

SECTION 303-01A: Engine — 3.5L GTDI
INSTALLATION

2014 F-150 Workshop Manual
Procedure revision date: 10/25/2013

Engine

Special Tool(s)

 ST3101-A	Bar, Engine Spreader 303-1454
 ST1377-A	Lifting Bracket, Engine 303-F047 (014-00073) or equivalent
 ST3265-A	Lift Eye, Right Front 303-1566
 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

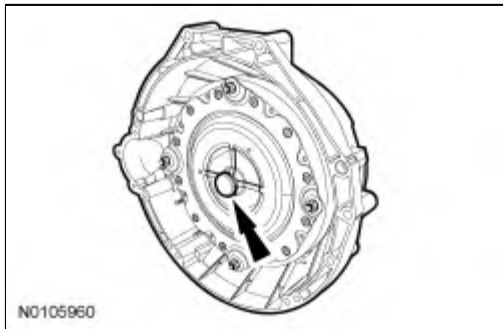
Item	Specification
Motorcraft® SAE 5W-30 Premium Synthetic Blend Motor Oil (US); Motorcraft® SAE 5W-30 Super Premium Motor Oil (Canada) XO-5W30-QSP (US); CXO-5W30-LSP12 (Canada)	WSS-M2C946-A
Motorcraft® Multi-Purpose Grease XL-5	ESB-M1C93-B



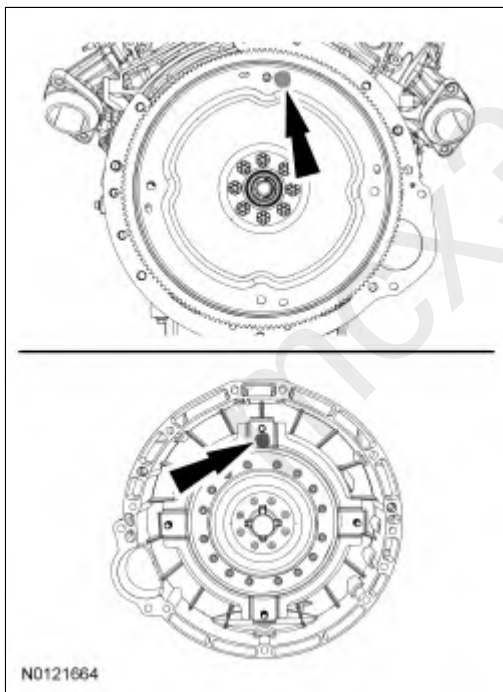
WARNING: Do not smoke, carry lighted tobacco or have an open flame of any type when working on or near any fuel-related component. Highly flammable mixtures are always present and may be ignited. Failure to follow these instructions may result in serious personal injury.

1. **NOTICE:** 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

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.



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



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

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.



- Tighten to 48 Nm (35 lb-ft).



- support insulator.

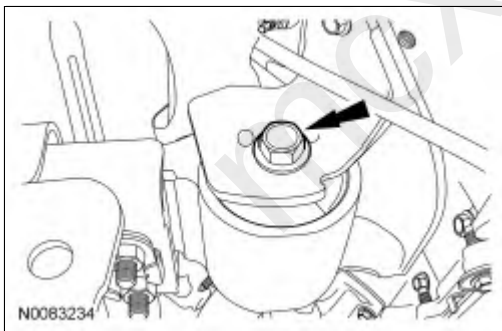


8. **NOTICE:** Only use hand tools when loosening or tightening the LH engine support insulator through bolt or damage to the engine support insulator-to-cylinder block bracket can occur.

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 and the new through bolt.

- Do not torque at this time.



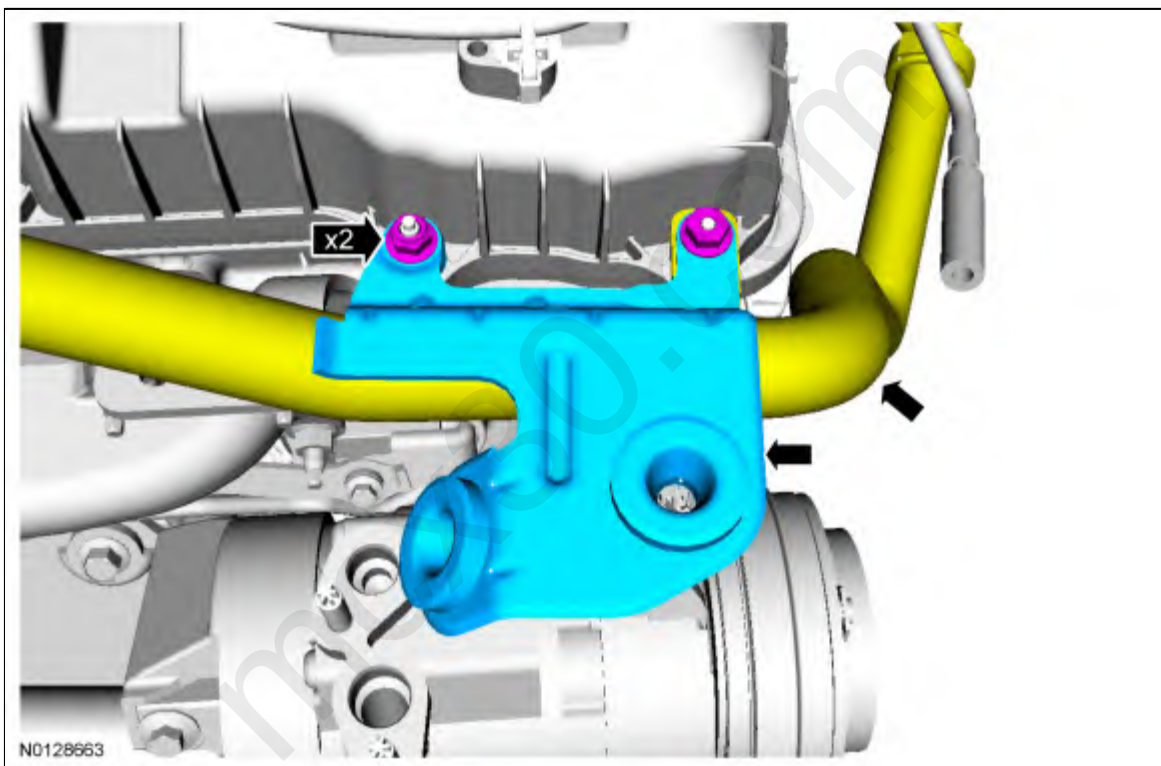
9. Lower the engine.
10. **NOTICE:** Use only hand tools when removing or installing the engine support insulator-to-frame bolts or the damage to the engine support insulator-to-frame nut plate can occur.

Install the 3 new LH engine support insulator bolts.

- Tighten to 175 Nm (129 lb-ft).



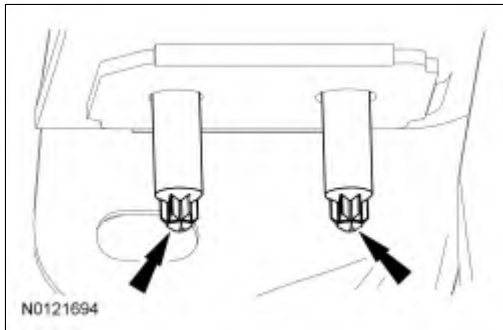
11. Position back the coolant hose to the valve cover stud. Install the Charge Air Cooler (CAC) bracket and 2 nuts.
 - Tighten to 6 Nm (53 lb-in).



12. **NOTICE:** Use only hand tools when installing the engine support insulator stud bolts or damage to the engine support insulator can occur.

Install the 2 new RH engine support insulator studs.

- Tighten to 30 Nm (22 lb-ft).



13. **NOTICE:** Use only hand tools when installing the RH engine support insulator nuts or damage to the engine support insulator can occur.

Install the 2 new RH engine support insulator nuts.

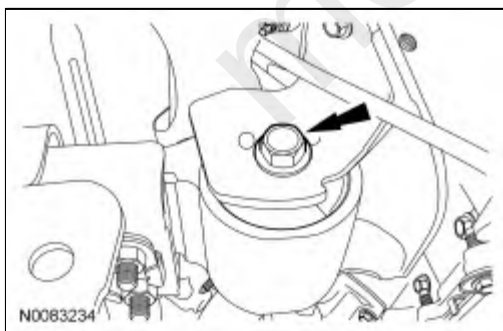
- Tighten to 175 Nm (129 lb-ft).



14. **NOTICE:** Only use hand tools when loosening or tightening the LH engine support insulator through bolt or damage to the engine support insulator-to-cylinder block bracket can occur.

Tighten the LH engine mount through bolt.

- Tighten to 350 Nm (258 lb-ft).



15. **NOTE:** Do not lubricate the engine oil filter gasket.

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.



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



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



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



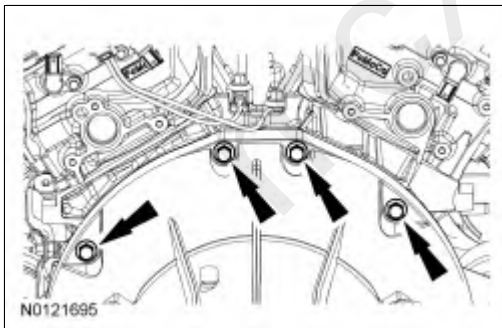
20. Install the LH bellhousing-to-engine bolt.
- Tighten to 48 Nm (35 lb-ft).



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



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



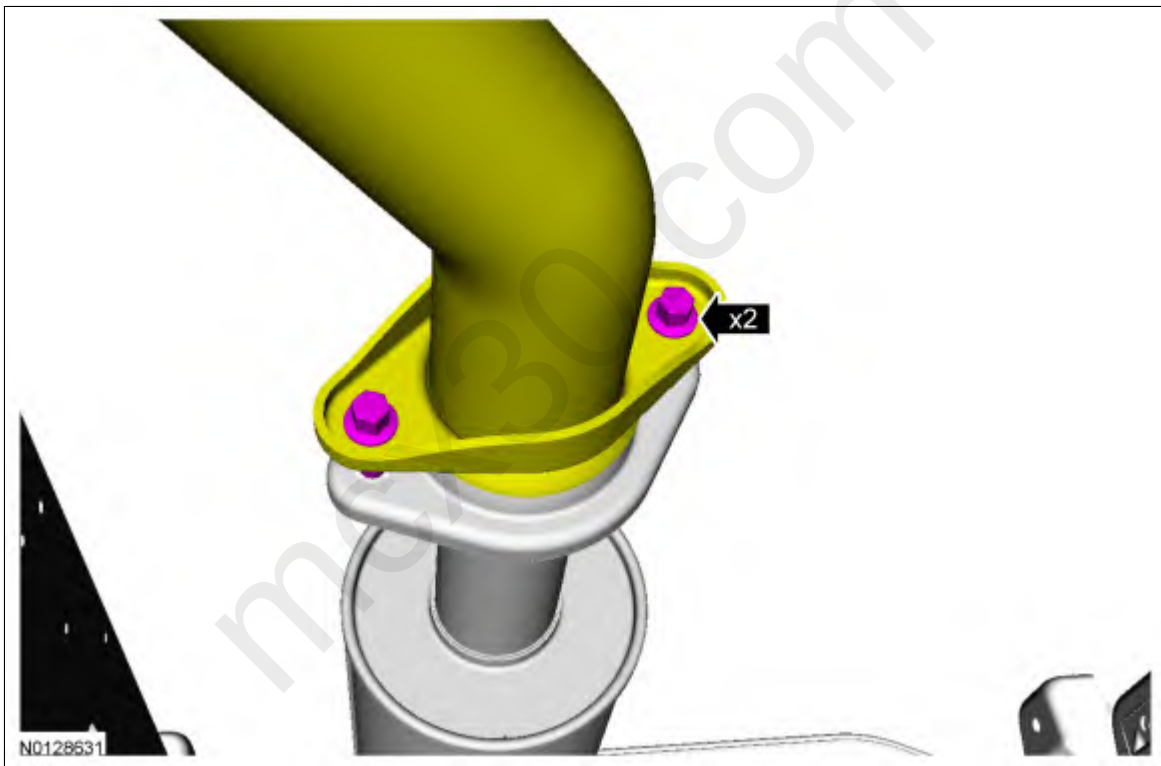
23. **NOTE:** LH shown, RH similar.

Install the new 2 LH and RH catalytic converter-to-exhaust manifold nuts.

- Tighten to 45 Nm (35 lb-ft).



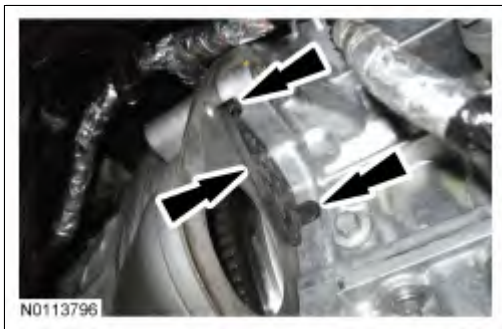
24. Position the exhaust Y-pipe dual catalytic converter-to-intermediate pipe and install the 2 bolts.
- Tighten the inner exhaust Y-pipe catalytic converter-to-exhaust intermediate pipe bolt to 63 Nm (46 lb-ft).
 - Tighten the outer exhaust Y-pipe catalytic converter-to-exhaust intermediate pipe bolt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



25. Install the 4 torque converter nuts.
- Tighten to 44 Nm (32 lb-ft).



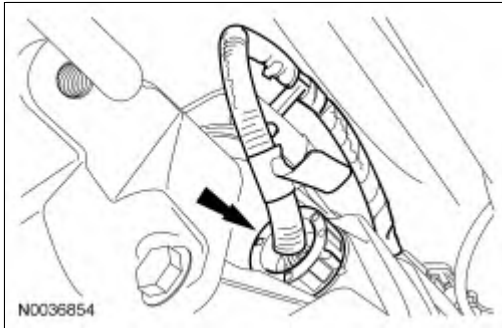
26. Install the access cover and the 2 pin-type retainers.



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



28. Install the starter motor. For additional information, refer to [Section 303-06](#).
29. If equipped, install the front driveshaft. For additional information, refer to [Section 205-01](#).
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.



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



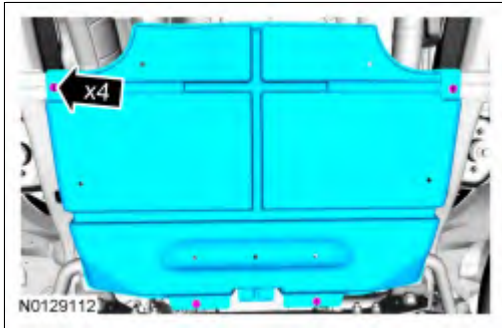
33. **NOTE:** Only one wire harness retainer and one electrical connector shown, others similar.

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.



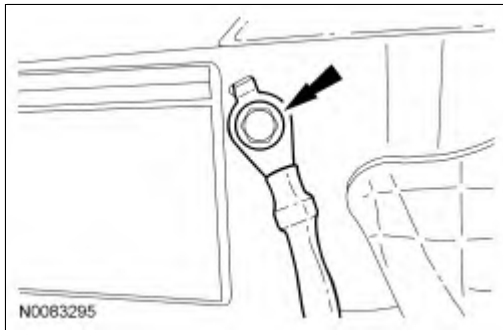
35. Connect the HO2S electrical connector to the wiring harness retainer.
- Connect the HO2S electrical connector to the engine wiring harness at the rear of the LH cylinder head.



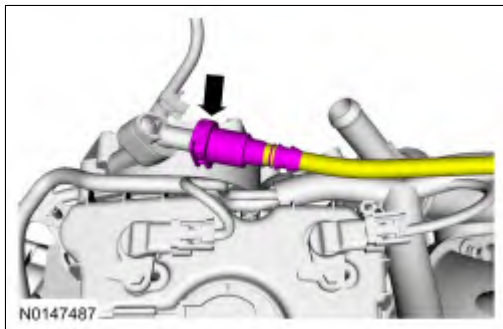
36. Install the cowl panel and attach the 2 clips and install the 6 screws.



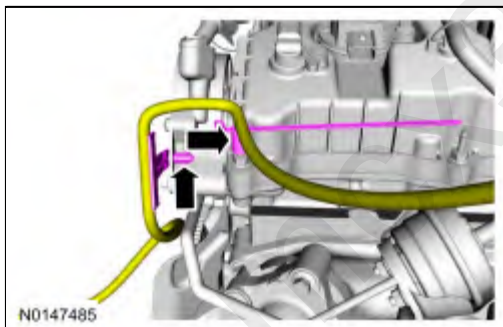
37. Install the cowl panel grille. For additional information, refer to [Section 501-02](#).
38. Install the ground strap and bolt to the cowl.
- Tighten to 10 Nm (89 lb-in).



39. Connect the vacuum pump tube.



40. Attach the wiring harness retainers to the rear of the RH valve cover stud bolt and the rear of the vacuum pump.



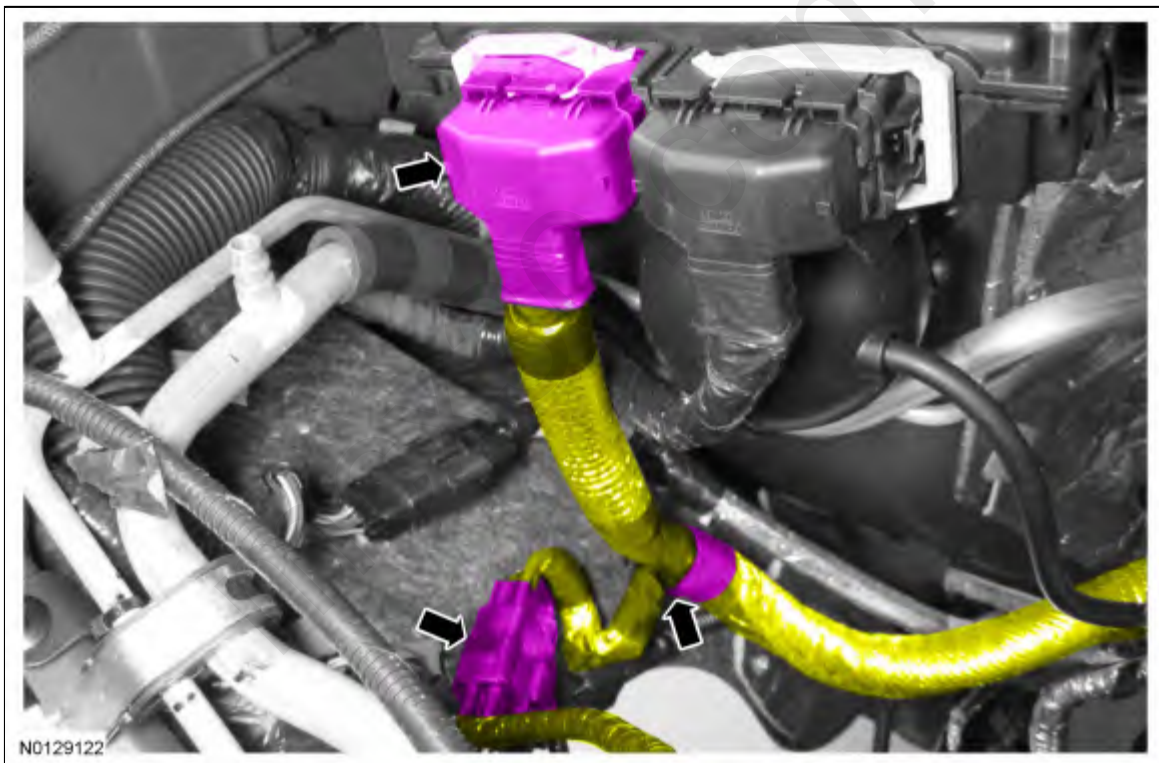
41. Connect the 2 coolant hoses to the degas bottle.



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



43. Install the intake manifold. For additional information, refer to [Intake Manifold](#) in this section.
44. Install the fuel injection pump. For additional information, refer to [Section 303-04A](#).
45. Connect the PCM electrical connector and the engine harness electrical connector.
 - Attach the wiring harness retainers to the fender splash shield.



46. Install the A/C compressor belt. For additional information, refer to [Section 303-05](#).
47. Install the generator. For additional information, refer to [Section 414-00](#).
48. Connect the A/C compressor electrical connector.
 - Attach the A/C compressor wiring harness to the A/C compressor.



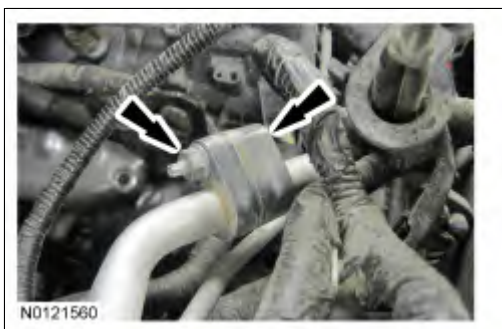
49. Attach the generator wiring harness to the engine front cover.



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

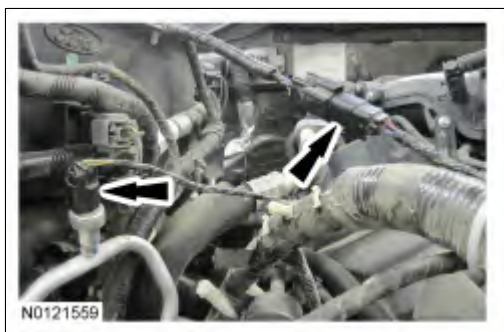


51. Using a new O-ring seal and gasket seal, install the A/C tube and the nut.
- Tighten to 15 Nm (133 lb-in).



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

connectors.



53. Fill the engine with clean engine oil.
54. 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 [Section 303-12](#).
55. 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 [Section 303-12](#).
56. Install the cooling module. For additional information, refer [Section 303-03](#).
57. 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.

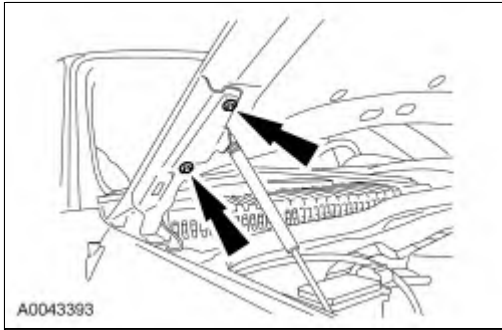


58. Connect the battery ground cable. For additional information, refer to [Section 414-01](#).
59. **NOTE:** Align the index marks made during hood removal.

NOTE: RH shown, LH similar.

Position the hood and install the 4 bolts.

- Tighten to 12 Nm (106 lb-in).



60. 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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