

SECTION

LU

ENGINE LUBRICATION SYSTEM

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## PRECAUTIONS

### Precautions For Liquid Gasket

#### REMOVAL OF LIQUID GASKET SEALING

- After removing the mounting bolts and nuts, separate the mating surface using a seal cutter and remove the liquid gasket.

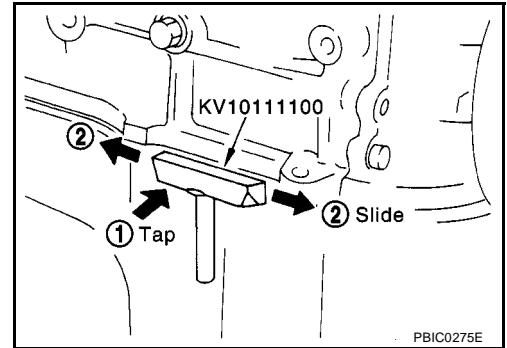
#### CAUTION:

Be careful not to damage the mating surfaces.

- In areas where the cutter is difficult to use, use a plastic hammer to lightly tap the areas where the liquid gasket is applied.

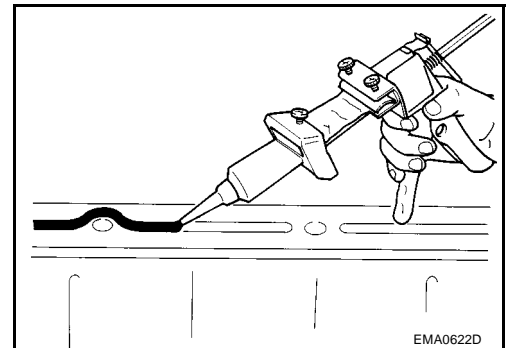
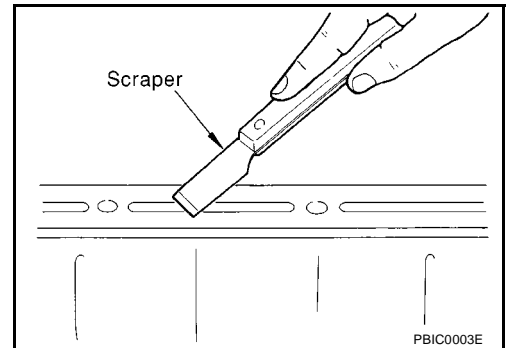
#### CAUTION:

If for some unavoidable reason a tool such as a flat-bladed screwdriver is used, be careful not to damage the mating surfaces.



#### LIQUID GASKET APPLICATION PROCEDURE

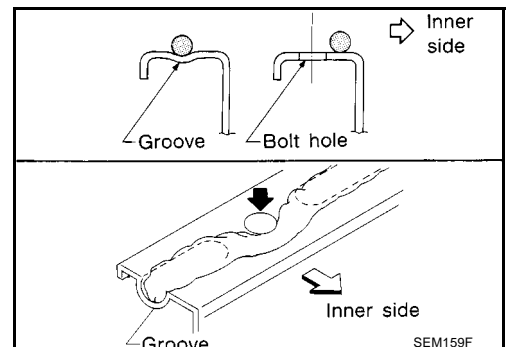
- Using a scraper, remove the old liquid gasket adhering to the gasket application surface and the mating surface.
  - Remove the liquid gasket completely from the groove of the gasket application surface, mounting bolts, and bolt holes.
- Wipe the gasket application surface and the mating surface with white gasoline (lighting and heating use) to remove adhering moisture, grease and foreign materials.
- Attach the liquid gasket to the tube presser.
  - Use Genuine Liquid Gasket or equivalent.
- Apply the gasket without breaks to the specified location with the specified dimensions.
  - If there is a groove for the liquid gasket application, apply the gasket to the groove.



- As for the bolt holes, normally apply the gasket inside the holes. Occasionally, it should be applied outside the holes. Make sure to read this service manual.
- Within five minutes of gasket application, install the mating component.
- If the liquid gasket protrudes, wipe it off immediately.
- Do not retighten after the installation.
- After 30 minutes or more have passed from the installation, fill the engine oil and coolant.

#### CAUTION:

If there are specific instructions in this service manual, observe them.



# PREPARATION

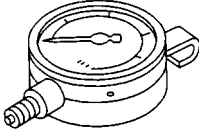
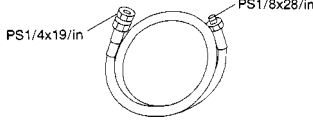
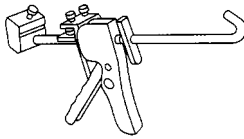
[YD.]

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## PREPARATION

### Special Service Tools

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Tool number Tool name	Description	LU
ST25051001 Oil pressure gauge	 <p>S-NT050</p>	<p>Measuring oil pressure <b>Maximum measuring range:</b> <b>2,452 kPa (25 kg/cm2, 356 psi)</b></p> <p>C</p> <p>D</p>
ST25052000 Hose	 <p>S-NT559</p>	<p>Adapting oil pressure gauge to cylinder block</p> <p>E</p> <p>F</p>
WS39930000 Tube presser	 <p>S-NT052</p>	<p>Pressing the tube of liquid gasket</p> <p>G</p> <p>H</p> <p>I</p> <p>J</p> <p>K</p> <p>L</p> <p>M</p>

# LUBRICATION SYSTEM

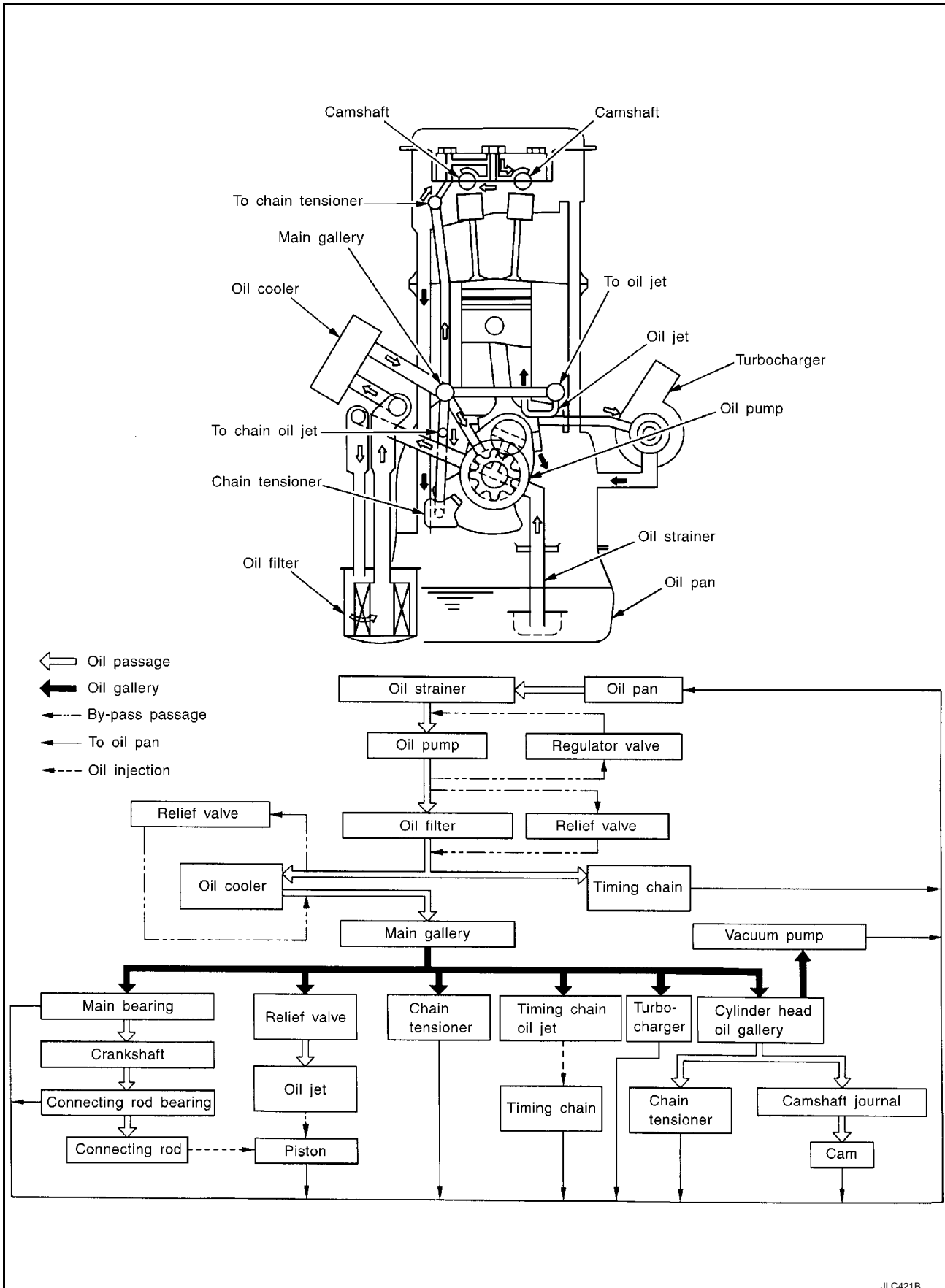
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## LUBRICATION SYSTEM

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### Lubrication Circuit

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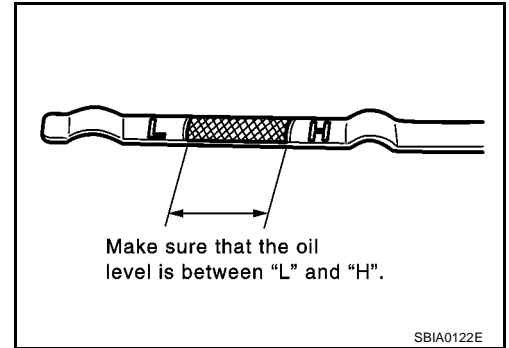
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## ENGINE OIL

### Inspection

#### OIL LEVEL AND MUDDINESS

- Before starting the engine, check the oil level placing vehicle horizontally. If the engine is already started, stop it and allow 10 minutes before checking.
- Check that the oil level is within the range shown in the figure.
- If it is out of range, adjust it.
- Check the oil for white turbidity or remarkable contamination.
- If the oil becomes turbid and white, it is highly probable that it is contaminated with coolant. Find the cause and repair.



#### OIL LEAKAGE

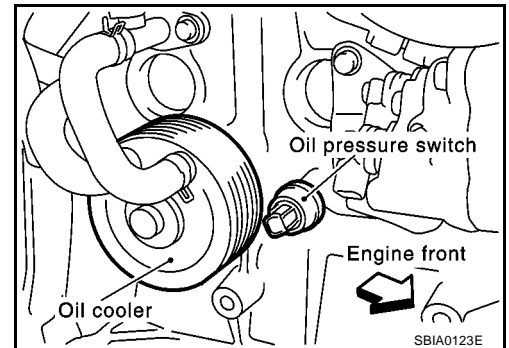
Check for oil leakage around the following area.

- Oil pan
- Oil pan drain plug
- Oil pressure switch
- Oil filter bracket
- Vacuum pump
- Cylinder head rear cover assembly
- Chain case
- Oil pump housing
- Mating surface between cylinder block and cylinder head
- Mating surface between cylinder head and rocker cover
- Oil cooler
- Crankshaft oil seals

#### OIL PRESSURE CHECK

##### **WARNING:**

- Be careful not to burn yourself, as the engine oil is hot.
  - Oil pressure check should be done in Neutral "N" position.
- Check the oil level. Refer to [LU-5, "OIL LEVEL AND MUDDINESS"](#)
  - Remove the undercover.
  - Remove the oil pressure switch to connect the oil pressure gauge.
  - After warming up the engine, check that oil pressure corresponding to the engine speed is produced.




#### Engine oil pressure [Oil temperature is 80 °C (176 °F)]

Engine speed (rpm)	Idle speed	2,000	4,000
Engine oil pressure kPa (bar, kg/cm <sup>2</sup> , psi)	Approx. 140 (1.40, 1.43, 20.3) or more	Approx. 270 (2.69, 2.75, 39.1) or more	Approx. 430 (4.29, 4.38, 62.3) or more

- After checking, install the oil pressure switch as follows.
  - Remove old sealant adhering to the switch and engine.
  - Apply thread sealant.

**Use Genuine Liquid Gasket or equivalent.**

## Oil pressure switch:

 : 13 - 17 N·m (1.4 - 1.7 kg-m, 10 - 12 ft-lb)

6. Start engine and check for oil leakage.

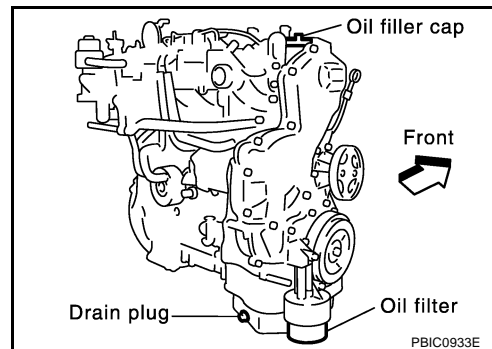
## Changing Engine Oil

EBS00SJC

### WARNING:

- Be careful not to burn yourself, as the engine oil is hot.
- Prolonged and repeated contact with used engine oil may cause skin cancer: try to avoid direct skin contact with used oil. If skin contact is made, wash thoroughly with soap or hand cleaner as soon as possible.

1. Put vehicle horizontally.
2. Warm up engine, and check for oil leakage from engine components.
3. Stop engine and wait for 10 minutes.
4. Remove drain plug and oil filler cap.



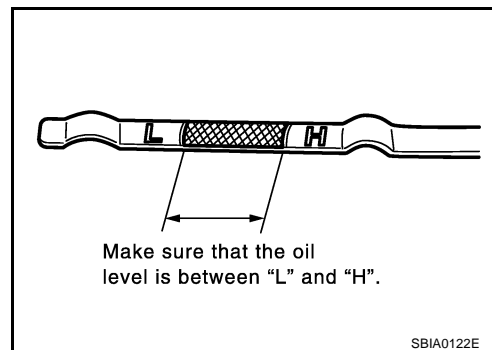
5. Drain oil and refill with new engine oil.

### Oil specification and viscosity:

- API grade CF- 4.
- Refer to [MA-15, "RECOMMENDED FLUIDS AND LUBRICANTS"](#).

### Oil capacity (Approximate):

Drain and refill	With oil filter change	5.2 ℓ (4-5/8 Imp qt)
	Without oil filter change	4.9 ℓ (4-3/8 Imp qt)
Dry engine (engine overhaul)		6.3 ℓ (5-1/2 Imp qt)



- The refill capacity depends on the oil temperature and drain time. Use these specifications for reference only.
- Always use the dipstick to determine when the proper amount of oil is in the engine.

### CAUTION:

- Be sure to clean drain plug and install with new washer.

## Oil pan drain plug:

 : 29 - 39 N·m (3.0 - 4.0 kg-m, 22 - 29 ft-lb)

- The refill capacity depends on the oil temperature and drain time. Use these specifications for reference only.
- Always use the dipstick to determine when the proper amount of oil is in the engine.

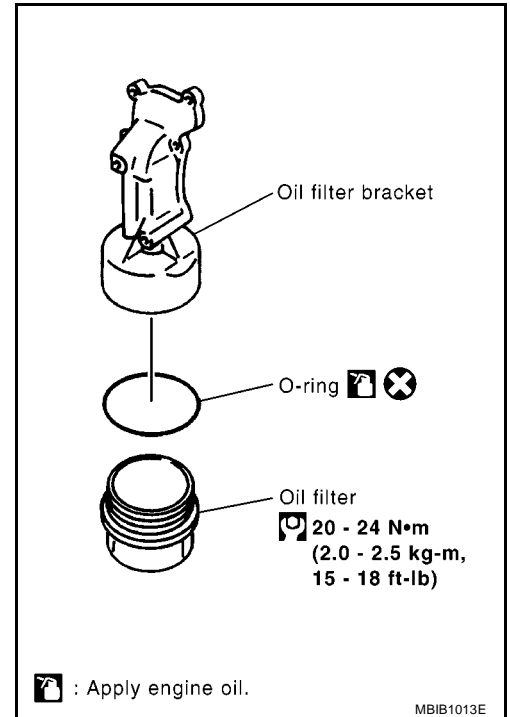
6. Warm up engine and check area around drain plug and oil filter for oil leakage.
7. Stop engine and wait for 10 minutes.
8. Check oil level.

## OIL FILTER

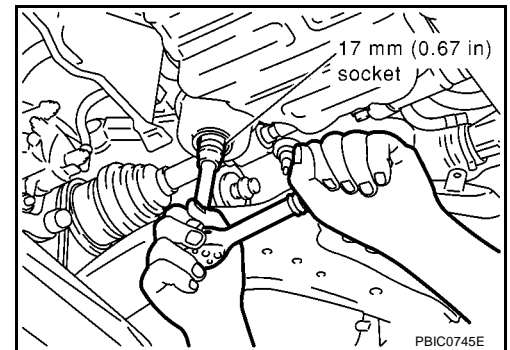
### Removal and Installation REMOVAL

#### CAUTION:

- Be careful not to get burned when the engine and engine oil are hot.
- When removing, prepare a shop cloth to absorb any oil leakage or spillage.
- Do not allow engine oil to adhere to the drive belts.
- Completely wipe off any oil that adhere to the engine and the vehicle.



1. Using a socket wrench [plane-to-plane width: 17 mm (0.67 in)], loosen the filter body approximately four turns.



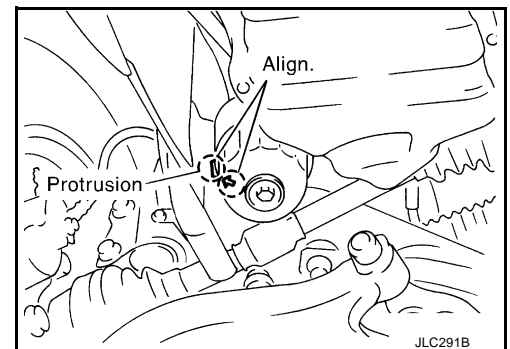
2. Drain the oil after matching the "DRAIN" arrow mark at the bottom of the filter to the protrusion on the oil filter bracket.

- Catch the oil with a pan or cloth.

#### CAUTION:

- The drained oil flows over the right surface of the filter.
- Completely wipe clean any engine oil remaining on the filter body or vehicle.

3. Remove oil filter.



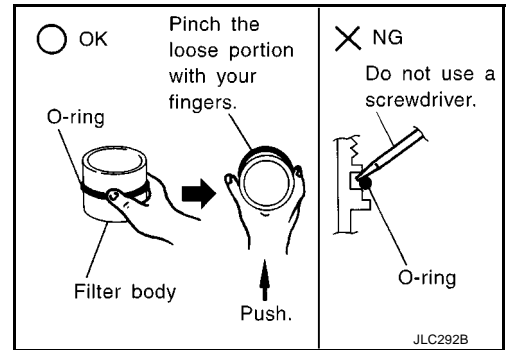
## OIL FILTER

[YD.]

4. Remove the O-ring from the filter body.
  - Push the O-ring in one direction, lift the slack part using fingers, and remove the O-ring from the filter body.

**CAUTION:**


**Do not use wires or flat-bladed screwdrivers etc. as they may cause damage to the filter.**



### INSTALLATION

1. Completely remove all foreign objects adhering to the inside of the filter or O-ring mounting area (filter side and bracket side).
2. Install O-ring to the filter.
3. Install the filter to the oil filter bracket.

**Oil filter:**

: **20 - 24 N·m (2.0 - 2.5 kg-m, 15 - 18 ft-lb)**

4. After warming up the engine, check for engine oil leakage.
5. Check oil level and add engine oil. Refer to [LU-5, "ENGINE OIL"](#).



## OIL FILTER BRACKET

## Removal and Installation

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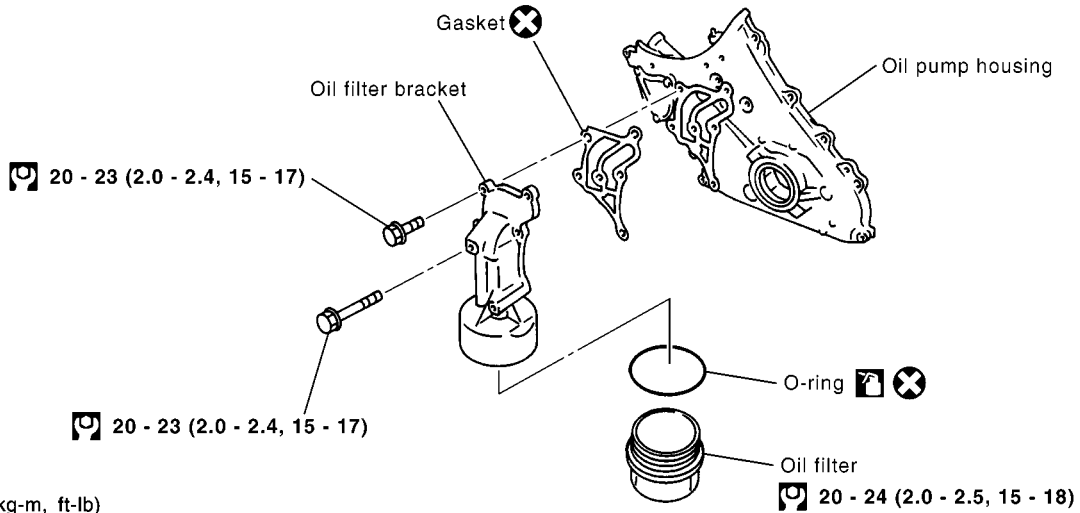
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M

SEC. 150



: N·m (kg-m, ft-lb)

: Apply engine oil.

MBIB1012E

## REMOVAL

1. Remove the undercover.
2. Steer the front wheel to the right.
3. Remove the right splash cover.
4. Remove the oil filter bracket bolt. Refer to [LU-7, "OIL FILTER"](#) for cautions.

## INSTALLATION

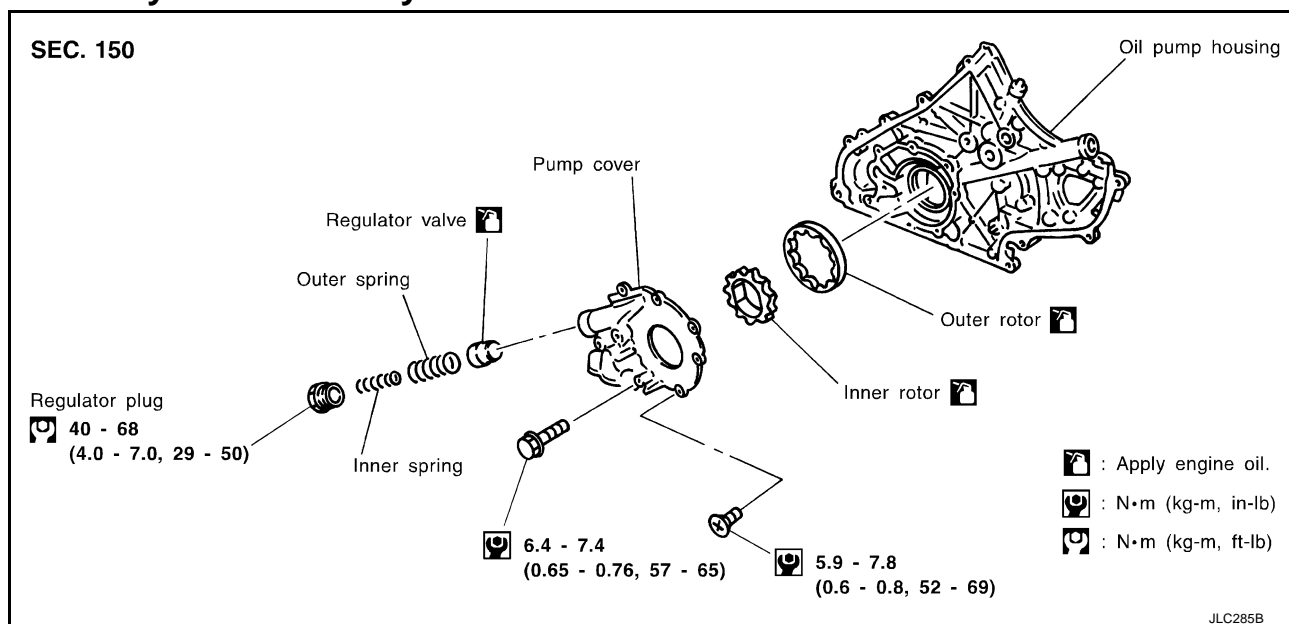
1. Install all removed parts in the reverse order of removal.
  - Insert the top mounting bolt to the oil filter bracket beforehand, and set the oil filter bracket to the installation location.
  - After warming up the engine, check for engine oil leakage and oil level. Refer to [LU-5, "OIL LEVEL AND MUDDINESS"](#).

## OIL PUMP

## Removal and Installation

- Remove oil pump housing. Refer to [EM-68, "PRIMARY TIMING CHAIN"](#).

## Disassembly and Assembly

**CAUTION:**

Before installation, apply new engine oil to the parts as instructed in the figure.

## DISASSEMBLY

- Remove oil pump cover.
- Remove inner rotor and outer rotor from oil pump housing.
- After removing regulator plug, remove regulator spring and regulator valve.

## INSPECTION AFTER DISASSEMBLY

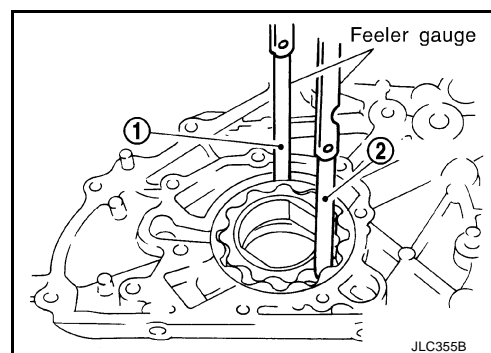
## Clearance of Oil Pump Parts

- Measure clearance with feeler gauge.  
Clearance between outer rotor and oil pump housing (position 1)

**Standard : 0.114 - 0.260 mm (0.0045 - 0.0102 in)**

Tip clearance between inner rotor and outer rotor (position 2)

**Standard : Below 0.18 mm (0.0071in)**

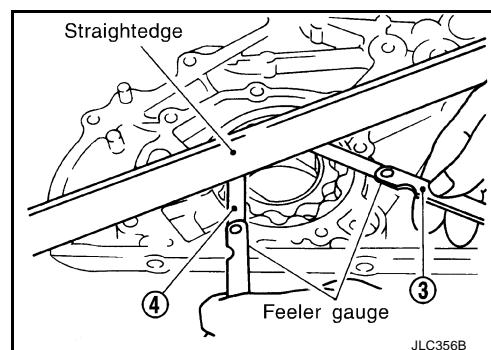


- Measure clearance with feeler gauge and straightedge.  
Side clearance between inner rotor and oil pump housing (position 3)

**Standard : 0.050 - 0.090 mm (0.0020 - 0.0035 in)**

Side clearance between outer rotor and oil pump housing (position 4)

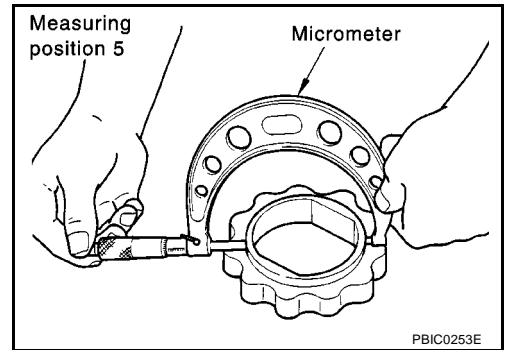
**Standard : 0.030 - 0.190 mm (0.0012 - 0.0075 in)**



# OIL PUMP

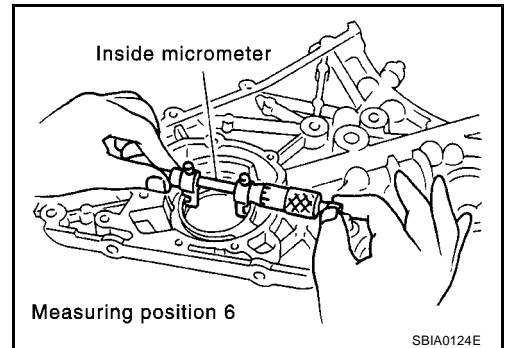
[YD.]

- Calculate the clearance between inner rotor and oil pump housing as follows.
1. Measure the outer diameter of protruded portion of inner rotor (Position 5)



2. Measure the inner diameter of oil pump housing with inside micrometer (Position 6)  
 (Clearance) = (Inner diameter of oil pump housing) – (Outer diameter of inner rotor)

**Standard : 0.045 - 0.091mm (0.0018 - 0.0036 in)**

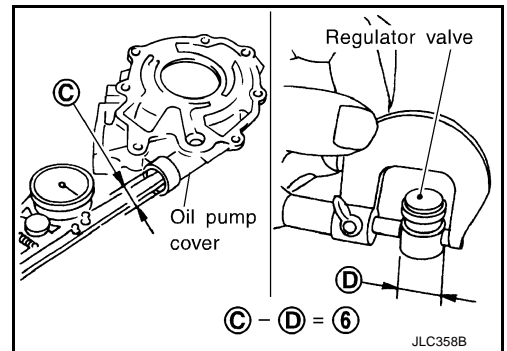


## Regulator Valve

1. Visually inspect components for wear and damage.
2. Check oil pressure regulator valve sliding surface and valve spring.
3. Coat regulator valve with engine oil. Check that it falls smoothly into the valve hole by its own weight. If damaged, replace regulator valve set or oil pump cover.
4. Check regulator valve to oil pump cover clearance.

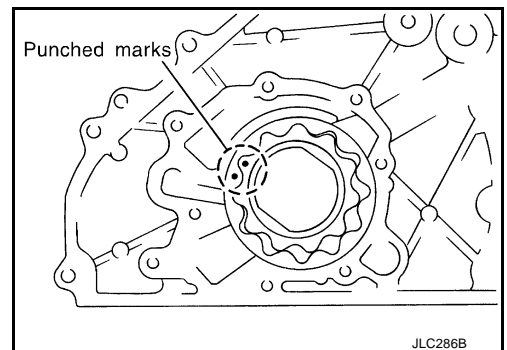
### Clearance 6

**Standard : 0.040 - 0.097 mm (0.0016 - 0.0038 in)**



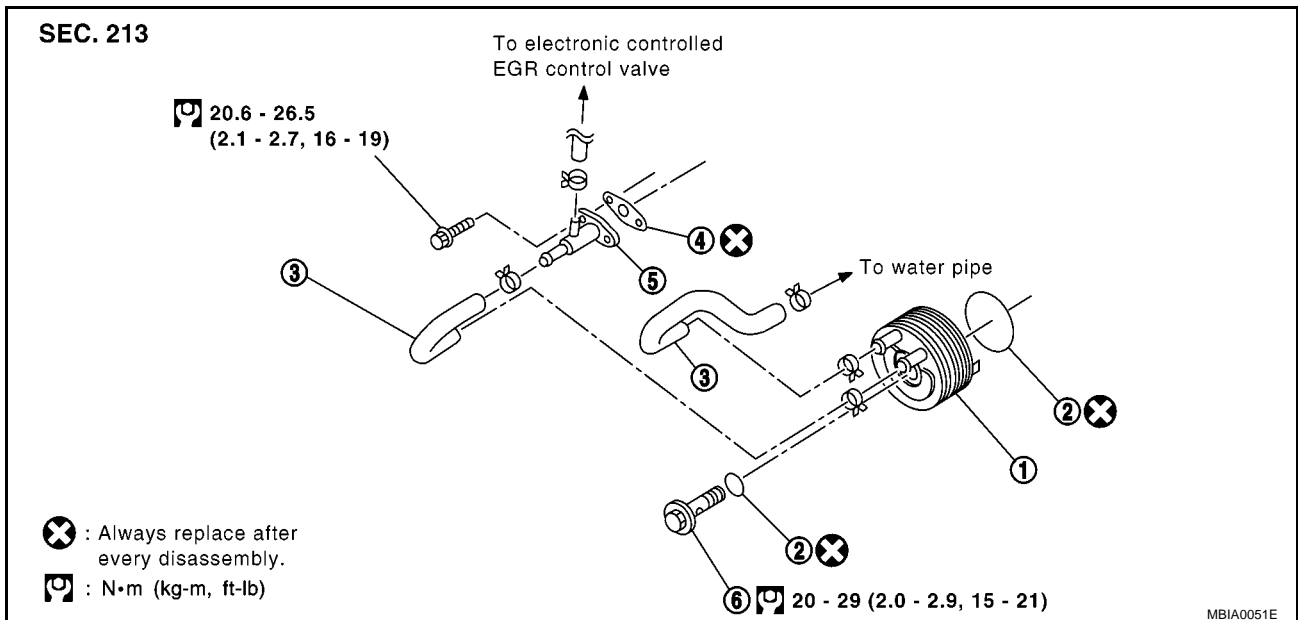
## ASSEMBLY

- Assemble in the reverse order of disassembly.
- Install the inner rotor and outer rotor with the punched marks on the oil pump cover side.



## OIL COOLER

## Removal and Installation



- |               |                         |                    |
|---------------|-------------------------|--------------------|
| 1. Oil cooler | 2. O-ring               | 3. Water hose      |
| 4. Gasket     | 5. Water hose connector | 6. Connecting bolt |

**CAUTION:**

- Be careful not to get burned when the engine and engine oil are hot.
- When removing, prepare a shop cloth to absorb any oil leakage or spillage.
- Completely wipe off any oil that abhere to the engine and the vehicle.

**REMOVAL**

1. Remove front RH wheel and engine side cover.
2. Remove the exhaust front tube.
3. Drain coolant by removing cylinder block drain plug and disconnecting radiator lower hose.

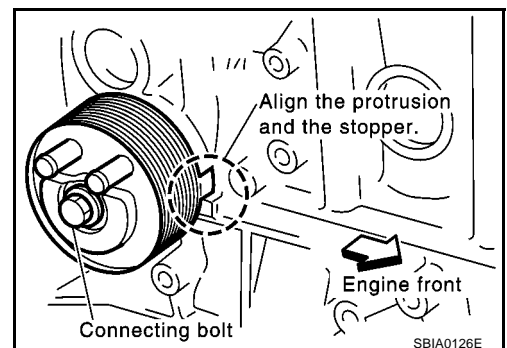
**INSPECTION****Oil Cooler**

Check oil cooler for cracks and clogging by blowing through coolant inlet. If necessary, replace oil cooler assembly.

**INSTALLATION**

Installation is in reverse order of removal.

- Confirm that no foreign objects are adhering to the installation planes of the oil cooler and block.
- Tighten the connecting bolt after aligning the stopper on the cylinder block side with protrusion of the oil cooler.



# SERVICE DATA AND SPECIFICATIONS (SDS)

[YD.]

## SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

### Standard and Limit OIL PRESSURE

EBS00SJ

Engine speed (rpm)	Approximate oil pressure kPa (bar, kg/cm <sup>2</sup> , psi)
Idle speed	More than 140 (1.40, 1.43, 20.3)
2,000	More than 270 (2.69, 2.75, 39.1)
4,000	More than 430 (4.29, 4.38, 62.3)

### OIL PUMP

Unit: mm (in)

Body to outer rotor radial clearance	0.114 - 0.260 (0.0045 - 0.0102)
Inner rotor to outer rotor tip clearance	Below 0.18 (0.0071)
Body to inner rotor axial clearance	0.050 - 0.090 (0.0020 - 0.0035)
Body to outer rotor axial clearance	0.030 - 0.190 (0.0012 - 0.0075)
Inner rotor to brazed portion of housing clearance	0.045 - 0.091 (0.0018 - 0.0036)

### REGULATOR VALVE

Unit: mm (in)

Regulator valve to oil pump cover clearance	0.040 - 0.097 (0.0016 - 0.0038)
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### OIL CAPACITY

Unit: ℓ · (Imp qt)

With oil filter change	Approximately 5.2 (4-5/8 Imp qt)
Without oil filter change	Approximately 4.9 (4-3/8 Imp qt)
Dry engine (engine overhaul)	Approximately 6.3 (5-1/2 Imp qt)

### Tightening Torque

EBS00SJ

Unit: N·m (kg-m, ft-lb)  
Unit: N·m (kg-m, in-lb)\*

Oil pressure switch	13 - 17 (1.4 - 1.7, 10 - 12)
Oil pan drain plug	29 - 39 (3.0 - 4.0, 22 - 29)
Oil filter bracket	20 - 23 (2.0 - 2.4, 15 - 17)
Oil filter body	20 - 24 (2.0 - 2.5, 15 - 18)
Oil pump assembly	6.4 - 7.4 (0.65 - 0.76, 57 - 65)*
Oil pump cover	5.9 - 7.8 (0.6 - 0.8, 52 - 69)*
Regulator plug	40 - 68 (4.0 - 7.0, 29 - 50)
Water hose connector for oil cooler	20.6 - 26.5 (2.1 - 2.7, 15 - 20)
Connecting bolt for oil cooler	20 - 29 (2.0 - 3.0, 15 - 21)

## PRECAUTIONS

### Precautions For Liquid Gasket REMOVAL OF LIQUID GASKET

EBS00S2X

- After removing the mounting bolts and nuts, separate the mating surface using a seal cutter and remove the liquid gasket.

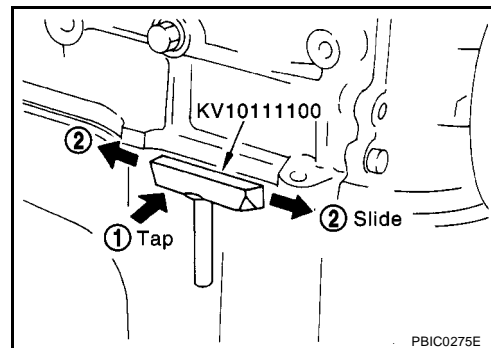
**CAUTION:**

**Be careful not to damage the mating surfaces.**

- In areas where the cutter is difficult to use, use a plastic hammer to lightly tap the gasket applied area.

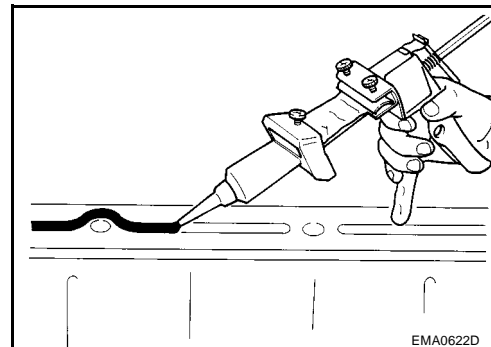
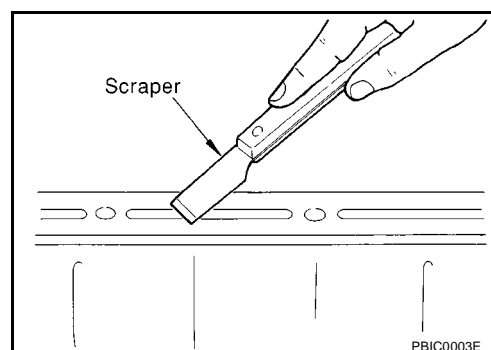
**CAUTION:**

**If for some unavoidable reason a tool such as a flat-bladed screwdriver is used, be careful not to damage the mating surfaces.**



### LIQUID GASKET APPLICATION PROCEDURE

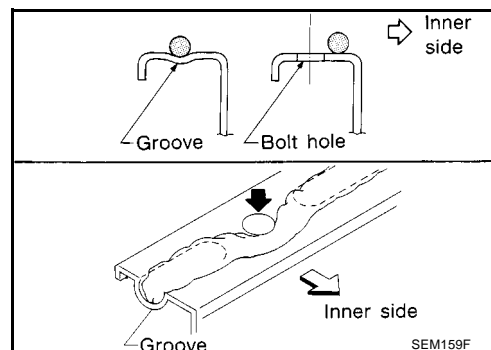
- Using a scraper, remove the old liquid gasket adhering to the gasket application surface and the mating surface.
  - Remove the liquid gasket completely from the groove of the gasket application surface, mounting bolts and bolt holes.
- Wipe the gasket application surface and the mating surface with white gasoline (lighting and heating use) to remove adhering moisture, grease and foreign materials.
- Attach the liquid gasket to the tube presser.
  - Use Genuine Liquid Gasket or equivalent.**
- Apply the gasket without breaks to the specified location with the specified dimensions.
  - If there is a groove for the liquid gasket application, apply the gasket to the groove.



- As for the bolt holes, normally apply the gasket inside the holes. If specified, it should be applied outside the holes. Make sure to read the instruction in this manual.
- Within five minutes of gasket application, install the mating component.
- If the liquid gasket protrudes, wipe it off immediately.
- Do not retighten after the installation.
- After 30 minutes or more have passed from the installation, fill the engine oil and coolant.

**CAUTION:**

**If there are instructions in this manual, observe them.**



# PREPARATION

[F9Q]

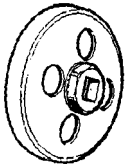
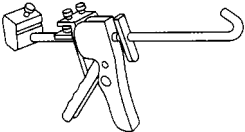
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## PREPARATION

### Special Service Tools

EBS00S2Y

NISSAN tool number (RENAULT tool number) Tool name	Description	LU
KV113C0020 (Mot.1281-01) Oil filter wrench	 <p>MBIB0369E</p>	Removing and installing oil filter  C  D
WS39930000 ( — ) Tube presser	 <p>S-NT052</p>	Pressing the tube of liquid gasket  E  F  G

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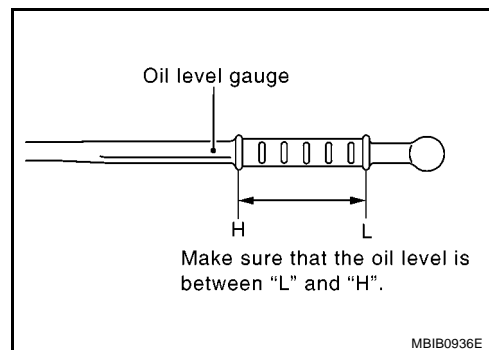
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## ENGINE OIL

### Inspection

#### OIL LEVEL AND MUDDINESS

- Before starting the engine, check the oil level placing vehicle horizontally. If the engine is already started, stop it and allow 10 minutes before checking.
- Make sure the oil level is within the range shown in the figure.
- If it is out of range, adjust it.
- Check the oil for white turbidity or remarkable contamination.
- If the oil becomes turbid and white, it is highly probable that it is contaminated with coolant. Find the cause and repair.



#### OIL LEAKAGE

Check for oil leakage around the following area.

- Oil pan
- Oil pan drain plug
- Oil pressure switch
- Vacuum pump
- Oil pump housing
- Mating surface between cylinder block and cylinder head
- Mating surface between cylinder head and rocker cover
- Oil cooler
- Crankshaft oil seals

### Changing Engine Oil

#### WARNING:

- Be careful not to burn yourself, as the engine oil is hot.
  - Prolonged and repeated contact with used engine oil may cause skin cancer: try to avoid direct skin contact with used oil. If skin contact is made, wash thoroughly with soap or hand cleaner as soon as possible.
- Put vehicle horizontally.
  - Warm up engine, and check for oil leakage from engine components.
  - Stop engine and wait for 10 minutes.
  - Remove oil pan drain plug and oil filler cap (with oil level gauge).
  - Drain oil and refill with new engine oil.

Oil specification and viscosity:

- Refer to [MA-15, "RECOMMENDED FLUIDS AND LUBRICANTS"](#).

#### Oil capacity (Approximate):

Drain and refill	With oil filter change	4.66 ℓ (4-1/8 Imp qt)
	Without oil filter change	4.5 ℓ (4 Imp qt)

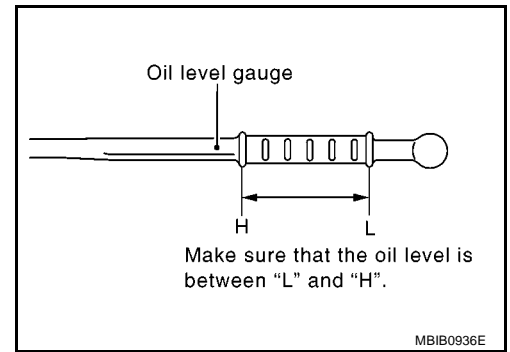
- The refill capacity depends on the oil temperature and drain time. Use these specifications for reference only.
- Always use the dipstick to determine when the proper amount of oil is in the engine.

#### CAUTION:

- Be sure to clean drain plug and install with new washer.
  - The refill capacity depends on the oil temperature and drain time. Use these specifications for reference only.
  - Always use the dipstick to determine when the proper amount of oil is in the engine.
- Warm up engine and check area around drain plug and oil filter for oil leakage.



7. Stop engine and wait for 10 minutes.
8. Check oil level.



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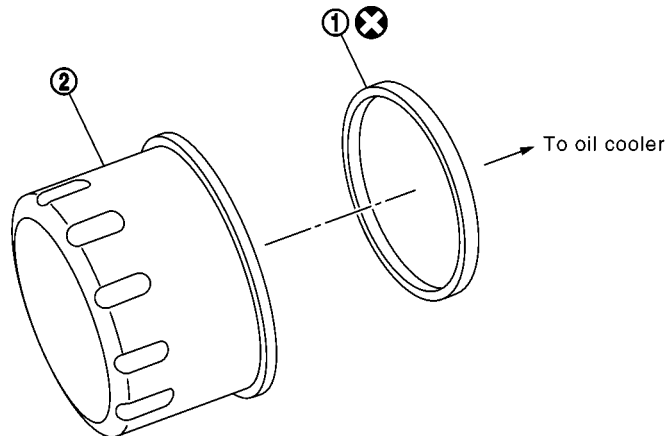
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## OIL FILTER

## Removal and Installation

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⊗: Always replace after every disassembly.

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1. O-ring

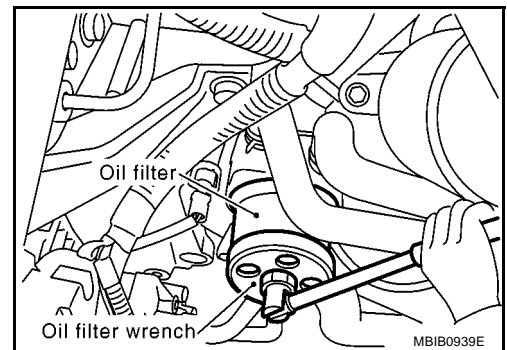
2. Oil filter

## REMOVAL

- Using an oil filter wrench (special service too), remove oil filter.

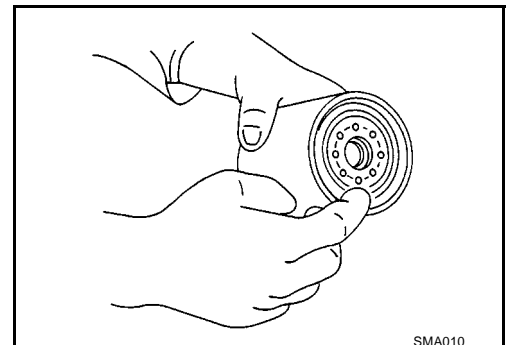
**CAUTION:**

- Be careful not to get burned when the engine and engine oil are hot.
- When removing, prepare a shop cloth to absorb any oil leakage or spillage.
- Do not allow engine oil to adhere to the drive belts.
- Completely wipe off any oil that adhere to the engine and the vehicle.



## INSTALLATION

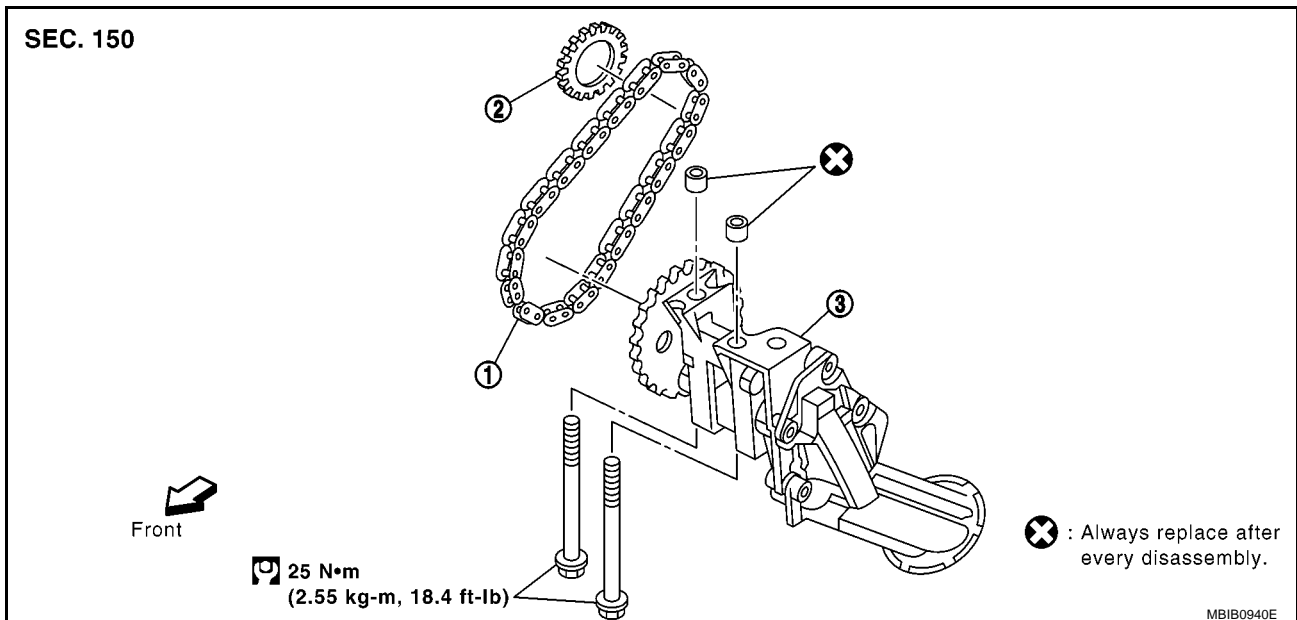
- Remove foreign materials adhering to the oil filter installation surface.
- Apply engine oil to the oil seal contact surface of the new oil filter.



- Install the oil filter to oil cooler.
- After warming up the engine, check for engine oil leakage.
- Check oil level and add engine oil. Refer to [LU-16, "ENGINE OIL"](#).

## OIL PUMP

## Removal and Installation



1. Oil pump drive chain

2. Crankshaft sprocket

3. Oil pump assembly

## REMOVAL

1. Remove the following parts.
  - Battery ground cable
  - Undercover
  - RH front wheel
2. Remove right side splash cover.
3. Remove drive belt. Refer to [EM-142, "DRIVE BELTS"](#).
4. Remove oil pan. Refer to [EM-150, "OIL PAN"](#).
5. Remove front cover. Refer to [EM-157, "TIMING BELT"](#).
6. Remove oil pump drive chain. Refer to [EM-183, "Disassembly The Lower Engine"](#).
7. Remove oil pump assembly.

## INSTALLATION

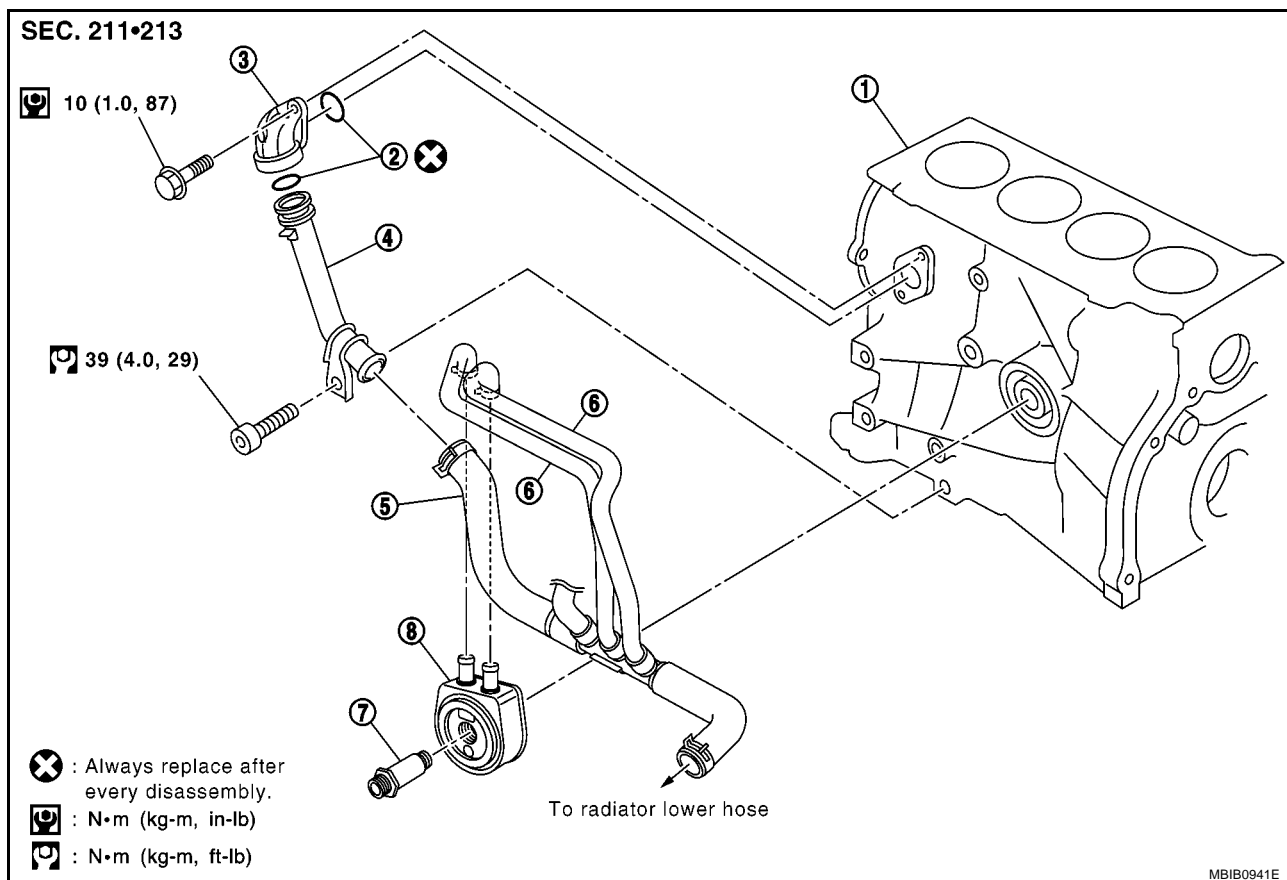
Install in the reverse order of removal paying attention to the following.

## Front Cover and Oil Pump

- Refer to [EM-203, "INSTALLATION OF LOWER ENGINE"](#).

## OIL COOLER

## Removal and Installation



- |                    |               |                     |
|--------------------|---------------|---------------------|
| 1. Cylinder block  | 2. O-ring     | 3. Water inlet pipe |
| 4. Water pipe      | 5. Water hose | 6. Oil cooler hose  |
| 7. Connecting bolt | 8. Oil cooler |                     |

**CAUTION:**

- Be careful not to get burned when the engine and engine oil are hot.
- When removing, prepare a shop cloth to absorb any oil leakage or spillage.
- Completely wipe off any oil that adhere to the engine and the vehicle.

**REMOVAL**

1. Drain engine coolant. Refer to [CO-25, "Changing Engine Coolant"](#).

**CAUTION:**

**Perform when engine is cold.**

2. Remove oil filter. Refer to [LU-18, "OIL FILTER"](#).
3. Disconnect oil cooler hoses from oil cooler.
4. Remove oil cooler.

**INSPECTION****Oil Cooler**

Check oil cooler for cracks and clogging by blowing through coolant inlet. If necessary, replace oil cooler assembly.

**INSTALLATION**

Installation is in reverse order of removal.

- Confirm that no foreign objects are adhering to the installation planes of the oil cooler and block.