# Component Procedures: Crankshaft

## Table of Contents

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## Parts and Labor (itype_189)

### Parts

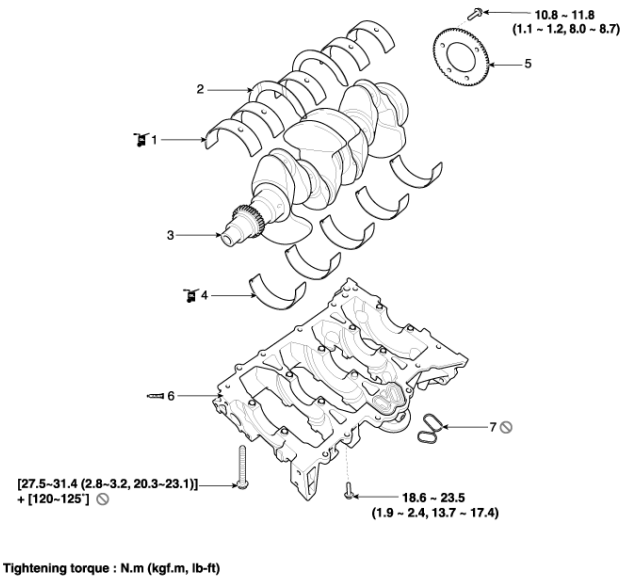
| Qualifier | Part # | Name | Price | Note |
|---|---|---|---|---|
| Crankshaft & Bearings > Cran? | 6D0562EU00 | 25 - Korea Built | 844.63 | |
| Crankshaft & Bearings > Cran? | 231102E810 | 25 - Us Built | 1375.50 | |

### Labor

| Operation | Qualifier Path | Skill | Std Hrs | Wty Hrs |
|---|---|---|---|---|
| Remove & Replace | Crankshaft & Bearings > Crankshaft, R&R | A | 15.8 | 0.0 |

## Crankshaft - Components and Components Location (Article 45358)

- Components




Tightening torque : N.m (kgf.m, lb-ft)

1. Crankshaft upper bearing 2. Crankshaft thrust bearing 3. Crankshaft 4. Crankshaft lower bearing 5. Crankshaft position sensor (CKPS) wheel 6. Lower crankcase 7. Gasket

## Crankshaft - Repair Procedures (Article 45359)

- Disassembly

Use fender covers to avoid damaging painted surfaces. To avoid damaging the cylinder head , wait until the engine coolant temperature drops below normal temperature (20°C [68°F]) before removing it. When handling a metal gasket, take care not to fold the gasket or damage the contact surface of the gasket. To avoid damage, unplug the wiring connectors carefully while holding the connector portion.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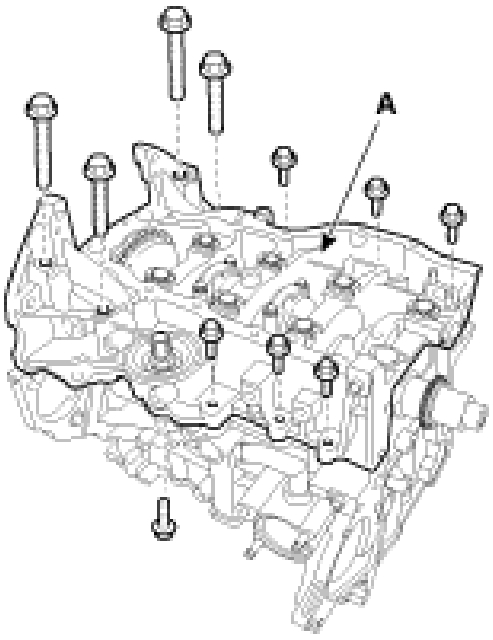
- To avoid damaging the cylinder head , wait until the engine coolant temperature drops below normal temperature (20°C [68°F]) before removing it.

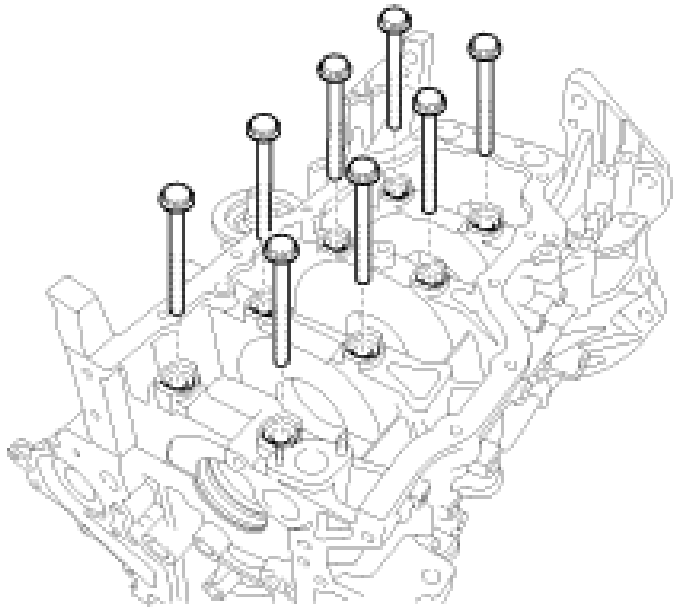
- When handling a metal gasket, take care not to fold the gasket or damage the contact surface of the gasket.
- To avoid damage, unplug the wiring connectors carefully while holding the connector portion.

Mark all wiring and hoses to avoid misconnection. Turn the crankshaft pulley so that the No.1 piston isat TDC (Top dead center).

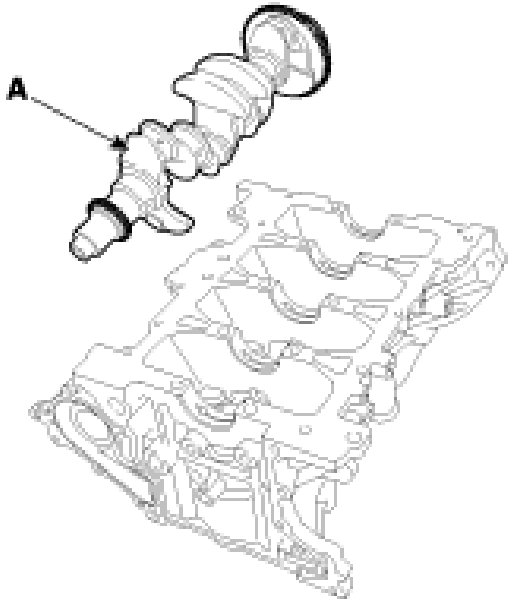

- Mark all wiring and hoses to avoid misconnection.
- Turn the crankshaft pulley so that the No.1 piston isat TDC (Top dead center).
- Remove the engine assembly from the vehicle. (Refer to Engine and Transaxle Assembly - "Engine and Transaxle Assembly")
- Remove the transaxle assembly from the engine assembly. Automatic Transaxle (Refer to Automatic Transaxle System - "Automatic Transaxle")
- Remove the drive plate. (Refer to Cylinder Block - "Drive Plate")
- Remove the rear oil seal . (Refer to Cylinder Block - "Rear Oil Seal")
- Install the engine to engine stand for disassembly.
- Remove the timing chain . (Refer to Timing System - "Timing Chain")
- Remove the water pump assembly. (Refer to Cooling System - "Water Pump")
- Remove the water inlet fitting and the thermostat assembly. (Refer to Cooling System - "Electric Thermostat (ECT)")
- Remove the intake manifold . (Refer to Intake and Exhaust System - "Intake Manifold")
- Remove the A/C compressor. (Refer to Heating, Ventilation Air conditioning - "Compressor")
- Remove the exhaust manifold . (Refer to Intake and Exhaust System - "Exhaust Manifold")
- Remove the cylinder head assembly . (Refer to Cylinder Head Assembly - "Cylinder Head")
- Remove the oil filter . (Refer to Lubrication System - "Engine Oil")
- Remove the oil screen. (Refer to Lubrication System - "Oil Pan")
- Remove the piston and connecting rod assemblies. (Refer to Cylinder Block - "Piston and Connecting Rod")
- Check the crankshaft bearing oil clearance.
- Remove the lower crankcase (A). Remove the lower crankcase mounting bolts. Remove the main bearing cap bolts.
- Remove the lower crankcase mounting bolts.




- Remove the main bearing cap bolts.



- Check the crankshaft end play.
- Lift the crankshaft (A) out of the engine, being careful not to damage journals. Arrange the main bearings and thrust bearings in the correct order.

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- Arrange the main bearings and thrust bearings in the correct order.
- Inspection
- Check the crankshaft bearing oil clearance. To check main bearing-to-journal oil clearance, remove the lower crankcase and lower bearings. Clean each main journal and bearing with a clean shop towel. Place one strip of plastigage across each main journal. Reinstall the lower crankcase and lower bearings, and then tighten the main bolts. Tightening torque 1st step : 27.5 - 31.4 N.m (2.8 - 3.2 kgf.m, 20.3 - 23.1 lb-ft) 2nd step : 120 - 125° Do not turn the crankshaft. Remove the lower crankcase and lower bearings. Measure the width of the plastigage at its widest point. Oil clearance : 0.016 - 0.034 mm (0.00063 - 0.00134 in.) If the plastigage measures too wide or too narrow, remove the upper and lower bearing and then install a new bearings with the same color mark. Recheck the oil clearance. Do not file, shim, or scrape the bearings or the caps to adjust clearance. If the plastigage shows the clearance is still incorrect, try the next larger or smaller bearing. Recheck the oil clearance. If the proper clearance cannot be obtained by using the appropriate larger or smaller bearings, replace the crankshaft and start over. If the marks are indecipherable because of an accumulation of dirt and dust, do not scrub them with a wire brush or scraper. Clean them only with solvent or

detergent. Crankshaft Bore Identification Mark Letters have been stamped on the block as a mark for the size of each of the 5 main journal bores. Use them, and the numbers or bar stamped on the crank (marks for main journal size), to choose the correct bearings. Cylinder Block Specifications Calss Mark Inside Diameter a A 59.000 - 59.006 mm (2.32283 - 2.32307 in.) b B 59.006 - 59.012 mm (2.32307 - 2.32330 in.) c C 59.012 - 59.018 mm (2.32330 - 2.32354 in.) Crankshaft Journal Identification Mark Conform to read stamping order as shown arrow direction from #1. Crankshaft Specifications Class Mark Outside Diameter Of Journal I 1 54.954 - 54.960 mm (2.16354 - 2.16378 in.) II 2 54.948 - 54.954 mm (2.16330 - 2.16354 in.) III 3 54.942 - 54.948 mm (2.16307 - 2.16330 in.) Crankshaft Bearing Identification Mark Crankshaft Bearing Specifications Class Mark Thickness Of Bearing A Blue 2.021 - 2.024 mm (0.07957 - 0.07968 in.) B Black 2.018 - 2.021 mm (0.07945 - 0.07957 in.) C None 2.015 - 2.018 mm (0.07933 - 0.07945 in.) D Green 2.012 - 2.015 mm (0.07921 - 0.7933 in.) E Yellow 2.009 - 2.012 mm (0.07909 - 0.07921 in.) Select a crankshaft bearing using the selection chart. Selection Chart For Crankshaft Bearings Assembling Classification Of Bearing Crankshaft Bore Identification Mark a (A) b (B) c (C) Crankshaft Identification Mark I (1) E (Yellow) D (Green) C (None) II (2) D (Green) C (None) B (Black) III (3) C (None) B (Black) A (Blue)

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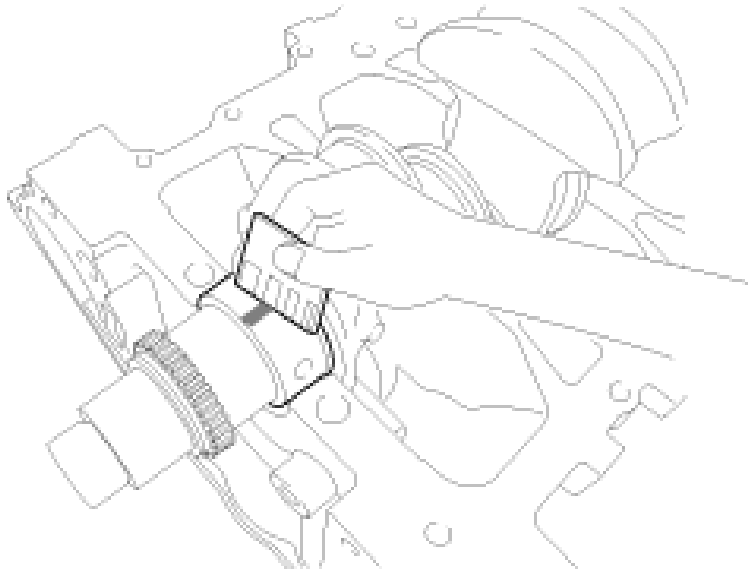

- If the plastigage measures too wide or too narrow, remove the upper and lower bearing and then install a new bearings with the same color mark. Recheck the oil clearance. Do not file, shim, or scrape the bearings or the caps to adjust clearance.

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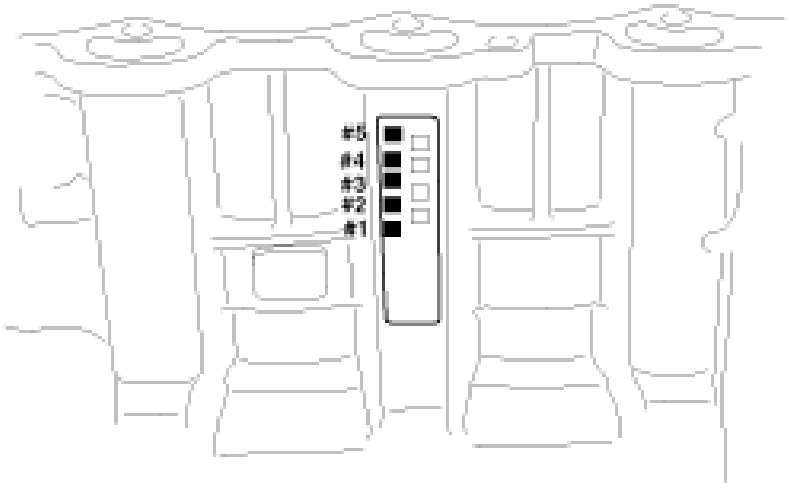


Cylinder Block Specifications
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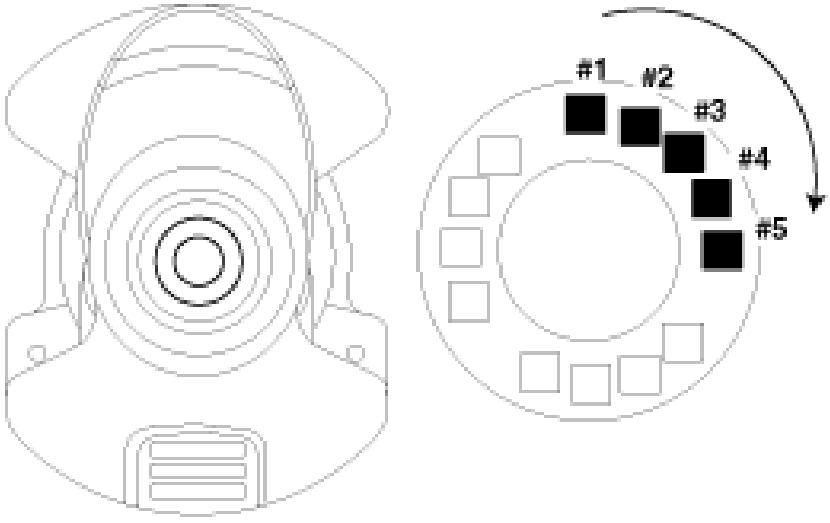


Conform to read stamping order as shown arrow direction from #1.
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Crankshaft Specifications

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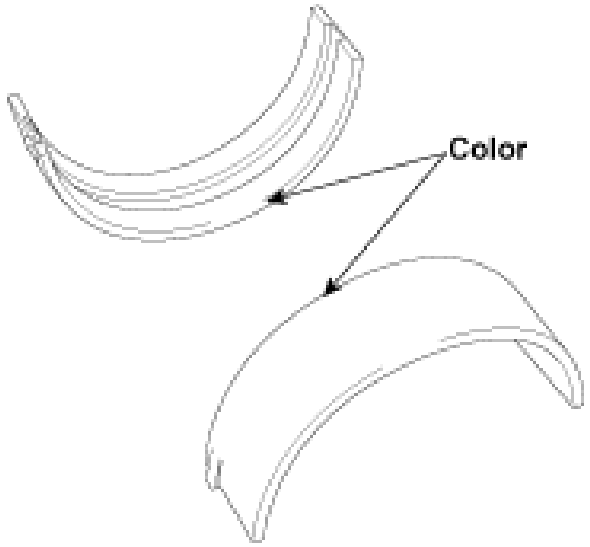


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Selection Chart For Crankshaft Bearings
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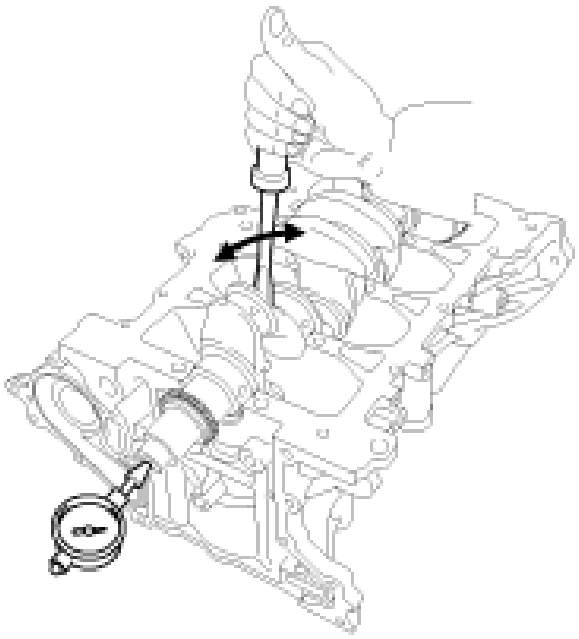
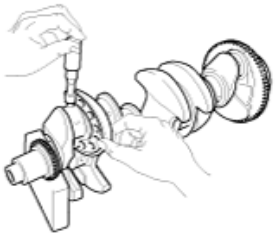
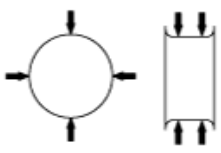
- Check crankshaft end play. Using a dial indicator, measure the thrust clearance while prying the crankshaft back and forth with a screwdriver. If the end play is greater than maximum, replace the center bearing. End play Standard : 0.07 - 0.25 mm (0.0028 - 0.0098 in.)



- Inspect main journals and crank pins. Using a micrometer, measure the diameter of each main journal and crank pin. Main journal diameter : 54.942 - 54.960 mm (2.16307 - 2.16378 in.) Crank pin diameter : 44.954 - 44.972 mm (1.76984 - 1.77055 in.)





- Reassembly
Thoroughly clean all parts to be assembled. Before installing the parts, apply fresh engine oil to all sliding and rotating surfaces.
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- Install the crankshaft main bearing s. Upper bearings have an oil groove of oil holes; Lower bearings do

not. Align the bearing claw with the groove of the cylinder block, and push in the 5 upper bearings (A). Align the bearing claw with the groove of the lower crankcase (B), and push in the 5 lower bearings (A).
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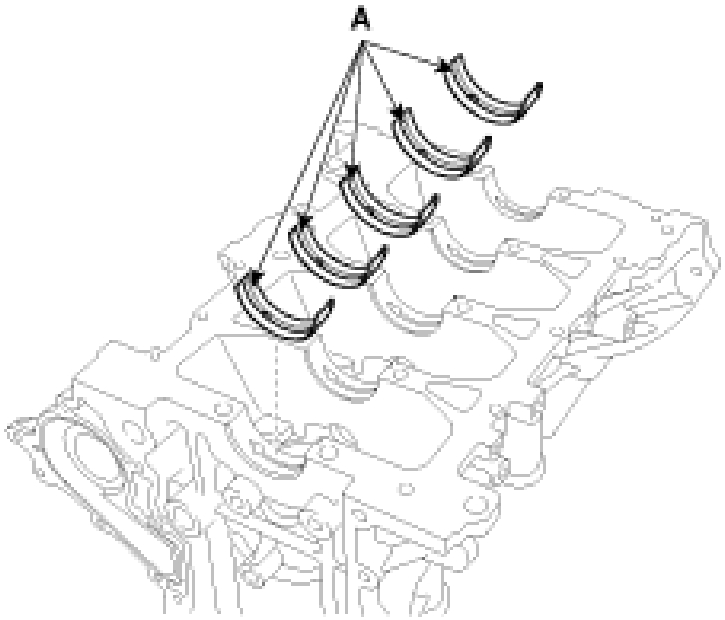
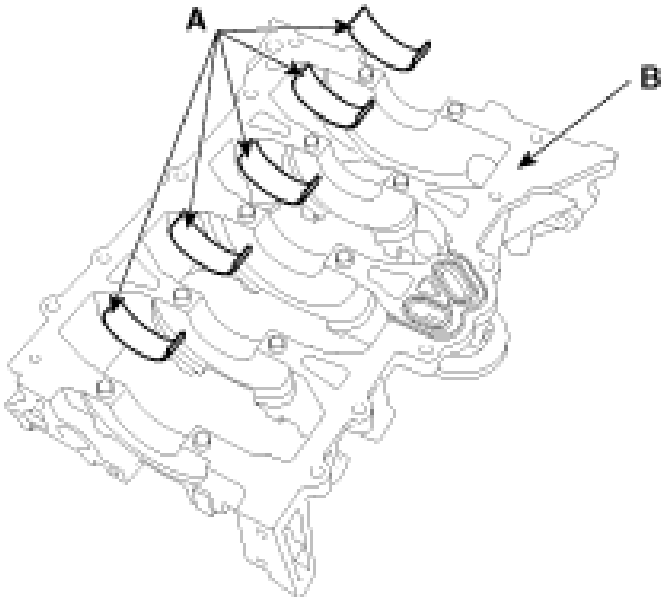
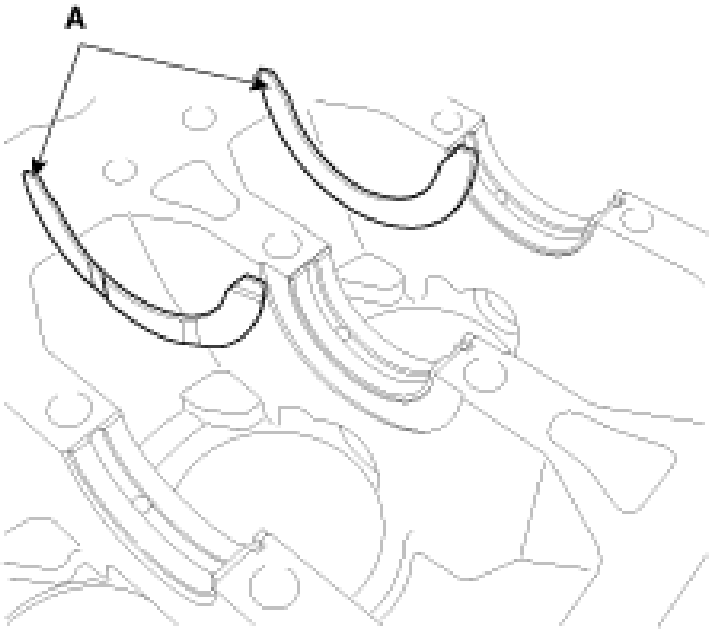


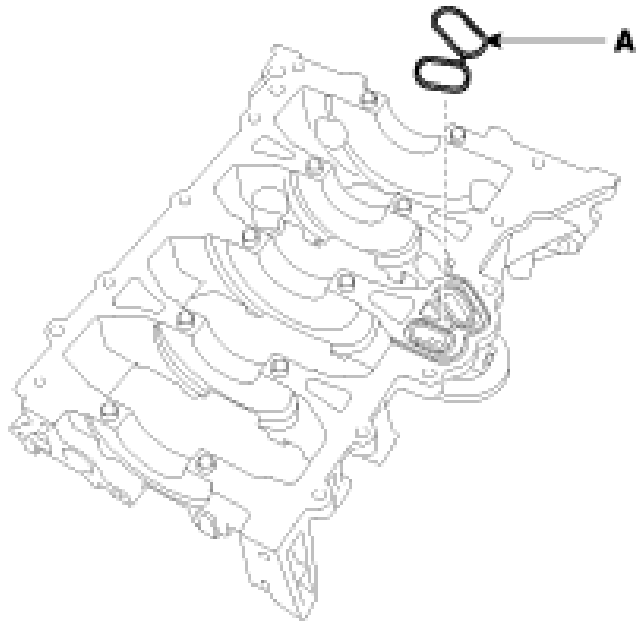

- Align the bearing claw with the groove of the lower crankcase (B), and push in the 5 lower bearings (A).




- Install the thrust bearings. Install the 2 thrust bearings (A) on both sides of the No.3 journal of the cylinder block with the oil groove facing out.




- Place the crankshaft (A) on the cylinder block.
- Apply liquid sealant on the top surface of the lower crankcase. Using a gasket scraper, remove all the old packing material from the gasket surfaces. The sealant locations on the lower crankcase and the cylinder block must be free of harmful foreign materials, oil, dust and moisture. Spraying cleaner on the surface and wiping with a clean duster. Assemble a new rubber gasket (A) on the top of lower crankcase. Apply liquid sealant on the bottom of the cylinder block. Continuous bead of sealant should be applied to prevent any path from oil leakage. Bead width : 2.5 - 3.5 mm (0.10 - 0.14 in.) Sealant : Threebond 1217H or equivalent Assemble the lower crankcase within 5 minutes after applying sealant. The engine running or pressure test should not be performed within 30 minutes after assembling the lower crankcase. Excess sealant on application surface of sealant of following process should be removed before hardening. If the sealant is applied to the top surface of the lower crankcase, it should be the same position as the cylinder block. To prevent leakage of oil, apply sealant gasket on the inner threads of the bolt holes.
- Using a gasket scraper, remove all the old packing material from the gasket surfaces.
- The sealant locations on the lower crankcase and the cylinder block must be free of harmful foreign materials, oil, dust and moisture. Spraying cleaner on the surface and wiping with a clean duster.
- Assemble a new rubber gasket (A) on the top of lower crankcase.




- Apply liquid sealant on the bottom of the cylinder block. Continuous bead of sealant should be applied to prevent any path from oil leakage. Bead width : 2.5 - 3.5 mm (0.10 - 0.14 in.) Sealant : Threebond 1217H or

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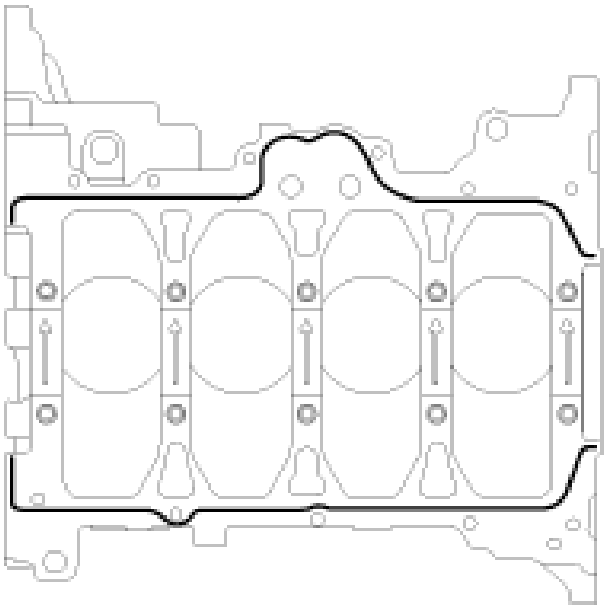

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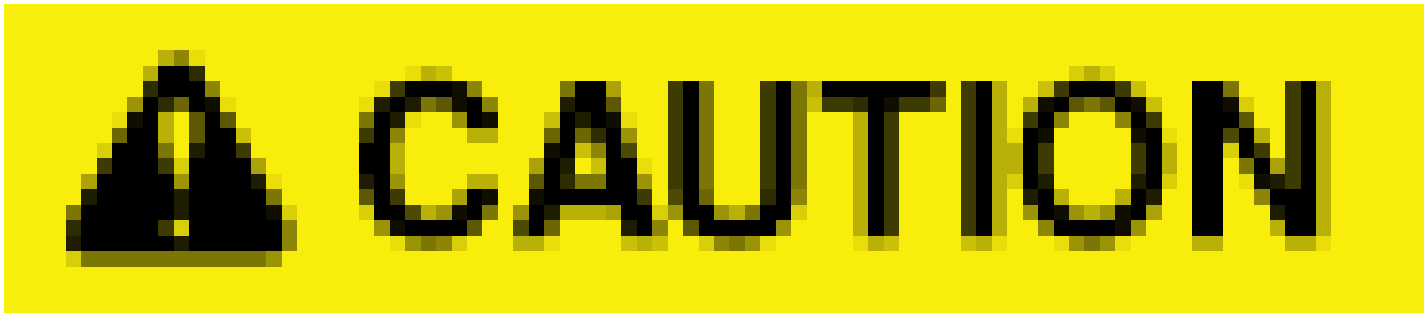


- Assemble the lower crankcase within 5 minutes after applying sealant.
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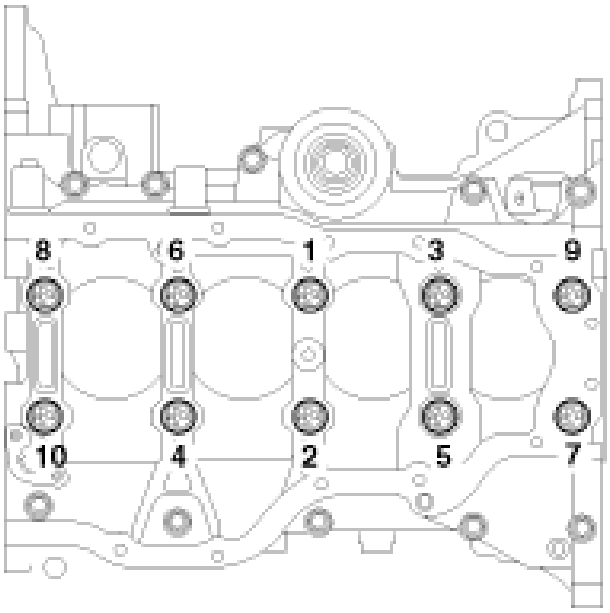
- Excess sealant on application surface of sealant of following process should be removed before hardening.
- If the sealant is applied to the top surface of the lower crankcase, it should be the same position as the cylinder block.
- To prevent leakage of oil, apply sealant gasket on the inner threads of the bolt holes.
- Place the lower crankcase on the cylinder block.
- Install the main bearing cap bolts. Using SST (09221-4A000), install and tighten the 10 main bearing cap bolts, in several passes, in the sequence as shown. Tightening torque 1st step : 27.5 - 31.4 N.m (2.8 - 3.2 kgf.m, 20.3 - 23.1 lb-ft) 2nd step : 120 - 125° Do not reuse the bearing cap bolts. Do not apply engine oil on the bolt threads to achieve correct torque. The main bearing cap bolts are tightened in 2 progressive steps. If any of the bearing cap bolts is broken or deformed, replace it. Be sure to assemble the main bearing cap bolts in correct order.

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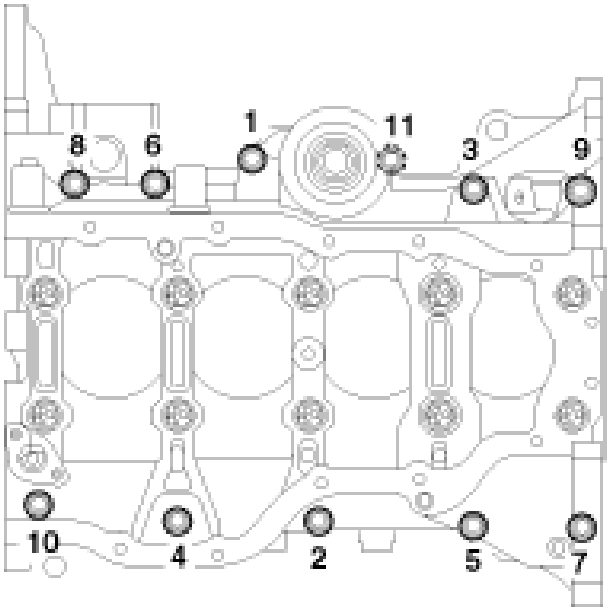
- If any of the bearing cap bolts is broken or deformed, replace it.
- Be sure to assemble the main bearing cap bolts in correct order.
- Install the lower crankcase bolts, in several passes, in sequence as shown. Tightening torque : 18.6 -23.5 N.m (1.9 - 2.4 kgf.m, 13.7 - 17.4 lb-ft) Check that the crankshaft turns smoothly.




- Assemble the other parts in the reverse order of disassembly.

In case the crankshaft is replaced with a new one, select the proper connecting rod bearing according to the pin journal mark on the crankshaft. Connecting rod bearing selection (Refer to Cylinder Block - "Piston and Connecting Rod")
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