

# ***BD PERFORMANCE TRANSMISSION***

## **2007-12 Dodge 68RFE**

### **Installation Instructions**

***Please read the instructions and warranty disclaimer before beginning installation.  
All learn procedures should be performed at the operating  
power setting of the vehicle.***

BD Engine Brake Inc.  
Plant Address: 33541 MacLure Rd. Abbotsford, BC, Canada V2S 7W2  
U.S. Shipping Address: 88-446 Harrison St, Sumas, WA 98295 U.S. Mailing Address: P.O. Box 231, Sumas, WA 98295  
Phone#: (604) 853-6096 | Fax: (604) 853-8749 | Web: [www.dieselperformance.com](http://www.dieselperformance.com)

## DO THIS FIRST

Check off boxes to ensure you do not miss any important steps. Failure to perform some of these steps stated below may void your warranty.

<input type="radio"/> <b>Step 1.</b>	Read over the transmission warranty statement. (With Customer)
<input type="radio"/> <b>Step 2.</b>	Complete top part of the transmission warranty form.
<input type="radio"/> <b>Step 3.</b>	Ensure you have an OEM or equivalent scan tool. If you do not have this tool, DO NOT INSTALL THIS TRANSMISSION.
<input type="radio"/> <b>Step 4.</b>	Record CVI 's of stock transmission and record on warranty form.
<input type="radio"/> <b>Step 5.</b>	Proceed with Re & RE of transmission see installation instructions below
<input type="radio"/> <b>Step 6.</b>	Install 68 RFE pressure module.
<input type="radio"/> <b>Step 7.</b>	Using pressure adapter kit (1061529) record pressures on warranty sheet.
<input type="radio"/> <b>Step 8.</b>	Proceed with relearn procedure while continuing to update warranty sheet
<input type="radio"/> <b>Step 9.</b>	Fax warranty sheet to BD diesel and keep a copy for your records.

Anything listed below will require or cause a relearn of the transmission to be performed :

**Relearn required after replacement of**

- Transmission Replacement or repair.
- Torque Convertor Replacement
- Solenoid Pack Replacement
- Valve Body Replacement or Recondition
- Transmission Control Module Replacement
- Battery Disconnect or Replacement
- Power Upgrade or Flash Programmer Installation and/or Updates.

**Will cause relearn if broken or damaged**

- Faulty electrical connection
- Sensor

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## Specific Tools Required

### ➤ Scanner

SCANNER	YEAR
WiTech	2007-Current
Star Mobile	2007-Current
StarScan	2007-2009



### ➤ 300 psi oil filled gauge, with approx. 6ft line with male 1/8" NPT fitting.



**NOTE: Before the transmission is removed clutch fluid volume index numbers must be recorded using an OEM or equivalent scan tool.**

***Another note: After transmission is installed a quick learn and drive learn will need to be performed for proper break in. CVI's will need to be recorded after quick learn and after drive learn.***

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## ***SERVICE INTERVALS***

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*We recommend the first service for the transmission at 1000 km (600 miles). And depending upon usage every 50 000 km (30 000 miles) following the first service.*

## ***AFTERMARKET TUNERS OR TCMS***

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There is a number of aftermarket TCMs and TCM reflashes available in the aftermarket. At BD we have tested the H&S unit and found it to be somewhat beneficial. **IF USING AN AFTERMARKET TCM PROGRAM YOU MUST DISABLE THE TRANSMISSION MAINLINE PRESSURE INCREASE.** It will directly conflict with the BD module, the BD module provides a better sweep of pressure anyhow and will give you better results.

## ***PRE INSTALLATION***

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Before installing your BD transmission you must flush the transmission coolers using a backflow heated transmission flushing machine. By not doing this you may void your warranty.

If the transmission you are removing failed or has an excessive amount of debris in the pan, you should replace the transmission cooler and check valve assembly.

*Upon installation ensure the plug is in the torque converter and preload the torque converter with 2 quarts, fluid type see below.*

<b><i>Application</i></b>	<b><i>Oil Type</i></b>
Dodge 68 RFE	Mopar® ATF +4

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**\*\*\* IMPORTANT NOTICE \*\*\***

You must perform the correct relearn procedure otherwise your transmission clutches will look like the above and your warranty will be voided. The unit is not to be used for heavy towing or hauling until the 300 mile stop and go computer relearn procedure has been completed.

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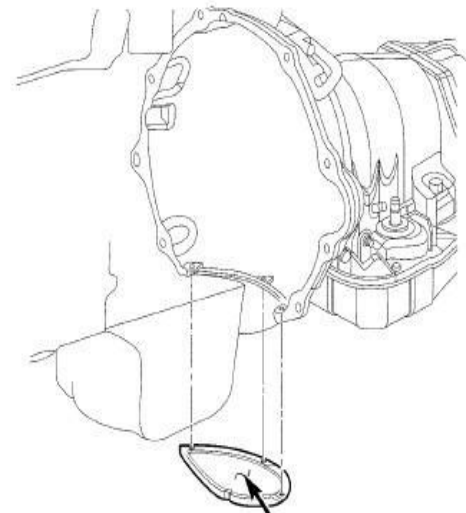
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**TRANSMISSION REMOVAL:**

1. Disconnect the negative battery cable.
2. Raise and support the vehicle.
3. Remove any necessary skid plates.
4. Drain transmission.

**NOTE: Mark drive shaft and axle companion flanges for assembly alignment.**

5. Remove the rear drive shaft.
6. Remove the front drive shaft, if necessary.
7. Remove the exhaust support bracket from the converter housing.
8. Remove the bolts securing the right power bending bracket to the engine block and the transmission adapter plate.
9. Remove the right side power bending bracket.
10. Loosen the inspection cover bolts and rotate the inspection cover out of the way.
11. Remove the transmission dust shield.



TRANSMISSION  
DUST SHIELD

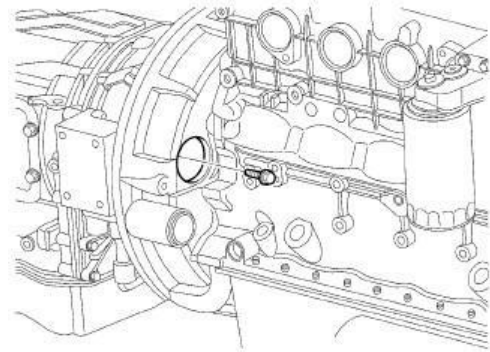
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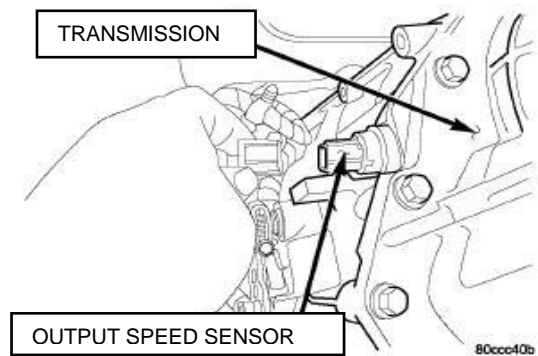
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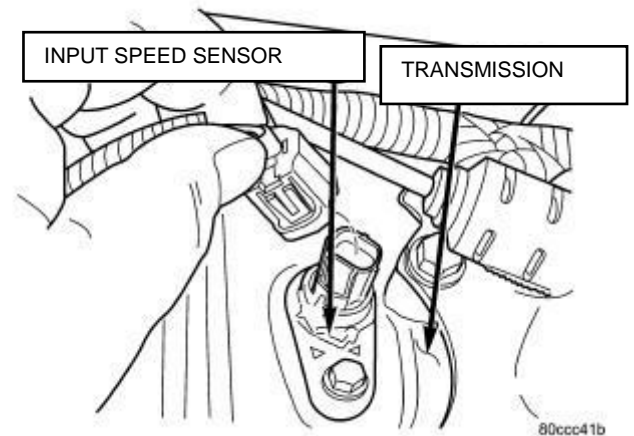
12. Rotate the fly wheel by using the Chrysler barring tool # 7471B/ or a blade screw driver and remove the torque converter bolts one at a time.



13. Disengage the output speed sensor connector from the output speed sensor.



14. Disengage the input speed sensor connector from the input speed sensor.



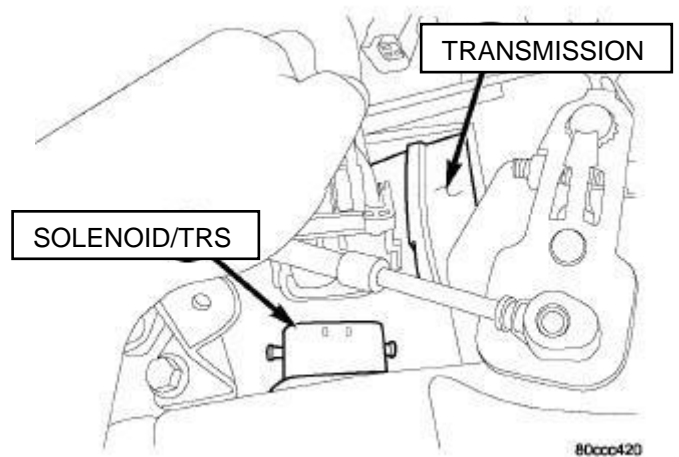
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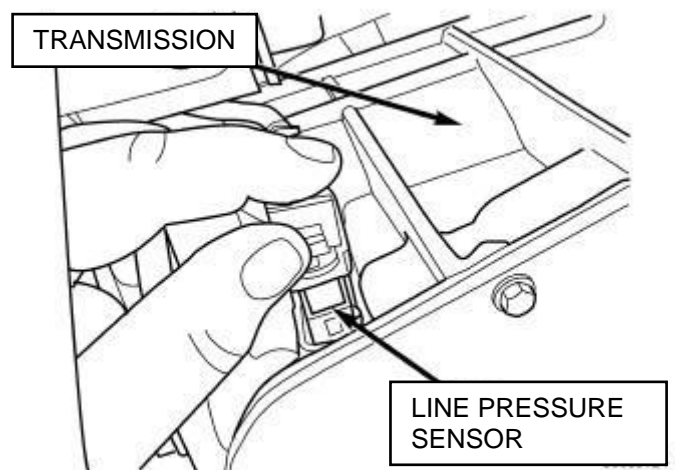
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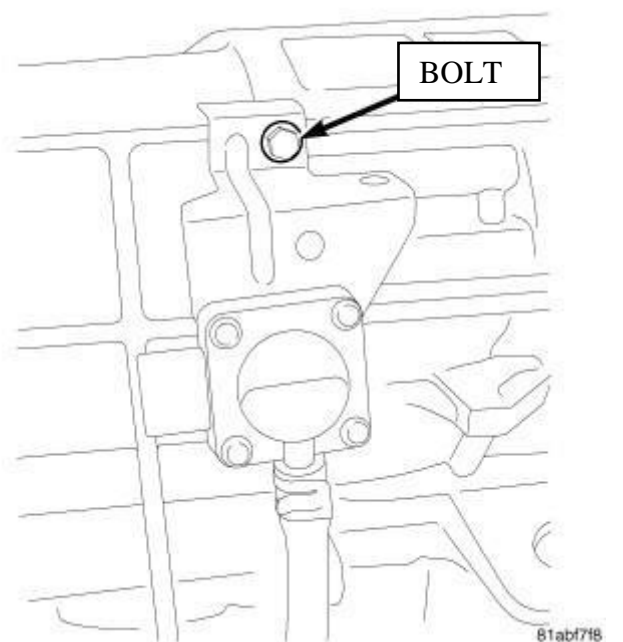
15. Disengage the transmission solenoid/TRS assembly connector from the transmission solenoid/TRS assembly.



16. Disengage the line pressure sensor connector from the line pressure sensor.



17. Disconnect electrical connector from the differential pressure sensor.
18. Remove bolt securing differential pressure sensor to the transmission case and position differential pressure sensor aside.



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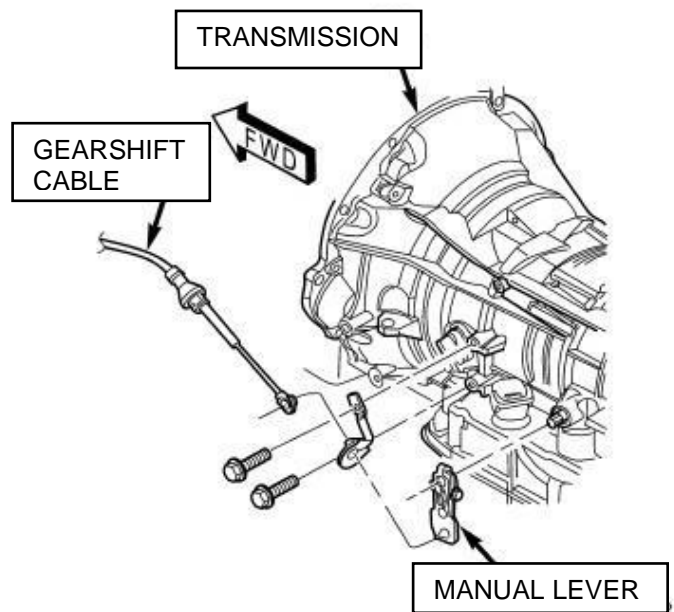
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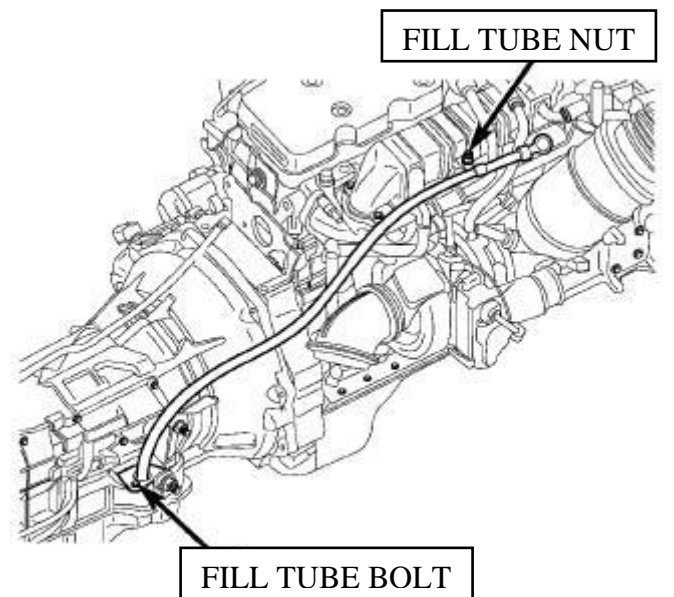
19. Disconnect gearshift cable from transmission manual valve lever.



20. Remove the wiring harness and position aside.

21. Remove the bolt securing the fill tube at the transmission.

22. Disconnect the cooler lines from the transmission using cooler line disconnect tool Chrysler # 9546.



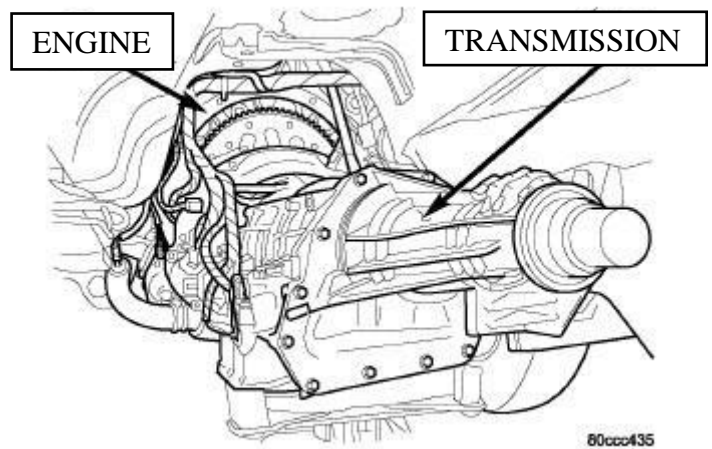
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23. Support rear of engine with safety stand or jack.
24. Raise transmission slightly with service jack to relieve load on crossmember and supports.
25. Remove the wiring harness from the crossmember and position aside.
26. Remove bolts securing rear support and cushion to transmission and remove the crossmember from the vehicle.
27. If equipped, Disconnect vent lines and connectors to the transfer case assembly. Remove mounting nuts for the transfer case and remove the t/case from the vehicle.
28. Disconnect the transmission vent hose from the transmission.
29. Remove all remaining converter housing bolts.
30. Carefully work transmission and torque converter assembly rearward off engine block dowels while removing the fill tube from the fill tube bore.
31. Hold torque converter in place during transmission removal.
32. Lower transmission and remove assembly from under the vehicle.



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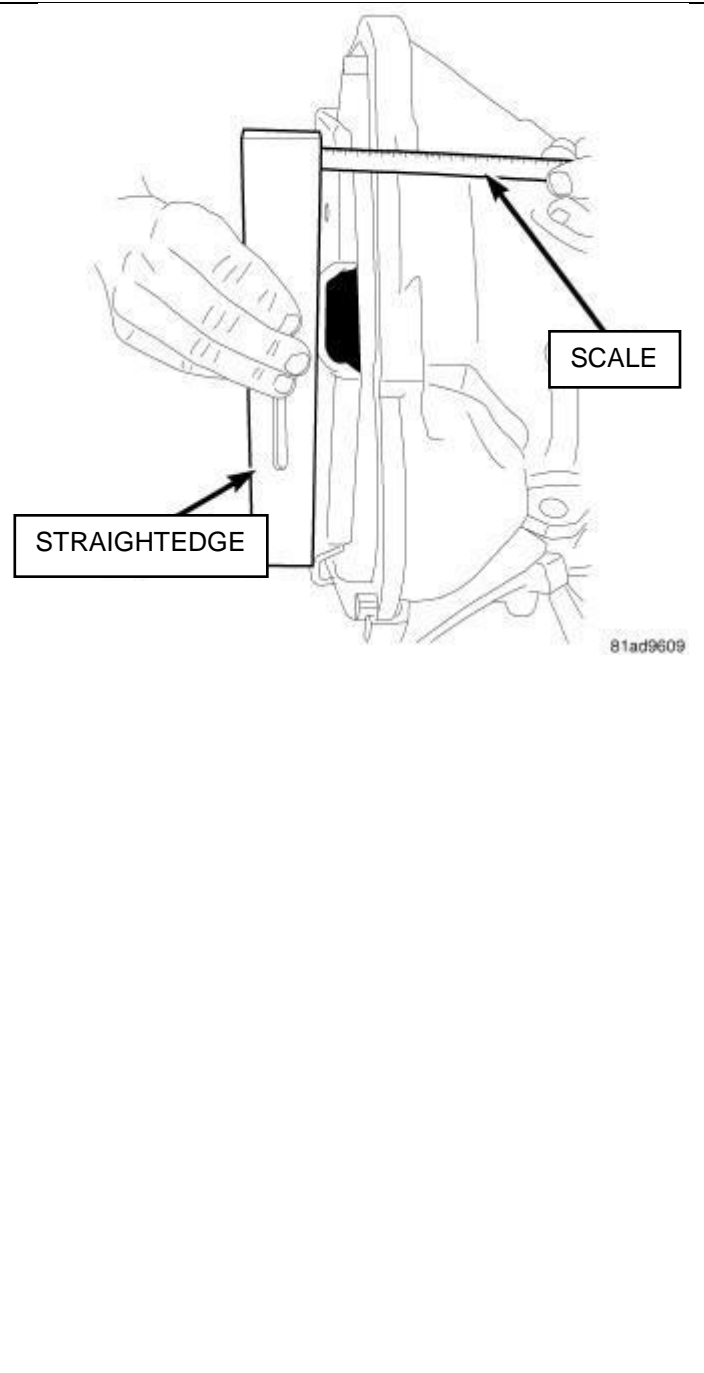
**TORQUE CONVERTER REMOVAL:**

To remove torque converter, carefully slide torque converter out of the transmission and drain

**ALL COMPONENTS/CORES MUST BE DRAINED BEFORE SENDING BACK TO BD FOR CORE CREDIT**

**TORQUE CONVERTER INSTALLATION:**

1. Check torque converter hub and hub drive flats for sharp edges burrs, scratches, or nicks. Polish the hub and flats with 800/1000 grit paper and crocus cloth if necessary. Verify that the converter hub o-ring is properly installed and is free of any debris. The hub must be smooth to avoid damaging pump seal at installation.
2. Lubricate oil pump seal lip with transmission fluid.
3. Prefill torque convertor with 5 quarts of Mopar ATF+4 before installing.
4. Align converter and oil pump.
5. Carefully insert converter in oil pump. Then rotate converter back and forth until fully seated in pump gears.
6. Check converter seating with steel scale and straightedge. Surface of converter lugs should be in front of the bell housing face about 25 mm, (1 in.).
7. Temporarily secure converter with C-clamp.



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## TRANSMISSION INSTALLATION:

**Note : The following items and procedures are critical in the safe operation of your transmission. Failure to follow these recommendations will result in a VOIDED WARRANTY.**

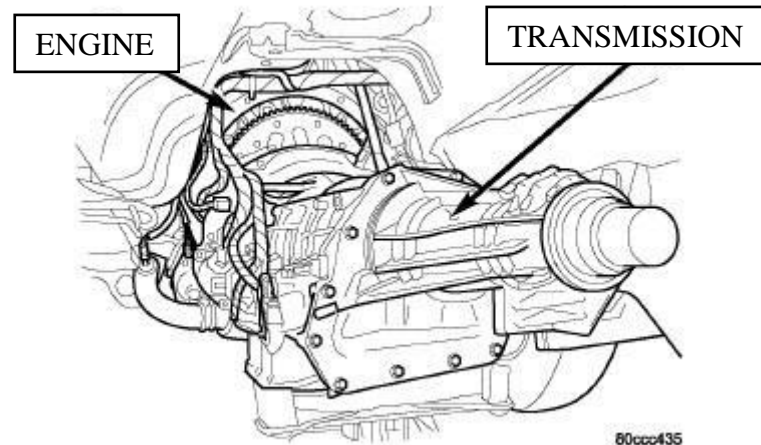
- Mopar ATF +4 is the only recommended oil
- A quick relearn and a reset of CVI's must be performed
- A low speed drive cycle up through the gears must be performed multiple times. No towing and only stock power for 300 miles. See relearn procedure at end of manual.

1. Transfer any components necessary, such as the manual shift lever and shift cable bracket, from the original transmission onto the BD performance transmission.

2. Position transmission on jack and secure it with chains.

3. Check condition of converter driveplate. Replace the plate if cracked, distorted or damaged. A BD flexplate would make a great upgrade.

**4. Also be sure transmission dowel pins are seated in engine block and protrude far enough to hold transmission in alignment.**



5. Apply a light coating of Mopar® High Temp Grease to the torque converter hub pocket in the rear pocket of the engine's crankshaft.

6. Raise transmission and align the torque converter with the drive plate and transmission converter housing with the engine block.

7. Move transmission forward. Then raise, lower or tilt transmission to align the converter housing with engine block dowels while positioning filler tube into the filler tube bore.

8. Carefully work transmission forward and over engine block dowels until converter hub is seated in crankshaft. Verify that no wires, or the transmission vent hose, have become trapped between the engine block and the transmission.

9. Install two bolts to attach the transmission to the engine, and check to ensure the torque converter is still able to rotate.

10. Install remaining torque converter housing to engine bolts. Tighten to 68 N.m (50 ft.lbs.).

11. CAUTION: It is essential that the correct length bolts are used to attach the converter to the flex plate. Bolts that are too long will damage the clutch surface inside the torque converter.

12. Install torque converter-to-driveplate bolts. Tighten bolts to 88 N.m (65ft.lbs).

13. If equipped, Install transfer case. Tighten transfer case nuts to 35 N.m (26 ft.lbs.).

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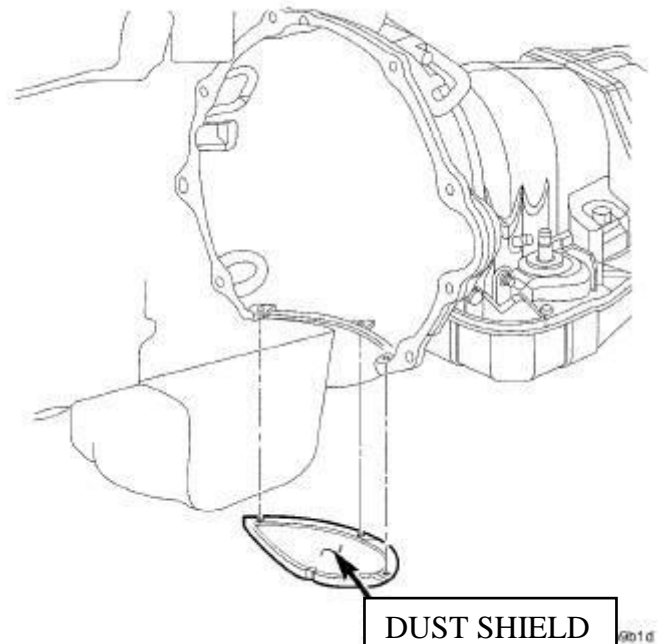
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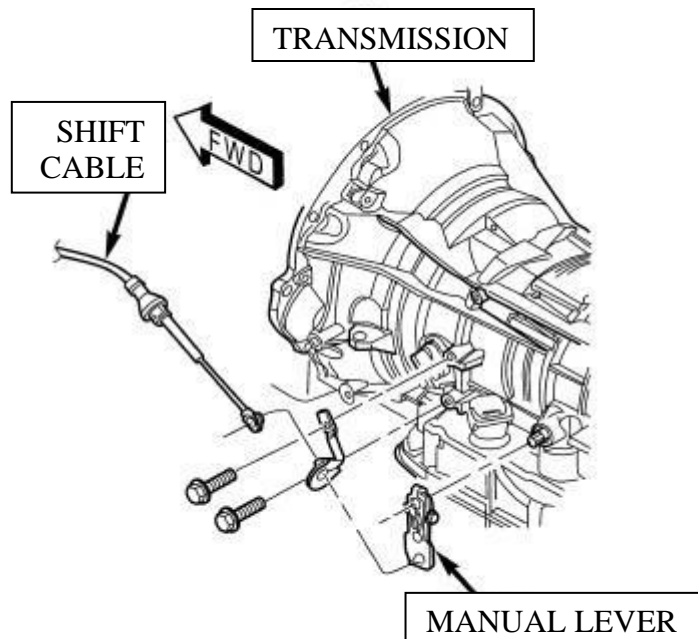
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14. Install rear support to transmission. Tighten bolts to 47 N.m (35 ft.lbs.).
15. Install crossmember.
16. Lower transmission onto crossmember and install bolts attaching transmission mount to crossmember. Tighten clevis bracket to crossmember bolts to 47 N.m (35 ft.lbs.). Tighten the clevis bracket to rear support bolt to 68 N.m (50 ft.lbs.).
17. Remove engine support fixture.
18. Install the transmission inspection cover. Tighten the bolts to 10N.m (88 in.lbs.)
19. Install the right side power bending bracket.

20. Install the transmission dust shield.



21. Connect gearshift cable to transmission.



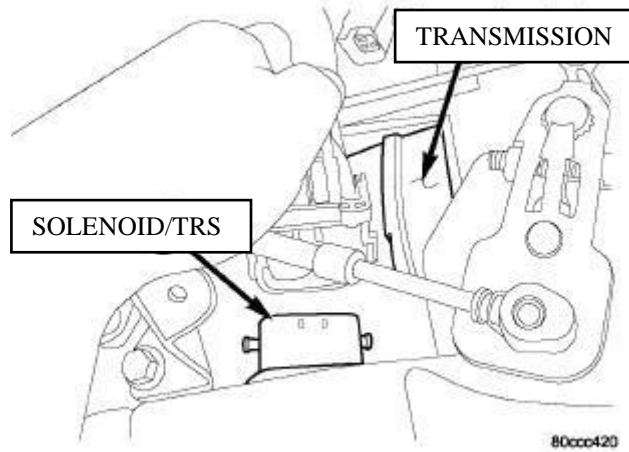
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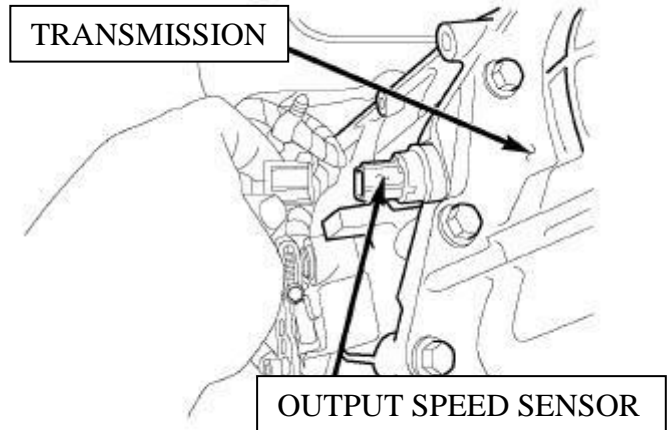
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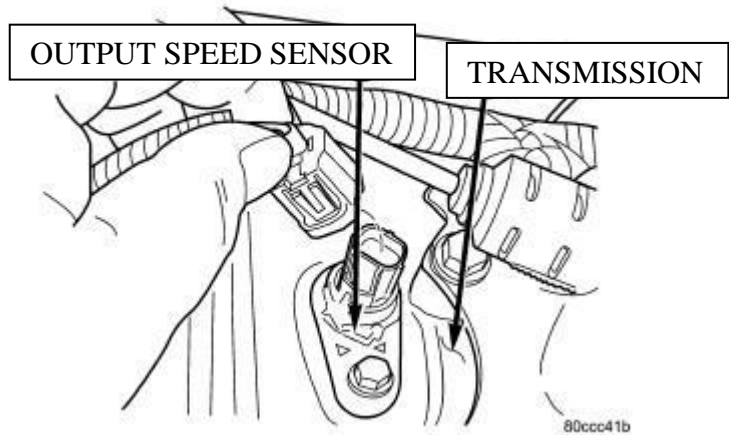
22. Connect wires to solenoid and pressure switch assembly connector.



23. Connect wires to input speed sensor.



24. Connect wires to output speed sensor.



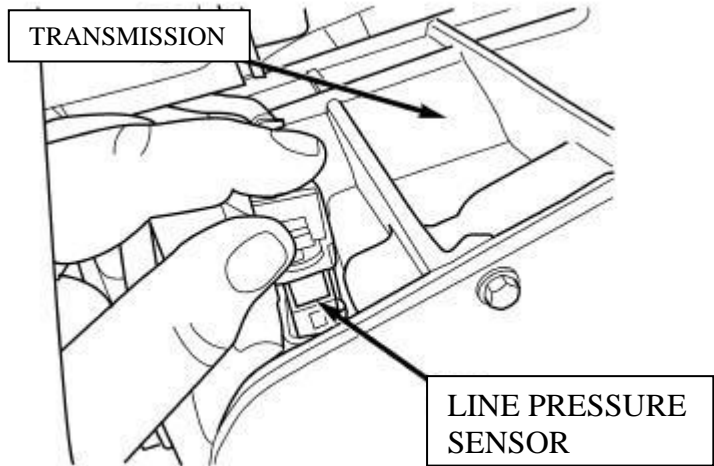
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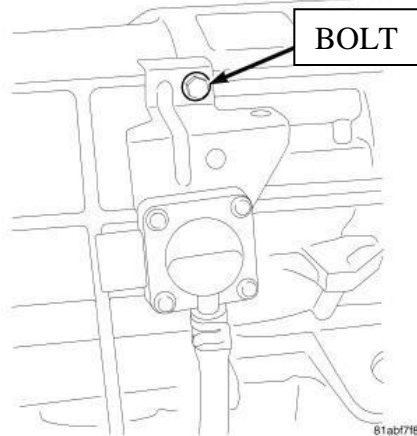
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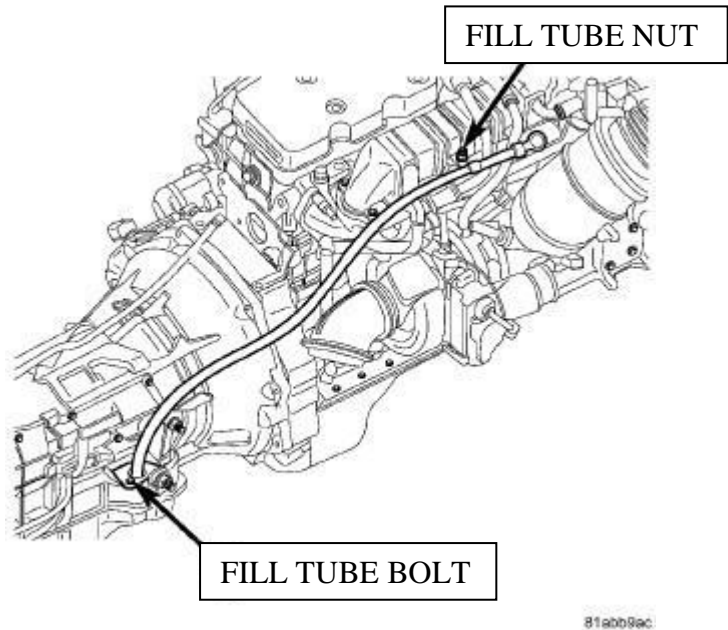
25. Connect wires to line pressure sensor. Be sure transmission harnesses are properly routed.



26. Install the differential pressure sensor bolt (if equipped). Tighten bolt to 10N.m (88 in.lbs.).



- 27. Connect cooler lines to transmission.
- 28. Install transmission fill tube bolt. Tighten bolt to 10N.m (88 in. lbs.)
- 29. Install exhaust components, if necessary.
- 30. Align and connect drive shaft(s).



**Drive Shaft Torque Specs**

Front Axle	28Nm (21ftlbs)
Front T-Case	88Nm (65ftlbs)
Center Bearing Bolts	54Nm (40ftlbs)
Rear Bolts	115Nm(85ftlbs)

31. Adjust gearshift cable if necessary.

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- 32. Disconnect and remove line pressure sensor.
- 33. Install pressure adapter with OE sensor back into transmission, attach 300 PSI liquid filled gauge to pressure adapter.
- 34. Route gauge from under vehicle into cab leaving sufficient clearance to exhaust system and moving parts. Lower vehicle.
- 35. Fill transmission with, Automatic Transmission Fluid. (See table below for suggested amounts).

**NOTE:** Fill capacities listed only as a guide. **Correct fluid level should always be determined by marks on dipstick.** Capacities listed are total system capacity including torque converter and BD pan.

<u>Application</u>	<u>First Fill Quarts (Liters)</u>	<u>Secondary Fill Quarts (Liters) (Includes TC Preload)</u>	<u>Total Capacity (Liters)</u>
2007.5-2012	12 (11.4)	Approx 10 (9.4)	22 (20.8)

- 36. Road test vehicle and verify pressures
- 37. Once Complete lift vehicle and remove gauge and adapter, reinstall line pressure sensor into transmission, re-install any skid plates that were removed previously.
- 38. Lower vehicle and double check fluid level on dipstick.



Transmissions that will include BD's Pressure adapter Kit are:

- ❖ 1064242 & 1064242B
- ❖ 1064244 & 1064244B
- ❖ 1064252 & 1064252B
- ❖ 1064254 & 1064254B

***This Pressure adapter kit must remain with the vehicle at all times.***

<b>Mainline Pressures</b>		
	<b>At Idle</b>	<b>Wide Open Throttle</b>
68 RFE	110-150 psi	250 psi

**NOTE:** Mainline pressures will see a large gauge sweep in neutral at idle when the transmission is first installed and learning. **The wide open throttle reading should only be taken after the drive learn.** This reading is easily achieved by cruising in 5<sup>th</sup> or 6<sup>th</sup> gear with torque converter locked up and accelerating hard for a couple of seconds.



***In order to complete the transmission installation the Line Pressure Module (1030369) provided with this kit will need to be installed. Please follow the instructions that come with the module kit.***

## **INSTALLATION VERIFICATIONS**

At this time you can check the transmission cooler outlet flow rate. At idle it should be a minimum of 1.5 GPM. You can use a clean bucket to drain into for this test. If it does not meet this requirement you will need to replace your cooler and check valve assembly.

### **IMPORTANT**

You must perform a transmission quick learn, in order for the TCM to recalibrate to the new CVI indexes. This can be accomplished with a newer scan tool.

**The drive learn procedure must be performed should any of the following repairs are applied on the vehicle.**

- 1) Transmission Replacement**
- 2) Transmission Control Module Replacement (TCM)**
- 3) Solenoid Pack Replacement**
- 4) Clutch Plate and/or Seal Replacement**
- 5) Valve Body Replacement or Recondition**
- 6) Torque Converter Replacement**
- 7) Battery Disconnect or Replacement**
- 8) Power Upgrade or Flash Programmer Installation and/or Updates.**

### **68RFE Transmission Learn Procedure**

Once the transmission is installed and full of fluid a scan tool must be connected. The first step is to locate the TCM or ECM Reset and complete the test. Next locate the Clutch Fill Volume Index (CVI) values in the data section of the Transmission Control Module (TCM). This data is in the Powertrain Control Module (PCM) on 2010-12 models. Record these values on the data sheet provided. Next a Quick Learn will need to be performed. This test will be located in the MISC section of the TCM or PCM. After the Quick Learn has completed, the CVI values will need to be recorded again. Now you are ready for the initial test drive. It is imperative on this test drive not to accelerate aggressively. Bring the vehicle up to normal operating temperature. Try to locate a long level stretch of road with very little to no traffic. To initiate the first part of the drive learn bring the vehicle to a complete stop, place the transmission into reverse gear for 2-3 seconds and then back into drive. While watching throttle percentage accelerate holding a 15 degree throttle angle through the 1-2, 2-3 and 3-4 upshifts and bring the vehicle back to a stop. Now repeat the acceleration and upshift procedure at least 2-4 times before the next reverse or park gear selection. This complete procedure needs to be repeated until the CVI values stabilize (stop changing during shifts). When the CVI values have stabilized the drive learn can process is now ready for some heavier throttle upshifts. The vehicle should be accelerated from a stop at a 30 degree throttle angle through all gears to verify quick clean shifts. **If any stumble, chatter, clunking is felt repeat the initial drive learn test again**

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**to restablize the CVI values.** When upshifts are feeling quick and crisp the vehicle can be accelerated at a higher and higher throttle percentage through all gears until 50-60 percent throttle is reached. **If at any time the transmission upshifts become irregular initial drive learn procedure will need to be applied.**

After the drive learn is complete and the transmission is shifting correctly a final recording of the CVI values should be entered on to data sheet provided. As well any particularly objectionable shifts can be fine tuned by following the applicable procedure below.

At this time vehicle can be released to customer to complete break in period.

**NOTE: It is not necessary to perform the complete Drive Learn procedure every time the TCM is Quick Learned. Perform only the portions which target the objectionable shift.**

#### **LEARN A SMOOTH 1ST NEUTRAL TO DRIVE SHIFT**

Perform this procedure only if the complaint is for a delayed or harsh shift the first time the transmission is put into gear after the vehicle is allowed to set with the engine not running for at least 10 minutes. Use the following steps to have the TCM learn the 1st N-D UD CVI.

**NOTE: The transmission oil temperature must be between 80 - 110°F (27 - 43°C).**

1. Start the engine only when the engine and ignition have been off for at least ten (10)minutes.
2. With the vehicle at a stop and the service brake applied, record the 1st N-D UD CVI while performing a Neutral to Drive shift. The 1st N-D UD CVI accounts for air entrapment in the UD clutch that may occur after the engine has been off for a period of time.
3. Repeat 1 and 2 until the recorded 1st N-D UD CVI value stabilizes.

**NOTE: It is important that this procedure be performed when the transmission temperature is between 80 - 110°F (27 - 43°C). If this procedure takes too long to complete fully for the allowed transmission oil temperature, the vehicle may be returned to the customer with an explanation that the shift will improve daily during normal vehicle usage. The TCM also learns at higher oil temperatures, but these values (line pressure correction values) are not available for viewing on the scan tool.**

#### **LEARN A SMOOTH NEUTRAL TO DRIVE GARAGE SHIFT**

Perform this procedure if the complaint is for a delayed or harsh shift when the transmission is put into gear after the vehicle has had its first shift. Use the following steps to have the TCM learn the Norm N-D UD CVI.

**NOTE: The transmission oil temperature must be between 80 - 110°F (27 - 43°C) to learn the UD CVI. Additional learning occurs at temperatures as low as 0°F and as high as 200°F. This procedure may be performed at any temperature that experiences poor shift quality. Although the UD CVI may not change, shift quality should improve.**

1. Start the vehicle engine and shift to drive.
2. Move the vehicle forward to a speed of at least 16 km/h (10 MPH) and come to a stop. This ensures no air is present in the UD hydraulic circuit.
3. Perform repeated N-D shifts at a stop while pausing in Neutral for at least 2-3 seconds and monitor Norm N-D UD CVI volume until the value stabilizes. The value will change during the N-D shift. This

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is normal since the UD value is different for the N-D shift then the normal value shown which is used for 4-3 coastdown and kickdowns. Perform repeated shifts in this temperature range until the Norm N-D UD CVI value stabilizes and the N-D shifts become smooth.

### LEARN THE 1ST 2-3 SHIFT AFTER A RESTART OR SHIFT TO REVERSE

Use the following steps to have the TCM learn the 1st 2-3 shift OD CVI.

**NOTE: The transmission oil temperature must be above 80°F (27°C).**

1. With the vehicle engine running, select reverse gear for over 2 seconds.
2. Shift the transmission to Drive and accelerate the vehicle from a stop at a steady 15 degree throttle opening and perform a 2-3 shift while noting the 1st 2-3 OD CVI.
3. Shift the transmission to Drive and accelerate the vehicle from a stop at a steady 15 degree throttle opening and perform a 2-3 shift while noting the 1st 2-3 OD CVI.
4. Repeat 1 and 2 until the 1st 2-3 upshift becomes smooth and the 1st 2-3 OD CVI stabilizes.
- 5.

### LEARN A SMOOTH 2-3 AND 3-4 UPSHIFT

**NOTE: The transmission oil temperature must be above 110°F (43°C).**

Use the following steps to have the TCM learn the OD and 4C CVI's.

1. Accelerate the vehicle from a stop at a steady 15 degree throttle opening and perform multiple 1-2, 2-3, and 3-4 upshifts. The 2nd 2-3 shift following a restart or shift to reverse will be shown during the shift as a value between the 1st 2-3 OD CVI and the normal OD CVI. Updates to the normal OD CVI will occur after the 2nd shift into 3rd gear, following a restart or shift to reverse.
2. Repeat 1 until the 2-3 and 3-4 shifts become smooth and the OD and 4C CVI become stable.

### LEARN A SMOOTH 4-3 COASTDOWN AND PART THROTTLE 4-3 KICKDOWN

**NOTE: The transmission oil temperature must be above 110°F (43°C).**

Use the following steps to have the TCM learn the UD shift volume.

1. At a vehicle speed between 64-97 km/h (40-60 MPH), perform repeated 4-3 kickdown shifts.
2. Repeat 1 until the UD volume becomes somewhat stable and the shift becomes smooth.

### LEARN A SMOOTH 1-2 UPSHIFT AND 3-2 KICKDOWN

Use the following steps to have the TCM learn the 2C shift volume.

**NOTE: The transmission oil temperature must be above 110°F (43°C).**

1. With a vehicle speed below 48 km/h (30 MPH) and the transmission in 3rd gear, perform multiple 3-2 kickdowns.

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2. Repeat 1 until the 3-2 kickdowns become smooth and the 2C CVI becomes stable.

### LEARN A SMOOTH MANUAL 2-1 PULLDOWN SHIFT AS WELL AS A NEUTRAL TO REVERSE SHIFT

**NOTE: The transmission oil temperature must be above 110°F (43°C).**

Use the following steps to have the TCM learn the LR volume.

1. With the vehicle speed around 40-48 km/h (25-30 MPH) in Manual 2nd, perform manual pulldowns to Low or 1st gear at closed throttle.
2. Repeat 1 until the LR CVI becomes stable and the manual 2-1 becomes smooth.

### LEARN A SMOOTH NEUTRAL TO REVERSE SHIFT

**NOTE: The transmission oil temperature must be above 110°F (43°C).**

1. With the vehicle at a stop, perform Neutral to Reverse shifts until the shift is smooth. An unlearned Neutral to Reverse shift may be harsh or exhibit a double bump.
2. If any of the shifts are still not smooth after the clutch volume stabilizes, an internal transmission problem may be present.

### LEARN A SMOOTH 4-5 UPSHIFT

**NOTE: The transmission oil temperature must be above 110°F (43°C).**

Use the following steps to have the TCM learn the Alt 2C CVI.

1. Accelerate the vehicle through 88 km/h (55mph) at a steady 10-15 degree throttle opening and perform multiple 4-5 upshifts.

Repeat 1 until the 4-5 shift become smooth and the Alt 2C CVI become stable. There is a separate 2C volume used and learned for 4-5 shifts, 2CA. It is independent of the 2C CVI learned on 3-2 kickdowns.

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