

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

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

Engine Front Cover

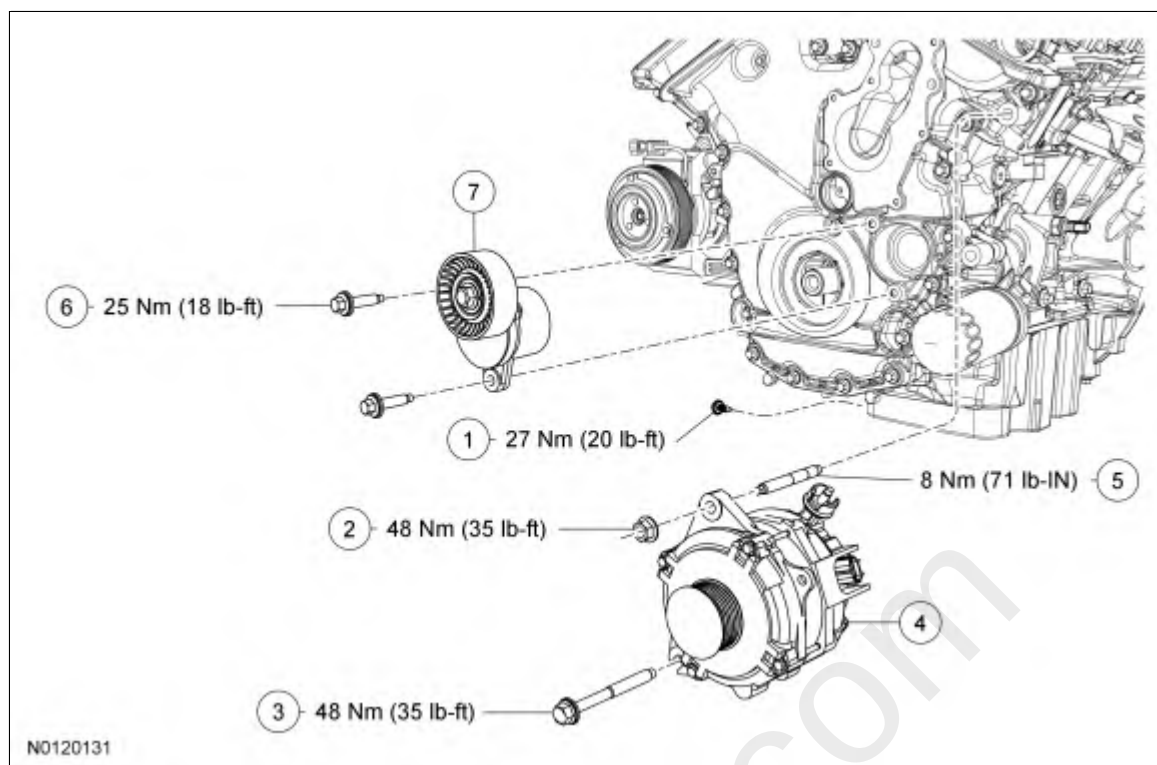
Special Tool(s)

 ST1326-A	Handle 205-153 (T80T-4000-W)
 ST1804-A	Installer, Spindle Bearing 205-149 (T80T-4000-R)
 ST2240-A	Installer, Spindle Bearing 205-150 (T80T-4000-S)

Material

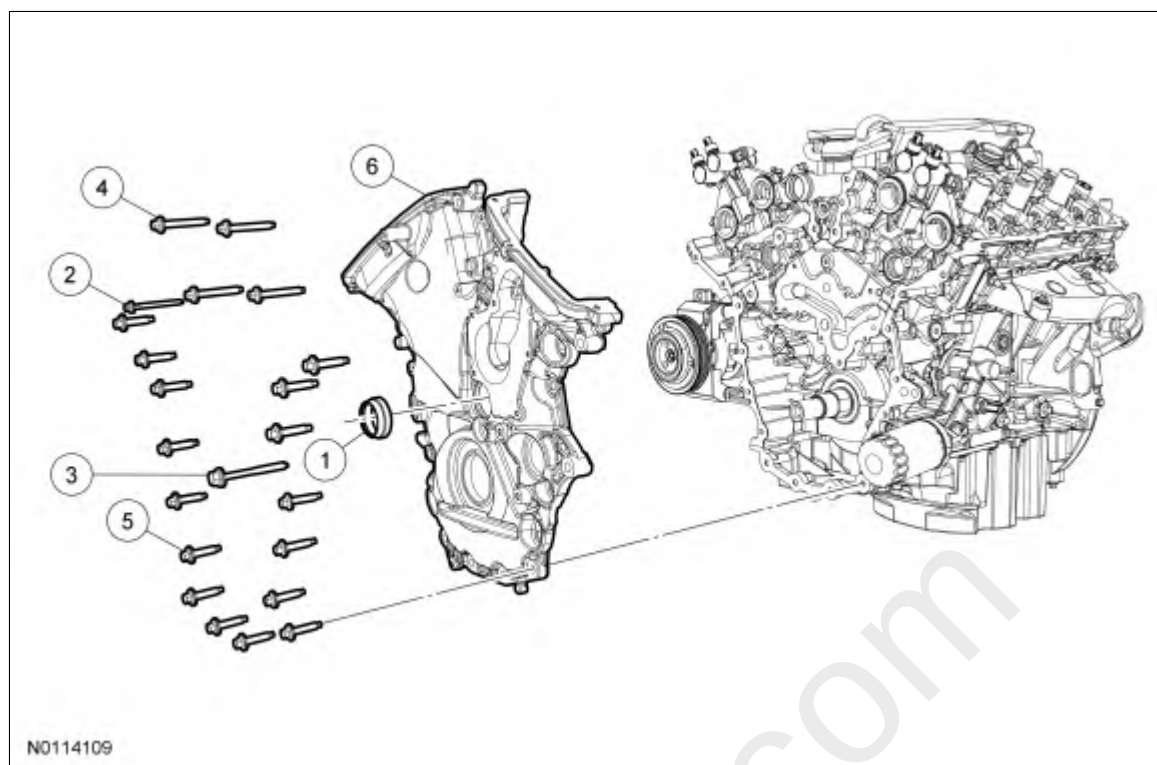
Item	Specification
Motorcraft® High Performance Engine RTV Silicone TA-357	WSE-M4G323-A6
Motorcraft® Metal Surface Prep ZC-31-A	—
Motorcraft® SAE 5W-30 Premium Synthetic Blend Motor Oil (US); Motorcraft® SAE 5W-30 Super Premium Motor Oil (Canada) XO-5W30-QSP (US); CXO-5W30-LSP12 (Canada)	WSS-M2C946-A
Motorcraft® Silicone Gasket Remover ZC-30	—

NOTE: Engine Front Cover (View 1 of 2)



Item	Part Number	Description
1	6730	Oil pan drain plug.
2	W520414	Generator nut
3	W714577	Generator bolt
4	10346	Generator
5	W714329	Generator stud
6	W713261	Accessory drive belt tensioner bolt (2 required)
7	6B209	Accessory drive belt tensioner

NOTE: Engine Front Cover (View 2 of 2)



Item	Part Number	Description
1	6020	Front cover radial seal
2	W503285	Engine front cover bolt
3	W714662	Engine front cover bolt
4	W503301	Engine front cover bolt (4 required)
5	W503297	Engine front cover bolt (16 required)
6	6019	Engine front cover

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. Release the fuel pressure. Refer to [Section 310-00](#).
2. Remove the Charge Air Cooler (CAC)-to-Throttle Body (TB) pipe. For additional information, refer to Intake Air System Components — Exploded View, 3.5L in [Section 303-12](#).
3. Remove the intake manifold. For additional information, refer to [Intake Manifold](#) in this section.
4. Remove the LH and RH valve covers. For additional information, refer to [Valve Cover — LH](#) and [Valve Cover — RH](#) in this section.
5. Remove the drain plug and drain the engine oil.
 - Install the drain plug and tighten to 27 Nm (20 lb-ft).
6. Remove the coolant pump. For additional information, refer to [Section 303-03](#).

7. Remove the bolt and position the generator aside.
8. Remove the generator stud.
9. Remove the 2 bolts and the accessory drive belt tensioner.
10. Remove the crankshaft front seal. For additional information, refer to [Crankshaft Front Seal](#) in this section.
11. Remove the pushpin retainer from the oil pan.



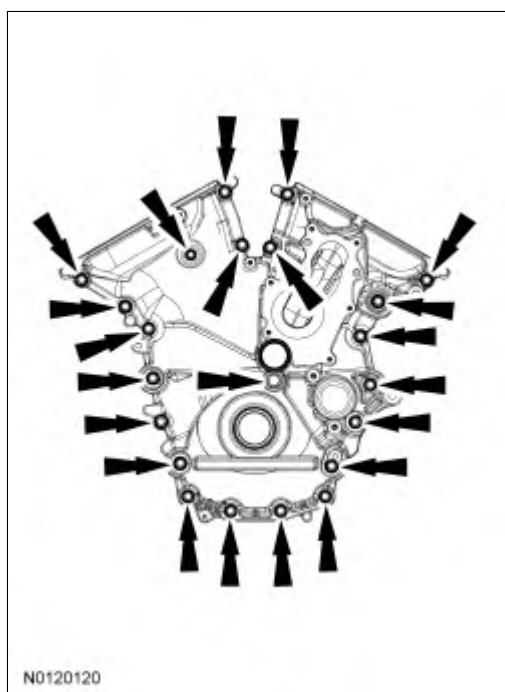
12. Remove the nut and the transmission cooler tube bracket from the engine front cover stud bolt.



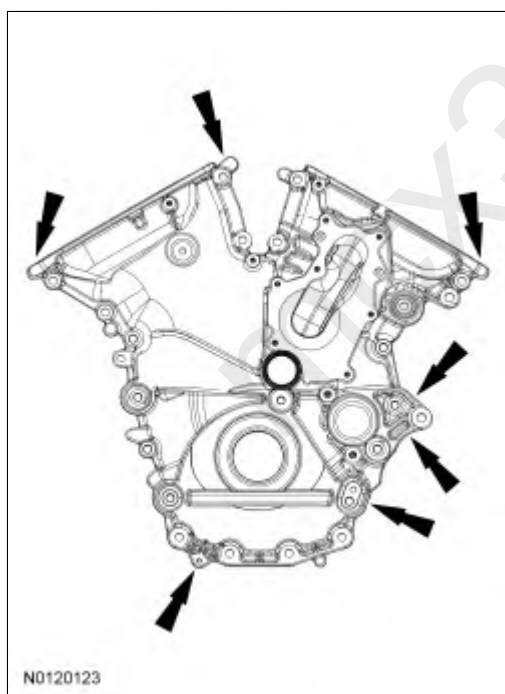
13. Disconnect the generator wiring harness from the engine front cover and the stud bolt.



14. Remove the 22 engine front cover bolts.

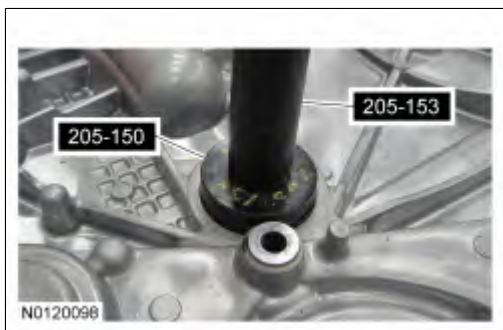


15. Using a suitable pry tool, locate the 7 pry pads shown and pry the engine front cover loose and remove.



16. **NOTE:** Inspect and replace the front cover radial seal as necessary.

Using the Spindle Bearing Installer and Handle, remove the front cover radial seal from the rear side of the front cover.



Installation

1. **NOTICE:** Only use a 3M™ Roloc® Bristle Disk (2-in white, part number 07528) to clean the engine front cover. Do not use metal scrapers, wire brushes or any other power abrasive disk to clean. These tools cause scratches and gouges that make leak paths.

Clean the engine front cover using 3M™ Roloc® Bristle Disk (2-in white, part number 07528) in a suitable tool turning at the recommended speed of 15,000 rpm.

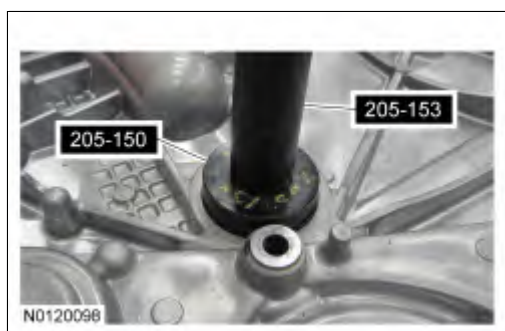
- Thoroughly wash the engine front cover to remove any foreign material, including any abrasive particles created during the cleaning process.

2. **NOTICE:** Place clean, lint-free shop towels over exposed engine cavities. Carefully remove the towels so foreign material is not dropped into the engine. Any foreign material (including any material created while cleaning gasket surfaces) that enters the oil passages or the oil pan may cause engine failure.

NOTICE: Do not use wire brushes, power abrasive discs or 3M™ Roloc® Bristle Disk (2-in white, part number 07528) to clean the sealing surfaces. These tools cause scratches and gouges that make leak paths. These tools cause contamination that can cause premature engine failure. Remove all traces of sealant, including any sealant from the inner surface of the cylinder block and cylinder head.

Clean the sealing surfaces of the cylinder heads, the cylinder block and the oil pan in the following sequence.

1. Remove any large deposits of silicone or gasket material.
 2. Apply silicone gasket remover and allow to sit for several minutes.
 3. Remove the silicone gasket remover. A second application of silicone gasket remover may be required if residual traces of silicone or gasket material remain.
 4. Apply metal surface prep to remove any remaining traces of oil and to prepare the surfaces to bond. Do not attempt to make the metal shiny. Some staining of the metal surfaces is normal.
 5. Make sure the 2 locating pins are seated correctly in the cylinder block.
3. Using the Spindle Bearing Installer, install a new front cover radial seal from the rear side of the front cover.



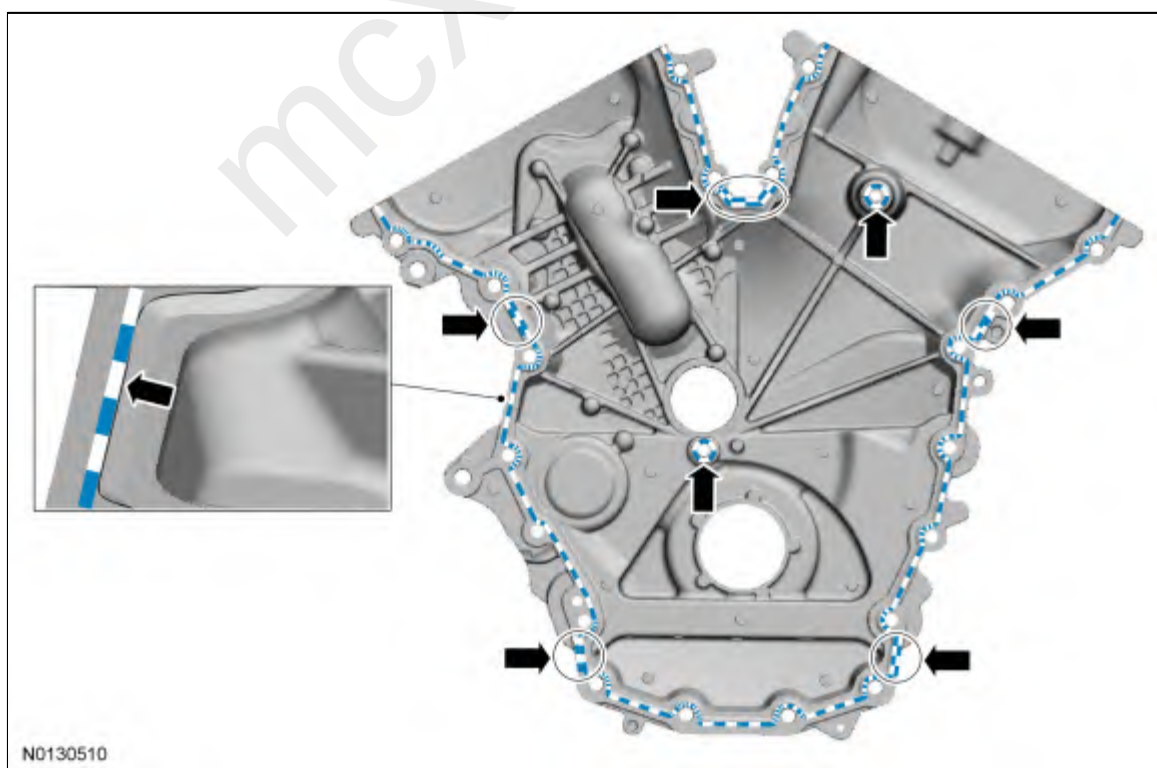
4. **NOTICE:** Failure to use Motorcraft® High Performance Engine RTV Silicone may cause the engine oil to foam excessively and result in serious engine damage.

NOTICE: Do not expose the Motorcraft® High Performance Engine RTV Silicone to engine oil for at least 90 minutes after installing the engine front cover. Failure to follow this procedure can cause engine oil leakage.

NOTE: The engine front cover and bolts 1, 2, 7, 8, 15, 17, 18, 19, 20 and 21 must be installed within 10 minutes of the initial sealant application. The remainder of the engine front cover bolts and the engine mount bracket bolts must be installed and tightened within 35 minutes of the initial sealant application. If the time limits are exceeded, the sealant must be removed, the sealing area cleaned and sealant reapplied. To clean the sealing area, use silicone gasket remover and metal surface prep. Failure to follow this procedure can cause future oil leakage.

Apply a 3.0 mm (0.11 in) bead of Motorcraft® High Performance Engine RTV Silicone on the inside edge of the engine front cover to the engine front cover sealing surfaces including the 2 engine front cover bolt bosses.

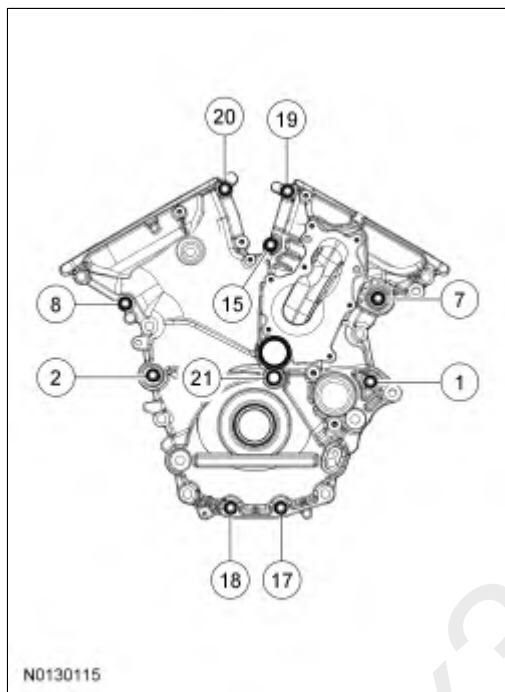
- Apply a 5.5 mm (0.21 in) bead of Motorcraft® High Performance Engine RTV Silicone to the oil pan-to-cylinder block joint and the cylinder head-to-cylinder block joint areas of the engine front cover in 5 places as indicated.



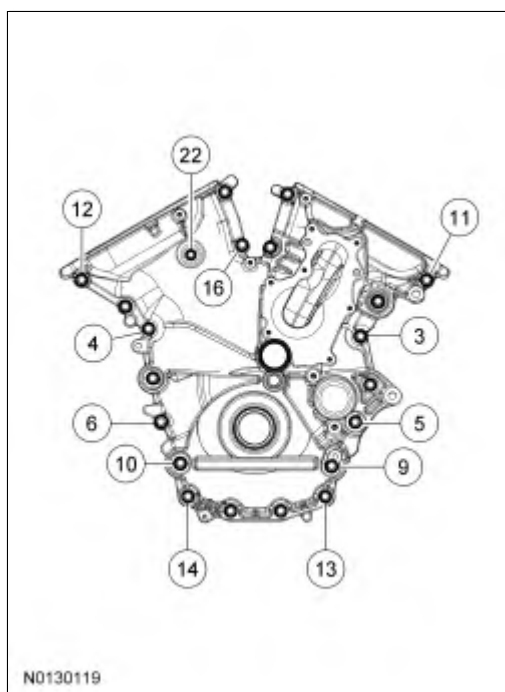
5. **NOTE:** Make sure the 2 locating dowel pins are seated correctly in the cylinder block.

Install the engine front cover and bolts 1, 2, 7, 8, 15, 17, 18, 19, 20 and 21 and tighten in the sequence shown in 3 stages:

- Stage 1: Tighten bolts 1, 2, 7, 8, 15, 17, 18, 19, 20 and 21 in sequence to 10 Nm (89 lb-in).
- Stage 2: Tighten bolts 1, 2, 7, 8, 15, 17, 18, 19 and 20 in sequence to 20 Nm (177 lb-in) then an additional 45 degrees.
- Stage 3: Tighten bolt 21 to 20 Nm (177 lb-in) then an additional 90 degrees.



6. Install the remaining 12 engine front cover bolts 3, 4, 5, 6, 9, 10, 11, 12, 13, 14, 16, 22 and tighten in the sequence shown in 3 stages:
- Stage 1: Tighten bolts 3, 4, 5, 6, 9, 10, 11, 12, 13, 14, and 16 to 10 Nm (89 lb-in).
 - Stage 2: Tighten bolts 3, 4, 5, 6, 9, 10, 11, 12, 13, 14, and 16 to 20 Nm (177 lb-in) then an additional 45 degrees.
 - Stage 3: Tighten bolt 22 to 10 Nm (89 lb-in) then an additional 45 degrees.



7. Position the generator wiring harness on the stud bolt and clip the engine harness on the engine front cover.



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



9. Install the pushpin retainer into the oil pan.



10. Install the crankshaft front seal. For additional information, refer to [Crankshaft Front Seal](#) in this section.
 11. Install the accessory drive belt tensioner and 2 bolts.
 - Tighten to 25 Nm (18 lb-ft).
 12. Install the generator stud.
 - Tighten to 8 Nm (71 lb-in).
 13. Position back the generator and install the bolt.
 - Tighten to 48 Nm (35 lb-ft).
 14. Install the coolant pump. For additional information, refer to [Section 303-03](#).
 15. Install the LH and RH valve covers. For additional information, refer to [Valve Cover — LH](#) and [Valve Cover — RH](#) in this section.
 16. Install the intake manifold. For additional information, refer to [Intake Manifold](#) in this section.
 17. Install the CAC -to- TB pipe. For additional information, refer to Intake Air System Components — Exploded View, 3.5L in [Section 303-12](#).
 18. Connect the battery ground cable. For additional information, refer to [Section 414-01](#).
 19. Fill the engine with clean engine oil.
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