2000 AUTOMATIC TRANSMISSIONS

Nissan RE4F03 Series Overhaul

APPLICATION

AUTOMATIC TRANSAXLE APPLICATIONS

Application	Transaxle Model
Infiniti G20	RE4F03B/W
Nissan Sentra	RE4F03B

IDENTIFICATION

Transaxle model is identified on vehicle identification plate in driver's door frame area. 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. 1** .

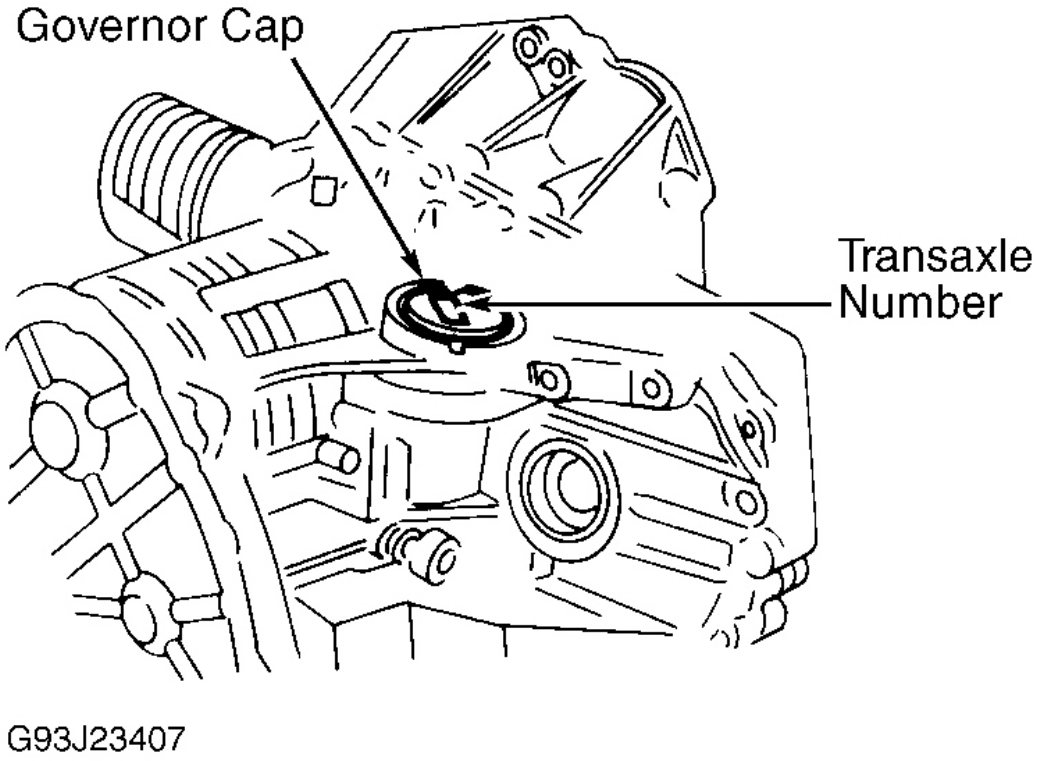


Fig. 1: Locating Automatic Transaxle Model Number
Courtesy of NISSAN MOTOR CO., U.S.A.

GEAR RATIOS

TRANSAXLE GEAR RATIOS

Gear Range	Gear Ratio
1st	2.861:1
2nd	1.562:1
3rd	1.000:1
4th	0.698:1
Reverse	2.310:1
Final Drive	
1.8L	3.827:1
2.0L	4.072:1

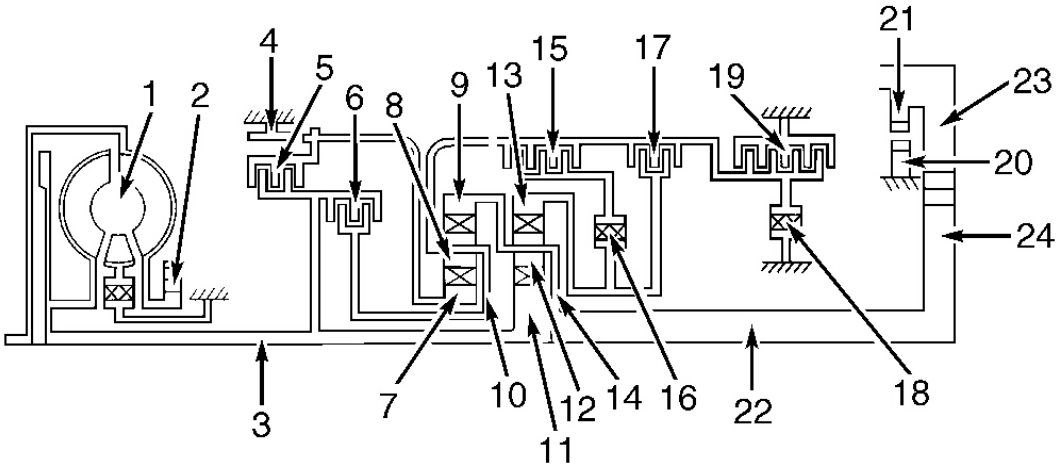
DESCRIPTION & OPERATION

Transaxle consists of 4 main units: automatic transaxle, torque converter, differential assembly with a viscous coupling (RE4F03W) or without a viscous coupling (RE4F03B) and Transaxle Control Module (TCM). The TCM electrically controls shifting functions. Internal transaxle components include forward clutch, forward one-way clutch, high clutch, low and reverse brake, overrun clutch, reverse clutch, brake band, band servo, accumulators and control valve (valve body) assembly. See **Fig. 2** and **Fig. 3** .

The following electronic signals, sensors, switches and solenoids are used to control transaxle shifting. See NISSAN RE4F03 SERIES ELECTRONIC CONTROLS article for additional information and testing:

- Engine Revolution Signal (Tach Signal)
- Transmission Fluid Temperature Sensor
- Park/Neutral Position (PNP) Switch
- Line Pressure Solenoid
- Lock-Up Solenoid
- Overdrive Switch
- Overrun Clutch Solenoid
- Mainshaft Revolution Sensor
- Shift Solenoids "A" & "B"
- Speed Sensor
- Throttle Position (TP) Sensor with integral switch
- Shift Lock System

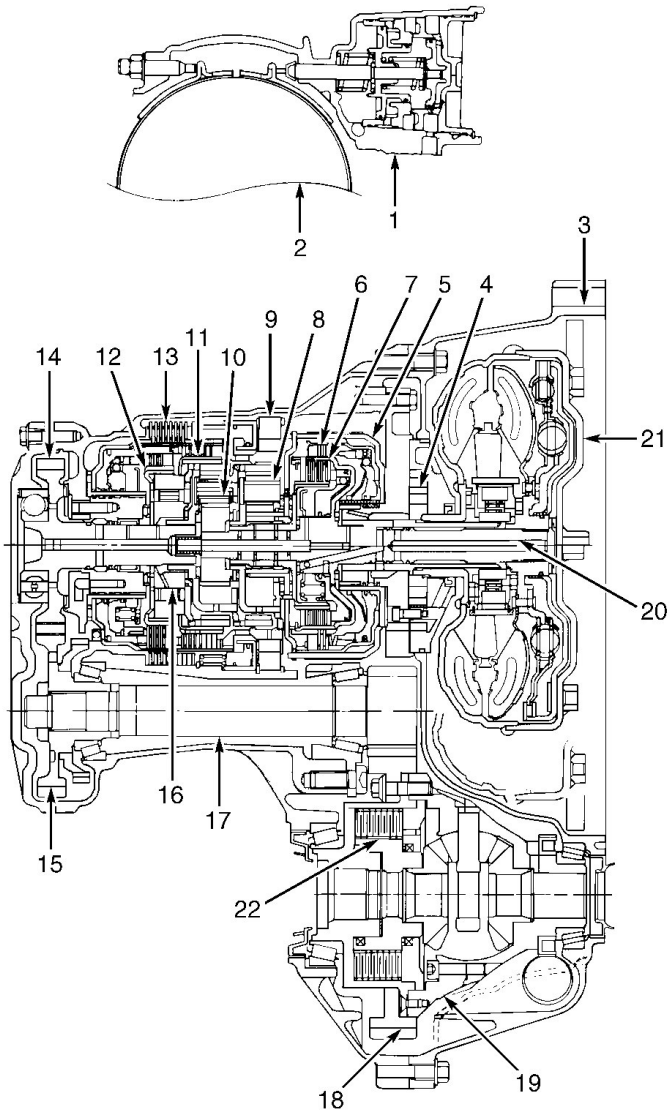
NOTE: Transaxle is equipped with a electronic shift lock and key lock system. Shift lock system prevents shift lever from being moved from Park unless brake pedal is depressed. For more information on shift lock and key lock system, see NISSAN SHIFT LOCK SYSTEM article.



1. Torque Converter
2. Oil Pump
3. Input Shaft
4. Brake Band
5. Reverse Clutch
6. High Clutch
7. Front Sun Gear
8. Front Pinion Gear
9. Front Internal Gear
10. Front Planetary Carrier
11. Rear Sun Gear
12. Rear Pinion Gear
13. Rear Internal Gear
14. Rear Planetary Carrier
15. Forward Clutch
16. Forward One-Way Clutch
17. Overrun Clutch
18. Low One-Way Clutch
19. Low & Reverse Brake
20. Parking Pawl
21. Parking Gear
22. Output Shaft
23. Idle Gear
24. Output Gear

G99F04675

Fig. 2: Transaxle Operational Flow Diagram
Courtesy of NISSAN MOTOR CO., U.S.A.



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

G93B23581

Fig. 3: Transaxle Component Locations (RE4F03W Shown; RE4F03B Is Similar)
Courtesy of NISSAN MOTOR CO., U.S.A.

LUBRICATION

RECOMMENDED FLUID

Use Nissan Matic "D", Dexron-III/Mercon ATF or equivalent. For additional lubrication procedures, see appropriate AUTOMATIC TRANSMISSION SERVICING article in TRANSMISSION SERVICING.

FLUID CAPACITIES

Fluid capacity for RE4F03B/W transaxle with torque converter is 7.4 Qts. (7.0 L).

ON-VEHICLE SERVICE

The following components can be serviced without removing transaxle from vehicle:

- Differential Side Oil Seals
- Park/Neutral Position (PNP) Switch
- Vehicle Speed Sensor (VSS)
- Valve Body

OIL COOLER FLUSHING PROCEDURE

If friction material is detected, replace radiator after repair of transaxle. Cooler lines must be flushed with cleaning solvent to remove any foreign material.

TROUBLE SHOOTING

PRELIMINARY INSPECTION

Check transmission fluid level and shift linkage. See appropriate AUTOMATIC TRANSMISSION SERVICING article in TRANSMISSION SERVICING. 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

NOTE: TCM is equipped with a Fail-Safe (limp home) mode under which vehicle always runs in 3rd gear with shift lever in "D", "2" or "1" positions (sluggish, poor acceleration). When Fail-Safe occurs, next time key is turned to "ON" position, O/D OFF indicator light will blink for about 8 seconds. Fail-Safe may activate without electrical circuit damage (such as excessive wheel spins or immediately following emergency braking). Turn ignition switch to OFF position for 5 seconds, then to ON position to recover normal shift pattern.

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

Possible cause: defective ignition switch or starter. Control linkage or PNP switch misadjusted.

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

Possible cause: control linkage or PNP switch misadjusted.

Transaxle Noise In "P" Or "N" Position

Possible cause: incorrect fluid level or line pressure, Throttle Position (TP) sensor misadjusted, incorrect VSS signal, engine speed signal, damaged oil pump or torque converter.

Park Will Not Engage Or Disengage

Possible cause: control linkage misadjusted or defective parking components.

Vehicle "Creeps" In "N" Position

Possible cause: control linkage misadjusted, damaged forward clutch, reverse clutch or overrun clutch.

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

Possible cause: control linkage misadjusted, incorrect line pressure, damaged line pressure solenoid valve, valve body assembly, reverse clutch, high clutch, forward clutch, overrun clutch or low-reverse brake.

Vehicle Brakes When Shifted To "R" Position

Possible cause: incorrect fluid level or line pressure, control linkage misadjusted, damaged line pressure solenoid valve, valve body assembly, high clutch, brake band forward clutch or overrun clutch.

Excessive Shift Shock From "N" To "D" Position

Possible cause: engine idle RPM or TP sensor misadjusted, incorrect line pressure, incorrect transmission fluid temperature signal or engine speed signal, damaged line pressure solenoid valve, valve body assembly, N-D accumulator or forward clutch.

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

Possible cause: control linkage misadjusted, damaged low one-way clutch.

Vehicle Will Not Move Or Slips In "D", "1" & "2" Positions; Okay In "R" Position

Possible cause: incorrect fluid level or line pressure, damaged line pressure solenoid valve, valve body assembly, N-D accumulator, reverse clutch, high clutch, forward clutch, forward one-way clutch or low one-way clutch. See **CLUTCH & BAND APPLICATIONS** .

Slips On Acceleration

Possible cause: incorrect fluid level or line pressure, control linkage or TP sensor misadjusted, damaged line pressure solenoid valve, valve body assembly, N-D accumulator, forward clutch, reverse clutch, low-reverse brake, oil pump or torque converter.

Excessive "Creep"

Possible cause: incorrect engine idle RPM.

No "Creep"

Possible cause: incorrect fluid level or line pressure, damaged valve body assembly, forward clutch, oil pump or torque converter.

No 1-2 Upshift

Possible cause: PNP switch or control linkage misadjusted, damaged shift solenoid "A", valve body assembly, brake band or incorrect VSS signal.

No 2-3 Upshift

Possible cause: PNP switch or control linkage misadjusted, incorrect VSS signal, damaged shift solenoid "B", valve body assembly, high clutch or brake band.

No 3-4 Upshift

Possible cause: PNP switch or control linkage misadjusted, damaged shift solenoid "A", incorrect VSS signal or transmission fluid temperature sensor signal, or damaged brake band.

Upshift Points Too High In All Gears

Possible cause: TP sensor misadjusted, incorrect VSS signal or damaged shift solenoid "A" or "B".

Shifts From 1st To 3rd; Skips 2nd

Possible cause: incorrect fluid level, leaking accumulator servo release or damaged brake band.

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

Possible cause: incorrect engine idle RPM, damaged Torque Converter Clutch (TCC) solenoid, valve body assembly or torque converter.

Excessive Shock During 1-2 Upshift

Possible cause: TP sensor misadjusted, incorrect line pressure, damaged accumulator servo, valve body assembly, incorrect transmission fluid temperature sensor signal or damaged brake band.

Excessive Shock During 2-3 Upshift

Possible cause: TP sensor misadjusted, incorrect line pressure, damaged valve body assembly, high clutch or brake band.

Excessive Shock During 3-4 Upshift

Possible cause: TP sensor misadjusted, incorrect line pressure, damaged valve body assembly, brake band or overrun clutch.

Slips During 1-2 Upshift

Possible cause: incorrect fluid level, TP sensor misadjusted, incorrect line pressure, damaged accumulator servo release, valve body assembly or brake band.

Slips During 2-3 Or 3-4 Upshift

Possible cause: incorrect fluid level, TP sensor misadjusted, incorrect line pressure, damaged valve body assembly, high clutch or brake band.

Vehicle Brakes During 1-2 Upshift

Possible cause: incorrect fluid level, damaged reverse clutch, low reverse brake, high clutch or low one-way clutch.

Vehicle Brakes During 2-3 Upshift

Possible cause: incorrect fluid level or damaged brake band.

Vehicle Brakes During 3-4 Upshift

Possible cause: incorrect fluid level, damaged overrun clutch, forward one-way clutch or reverse clutch.

Acceleration Poor; Maximum Speed Unattainable

Possible cause: incorrect fluid level, misadjusted PNP switch, damaged shift solenoids "A" or "B", valve body assembly, reverse or high clutch, brake band, low-reverse brake, oil pump or torque convertor.

No 4-3 Downshift

Possible cause: incorrect fluid level, TP sensor misadjusted, damaged overrun clutch solenoid valve, shift solenoid valve "A", line pressure solenoid valve, valve body assembly, low-reverse brake or overrun clutch.

No 3-2 Or 4-2 Downshift

Possible cause: incorrect fluid level, TP sensor misadjusted, damaged shift solenoid valves "A" or "B", valve body assembly, high clutch or brake band.

No 2-1 Or 3-1 Downshift

Possible cause: incorrect fluid level, TP sensor misadjusted, damaged shift solenoids "A" or "B", valve body assembly, low one-way clutch, high clutch or brake band.

Shift Shock Felt During Deceleration When Accelerator Released

Possible cause: TP sensor misadjusted, line pressure, damaged overrun clutch solenoid or valve body assembly.

Downshift Point Speed Too High From 4-3, 3-2 & 2-1

Possible cause: TP sensor misadjusted or incorrect VSS signal.

No Kickdown From 4th Gear Within Kickdown Range Or Engine Overruns When Accelerator Pedal Depressed In 4th Gear Beyond Kickdown Range

Possible cause: TP sensor misadjusted, incorrect VSS signal or damaged shift solenoid valves "A" or "B".

Engine Races Or Slips From 4-3 When Accelerator Depressed

Possible cause: incorrect fluid level, TP sensor misadjusted, incorrect line pressure, damaged line pressure solenoid valve, valve body assembly, high or forward clutch.

Engine Races Or Slips From 4-2 When Depressing Accelerator

Possible cause: incorrect fluid level, TP sensor misadjusted, incorrect line pressure, damaged line pressure solenoid valve, shift solenoid valve "A", valve body assembly, brake band or forward clutch.

Engine Races Or Slips From 3-2 When Depressing Accelerator

Possible cause: incorrect fluid level, TP sensor misadjusted, incorrect line pressure, damaged line pressure solenoid valve, valve body assembly, transmission fluid temperature sensor, brake band, forward or high clutch.

Engine Races Or Slips In 4th Gear Or On 3-1 Downshift When Depressing Accelerator Pedal

Possible cause: incorrect fluid level, TP sensor misadjusted, incorrect line pressure, damaged line pressure solenoid valve, valve body assembly, forward clutch or forward one-way clutch or low one-way clutch.

Vehicle Will Not Move In Any Selector Lever Position

Possible cause: incorrect fluid level or line pressure, misadjusted control linkage, damaged line pressure solenoid valve, oil pump, high clutch, brake band, low-reverse brake, torque converter or parking components.

Transaxle Noise In "D", "2", "1" & "R" Positions

Possible cause: incorrect fluid level or damaged torque converter.

Will Not Shift 3-2 When Changing Lever Into "2" Position

Possible cause: PNP switch or TP sensor misadjusted, damaged overrun clutch solenoid valve, shift solenoids "A" or "B", valve body assembly, control linkage, brake band or overrun clutch.

2-3 Upshift In "2" Position

Possible cause: misadjusted or damaged PNP switch.

No Engine Braking In "1" Position

Possible cause: misadjusted PNP switch, control linkage or TP sensor, incorrect VSS signal, damaged shift solenoid "A", valve body assembly, overrun clutch solenoid valve, overrun clutch or low-reverse brake.

1-2 Upshift In "1" Position

Possible cause: misadjusted PNP switch or control linkage.

No 2-1 Downshift When Shifted From "1" Position

Possible cause: misadjusted PNP switch, incorrect VSS signal, damaged shift solenoid "A", valve body assembly, overrun clutch solenoid valve, overrun clutch or low-reverse brake.

Heavy Shift Shock Shifting From 2-1 In "1" Position

Possible cause: damaged valve body assembly or low-reverse brake.

Transaxle Overheats

Possible cause: incorrect fluid level or line pressure, engine idle RPM, TP sensor misadjusted, damaged line pressure solenoid valve, valve body assembly, oil pump, reverse, high or forward clutch, torque converter, overrun clutch, low-reverse brake or brake band.

ATF Shoots Out From Relief Valve &/Or Filler Tube; White Smoke From Tailpipe

Possible cause: incorrect fluid level, damaged overrun, reverse, high or forward clutches, brake band, or low-reverse brake.

Offensive Odor At Filler Tube

Possible cause: incorrect fluid level, damaged torque converter, oil pump, reverse, high, overrun or forward clutches, brake band or low-reverse brake.

No Torque Converter Clutch Lock-Up Occurs

Possible cause: TP sensor or PNP switch misadjusted, incorrect engine speed or VSS signals, incorrect line pressure, damaged fluid temperature sensor, TCC solenoid, valve body assembly or torque converter.

Extremely Late Or Early Torque Converter Clutch Lock-Up

Possible cause: TP sensor misadjusted, incorrect VSS signal, damaged TCC solenoid or valve body assembly.

No 3-4 Upshift With OD Switch On

Possible cause: TP sensor or PNP switch misadjusted, incorrect VSS signal or line pressure, damaged shift solenoid "A", overrun clutch solenoid valve, valve body assembly, fluid temperature sensor, brake band or overrun clutch.

Engine Stalls In "R", "D", "2" & "1" Positions

Possible cause: incorrect fluid level, damaged TCC solenoid valve, shift solenoid valves "A" or "B", or valve body assembly.

Vehicle Will Not Move In Any Range

Possible cause: incorrect fluid level or line pressure, control linkage misadjusted, damaged line pressure solenoid, torque converter, oil pump, high clutch, low-reverse brake, brake band or parking components. See **CLUTCH & BAND APPLICATIONS** .

CLUTCH & BAND APPLICATIONS

CLUTCH & BAND APPLICATIONS

Selector Lever Position	Elements In Use
"D" (Drive) (1)	
1st Gear	Forward Clutch, (2) Forward One-Way Clutch, (3) (4) Overrun Clutch & (2) Low One-Way Clutch
2nd Gear	Band Servo (2nd Apply), Forward Clutch, (2) Forward One-Way Clutch & (3) (4) Overrun Clutch
3rd Gear	(5) Band Servo (2nd Apply & 3rd Release), Forward Clutch, (2) Forward One-Way Clutch, High Clutch & (3) (4) Overrun Clutch & Lock-Up
4th Gear	(6) Band Servo (2nd & 4th Apply, 3rd Release), Forward Clutch, High Clutch & Lock-Up
"2" (Second)	
1st Gear	Forward Clutch, (2) Forward One-Way Clutch (2) Low One-Way Clutch & Overrun Clutch
2nd Gear	Band Servo (2nd Apply), Forward Clutch, (2) Forward One-Way Clutch & Overrun Clutch
"1" (Low)	
1st Gear	Forward Clutch, (2) Forward One-Way Clutch, Low-Reverse Brake & Overrun Clutch
2nd 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 OD switch is in OFF position.	

(2) Operates during progressive acceleration.

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

(4) Operates when throttle opening is less than 3/16.

(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.

PERFORMANCE TESTS

ROAD TEST

Check With Engine Idling

1. Ensure engine starts with selector lever in "P" position. Turn ignition switch to ACC position, move selector to "D", "2", "1", or "R" position. Ensure engine will not start in these positions. With selector lever in "P" position, parking brake off, verify PARK engagement by pushing vehicle backward or forward. Vehicle should not roll.
2. Apply parking brake. Start engine. Move selector lever to "N" position. Release parking brake. Vehicle should not move. Apply foot brake. Move selector lever to "R" position. Shock should be felt as transaxle shifts from Neutral to Reverse. Release parking brake. Vehicle should creep backward. Repeat procedure in forward gears to verify operation of forward gears.

Road Test Procedure

1. Park vehicle on flat surface and set OD switch to ON position. Move selector lever to "P" position and start engine.
2. Move selector lever to "D" position. Depress accelerator pedal halfway. Vehicle should start from 1st gear. Verify 1-2, 2-3 and 3-4 upshifts occur at specified speed. See appropriate SHIFT SPEED SPECIFICATIONS table.
3. Lock-up occurs at speeds relative to throttle opening in 3rd or 4th gear. Verify lock-up speeds. See appropriate LOCK-UP SPEED SPECIFICATION table. Lock-up condition should be maintained for more than 30 seconds. Lock-up state is released upon deceleration.
4. Confirm OD switch is in ON position and selector lever is in "D" position. Accelerate vehicle to approximately 50 MPH using light-throttle. Release accelerator pedal and then quickly depress pedal to floor. Transaxle should downshift from 4th to 2nd gear. Release accelerator and verify 2-3, and 3-4 upshifts. Check shift points and specified speeds. See appropriate SHIFT SPEED SPECIFICATIONS table.
5. Confirm OD switch is in ON position and selector lever is in "D" position. Accelerate vehicle to 4th gear using half-throttle. Release accelerator and move OD switch 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 (1.8L - CALIFORNIA) (1)

Application	MPH
OD Switch On	
Lock-Up On In 4th	60-65
Lock-Up Off In 4th	39-44
OD Switch Off	
Lock-Up On In 3rd	53-58
Lock-Up Off In 3rd	52-57
(1) With 1/4 throttle opening.	

LOCK-UP SPEED SPECIFICATIONS (1.8L - EXCEPT CALIFORNIA) (1)

Application	MPH
OD Switch On	
Lock-Up On In 4th	58-63
Lock-Up Off In 4th	38-43
OD Switch Off	
Lock-Up On In 3rd	53-58
Lock-Up Off In 3rd	52-57
(1) With 1/4 throttle opening.	

LOCK-UP SPEED SPECIFICATIONS (2.0L) (1)

Application	MPH
OD Switch On	
Lock-Up On In 4th	65-70
Lock-Up Off In 4th	46-51
OD Switch Off	
Lock-Up On In 3rd	53-58
Lock-Up Off In 3rd	52-57
(1) With 1/4 throttle opening.	

SHIFT SPEED SPECIFICATIONS (1.8L - CALIFORNIA) (1)

Application	Full Throttle MPH	Half Throttle MPH
1st-2nd	34-39	20-25
2nd-3rd	64-69	37-42
3rd-4th	101-106	77-82
4th-3rd	99-104	43-48
3rd-2nd	58-63	22-27
2nd-1st	25-30	16-21
(1) With 1/4 throttle opening.		

SHIFT SPEED SPECIFICATIONS (1.8L - EXCEPT CALIFORNIA) (1)

Application	Full Throttle MPH	Half Throttle MPH
1st-2nd	32-37	21-25
2nd-3rd	62-67	36-41
3rd-4th	98-103	74-79
4th-3rd	96-101	42-47
3rd-2nd	56-61	21-26
2nd-1st	25-30	15-20
(1) With 1/4 throttle opening.		

SHIFT SPEED SPECIFICATIONS (2.0L) (1)

Application	Full Throttle MPH	Half Throttle MPH
1st-2nd	32-37	21-25
2nd-3rd	60-65	36-41
3rd-4th	95-100	75-80
4th-3rd	93-98	45-50
3rd-2nd	54-59	21-26
2nd-1st	25-30	6-11
(1) With 1/4 throttle opening.		

TORQUE CONVERTER

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

Stall Speed Test

1. Check engine and transaxle fluid levels. Ensure engine and transaxle are at normal operating temperatures. Set parking brake and block wheels.

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

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 2350-2800 RPM for 1.8L models and 2350-2850 RPM for 2.0L models.
3. Place selector lever in "N" position and run engine at idle for 2 minutes to allow transaxle to cool. Repeat stall speed test procedure in "2", "1" and "R" positions, allowing transaxle to cool between each test. Compare stall speed test results with the following symptoms:
   - If stall speed is low in all selector lever positions, possible cause is insufficient engine performance or faulty torque converter one-way clutch.

- If stall speed is high in all selector lever positions, possible cause is low-reverse brake slipping, faulty forward one-way clutch, forward clutch, overrun clutch or hydraulic circuit for line pressure control.
- If stall speed is high in "R" position only, possible cause is reverse clutch slipping or low-reverse brake slipping.
- If stall speed is high in "D", "2" & "R" positions and okay in "1" position, possible cause is defective reverse clutch, forward clutch, forward clutch or low one-way clutch.
- If stall speed is high in "D", "2" & "1" positions and okay in "R" position, possible cause is defective forward clutch, overrun clutch or forward one-way clutch.
- If stall speed is high in "D" & "2" positions and okay in "1" & "R" positions, possible cause is defective forward clutch, low one-way clutch and overrun clutch.

HYDRAULIC PRESSURE TESTS

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

Line Pressure Test Procedure

1. Check engine and transaxle fluid levels and add fluid as necessary. Warm engine and transaxle to normal operating temperature. Install pressure gauge to line pressure port. See **Fig. 4** and **Fig. 5** .
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. See **STALL SPEED TEST** . Note pressure readings and see **LINE PRESSURE SPECIFICATIONS** table.

LINE PRESSURE SPECIFICATIONS

Application	psi (kPa)
At Idle	
"D", "2" & "1" Positions	73 (500)
"R" Position	113 (778)
At Stall Speed	
"D", "1" & "2" Positions	169 (1165)
"R" Position	263 (1813)

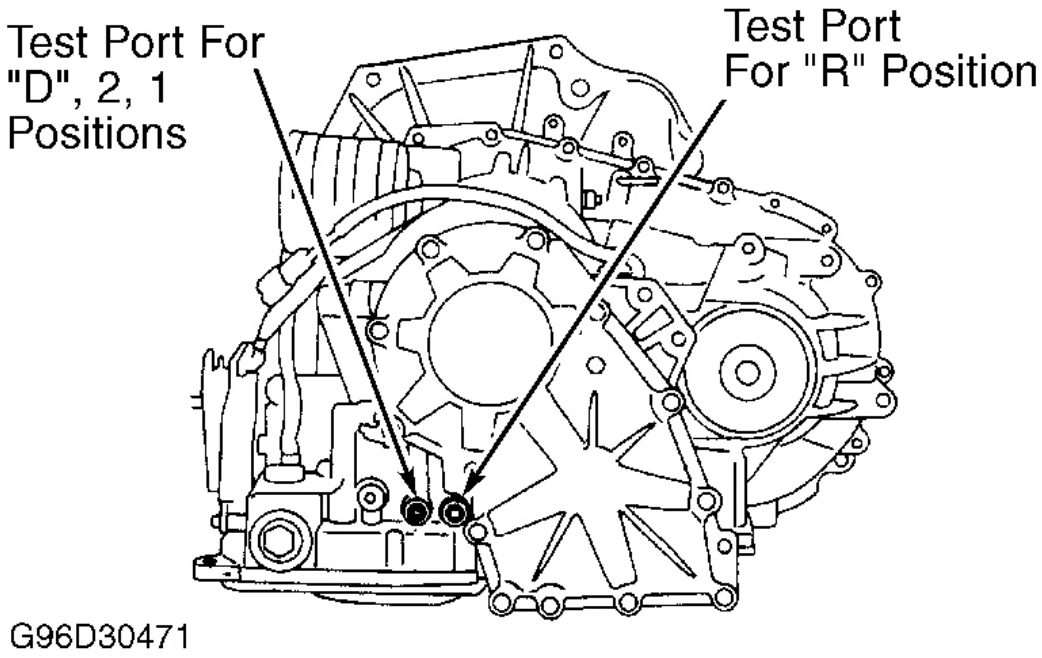


Fig. 4: Identifying Hydraulic Pressure Test Ports
Courtesy of NISSAN MOTOR CO., U.S.A.

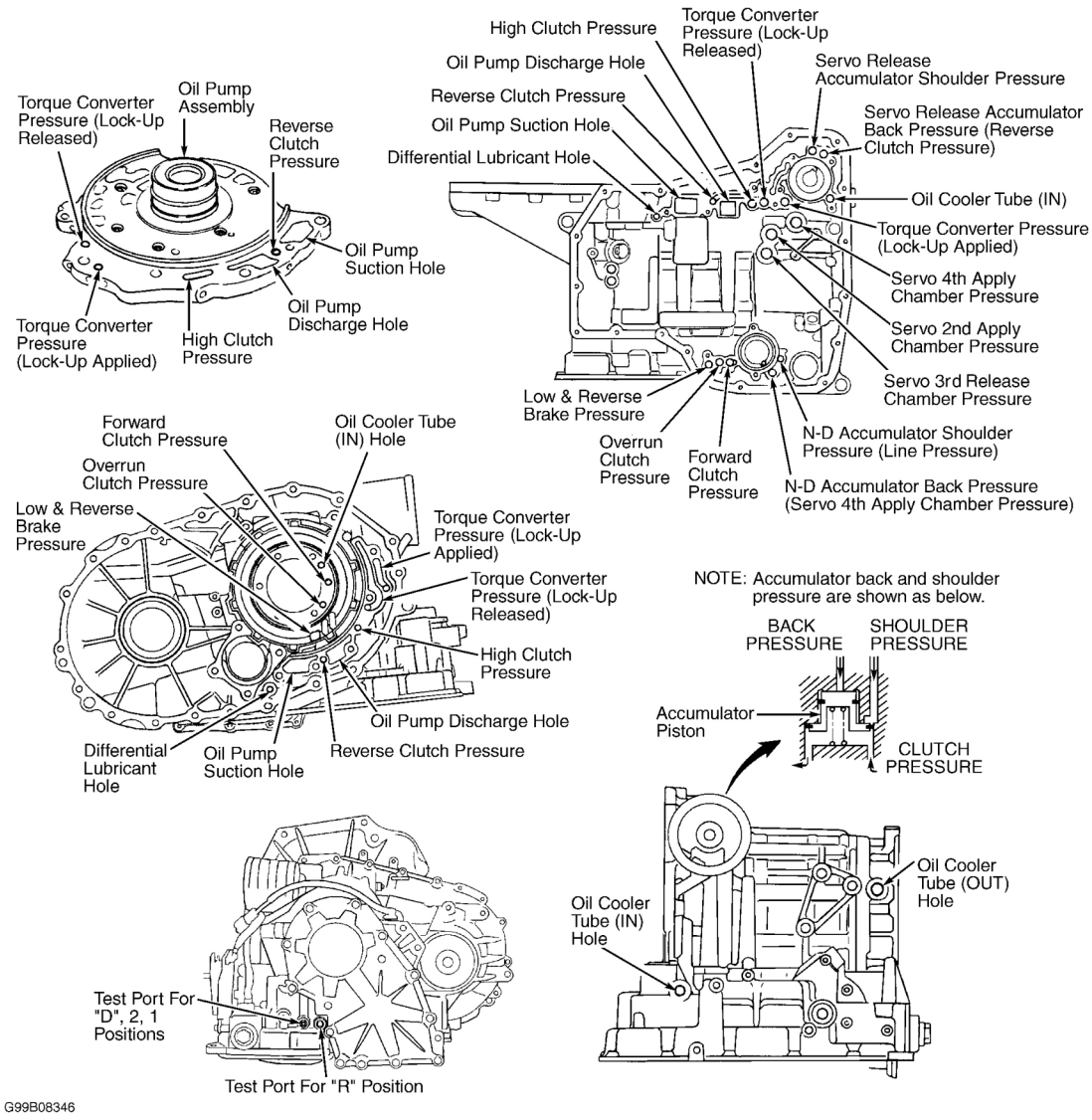


Fig. 5: Identifying Hydraulic Fluid Passages (RF4F03B/W Transaxle)
Courtesy of NISSAN MOTOR CO., U.S.A.

Line Pressure Test Results

1. If line pressure is low at idle in all selector lever 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 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 TP sensor misadjusted, fluid temperature sensor damaged, line pressure solenoid sticking or shorted, pressure regulator or plug, modifier valve sticking or open in dropping resistor.

4. If line pressure is low at stall speed, possible causes are TP sensor misadjusted, line pressure solenoid valve sticking or shorted, pressure regulator or plug sticking, modifier valve or pilot valve sticking.

COMPONENT TESTS

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. 6** .
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.

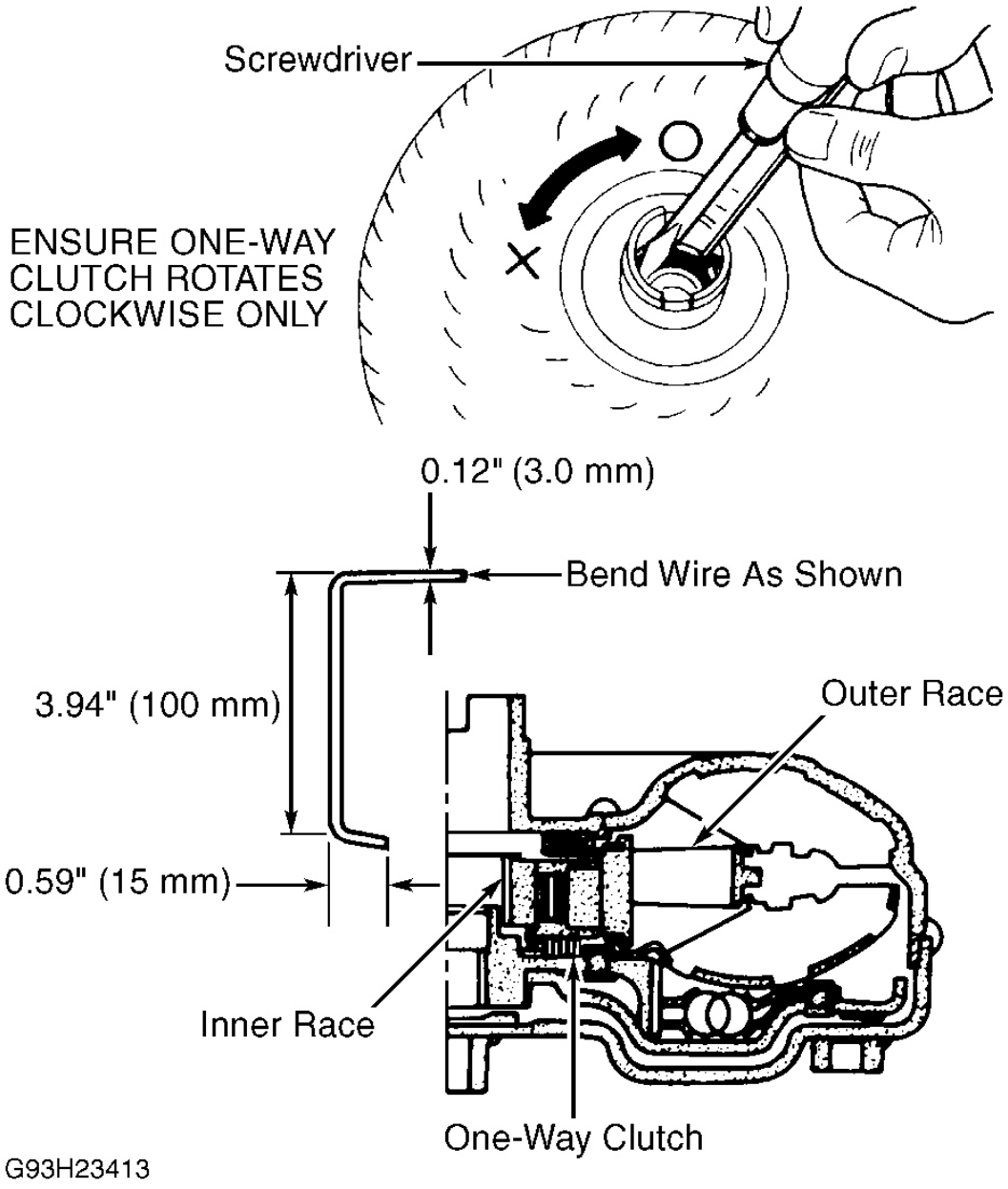


Fig. 6: Checking Torque Converter One-Way Clutch
Courtesy of NISSAN MOTOR CO., U.S.A.

REMOVAL & INSTALLATION

DIFFERENTIAL SIDE OIL SEAL REPLACEMENT

Removal & Installation

1. Remove axle shaft assemblies. See appropriate article in DRIVE AXLES. Remove oil seals.
2. Apply ATF to NEW oil seals. Install differential side oil seals. Ensure dimensions "A" and "B" are within specification. See **Fig. 54** . Dimension "A" should be .217-.256 (5.50-6.50). Dimension "B" should be plus or minus .020" (.5 mm). Reinstall axle shaft assemblies. Add fluid as necessary.

PARK/NEUTRAL POSITION SWITCH ADJUSTMENT

NOTE: See appropriate AUTOMATIC TRANSMISSION SERVICING article in TRANSMISSION SERVICING.

TRANSAXLE

NOTE: See appropriate AUTOMATIC TRANSMISSION REMOVAL article in TRANSMISSION SERVICING.

VALVE BODY ASSEMBLY

Removal & Installation

1. Remove drain plug and drain fluid. Remove oil pan and gasket. Remove oil strainer. Disconnect transaxle solenoid harness connector. Remove stopper ring from transaxle solenoid harness terminal body and press terminal body into case. Remove valve body assembly by removing bolts. See **VALVE BODY ASSEMBLY BOLT IDENTIFICATION** table. Remove accumulators by applying compressed air (if necessary). See **Fig. 5** .
2. To install valve body assembly, set manual valve in Neutral position and align with manual plate. Install valve body assembly and tighten bolts to specification. See **TORQUE SPECIFICATIONS** . To complete installation, reverse removal procedure. Add fluid as necessary.

VALVE BODY ASSEMBLY BOLT IDENTIFICATION (1)

Application	In. (mm)
A	1.713 (43.50)
B	1.30 (33.00)
C	1.57 (40.00)
(1) For valve body bolt locations, refer to illustration. See **Fig. 7** .	

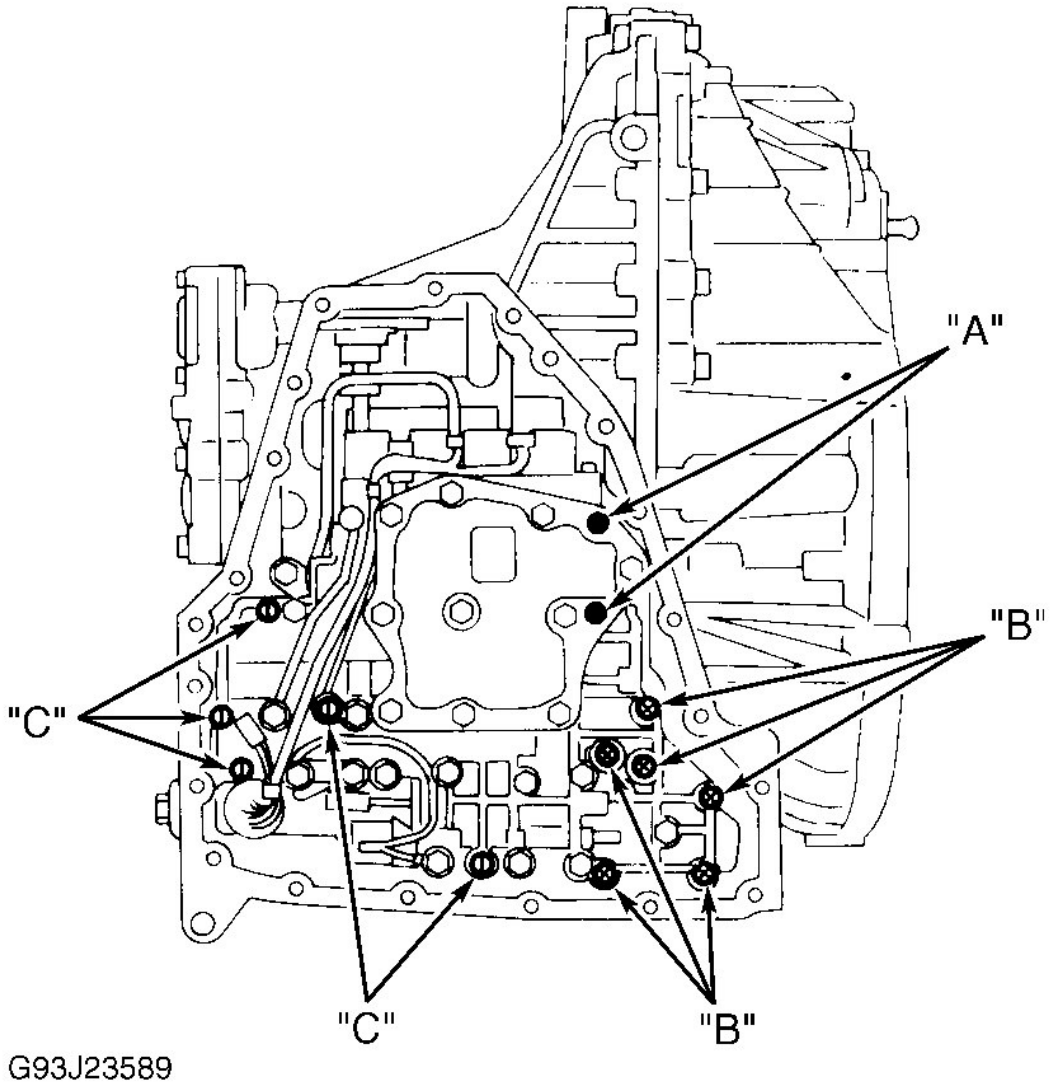


Fig. 7: Identifying Valve Body Bolt Locations
Courtesy of NISSAN MOTOR CO., U.S.A.

VEHICLE SPEED SENSOR

Removal & Installation

Disconnect VSS harness connector and remove harness from bracket. Remove VSS bolt and remove sensor. Install NEW seal onto VSS. To install sensor, reverse removal procedure. Tighten sensor bolt to specification. See **TORQUE SPECIFICATIONS** .

TRANSAXLE DISASSEMBLY

1. Remove drain plug and drain fluid. Remove torque converter. Check torque converter one-way clutch. See **TORQUE CONVERTER** under COMPONENT TESTS. Remove dipstick and dipstick tube. Remove oil cooler tube. Place manual lever in Park. Remove PNP switch. Remove oil pan and gasket. See **Fig. 8** . DO NOT reuse oil pan bolts.
2. Remove valve body assembly bolts. See **Fig. 7** . Remove clip from solenoid harness terminal body. Push terminal body into transaxle case and remove solenoid harness. Remove manual valve from valve body assembly. Remove return spring from servo release accumulator piston. Using compressed air, remove servo release accumulator piston. See **Fig. 5** and **Fig. 13** .
3. Remove "O" rings from servo release accumulator piston. Using compressed air, remove N-D accumulator piston and return spring. See **Fig. 9** . 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 **ACCUMULATOR SPRING SPECIFICATIONS** table.

ACCUMULATOR SPRING SPECIFICATIONS

Application	In. (mm)
N-D Accumulator	
Free Length	1.77 (45.0)
Outer Diameter	1.09 (27.6)
Servo Release Accumulator	
Free Length	2.07 (52.5)
Outer Diameter	.79 (20.1)

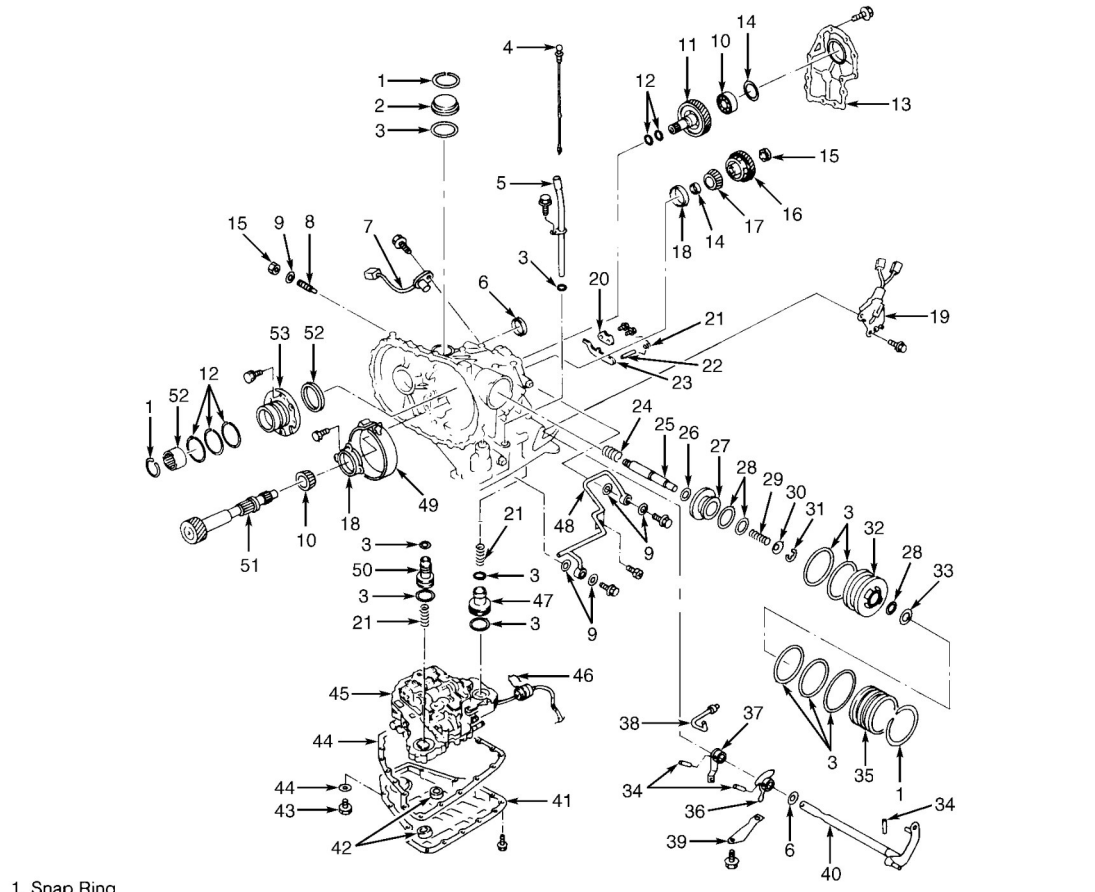


Fig. 8: Exploded View Of Transaxle Case Components
Courtesy of NISSAN MOTOR CO., U.S.A.

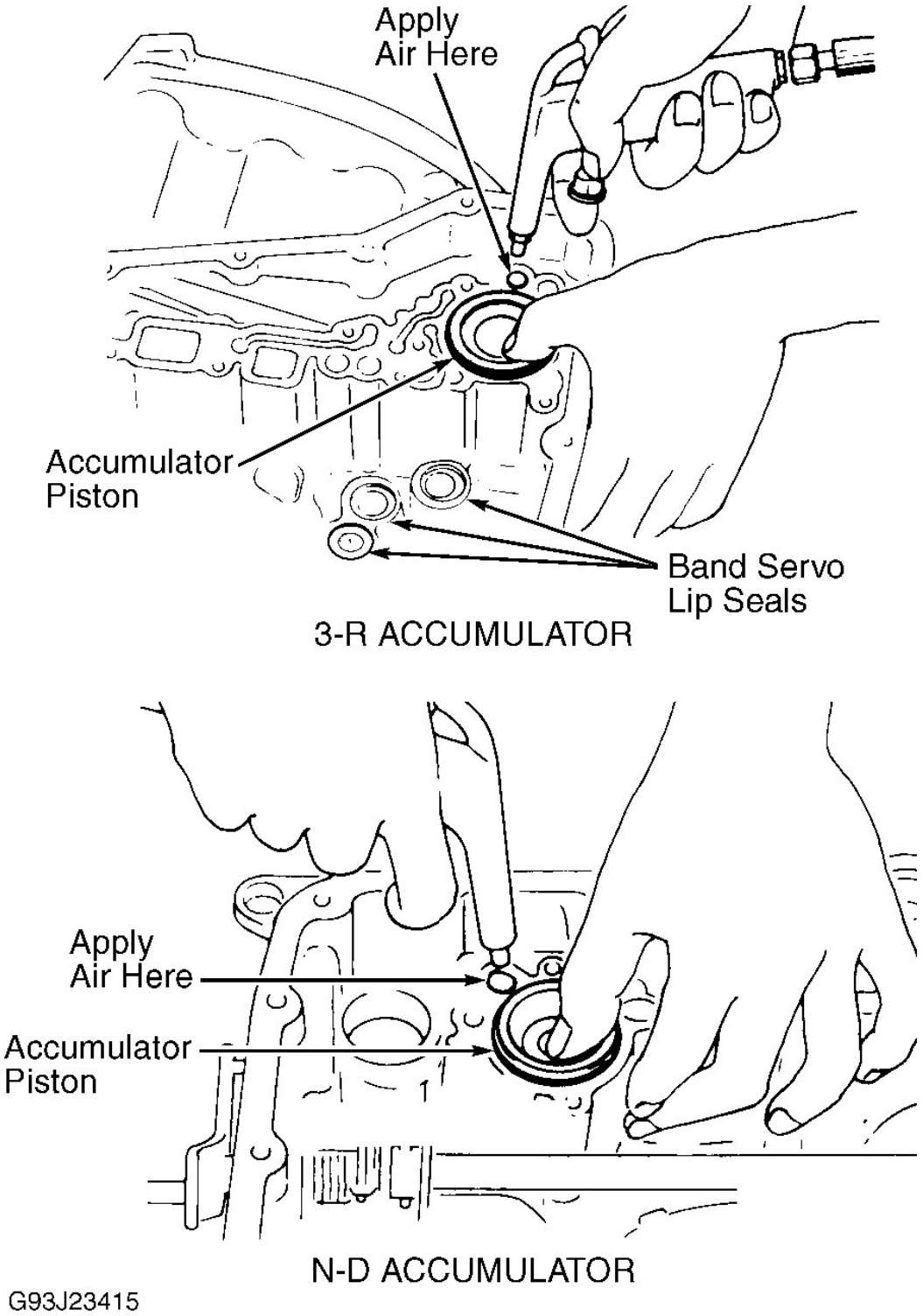


Fig. 9: Removing N-D & Servo Release Accumulator Pistons

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

4. Remove lip seals from band servo oil port. See **Fig. 5** and **Fig. 9** . 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. 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. 11** .
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. See **Fig. 10** . Remove low one-way clutch from front planetary carrier by rotating one-way clutch counterclockwise. Remove needle bearing from planetary carrier. See **Fig. 11** . 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. See **Fig. 12** . 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. 8** .
13. Remove side cover bolts. Remove side cover by lightly tapping cover with soft-faced hammer. Remove differential side bearing adjusting shim. Remove output shaft assembly. 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). Remove needle bearing.
14. Place manual lever in Park 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. 8** .
16. Remove manual shaft and throttle lever components. See **MANUAL SHAFT & THROTTLE LEVER** under COMPONENT DISASSEMBLY & REASSEMBLY.

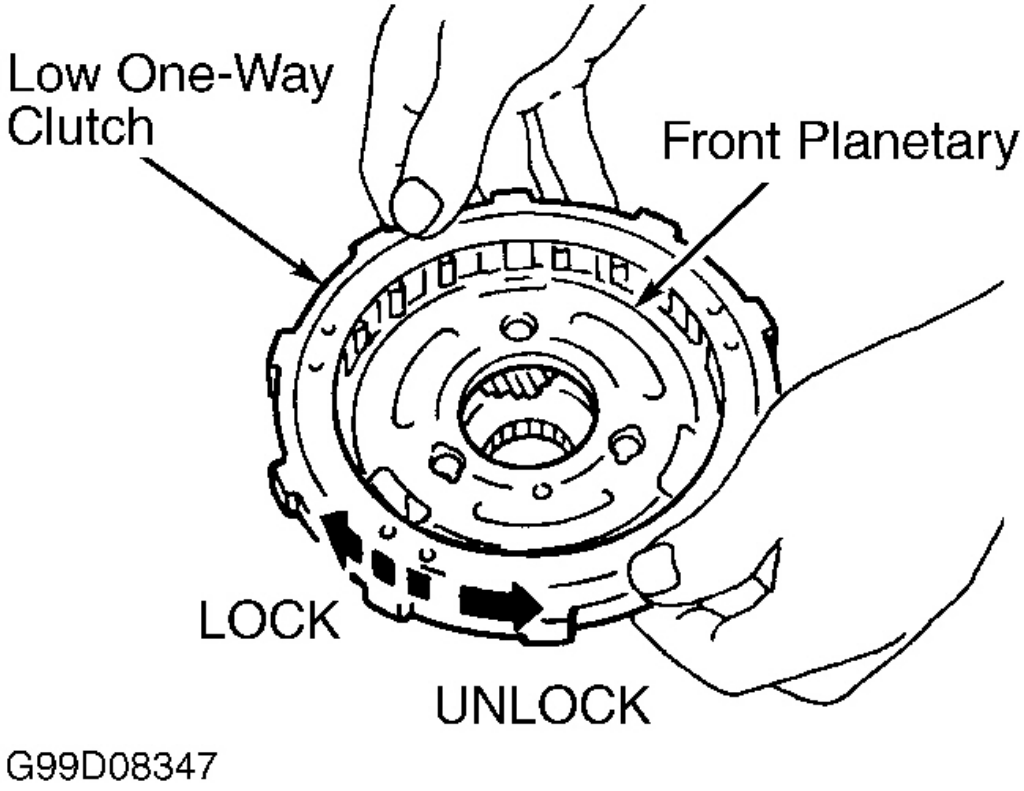
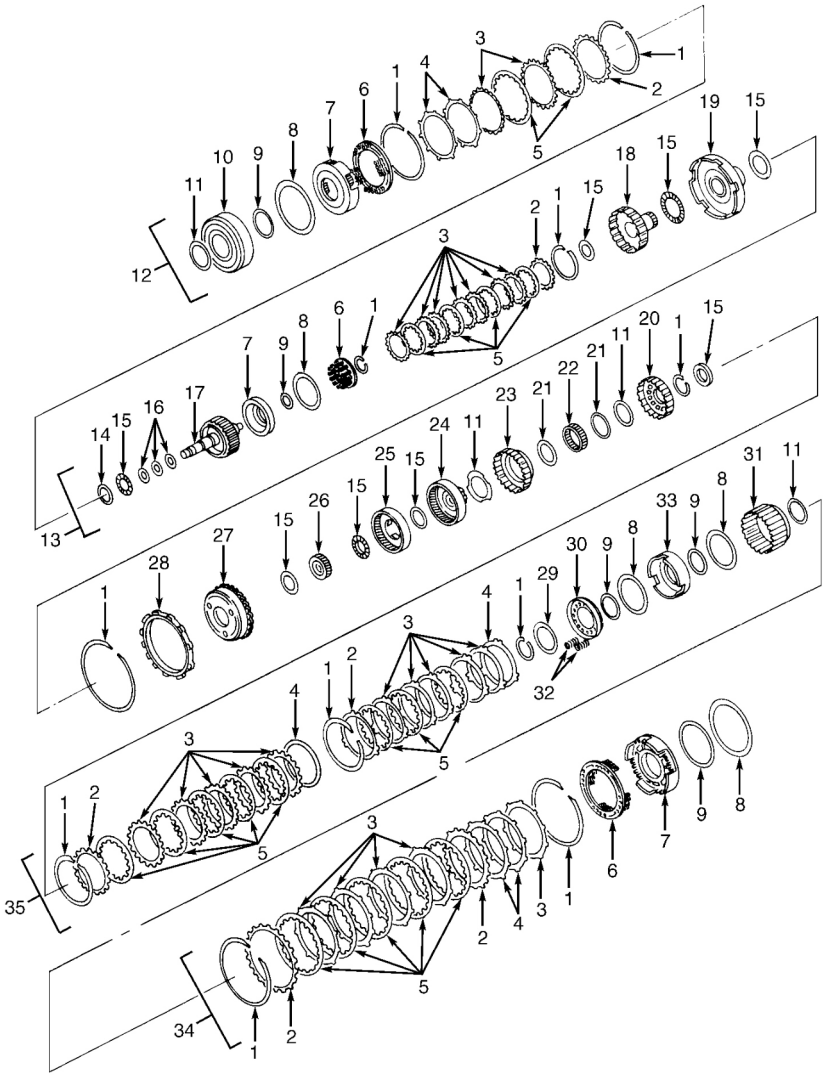


Fig. 10: Checking Low One-Way Clutch Operation
Courtesy of NISSAN MOTOR CO., U.S.A.



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

G95F19732

Fig. 11: Exploded View Of Forward Clutch, High Clutch, Low-Reverse Brake, Overrun Clutch & Reverse Clutch Assemblies
Courtesy of NISSAN MOTOR CO., U.S.A.

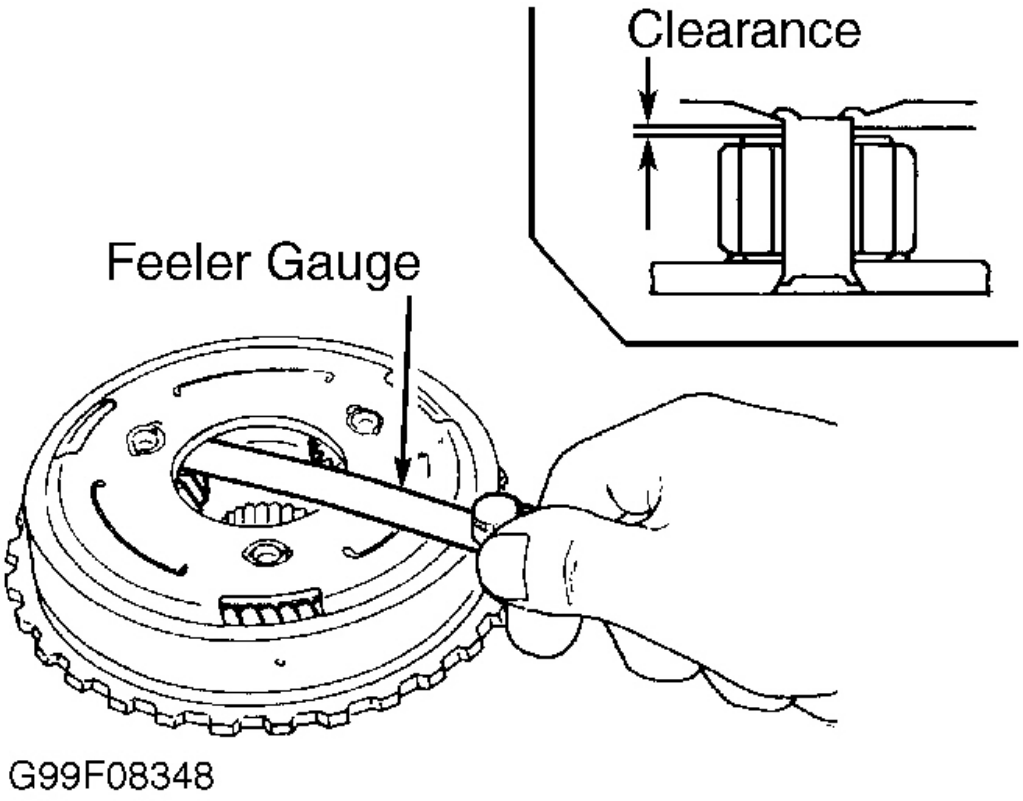


Fig. 12: Measuring Pinion Gear Clearance (Typical)
Courtesy of NISSAN MOTOR CO., U.S.A.

COMPONENT DISASSEMBLY & REASSEMBLY

NOTE: Coat all oil seal rings, clutch discs, clutch plates, rotating parts and sliding surfaces with ATF prior to reassembly. All gaskets and rubber "O" rings should be replaced. Ensure ends of snap rings are not aligned with cut-outs of drum. Check thrust bearings and races for wear or damage. Use petroleum jelly to secure parts in place. Clutch discs should be soaked in ATF for at least 15 minutes before installation.

OIL PUMP

Disassembly

Remove seal rings. Remove oil pump cover bolts in numerical order and remove oil pump cover. See **Fig. 13** . 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. 14** .

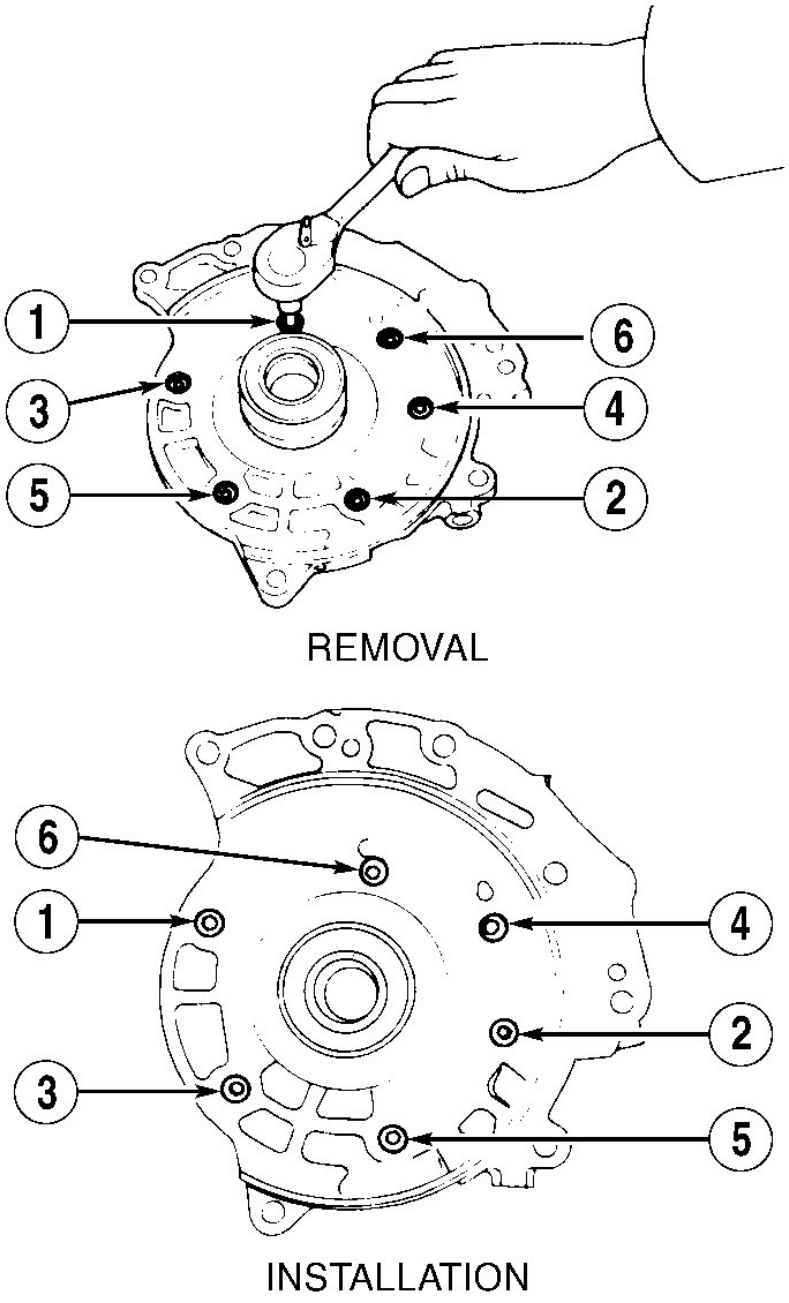


Fig. 13: Removal & Installation Of Oil Pump Cover
Courtesy of NISSAN MOTOR CO., U.S.A.

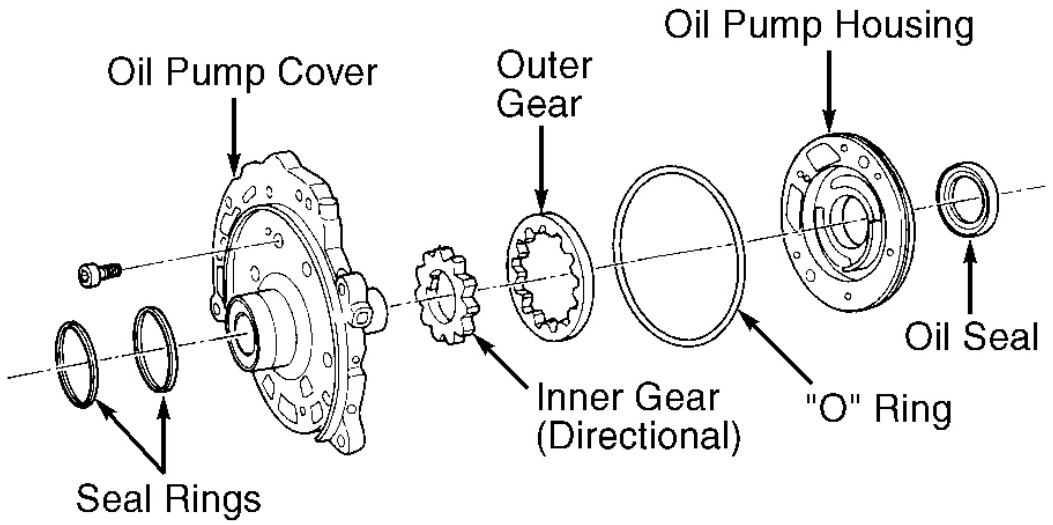


Fig. 14: Exploded View Of Oil Pump Assembly
Courtesy of NISSAN MOTOR CO., U.S.A.

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. 15** .
2. If clearance is less then specified, replace inner and outer gears as a set. Note direction of gears for installation. Ensure clearance is as specified. Gears are available in varied thicknesses. See **OIL PUMP GEAR THICKNESS** table. If clearance is greater than specified, replace oil pump assembly only. DO NOT replace 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 only. DO NOT replace 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). If clearance is not as specified, replace oil pump cover.

OIL PUMP GEAR THICKNESS

Part No.	In. (mm)
31346-31X00	.3933-.3937 (9.990-10.000)
31346-31X01	.3929-.3933 (9.980-9.990)
31346-31X02	.3925-.3929 (9.970-9.980)

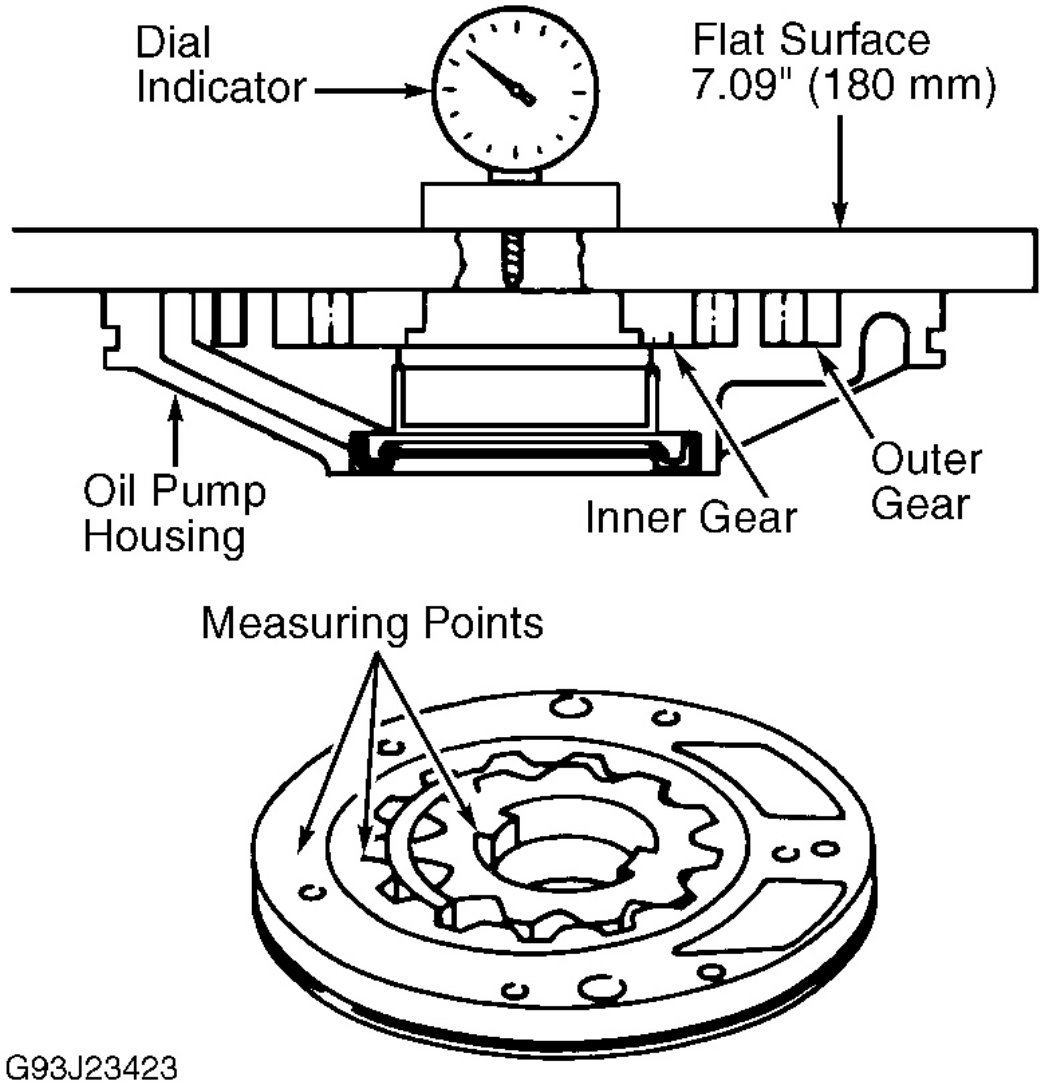


Fig. 15: Measuring Oil Pump Side Clearance
Courtesy of NISSAN MOTOR CO., U.S.A.

Reassembly

1. Using appropriate seal installer, 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 specification. See **Fig. 13** . See **TORQUE SPECIFICATIONS** . 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.

VALVE BODY ASSEMBLY

Disassembly

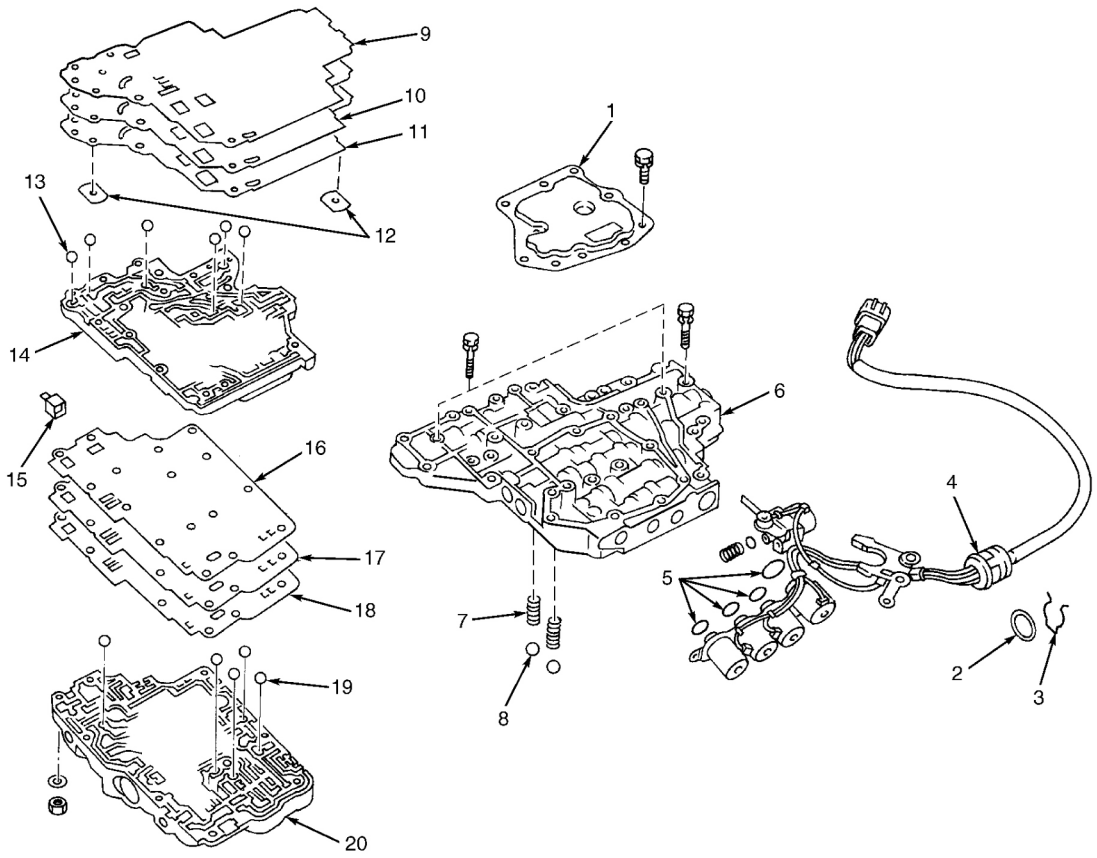
NOTE: Inter valve body may also be known as intermediate valve body.

1. Disassemble upper, inter and lower valve bodies. See **Fig. 16** . Note bolt length, number of bolts and location. See **VALVE BODY BOLT IDENTIFICATION** table.
2. Remove bolts "A", "D" and "F". Remove oil strainer from valve body assembly. Remove solenoid assembly and line pressure solenoid from valve body 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. 16** . 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.

VALVE BODY BOLT IDENTIFICATION (1)

Application	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) For bolt location, refer to illustration. See **Fig. 17** .



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

G99H08349

Fig. 16: Exploded View Of Valve Body Assembly
Courtesy of NISSAN MOTOR CO., U.S.A.

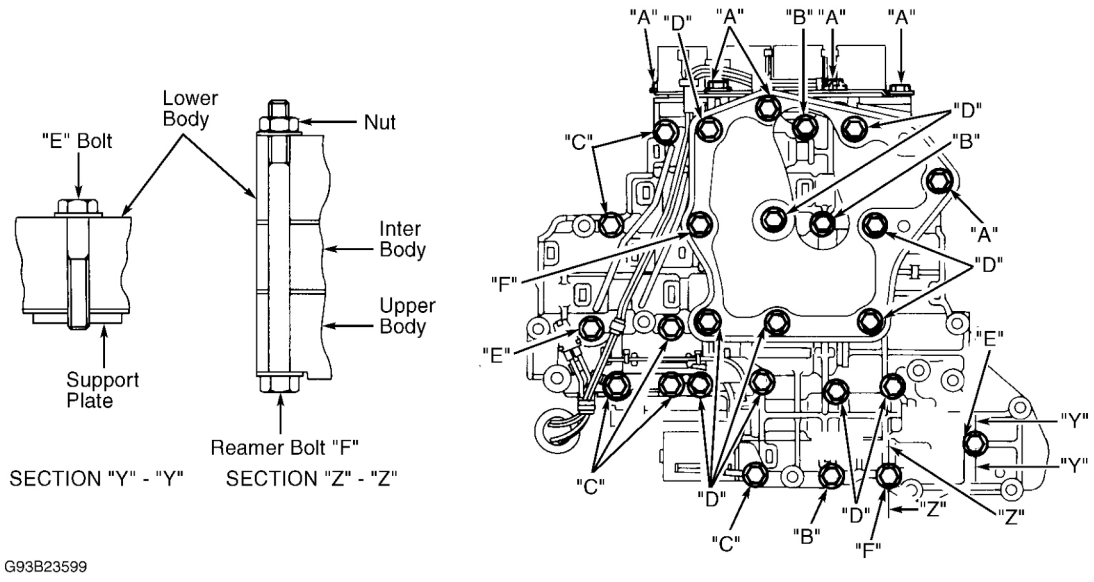


Fig. 17: Identifying Valve Body Assembly Bolt Locations
Courtesy of NISSAN MOTOR CO., U.S.A.

Inspection

Ensure retainer plates are properly positioned in lower and upper valve bodies. See **Fig. 18** . 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. See NISSAN RE4F03 SERIES ELECTRONIC CONTROLS article. Check oil cooler relief valve springs for damage or deformation. Measure oil cooler relief valve springs free length and outer diameter. Free length should be .670" (17.00 mm) and diameter should be .315" (8.00 mm). Replace springs if not as specified.

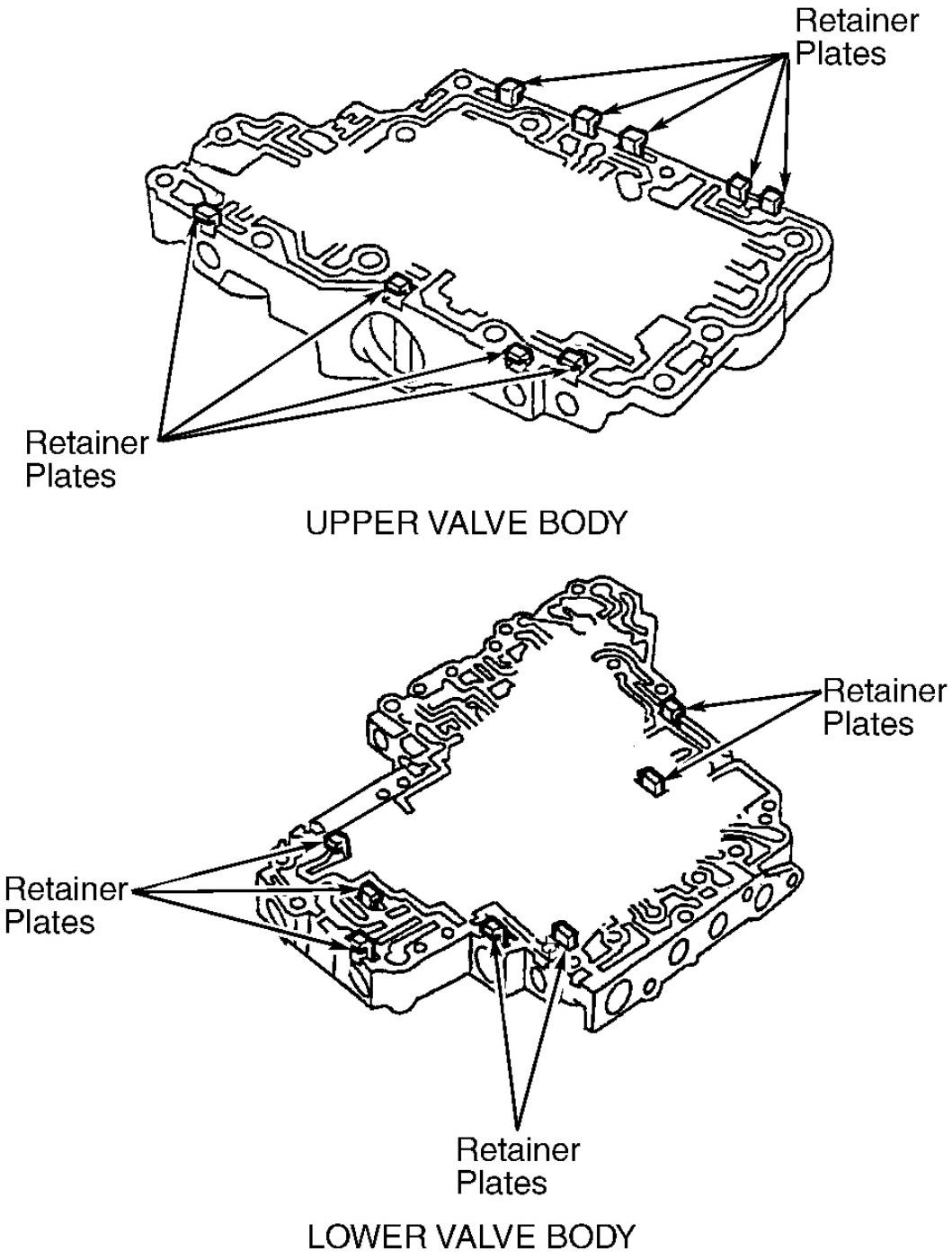


Fig. 18: Identifying Retainer Plate Locations
Courtesy of NISSAN MOTOR CO., U.S.A.

Reassembly

1. Place oil circuit of upper valve body face up. Install steel balls in proper locations. See **Fig. 19** . Using NEW gaskets, install upper separating gasket, upper inter separating gasket and upper separating plate. Install reamer bolts "F" from bottom of upper valve body. See **Fig. 17** . 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 locations. Install inter valve body on upper valve body, using reamer bolts "F" as a guide. Install check balls and relief valve springs in proper locations in lower valve body. Install lower separating gasket, inter separating gasket and lower separating plate. See **Fig. 16** .
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. 17** . Tighten bolts to specification. See **TORQUE SPECIFICATIONS** .
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 bolts to specification. See **TORQUE SPECIFICATIONS** .

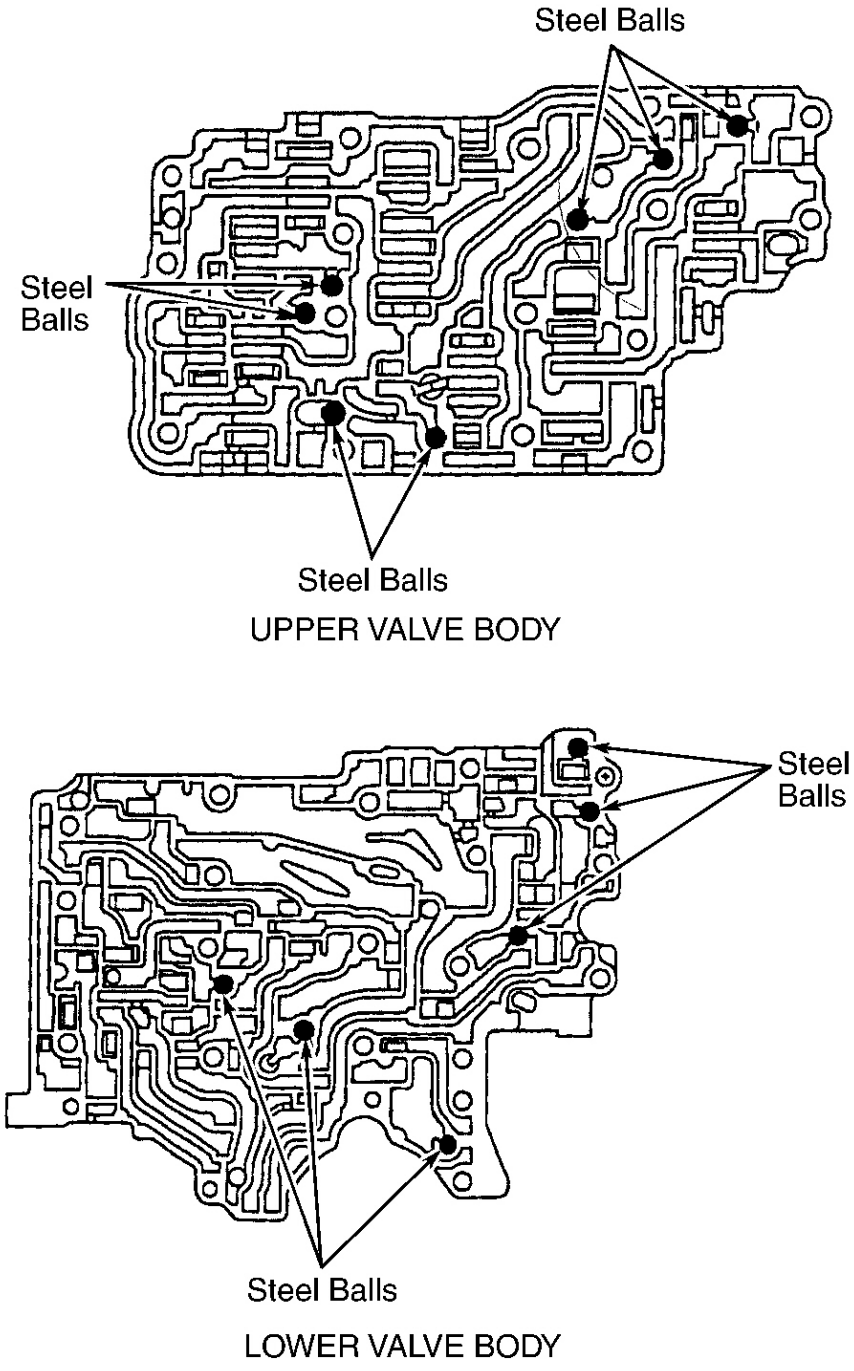


Fig. 19: Identifying Steel Ball Locations
Courtesy of NISSAN MOTOR CO., U.S.A.

UPPER VALVE BODY

CAUTION: DO NOT use a magnet to remove valves.

Disassembly

1. Use a screwdriver to pry out retainer plates. Remove retainer plates while holding spring, plugs and sleeves. Remove retainer plates slowly to prevent valve body components under spring pressure from being lost or damaged.
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.

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)

Application	Length - In. (mm)	Diameter - In. (mm)
Overrun Clutch Reducing Valve	1.48 (37.5)	.28 (7.0)
Torque Converter Relief Valve	1.31 (33.3)	.35 (9.0)
Torque Converter Clutch Control Valve	2.09 (53.0)	.25 (6.5)
1-2 Accumulator Valve	.81 (20.5)	.28 (7.0)
Cooler Check Valve	1.10 (28.0)	.28 (7.0)
Pilot Valve	.85 (21.7)	.28 (7.0)
1-2 Accumulator Piston	2.20 (55.7)	.77 (19.5)
1st Reducing Valve	1.06 (27.0)	.28 (7.0)
3-2 Timing Valve	.91 (23.0)	.26 (6.7)
(1) For spring locations, refer to illustration. See **Fig. 20** .		

Reassembly

1. Lay valve body face down when installing valves. DO NOT stand valve body on edge. Lubricate valves and valve body with ATF prior to installation. Install 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 valve body. Install return spring, 1-2 accumulator piston and plug. See **Fig. 20** . While pushing plug or return spring, install retainer plates. See **UPPER VALVE BODY RETAINER PLATE IDENTIFICATION** table for retainer plate dimensions.

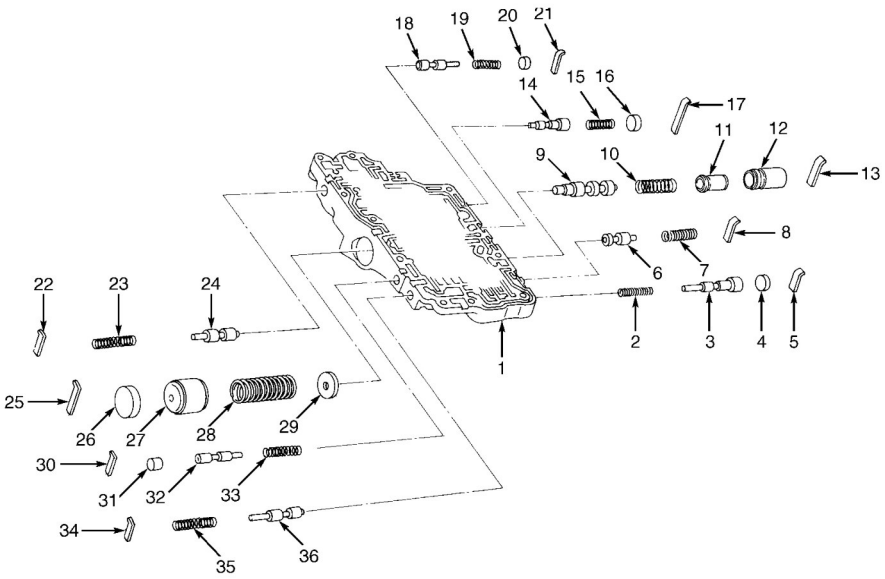
UPPER VALVE BODY RETAINER PLATE IDENTIFICATION (1)

Application	(2) Length "B" - In. (mm)

Pilot , Torque Converter Relief, 1st Reducing Valve & 2-3 Timing Valve	.846 (21.50)
Torque Converter Clutch Control Valve	1.10 (28.0)
1-2 Accumulator Valve & Piston	1.52 (38.5)
Cooler Check Valve & Overrun Clutch Reducing Valve	.95 (24.0)

(1) For retainer plate locations, refer to illustration. See **Fig. 18** .

(2) Length "A" for all valves is .236" (6.0 mm). All valves use type "A" retainer plate. See **Fig. 21** .



1. Upper Valve Body
2. Overrun Clutch Reducing Valve Spring
3. Overrun Clutch Reducing Valve
4. Plug
5. Overrun Clutch Reducing Valve Retainer Plate
6. Torque Converter Relief Valve
7. Torque Converter Relief Valve Spring
8. Torque Converter Relief Valve Retainer Plate
9. Torque Converter Clutch Control Valve
10. Torque Converter Clutch Control Valve Spring
11. Plug
12. Sleeve
13. Torque Converter Clutch Control Valve Retainer Plate
14. 1-2 Accumulator Valve
15. 1-2 Accumulator Valve Spring
16. Plug
17. 1-2 Accumulator Valve Retainer Plate
18. Cooler Check Valve
19. Cooler Check Valve Spring
20. Plug
21. Cooler Check Valve Retainer Plate
22. Pilot Valve Retainer Plate
23. Pilot Valve Spring
24. Pilot Valve
25. 1-2 Accumulator Piston Retainer Plate
26. Plug
27. 1-2 Accumulator Piston
28. 1-2 Accumulator Piston Spring
29. 1-2 Accumulator Retainer Plate
30. 1st Reducing Valve Retainer Plate
31. Plug
32. 1st Reducing Valve
33. 1st Reducing Valve Spring
34. 3-2 Timing Valve Retainer Plate
35. 3-2 Timing Valve Spring
36. 3-2 Timing Valve

G00031975

Fig. 20: Exploded View Of Upper Valve Body
Courtesy of NISSAN MOTOR CO., U.S.A.

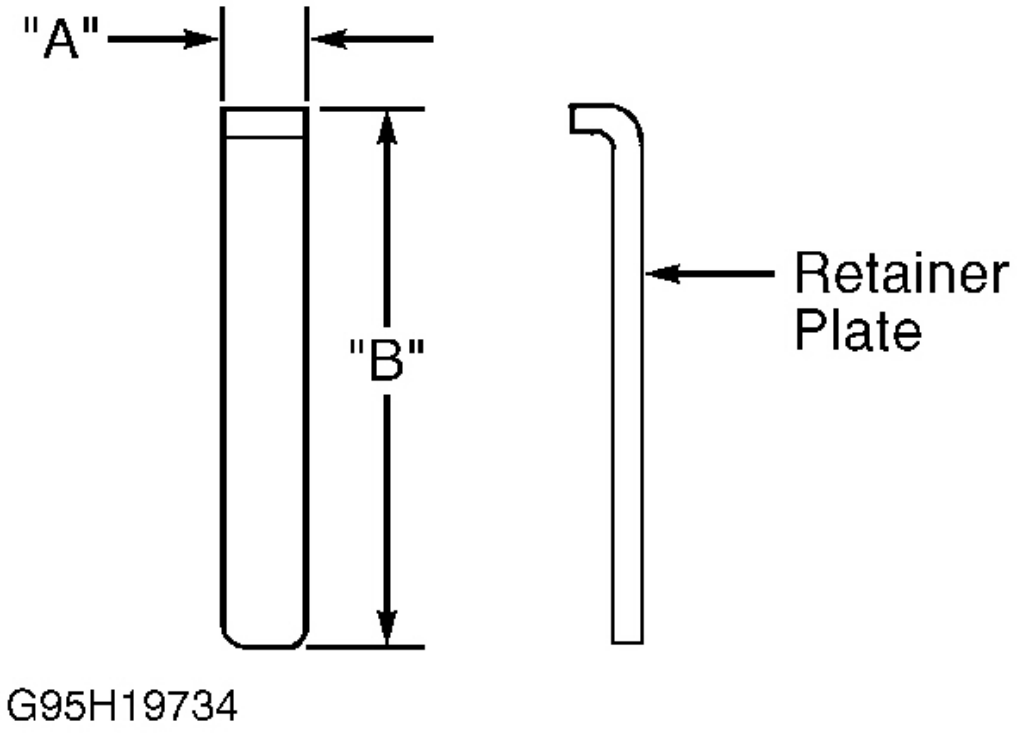


Fig. 21: Measuring Retainer Plate Dimensions (Upper Valve Body)
Courtesy of NISSAN MOTOR CO., U.S.A.

LOWER VALVE BODY

CAUTION: DO NOT use a magnet to remove valves.

Disassembly

Use a screwdriver to pry out retainer plates. Remove retainer plates while holding spring, plugs and sleeves. Remove retainer plates slowly to prevent valve body components under spring pressure from being lost or damaged. Place mating surface of valve body face down and remove internal parts. See **Fig. 22** . If valve is hard to remove, lightly tap valve body with soft-faced hammer.

Inspection

Measure spring free length and outer diameter. See **LOWER 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.

LOWER VALVE BODY SPRING IDENTIFICATION (1)

Application	Length - In. (mm)	Diameter - In. (mm)
Shift Valve "B"	.85 (21.7)	.28 (7.0)
Pressure Modifier Valve		
Inner	1.26 (32.0)	.27 (6.9)
Outer	1.20 (30.5)	.39 (9.8)
Pressure Regulator Valve	1.77 (45.0)	.59 (15.0)
Overrun Clutch Control Valve	.85 (21.7)	.28 (7.0)
Accumulator Control Valve	.87 (22.0)	.26 (6.5)
Shift Valve "A"	.85 (21.7)	.28 (7.0)
Shuttle Control Valve	2.00 (51.0)	.23 (5.7)

(1) For spring locations, refer to illustration. See **Fig. 22** .

Reassembly

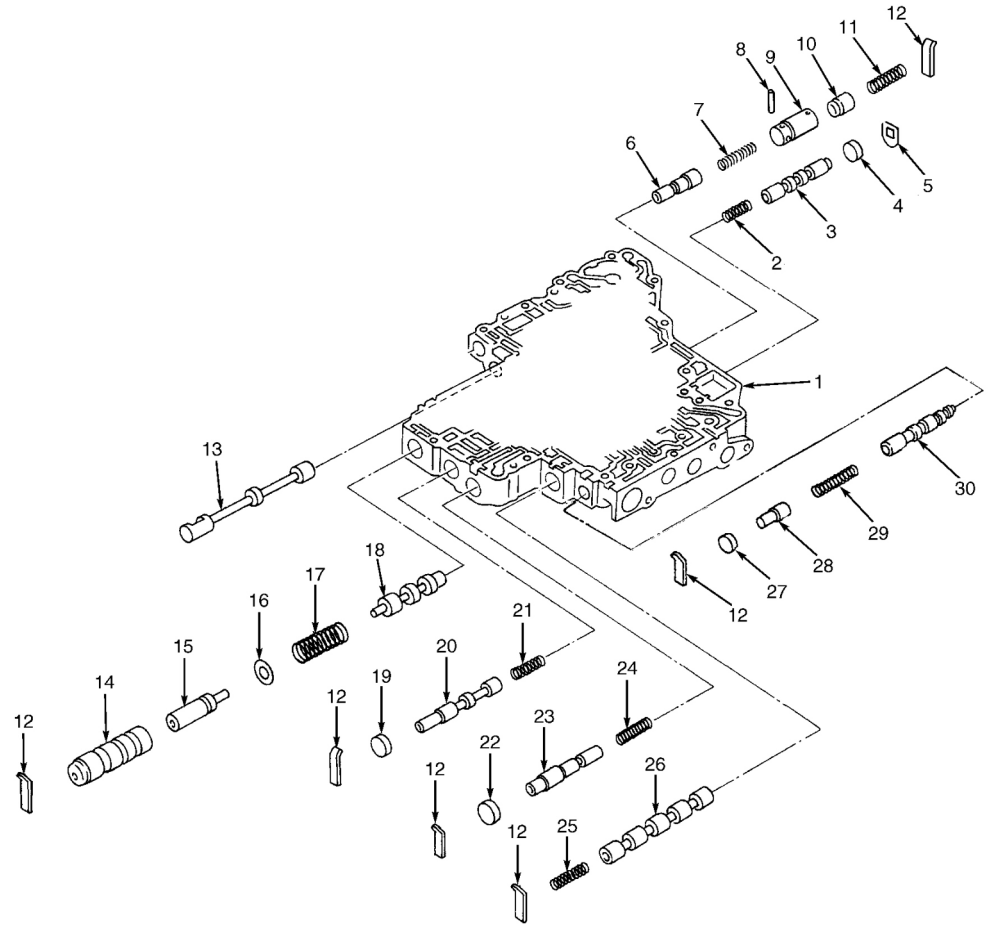
1. Lay valve body face down when installing valves. DO NOT stand valve body on edge. Lubricate valves and valve body with ATF prior to installation. Install valves by sliding valves into appropriate bores. DO NOT scratch or damage valve body.
2. Wrap shaft of small screwdriver with vinyl tape and insert valves into bores using screwdriver as necessary. While pushing plug or return spring, install retainer plates. See **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)
All Valves (2)	.236 (6.00)	1.102 (28.00)

(1) For retainer plate locations, refer to illustration. See **Fig. 18** .

(2) Shift Valve "B" not applicable. All valves use type "A" retainer plate except shift valve "B" (Type "B"). See **Fig. 23** .



1. Lower Valve Body
2. Shift Valve "B" Spring
3. Shift Valve "B"
4. Plug
5. Shift Valve "B" Retainer
6. Pressure Modifier Valve
7. Pressure Modifier Valve Spring (Inner)
8. Parallel Pin
9. Sleeve
10. Piston
11. Pressure Modifier Valve Spring (Outer)
12. Retainer Plate
13. Manual Valve
14. Sleeve
15. Plug
16. Spring Seat
17. Pressure Regulator Valve Spring
18. Pressure Regulator Valve
19. Plug
20. Overrun Clutch Control Valve
21. Overrun Clutch Control Valve Spring
22. Plug
23. Accumulator Control Valve
24. Accumulator Control Valve Spring
25. Shift Valve "A" Spring
26. Shift Valve "A"
27. Plug
28. Plug
29. Shuttle Control Valve Spring
30. Shuttle Control Valve

G00031976

Fig. 22: Exploded View Of Lower Valve Body
Courtesy of NISSAN MOTOR CO., U.S.A.

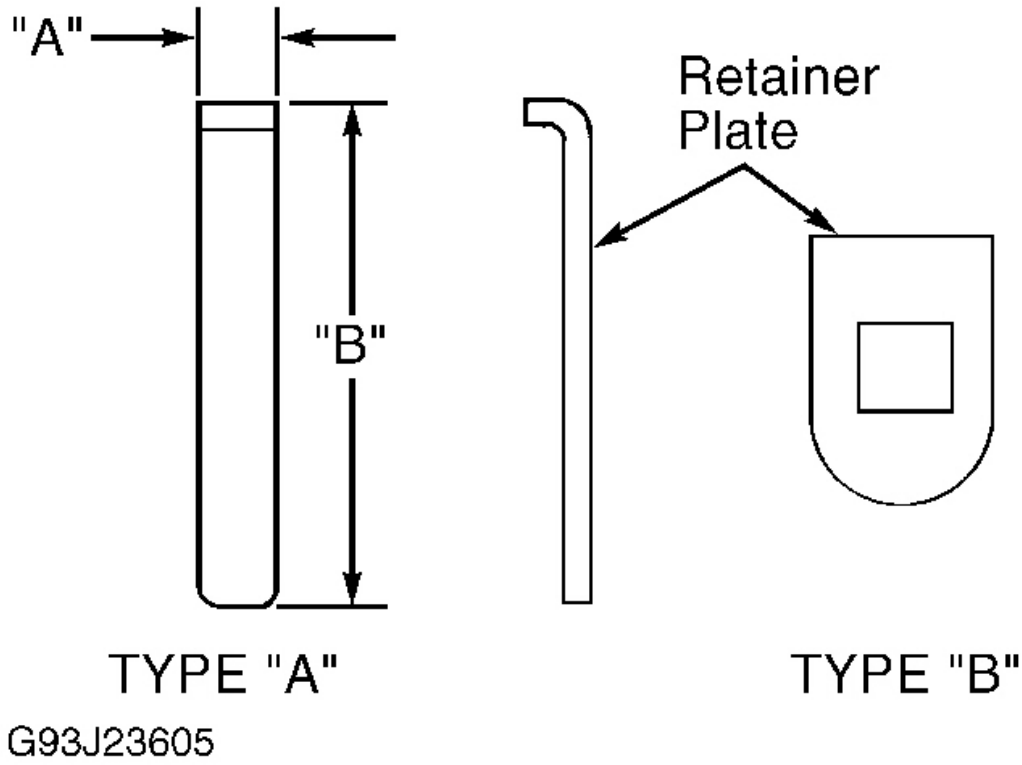


Fig. 23: Measuring Retainer Plate Dimensions (Lower Valve Body)
Courtesy of NISSAN MOTOR CO., U.S.A.

REVERSE CLUTCH

Disassembly

Remove snap ring from reverse clutch assembly. Remove drive plates, driven plates, retaining plate, and dish plates. See **Fig. 24** . 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). See **Fig. 25** . Drive plate thickness should be .079" (2.00 mm). Service limit is .071" (1.80 mm). Replace drive plate if not as specified. Using compressed air, 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. See **Fig. 26** . Specified clearance is .020-.031" (.50-.80 mm). Service limit is .047" (1.20 mm). Install correct retaining plate to achieve specified clearance. Retaining plates are available in .008" (.20 mm) increments. See **REVERSE CLUTCH RETAINING PLATE THICKNESS** table.

REVERSE CLUTCH RETAINING PLATE SPECIFICATIONS

Part No.	In. (mm)
31537-31X00	.173 (4.4)
31537-31X01	.181 (4.6)
31537-31X02	.189 (4.8)
31537-31X03	.197 (5.0)
31537-31X04	.205 (5.2)

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. 27** . Ensure retaining plate moves toward snap ring. If retaining plate does not move as described, "D" ring or oil seal may be damaged.

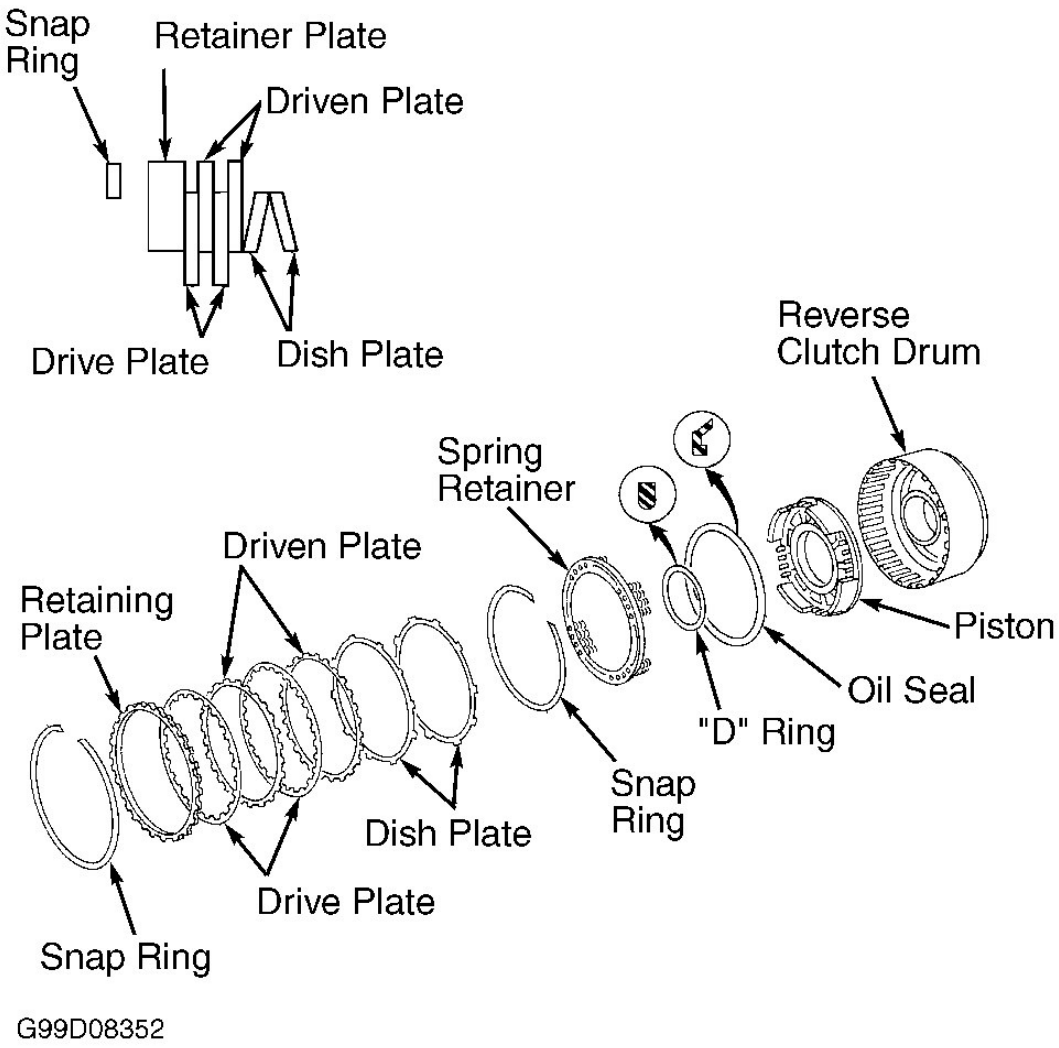


Fig. 24: Exploded View Of Reverse Clutch
Courtesy of NISSAN MOTOR CO., U.S.A.

Fig. 25: Measuring Thickness Of Dish Plate (Typical)
Courtesy of NISSAN MOTOR CO., U.S.A.

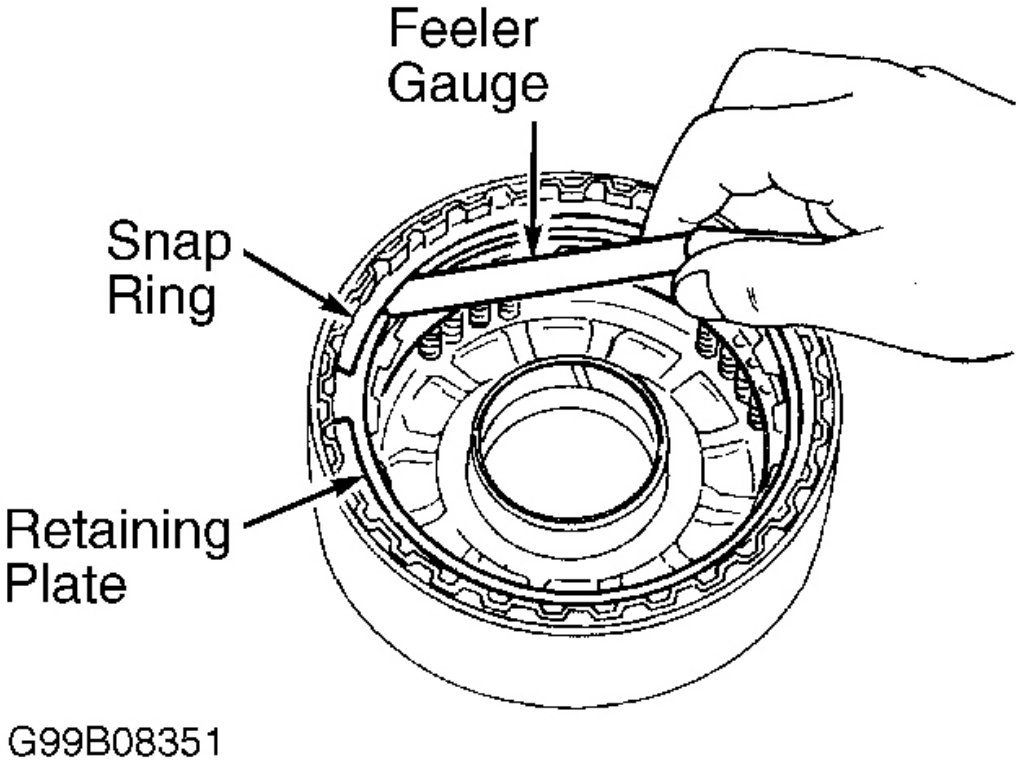


Fig. 26: Measuring Clutch Pack Clearance (Reverse Clutch Shown; Others Are Similar)
Courtesy of NISSAN MOTOR CO., U.S.A.

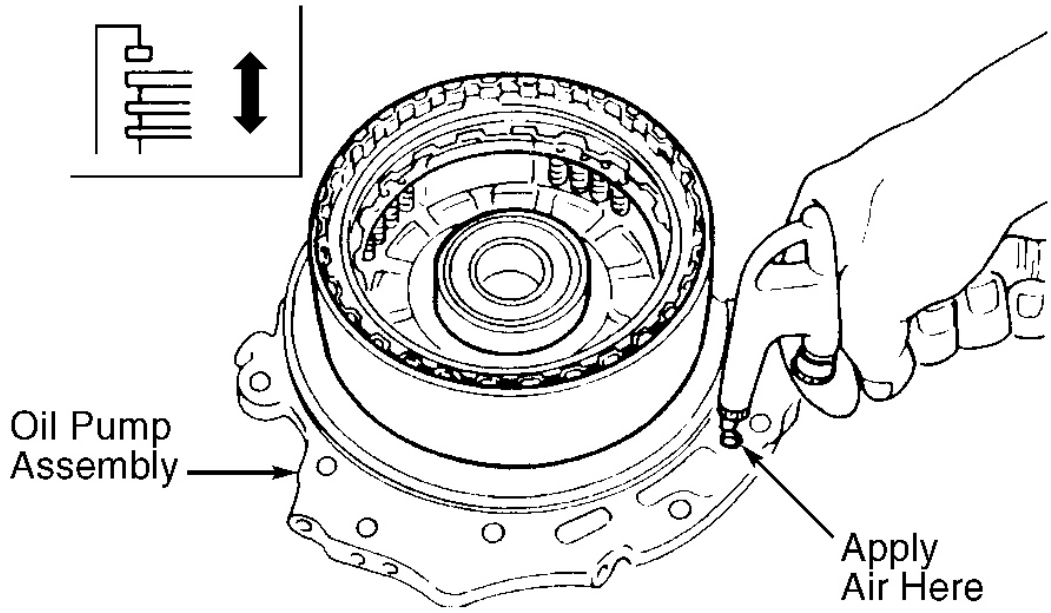


Fig. 27: Checking Reverse Clutch Operation
Courtesy of NISSAN MOTOR CO., U.S.A.

HIGH CLUTCH

Disassembly & Inspection

Remove seal rings from input shaft. See **Fig. 28** . Service procedures for high clutch are same as for reverse clutch. Drive plate thickness should be .079" (2.0 mm). Service limit is .071" (1.8 mm). Using compressed air, 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. Measure clearance between retaining plate and snap ring. See **Fig. 26** . Specified clearance is .055-.071" (1.40-1.80 mm). Service limit is .094" (2.40 mm). Install correct retaining plate to achieve specified clearance. Retaining plate is available in .008" (.20 mm) increments. See **HIGH CLUTCH RETAINING PLATE THICKNESS** table.
3. Apply compressed air to oil hole (hole nearest high clutch drum) of input shaft. See **Fig. 29** . 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.

HIGH CLUTCH RETAINING PLATE THICKNESS

Part No.	In. (mm)
31537-32X05	.189 (4.80)
31537-32X06	.197 (5.00)
31537-32X07	.205 (5.20)
31537-32X08	.213 (5.40)
31537-32X09	.220 (5.60)
31537-32X10	.228 (5.80)
31537-32X11	.236 (6.00)

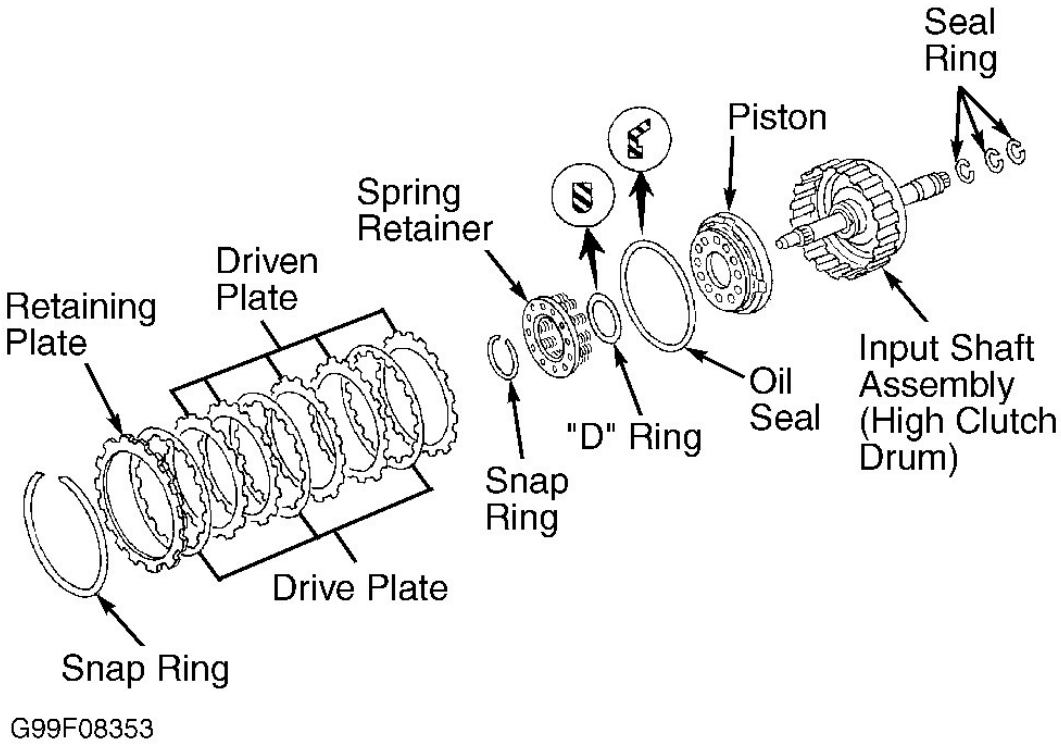


Fig. 28: Exploded View Of High Clutch
Courtesy of NISSAN MOTOR CO., U.S.A.

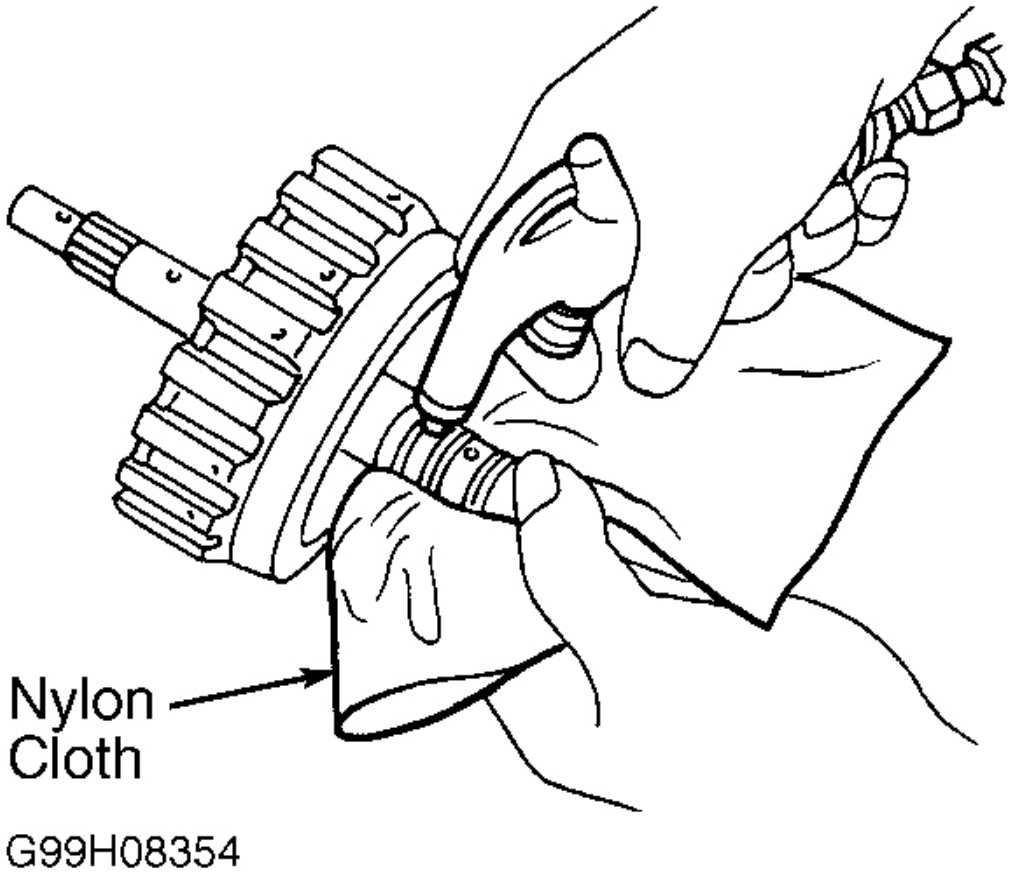


Fig. 29: Checking High Clutch Operation
Courtesy of NISSAN MOTOR CO., U.S.A.

FORWARD & OVERRUN CLUTCHES

Disassembly

Service procedures for forward clutch and overrun clutch are same as for reverse clutch. See **Fig. 30** .

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. Using compressed air, 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. Ensure notch in forward clutch piston is aligned with groove in forward clutch drum. See **Fig. 31** . Measure dish plate thickness. See **Fig. 25** . 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. **Fig. 26** . 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. Install correct retaining plate to achieve specified clearance. Retaining plate is available in .008" (.20 mm) increments. See **FORWARD CLUTCH RETAINING PLATE SPECIFICATIONS** and **OVERRUN CLUTCH RETAINING PLATE SPECIFICATIONS** tables.
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.

FORWARD CLUTCH RETAINING PLATE SPECIFICATIONS

Part No.	In. (mm)
31537-31X60	.142 (3.60)
31537-31X61	.150 (3.80)
31537-31X62	.157 (4.00)
31537-31X63	.165 (4.20)
31537-31X64	.173 (4.40)
31537-31X65	.181 (4.60)

OVERRUN CLUTCH RETAINING PLATE SPECIFICATIONS

Part No.	In. (mm)
31567-31X79	.142 (3.60)
31567-31X80	.150 (3.80)
31567-31X81	.157 (4.00)
31567-31X82	.165 (4.20)
31567-31X83	.173 (4.40)

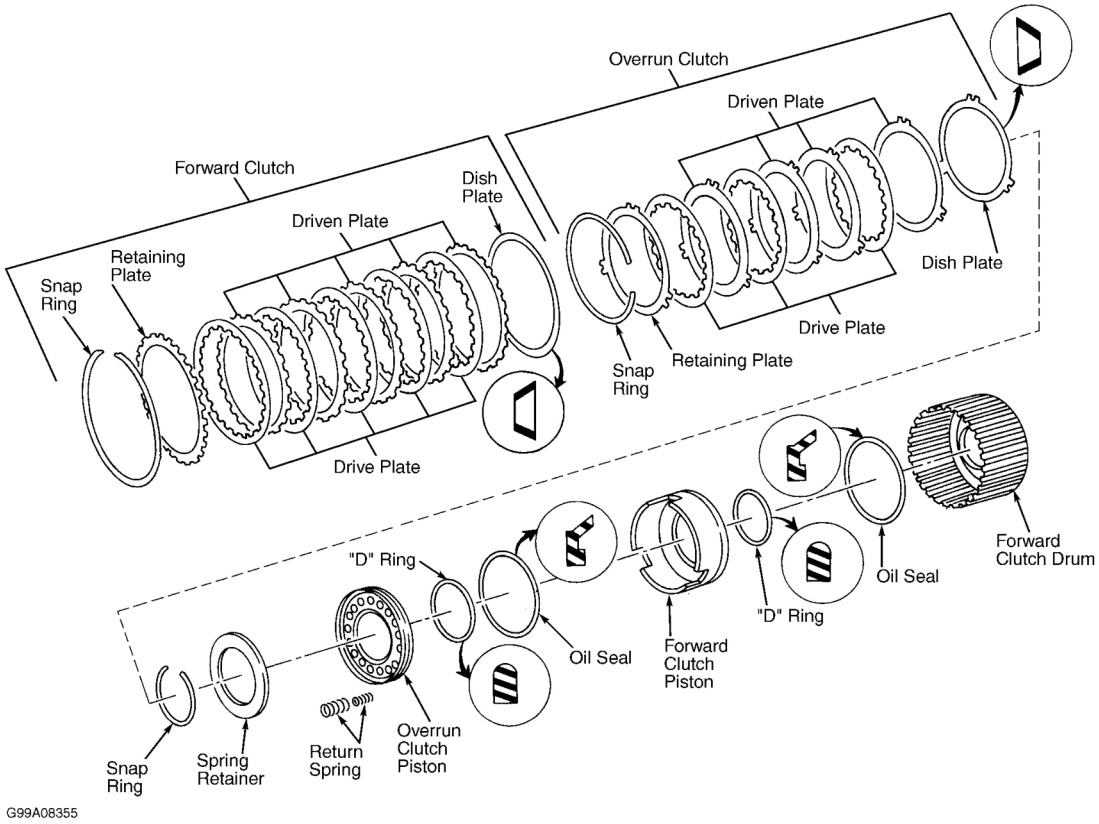


Fig. 30: Exploded View Of Forward & Overrun Clutch
Courtesy of NISSAN MOTOR CO., U.S.A.

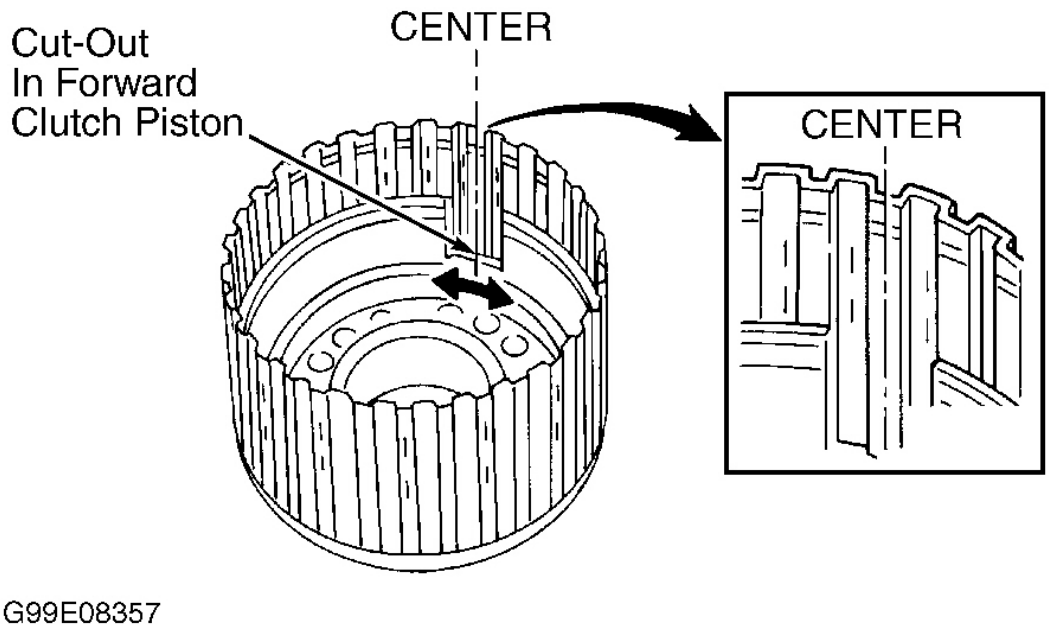


Fig. 31: Checking Forward Clutch Drum Piston Installation
Courtesy of NISSAN MOTOR CO., U.S.A.

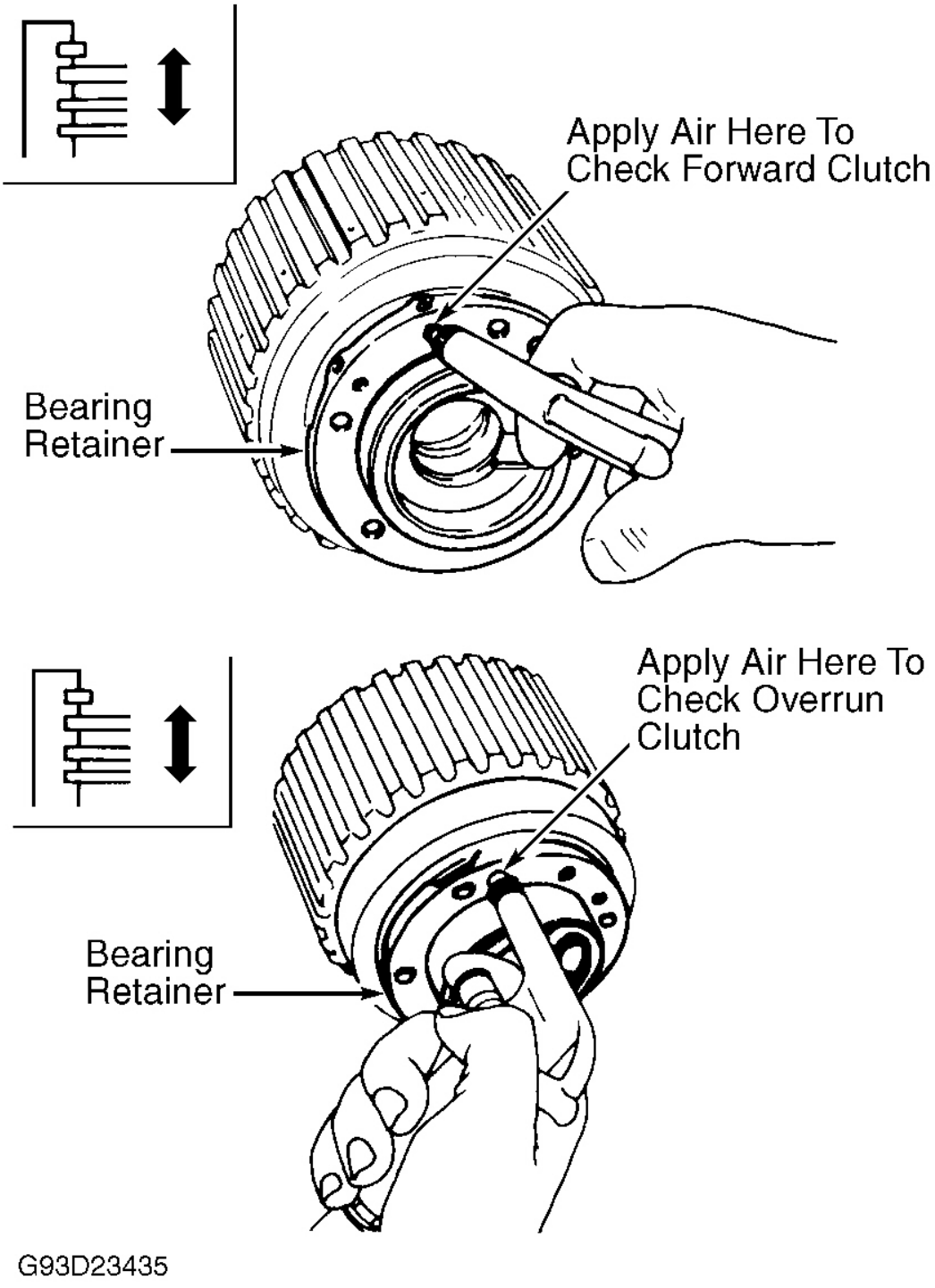


Fig. 32: Checking Forward & Overrun Clutch Operation
Courtesy of NISSAN MOTOR CO., U.S.A.

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. 33** . 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. 34** . 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). Measure clearance between snap ring and drive plate. See **Fig. 35** . Specified clearance is .055-.071" (1.40-1.80 mm). Service limit is .110" (2.80 mm). Install correct retaining plate to achieve specified clearance. Retaining plate is available in increments of .008" (.20 mm). See **LOW-REVERSE BRAKE RETAINING PLATE SPECIFICATIONS** table.
2. Check low-reverse brake operation. Apply compressed air to oil hole in transaxle case. See **Fig. 5** and **Fig. 36** . Ensure retaining plate moves toward snap ring. If retaining plate does not move, "D" ring or oil seal may be damaged.

LOW-REVERSE BRAKE RETAINING PLATE SPECIFICATIONS

Part No.	In. (mm)
31667-31X16	.142 (3.60)
31667-31X17	.150 (3.80)
31667-31X18	.157 (4.00)
31667-31X19	.165 (4.20)
31667-31X20	.173 (4.40)
31667-31X21	.181 (4.60)

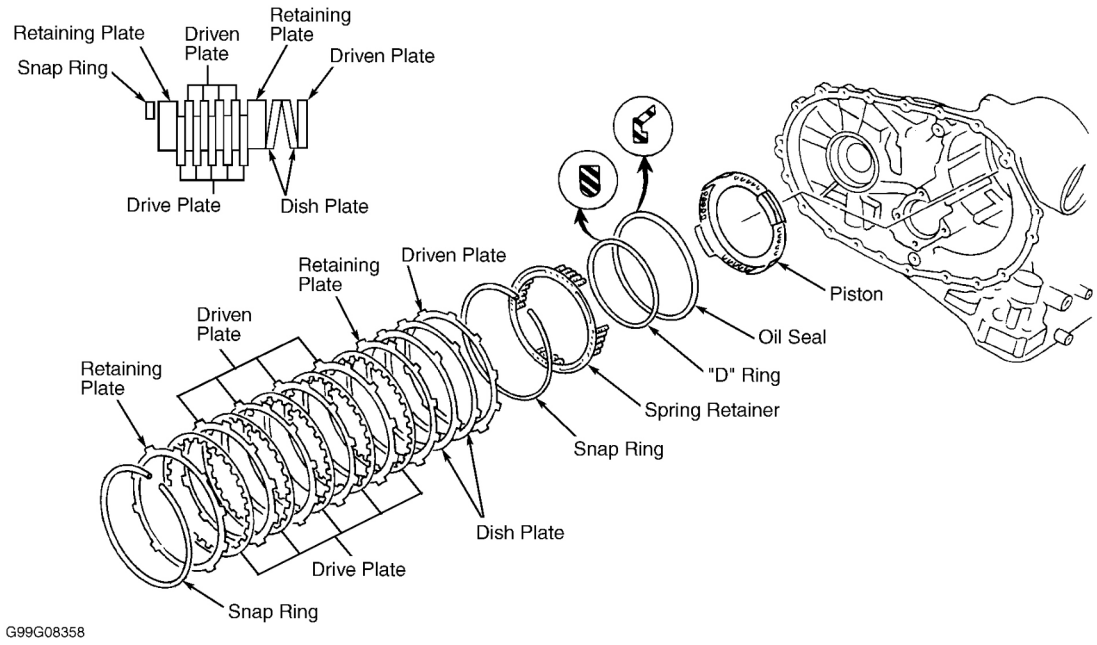


Fig. 33: Exploded View Of Low-Reverse Brake Clutch
Courtesy of NISSAN MOTOR CO., U.S.A.

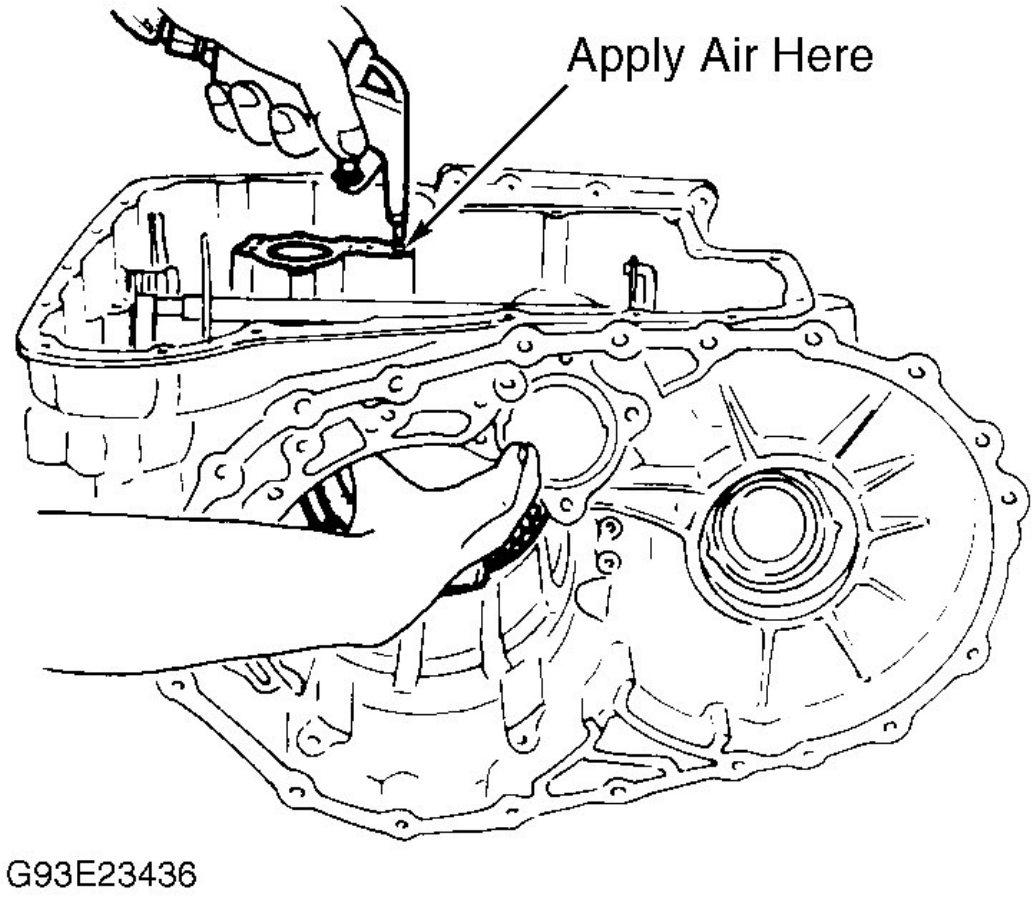


Fig. 34: Removing Low-Reverse Brake Clutch Piston
Courtesy of NISSAN MOTOR CO., U.S.A.

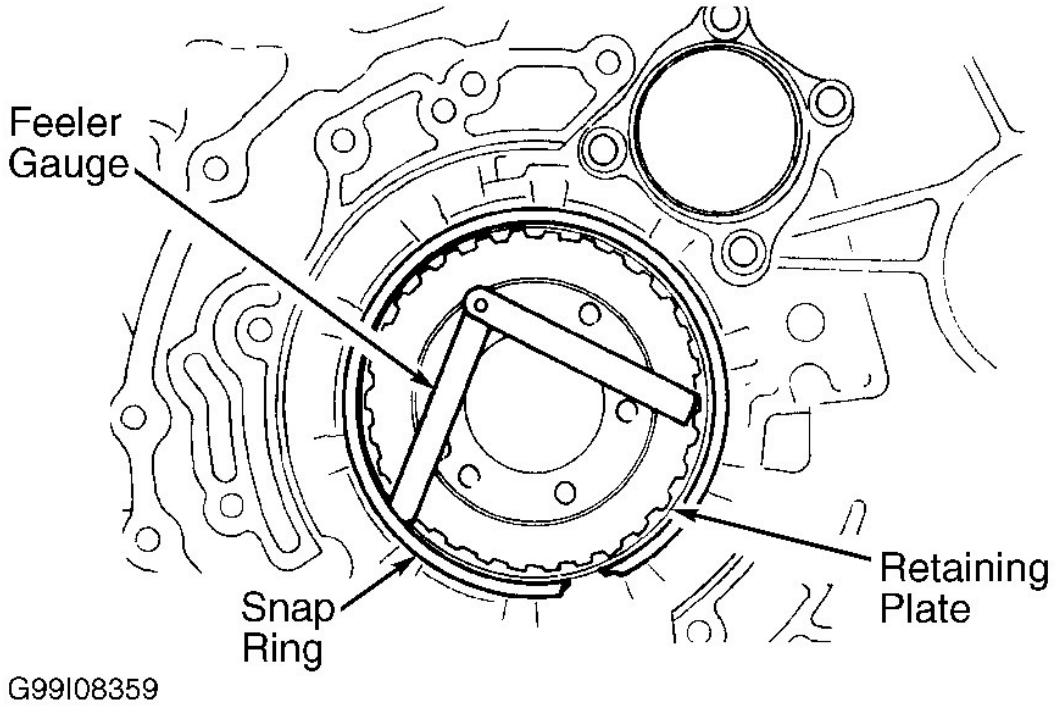


Fig. 35: Measuring Low-Reverse Brake Clutch Clearance
Courtesy of NISSAN MOTOR CO., U.S.A.

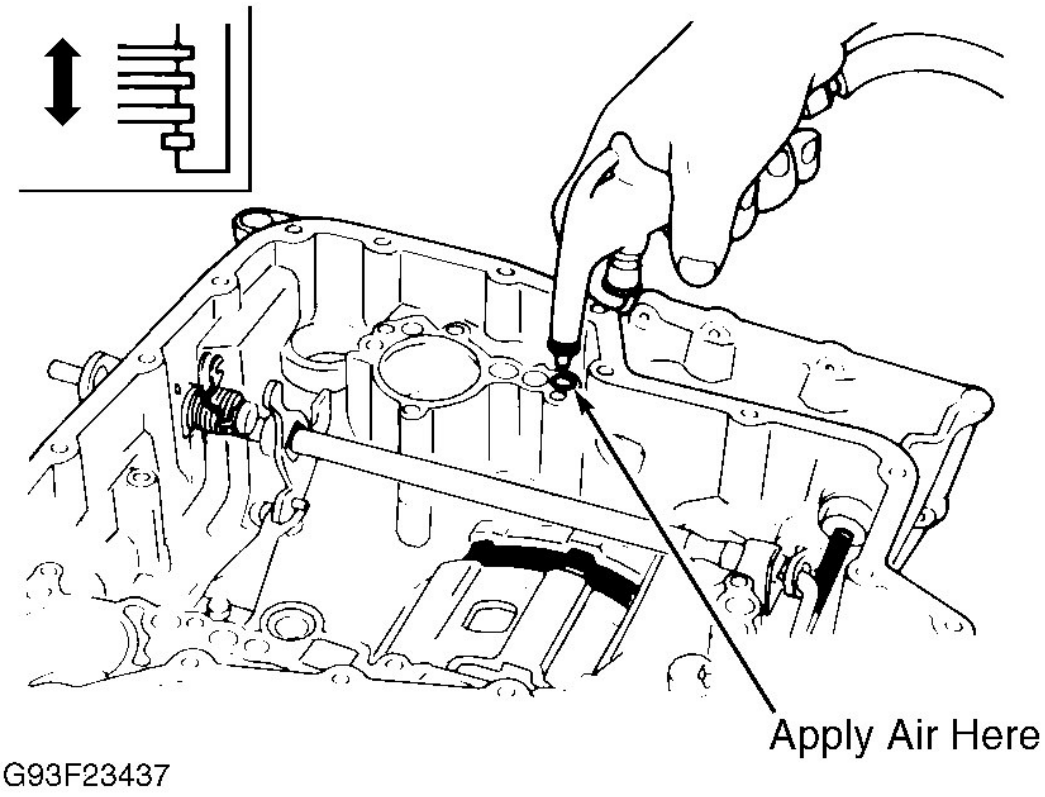


Fig. 36: Checking Low-Reverse Clutch Operation
Courtesy of NISSAN MOTOR CO., U.S.A.

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. 37** . 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 friction 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. 38** . 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 in correct direction. Holding rear internal gear, forward clutch hub should turn clockwise and lock counterclockwise. See **Fig. 39** .
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.

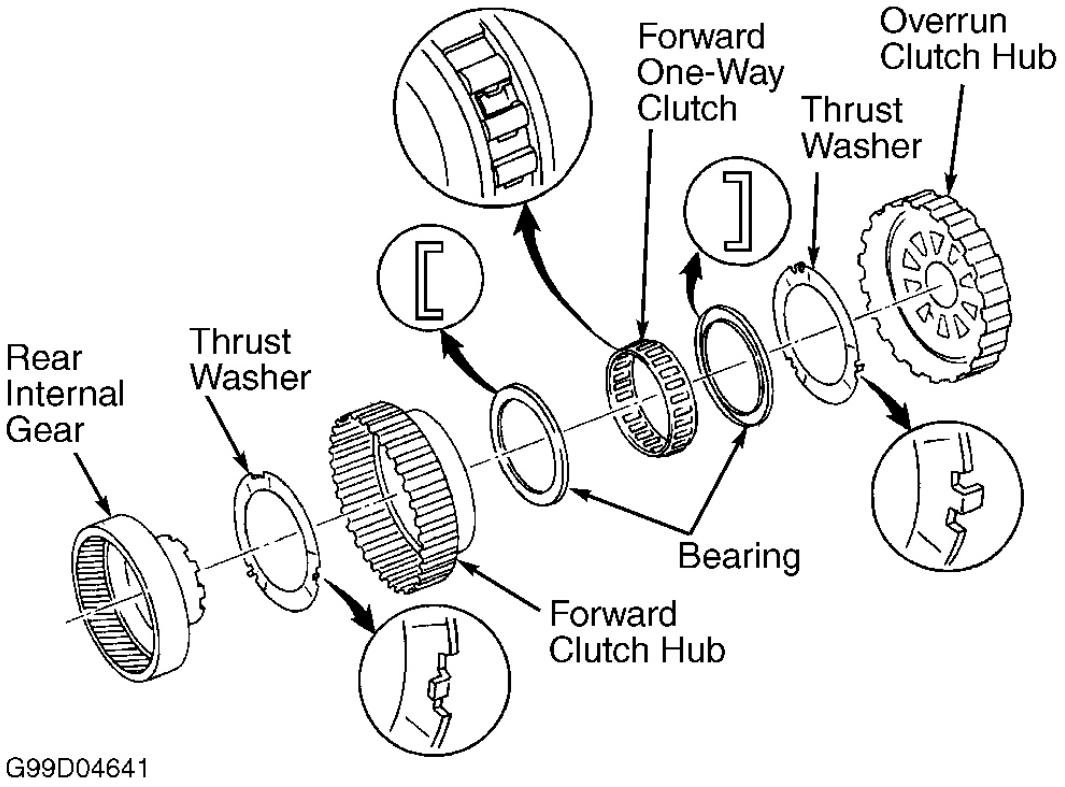


Fig. 37: Exploded View Of Rear Internal Gear, Forward Clutch Hub & Overrun Clutch Hub Assembly
Courtesy of NISSAN MOTOR CO., U.S.A.

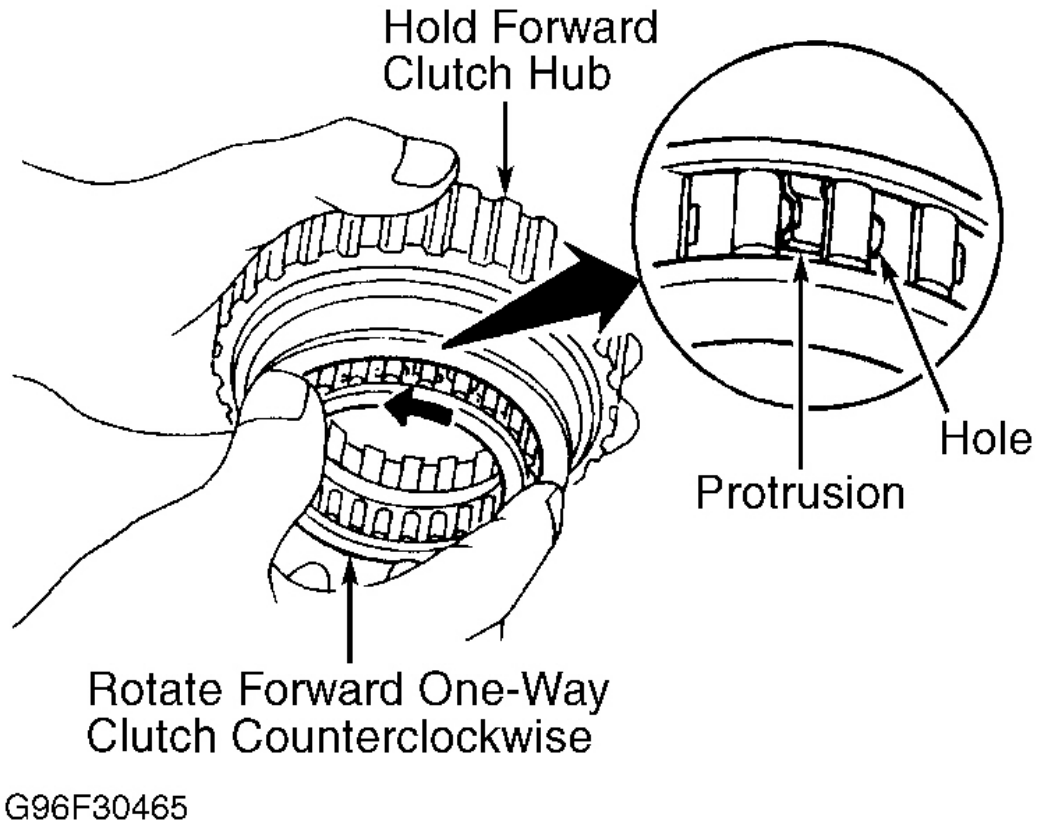


Fig. 38: Installing Forward One-Way Clutch
Courtesy of NISSAN MOTOR CO., U.S.A.

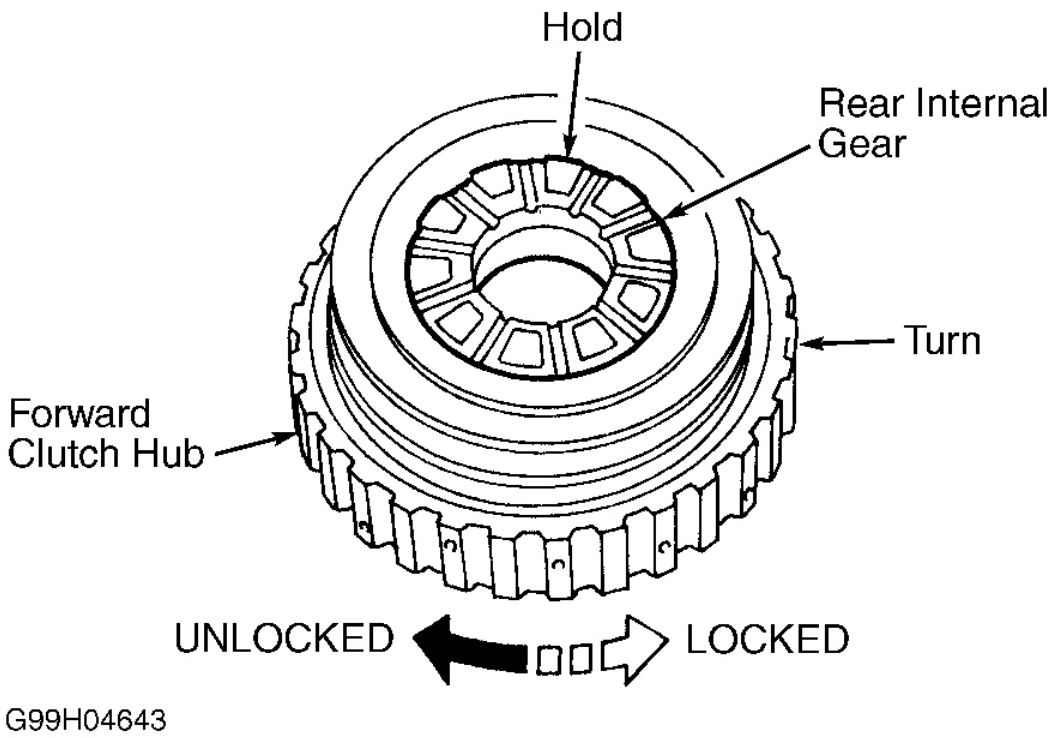


Fig. 39: Checking Forward One-Way Clutch Rotation
Courtesy of NISSAN MOTOR CO., U.S.A.

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. 5** and **Fig. 40** .
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. 11** .
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.

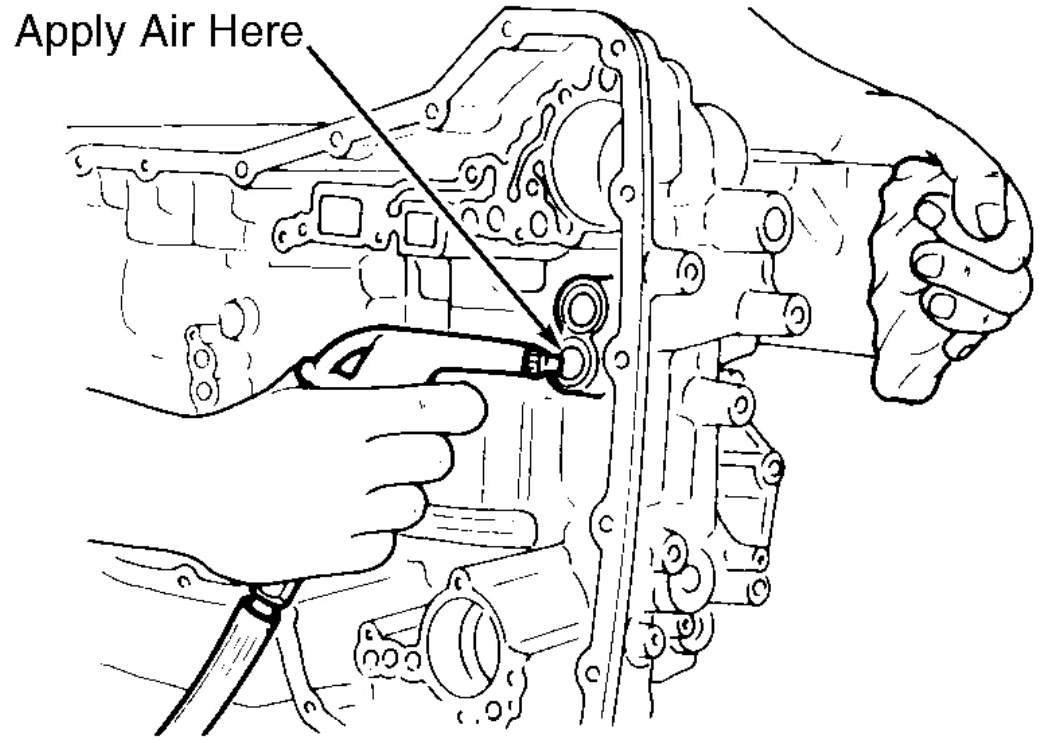


Fig. 40: Removing OD Piston Retainer & Band Servo Piston
Courtesy of NISSAN MOTOR CO., U.S.A.

Inspection

Check friction 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 1.02" (25.9 mm). Free length of OD servo return spring should be 1.52" (38.50 mm), diameter should be .87" (22.0 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. 8** .

OUTPUT SHAFT, IDLER GEAR, REDUCTION GEAR & BEARING RETAINER

Disassembly

1. Remove seal rings from output shaft and bearing retainer. See **Fig. 8** . 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. 8** .

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 specification. See **TORQUE SPECIFICATIONS** . Apply petroleum jelly to NEW seal rings and install onto 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. 8** .
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 .20-.24" (5.0-6.0 mm) outside of shaft. Install detent spring and bolt, and tighten to specifications. See **TORQUE SPECIFICATIONS** .

DIFFERENTIAL ASSEMBLY

Disassembly

Remove ring gear. Using appropriate puller, adapter and drift, remove differential side bearings. Remove viscous coupling (RE4F03W). On all models, remove speedometer drive gear. Drive out pinion shaft retaining pin. Remove pinion shaft from differential case. Remove pinion gears and side gears. See **Fig. 41** .

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 (KV38105710) on RE4F03B or Adapter (KV38107700) on RE4F03W, measure clearance on differential case side, between side gear thrust washer and differential case. Move side gear up and down to measure deflection. Always measure deflection on both side gears. See **Fig. 42** .
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 increments of .002" (.05 mm). See **DIFFERENTIAL SIDE GEAR THRUST WASHER SPECIFICATIONS (RE4F03B)** or **DIFFERENTIAL SIDE GEAR THRUST WASHER SPECIFICATIONS (RE4F03W)** table.

DIFFERENTIAL SIDE GEAR THRUST WASHER SPECIFICATIONS (RE4F03B)

Part No.	In. (mm)
38424-D2111	.0295-.0315 (.750-.800)
38424-D2112	.0315-.0335 (.800-.850)
38424-D2113	.0335-.0354 (.850-.900)
38424-D2114	.0354-.0374 (.900-.950)
38424-D2115	.0374-.0394 (.950-1.000)

DIFFERENTIAL SIDE GEAR THRUST WASHER SPECIFICATIONS (RE4F03W)

Part No.	In. (mm)
38424-D2111 (1)	.0295-.0315 (.750-.800)
38424-D2112 (1)	.0315-.0335 (.800-.850)
38424-D2113 (1)	.0335-.0354 (.850-.900)
38424-D2114 (1)	.0354-.0374 (.900-.950)
38424-D2115 (1)	.0374-.0394 (.950-1.000)
38424-D2116	.0394-.0413 (1.000-1.050)
38424-D2117	.0413-.0433 (1.050-1.100)
38424-D2118	.0433-.0453 (1.100-1.150)

38424-D2119	.0453-.0472 (1.150-1.200)
38424-D2120	.0472-.0492 (1.200-1.250)
38424-D2121	.0492-.0512 (1.250-1.300)
38424-D2122	.0512-.0531 (1.300-1.350)
(1) Part numbers used on differential case side. (All shims may be used on vicious coupling side).	

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. 43** .
4. Clearance between side gear and viscous coupling is determined by using the following equation: X + Y - 2A = CLEARANCE (Dimension A = height of gauge spacer). 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 increments of .002" (.05 mm). See **DIFFERENTIAL SIDE GEAR THRUST WASHER SPECIFICATIONS (RE4F03W)** table.
5. 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. 44** .
6. Press differential side bearings on differential case. Install ring gear and tighten bolts in numerical order. See **Fig. 45** . Tighten bolts to specification. See **TORQUE SPECIFICATIONS** .

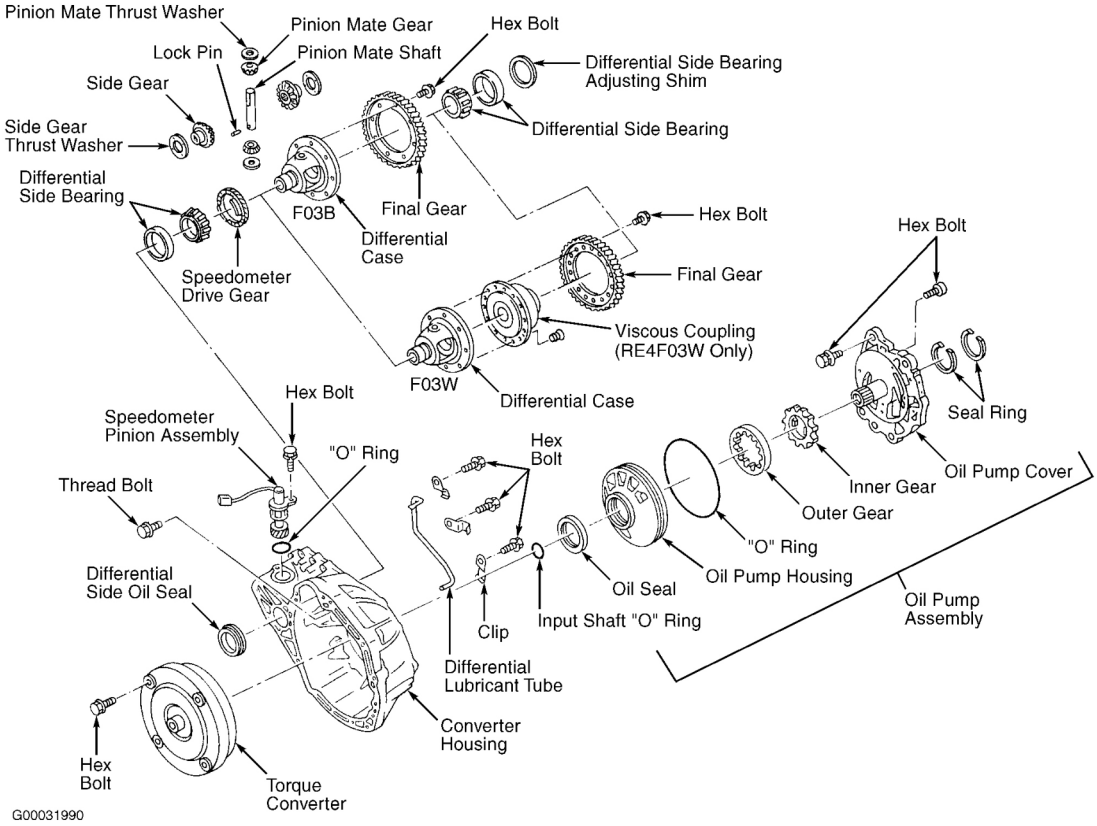


Fig. 41: Exploded View Of Torque Converter Housing & Differential Components
Courtesy of NISSAN MOTOR CO., U.S.A.

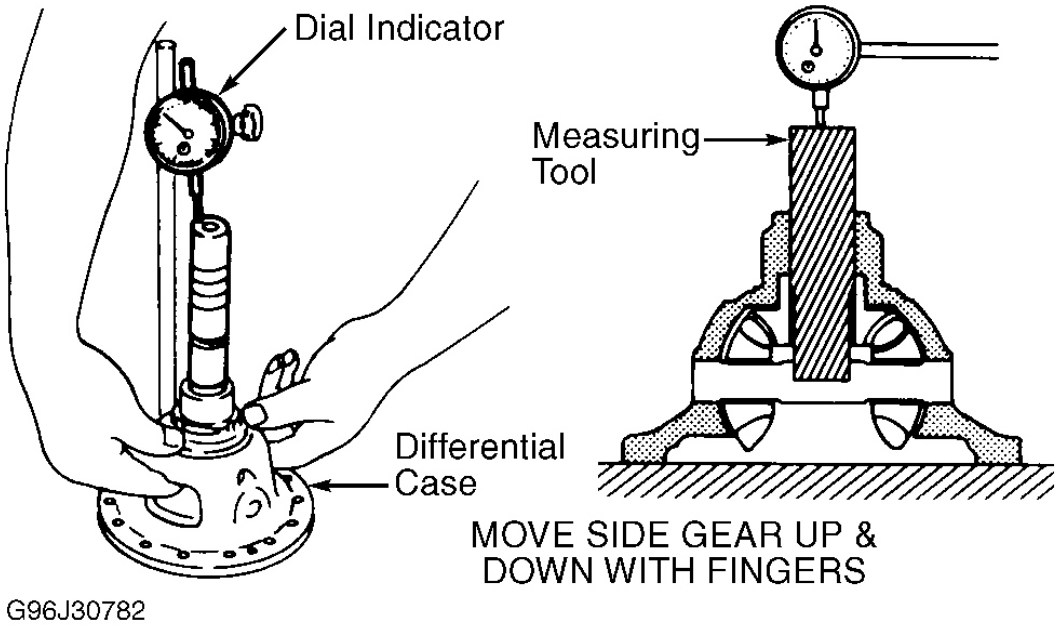


Fig. 42: Measuring Side Gear-To-Differential Case Clearance
Courtesy of NISSAN MOTOR CO., U.S.A.

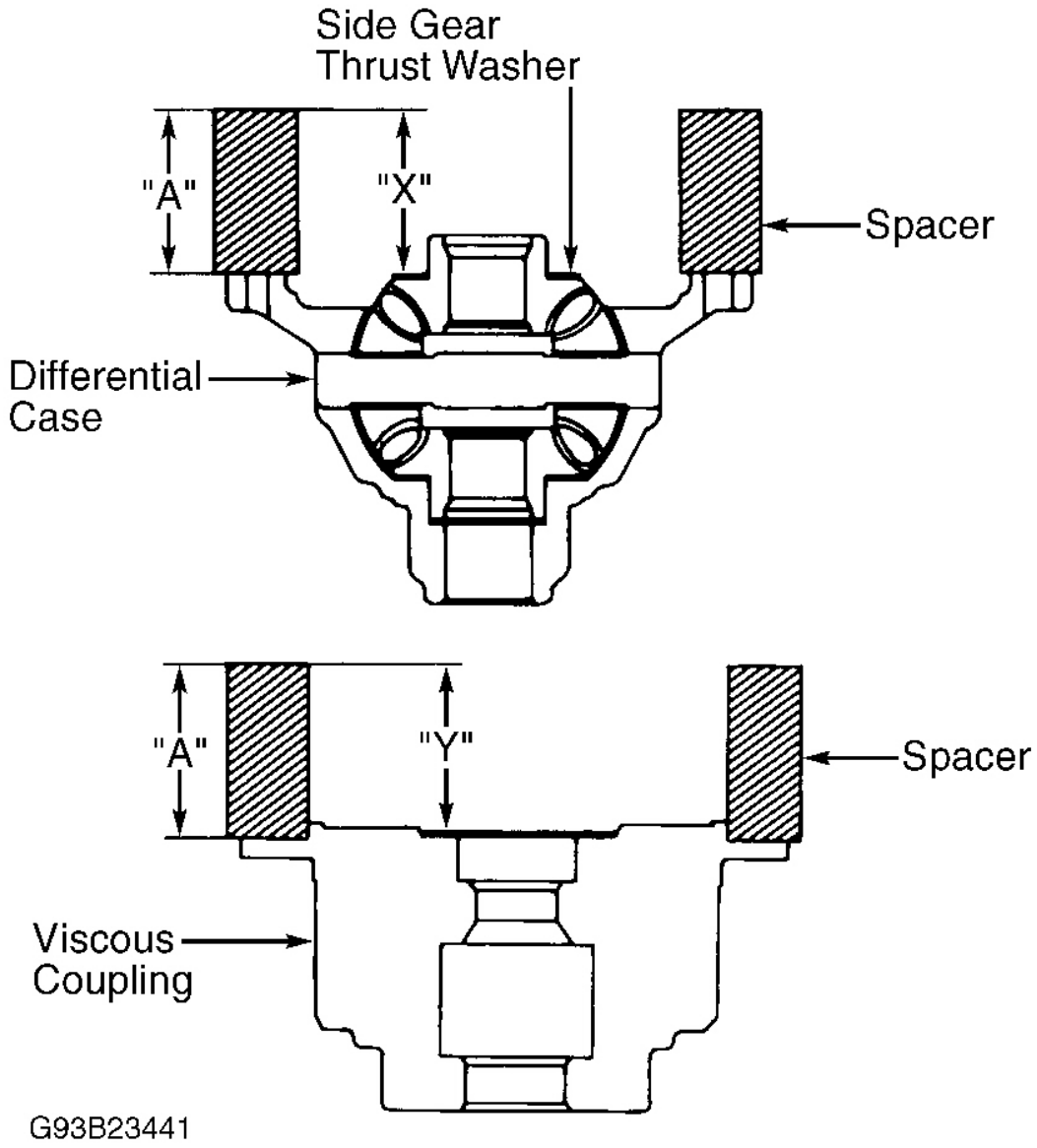


Fig. 43: Measuring Side Gear-To-Viscous Coupling Clearance
Courtesy of NISSAN MOTOR CO., U.S.A.

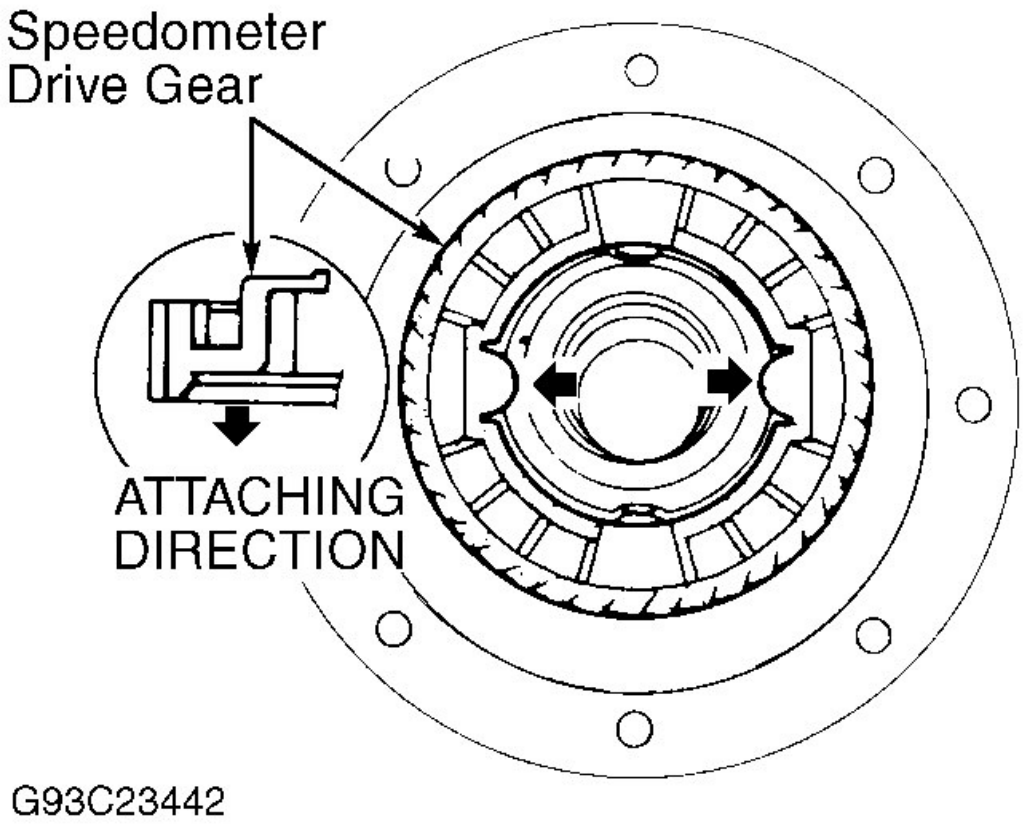


Fig. 44: Installing Speedometer Drive Gear
Courtesy of NISSAN MOTOR CO., U.S.A.

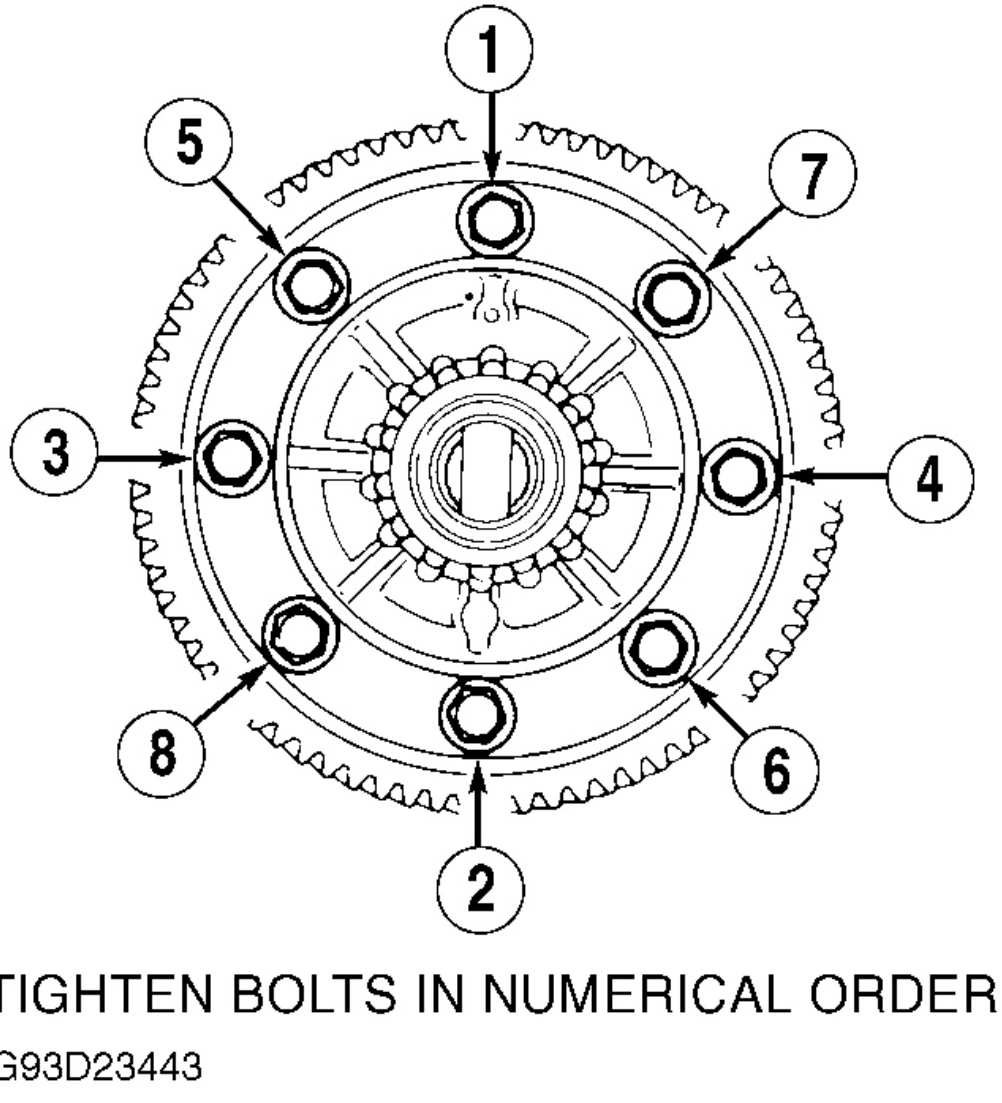


Fig. 45: Ring Gear Bolt Tightening Sequence
Courtesy of NISSAN MOTOR CO., U.S.A.

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 changing 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 19-22 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. 46** . Move tool up and down and measure deflection. Differential side bearing preload should be .002-.04" (.04-.09 mm). Select proper thickness of differential side bearing adjusting shims. Shims are available in increments of .002" (.05 mm). See **DIFFERENTIAL SIDE BEARING ADJUSTING SHIM SPECIFICATIONS (RE4F03B)** or **DIFFERENTIAL SIDE BEARING ADJUSTING SHIM SPECIFICATIONS (RE4F03W)** table.
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 19-22 ft. lbs. (26-30 N.m).
4. Insert Measuring Tool (KV38107700) into differential case. Using INCH lb. 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.

DIFFERENTIAL SIDE BEARING ADJUSTING SHIM SPECIFICATIONS (RE4F03B)

Part No.	Thickness - In. (mm)
31499-21X07	.0157 (.400)
31499-21X08	.0173 (.440)
31499-21X09	.0189 (.480)
31499-21X10	.0205 (.520)
31499-21X11	.0220 (.560)
31499-21X12	.0236 (.600)
31499-21X13	.0252 (.640)
31499-21X14	.0268 (.680)
31499-21X15	.0283 (.720)
31499-21X16	.0299 (.760)
31499-21X17	.0315 (.800)
31499-21X18	.0331 (.840)
31499-21X19	.0346 (.880)
31499-21X20	.0362 (.920)
31499-21X21	.0567 (1.440)

DIFFERENTIAL SIDE BEARING ADJUSTING SHIM SPECIFICATIONS (RE4F03W)

Part No.	Thickness - In. (mm)
31439-31X00	.0110 (.280)
31439-31X01	.0126 (.320)
31439-31X02	.0142 (.360)
31439-31X03	.0157 (.400)

31439-31X04	.0173 (.440)
31439-31X05	.0189 (.480)
31439-31X06	.0205 (.520)
31439-31X07	.0220 (.560)
31439-31X08	.0236 (.600)
31439-31X09	.0252 (.640)
31439-31X10	.0268 (.680)
31439-31X11	.0283 (.720)
31439-31X12	.0299 (.760)
31439-31X13	.0315 (.800)
31439-31X14	.0331 (.840)
31439-31X15	.0346 (.880)
31439-31X16	.0362 (.920)
31439-31X17	.0378 (.960)
31439-31X18	.0567 (1.440)

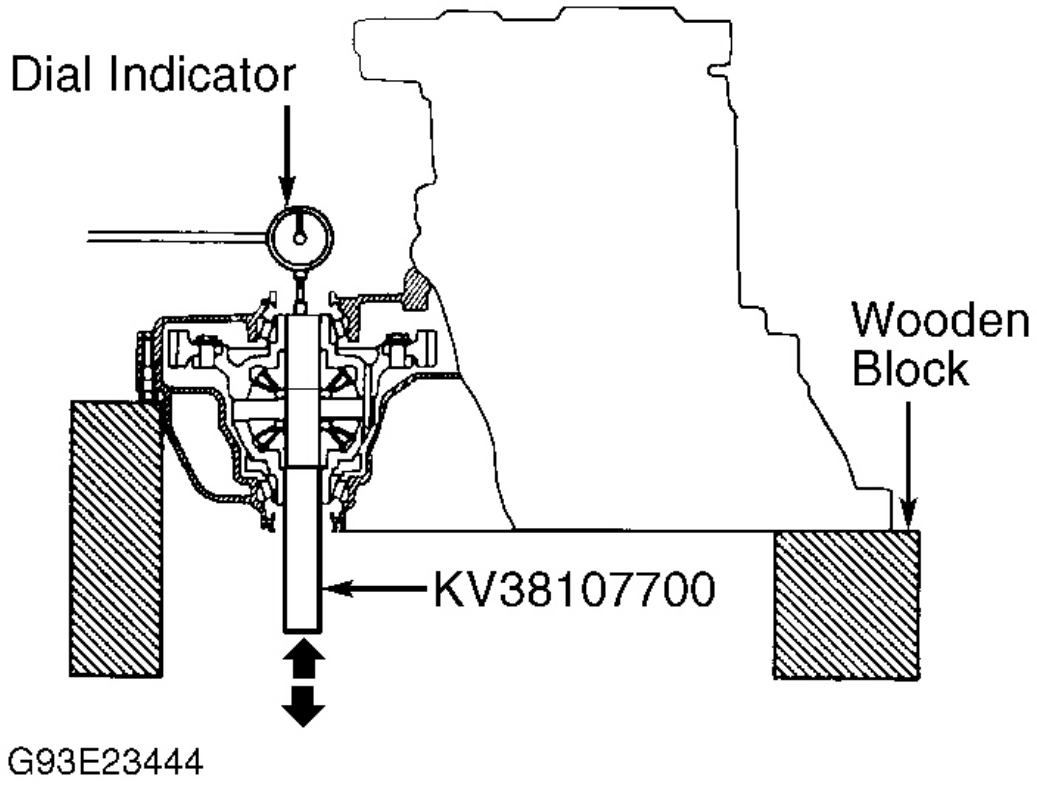


Fig. 46: Measuring Differential Side Bearing Preload

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

REDUCTION GEAR BEARING PRELOAD

NOTE: Idler gear bearing must be removed to perform measuring procedure.

1. Preload is adjusted by changing shim thickness. Remove converter housing and differential assembly from transaxle case (if necessary). Install reduction gear in transaxle case. Using a depth gauge and straightedge, measure and record distance between end of reduction gear and surface of transaxle case in at least 2 places (dimension "B"). See **Fig. 47** . Remove reduction gear. Place idler gear bearing in applicable outer race in case. Measure and record distance between inner race surface of idler gear bearing and surface of transaxle case in at least 2 places (dimension "C").
2. Measure and record distance between end of reduction gear and adjusting shim mating surface of reduction gear in at least 2 places (dimension "D"). To determine dimension "A" (distance between surface of idler gear bearing and adjusting shim mating surface of reduction pinion gear), use the following equation: A = D - (B + C).
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). See **Fig. 47** .
4. Measure and record distance between end of idler gear and idler gear bearing mating surface of idler gear in at least 2 places (dimension "E"). Select proper thickness of reduction gear bearing adjusting shim by subtracting dimension "E" from dimension "A". Reduction gear bearing preload should be .002" (.05 mm).
5. Shims are available in thicknesses of .0685-.1047" (1.74-2.66 mm), in increments of .002" (.04 mm). If total dimension is .085-.086" (2.16-2.18 mm), required shim thickness is .083" (2.12 mm). For each .002" (.04 mm) dimension increase, shim thickness will increase same amount.
6. Install selected adjusting shim onto reduction gear shaft. Press idler gear bearing on idler gear. Drive idler gear on reduction gear. See **Fig. 48** . Ensure idler gear locks on parking pawl. Lock idler gear with parking pawl and tighten idler gear lock nut to specification. See **TORQUE SPECIFICATIONS** .
7. Turn reduction gear in both directions several times to seat bearings. Using an INCH-lb. torque wrench and appropriate socket, measure reduction gear turning torque. Turning torque should be .95-6.08 INCH lbs. (.10-.70 N.m). Stake lock nut to ensure nut will not loosen.

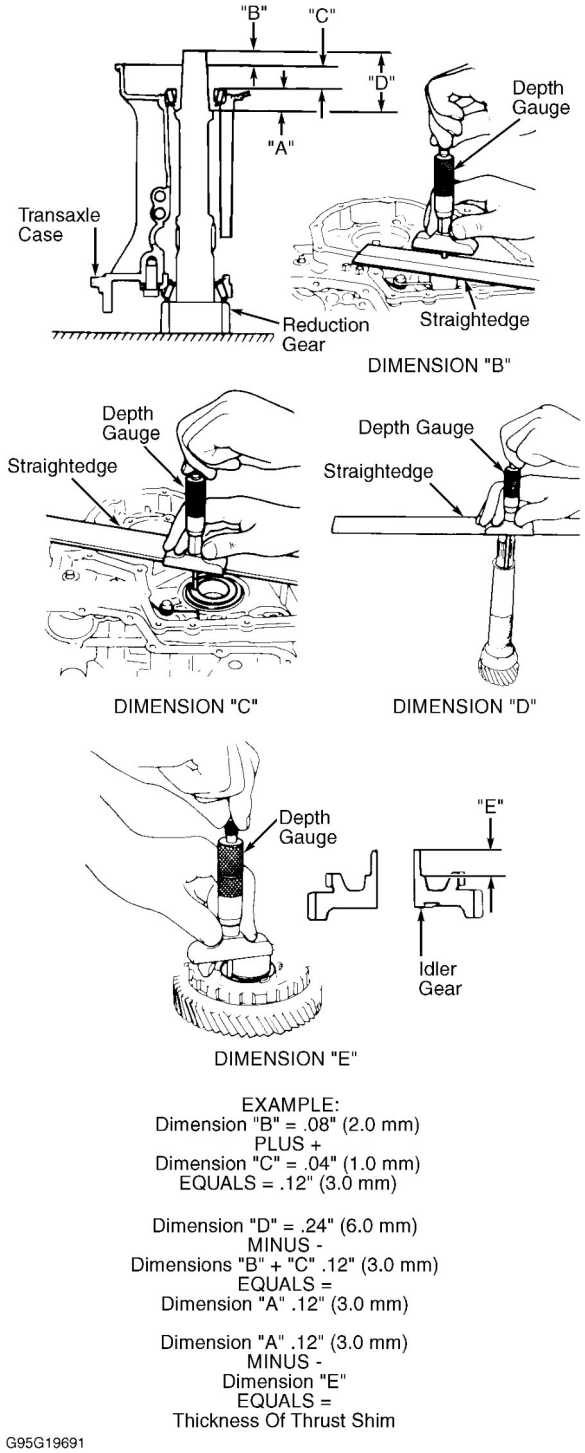


Fig. 47: Measuring Reduction Gear Bearing Preload
Courtesy of NISSAN MOTOR CO., U. S. A.

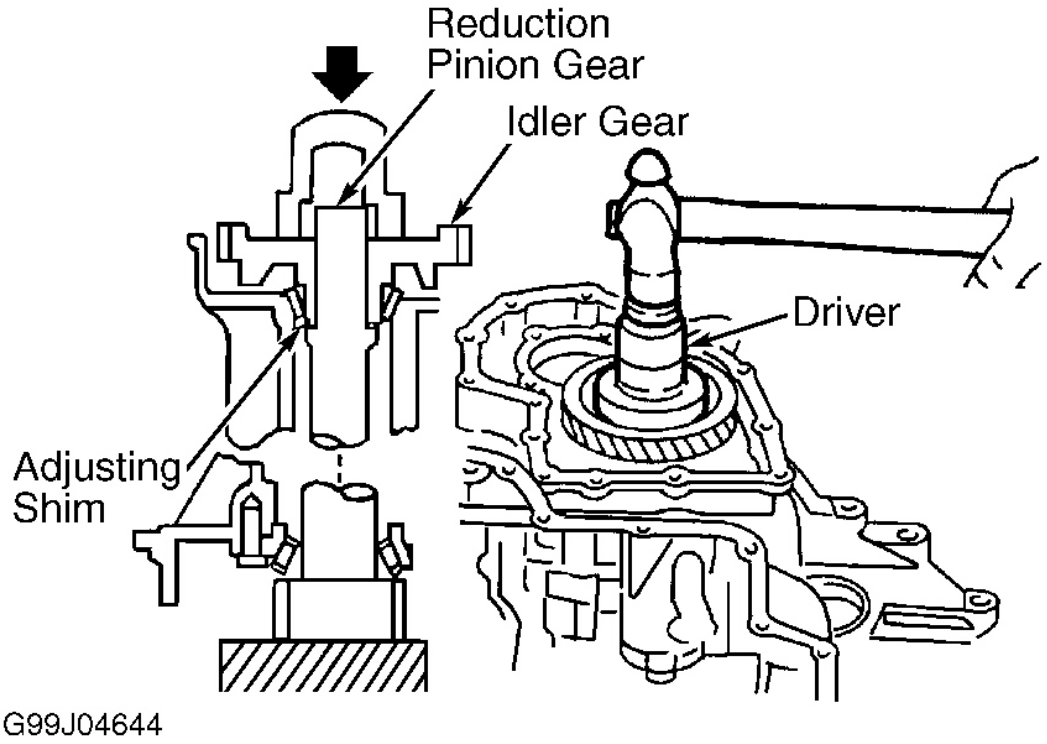


Fig. 48: Installing Idler Gear On Reduction Gear Shaft
Courtesy of NISSAN MOTOR CO., U. S. A.

OUTPUT SHAFT END PLAY

1. Output shaft end play is adjusted by changing 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. See **Fig. 49** .
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. 50** . Determine dimension "A" using the following equation: A = L1 - L2 Dimension "A" equals distance between transaxle case surface and adjusting shim mating surface. "L2" = height of gauge.
3. Determine dimension "B" using the following equation: B = L2 - L3 Measure Dimensions "L2" and "L3" in at least 2 places. Dimension "B" equals distance between end of output shaft bearing race and side cover surface of transaxle case. Specified output shaft end play ("A" - "B") 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 3 thicknesses. See **OUTPUT SHAFT ADJUSTING SHIM SPECIFICATIONS** table.
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 19-22 ft. lbs. (26-30 N.m). See **Fig. 51** . Replace bolts "A". Bolts have Green threads and

are self-sealing.

OUTPUT SHAFT ADJUSTING SHIM SPECIFICATIONS

Part No.	Thickness - In. (mm)
31438-31X46	.022 (.56)
31438-31X47	.038 (.96)
31438-31X48	.054 (1.36)

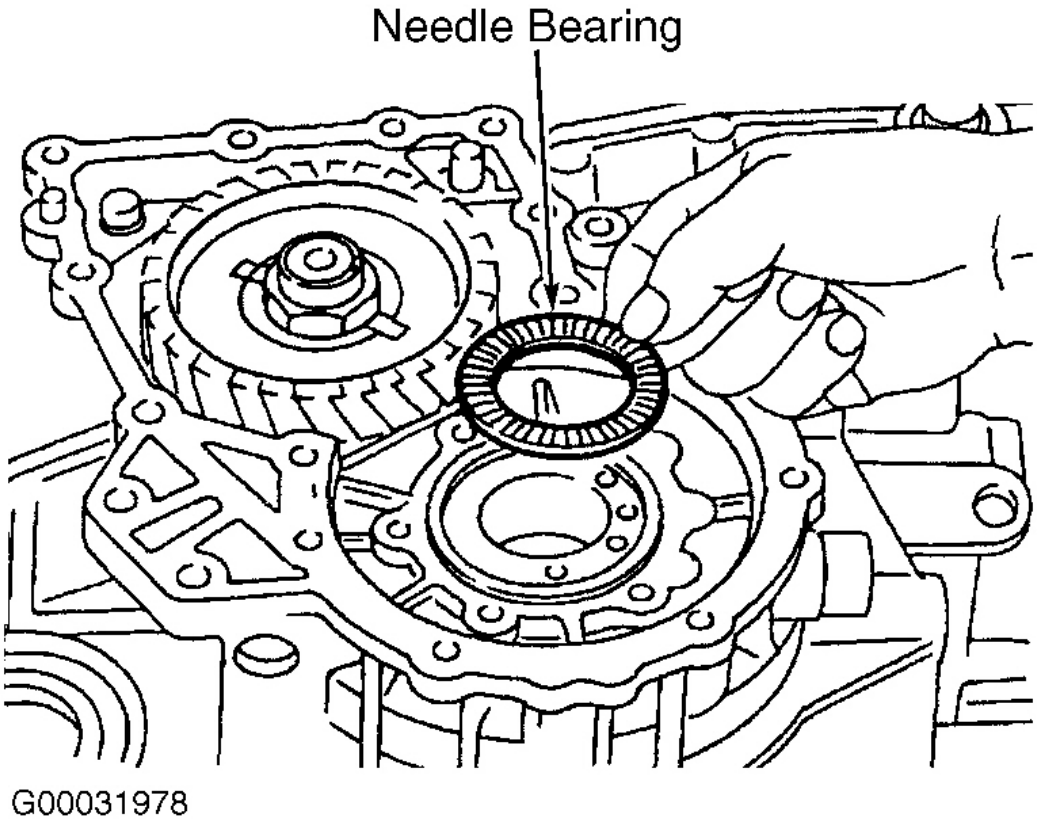
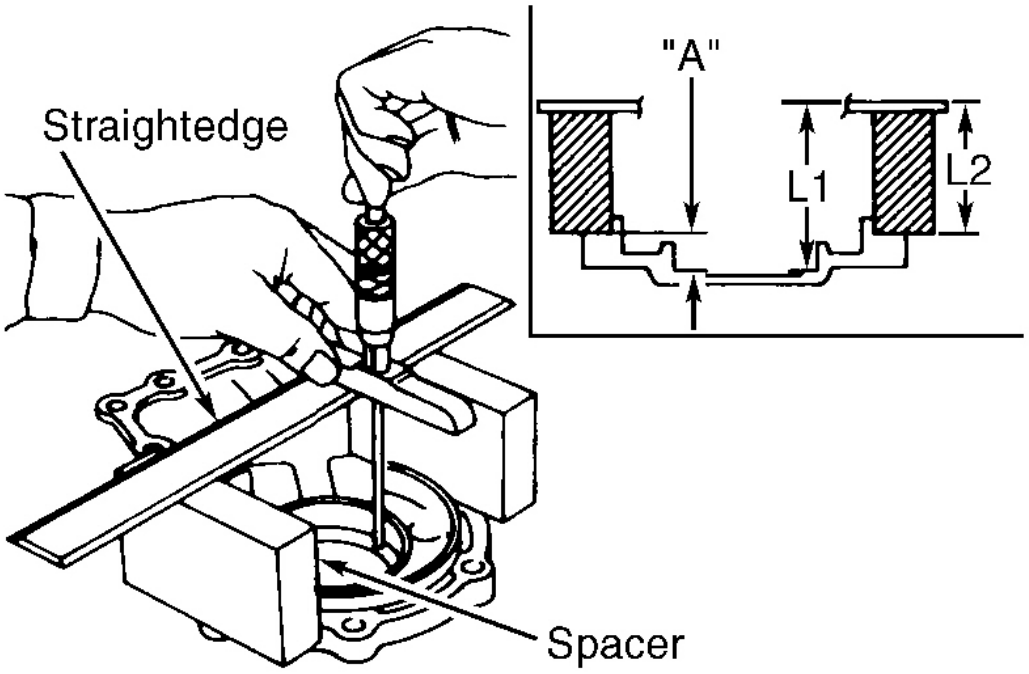
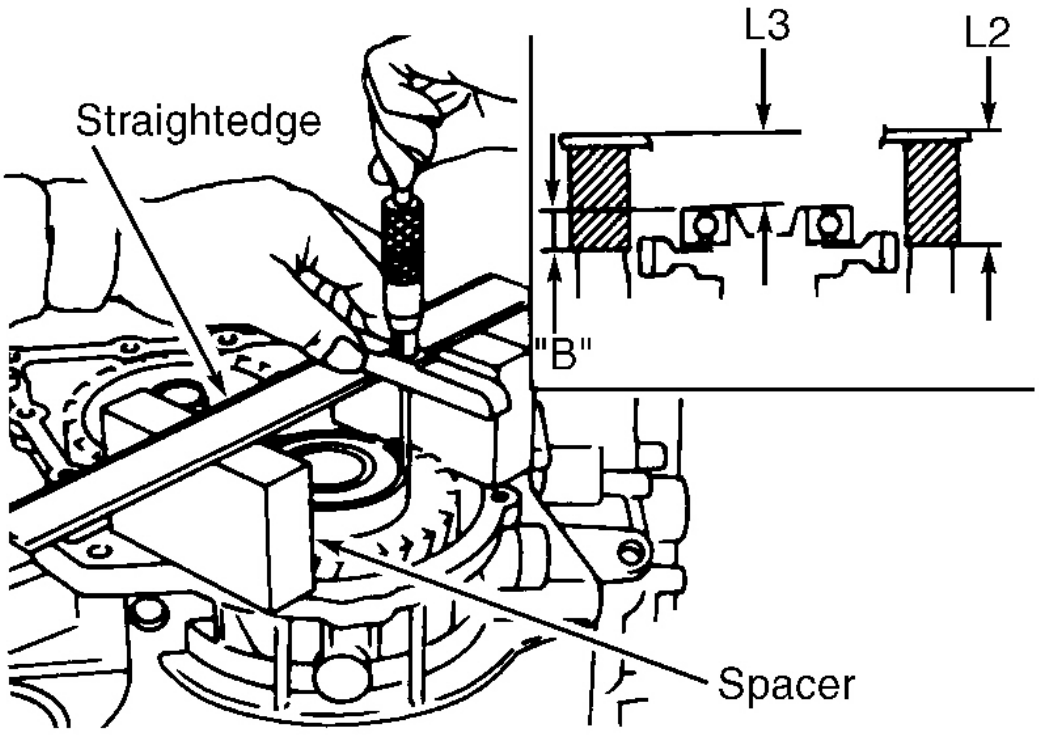


Fig. 49: Output Shaft Needle Bearing Location
Courtesy of NISSAN MOTOR CO., U.S.A.



DIMENSION "A"



DIMENSION "B"

G93H23447

Fig. 50: Measuring Output Shaft End Play
Courtesy of NISSAN MOTOR CO., U. S. A.

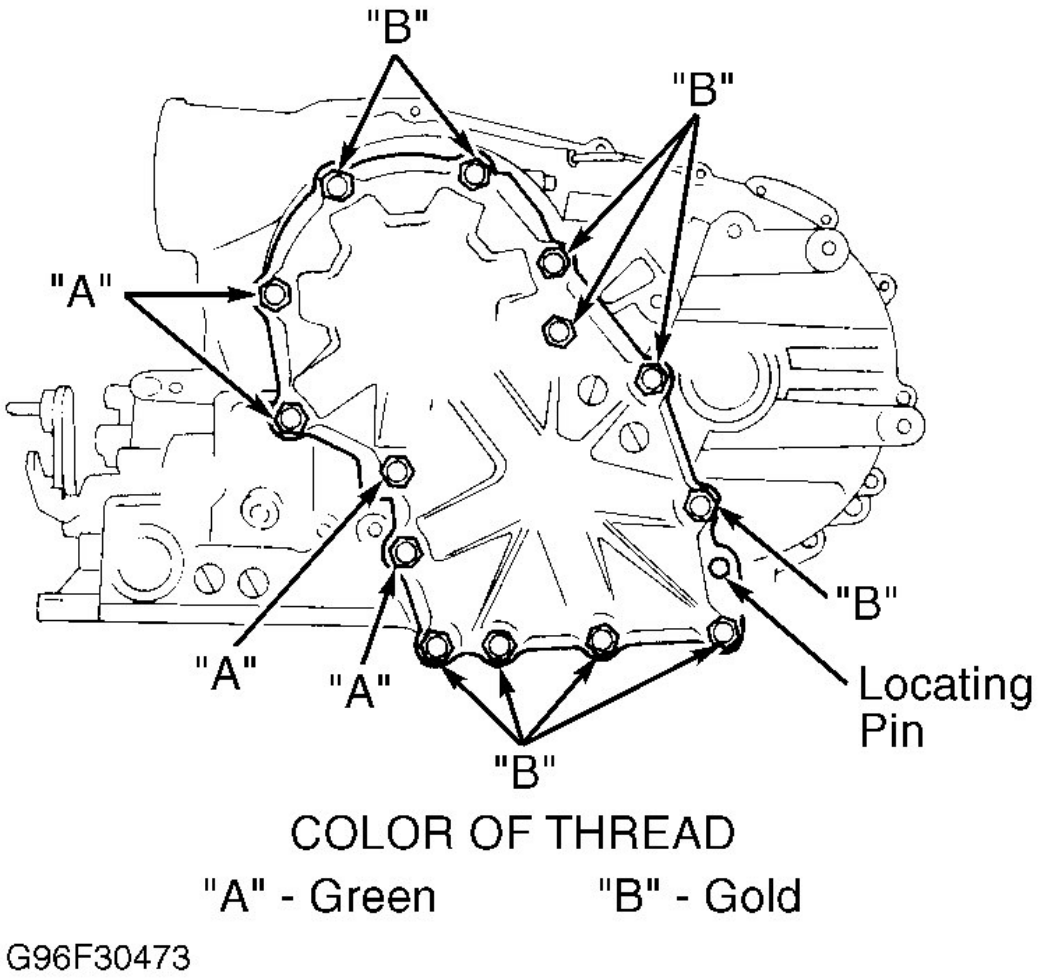


Fig. 51: Identifying Side Cover Bolts
Courtesy of NISSAN MOTOR CO., U.S.A.

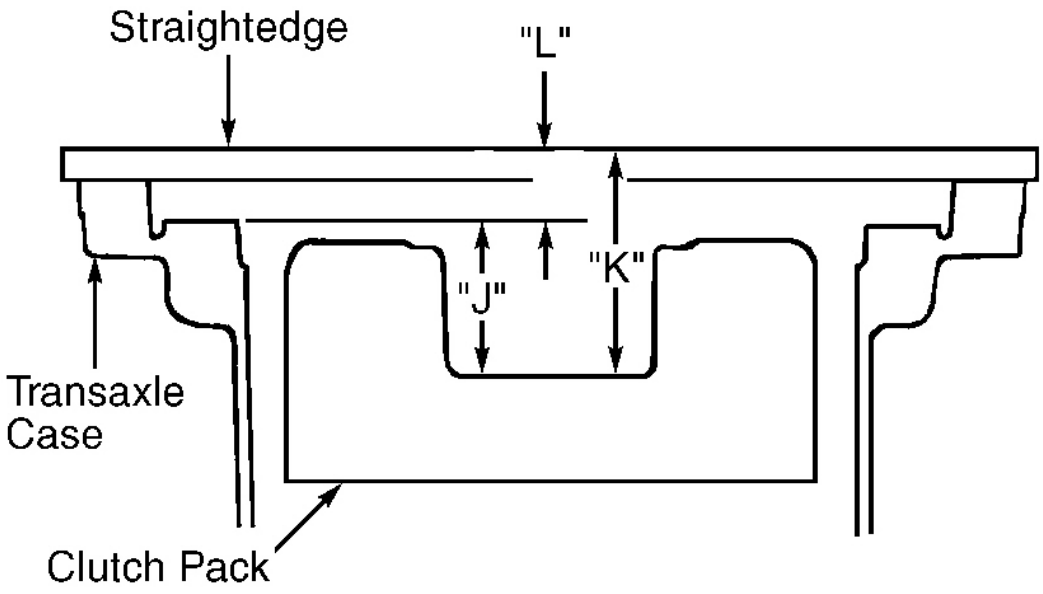
TOTAL END PLAY

1. Total end play is adjusted by changing bearing race thickness. Determine dimension "J" using the following equation: J = K - L. Dimension "J" equals distance between oil pump surface of transaxle case and needle bearing mating surface of high clutch drum. Using a depth gauge and straightedge, measure dimensions "K" and "L". See **Fig. 52** .
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").

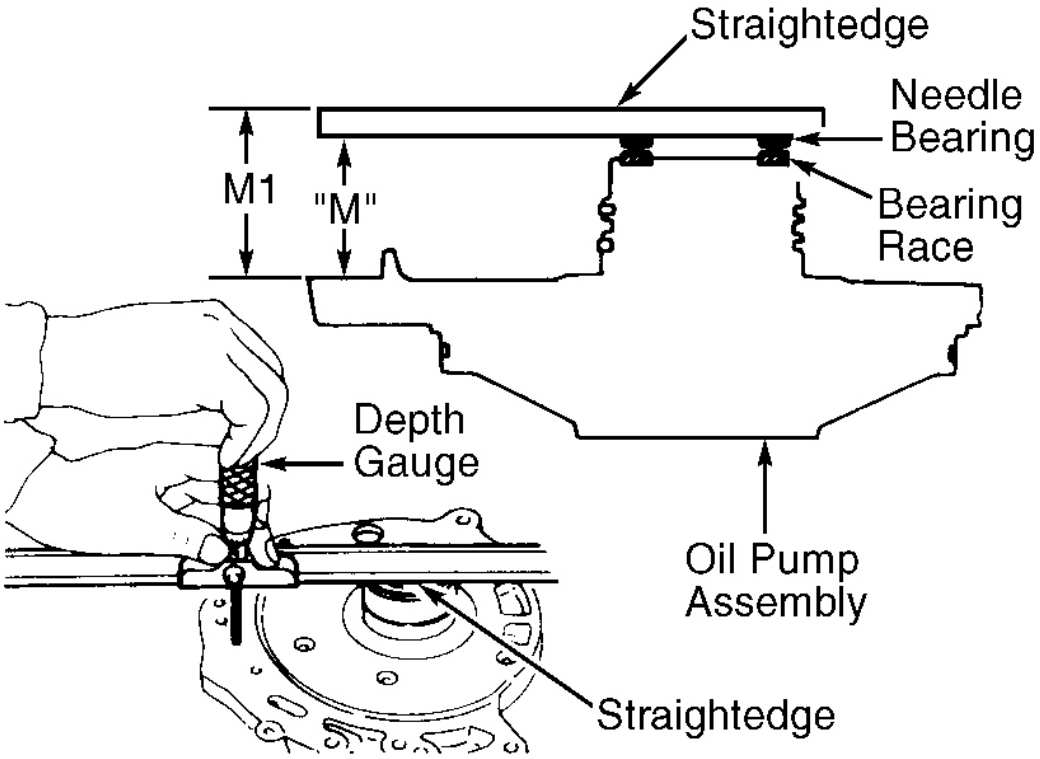
3. Dimension "M1" minus straightedge thickness equals distance "M". Dimension "J" minus dimension "M" equals total end play. See **Fig. 52** . Total end play should be .010-.022" (.25-.55 mm). Bearing races are available in increments of .015" (.40 mm). See **TOTAL END PLAY BEARING RACE SPECIFICATIONS** table. Select proper thickness of bearing race to ensure total end play is as specified.

TOTAL END PLAY BEARING RACE SPECIFICATIONS

Part No.	Thickness - In. (mm)
31435-31X01	.024 (.60)
31435-31X02	.031 (.80)
31435-31X03	.039 (1.00)
31435-31X04	.047 (1.20)
31435-31X05	.055 (1.40)
31435-31X06	.063 (1.60)
31435-31X07	.071 (1.80)
31435-31X08	.079 (2.00)



DIMENSION "J"



DIMENSION "M"

G93I23448

Fig. 52: Measuring Total End Play
Courtesy of NISSAN MOTOR CO., U. S. A.

REVERSE CLUTCH END PLAY

1. Reverse clutch end play is adjusted by changing 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. 53** . To determine dimension "N", use the following equation: N = O - P. Dimension "N" equals distance between oil pump surface of transaxle case and thrust washer on reverse clutch drum.
2. Measure distance between oil pump surface and straightedge (dimension "R"). See **Fig. 53** . To calculate dimension "Q" use the following equation: Q = R - S. Measure distance between thrust washer mating surface and straightedge (dimension "S"). Dimension "Q" is distance between transaxle case surface and thrust washer mating surface.
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 increments of .006" (.15 mm). See **REVERSE CLUTCH END PLAY THRUST WASHER SPECIFICATIONS** table. Select proper thickness thrust washer to ensure reverse clutch end play is as specified.

REVERSE CLUTCH END PLAY THRUST WASHER SPECIFICATIONS

Part No.	Thickness - In. (mm)
31508-31X00	.026 (.65)
31508-31X01	.031 (.80)
31508-31X02	.037 (.95)
31508-31X03	.043 (1.10)
31508-31X04	.049 (1.25)
31508-31X05	.055 (1.40)

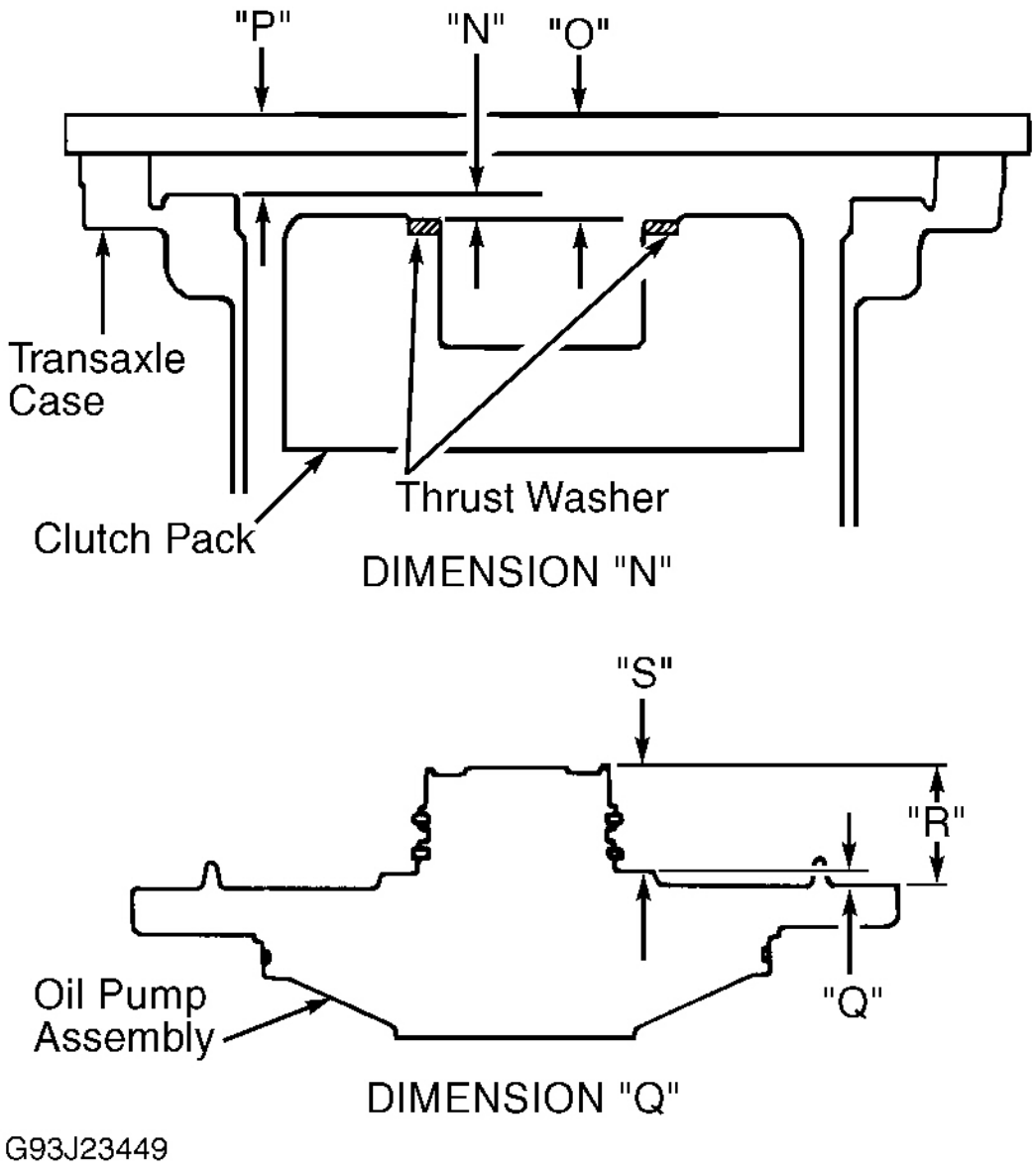


Fig. 53: Measuring Reverse Clutch End Play
Courtesy of NISSAN MOTOR CO., U. S. A.

TRANSAXLE REASSEMBLY

NOTE: **Coat all oil seal rings, clutch discs, clutch plates, rotating parts and sliding surfaces with ATF prior to reassembly. All gaskets and rubber "O" rings should be replaced. Ensure ends of snap rings are not aligned with cut-outs of drum. Check thrust bearings and races for wear or damage. Use petroleum jelly to**

secure parts in place. Clutch discs should be soaked in ATF for at least 15 minutes before installation.

NOTE: For component identification, see NEEDLE BEARING, SNAP RING, THRUST WASHER & SHIM IDENTIFICATION table. For component locations, refer to illustration. See Fig. 67 .

1. Install revolution sensor into transaxle case. Install differential side oil seals in converter housing. Ensure seals are installed with proper recess or protrusion as specified. Dimension "A" should be recessed .217-.256" (5.50-6.50 mm) from case surface. Dimension "B" may be recessed or protruded .020" (.5 mm) from case surface. See **Fig. 54** .

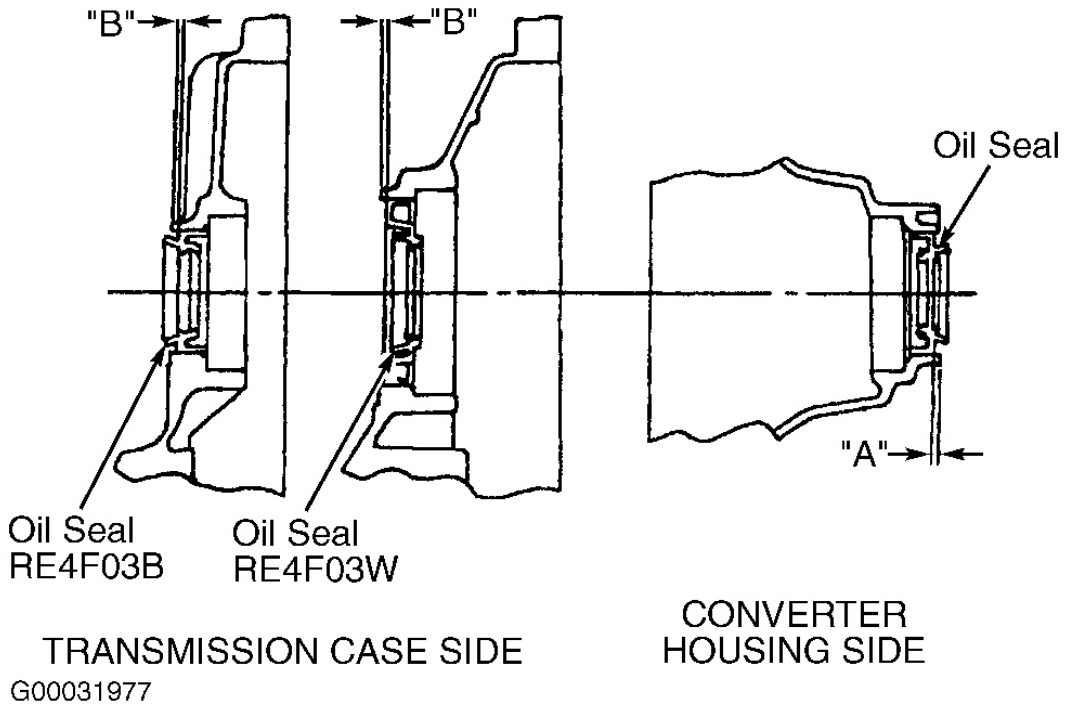


Fig. 54: Installing Differential Side Oil Seals
Courtesy of NISSAN MOTOR CO., U.S.A.

2. Install parking actuator support to transaxle case with beveled edge inward. Install parking pawl on transaxle case and secure with parking shaft. Install return spring. See **Fig. 8** . Perform **DIFFERENTIAL SIDE BEARING PRELOAD** , **REDUCTION GEAR BEARING PRELOAD** and **OUTPUT SHAFT END PLAY** adjustment procedures under TRANSAXLE ADJUSTMENTS.
3. Remove paper from bearing retainer. Apply petroleum jelly to thrust washers, bearing races and needle bearings. Install thrust washer on bearing retainer. See **Fig. 55** . Ensure bearing retainer seal rings are not spread. Align teeth of low-reverse brake drive plates. Install forward clutch assembly. Install thrust needle bearing race on bearing retainer. See **Fig. 56** . Install bearing on rear internal gear with smooth side down.

See **Fig. 57** .

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. See **REAR INTERNAL GEAR, FORWARD CLUTCH HUB & OVERRUN CLUTCH HUB** in COMPONENT DISASSEMBLY AND REASSEMBLY. Align forward clutch and overrun clutch drive plate teeth and install rear internal gear assembly. See **Fig. 11** .
5. Apply petroleum jelly to needle bearing and install needle bearing with smooth side down on rear planetary carrier. See **Fig. 58** . 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. See **Fig. 59** .

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

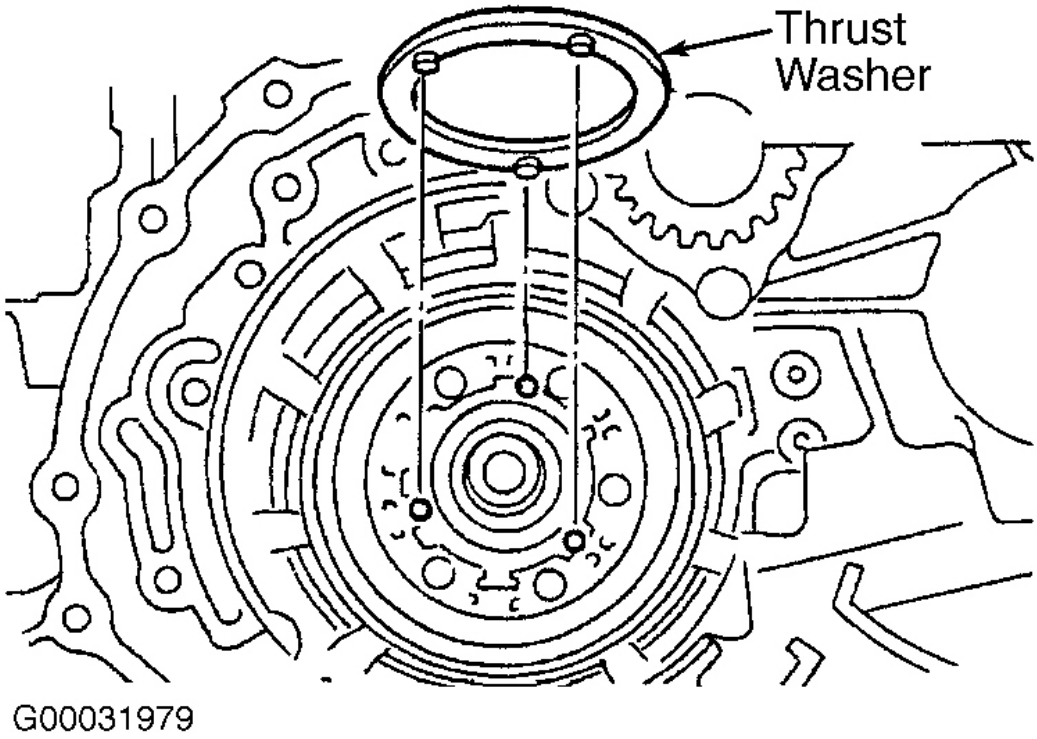


Fig. 55: Identifying Output Shaft Bearing Retainer Thrust Washer Location
Courtesy of NISSAN MOTOR CO., U.S.A.

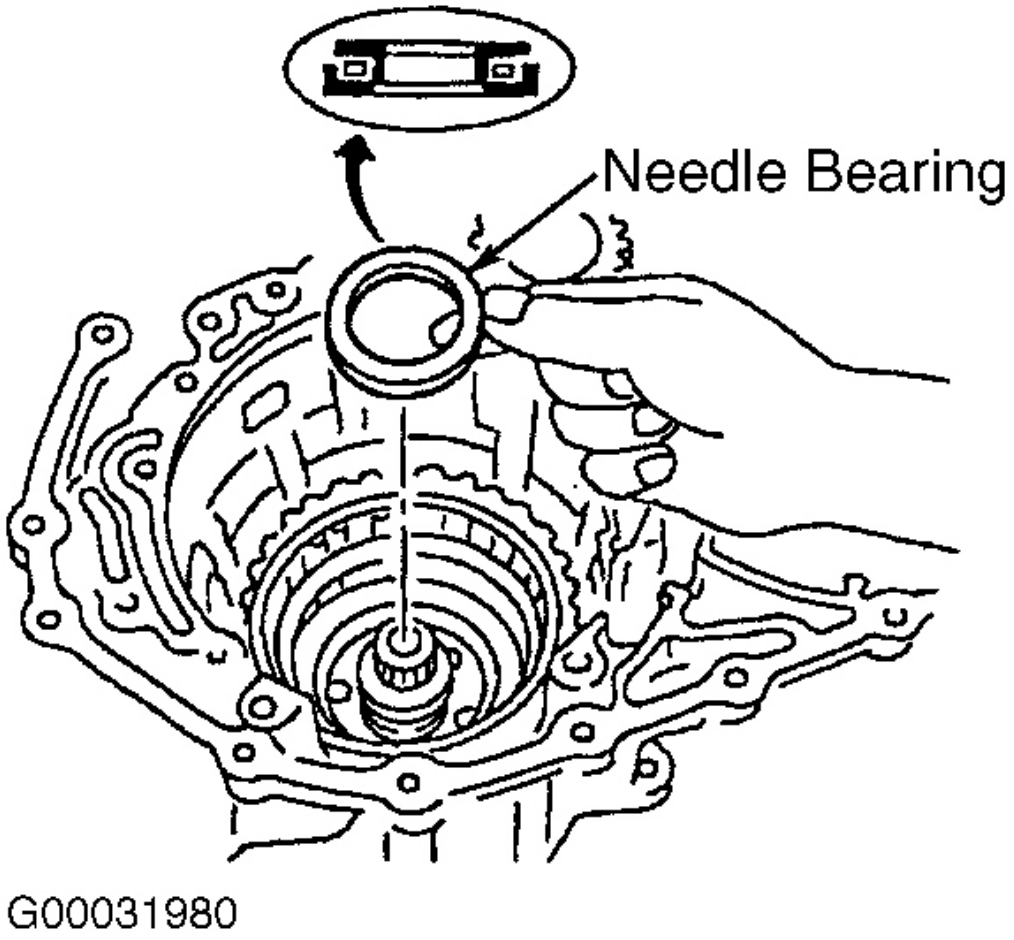


Fig. 56: Identifying Output Shaft Bearing Retainer Needle Bearing Location
Courtesy of NISSAN MOTOR CO., U.S.A.

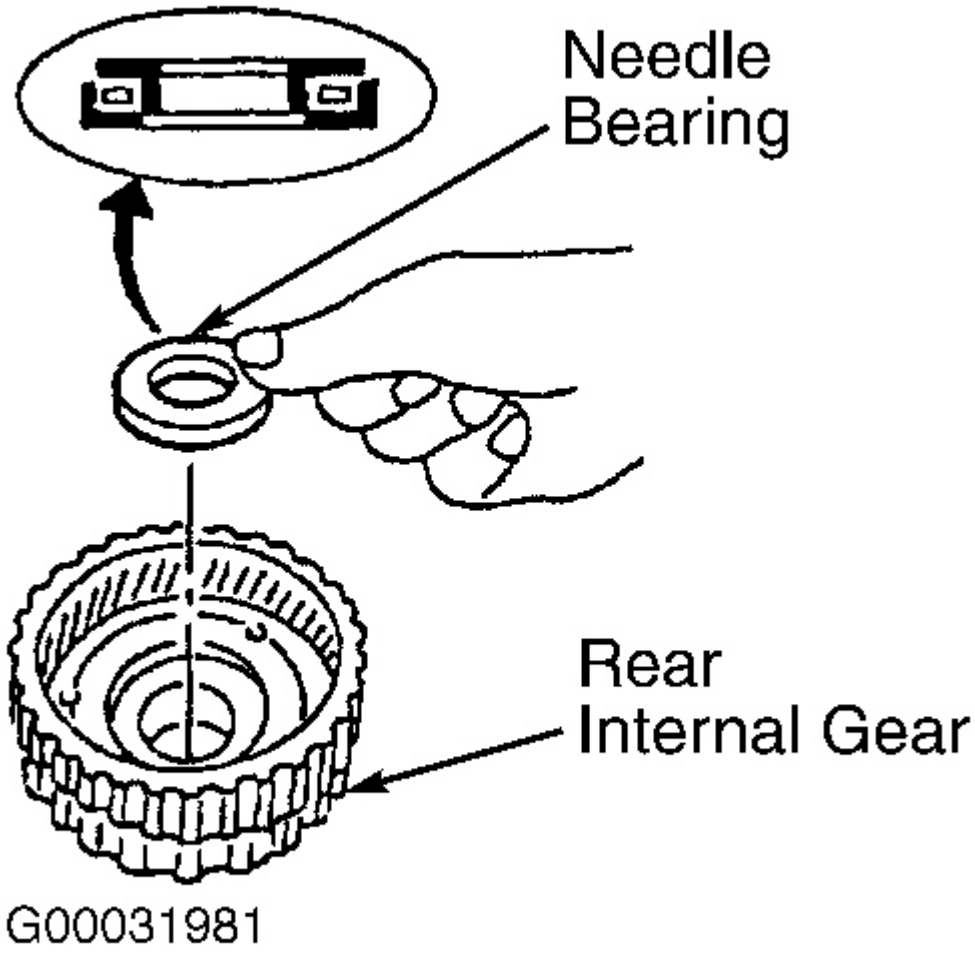


Fig. 57: Identifying Rear Internal Gear Thrust Needle Bearing Location
Courtesy of NISSAN MOTOR CO., U.S.A.

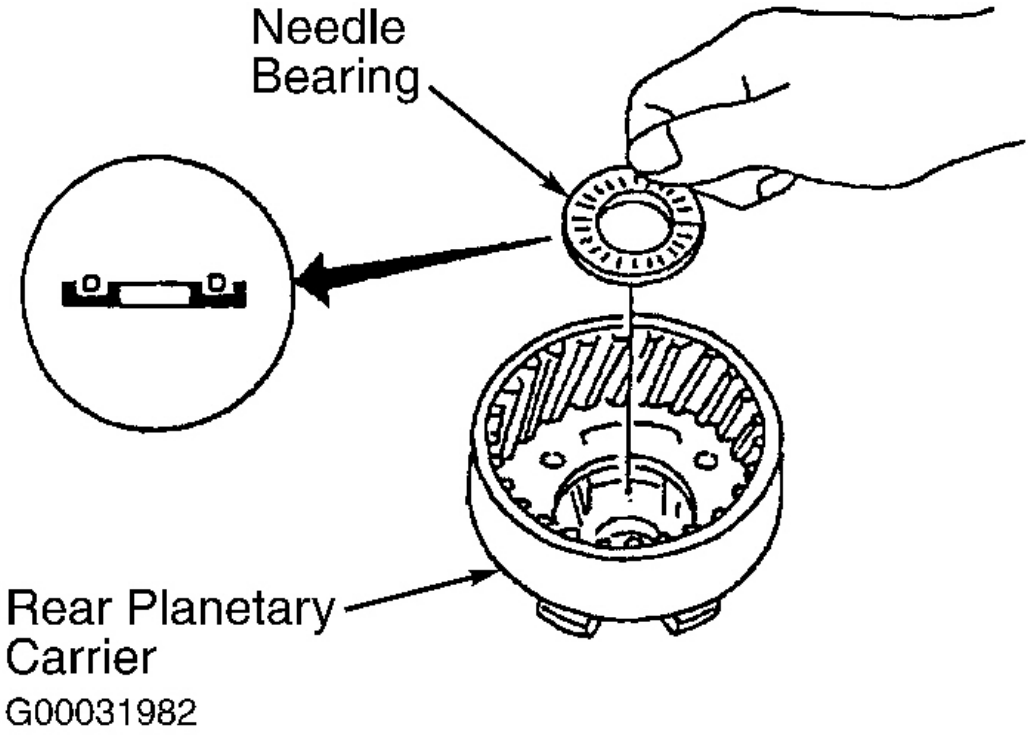


Fig. 58: Identifying Rear Planetary Carrier Thrust Needle Bearing Location
Courtesy of NISSAN MOTOR CO., U.S.A.

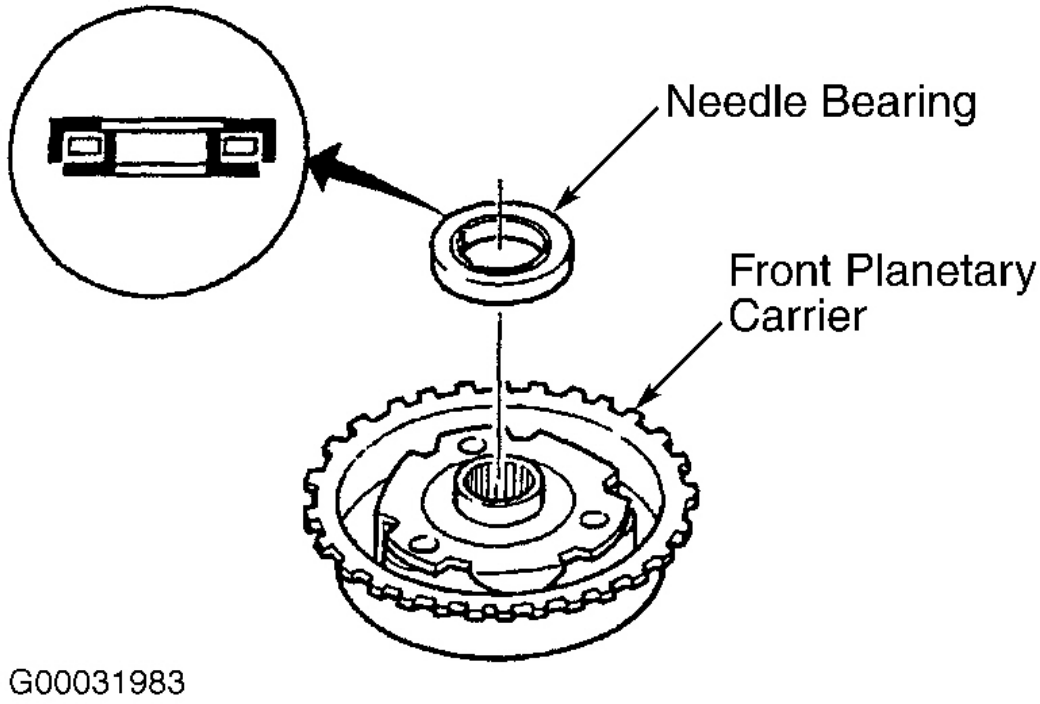


Fig. 59: Identifying Front Planetary Carrier Thrust Needle Bearing Location
Courtesy of NISSAN MOTOR CO., U.S.A.

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. See **Fig. 10** . Install front planetary carrier assembly in transaxle case. Install snap ring.
7. Install thrust needle bearing on front sun gear with flat side down. See **Fig. 60** . Install front sun gear on front planetary carrier. Install needle bearing on front sun gear with smooth side down. See **Fig. 61** . Install high clutch hub on front sun gear. Install needle bearing on high clutch hub with smooth side up. See **Fig. 62** .
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. See **Fig. 63** .
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 under TRANSAXLE ADJUSTMENTS. Install bearing race on oil pump cover. Apply petroleum jelly on thrust washer selected in **REVERSE CLUTCH END PLAY** adjustment procedure under TRANSAXLE ADJUSTMENTS. Install thrust washer on reverse clutch drum. Install oil pump assembly on transaxle case.
11. Tighten oil pump bolts to specification. See **TORQUE SPECIFICATIONS** . 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. 64** .

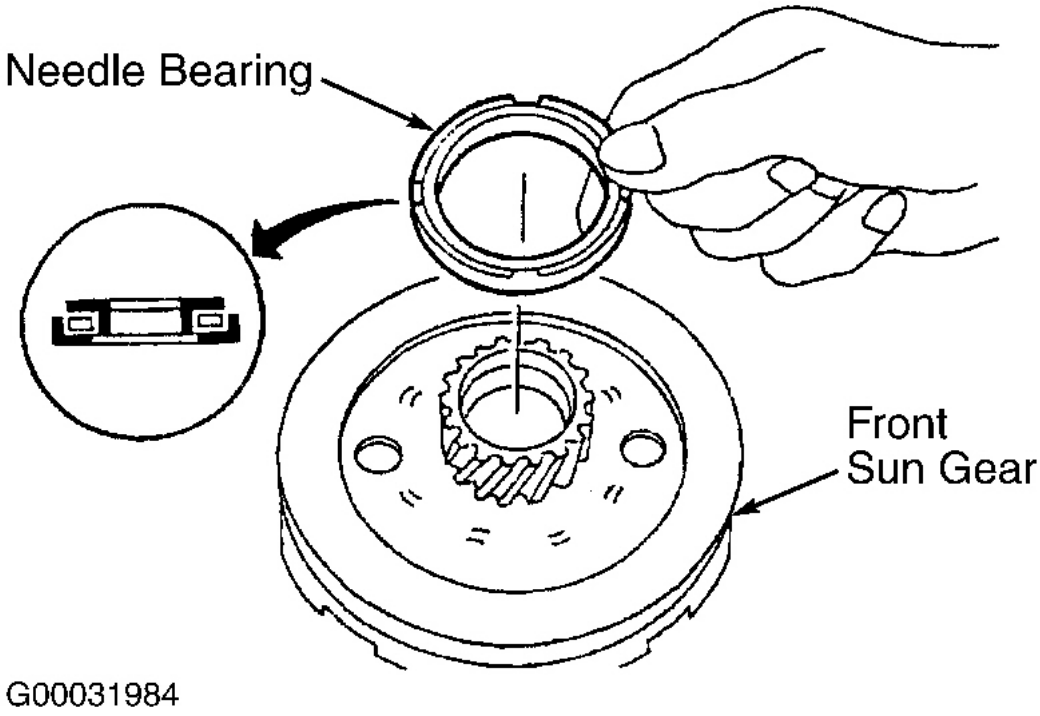


Fig. 60: Identifying Front Sun Gear Thrust Needle Bearing Location
Courtesy of NISSAN MOTOR CO., U.S.A.

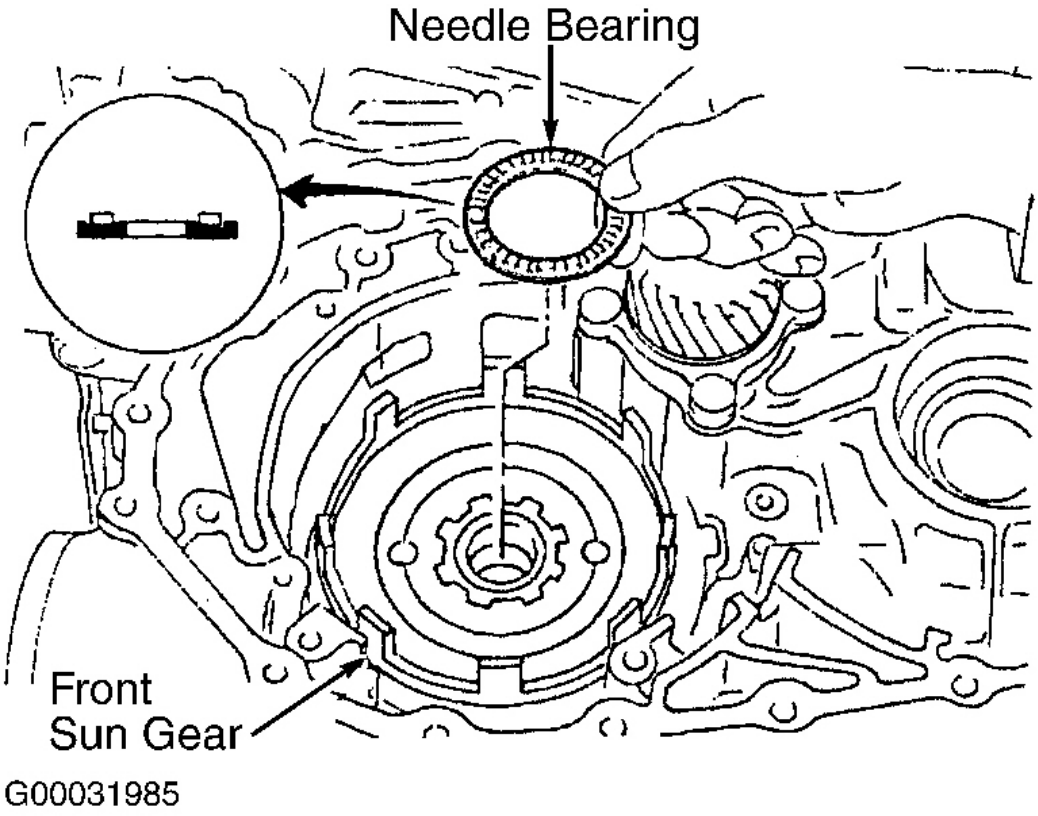


Fig. 61: Identifying Front Sun Gear-To-High Clutch Thrust Needle Bearing Location
Courtesy of NISSAN MOTOR CO., U.S.A.

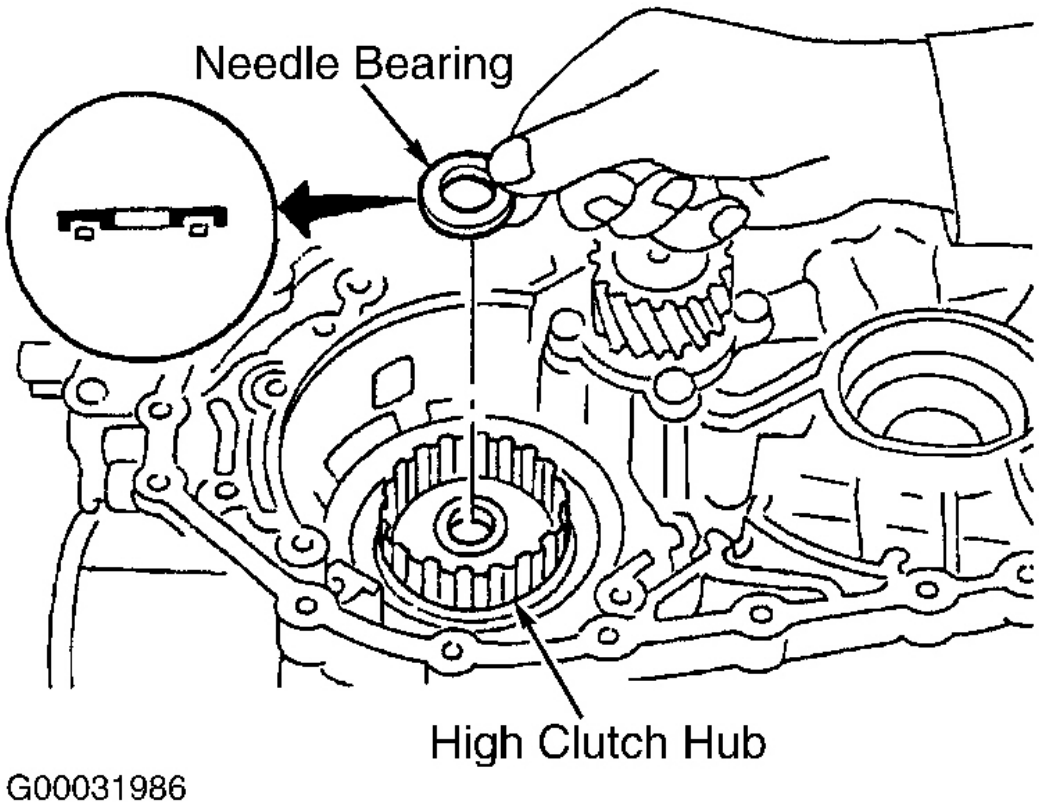


Fig. 62: Identifying High Clutch Hub Thrust Needle Bearing Location
Courtesy of NISSAN MOTOR CO., U.S.A.

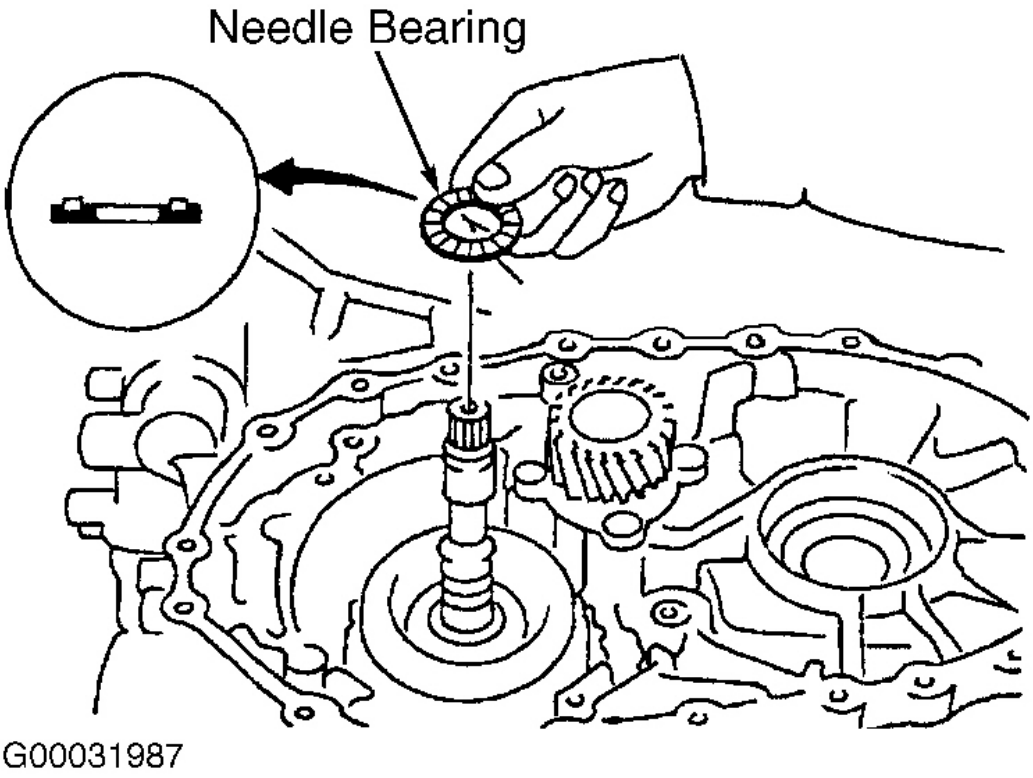


Fig. 63: Identifying Input Shaft Thrust Needle Bearing Location
Courtesy of NISSAN MOTOR CO., U.S.A.

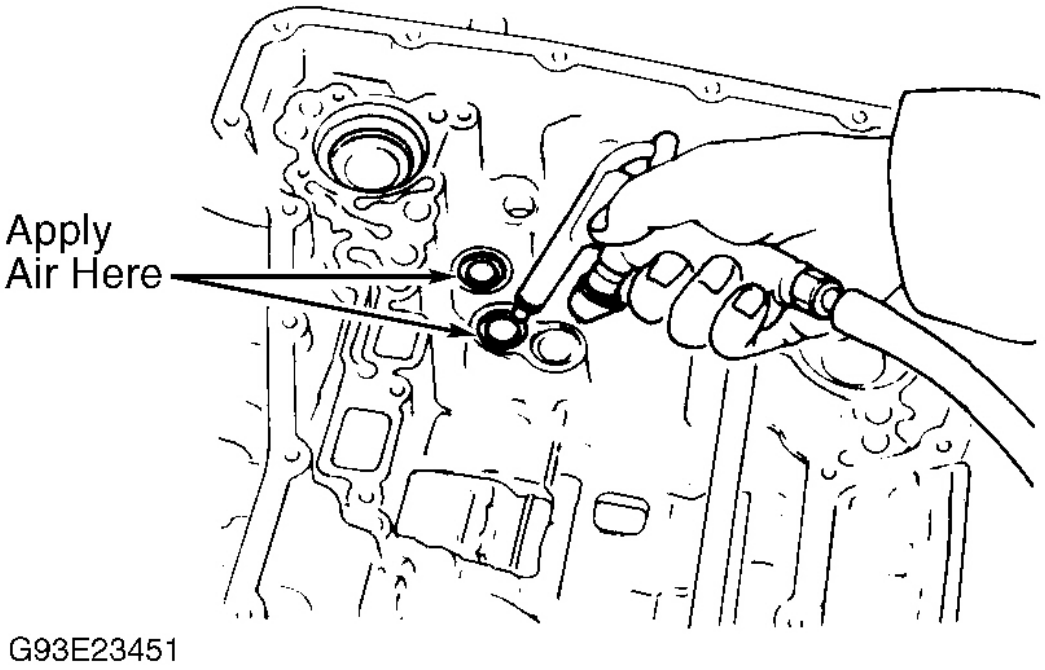


Fig. 64: Checking Brake Band Operation
Courtesy of NISSAN MOTOR CO., U. S. A.

12. Install differential assembly on transaxle case. Install oil tube on converter housing and tighten bolts to specification. See **TORQUE SPECIFICATIONS** . 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. Install converter housing bolts. See **CONVERTER HOUSING BOLT LENGTH** table. Tighten bolts to specification.
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. See **Fig. 66** .

CONVERTER HOUSING BOLT LENGTH (1)

Application	Length - In. (mm)
A	1.29 (32.8)
B	1.57 (40.0)
(1) For bolt location, refer to illustration. See **Fig. 65** .	

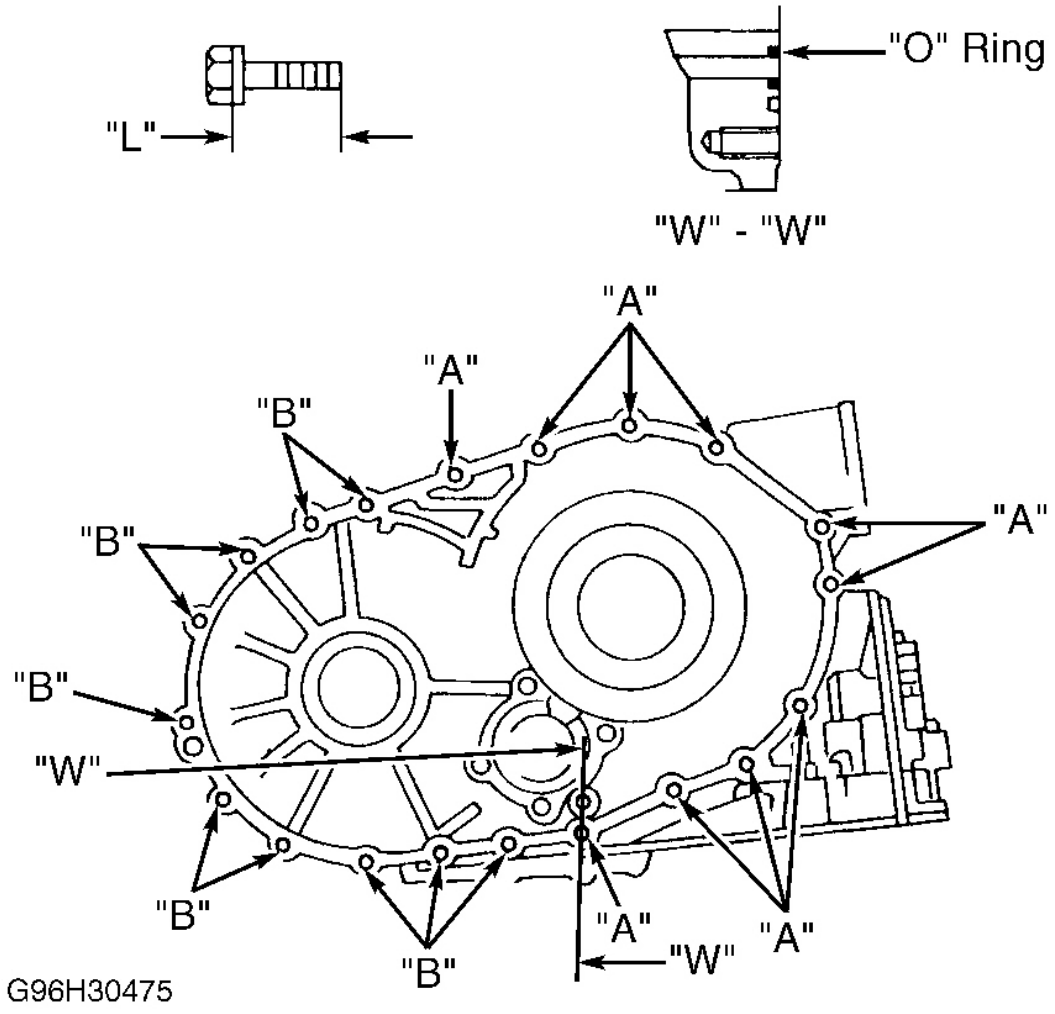


Fig. 65: Identifying Converter Housing Bolt Length & Location
Courtesy of NISSAN MOTOR CO., U.S.A.

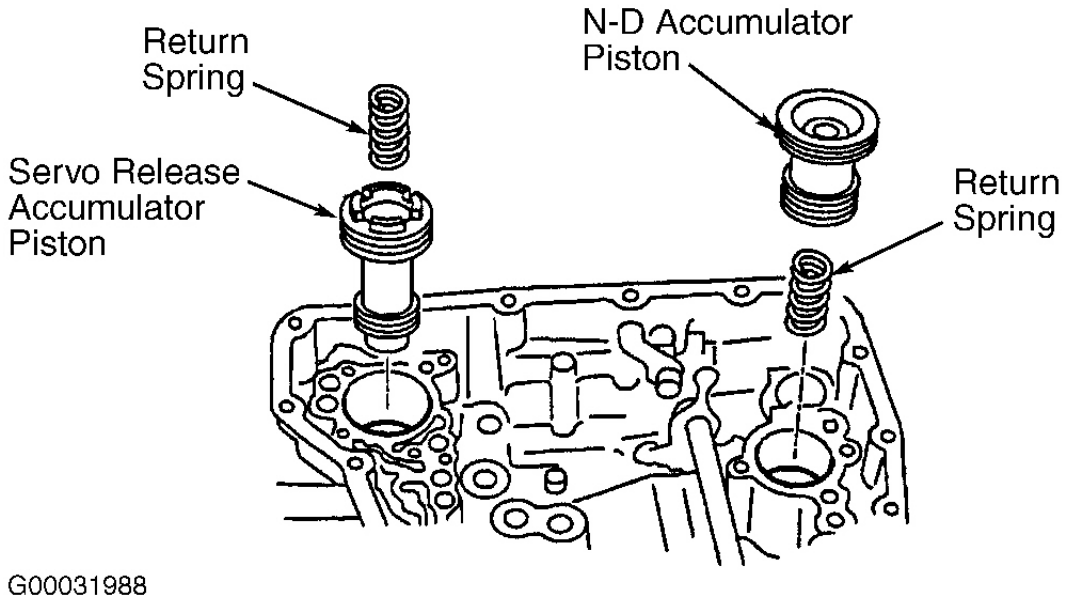


Fig. 66: Accumulator & Spring Location
Courtesy of NISSAN MOTOR CO., U.S.A.

14. Apply ATF to manual valve and insert valve into valve body assembly. Set manual shaft in Neutral position. Install valve body assembly on transaxle case while aligning manual valve with manual plate and detent valve with throttle lever.

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

15. Put solenoid harness into transaxle case and push terminal body onto transaxle case. Install clip to terminal body. Install valve body assembly bolts and tighten to specification. See **Fig. 7** . See **TORQUE SPECIFICATIONS** . Attach magnet to oil pan. Install NEW oil pan gasket and install oil pan. Tighten NEW pan bolts in a crisscross pattern to specification. Install drain plug (if necessary) and tighten to specification.
16. Install PNP switch and adjust if necessary. See appropriate AUTOMATIC TRANSMISSION SERVICING article in TRANSMISSION SERVICING. Apply ATF to NEW "O" ring and install on dipstick tube. Install dipstick tube and oil cooler tube to transaxle. Tighten bolts to specification.
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. 68** . Distance "A" should be 0.63" (15.9 mm).

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

Application & ID Number	Outer Diameter - In. (mm)
Snap Rings	
1	5.59 (142.0)
2	4.45 (113.0)

3	6.39 (162.4)
4	5.33 (135.4)
5	6.39 (162.3)
6	4.96 (126.0)
7	1.59 (40.5)
Needle Bearings	
8	1.85 (47.0)
9	1.38 (35.0)
10	2.36 (60.0)
11	2.36 (60.0)
12	1.85 (47.0)
13	1.68 (42.6)
14	1.89 (48.0)
15	2.16 (55.0)
16	2.36 (60.0)
Thrust Washers	
17 (Selective)	2.84 (72.0)
18	3.09 (78.5)
Race & Shims (Selective)	
19	1.89 (48.0)
20	2.83 (72.0)
21	1.36 (34.5)
22	2.68 (68.0)
(1) For component locations, refer to illustration. See **Fig. 67** .	

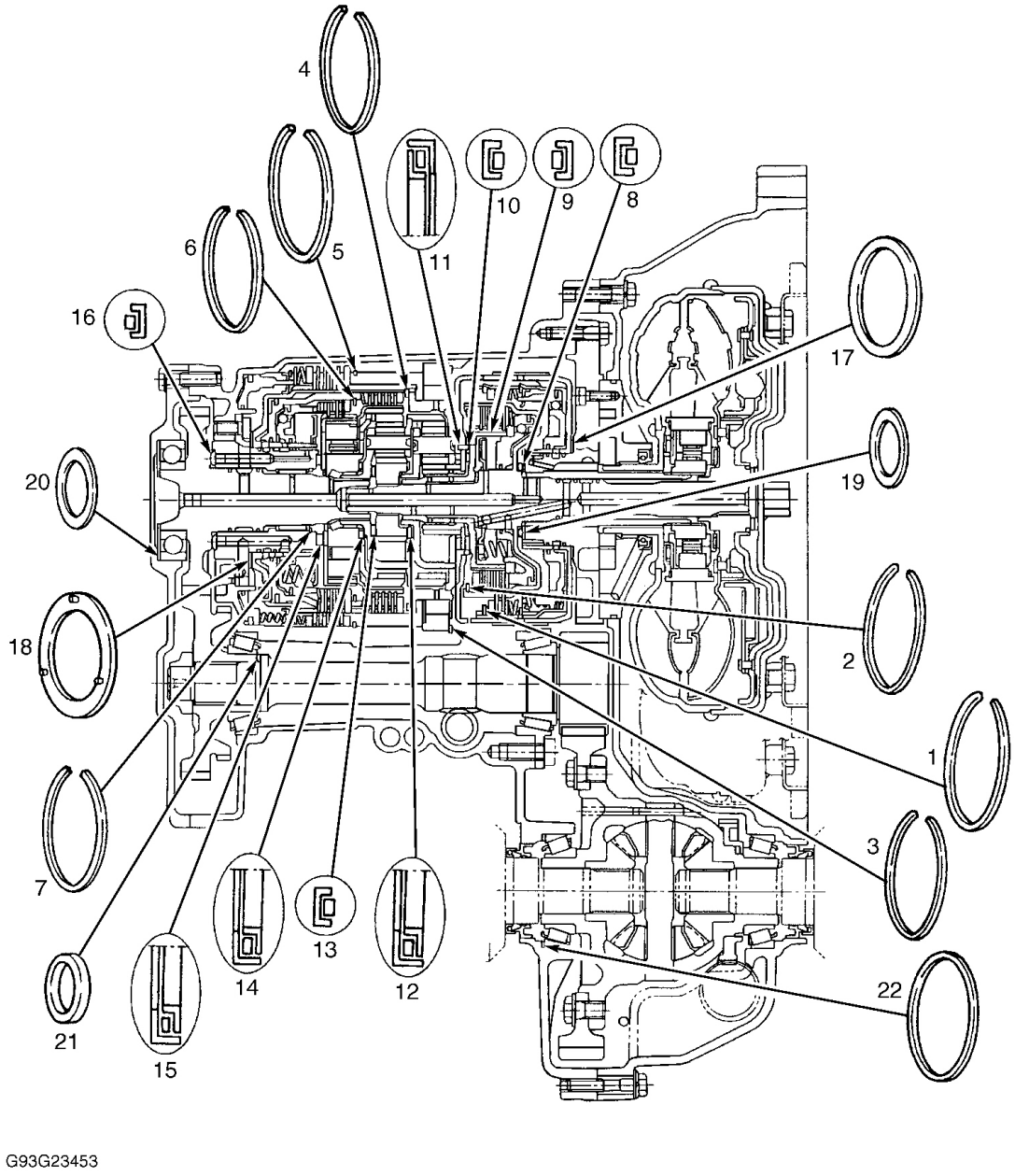


Fig. 67: Identifying Needle Bearing, Snap Ring, Thrust Washer & Selective Shim Locations
Courtesy of NISSAN MOTOR CO., U. S. A.

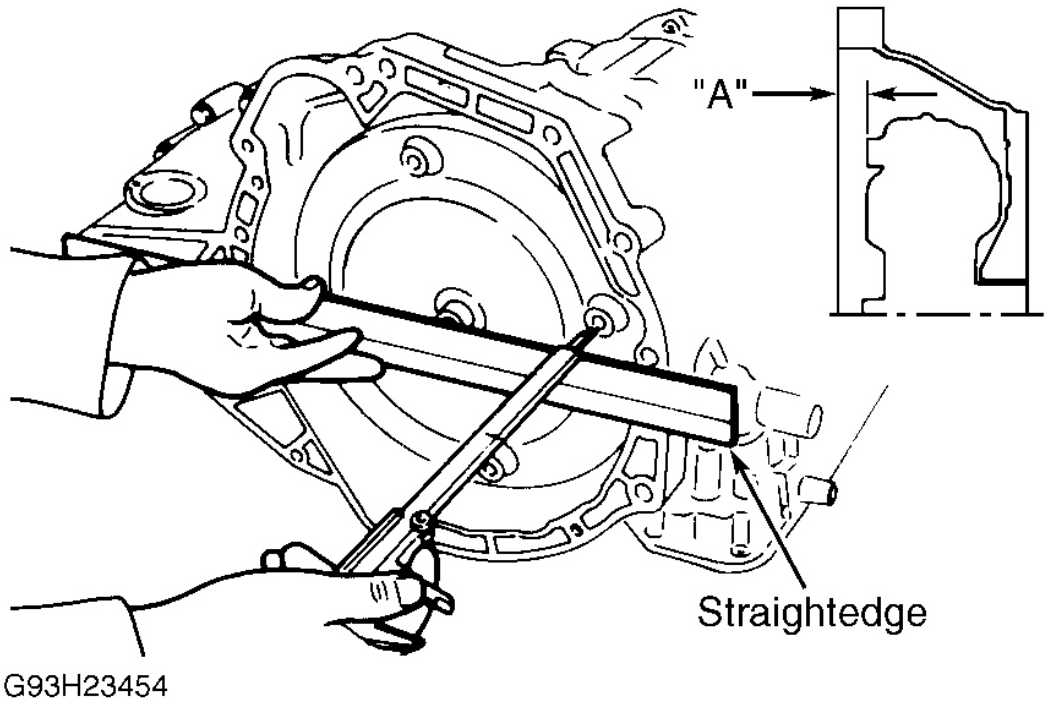


Fig. 68: Measuring Torque Converter Installed Depth
Courtesy of NISSAN MOTOR CO., U. S. A.

TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS

Application	Ft. Lbs. (N.m)
Anchor End Pin Lock Nut	23-27 (31-36)
Bearing Retainer	12-15 (16-21)
Converter Housing Bolt	19-22 (26-30)
Idler Gear Lock Nut	181-203 (245-275)
Oil Cooler Tube Bolt	29-44 (39-59)
Oil Pan Drain Plug	22-29 (30-39)
Oil Pump-To-Converter Housing Bolt	19-22 (26-30)
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	

RE4F03B	55-65 (74-88)
RE4F03W	39-50 (53-68)
Side Cover Bolt	19-22 (26-30)
	INCH Lbs. (N.m)
Detent Spring Bolt	57-66 (6.4-7.5)
Dipstick Tube	35-44 (3.7-5)
Inhibitor Switch Bolt	18-22 (2-2.5)
Oil Pan Bolt	62-80 (7-9)
Oil Pump Cover-To-Housing Bolt	62-97 (7-11)
Oil Tube	44-62 (5-7)
Revolution Sensor	44-62 (5-7)
Speedometer Pinion Bolt	33-44 (3.7-5)
Valve Body Bolt (All Except "E")	62-80 (7-9)
Valve Body Bolt "E"	35-44 (4-5)
Viscous Coupling to Differential Case	33-52 (3.7-5.9)

TRANSAXLE SPECIFICATIONS

TRANSAXLE SPECIFICATIONS

Application	**In. (mm)**
Differential Assembly	
Side Gear-To-Differential Case Specified Clearance	.004-.008 (.10-.20)
Differential Side Bearing Preload	.002-.004 (.04-.10)
Forward & Overrun Clutch	
Dish Plate Thickness	
Forward Clutch	.098 (2.50)
Overrun Clutch	.085 (2.15)
Drive Plate Thickness	
Forward Clutch	
Desired Thickness	.071 (1.80)
Service Limit	.063 (1.60)
Overrun Clutch	
Desired Thickness	.063 (1.60)
Service Limit	.055 (1.40)
Retaining Plate-To-Snap Ring	
Desired Clearance	
Forward Clutch	.018-.034 (.45-.85)
Overrun Clutch	.039-.055 (1.00-1.40)
Service Limit	
Forward Clutch	.073 (1.85)
Overrun Clutch	.079 (2.00)

High Clutch	
Drive Plate Thickness	
Desired Thickness	.079 (2.00)
Service Limit	.071 (1.80)
Retaining Plate-To-Snap Ring	
Desired Clearance	.055-.071 (1.40-1.80)
Service Limit	.094 (2.40)
Input Shaft Seal Ring-To-Ring Groove	
Desired Clearance	.003-.009 (.08-.23)
Service Limit	.009 (.23)
Low-Reverse Brake	
Drive Plate Thickness	
Desired Thickness	.079 (2.00)
Service Limit	.071 (1.80)
Retaining Plate-To-Snap Ring	
Desired Clearance	.055-.071 (1.40-1.80)
Service Limit	.110 (2.80)
Oil Pump	
Oil Pump Side Clearance	.0008-.0016 (.020-.040)
Seal Ring-To-Ring Groove	
Desired Clearance	.004-.010 (.10-.25)
Service Limit	.010 (.25)
Outer Gear-To-Oil Pump Housing Clearance	.003-.006 (0.08-0.15)
Output Shaft End Play	0-.02 (0-.5)
Output Shaft Seal Ring-To-Ring Groove	
Desired Clearance	.004-.010 (.10-.25)
Service Limit	.010 (.25)
Front & Rear Planetary Carrier	
Pinion Washer-To-Planetary Gear	
Desired Clearance	.006-.028 (.15-.70)
Service Limit	.031 (.80)
Reverse Clutch	
Dish Plate Thickness	.110 (2.80)
Drive Plate Thickness	
Desired Thickness	.079 (2.00)
Service Limit	.071 (1.80)
Retaining Plate-To-Snap Ring	
Desired Clearance	.020-.031 (.50-.80)
Service 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)

