



Technical Service Information

TRANSMISSION NOISY — OTHER THAN VALVE RESONANCE

TEST STEP		RESULT	ACTION TO TAKE
1	VERIFY NOISE • Check for gear noise to verify if within normal range.	Noise within normal range	Normal condition.
		Noise not within normal range	GO to 2.
2	LINKAGE CHECK • Check linkage for proper adjustment, wear or damage.		GO to 3.
			SERVICE, REPLACE and/or ADJUST linkage as required.
3	FLUID CHECK • Check the fluid for proper level and/or contamination. ①	Fluid level within cross-hatched area at operating temperature	GO to 4.
		Fluid level beneath cross-hatched area	ADD specified fluid to bring level within cross-hatched area at operating temperature.
		Fluid contaminated	DISASSEMBLE, CLEAN and SERVICE transmission. FLUSH torque converter and cooler.
4	STALL TEST • Perform the Stall Test as described under Stall Test in the Diagnosis and Testing portion of this section.	Noise stops	GO to 5.
		Noise doesn't stop	EXAMINE torque converter and pump. SERVICE or REPLACE as required. Also CHECK for loose torque converter to flywheel housing bolts or nuts.

① For definition of contamination, refer to Transmission Fluid Condition in the Diagnosis and Testing portion of this section.



TRANSMISSION NOISY — OTHER THAN VALVE RESONANCE (Cont'd.)		
TEST STEP	RESULT	ACTION TO TAKE
5 NOISE CHECK		
<ul style="list-style-type: none"> Run transmission in all gears and check for noise. 	Noise doesn't stop in any gear	▶ GO to 6.
	Noise stops in Low and R only	▶ SERVICE forward planetary and/or one-way clutch.
	Noise stops in 2, HIGH and R only	▶ SERVICE reverse planetary.
	HIGH only	▶ SERVICE both planetaries.
6 SPEEDOMETER GEAR		
<ul style="list-style-type: none"> Remove the speedometer gear and check for noise. 	Noise stops	▶ REPLACE speedometer gear.
	Noise doesn't stop	▶ CHECK extension housing bushing, seal or driveshaft. SERVICE or REPLACE as required.

CLEANING AND INSPECTION

Transmission Fluid Drain and Refill

Normal maintenance and lubrication requirements do not necessitate periodic automatic transmission fluid changes. If major service, such as a clutch band, bearing, etc., is required in the transmission, it will have to be removed for service. **At this time the converter, transmission cooler and cooler lines must be thoroughly flushed to remove any dirt.**

When used under continuous or severe conditions, the transmission should be drained and refilled with fluid as specified. Before adding fluid, be sure that the correct type will be used. If in doubt, check the Safety Standard Certification Label affixed to the left front door face panel or door pillar for the Transmission Code.

For A4LD Automatic Transmission (Code T), use fluid that meets Ford Specification, Motorcraft Mercon® Multi-Purpose Automatic Transmission Fluid XT-2-QDX or DDX (ESP-M2C166-H) or equivalent.

CAUTION: Use of a fluid other than specified above could result in transmission malfunction and/or failure.

When filling a dry transmission and converter, refer to Specifications for capacity. Check the fluid level following the room temperature checking procedures.

Procedures for partial drain and refill, due to in-vehicle service operation, are as follows.

- Loosen the pan attaching bolts to drain the fluid from the transmission.
- When all fluid has drained from the transmission, remove and thoroughly clean the pan. Discard pan gasket.
- Place a new gasket on the pan, and install pan on transmission.
- Add 2.8 liters (3 quarts) of fluid to transmission through the filler tube.
- Check the fluid level following the room temperature checking procedures.

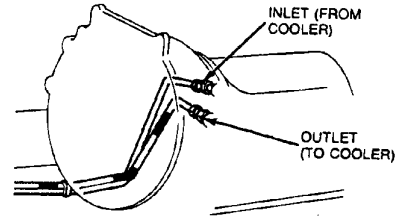
If it is necessary to perform a complete drain and refill, it will be necessary to remove the residual fluid from the cooler lines and flush cooler lines completely.

Transmission Fluid Lines

When one or more of the fluid cooler steel tubes must be replaced, each replacement tube must be fabricated from the same size steel tubing as the original line.

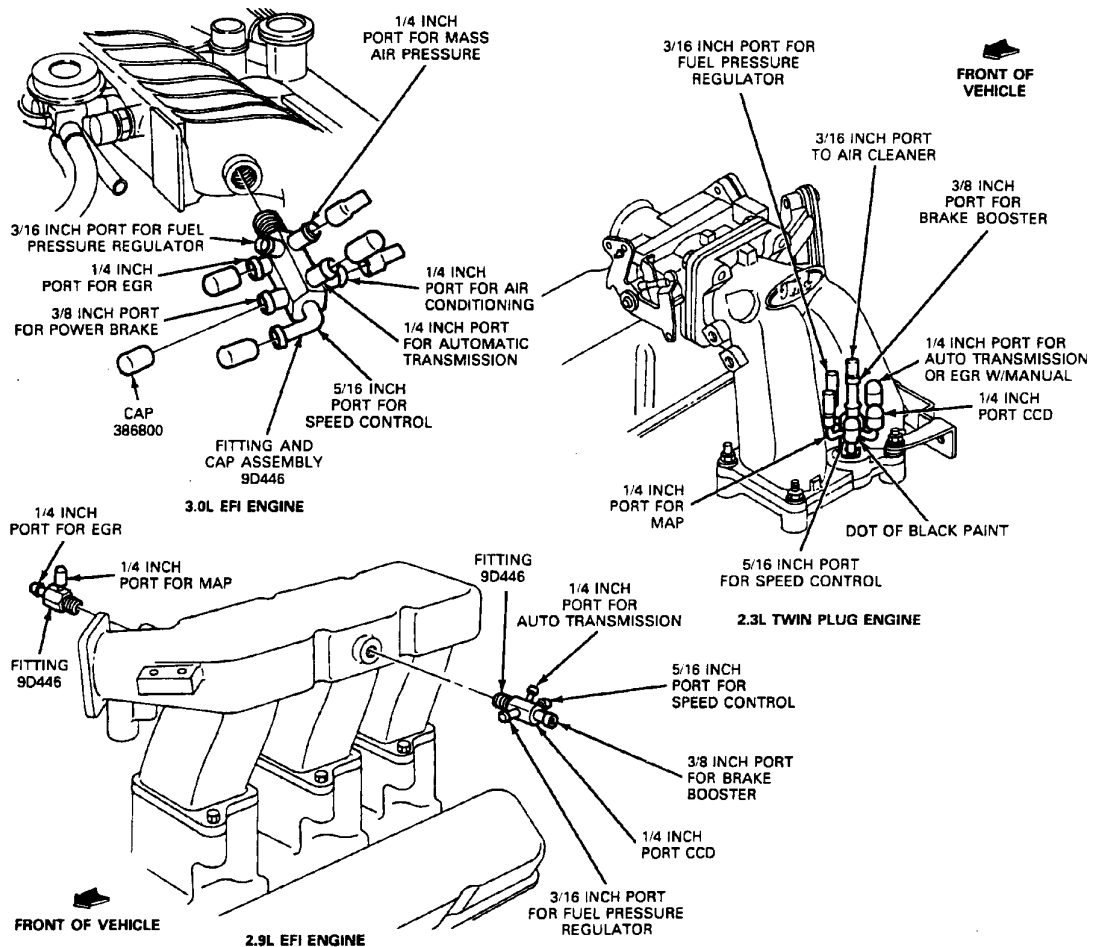
Using the old tube as a guide, bend the new tube as required. Add the necessary fittings, and install the tube. Make sure that the replacement tube has adequate clearance to other components, especially the exhaust system and parts having sharp edges.

After the fittings have been tightened, add fluid as needed, and check for fluid leaks.



Vacuum Tubes

Refer to the following illustration for vacuum tube installation.



Transmission

It is important to completely clean all transmission components, including converter, cooler, cooler lines, main control valve body, governor, all clutches, and all check balls after any transmission servicing that generates contamination. These contaminants are a major cause for recurring transmission troubles and must be removed from the system before the transmission is put back into service. The cleaning of debris from the direct clutch check ball is often omitted. This omission can lead to a repeat servicing of the transmission.

Clean the parts with suitable solvent and use moisture-free air to dry off all the parts and clean out fluid passages.

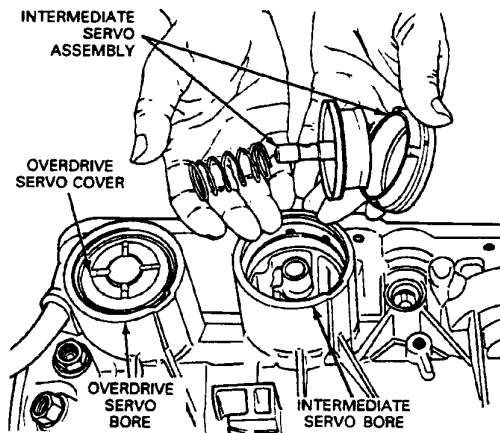
The composition clutch plates, bands and synthetic seals should not be cleaned in a vapor degreaser or with any type of detergent solution. To clean these parts, wipe them off with a lint-free cloth. New clutch plates or bands should be soaked in transmission fluid specified for that transmission type for fifteen minutes before being assembled.

Control Valve Body

1. Clean all parts thoroughly in clean solvent, and blow dry with moisture-free compressed air.
2. Inspect all valve and plug bores for scores. Check all fluid passages for obstructions. Inspect the check valve for free movement. Inspect all mating surfaces for burrs or distortion. Inspect all plugs and valves for burrs or scores. Use crocus cloth to polish valves and plugs. Avoid rounding the sharp edges of the valves and plugs with the cloth.
3. Inspect all springs for distortion. Check all valves and plugs for free movement in their respective bores. Valves and plugs, when dry, must fall from their own weight in their respective bores.
4. Roll the manual valve on a flat surface to check for bent condition.

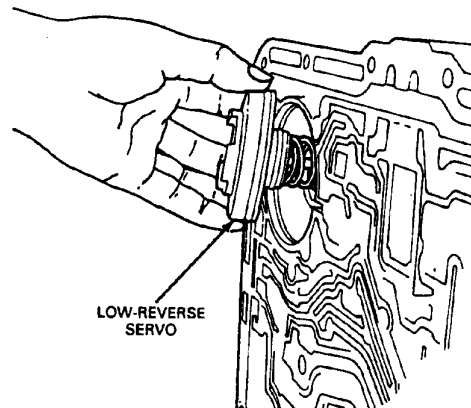
Overdrive and Intermediate Servos

1. Inspect the servo bore for cracks, the servo piston for damage, and the piston bore and servo piston stem for scores. Check fluid passages for obstructions. Replace damaged seals.
 2. Check the servo spring and servo band strut(s) for distortion.
 3. Inspect the cover seal and gasket cover sealing surface for damage.
 4. Inspect the band lining for excessive wear and for proper bonding to the metal band.
- NOTE: Identify servo covers, pistons, and springs with a tag for proper identification.



Low-Reverse Servo

1. Inspect the bore for scores.
2. Check the fluid passages for obstructions.
3. Inspect the band for distortion. Inspect the band ends for cracks.
4. Inspect the servo spring for distortion.
5. Inspect the band lining for excessive wear and for proper bonding to the metal band.
6. Replace damaged cover seal.
7. Replace piston seals if damaged.



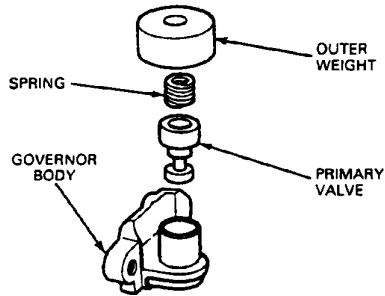
Extension Housing

1. Inspect housing for cracks. Inspect gasket surface for burrs or warpage.

2. Inspect bushing for scores or wear. Replace if required.
3. Inspect the rear seal for hardness, cracks, or wear. If the seal shows wear or deterioration, replace the seal.
4. Inspect the seal counterbore and remove all burrs and scores with crocus cloth.
5. Check vent for obstructions.

Governor

1. Inspect the governor valves and bore for scores. Minor scores may be removed from the valves with crocus cloth. Replace the governor if the valves or body is deeply scored.
2. Check for free movement of the valve in the bore. The valve should slide freely of its own weight in the bore when dry. Inspect fluid passages in the valve body and collector body for obstructions. **All fluid passages must be clean.**
3. Inspect the mating surfaces of the governor body and collector body for burrs and distortion. Mating surfaces must be smooth and flat.



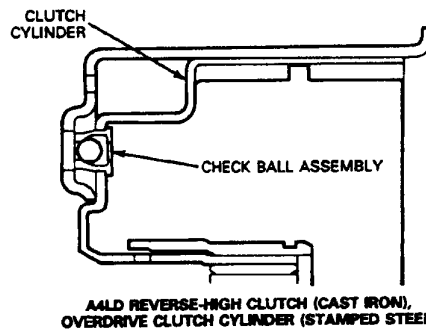
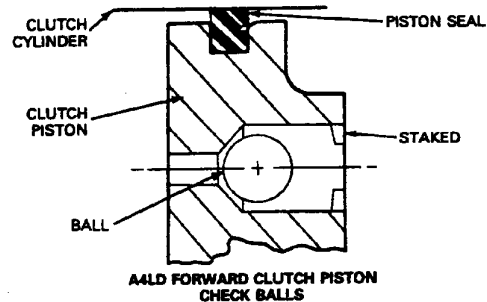
Pump

1. Inspect mating surfaces of pump body and case for burrs.
2. Inspect the drive and driven gear bearing surface for scores and check gear teeth for burrs.
3. Inspect the front pump seal for cuts or nicks, and pump bushing for scoring.
4. Check fluid passages for obstructions.
5. If any parts are found damaged or worn, replace the pump as a unit. Minor burrs and scores may be removed with crocus cloth.

Reverse-High and Overdrive Clutches

1. Inspect the drum band surface, bushing, and thrust surfaces for scores. Minor scores may be removed with crocus cloth. **Badly scored parts must be replaced.**
2. Inspect the clutch piston bore and the piston inner and outer bearing surfaces for scores.
3. Check the fluid passages for obstructions. All fluid passages must be clean and free of obstructions.
4. Inspect the clutch plates for wear, scoring, and fit on the clutch hub serrations. Replace all plates that are badly scored, worn, or do not fit freely in the hub serrations.
5. Inspect the clutch pressure plate for scores on the clutch plate bearing surface. Check the clutch release spring for distortion.
6. The clutch cylinders have check balls. Inspect the check balls for freedom of movement and proper seating.

Forward Clutch



1. Inspect the clutch cylinder thrust surfaces, piston bore, and clutch plate serrations for scores or burrs. Minor scores or burrs may be removed with crocus cloth. Replace clutch cylinder if it is badly scored or damaged.

2. Check fluid pressure in the clutch cylinder for obstructions. Clean out all fluid passages. Inspect clutch piston for scores and replace if necessary. Inspect the piston check ball for freedom of movement and proper seating.
3. Check clutch release springs for distortion and cracks. Replace springs if they are distorted or cracked.
4. Inspect composition clutch plates, steel clutch plates, and clutch pressure plate for worn or scored bearing surface. Replace all parts that are deeply scored.
5. Check clutch plates for flatness and fit on the clutch hub serrations. Discard any plate that does not slide freely on the serrations or that is not flat.
6. Check clutch hub thrust surfaces for scores and clutch hub splines for wear.
7. Check input shaft for damaged or worn splines. Replace shaft if the splines are excessively worn. Inspect bushing in stator support for scores.

Overdrive One-Way Clutch and Planetary Rear One-Way Clutch

1. Inspect outer and inner races for scores or damaged surface areas where rollers contact races.
2. Inspect rollers and springs for excessive wear or damage.
3. Inspect spring and roller cage for bent or damaged spring retainers.

Converter and Fluid Cooler

When internal wear or damage has occurred in the transmission, metal particles, clutch plate material, or band material may have been carried into the converter and oil cooler. These contaminants are a major cause of recurring transmission troubles and **MUST** be removed from the system before the transmission is put back into service.

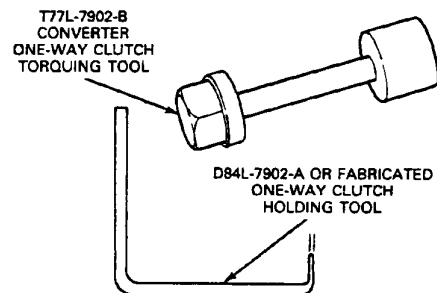
Whenever a transmission has been disassembled to replace worn or damaged parts or because the valve body sticks from foreign material, the converter, oil cooler and oil cooler lines **MUST** be cleaned and finished by using the Rotunda Torque Converter Cleaner (model 014-00028) or equivalent. Under **NO** circumstances should an attempt be made to clean converters by hand agitation with solvent.

The lack of a drain plug in the A4LD converter increases the amount of residual flushing solvent retained in the converter after cleaning. This retained solvent is not acceptable and a method of diluting it is required. The following procedure is to be used after removal of the A4LD torque converter from the cleaning equipment.

1. **Thoroughly drain** remaining solvent through the converter hub.
2. Add 1.9L (2.0 U.S. quarts) of clean transmission fluid to the converter. Agitate by hand.
3. **Thoroughly drain** solution through the converter hub.

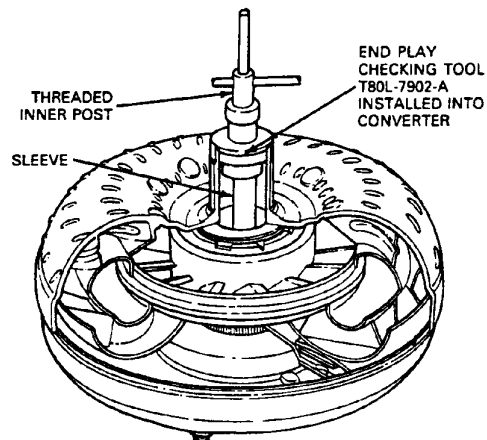
Converter End Play and One-Way Clutch Check

The Converter One-Way Clutch Torquing Tool T77L-7902-B and D84L-7902-A One-Way Clutch Holding Tool or an equivalent fabricated holding tool are used to check the converter one-way clutch.



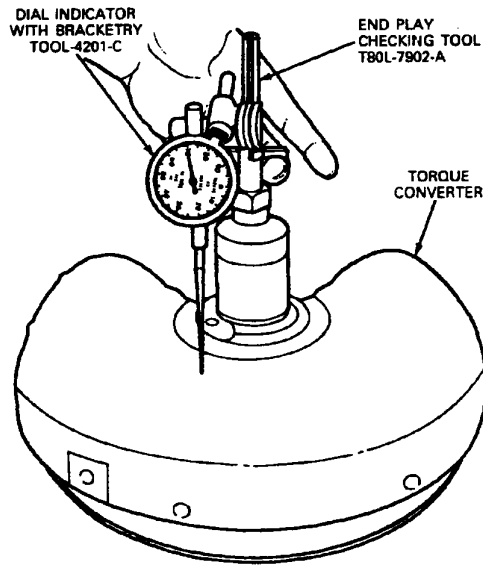
End Play Check

1. Insert Torque Converter End Play Checking Tool, T80L-7902-A or equivalent into the converter impeller hub, until it bottoms.



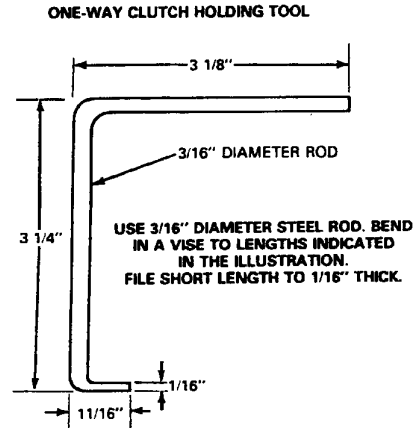
2. Expand sleeve in the turbine spline by tightening the threaded inner post until the tool is securely locked in the spline.

3. Attach Dial Indicator with Bracketry TOOL-4201-C or equivalent to the Torque Converter End Play Checking Tool T80L-7902-A or equivalent. Position the indicator button on the converter impeller housing, and set the dial face at 0 (zero).
4. Lift tool upward as far as it will go and note indicator reading. The indicator reading is the total end play which the turbine and stator share. Replace the converter unit if the total end play exceeds the limits. Refer to Specifications.
5. Loosen threaded inner post to free tool, and remove the tool from the converter.

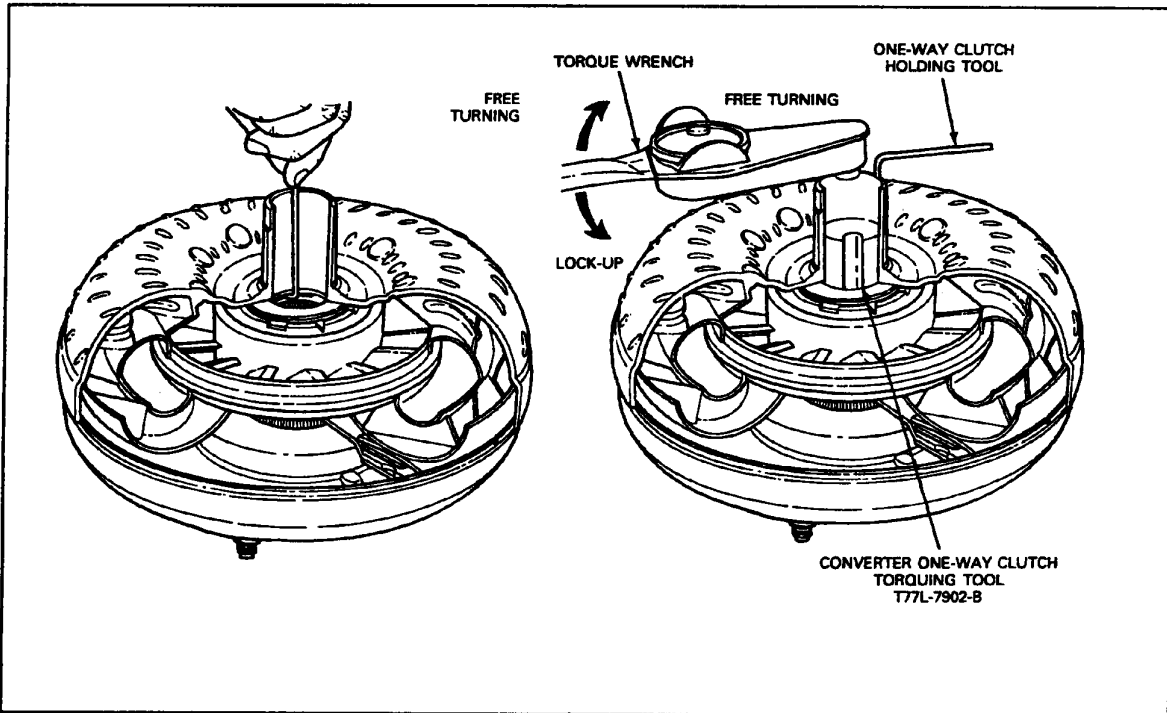


Converter One-Way Clutch Check

1. Use One-Way Clutch Holding Tool, D84L-7902-A or equivalent or fabricate a one-way clutch holding tool as shown below.

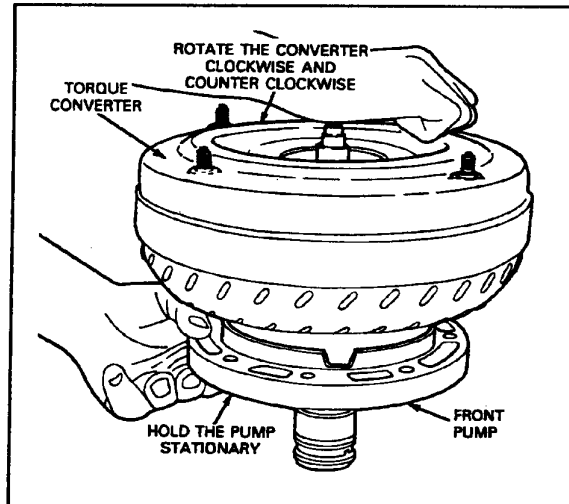


2. Insert one-way clutch holding tool in one of the grooves in the stator thrust washer.
3. Insert the Converter One-Way Clutch Torquing Tool, T77L-7902-B in the converter impeller hub so as to engage the one-way clutch inner race.
4. Attach a torque wrench to the one-way clutch torquing tool. With the one-way clutch holding tool held stationary, turn torque wrench counterclockwise. The converter one-way clutch should lockup and hold a 14 N-m (10 ft-lb) torque. The converter one-way clutch should rotate freely in a clockwise direction. Try the one-way clutch for lockup and hold in at least five different locations around the converter.
5. If the one-way clutch fails to lockup and hold at 14 N-m (10 ft-lb) torque, replace the torque converter.



Stator To Impeller Interference Check

1. Position front pump assembly on a bench with spline end of the stator shaft pointing up.
2. Mount a converter on the pump with splines on the one-way clutch inner race engaging the mating splines of the stator support. The impeller hub will then engage the pump drive gear.
3. Hold pump stationary and try to rotate the torque converter both clockwise and counterclockwise. The converter should rotate freely without any signs of interference or scraping within the converter assembly.
4. If there is an indication of scraping, the trailing edges of the stator blades may be interfering with the leading edges of the impeller blades. In such cases, replace the converter.



Pinion Carriers

Individual parts of the planet carriers are not serviceable.



1. Check pins and shafts in planet assemblies for loose fit and/or complete disengagement. Use a new planet assembly if either condition exists. Before installing a planet assembly, the shaft retaining pins should be checked for adequate staking. If necessary, restake the pins before installation. When restaking, the retaining pins must not be driven into the carrier any further than 1.0mm (0.040 inch) below the surface of the carrier.
2. Inspect pinion gears for damaged or excessively worn teeth.
3. Check for free rotation of pinion gears.

Stator Support

1. Inspect stator support splines for burrs and wear.
2. Check oil ring grooves in stator support for nicks, burrs or damaged edges.
3. Check front and rear bushings of stator support for wear or scoring.
4. Check front pump support seal.
5. Check seal rings for damage.

Case

Inspect the case for cracks and stripped threads. Inspect the gasket surfaces and mating surfaces for burrs. Check the vent for obstructions, and check all fluid passages for obstructions and leakage.

Inspect the case bushing for scores. Check all parking linkage parts for wear or damage.

If a transmission case thread is damaged, service kits may be purchased from local jobbers. To service a damaged thread, the following procedures should be carefully followed:

1. Drill out the damaged threads, **using the same drill size as the thread outside diameter**. For example, use a 5/16 inch drill for a 5/16-18 thread.
2. Select the proper special tap and tap the drilled hole. The tap is marked for the size of the thread being repaired. Thus, the special tap marked 5/16-18 will not cut the same thread as a standard 5/16-18 tap. It does cut a thread large enough to accommodate the insert, and after the insert is installed, the original thread size (5/16-18) is restored.

3. Select the proper coil inserting tool. These tools are marked with the thread size being repaired. Place the insert on the tool and adjust the sleeve to the length of the insert being used. Press the insert against the face of the tapped hole. Turn the tool clockwise and wind the insert into the hole until the insert is 1/2 turn below the face.
4. Working through the insert, bend the insert tang straight up and down until it breaks off at the notch.
5. Improperly installed inserts can be removed with the extractor tool. Place the extractor tool in the insert with the blade resting against the top coil 1/4 to 1/2 turn away from the end of the coil. Tap the tool sharply with a hammer until the blade cuts into the insert. Exert downward pressure on the tool and turn it counterclockwise until the insert is removed.

REMOVAL AND INSTALLATION

Transmission

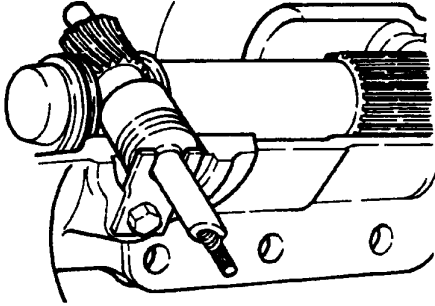
Removal

1. Disconnect the battery negative cable.
2. Raise the vehicle on a hoist.
3. Place a drain pan under the transmission fluid pan. On Explorer vehicles, pry the lower clips of transmission heat shield back slightly to allow access to pan bolts. Starting at the rear of the pan and working toward the front, loosen the attaching bolts and allow the fluid to drain. Then remove all of the pan attaching bolts except two at the front, to allow the fluid to further drain. After all the fluid has drained, install two bolts on the rear side of the pan to temporarily hold it in place.
4. Remove the converter access cover from the converter housing. Remove one (1) bolt on the access cover of 6 cylinder applications (3.0L) pivot / swing cover open.
5. Remove the starter-to-converter housing attaching bolts and position the starter out of the way.
NOTE: On 2.9L and 4.0L engines, the converter attaching nuts are accessed through the starter motor mounting hole. On 2.3L engines, the converter attaching nuts are accessed through the cover on the engine oil pan.
6. Remove the four flywheel-to-converter attaching nuts by placing a 22mm socket and breaker bar on the crankshaft pulley attaching bolt. Rotate the pulley clockwise (as viewed from the front) to gain access to each of the nuts.

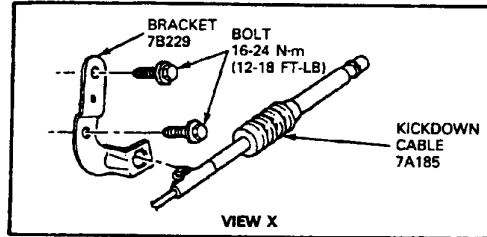
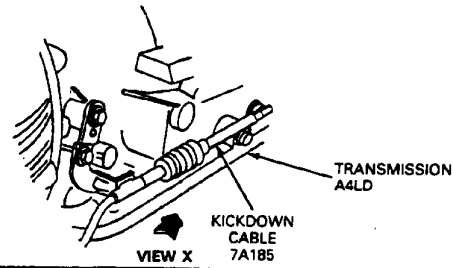
CAUTION: On 2.3L belt driven overhead cam engines, never rotate the pulley in a counterclockwise direction (as viewed from the front).

7. Scribe a mark indexing the driveshaft to the rear axle flange. Remove the driveshaft

install the extension housing seal replacer tool in the extension housing.



8. Remove the speedometer cable from the extension housing.
9. Disconnect the shift rod at the transmission manual lever. Remove the kickdown cable from the ball stud lever. Depress the tab on the cable downshift retainer and remove the cable from the bracket.
10. Disconnect the neutral start switch wires and the converter clutch solenoid connector.
11. Remove the vacuum line from the transmission vacuum modulator.
12. Position a transmission jack under the transmission and raise it slightly.
13. Remove the engine rear support-to-crossmember bolts.
14. Remove the crossmember-to-frame side support attaching bolts and remove the crossmember insulator and support and damper.



15. Lower the jack under the transmission and allow the transmission to hang.
16. Position a jack to the front of the engine and raise the engine to gain access to the two upper converter housing-to-engine attaching bolts on Ranger and Explorer vehicles.
17. Disconnect the oil cooler lines at the transmission. Plug all openings to keep out dirt.
18. Remove the lower converter housing-to-engine attaching bolts.
19. Remove the transmission filler tube.
20. Secure the transmission to the jack with a safety chain.
21. Remove the two upper converter housing-to-engine attaching bolts. Move the transmission to the rear so it disengages from the dowel pins and the converter is disengaged from the flywheel. Lower the transmission from the vehicle.