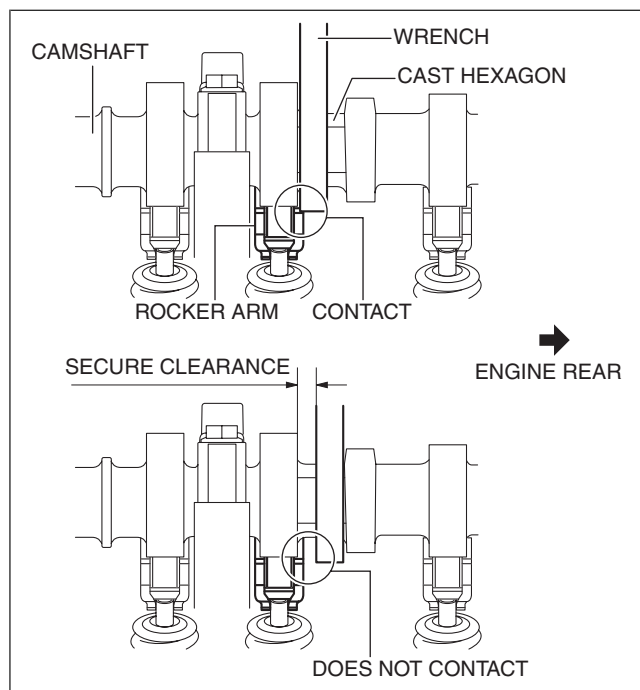


CYLINDER HEAD ASSEMBLY (II)

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Caution

- If the camshaft is rotated with the timing chain removed and the piston at the top dead center position, the valve may contact the piston and the engine could be damaged. When rotating the camshaft with the timing chain removed, rotate it after lowering the piston from the top dead center position.
- 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.

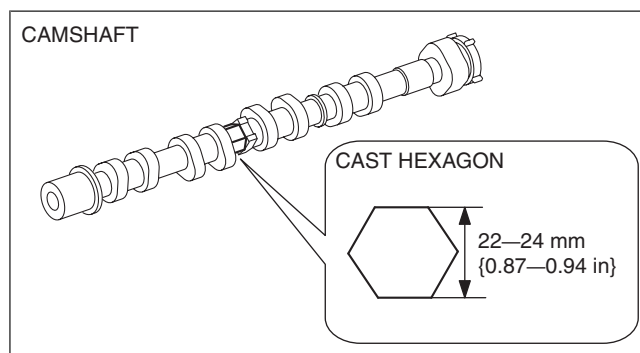


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Note

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

1. Assemble in the order indicated in the table.



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- Length exceeds maximum specification

Standard cylinder head bolt length L
145.2—145.8 mm {5.717—5.740 in}

Maximum cylinder head bolt length L
146.5 mm {5.767 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.

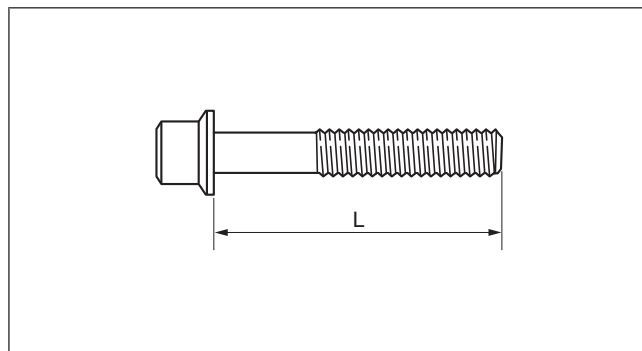
Tightening procedure

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

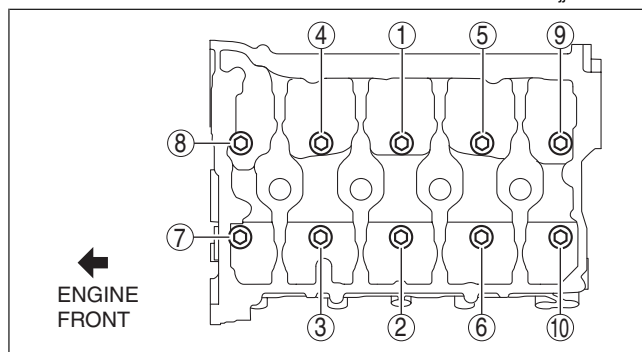
Step 2: 43—47 N·m {4.4—4.7 kgf·m, 32—34 ft·lbf}

Step 3: 85—95°

Step 4: 85—95°



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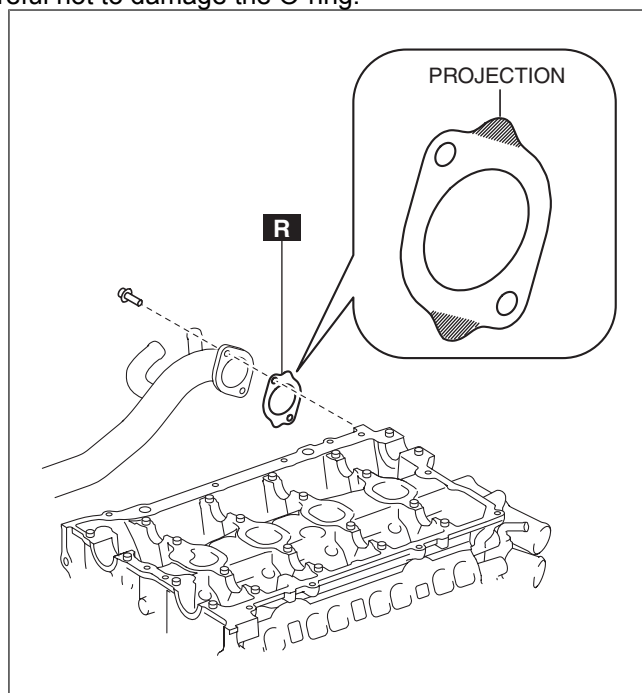
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Water Inlet Pipe Assembly Note

Caution

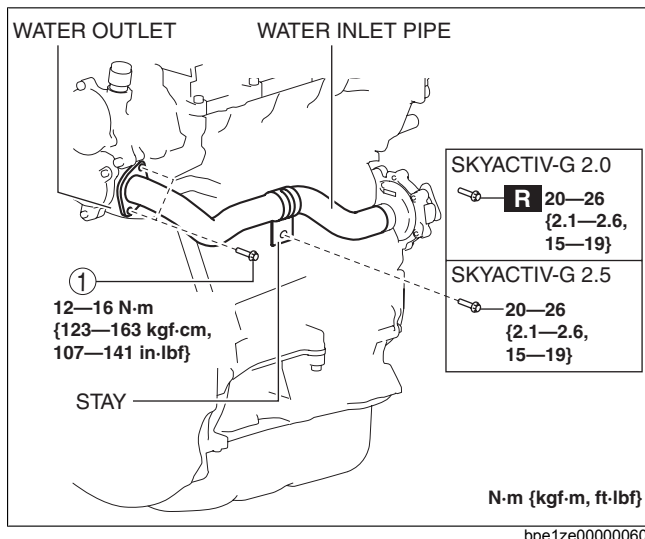
- Do not apply oil (engine oil, ATF etc.) to the O-ring of the water inlet pipe. Otherwise, the O-ring could swell causing a seal malfunction.

1. Clean away the sealant adhering to the bolt hole on the cylinder block side of the water inlet pipe stay.
2. Apply engine coolant to the O-ring.
3. Install the O-ring to the water inlet pipe.
4. Insert the water inlet pipe into the water pump being careful not to damage the O-ring.
5. Install the water inlet pipe gasket with the gasket projection facing the direction shown in the figure.



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6. Tighten the bolts in the order shown in the figure.



HLA Assembly Note

1. Perform HLA air bleeding using the following procedure:

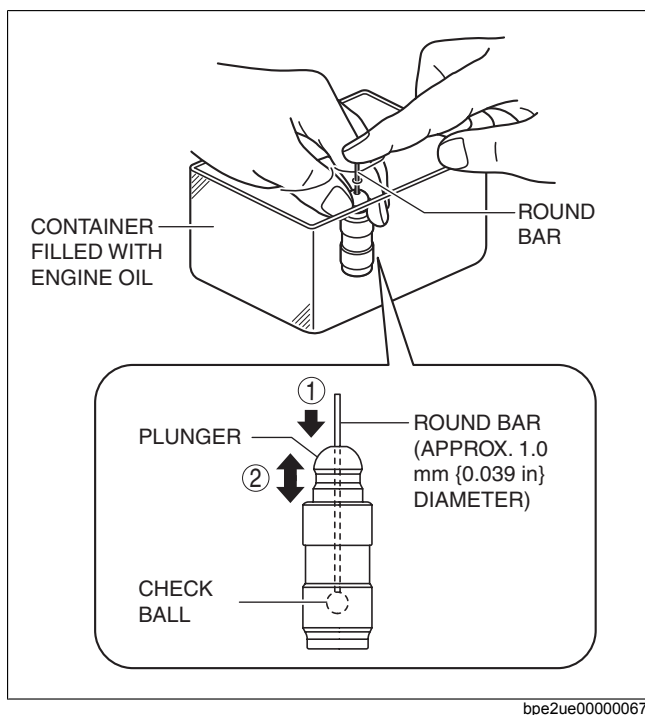
(1) Put the HLA in a container filled with engine oil.

Caution

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

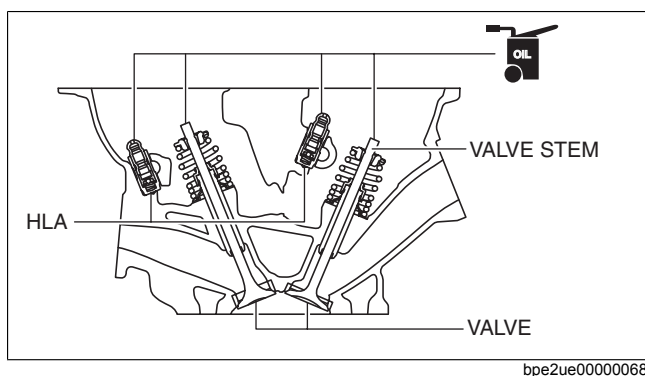
- (2) While lightly pressing the check ball using a round bar (approx. 1.0 mm {0.039 in} diameter), bleed air by moving the plunger up and down.
- (3) Press the end of the plunger in the oil and verify that there is no rebounding feel.
 - If rebounding feel cannot be eliminated, replace the HLA.

2. Install the HLAs to their original positions as before removal.



Rocker Arm Assembly Note

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

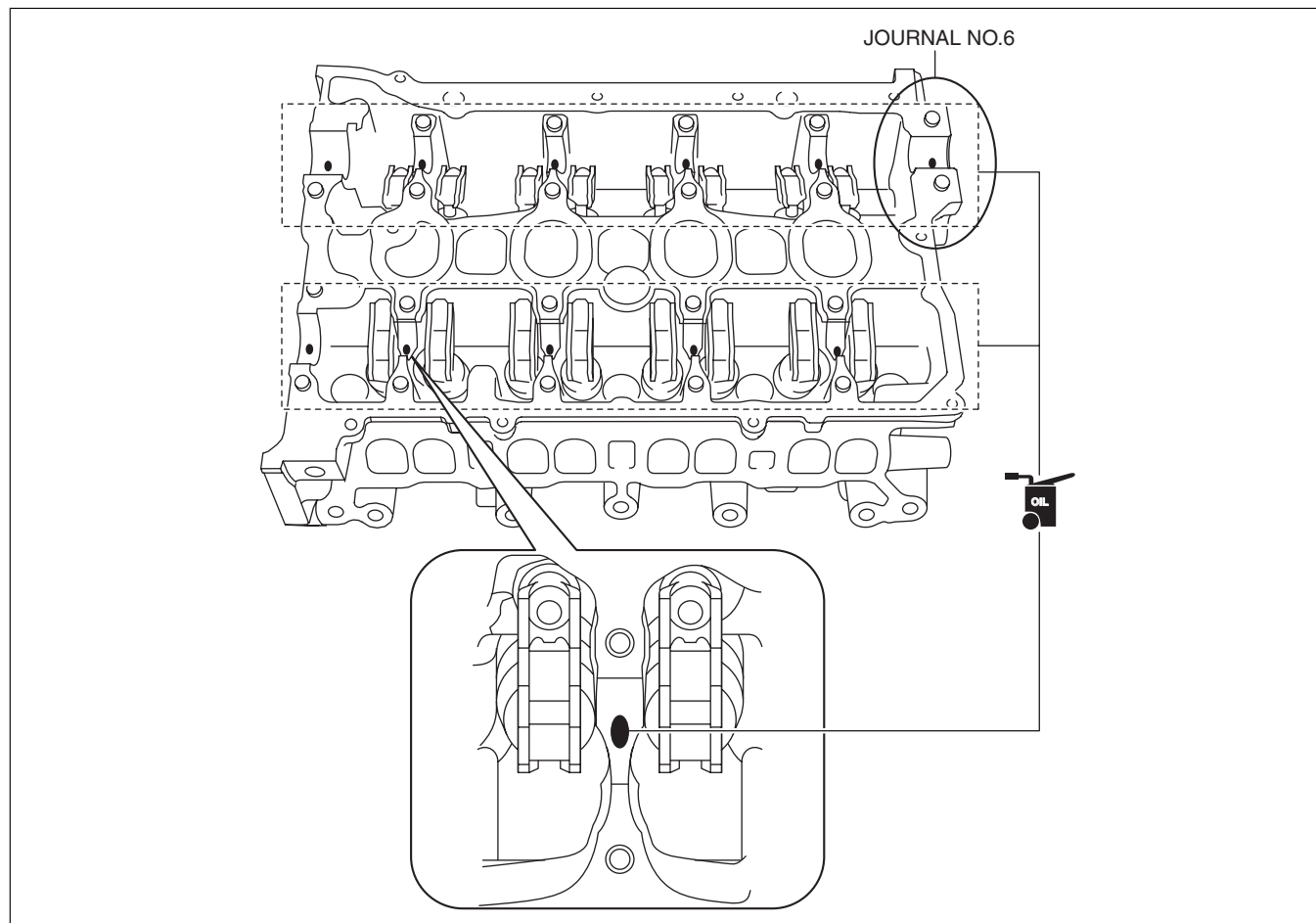


Camshaft Assembly Note

1. 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 cylinder head.

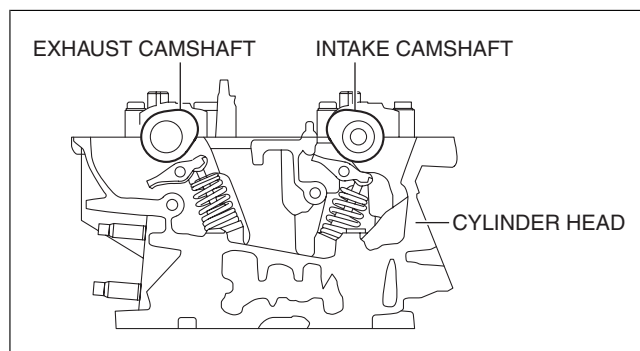
Caution

- Apply 0.05 ml {0.05 cc, 0.003 in³} or less of oil to journal No.6.



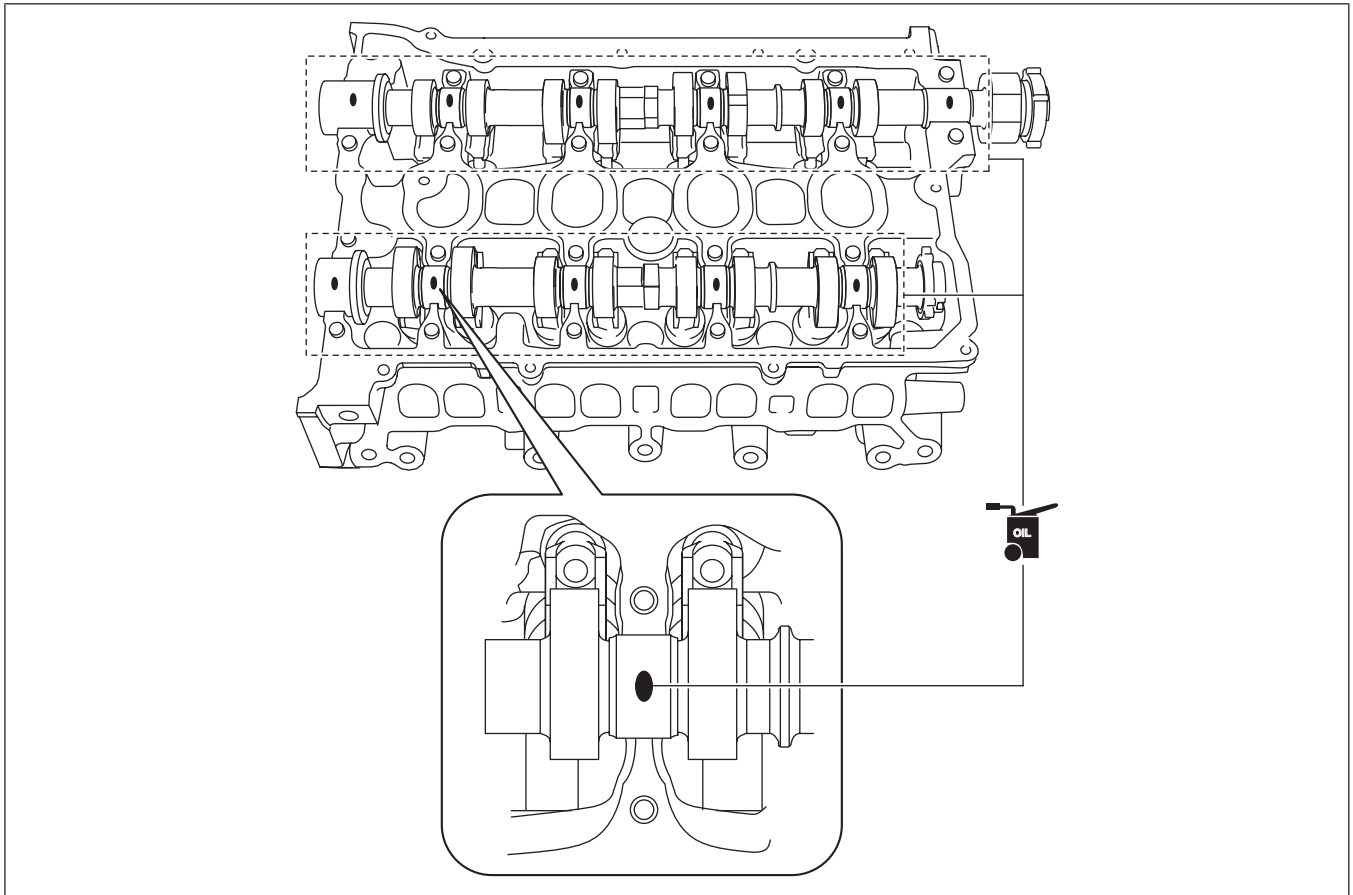
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2. Apply gear oil (SAE No. 90 or equivalent) or engine oil to the following locations of each camshaft.
 - Thrust surface of front journal
3. As shown in the figure, align the cam position of cylinder No.1 around top dead center (TDC) and place the camshafts on the cylinder head.



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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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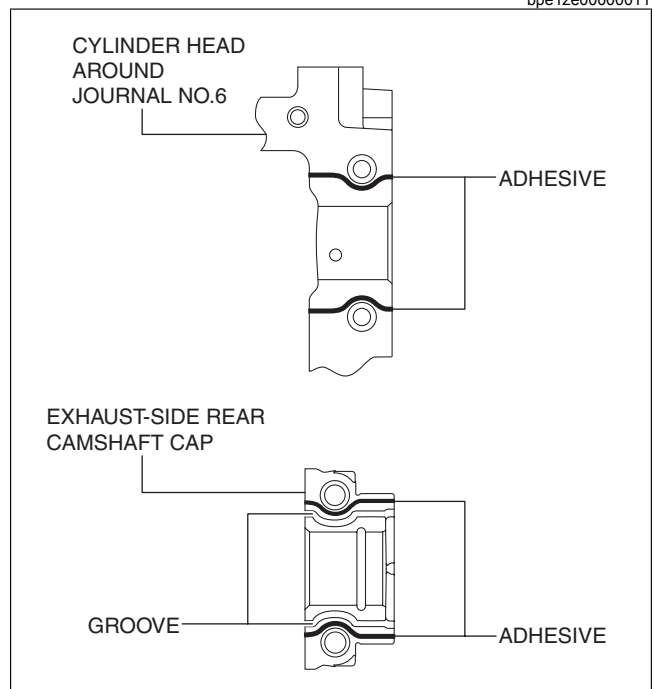
5. Apply adhesive agent (Loctite 962T) around journal No.6 of the cylinder head or the exhaust-side rear camshaft cap.

Caution

- **Verify that there is no adhesive agent on the journal.**

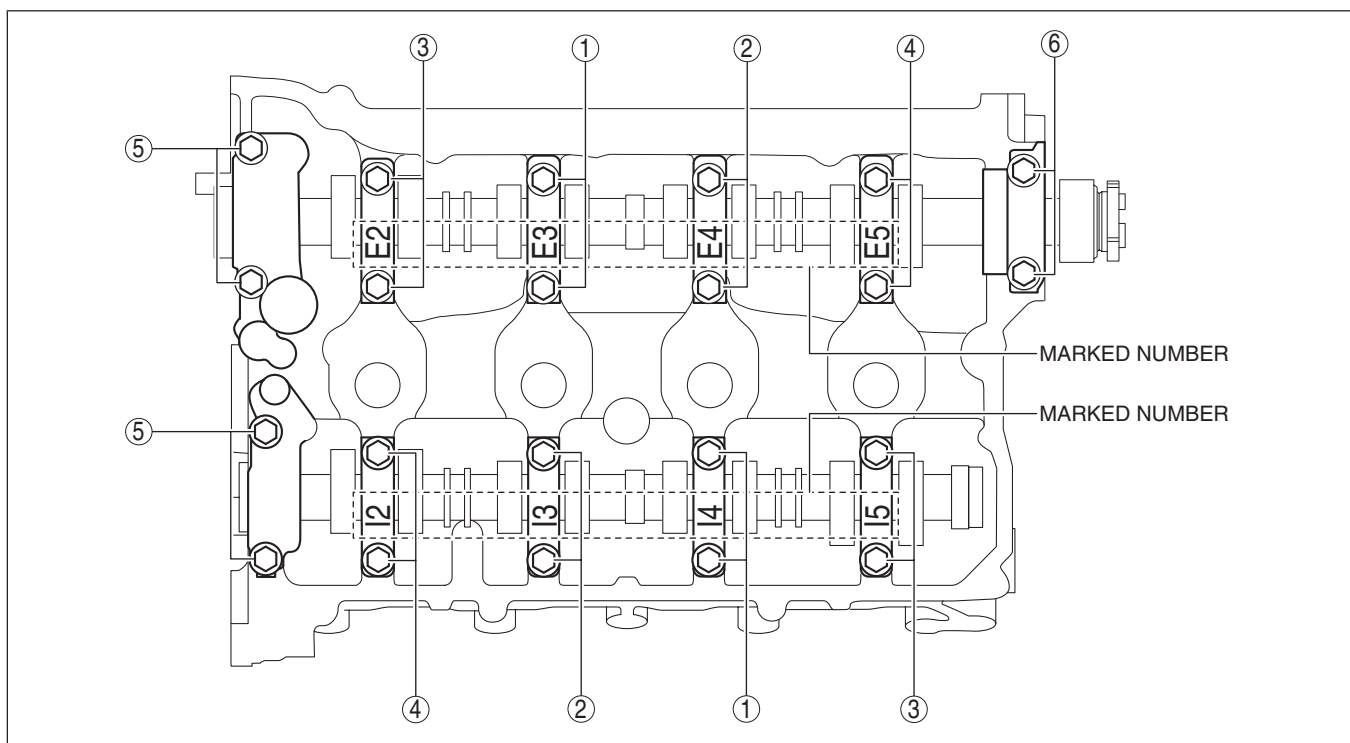
Adhesive agent bead width
0.5—1.5 mm {0.02—0.05 in}

6. Install the camshaft caps in the marked number order, and temporarily tighten the camshaft cap installation bolts in two or three passes evenly.



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7. Tighten the camshaft cap installation bolts in two steps in the order shown in the figure.



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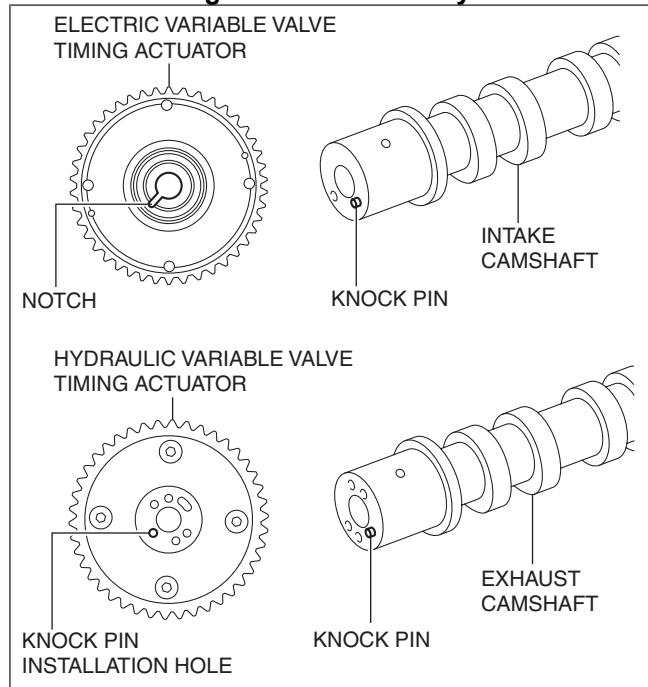
Tightening torque

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}

Electric Variable Valve Timing Actuator, Hydraulic Variable Valve Timing Actuator Assembly Note

1. Align the knock pin on the end of the camshaft with the notch on the actuator (intake side) or knock pin installation hole (exhaust side), then install the actuator to the camshaft.



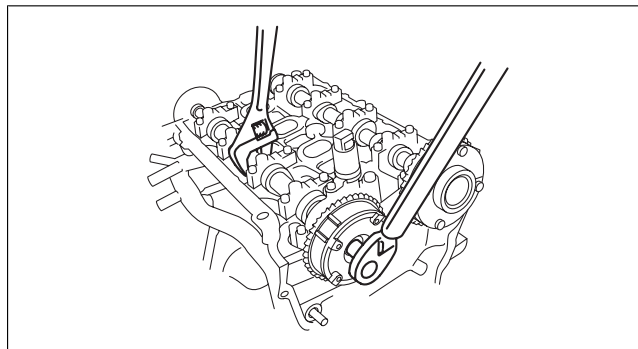
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2. Hold the camshaft using a wrench on the cast hexagon, and tighten the actuator installation bolt.

Tightening torque

Electric variable valve timing actuator (intake side): 102—114 N·m {10.5—11.6 kgf·m, 76—84 ft·lbf}

Hydraulic variable valve timing actuator (exhaust side): 75—85 N·m {7.7—8.6 kgf·m, 56—62 ft·lbf}



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