

ENGINE LUBRICATION SYSTEM

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PRECAUTION

PRECAUTIONS

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

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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 SR 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 SR 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.

PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

**WARNING:**

- When working near the Airbag Diagnosis Sensor Unit or other Airbag System sensors with the Ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.
- When using air or electric power tools or hammers, always switch the Ignition OFF, disconnect the battery and wait at least three minutes before performing any service.

Precaution for Liquid Gasket

INFOID:000000009461023

REMOVAL OF LIQUID GASKET

- After removing the bolts and nuts, separate the mating surface and remove the liquid gasket using Tool (A).

**Tool Number (A): KV10111100 (J-37228)**

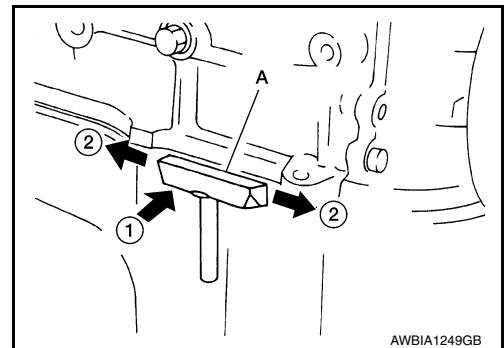
**CAUTION:**

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

- In areas where the cutter is difficult to use, use a plastic hammer to lightly tap (1) the cutter where the liquid gasket is applied. Use a plastic hammer to slide (2) the cutter by tapping on the side.

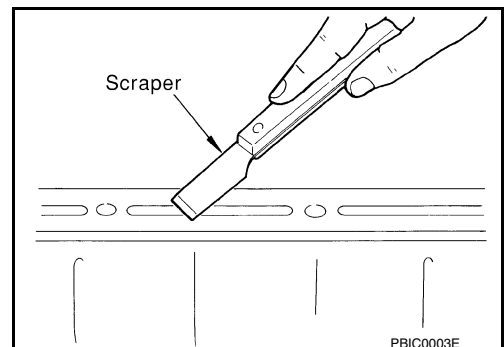
**CAUTION:**

**Do not damage the mating surfaces.**



LIQUID GASKET APPLICATION PROCEDURE

1. 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.
2. Thoroughly clean the gasket application surface and the mating surface and remove adhering moisture, grease and foreign materials.
3. Attach the liquid gasket tube to the tube presser. **Use Genuine Silicone RTV Sealant or equivalent. Refer to [GI-21, "Recommended Chemical Products and Sealants"](#).**

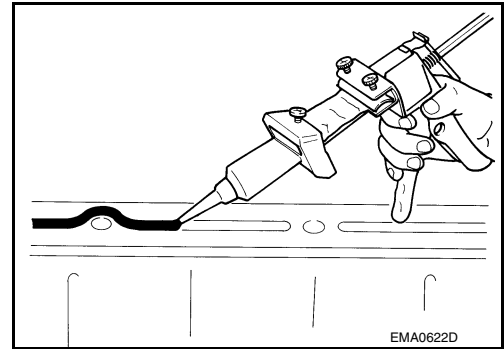


## PRECAUTIONS

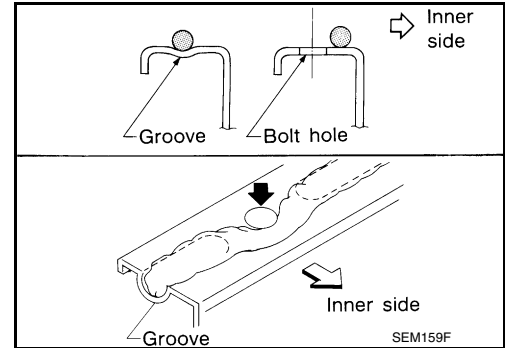
[QR25DE]

### < PRECAUTION >

4. Apply the liquid gasket using suitable tool without breaks to the specified location.
  - If there is a groove for the liquid gasket application, apply the liquid gasket to the groove.
  - As for the bolt holes, normally apply the liquid gasket inside the holes. If specified, it should be applied outside the holes. Make sure to read the text of this manual.
  - Within five minutes of the liquid 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 with the specified oil and coolant. Refer to [MA-11](#), "[FOR USA AND CANADA : Fluids and Lubricants](#)".



### **CAUTION:**

If there are more specific instructions in the procedures contained in this manual concerning liquid gasket application, observe them.

# PREPARATION

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## PREPARATION

### PREPARATION

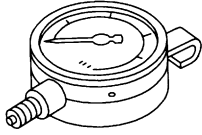
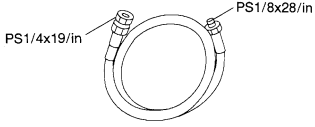
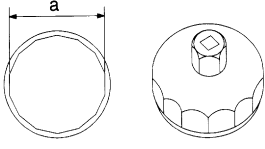
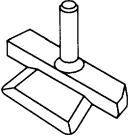
#### Special Service Tool

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The actual shapes of the tools may differ from those illustrated here.

Tool number (TechMate No.) Tool name	Description
ST25051001 (J-25695-1) Oil pressure gauge   S-NT050	Measuring oil pressure <b>Maximum measuring range:</b> <b>2,452 kPa (25 kg/cm<sup>2</sup>, 356 psi)</b>
ST25052000 (J-25695-2) Hose   S-NT559	Adapting oil pressure gauge to cylinder block
KV10115801 (J-38956) Oil filter wrench   S-NT375	Removing and installing oil filter a: 64.3mm (2.531 in)
KV10111100 (J-37228) Seal cutter   S-NT046	Removing oil pan

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#### Commercial Service Tool

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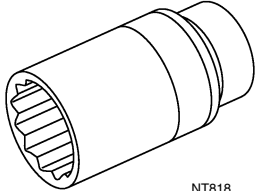
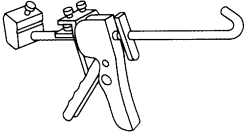
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# PREPARATION

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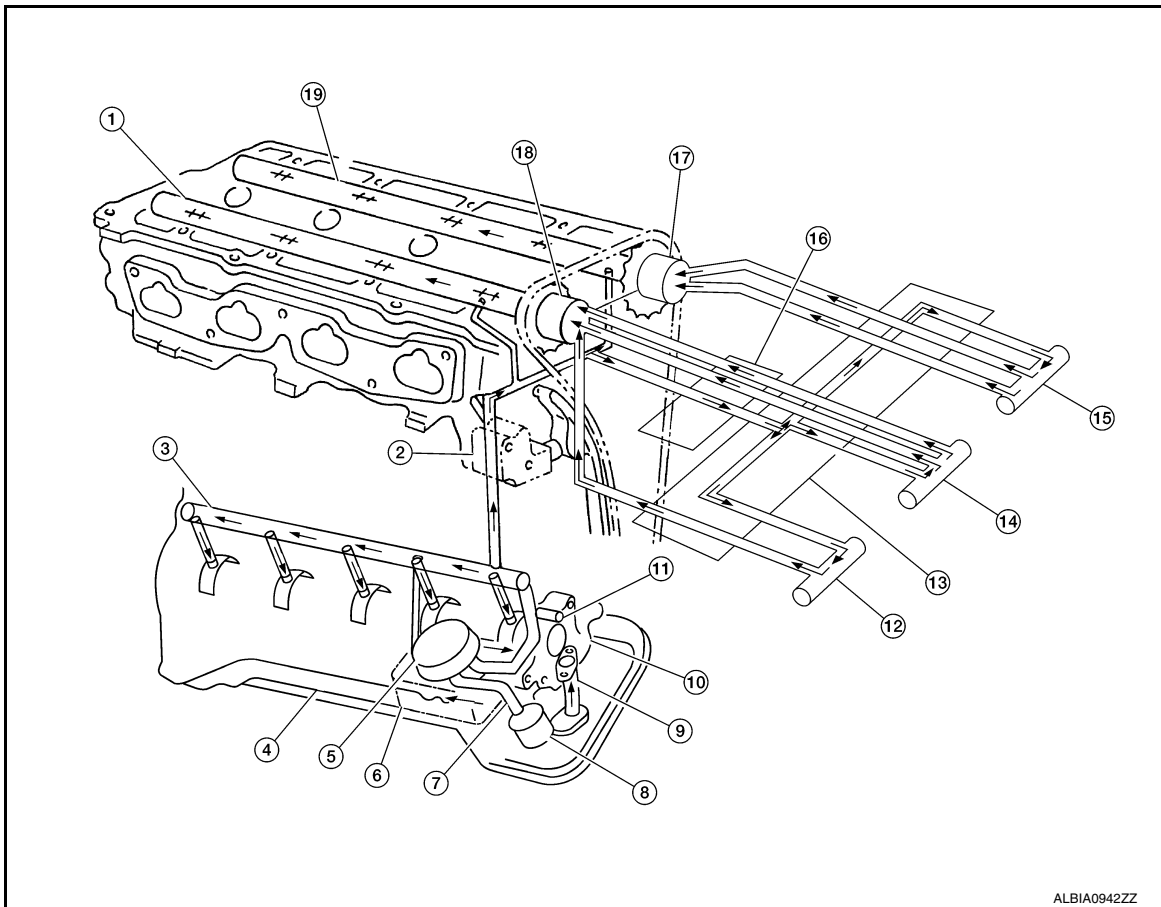
Tool name	Description
<p>Power tool</p>  <p>PIIB1407E</p>	<p>Loosening nuts, screws and bolts</p>
<p>Deep socket</p>  <p>NT818</p>	<p>Removing and installing oil pressure switch Deep socket 27 mm, 3/8 drive</p>
<p>Tube presser</p>  <p>S-NT052</p>	<p>Pressing the tube of liquid gasket</p>

## SYSTEM DESCRIPTION

### LUBRICATION SYSTEM

#### Lubrication Circuit

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- |                                       |  |   |
|---------------------------------------|--|---|
| 1. Camshaft (INT)                     | 2. Chain tensioner   | 3. Main gallery                                 |
| 4. Oil pan                            | 5. Oil cooler  | 6. Balancer unit                                |
| 7. Oil pan oil gallery                | 8. Oil filter (with relief valve)                                | 9. Oil Strainer                                 |
| 10. Oil pump                          | 11. Timing chain and balancer unit timing chain oil jet          | 12. Intake valve timing control solenoid valve  |
| 13. Intake valve timing control cover | 14. Intake valve timing intermediate lock control solenoid valve | 15. Exhaust valve timing control solenoid valve |
| 16. Front cover                       | 17. Exhaust valve timing controller                              | 18. Intake valve timing controller              |
| 19. Camshaft (EXH)                    |  |   |

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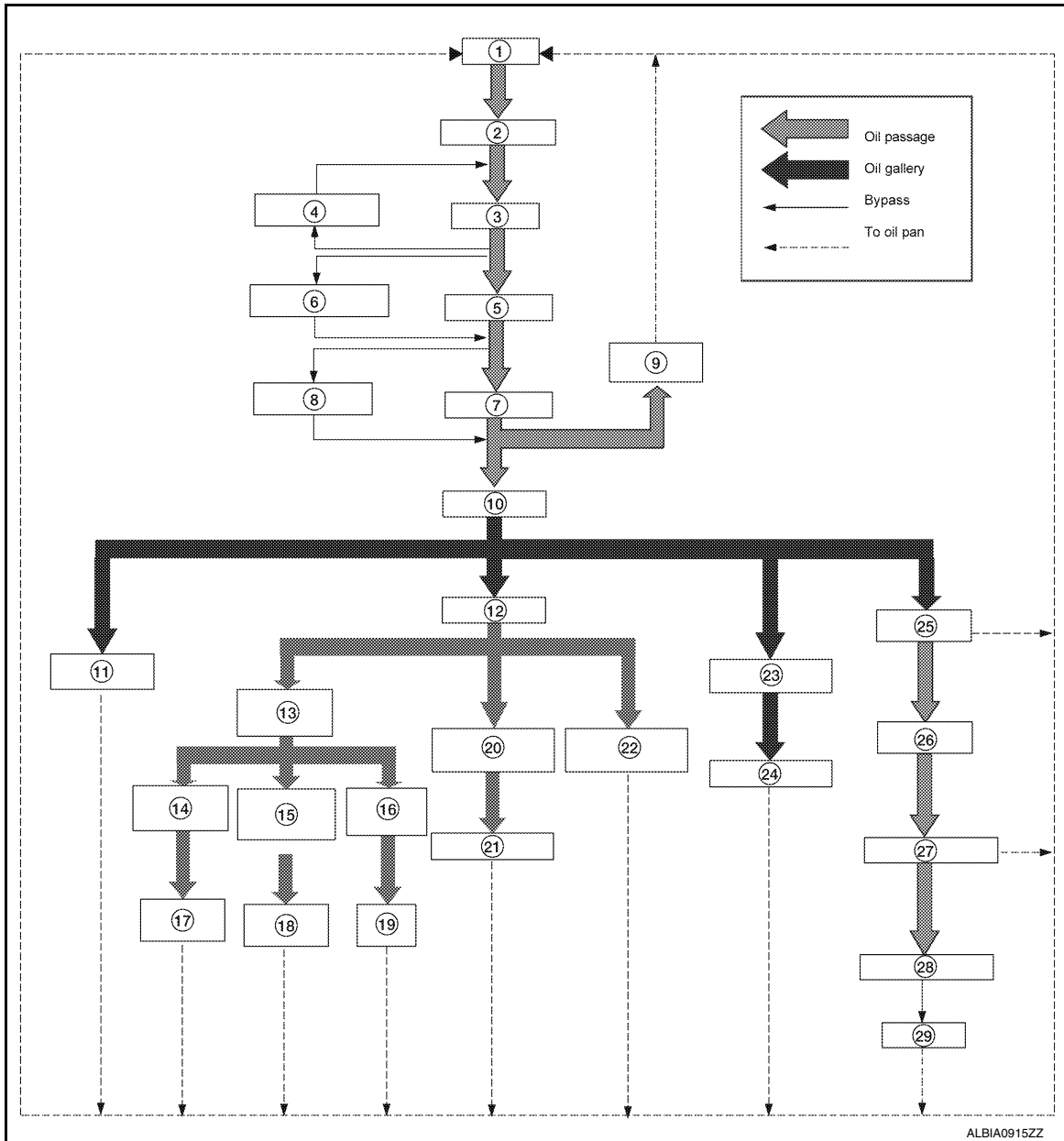
# LUBRICATION SYSTEM

< SYSTEM DESCRIPTION >

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## Schematic

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- |                              |                              |                                       |
|------------------------------|------------------------------|---------------------------------------|
| 1. Oil pan                   | 2. Oil strainer              | 3. Oil pump                           |
| 4. Regulator valve           | 5. Oil filter                | 6. Relief valve (Built in oil filter) |
| 7. Oil cooler                | 8. Relief valve              | 9. Chain oil jet                      |
| 10. Main gallery             | 11. Piston oil jet           | 12. Cylinder head                     |
| 13. C-VTC oil filter         | 14. C-VTC EXH solenoid valve | 15. C-VTC intermediate solenoid valve |
| 16. C-VTC INT solenoid valve | 17. C-VTC exhaust            | 18. C-VTC intermediate                |
| 19. C-VTC intake             | 20. Camshaft journal         | 21. Camshaft                          |
| 22. Chain tensioner          | 23. Balancer housing         | 24. Balancershaft journal             |
| 25. Main bearing             | 26. Crankshaft               | 27. Connecting rod bearing            |
| 28. Connecting rod           | 29. Piston                   |                                       |



# PERIODIC MAINTENANCE

## ENGINE OIL

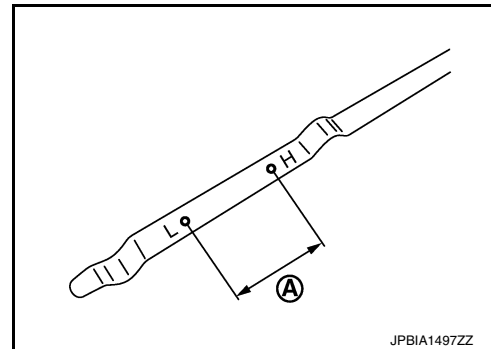
### Inspection

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#### OIL LEVEL

- 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 (A) on the oil level gauge.
- If it is out of range, add oil as necessary.



#### ENGINE OIL APPEARANCE

- Check engine oil for white milky appearance 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 switch
- Oil filter
- Oil cooler
- Valve timing control cover and valve timing control solenoid valve
- Front cover
- Mating surface between cylinder block and cylinder head
- Mating surface between cylinder head and rocker cover
- Crankshaft oil seal (front and rear)

#### OIL PRESSURE CHECK

##### WARNING:

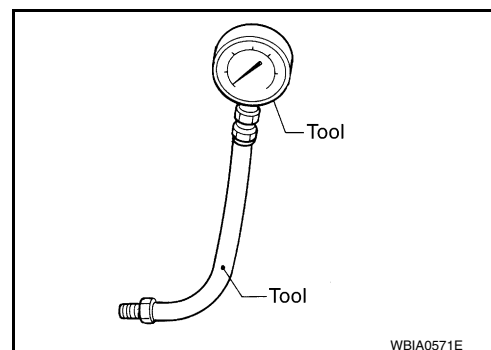
- **Be careful not to burn yourself, as engine oil may be hot.**
- **Put the CVT shift selector in the Park "P" position.**

1. Check engine oil level. Refer to OIL LEVEL.
2. Remove fender protector side cover (RH). Refer to [EXT-26, "FENDER PROTECTOR : Exploded View"](#).
3. Disconnect oil pressure switch harness connector at oil pressure switch. Remove oil pressure switch and install Tools.

##### CAUTION:

**Do not drop or shock oil pressure switch.**

**Tool numbers : ST25051001 (J-25695-1)**  
**: ST25052000 (J-25695-2)**



4. Start engine and warm it up to normal operating temperature.
5. Check oil pressure with engine running under no-load, using Tool.

##### NOTE:

# ENGINE OIL

< PERIODIC MAINTENANCE >

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- When engine oil temperature is low, engine oil pressure becomes high.
- If difference is extreme, check oil passage and oil pump for oil leaks.

**Engine oil pressure** : Refer to [LU-18, "Oil Pressure"](#)

6. After the inspections, install oil pressure switch as follows:
  - a. Remove old liquid gasket adhering to oil pressure switch.
  - b. Apply liquid gasket and tighten oil pressure switch to the specification.  
**Use Genuine RTV Silicone Sealant or equivalent.**

**Oil pressure switch** : Refer to [EM-28, "Exploded View"](#)

- c. After warming up engine, make sure there are no engine oil leaks.
7. Install fender protector side cover (RH). Refer to [EXT-26, "FENDER PROTECTOR : Exploded View"](#).

## Changing Engine Oil

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### 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.**

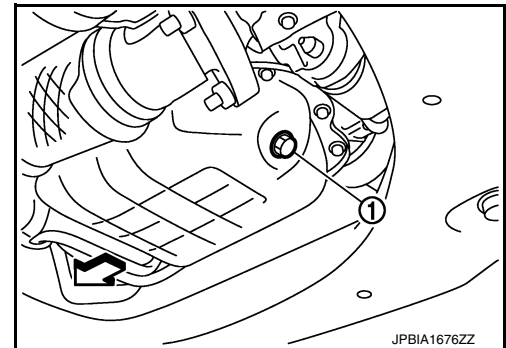
1. Position the vehicle so it is level on the hoist.
2. Warm up the engine and check for oil leaks from the engine.
3. Stop engine and wait for 10 minutes.
4. Remove the oil pan drain plug (1) and oil filler cap.

↔ : Front

5. Drain the engine oil.
6. Install the oil pan drain plug with a new washer and refill the engine with new engine oil.

**Oil specification and viscosity** : Refer to [MA-11, "FOR USA AND CANADA : Engine Oil Recommendation"](#).

**Oil pan drain plug** : [EM-36, "Removal and Installation"](#)



### CAUTION:

- **Be sure to clean the oil pan drain plug and install using a new washer.**
- **The refill capacity depends on the oil temperature and drain time. Use these specifications for reference only. Always use the oil level gauge to determine when the proper amount of oil is in the engine.**

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

### CAUTION:

**Do not overfill the engine with engine oil.**

## OIL FILTER

### Removal and Installation

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#### REMOVAL

1. Remove fender protector side cover (RH). Refer to [EXT-26, "FENDER PROTECTOR : Exploded View"](#).
2. Drain engine oil. Refer to [LU-10, "Changing Engine Oil"](#)
3. Remove the oil filter using suitable tool.

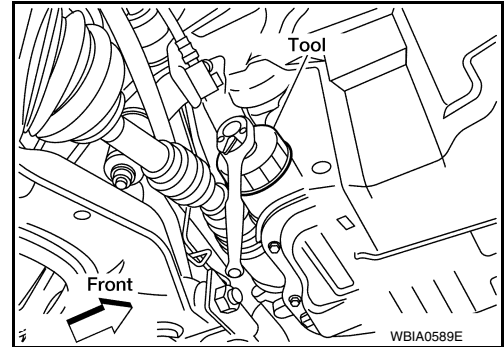
**Tool number : KV10115801 (J-38956)**

**WARNING:**

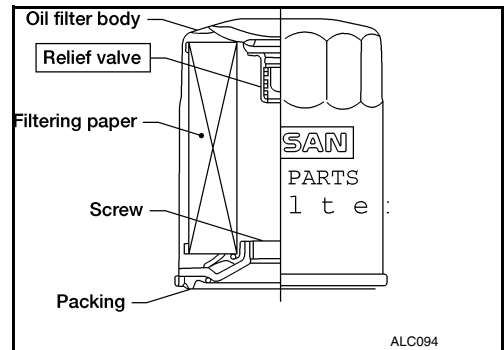
- Be careful not to get burned, the engine and engine oil may be hot.

**CAUTION:**

- 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.

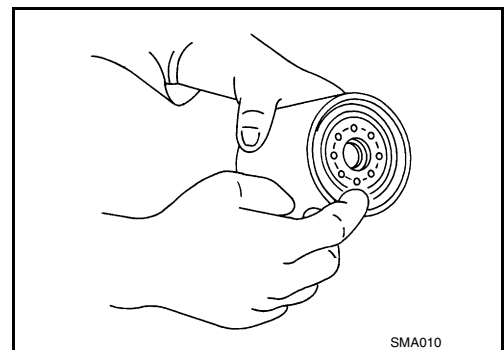


- The oil filter has a built in pressure relief valve. Use a Genuine NISSAN oil filter or equivalent



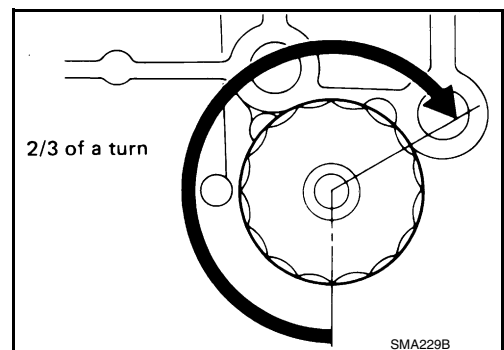
#### INSTALLATION

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 2/3 turn. Or tighten to specification below.

**Oil filter : 18.0 N·m (1.8 kg·m, 13 ft·lb)**



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## OIL FILTER

< PERIODIC MAINTENANCE >

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4. Refill engine with new engine oil. Refer to [LU-10. "Changing Engine Oil"](#).
  5. After warming up the engine, check for engine oil leaks. Repair as necessary.
  6. Install fender protector side cover (RH). Refer to [EXT-26. "FENDER PROTECTOR : Exploded View"](#).

## REMOVAL AND INSTALLATION

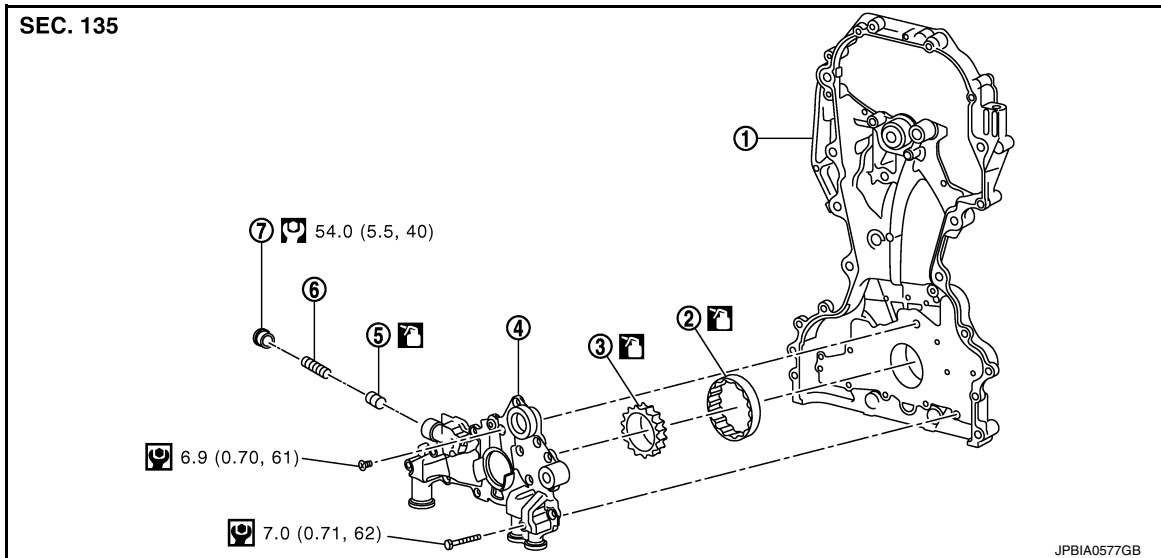
### OIL PUMP

#### Exploded View

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- |                                       |                    |                           |
|---------------------------------------|--------------------|---------------------------|
| 1. Front cover (Oil pump body united) | 2. Outer rotor     | 3. Inner rotor            |
| 4. Oil pump cover                     | 5. Regulator valve | 6. Regulator valve spring |
| 7. Regulator valve plug               |                    |                           |

**CAUTION:**

**Before assembly, apply new engine oil to the parts as shown above.**

### Removal and Installation

INFOID:000000009461032

#### REMOVAL

Remove front cover. Refer to [EM-61. "Exploded View"](#).

**NOTE:**

Oil pump is built into front cover.

#### INSTALLATION

Installation is in the reverse order of removal.

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

### Disassembly and Assembly

INFOID:000000009461033

#### DISASSEMBLY

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

#### ASSEMBLY

Assembly is in the reverse order of disassembly.

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# OIL PUMP

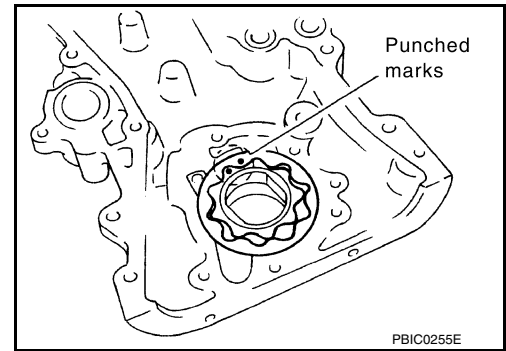
## < REMOVAL AND INSTALLATION >

[QR25DE]

- Install the inner rotor and outer rotor with the punched marks on the oil pump cover side.

**CAUTION:**

Before assembly apply new engine oil to the parts specified.



## Inspection

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### INSPECTION AFTER DISASSEMBLY

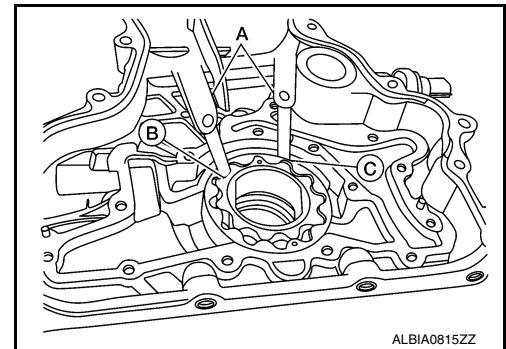
#### OIL PUMP CLEARANCE

- Measure the clearance with feeler gauge (A).
- Clearance between outer rotor and front cover (C)

**Standard** : Refer to [LU-18, "Oil Pump"](#).

- Tip clearance between inner rotor and outer rotor (B)

**Standard** : Refer to [LU-18, "Oil Pump"](#).

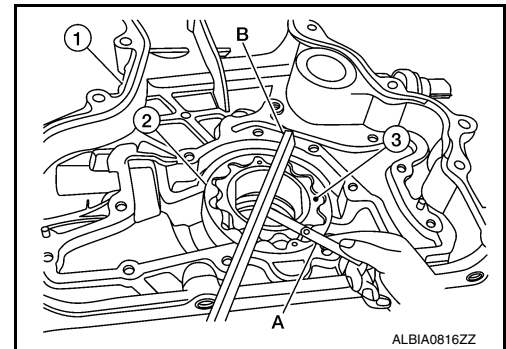


- Measure the clearance with feeler gauge (A) and straightedge (B).
- Side clearance between inner rotor (3) and front cover (1)

**Standard** : Refer to [LU-18, "Oil Pump"](#).

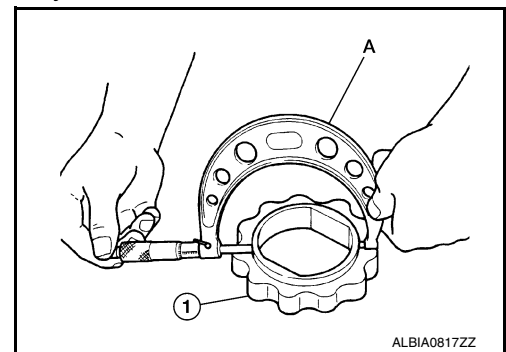
- Side clearance between outer rotor (2) and front cover (1)

**Standard** : Refer to [LU-18, "Oil Pump"](#).



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

- Measure the outer diameter of protruded portion of inner rotor (1) with micrometer (A).

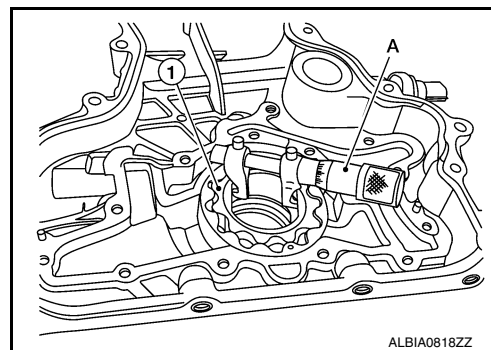


# OIL PUMP

[QR25DE]

## < REMOVAL AND INSTALLATION >

- Measure the inner diameter of inner rotor (1) with inside micrometer (A).



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

**Standard** : Refer to [LU-18, "Oil Pump"](#).

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

### REGULATOR VALVE TO OIL PUMP COVER CLEARANCE

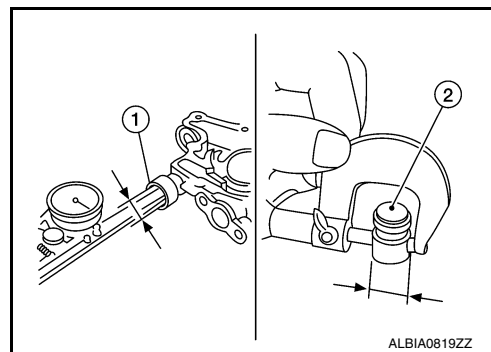
- (Clearance) = (Regulator valve hole (1) diameter) – (Regulator valve (2) outer diameter)

**Standard** : Refer to [LU-18, "Oil Pump"](#).

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

### CAUTION:

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



## INSPECTION AFTER INSTALLATION

1. Check the engine oil level. Refer to [LU-9, "Inspection"](#).
2. Start the engine, and check that there is no leakage of engine oil.
3. Stop the engine and wait for 10 minutes.
4. Check the engine oil level and adjust the level. Refer to [LU-9, "Inspection"](#).

# OIL COOLER

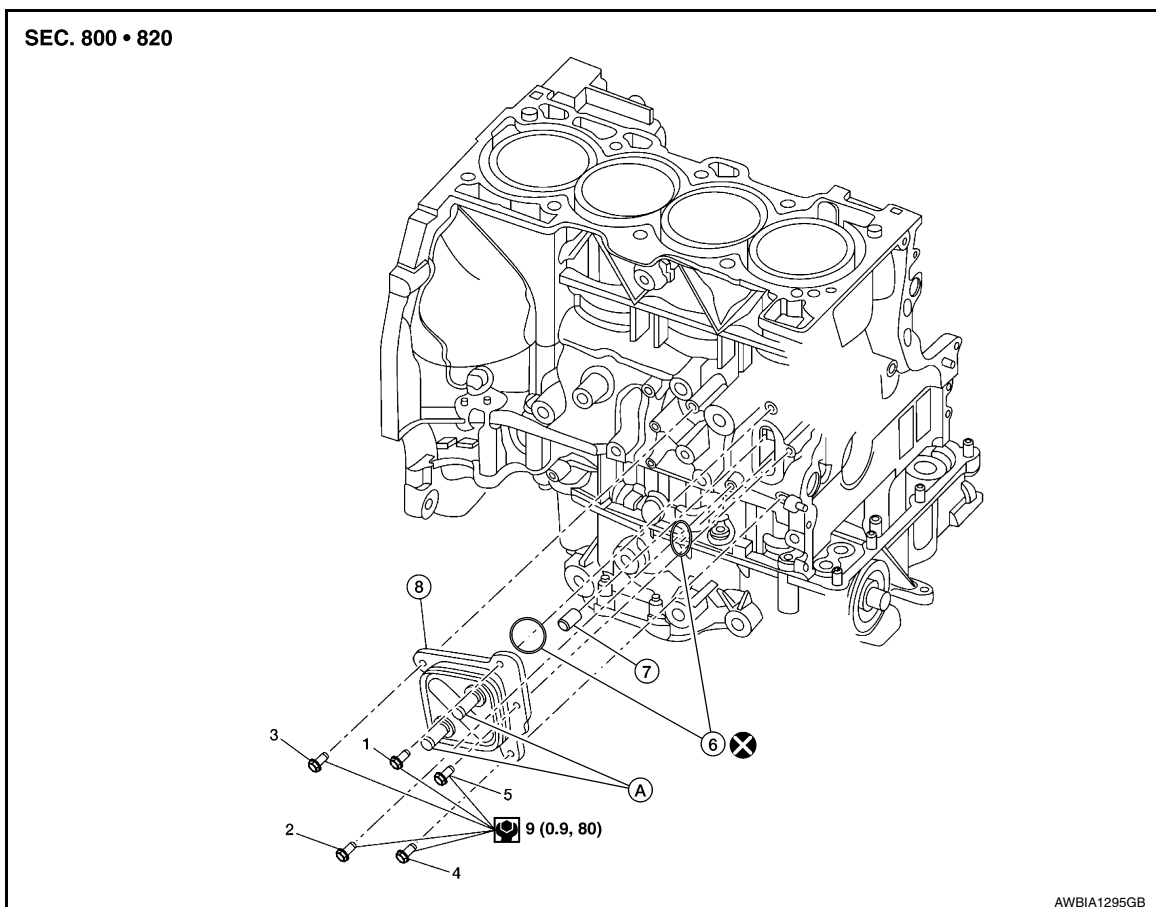
< REMOVAL AND INSTALLATION >

[QR25DE]

## OIL COOLER

### Exploded View

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1-5. Tightening sequence

6. O-ring

7. Relief Valve

8. Oil cooler

A. To water hose

## Removal and Installation

INFOID:000000009461036

### **WARNING:**

**Be careful not to burn yourself, as engine oil and engine coolant may be hot.**

### **NOTE:**

When removing components such as hoses, tubes/lines, etc., cap or plug openings to prevent fluid from spilling.

### REMOVAL

1. Remove RH front road wheel and tire. Refer to [WT-55. "Adjustment"](#).
2. Remove RH fender protector. Refer to [EXT-26. "FENDER PROTECTOR : Removal and Installation"](#).
3. Drain engine coolant by removing water drain plug on cylinder block and radiator drain plug. Refer to [CO-12. "Changing Engine Coolant"](#).
4. Disconnect hoses from the oil cooler.
5. Remove oil cooler bolts in reverse numerical order.
6. Remove oil cooler.
7. Remove relief valve and O-rings.

### INSTALLATION

Installation is in the reverse order of removal.

### **CAUTION:**



# OIL COOLER

< REMOVAL AND INSTALLATION >

[QR25DE]

- Tighten oil cooler bolts to specification in numerical order.
- Do not reuse O-ring.

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## Inspection

INFOID:000000009461037

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### INSPECTION AFTER REMOVAL

#### Oil Cooler

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

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### INSPECTION AFTER INSTALLATION

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1. Check the engine oil level and the engine coolant level and add engine oil and engine coolant. Refer to [LU-9, "Inspection"](#) and [CO-11, "System Inspection"](#).
2. Start the engine, and check that there is no leakage of engine oil or engine coolant.
3. Stop the engine and wait for 10 minutes.
4. Check the engine oil level and the engine coolant level again. Refer to [LU-9, "Inspection"](#) and [CO-11, "System Inspection"](#).

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# SERVICE DATA AND SPECIFICATIONS (SDS)

< SERVICE DATA AND SPECIFICATIONS (SDS)

[QR25DE]

## SERVICE DATA AND SPECIFICATIONS (SDS)

### SERVICE DATA AND SPECIFICATIONS (SDS)

#### Oil Pressure

INFOID:000000009461038

Unit: kPa (kg/cm<sup>2</sup>, psi)

Engine speed	Approximate discharge oil pressure*
Idle speed	98 (1.0, 14)
2,000 rpm	294 (3.0, 43)
6,000 rpm	392 (4.0, 57)

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

#### Oil Pump

INFOID:000000009461039

Unit: mm (in)

Clearance between outer rotor and oil pump body	0.114 - 0.179 (0.0045 - 0.0070)
Tip clearance between inner rotor and outer rotor	0.170 - 0.220 (0.0067 - 0.0087)
Side clearance between inner rotor and oil pump body	0.030 - 0.070 (0.0012 - 0.0028)
Side clearance between outer rotor and oil pump body	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

INFOID:000000009461040

Unit: mm (in)

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

INFOID:000000009461041

Unit: ℓ (US qt, Imp qt)

Drain and refill	With oil filter change	Approximately 4.6 (4-7/8, 4)
	Without oil filter change	Approximately 4.3 (4-1/2, 3-3/4)
Dry engine (engine overhaul)		Approximately 5.4 (5-3/4, 4-3/4)

PRECAUTION

PRECAUTIONS

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

INFOID:000000009951686

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 SR 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 SR 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.

PRECAUTIONS WHEN USING POWER TOOLS (AIR OR ELECTRIC) AND HAMMERS

**WARNING:**

- When working near the Airbag Diagnosis Sensor Unit or other Airbag System sensors with the Ignition ON or engine running, DO NOT use air or electric power tools or strike near the sensor(s) with a hammer. Heavy vibration could activate the sensor(s) and deploy the air bag(s), possibly causing serious injury.
- When using air or electric power tools or hammers, always switch the Ignition OFF, disconnect the battery and wait at least three minutes before performing any service.

Precaution for Liquid Gasket

INFOID:000000009461043

REMOVAL OF LIQUID GASKET

- After removing the bolts and nuts, separate the mating surface and remove the liquid gasket using Tool (A).

Tool Number (A): KV10111100 (J-37228)

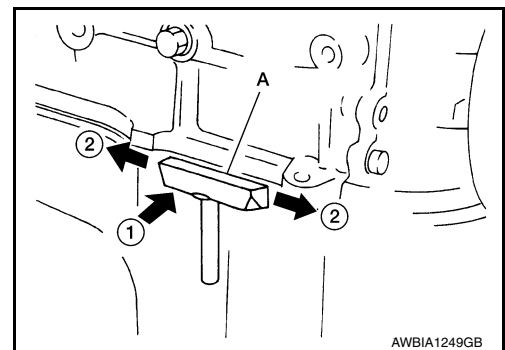
**CAUTION:**

Be careful not to damage the mating surfaces.

- In areas where the cutter is difficult to use, use a plastic hammer to lightly tap (1) the cutter where the liquid gasket is applied. Use a plastic hammer to slide (2) the cutter by tapping on the side.

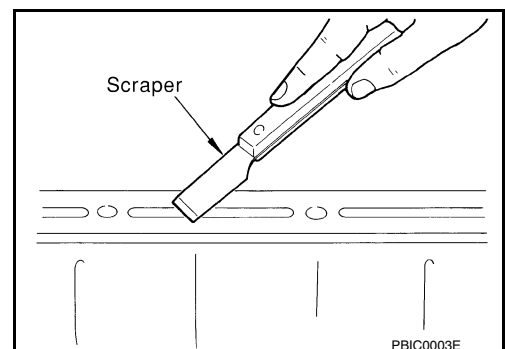
**CAUTION:**

Do not damage the mating surfaces.



LIQUID GASKET APPLICATION PROCEDURE

1. 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.
2. Thoroughly clean the gasket application surface and the mating surface and remove adhering moisture, grease and foreign materials.
3. Attach the liquid gasket tube to the tube presser. Use Genuine Silicone RTV Sealant or equivalent. Refer to [GI-21, "Recommended Chemical Products and Sealants"](#).

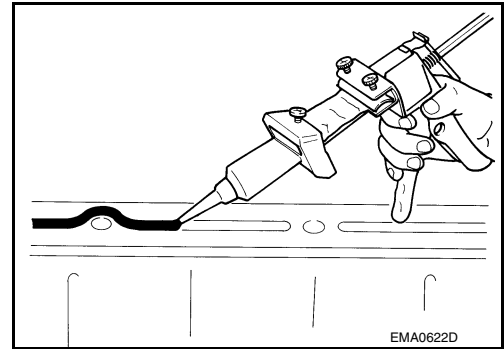


## PRECAUTIONS

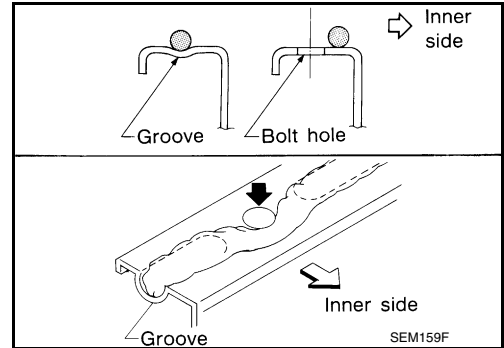
[VQ35DE]

### < PRECAUTION >

4. Apply the liquid gasket using suitable tool without breaks to the specified location.
  - If there is a groove for the liquid gasket application, apply the liquid gasket to the groove.
  - As for the bolt holes, normally apply the liquid gasket inside the holes. If specified, it should be applied outside the holes. Make sure to read the text of this manual.
  - Within five minutes of the liquid 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 with the specified oil and coolant. Refer to [MA-11](#), "[FOR USA AND CANADA : Fluids and Lubricants](#)".



### **CAUTION:**

If there are more specific instructions in the procedures contained in this manual concerning liquid gasket application, observe them.

# PREPARATION

< PREPARATION >

[VQ35DE]

## PREPARATION

### PREPARATION

#### Special Service Tool

INFOID:000000009461044

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The actual shapes of the tools may differ from those illustrated here.

Tool number (TechMate No.) Tool name	Description
ST25051001 (J-25695-1) Oil pressure gauge	Measuring oil pressure <b>Maximum measuring range:</b> <b>2,452 kPa (25 kg/cm<sup>2</sup>, 356 psi)</b>
ST25052000 (J-25695-2) Hose	Adapting oil pressure gauge to cylinder block
KV10115801 (J-38956) Oil filter wrench	Removing and installing oil filter a: 64.3mm (2.531 in)
KV10111100 (J-37228) Seal cutter	Removing oil pan

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#### Commercial Service Tool

INFOID:000000009461045

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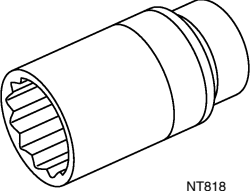
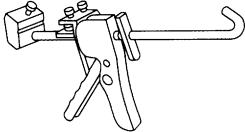
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# PREPARATION

< PREPARATION >

[VQ35DE]

Tool name	Description
<p>Power tool</p>  <p>PIIB1407E</p>	<p>Loosening nuts, screws and bolts</p>
<p>Deep socket</p>  <p>NT818</p>	<p>Removing and installing oil pressure switch Deep socket 27 mm, 3/8 drive</p>
<p>Tube presser</p>  <p>S-NT052</p>	<p>Pressing the tube of liquid gasket</p>

# SYSTEM DESCRIPTION

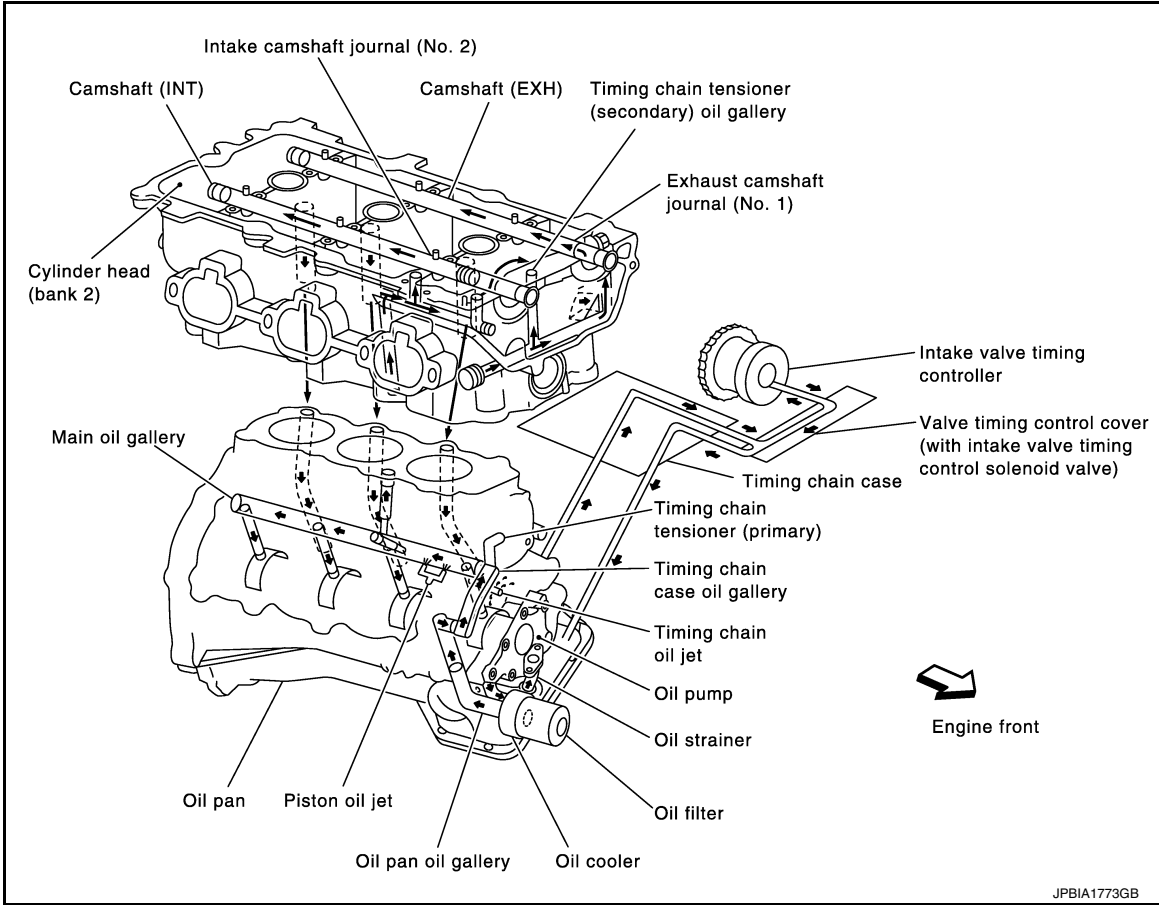
## LUBRICATION SYSTEM

### Lubrication Circuit

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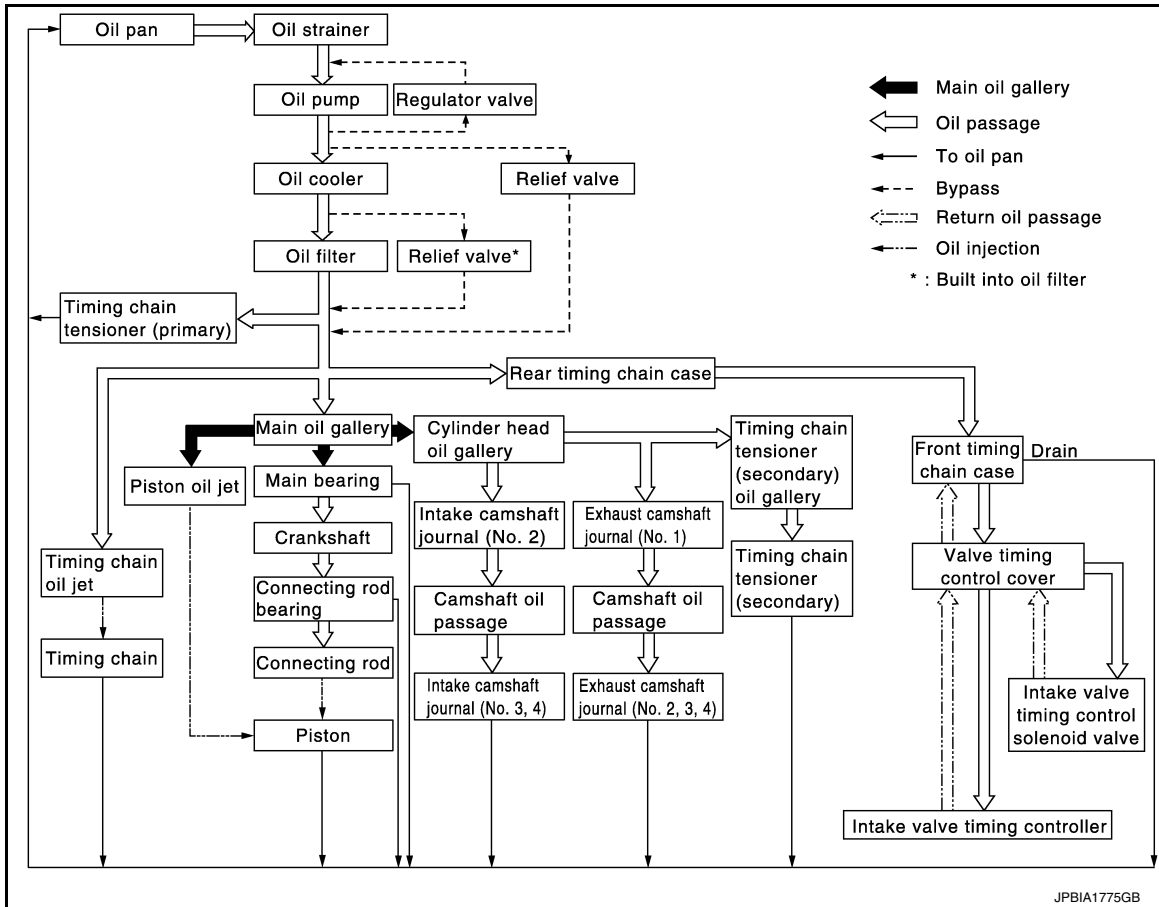
# LUBRICATION SYSTEM

< SYSTEM DESCRIPTION >

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## Schematic

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## PERIODIC MAINTENANCE

### ENGINE OIL

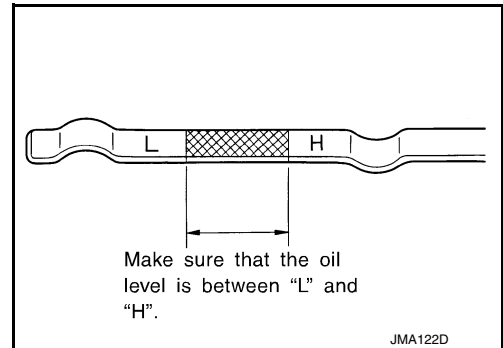
#### Inspection

INFOID:000000009461048

#### 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 oil level gauge.
- If it is out of range, add oil as necessary.



#### ENGINE OIL APPEARANCE

- Check engine oil for white milky appearance 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 switch
- Oil filter
- Oil cooler
- Intake valve timing control cover and intake valve timing control solenoid valve
- Front cover
- Mating surface between cylinder block and cylinder head
- Mating surface between cylinder head and rocker cover
- Crankshaft oil seal (front and rear)

#### OIL PRESSURE CHECK

##### WARNING:

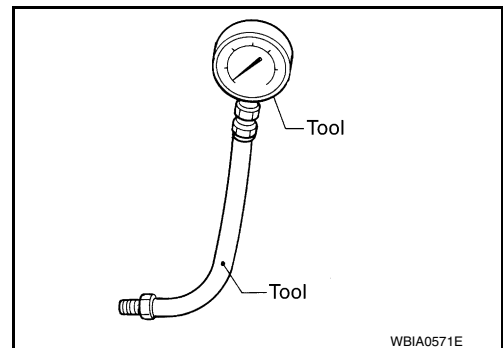
- **Be careful not to burn yourself, as engine oil may be hot.**
- **Put the CVT shift selector in the Park "P" position.**

1. Check the oil level.
2. Remove fender protector side cover (RH). Refer to [EXT-26. "FENDER PROTECTOR : Exploded View"](#).
3. Disconnect oil pressure switch harness connector at the oil pressure switch. Remove oil pressure switch and install Tools.

##### CAUTION:

**Do not drop or shock oil pressure switch.**

**Tool numbers : ST25051001 (J-25695-1)**  
**: ST25052000 (J-25695-2)**



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

##### NOTE:

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

# ENGINE OIL

[VQ35DE]

< PERIODIC MAINTENANCE >

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

**Engine oil pressure** : [LU-34, "Oil Pressure"](#)

6. After the inspections, install the oil pressure switch as follows:
  - a. Remove the old sealant adhering to oil pressure switch and engine.
  - b. Apply thread sealant and tighten the oil pressure switch to specification.  
**Use Genuine High Performance Thread Sealant, or equivalent.**

**Oil pressure switch** : Refer to [EM-174, "Removal and Installation"](#)

- c. After warming up engine, make sure there are no engine oil leaks.
7. Install fender protector side cover (RH). Refer to [EXT-16, "Exploded View"](#).

## Changing Engine Oil

INFOID:000000009461049

### 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.**

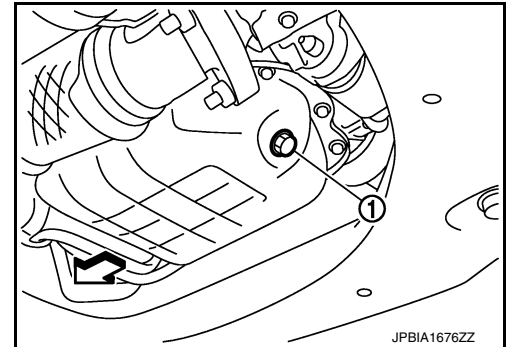
1. Position the vehicle so it is level on the hoist.
2. Warm up the engine and check for oil leaks from the engine.
3. Stop engine and wait for 10 minutes.
4. Remove the oil pan drain plug (1) and oil filler cap.

⇐ : Front

5. Drain the engine oil.
6. Install the oil pan drain plug (1) with a new washer and refill the engine with new engine oil.

**Oil specification and viscosity** : Refer to [MA-11, "FOR USA AND CANADA : Engine Oil Recommendation"](#).

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



### CAUTION:

- **Be sure to clean the oil pan drain plug and install with a 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.**
7. Warm up the engine and check around the oil pan drain plug and oil filter for oil leaks.
  8. Stop engine and wait for 10 minutes.
  9. Check the engine oil level using the oil level gauge.

### CAUTION:

**Do not overfill the engine with engine oil.**

## OIL FILTER

## Removal and Installation

INFOID:00000009461050

## REMOVAL

1. Drain engine oil. Refer to [LU-26, "Changing Engine Oil"](#).
2. Remove the fender protector side cover (RH). Refer to [EXT-26, "FENDER PROTECTOR : Exploded View"](#).
3. Remove the oil filter using Tool (A) as shown.

**Tool number** : KV10115801 (J-38956)

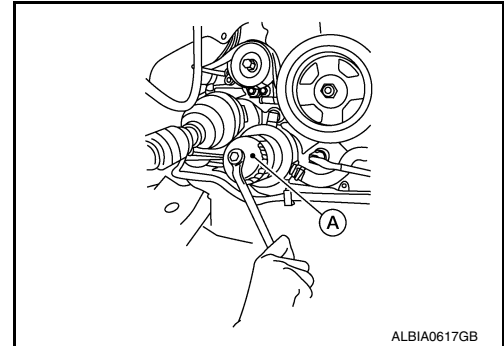
**WARNING:**

- Be careful not to get burned, the engine and engine oil may be hot.

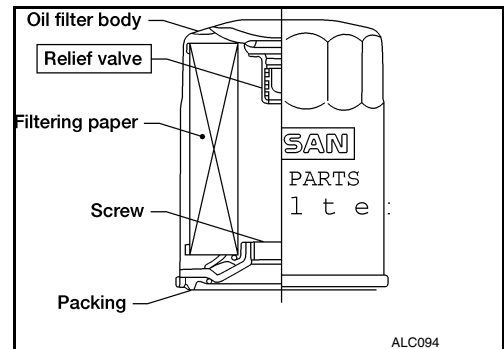
**CAUTION:**

- 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 has a built in pressure relief valve. Use a Genuine NISSAN oil filter or equivalent



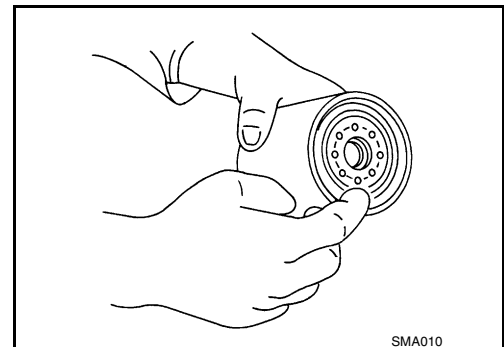
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## INSTALLATION

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.



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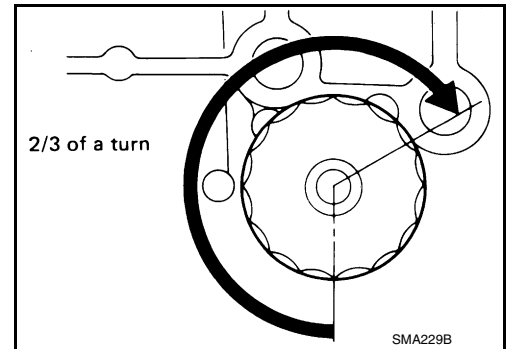
## OIL FILTER

[VQ35DE]

### < PERIODIC MAINTENANCE >

3. 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 : 18.0 N·m (1.8 kg-m, 13 ft-lb)**



4. Refill engine with new engine oil. Refer to [LU-26, "Changing Engine Oil"](#).
5. After warming up the engine, check for any engine oil leaks.
6. Install the fender protector side cover (RH). Refer to [EXT-26, "FENDER PROTECTOR : Exploded View"](#).

# OIL PUMP

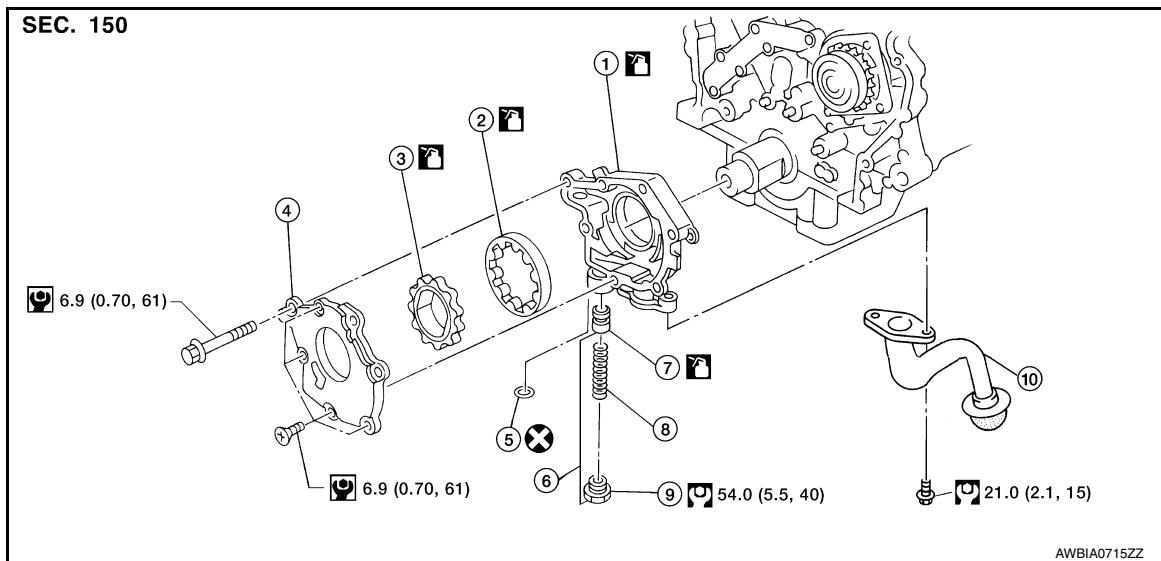
< REMOVAL AND INSTALLATION >

[VQ35DE]

## REMOVAL AND INSTALLATION

### OIL PUMP

#### Exploded View



- |                     |                |                        |
|---------------------|----------------|------------------------|
| 1. Oil pump housing | 2. Outer rotor | 3. Inner rotor         |
| 4. Oil pump cover   | 5. O-ring      | 6. Regulator valve set |
| 7. Regulator valve  | 8. Spring      | 9. Regulator plug      |
| 10. Oil strainer    |                |                        |

#### Removal and Installation

INFOID:000000009461052

##### REMOVAL

1. Remove the engine from the vehicle. Refer to [EM-220, "Removal and Installation"](#).
2. Remove the upper oil pan. Refer to [EM-157, "Removal and Installation \(Upper Oil Pan\)"](#).
3. Remove the timing chain. Refer to [EM-182, "Removal and Installation"](#).
4. Remove oil pump assembly.

##### INSTALLATION

Installation is in the reverse order of removal.

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

#### Disassembly and Assembly

INFOID:000000009461053

##### DISASSEMBLY

1. Remove the oil pump cover.
2. Remove inner rotor and outer rotor from oil pump housing.  
**CAUTION:**  
The outer rotor has directional vanes in relation to the rotation of the oil pump shaft. Note the outer rotor vane direction for assembly.
3. Remove oil strainer from oil pump housing.
4. After removing regulator plug, remove spring and regulator valve.

##### Assembly

##### **CAUTION:**

- Do not reuse O-ring.
- Before assembly apply new engine oil to the parts as specified.

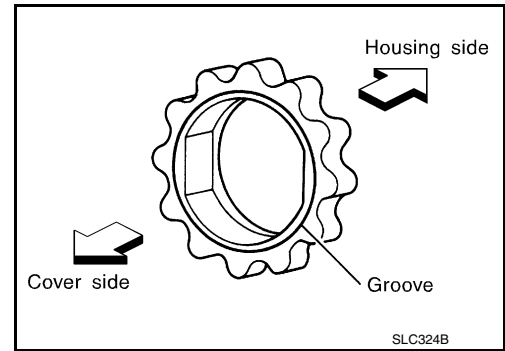
# OIL PUMP

## < REMOVAL AND INSTALLATION >

[VQ35DE]

Assembly is in the reverse order of disassembly.

- Assemble the outer rotor in the correct vane orientation to rotation as noted during disassembly and the inner rotor with the groove on the oil pump cover side.



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## Inspection

### INSPECTION AFTER DISASSEMBLY

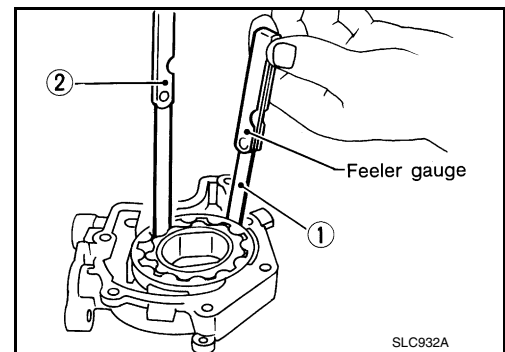
Clearance of Oil Pump Parts

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

**Standard** : [LU-34, "Oil Pump"](#)

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

**Standard** : [LU-34, "Oil Pump"](#)

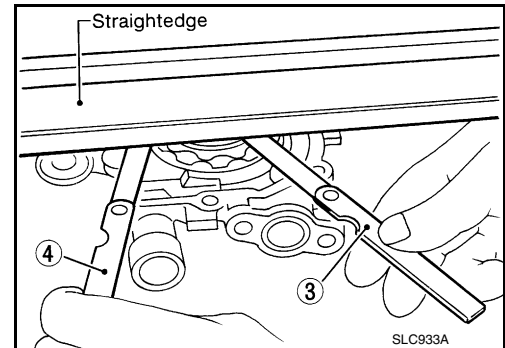


- Measure clearance with feeler gauge and straightedge.
- Side clearance between inner rotor and oil pump body (position 3).

**Standard** : [LU-34, "Oil Pump"](#)

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

**Standard** : [LU-34, "Oil Pump"](#)

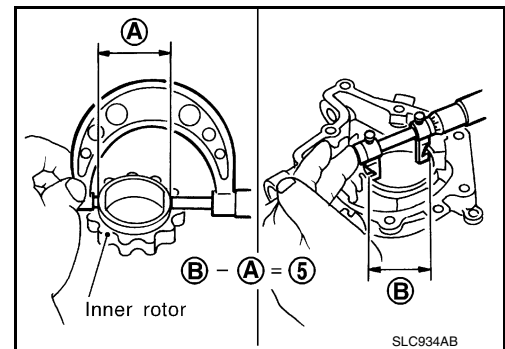


- Calculate the clearance between inner rotor and oil pump body as follows:

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** : [LU-34, "Oil Pump"](#)

3. If out of specifications, replace oil pump assembly.



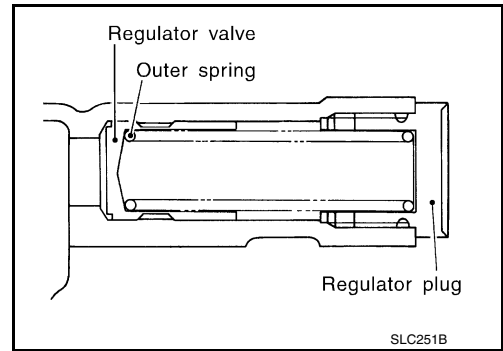
Regulator Valve

# OIL PUMP

[VQ35DE]

## < REMOVAL AND INSTALLATION >

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 oil pump assembly.**



### Regulator Valve Clearance

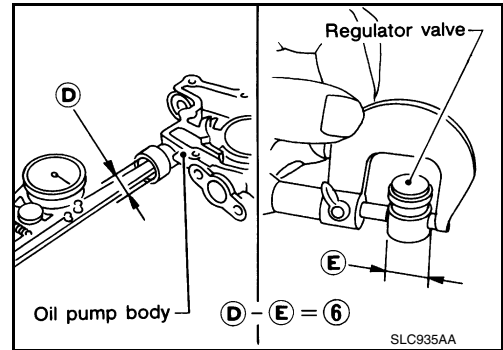
(Clearance 6) = D (Valve hole diameter) – E (Outer diameter of valve)

**Standard** : [LU-34, "Regulator Valve"](#)

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

### CAUTION:

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



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# OIL COOLER

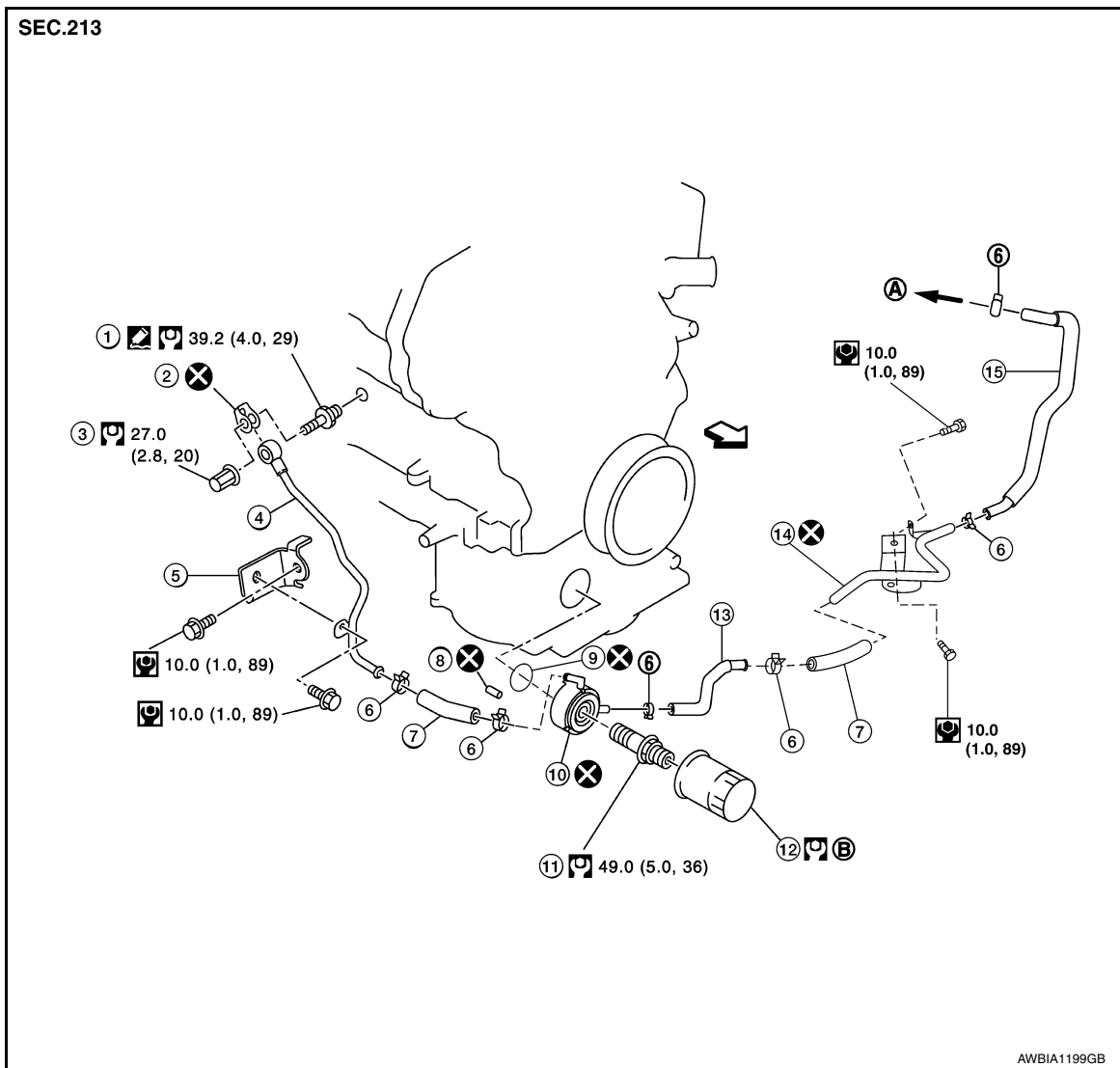
< REMOVAL AND INSTALLATION >

[VQ35DE]

## OIL COOLER

Exploded View

INFOID:000000009461055



- |                       |   |                     |
|-----------------------|---|---------------------|
| 1. Connector bolt     | 2. Copper gasket  | 3. Water drain plug |
| 4. Water pipe         | 5. Bracket  | 6. Clamp            |
| 7. Water hose         | 8. Relief valve   | 9. O-ring           |
| 10. Oil cooler        | 11. Connector bolt  | 12. Oil filter      |
| 13. Water hose        | 14. Water pipe  | 15. Water hose      |
| A. To water connector | B. Refer to <a href="#">LU-27. "Removal and Installation"</a> |                     |

↔ : Engine front

▣ : Sealing point

## Removal and Installation

INFOID:000000009461056

### WARNING:

Be careful not to burn yourself, as the engine oil and engine coolant may be hot.

### CAUTION:

- When removing oil cooler, prepare a shop cloth to absorb any engine oil leaks or spills.
- Completely wipe off any engine oil that adheres to the engine and the vehicle.

### NOTE:



# OIL COOLER

< REMOVAL AND INSTALLATION >

[VQ35DE]

When removing components such as hoses, tubes/lines, etc., cap or plug openings to prevent fluid from spilling.

## REMOVAL

1. Remove the engine under cover. Refer to [EXT-17, "Removal and Installation"](#).
2. Remove the RH wheel and tire. Refer to [WT-53, "Inspection"](#).
3. Remove the front fender protector side cover RH. Refer to [EXT-26, "FENDER PROTECTOR : Exploded View"](#).
4. Drain engine coolant. Refer to [CO-36, "Changing Engine Coolant"](#).  
**CAUTION:**  
**Do not spill coolant on the drive belt.**
5. Disconnect water hoses from oil cooler.
6. Remove the oil filter. Refer to [LU-27, "Removal and Installation"](#).
7. Remove oil cooler.
8. Remove core support cover. Refer to [DLK-179, "Removal and Installation"](#).
9. Remove front air duct. Refer to [EM-84, "Removal and Installation"](#).
10. Remove reservoir tank. Refer to [CO-40, "Exploded View"](#).

## 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.

### 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 the reverse order of removal.

### **CAUTION:**

- **Do not reuse O-ring.**
- **Do not reuse copper gasket.**
- **When installing the oil cooler, align the oil cooler slot with the stopper of the oil pan.**

## INSPECTION AFTER INSTALLATION

1. Check the engine oil level and the engine coolant level and add engine oil and engine coolant. Refer to [LU-9, "Inspection"](#) and [CO-11, "System Inspection"](#).
2. Start the engine, and check that there is no leakage of engine oil or engine coolant.
3. Stop the engine and wait for 10 minutes.
4. Check the engine oil level and the engine coolant level again. Refer to [LU-9, "Inspection"](#) and [CO-11, "System Inspection"](#).

# SERVICE DATA AND SPECIFICATIONS (SDS)

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[VQ35DE]

## SERVICE DATA AND SPECIFICATIONS (SDS)

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#### Oil Pressure

INFOID:000000009461057

Unit: kPa (kg/cm<sup>2</sup>, psi)

Engine speed	Approximate discharge oil pressure*
Idle speed	98 (1.0, 14)
2,000 rpm	294 (3.0, 43)
6,000 rpm	392 (4.0, 57)

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

#### Oil Pump

INFOID:000000009461058

Unit: mm (in)

Clearance between outer rotor and oil pump body	0.114 - 0.260 (0.0045 - 0.0102)
Tip clearance between inner rotor and outer rotor	Below 0.180 (0.0071)
Side clearance between inner rotor and oil pump body	0.030 - 0.070 (0.0012 - 0.0028)
Side clearance between outer rotor and oil pump body	0.050 - 0.110 (0.0020 - 0.0043)
Clearance between inner rotor and oil pump body	0.045 - 0.091 (0.0018 - 0.0036)

#### Regulator Valve

INFOID:000000009461059

Unit: mm (in)

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

INFOID:000000009461060

Unit: ℓ (US qt, Imp qt)

Drain and refill	With oil filter change	4.8 (5-1/8, 4-1/4)
	Without oil filter change	4.5 (4-3/4, 4)
Dry engine (engine overhaul)		5.3 (5-5/8, 4-5/8)