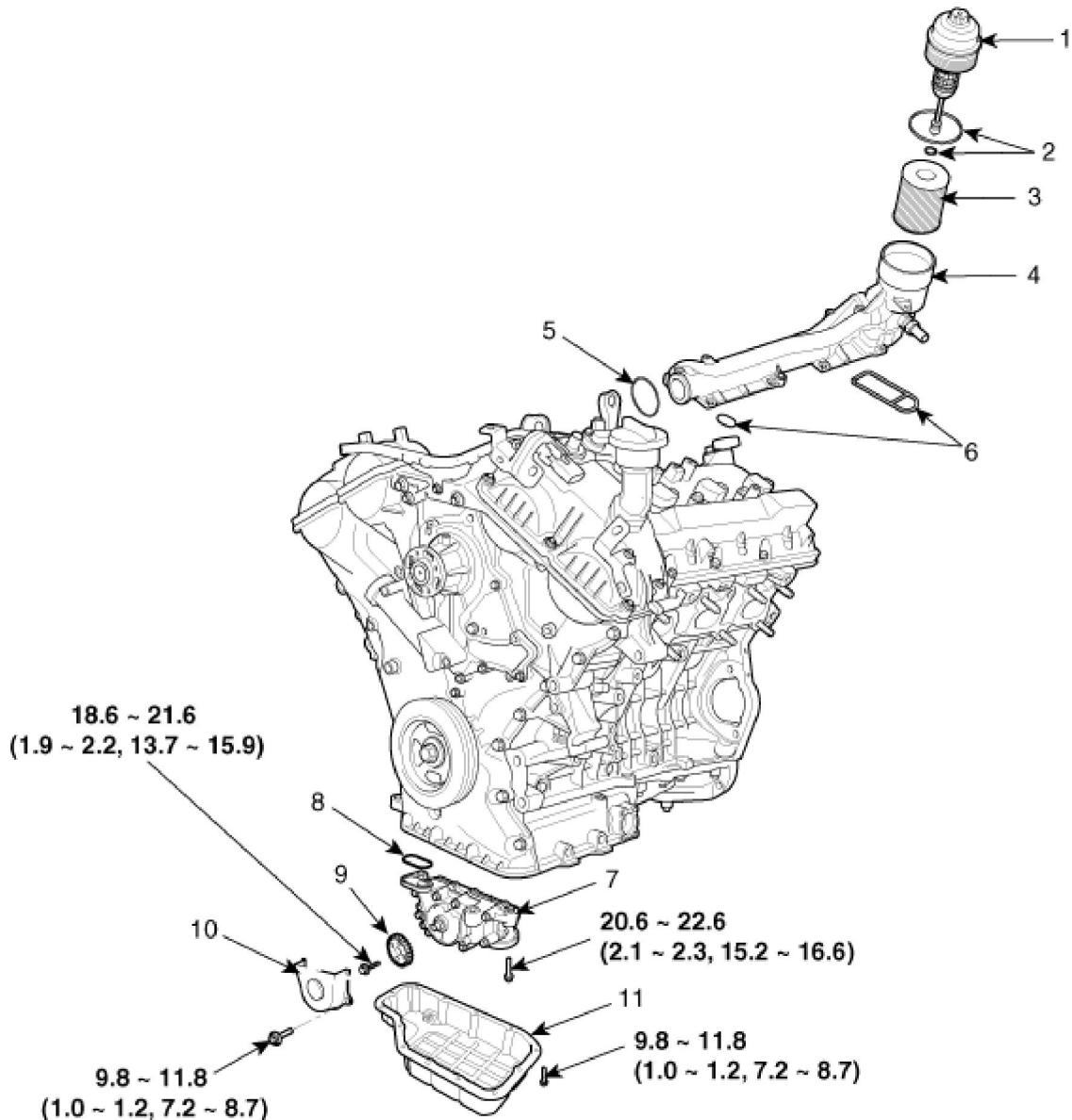


excessively	performance (cool air blown-out) • Thermogauge indicates 'LOW'	after removing the radiator cap. GDS check & Starting engine	leakage. • Check DTCs • Check connection of the fan clutch or the fan motor. ※ If the fan clutch is always connected, there will be a noise at idle.	recheck. • Check the engine coolant sensor, wiring and connectors. • Replace the components.
		Remove the thermostat and inspect	• Check if there are dusts or chips in the thermostat valve. • Check adherence of the thermostat.	• Clean the thermostat valve and reuse the thermostat. • Replace the thermostat, if it doesn't work properly.
Heated excessively	• Engine overheated • Thermogauge indicates 'HI'	Visually check after removing the radiator cap.	• Insufficient coolant or leakage. ※ Be careful when removing a radiator cap of the overheated vehicle. • Check air in cooling system.	• After refilling coolant, recheck. • Check the cylinder head gaskets for damage and the tightening torque of the mounting bolts.
		GDS check & Starting engine	• Check DTCs • Check the fan motor performance as temperature varies. • Check if the fan clutch slips. • Check the water pump adherence or impeller damaged.	• Check the engine coolant sensor, wiring and connectors. • Check the fan motor, the relay and the connector. • Replace the fan clutch, if it doesn't work properly. • Replace the water pump, if it doesn't work properly.
		Immerse the thermostat in boiling water and inspection.	• After removing the thermostat, check it works properly. ※ Check the thermostat opens at the valve opening temperature.	• Replace the thermostat, if it doesn't work properly.

Engine Mechanical System > Lubrication System > Oil Pump > Components and Components Location

Components



Torque : N.m (kgf.m, lb-ft)

1. Oil filter cap	5. O-ring	9. Oil pump sprocket
2. O-ring	6. Gasket	10. Oil pump chain cover
3. Oil filter element	7. Oil pump	11. Lower oil pan
4. Oil filter body	8. Gasket	

Engine Mechanical System > Lubrication System > Oil Pump > Repair procedures

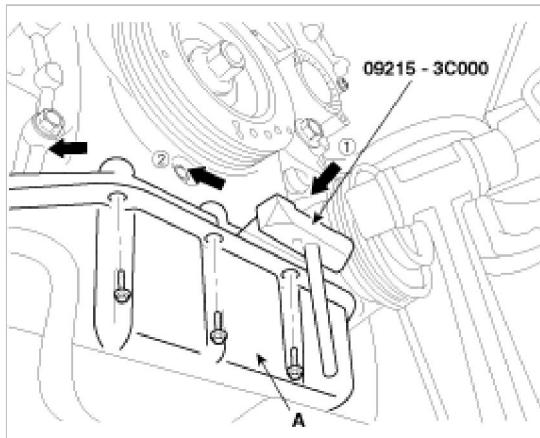
Removal

Oil Pump

1. Drain the engine oil.

2. Remove the lower oil pan (A).

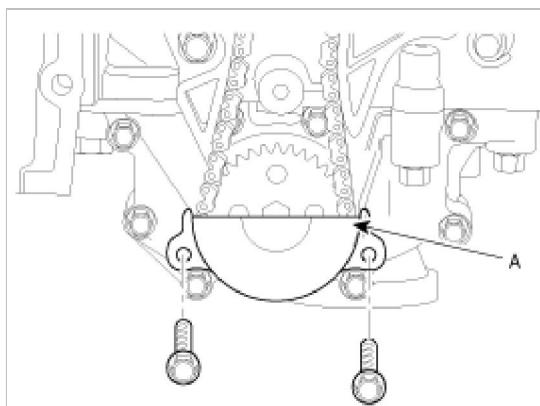
Insert the blade of SST(09215-3C000) between the upper oil pan and lower oil pan. Cut off applied sealer and remove the lower oil pan.



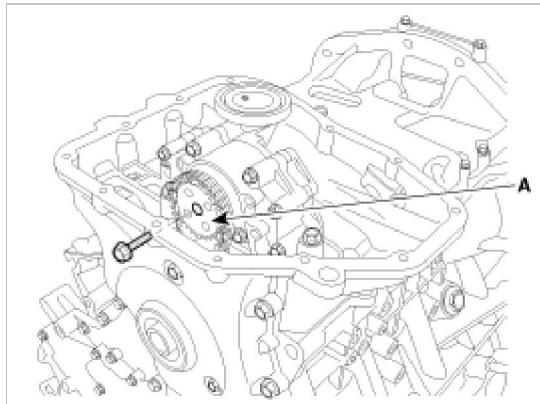
NOTE

- Insert the SST between the oil pan and the ladder frame by tapping it with a plastic hammer in the direction of arrow.
- After tapping the SST with a plastic hammer along the direction of arrow around more than 2/3 edge of the oil pan, remove it from the ladder frame.
- Do not turn over the SST abruptly without tapping. It be result in damage of the SST.
- Be careful not to damage the contact surfaces of Upper oil pan and lower oil pan.

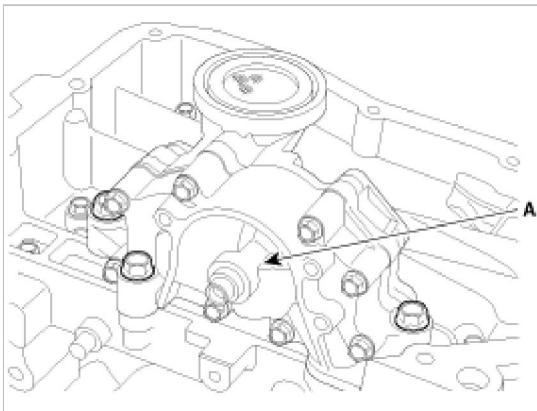
3. Remove the oil pump chain cover (A).



4. Remove the oil pump chain sprocket (A).

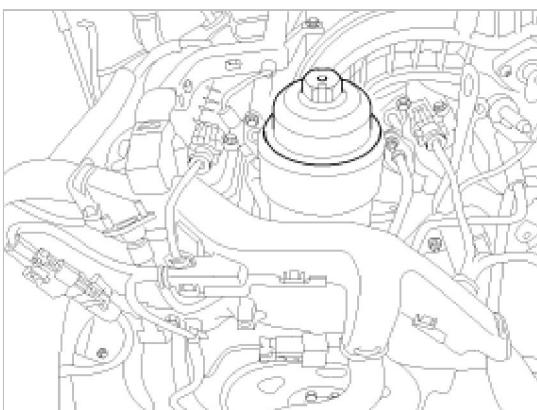


5. Remove the oil pump (A).

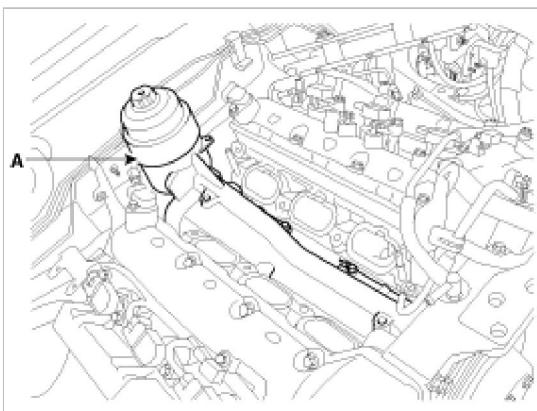


Oil Filter Assembly

1. Remove the water temperature control assembly. (Refer to Cooling system in this group)
2. Remove the intake manifold. (Refer to Intake and exhaust system in this group)
3. Wait for 5 minutes after loosening the oil filter cap to drain well the oil in the oil filter.



4. Remove the oil filter body.



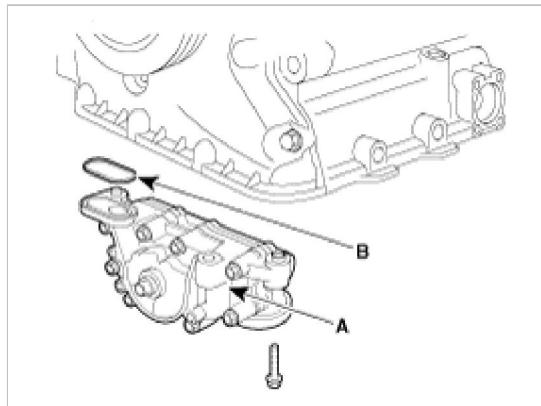
Installation

Oil Pump

1. Install the oil pump (A).

Tightening torque :

20.6 ~ 22.6N.m (2.1 ~ 2.3kgf.m, 15.2 ~ 16.6lb-ft)

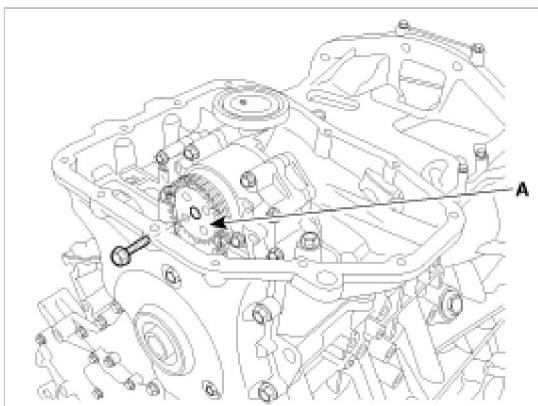
**NOTE**

Always use a new O-ring (B).

2. Install the oil pump sprocket (A) and the oil pump chain on the oil pump.

Tightening torque :

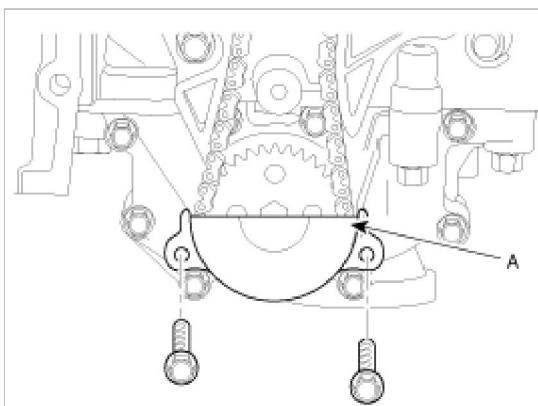
18.6 ~ 21.6N.m (1.9 ~ 2.2kgf.m, 13.7 ~ 15.9lb-ft)



3. Install the oil pump chain cover (A).

Tightening torque :

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

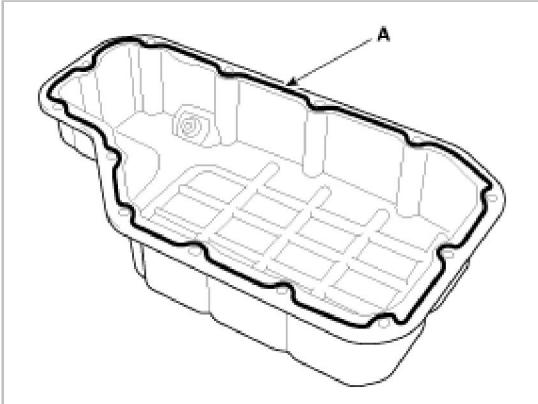


4. Install the lower oil pan (A).

(1) Using a gasket scraper, remove all the old packing material from the gasket surfaces.

(2) Before assembling the oil pan, the liquid sealant TB 1217H should be applied on oil pan. The part must be assembled within 5 minutes after the sealant was applied.

Bead width : 2.5mm(0.1in.)



CAUTION

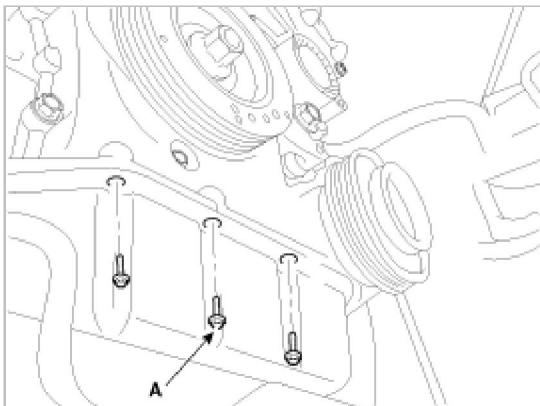
- Clean the sealing face before assembling two parts.
- Remove harmful foreign matters on the sealing face before applying sealant.
- When applying sealant gasket, sealant must not be protruded into the inside of oil pan.
- To prevent leakage of oil, apply sealant gasket to the inner threads of the bolt holes.

(3) Install the oil pan (A).

Uniformly tighten the bolts in several passes.

Tightening torque :

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



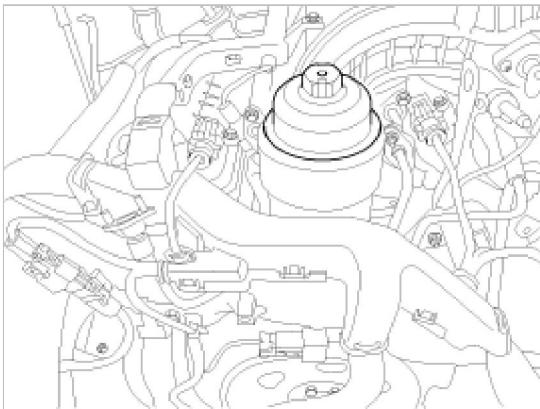
5. After assembly, wait at least 30 minutes before filling the engine with oil.

Oil Filter Assembly

1. Install the oil filter body.

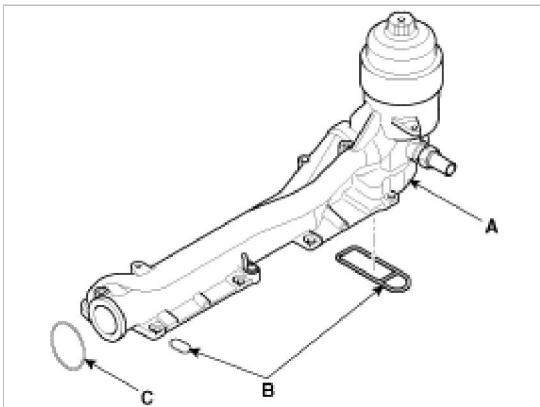
Tightening torque :

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



CAUTION

- All rubber gaskets must not be damaged by assembling parts.
- Always use a new O-ring (C) and oil seal (B).

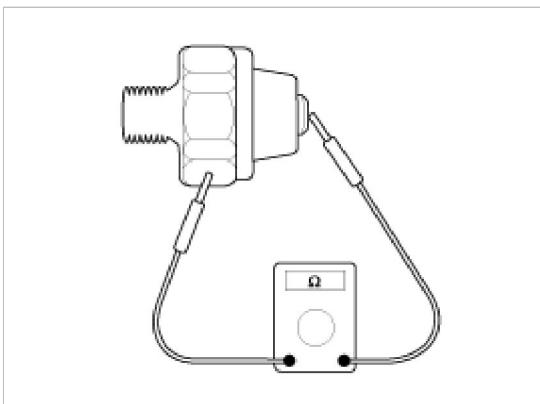


2. Install the intake manifold. (Refer to Intake and exhaust system in this group)
3. Install the water temperature control assembly. (Refer to Cooling system in this group)

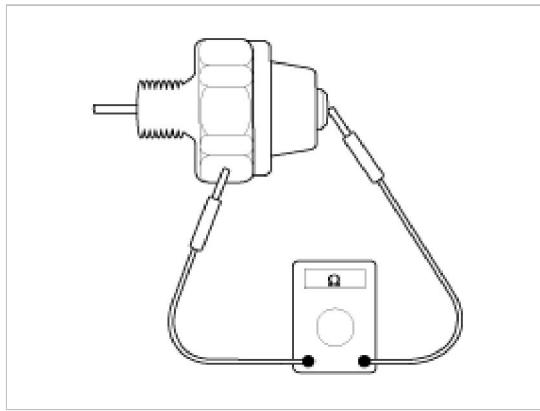
Engine Mechanical System > Lubrication System > Oil Pressure Switch > Repair procedures

Inspection

1. Check the continuity between the terminal and the body with an ohmmeter.
If there is no continuity, replace the oil pressure switch.



2. Check the continuity between the terminal and the body when the fine wire is pushed. If there is continuity even when the fine wire is pushed, replace the switch.



Engine Mechanical System > Lubrication System > Engine Oil > Repair procedures

Inspection

1. Check the engine oil quality. Check the oil deterioration, entry of water, discoloring or thinning. If the quality is visibly poor, replace the oil.
2. Check the engine oil level.
After warming up the engine and then 5 minutes after the engine stop, oil level should be between the “L” and “F” marks in the dipstick.
If low, check for leakage and add oil up to the “F” mark.

NOTE

Do not fill with engine oil above the “F” mark.

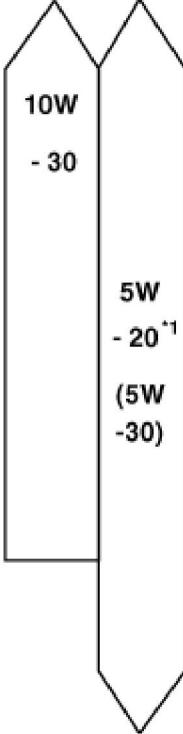
Selection Of Engine Oil

Recommendation : 5W-20/GF4&SM (If not available, refer to the recommended API or ILSAC classification and SAE viscosity number.)

API classification : SL, SM or above

ILSAC classification : GF3, GF4 or above

SAE viscosity grade : Refer to the recommended SAE viscosity number.

Temperature range anticipated before next oil change	Recommended SAE viscosity number
<p style="text-align: center;">- 18°C - 0.4°F</p>	

*1 If 5W-20 / GF4 engine oil is not available, 5W-30 or secondary recommended engine oil for corresponding temperature range can be used.

NOTE

For best performance and maximum protection of all types of operation, select only those lubricants which :

1. Satisfy the requirement of the API or ILSAC classification.
2. Have proper SAE grade number for expected ambient temperature range.
3. Lubricants that do not have both an SAE grade number and API or ILSAC service classification on the container should not be used.

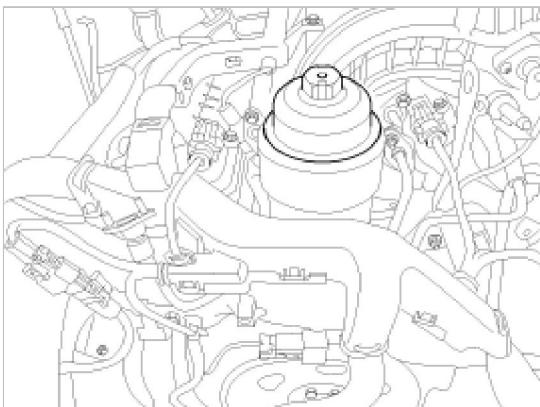
Replacement

CAUTION

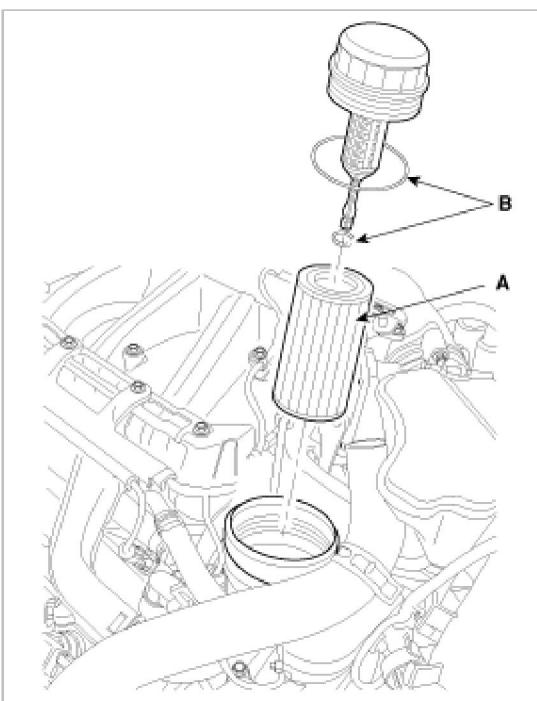
- Prolonged and repeated contact with mineral oil will result in the removal of natural fats from the skin, leading to dryness, irritation and dermatitis. In addition, used engine oil contains potentially harmful contaminants which may cause skin cancer.
- Exercise caution in order to minimize the length and frequency of contact of your skin to used oil. Wear protective clothing and gloves. Wash your skin thoroughly with soap and water, or use water-less hand cleaner, to remove any used engine oil. Do not use gasoline, thinners, or solvents.
- In order to preserve the environment, used oil and used oil filter must be disposed of only at designated disposal sites.

1. Park the car on level ground.
Start the engine and let it warm up.

2. Turn the engine off and open the hood.
Remove the engine cover.
3. Wait for 5 minutes after loosening the oil filter cap to drain well the oil in the oil filter.



4. Drain engine oil.
 - (1) Remove the oil filler cap.
 - (2) After lifting the car, remove the oil drain plug and drain oil into a container.
5. Replace the oil filter.
 - (1) Disconnect the oil filter cap from the oil filter body.
 - (2) Remove the oil filter element.
 - (3) Check and clean the oil filter installation surface.
 - (4) Check the part number of a new oil filter is same as old one.
 - (5) Install a new oil filter element (A) and two new O-rings (B).



- (6) Apply clean engine oil to the new O-rings.
Lightly screw the oil filter cap into place, and tighten it until the O-ring contacts the seat.
- (7) Finally tighten it again by specified tightening torque.

Tightening torque :
24.5N.m (2.5kgf.m, 18.1lb-ft)
