

VALVE CLEARANCE INSPECTION/ADJUSTMENT [L3 Turbo]

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Valve Clearance Inspection

1. Remove the battery cover.
2. Disconnect the negative battery cable.
3. Remove the splash shield (RH).
4. Remove the charge air cooler. (See INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [L3 Turbo].)
5. Remove the high pressure fuel pump. (See HIGH PRESSURE FUEL PUMP REMOVAL/INSTALLATION [L3 Turbo].)
6. Remove the ignition coils. (See IGNITION COIL REMOVAL/INSTALLATION [L3 Turbo].)
7. Disconnect the wiring harness.
8. Remove the ventilation hose.
9. Remove the cylinder head cover. (See TIMING CHAIN REMOVAL/INSTALLATION [L3 Turbo].)
10. Measure the valve clearance.
 - (1) Rotate the crankshaft clockwise so that the No.1 cylinder is at TDC of the compression stroke.
 - (2) Measure the valve clearance of location A shown in the figure.

Standard valve clearance [Engine cold]

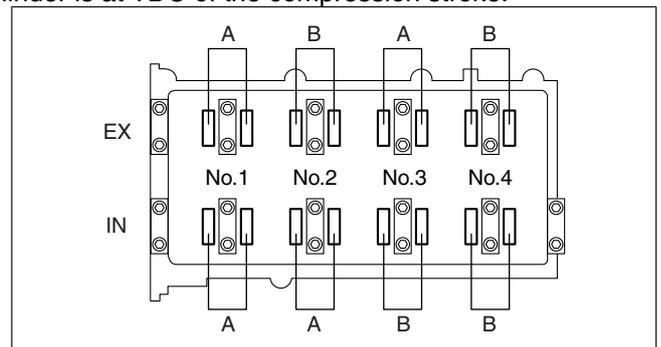
IN: 0.22—0.28 mm {0.0087—0.011 in}

EX: 0.27—0.33 mm {0.011—0.012 in}

- (3) If it is not within the specification, replace the tappet and adjust the valve clearance to the median value of the standard.

Note

- Make sure to note down the measured values for choosing the suitable replacement tappets.



- (4) Rotate the crankshaft clockwise **360°** so that the No.4 cylinder is at TDC of the compression stroke.
- (5) Measure the valve clearance of location B shown in the figure.

Standard valve clearance [Engine cold]

IN: 0.22—0.28 mm {0.0087—0.011 in}

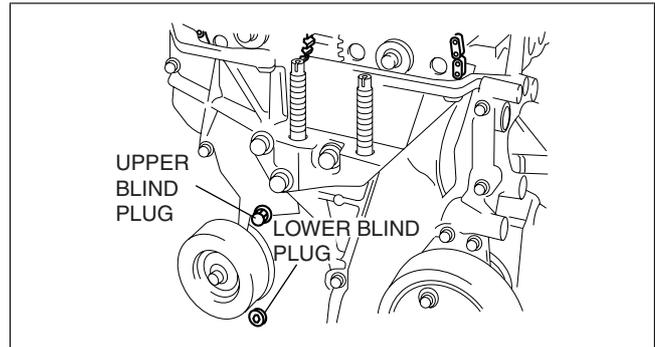
EX: 0.27—0.33 mm {0.011—0.012 in}

- (6) If not within the specification, replace the tappet and adjust the valve clearance to the median value of the standard.
11. Install the cylinder head cover. (See TIMING CHAIN REMOVAL/INSTALLATION [L3 Turbo].)
12. Install the ventilation hose.
13. Connect the wiring harness.
14. Install the ignition coils. (See IGNITION COIL REMOVAL/INSTALLATION [L3 Turbo].)
15. Install the high pressure fuel pump. (See HIGH PRESSURE FUEL PUMP REMOVAL/INSTALLATION [L3 Turbo].)
16. Install the charge air cooler. (See INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [L3 Turbo].)
17. Install the splash shield (RH).
18. Connect the negative battery cable.
19. Install the battery cover.

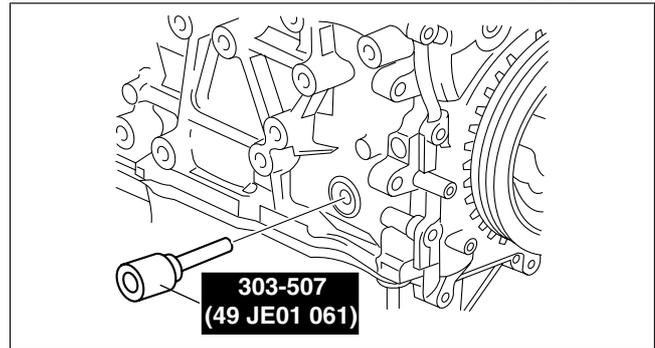
Valve Clearance Adjustment

1. Remove the battery cover.
2. Disconnect the negative battery cable.
3. Remove the splash shield (RH).
4. Remove the charge air cooler. (See INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [L3 Turbo].)
5. Remove the high pressure fuel pump. (See HIGH PRESSURE FUEL PUMP REMOVAL/INSTALLATION [L3 Turbo].)
6. Remove the ignition coils. (See IGNITION COIL REMOVAL/INSTALLATION [L3 Turbo].)
7. Disconnect the wiring harness.
8. Remove the ventilation hose.
9. Remove the cylinder head cover. (See TIMING CHAIN REMOVAL/INSTALLATION [L3 Turbo].)
10. Remove the drive belt. (See DRIVE BELT REMOVAL/INSTALLATION [L3 Turbo].)
11. Remove the engine front cover lower blind plug.

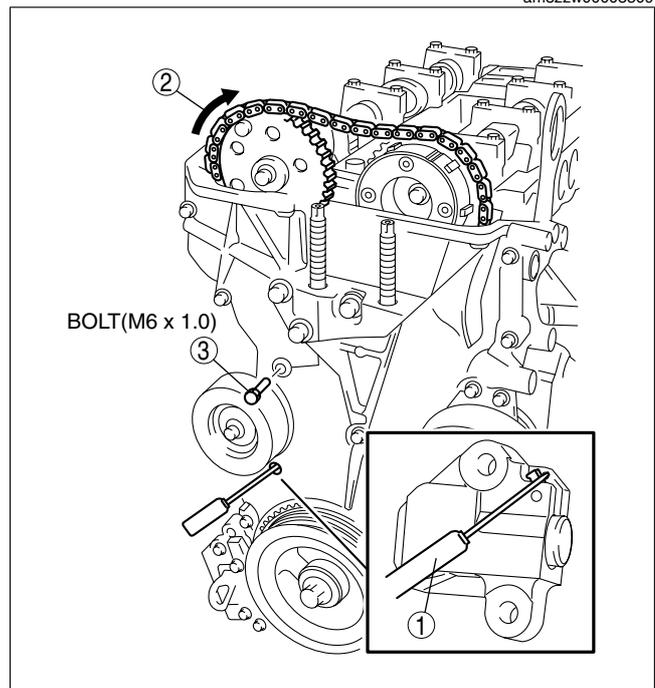
12. Remove the engine front cover upper blind plug.



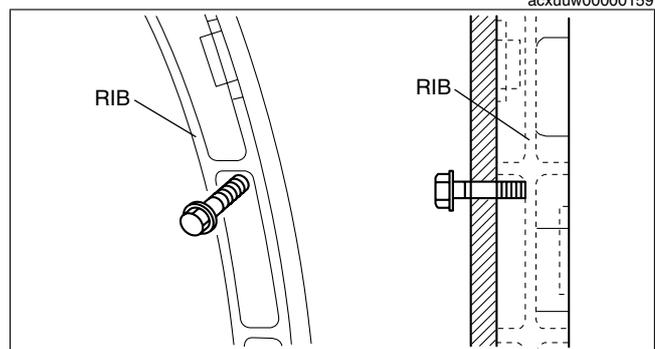
13. Remove the cylinder block lower blind plug, and install the **SST**.
14. Rotate the crankshaft in the direction of the engine rotation so that the No.1 piston is at TDC of the compression stroke. (Until the crank weight contacts **SST** and stops.)



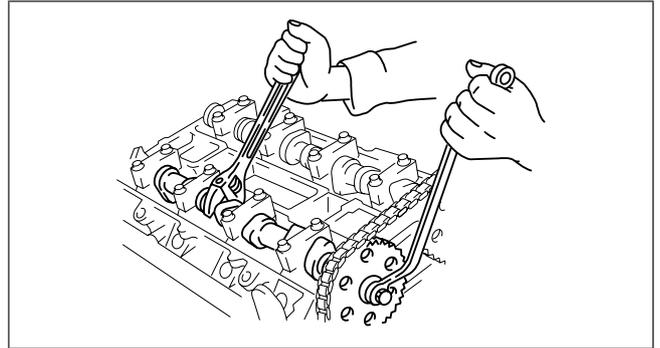
15. Release the tension on the timing chain shown in the figure.
- (1) Using a suitable screwdriver or equivalent tool, unlock the chain tensioner ratchet.
 - (2) Rotate the exhaust camshaft clockwise using a suitable wrench on the cast hexagon and loosen the tension on the timing chain.



- (3) Using a suitable bolt (**M6 X 1.0 length 25mm —35mm {0.99—1.3 in}**) at the engine front cover upper blind plug, secure the tensioner arm at the position where the tension is released.

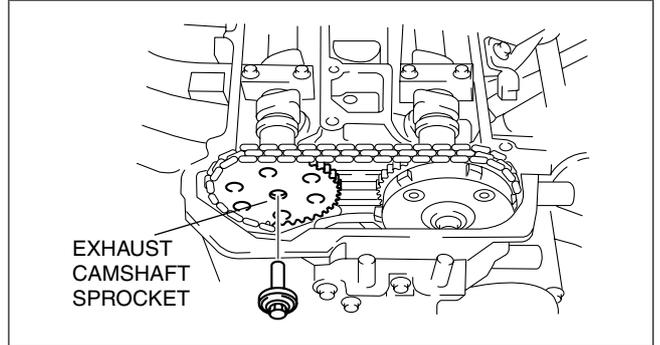


16. Fix the exhaust camshaft using a wrench on the cast hexagon, and loosen the camshaft sprocket installation bolt.



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17. Remove the installation bolt and remove the exhaust camshaft sprocket.
 18. Remove the oil control valve (OCV). (See OIL CONTROL VALVE (OCV) REMOVAL/ INSTALLATION [L3 Turbo].)



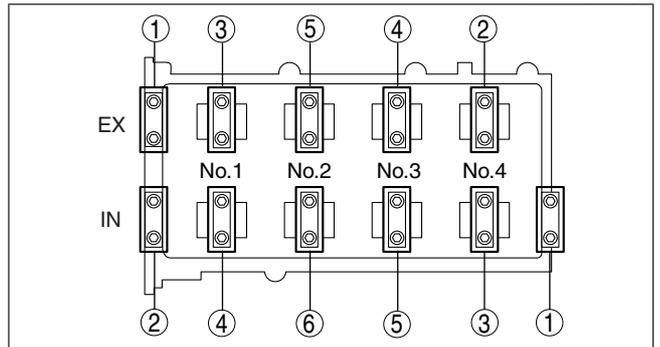
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19. Loosen the camshaft cap bolts in two or three passes in the order shown in the figure and remove the camshaft cap.

Note

- The camshaft caps are to be kept ordered for correct reassembly in their original positions. Do not mix the caps.

20. Remove the camshafts for the intake and exhaust sides.
 21. Remove the tappet.
 22. Install an appropriate tappet based on the results of the valve clearance inspection.

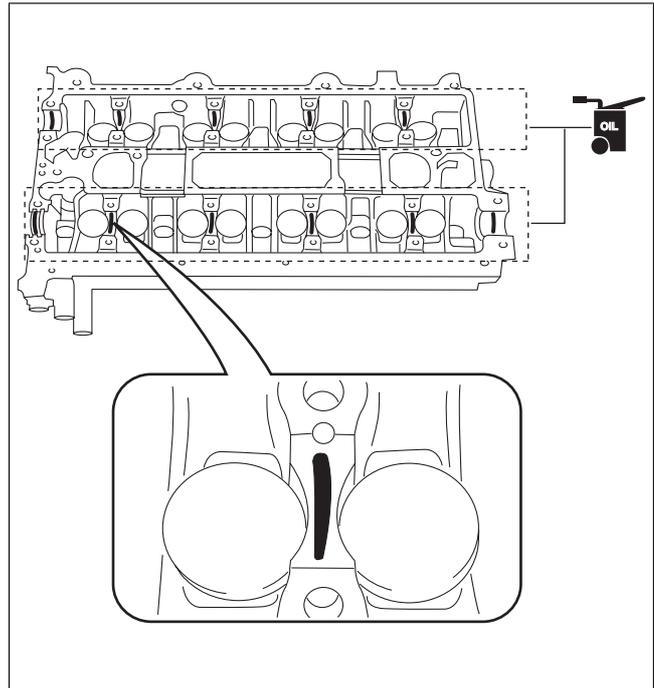


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$$\text{Selected tappet} = \text{Removed tappet thickness} + \text{Measured valve clearance} - \text{Standard valve clearance}$$

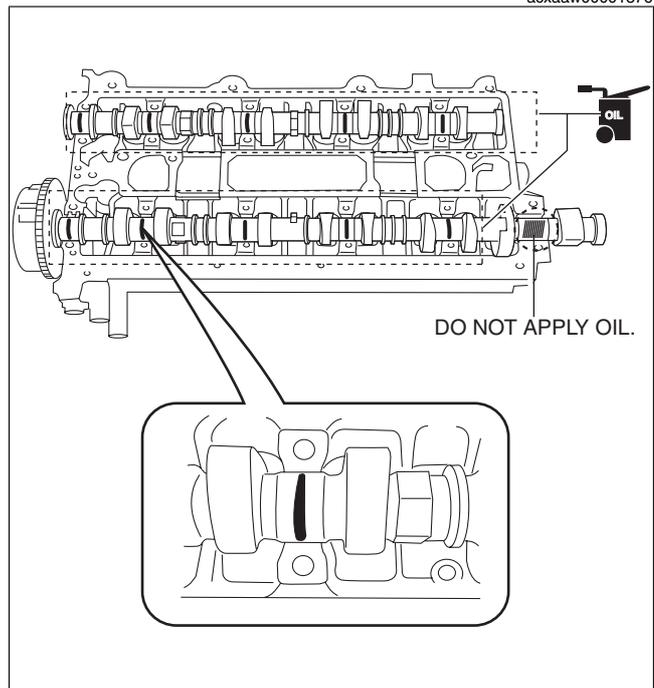
Standard valve clearance [Engine cold]
IN: 0.22—0.28 mm {0.0087—0.011 in}
EX: 0.27—0.33 mm {0.011—0.012 in}

23. Apply the gear oil (SAE No. 90 or equivalent) to each journal of the cylinder head as shown in the figure.
24. Install the camshaft with No.1 cylinder cam aligned at TDC of the compression stroke.



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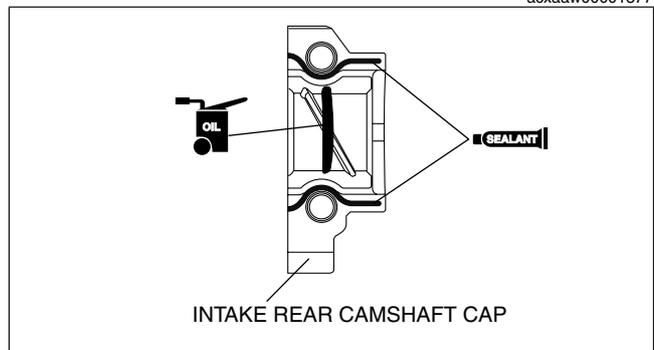
25. Apply the gear oil (SAE No. 90 or equivalent) to each journal of the camshaft as shown in the figure. However, do not apply it to the end journal of the intake camshaft.



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26. Carefully apply adhesive agent (Loctite 518 or 962) to the area indicated in the figure so that it does not leak into the sliding part then, apply the gear oil (SAE No. 90 or equivalent) to the journal.

Thickness
1.0 mm {0.039 in}



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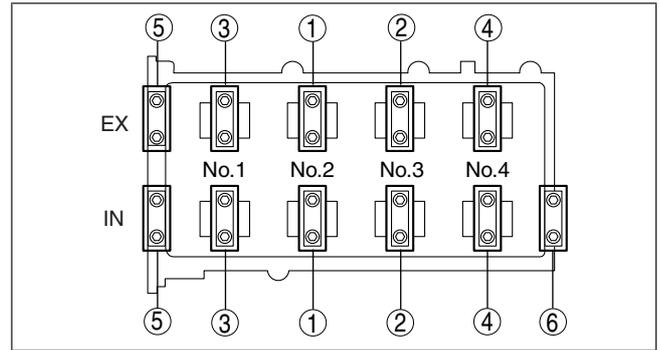
27. Install the camshaft caps and temporarily tighten the camshaft cap bolts evenly in two or three passes, and then tighten the camshaft cap bolts in two passes, using the following two steps and in the order shown in the figure.

Tightening procedure

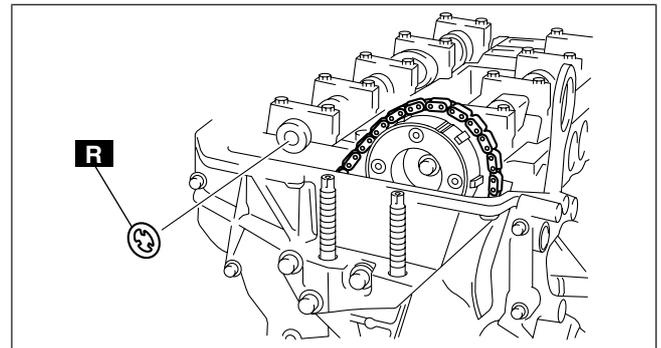
1st step: 5.0—9.0 N·m {51—91 kgf·cm, 45—79 in·lbf}

2nd step: 14.0—17.0 N·m {1.5—1.7 kgf·m, 10.4—12.5 ft·lbf}

28. Install the OCV. (See OIL CONTROL VALVE (OCV) REMOVAL/INSTALLATION [L3 Turbo].)
29. Install a new washer.



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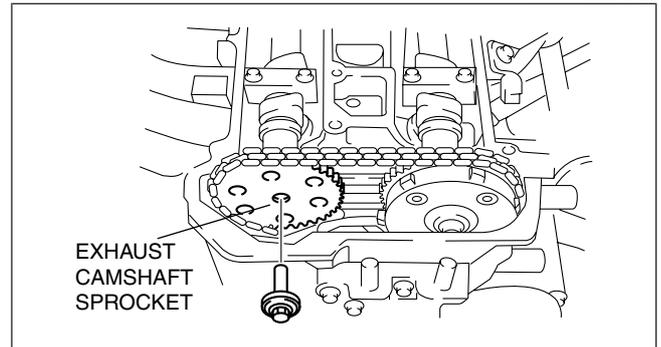


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30. Install the exhaust camshaft sprocket.

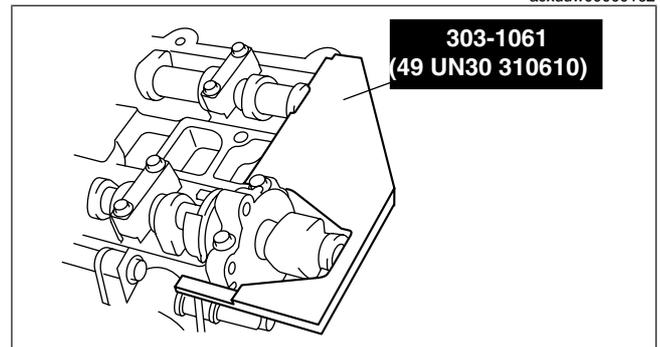
Caution

- **Do not tighten the camshaft sprocket installation bolt at this stage. Verify the valve timing before performing the bolt tightening.**



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31. Install the **SST** on the camshaft as shown in the figure.
32. Remove the installation bolt for the engine front cover upper blind plug (**M6 X 1.0 length 25—35mm {0.99—1.3 in}**), and apply tension to the timing chain.
33. Rotate the crankshaft clockwise and verify that the No.1 cylinder is at TDC of the compression stroke. (The position crank weight contacts the **SST**.)



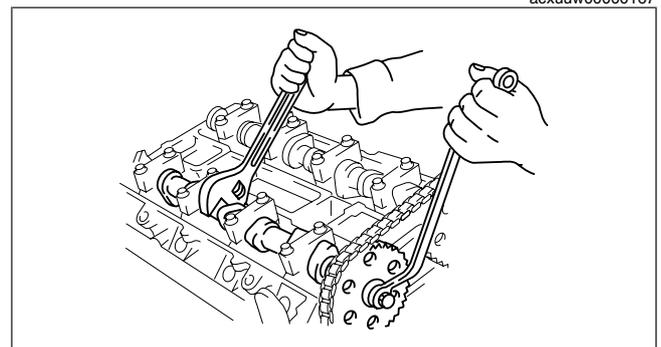
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34. Fix the exhaust camshaft using a wrench on the cast hexagon, and tighten the sprocket installation bolt.

Tightening torque

69—75 N·m {7.1—7.6 kgf·m, 51—55 ft·lbf}

35. Remove the **SST** from the camshaft.
36. Remove the **SST** installed in the cylinder block lower blind plug hole.
37. Rotate the crankshaft clockwise two turns and inspect the valve timing.
• If it is not aligned, repeat the procedure.

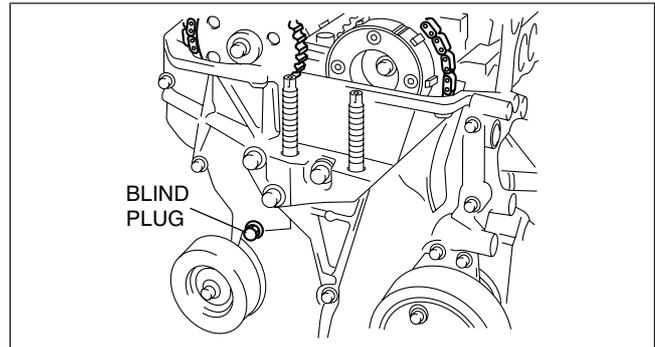


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38. Apply the silicone sealant and install the engine front cover upper blind plug.

Tightening torque

8.0—11.5 N·m {82—117 kgf·cm, 71—101 in·lbf}

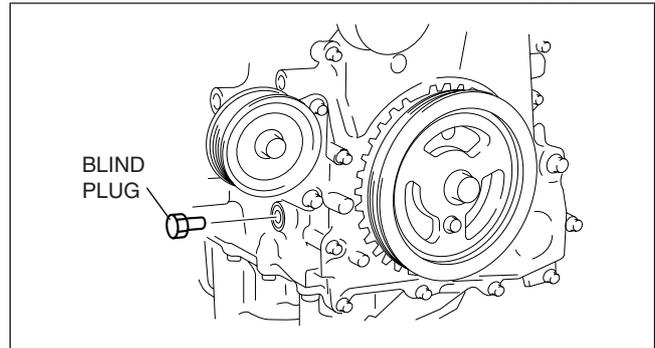


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39. Install the cylinder block lower blind plug.

Tightening torque

18—22 N·m {1.9—2.2 kgf·m, 14—16 ft·lbf}

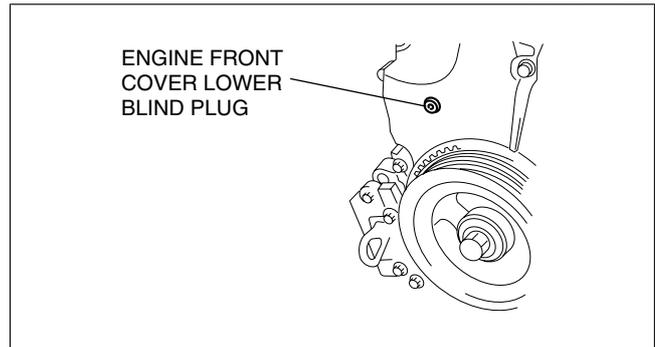


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40. Install a new engine front cover lower blind plug.

Tightening torque

10.0—14.0 N·m {102—142 kgf·cm, 89—123 in·lbf}



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41. Install the drive belt. (See DRIVE BELT REMOVAL/INSTALLATION [L3 Turbo].)
42. Install the cylinder head cover. (See TIMING CHAIN REMOVAL/INSTALLATION [L3 Turbo].)
43. Install the ventilation hose.
44. Connect the wiring harness.
45. Install the ignition coils. (See IGNITION COIL REMOVAL/INSTALLATION [L3 Turbo].)
46. Install the high pressure fuel pump. (See HIGH PRESSURE FUEL PUMP REMOVAL/INSTALLATION [L3 Turbo].)
47. Install the charge air cooler. (See INTAKE-AIR SYSTEM REMOVAL/INSTALLATION [L3 Turbo].)
48. Install the splash shield (RH).
49. Connect the negative battery cable.
50. Install the battery cover.