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ENGINE LUBRICATION SYSTEM C

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< PRECAUTION >

PRECAUTION

PRECAUTIONS

Liquid Gasket

INFOID:000000007579607

REMOVAL OF LIQUID GASKET SEALING

- After removing mounting nuts and bolts, separate the mating surface using the seal cutter [SST: KV10111100 (J-37228)] (A) and remove old liquid gasket sealing.

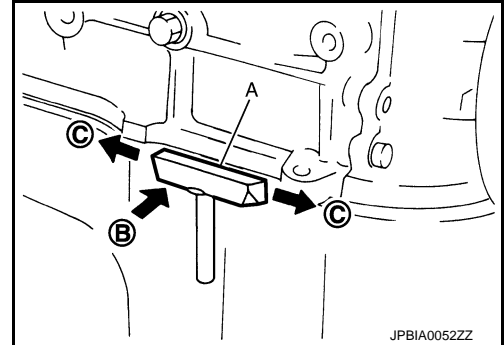
CAUTION:

Be careful not to damage the mating surfaces.

- Tap the seal cutter [SST: KV10111100 (J-37228)] to insert it (B), and then slide it (C) by tapping on the side as shown in the figure.
- In areas where the seal cutter [SST: KV10111100 (J-37228)] is difficult to use, lightly tap the parts using a plastic hammer to remove it.

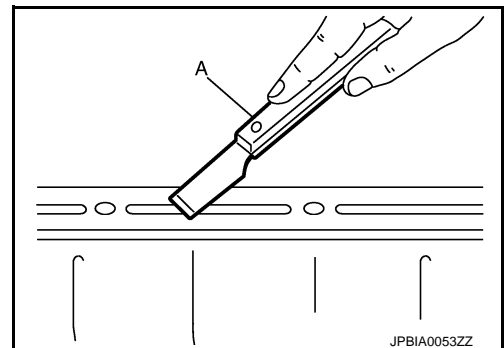
CAUTION:

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

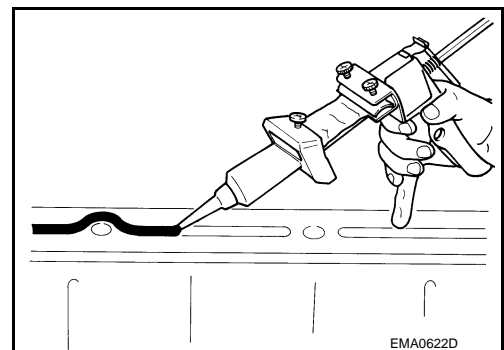


LIQUID GASKET APPLICATION PROCEDURE

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 RTV silicon sealant or equivalent. Refer to [GI-22, "Recommended Chemical Products and Sealants"](#).**
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.

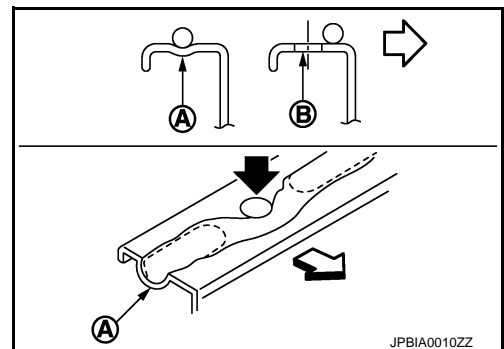


- As for bolt holes (B), normally apply liquid gasket inside the holes. Occasionally, it should be applied outside the holes. Check to read the text of this manual.

A : 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.



PRECAUTIONS

< PRECAUTION >

[MR16DDT]

CAUTION:

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

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PREPARATION

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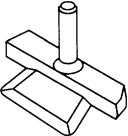
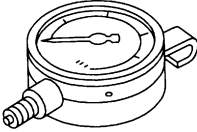
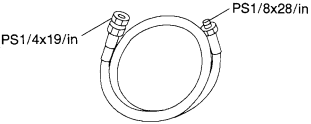
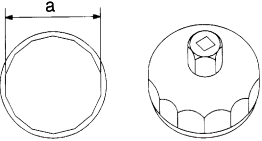
[MR16DDT]

PREPARATION

PREPARATION

Special Service Tools

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Tool number (Kent – Moore No.) Tool name	Description
KV10111100 (J-37228) Seat cutter	Removing oil pan (lower) etc.
 <p>NT046</p>	
ST25051001 (J-25695-1) Oil pressure gauge	Measuring oil pressure Maximum measuring range: 2,452 kPa (25 kg/cm², 356 psi)
 <p>NT050</p>	
ST25052000 (J-25695-2) Hose	Adapting oil pressure gauge to cylinder block
 <p>S-NT559</p>	
KV10115801 (J-38956) Oil filter wrench	Removing and installing oil filter a: 64.3 mm (2.531 in)
 <p>S-NT375</p>	

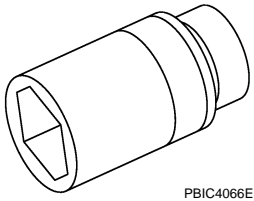
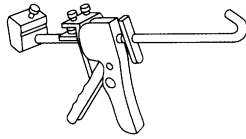
Commercial Service Tools

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PREPARATION

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[MR16DDT]

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

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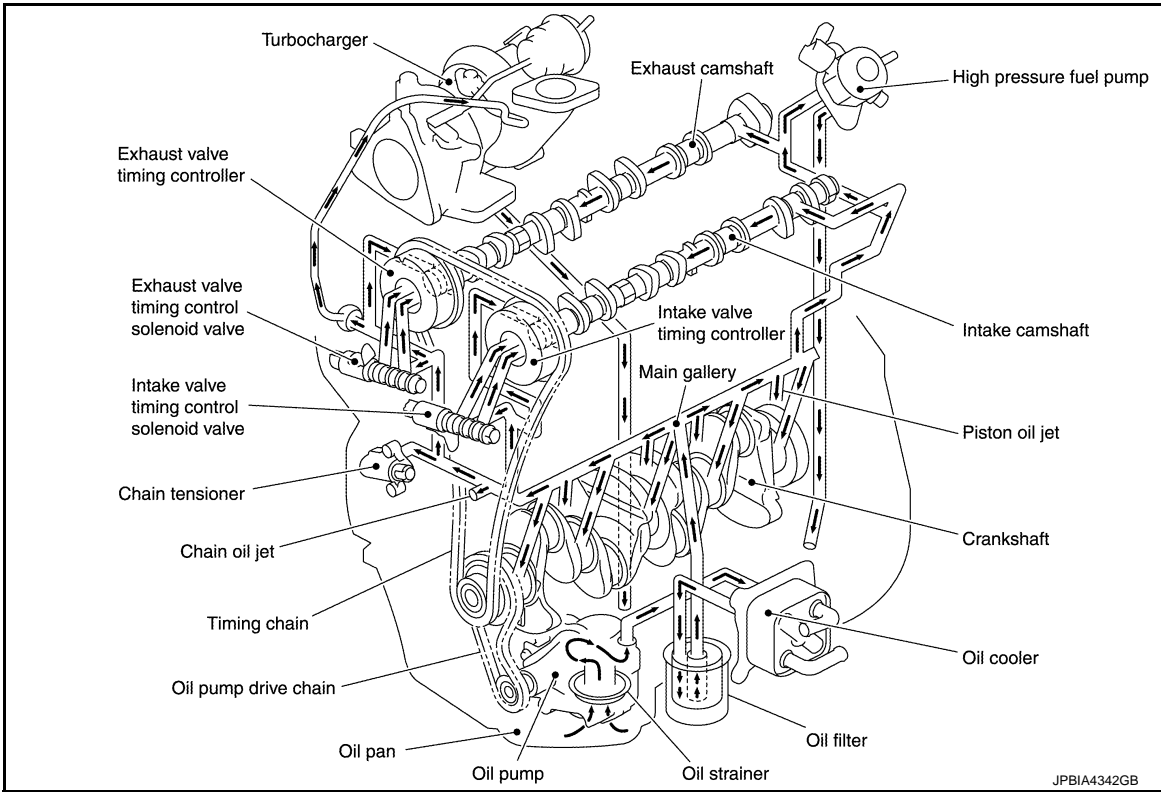
< SYSTEM DESCRIPTION >

SYSTEM DESCRIPTION

DESCRIPTION

Engine Lubrication System

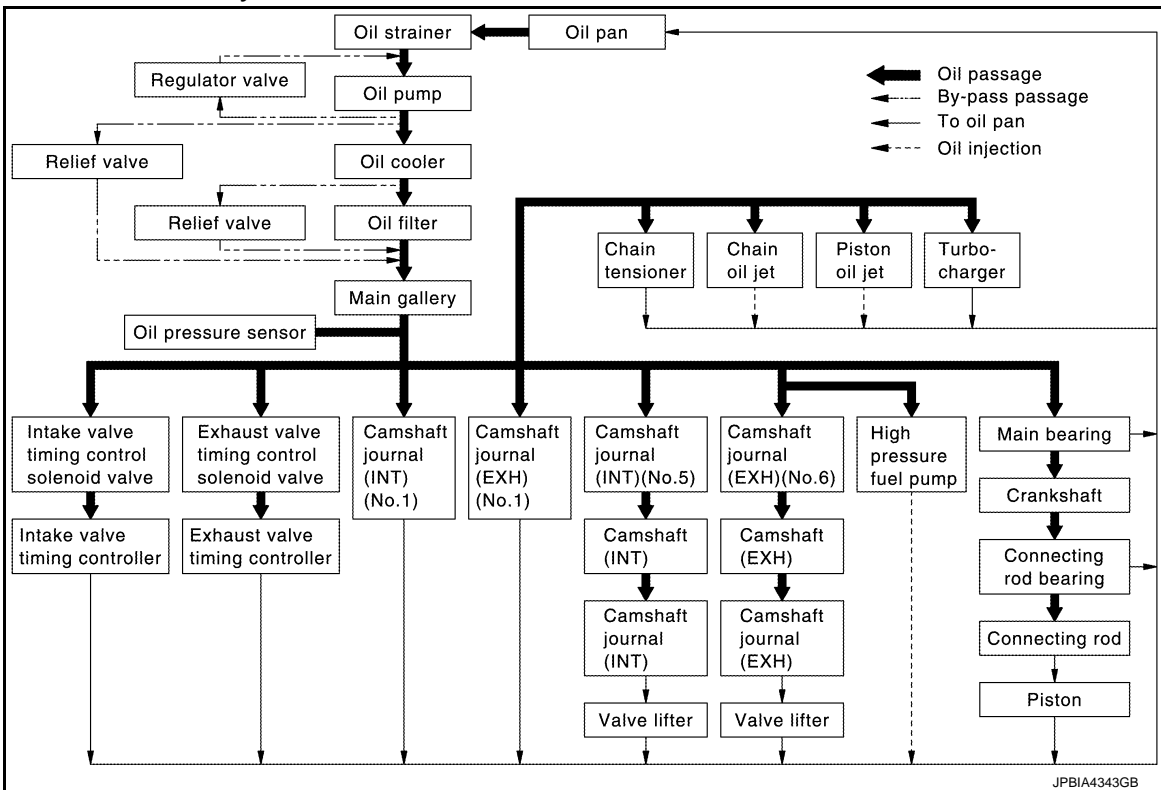
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Engine Lubrication System Schematic

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PERIODIC MAINTENANCE

ENGINE OIL

Inspection

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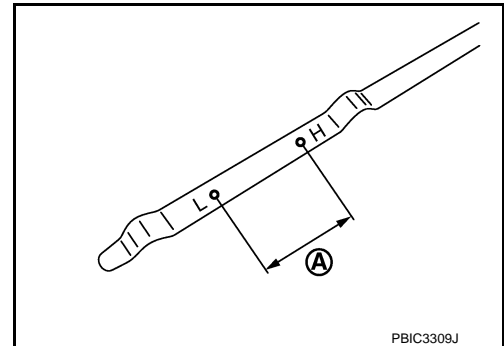
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ENGINE OIL LEVEL

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 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 cooler
- Oil temperature sensor
- Oil pan bolt
- Oil pan (upper and lower)
- Oil pan drain plug
- Oil pressure sensor
- Oil filter
- Valve timing control cover
- Valve timing control solenoid valve (intake and exhaust)
- Front cover
- Turbocharger
- Turbocharger oil tube (feed and return)
- Turbocharger oil hose
- Mating surface between high pressure fuel pump and camshaft bracket
- 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” (CVT models) or “Neutral” (M/T models), and apply parking brake securely.**

1. Check engine oil level.

ENGINE OIL

[MR16DDT]

< PERIODIC MAINTENANCE >

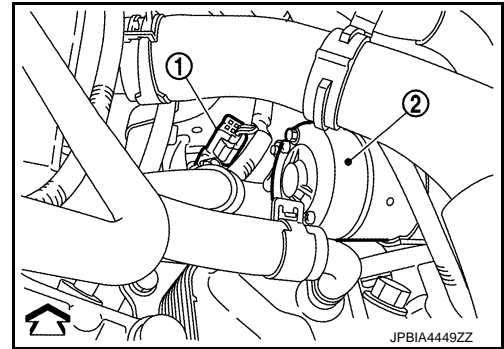
2. Disconnect harness connector at oil pressure sensor (1), and remove oil pressure sensor using a deep socket (commercial service tool).

2 : Starter motor

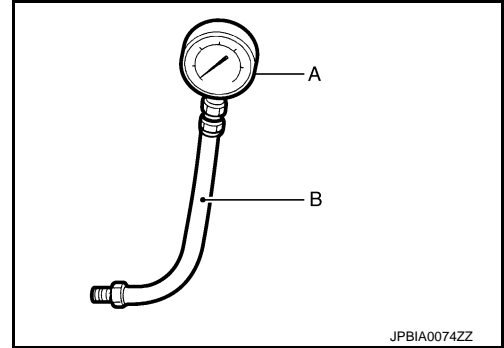
↩ : Engine front

CAUTION:

Never drop or shock oil pressure sensor.



3. Install oil pressure gauge [SST: ST25051001 (J-25695-1)] (A) and hose [SST: ST25052000 (J-25695-2)] (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 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 RTV Silicon Sealant or equivalent.

Tightening torque : Refer to [EM-110, "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:000000007579613

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-7, "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

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1. Install drain plug with new drain plug washer. Refer to [EM-43, "Exploded View"](#).

CAUTION:

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

Tightening torque : Refer to [EM-43, "Exploded View"](#).

2. Refill with new engine oil.
Engine oil specification and viscosity: Refer to [MA-10, "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-7, "Inspection"](#).

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OIL FILTER

Removal and Installation

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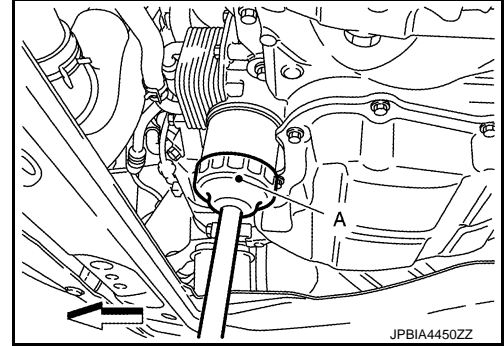
REMOVAL

1. Remove engine under cover.
2. Using oil filter wrench [SST: KV10115801 (J-38956)] (A), remove oil filter.

⇐ : Vehicle front

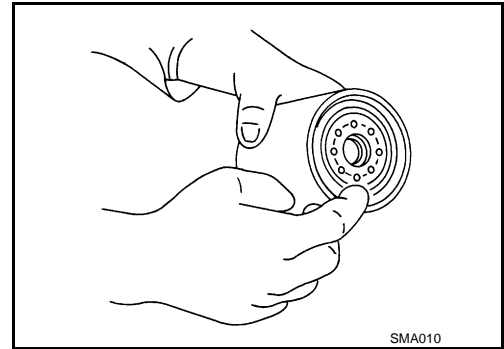
CAUTION:

- 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

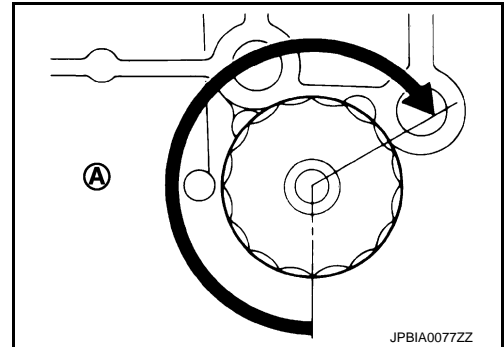
1. Remove foreign materials adhering to the oil filter installation surface.
2. Apply new engine oil to the oil seal contact surface of new oil filter.



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

Oil filter:

: 17.7 N·m (1.8 kg-m, 13 ft-lb)



Inspection

INFOID:000000007579616

INSPECTION AFTER INSTALLATION

1. Check the engine oil level. Refer to [LU-7, "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-7, "Inspection"](#).

OIL COOLER

< REMOVAL AND INSTALLATION >

[MR16DDT]

REMOVAL AND INSTALLATION

OIL COOLER

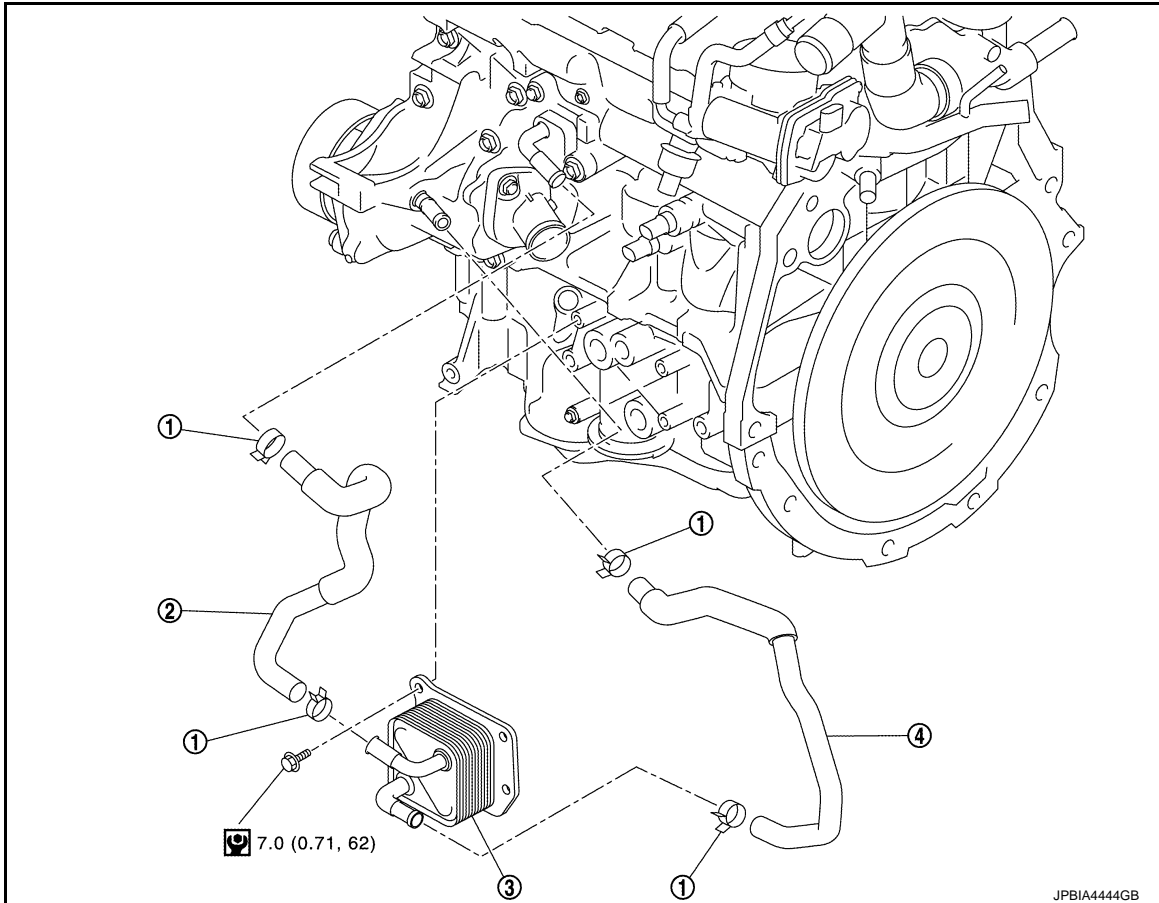
Exploded View

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M/T models



- 1. Clamp
- 2. Water hose
- 3. Oil cooler
- 4. Water hose

 : N·m (kg-m, in-lb)

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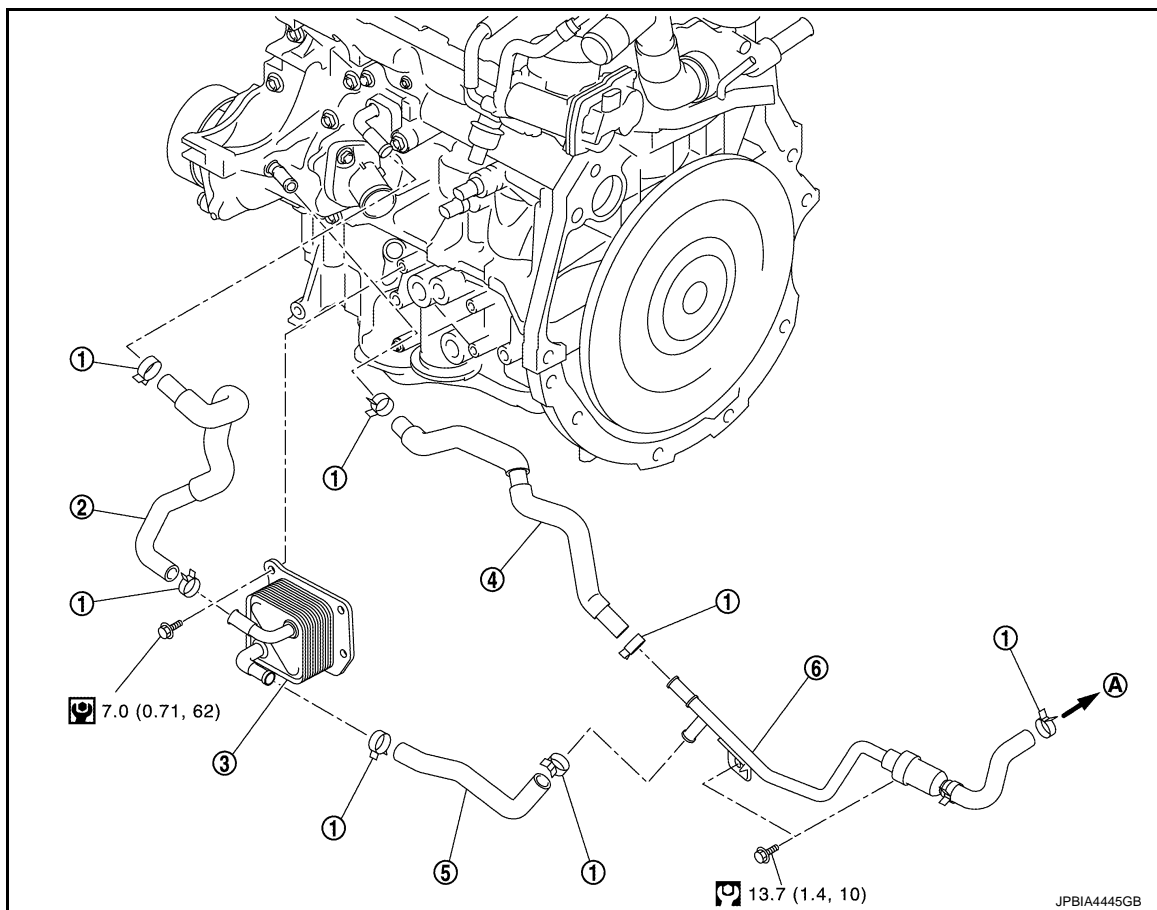
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OIL COOLER

< REMOVAL AND INSTALLATION >

[MR16DDT]

CVT models



- | | | |
|----------------------|---------------|----------------------|
| 1. Clamp | 2. Water hose | 3. Oil cooler |
| 4. Water hose | 5. Water hose | 6. Heater thermostat |
| A. To CVT oil warmer | | |

: N·m (kg-m, in-lb)

: N·m (kg-m, ft-lb)

Removal and Installation

INFOID:000000007579618

REMOVAL

1. Drain engine coolant. Refer to [CO-8, "Draining"](#).
CAUTION:
Perform when engine is cold.
2. Remove front bumper. Refer to [EXT-11, "Exploded View"](#).
3. Remove charge air cooler. Refer to [EM-30, "Exploded View"](#).
4. Remove water hose.
5. Remove oil cooler.

INSTALLATION

Installation is in reverse order of removal.

Inspection

INFOID:000000007579619

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.

OIL COOLER

< REMOVAL AND INSTALLATION >

[MR16DDT]

INSPECTION AFTER INSTALLATION

1. Check the engine oil level and the engine coolant level and add engine oil and engine coolant. Refer to [LU-7, "Inspection"](#) and [CO-8, "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-7, "Inspection"](#) and [CO-8, "Inspection"](#).

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OIL PUMP

< UNIT DISASSEMBLY AND ASSEMBLY >

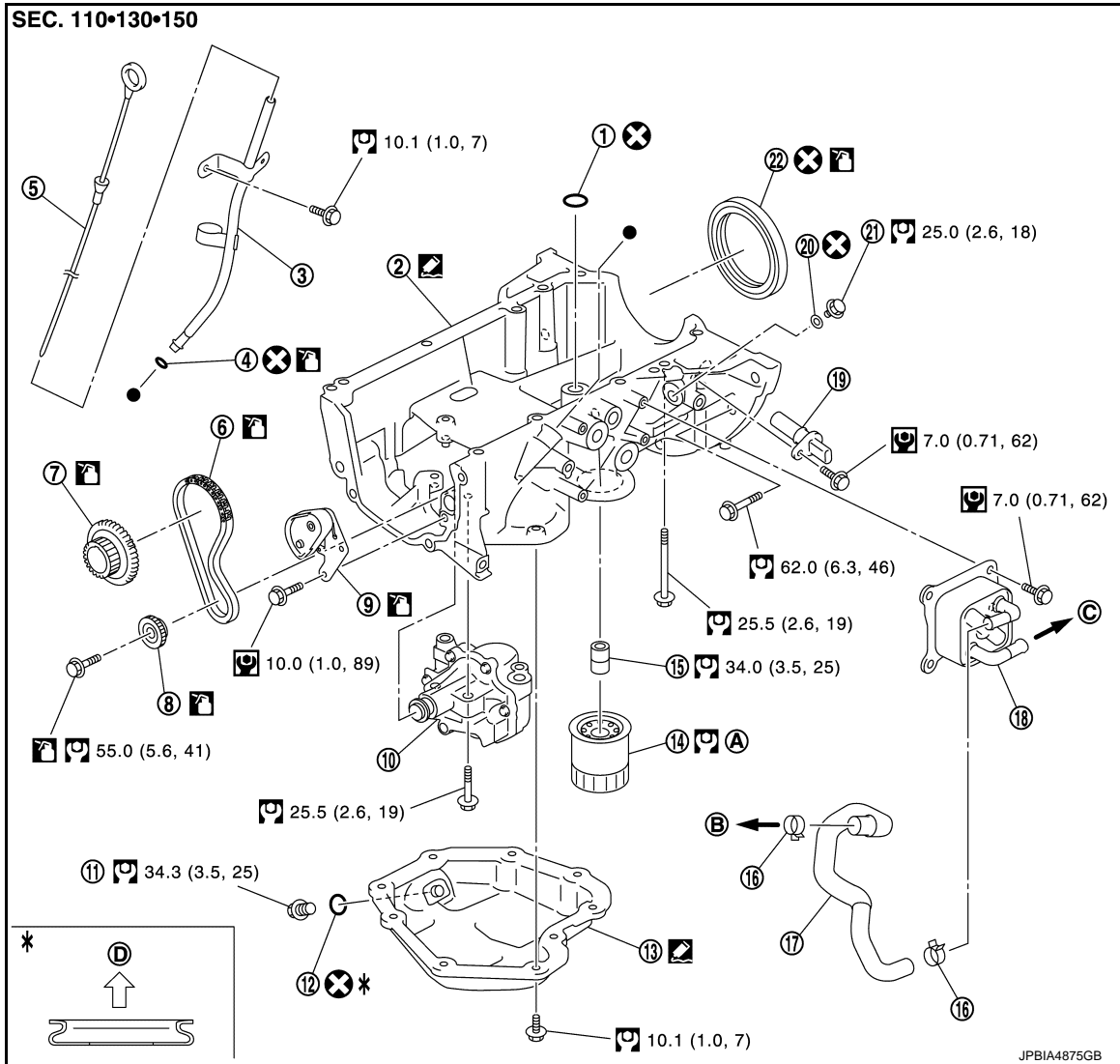
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UNIT DISASSEMBLY AND ASSEMBLY

OIL PUMP

Exploded View

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- | | | |
|--------------------------------|----------------------|-----------------------------|
| 1. O-ring | 2. Oil pan (upper) | 3. Oil level gauge guide |
| 4. O-ring | 5. Oil level gauge | 6. Oil pump drive chain |
| 7. Crankshaft sprocket | 8. Oil pump sprocket | 9. Oil pump chain tensioner |
| 10. Oil pump | 11. Drain plug | 12. Drain plug washer |
| 13. Oil pan (lower) | 14. Oil filter | 15. Connector bolt |
| 16. Clamp | 17. Oil cooler hose | 18. Oil cooler |
| 19. Crankshaft position sensor | 20. Gasket | 21. Oil pan bolt |
| 22. Rear oil seal | | |

A. Refer to [LU-10](#)

B. To thermostat housing

C. To thermostat housing (M/T models)
To CVT oil warmer (CVT models)

D. Oil pan side

: N·m (kg·m, ft·lb)

: N·m (kg·m, in·lb)

: Always replace after every disassembly.



: Should be lubricated with oil.



: Sealing point



: Indicates that the parts is connected at points with same symbols in actual vehicle.

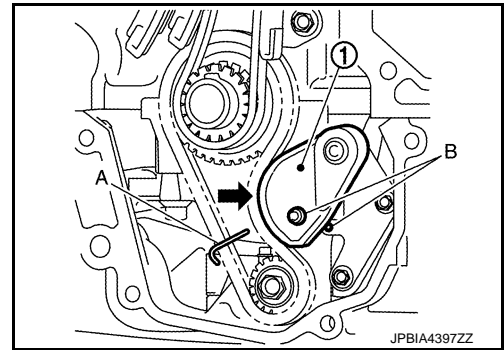
Removal and Installation

INFOID:000000007579621

REMOVAL

1. Remove engine assembly. Refer to [EM-59. "2WD : Exploded View"](#) (2WD) , [EM-64. "4WD \(AWD\) : Exploded View"](#) (AWD).
2. Remove oil pan (lower). Refer to [EM-44. "Removal and Installation"](#).
3. Remove front cover, and other related parts. Refer to [EM-72. "Exploded View"](#).
4. Remove oil pump sprocket with the following procedure:
 - Add matching mark if necessary for easier installation.

- a. Push oil pump drive chain tensioner (1) in the direction show in the figure.
- b. Insert a stopper pin (A) into the body hole (B).
- c. Remove oil pump chain tensioner.
 - When the holes on lever and tensioner body cannot be aligned, align these holes by slightly moving the oil pump chain tensioner slack guide.



- d. Hold the WAF part of oil pump shaft [WAF: 10 mm (0.39 in)] (A), and then loosen the oil pump sprocket bolt and remove it.

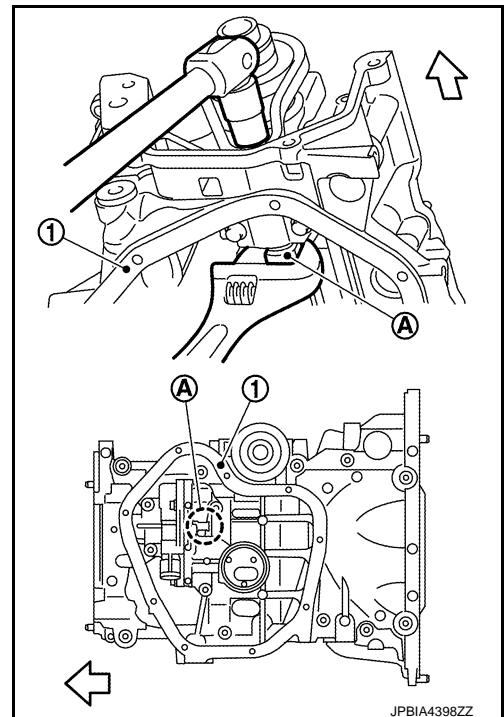
1 : Oil pan (upper)

↔ : Engine front

CAUTION:

- **Secure the oil pump shaft with the WAF part.**
- **Never loosen the oil pump sprocket bolt by tightening the oil pump drive chain.**

- e. Remove oil pump sprocket.



5. Remove oil pump.

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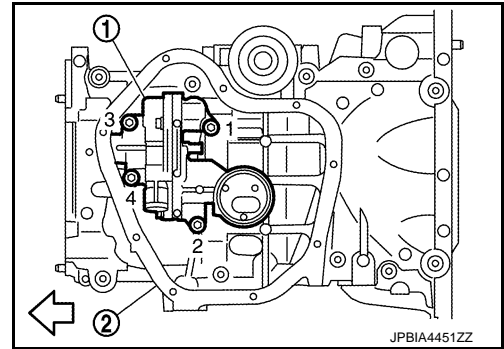
OIL PUMP

< UNIT DISASSEMBLY AND ASSEMBLY >

[MR16DDT]

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

- 1 : Oil pump
- 2 : Oil pan (upper)
- ⇐ : Engine front



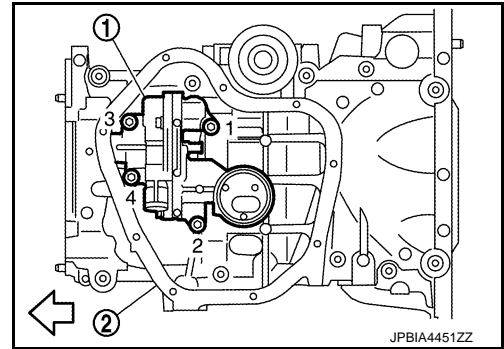
INSTALLATION

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

Oil Pump

- Tighten bolts in numerical order as shown in the figure.

- 1 : Oil pump
- 2 : Oil pan (upper)
- ⇐ : Engine front



Inspection

INFOID:000000007579622

INSPECTION AFTER INSTALLATION

1. Check the engine oil level. Refer to [LU-7. "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-7. "Inspection"](#).

SERVICE DATA AND SPECIFICATIONS (SDS)

< SERVICE DATA AND SPECIFICATIONS (SDS)

[MR16DDT]

SERVICE DATA AND SPECIFICATIONS (SDS)

SERVICE DATA AND SPECIFICATIONS (SDS)

Periodical Maintenance Specification

INFOID:0000000007579623

LU

ENGINE OIL CAPACITY (APPROXIMATE)

Unit: ℓ (US qt, Imp qt)

Drain and refill	With oil filter change	4.5 (4-6/8, 4)
	Without oil filter change	4.3 (4-4/8, 3-6/8)
Dry engine (Overhaul)		5.4 (5-6/8, 4-6/8)

Engine Oil Pressure

INFOID:0000000007579624

Unit: kPa (kg/cm², psi)

Engine speed	Approximate discharge pressure*
Idle speed	90 (0.92, 13.1)
2,000 rpm	260 (2.65, 37.7)

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

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