Engine

Special Tool(s)

 ST1341-A	2,200# Floor Crane, Fold Away 300-OTC1819E
 ST1377-A	Lifting Bracket, Engine 303-F047 (014-00073)
 ST2834-A	Vehicle Communication Module (VCM) and Integrated Diagnostic System (IDS) software with appropriate hardware, or equivalent scan tool

Material

Item	Specification
Motorcraft® SAE 5W-20 Premium Synthetic Blend Motor Oil (US); Motorcraft® SAE 5W-20 Super Premium Motor Oil (Canada) XO-5W20-QSP (US); CXO-5W20-LSP12 (Canada)	WSS-M2C945-A
Threadlock 262 TA-26	WSK-M2G351-A6

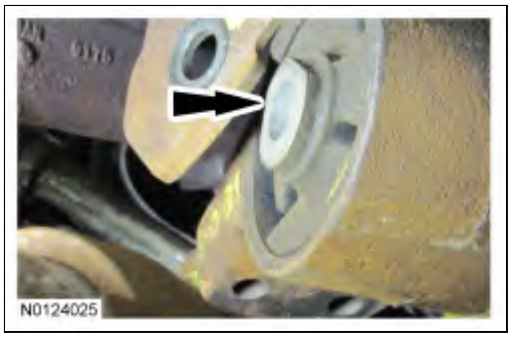
WARNING: Do not smoke, carry lighted tobacco or have an open flame of any type when working on or near any fuel-related component. Highly flammable mixtures are always present and may be ignited. Failure to follow these instructions may result in serious personal injury.

WARNING: Before working on or disconnecting any of the fuel tubes or fuel system components, relieve the fuel system pressure to prevent accidental spraying of fuel. Fuel in the fuel system remains under high pressure, even when the engine is not running. Failure to follow this instruction may result in serious personal injury.

1. Using the Heavy Duty Floor Crane and the Engine Lifting Bracket, position the engine in the engine compartment leaving access to the LH engine support insulator bolts.

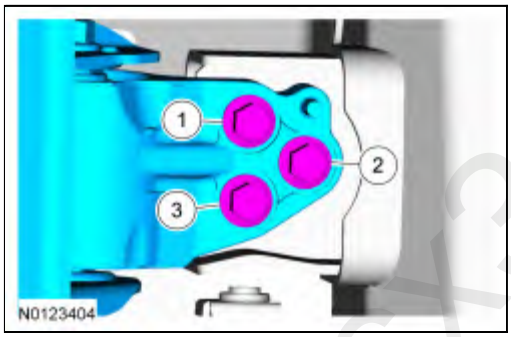
2. **NOTE:** Clean the LH and RH engine support insulator-to-frame mating surfaces of any dirt or foreign material prior to installation.

   Install the LH engine support insulator from under the vehicle.



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

   Using a suitable floor crane, raise the engine assembly to gain access to install the 3 LH engine support insulator bolts.
   - Tighten the 3 LH engine support insulator bolts in the sequence shown to 175 Nm (129 lb-ft).



4. Lower the engine.

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

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

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

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6. ***NOTICE:*** **Use only hand tools when installing the RH engine support insulator studs or the engine support insulator may be damaged.**

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

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

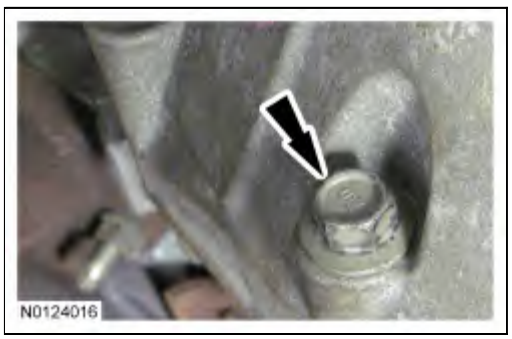
7. ***NOTICE:*** **Use only hand tools when installing the RH engine support insulator nuts or the engine support insulator may be damaged.**

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

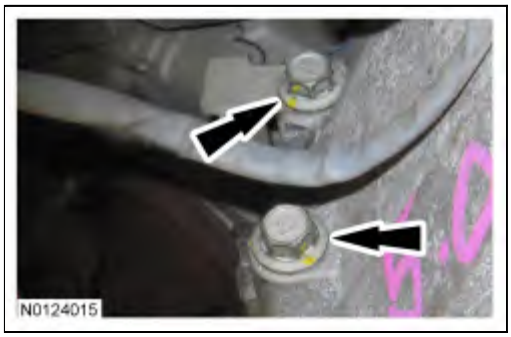
   Install the 2 RH engine support insulator nuts.
   - Tighten to 175 Nm (129 lb-ft).

8. **NOTE:** The 2 upper transmission-to-engine bolt will be installed later.

   Install the lower transmission-to-engine bolt.
   - Tighten to 48 Nm (35 lb-ft).

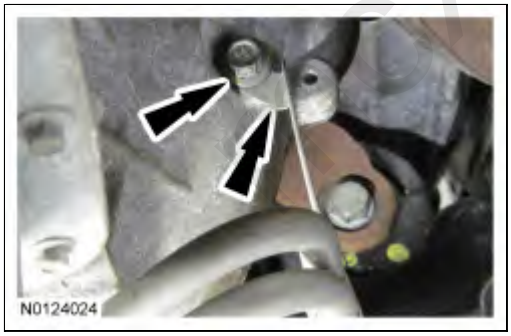


9. Install the 2 lower transmission-to-engine bolts.
    - Tighten to 48 Nm (35 lb-ft).



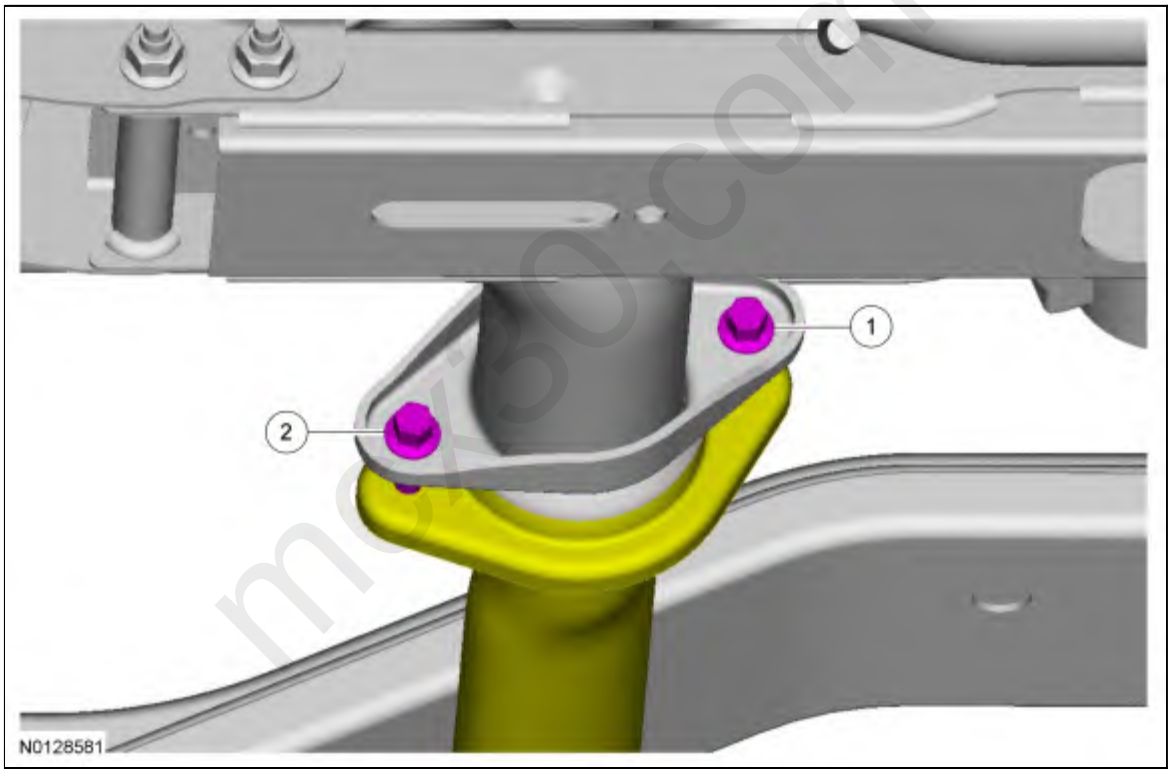
10. Install the lower transmission-to-engine bolt.
    - Tighten to 48 Nm (35 lb-ft).

11. Install the transmission cooler tube support bracket and the transmission-to-engine bolt.
    - Tighten to 48 Nm (35 lb-ft).



12. Tighten the 2 transmission mount-to-crossmember nuts.
    - Tighten to 25 Nm (18 lb-ft).

13. Position the exhaust Y-pipe dual catalytic converter-to-exhaust intermediate pipe and install the 2 new bolts.
    1. Tighten the inner exhaust Y-pipe dual catalytic converter-to-exhaust intermediate pipe bolt to 63 Nm (46 lb-ft).
    2. Tighten the outer exhaust Y-pipe dual catalytic converter-to-exhaust intermediate pipe bolt to 63 Nm (46 lb-ft).



14. Install 2 new RH catalytic converter-to-exhaust manifold nuts.
    - Tighten to 40 Nm (30 lb-ft).

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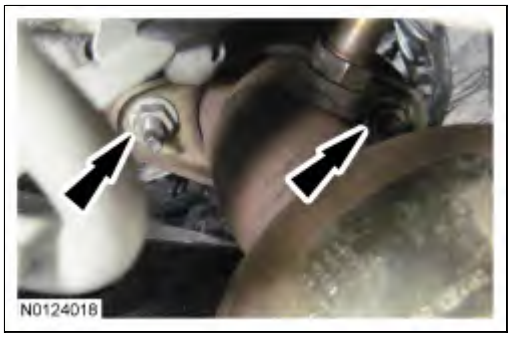

15. Install 2 new LH catalytic converter-to-exhaust manifold nuts.
    - Tighten to 40 Nm (30 lb-ft).

16. Install 4 new torque converter-to-flexplate nuts.
    - Tighten to 35 Nm (26 lb-ft).

17. Install the cylinder block opening cover.

18. Install the flexplate inspection cover and the 2 bolts.

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- Tighten to 35 Nm (26 lb-ft).

19. **NOTE:** Do not lubricate the O-ring seal.

    Install a new oil filter.
    - Tighten to 16 Nm (142 lb-in).

20. Connect the oil level sensor electrical connector.

21. Install the starter. For additional information, refer to Section 303-06 .

22. If equipped, install the front driveshaft. For additional information, refer to Section 205-01 .

23. Install the 2 upper transmission-to-engine bolts.
    - Tighten to 48 Nm (35 lb-ft).

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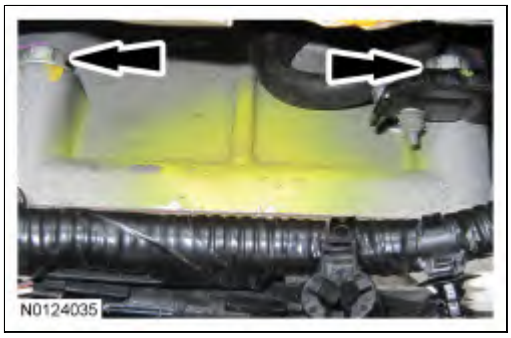


24. Attach the PCM wiring harness retainer to the valve cover bolt stud.

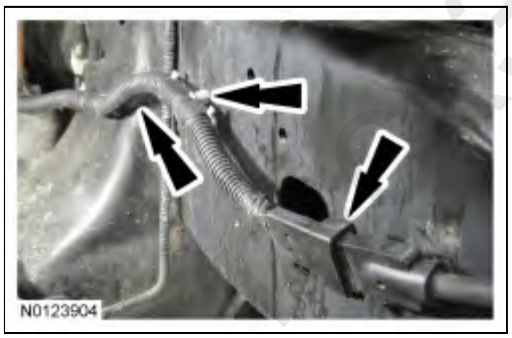
25. Attach and connect the engine harness electrical connector.

26. Connect the middle PCM electrical connector.

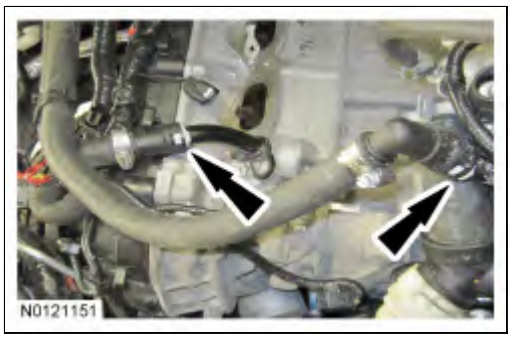
27. Install the crankcase ventilation tube. For additional information, refer to the quick connect coupling procedure in Section 310-00 .

28. Install the ground strap and bolt to the cowl.
    - Tighten to 10 Nm (89 lb-in).

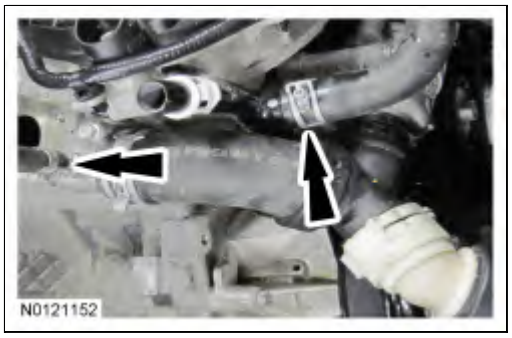
29. If equipped, attach and connect the block heater electrical connector and the 2 wiring harness retainers.



30. Connect the 2 heater hose quick connect couplings. For additional information, refer to Section 412-00 .

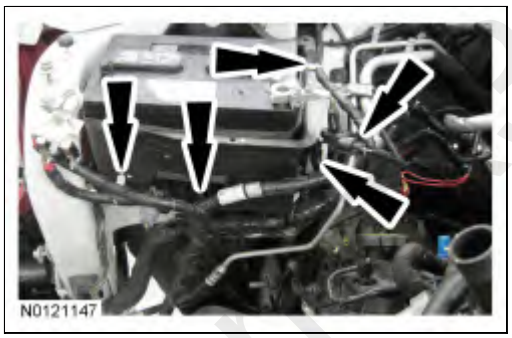


31. Connect the 2 coolant hoses.

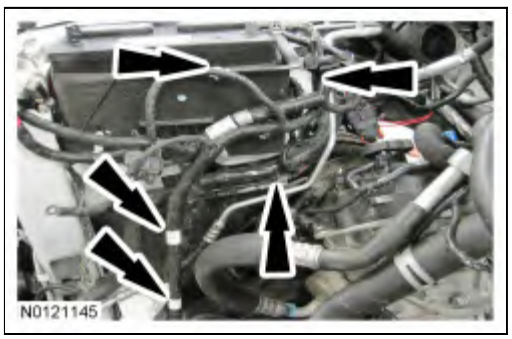


32. Install the spring clip, the clamp and connect the coolant bypass T assembly to the engine.

33. Connect the 2 wiring harness connectors and attach the 3 wiring harness retainers.

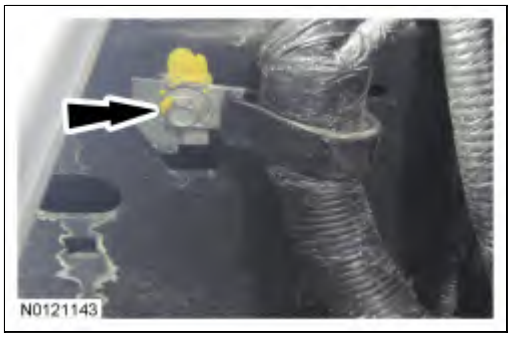


34. Attach the 5 wiring harness retainers.

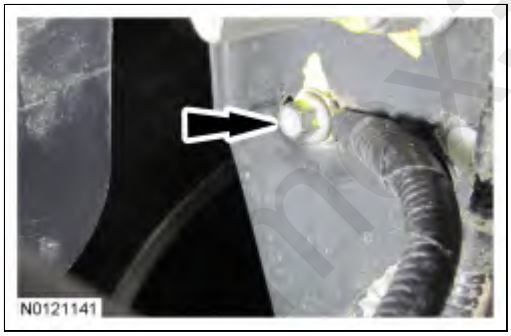


35. Connect the B+ wire and nut.
    - Tighten to 17 Nm (150 lb-in).
    - Attach the wiring harness retainer to the battery tray.

36. Install the wiring harness bracket and the bolt to the RH frame rail.
    - Tighten to 20 Nm (177 lb-in).

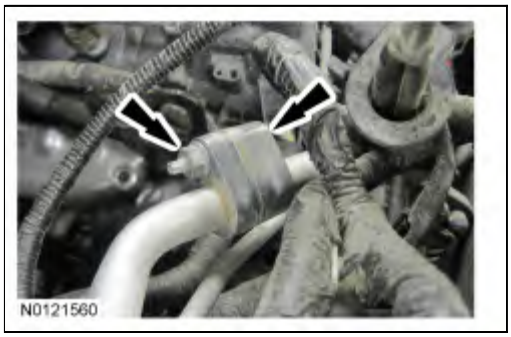


37. Install the ground wire and the bolt to the RH frame rail.
    - Tighten to 12 Nm (106 lb-in).



38. Install the transmission cooler line bracket and the nut to the engine front cover stud bolt.
    - Tighten to 13 Nm (115 lb-in).

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



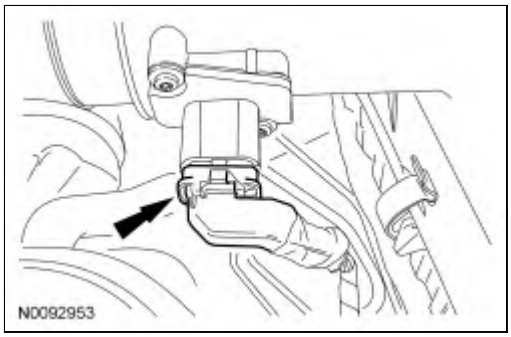
40. Connect the wiring harness electrical connector and pin-type retainer.
    - Position the Power Distribution Box (PDB) and wiring harness toward the engine.

41. Connect the A/C pressure transducer electrical connector.

42. Install the cooling module. For additional information, refer to Section 303-03 .

43. Install the Air Cleaner (ACL) element and ACL upper tray. For additional information, refer to Section 303-12

44. Connect the Mass Air Flow (MAF) sensor electrical connector.



45. ***NOTICE:*** **If the engine is repaired or replaced because of upper engine failure, typically including valve or piston damage, check the intake manifold for metal debris. If metal debris is found, install a new intake manifold. Failure to follow these instructions can result in engine damage.**

    Install the intake manifold. For additional information, refer to Intake Manifold in this section.

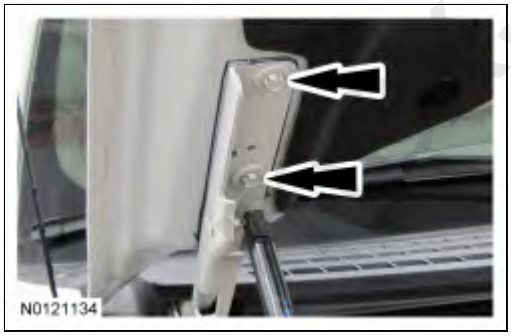
46. Fill the engine with clean engine oil.

47. Connect the battery ground cable. For additional information, refer to Section 414-01 .

48. **NOTE:** Align the index marks made during hood removal.

    NOTE: RH shown, LH similar.

    Install the hood and the 4 bolts.
    - Tighten to 12 Nm (106 lb-in).



49. After completing the repairs, use the scan tool to perform the Misfire Monitor Neutral Profile Correction procedure following the on-screen instructions.

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