

LUBRICATION

LU(H4DOTC)

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General Description

LUBRICATION

1. General Description

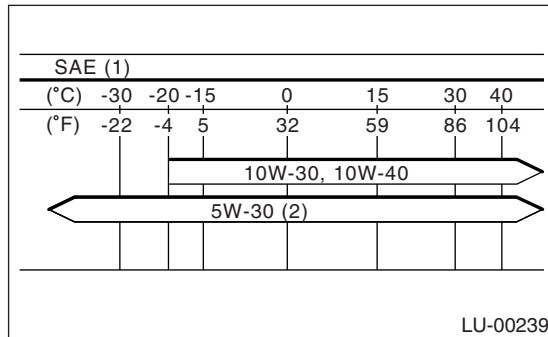
A: SPECIFICATION

Lubrication method				Forced lubrication
Oil pump	Pump type			Trochoid type
	Number of teeth	Inner rotor		9
		Outer rotor		10
	Outer rotor diameter × thickness			mm (in) 78 × 10 (3.07 × 0.47)
	Tip clearance between inner and outer rotors			mm (in) 0.04 — 0.14 (0.0016 — 0.0055)
	Side clearance between inner rotor and pump case			mm (in) 0.02 — 0.07 (0.0008 — 0.0028)
	Case clearance between outer rotor and pump case		Standard value	mm (in) 0.10 — 0.175 (0.0039 — 0.0069)
	Performance at 80°C (176°F)	600 rpm	Discharge pressure	kPa (kg/cm ² , psi) 98 (1.0, 14)
			Discharge	ℓ (US qt, Imp qt)/min. 4.6 (4.9, 4.0) or more
		5,000 rpm	Discharge pressure	kPa (kg/cm ² , psi) 294 (3.0, 43)
			Discharge	ℓ (US qt, Imp qt)/min. 47.0 (49.7, 41.4) or more
Relief valve working pressure			kPa (kg/cm ² , psi) 588 (6.0, 85)	
Oil filter	Filter type			Full-flow filter type
	Filtration area	cm ² (sq in)	Outer diameter 68 mm (2.68 in)	800 (124)
			Outer diameter 65 mm (2.56 in)	470 (72.9)
	By-pass valve opening pressure			kPa (kg/cm ² , psi) 160 (1.63, 23.2)
	Outer diameter × width	mm (in)	Outer diameter 68 mm (2.68 in)	68 × 65 (2.68 × 2.56)
			Outer diameter 65 mm (2.56 in)	65 × 74.4 (2.56 × 2.93)
	Installation screw specifications			M 20 × 1.5
Oil pressure switch	Type			Immersed contact point type
	Working voltage — wattage			12 V — 3.4 W or less
	Warning light activation pressure			kPa (kg/cm ² , psi) 14.7 (0.15, 2.1)
	Proof pressure			kPa (kg/cm ² , psi) 981 (10, 142) or more
Oil capacity (at replacement)			ℓ (US qt, Imp qt) 4.0 (4.2, 3.5)	

Recommended oil:

API standard SL with the “Energy Conserving” logo is printed (if you cannot obtain the oil with SL grade, you may use SJ grade “ENERGY CONSERVING” oil.)

ILSAC standard, GF-3 or New API certification mark (Star burst mark) label is on the container



- (1) SAE viscosity No. and applicable temperature
- (2) Recommended

The proper viscosity helps vehicle get good cold and hot starting by reducing viscous friction and thus increasing cranking speed.

CAUTION:

When replenishing oil, it does not matter if the oil to be added is a different brand from that in the engine; however, use oil having the API standard and SAE viscosity No. designated by SUBARU.

NOTE:

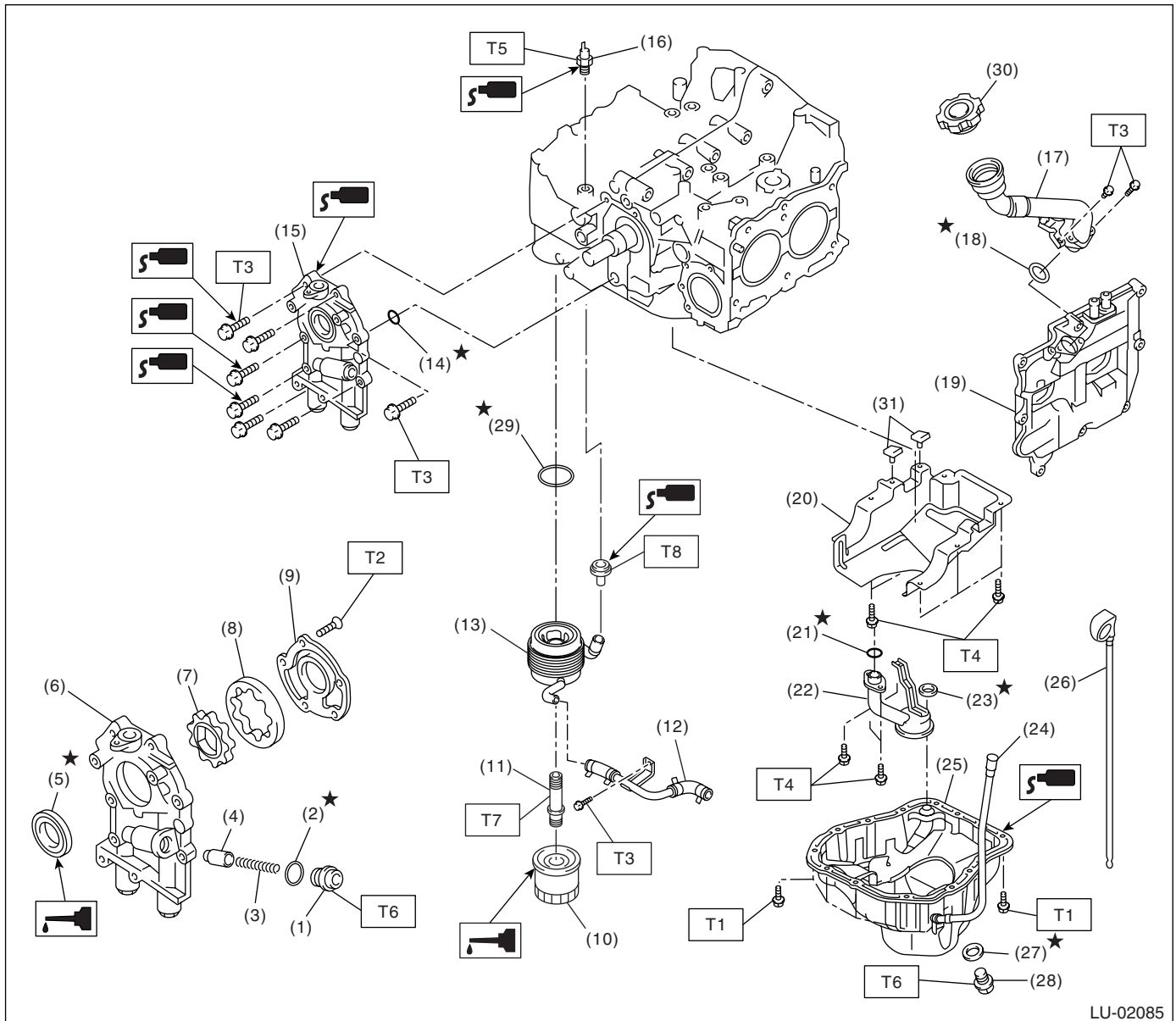
If the vehicle is used in areas with very high temperatures or for other heavy duty applications, the following viscosity oils may be used: API standard: SL or SJ

SAE Viscosity No.: 30, 40, 10W-50, 20W-40, 20W-50.

General Description

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B: COMPONENT



LU-02085

- | | | |
|---------------------------|----------------------------|---------------------|
| (1) Plug | (15) Oil pump ASSY | (29) O-ring |
| (2) Gasket | (16) Oil pressure switch | (30) Oil filler cap |
| (3) Relief valve spring | (17) Oil filler duct | (31) Seal |
| (4) Relief valve | (18) O-ring | |
| (5) Oil seal | (19) Rocker cover | |
| (6) Oil pump case | (20) Baffle plate | |
| (7) Inner rotor | (21) O-ring | |
| (8) Outer rotor | (22) Oil strainer | |
| (9) Oil pump cover | (23) Gasket | |
| (10) Oil filter | (24) Oil level gauge guide | |
| (11) Oil cooler connector | (25) Oil pan | |
| (12) Water bypass pipe | (26) Oil level gauge | |
| (13) Oil cooler | (27) Metal gasket | |
| (14) O-ring | (28) Drain plug | |

Tightening torque: N·m (kgf-m, ft-lb)

- | | |
|------------|------------------------|
| T1: | 5 (0.5, 3.6) |
| T2: | 5.4 (0.55, 4.0) |
| T3: | 6.4 (0.65, 4.7) |
| T4: | 10 (1.0, 7.0) |
| T5: | 25 (2.5, 18.1) |
| T6: | 44 (4.5, 32.5) |
| T7: | 54 (5.5, 40) |
| T8: | 69 (7.0, 50) |

LU(H4DOTC)-4

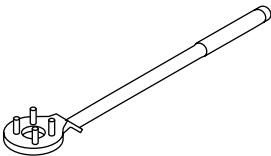
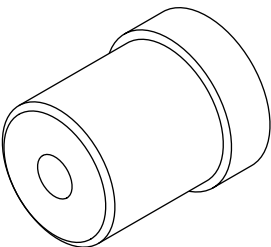
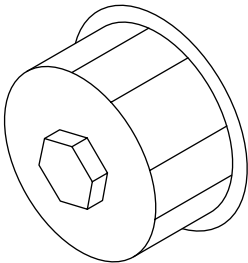
C: CAUTION

- Wear work clothing, including a cap, protective goggles and protective shoes during operation.
- Remove contamination including dirt and corrosion before removal, installation or disassembly.
- Keep the disassembled parts in order and protect them from dust and dirt.
- Before removal, installation or disassembly, be sure to clarify the failure. Avoid unnecessary removal, installation, disassembly and replacement.

- Be careful not to burn yourself, because each part on the vehicle is hot after running.
- Be sure to tighten fasteners including bolts and nuts to the specified torque.
- Place shop jacks or rigid racks at the specified points.
- Before disconnecting electrical connectors of sensors or units, be sure to disconnect the ground cable from battery.

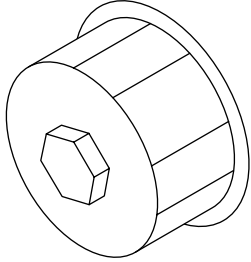
D: PREPARATION TOOL

1. SPECIAL TOOL

ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST-499977100	499977100	CRANK PULLEY WRENCH	Used for stopping rotation of crank pulley when removing and tightening crank pulley bolt.
 ST-499587100	499587100	OIL SEAL INSTALLER	Used for installing oil seal into oil pump.
 ST18332AA000	18332AA000	OIL FILTER WRENCH	Used for removing and installing oil filter. (Outer diameter: 68 mm (2.68 in))

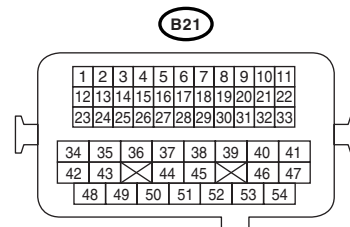
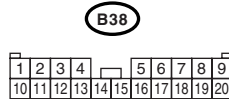
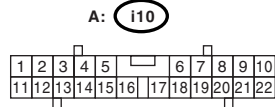
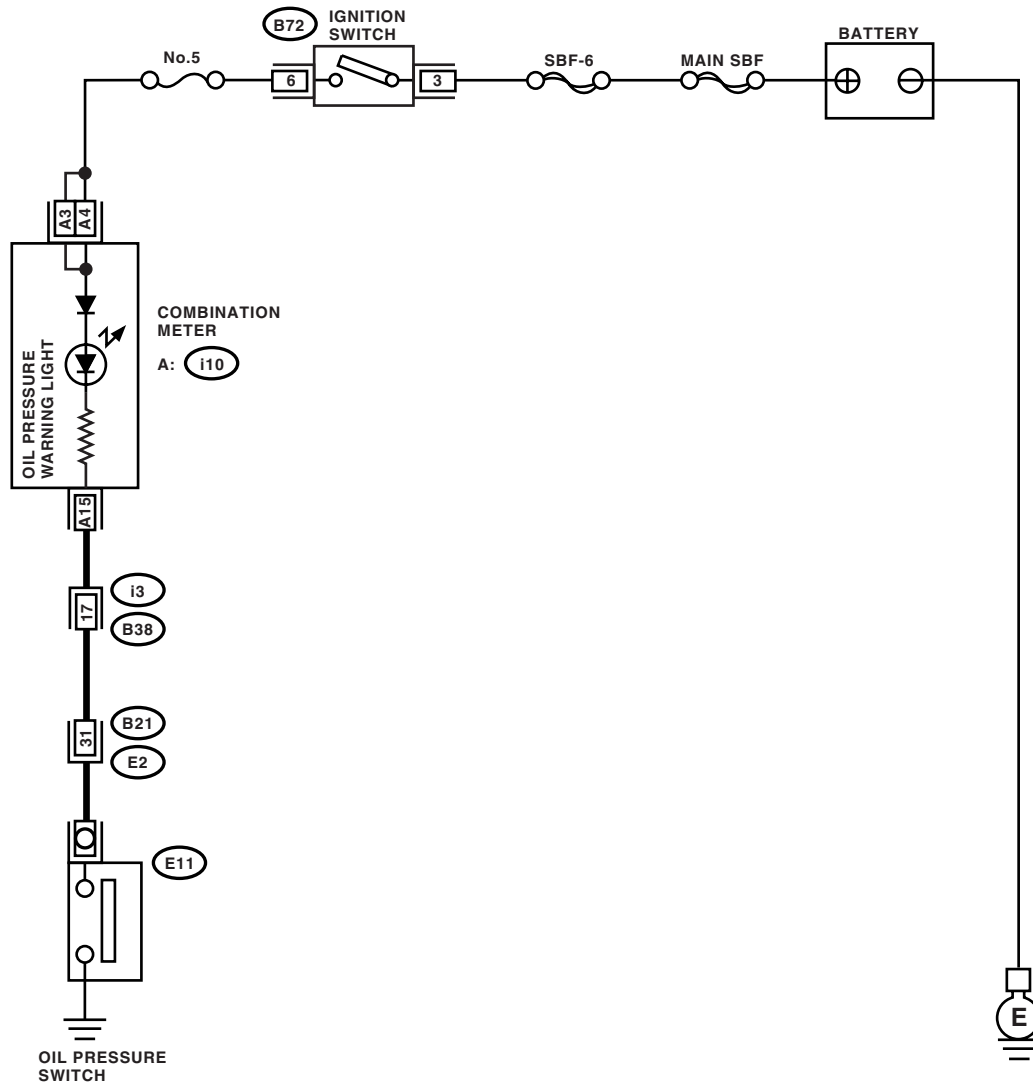
General Description

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ILLUSTRATION	TOOL NUMBER	DESCRIPTION	REMARKS
 ST18332AA010	18332AA010	OIL FILTER WRENCH	Used for removing and installing oil filter. (Outer diameter: 65 mm (2.56 in))

2. Oil Pressure System

A: WIRING DIAGRAM



LU-02113

Oil Pressure System

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B: INSPECTION

Step	Check	Yes	No
1 CHECK COMBINATION METER. 1) Turn the ignition switch to ON (engine OFF). 2) Check the warning light of combination meter.	Does the warning light illuminate?	Go to step 2.	Repair or replace the combination meter. <Ref. to IDI-3, INSPECTION, Combination Meter System.>
2 CHECK HARNESS CONNECTOR BETWEEN COMBINATION METER AND OIL PRESSURE SWITCH. 1) Turn the ignition switch to OFF. 2) Disconnect the connector from oil pressure switch. 3) Turn the ignition switch to ON. 4) Measure the voltage of harness between oil pressure switch connector and chassis ground. Connector & terminal (E11) No. 1 (+) — Chassis ground (-):	Is the voltage more than 10 V?	Replace the oil pressure switch.	Go to step 3.
3 CHECK COMBINATION METER. 1) Turn the ignition switch to OFF. 2) Remove the combination meter. 3) Measure the resistance of combination meter. Terminals (i10) No. 4 — (i10) No. 15: (i10) No. 3 — (i10) No. 15:	Is the resistance less than 10 Ω ?	Replace the harness connector between combination meter and oil pressure switch.	Repair or replace the combination meter. <Ref. to IDI-3, INSPECTION, Combination Meter System.>

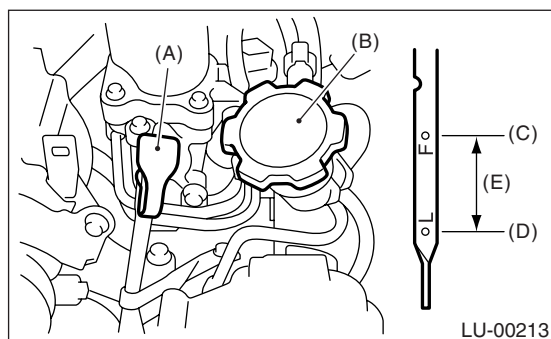
3. Engine Oil

A: INSPECTION

- 1) Park the vehicle on a level surface.
- 2) Remove the oil level gauge and wipe it clean.
- 3) Reinsert the level gauge all the way. Be sure that the level gauge is correctly inserted and properly orientated.
- 4) Remove it again and check the engine oil level. If the engine oil level is below "L" line, add oil to bring the level up to "F" line.
- 5) After turning off the engine, wait a few minutes for the oil to return to the oil pan before checking the level.
- 6) Just after driving or while the engine is warm, engine oil level show in the range between "F" line and notch mark. This is caused by thermal expansion of the engine oil.

NOTE:

To prevent overfilling the engine oil, do not add oil above "F" line when the engine is cold.



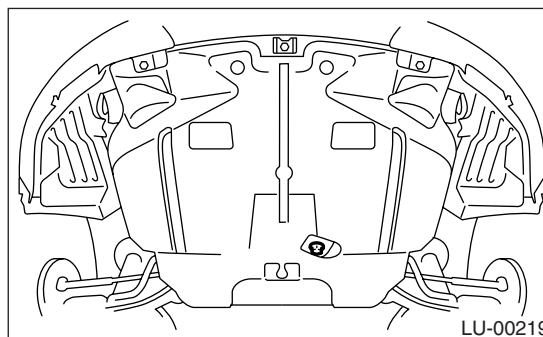
- (A) Oil level gauge
- (B) Engine oil filler cap
- (C) Upper level
- (D) Lower level
- (E) Approx. 1.0 ℓ (1.1 US qt, 0.9 Imp qt)

B: REPLACEMENT

- 1) Open the engine oil filler cap for quick draining of engine oil.
- 2) Lift-up the vehicle.
- 3) Drain engine oil by loosening the engine oil drain plug.

NOTE:

Prepare the container for draining of engine oil.



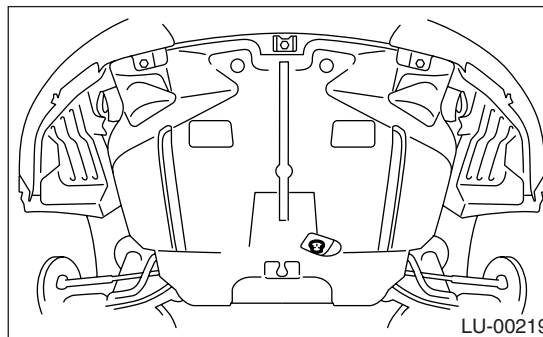
- 4) Tighten the engine oil drain plug after draining engine oil.

NOTE:

Use a new metal gasket.

Tightening torque:

44 N·m (4.5 kgf-m, 32.5 ft-lb)



- 5) Use the engine oil of proper quality and viscosity, fill engine oil through the oil filler duct to upper point on level gauge. Make sure that the vehicle is parked on a level surface when checking oil level.

Recommended oil:

<Ref. to LU(H4DOTC)-2, SPECIFICATION, General Description.>

Engine oil capacity:

Upper level

4.0 ℓ (4.2 US qt, 3.5 Imp qt)

Lower level

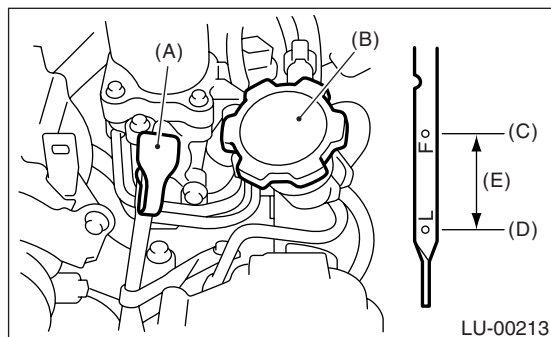
3.0 ℓ (3.2 US qt, 2.6 Imp qt)

- 6) Close the engine oil filler cap.
- 7) Start the engine and warm it up for a time.

Engine Oil

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8) After the engine stops, recheck the oil level. If necessary, add engine oil up to the upper level on level gauge.

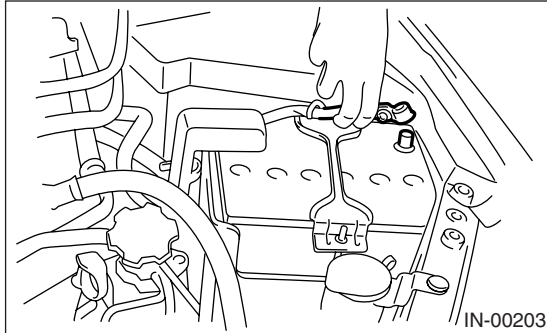


- (A) Oil level gauge
- (B) Engine oil filler cap
- (C) Upper level
- (D) Lower level
- (E) Approx. 1.0 ℓ (1.1 US qt, 0.9 Imp qt)

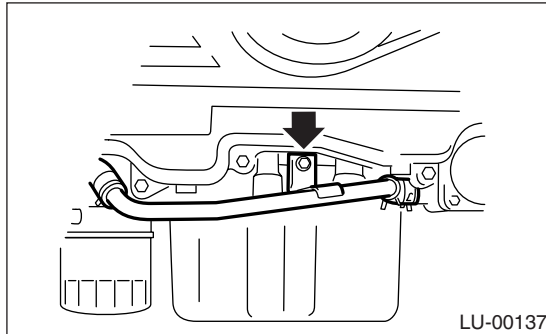
4. Oil Pump

A: REMOVAL

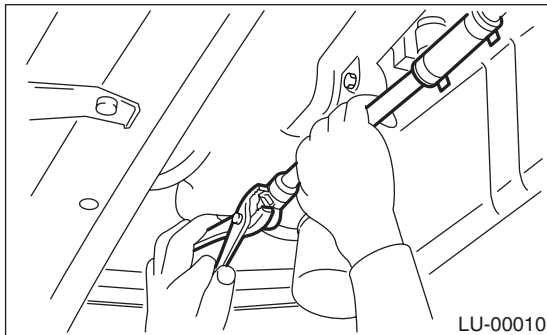
- 1) Remove the collector cover.
- 2) Disconnect the ground cable from battery.



- 3) Lift-up the vehicle.
- 4) Remove the under cover.
- 5) Remove the bolts which install water pipe of oil cooler to oil pump.

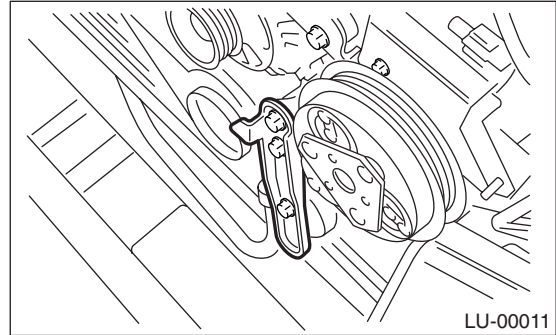


- 6) Remove the water pipe and hoses between oil cooler and water pump. (MT model)

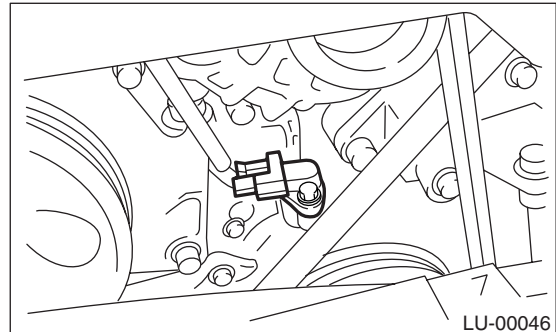


- 7) Lower the vehicle.
- 8) Remove the radiator. <Ref. to CO(H4DOTC)-19, REMOVAL, Radiator.>
- 9) Remove the V-belts. <Ref. to ME(H4DOTC)-37, REMOVAL, V-belt.>

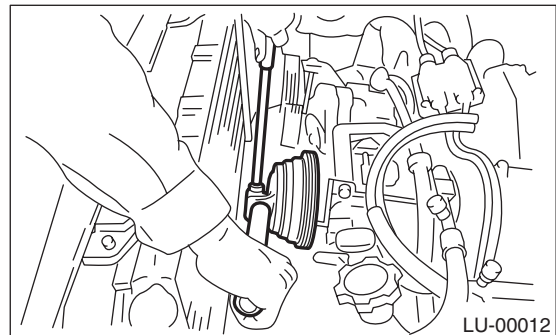
- 10) Remove the rear side V-belt tensioner.



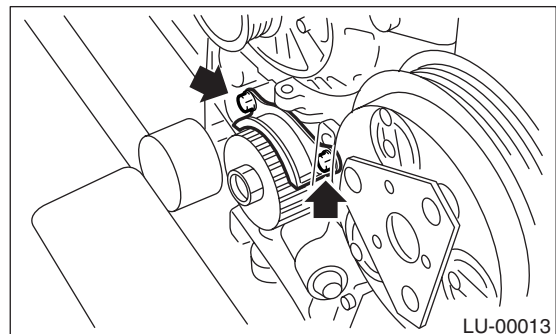
- 11) Remove the crankshaft position sensor.



- 12) Remove the crank pulley by using ST. <Ref. to ME(H4DOTC)-39, REMOVAL, Crank Pulley.>



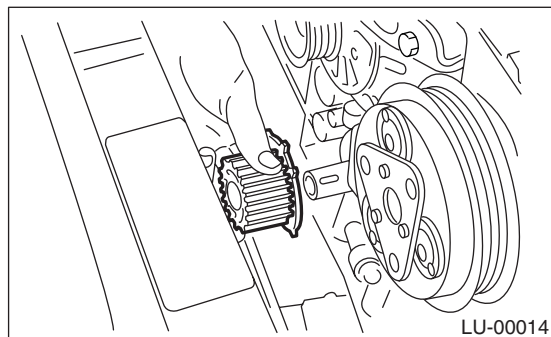
- 13) Remove the water pump. <Ref. to CO(H4DOTC)-15, REMOVAL, Water Pump.>
- 14) Remove the timing belt guide.



Oil Pump

LUBRICATION

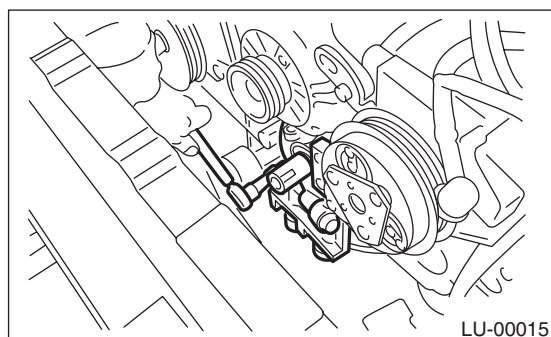
15) Remove the crank sprocket.



16) Remove the bolts which hold oil pump onto cylinder block.

NOTE:

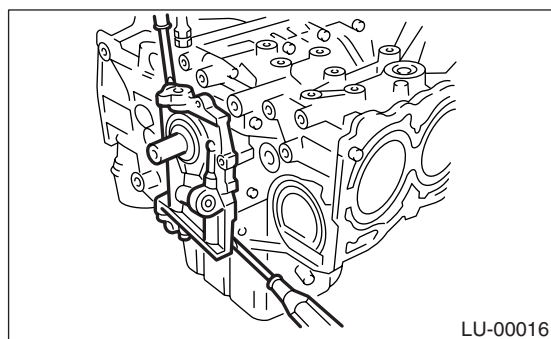
When disassembling and checking the oil pump, loosen the relief valve plug before removing oil pump.



17) Remove the oil pump by using flat bladed screwdriver.

CAUTION:

Be careful not to scratch mating surfaces of cylinder block and oil pump.



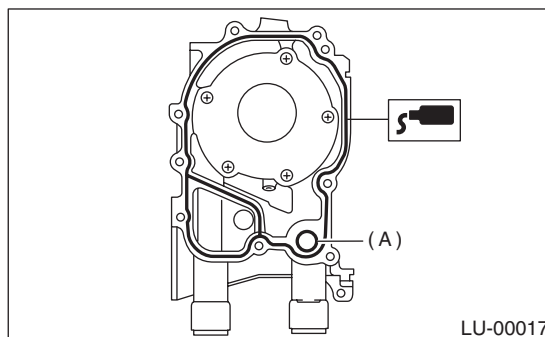
B: INSTALLATION

Install in the reverse order of removal.
Perform the following.

1) Apply liquid gasket to the matching surfaces of oil pump.

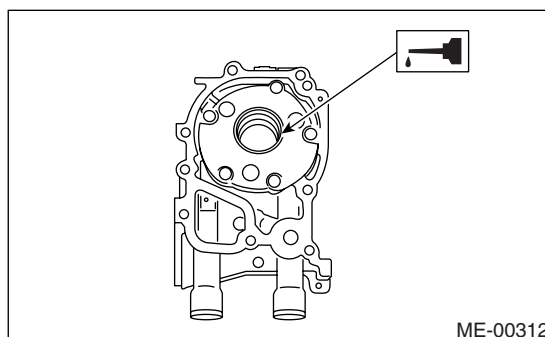
Liquid gasket:

THREE BOND 1215 (Part No. 004403007) or equivalent



2) Replace the O-ring (A) with a new one.

3) Apply a coat of engine oil to the inside of oil seal.



4) Position the oil pump, aligning the notched area with crankshaft, and push the oil pump straight.

CAUTION:

- Make sure the oil seal lip is not folded.
- Be careful not to scratch oil seal when installing oil pump on cylinder block.

5) Install the oil pump.

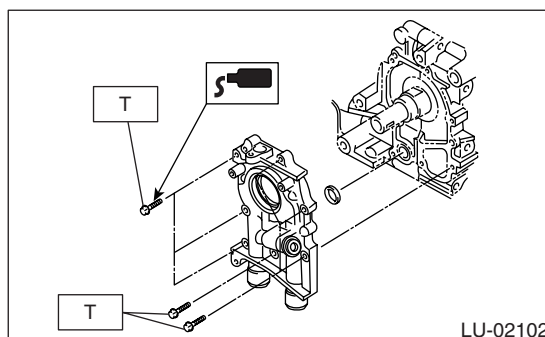
6) Apply liquid gasket to the threaded portion of three bolts.

Liquid gasket:

THREE BOND 1215 (Part No. 004403007) or equivalent

Tightening torque:

6.4 N·m (0.65 kgf-m, 4.7 ft-lb)

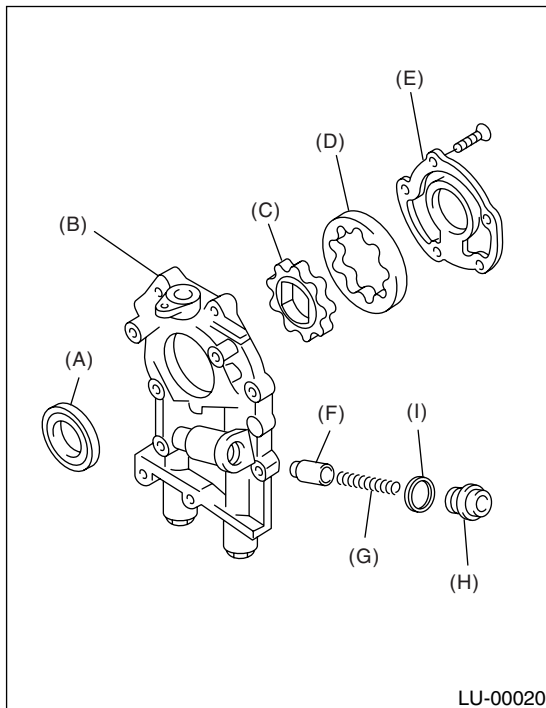


C: DISASSEMBLY

Remove the screws which secure oil pump cover and then disassemble oil pump. Inscribe alignment marks on the inner and outer rotors so that they can be replaced in their original positions during reassembly.

CAUTION:

Before disassembling the oil pump, remove the relief valve.



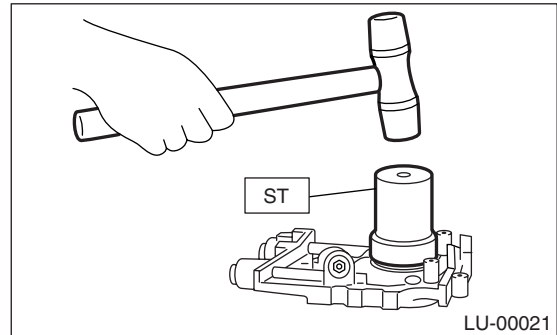
- (A) Oil seal
- (B) Pump case
- (C) Inner rotor
- (D) Outer rotor
- (E) Pump cover
- (F) Relief valve
- (G) Relief valve spring
- (H) Plug
- (I) Gasket

D: ASSEMBLY

1) Install the front oil seal by using ST.
ST 499587100 OIL SEAL INSTALLER

NOTE:

Use a new oil seal.



2) Apply a coat of engine oil to the inner and outer rotors.

3) Install the inner and outer rotors in their original positions.

4) Install the oil relief valve and relief valve spring and plug.

NOTE:

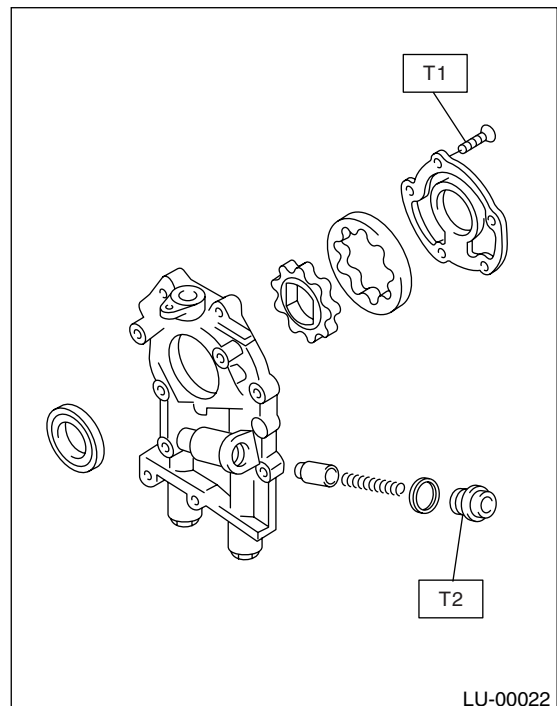
Use a new gasket.

5) Install the oil pump cover.

Tightening torque:

T1: 5.4 N·m (0.55 kgf-m, 4.0 ft-lb)

T2: 44 N·m (4.5 kgf-m, 32.5 ft-lb)



E: INSPECTION

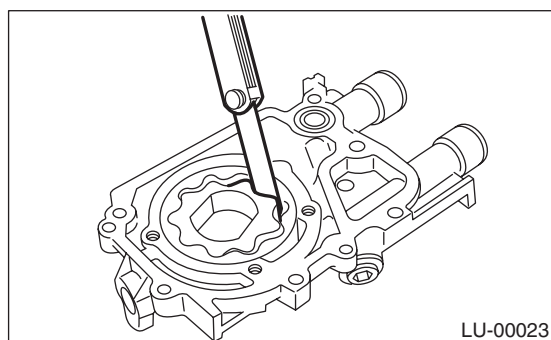
1. TIP CLEARANCE

Measure the tip clearance of rotors. If the clearance exceeds the standard value, replace the rotors as a matched set.

Tip clearance:

Standard value

0.04 — 0.14 mm (0.0016 — 0.0055 in)



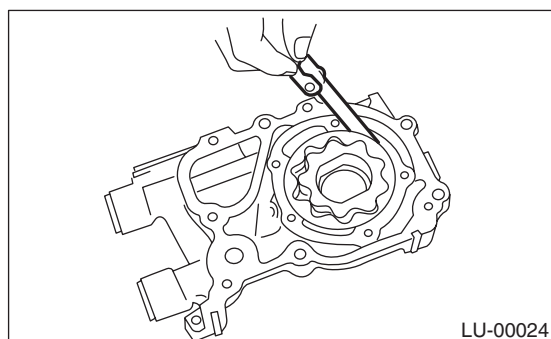
2. CASE CLEARANCE

Measure the clearance between outer rotor and oil pump rotor housing. If the clearance exceeds the standard value, replace the oil pump case.

Case clearance:

Standard value

0.10 — 0.175 mm (0.0039 — 0.0069 in)



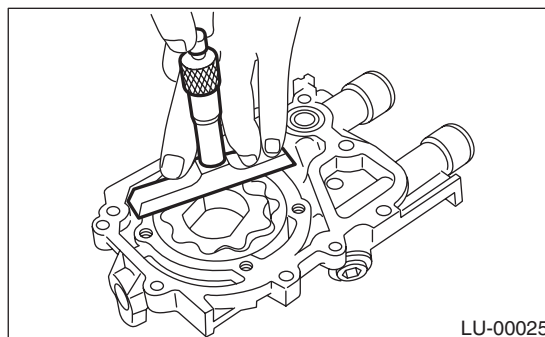
3. SIDE CLEARANCE

Measure the clearance between oil pump inner rotor and pump cover. If the clearance exceeds the standard value, replace the rotor or pump body.

Side clearance:

Standard value

0.02 — 0.07 mm (0.0008 — 0.0028 in)



4. OIL RELIEF VALVE

Check the valve for fitting condition and damage, and the relief valve spring for damage and deterioration. Replace the parts if defective.

Relief valve spring:

Free length

73.7 mm (2.902 in)

Installed length

54.7 mm (2.154 in)

Load when installed

93.1 N (9.49 kgf, 20.88 lb)

5. OIL PUMP CASE

Check the oil pump case for worn shaft hole, clogged oil passage, worn rotor chamber, cracks and other faults.

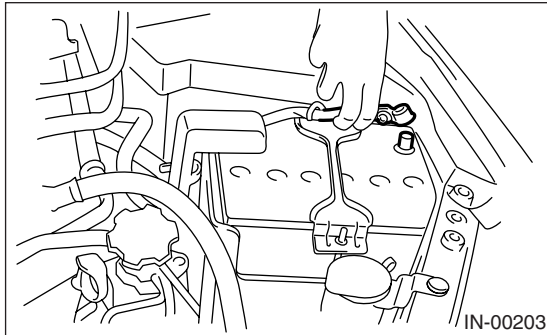
6. OIL SEAL

Check the oil seal lips for deformation, hardening, wear, etc. and replace if defective.

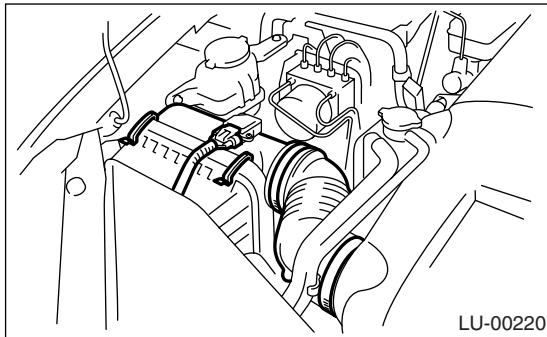
5. Oil Pan and Strainer

A: REMOVAL

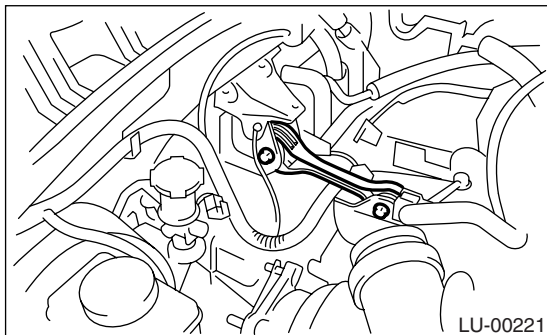
- 1) Set the vehicle on a lift.
- 2) Remove the front wheels.
- 3) Remove the collector cover.
- 4) Disconnect the ground cable from battery.



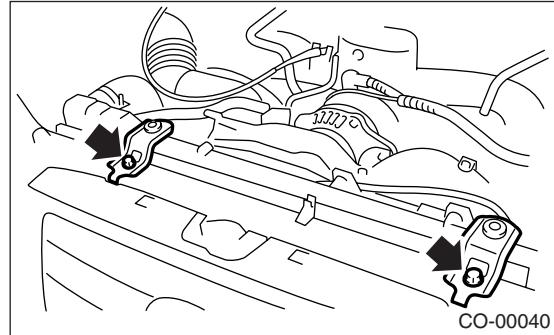
- 5) Disconnect the connector from mass airflow sensor.
- 6) Remove the air intake boot and air cleaner upper cover.



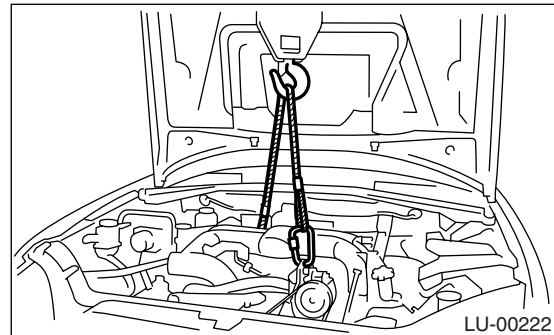
- 7) Remove the intercooler.
<Ref. to IN(H4DOTC)-12, REMOVAL, Intercooler.>
- 8) Remove the pitching stopper.



- 9) Remove the radiator upper brackets.



- 10) Support the engine with a lifting device and wire ropes.

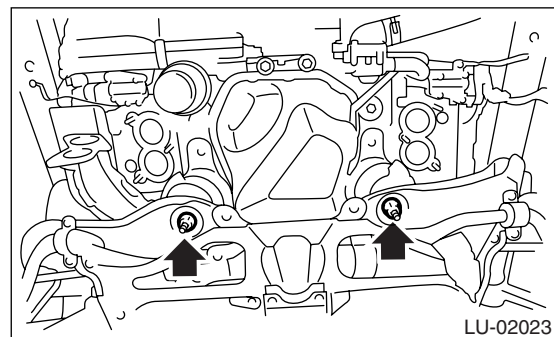


- 11) Lift-up the vehicle.

CAUTION:

When lifting up the vehicle, raise up wire ropes at the same time.

- 12) Remove the under cover.
- 13) Drain engine oil.
- 14) Remove the front exhaust pipe.
<Ref. to EX(H4DOTC)-6, REMOVAL, Front Exhaust Pipe.>
- 15) Remove the nuts which install front cushion rubber onto front crossmember.



- 16) Remove the bolts which install oil pan on cylinder block with the engine raised up.
- 17) Insert the oil pan cutter blade into the clearance between cylinder block and oil pan.

CAUTION:

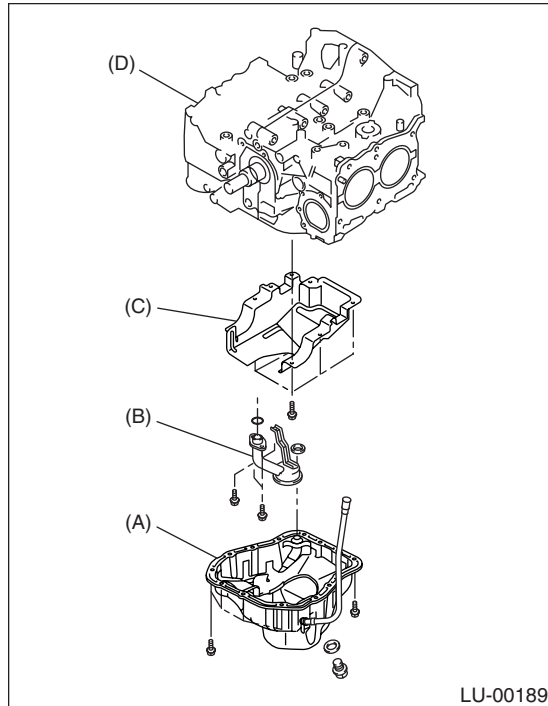
Do not use a screwdriver or similar tool in place of oil pan cutter.

- 18) Remove the oil strainer.

Oil Pan and Strainer

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19) Remove the baffle plate.



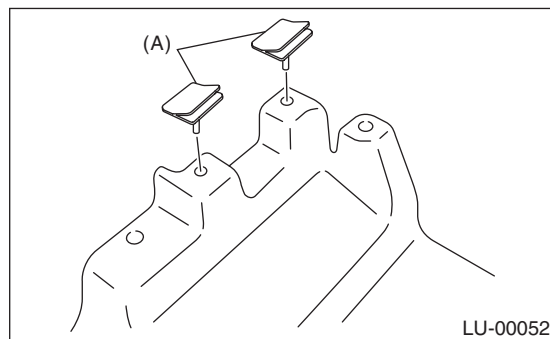
- (A) Oil pan
- (B) Oil strainer
- (C) Baffle plate
- (D) Cylinder block

B: INSTALLATION

CAUTION:

Before installing the oil pan, wipe clean the oil pan and the mating face of engine block.

1) Check the seal (A) is securely installed in baffle plate in the direction as shown in the figure.



2) Install the baffle plate.

Tightening torque:

6.4 N·m (0.65 kgf-m, 4.7 ft-lb)

3) Install the oil strainer onto baffle plate.

NOTE:

Replace O-ring with new one.

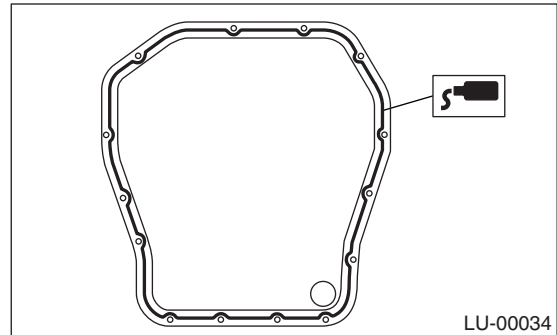
Tightening torque:

10 N·m (1.0 kgf-m, 7.0 ft-lb)

4) Apply liquid gasket to the mating surfaces and install the oil pan.

Liquid gasket:

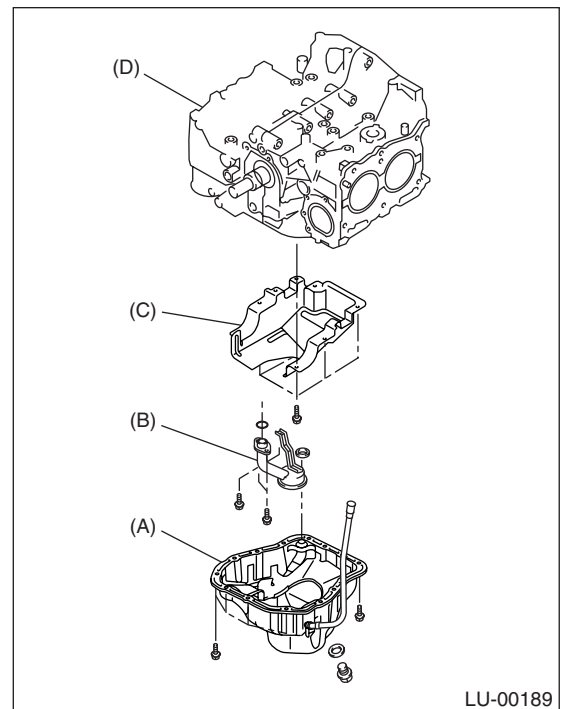
THREE BOND 1207C (Part No. 004403012) or equivalent



5) Tighten the bolts which install oil pan onto engine block.

Tightening torque:

5 N·m (0.5 kgf-m, 3.6 ft-lb)



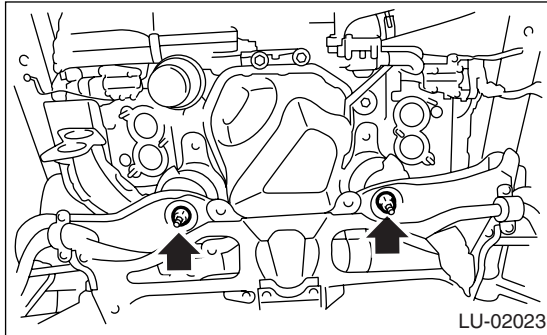
- (A) Oil pan
- (B) Oil strainer
- (C) Baffle plate
- (D) Cylinder block

6) Lower the engine onto front crossmember.

7) Tighten the nuts which hold front cushion rubber onto front crossmember.

Tightening torque:

83 N·m (8.5 kgf-m, 61 ft-lb)



8) Install the front exhaust pipe. <Ref. to EX(H4DOTC)-6, INSTALLATION, Front Exhaust Pipe.> <Ref. to EX(H4SO)-5, INSTALLATION, Front Exhaust Pipe.>

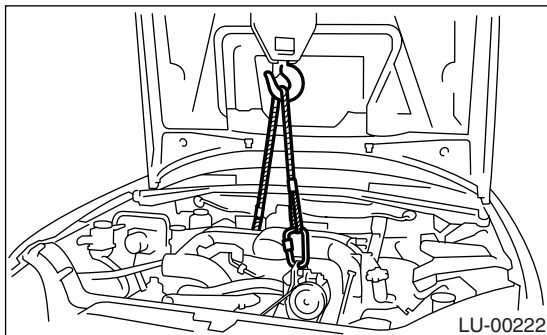
9) Install the under cover.

10) Lower the vehicle.

CAUTION:

When lowering the vehicle, lower the lift-up device and wire ropes at the same time.

11) Remove the lifting device and wire ropes.

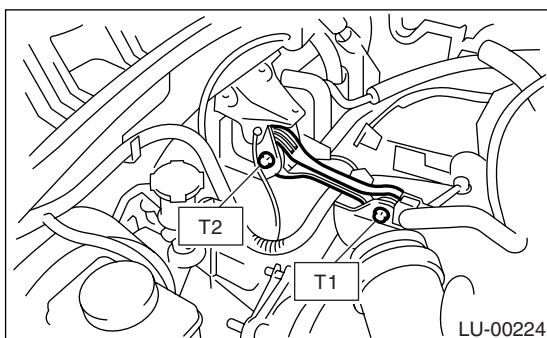


12) Install the pitching stopper.

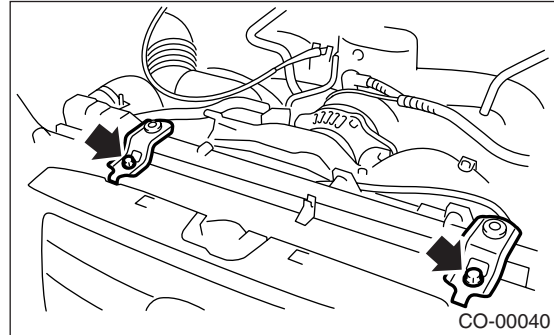
Tightening torque:

T1: 50 N·m (5.1 kgf-m, 36.9 ft-lb)

T2: 58 N·m (5.9 kgf-m, 42.8 ft-lb)



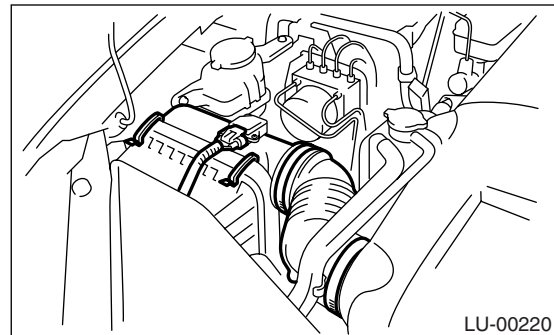
13) Install the radiator upper brackets.



14) Install the intercooler. <Ref. to IN(H4DOTC)-12, INSTALLATION, Intercooler.>

15) Install the air intake boot and air cleaner upper cover.

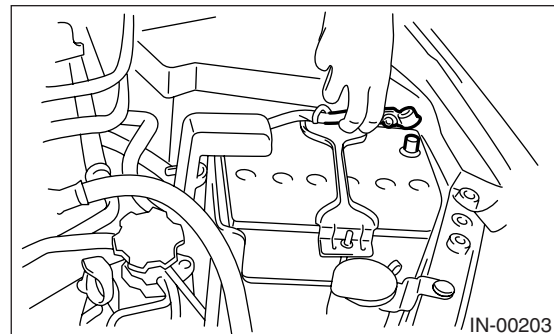
16) Connect the connector to mass air flow sensor.



17) Install the front wheels.

18) Install the collector cover.

19) Connect the battery ground cable to battery.



20) Fill engine oil. <Ref. to LU(H4DOTC)-9, INSPECTION, Engine Oil.>

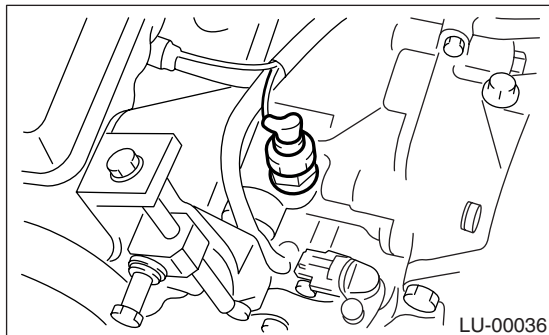
C: INSPECTION

Visually check that the oil pan, oil strainer, oil strainer stay and baffle plate are not damaged.

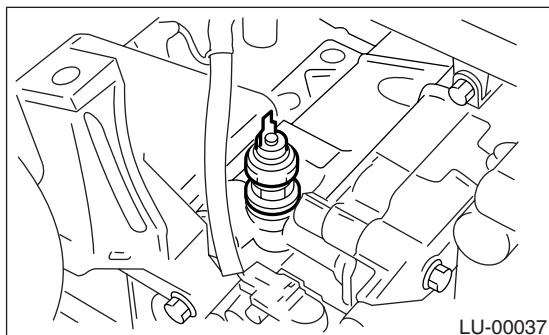
6. Oil Pressure Switch

A: REMOVAL

- 1) Remove the collector cover.
- 2) Remove the generator from bracket. <Ref. to SC(H4SO)-20, REMOVAL, Generator.>
- 3) Disconnect the terminal from oil pressure switch.



- 4) Remove the oil pressure switch.

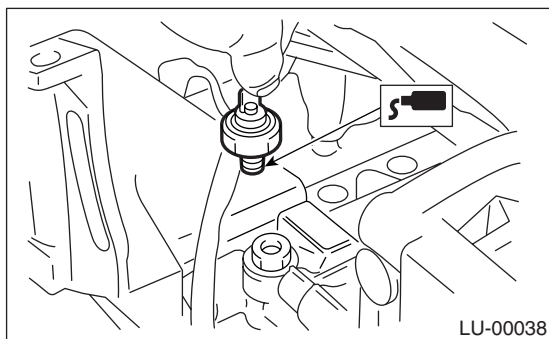


B: INSTALLATION

- 1) Apply liquid gasket to the oil pressure switch threads.

Liquid gasket:

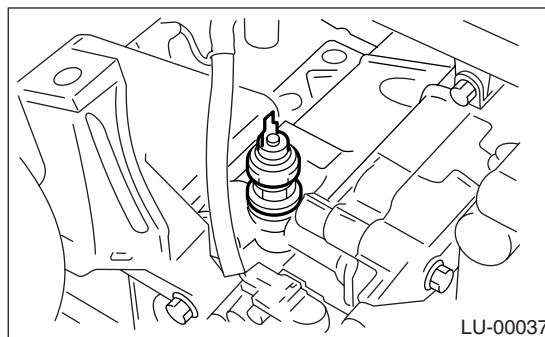
THREE BOND 1324 (Part No. 004403007) or equivalent



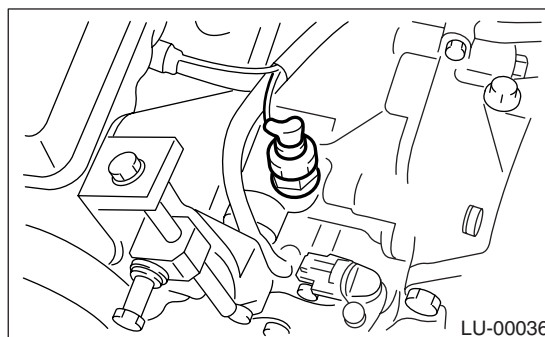
- 2) Install the oil pressure switch onto engine block.

Tightening torque:

25 N·m (2.5 kgf-m, 18.1 ft-lb)



- 3) Connect the terminal to oil pressure switch.



- 4) Install the generator to bracket. <Ref. to SC(H4SO)-20, INSTALLATION, Generator.>
- 5) Install the collector cover.

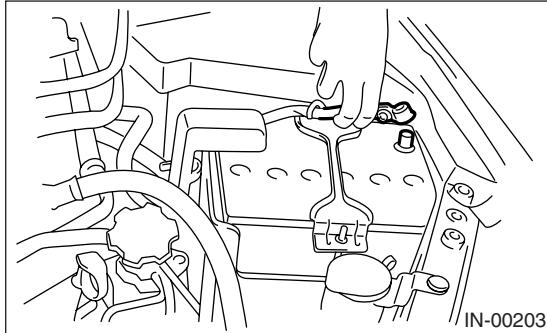
C: INSPECTION

Make sure oil does not leak or seep from where the oil pressure switch is installed.

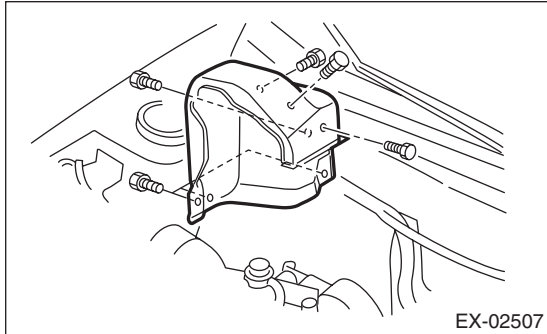
7. Oil Pipe

A: REMOVAL

- 1) Remove the collector cover.
- 2) Disconnect the ground cable from battery.



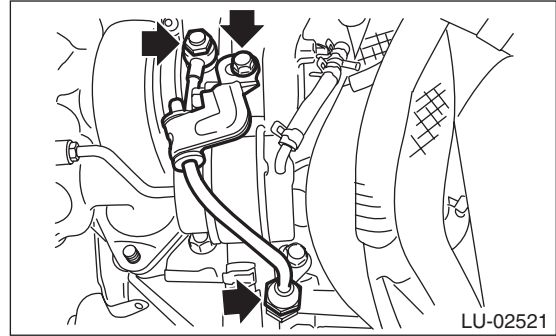
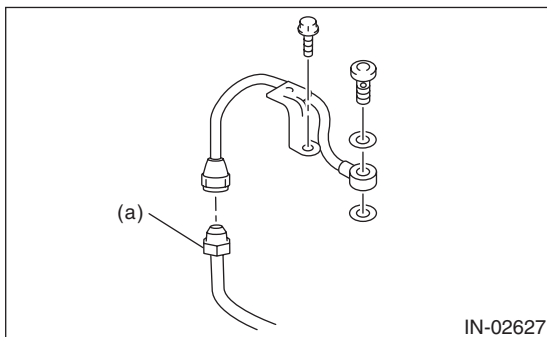
- 3) Remove the intercooler. <Ref. to IN(H4DOTC)-12, REMOVAL, Intercooler.>
- 4) Remove the intercooler bracket RH.
- 5) Remove the turbocharger upper cover.



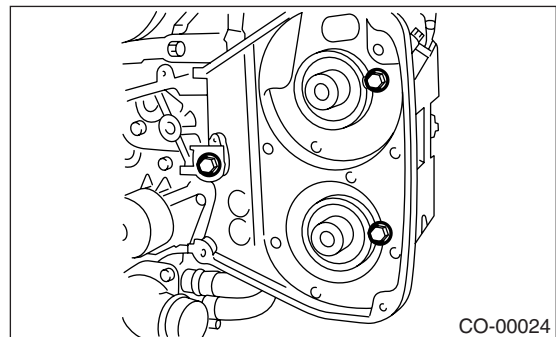
- 6) Remove the oil inlet pipe from the turbocharger.

CAUTION:

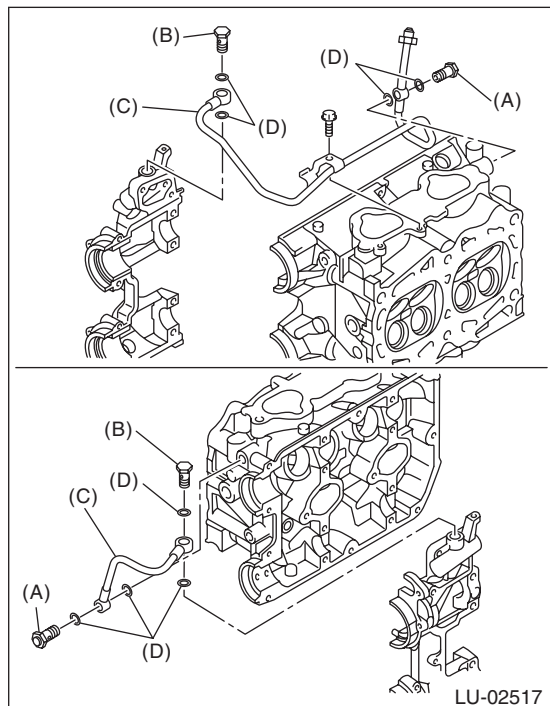
In order to prevent damaging the oil pipe on the cylinder head side, fix the section (a) shown in the figure when loosening the oil inlet pipe flare nut, and avoid the part from rotating together while loosening the nut.



- 7) Remove the intake manifold. <Ref. to FU(H4DOTC)-12, REMOVAL, Intake Manifold.>
- 8) Remove the radiator main fan and radiator sub fan. <Ref. to CO(H4DOTC)-24, REMOVAL, Radiator Main Fan and Fan Motor.> <Ref. to CO(H4DOTC)-27, REMOVAL, Radiator Sub Fan and Fan Motor.>
- 9) Remove the V-belts. <Ref. to ME(H4DOTC)-37, REMOVAL, V-belt.>
- 10) Remove the crank pulley. <Ref. to ME(H4DOTC)-39, REMOVAL, Crank Pulley.>
- 11) Remove the timing belt cover. <Ref. to ME(H4DOTC)-41, REMOVAL, Timing Belt Cover.>
- 12) Remove the timing belt. <Ref. to ME(H4DOTC)-42, REMOVAL, Timing Belt.>
- 13) Remove the cam sprocket LH. <Ref. to ME(H4DOTC)-50, REMOVAL, Cam Sprocket.>
- 14) Remove the belt cover No. 2 LH.



15) Remove the oil pipe.



- (A) Union screw with filter (with protrusion)
 (B) Union screw without filter (without protrusion)
 (C) Oil pipe
 (D) Gasket

B: INSTALLATION

1) Inspect the union screw with filter. <Ref. to LU(H4DOTC)-22, INSPECTING UNION SCREW WITH FILTER, INSPECTION, Oil Pipe.>

2) Install the oil pipe.

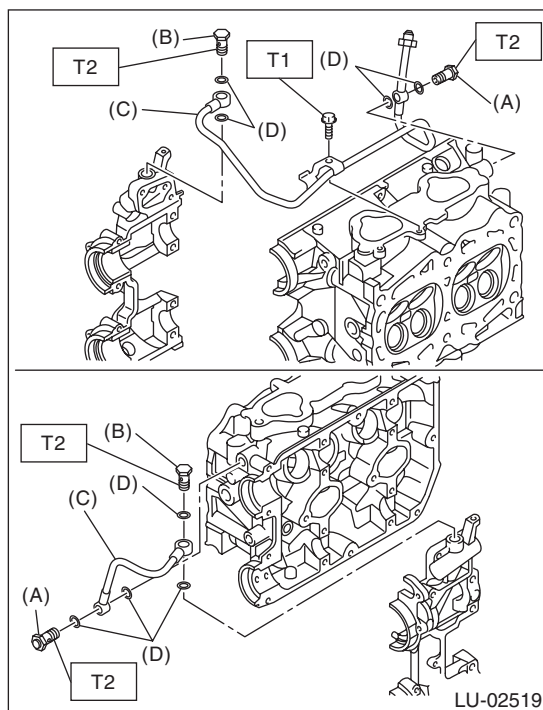
NOTE:

- Make sure not to mix up the union screws with filter and without filter as their installation positions are different.
- Use a new gasket.

Tightening torque:

T1: 8 N·m (0.8 kgf-m, 5.9 ft-lb)

T2: 29 N·m (3.0 kgf-m, 21.4 ft-lb)

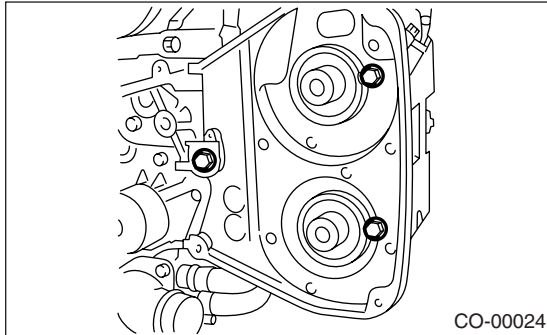


- (A) Union screw with filter (with protrusion)
 (B) Union screw without filter (without protrusion)
 (C) Oil pipe
 (D) Gasket

3) Install the belt cover No. 2 LH.

Tightening torque:

5 N·m (0.5 kgf-m, 3.7 ft-lb)



4) Install the cam sprocket LH. <Ref. to ME(H4DOTC)-50, INSTALLATION, Cam Sprocket.>

5) Install the timing belt. <Ref. to ME(H4DOTC)-44, TIMING BELT, INSTALLATION, Timing Belt.>

6) Install the timing belt cover. <Ref. to ME(H4DOTC)-41, INSTALLATION, Timing Belt Cover.>

7) Install the crank pulley. <Ref. to ME(H4DOTC)-39, INSTALLATION, Crank Pulley.>

8) Install the V-belts. <Ref. to ME(H4DOTC)-37, INSTALLATION, V-belt.>

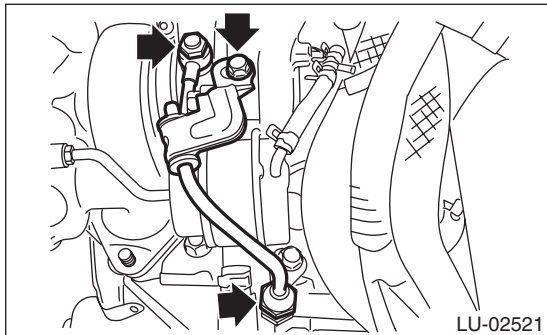
9) Install the radiator main fan and the radiator sub fan. <Ref. to CO(H4DOTC)-24, INSTALLATION, Radiator Main Fan and Fan Motor.> <Ref. to CO(H4DOTC)-27, INSTALLATION, Radiator Sub Fan and Fan Motor.>

10) Install the intake manifold. <Ref. to FU(H4DOTC)-14, INSTALLATION, Intake Manifold.>

11) Temporarily tighten the bolts and flare nuts which secure the oil inlet pipe to the turbocharger.

NOTE:

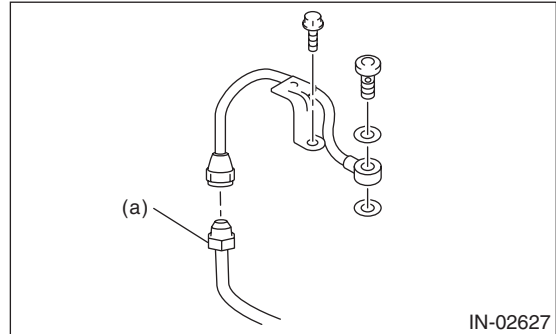
Use a new gasket.



12) Tighten the union screws and flare nuts which secure the oil inlet pipe to the turbocharger.

CAUTION:

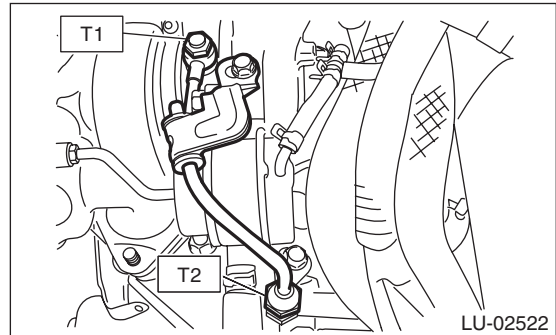
In order to prevent damaging the oil pipe on the cylinder head side, fix the section (a) shown in the figure when tightening the oil inlet pipe flare nut, and avoid the part from rotating together while tightening the nut.



Tightening torque:

T1: 16 N·m (1.6 kgf-m, 11.8 ft-lb)

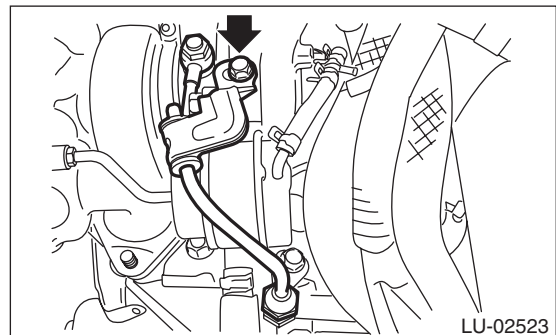
T2: 20 N·m (2.0 kgf-m, 14.8 ft-lb)



13) Tighten the bolts which hold the oil inlet pipe stay to the turbocharger.

Tightening torque:

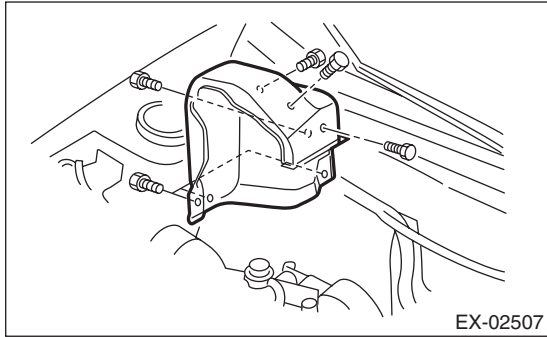
5 N·m (0.5 kgf-m, 3.7 ft-lb)



14) Install the turbocharger upper cover.

Tightening torque:

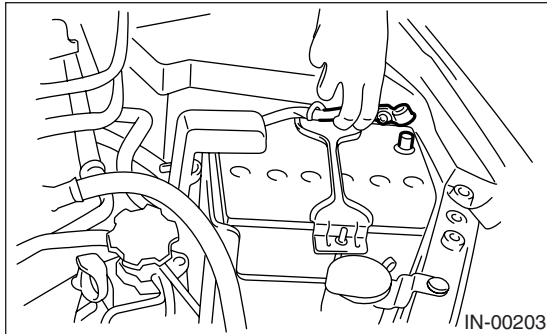
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)



15) Install the intercooler bracket RH.

16) Install the intercooler. <Ref. to IN(H4DOTC)-12, INSTALLATION, Intercooler.>

17) Connect the ground cable to battery.

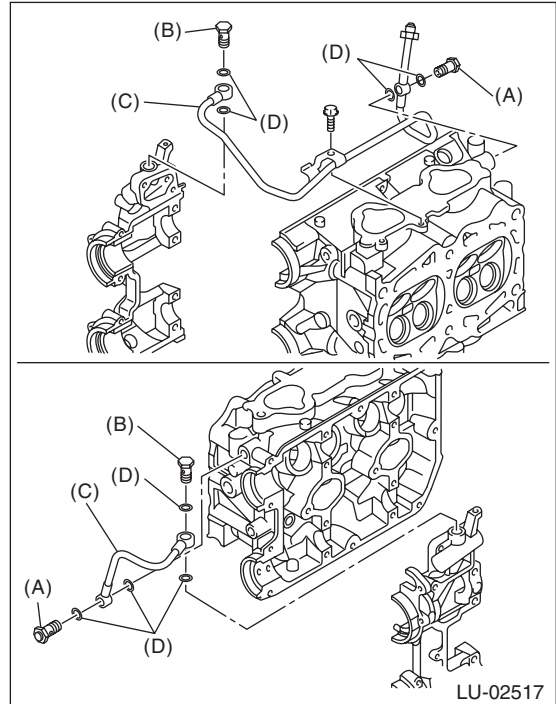


18) Install the collector cover.

C: INSPECTION

1. INSPECTING UNION SCREW WITH FILTER

Check the filter part of union screw for clogging or damage, and if defective, replace the union screw with filter with a new part.



- (A) Union screw with filter (with protrusion)
- (B) Union screw without filter (without protrusion)
- (C) Oil pipe
- (D) Gasket

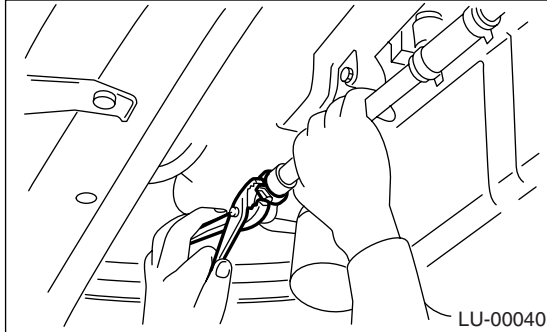
2. OTHER INSPECTIONS

- 1) Check that the oil pipe and union screw have no deformation, cracks and other damages.
- 2) Check that there are no oil leaks or oil oozing from the oil pipe attachment section.

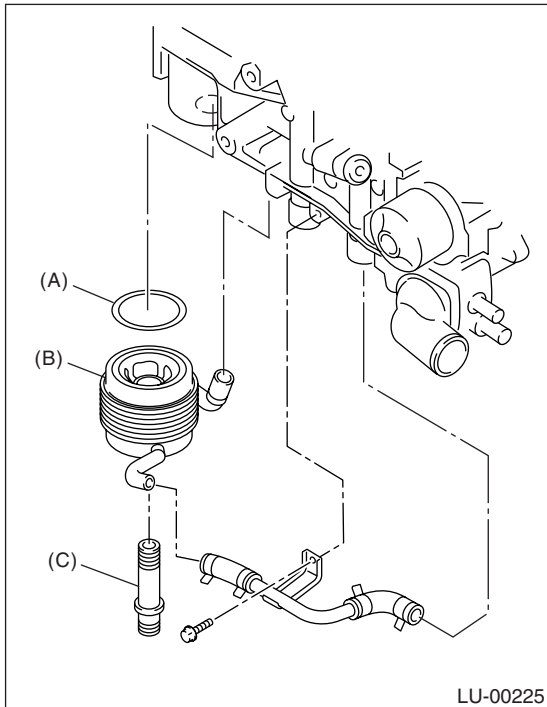
8. Engine Oil Cooler

A: REMOVAL

- 1) Lift-up the vehicle.
- 2) Remove the under cover.
- 3) Drain engine oil.
- 4) Drain coolant.
- 5) Remove the water by-pass pipe between oil cooler and water pump.



- 6) Remove the engine oil filter. <Ref. to LU(H4DOTC)-24, REMOVAL, Engine Oil Filter.>
- 7) Remove the oil cooler connector and remove oil cooler.



- (A) O-ring
- (B) Oil cooler
- (C) Oil cooler connector

B: INSTALLATION

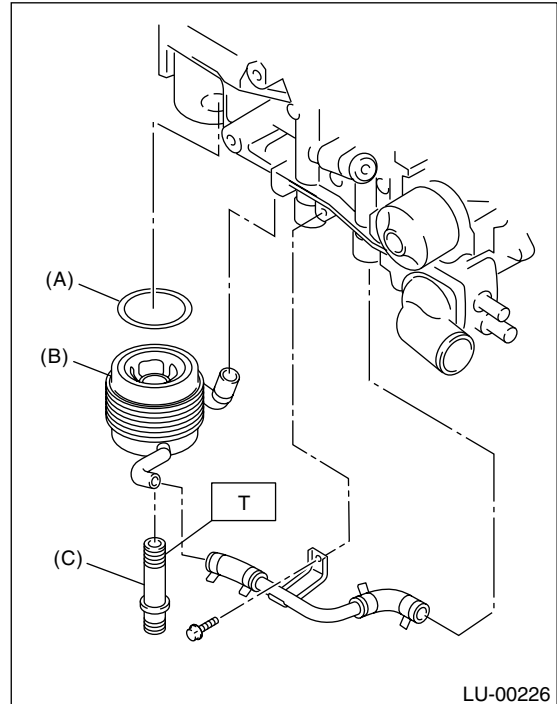
Install in the reverse order of removal.

NOTE:

Use new O-rings.

Tightening torque:

T: 54 N·m (5.5 kgf-m, 40 ft-lb)



- (A) O-ring
- (B) Oil cooler
- (C) Oil cooler connector

C: INSPECTION

- 1) Check that coolant passages are not clogged by blowing compressed air.
- 2) Check the mating surfaces of cylinder block, O-ring groove and oil filter for damage.

9. Engine Oil Filter

A: REMOVAL

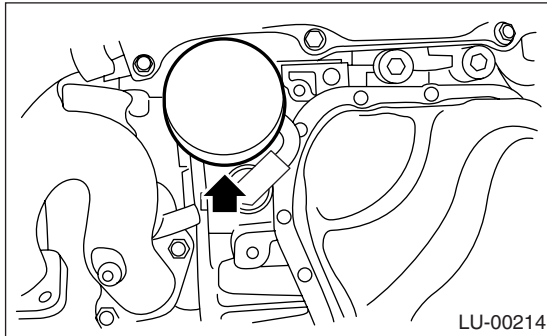
- 1) Lift-up the vehicle.
- 2) Remove the under cover.
- 3) Remove the oil filter using STs.

ST 18332AA000 OIL FILTER WRENCH (Outer diameter: 68 mm (2.68 in))

ST 18332AA010 OIL FILTER WRENCH (Outer diameter: 65 mm (2.56 in))

NOTE:

Standard oil filter is outer diameter of 68 mm (2.68 in). However, SUBARU genuine oil filter having outer diameter of 65 mm (2.56 in) can also be used.



B: INSTALLATION

- 1) Clean the oil filter installation surface on cylinder block or oil cooler.
- 2) Obtain a new oil filter and apply a thin coat of engine oil to seal rubber.
- 3) Install the oil filter, turning it by hand, being careful not to damage seal rubber.
- 4) Tighten more after the seal rubber contacts oil cooler.

NOTE:

- In case of oil filter in diameter 68 mm (2.68 in), tighten by approx. one turn.
- In case of oil filter in diameter 65 mm (2.56 in), tighten by approx. 2/3 to 3/4 turn.
- Over-tightening may cause oil leak.

- 5) Install the under cover.
- 6) Lower the vehicle.

C: INSPECTION

- 1) After installing the oil filter, run the engine and make sure that no oil is leaking around seal rubber.

NOTE:

The filter element and filter case are permanently jointed; therefore, interior cleaning is not necessary.

- 2) Check the engine oil level.

<Ref. to LU(H4DOTC)-9, INSPECTION, Engine Oil.>

10.Engine Lubrication System Trouble in General

A: INSPECTION

Before performing diagnosis, make sure that the engine oil level is correct and no oil leakage exists.

Symptom	Possible cause		Corrective action
1. Warning light remains on.	1) Oil pressure switch failure	Cracked diaphragm or oil leakage within switch	Replace.
		Broken spring or seized contacts	Replace.
	2) Low oil pressure	Clogging of oil filter	Replace.
		Malfunction of oil by-pass valve in oil filter	Clean or replace.
		Malfunction of oil relief valve in oil pump	Clean or replace.
		Clogged oil passage	Clean.
		Excessive tip clearance and side clearance of oil pump rotor and gear	Replace.
		Clogged oil strainer or broken pipe	Clean or replace.
	3) No oil pressure	Insufficient engine oil	Replenish.
		Broken pipe of oil strainer	Replace.
		Stuck oil pump rotor	Replace.
2. Warning light does not come on.	1) Malfunction of combination meter		Replace.
	2) Poor contact of switch contact points		Replace.
	3) Disconnection of wiring		Repair.
3. Warning light flickers momentarily.	1) Poor contact at terminals		Repair.
	2) Defective wiring harness		Repair.
	3) Low oil pressure		Check for the same possible causes as listed in 1).— 2).

