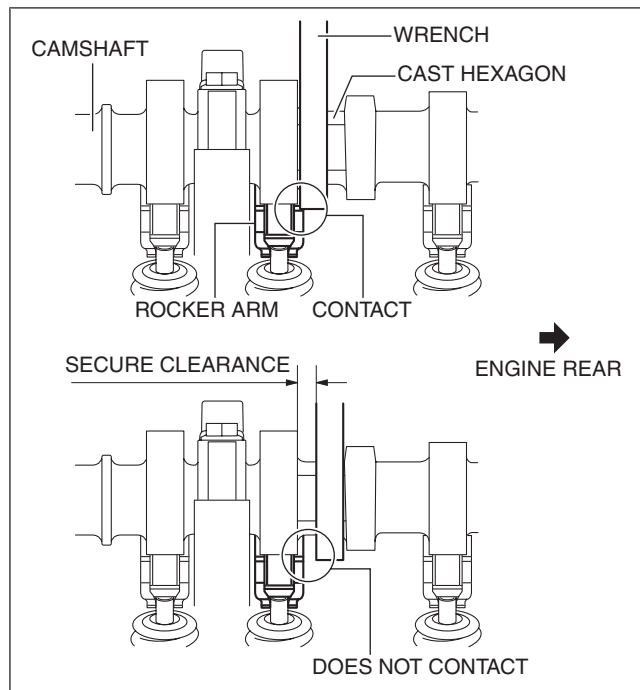


CYLINDER HEAD ASSEMBLY (II)

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Caution

- When rotating the camshaft using a wrench on the cast hexagon, the wrench may contact the rocker arm and damage the rocker arm. To prevent damage to the rocker arm when holding the camshaft on the cast hexagon, use the wrench at engine rear side as shown in the figure to secure a clearance between the cam.

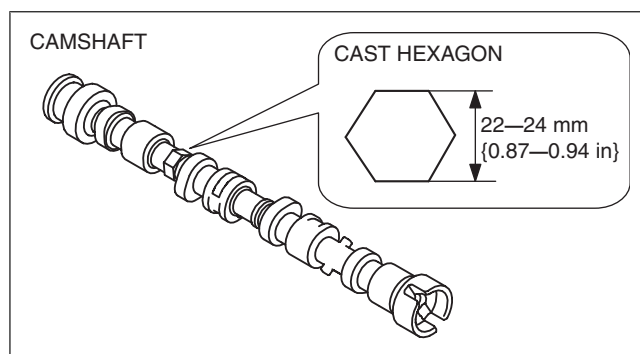


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Note

- Width at the cast hexagon of the camshaft is 22—24 mm {0.87—0.94 in}.

- Assemble in the order indicated in the table.



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Cylinder Head Assembly Note

Caution

- The end of the glow plug protrudes from the cylinder head (tightened surface of cylinder block). When removing/installing the cylinder head and placing the cylinder head on a workbench, be careful not to allow the end of the glow plug to contact the cylinder block or workbench. Otherwise, the end of the glow plug could be damaged.
- If the following condition is met, replace the cylinder head bolts.
 - Length exceeds maximum specification

Standard cylinder head bolt length L
169.2—169.8 mm {6.662—6.685 in}

Maximum cylinder head bolt length L
170.5 mm {6.713 in}

1. When a cylinder head bolt is reused, apply engine oil to any part of the following:
 - Bolt seating surface
 - Cylinder head seating surface
2. Tighten the cylinder head bolts in the order shown in the following four steps.

Tightening procedure

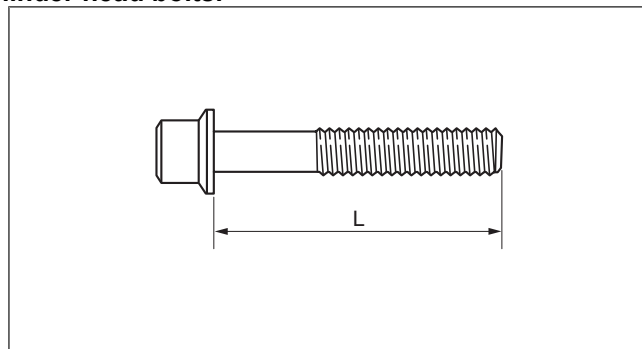
Step 1: 13—17 N·m {133—173 kgf·cm, 116—150 in·lbf}

Step 2: 36—40 N·m {3.7—4.0 kgf·m, 27—29 ft·lbf}

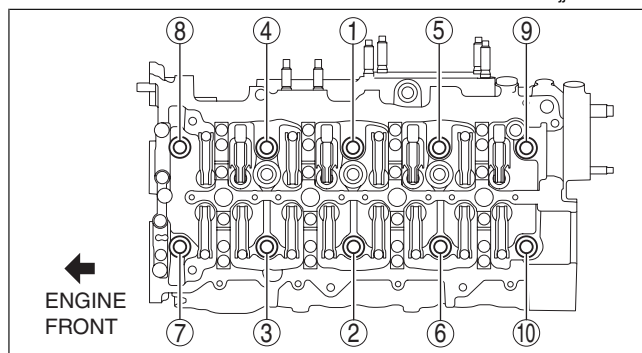
Step 3: 85—95°

Step 4: 85—95°

Step 5: 85—95°



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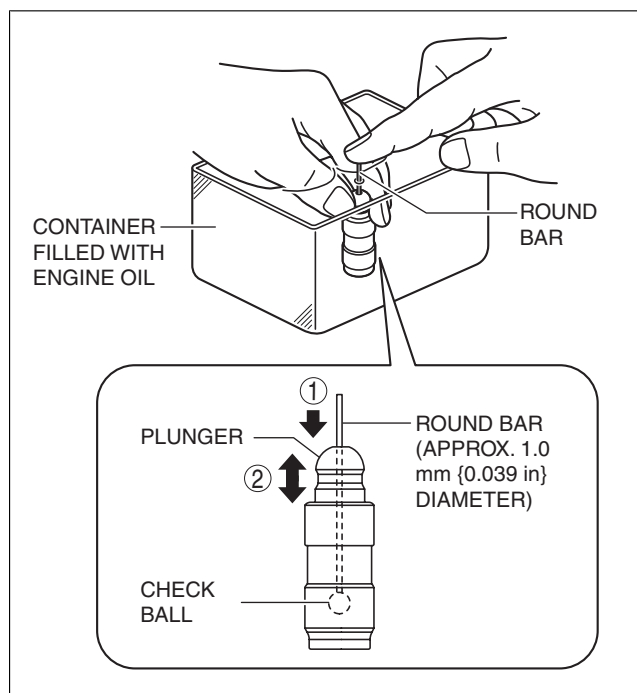
HLA Assembly Note

1. Perform HLA air bleeding using the following procedure:
 - (1) Put the HLA in a container filled with engine oil.

Caution

- Do not insert the round bar firmly because the check ball spring force is extremely weak.

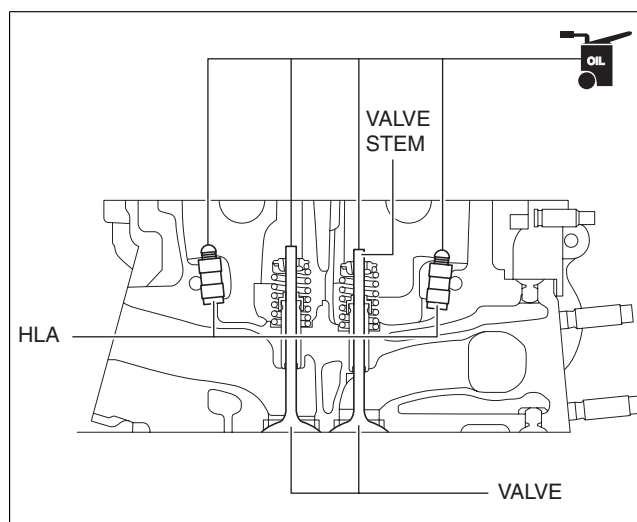
- (2) While lightly pressing the check ball using a round bar (**approx. 1.0 mm {0.039 in}** diameter), bleed air by moving the plunger up and down.
- (3) Press the end of the plunger in the oil and verify that there is no rebounding feel.
 - If rebounding feel cannot be eliminated, replace the HLA.
2. Install the HLAs to the same positions as before removal.



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Rocker Arm Assembly Note

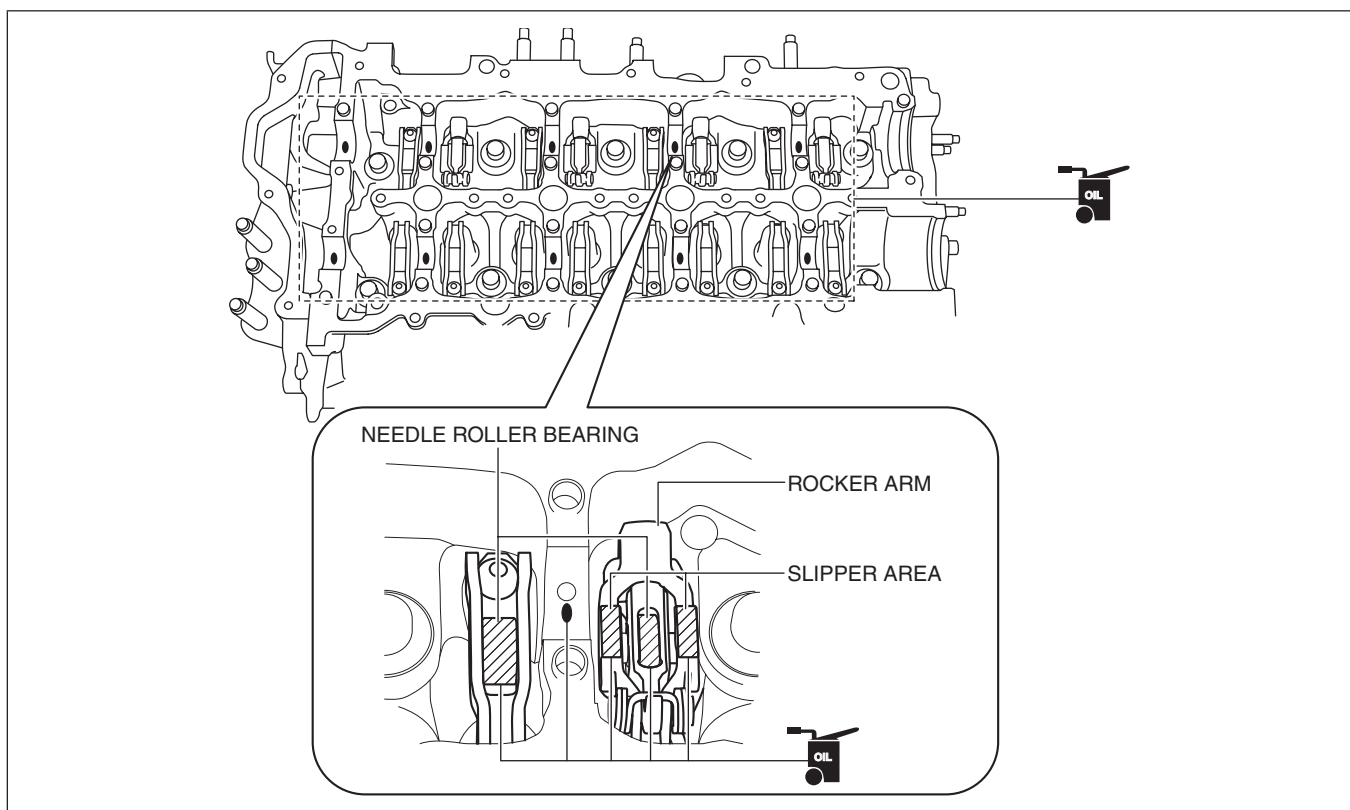
1. Apply engine oil to the HLAs and the end of the valve stems.
2. Install the rocker arms to the same positions as before removal.



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Camshaft Assembly Note

1. Apply gear oil (SAE No. 90 or equivalent) or engine oil to the following locations.
 - Each journal of the cylinder heads
 - Needle roller bearing and slipper area of the rocker arm



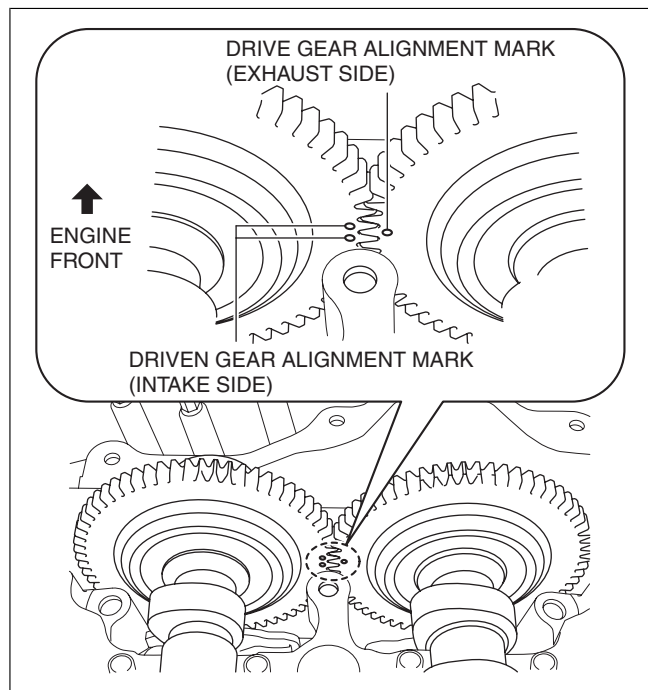
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2. Apply gear oil (SAE 90 or equivalent) or engine oil to the following locations of each camshaft.
 - Gear sliding surfaces
 - Thrust surface of front journal

Note

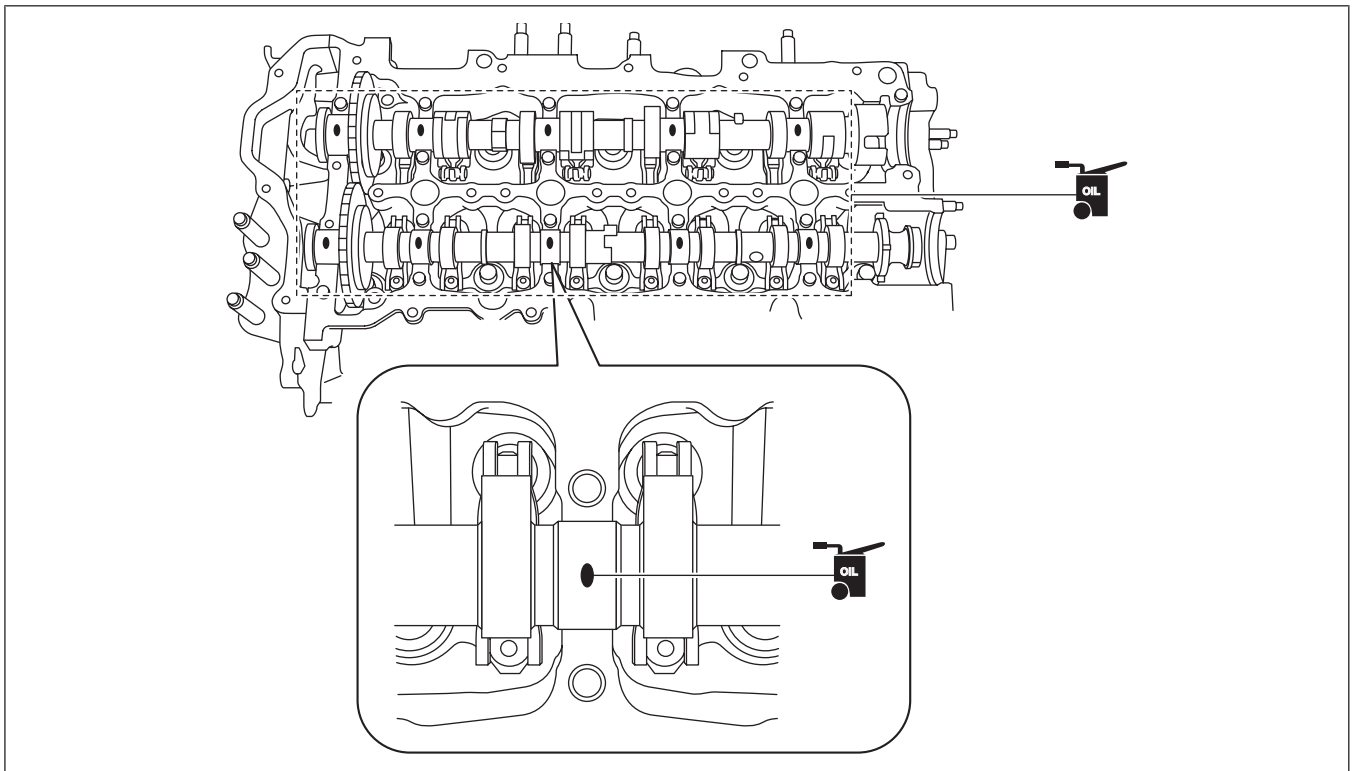
- If oil is applied to the front camshaft cap, oil should not be applied to the thrust surface of the front journal.

3. Place the camshaft on the cylinder head and align the alignment marks for each gear as shown in the figure.



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4. As shown in the figure, apply gear oil (SAE No. 90 or equivalent) or engine oil to the center area of each journal of the camshaft.

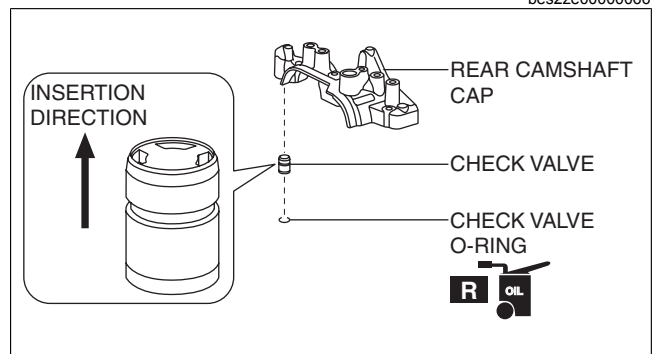


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5. Install the check valve to the rear camshaft cap using the following procedure:
 - (1) Apply engine oil to the new check valve O-ring and install it to the check valve.

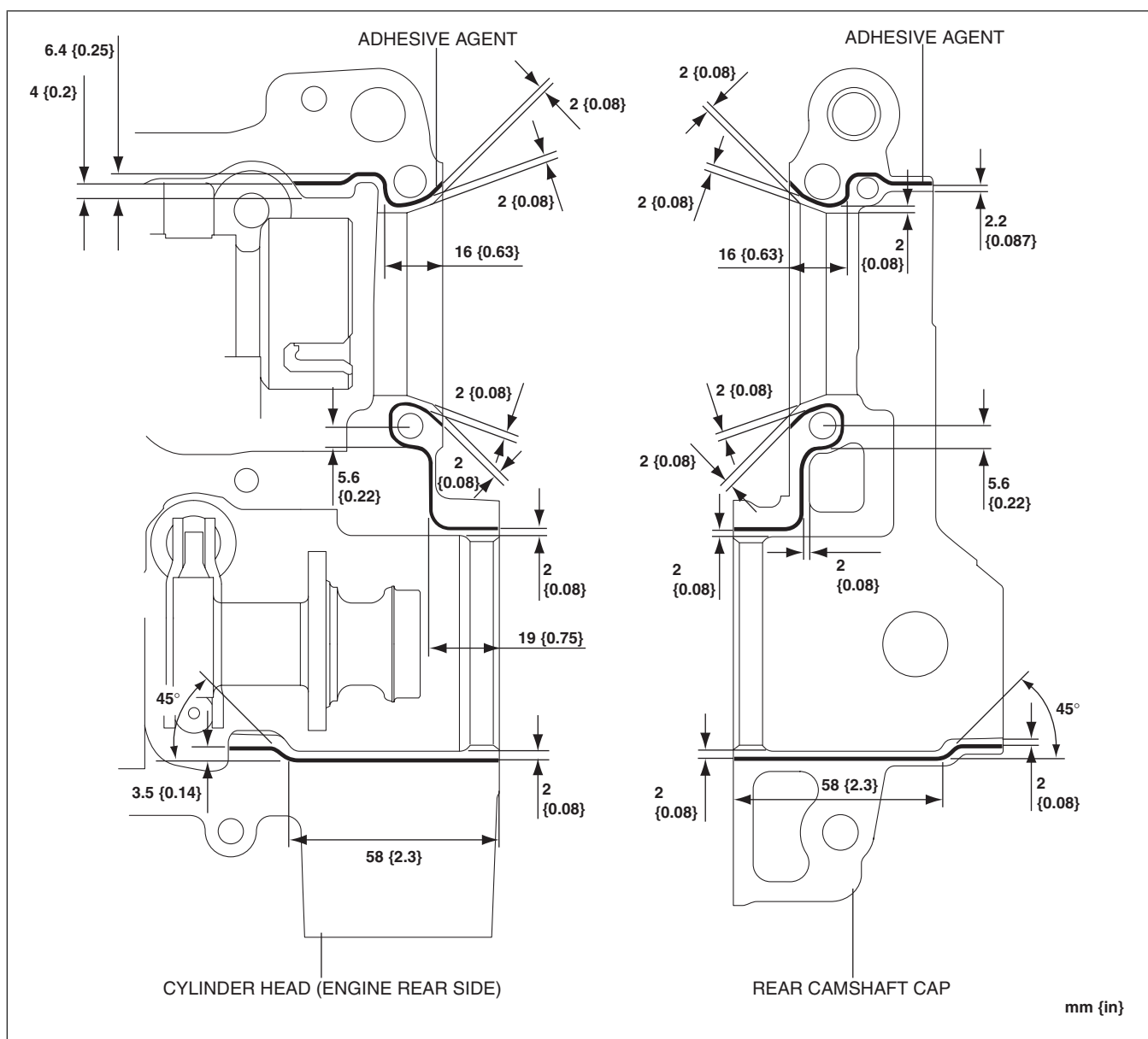
Caution

- When installing the check valve O-ring, be careful of the following:
 - Do not drop O-ring
 - Do not damage O-ring
 - Do not apply anything other than engine oil



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- (2) Insert the check valve until it contacts the rear camshaft cap.
6. Apply adhesive agent (Loctite#962T) to the rear side of the cylinder head or rear camshaft cap.



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Caution

- Do not spill adhesive agent on the journal.
- To prevent adhesive agent from hardening, adhere the rear camshaft cap to the cylinder head within 10 min after adhesive agent is applied. Tighten the installation bolts completely soon after adhering.

Adhesive agent bead width
1—3 mm {0.04—0.11 in}

7. Apply engine oil to the new rear camshaft cap O-ring and install it to the rear camshaft cap.

Caution

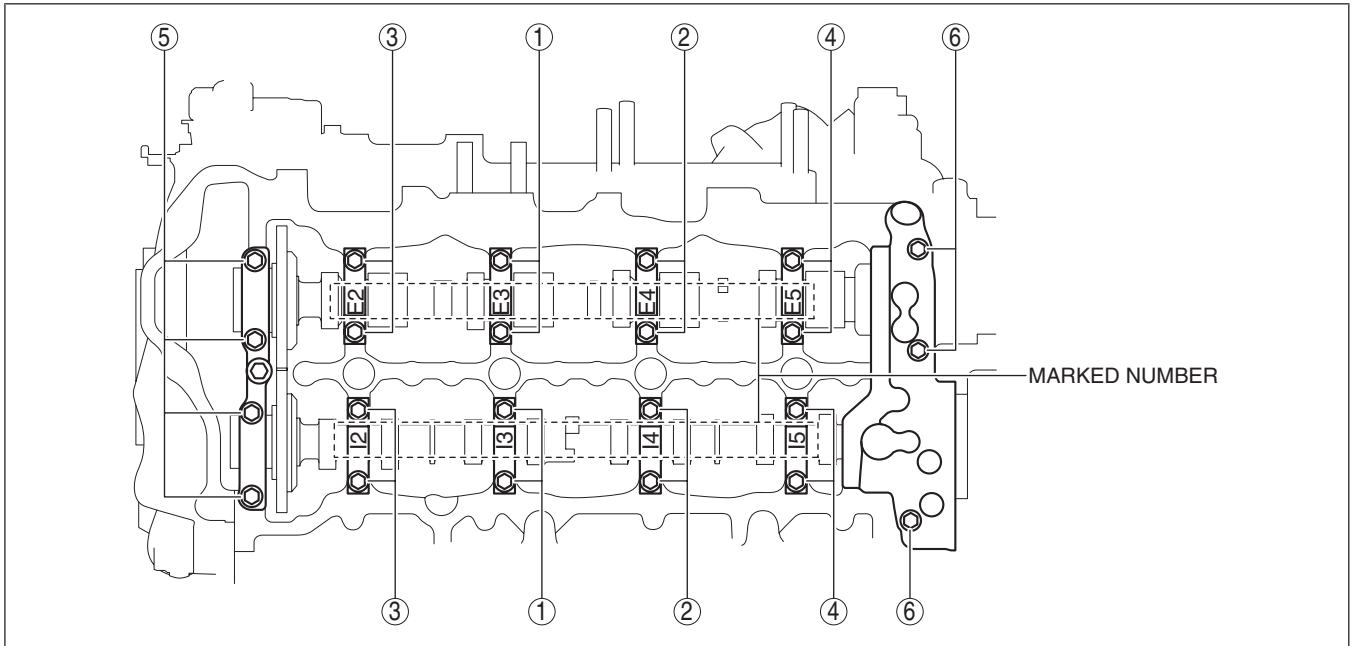
- Be careful not to damage or drop the O-ring when installing the rear camshaft cap.

8. Apply gear oil (SAE 90 or equivalent) or engine oil to the thrust surface of the front camshaft cap.

Note

- If oil is applied to the front journal thrust surface of each camshaft, oil should not be applied to the front camshaft cap.

9. Install the camshaft caps in the marked number order, and temporarily tighten the camshaft cap installation bolts in two or three passes evenly.
10. Tighten the camshaft cap installation bolts in two steps in the order shown in the figure.



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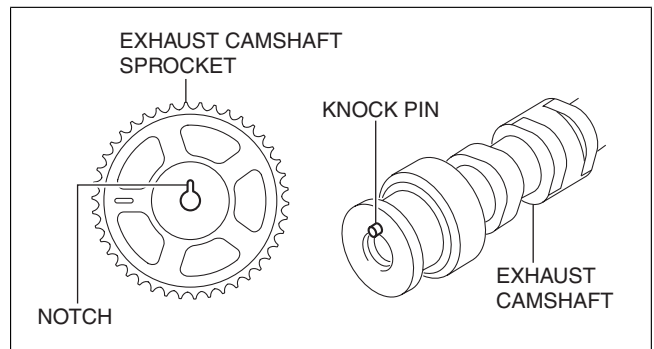
Tightening procedure

Step 1: 3.0—6.0 N·m {31—61 kgf·cm, 27—53 in·lbf}

Step 2: 8—11 N·m {82—112 kgf·cm, 71—97 in·lbf}

Exhaust Camshaft Sprocket Assembly Note

1. Align the knock pin on the end of the camshaft with the notch on the sprocket, then install the exhaust camshaft sprocket to the camshaft.

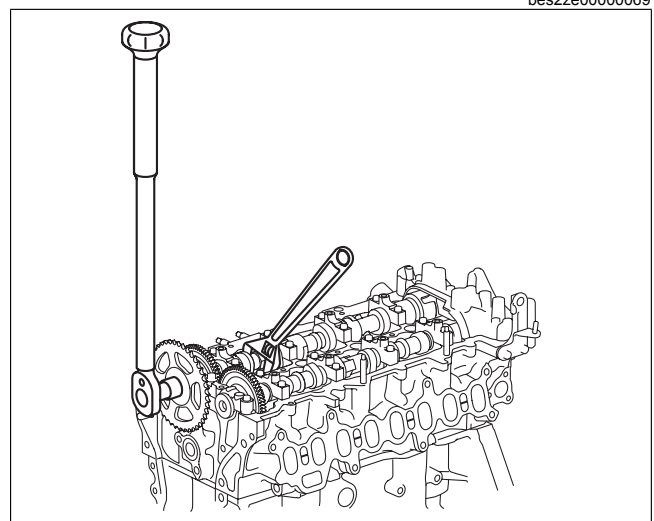


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2. Hold the exhaust camshaft using a wrench on the cast hexagon, and tighten the sprocket installation bolt.

Tightening torque

123—140 N·m {13—14 kgf·m, 91—103 ft·lbf}



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