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SECTION LU

ENGINE LUBRICATION SYSTEM

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PRECAUTIONS

PFP:00001

Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER”

EBS00F14

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. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted. 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.

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

EBS00EZK

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

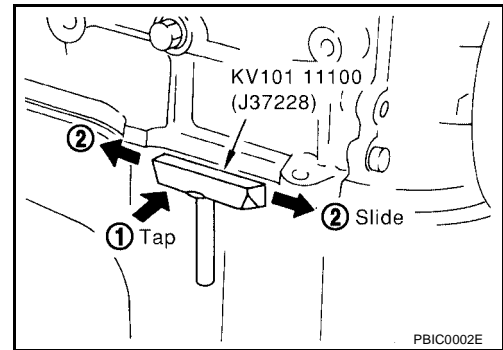
CAUTION:

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.

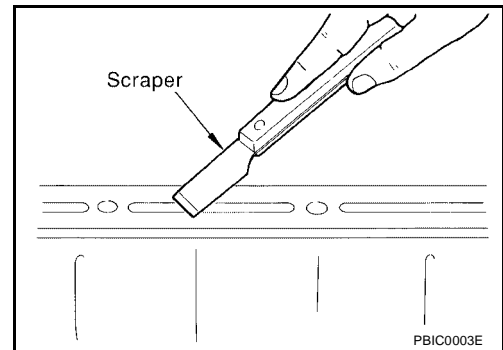


PBIC0002E

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

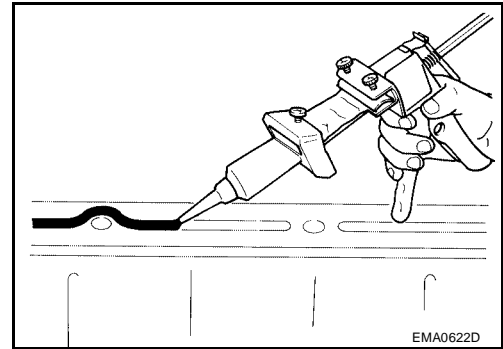


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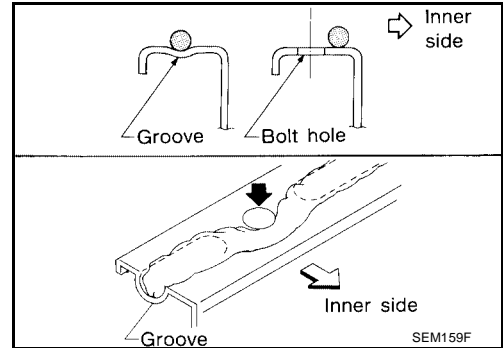
PRECAUTIONS

[KA24DE]

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 [MA-12](#), "[Recommended Fluids and Lubricants](#)".



CAUTION:

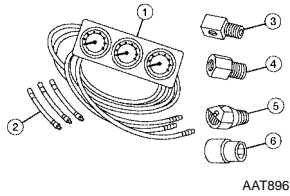
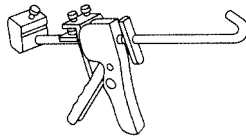
If there are specific instructions in the service manual, observe them.

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PREPARATION

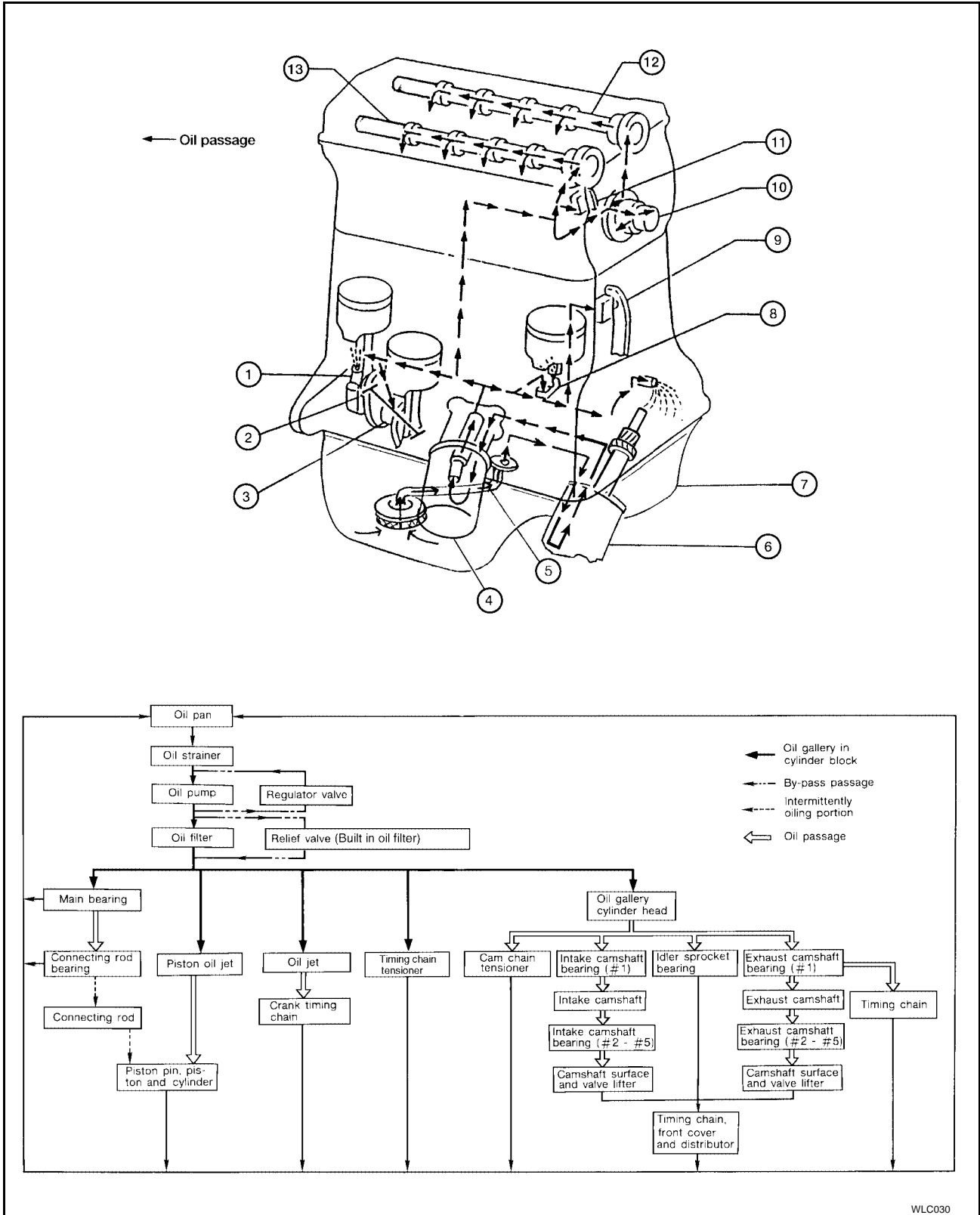
Special Service Tools

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
(J34301-C) Oil pressure gauge set 1: (J34301-1) Oil pressure gauge 2: (J34301-2) Hoses 3: (J34298) Adapter 4: (J34282-1) Adapter 5: (790-301-1230-A) 60° adapter 6: (J34301-15) Square socket	 Measuring oil pressure Maximum measuring range: 1,379 kPa (14 kg/cm² , 200 psi)
WS39930000 (—) Tube presser	 Pressing the tube of liquid gasket

LUBRICATION SYSTEM

Lubrication Circuit



- | | | |
|-------------------|---------------------------|---------------------------|
| 1. Connecting rod | 2. Connecting rod bearing | 3. Main bearing |
| 4. Oil filter | 5. Oil strainer | 6. Oil pump |
| 7. Oil pan | 8. Piston oil jet | 9. Timing chain tensioner |

LUBRICATION SYSTEM

[KA24DE]

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- 10. Idler sprocket
 - 13. Intake camshaft

- 11. Upper timing chain tensioner

- 12. Exhaust camshaft

ENGINE OIL

Oil Pressure Check

WARNING:

- Be careful not to burn yourself, as the engine and oil may be hot.
- Put the shift lever in the Neutral “N” position.

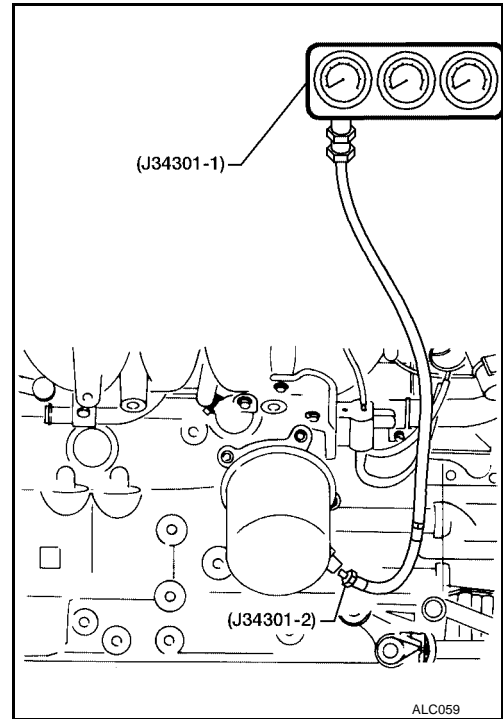
1. Check oil level.
2. Remove oil pressure switch.
3. Install pressure gauge.
4. Start engine and warm it up to normal operating temperature.
5. Check oil pressure with engine running under no-load at idle speed and at 3,000 rpm.

Engine oil pressure [oil temperature at 80°C (148°F)]

Engine speed rpm	Approximate discharge pressure [kPa (kg/cm ² , psi)]
Idle speed	More than 78 (0.8, 11)
3,000	412 - 481 (4.2 - 4.9, 60 - 70)

- If difference is extreme, check oil passage and oil pump for oil leaks.
6. Install oil pressure switch with sealant. Refer to [GI-42, "RECOMMENDED CHEMICAL PRODUCTS AND SEALANTS"](#).

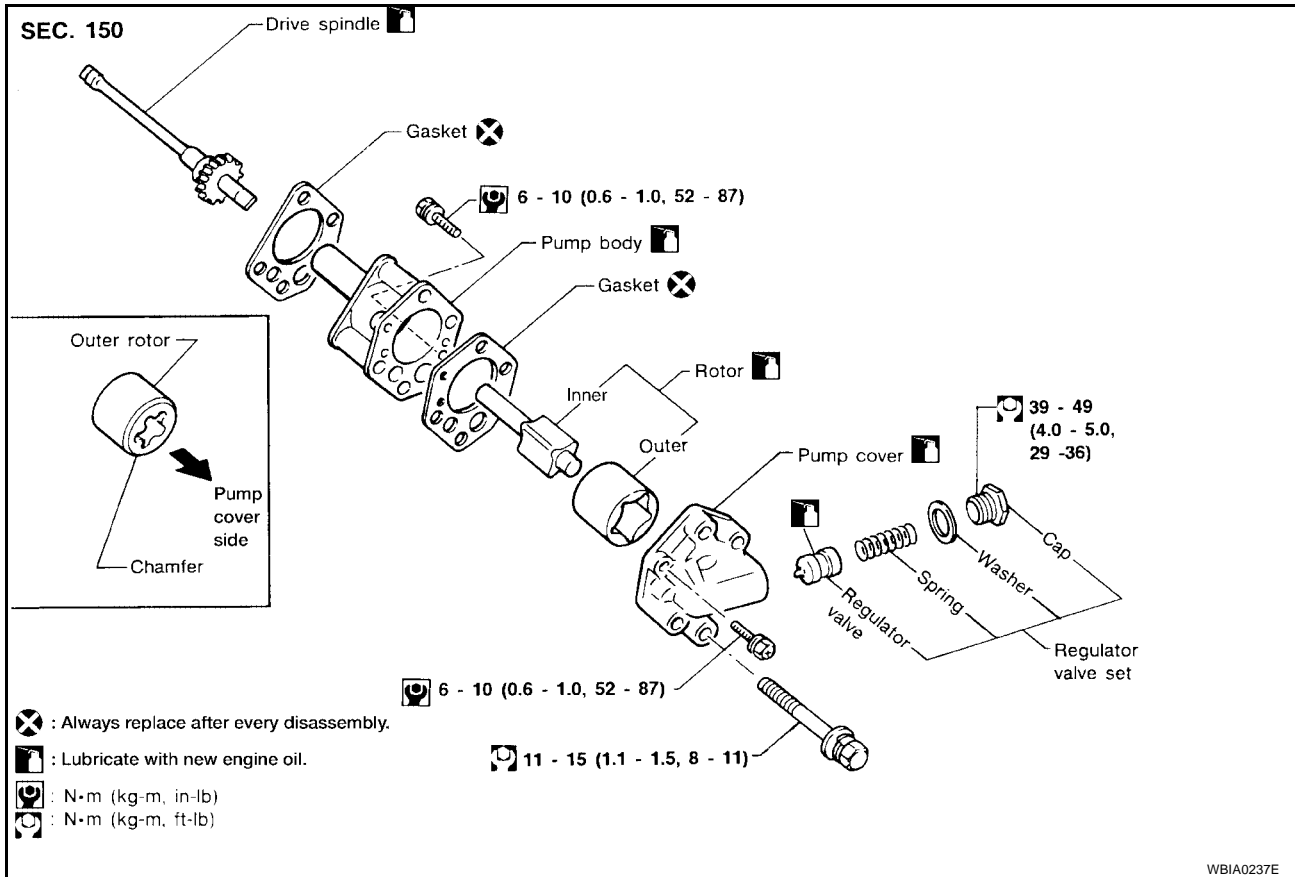
Oil pressure switch : 12.25 – 17.15 N·m (1.3 – 1.7 kg·m, 9 – 12 ft·lb)



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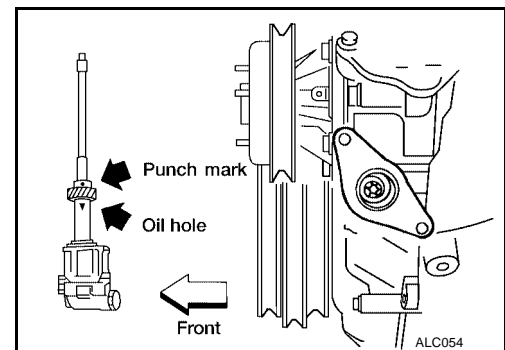
OIL PUMP

Removal and Installation



- Remove oil pump mounting bolts, then withdraw oil pump from engine.
 - When removing oil pump, turn crankshaft so that No. 1 piston is at TDC on its compression stroke.

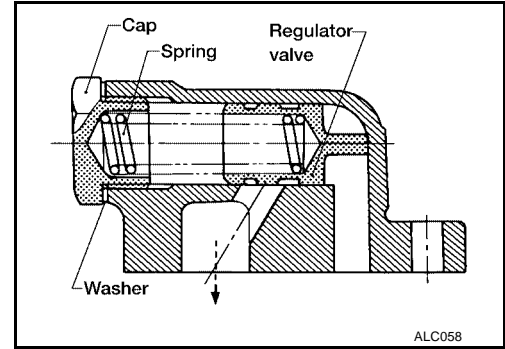
CAUTION:
Be careful not to damage drive spindle when withdrawing oil pump from engine.
- Installation is in the reverse order of removal.
 - Always replace with new oil seal and gasket.
 - When installing oil pump, apply engine oil to gears, then align punch mark on drive spindle and oil hole on oil pump.



EBS00CC2

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.
4. Replace regulator valve set or oil pump assembly, if damaged.

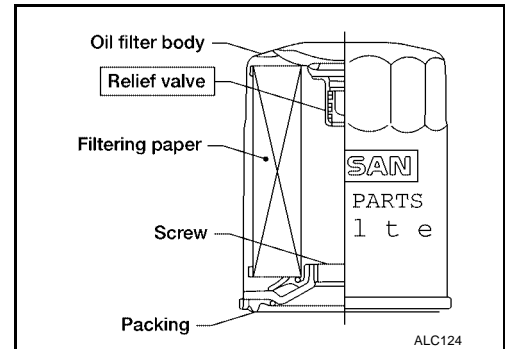


EBS00CC3

Oil Filter

The oil filter is a small, full-flow cartridge type and is provided with a relief valve.

- When changing oil filter, refer to [MA-21, "Changing Oil Filter"](#).



EBS00CC4

Oil Pump Inspection

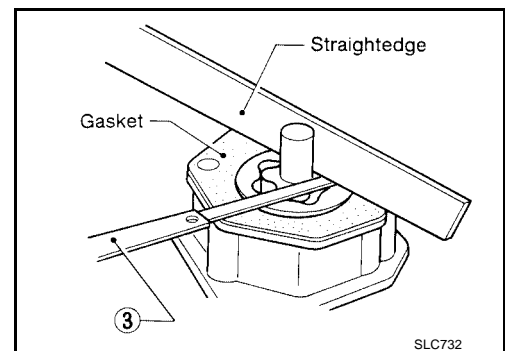
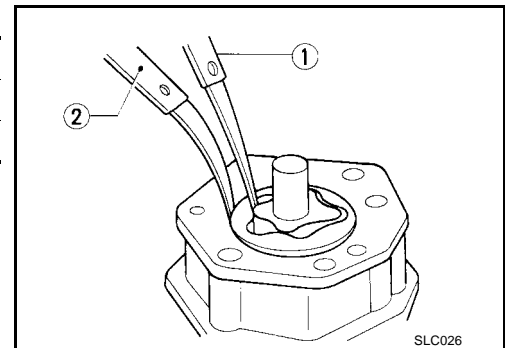
Using a feeler gauge, check the following clearances after the pump is disassembled.

Standard clearance:

Unit: mm (in)

Rotor tip clearance 1	Less than 0.12 (0.0047)
Outer rotor to body clearance 2	0.15 - 0.21 (0.0059 - 0.0083)
Side clearance (with gasket) 3	0.04 - 0.100 (0.0016 - 0.0039)

- If the inner rotor tip clearance (1) exceeds the limit, replace rotor set.
- If pump body to outer rotor clearance and side clearance (2, 3) exceed specification, replace oil pump assembly.



SERVICE DATA AND SPECIFICATIONS (SDS)

[KA24DE]

SERVICE DATA AND SPECIFICATIONS (SDS)

PF0:00030

Oil Pressure Check

EBS00CC5

Engine speed rpm	Approximate discharge pressure kPa (kg/cm ² , psi)
Idle speed	More than 78 kPa (0.8 kg/cm ² , 11 psi)
3,000 rpm	412 - 481 kPa (4.2 - 4.9 kg/cm ² , 60 - 70 psi)

Regulator Valve

EBS00CC6

Unit: mm (in)

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

EBS00CC7

Unit: mm (in)

Inner rotor tip clearance	Less than 0.12 (0.0047)
Outer rotor to pump body clearance	0.15 - 0.21 (0.0059 - 0.0083)
Side clearance (with gasket)	0.04 - 0.100 (0.0016 - 0.0039)

PRECAUTIONS

PF0:00001

Precautions for Supplemental Restraint System (SRS) “AIR BAG” and “SEAT BELT PRE-TENSIONER”

EBS00EZL

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. This system includes seat belt switch inputs and dual stage front air bag modules. The SRS system uses the seat belt switches to determine the front air bag deployment, and may only deploy one front air bag, depending on the severity of a collision and whether the front occupants are belted or unbelted. Information necessary to service the system safely is included in the SRS and SB section of this Service Manual.

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- 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.

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

EBS00EZM

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

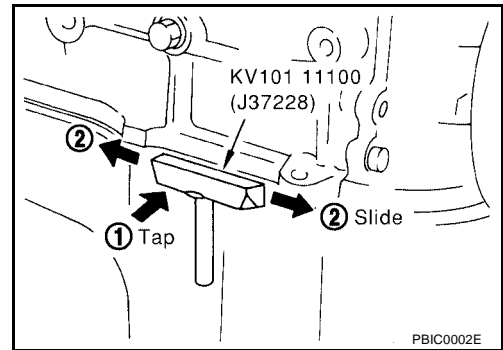
CAUTION:

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:

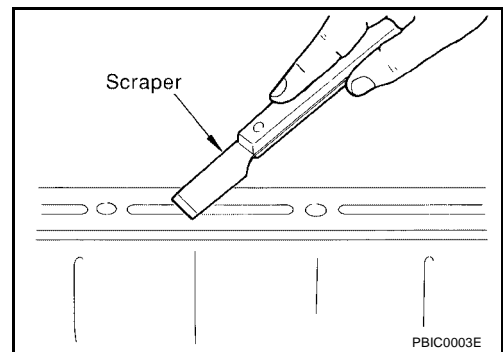
If for some unavoidable reason a tool such as a flat-bladed screwdriver is used, be careful not to damage the mating surfaces.



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.

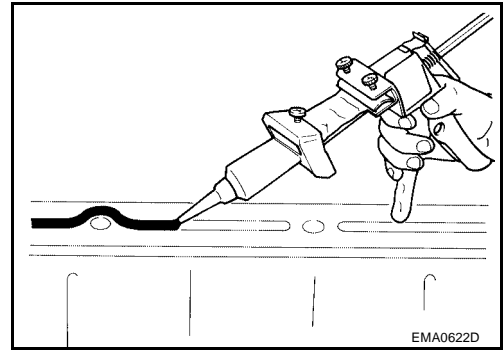
Use Genuine Silicone RTV or equivalent. Refer to [GI-42, "Recommended Chemical Products and Sealants"](#) .



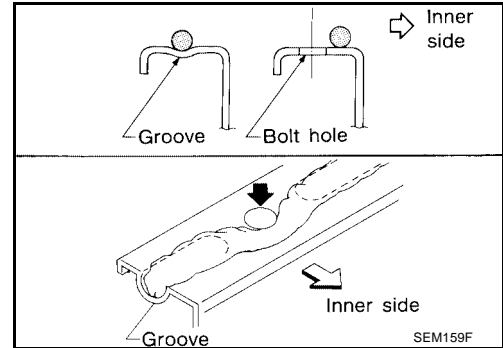
PRECAUTIONS

[VG33E and VG33ER]

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 [MA-12](#), "[Recommended Fluids and Lubricants](#)".



CAUTION:

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

PREPARATION

[VG33E and VG33ER]

PREPARATION

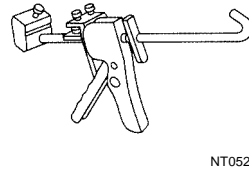
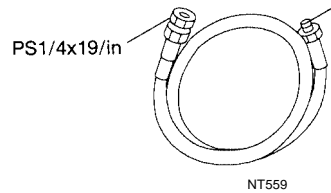
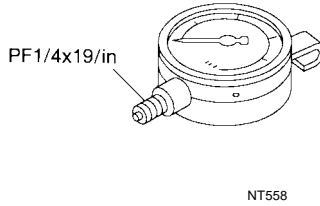
PF0:00002

Special Service Tools

EBS00CCA

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	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
WS39930000 (—) Tube presser	Pressing the tube of liquid gasket

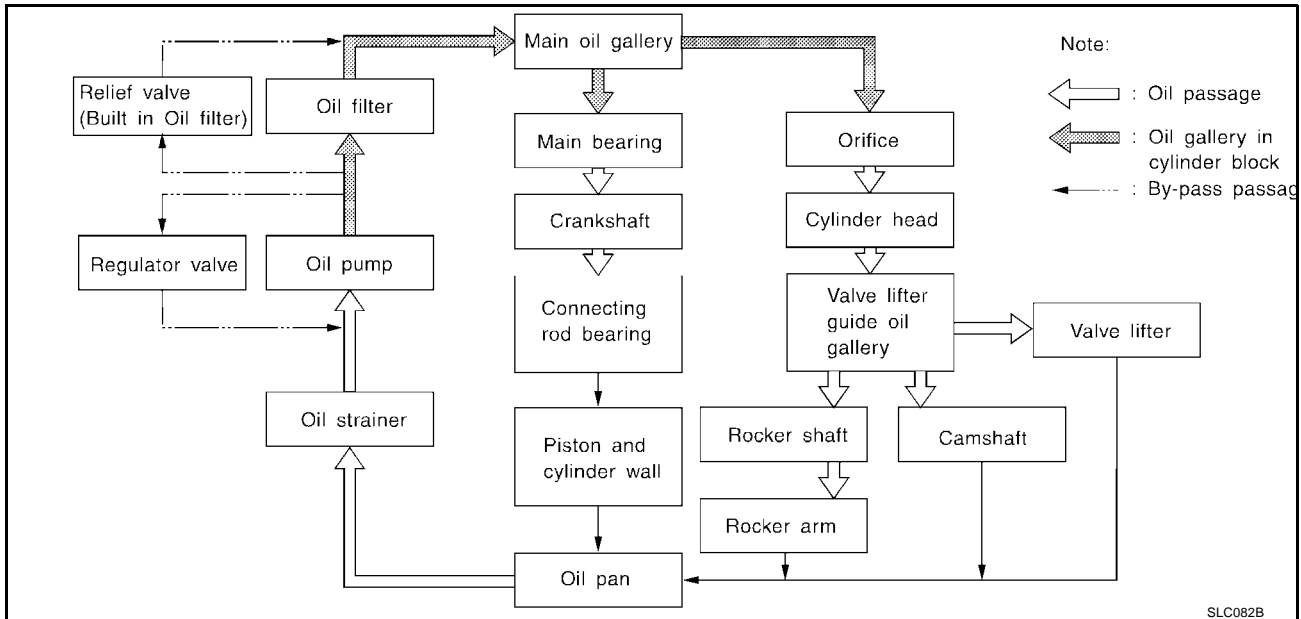


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LUBRICATION SYSTEM

Lubrication Circuit

EBS00CCB



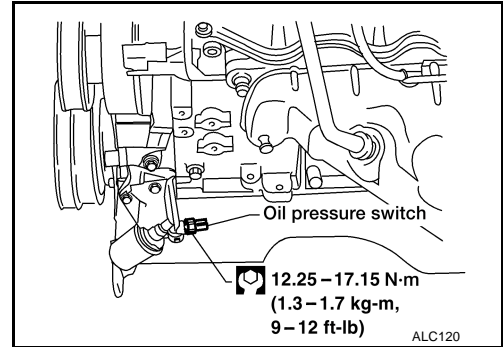
ENGINE OIL

Oil Pressure Check

WARNING:

- Be careful not to burn yourself, as the engine and oil may be hot.
- For M/T models, put the shift lever in the Neutral "N" position. For A/T models, put the selector lever in Park "P" position.

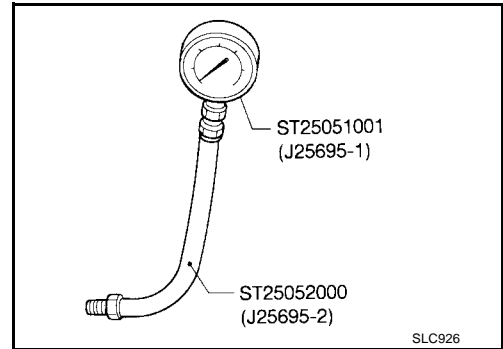
1. Check oil level.
2. Remove oil pressure switch.



3. Install pressure gauge.
4. Start engine and warm it up to normal operating temperature.
5. Check oil pressure with engine running under no-load at idle speed and at 2,000 rpm.

Engine oil pressure [oil temperature at 80°C (148°F)]

Engine speed rpm	Approximate discharge pressure [kPa (kg/cm ² , psi)]
Idle speed	More than 59 (0.6, 9)
2,000	412 - 451 (4.2 - 4.6, 60 - 65)



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

6. Install oil pressure switch with sealant. Refer to [GI-42, "RECOMMENDED CHEMICAL PRODUCTS AND SEALANTS"](#).

Oil pressure switch : 12.25 – 17.15 N·m (1.3 – 1.7 kg-m, 9 – 12 ft-lb)

OIL PUMP

PFP:15010

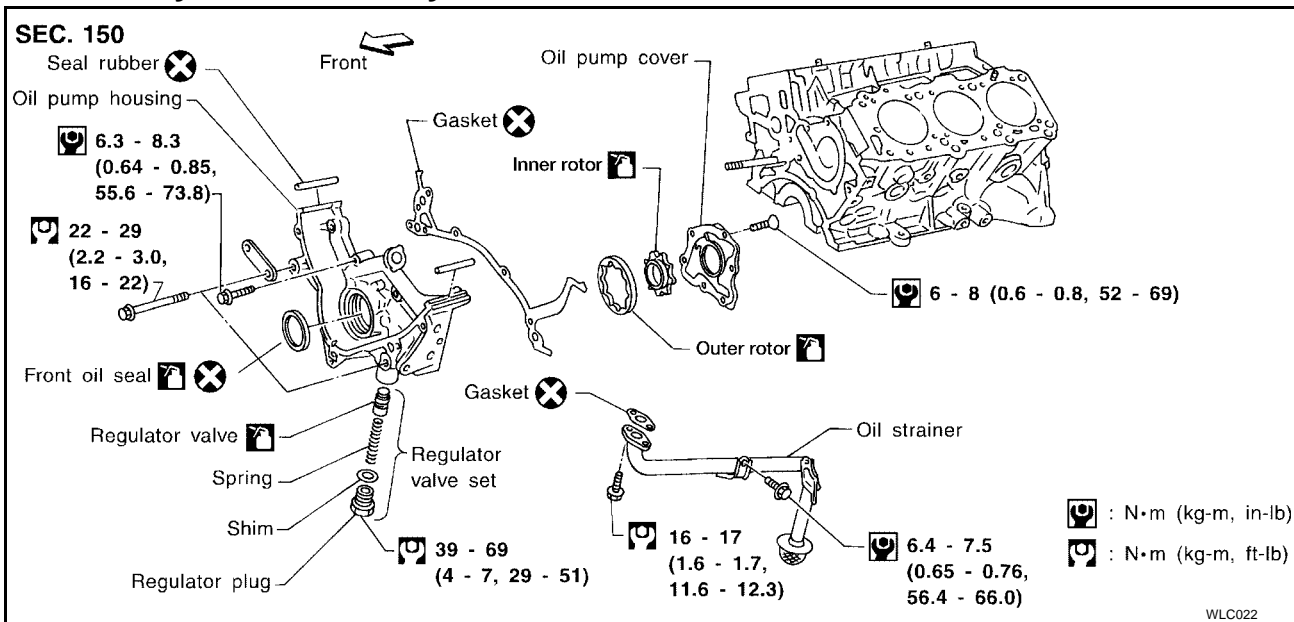
Removal and Installation

EBS00CCD

1. Drain engine oil. Refer to [MA-30, "Changing Engine Oil"](#) .
2. Drain engine coolant from drain plug on radiator. Refer to [MA-26, "Changing Engine Coolant"](#) .
3. Remove air duct from mass air flow sensor to throttle body.
4. Remove cooling fan. Refer to [CO-31, "COOLING FAN \(CRANKSHAFT DRIVEN\)"](#) .
5. Remove radiator hoses (upper and lower) and fan shroud. Refer to [CO-29, "RADIATOR"](#) .
6. Remove drive belts. Refer to [MA-24, "Checking Drive Belts"](#) .
7. Remove crankshaft pulley and front upper and lower belt covers. Refer to [EM-88, "TIMING BELT"](#) .
8. Remove oil pan. Refer to [EM-85, "OIL PAN"](#) .
9. Remove oil strainer.
10. Remove oil pump assembly.
11. Installation is in the reverse order of removal.

Disassembly and Assembly

EBS00CCE



- Always replace with new oil seal and gasket.
- When installing oil pump, apply engine oil to inner and outer gears.
- Be sure that O-ring is properly installed.

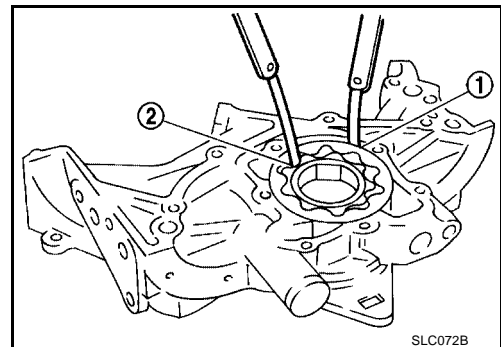
Inspection

EBS00CCF

Using a feeler gauge, straightedge and micrometers, check the following clearances:

Unit: mm (in)

Oil pump housing to outer rotor radial clearance 1	0.114 - 0.200 (0.0045 - 0.0079)
Inner rotor to outer rotor tip clearance 2	Below 0.18 (0.0071)
Oil pump housing to inner rotor axial clearance 3	0.05 - 0.09 (0.0020 - 0.0035)
Oil pump housing to outer rotor axial clearance 4	0.050 - 0.110 (0.0020 - 0.0043)
Inner rotor brazed portion to housing clearance 5	0.045 - 0.091 (0.0018 - 0.0036)

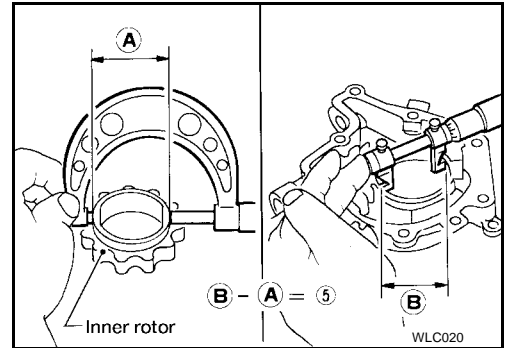
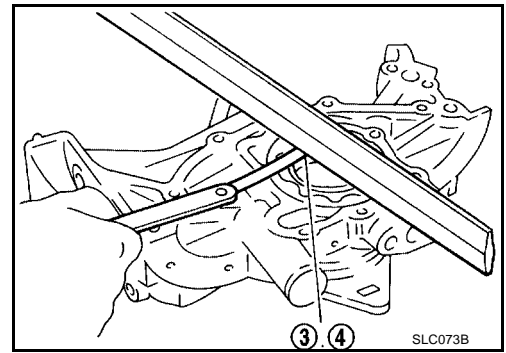


- If the tip clearance (2) exceeds the limit, replace rotor set.

OIL PUMP

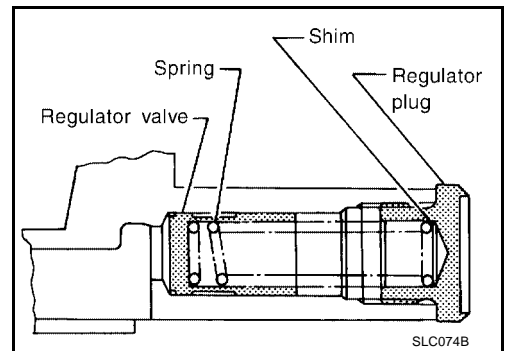
[VG33E and VG33ER]

- If body to rotor clearances (1, 3, 4, 5) exceed the limit, replace oil pump body assembly.



Regulator Valve Inspection

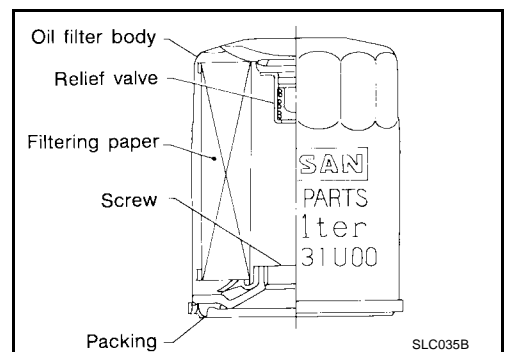
1. Visually inspect components for wear and damage.
2. Check oil pressure regulator valve sliding surface and valve spring.
3. Coat regulator valve with engine oil. Check that it falls smoothly into the valve hole by its own weight.
4. If damaged, replace regulator valve set or oil pump assembly.



Oil Filter

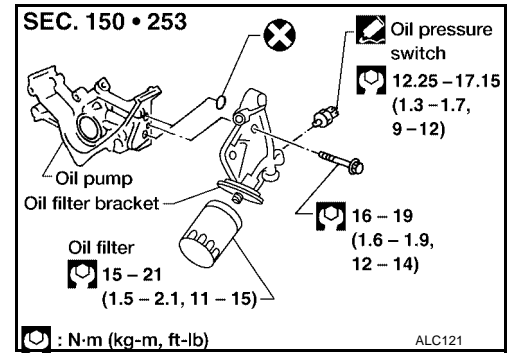
The oil filter is a small, full-flow cartridge type and is provided with a relief valve.

- When changing oil filter. Refer to [MA-31, "Changing Oil Filter"](#).



Oil Filter Bracket REMOVAL AND INSTALLATION

1. Remove oil filter. Refer to [MA-31, "Changing Oil Filter"](#).
2. Disconnect oil pressure switch connector.
3. Remove oil filter bracket.
4. Installation is in the reverse order of removal.



SERVICE DATA AND SPECIFICATIONS (SDS)

[VG33E and VG33ER]

SERVICE DATA AND SPECIFICATIONS (SDS)

PFP:00030

Oil Pressure Check

EBS00CCJ

Engine speed rpm	Approximate discharge pressure kPa (kg/cm ² , psi)
Idle speed	More than 59 (0.6, 9)
2,000	412 - 451 (4.2 - 4.6, 60 - 65)

Regulator Valve

EBS00CCK

Unit: mm (in)

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

Oil Pump

EBS00CCL

Unit: mm (in)

Oil pump housing 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)
Oil pump housing to inner rotor axial clearance	0.05 - 0.09 (0.0020 - 0.0035)
Oil pump housing to outer rotor axial clearance	0.050 - 0.110 (0.0020 - 0.0043)
Inner rotor brazed portion to housing clearance	0.045 - 0.091 (0.0018 - 0.0036)

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