SECTION LU

ENGINE LUBRICATION SYSTEM

CONTENTS

R9M

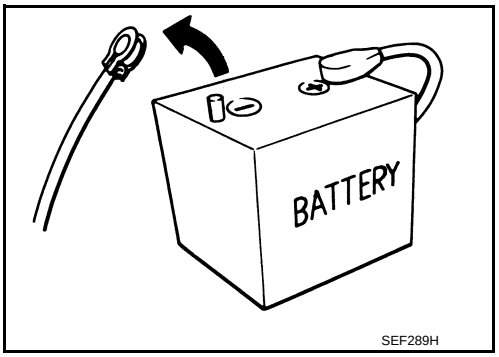
PRECAUTION

PRECAUTIONS

Precautions for Removing Battery Terminal

INFOID:0000000010783413

- With the adoption of Auto ACC function, ACC power is automatically supplied by operating the intelligent key or remote keyless entry or by opening/closing the driver side door. In addition, ACC power is supplied even after the ignition switch is turned to the OFF position, i.e. ACC power is supplied for a certain fixed time.
- When disconnecting the 12V battery terminal, turn off the ACC power before disconnecting the 12V battery terminal, observing “How to disconnect 12V battery terminal” described below.
  NOTE:
  Some ECUs operate for a certain fixed time even after ignition switch is turned OFF and ignition power supply is stopped. If the battery terminal is disconnected before ECU stops, accidental DTC detection or ECU data damage may occur.
- For vehicles with the 2-batteries, be sure to connect the main battery and the sub battery before turning ON the ignition switch.
  NOTE:
  If the ignition switch is turned ON with any one of the terminals of main battery and sub battery disconnected, then DTC may be detected.
- After installing the 12V battery, always check "Self Diagnosis Result" of all ECUs and erase DTC.
  NOTE:
  The removal of 12V battery may cause a DTC detection error.



HOW TO DISCONNECT 12V BATTERY TERMINAL

Disconnect 12V battery terminal according to Instruction 1 or Instruction 2 described below.
For vehicles parked by ignition switch OFF, refer to Instruction 2.

INSTRUCTION 1

1. Open the hood.
2. Turn key switch to the OFF position with the driver side door opened.
3. Get out of the vehicle and close the driver side door.
4. Wait at least 3 minutes. For vehicle with the engine listed below, remove the battery terminal after a lapse of the specified time.

D4D engine	: 20 minutes
HRA2DDT	: 12 minutes
K9K engine	: 4 minutes
M9R engine	: 4 minutes
R9M engine	: 4 minutes
V9X engine	: 4 minutes

CAUTION:
While waiting, never operate the vehicle such as locking, opening, and closing doors. Violation of this caution results in the activation of ACC power supply according to the Auto ACC function.

5. Remove 12V battery terminal.
   CAUTION:
   After installing 12V battery, always check self-diagnosis results of all ECUs and erase DTC.

INSTRUCTION 2 (FOR VEHICLES PARKED BY IGNITION SWITCH OFF)

1. Unlock the door with intelligent key or remote keyless entry.
   NOTE:
   At this moment, ACC power is supplied.
2. Open the driver side door.
3. Open the hood.
4. Close the driver side door.
5. Wait at least 3 minutes.

CAUTION:
While waiting, never operate the vehicle such as locking, opening, and closing doors. Violation of this caution results in the activation of ACC power supply according to the Auto ACC function.

6. Remove 12V battery terminal.
CAUTION:
After installing 12V battery, always check self-diagnosis results of all ECUs and erase DTC.

Precautions For Engine Service

INFOID:0000000010783283

DISCONNECTING FUEL PIPING

- Before starting work, check no fire or spark producing items are in the work area.
- Release fuel pressure before disconnecting and disassembly.
- After disconnecting pipes, plug openings to stop fuel leakage.

DRAINING ENGINE COOLANT

Drain engine coolant and engine oil when the engine is cooled.

INSPECTION, REPAIR AND REPLACEMENT

Before repairing or replacing, thoroughly inspect parts. Inspect new replacement parts in the same way, and replace if necessary.

REMOVAL AND DISASSEMBLY

- When instructed to use SST, use specified tools. Always be careful to work safely, avoid forceful or unin-structed operations.
- Exercise maximum care to avoid damage to mating or sliding surfaces.
- Dowel pins are used for several parts alignment. When replacing and reassembling parts with dowel pins, check that dowel pins are installed in the original position.
- Must cover openings of engine system with a tape or equivalent, to seal out foreign materials.
- Mark and arrange disassembly parts in an organized way for easy troubleshooting and reassembly.
- When loosening nuts and bolts, as a basic rule, start with the one furthest outside, then the one diagonally opposite, and so on. If the order of loosening is specified, do exactly as specified. Power tools may be used in the step.

ASSEMBLY AND INSTALLATION

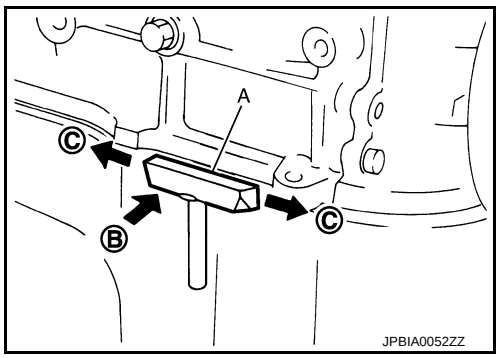
- Use torque wrench to tighten bolts or nuts to specification.
- When tightening nuts and bolts, as a basic rule, equally tighten in several different steps starting with the ones in center, then ones on inside and outside diagonally in this order. If the order of tightening is specified, do exactly as specified.
- Replace with new gasket, packing, oil seal or O-ring.
- Thoroughly wash, clean, and air-blow each part. Carefully check engine oil or engine coolant passages for any restriction and blockage.
- Avoid damaging sliding or mating surfaces. Completely remove foreign materials such as cloth lint or dust. Before assembly, oil sliding surfaces well.
- After disassembling, or exposing any internal engine parts, change engine oil and replace oil filter with a new one.
- Release air within route when refilling after draining engine coolant.
- After repairing, start the engine and increase engine speed to check engine coolant, fuel, engine oil, and exhaust gases for leakage.

Liquid Gasket

INFOID:0000000010783284

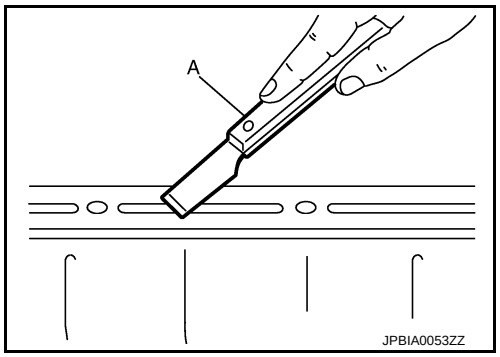
REMOVAL OF LIQUID GASKET SEALING

- After removing mounting nuts and bolts, separate the mating surface using the seal cutter [SST: KV10111100] (A) and remove old liquid gasket sealing.
  CAUTION:
  Never damage the mating surfaces.
- Tap the seal cutter [SST: KV10111100] to insert it Ⓑ, and then slide it Ⓒ by tapping on the side as shown in the figure.
- In areas where the seal cutter [SST: KV10111100] is difficult to use, lightly tap the parts using a plastic hammer to remove it.
  CAUTION:
  If for some unavoidable reason tool such as a screwdriver is used, be careful not to damage the mating surfaces.

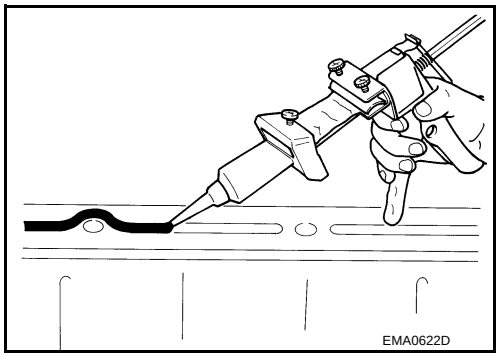


LIQUID GASKET APPLICATION PROCEDURE

1. Using a scraper (A), remove old liquid gasket adhering to the liquid gasket application surface and the mating surface.
   - Remove liquid gasket completely from the groove of 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.



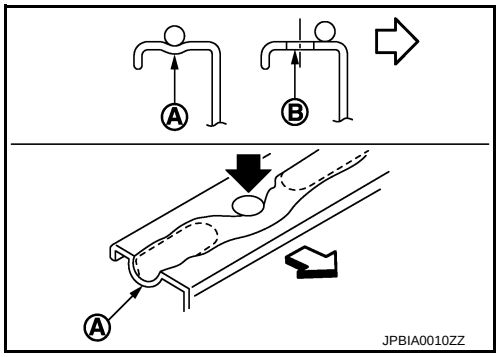
3. Attach liquid gasket tube to the tube presser (commercial service tool).
   Use Genuine Liquid Gasket or equivalent.
4. Apply liquid gasket without gaps to the specified location according to the specified dimensions.
   - If there is a groove for liquid gasket application, apply liquid gasket to the groove.



- As for bolt holes Ⓑ, normally apply liquid gasket inside the holes. Occasionally, it should be applied outside the holes. Check to read the text of this manual.

  Ⓐ : Groove

  ⇦ : Inside



- 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.

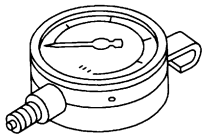
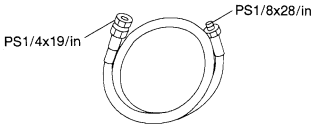
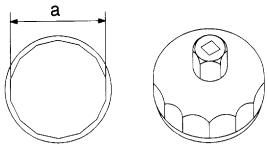
CAUTION:
If there are specific instructions in this manual, observe them.

PREPARATION

PREPARATION

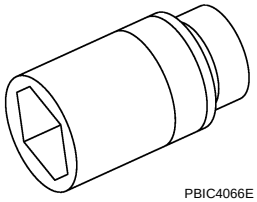
Special Service Tools

INFOID:0000000010783285

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)**

Commercial Service Tools

INFOID:0000000010783286

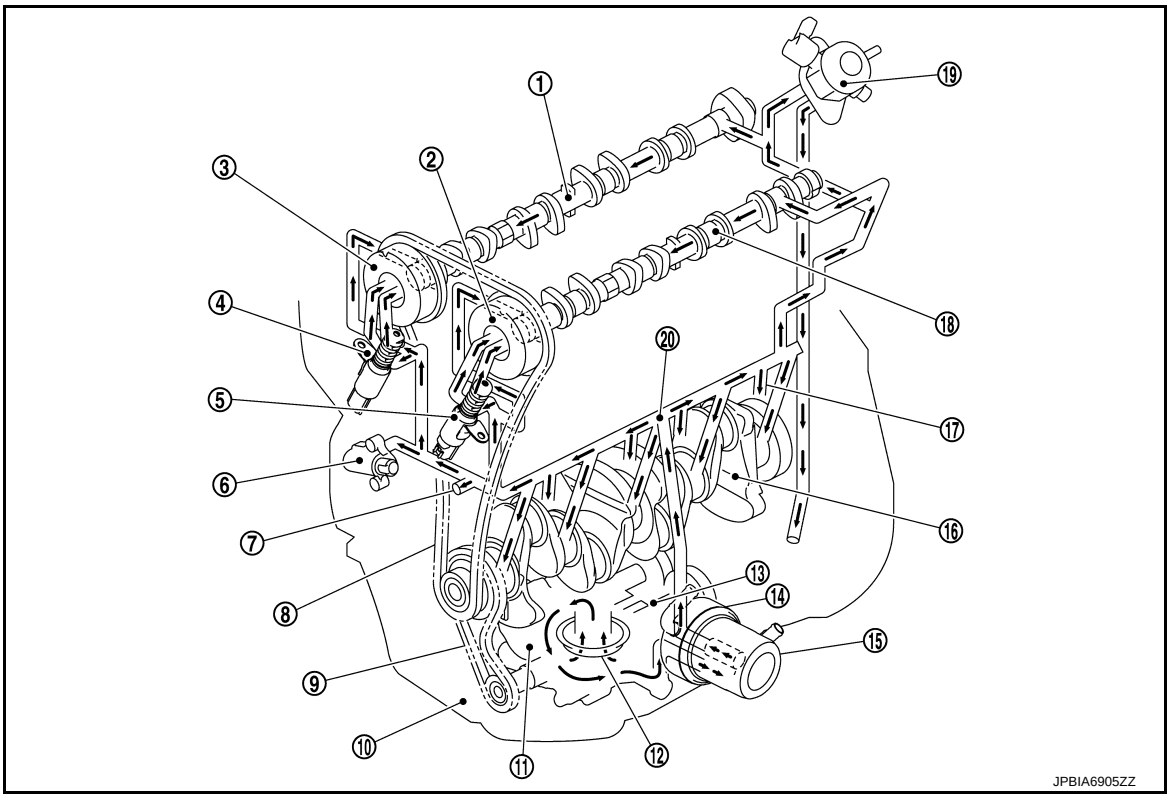
Tool name	Description
Deep socket  PBIC4066E	Removing and installing oil pressure switch **27 mm (1.06 in)**

SYSTEM DESCRIPTION

DESCRIPTION

Engine Lubrication System

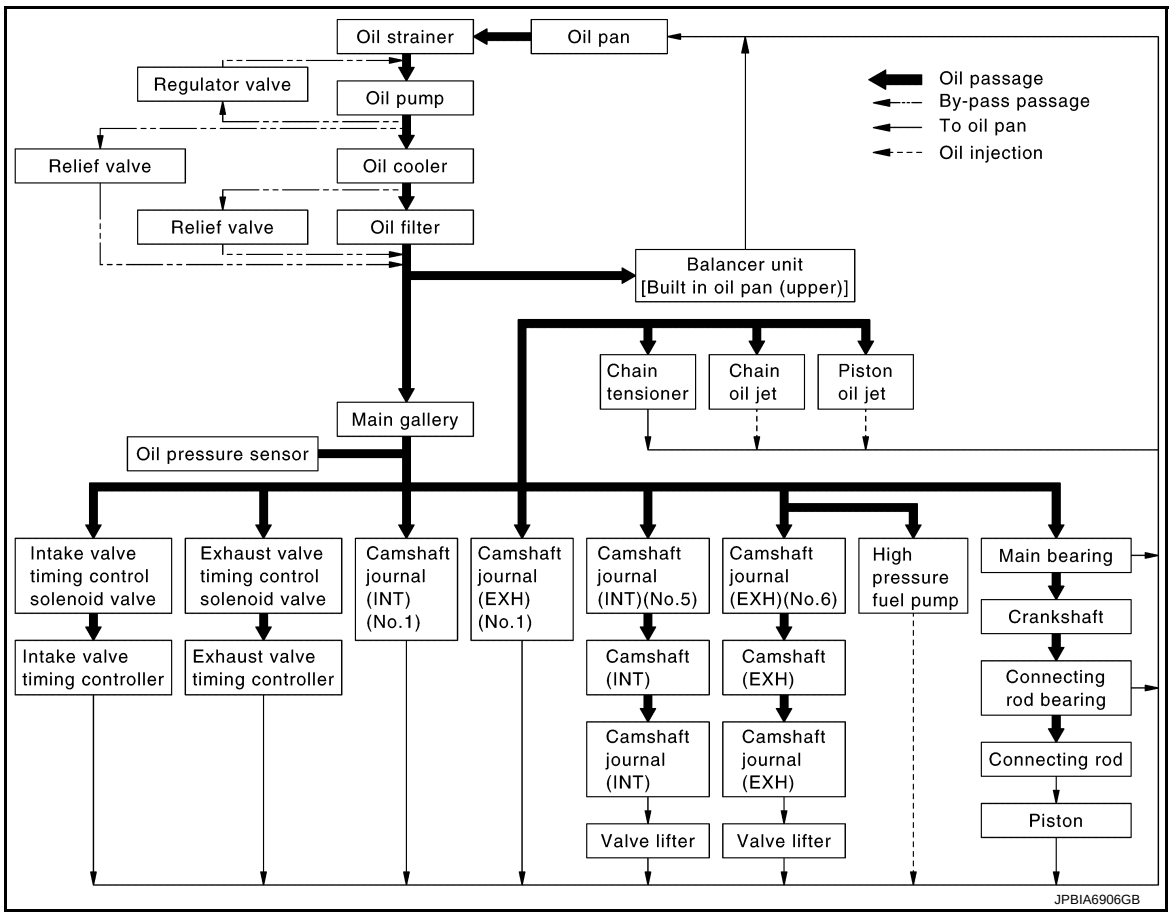
INFOID:0000000010783287



① Camshaft (EXH)	② Intake valve timing controller	③ Exhaust valve timing controller
④ Exhaust valve timing control solenoid valve	⑤ Intake valve timing control solenoid valve	⑥ Timing chain tensioner
⑦ Timing chain oil jet	⑧ Timing chain	⑨ Oil pump drive chain
⑩ Oil pan	⑪ Oil pump	⑫ Oil strainer
⑬ Balancer unit	⑭ Oil cooler	⑮ Oil filter
⑯ Crankshaft	⑰ Piston oil jet	⑱ Camshaft (INT)
⑲ High pressure fuel pump	⑳ Main gallery	

Engine Lubrication System Schematic

INFOID:0000000010783288



PERIODIC MAINTENANCE

ENGINE OIL

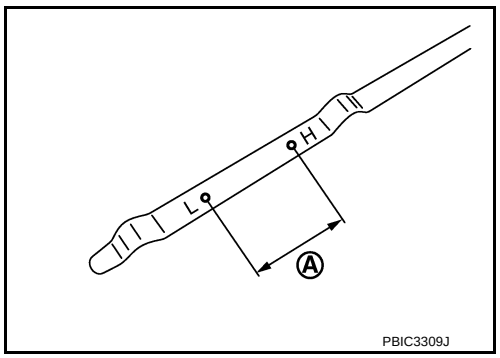
Inspection

INFOID:0000000010783289

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 Ⓐ shown in the figure.
3. If it is out of range, adjust it.



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 sensor
- Oil filter
- Oil cooler
- Intake valve timing control solenoid valve
- Exhaust valve timing control solenoid valve
- Front cover
- VTC cover
- Mating surface between cylinder block and cylinder head
- Mating surface between cylinder head and camshaft bracket
- Mating surface between camshaft bracket and rocker cover
- Mating surface between camshaft bracket and high pressure fuel pump
- Crankshaft oil seals (front and rear)

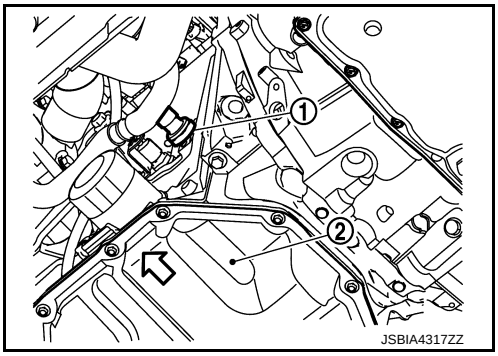
OIL PRESSURE CHECK

WARNING:

- **Be careful not to get burned, as engine oil may be hot.**
- **When checking engine oil pressure, shift position should be “Parking position”, and apply parking brake securely.**

1. Check engine oil level.

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

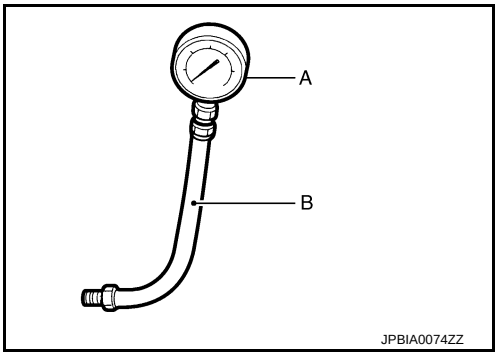


② : Oil pan (lower)

⇦ : 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-17, "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 LU-13, "Exploded View".

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

Draining

INFOID:0000000010783290

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-9, "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

INFOID:0000000010783291

1. Install drain plug with new drain plug washer. Refer to EM-40, "Exploded View".

CAUTION:
- **Do not reuse drain plug washer.**
- **Be sure to clean drain plug and install with new drain plug washer.**

2. Refill with new engine oil.
Engine oil specification and viscosity: Refer to MA-23, "Fluids and Lubricants".

Engine oil capacity : Refer to LU-17, "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-9, "Inspection".

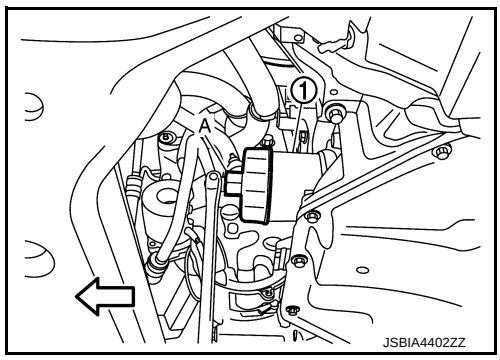
OIL FILTER

Removal and Installation

INFOID:0000000010783292

REMOVAL

- Using oil filter wrench [SST: KV10115801](A), remove oil filter ①.



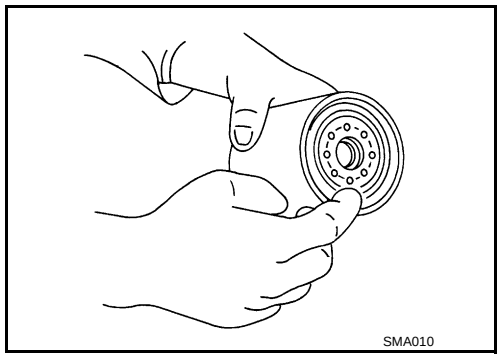
⇦ : Engine front

CAUTION:

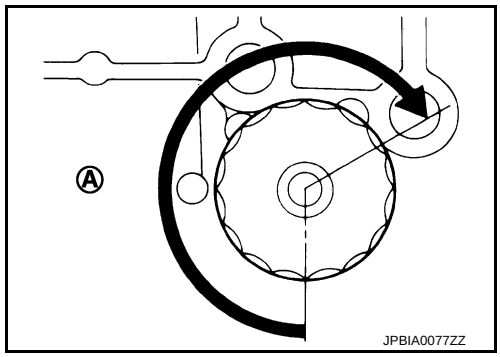
- **Oil filter is provided with relief valve. Use Genuine NISSAN Oil Filter or equivalent.**
- **Be careful not to get burned when engine and engine oil may be hot.**
- **When removing, prepare a shop cloth to absorb any engine oil leakage or spillage.**
- **Completely wipe off any engine oil that adheres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

INSTALLATION

1. Remove foreign materials adhering to the 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 Ⓐ. Or tighten to specification.



Oil filter:

: 17.7 N·m (1.8 kg-m, 13 ft-lb)

Inspection

INFOID:0000000010783293

INSPECTION AFTER INSTALLATION

1. Check the engine oil level. Refer to LU-9, "Inspection".
2. Start the engine, and check 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".

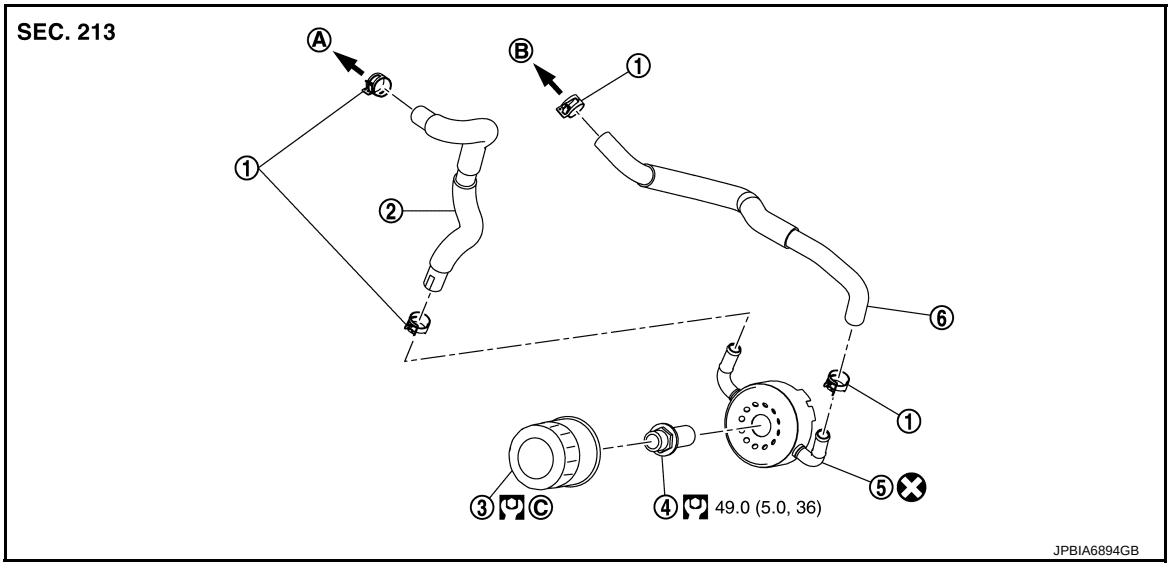
REMOVAL AND INSTALLATION

OIL COOLER

Exploded View

INFOID:0000000010783294

M/T models

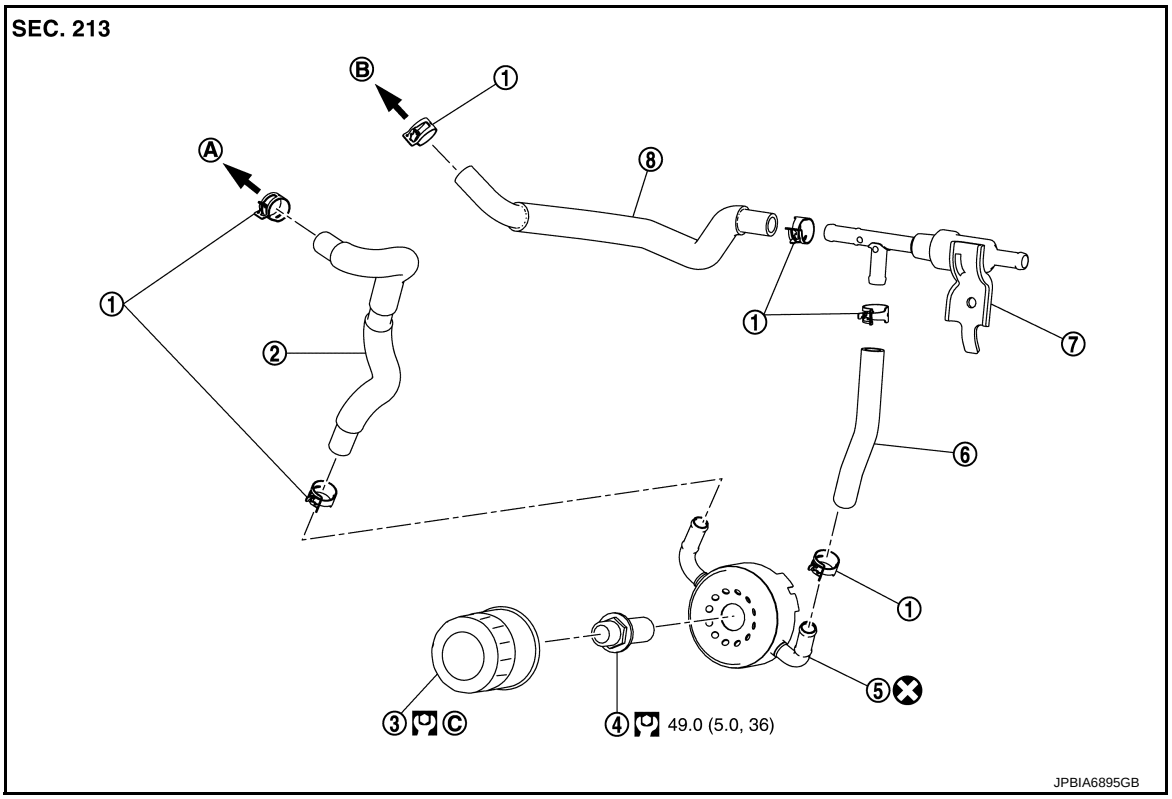


① Clamp	② Water hose	③ Oil filter
④ Connector bolt	⑤ Oil cooler	⑥ Water hose
Ⓐ To thermostat housing	Ⓑ To thermostat housing	Ⓒ Comply with the assembly procedure when tightening. Refer to LU-12

: Always replace after every disassembly.

: N·m (kg-m, ft-lb)

CVT models



①	Clamp	②	Water hose	③	Oil filter
④	Connector bolt	⑤	Oil cooler	⑥	Water hose
⑦	Heater thermostat	⑧	Water hose		
Ⓐ	To thermostat housing	Ⓑ	To thermostat housing	Ⓒ	Comply with the assembly procedure when tightening. Refer to LU-12

: Always replace after every disassembly.

: N·m (kg-m, ft-lb)

Removal and Installation

INFOID:0000000010783295

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-13, "Draining" and EM-61, "Setting".
   NOTE:
   Perform this step when removing water hoses.
2. Using oil filter wrench [SST: KV10115801], remove oil filter. Refer to LU-12, "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.

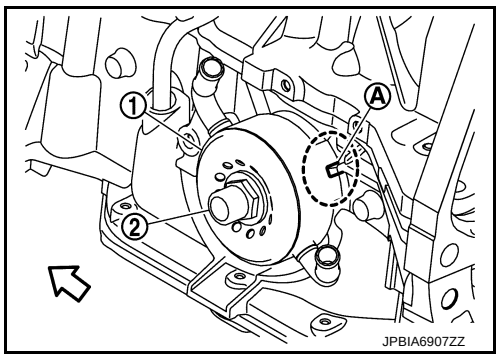
   CAUTION:
   Perform this step when the engine is cold.
4. Remove connector bolt, and remove oil cooler.

INSTALLATION

Installation is the reverse order of removal.

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

⇦ : Engine front



Inspection

INFOID:0000000010783296

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-9, "Inspection" and CO-13, "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-13, "Inspection".

UNIT DISASSEMBLY AND ASSEMBLY

OIL PUMP

Exploded View

INFOID:0000000010783297

Oil pump is integrated in the oil pan (upper). Refer to EM-102, "Exploded View".

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Periodical Maintenance Specification

INFOID:0000000010783298

ENGINE OIL CAPACITY (APPROXIMATE)

Unit: ℓ (lmp qt)

Drain and refill	With oil filter change	3.8 (3-3/8)
	Without oil filter change	3.6 (3-1/8)
Dry engine (Overhaul)		4.4 (3-7/8)

Engine Oil Pressure

INFOID:0000000010783299

Unit: kPa (bar, kg/cm^2, psi)

Engine speed	Approximate discharge pressure*
Idle speed	More than 85 (0.85, 0.867, 12.3)
2,000 rpm	More than 200 (2.0, 2.04, 29)

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

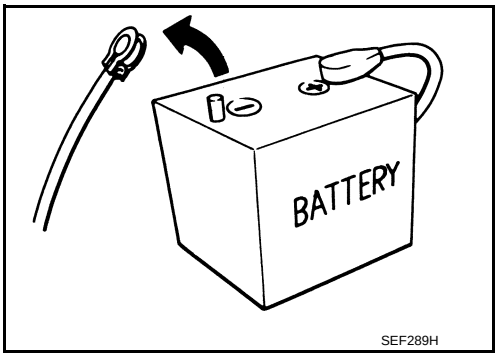
PRECAUTION

PRECAUTIONS

Precautions for Removing Battery Terminal

INFOID:0000000010783414

- With the adoption of Auto ACC function, ACC power is automatically supplied by operating the intelligent key or remote keyless entry or by opening/closing the driver side door. In addition, ACC power is supplied even after the ignition switch is turned to the OFF position, i.e. ACC power is supplied for a certain fixed time.
- When disconnecting the 12V battery terminal, turn off the ACC power before disconnecting the 12V battery terminal, observing “How to disconnect 12V battery terminal” described below.
  NOTE:
  Some ECUs operate for a certain fixed time even after ignition switch is turned OFF and ignition power supply is stopped. If the battery terminal is disconnected before ECU stops, accidental DTC detection or ECU data damage may occur.
- For vehicles with the 2-batteries, be sure to connect the main battery and the sub battery before turning ON the ignition switch.
  NOTE:
  If the ignition switch is turned ON with any one of the terminals of main battery and sub battery disconnected, then DTC may be detected.
- After installing the 12V battery, always check "Self Diagnosis Result" of all ECUs and erase DTC.
  NOTE:
  The removal of 12V battery may cause a DTC detection error.



HOW TO DISCONNECT 12V BATTERY TERMINAL

Disconnect 12V battery terminal according to Instruction 1 or Instruction 2 described below.
For vehicles parked by ignition switch OFF, refer to Instruction 2.

INSTRUCTION 1

1. Open the hood.
2. Turn key switch to the OFF position with the driver side door opened.
3. Get out of the vehicle and close the driver side door.
4. Wait at least 3 minutes. For vehicle with the engine listed below, remove the battery terminal after a lapse of the specified time.

D4D engine	: 20 minutes
HRA2DDT	: 12 minutes
K9K engine	: 4 minutes
M9R engine	: 4 minutes
R9M engine	: 4 minutes
V9X engine	: 4 minutes

CAUTION:
While waiting, never operate the vehicle such as locking, opening, and closing doors. Violation of this caution results in the activation of ACC power supply according to the Auto ACC function.

5. Remove 12V battery terminal.
   CAUTION:
   After installing 12V battery, always check self-diagnosis results of all ECUs and erase DTC.

INSTRUCTION 2 (FOR VEHICLES PARKED BY IGNITION SWITCH OFF)

1. Unlock the door with intelligent key or remote keyless entry.
   NOTE:
   At this moment, ACC power is supplied.
2. Open the driver side door.
3. Open the hood.
4. Close the driver side door.
5. Wait at least 3 minutes.

CAUTION:
While waiting, never operate the vehicle such as locking, opening, and closing doors. Violation of this caution results in the activation of ACC power supply according to the Auto ACC function.

6. Remove 12V battery terminal.

CAUTION:
After installing 12V battery, always check self-diagnosis results of all ECUs and erase DTC.

Precautions For Engine Service

INFOID:0000000010783301

DISCONNECTING FUEL PIPING

- Before starting work, check no fire or spark producing items are in the work area.
- Release fuel pressure before disconnecting and disassembly.
- After disconnecting pipes, plug openings to stop fuel leakage.

DRAINING ENGINE COOLANT

Drain engine coolant and engine oil when the engine is cooled.

INSPECTION, REPAIR AND REPLACEMENT

Before repairing or replacing, thoroughly inspect parts. Inspect new replacement parts in the same way, and replace if necessary.

REMOVAL AND DISASSEMBLY

- When instructed to use SST, use specified tools. Always be careful to work safely, avoid forceful or unin-structed operations.
- Exercise maximum care to avoid damage to mating or sliding surfaces.
- Dowel pins are used for several parts alignment. When replacing and reassembling parts with dowel pins, check that dowel pins are installed in the original position.
- Must cover openings of engine system with a tape or equivalent, to seal out foreign materials.
- Mark and arrange disassembly parts in an organized way for easy troubleshooting and reassembly.
- When loosening nuts and bolts, as a basic rule, start with the one furthest outside, then the one diagonally opposite, and so on. If the order of loosening is specified, do exactly as specified. Power tools may be used in the step.

ASSEMBLY AND INSTALLATION

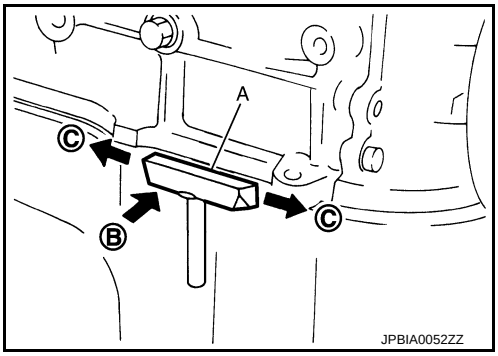
- Use torque wrench to tighten bolts or nuts to specification.
- When tightening nuts and bolts, as a basic rule, equally tighten in several different steps starting with the ones in center, then ones on inside and outside diagonally in this order. If the order of tightening is specified, do exactly as specified.
- Replace with new gasket, packing, oil seal or O-ring.
- Thoroughly wash, clean, and air-blow each part. Carefully check engine oil or engine coolant passages for any restriction and blockage.
- Avoid damaging sliding or mating surfaces. Completely remove foreign materials such as cloth lint or dust. Before assembly, oil sliding surfaces well.
- After disassembling, or exposing any internal engine parts, change engine oil and replace oil filter with a new one.
- Release air within route when refilling after draining engine coolant.
- After repairing, start the engine and increase engine speed to check engine coolant, fuel, engine oil, and exhaust gases for leakage.

Liquid Gasket

INFOID:0000000010783302

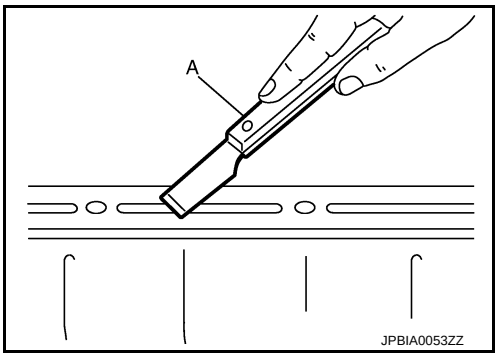
REMOVAL OF LIQUID GASKET SEALING

- After removing mounting nuts and bolts, separate the mating surface using the seal cutter [SST: KV10111100] (A) and remove old liquid gasket sealing.
  CAUTION:
  Never damage the mating surfaces.
- Tap the seal cutter [SST: KV10111100] to insert it Ⓑ, and then slide it Ⓒ by tapping on the side as shown in the figure.
- In areas where the seal cutter [SST: KV10111100] is difficult to use, lightly tap the parts using a plastic hammer to remove it.
  CAUTION:
  If for some unavoidable reason tool such as a screwdriver is used, be careful not to damage the mating surfaces.

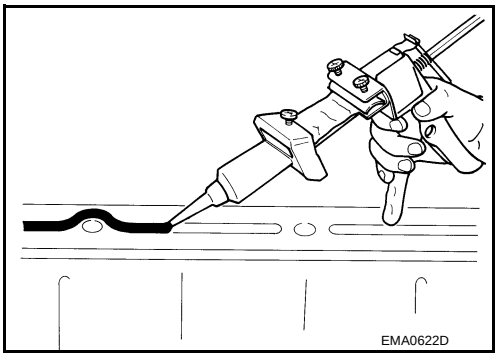


LIQUID GASKET APPLICATION PROCEDURE

1. Using a scraper (A), remove old liquid gasket adhering to the liquid gasket application surface and the mating surface.
   - Remove liquid gasket completely from the groove of 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.



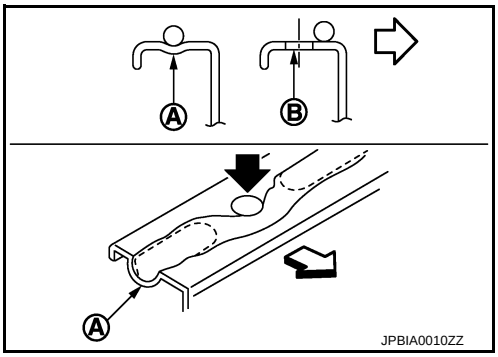
3. Attach liquid gasket tube to the tube presser (commercial service tool).
   Use Genuine Liquid Gasket or equivalent.
4. Apply liquid gasket without gaps to the specified location according to the specified dimensions.
   - If there is a groove for liquid gasket application, apply liquid gasket to the groove.



- As for bolt holes Ⓑ, normally apply liquid gasket inside the holes. Occasionally, it should be applied outside the holes. Check to read the text of this manual.

  Ⓐ : Groove

  ⇦ : Inside



- 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.

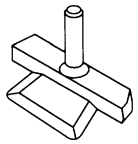
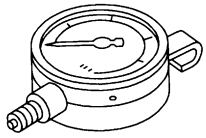
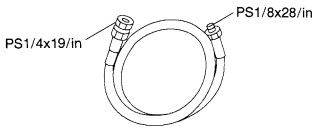
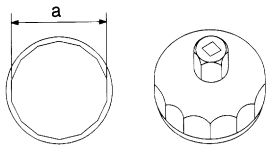
CAUTION:
If there are specific instructions in this manual, observe them.

PREPARATION

PREPARATION

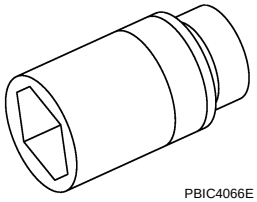
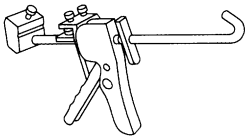
Special Service Tools

INFOID:0000000010783303

Tool number Tool name	Description
KV10111100 Seat cutter  NT046	Removing oil pan (lower) etc.
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)**

Commercial Service Tools

INFOID:0000000010783304

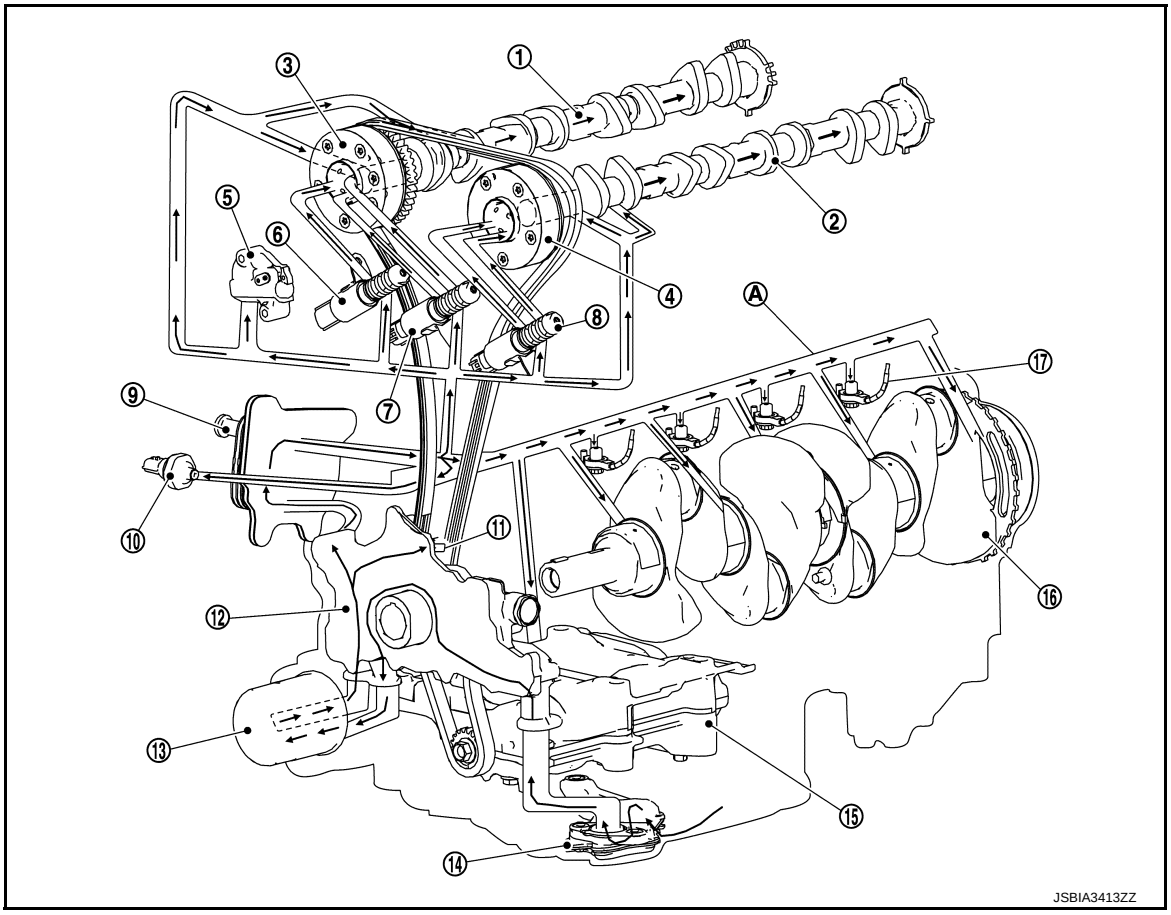
Tool name	Description
Deep socket  PBIC4066E	Removing and installing oil pressure sensor **27 mm (1.06 in)**
Tube presser  NT052	Pressing the tube of liquid gasket

SYSTEM DESCRIPTION

DESCRIPTION

Engine Lubrication System

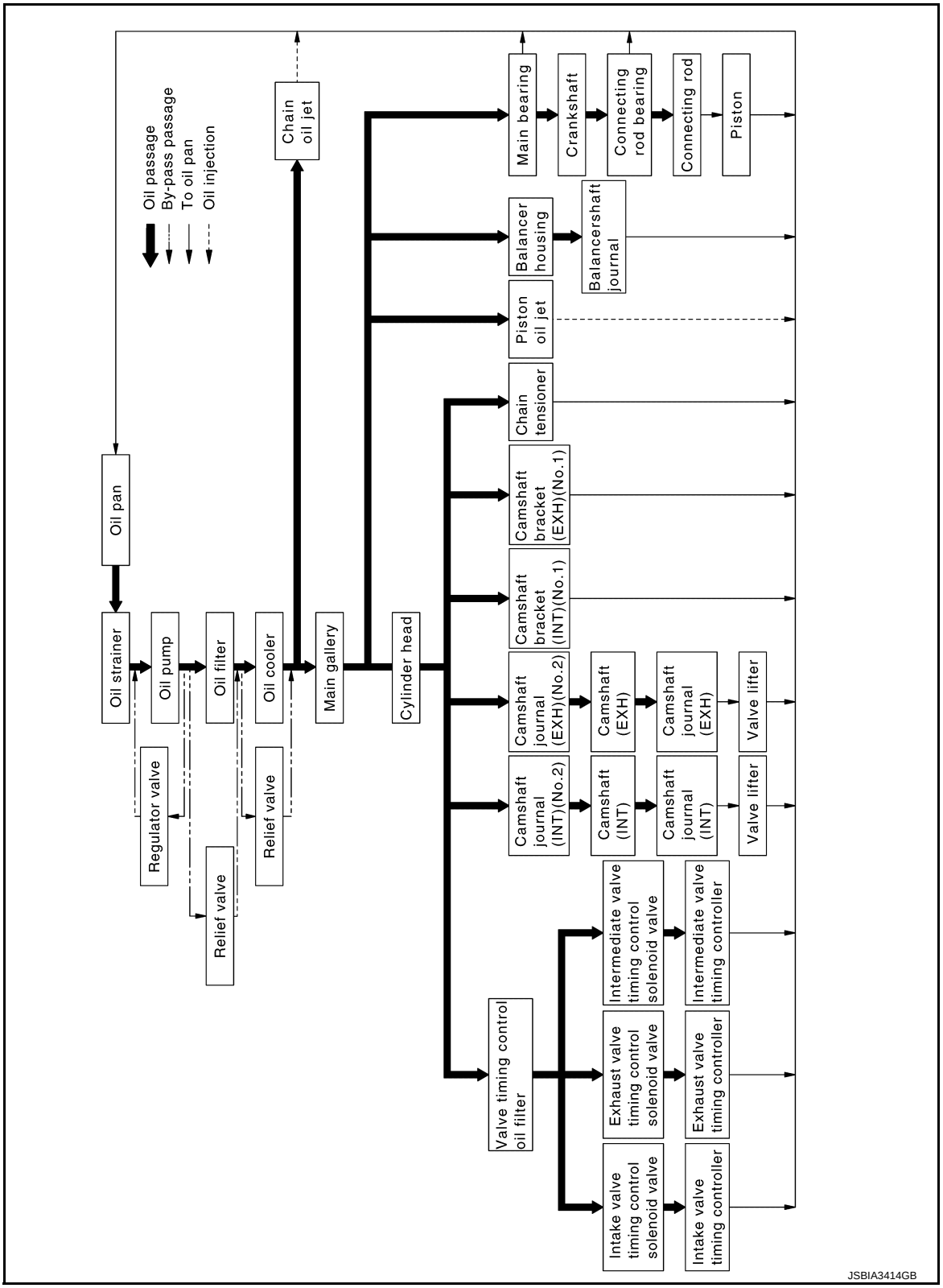
INFOID:0000000010783305



① Intake camshaft	② Exhaust camshaft	③ Intake camshaft sprocket
④ Exhaust camshaft sprocket	⑤ Chain tensioner	⑥ Intermdeiate valve timing control solenoid valve
⑦ Intake valve timing control solenoid valve	⑧ Exhaust valve timing control solenoid valve	⑨ Oil cooler
⑩ Oil pressure sensor	⑪ Timing chain oil jet	⑫ Oil pump
⑬ Oil filter	⑭ Oil strainer	⑮ Balancer unit
⑯ Crankshaft	⑰ Timing chain oil jet	
Ⓐ Main gallery		

Engine Lubrication System Schematic

INFOID:0000000010783306



PERIODIC MAINTENANCE

ENGINE OIL

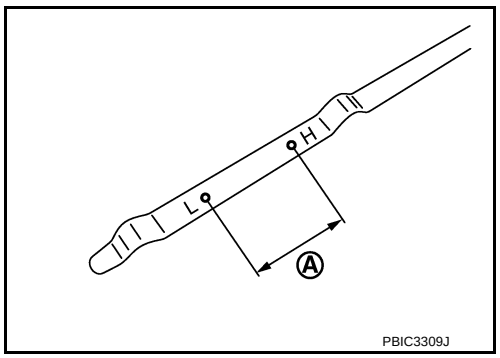
Inspection

INFOID:0000000010783307

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 Ⓐ shown in the figure.
3. If it is out of range, adjust it.



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 cooler
- Oil temperature sensor
- Oil pan (upper and lower)
- Oil pan drain plug
- Oil pressure sensor
- Oil filter
- Valve timing control cover
- Valve timing control solenoid valve (intake , exhaust and intermdeiate)
- Front cover
- Mating surface between cylinder head and camshaft bracket
- Mating surface between cylinder block and cylinder head
- Mating surface between camshaft bracket and rocker cover
- Crankshaft oil seals (front and rear)

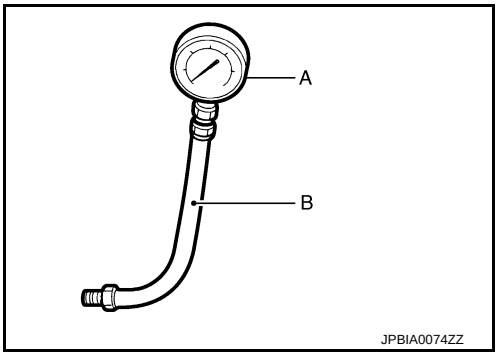
OIL PRESSURE CHECK

WARNING:

- **Be careful not to get burned, as engine oil may be hot.**
- **When checking engine oil pressure, shift position should be “Parking”, and apply parking brake securely.**

1. Check engine oil level.
2. Disconnect harness connector at oil pressure sensor, and remove oil pressure sensor using a deep socket (commercial service tool).
   CAUTION:
   Never drop or shock oil pressure sensor.

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-32, "Engine Oil Pressure".

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

6. After the inspections, install oil pressure sensor as follows:

a. Remove old liquid gasket adhering to oil pressure sensor and engine.
b. Apply liquid gasket and tighten oil pressure sensor to specification.
Use Genuine Liquid Gasket or equivalent.

Tightening torque : Refer to EM-210, "Exploded View".

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

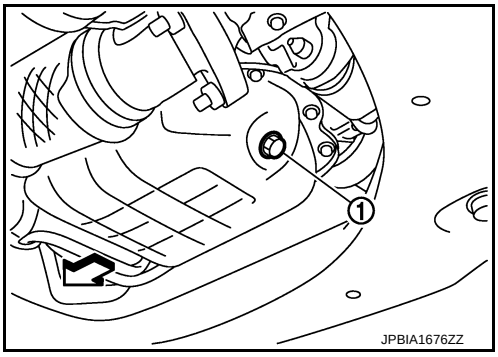
Draining

INFOID:0000000010783308

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-25, "Inspection".
2. Stop the engine and wait for 10 minutes.
3. Loosen oil filler cap.
4. Remove drain plug ① and then drain engine oil.

⇦ : Vehicle front



Refilling

INFOID:0000000010783309

1. Install drain plug with new drain plug washer. Refer to EM-193, "Exploded View".
CAUTION:
Be sure to clean drain plug and install with new drain plug washer.

2. Refill with new engine oil.
Engine oil specification and viscosity: Refer to MA-23, "Fluids and Lubricants".

Engine oil capacity : Refer to LU-32, "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-25, "Inspection".

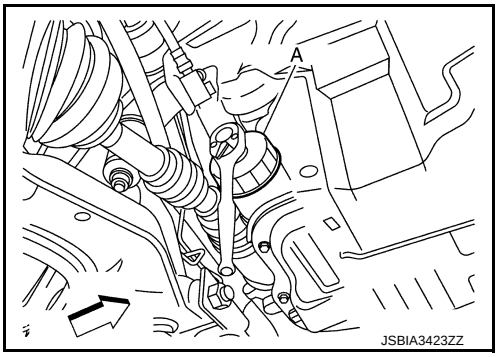
OIL FILTER

Removal and Installation

INFOID:0000000010783310

REMOVAL

1. Remove splash guard (RH). Refer to EXT-35, "FENDER PROTECTOR : Exploded View".
2. Using oil filter wrench [SST: KV10115801] (A), remove oil filter.



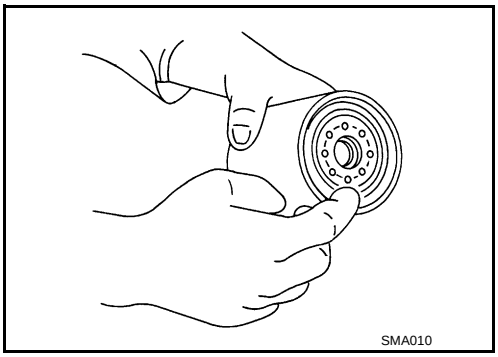
⇦ : Vehicle front

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.**
- **Completely wipe off any engine oil that adheres to engine and vehicle.**

INSTALLATION

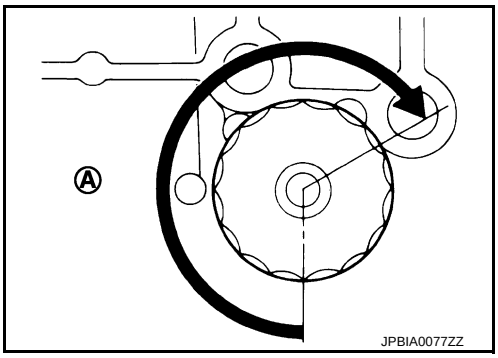
1. Remove foreign materials adhering to the oil filter installation surface.
2. Apply new engine oil to the oil seal contact surface of new oil filter.



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

Oil filter:

: 18.0 N·m (1.8 kg-m, 13 ft-lb)



Inspection

INFOID:0000000010783311

INSPECTION AFTER INSTALLATION

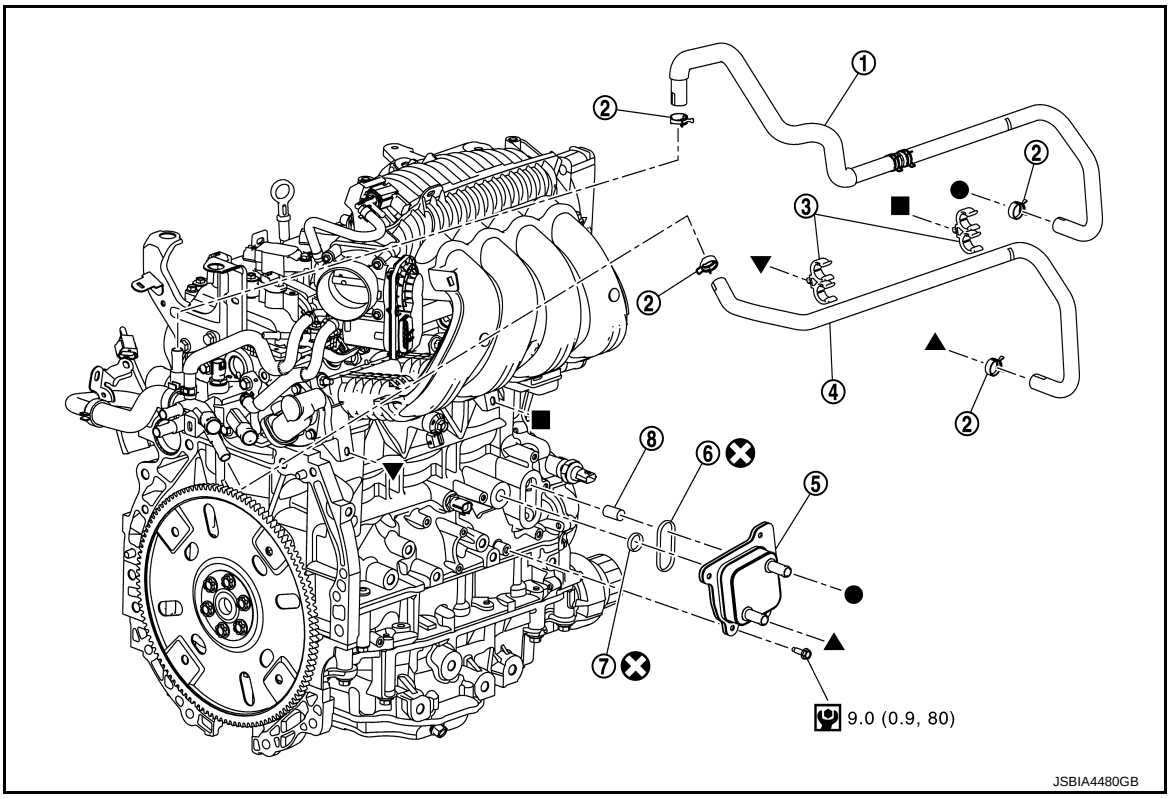
1. Check the engine oil level. Refer to LU-25, "Inspection".
2. Start the engine, and check that there is no leakage of engine oil.
3. Stop the engine and wait for 10 minutes.
4. Check the engine oil level, and adjust the level. Refer to LU-25, "Inspection".

REMOVAL AND INSTALLATION

OIL COOLER

Exploded View

INFOID:0000000010783312



① Water hose	② Clamp	③ Clamp
④ Water hose	⑤ Oil cooler	⑥ O-ring
⑦ O-ring	⑧ Relief valve	

: N·m (kg-m, in-lb)

: Always replace after every disassembly.

●, ▲, ■, ▼ : Indicates that the part is connected at points with same symbol in actual vehicle.

Removal and Installation

INFOID:0000000010783313

REMOVAL

1. Remove engine under cover.
2. Drain engine coolant. Refer to CO-39, "Draining".
   CAUTION:
   Perform this step when engine is cold.
3. Remove water hose.
4. Remove oil cooler.
   CAUTION:
   - **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

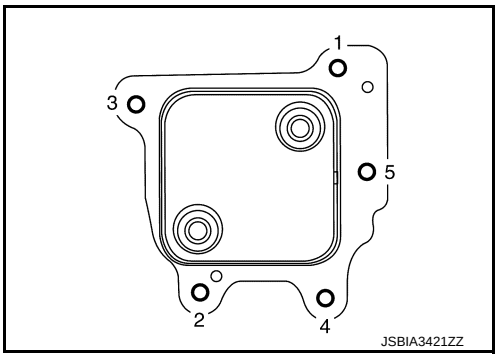
Installation is in reverse order of removal.

CAUTION:

Do not reuse O-rings.

1. Install oil cooler with the following procedure:

a. Tighten mounting bolts in numerical order as shown in the figure.



Inspection

INFOID:0000000010783314

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 assembly.

INSPECTION AFTER INSTALLATION

1. Check the engine oil level and the engine coolant level and add engine oil and engine coolant. Refer to LU-25, "Inspection" and CO-39, "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-25, "Inspection" and CO-39, "Inspection".

UNIT DISASSEMBLY AND ASSEMBLY

OIL PUMP

Exploded View

INFOID:0000000010783315

Oil pump is integrated in the oil pump and front cover assembly. Refer to EM-210, "Exploded View".

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Periodical Maintenance Specification

INFOID:0000000010783316

ENGINE OIL CAPACITY (APPROXIMATE)

Unit: ℓ (Imp qt)

Drain and refill	With oil filter change	4.6 (4)
	Without oil filter change	4.3 (3-3/4)
Dry engine (Overhaul)		5.3 (4-5/8)

Engine Oil Pressure

INFOID:0000000010783317

Unit: kPa (bar, kg/cm^2, psi)

Engine speed	Approximate discharge pressure*
Idle speed	98.0 (0.98, 1.0, 14.21)
2,000 rpm	294 (2.94, 3.0, 42.63)

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

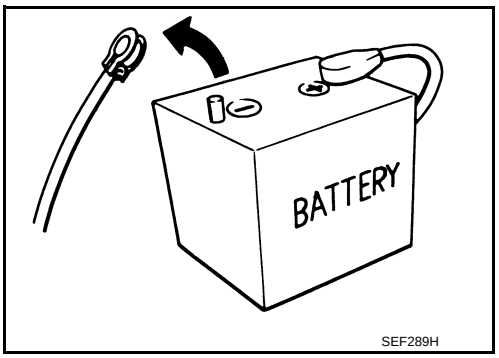
PRECAUTION

PRECAUTIONS

Precautions for Removing Battery Terminal

INFOID:0000000010783415

- With the adoption of Auto ACC function, ACC power is automatically supplied by operating the intelligent key or remote keyless entry or by opening/closing the driver side door. In addition, ACC power is supplied even after the ignition switch is turned to the OFF position, i.e. ACC power is supplied for a certain fixed time.
- When disconnecting the 12V battery terminal, turn off the ACC power before disconnecting the 12V battery terminal, observing “How to disconnect 12V battery terminal” described below.
  NOTE:
  Some ECUs operate for a certain fixed time even after ignition switch is turned OFF and ignition power supply is stopped. If the battery terminal is disconnected before ECU stops, accidental DTC detection or ECU data damage may occur.
- For vehicles with the 2-batteries, be sure to connect the main battery and the sub battery before turning ON the ignition switch.
  NOTE:
  If the ignition switch is turned ON with any one of the terminals of main battery and sub battery disconnected, then DTC may be detected.
- After installing the 12V battery, always check "Self Diagnosis Result" of all ECUs and erase DTC.
  NOTE:
  The removal of 12V battery may cause a DTC detection error.



HOW TO DISCONNECT 12V BATTERY TERMINAL

Disconnect 12V battery terminal according to Instruction 1 or Instruction 2 described below.
For vehicles parked by ignition switch OFF, refer to Instruction 2.

INSTRUCTION 1

1. Open the hood.
2. Turn key switch to the OFF position with the driver side door opened.
3. Get out of the vehicle and close the driver side door.
4. Wait at least 3 minutes. For vehicle with the engine listed below, remove the battery terminal after a lapse of the specified time.

D4D engine	: 20 minutes
HRA2DDT	: 12 minutes
K9K engine	: 4 minutes
M9R engine	: 4 minutes
R9M engine	: 4 minutes
V9X engine	: 4 minutes

CAUTION:
While waiting, never operate the vehicle such as locking, opening, and closing doors. Violation of this caution results in the activation of ACC power supply according to the Auto ACC function.

5. Remove 12V battery terminal.
   CAUTION:
   After installing 12V battery, always check self-diagnosis results of all ECUs and erase DTC.

INSTRUCTION 2 (FOR VEHICLES PARKED BY IGNITION SWITCH OFF)

1. Unlock the door with intelligent key or remote keyless entry.
   NOTE:
   At this moment, ACC power is supplied.
2. Open the driver side door.
3. Open the hood.
4. Close the driver side door.
5. Wait at least 3 minutes.

CAUTION:
While waiting, never operate the vehicle such as locking, opening, and closing doors. Violation of this caution results in the activation of ACC power supply according to the Auto ACC function.

6. Remove 12V battery terminal.
CAUTION:
After installing 12V battery, always check self-diagnosis results of all ECUs and erase DTC.

Precautions For Engine Service

INFOID:0000000010783470

DISCONNECTING FUEL PIPING

- Before starting work, check no fire or spark producing items are in the work area.
- Release fuel pressure before disconnecting and disassembly.
- After disconnecting pipes, plug openings to stop fuel leakage.

DRAINING ENGINE COOLANT

Drain engine coolant and engine oil when the engine is cooled.

INSPECTION, REPAIR AND REPLACEMENT

Before repairing or replacing, thoroughly inspect parts. Inspect new replacement parts in the same way, and replace if necessary.

REMOVAL AND DISASSEMBLY

- When instructed to use SST, use specified tools. Always be careful to work safely, avoid forceful or unin-structed operations.
- Exercise maximum care to avoid damage to mating or sliding surfaces.
- Dowel pins are used for several parts alignment. When replacing and reassembling parts with dowel pins, check that dowel pins are installed in the original position.
- Must cover openings of engine system with a tape or equivalent, to seal out foreign materials.
- Mark and arrange disassembly parts in an organized way for easy troubleshooting and reassembly.
- When loosening nuts and bolts, as a basic rule, start with the one furthest outside, then the one diagonally opposite, and so on. If the order of loosening is specified, do exactly as specified. Power tools may be used in the step.

ASSEMBLY AND INSTALLATION

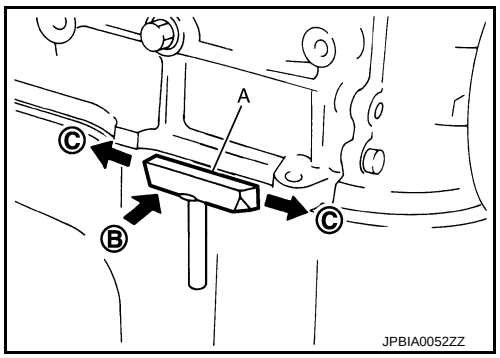
- Use torque wrench to tighten bolts or nuts to specification.
- When tightening nuts and bolts, as a basic rule, equally tighten in several different steps starting with the ones in center, then ones on inside and outside diagonally in this order. If the order of tightening is specified, do exactly as specified.
- Replace with new gasket, packing, oil seal or O-ring.
- Thoroughly wash, clean, and air-blow each part. Carefully check engine oil or engine coolant passages for any restriction and blockage.
- Avoid damaging sliding or mating surfaces. Completely remove foreign materials such as cloth lint or dust. Before assembly, oil sliding surfaces well.
- After disassembling, or exposing any internal engine parts, change engine oil and replace oil filter with a new one.
- Release air within route when refilling after draining engine coolant.
- After repairing, start the engine and increase engine speed to check engine coolant, fuel, engine oil, and exhaust gases for leakage.

Liquid Gasket

INFOID:0000000010783471

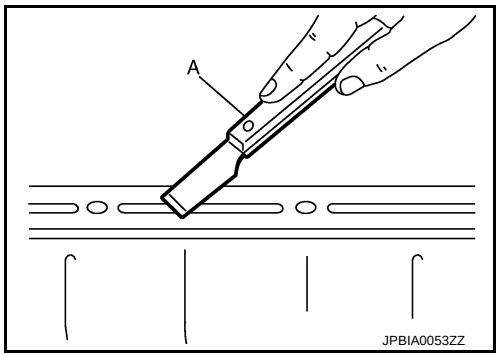
REMOVAL OF LIQUID GASKET SEALING

- After removing mounting nuts and bolts, separate the mating surface using the seal cutter [SST: KV10111100] (A) and remove old liquid gasket sealing.
  CAUTION:
  Never damage the mating surfaces.
- Tap the seal cutter [SST: KV10111100] to insert it Ⓑ, and then slide it Ⓒ by tapping on the side as shown in the figure.
- In areas where the seal cutter [SST: KV10111100] is difficult to use, lightly tap the parts using a plastic hammer to remove it.
  CAUTION:
  If for some unavoidable reason tool such as a screwdriver is used, be careful not to damage the mating surfaces.

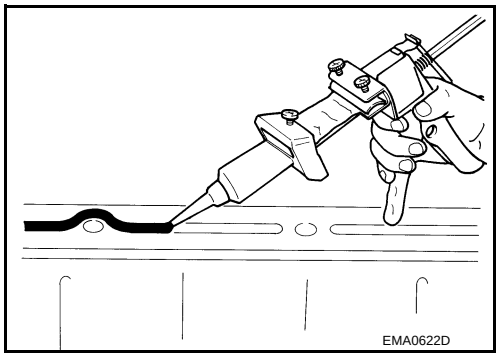


LIQUID GASKET APPLICATION PROCEDURE

1. Using a scraper (A), remove old liquid gasket adhering to the liquid gasket application surface and the mating surface.
   - Remove liquid gasket completely from the groove of 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.



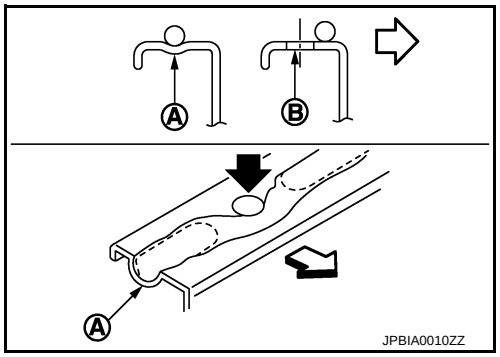
3. Attach liquid gasket tube to the tube presser (commercial service tool).
   Use Genuine Liquid Gasket or equivalent.
4. Apply liquid gasket without gaps to the specified location according to the specified dimensions.
   - If there is a groove for liquid gasket application, apply liquid gasket to the groove.



- As for bolt holes Ⓑ, normally apply liquid gasket inside the holes. Occasionally, it should be applied outside the holes. Check to read the text of this manual.

  Ⓐ : Groove

  ⇦ : Inside



- 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.

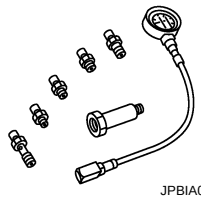
CAUTION:
If there are specific instructions in this manual, observe them.

PREPARATION

PREPARATION

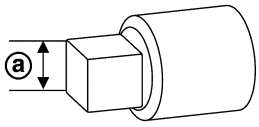
Special Service Tools

INFOID:0000000010783320

NISSAN tool number (RENAULT tool number) Tool name	Description
KV113E0020 (Mot.836-05) Oil pressure gauge set  JPBIA0949ZZ	Measuring oil pressure

Commercial Service Tools

INFOID:0000000011004695

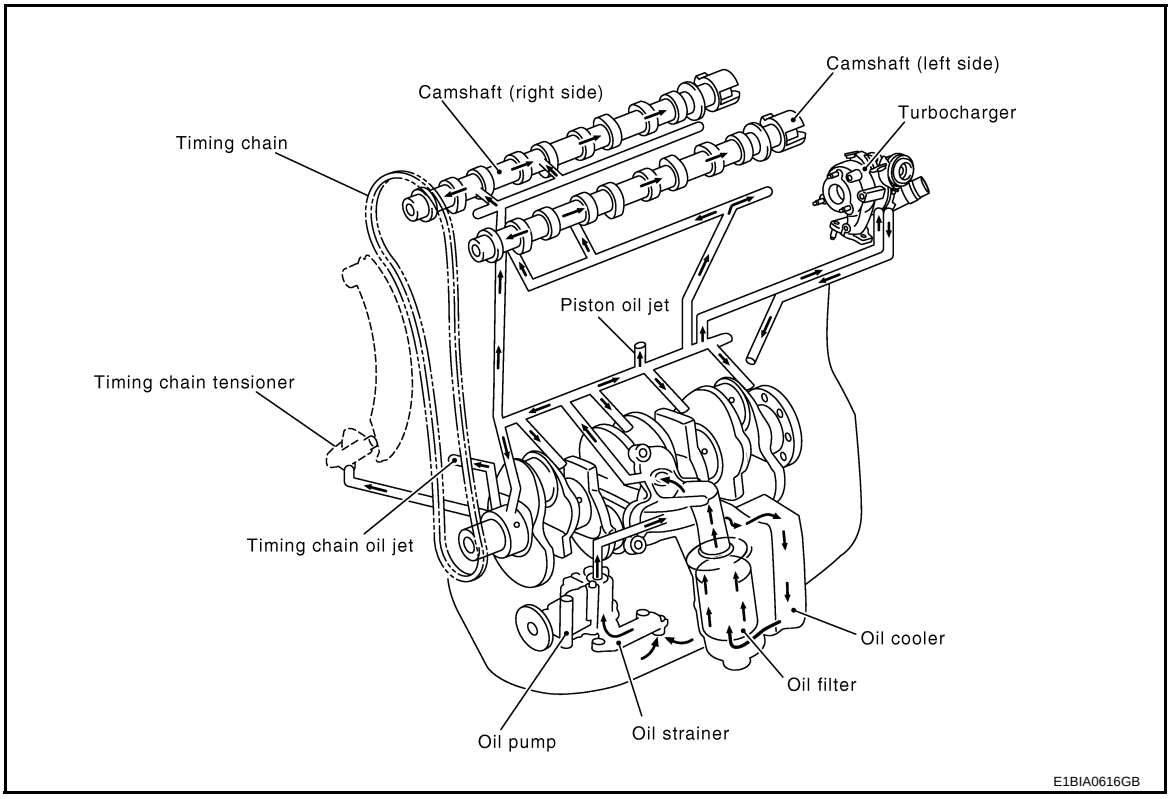
Tool name	Description
Drain plug wrench  JPBIA5904ZZ	Removing and installing drain plug ⓐ: 8 mm (0.315 in)

SYSTEM DESCRIPTION

DESCRIPTION

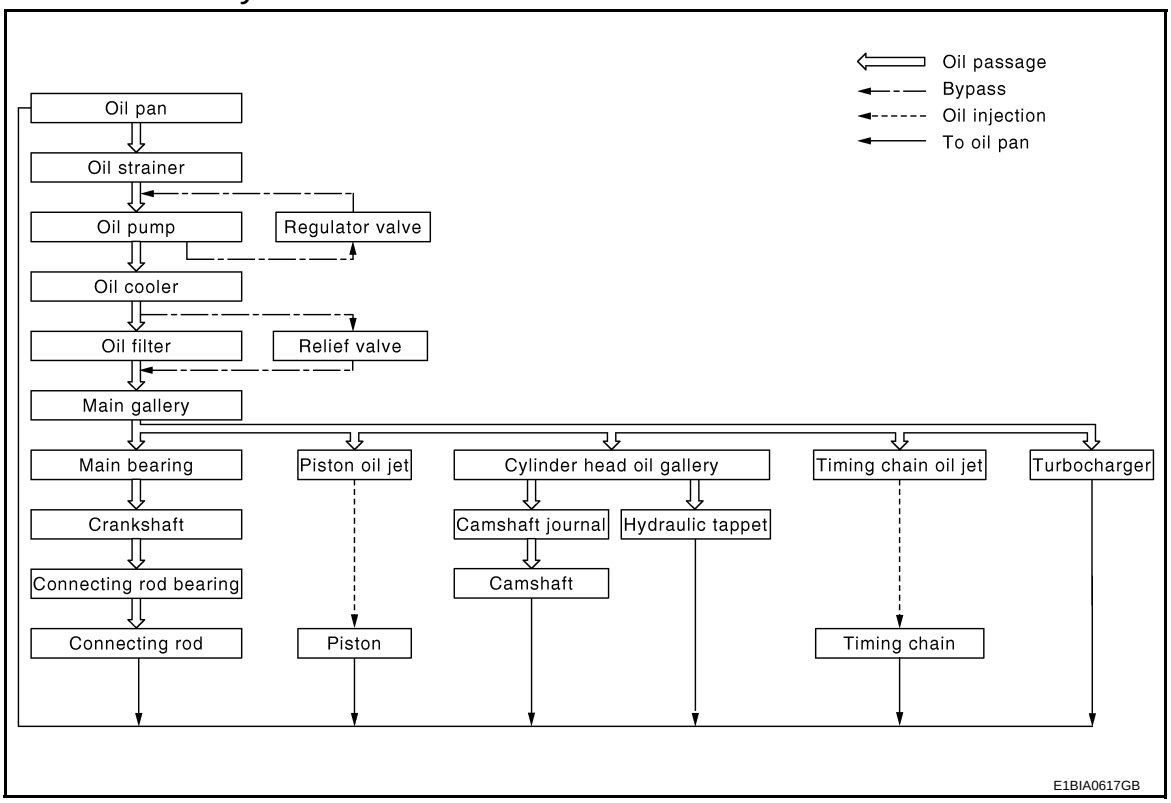
Engine Lubrication System

INFOID:0000000010783321



Engine Lubrication System Schematic

INFOID:0000000010783322



PERIODIC MAINTENANCE

ENGINE OIL

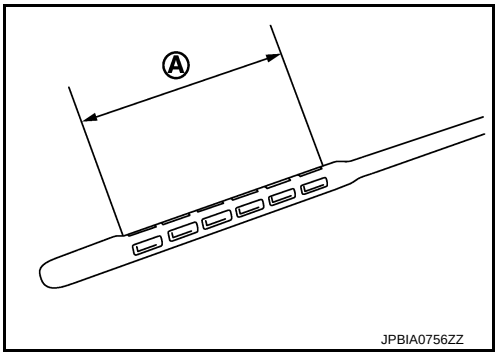
Inspection

INFOID:0000000010783323

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 Ⓐ shown in the figure.
3. If it is out of range, adjust it.
4. When replacing engine oil this procedure must be performed. Refer to EC-943, "Special Repair Requirement List"



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 “Neutral”, and apply parking brake securely.**

1. Check engine oil level.
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.

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-46, "Engine Oil Pressure".

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-42, "Exploded View".

b. Check engine oil level.

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

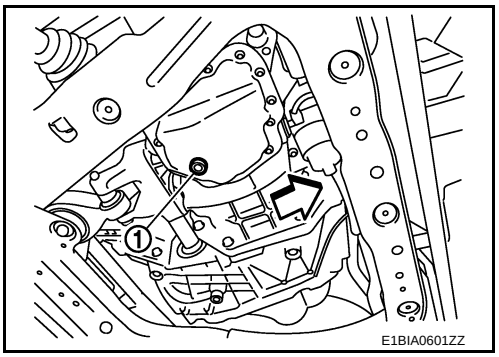
Draining

INFOID:0000000010783324

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-38, "Inspection".
2. Stop the engine and wait for 10 minutes.
3. Remove engine under cover. Refer to EXT-39, "ENGINE UNDER COVER : Exploded View".
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:0000000010783325

1. Install drain plug with new washer. Refer to EM-330, "Exploded View".
CAUTION:
Be sure to clean drain plug and install with new washer.
2. Refill with new engine oil.
Engine oil specification and viscosity: Refer to MA-23, "Fluids and Lubricants".

Engine oil capacity : Refer to LU-46, "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-38, "Inspection".
6. Perform "Engine oil data reset". Refer to EC-959, "Work Procedure".

OIL FILTER

Removal and Installation

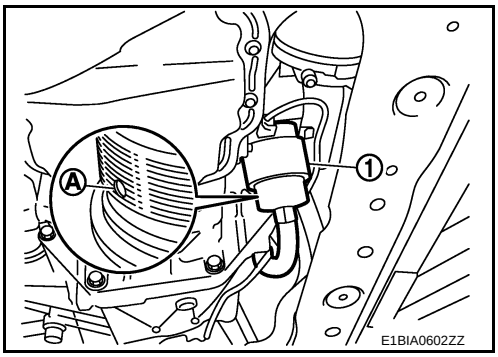
INFOID:0000000010783326

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 under cover. Refer to EXT-39, "ENGINE UNDER COVER : Exploded View".
2. Loosen oil filter body ① using a socket [27 mm (1.06 in)].
   - Loosen oil filter body until orifice Ⓐ of the oil filter body is exposed, and then drain engine oil.
   - Catch the engine oil drip, using a tray or waste.

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

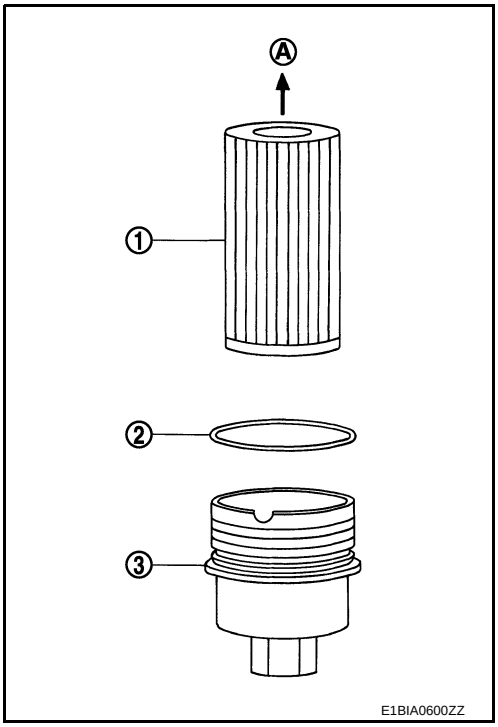


3. Remove oil filter body ③, and then remove oil filter ① and O-ring ②.

   Ⓐ : Oil cooler side

   - Push the O-ring in the one direction by hand, and then pick a pushed out-part with fingers to remove the O-ring.

   CAUTION:
   Never use wires or screwdrivers to prevent the oil filter body from damage.



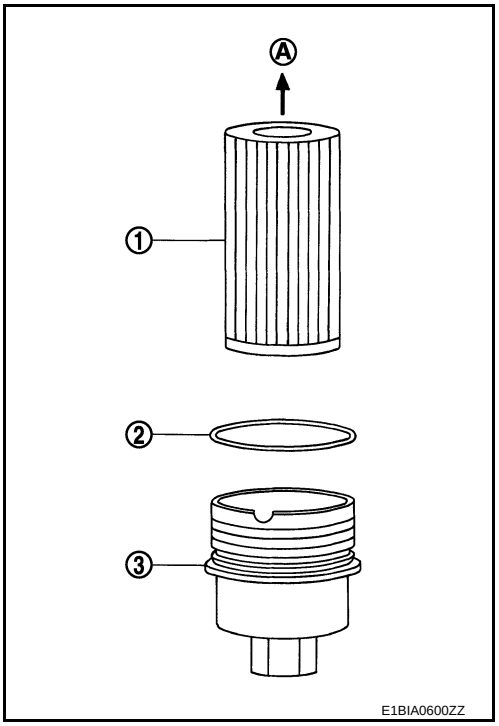
INSTALLATION

1. Completely remove all foreign objects adhering to the inside of oil filter body or O-ring mounting area.

2. Install oil filter ① and O-ring ② to oil filter body ③.

Ⓐ : Oil cooler side

CAUTION:
Be sure to use a new O-ring.
- Securely press the oil filter into the oil filter body.
- When installing an O-ring, apply engine oil all around the O-ring.



3. Install oil filter body assembly to oil cooler. Refer to LU-42, "Exploded View".

Inspection

INFOID:0000000010783327

INSPECTION AFTER INSTALLATION

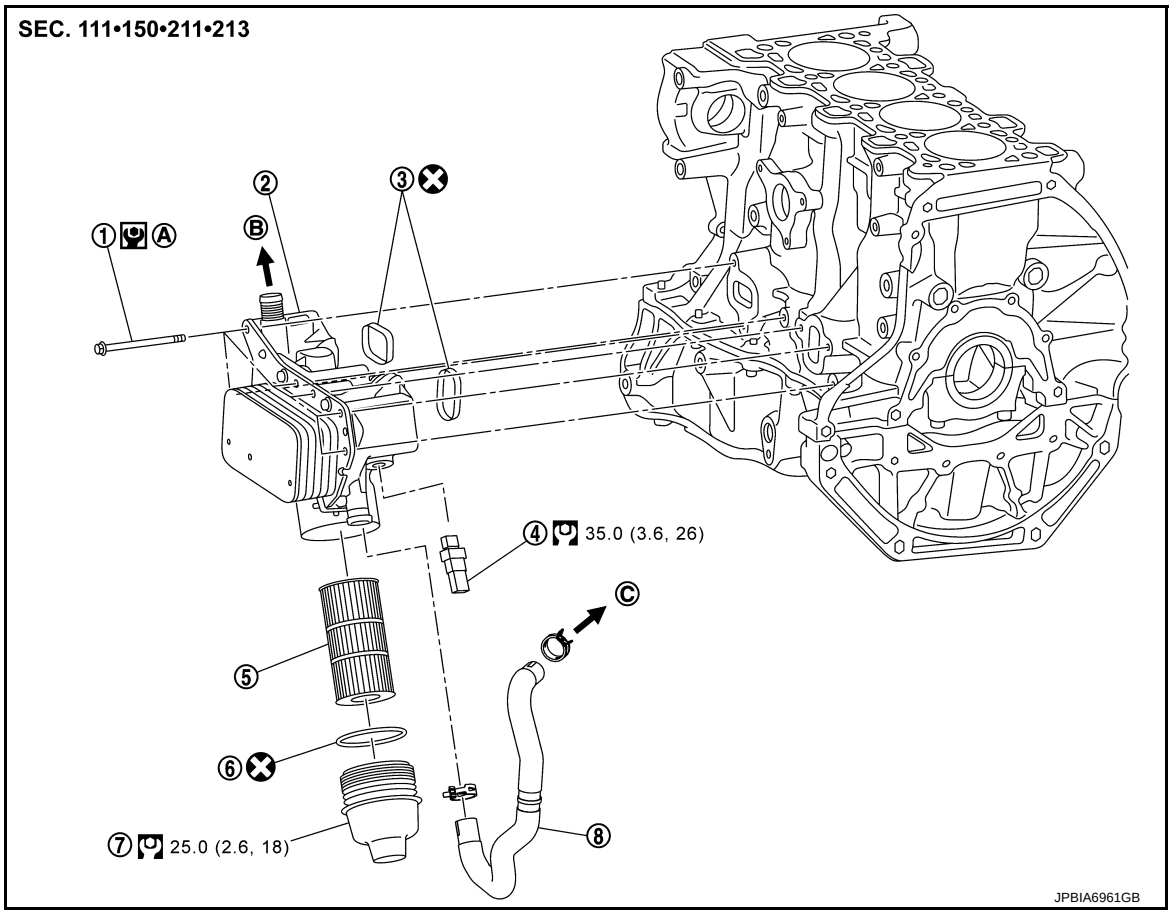
1. Check that the engine oil level. Refer to LU-38, "Inspection".
2. Start the engine, and check that there is no leak of engine oil.
3. Stop the engine and wait for 10 minutes.
4. Check that the engine oil level, and adjust the level. Refer to LU-38, "Inspection".

REMOVAL AND INSTALLATION

OIL COOLER

Exploded View

INFOID:0000000010783328



①	Oil cooler bolt	②	Oil cooler	③	Gasket
④	Oil pressure sensor	⑤	Oil filter	⑥	O-ring
⑦	Oil filter body	⑧	Water hose		
Ⓐ	Comply with the installation procedure when tightening. Refer to LU-42	Ⓑ	To thermoplunger	Ⓒ	To water inlet

: N·m (kg-m, ft-lb)

: N·m (kg-m, in-lb)

: Always replace after every disassembly.

Removal and Installation

INFOID:0000000010783329

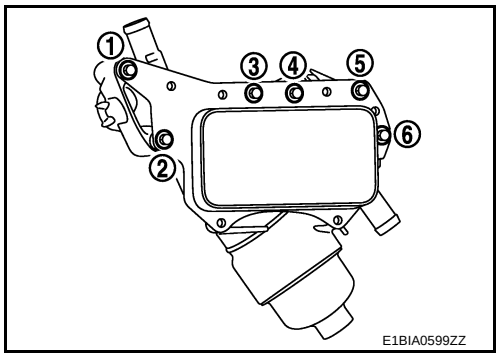
REMOVAL

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-64, "Draining".
   CAUTION:
   Perform this step when the engine is cold.
2. Disconnect air inlet tube 2 (charge air cooler side). Refer to EM-310, "Exploded View".

3. Remove A/C compressor from bracket with piping connected, and temporarily secure it aside. Refer to HA-167, "Exploded View" (for RUSSIA) or HA-30, "Exploded View" (except for RUSSIA).
4. Disconnect oil level sensor and oil pressure switch harness connectors.
5. Disconnect water hose from oil cooler. (To water inlet)
   CAUTION:
   Never adhere the engine coolant to electronic equipments. (alternator etc.)
6. Remove oil pressure switch, if necessary.
   CAUTION:
   Handle oil pressure switch carefully and avoid impacts.
7. Remove oil cooler.
   • Loosen mounting bolts in reverse order as shown in the figure.



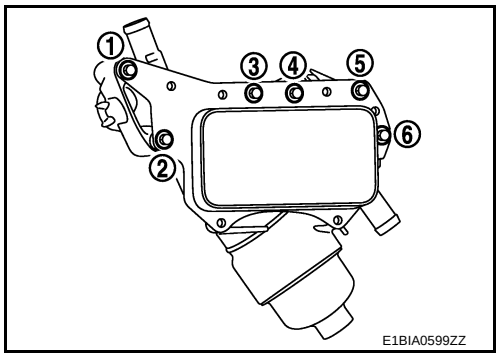
8. Disconnect water hose from oil cooler. (To thermoplunger)

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.1 and 6.

   : 10.0 N·m (1.0 kg-m, 89 in-lb)

2. Tighten all mounting bolts.

   : 10.0 N·m (1.0 kg-m, 89 in-lb)

Inspection

INFOID:0000000010783330

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.

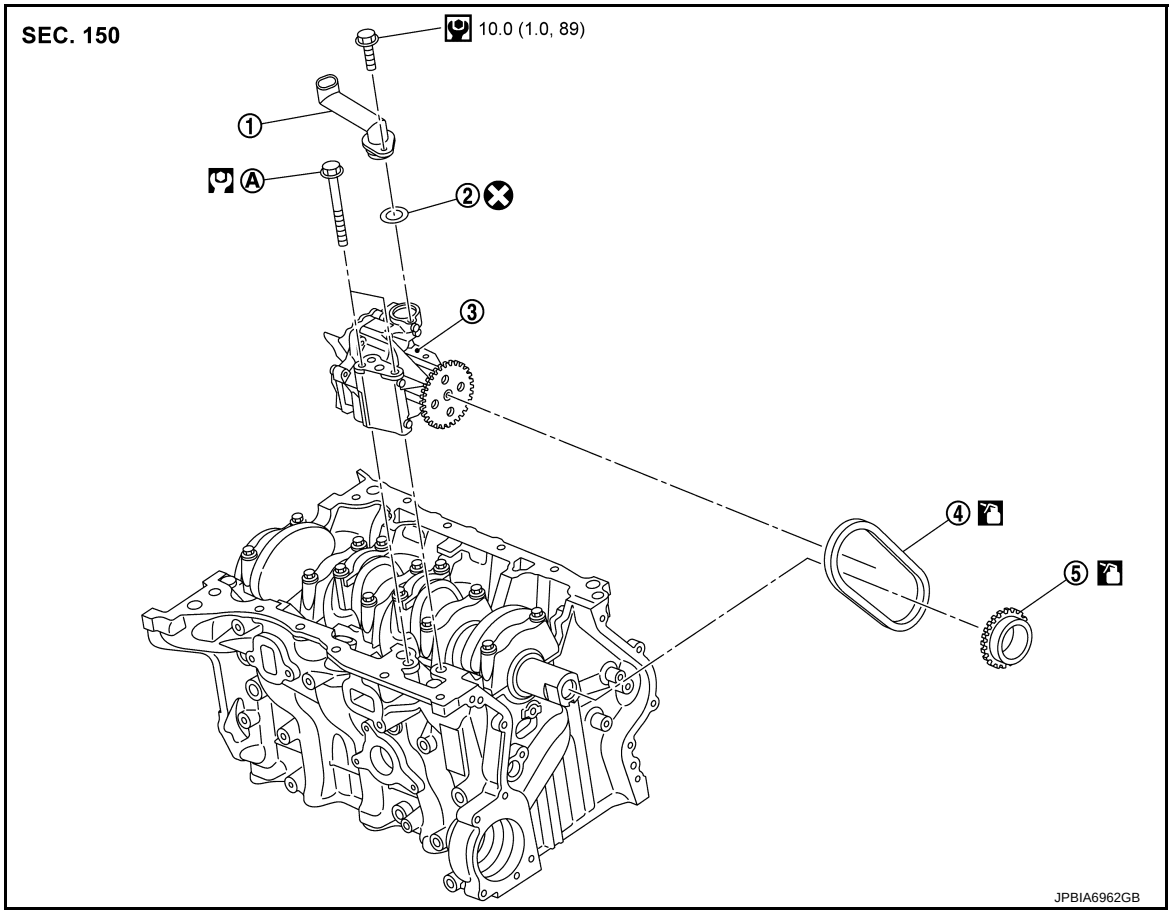
INSPECTION AFTER INSTALLATION

1. Check that the engine oil level and the engine coolant level and add engine oil and engine coolant. Refer to LU-38, "Inspection" and CO-64, "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-38, "Inspection" and CO-64, "Inspection".

OIL PUMP

Exploded View

INFOID:0000000010994267



① Oil strainer
② O-ring
③ Oil pump
④ Oil pump drive chain
⑤ Crankshaft sprocket (oil pump drive chain)
Ⓐ Comply with the installation procedure when tightening. Refer to LU-44, "Removal and Installation"
: N·m (kg-m, ft-lb)
: N·m (kg-m, in-lb)
: Always replace after every disassembly.
: Should be lubricated with oil.

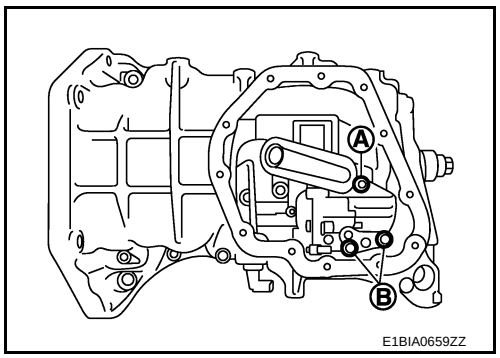
Removal and Installation

INFOID:0000000010994268

REMOVAL

1. Remove oil pan (lower). Refer to EM-330, "Exploded View".

2. Remove oil strainer with the following procedure:
   - Remove oil strainer mounting bolt Ⓐ.
   - Remove oil strainer
3. Remove oil pump with the following procedure:
   - Remove oil pump bolts Ⓑ.
   - Disengage oil pump with sprocket assembly from oil pump drive chain.
   - Remove oil pump.



INSTALLATION

CAUTION:

- **Before crank the engine, rotate crankshaft by hand to be sure that oil pump chain is correctly install on the oil pump sprocket.**

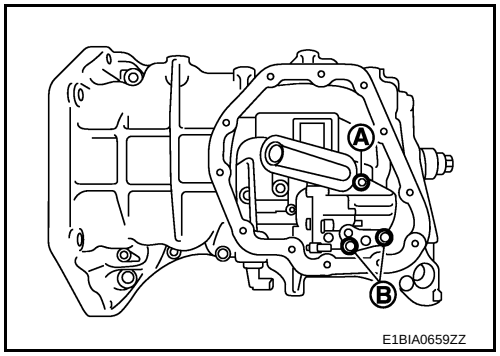
1. Install oil pump with the following procedure:

a. Install oil pump.
CAUTION:
Check that oil pump chain is correctly install on the oil pump sprocket.

b. Tighten oil pump mounting bolts Ⓑ in two steps.

1st step: 5.0 N·m (0.51 kg-m, 44 in-lb)

2nd step: 25.0 N·m (2.6 kg-m, 18 ft-lb)



c. Install oil strainer.
CAUTION:
Never reuse oil strainer gasket.

d. Tighten oil stainer bolt Ⓐ.

2. Install oil pan (lower). Refer to EM-330, "Exploded View"

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Periodical Maintenance Specification

INFOID:0000000010783331

ENGINE OIL CAPACITY (APPROXIMATE)

Unit: ℓ (Imp qt)

Drain and refill	With oil filter change	5.5 (4-7/8)
	Without oil filter change	5.1 (4-1/2)
Dry engine (Overhaul)		6.6 (5-7/8)

Engine Oil Pressure

INFOID:0000000010783332

Unit: kPa (bar, kg/cm^2, psi)

Engine speed	Approximate discharge pressure*
Idle speed	More than 70 (0.7, 0.7, 10)
1,750 rpm	More than 150 (1.5, 1.5 , 22)
4,000 rpm	More than 360 (3.6, 3.7 , 52)

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