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SECTION LU

ENGINE LUBRICATION SYSTEM

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PRECAUTIONS

**Precautions for Liquid Gasket
REMOVAL OF LIQUID GASKET**

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

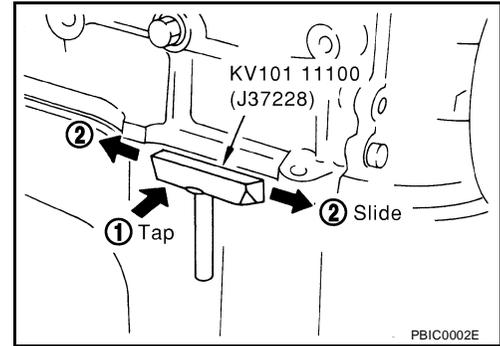
CAUTION:

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 sealant is applied.

CAUTION:

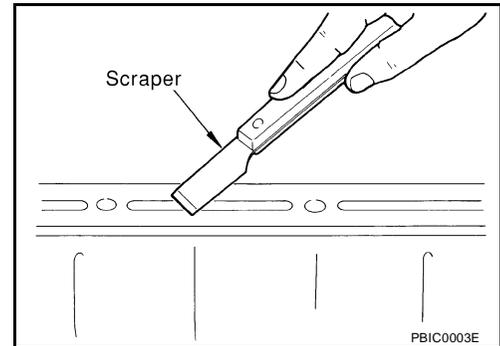
If for some unavoidable reason a tool such as a flat-bladed screwdriver is used, be careful not to damage the mating surfaces.



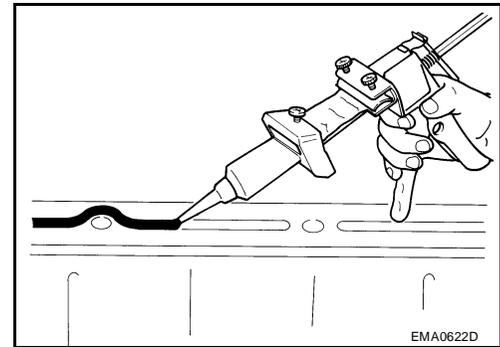
LIQUID GASKET APPLICATION PROCEDURE

1. Using a scraper, remove the old sealant adhering to the mating surface.
- Remove the sealant completely from the groove, mounting bolts, and bolt holes.
2. Clean the mating surface thoroughly to remove adhering moisture, grease and foreign materials.
3. Install the sealant tube into the tube presser.

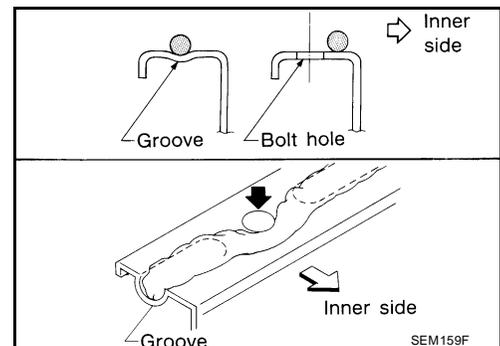
Use Genuine RTV Silicone Sealant or equivalent. Refer to [GI-42. "Recommended Chemical Products and Sealants"](#).



4. Apply the sealant without breaks to the specified area with the specified dimensions.
- If there is a groove for the sealant application, apply the sealant to the groove.



- As for the bolt holes, normally apply the sealant inside the holes. If specified, it should be applied outside the holes. Make sure to read the instructions in this manual.
- Within five minutes of sealant application, install the mating component.
- If the sealant protrudes, wipe it off immediately.
- Do not retighten after the installation.
- After 30 minutes or more have passed from the installation, fill the engine with the correct oil and coolant. Refer to [GI-42. "Recommended Chemical Products and Sealants"](#).



CAUTION:

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

PREPARATION

[QR25DE]

PF0:00002

EBS007QK

PREPARATION

Special Service Tools

The actual shape of the Kent-Moore tools may differ from those tools illustrated here.

Tool number (Kent Moore No.) Tool name	Description
ST25051001 (J25695-1) Oil pressure gauge	Measuring oil pressure Maximum measuring range: 2,452 kPa (25 kg/cm² , 356 psi)
ST25052000 (J25695-2) Hose	Adapting oil pressure gauge to cylinder block
KV10115801 (J38956) Oil filter wrench	Removing and installing oil filter
WS39930000 (—) Tube presser	Pressing the tube of liquid gasket

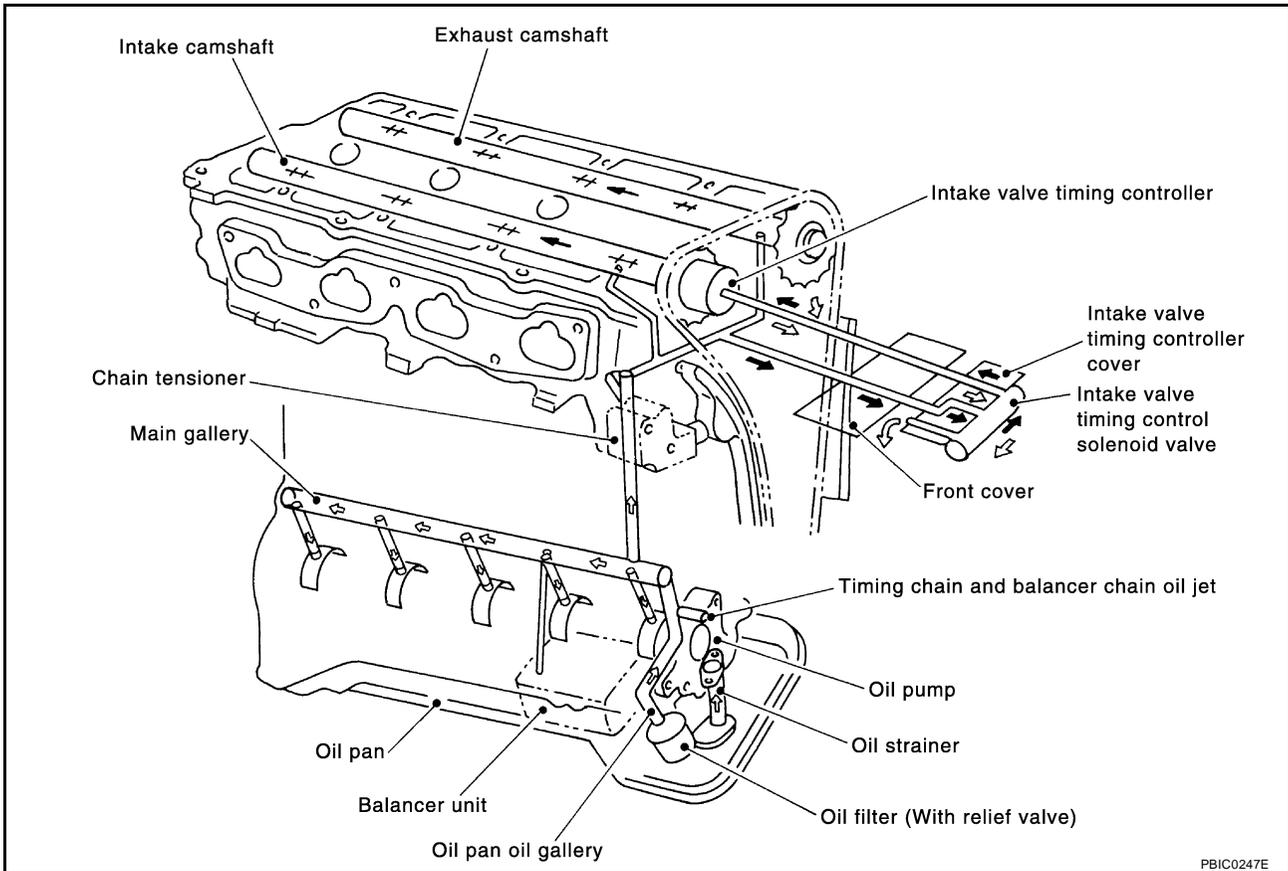
Commercial Service Tools

EBS007QL

Tool name	Description
Power tool	Loosening bolts and nuts
Deep socket	Removing and installing oil pressure switch Deep socket 26 mm, 3/8 drive

LUBRICATION SYSTEM

Lubrication Circuit



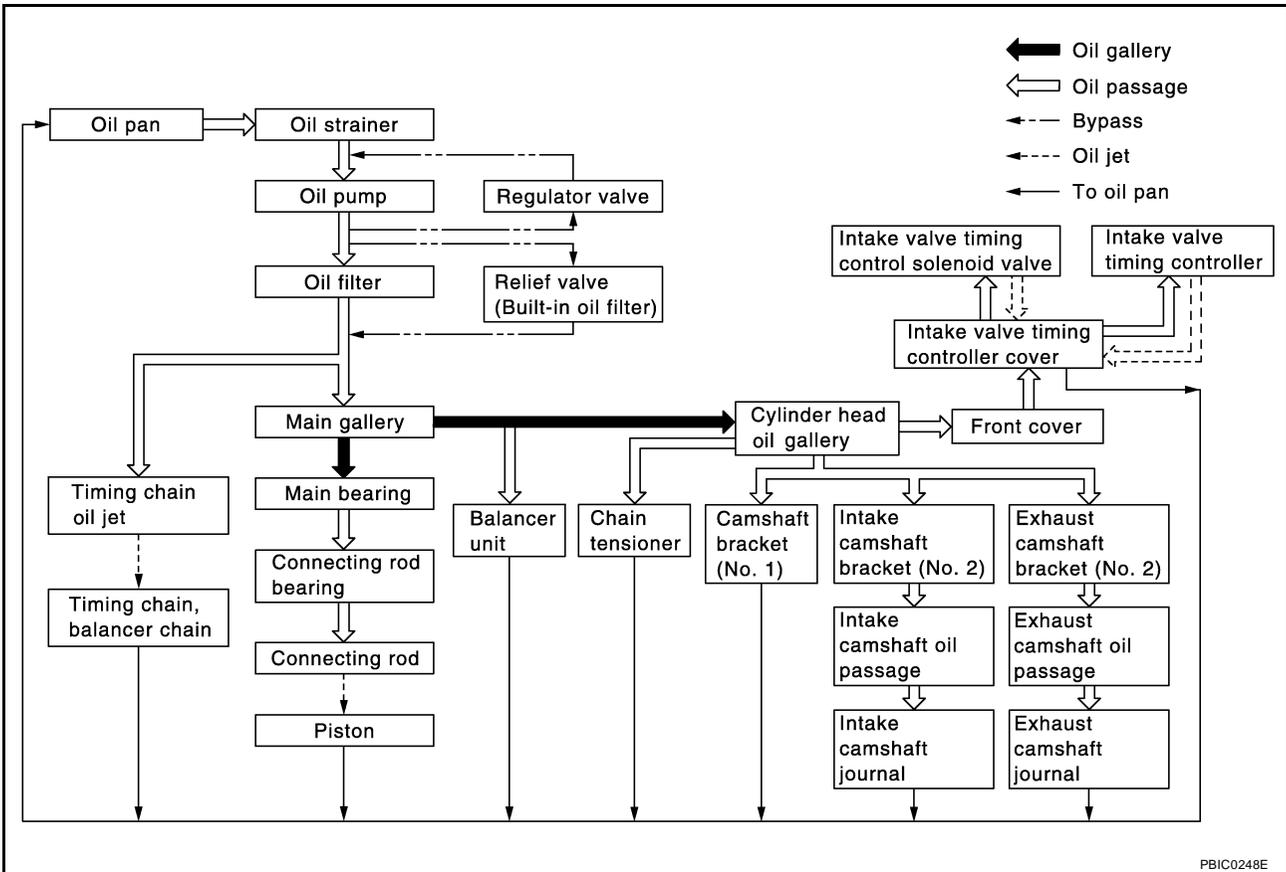
PBIC0247E

LUBRICATION SYSTEM

[QR25DE]

System Drawing

EBS007QN



PBIC0248E

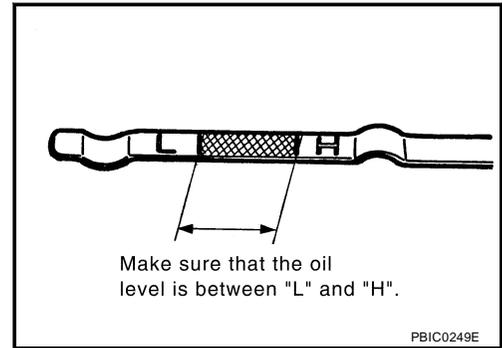
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ENGINE OIL

Inspection OIL LEVEL AND MUDDINESS

- Before starting the engine, 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 on the dipstick.
- If it is out of range, add oil as necessary. Refer to [MA-12, "RECOMMENDED FLUIDS AND LUBRICANTS"](#) .
- Check the oil for white turbidity or heavy contamination.
- If the oil becomes turbid and white, it is highly probable that it is contaminated with coolant. Determine the cause and correct as necessary.



OIL LEAKAGE

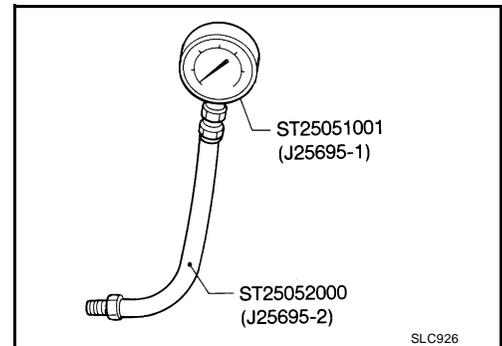
Check for oil leakage around the following areas:

- Oil pan
- Oil pan drain plug
- Oil pressure switch
- Oil filter
- IVTC cover
- Front cover
- Mating surface between cylinder block and cylinder head
- Mating surface between cylinder head and rocker cover
- Crankshaft oil seal

OIL PRESSURE CHECK

WARNING:

- **Be careful not to burn yourself, as the engine oil may be hot.**
 - **For M/T models, put the gearshift lever in the Neutral "N" position. For A/T models, put the selector lever in the Park "P" position.**
1. Check the oil level.
 2. Remove the under cover, using power tools.
 3. Remove the oil pressure switch to connect the oil pressure gauge.
 4. 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	6,000
Engine pressure kPa (bar.kg/cm ² , psi)	Approx. 98 (0.98, 1.0, 14) or more	Approx. 294 (2.9, 3.0, 43) or more	Approx. 392 (3.9, 4.0, 57) or more

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

Use Genuine High Performance Thread Sealant or equivalent. Refer to [GI-42, "RECOMMENDED CHEMICAL PRODUCTS AND SEALANTS"](#) .

Oil pressureswitch : 12.3 - 17.2 N-m (1.25 - 1.75 kg-m, 10 - 12 ft-lb)

Changing Engine Oil

WARNING:

- Be careful not to burn yourself, as the 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 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 drain plug and oil filler cap.
4. Drain oil and refill with new engine oil.

Oil specification and viscosity

- Refer to [MA-12, "RECOMMENDED FLUIDS AND LUBRICANTS"](#) .

Oil capacity (Approximate):

Unit: ℓ (qt.)

Drain and refill	With oil filter change	4.2 (4 1/2)
	Without oil filter change	4.0 (4 1/4)
Dry engine (engine overhaul)		4.6 (4 7/8)

CAUTION:

- Be sure to clean the drain plug and install using a new washer.

Oil pan drain plug : 29.4 - 39 N·m (3.0 - 4.0 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.

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

OIL FILTER

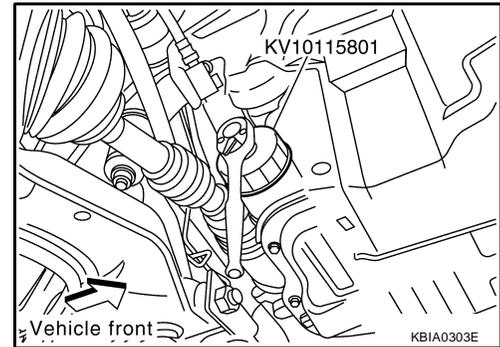
Removal and Installation

REMOVAL

- Using an oil filter wrench, remove the oil filter.

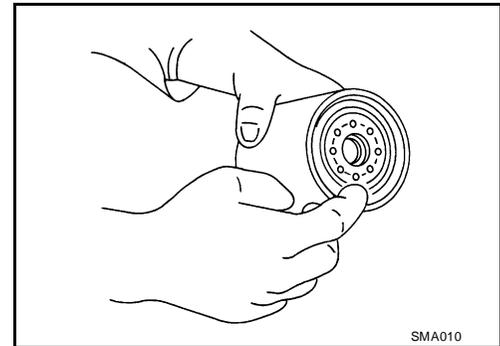
CAUTION:

- Be careful not to get burned when the engine and engine oil are hot.
- The oil filter has a built in pressure relief valve. Use a genuine NISSAN oil filter or equivalent
- 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.



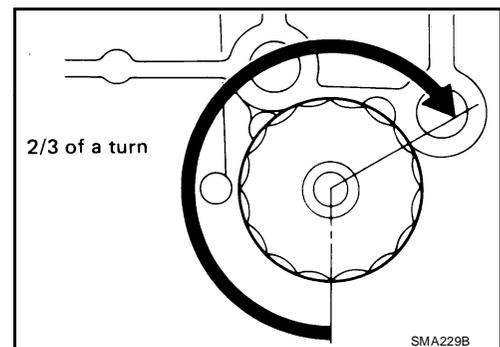
INSTALLATION

- Clean off any foreign materials adhering to the oil filter installation surface.
- Apply engine oil to the oil seal surface of the new oil filter.

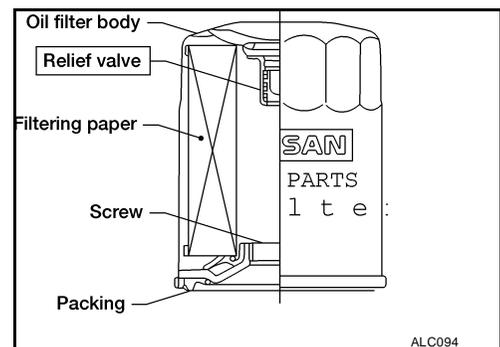


- Screw the oil filter manually until it touches the installation surface, then tighten it by 2/3 turn. Or tighten to specification below.

Oil filter : 14.7 - 20.5 N-m (1.5 - 2.1 kg-m, 11 - 15 ft-lb)



- After warming up the engine, check for oil leaks.
- Check oil level and add engine oil as necessary. Refer to [LU-6](#), "[ENGINE OIL](#)".

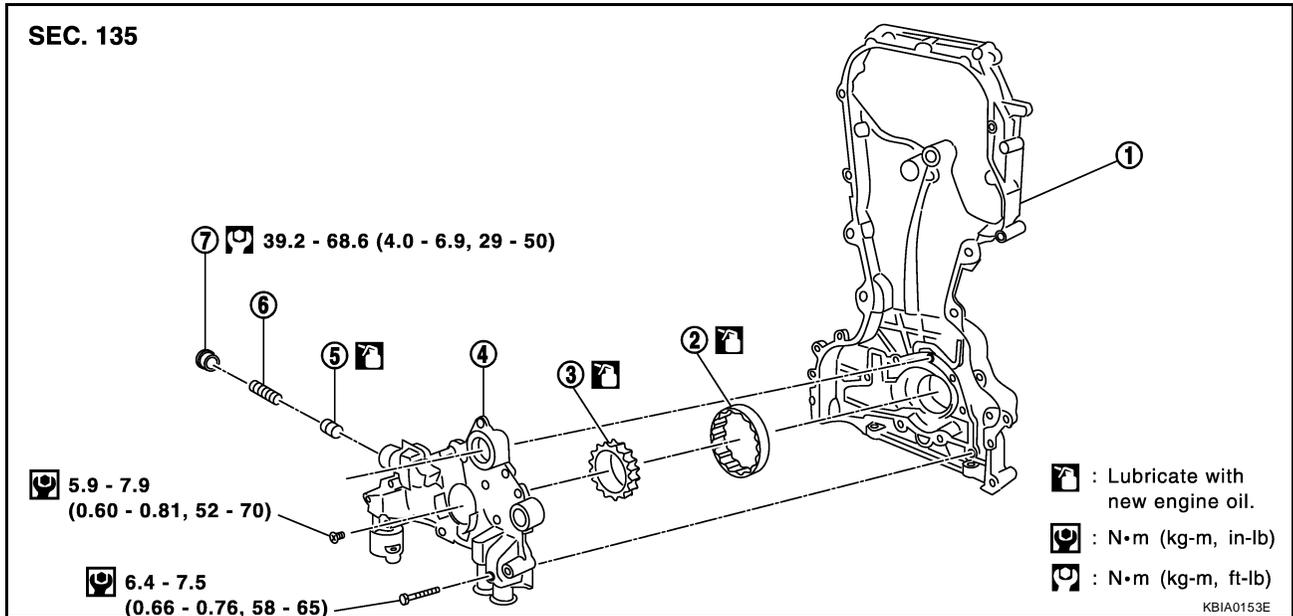


OIL PUMP

Removal and Installation

- Remove the front cover.

Disassembly and Assembly



- | | | |
|-------------------|--------------------|----------------|
| 1. Front cover | 2. Outer rotor | 3. Inner rotor |
| 4. Oil pump cover | 5. Regulator valve | 6. Spring |
| 7. Regulator plug | | |

CAUTION:

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

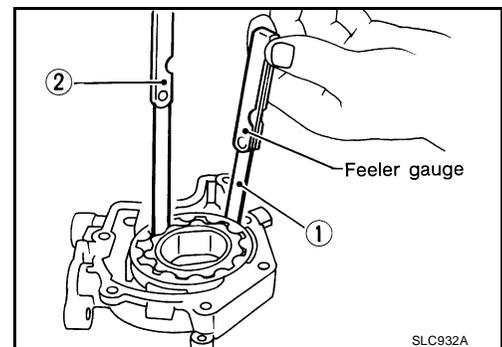
DISASSEMBLY

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

INSPECTION AFTER DISASSEMBLY

Measure the clearance of the oil pump parts.

- Measure clearance with feeler gauge.
- Clearance between outer rotor and oil pump body (position 1).
Standard : 0.114 - 0.179 mm (0.0045 - 0.0070 in)
- Tip clearance between inner rotor and outer rotor (position 2).
Standard : Below 0.220 mm (0.0087 in)



OIL PUMP

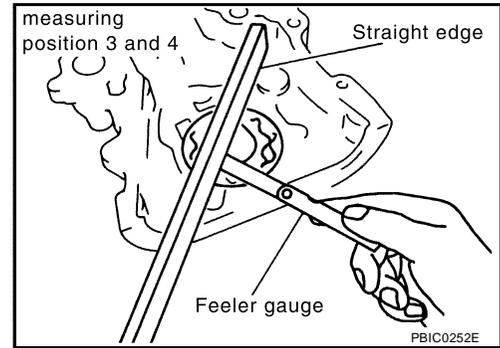
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- Measure clearance with feeler gauge and straightedge.
- Side clearance between inner rotor and oil pump body (position 3).

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

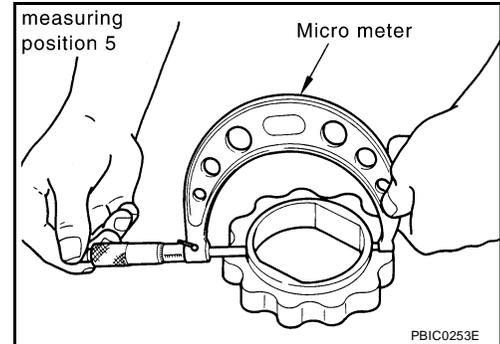
- Side clearance between outer rotor and oil pump body (position 4).

Standard : 0.060 - 0.110 mm (0.0024 - 0.0043 in)



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

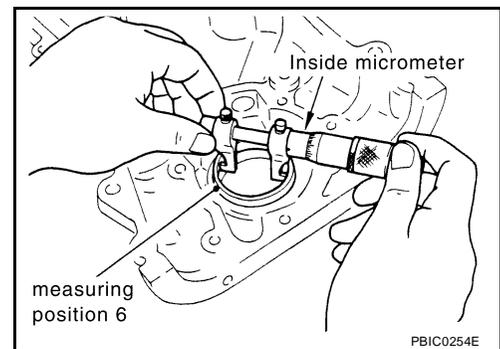
1. Measure the outer diameter of protruded portion of inner rotor (Position 5).



2. Measure the inner diameter of oil pump body with inside micrometer (Position 6).

(Clearance) = (Inner diameter of oil pump body) – (Outer diameter of inner rotor).

Standard : 0.035 - 0.070 mm (0.0014 - 0.0028 in)

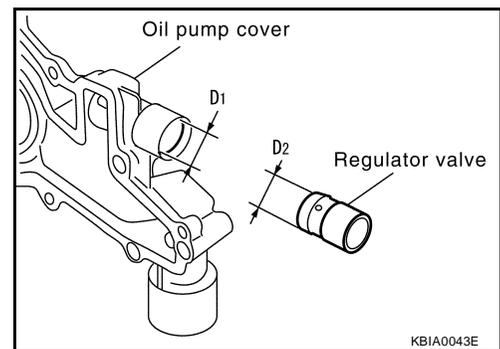


- Regulator valve clearance:
(Clearance) = D1 (Valve hole diameter) – D2 (Outer diameter of valve)

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

CAUTION:

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

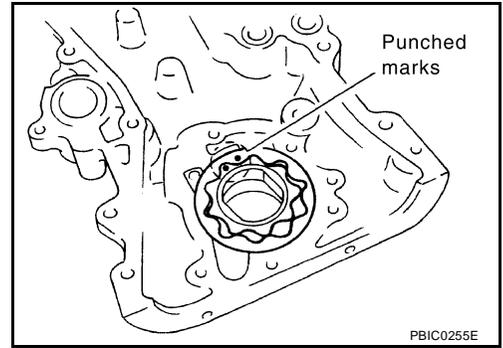


OIL PUMP

[QR25DE]

ASSEMBLY

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



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SERVICE DATA AND SPECIFICATIONS (SDS)

[QR25DE]

SERVICE DATA AND SPECIFICATIONS (SDS)

PF0:00030

Oil Pressure

EBS007QT

Engine speed rpm	Approximate discharge pressure kPa (bar, kg/cm ² , psi)
Idle speed	More than 98 (0.98, 1.0, 14)
2,000	294 (2.9, 3.0, 43)
6,000	392 (3.9, 4.0, 57)

Oil Pump

EBS007QU

Unit: mm (in)

Body to outer rotor radial clearance	0.114 - 0.179 (0.0045 - 0.0070)
Inner rotor to outer rotor tip clearance	Below 0.220 (0.0087)
Body to inner rotor axial clearance	0.030 - 0.070 (0.0012 - 0.0028)
Body to outer rotor axial clearance	0.060 - 0.110 (0.0024 - 0.0043)
Inner rotor to brazed portion of housing clearance	0.035 - 0.070 (0.0014 - 0.0028)

Regulator Valve

EBS007QV

Unit: mm (in)

Regulator valve to oil pump cover clearance	0.040 - 0.097 (0.0016 - 0.0038)
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Oil Capacity

EBS007QW

Unit: ℓ (qt.)

Drain and refill	With oil filter change	Approximately 4.2 (4 1/2)
	Without oil filter change	Approximately 4.0 (4 1/4)
Dry engine (engine overhaul)		Approximately 4.6 (4 7/8)

PRECAUTIONS

Precautions for Liquid Gasket REMOVAL OF LIQUID GASKET

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

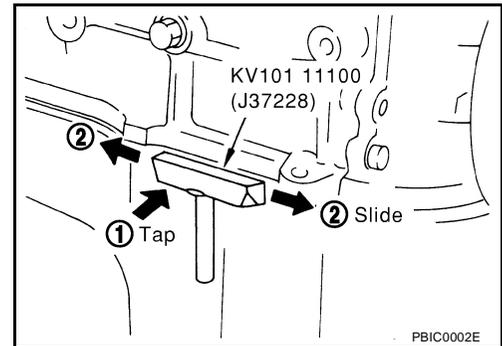
CAUTION:

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 sealant is applied.

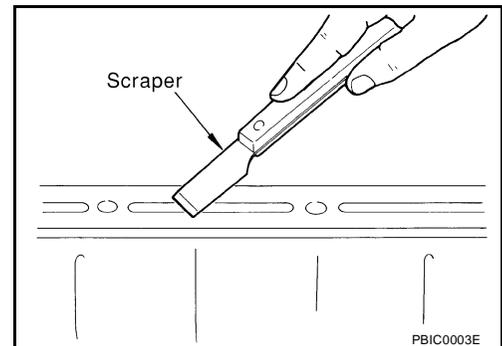
CAUTION:

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

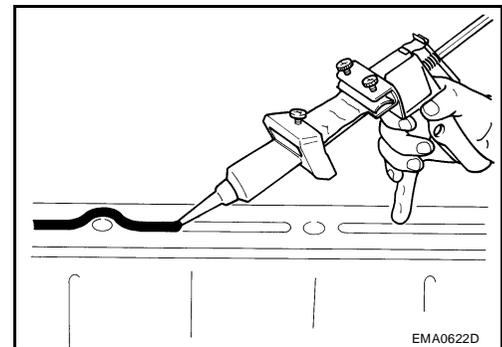


LIQUID GASKET APPLICATION PROCEDURE

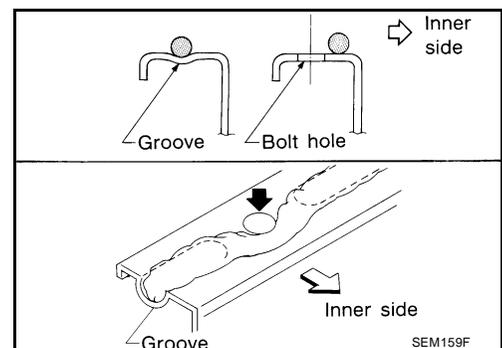
- Using a scraper, remove the old sealant adhering to the mating surface.
 - Remove the sealant completely from the groove, mounting bolts, and bolt holes.
 - Clean the mating surface thoroughly to remove adhering moisture, grease and foreign materials.
 - Install the sealant tube into the tube presser.
- Use Genuine RTV Silicone Sealant or equivalent. Refer to [GI-42, "Recommended Chemical Products and Sealants"](#).**



- Apply the sealant without breaks to the specified area with the specified dimensions.
- If there is a groove for the sealant application, apply the sealant to the groove.



- As for the bolt holes, normally apply the sealant inside the holes. If specified, it should be applied outside the holes. Make sure to read the instructions in this manual.
- Within five minutes of sealant application, install the mating component.
- If the sealant protrudes, wipe it off immediately.
- Do not retighten after the installation.
- After 30 minutes or more have passed from the installation, fill the engine with the correct oil and coolant. Refer to [GI-42, "Recommended Chemical Products and Sealants"](#).



CAUTION:

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

PREPARATION

[VQ35DE]

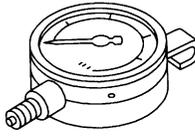
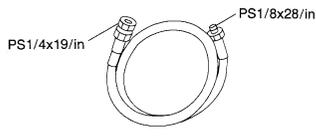
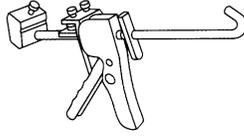
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PREPARATION

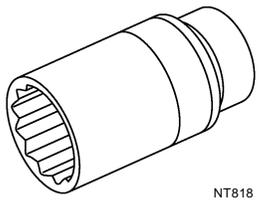
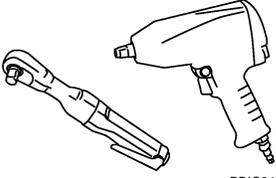
Special Service Tools

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	 <p style="text-align: center;">NT050</p>	Measuring oil pressure Maximum measuring range: 2,452 kPa (25 kg-cm² , 356 psi)
ST25052000 (J25695-2) Hose	 <p style="text-align: center;">S-NT559</p>	Adapting oil pressure gauge to upper oil pan
KV10115801 (J38956) Oil filter wrench	 <p style="text-align: center;">14 faces Inner span 64.3 mm (2.531 in) (Face to opposite face)</p> <p style="text-align: center;">S-NT772</p>	Removing and installing oil filter
WS39930000 (—) Tube presser	 <p style="text-align: center;">NT052</p>	Pressing the tube of liquid gasket

Commercial Service Tool

EBS0070Z

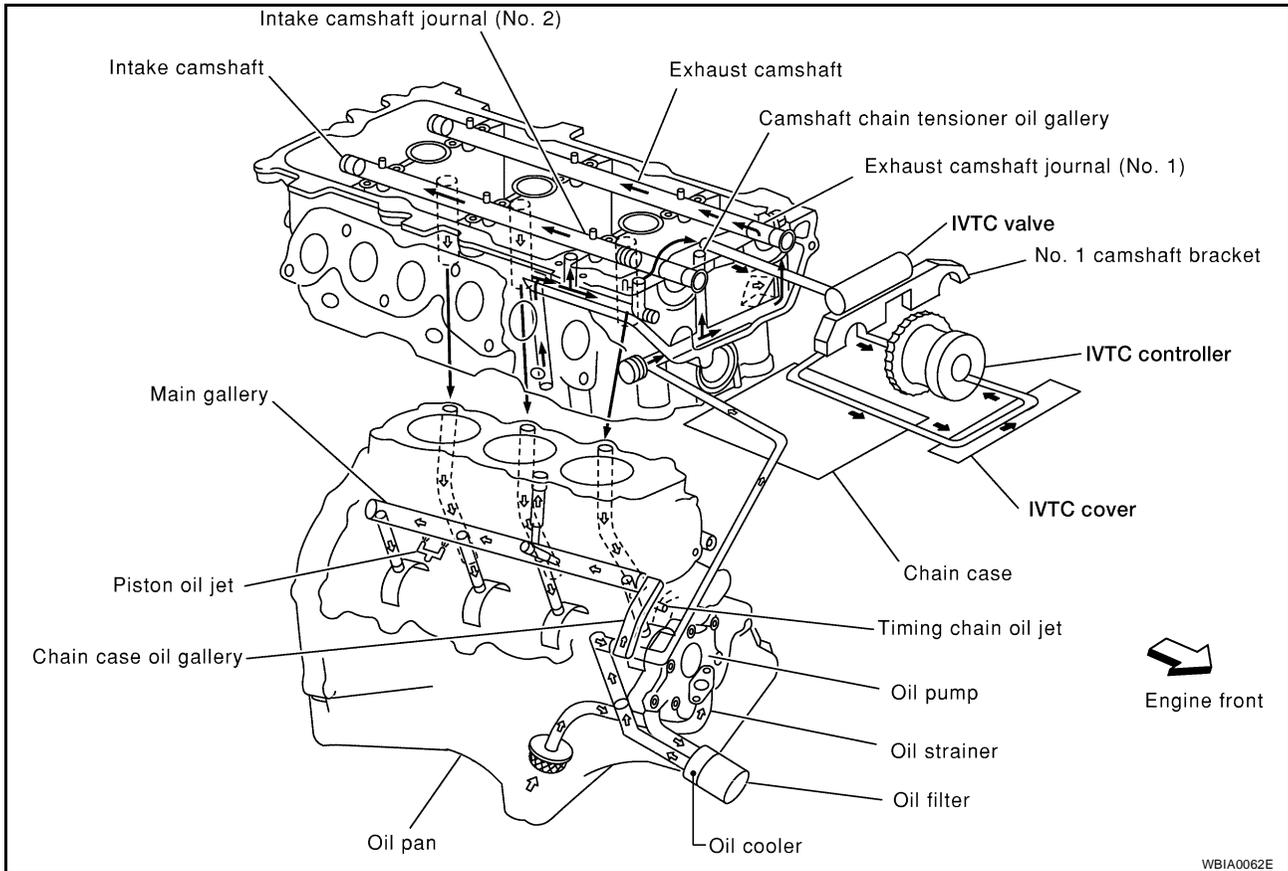
Tool name	Description	
Deep socket	 <p style="text-align: center;">NT818</p>	Removing and installing oil pressure switch Deep socket 26 mm, 3/8 drive
Power tools	 <p style="text-align: center;">PBIC0190E</p>	Loosening nuts and bolts

LUBRICATION SYSTEM

PF15010

Lubrication Circuit

EBS007R0



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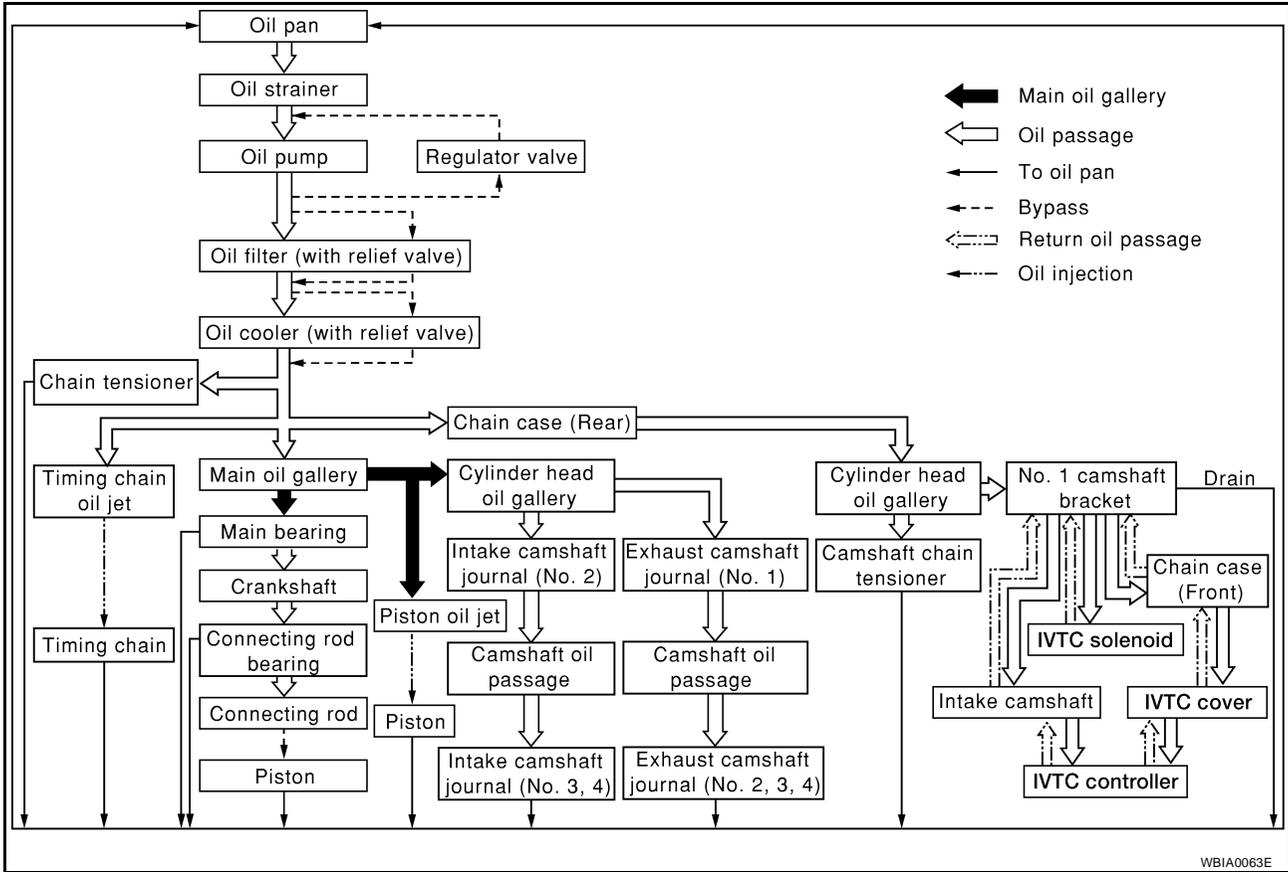
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LUBRICATION SYSTEM

[VQ35DE]

EBS007R1

System Drawing

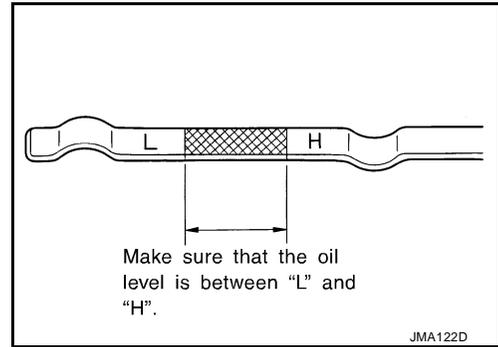


ENGINE OIL

Inspection OIL LEVEL

NOTE:

- Before starting the engine, 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 as indicated on the dipstick.
- If it is out of range, add oil as necessary.



OIL APPEARANCE

- Check the oil for white turbidity or heavy contamination.
- If the oil becomes turbid and white, it is highly probable that it is contaminated with coolant.

OIL LEAKAGE

Check for oil leakage around the following areas:

- Oil pan
- Oil pan drain plug
- Oil pressure switch
- Oil filter
- Oil cooler
- IVTC cover
- Intake valve timing control cover
- Front cover
- Mating surface between cylinder block and cylinder head
- Mating surface between cylinder head and rocker cover
- Crank oil seal (front and rear)

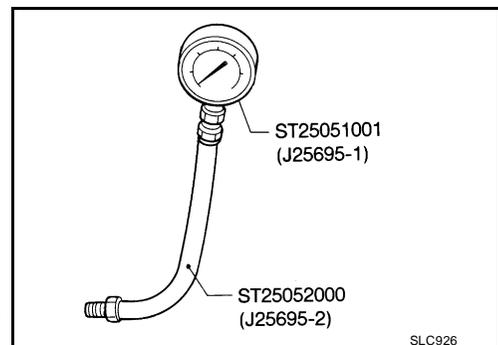
OIL PRESSURE CHECK

WARNING:

- **Be careful not to burn yourself, as engine oil may be hot.**
 - **For M/T models, put the gearshift lever in the Neutral "N" position. For A/T models, put the selector lever in the Park "P" position.**
1. Check the oil level.
 2. Disconnect oil pressure switch harness connector.
 3. Remove oil pressure switch.
 4. Install the pressure gauge.
 5. Start the engine and warm it up to normal operating temperature.
 6. Check oil pressure with engine running under no-load.

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

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



7. After the inspections, install the oil pressure switch as follows:
 - a. Remove the old sealant adhering to switch and engine.
 - b. Apply thread sealant and tighten the oil pressure switch to specification.
Use Genuine High Performance Thread Sealant, or equivalent. Refer to [GI-42, "RECOMMENDED CHEMICAL PRODUCTS AND SEALANTS"](#) .

Oil pressure switch : 13 - 17 N·m (1.25 - 1.75 kg·m, 9 - 12 ft·lb)

Changing Engine Oil

EBS007R3

WARNING:

- **Be careful not to burn yourself, as the 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 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 drain plug and oil filler cap.
 4. Drain oil.
 5. Install drain plug and refill with new engine oil.
 - Refer to [MA-12, "RECOMMENDED FLUIDS AND LUBRICANTS"](#) .

Oil capacity (Approximate):

Unit: ℓ (qt.)

Drain and refill	With oil filter change	Approximately 4.0 (4 1/4)
	Without oil filter change	Approximately 3.7 (3 7/8)
Dry engine (engine overhaul)		Approximately 5.0 (5 1/4)

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

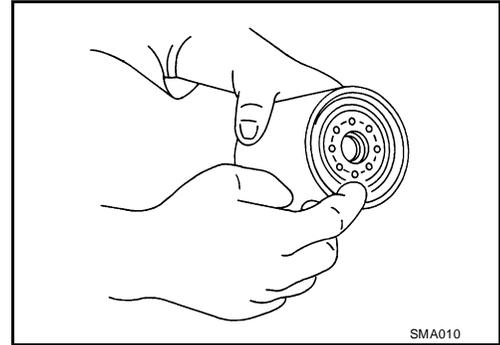
- Using an oil filter wrench, remove the oil filter.

CAUTION:

- The oil filter is provided with a relief valve. Use genuine NISSAN oil filter or equivalent.
- Be careful not to get burned, the engine oil may be 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.

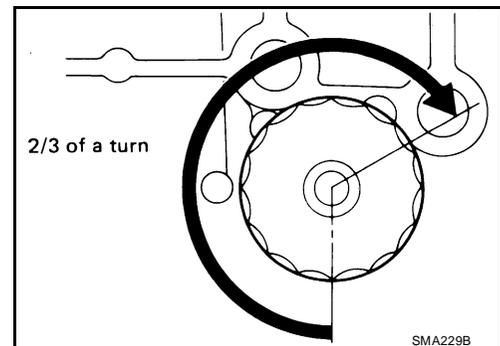
INSTALLATION

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



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

Oil filter : 14.7 - 20.5 N·m (1.5 - 2.1 kg·m, 11 - 15 ft·lb)



- After warming up the engine, check for engine oil leakage.
- Check oil level and add engine oil. Refer to [LU-17, "ENGINE OIL"](#).

OIL PUMP

PFP:15010

Removal and Installation

EBS007R5

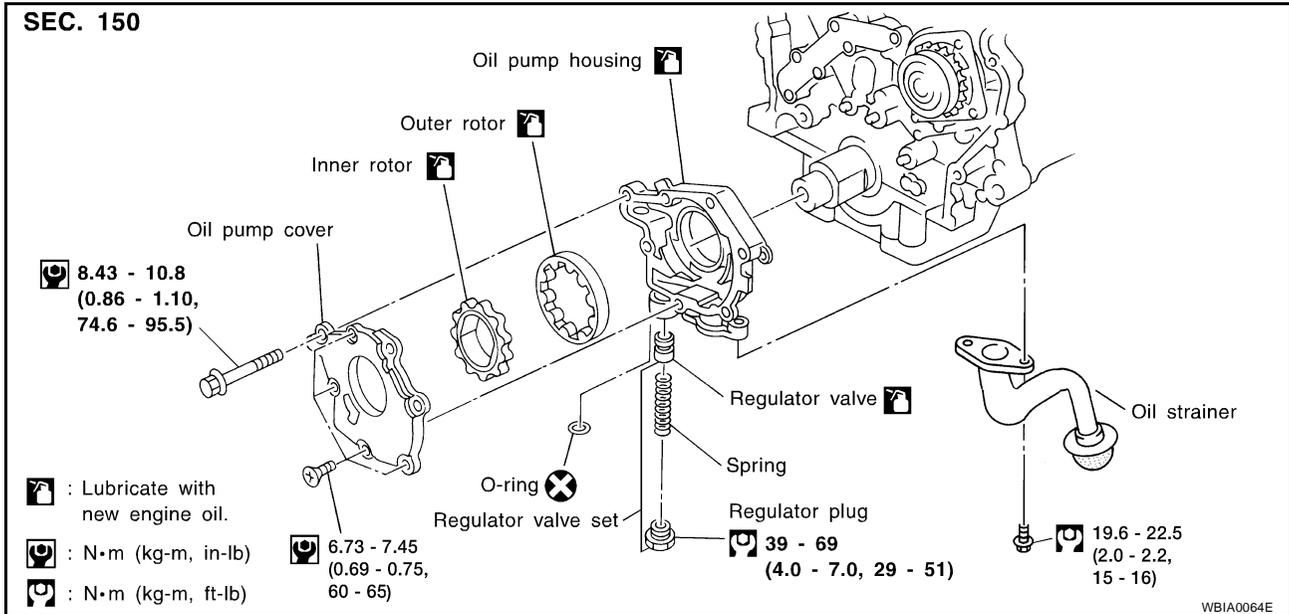
1. Remove the timing chain. Refer to [EC-1288, "Engine Coolant Temperature Sensor"](#) .
2. Remove oil pump assembly.

INSTALLATION

- Installation is in the reverse order of removal.

Disassembly and Assembly

EBS007R6



- Disassemble as shown.
- Assembly is in the reverse order of Disassembly. When assembling the oil pump, apply engine oil to the rotors.

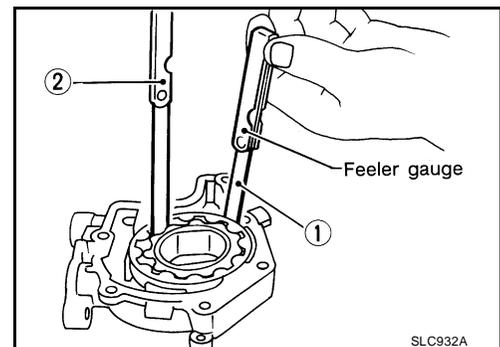
INSPECTION AFTER DISASSEMBLY

Clearance of Oil Pump Parts

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

Standard : 0.114 - 0.200 mm (0.0045 - 0.0079 in)
 - Tip clearance between inner rotor and outer rotor (position 2)

Standard : Below 0.180 mm (0.0071 in)



OIL PUMP

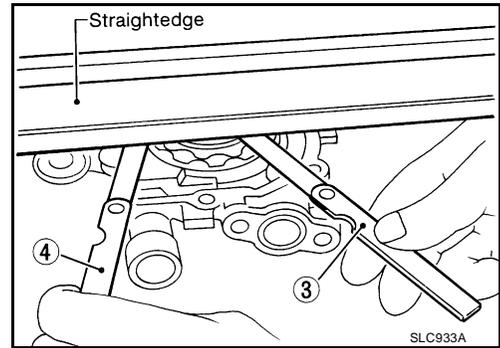
[VQ35DE]

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

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

- Side clearance between outer rotor and oil pump body (position 4).

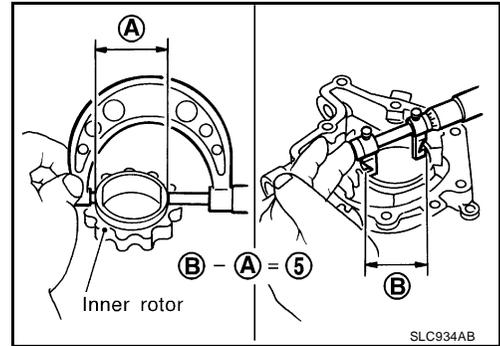
Standard : 0.050 - 0.110 mm (0.0020 - 0.0043 in)



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

1. Measure the outer diameter of protruded portion of inner rotor (position A).
2. Measure the inner diameter of oil pump body with inside micrometer (position B).
(clearance 5) = (inner diameter of oil pump body B) – (outer diameter of inner rotor A)

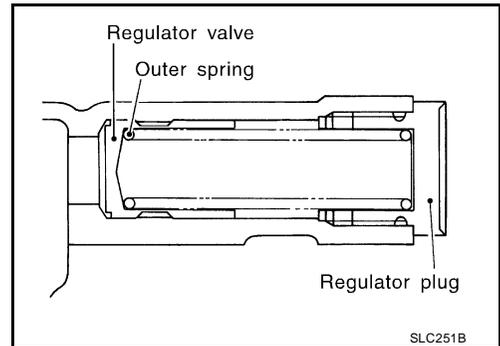
Standard : 0.045 - 0.091 mm (0.0018 - 0.0036 in)



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 body.



Regulator Valve Clearance

(Clearance 6) = D (Valve hole diameter) – E (Outer diameter of valve)

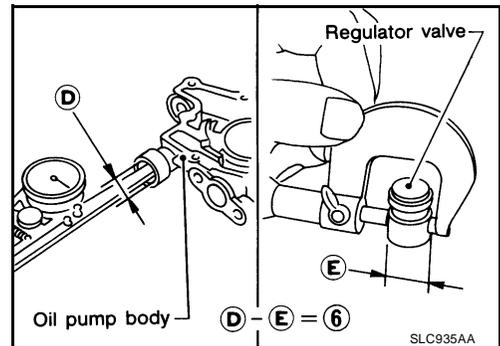
Standard : 0.040 - 0.097 mm (0.0016 - 0.0038 in)

If it exceeds the standard, replace the oil pump body.

CAUTION:

Coat regulator valve with engine oil.

Check that it falls smoothly into the valve hole by its own weight.

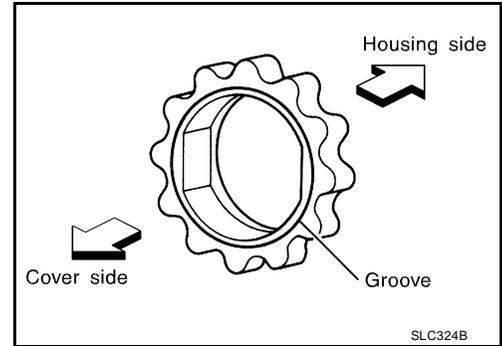


OIL PUMP

[VQ35DE]

ASSEMBLY

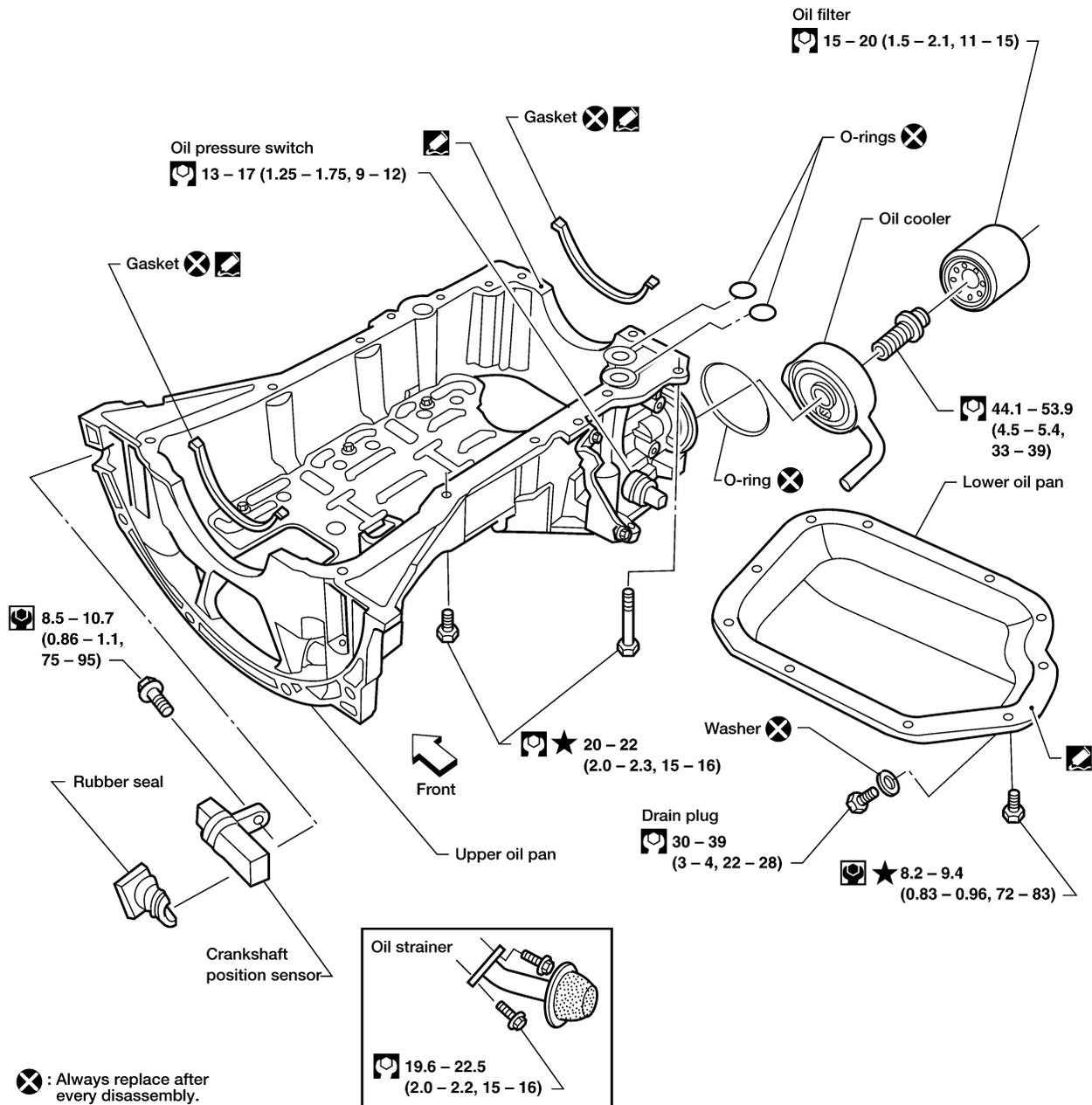
- Assembly is in the reverse order of Disassembly.
- Assemble the inner rotor and outer rotor with the punched marks on the oil pump cover side.



OIL COOLER

Removal and Installation

SEC. 110 • 150 • 213 • 221 • 251



⊗ : Always replace after every disassembly.

⊙ : N-m (kg-m, in-lb)

⊙ : N-m (kg-m, ft-lb)

▣ : Apply Genuine RTV Silicone Sealant or equivalent. Refer to "GI Section".

★ : Follow the numerical tightening sequence. Refer to "INSTALLATION".

REMOVAL

1. Drain engine oil. Refer to [LU-18, "Changing Engine Oil"](#).
2. Drain engine coolant. Refer to [MA-22, "DRAINING ENGINE COOLANT"](#).
 - Do not spill coolant on the drive belt.

3. Remove the oil filter and the oil cooler.

INSPECTION AFTER REMOVAL

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

Oil Pressure Relief Valve

Inspect oil pressure relief valve for movement, cracks and breaks by pushing the ball. If replacement is necessary, remove valve by prying it out with a suitable tool. Install a new valve in place by tapping it.

INSTALLATION

- Installation is in reverse order of removal.
- **When installing the oil cooler, align the oil cooler stopper with the stopper of the oil pan.**

INSPECTION AFTER INSTALLATION

Start engine and check there are no leaks of engine oil or coolant.

SERVICE DATA AND SPECIFICATIONS (SDS)

[VQ35DE]

SERVICE DATA AND SPECIFICATIONS (SDS)

PF0:00100

Oil Pressure

EBS007R8

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

Regulator Valve

EBS007R9

Unit: mm (in)

Regulator valve to oil pump cover clearance	0.040 - 0.097 (0.0016 - 0.0038)
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Oil Pump

EBS007RA

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	0.030 - 0.070 (0.0012 - 0.0028)
Body to outer rotor axial clearance	0.050 - 0.110 (0.0020 - 0.0043)
Inner rotor to brazed portion of housing clearance	0.045 - 0.091 (0.0018 - 0.0036)

Oil Capacity

EBS00F15

Unit: ℓ (qt.)

Drain and refill	With oil filter change	Approximately 4.0 (4 1/4)
	Without oil filter change	Approximately 3.7 (3 7/8)
Dry engine (engine overhaul)		Approximately 5.0 (5 1/4)

