

DIAGNOSIS AND TESTING

PRELIMINARY

Two basic procedures are required. One procedure for vehicles that are drivable and an alternate procedure for disabled vehicles (will not back up or move forward).

VEHICLE IS DRIVABLE

1. Record all DTCs and the accompanying DTC Event Data.
2. Check for an appropriate Technical Service Bulletin that applies to the customer complaint.
3. Check fluid level and condition.
4. Road test and note how transmission upshifts, downshifts, and engages.
5. If the complaint was related to shift quality, perform the **TCM QUICK LEARN** procedure , and the **DRIVE LEARN** Procedure .
6. If the shift complaint still exists, compare actual line pressure (sensor reading, using the scan tool) to the Desired Line Pressure reading, in Park, Drive, and Reverse at 1500 RPM. Check that the LP sensor reads 30 psi (the minimum it should ever display) with key on/engine off.
7. Perform air-pressure test to check clutch operation. See **DIAGNOSIS AND TESTING**.
8. Replace the Transmission Solenoid/TRS Assembly and perform the Quick Learn and Drive Learn procedures again.
9. If the complaint still exists, remove, inspect, and repair the transmission as necessary.

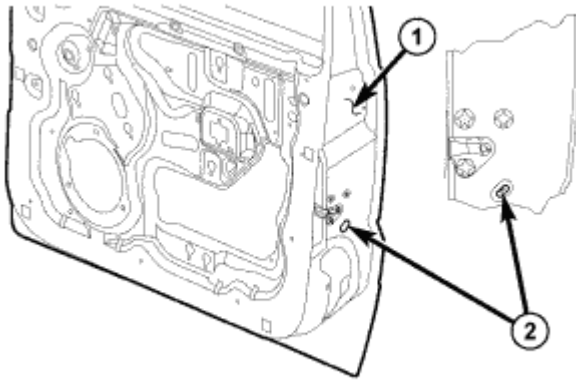
VEHICLE IS DISABLED

1. Record all DTCs and the accompanying DTC Event Data.
2. With engine running, place transmission in gear and verify correct PRNDL reading. Observe the Input and Output speeds using the scan tool. If output RPM is greater than zero but vehicle does not move, check for transfer case in Neutral (or failed internally), failed propshaft, or failed/disconnected drive axle. If output RPM is zero and input RPM is greater than zero, internal transmission slippage is indicated. Run clutch slip tests using the scan tool, check oil pan for debris, and air check the various clutch circuits.
3. Shift the transmission into neutral, if both input and output speeds are zero, check flexplate bolts, torque converter, and transmission input shaft.
4. Compare actual line pressure (sensor reading, using the scan tool) to the Desired Line Pressure reading, in Park, Drive, and Reverse at 1500 RPM. Check that the LP sensor reads 30 psi (the minimum it should ever display) with key on/engine off. If line pressure is incorrect, check fluid level and condition.
5. Remove, inspect, and repair the transmission as necessary.

HYDRAULIC PRESSURE TESTS - 42RLE

NOTE: Before performing the hydraulic pressure tests be certain to disconnect the Variable Line Pressure (VLP) electrical connector at the transmission. Check for and clear any codes that may have been set after performing any hydraulic pressure test and connecting the Variable Line Pressure (VLP) electrical

connector.



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Fig. 8: Pressure Taps

Courtesy of CHRYSLER LLC

- 1 - TORQUE CONVERTER CLUTCH OFF
- 2 - REVERSE
- 3 - LOW/REVERSE
- 4 - 2/4
- 5 - UNDERDRIVE
- 6 - TORQUE CONVERTER CLUTCH ON
- 7 - OVERDRIVE

Pressure testing is a very important step in the diagnostic procedure. These tests usually reveal the cause of most transmission problems.

Before performing pressure tests, be certain that fluid level and condition, and shift cable adjustments have been checked and approved. Fluid must be at operating temperature (150 to 200 degrees F.).

Install an engine tachometer, raise vehicle on hoist which allows the wheels to turn, and position tachometer so it can be read.

Using special adapters L-4559, attach 300 psi gauge(s) C-3293SP to the port(s) required for test being conducted.

Test port locations are shown in the Pressure Taps graphic. See **Fig. 8**

TEST ONE - SELECTOR IN MANUAL 1 (1st Gear)

NOTE: This test checks pump output, pressure regulation and condition of the low/reverse clutch hydraulic circuit and shift schedule.

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1. Attach pressure gauge to the low/reverse clutch tap.
2. Move selector lever to the MANUAL 1 position.
3. Allow vehicle wheels to turn and increase throttle opening to achieve an indicated vehicle speed to 20 mph.
4. Low/reverse clutch pressure should read 115 to 145 psi.

TEST TWO - SELECTOR IN MANUAL 2 (Second Gear)

NOTE: This test checks the underdrive clutch hydraulic circuit as well as the shift schedule.

1. Attach gauge to the underdrive clutch tap.
2. Move selector lever to the MANUAL 2 position.
3. Allow vehicle wheels to turn and increase throttle opening to achieve an indicated vehicle speed of 30 mph.
4. In second gear the underdrive clutch pressure should read 110 to 145 psi.

TEST TWO A - SELECTOR IN DRIVE (OD ON - Fourth Gear)

NOTE: This test checks the underdrive clutch hydraulic circuit as well as the shift schedule.

1. Attach gauge to the underdrive clutch tap.
2. Move selector lever to the DRIVE position. Verify that the OD switch is ON.
3. Allow wheels to rotate freely and increase throttle opening to achieve an indicated speed of 40 mph.
4. Underdrive clutch pressure should read below 5 psi. If not, than either the solenoid assembly or controller is at fault.

TEST THREE - SELECTOR IN DRIVE (OD OFF - Third and Second Gear)

NOTE: This test checks the overdrive clutch hydraulic circuit as well as the shift schedule.

1. Attach gauge to the overdrive clutch tap.
2. Move selector lever to the DRIVE position.
3. Allow vehicle wheels to turn and increase throttle opening to achieve an indicated vehicle speed of 20 mph.
4. Overdrive clutch pressure should read 74 to 95 psi.
5. Move selector lever to the DRIVE position and increase indicated vehicle speed to 30 mph.
6. The vehicle should be in second gear and overdrive clutch pressure should be less than 5 psi.

TEST FOUR - SELECTOR IN DRIVE (OD ON - Fourth Gear)

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NOTE: This test checks the 2/4 clutch hydraulic circuit.

1. Attach gauge to the 2/4 clutch tap.
2. Move selector lever to the DRIVE position.
3. Allow vehicle front wheels to turn and increase throttle opening to achieve an indicated vehicle speed of 30 mph. Vehicle should be in fourth gear.
4. The 2/4 clutch pressure should read 75 to 95 psi.

TEST FIVE-SELECTOR IN DRIVE (OD ON - Fourth Gear, CC on)

NOTE: These tests check the torque converter clutch hydraulic circuit.

1. Attach gauge to the torque converter clutch off pressure tap.
2. Move selector lever to the DRIVE position.
3. Allow vehicle wheels to turn and increase throttle opening to achieve an indicated vehicle speed of 50 mph. Vehicle should be in 4th gear, CC on.

CAUTION: Both wheels must turn at the same speed.

4. Torque converter clutch off pressure should be less than 5 psi.
5. Now attach the gauge to the torque converter clutch on pressure tap.
6. Move selector to the OD position.
7. Allow vehicle wheels to turn and increase throttle opening to achieve an indicated vehicle speed of 50 mph.
8. Verify the torque converter clutch is applied mode using the RPM display of the scan tool.
9. Torque converter clutch on pressure should be 60-90 psi.

TEST SIX-SELECTOR IN REVERSE

NOTE: This test checks the reverse clutch hydraulic circuit.

1. Attach gauge to the reverse and low/reverse clutch tap.
2. Move selector lever to the REVERSE position.
3. Read reverse clutch pressure with output stationary (foot on brake) and throttle opened to achieve 1500 RPM.
4. Reverse and low/reverse clutch pressure should read 165 to 235 psi.

TEST RESULT INDICATIONS

1. If proper line pressure is found in any one test, the pump and pressure regulator are working properly.
2. Low pressure in all positions indicates a defective pump, a clogged filter, or a stuck pressure regulator

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valve.

3. Clutch circuit leaks are indicated if pressures do not fall within the specified pressure range.
4. If the overdrive clutch pressure is greater than 5 psi in step 6 of Test Three, a worn reaction shaft seal ring or a defective solenoid assembly is indicated.
5. If the underdrive clutch pressure is greater than 5 psi in step 4 of Test Two-A, a defective solenoid/pressure switch assembly or controller is the cause.

ALL PRESSURE SPECIFICATIONS ARE PSI (on hoist, with wheels free to turn)

Gear Selector Position	Actual Gear	PRESSURE TAPS						
		Underdrive Clutch	Overdrive Clutch	Reverse Clutch	Torque Converter Clutch Off	Torque Converter Clutch On	2/4 Clutch	Low/Reverse Clutch
PARK - 0 mph *	PARK	0-2	0-5	0-2	60-110	45-100	0-2	115-145
REVERSE - 0 mph *	REVERSE	0-2	0-7	165-235	50-100	35-85	0-2	165-235
NEUTRAL - 0 mph *	NEUTRAL	0-2	0-5	0-2	60-110	45-100	0-2	115-145
Low - 20 mph #	FIRST	110-145	0-5	0-2	60-110	45-100	0-2	115-145
Third - 30 mph #	SECOND	110-145	0-5	0-2	60-110	45-100	115-145	0-2
Third - 45 mph #	DIRECT	75-95	75-95	0-2	60-90	45-80	0-2	0-2
OD - 30 mph #	OVERDRIVE	0-2	75-95	0-2	60-90	45-80	75-95	0-2
OD - 50 mph #	OVERDRIVE WITH TCC	0-2	75-95	0-2	0-5	60-95	75-95	0-2

* Engine Speed at 1500 RPM

CAUTION: Both wheels must be turning at same speed.

CLUTCH AIR PRESSURE TESTS - 42RLE

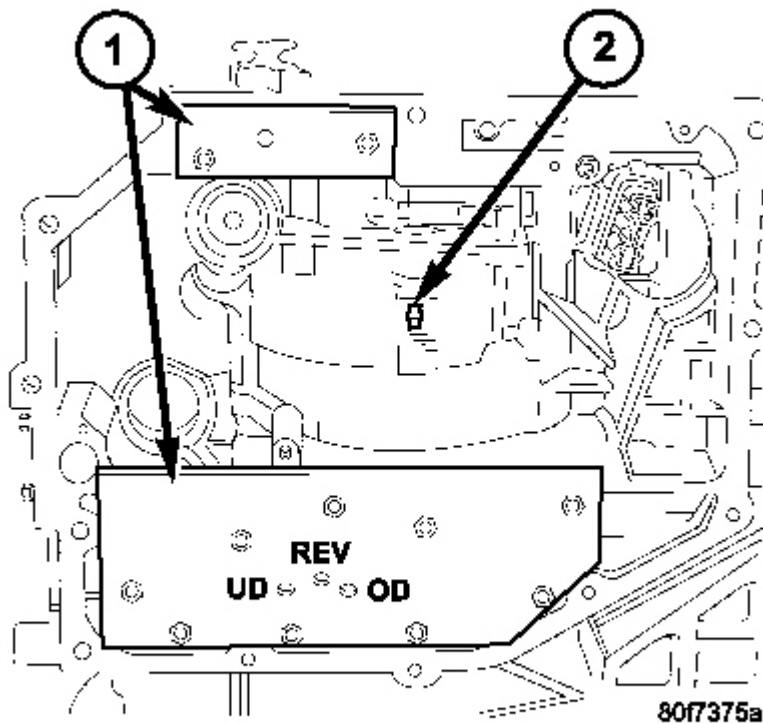


Fig. 9: Air Pressure Test Plates & 2/4 Clutch Retainer Hole
 Courtesy of CHRYSLER LLC

- | |
|--------------------------------------------------------------|
| 1 - AIR PRESSURE TEST PLATES
2 - 2/4 CLUTCH RETAINER HOLE |
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Inoperative clutches can be located by substituting air pressure for fluid pressure. The clutches may be tested by applying air pressure to their respective passages after the valve body has been removed. Use Plate Set 6599-1 (1) and 6599-2 (1) to perform test. See **Fig. 9**.

To make air pressure tests, proceed as follows:

NOTE: The compressed air supply must be free of all dirt and moisture. Use a pressure of 30 psi.

1. Remove oil pan and valve body. See **REMOVAL**.
2. Apply air pressure to the holes in the special tool (1), one at a time.

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3. Listen for the clutch to apply. It will give a slight thud sound. If a large amount of air is heard escaping, the transmission must be removed from vehicle, disassembled and all seals inspected.

2/4 CLUTCH

Apply air pressure to the feed hole located on the 2/4 clutch retainer (2). Look in the area where the 2/4 piston contacts the first separator plate and watch carefully for the 2/4 piston to move rearward. The piston should return to its original position after the air pressure is removed.

OVERDRIVE CLUTCH

Apply air pressure to the overdrive clutch apply passage and watch for the push/pull piston to move forward. The piston should return to its starting position when the air pressure is removed.

REVERSE CLUTCH

Apply air pressure to the reverse clutch apply passage and watch for the push/pull piston to move rearward. The piston should return to its starting position when the air pressure is removed.

LOW/REVERSE CLUTCH

Apply air pressure to the low/reverse clutch feed hole passage. Look in the area where the low/reverse piston contacts the first separator plate. Watch carefully for the piston to move forward. The piston should return to its original position after the air pressure is removed.

UNDERDRIVE CLUTCH

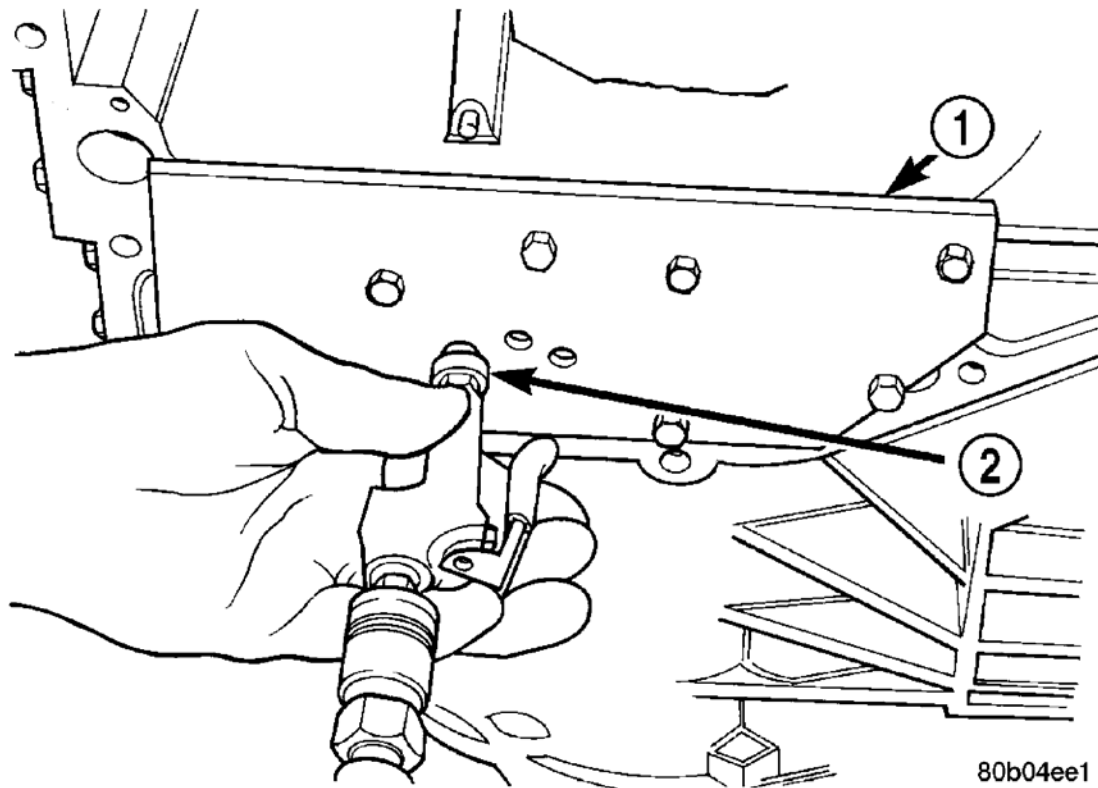


Fig. 10: Testing Underdrive Clutch
 Courtesy of CHRYSLER LLC

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|------------------------------------------------------|
| 1 - AIR PRESSURE TEST PLATE 6599-1
2 - AIR NOZZLE |
|------------------------------------------------------|

Because this clutch piston cannot be seen, its operation is checked by function. Use an air nozzle (2) to apply air pressure to the low/reverse or the 2/4 clutch opening in Plate Set 6599-1 (2). This locks the output shaft. Use a piece of rubber hose wrapped around the input shaft and a pair of clamp-on pliers to turn the input shaft. Next apply air pressure to the underdrive clutch. The input shaft should not rotate with hand torque. Release the air pressure and confirm that the input shaft will rotate. See [Fig. 10](#).

AUTOMATIC TRANSMISSION - 42RLE

CAUTION: Before attempting any repair on the 42RLE Four Speed Automatic Transmission, always check for proper shift cable adjustment. Also check for diagnostic trouble codes with the scan tool and the 42RLE Transmission Diagnostic information.

42RLE automatic transmission malfunctions may be caused by these general conditions:

Poor engine performance

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- Improper adjustments
- Hydraulic malfunctions
- Mechanical malfunctions
- Electronic malfunctions

When diagnosing a problem always begin with recording the complaint. The complaint should be defined as specific as possible. Include the following checks:

- Temperature at occurrence (cold, hot, both)
- Dynamic conditions (acceleration, deceleration, upshift, cornering)
- Elements in use when condition occurs (what gear is transmission in during condition)
- Road and weather conditions
- Any other useful diagnostic information.

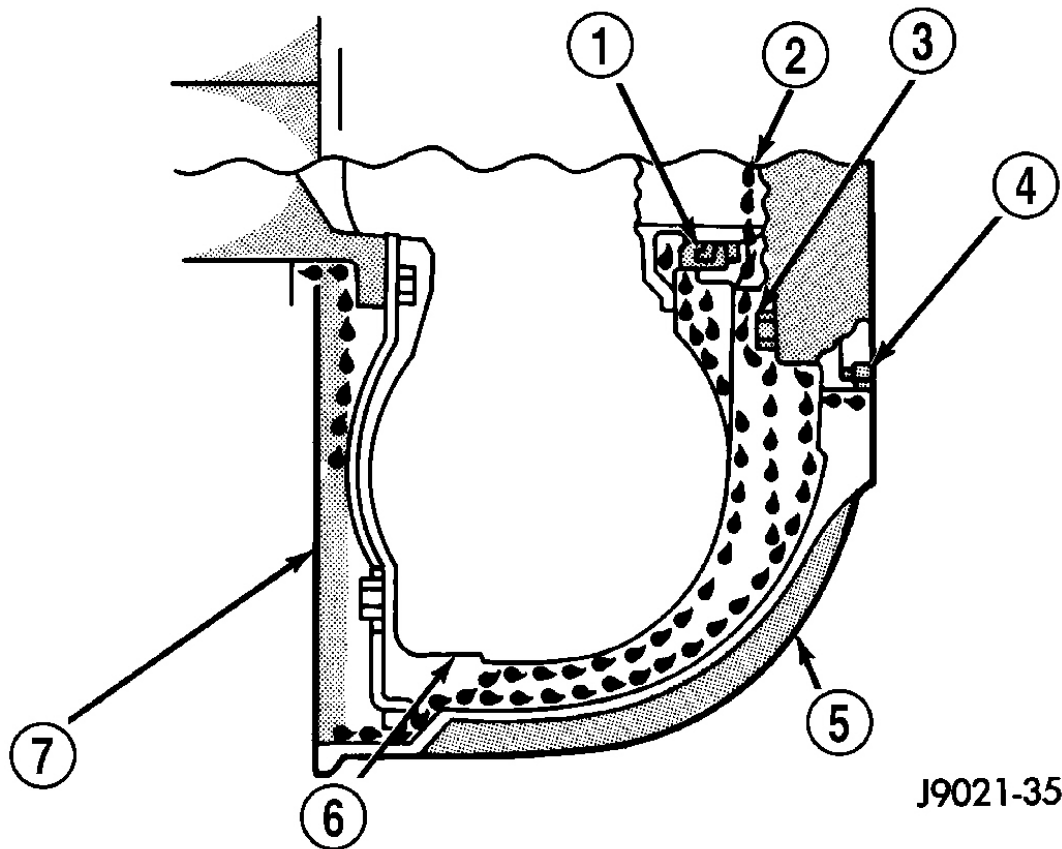
After noting all conditions, check the easily accessible variables:

- Fluid level and condition
- Shift cable adjustment
- Diagnostic trouble code inspection

Then perform a road test to determine if the problem has been corrected or that more diagnosis is necessary. If the problem exists after the preliminary tests and corrections are completed, hydraulic pressure checks should be performed.

FLUID LEAKAGE

FLUID LEAKAGE - TORQUE CONVERTER HOUSING AREA



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Fig. 11: Fluid Leakage Paths
 Courtesy of CHRYSLER LLC

- | |
|-------------------------|
| 1 - PUMP SEAL |
| 2 - PUMP VENT |
| 3 - PUMP BOLT |
| 4 - PUMP GASKET |
| 5 - CONVERTER HOUSING |
| 6 - CONVERTER |
| 7 - REAR MAIN SEAL LEAK |

When diagnosing converter housing (5) fluid leaks, three actions must be taken before repair:

1. Verify proper transmission fluid level.
2. Verify that the leak originates from the converter housing area and is transmission fluid.
3. Determine the true source of the leak.

Fluid leakage at or around the torque converter area may originate from an engine oil leak (7). The area should

be examined closely. Factory fill fluid is red and, therefore, can be distinguished from engine oil. See **Fig. 11**.

Some suspected converter housing fluid leaks may not be leaks at all. They may only be the result of residual fluid in the converter housing, or excess fluid spilled during factory fill, or fill after repair. Converter housing leaks have several potential sources. Through careful observation, a leak source can be identified before removing the transmission for repair.

Pump seal (1) leaks tend to move along the drive hub and onto the rear of the converter. Pump o-ring or pump body leaks follow the same path as a seal leak. Pump attaching bolt (3) leaks are generally deposited on the inside of the converter housing (5) and not on the converter itself. Pump seal (1) or gasket (4) leaks usually travel down the inside of the converter housing. See **Fig. 11**.

TORQUE CONVERTER LEAKAGE

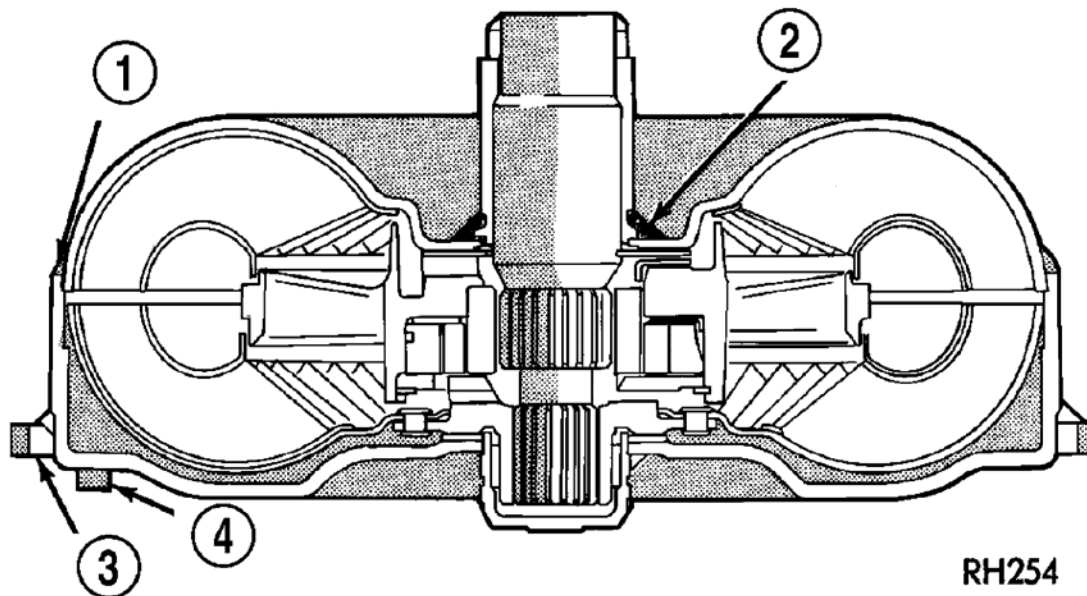


Fig. 12: Outside Diameter Weld, Torque Converter Hub Weld, Starter Ring Gear & Lug
Courtesy of CHRYSLER LLC

- 1 - OUTSIDE DIAMETER WELD
- 2 - TORQUE CONVERTER HUB WELD
- 3 - STARTER RING GEAR
- 4 - LUG

Possible sources of torque converter leakage are:

Torque converter weld leaks at the outside diameter weld (1). See **Fig. 12**

Torque converter hub weld (2).

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ROAD TEST

Prior to performing a road test, verify that the fluid level, fluid condition, and linkage adjustment have been approved.

During the road test, the transmission should be operated in each position to check for slipping and any variation in shifting.

If the vehicle operates properly at highway speeds, but has poor acceleration, the converter stator overrunning clutch may be slipping. If acceleration is normal, but high throttle opening is needed to maintain highway speeds, the converter stator clutch may have seized. Both of these stator defects require replacement of the torque converter and thorough transmission cleaning.

Slipping clutches can be isolated by comparing the "Elements in Use" chart with clutch operation encountered on a road test. This chart identifies which clutches are applied at each position of the selector lever.

A slipping clutch may also set a DTC and can be determined by operating the transmission in all selector positions.

ELEMENTS IN USE AT EACH POSITION OF SELECTOR LEVER

Shift Lever Position	INPUT CLUTCHES			HOLDING CLUTCHES	
	Underdrive	Overdrive	Reverse	2/4	Low/Reverse
P - PARK	-	-	-	-	X
R - REVERSE	-	-	X	-	X
N - NEUTRAL	-	-	-	-	X
OD - OVERDRIVE	-	-	-	-	-
First	X	-	-	-	X
Second	X	-	-	X	-
Direct	X	X	-	-	-
Overdrive	-	X	-	X	-
D - DRIVE*	-	-	-	-	-
First	X	-	-	-	X
Second	X	-	-	X	-
Direct	X	X	-	-	-
L - LOW*	-	-	-	-	-
First	X	-	-	-	X
Second	X	-	-	X	-
Direct	X	X	-	-	-

* Vehicle upshift and downshift speeds are increased when in these selector positions.

The process of elimination can be used to detect any unit which slips and to confirm proper operation of good units. Road test analysis can diagnose slipping units, but the cause of the malfunction cannot be determined. Practically any condition can be caused by leaking hydraulic circuits or sticking valves.