2001-04 AUTOMATIC TRANSMISSIONS

A-44D Overhaul

APPLICATION

CAUTION: Flush oil cooler and oil cooler lines prior to transmission installation. Oil cooling system contamination may cause premature transmission failure.

TRANSMISSION APPLICATION

Application	(1) Transmission Model
Tacoma 2WD (2.4L)	A-44D
(1) Transmission may also be referred to as A-43D.	

IDENTIFICATION

TRANSMISSION

Transmission is identified by Vehicle Identification Number (VIN). VIN locations are at top left of instrument panel and driver's side door post. See **Fig. 1** . VIN is used to ensure correct application of component parts and assemblies.

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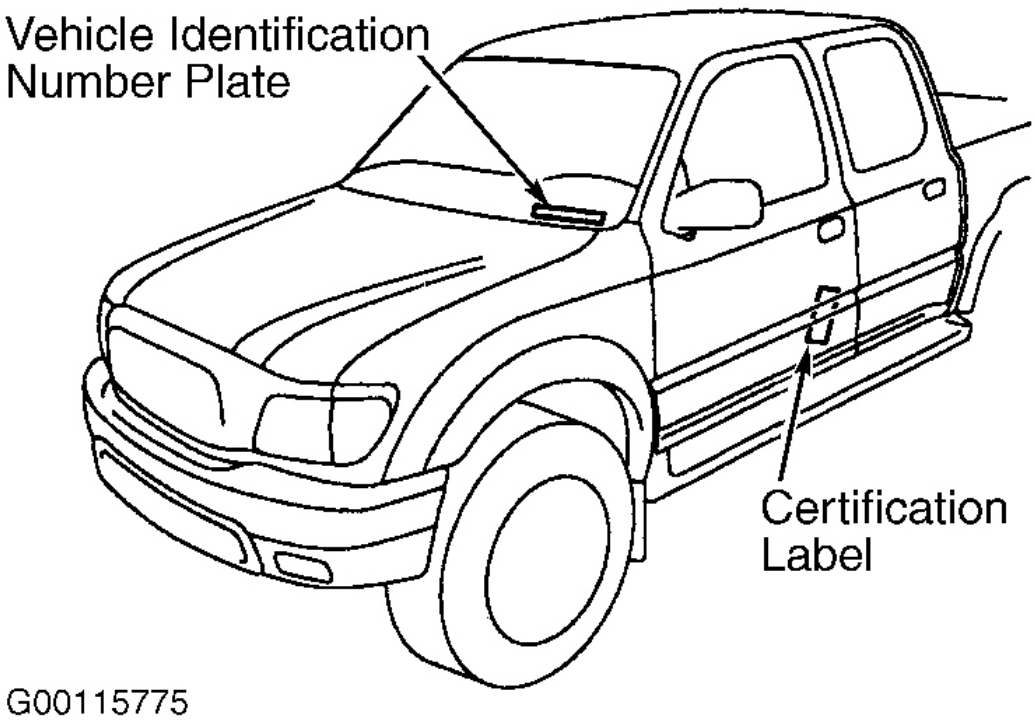


Fig. 1: Locating Vehicle Identification Number Plate
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GEAR RATIOS

TRANSMISSION GEAR RATIOS

Gear Range	Gear Ratio
1st	2.826:1
2nd	1.493:1
3rd	1.000:1
OD	0.688:1
Reverse	2.703:1

DESCRIPTION & OPERATION

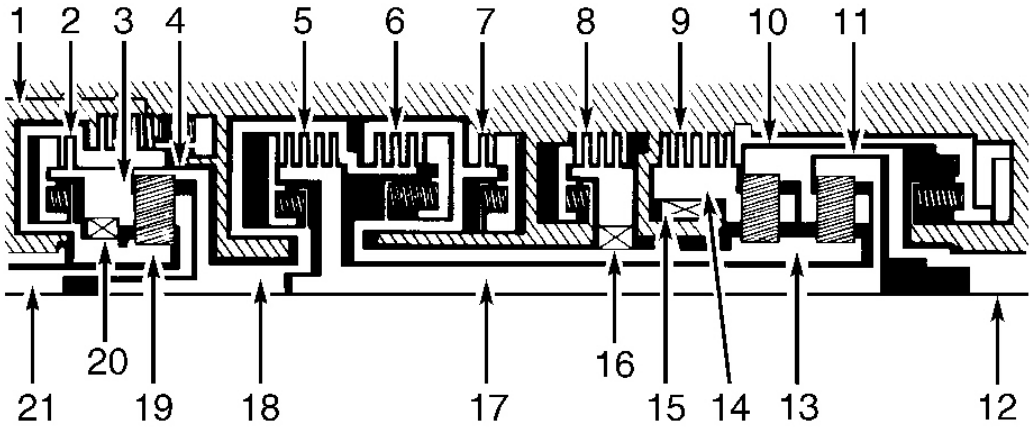
INTRODUCTION

Transmission consists of a torque converter, oil pump, valve body assembly, front clutch, O/D direct clutch, rear clutch, 3 planetary gear sets, 4 clutch style brakes and 3 one-way clutches. See **Fig. 2** .

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An Overdrive (OD) switch is mounted on the gearshift lever. When OD switch is depressed to ON position, transmission will shift into 4th gear when gearshift lever is in "D" position, and OD OFF light on instrument panel will turn off. When OD switch is released to OFF position, transmission will shift into 3rd gear, and OD OFF light on instrument panel will illuminate. Overdrive is controlled by overdrive solenoid. For solenoid testing, see appropriate DIAGNOSIS article.

Transmission is equipped with a shift lock and key lock system. Shift lock system prevents gearshift lever from being moved from "P" position unless brake pedal is depressed. Key lock system prevents ignition key from being moved from ACC to LOCK position on ignition switch unless gearshift lever is in "P" position. For more information on shift lock and key lock system, see appropriate SHIFT INTERLOCK SYSTEMS article.



1. OD Brake
2. OD Direct Clutch
3. OD Planetary Carrier
4. OD Planetary Ring Gear
5. Front Clutch
6. Rear Clutch
7. No. 1 Brake
8. No. 2 Brake
9. No. 3 Brake
10. Front Planetary Ring Gear
11. Rear Planetary Ring Gear
12. Output Shaft
13. Sun Gear
14. Front Planetary Carrier
15. No. 2 One-Way Clutch
16. No. 1 One-Way Clutch
17. Intermediate Shaft
18. Input Shaft
19. OD Planetary Sun Gear
20. OD One-Way Clutch
21. OD Input Shaft

G93J23803

Fig. 2: Identifying Transmission Component Locations
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LUBRICATION

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NOTE: See appropriate SERVICING - A/T article.

TROUBLE SHOOTING

NOTE: Transmission malfunctions may be caused by poor engine performance, improper adjustments, fluid condition or failure of hydraulic, mechanical or electronic components. Ensure all concerns have been properly checked prior to transmission overhaul. See appropriate DIAGNOSIS article.

COMPONENT TESTS

TORQUE CONVERTER

NOTE: Torque converter is a sealed unit and must be serviced as complete assembly. Perform following tests to check converter condition. Torque converter and transmission cooler must be thoroughly cleaned and flushed if transmission fluid is contaminated.

One-Way Clutch Test

1. Install turner and stopper of One-Way Clutch Tester (09350-20015) in torque converter. See **Fig. 3** . Turner fits in inner race of one-way clutch. Stopper fits in notch of converter hub and outer race of one-way clutch.
2. Clutch should lock when rotated counterclockwise, and turn freely when rotated clockwise. If necessary, clean converter and retest clutch. Replace converter if clutch fails test.

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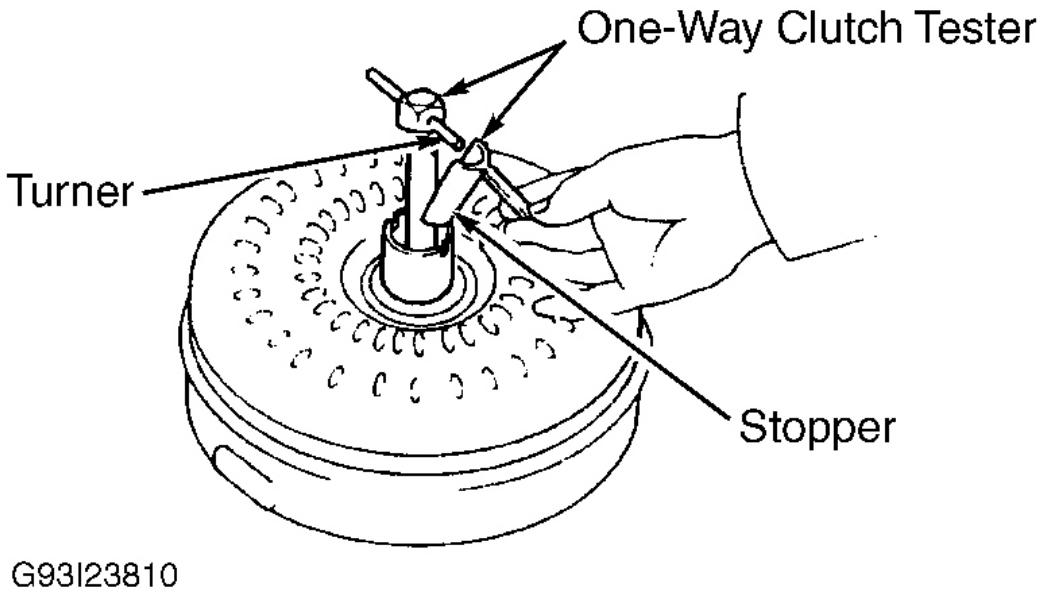


Fig. 3: Checking Torque Converter One-Way Clutch
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Drive Plate Runout Test

Measure drive plate runout. See **Fig. 4** . If runout exceeds .008" (.20 mm), or if ring gear is damaged, replace drive plate. If installing a new drive plate, note position of spacers. Tighten bolts to 55 ft. lbs. (74 N.m).

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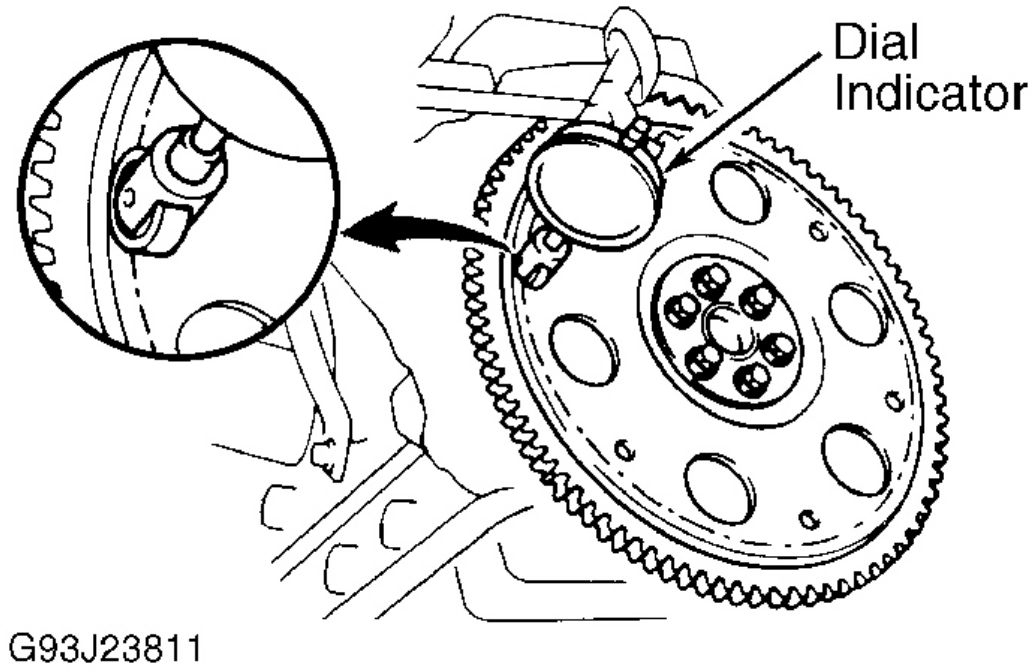


Fig. 4: Checking Drive Plate Runout
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Converter Sleeve Runout Test

1. Temporarily mount torque converter to drive plate. Mount a dial indicator with needle resting on converter sleeve. See **Fig. 5** . Rotate converter. If runout exceeds .012" (.30 mm), ensure converter is properly mounted to drive plate and drive plate is not broken or bent.
2. If converter is properly mounted and runout exceeds specification, replace torque converter. Mark position of converter to ensure correct installation. Remove converter from drive plate.

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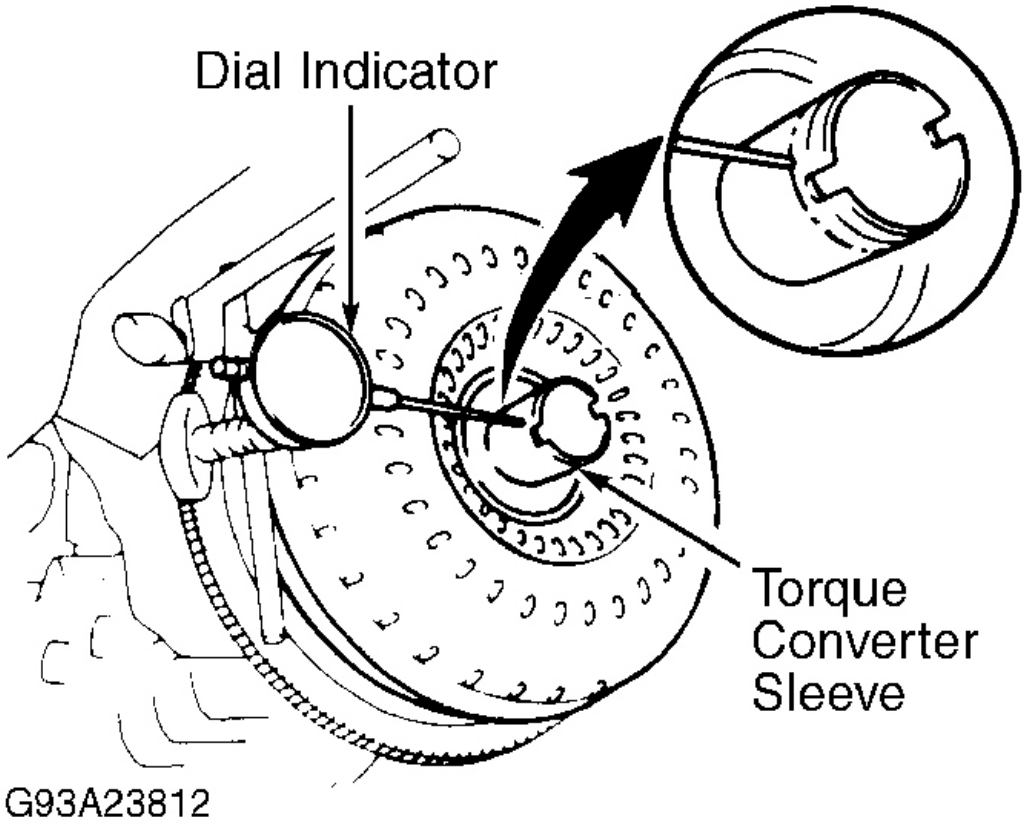


Fig. 5: Checking Converter Sleeve Runout
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TRANSMISSION DISASSEMBLY

1. Remove wire harness clamp and throttle cable from converter housing. Remove control shaft lever. Remove overdrive solenoid, park/neutral position switch (neutral start switch) and speed sensor. See **Fig. 7** .
2. Remove oil pump bolts. Using appropriate 2-jaw puller, remove oil pump from transmission case. Remove bearing and race from rear of oil pump. Remove converter housing bolts. Note length and bolt location. While holding input shaft, remove converter housing. Remove "O" ring from OD case.
3. Remove extension housing and gasket. Note bolt length and location. Remove oil supply tube. Remove snap ring, speedometer drive gear, lock ball and remaining snap ring from output shaft. See **Fig. 7** .
4. Remove staked area on lock plate. Remove governor assembly lock plate bolt. Using screwdriver, lift retaining clip from hole of output shaft. Remove governor assembly.
5. Remove cover, gasket and governor oil strainer from rear of transmission case. Remove oil pan and gasket. Remove magnets from oil pan. Inspect magnets and pan for metal or brass particles.

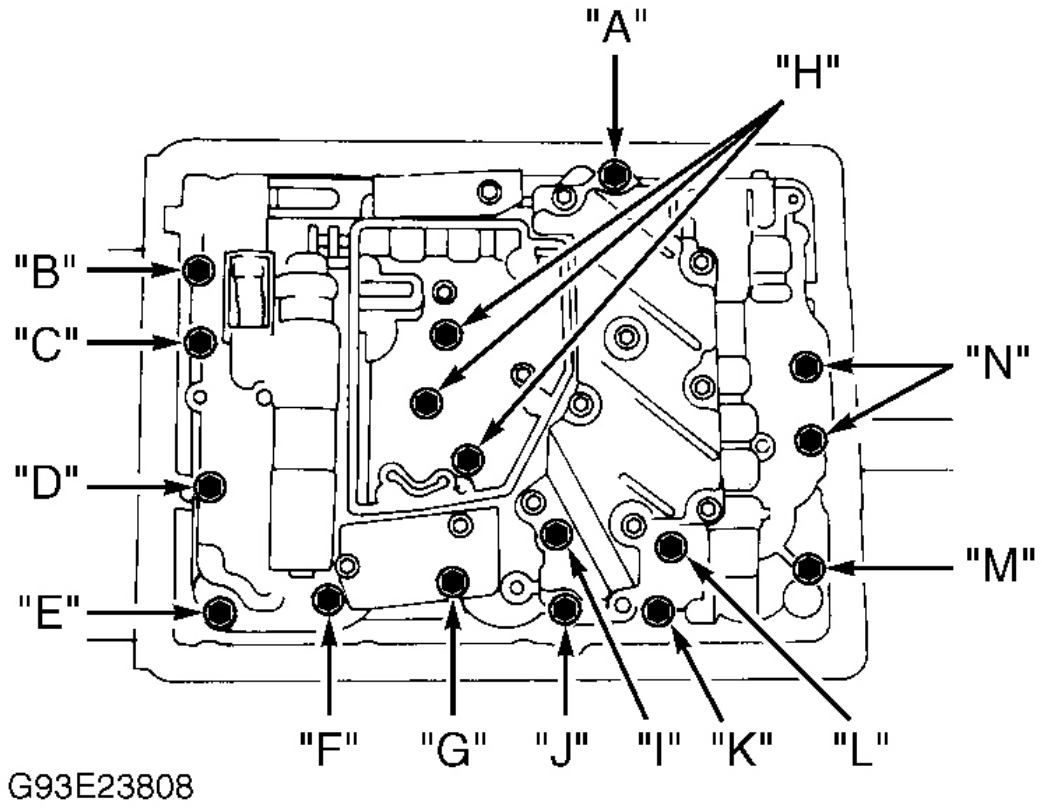
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6. Remove oil tubes by carefully prying both ends of tube with screwdriver. Remove oil strainer (filter) and gasket. See **Fig. 8** . Remove valve body assembly bolts. Note bolt location and length. See **VALVE BODY ASSEMBLY BOLT SPECIFICATIONS** table. See **Fig. 6** . Slightly lower valve body assembly. Disconnect throttle cable from valve assembly cam. Remove valve body assembly.

VALVE BODY ASSEMBLY BOLT SPECIFICATIONS (1)

Bolt Identification	In. (mm)
A, I & J	2.17 (55)
B	1.57 (40)
C, D & M	1.42 (36)
E & F	.98 (25)
G	1.85 (47)
H & N	1.18 (30)
K & L	.79 (20)

(1) For bolt identification and locations, refer to illustration. See **Fig. 6** .



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Fig. 6: Identifying Valve Body Assembly Bolt Locations
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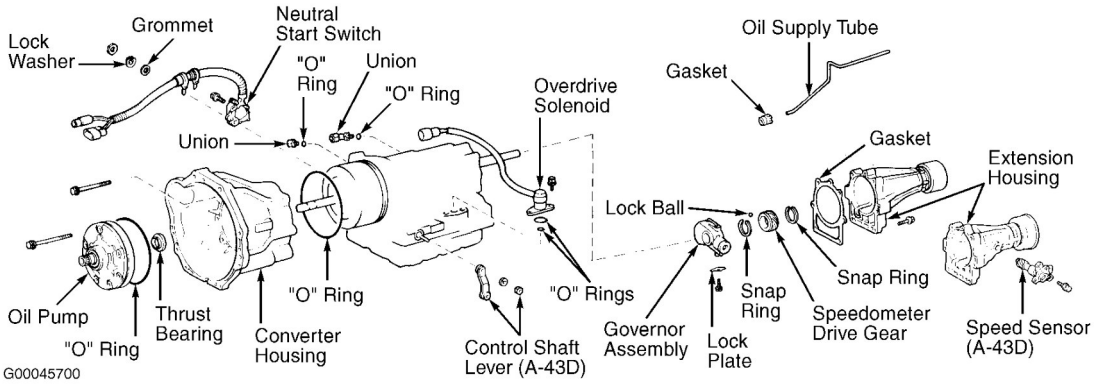


Fig. 7: Identifying Transmission & Extension Housing Components
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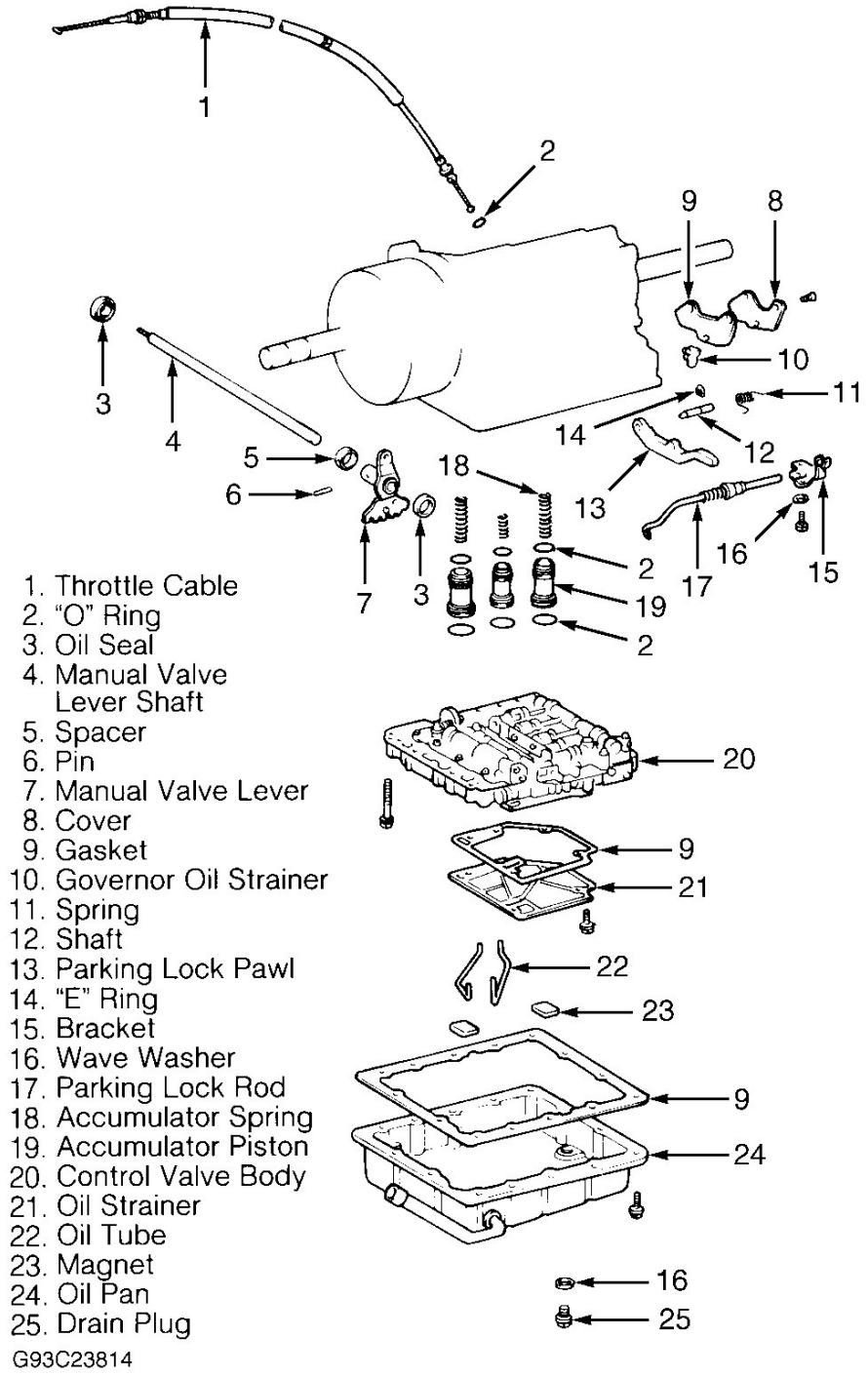


Fig. 8: Identifying Transmission Case Components
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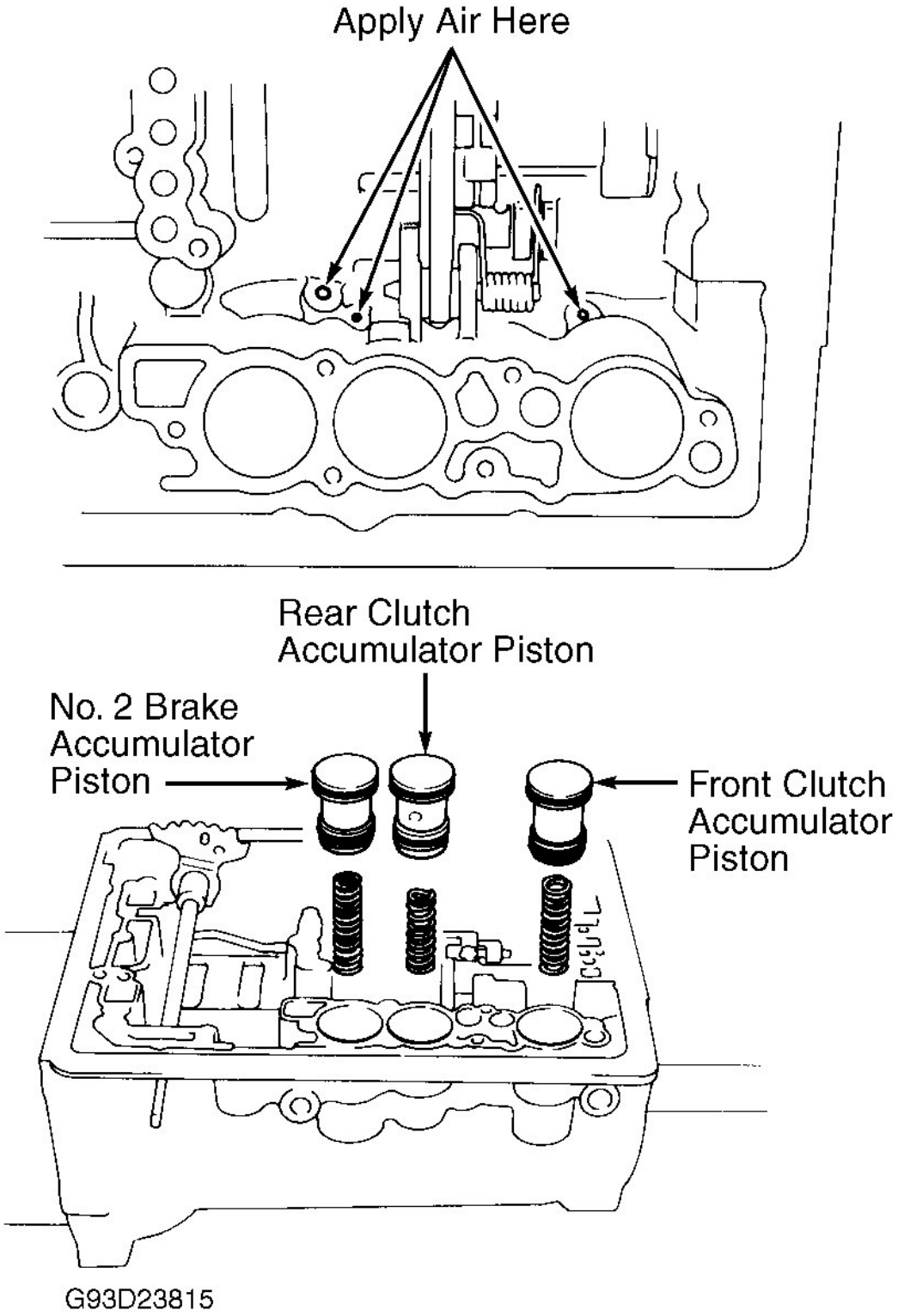
7. Remove throttle cable and "O" ring. Place shop cloth over accumulator pistons. Apply compressed air to oil passages of transmission case to remove accumulator pistons and springs. See **Fig. 9** . Note spring and

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piston locations.

8. Remove parking lock rod bracket and rod. Remove parking lock pawl, pivot pin and spring. If manual valve lever shaft requires removal, use hammer and chisel to cut spacer and slide spacer toward lever to obtain clearance to shaft pin. Drive out pin. Remove shaft and spacer. Remove oil seals. See **Fig. 8** .
9. Position transmission case with front of case facing upward. Push input shaft and drum toward rear of transmission case to ensure OD direct clutch is installed correctly. Using vernier caliper and Clutch Drum Thrust Plate Gauge (09370-12010), measure distance between top of OD case and OD direct clutch drum. See **Fig. 10** .
10. Record measurement for reassembly reference. Remove OD planetary gear with OD direct clutch and one-way clutch from OD case. Note location of thrust washer and race on clutch assembly. Hold both sides of OD case and remove from transmission case. Note location of bearing and race. See **Fig. 12** .
11. Push input shaft and drum toward rear of transmission case. Ensure front clutch is installed correctly. Using vernier caliper and Clutch Drum Thrust Plate Gauge (09370-12010), measure distance between top of case and front clutch drum. See **Fig. 11** . Record measurement for reassembly reference.

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Fig. 9: Removing Accumulator Pistons & Springs
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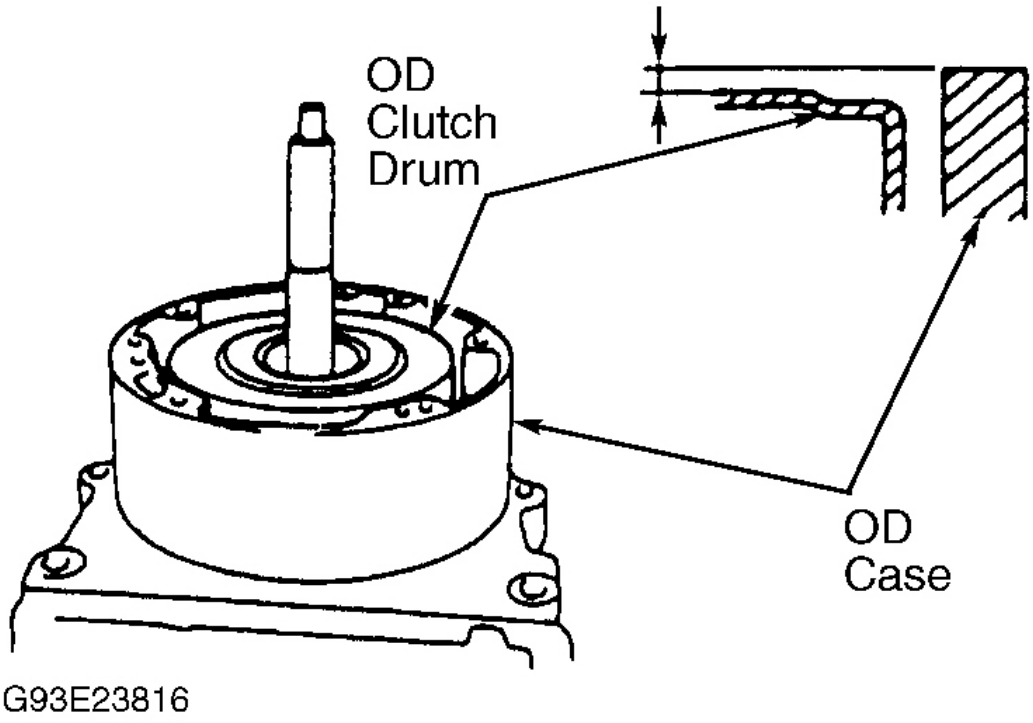


Fig. 10: Measuring OD Direct Clutch Drum Clearance
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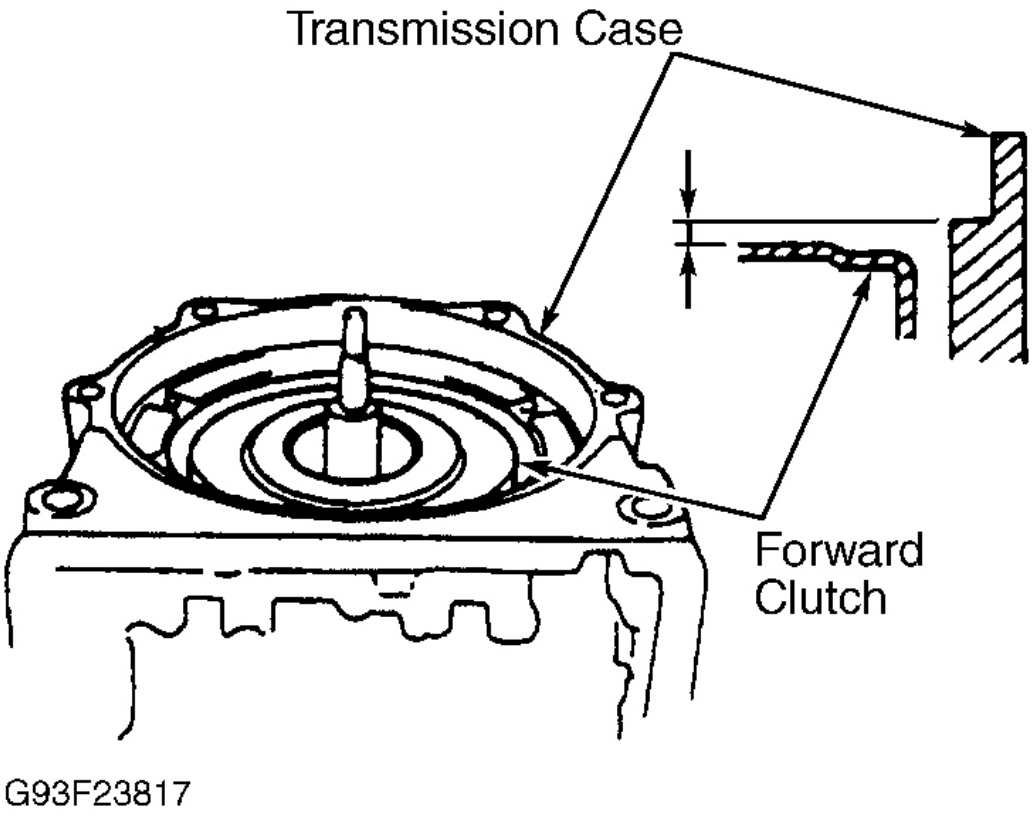


Fig. 11: Measuring Front Clutch Drum Clearance
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12. Remove front clutch assembly from transmission case. Note location of bearings and race. Remove rear clutch assembly. Remove center support-to-case retaining bolts and washers. Bolts are located at valve body side of case. See **Fig. 12** .
13. Remove center support and sun gear shaft assembly from transmission case. Note direction of bearing race on end of sun gear. Using 2 screwdrivers, remove front planetary gear snap ring. Insert 2 wires into planetary gear and remove gear. Using calipers, measure pack clearance of No. 3 brake between disc and transmission case. See **Fig. 13** . Pack clearance should be .024-.104" (.61-2.64 mm). If clearance is not as specified, inspect brake discs.
14. Remove No. 3 brake pack and pressure plate. Remove rear planetary gear, output shaft and 2 bearings. Remove brake apply tube. See **Fig. 12** . Remove race from transmission case. Ensure No. 3 brake pistons move smoothly when applying compressed air into transmission case. See **Fig. 14** .
15. Using appropriate spring compressor, compress No. 3 brake piston return spring. Remove snap ring. Remove piston return spring. While holding outer piston with hand, apply compressed air to case and remove outer piston.
16. Insert Puller (09350-07080) behind reaction sleeve and gradually lift sleeve out of transmission case.

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Insert Puller (09350-07090) behind inner piston and lift piston out of transmission case. See **Fig. 12** and **Fig. 15** . Measure inside diameter of transmission case rear bushing. Replace transmission case if diameter exceeds 1.5035" (38.188 mm).

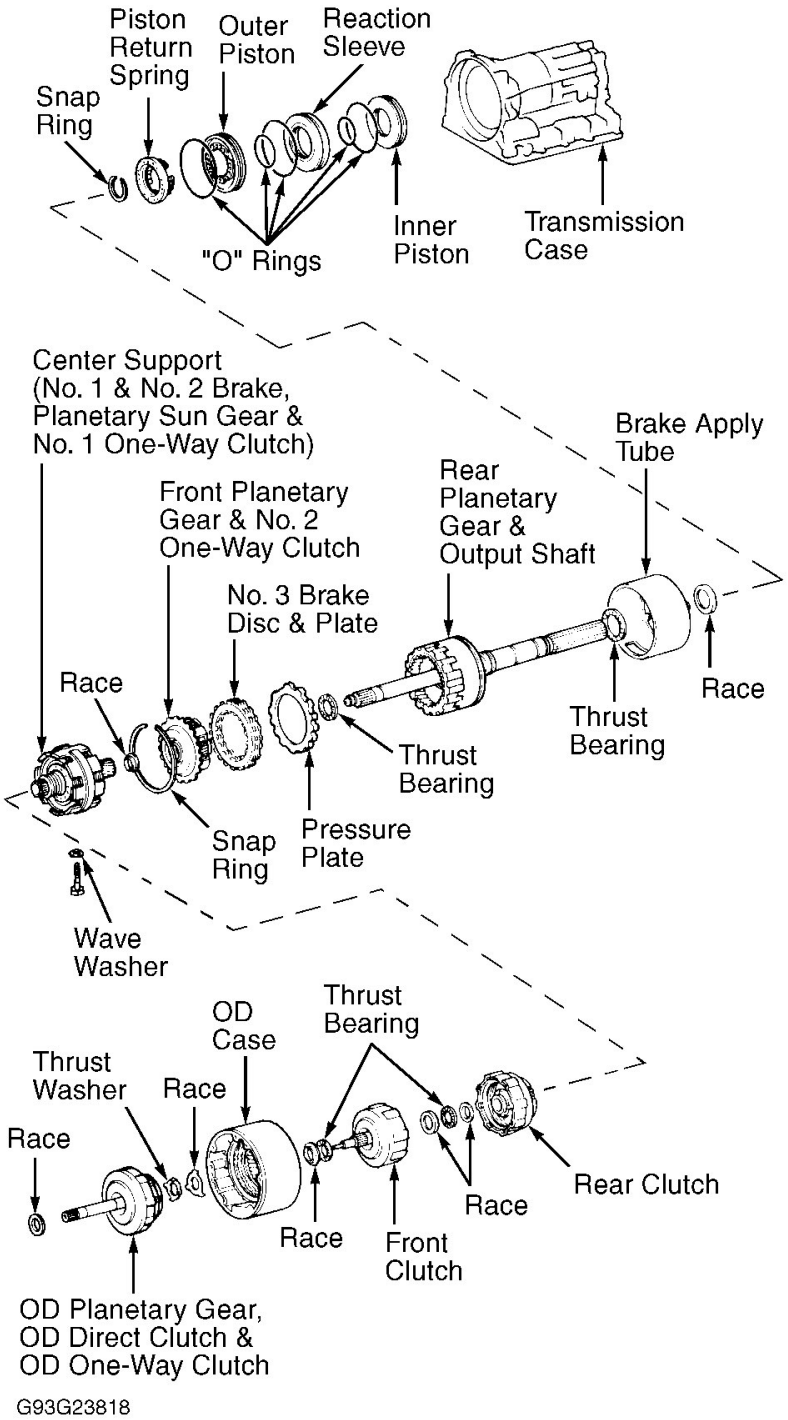


Fig. 12: Identifying Transmission Case Internal Components

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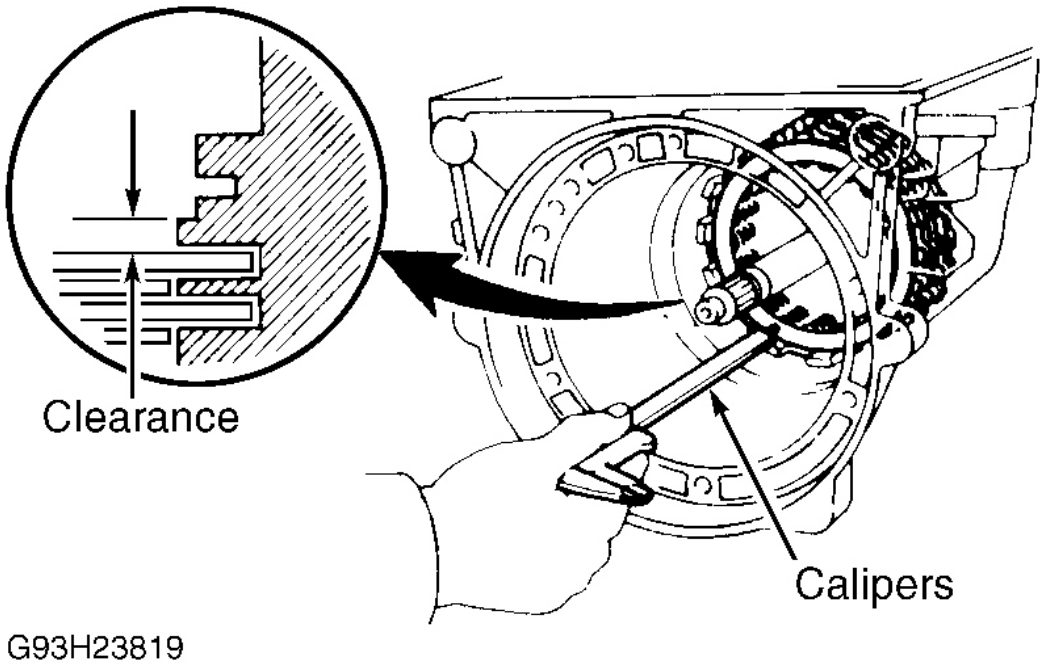


Fig. 13: Measuring No. 3 Brake Pack Clearance
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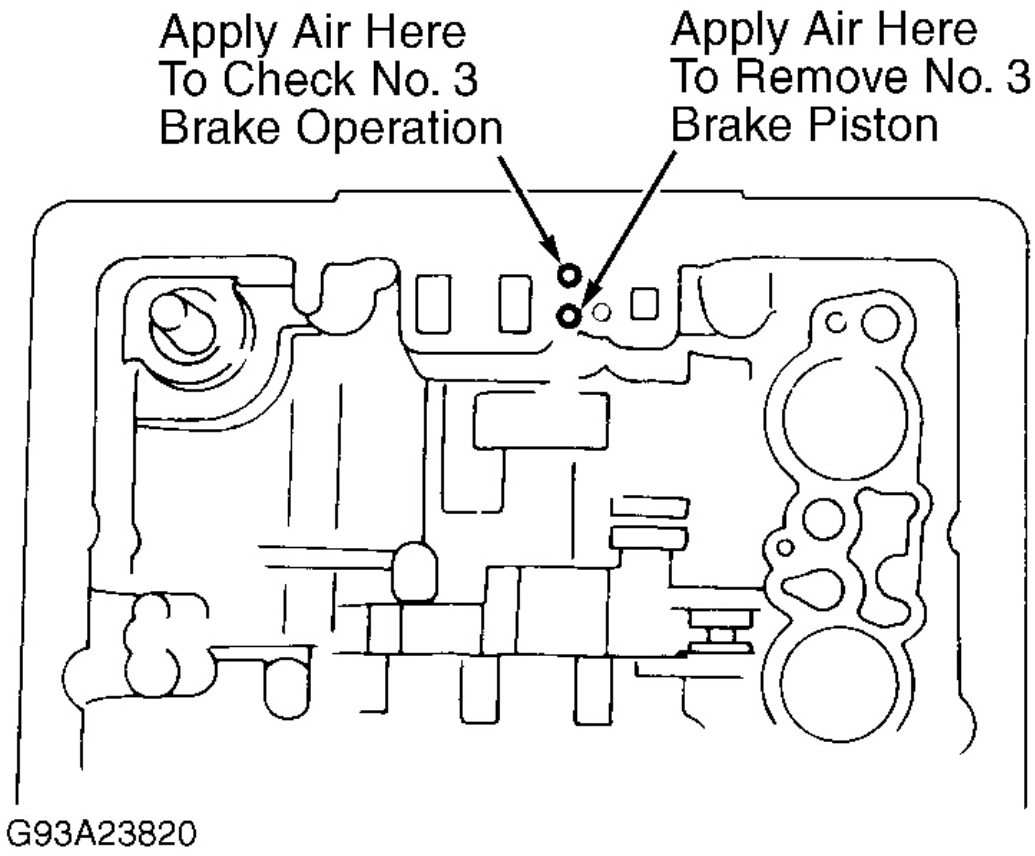


Fig. 14: Checking No. 3 Brake Operation & Removing Piston
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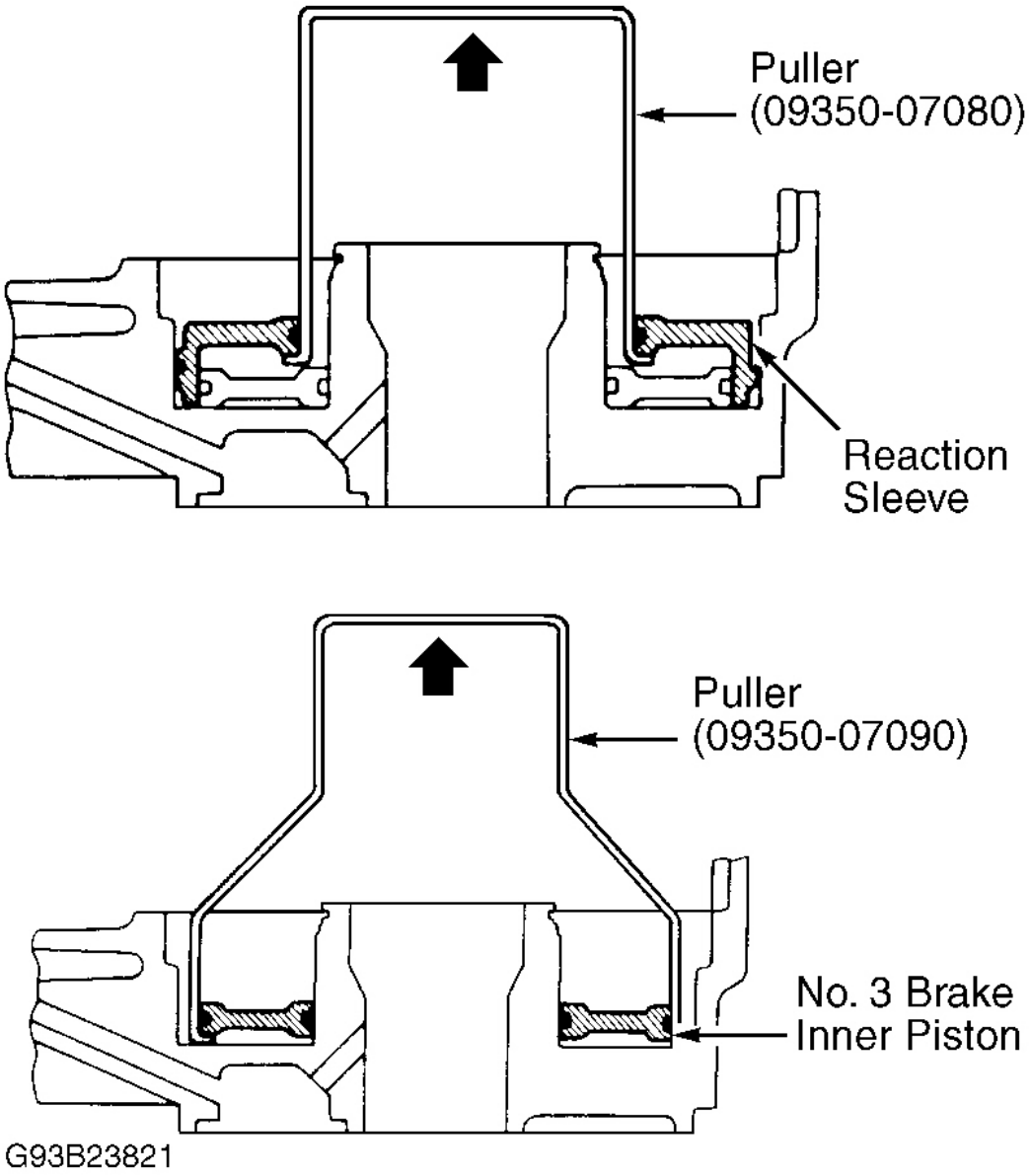


Fig. 15: Removing Reaction Sleeve & No. 3 Brake Piston
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COMPONENT DISASSEMBLY & REASSEMBLY

OIL PUMP ASSEMBLY

Disassembly

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Place oil pump assembly on torque converter. Remove seal rings from stator shaft. Remove stator shaft from oil pump housing. Place reference mark on drive and driven gears and remove from pump housing. If oil seal requires replacement, pry seal from housing with a screwdriver. See **Fig. 16** .

Inspection

1. Clean all components in solvent. Dry with compressed air. Inspect all components for damage or wear. Measure inside diameter of oil pump housing and stator shaft bushings. Measure driven gear-to-housing clearance and gear tip clearance. Using feeler gauge and straightedge, measure gear side clearance between pump housing face and top of gears. See **Fig. 17** .
2. Ensure all measurements are within specification. See **OIL PUMP SPECIFICATIONS** table. If bushing inside diameter exceeds specification, oil pump housing or stator shaft must be replaced. Replace necessary components to obtain correct clearances.

OIL PUMP SPECIFICATIONS

Application	Standard - In. (mm)	Maximum - In. (mm)
Gear Side Clearance	.0008-.0020 (.020-.050)	.004 (.10)
Gear Tip Clearance	.0043-.0055 (.109-.140)	.012 (.30)
Gear-To-Housing	.0028-.0059 (.071-.150)	.012 (.30)
Housing Bushing	N/A	1.504 (38.19)
Stator Shaft Bushing (Front & Rear)	N/A	.850 (21.58)

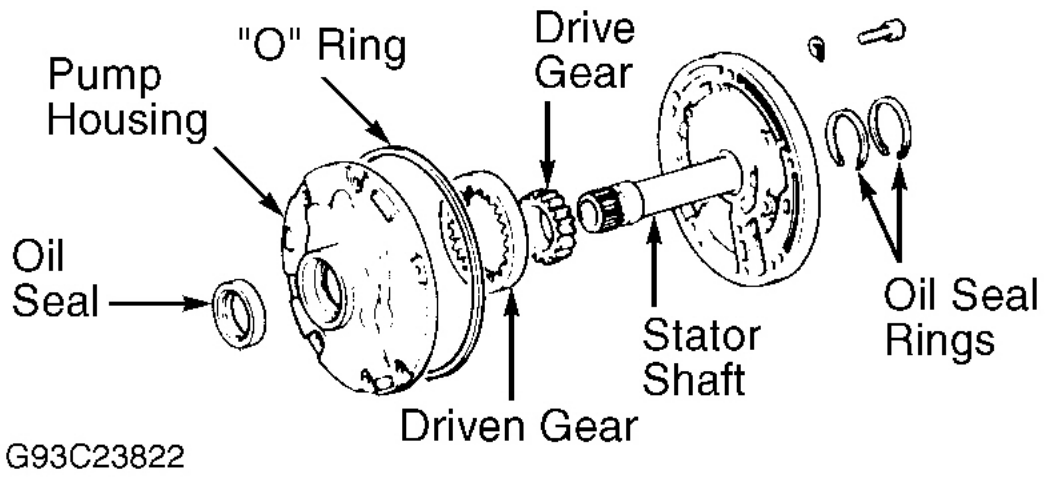


Fig. 16: Exploded View Of Oil Pump Assembly
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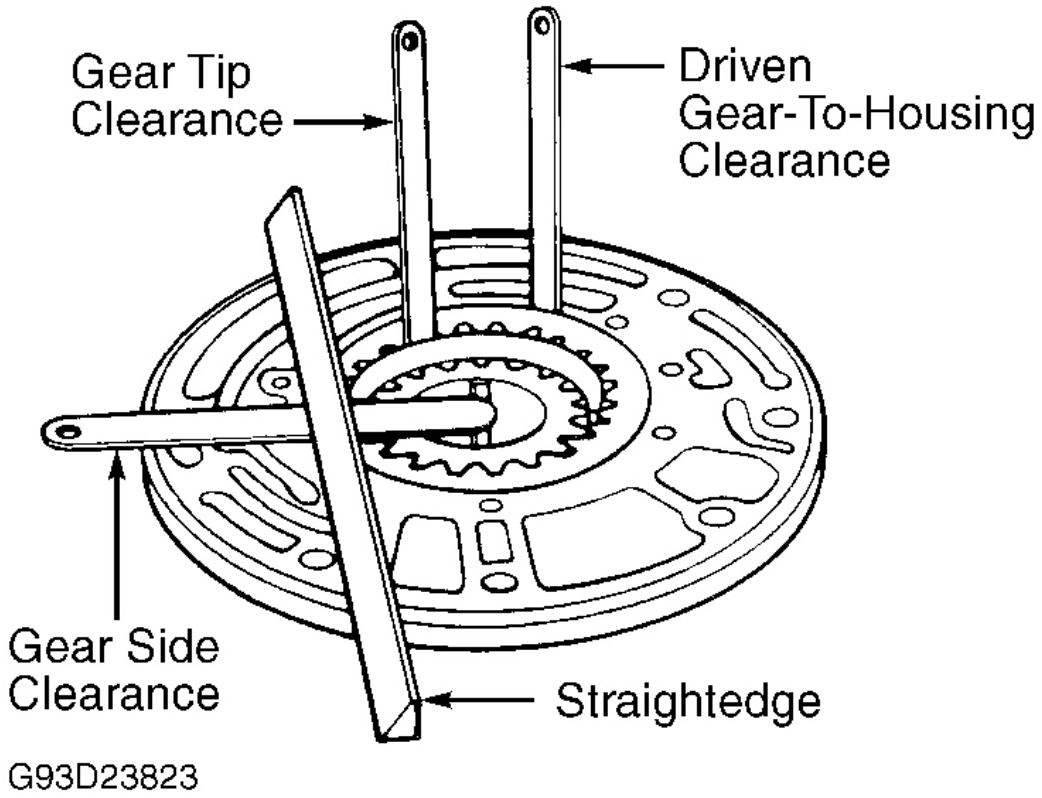


Fig. 17: Measuring Oil Pump Gear Clearances
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Reassembly

1. Place oil pump housing on torque converter. Coat all components with ATF. Align reference marks on driven and drive gears during installation. Align bolt holes and place stator shaft onto pump housing. Install but do not tighten attaching bolts. Install Oil Pump Aligning Tool (09363-20010) around outside of pump assembly to align pump housing and stator shaft. See **Fig. 18** .
2. Tighten oil pump bolts to 65 INCH lbs. (7.4 N.m). Remove aligning tool. Install oil seal rings. DO NOT spread ring ends more than necessary for installation. Ensure seal rings move smoothly after installation. Ensure pump drive gear rotates smoothly. Lubricate and install "O" ring on oil pump assembly.

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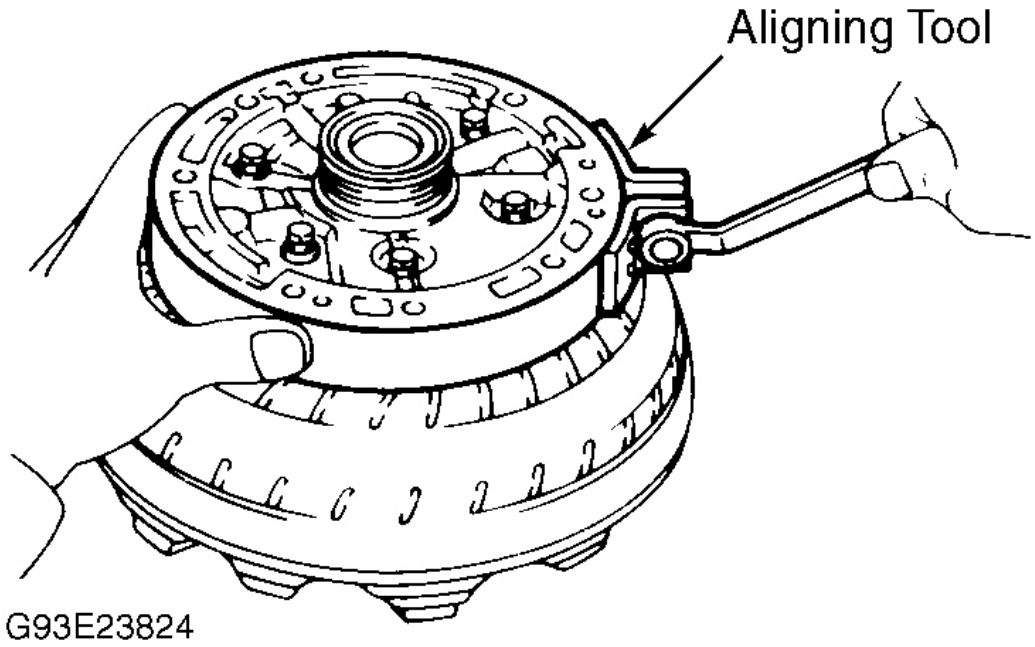


Fig. 18: Aligning Oil Pump Housing & Stator Shaft
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OD PLANETARY GEAR, OD DIRECT CLUTCH & OD ONE-WAY CLUTCH

Disassembly

1. Remove OD direct clutch drum from OD planetary gear. Remove thrust bearing and race (if equipped) from planetary gear. See **Fig. 19** . Place OD direct clutch assembly on oil pump assembly. Using a dial indicator, measure OD direct clutch piston stroke, while applying 57-114 psi (4-8 kg/cm^2) to oil pump port. See **Fig. 20** .
2. Piston stroke should be .070-.102" (1.77-2.58 mm). If dial indicator reading is not within specified range, inspect discs for wear or damage. Remove OD direct clutch assembly from oil pump assembly. Remove OD brake hub snap ring and hub. Remove disc, snap ring, flange and cushion plate.
3. Using appropriate spring compressor, compress piston return spring and remove snap ring. Remove piston return spring. Install OD direct clutch drum on oil pump assembly. Hold OD direct clutch piston and apply compressed air to oil pump to remove OD direct clutch piston. See **Fig. 20** . Remove 2 "O" rings from piston.
4. Remove snap ring and thrust washer. Remove one-way clutch assembly. Disassemble one-way clutch. Remove 2 retainers from both sides of one-way clutch. Remove one-way clutch from outer race. See **Fig. 19** . Note direction of one-way clutch installation. Remove thrust washer. Using a magnet, remove 4 plugs (if applicable). DO NOT lose plugs.

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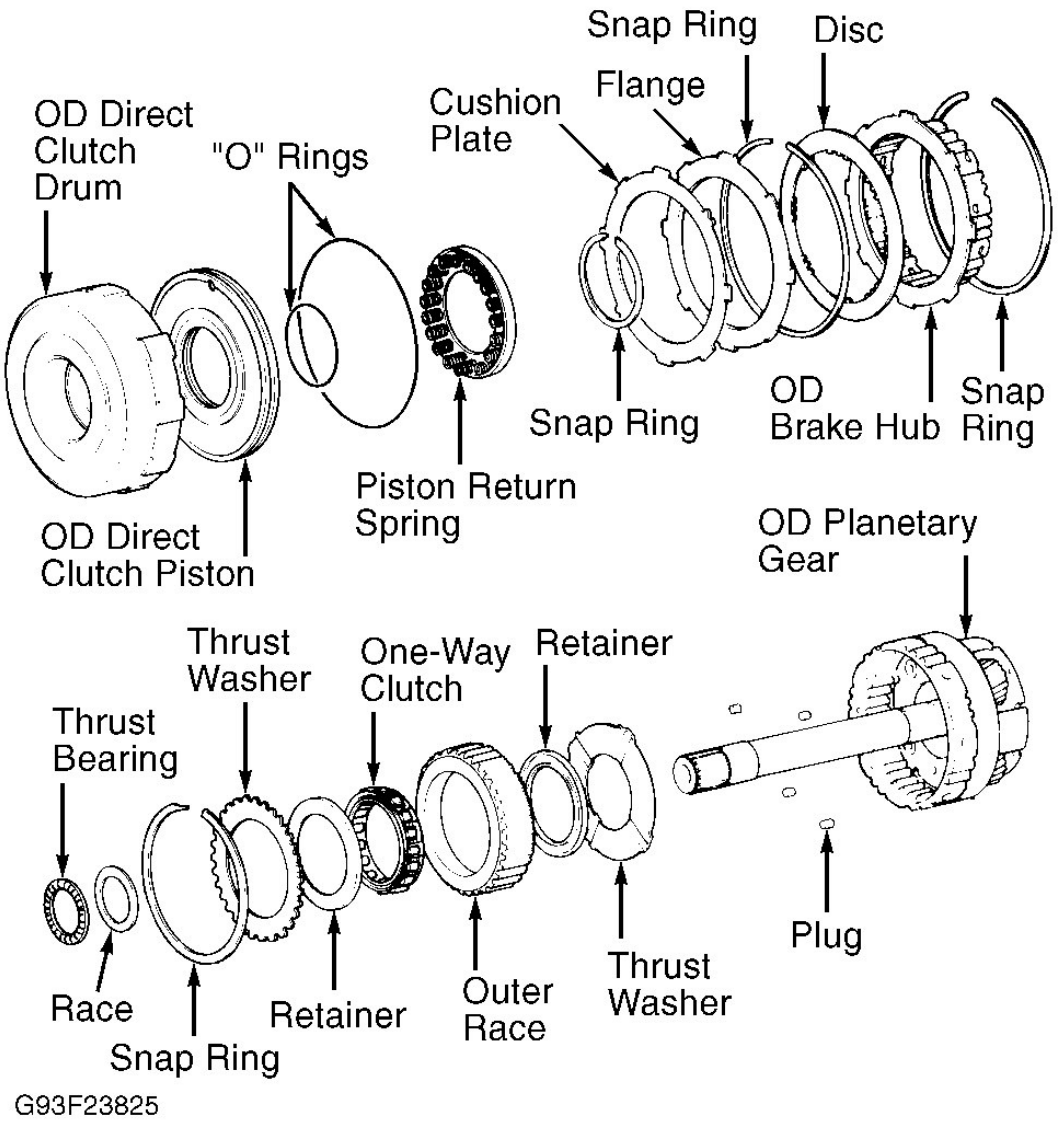


Fig. 19: Exploded View Of OD Planetary Gear, OD Direct Clutch & One-Way Clutch
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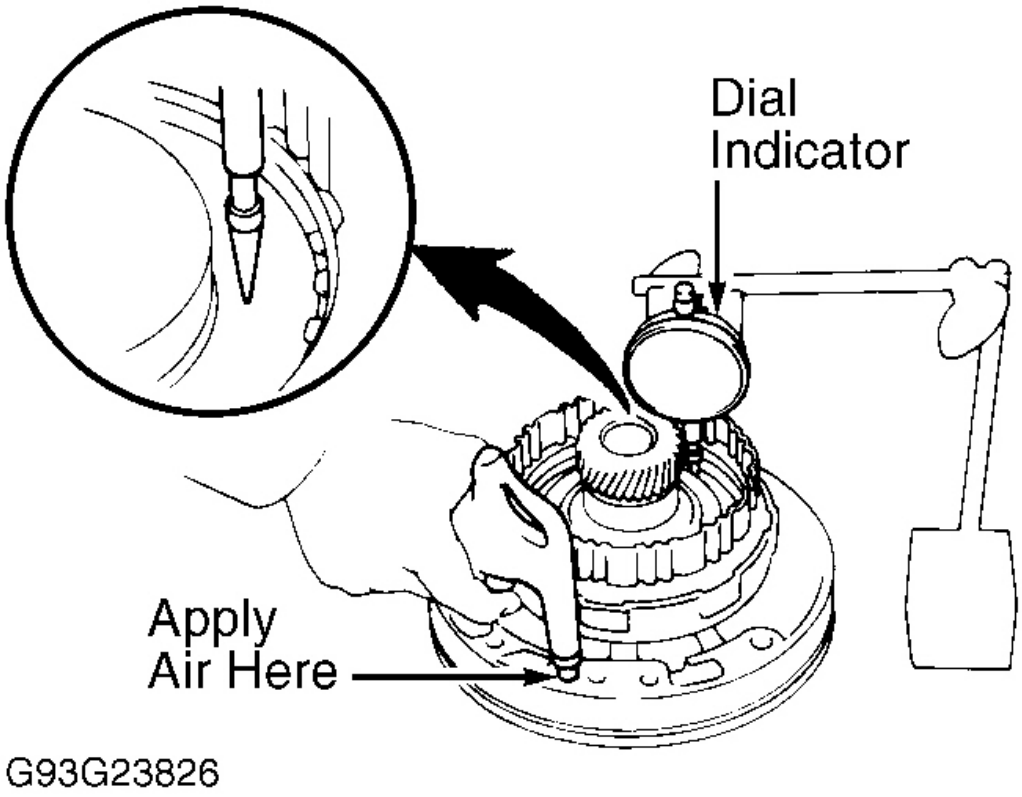


Fig. 20: Measuring OD Direct Clutch Piston Stroke
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Inspection

1. Inspect disc and flange for flaking or burnt areas. If disc lining is peeling or discolored, replace disc. Inspect piston return springs for wear, damage and collapsed coils. Clean all components (except disc) with solvent. Dry with compressed air. Ensure check ball is free in direct clutch piston. Apply compressed air to check ball area. Ensure check ball does not allow air to bleed through piston.
2. Using a dial indicator, measure inside diameter of OD direct clutch drum bushing. Bushing maximum inside diameter should be .911" (23.14 mm). If inside diameter is greater than specified, replace clutch drum. Measure inside diameter of OD planetary gear bushing. Bushing maximum inside diameter should be .444" (11.27 mm). If inside diameter is greater than specified, replace planetary gear.
3. Using a feeler gauge, measure clearance between planetary pinion gear and OD planetary gear housing. Standard clearance is .008-.020" (.20-.50 mm). If clearance is not as specified, inspect planetary gear thrust washer. Replace planetary gear assembly (if necessary).

CAUTION: Clutch discs should be soaked in ATF for 15 minutes prior to installation.

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Lubricate all parts with ATF. Coat thrust bearings and races with petroleum jelly.

Reassembly

1. Install 4 plugs in planetary gear holes (if applicable). Install thrust washer to OD planetary gear with grooved side facing upward. Install one-way clutch in outer race with open end of retainers facing upward. Install retainer on both sides of one-way clutch. See **Fig. 21** . Install one-way clutch assembly. Install thrust washer and snap ring.
2. Coat NEW "O" rings with ATF and install on OD direct clutch piston. Carefully press direct clutch piston into clutch drum. Using spring compressor, compress piston return spring and install snap ring. Ensure end gap of snap ring is not aligned with spring seat claw.
3. Install cushion plate. Install flange with rounded edge facing upward. Install snap ring. Ensure end gap of snap ring is not aligned with cutout portion of clutch drum. Install disc, OD brake hub and snap ring. Ensure end gap of snap ring is not aligned with cutout portion of drum.
4. Recheck piston stroke of OD direct clutch. If piston stroke is less than specified, check for incorrect reassembly of components. Install race and thrust bearing on OD planetary gear. Install direct clutch assembly on OD planetary gear.
5. Rotate and push OD planetary gear to mesh splines of planetary gear with flukes of disc. Check one-way clutch operation. Hold OD direct clutch drum and rotate input shaft. Input shaft should rotate freely in clockwise direction and lock in counterclockwise direction. See **Fig. 22** .

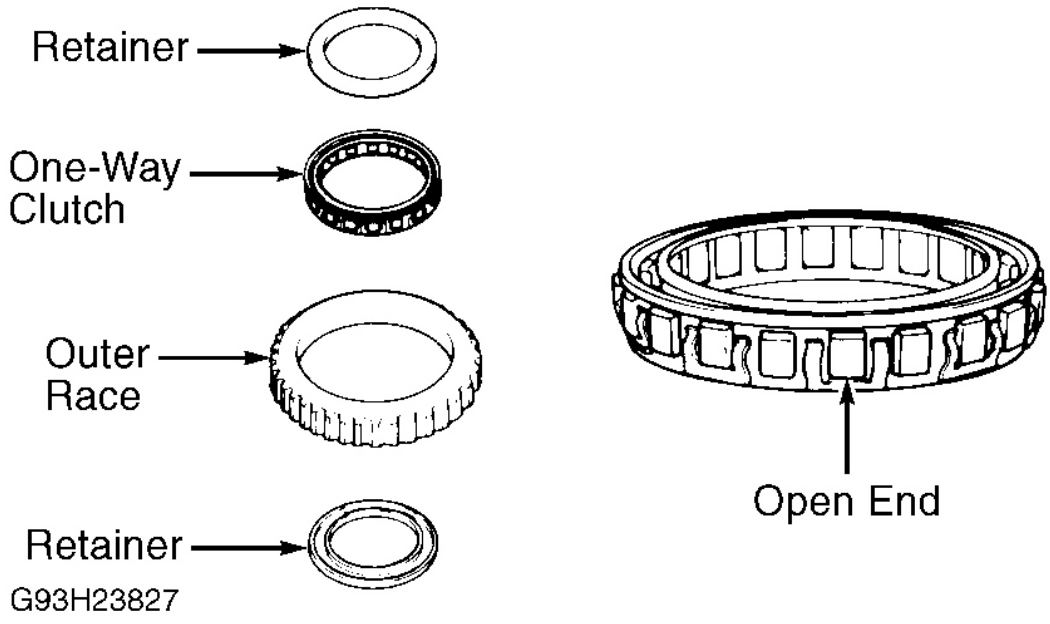


Fig. 21: Exploded View Of One-Way Clutch (Typical)
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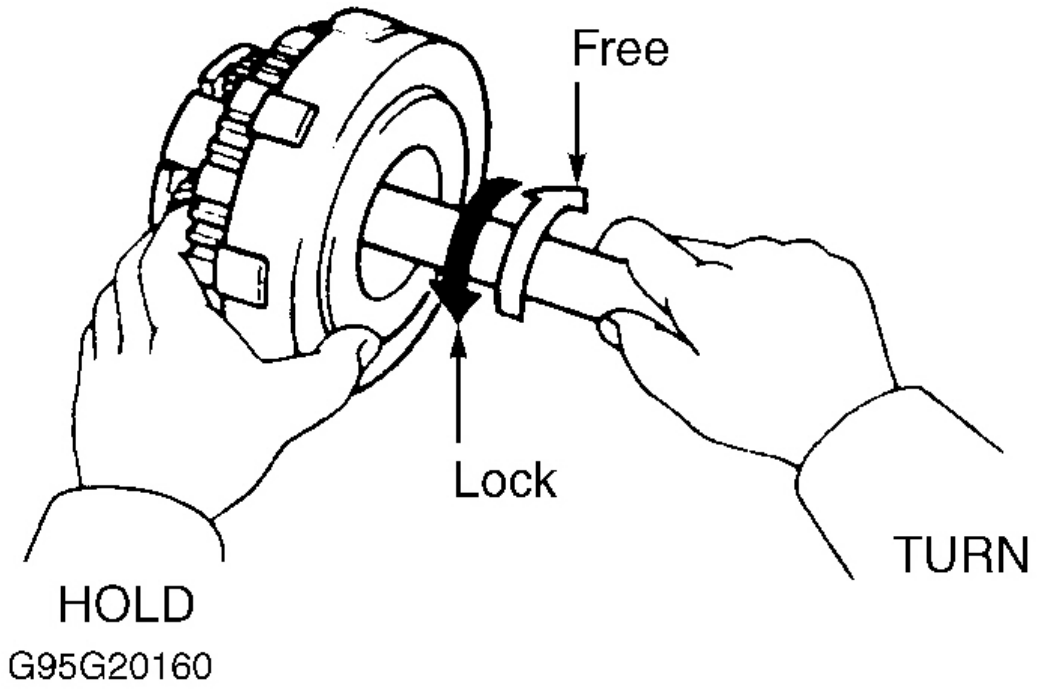


Fig. 22: Checking Operation Of One-Way Clutch
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OVERDRIVE BRAKE

Disassembly

1. Prior to disassembly, check OD brake piston stroke. Install OD case on transmission case with cutout portion of OD case at 6 o'clock position. Ensure OD case oil hole is aligned with transmission case oil hole. See **Fig. 23** .
2. Using a dial indicator, measure brake piston stroke by applying compressed air to oil hole. See **Fig. 24** . Piston stroke should be .026-.087" (.65-2.21 mm). If piston stroke is not as specified, inspect discs. Remove OD case from transmission case. Remove snap ring from OD case. Remove flange, discs, plates and cushion plate. Note location and number of components.
3. Remove OD planetary ring gear, thrust bearing and races from OD case. Remove snap ring, spring seat and piston return spring. See **Fig. 25** . Remove brake piston by applying air pressure to OD case. See **Fig. 26** . Remove oil seal rings from case and "O" rings from piston.

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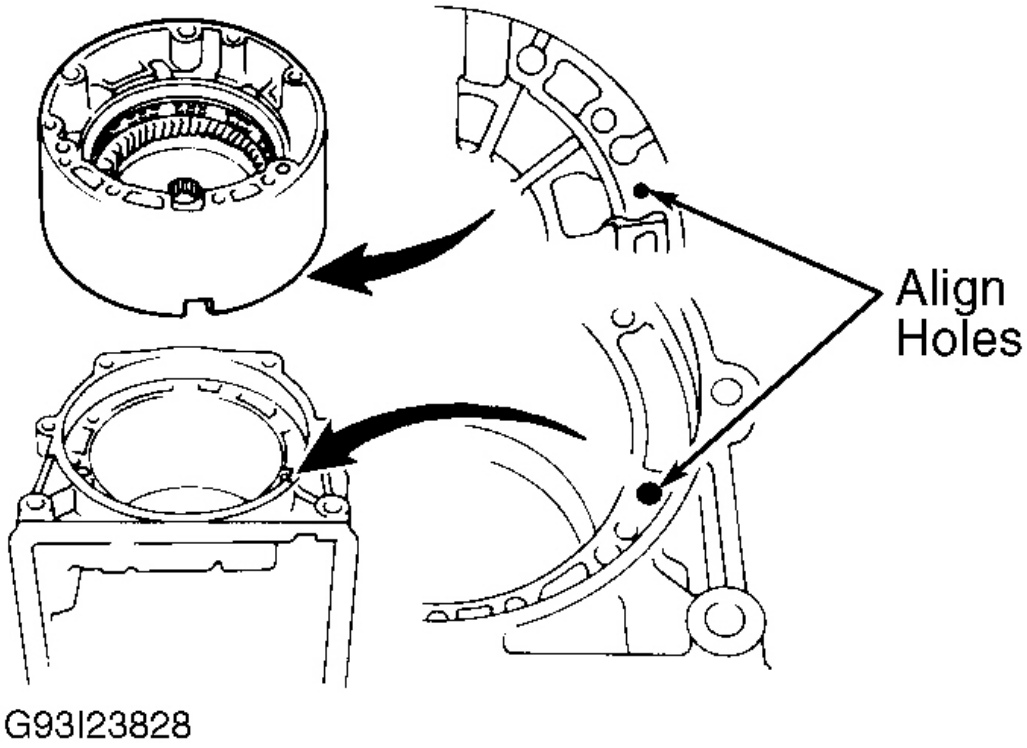


Fig. 23: Aligning OD Case & Transmission Case Oil Holes
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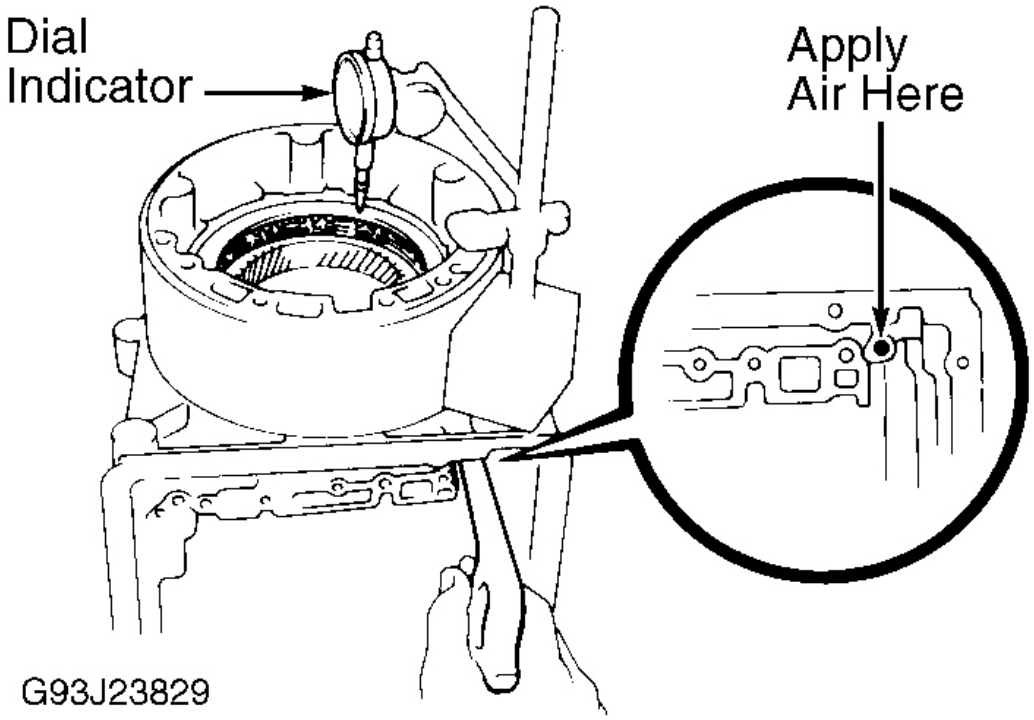


Fig. 24: Measuring OD Brake Piston Stroke
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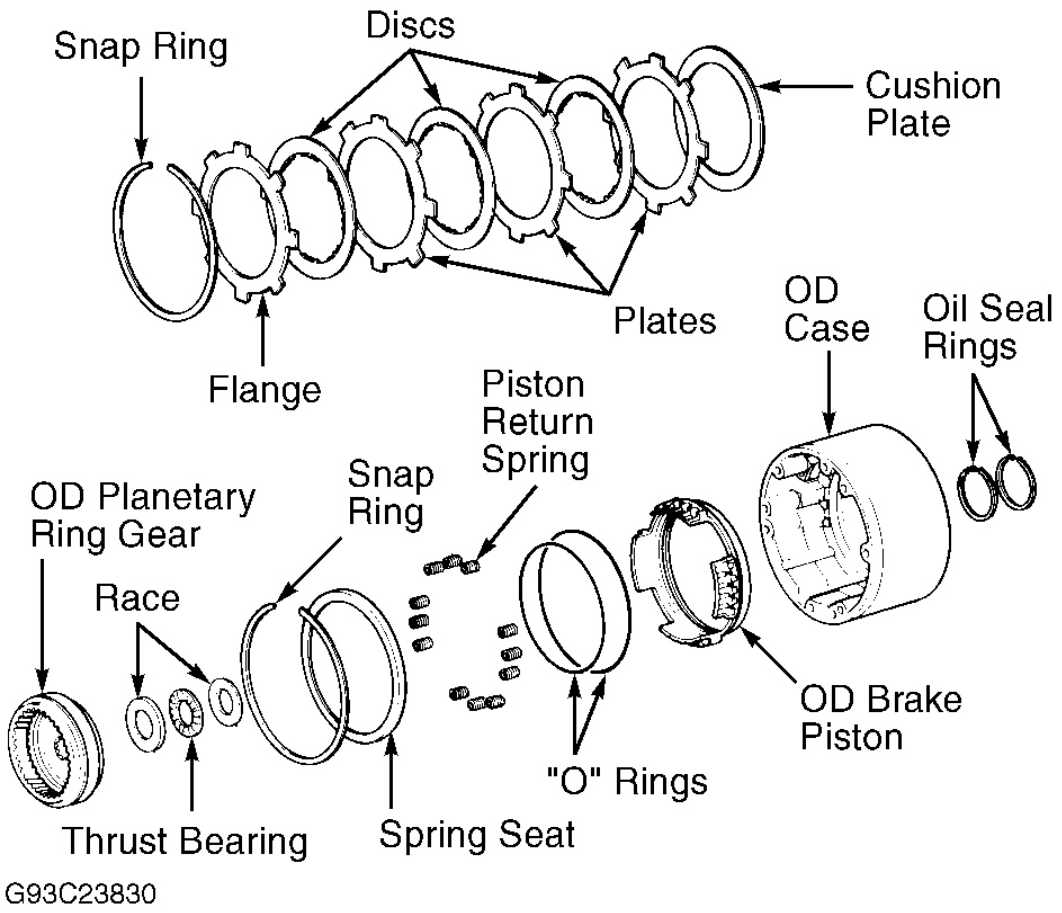


Fig. 25: Exploded View Of OD Brake Components
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

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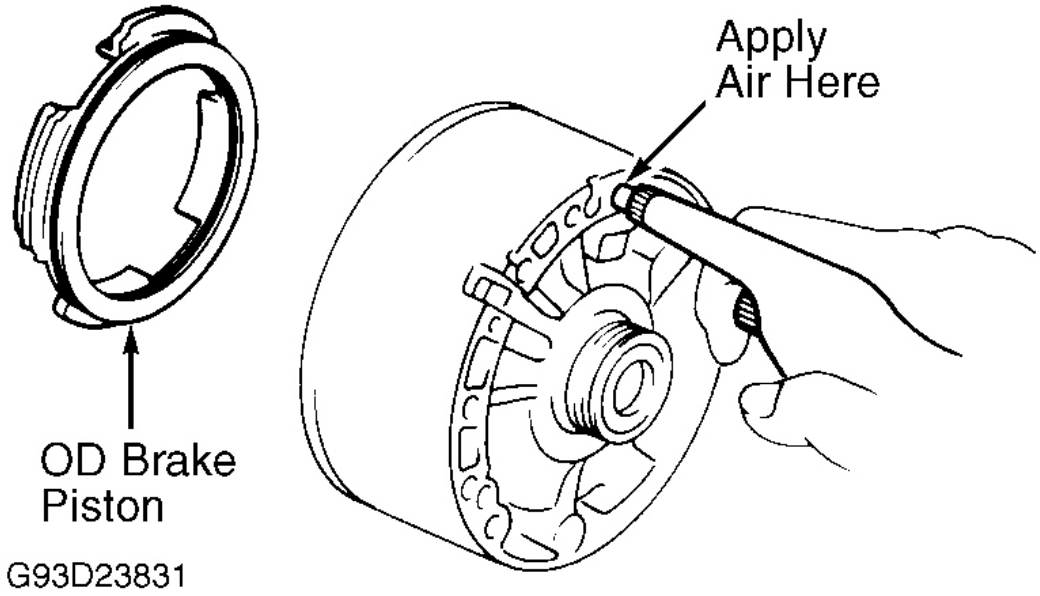


Fig. 26: Removing OD Brake Piston
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Inspection

Clean all components (except discs) with solvent. Dry with compressed air. Inspect flanges, plates and discs for flaking or burnt areas. If disc lining is peeling or discolored, replace discs as necessary. Inspect piston return springs for wear, damage and collapsed coils.

CAUTION: Clutch discs should be soaked in ATF for 15 minutes prior to installation. Lubricate all parts with ATF. Coat thrust bearings and races with petroleum jelly.

Reassembly

1. Lubricate and install oil seal rings on OD case. Ensure rings rotate smoothly after installation. Install NEW "O" rings on OD brake piston. Using hand pressure, carefully install brake piston into OD case with cup side upward.
2. Install piston return springs into OD case in appropriate locations. See **Fig. 27** . Install spring seat and snap ring. Ensure end gap of snap ring is not aligned with cutout portion of OD case. Ensure snap ring is inserted in its groove.
3. Install 1.752" (44.50 mm) outside diameter rear bearing race, thrust bearing and 1.909" (48.50 mm) outside diameter front bearing race on OD planetary ring gear. Install OD planetary ring gear assembly into OD case.
4. Install cushion plate into OD case with rounded side inward. Install plates and discs in appropriate order.

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Install flange with rounded edge facing upward. Install snap ring. Ensure end gap of snap ring is not aligned with cutout portion of OD case. Recheck OD brake piston stroke or clearance. If measurement is not as specified, check for incorrect reassembly of components.

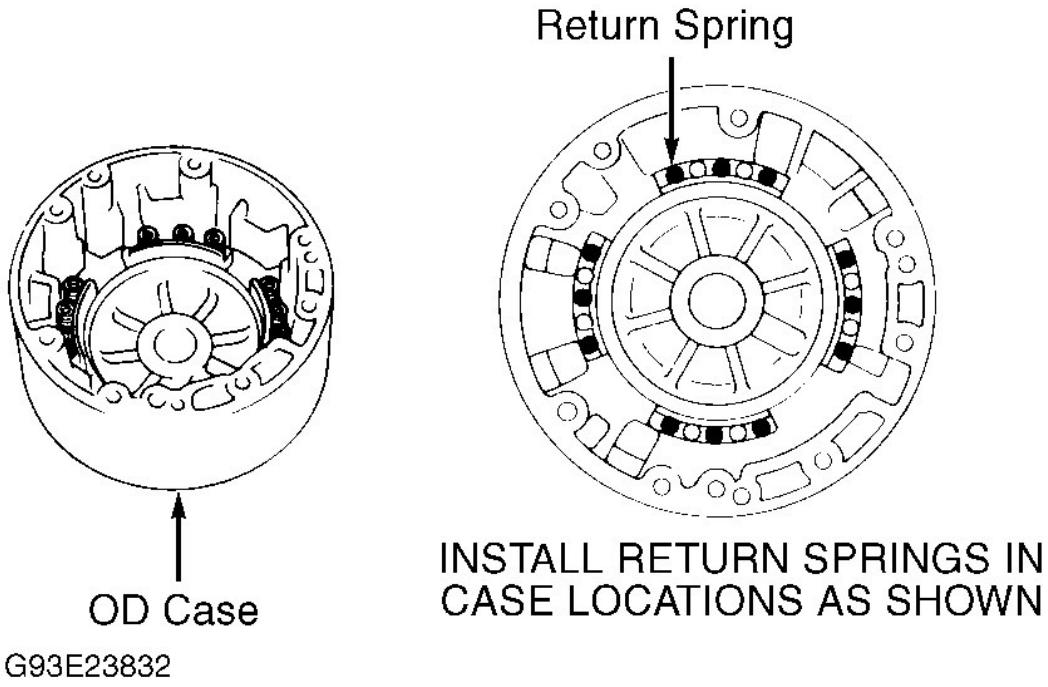


Fig. 27: Installing OD Case Piston Return Springs
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

FRONT CLUTCH

Disassembly

1. Install front clutch assembly to OD case. Remove snap ring. Remove front and rear clutch hubs. Remove thrust bearing and races from clutch drum, noting component direction prior to removal. See **Fig. 28** .
2. Check front clutch piston stroke. Install rear clutch hub and snap ring. Using Measuring Tool (09350-06120) and a dial indicator, measure front clutch piston stroke while applying 57-114 psi (4-8 kg/cm^2) to OD case oil hole. See **Fig. 29** . Piston stroke should be .052-.105" (1.32-2.66 mm). If piston stroke is not as specified, inspect discs. Remove snap ring and rear clutch hub.
3. Remove snap ring, discs and plates. Note location and number of components. Using appropriate spring compressor, compress piston return spring. Remove snap ring and piston return spring. Place front clutch drum on OD case. Carefully apply air pressure to case oil hole to remove piston. See **Fig. 29** . Remove "O" rings from clutch piston.

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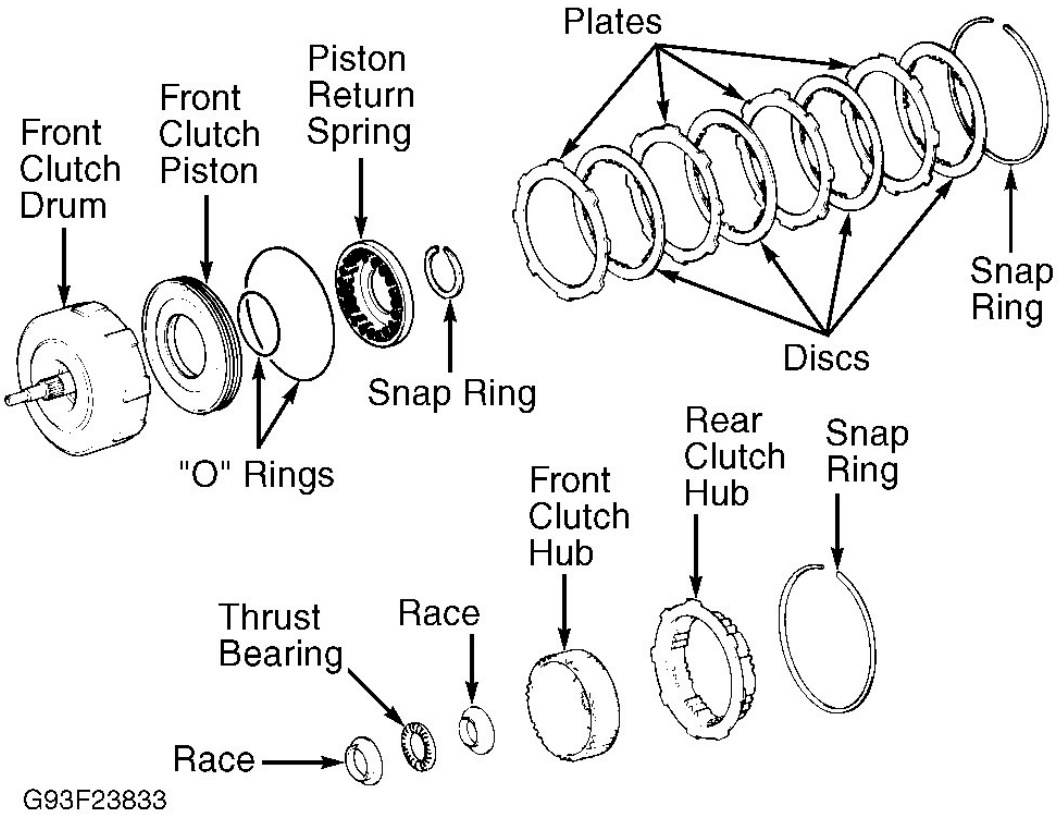


Fig. 28: Exploded View Of Front Clutch Components
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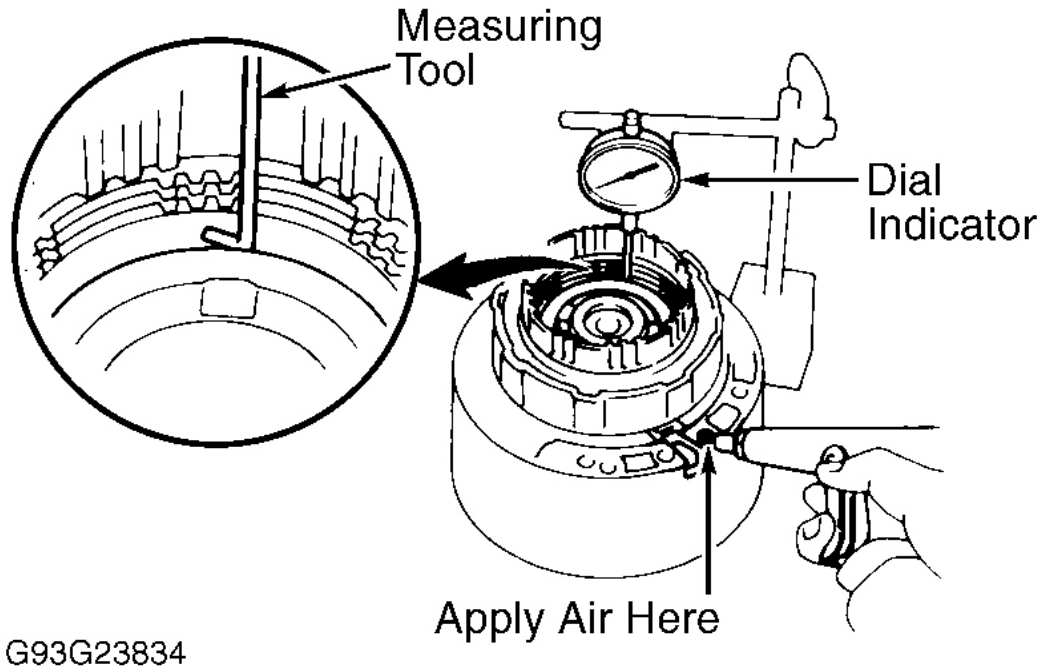


Fig. 29: Measuring Front Clutch Piston Stroke
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Inspection

1. Clean all components (except discs) with solvent. Dry with compressed air. Inspect plates and discs for flaking or burnt areas. If disc lining is peeling or discolored, replace discs as necessary.
2. Ensure check ball is free in clutch piston. Apply air pressure to check ball area. Ensure check ball does not allow air to bleed through piston. Inspect piston return springs for wear, damage and collapsed coils. Replace worn or damaged components.

CAUTION: Clutch discs should be soaked in ATF for 15 minutes prior to installation. Lubricate all parts with ATF. Coat thrust bearings and races with petroleum jelly.

Reassembly

1. Lubricate and install NEW "O" rings onto clutch piston. Carefully install front clutch piston into clutch drum. Install piston return spring. Using spring compressor and appropriate press, compress return spring and install snap ring. Ensure end gap of snap ring is not aligned with claw area on spring seat claw.
2. Install plates, discs and snap ring in appropriate order. See **Fig. 28** . Ensure end gap of snap ring is not aligned with cutout portion of front clutch drum. Install rear clutch hub and snap ring. Recheck front clutch piston stroke.

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3. If piston stroke is less than specified, check for incorrect reassembly of components. If piston stroke is greater than specified, select a NEW plate. Plates are available in thicknesses of .071" (1.80 mm) and .079" (2.00 mm). Remove snap ring and rear clutch hub. Install bearing races and thrust bearing into front clutch drum with flat surface of races facing away from clutch drum.
4. Rotate and push front clutch hub to mesh splines of front clutch hub with flukes of discs. Install front clutch hub into front clutch drum. Install rear clutch hub and snap ring. Ensure end gap of snap ring is not aligned with cutout portion of clutch drum.

REAR CLUTCH

Disassembly

1. Prior to disassembly, place rear clutch drum on center support. Using a dial indicator and compressed air, measure rear clutch piston stroke while applying 57-114 psi (4-8 kg/cm^2) to OD case oil hole. See **Fig. 30** . Piston stroke should be .036-.078" (.91-1.99 mm). If piston stroke is not as specified, inspect discs. Remove rear clutch from center support.
2. Remove snap ring, flange, discs and plates. Note location and number of components. See **Fig. 31** . Using appropriate spring compressor, compress piston return spring and remove snap ring. Remove piston return spring.
3. Place rear clutch drum on center support. Hold rear clutch piston with hand, and apply compressed air to center support to remove rear clutch piston.

Inspection

1. Clean all components (except discs) with solvent. Dry with compressed air. Inspect plates and discs for flaking or burnt areas. If disc lining is peeling or discolored, replace discs as necessary.
2. Ensure check ball is free in clutch piston. Apply air pressure to check ball area. Ensure check ball does not allow air to bleed through piston. Inspect piston return springs for wear, damage and collapsed coils. Replace worn or damaged components.

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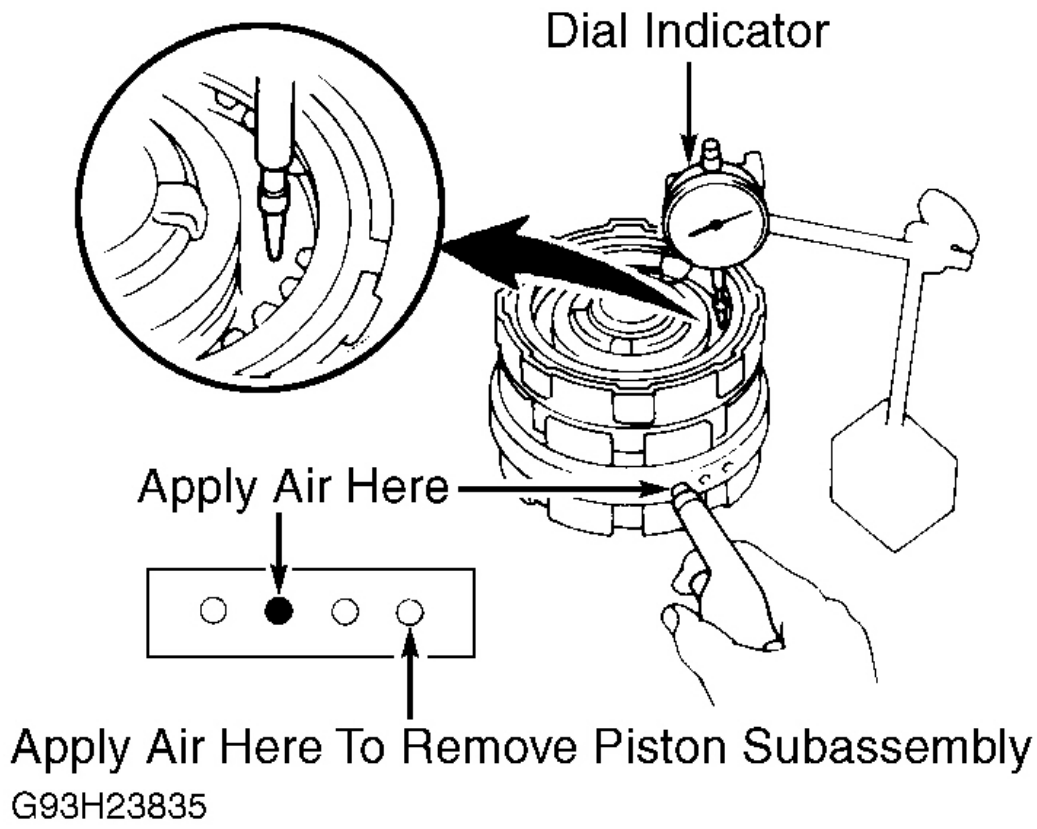


Fig. 30: Measuring Rear Clutch Piston Stroke & Removing Piston Subassembly
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

CAUTION: Clutch discs should be soaked in ATF for 15 minutes prior to installation. Lubricate all parts with ATF.

Reassembly

1. Lubricate and install NEW "O" rings on clutch piston. Carefully install rear clutch piston into clutch drum. Using appropriate spring compressor and press, install piston return spring and snap ring. Ensure end gap of snap ring is not aligned with spring seat claw.
2. Install plates and discs in appropriate order. See **Fig. 31** . Install flange with flat end facing down. Install snap ring. Ensure end gap of snap ring is not aligned with cutout portion of rear clutch drum. Recheck rear clutch piston stroke. If piston stroke is less than specified, check for incorrect reassembly of components.

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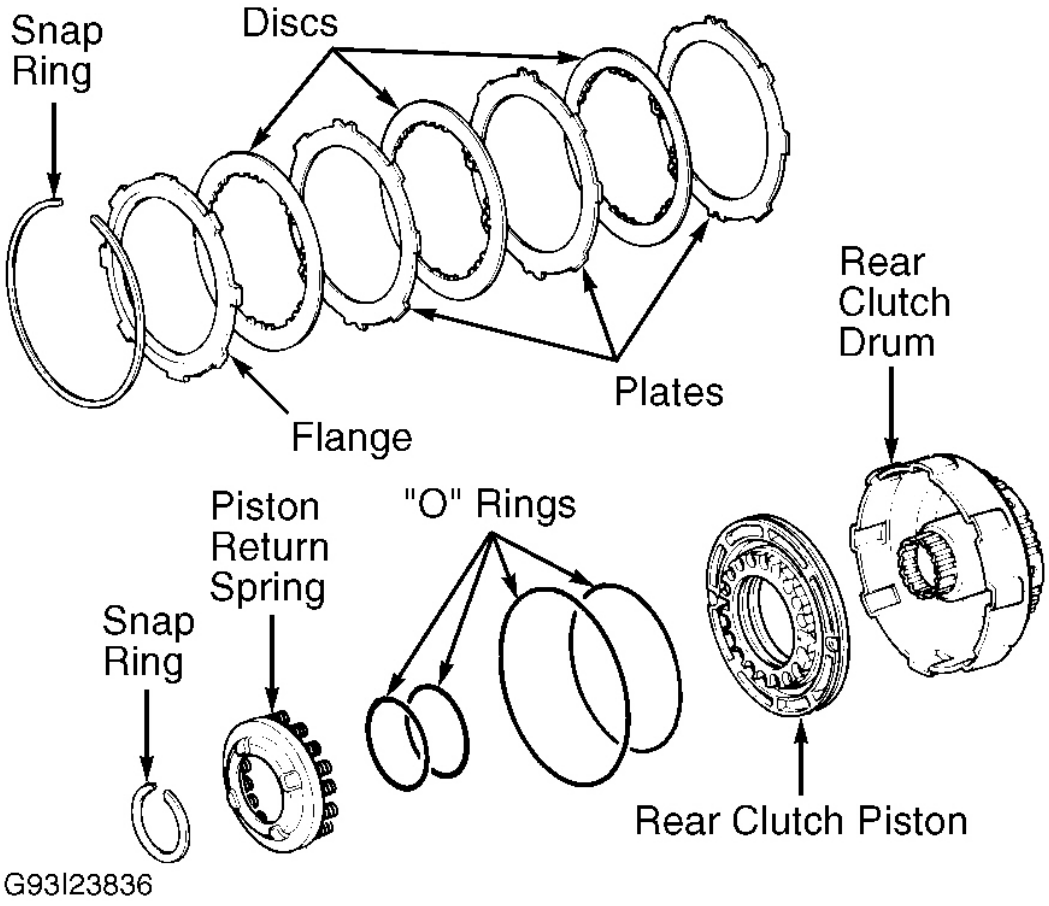


Fig. 31: Exploded View Of Rear Clutch Components
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

CENTER SUPPORT ASSEMBLY

Disassembly

1. Remove snap ring from end of sun gear shaft. Remove planetary sun gear with No. 1 one-way clutch from center support. Repeat procedure used in rear clutch disassembly to check No. 1 brake piston stroke. See **Fig. 32** . Piston stroke should be .031-.059" (.78-1.50 mm). If piston stroke is not as specified, inspect discs.
2. Remove snap ring from front of center support. Remove flange, disc(s) and plate(s). See **Fig. 33** . Using appropriate spring compressor, compress piston return spring. Remove snap ring. Remove piston return spring.
3. Hold No. 1 brake piston and apply air pressure to center support oil hole to remove No. 1 brake piston. See **Fig. 32** . Remove "O" rings and oil seal rings. Turn center support over.
4. Check No. 2 brake piston stroke. Repeat test procedure used previously for checking piston stroke on No.

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1 brake piston. See **Fig. 34** . Piston stroke should be .040-.089" (1.01-2.25 mm). If piston stroke is not as specified, inspect discs. Remove rear snap ring, flange, discs and plates. Note location and number of components. See **Fig. 35** .

5. Using appropriate spring compressor and press, compress piston return spring. Remove snap ring. Remove piston return spring. Hold No. 2 brake piston and apply air pressure to center support oil hole to remove No. 2 brake piston. See **Fig. 34** . Remove "O" rings.
6. Hold No. 1 one-way clutch and rotate planetary sun gear. Sun gear should rotate freely in counterclockwise direction and lock in clockwise direction. See **Fig. 36** . If component does not test as described, one-way clutch requires replacement. Loosen staked part of rear side retainer. Remove No. 1 one-way clutch and 2 retainers from outer race. See **Fig. 37** . Using a pin punch and hammer, remove front side retainer. Remove oil seal rings from sun gear.
7. Remove thrust washer from front planetary gear. Hold one-way clutch inner race and rotate planetary gear. Planetary gear should rotate freely in counterclockwise direction and lock in clockwise direction. See **Fig. 38** . Remove one-way clutch inner race. Remove snap ring, one-way clutch and 2 retainers. See **Fig. 39** .

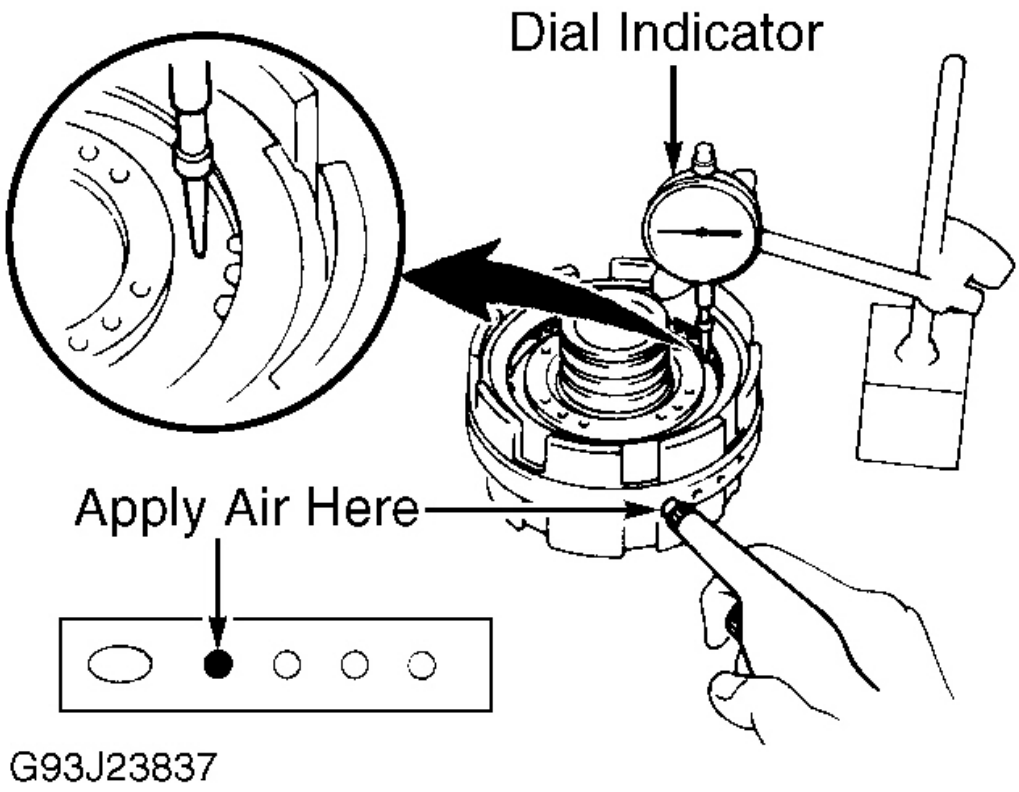


Fig. 32: Measuring No. 1 Brake Piston Stroke
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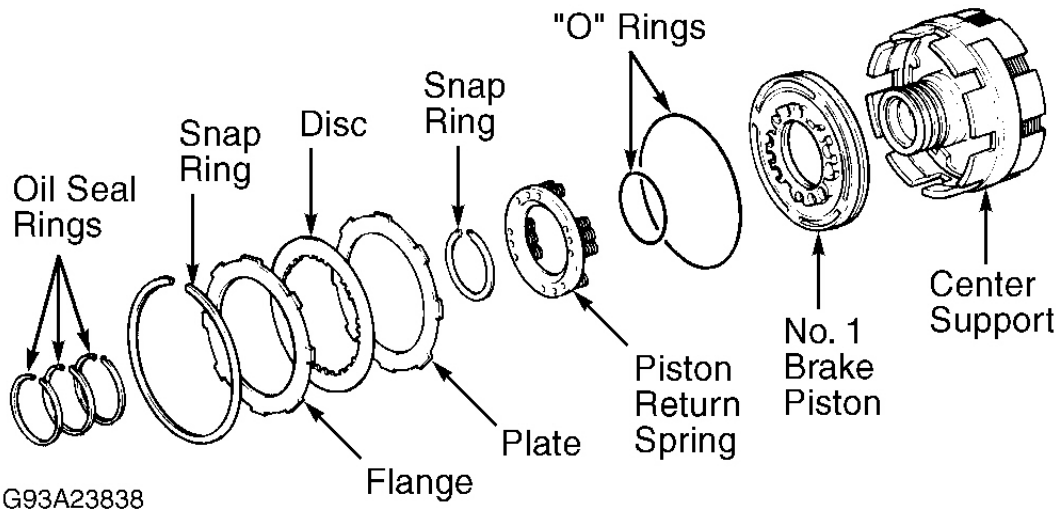


Fig. 33: Exploded View Of No. 1 Brake Components
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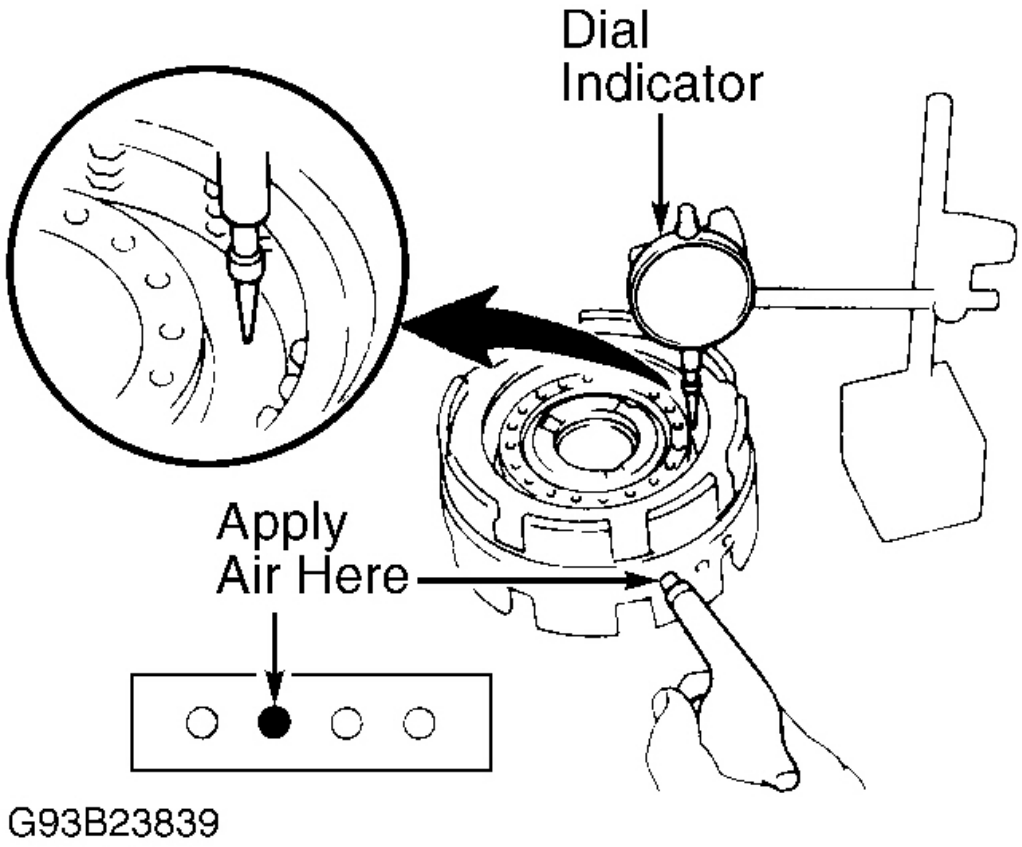


Fig. 34: Measuring No. 2 Brake Piston Stroke
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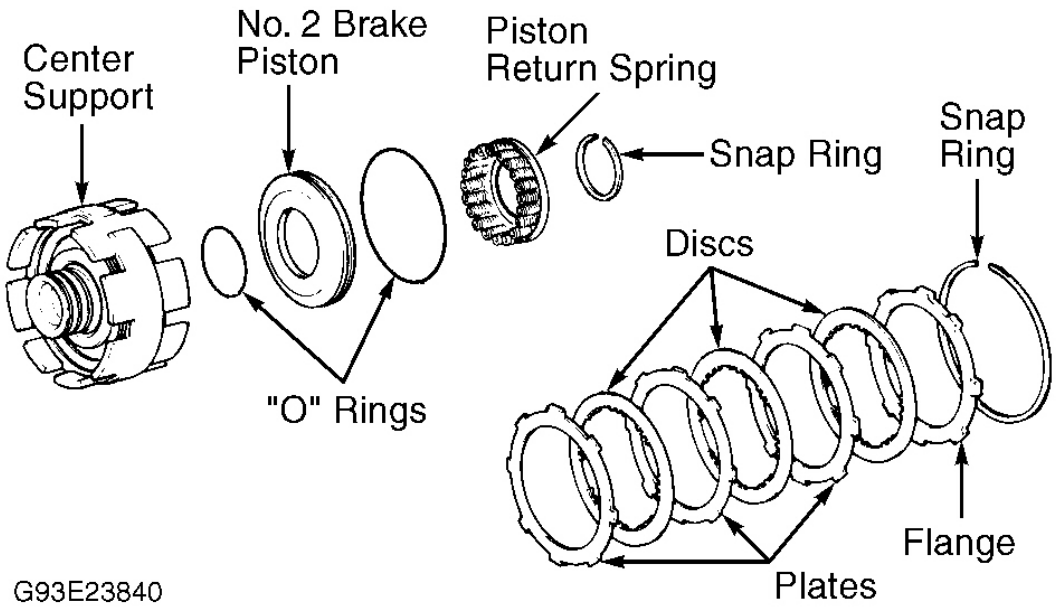


Fig. 35: Exploded View Of No. 2 Brake Components
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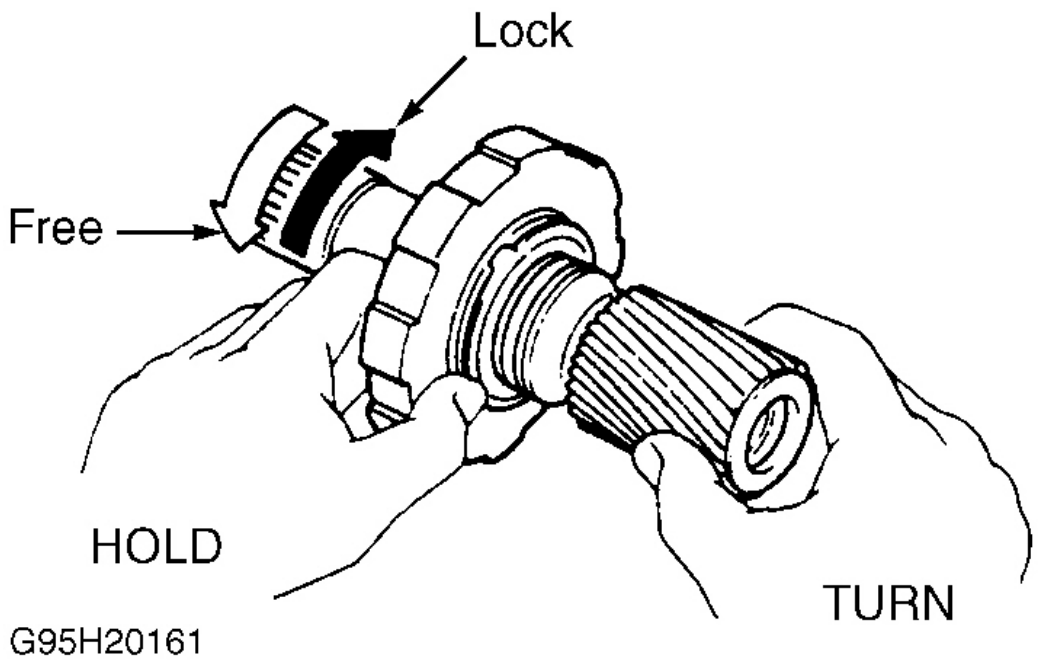


Fig. 36: Checking No. 1 One-Way Clutch Operation
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Inspection

1. Clean all components (except discs) with solvent. Dry with compressed air. Inspect plates and discs for flaking or burnt areas. If disc lining is peeling or discolored, replace disc as necessary. Inspect piston return springs for wear, damage or collapsed coils.
2. Using a dial indicator, measure inside diameter of center support bushing. Maximum inside diameter is 1.435" (36.46 mm). If inside diameter is greater than specified, replace center support. Measure inside diameter of planetary sun gear bushings. Maximum inside diameter is .850" (21.58 mm). If inside diameter is greater than specified, replace planetary sun gear.
3. Using a feeler gauge, measure clearance between planetary pinion gear and planetary gear case. Standard clearance is .008-.020" (.20-.50 mm). If clearance is not as specified, replace planetary gear assembly.

CAUTION: Clutch discs should be soaked in ATF for 15 minutes prior to installation. Lubricate all parts with ATF.

Reassembly

1. Lubricate "O" rings with ATF. To reassemble, reverse disassembly procedure. Ensure end gap of snap ring does not align with claw area on spring seat of piston return spring. Install plates and discs in

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appropriate order. See **Fig. 33** and **Fig. 35** .

2. Install No. 1 brake flange with rounded side facing down. Install No. 2 brake flange with flat side facing down. Install all snap rings. Ensure ends of snap rings do not align with cutout areas of center support.
3. Recheck No. 1 and No. 2 brake piston stroke. See **Fig. 32** and **Fig. 34** . If piston stroke is not as specified, check for incorrect reassembly of components. Reassemble sun gear and No. 1 one-way clutch. See **Fig. 37** . While turning one-way clutch, install sun gear into center support. Install snap ring on end of sun gear. Ensure sun gear rotates in counterclockwise direction only.
4. Reassembly front planetary gear and No. 2 one-way clutch. See **Fig. 39** . Ensure lug shaped cutout on thrust washer for No. 2 one-way clutch is aligned with lug shaped cutout on front planetary gear. See **Fig. 40** . Ensure front planetary gear rotates in counterclockwise direction only.

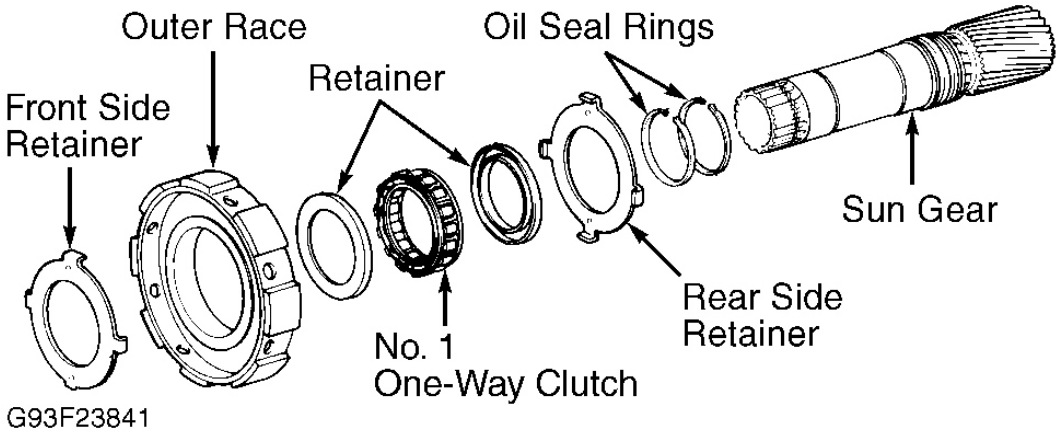


Fig. 37: Exploded View Of Planetary Sun Gear & No. 1 One-Way Clutch
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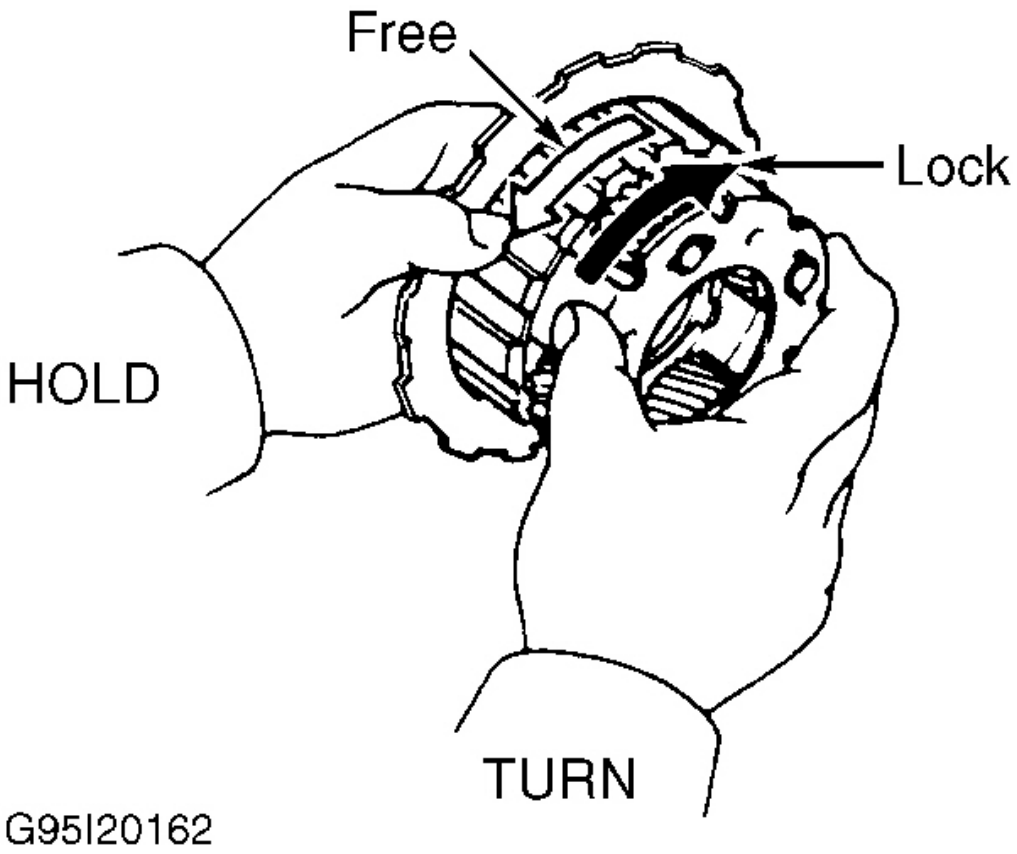


Fig. 38: Checking No. 2 One-Way Clutch Operation
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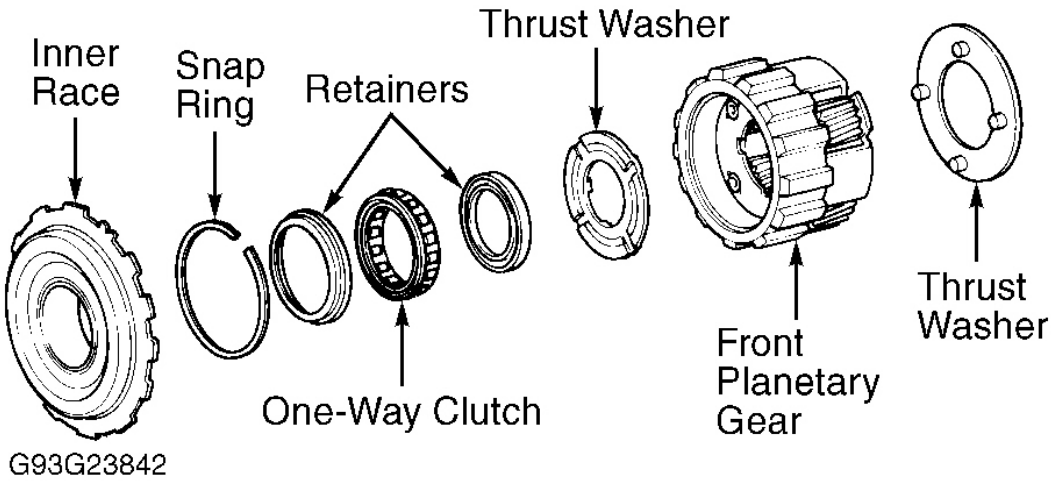


Fig. 39: Exploded View Of Front Planetary Gear & No. 2 One-Way Clutch
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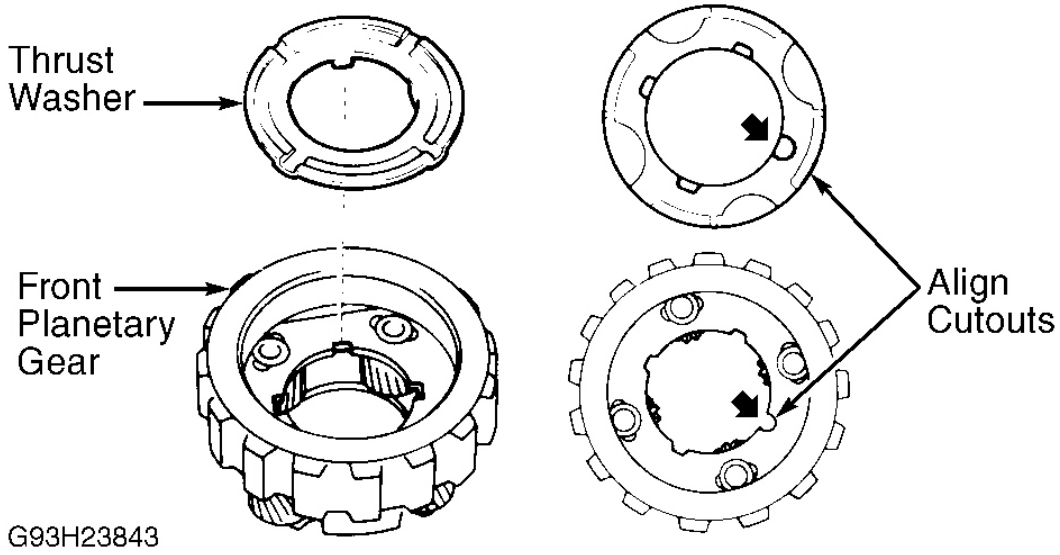


Fig. 40: Aligning Thrust Washer To Planetary Gear
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REAR PLANETARY GEAR & OUTPUT SHAFT

Disassembly

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1. Remove thrust washer from front planetary ring gear. Compress snap ring and remove front planetary ring gear. Remove snap ring from ring gear. Remove rear planetary gear assembly from output shaft. Remove bearing and race.
2. Remove rear planetary carrier from rear planetary ring gear. Remove set ring. Remove rear planetary ring gear. Remove race from ring gear. Remove oil seal ring from intermediate shaft. Remove 3 oil seal rings from output shaft. See **Fig. 41** .

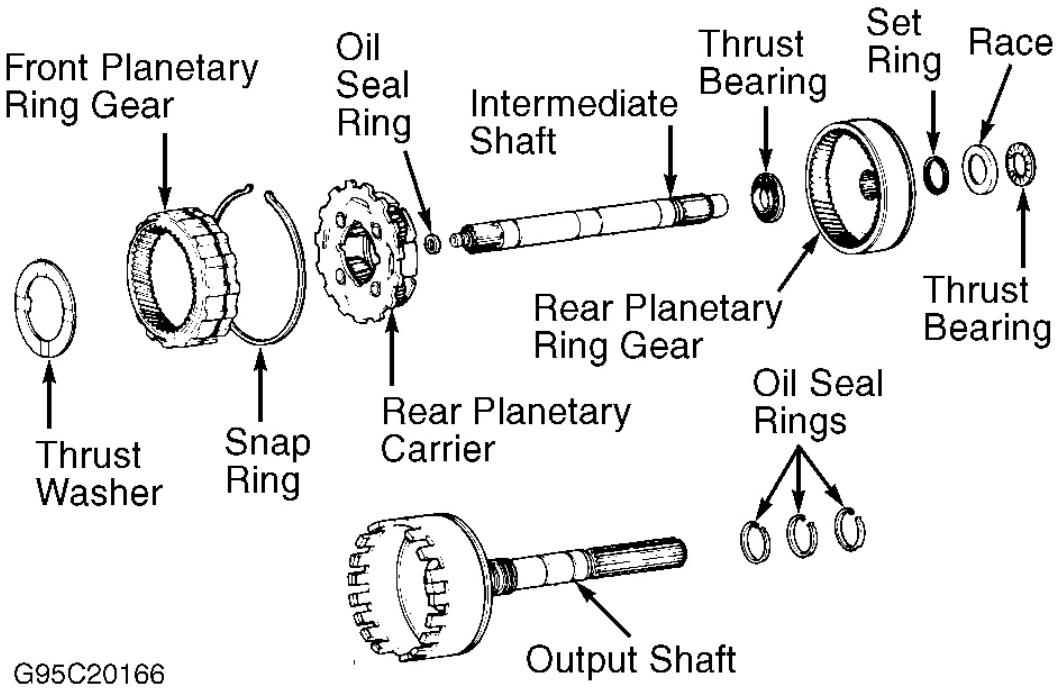


Fig. 41: Exploded View Of Rear Planetary Gear & Output Shaft
Courtesy of TOYOTA MOTOR SALES, U.S.A., INC.

Inspection

1. Clean all components with solvent. Dry with compressed air. Inspect all components for wear or damage. Using a dial indicator, measure inside diameter of output shaft bushing. Maximum inside diameter is .712" (18.08 mm). If inside diameter is greater than specified, replace output shaft.
2. Using a feeler gauge, measure clearance between rear planetary carrier pinion gear and carrier case. Standard clearance should be .008-.020" (.20-.50 mm). If clearance is not as specified, inspect rear planetary carrier thrust washer. If necessary, replace rear planetary carrier assembly.

Reassembly

1. Lubricate oil seal rings with ATF. Install oil seal rings on output shaft. Ensure rings rotate smoothly after installation. Lubricate and install NEW oil seal ring on intermediate shaft. Ensure ring rotates smoothly.

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Apply petroleum jelly to race and install race on intermediate shaft with flat surface away from shaft.

2. Install rear planetary ring gear on intermediate shaft. Install set ring. Install rear planetary carrier to planetary ring gear. Apply petroleum jelly to bearing and race and install on rear planetary ring gear. Install rear planetary gear assembly to output shaft. Install front planetary ring gear. See **Fig. 41** .
3. Ensure snap ring is installed in groove of output shaft. Align snap ring end with wide cutout portion of output shaft. Apply petroleum jelly to thrust washer and install on rear planetary carrier. Ensure lug shapes match cutout portions on rear planetary carrier.

NO. 3 BRAKE PISTON

Disassembly

1. Using appropriate spring compressor, compress piston return springs and remove snap ring. Remove spring retainer and return springs. Position transmission with front opening facing upward.
2. Place shop towels under case to prevent piston damage. Apply air pressure to case passages to remove No. 3 brake outer piston, reaction sleeve and No. 3 brake inner piston. See **Fig. 12** and **Fig. 14** . It may be necessary to use long hooks to remove sleeve and inner piston. Using screwdriver, pry manual valve lever shaft seals from case if replacement is required.

Inspection

Clean all parts (except discs) in solvent. Dry with compressed air. Inspect pistons and sleeve for scoring, wear or damage. Check return springs for cracked or broken coils. If disc lining is peeled or discolored, replace discs as necessary. Replace damaged components as necessary.

Reassembly

Install manual valve lever shaft seals if removed. Lubricate and install all NEW "O" rings. Thin "O" ring goes on outside of reaction sleeve. Soak discs in ATF for 15 minutes prior to installation. To complete reassembly, reverse disassembly procedure. Check No. 3 brake operation. See **Fig. 14** .

VALVE BODY ASSEMBLY

CAUTION: All valve body components must be installed in original location. Lay all components in sequence during removal for reassembly reference. See Fig. 42 -Fig. 51 .

NOTE: Throttle pressure is changed according to number of adjusting rings on valve body. When assembling valve body, install same number of adjusting rings as removed. Some valve bodies do not have adjusting rings.

Disassembly

1. Remove detent spring, detent spring cover and manual valve from valve body assembly. Remove lower valve body cover, gaskets, plate, check balls, retainers and pins. Remove lower valve body plate. See **Fig. 42** and **Fig. 43** .

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2. Remove 3 lower valve body bolts. Turn valve body assembly over. Remove 5 front upper valve body bolts. Remove 5 rear upper valve body bolts. Note bolt length and location. See **Fig. 44** . Separate lower valve body and plate from upper valve bodies.

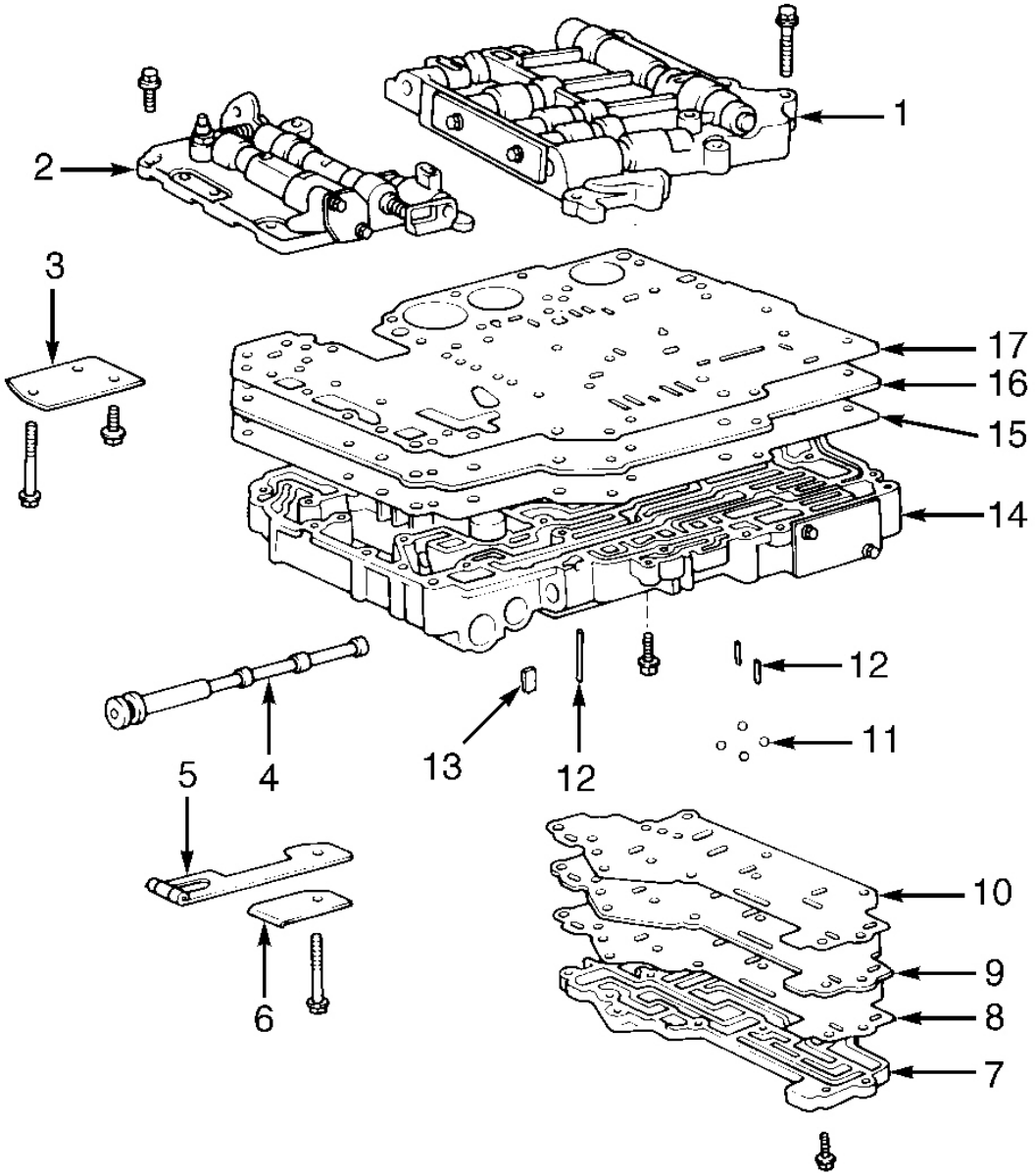
CAUTION: DO NOT allow plate to separate from lower valve body during removal, or check balls and retainers may fall out.

3. Remove plate and gaskets from lower valve body. Note location and diameter of check balls, springs and valves. Push inward on sleeves or plugs to remove all pins and retainers. Retainers may be removed using a magnet. Remove all check balls, springs and valves. Note location of pins, retainers and diameter of check balls.

Inspection

Clean all parts in solvent. Dry with compressed air. Ensure all valve body passages are clear. Inspect valves for scoring or roughness. Ensure valves slide freely in bores. Inspect valve springs for damage, squareness and collapsed coils. Measure spring free length and outer diameter. Replace spring if not within specification. See appropriate VALVE BODY SPRING SPECIFICATIONS table.

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1. Rear Upper Valve Body
2. Front Upper Valve Body
3. Lower Valve Body Plate
4. Manual Valve
5. Detent Spring
6. Detent Spring Cover
7. Lower Valve Body Cover
8. No. 4 Gasket
9. Plate
10. No. 3 Gasket
11. Check Balls
12. Pin
13. Retainer
14. Lower Valve Body
15. No. 2 Gasket
16. Valve Body Plate
17. No. 1 Gasket

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Fig. 42: Exploded View Of Valve Body Assembly
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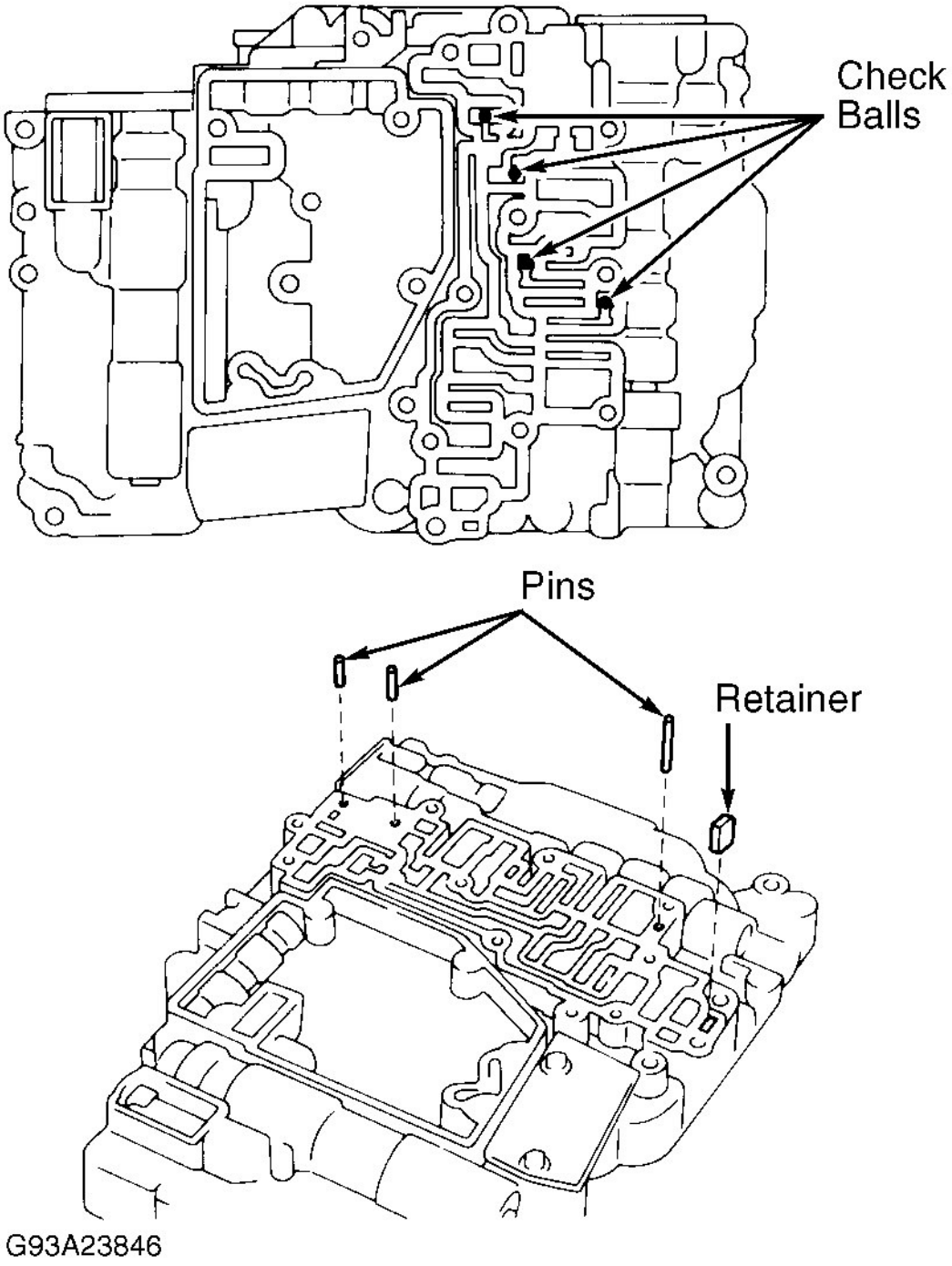


Fig. 43: Identifying Lower Valve Body (Bottom) Check Ball, Pin & Retainer Locations

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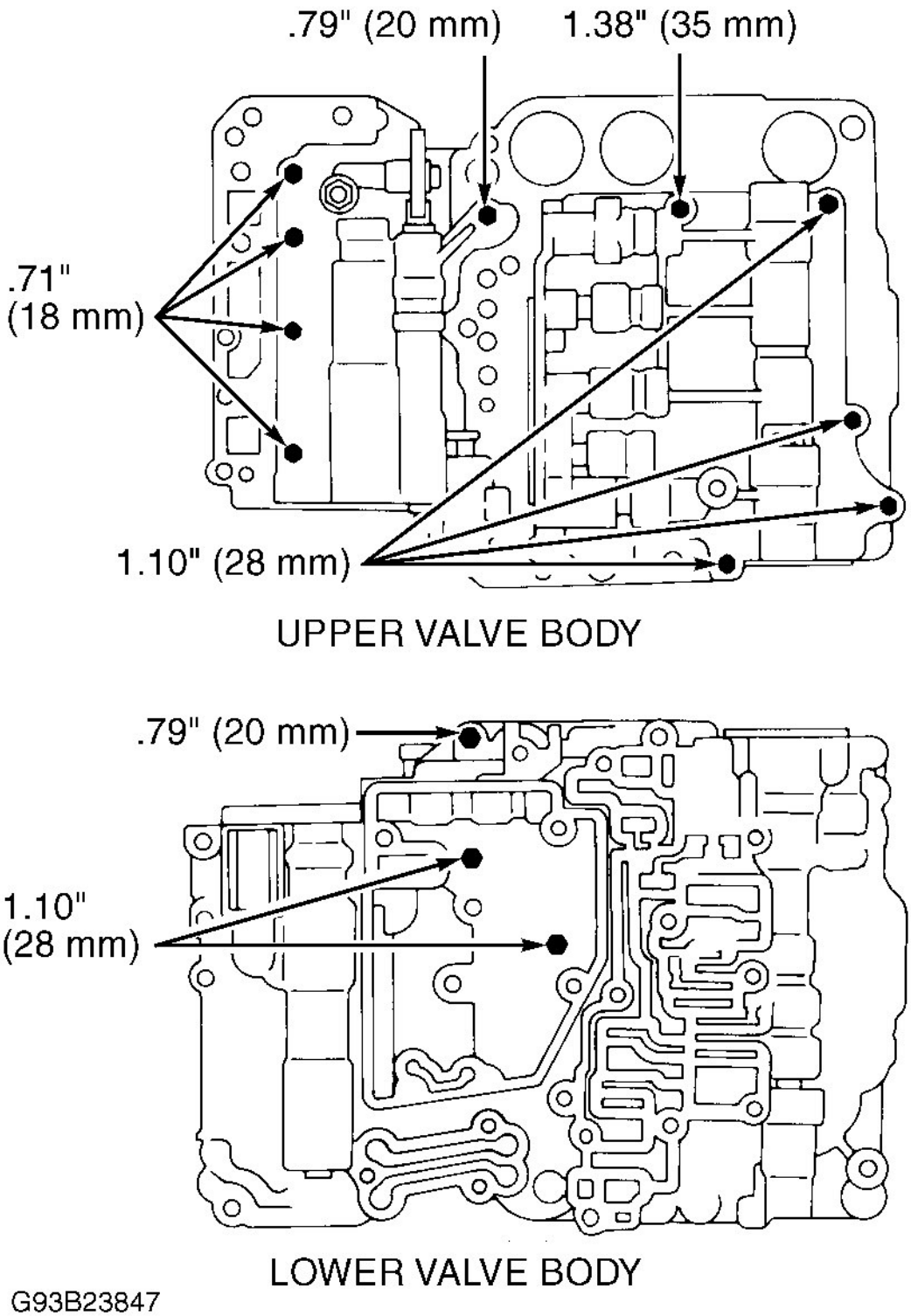


Fig. 44: Identifying Valve Body Bolts

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LOWER VALVE BODY SPRING SPECIFICATIONS

Spring No. (1)	Diameter - In. (mm)	Free Length - In. (mm)
1	.197 (5.00)	.787 (20.00)
2	.543 (13.80)	.1.138 (28.90)
3	.413 (10.50)	.539 (13.70)
4	.299 (7.60)	1.362 (34.60)
5	.417 (10.60)	1.327 (33.70)
6	.516 (13.10)	1.264 (32.10)
7	.669 (17.00)	2.173 (55.20)
(1) For spring locations, refer to illustration. See **Fig. 45** .		

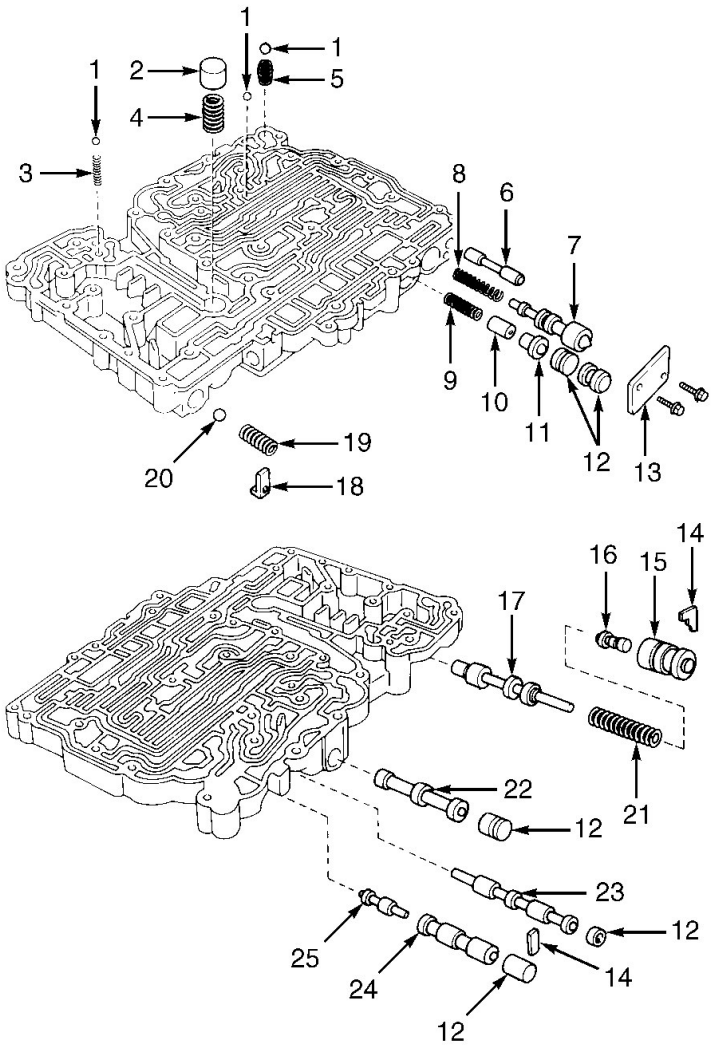
FRONT UPPER VALVE BODY SPRING SPECIFICATIONS

Spring No. (1)	Diameter - In. (mm)	Free Length - In. (mm)
1	.425 (10.80)	1.567 (39.80)
2	.339 (8.60)	.862 (21.90)
3	.685 (17.40)	2.807 (71.30)
(1) For spring locations, refer to illustration. See **Fig. 48** .		

REAR UPPER VALVE BODY SPRING SPECIFICATIONS

Spring No. (1)	Diameter In. (mm)	Free Length In. (mm)
1	.350 (8.90)	1.146 (29.10)
2	.354 (9.00)	1.075 (27.30)
3	.362 (9.20)	1.480 (37.60)
4	.362 (9.20)	1.669 (42.40)
5	.354 (9.00)	1.382 (35.10)
(1) For spring locations, refer to illustration. See **Fig. 50** .		

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1. Check Ball
2. Cooler By-Pass Valve
3. Spring No. 1 (A-43D Only)
4. Spring No. 2
5. Spring No. 3
6. Reverse Brake Plug
7. Low Coast Shift Valve
8. Spring No. 4
9. Spring No. 5
10. 3-4 Coast Shift Valve
11. 3rd Coast Shift Valve
12. Plug
13. Valve Body Cover
14. Retainer
15. Sleeve
16. Plunger
17. Primary Regulator Valve
18. Seat
19. Spring No. 6
20. Pressure Relief Valve
21. Spring No. 7
22. D-2 Down Timing Valve
23. 3-4 Shift Valve
24. 1-2 Shift Lower Valve
25. 1-2 Shift Upper Valve

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Fig. 45: Exploded View Of Lower Valve Body
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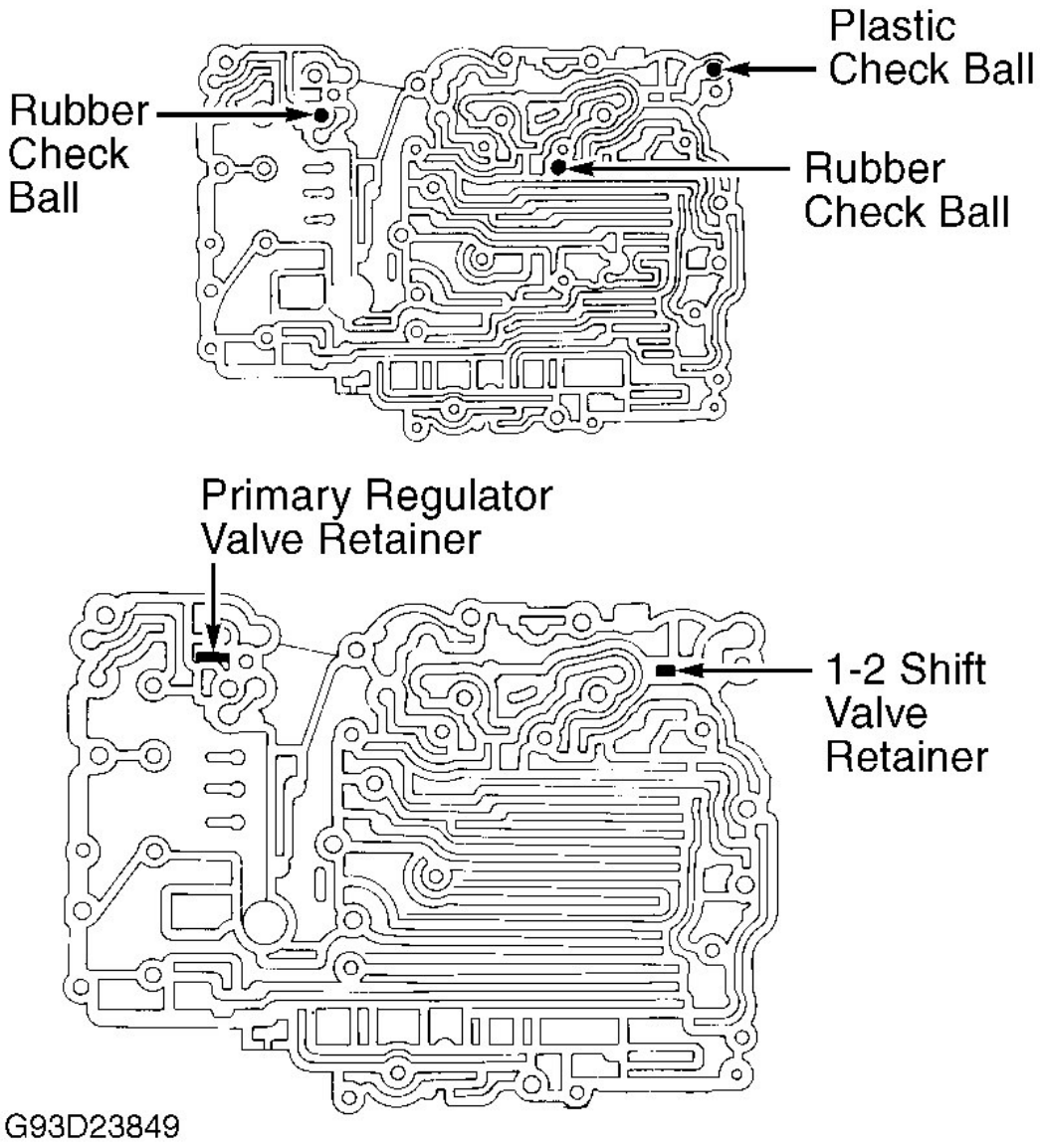


Fig. 46: Identifying Lower Valve Body (Top) Check Ball & Retainer Locations
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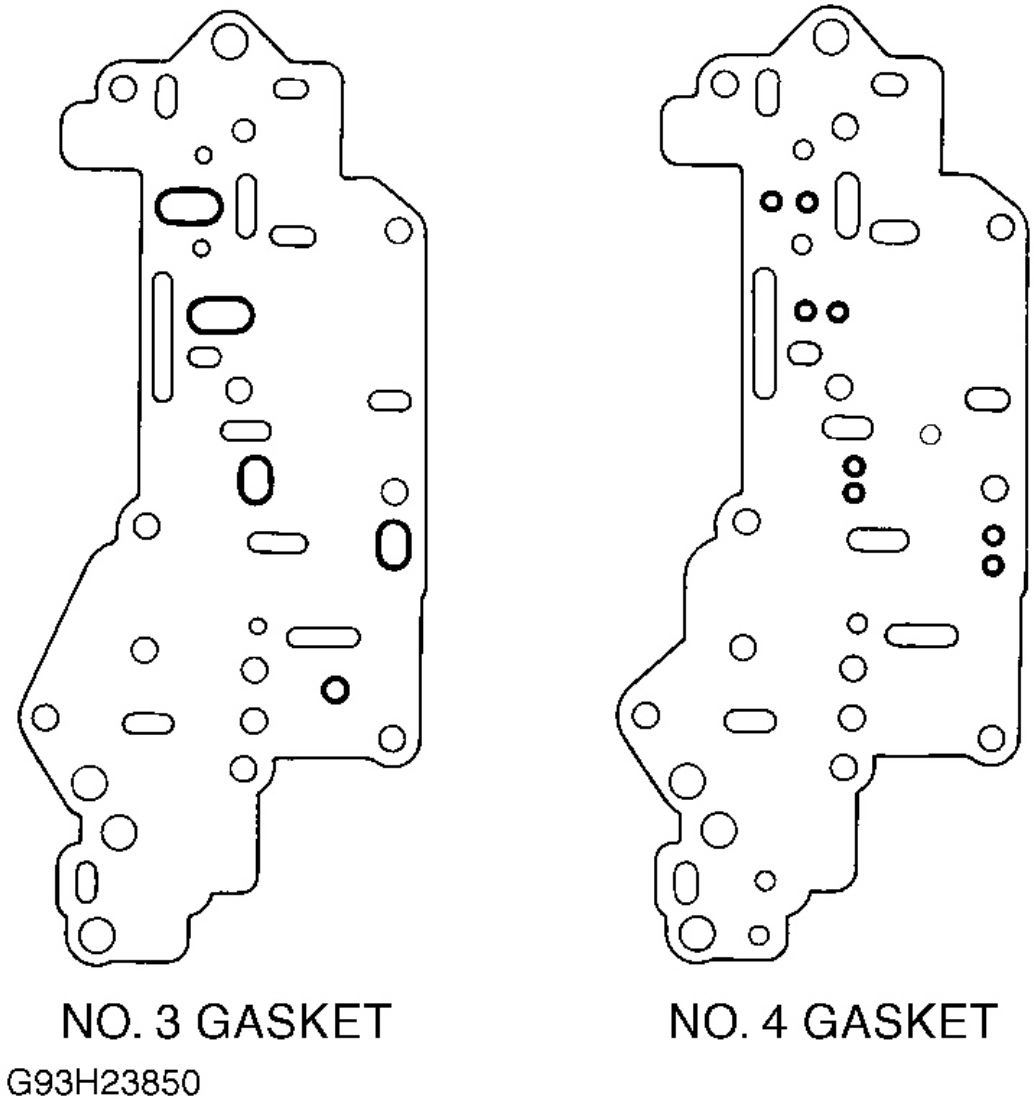
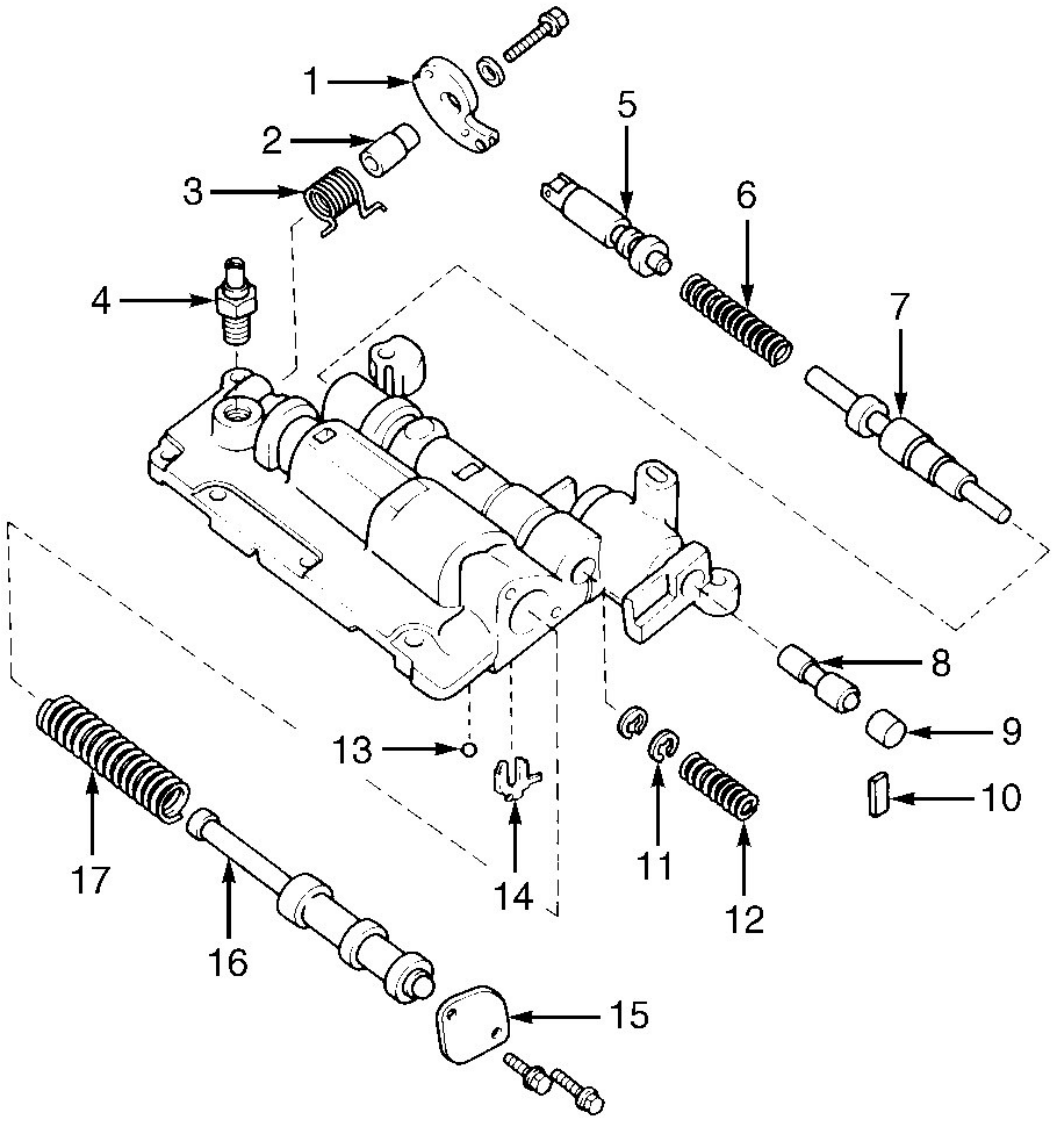


Fig. 47: Identifying Lower Valve Body No. 3 & No. 4 Gaskets
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1. Cam
2. Pin
3. Spring
4. Check Ball Body
5. Downshift Plug
6. Spring No. 1
7. Throttle Valve
8. Cut-Back Valve
9. Plug
10. Retainer
11. Adjusting Ring
12. Spring No. 2
13. Check Ball
14. Valve Vibrating Stopper
15. Valve Body Cover
16. Secondary Regulator Valve
17. Spring No. 3

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Fig. 48: Exploded View Of Front Upper Valve Body
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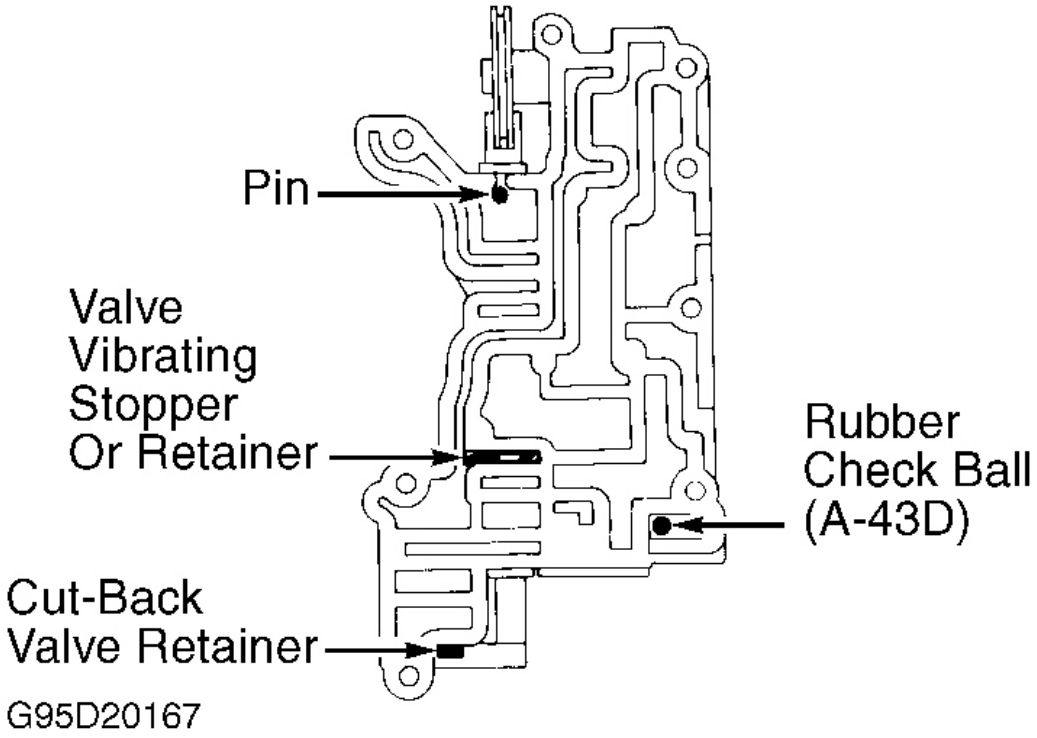
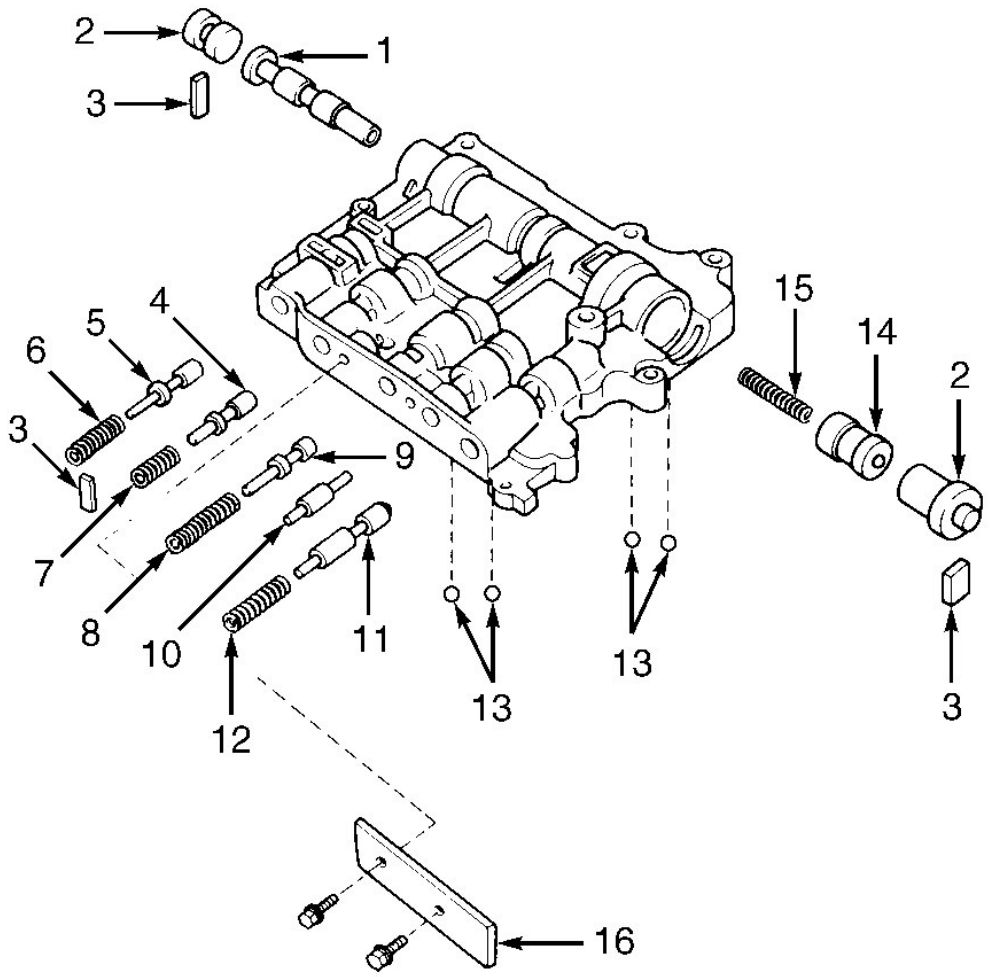


Fig. 49: Identifying Front Upper Valve Body Check Ball, Pin, Stopper & Retainer Locations
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1. 2-3 Shift Valve
2. Plug
3. Retainer
4. Intermediate Modulator Valve
5. Detent Regulator Valve
6. Spring No. 1
7. Spring No. 2
8. Spring No. 3
9. Reverse Clutch Sequence Valve
10. Governor Modulator Plug
11. Low Coast Modulator Valve
12. Spring No. 4
13. Check Balls
14. Intermediate Shift Valve
15. Spring No. 5
16. Valve Body Cover

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Fig. 50: Exploded View Of Rear Upper Valve Body
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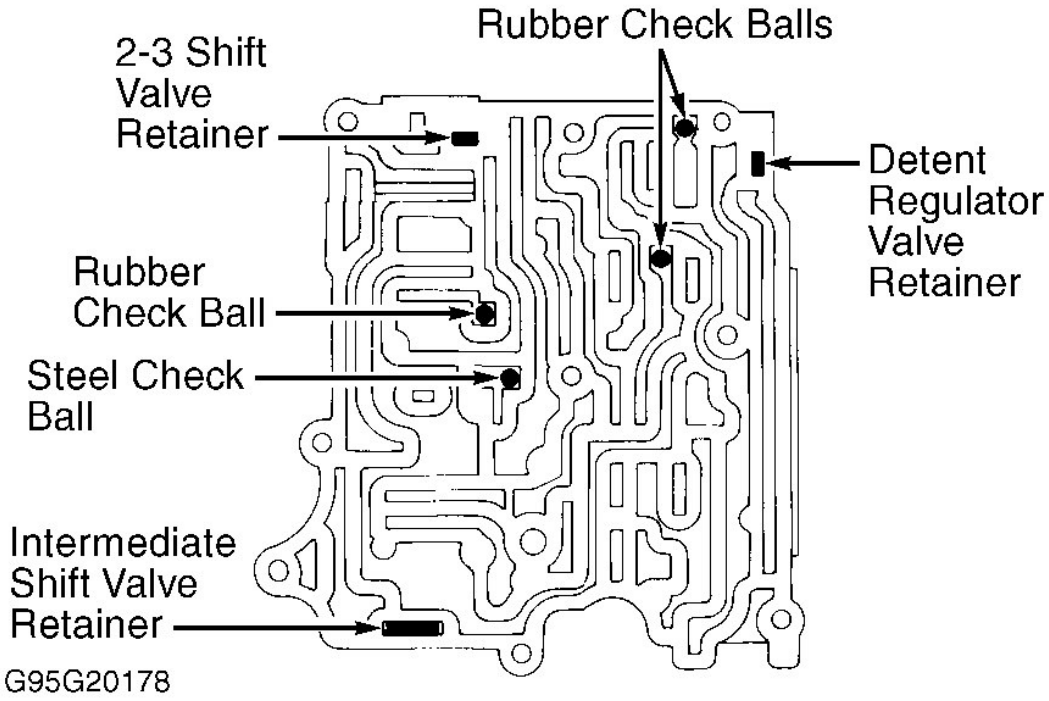


Fig. 51: Identifying Rear Upper Valve Body Check Ball, Pin & Retainer Locations
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Reassembly

1. Coat all components with ATF. To reassemble, reverse disassembly procedure. Ensure valves slide freely in bores.
2. Place No. 2 gasket and separator plate on lower valve body. No. 2 gasket does not have 3 large holes. Temporarily install 2 bolts to secure plate. Place No. 1 gasket on plate. Place lower valve body with gaskets and separator plate on rear upper valve body.
3. Install and finger tighten bolt in lower valve body. Turn assembly over. Install 5 bolts in upper valve body. Ensure bolts are correct length. See **Fig. 44** . Remove bolts that were temporarily installed.
4. Install front upper valve body on lower valve body. Install correct bolts and finger tighten. Turn assembly over and install remaining bolts. Tighten all bolts to specification. See **TORQUE SPECIFICATIONS** .
5. Install lower valve body plate. See **Fig. 42** . Install check balls in lower valve body. See **Fig. 43** . Install No. 3 gasket, separator plate, No. 4 gasket and lower valve body cover. For gasket identification, refer to illustration. See **Fig. 47** . Install bolts and tighten to specification. Install manual valve and detent spring.

GOVERNOR ASSEMBLY

Disassembly & Reassembly

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Remove retaining clip (if necessary). Push downward on governor shaft. Remove "E" clip and remove governor components. See **Fig. 52** . Inspect all parts for wear and damage. Insert valve shaft into body. Ensure valve slides smoothly. Check oil passage for restrictions. To reassemble, reverse disassembly procedure. Ensure "E" clip is fully seated.

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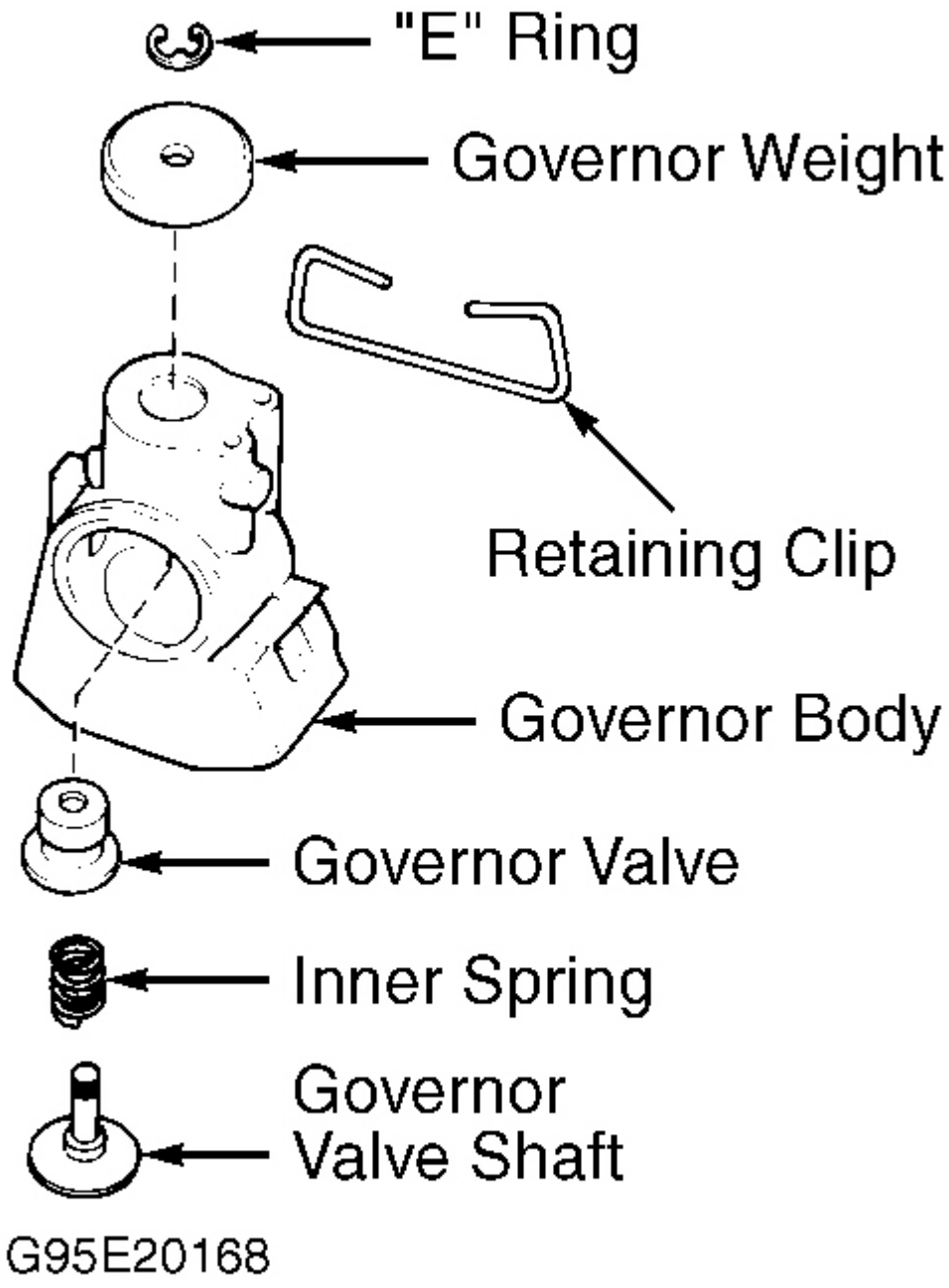


Fig. 52: Exploded View Of Governor Assembly
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TRANSMISSION REASSEMBLY

NOTE: For bearing race and thrust bearing outer diameter specifications, see BEARING RACE & THRUST BEARING SPECIFICATIONS table. For bearing race and thrust bearing locations, refer to illustration. See Fig. 53 .

CAUTION: Lubricate all components with ATF. Clutch discs should be soaked in ATF for 15 minutes prior to installation. Coat thrust bearings and races with petroleum jelly. Ensure ends of snap rings are not aligned with cutout area of case.

1. Position transmission case with front facing upward. Assemble No. 3 brake inner piston, reaction sleeve and outer piston. Press assembled pistons into case with hand pressure. Using appropriate spring compressor, install piston return spring on outer piston. Install snap ring. Ensure No. 3 brake piston moves smoothly when compressed air is applied. See **Fig. 14** .
2. Install No. 1 bearing race. Install brake apply tube into transmission case, aligning locking tab with cutout in valve body side of transmission case. Ensure lips of tube end are completely inserted onto outer piston. Install output shaft No. 1 thrust bearing into case. Install rear planetary gear and output shaft into case. Install No. 2 thrust bearing. See **Fig. 53** .
3. Install pressure plate, with flat surface facing forward. Install 5 discs and 4 plates, starting with a disc and alternating each component. Measure No. 3 brake pack clearance. See **Fig. 13** . Clearance should be .024-.104" (.61-2.64 mm).
4. Remove one-way clutch inner race from planetary gear assembly. Install front planetary gear. Mesh splines of planetary gear with flukes of discs by rotating and pushing planetary gear. Position inner race with notched tooth toward valve body side of case. Push plate into place. Install snap ring. Ensure snap ring is fully seated.
5. Align oil and bolt holes of center support toward valve body side. Align center support bolt holes with case holes and install. Install bolts with wave washers. Tighten bolt on accumulator piston side first to 18 ft. lbs. (25 N.m). Install rear clutch assembly while rotating to align with center support.
6. If fully installed, splined center of clutch will be even with end of sun gear shaft. Install No. 3 rear bearing race, thrust bearing and front bearing race over splined end of rear clutch. Install No. 4 thrust bearing and bearing race on front clutch. See **Fig. 53** . Install front clutch. Rotate and push front clutch to mesh splines of front clutch with flukes of discs.
7. Using calipers and Clutch Drum Thrust Plate Gauge (09370-12010), measure distance between top of case and front clutch drum. See **Fig. 11** . Distance should be equal to that recorded during disassembly. Install Guide Rods (09362-30011) finger tight in front case bolt holes.
8. Install OD case over guide rods with cutout area toward valve body side of case. Install thrust washer on OD case and OD planetary gear. Ensure washer lugs align with holes in OD case and planetary gear assembly. Install No. 5 bearing race on OD planetary gear assembly. See **Fig. 53** .
9. Install OD planetary gear assembly with OD direct clutch and one-way clutch. Rotate and push OD planetary gear to mesh splines with flukes of discs. Ensure thrust washer does not fall during installation. Using calipers and Clutch Drum Thrust Plate Gauge (09370-12010), measure distance between top of case and OD clutch drum. See **Fig. 10** . Distance should be equal to that recorded during disassembly.
10. Install "O" ring on OD case. Install converter housing to transmission case. Tighten 10-mm bolts to 25 ft. lbs. (34 N.m) and 12-mm bolts to 42 ft. lbs. (57 N.m). Install No. 5 thrust bearing on rear of oil pump.

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Ensure oil seal rings and "O" ring are installed on oil pump.

11. Install oil pump over guide rods and into transmission case. Ensure thrust bearing does not fall off oil pump. Coat oil pump retaining bolts below bolt heads with thread sealer. Remove guide rods. Install bolts and tighten to 15 ft. lbs. (21 N.m). Ensure input shaft turns freely. Using a dial indicator, check output shaft end play. Position dial indicator against end of output shaft. End play should be .012-.035" (.30-.90 mm).
12. Apply air pressure to specific oil passage to check appropriate operating components. See **Fig. 54** . Component application should be heard while applying air. Install NEW oil seals in transmission case. Lubricate oil seal lips prior to installation. Install NEW spacer on manual valve lever. Install manual valve lever shaft into case and through manual valve lever. Install NEW pin with slot at right angle to shaft.
13. Align spacer hole to hollow area of lever. Stake spacer to lever. Ensure manual valve lever shaft turns smoothly. Install "E" ring on shaft. Install parking lock pawl, pivot pin and spring in case. Install lock rod on manual valve lever and install parking lock pawl. Install parking pawl bracket on case. Ensure collar on control rod is toward front of transmission. Tighten bracket bolts to 65 INCH lbs. (7.4 N.m).
14. Check operation of park lock pawl. Ensure output shaft is locked when manual valve lever is in "P" position. Determine proper accumulator piston locations. See **Fig. 9** . Ensure accumulator piston is proper diameter. See **ACCUMULATOR PISTON DIAMETER** table. Determine proper spring free length and outer diameter for accumulator piston application. See **ACCUMULATOR SPRING SPECIFICATIONS** table.

ACCUMULATOR PISTON DIAMETER (1)

Application	In. (mm)
Front & Rear Clutch	1.252 (31.80)
No. 2 Brake	1.370 (34.80)
(1) For accumulator piston locations, refer to illustration. See **Fig. 9** .	

ACCUMULATOR SPRING SPECIFICATIONS (1)

Application	Diameter - In. (mm)	Free Length - In. (mm)
Front Clutch	.689 (17.50)	2.547 (64.70)
No. 2 Brake	.646 (16.40)	2.626 (66.70)
Rear Clutch	.626 (15.90)	2.173 (55.20)
(1) For accumulator spring locations, refer to illustration. See **Fig. 9** .		

15. Install accumulator pistons and springs. Ensure accumulator pistons are pressed fully into bore. Install NEW "O" rings on throttle cable fitting. Install throttle cable. Align manual valve with pin on manual valve lever. Connect throttle cable to cam. Install valve body assembly and tighten bolts to 89 INCH lbs. (10 N.m). See **Fig. 6** .
16. Install gasket and oil strainer. Tighten bolts to 48 INCH lbs. (5.4 N.m). Using a plastic hammer, install oil tubes. Do not bend or damage oil tubes. Install magnets in oil pan. Ensure magnets do not interfere with oil tubes. Install NEW oil pan gasket to transmission case. Align cut part of gasket and transmission case. Install oil pan bolts and tighten to 39 INCH lbs. (4.4 N.m).

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17. Install governor strainer and plate, if removed. Lift governor assembly retaining clip with screwdriver. Slide governor assembly onto output shaft. Install retaining clip into hole on output shaft. Install lock plate and bolt. Tighten bolt to 35 INCH lbs. (3.9 N.m). Stake lock plate in place.
18. Install snap ring, lock ball, speedometer drive gear and retaining snap rings. Install sensor rotor and snap ring. Install oil supply tube and extension housing with NEW gasket. Clean all bolt threads. Apply thread sealer to top 4 extension housing bolts prior to installation. Install short bolts to bottom of extension housing. Tighten bolts to 25 ft. lbs. (34 N.m).
19. Install overdrive solenoid. Tighten bolts to 115 INCH lbs. (13 N.m). Lubricate and install NEW "O" rings on cooler unions. Install unions and tighten to 25 ft. lbs. (34 N.m). Install speed sensor. Using control shaft lever, turn manual valve lever shaft fully forward and return 2 notches.
20. Insert park/neutral position switch on manual valve lever shaft and temporarily tighten adjusting bolt. Install grommet and NEW lock washer. Install and tighten nut to 35 INCH lbs. (3.9 N.m). Align park/neutral position switch neutral basic line and switch groove. See **Fig. 55** . Tighten adjusting bolt to 48 INCH lbs. (5.4 N.m). Bend over at least 2 washer tabs.
21. Install control shaft lever with spring washer and nut. Tighten nut to 61 INCH lbs. (6.9 N.m). Install wire harness and throttle cable clamp. Install torque converter. Ensure torque converter is installed correctly. Using a straightedge and calipers, measure torque converter depth. Depth should be 1.250" (31.75 mm). See **Fig. 56** .

BEARING RACE & THRUST BEARING SPECIFICATIONS (1)

Application	Outer Diameter - In. (mm)
Bearing Race No.	
1	2.26 (57.5)
3 (Rear)	1.75 (44.5)
3 (Front)	1.91 (48.5)
4	1.47 (37.3)
5	1.54 (39.1)
Thrust Bearing No.	
1	1.74 (44.3)
2	2.17 (55.2)
3	1.83 (46.4)
4	1.48 (37.5)
5	1.70 (43.2)

(1) For component locations, refer to illustration. See **Fig. 53**
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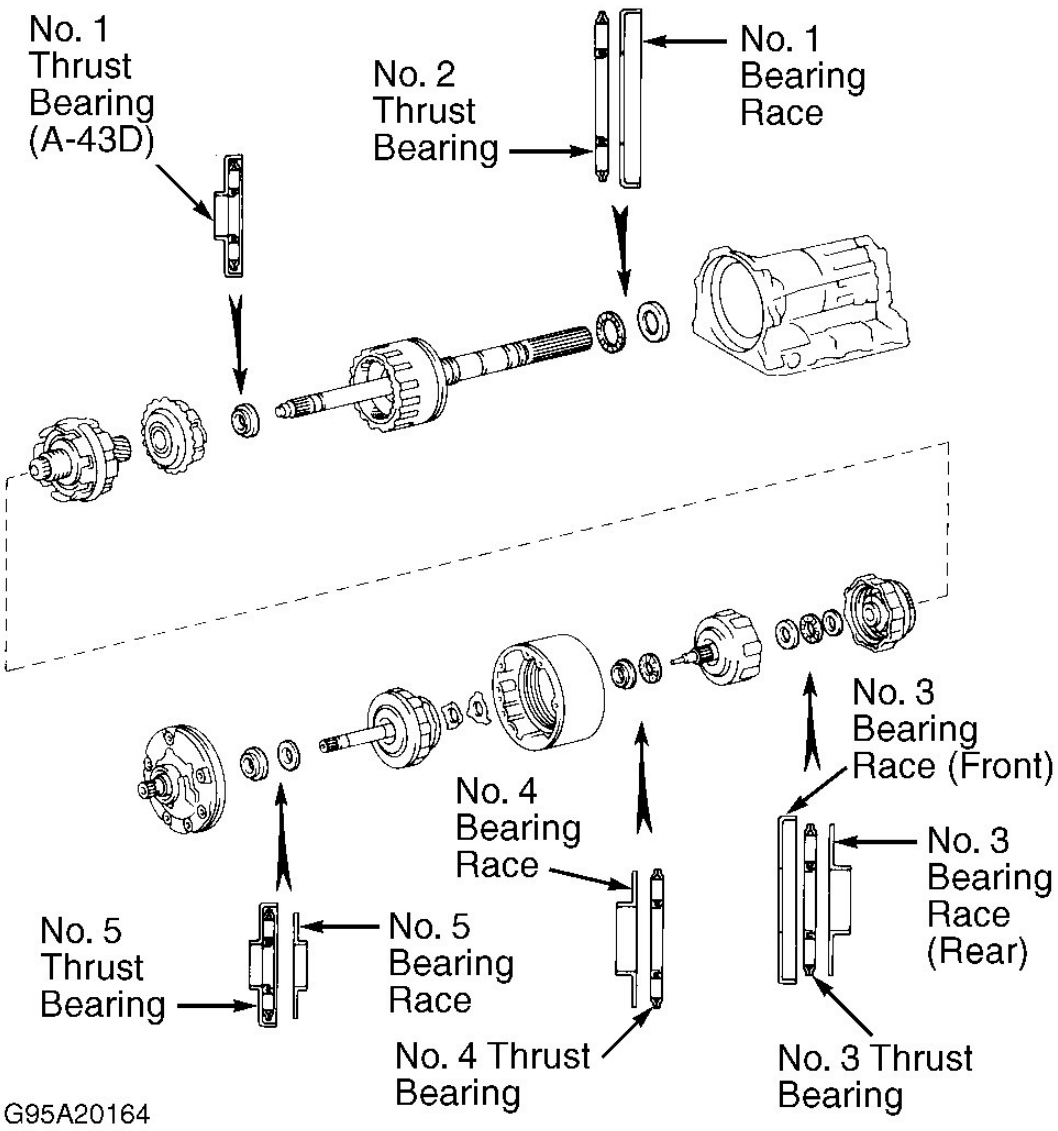


Fig. 53: Identifying Bearing Race & Thrust Bearing Locations
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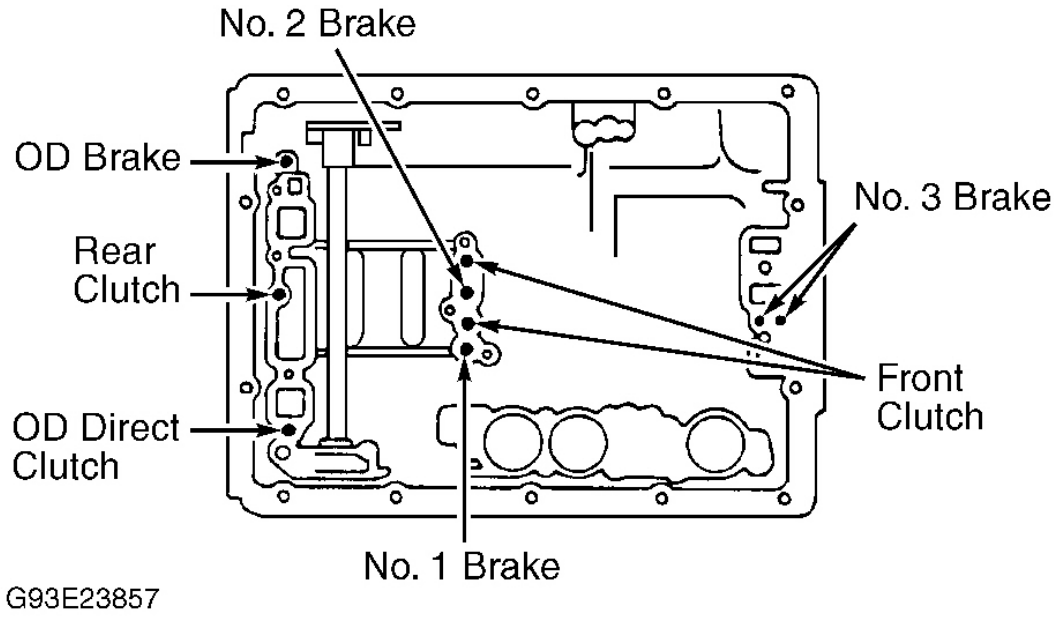


Fig. 54: Checking Component Piston Operation
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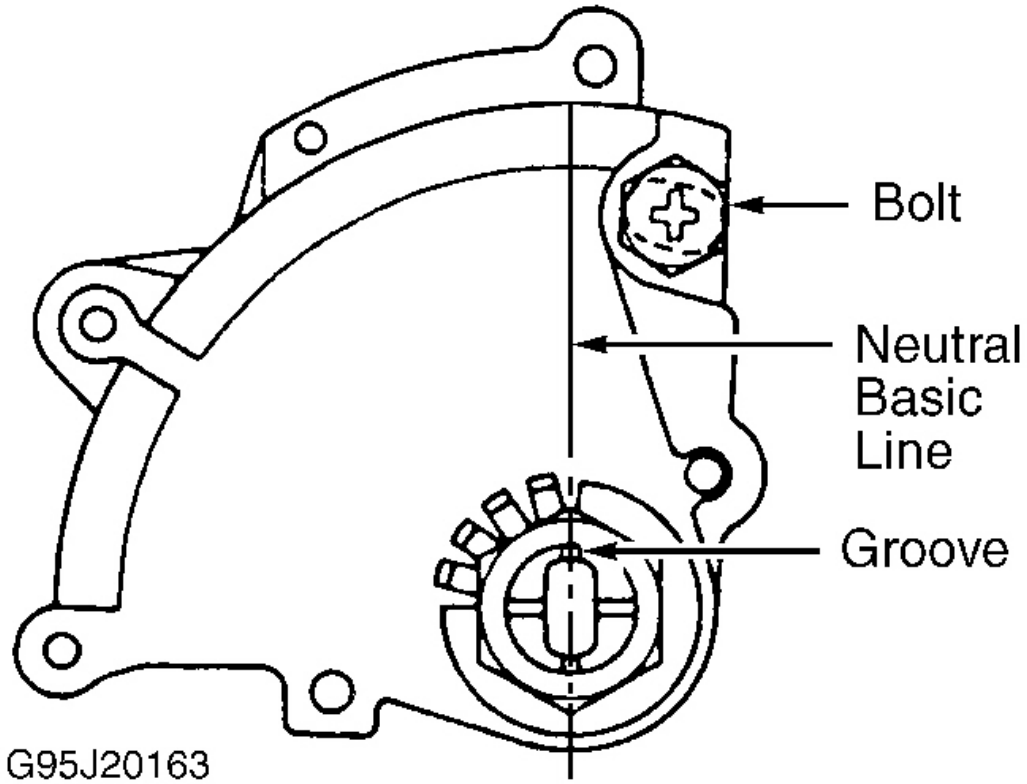


Fig. 55: Aligning Park/Neutral Position Switch
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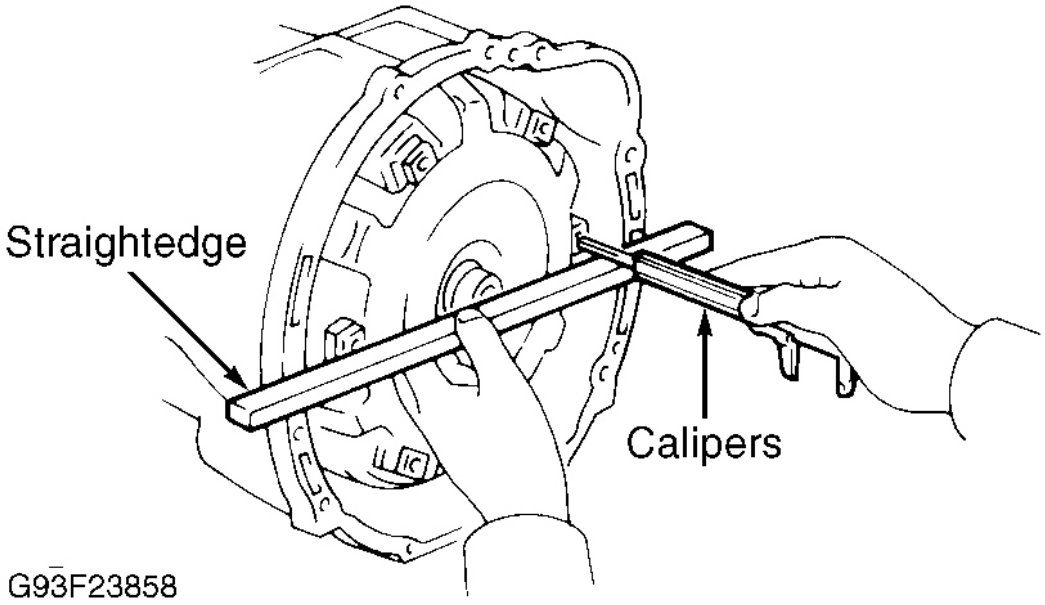


Fig. 56: Measuring Torque Converter Installed Depth
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TORQUE SPECIFICATIONS

TORQUE SPECIFICATIONS

Application	Ft. Lbs. (N.m)
Center Support-To-Case Bolt	18 (25)
Converter-To-Drive Plate Bolt	30 (41)
Cooler Union Nut	25 (34)
Drain Plug	15 (20)
Drive Plate Bolt	55 (74)
Extension Housing Mount Bracket Bolt	
Frame Side Bolt	42 (57)
Rear Bolt	13 (18)
Extension Housing-To-Case Bolt	27 (36)
Oil Pump-To-Case Bolt	15 (21)
Starter Bolt	29 (39)
Stiffener Bolt	27 (37)
Transmission Case-To-Converter Housing Bolt	
10-mm	25 (34)
12-mm	42 (57)
Transmission-To-Engine Bolt	53 (71)

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Vehicle Speed Sensor Bolt	12 (16)
	INCH Lbs. (N.m)
Control Shaft Lever Nut	61 (6.9)
Governor Lock Plate Bolt	35 (3.9)
Lock Pawl Bracket Bolt	65 (7.4)
Oil Pan Bolt	39 (4.4)
Oil Pump Housing Bolt	65 (7.4)
Oil Strainer Bolt	48 (5.4)
Overdrive Solenoid Bolt	115 (13)
Park/Neutral Position Switch	
Adjusting Bolt	48 (5.4)
Mounting Nut	35 (3.9)
Throttle Cam Bolt	65 (7.4)
Upper Valve Body-To-Lower Valve Body Bolt	48 (5.4)
Valve Assembly-To-Case Bolt	89 (10)

TRANSMISSION SPECIFICATIONS

TRANSMISSION SPECIFICATIONS

Application	**In. (mm)**
Bushing Diameter (Maximum)	
Center Support	1.435 (36.46)
Extension Housing	1.4996 (38.090)
OD Direct Clutch Drum	.911 (23.14)
OD Planetary Gear	.444 (11.27)
Oil Pump Body	1.504 (38.19)
Oil Pump Stator Shaft (Front & Rear)	.850 (21.58)
Output Shaft	.712 (18.08)
Planetary Sun Gear	.850 (21.58)
Transmission Case	1.5035 (38.188)
Converter Sleeve Runout (Maximum)	.012 (.30)
Drive Plate Runout (Maximum)	.008 (.20)
No. 3 Brake Pack Clearance	.024-.104 (.61-2.64)
Output Shaft End Play	.012-.035 (.30-.90)
Piston Stroke	
Front Clutch	.052-.105 (1.32-2.66)
No. 1 Brake	.031-.059 (.78-1.50)
No. 2 Brake	.040-.089 (1.01-2.25)
OD Direct Clutch	.070-.102 (1.77-2.58)
OD Brake	.026-.087 (.65-2.21)
Rear Clutch	.036-.078 (.91-1.99)

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Planetary Pinion Gear Clearance	.008-.020 (.20-.50)
Torque Converter Depth	1.250 (31.75)

CLUTCH DISC & PLATE QUANTITY

Component	Disc	Plate
Front Clutch	4	4
No. 1 Brake	1	1
No. 2 Brake	3	3
No. 3 Brake	5	4
OD Brake	3	3
OD Direct Clutch	1	0
Rear Clutch	3	3

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