

Technical Service Information

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FORD F4-EAT, F4E-III

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Hot-Line Service Information

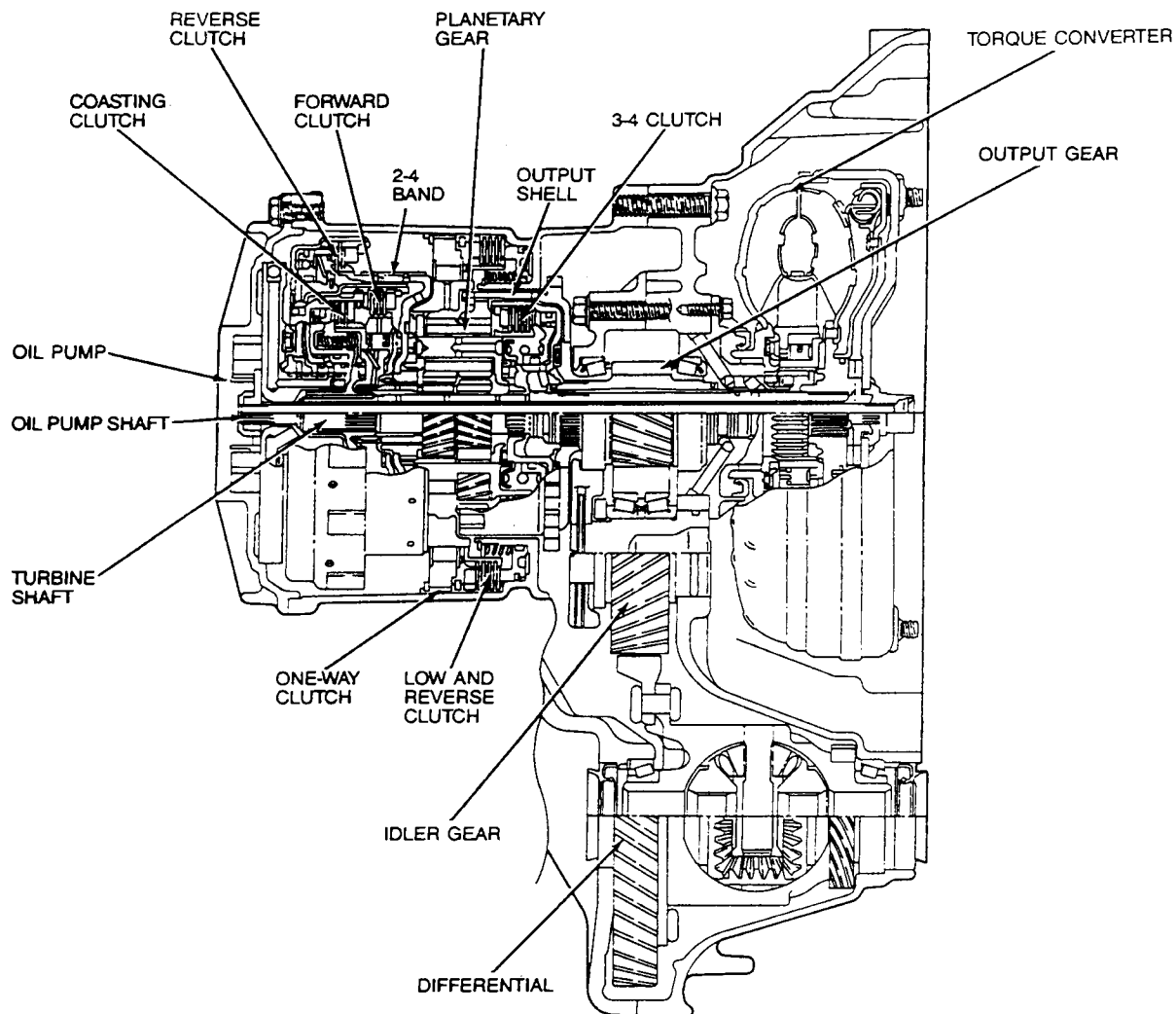
VEHICLE APPLICATION

Escort / Tracer

DESCRIPTION AND OPERATION

The Type F 4EAT is an electronically controlled automatic transaxle featuring a combination of electronic and mechanical systems for controlling forward gear shifting, torque converter lockup for quietness and fuel economy, and self-diagnosis capability for simplifying troubleshooting procedures. This transaxle has a 163 N·m (120 lb-ft) torque capacity.

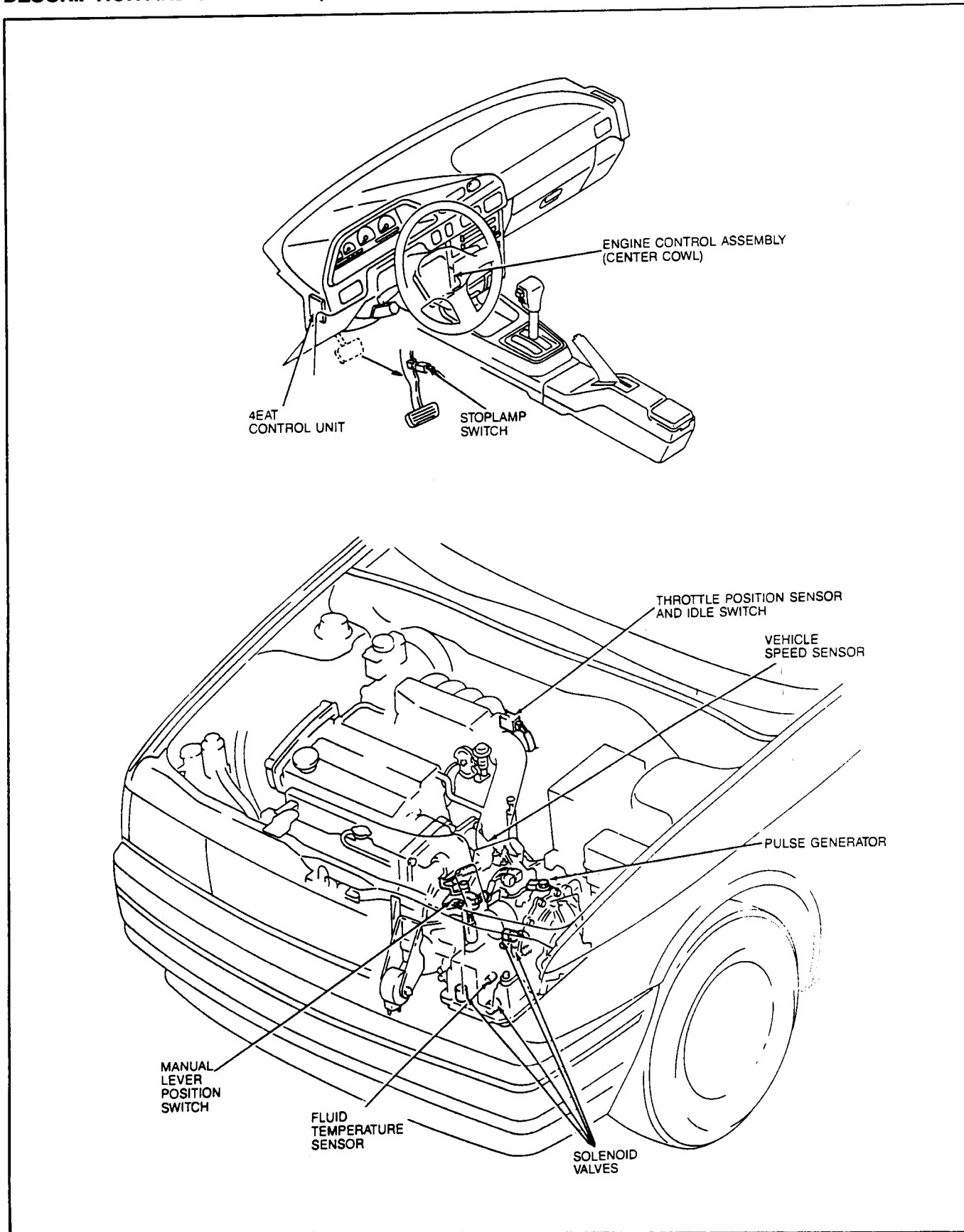
A notable mechanical feature of the 4EAT is a single compact combination-type planetary gear (4-speed capability) instead of two planetary gears used in previous 3-speed transaxles, making a reduction in overall size possible. Also, a new variable-capacity rotor-type oil pump is used which provides a constant oil quantity at and above a medium speed, and reduces the power losses resulting from pumping more oil than necessary at higher speeds.



AUTOMATIC TRANSMISSION SERVICE GROUP

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DESCRIPTION AND OPERATION (Continued)



AUTOMATIC TRANSMISSION SERVICE GROUP

Hot-Line Service Information

DIAGNOSIS AND TESTING (Continued)

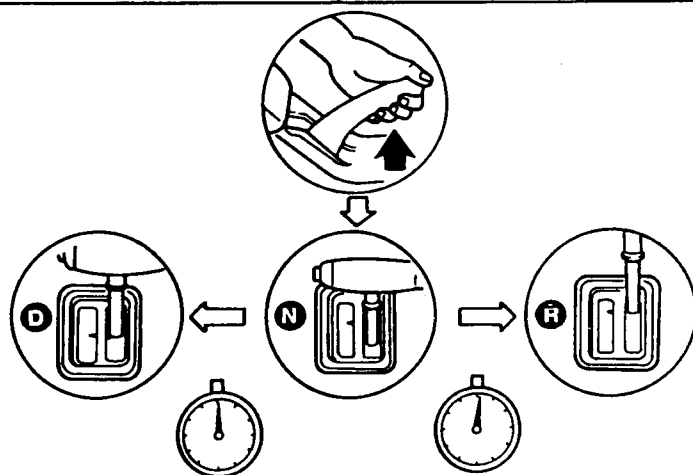
Symptom Chart

SYMPTOM	POSSIBLE CAUSE	ACTION
<ul style="list-style-type: none"> • Drags in REVERSE Like Parking Brake Is Applied 	<ul style="list-style-type: none"> • 2-4 band adjustment incorrect. • Brakes partially applied. 	<ul style="list-style-type: none"> • INSPECT the band adjustment. • GO to Section 06-00.
<ul style="list-style-type: none"> • Drags in Forward Gears Like Parking Brake Is Applied 	<ul style="list-style-type: none"> • 2-4 band adjustment incorrect. • Brakes partially applied. 	<ul style="list-style-type: none"> • INSPECT the band adjustment. • GO to Section 06-00.
<ul style="list-style-type: none"> • Engine Runaway or Flare-up on Upshift 	<ul style="list-style-type: none"> • Fluid level low. • Valve body damaged or sticking valves. • Oil pump pressure inadequate. • Damaged bypass valve. • Clutches slipping. 	<ul style="list-style-type: none"> • CHECK the fluid level. • INSPECT the valve body and solenoid valves. • INSPECT the oil pump and pressure. • INSPECT the bypass valve. • INSPECT the clutches.
<ul style="list-style-type: none"> • Engine Runaway or Flare-up on Downshift 	<ul style="list-style-type: none"> • Coasting bypass valve sticking. • Clutches slipping. • Fluid level inadequate. • Oil pump pressure inadequate. 	<ul style="list-style-type: none"> • GO to operational test OPA. • INSPECT the clutches. • CHECK the fluid level. • INSPECT the oil pump.
<ul style="list-style-type: none"> • Excessive Creep 	<ul style="list-style-type: none"> • Torque converter. • Kickdown cable out of adjustment. • Ignition timing and idle speed. • Manual valve misadjusted. 	<ul style="list-style-type: none"> • INSPECT the torque converter. • INSPECT the kickdown cable adjustment. • CHECK and ADJUST as necessary. • ADJUST manual valve.
<ul style="list-style-type: none"> • No Creep 	<ul style="list-style-type: none"> • ATF level and condition. • Kickdown cable out of adjustment. • Selector lever. • Valve body. • Control valves. • Forward clutch. • REVERSE clutch. • Oil pump. • Brakes partially applied. 	<ul style="list-style-type: none"> • CHECK the level and condition. • INSPECT the kickdown cable adjustment. • CONFIRM the selector linkage adjustment and operation. • INSPECT the valve body. • INSPECT the control valves. • INSPECT the clutches. • INSPECT the oil pump. • INSPECT brake adjustment.
<ul style="list-style-type: none"> • Engine Stalls when put into Gear 	<ul style="list-style-type: none"> • Torque converter. • Valve body. • Control valves. • 4EAT control. 	<ul style="list-style-type: none"> • INSPECT the torque converter. • INSPECT the valve body. • GO to switch monitor Test SMA.

Hot-Line Service Information

DIAGNOSIS AND TESTING (Continued)

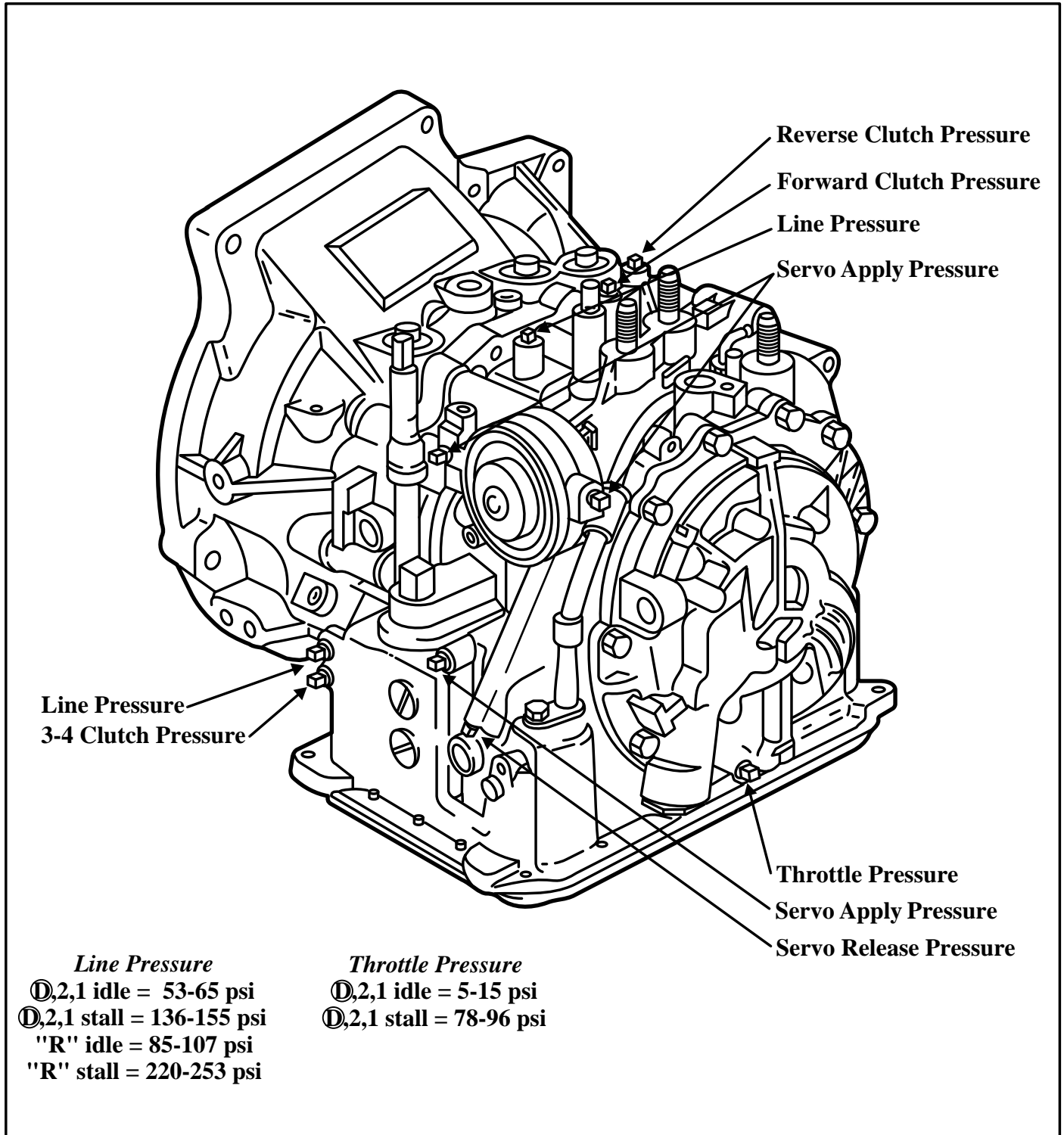
	TEST STEP	RESULT	ACTION TO TAKE
OPB	HYDRAULIC CONTROL SYSTEM TIME LAG CHECK		
	<ul style="list-style-type: none"> • Check the time lag between selector lever positions using a stopwatch. • Time Lag Test Procedure: <ol style="list-style-type: none"> 1. With the engine idling at 750 ± 50 rpm, in PARK range, shift from NEUTRAL range to DRIVE range and measure the elapsed time until engagement is felt, using the stopwatch. 2. Idle the engine in NEUTRAL range for one minute (minimum) to cool the ATF. 3. Repeat step 1 procedure for NEUTRAL to DRIVE range, and NEUTRAL to REVERSE range. 4. Repeat steps 1 through 3, three times and average the results. 5. Use the following "Time Lag Evaluation" to verify, and follow the corresponding action to take. 		SEE "Time Lag Evaluation" Chart.



Technical Service Information

MAZDA/FORD F4A-EL AND F4EAT

LINE PRESSURE SPECIFICATIONS AND PRESSURE TAP LOCATIONS



Hot-Line Service Information

	TEST STEP	RESULT	ACTION TO TAKE
OPD	THROTTLE PRESSURE TEST—CONTINUED		
THROTTLE PRESSURE TEST EVALUATION			
	Pressure Test Result	Possible Location of Problem	Action to Take
	Not within specified limits.	Throttle valve sticking Pressure Regulator Valve	DISASSEMBLE, INSPECT, REPAIR, CLEAN or REPLACE the valve(s) as required.
		Improper adjustment of throttle cable	REMOVE, INSPECT for damage and freedom of movement, REPLACE and ADJUST per shop manual as required.
	Within specified limits.	—	GO to Road Test.

Performance Evaluation

Description

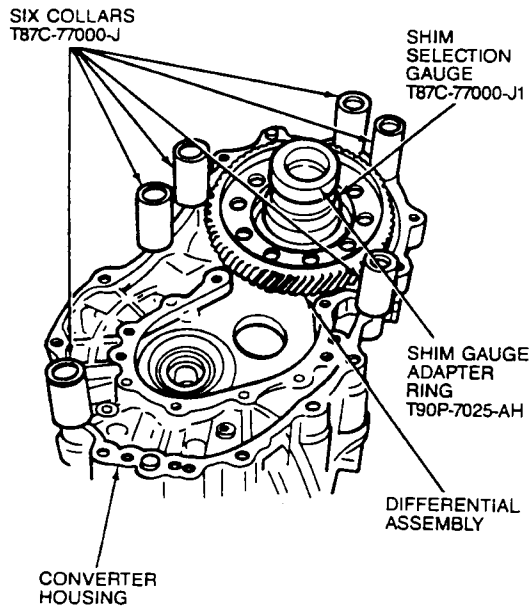
This test evaluates the 4EAT performance. The test should be run only at the direction of the 4EAT Symptom Menu. This test is a driving evaluation of the transaxle shifting quality, ability and timing. Shift problems will be directed to a list of symptoms for appropriate actions to take. These symptom menus are Upshift, Downshift, and Shift Feel for the various symptoms encountered.

1. Drive the vehicle and attempt to recreate the symptom.
2. **Safety.** It is important that the road test be performed with safety issues in mind. Use the seat belts and operate the vehicle in a safe manner.

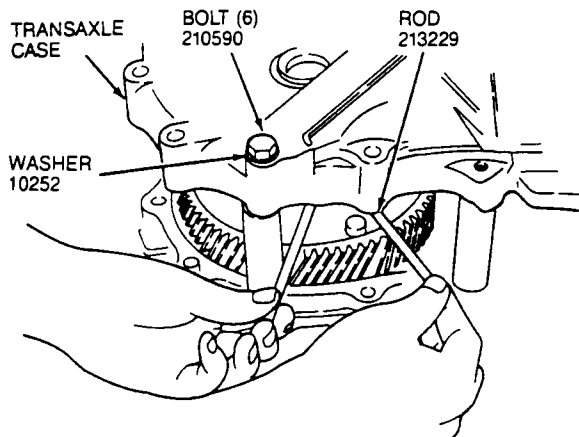
3. Two people should participate in this test. One person should drive the vehicle, and the other should observe the conditions and symptoms encountered during the road test.
4. **Alternatives.** In some cases it may not be necessary or desirable to perform an actual road test. If the symptom occurs at starting, idling or high rpm idling conditions, perform the test at the operating condition that applies to the situation.
5. If several symptoms are found, service them in the order they occur.
6. Begin the test with step SP1.

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6. Place Shim Selection Gauge T87C-77000-J1 and Shim Gauge Adapter Ring T90P-7025-AH or equivalents on the output gear. Turn the two halves of the gauge to eliminate any gap between them.

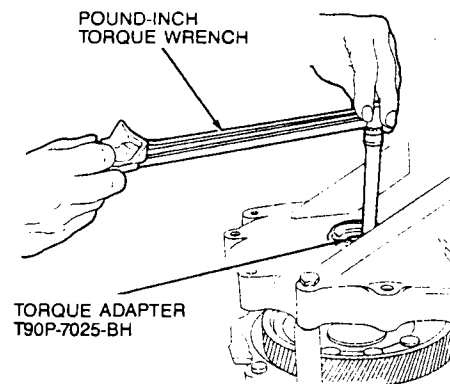


7. Place the transaxle case on the collars, then install six Bolts 210590 or equivalent with washers. Tighten the bolts to 37-52 N·m (27-38 lb-ft).
8. Using Rods 213229 or equivalent, unthread the gauge halves until the free play is removed and the bearing cup is seated. Then thread the gauge halves back together.

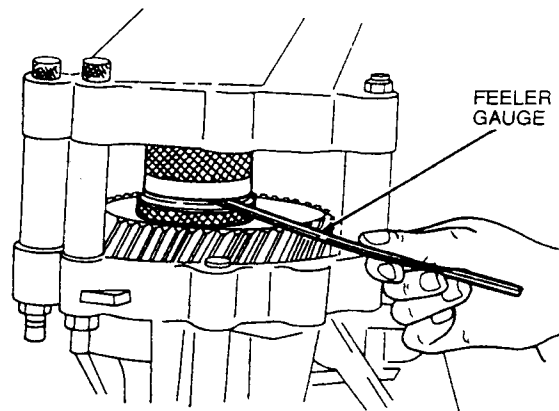


9. Engage Torque Adapter T90P-7025-BH or equivalent and attach a pound-inch torque wrench to the adapter. Measure the drag on the differential bearing.

NOTE: Read the preload when the differential starts to turn.



10. Turn the gauge using the rods until a reading of 0.5 N·m (4.3 lb-in) is obtained on the torque wrench.
11. Use a feeler gauge to measure the gap between the two halves of the shim selection gauge. Measure the gap at four spots at 90 degree intervals. Use the largest measurement.



12. Add 0.3mm (0.0118 inch) to the largest measurement. Select the shim(s) closest (or slightly larger) to this final value.

NOTE: Use no more than three shims.

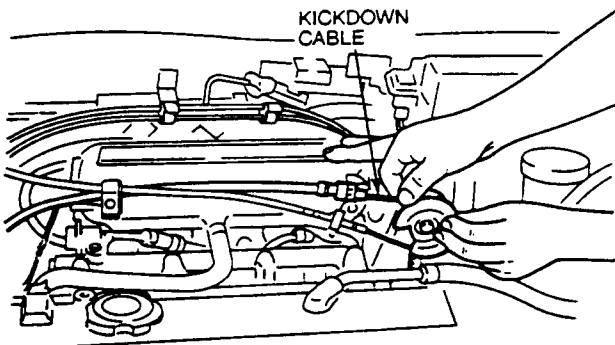
Hot-Line Service Information

12. Install the wheels. Tighten to 88-118 N·m(65-88 lb-ft).
13. Install the wheel covers.
14. Lower the vehicle.
15. Install transaxle-to-engine bolts. Tighten the bolts to 55-80 N·m (41-59 lb-ft).
16. Install the upper transaxle mount. Tighten the nuts to 67-93 N·m (49-69 lb-ft).
17. Connect the transaxle vent hose.
18. Connect the electrical connector at the vehicle speed sensor.
19. Connect the speedometer cable.
20. Connect the EGO sensor wiring connector.
21. Connect the transaxle cooler lines.
22. Connect the kickdown cable at the throttle body.
23. Remove the Three Bar Engine Support.
24. Connect the ground wires to the transaxle.
25. Connect the manual lever position switch bracket and wiring connectors.
26. Connect the shift control cable to the cable bracket and to the selector lever.
27. Install the battery tray and battery.
28. Install the air cleaner assembly.
29. Connect the negative battery cable.
30. Add the specified transaxle fluid as explained in this Section.
31. Check for proper operation.

Kickdown Cable

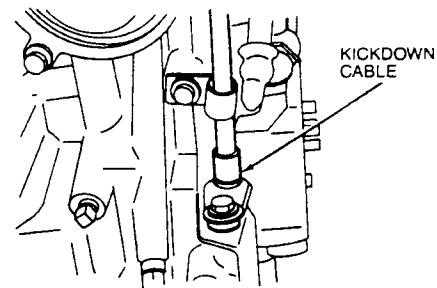
Removal

1. Loosen the nuts securing the kickdown cable to the bracket mounted on the throttle body.

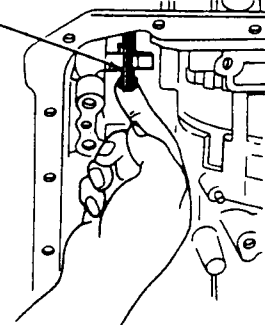


2. Disengage the cable from the throttle cam.
3. Remove the cable from the bracket near the throttle cam.
4. Remove the bolts securing the cable to the transaxle.
5. Remove the valve body as explained in this Section.
6. Disengage the cable from the throttle pulley in the transaxle.

(EXTERNAL VIEW)



THROTTLE
PULLEY



(INTERNAL VIEW)

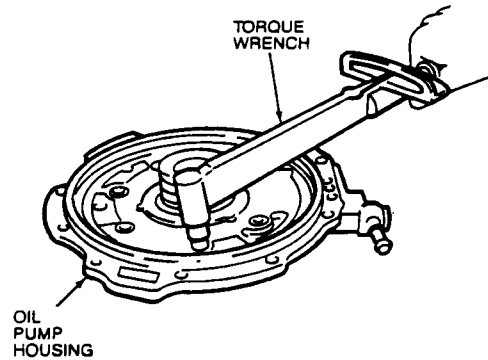
Installation

1. Install the kickdown cable into the transaxle and secure the cable with a bolt.
2. Connect the cable to the pulley in the transaxle.
3. Install the valve body and the pan, then fill with the specified automatic transaxle fluid as explained in this Section.
4. Position the cable into the bracket at the throttle valve and secure.
5. Adjust the kickdown cable as explained in this Section.

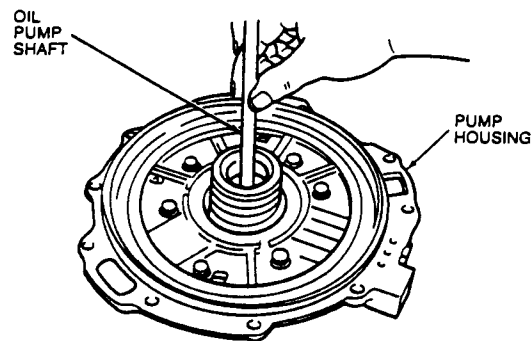
Hot-Line Service Information

DISASSEMBLY AND ASSEMBLY (Continued)

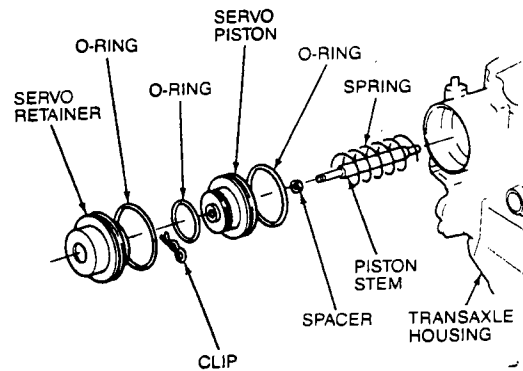
NOTE: Tighten cover bolts with an "X" pattern.



6. Install the oil pump shaft and verify smooth oil pump operation.
7. Install new seal rings.
8. Apply petroleum jelly to the selective thrust washer and secure it onto the oil pump cover.



Servo Assembly Disassembly



NOTE: Before disassembling the servo assembly, refer to Servo Assembly Inspection in this Section.

1. Remove the servo assembly from the transaxle housing as described in this Section.
2. Remove the servo retainer from the servo assembly.
3. Remove the O-ring from the servo retainer.
4. Remove the spring from the servo piston stem.
5. Remove the clip from the servo piston stem.
6. Remove the O-ring from the servo piston.
7. Remove the spacer from the servo piston stem.

Assembly

1. Install the spacer onto the servo piston stem.
2. Install the new O-rings onto the servo piston and servo retainer. Apply a liberal coat of the appropriate ATF to the O-rings.
3. Install the servo piston onto the servo piston stem.
4. Install the clip onto the servo piston stem.
5. Install the servo retainer onto the servo piston.
6. Install the spring onto the servo piston stem.
7. Install the servo assembly into the transaxle housing as described in this Section.

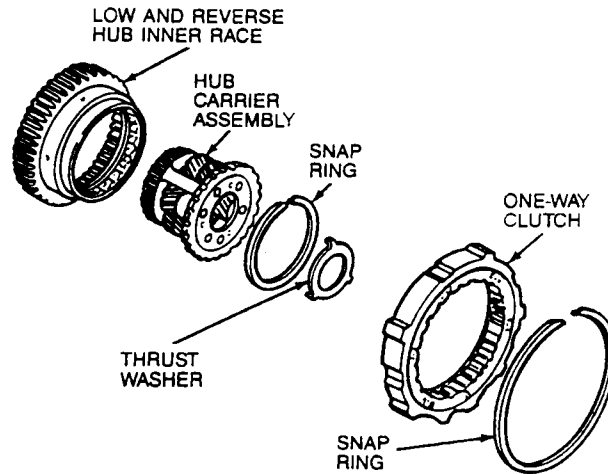
CAUTION: Verify that the 2-4 band and all related components have been installed properly.

8. Assemble the transaxle as explained in this Section.

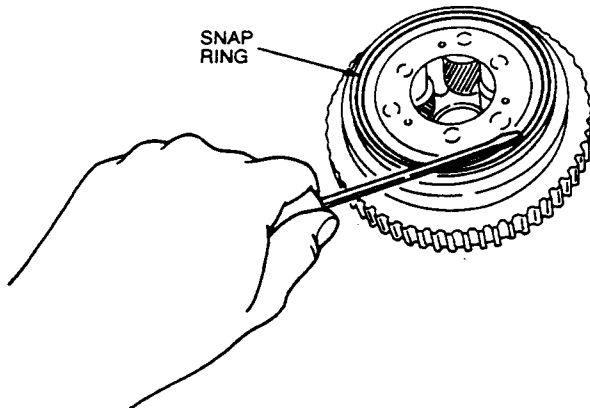
Hot-Line Service Information

DISASSEMBLY AND ASSEMBLY (Continued)

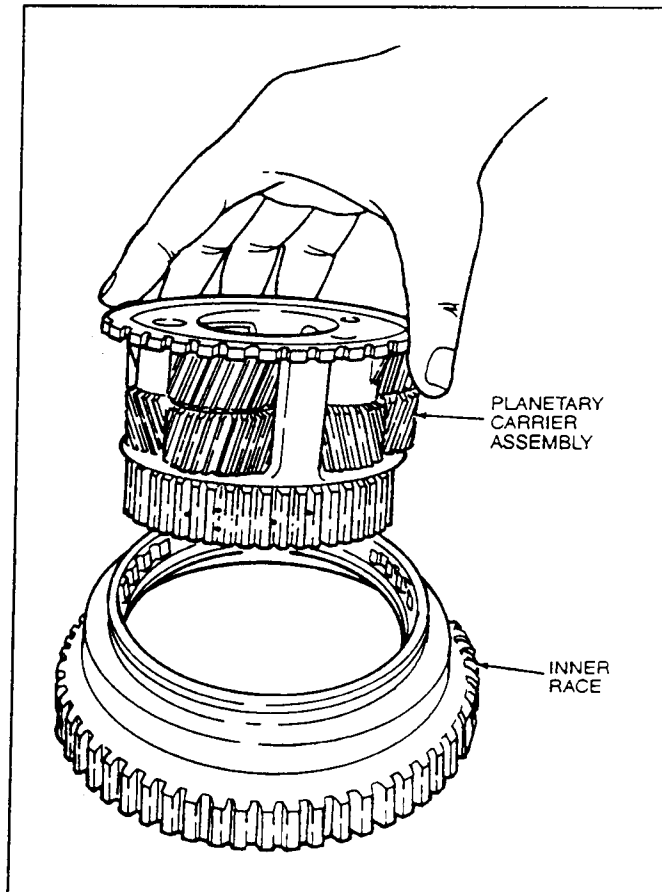
One-Way Clutch and Planetary Carrier Assembly Disassembly



1. Remove the one-way clutch.
2. Remove the thrust washer.
3. Remove the snap ring.



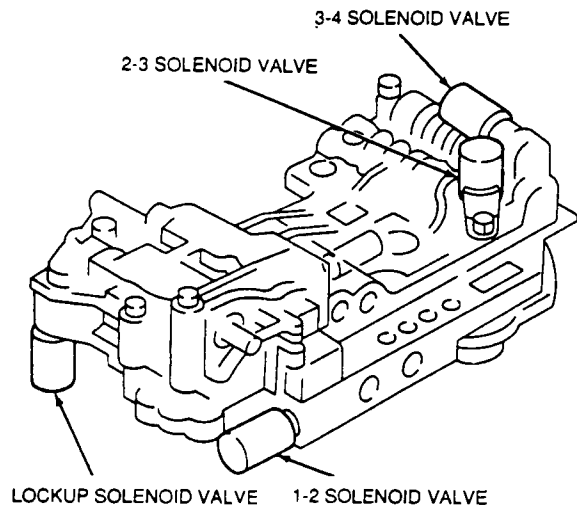
4. Remove the planetary carrier assembly from the inner race.



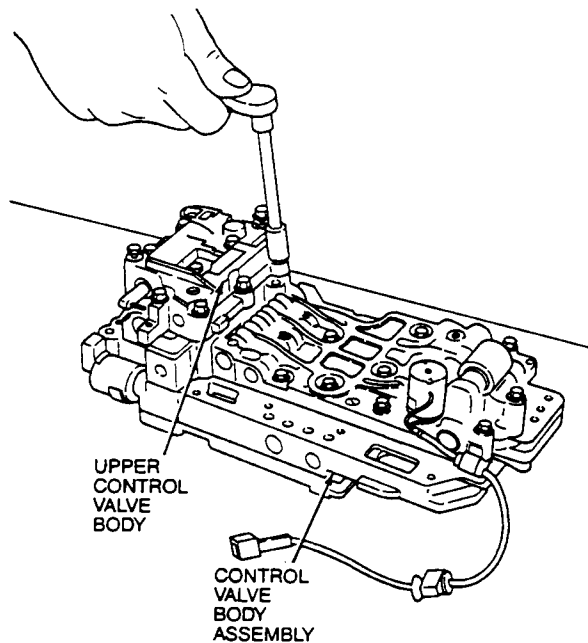
Hot-Line Service Information

DISASSEMBLY AND ASSEMBLY (Continued)

7. Remove the 2-3 and 3-4 solenoid valves and oil strainers.

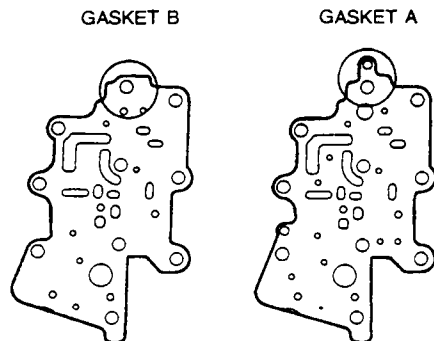


8. Remove the upper control valve body.

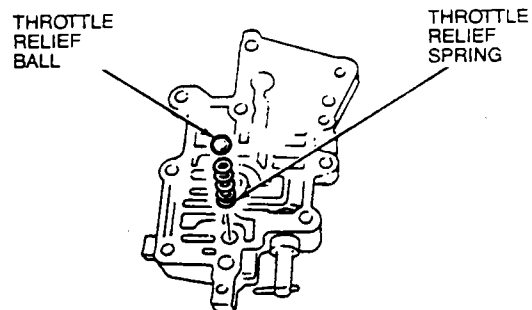


9. Remove the screws.

10. Remove gasket B, upper separator plate, oil filter, and gasket A.



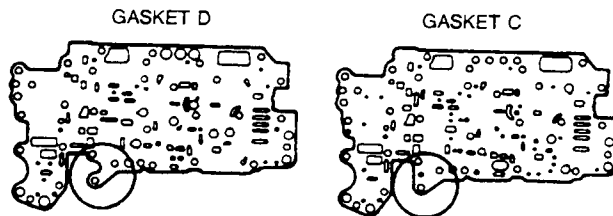
11. Remove the throttle relief ball and the throttle relief spring from the upper valve body.



12. Remove the main control valve body.

13. Remove the screws.

14. Remove gasket D, the main separator plate, and gasket C.

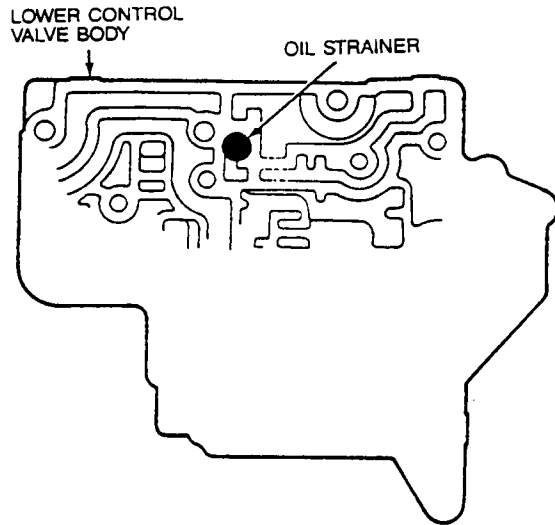


15. Remove the rubber check balls from the main control valve body.

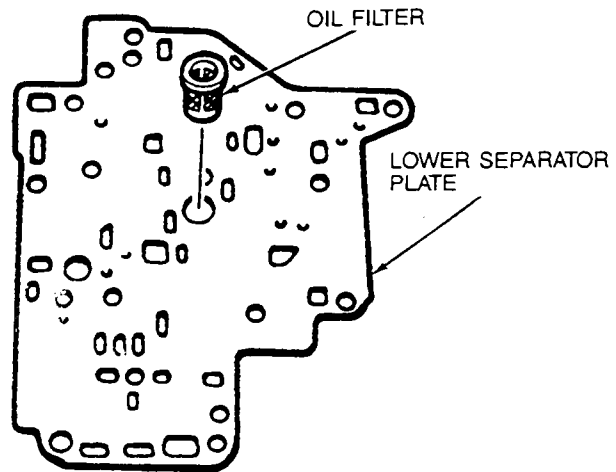
Hot-Line Service Information

DISASSEMBLY AND ASSEMBLY (Continued)

1. Install the oil strainer into the lower control valve body.

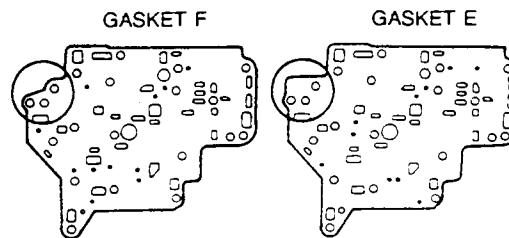


2. Set the oil filter into the lower separator plate.



CAUTION: Do not confuse gasket F with gasket E.

3. Set the new gasket F, the lower separator plate, and the new gasket E onto the lower valve body.



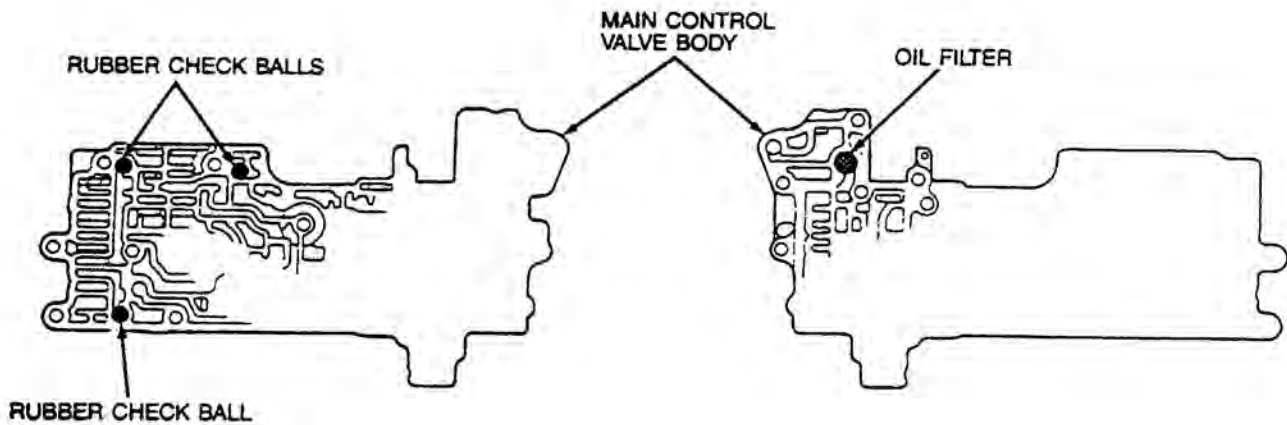
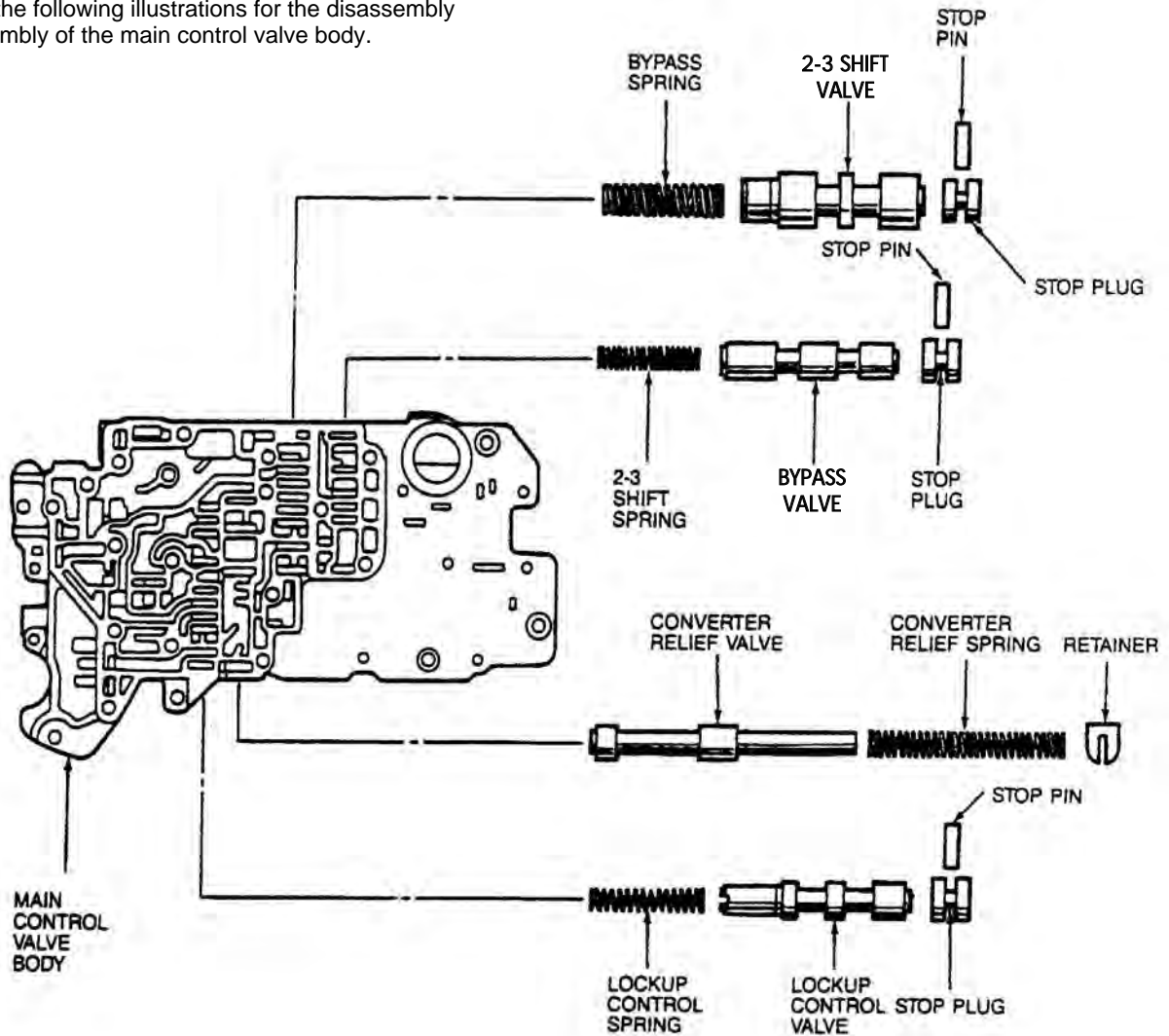
4. Set the premain control valve body onto the lower valve body.

Technical Service Information

Main Control Valve Body

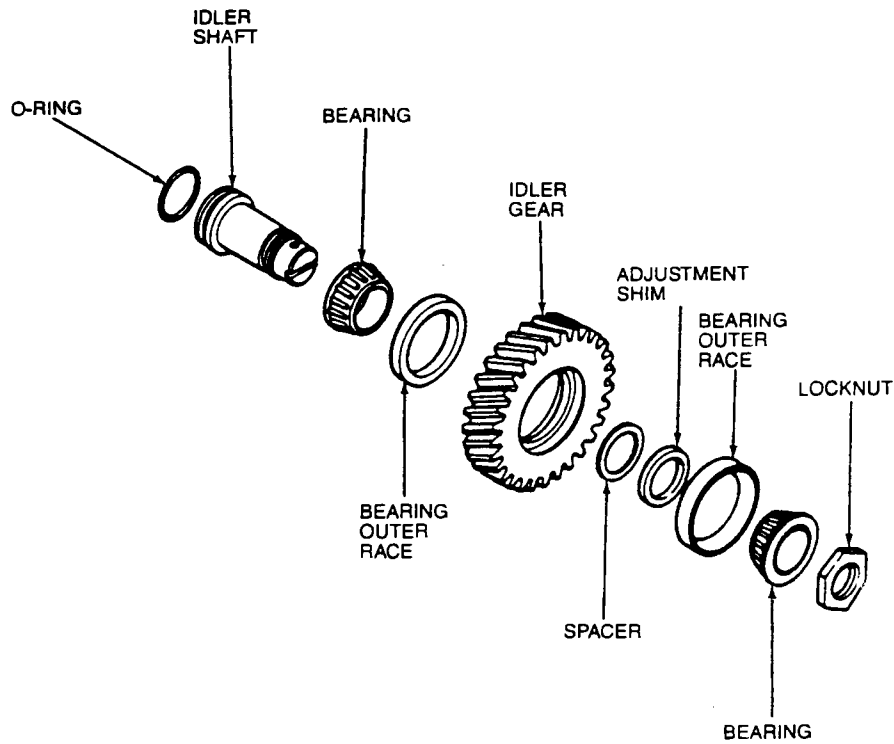
Disassembly and Assembly

Refer to the following illustrations for the disassembly and assembly of the main control valve body.



Hot-Line Service Information

Idler Gear Disassembly



1. Secure the idler shaft in a vise using Torque Adapter T87C-77000-E or equivalent and remove the locknut.

