



INSTALLATION

ENGINE

Special Tool(s)

ENGINE INSTALLATION SPECIAL TOOL REFERENCE CHART

 <p>ST3101-A</p>	<p>Bar, Engine Spreader 303-1454</p>
 <p>ST1377-A</p>	<p>Lifting Bracket, Engine 303-F047 (014-00073) or equivalent</p>
	<p>Lift Eye, Right Front 303-1566</p>



ST3265-A



ST1341-A

2,200# Floor Crane, Floor Crane
300-OTC1819E or equivalent



ST2834-A

Vehicle Communication Module (VCM) and Integrated Diagnostic System (IDS) software with appropriate hardware, or equivalent scan tool

Material

ENGINE INSTALLATION MATERIAL SPECIFICATIONS CHART

Item	Specification
Motorcraft® SAE 5W-30 Premium Synthetic Blend Motor Oil (US); Motorcraft® SAE 5W-30 Super Premium Motor Oil (Canada) XO-5W30-QSP (US); CXO-5W30-LSP12 (Canada)	WSSM2C946-A
Multi-Purpose Grease XG-4 and/or XL-5	ESB-M1C93-B
Threadlock 262 TA-26	WSKM2G351-A6

WARNING: Do not smoke, carry lighted tobacco or have an open flame of any type when working on or near any fuel-related component. Highly flammable mixtures are always present and may be ignited. Failure to follow these instructions may result in serious personal injury.

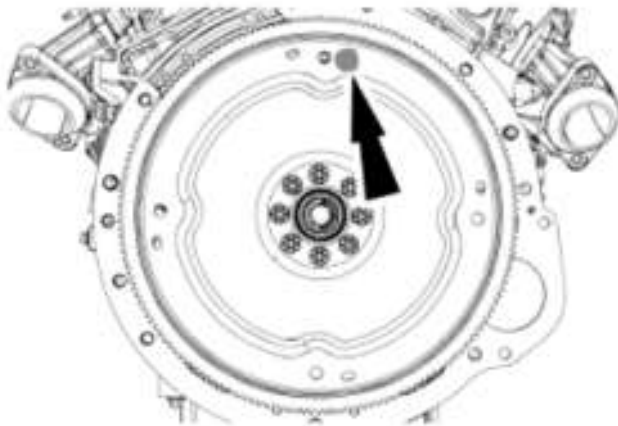
NOTE: Prior to installation of the engine, the torque converter pilot hub must be lubricated with multi-purpose grease or damage to the torque converter or the engine crankshaft can occur



N0105960

Fig. 856: Locating Torque Converter Pilot Hub
Courtesy of FORD MOTOR CO.

1. Lubricate the torque converter pilot hub with multi-purpose grease.
2. Align the torque converter stud and flexplate hole near the paint marks at the 12 o'clock position.



N0121664

Fig. 857: Locating Torque Converter Stud And Flexplate Hole
Courtesy of FORD MOTOR CO.

3. Using the Floor Crane and Engine Spreader Bar, position the engine in the engine compartment.



Fig. 858: Lifting Engine Using Floor Crane And Engine Spreader Bar Assembly
Courtesy of FORD MOTOR CO.

NOTE: The transmission wiring harness is part of the engine wiring harness.

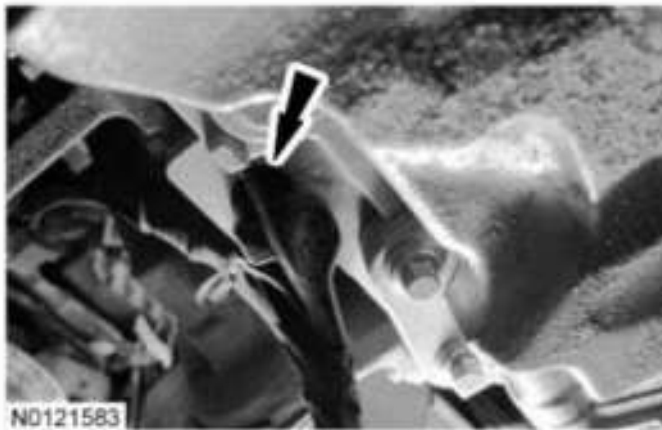


Fig. 859: Locating Generator Wiring Harness Retainer
Courtesy of FORD MOTOR CO.

4. Attach the generator wiring harness retainer to the lower LH side of the engine block.
 - Position the transmission wiring harness along the side of the transmission for installation.
5. Using the Floor Crane and Engine Spreader Bar, position the engine to the transmission.



Fig. 860: Lifting Engine Using Floor Crane And Engine Spreader Bar Assembly
Courtesy of FORD MOTOR CO.

6. Align the engine to the transmission and install the 2 LH bellhousing-to-oil pan bolts.
 - Tighten to 48 Nm (35 lb-ft).

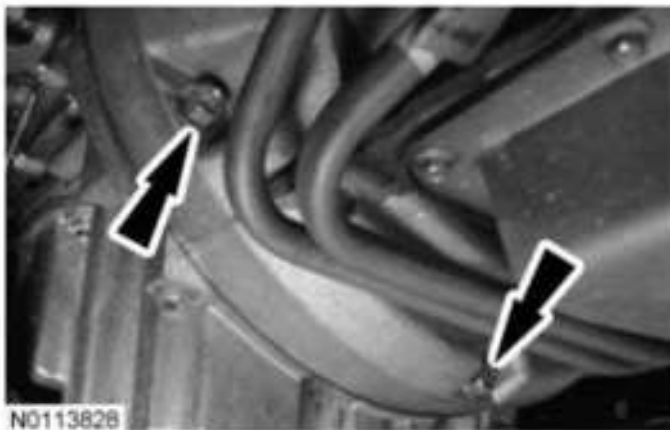


Fig. 861: Locating Bellhousing-To-Oil Pan Bolts
Courtesy of FORD MOTOR CO.

7. Using the Floor Crane and Engine Spreader Bar, raise the engine for clearance for the LH engine support insulator.



Fig. 862: Lifting Engine Using Floor Crane And Engine Spreader Bar Assembly
Courtesy of FORD MOTOR CO.

NOTE: Use only hand tools when installing the LH engine support insulator through bolt or the engine support insulator may be damaged.

NOTE: Clean the LH and RH engine support insulator-to-frame mating surfaces of any dirt or foreign material prior to installation.

NOTE: Apply threadlock to the bolt threads prior to installation.

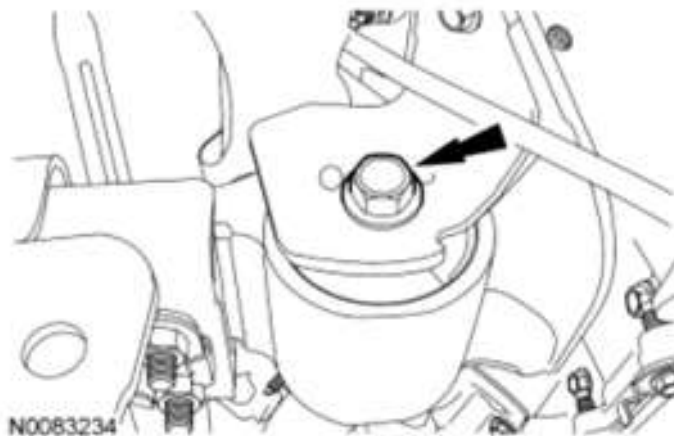


Fig. 863: Locating LH Engine Support Insulator Bolt
Courtesy of FORD MOTOR CO.

8. Install the LH engine support insulator and the through bolt.
 - Do not torque at this time.
9. Lower the engine.

NOTE: Apply threadlock to the bolt threads prior to installation.

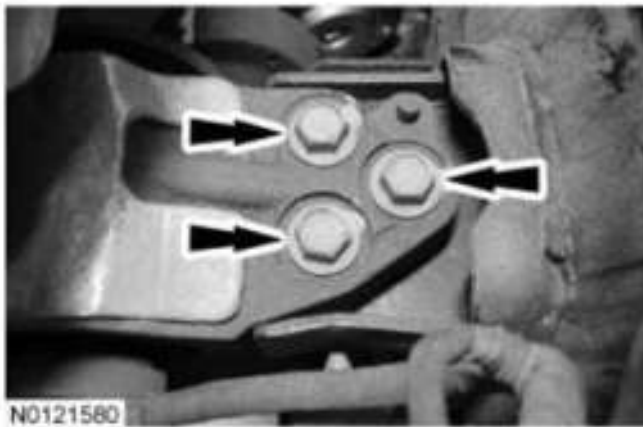


Fig. 864: Locating Engine Support Insulator Mounting Bolts
Courtesy of FORD MOTOR CO.

10. Install the 3 LH engine support insulator bolts.
 - Tighten to 175 Nm (129 lb-ft).
11. Position back the coolant hose to the valve cover stud. Install the Charge Air Cooler (CAC) bracket and 2 nuts.
 - Tighten to 6 Nm (53 lb-in).

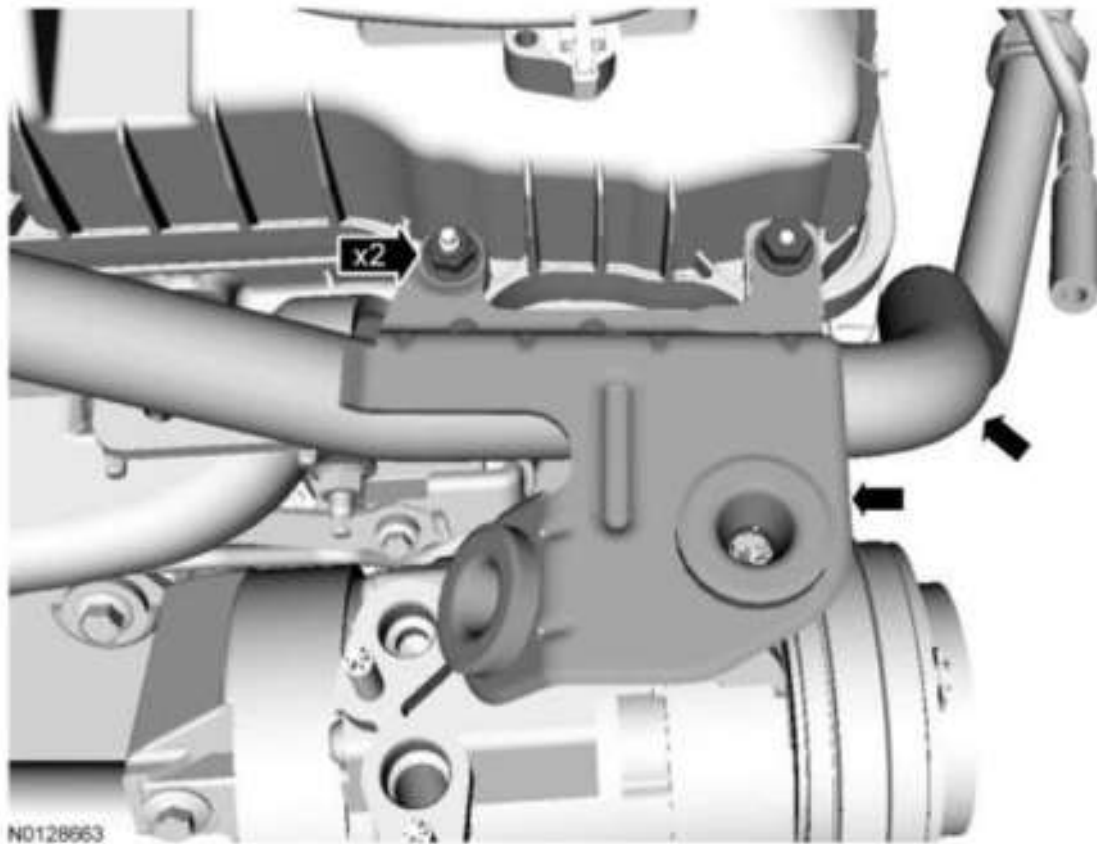


Fig. 865: Locating CAC Tube Bracket And Nuts
 Courtesy of FORD MOTOR CO.

NOTE: Apply threadlock to the stud threads prior to installation.

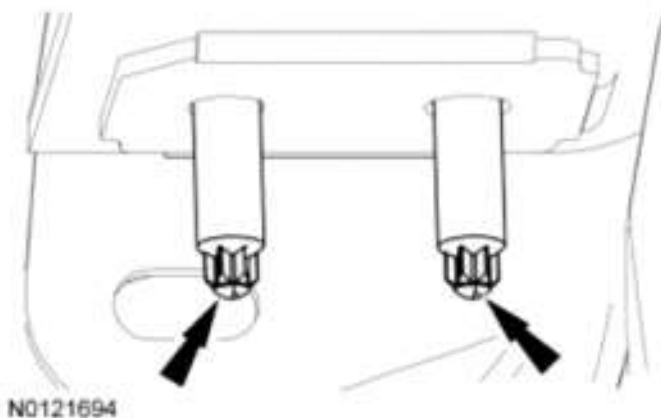


Fig. 866: Locating RH Engine Support Insulator Studs
 Courtesy of FORD MOTOR CO.

12. Install the 2 RH engine support insulator studs.
 - Tighten to 15 Nm (133 lb-in).

NOTE: Use only hand tools when installing the RH engine support insulator nuts or the engine support insulator may be damaged.

NOTE: Apply threadlock to the nut threads prior to installation.



Fig. 867: Locating RH Engine Support Insulator Nuts
Courtesy of FORD MOTOR CO.

13. Install the 2 RH engine support insulator nuts.
 - Tighten to 175 Nm (129 lb-ft).

NOTE: Use only hand tools when tightening the LH engine support insulator through bolt or the engine support insulator may be damaged.

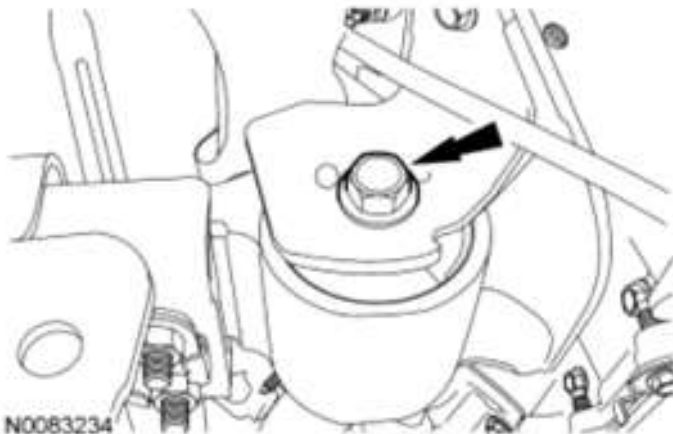


Fig. 868: Locating LH Engine Support Insulator Bolt
Courtesy of FORD MOTOR CO.

14. Tighten the LH engine mount through bolt.
 - Tighten to 350 Nm (258 lb-ft).

NOTE: Do not lubricate the engine oil filter gasket.

15. Install a new engine oil filter.
 - Tighten to 5 Nm (44 lb-in) and then rotate an additional 180 degrees.
16. Install the LH bellhousing-to-engine bolt.

- Tighten the bolt, it will be torqued at a later step.



Fig. 869: Locating LH Bellhousing-To-Engine Bolt
Courtesy of FORD MOTOR CO.

17. Install the engine-to-bellhousing bolt.
 - Tighten the bolt, it will be torqued at a later step.



Fig. 870: Locating Engine-To-Bellhousing Bolt
Courtesy of FORD MOTOR CO.

18. Install the oil pan-to-bellhousing bolt.
 - Tighten to 48 Nm (35 lb-ft).



Fig. 871: Locating Oil Pan-To-Bellhousing Bolt
Courtesy of FORD MOTOR CO.

19. Tighten the engine-to-bellhousing bolt.
 - Tighten to 48 Nm (35 lb-ft).



Fig. 872: Locating Engine-To-Bellhousing Bolt
Courtesy of FORD MOTOR CO.

20. Install the LH bellhousing-to-engine bolt.
 - Tighten to 48 Nm (35 lb-ft).



Fig. 873: Locating LH Bellhousing-To-Engine Bolt
Courtesy of FORD MOTOR CO.

21. Tighten the LH bellhousing-to-engine bolt.
 - Tighten to 48 Nm (35 lb-ft).



Fig. 874: Locating LH Bellhousing-To-Engine Bolt
Courtesy of FORD MOTOR CO.

22. Install the 4 upper bellhousing-to-engine bolts.
 - Tighten to 48 Nm (35 lb-ft).

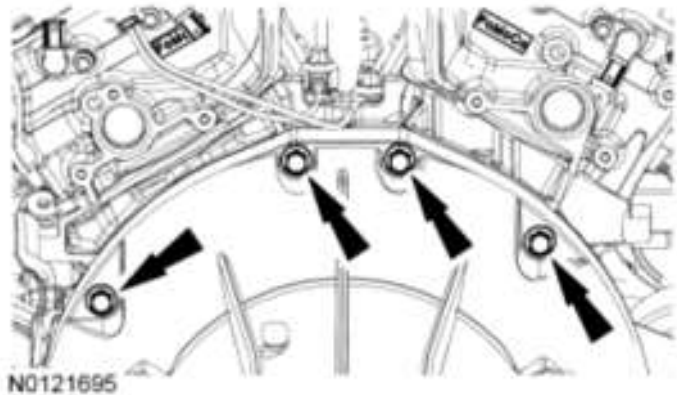


Fig. 875: Locating Upper Bellhousing-To-Engine Bolts
Courtesy of FORD MOTOR CO.

NOTE: LH shown in the figure below, RH similar.



Fig. 876: Locating Catalytic Converter-To-Turbocharger Nuts
Courtesy of FORD MOTOR CO.

23. Install the new 2 LH and RH catalytic converter-to-exhaust manifold nuts.
 - Tighten to 45 Nm (35 lb-ft).
24. Position the exhaust Y-pipe dual catalytic converter-to-intermediate pipe and install the 2 bolts.
 - Tighten the inner exhaust Y-pipe catalytic converter-to-exhaust intermediate pipe bolt to 63 Nm (46 lb-ft).
 - Tighten the outer exhaust Y-pipe catalytic converter-to-exhaust intermediate pipe bolt to 63 Nm (46 lb-ft).



Fig. 877: Locating Exhaust Y-Pipe Dual Catalytic Converter-To-Exhaust Intermediate Pipe Bolts
Courtesy of FORD MOTOR CO.

25. Install the 4 torque converter nuts.

- Tighten to 44 Nm (32 lb-ft).

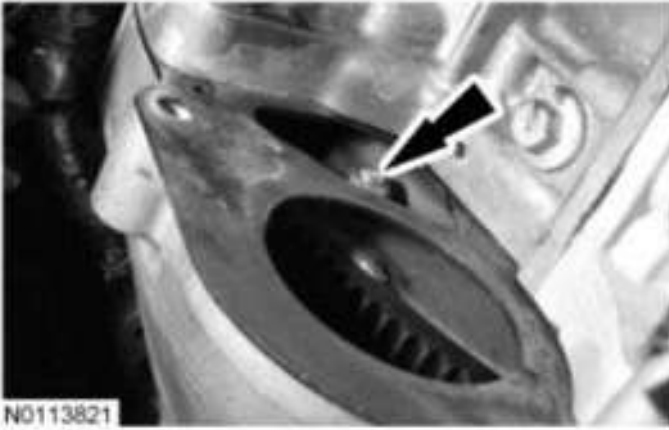


Fig. 878: Locating Torque Converter Nuts
Courtesy of FORD MOTOR CO.

26. Install the access cover and the 2 pin-type retainers.

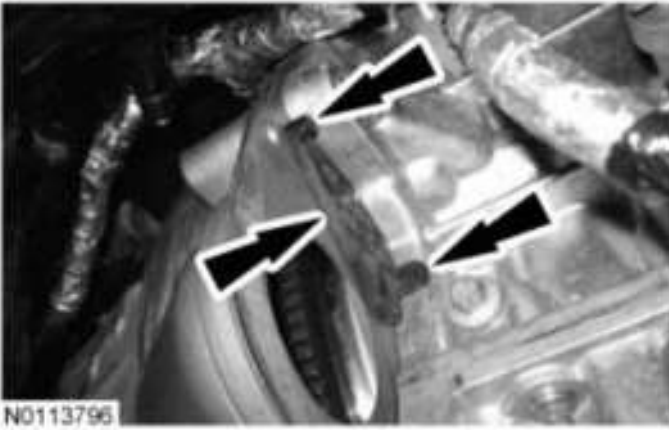


Fig. 879: Locating Access Cover Pin-Type Retainers
Courtesy of FORD MOTOR CO.

27. Attach the starter motor wiring harness retainer to the oil pan.

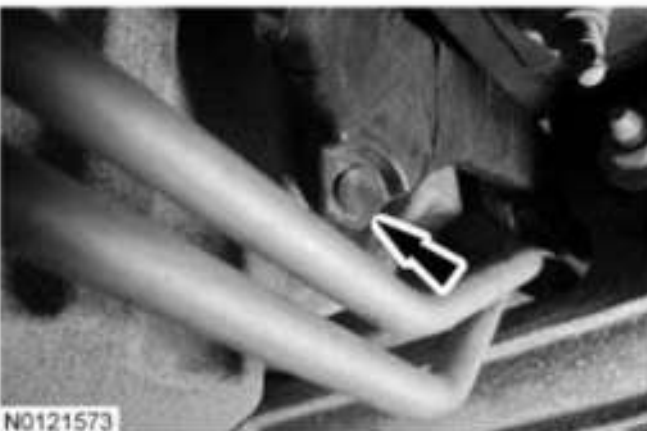


Fig. 880: Locating Starter Motor Wiring Harness
Courtesy of FORD MOTOR CO.

28. Install the starter motor. For additional information, refer to **STARTING SYSTEM** .
29. If equipped, install the front driveshaft. For additional information, refer to **DRIVESHAFT** .
30. Install the skid plate and the 4 bolts.
 - Tighten to 48 Nm (35 lb-ft).
31. Connect the transmission vehicle harness connector by pushing the connector into the transmission and twisting the outer shell.



Fig. 881: Locating Transmission Vehicle Harness Connector
Courtesy of FORD MOTOR CO.

32. Connect the electrical connector retainer to the bracket at the rear of the transmission.
 - Connect the Heated Oxygen Sensor (HO2S) electrical connector.



Fig. 882: Locating HO2S Electrical Connector Retainer
Courtesy of FORD MOTOR CO.

NOTE: Only one wire harness retainer and one electrical connector shown in the figure below, others similar.

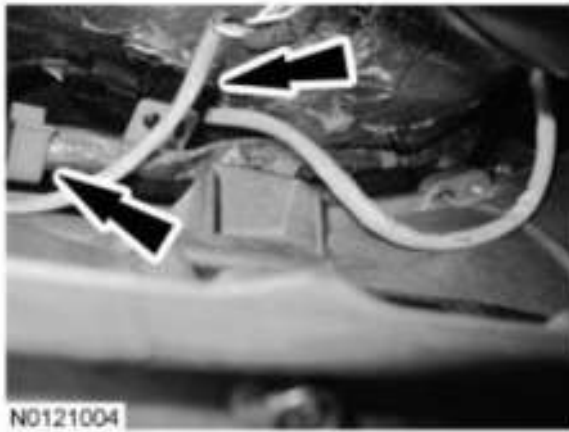


Fig. 883: Locating Transmission Wire Harness Retainers
Courtesy of FORD MOTOR CO.

33. If equipped, connect the 5 transmission wire harness retainers to the transfer case wire harness.
 - Connect the 2 **HO2S** electrical connector retainers.
 - Connect the 2 **HO2S** electrical connectors.
34. Install the splash shield and the 4 retainers.

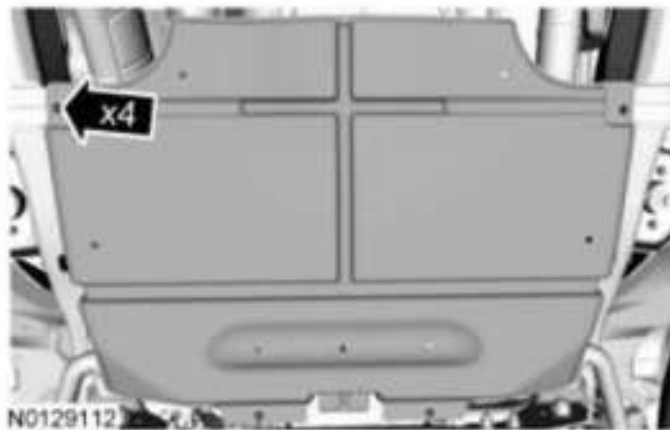


Fig. 884: Locating Splash Shield Fasteners
Courtesy of FORD MOTOR CO.

35. Connect the **HO2S** electrical connector to the wiring harness retainer.
 - Connect the **HO2S** electrical connector to the engine wiring harness at the rear of the LH cylinder head.



Fig. 885: Locating Heated Oxygen Sensor Electrical Connector
Courtesy of FORD MOTOR CO.

36. Install the cowl panel and attach the 2 clips and install the 6 screws.

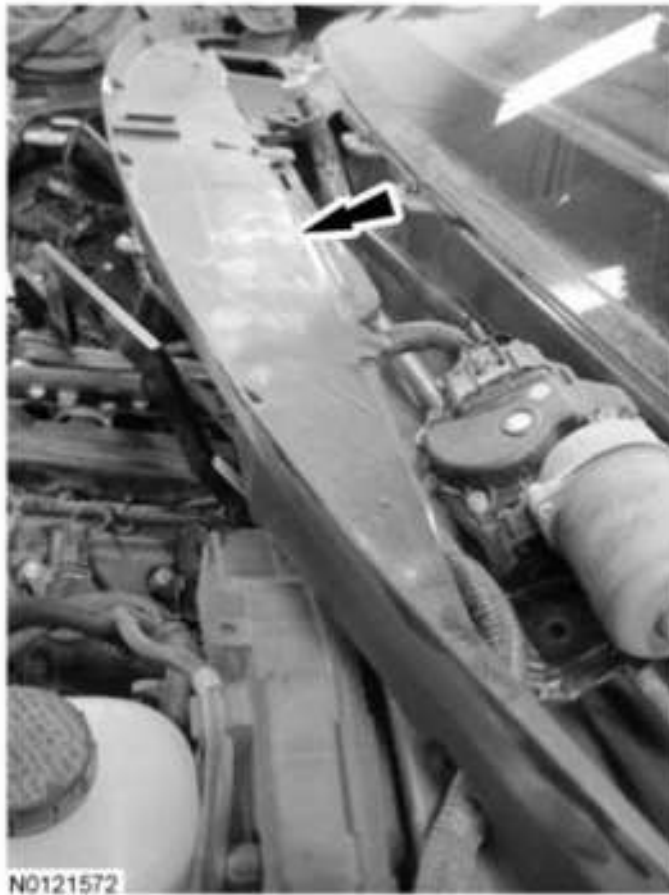


Fig. 886: Locating Cowl Panel
Courtesy of FORD MOTOR CO.

37. Install the cowl panel grille. For additional information, refer to **FRONT END BODY PANELS** .
38. Install the ground strap and bolt to the cowl.
- Tighten to 10 Nm (89 lb-in).

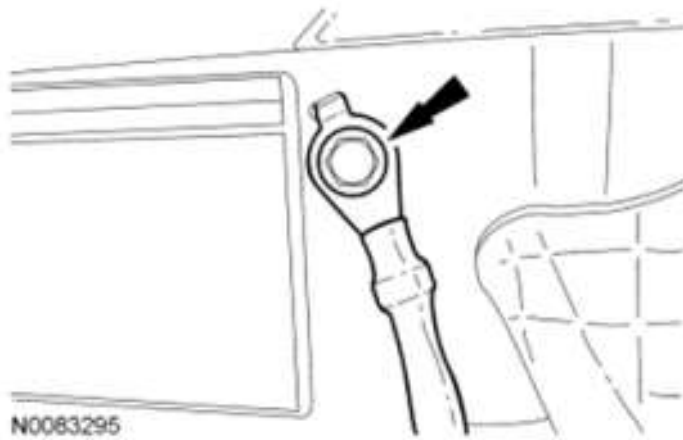


Fig. 887: Locating Ground Strap And Bolt
Courtesy of FORD MOTOR CO.

39. Attach the wiring harness retainers to the rear of the RH valve cover stud bolt and the rear of the RH cylinder head.

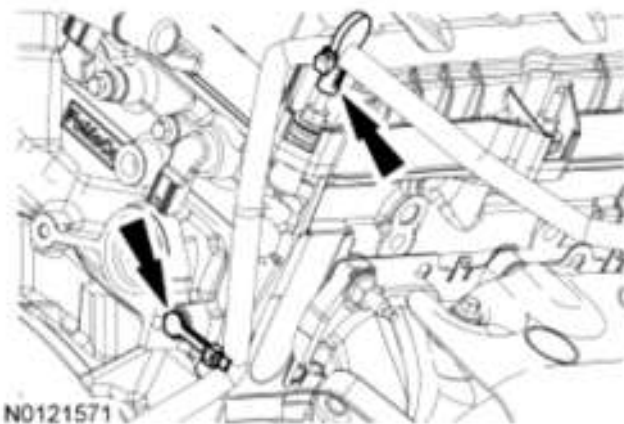


Fig. 888: Locating Wiring Harness Retainers
Courtesy of FORD MOTOR CO.

40. Connect the 2 coolant hoses to the degas bottle.



Fig. 889: Locating Coolant Hoses Of Degas Bottle
Courtesy of FORD MOTOR CO.

41. Connect the 2 heater hose couplings at the RH rear of the engine.



Fig. 890: Locating Heater Hose Couplings
Courtesy of FORD MOTOR CO.

42. Install the intake manifold. For additional information, refer to INTAKE MANIFOLD.
43. Install the fuel injection pump. For additional information, refer to FUEL CHARGING AND CONTROLS - 3.5L GTDI.
44. Connect the PCM electrical connector and the engine harness electrical connector.
- Attach the wiring harness retainers to the fender splash shield.



Fig. 891: Locating PCM Electrical Connector And Engine Wire Harness Electrical Connector
Courtesy of FORD MOTOR CO.

45. Install the A/C compressor belt. For additional information, refer to ACCESSORY DRIVE.
46. Install the generator. For additional information, refer to CHARGING SYSTEM.

47. Connect the A/C compressor electrical connector.
 - Attach the A/C compressor wiring harness to the A/C compressor.

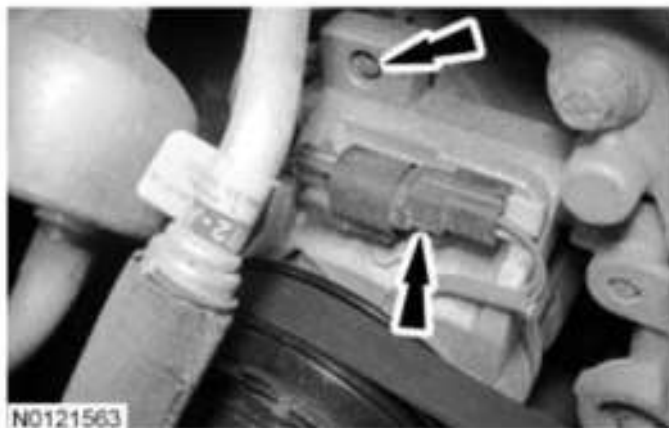


Fig. 892: Locating A/C Compressor Electrical Connector
Courtesy of FORD MOTOR CO.

48. Attach the generator wiring harness to the engine front cover.



Fig. 893: Identifying Generator Wiring Harness
Courtesy of FORD MOTOR CO.

49. Install the transmission cooler line bracket and nut to the engine front cover stud bolt.
 - Tighten to 12 Nm (106 lb-in).

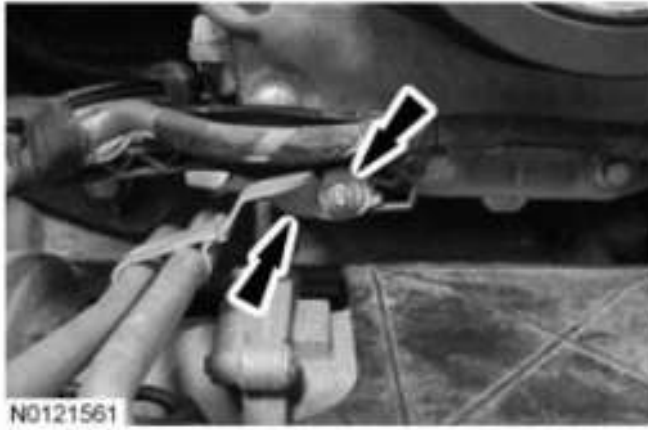


Fig. 894: Locating Transmission Cooler Line Bracket And Nut
Courtesy of FORD MOTOR CO.

50. Using a new O-ring seal and gasket seal, install the A/C tube and the nut.
 - Tighten to 15 Nm (133 lb-in).

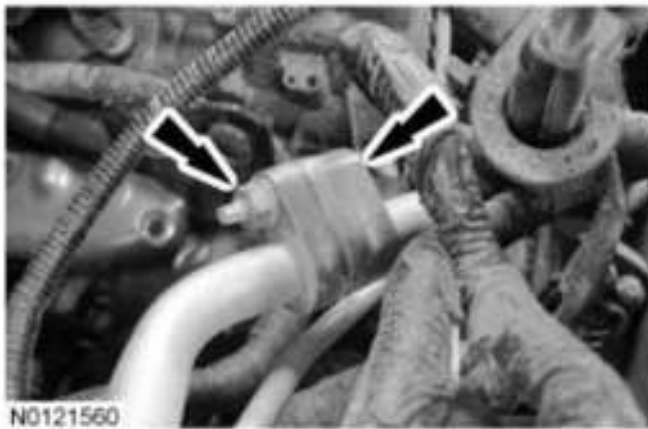


Fig. 895: Locating A/C Tube And Nut
Courtesy of FORD MOTOR CO.

51. Connect the Battery Junction Box (BJB) wiring harness and the A/C pressure transducer electrical connectors.

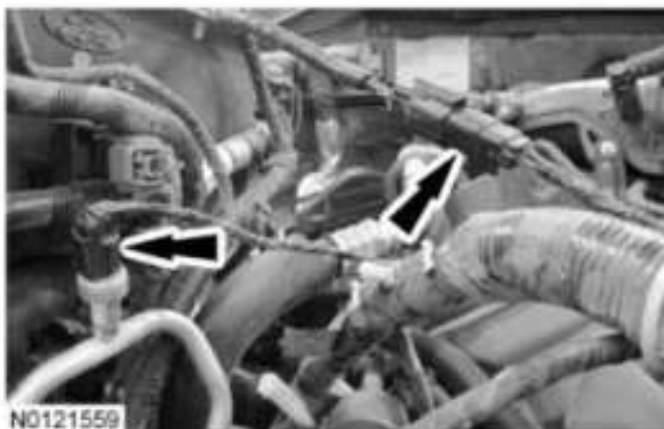


Fig. 896: Locating A/C Pressure Transducer Electrical Connectors
Courtesy of FORD MOTOR CO.

52. Fill the engine with clean engine oil.
53. Install the 2 Charge Air Cooler (CAC) inlet tubes and the CAC outlet tube. For additional information, refer to 3.5L Gasoline Turbocharged Direct Injection (GTDI) Charge Air Cooler (CAC) and Tubes Exploded View in **INTAKE AIR DISTRIBUTION AND FILTERING** .
54. Install the LH and RH turbocharger intake tubes. For additional information, refer to 3.5L Gasoline Turbocharged Direct Injection (GTDI) Charge Air Cooler (CAC) and Tubes Exploded View in **INTAKE AIR DISTRIBUTION AND FILTERING** .
55. Install the cooling module. For additional information, refer **ENGINE COOLING** .
56. If equipped, connect the block heater electrical connector at the thermostat housing.
 - Attach the block heater wiring harness retainer to the LH valve cover stud bolt.



Fig. 897: Locating Block Heater Electrical Connector
Courtesy of FORD MOTOR CO.

57. Connect the battery ground cable. For additional information, refer to **BATTERY, MOUNTING AND CABLES** .

NOTE: Align the index marks made during hood removal.

NOTE: RH shown in the figure below, LH similar.

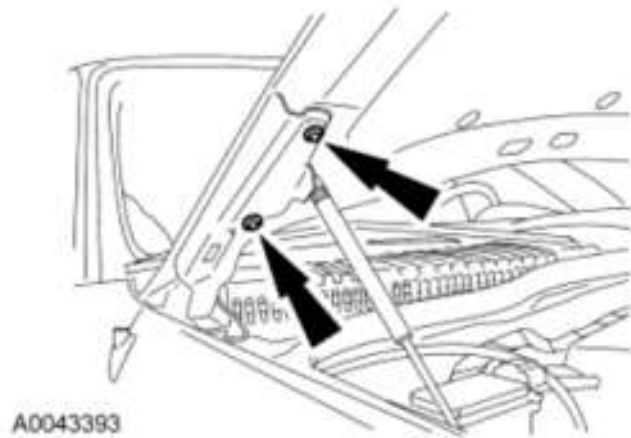


Fig. 898: Locating Hood Hinge Bolts
Courtesy of FORD MOTOR CO.

58. Position the hood and install the 4 bolts.
 - Tighten to 12 Nm (106 lb-in).
59. After completing the repairs, use the scan tool to perform the Misfire Monitor Neutral Profile Correction procedure following the on-screen instructions.