

Removal

⚠ WARNING

Be sure to read and follow the **General Safety Information and Caution** before doing any work related with the high voltage system. Failure to follow the safety instructions may result in serious electrical injuries.

Be sure to read and follow the **High Voltage Shut-off Procedures** before doing any work related with the high voltage system. Failure to follow the safety instructions may result in serious electrical injuries.

⚠ CAUTION

Use fender covers to avoid damaging painted surfaces.

To avoid damage, unplug the wiring connectors carefully while holding the connector portion.

NOTICE

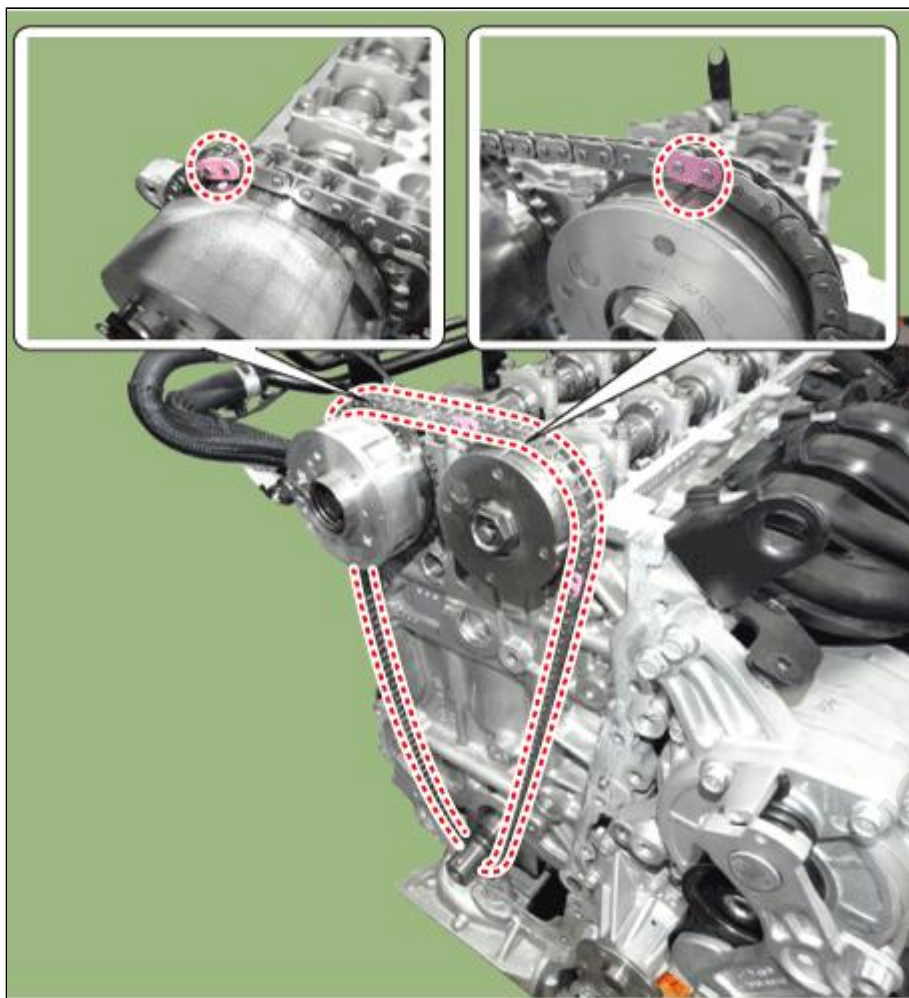
Mark all wiring and hoses to avoid misconnection.

Turn the crankshaft damper pulley so that the No.1 piston is at top dead center.

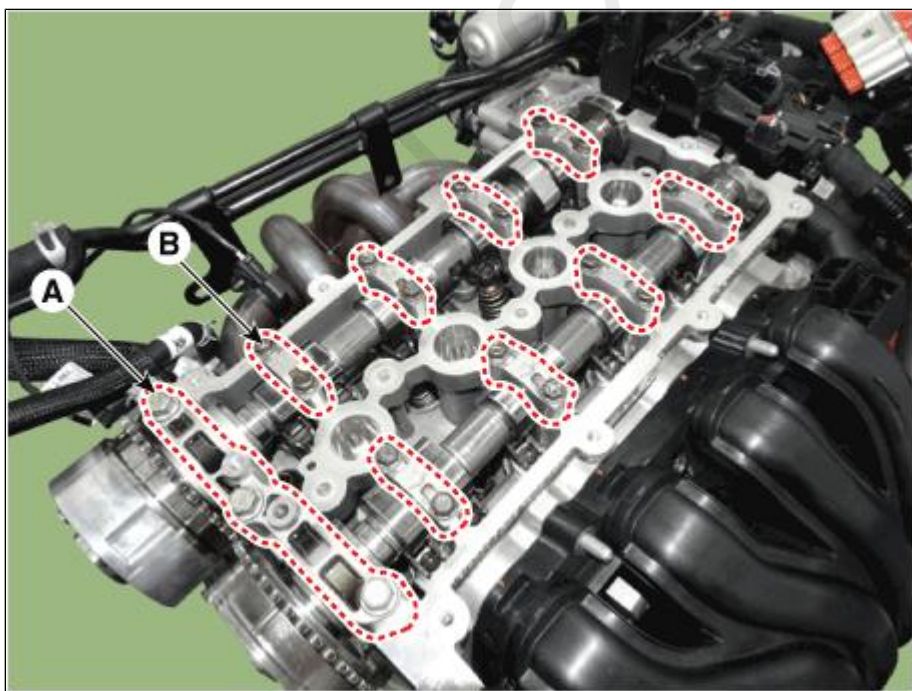
1. Shut off the High Voltage circuit.
(Refer to General Information - "High Voltage Shutoff Procedure")
2. Disconnect the battery positive terminal.
3. Remove the cylinder head cover.
(Refer to Cylinder Head Assembly - "Cylinder Head Cover")
4. Turn the crankshaft damper pulley and align its groove with the timing mark of the timing chain cover to set the piston of No.1 cylinder to the top dead center on compression stroke.
5. Set No.1 cylinder to TDC (Top dead center) on compression stroke.
 - (1) Turn the crankshaft damper pulley and align its groove with the timing mark of the timing chain cover.



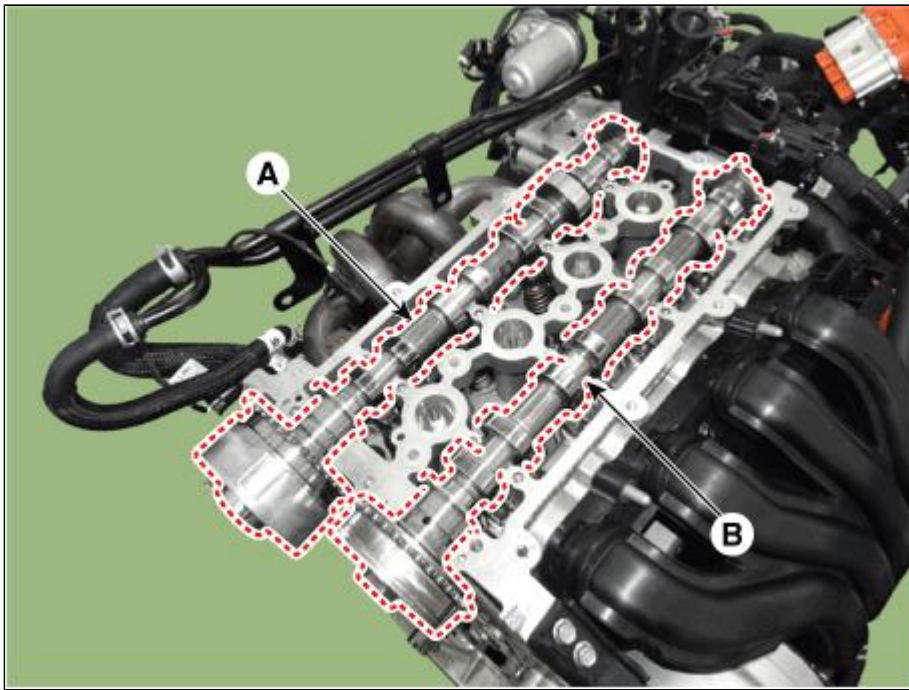
- (2) Put paint marks on the timing chain links (2 places) that meet with the timing marks of the intake, exhaust continuous variable valve timing (CVVT) sprockets.



6. Remove the timing chain cover.
(Refer to Timing System - "Timing Chain Cover")
7. Remove the timing chain.
(Refer to Timing System - "Timing Chain")
8. Remove the front camshaft bearing cap (A) and the camshaft bearing caps (B).



9. Remove the exhaust camshaft (A) first, then intake camshaft (B).



Inspection

Camshaft

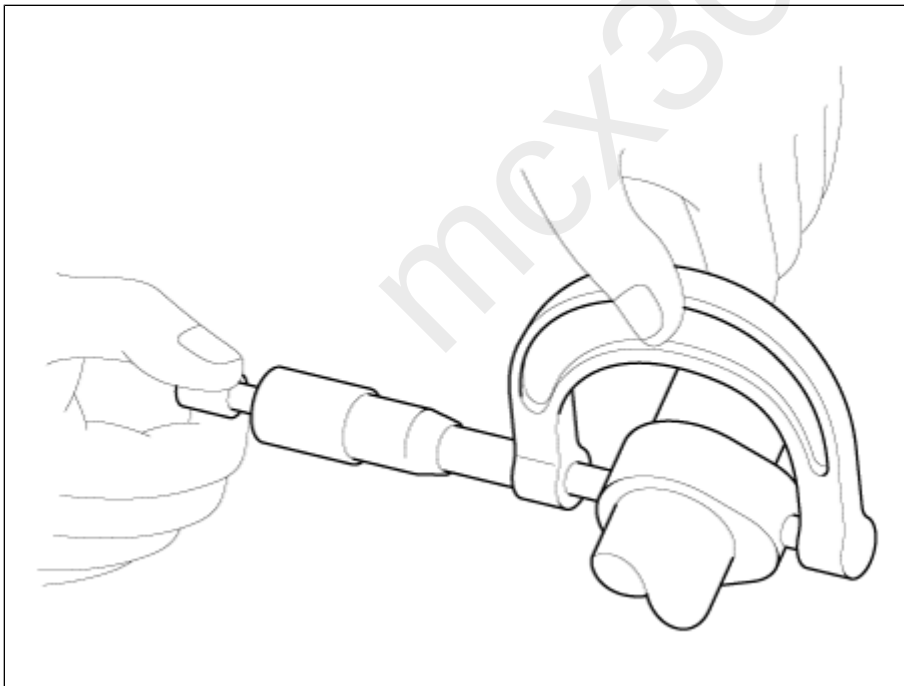
1. Inspect cam lobes.

Using a micrometer, measure the cam lobe height.

Cam height

Intake : 36.42 mm (1.4339 in)

Exhaust : 36.15 mm (1.4232 in)



If the cam lobe height is less than standard, replace the camshaft.

2. Check the surface of the camshaft journal for wear.

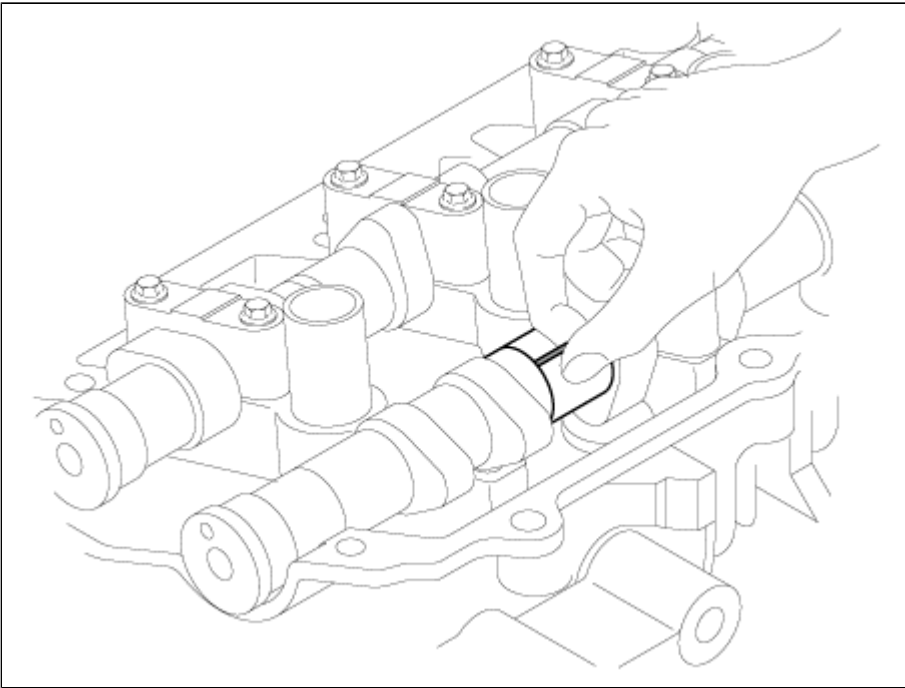
If the journal is worn excessively, replace the camshaft.

3. Inspect the camshaft journal clearance.

(1) Clean the bearing caps and camshaft journals.

(2) Place the camshafts on the cylinder head.

(3) Lay a strip of plastigage across each of the camshaft journals.

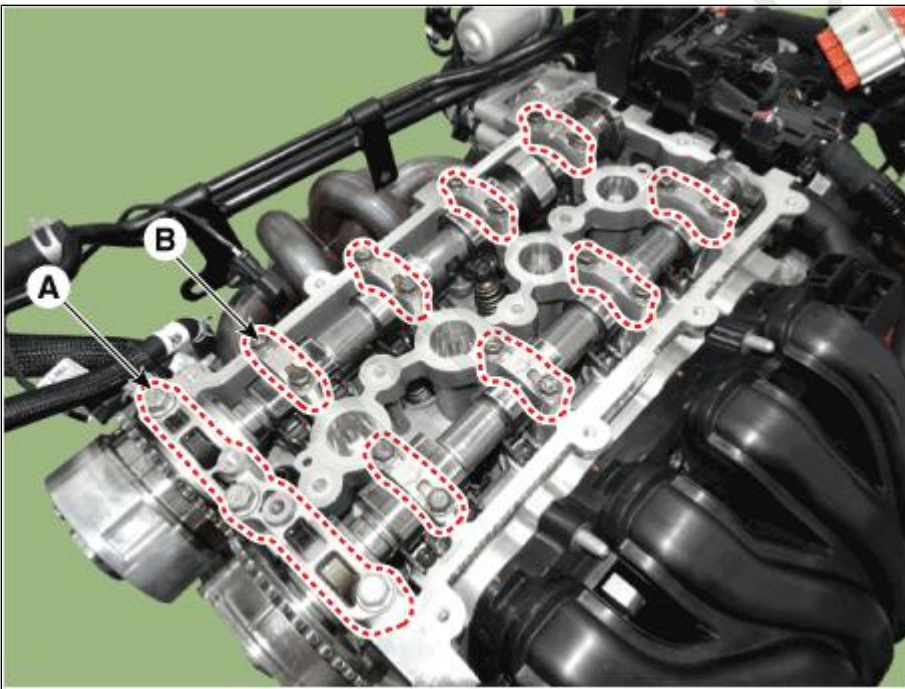


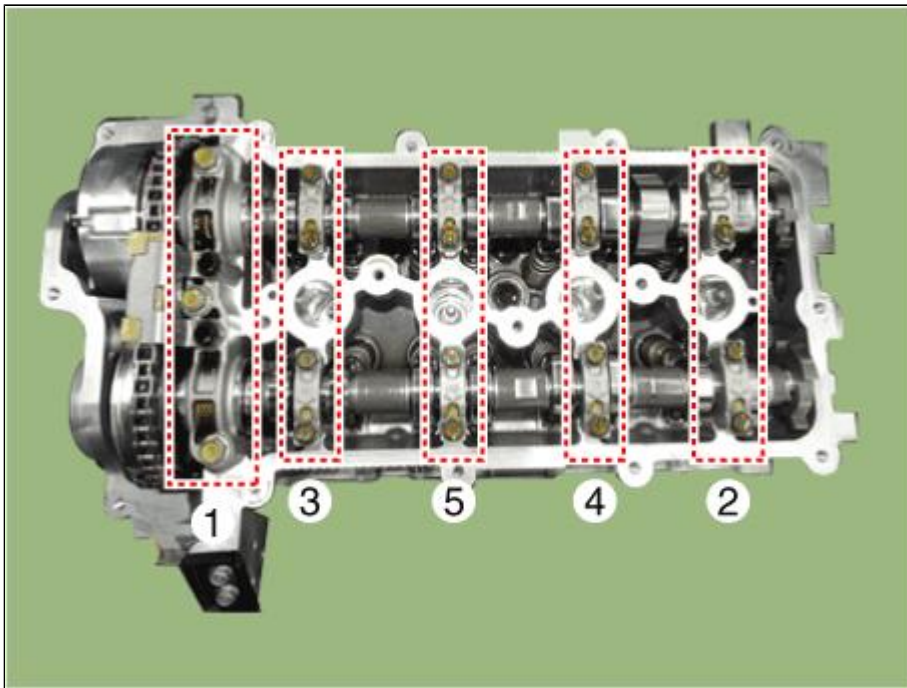
- (4) Install the front camshaft bearing cap (A) and the camshaft bearing caps (B) as following method with specified torque.

Tightening torque

A : 18.6 - 22.6 N.m (1.9 - 2.3 kgf.m, 13.7 - 16.6 lb-ft)

B : 11.8 - 12.7 N.m (1.2 - 1.3 kgf.m, 8.7 - 9.4 lb-ft)





NOTICE

Do not turn the camshaft.

- (5) Remove the bearing caps.
- (6) Measure the plastigage at its widest point.

Bearing oil clearance

Standard :

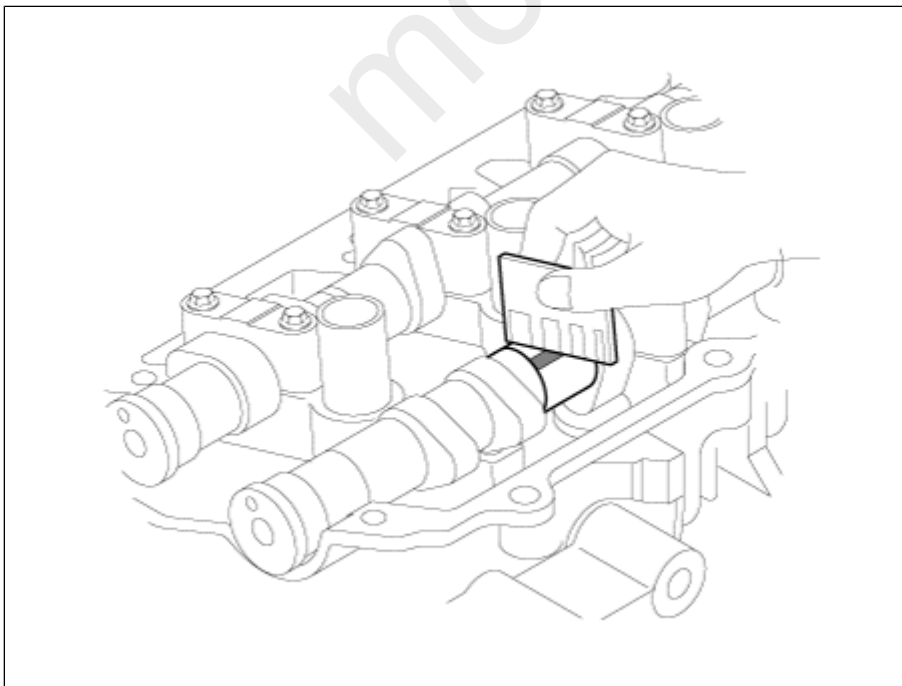
Intake : 0.032 - 0.062mm (0.0013 - 0.0024in) (No.1 journal)

0.027 - 0.057mm (0.0011 - 0.0022in) (No.2, 3, 4, 5 journal)

Exhaust : 0.027 - 0.057mm (0.0011 - 0.0022in) (No.1 journal)

0.027 - 0.057mm (0.0011 - 0.0022in) (No.2, 3, 4, 5 journal)

If the oil clearance is greater than maximum, replace the camshaft. If necessary, replace cylinder head.



- (7) Completely remove the plastigage.
- (8) Remove the camshafts.

4. Inspect the camshaft end play.

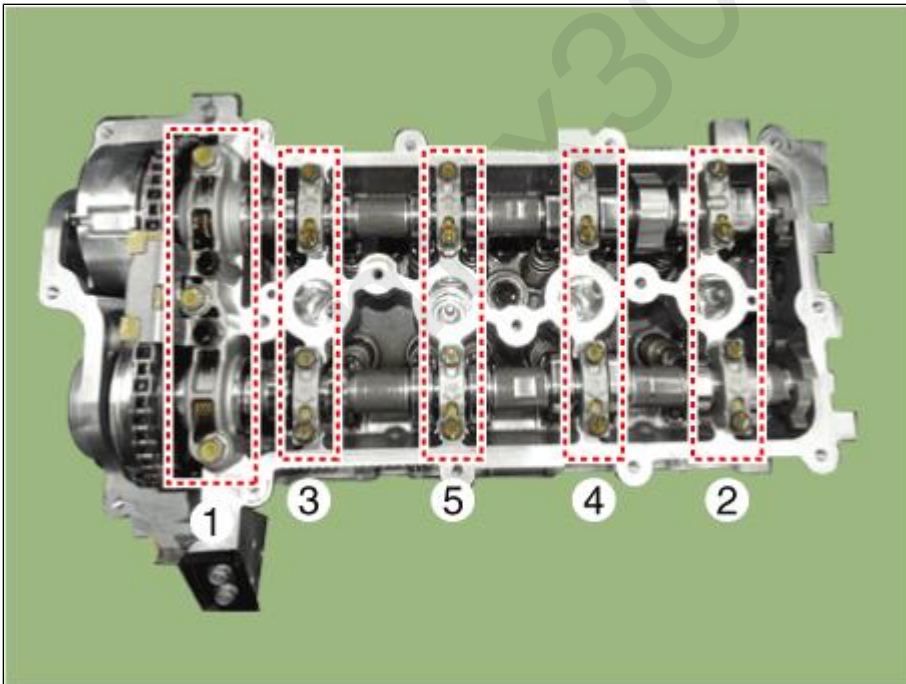
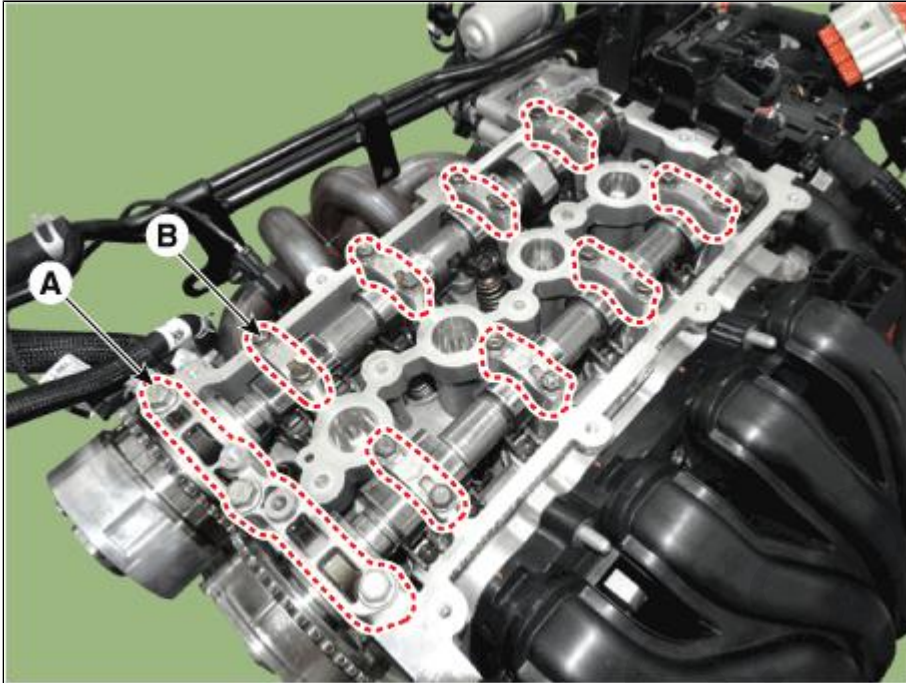
(1) Install the camshafts.

(2) Install the front camshaft bearing cap (A) and the camshaft bearing caps (B) as following method with specified torque.

Tightening torque

A : 18.6 - 22.6 N.m (1.9 - 2.3 kgf.m, 13.7 - 16.6 lb-ft)

B : 11.8 - 12.7 N.m (1.2 - 1.3 kgf.m, 8.7 - 9.4 lb-ft)

**NOTICE**

Do not turn the camshaft.

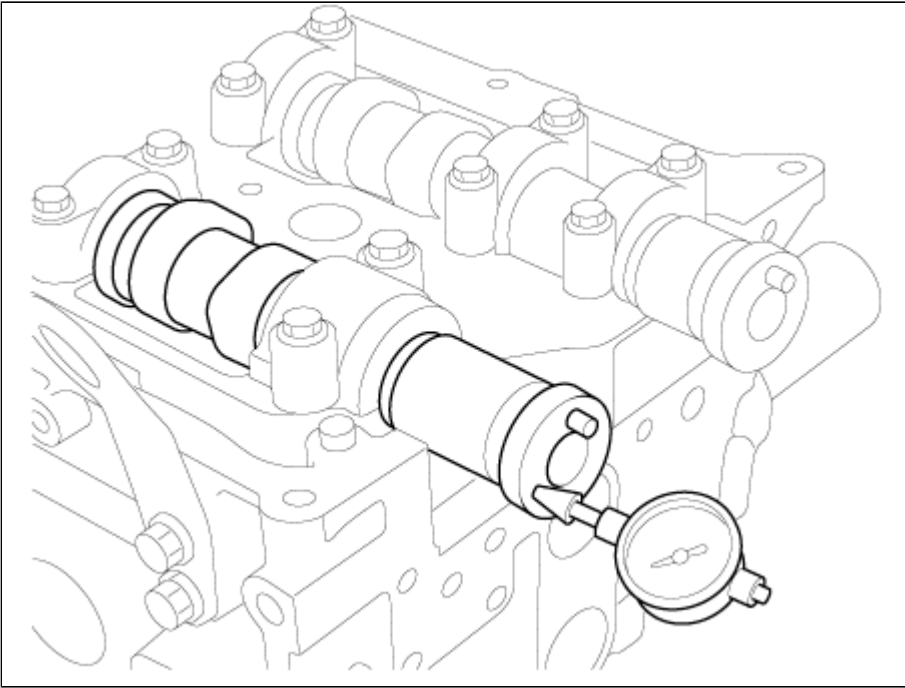
When cam caps are installed, arrows on the top of caps must point to out side of engine.

(3) Using a dial indicator, measure the end play while moving the camshaft back and forth.

Camshaft end play

Intake : 0.1 - 0.2 mm (0.0039 - 0.0078 in)

Exhaust : 0.1 - 0.2 mm (0.0039 - 0.0078 in)



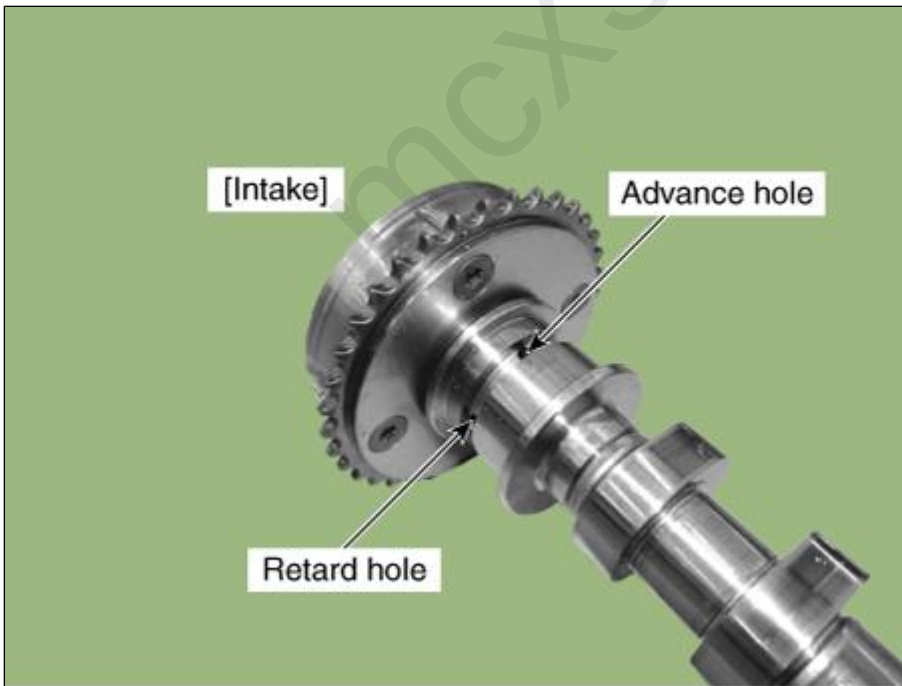
If the end play is greater than maximum, replace the camshaft. If necessary, replace cylinder head.

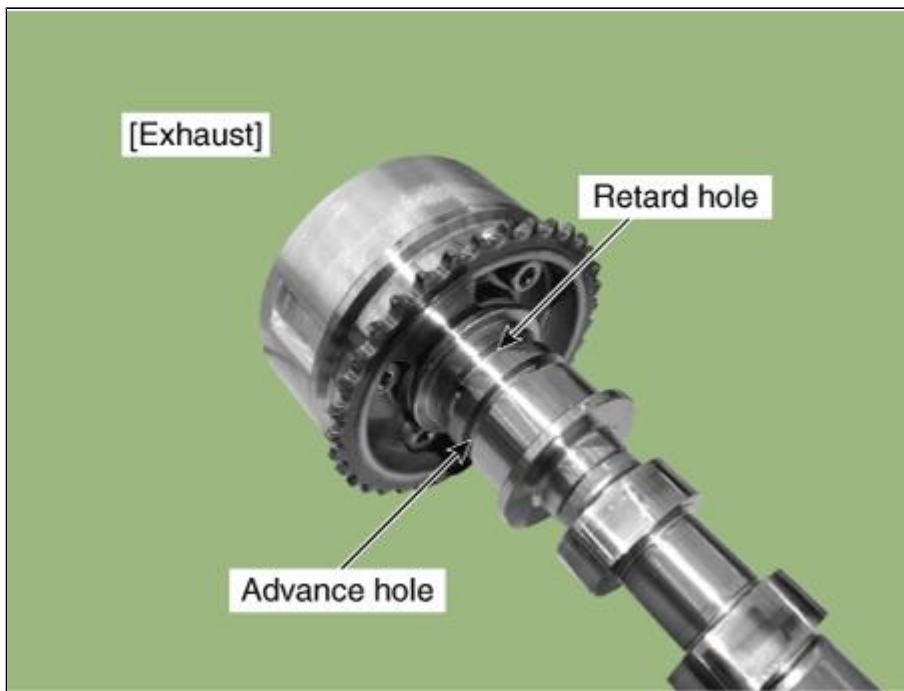
(4) Remove the camshafts.

Continuously variable valve timing (CVVT) Assembly

1. Inspect CVVT for smooth rotation.

- (1) Clamp the camshaft using a vise. Be careful not to damage the cam lobes and journals in the vise.
- (2) Check that the CVVT is locked by turning it clockwise or counterclockwise. It must not rotate.
- (3) Intake CVVT : Seal one of the two advance holes in the camshaft journal with tape.
Exhaust CVVT : Seal one of the two retard holes in the camshaft journal with tape.





- (4) Intake CVVT : Apply approx. 150 kPa (1.5 kgf/cm², 21 psi) of compressed air into the unsealed advance hole to release the lock.
Exhaust CVVT : Apply approx. 150 kPa (1.5 kgf/cm², 21 psi) of compressed air into the unsealed retard hole to release the lock.

i Information

Cover the oil paths with a piece of cloth when applying compressed air to prevent oil from spraying.

- (5) Intake CVVT : With compressed air applied, rotate the CVVT into the advance direction (counterclockwise) within its phasing range and check that the CVVT turns smoothly.
Exhaust CVVT : With compressed air applied, rotate the CVVT into the retard direction (clockwise) and check that the CVVT turns smoothly.

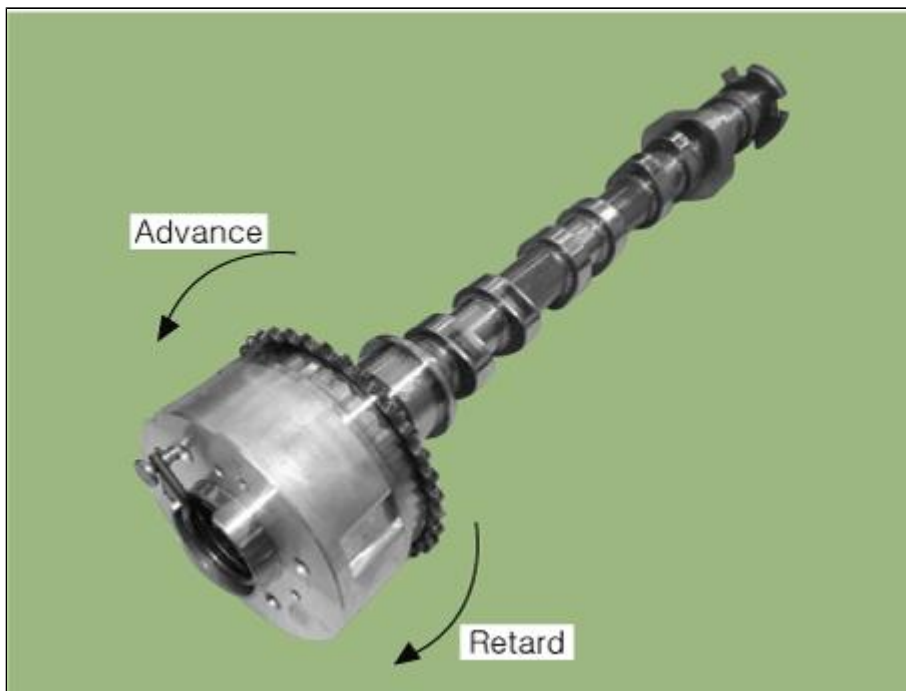
CVVT phasing range

Intake : $35^{\circ} \pm 1^{\circ}$

(from the most retarded position to the most advanced position)

Exhaust : $20^{\circ} \pm 1^{\circ}$

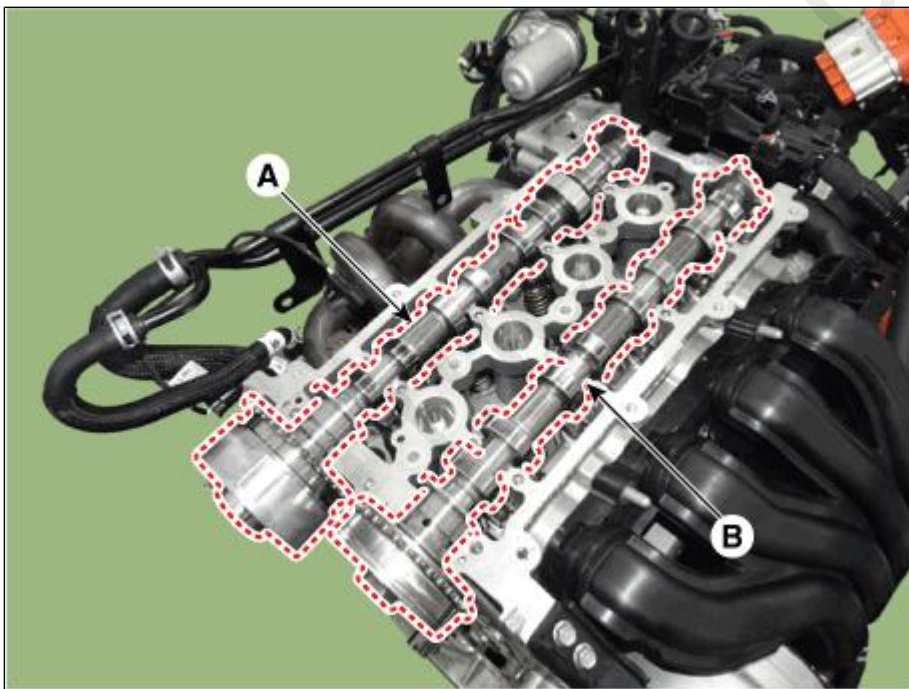
(from the most advanced position to the most retarded position)



- (6) Intake CVVT : Rotate the CVVT into the most retarded position (clockwise) and then check that the CVVT is locked.
 Exhaust CVVT : Rotate the CVVT into the most advanced position (counterclockwise) and then check that the CVVT is locked.

Installation

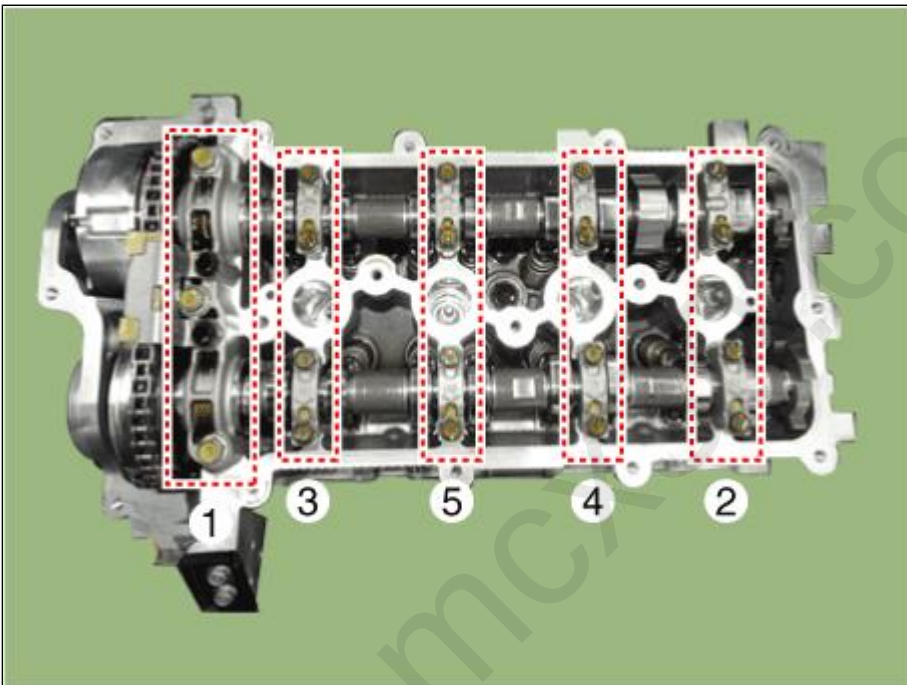
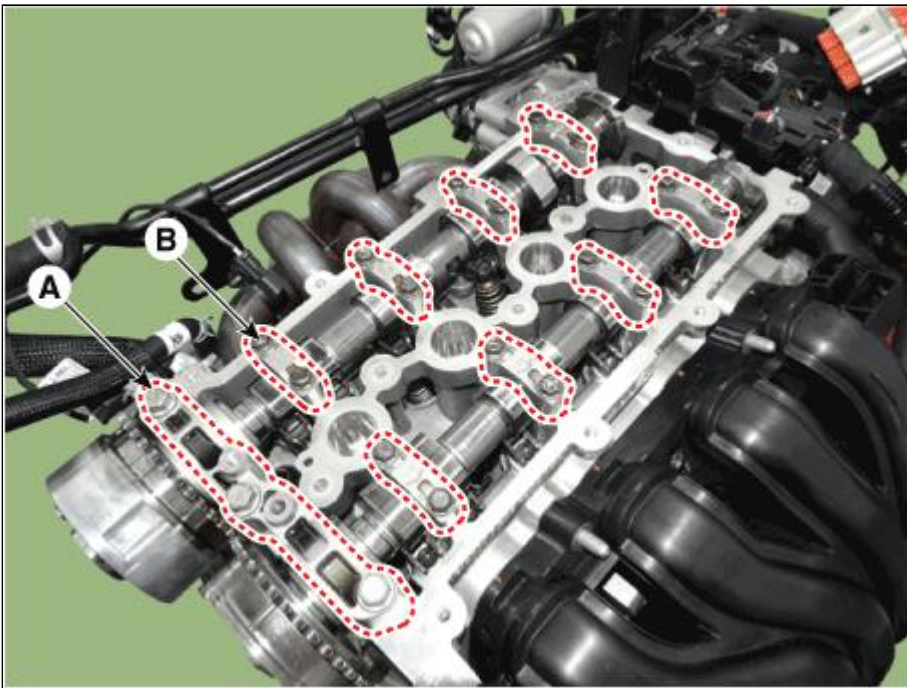
1. Install the exhaust camshaft (A) first, then intake camshaft (B).



2. Install the front camshaft bearing cap (A) and the camshaft bearing caps (B) as following method with specified torque.

Tightening torque

A : 18.6 - 22.6 N.m (1.9 - 2.3 kgf.m, 13.7 - 16.6 lb-ft)
 B : 11.8 - 12.7 N.m (1.2 - 1.3 kgf.m, 8.7 - 9.4 lb-ft)



NOTICE

Do not turn the camshaft.

When cam caps are installed, arrows on the top of caps must point to out side of engine.

3. Install the timing chain.
(Refer to Timing System - "Timing Chain")
4. Install the timing chain cover.
(Refer to Timing System - "Timing Chain Cover")
5. Install the cylinder head cover.
(Refer to Cylinder Head Assembly - "Cylinder Head Cover")
6. Connect the High Voltage circuit.
(Refer to General Information - "High Voltage Shutoff Procedure")

Rate this Document

☐ Document Type : SHOP

☐ Document Rating :

Please rate the above contents on a scale of 1 to 5.

Little Value 1 2 3 4 5 Excellent Value

mcx30.com