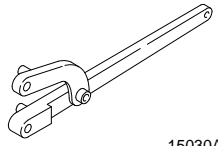
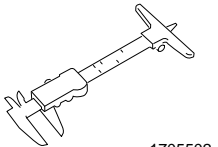
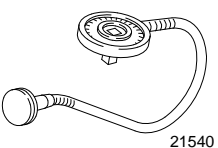
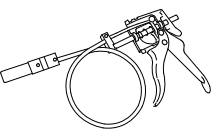


Cylinder Head – Remove and Install (21 163 0)**Special Tools**

 15030A	15-030A Universal flange-holding wrench
 1705502	17-055-02 Depth gauge for reworking the cylinder head
 21540	21-540 Angle gauge
 24003	24-003 Remover/installer, radiator hose clip

Materials

Engine oil	
Coolant	ESD-M97B49-A

Workshop Equipment

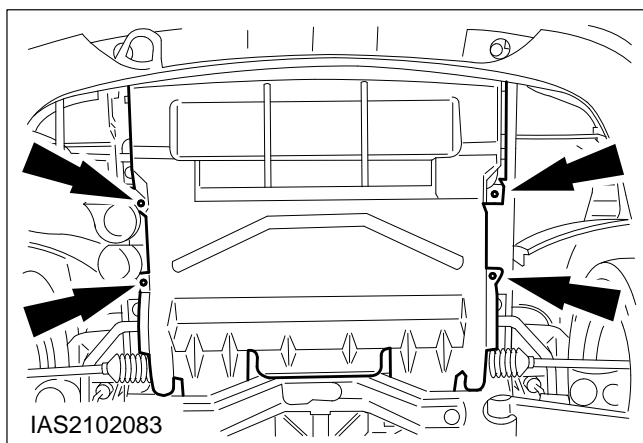
500x5 steel straightedge	
Feeler gauge	

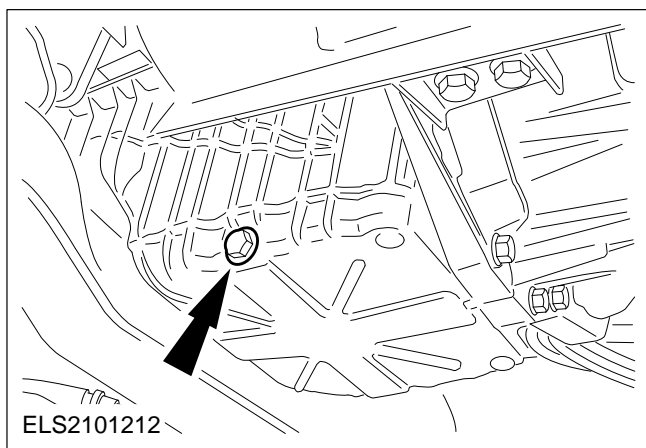
Remove**1. Standard preparatory operations**

- Make a note of the radio keycode.
- Make a note of the preset radio stations.
- Detach the battery cover.

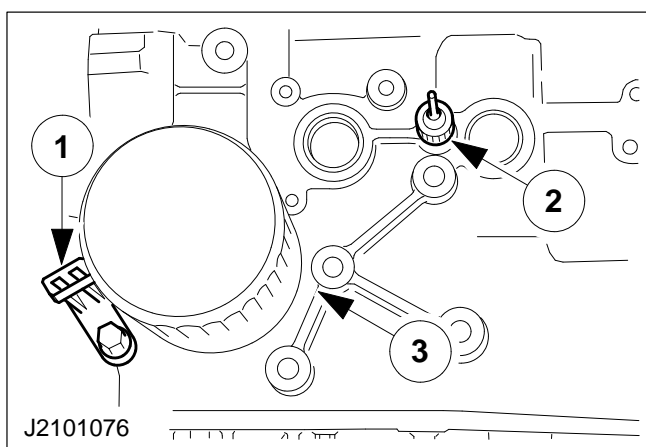
**CAUTION:** Disconnect the battery earth lead.**NOTE:** When removing and installing coolant or breather hoses use Remover/Installer 24-003 as required.

- Open the coolant expansion tank.

2. Raise the vehicle.**3. Detach the engine undershield.****4. Drain off the coolant.**



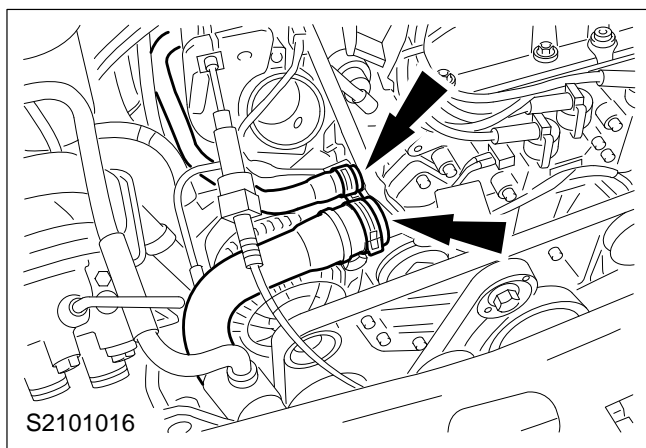
5. Drain off the engine oil.



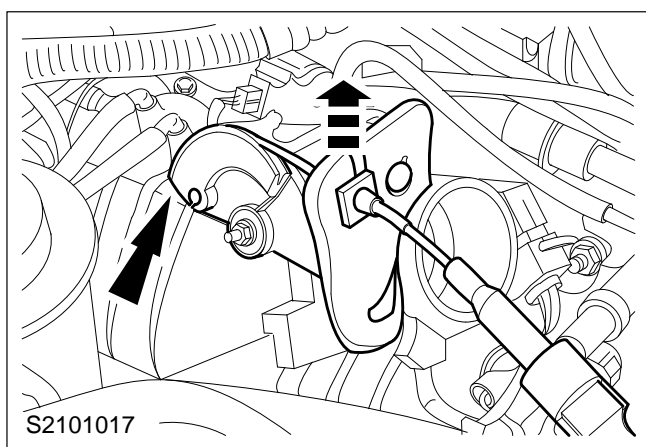
6. Detach the oil filter.

7. Disconnect the plugs from the oil pressure switch and the crankshaft position sensor (CKP sensor).

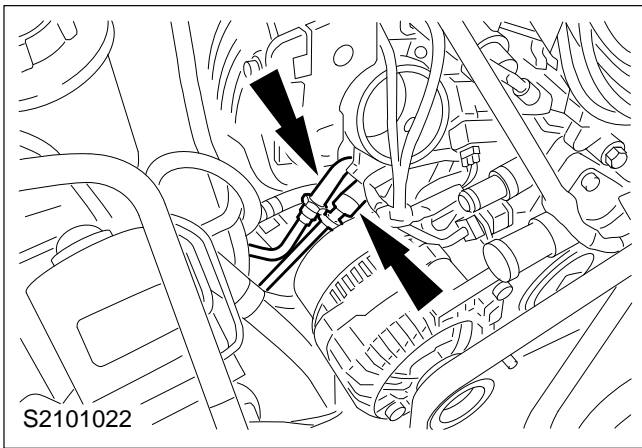
8. Lower the vehicle.



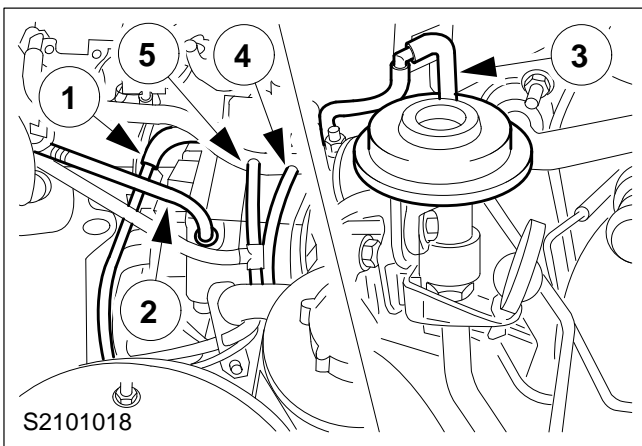
9. Disconnect the coolant hoses from the thermostat housing.



10. Detach the throttle cable.

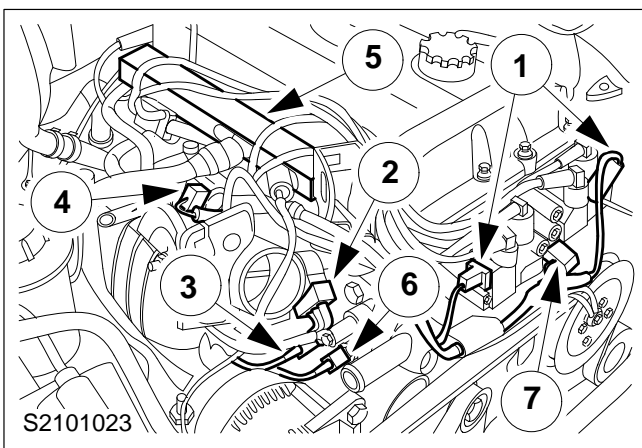


11. Disconnect the fuel lines.



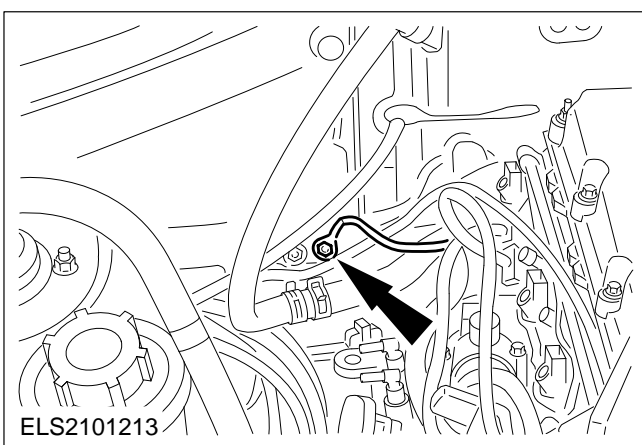
12. Disconnect the vacuum hoses.

- 1 From the idle air control (IAC) valve
- 2 To the brake servo.
- 3 From the EGR valve.
- 4 From the EGR system vacuum controller (CVT).
- 5 To the evaporative emission control system valve (EVAP).

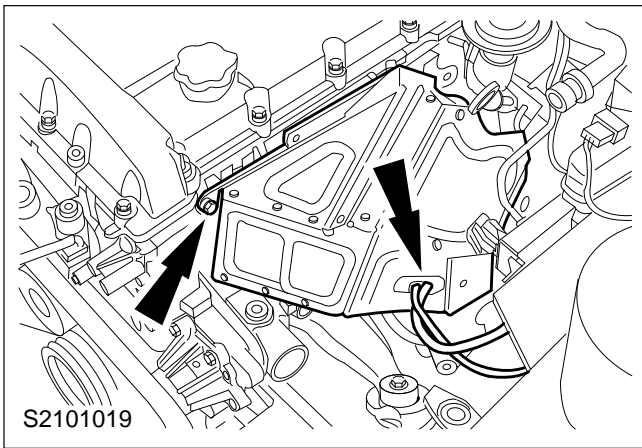


13. Disconnect the plugs.

- 1 From the DIS ignition coils
- 2 From the throttle position sensor (TPS)
- 3 From the engine coolant temperature (ECT) sensor
- 4 From the IAC valve
- 5 Injector wiring rail
- 6 From the temperature gauge sender unit
- 7 From the noise suppression capacitor

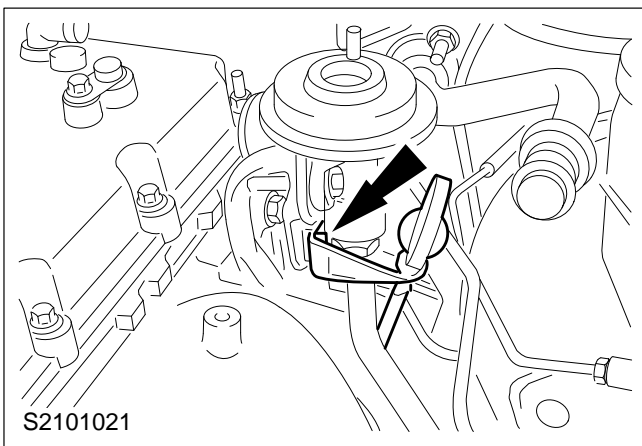


14. Detach the earth lead from the bulkhead.



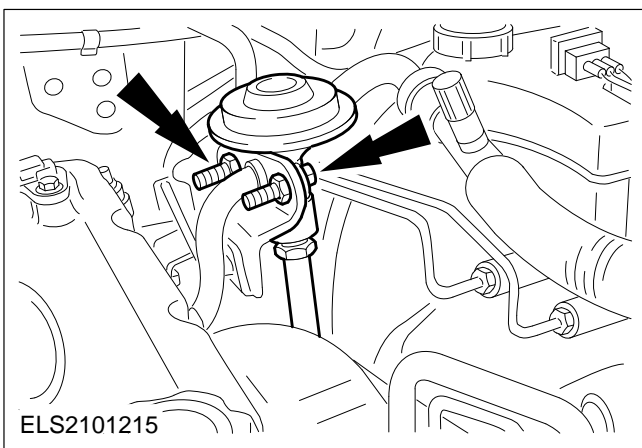
15. Detach the exhaust manifold heat shield (three bolts, one nut).

Disconnect the two vacuum hoses from the differential pressure feedback EGR (DPFE sensor).

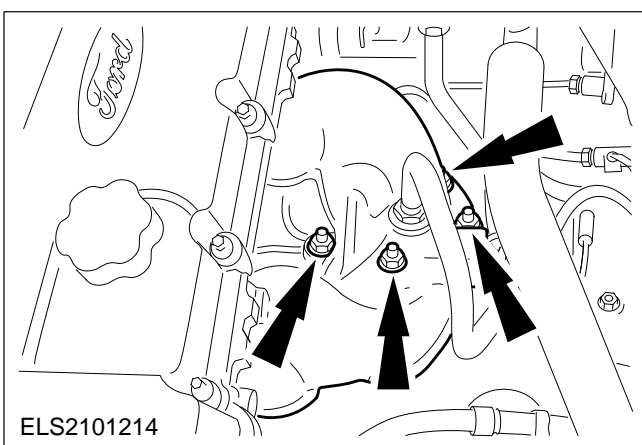


16. Remove the oil dipstick tube.

Withdraw the oil dipstick.

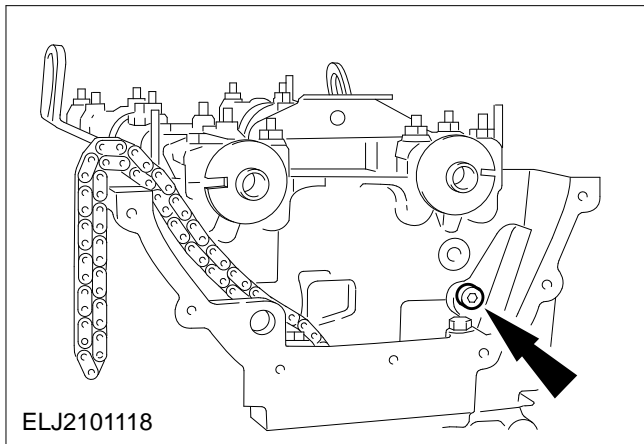


17. Remove the EGR valve (two bolts).



18. Detach the exhaust pipe from the exhaust manifold (four nuts).

19. Remove the camshafts as described in Op. no. 21 284 0.



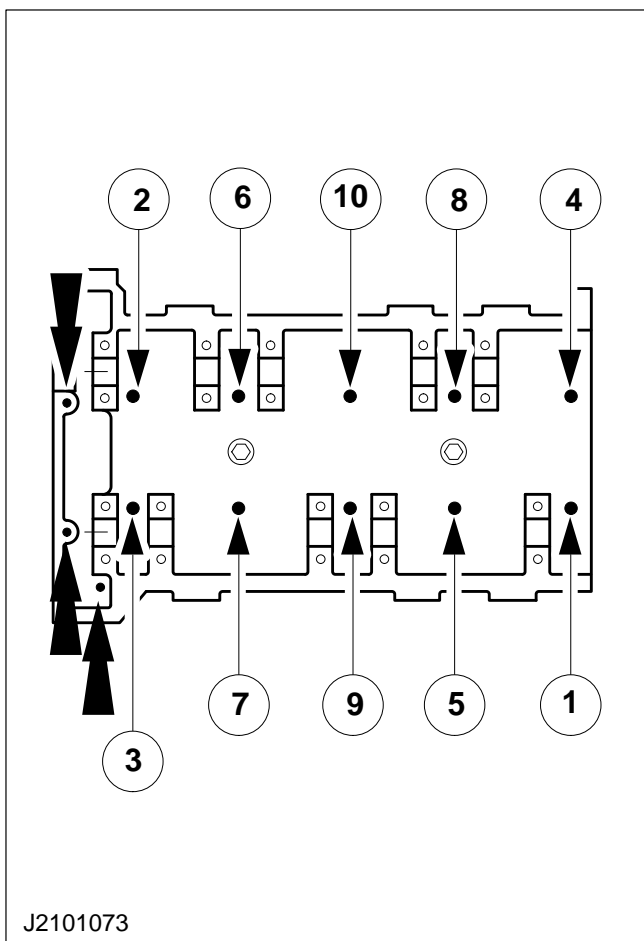
20. Remove the upper chain guide.

NOTE: Release the three auxiliary bolts first.

⚠ CAUTION: Do not reuse the cylinder head bolts.

⚠ CAUTION: The cylinder head must be allowed to cool down to ambient temperature before the bolts are undone.

21. Remove the cylinder head.



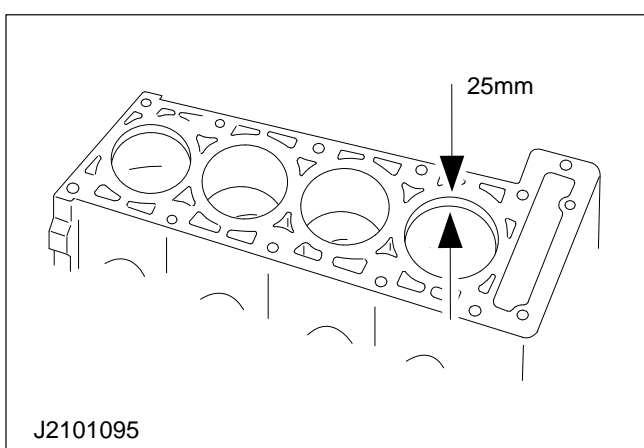
Install the cylinder head

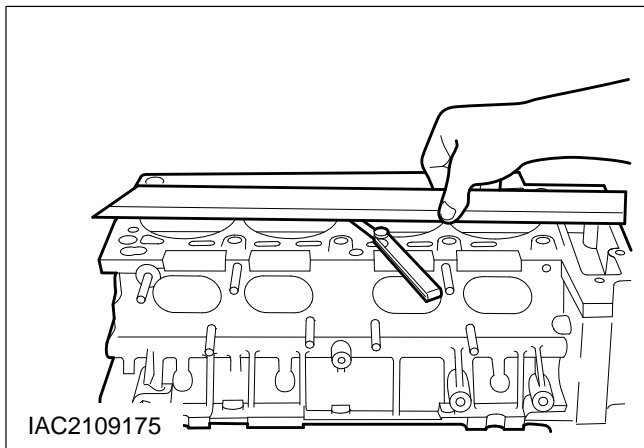
22. Preparatory measures.

⚠ CAUTION: Do not use abrasive paper. The debris could cause engine damage.

All mating faces and reusable parts must be thoroughly cleaned with brake cleaner and a spatula and examined for damage.

23. Bring the piston of cylinder no. 1 to a point 25 mm before TDC.

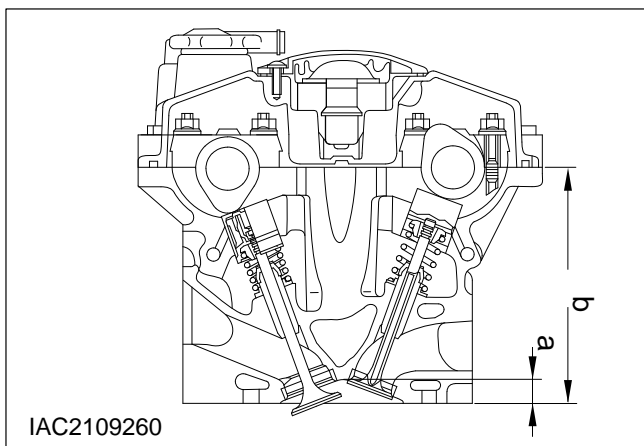




Check the cylinder head for distortion

24. Check cylinder head mating surface for distortion.

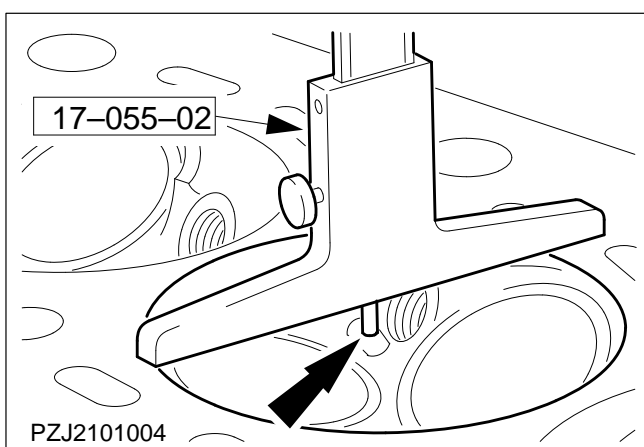
- The maximum acceptable distortion at combustion chamber lands is: transversely 0,05 mm, longitudinally and diagonally 0,10 mm.
- Place straightedge transversely across all combustion chamber lands and check at three locations.
- Place straightedge longitudinally across the cylinder head at three locations in the combustion chamber area and check at all combustion chamber lands.
- Place straightedge diagonally across the cylinder head and check at all combustion chamber lands.
- If necessary, re-machine cylinder head as described in step 25.



25. Note - machining of cylinder head.

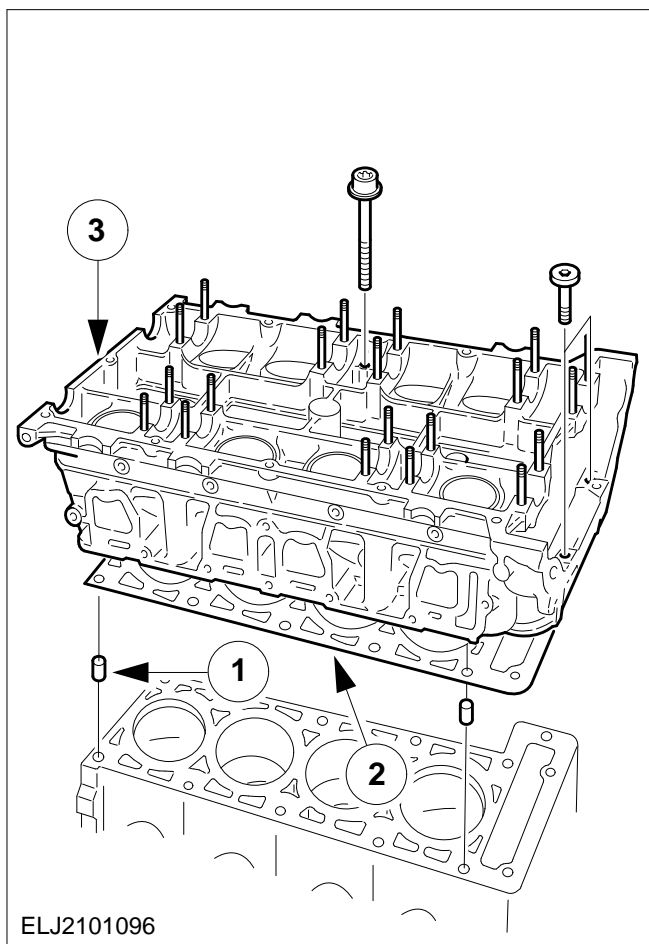
NOTE: Maintain a peak-to-valley height Rz of 13,5 micrometres during re-machining.

The cylinder head may be machined (milled or surface ground) by a maximum of 0.20mm. During machining dimension "a" must remain at least 16,35 mm (see step 26.) and "b" at least 147,25 mm.

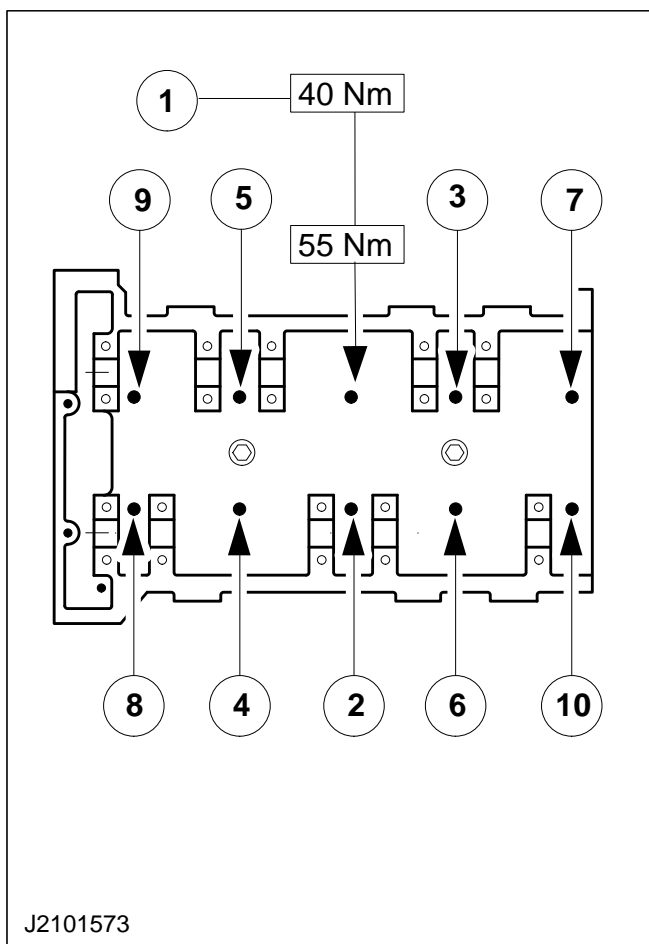


NOTE: Remove carbon deposits at the measuring site.

26. Location of measuring site for dimension "a" in the combustion chamber.

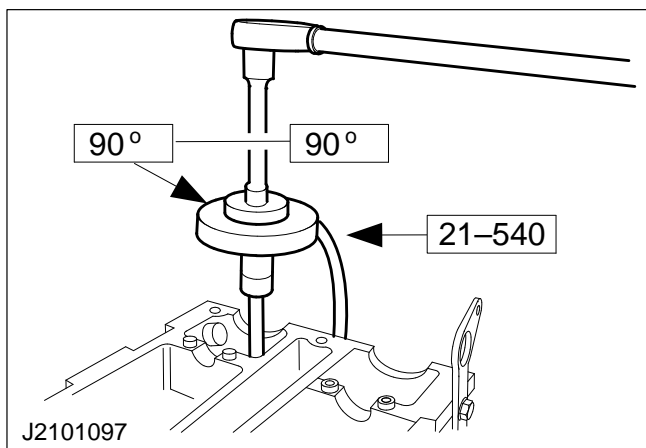
**27. Fit the cylinder head.**

- 1 Insert the locating bushes.
- 2 Put a new cylinder head gasket in place.
- 3 Fit the cylinder head.



⚠ CAUTION: Use new bolts.

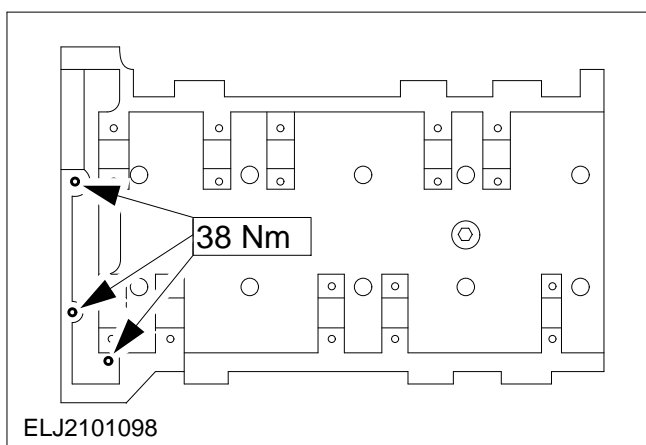
28. Tighten the cylinder head bolts.



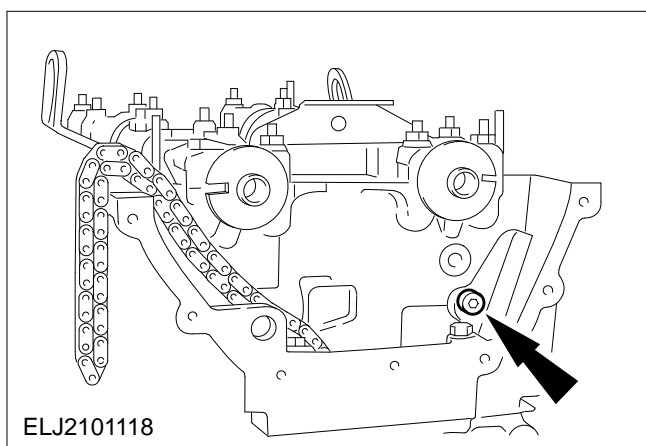
CAUTION: The cylinder head bolts must not be retorqued.

29. Tighten the cylinder head bolts (continued).

Twice through 90°

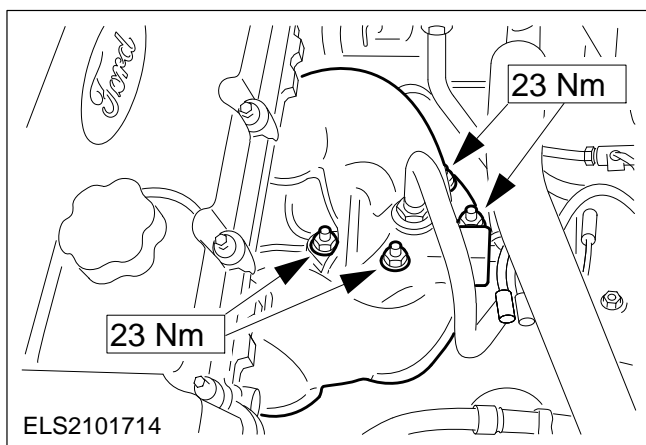


30. Tighten the auxiliary cylinder head bolts.

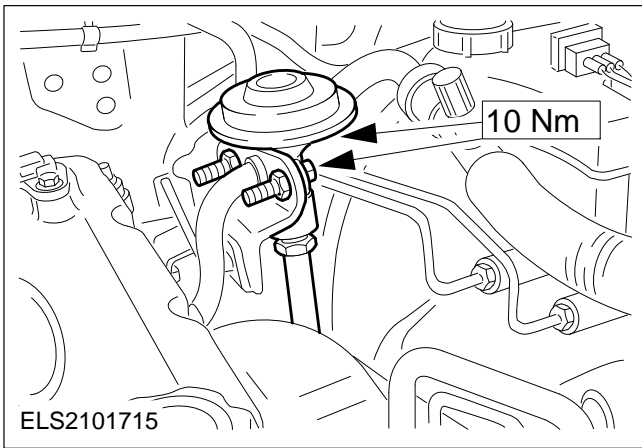


31. Fit the upper chain guide.

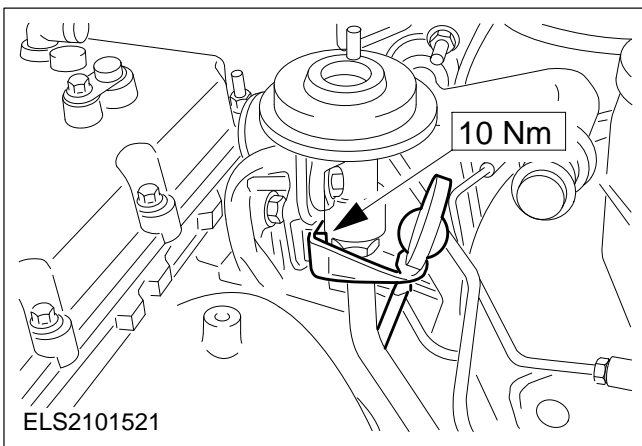
32. Fit the camshafts as described in Op. no. 21 284 0.



33. Attach the exhaust pipe to the exhaust manifold.

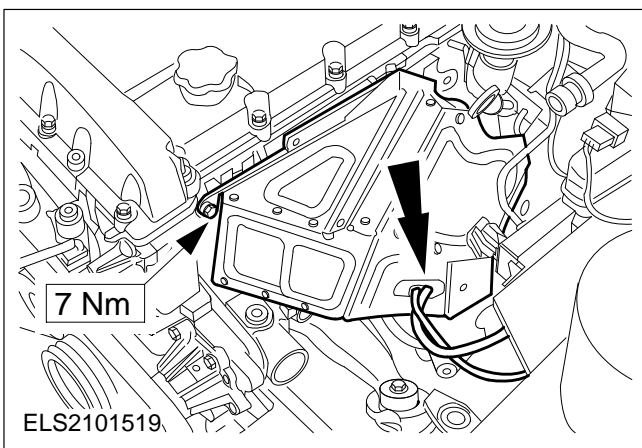


34. Attach the EGR valve to the bracket.



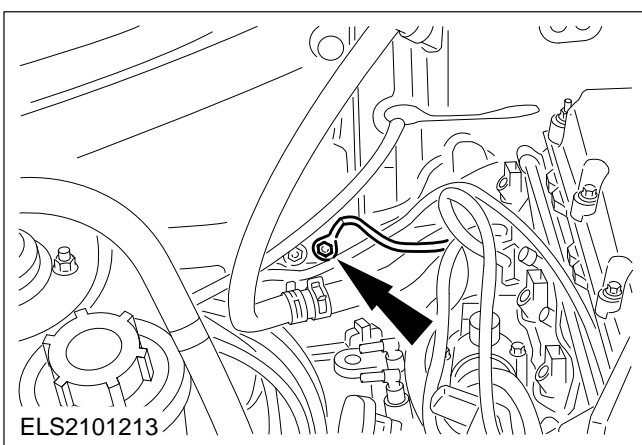
35. Install the oil dipstick tube.

Insert the oil dipstick.

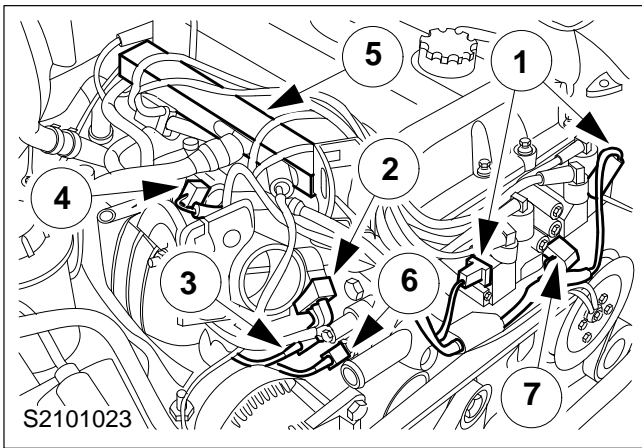


36. Fit the exhaust manifold heat shield (three bolts, one nut).

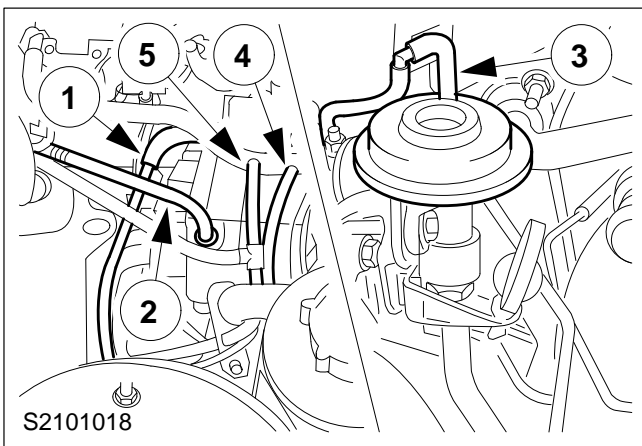
Connect the two vacuum hoses to the DPFE sensor.



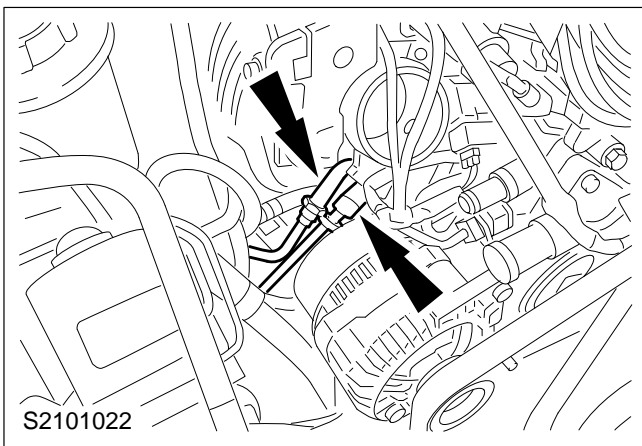
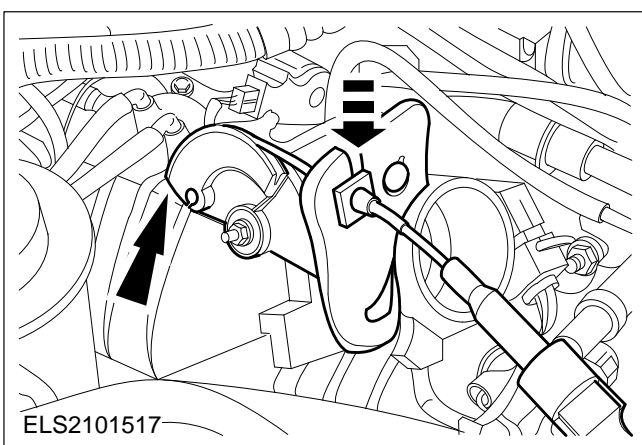
37. Attach the earth lead to the bulkhead.

**38. Connect the plugs.**

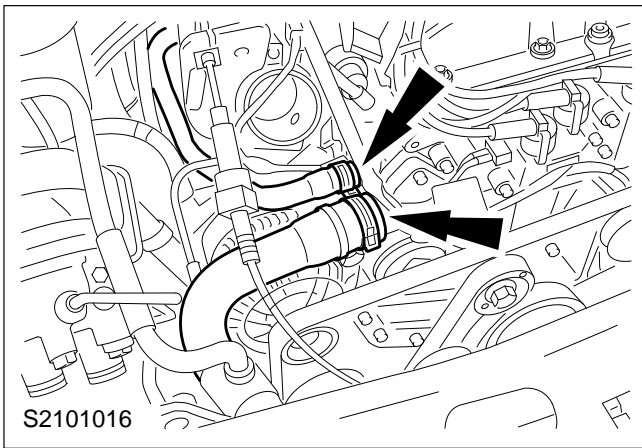
- 1 To the DIS ignition coils
- 2 To the TP sensor
- 3 To the ECT sensor
- 4 To the IAC valve
- 5 Injector wiring rail.
- 6 To the temperature gauge sender unit
- 7 To the noise suppression capacitor

**39. Connect the vacuum hoses.**

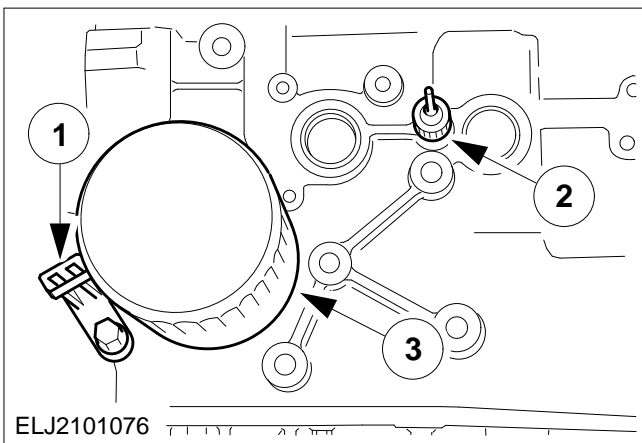
- 1 To the IAC valve
- 2 To the brake servo.
- 3 To the EGR valve
- 4 To the EGR pressure transducer
- 5 To the EVAP valve

**40. Connect the fuel pipes.****41. Attach the throttle cable.**

- Attach the throttle cable.
- Fit the accelerator cable clip in the bracket.



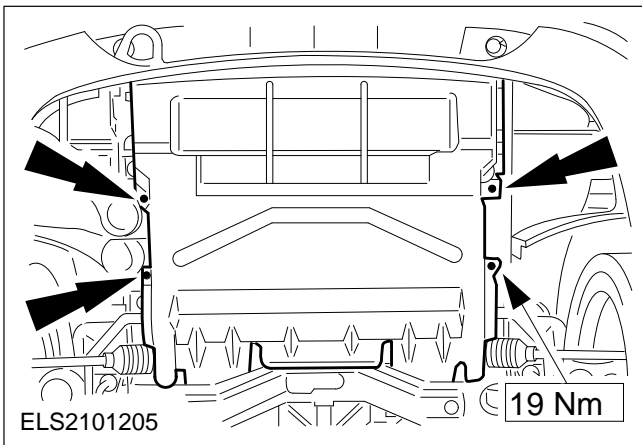
42. Attach the coolant hoses to the thermostat housing.



43. Raise the vehicle.

44. Connect the plugs to the oil pressure switch and the CKP sensor.

45. Attach the oil filter.



46. Attach the engine undershield.

47. Lower the vehicle.

48. Standard finishing operations.

- Connect the battery earth lead.
- Fit the battery cover.
- Top up the coolant.
- Check the engine and cooling system for leaks.
- Enter the radio keycode.
- Reprogramme the preset radio stations.
- Reset the clock.
- Carry out a road test to enable the PCM to gather data.
- Check the fluid levels and rectify as necessary.