

SECTION **LU**
ENGINE LUBRICATION SYSTEM

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C

D

E

CONTENTS

SERVICE INFORMATION	2	ENGINE OIL	5	F
PRECAUTIONS	2	Inspection	5	
Precaution for Battery Service	2	Changing Engine Oil	6	G
Precaution for Liquid Gasket	2	OIL FILTER	8	
PREPARATION	3	Removal and Installation	8	H
Special Service Tool	3	OIL PUMP	9	
Commercial Service Tool	3	Removal and Installation	9	
LUBRICATION SYSTEM	4	Disassembly and Assembly	9	I
Lubrication Circuit	4	SERVICE DATA AND SPECIFICATIONS		
System Chart	4	(SDS)	12	J
		Standard and Limit	12	

K

L

M

N

O

P

PRECAUTIONS

< SERVICE INFORMATION >

SERVICE INFORMATION

PRECAUTIONS

Precaution for Battery Service

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Before disconnecting the battery, lower both the driver and passenger windows. This will prevent any interference between the window edge and the vehicle when the door is opened/closed. During normal operation, the window slightly raises and lowers automatically to prevent any window to vehicle interference. The automatic window function will not work with the battery disconnected.

Precaution for Liquid Gasket

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LIQUID GASKET APPLICATION PROCEDURE

1. Removal old liquid gasket adhering to the liquid gasket application surface and the mating surface.
 - Remove liquid gasket completely from the liquid gasket application surface, mounting bolts, and bolt holes.
2. Wipe the liquid gasket application surface and the mating surface with white gasoline (lighting and heating use) to remove adhering moisture, grease and foreign materials.
3. Apply liquid gasket to the liquid gasket application surface.
Use Genuine RTV Silicone Sealant or equivalent. Refer to [GI-42](#).
 - Within five minutes of liquid gasket application, install the mating component.
 - If liquid gasket protrudes, wipe it off immediately.
 - Do not retighten mounting bolts or nuts after the installation.
 - After 30 minutes or more have passed from the installation, fill engine oil and engine coolant.

PREPARATION

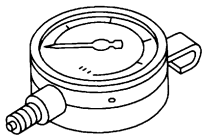
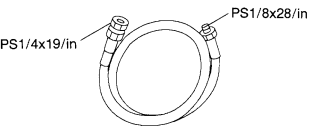
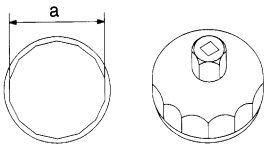
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PREPARATION

Special Service Tool

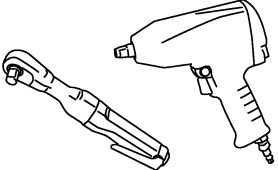
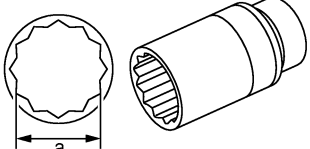
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The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

Tool number (Kent-Moore No.) Tool name	Description
ST25051001 (J25695-1) Oil pressure gauge  NT050	Measuring oil pressure Maximum measuring range: 2,452 kPa (25 kg/cm², 356 psi)
ST25052000 (J25695-2) Hose  S-NT559	Adapting oil pressure gauge to oil pan (upper)
KV10115801 (J38956) Oil filter wrench  S-NT375	Removing oil filter a: 64.3 mm (2.531 in)

Commercial Service Tool

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Tool name	Description
Power tool  PBIC0190E	Loosening nuts and bolts
Deep socket  PBIC2072E	Removing and installing oil pressure sensor a: 24 mm (0.94 in)

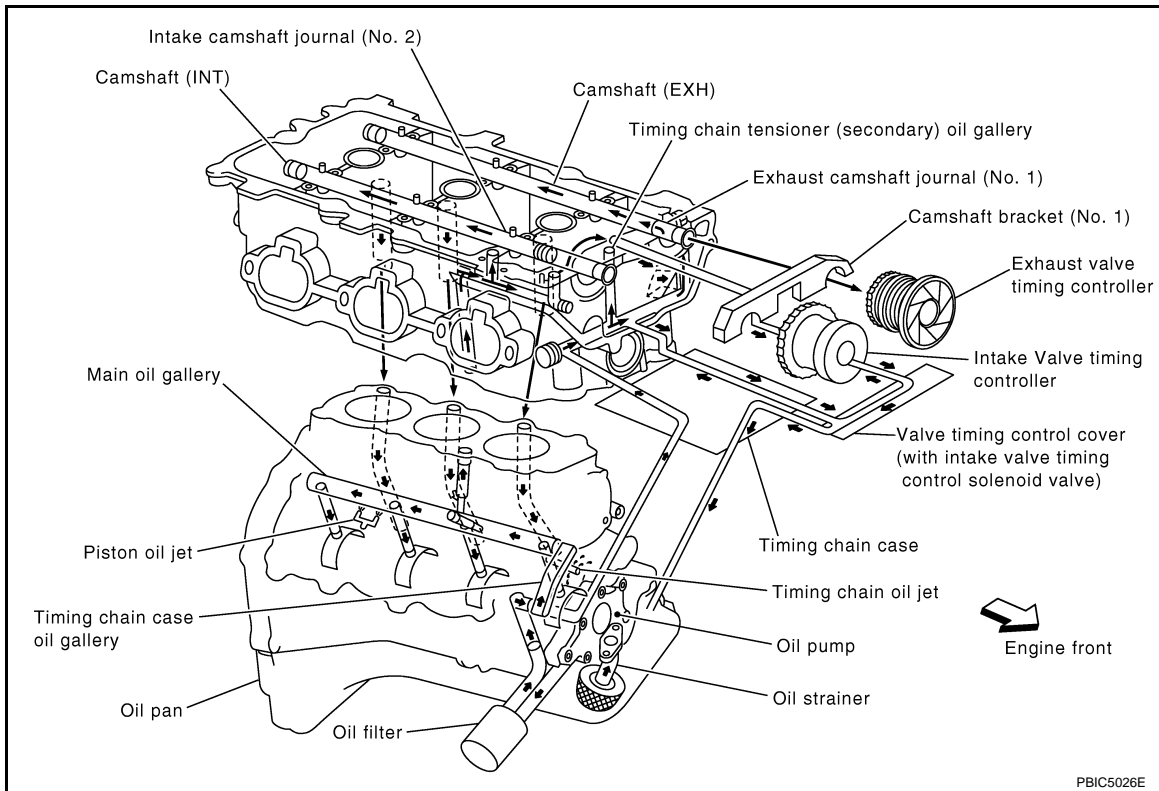
LUBRICATION SYSTEM

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LUBRICATION SYSTEM

Lubrication Circuit

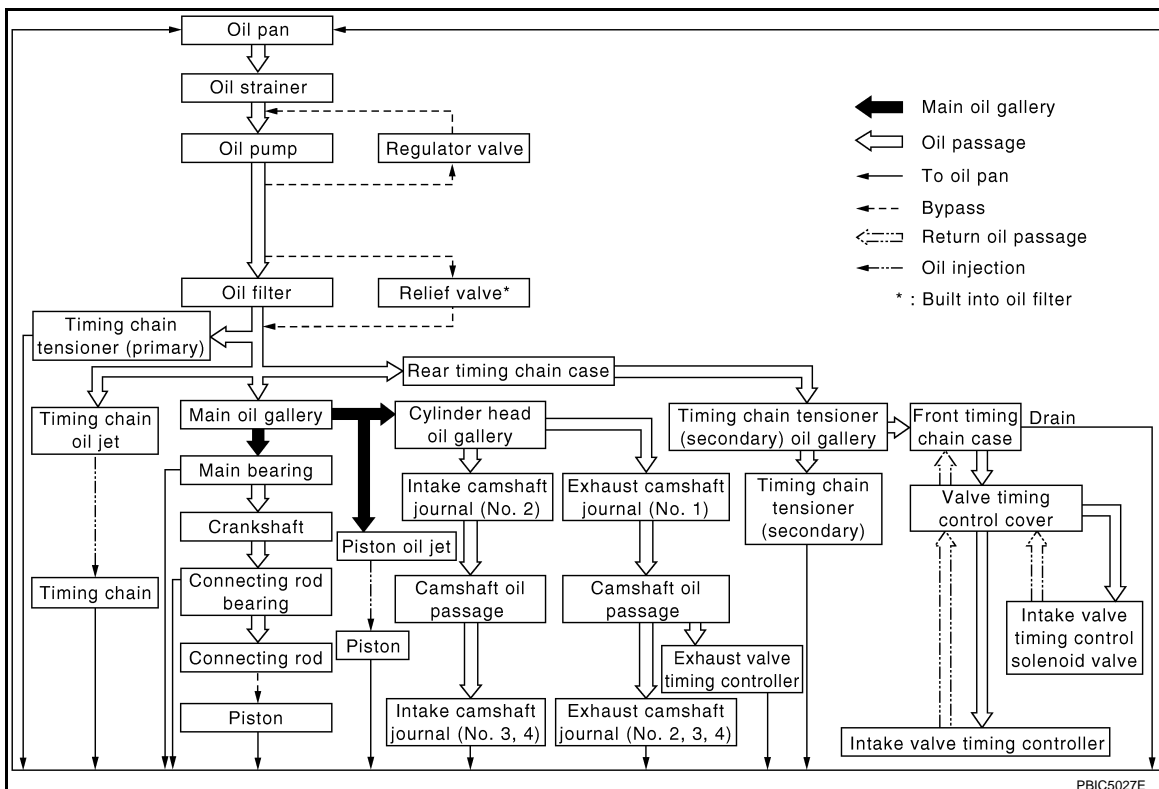
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PBIC5026E

System Chart

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PBIC5027E

ENGINE OIL

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ENGINE OIL

Inspection

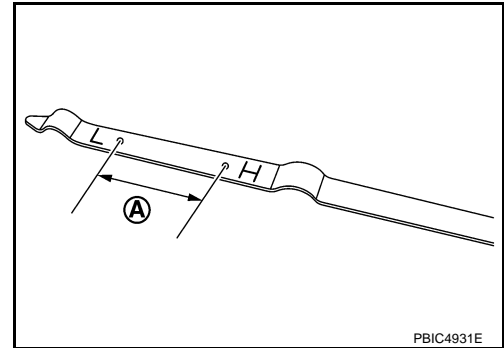
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ENGINE OIL LEVEL

NOTE:

Before starting engine, put vehicle horizontally and check the engine oil level. If engine is already started, stop it and allow 10 minutes before checking.

1. Pull out oil level gauge and wipe it clean.
2. Insert oil level gauge and check the engine oil level is within the range (A) shown in the figure.
3. If it is out of range, adjust it.

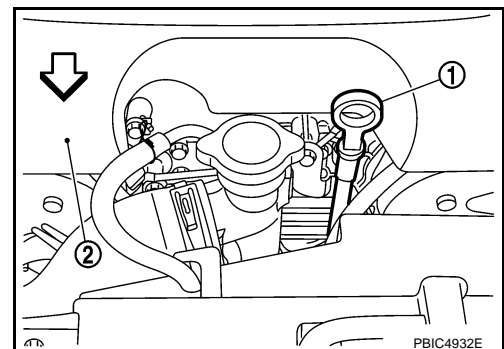


NOTE:

When checking oil level, insert oil level gauge (1) with its tip aligned with oil level gauge guide on cylinder head.

2 : Engine cover

⇐ : Vehicle front



ENGINE OIL APPEARANCE

- Check engine oil for white turbidity or heavy contamination.
- If engine oil becomes turbid and white, it is highly probable that it is contaminated with engine coolant. Repair or replace damaged parts.

ENGINE OIL LEAKAGE

Check for oil leakage around the following areas:

- Oil pans (lower and upper)
- Oil pan drain plug
- Oil pressure sensor
- Oil filter
- Valve timing control cover
- Mating surface between cylinder head and rocker cover
- Mating surface between front timing chain case and rear timing chain case
- Mating surface between rear timing chain case and cylinder head
- Mating surface between rear timing chain case and cylinder block
- Mating surface between rear timing chain case and oil pan (upper)
- Mating surface between cylinder block and cylinder head
- Mating surface between lower cylinder block and cylinder block
- Crankshaft oil seals (front and rear)
- Camshaft position sensor and exhaust valve timing control position sensor

OIL PRESSURE CHECK

WARNING:

ENGINE OIL

< SERVICE INFORMATION >

- Be careful not to burn yourself, as engine oil may be hot.
- Oil pressure check should be done in "Neutral position" (M/T models) or "Parking position" (A/T models).

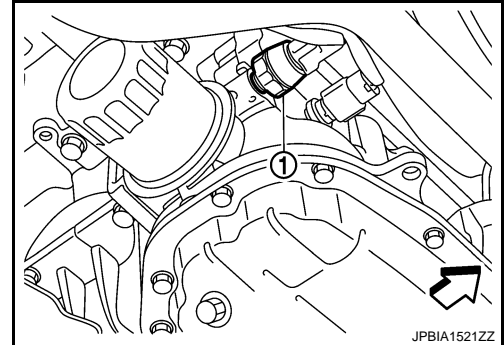
1. Check the engine oil level. Refer to "ENGINE OIL LEVEL".
2. Remove undercover with power tool.
3. Disconnect harness connector at oil pressure sensor, and remove oil pressure sensor using deep socket (commercial service tool).

1 : Oil pressure switch

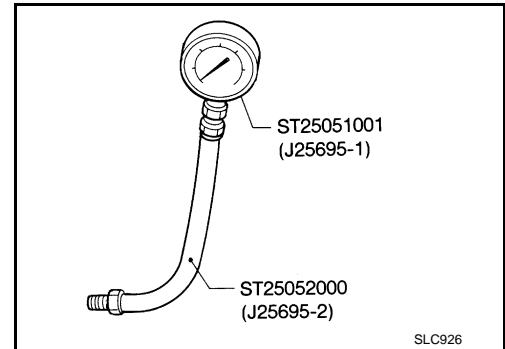
↔ : Engine front

CAUTION:

Never drop or shock oil pressure sensor.



4. Install the oil pressure gauge (SST) and hose (SST).



5. Start the engine and warm it up to normal operating temperature.
6. Check the engine oil pressure with engine running under no-load.

NOTE:

When the engine oil temperature is low, the engine oil pressure becomes high.

Engine oil pressure [Engine oil temperature at 80 °C (176 °F)]

kPa (kg/cm², psi)

Engine speed	Approximate discharge pressure
Idle speed	More than 98 (1.0, 14)
2,000 rpm	More than 294 (3.0, 43)

If difference is extreme, check engine oil passage and oil pump for engine oil leaks.

7. After the inspections, install oil pressure sensor as follows:
 - a. Remove old liquid gasket adhering to oil presser sensor and the mating surface.
 - b. Apply liquid gasket and tighten oil pressure sensor to the specification.
Use Genuine RTV Silicone Sealant or equivalent. Refer to [GI-42](#).

: 14.7 N·m (1.5 kg-m, 11 ft-lb)

- c. After warming up engine, check there is no leakage of engine oil with running engine.

Changing Engine Oil

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WARNING:

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

ENGINE OIL

< SERVICE INFORMATION >

1. Warm up engine, put vehicle horizontally and check for oil leakage from engine components. Refer to [LU-5, "Inspection"](#).
2. Stop the engine and wait for 10 minutes.
3. Loosen oil filler cap and then remove drain plug.
4. Drain engine oil.
5. Install drain plug with new washer. Refer to [EM-27](#).

CAUTION:

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

Oil pan drain plug:

: **34.3 N·m (3.5 kg·m, 25 ft·lb)**

6. Refill with new engine oil.
Engine oil specification and viscosity:
Refer to [MA-10](#).

Engine oil capacity (Approximate):

Unit: ℓ (US qt, Imp qt)

Drain and refill	With oil filter change	4.9 (5-1/8, 4-1/4)
	Without oil filter change	4.6 (4-7/8, 4)
Dry engine (Overhaul)		5.7 (6, 5)

CAUTION:

- **When filling engine oil, never pull out oil level gauge.**
- **The refill capacity depends on the engine oil temperature and drain time. Use these specifications for reference only.**
- **Always use oil level gauge to determine the proper amount of engine oil in the engine.**

7. Warm up engine and check area around drain plug and oil filter for oil leakage.
8. Stop engine and wait for 10 minutes.
9. Check the engine oil level. Refer to [LU-5, "Inspection"](#).

OIL FILTER

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OIL FILTER

Removal and Installation

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REMOVAL

WARNING:

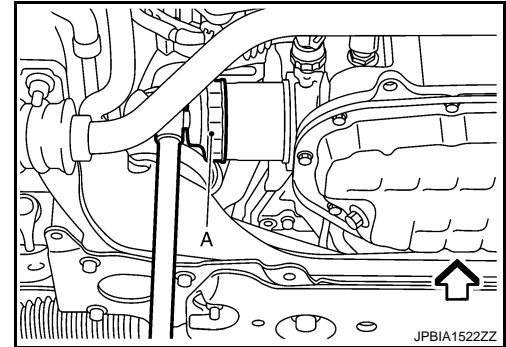
Be careful not to get burned when engine and engine oil may be hot.

CAUTION:

- Oil filter is provided with relief valve. Use Genuine NISSAN Oil Filter or equivalent.
- When removing, prepare a shop cloth to absorb any engine oil leakage or spillage.
- Never allow engine oil to adhere to drive belts.
- Completely wipe off any engine oil that adheres to engine and vehicle.

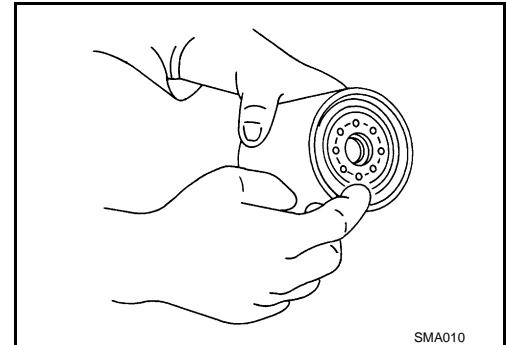
1. Remove undercover with power tool.
2. Using oil filter wrench [SST: KV10115801(J38956)] (A), remove oil filter.

⇐ : Engine front



INSTALLATION

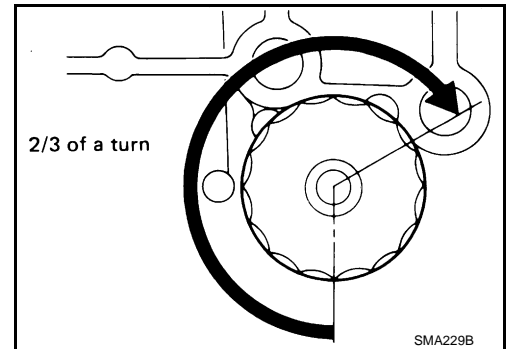
1. Remove foreign materials adhering to oil filter installation surface.
2. Apply engine oil to the oil seal contact surface of new oil filter.



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

Oil filter:

: 17.7 N·m (1.8 kg·m, 13 ft·lb)



INSPECTION AFTER INSTALLATION

1. Check the engine oil level. Refer to [LU-5](#).
2. Start engine, and check there is no leaks of engine oil.
3. Stop engine and wait for 10 minutes.
4. Check the engine oil level and adjust engine oil. Refer to [LU-5](#).

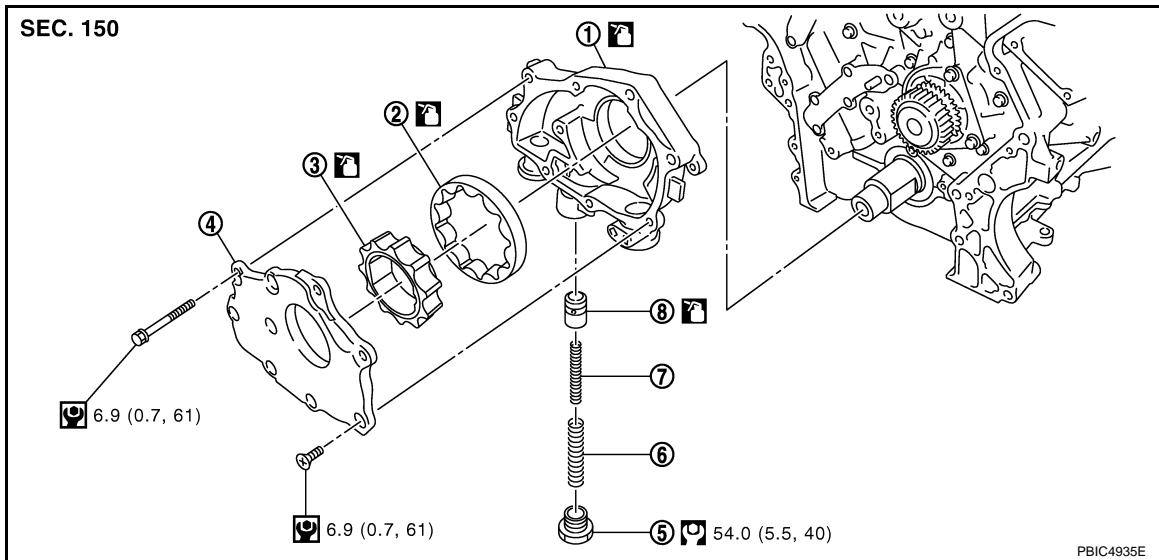
OIL PUMP

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OIL PUMP

Removal and Installation

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- | | | |
|---------------------------|-------------------------|---------------------------|
| 1. Oil pump body | 2. Oil pump outer rotor | 3. Oil pump inner rotor |
| 4. Oil pump cover | 5. Regulator valve plug | 6. Regulator valve spring |
| 7. Regulator valve spring | 8. Regulator valve | |

- Refer to [GI-8. "Component"](#) for symbol marks in the figure.

REMOVAL

1. Remove oil pan (lower) and oil strainer. Refer to [EM-27](#).
2. Remove front timing chain case and timing chain (primary). Refer to [EM-53](#).
3. Remove oil pump assembly.

INSTALLATION

CAUTION:

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

Note the following, and install in the reverse order of removal.

- When installing, align crankshaft flat faces with inner rotor flat faces.

INSPECTION AFTER INSTALLATION

1. Check the engine oil level. Refer to [LU-5](#).
2. Start engine, and check there is no leaks of engine oil.
3. Stop engine and wait for 10 minutes.
4. Check the engine oil level and adjust engine oil. Refer to [LU-5](#).

Disassembly and Assembly

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DISASSEMBLY

1. Remove oil pump cover.
2. Remove oil pump inner rotor and oil pump outer rotor from oil pump body.
3. After removing regulator valve plug, remove regulator valve spring and regulator valve.

INSPECTION AFTER DISASSEMBLY

Oil Pump Clearance

- Measure the clearance with feeler gauge.

OIL PUMP

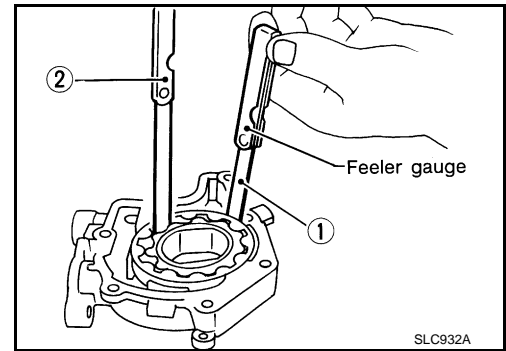
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- Clearance between oil pump outer rotor and oil pump body (Position "1")

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

- Tip clearance between oil pump inner rotor and oil pump outer rotor (Position "2")

Standard : Below 0.180 mm (0.0071 in)

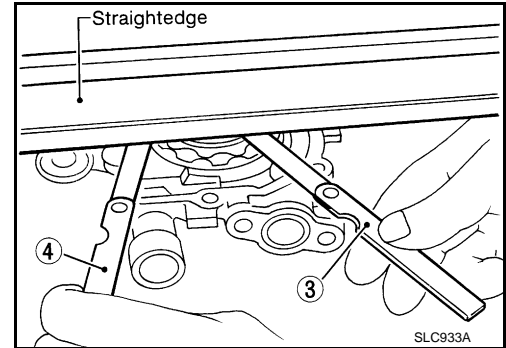


- Measure the clearance with feeler gauge and straightedge.
- Side clearance between oil pump inner rotor and oil pump body (Position "3")

Standard : 0.030 - 0.070 mm (0.0012 - 0.0028 in)

- Side clearance between oil pump outer rotor and oil pump body (Position "4")

Standard : 0.030 - 0.090 mm (0.0012 - 0.0035 in)



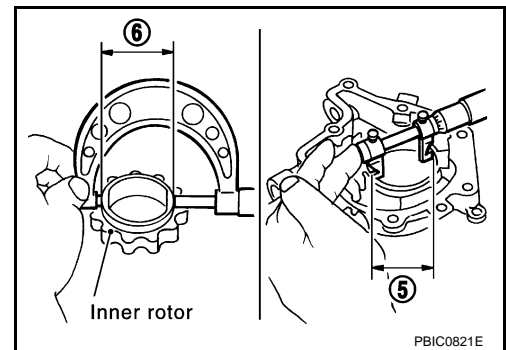
- Calculate the clearance between oil pump inner rotor and oil pump body as follows:

OIL PUMP BODY INNER DIAMETER

- Measure the inner diameter of oil pump body with inside micrometer. (Position "5")

OIL PUMP INNER ROTOR OUTER DIAMETER

- Measure the outer diameter of protruded portion of oil pump inner rotor with micrometer. (Position "6")



OIL PUMP INNER ROTOR TO OIL PUMP BODY CLEARANCE

- (Clearance) = (Oil pump body inner diameter) – (Oil pump inner rotor outer diameter)

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

- If measured/calculated values are out of the standard, replace oil pump assembly.

Regulator Valve Clearance

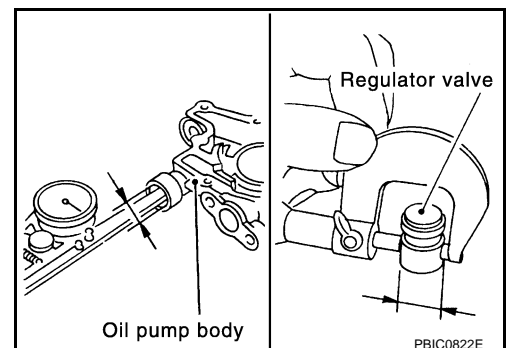
- (Clearance) = (Valve hole diameter) – (Regulator valve outer diameter)

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

- If the calculated value is out of the standard, replace oil pump assembly.

CAUTION:

- Coat regulator valve with engine oil.
- Check that it falls smoothly into valve hole by its own weight.



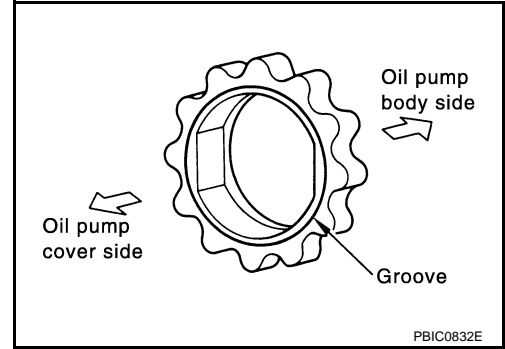
OIL PUMP

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ASSEMBLY

Note the following, and assemble in the reverse order of disassembly.

- Install oil pump inner rotor with the groove faced to oil pump cover side.



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C

D

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H

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SERVICE DATA AND SPECIFICATIONS (SDS)

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SERVICE DATA AND SPECIFICATIONS (SDS)

Standard and Limit

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OIL PRESSURE

kPa (kg/cm², psi)

Engine speed	Approximate discharge pressure*
Idle speed	More than 98 (1.0, 14)
2,000 rpm	More than 294 (3.0, 43)

*: Engine oil temperature at 80°C (176°F)

OIL CAPACITY (APPROXIMATE)

Unit: ℓ (US qt, Imp qt)

Drain and refill	With oil filter change	4.9 (5-1/8, 4-1/4)
	Without oil filter change	4.6 (4-7/8, 4)
Dry engine (Overhaul)		5.7 (6, 5)

OIL PUMP

Unit: mm (in)

Oil pump body to oil pump outer rotor radial clearance	0.114 - 0.260 (0.0045 - 0.0102)
Oil pump inner rotor to oil pump outer rotor tip clearance	Below 0.180 (0.0071)
Oil pump body to oil pump inner rotor side clearance	0.030 - 0.070 (0.0012 - 0.0028)
Oil pump body to oil pump outer rotor side clearance	0.030 - 0.090 (0.0012 - 0.0035)
Oil pump inner rotor to oil pump body clearance	0.045 - 0.091 (0.0018 - 0.0036)

REGULATOR VALVE

Unit: mm (in)

Regulator valve to oil pump body clearance	0.040 - 0.097 (0.0016 - 0.0038)
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