

SECTION

LU

ENGINE LUBRICATION SYSTEM

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# PREPARATION

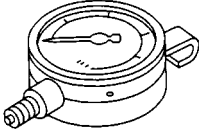
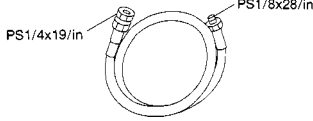
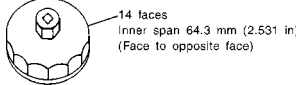
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## PREPARATION

### Special Service Tools

Tool number Tool name	Description
ST25051001 Oil pressure gauge	Measuring oil pressure <b>Maximum measuring range:</b> <b>2,452 kPa (24.5 bar, 25 kg/cm<sup>2</sup> , 356 psi)</b>
 <p>S-NT050</p>	
ST25052000 Hose	Adapting oil pressure gauge to cylinder block
 <p>S-NT559</p>	
KV10115801 Oil filter wrench	Removing oil filter
 <p>S-NT772</p>	

## LUBRICATION SYSTEM

### Lubrication Circuit

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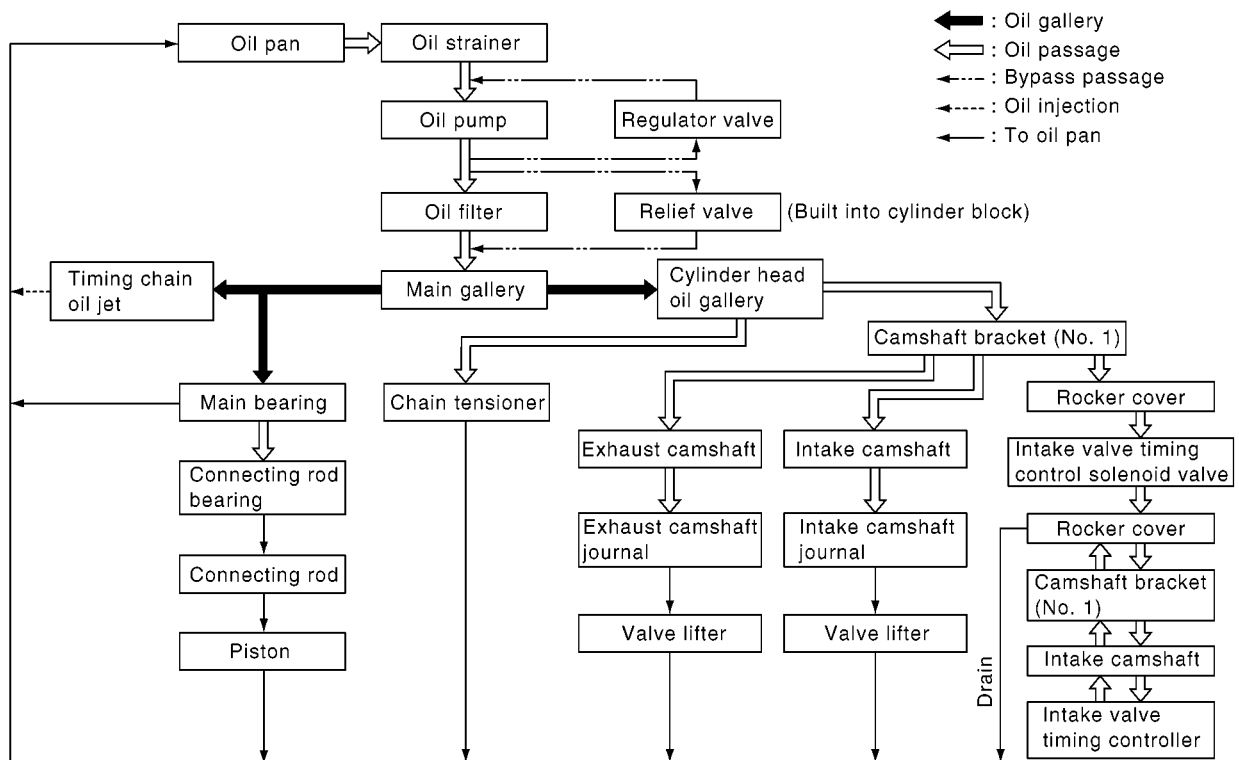
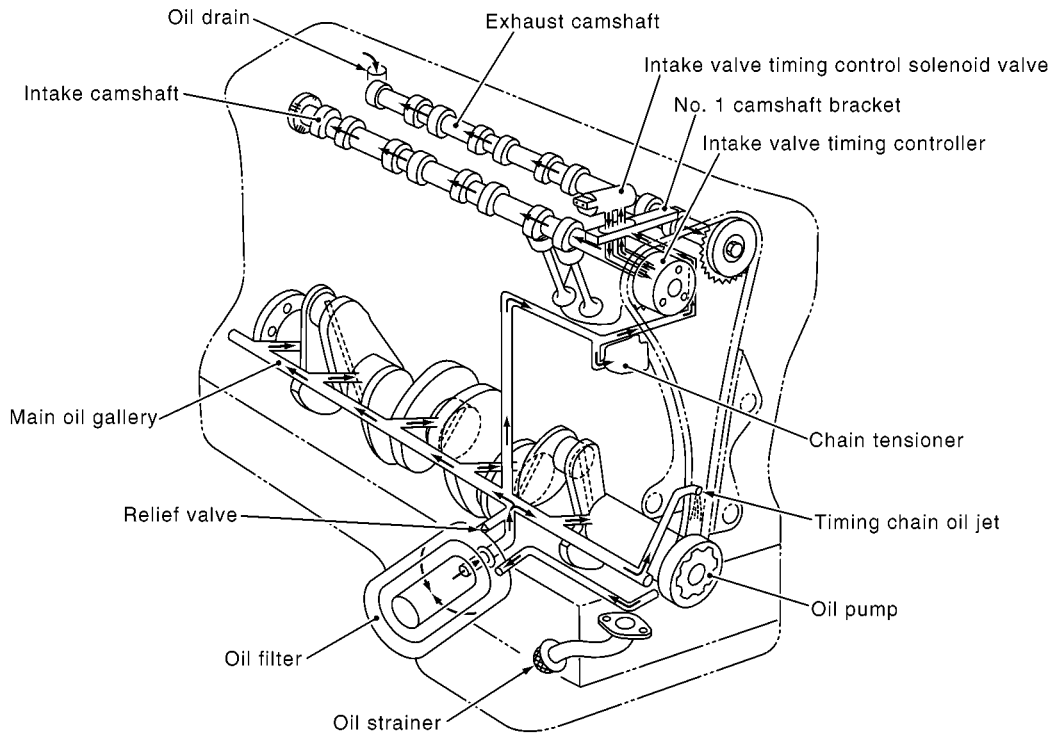
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## ENGINE OIL

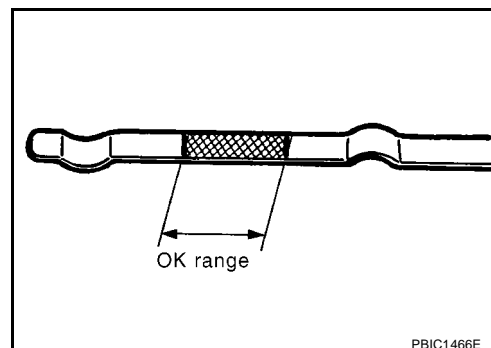
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### Inspection

#### OIL LEVEL AND CONTAMINATION

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- Before starting the engine, put vehicle horizontally and check the oil level. 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 oil level is outside the range, adjust level.
- 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.
- When oil level gauge is inserted in guide, apply engine oil to rubber seal of grip.



### OIL LEAK

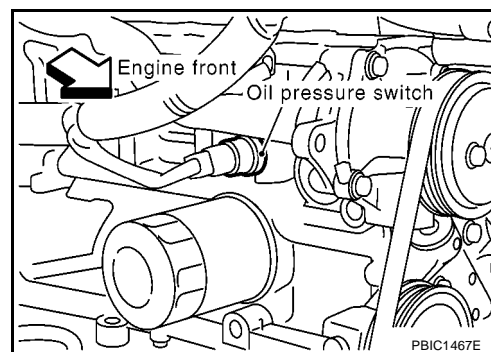
Check the following parts for engine oil leaks.

- Oil pan
- Oil pan drain plug
- Oil pressure switch
- Oil filter
- Front cover
- Cylinder head front cover
- Mating surfaces of cylinder block and cylinder head
- Mating surfaces of cylinder head and rocker cover

### OIL PRESSURE CHECK

#### WARNING:

- Be careful not to burn yourself, as the engine oil is hot.
  - Oil pressure check should be done in "Parking" or "Neutral" position.
1. Check the engine oil level.
  2. Remove oil filter. Refer to [LU-6, "OIL FILTER"](#).
  3. Remove oil pressure switch and connect an oil pressure gauge.



4. Install oil filter. Refer to [LU-6, "OIL FILTER"](#).
5. After warming up the engine, check that oil pressure corresponding to the engine speed is produced.

#### NOTE:

Low oil temperature creates high pressure.

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

Engine speed (rpm)	Idle speed	2,000	6,000
Engine oil pressure kPa (bar, kg/cm <sup>2</sup> , psi)	Approx. 44.1 (0.441, 0.45, 6.4) or more	Approx. 265 (2.65, 2.7, 38) or more	Approx. 373 (3.73, 3.8, 54) or more

6. After checking the oil pressure, install oil pressure switch as follows:

a. Remove old sealant on the switch and engine.

b. Apply thread sealant and tighten.

**Use Genuine Liquid Gasket or equivalent.**

 : 18.7 - 20.5 N·m (1.9 - 2.0 kg-m, 14 - 15 ft-lb)

### CAUTION:

Be careful not to get burned when engine or engine oil is heated.

## Changing Engine Oil

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### 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. Warm up engine, and check for oil leakage from engine components.

2. Stop engine and wait for 10 minutes.

3. Remove oil filler cap, and remove drain plug.

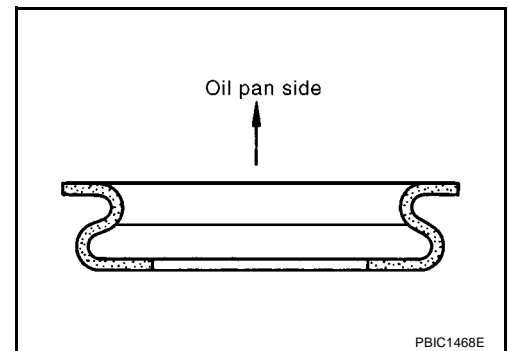
4. Drain engine oil.

5. Install drain plug. Refill with new engine oil.

- Install drain plug washer in the direction shown in figure.

- **Oil specification and viscosity:**

Refer to [MA-18, "RECOMMENDED FLUIDS AND LUBRICANTS"](#).



### Oil capacity (Approximate):


Unit: ℓ (Imp qt)

Drain and refill	With oil filter change	3.0 (2-5/8)
	Without oil filter change	2.8 (2-1/2)
Dry engine (engine overhaul)		3.5 (3-1/8)

### CAUTION:

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

#### Oil pan drain plug:

 : 29.4 - 39.2 N·m (3.0 - 3.9 kg-m, 22 - 28 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. Refer to [LU-4, "Inspection"](#).

## OIL FILTER

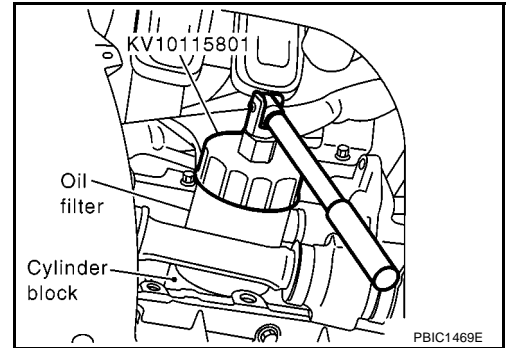
### Removal and Installation

#### REMOVAL

- Using an oil filter wrench (special service tool), 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 adheres to the engine and the vehicle.

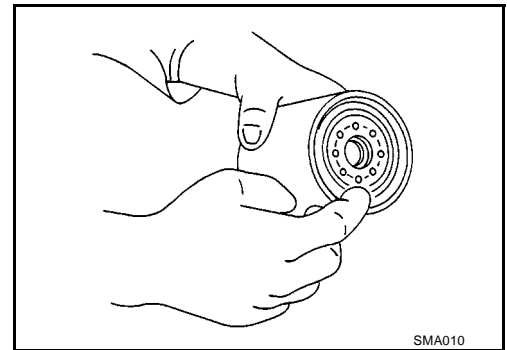


#### INSTALLATION

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

#### CAUTION:

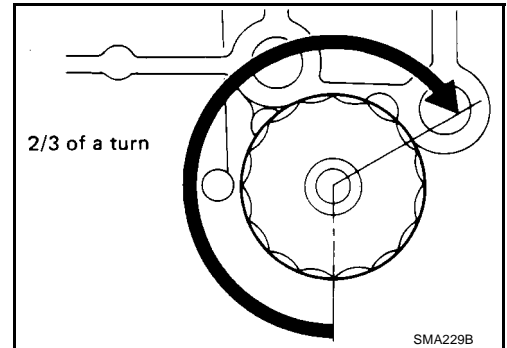
- Use genuine NISSAN oil filter or the equivalent.



- Screw the oil filter manually until it touches the installation surface, then tighten it by 2/3 turn.

#### Oil filter:

 :11 - 14 N·m (1.2 - 1.4 kg-m, 9 - 10 ft-lb)



#### INSPECTION AFTER INSTALLATION

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

## OIL PUMP

## Removal and Installation

## REMOVAL

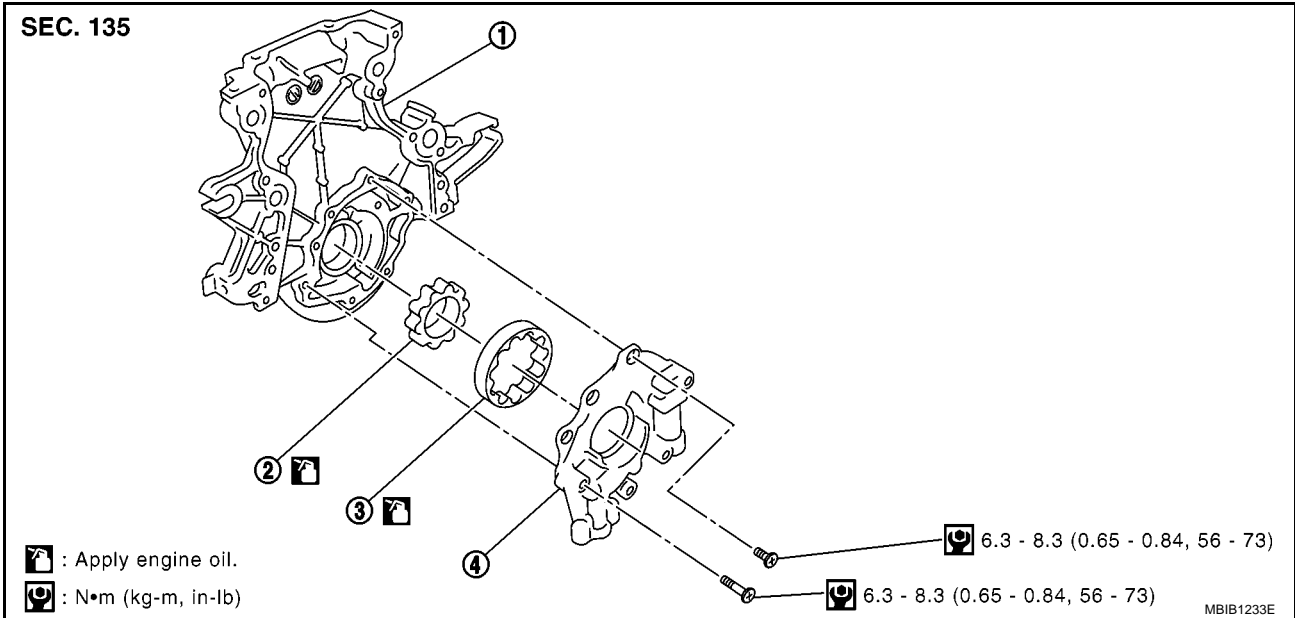
- Remove front cover. Refer to [EM-48. "TIMING CHAIN"](#).

## INSTALLATION

- Install in the reverse order of removal.

## Disassembly and Assembly

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- Front cover
- Inner rotor
- Outer rotor
- Oil pump cover

**CAUTION:**

Prior to installation, apply new engine oil to the parts marked in figure.

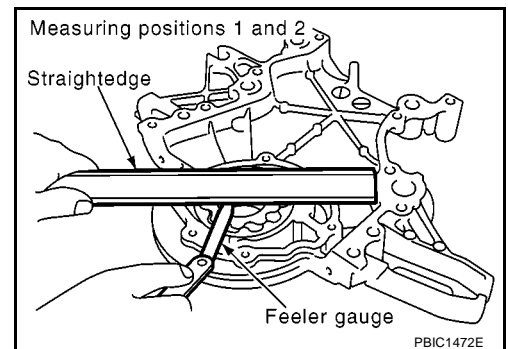
## DISASSEMBLY

- Remove oil pump cover.
- Remove outer rotor and inner rotor from front cover.

## INSPECTION AFTER DISASSEMBLY

## Clearances of Oil Pump Parts

- Measure clearance with feeler gauge and straightedge.  
 Side clearance between inner rotor and front cover (position 1).  
**Standard : 0.025 - 0.075 mm (0.0010 - 0.0030 in)**  
 Side clearance between outer rotor and front cover (position 2).  
**Standard : 0.025 - 0.075 mm (0.0010 - 0.0030 in)**

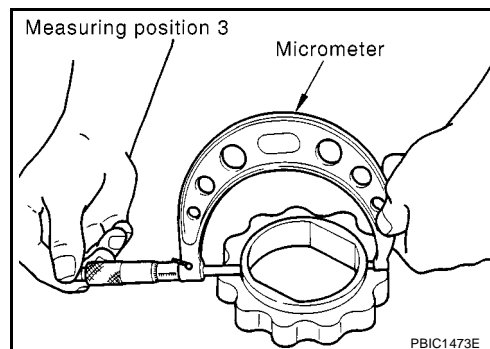


- Calculate the clearance from inner rotor to front cover socket with the following procedures.

# OIL PUMP

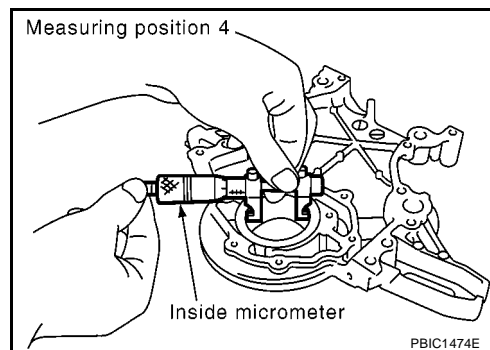
[CR]

1. Using a micrometer, measure the outer diameter of inner rotor protrusion (Position 3).



2. Using an inside micrometer, measure the inner diameter of front cover. (Position 4)  
(Clearance) = (Inner diameter of front cover) - (outer diameter of inner rotor protrusion)

**Standard** : 0.045 - 0.095 mm (0.0011 - 0.0037 in)



## ASSEMBLY

Install in the reverse order of disassembly.



# SERVICE DATA AND SPECIFICATIONS (SDS)

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## SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

### Standard and Limit OIL PRESSURE

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Engine speed rpm	Approximate discharge pressure kPa (bar, kg/cm <sup>2</sup> , psi)
Idle speed	Approx. 44.1 (0.441, 0.45, 6.4) or more
2,000	Approx. 265 (2.65, 2.7, 38) or more
6,000	Approx. 373 (3.73, 3.8, 54) or more

### OIL PUMP

Unit: mm (in)

Body to inner rotor axial clearance	0.025 - 0.075 (0.0010 - 0.0030)
Body to outer rotor axial clearance	0.025 - 0.075 (0.0010 - 0.0030)
Inner rotor to brazed portion of housing clearance	0.045 - 0.095 (0.0018 - 0.0037)

### OIL CAPACITY

Unit: ℓ (Imp qt)

With oil filter change	Approximately 3.0 (2-5/8)
Without oil filter change	Approximately 2.8 (2-1/2)
Dry engine (engine overhaul)	Approximately 3.5 (3-1/8)

### TIGHTENING TORQUE

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

Oil pressure switch	18.7 - 20.5 (1.9 - 2.0, 14 - 15)
Oil pan drain plug	29.4 - 39.2 (3.0 - 3.9, 22 - 28)
Oil filter	11 - 14 (1.2 - 1.4, 9 - 10)
Oil pump cover	6.3 - 8.3 (0.65 - 0.84, 56 - 73)*

## PRECAUTIONS

### Precautions For Liquid Gasket REMOVAL OF LIQUID GASKET

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

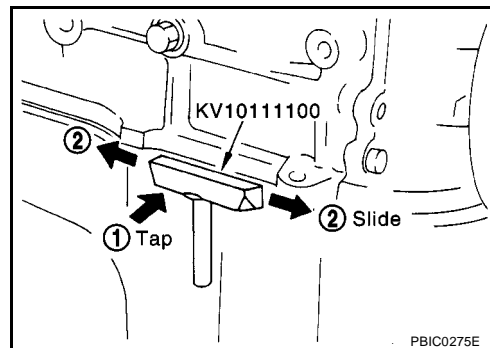
**CAUTION:**

**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.

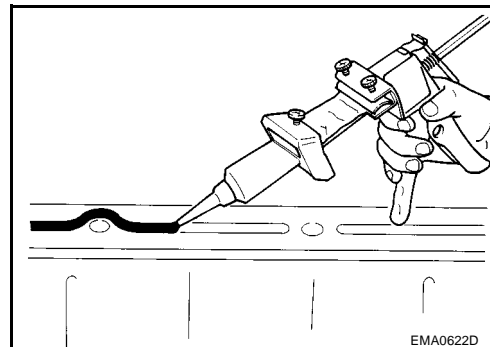
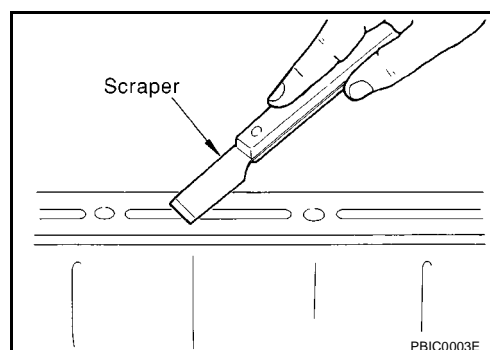
**CAUTION:**

**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

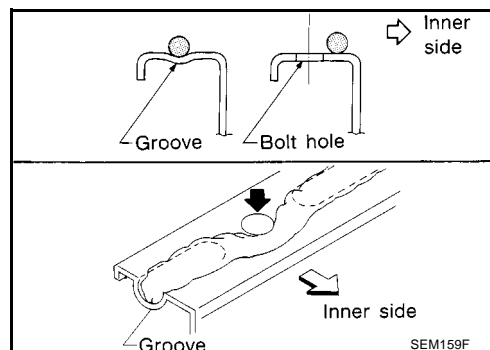
- Using a scraper, remove the old liquid gasket adhering to the gasket application surface and the mating surface.
  - Remove the liquid gasket completely from the groove of the gasket application surface, mounting bolts and bolt holes.
- Wipe the gasket application surface and the mating surface with 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

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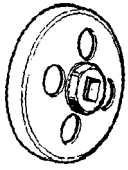
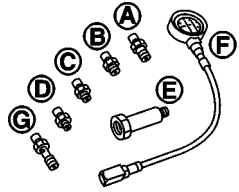
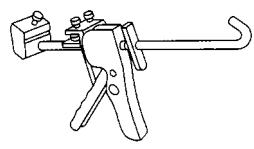
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## PREPARATION

### Special Service Tools

NISSAN tool number (RENAULT tool number) Tool name	Description	LU
KV113C0010 (Mot.1329) Oil filter wrench	Removing and installing oil filter  MBIB0369E	C D
KV113E0020 (Mot.836-05) Oil pressure gauge set	Measuring oil pressure Use C, E, F.  MBIB0663E	E F G
WS39930000 ( — ) Tube presser	Pressing the tube of liquid gasket  S-NT052	H I

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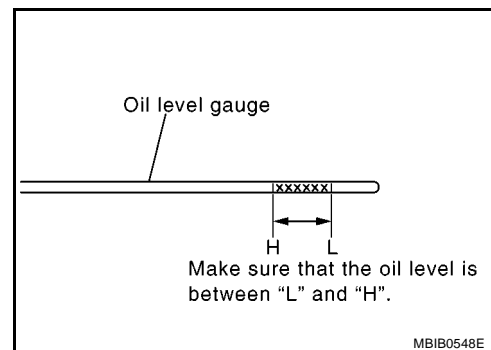
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## ENGINE OIL

### 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
- Oil filter bracket
- 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

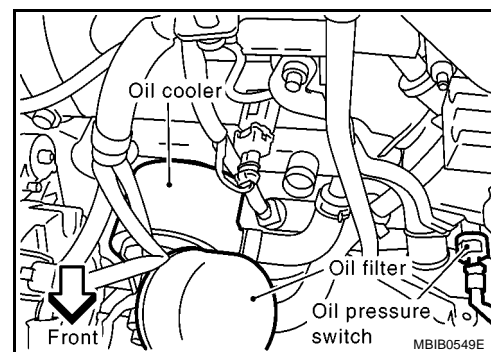
#### OIL PRESSURE CHECK

##### **WARNING:**

- **Be careful not to burn yourself, as the engine oil is hot.**
  - **Oil pressure check should be done in Neutral "N" position.**
1. Check the oil level. Refer to [LU-12, "OIL LEVEL AND MUDDINESS"](#).
  2. Remove engine undercover.
  3. Remove the oil pressure switch to connect the oil pressure gauge (special service tool).
  4. After warming up the engine, make sure oil pressure corresponding to the engine speed is produced.

**Idle speed** : Approx. 120 kPa (1.2 bar, 1.22 kg/cm<sup>2</sup>, 17.4 psi)

**3000 rpm** : Approx. 350 kPa (3.5 bar, 3.57 kg/cm<sup>2</sup>, 50.8 psi)



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

**Use Genuine Liquid Gasket or equivalent.**

##### **Oil pressure switch:**

: 25 N·m (2.55 kg-m, 18.4 ft-lb)

6. Start engine and check for oil leakage.

Changing Engine Oil

EBS01C7J

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.
- Refer to [MA-18, "RECOMMENDED FLUIDS AND LUBRICANTS"](#).

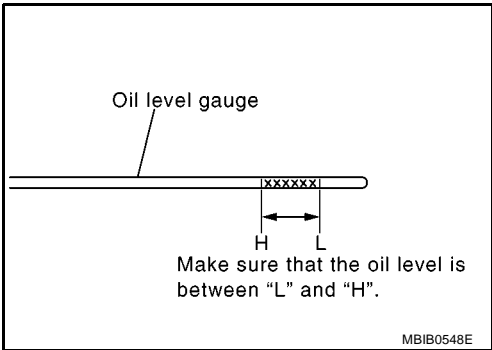
Oil capacity (Approximate):

Drain and refill	With oil filter change	4.55 ℓ (4 Imp qt)
	Without oil filter change	4.39 ℓ (3-7/8 Imp qt)
Dry engine (overhaul)		4.71 ℓ (4-1/8 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.
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.

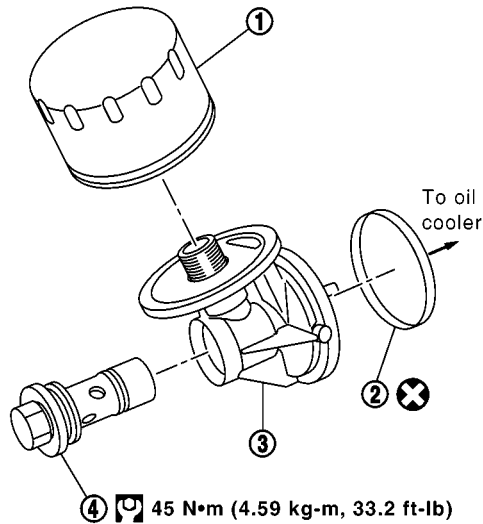


## OIL FILTER

### Removal and Installation

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✗ : Always replace after every disassembly.

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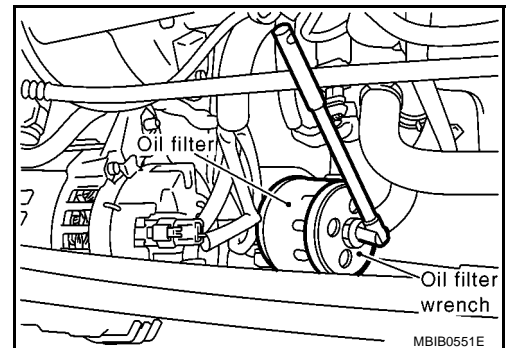
- |                    |           |                       |
|--------------------|-----------|-----------------------|
| 1. Oil filter      | 2. O-ring | 3. Oil filter bracket |
| 4. Connecting bolt |           |                       |

### REMOVAL

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



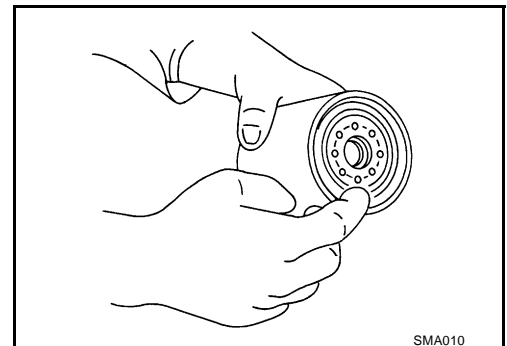
### INSTALLATION

- Remove foreign materials adhering to the oil filter installation surface.
- Install oil filter bracket to oil cooler.

#### CAUTION:

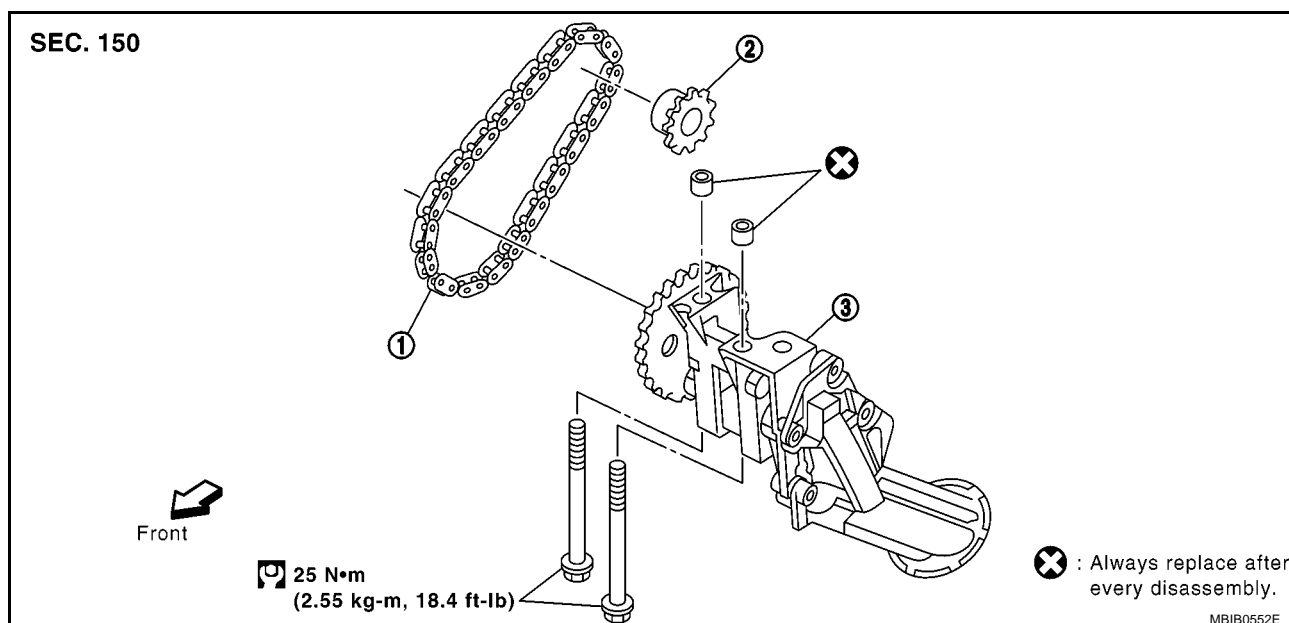
**Install oil filter bracket, positioning lug in the hole of oil cooler.**

- Apply engine oil to the oil seal contact surface of the new oil filter.
- Install the oil filter until it comes into contact with the oil seal on the engine bracket.
- Tighten the oil filter three-quarters of a turn by hand.
- After warming up the engine, check for engine oil leakage.
- Check oil level and add engine oil. Refer to [LU-12, "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-121, "DRIVE BELTS"](#).
4. Remove oil pan. Refer to [EM-133, "OIL PAN"](#).
5. Remove rear oil seal retainer. Refer to [EM-140, "TIMING BELT"](#).
6. Remove oil pump drive chain. Refer to [EM-167, "Disassembly of The Bottom Engine"](#).
7. Remove oil pump assembly.

## INSTALLATION

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

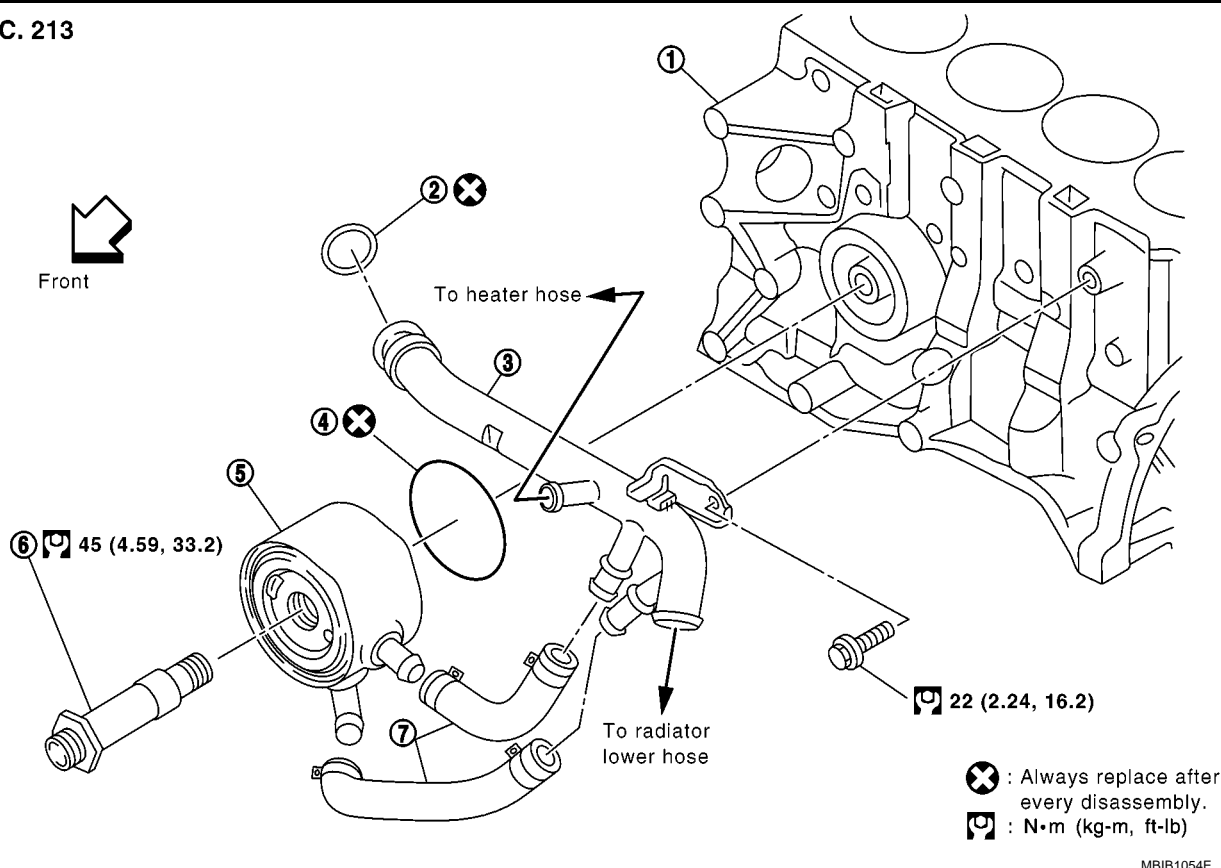
## Rear Oil Seal Retainer and Oil Pump

- Refer to [EM-179, "INSTALLATION OF REAR OIL SEAL RETAINER AND OIL PUMP"](#).

## OIL COOLER

## Removal and Installation

SEC. 213



1. Cylinder block

2. O-ring

3. Water pipe

4. O-ring

5. Oil cooler

6. Connecting bolt

7. Water hose

**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-32, "DRAINING ENGINE COOLANT"](#).

**CAUTION:****Perform when engine is cold.**

2. Remove oil filter and oil filter bracket. Refer to [LU-14, "OIL FILTER"](#).
3. Remove water 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**

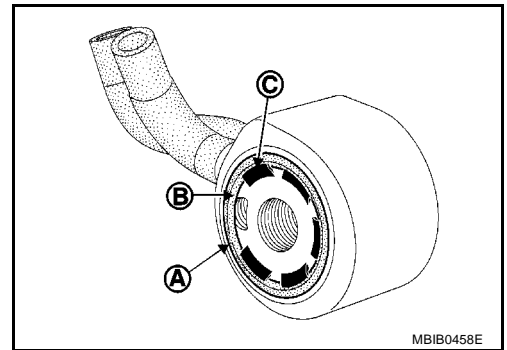
Installation is in reverse order of removal.



## OIL COOLER

[K9K]

- Replace the O-ring (A) of the oil cooler, positioning the lip (B) of the seal behind the lug (C) of the oil cooler.



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

A

LU

C

D

E

F

G

H

I

J

K

L

M

