

Assembly

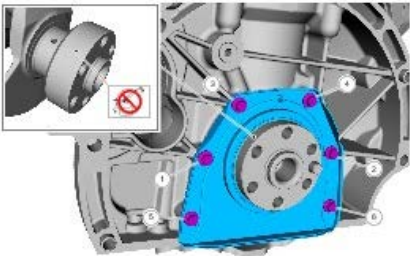
Special Tool(s) / General Equipment

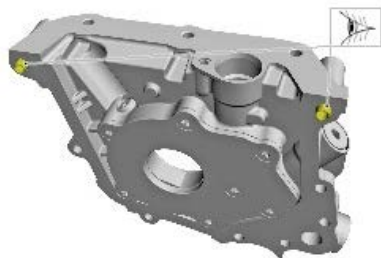
	303-1097 Locking Tool, Variable Camshaft Timing Oil Control Unit
	303-1550 Alignment Tool, Crankshaft Vibration Damper
	303-1552 Alignment Tool, Camshaft
	303-318 Aligner / Installer, Crankshaft Front Seal
	303-395 Installer, Crankshaft Seal
	303-748 Locking Tool, Crankshaft
Round-Ended Steel Rule	

Materials

Name	Specification
Silicone Sealant	WSE-M4G323-A4
Engine Oil - SAE 5W-20	WSS-M2C948-B
Flange Sealant	WSS-M2G348-A11

1.  **NOTICE:** Make sure that the mating faces are clean and free of foreign material.
NOTE: New crankshaft rear seal carriers are supplied with an alignment sleeve which must be removed after installation.
Torque: 10 Nm

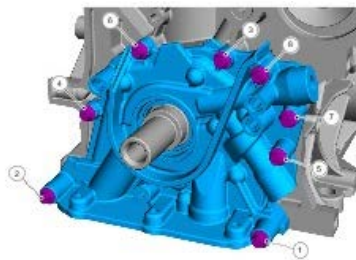




81 688 79

3. **NOTE:** Note the different lengths of the bolts.
NOTE: Install all the bolts finger tight before final tightening.

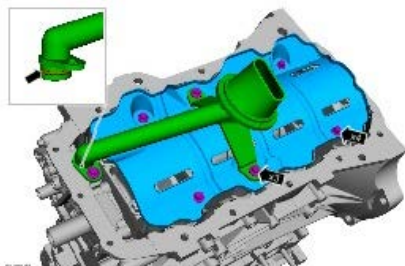
Torque: 10 Nm



81 688 74

4. **NOTE:** The O-ring seal is to be reused unless damaged.

Torque: 9 Nm



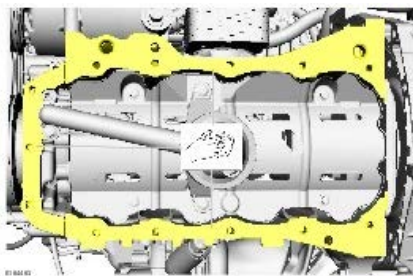
81 688 82

5. **NOTE:** Make sure that the mating faces are clean and free of foreign material.



81 688 82

6. **NOTE:** Make sure that the mating faces are clean and free of foreign material.



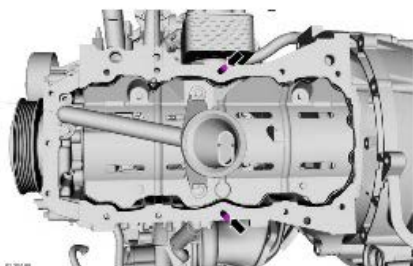
7. **NOTE:** Make sure that the mating faces are clean and free of foreign material.



8.  **NOTICE:** Make sure that the mating faces are clean and free of foreign material.

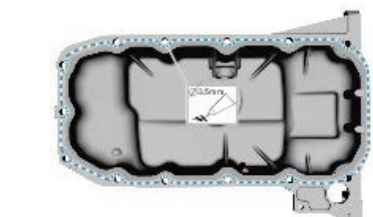
Install the following items:

- 2x M8x20 studs



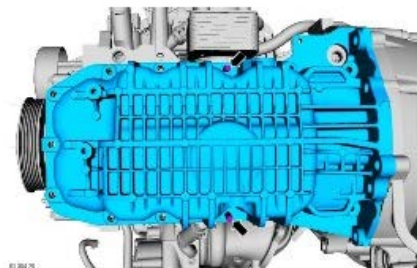
9. **NOTE:** The component must be installed within 10 minutes of applying the sealant.

Material: **WSE-M4G323-A4 (Silicone Sealant)**



10. Remove the following items:

2x M8x20 studs

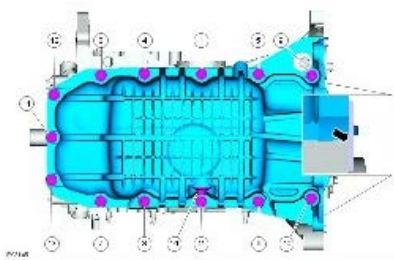


11. Use the General Equipment: **Round-Ended Steel Rule**

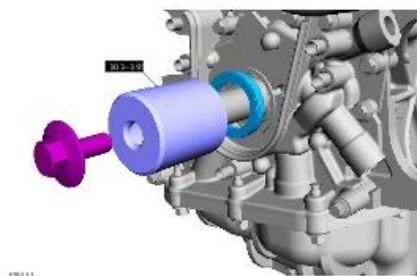
Torque:

1-13 **19 Nm**

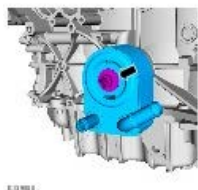
14 **27 Nm**



12. Use Special Service Tool: **303-395.**

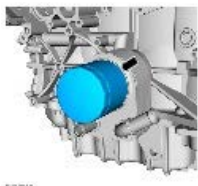


13. Torque: **55 Nm**



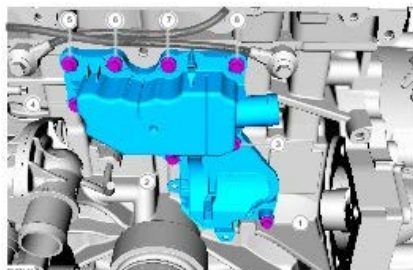
14. **NOTE:** Make sure that a new component is installed.

Torque: **14 Nm**

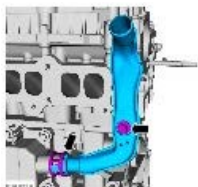


15. Torque:

- 1-3 [6 Nm](#)
- 4-8 [6 Nm](#)
- 1-8 [10 Nm](#)



16. Torque: [4 Nm](#)



17.

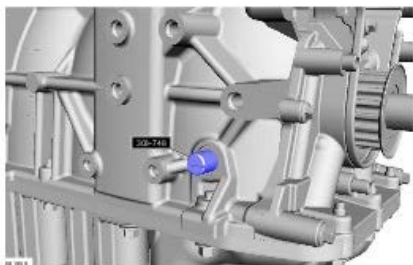


18. **NOTICE: Only rotate the crankshaft clockwise.**

Rotate the crankshaft slowly until the crankshaft stops.

Install Special Service Tool: [303-748](#).





19. NOTICE:



Make sure that new bolts are installed.



Make sure that no fluids are present in the cylinder head bolt threaded bores.

Torque:

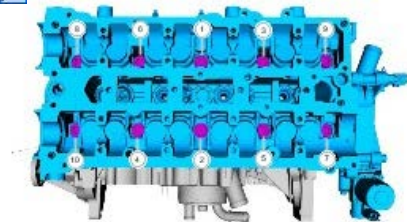
Stage 1: 5 Nm

Stage 2: 15 Nm

Stage 3: 35 Nm

Stage 4: 90°

Stage 5: 90°



20. NOTE: The O-ring seal is to be reused unless damaged.



21. NOTICE: Make sure that the mating faces are clean and free of foreign material.
NOTE: The component must be installed within 5 minutes of applying the sealant.

Material: WSS-M2G348-A11 (Flange Sealant)



8/10/2021

22. NOTICE:



Make sure that the components are installed to the position noted before removal.



Make sure that new bolts are installed.

Apply clean engine oil to the bearing surfaces of the camshaft bearing caps and the VVT bridge.

Material: WSS-M2C948-B (Engine Oil - SAE 5W-20)

23. Install the camshafts approximately at valve overlap position cylinder No. 4.

24. Torque:

1-16

Stage 1: 7 Nm

Stage 2: 45°

17, 18

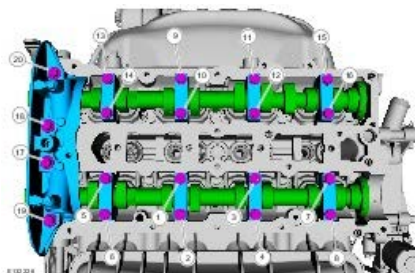
Stage 1: 10 Nm

Stage 2: 70°

19, 20

Stage 1: 10 Nm

Stage 2: 53°



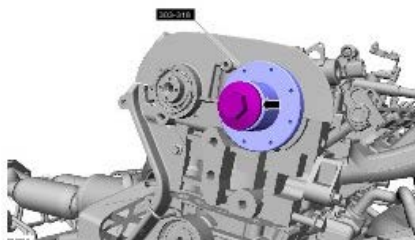
8/10/2021

25. Refer to: [Valve Clearance Adjustment](#) (303-01B Engine, General Procedures).

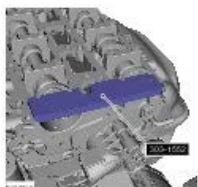
26. Coat the camshaft bearing journal and the sealing lip of the camshaft oil seal with clean engine oil.

Use Special Service Tool: [303-318](#).

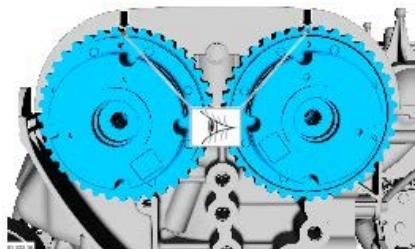
Material: WSS-M2C948-B (Engine Oil - SAE 5W-20)



27. Install Special Service Tool: [303-1552](#).



28.

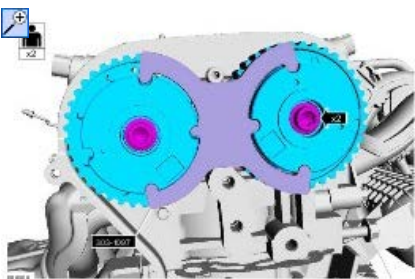


29.  **NOTICE:** Use an open-ended wrench to prevent the component from turning.

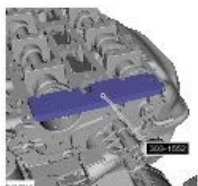
Install Special Service Tool: **303-1097**.

Torque: **25 Nm**

30. Remove Special Service Tool: **303-1097**.

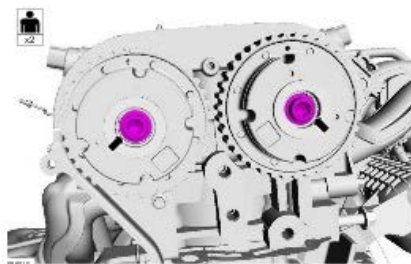


31. Remove Special Service Tool: **303-1552**.

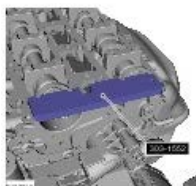


32.  **NOTICE:** Use an open-ended wrench to prevent the component from turning.

Torque: **75°**

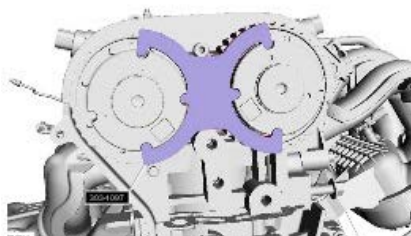


33. Install Special Service Tool: 303-1552.



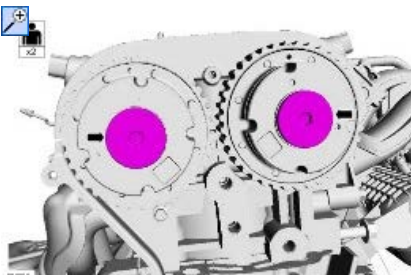
34. **NOTE:** The special tool can only be installed if the valve timing is correct.

Install Special Service Tool: 303-1097.



35. **NOTICE:** Use an open-ended wrench to prevent the component from turning.

Torque: 16 Nm

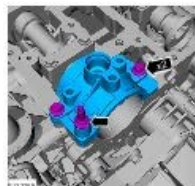


36. **NOTICE:** Make sure that the mating faces are clean and free of foreign material.
NOTE: The component must be installed within 5 minutes of applying the sealant.

Material: WSS-M2G348-A11 (Flange Sealant)

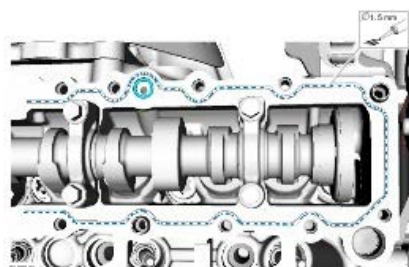


37. Torque: 10 Nm

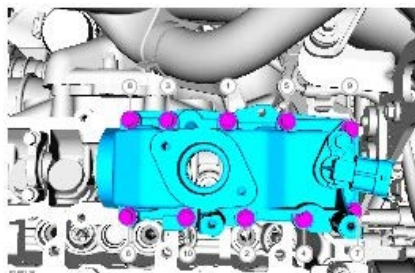


38. NOTE: Make sure that the mating faces are clean and free of foreign material.
NOTE: The component must be installed within 5 minutes of applying the sealant.

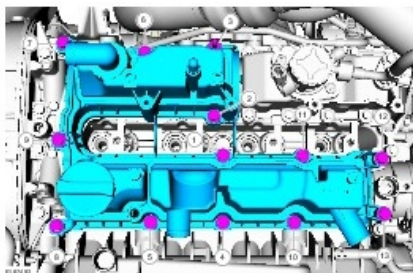
Material: WSS-M2G348-A11 (Flange Sealant)



39. Torque:
1-8 4 Nm
1-8 14 Nm
9, 10 11 Nm



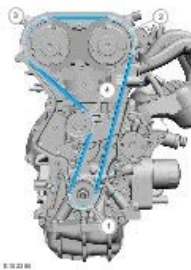
40. Torque:
Stage 1: 5 Nm
Stage 2: 9 Nm
Stage 3: 10 Nm



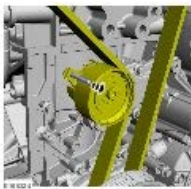
41. Torque:
1-6 10 Nm
7 25 Nm



42.



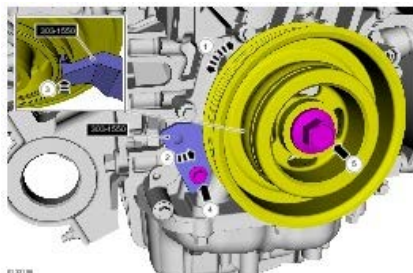
43.  **WARNING:** The tensioner is under spring tension. Be careful when handling the tensioner. Failure to follow this instruction may result in personal injury.



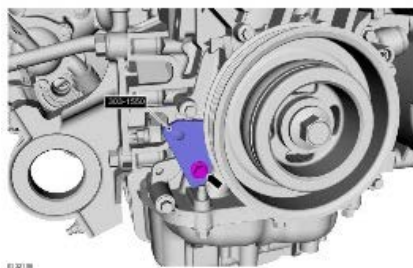
44.



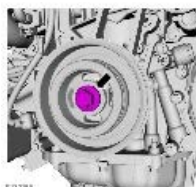
- 45.
- 1.
 2. *Install Special Service Tool: 303-1550.*
 3. *Use Special Service Tool: 303-1550.*
 4. **NOTE:** Only tighten the bolt finger tight at this stage.
 5.  **NOTICE:** Make sure that a new bolt is installed.
NOTE: Only tighten the bolt finger tight at this stage.



46. *Remove Special Service Tool: 303-1550.*



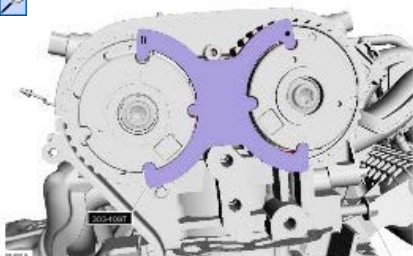
47. **Torque:**
Stage 1: 100 Nm
Stage 2: 90°
Stage 3: Wait 10 s
Stage 4: 15°



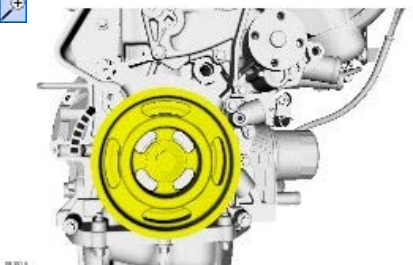
48. *Remove Special Service Tool: 303-748.*



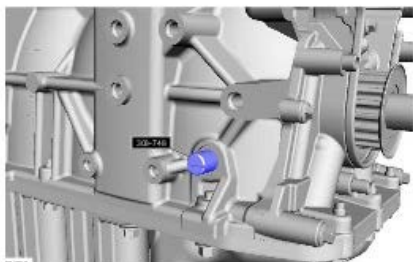
49. Remove Special Service Tool: 303-1097.



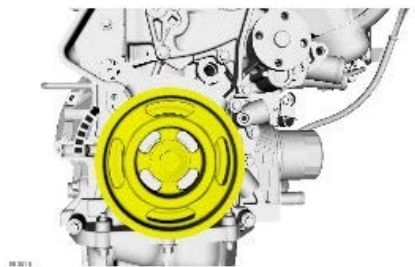
50.  **NOTICE: Only rotate the crankshaft clockwise.**
Rotate the crankshaft 1 and 3/4 revolutions and continue until piston No. 1 is approximately 45° before top dead center (BTDC).



51. Install Special Service Tool: 303-748.



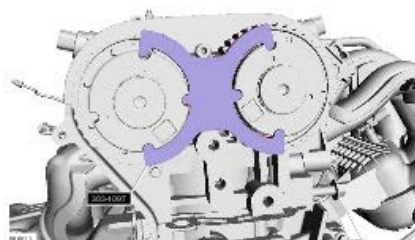
52.  **NOTICE: Only rotate the crankshaft clockwise.**
Rotate the crankshaft slowly until the crankshaft stops.



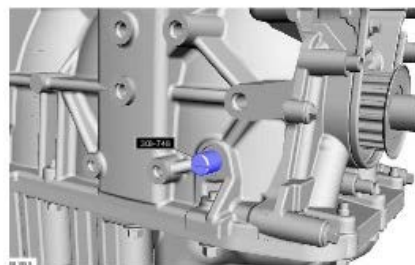
53. **NOTE:** The special tool can only be installed if the valve timing is correct.

Install Special Service Tool: 303-1097.

54. *Remove Special Service Tool: 303-1097.*



55. *Remove Special Service Tool: 303-748.*



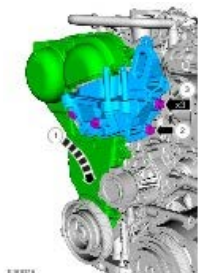
56. **Torque:** 20 Nm



57. **NOTE:** Note the different lengths of the bolts.

NOTE: Install all the bolts finger tight before final tightening.

Torque: 55 Nm



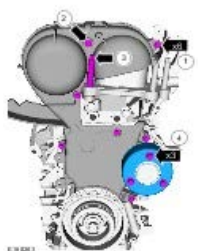
58.

1. **Torque: 10 Nm**

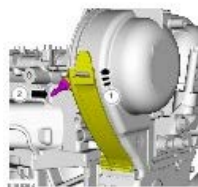
2. **Torque: 10 Nm**

3. **Torque: 10 Nm**

4. **NOTE: Only tighten the bolts finger tight at this stage.**



59. **Torque: 10 Nm**



60. **Torque: 8 Nm**

