



V8 XJ Series

DATE 12/02

100-21

SERVICE

## TECHNICAL BULLETIN

Engine Vibration/Noise Above 1000 RPM –  
Oil Pump Resonance –  
Install Revised Oil Pump

MODEL 2002 MY  
V8 XJ Series  
VIN F44114 - F55936

### Issue:

Some 2002 MY V8 XJ Series N/A vehicles within the above VIN range, may display an engine vibration/noise at engine speeds in excess of 1000 rpm. This noise is caused by the oil pump resonating which in turn causes the engine oil pan to vibrate.

When the noise is evident the complaint can be verified by pressing against the oil pan. If a vibration can be felt, a new engine oil pump that has a modified oil pressure release valve should be installed.

### Action:

In case of a customer complaint of the above condition on a 2002 MY V8 XJ Series vehicle within the above VIN range, verify if the noise is present, and install a new oil pump as outlined on the next page.

**⚠ Warning:** Use care when pressing against the oil pan, since the engine may be hot.

## OIL PUMP REPLACEMENT PROCEDURE

1. Open luggage compartment lid.
2. Remove battery cover and disconnect battery. Refer to Technical Bulletin 414-01.
3. Open hood and fit fender protectors.
4. Raise vehicle on lift.
5. Place suitable container under vehicle.
6. Remove engine drain plug and drain engine oil.
7. Remove engine oil pan bolts (1 Illustration 1), remove engine oil pan (2 Illustration 1), remove engine oil pan gasket and discard (3 Illustration 1).

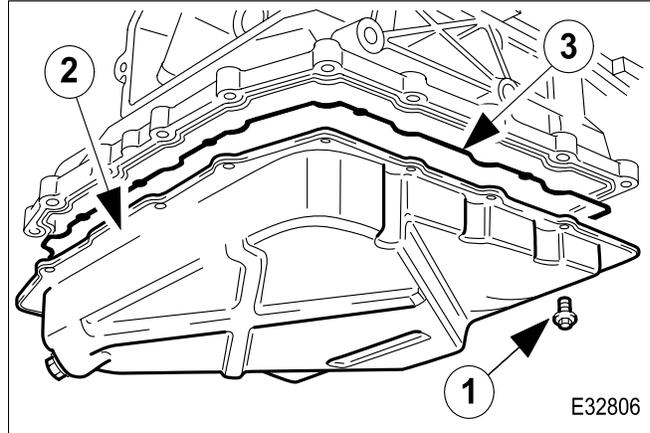


Illustration 1

8. Remove oil strainer bolts. Remove oil strainer. (Illustration 2)

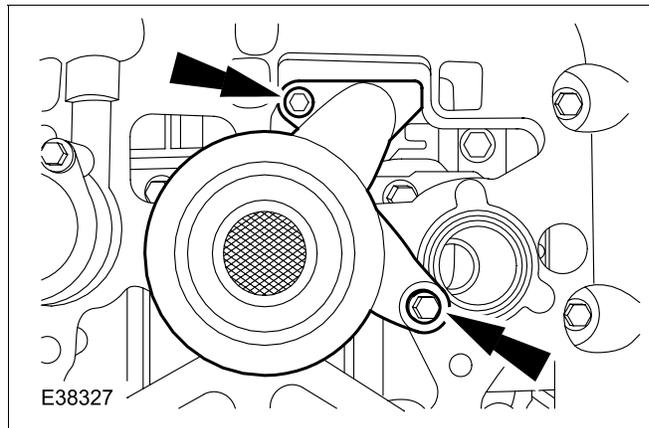


Illustration 2

9. Remove and discard O-ring seal.
10. Place a suitable tray under vehicle and drain coolant from radiator.
11. Lower vehicle on lift.
12. Remove coolant top hose.
13. Remove engine covers.
14. Remove air cleaner cover and intake assembly.
15. Remove bank 1 and bank 2 ignition coil on-plug covers.

16. Remove oil level indicator and tube.  
(Illustration 3)

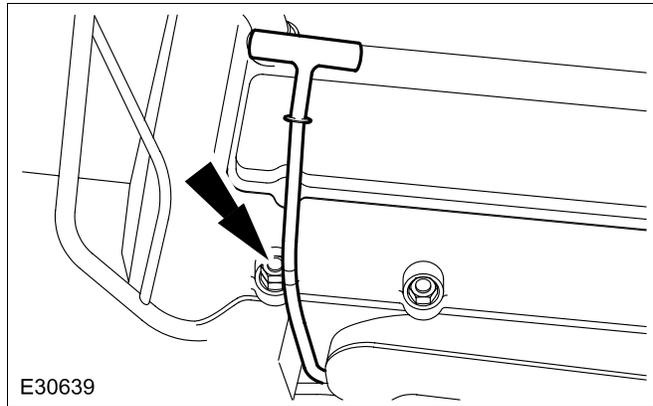


Illustration 3

17. Disconnect variable valve timing (VVT) oil control solenoid electrical connectors.  
18. Disconnect ignition coil on-plug electrical connectors.  
19. Remove all ignition coil on-plugs.  
20. Remove both camshaft cover assemblies.

**Note:** When removing the camshaft cover retaining bolts, note their position in the cover. Remove and discard the camshaft cover gaskets and retaining bolt O-ring seals.

21. Remove all engine drive belts.

**Note:** Loosen three screws that secure the water pump pulley before removing drive belt.

22. Remove water pump pulley. (Illustration 4)

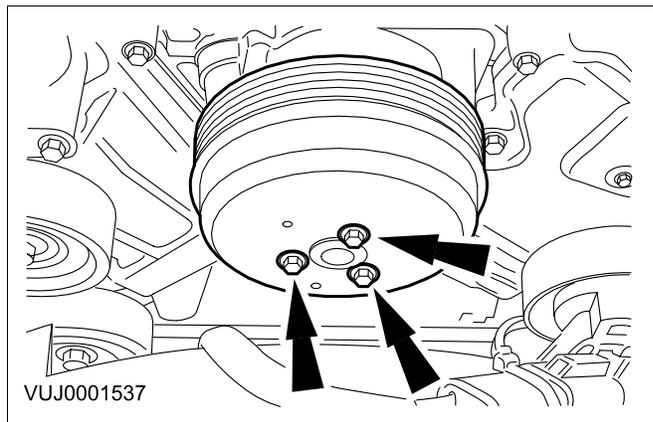


Illustration 4

23. Remove accessory drive belt idler pulley.  
(Illustration 5)

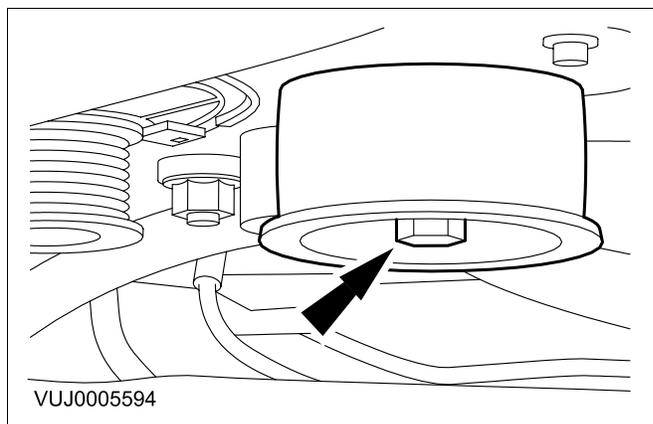


Illustration 5

24. Remove accessory drive belt tensioner.  
25. Detach engine harness retaining clips from bank 1 and bank 2 timing covers.

**Caution: Do not use the crankshaft setting peg 303-645 in the following operations to lock the crankshaft.**

26. Use special tools 303-191 and 303-191-02 to retain crankshaft pulley, then remove and discard crankshaft pulley bolt. Remove special tools. (Illustration 6)

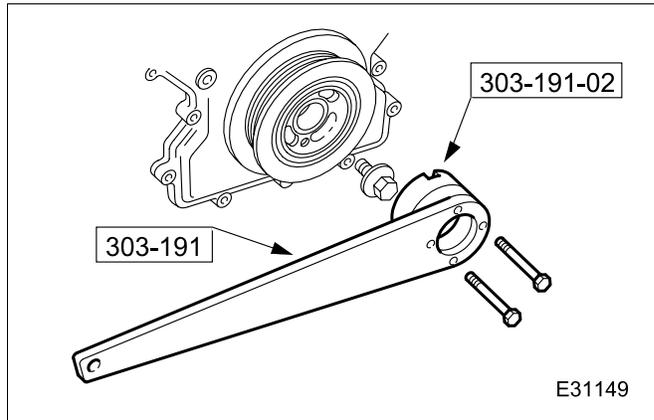


Illustration 6

27. Use special tools 303-588 to remove crankshaft pulley. Remove special tools. (Illustration 7)  
**Note:** The damper only needs to be withdrawn along the crankshaft nose by approximately 2 mm before removing the puller. The damper will then either be loose or only require a sharp tap with a mallet to release it from the split-locking ring.

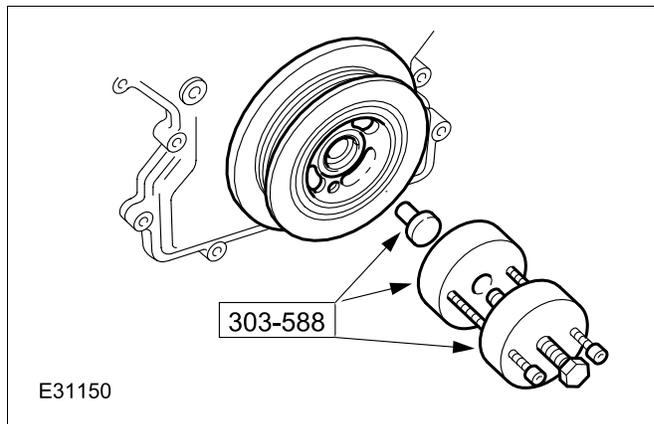


Illustration 7

28. Remove engine front cover; remove and discard seals. (Illustration 8)

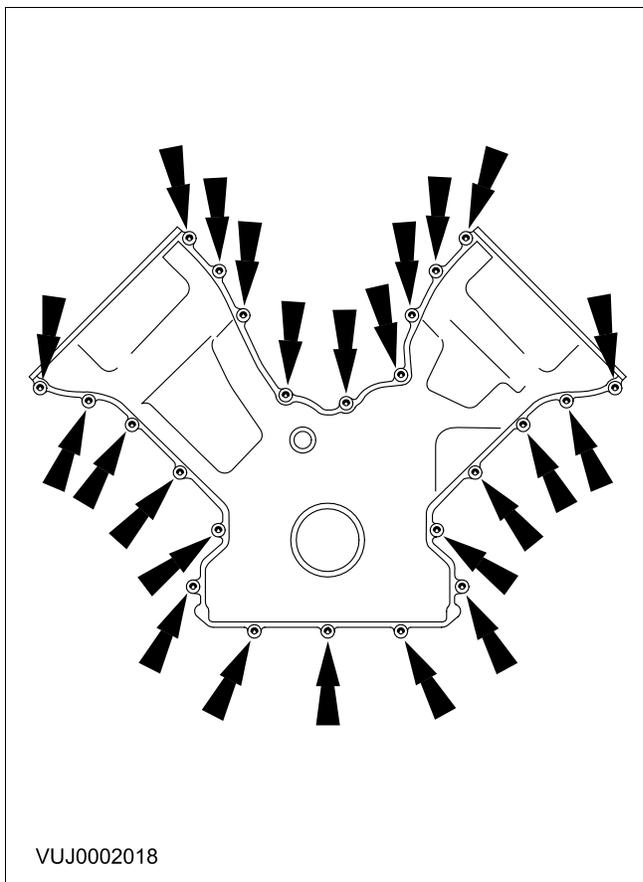


Illustration 8

29. Remove bank 1 VVT oil control unit housing; remove and discard the O-ring seals. (Illustration 9)

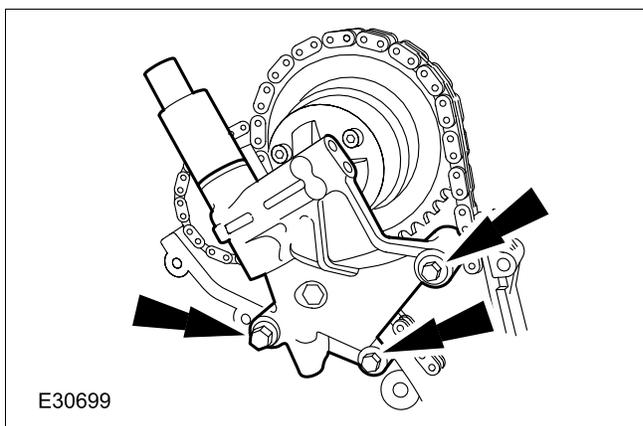


Illustration 9

30. Remove bank 2 VVT oil control unit housing; remove and discard the O-ring seals. (Illustration 10)

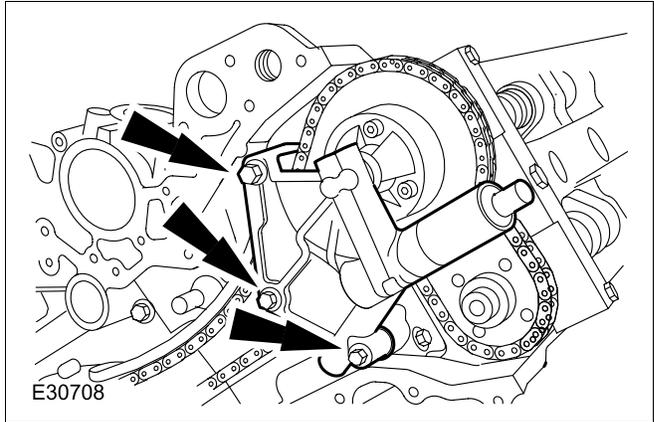


Illustration 10

31. Raise vehicle on lift.  
32. Disconnect crankshaft position sensor electrical connector. (Illustration 11)

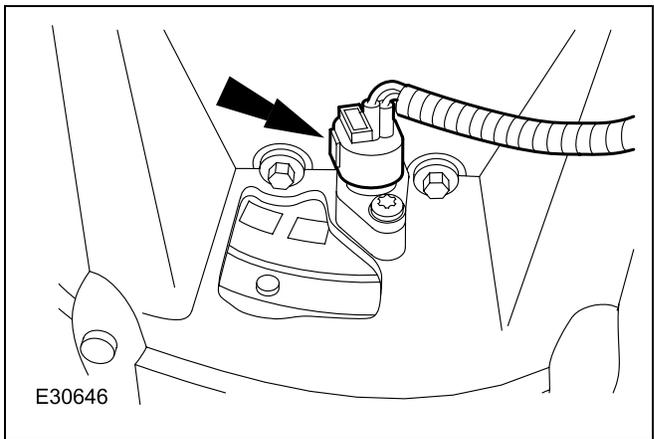


Illustration 11

33. Remove crankshaft position sensor. (Illustration 12)

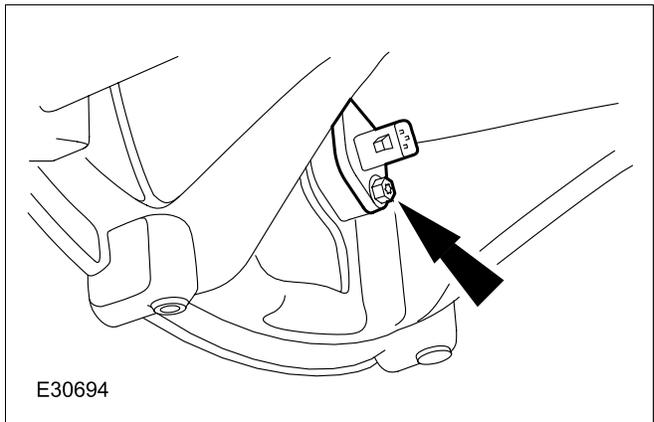


Illustration 12

- 34. Install special tool 303-645. (Illustration 13)

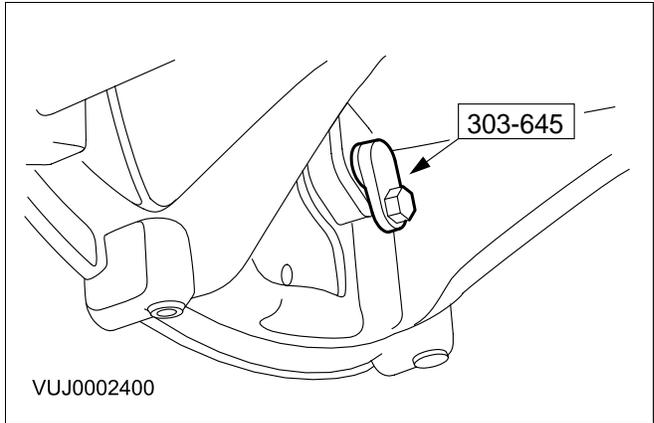


Illustration 13

- 35. Lower vehicle on lift
- 36. Install special tool 303-530 to bank 1 cylinder head. (Illustration 14)

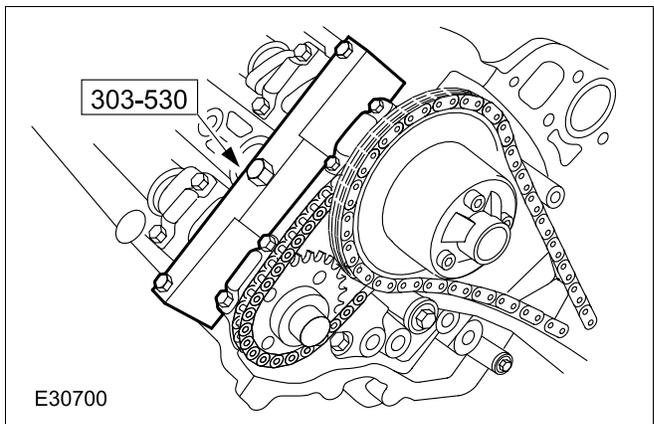


Illustration 14

**Caution: Ensure that the secondary timing chain and camshaft sprockets are free to rotate.**

- 37. Loosen camshaft sprockets. (Illustration 15)

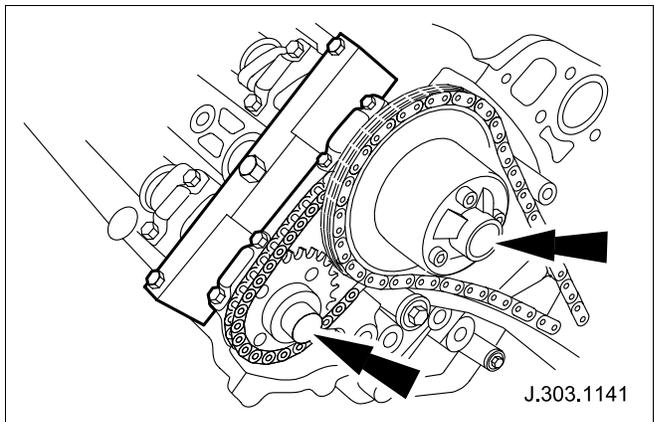


Illustration 15

38. Remove primary timing chain tensioner assembly. (Illustration 16)

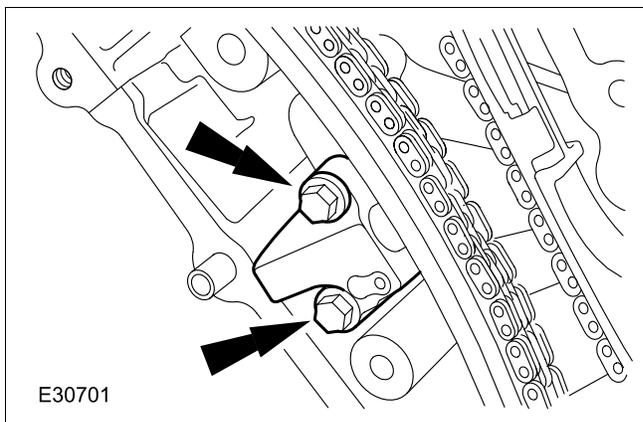


Illustration 16

39. Remove primary timing chain tensioner guide. (Illustration 17)

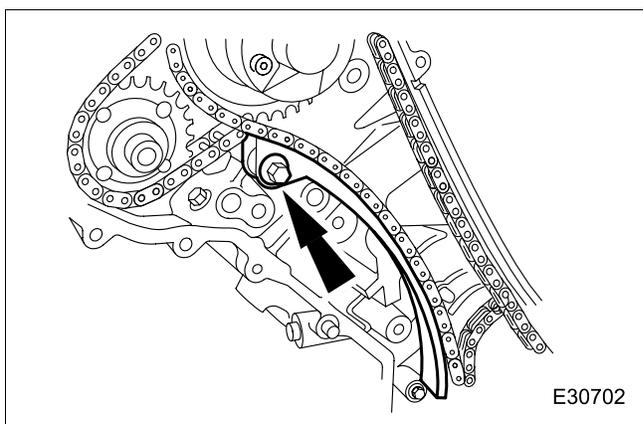


Illustration 17

40. Remove primary timing chain. (Illustration 18)

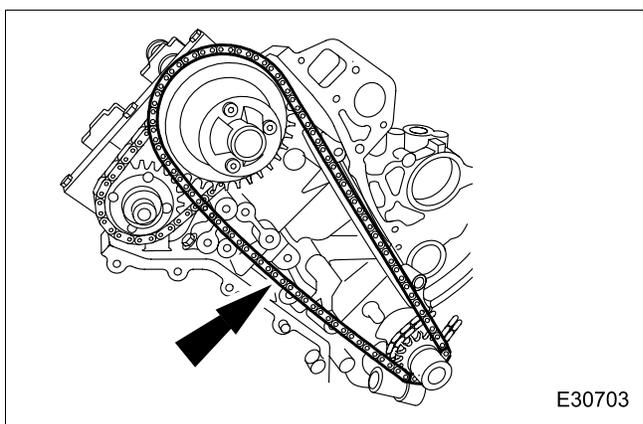


Illustration 18

41. Remove primary timing chain guide.  
(Illustration 19)

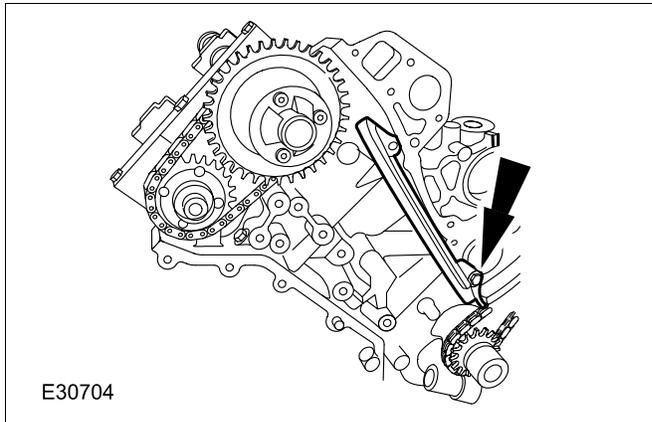


Illustration 19

42. Remove camshaft locking special tool  
303-530 and transfer to bank 2.  
(Illustration 20)

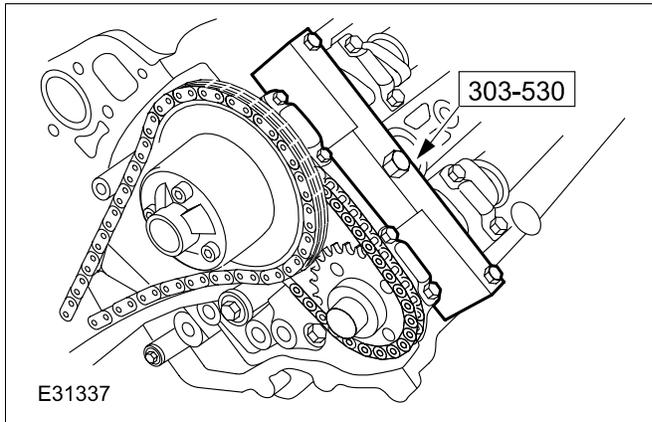


Illustration 20

**Caution: Ensure that the secondary timing chain and camshaft sprockets are free to rotate.**

43. Loosen camshaft sprockets. (Illustration  
21)

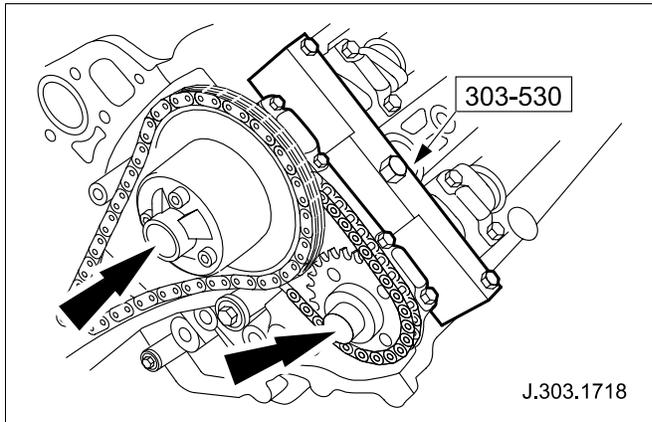


Illustration 21

44. Remove primary timing chain tensioner assembly. (Illustration 22)

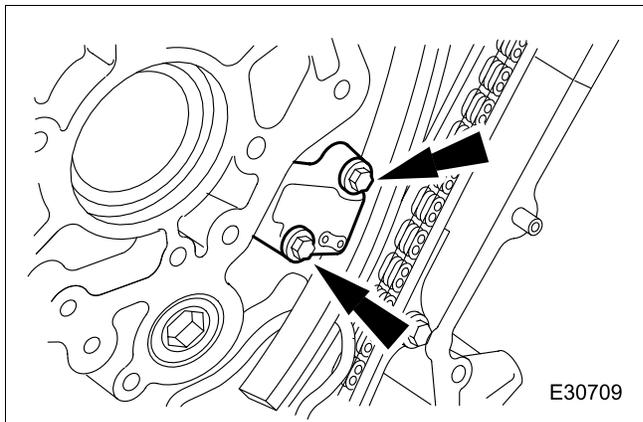


Illustration 22

45. Remove primary timing chain tensioner guide. (Illustration 23)

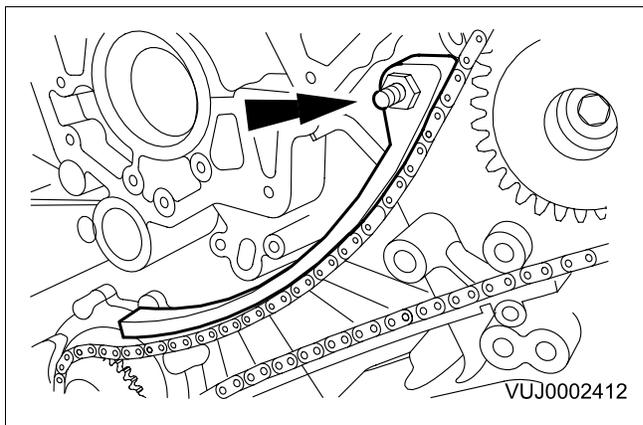


Illustration 23

46. Remove primary timing chain. (Illustration 24)

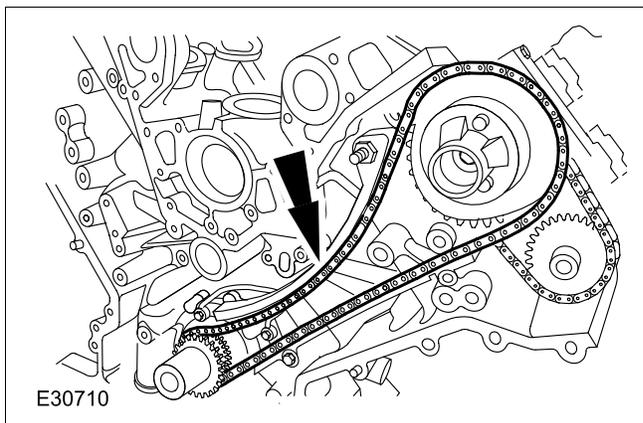


Illustration 24

47. Remove primary timing chain guide.  
(Illustration 25)

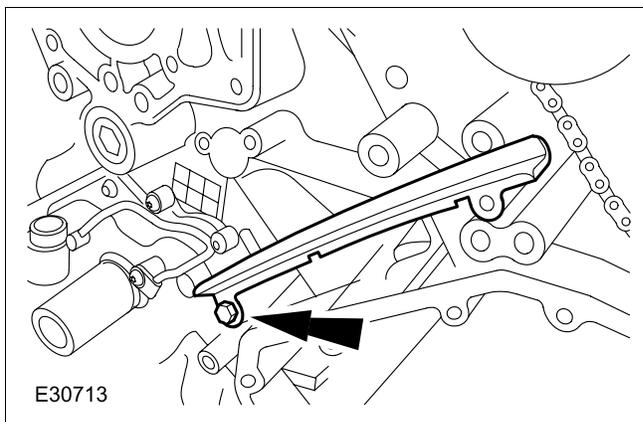


Illustration 25

48. Remove oil pump. Remove and discard the gasket. (Illustration 26)

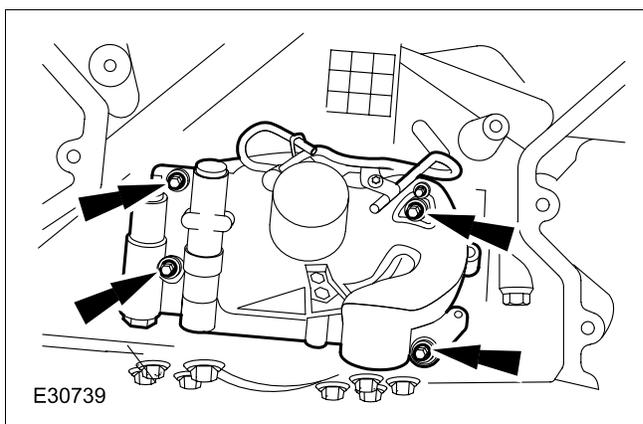


Illustration 26

#### Installation

49. Install new oil pump and gasket and tighten to 12 Nm. (Illustration 27)

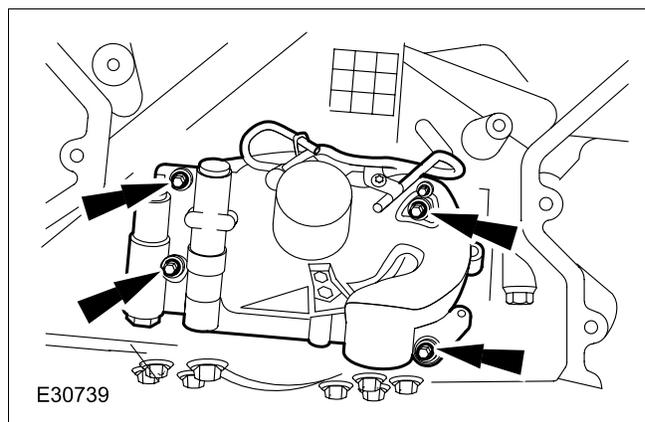


Illustration 27

50. Install timing chain tensioning tool 303-532 to exhaust camshaft sprocket, reposition camshaft sprockets for the most advantageous position then remove 303-532 tool. (Illustration 28)

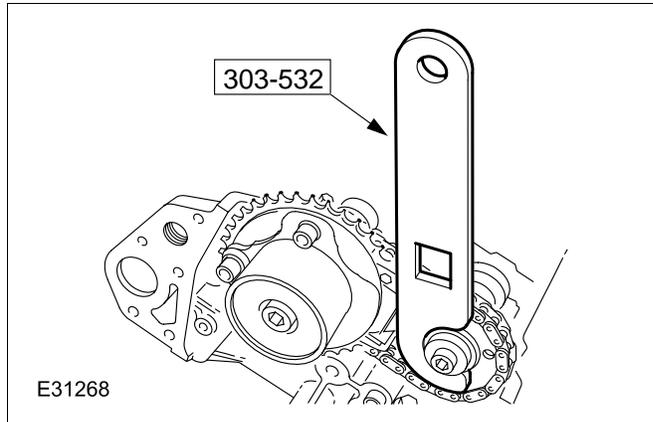


Illustration 28

51. Install primary timing chain guide and tighten to 12 Nm. (Illustration 29)

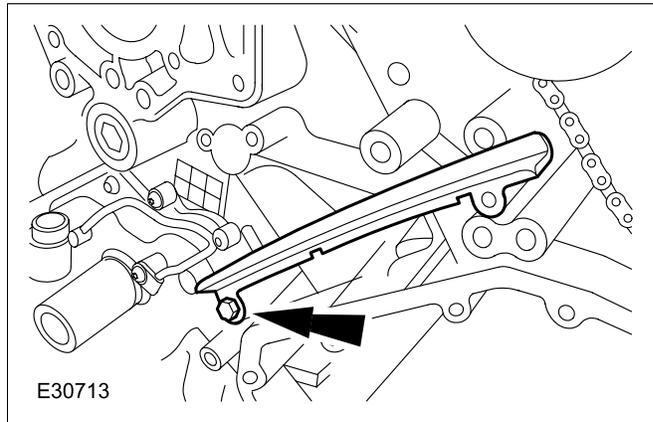


Illustration 29

**Caution: Ensure that the timing chain slack is on the tensioned side of the timing chain.**

52. Install primary chain over crankshaft sprocket and intake sprocket. (Illustration 30)

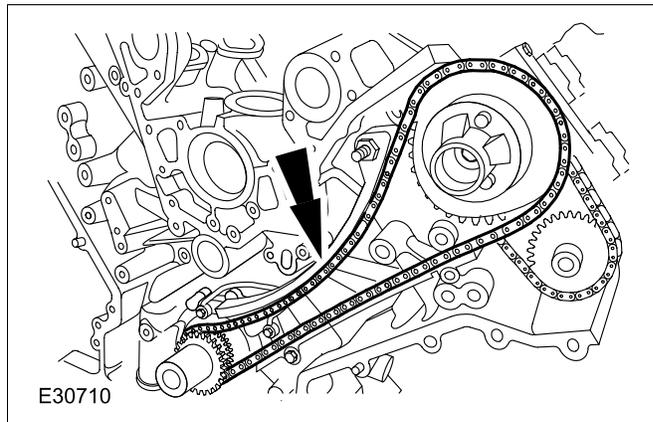


Illustration 30

53. Install primary timing chain tensioner guide and tighten to 12 Nm. (Illustration 31)

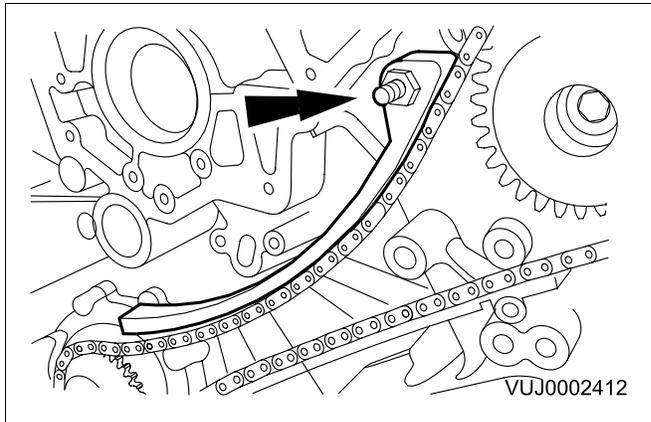


Illustration 31

**Caution: Use suitable protective covers on the vice jaws to protect the timing chain tensioner.**

54. Secure bank 2 timing chain tensioner in suitable vice jaws. (Illustration 32)

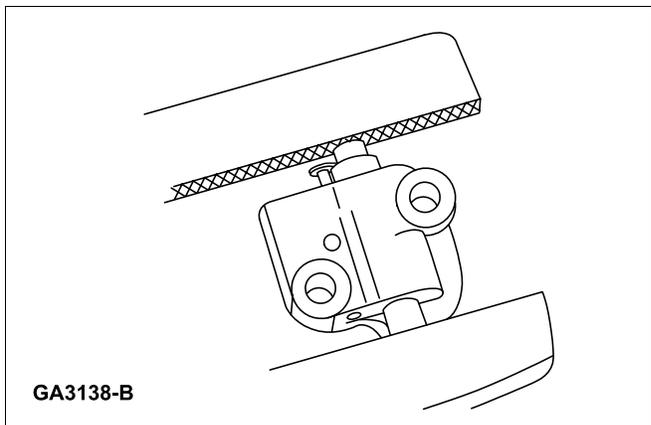


Illustration 32

**Caution: During timing chain tensioner compression, do not release the ratchet stem until the timing chain tensioner piston is fully bottomed in its bore or damage to the ratchet stem will result.**

55. Using a suitable tool, hold bank 2 timing chain tensioner ratchet lock mechanism away from the ratchet stem. Slowly compress bank 2 timing chain tensioner. (Illustration 33)

**Note: The timing chain tensioner piston should retract with minimal force. If binding occurs, reposition the timing chain tensioner to eliminate side loading.**

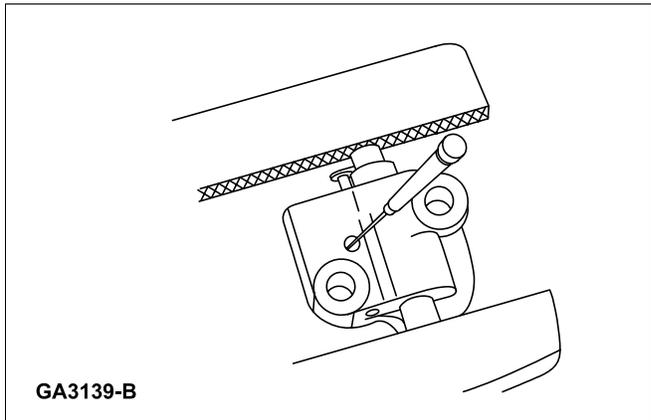


Illustration 33

56. Using a suitable tool, retain the bank 2 timing chain tensioner piston.  
(Illustration 34)

**Note: The retaining tool must remain in the timing chain tensioner until the timing chain tensioner is installed to the engine with the piston bottomed in the bore.**

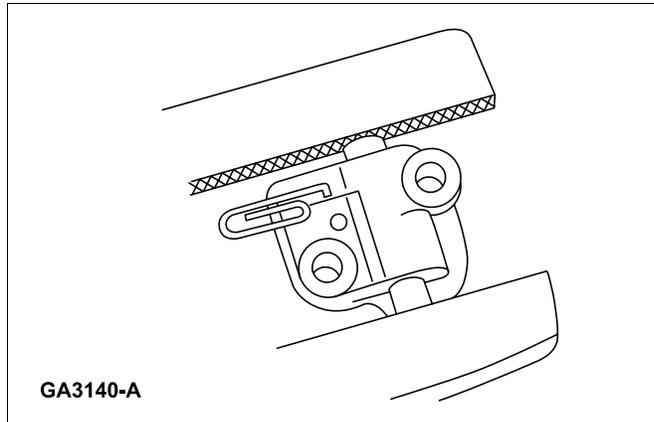


Illustration 34

57. Install primary timing chain tensioner assembly and tighten to 12 Nm.  
(Illustration 35)

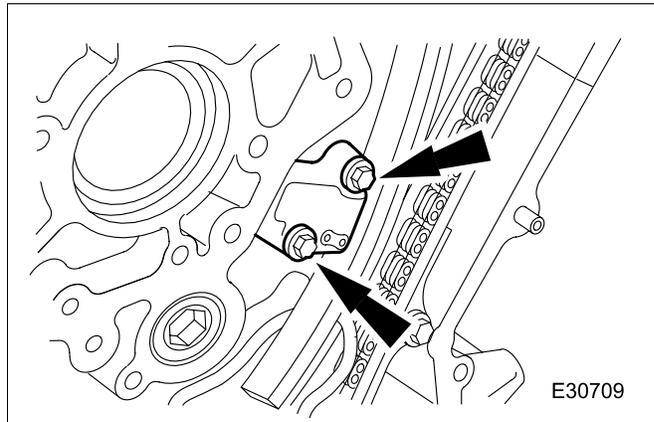


Illustration 35

58. Release the tension in the bank 2 timing chain tensioner and remove retaining tool.

**Caution: While applying the opposing force to sprocket and chain, tighten the sprocket bolt.**

59. When using special tool, apply force to the tool in an anti-clockwise direction to tension the primary timing chain on its drive side and tighten exhaust camshaft sprocket retaining bolt to 120 Nm.  
(Illustration 36)

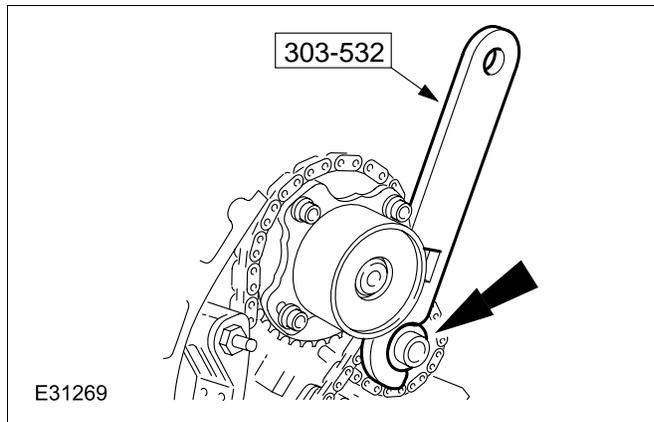


Illustration 36

**Caution: While applying the opposing force to sprocket and chain, tighten the sprocket bolt.**

60. When using special tool apply force to the tool in an anti-clockwise direction and tighten inlet camshaft sprocket retaining bolt to 120 Nm. (Illustration 37)

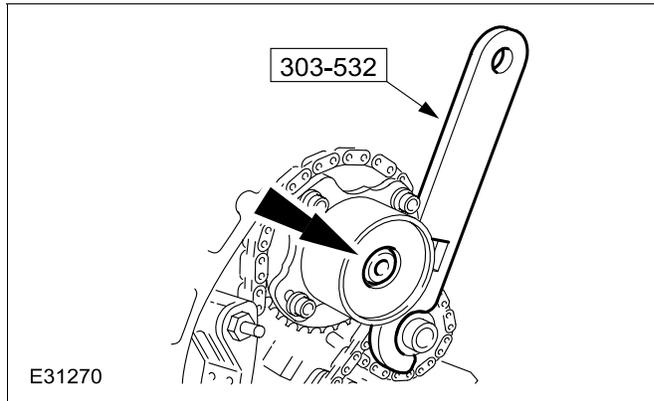


Illustration 37

61. Remove camshaft-locking tool 303-530 and transfer it to bank 1. (Illustration 38)

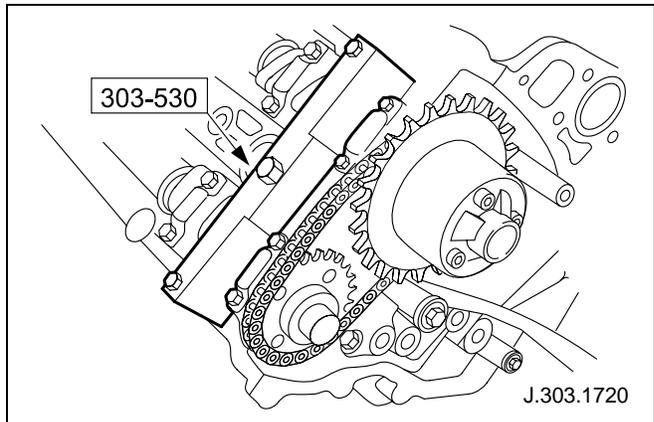


Illustration 38

62. Install timing chain tensioning tool 303-532 to exhaust camshaft sprocket, reposition camshaft sprockets for the most advantageous position then remove tool 303-532. (Illustration 39)

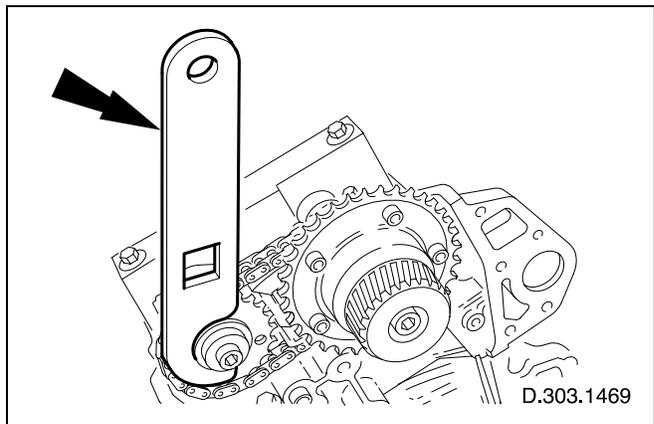


Illustration 39

63. Install primary timing chain guide and tighten to 12 Nm. (Illustration 40)

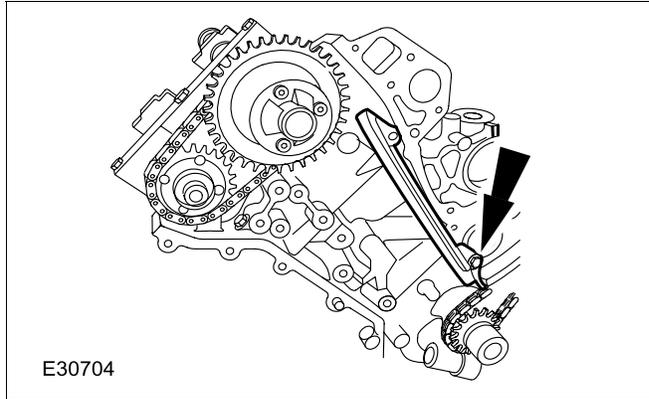


Illustration 40

**Caution: Ensure that the timing chain slack is on the tensioned side of the timing chain.**

64. Install primary timing chain over crankshaft sprocket and intake sprocket. (Illustration 41)

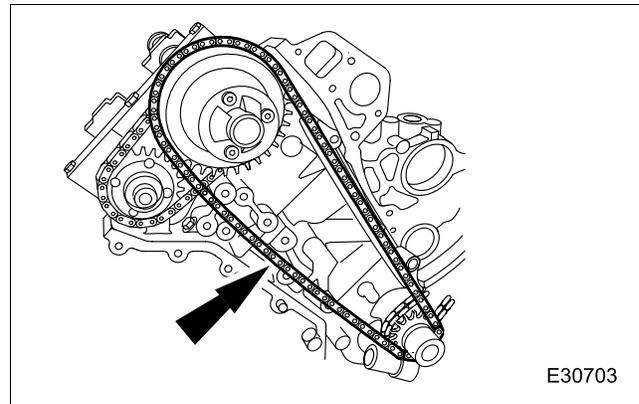


Illustration 41

65. Install primary timing chain tensioner guide and tighten to 12 Nm. (Illustration 42)

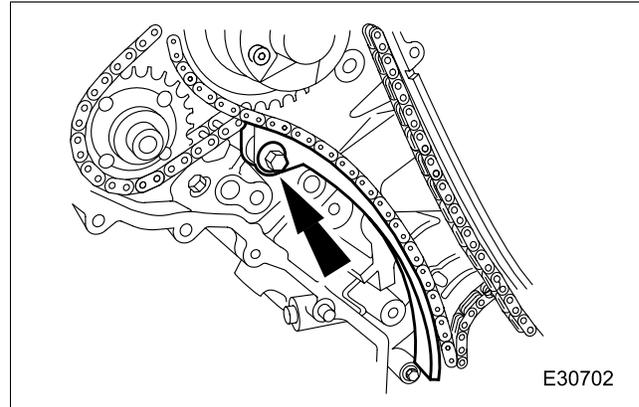


Illustration 42

**Caution: Use suitable protective covers on the vice jaws to protect the timing chain tensioner.**

66. Secure the bank 1 timing chain tensioner in the vice jaws. (Illustration 43)

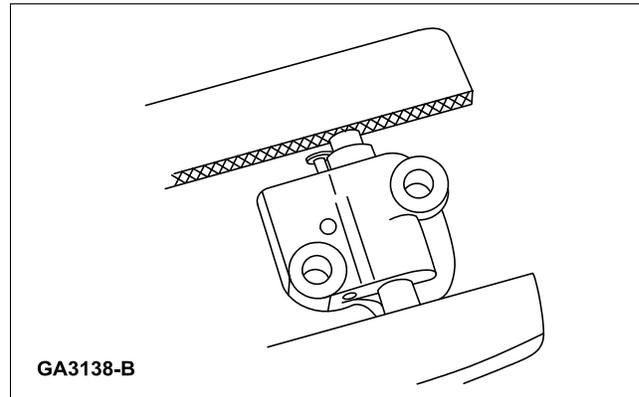


Illustration 43

**Caution: During timing chain tensioner compression, do not release the ratchet stem until the timing chain tensioner piston is fully bottomed in its bore or damage to the ratchet stem will result.**

67. Using a suitable tool, hold the bank 1 timing chain tensioner ratchet lock mechanism away from ratchet stem. Slowly compress the bank 1 timing chain tensioner. (Illustration 44)

**Note: The timing chain tensioner piston should retract with minimal force. If binding occurs, reposition the timing chain tensioner to eliminate side loading.**

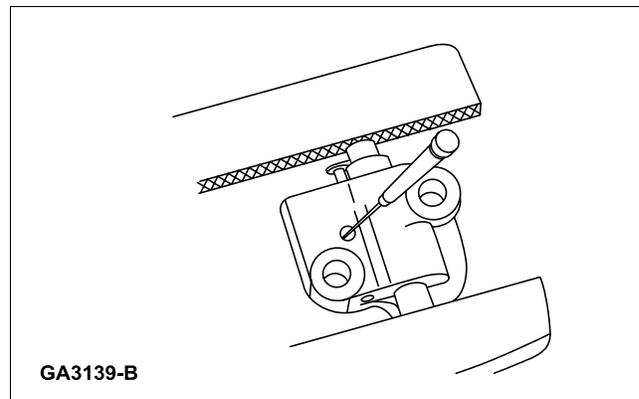


Illustration 44

68. Using a suitable tool, retain bank 1 timing chain tensioner piston. (Illustration 45)

**Note: The retaining tool must remain in the timing chain tensioner until the timing chain tensioner is installed to the engine with the piston bottomed in the bore.**

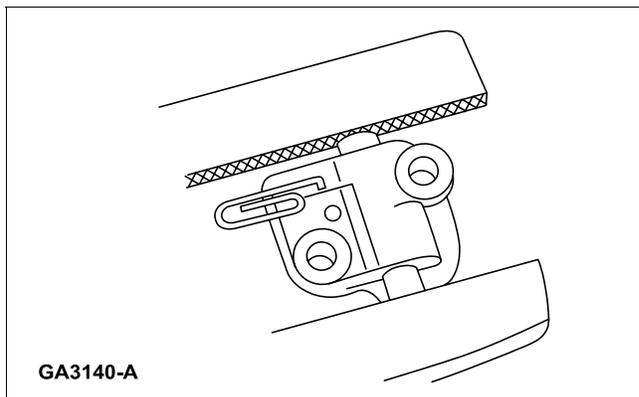


Illustration 45

69. Install primary timing chain tensioner assembly and tighten to 12 Nm. (Illustration 46)

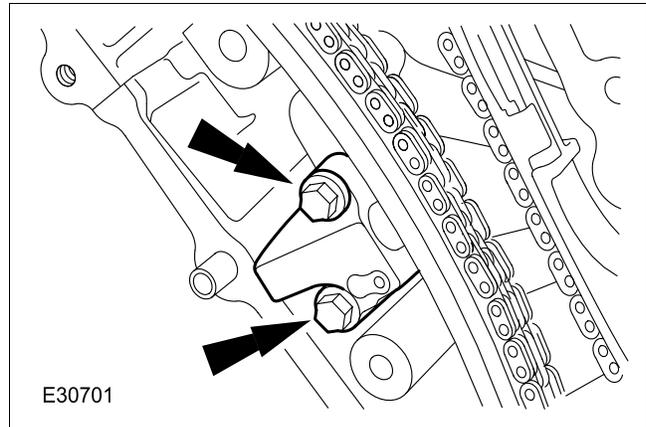


Illustration 46

70. Release tension in the bank 1 timing chain tensioner.  
71. Remove the retaining tool.

**Caution: While applying the opposing force to sprocket and chain, tighten the sprocket bolt.**

72. Using special tool 303-532 apply force to special tool in an anti-clockwise direction to tension primary timing chain on its drive side and tighten exhaust camshaft sprocket retaining bolt to 120 Nm. (Illustration 47)

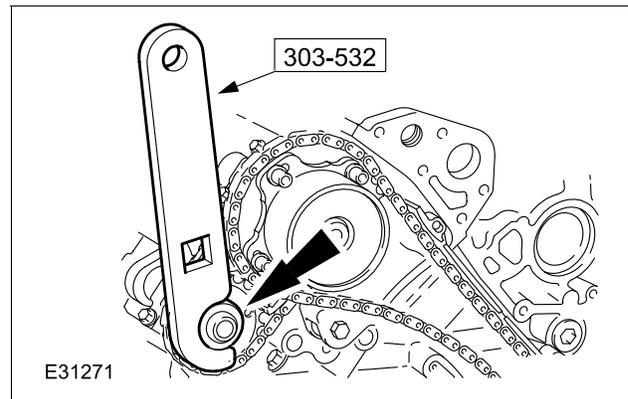


Illustration 47

**Caution: While applying the opposing force to sprocket and chain, tighten the sprocket bolt.**

73. Using special tool 303-532 apply force to special tool in an anti-clockwise direction and tighten inlet camshaft sprocket retaining bolt to 120 Nm. (Illustration 48)

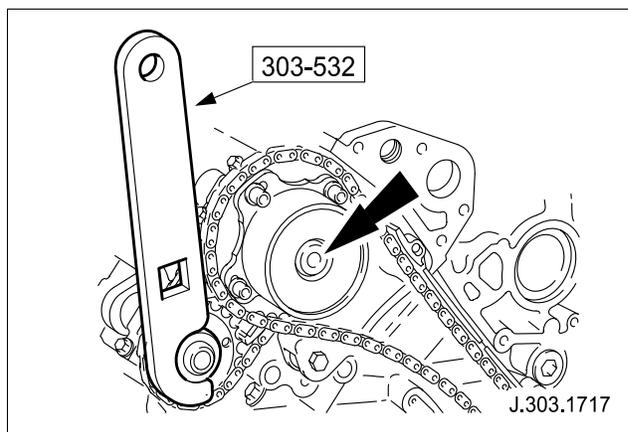


Illustration 48

74. Remove special tool 303-530 from bank 1 cylinder head. (Illustration 49)

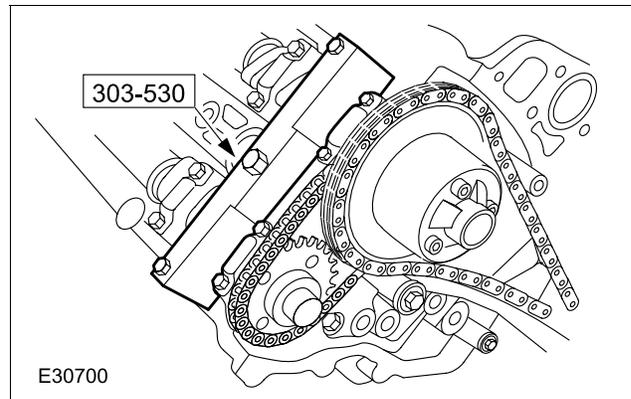


Illustration 49

75. Install new O-ring seals to bank 1 and bank 2 VVT oil control unit housings.  
76. Install bank 1 VVT oil control unit housing and tighten to 22 Nm. (Illustration 50)

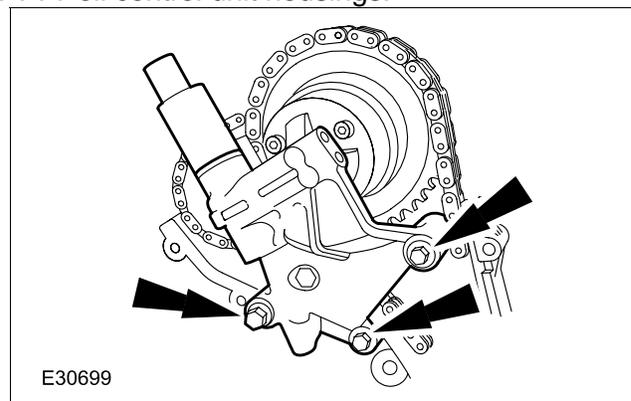


Illustration 50

77. Install bank 2 VVT oil control unit housing and tighten to 22 Nm. (Illustration 51)

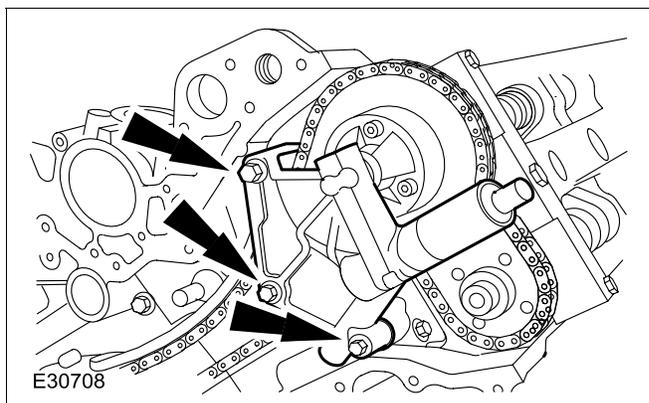


Illustration 51

78. Raise vehicle on lift.  
79. Install new O-ring seals to oil strainer.

80. Install oil strainer and tighten to 12 Nm.  
(Illustration 52)

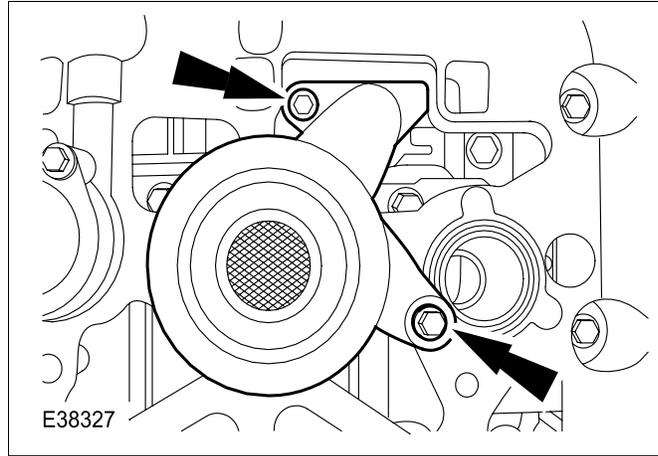


Illustration 52

81. Install new engine oil pan gasket, install and tighten oil pan bolts to correct torque figure 12 Nm, in sequence indicated.  
(Illustration 53)

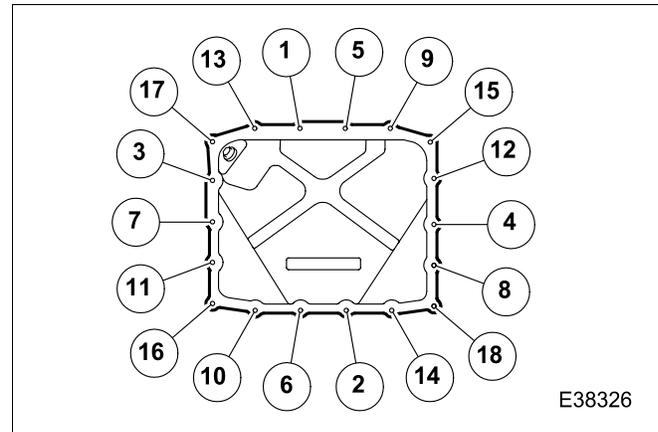


Illustration 53

82. Remove special tool 303-645.  
(Illustration 54)

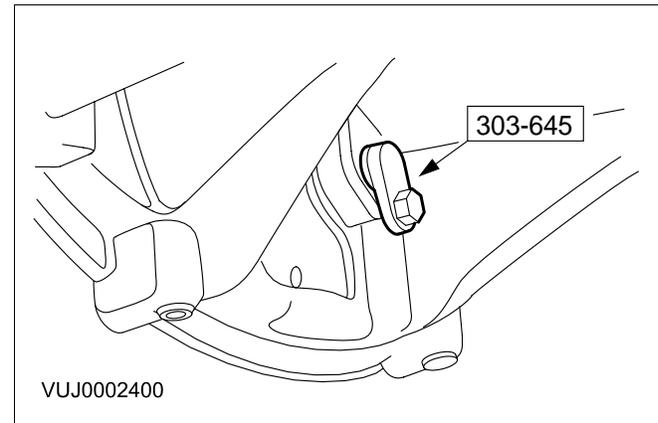


Illustration 54

83. Install crankshaft position sensor.  
84. Connect crankshaft position sensor electrical connector.  
85. Lower vehicle on lift.  
86. Install new seals to the engine timing cover.

87. Apply sealant to eight joints on the engine face. (Illustration 55)

**Note: Sealant beads to be 3 mm diameter and 12 mm long. Cut the nozzle of the sealant tube to produce a 3 mm bead. Install and tighten the securing bolts within twenty minutes of sealant application.**

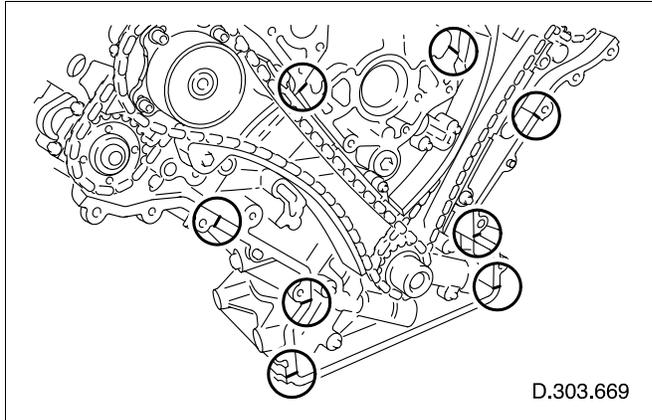


Illustration 55

88. Install engine timing cover and tighten to 13 Nm in sequence shown. (Illustration 56)

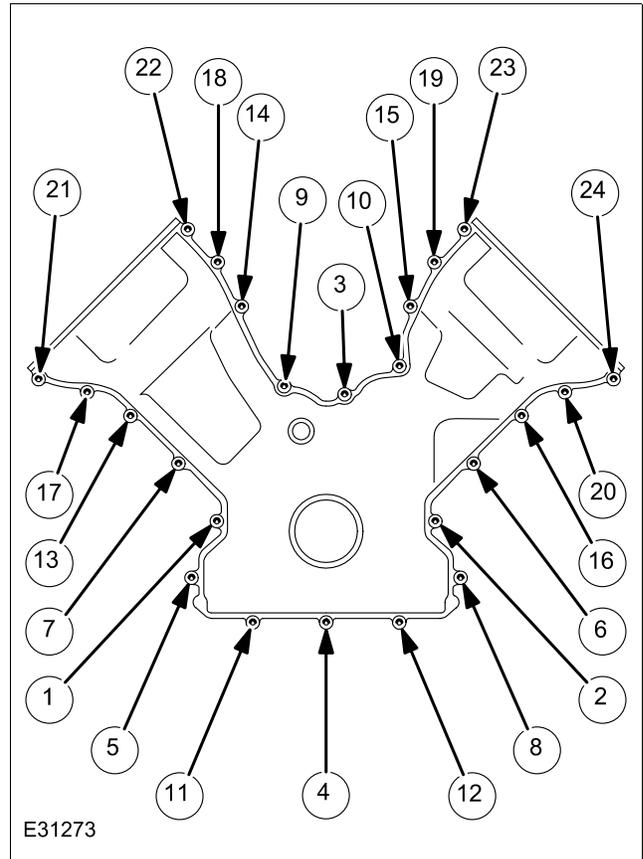


Illustration 56

89. Clean all crankshaft pulley mating faces.

**Note: Check crankshaft pulley and locking ring for damage.**

90. Install crankshaft pulley and locking ring to the crankshaft. Install, but do not tighten, a new crankshaft pulley retaining bolt.

(Illustration 57)

**Note: The screw thread in the crankshaft must be cleaned out before a new crankshaft pulley bolt is installed. A new crankshaft pulley bolt must be used.**

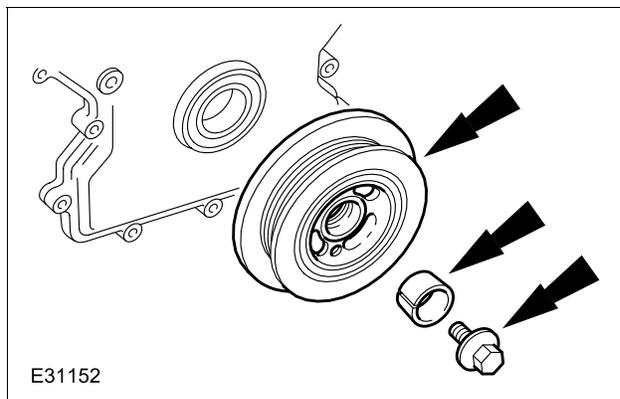


Illustration 57

91. Using special tools 303-191 and 303-191-02 retain crankshaft pulley. (Illustration 58)

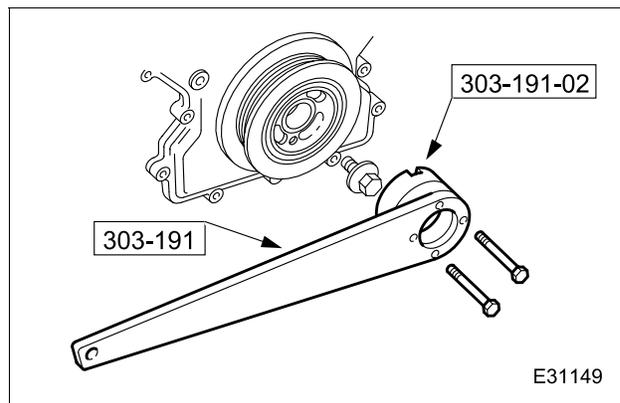


Illustration 58

92. Tighten crankshaft pulley retaining bolt to 375 Nm.  
93. Remove special tools.  
94. Attach engine harness to bank 1 and bank 2 timing covers.  
95. Install accessory drive belt idler pulley and tighten to 25 Nm.  
96. Install accessory drive belt tensioner and tighten to 40 Nm.  
97. Install water pump pulley.  
98. Install all drive belts and final-tighten water pump pulley fixing bolts to 10 Nm + 45 degrees.  
99. Apply a bead of silicone gasket sealant or equivalent on the two places where the cylinder head and front cover join bank 1. (Illustration 59)

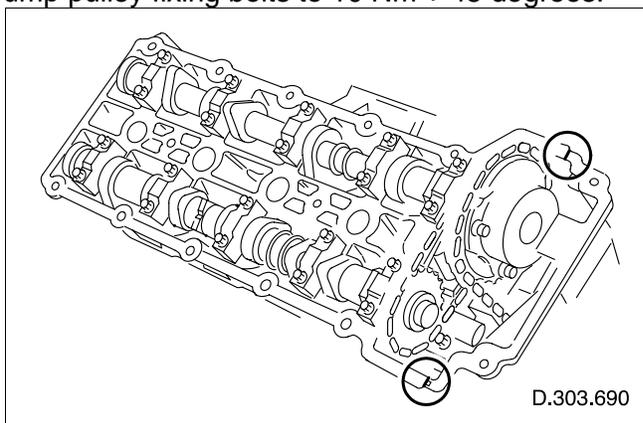


Illustration 59

100. Install new camshaft cover gasket and retaining bolt O-ring seals, install bank 1 camshaft cover and tighten to 12 Nm in sequence shown. (Illustration 60)

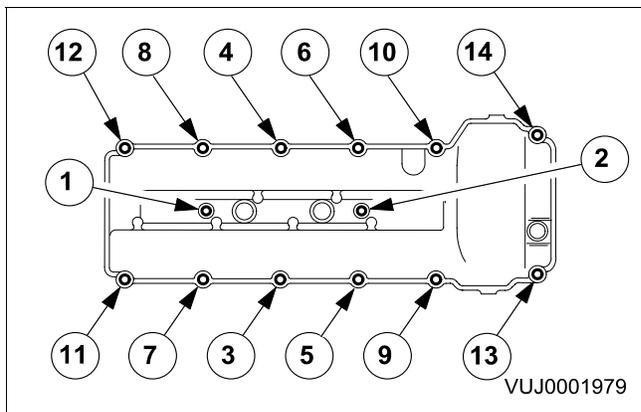


Illustration 60

101. Apply a bead of silicone gasket sealant or equivalent on the two places where the cylinder head and front cover join bank 2.
102. Install new camshaft cover gasket and retaining bolt O-ring seals, install bank 2 camshaft cover and tighten to 12 Nm in sequence shown. (Illustration 61)

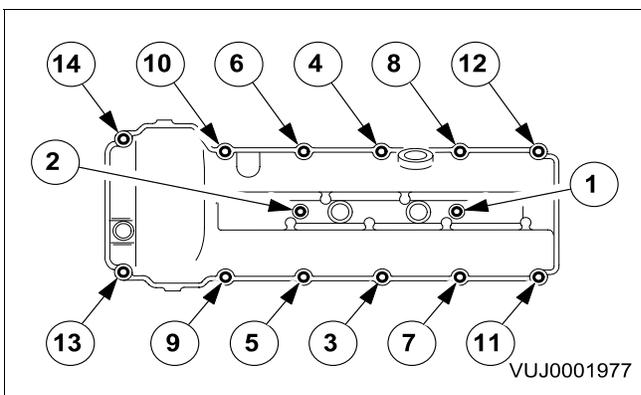


Illustration 61

103. Install ignition coil on-plugs and tighten to 5 Nm.
104. Connect ignition coil on-plug electrical connectors.
105. Connect VVT oil control solenoid electrical wiring connector.
106. Install new O-ring and install oil level indicator and tube.
107. Install ignition coil on-plug covers.
108. Install air cleaner cover and intake tube assembly.
109. Install coolant top hose.
110. Install engine covers.
111. Fill engine to correct level with engine oil.
112. Remove fender protector covers and close hood.
113. Connect battery install battery cover.
114. Close luggage compartment lid.

**Parts Information:**

<b><u>DESCRIPTION</u></b>	<b><u>PART NUMBER</u></b>	<b><u>QTY</u></b>
Engine oil pump/gasket kit	C2A 1409	1
VVT unit seal	AJ8 2856	1
Oil strainer O-ring	AJ8 5413	1
Engine oil sump pan gasket	NCA 1730AD	1
Cam cover gasket (left hand)	NCE 2516AB	1
Cam cover gasket (right hand)	NCE 2515AB	1
Cam cover bolt O-ring seals	NCA 2575CA	28
Spark plug seal	NCE 2578AA	8
Center seal	NCE 2577AC	1
Dipstick O-ring seal	KSH 108624	1
Front cover seal	AJ8 3699	1
Front cover seal	NCA 2127AC	1
Front crankshaft oil seal	AJ8 3698	1
Crank pulley bolt	NCA 1451AA	1
Crank pulley O-ring seal	XR8 1139	1

**Warranty Information:**

Warranty claims should be submitted quoting the information found in the table below. This will result in payment of the stated time and, where applicable parts/miscellaneous expense codes as listed.

<b>Description</b>	<b>SRO</b>	<b>Time</b>	<b>Causal Part Number</b>	<b>Causal Part Description</b>
Install new engine oil pump	12.60.26	6.8 hrs.	C2A 1409	Engine oil pump/gasket kit