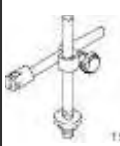
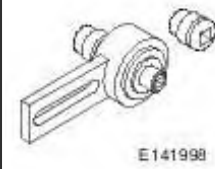
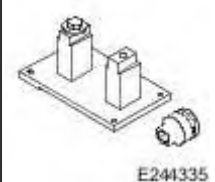
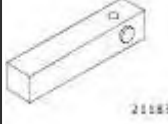


Removal and Installation

Special Tool(s) / General Equipment

	205-069 Dial Indicator Gauge (Metric)
	205-070 Holding Fixture, Dial Indicator Gauge
	303-1611 Torque Multiplier
	303-1611-03 Adapter for 303-1611, Torque Multiplier
	303-432 Holding Fixture, Dial Indicator Gauge (Cylinder Liner Protrusion)
1/2 Inch Square Drive Breaker Bar	
Fluid Container	
Hose Clamp Remover/Installer	
Plastic Scraper	
Wooden Block	

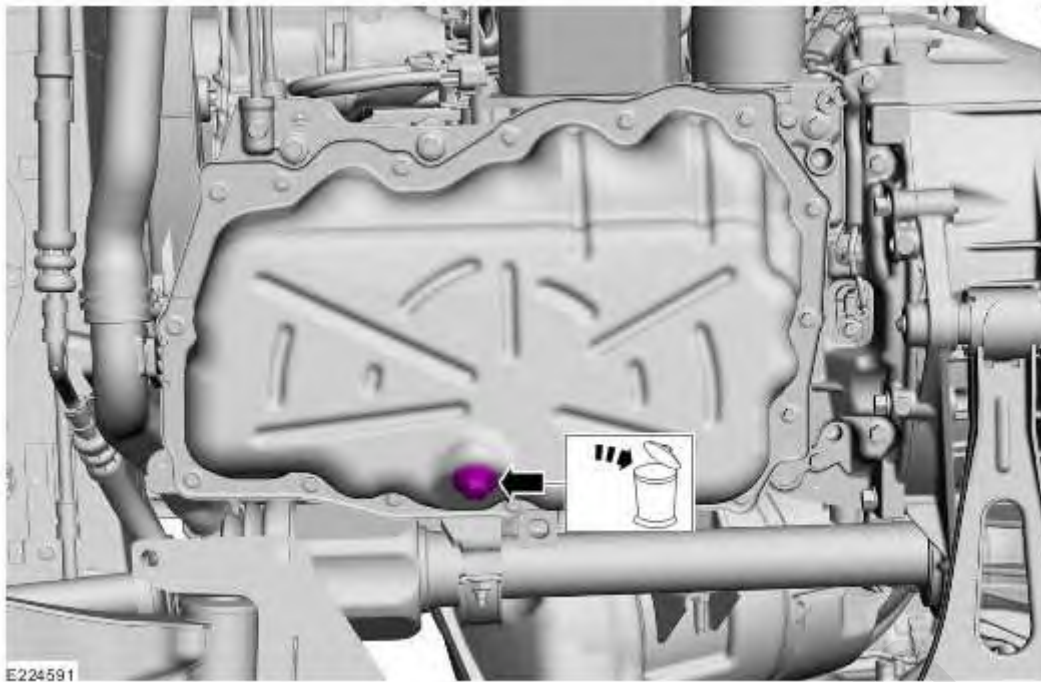
Materials

Name	Specification
Brake Cleaner	-

Removal

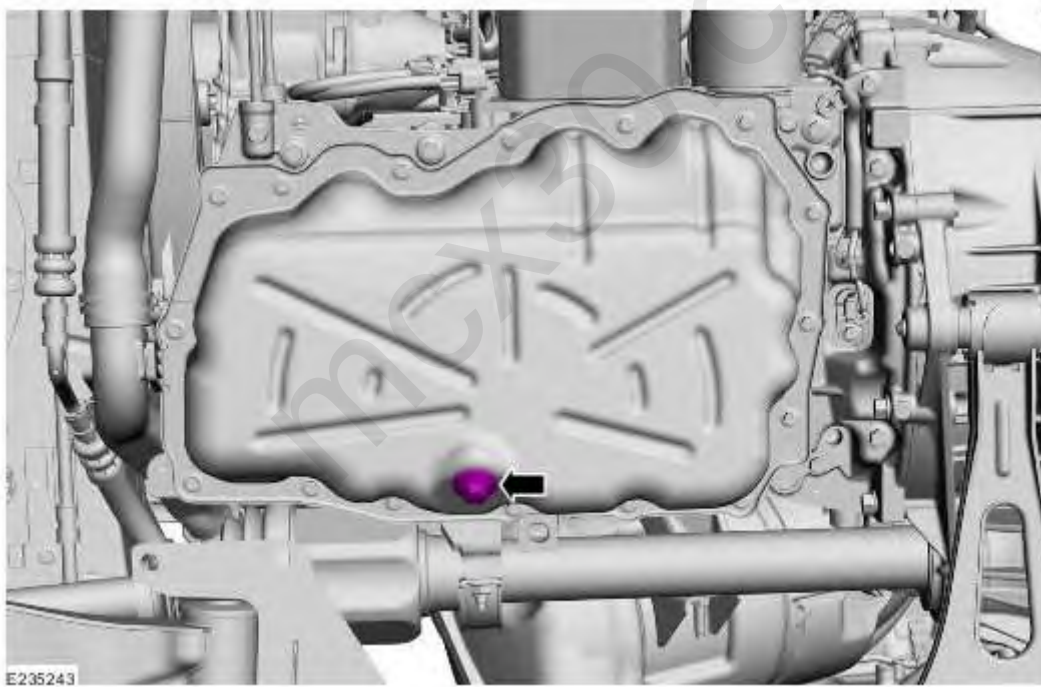
1. Refer to: [Jacking and Lifting](#) (100-02 Jacking and Lifting, Description and Operation).
2. **NOTE:** Change engine oil and oil filter.
NOTE: Be prepared to collect escaping fluid.

Use the General Equipment: [Fluid Container](#)



3. **NOTE:** Make sure a new bolt is installed.

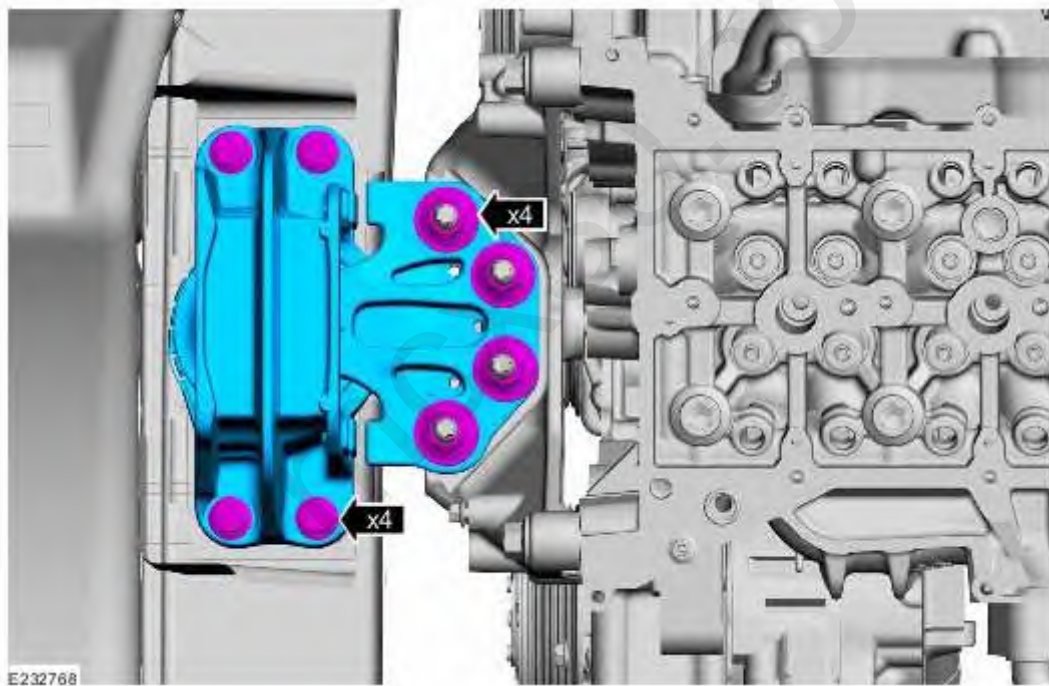
Torque: 39 Nm



4. Refer to: [Jacking and Lifting](#) (100-02 Jacking and Lifting, Description and Operation).
5. Refer to: [Camshaft and Carrier Assembly](#) (303-01A Engine, Removal and Installation).
6. Refer to: [Intake Manifold](#) (303-01A Engine, Removal and Installation).
7. **NOTE:** Only tighten the bolts finger tight at this stage.

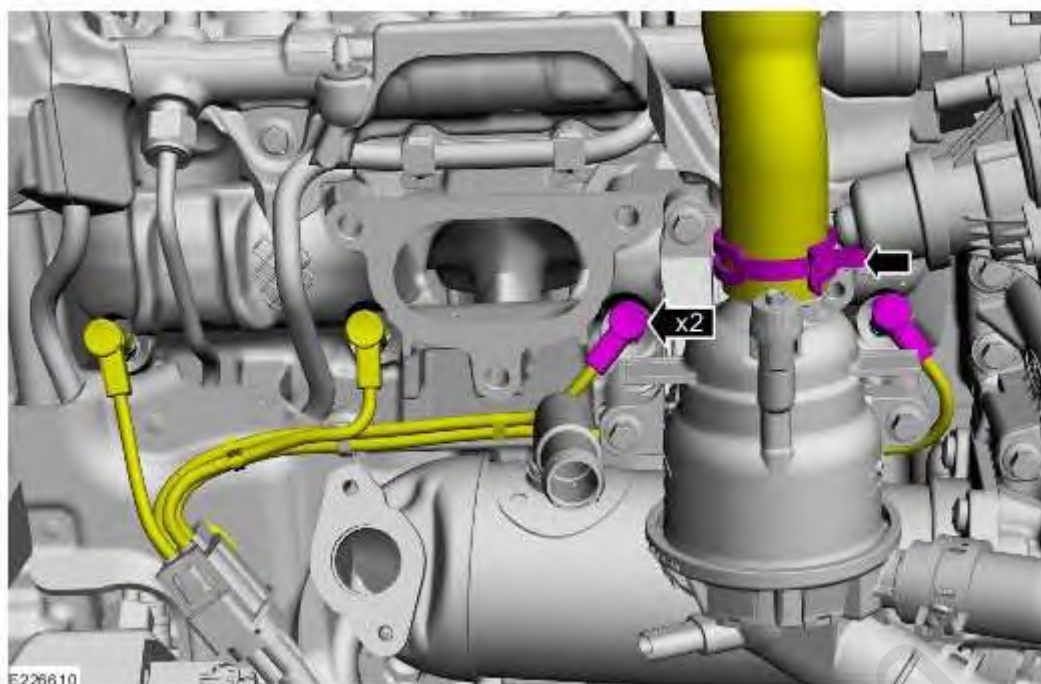


8. NOTE: Only tighten the nuts and bolts finger tight at this stage.

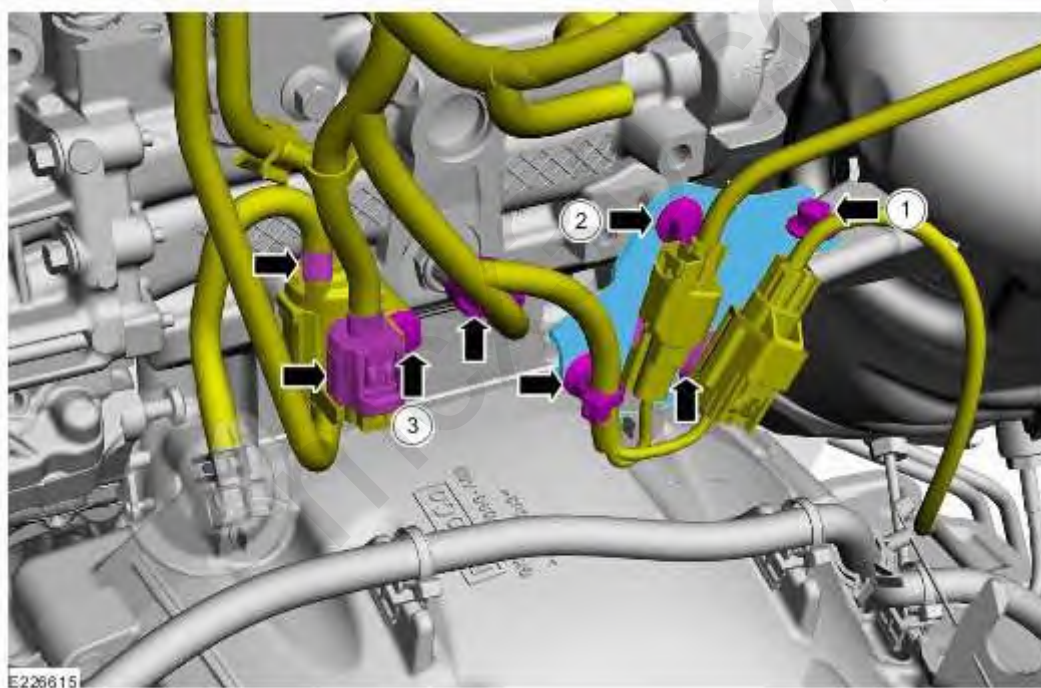


9. NOTE: Be prepared to collect escaping fluid.

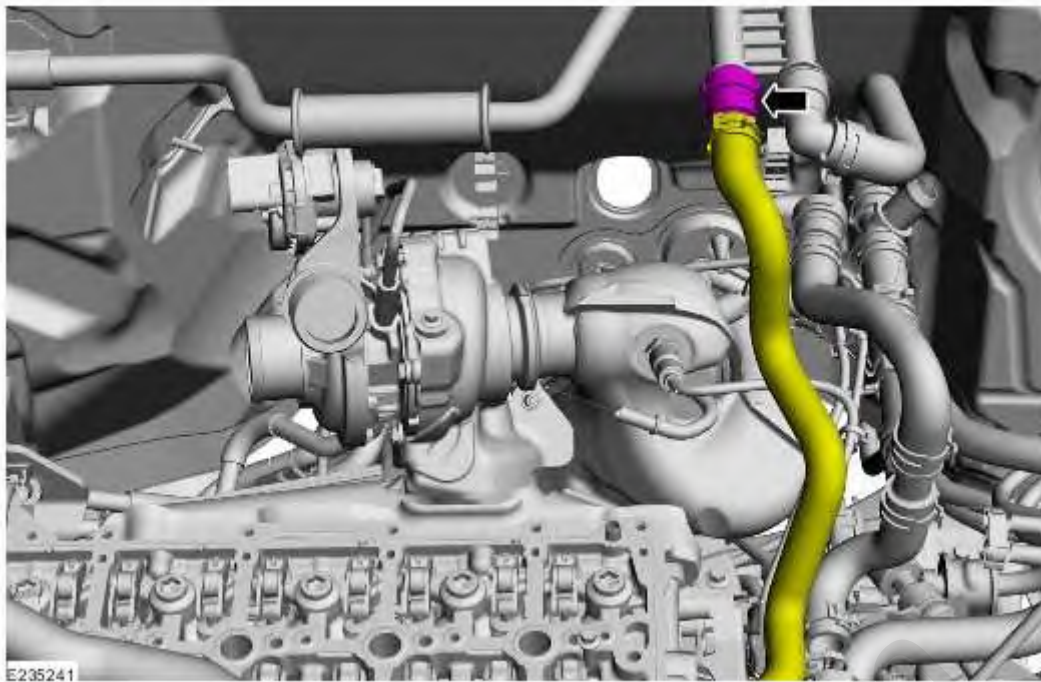
Use the General Equipment: [Hose Clamp Remover/Installer](#)



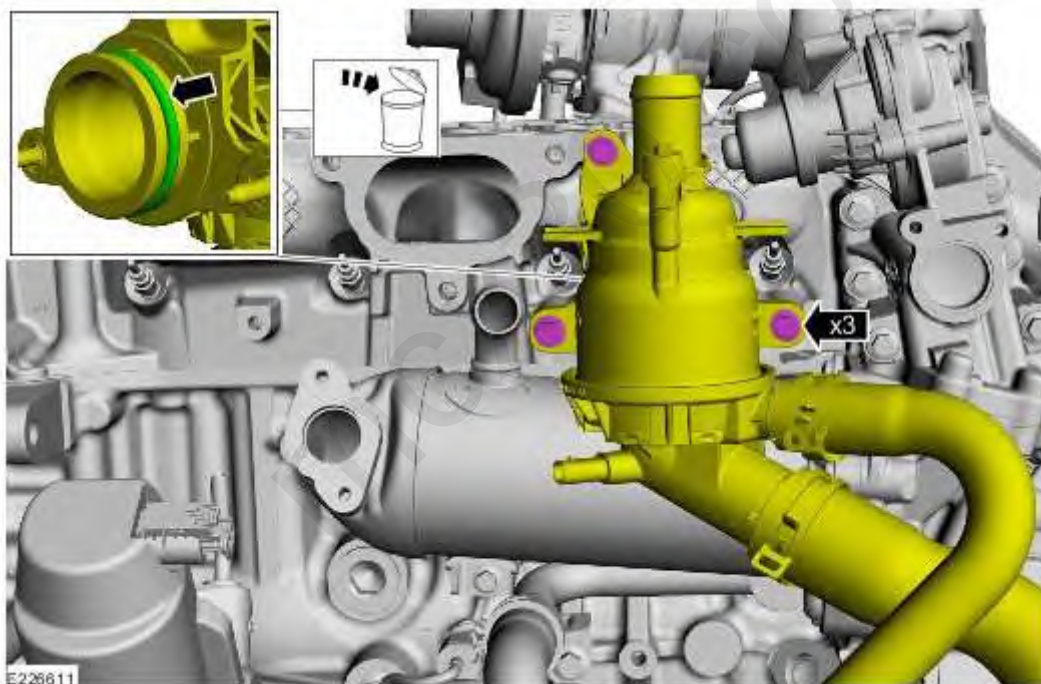
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11.

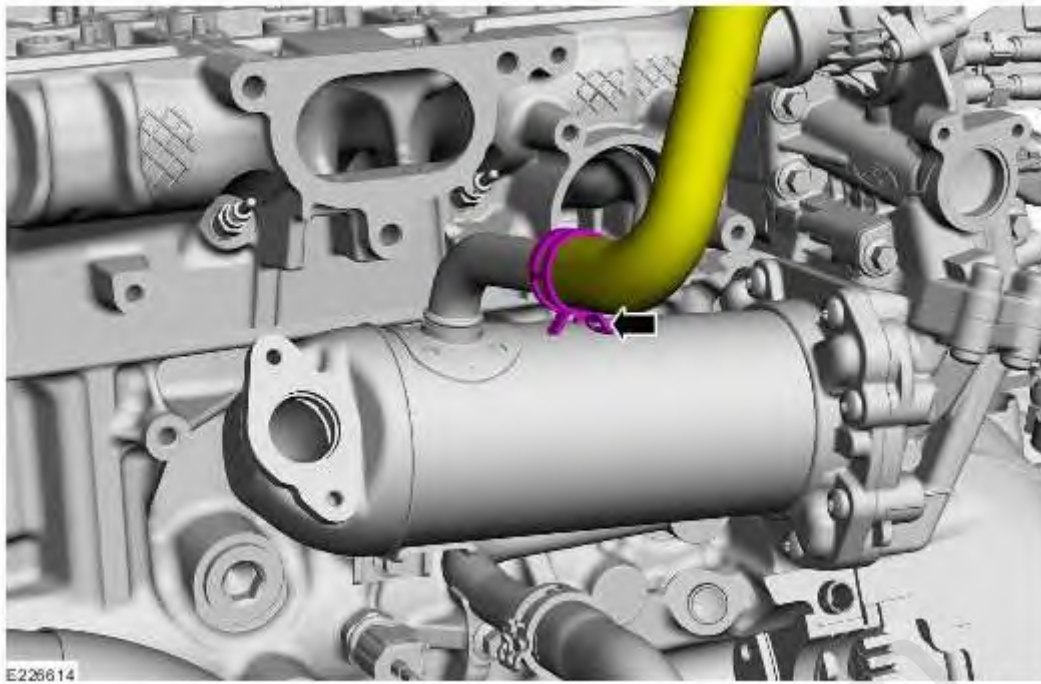


12. NOTE: Be prepared to collect escaping fluid.

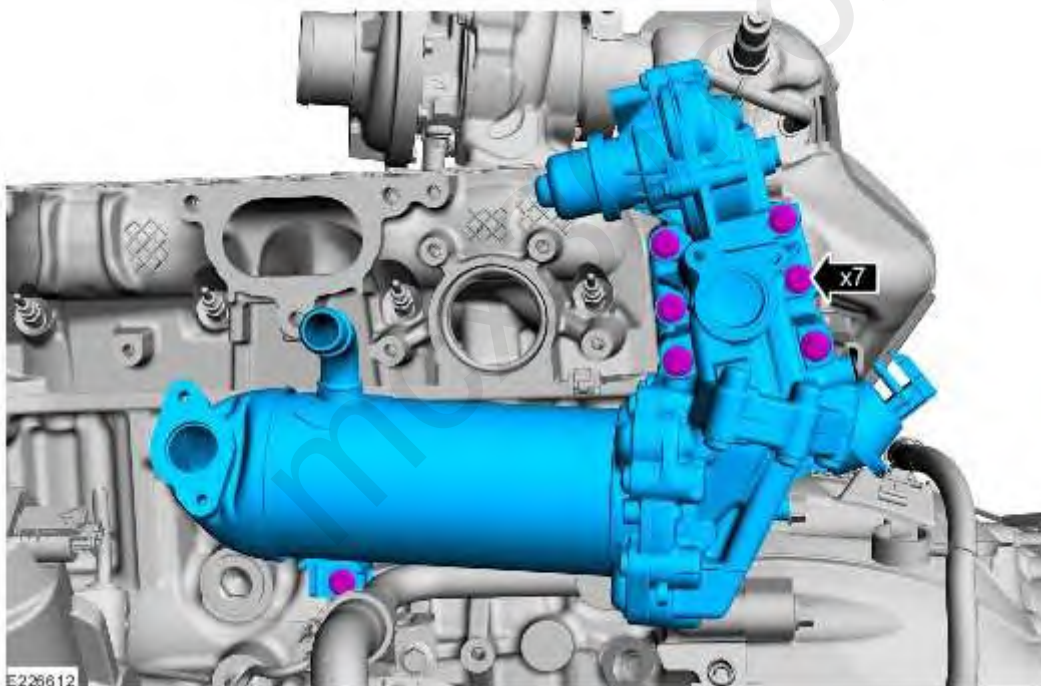


13. NOTE: Be prepared to collect escaping fluid.

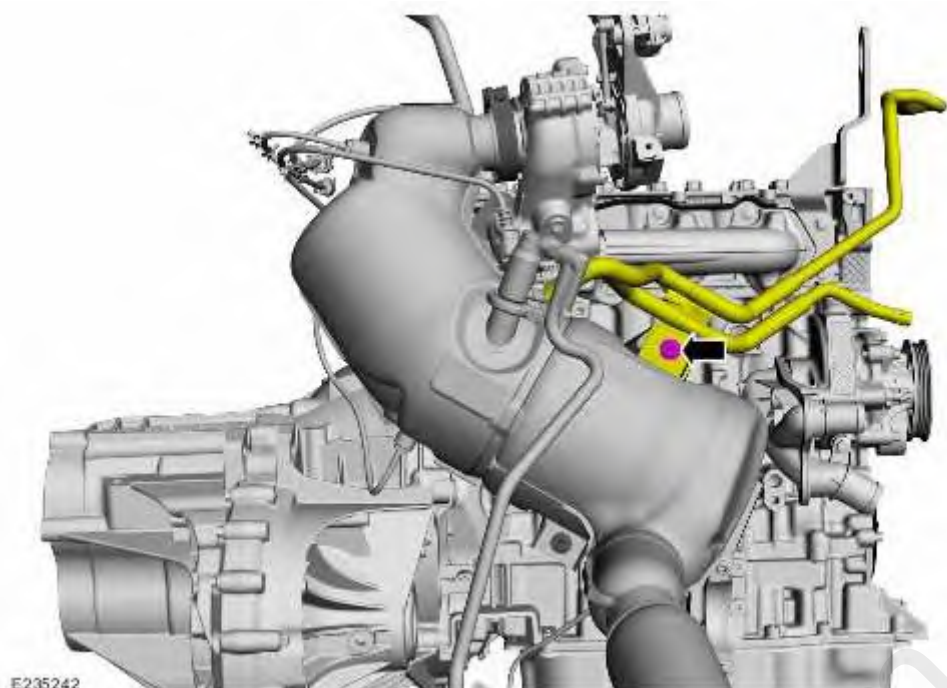
Use the General Equipment: [Hose Clamp Remover/Installer](#)



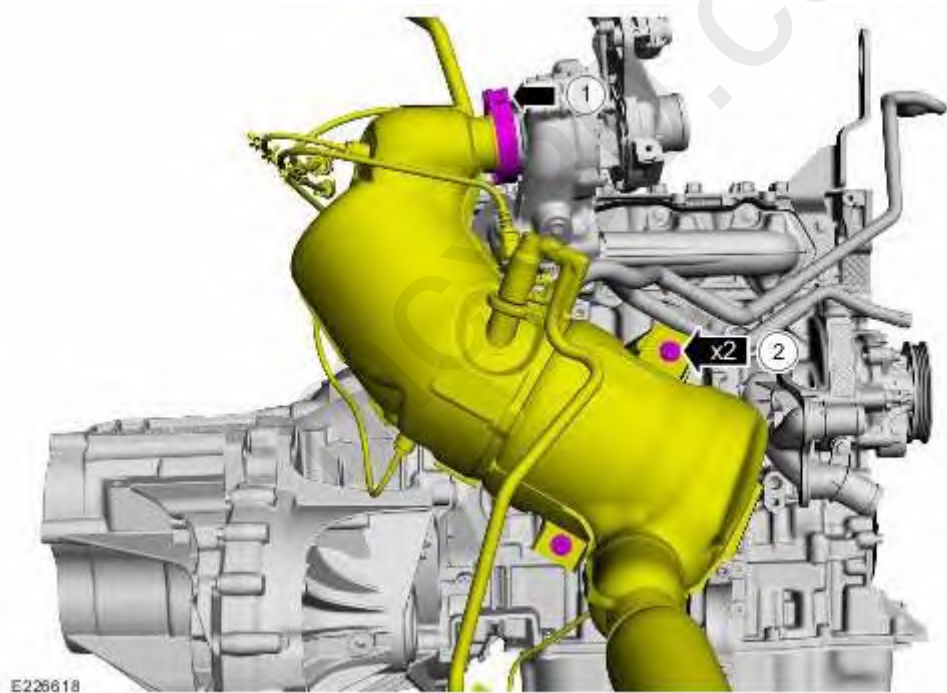
14. NOTE: Be prepared to collect escaping fluid.



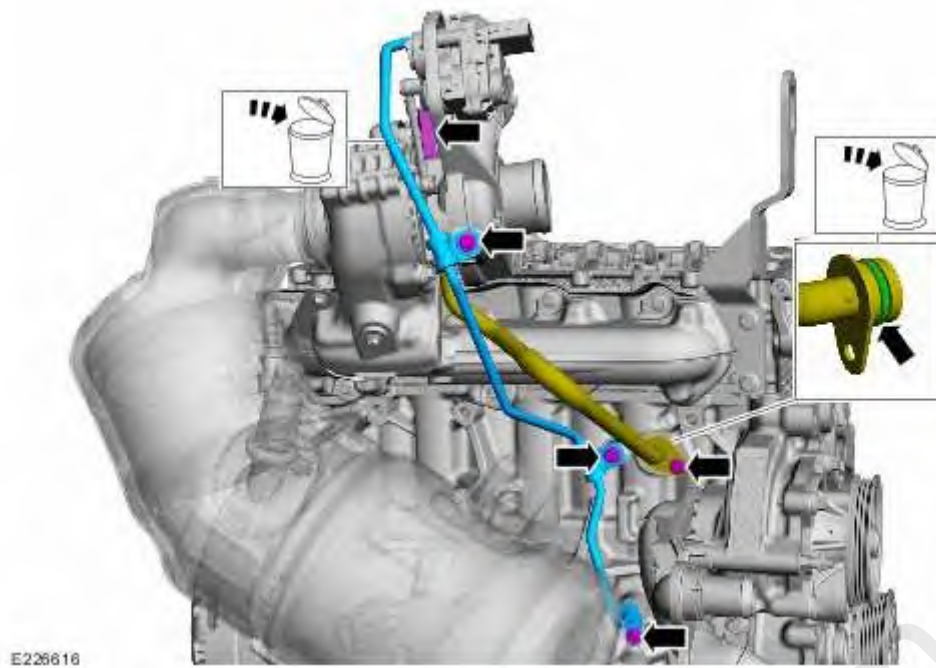
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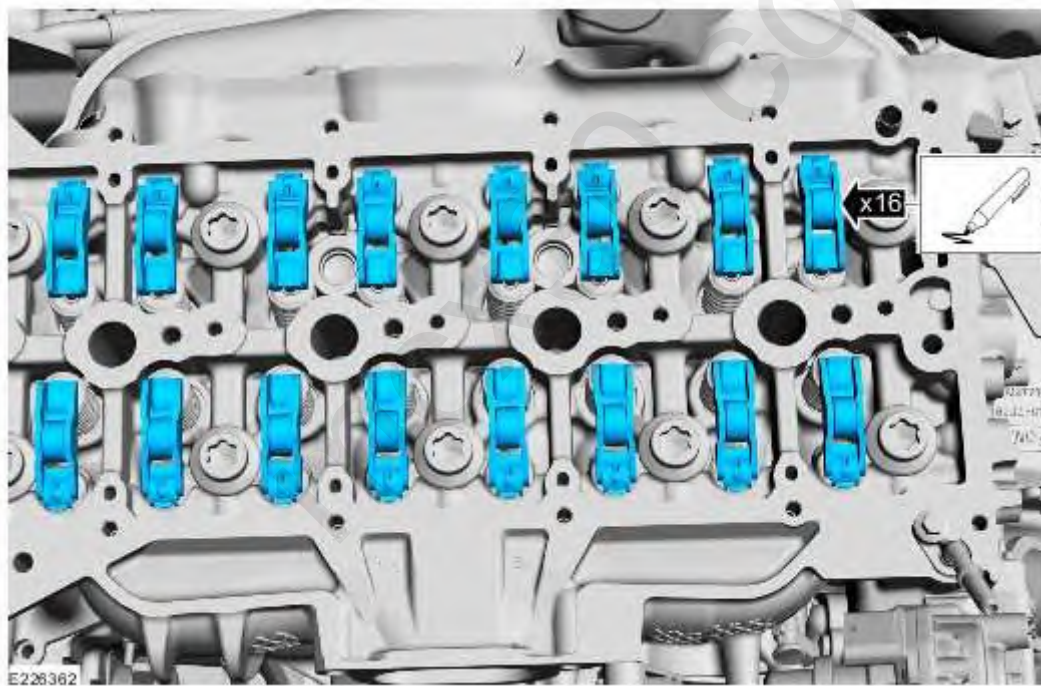
16. NOTE: Make sure that no components catch.
1. NOTE: Note the position of the component before removal.
 - 2.



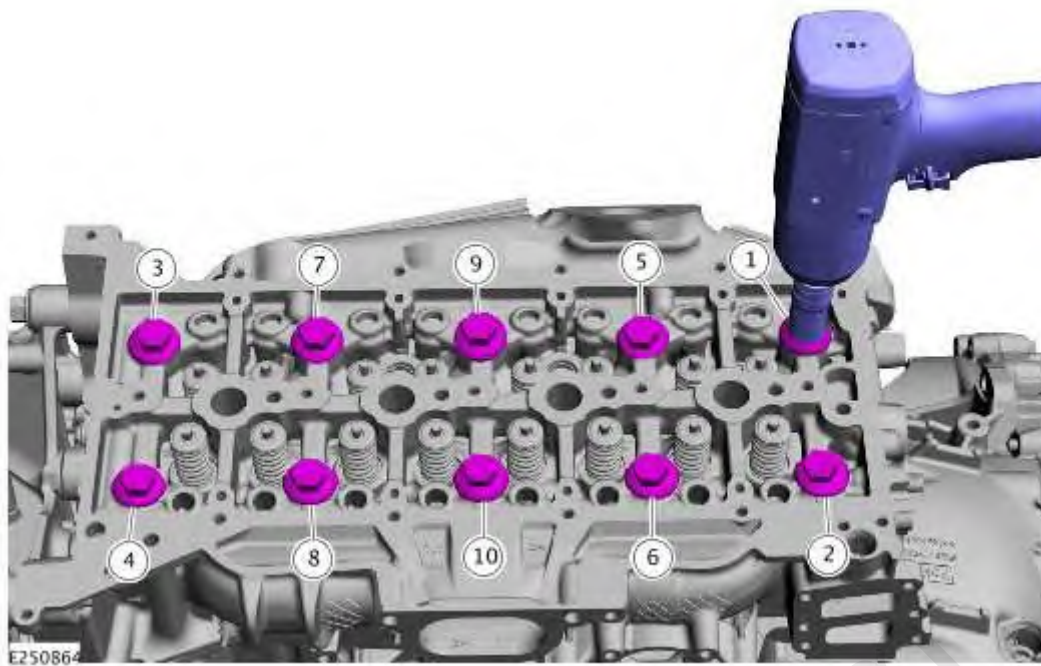
17.  NOTICE: Take extra care when handling the component.
NOTE: Use suitable paper to absorb any escaping fluid.



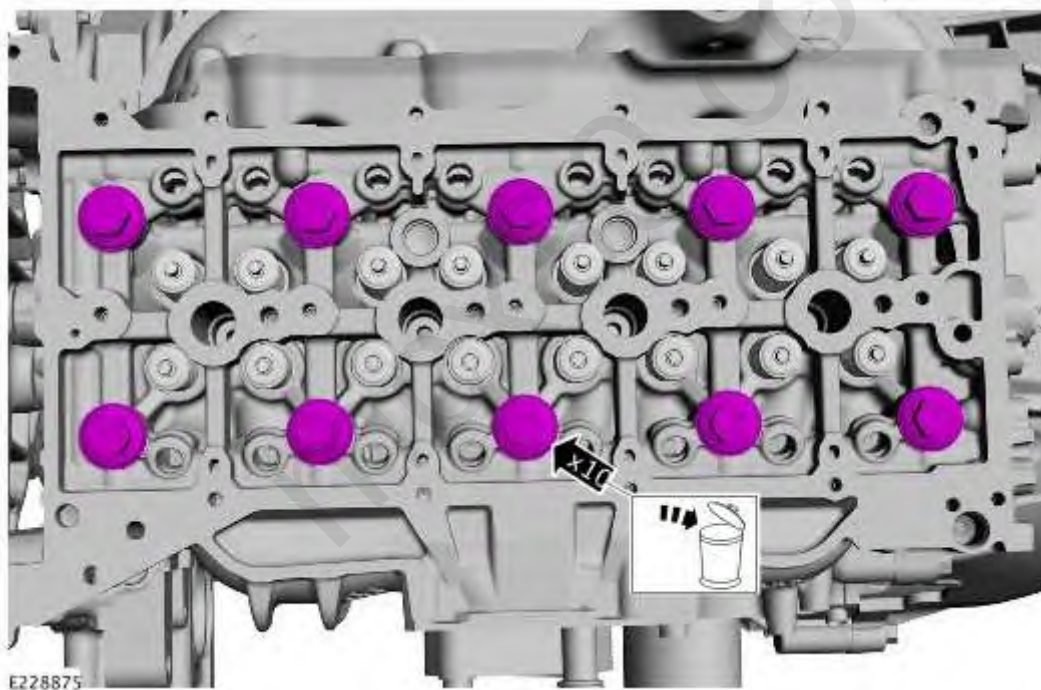
18. NOTE: Note the position of the components before removal.



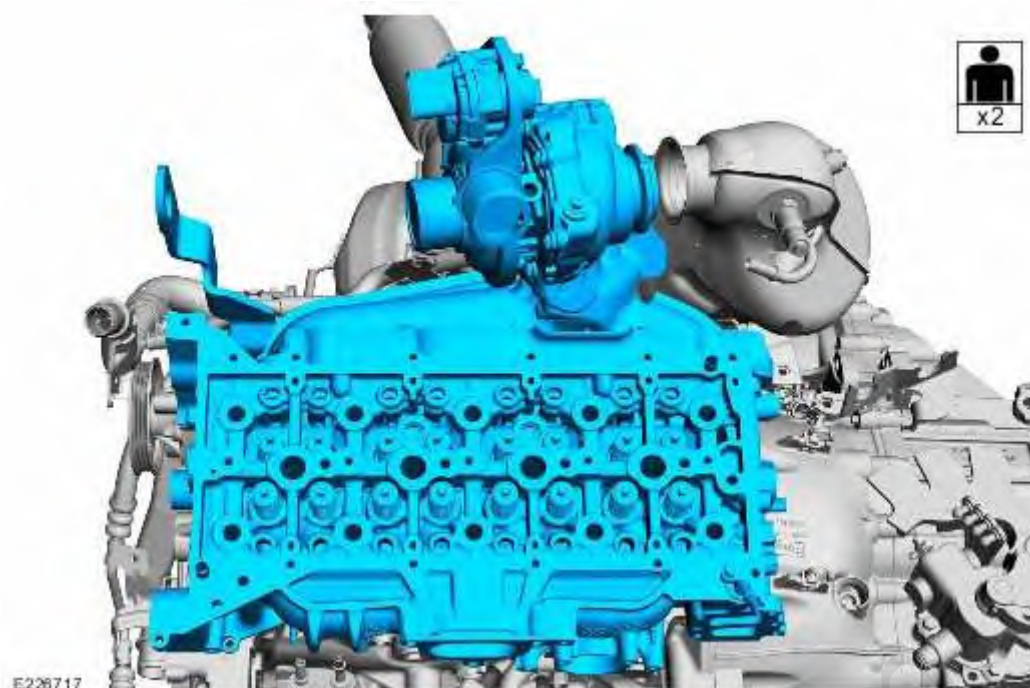
19.  NOTICE: Make sure that the cylinder head is at ambient air temperature before removing the cylinder head bolts.
Use Power Tool only.



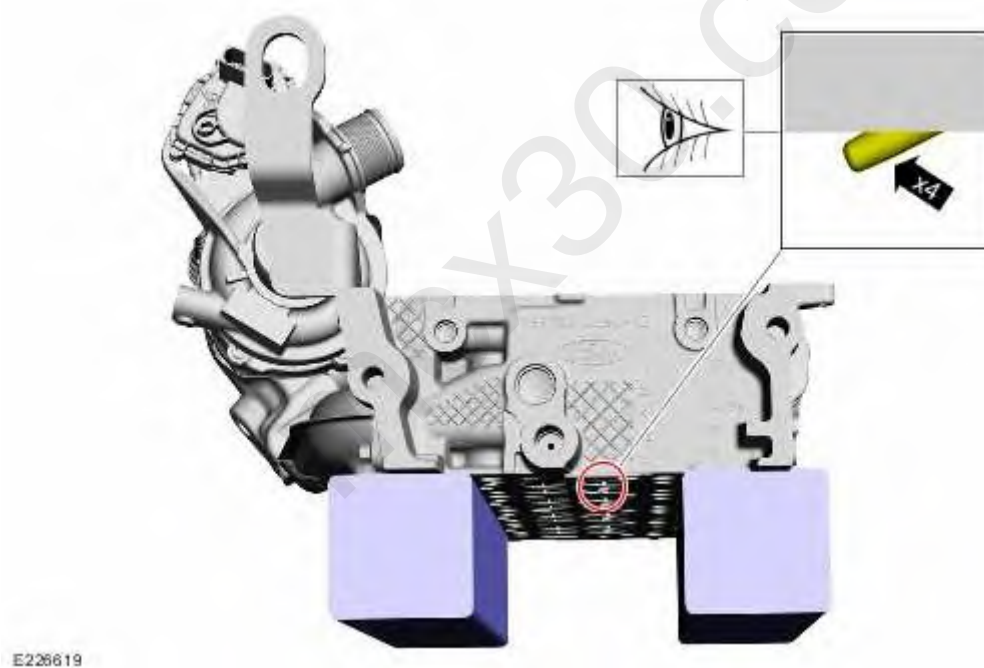
20.



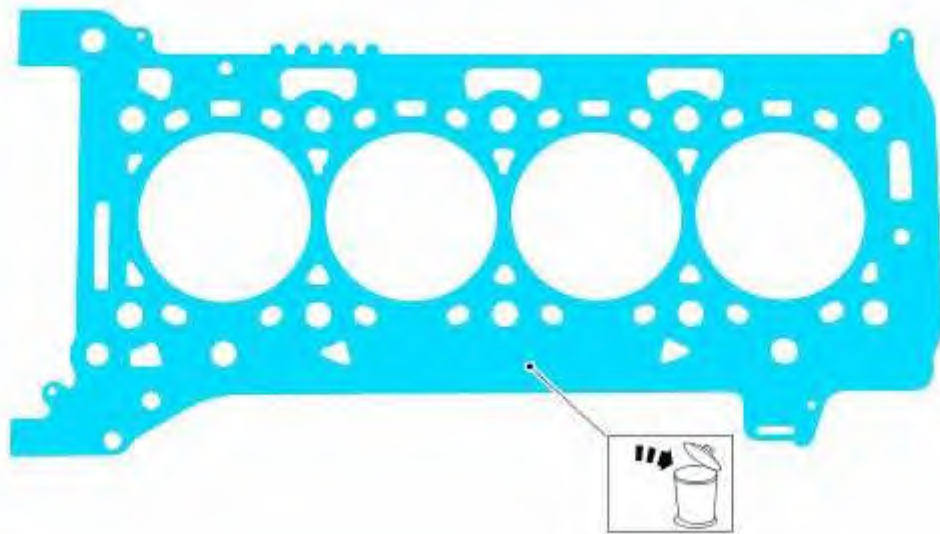
21.  NOTICE: Take extra care when handling the component.
NOTE: Make sure that no components catch.



22. Use the General Equipment: [Wooden Block](#)



23.

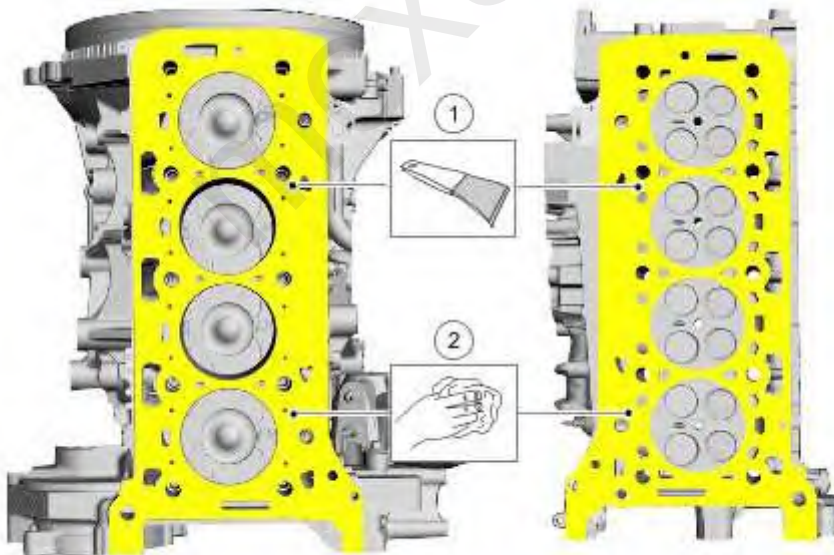


E226718

Installation

1.
 1. Use the General Equipment: [Plastic Scraper](#)
 2. NOTE: Make sure that the mating faces are clean and free of foreign material.

Material: - ([Brake Cleaner](#))



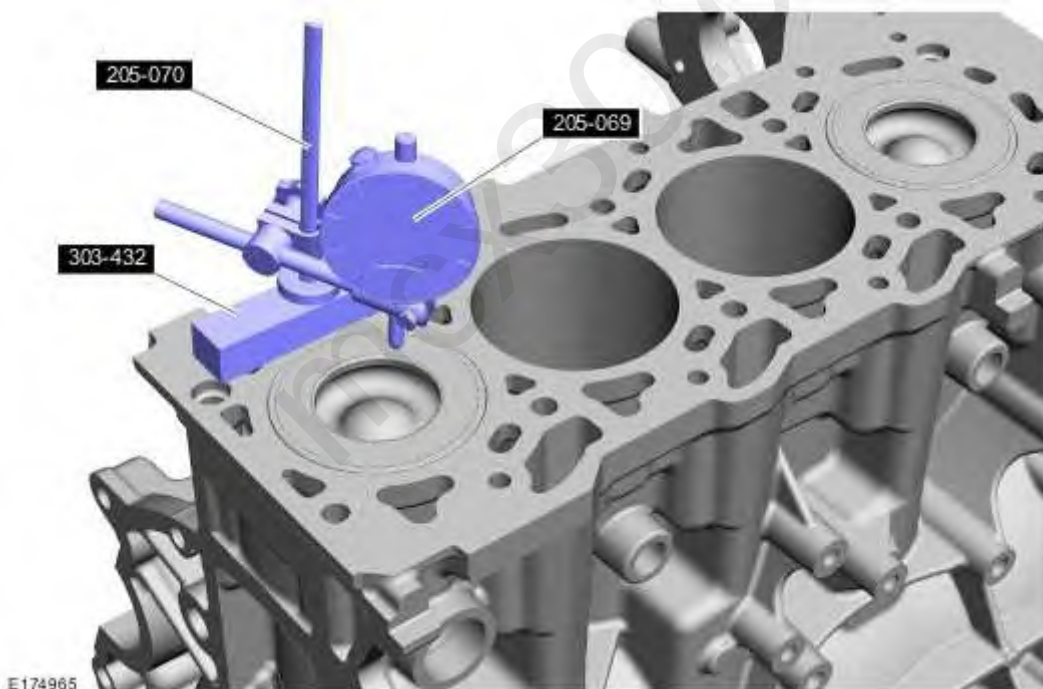
E228874

2. NOTE: Measure the piston protrusion of each cylinder at top dead center (TDC) Measure the distance between the piston crown and the cylinder block at the points indicated.

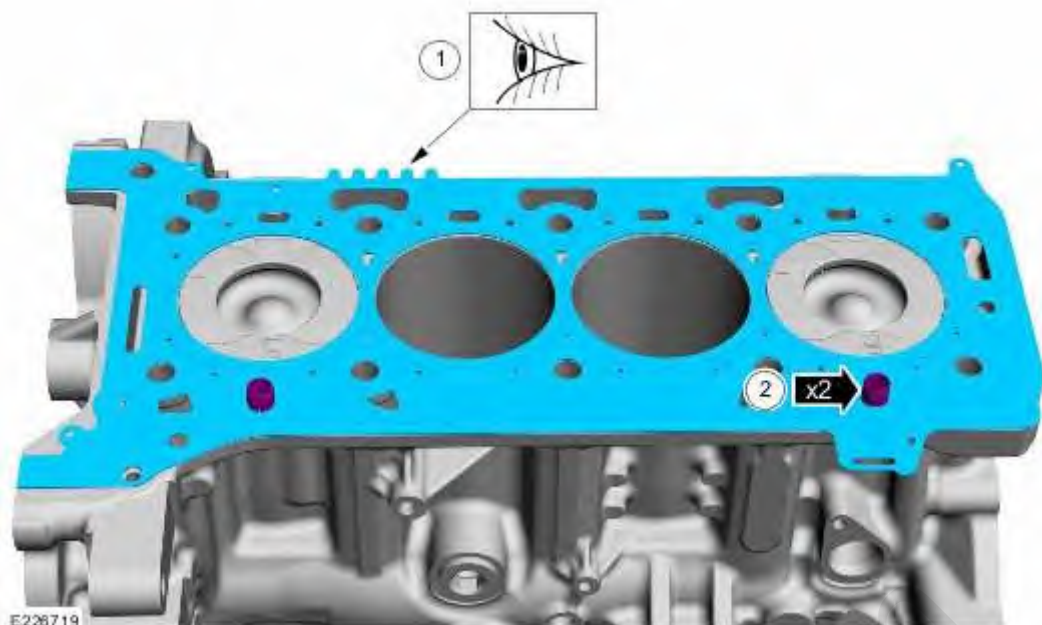


3. The largest measurement determines the choice of the cylinder head gasket.

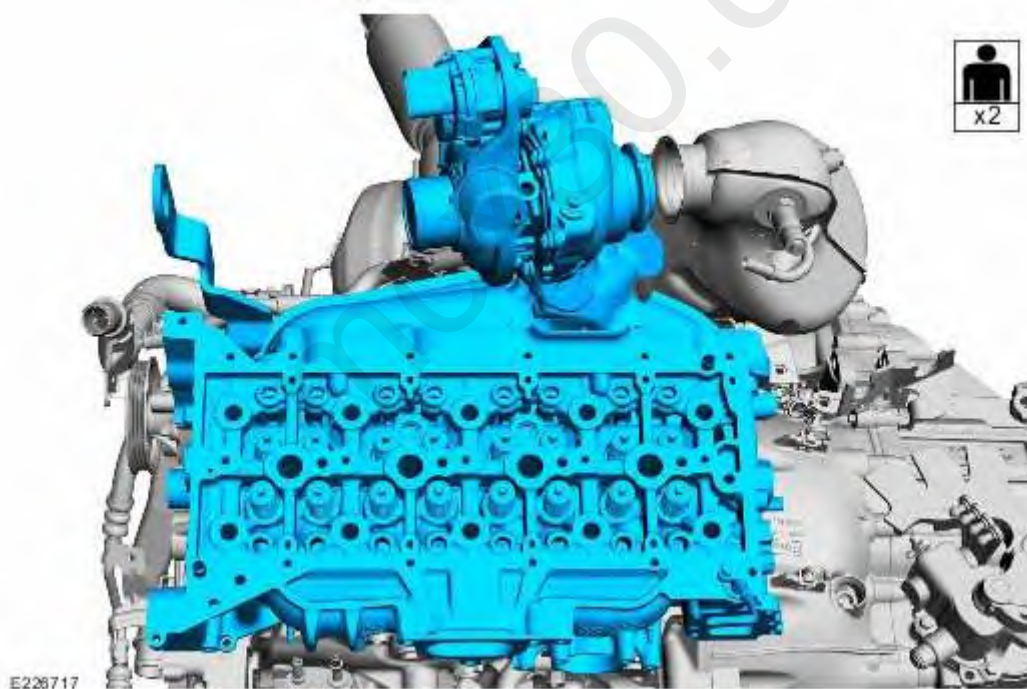
Use Special Service Tools: [205-070](#), [205-069](#), [303-432](#).



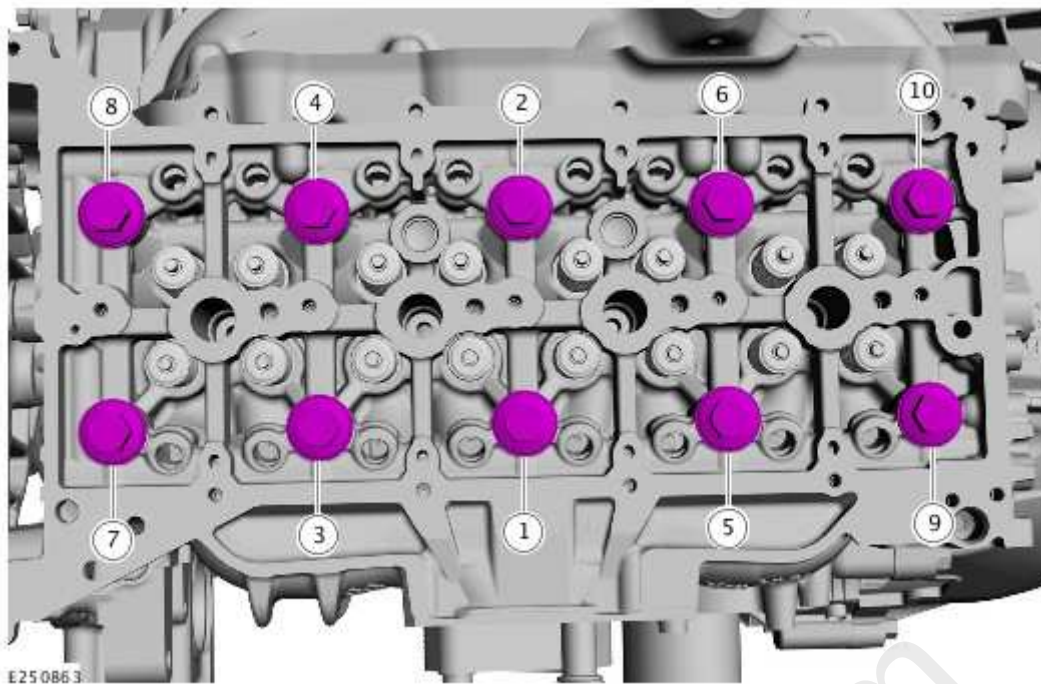
4.  **NOTICE:** Make sure that no fluids are present in the cylinder head bolt threaded bores.
 1. **NOTE:** Make sure that a new component is installed.
Refer to: [Specifications](#) (303-01A Engine, Specifications).
 2.  **NOTICE:** Make sure that the gasket is correctly located.



5.  NOTICE: Take extra care when handling the component.
NOTE: Make sure that no components catch.
NOTE: The component can only be installed in 1 position.

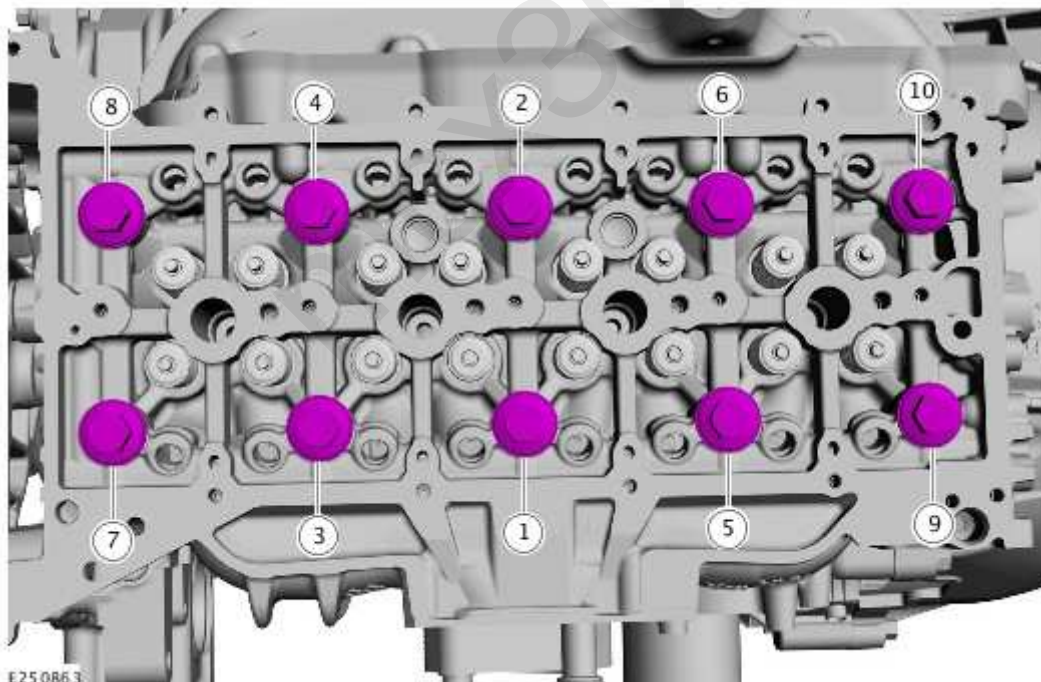


6. NOTE: Only tighten the bolts finger tight at this stage.
NOTE: Make sure that new bolts are installed.

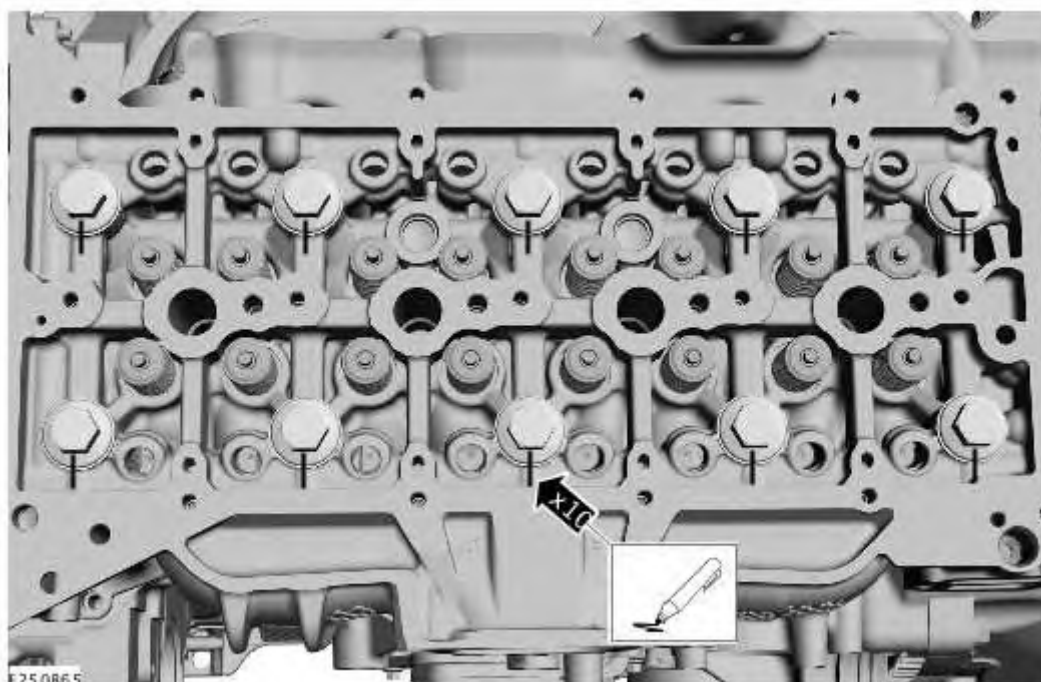


7. Torque:

- Stage 1: 15 Nm
- Stage 2: 25 Nm
- Stage 3: 40 Nm
- Stage 4: 90°
- Stage 5: 90°



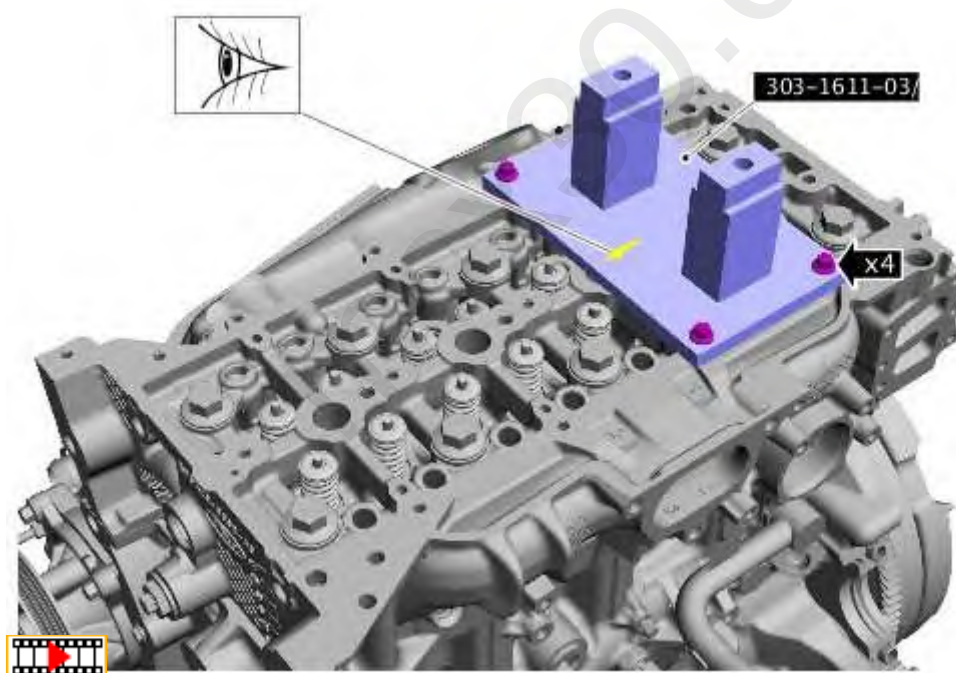
8. Mark the position of the bolts.



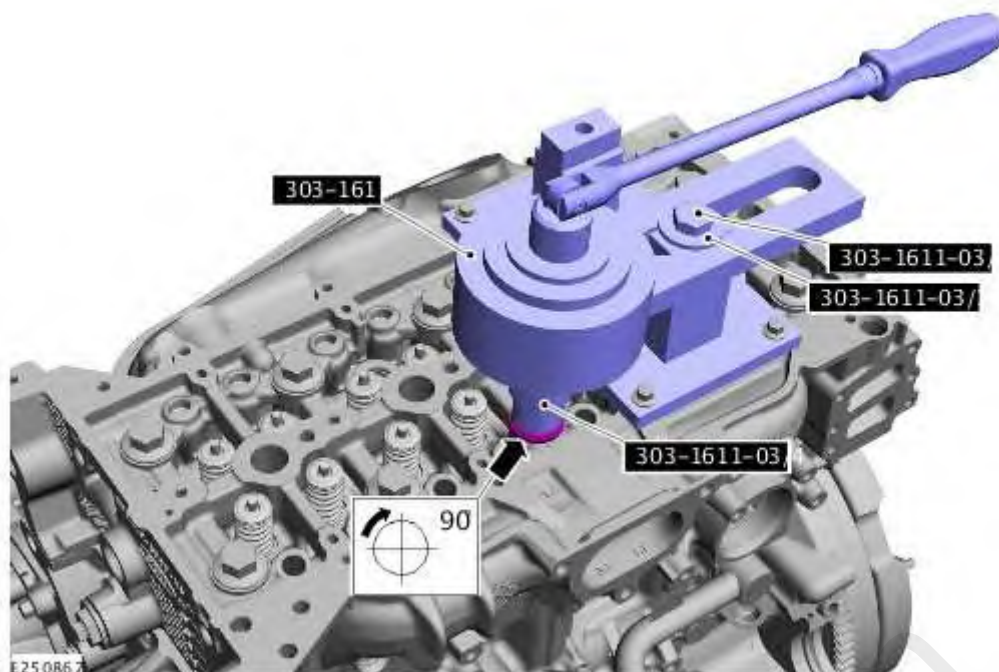
9. **NOTE:** Make sure that the component is correctly installed.

Install Special Service Tool: [303-1611-03](#).

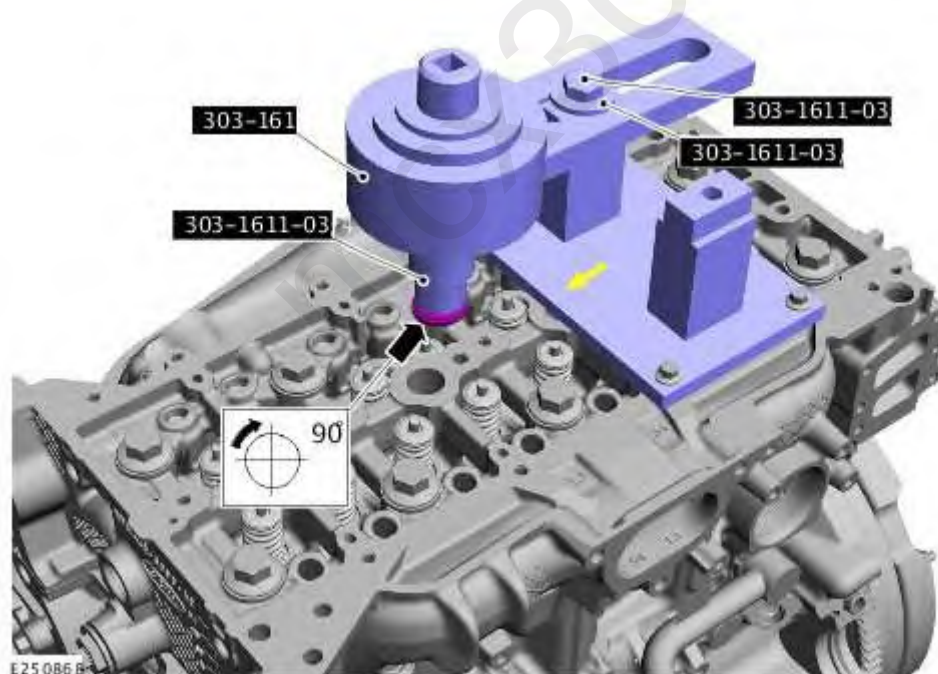
Torque: 10 Nm



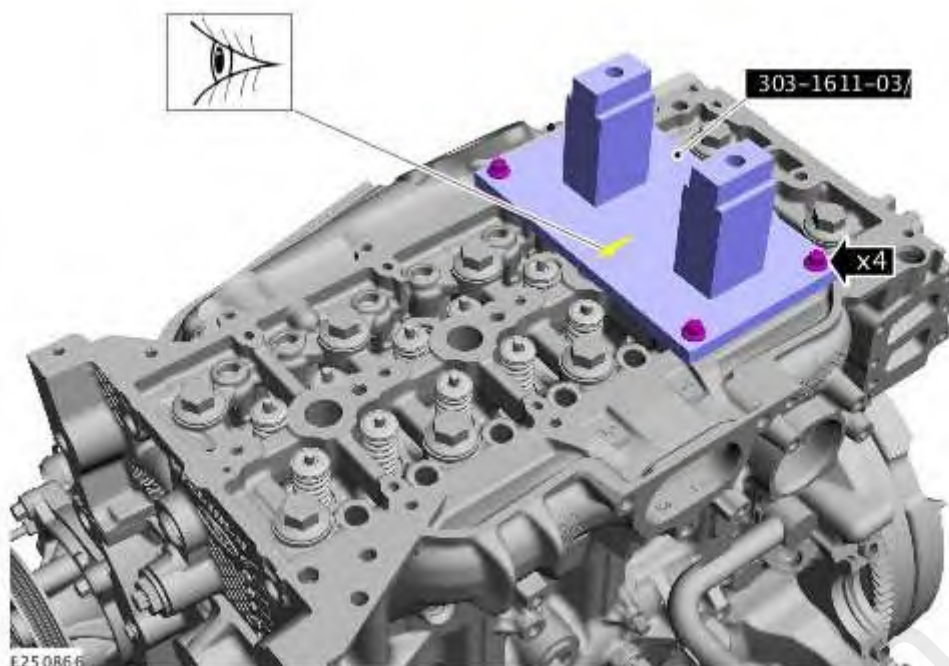
10. *Install Special Service Tools:* [303-1611-03](#), [303-1611](#).
Use the General Equipment: [1/2 Inch Square Drive Breaker Bar](#)
Torque:
 Stage 6: 90°



11. Remove Special Service Tools: 303-1611, 303-1611-03.
12. Install Special Service Tools: 303-1611-03, 303-1611.
Use the General Equipment: 1/2 Inch Square Drive Breaker Bar
Torque:
Stage 6: 90°



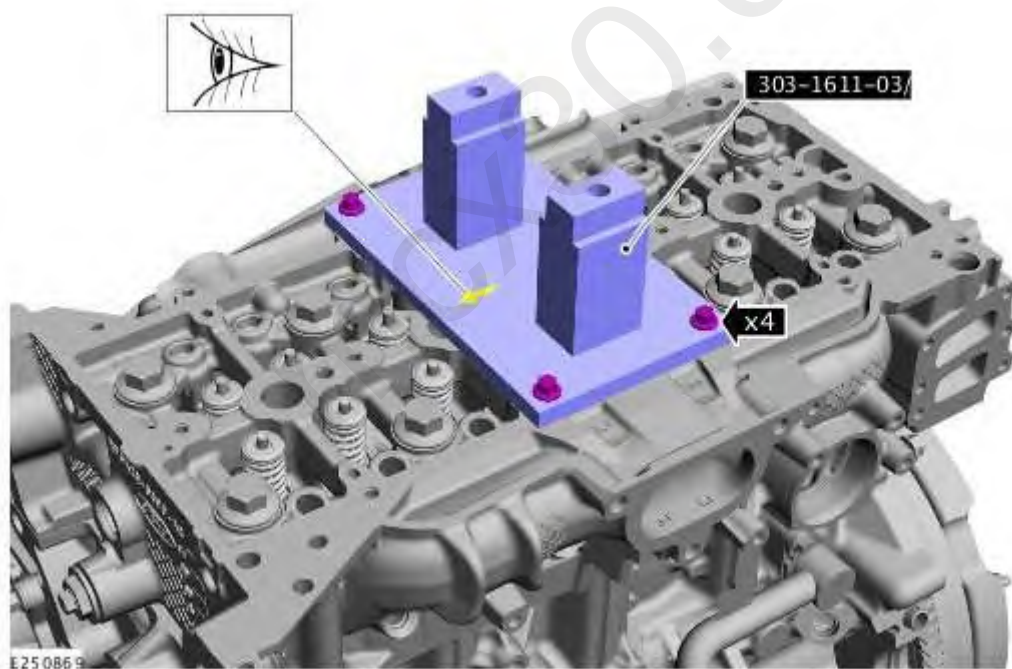
13. Remove Special Service Tools: 303-1611, 303-1611-03.
14. Remove Special Service Tool: 303-1611-03.



15. **NOTE:** Make sure that the component is correctly installed.

Install Special Service Tool: **303-1611-03.**

Torque: **10 Nm**

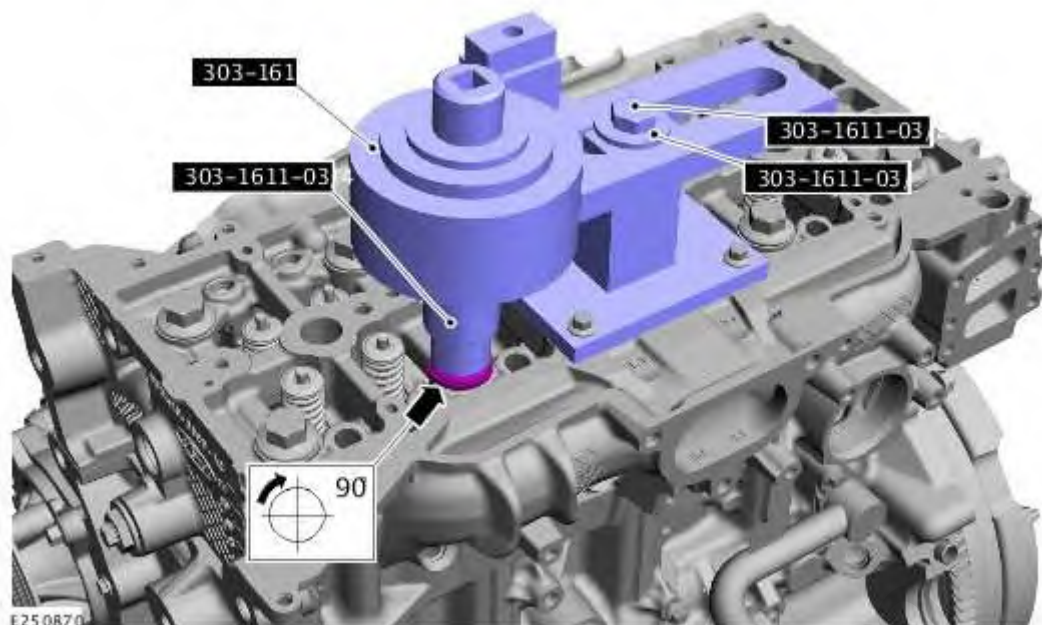


16. *Install Special Service Tools:* **303-1611-03, 303-1611.**

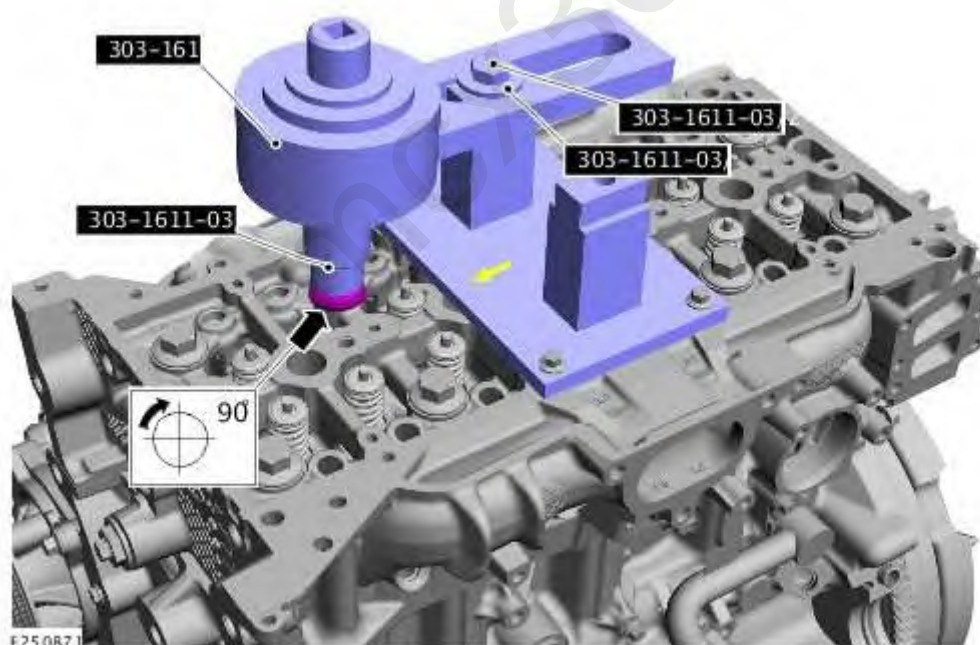
Use the General Equipment: **1/2 Inch Square Drive Breaker Bar**

Torque:

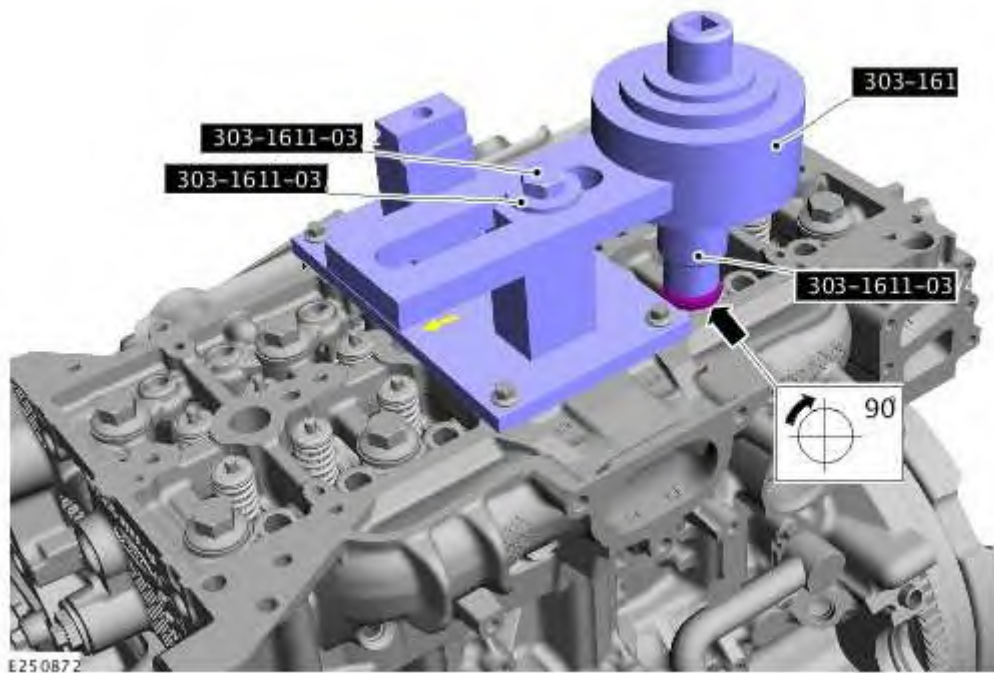
Stage 6: 90°



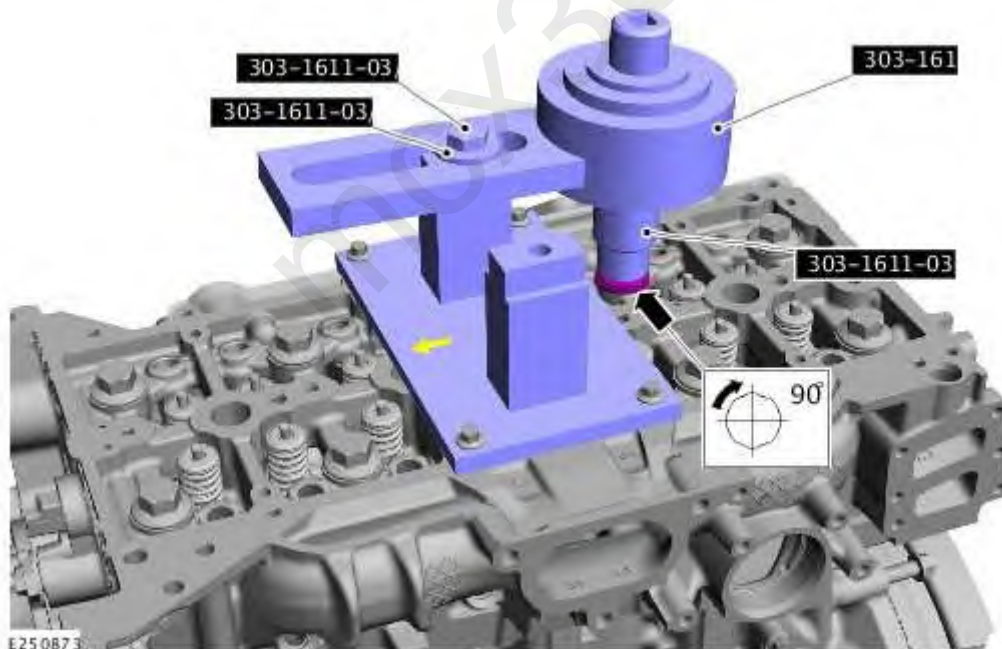
17. Remove Special Service Tools: 303-1611, 303-1611-03.
18. Install Special Service Tools: 303-1611-03, 303-1611.
Use the General Equipment: 1/2 Inch Square Drive Breaker Bar
Torque:
Stage 6: 90°



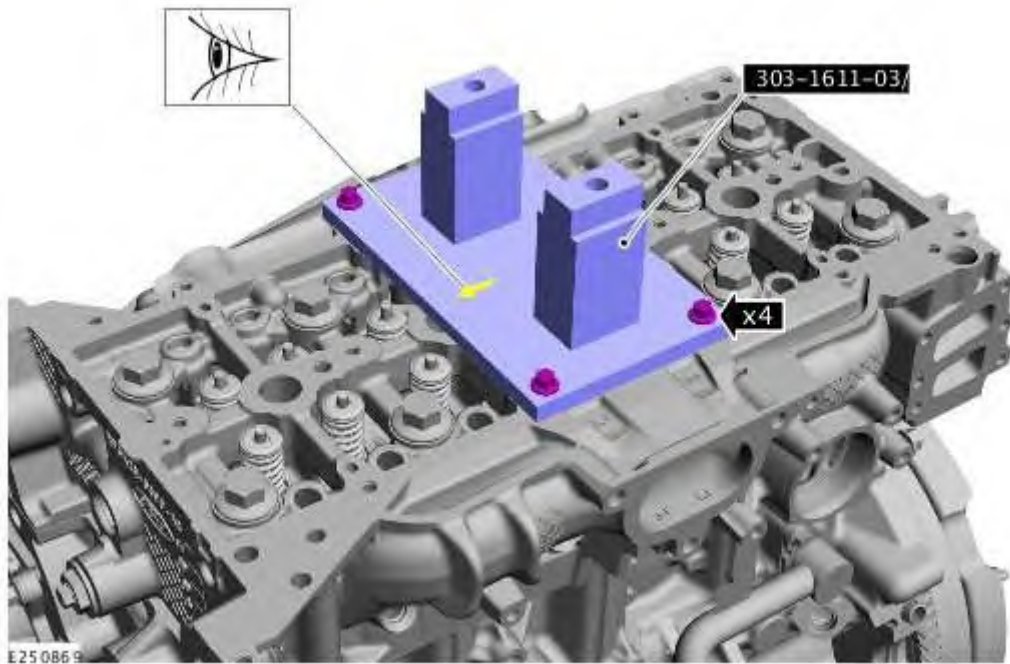
19. Remove Special Service Tools: 303-1611, 303-1611-03.
20. Install Special Service Tools: 303-1611-03, 303-1611.
Use the General Equipment: 1/2 Inch Square Drive Breaker Bar
Torque:
Stage 6: 90°



21. Remove Special Service Tools: 303-1611, 303-1611-03.
22. Install Special Service Tools: 303-1611-03, 303-1611.
 Use the General Equipment: 1/2 Inch Square Drive Breaker Bar
 Torque:
 Stage 6: 90°



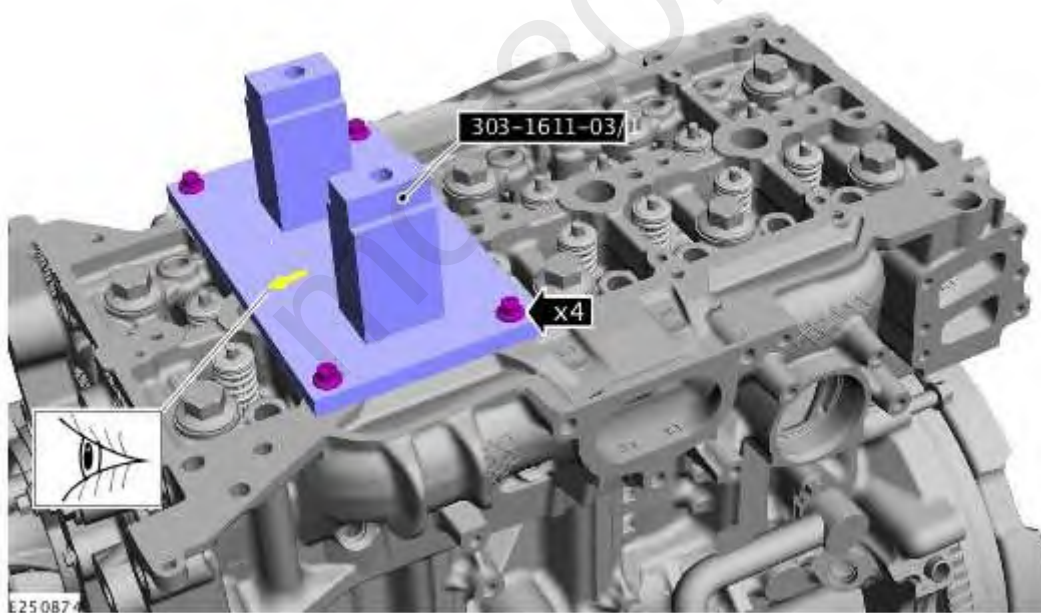
23. Remove Special Service Tools: 303-1611, 303-1611-03.
24. Remove Special Service Tool: 303-1611.



25. **NOTE:** Make sure that the component is correctly installed.

Install Special Service Tool: 303-1611-03.

Torque: 10 Nm

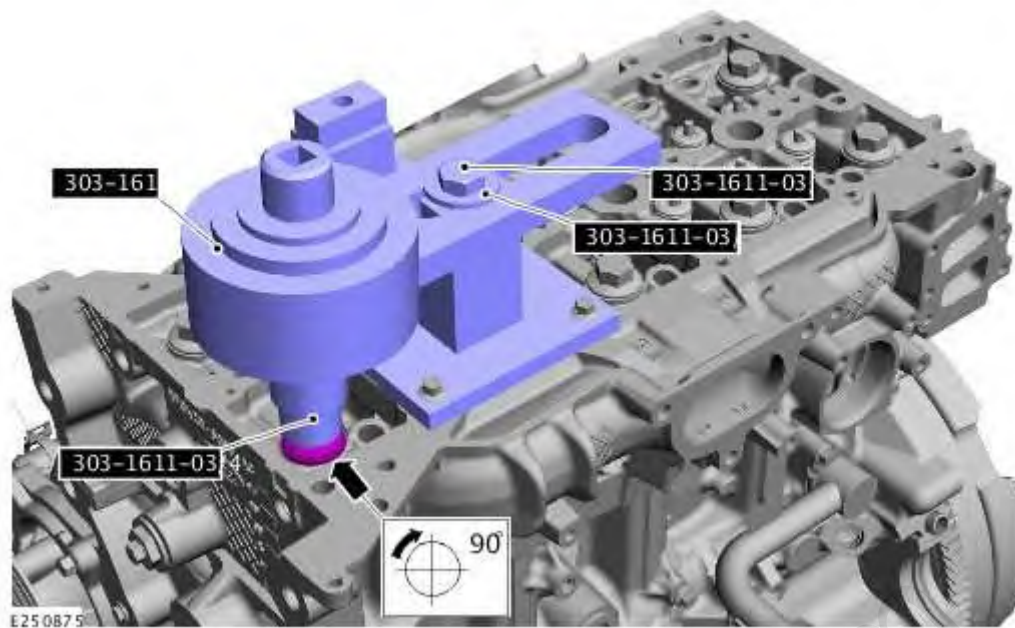


26. Install Special Service Tools: 303-1611-03, 303-1611.

Use the General Equipment: 1/2 Inch Square Drive Breaker Bar

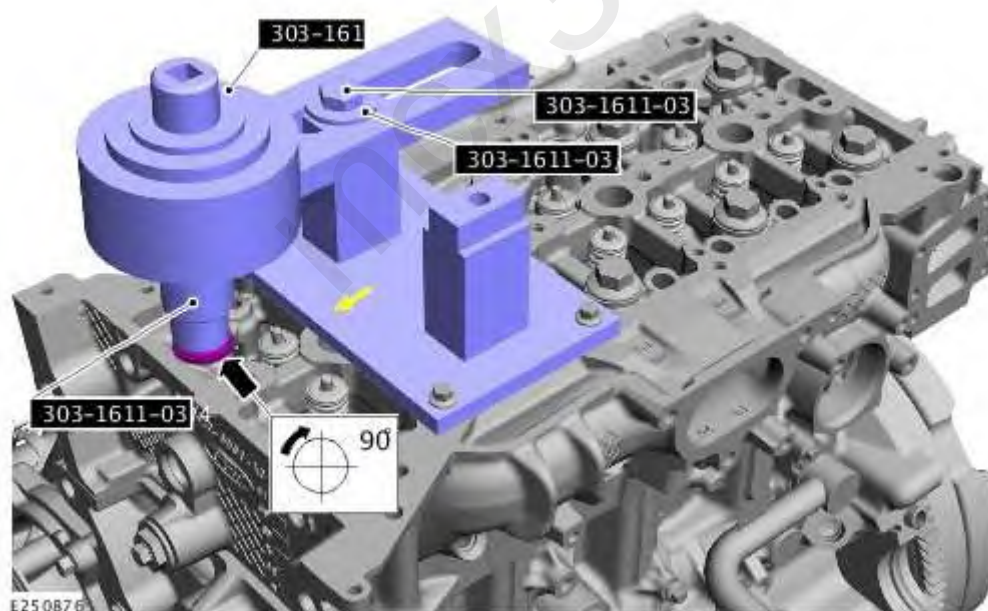
Torque:

Stage 6: 90°



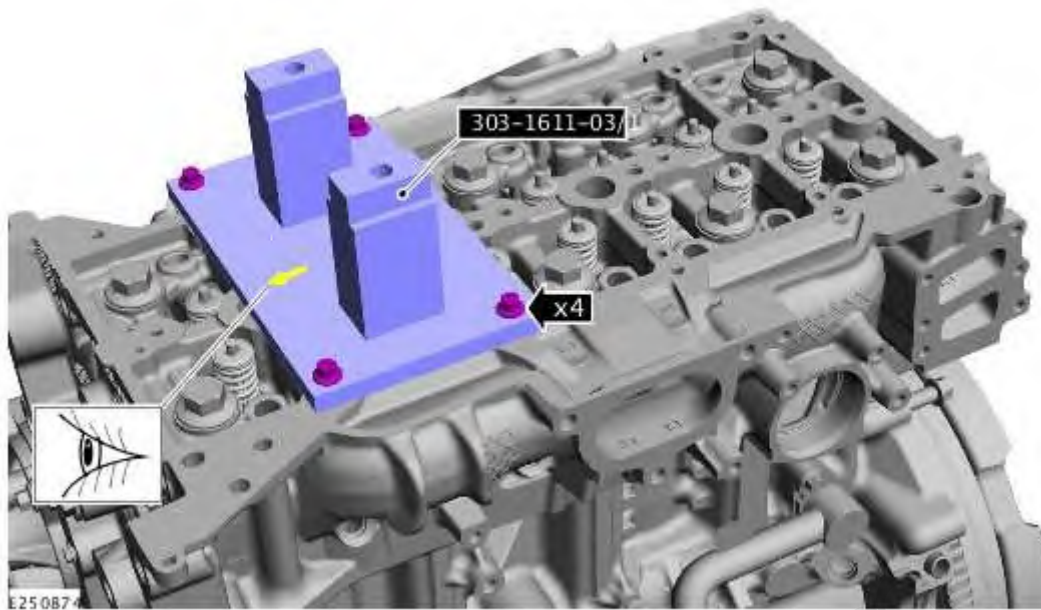
27. Remove Special Service Tools: 303-1611, 303-1611-03.

28. Install Special Service Tools: 303-1611-03, 303-1611.
 Use the General Equipment: 1/2 Inch Square Drive Breaker Bar
 Torque:
 Stage 6: 90°



29. Remove Special Service Tools: 303-1611, 303-1611-03.

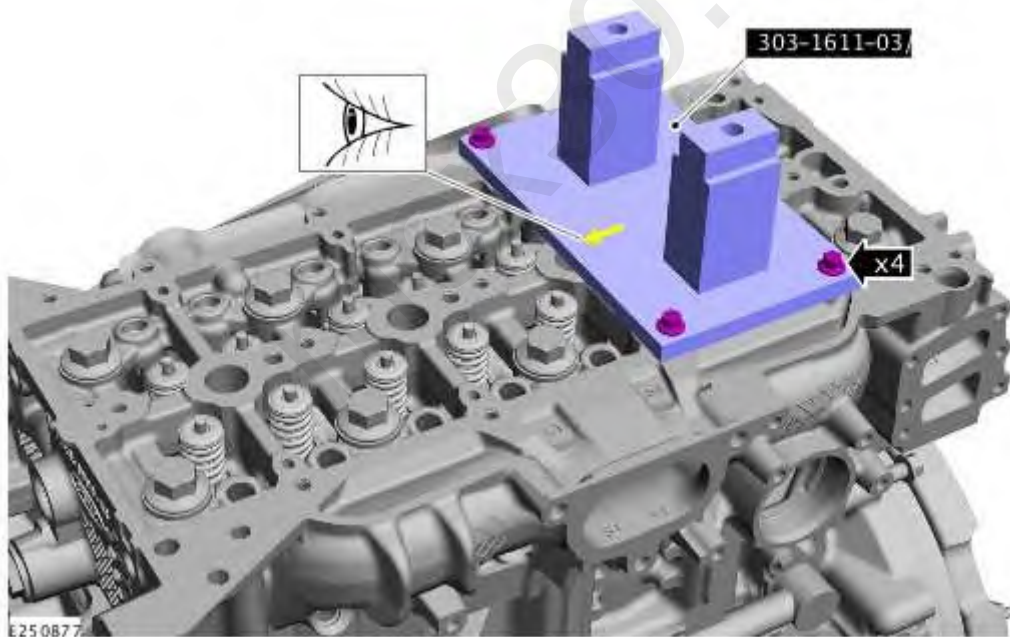
30. Remove Special Service Tool: 303-1611-03.



31. **NOTE:** Make sure that the component is correctly installed.

Install Special Service Tool: [303-1611-03](#).

Torque: 10 Nm

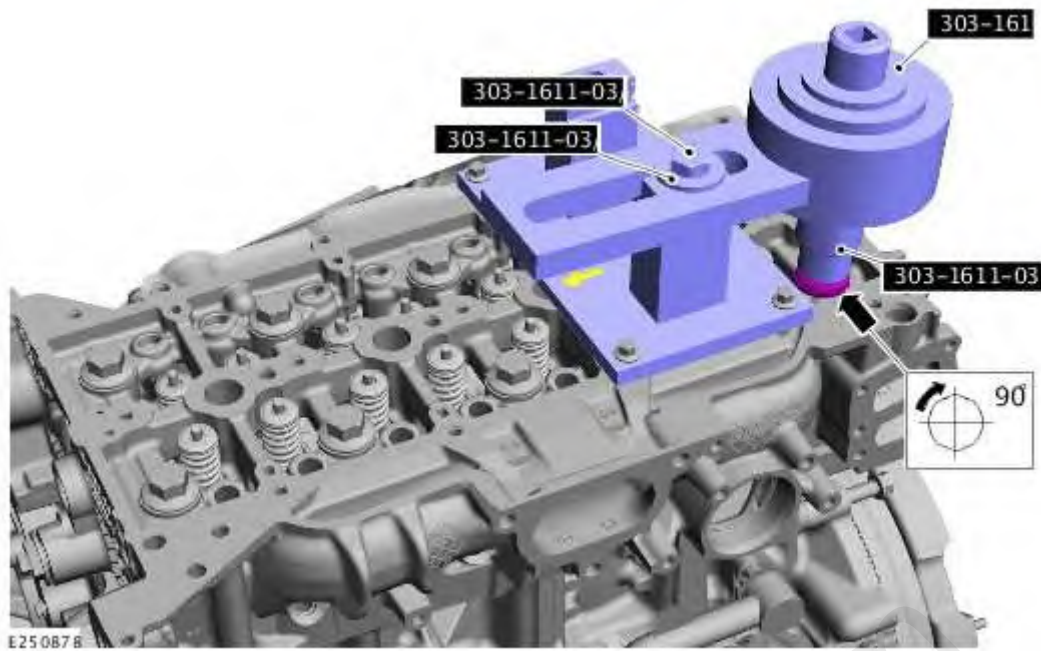


32. Install Special Service Tools: [303-1611-03](#), [303-1611](#).

Use the General Equipment: [1/2 Inch Square Drive Breaker Bar](#)

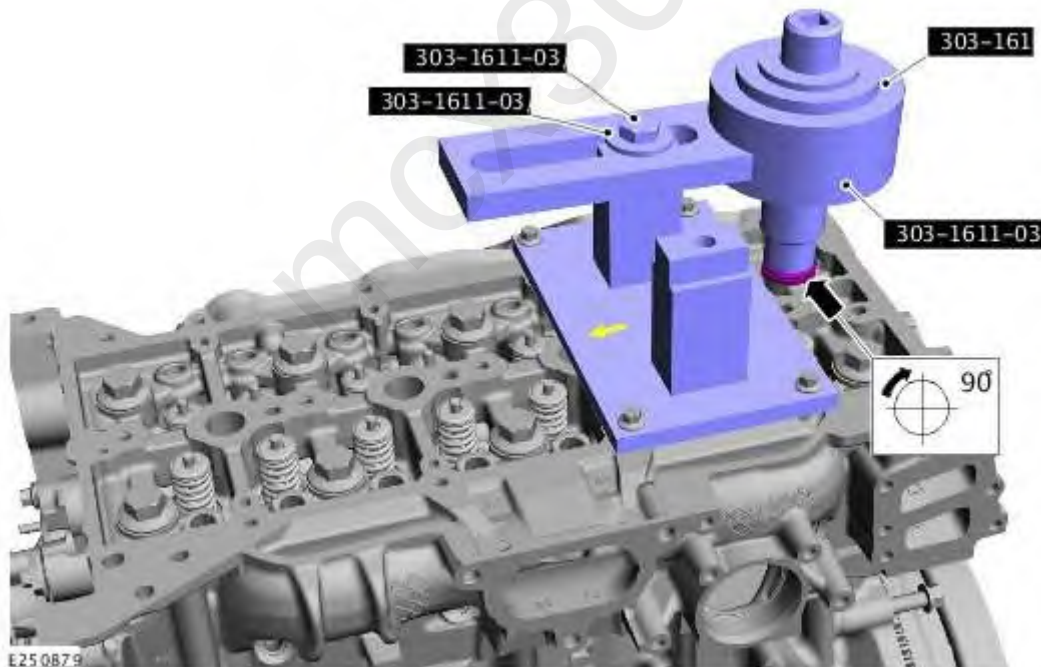
Torque:

Stage 6: 90°



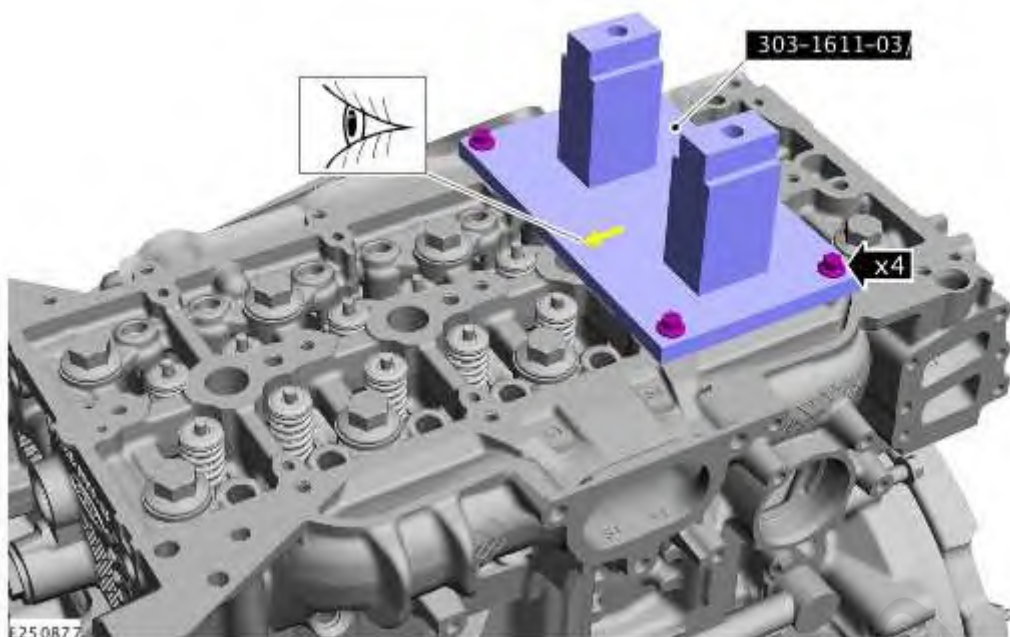
33. Remove Special Service Tools: 303-1611, 303-1611-03.

34. Install Special Service Tools: 303-1611-03, 303-1611.
 Use the General Equipment: 1/2 Inch Square Drive Breaker Bar
 Torque:
 Stage 6: 90°



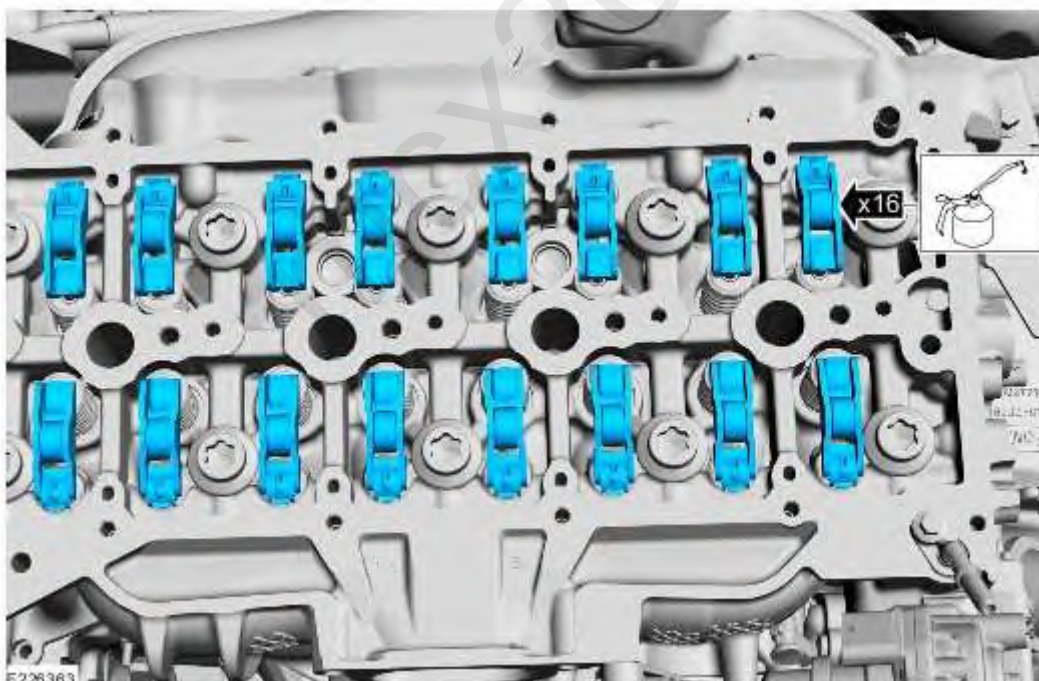
35. Remove Special Service Tools: 303-1611, 303-1611-03.

36. Remove Special Service Tool: 303-1611-03.



37. **Stage 7: Repeat the steps 9 to 36.**

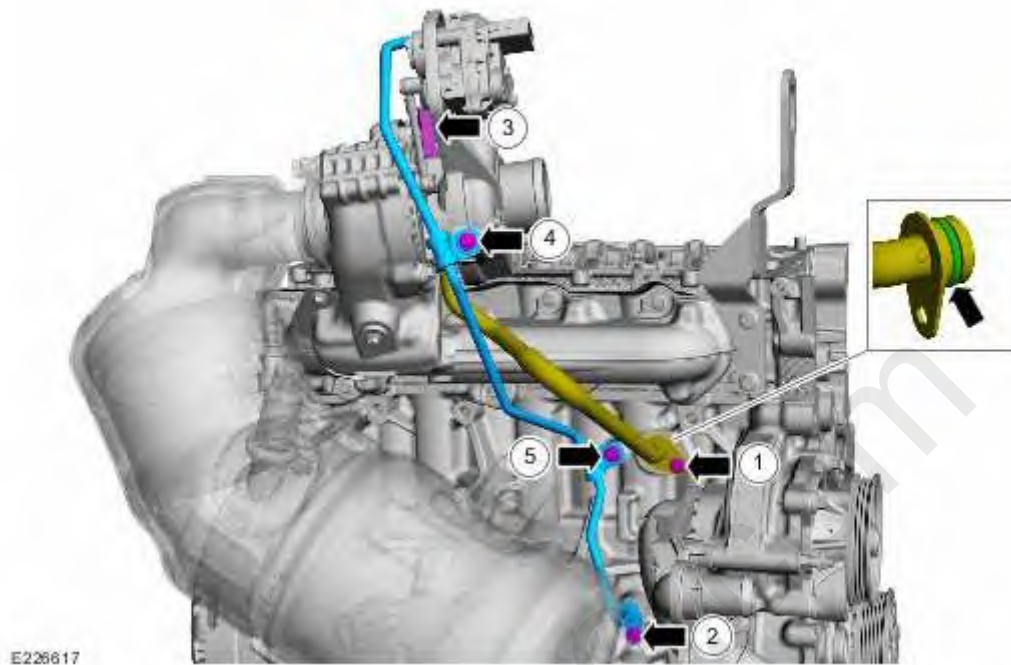
38. 1. **NOTE:** Component must be lubricated with clean engine oil.
Refer to: [Specifications](#) (303-01A Engine, Specifications).
2. **NOTE:** Make sure that the components are installed to the position noted before removal.



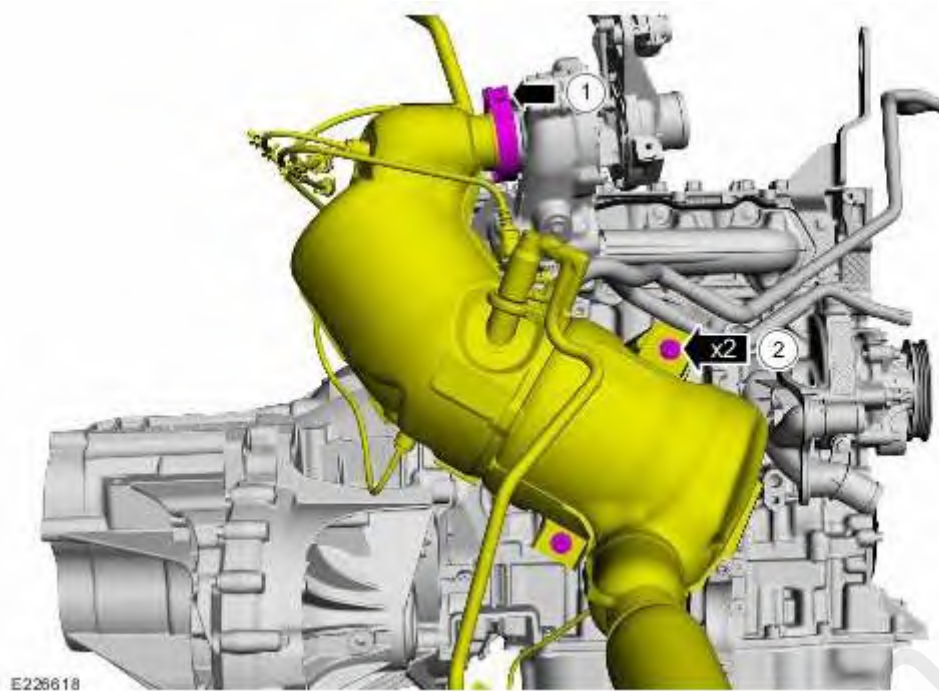
39.  **NOTICE:** Take extra care when handling the components.
NOTE: Only tighten the nut and bolts finger tight at this stage.
NOTE: Make sure that a new O-ring seal is installed.
NOTE: Make sure that a new component is installed.

1. **Torque:** 10 Nm

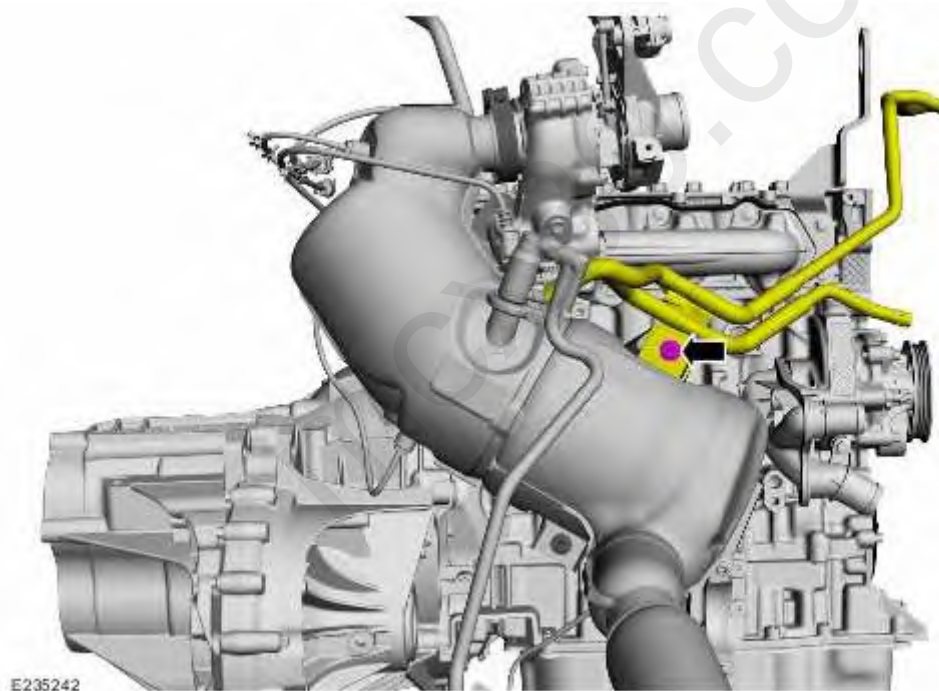
2. Torque: 10 Nm
3. Torque: 20 Nm
4. Torque: 10 Nm
5. Torque: 10 Nm



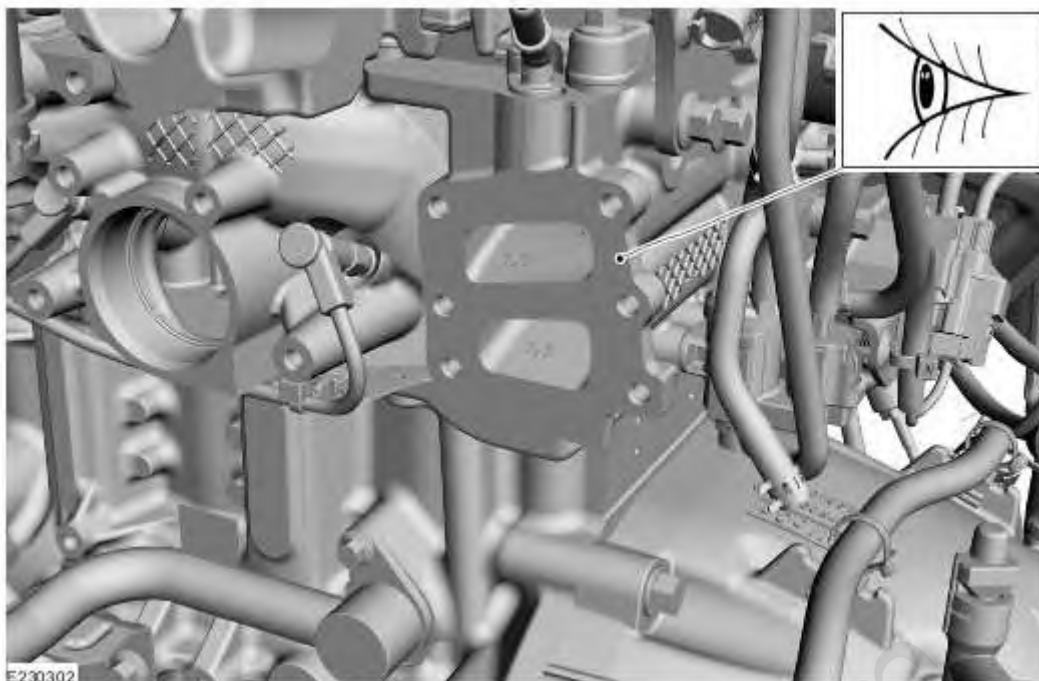
40. NOTE: Only tighten the nuts and bolt finger tight at this stage.
 1. NOTE: Make sure that the component is installed to the position noted before removal.
Torque: 8 Nm
 2. Torque: 25 Nm



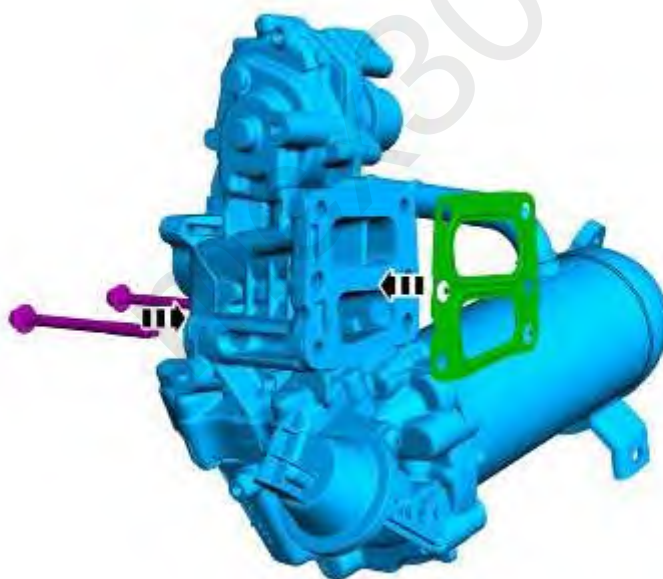
41. Torque: 25 Nm



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



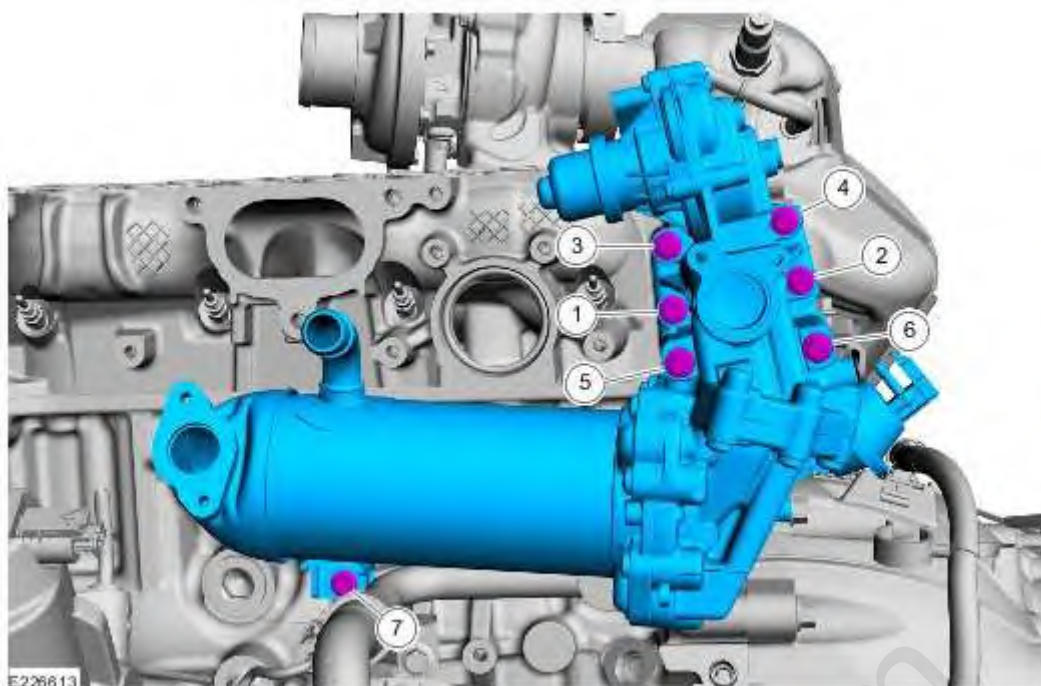
43.  **NOTICE:** The bolts must not be reused more than 1 time.
NOTE: Using a center punch, mark the heads of all bolts which are to be reused.
NOTE: Make sure that the mating faces are clean and free of foreign material.
NOTE: Use a new seal.



44.  **NOTICE:** The bolts must not be reused more than 1 time.
NOTE: Using a center punch, mark the heads of all bolts which are to be reused.
NOTE: Make sure that the seal is correctly located.
NOTE: Only tighten the bolts finger tight at this stage.

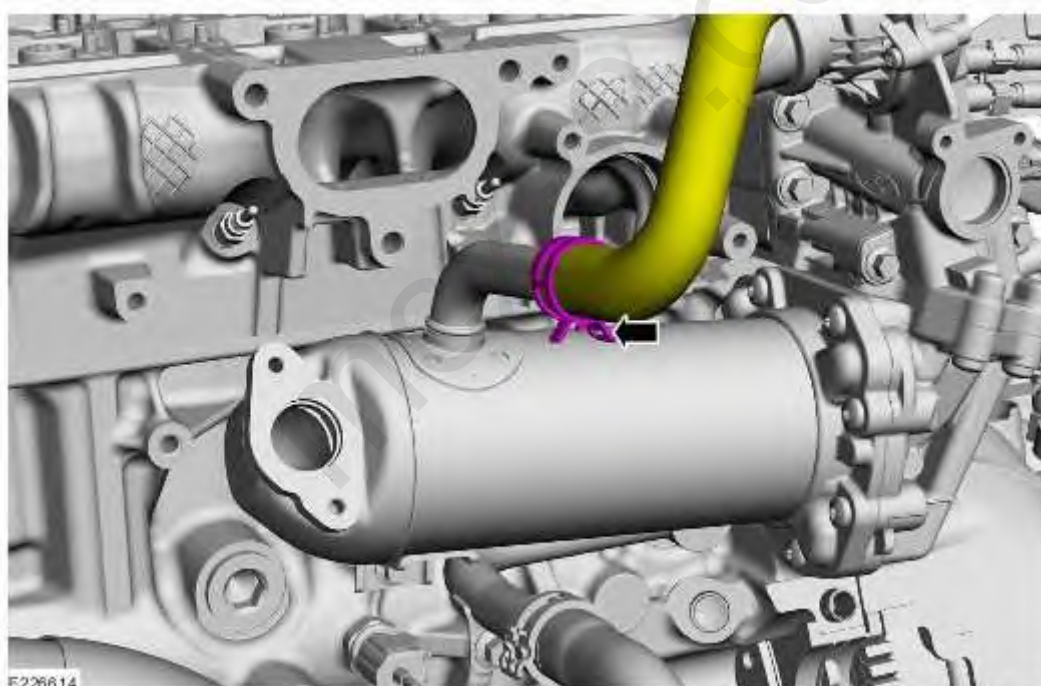
Torque:

Stage 1: 4 Nm
 Stage 2: 10 Nm



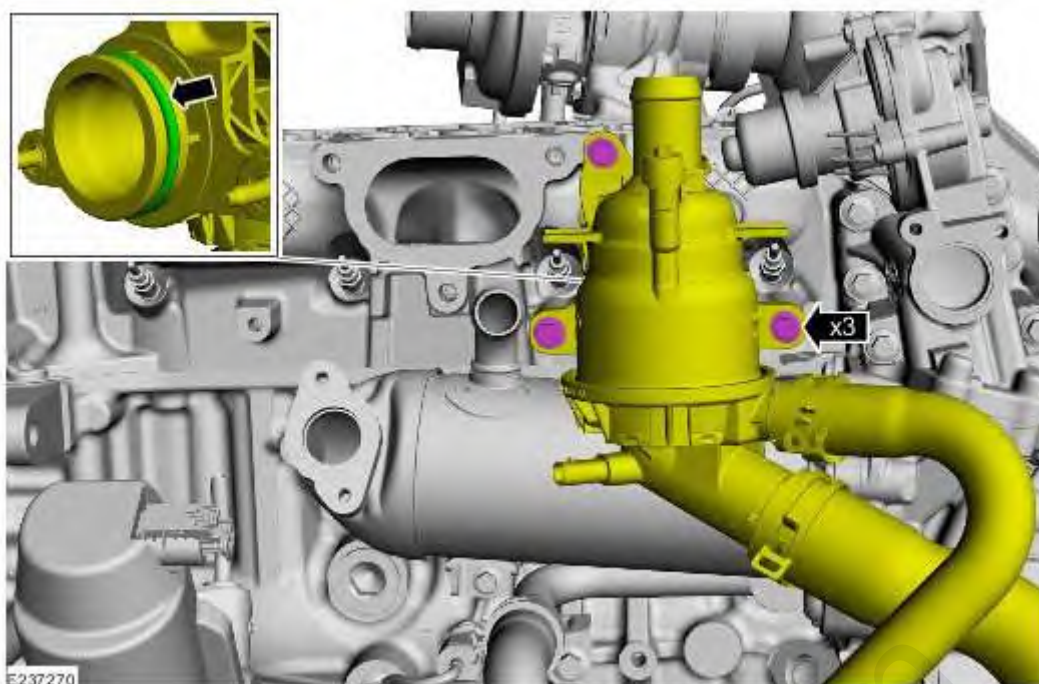
45. **NOTE:** Be prepared to collect escaping fluid.

Use the General Equipment: [Hose Clamp Remover/Installer](#)

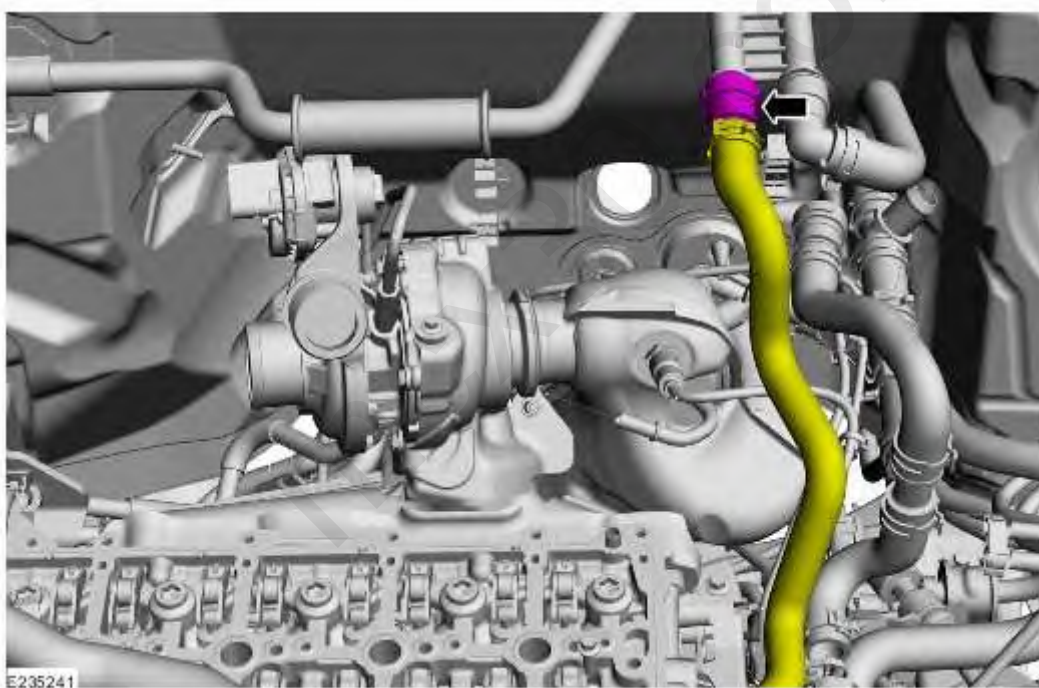


46. **NOTE:** Make sure that a new O-ring seal is installed.
NOTE: Only tighten the bolts finger tight at this stage.

Torque: 10 Nm

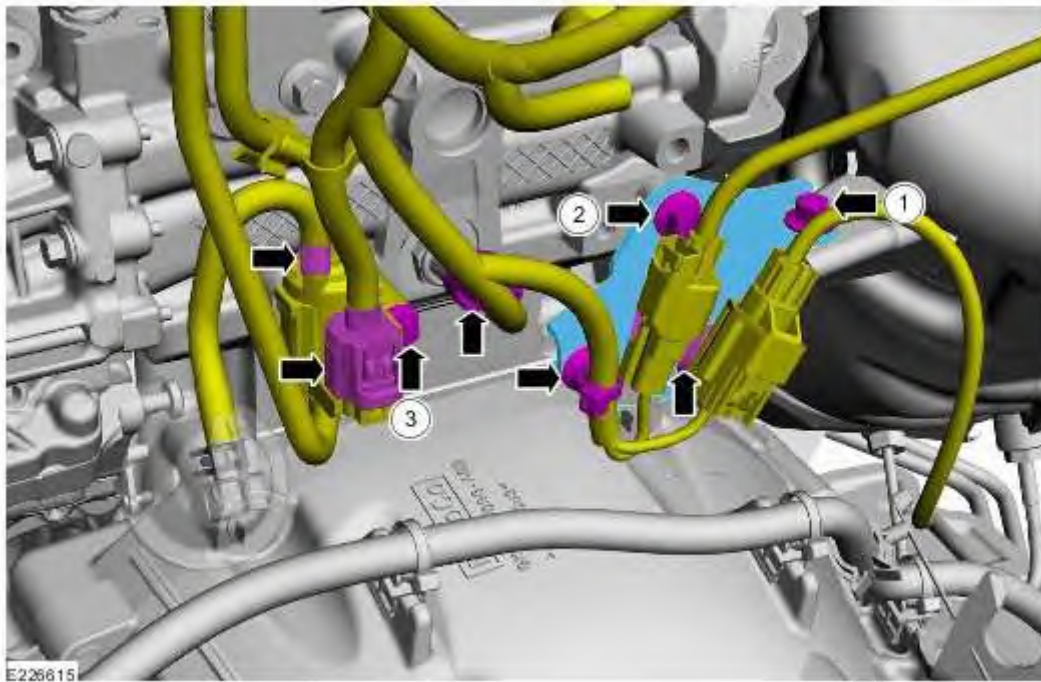


47.

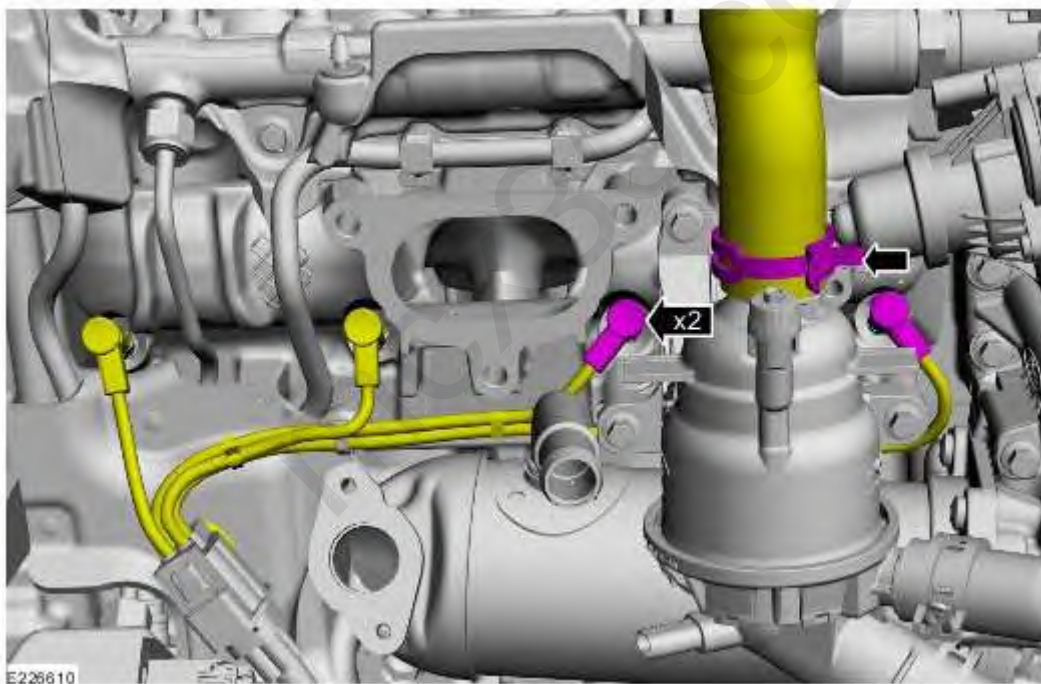


48. Torque:

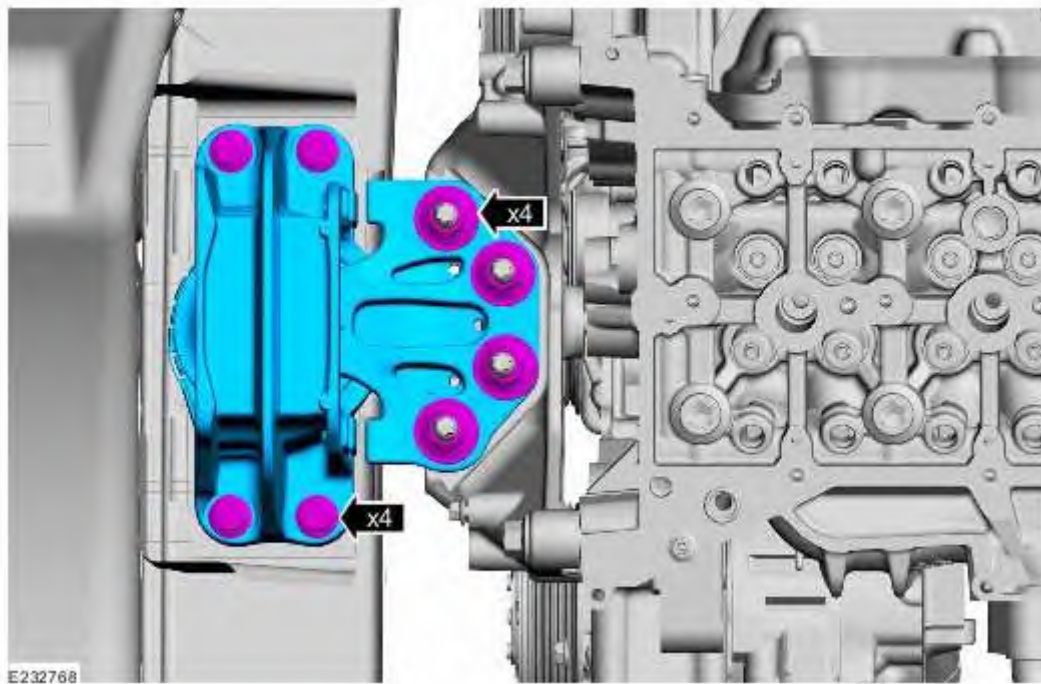
- 1: 25 Nm
- 2: 25 Nm
- 3: 10 Nm



49. Use the General Equipment: [Hose Clamp Remover/Installer](#)



50. Remove the component.



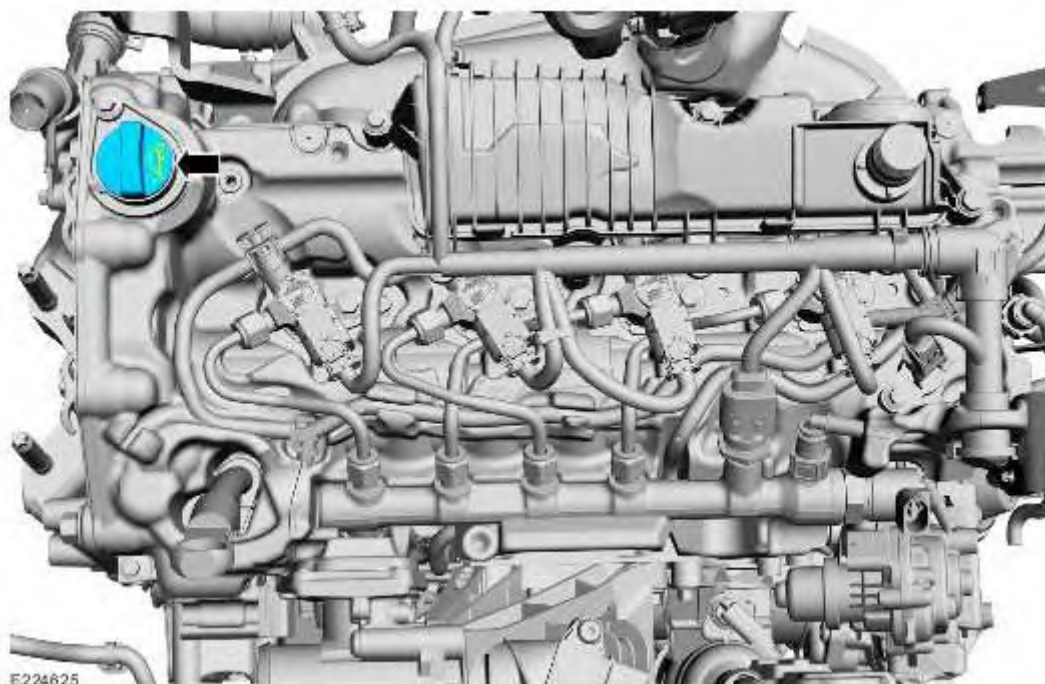
51. Remove the component.



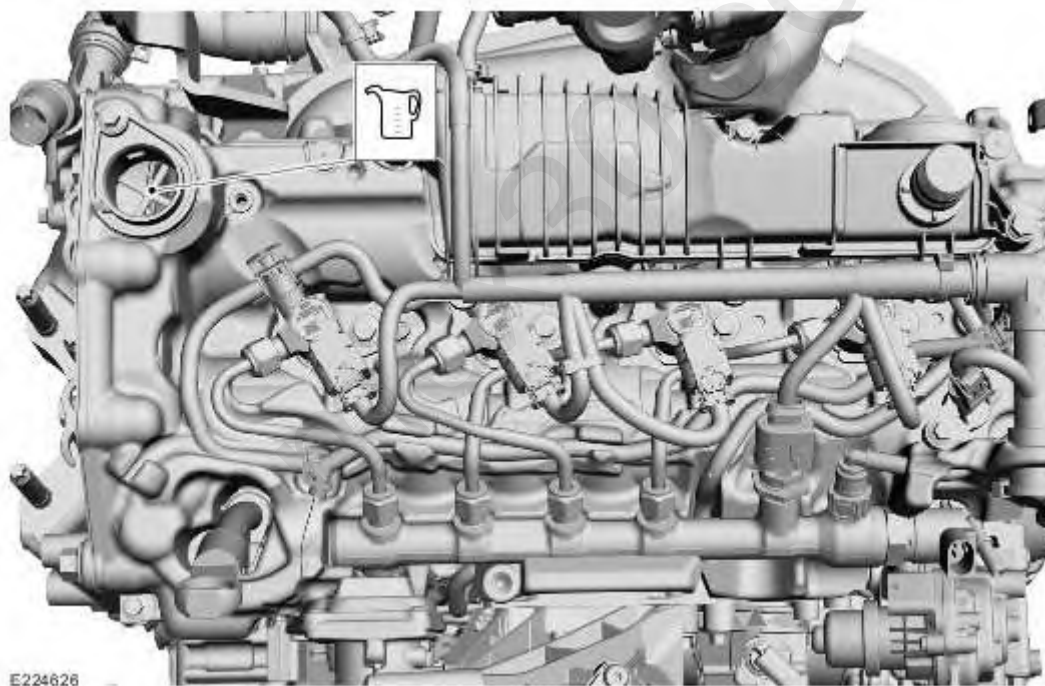
52. Refer to: [Intake Manifold](#) (303-01A Engine, Removal and Installation).

53. Refer to: [Camshaft and Carrier Assembly](#) (303-01A Engine, Removal and Installation).

54.



55. Refer to: [Specifications](#) (303-01A Engine, Specifications).



56.

