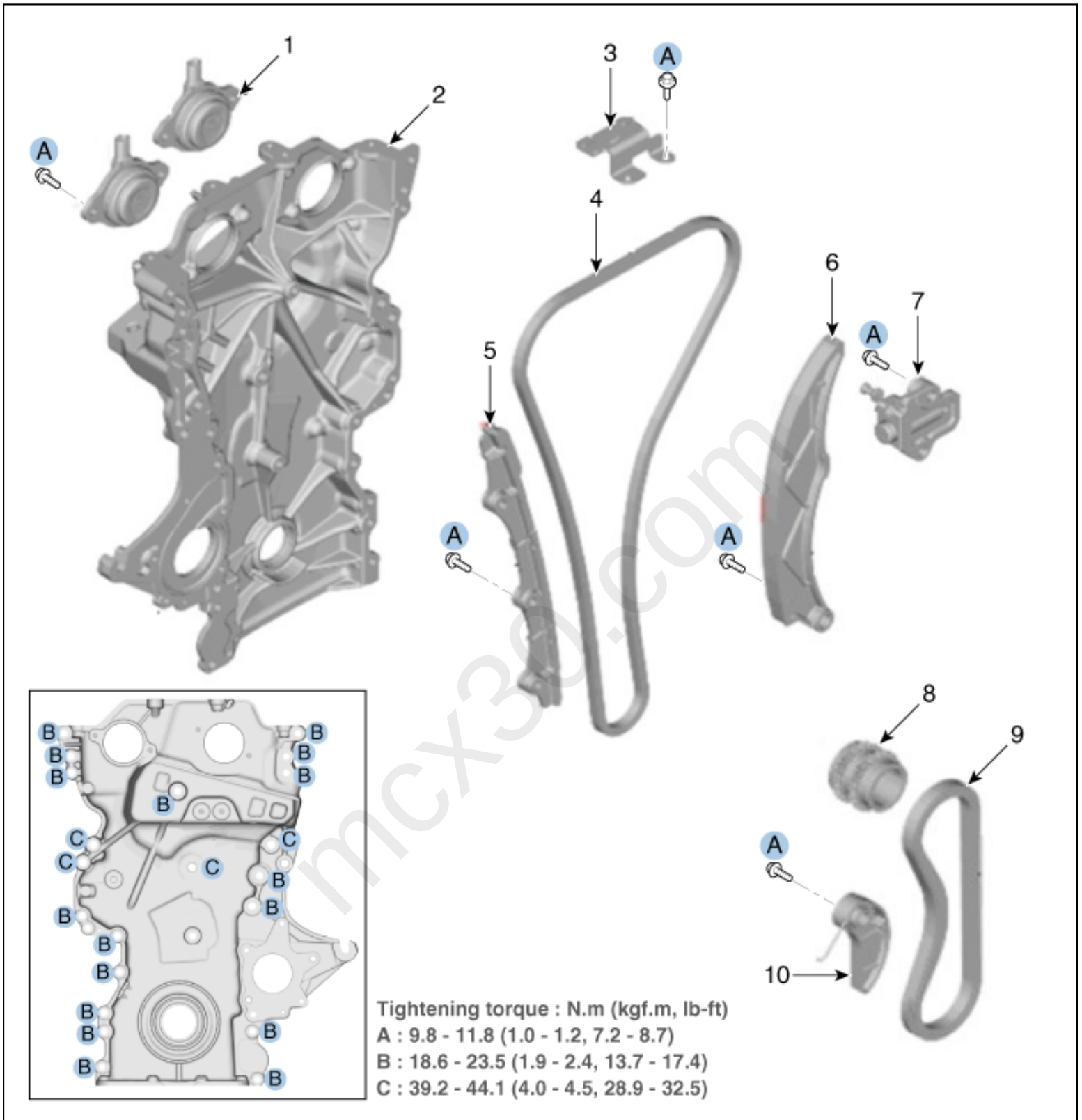


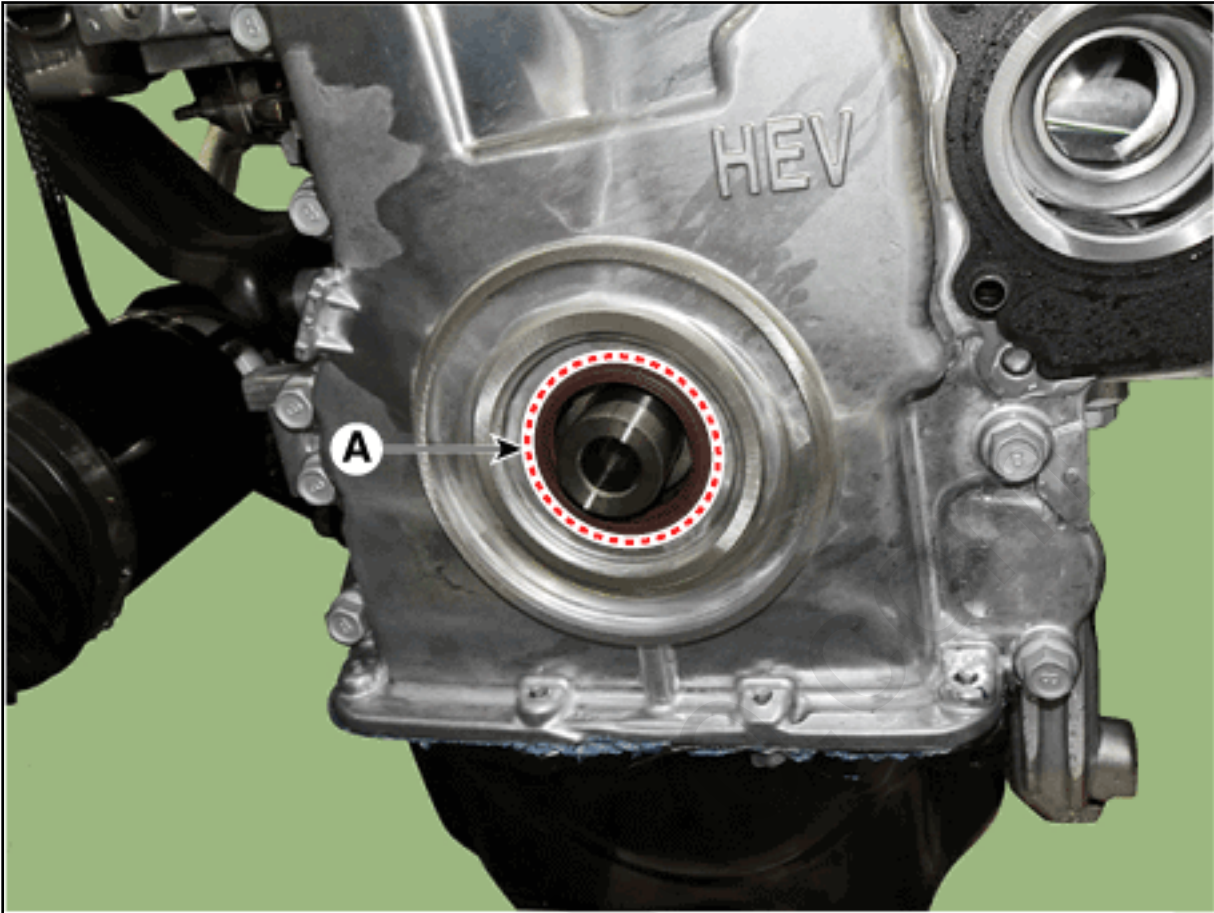


1. Variable force solenoid valves
2. Timing chain cover
3. Cam to cam guide
4. Timing chain
5. Timing chain tensioner arm

6. Timing chain tensioner arm
7. Timing chain tensioner
8. Crankshaft sprocket
9. Oil pump chain
10. Oil pump chain tensioner

Replacement

1. Remove the crankshaft damper pulley.
(Refer to Drive Belt System - "Crankshaft Damper Pulley")
2. Remove the front oil seal (A).



3. Apply engine oil to a new oil seal lip & outer surface.



- Remove any debris from the lip portion of the oil seal.

4. Using the SST (0K231-2C200), install a new front oil seal.



- Always use a new front oil seal.

5. Install in the reverse order of removal.

Removal



- Use fender covers to avoid damaging painted surfaces.
- To avoid damage, unplug the wiring connectors carefully while holding the connector portion.



- Mark all wiring and hoses to avoid misconnection.

1. Disconnect the battery negative terminal.
2. Remove the engine room under cover, and then drain the engine coolant.
(Refer to Cooling System - "Coolant")
3. Drain the engine oil.
(Refer to Lubrication System - "Engine Oil")
4. Remove the drive belt, and then remove the drive belt tensioner.
(Refer to Drive Belt System - "Drive Belt Tensioner")
5. Remove the hybrid starter generator (HSG).
(Refer to Engine Electrical System - "Mild Hybrid Starter Generator (MHSG)")
6. Remove the crankshaft damper pulley.
(Refer to Drive Belt System - "Crankshaft Damper Pulley")
7. Remove the oil pan.
(Refer to Lubrication System - "Oil Pan")
8. Remove the cylinder head cover.
(Refer to Cylinder Head Assembly - "Cylinder Head Cover")
9. Insert the rubber block between jack and lower crankcase.



- Insert the rubber block between jack and lower crankcase to prevent damage to parts.

10. Remove the engine mounting support bracket.
(Refer to Engine And Transaxle Assembly - "Engine Mounting")
11. Remove the water pump.
(Refer to Cooling System - "Water Pump")
12. Disconnect the engine ground cable (A) from the timing chain cover.

Tightening torque :

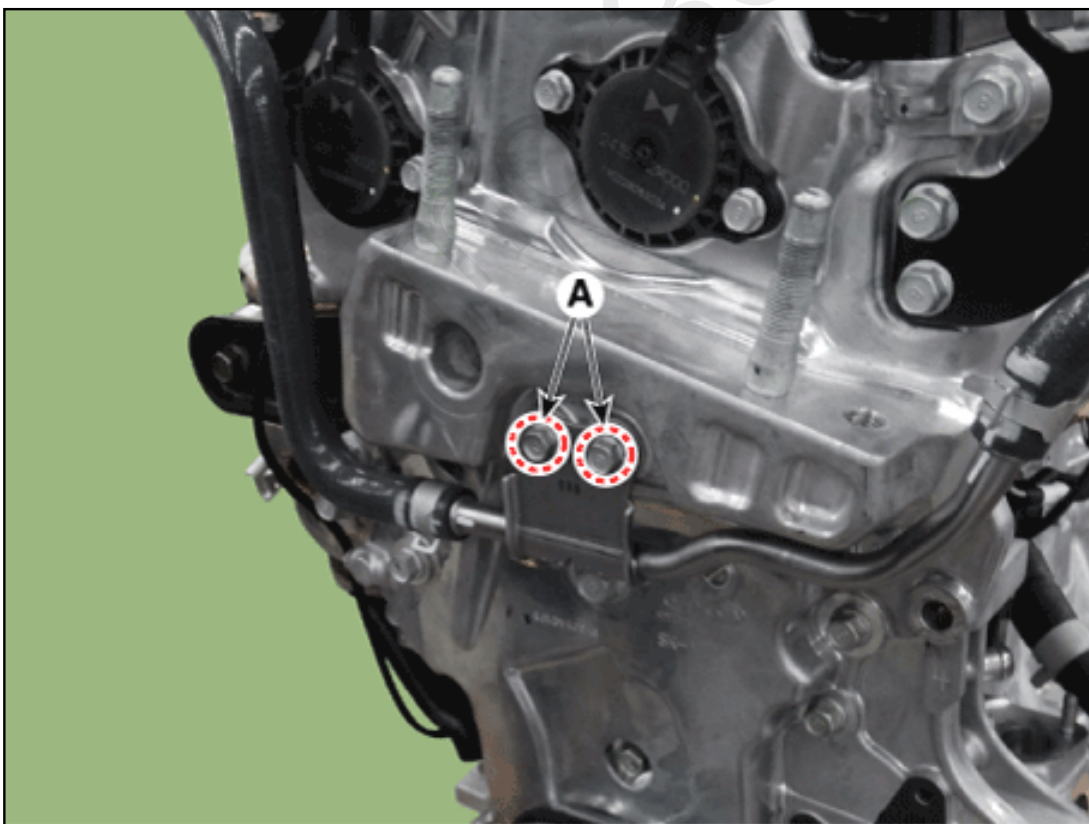
6.8 - 9.8 N.m (0.7 - 1.0 kgf.m, 5.1 - 7.2 lb-ft)



13. Loosen the turbo charger coolant hose and pipe mounting bolts (A).

Tightening torque :

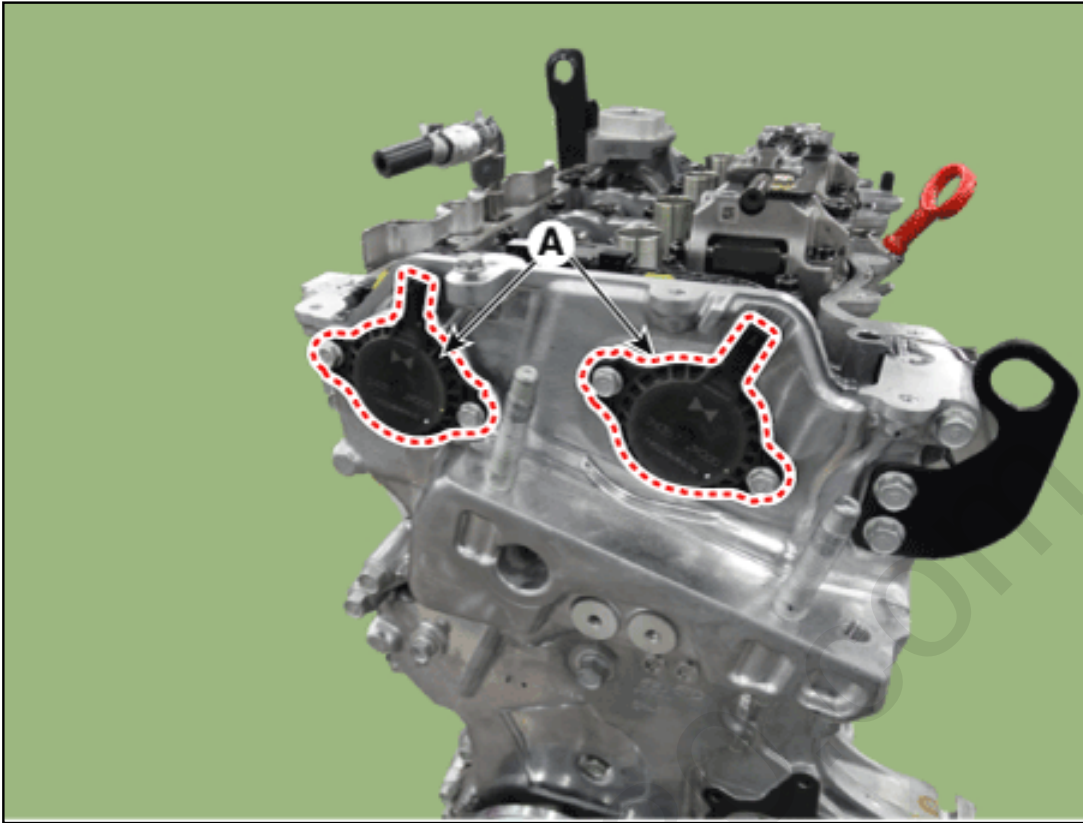
9.8 - 11.8 N.m (1.0 - 1.2 kgf.m, 7.2 - 8.7 lb-ft)



14. Remove the intake and exhaust variable force solenoid (VFS) valves (A).

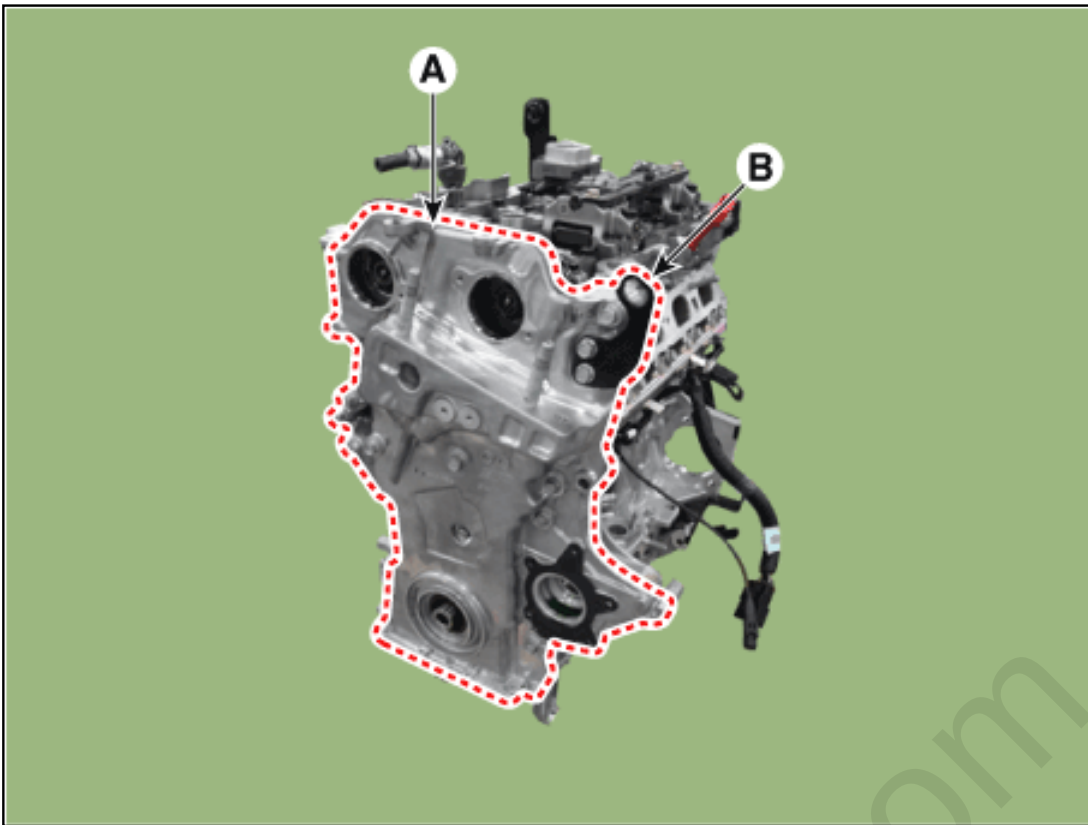
Tightening torque :

9.8 - 11.8 N.m (1.0 - 1.2 kgf.m, 7.2 - 8.7 lb-ft)



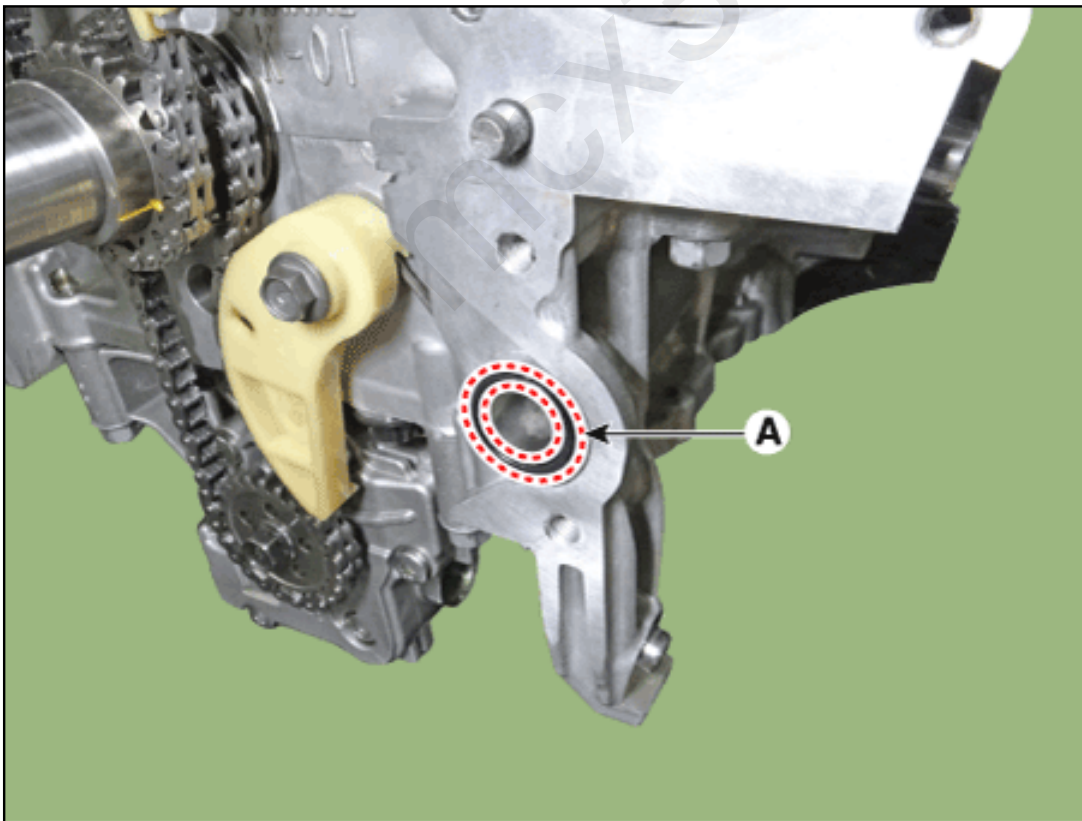
- The variable force solenoid (VFS) must be removed before removing the timing chain cover.

15. Remove the timing chain cover (A) and hanger (B).



Installation

1. Keep the liquid gasket sealing surfaces (timing chain cover, cylinder head, cam carrier, cylinder block, lower crankcase) free from foreign matters, cured sealant, oil, dust, moisture and etc. Spray the cleaner on the sealing surface and wipe it off with a clean cloth.
2. Install the new O-ring (A).

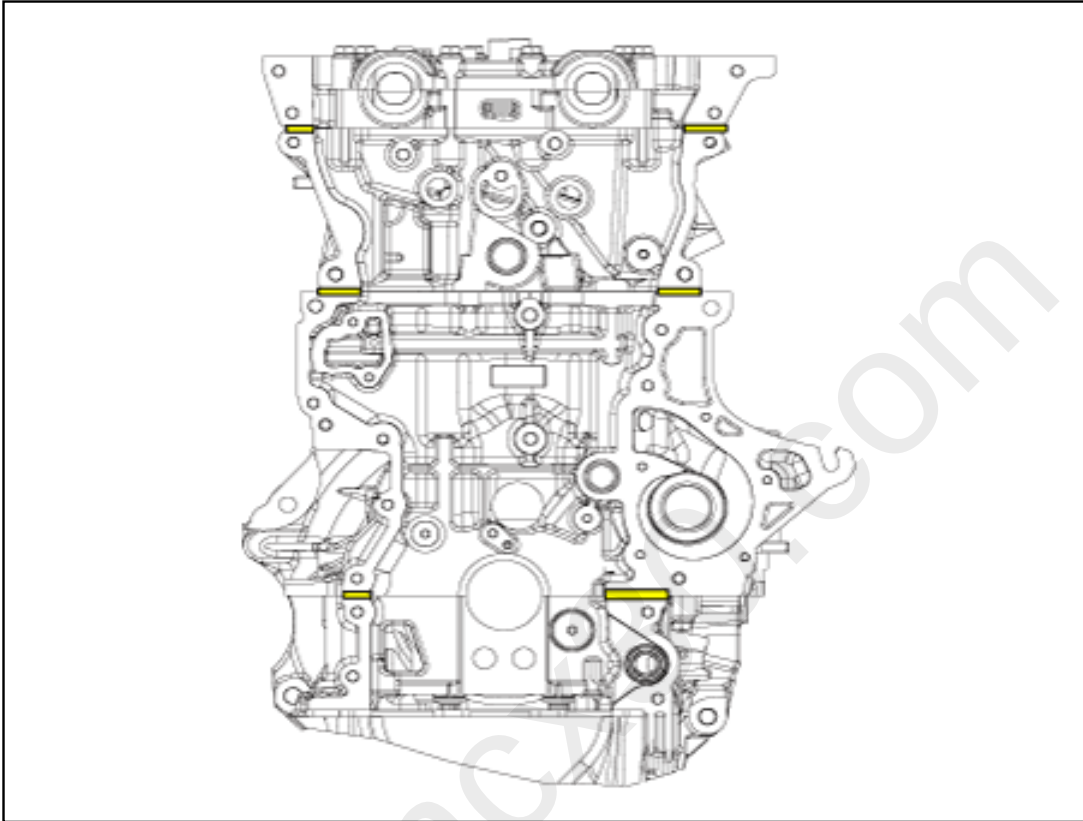


3. Install the timing chain cover.

- (1) Keep the liquid gasket sealing surfaces (cam carrier, cylinder head, cylinder block, lower crankcase) free from foreign matters, cured sealant, oil, dust, moisture and etc. Spray the cleaner on the sealing surface and wipe it off with a clean cloth.
- (2) Apply liquid gasket sealant to an interface between cam carrier, cylinder head, cylinder block and lower crankcase.

Width : Ø 3.0 - 5.0 mm (0.1181 - 0.1969 in.)

Specification : MS721-40AA or AAO



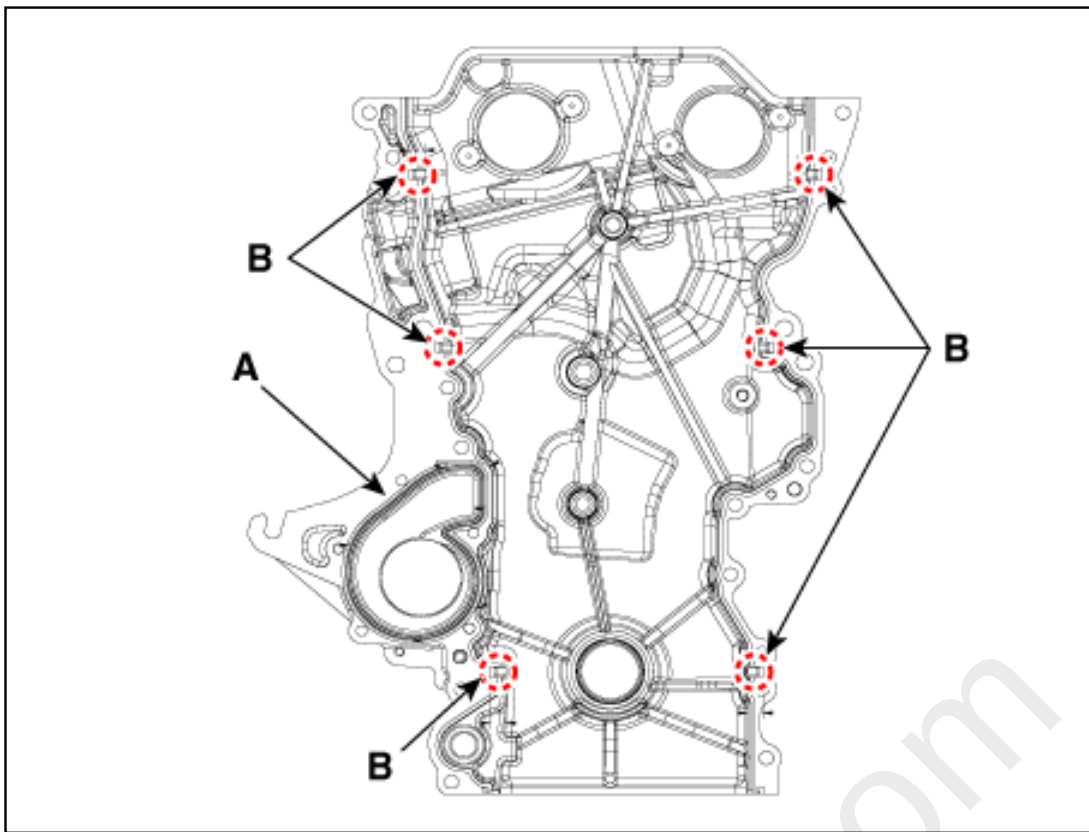
- (3) Apply liquid sealant on timing chain cover. Then, assemble the part within 5 minutes of applying sealant.

Width / Specification

Whole section : Ø 2.5 - 3.5 mm (0.0984 - 0.1378 in) / MS721-40AA or AAO

Section A : Ø 1.5 - 2.5 mm (0.0591 - 0.0984 in) / MS721-40CC

Section B : Ø 3.5 - 4.5 mm (0.1378 - 0.1772 in) / MS721-40AA or AAO

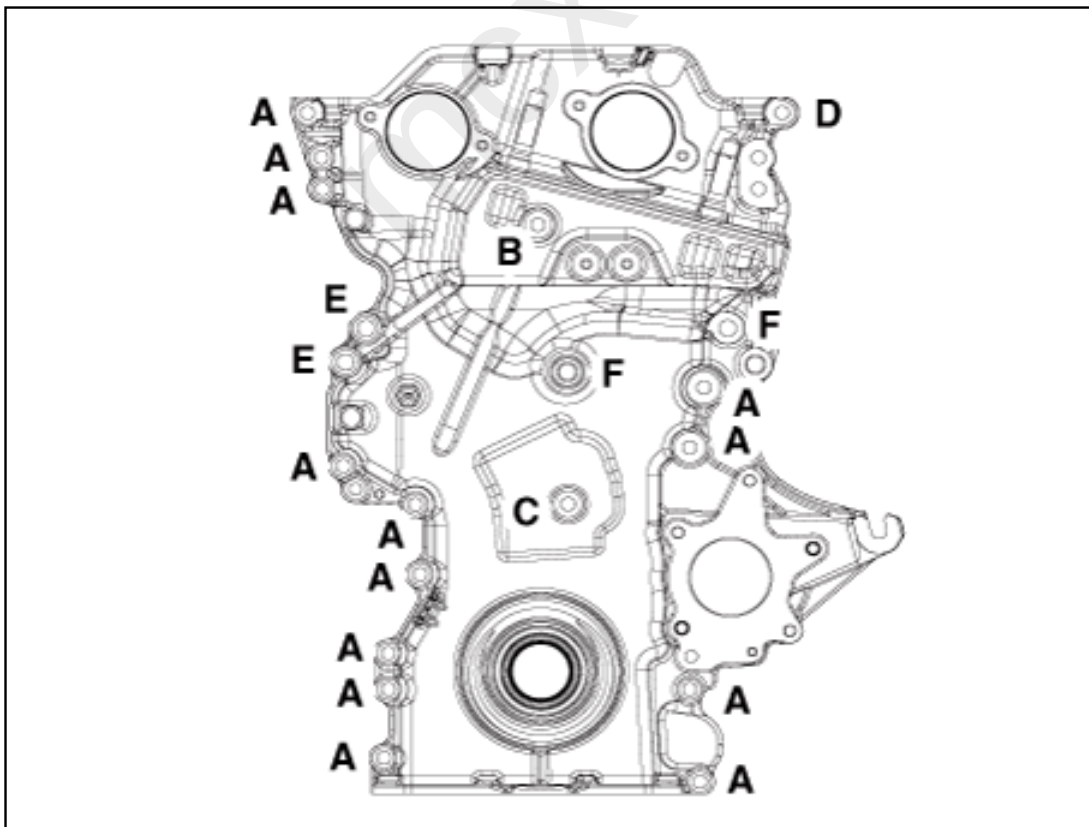


- (4) The dowel pins on the cylinder block and holes on the timing chain cover should be used as a reference for assembling the timing chain cover to the exact position.

Tightening torque

Bolt (A, B, C, D) : 18.6 - 23.5 N.m (1.9 - 2.4 kgf.m, 13.7 - 17.4 lb-ft)

Bolt (E, F) : 39.2 - 44.1 N.m (4.0 - 4.5 kgf.m, 28.9 - 32.5 lb-ft)





- The firing and / or blow out test should not be performed within 30 minutes of assembling the timing chain cover.

4. Replace the front oil seal.
(Refer to Timing System - "Front Oil Seal")
5. Install the other parts in the reverse order of removal.
6. Refill engine with engine oil.
(Refer to Lubrication System - "Engine Oil")
7. Fill with engine coolant.
(Refer to Cooling System - "Coolant")

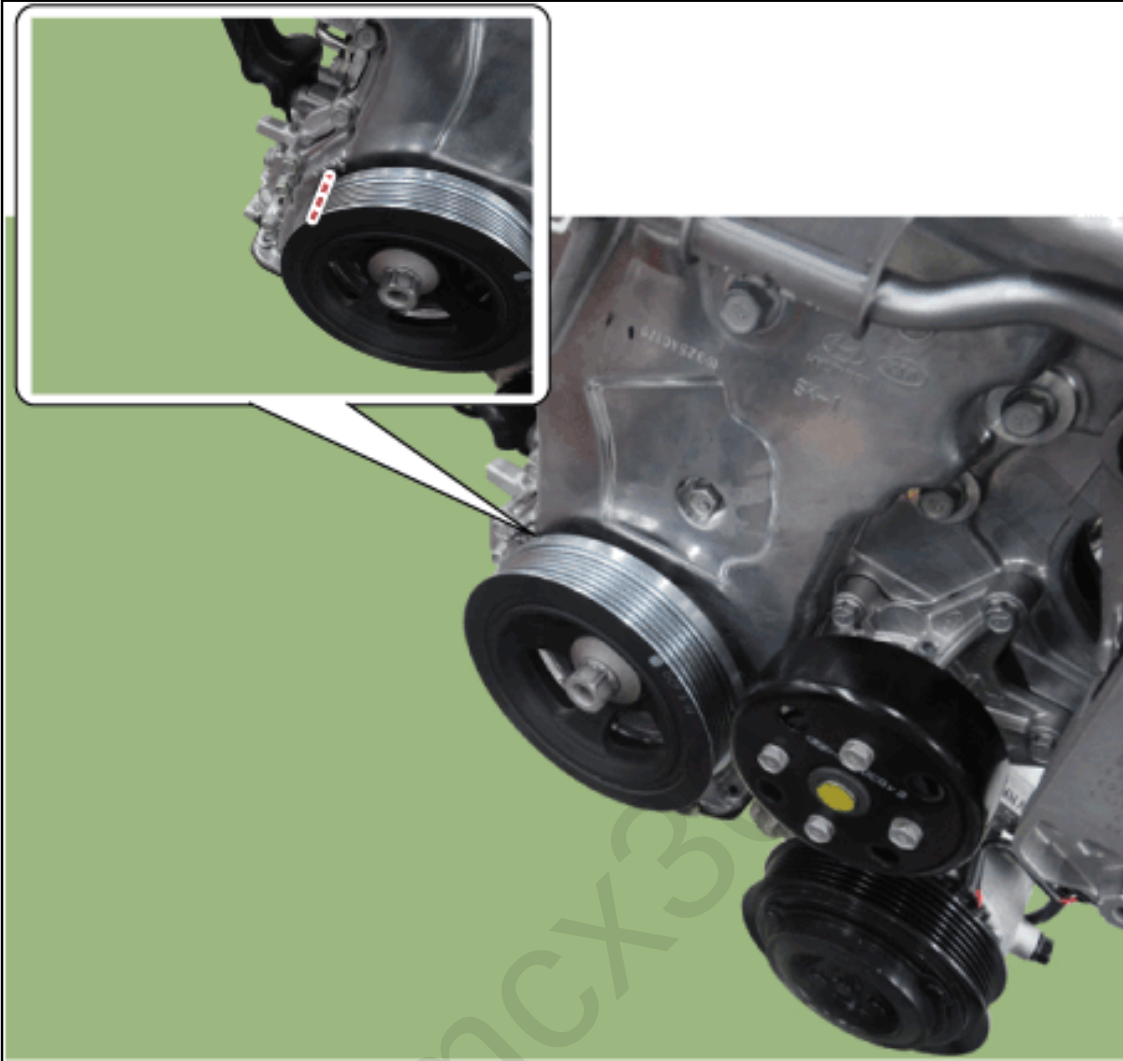


- The coolant must be injected according to the integrated thermal management module (ITM) coolant filling method.

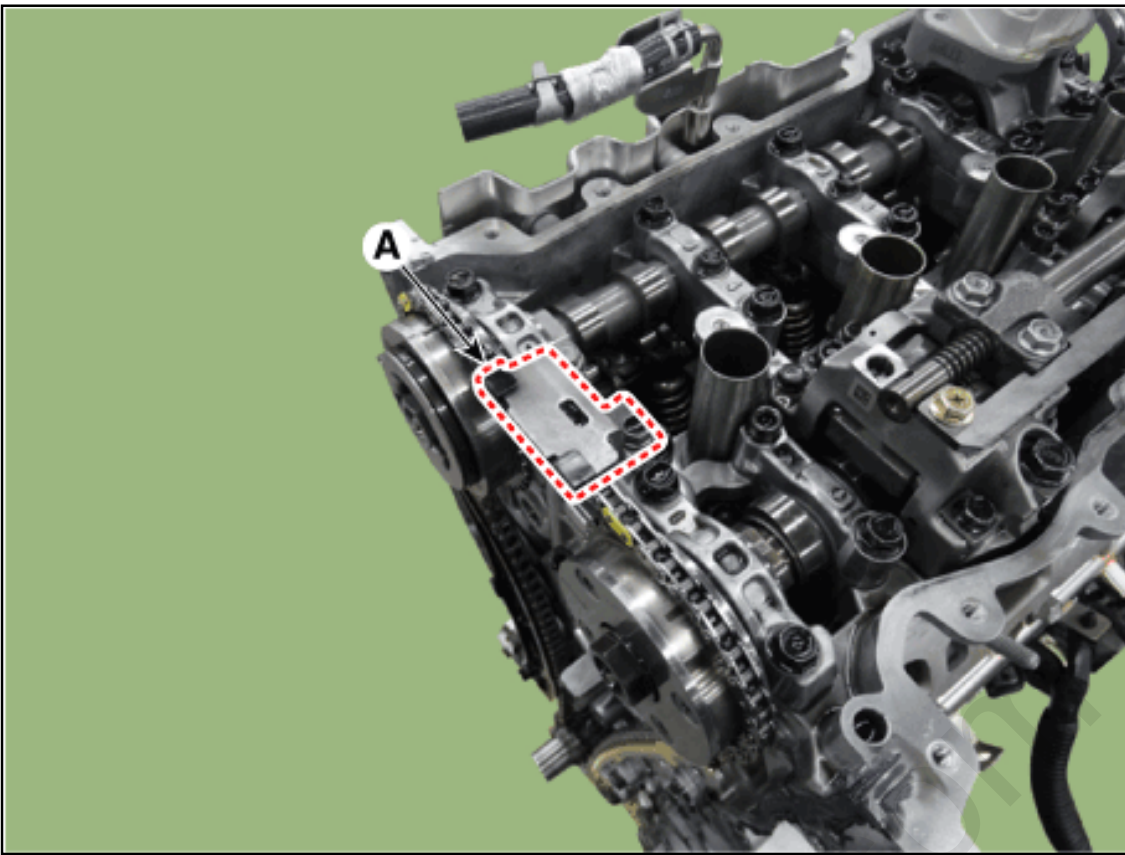
mcx30.com

Removal

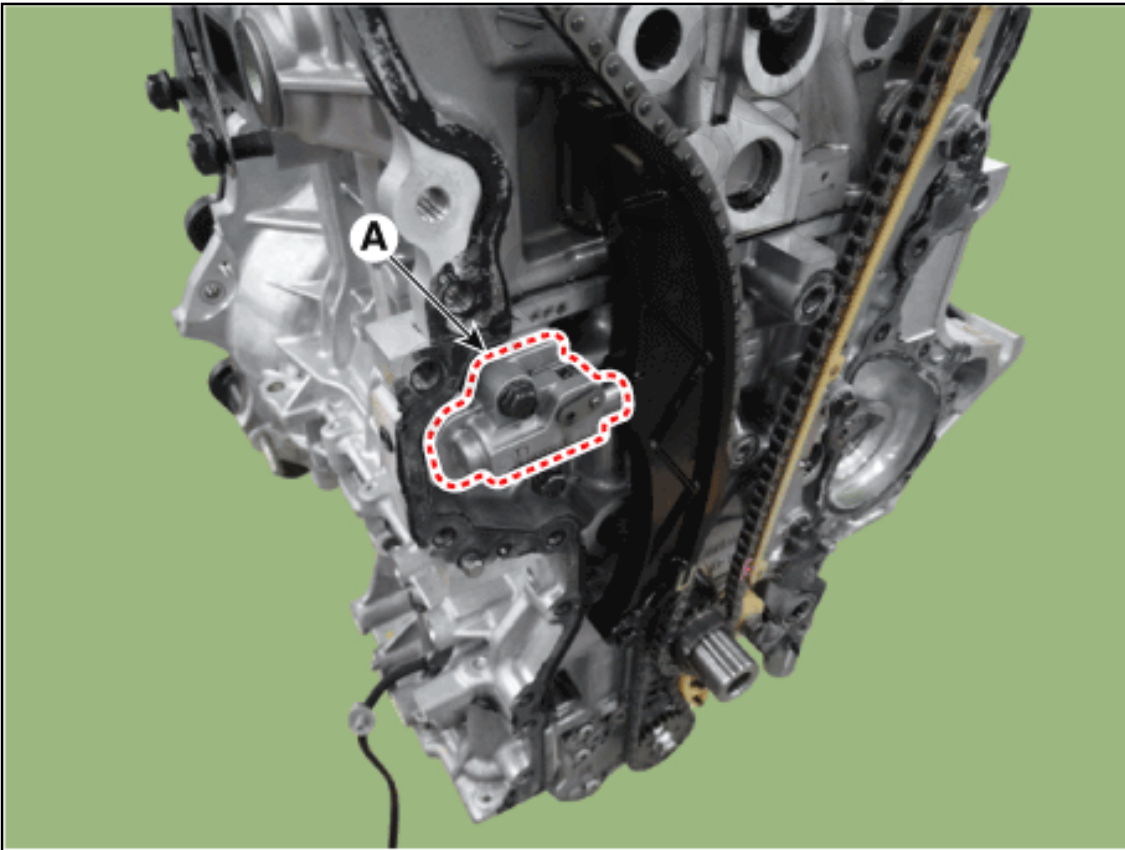
1. Disconnect the battery negative terminal.
2. Turn the crankshaft damper pulley clockwise, and align its groove with the timing mark of the timing chain cover.



3. Remove the timing chain cover.
(Refer to Timing System - "Timing Chain Cover")
4. Remove the cam to cam guide (A).

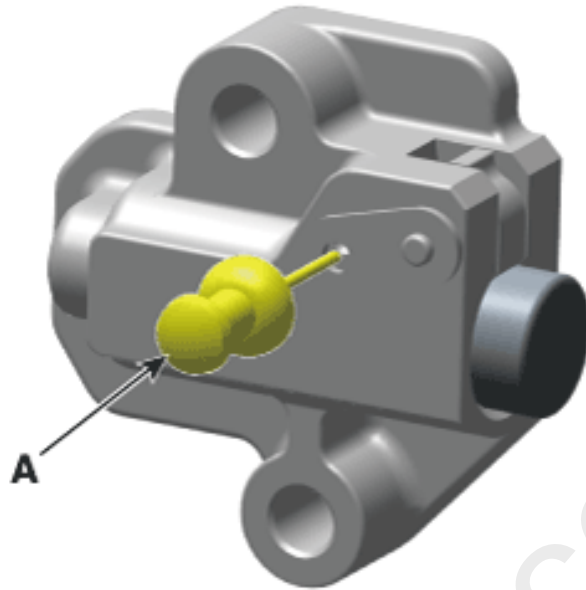


5. Remove the timing chain tensioner (A).

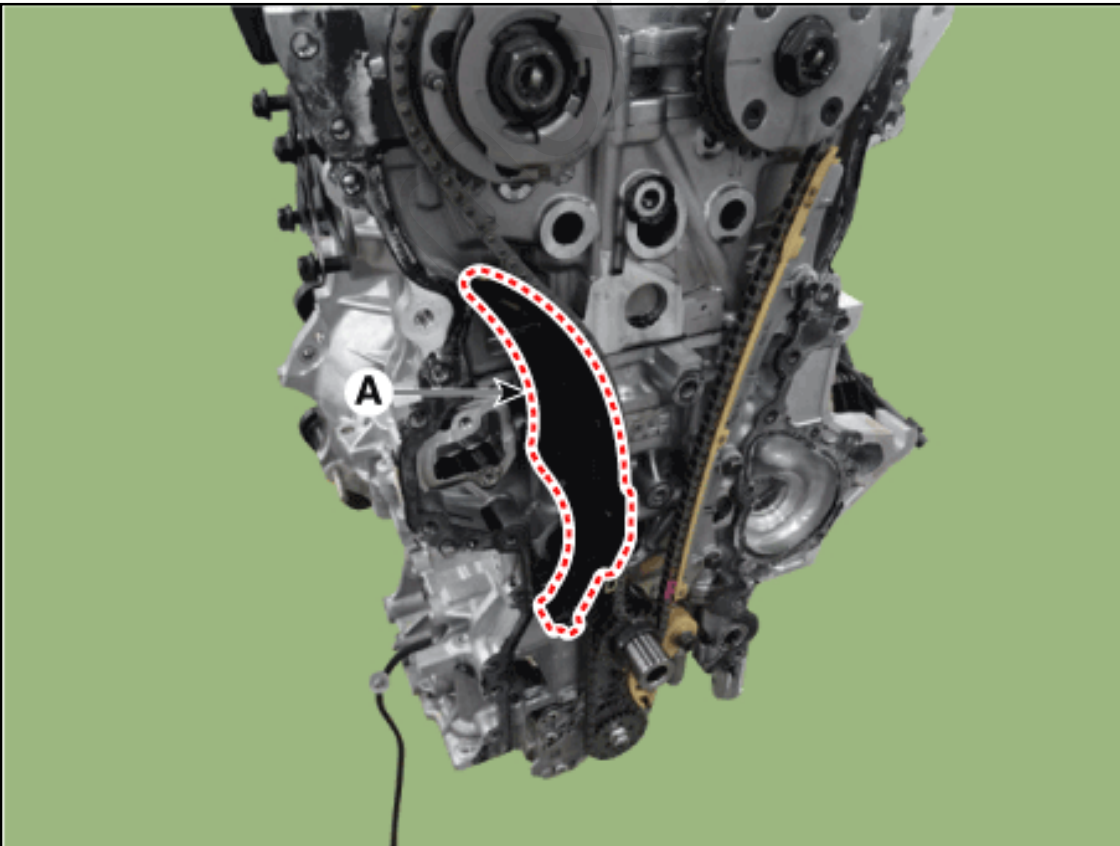




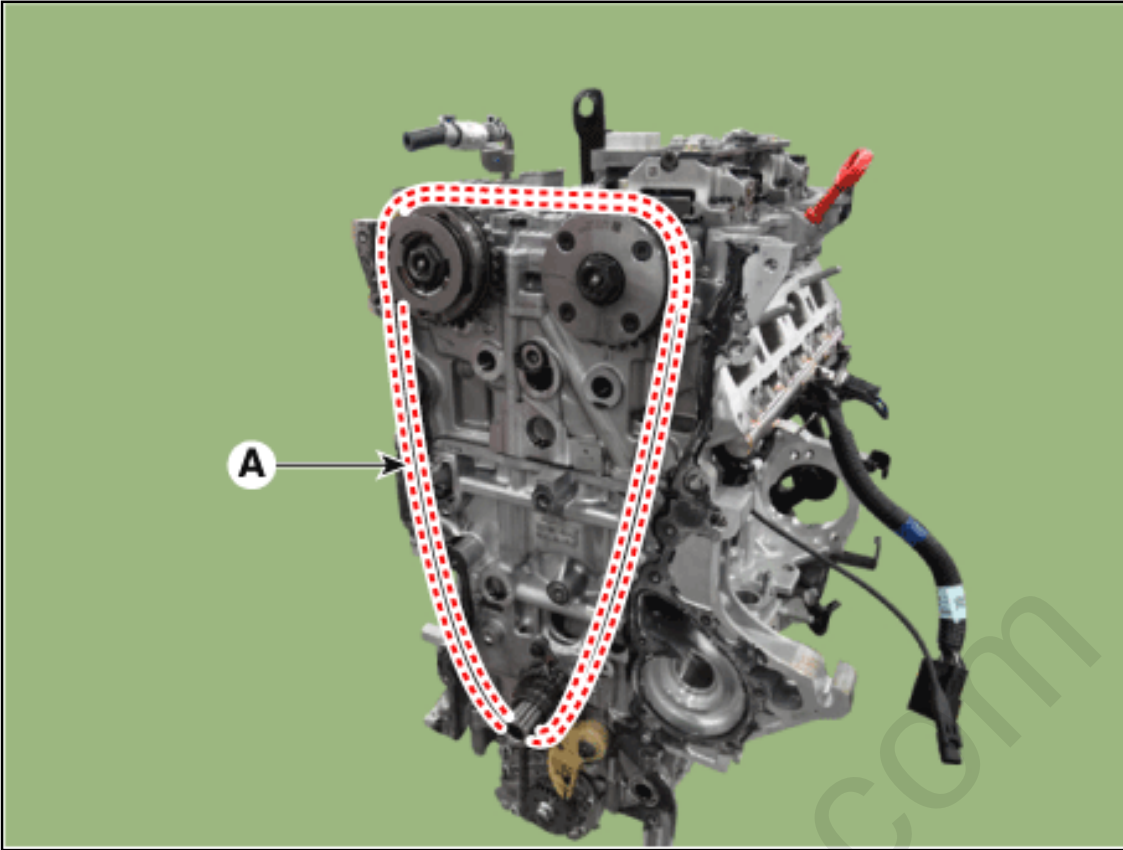
- Before the removal of timing chain tensioner, compress tensioner piston then remove the tensioner after fixing with fixing pin (A).



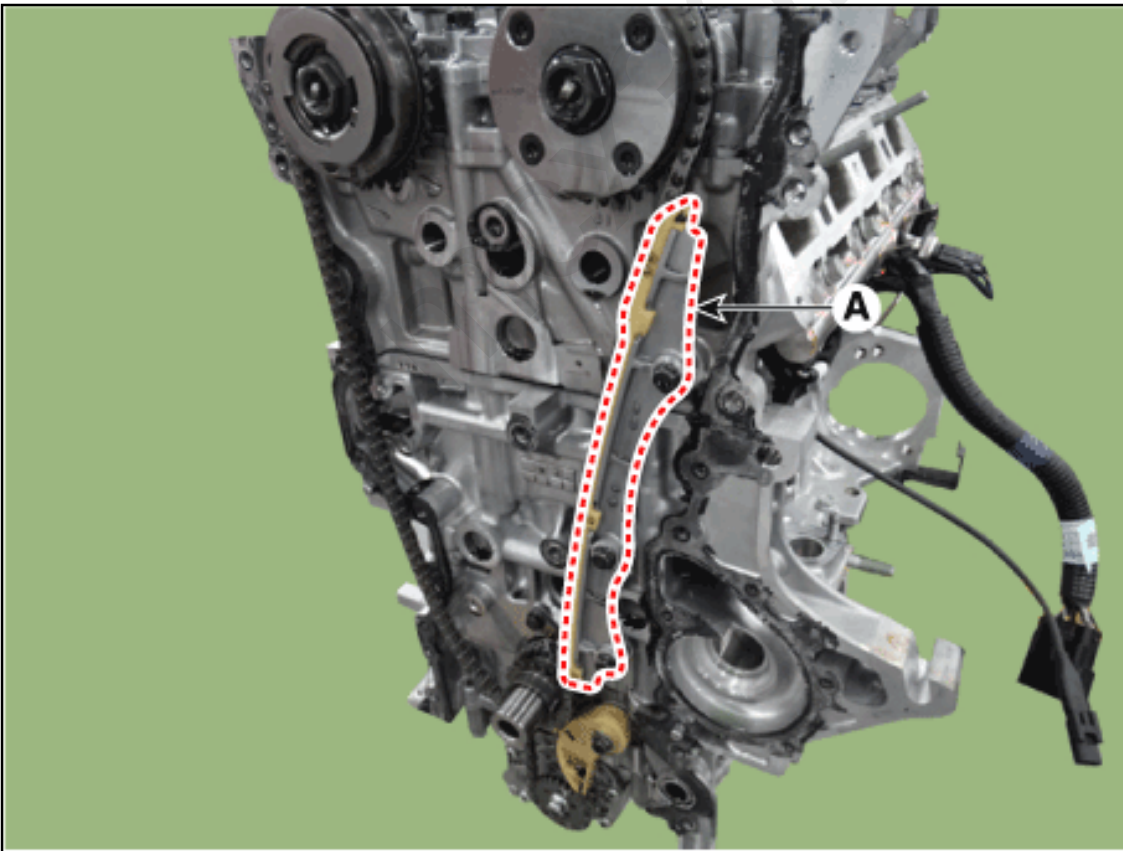
6. Remove the timing chain tensioner arm (A).



7. Remove the timing chain (A).

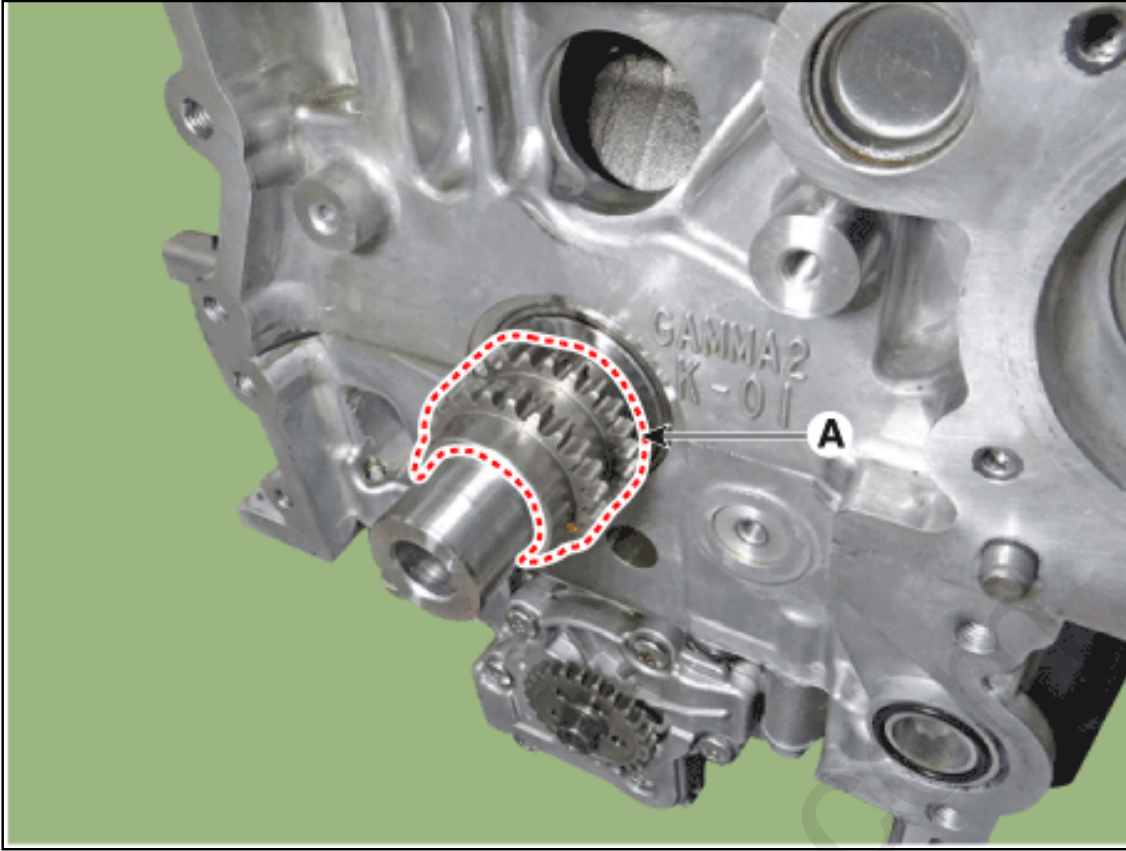


8. Remove the timing chain guide (A).



9. Remove the oil pump chain.
(Refer to Lubrication System - "Oil Pump")

10. Remove the crankshaft sprocket (A).



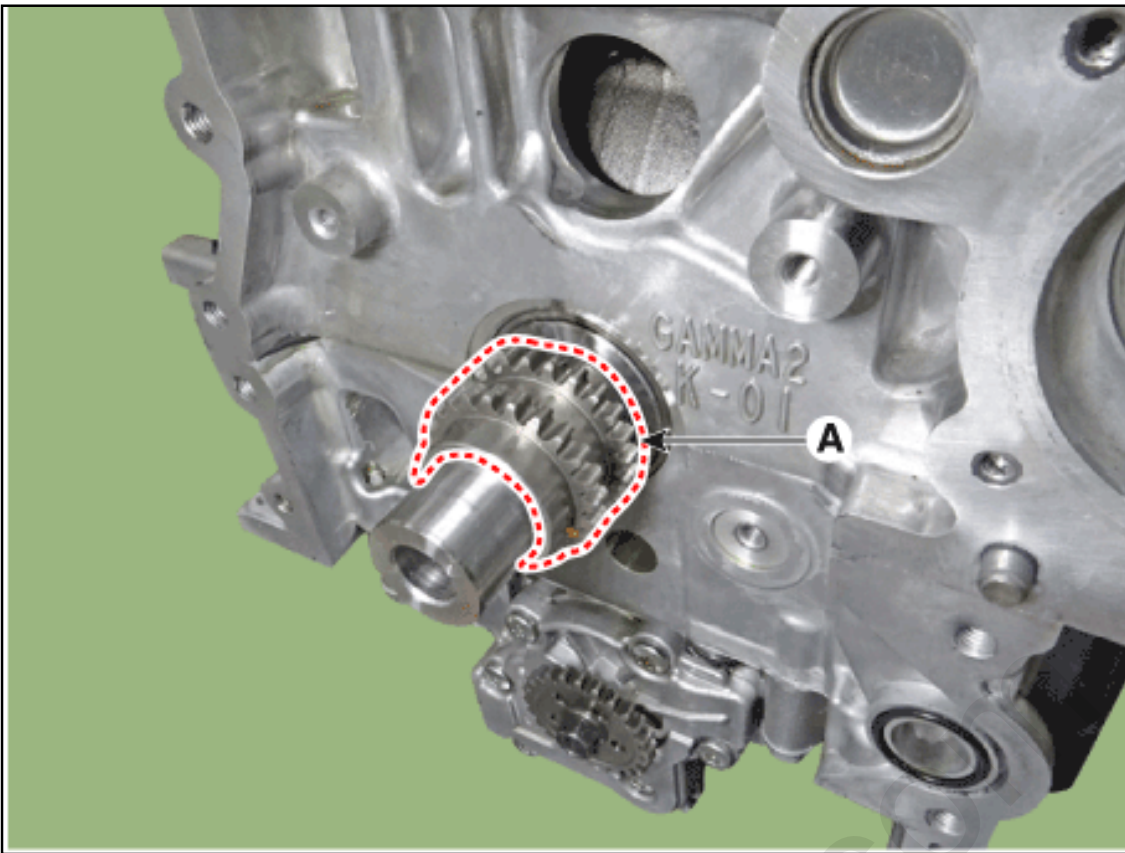
Inspection

Sprockets, Hydraulic Tensioner, Chain Guide, Chain Tensioner Arm

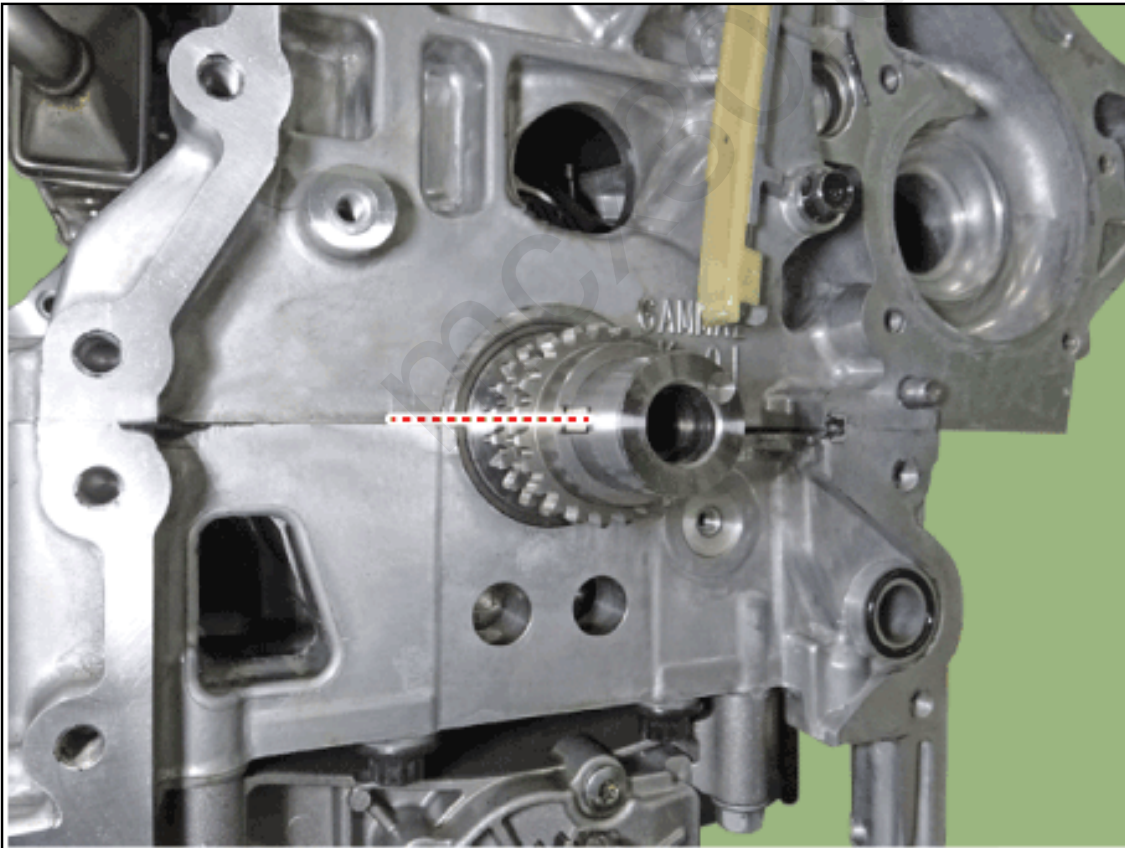
1. Check the camshaft sprocket, crankshaft sprocket teeth for abnormal wear, cracks or damage. Replace if necessary.
2. Check a contact surface of the chain tensioner arm and guide for abnormal wear, cracks or damage. Replace if necessary.
3. Check the hydraulic tensioner for its piston stroke and ratchet operation. Replace if necessary.

Installation

1. Install the crankshaft sprocket (A).

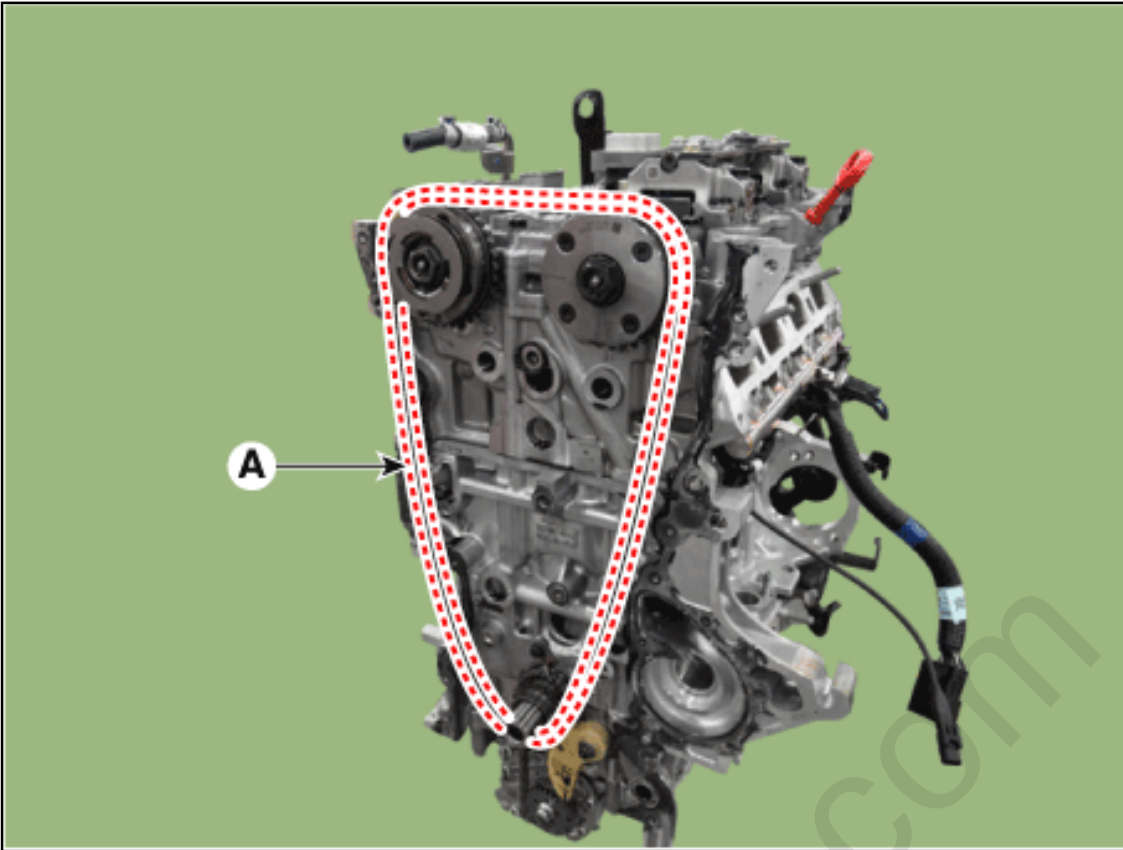


2. Place the crankshaft key at the left 180°.



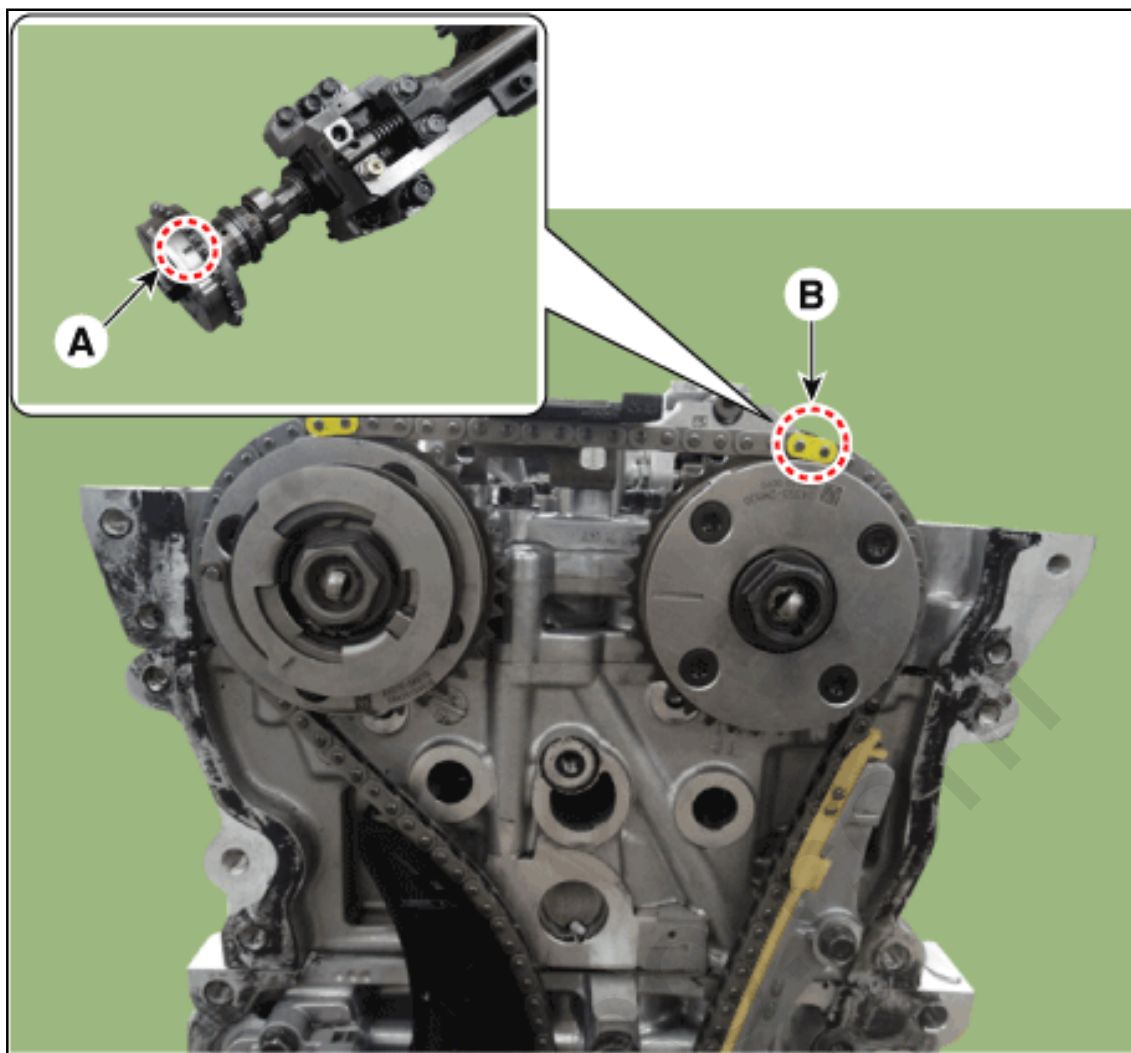
3. Install the oil pump chain.
(Refer to Lubrication System - "Oil Pump")

4. Install the timing chain (A).

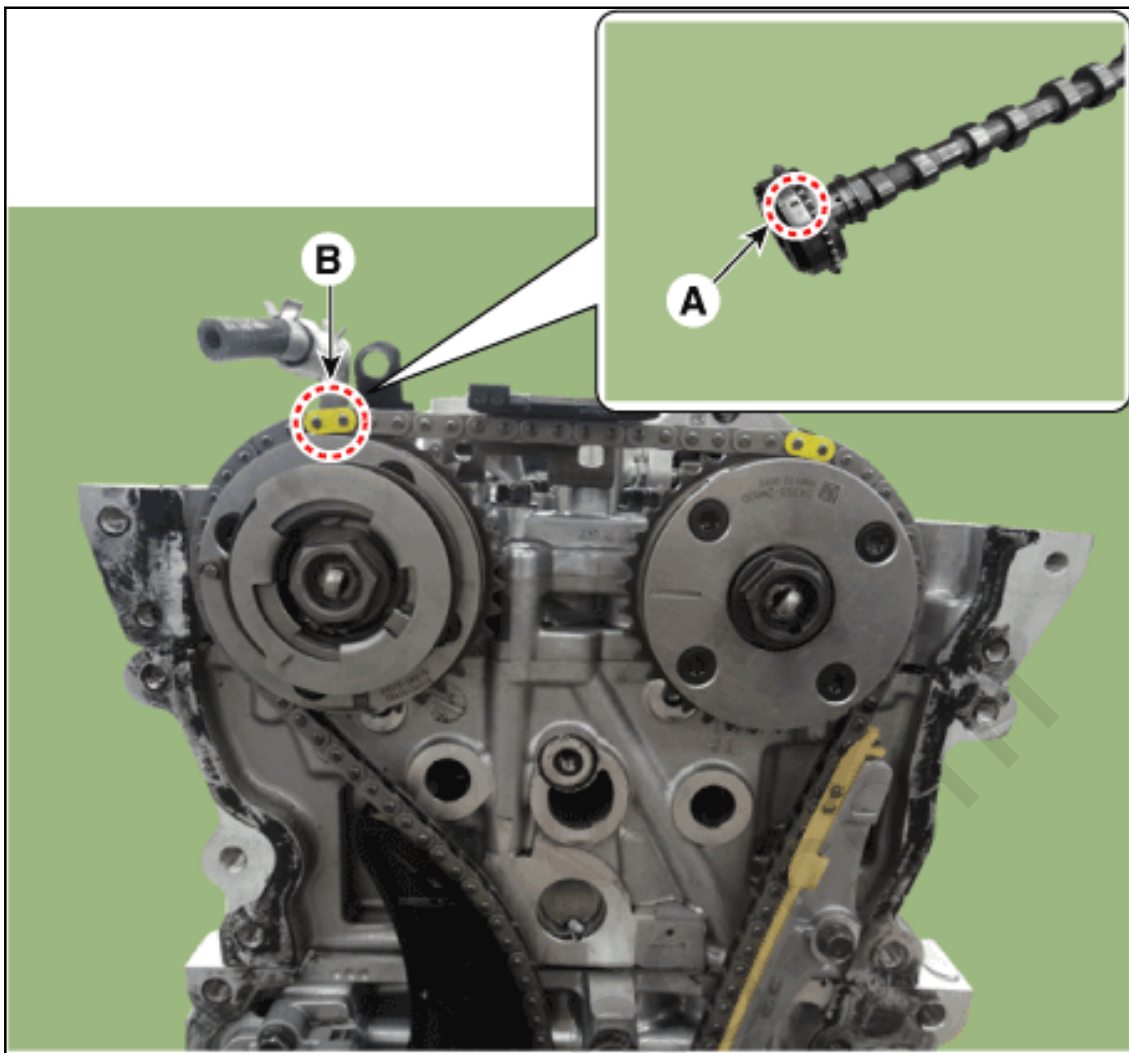


- When installing the timing chain, be sure that the timing mark (A) of each sprocket is matched with the timing mark (B) (color link) of the timing chain.

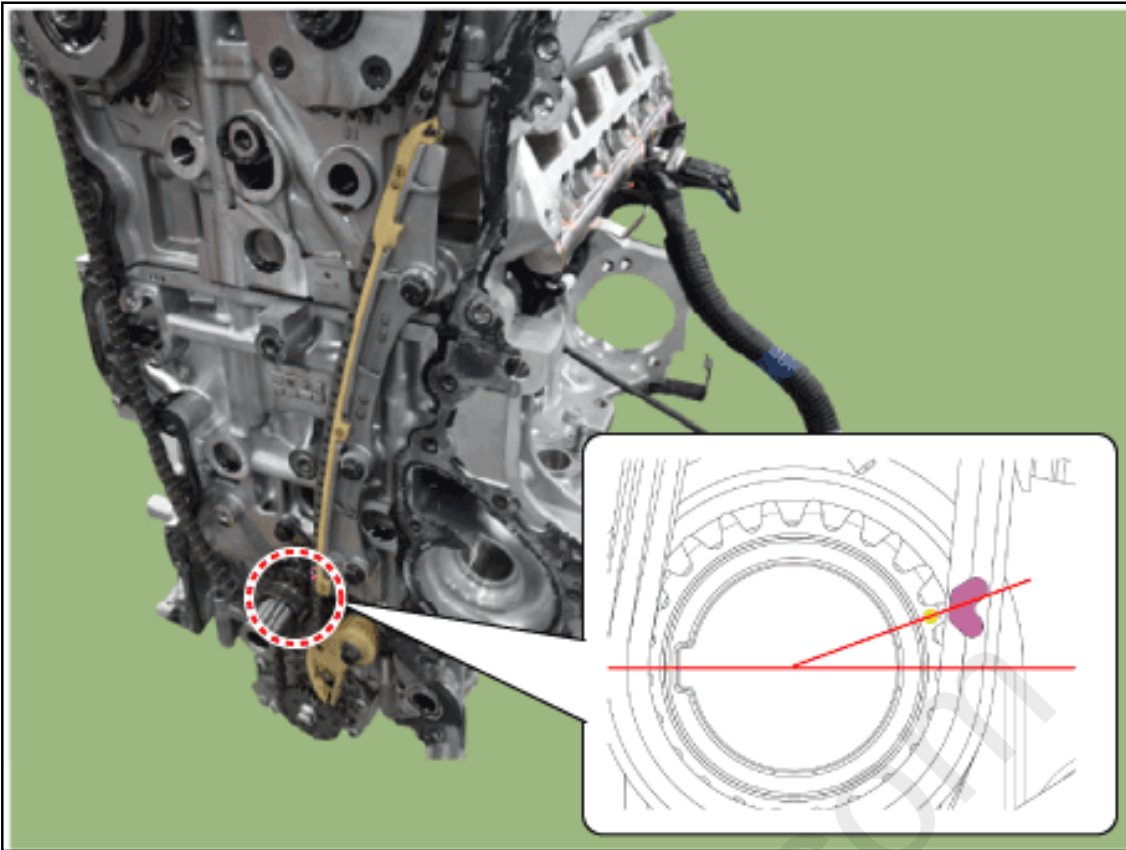
[Intake CVVT Timing Mark]



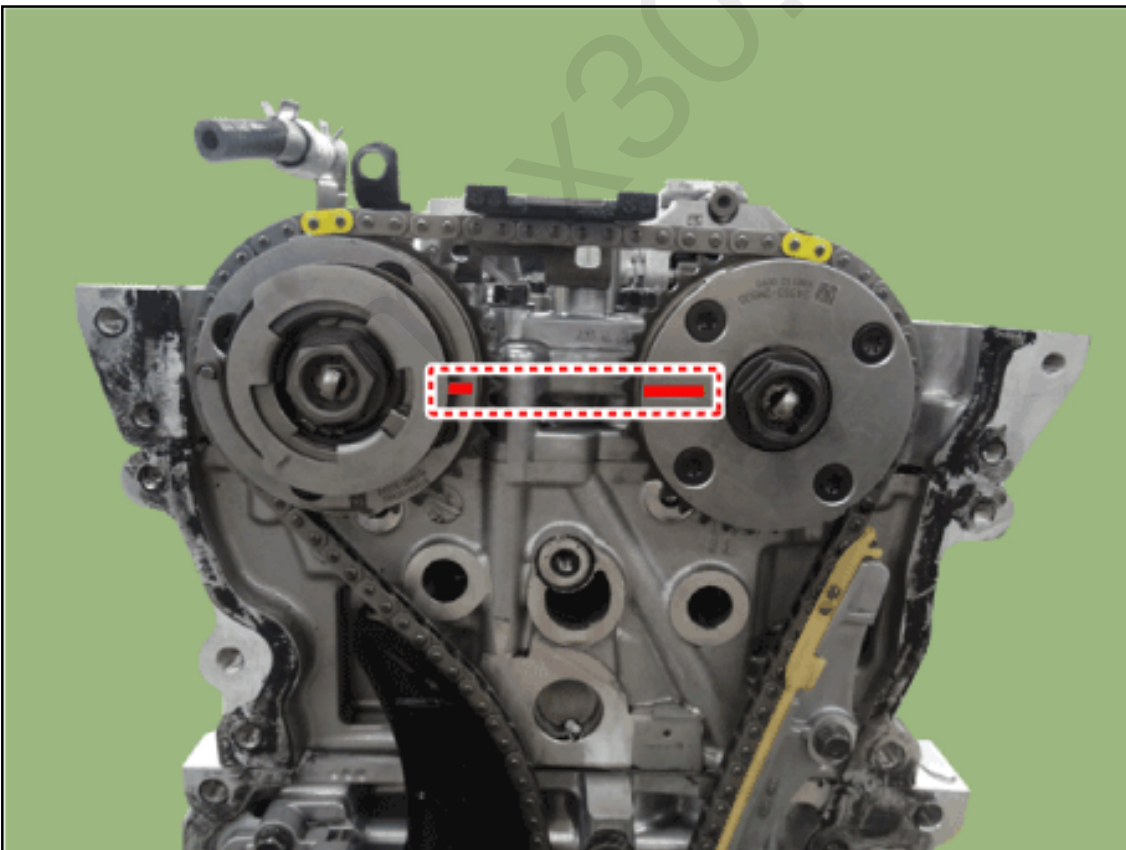
[Exhaust CVVT Timing Mark]



[Crankshaft Sprocket Timing Mark]



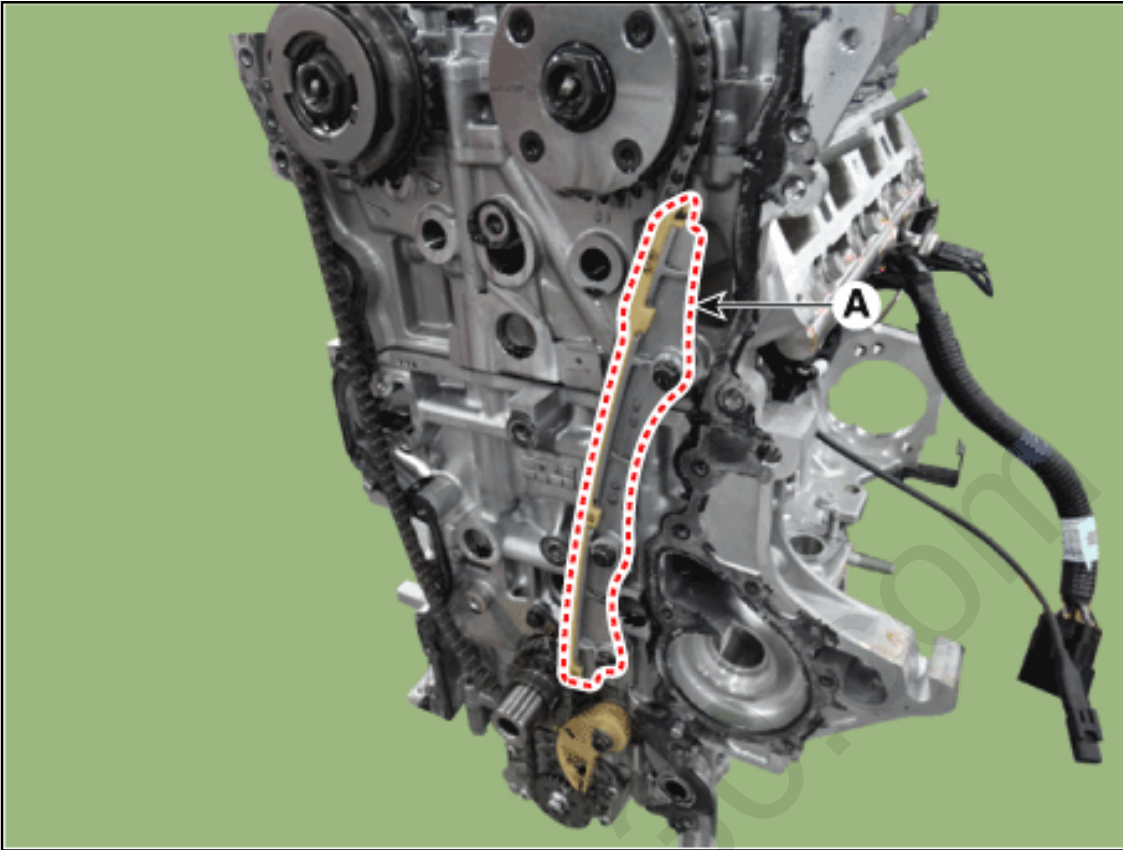
- Confirm that the TDC marks on the intake and exhaust CVVT sprockets are aligned with the top surface of cylinder head.



5. Install the timing chain guide (A).

Tightening torque :

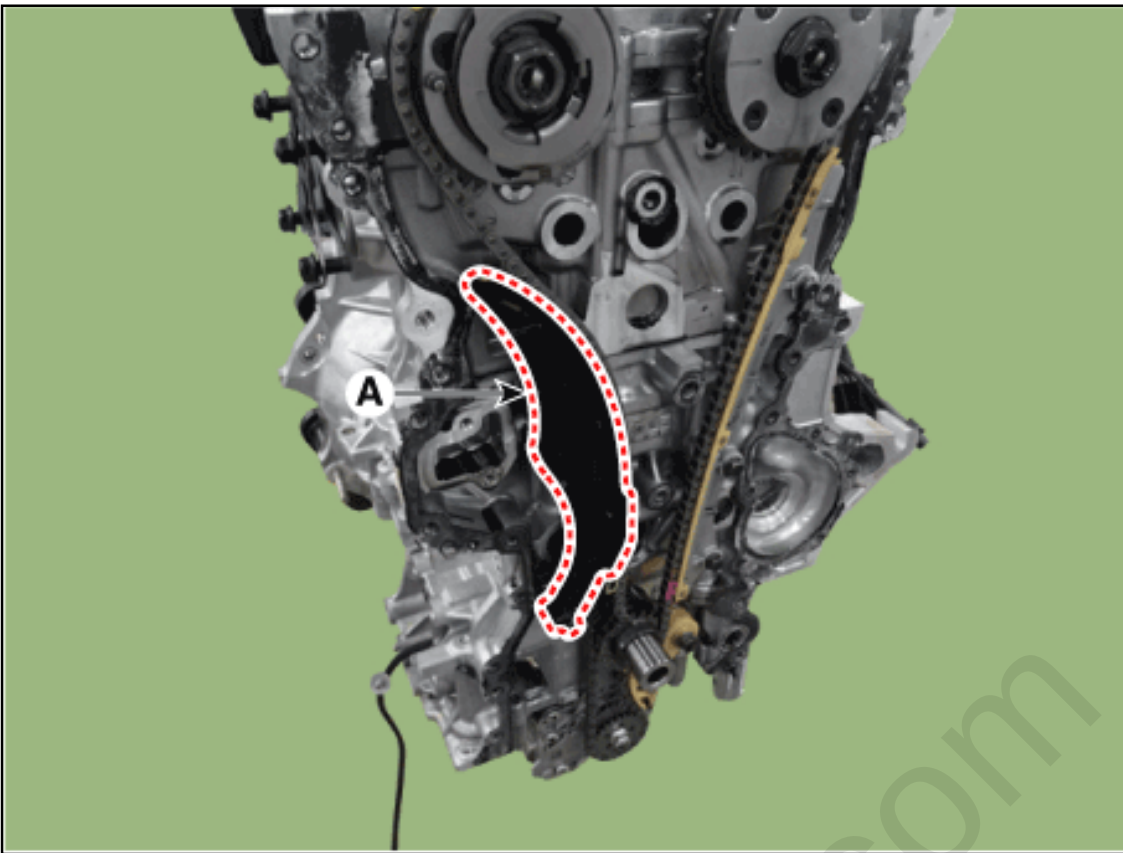
9.8 - 11.8 N.m (1.0 - 1.2 kgf.m, 7.2 - 8.7 lb-ft)



6. Install the timing chain tensioner arm (A).

Tightening torque :

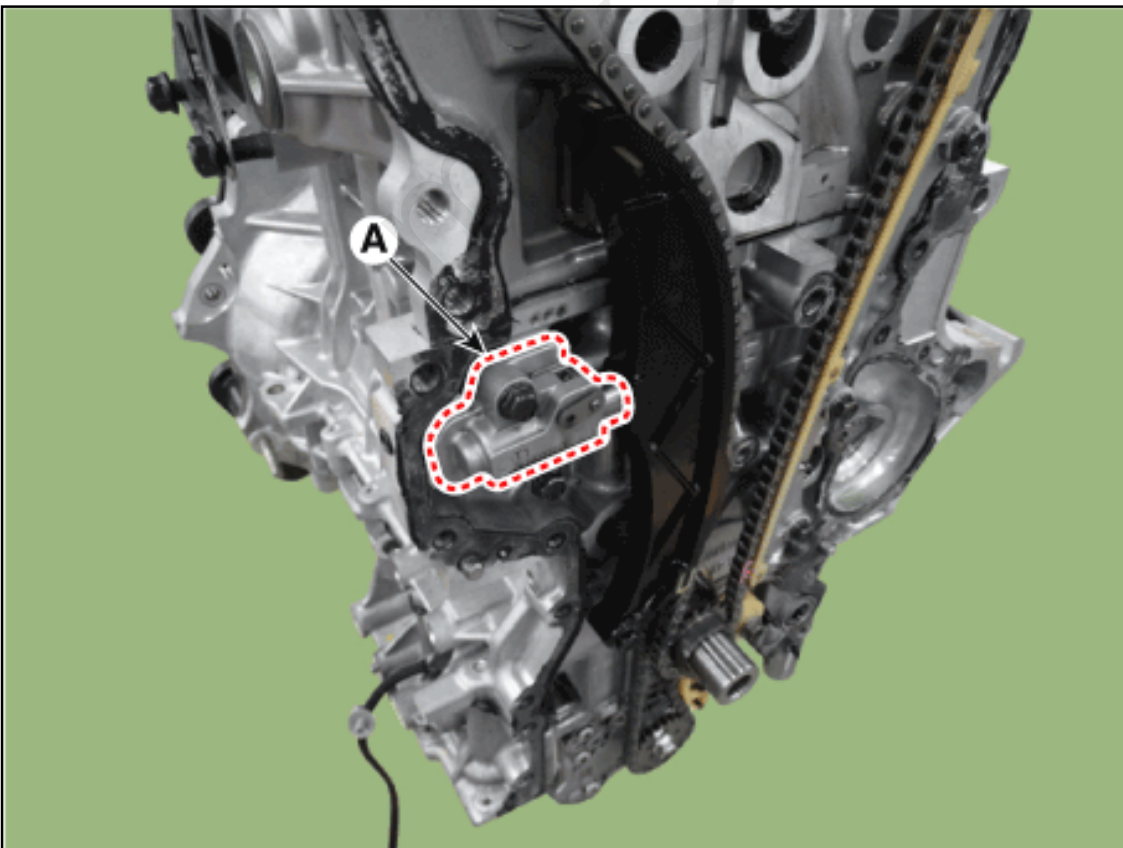
9.8 - 11.8 N.m (1.0 - 1.2 kgf.m, 7.2 - 8.7 lb-ft)



7. Install the timing chain tensioner (A).

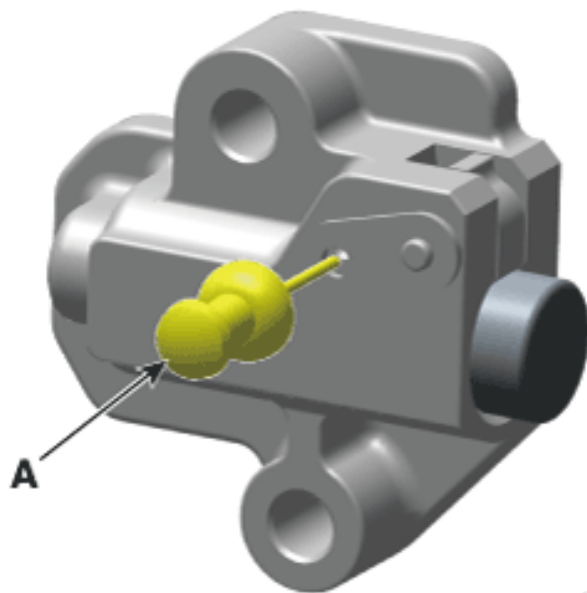
Tightening torque :

9.8 - 11.8 N.m (1.0 - 1.2 kgf.m, 7.2 - 8.7 lb-ft)





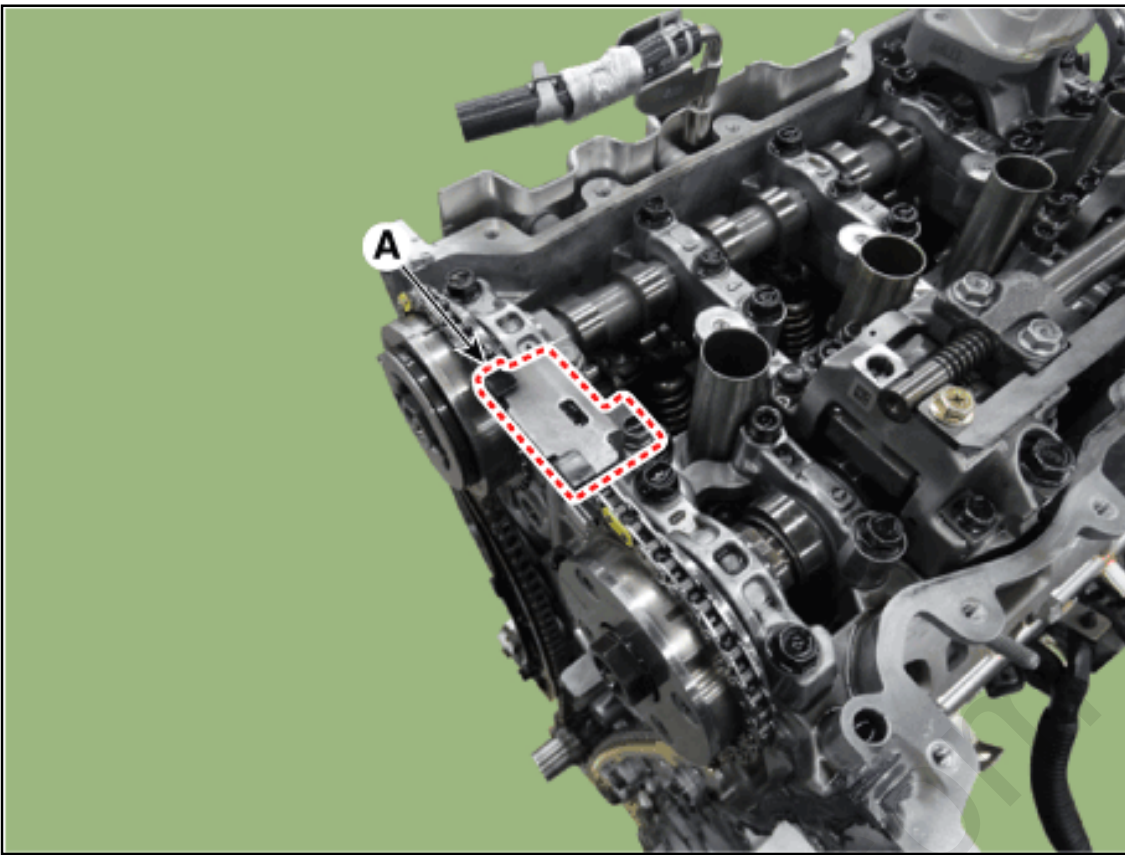
- Install the timing chain tensioner, and then remove the pin (A).



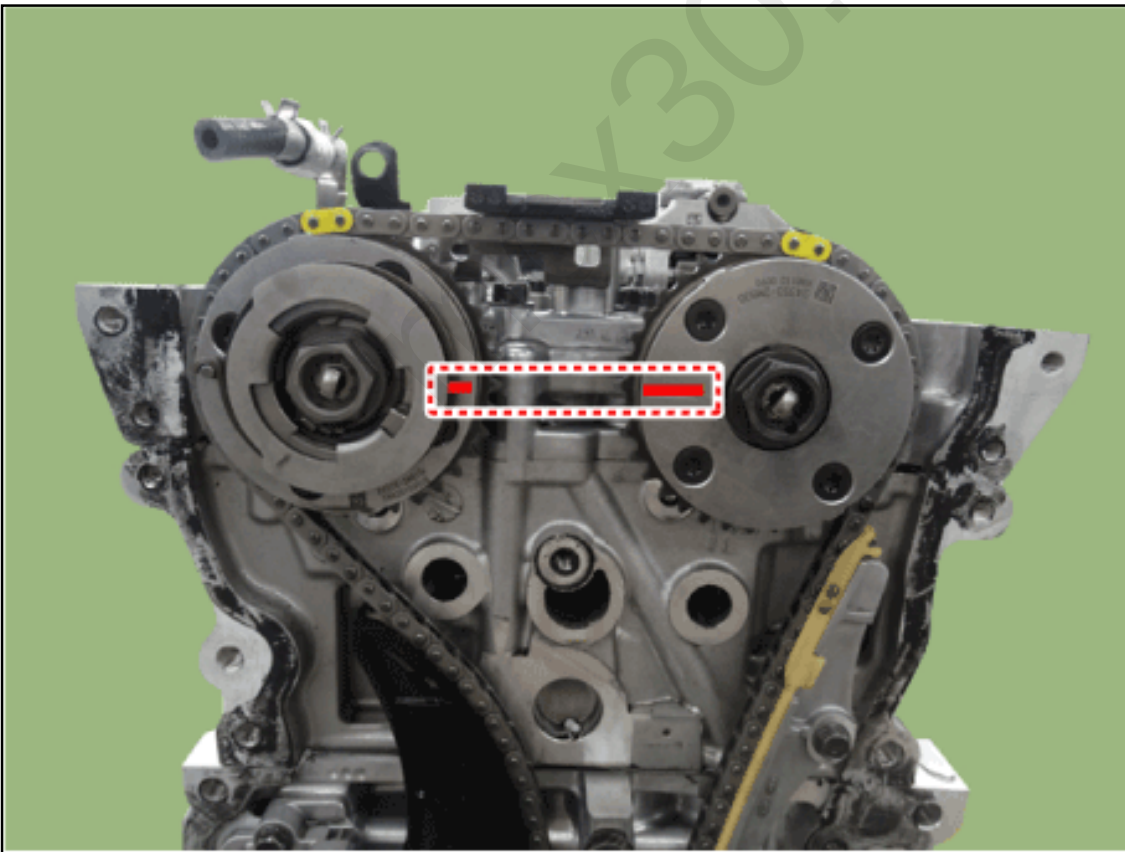
8. Install the cam to cam guide (A).

Tightening torque :

9.8 - 11.8 N.m (1.0 - 1.2 kgf.m, 7.2 - 8.7 lb-ft)



9. After rotating crankshaft 2 revolutions in regular direction (clockwise viewed from front), confirm that the TDC marks on the intake and exhaust CVVT sprockets are aligned with the top surface of cylinder head.



10. Install the timing chain cover.
(Refer to Timing System - "Timing Chain Cover")
 11. Install the other parts in the reverse order of removal.

