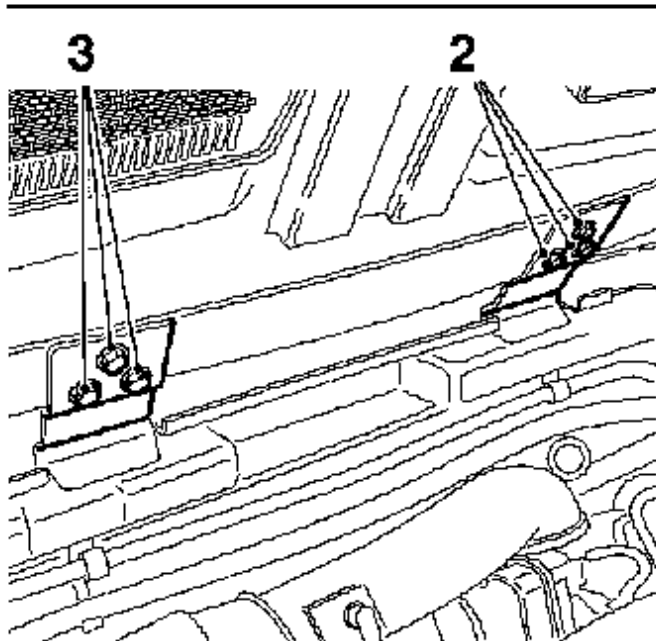
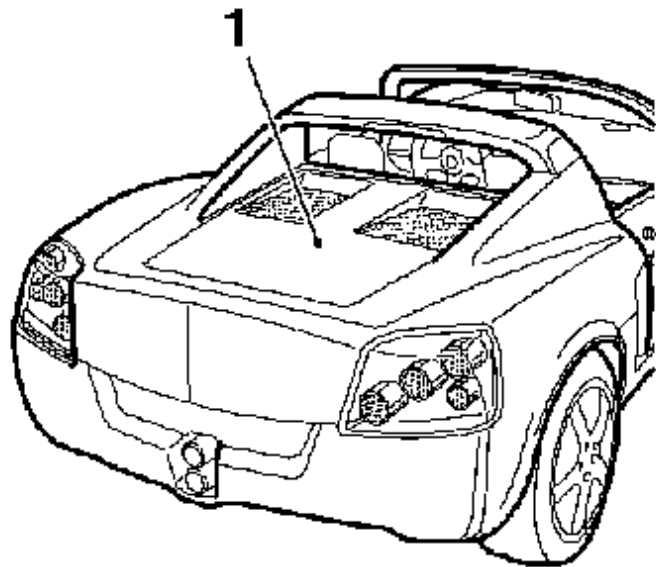


Timing Chain, Camshaft, Replace (Z 22 SE)

1. Open the bonnet.
2. Disconnect the battery.
3. Open the engine cover (1).
4. Detach the engine cover.
 - 6 bolts (2) and (3)

Note: Access to the front of the engine is best gained through the right hand rear wheel arch with the wheel arch liner removed.

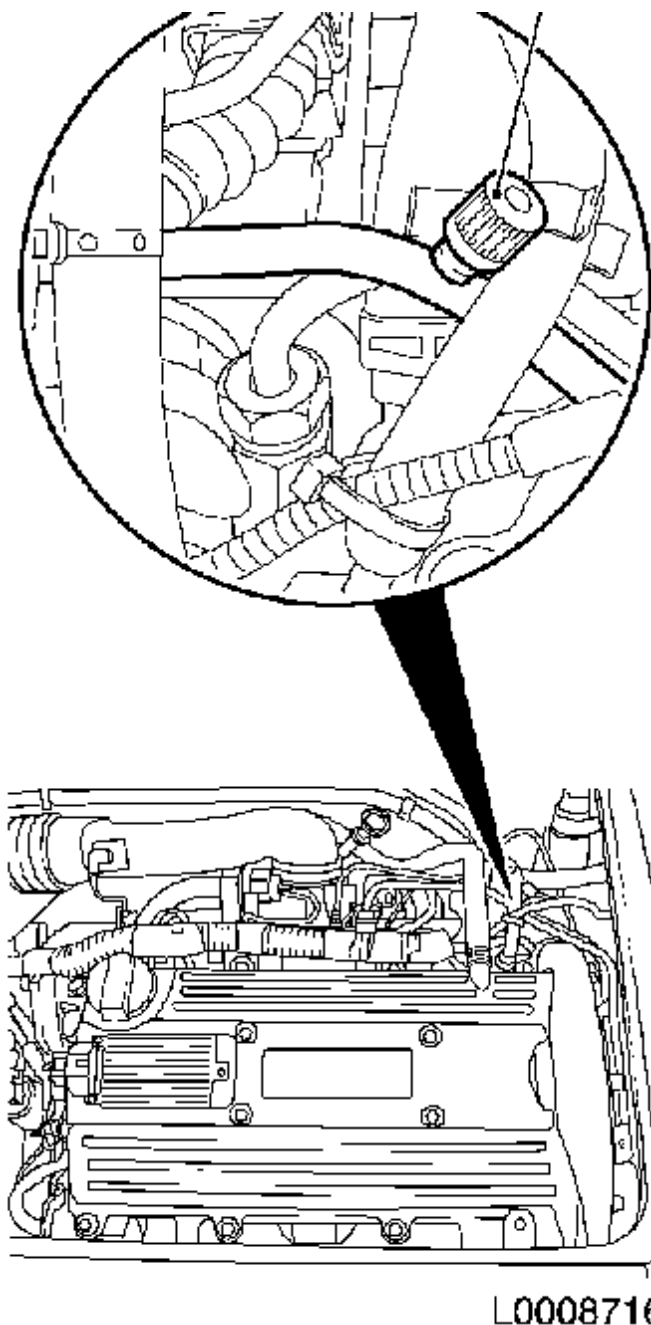


L0008715

5. Release the fuel pressure.

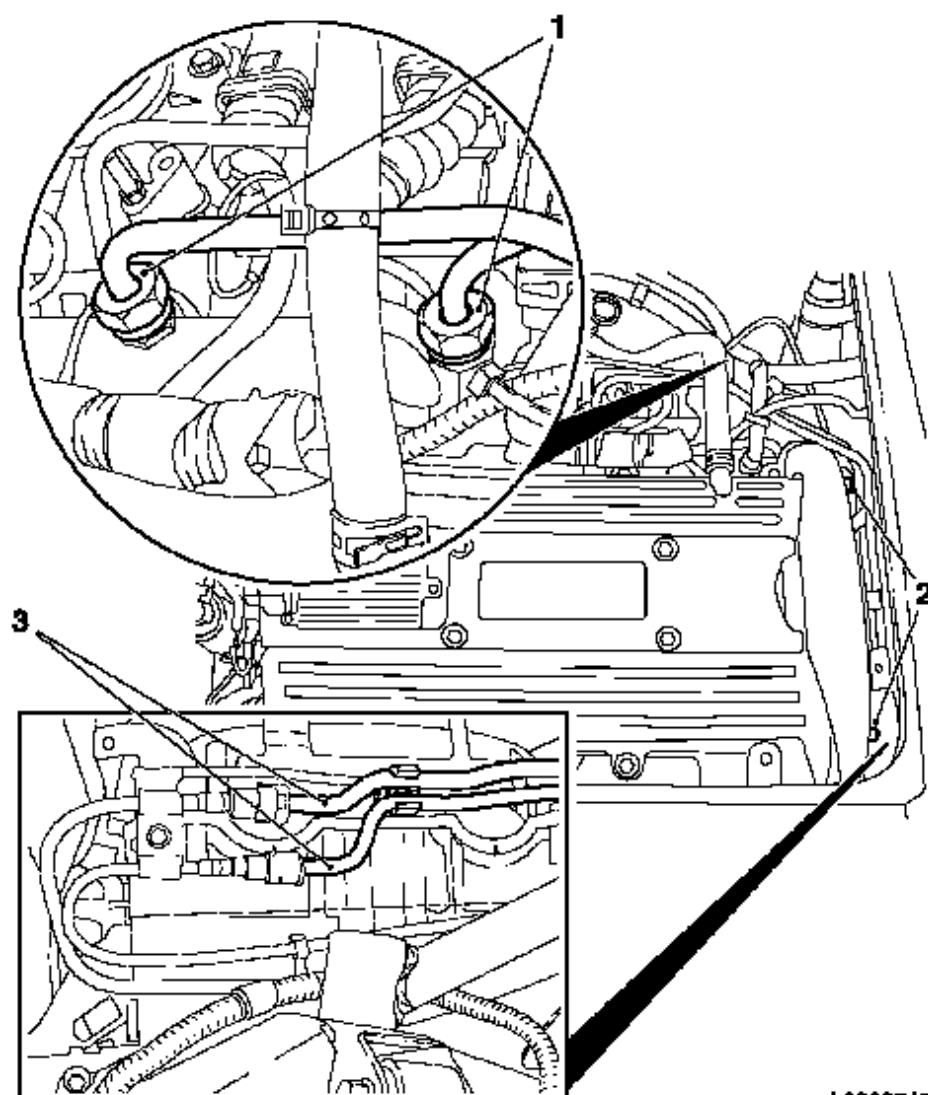
Warning: Fuel may escape – observe the safety regulations and relevant national legislation.

 - Release the fuel pressure with the pressure tester **KM-J-34730-91** via test connection (1).
 - Collect any escaping fuel in a suitable container.



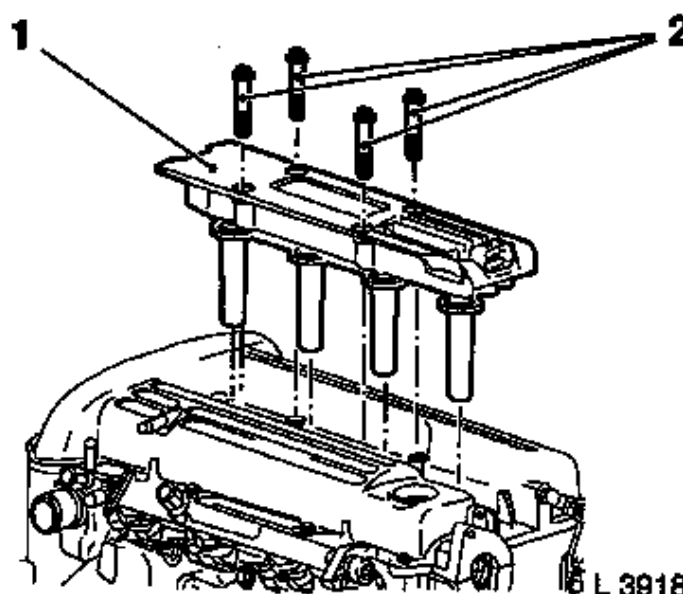
L0008716

6. Disconnect the fuel lines.
 - 2 union nuts (1)
 - Fuel line bracket
 - 2 bolts (2)
 - Reposition the fuel lines with the fuel line bracket to one side.



L0008717

7. Detach the ignition module (1).
- Release and detach the wiring harness connector.
 - 4 bolts (2)

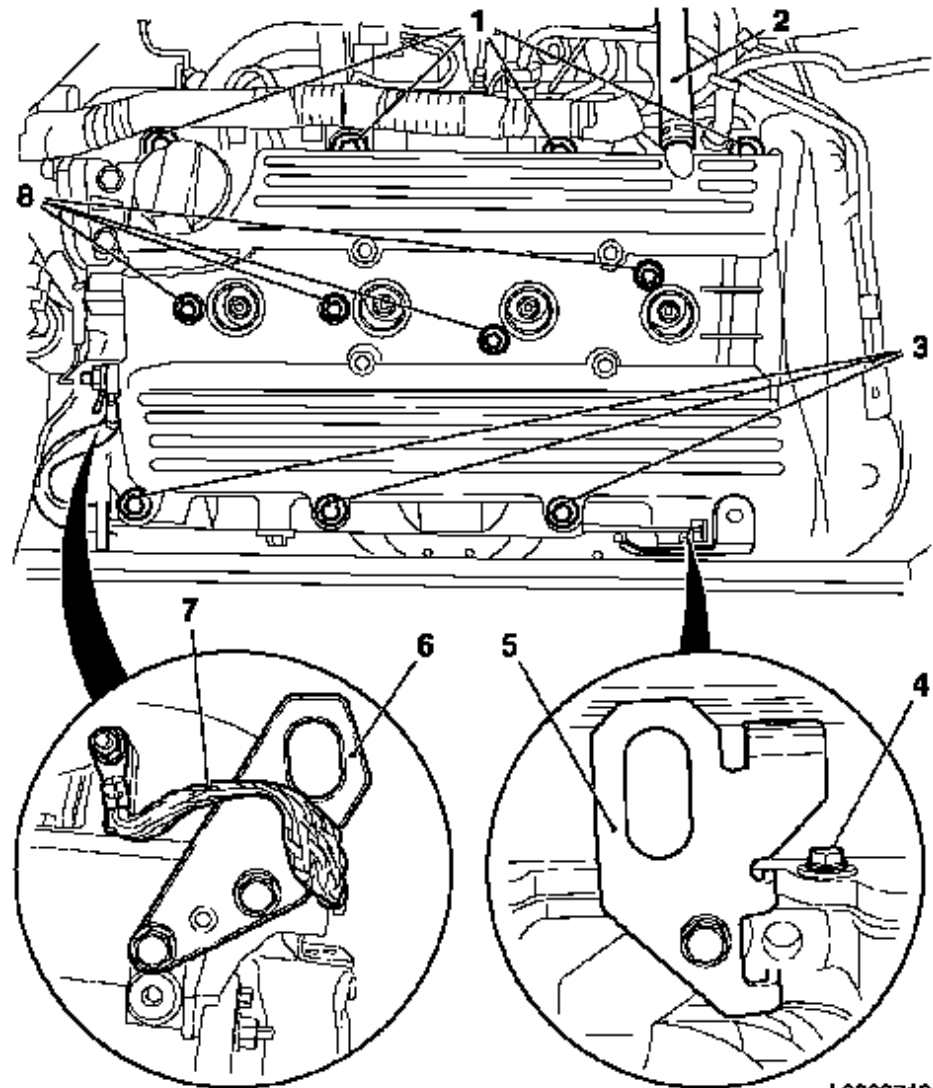


L 3918

8. Remove the cylinder head cover.

- Detach the engine breather hose (2).
- Detach the engine lifting eyes (5) and (6).
 - 2 bolts, 1 nut
- Detach the ground cable (7).
 - 1 bolt
- 12 bolts (1), (3), (4) and (8)

9. Raise the lifting ramp.



L0008718

10. Remove the lower engine splash shield (1).

- 13 bolts

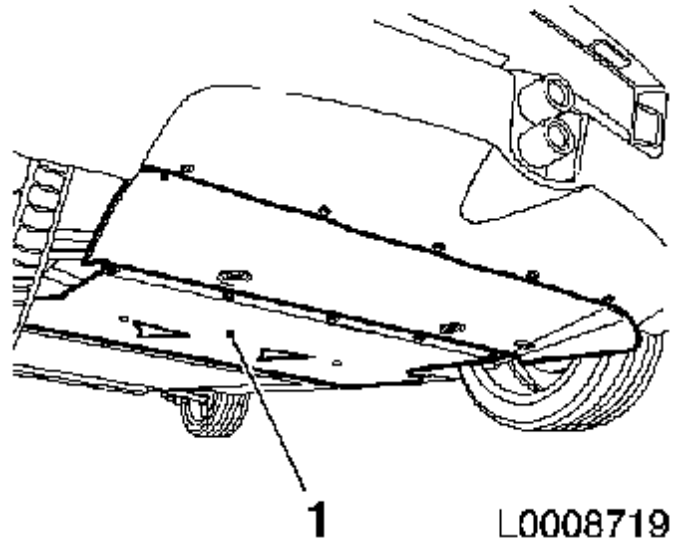
11. Support vehicle

12. Remove right hand rear wheel

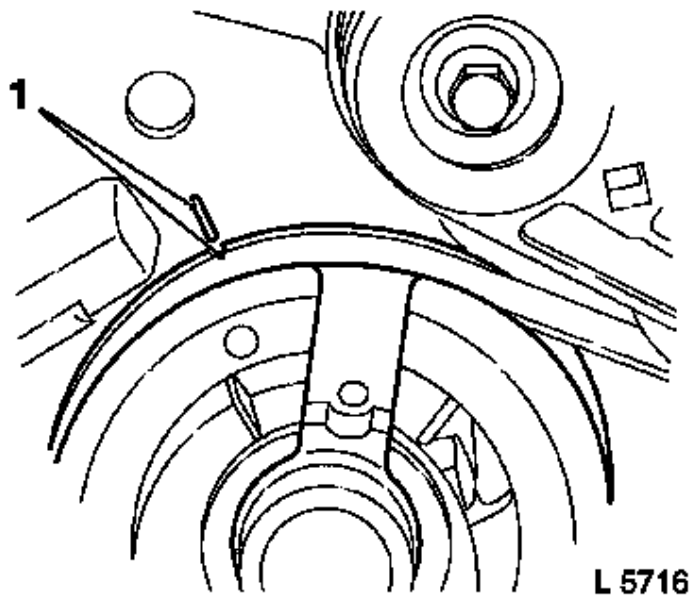
- Remove 4 bolts, remove the locking bolt
 - Use special socket under the front bonnet

13. Remove wheel arch liner

- Remove 6 screws



14. Align the crankshaft.
 - Rotate the crankshaft in the normal direction of rotation to TDC on cylinder no. 4 (marking 1).
15. Lower the lifting ramp.



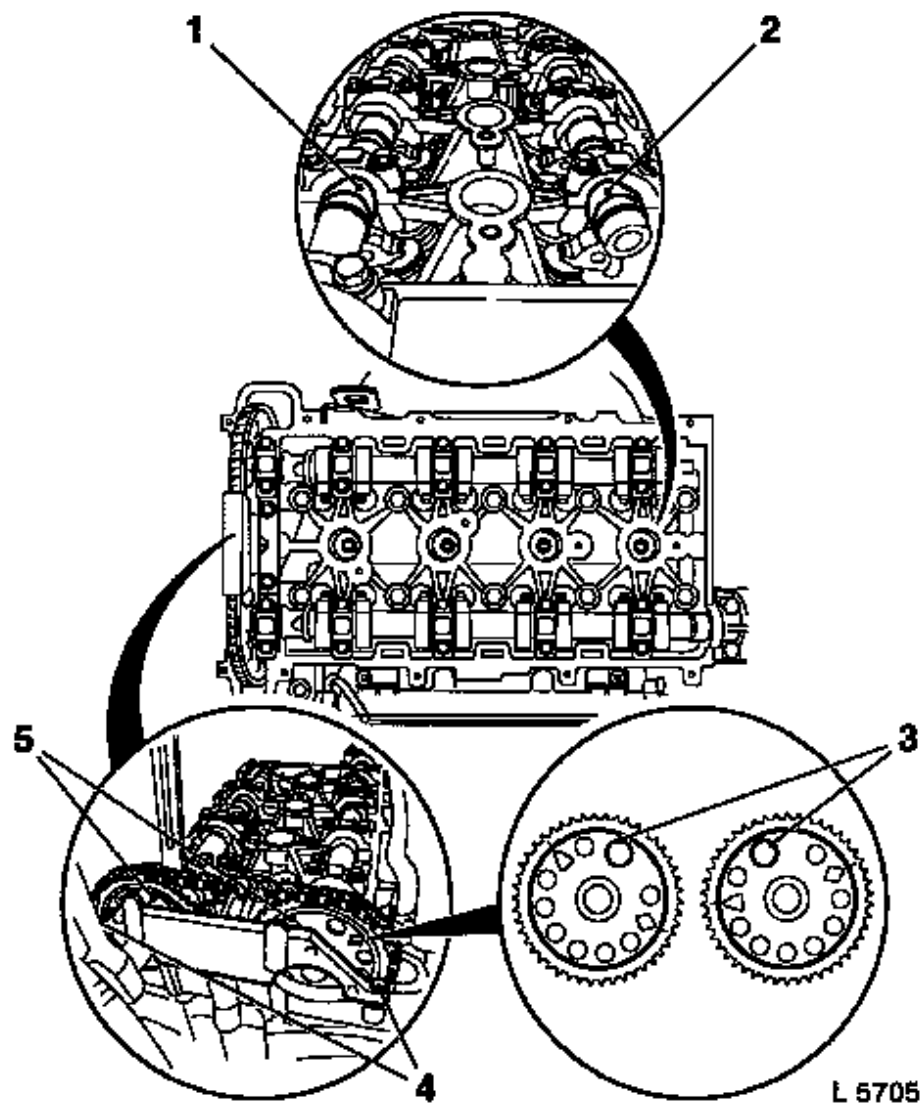
16. Attach **KM-6148**.

Note: In this position the cams (1) and (2) of cylinder no. 4 point upwards.

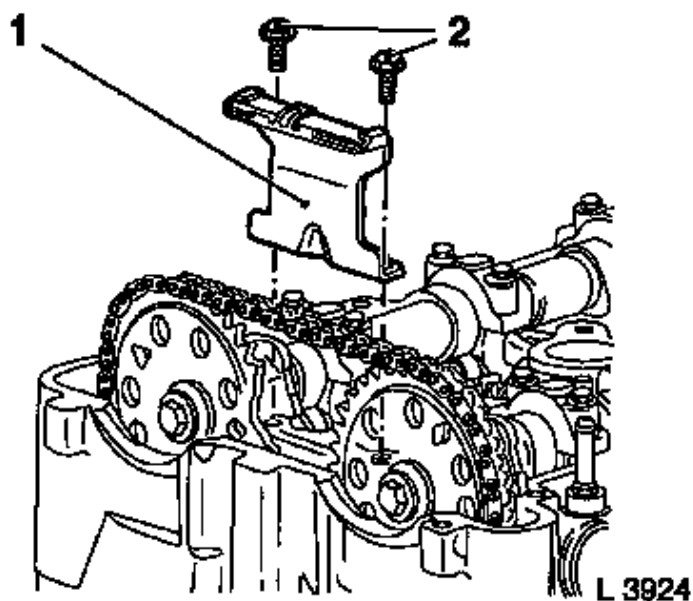
 - Attach **KM-6148** with the enclosed bolts (4).
 - Slide the positioning bolts (5) into the designated bores (3) on the

camshaft
sprockets.

17. Detach **KM-6148**.

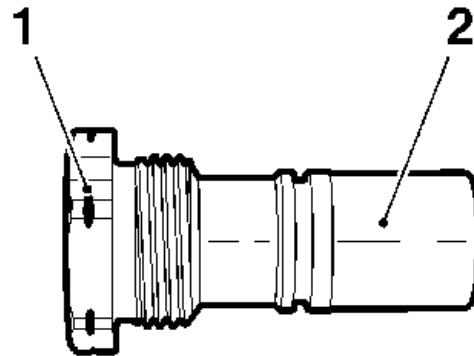


18. Remove the guide rail (1).
• 2 bolts (2)

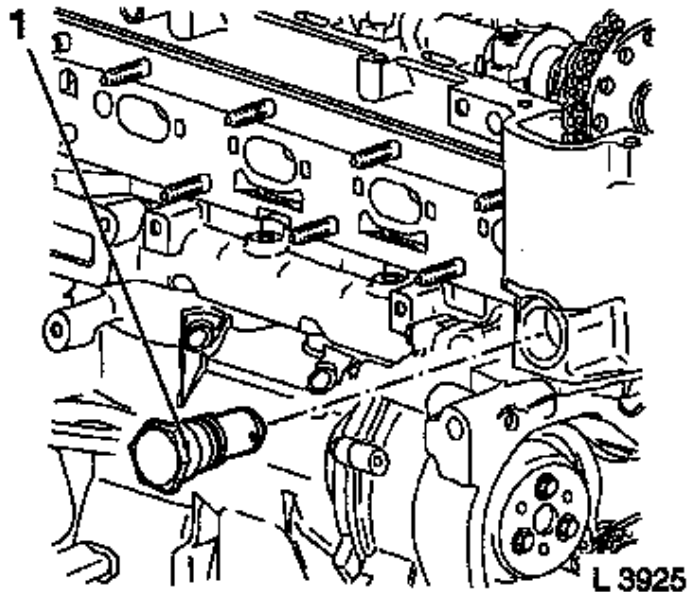


19. Note:

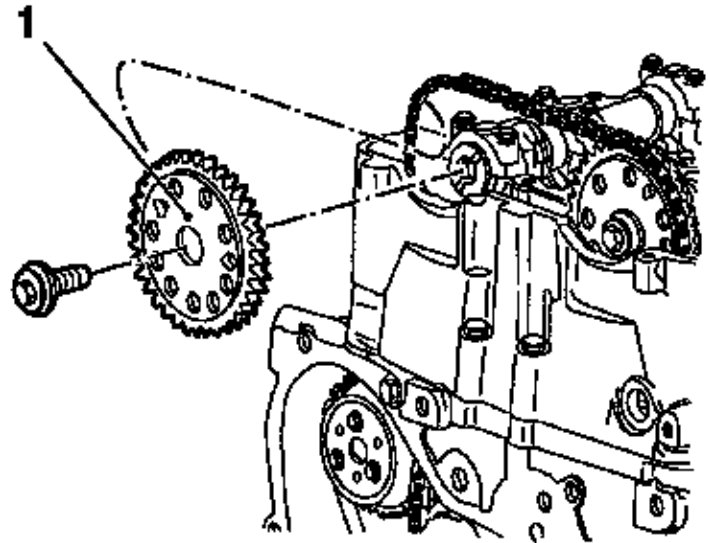
If there is no marking (1) on the camshaft timing chain tensioner (2), then it should be replaced with a new camshaft timing chain tensioner (part number 24 448 509) including a new camshaft timing chain tensioner rail (part number 24 449 448).



L0008542

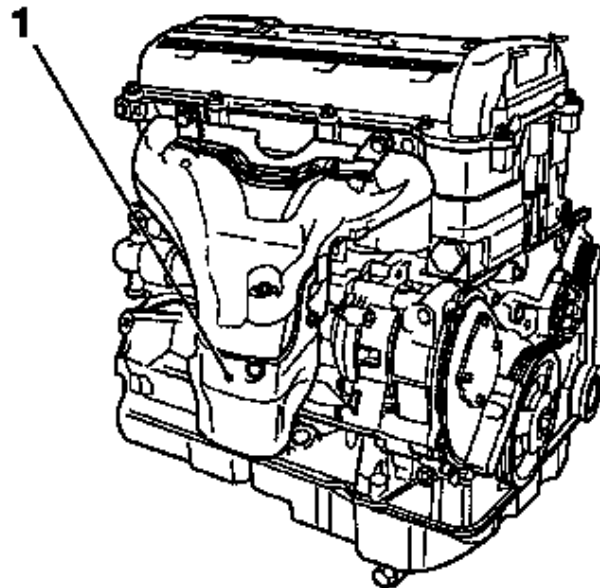
20. Remove the camshaft timing chain tensioner (1).**21. Remove the exhaust camshaft sprocket (1).**

- Hold the exhaust camshaft by the hexagon.



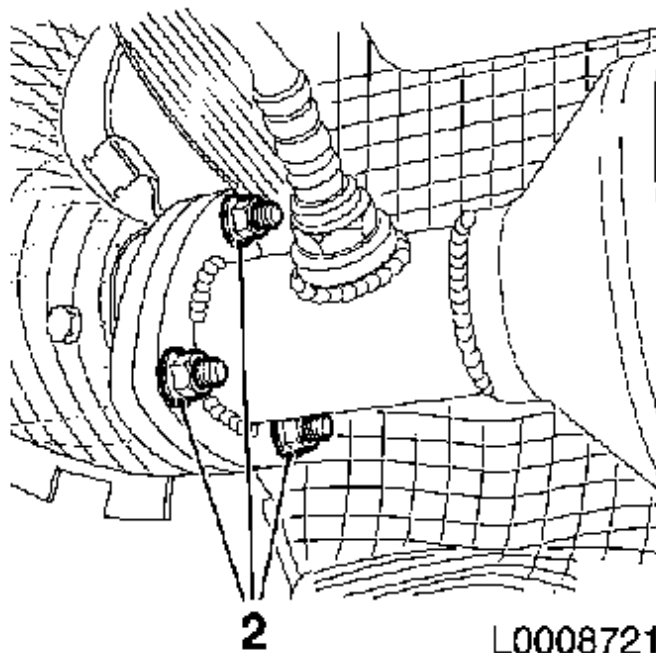
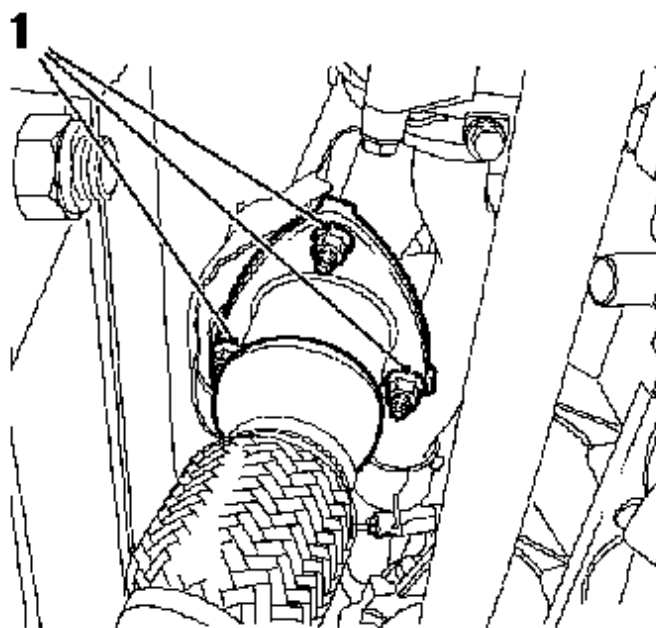
L 3926

22. Remove the lower heat shield (1).
 - 3 bolts
23. Raise the lifting ramp.

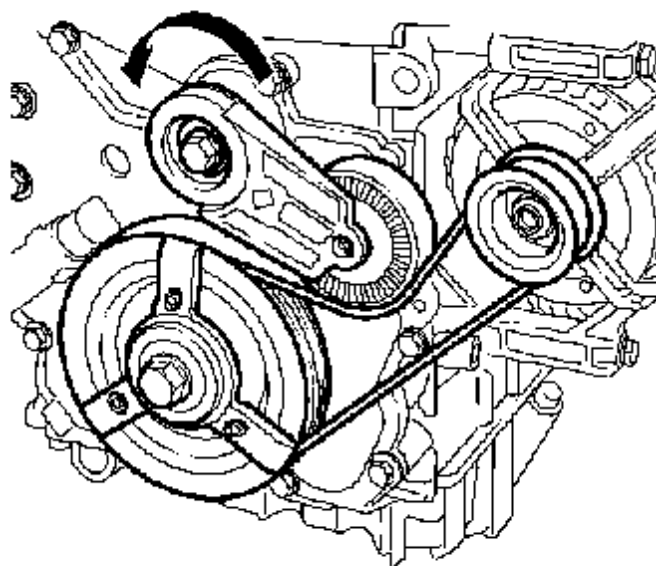


L 3920

24. Place a drip tray underneath.
25. Drain the engine oil.
 - Open the oil drain plug.
 - Install the oil drain plug using a new oil seal.
 - Tightening torque **25 Nm**
26. Detach the front exhaust pipe.
 - 6 nuts (1) and (2), 3 bolts
 - Unhook the exhaust pipe from its mountings.
 - Remove the gaskets.

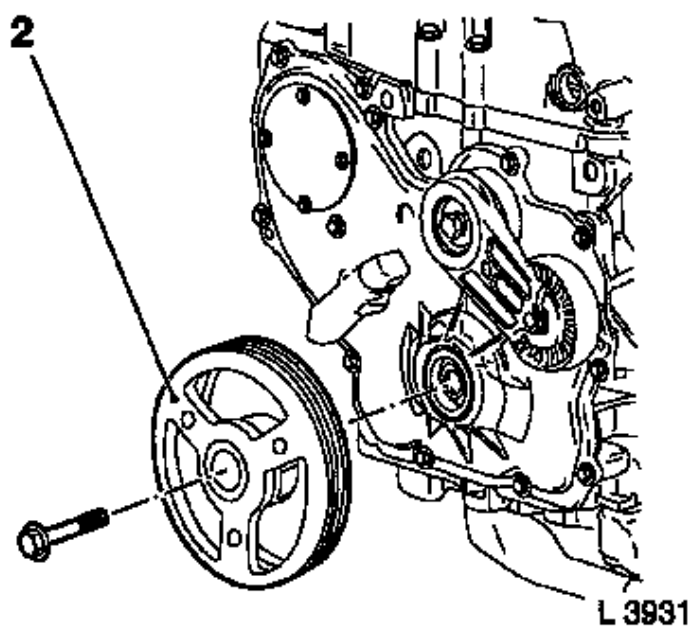
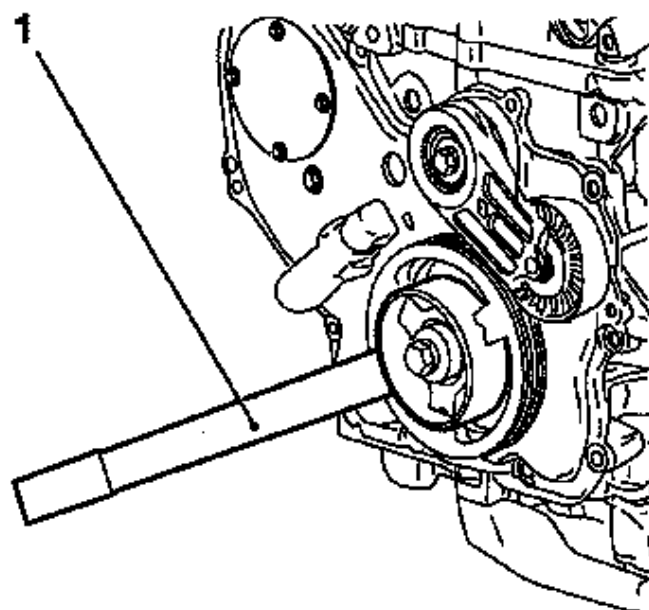


27. Remove the ribbed V-belt.
- Mark the running direction of the ribbed V-belt.
 - Tension the ribbed V-belt tensioner in the direction of the arrow with **KM-6151**.
 - Take out the ribbed V-belt.

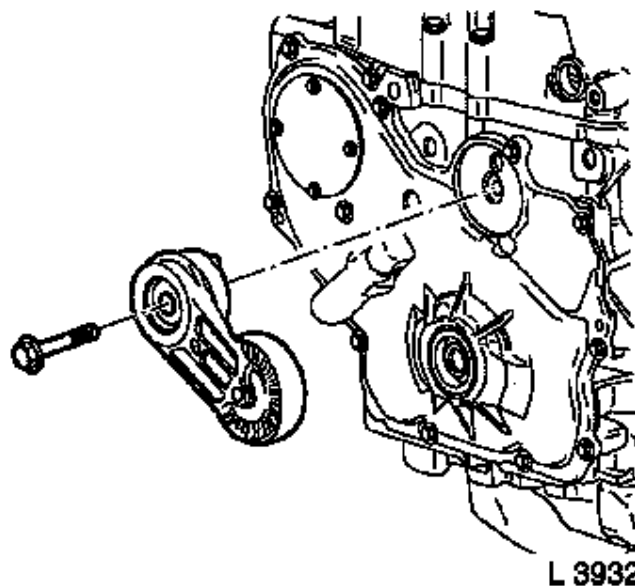


L0008730

28. Detach the rotational vibration damper (2).
- Use holding adapter **KM-J-38122-A** in conjunction with **KM-956-1** (1) to hold.

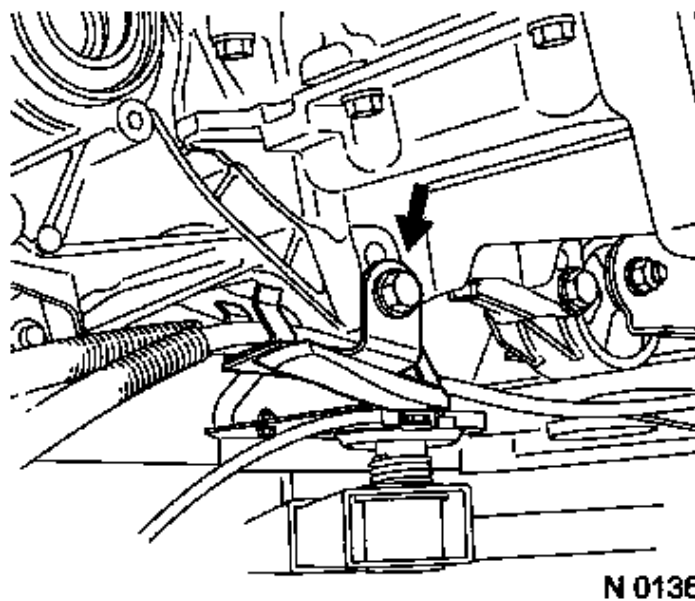


29. Detach the ribbed V-belt tensioner.



30. Detach the bracket for the gearshift cables.

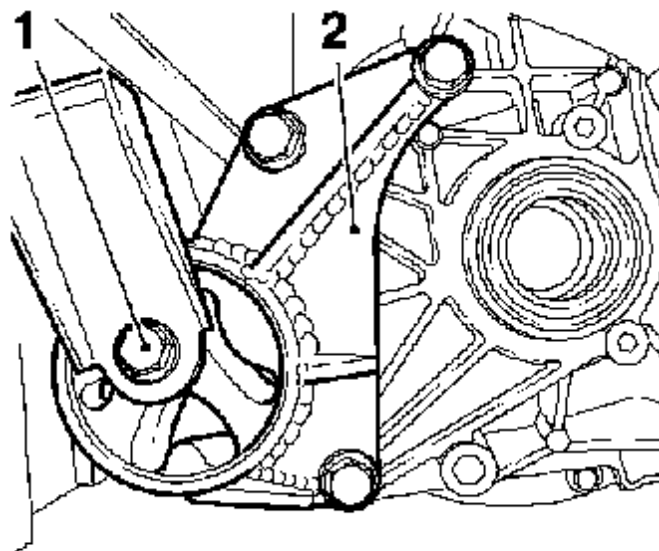
- From the transmission
- 1 bolt (arrow)



31. Support the engine from underneath with **KM-904** together with **KM-6054**.

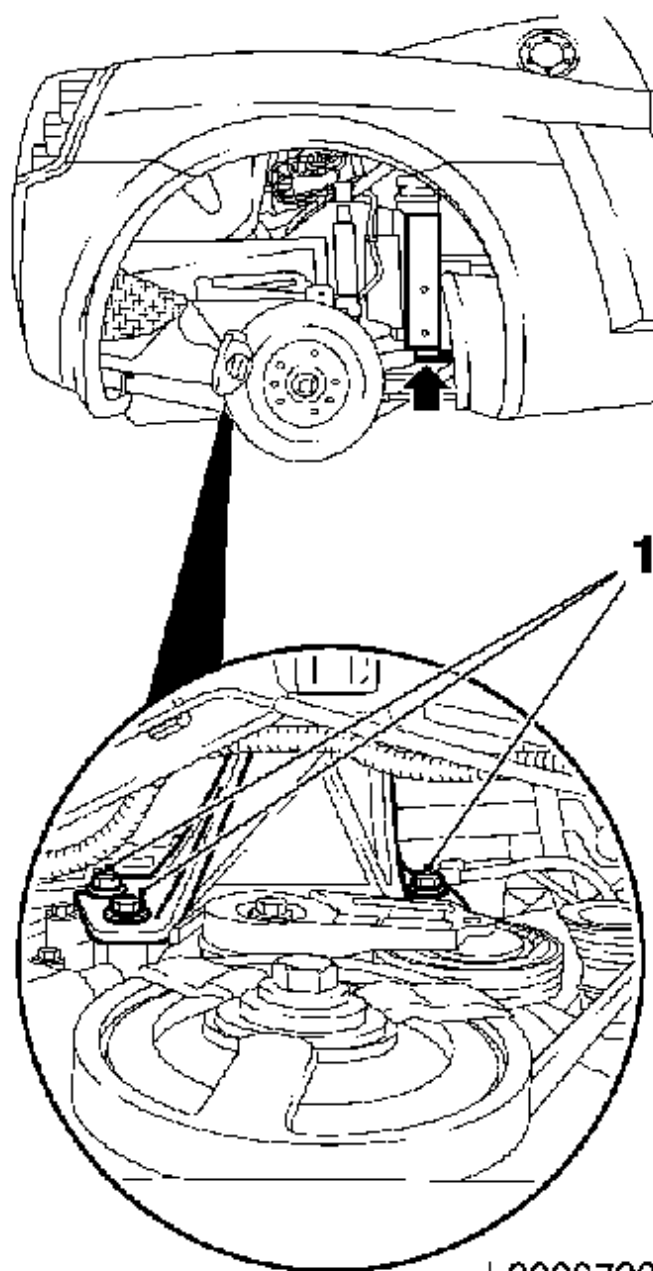
32. Release the rear engine damping block (2).

- 1 bolt (1), 1 nut



L0008722

33. Undo the bolts on the right-hand engine damping block bracket.
 - 3 bolts (1)
34. Undo the bolts on the right-hand engine damping block.
 - 1 nut (arrow)
35. Take out the engine damping block bracket together with the right-hand engine damping block.



L0008723

36. Undo the bolts on the timing case (5).
 - 11 bolts (1), (2) and (6)
37. Lower the engine.

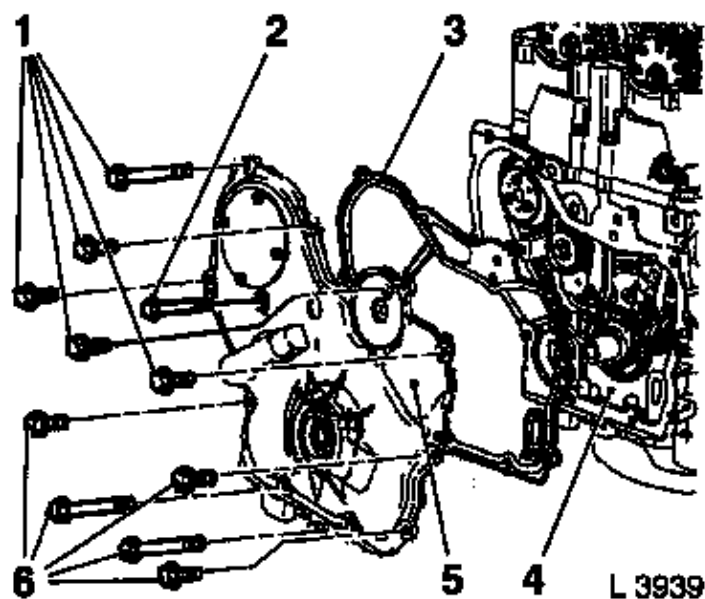
Note: It must be possible to guide the long bolt (2) of the timing case past the longitudinal member.
38. Remove the timing case.
 - Remove the gasket (3).

Note: Cover the opening (4) in the timing case with a cloth.
 - Use a suitable tool to remove the oil seal.

Warning: Do not damage the sealing

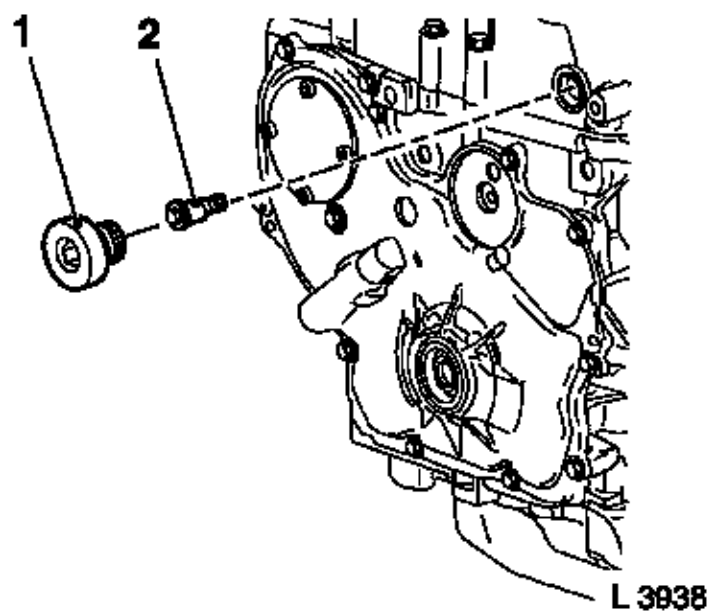
surfaces.

- Clean the sealing surfaces.



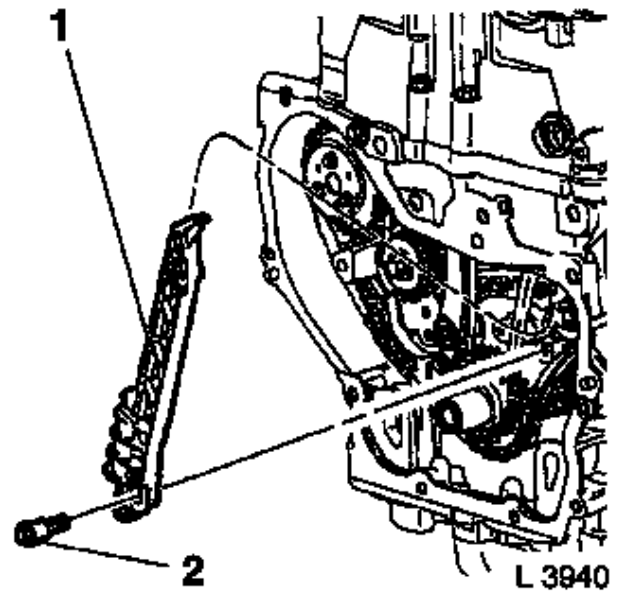
39. Remove the camshaft timing chain guide rail (1).

- Remove the screw plug (1).
- 1 bolt (2)

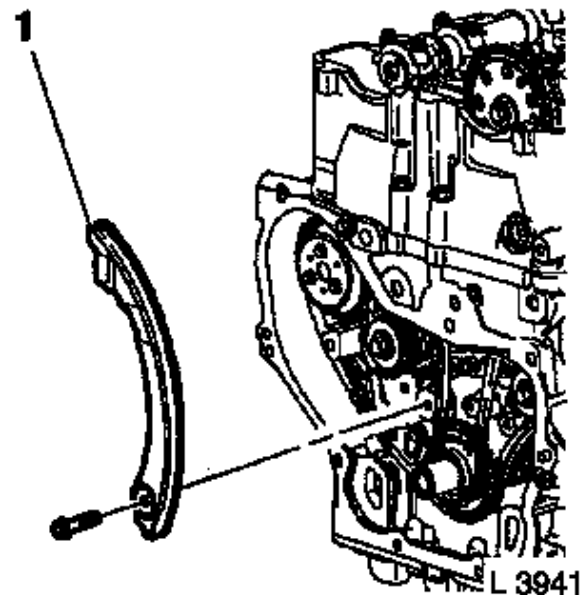


40. Remove the camshaft timing chain guide rail (1).

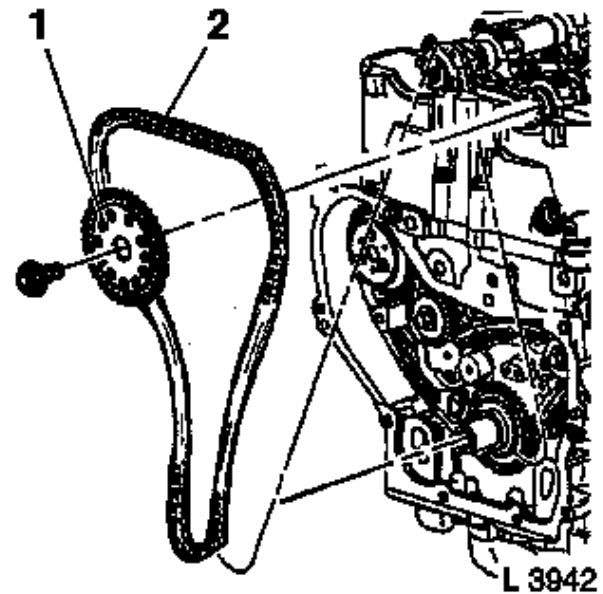
- 1 bolt (2)



41. Remove the camshaft timing chain tensioner rail (1).
42. Raise the engine.
43. Secure the engine
 - to the rear engine damping block.
 - Retaining bolt
44. Lower the engine.
 - Take out **KM-904** with **KM-6054**.
45. Lower the lifting ramp.



46. Remove the intake camshaft sprocket (1).
 - Hold the intake camshaft by the hexagon.
47. Take out the camshaft timing chain (2).
 - Guide the chain past the crankshaft and lift it out to the top.

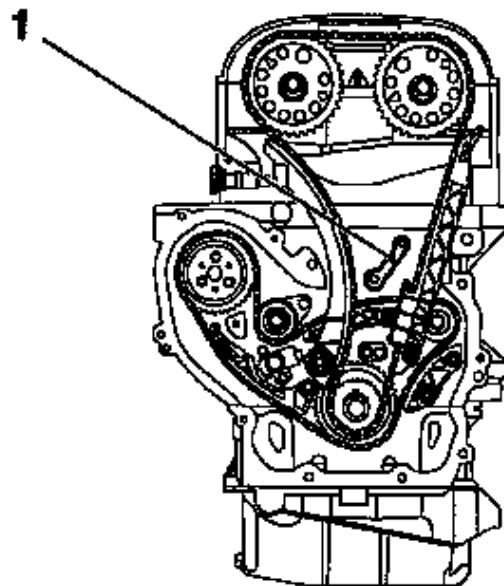


48. Insert the camshaft timing chain.

Note: Working from the top left and right, insert the timing chain past the central web (1).

49. Install the intake camshaft sprocket.

- Lay the camshaft timing chain onto the camshaft sprocket.
- Use a new bolt.
- Hold the intake camshaft by the hexagon.
 - Tightening torque **85 Nm + 30° + 15°**



50. Fit the camshaft timing chain.

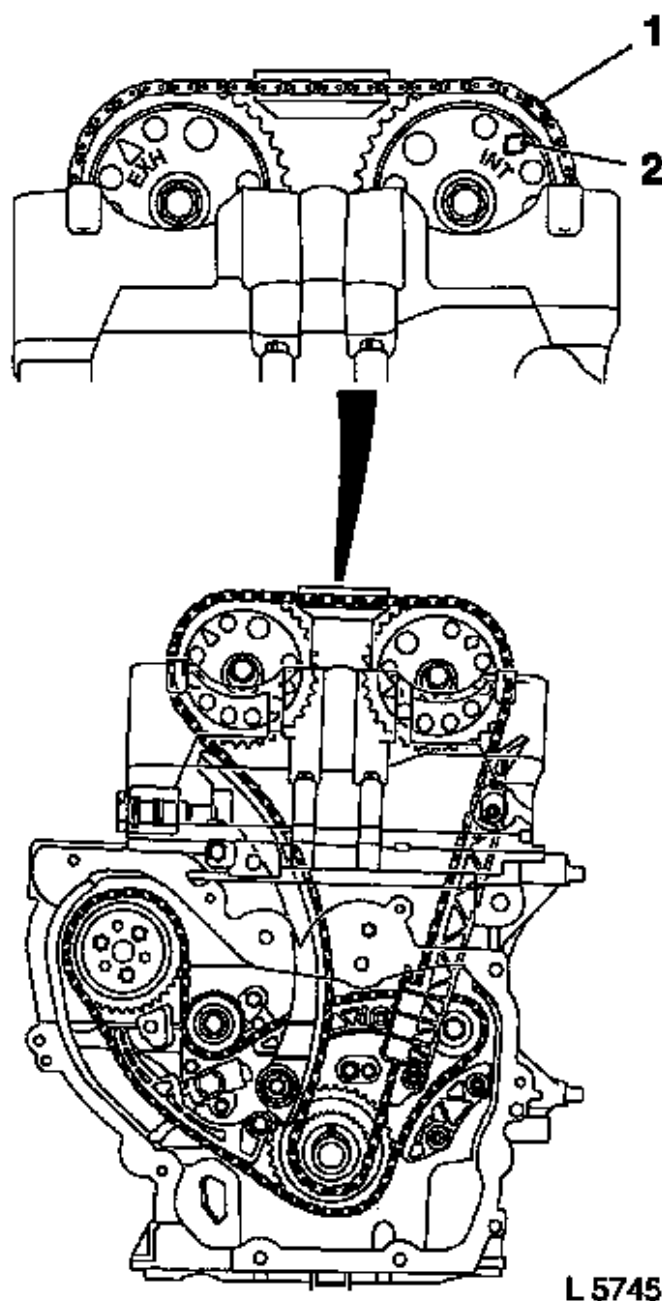
Note: The TDC reference points on the timing chain are indicated by coloured links in the chain. These must line up with the markings on the timing sprockets.

- Chain link (copper colour) (1) to INT marking (2) on the intake camshaft sprocket

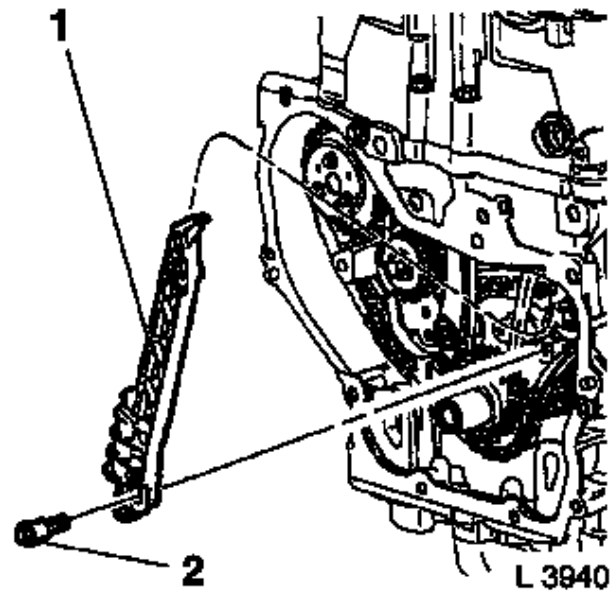
51. Raise the lifting ramp.

52. Install the camshaft timing chain tensioner rail (part number 24 449 448)

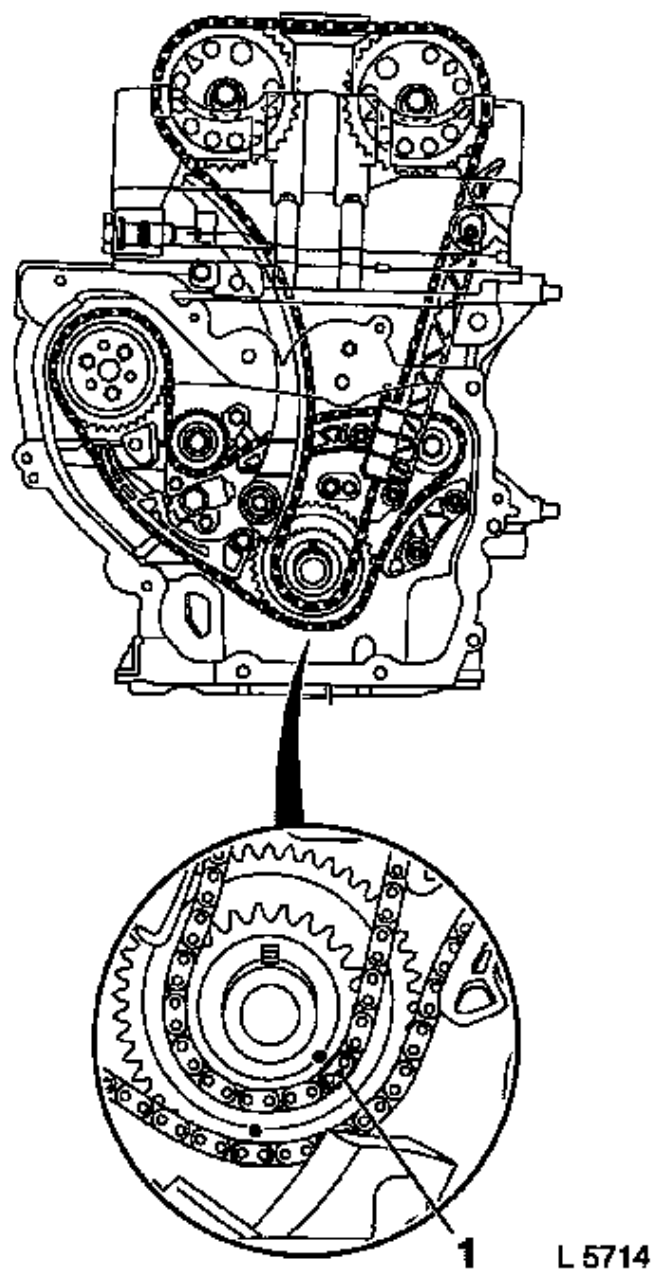
- Tightening torque **10 Nm**



53. Install the camshaft timing chain guide rail (1).
- 1 bolt (2)
 - Tightening torque **10 Nm**

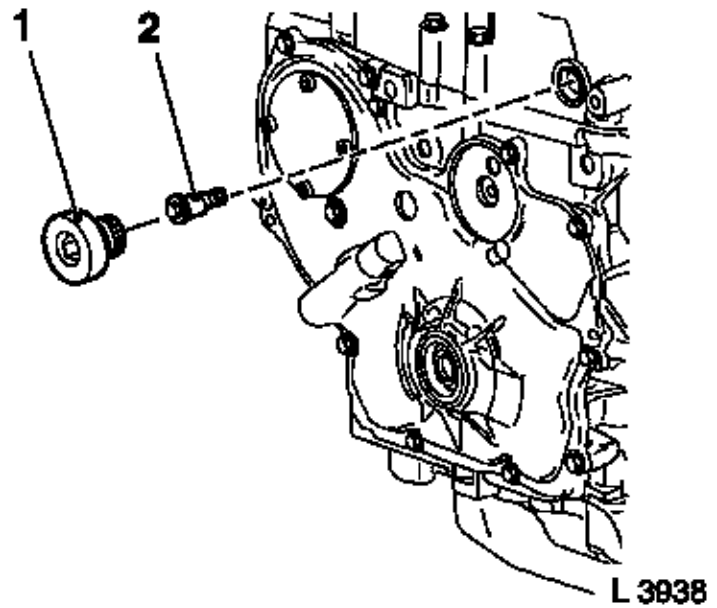


54. Secure the camshaft timing chain.
- Important:
Check that the TDC reference points
line up.
Secure the chain link (1) with a plastic
wedge at the marking on the camshaft
timing chain sprocket
55. Lower the lifting ramp.

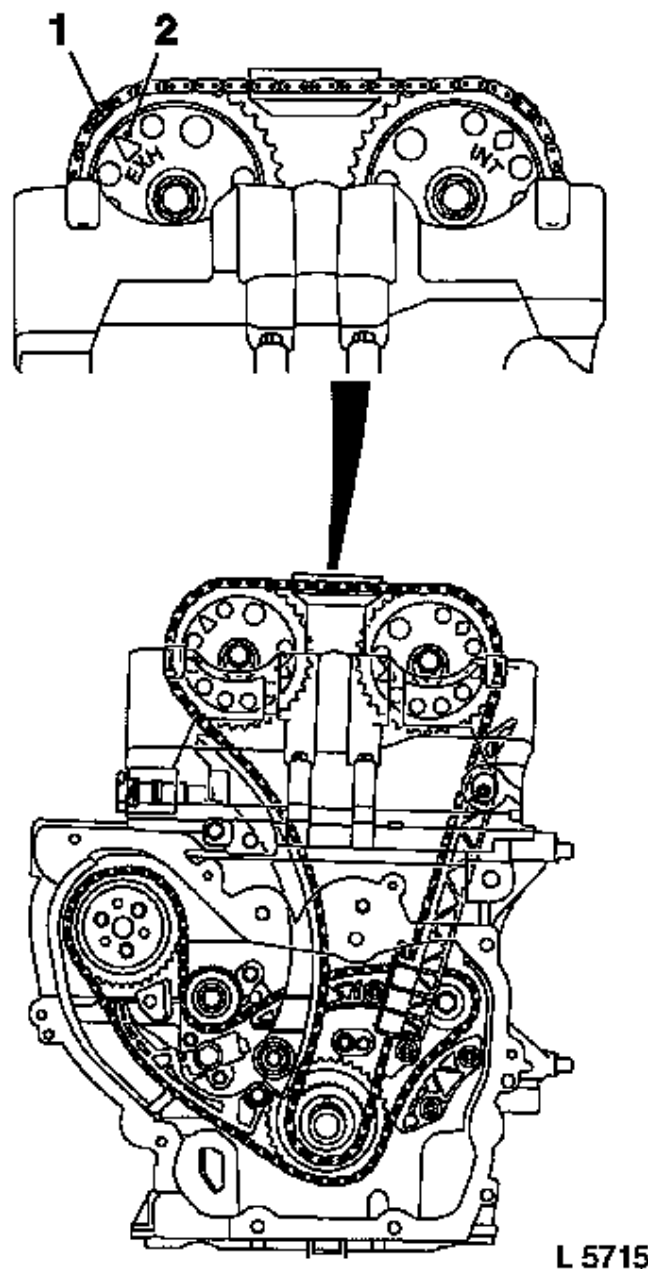


56. Install the camshaft timing chain guide rail.

- 1 bolt (2)
 - Tightening torque **10 Nm**
- Install the screw plug (1).
 - Tightening torque **65 Nm**

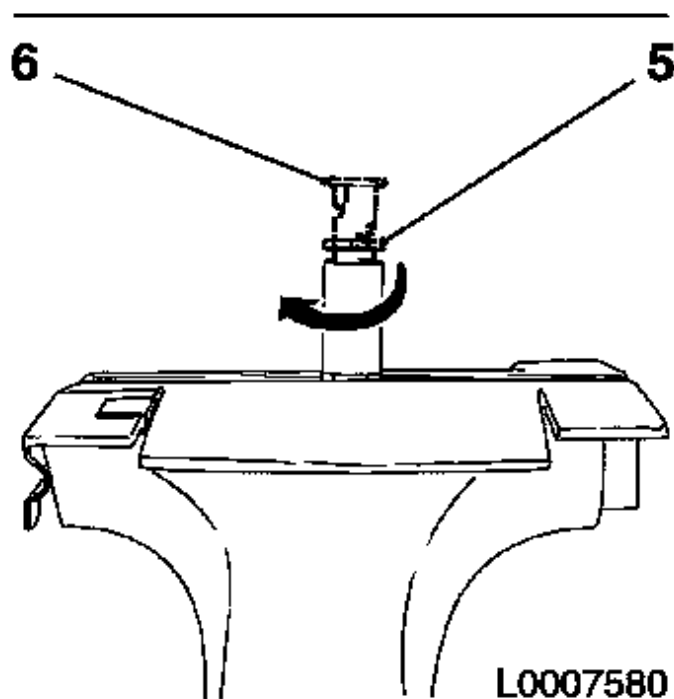
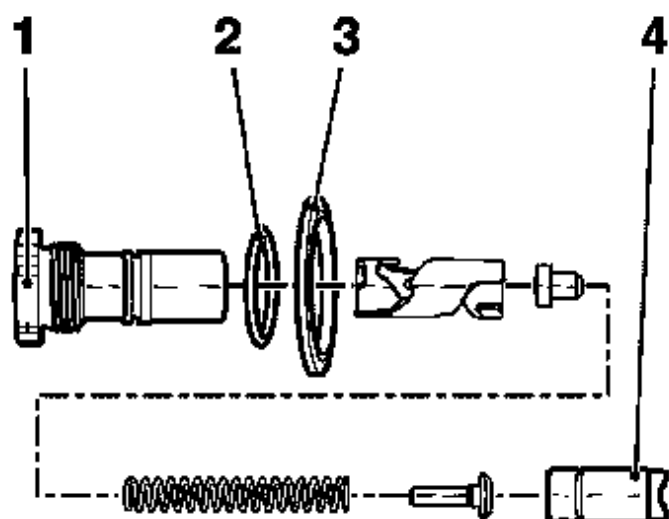


57. Install the exhaust camshaft sprocket.
- Important:
Check that the TDC reference points line up. Chain link (1) to EXH marking (2) on the exhaust camshaft sprocket
 - Rotate the exhaust camshaft by the hexagon until the exhaust camshaft sprocket is seated in the guide.
 - Use a new bolt.
 - Hold the camshaft by the hexagon.
 - Tightening torque **85 Nm + 30° + 15°**
58. Recut the thread.
- 2 off
59. Install the guide rail.
- Coat the bolts with thread locking compound (red) and insert them.
 - Tightening torque **8 Nm**



60. Install the camshaft timing chain tensioner.

- Pull out the piston (4) from the housing (1).
 - Clamp the piston at the square into a vice.
 - Turn clockwise to lock the internal piston (6) in the last latch position (5).
 - Insert the piston into the housing.
- Use new oil seals (2) and (3).
- Tightening torque **75 Nm**



Important: Failure to follow this instruction could cause the camshaft timing chain to jump.

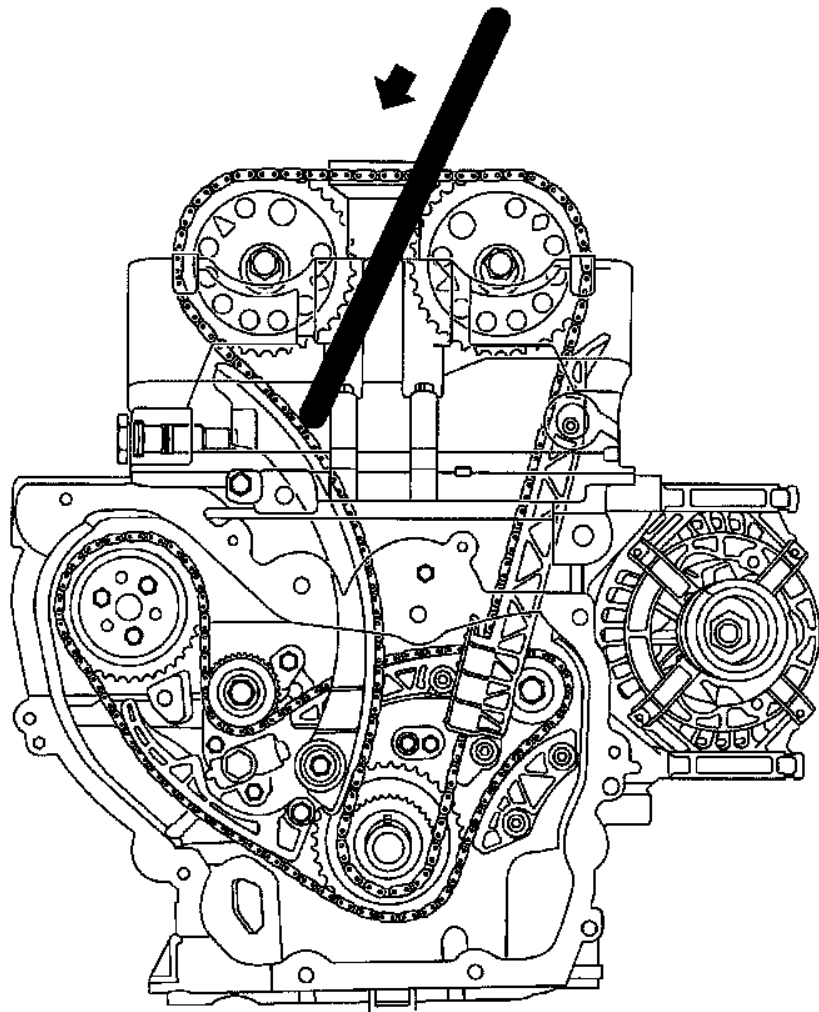
61.

Release the camshaft timing chain tensioner by pressing on the tensioner rail or the camshaft timing chain (using a blunt tool – e.g. a rounded assembly lever).

Note: If the TDC markings no longer line up with the

coloured chain links, refit the camshaft timing chain. Once the crankshaft has been rotated once again they will no longer line up.

62. Raise the lifting ramp.
63. Support the engine from underneath with **KM-904** together with **KM-6054**.
64. Remove the retaining bolt from the engine damping block.
 - 1 retaining bolt
65. Lower the engine.

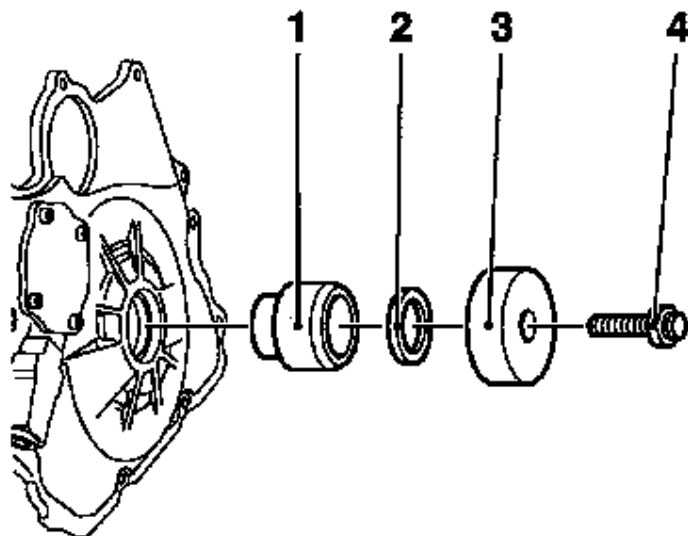


J 0935

66. Install the timing case.

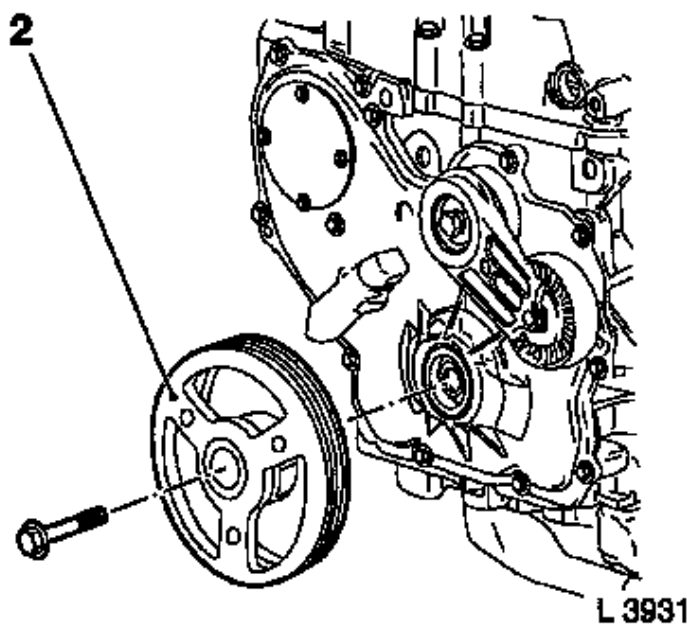
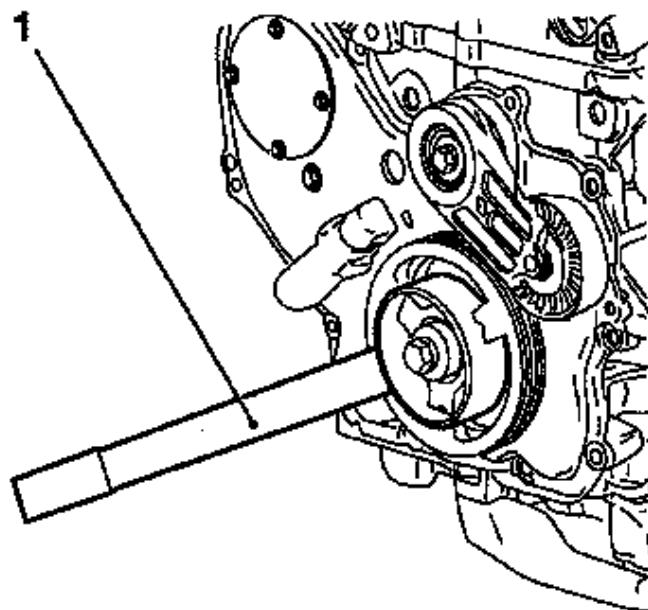
Note: Remove the cloth from the opening in the timing case.

 - Use a new gasket.
 - Tightening torque **21 Nm**
 - Install a new crankshaft front oil seal (2).
 - Slide protective sleeve (1) from **KM-6105** (3) onto the connecting rod journal.
 - Coat the sealing lips with silicone grease (white).
 - Slide the oil seals over the protective sleeve onto the connecting rod journal.
 - Use **KM-6105** to press the oil seal into the timing case.
 - Use bolt (4) of the rotational vibration damper.
 - Take out **KM-6105**.



L 3952

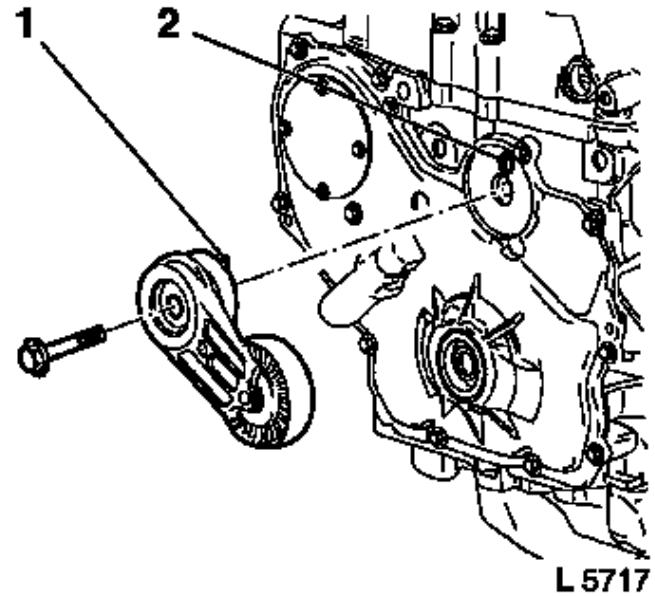
67. Raise the engine.
68. Insert the right-hand engine damping block together with the engine damping block bracket.
69. Attach the right-hand engine damping block.
 - 1 nut
 - Tightening torque **45 Nm**
70. Attach the right-hand engine damping block bracket.
 - 3 bolts
 - Tightening torque **85 Nm**
71. Attach the rear engine damping block.
 - 1 bolt, 1 nut
 - Tightening torque **49 Nm**
72. Lower the engine.
 - Remove the lifting device **KM-904** with **KM-6054**.
73. Attach the bracket for the gearshift cables.
 - To the transmission
 - 1 bolt
 - Tightening torque **22 Nm**
74. Attach the rotational vibration damper (2).
 - Use holding adapter **KM-J-38122-A** in conjunction with **KM-956-1** (1) to hold.
 - Use a new bolt.
 - Tightening torque **100 Nm + 75° + 15°**



75. Attach the ribbed V-belt tensioner.

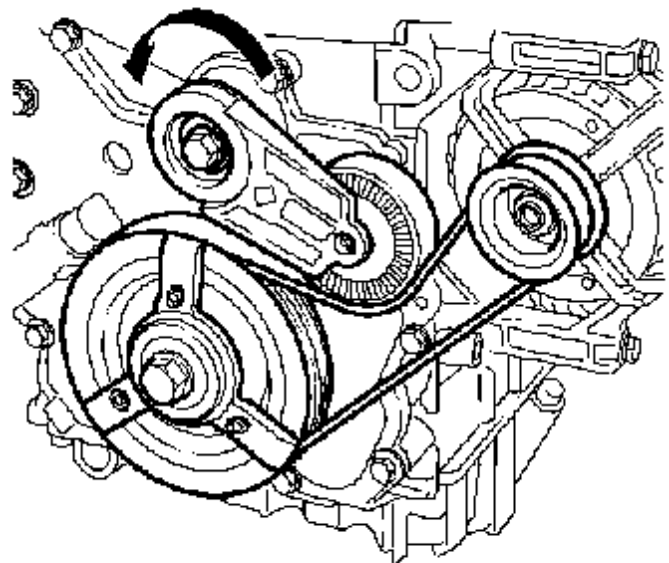
Note: The lug (1) of the ribbed V-belt tensioner engages into the bore in the timing case (2).

- Tightening torque **43 Nm**



76. Install the ribbed V-belt.

- Lay the ribbed V-belt in place.
Note: Note the running direction and installation position of the ribbed V-belt.
- Tension the ribbed V-belt tensioner in the direction of the arrow with **KM-6151**.



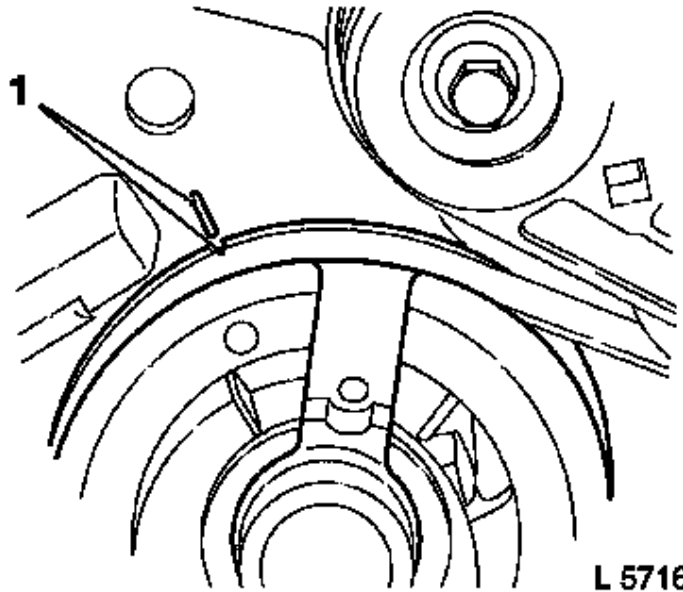
77. Rotate the crankshaft **720°**.

- Rotate the crankshaft in the normal direction of rotation to TDC on cylinder no. 4 (marking 1).
Note: In this position the cams (1) and (2) of cylinder no. 4 point upwards.

78. Install the front exhaust pipe.

- Use new gaskets.
- 6 nuts, 3 bolts
 - Tightening torque **16 Nm**
- Hook into the mountings.

79. Install wheel arch liner
 - Install 6 screws
80. Install rear wheel
 - Install 4 bolts, install locking bolt **90 Nm**
81. Remove support
82. Install the lower engine splash shield
 - 13 bolts
83. Lower the lifting ramp.



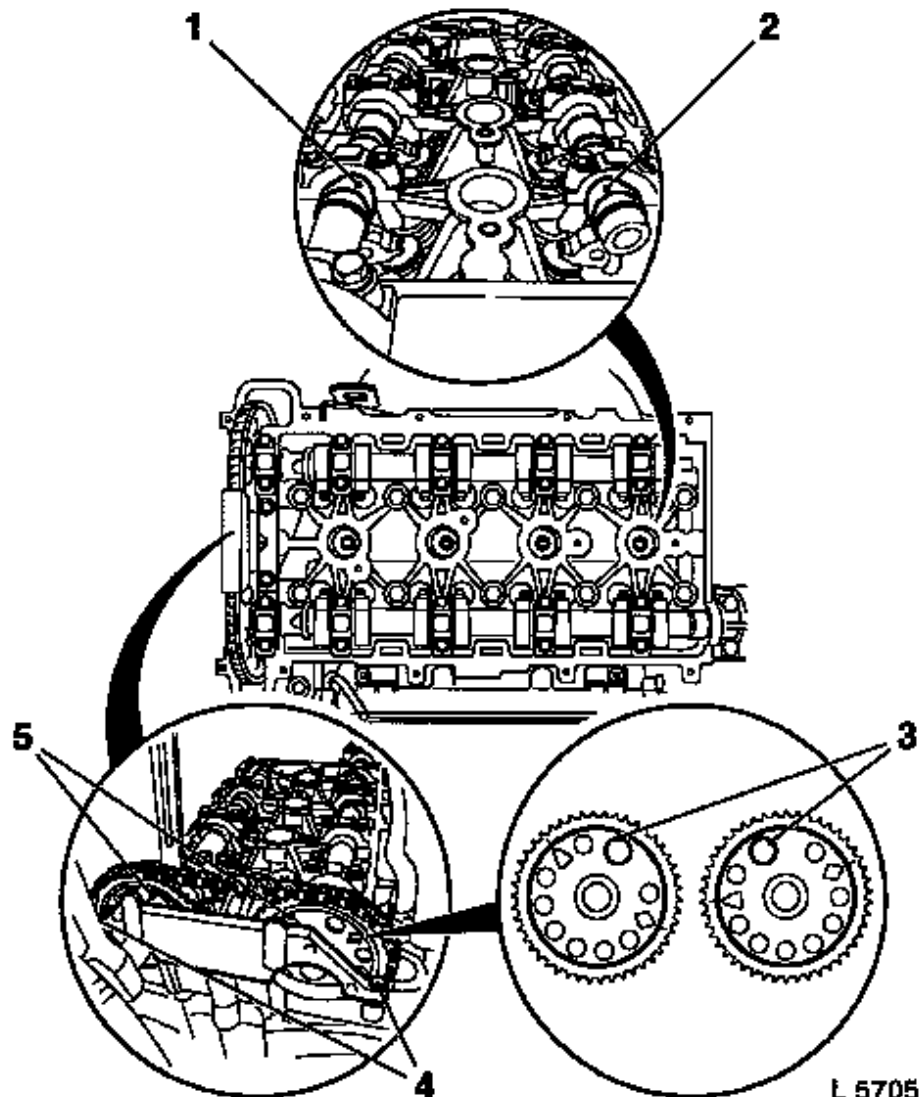
L 5716

84. Attach **KM-6148**.

Note: In this position the cams (1) and (2) of cylinder no. 4 point upwards.

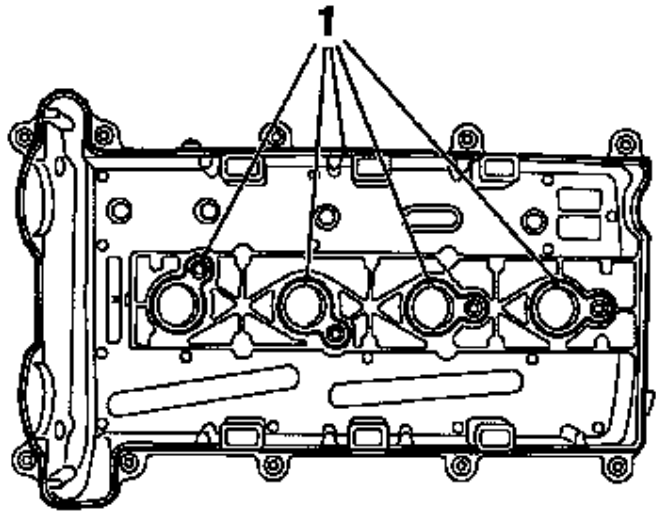
- Attach **KM-6148** with the enclosed bolts (4).
- Slide the positioning bolts (5) into the designated bores (3) on the camshaft sprockets.

85. Detach **KM-6148**.



L 5705

86. Attach the cylinder head cover
- Clean the sealing surfaces.
 - Use new gaskets.
Note: The sealing lips of the seals (1) must be inserted into the groove on the cylinder head cover.
 - Tightening torque **9 Nm**
 - Attach the ground cable
 - Tightening torque **9 Nm**
 - Attach the engine lifting eyes.
 - 2 bolts, 1 nut
 - Attach the engine breather hose.
 - Attach the fuel line bracket.
 - 2 bolts, tightening torque **9 Nm**
87. Attach the ignition module.
- Tightening torque **9 Nm**
 - Attach and secure the wiring harness connector.

**L 5706**

88. Connect the fuel lines.
- 2 union nuts
 - Tightening torque **10 Nm**
89. Install the engine cover.
- Check the alignment.
 - 6 bolts, tightening torque **14 Nm**
90. Close the engine cover.
91. Connect the battery.
92. Close the bonnet.
93. Reprogram the volatile memories.