

SECTION **LU**

ENGINE LUBRICATION SYSTEM

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PRECAUTIONS

< SERVICE INFORMATION >

SERVICE INFORMATION

PRECAUTIONS

Precaution for Supplemental Restraint System (SRS) "AIR BAG" and "SEAT BELT PRE-TENSIONER"

INFOID:000000003106655

The Supplemental Restraint System such as "AIR BAG" and "SEAT BELT PRE-TENSIONER", used along with a front seat belt, helps to reduce the risk or severity of injury to the driver and front passenger for certain types of collision. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

WARNING:

- To avoid rendering the SRS inoperative, which could increase the risk of personal injury or death in the event of a collision which would result in air bag inflation, all maintenance must be performed by an authorized NISSAN/INFINITI dealer.
- Improper maintenance, including incorrect removal and installation of the SRS, can lead to personal injury caused by unintentional activation of the system. For removal of Spiral Cable and Air Bag Module, see the SRS section.
- Do not use electrical test equipment on any circuit related to the SRS unless instructed to in this Service Manual. SRS wiring harnesses can be identified by yellow and/or orange harnesses or harness connectors.

Precaution for Liquid Gasket

INFOID:000000001720704

REMOVAL OF LIQUID GASKET SEALING

- After removing nuts and bolts, separate the mating surface, using Tool and remove old liquid gasket sealing.

Tool number : KV10111100 (J-37228)

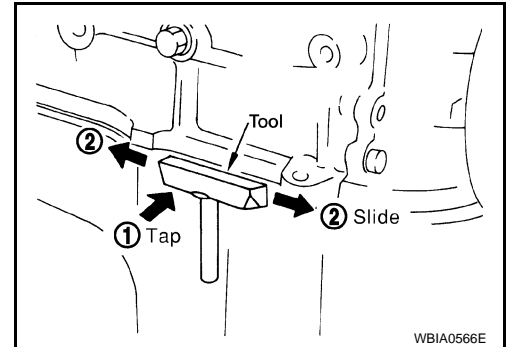
CAUTION:

Be careful not to damage the mating surfaces.

- Tap Tool to insert it (1), and then slide it by tapping on the side (2) as shown.
- In areas where Tool is difficult to use, use plastic hammer to lightly tap the parts, to remove it.

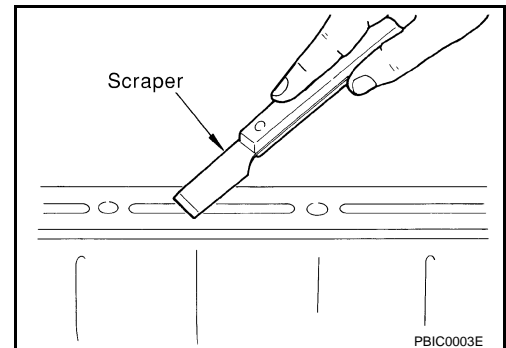
CAUTION:

If for some unavoidable reason suitable tool such as screw-driver is used, be careful not to damage the mating surfaces.



LIQUID GASKET APPLICATION PROCEDURE

1. Remove old liquid gasket adhering to the liquid gasket application surface and the mating surface, using scraper.
 - Remove liquid gasket completely from the groove of the liquid gasket application surface, bolts, and bolt holes.
2. Thoroughly clean the mating surfaces and remove adhering moisture, grease and foreign materials.



3. Attach liquid gasket tube to Tool.

PRECAUTIONS

< SERVICE INFORMATION >

Tool number : WS39930000 (—)

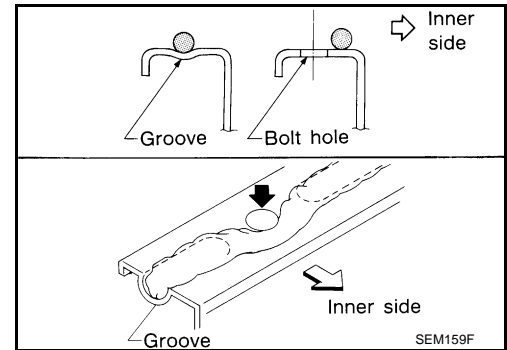
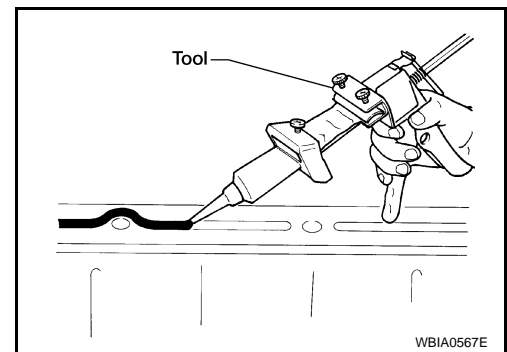
Use Genuine RTV Silicone Sealant or equivalent. Refer to GI-42, "Recommended Chemical Product and Sealant".

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

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

CAUTION:

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



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PREPARATION

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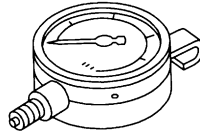
PREPARATION

Special Service Tool

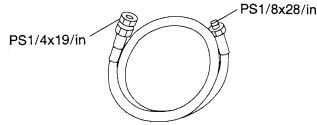
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The actual shapes of Kent-Moore tools may differ from those of special service tools illustrated here.

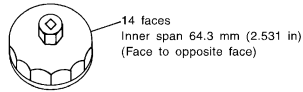
Tool number (Kent-Moore No.) Tool name	Description
ST25051001 (J-25695-1) Oil pressure gauge	Measuring oil pressure Maximum measuring range: 2,452 kPa (25 kg-cm², 356 psi)
ST25052000 (J-25695-2) Hose	Adapting oil pressure gauge to upper oil pan
KV10115801 (J-38956) Oil filter wrench	Removing and installing oil filter
KV10111100 (J-37228) Seal cutter	Removing steel oil pan and rear timing chain case
WS39930000 (—) Tube presser	Pressing the tube of liquid gasket



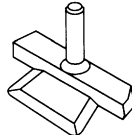
NT050



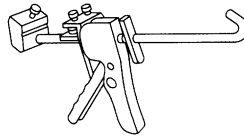
S-NT559



S-NT772



S-NT046



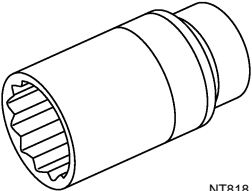
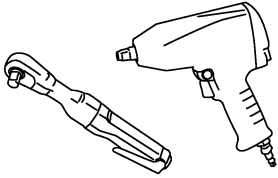
NT052

Commercial Service Tool

INFOID:000000001720706

PREPARATION

< SERVICE INFORMATION >

Tool name	Description
<p data-bbox="164 197 293 222">Deep socket</p>  <p data-bbox="850 415 896 432">NT818</p>	<p data-bbox="1013 197 1446 254">Removing and installing oil pressure switch Deep socket 26 mm, 3/8 drive</p>
<p data-bbox="164 449 285 474">Power tools</p>  <p data-bbox="850 663 922 680">PBIC0190E</p>	<p data-bbox="1013 449 1263 474">Loosening nuts and bolts</p>

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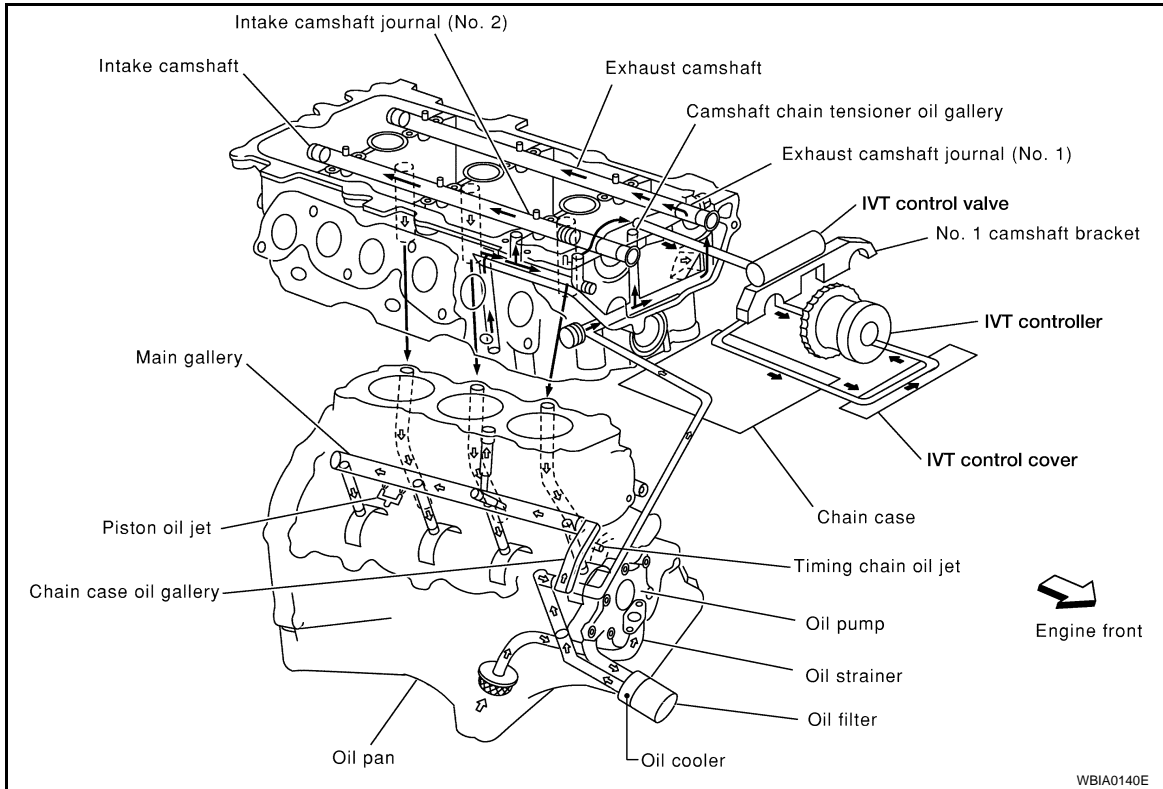
LUBRICATION SYSTEM

< SERVICE INFORMATION >

LUBRICATION SYSTEM

Lubrication Circuit

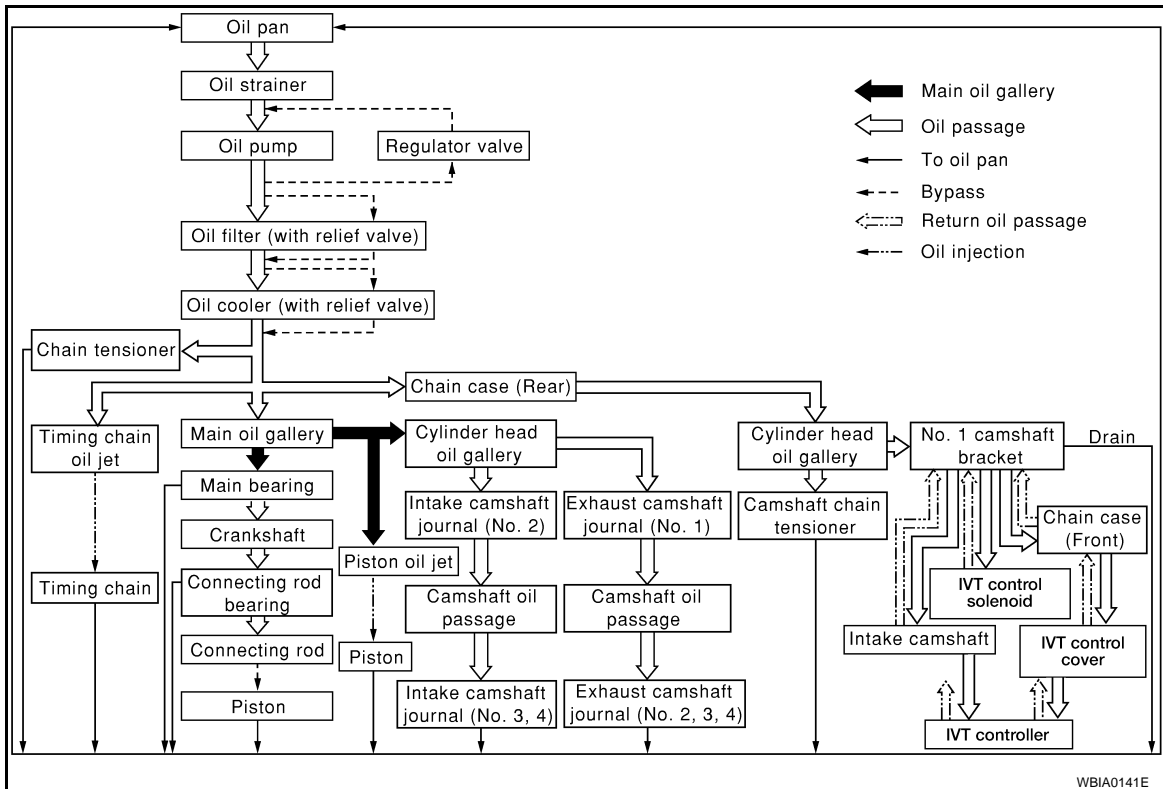
INFOID:000000001720707



WBIA0140E

Schematic

INFOID:000000001720708



WBIA0141E

ENGINE OIL

< SERVICE INFORMATION >

ENGINE OIL

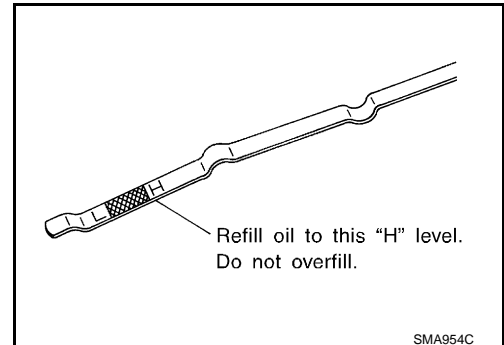
Inspection

INFOID:000000001720709

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. Refer to [MA-11. "Fluids and Lubricants"](#).



ENGINE OIL APPEARANCE

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

OIL LEAKAGE

Check for oil leakage around the following areas:

- Oil pan
- Oil pan drain plug
- Oil pressure sensor
- 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

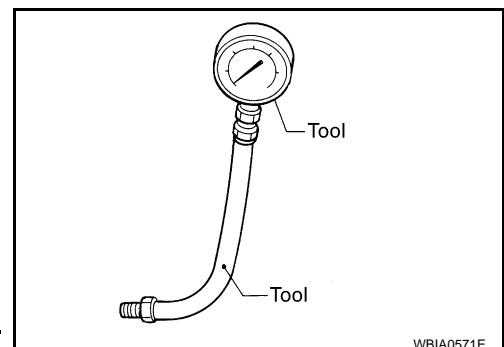
WARNING:

- **Be careful not to burn yourself, as engine oil may be hot.**
- **For CVT 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 sensor.
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, using Tool

Tool numbers : ST25051001 (J-25695-1)

: ST25052000 (J-25695-2)



Engine speed rpm	Approximate discharge pressure kPa (kg/cm ² , psi)
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ENGINE OIL

< SERVICE INFORMATION >

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 Product and Sealant"](#).

Oil pressure switch : 14.7 N·m (1.5 kg·m, 11 ft·lb)

Changing Engine Oil

INFOID:000000001720710

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. Position the vehicle so it is level on the hoist.
2. Warm up the engine and check for oil leaks from the engine.
3. Stop engine and wait for 10 minutes.
4. Remove the oil pan drain plug and oil filler cap.
5. Drain the engine oil.
6. Install the oil pan drain plug with a new washer.

CAUTION:

- **Be sure to clean the oil pan drain plug and install with a new washer.**

Oil pan drain plug : 34.3 N·m (3.5 kg·m, 25 ft·lb)

7. Refill the engine with new engine oil.

CAUTION:

- **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.**

Oil Capacity (Approximate)

Drain and refill	With oil filter change	Approximately 4.2 ℓ (4 1/2 qt., 3 3/4 imp qt)
	Without oil filter change	Approximately 4.0 ℓ (4 1/4 qt., 3 1/2 imp qt.)
Dry engine (engine overhaul)		Approximately 4.6 ℓ (4 7/8 qt., 4.0 imp qt.)

- Refer to [MA-11, "Fluids and Lubricants"](#).

8. Warm up the engine and check around the oil pan drain plug and oil filter for oil leaks.
9. Stop engine and wait for 10 minutes.
10. Check the engine oil level using the dipstick.

CAUTION:

Do not overfill the engine oil.

OIL FILTER

< SERVICE INFORMATION >

OIL FILTER

Removal and Installation

INFOID:000000001720711

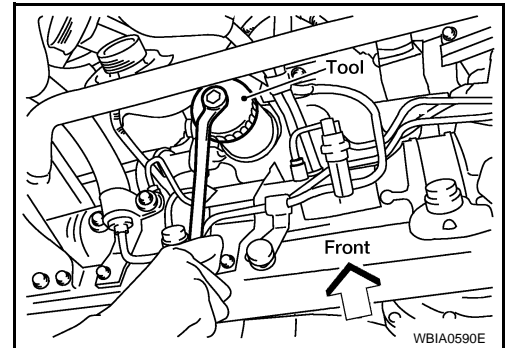
REMOVAL

1. Remove the oil filter using Tool as shown.

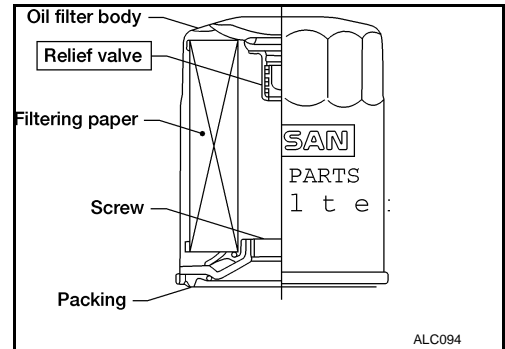
Tool number : KV10115801 (J-38956)

CAUTION:

- 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.

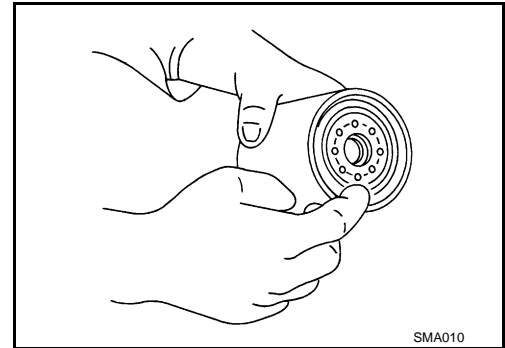


- The oil filter is provided with a relief valve. Use a genuine NISSAN oil filter or equivalent



INSTALLATION

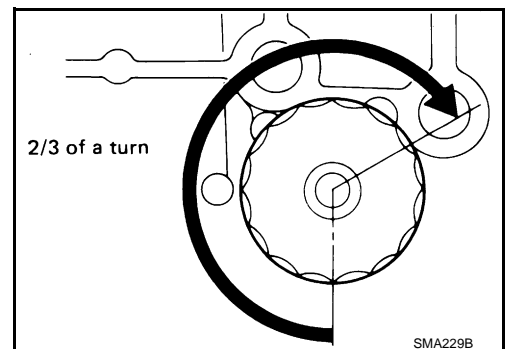
1. Remove foreign materials adhering to the oil filter installation surface.
2. Apply clean engine oil to the oil seal contact surface of the new oil filter.



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

Oil filter : 17.6 N-m (1.8 kg-m, 13 ft-lb)

Tool number : KV10115801 (J-38956)



4. Check the oil level and add engine oil as necessary. Refer to [LU-7](#).
5. After warming up the engine, check for any engine oil leaks.

OIL PUMP

< SERVICE INFORMATION >

OIL PUMP

Removal and Installation

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REMOVAL

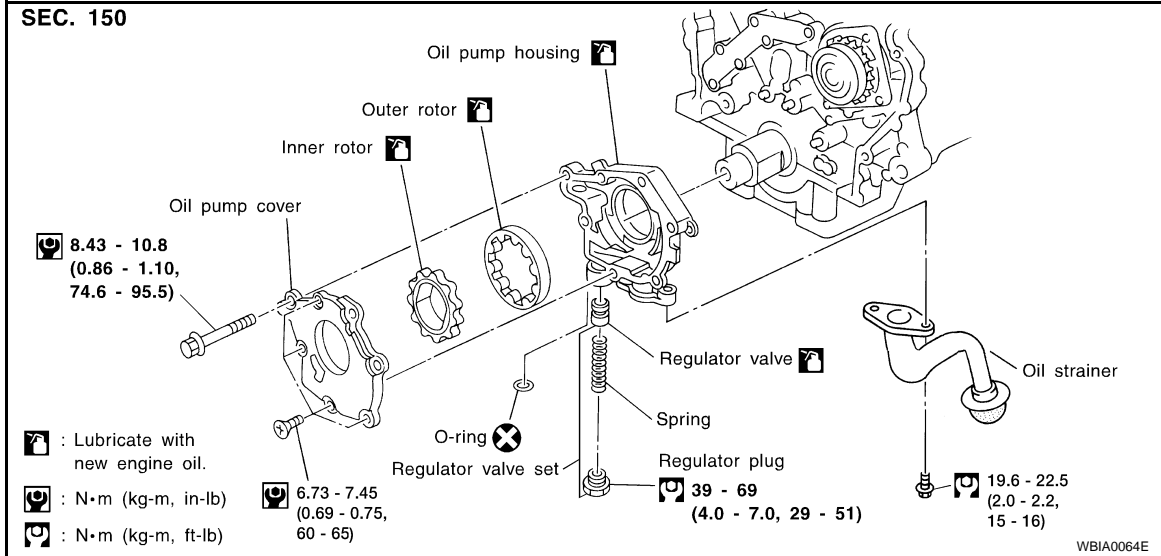
1. Remove the timing chain. Refer to [EM-57. "Removal"](#).
2. Remove oil pump assembly.

INSTALLATION

- Installation is in the reverse order of removal.

Disassembly and Assembly

INFOID:000000001720713



- **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

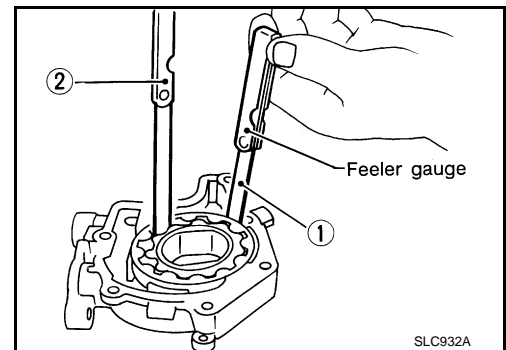
Clearance of Oil Pump Parts

- 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)

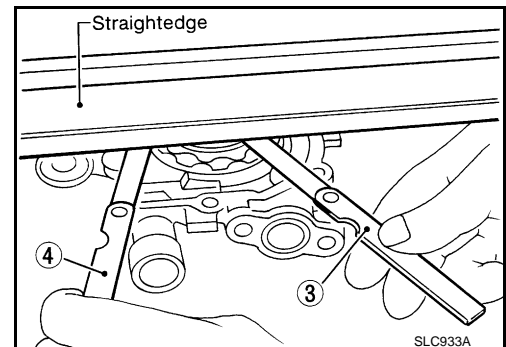


- Measure clearance with feeler gauge and straightedge.
Side clearance between inner rotor and oil pump body (position 3).

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)



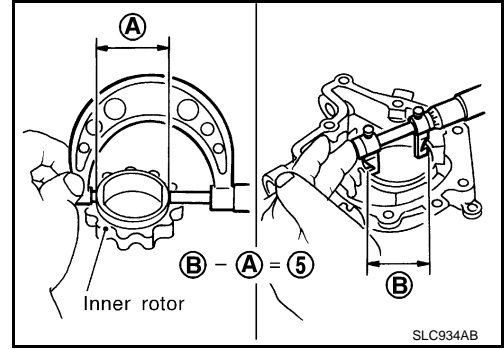
OIL PUMP

< SERVICE INFORMATION >

- 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)

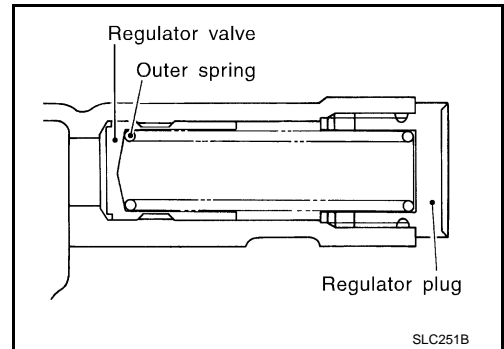
Standard : 0.045 - 0.091 mm (0.0018 - 0.0036 in)



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)

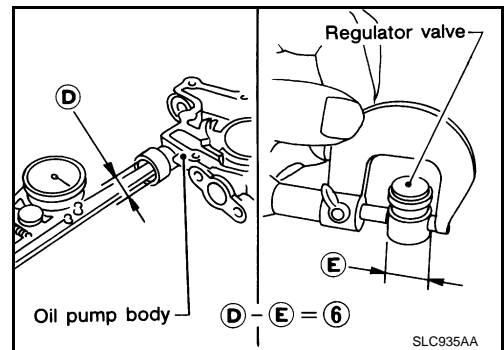
Standard : 0.040 - 0.097 mm (0.0016 - 0.0038 in)

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

CAUTION:

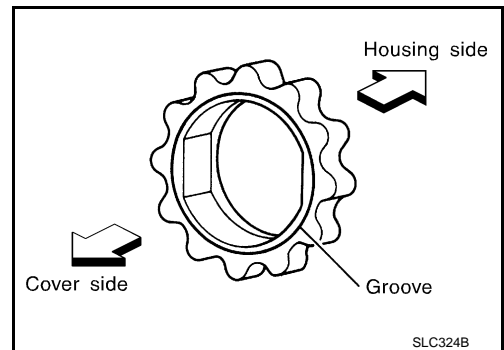
Coat regulator valve with engine oil.

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



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.



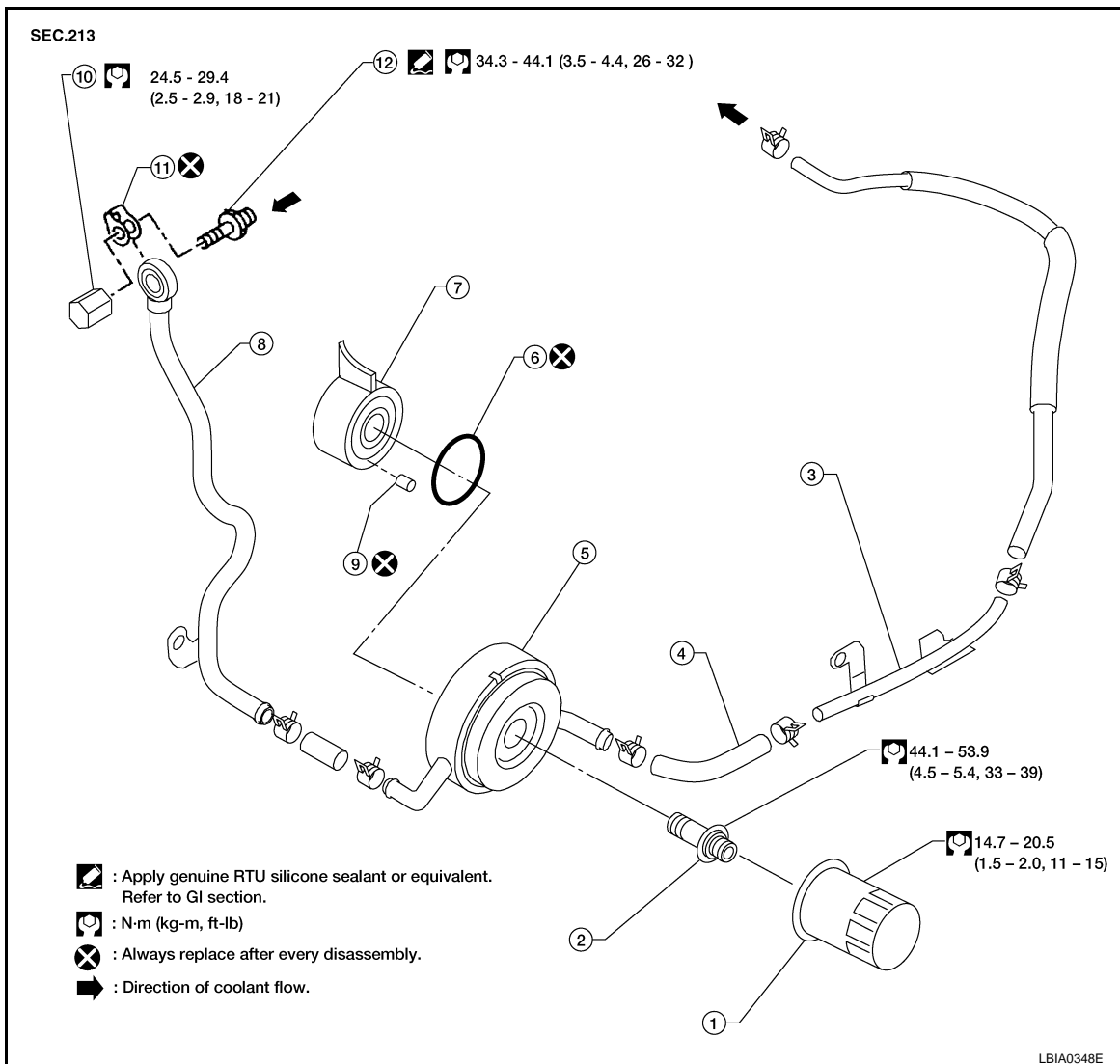
OIL COOLER

< SERVICE INFORMATION >

OIL COOLER

Removal and Installation

INFOID:000000001720714



- | | | |
|-------------------|--------------------|---------------------|
| 1. Oil filter | 2. Oil cooler bolt | 3. Oil inlet pipe |
| 4. Oil inlet hose | 5. Oil cooler | 6. O-ring |
| 7. Oil pan | 8. Oil outlet pipe | 9. Relief valve |
| 10. Drain plug | 11. Copper gasket | 12. Water connector |

REMOVAL

1. Drain engine oil. Refer to [MA-17. "Changing Engine Oil"](#).
2. Drain engine coolant. Refer to [MA-15. "Changing 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

OIL COOLER

< SERVICE INFORMATION >

- 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.

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SERVICE DATA AND SPECIFICATIONS (SDS)

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SERVICE DATA AND SPECIFICATIONS (SDS)

Oil Pressure

INFOID:000000001720715

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

INFOID:000000001720716

Unit: mm (in)

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

INFOID:000000001720717

Unit: mm (in)

Body to outer rotor radial clearance	0.114 - 0.200 (0.0045 - 0.0079)
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

INFOID:000000001720718

Unit: ℓ (US qt, Imp qt)

Drain and refill	With oil filter change	Approximately 4.2 (4 1/2, 3 3/4)
	Without oil filter change	Approximately 4.0 (4 1/4, 3 1/2)
Dry engine (engine overhaul)		Approximately 4.6 (4 7/8, 4)