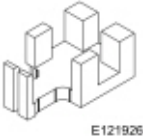
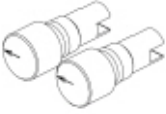




303-01 Engine - 2.3L EcoBoost (201kW/273PS)
Removal and Installation

2019 Ranger
Procedure revision date: 01/4/2019

Crankshaft Pulley

Special Tool(s) / General Equipment

 E121926	303-1521 Alignment Tool, Crankshaft Position Sensor TKIT-2010C-FLM
 E274103	303-1686 Holding Tool, Camshaft
 E274106	303-1689 Holding Tool, Crank Damper
 PZ21210	303-507 Timing Peg, Crankshaft TDC TKIT-2001N-FLM TKIT-2001N-ROW

Materials

Name	Specification
Motorcraft® Silicone Brake Caliper Grease and Dielectric Compound XG-3-A	ESE-M1C171-A

Removal

NOTICE: Do not loosen or remove the crankshaft pulley bolt without first installing the special tools as instructed in this procedure. The crankshaft pulley and the crankshaft timing sprocket are not keyed to the crankshaft. The crankshaft, the crankshaft sprocket and the pulley are fitted together by friction. For that reason, the crankshaft sprocket is also unfastened if the pulley bolt is loosened. Before any repair requiring loosening or removal of the crankshaft pulley bolt, the crankshaft and camshafts must be locked in place by the special service tools, otherwise severe engine damage can occur.

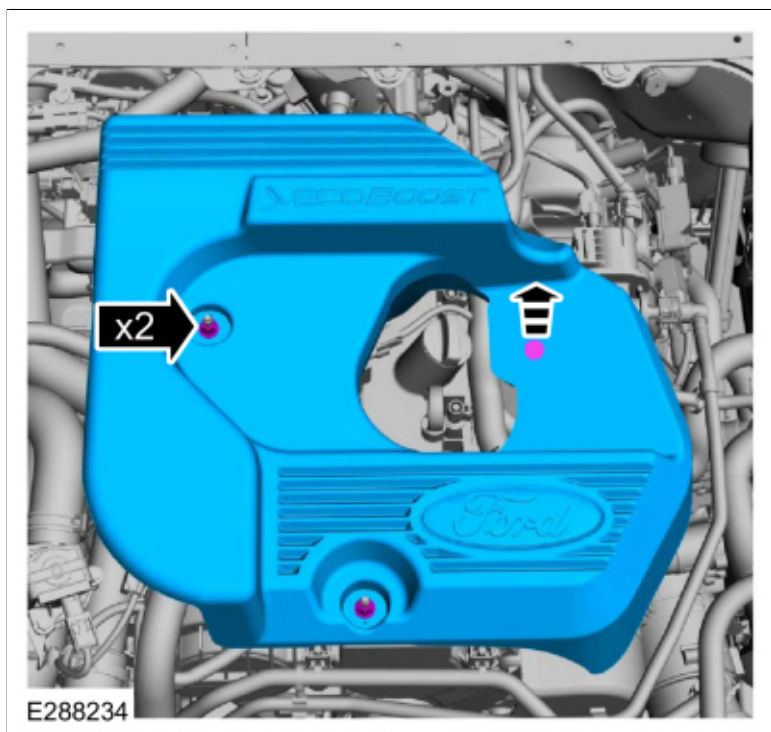
NOTICE: During engine repair procedures, cleanliness is extremely important. All parts must be thoroughly cleaned and any foreign material, including any material created while cleaning gasket surfaces, that enters the oil passages, coolant passages or the oil pan, can cause engine failure.

1. With the vehicle in NEUTRAL, position it on a hoist.

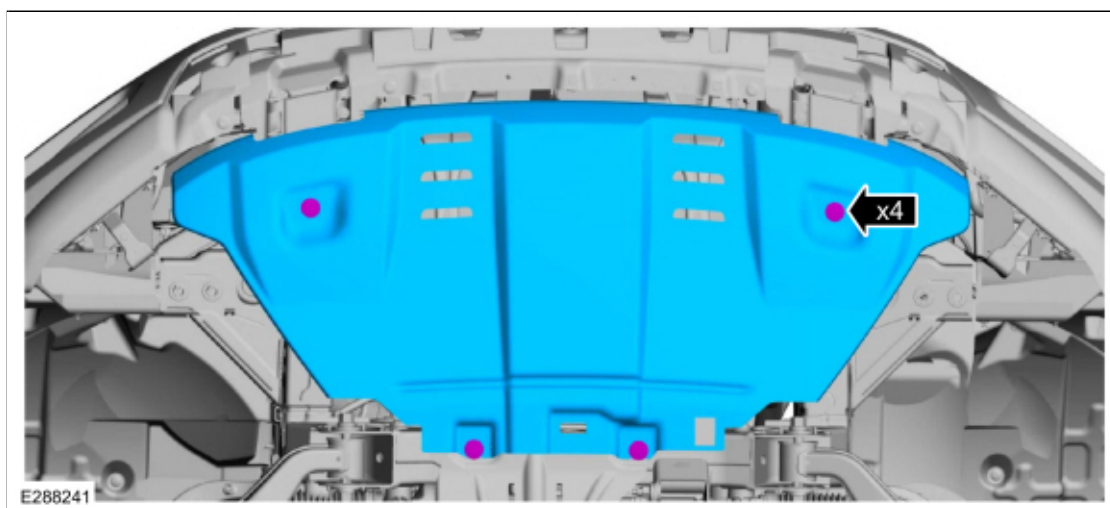
Refer to: [Jacking and Lifting](#) (100-02 Jacking and Lifting, Description and Operation).

2. **NOTICE:** Do not pull the engine appearance cover forward or sideways to remove. Failure to press straight upward on the underside of the cover at the attachment points may result in damage to the cover or engine components.

1. Remove the engine appearance cover nuts.
2. Place your hand under the engine appearance cover at each grommet location and push straight up to release each grommet from the studs.
3. After all of the grommets have been released from the studs, remove the appearance cover from the engine.



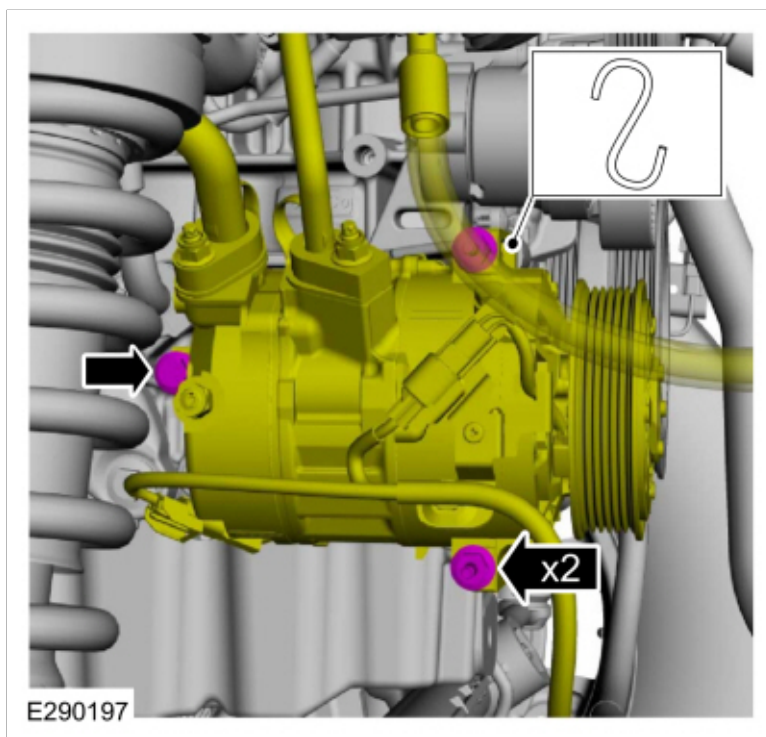
3. Remove the bolts and the front skid plate.



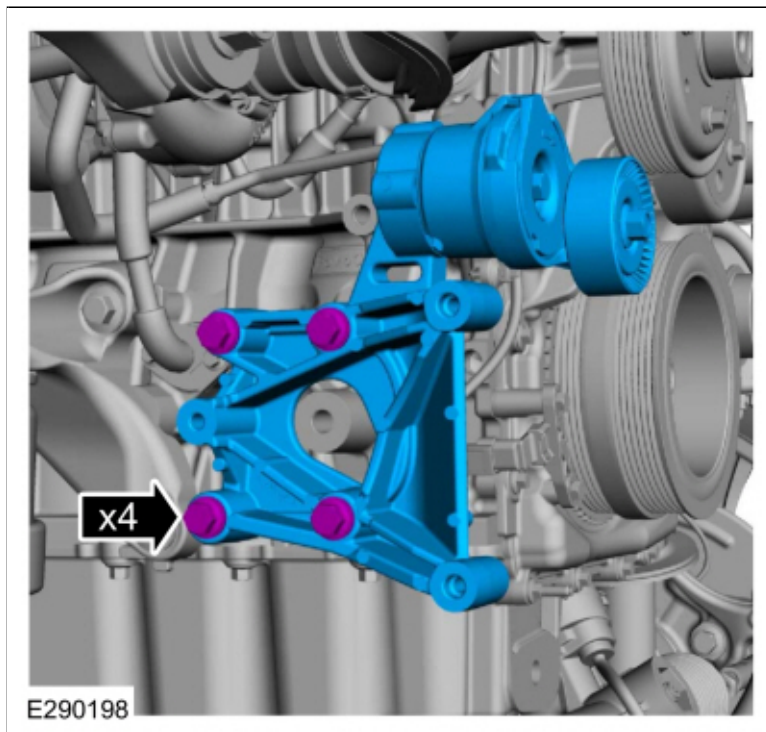
4. Remove the following items:
 1. Remove the upper and lower cooling fan shrouds.
Refer to: [Cooling Fan Upper Shroud](#) (303-03 Engine Cooling - 2.3L EcoBoost (201kW/273PS), Removal and Installation).
Refer to: [Cooling Fan Lower Shroud](#) (303-03 Engine Cooling - 2.3L EcoBoost (201kW/273PS), Removal and Installation).
 2. Remove the cooling fan.
Refer to: [Cooling Fan](#) (303-03 Engine Cooling - 2.3L EcoBoost (201kW/273PS), Removal and Installation).
 3. Remove the accessory drive belt.
Refer to: [Accessory Drive Belt](#) (303-05 Accessory Drive - 2.3L EcoBoost (201kW/273PS), Removal and Installation).

5. **NOTE:** The A/C compressor bolts will stay with the A/C compressor.

Loosen the bolts, position and support the A/C compressor aside.

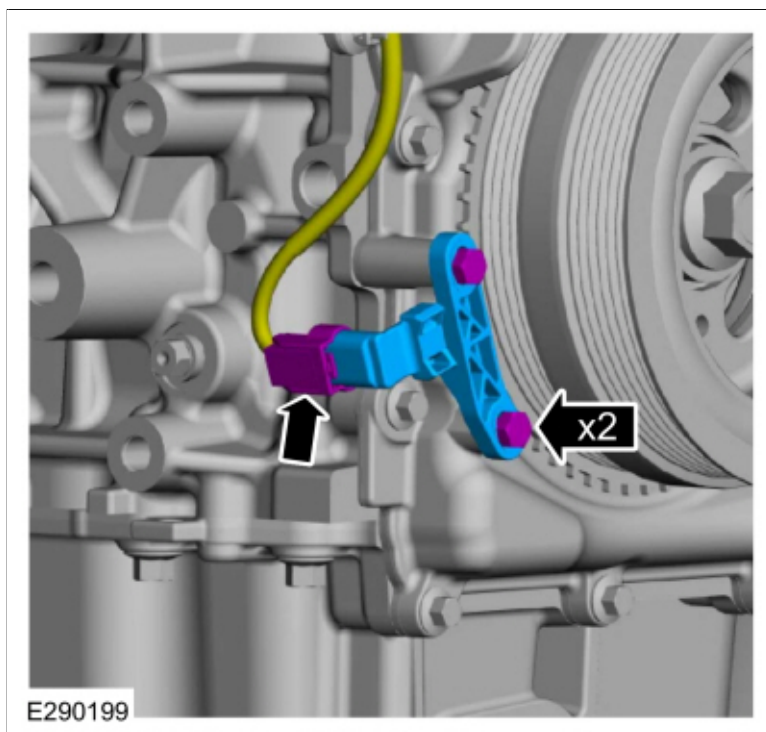


6. Remove the bolts and the A/C compressor bracket.

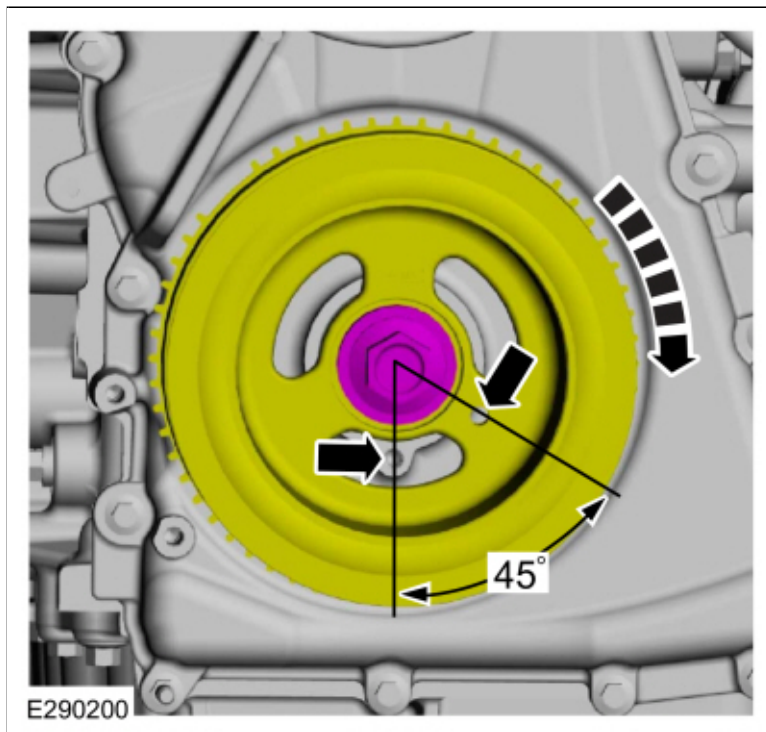


7.

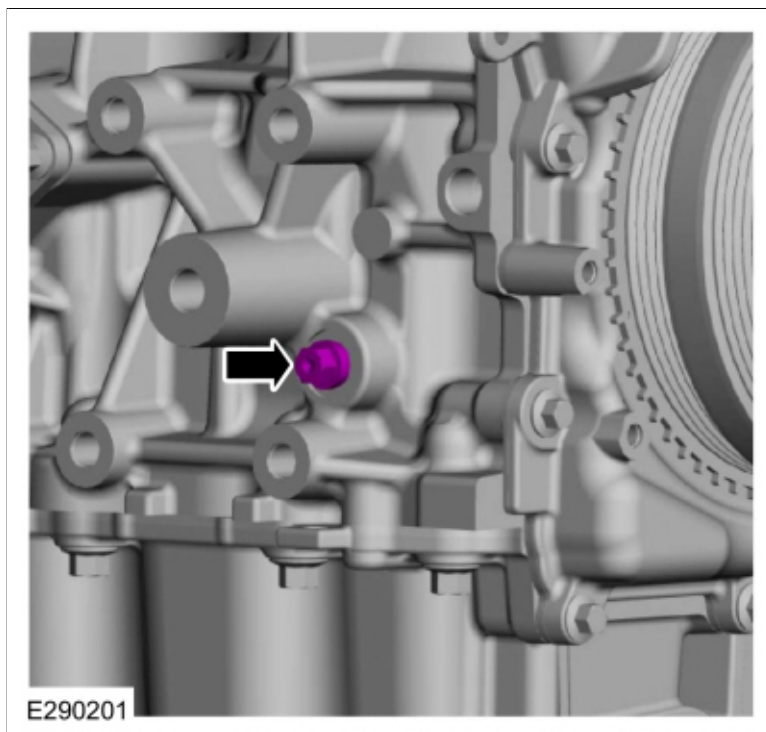
- Disconnect the CKP sensor electrical connector.
- Remove the bolts and the CKP sensor.



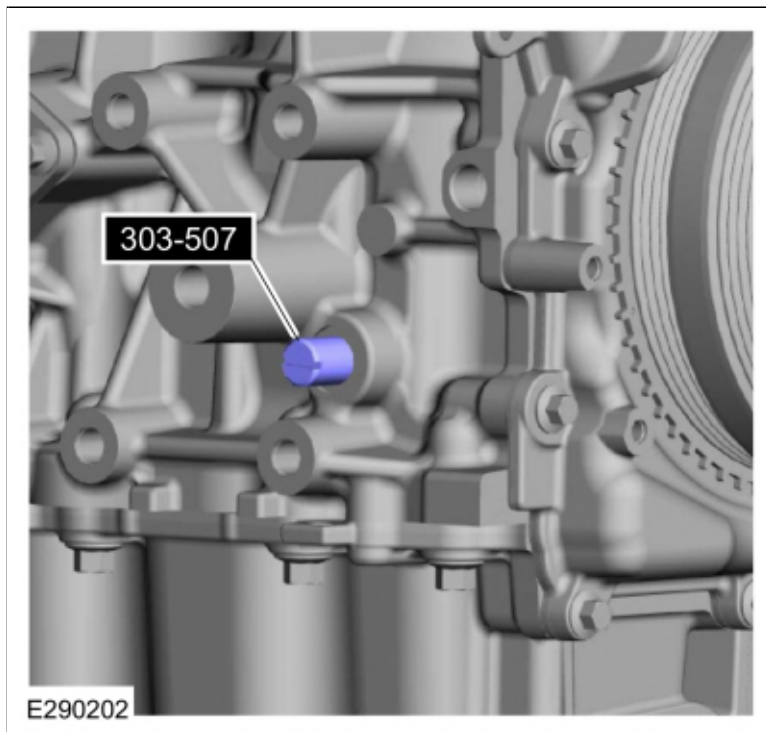
8. Turn the crankshaft clockwise until the No.1 piston is 45 degrees BTDC using the guide holes on the engine front cover and the crankshaft pulley.



9. Remove the engine plug bolt.



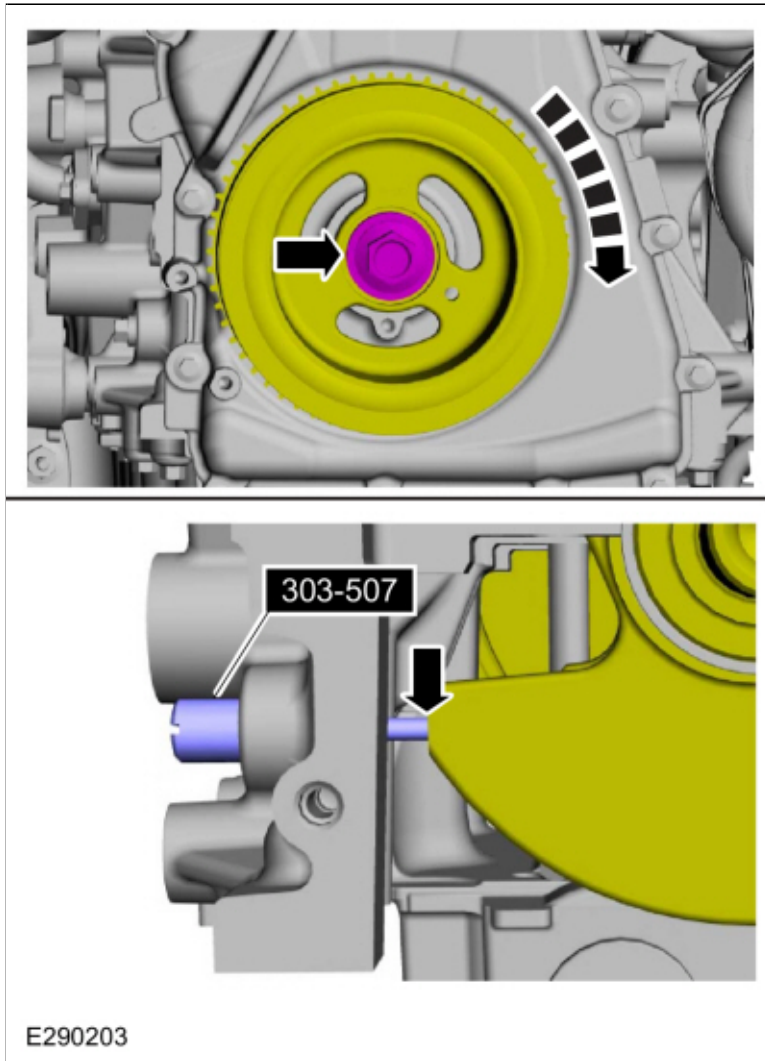
10. Install Special Service Tool: [303-507 Timing Peg, Crankshaft TDC.](#)



11. **NOTE:** The Crankshaft TDC Timing Peg will contact the crankshaft and prevent it from turning past TDC. However, the crankshaft can still be rotated in the counterclockwise direction. The crankshaft must remain at the TDC position during the crankshaft pulley removal and installation.

NOTE: The engine front cover is removed from graphic for clarity.

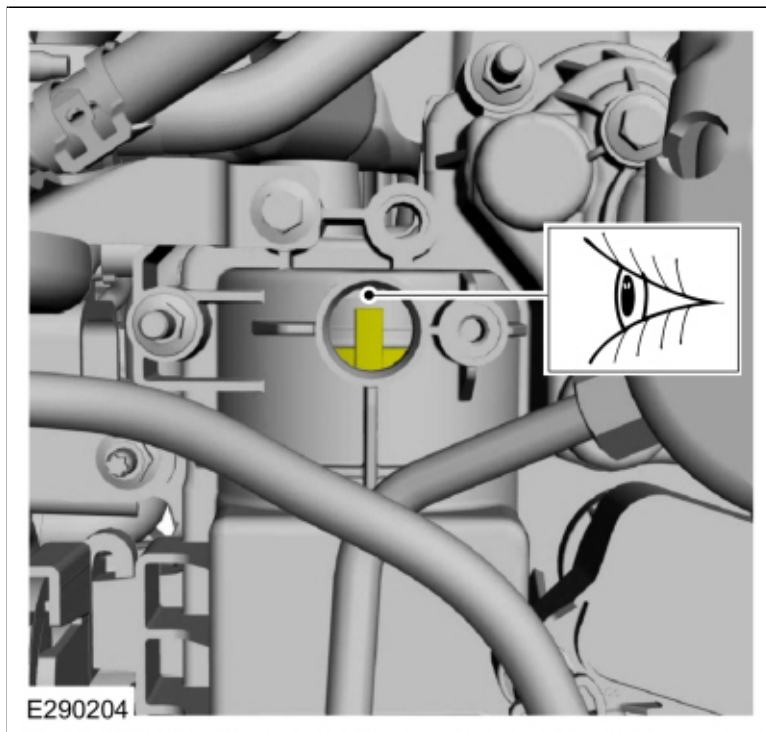
Rotate the crankshaft clockwise until the contacts the special tool.
Use Special Service Tool: [303-507 Timing Peg, Crankshaft TDC](#).



12. Remove the RH and LH CMP sensors.
Refer to: [Camshaft Position \(CMP\) Sensor](#) (303-14 Electronic Engine Controls - 2.3L EcoBoost (201kW/273PS), Removal and Installation).

13. **NOTE:** *Exhaust camshaft shown, intake camshaft similar.*

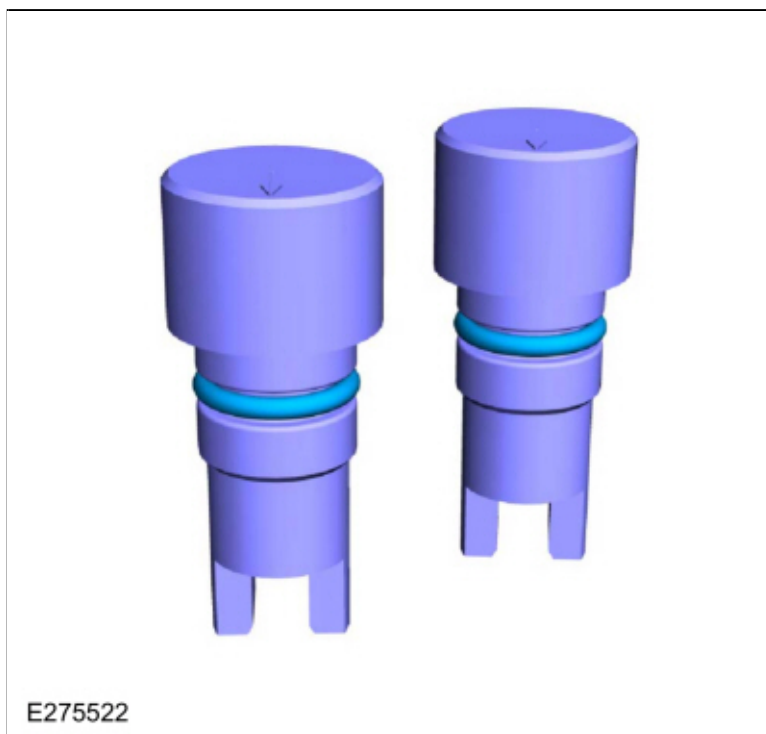
Make sure the camshaft trigger wheels are aligned as shown.



14. **NOTE:** Removing the O-ring seals will aid in the installation of 303-1686.

Remove the O-ring seals from 303-1686.

Use Special Service Tool: [303-1686 Holding Tool, Camshaft](#).

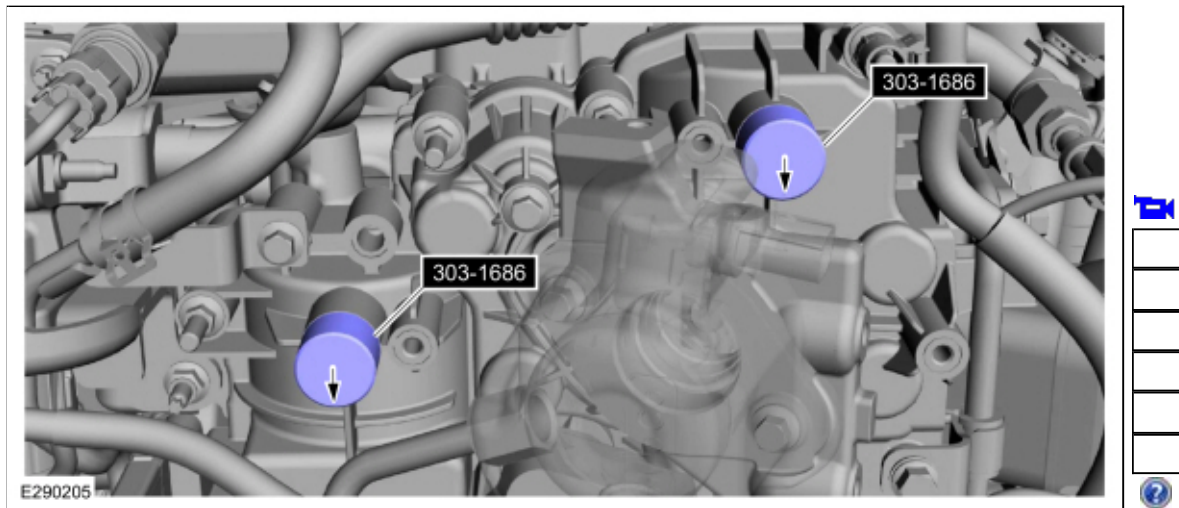


15. **NOTICE:** The Camshaft Alignment Tool is for camshaft alignment only. Using this tool to prevent engine rotation can result in engine damage.

NOTICE: Do not force the camshaft holding tool into the valve cover or damage can result to the camshaft trigger wheels.

NOTE: The camshaft trigger wheels are offset. If the Camshaft Holding Tools cannot be installed, remove the TDC Timing Peg and rotate the crankshaft three-fourths of a revolution clockwise and repeat steps 10 and 11 of this removal procedure.

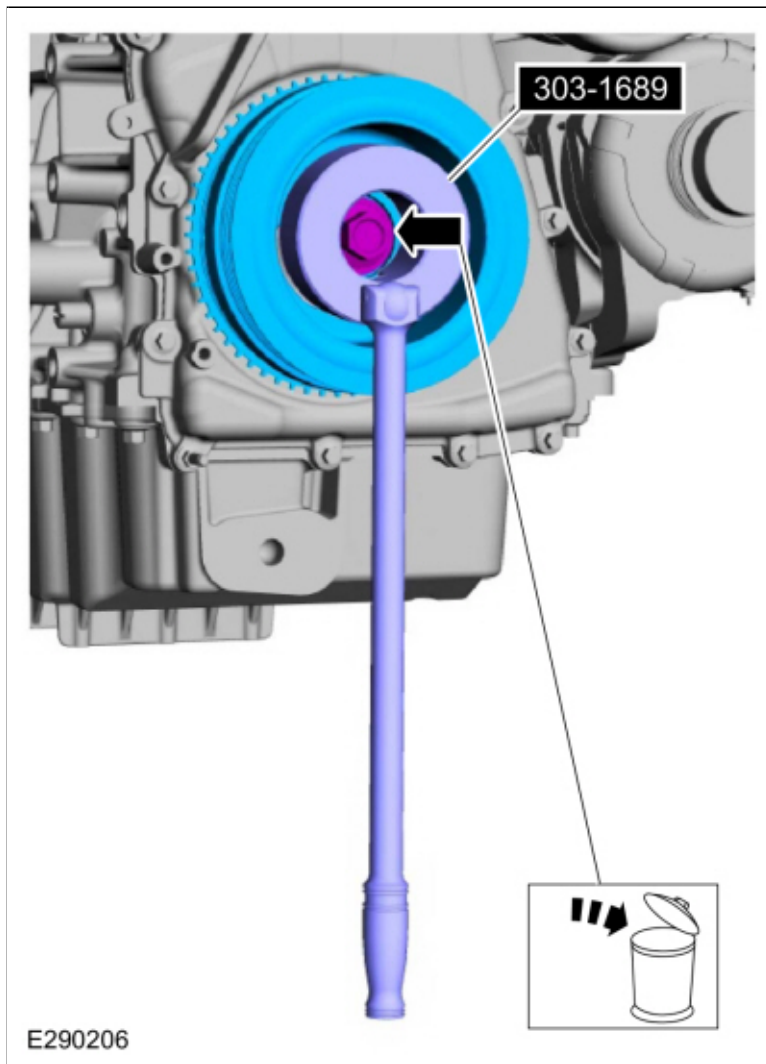
Install Special Service Tool: [303-1686 Holding Tool, Camshaft](#).



16. **NOTICE:** The crankshaft must remain in the TDC position during removal of the pulley bolt or damage to the engine can occur. Therefore, the crankshaft pulley must be held in place with the Crank Damper Holding Tool and the bolt should be removed using an air impact wrench (1/2-in drive minimum).

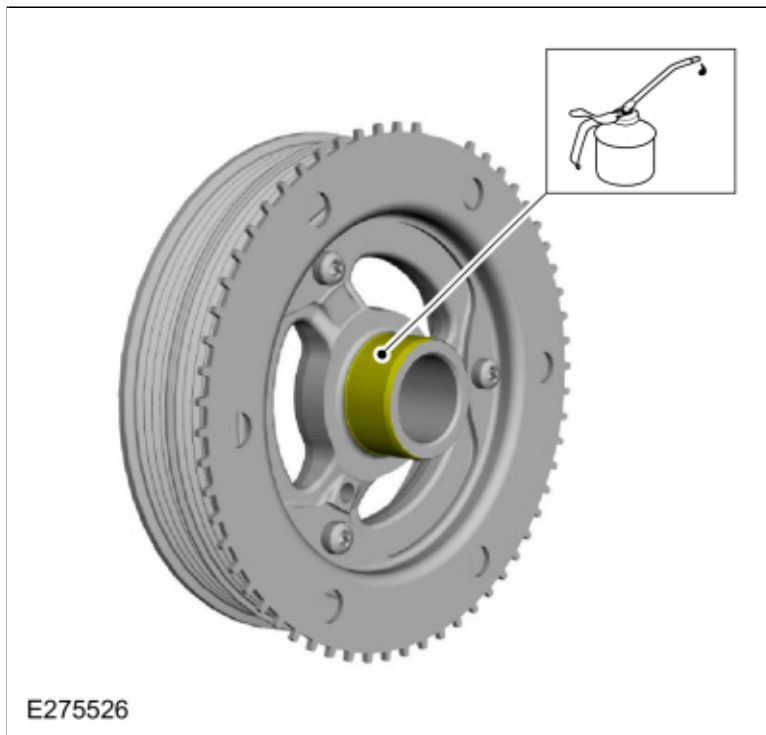
- Using the special tool, remove the bolt, washer and the crankshaft pulley.
Use Special Service Tool: [303-1689 Holding Tool, Crank Damper](#).
- **NOTE:** If necessary, retain the original crankshaft pulley bolt to use for the removal of the crankshaft front seal.

Discard the bolt.

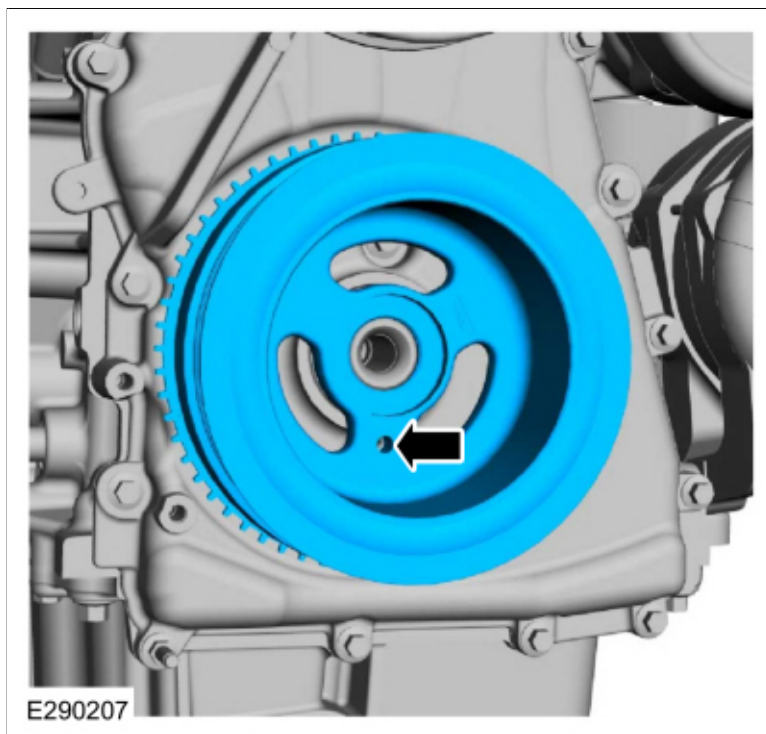


Installation

1. Lubricate the crankshaft pulley with clean engine oil.

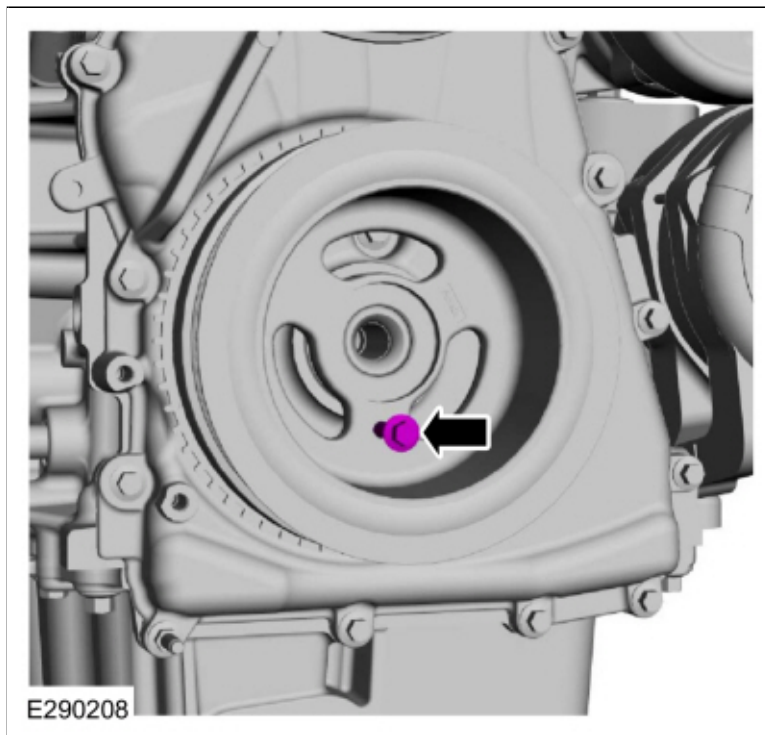


2. Position the crankshaft pulley onto the crankshaft with the access hole at the 6 o'clock position.



3. **NOTE:** This step will correctly align the crankshaft pulley to the crankshaft.

Install an M6 bolt finger tight.



4. **NOTICE:** The crankshaft must remain in the TDC position during installation of the pulley bolt or damage to the engine can occur. Therefore, the crankshaft pulley must be held in place with the Crank Damper Holding Tool and the bolt should be installed using hand tools only.

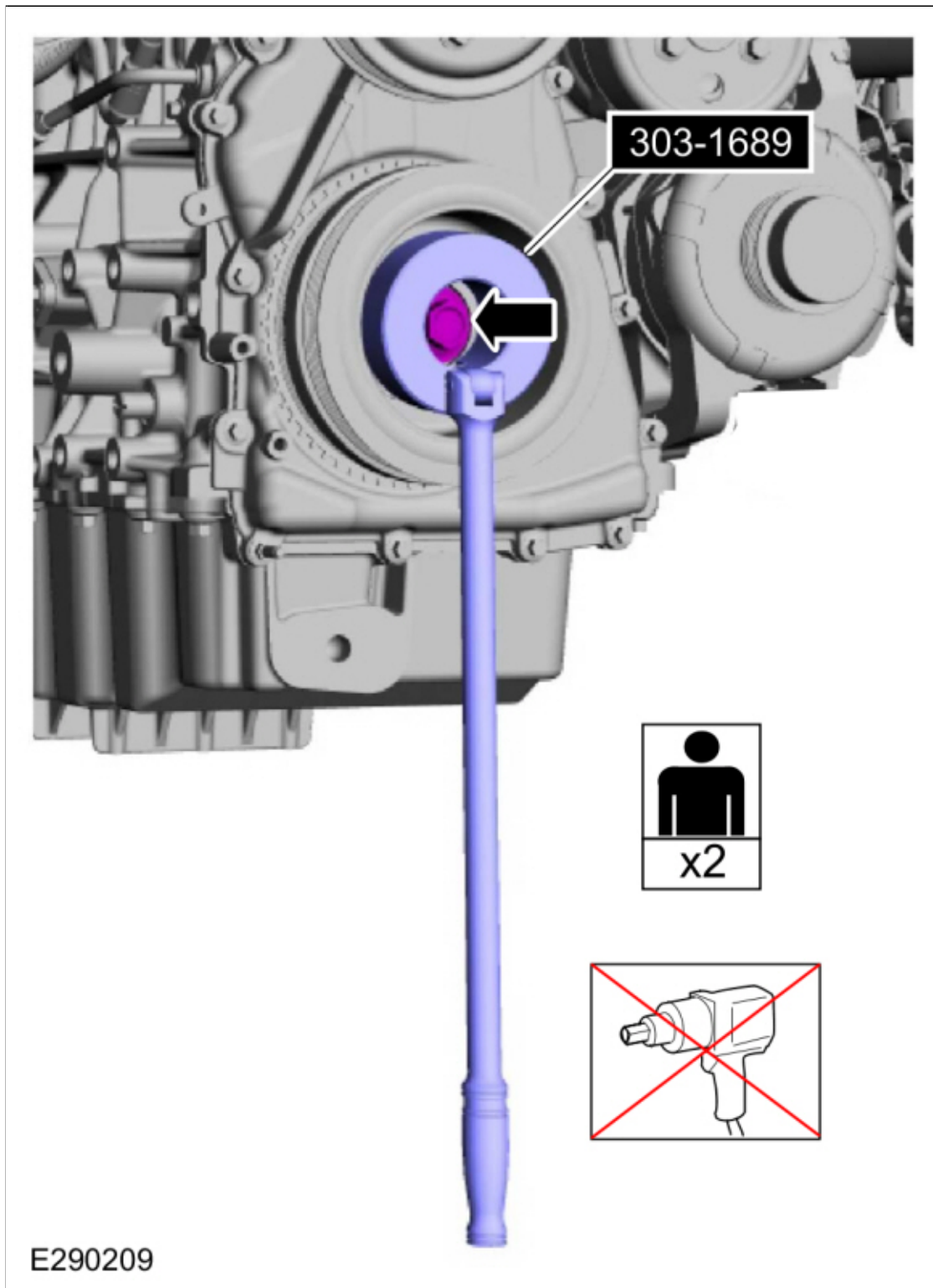
With the aid of an assistant and using the special tool, install the new crankshaft bolt and washer and tighten.

Use Special Service Tool: [303-1689 Holding Tool, Crank Damper](#).

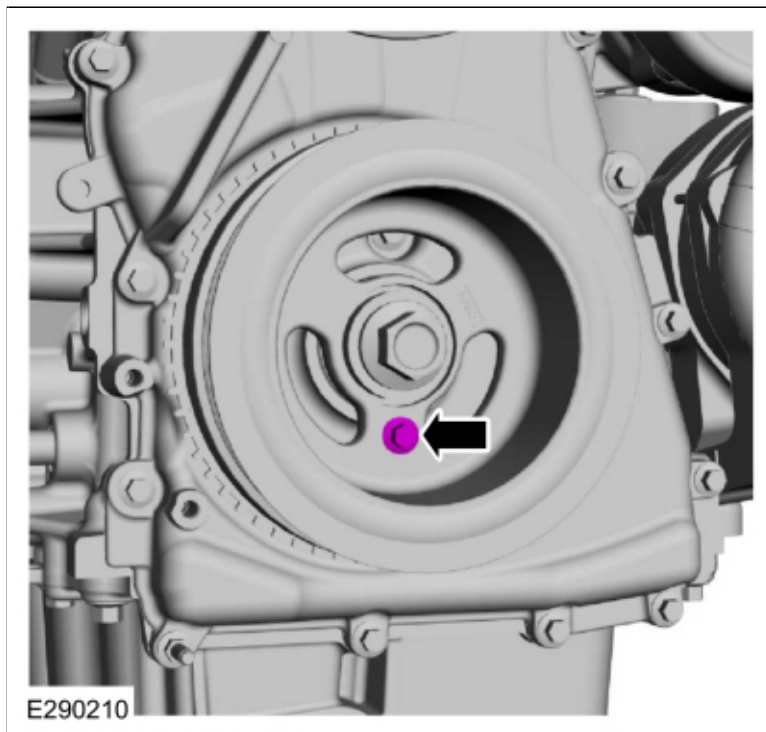
Torque:

Stage 1: 74 lb.ft (100 Nm)

Stage 2: 90°

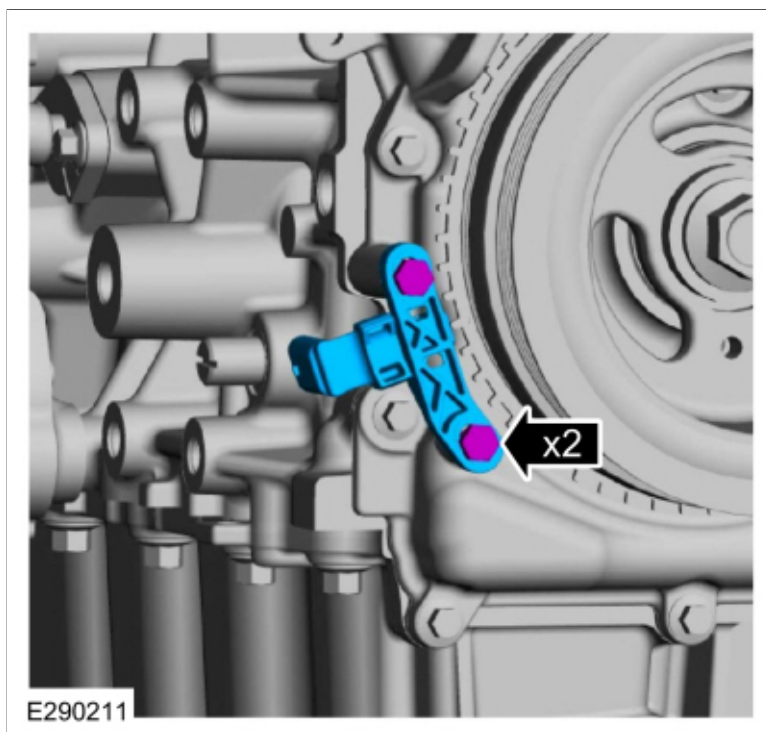


5. Remove the M6 bolt.



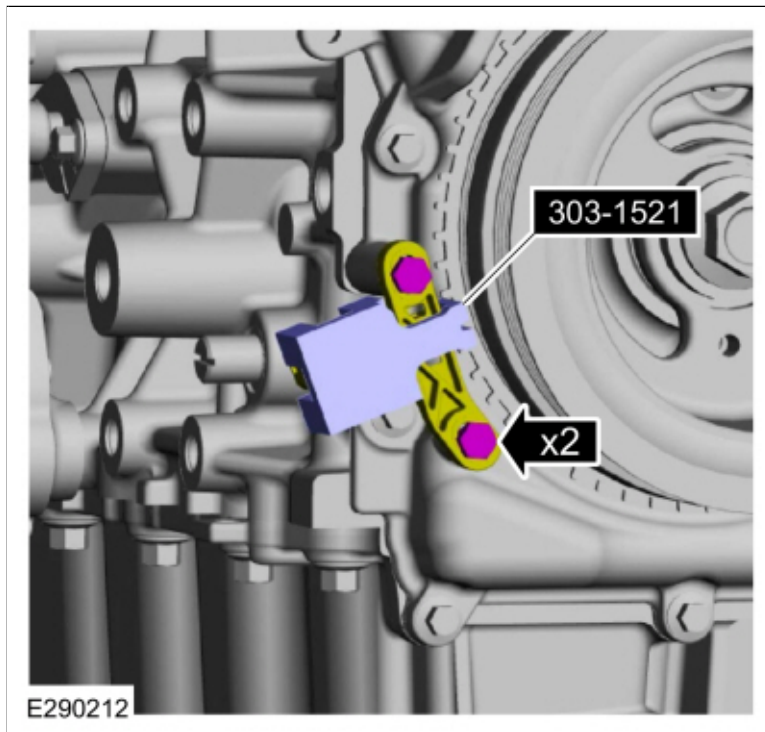
6. **NOTE:** Do not tighten the CKP sensor bolts at this time.

Install the CKP sensor and the bolts finger tight.

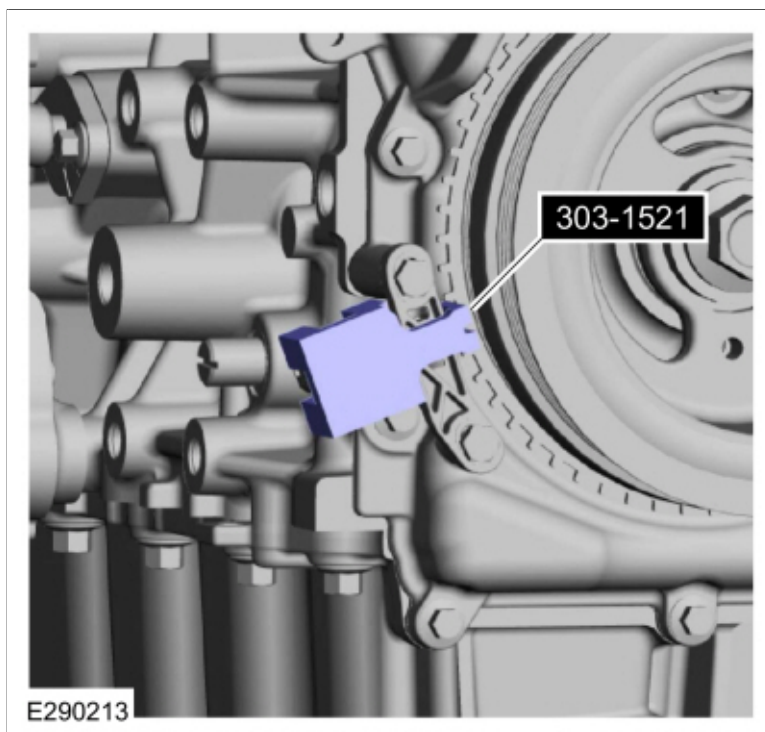


7. Install the special tool onto the CKP sensor and the tooth of the crankshaft pulley trigger wheel and tighten the bolts.
Use Special Service Tool: [303-1521 Alignment Tool, Crankshaft Position Sensor](#).

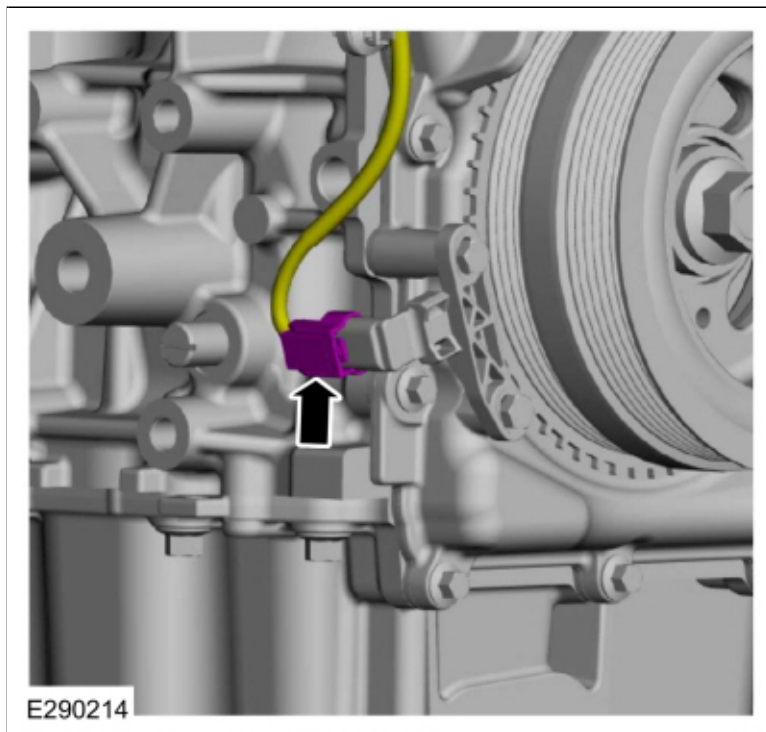
Torque: 97 lb.in (11 Nm)



8. Remove Special Service Tool: [303-1521 Alignment Tool, Crankshaft Position Sensor](#).

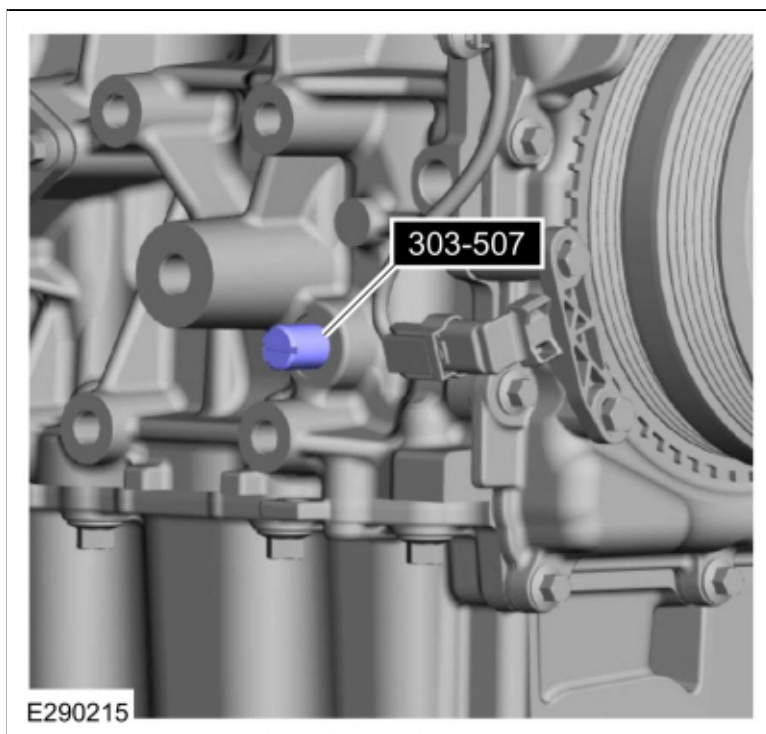


9. Connect the CKP sensor electrical connector.

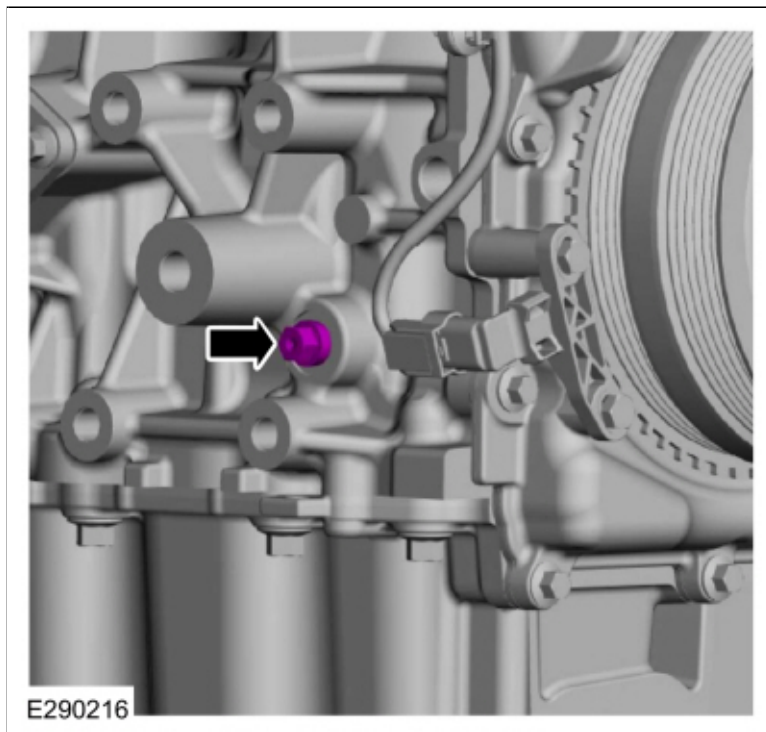


10. **NOTICE:** Do not rotate the crankshaft until the special tools 303-1686 are removed from the valve cover.

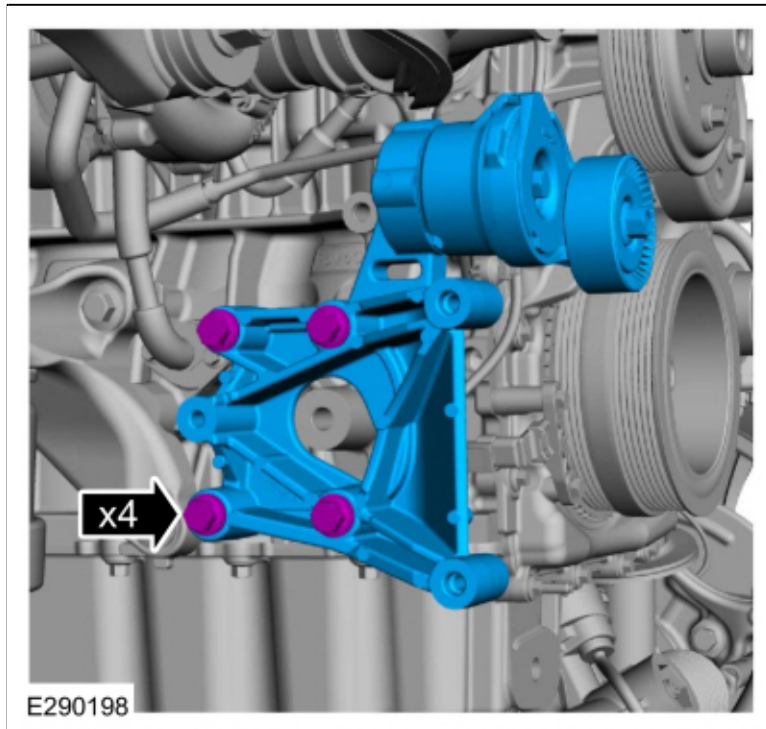
Remove Special Service Tool: [303-507 Timing Peg, Crankshaft TDC](#).



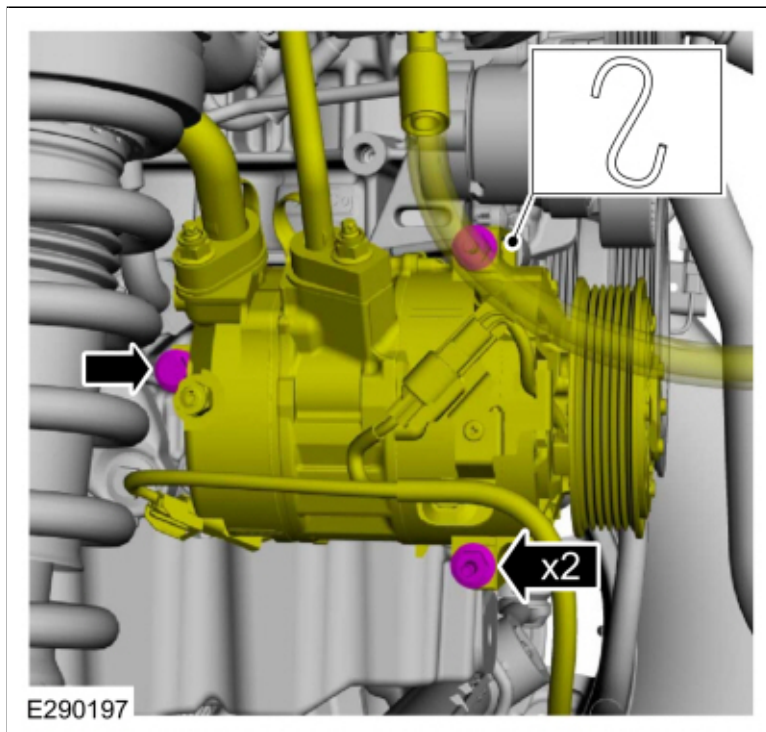
11. Install the engine plug bolt.
Torque: 177 lb.in (20 Nm)



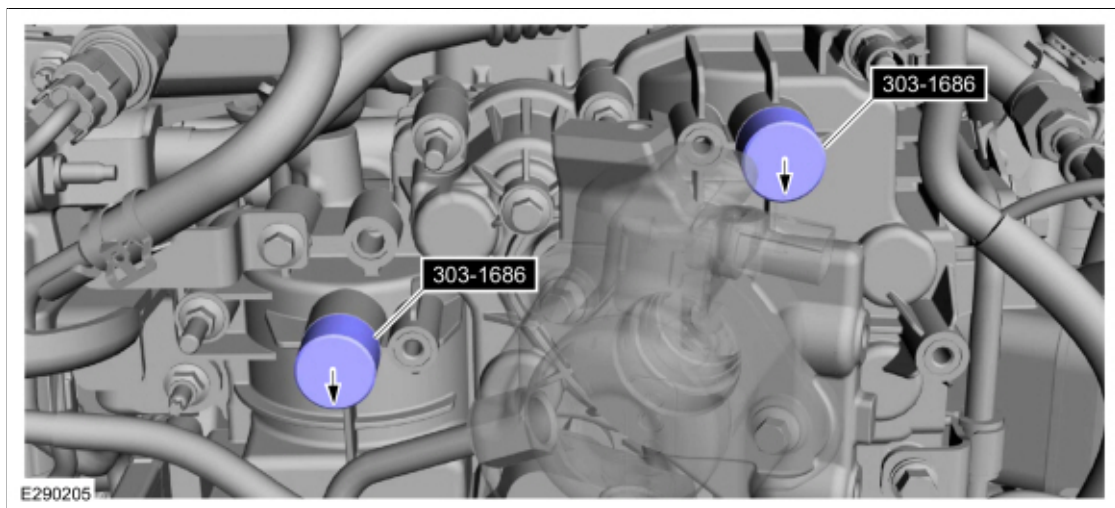
12. Install the A/C compressor bracket and the bolts.
Torque: 35 lb.ft (48 Nm)



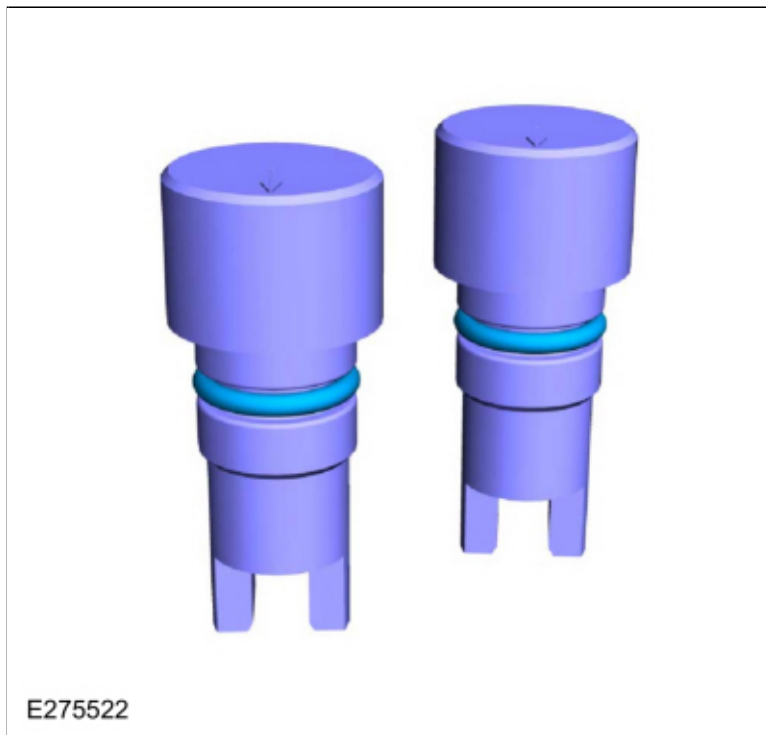
13. Remove the support and position the A/C compressor and tighten the bolts.
Torque: 18 lb.ft (25 Nm)



14. Remove Special Service Tool: [303-1686 Holding Tool, Camshaft](#).

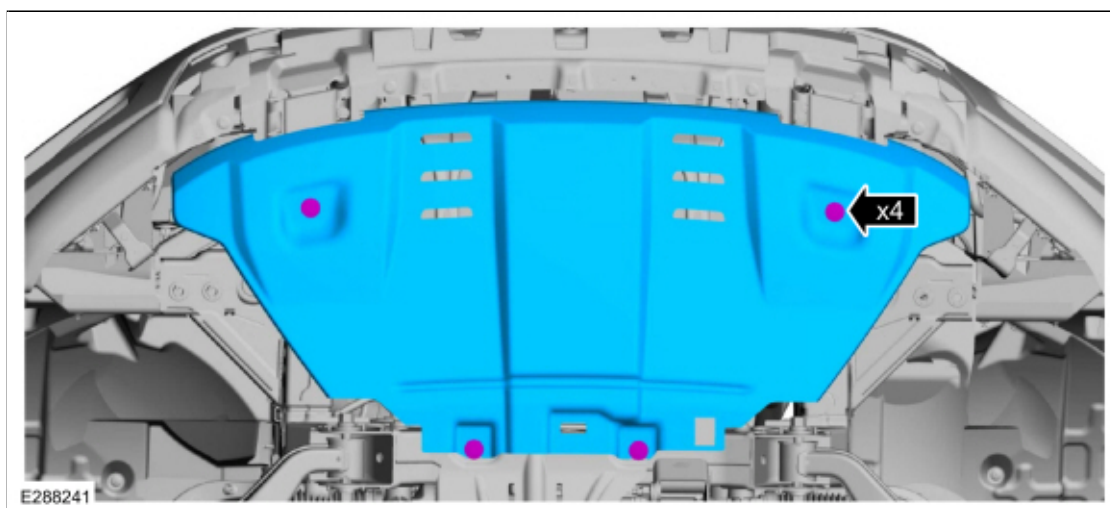


15. Install the O-ring seals on 303-1686.



16. Install the following items:
 1. Install the accessory drive belt.
Refer to: [Accessory Drive Belt](#) (303-05 Accessory Drive - 2.3L EcoBoost (201kW/273PS), Removal and Installation).
 2. Install the cooling fan.
Refer to: [Cooling Fan](#) (303-03 Engine Cooling - 2.3L EcoBoost (201kW/273PS), Removal and Installation).
 3. Install the upper and lower cooling fan shrouds.
Refer to: [Cooling Fan Upper Shroud](#) (303-03 Engine Cooling - 2.3L EcoBoost (201kW/273PS), Removal and Installation).
Refer to: [Cooling Fan Lower Shroud](#) (303-03 Engine Cooling - 2.3L EcoBoost (201kW/273PS), Removal and Installation).
17. Install the front skid plate and the bolts.
Torque: 22 lb.ft (30 Nm)





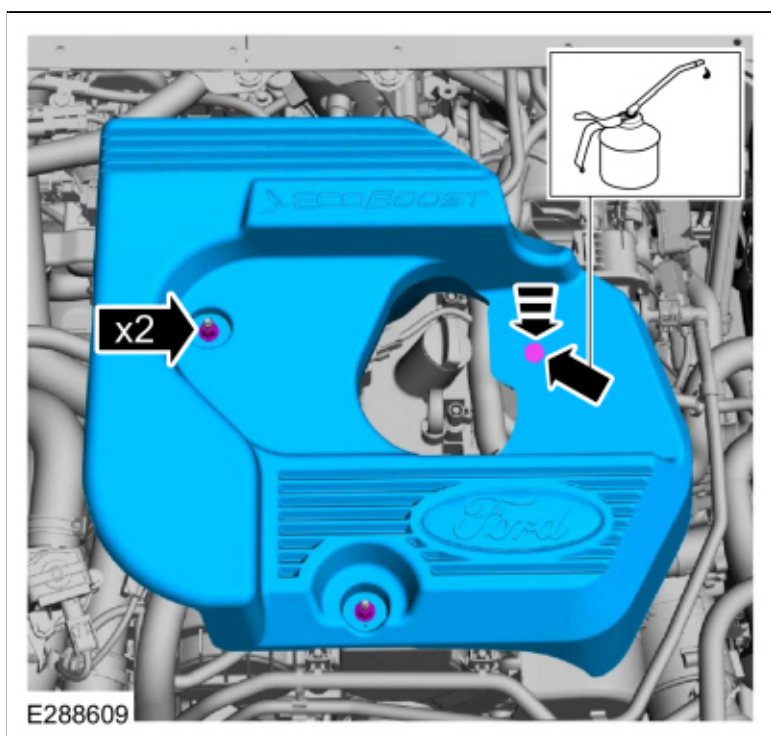
18.

1. **NOTE:** Lubricating the grommets with silicone grease will aid in the installation of the engine appearance cover, and any future removal and installation of the cover.

Lubricate each grommet with silicone grease.

Material: Motorcraft® Silicone Brake Caliper Grease and Dielectric Compound / XG-3-A (ESE-M1C171-A)

2. Position the engine appearance cover onto engine with the grommet aligned with the studs.
3. Press down on the engine appearance cover at each grommet location to attach the grommets onto the studs and install the nuts.



19. Use the Powertrain Control Module (PCM) Misfire Monitor Profile Correction routine in the diagnostic scan tool.

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