1991-94 AUTOMATIC TRANSMISSIONS

Nissan RE4F03V Electronic Controls & Overhaul

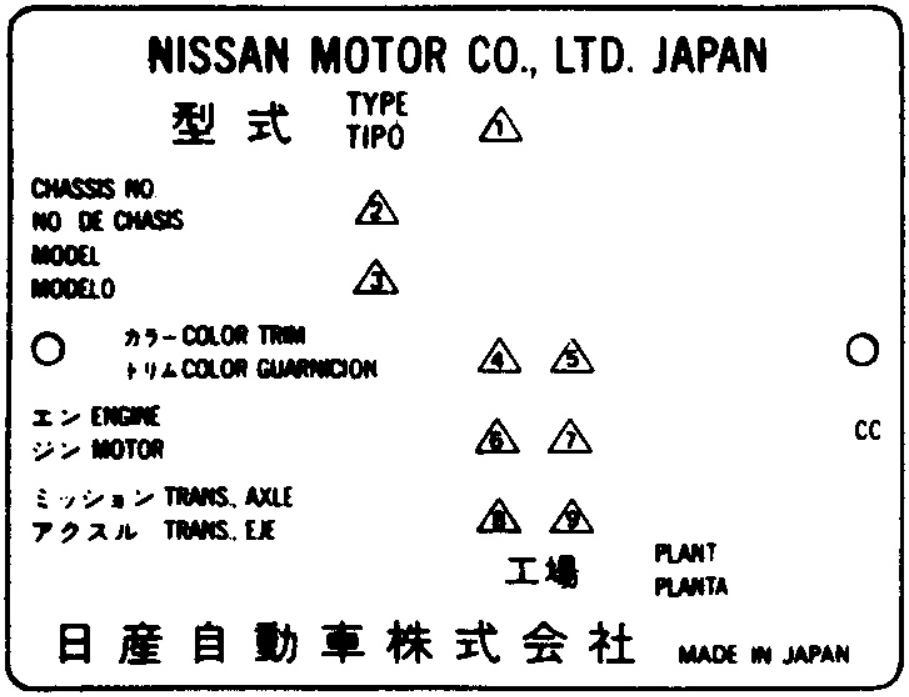
APPLICATION

TRANSMISSION APPLICATIONS

Vehicle Model	Transmission Model
Infiniti (1993-94) G20 (From VIN No. 450021)	RE4F03V
Nissan	
NX SE (1991-93)	RE4F03V
Sentra SE-R (1991-94)	RE4F03V

IDENTIFICATION

Transaxle model is located on vehicle identification plate in engine compartment area, on firewall. See **Fig. 1**. Transaxle number is located on transaxle governor cap. Governor cap is still a component of this transaxle although governor is no longer used. 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

93E22362

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

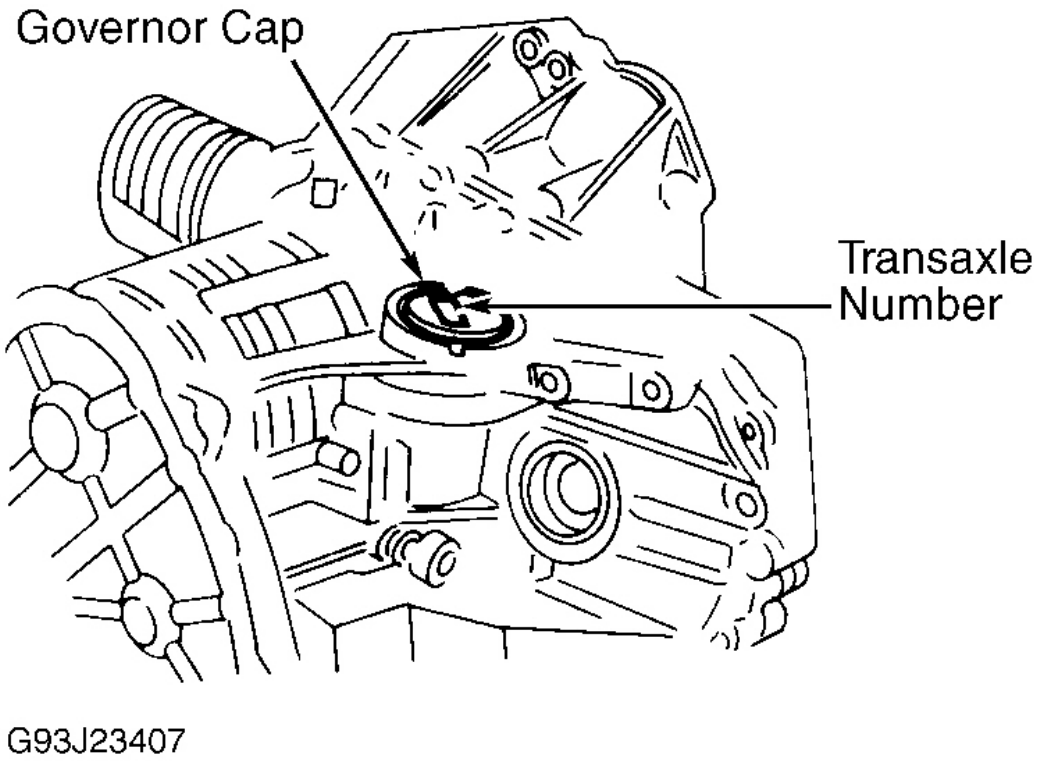


Fig. 2: Locating Automatic Transaxle Number
Courtesy of NISSAN MOTOR CO., U.S.A.

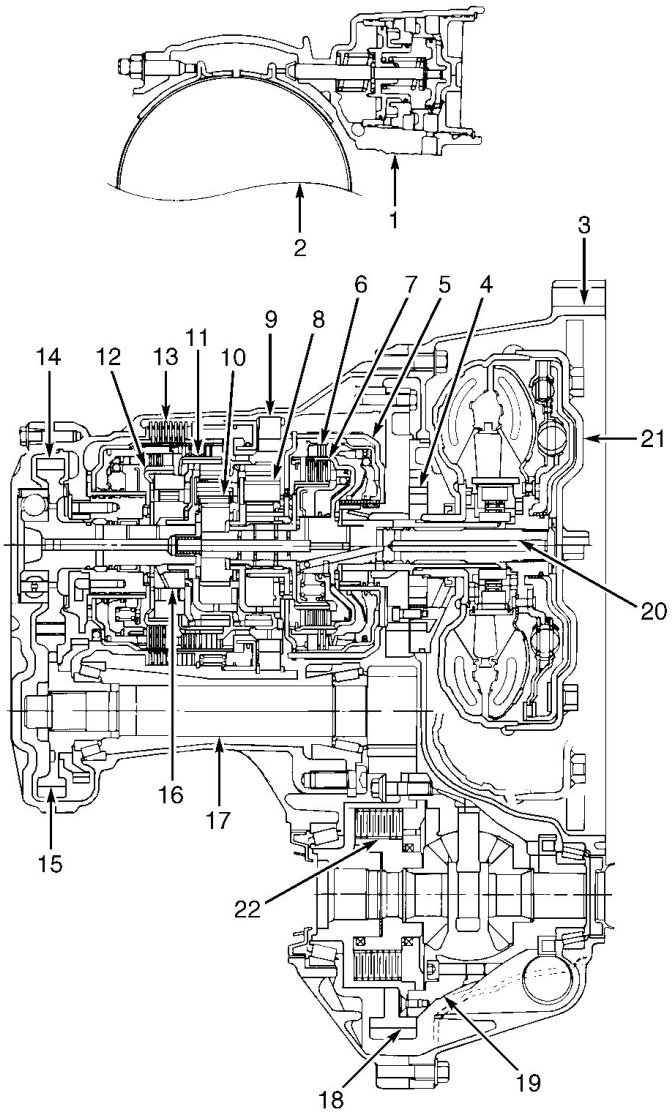
DESCRIPTION

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.

The following electronic signals, sensors, switches and solenoids are used to control transaxle shifting. Refer to the **ELECTRONIC COMPONENT & CIRCUIT TESTS** for more information and testing:

- Engine Revolution Signal (Tach Signal)
- Transmission Fluid Temperature Sensor
- Inhibitor Switch
- Line Pressure Solenoid
- Lock-Up Solenoid

- Overdrive Switch
- Overrun Clutch Solenoid
- Mainshaft Revolution Sensor
- Shift Solenoids "A" and "B"
- Speed Sensor
- Throttle Position Sensor
- T.V. Valve
- Shift Lock System



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

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:

- G20, see **TRANSMISSION SERVICING - A/T**
- NX SE, see **TRANSMISSION SERVICING - A/T**
- Sentra SE-R, see **TRANSMISSION SERVICING - A/T**

ON-VEHICLE SERVICE

CONTROL VALVE ASSEMBLY

Removal & Installation

1. Remove the drain plug. Drain transmission fluid. Remove the oil pan and gasket. Remove oil strainer. Remove control valve assembly by removing bolts and disconnecting the wiring harness connector. See the **CONTROL VALVE ASSEMBLY BOLT IDENTIFICATION** table. See **Fig. 4**. Remove accumulators by applying compressed air (if necessary).
2. To install control valve assembly, 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). To complete installation, reverse removal procedure. Fill transaxle to appropriate fluid level.

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.	

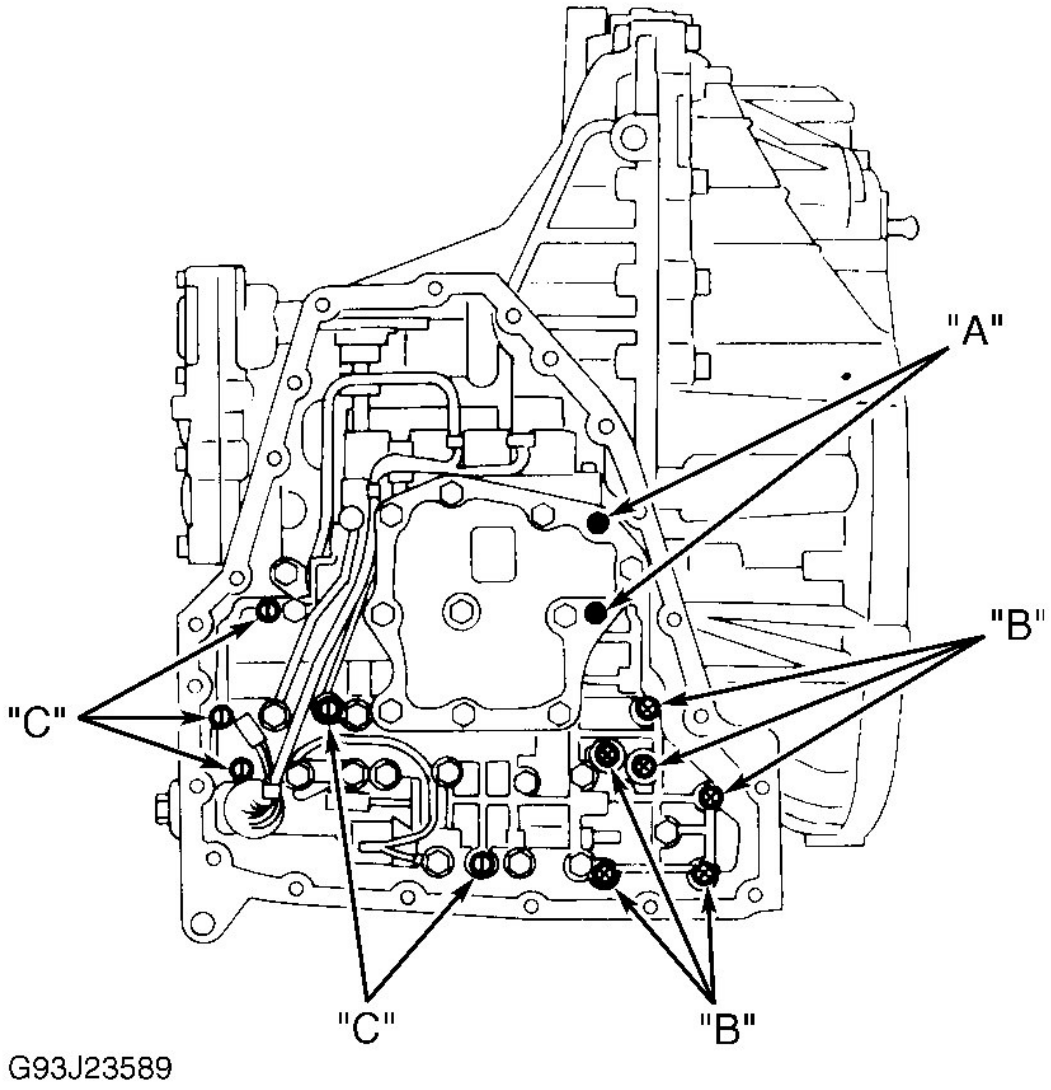


Fig. 4: Removing & Installing Control Valve Assembly
Courtesy of NISSAN MOTOR CO., U.S.A.

INHIBITOR SWITCH ADJUSTMENT

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

- G20, see **TRANSMISSION SERVICING - A/T**
- NX SE, see **TRANSMISSION SERVICING - A/T**
- Sentra SE-R, see **TRANSMISSION SERVICING - A/T**

OIL COOLER FLUSHING PROCEDURE

Vehicles with tube type transaxle fluid cooler may be cleaned 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 **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

1. Check fluid level using HOT range on dipstick with 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.
2. Fluid level should be checked with vehicle on level surface and parking brake applied. Check fluid level while engine is idling and selector lever is in "P" position.
3. If fluid level is at low side of either range, add fluid. Check fluid condition. Check for fluid leakage. Examine fluid color, texture and odor. If fluid is Black and has a burnt odor, clutch friction plates are worn.
4. If fluid is milky Pink in color, fluid is water-contaminated. Water may be entering transaxle through filler tube or breather. If fluid is Light/Dark Brown in color and tacky, fluid level is incorrect or transaxle is overheating.

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. Refer to SHIFT SPEED SPECIFICATIONS tables. Also See **Fig. 5**.
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 12 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 SHIFT SPEED SPECIFICATIONS tables. Also See **Fig. 5**.

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
Comfort Pattern	
Lock-Up ON in 4th	50-55
Lock-Up OFF in 4th	38-43
Power Pattern	
Lock-Up ON in 4th	60-65
Lock-Up OFF in 4th	41-46
(1) With 1/4 throttle opening.	

SHIFT SPEED SPECIFICATIONS TABLES

SHIFT SPEED SPECIFICATIONS (COMFORT PATTERN)

Application	Full Throttle MPH	Half Throttle MPH
1st-2nd	35-37	22-24
2nd-3rd	63-68	39-43
3rd-4th	101-106	61-66
4th-3rd	98-103	39-43
3rd-2nd	57-62	25-30
2nd-1st	31-34	7-9

SHIFT SPEED SPECIFICATIONS (POWER PATTERN)

Application	Full Throttle MPH	Half Throttle MPH
1st-2nd	35-37	25-28
2nd-3rd	63-68	46-51
3rd-4th	101-106	73-78
4th-3rd	98-103	52-57
3rd-2nd	57-62	26-31
2nd-1st	31-34	7-9

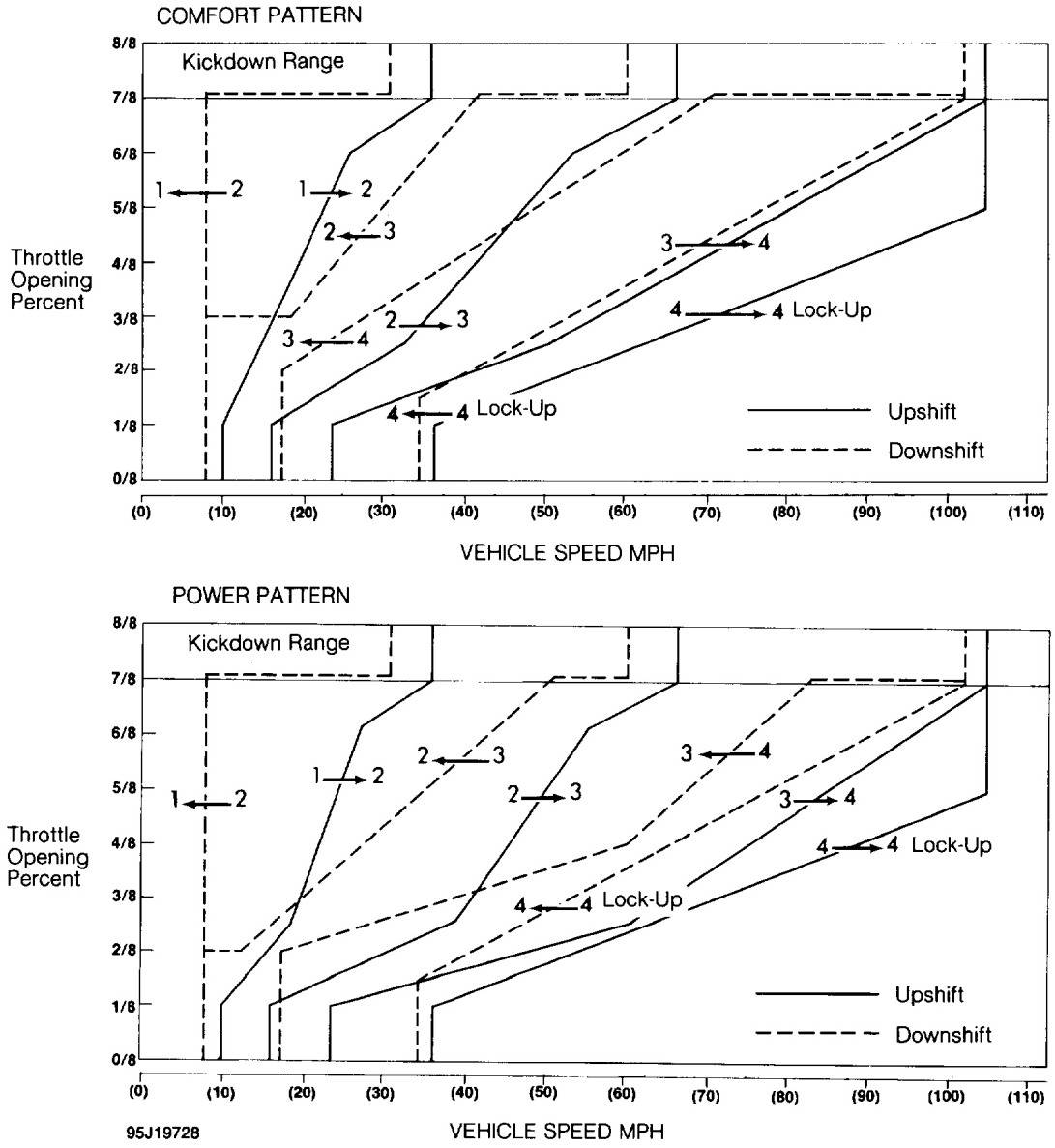


Fig. 5: Shift Speed Charts
Courtesy of NISSAN MOTOR CO., U.S.A.

HYDRAULIC PRESSURE TESTS

NOTE: Always replace pressure plug. Plug is self-sealing type.

Line Pressure Test Procedure

1. Warm engine and transaxle to normal operating temperature. Check engine and transaxle fluid levels and add fluid as necessary. Install pressure gauge to line pressure port. See **Fig. 6**.

2. Set parking brake and block wheels. Apply foot brake fully while line pressure test at stall speed is performed. Start engine and measure line pressure at idle and stall speed in "D", "2", "1" and "R" positions. When measuring line pressure at stall speed, follow the stall speed test procedure. Note pressure readings and refer to the

LINE PRESSURE SPECIFICATIONS table.

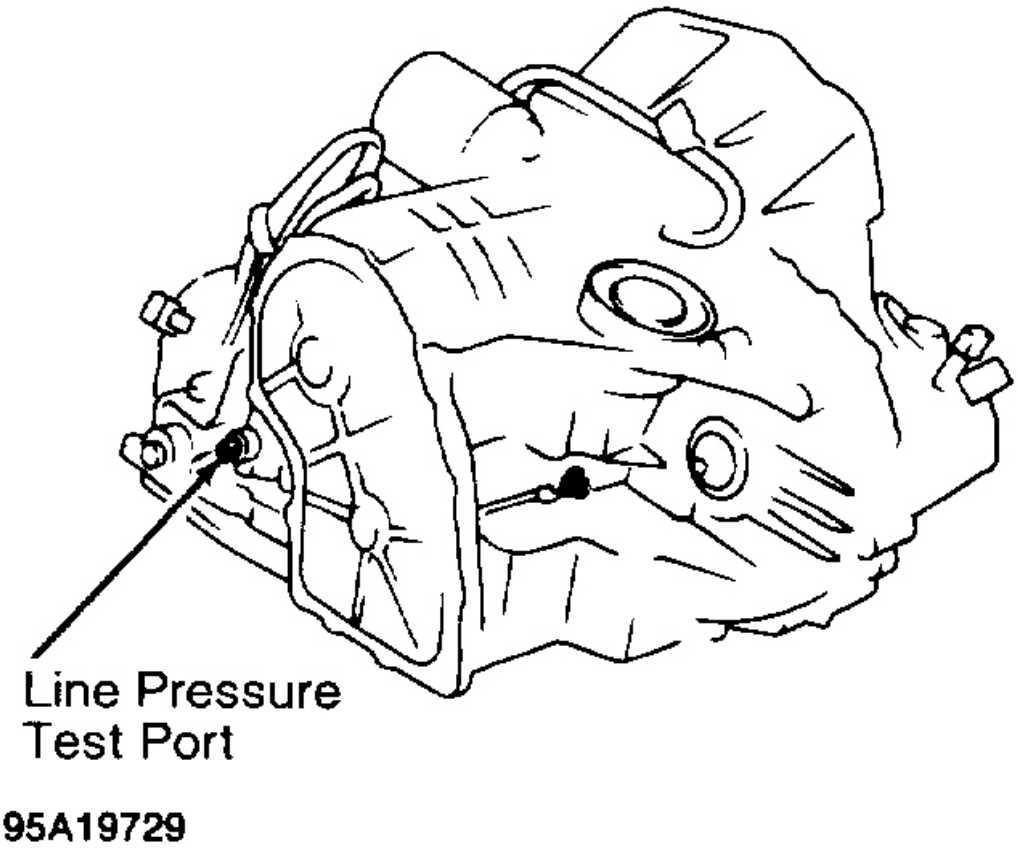


Fig. 6: Identifying Hydraulic Pressure Test Port
Courtesy of NISSAN MOTOR CO., U.S.A.

LINE PRESSURE SPECIFICATIONS

Application	psi (kPa)
At Idle	
In "D", "2" & "1"	73 (500)
In "R"	124 (853)
At Stall Speed	

In "D", "1" & "2"	159 (1098)
In "R"	270 (1863)

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.

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. Gradually depress accelerator pedal to wide-open throttle position while applying foot brake. Note engine stall speed and release accelerator pedal immediately. Stall speed should be 1900-2200 RPM.
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

- **Stall Speed Low In All Positions**

  Insufficient engine performance or faulty torque converter one-way clutch.

- **Stall Speed High In All Positions**

  Low and reverse brake slipping, faulty low one-way clutch or hydraulic circuit for line pressure control.

- **Stall Speed High In "R" Position Only**

  Reverse clutch slipping or low and reverse brake slipping.

- **Stall Speed High In "D", "2" & "R" Positions, Okay In "1" Position**

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

- **Stall Speed High In "D", "2" & "1" Positions, Okay In "R" Position**

  Defective forward clutch, overrun clutch or forward one-way clutch.

- **Stall Speed High In "D" & "2" Positions, Okay In "1" & "R" Positions**

  Defective forward clutch, low one-way clutch and overrun clutch.

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

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, then to ACC position. Set transmission mode switch to AUTO position, overdrive switch to OFF position, and selector lever to "D" position. Turn ignition switch to ON position. POWER indicator light should come on for 2 seconds.
2. Move selector lever to "2" position. Set overdrive switch to ON position. Move selector lever to "1" position. Set overdrive switch to OFF position. Depress accelerator pedal to floor and release pedal. Record POWER indicator light flashes and refer to SELF-DIAGNOSTIC CODES charts. See **Fig. 7**-**Fig. 10**.

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

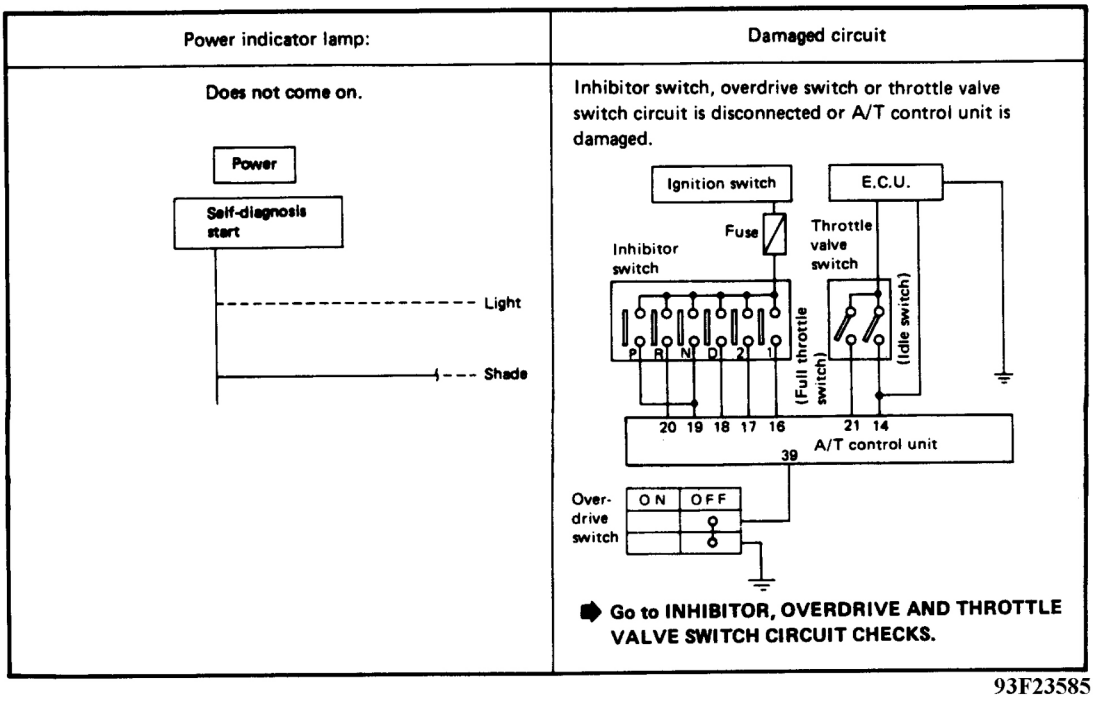


Fig. 7: Identifying Transaxle Self-Diagnostic Codes (1 Of 4)
Courtesy of NISSAN MOTOR CO., U.S.A.

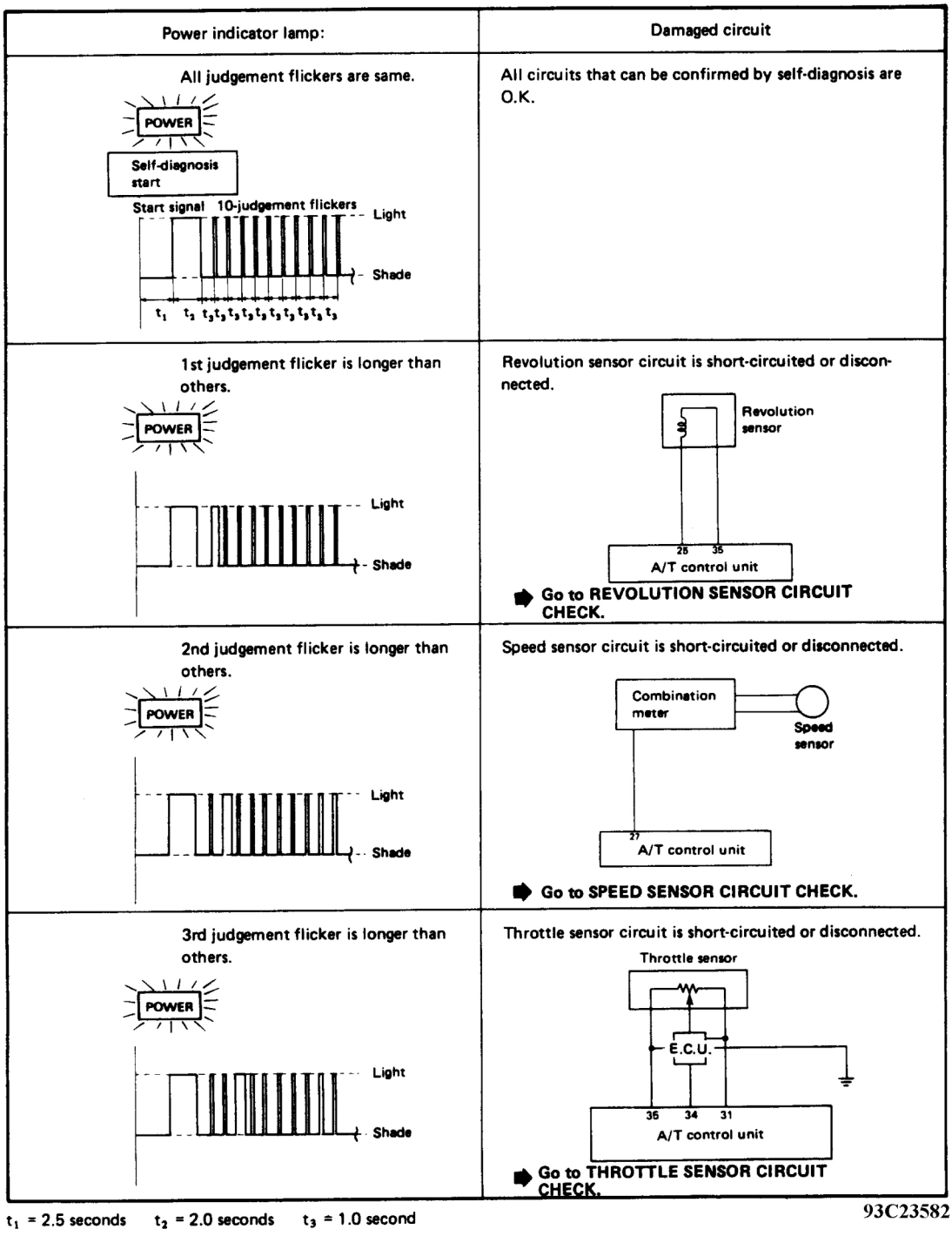


Fig. 8: Identifying Transaxle Self-Diagnostic Codes (2 Of 4)
Courtesy of NISSAN MOTOR CO., U.S.A.

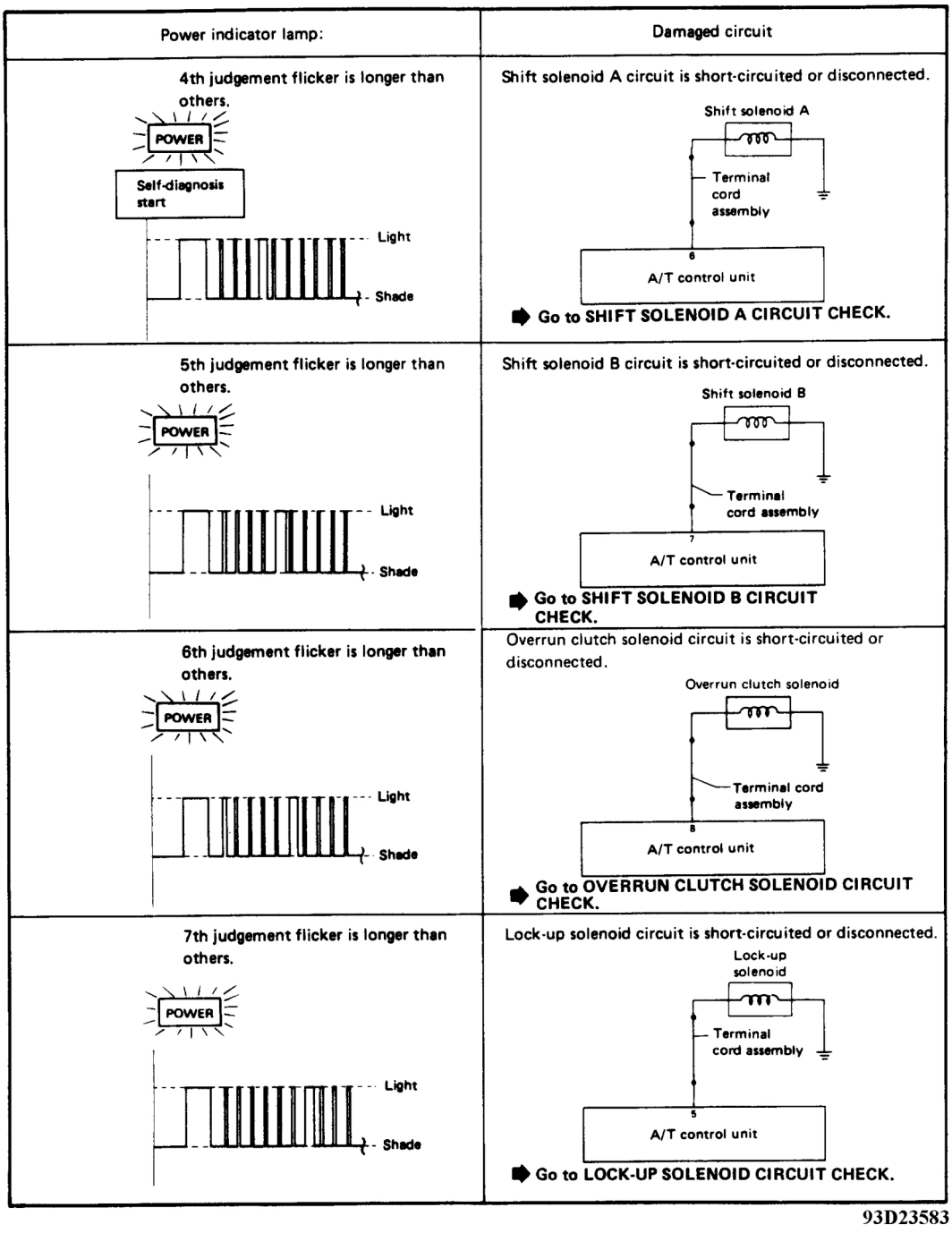


Fig. 9: Identifying Transaxle Self-Diagnostic Codes (3 Of 4)
Courtesy of NISSAN MOTOR CO., U.S.A.

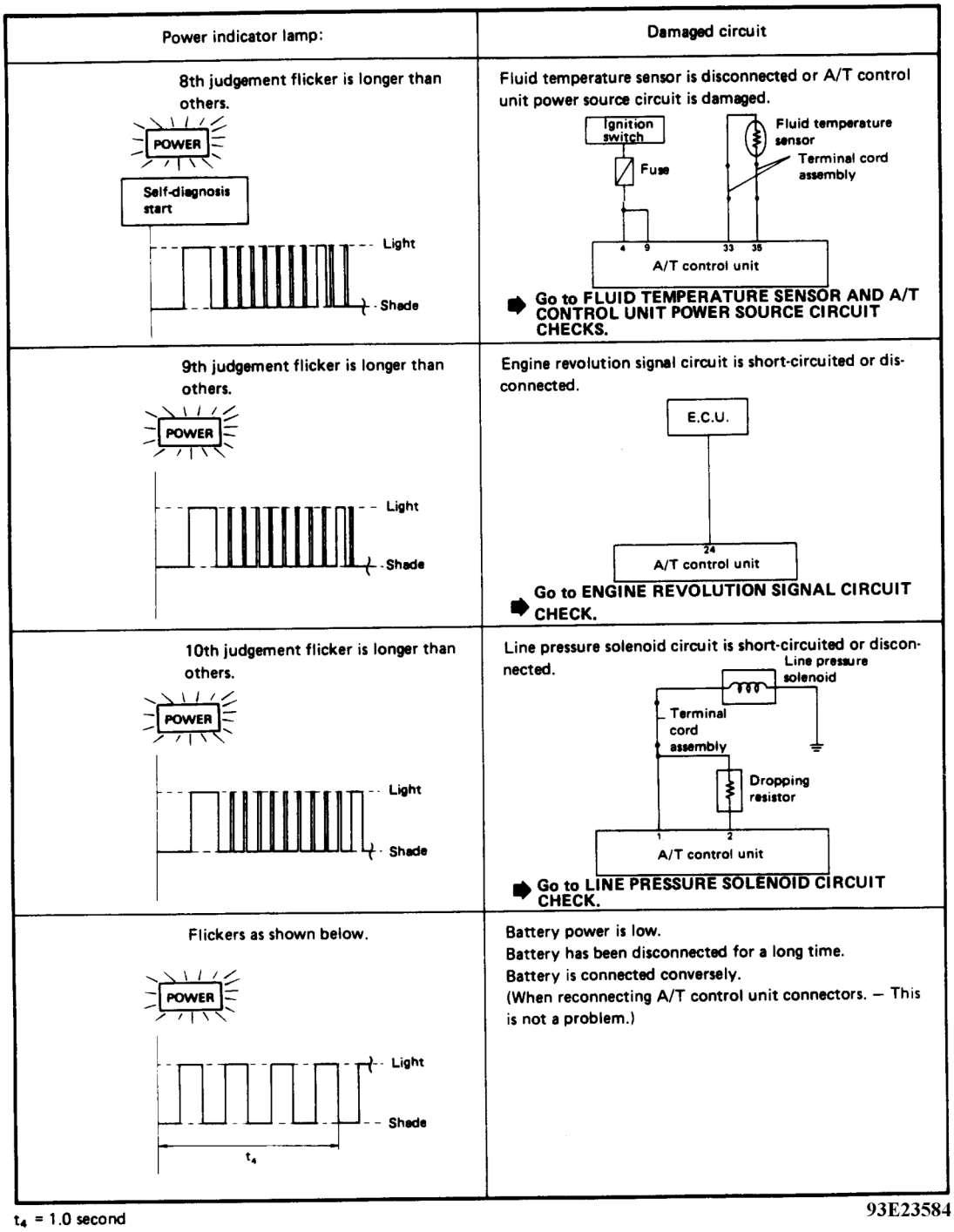


Fig. 10: Identifying Transaxle Self-Diagnostic Codes (4 Of 4)
Courtesy of NISSAN MOTOR CO., U.S.A.

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 DIAGRAMS.

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 (TACH SIGNAL)

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

Transaxle 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

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 on left front fender, near 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 (Black/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. 40 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 (Green/Yellow wire) 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 (TRANSMISSION MAINSHAFT)

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 does not rise when vehicle is driven, 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 (VEHICLE SPEED SENSOR)

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 (THROTTLE POSITION SENSOR - TPS)

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 (T.V.) 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

1. Disconnect 9-pin shift lock harness connector, located below shift lever housing. Check for continuity between shift lock harness connector, terminal No. 5 (Blue/Black 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 at base of shift lever).

Shift Lock Solenoid

Disconnect 9-pin shift lock harness connector, located below shift lever housing. Connect fused jumper wire from battery positive terminal to terminal No. 8 (Blue/Green wire) at shift lock harness connector. Connect jumper wire from battery negative 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

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 (Yellow 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 10-amp fuse 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 15-amp fuse on NX and Sentra, or 20-amp fuse on G20, located 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/Green 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 (Blue/Black 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.

REMOVAL & INSTALLATION

See the TRANSMISSION REMOVAL & INSTALLATION - A/T article in the AUTOMATIC TRANS SERVICING section.

- G20, see **TRANSMISSION REMOVAL & INSTALLATION - A/T**
- NX SE, see **TRANSMISSION REMOVAL & INSTALLATION - A/T**
- Sentra SE-R, 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. 11**.
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.

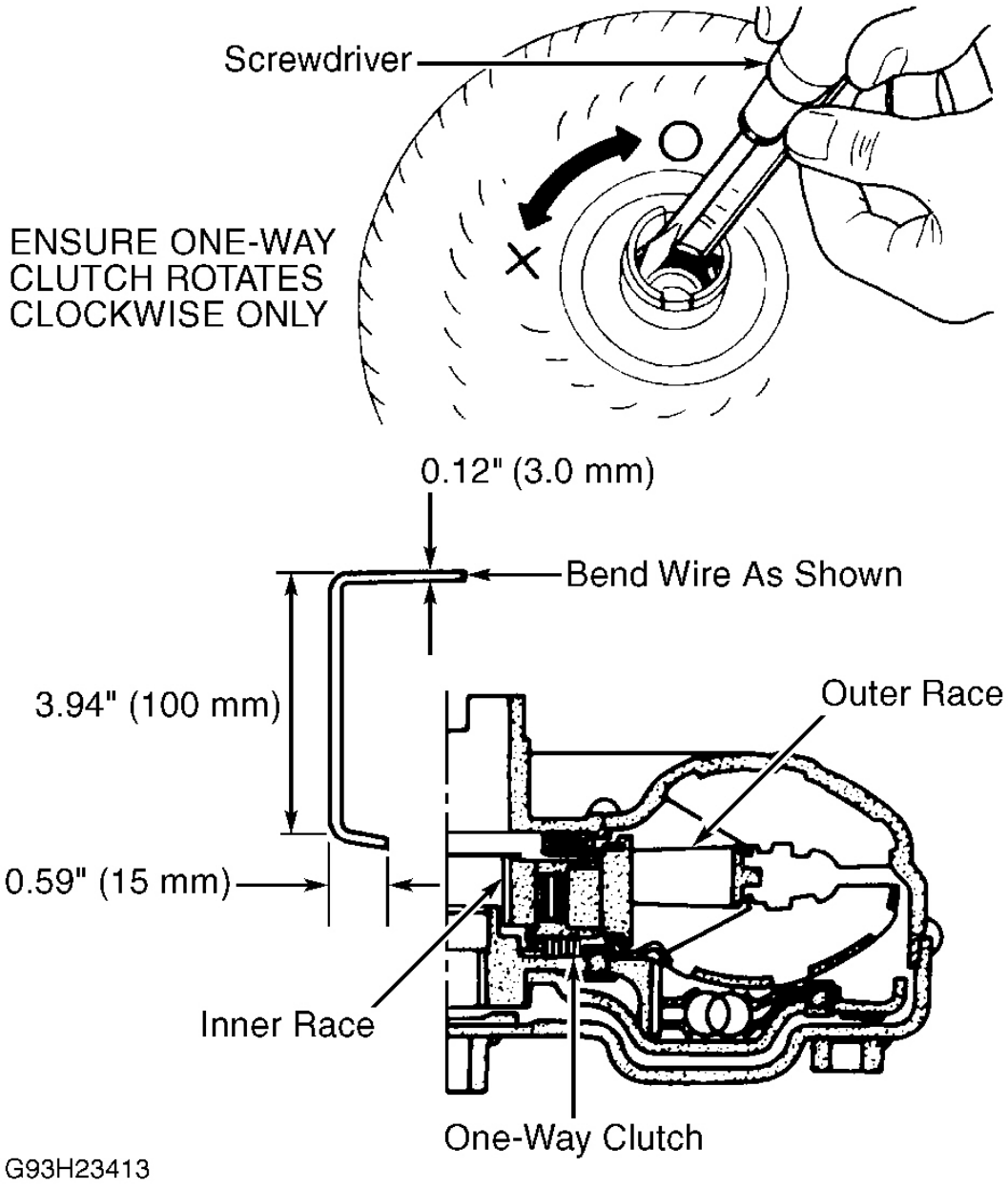


Fig. 11: Checking Torque Converter One-Way Clutch
Courtesy of NISSAN MOTOR CO., U.S.A.

TRANSAXLE DISASSEMBLY

1. Remove drain plug and drain transmission fluid. Remove the torque converter. Check torque converter one-way clutch. Refer to **TORQUE CONVERTER**. 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. 12. **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	1.102 (280)
3-R Accumulator	
Inner Spring	
Free Length	2.047 (52.00)
Outer Diameter	.516 (13.10)
Outer Spring	
Free Length	2.067 (52.50)
Outer Diameter	.831 (21.10)

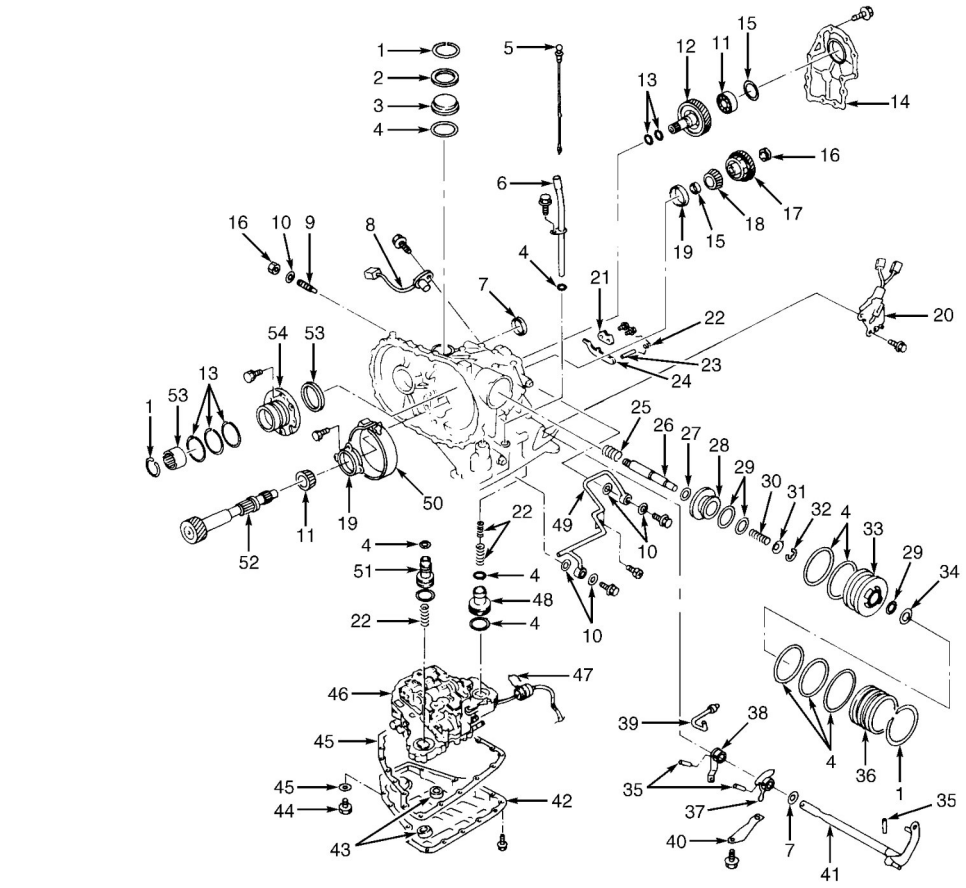


Fig. 12: Exploded View Of Transaxle Case Components
Courtesy of NISSAN MOTOR CO., U.S.A.

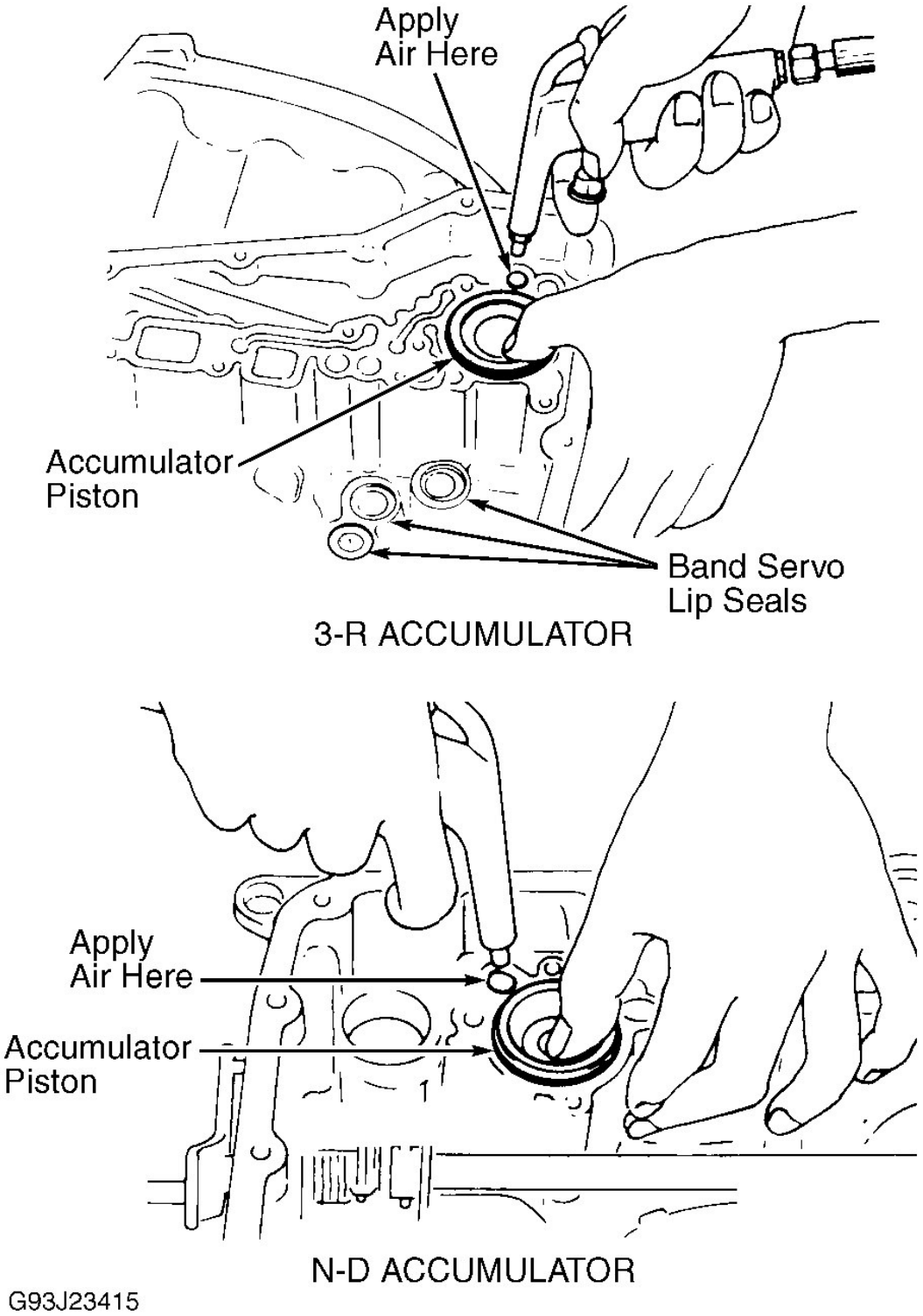


Fig. 13: Removing N-D & 3-R Accumulator Pistons

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

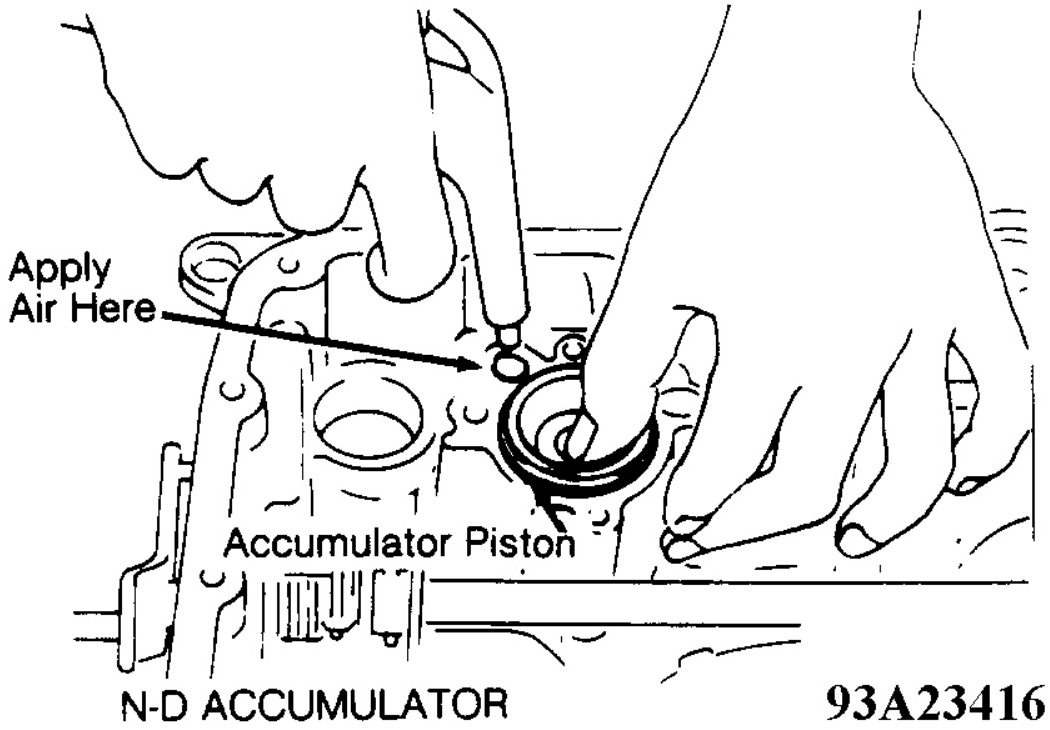


Fig. 14: Removing N-D & 3-R Accumulator Pistons
Courtesy of NISSAN MOTOR CO., U.S.A.

4. Remove lip seals from band servo oil port. Remove converter housing bolts and 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. 15**. Remove oil pump assembly bolts and remove oil pump assembly 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 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) and reverse clutch assemblies. Remove high clutch from reverse clutch. See **Fig. 16**.
8. Remove needle bearing from high clutch drum. Remove high clutch hub and needle bearing from transaxle case. Remove front sun gear and needle bearings from transaxle case. Check all components for

damage or wear.

9. Remove snap ring and front planetary carrier assembly with low one-way clutch. Ensure low one-way clutch rotates counterclockwise only. Remove low one-way clutch from front planetary carrier by rotating one-way clutch counterclockwise. Remove needle bearing from planetary carrier. See **Fig. 16**. Check all components for damage or wear.
10. Remove rear planetary carrier assembly from transaxle case. Remove rear sun gear from rear planetary carrier. Remove needle bearings from rear planetary carrier. Check all components for damage or wear.
11. Using a feeler gauge, check clearance between pinion washer and planetary carrier. Clearance between pinion washer and planetary carrier should be .006-.028" (.15-.70 mm). Replace appropriate planetary carrier if clearance exceeds .031" (.80 mm).
12. Remove rear internal gear from transaxle case. Remove needle bearing from rear internal gear and check bearing for damage or wear. Remove forward clutch assembly from transaxle case. Remove thrust washer from transaxle case. See **Fig. 12**.
13. Remove side cover bolts. Remove side cover by lightly tapping cover with soft-faced hammer. Remove adjusting shim. Remove output shaft assembly. See **Fig. 12**. Output shaft assembly may be removed together with side cover. **DO NOT** drop output shaft assembly. Remove side cover from output shaft assembly (if necessary).
14. 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. Use appropriate puller to remove idler gear. Remove reduction gear. Remove adjusting shim from reduction gear.
15. Remove return spring from parking shaft. Remove parking shaft and parking pawl from transaxle case. Check parking shaft and pawl for wear or damage. Note direction of parking actuator support and remove actuator support from transaxle case. Inspect actuator support for wear or damage. Remove revolution sensor from transaxle. See **Fig. 12**.
16. Remove manual shaft and throttle lever components. See **MANUAL SHAFT & THROTTLE LEVER** under COMPONENT DISASSEMBLY & REASSEMBLY.

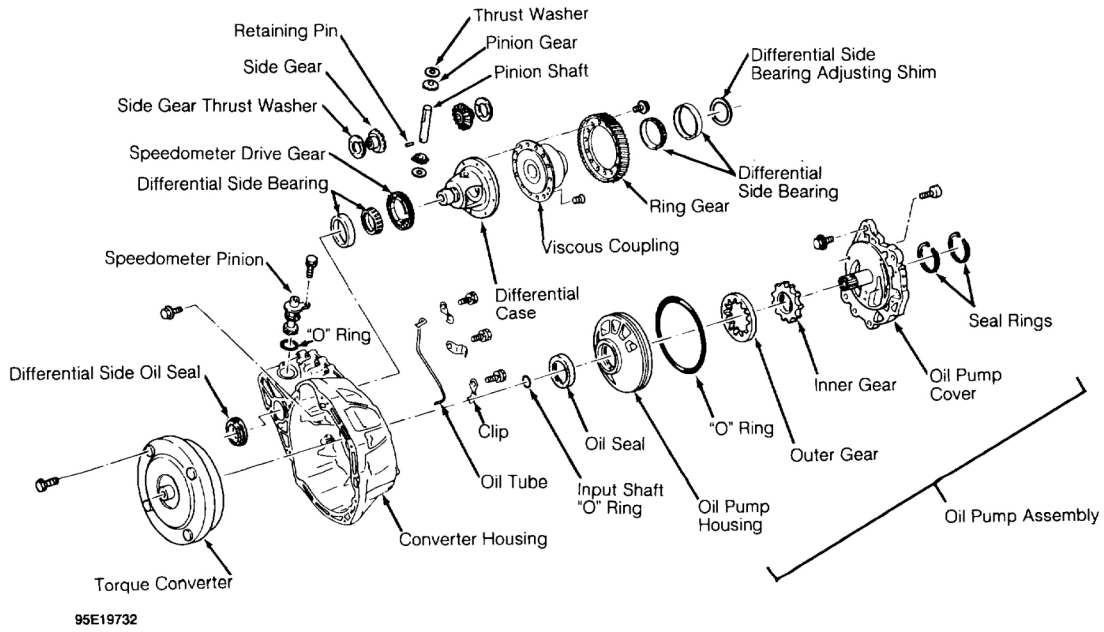
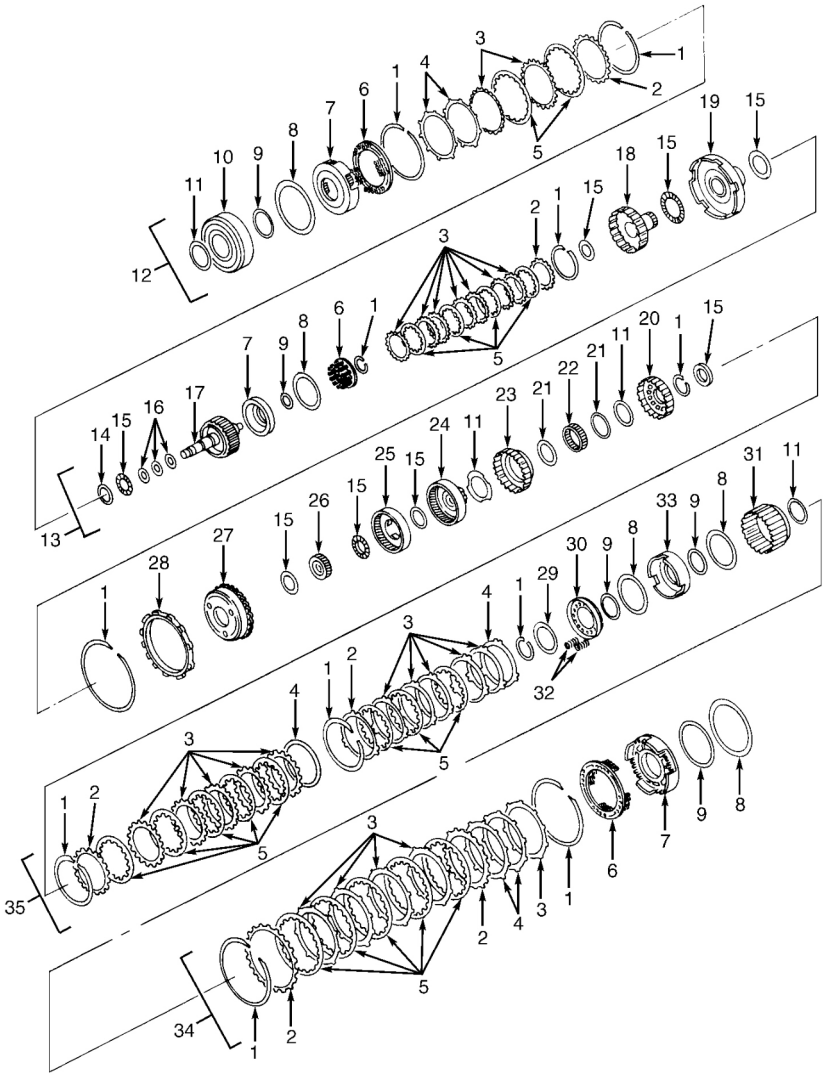


Fig. 15: Exploded View Of Torque Converter Housing & Differential Components
Courtesy of NISSAN MOTOR CO., U.S.A.



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

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Fig. 16: Exploded View Of Forward Clutch, High Clutch, Low-Reverse Brake, Overrun Clutch & Reverse Clutch Assemblies
Courtesy of NISSAN MOTOR CO., U.S.A.

COMPONENT DISASSEMBLY & REASSEMBLY

OIL PUMP

Disassembly

Remove seal rings. Remove oil pump cover bolts in numerical order and remove oil pump cover. See **Fig. 16**. Remove inner and outer gears from oil pump housing, noting direction of inner gear prior to removal. Remove "O" ring from oil pump housing. Pry out oil pump housing oil seal. See **Fig. 19**.

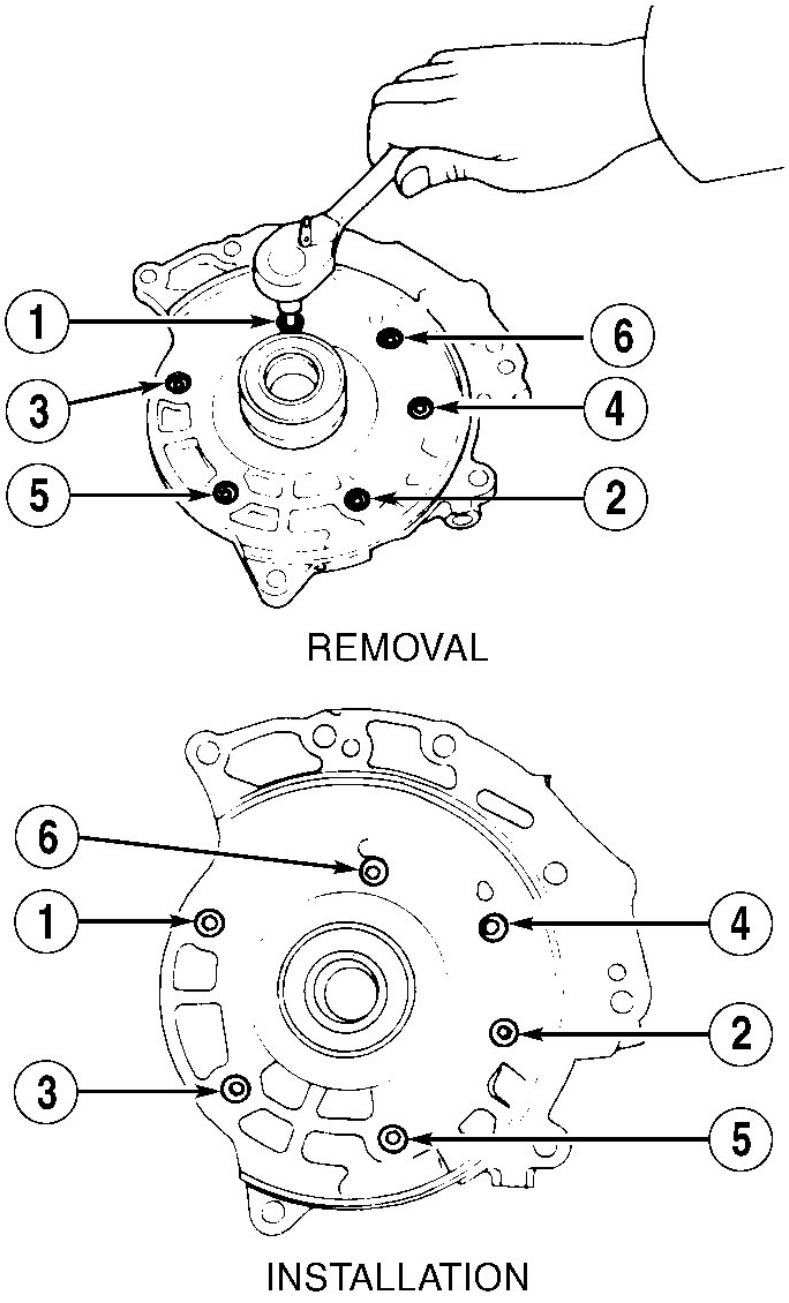


Fig. 17: Removal & Installation Of Oil Pump Cover
Courtesy of NISSAN MOTOR CO., U.S.A.

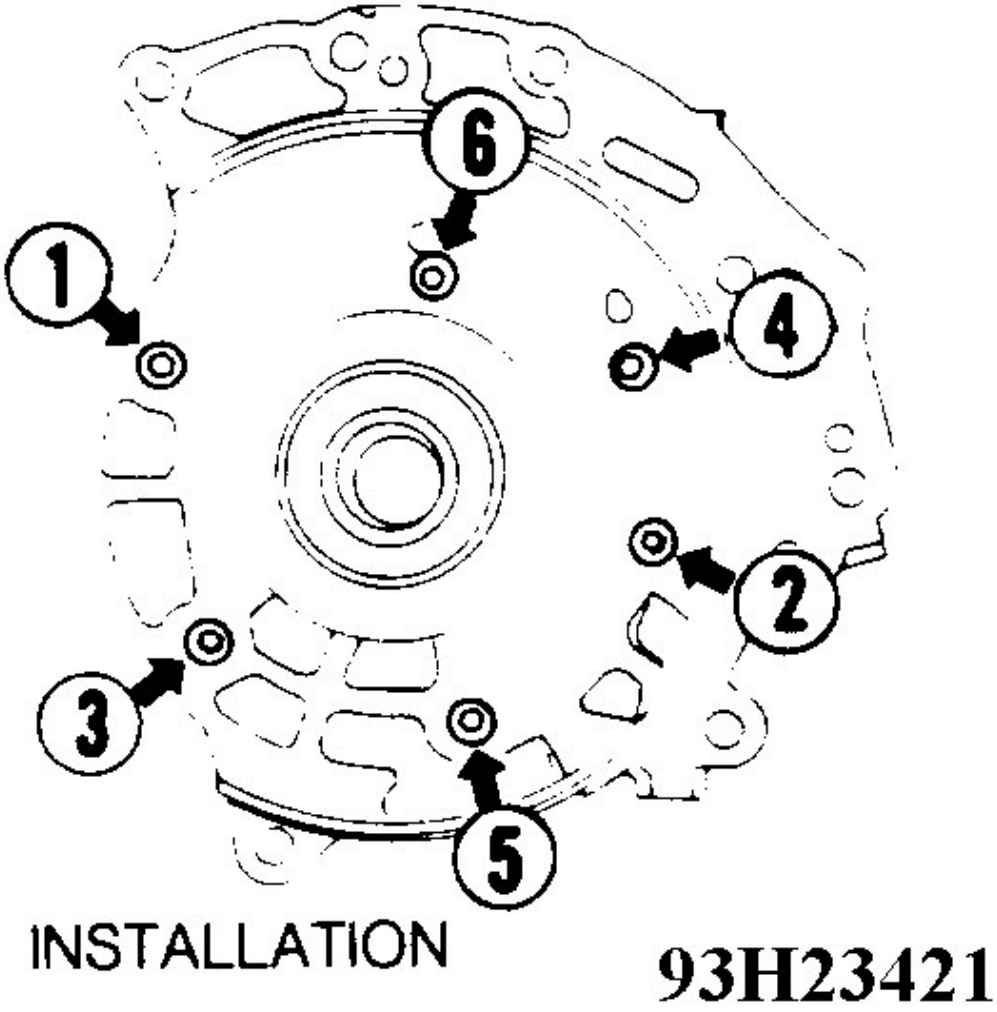


Fig. 18: Removal & Installation Of Oil Pump Cover
Courtesy of NISSAN MOTOR CO., U.S.A.

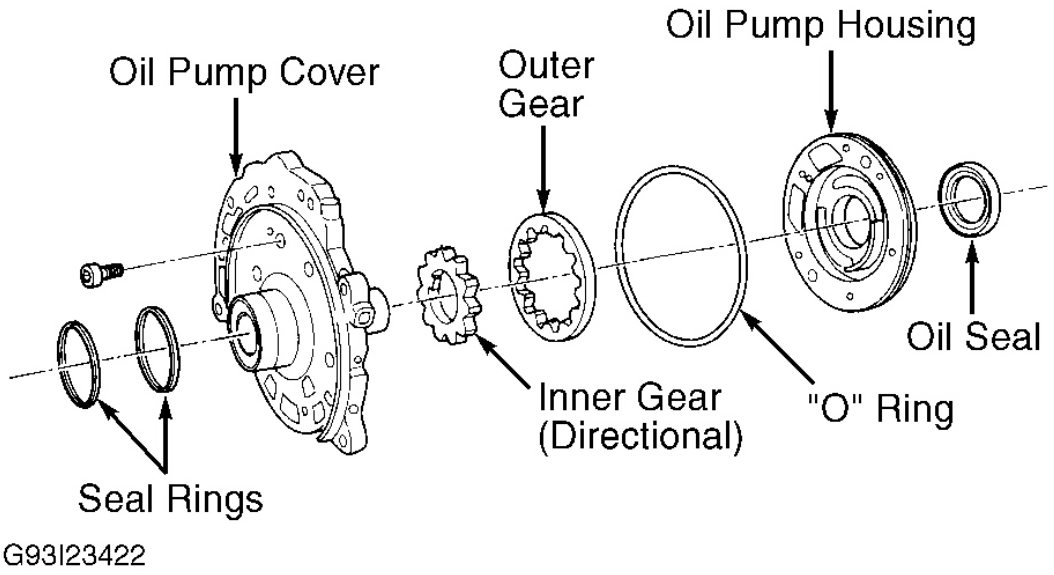


Fig. 19: Exploded View Of Oil Pump Assembly
Courtesy of NISSAN MOTOR CO., U.S.A.

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. Clearance should be .0008-.0016" (.020-.040 mm). See **Fig. 20**.
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 .3925-.3929" (9.970-9.980 mm), .3929-.3933" (9.980-9.990 mm) and .3933-.3937" (9.990-10.000 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. Clearance should be .003-.006" (.08-.15 mm). If clearance is not as specified, replace oil pump assembly, except oil pump cover. Install NEW seal rings onto oil pump cover. Measure clearance between seal ring and ring groove. Clearance should be .004-.010" (.10-.25 mm), with allowable limit of .010" (.25 mm). If clearance is not as specified, replace oil pump cover.

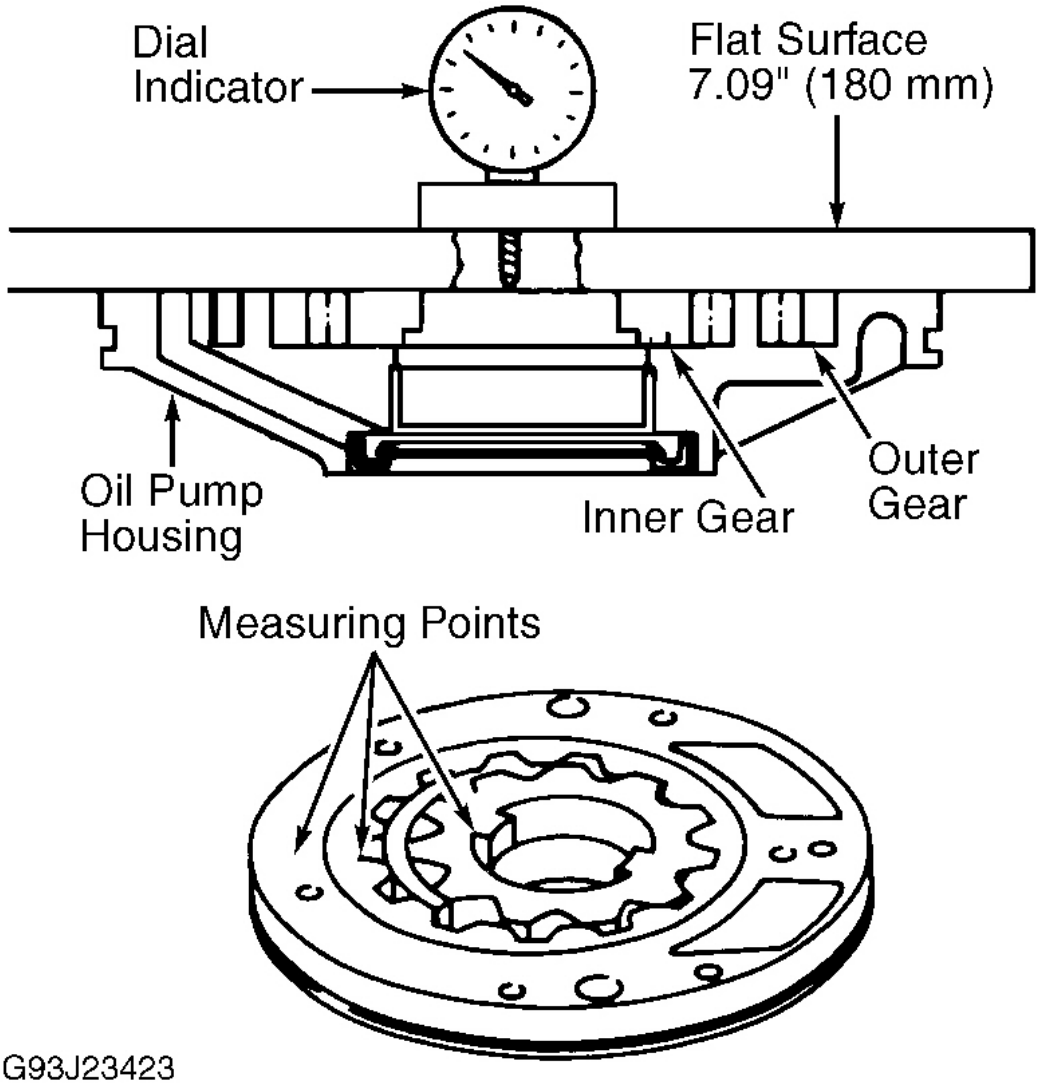


Fig. 20: Measuring Oil Pump Side Clearance
Courtesy of NISSAN MOTOR CO., U.S.A.

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 numerical order to 62-97 INCH lbs. (7-11 N.m). See **Fig. 16**. Pack ring groove with petroleum jelly, then carefully install NEW seal rings. Connect seal ring hooks. **DO NOT** spread gap of seal ring excessively while installing as ring may become deformed.

CONTROL VALVE ASSEMBLY

Disassembly

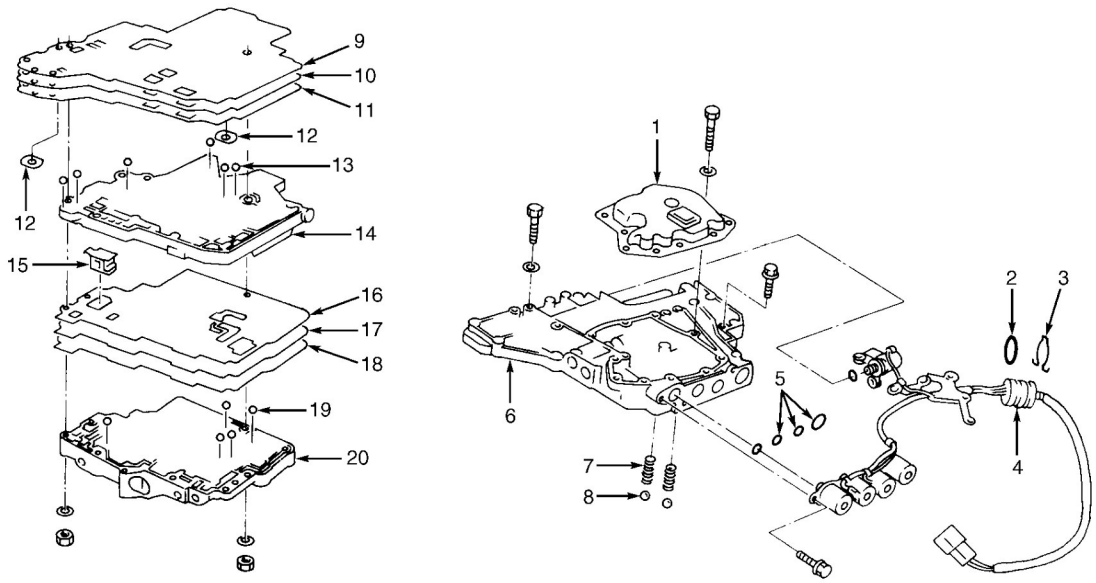
1. Disassemble the upper, inter and lower valve bodies. See **Fig. 21**. Note bolt length, number of bolts and location. Refer to the

   VALVE BODY BOLT IDENTIFICATION table.

VALVE BODY BOLT IDENTIFICATION (1)

Bolt I.D. (Letter)	Length - In. (mm)	No. Of Bolts
"A"	.53 (13.5)	6
"B"	2.28 (58.0)	3
"C"	1.57 (40.0)	6
"D"	2.60 (66.0)	11
"E"	1.30 (33.0)	2
"F"	3.07 (78.0)	2
(1) See **Fig. 22** for bolt location.		

2. Remove bolts "A", "D" and "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. 21**. 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

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Fig. 21: Exploded View Of Control Valve Assembly
Courtesy of NISSAN MOTOR CO., U.S.A.

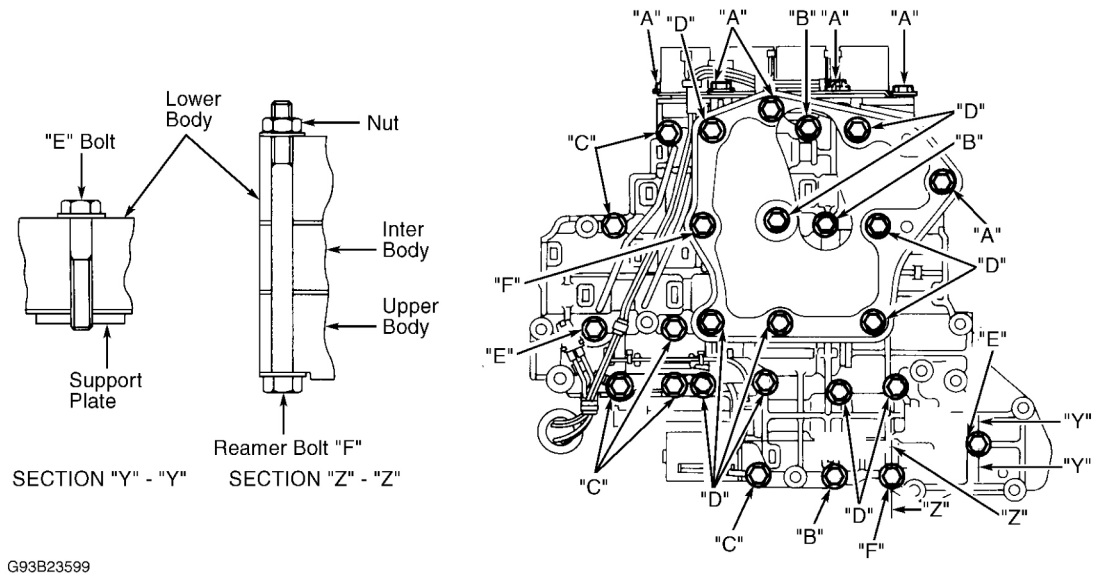

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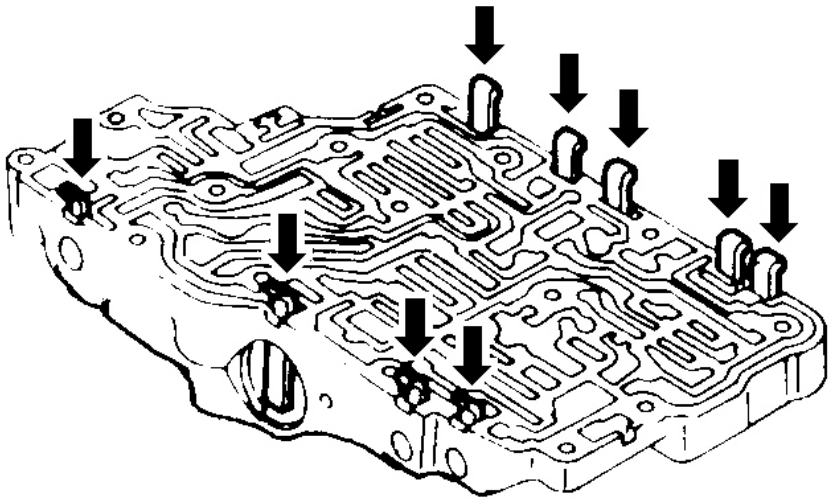
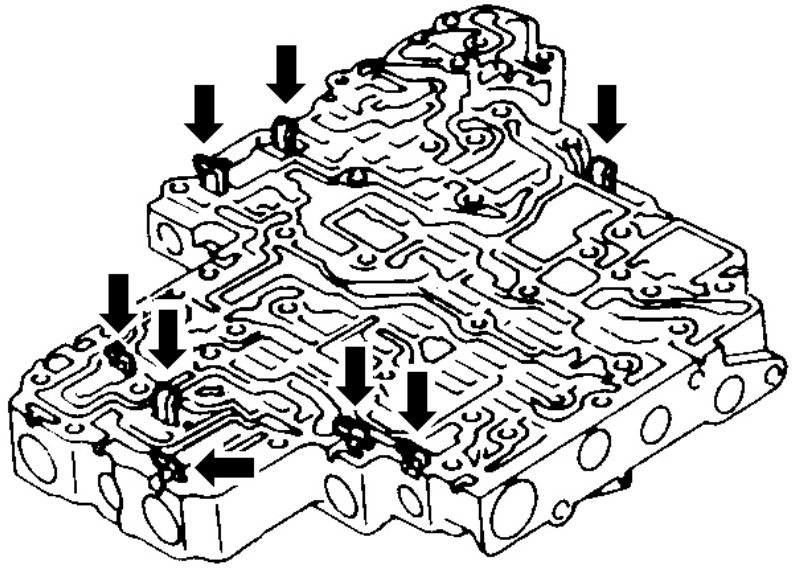
Fig. 22: Identifying Control Valve Assembly Bolt Locations
Courtesy of NISSAN MOTOR CO., U.S.A.

Inspection

Ensure retainer plates are properly positioned in lower and upper valve bodies. See **Fig. 23**. **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

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Fig. 23: Identifying Retainer Plate Locations
Courtesy of NISSAN MOTOR CO., U.S.A.

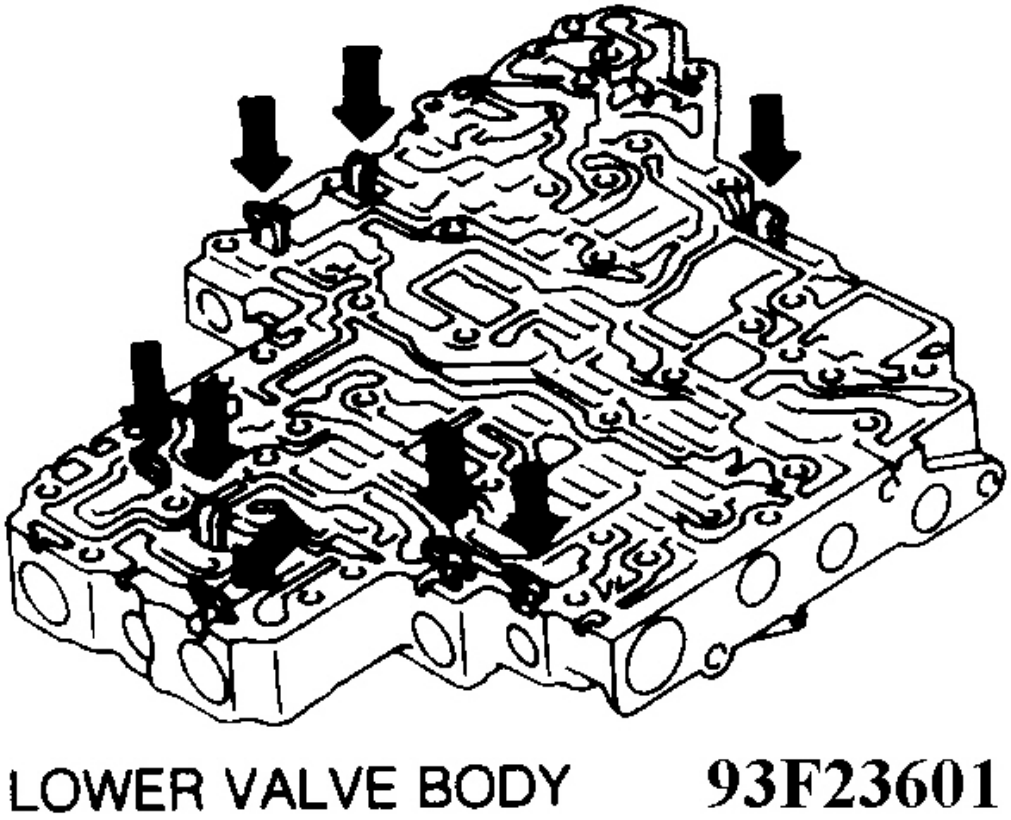
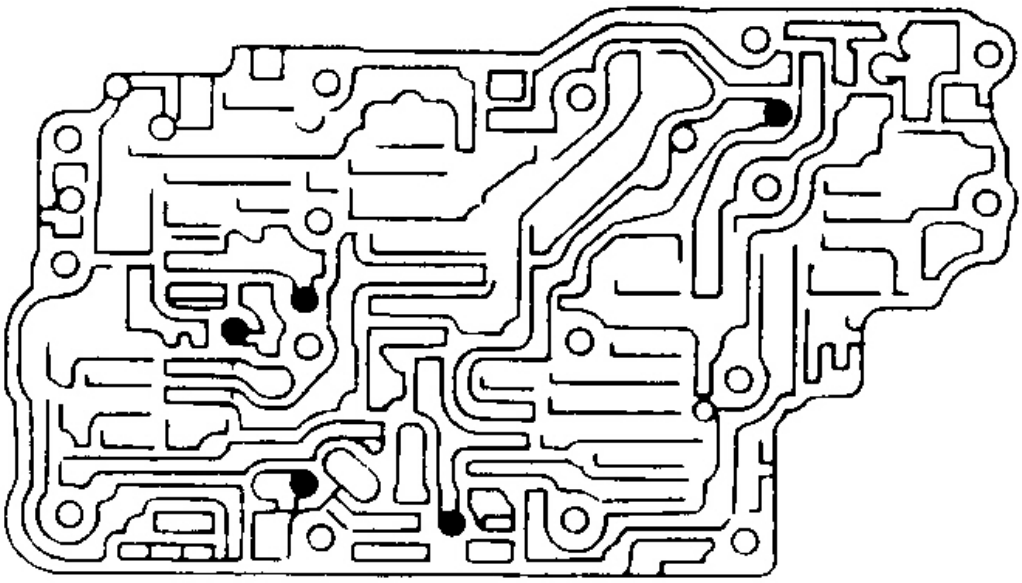


Fig. 24: Identifying Retainer Plate Locations
Courtesy of NISSAN MOTOR CO., U.S.A.

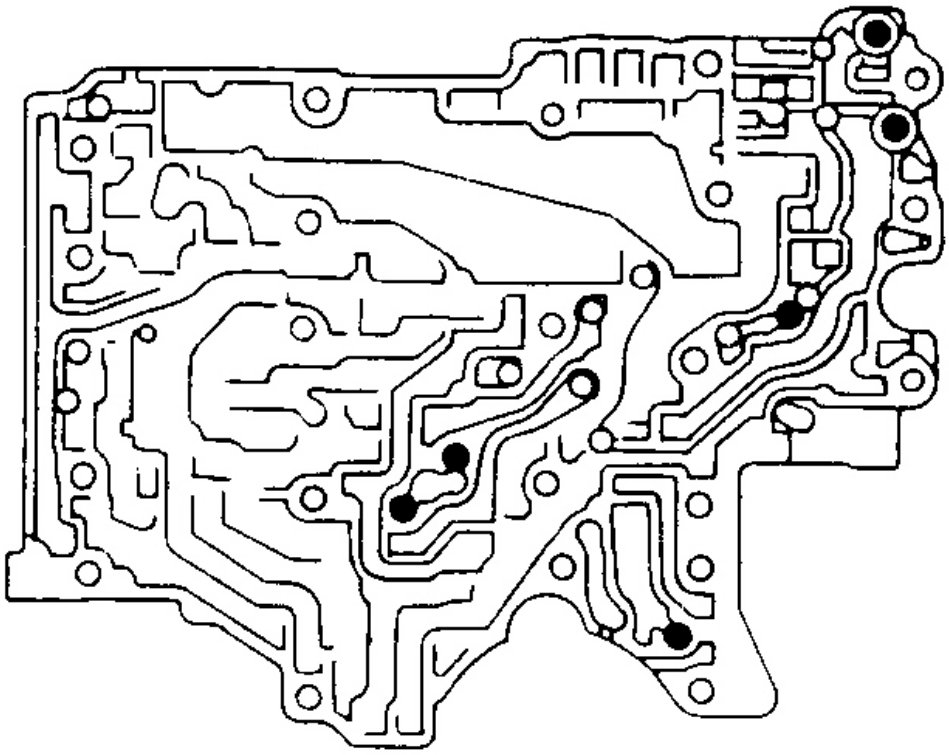
Reassembly

1. Place oil circuit of upper valve body face up. Install steel balls in proper positions. See **Fig. 25**. 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 side of inter valve body face up. Install steel balls in proper positions. 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. 21**.
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. 22**. Tighten bolts.

4. Install "O" rings to 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. Tighten all bolts to 62-80 INCH lbs. (7-9 N.m).



UPPER VALVE BODY



LOWER VALVE BODY

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Fig. 25: Identifying Steel Ball Locations
Courtesy of NISSAN MOTOR CO., U.S.A.

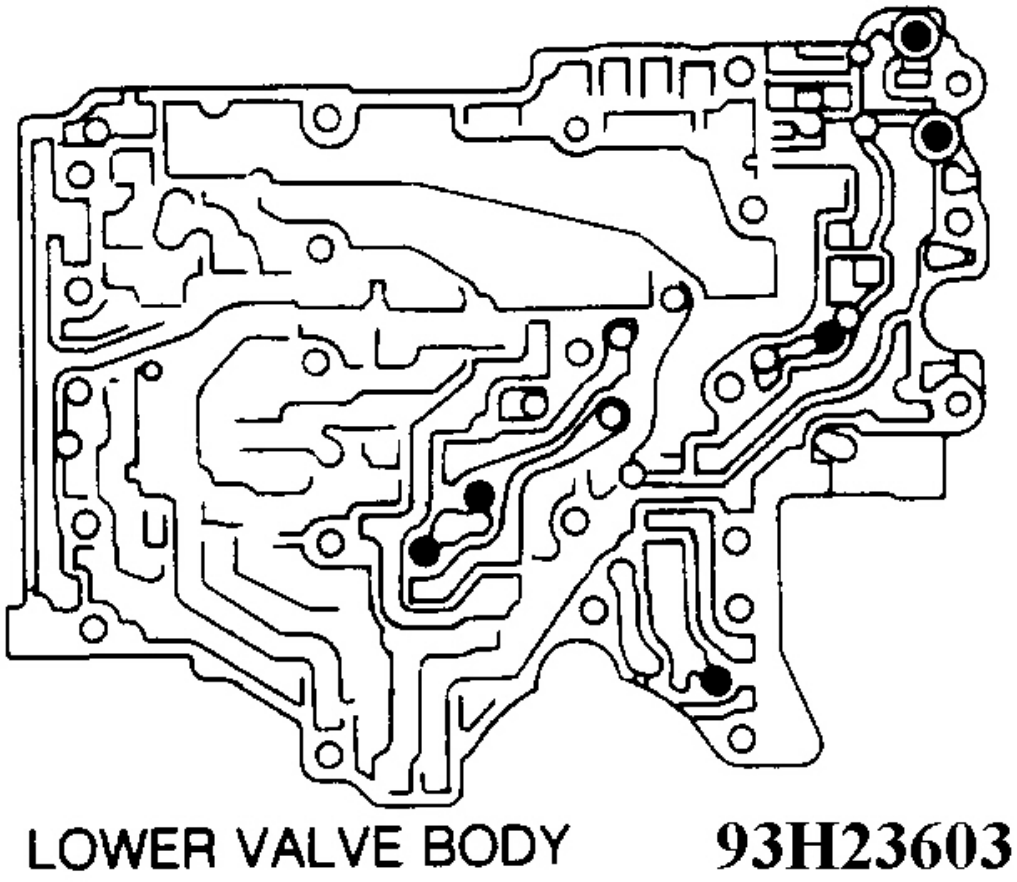


Fig. 26: Identifying Steel Ball Locations
Courtesy of NISSAN MOTOR CO., U.S.A.

CONTROL VALVE UPPER BODY

Disassembly

1. Use a screwdriver to 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 **UPPER VALVE BODY SPRING IDENTIFICATION** table. 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	.48 (37.5)	.28 (7.00)
2	1.22 (31.0)	.35 (8.9)
3	1.56 (39.5)	.43 (11.0)
4	.81 (20.5)	.28 (7.00)
5	1.41 (36.0)	.32 (8.1)
6	1.92 (48.8)	.77 (19.6)
7	1.06 (27.0)	.28 (7.00)
(1) See **Fig. 27** 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 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. 27**. While pushing plug or return spring, install retainer plates. See **UPPER VALVE BODY RETAINER PLATE IDENTIFICATION**

table for retainer plate dimensions.

UPPER VALVE BODY RETAINER PLATE IDENTIFICATION (1)

Application	(2) Length "B" In. (mm)
Lock-Up Control & 2-3 Timing Valves	1.102 (28.00)
Torque Converter Relief, Pilot & 1st Reducing Valves	.846 (21.50)
1-2 Accumulator & Piston Valves	1.516 (38.50)
Overrun Clutch Reducing Valve	.945 (24.00)
(1) See **Fig. 23** for retainer plate locations.	
(2) Length "A" for all valves is .236" (6.0 mm). All valves use type "A" retainer plate. See **Fig. 28**.	

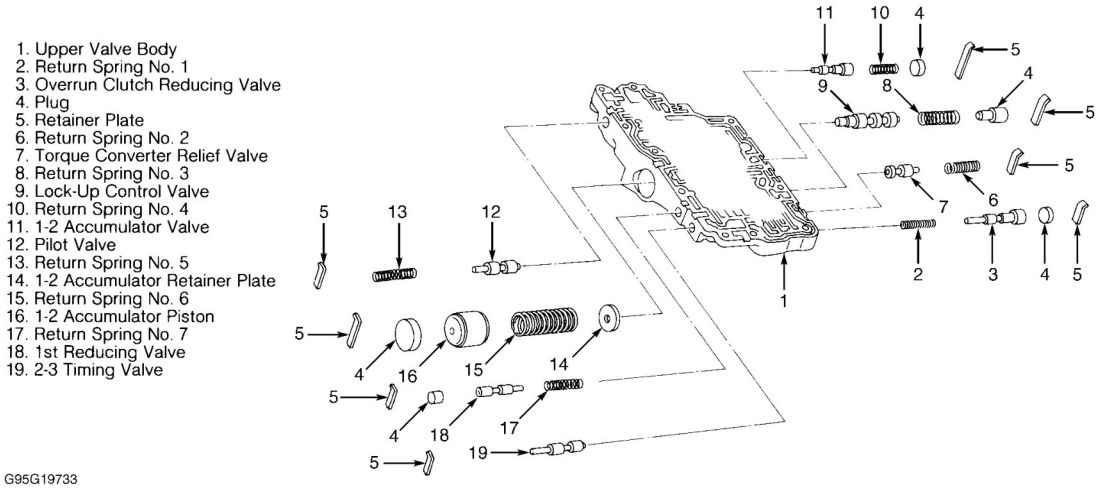


Fig. 27: Exploded View Of Control Valve Upper Body
Courtesy of NISSAN MOTOR CO., U.S.A.

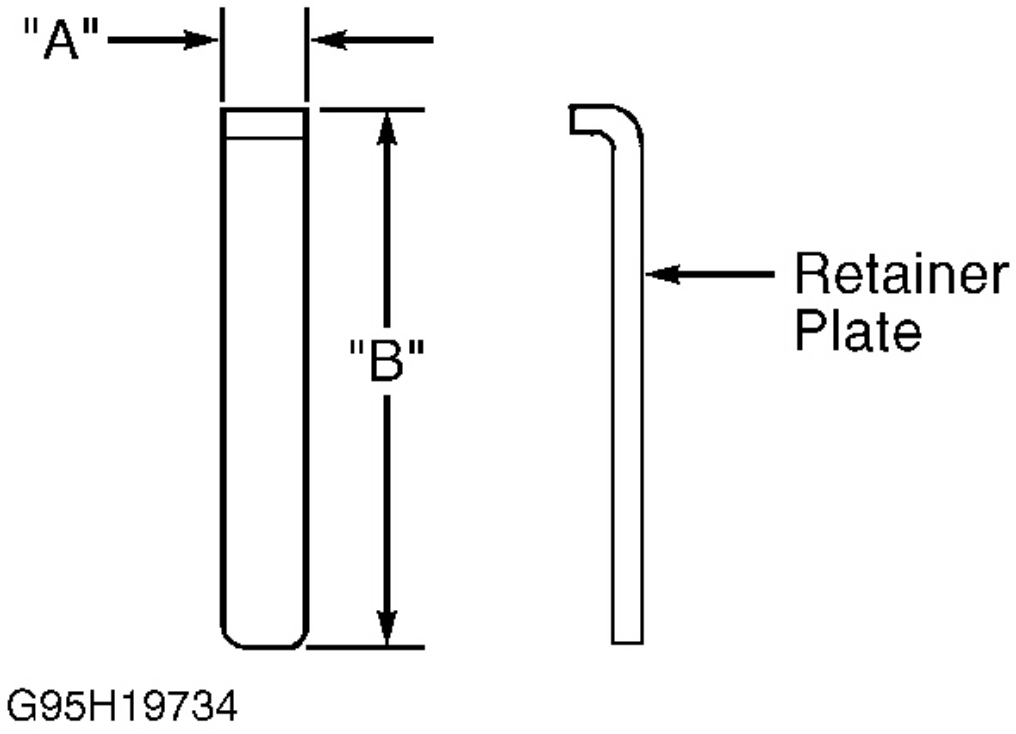


Fig. 28: Measuring Retainer Plate Dimensions (Upper Valve Body)
Courtesy of NISSAN MOTOR CO., U.S.A.

CONTROL VALVE LOWER BODY

Disassembly

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

Inspection

Measure spring free length and outer diameter. Refer to the **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	.85 (21.7)	.28 (7.0)
2	1.20 (30.5)	.39 (9.8)
3	1.26 (32.0)	.27 (6.9)
4	.67 (17.0)	.42 (10.7)
5	1.77 (45.0)	.59 (15.0)
6	.85 (21.7)	.28 (7.0)
7	.87 (22.0)	.26 (6.5)
8	.85 (21.7)	.28 (7.0)

(1) See **Fig. 29** 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.
2. Wrap shaft of a small screwdriver with vinyl tape and insert valves into bores using the screwdriver as necessary. While pushing on the plug or return spring, install the retainer plates. See the **LOWER VALVE BODY RETAINER PLATE IDENTIFICATION** table for retainer plate dimensions.

LOWER VALVE 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. 23** 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. 30**.

1. Lower Valve Body
2. Return Spring No. 1
3. Shift Valve "B"
4. Plug
5. Retainer Plate
6. Return Spring No. 2
7. Piston
8. Sleeve
9. Parallel Pin
10. Return Spring No. 3
11. Pressure Modifier Valve
12. Accumulator Shift Valve
13. Return Spring No. 4
14. Manual Valve
15. Pressure Regulator Valve
16. Return Spring No. 5
17. Spring Seat
18. Return Spring No. 6
19. Overrun Clutch Control Valve
20. Accumulator Control Valve
21. Return Spring No. 7
22. Shift Valve "A"
23. Return Spring No. 8

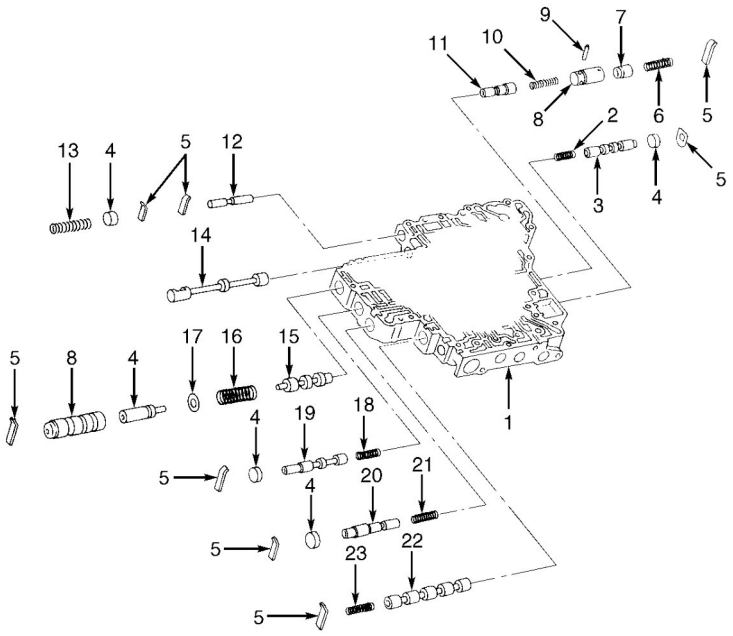


Fig. 29: Exploded View Of Control Valve Lower Body
Courtesy of NISSAN MOTOR CO., U.S.A.

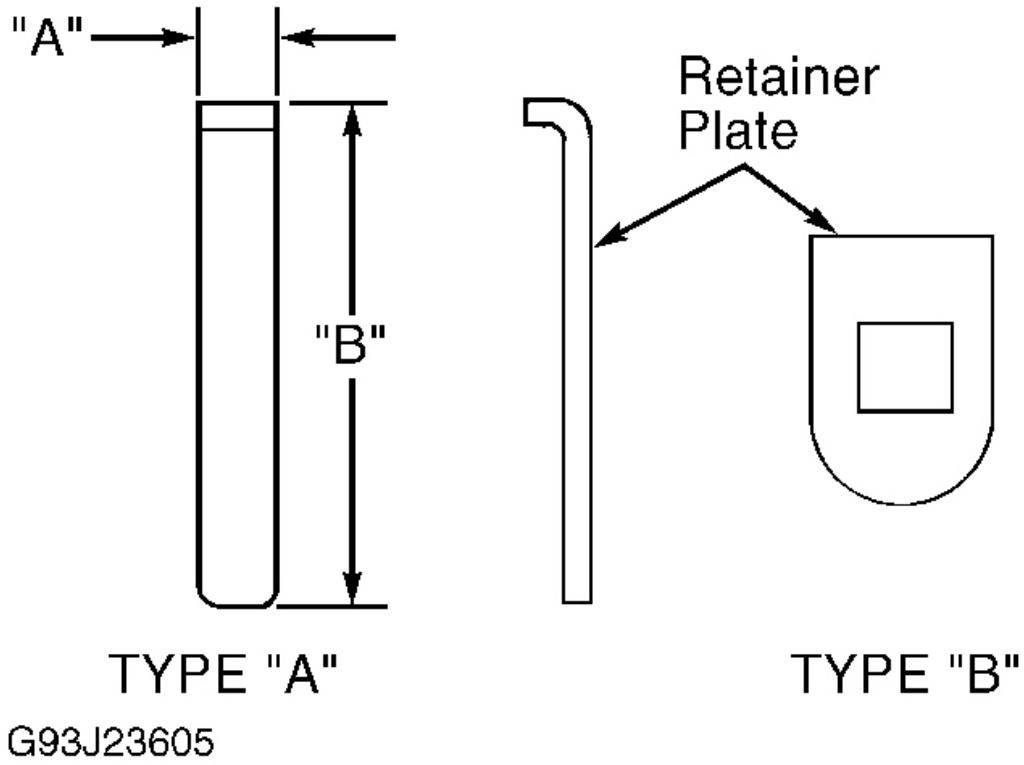


Fig. 30: Measuring Retainer Plate Dimensions (Lower Valve Body)
Courtesy of NISSAN MOTOR CO., U.S.A.

REVERSE CLUTCH

Disassembly

Remove snap ring from reverse clutch assembly. Remove drive plates, driven plates, retaining plate, and dish plates. See **Fig. 16**. Record number of plates for reassembly reference. Remove snap ring from clutch drum while compressing springs. Remove spring retainer and return springs. **DO NOT** remove return springs from spring retainer. Remove piston from 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. Always replace spring retainer and return springs as a set (if necessary). Inspect drive plate facing for burns, cracks or damage. Dish plate thickness should be .110" (2.80 mm). Drive plate thickness should be .079" (2.00 mm). Service limit is .071" (1.80 mm). 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 drum while slowly turning clockwise. Install return springs and spring retainer on piston. Compress springs and install snap ring. Install dish plate, drive plates, driven plates, retaining plate and snap ring. **DO NOT** align projections of dish plates.
2. Measure clearance between retaining plate and snap ring. Specified clearance is .019-.031" (.50-.80 mm). Service limit is .047" (1.20 mm). Retaining plate is available in selective thicknesses of .17-.20" (4.4-5.2 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. Apply compressed air to oil hole. See **Fig. 31**. Ensure retaining plate moves toward snap ring. If retaining plate does not move as described, "D" ring or oil seal may be damaged.

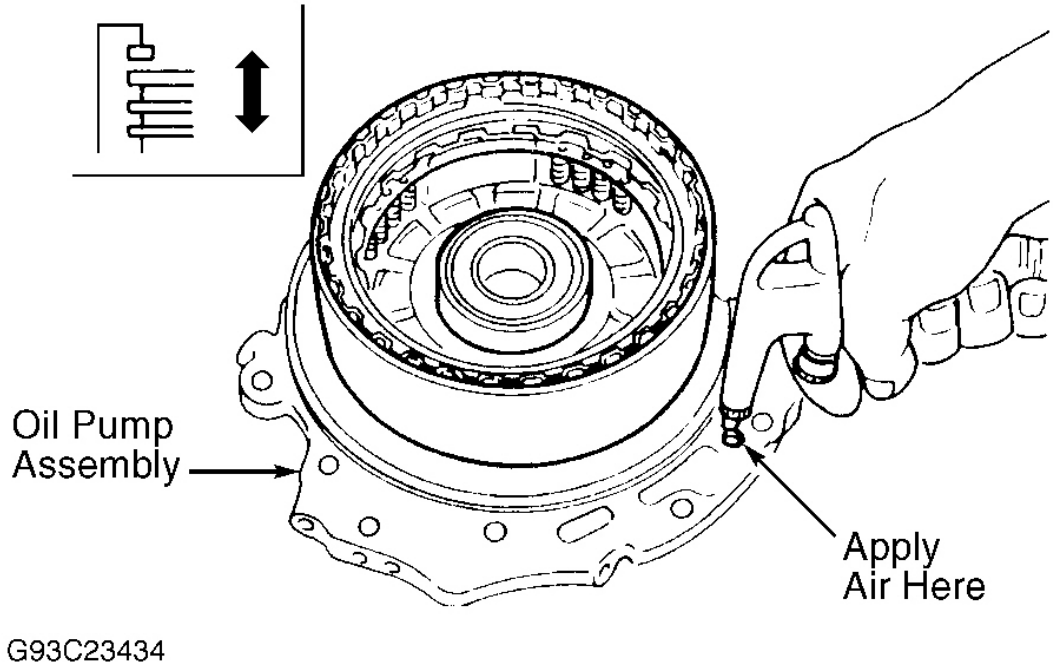


Fig. 31: Checking Reverse Clutch Operation
Courtesy of NISSAN MOTOR CO., U.S.A.

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). Service limit is .055" (1.40 mm).
2. Measure clearance between retaining plate and snap ring. Specified clearance is .055-.071" (1.40-1.80 mm). Service limit is .102" (2.60 mm). Retaining plate is available in selective thicknesses of .142-

.197" (3.60-5.00 mm) in .008" (.20 mm) increments. Ensure check balls in high clutch piston are not seized.

Reassembly

1. Install NEW seal rings on input shaft. Measure clearance between seal ring and ring groove. Specified clearance is .003-.009" (.08-.23 mm). Service limit is .009" (.23 mm). If clearance is not as specified, replace input shaft. Check operation of high clutch.
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. 16**.

Inspection

Check forward clutch and overrun clutch return springs for deformation or damage. Check spring free length and outer diameter. Inner spring free length should be 1.035" (26.30 mm). Inner spring diameter should be .30" (7.7). Outer spring free length should be 1.047" (26.60 mm). Outer spring diameter should be .417" (10.60 mm). 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 clutch should be .098" (2.50 mm). Dish plate thickness for overrun clutch should be .085" (2.15 mm). Drive plate thickness for forward clutch should be .071" (.1.80 mm). Service limit is .063" (1.60 mm). Drive plate thickness for overrun clutch should be .063" (1.60 mm). Service limit is .055" (1.40 mm).
2. Measure clearance between retaining plate and snap ring. Specified clearance for forward clutch is .018-.034" (.45-.85 mm). Service limit is .073" (1.85 mm). Specified clearance for overrun clutch is .039-.055" (1.00-1.40 mm). Service limit is .079" (2.00 mm).
3. Forward clutch retaining plate is available in selective thicknesses of .14-.18" (3.6-4.6 mm) in .008" (.20 mm) increments. Overrun clutch retaining plate is available in selective thicknesses of .14-.17" (3.6-4.4 mm) in .008" (.20 mm) increments.
4. 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. 32**. Ensure retaining plate moves toward snap ring. If retaining plate does not move as described, "D" ring or oil seal may be damaged.

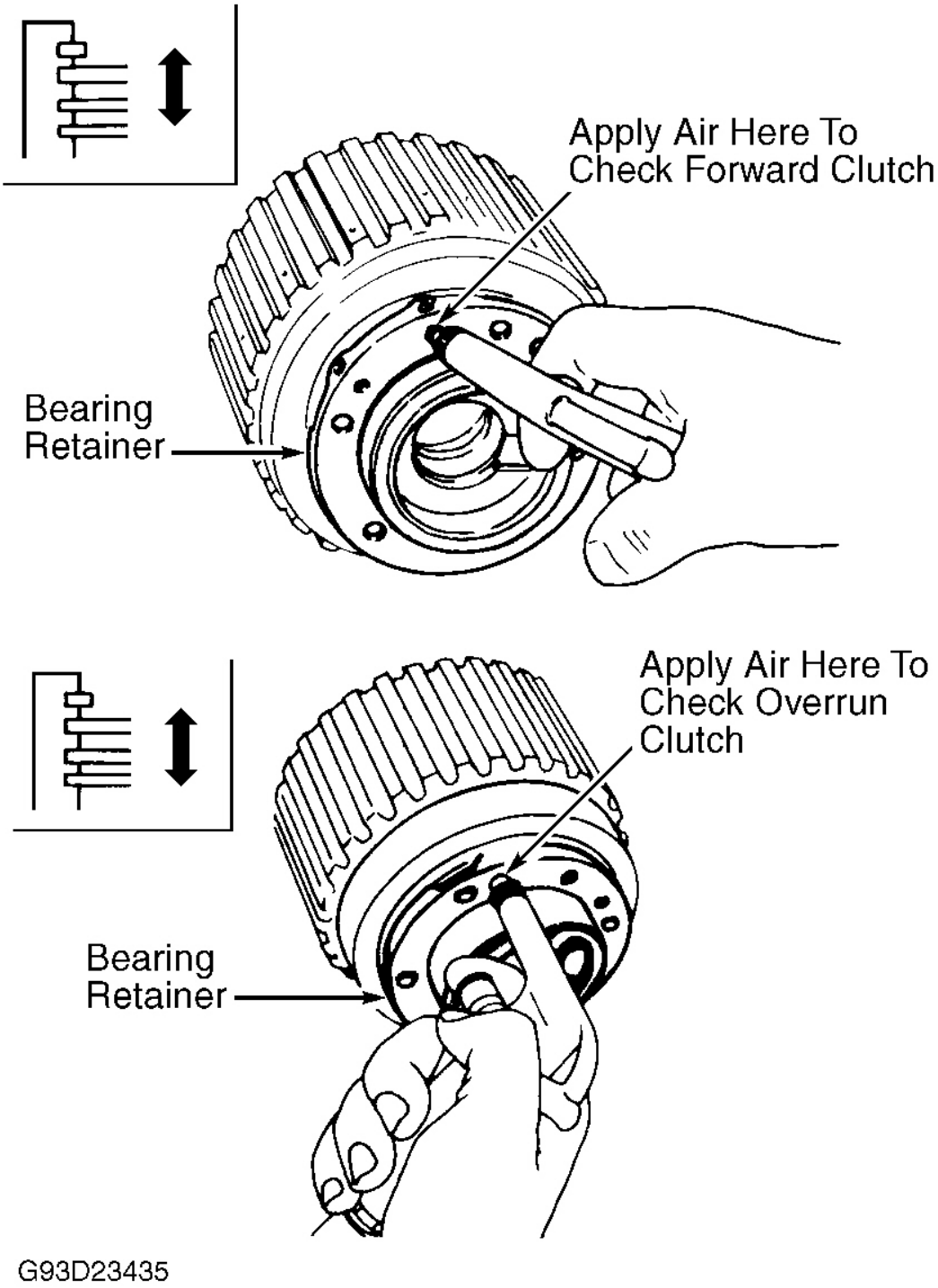


Fig. 32: Checking Forward & Overrun Clutch Operation
Courtesy of NISSAN MOTOR CO., U.S.A.

LOW- REVERSE BRAKE

Disassembly

Position transaxle case to obtain access to low-reverse brake snap ring. Remove snap ring. Remove drive plates, driven plates and retaining plate from transaxle case. See **Fig. 16**. Record number of plates for reassembly reference. Compress return springs and remove snap ring. Remove spring retainer and return springs from transaxle case. **DO NOT** remove return springs from spring retainer. Apply compressed air to oil hole in transaxle case and remove piston. See **Fig. 33**. Remove "D" ring and oil seal from piston.

Inspection

Check low-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-reverse drive plates for burns, cracks or damage.

Reassembly

1. Reassembly procedures for low-reverse brake are same as for reverse clutch. Drive plate thickness should be .079" (2.00 mm). Service limit is .070" (1.80 mm). Specified clearance is .055-.071" (1.40-1.80 mm). Service limit is .110" (2.80 mm). Retaining plate is available in selective thicknesses of .141-.181" (3.60-4.60 mm), in increments of .008" (.20 mm).
2. Check low-reverse brake operation. Apply compressed air to oil hole in transaxle case. See **Fig. 34**. Ensure retaining plate moves toward snap ring. If retaining plate does not move, "D" ring or oil seal may be damaged.

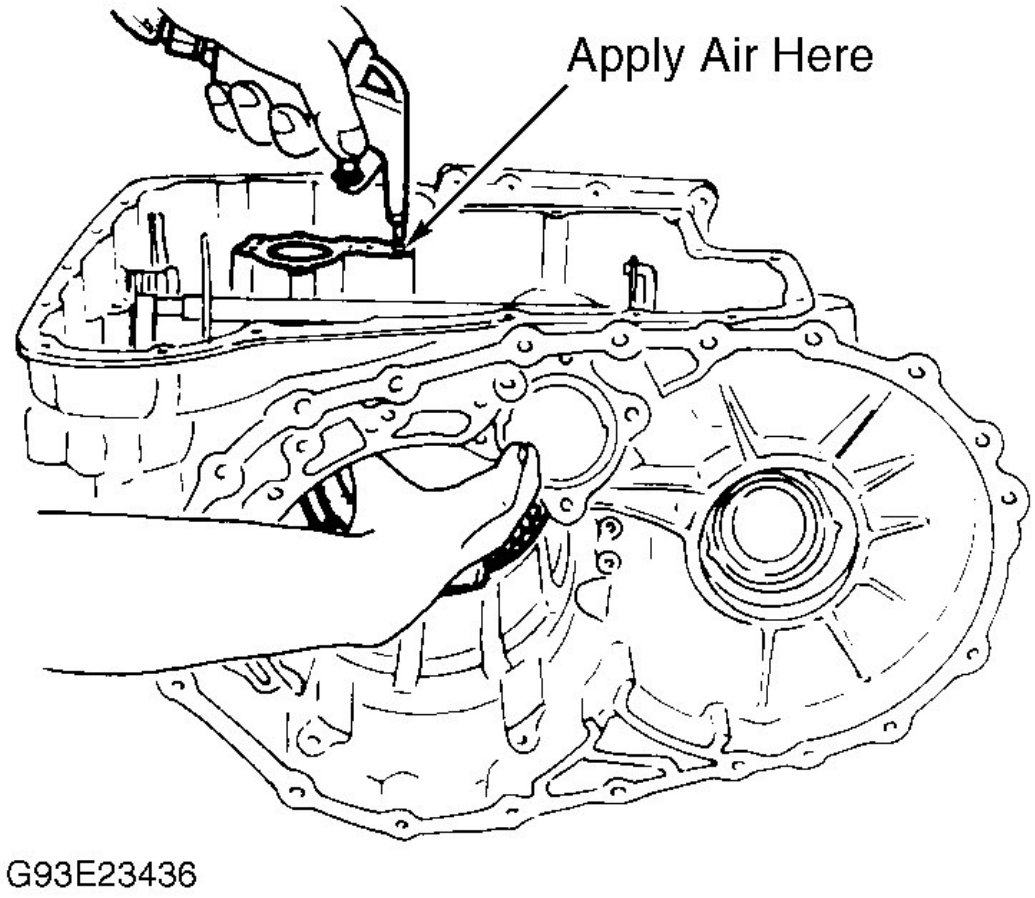


Fig. 33: Removing Low-Reverse Brake Piston
Courtesy of NISSAN MOTOR CO., U.S.A.

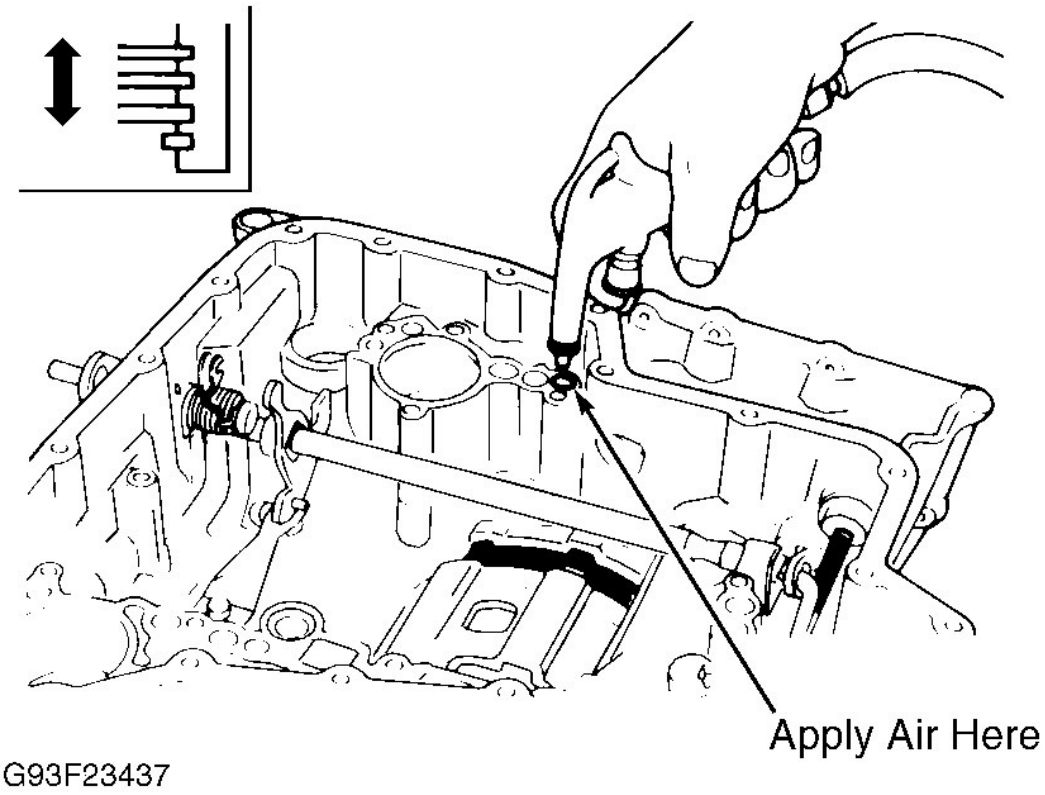


Fig. 34: Checking Low & Reverse Operation
Courtesy of NISSAN MOTOR CO., U.S.A.

REAR INTERNAL GEAR, FORWARD CLUTCH HUB & OVERRUN CLUTCH HUB

Disassembly

Remove snap ring from overrun clutch hub. Remove overrun clutch hub from forward clutch hub. See **Fig. 16**. Remove thrust washer from forward clutch hub. 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 one-way clutch from forward clutch hub.

Inspection

Check frictional surfaces for wear or damage. Check forward one-way clutch, end bearing and snap ring for wear or damage.

Reassembly

1. Install forward one-way clutch on forward clutch hub with arrow facing forward. See **Fig. 35**. Apply petroleum jelly to end bearings and thrust washers. Install end bearing on forward one-way clutch.

2. Install thrust washer on rear internal gear. Align pawls of thrust washer with holes in rear internal gear. Install end bearing on rear internal gear. 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. Install snap ring to rear internal gear.

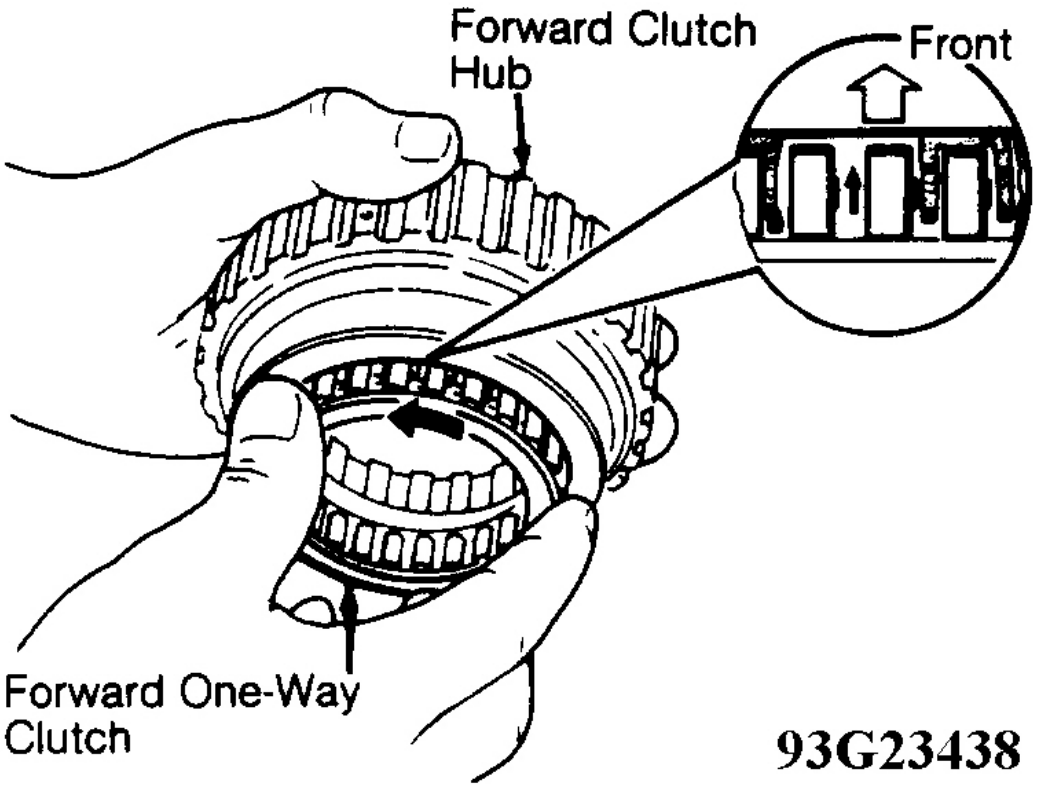


Fig. 35: Checking Forward One-Way Clutch Rotation
Courtesy of NISSAN MOTOR CO., U.S.A.

BAND SERVO PISTON ASSEMBLY

Disassembly

1. Use appropriate puller to compress servo piston. Remove band servo piston snap ring. Apply compressed air to oil hole in transaxle case to remove OD servo piston retainer and band servo piston assembly. See **Fig. 36**.
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. Remove "O" rings from OD servo piston retainer. See **Fig. 12**.

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 retainer 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.

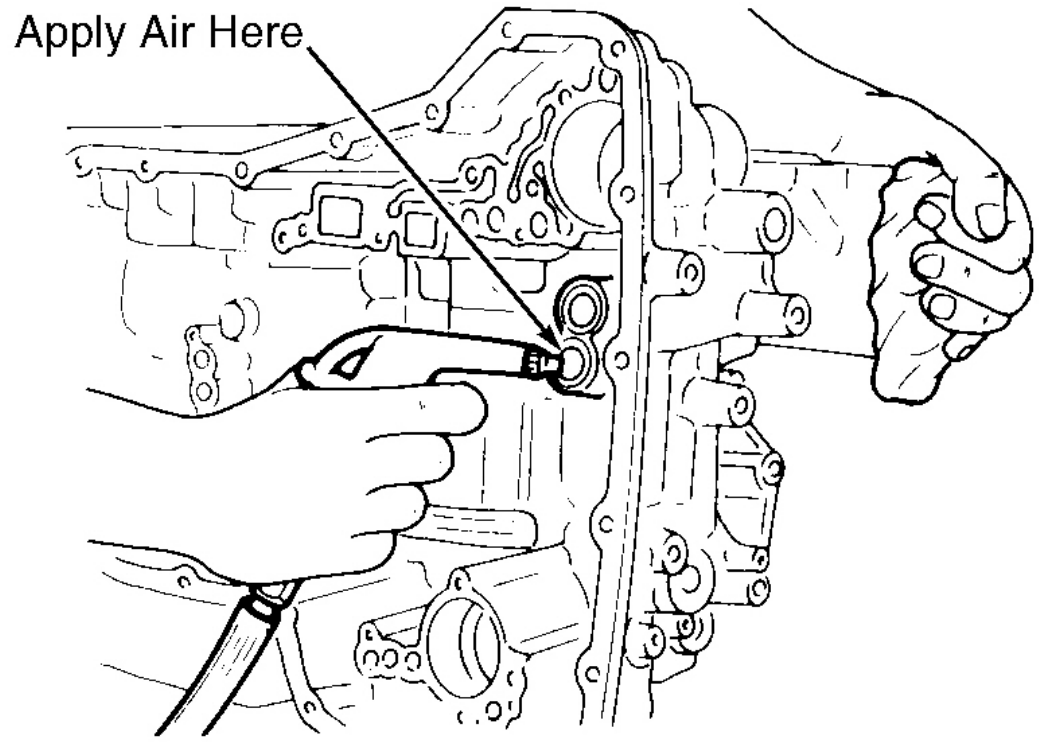


Fig. 36: Removing OD Piston Retainer & Band Servo Piston
Courtesy of NISSAN MOTOR CO., U.S.A.

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 1.28" (32.5 mm), diameter should be 1.020" (25.90 mm). Free length of OD servo return spring should be 1.220" (31.00 mm), diameter should be .854" (21.70 mm). 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 to transaxle case. Install band servo piston snap ring on transaxle case. See **Fig. 12**.

OUTPUT SHAFT, IDLER GEAR, REDUCTION GEAR & BEARING RETAINER

Disassembly

1. Remove seal rings from output shaft and bearing retainer. See **Fig. 12**. 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 Puller (KV381054S0), 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. 12**.

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 and bearing retainer. Specified clearance is .004-.010" (.10-.25 mm). Service limit is .010" (.25 mm). If clearance is not as specified, replace output shaft or bearing retainer as necessary.

Reassembly

To reassemble, reverse disassembly procedure. Tighten reduction gear bearing race bolts to 46-49 ft. lbs. (63-67 N.m). Apply petroleum jelly to NEW seal rings and install seal rings on output shaft and bearing retainer. Tape thick paper around seal rings to prevent rings from spreading.

MANUAL SHAFT & THROTTLE LEVER

Disassembly

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. 12**.
2. Remove parking rod from transaxle case. 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.

Reassembly

To reassemble, reverse disassembly procedure. Apply ATF to outer surface of oil seal prior to installation. Manual plate and parking rod plate retaining pins should extend .197-.236" (5.00-6.00 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, adapter and drift, remove differential side bearings. Remove viscous coupling. Remove speedometer drive gear. Drive out pinion shaft retaining pin. Remove pinion shaft from differential case. Remove pinion gears and side gears. See **Fig. 15**.

Inspection

Check mating surfaces of differential case, side gears and pinion gears for wear, scoring or damage. Check washers for wear or damage. Ensure bearings roll freely and are free from cracks, pitting or wear. Inspect viscous coupling case for cracks or silicone oil leakage.

Reassembly

1. Install side gears and thrust washers in differential case. Install pinion gears and thrust washers in case by rotating gears. Apply ATF to all components. Using a dial indicator and Adapter (KV38100770), measure clearance on differential case side, between side gear thrust washer and differential case. Move side gear up and down to measure deflection. See **Fig. 37**.
2. Specified clearance is .004-.008" (.10-.20 mm). If clearance is not as specified, adjust clearance by changing thickness of side gear thrust washers. Washers are available in selective thicknesses of .030-.040" (.75-1.00 mm), in increments of .002" (.05 mm).
3. Place side gear and thrust washer on pinion gears installed on viscous coupling side of differential. Using a height gauge, measure Dimension "X" of differential case and Dimension "Y" of viscous coupling in at least 2 places. See **Fig. 38**.
4. Clearance between side gear and viscous coupling is determined by adding Dimension "X" to Dimension "Y", then multiply Dimension "A" (spacer measurement) by 2. Subtract total of Dimension "A" from total of Dimension "X" and Dimension "Y".
5. Specified clearance is .004-.008" (.10-.20 mm). If clearance is not as specified, adjust clearance by changing thickness of side gear thrust washers. Washers are available in selective thicknesses of.003-.53" (.07-1.35mm), in increments of .002" (.05 mm)
6. Install retaining pin. Ensure retaining pin is flush with case. Install side gear (viscous coupling side), on differential case, then install viscous coupling. Install speedometer drive gear in differential case. Align projections of speedometer drive gear with groove in differential case. See **Fig. 39**.
7. Press differential side bearings on differential case. Install ring gear and tighten bolts in numerical order. See **Fig. 40**. Tighten bolts to 39-50 ft. lbs. (53-68 N.m).

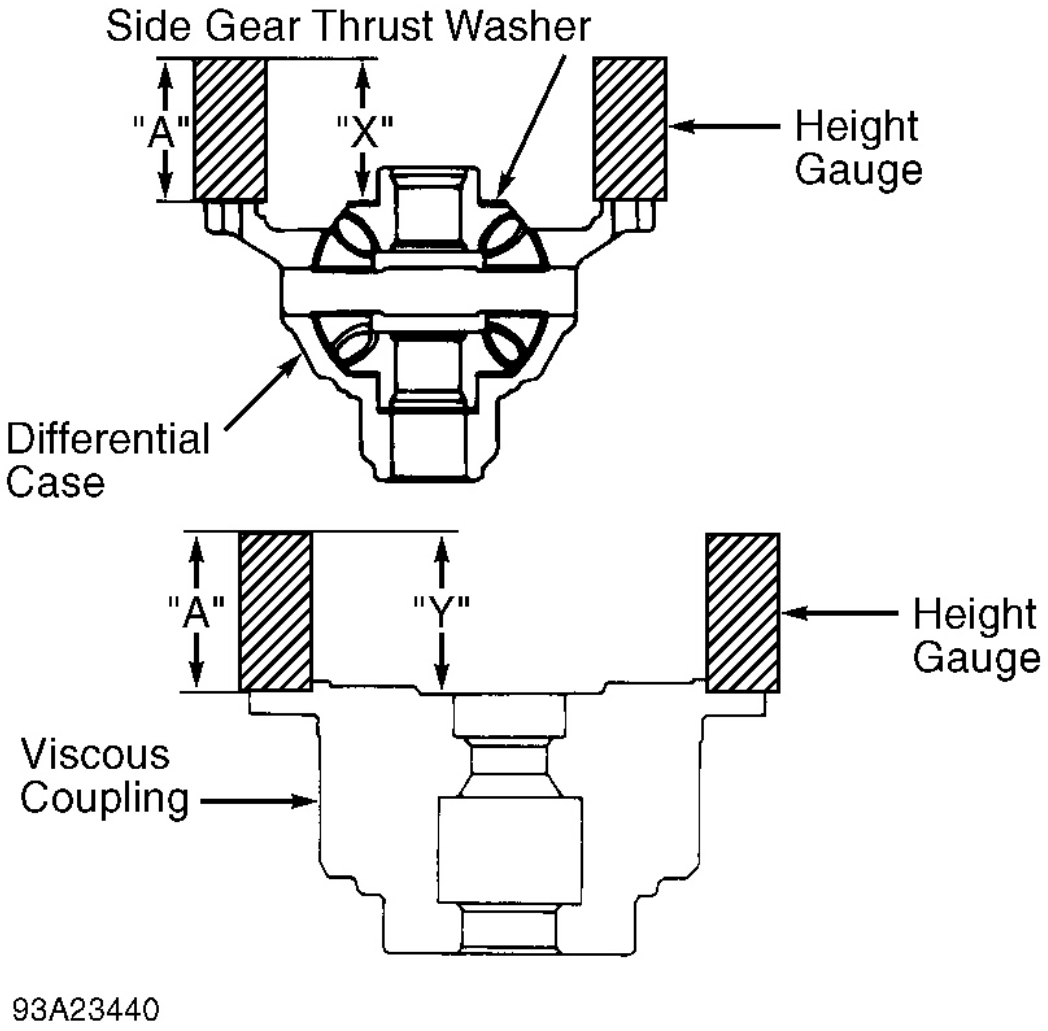


Fig. 37: Measuring Side Gear-To-Differential Case Clearance
Courtesy of NISSAN MOTOR CO., U.S.A.

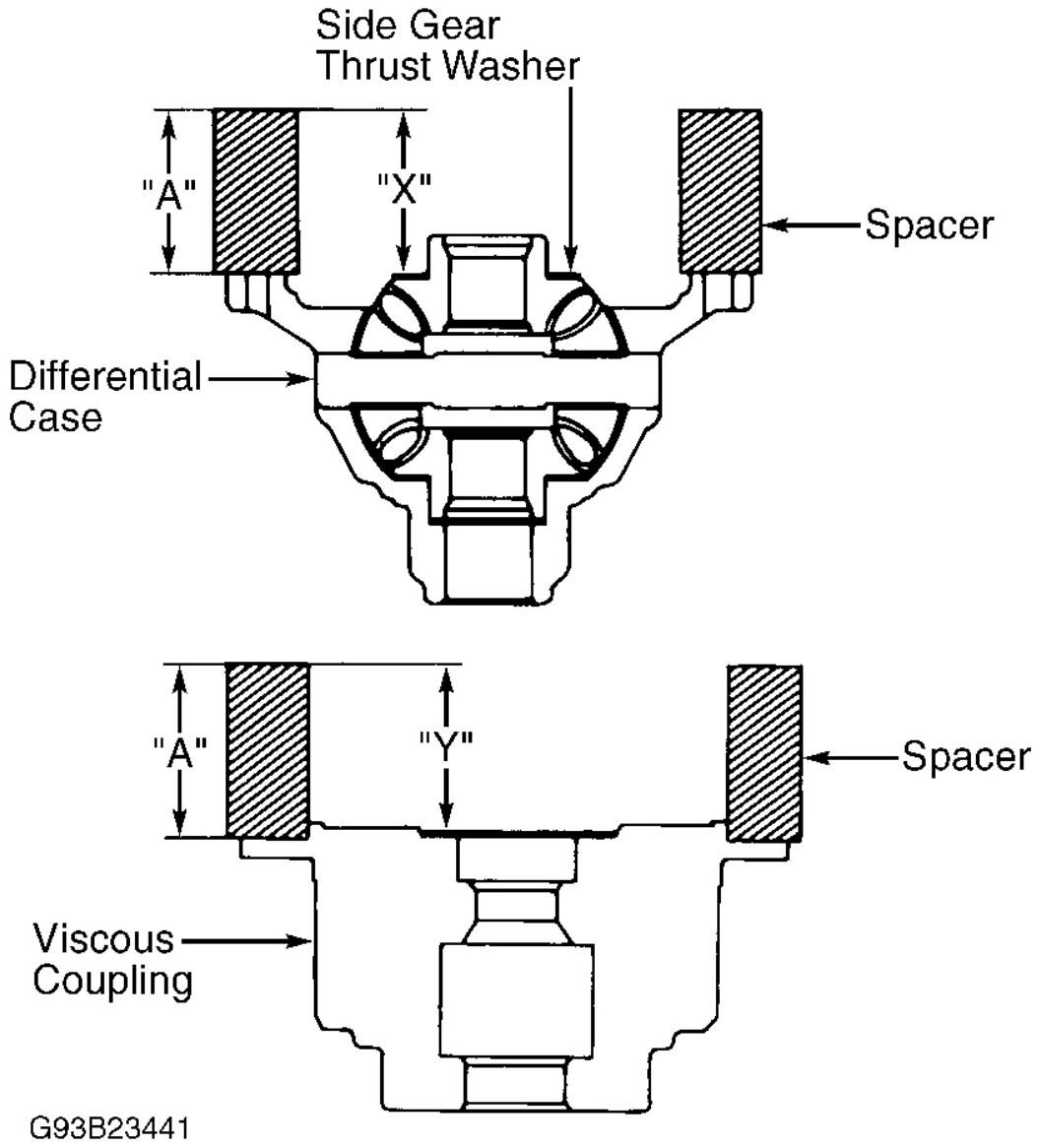


Fig. 38: Measuring Side Gear-To-Viscous Coupling Clearance
Courtesy of NISSAN MOTOR CO., U.S.A.

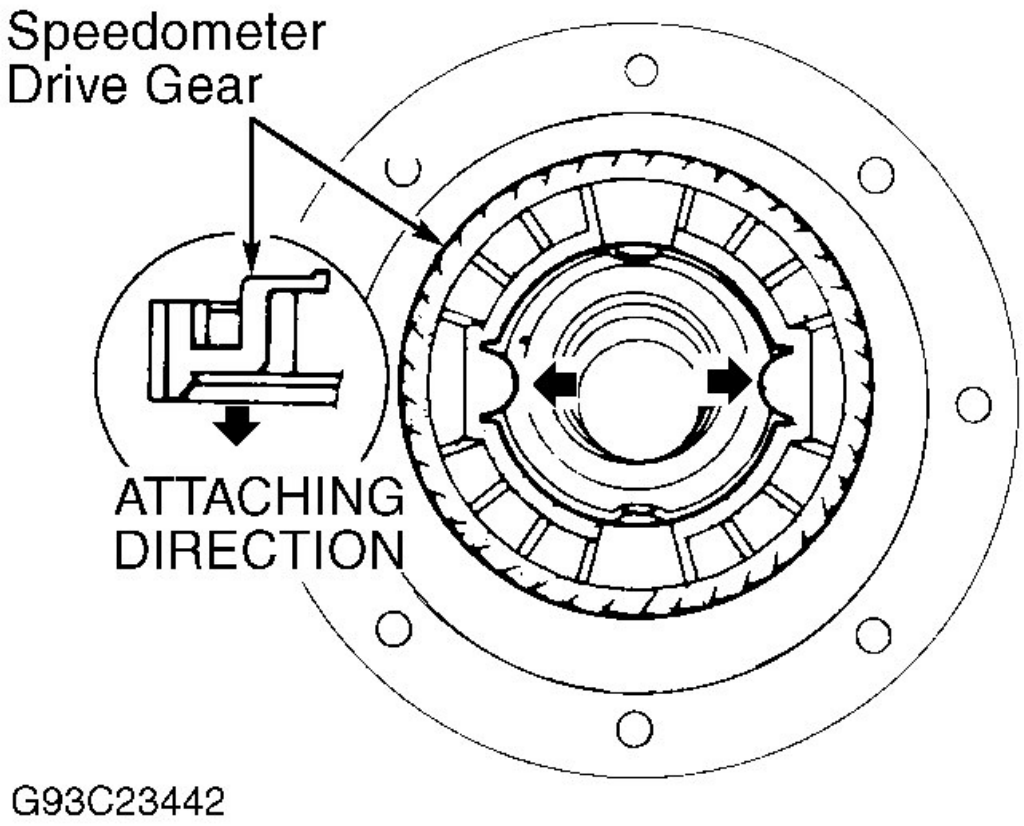


Fig. 39: Installing Speedometer Drive Gear
Courtesy of NISSAN MOTOR CO., U.S.A.

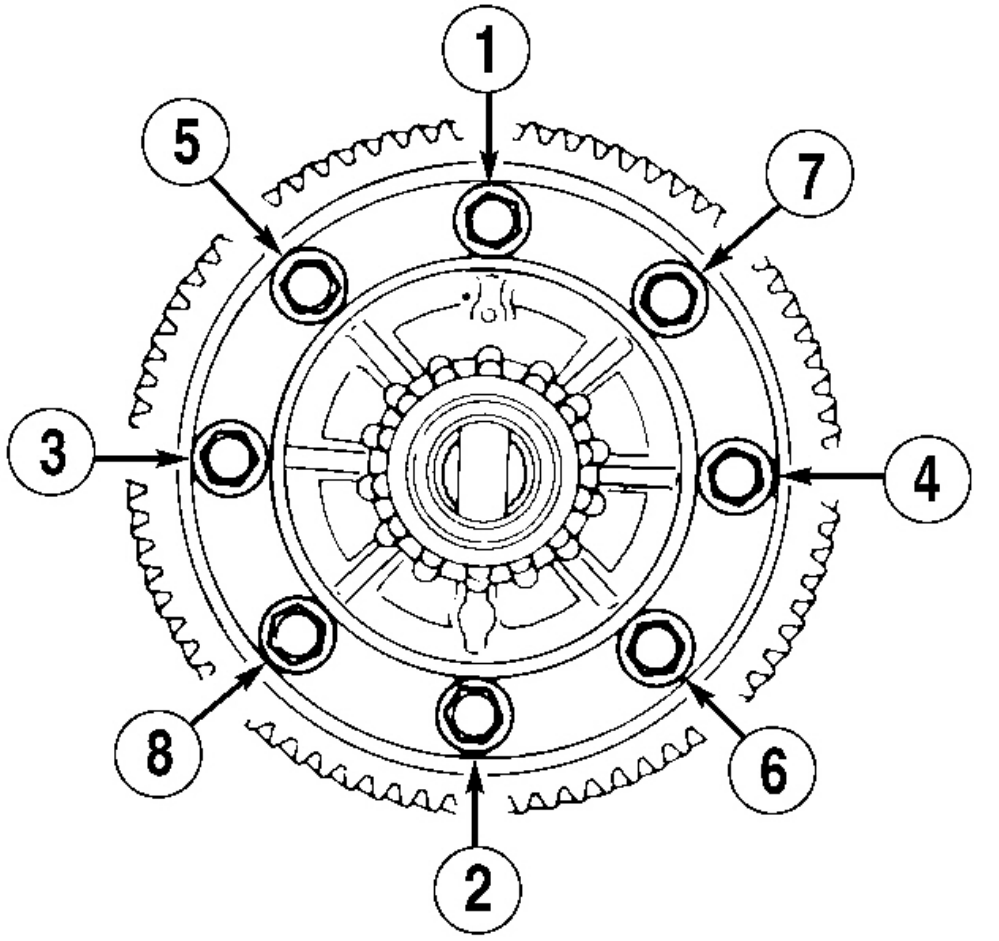


Fig. 40: Tightening Ring Gear Bolts
Courtesy of NISSAN MOTOR CO., U.S.A.

TRANSAXLE ADJUSTMENTS

NOTE: Transaxle adjustments are performed as part of transaxle assembly procedure. See TRANSAXLE REASSEMBLY.

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 20-22 ft. lbs. (26-30 N.m).
2. Attach dial indicator on differential case at transaxle case side. Install Preload Adapter (KV38107700) into differential side gear from converter housing side. See **Fig. 41**. Move tool up and down and measure deflection. Differential side bearing preload should be .002-.004" (.04-.09 mm). Select proper thickness of differential side bearing adjusting shims. Shims are available in thicknesses of .011-.060" (.28-1.44 mm), in increments of .002" (.05 mm)
3. 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 20-22 ft. lbs. (26-30 N.m).
4. Insert Measuring Tool (KV38107700) into differential case. 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 4.3-9.6 INCH lbs. (.49-1.08 N.m). If using original bearings, turning torque will be slightly less then specified. Ensure turning torque is within specified range.

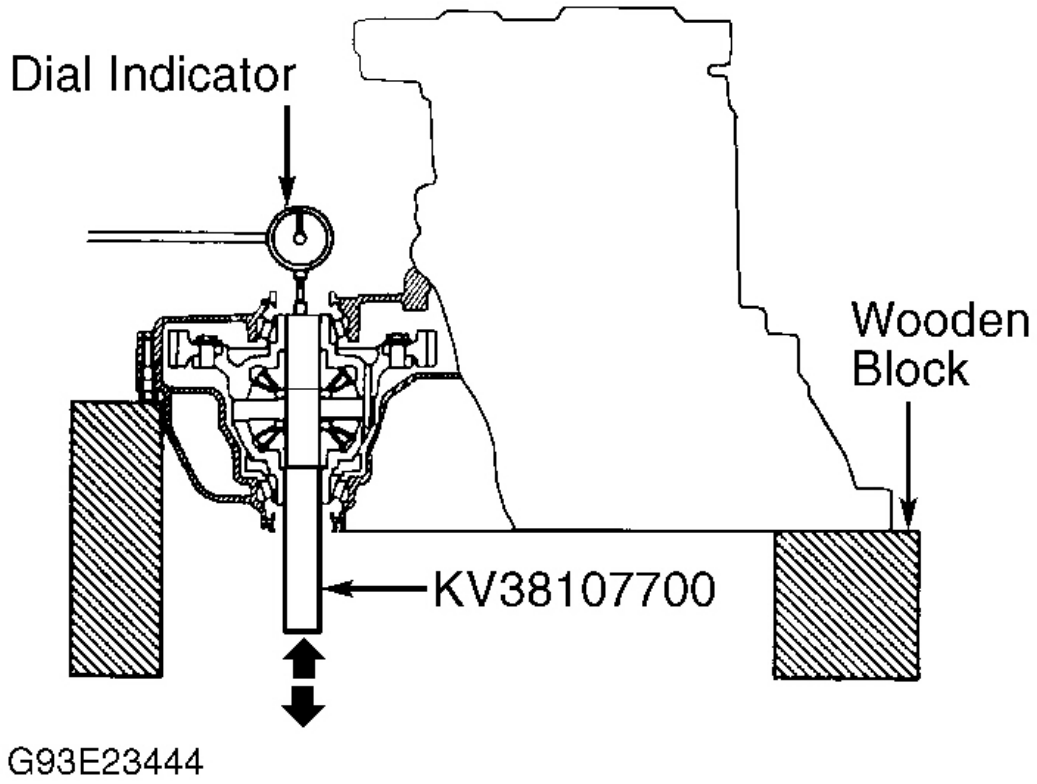


Fig. 41: Measuring Differential Side Bearing Preload

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

REDUCTION GEAR BEARING PRELOAD

1. Preload is adjusted by adjusting shim thickness. 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. 42**. 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. 42**.
3. For example, Dimension "D" is .24" (6.0 mm). Dimension "B" is .08" (2.0 mm) and Dimension "C" is .04" (1.0 mm). Total Dimension "A" would be .12" (3.0 mm).
4. 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).
5. Select proper thickness of reduction gear bearing adjusting shim by subtracting Dimension "E" from Dimension "A". Shims are available in thicknesses of .043-.111" (1.10-2.82 mm), in increments of .002" (.04 mm). If total dimension is .045-.046" (1.13-1.17 mm), required shim thickness is .043" (1.10 mm). For each .002" (.04 mm) dimension increase, shim thickness will increase same amount up to .112-.114" (2.85-2.89 mm).
6. Install selected adjusting shim. Press idler gear bearing on idler gear. Press idler gear on reduction gear. Ensure idler gear locks on parking pawl. Lock idler gear with parking pawl and tighten idler gear lock nut to 181-203 ft. lbs. (245-275 N.m.).
7. 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 .97-6.10 INCH Lbs. (.11-.69 N.m). After adjusting turning torque, stake lock nut to ensure nut will not loosen.

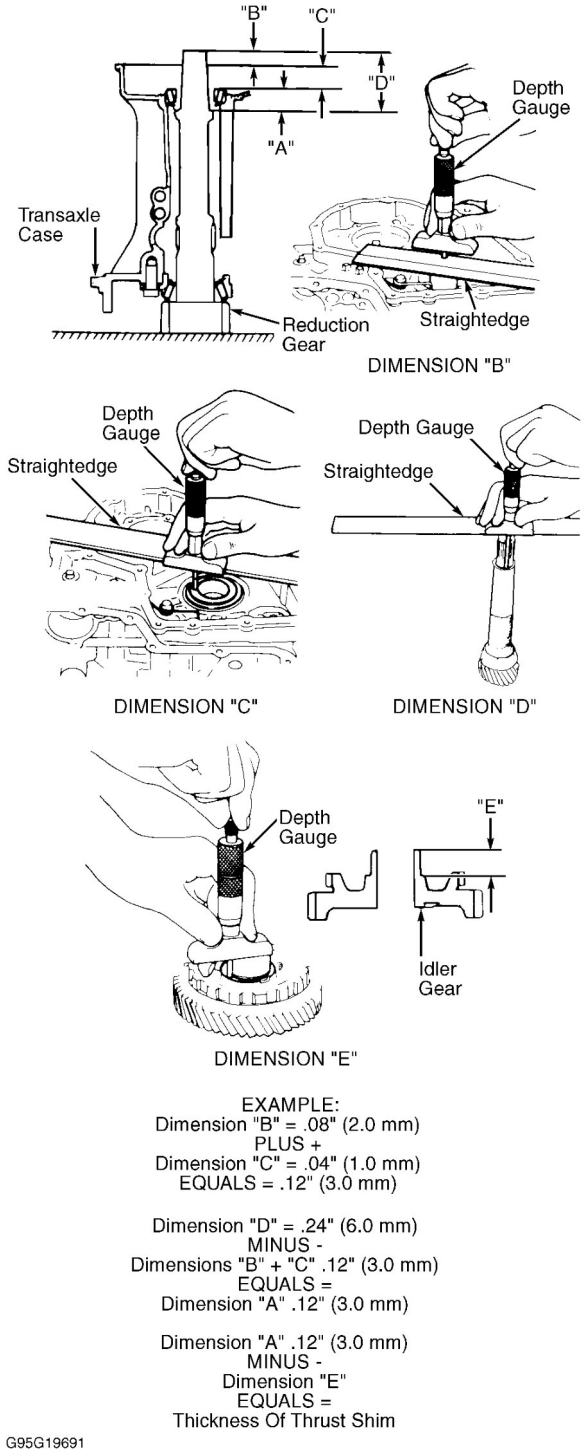
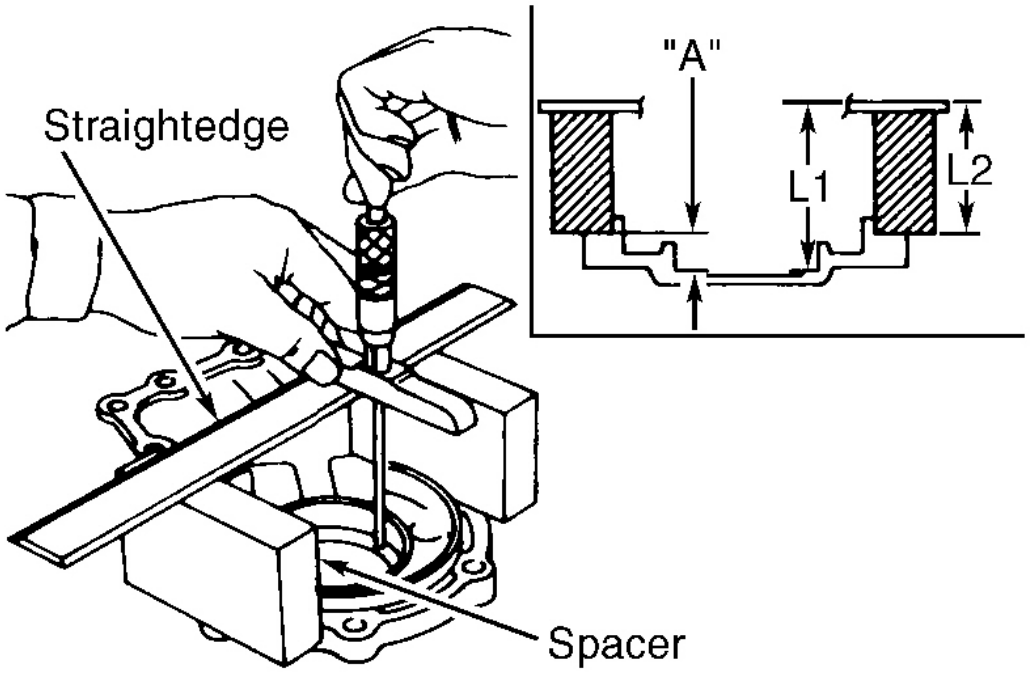


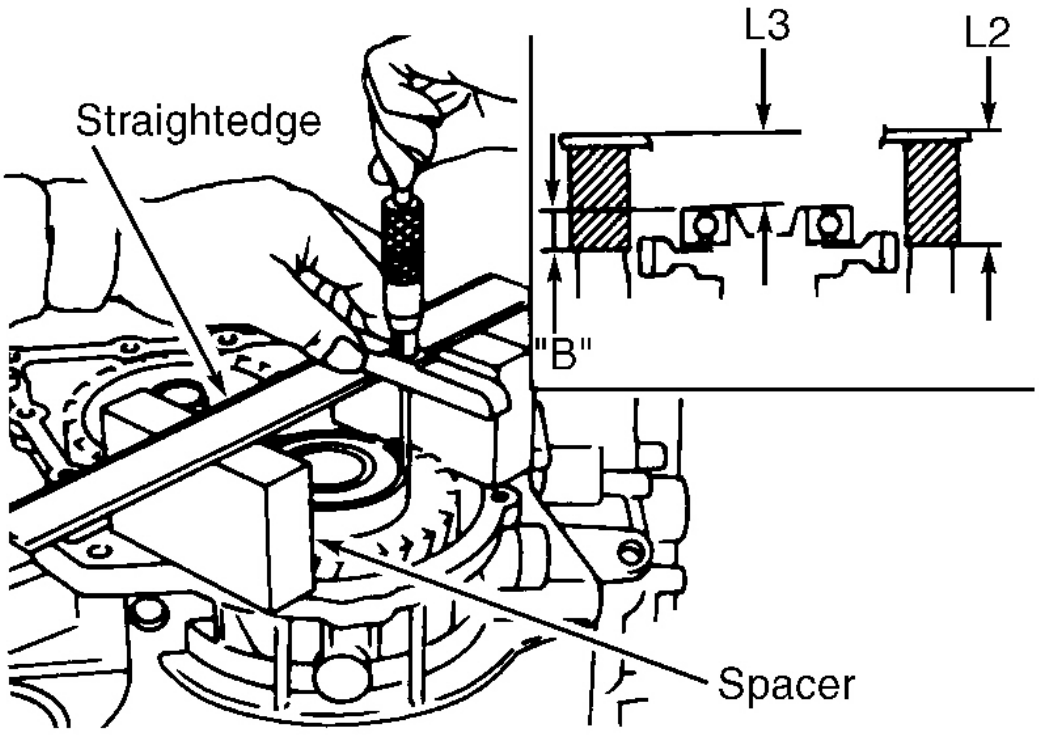
Fig. 42: Measuring Reduction Gear Bearing Preload
Courtesy of NISSAN MOTOR CO., U. S. A.

OUTPUT SHAFT END PLAY

1. Output shaft end play is adjusted by adjusting output shaft shim thickness. Install output shaft bearing retainer. Tighten bolts to 12-15 ft. lbs. (16-21 N.m). 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. 43**. 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 0-0.02" (0-.5 mm). Select proper thickness of adjusting shim to ensure output shaft end play is within specification. Adjusting shims are available in thicknesses of .022" (.56 mm), .039" (.96 mm) and .054" (1.36 mm).
4. Install selected adjusting shim on output shaft bearing. Apply a bead of liquid gasket .06" (1.5 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. 12**. Always replace bolts "A". Bolts have **Green** threads and are self-sealing.



DIMENSION "A"



DIMENSION "B"

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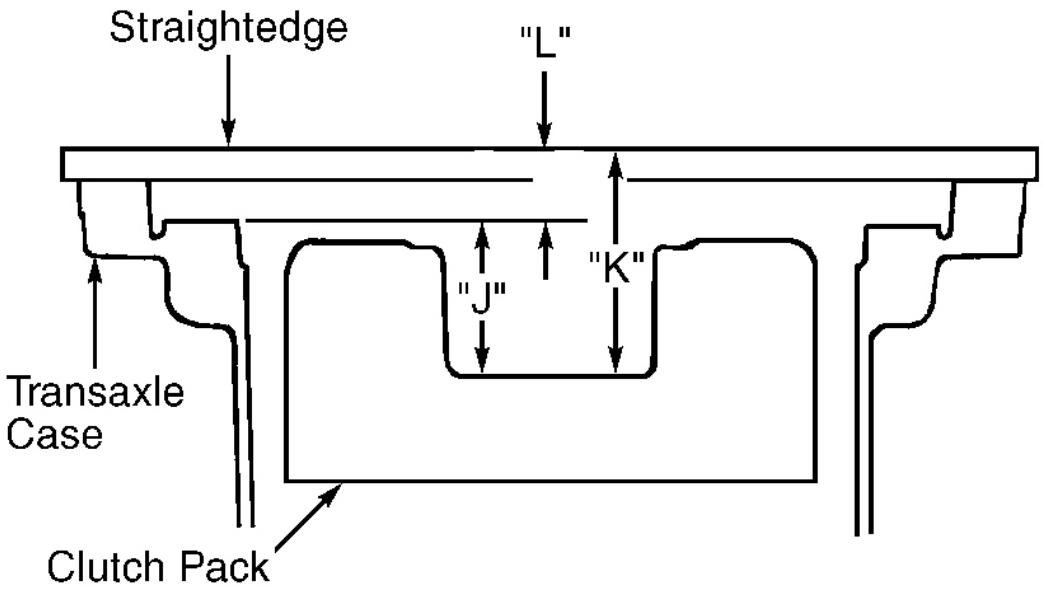
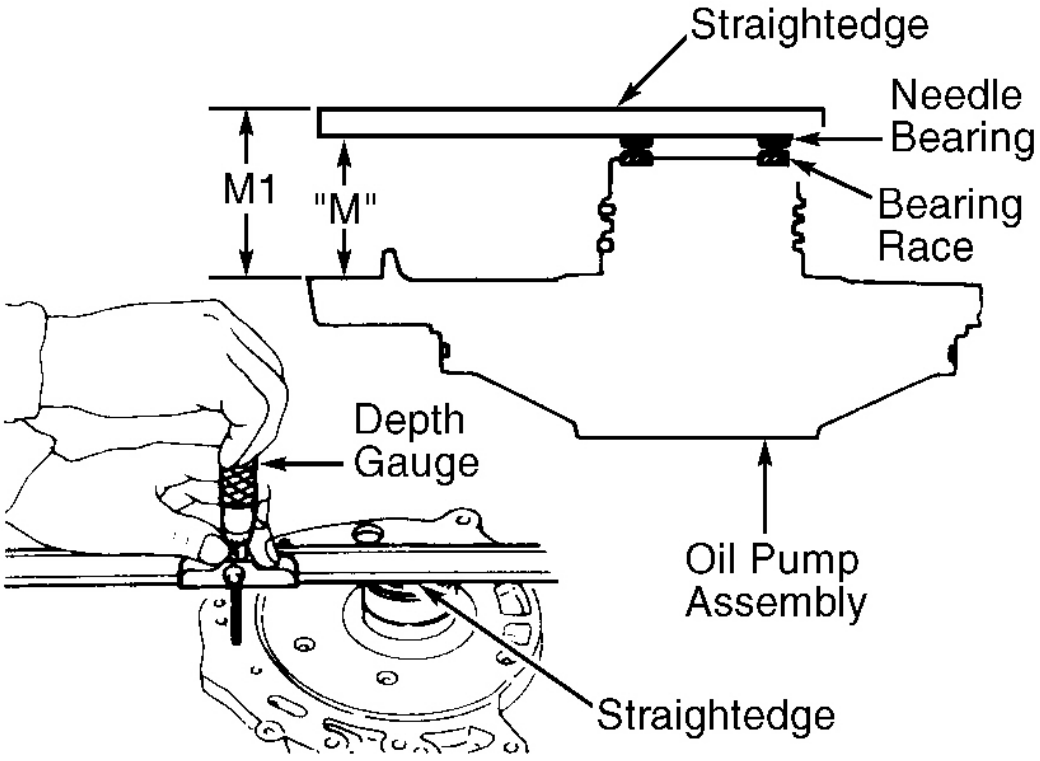
Fig. 43: Measuring Output Shaft End Play
Courtesy of NISSAN MOTOR CO., U. S. A.

TOTAL END PLAY

1. Total end play is adjusted by adjusting bearing race thickness. Using a depth gauge and straightedge, measure dimensions "K" and "L". Dimension "K" minus Dimension "L" equals distance between oil pump surface of transaxle case and needle bearing mating surface of high clutch drum (Dimension "J"). See **Fig. 44**.
2. Install bearing race and needle bearing on oil pump assembly. Measure distance between transaxle case surface and needle bearing on oil pump cover (Dimension "M").
3. Dimension "M1" minus straightedge thickness equals Distance "M". Dimension "J" minus Dimension "M" equals total end play. See **Fig. 44**. Total end play should be .010-.022" (.25-.55 mm). Bearing races are available in thicknesses of .024-.087" (.60-2.20 mm) in increments of .015" (.40 mm). Select proper thickness of bearing race to ensure total end play is as specified.



DIMENSION "J"



DIMENSION "M"

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Fig. 44: 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 thrust washer on reverse clutch drum. Using a depth gauge and straightedge, measure distance between thrust washer and straightedge (Dimension "O"). Measure distance between oil pump mating surface on transaxle case and straightedge (Dimension "P"). See **Fig. 45**. Dimension "O" minus Dimension "P equals distance between oil pump surface of transaxle case and thrust washer on reverse clutch drum (Dimension "N").
2. Measure distance between oil pump surface and straightedge (Dimension "R"). See **Fig. 45**. Measure distance between thrust washer mating surface and straightedge (Dimension "S"). Dimension "R" minus Dimension "S" is distance between transaxle case surface and thrust washer mating surface (Dimension "Q").
3. Dimension "N" minus Dimension "Q" equals total reverse clutch end play. Reverse clutch end play should be .026-.039" (.65-1.00 mm). Thrust washers are available in thicknesses of .026-.061" (.65-1.55 mm), in increments of .006" (.15 mm). Select proper thickness thrust washer to ensure reverse clutch end play is as specified.

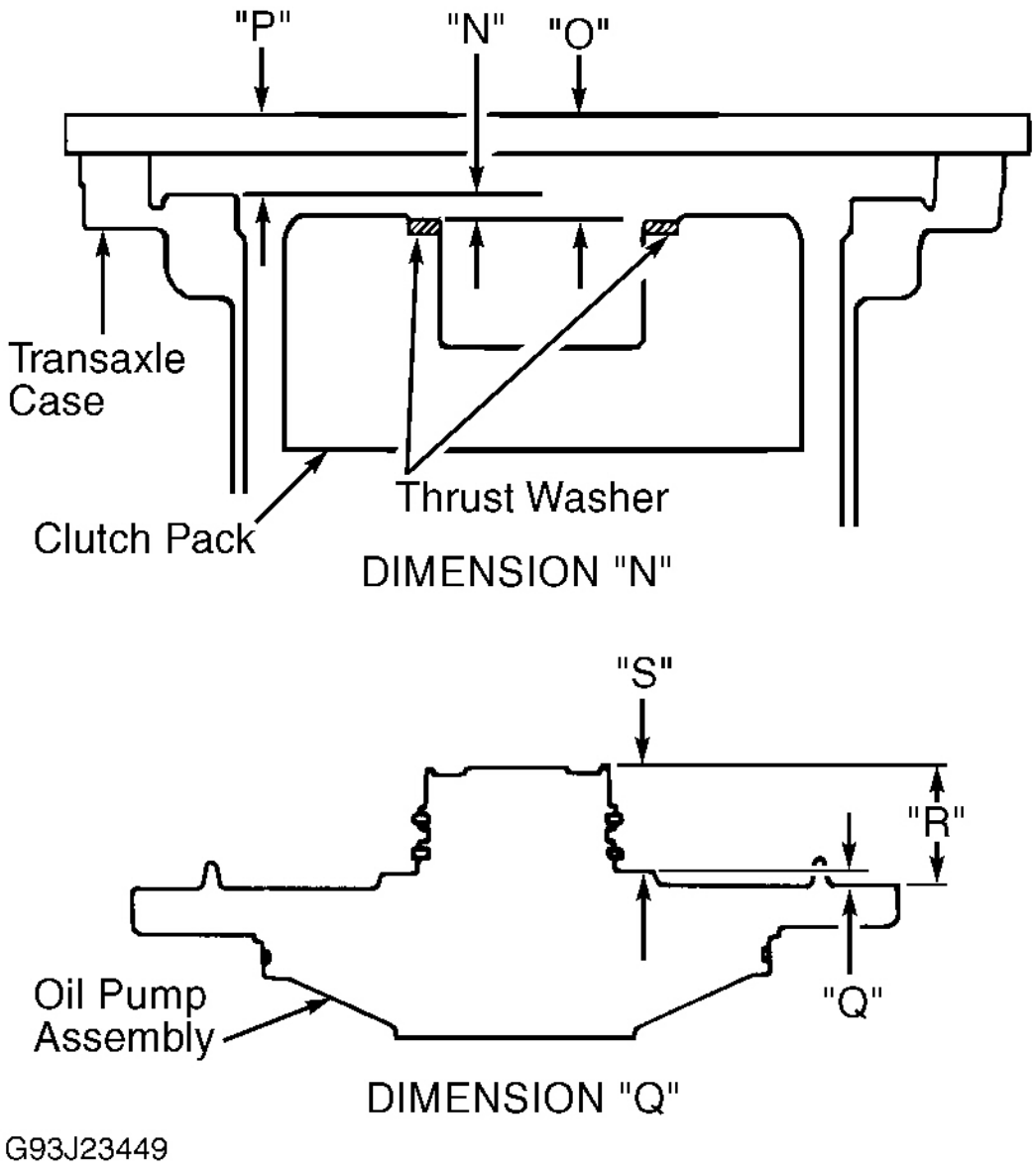

Fig. 45: Measuring Reverse Clutch End Play
Courtesy of NISSAN MOTOR CO., U. S. A.

TRANSAXLE REASSEMBLY

NOTE: See NEEDLE BEARING, SNAP RING, THRUST WASHER & SHIM ID table for specifications. For component locations, see Fig. 47.

1. Install revolution sensor into transaxle case. Install differential side oil seal in converter housing

with .216-.259" (5.50-6.60 mm) of seal protruding from housing. Install differential side oil seal in transaxle case with 0.02" (0.5 mm) of seal recessed inside housing.

2. Install the parking actuator support to the transaxle case with the beveled edge facing inward. Install parking pawl on transaxle case and secure with parking shaft. Install the return spring. See **Fig. 12**. Perform Differential Side Bearing Preload, Reduction Gear Bearing Preload and Output Shaft End Play adjustment procedures. Refer to **TRANSAXLE ADJUSTMENTS**.
3. Remove paper from bearing retainer. Apply petroleum jelly to thrust washer, bearing race and needle bearing. Install thrust washer on bearing retainer. Ensure bearing retainer seal rings are not spread. Align teeth of low-reverse brake drive plates. Install forward clutch assembly. Install bearing race on bearing retainer. Install bearing on rear internal gear with smooth side down.
4. Hold forward clutch hub and turn overrun clutch hub. Ensure overrun clutch hub rotates counterclockwise and does not rotate clockwise. If overrun clutch hub does not operate as described, check installed direction of forward one-way clutch. Align forward clutch and overrun clutch drive plate teeth and install rear internal gear assembly. See **Fig. 16**.
5. Apply petroleum jelly to needle bearing and install needle bearing with smooth side down on rear planetary carrier. Install rear sun gear on rear planetary carrier with grooved side facing out. Install rear planetary carrier in transaxle case. Apply petroleum jelly to thrust needle bearing and install bearing on front planetary carrier with grooved side down.
6. Install low one-way clutch to front planetary carrier by rotating clutch counterclockwise. Ensure low one-way clutch does not rotate in clockwise direction. Install front planetary carrier assembly in transaxle case. Install snap ring.

NOTE: Snap ring will not fit in groove of transaxle case if forward clutch and bearings are not installed correctly.

7. Apply petroleum jelly to thrust needle bearing and needle bearings. Install thrust needle bearing on front sun gear with flat side down. Install front sun gear on front planetary carrier. Install needle bearing on front sun gear with smooth side down. Install high clutch hub on front sun gear. Install needle bearing on high clutch hub with smooth side up. See **Fig. 16**.
8. Remove paper from input shaft. Align teeth of high clutch drive plates and install input shaft assembly. Align teeth of reverse clutch drive plates. Apply petroleum jelly to needle bearing and install needle bearing on high clutch assembly with smooth side down.
9. Install reverse clutch assembly. Install anchor end pin, washer and lock nut on transaxle case. Place brake band on reverse clutch drum. Tighten anchor end pin enough that brake band is on reverse drum evenly.
10. Apply petroleum jelly on bearing race selected in TOTAL END PLAY adjustment procedure. See **TRANSAXLE ADJUSTMENTS**. Install bearing race on oil pump cover. Apply petroleum jelly on thrust washer selected in REVERSE CLUTCH END PLAY adjustment procedure. See **TRANSAXLE ADJUSTMENTS**. Install thrust washer on reverse clutch drum. Install oil pump assembly on transaxle case.
11. 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. 46**.

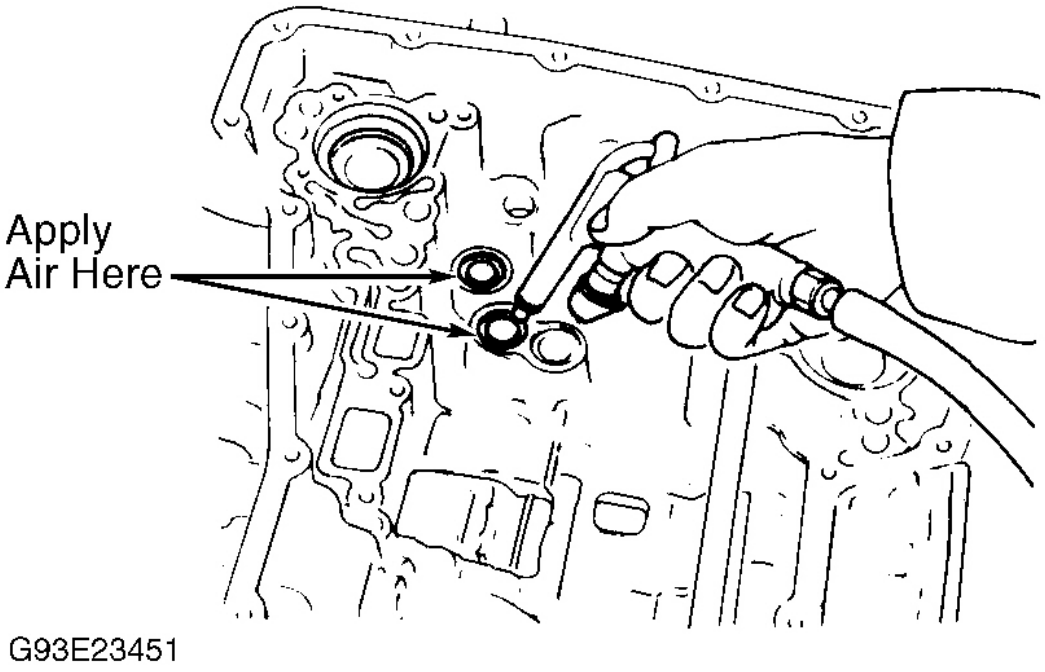

Fig. 46: Checking Brake Band Operation
Courtesy of NISSAN MOTOR CO., U. S. A.

12. 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 bead of liquid gasket .060" (1.5 mm) in diameter on inside edge of converter housing mating surface. Install converter housing on transaxle case. Tighten bolts to 20-22 ft. lbs. (26-30 N.m).
13. 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.
14. 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 and detent valve with throttle lever.
15. 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 44-62 INCH lbs. (5-7 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.

16. 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 40-62 INCH lbs. (4-5

N.m). Tighten oil cooler tube bolts to 22-36 ft. lbs. (29-49 N.m).

17. 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. 48**. Distance "A" should be 0.63" (15.9 mm).

NEEDLE BEARING, SNAP RING, THRUST WASHER & SHIM ID (1)

Application & No.	Outer Diameter: In. (mm)
Snap Rings	
No. 1	5.59 (142.0)
No. 2	4.45 (113.0)
No. 3	6.39 (162.4)
No. 4	5.33 (135.4)
No. 5	6.26 (159.0)
No. 6	4.96 (126.0)
No. 7	1.59 (40.5)
Needle Bearings	
No. 8	1.85 (47.0)
No. 9	1.38 (35.0)
No. 10	2.36 (60.0)
No. 11	2.36 (60.0)
No. 12	1.85 (47.0)
No. 13	1.68 (42.6)
No. 14	1.89 (48.0)
No. 15	2.13 (55.0)
No. 16	2.36 (60.0)
Thrust Washers	
No. 17 (Selective)	2.84 (72.0)
No. 18	3.09 (78.5)
Race & Shims (Selective)	
No. 19	1.89 (48.0)
No. 20	2.83 (72.0)
No. 21	1.36 (34.5)
No. 22	4.13 (105.0)
(1) See **Fig. 47** for component locations.	

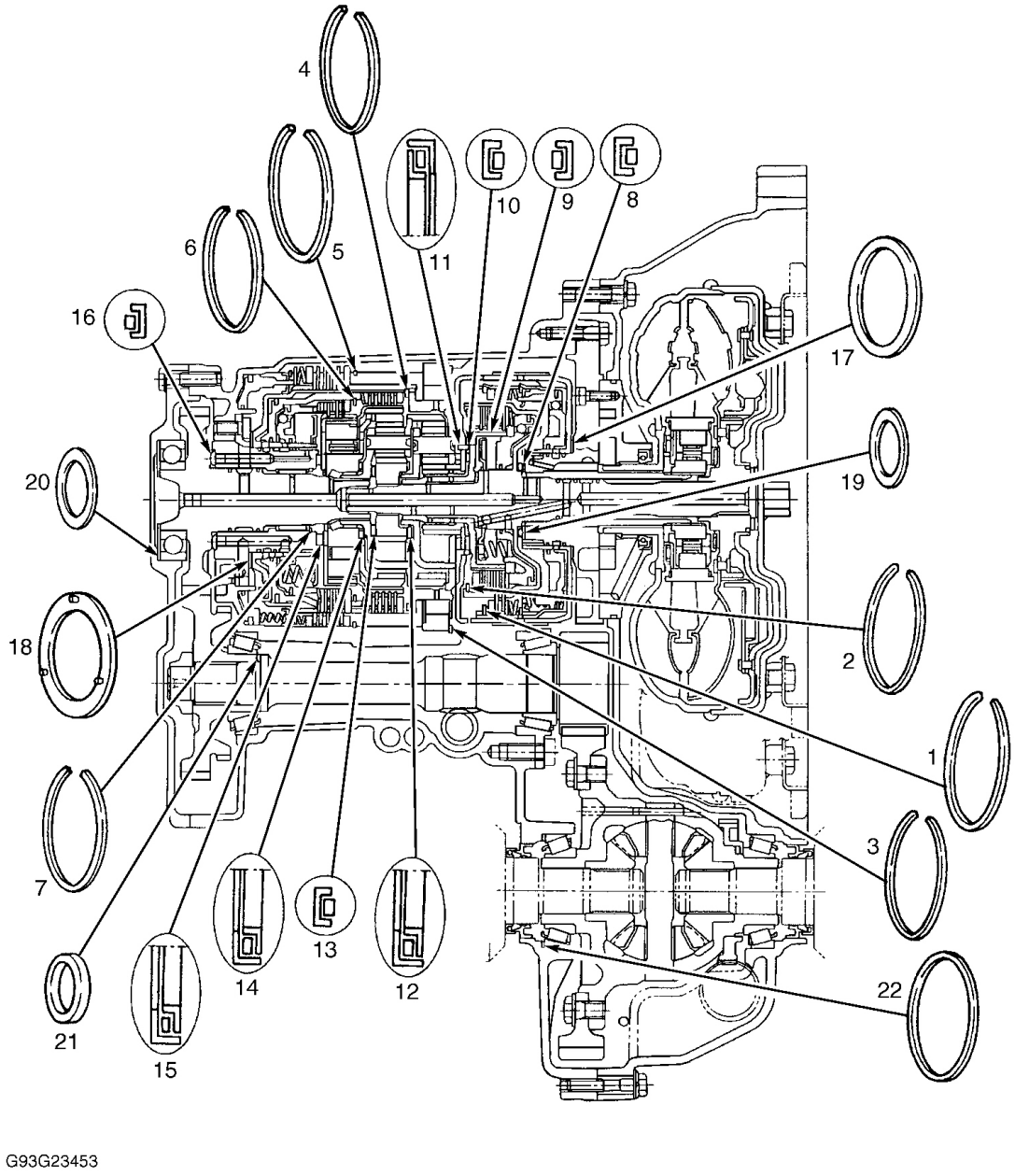

Fig. 47: Needle Bearing, Snap Ring, Thrust Washer I.D. & Selective Shim Locations
Courtesy of NISSAN MOTOR CO., U. S. A.

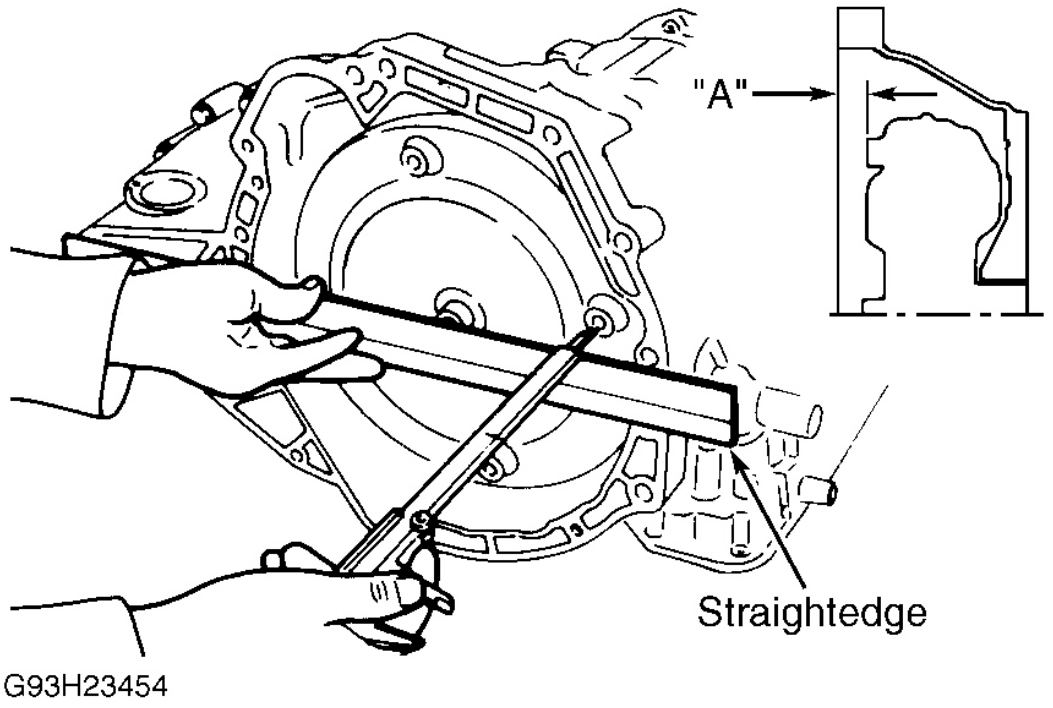

Fig. 48: Measuring Torque Converter Installed Depth
Courtesy of NISSAN MOTOR CO., U. S. A.

TRANSMISSION SPECIFICATIONS

TRANSAXLE SPECIFICATIONS

Application	In. (mm)
Differential Assembly	
Side Gear-To-Differential Case	
Specified Clearance	.004-.008 (0.10-0.20)
Differential End Play	0-.006 (0-.15)
Differential Side Bearing Preload	.002-.004 (.04-.010)
Forward & Overrun Clutches	
Dish Plate Thickness	
Forward Clutch	.098 (2.50)
Overrun Clutch	.085 (2.15)
Drive Plate Thickness	
Forward Clutch	
Specified Clearance	.071 (1.80)
Allowable Limit	.063 (1.60)

Overrun Clutch	
Specified Clearance	.063 (1.60)
Allowable Limit	.055 (1.40)
Retaining Plate-To-Snap Ring	
Forward Clutch	
Specified Clearance	.018-.0335 (.45-.85)
Allowable Limit	.073 (1.85)
Overrun Clutch	
Specified Clearance	.039-.055 (1.00-1.40)
Allowable Limit	.079 (2.00)
High Clutch	
Drive Plate Thickness	.063 (1.60)
Allowable Limit	.071 (1.80)
Retaining Plate-To-Snap Ring	
Specified Clearance	.055-.071 (1.40-1.80)
Allowable Limit	.102 (2.60)
Input Shaft Seal Ring-To-Ring Groove	
Specified Clearance	.003-.009 (.08-.23)
Allowable Limit	.009 (.23)
Low-Reverse Brake	
Drive Plate Thickness	.079 (2.00)
Allowable Thickness Limit	.071 (1.80)
Specified Clearance	.055-.071 (1.40-1.80)
Allowable Clearance Limit	.110 (2.80)
Oil Pump Seal Ring-To-Ring Groove	
Specified Clearance	.004-.010 (.10-.25)
Allowable Limit	.010 (.25)
Oil Pump Side Clearance	.0008-.0016 (.020-.040)
Output Shaft End Play	0-.02 (0-.5)
Output Shaft Seal Ring-To-Ring Groove	
Specified Clearance	.004-.010 (.10-.25)
Allowable Limit	.010 (.25)
Pinion Washer-To-Planetary Gear	
Specified Clearance	.006-.028 (.15-.70)
Allowable Limit	.031 (.80)
Reverse Clutch	
Dish Plate Thickness	.110 (2.80)
Drive Plate Thickness	.079 (2.00)
Allowable Limit	.071 (1.80)
Retaining Plate-To-Snap Ring	
Specified Clearance	.020-.031 (.50-.80)
Allowable Limit	

	.047 (1.20)
Reduction Gear Bearing Preload	.002 (.05)
Reverse Clutch End Play	.026-.039 (.65-1.00)
Total End Play	.010-.022 (.25-.55)

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS

Application	**Ft. Lbs. (N.m)**
Anchor End Pin	23-31 (31-42)
Converter Housing Bolt	19-22 (26-30)
Idler Gear Lock Nut	181-203 (245-275)
Oil Cooler Tube Bolt	21-36 (29-49)
Oil Pan Drain Plug	21-24 (29-32)
Oil Pump-To-Transaxle Case Bolt	13-15 (18-21)
Output Gear Lock Nut	181-203 (245-275)
Output Shaft Bearing Retainer Bolt	12-15 (16-21)
Parking Actuator Support Bolt	15-18 (21-24)
Reduction Gear Bearing Race Bolt	46-49 (63-67)
Ring Gear Bolt	
Infiniti	55-65 (74-88)
Nissan	39-50 (53-68)
Side Cover Bolt	20-22 (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	35-44 (4-5)
Inhibitor Switch Bolt	18-22 (2-2.5)
Oil Pan Bolt	44-62 (5-7)
Oil Pump Cover-To-Housing Bolt	62-97 (7-11)
Oil Tube	44-62 (5-7)
Speedometer Pinion Bolt	33-44 (3.7-5)

WIRING DIAGRAMS

Fig. 49: 1993-94 Infiniti G20 Transaxle Wiring Diagram

Fig. 50: 1993 Nissan NX & Sentra Transaxle Wiring Diagram (With Analog Instrument Cluster)

Fig. 51: 1993 Nissan NX & Sentra Transaxle Wiring Diagram (With Digital Instrument Cluster)

Fig. 52: 1994 Nissan Sentra Transaxle Wiring Diagram

OIL CIRCUIT DIAGRAM

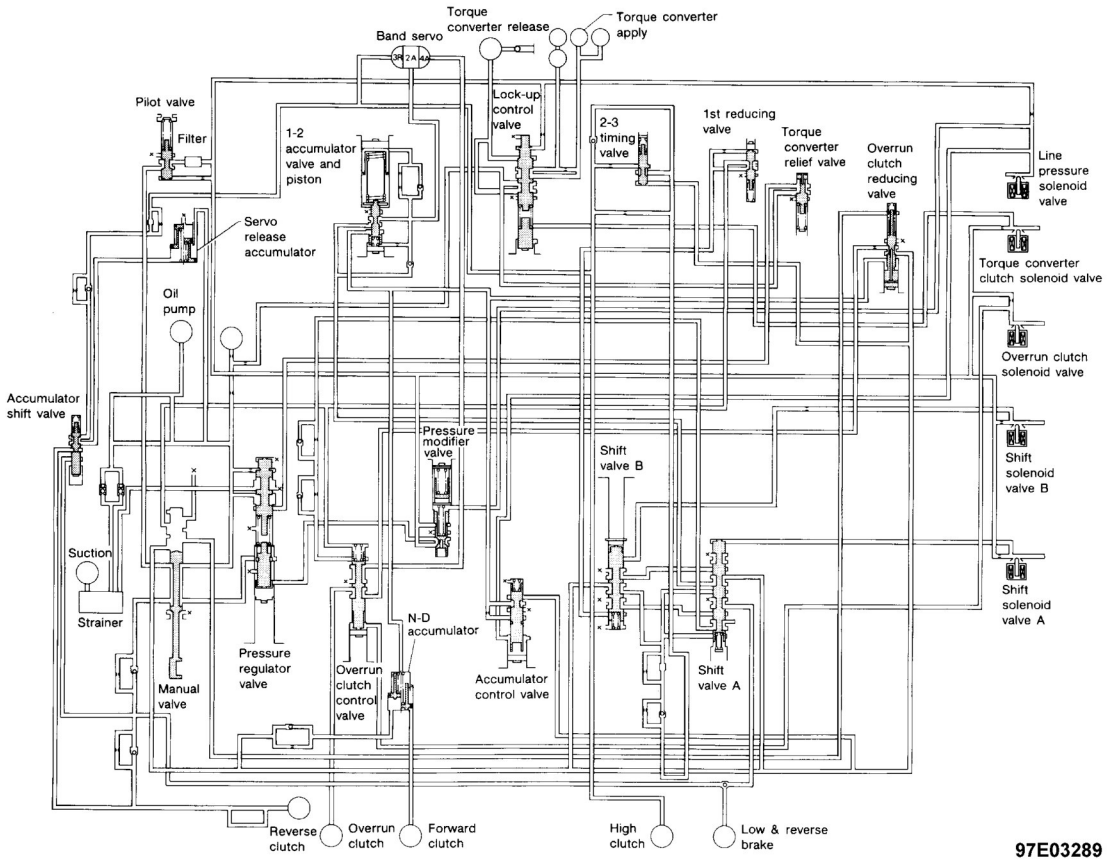

Fig. 53: Oil Circuit Diagram (Nissan RE4F03V)

