima and Quest 1993 models, drive plate thickness should be .079" (2.00 mm), with allowable limit of .071" (1.80 mm). On all other models, drive plate thickness should be .063" (1.60 mm), with allowable limit of .055" (1.40 mm). On all models, if drive plate is not as specified, replace drive plate. Ensure check balls in reverse clutch piston are not seized.

Reassembly

1. Prior to installation, apply ATF to "D" ring, oil seal and inner surface of drum. Install "D" ring and oil

seal on piston. Install piston assembly in clutch drum while slowly turning clockwise. Install return spring and spring retainer on piston. Compress springs and install snap ring. Install drive plates, driven plates, retaining plate, dish plates and snap ring.

2. Measure clearance between retaining plate and snap ring. Specified clearance is .020-.031" (.50-.80 mm), with allowable limit of .047" (1.20 mm). Retaining plate is available in selective thicknesses of .260-.307" (6.60-7.80 mm) in .008" (.20 mm) increments.
3. Check reverse clutch operation. Install seal ring onto drum support of oil pump cover. Install reverse clutch assembly on oil pump assembly. Apply compressed air to oil hole. See **Fig. 33**. Ensure retaining plate moves toward snap ring. If retaining plate does not move as described, "D" ring or oil seal may be damaged.

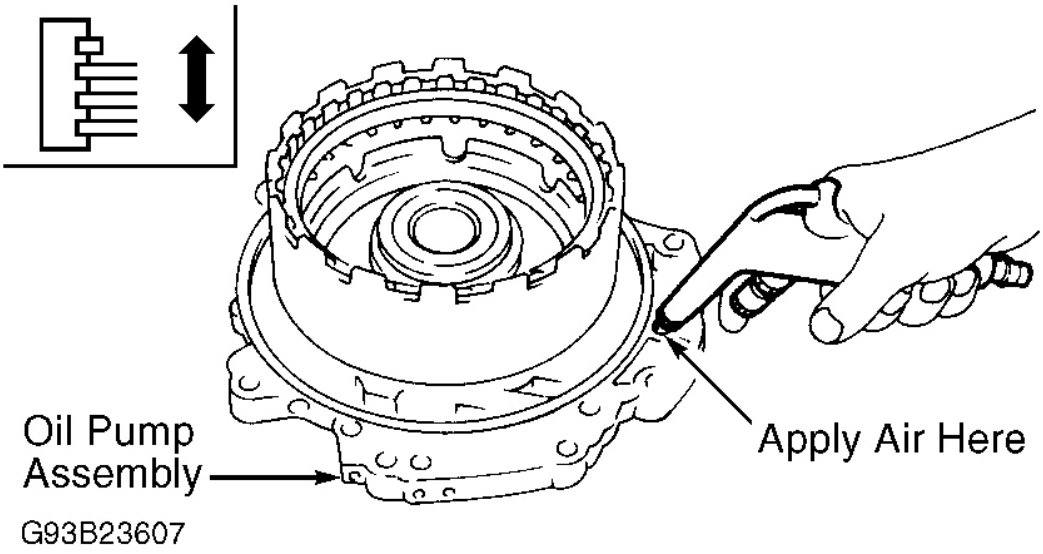


Fig. 33: Checking Reverse Clutch Operation
Courtesy of NISSAN MOTOR CO., U.S.A.

HIGH CLUTCH

Disassembly & Inspection

1. Remove seal rings from input shaft. Service procedures for high clutch are same as for reverse clutch. Drive plate thickness should be .063" (1.60 mm), with allowable limit of .055" (1.40 mm).
2. Measure clearance between retaining plate and snap ring. Specified clearance is .071-.087" (1.80-2.20 mm), with allowable limit of .12" (3.0 mm).
3. Retaining plate is available in selective thicknesses of .118-.150" (3.00-3.80 mm) in .008" (.20 mm) increments. Ensure check balls in high clutch piston are not seized.

Reassembly

1. Always replace spring retainer and return springs as a set (if necessary). **DO NOT** align snap ring gap with spring retainer stopper. Install NEW seal rings on input shaft. Measure clearance between seal ring and ring groove. Specified clearance is .003-.009" (.08-.23 mm). If clearance is not as specified, replace input shaft. Check high clutch operation.
2. Apply compressed air to oil hole (hole nearest high clutch drum) of input shaft. Plug opposite side of oil hole. Ensure retaining plate moves toward snap ring. If retaining plate does not move as described, "D" ring or oil seal may be damaged. Apply petroleum jelly to seal rings. Tape thick paper around seal rings to prevent rings from spreading.

FORWARD & OVERRUN CLUTCHES

Disassembly

Service procedures for forward clutch and overrun clutch are same as for reverse clutch. See **Fig. 19**.

Inspection

Check forward clutch and overrun clutch return springs for deformation or damage. Always replace spring retainer and return springs as a set (if necessary). Inspect drive plate facing for burns, cracks or damage. Ensure check balls in forward clutch and overrun clutch pistons are not seized.

Reassembly

1. Reassembly procedures for forward and overrun clutches are same as for reverse clutch. Dish plate thickness for forward and overrun clutch should be .106" (2.70 mm). Drive plate thickness for forward and overrun clutch should be .063" (1.60 mm), with allowable limit of .055" (1.40 mm).
2. Lubricate "D" rings and oil seals with ATF, and install on forward and overrun clutch pistons. Ensure "D" rings and oil seals are installed in correct direction. See **Fig. 34**. Align triangle mark on spring retainer with check ball in overrun clutch piston. **DO NOT** align snap ring gap with spring retainer stopper.
3. Measure clearance between retaining plate and snap ring. Specified clearance for forward clutch is .018-.033" (.45-.85 mm), with allowable limit of .065" (1.65 mm) on Altima, or .073" (1.85 mm) on all other models. Specified clearance for overrun clutch is .028-.043" (.70-1.10 mm), with allowable limit of .067" (1.70 mm).
4. Forward clutch retaining plate is available in selective thicknesses of .126-.173" (3.20-4.40 mm) in .008" (.20 mm) increments. Overrun clutch retaining plate is available in selective thicknesses of .118-.150" (3.00-3.80 mm) in .008" (.20 mm) increments.
5. Check forward and overrun clutch operation. Install bearing retainer on forward clutch drum. Apply compressed air to appropriate oil hole of forward clutch drum. See **Fig. 35**. Ensure retaining plate moves toward snap ring. If retaining plate does not move as described, "D" ring or oil seal may be damaged.

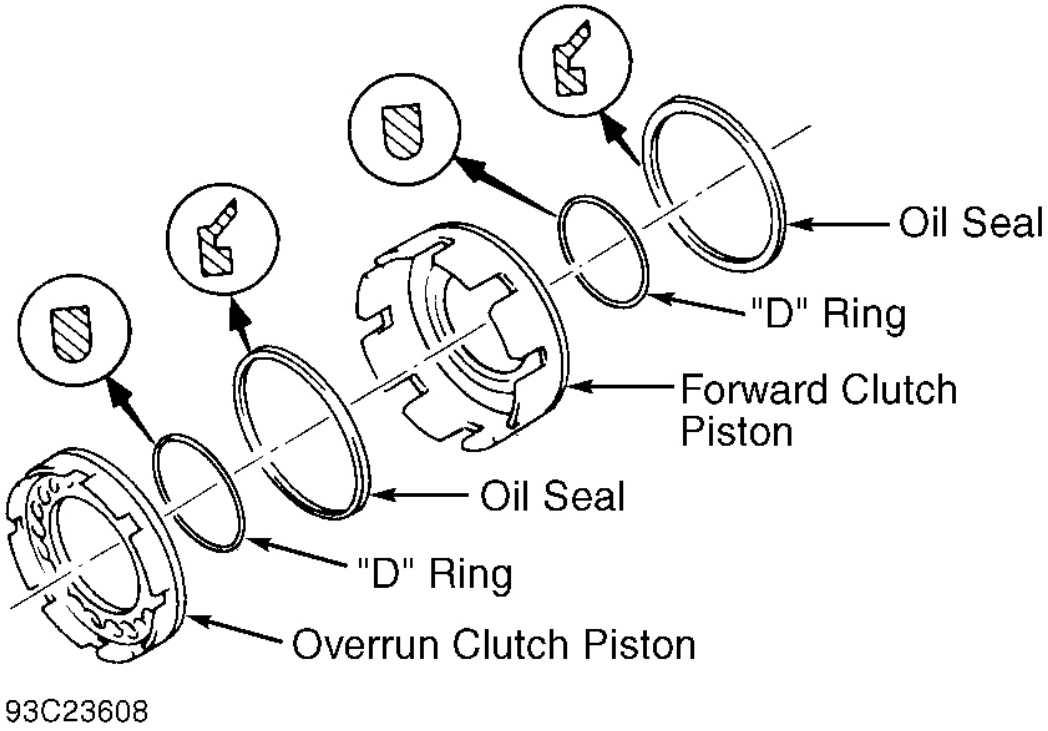


Fig. 34: Installing Forward & Overrun Clutch "D" Rings & Oil Seals
Courtesy of NISSAN MOTOR CO., U.S.A.

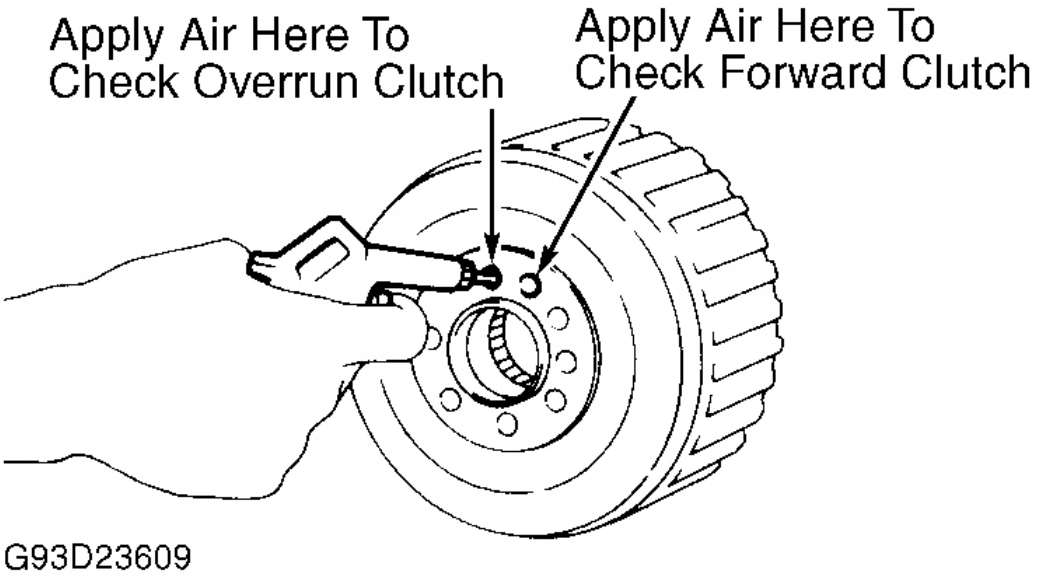


Fig. 35: Checking Forward & Overrun Clutch Operation
Courtesy of NISSAN MOTOR CO., U.S.A.

LOW & REVERSE BRAKE

Disassembly

Position transaxle case to obtain access to low and reverse brake snap ring. Remove snap ring. Remove dish plate, retaining plate, drive plates and driven plates from transaxle case. See **Fig. 19**. Record number of plates for reassembly reference. Apply compressed air to oil hole of piston retainer to remove piston. Remove "D" rings from piston.

Inspection

Check low and reverse brake snap ring, springs and retainer for deformation or damage. Always replace spring retainer and return springs as a set (if necessary). Check low and reverse drive plates for burns, cracks or damage.

Reassembly

1. Reassembly procedures for low and reverse brake are same as for reverse clutch. Drive plate thickness should be .071" (1.80 mm), with allowable minimum limit of .063" (1.60 mm). Specified clearance is .067-.083" (1.70-2.10 mm), with allowable minimum limit of .138" (3.50 mm). Retaining plate is available in selective thicknesses of .079-.134" (2.00-3.40 mm), in increments of .008" (.20 mm).
2. Lubricate "D" rings with ATF, and install on low-reverse brake piston. Ensure "D" rings are installed in correct direction. See **Fig. 36**. Ensure piston bracket is aligned with retainer bracket. See **Fig. 37**. Check

low and reverse brake operation. Apply compressed air to oil hole in transaxle case. See **Fig. 17**.

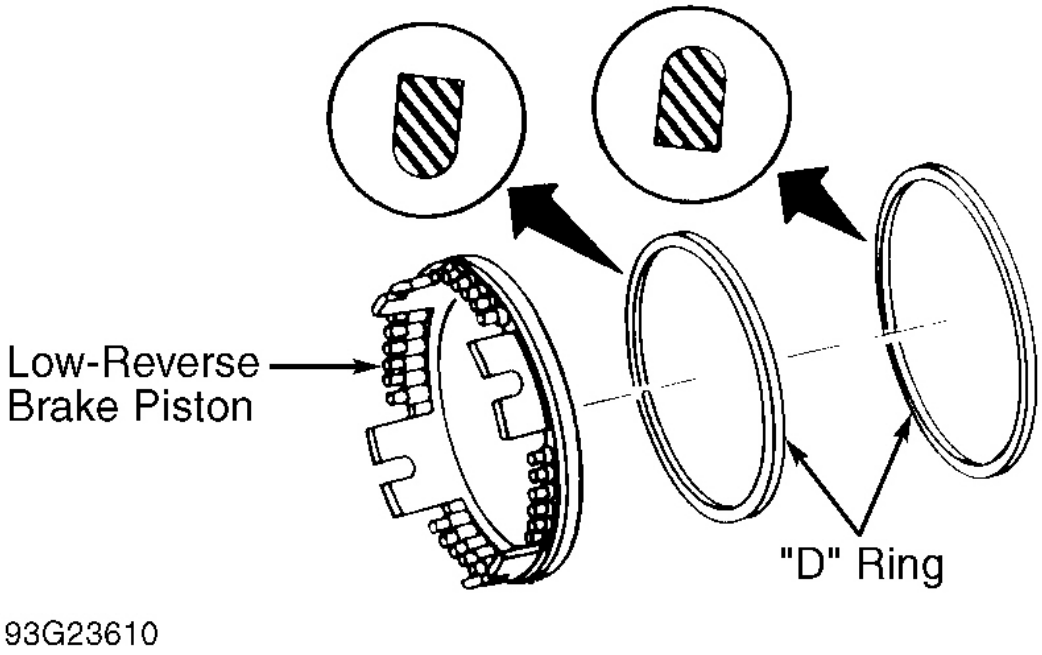


Fig. 36: Installing Low-Reverse Brake "D" Rings
Courtesy of NISSAN MOTOR CO., U.S.A.

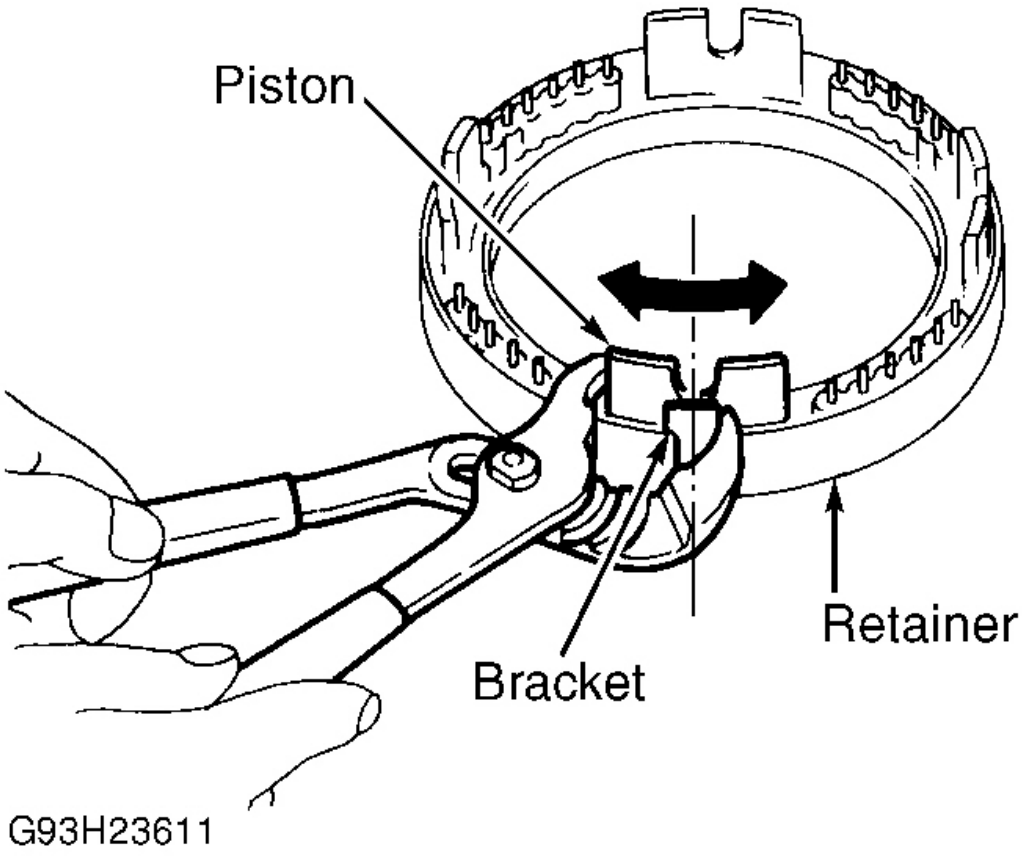


Fig. 37: Aligning Brake Piston With Spring Retainer
Courtesy of NISSAN MOTOR CO., U.S.A.

REAR INTERNAL GEAR, FORWARD CLUTCH HUB & OVERRUN CLUTCH HUB

Disassembly

Remove overrun clutch hub and thrust washer from forward clutch hub. See **Fig. 19**. Remove forward clutch hub from rear internal gear. Remove end bearing from rear internal gear. Remove thrust washer from rear internal gear. Remove end bearing from forward one-way clutch. Remove forward one-way clutch from forward clutch hub.

Inspection

Check rear internal gear, forward clutch hub and overrun clutch hub frictional surfaces for wear or damage. Check forward one-way clutch and end bearings for wear or damage.

Reassembly

1. Install forward one-way clutch on forward clutch hub with arrow facing forward. See **Fig. 38**. Apply petroleum jelly to end bearings and thrust washers. Install end bearing on forward one-way clutch with smooth side up.
2. Install thrust washer on rear internal gear. Install end bearing on rear internal gear with smooth side down. Install forward clutch hub on rear internal gear. Ensure forward clutch hub rotates counterclockwise only.
3. Install thrust washer on overrun clutch hub. Align pawls of thrust washer with holes in overrun clutch hub. Install overrun clutch hub on rear internal gear. Align projections of rear internal gear with holes in overrun clutch hub.

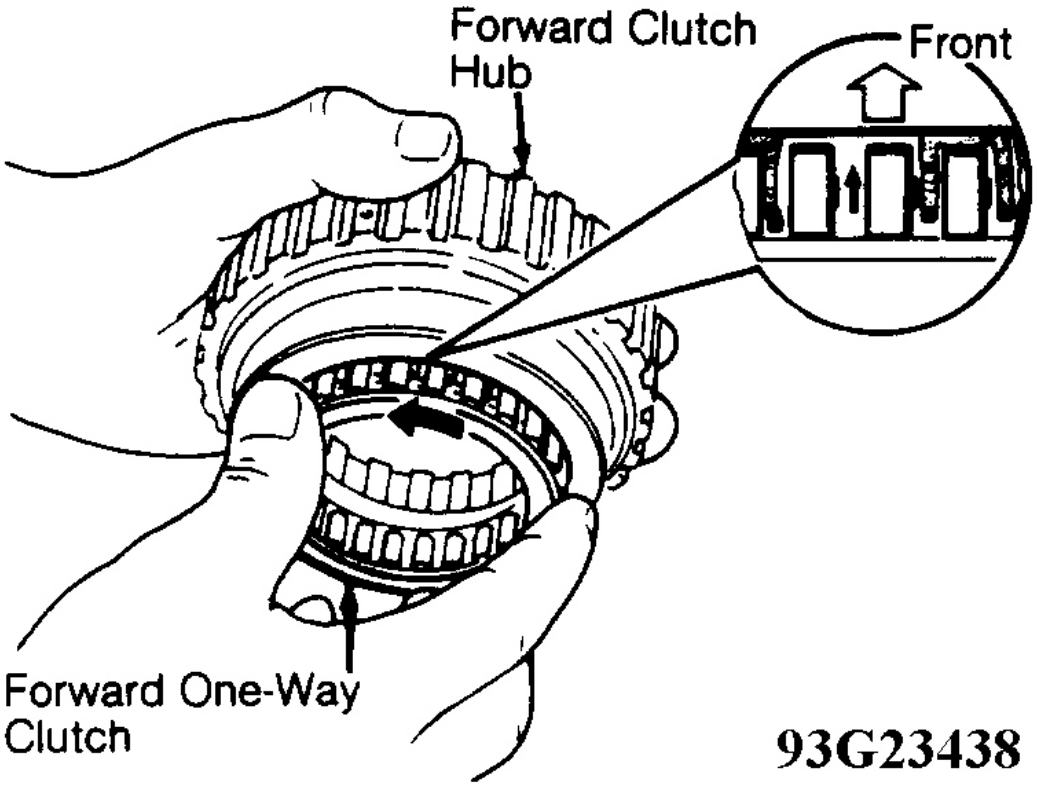


Fig. 38: Checking Forward One-Way Clutch Rotation
Courtesy of NISSAN MOTOR CO., U.S.A.

BAND SERVO PISTON ASSEMBLY

NOTE: Band servo piston may be secured with snap ring or bolts.

Disassembly

1. Use appropriate puller to compress servo piston (if necessary). Remove band servo piston snap ring (if equipped). Remove band servo piston retainer bolts (if equipped). Apply compressed air to oil hole in transaxle case to remove OD servo piston retainer and band servo piston assembly. See **Fig. 39**.
2. Apply compressed air to oil hole in servo piston retainer to remove OD band servo piston from retainer. Secure OD band servo piston while applying compressed air. Remove "D" ring from OD band servo piston. On Quest, remove "E" ring, cushion servo return spring and spring retainer from OD band servo piston. On all models, remove "O" rings from OD servo piston retainer. See **Fig. 15**.
3. Remove band servo piston assembly from servo piston retainer by pushing forward. Place piston stem end on wooden block. While pushing servo piston spring retainer down, remove "E" ring. Remove OD servo return spring, band servo thrust washer and band servo piston stem from band servo piston. Remove "O" rings from servo piston retainer. Remove "D" rings from band servo piston.

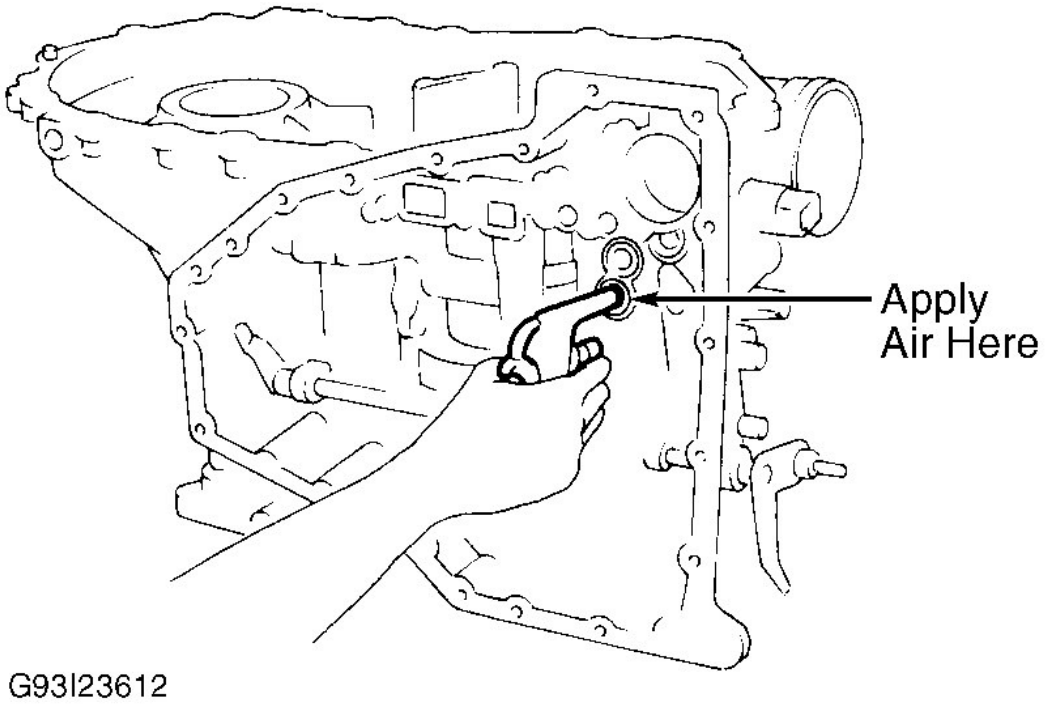


Fig. 39: Removing OD Piston Retainer & Band Servo Piston
Courtesy of NISSAN MOTOR CO., U.S.A.

Inspection

Check frictional surfaces for abnormal wear or damage. Check return springs for deformation or damage. Check spring free length and outer diameter. Free length of 2nd servo return spring should be 1.279" (32.50 mm). Diameter should be 1.019" (25.90 mm). Free length of OD servo return spring should be 1.220" (31.00 mm). Diameter should be 0.854" (21.70 mm). On Quest, free length of cushion servo return spring should be .921" (23.40 mm). Diameter should be 1.004" (25.50 mm). On all models, replace spring(s) if not as

specified.

Reassembly

1. Apply ATF to all "D" rings and "O" rings prior to installation. Install "D" rings on servo piston retainer. Install band servo piston stem, band servo thrust washer, OD servo return spring and spring retainer on band servo piston. Place piston stem on wooden block. While pushing servo piston spring retainer down, install "E" ring.
2. Install "O" rings on servo piston retainer. Install band servo piston assembly into servo piston retainer by pushing inward. Install "D" ring on OD band servo piston. Install "O" rings on OD servo piston retainer.
3. Install OD band servo piston to OD servo piston retainer. Install band servo piston assembly and 2nd servo return spring in transaxle case. Install OD band servo piston assembly in transaxle case. Install band servo piston retainer and snap ring or bolts on transaxle case. See **Fig. 15**.

OUTPUT SHAFT, IDLER GEAR, REDUCTION GEAR & BEARING RETAINER

Disassembly

1. Remove seal rings from output shaft and bearing retainer. See **Fig. 15**. Pry off output shaft bearing from output shaft using 2 flat-blade screwdrivers. If bearing is removed, always install NEW bearing. Remove snap ring from bearing retainer. Using a hammer and suitable drift, remove needle bearing from bearing retainer.
2. Using appropriate puller and drift, remove idler gear bearing from idler gear. Using Puller (KV381054S0), remove idler gear bearing race from transaxle case. Using appropriate puller and press, press reduction gear bearing from reduction gear. Remove bearing race bolts and remove reduction gear bearing race from transaxle case. See **Fig. 15**.

Inspection

1. Inspect output shaft for cracks, wear or damage. Check all gears for wear, chips and cracks. Ensure bearings roll freely and are free from noise, cracks, pitting or wear. Always replace bearings as a set (if necessary).
2. Install NEW seal rings to output shaft and bearing retainer. Measure clearance between seal ring and ring grooves of output shaft. Specified clearance is .004-.010" (.10-.25 mm). If clearance is not as specified, replace output shaft.
3. Measure clearance between seal ring and ring grooves of bearing retainer. Specified clearance is .004-.012" (.10-.30 mm). If clearance is not as specified, replace bearing retainer.

Reassembly

To reassemble, reverse disassembly procedure. Tighten reduction gear bearing race bolts to 80-90 ft. lbs. (109-123 N.m). Apply petroleum jelly to NEW seal rings installed on output shaft and bearing retainer. Tape thick paper around seal rings to prevent rings from spreading.

MANUAL SHAFT ASSEMBLY

Disassembly & Reassembly

1. Remove detent spring from transaxle case. Drive out manual plate retaining pin. Drive and pull out parking rod plate retaining pin. Remove parking rod plate from manual shaft. See **Fig. 15**. Remove parking rod from transaxle case.
2. Pull out manual shaft retaining pin. Remove manual shaft and manual plate from transaxle case. Remove manual shaft oil seal. Inspect all components for wear or damage. To reassemble, reverse disassembly procedure. Apply ATF to outer surface of oil seal prior to installation. Both ends of manual plate and parking rod plate retaining pins should protrude evenly, .12" (3.0 mm) outside of shaft. Tighten detent spring bolt to 57-66 INCH lbs. (6.4-7.5 N.m).

DIFFERENTIAL ASSEMBLY

Disassembly

Remove ring gear. Using appropriate puller and adapter, remove differential side bearings. Using appropriate puller and Adapter (KV381054S0), remove differential side bearing race and adjusting shim from transaxle case. Remove speedometer drive gear. Remove viscous coupling (if equipped). Mark differential case halves for reassembly reference. Remove differential case bolts and separate differential case. Remove pinion shaft from differential case. Remove pinion shaft and gears from differential case. See **Fig. 16**.

Inspection

Check mating surfaces of differential case, gears and pinion shaft for wear, scoring or damage. Check thrust washers for wear or damage. Ensure bearings roll freely and are free from cracks, pitting or wear. Check viscous coupling case for cracks or silicone oil leakage (if equipped). Replace bearings as a set (if necessary).

Reassembly

1. Install Gauge Set (J34291) on differential case (speedometer drive gear side) and lock gauging cylinder in place (STEP "A"). See **Fig. 40**. Install Gauging Plunger (J34290-6) into gauging cylinder. Install pinion and side gears with thrust washers in viscous coupling half of differential case. Install gauge set on case and allow gauging plunger to rest on side gear thrust washer.
2. Using a feeler gauge, measure gap between gauging plunger and gauging cylinder (STEP "B"). See **Fig. 40**. Specified clearance is .004-.008" (0.1-0.2 mm). If clearance is not as specified, adjust clearance by changing thrust washer thickness. Thrust washers are available in selective thicknesses from .030-.038" (.75-.95 mm), in increments of .0020" (.05 mm).
3. Install Gauge Set (J34291) on differential case side of viscous coupling and lock gauging cylinder in place. Remove gauging cylinder. Install speedometer drive gear side of differential case to viscous coupling side of differential case, matching marks made during disassembly. Tighten case bolts to 27-30 ft. lbs. (36-40 N.m). Install gauge set on viscous coupling side of differential case and allow gauging plunger to rest on thrust washer. See **Fig. 40**.
4. Using a feeler gauge, measure gap between gauging plunger and gauging cylinder (STEP "C"). See **Fig. 40**. Measurement should be exact clearance between side gear thrust washer and differential case. Specified clearance is .004-.008" (0.1-0.2 mm).
5. If clearance is not as specified, adjust clearance by changing thrust washer thickness. Thrust washers are available in selective thicknesses from .017-.032" (.43-.81 mm), in increments of .008" (.02 mm).
6. Install viscous coupling onto differential case (if equipped). Tighten bolts to 33-52 INCH lbs. (3.7-5.9

N.m). Install speedometer drive gear in differential case. Align projections of speedometer drive gear with groove in differential case. See **Fig. 41**. Press differential side bearings on differential case. Install ring gear and tighten bolts in crisscross pattern to 65-76 ft. lbs. (88-103 N.m).

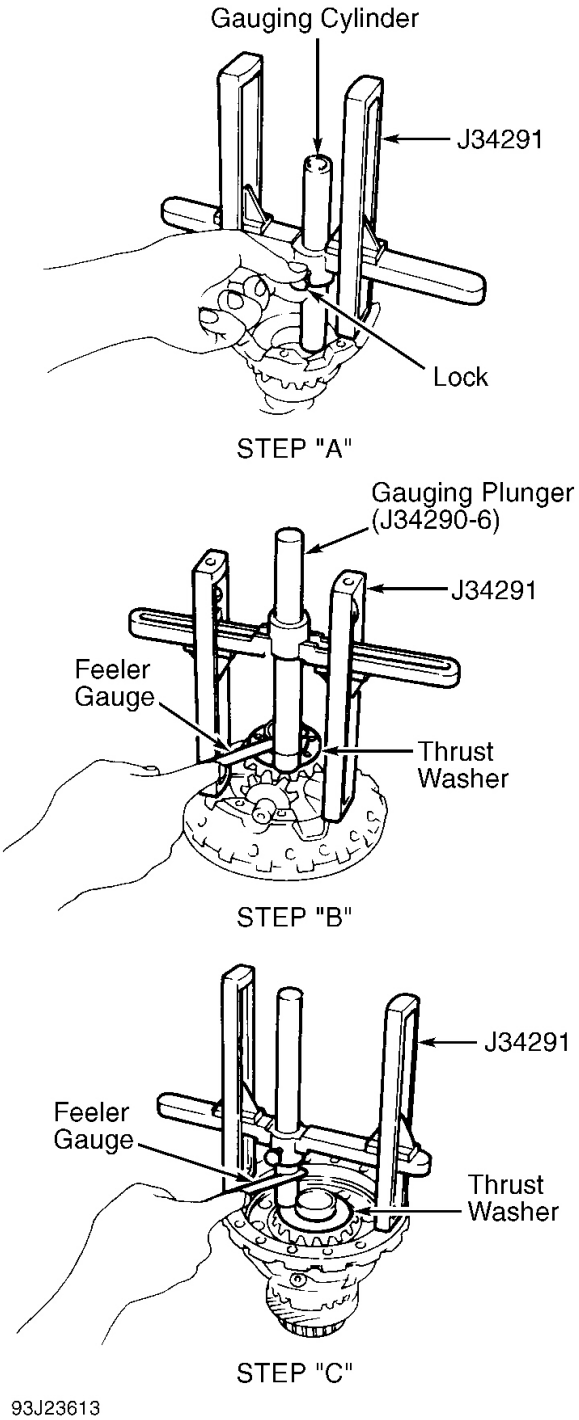


Fig. 40: Measuring Side Gear-To-Differential Case Clearance (With Viscous Coupling)

Courtesy of NISSAN MOTOR CO., U.S.A.

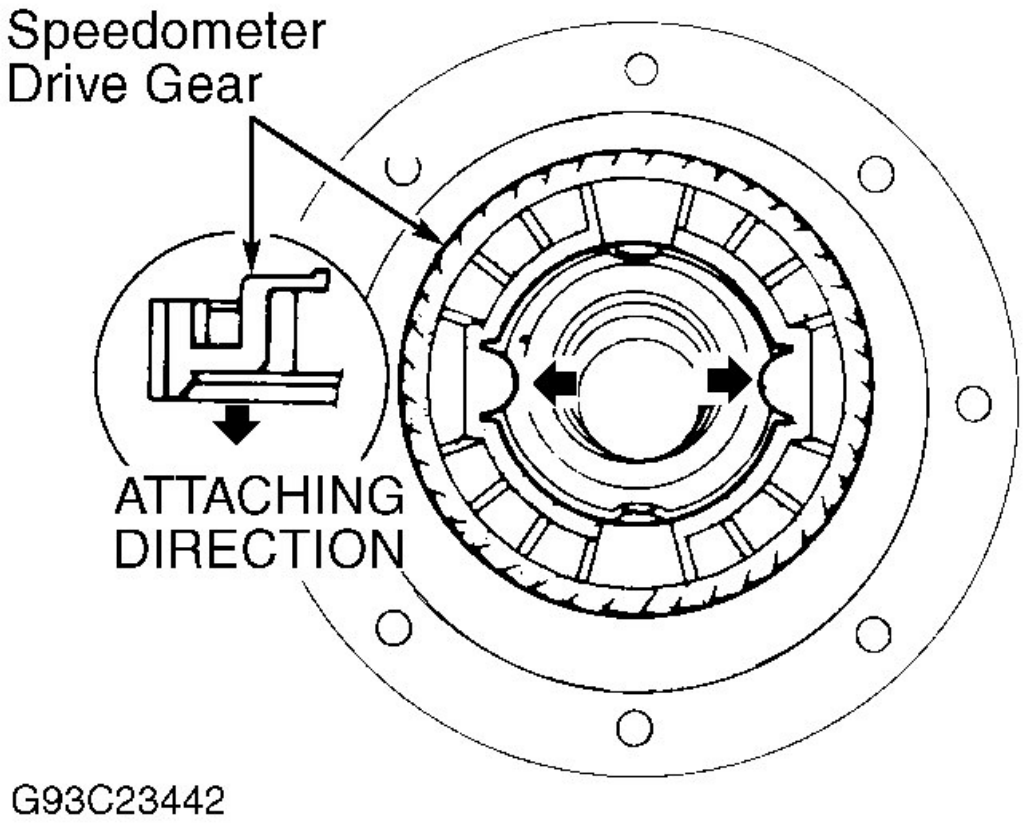


Fig. 41: Installing Speedometer Drive Gear
Courtesy of NISSAN MOTOR CO., U.S.A.

DIFFERENTIAL SIDE BEARING PRELOAD

1. Preload is adjusted by adjusting shim thickness. Install differential side bearing race in transaxle case. **DO NOT** install adjusting shim in transaxle case. Install differential side bearing race in converter housing. Place differential assembly on transaxle case. Install converter housing on transaxle case and tighten case bolts to 30-35 ft. lbs. (43-47 N.m).
2. Install Preload Adapter (KV38105210) on differential case at converter housing side, and attach dial indicator on tool. See **Fig. 42**. Insert Drift (ST33220000) on viscous coupling from transaxle case side and move up and down to measure deflection.
3. Determine shim thickness by adding dial indicator reading to bearing preload specification. Differential side bearing preload dimension should be .002-.003" (.05-.09 mm). Select proper thickness of differential side bearing adjusting shim. Shims are available in thicknesses of .004-.036" (.12-.92 mm), in increments of .002" (.04 mm).

4. Remove converter housing from transaxle case. Remove differential assembly from transaxle case. Using Puller (KV381054S0), remove differential side bearing race from transaxle case. Install selected shim and differential side bearing race in transaxle case. Install converter housing on transaxle case and tighten case bolts to 30-35 ft. lbs. (43-47 N.m).
5. Insert Preload Adapter (KV38105210) into viscous coupling. Using a torque wrench, measure turning torque of differential assembly. Turn differential assembly in both directions several times to seat bearings. Turning torque should be 6.9-12.2 INCH lbs. (.78-1.37 N.m). If using original bearings, turning torque will be slightly less then specified. Ensure turning torque is within specified range.

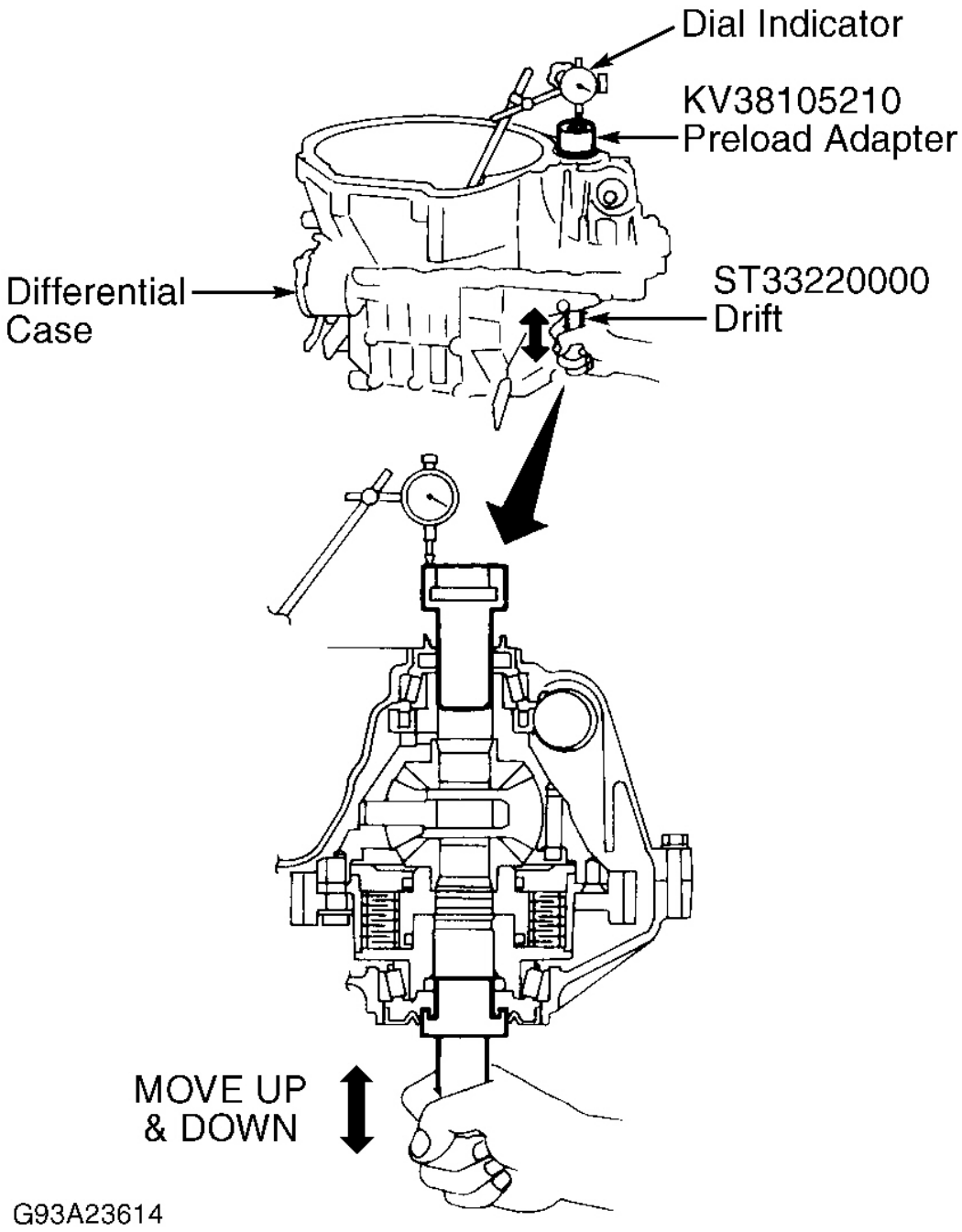


Fig. 42: Measuring Differential Side Bearing Preload
Courtesy of NISSAN MOTOR CO., U. S. A.

REDUCTION GEAR BEARING PRELOAD

1. Preload is adjusted by adjusting shim thickness between adjusting gear and bearing. Remove converter housing and differential assembly from transaxle case (if necessary). Install reduction gear and idler gear in transaxle case. Using a depth gauge and straightedge, measure distance between end of reduction gear and surface of transaxle case in at least 2 places (Dimension "B"). See **Fig. 43**. Measure distance between surface of idler gear bearing and surface of transaxle case in at least 2 places (Dimension "C").
2. Measure distance between end of reduction gear and adjusting shim mating surface of reduction gear in at least 2 places (Dimension "D"). Dimension "A" equals Dimension "D" minus Dimensions "B" plus "C". See **Fig. 43** for example.
3. Measure distance between end of idler gear and idler gear bearing mating surface of idler gear in at least 2 places (Dimension "E"). Reduction gear bearing preload should be .002" (.05 mm).
4. Select proper thickness of reduction gear bearing adjusting shim by subtracting Dimension "E" from Dimension "A". Shims are available in thicknesses of .197-.264" (5.00-6.72 mm), in increments of .0008" (.02 mm).
5. Install reduction gear and selected adjusting shim. Press idler gear bearing on idler gear. Press idler gear on reduction gear, ensuring idler gear locks on parking pawl. Lock idler gear with parking pawl and tighten idler gear lock nut to 217-239 ft. lbs (294-324 N.m.).
6. Turn reduction gear in both directions several times to seat bearings. Using a torque wrench and appropriate socket, measure reduction gear turning torque. Turning torque should be .44-3.45 INCH lbs. (.05-.39 N.m). After adjusting turning torque, stake lock nut to ensure nut will not loosen.

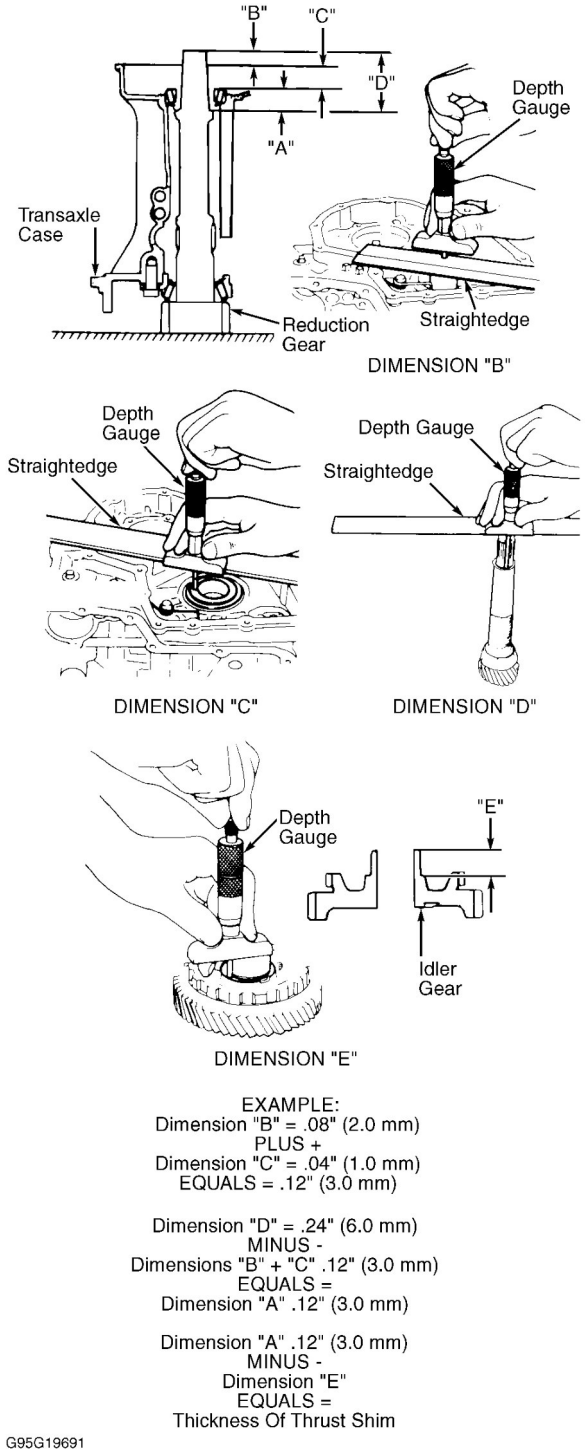
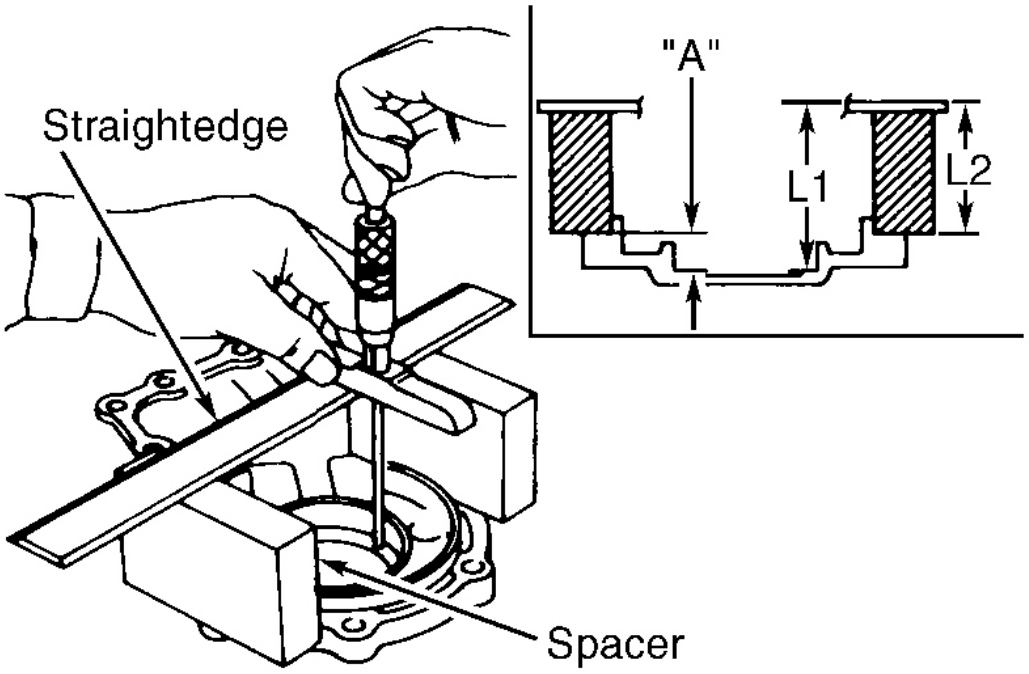


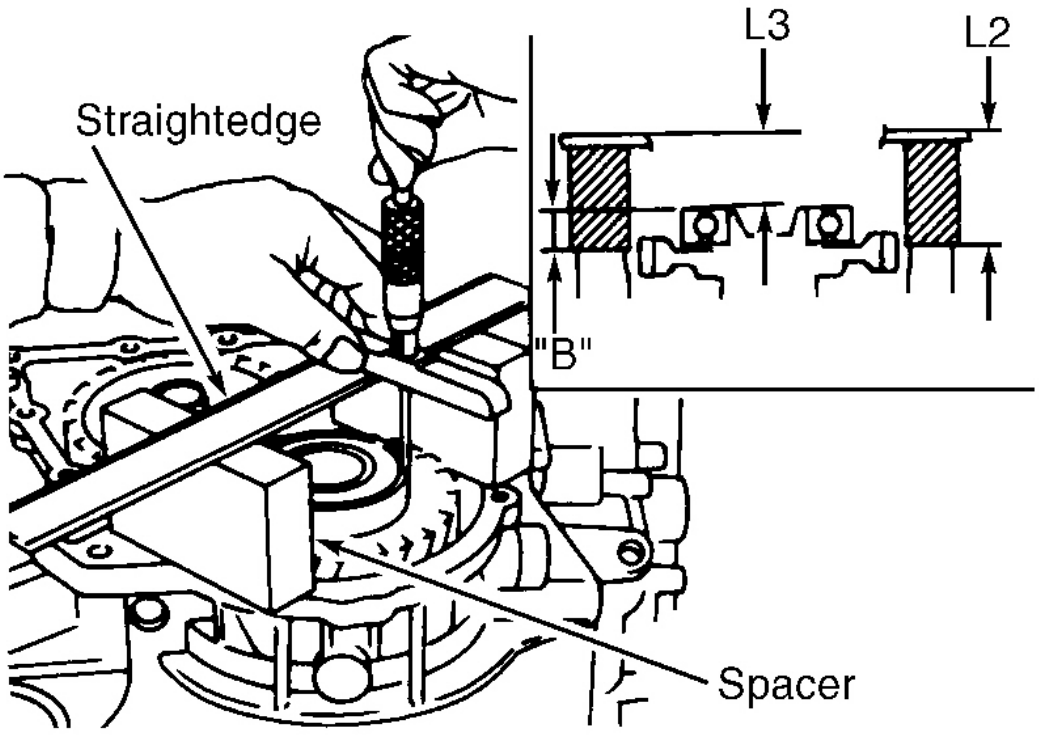
Fig. 43: Measuring Reduction Gear Bearing Preload
Courtesy of NISSAN MOTOR CO., U. S. A.

OUTPUT SHAFT END PLAY

1. Output shaft end play is adjusted by adjusting output shaft shim thickness. Install output shaft bearing retainer. Install output shaft thrust needle bearing on bearing retainer with smooth side down.
2. Install output shaft in transaxle case. Using a depth gauge and straightedge, measure Dimensions "L1" and "L2" at side cover in at least 2 places. See **Fig. 44**. Dimension "L1" minus Dimension "L2" equals distance between transaxle case surface and adjusting shim mating surface (Dimension "A").
3. Measure Dimensions "L2" and "L3" in at least 2 places. Dimension "L2" minus Dimension "L3" equals distance between end of output shaft bearing race and side cover surface of transaxle case (Dimension "B"). Specified output shaft end play should be 0-0.006" (0-.15 mm). Select proper thickness of adjusting shim to ensure output shaft end play is within specification. Adjusting shims are available in thicknesses of .031-.047" (.80-1.20 mm) in increments of .002" (.04 mm).
4. Install selected adjusting shim on output shaft bearing. Apply a bead of liquid gasket .059" (1.50 mm) in diameter on inside edge of side cover surface of transaxle case. Install side cover on transaxle case and tighten bolts to 20-22 ft. lbs. (26-30 N.m). See **Fig. 20**. Always replace bolts "A". Bolts are self-sealing.



DIMENSION "A"



DIMENSION "B"

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Fig. 44: Measuring Output Shaft End Play
Courtesy of NISSAN MOTOR CO., U. S. A.

TOTAL END PLAY

1. Total end play is adjusted by adjusting bearing race thickness. With original bearing race installed on oil pump, place Gauge Set (J34291) onto oil pump. Long ends of gauge set legs should be placed firmly on machined surface of oil pump assembly, and gauging cylinder should rest on top of bearing race. Lock gauging cylinder in place (STEP "A"). See **Fig. 45**. Remove gauging cylinder. Install Gauging Plunger (J3429-25) into gauging cylinder.
2. With needle bearing installed on high clutch drum, place gauge set legs on machined surface of transaxle case (with gasket), and allow plunger to rest on needle bearing (STEP "B"). See **Fig. 45**. Using a feeler gauge, measure gap between gauging cylinder and gauging plunger. Measurement should give exact total end play. Total end play should be .010-.022" (.25-.55 mm). Select proper thickness of bearing race to ensure total end play is as specified. Bearing race are available in selective thicknesses of .031-.075" (.8-1.9 mm), in increments of .008" (.20 mm).

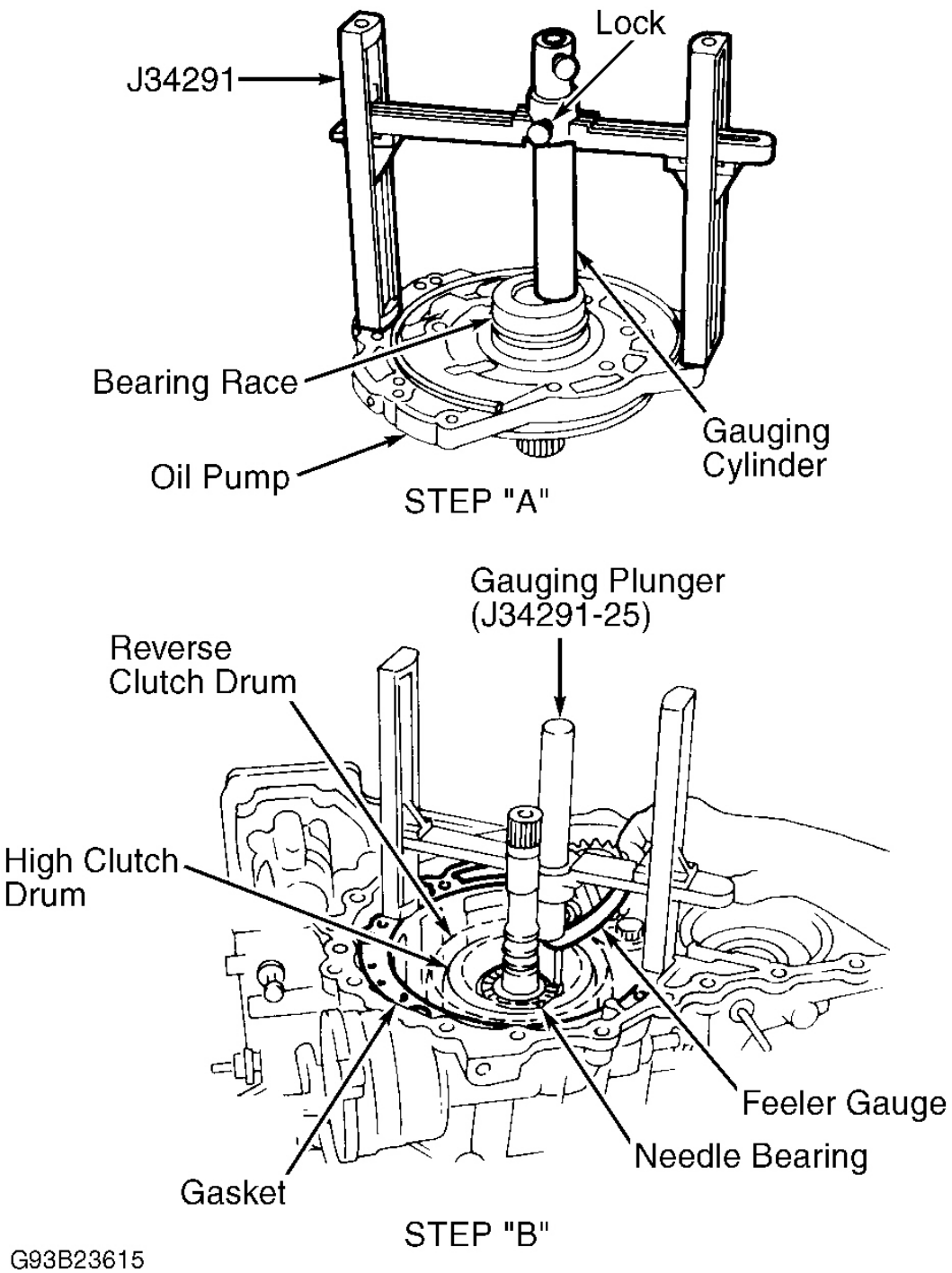
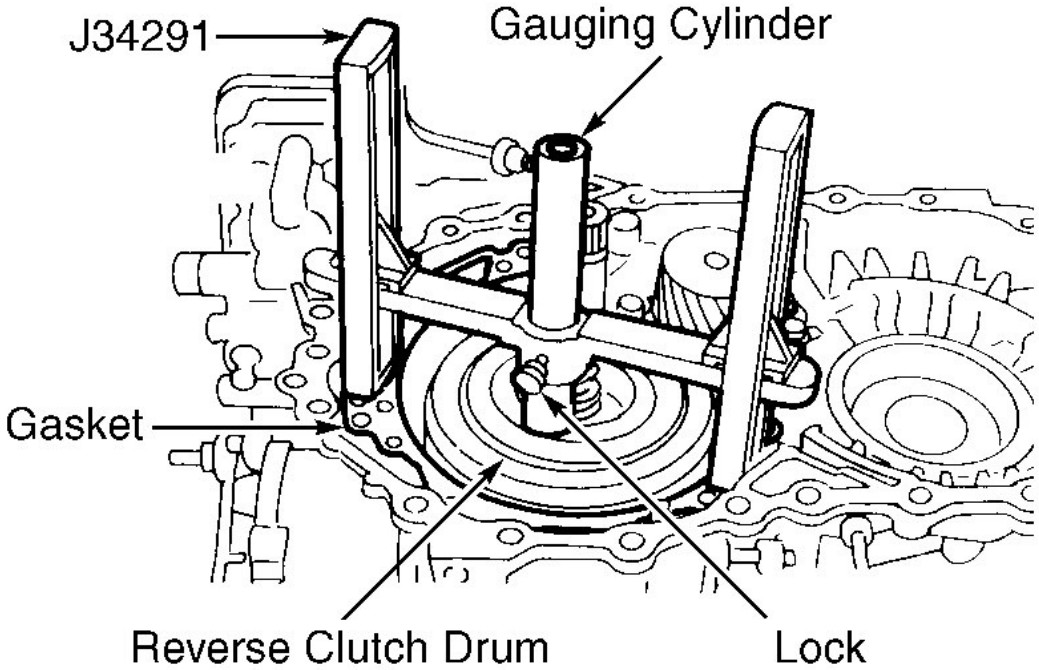


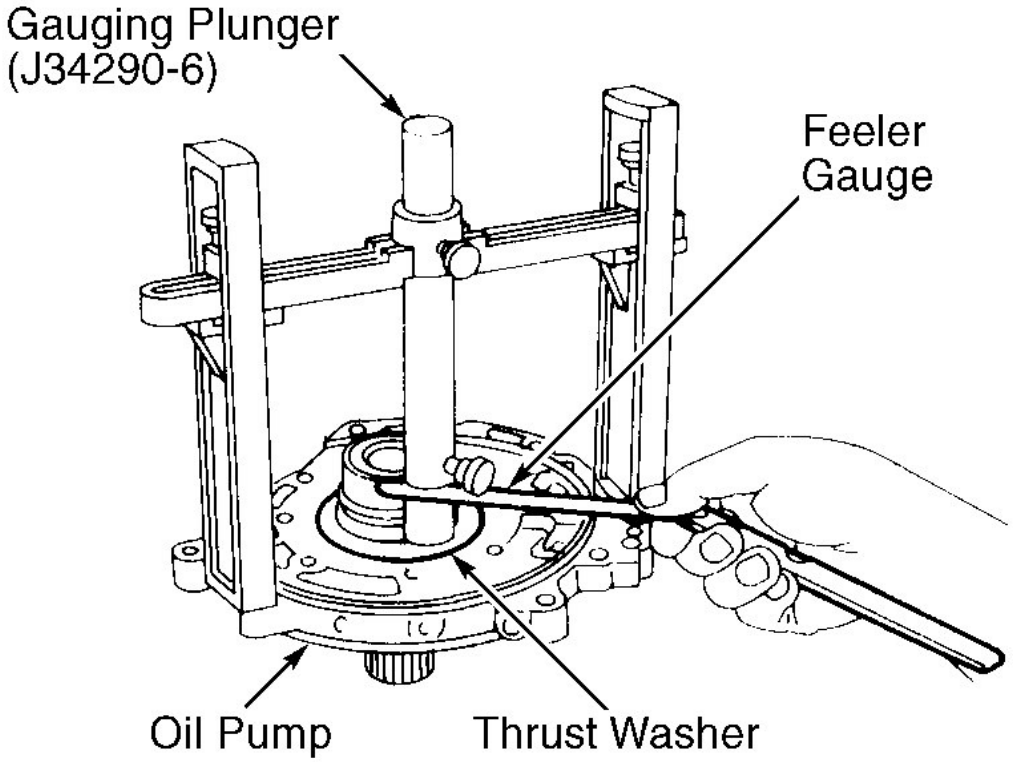
Fig. 45: Measuring Total End Play
Courtesy of NISSAN MOTOR CO., U. S. A.

REVERSE CLUTCH END PLAY

1. Reverse clutch end play is adjusted by adjusting thrust washer thickness. Place Gauge Set (J34291) on machined surface of transaxle case (with gasket), and allow gauging cylinder to rest on reverse clutch drum. Lock cylinder in place. Remove gauging cylinder. Install Gauging Plunger (J344290-6) into gauging cylinder. See **Fig. 46**.
2. With original thrust washer installed on oil pump, place gauge set legs onto machined surface of oil pump assembly, and allow plunger to rest on thrust washer. Using a feeler gauge, measure gap between gauging cylinder and gauging plunger. Measurement should give exact reverse clutch end play.
3. Reverse clutch end play should be .022-.035" (.55-.90 mm). Select proper thickness of thrust washer to ensure total end play is as specified. Thrust washers are available in selective thicknesses of .031-.073" (.80-1.85 mm) in increments of .006" (.15 mm).



STEP "A"



STEP "B"

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Fig. 46: Measuring Reverse Clutch End Play
Courtesy of NISSAN MOTOR CO., U. S. A.

TRANSAXLE REASSEMBLY

NOTE: For needle bearing, snap ring and thrust washer locations, See Fig. 17.

1. Install differential side oil seals in converter housing and transaxle case. Install parking actuator support to transaxle case with beveled edge inward. Install parking pawl on transaxle case and secure with parking shaft. Install return spring. See **Fig. 13**.
2. Perform DIFFERENTIAL SIDE BEARING PRELOAD, REDUCTION GEAR BEARING PRELOAD and OUTPUT SHAFT END PLAY adjustment procedures.
3. Remove paper from bearing retainer. Apply petroleum jelly to thrust washer. Install thrust washer on bearing retainer with Black side facing up. Ensure bearing retainer seal rings are not spread. Align teeth of low and reverse brake drive plates. Install forward clutch assembly. Forward clutch is installed correctly if bearing retainer and edge of forward clutch drum are near same level.
4. Apply petroleum jelly to thrust needle bearing. Install thrust needle bearing on bearing retainer with flat side down. Align teeth of overrun clutch drive plates. Install overrun clutch hub. Apply petroleum jelly to thrust washer and install thrust washer on overrun clutch hub.
5. Hold forward clutch hub and turn rear internal gear. Ensure overrun clutch hub rotates clockwise and does not rotate counterclockwise. If overrun clutch hub does operate as described, check installed direction of forward one-way clutch. Align forward clutch hub drive plate teeth and install forward clutch hub and rear internal gear assembly. Ensure thrust washer hooks are aligned on forward clutch hub.
6. Apply petroleum jelly to needle bearings. Install one needle bearing in rear planetary carrier with Black side down. Install other needle bearing on opposite side of rear planetary carrier with smooth side of bearing toward planetary carrier.
7. Install rear sun gear on rear planetary carrier with grooved side facing up. Install rear planetary carrier in transaxle case. Apply petroleum jelly to thrust needle bearing and install bearing on front planetary carrier with Black side down.
8. Align return springs to transaxle case gutters. See **Fig. 47**. Align brake piston with spring retainer. See **Fig. 37**. Install piston and retainer assembly in transaxle case. Align bracket with gutter and band servo piston stem. See **Fig. 48**.

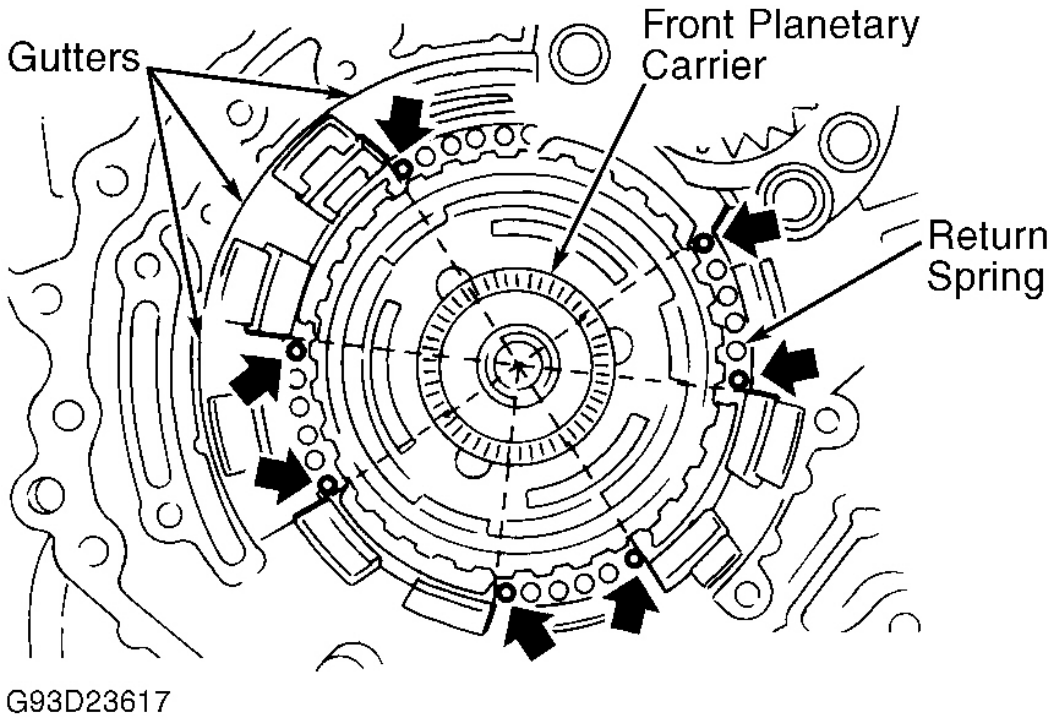

Fig. 47: Aligning Return Springs-To-Case Gutters
Courtesy of NISSAN MOTOR CO., U. S. A.

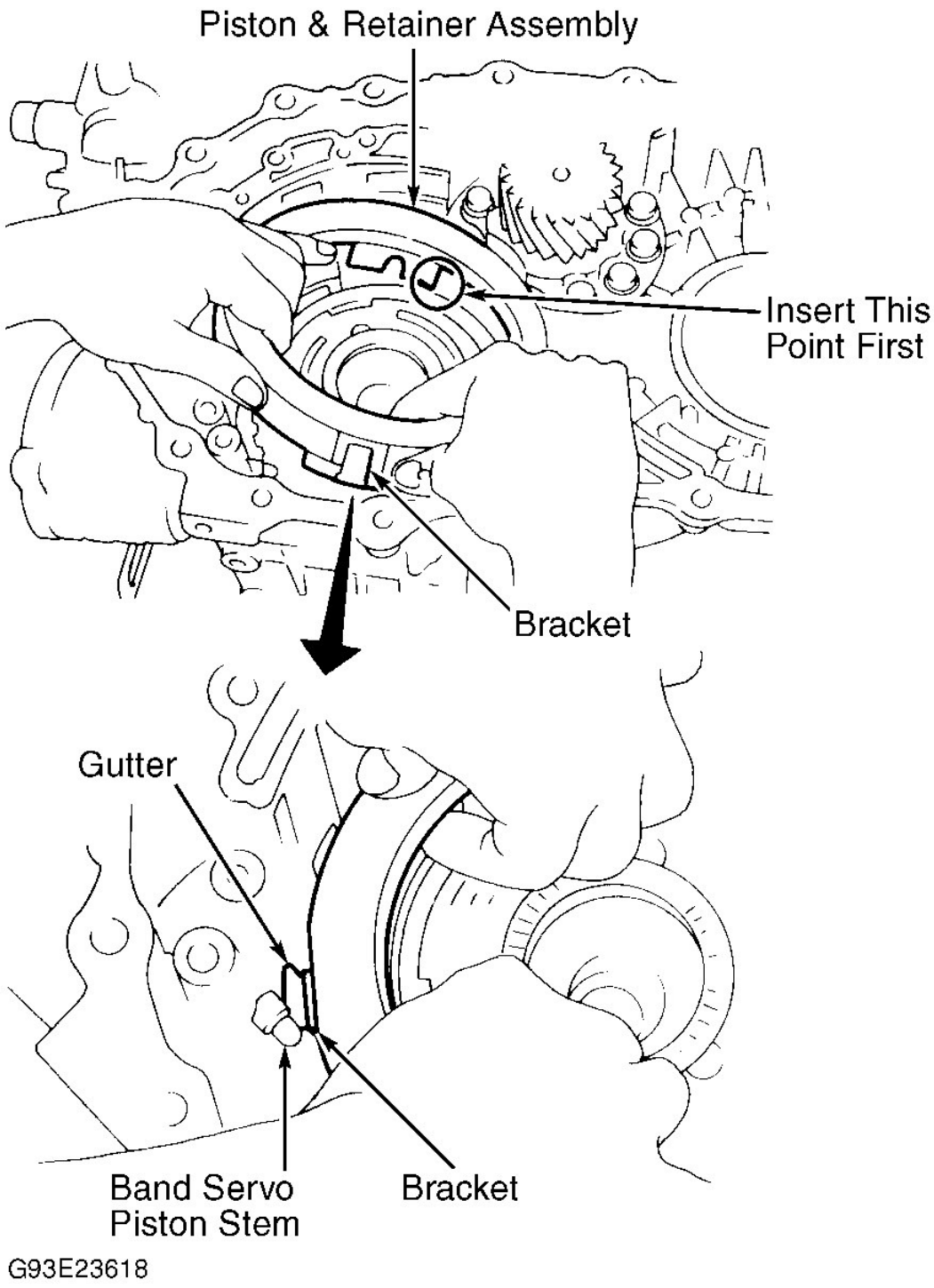

Fig. 48: Aligning Bracket-To-Case Gutter
Courtesy of NISSAN MOTOR CO., U. S. A.

9. Ensure each protrusion of piston is correctly set to corresponding return spring. Push piston and retainer assembly evenly and confirm smooth movement. If smooth movement does not occur, remove piston and retainer assembly and align return springs. See **Fig. 47**.
10. Using Tool (ST25420001), compress piston and retainer assembly and install snap ring. Install low one-way clutch to front planetary carrier by rotating carrier clockwise. Install snap ring.
11. Apply petroleum jelly to needle bearings and bearing race. Install needle bearing on front planetary carrier with flat side down. Install bearing race on front sun gear. Install needle bearing on high clutch hub with flat side facing front sun gear.
12. Install high clutch hub on front sun gear. Install needle bearing on high clutch drum side of high clutch hub. Install high clutch drum on high clutch hub. Install needle bearing on high clutch drum with flat side down. See **Fig. 12**.
13. Remove paper from input shaft. Align teeth of reverse clutch drive plates and install input shaft assembly. Align teeth of high clutch drive plates and install reverse clutch assembly.
14. Install anchor end pin, washer and lock nut on transaxle case. Place brake band and strut on reverse clutch drum. Tighten anchor end pin until brake band is on reverse drum evenly.
15. Apply petroleum jelly on bearing race selected in TOTAL END PLAY adjustment procedure. Install bearing race on oil pump cover. Apply petroleum jelly on thrust washer selected in REVERSE CLUTCH END PLAY adjustment procedure. Install thrust washer on reverse clutch drum.
16. Install oil pump assembly, baffle plate and gasket on transaxle case. Tighten oil pump bolts to 13-15 ft. lbs. (18-21 N.m). Apply ATF to input shaft "O" ring and install "O" ring on input shaft. Adjust brake band. Tighten anchor end pin to 35-53 INCH lbs. (4-6 N.m). Back off anchor end pin 2 1/2 turns. While holding anchor end pin, tighten lock nut. Apply compressed air to oil holes in transaxle case to ensure correct brake band operation. See **Fig. 49**.

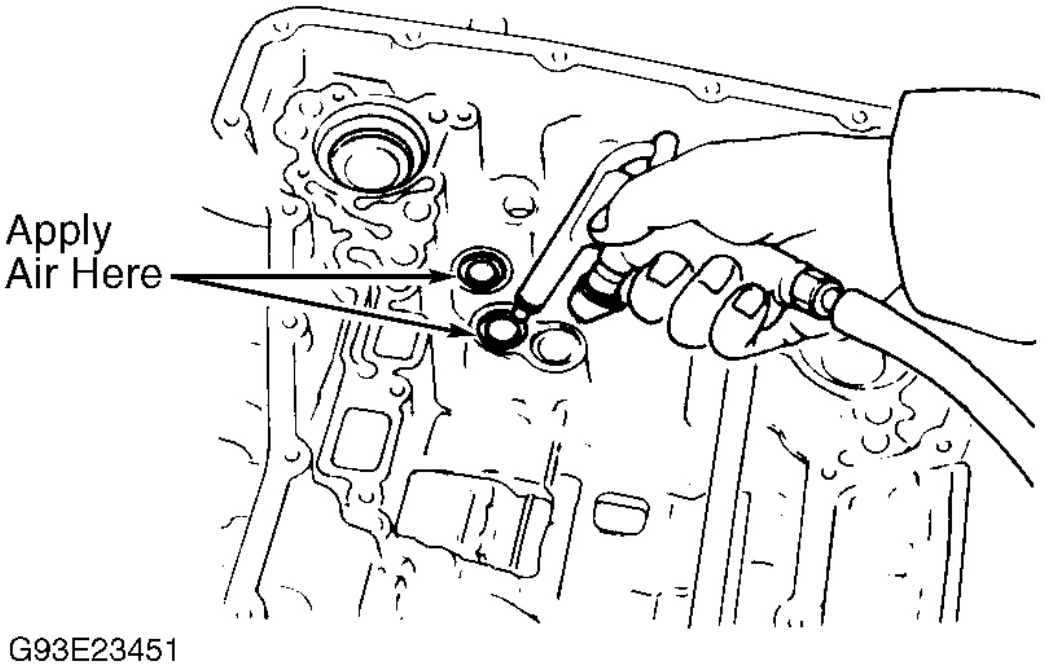

Fig. 49: Checking Brake Band Operation
Courtesy of NISSAN MOTOR CO., U. S. A.

17. Install differential assembly on transaxle case. Install oil tube on converter housing and tighten bolts to 44-62 INCH lbs. (5-7 N.m). Install "O" ring on differential oil port of transaxle case. Apply a .059" (1.50 mm) bead of liquid gasket on inside edge of converter housing mating surface. Install converter housing on transaxle case. Tighten bolts to 32-35 ft. lbs. (43-47 N.m).
18. Check contact surface of accumulator piston for damage. Apply ATF to "O" rings and install on accumulator piston. Install accumulator pistons and return springs in transaxle case. Apply petroleum jelly to lip seals for band servo oil holes and install in transaxle case. Install tube and sleeve.
19. Apply ATF to manual valve and insert valve into control valve assembly. Set manual shaft in Neutral position. Install control valve assembly on transaxle case while aligning manual valve with manual plate.
20. Put solenoid harness into transaxle case and push terminal body onto transaxle case. Install clip to terminal body. Install and tighten control valve assembly bolts to 44-62 INCH lbs. (5-7 N.m). See **Fig. 4**. Attach magnet to oil pan. Install NEW oil pan gasket and install oil pan. Tighten NEW pan bolts in a crisscross pattern to 62-80 INCH lbs. (7-9 N.m). Install drain plug (if necessary) and tighten to 22-29 ft. lbs. (29-39 N.m) .

NOTE: Always replace oil pan bolts. Bolts are self-sealing.

21. Install inhibitor switch and adjust if necessary. Apply ATF to NEW "O" ring and install on dipstick tube. Install dipstick tube and oil cooler tube to transaxle. Tighten dipstick tube bolt to 35-44 INCH lbs. (4-5 N.m). Tighten oil cooler tube bolts to 22-36 ft. lbs. (29-49 N.m).

22. Pour 1.1 qt. (1.0L) of ATF into torque converter and install torque converter. Measure distance "A" to ensure torque converter is installed correctly. See **Fig. 50**. Distance "A" should be .75" (19 mm) on Altima, and .55" (14 mm) on Maxima and Quest.

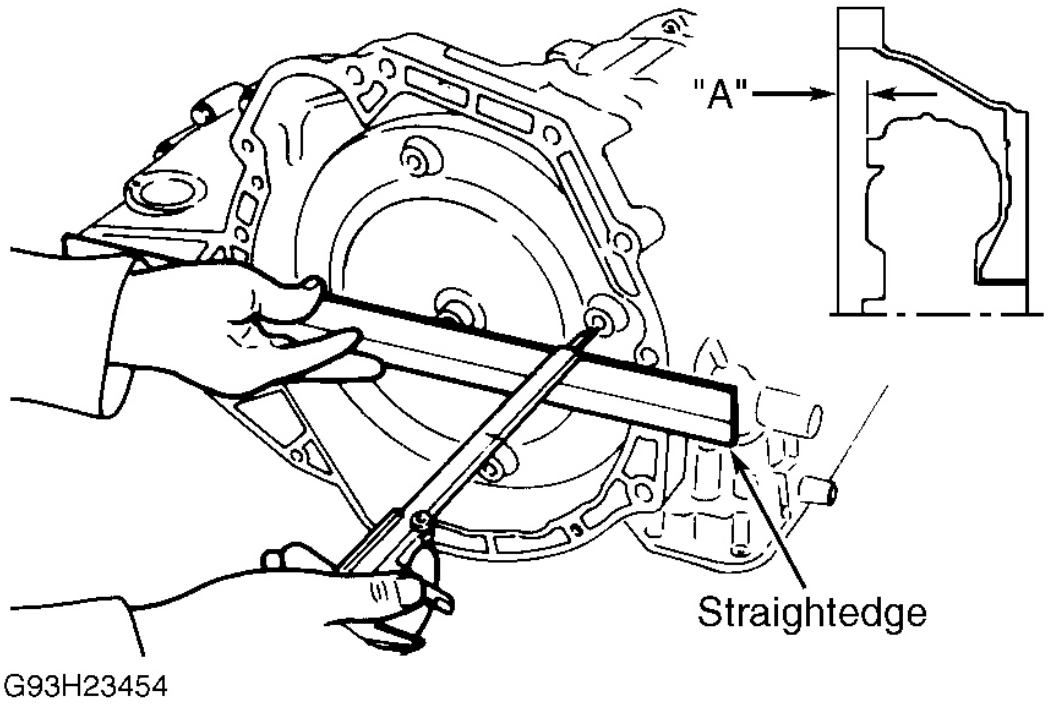

Fig. 50: Measuring Converter Installed Depth
Courtesy of NISSAN MOTOR CO., U. S. A.

TRANSMISSION SPECIFICATIONS

TRANSAXLE SPECIFICATIONS

Application	In. (mm)
Differential Side Gear-To-Clearance	.004-.008 (.10-.20)
Differential Side Bearing Preload	.002-.0035 (.05-.09)
Forward & Overrun Clutches	
Dish Plate Thickness	.106 (2.70)
Drive Plate Thickness	.063 (1.60)
Service Limit	.055 (1.40)
Retaining Plate-To-Snap Ring	
Specified Clearance	
Forward Clutch	.018-.033 (.45-.85)
Overrun Clutch	.028-.043 (.70-1.10)

Service Limit	
Forward Clutch	.073 (1.85)
Overrun Clutch	.067 (1.70)
High Clutch	
Drive Plate Thickness	.063 (1.60)
Service Limit	.055 (1.40)
Retaining Plate-To-Snap Ring	
Specified Clearance	.071-.087 (1.80-2.20)
Service Limit	.118 (3.00)
Input Shaft Seal Ring-To-Ring Groove	
Specified Clearance	.003-.009 (.08-.23)
Service Limit	.009 (.23)
Low & Reverse Brake	
Drive Plate Thickness	.071 (1.80)
Service Limit	.063 (1.60)
Specified Clearance	.067-.083 (1.70-2.10)
Service Limit	.138 (3.50)
Oil Pump Seal Ring-To-Ring Groove	
Specified Clearance	.0014-.0069 (.036-.176)
Service Limit	.0069 (.176)
Oil Pump Side Clearance	.001-.002 (.03-.05)
Oil Pump Outer Gear-To-Housing Clearance	.004-.007 (.11-.18)
Output Shaft End Play	0-.006 (0-.15)
Output Shaft Seal Ring-To-Ring Groove	
Specified Clearance	.004-.010 (.10-.25)
Service Limit	.010 (.25)
Pinion Washer-To-Planetary Gear	
Specified Clearance	.008-.028 (.20-.70)
Service Limit	.031 (.80)
Reverse Clutch	
Dish Plate Thickness	.121 (3.08)
Drive Plate Thickness	.079 (2.00)
Service Limit	.071 (1.80)
Retaining Plate-To-Snap Ring	
Specified Clearance	.020-.031 (.50-.80)
Service Limit	.047 (1.20)
Reduction Gear Bearing Preload	.002 (.05)
Reverse Clutch End Play	.022-.035 (.55-.90)
Total End Play	.010-.022 (.25-.55)

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS

Application	Ft. Lbs. (N.m)
Anchor End Pin Lock Nut	23-31 (31-42)
Converter Housing Bolt	32-35 (43-47)
Differential Case Bolt	27-30 (36-40)
Idler Gear Lock Nut	195-224 (265-304)
Oil Pan Drain Plug	21-25 (29-34)
Oil Cooler Tube Bolt	21-36 (29-49)
Oil Pump-To-Transaxle Case Bolt	13-15 (18-21)
Parking Actuator Support Bolt	15-18 (20-24)
Reduction Gear Bearing Race Bolt	80-91 (109-123)
Ring Gear Bolt	65-76 (88-103)
Side Cover Bolt	19-22 (26-30)
INCH Lbs. (N.m)	
Control Valve Assembly Bolt	62-80 (7-9)
Control Valve Body Bolt	44-62 (5-7)
Detent Spring Bolt	57-66 (6.4-7.5)
Dipstick Tube Bolt	35-44 (4-5)
Inhibitor Switch Bolt	22-35 (2.5-3.9)
Oil Pan Bolt	62-80 (7-9)
Oil Pump Cover-To-Housing Bolt	62-97 (7-11)
Oil Tube Bolt	44-62 (5-7)
Revolution Sensor Bolt	44-62 (5-7)
Solenoid Assembly Bolt	62-80 (7-9)
Speedometer Pinion Bolt	44-62 (5-7)
Viscous Coupling-To-Differential Case Bolt	33-52 (3.7-5.9)

WIRING DIAGRAMS

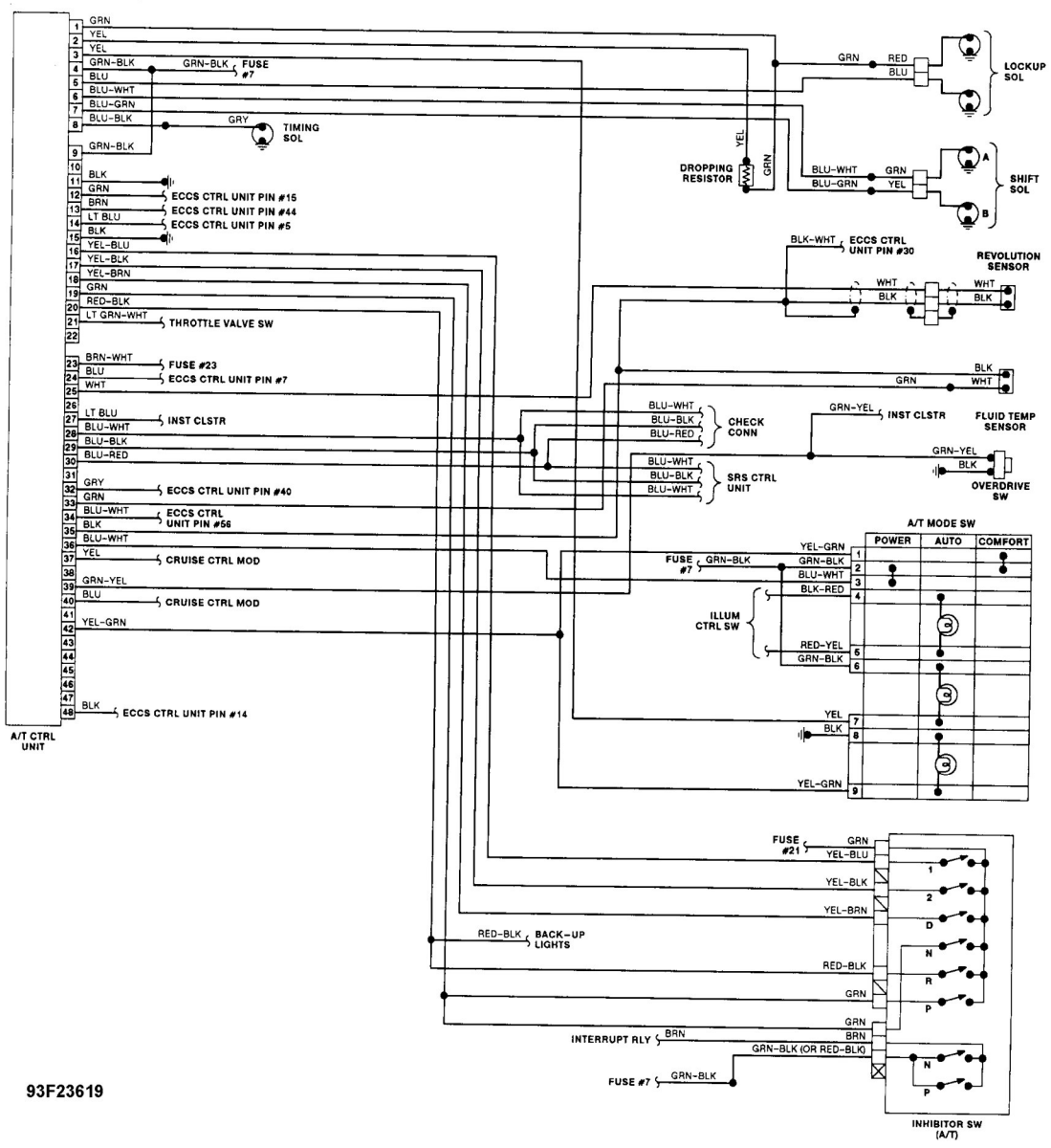

Fig. 51: 1992 Maxima Wiring Diagram (RE4F04V)
Courtesy of NISSAN MOTOR CO., U. S. A.

Fig. 52: 1993-94 Maxima Wiring Diagram (RE4F04V)

Courtesy of NISSAN MOTOR CO., U. S. A.

Fig. 53: 1993-94 Altima Wiring Diagram (RE4F04A & RE4F04V)

Courtesy of NISSAN MOTOR CO., U. S. A.

Fig. 54: 1993-94 Quest Wiring Diagram (RE4F04A)

Courtesy of NISSAN MOTOR CO., U. S. A.

OIL CIRCUIT DIAGRAM

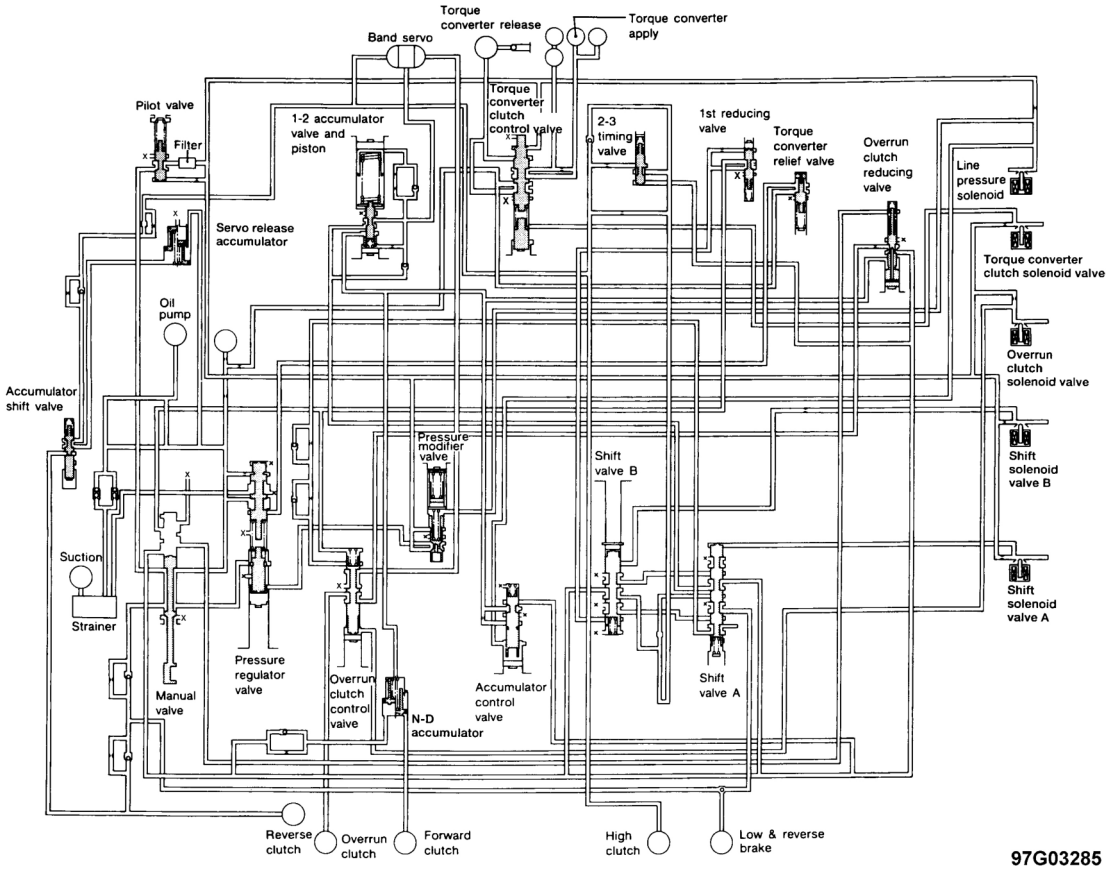

Fig. 55: Oil Circuit Diagram (RE4F04A)

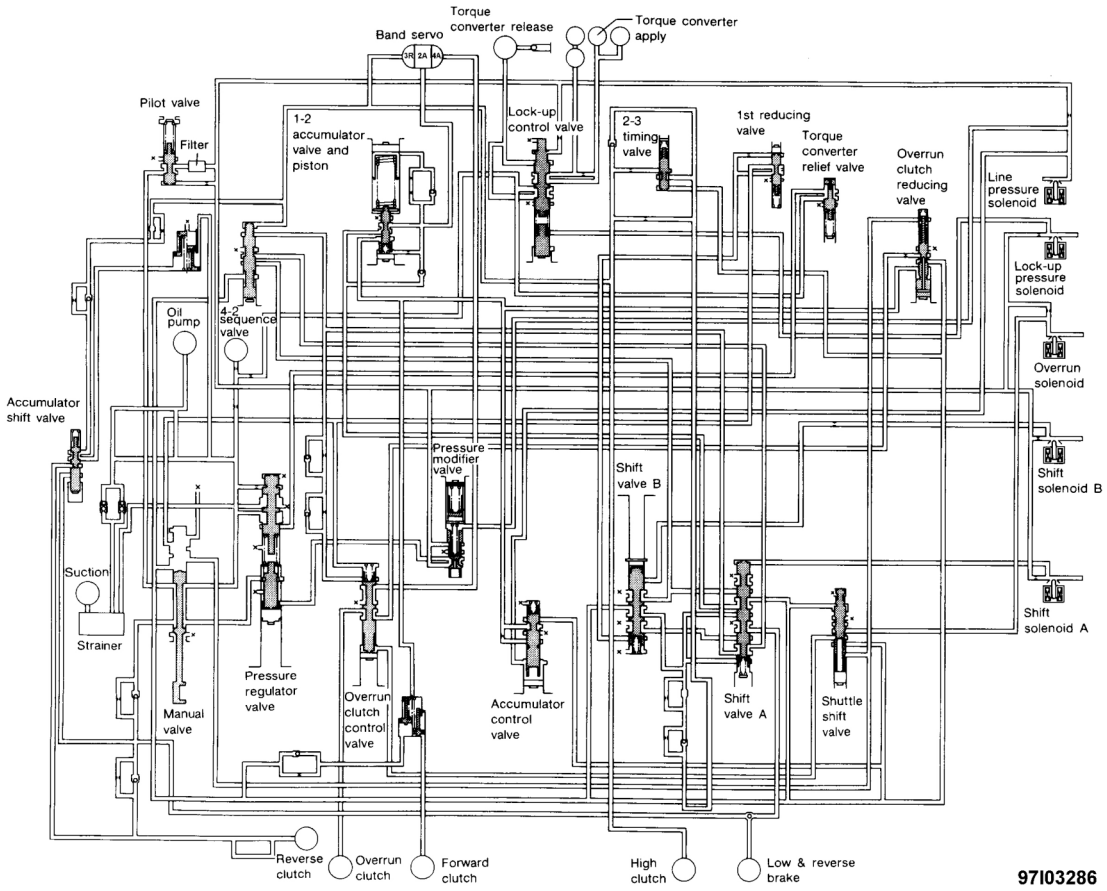

Fig. 56: Oil Circuit Diagram (RE4F04V)

