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BD TorqShift 6 (6R140)

	Year Range	Transmission Only	Transmission + Torque Converter
TORQUEMASTER TRANSMISSION (700HP)	2011-2016	1064504B	1064504BM
	2017-2019	1064514B	1064514BM
TOWMASTER TRANSMISSION (600HP)	2011-2016	1064504	1064504SS
	2017-2019	1064514	1064514SS
ROADMASTER TRANSMISSION (500HP)	2011-2016	1064524	1064524SS
	2017-2019	1064534	1064514SS

****Installer Note** - Ford™ I.D.S Required for this Installation**

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Introduction

BD's RoadMaster transmission is a stock clutch count transmission. It comes with a pressure controller capable of increasing hydraulic line pressure up to 300psi to increase clutch holding capability.

BD's TowMaster transmission increases transmission clutch count in the critical areas using BD's patented interlocking pressure plate kit. These special pressure plates increase clutch count without machining down the OEM plates ensuring no compromise in strength. It comes with a pressure controller capable of increasing hydraulic line pressure up to 300psi to increase clutch holding capability.

BD's TorqueMaster transmission boasts the same increased clutch count, interlocking pressure plates and pressure increase as in the TowMaster transmission but also includes a billet intermediate shaft and OD hub as well as a tig-welded upgraded input shaft. The 6R140 TorqueMaster is the only transmission in this lineup to receive the ProForce 4D billet torque converter boasting an impressive 4 clutch discs!

Important note

If your truck came equipped with an 8 bolt flexplate (2011-Early 2012), you will need to purchase a new 6 bolt flexplate. BD #1041245 or from Ford. Otherwise this transmission will **NOT** fit.

A **Ford IDS scan-tool** is **required** for proper installation of this transmission. The scan-tool is used to enter the new solenoid strategy/transmission characteristic code provided with the transmission, TCM KAM Reset, TCM Adaptive Table Reset, and initiate a re-learn. See **steps 45-49**, failure to follow these steps will void the warranty.

Special Tools

- Ford tool #307-346 (Optional)
- Ford IDS Scan-tool (**Required**)

Service Information

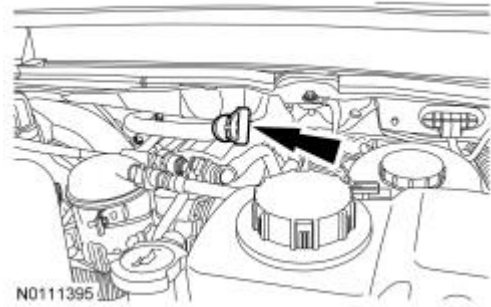
BD Diesel recommends installing OE Ford filter when servicing the 6R140 transmission. **NOTE:** Some customers have reported aftermarket filter failures that cause a fluid flow restriction and an audible pump whine.

Removal/Installation

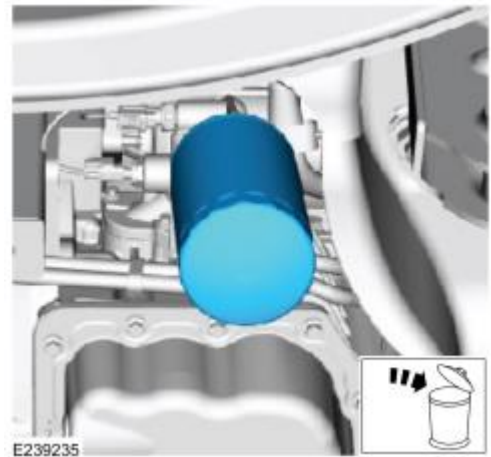
Disconnect both vehicle batteries before installation for safety.

Removal

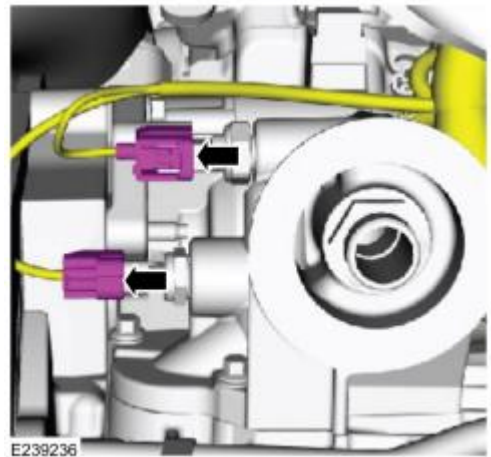
1. With the vehicle in NEUTRAL, position it on a hoist.
2. Remove the transmission fluid level indicator.



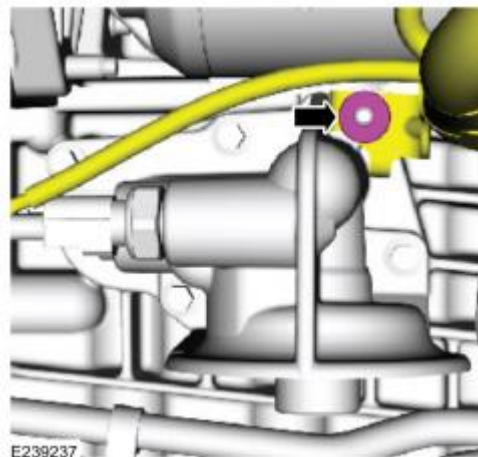
3. Remove and discard the oil filter.



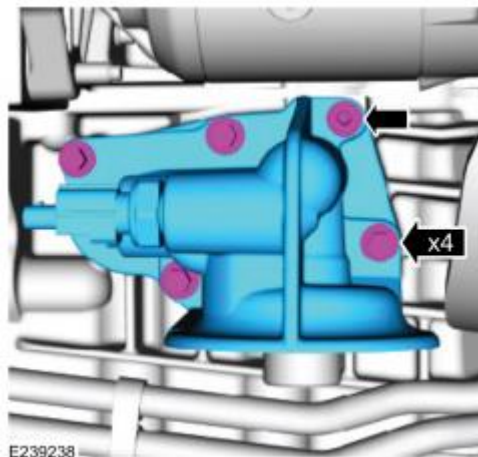
4. Disconnect the oil temperature sensor and oil pressure switch electrical connectors.



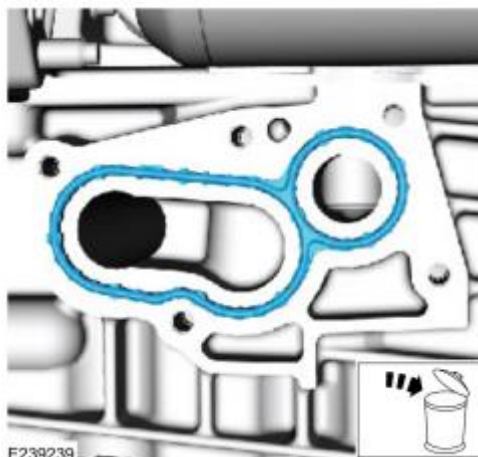
5. Remove the wiring harness bracket nut and position the wiring harness aside.



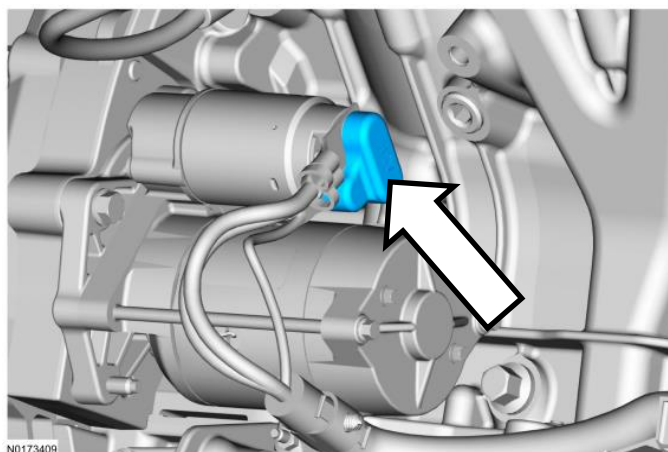
6. Remove the stud bolt, the bolts and the oil filter adapter.



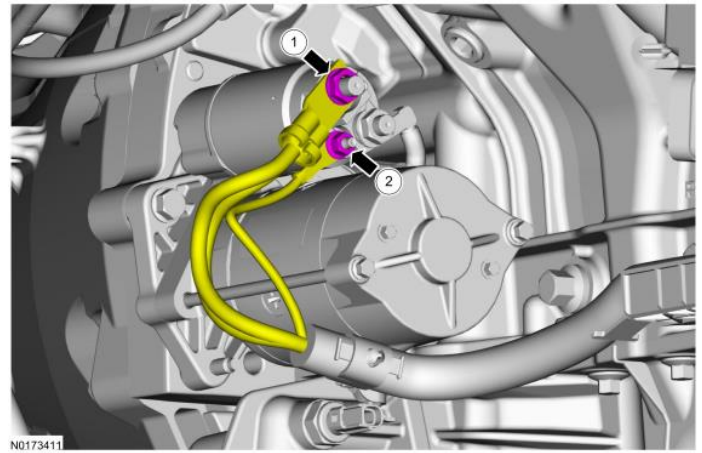
7. Remove and discard the gasket.



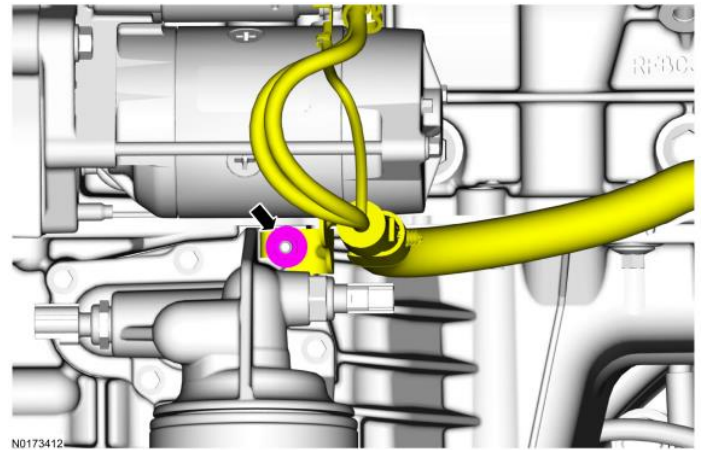
8. Remove the starter motor cable cap.



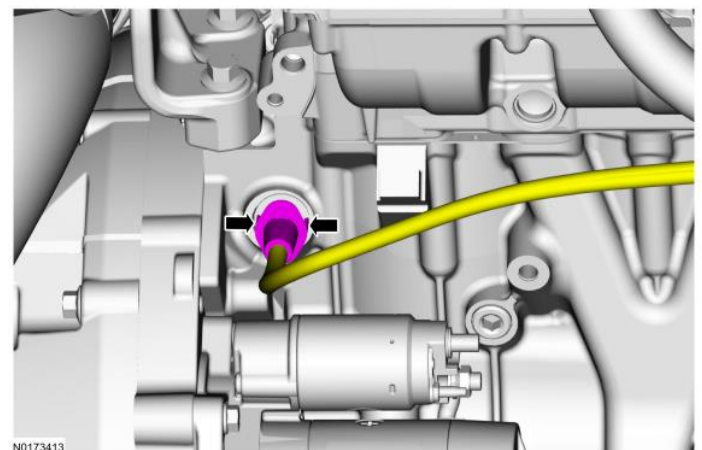
9. Remove the nut and disconnect the starter motor solenoid battery cable.
10. Remove the nut and disconnect the starter motor solenoid control wire.



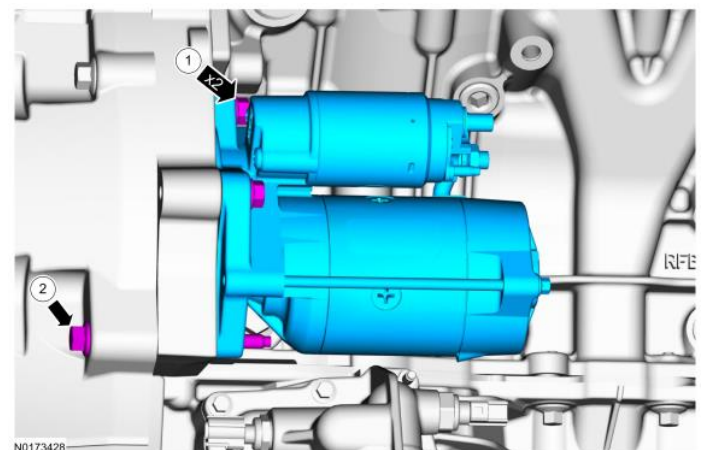
11. Remove the nut and position the wiring harness aside.



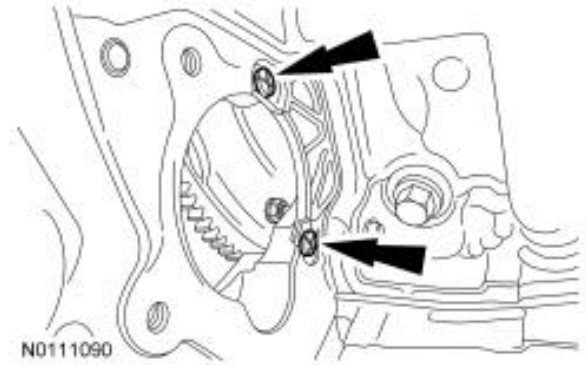
12. If equipped, disconnect the block heater cord.



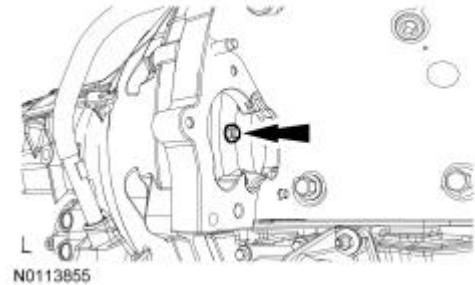
13. Remove the 3 bolts securing the starter and remove the starter.



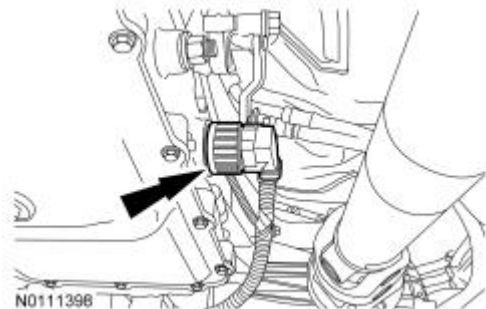
14. Remove the retainers and remove the starter dust shield.



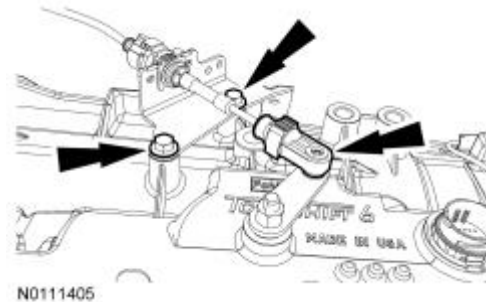
15. Remove and discard the 6 torque converter nuts.
Note: certain models have 8 nuts.



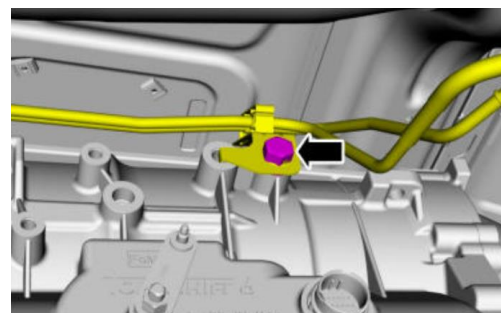
16. Rotate the shell of transmission vehicle harness connector counterclockwise and disconnect the transmission vehicle harness connector.



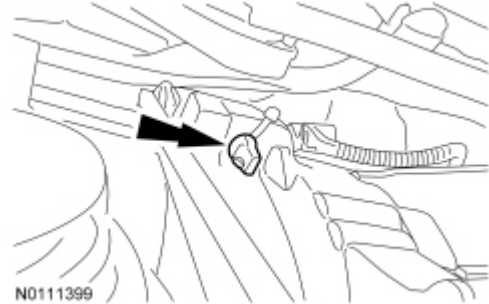
17. Disconnect the selector lever cable end from the manual control lever, remove the 2 bolts and position selector lever cable and bracket aside.



18. For **2017-2019** trucks remove the bolt for the fuel line bracket and position aside.

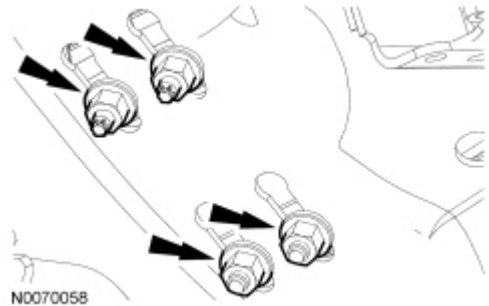


19. Remove the wiring harness retainer from the transmission and position the wiring harness aside.

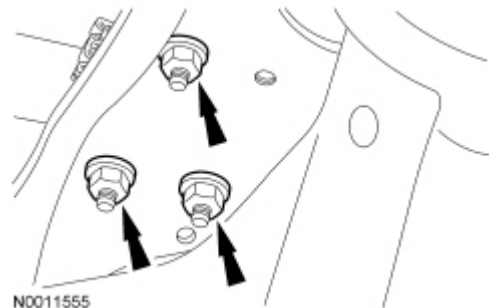


20. Remove the 4 RH engine support insulator nuts.

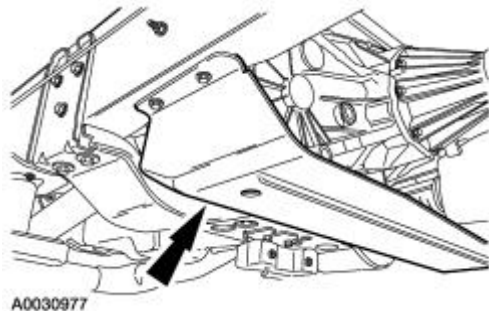
Note: 2017-2019 model year trucks will only have 3.



21. Remove the 3 LH engine support insulator nuts.

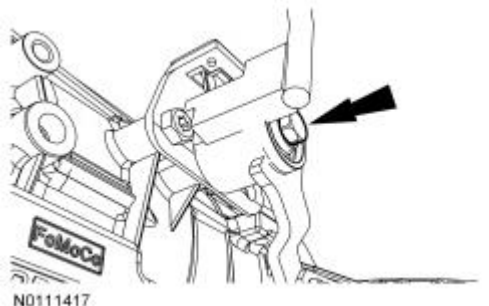


22. Remove the rear driveshaft.
23. If equipped, remove the 4 bolts and skid plate.
24. Index mark the front driveshaft and remove the front driveshaft and position aside.

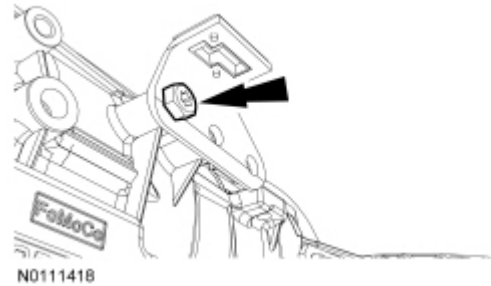


For transmission equipped with a manual shift transfer case follows steps 24-26. Skip ahead otherwise.

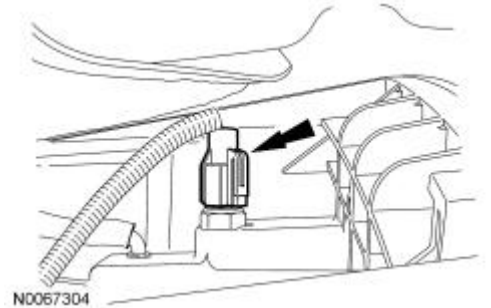
25. remove the transfer case linkage bolt and position the transfer case linkage aside.



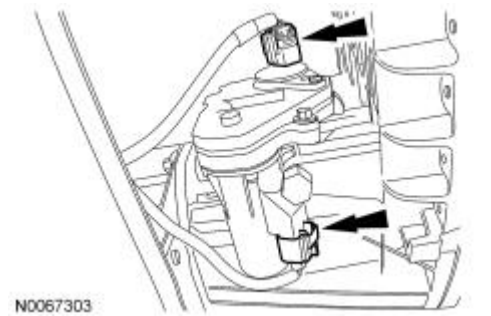
26. Remove the bolt and transfer case linkage bracket.



27. Disconnect the 3-position mode switch electrical connector.



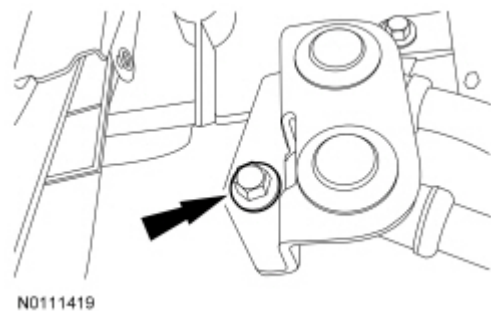
28. For vehicle with electric shift transfer case; disconnect the gearmotor encoder connector and the gearmotor electrical connector.



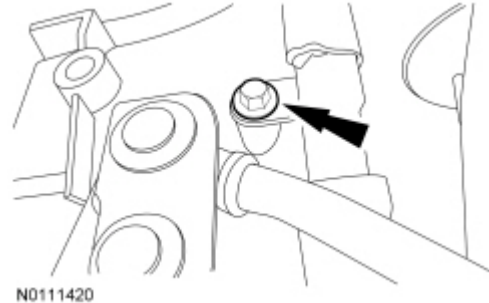
29. Disconnect the vent hose.
30. Remove the transmission support crossmember.
31. Position a suitable high-lift jack to transfer case and secure it.
32. Remove the transfer case bolts. Pull the transfer case rearward and remove from vehicle.



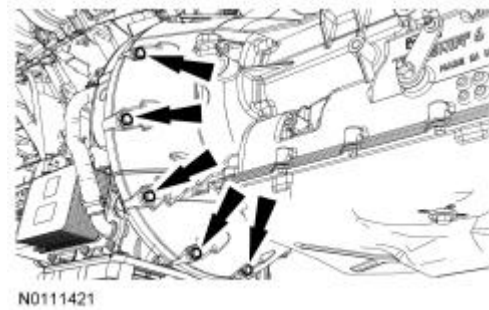
33. Support the transmission with a proper high-lift jack.
34. Remove the bolt and position the transmission fluid cooler tubes aside.



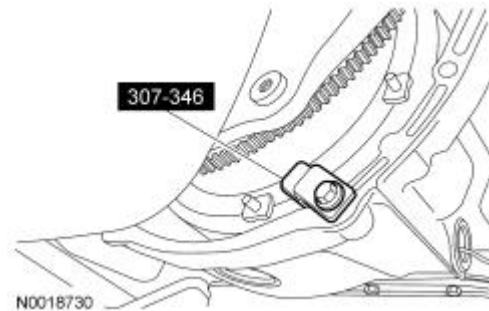
35. Remove the lowers transmission fluid filler tube bolt and position and transmission fluid filler tube aside. Remove and discard the transmission fluid filler tube O-ring.



36. Remove the 11 bolts and remove the transmission from the engine dowel pins.



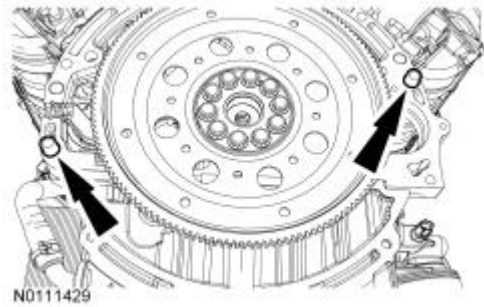
37. Slide the transmission back enough to install the Torque Converter Retainer and remove the transmission.



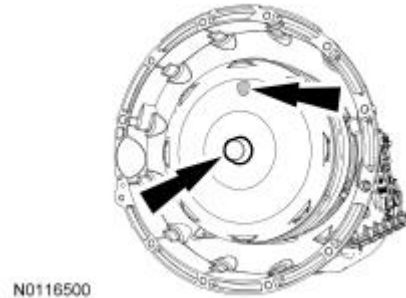
Installation

It is highly recommended to clean and backflush the transmission fluid cooler tubes to prevent future repairs.

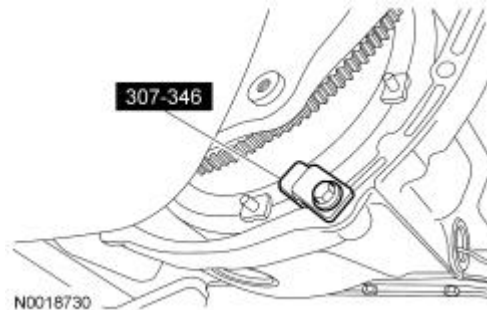
1. Inspect the back of the engine to be sure both dowel pins are in the engine. If the dowel pins are not in the engine, remove the dowel pins from the previous transmission and reinstall into the engine or install new dowel pins.



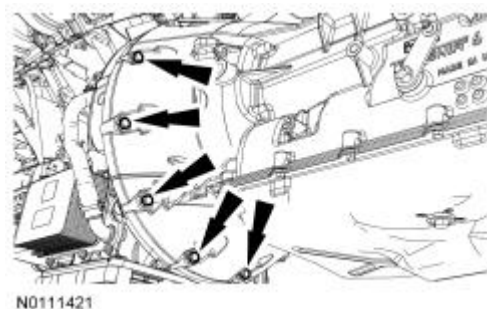
2. Lubricate the torque converter pilot hub with multi-purpose grease and align the paint dot on the torque converter in the 12 o'clock position.



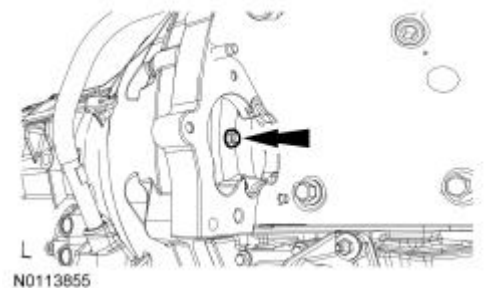
3. Install the Torque Converter Retainer to hold the torque converter in place while moving and positioning the transmission in place. Once the transmission is in place, remove the Torque Converter Retainer.



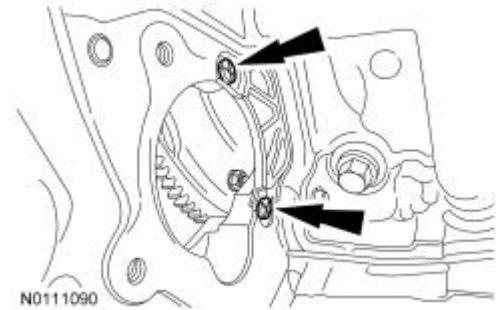
4. Position the transmission on the dowel pins on the back of the engine. Install the 11 bolts. Tighten to 48 Nm (35 ft-lb).



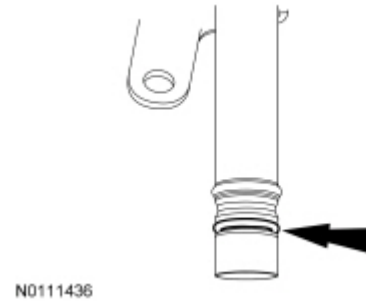
5. Install 6 new torque converter nuts. Tighten to 48 Nm (35 ft-lb).



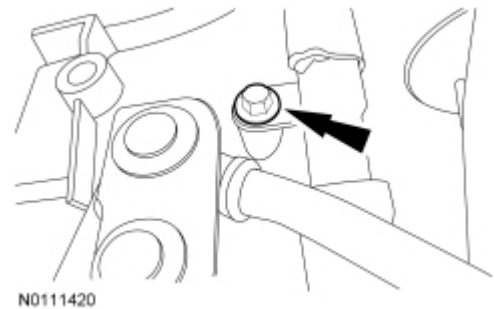
6. Install the starter motor dust shield and install the 2 retainers.



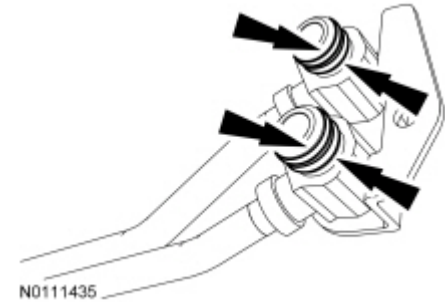
7. Install a new transmission fluid filler tube O-ring. Lubricate it with clean transmission fluid.



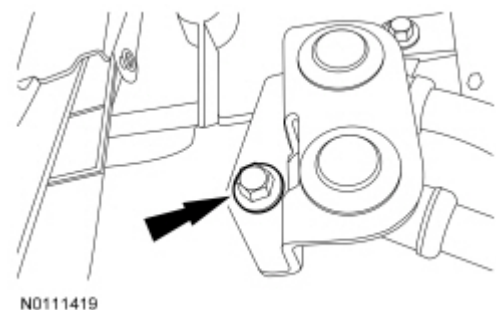
8. Install the transmission fluid filler tube in the transmission and install the lower transmission fluid filler tube bolt. Tighten to 25 Nm (18 ft-lb).



9. Inspect the transmission fluid cooler tube O-rings for damage and install new O-rings as necessary. Lubricate the O-rings with clean transmission fluid.

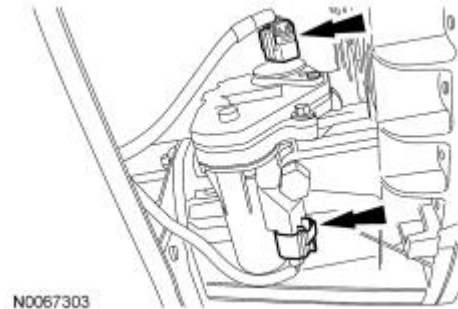


10. Position the transmission fluid cooler tubes in the transmission case and install the bolt. Tighten to 25 Nm (18 ft-lb).

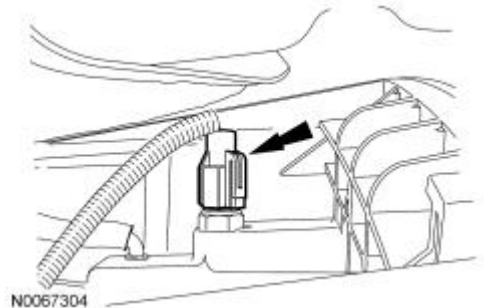


11. Secure the transfer case to a suitable high-lift transmission jack with a safety strap. Position the transfer case to the extension housing.
12. Install the transfer case-to-transmission bolts. Tighten to 55 Nm (40 ft-lb).
13. Lift the transfer case up and install the transmission support crossmember.

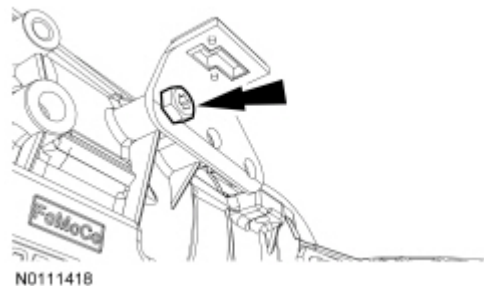
-
14. Vehicles with electric shift transfer case; connect the gearmotor encoder electrical connector and the gearmotor electrical connector.



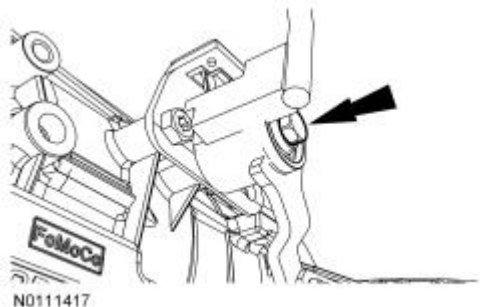
-
- Vehicles with manual shift transfer case do steps 15-18.
15. Vehicles with manual shift transfer case; connect the manual shift linkage to the transmission.
 16. Connect the 3-position mode switch electrical connector.



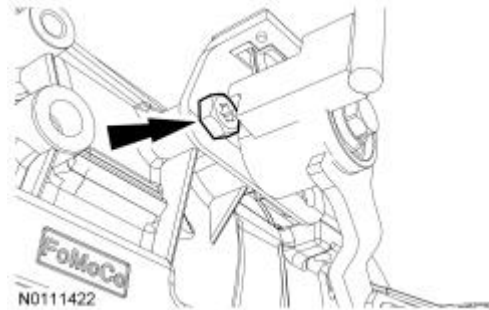
-
17. Position the transfer case linkage bracket and loosely install the bolt.



-
18. Position the transfer case linkage and install the bolt. Tighten to 115 Nm (85 ft-lb).



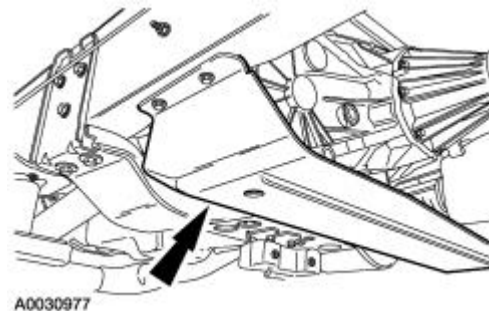
19. Tighten the transfer case linkage bracket bolt to 115 Nm (85 ft-lb).



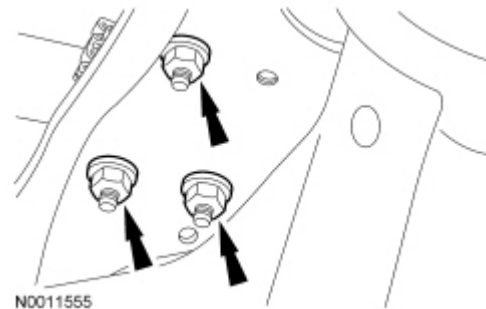
20. Connect the vent hose.
21. Remove the high-lift jack.
22. Install the front driveshaft. Be certain to align the index marks made earlier. Tighten to 111 Nm (82 ft-lb).



23. Install driveshaft.
24. If equipped, install the transfer case skid plate and the 4 bolts. Tighten to 24 Nm (18 ft-lb).

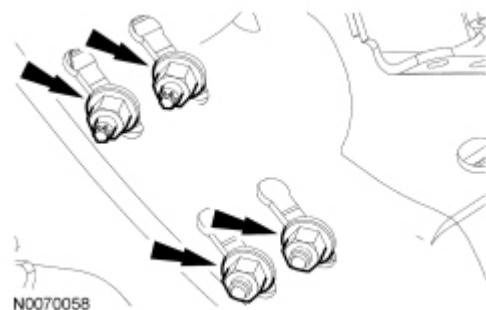


25. Install LH engine support insulator nuts. Tighten to 200 Nm (148 ft-lb).

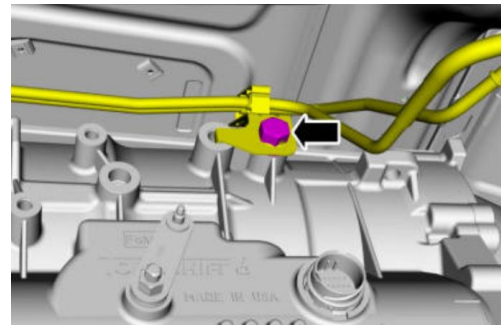


26. Install the 4 RH engine support insulator nuts. Tighten to 115 Nm (85 ft-lb).

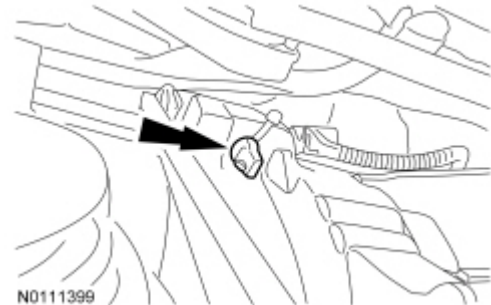
Note: 2017-2019 model year trucks will only have 3.



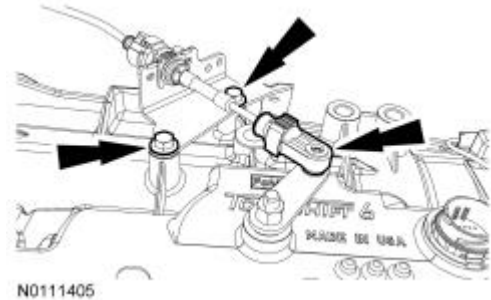
27. For **2017-2019** trucks install the fuel line bracket bolt. Tighten to 85 lb.ft (115 Nm).



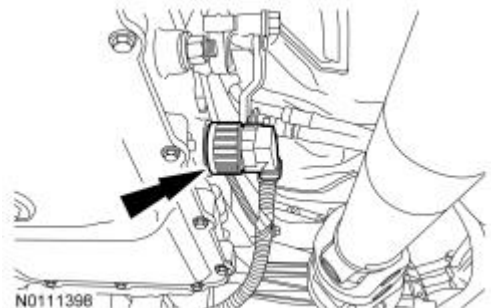
28. Position the wiring harness and install the retainer in the transmission case.



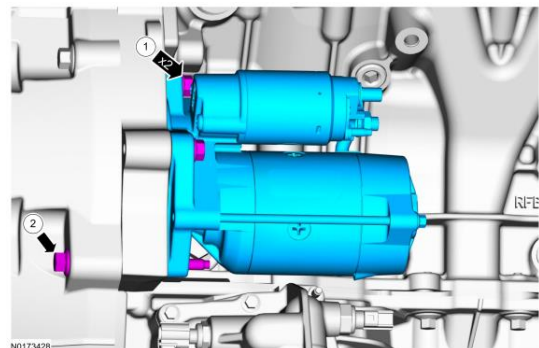
29. Position the selector lever cable bracket and install the 2 bolts. Tighten to 48 Nm (35 ft-lb).



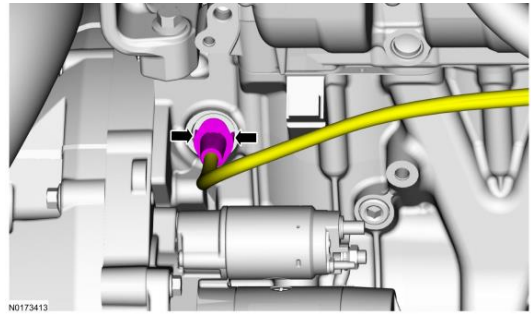
30. Install the transmission vehicle harness connector and lock the transmission vehicle harness connector by rotating the outer shell clockwise.



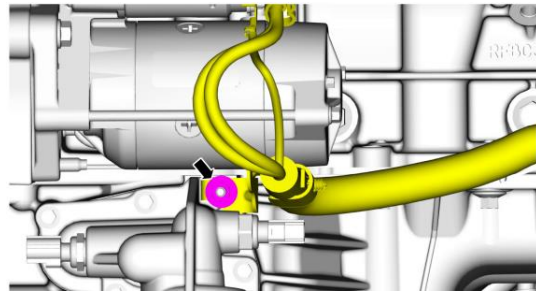
31. Install bolts and tighten to 25 Nm (18 lb-ft).



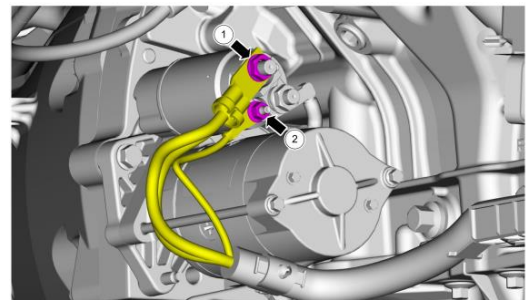
32. If equipped, connect the block heater cord.



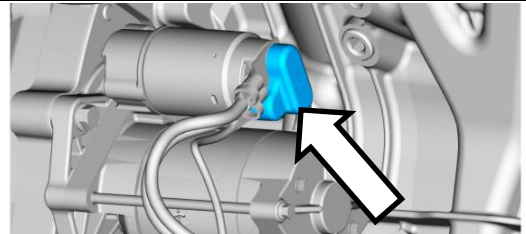
33. Secure the wiring harness and tighten to 12 Nm (106 in-lb).



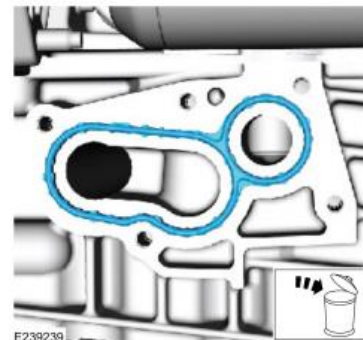
34. Connect the starter motor solenoid control wire (2), Tighten to 5 Nm (44 in-lb)
35. Connect the starter motor battery cable (1). Tighten to 12 Nm (106 in-lb).



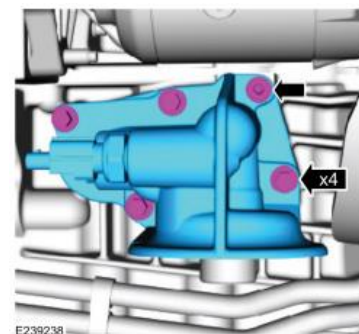
36. Install the starter motor cable cap.



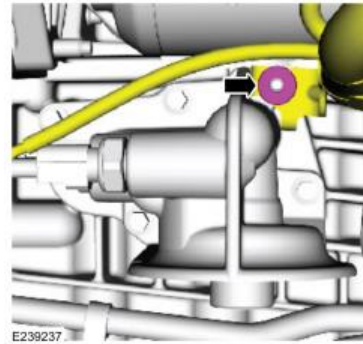
37. Install new gasket.



38. Install oil filter adapter and the bolts and stud bolt. Tighten to 12 Nm (106 in-lb)

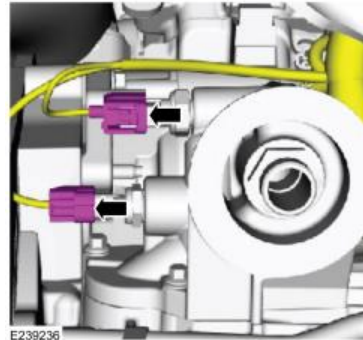


39. Position the wiring harness and install the wiring harness bracket nut. Tighten to 11 Nm (97 in-lb).



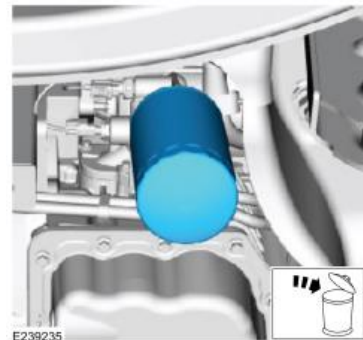
E239237

40. Connect the oil temperature sensor and oil pressure switch electrical connectors.



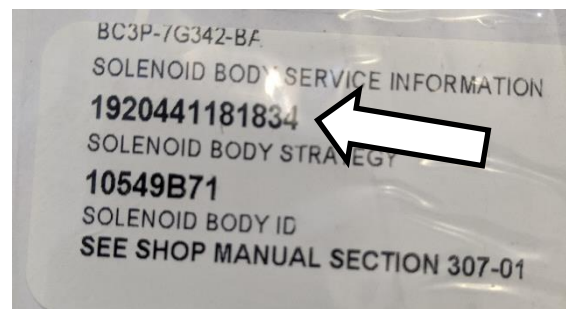
E239236

41. Install new oil filter.



E239235

42. Find the Solenoid Body Strategy code which should be decal that came with the transmission.



43. If the decal is missing. Remove the transmission pan and copy the note from the tag installed onto the valve body.



44. Refill transmission with MERCON LV ATF. Check level before starting the truck and cycling through all gear ranges.

Fill transmission using approximately:

14.2 Quarts: If the drain plug or pan was removed.

16.2 Quarts: If the main control Valve Body was removed.

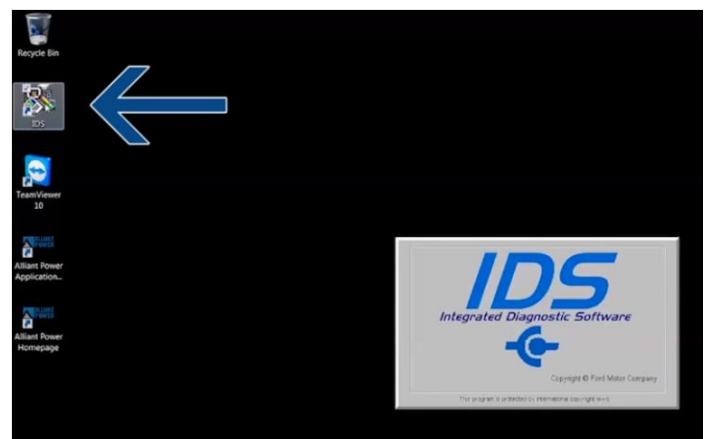
22.2 Quarts: If the transmission was removed and disassembled.

The above fill levels are approximate capacities; **always** use the dipstick to ensure proper fill volumes.

45. Connect a Ford IDS scan-tool by plugging in the on board data cable DVI into the diagnostics port and into the laptop.



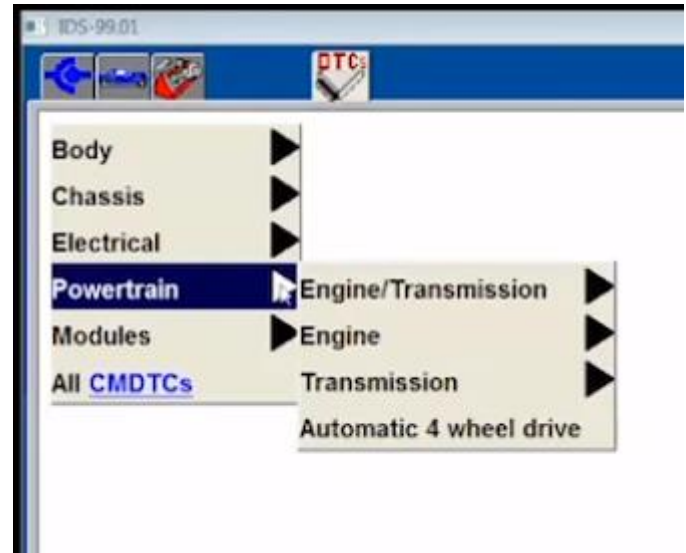
46. Start the IDS program on the laptop.



47. Turn the Key on and input the Vehicle Information and Vehicle Information Number into the IDS Software.
48. Using IDS, open the Portable Diagnostic Software (PDS) and select Module Reprogramming and then Transmission. It will go through a VIN verification process, then will ask you to enter the Transmission Solenoid Body IDN.

49. Next, go into the IDS Toolbox in the top left corner and in the drop-down menu, select Powertrain, then Transmission Reset KAM or right into Reset KAM. Using PDS, choose all Tests & Calibrations and then scroll down the menu and choose Reset TCM KAM.

Note: Reset TCM KAM and Clear Transmission Adaptive Tables are not the same and the Reset TCM KAM is critical. This must be done prior to relearning the Adaptive Tables for the transmission. DO NOT RESET THE PCM KAM.



50. Verify that the transmission fluid temperature is 91°-102°C. If not drive the vehicle until transmission fluid reaches operating temperature 91°-102°C (196°-216°F). Use scan-tool to verify temperature.
51. Apply the park brake with the vehicle on a level surface.
52. With the engine running and the brakes applied, move the selector lever in the following sequence pausing between each position for four seconds. Begin in Neutral, N-R-N-D-R-D-N. Repeat this sequence two additional times.
53. Release the park brake and accelerate at moderate throttle so each shift occurs around 1,500 rpm up to 105 km/h (65 mph). Brake moderately to a stop. Repeat this sequence two additional times.
54. Accelerate at moderate throttle so each shift occurs around 2,250 rpm up to 105 km/h (65 mph). Brake moderately to a stop. Repeat this pattern two additional times.
55. Stop the vehicle and apply the park brake.
56. With the engine running and the brakes applied, move the selector lever in the following sequence pausing between each position for four seconds. Begin in NEUTRAL, N-R-N-D-R-D-N. Repeat this sequence two additional times.
57. Check level again once at operating temperature and add fluid as necessary



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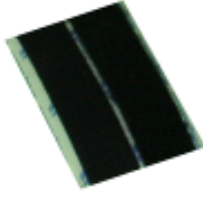



6R140 Pressure Controller

Transmission Line Pressure Booster

1031320	2011-2019 Ford 6.7L Diesel
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Kit Contents

1607276	1607275	FT-10910-03116	1300131
			
Control Module	Wire Harness	Velcro	Tie Wrap
Qty: 1	Qty: 1	Qty: 2 pcs	Qty: 6

Introduction

Ford TorqShift 6R140 transmission uses variable transmission line pressure to trim back line pressure depending on engine load to improve fuel economy and reduce unnecessary work. Unfortunately, it does not supply full line pressure even during wide open throttle operation. Stock transmission line pressure is between 70-170psi depending on load.

This pressure controller kit addresses this by overriding the pressure control solenoid during high engine load operation and delivers full 300psi line pressure to the clutches. This prevents clutch slippage, particularly in high horse power applications.

Operation

The BD control module will automatically activate before 15psi turbo boost at which time it will go to full line pressure. When boost pressure drops back below 10psi it will go back to stock control.

The benefit of this control strategy over a modified solenoid or valve body plug is that the transmission will still run its base pressure at idle and lower load operation. This reduces unnecessary loss in fuel economy and reduces stress on the transmission pump during low load periods but still delivers maximum pressure when its needed.

Installation

Disconnect both vehicle batteries before installation for safety.
Chock tires or position vehicle on a lift for safety before proceeding.

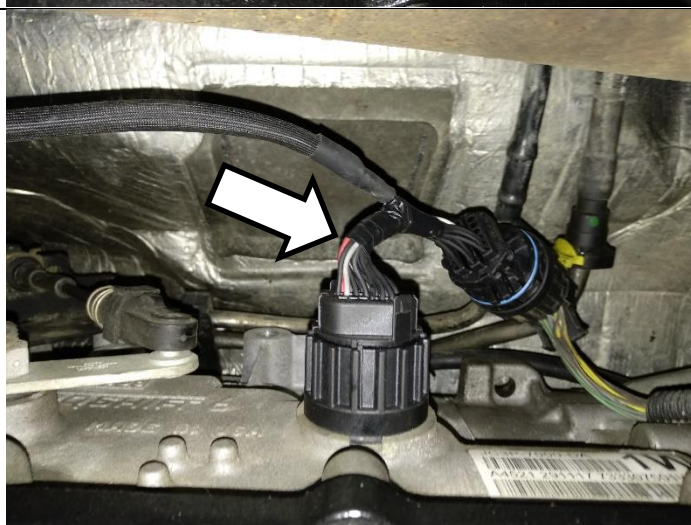
Locate the transmission connector on the supplied BD wiring harness. Feed this connector down from the engine bay towards the transmission.



Under the truck, locate the transmission connector. Rotate the lock ring counter clockwise to release it.

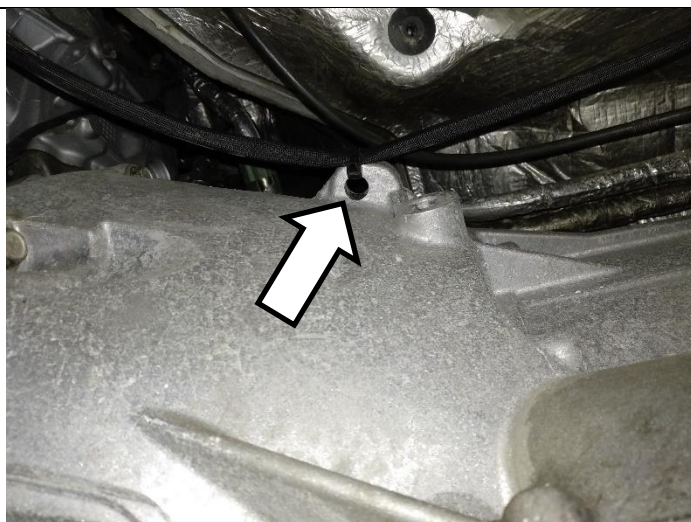


Route the supplied BD harness to the transmission and connect it inline.



Install supplied zip-ties to support the wiring harness between the engine bay and transmission.

IMPORTANT Ensure the harness is well clear of the driveshafts and other moving parts like the shift cable.



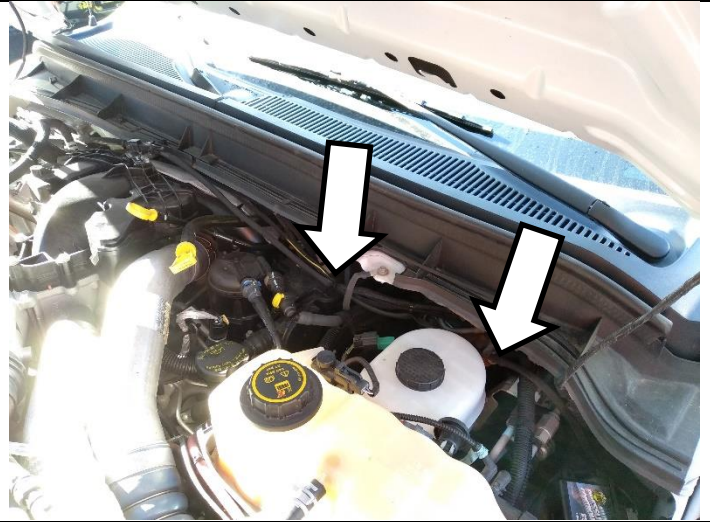
Locate the factory MAP sensor on the top of the intake manifold. Unplug the sensor connector.



Plug the supplied wiring harness MAP sensor connector inline.



Install supplied zip-ties to support the wiring harness.



Plug the module into the wiring harness and tie up extra wire slack.



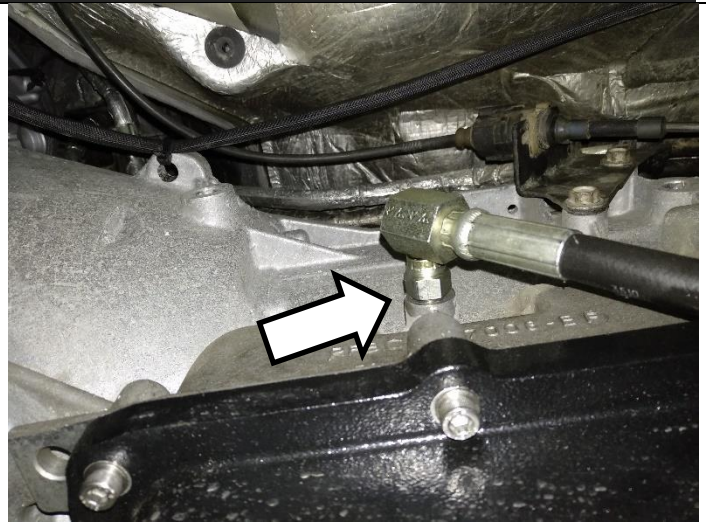
Use the supplied Velcro or use zip-ties to mount the module in the desired location.

Shown here adhered to the fuse box with Velcro.



Pressure Verification (Optional)

To verify operation, you may install a pressure gauge into the transmission. There is a pressure test port on the driver side of the transmission. It is a M10 o-ring boss seal.



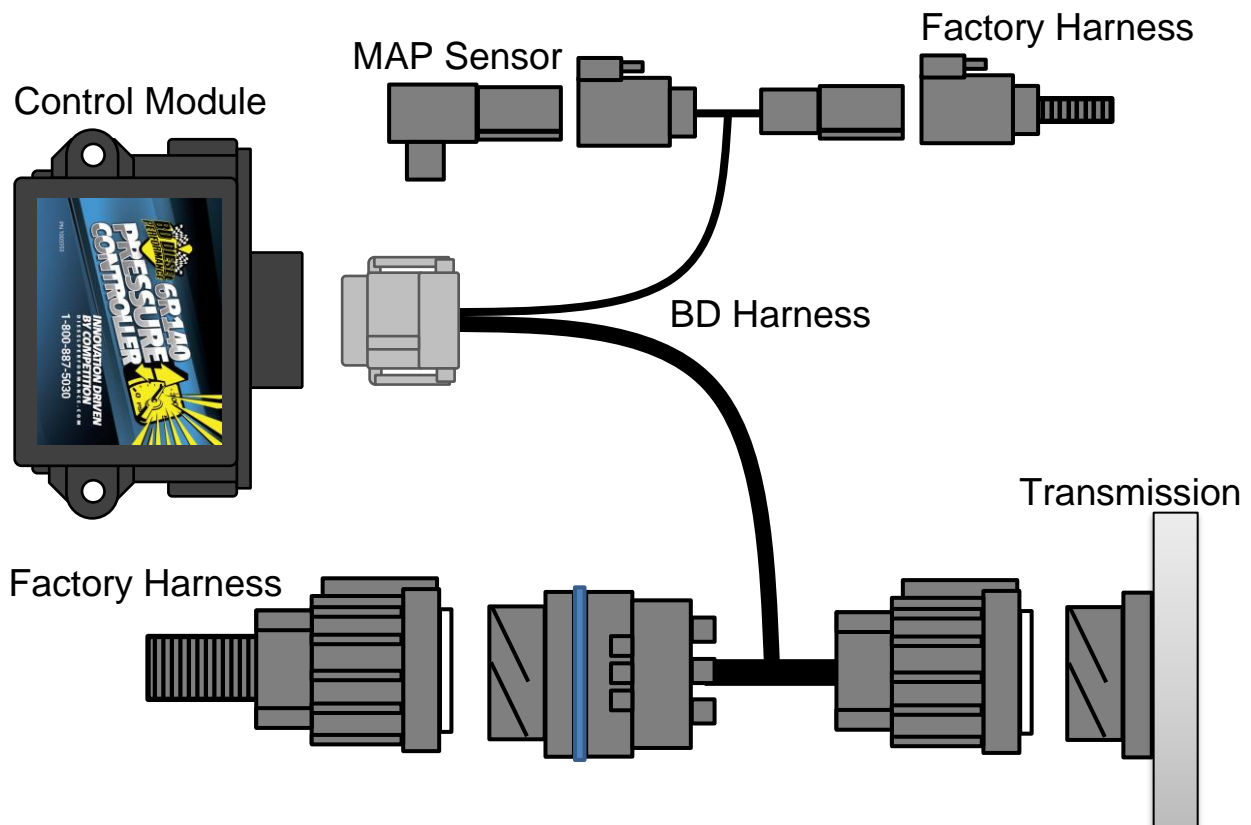
Stock pressure will range between approx. 70-170psi. With the BD kit installed the pressure is boosted up to 300 psi at higher engine load (15 psi+ turbo boost).



Troubleshooting

TCM Fault Code	Check for pushed out/bent pins at transmission connector. Module must be plugged in to harness otherwise fault codes will be set.
MAP sensor fault code	Check for pushed out/bent pins at MAP sensor connector of BD harness.
Pressure only operating in stock range	No MAP sensor signal to module. Open module, check the ACTIVE LED is illuminating when over 15psi boost. Confirm MAP sensor wire from BD harness has been plugged into the MAP sensor.
Pressure is always at maximum	Open module, check if the ACTIVE LED is lit. If the LED is lit all the time check for a short to power on the green MAP sensor wire. Confirm pinout of MAP sensor connector.

Wiring Layout



Pressure Indicator LED

An indicator LED BD 1031319 (not supplied) can also be added to show when line pressure boosting is active. This will light up whenever the PCS solenoid is being controlled.



Gray Plug

- 10 – RED - 12V for Pressure Light
- 11 – BLK - Ground for Pressure Light