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SECTION LU

ENGINE LUBRICATION SYSTEM

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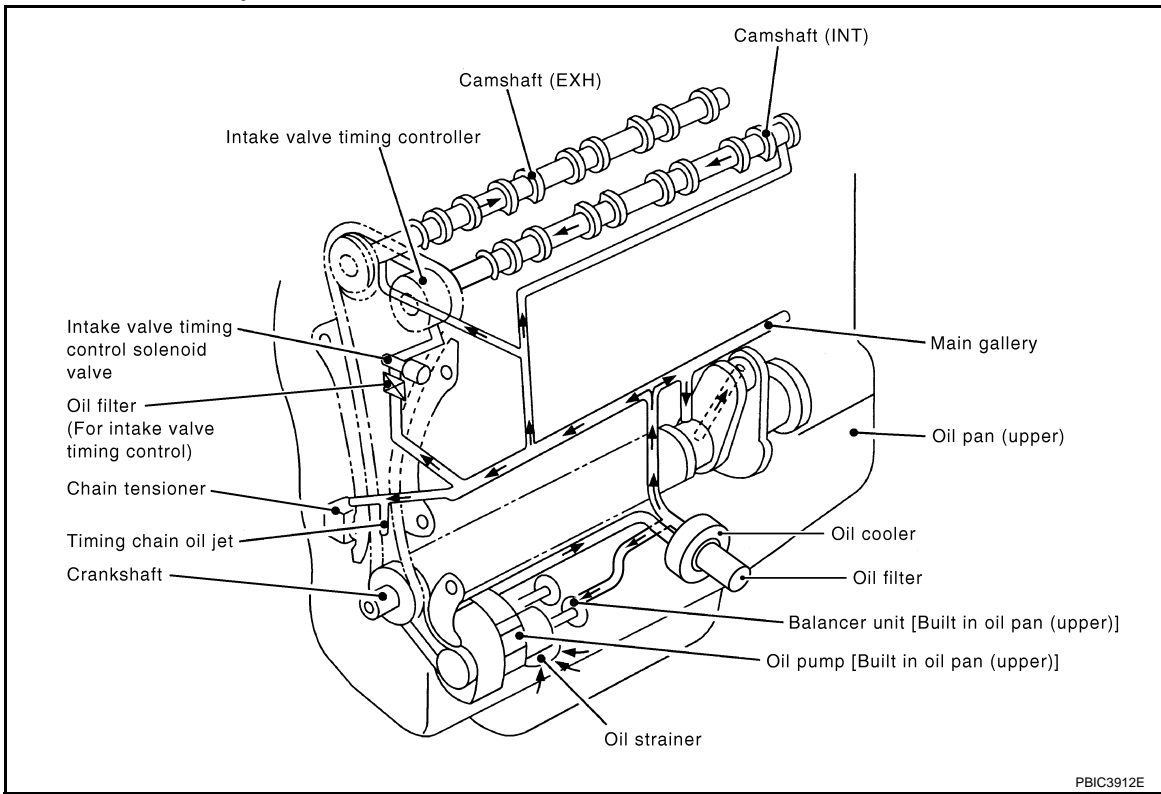
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FUNCTION DIAGNOSIS

DESCRIPTION

Engine Lubrication System

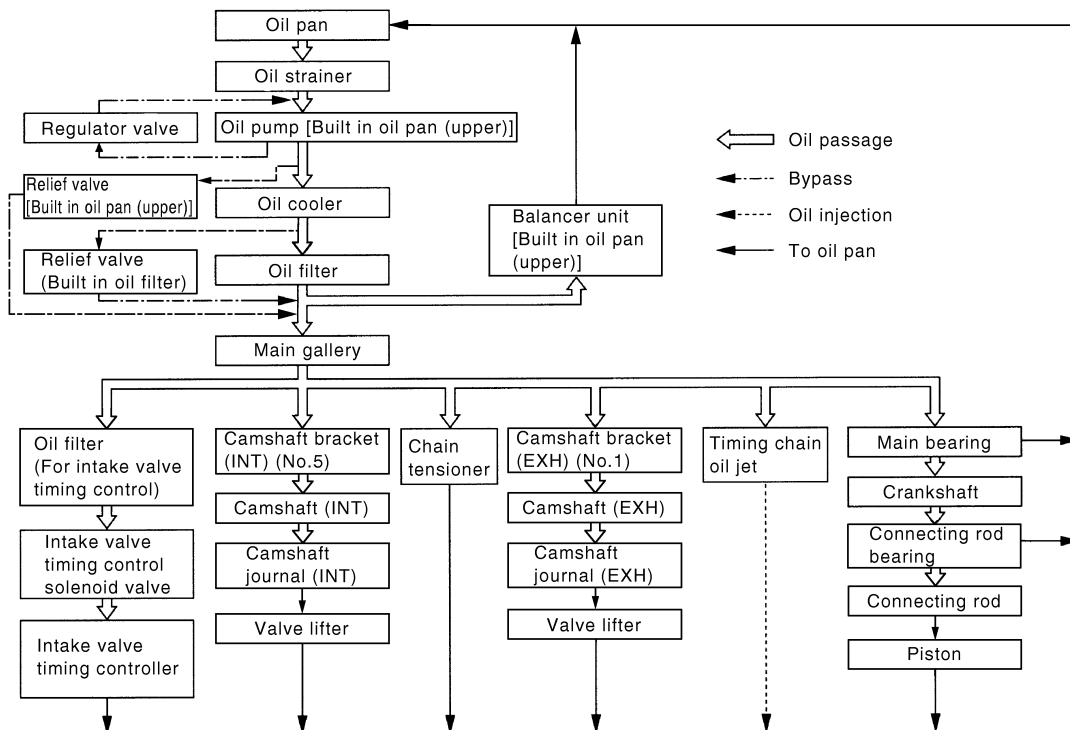
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PBIC3912E

Engine Lubrication System Schematic

INFOID:000000001160922



PBIC3913E

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< PRECAUTION >

PRECAUTION

PRECAUTIONS

Liquid Gasket

INFOID:000000001160923

LIQUID GASKET APPLICATION PROCEDURE

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

PREPARATION

< PREPARATION >

[MR20DE]

PREPARATION

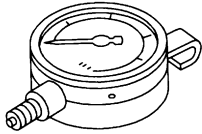
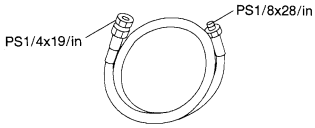
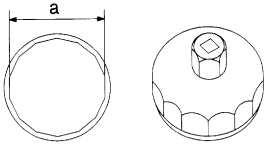
PREPARATION

Special Service Tools

INFOID:000000001160924

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Tool number Tool name	Description
ST25051001 Oil pressure gauge  NT050	Measuring oil pressure Maximum measuring range: 2,452 kPa (24.52 bar, 25 kg-cm ² , 356 psi)
ST25052000 Hose  S-NT559	Adapting oil pressure gauge to cylinder block
KV10115801 Oil filter wrench  S-NT375	Removing and installing oil filter a: 64.3 mm (2.531 in)

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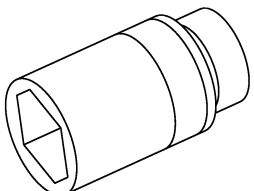
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Commercial Service Tools

INFOID:000000001160925

Tool name	Description
Deep socket  PBIC4066E	Removing and installing oil pressure switch a: 27 mm (1.06 in)

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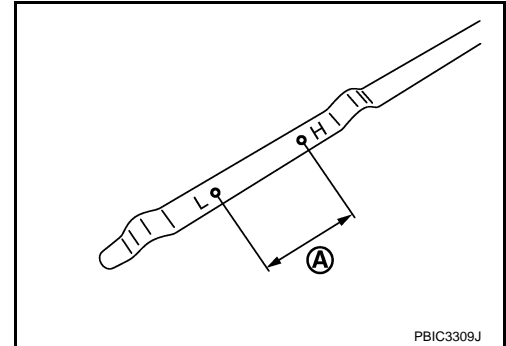
ON-VEHICLE MAINTENANCE**ENGINE OIL****Inspection**

INFOID:000000001160926

ENGINE OIL LEVEL**NOTE:**

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

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



PBIC3309J

ENGINE OIL APPEARANCE

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

ENGINE OIL LEAKAGE

Check for engine oil leakage around the following area.

- Oil pan (upper and lower)
- Oil pan drain plug
- Oil pressure switch
- Oil level sensor
- Oil filter
- Oil cooler
- Intake valve timing control solenoid valve
- Front cover
- Mating surface between cylinder head and camshaft bracket
- Mating surface between cylinder block and cylinder head
- Mating surface between cylinder head and rocker cover
- Crankshaft oil seals (front and rear)

OIL PRESSURE CHECK**WARNING:**

- **Be careful not to get burned, as engine oil may be hot.**
 - **When checking engine oil pressure, shift position should be “Parking” (CVT models) or “Neutral” (M/T models), and apply parking brake securely.**
1. Check engine oil level. Refer to [LU-6. "Inspection"](#).

ENGINE OIL

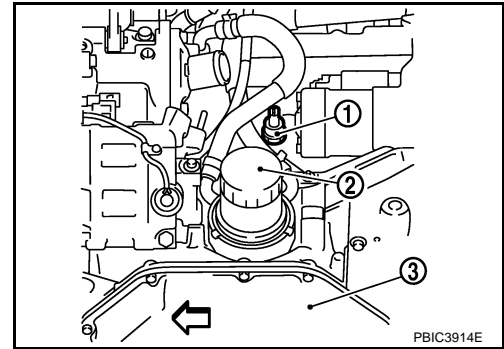
[MR20DE]

< ON-VEHICLE MAINTENANCE >

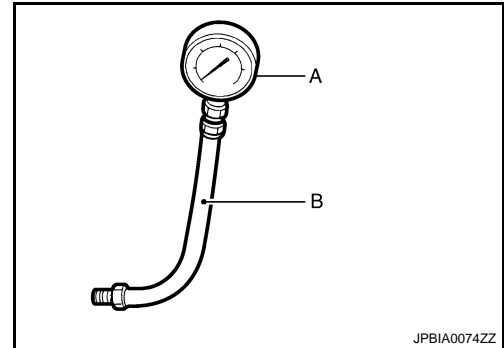
2. Disconnect harness connector at oil pressure switch (1), and remove oil pressure switch using a deep socket (commercial service tool).

- 2 : Oil filter
- 3 : Oil pan (lower)
- ⇐ : Engine front

CAUTION:
Never drop or shock oil pressure switch.



3. Install oil pressure gauge [SST: ST25051001] (A) and hose [SST: ST25052000] (B).



4. Start engine and warm it up to normal operating temperature.
5. Check oil pressure with engine running under no-load.
NOTE:
When engine oil temperature is low, engine oil pressure becomes high.

Engine oil pressure : Refer to [LU-12, "Engine Oil Pressure"](#).

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

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

Tightening torque : Refer to [EM-93, "Exploded View"](#).

- c. Check engine oil level. Refer to [LU-6, "Inspection"](#).
- d. After warming up engine, check that there is no leakage of engine oil with running engine.

Draining

INFOID:000000001160927

WARNING:

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

1. Warm up the engine, and check for engine oil leakage from engine components. Refer to [LU-6, "Inspection"](#).
2. Stop the engine and wait for 10 minutes.
3. Loosen oil filler cap.
4. Remove drain plug and then drain engine oil.

Refilling

1. Install drain plug with new washer. Refer to [EM-33, "Exploded View"](#).

CAUTION:

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

Tightening torque : Refer to [EM-33, "Exploded View"](#).

2. Refill with new engine oil.

Engine oil specification and viscosity: Refer to [MA-22, "Fluids and Lubricants"](#).

Engine oil capacity : Refer to [LU-12, "Periodical Maintenance Specification"](#).

CAUTION:

- The refill capacity depends on the engine oil temperature and drain time. Use these specifications for reference only.
- Always use oil level gauge to determine the proper amount of engine oil in the engine.

3. Warm up engine and check area around drain plug and oil filter for engine oil leakage.
4. Stop engine and wait for 10 minutes.
5. Check the engine oil level. Refer to [LU-6, "Inspection"](#).

OIL FILTER

Removal and Installation

INFOID:000000001160929

REMOVAL

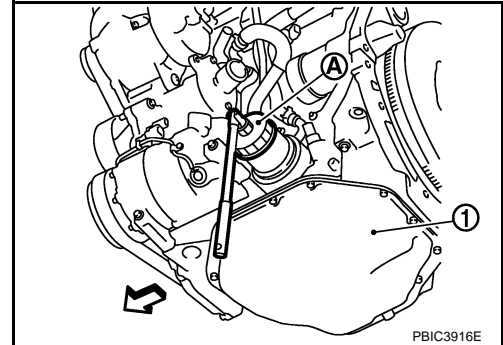
- Using oil filter wrench [SST: KV10115801] (A), remove oil filter.

1 : Oil pan (lower)

↶ : Engine front

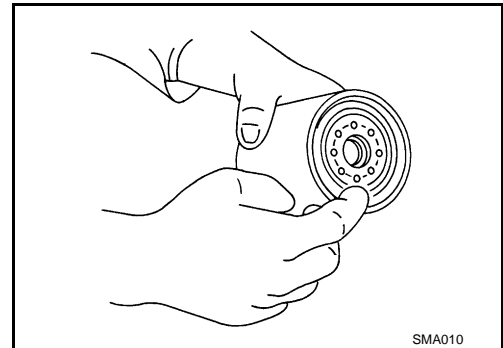
CAUTION:

- Oil filter is provided with relief valve. Use Genuine NISSAN Oil Filter or equivalent.
- Be careful not to get burned when engine and engine oil may be hot.
- When removing, prepare a shop cloth to absorb any engine oil leakage or spillage.
- Completely wipe off any engine oil that adheres to engine and vehicle.



INSTALLATION

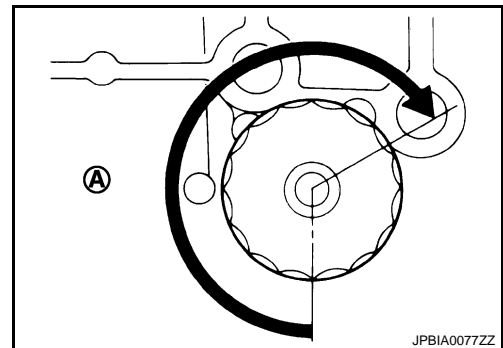
- Remove foreign materials adhering to the oil filter installation surface.
- Apply new engine oil to the oil seal contact surface of new oil filter.



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

Oil filter:

: 17.7 N·m (1.8 kg-m, 13 ft-lb)



Inspection

INFOID:000000001160930

INSPECTION AFTER INSTALLATION

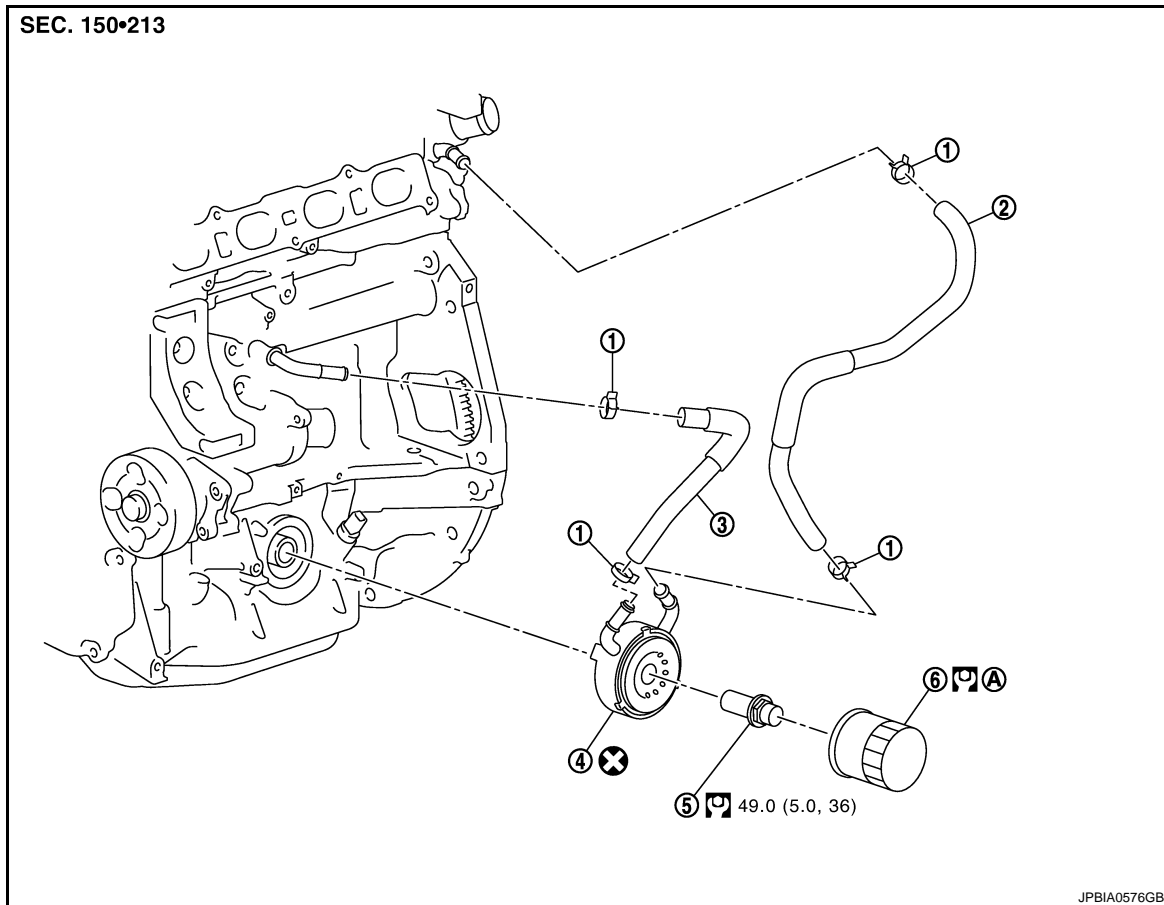
- Check the engine oil level. Refer to [LU-6, "Inspection"](#).
- Start the engine, and check there is no leak of engine oil.
- Stop the engine and wait for 10 minutes.
- Check the engine oil level, and adjust the level. Refer to [LU-6, "Inspection"](#).

ON-VEHICLE REPAIR

OIL COOLER

Exploded View

INFOID:000000001160931



- | | | |
|----------------------------------|-------------------|---------------|
| 1. Clamp | 2. Water hose | 3. Water hose |
| 4. Oil cooler | 5. Connector bolt | 6. Oil filter |
| A. Refer to LU-9 | | |

Refer to [GI-4, "Components"](#) for symbols in the figure.

Removal and Installation

INFOID:000000001160932

REMOVAL

WARNING:

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

1. Drain engine coolant from radiator and cylinder block. Refer to [CO-16, "Exploded View"](#) and [EM-94, "Disassembly and Assembly"](#).
2. Using oil filter wrench [SST: KV10115801], remove oil filter. Refer to [LU-9, "Removal and Installation"](#).
3. Disconnect water hoses from oil cooler.
 - When removing oil cooler only, pinching water hoses near oil cooler to prevent engine coolant from spilling out.
 - Remaining engine coolant in piping will come out. Use a tray to collect it.

CAUTION:

Perform this step when the engine is cold.

4. Remove connector bolt, and remove oil cooler.

INSTALLATION

OIL COOLER

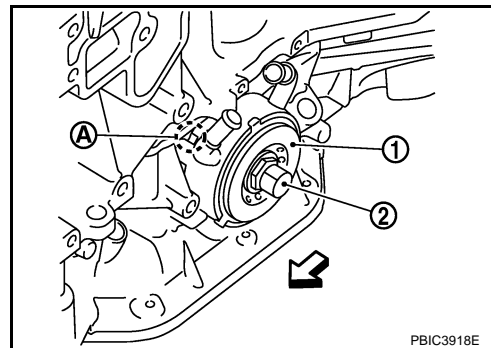
[MR20DE]

< ON-VEHICLE REPAIR >

Installation is the reverse order of removal.

- Tighten the connecting bolt (2) after aligning the stopper (A) on the oil pan (upper) side with protrusion of oil cooler (1).

← : Engine front



INFOID:000000001160933

Inspection

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.

INSPECTION AFTER INSTALLATION

1. Check the engine oil level and the engine coolant level and add engine oil and engine coolant. Refer to [LU-6, "Inspection"](#) and [CO-10, "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-6, "Inspection"](#) and [CO-10, "Inspection"](#).

SERVICE DATA AND SPECIFICATIONS (SDS)

< SERVICE DATA AND SPECIFICATIONS (SDS)

[MR20DE]

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Periodical Maintenance Specification

INFOID:000000001160934

ENGINE OIL CAPACITY (APPROXIMATE)

Unit: ℓ (Imp qt)

Drain and refill	With oil filter change	4.4 (3-7/8)
	Without oil filter change	4.2 (3-3/4)
Dry engine (Overhaul)		5.2 (4-5/8)

Engine Oil Pressure

INFOID:000000001160935

Unit: kPa (bar, kg/cm², psi)

Engine speed	Approximate discharge pressure*
Idle speed	More than 80 (0.80, 0.8, 12)
2,000 rpm	More than 450 (4.50, 4.6, 65)

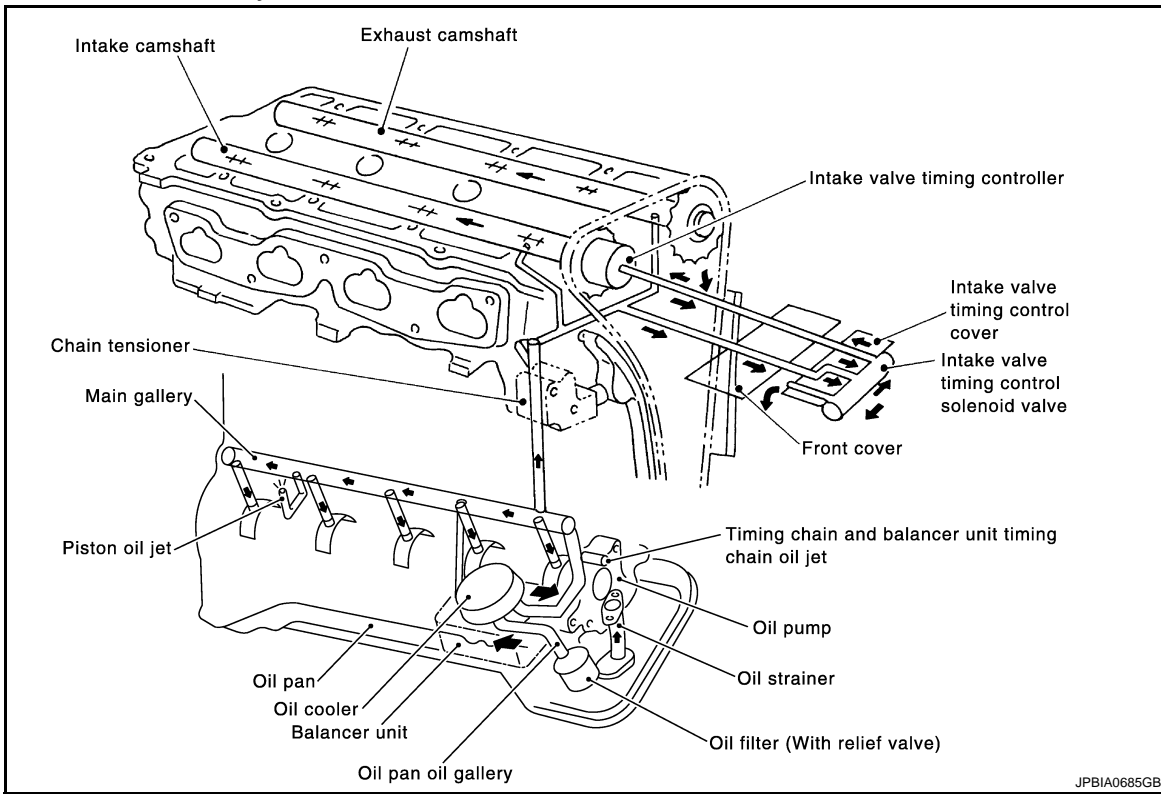
*: Engine oil temperature at 80°C (176°F)

FUNCTION DIAGNOSIS

DESCRIPTION

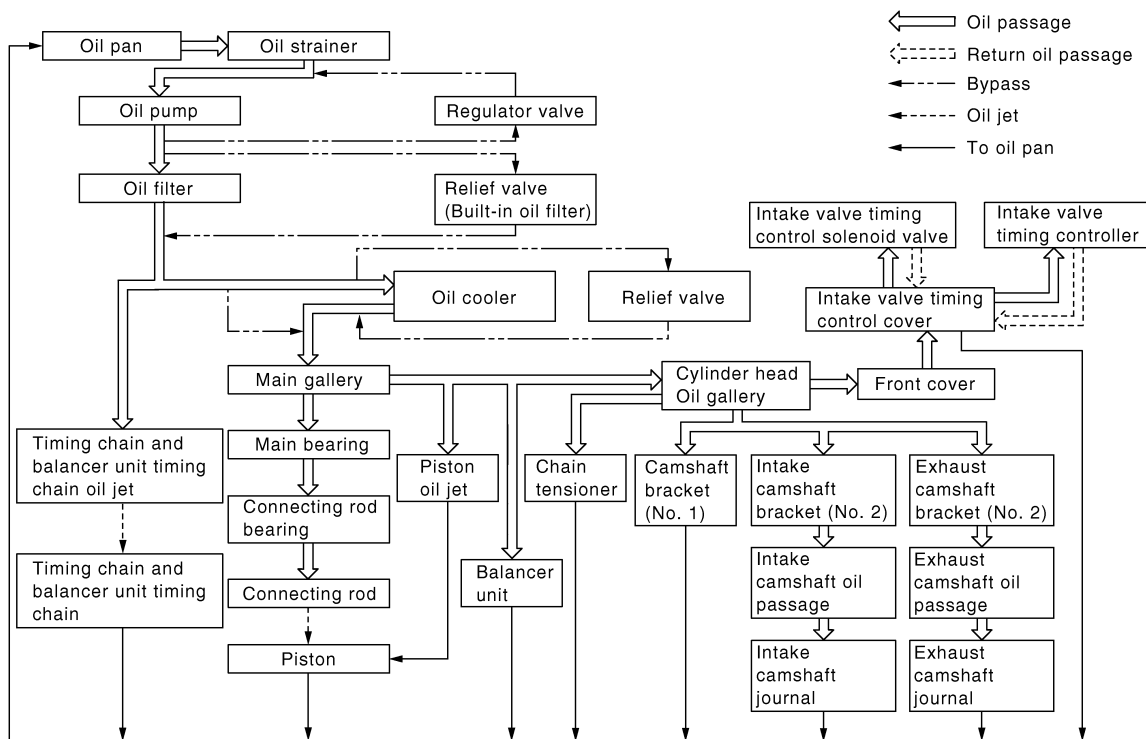
Engine Lubrication System

INFOID:000000001160901



Engine Lubrication System Schematic

INFOID:000000001160902



PRECAUTION

PRECAUTIONS

Liquid Gasket

INFOID:000000001160898

LIQUID GASKET APPLICATION PROCEDURE

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

PREPARATION

< PREPARATION >

[QR25DE]

PREPARATION

PREPARATION

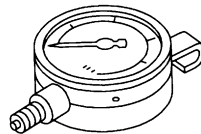
Special Service Tools

INFOID:000000001160899

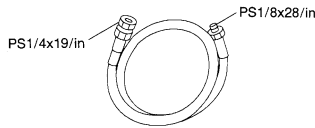
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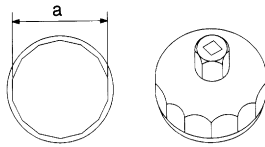
Tool number Tool name	Description
ST25051001 Oil pressure gauge	Measuring oil pressure Maximum measuring range: 2,452 kPa (24.52 bar, 25 kg-cm², 356 psi)
ST25052000 Hose	Adapting oil pressure gauge to oil pan (upper)
KV10115801 Oil filter wrench	Removing and installing oil filter a: 64.3 mm (2.531 in)



NT050



S-NT559

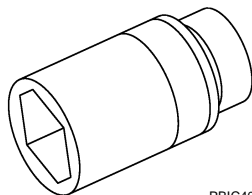


S-NT375

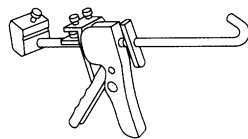
Commercial Service Tools

INFOID:000000001160900

Tool name	Description
Deep socket	Removing and installing oil pressure switch a: 27 mm (1.06 in)
Tube presser	Pressing tube of liquid gasket



PBIC4066E



NT052

ON-VEHICLE MAINTENANCE

ENGINE OIL

Inspection

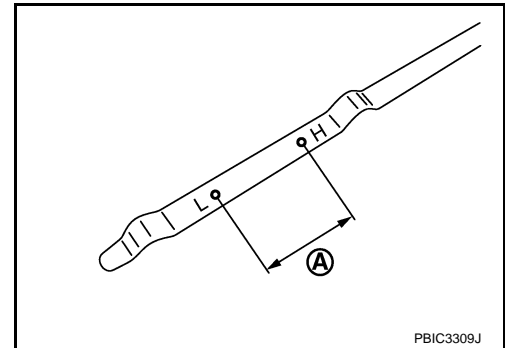
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ENGINE OIL LEVEL

NOTE:

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

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



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ENGINE OIL APPEARANCE

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

ENGINE OIL LEAKAGE

Check for engine oil leakage around the following areas:

- Oil pans (lower and upper)
- 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 head and rocker cover
- Mating surface between cylinder block and lower cylinder block
- Mating surface between cylinder block and cylinder head
- Crankshaft oil seals (front and rear)

OIL PRESSURE CHECK

WARNING:

- **Be careful not to get burn yourself, as engine oil may be hot.**
- **When checking engine oil pressure, shift position should be "Parking" (CVT models) or "Neutral" (M/T models), and apply parking brake securely.**

1. Check the engine oil level. Refer to [LU-16. "Inspection"](#).
2. Remove engine under cover with power tool.

ENGINE OIL

< ON-VEHICLE MAINTENANCE >

[QR25DE]

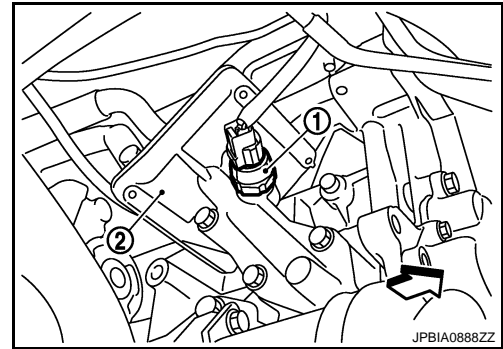
3. Disconnect harness connector at oil pressure switch (1), and remove oil pressure switch using deep socket (commercial service tool).

2 : Oil cooler

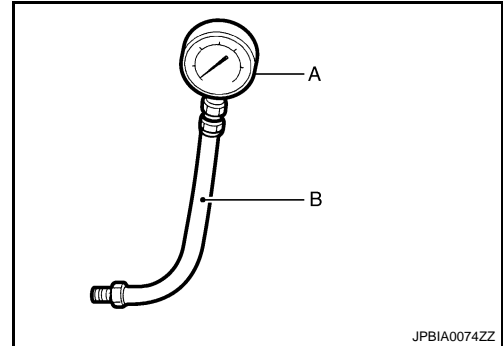
↔ : Engine front

CAUTION:

Never drop or shock oil pressure switch.



4. Install the oil pressure gauge [SST: ST25051001] (A) and hose [SST: ST25052000] (B).



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

NOTE:

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

Engine oil pressure : Refer to [LU-25, "Engine Oil Pressure"](#).

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

7. After the inspections, install oil pressure switch as follows:
 - a. Remove old liquid gasket adhering to oil pressure switch and the mating surface.
 - b. Apply liquid gasket and tighten oil pressure switch to the specification.

Use Genuine Liquid Gasket or equivalent.

Tightening torque : Refer to [LU-20, "Exploded View"](#).

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

Draining

INFOID:000000001160904

WARNING:

- Be careful not to get burn yourself, as engine oil may be hot.
 - Prolonged and repeated contact with used engine oil may cause skin cancer. Try to avoid direct skin contact with used engine oil. If skin contact is made, wash thoroughly with soap or hand cleaner as soon as possible.
1. Warm up the engine, and check for engine oil leakage from engine components. Refer to [LU-16, "Inspection"](#).
 2. Stop the engine and wait for 10 minutes.
 3. Loosen oil filler cap.

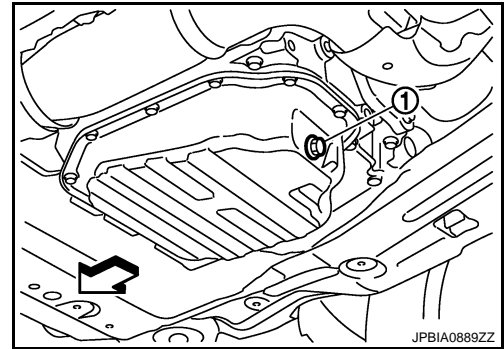
ENGINE OIL

< ON-VEHICLE MAINTENANCE >

[QR25DE]

4. Remove drain plug (1) and then drain engine oil.

⇐ : Vehicle front



Refilling

INFOID:000000001160905

1. Install drain plug with new washer. Refer to [EM-158, "Exploded View"](#).

CAUTION:

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

Tightening torque : Refer to [EM-XX, "Exploded View"](#).

2. Refill with new engine oil.

Engine oil specification and viscosity:

Refer to [MA-22, "Fluids and Lubricants"](#).

Engine oil capacity : Refer to [LU-25, "Periodical Maintenance Specification"](#).

CAUTION:

- The refill capacity depends on the engine oil temperature and drain time. Use these specifications for reference only.
 - Always use oil level gauge to determine the proper amount of engine oil in engine.
3. Warm up the engine and check area around drain plug and oil filter for engine oil leakage.
 4. Stop the engine and wait for 10 minutes.
 5. Check the engine oil level. Refer to [LU-16, "Inspection"](#).

OIL FILTER

Removal and Installation

INFOID:000000001160906

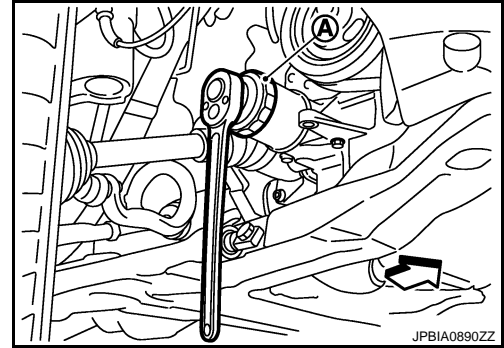
REMOVAL

1. Remove splash guard. Refer to [EXT-21. "Exploded View"](#).
2. Using oil filter wrench [SST: KV10115801] (A), remove oil filter.

← : Vehicle front

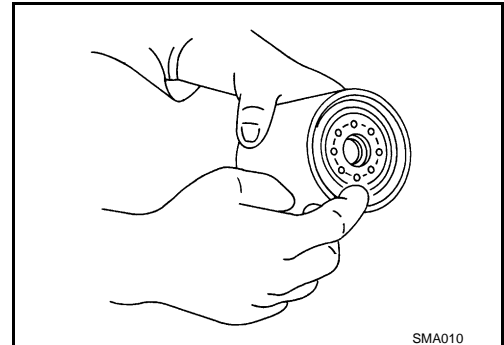
CAUTION:

- Oil filter is provided with relief valve. Use Genuine NISSAN Oil Filter or equivalent.
- Be careful not to get burned when engine and engine oil may be hot.
- When removing, prepare a shop cloth to absorb any engine oil leakage or spillage.
- Never allow engine oil to adhere to drive belts.
- Completely wipe off any engine oil that adheres to engine and vehicle.



INSTALLATION

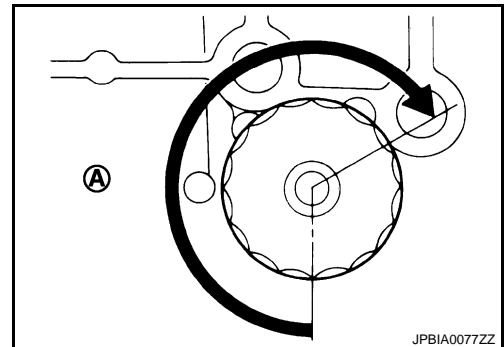
1. Remove foreign materials adhering to oil filter installation surface.
2. Apply new engine oil to the oil seal contact surface of new oil filter.



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

Oil filter:

: 17.6 N·m (1.8 kg·m, 13 ft·lb)



Inspection

INFOID:000000001160907

INSPECTION AFTER INSTALLATION

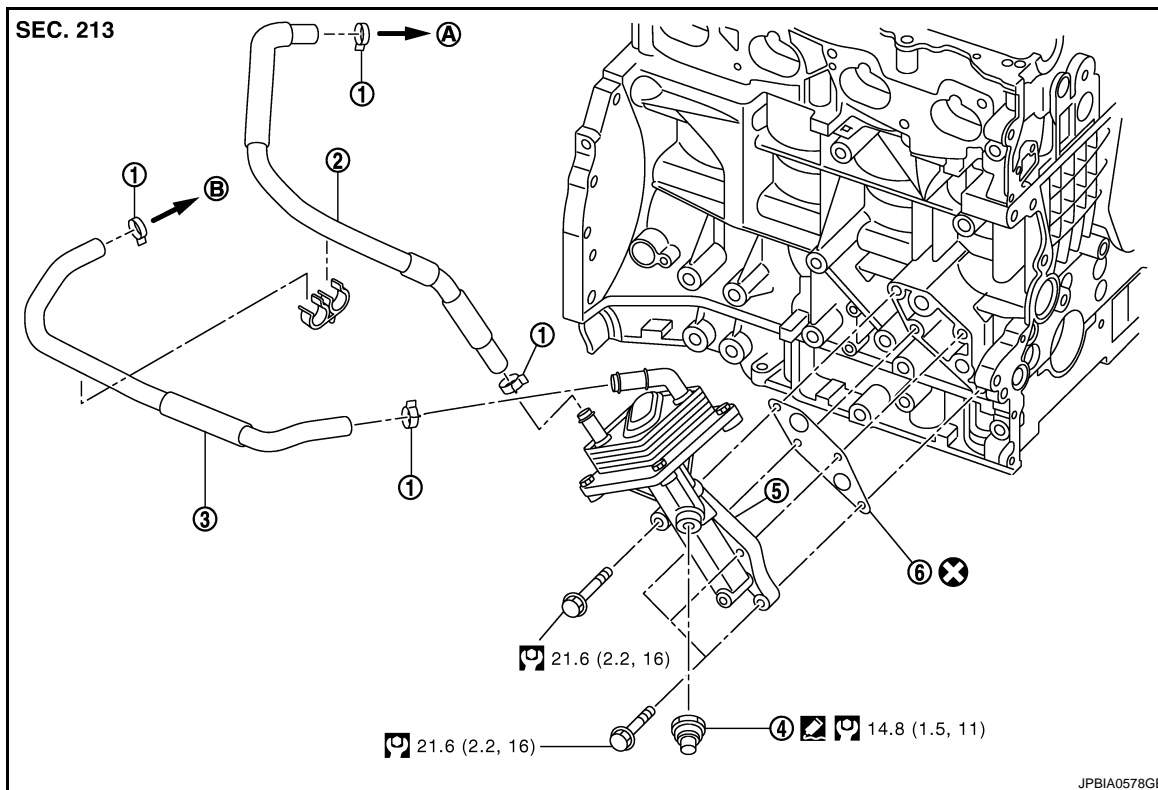
1. Check the engine oil level. Refer to [LU-16. "Inspection"](#).
2. Start the engine, and check there is no leak of engine oil.
3. Stop the engine and wait for 10 minutes.
4. Check the engine oil level, and adjust the level. Refer to [LU-16. "Inspection"](#).

ON-VEHICLE REPAIR

OIL COOLER

Exploded View

INFOID:000000001160908



- | | | |
|------------------------|-------------------|---------------|
| 1. Clamp | 2. Water hose | 3. Water hose |
| 4. Oil pressure switch | 5. Oil cooler | 6. Gasket |
| A. To water outlet | B. To heater pipe | |

Refer to [GI-4, "Components"](#) for symbols in the figure.

Removal and Installation

INFOID:000000001160909

REMOVAL

WARNING:

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

1. Remove RH front road wheel and tire.
2. Drain engine coolant by removing water drain plug on cylinder block and radiator drain plug. Refer to [EM-210, "Exploded View"](#) and [CO-47, "Exploded View"](#).
3. Remove oil cooler mounting bolts.
4. Disconnect water hoses from oil cooler.
5. Remove oil cooler.

INSTALLATION

Installation is the reverse order of removal.

Inspection

INFOID:000000001160910

INSPECTION AFTER REMOVAL

Oil Cooler

OIL COOLER

< ON-VEHICLE REPAIR >

[QR25DE]

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

A

INSPECTION AFTER INSTALLATION

1. Check the engine oil level and the engine coolant level and add engine oil and engine coolant. Refer to [LU-16, "Inspection"](#) and [CO-41, "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-16, "Inspection"](#) and [CO-41, "Inspection"](#).

LU

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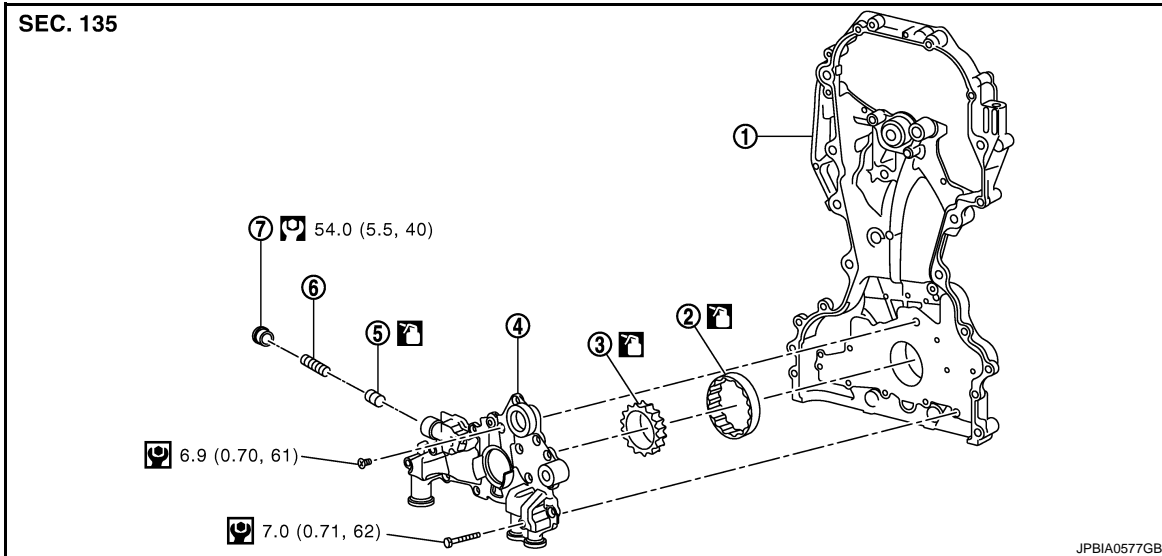
P

DISASSEMBLY AND ASSEMBLY

OIL PUMP

Exploded View

INFOID:000000001160911



- | | | |
|---------------------------------------|--------------------|---------------------------|
| 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 | | |

Refer to [GI-4, "Components"](#) for symbols in the figure.

Removal and Installation

INFOID:000000001160912

REMOVAL

Remove front cover. Refer to [EM-192, "Exploded View"](#).

NOTE:

Oil pump is built into front cover.

INSTALLATION

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

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

Disassembly and Assembly

INFOID:000000001282623

DISASSEMBLY

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

ASSEMBLY

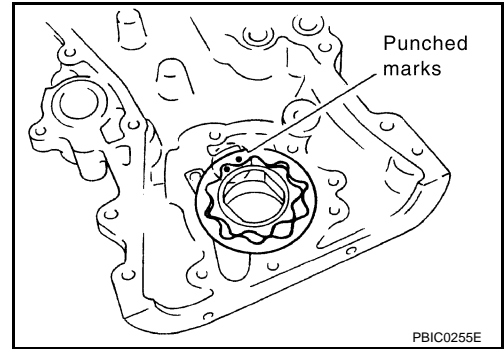
Note the following, and assemble in the reverse order of disassembly.

OIL PUMP

< DISASSEMBLY AND ASSEMBLY >

[QR25DE]

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



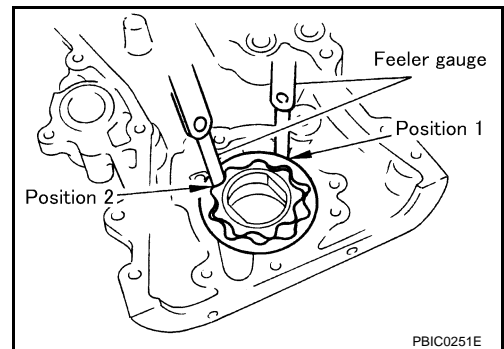
Inspection

INFOID:000000001160916

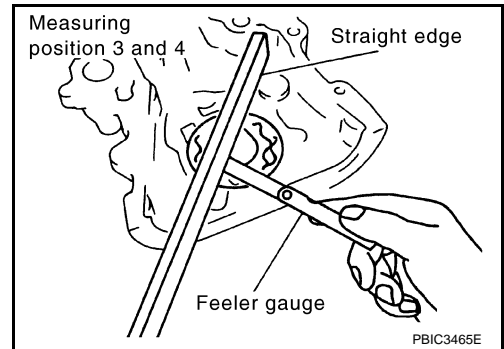
INSPECTION AFTER DISASSEMBLY

Oil Pump Clearance

- Measure the clearance with feeler gauge.
 - Clearance between outer rotor and front cover (Position "1")
Standard : Refer to [LU-25, "Oil Pump"](#).
 - Tip clearance between inner rotor and outer rotor (Position "2")
Standard : Refer to [LU-25, "Oil Pump"](#).



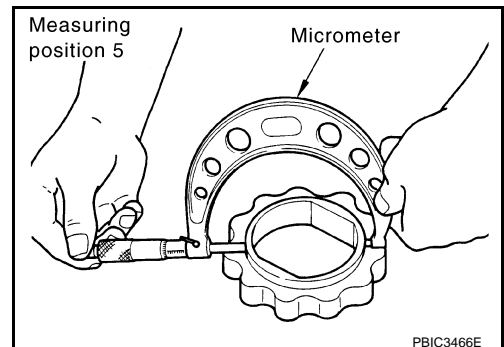
- Measure the clearance with feeler gauge and straightedge.
 - Side clearance between inner rotor and front cover (Position "3")
Standard : Refer to [LU-25, "Oil Pump"](#).
 - Side clearance between outer rotor and front cover (Position "4")
Standard : Refer to [LU-25, "Oil Pump"](#).



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

FRONT COVER INNER DIAMETER

- Measure the outer diameter of protruded portion of inner rotor with micrometer. (Position "5")



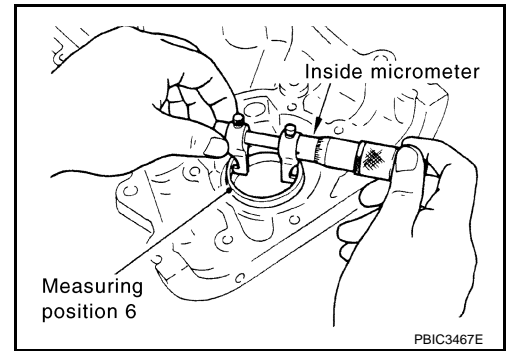
OIL PUMP INNER ROTOR OUTER DIAMETER

OIL PUMP

[QR25DE]

< DISASSEMBLY AND ASSEMBLY >

- Measure the inner diameter of front cover with inside micrometer.
(Position "6")



OIL PUMP INNER ROTOR TO FRONT COVER CLEARANCE

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

Standard : Refer to [LU-25, "Oil Pump"](#).

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

Regulator Valve Clearance

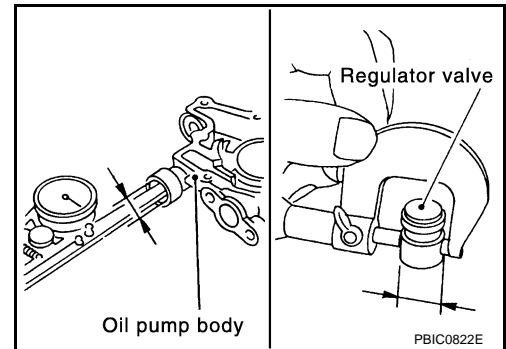
- (Clearance) = (Regulator valve hole diameter) – (Regulator valve outer diameter)

Standard : Refer to [LU-25, "Oil Pump"](#).

- If the calculated value is out of the standard, replace front cover.

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-16, "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-16, "Inspection"](#).

SERVICE DATA AND SPECIFICATIONS (SDS)

< SERVICE DATA AND SPECIFICATIONS (SDS)

[QR25DE]

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Periodical Maintenance Specification

INFOID:0000000001160917

LU

ENGINE OIL CAPACITY (APPROXIMATE)

Unit: ℓ (Imp qt)

Destination		With WVTA	Without WVTA
Drain and refill	With oil filter change	5.1 (4-1/2)	4.6 (4)
	Without oil filter change	4.8 (4-1/4)	4.3 (3-3/4)
Dry engine (Overhaul)		5.9 (5-1/4)	5.4 (4-3/4)

Engine Oil Pressure

INFOID:0000000001160918

Unit: kPa (bar, kg/cm², psi)

Engine speed	Approximate discharge pressure*
Idle speed	More than 98 (0.98, 1.0, 14)
2,000 rpm	More than 294 (2.94, 3.0, 43)

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

Oil Pump

INFOID:0000000001160919

Unit: mm (in)

Clearance between outer rotor and front cover	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 front cover	0.030 - 0.070 (0.0012 - 0.0028)
Side clearance between outer rotor and front cover	0.060 - 0.110 (0.0024 - 0.0043)
Oil pump inner rotor to front cover clearance	0.045 - 0.091 (0.0018 - 0.0036)

Regulator Valve

INFOID:0000000001160920

Unit: mm (in)

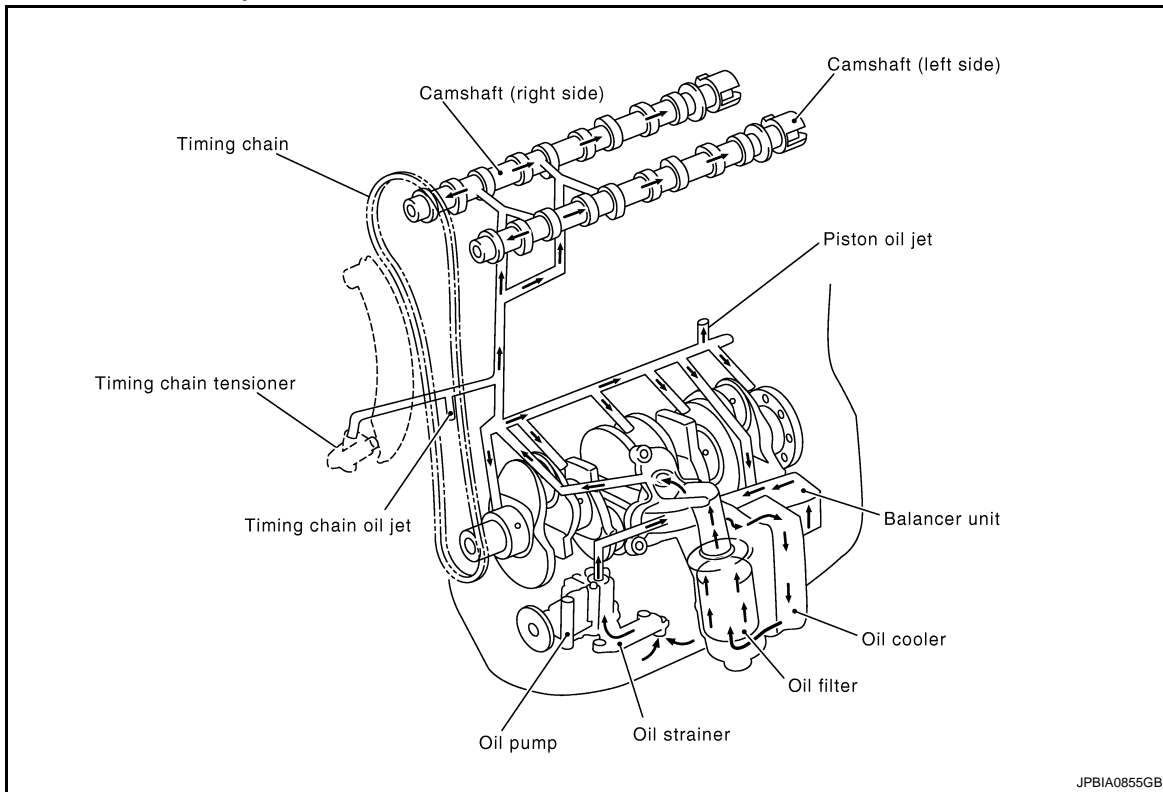
Regulator valve to oil pump cover clearance	0.040 - 0.097 (0.0016 - 0.0038)
---	---------------------------------

FUNCTION DIAGNOSIS

DESCRIPTION

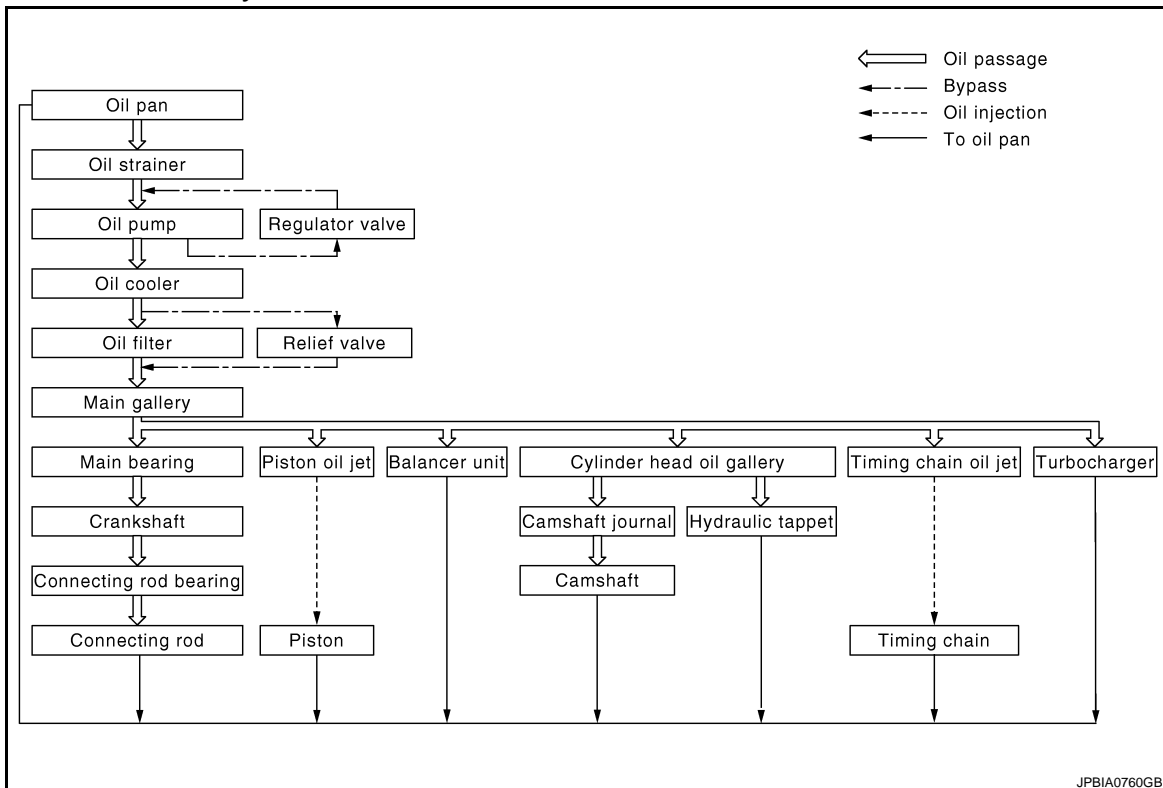
Engine Lubrication System

INFOID:000000001308939



Engine Lubrication System Schematic

INFOID:000000001308940



PREPARATION

< PREPARATION >

[M9R]

PREPARATION

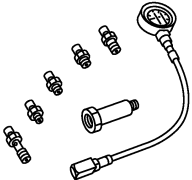
PREPARATION

Special Service Tools

INFOID:000000001160937

A

LU

NISSAN tool number (RENAULT tool number) Tool name	Description	C
KV113E0020 (Mot.836-05) Oil pressure gauge set  JPBIA0949ZZ	Measuring oil pressure	D E F G H I J K L M N O P

ON-VEHICLE MAINTENANCE

ENGINE OIL

Inspection

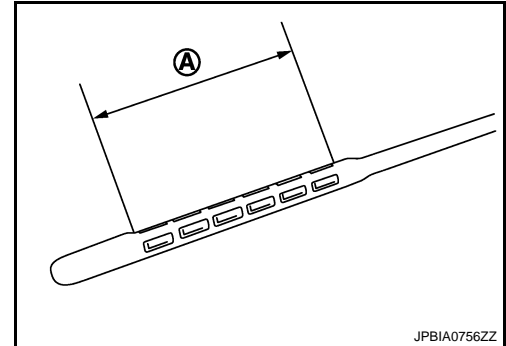
INFOID:000000001308942

ENGINE OIL LEVEL

NOTE:

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

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



ENGINE OIL APPEARANCE

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

ENGINE OIL LEAKAGE

Check for engine oil leakage around the following area.

- Oil pan (upper and lower)
- Oil pan drain plug
- Oil pressure switch
- Oil level sensor
- Oil filter body
- Oil cooler
- Fuel pump
- Vacuum pump
- Turbocharger
- Crankshaft position sensor
- Camshaft position sensor
- Front cover
- Mating surface between cylinder head and cylinder head housing
- Mating surface between cylinder block and cylinder head
- Mating surface between cylinder head housing and oil separator
- Front oil seal
- Rear oil seal retainer

OIL PRESSURE CHECK

WARNING:

- Be careful not to get burned, as engine oil may be hot.
- When checking engine oil pressure, shift position should be “Parking” (A/T models) or “Neutral” (M/T models), and apply parking brake securely.

1. Check engine oil level. Refer to [LU-28, "Inspection"](#).
2. Disconnect harness connector at oil pressure switch, and remove oil pressure switch using a deep socket.

CAUTION:

Handle oil pressure switch carefully and avoid impacts.

3. Install oil pressure gauge set [SST:KV113E0020 (Mot.836-05)].
4. Start engine and warm it up to normal operating temperature.

ENGINE OIL

< ON-VEHICLE MAINTENANCE >

[M9R]

5. Check oil pressure with engine running under no-load.

NOTE:

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

Engine oil pressure : Refer to [LU-33, "Periodical Maintenance Specification"](#).

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

6. After the inspections, install oil pressure switch with the following procedure:

- a. Tighten oil pressure switch to specification.

Tightening torque : Refer to [LU-31, "Exploded View"](#).

- b. Check engine oil level. Refer to [LU-28, "Inspection"](#).
- c. After warming up engine, check that there is no leakage of engine oil with running engine.

Draining

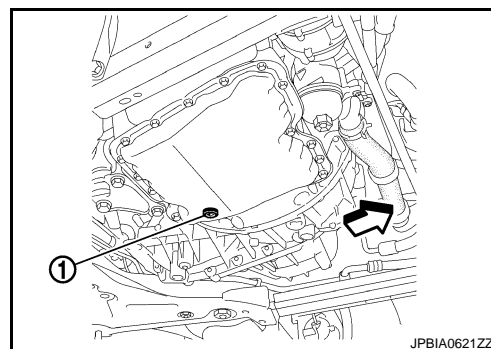
INFOID:000000001308943

WARNING:

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

1. Warm up the engine, and check for engine oil leakage from engine components. Refer to [LU-28, "Inspection"](#).
2. Stop the engine and wait for 10 minutes.
3. Remove engine undercover.
4. Loosen oil level gauge.
5. Remove oil pan drain plug (1) using a square driver [8 mm (0.315 in)]. Drain engine oil.

← : Vehicle front



Refilling

INFOID:000000001308944

1. Install drain plug with new washer.

CAUTION:

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

Tightening torque : Refer to [EM-280, "Exploded View"](#).

2. Refill with new engine oil.
Engine oil specification and viscosity: Refer to [MA-22, "Fluids and Lubricants"](#).

Engine oil capacity : Refer to [LU-33, "Periodical Maintenance Specification"](#).

CAUTION:

- The refill capacity depends on the engine oil temperature and drain time. Use these specifications for reference only.
- Always use oil level gauge to determine the proper amount of engine oil in the engine.

3. Warm up engine and check area around drain plug and oil filter body for engine oil leakage.
4. Stop engine and wait for 10 minutes.
5. Check the engine oil level. Refer to [LU-28, "Inspection"](#).

OIL FILTER

Removal and Installation

INFOID:000000001308945

REMOVAL

WARNING:

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

CAUTION:

- When removing, prepare a shop cloth to absorb any engine oil leakage or spillage.
- Completely wipe off any engine oil that adheres to engine and vehicle.

1. Remove engine undercover.
2. Loosen oil filter body assembly using a socket [27 mm (1.06 in)].
3. Remove oil filter body, and then remove oil filter and O-ring.

CAUTION:

Completely wipe clean any engine oil remaining on oil filter body or vehicle.

INSTALLATION

1. Completely remove all foreign objects adhering to the inside of oil filter body or O-ring mounting area.
2. Install oil filter and O-ring to oil filter body.
3. Install oil filter body assembly to oil cooler.

Tightening torque: Refer to [LU-31, "Exploded View"](#).

Inspection

INFOID:000000001308946

INSPECTION AFTER INSTALLATION

1. Check that the engine oil level. Refer to [LU-28, "Inspection"](#).
2. Start the engine, and check that there is no leak of engine oil.
3. Stop the engine and wait for 10 minutes.
4. Check that the engine oil level, and adjust the level. Refer to [LU-28, "Inspection"](#).

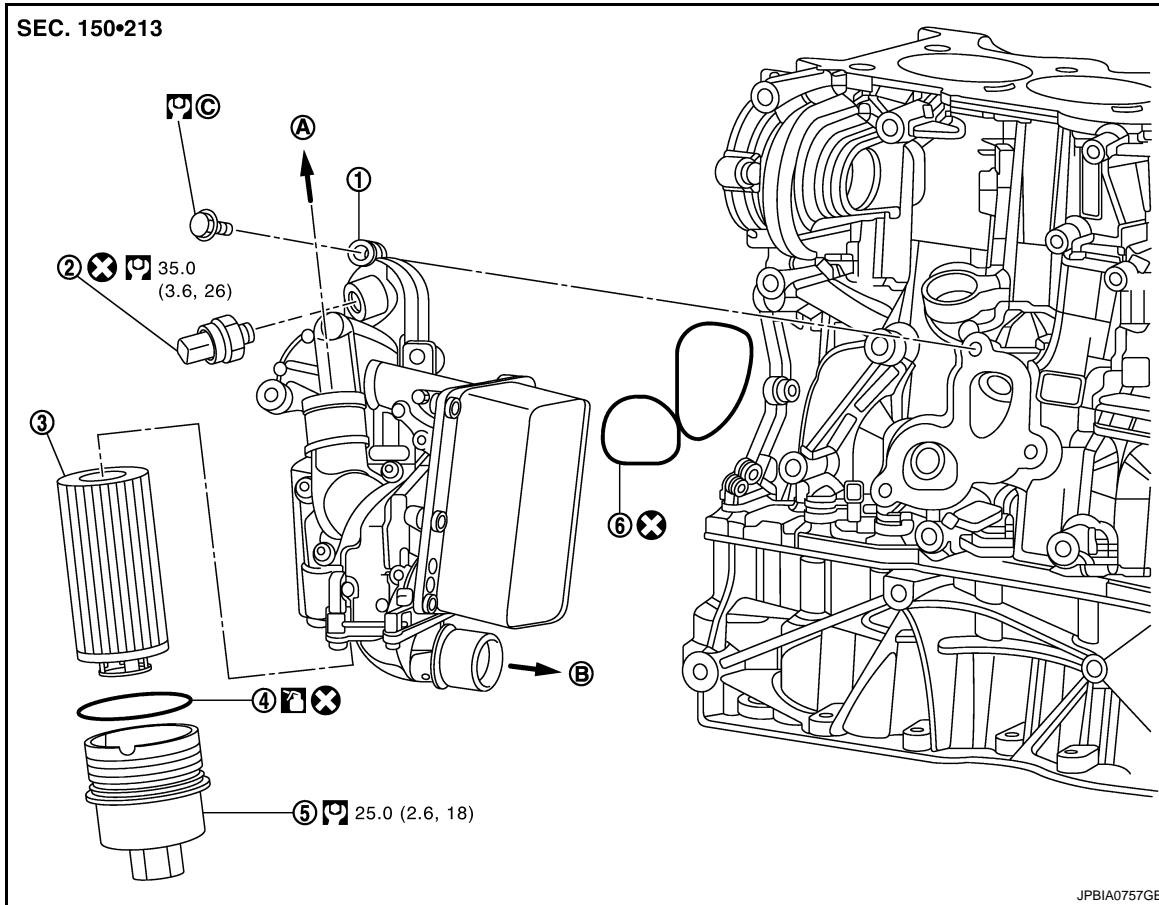
ON-VEHICLE REPAIR

OIL COOLER

Exploded View

INFOID:000000001308947

LU



- | | | |
|--------------------------|------------------------|-----------------------------------|
| 1. Oil cooler | 2. Oil pressure switch | 3. Oil filter |
| 4. O-ring | 5. Oil filter body | 6. Gasket |
| A. To water suction pipe | B. To radiator | C. Refer to LU-31 |

Refer to [GI-4, "Components"](#) for symbols in the figure.

Removal and Installation

INFOID:000000001308948

REMOVAL

WARNING:

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

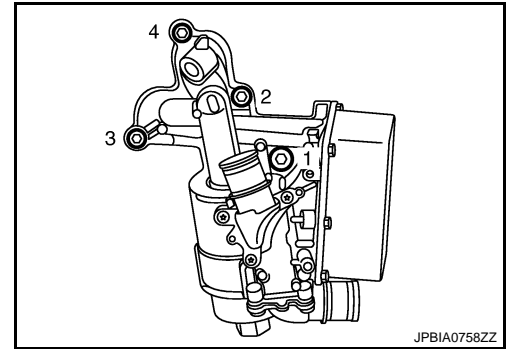
1. Drain engine coolant from radiator. Refer to [CO-68, "Draining"](#).
CAUTION:
Perform this step when the engine is cold.
2. Disconnect water hose and radiator hose (lower). Refer to [CO-73, "Exploded View"](#) and [CO-81, "Exploded View"](#).
CAUTION:
Never adhere the engine coolant to electronic equipments. (alternator etc.)
3. Remove oil pressure switch, if necessary.
CAUTION:
Handle oil pressure switch carefully and avoid impacts.
4. Remove oil cooler.

OIL COOLER

< ON-VEHICLE REPAIR >

[M9R]

- Loosen mounting bolts in reverse order as shown in the figure.



INSTALLATION

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

Oil Cooler

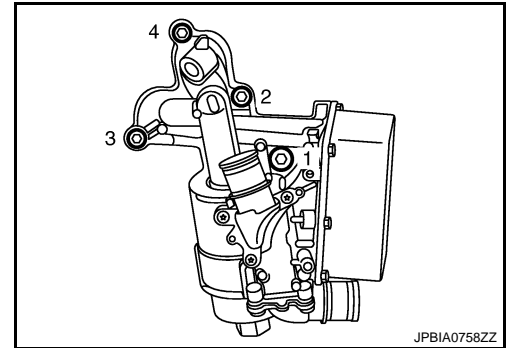
- Tighten mounting bolts in the following steps in numerical order as shown in the figure.

1. Tighten mounting bolts No.2 and 4.

: **5.0 N·m (0.51 kg·m, 4 ft·lb)**

2. Tighten all mounting bolts.

: **25.0 N·m (2.6 kg·m, 18 ft·lb)**



Inspection

INFOID:000000001308949

INSPECTION AFTER REMOVAL

Oil Cooler

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

INSPECTION AFTER INSTALLATION

1. Check that the engine oil level and the engine coolant level and add engine oil and engine coolant. Refer to [LU-28. "Inspection"](#) and [CO-68. "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 that the engine oil level and the engine coolant level again. Refer to [LU-28. "Inspection"](#) and [CO-68. "Inspection"](#).

SERVICE DATA AND SPECIFICATIONS (SDS)

< SERVICE DATA AND SPECIFICATIONS (SDS)

[M9R]

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Periodical Maintenance Specification

INFOID:0000000001308950

LU

ENGINE OIL CAPACITY (APPROXIMATE)

Unit: ℓ (Imp qt)

Drain and refill	With oil filter change	7.4 (6-1/2)
	Without oil filter change	7.0 (6-1/8)
Dry engine (Overhaul)		8.4 (7-3/8)

Engine Oil Pressure

INFOID:0000000001308951

Unit: kPa (bar, kg/cm², psi)

Engine speed	Approximate discharge pressure*
Idle speed	More than 88 (0.9, 0.9, 13)
3,000 rpm	More than 402 (4, 4.1, 58)

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

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