

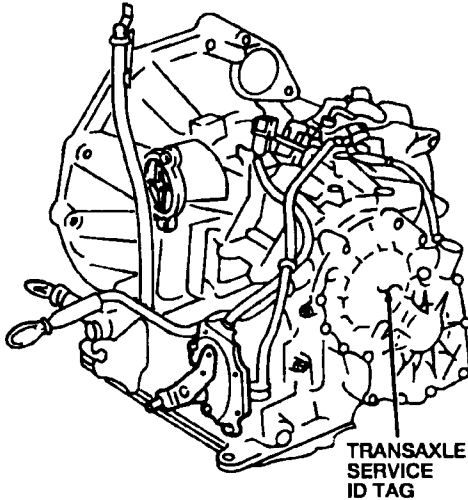
Service Information 4F20E

VEHICLE APPLICATION

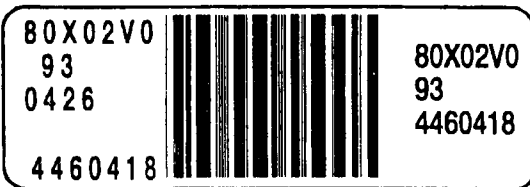
Villager

Transaxle Identification

For transaxle identification and serial number, refer to the transaxle service ID tag which is attached to the transaxle side cover.



Typical Transaxle Service ID Tag



Item	Part Number	Description
1	—	3-4 Clutch
2	—	Reverse Clutch
3	7D034	2-4 Band
4	7A103	Oil Pump Assembly
5	7005	Torque Converter Housing
6	7902	Torque Converter
7	—	Input Shaft (Part of 7F207)
8	4204	Differential Case
9	7F343	Final Drive Ring Gear
10	7F342	Reduction Gear
11	7A089	Forward One-Way Clutch (Sprag)
12	7F475	Idler Gear

Shift Control Selector Lever and Shift Patterns

The shift control selector lever has six positions, and appear as follows: P, R, N, D, 2, and 1.

These positions are:

- PARK
- REVERSE
- NEUTRAL
- DRIVE
- SECOND
- FIRST (Manual Low)

Additionally, an Overdrive control (O/D control) switch allows overdrive to be cancelled.

Park

There is no powerflow through the transaxle in PARK. The parking pawl (7A441) locks the output shaft (7060) to the transaxle case to prevent the vehicle from rolling. However, for safety reasons, the parking brake should also be used when the vehicle is parked and not in use. The engine (6007) can be started in the park range. In addition, PARK must be selected before the ignition key can be removed.

Reverse

The reverse gear enables the vehicle to be operated in a rearward direction, at a reduced ratio. There is engine braking in REVERSE.

Neutral

There is no powerflow through the transaxle in NEUTRAL. However, the vehicle's wheels are free to move because the output shaft is not held by the parking pawl. The engine may be started in NEUTRAL, but the ignition key cannot be removed while the vehicle is in this range.

Overdrive

Refer to Drive for overdrive information.

Item	Part Number	Description
13	7D006	Rear Planet
14	—	Coasting Clutch
15	—	Output Gear
16	7C492	2-4 Band Adjusting Stop
17	7D190	2-4 Servo Piston Stem
18	7D022	2-4 Servo Band Piston
19	7G278	2-4 Servo Piston Retainer
20	7F200	2-4 Servo Piston
21	7F201	2-4 Servo Piston Return Spring
22	—	Low/Reverse Clutch
23	—	Forward Clutch
24	7A398	Front Planet
25	7A089	Low One-Way Clutch (Roller)

DESCRIPTION AND OPERATION

Forward Clutch

The forward clutch is applied in all forward gears. The forward clutch connects the front planet (7A398) to the ring gear through the forward one-way clutch (sprag).

Coasting Clutch

The coasting clutch is applied in all forward gears only when the Overdrive control (O/D control) switch is OFF. The coasting clutch connects the front planet to the ring gear bypassing the forward one-way clutch (sprag). The coasting clutch allows for engine braking upon deceleration.

Forward One-Way Clutch (Sprag)

The forward one-way clutch (sprag) is engaged in all forward gears during acceleration. The forward one-way (sprag) overruns during deceleration. The forward one-way clutch (sprag) connects the forward clutch to the front planet during acceleration.

2-4 Band

The 2-4 band is applied by the 2-4 servo in second and fourth gears. In third gear, the second gear apply pressure is overcome by the third gear release pressure in the 2-4 servo. The 2-4 band holds the primary sun gear (7A399) stationary by locking it to the transaxle case.

Low One-Way Clutch (Roller)

The low one-way clutch (roller) is engaged in first gear, with the exception of manual low. In manual low, the low one-way clutch (roller) is locked out by the application of the low / reverse clutch. The low one-way clutch (roller) prevents the front planet from rotating counterclockwise. The low one-way clutch (roller) overruns during deceleration in first gear, with the exception of manual low.

Low / Reverse Clutch

The low / reverse clutch is applied in manual low and reverse gears only. The low / reverse clutch holds the front planet stationary by locking it to the transaxle case.

3-4 Clutch

The 3-4 clutch is applied in third and fourth (overdrive) gears only. The 3-4 clutch drives the front planet directly from the input shaft.

Reverse Clutch

The reverse clutch is applied in REVERSE only. The reverse clutch drives the primary sun gear directly from the input shaft.

Parking Pawl

The parking pawl locks the idler gear to the transaxle case.

Idler Gear

The idler gear is driven by the output shaft (7060) and attached to the reduction gear. The reduction gear drives the final drive ring gear (7F343), part of the differential. The idler gear also provides a gear for the parking pawl to lock the final drive from rotating.

Reduction Gear

The reduction gear connects the output shaft to the final drive ring gear and provides gear reduction.

Differential Assembly

The differential assembly drives the front wheel driveshaft and joints (3B436) and allows the front wheel driveshaft and joints to turn at different speeds.

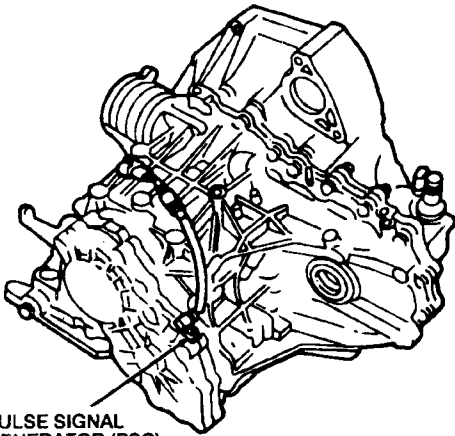
Item	Part Number	Description
9	—	Coasting Clutch Solenoid (Part of 7G484)

Torque Converter Clutch (TCC) Solenoid

The Torque Converter Clutch (TCC) solenoid is part of the shift solenoid assembly. The TCC solenoid is located on the main control valve body. The TCC solenoid is switched on and off by electrical signals from the Transmission Control Module (TCM). The TCC solenoid activates the TCC valve which controls lockup. When the TCC solenoid is off, lockup is prevented. Lockup is actuated when the TCC solenoid is on.

Pulse Signal Generator (PSG)

The Pulse Signal Generator (PSG) is a magnetic-pickup and located on the transaxle case. It detects the reverse clutch drum speed. There are 32 projections on the reverse clutch drum (7D044). As the reverse clutch drum rotates, the PSG produces an AC wave and sends it to the Transmission Control Module (TCM) or the Powertrain Control Module (PCM).



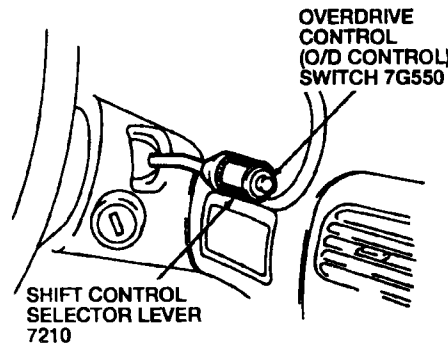
PULSE SIGNAL GENERATOR (PSG)
7F040

Idle Switch

The idle switch is integrated with the Throttle Position Sensor (TP sensor). The idle control switch sends a signal to the Powertrain Control Module (PCM) when the throttle valve is fully closed.

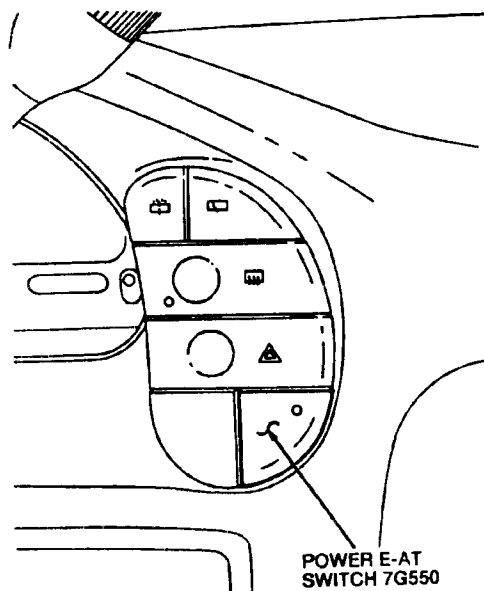
Overdrive Control (O/D Control) Switch

The Overdrive Control (O/D control) switch can be used to inhibit fourth gear operation. The OD / OFF lamp on the instrument panel will illuminate when fourth gear has been "locked out." If the O/D control switch is depressed during fourth gear operation, a 4-3 downshift will occur. The O/D control switch should be used when descending hills or during city driving to increase engine braking. The O/D control switch is located on the end of the shift control selector lever.

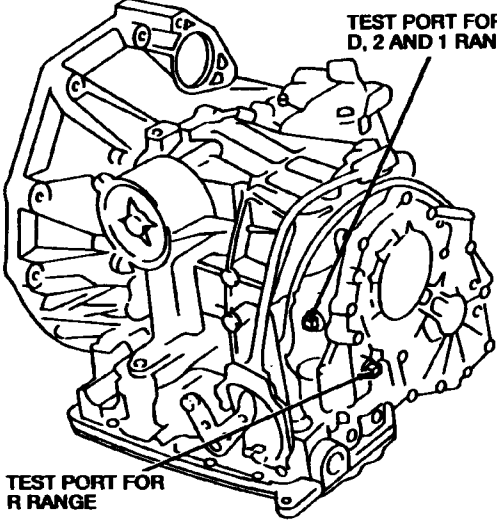


Power E-AT Switch

The power E-AT switch allows for a selection of two shift schedules to tailor transaxle operation to specific driving conditions. The normal schedule (Power E-AT switch released) provides increased fuel economy by providing earlier part throttle upshifts. The power schedule (Power E-AT switch depressed) provides delayed upshifts at part throttle, utilizing more engine power. The Transmission Control Module (TCM) has the capability to override the power schedule depending on driving conditions.



CONTROL PRESSURE TEST

	TEST STEP	RESULT	ACTION TO TAKE
B1	<p>CHECK CONTROL PRESSURE</p> <ul style="list-style-type: none"> ● Connect Rotunda Automatic Transmission Tester 014-00737 or equivalent to the test port for each range as shown below. <div style="text-align: center; margin: 10px 0;">  <p style="margin: 0;">TEST PORT FOR D, 2 AND 1 RANGE</p> <p style="margin: 0;">TEST PORT FOR R RANGE</p> </div> <ul style="list-style-type: none"> ● Key ON, engine running. ● Operate the engine at base idle — 700 ± 50 rpm. ● Depress and hold the brake pedal. ● Shift the shift control selector lever to the D range. ● Read and record the control pressure at idle. <p>CAUTION: The following steps must be completed within 5 seconds, followed by cooling the ATF in the N range while idling for 1 minute.</p> <ul style="list-style-type: none"> ● Steadily increase the accelerator pedal and shaft to its maximum. ● Read and record the control pressure when the engine speed is constant. ● Release the accelerator pedal and shaft. <p>NOTE: If the line pressure solenoid fails the automatic transaxle will operate at full line pressure.</p> <ul style="list-style-type: none"> ● Repeat this test for the R, 2, and 1 ranges, making certain to cool the ATF in between tests. ● Are the line pressures all OK? 	<p>Yes</p> <p>No</p>	<ul style="list-style-type: none"> ▶ GO to Engine Idle Speed Test. ▶ REFER to the Control Pressure Test Evaluation Chart in this section and REPAIR as necessary.

CONTROL PRESSURE EVALUATION CHART

	Control Pressure, kPa (psi)	Control Pressure, kPa (psi)
Range	D, 2, and 1	R
Idle	500 (73)	776 (113)*
Stall	1226 (176)*	1961 (284)*

* Approximately

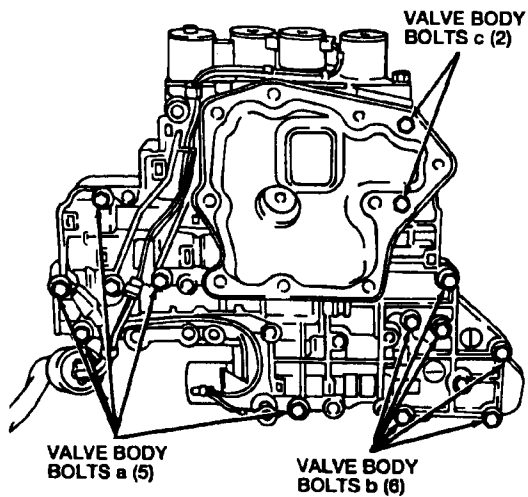
NOTE: Check for a plugged transaxle filter for all high and low pressure test results.

CAUTION: DO NOT reuse or clean the transmission oil filter assembly. The transmission oil filter element material will contaminate the transaxle.

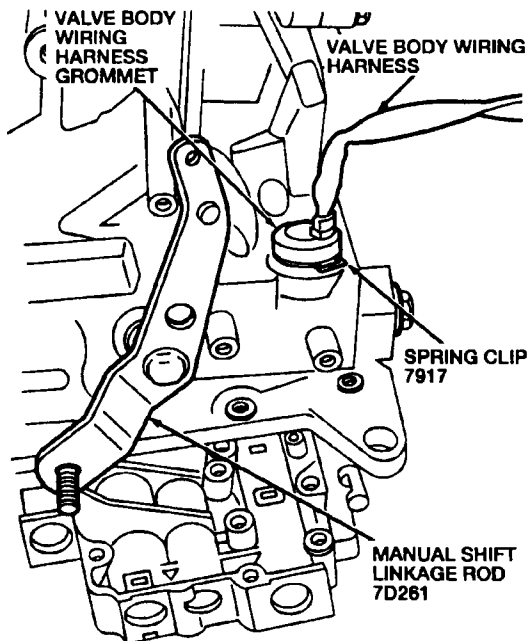
11. Remove the transmission oil filter bolts and gaskets and the transmission oil filter. Discard the transmission oil filter and gaskets.

NOTE: Identify the valve body bolts for installation.

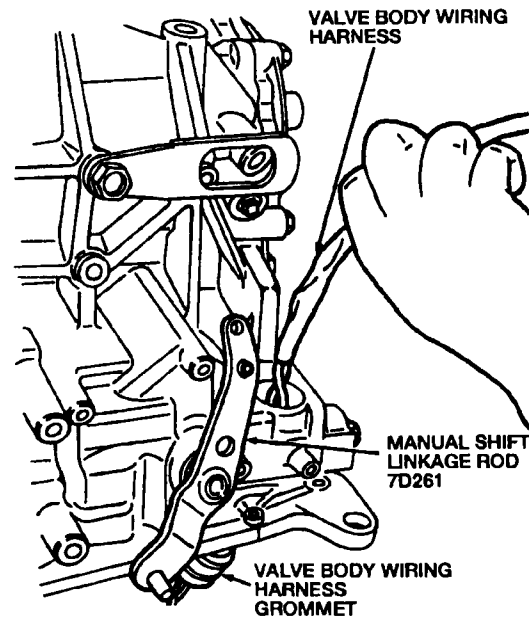
12. Remove valve body bolts a, b, and c.



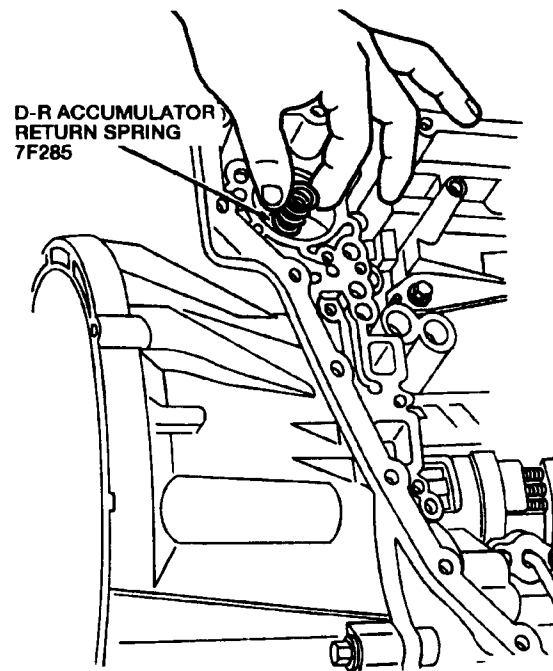
13. Remove the spring clip from the valve body wiring harness grommet.



14. Slide the valve body wiring harness through the transaxle case.

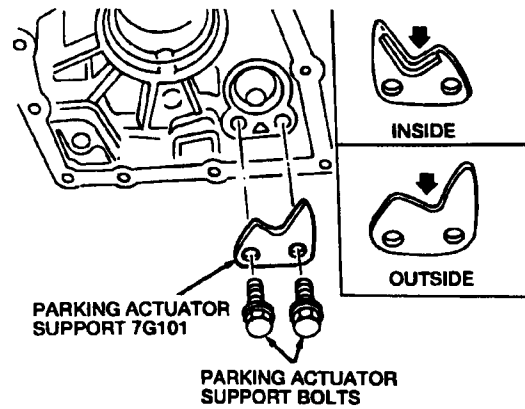


15. Remove the main control valve body (7A100) from the transaxle case.
16. Remove the D-R accumulator return spring from the D-R accumulator piston.

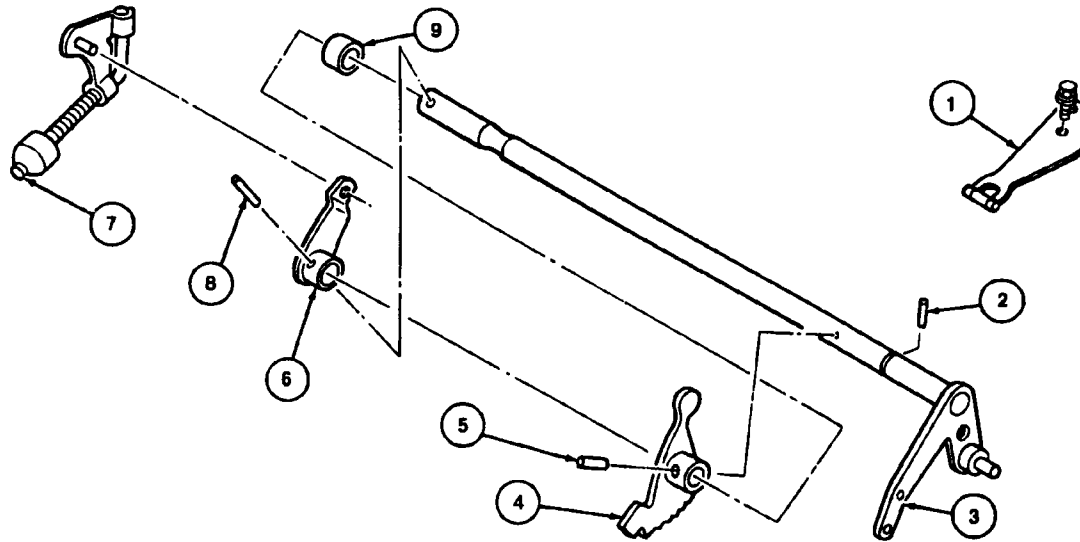


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86. Remove the two parking actuator support bolts, then the parking actuator support from the transaxle case.



Manual Shift Linkage

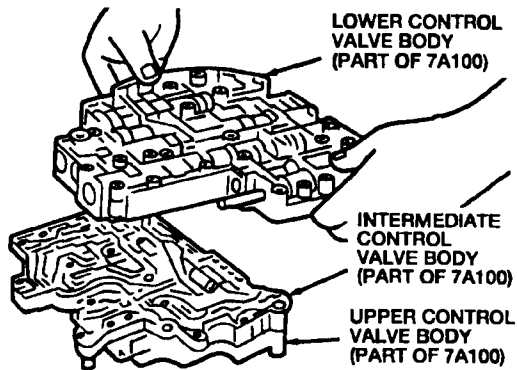


Item	Part Number	Description
1	7E332	Manual Detent Spring
2	7E333	Manual Shift Linkage Rod Roll Pin
3	7D261	Manual Shift Linkage Rod
4	7A115	Manual Detent Lever
5	7E333	Manual Detent Lever Inner Pin

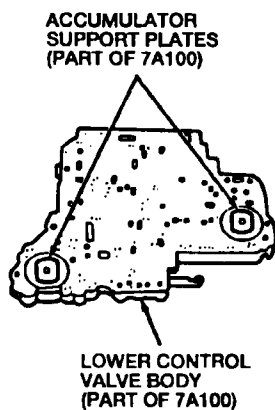
Item	Part Number	Description
6	7A121	Park Actuator Support
7	7A232	Parking Lever Actuating Rod
8	7E333	Park Actuator Support Roll Pin
9	7B498	Manual Control Lever Oil Seal

(Continued)

5. Remove the lower control valve body from the intermediate and upper control valve bodies.

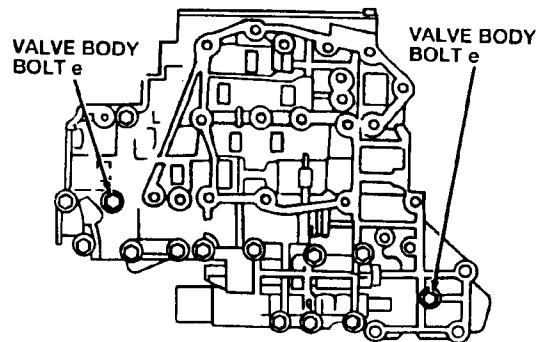


6. Turn the lower control valve body over and remove the two accumulator support plates.

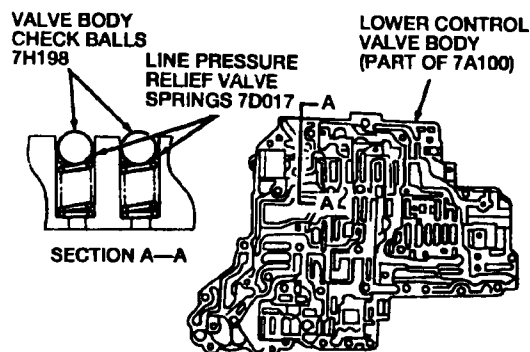


CAUTION: Do not lose the valve body check balls or the relief valve springs.

7. Remove the two valve body bolts e. Then remove the lower separating plate and the lower separating gasket from the lower control valve body.

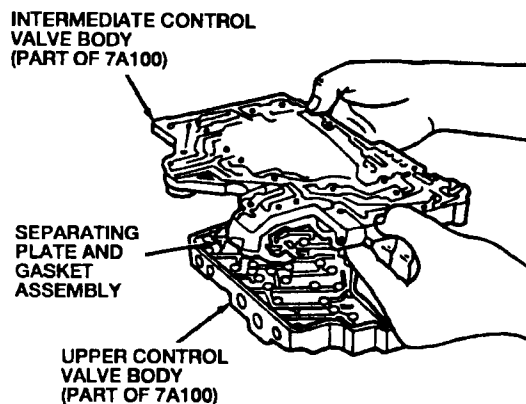


8. Remove the valve body check balls and the line pressure relief valve springs from the lower control valve body.



CAUTION: Do not lose the valve body check balls.

9. With the intermediate control valve body facing up, remove the intermediate control valve body from the upper control valve body.

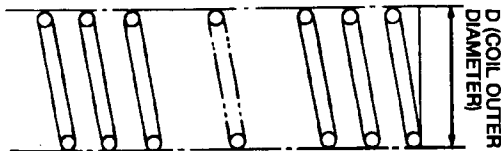


UPPER CONTROL VALVE BODY VALVE SPRING LENGTHS

Parts	Length
Solenoid reducing valve spring (Part of 7A100)	36.0mm (1.417 inches)
1-2 accumulator valve spring (Part of 7A100)	20.5mm (0.807 inch)
1-2 accumulator piston spring (Part of 7A100)	52.0mm (2.047 inches)
Low reducing valve spring (Part of 7A100)	27.0mm (1.063 inches)
2-3 timing valve spring (Part of 7A100)	30.5mm (1.201 inches)
Coasting clutch reducing valve spring (Part of 7A100)	37.5mm (1.476 inches)
Converter relief valve spring (Part of 7A100)	31.0mm (1.220 inches)
Torque Converter Clutch (TCC) control valve spring (Part of 7A100)	39.5mm (1.555 inches)

8. If the free length is out of specification, replace the main control valve body.

NOTE: When measuring the valve spring diameter, always measure at the outermost point of the coils.



9. Measure the valve spring diameter. Refer to the following chart for valve spring diameter.

UPPER CONTROL VALVE BODY VALVE SPRING DIAMETERS

Parts	Diameter
Solenoid reducing valve spring (Part of 7A100)	8.1mm (0.319 inch)
1-2 accumulator valve spring (Part of 7A100)	7.0mm (0.276 inch)
1-2 accumulator piston spring (Part of 7A100)	19.8mm (0.772 inch)
Low reducing valve spring (Part of 7A100)	7.0mm (0.276 inch)
2-3 timing valve spring (Part of 7A100)	6.6mm (0.260 inch)
Coasting clutch reducing valve spring (Part of 7A100)	6.9mm (0.272 inch)
Converter relief valve spring (Part of 7A100)	9.0mm (0.354 inch)
Torque Converter Clutch (TCC) control valve spring (Part of 7A100)	11.0mm (0.433 inch)

10. If the outer diameter is out of specification, replace the main control valve body.

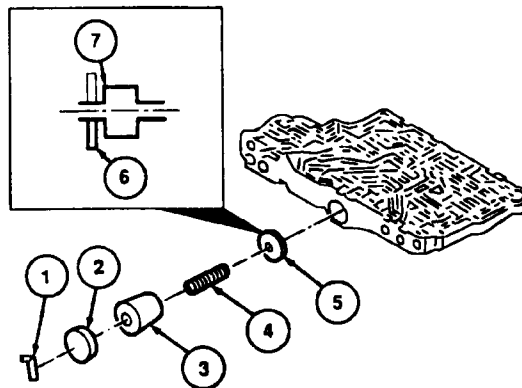
- Check the valve, sleeve, and plug sliding surfaces for scoring or varnish buildup.
- Clean the component as necessary.

Assembly

CAUTION: Lay the valve body down when installing the valves. Do not stand the valve body upright.

CAUTION: Use care not to scratch or otherwise damage the components during assembly. If any of the components of the upper control valve body are damaged, the entire main control valve body must be replaced.

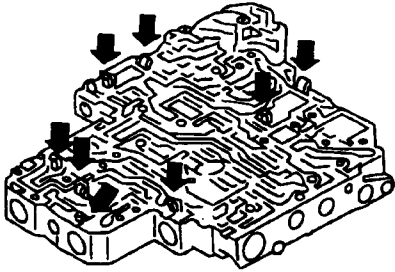
- Lubricate the upper control valve body and all of the valves with specified transmission fluid.
- Install the valves by carefully sliding them into their bores.
- Use a small screwdriver wrapped in vinyl tape to insert the valves.
- Install the 1-2 accumulator valve. Then from the opposite side of the valve body, align the 1-2 accumulator retainer plate with the 1-2 accumulator valve.



Item	Part Number	Description
1	—	Retainer Plate (Part of 7A100)
2	—	Plug (Part of 7A100)
3	—	1-2 Accumulator Piston (Part of 7A100)
4	—	Return Spring (Part of 7A100)
5	—	1-2 Accumulator Retainer Plate (Part of 7A100)
6	—	1-2 Accumulator Retainer Plate (Part of 7A100)
7	—	1-2 Accumulator Valve (Part of 7A100)

- Install the return spring, the 1-2 accumulator piston, and the plug.
- Install the retainer plates while pushing back the plug or return spring.

6. Ensure that the retainer plates are properly positioned in the lower control valve body.



1-2 Accumulator

Disassembly and Assembly

The 1-2 accumulator is serviced with the upper control valve body. For the upper control valve body disassembly and assembly procedure, refer to the procedures in this section.

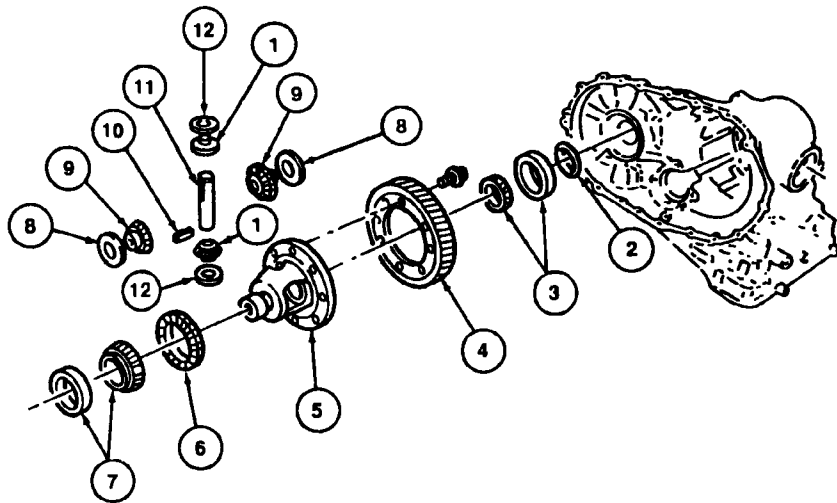
Differential

Disassembly

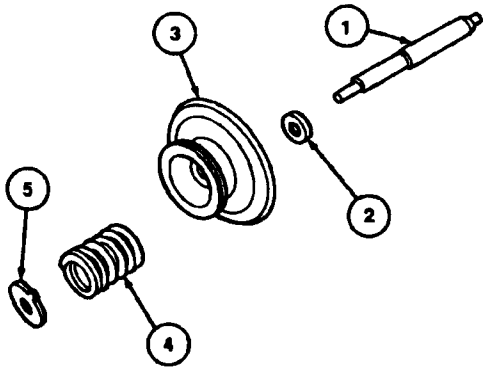
SPECIAL SERVICE TOOL(S) REQUIRED

Description	Tool Number
Puller-Differential Side Bearing	T77F-4220-B1

Differential Pinion Gears, Differential Side Gears, Differential Pinion Shaft, Differential Case, and Final Drive Ring Gear

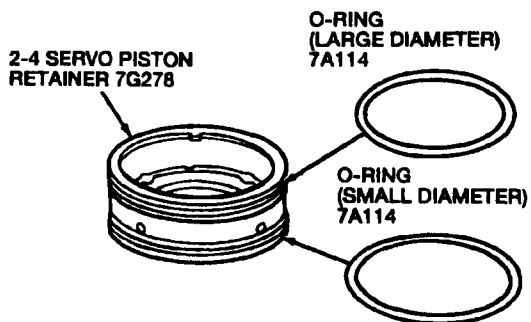


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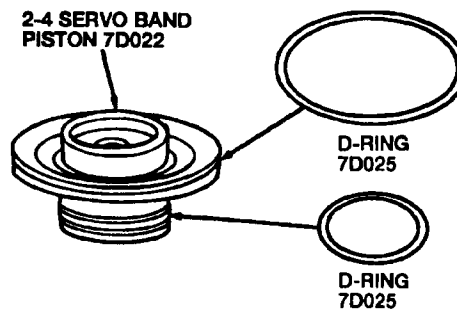


Item	Part Number	Description
1	7D190	2-4 Servo Band Piston Stem
2	7D300	2-4 Servo Band Thrust Washer
3	7D022	2-4 Servo Band Piston
4	7F201	2-4 Servo Piston Return Spring
5	7G280	2-4 Servo Piston Spring Retainer

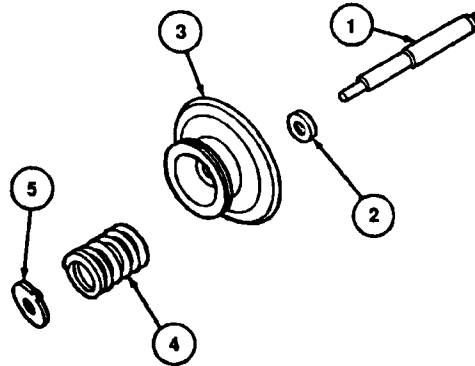
7. Remove the O-rings from the 2-4 servo piston retainer.



8. Remove the D-rings from the 2-4 servo band piston.

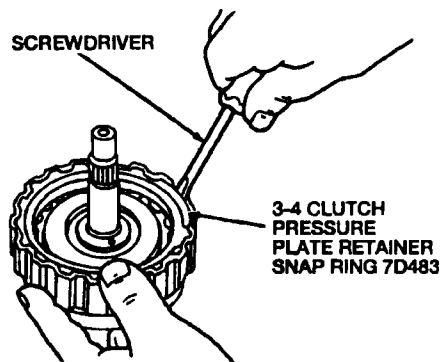


9. Inspect the servo piston stem for excessive wear. If worn, replace the servo piston.
10. Check the piston, retainer, and piston stem wear surfaces for abnormal wear or damage.



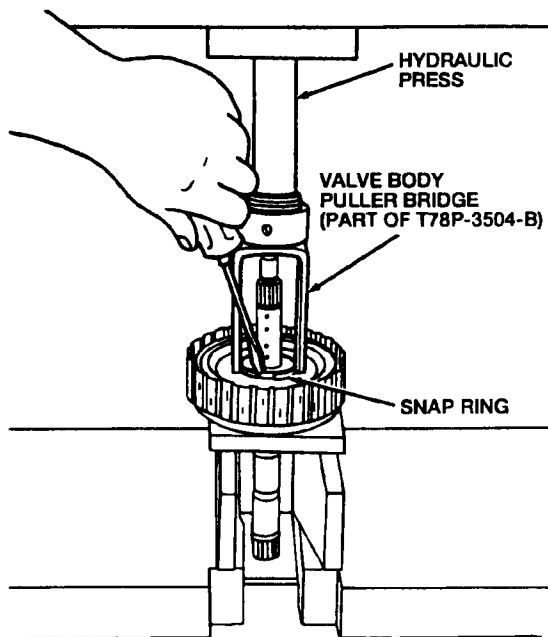
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5	7G280	2-4 Servo Piston Spring Retainer

- Use a screwdriver to remove the 3-4 clutch pressure plate retainer snap ring.

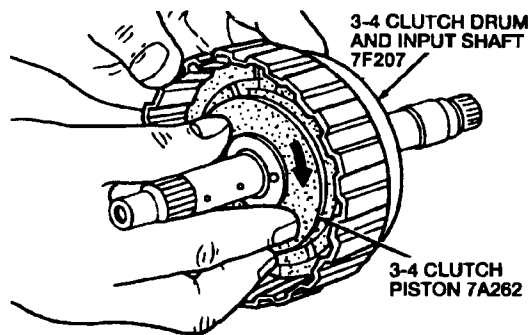


NOTE: Identify the clutch plates, their order, and their direction when removing them to aid in installation.

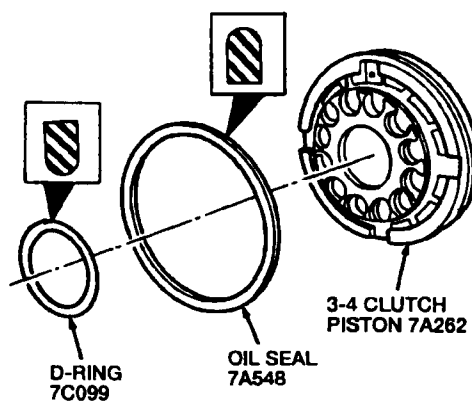
- Remove the 3-4 clutch pressure plate, 3-4 clutch internal spline clutch plates and 3-4 clutch external spline clutch plates.
- Use a hydraulic press and Valve Body Puller Bridge (part of T78P-3504-B) to compress the return springs and remove the snap ring.



- Remove the clutch piston spring retainer (7A527) and the return springs.
- Remove the 3-4 clutch piston from the 3-4 clutch drum and input shaft by turning the 3-4 clutch piston.

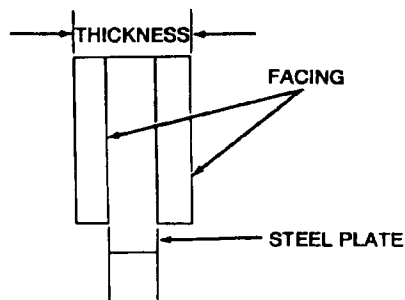


- Remove the D-ring and oil seal from the 3-4 clutch piston. Discard the D-ring and oil seal.

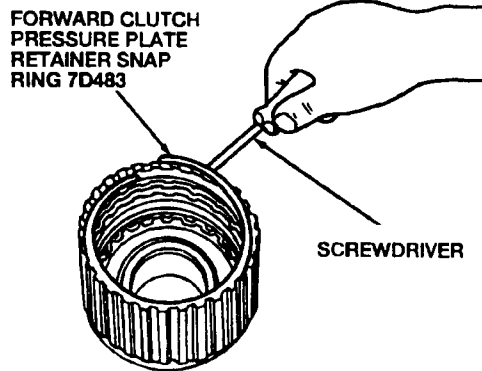


NOTE: When replacing a clutch piston spring retainer or return springs, replace them as a set.

- Check the components for deformation, fatigue, or damage. Replace if necessary.
- Check the facing of the 3-4 clutch internal spline clutch plates for burns, cracks, and damage.
- Measure the thickness of the internal spline clutch plate facing. The standard thickness is 1.6mm (0.063 inch), with a wear limit of 1.4mm (0.055 inch).

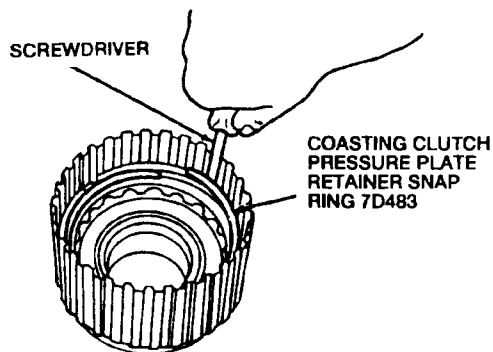


1. Use a screwdriver to remove the forward clutch pressure plate retainer snap ring.



NOTE: Identify the clutch plates, their order, and their direction when removing them to aid in installation.

2. Remove the forward clutch pressure plate, forward clutch internal spline clutch plates, forward clutch external spline clutch plates, and the dish plate from the forward clutch.
3. Use a screwdriver to remove the coasting clutch pressure plate retainer snap ring.

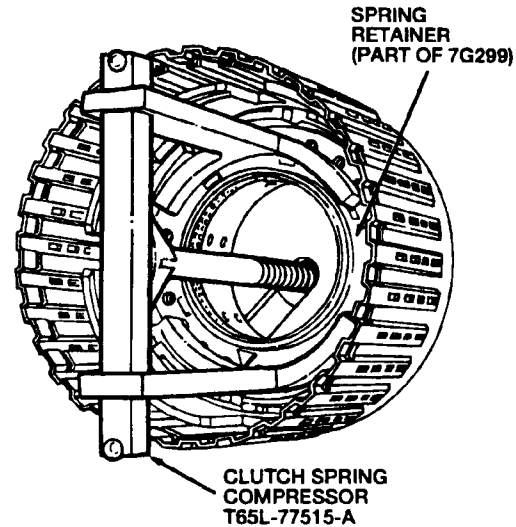


NOTE: Identify the clutch plates, their order, and their direction when removing them to aid in installation.

4. Remove the coasting clutch pressure plate, coasting clutch internal spline clutch plates, coasting clutch external spline clutch plates, and the dish plate from the coasting clutch.

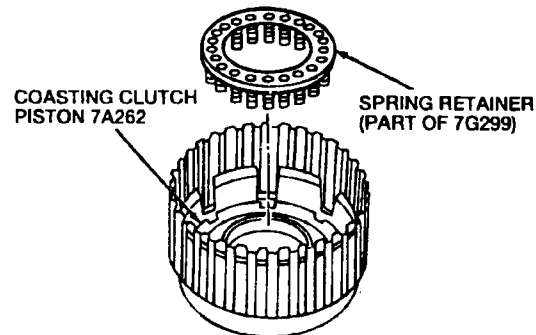
CAUTION: Do not expand the forward clutch pressure plate retainer snap ring further than necessary or damage may result.

5. Use Clutch Spring Compressor T65L-77515-A to compress the return springs and remove the forward clutch pressure plate retainer snap ring from the forward clutch cylinder.



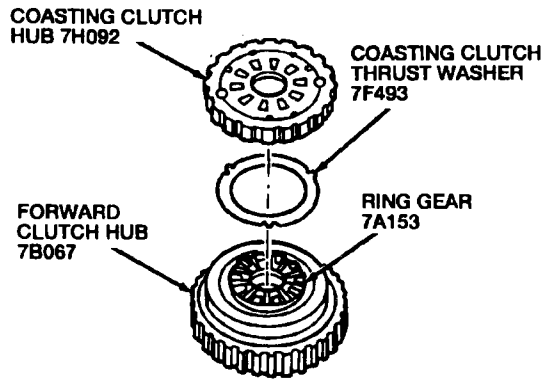
NOTE: Do not remove the return springs from the spring retainer.

6. Remove the spring retainer with the return springs still attached.



NOTE: Apply petroleum jelly to the coasting clutch thrust washer prior to installation.

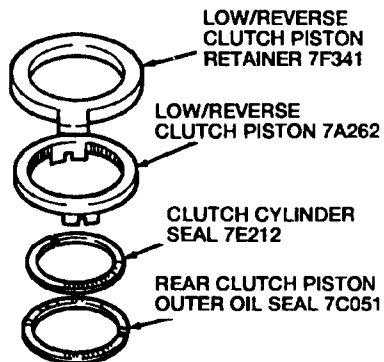
6. Install the coasting clutch thrust washer and the coasting clutch hub by aligning the hooks of the thrust washer with the holes of the coasting clutch hub. Align the projections of the ring gear with the holes of the coasting clutch hub.



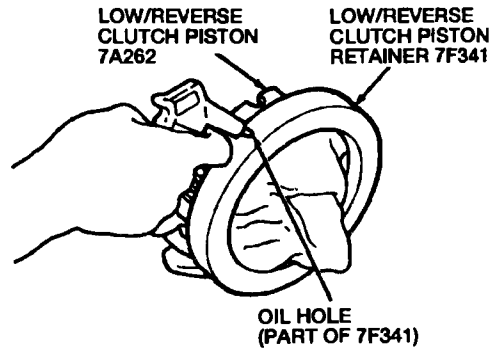
Low / Reverse Clutch Piston Assembly Disassembly

The following is an exploded view of the low / reverse clutch piston assembly.

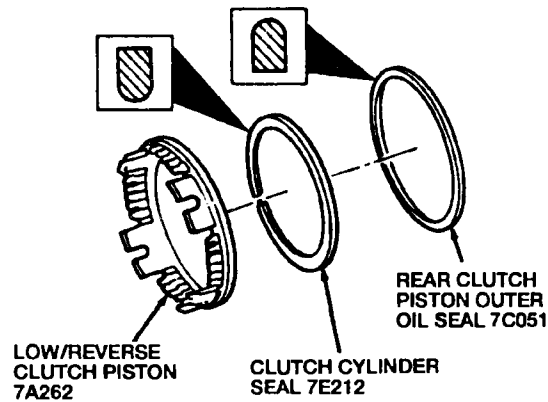
Low / Reverse Clutch Piston Assembly — Exploded View



1. To remove the low / reverse clutch piston, apply compressed air to the oil hole of the low / reverse clutch while holding the low / reverse clutch piston.

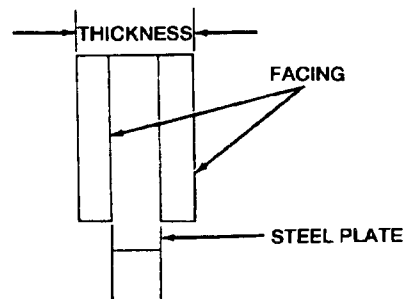


2. Remove the clutch cylinder seal (7E212) and rear clutch piston outer oil seal (7C051) from the low / reverse clutch piston.

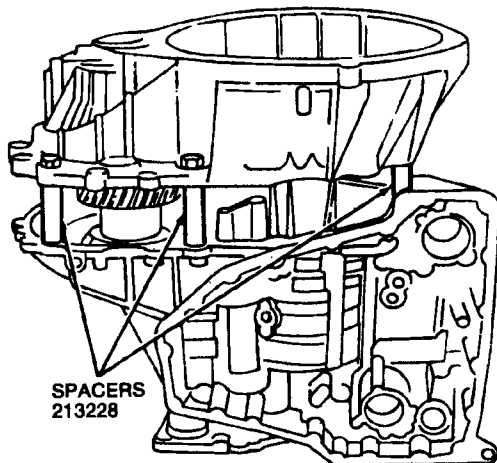


NOTE: When replacing a spring retainer or return springs, replace them as a set.

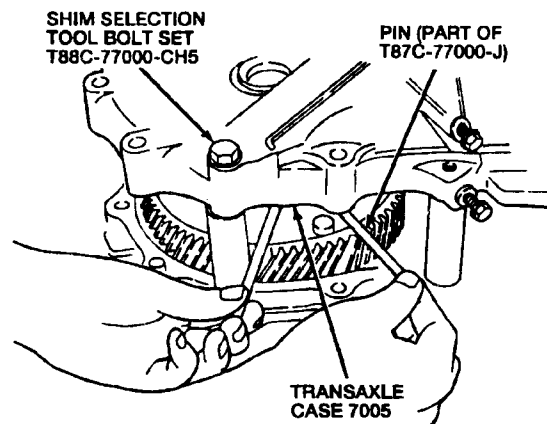
3. Check the components for deformation, fatigue, or damage. Replace if necessary.
4. Check the facing of the low / reverse clutch internal spline clutch plates for burns, cracks, and damage.
5. Measure the thickness of the low / reverse clutch internal spline clutch plate facing. The standard thickness is 1.8mm (0.071 inch), with a wear limit of 1.6mm (0.063 inch).



7. Place the transaxle case onto the spacers and install the Shim Selection Tool Bolt Set T92P-77000-DH. Tighten the bolts to 43-47 N·m (32-35 lb-ft).

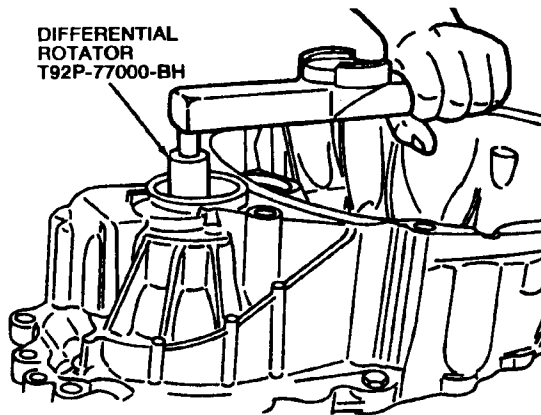


8. Use the pins (part of Shim Selection Set T87C-77000-J) to open the gauge halves until all the free play is gone and the differential bearing race is seated.



9. Turn the gauge halves in the opposite direction to eliminate any gap between the gauge halves.
 10. Engage Differential Rotator T92P-77000-BH and an inch-pound torque wrench to the differential.
 11. Turn the differential and measure the turning torque while the differential is turning.

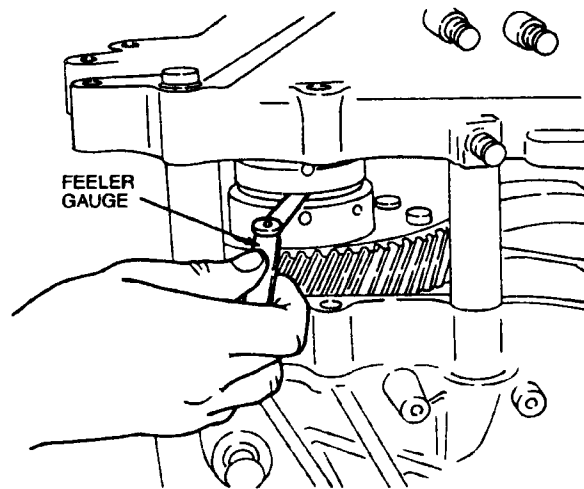
DIFFERENTIAL ROTATOR T92P-77000-BH



12. Use the pins to separate the gauge halves until a turning torque of 0.78-1.37 N·m (6.9-12.2 lb-in) is achieved.

NOTE: Always measure the gauge half gap at four points, 90 degrees apart. Use the largest of these measurements.

13. Use a feeler gauge to measure the gap between the two gauge halves.



14. Use the following chart to determine the proper thickness required for a differential bearing shim, based on the gap measured between the two gauge halves.

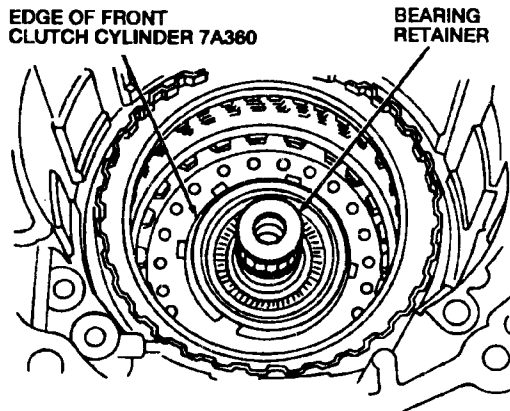
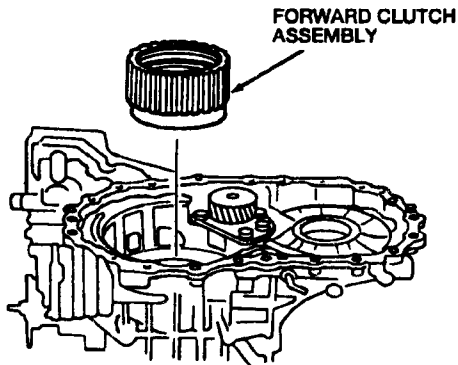
DIFFERENTIAL BEARING SHIM SPECIFICATIONS

Thickness mm (In)	Part Number
0.48 (0.0189)	F3XY-4067-A
0.52 (0.0205)	F3XY-4067-B
0.56 (0.0220)	F3XY-4067-C
0.60 (0.0236)	F3XY-4067-D

(Continued)

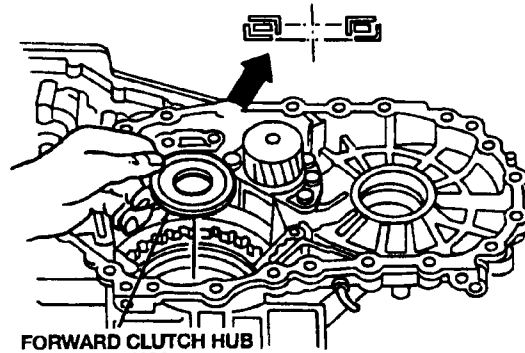
NOTE: Align the teeth of the internal spline clutch plates for the low and reverse clutch before installing the forward clutch assembly. Ensure that the bearing retainer seal rings are not spread.

65. Install the forward clutch assembly. When the forward clutch assembly is properly installed, the edge of the forward clutch cylinder and bearing retainer should be at almost the same level, as shown.



NOTE: Coat the forward clutch hub upper thrust washer with petroleum jelly.

66. Install the forward clutch hub upper thrust washer into the transaxle case.

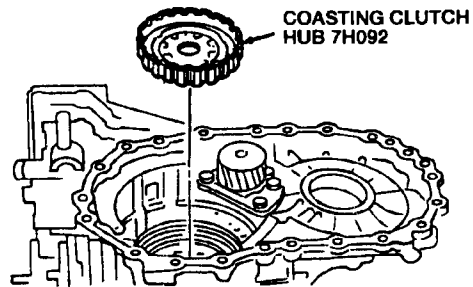


NOTE: Ensure that the tabs on the coasting clutch upper thrust washer are facing the coasting clutch hub.

67. Install the coasting clutch upper thrust washer on the coasting clutch hub.

NOTE: Align the internal spline clutch plate teeth of the coasting clutch before installing.

68. Install the coasting clutch hub into the transaxle case.



69. Hold the forward clutch hub and turn the ring gear (7A153). If the ring gear turns counterclockwise and is installed properly, replace the forward one-way clutch (sprag).

