

SECTION 303-01A: Engine — 3.5L GTDI
IN-VEHICLE REPAIR

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

Valve Cover — RH

Special Tool(s)

 ST1326-A	Handle 205-153 (T80T-4000-W)
 ST2212-A	Installer, Differential Bearing Cone 205-142 (T80T-4000-J)
 ST2983-A	Installer, Spark Plug Tube Seal 303-1247/2
 ST2982-A	Remover, Spark Plug Tube Seal 303-1247/1

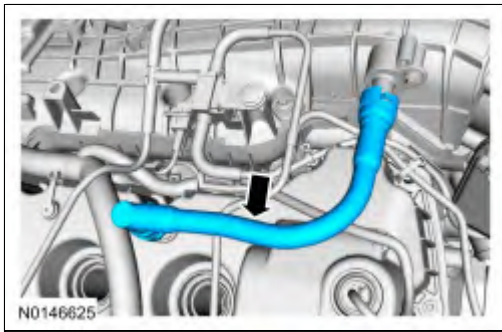
Material

Item	Specification
Motorcraft® High Performance Engine RTV Silicone TA-357	WSE-M4G323-A6
Motorcraft® Metal Surface Prep ZC-31-A	—
Motorcraft® Silicone Gasket Remover ZC-30	—
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

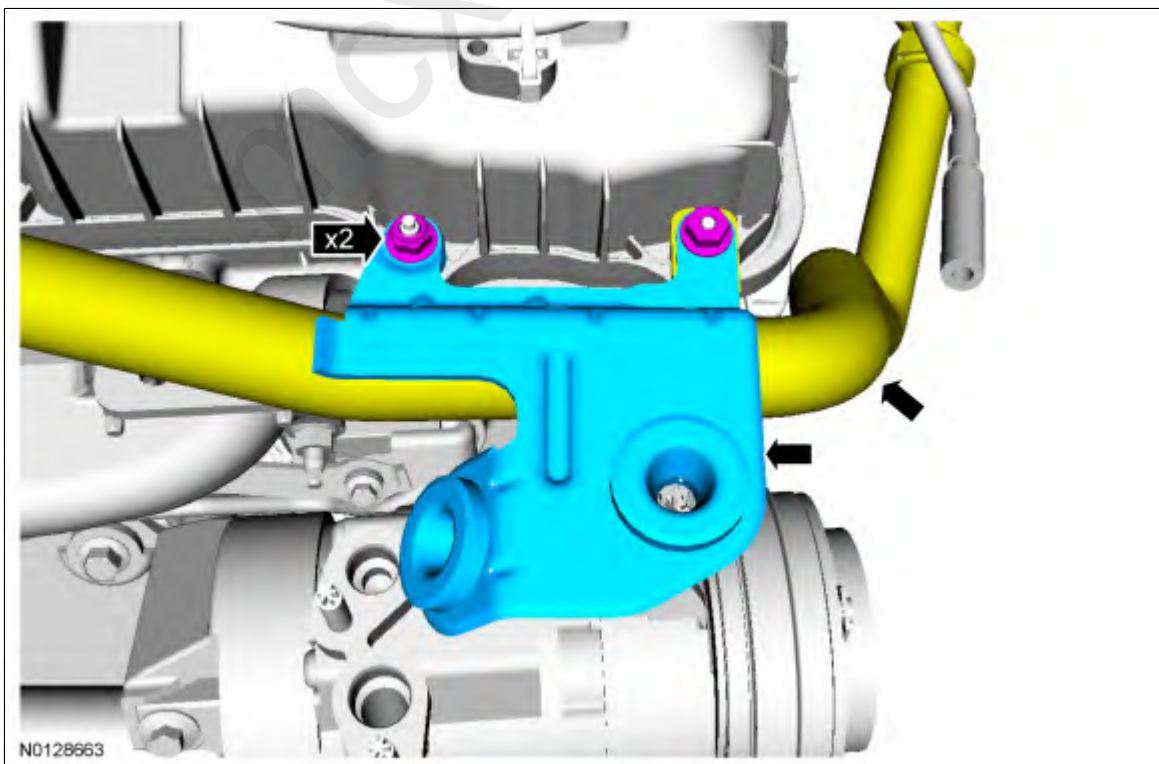
Removal

NOTICE: During engine repair procedures, cleanliness is extremely important. Any foreign material, including any material created while cleaning gasket surfaces that enters the oil passages, coolant passages or the oil pan, may cause engine failure.

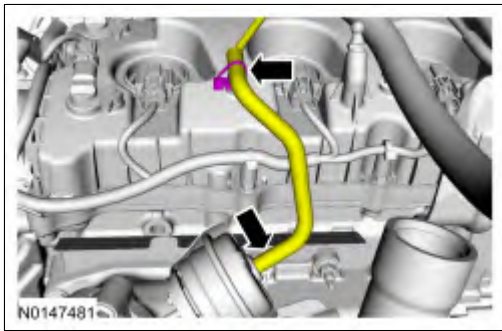
1. Remove the engine appearance cover.
2. Remove the Air Cleaner (ACL) outlet pipe and the RH ACL pipe-to-turbocharger pipe. Remove the RH turbocharger-to-Charge Air Cooler (CAC) tube. For additional information, refer to Intake Air System Components — Exploded View, 3.5L Gasoline Turbocharged Direct Injection (GTDI) in [Section 303-12](#).
3. Remove the ignition coil-over-plugs. for additional information, refer to [Section 303-07A](#).
4. Remove the PCV tube. Refer to [Section 310-00](#).



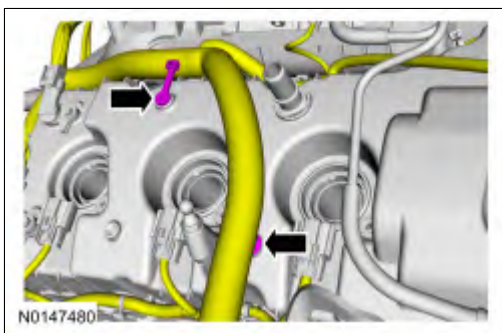
5. Remove the 2 nuts and the CAC tube bracket.
 - Disconnect the coolant hose from the valve cover stud.



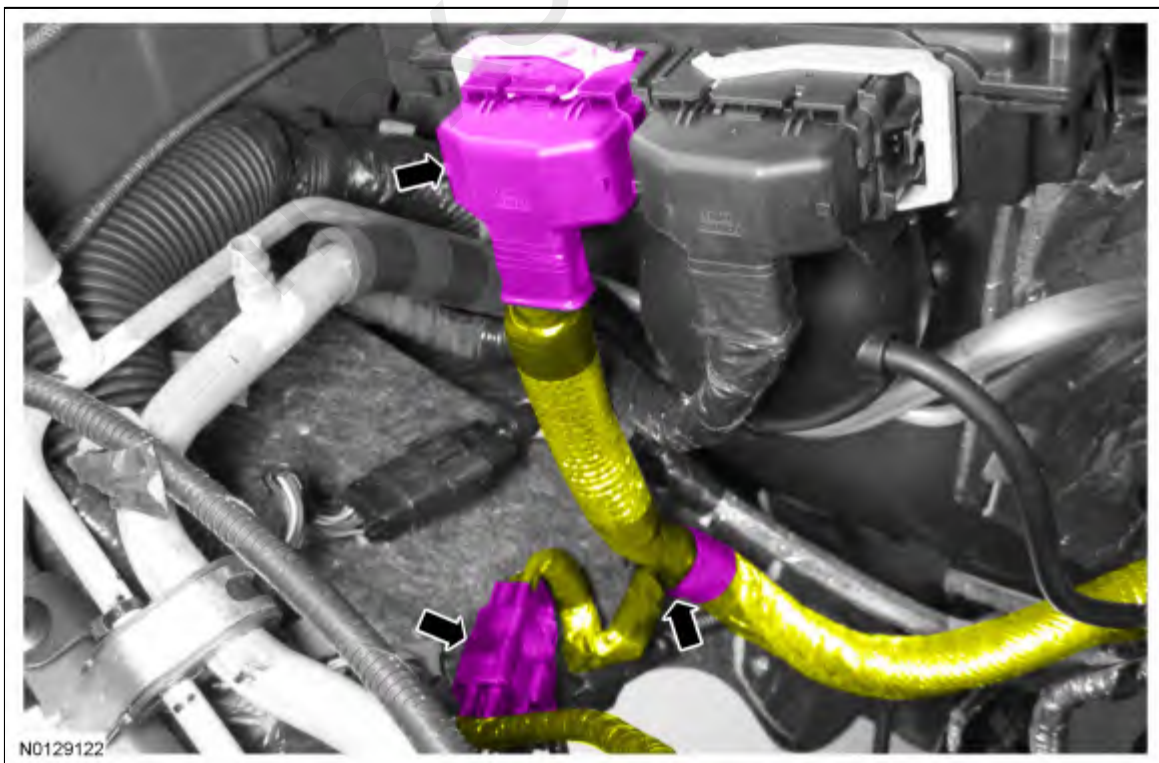
6. Remove the tie strap. Disconnect and position aside the turbocharger wastegate hose.



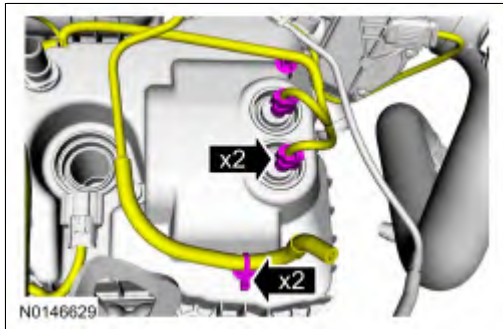
7. Remove the tie strap and disconnect the wire retainer from the valve cover.



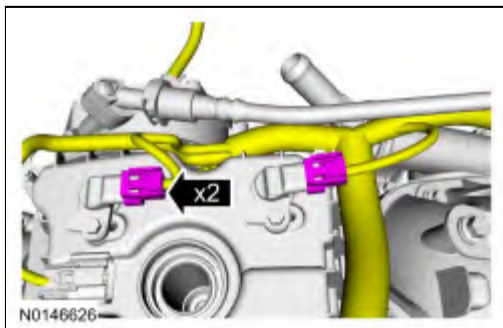
8. Disconnect the PCM electrical connector. Disconnect the electrical connector and the 2 wire retainers. Position aside the engine wire harness.



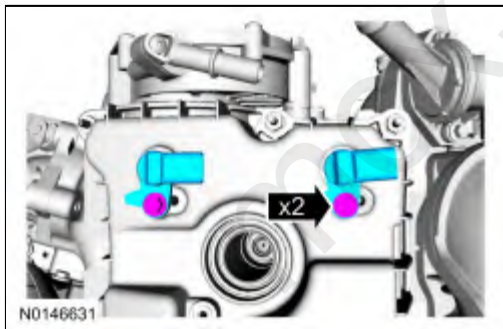
9. Disconnect the 2 RH Variable Camshaft Timing (VCT) solenoid electrical connectors. Remove the tie strap for the turbocharger wastegate hose and engine wiring.



10. Disconnect the 2 Camshaft Position (CMP) sensor electrical connectors.



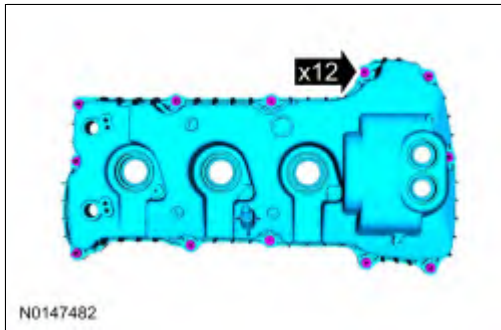
11. Remove the 2 bolts and the 2 CMP sensors.



12. Detach all of the wiring harness retainers from the RH valve cover and stud bolts.
13. **NOTE:** When removing the valve cover do not apply excessive force to the VCT oil control solenoid. If the VCT solenoid seal sticks to the VCT oil control solenoid carefully wiggle the valve cover until the seal breaks free. After the valve cover is removed, inspect and replace the VCT solenoids if damaged. The plastic electrical connector on the VCT solenoid will normally rotate approximately 12 degrees inside the steel housing.

Loosen the 12 valve cover stud bolts and remove the RH valve cover.

- Discard the valve cover gasket.



14. Inspect the 2 VCT solenoid seals. Remove any damaged seals.
- Using the Differential Bearing Cone Installer and Handle, remove the seal(s).



15. Inspect the spark plug tube seals. Remove any damaged seals.
- Using the VCT Spark Plug Tube Seal Remover and Handle, remove the seal(s).



16. Clean the valve cover, cylinder head and engine front cover sealing surfaces with metal surface prep.

Installation

1. **NOTE:** Installation of new seals is only required if damaged seals were removed.

Using the VCT Spark Plug Tube Seal Installer and Handle, install new spark plug tube seals.



2. **NOTE:** Installation of new seals is only required if damaged seals were removed.

Using the Differential Bearing Cone Installer and Handle, install new VCT solenoid seal(s).



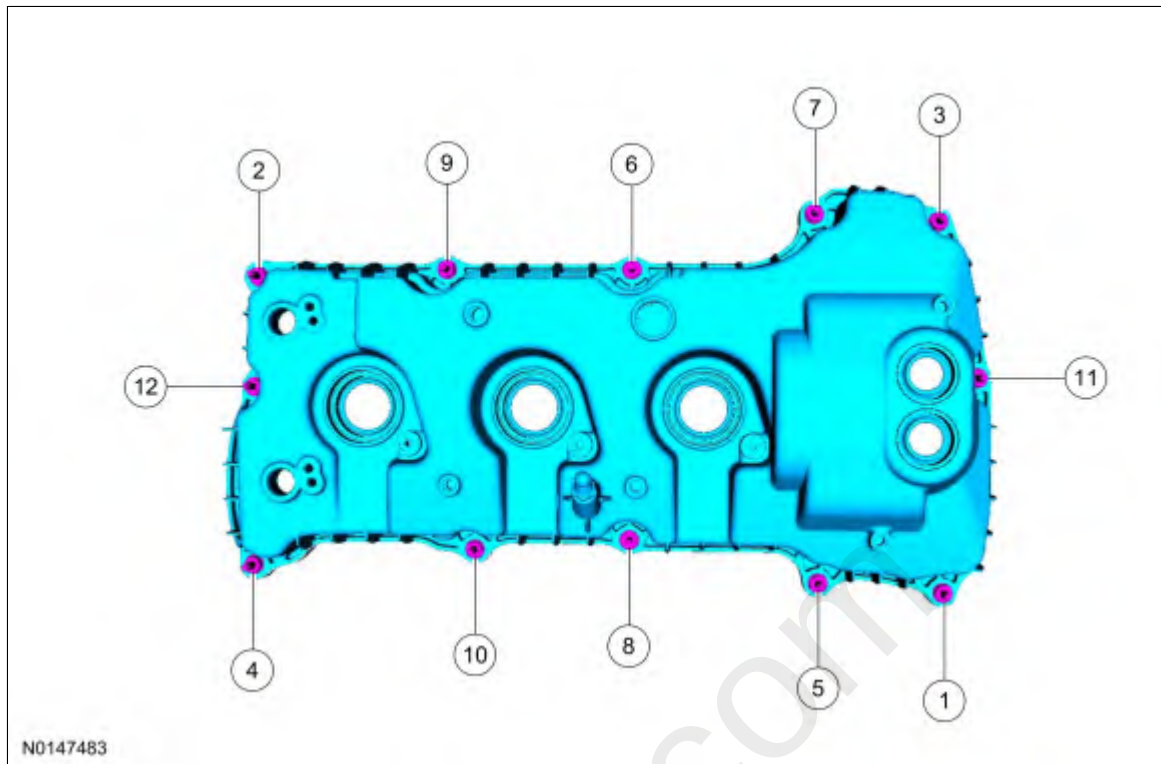
3. **NOTICE:** Failure to use the correct Motorcraft® High Performance Engine RTV Silicone may cause the engine oil to foam excessively and result in serious engine damage.

NOTE: If the valve cover is not installed and the fasteners tightened within 4 minutes, the sealant must be removed and the sealing area cleaned. To clean the sealing area, use silicone gasket remover and metal surface prep. Failure to follow this procedure can cause future oil leakage.

Apply an 8 mm (0.31 in) bead of Motorcraft® High Performance Engine RTV Silicone to the engine front cover-to-RH cylinder head joints.



4. Using a new gasket, install the RH valve cover, tighten the 12 valve cover stud bolts in the sequence shown.
- Tighten to 10 Nm (89 lb-in).



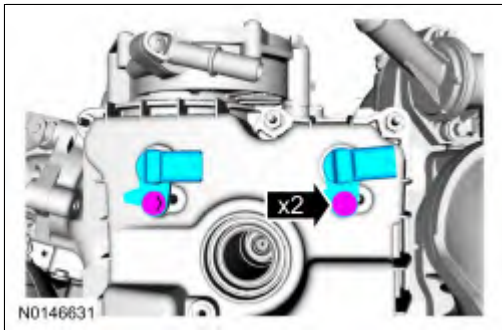
5. Make sure the VCT seals in the valve cover are below the top of the VCT oil control solenoid electrical connector or the VCT seal may leak oil.



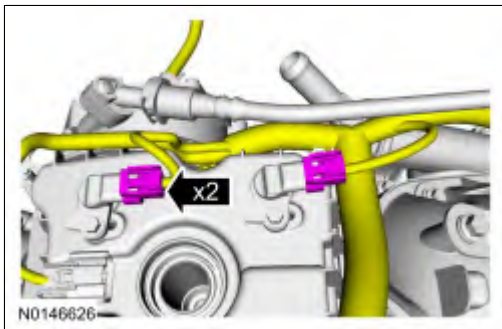
6. Attach all of the wiring harness retainers to the RH valve cover and stud bolts.
7. **NOTE:** Lubricate the 2 CMP sensor O-rings with clean engine oil.

Install the 2 CMP sensors and 2 bolts.

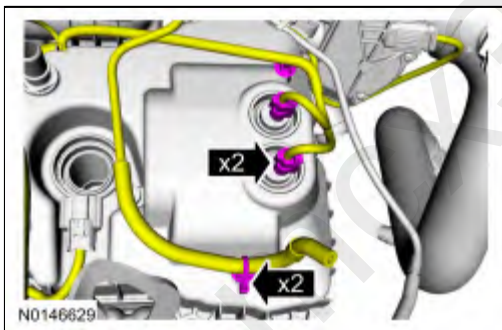
- Tighten to 7 Nm (62 lb-in).



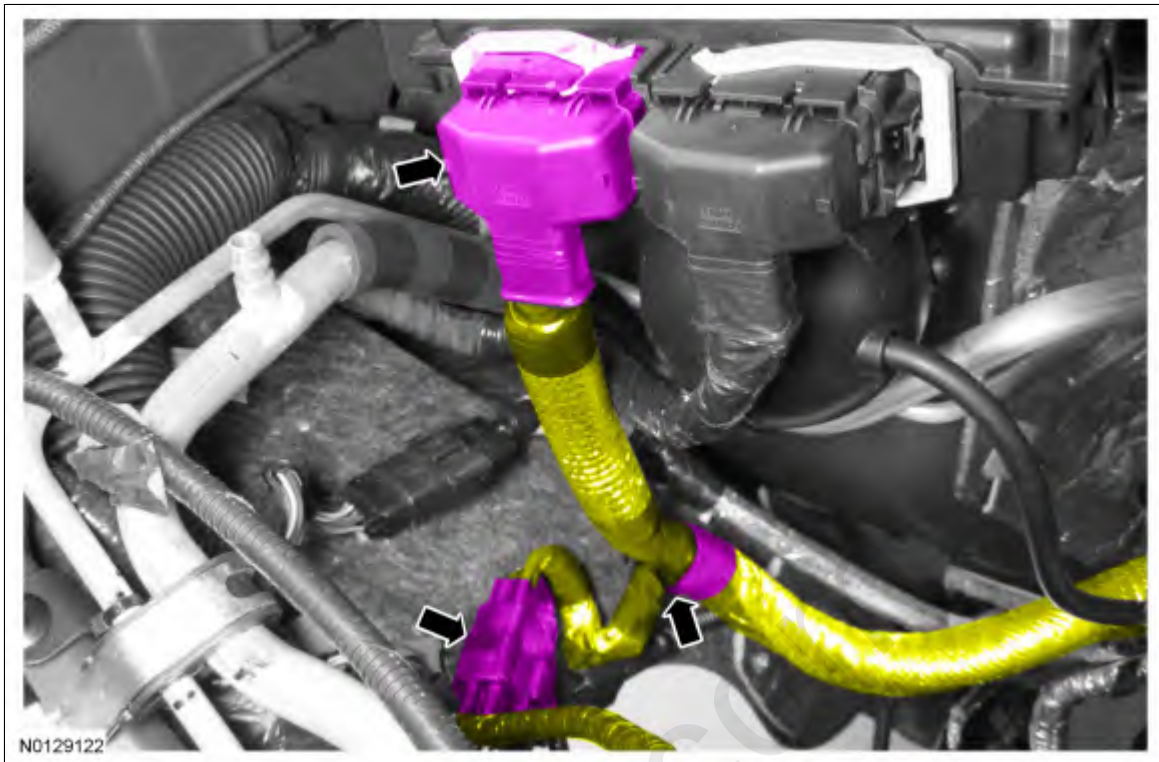
8. Connect the 2 CMP sensor electrical connectors.



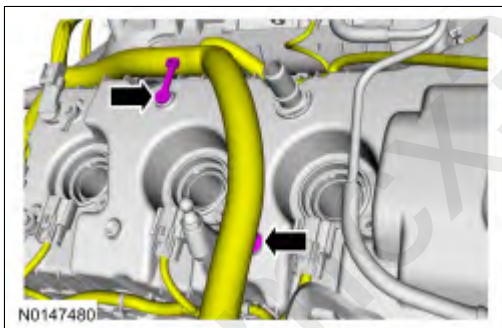
9. Connect the 2 RH VCT solenoid electrical connectors. Install a tie strap for the turbocharger wastegate hose and engine wiring.



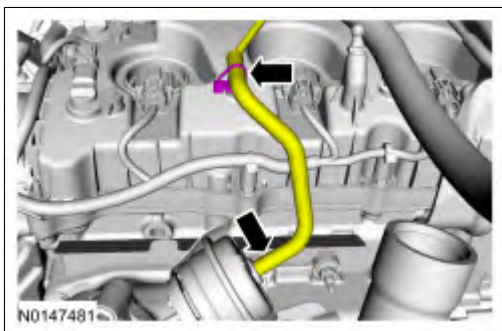
10. Connect the PCM electrical connector. Connect the electrical connector and the 2 wire retainers.



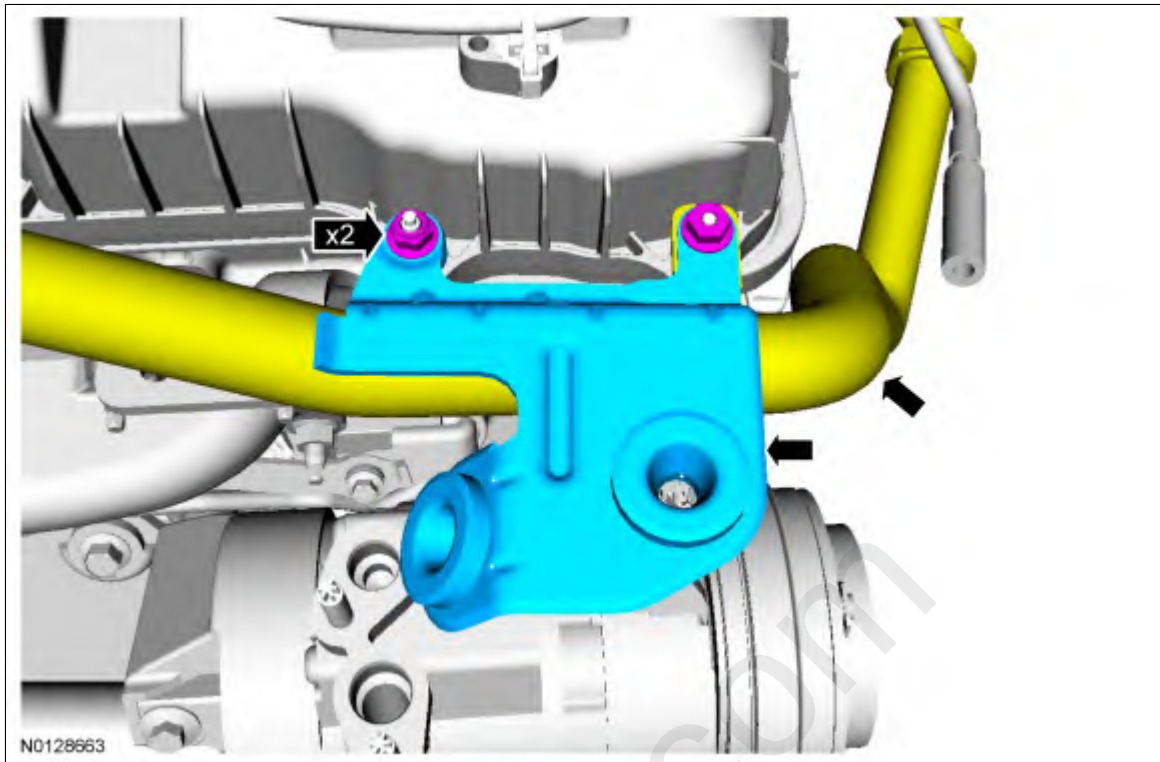
11. Connect the wire retainer to the valve cover. Install a tie strap



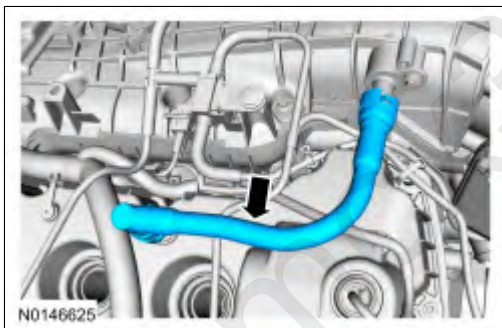
12. Connect the turbocharger wastegate hose. Install a the tie strap



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



14. Install the PCV tube. Refer to [Section 310-00](#).



15. Install the ignition coil-over-plugs. for additional information, refer to [Section 303-07A](#).
16. Install the RH turbocharger-to- CAC tube. Install the RH ACL pipe-to-turbocharger pipe and the ACL outlet pipe. For additional information, refer to Intake Air System Components — Exploded View, 3.5L GTDI in [Section 303-12](#).
17. Install the engine appearance cover.

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