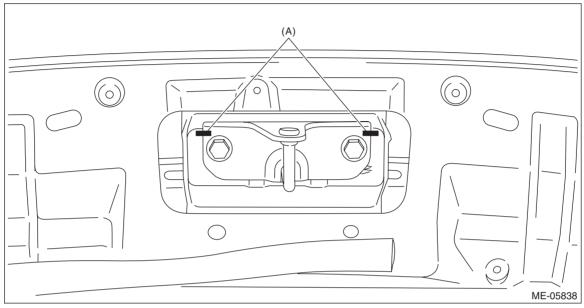
8. Oil Level Switch

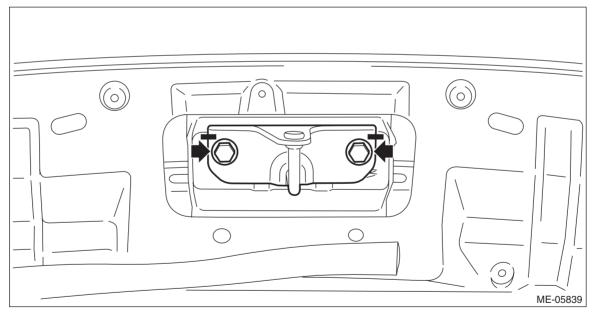
A: REMOVAL

1. GASOLINE ENGINE MODEL

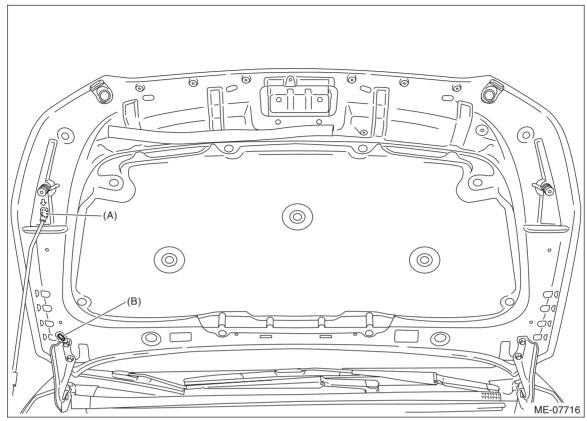
1) Open the front hood, and make alignment marks (A) on the front hood striker and the front hood using a marker pen.



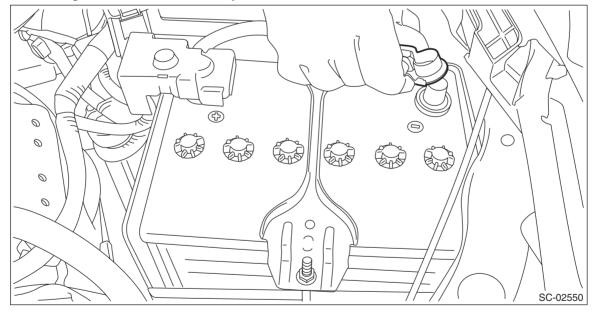
2) Remove the front hood striker from the front hood.



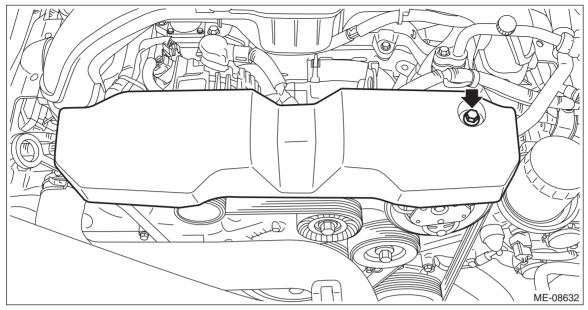
3) Change the front hood stay position from (A) to (B), and completely open the front hood.



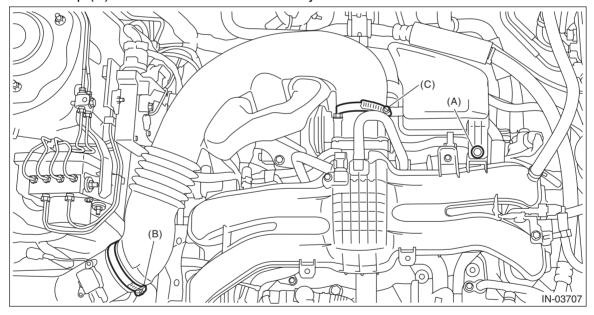
4) Disconnect the ground cable from battery.



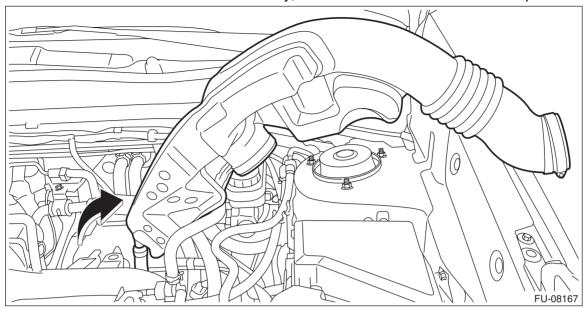
5) Remove the V-belt covers.



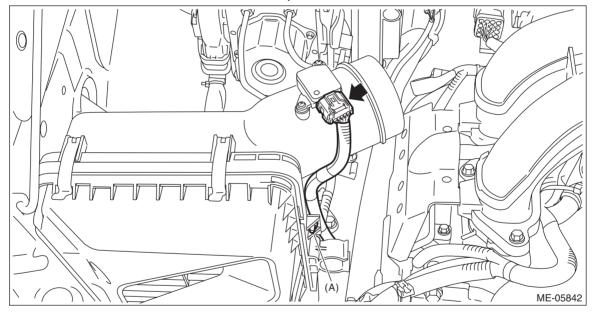
- 6) Remove the air intake duct. <Ref. to IN(H4DO(w/o HEV))-13, REMOVAL, Air Intake Duct.>
- 7) Remove the clip (A) from the air intake boot.
- 8) Loosen the clamp (B) securing the air cleaner case (rear) to the air intake boot.
 9) Loosen the clamp (C) which secures the throttle body to the air intake boot.



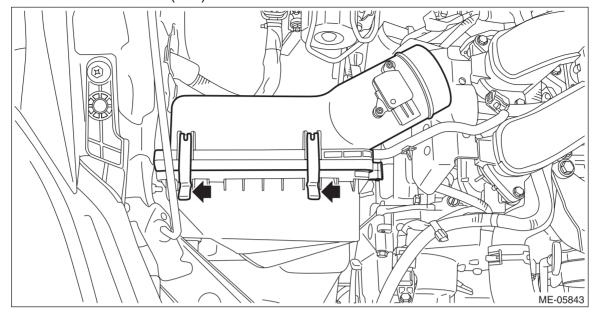
10) Remove the air intake boot from the throttle body, and move it to the left side wheel apron.



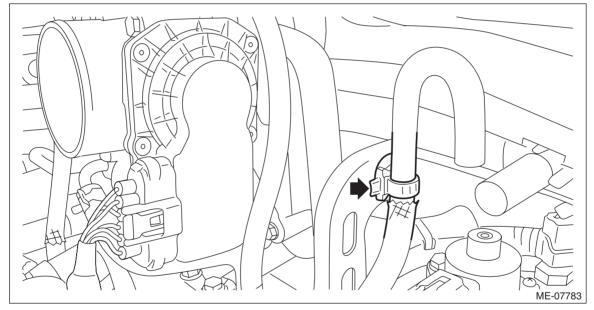
11) Disconnect the connector from the mass air flow and intake air temperature sensor, and remove the clip (A) which holds the mass air flow and intake air temperature sensor harness.



12) Remove the air cleaner case (rear).

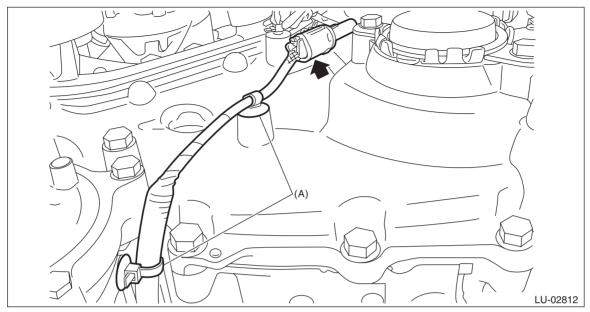


13) Remove the clip holding the air breather hose to the engine rear hanger. (MT model)

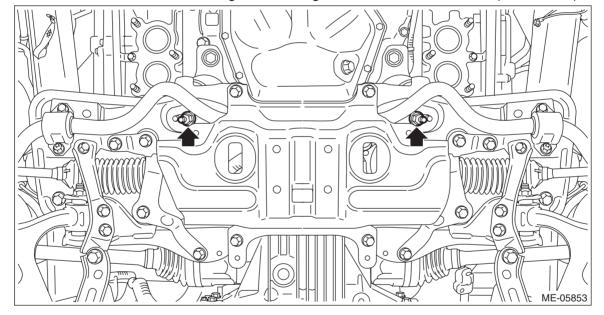


- 14) Lift up the vehicle.
- 15) Remove the under cover. <Ref. to EI-32, REMOVAL, Front Under Cover.>
- 16) Drain the engine oil. <Ref. to LU(H4DO(w/o HEV))-13, REPLACEMENT, Engine Oil.>
- 17) Remove the front exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-6, REMOVAL, Front Exhaust Pipe.>

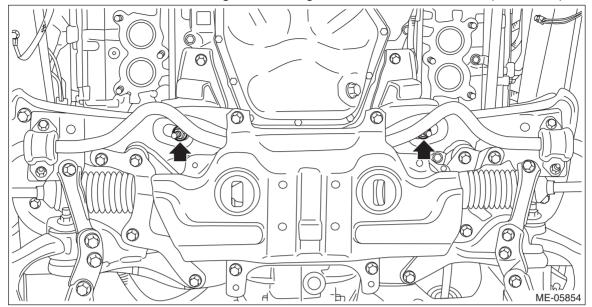
18) Disconnect the oil level switch connector from the engine harness, and remove the clip (A) securing the harness.



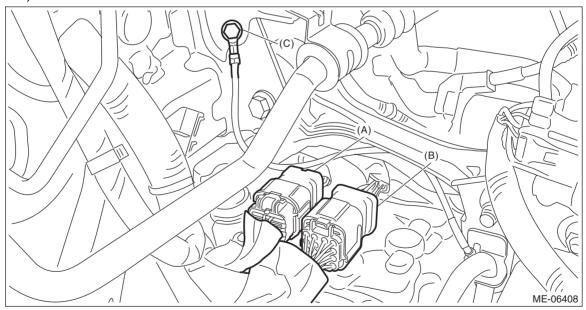
19) Remove the nuts which secure the engine mounting to the front crossmember. (CVT model)



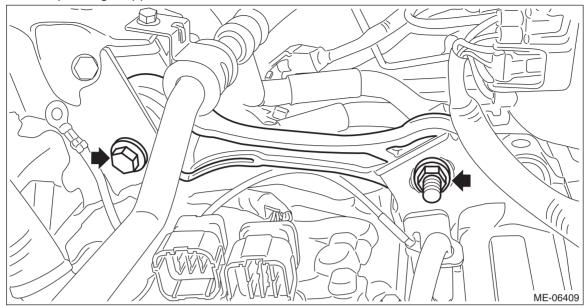
20) Remove the nuts which secure the engine mounting to the front crossmember. (MT model)



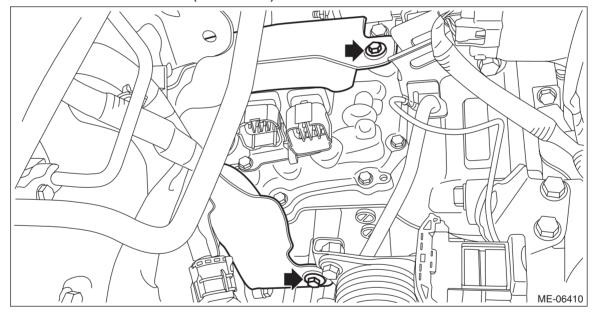
- 21) Remove the electric power steering gearbox. <Ref. to PS-28, REMOVAL, Electric Power Steering Gearbox.>
- 22) Remove the front drive shaft LH. <Ref. to DS-56, REMOVAL, Front Drive Shaft.>
- 23) Lower the vehicle.
- 24) Disconnect the bulkhead harness connector from the transmission harness connector (A) and the inhibitor harness connector (B), and disconnect the transmission radio ground terminal (C) from the vehicle body. (CVT model)



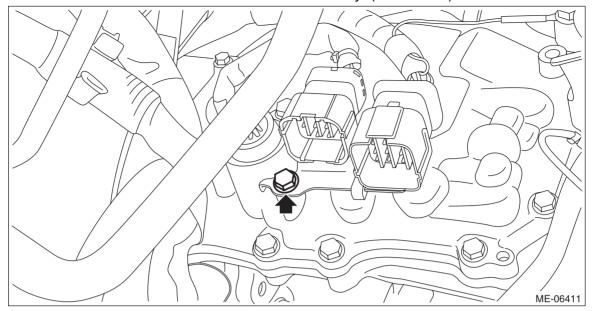
25) Remove the pitching stopper.



26) Remove the transmission cover. (CVT model)



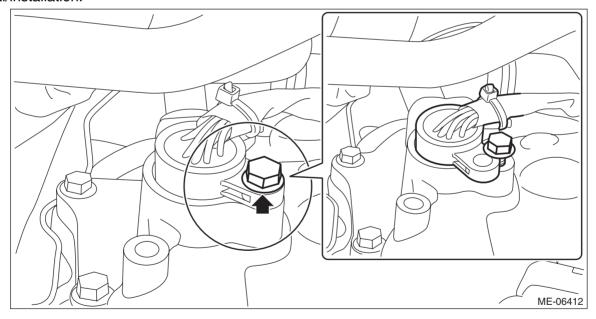
27) Remove the bolt which holds the transmission harness stay. (CVT model)



28) Remove the bolt which holds the transmission harness to the control valve body, and turn the transmission harness clockwise till the bolt hole can be seen as shown in the figure, and tighten the bolt to temporary lock the harness. (CVT model)

NOTE:

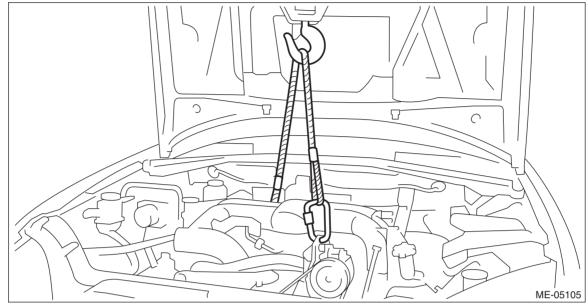
This procedure is required to prevent the transmission harness from touching the vehicle body during engine removal/installation.



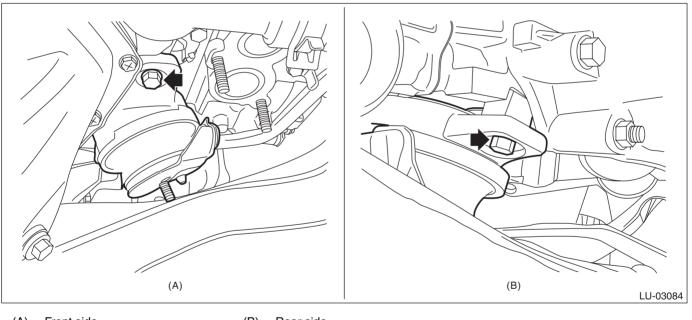
29) Lift up the engine with a lifting device and wire ropes.

CAUTION:

When lifting up the engine, pay attention to the clearance of each part and be careful not to lift the engine too much, in order to prevent damaging the vehicle.

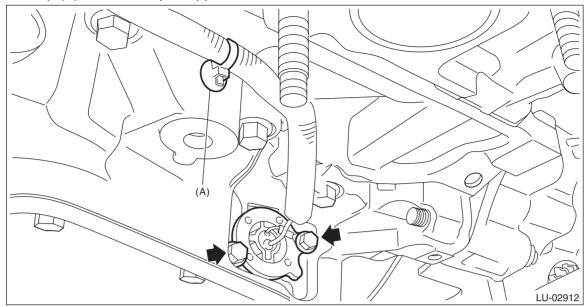


30) Remove the engine mounting LH from the engine.



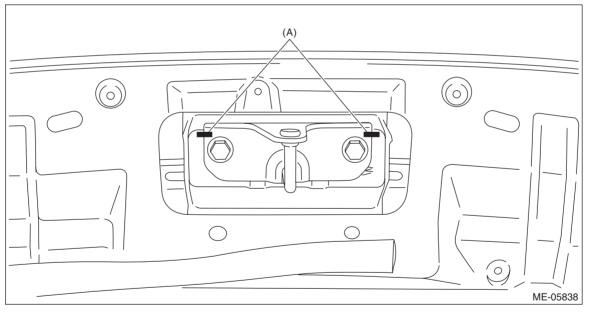
(B) Rear side

31) Remove clip (A) from the oil pan upper, and remove the oil level switch.

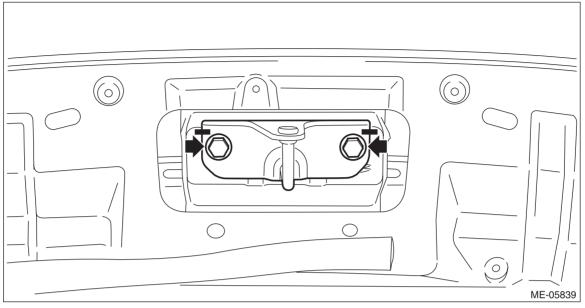


2. HEV MODEL

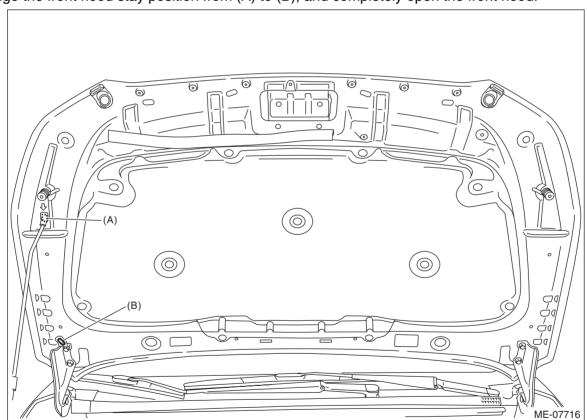
- 1) Turn the ignition switch to OFF.
- 2) Open the front hood, and make alignment marks (A) on the front hood striker and the front hood using a marker pen.



3) Remove the front hood striker from the front hood.



4) Change the front hood stay position from (A) to (B), and completely open the front hood.



5) Disconnect the ground cable from battery. <Ref. to NT-5, BATTERY, NOTE, Note.>

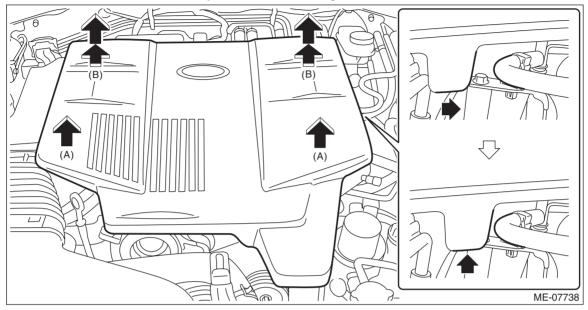
NOTE:

For the 12 volt engine restart battery, disconnect the ground terminal from 12V engine restart battery sensor.

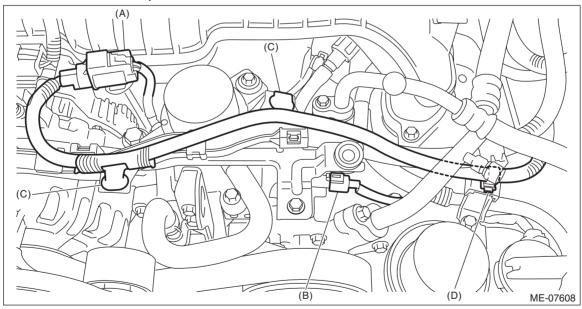
- 6) Remove the collector cover.
 - (1) Carefully pull up the front of collector cover at two positions (A).
 - (2) Carefully pull up the rear of collector cover at two positions (B) while moving it backward.

NOTE:

Be careful not to contact the fuel delivery tube when moving the collector cover rearward.

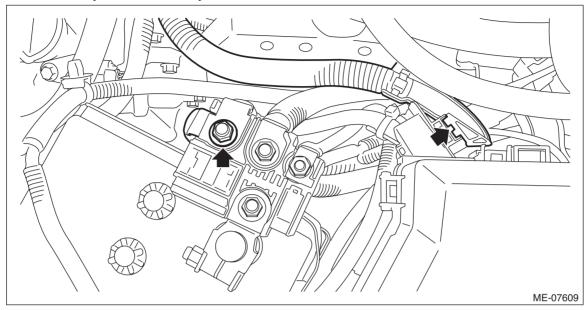


- 7) Remove the air intake duct. <Ref. to IN(H4DO(HEV))-15, REMOVAL, Air Intake Duct.>
- 8) Remove the air cleaner case. <Ref. to IN(H4DO(HEV))-6, REMOVAL, Air Cleaner Case.>
- 9) Disconnect the connector (A) from the brake vacuum pump, and disconnect the connector (B) from the A/C compressor.
- 10) Remove the clip (C) and the clip (D) securing the harness to the battery cable assembly, and move the harness to the left side wheel apron.

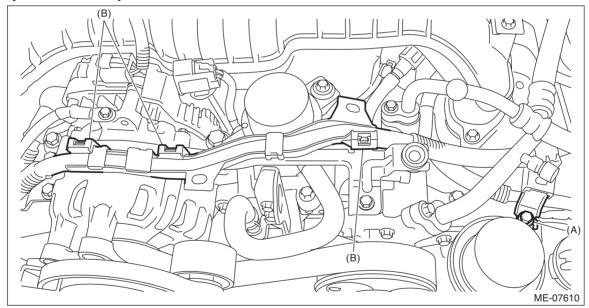


11) Remove the terminal boot from the positive terminal of the 12 volt auxiliary battery.

12) Remove the nuts fastening the battery cable assembly to the slow blow fuse (12 volt auxiliary battery), and remove the battery cable assembly from the main fuse box.

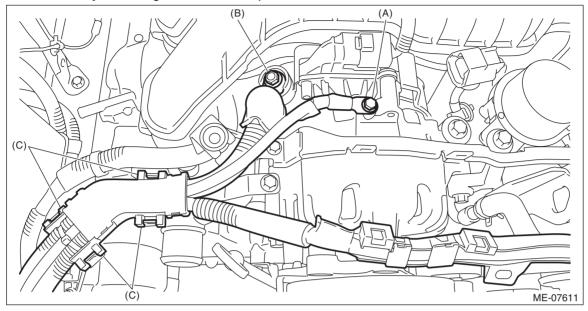


13) Remove the bolt (A) securing the battery cable stay to the chain cover, and remove the clip (B) securing the battery cable assembly to the collector cover bracket.

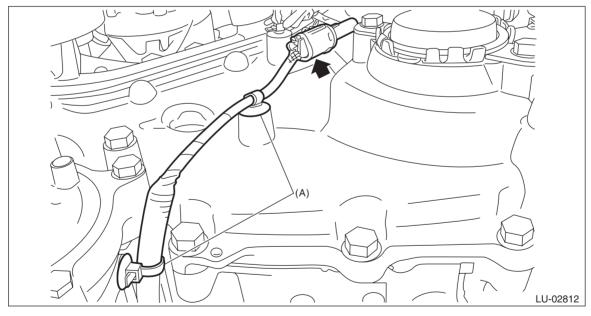


14) Disconnect the terminal (A) and the terminal (B) from ISG.

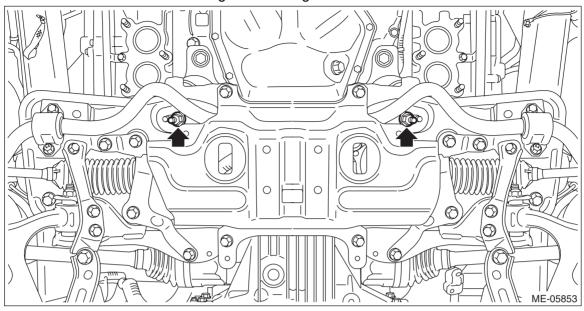
15) Remove the clip (C) securing the battery cable assembly to the battery cable bracket No. 1, and move the battery cable assembly to the right side wheel apron.



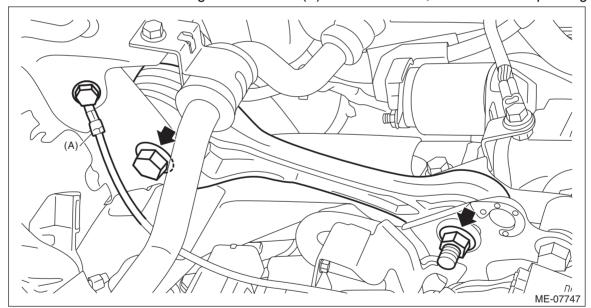
- 16) Lift up the vehicle.
- 17) Remove the under cover. <Ref. to El-32, REMOVAL, Front Under Cover.>
- 18) Drain the engine oil. <Ref. to LU(H4DO(w/o HEV))-13, REPLACEMENT, Engine Oil.>
- 19) Remove the front exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-6, REMOVAL, Front Exhaust Pipe.>
- 20) Disconnect the oil level switch connector from the engine harness, and remove the clip (A) securing the harness.



21) Remove the nuts which secure the engine mounting to the front crossmember.

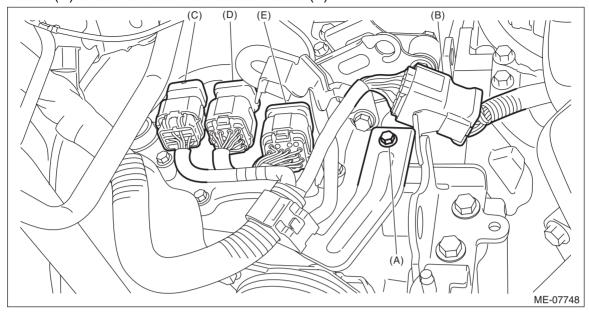


- 22) Remove the electric power steering gearbox. <Ref. to PS-28, REMOVAL, Electric Power Steering Gearbox.>
- 23) Remove the front drive shaft LH. <Ref. to DS-56, REMOVAL, Front Drive Shaft.>
- 24) Lower the vehicle.
- 25) Disconnect the transmission radio ground terminal (A) from the vehicle, and remove the pitching stopper.

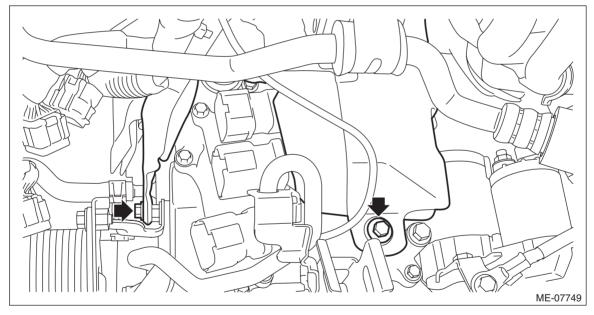


26) Remove the bolt (A) securing the bulkhead harness connector bracket, and disconnect the bulkhead harness connector from the engine harness connector (brown) (B).

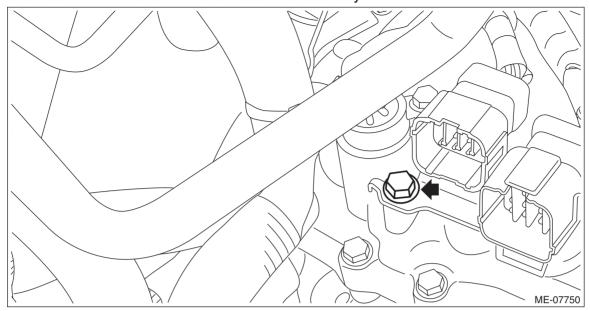
27) Disconnect the bulkhead harness connector from the transmission harness connector (C), inhibitor harness connector (D) and drive motor harness connector (E).



28) Remove the transmission case cover.



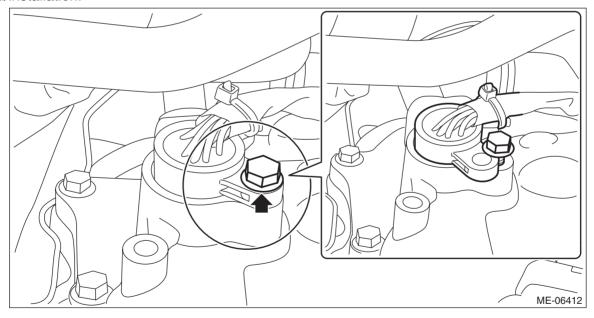
29) Remove the bolt which holds the transmission harness stay.



30) Remove the bolt which holds the transmission harness to the control valve body, and turn the transmission harness clockwise till the bolt hole can be seen as shown in the figure, and tighten the bolt to temporary lock the harness. (CVT model)

NOTE:

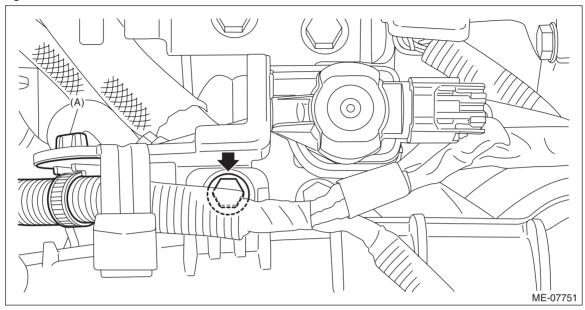
This procedure is required to prevent the transmission harness from touching the vehicle body during engine removal/installation.



31) Remove the clip (A) securing the engine harness to the purge control solenoid valve bracket, and disconnect the bolt securing the purge control solenoid valve bracket to the intake manifold.

NOTE:

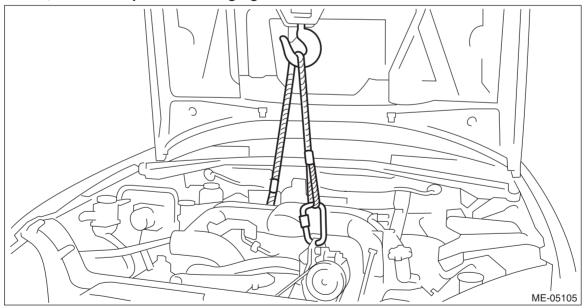
This operation is required to prevent the wire rope from contacting the purge control solenoid valve while lifting the engine.



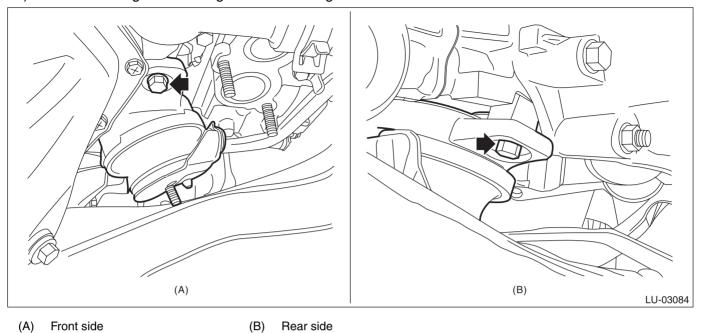
32) Lift up the engine with a lifting device and wire ropes.

CAUTION:

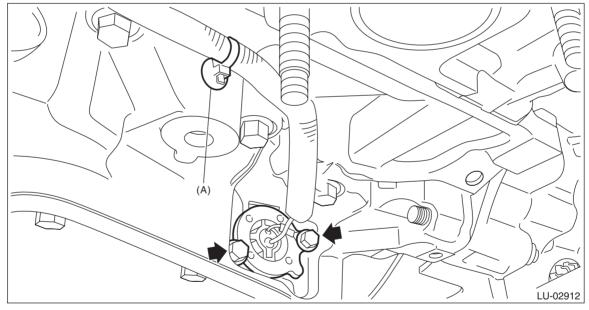
When lifting up the engine, pay attention to the clearance of each part and be careful not to lift the engine too much, in order to prevent damaging the vehicle.



33) Remove the engine mounting LH from the engine.



34) Remove clip (A) from the oil pan upper, and remove the oil level switch.



B: INSTALLATION

1. GASOLINE ENGINE MODEL

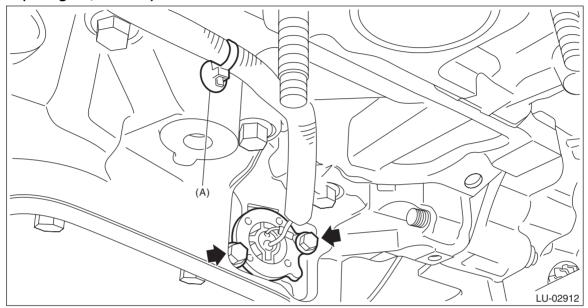
1) Install the oil level switch and the clip (A) to the oil pan upper.

NOTE:

- Use new O-rings.
- Apply a coat of engine oil to the O-rings.

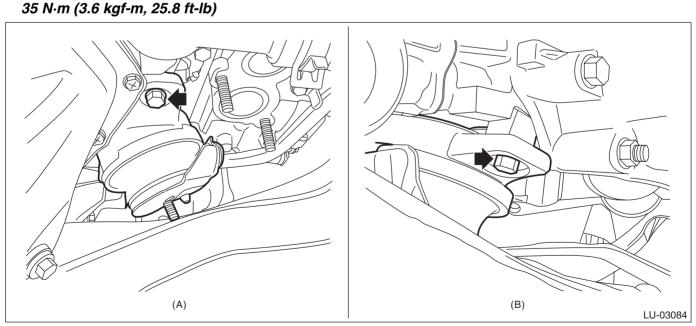
Tightening torque:

6.4 N·m (0.7 kgf-m, 4.7 ft-lb)



2) Install the engine mounting LH onto the engine.

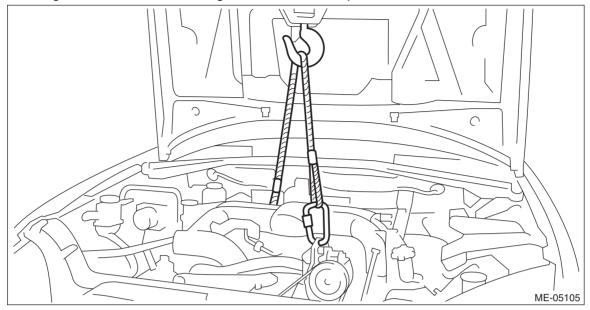
Tightening torque:



(A) Front side

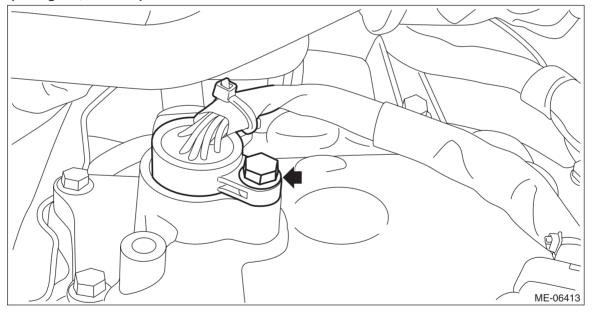
(B) Rear side

3) Lower the engine and remove the lifting device and wire ropes.



4) Remove the bolt and turn the transmission harness counterclockwise to install the transmission harness to the control valve body. (CVT model)

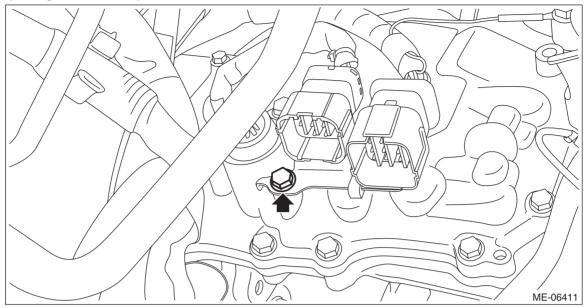
Tightening torque: 7 N·m (0.7 kgf-m, 5.2 ft-lb)



5) Install the bolt which holds the transmission harness stay. (CVT model)

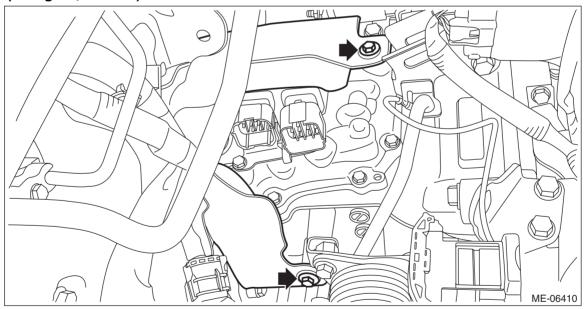
Tightening torque:

7 N·m (0.7 kgf-m, 5.2 ft-lb)



6) Install the transmission case cover. (CVT model)

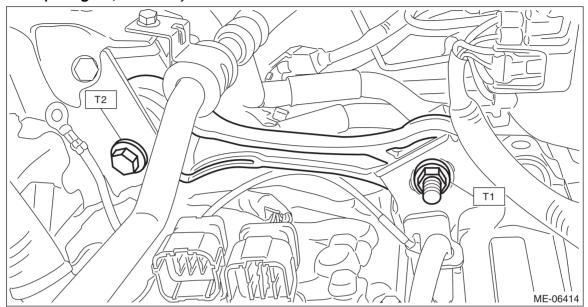
Tightening torque: 8 N·m (0.8 kgf-m, 5.9 ft-lb)



7) Install the pitching stopper.

Tightening torque:

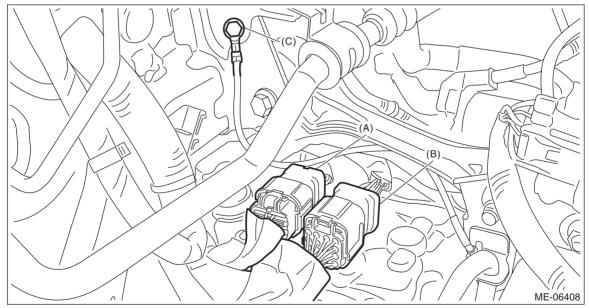
T1: 50 N·m (5.1 kgf-m, 36.9 ft-lb) T2: 58 N·m (5.9 kgf-m, 42.8 ft-lb)



8) Connect the transmission radio ground terminal (C) to the vehicle body, and connect the bulkhead harness connector to the transmission harness connector (A) and the inhibitor harness connector (B). (CVT model)

Tightening torque:

13 N⋅m (1.3 kgf-m, 9.6 ft-lb)



- 9) Install the electric power steering gearbox. <Ref. to PS-32, INSTALLATION, Electric Power Steering Gearbox.>
- 10) Install the front drive shaft LH. <Ref. to DS-57, INSTALLATION, Front Drive Shaft.>

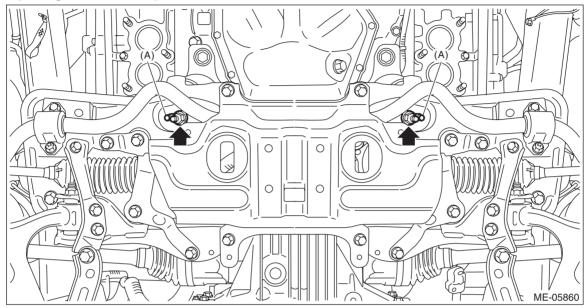
11) Install the nuts which hold the engine mounting to the crossmember. (CVT model)

NOTE:

- Make sure that locators (A) of the engine mounting are securely inserted.
- Use a new nut.

Tightening torque:

60 N⋅m (6.1 kgf-m, 44.3 ft-lb)



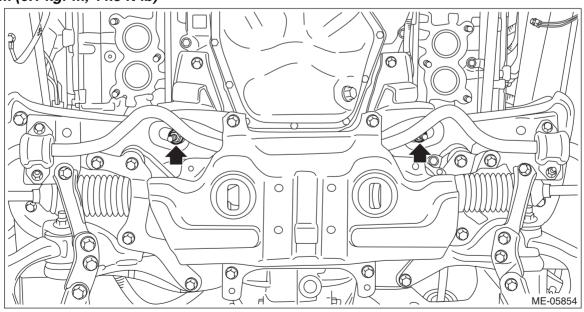
12) Install the nuts which hold the engine mounting to the crossmember. (MT model)

NOTE:

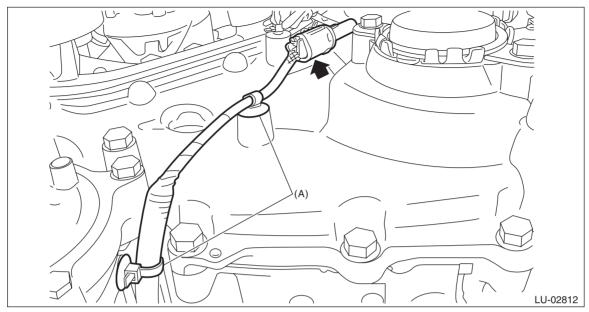
Use a new nut.

Tightening torque:

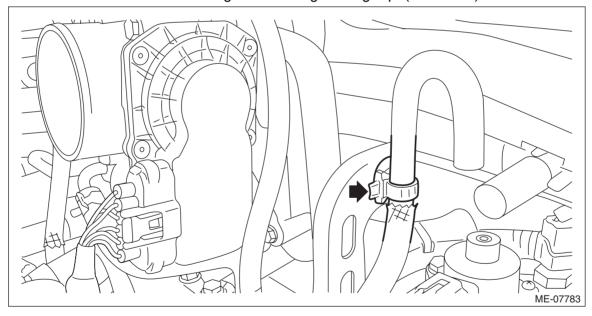
60 N·m (6.1 kgf-m, 44.3 ft-lb)



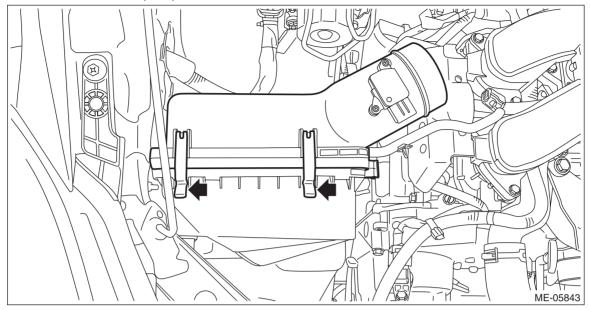
13) Connect the connector of oil level switch to the engine harness, and install the clip (A) securing the harness.



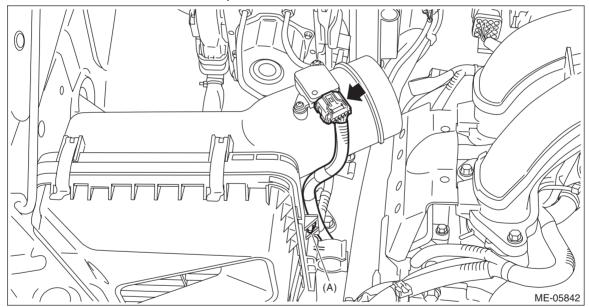
- 14) Install the front exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-8, INSTALLATION, Front Exhaust Pipe.>
- 15) Install the under cover.
- 16) Lower the vehicle.
- 17) Secure the air breather hose to the engine rear hanger using clip. (MT model)



18) Install the air intake case (rear).



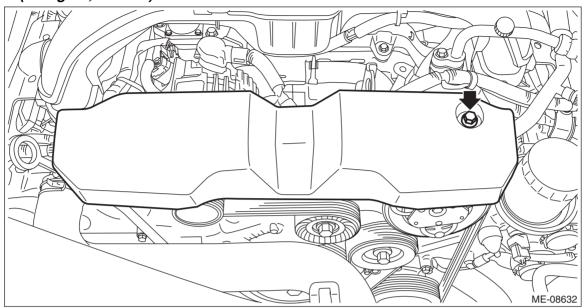
19) Install the clip (A) which secures the air flow and intake air temperature sensor harness, and connect the connector to the air flow and intake air temperature sensor.



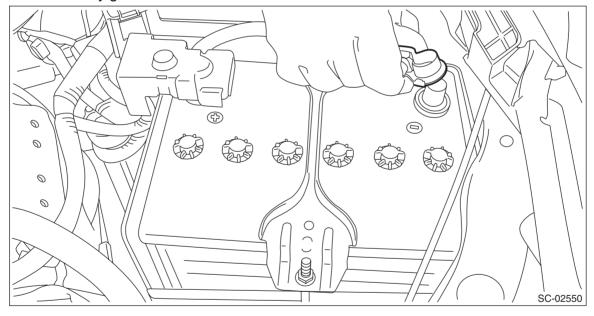
20) Install the air intake boot. <Ref. to IN(H4DO(w/o HEV))-12, INSTALLATION, Air Intake Boot.> 21) Install the air intake duct. <Ref. to IN(H4DO(w/o HEV))-13, INSTALLATION, Air Intake Duct.>

22) Install the V-belt cover.

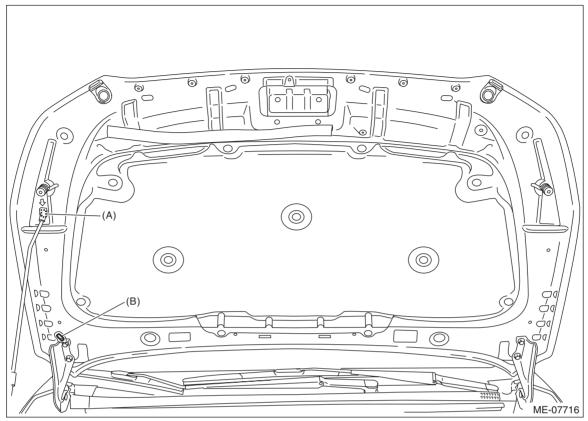
Tightening torque: 6.4 N⋅m (0.7 kgf-m, 4.7 ft-lb)



- 23) Refill the engine oil. <Ref. to LU(H4DO(w/o HEV))-13, REPLACEMENT, Engine Oil.>
- 24) Connect the battery ground terminal.

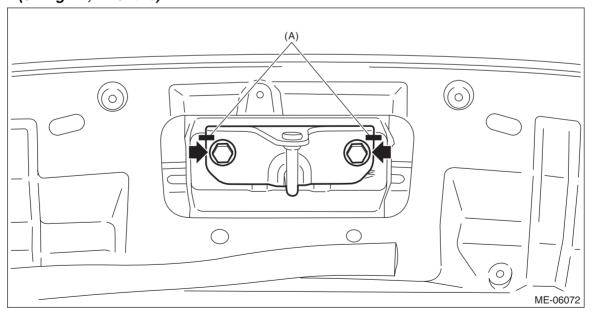


25) Change the front hood stay position from (B) to (A).



26) Install the front hood striker to the front hood by aligning the alignment marks (A), and close the front hood.

Tightening torque: 33 N⋅m (3.4 kgf-m, 24.3 ft-lb)



2. HEV MODEL

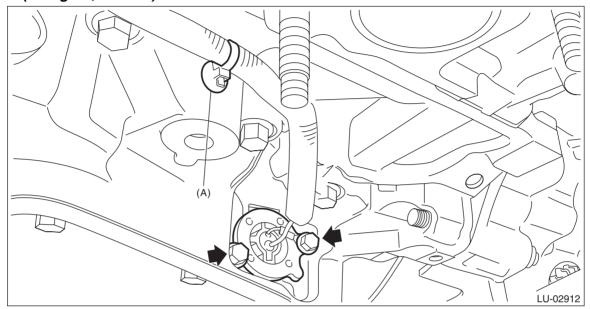
1) Install the oil level switch and the clip (A) to the oil pan upper.

NOTE:

- Use new O-rings.
- Apply a coat of engine oil to the O-rings.

Tightening torque:

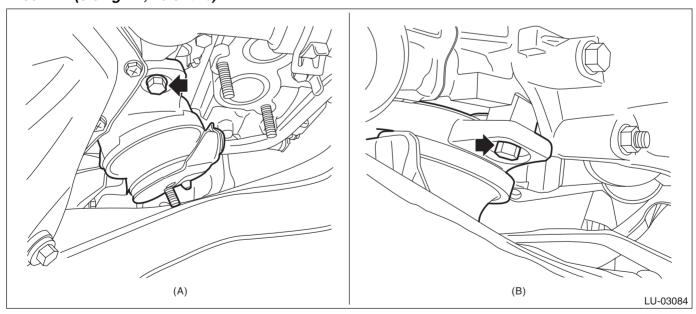
6.4 N·m (0.7 kgf-m, 4.7 ft-lb)



2) Install the engine mounting LH onto the engine.

Tightening torque:

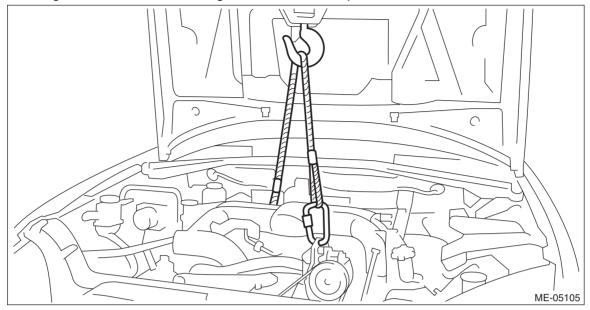
35 N⋅m (3.6 kgf-m, 25.8 ft-lb)



(A) Front side

(B) Rear side

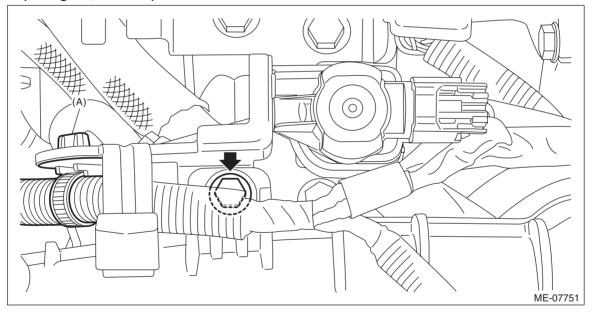
3) Lower the engine and remove the lifting device and wire ropes.



4) Install the bolts which secure the purge control solenoid valve bracket to the intake manifold, and secure the engine harness to the purge control solenoid valve bracket with the clip (A).

Tightening torque:

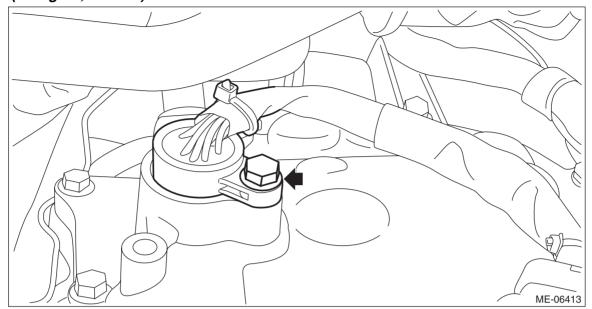
6.4 N·m (0.7 kgf-m, 4.7 ft-lb)



5) Remove the bolt and turn the transmission harness counterclockwise to install the transmission harness to the control valve body.

Tightening torque:

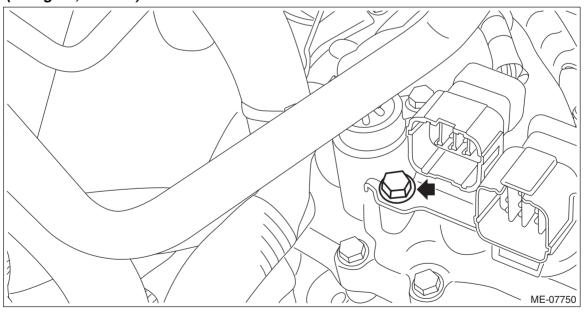
7 N·m (0.7 kgf-m, 5.2 ft-lb)



6) Install the bolt which holds the transmission harness stay.

Tightening torque:

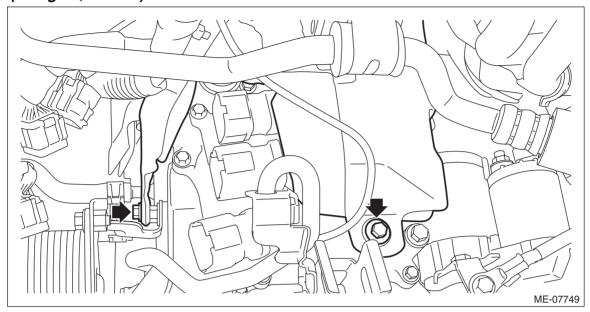
7 N⋅m (0.7 kgf-m, 5.2 ft-lb)



7) Install the transmission case cover.

Tightening torque:

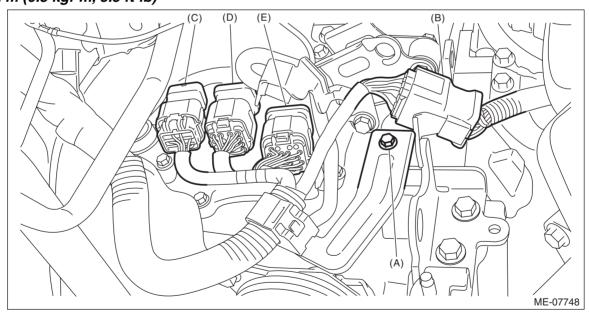
8 N·m (0.8 kgf-m, 5.9 ft-lb)



- 8) Connect the bulkhead harness connector to the transmission harness connector (C), inhibitor harness connector (D) and drive motor harness connector (E).
- 9) Connect the bulkhead harness connector to the engine harness connector (brown) (B), and install the bolt (A) securing the bulkhead harness connector bracket.

Tightening torque:

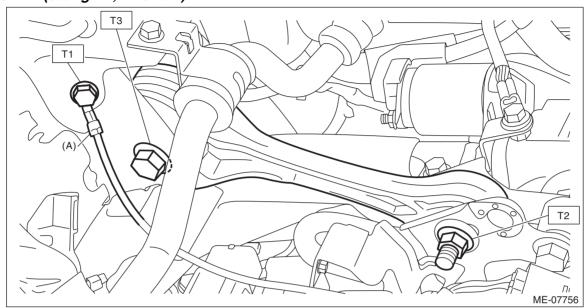
7.5 N·m (0.8 kgf-m, 5.5 ft-lb)



10) Install the pitching stopper, and connect the transmission radio ground terminal (A) to the vehicle.

Tightening torque:

T1: 13 N·m (1.3 kgf-m, 9.6 ft-lb) T2: 50 N·m (5.1 kgf-m, 36.9 ft-lb) T3: 58 N·m (5.9 kgf-m, 42.8 ft-lb)



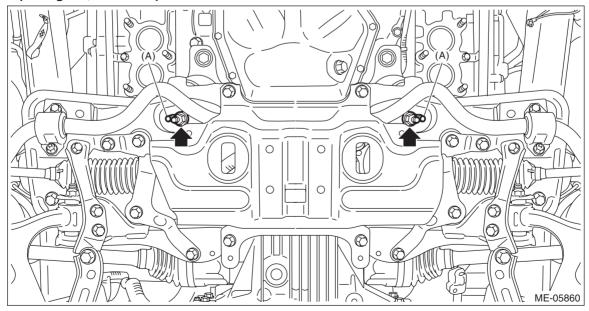
- 11) Install the electric power steering gearbox. <Ref. to PS-32, INSTALLATION, Electric Power Steering Gearbox.>
- 12) Install the front drive shaft LH. <Ref. to DS-57, INSTALLATION, Front Drive Shaft.>
- 13) Install the nuts which hold the engine mounting to the crossmember.

NOTE:

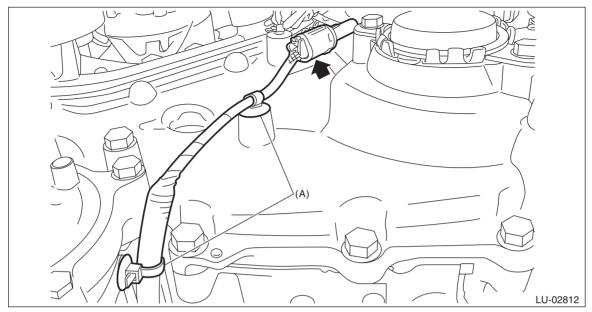
- Make sure that locators (A) of the engine mounting are securely inserted.
- Use a new nut.

Tightening torque:

60 N·m (6.1 kgf-m, 44.3 ft-lb)



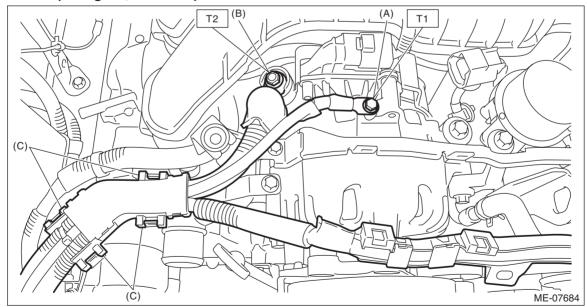
14) Connect the connector of oil level switch to the engine harness, and install the clip (A) securing the harness.



- 15) Install the front exhaust pipe. <Ref. to EX(H4DO(w/o HEV))-8, INSTALLATION, Front Exhaust Pipe.>
- 16) Install the under cover.
- 17) Lower the vehicle.
- 18) Set the battery cable assembly, and install the clip (C) which secures the battery cable assembly to the battery cable bracket No. 1.
- 19) Connect the terminal (A) and the terminal (B) to ISG.

Tightening torque:

T1: 7.5 N·m (0.8 kgf-m, 5.5 ft-lb) T2: 15.5 N·m (1.6 kgf-m, 11.4 ft-lb)



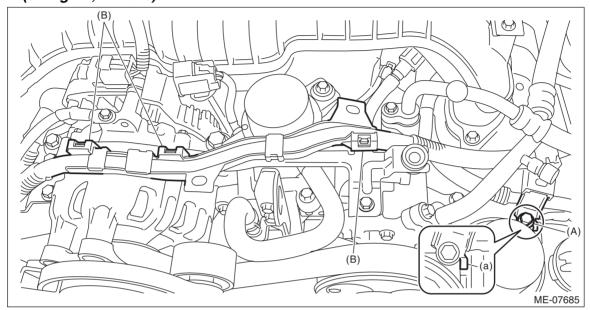
20) Install the clip (B) which secures the battery cable assembly to the collector cover bracket, and install the bolt (A) which secures the battery cable stay to the chain cover.

NOTE:

When installing the battery cable stay, install it by fitting the folded end (a) of the battery cable stay to the chain cover boss.

Tightening torque:

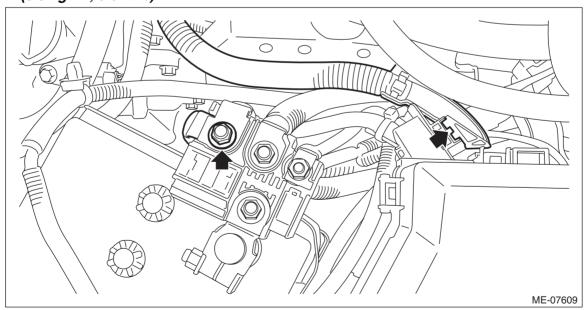
6.4 N·m (0.7 kgf-m, 4.7 ft-lb)



21) Install the battery cable assembly to the main fuse box, and install the nut which secures the battery cable assembly to the slow blow fuse (12 volt auxiliary battery).

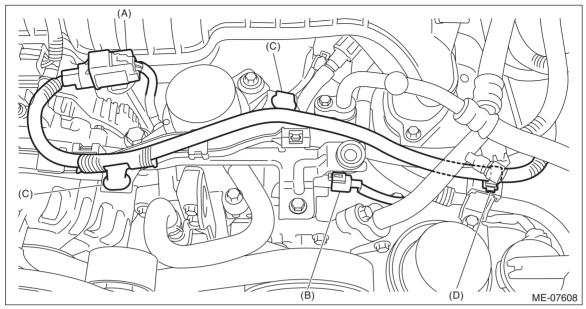
Tightening torque:

7.5 N·m (0.8 kgf-m, 5.5 ft-lb)

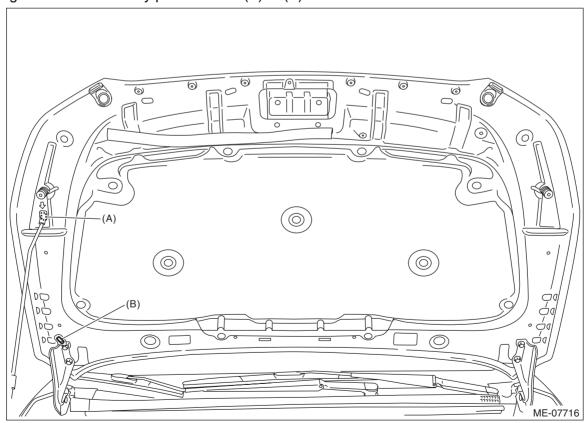


- 22) Install the terminal boot to the positive terminal of the 12 volt auxiliary battery.
- 23) Set the harness, and install the clip (C) and the clip (D) which secure the harness to the battery cable assembly.

24) Connect the connector (A) to the brake vacuum pump, and connect the connector (B) to the A/C compressor.



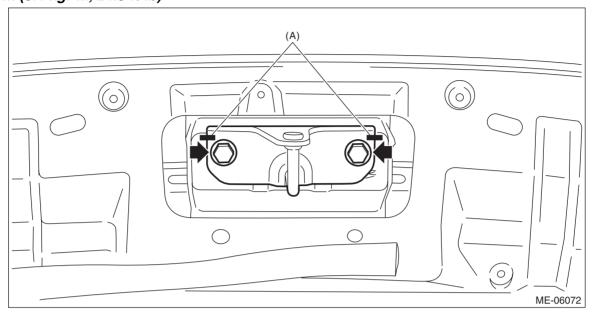
- 25) Install the air cleaner case. <Ref. to IN(H4DO(HEV))-8, INSTALLATION, Air Cleaner Case.>
- 26) Install the air intake duct. <Ref. to IN(H4DO(HEV))-15, INSTALLATION, Air Intake Duct.>
- 27) Install the collector cover.
- 28) Refill the engine oil. <Ref. to LU(H4DO(w/o HEV))-13, REPLACEMENT, Engine Oil.>
- 29) Connect the battery ground terminal. <Ref. to NT-5, BATTERY, NOTE, Note.>
- 30) Change the front hood stay position from (B) to (A).



31) Install the front hood striker to the front hood by aligning the alignment marks (A), and close the front hood.

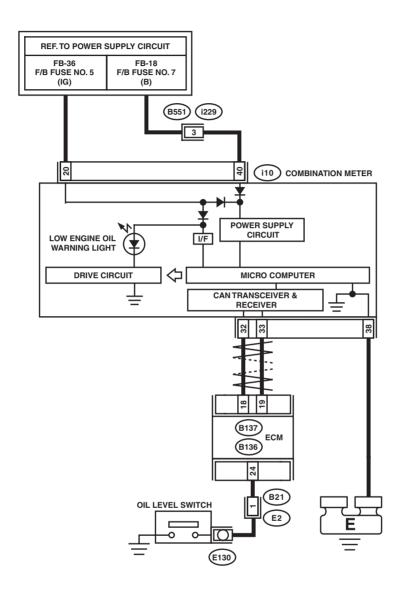
Tightening torque:

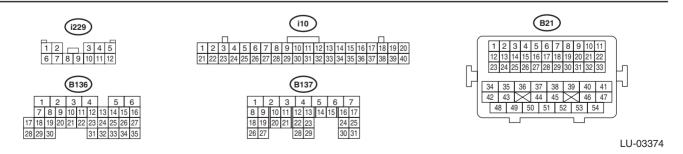
33 N⋅m (3.4 kgf-m, 24.3 ft-lb)



C: WIRING DIAGRAM

- Engine electrical system <Ref. to WI(w/o HEV)-98, WIRING DIAGRAM, Engine Electrical System.>
- CAN communication system <Ref. to WI(w/o HEV)-65, WIRING DIAGRAM, CAN Communication System.>





D: INSPECTION

1. INSPECTION WHEN LOW ENGINE OIL WARNING LIGHT IS ILLUMINATED

Step	Check	Yes	No
1 CHECK ENGINE OIL LEVEL.	Is engine oil level normal?	Go to step 2.	Replace engine oil or refill, and check again while the oil level is normal condition. <ref. engine="" hev))-13,="" lu(h4do(w="" o="" oil.="" replacement,="" to=""> To turn off the low engine oil warning light, install the spare fuse at the delivery (test) mode fuse in the main fuse box. Then turn the ignition switch to ON (engine off) again, to confirm the low engine oil warning light turns off. Remove the spare fuse installed to finish. NOTE: The engine oil level switch is normal if the low engine oil warning light turns off with the delivery (test) mode fuse inserted.</ref.>
2 CHECK LAN SYSTEM.	Has a DTC of the LAN system been input?	Perform the diagnosis according to DTC.	Go to step 3.

	Step	Check	Yes	No
3	CHECK OIL LEVEL SWITCH CIRCUIT.	Is the "Oil level switch" signal displayed in Subaru Select Monitor HIGH?	To turn off the low engine oil warning light, install the spare fuse at the delivery (test) mode fuse in the main fuse box. Then turn the ignition switch to ON (engine off) again, to confirm the low engine oil warning light turns off. Remove the spare fuse installed to finish. NOTE: The engine oil level switch is normal if the low engine oil warning light turns off with the delivery (test) mode fuse inserted.	
4	CHECK COMBINATION METER. Perform the self-diagnosis of combination meter to check if there are any faults in the combination meter. <ref. combination="" idi-8,="" meter="" operation,="" system.="" to=""></ref.>	Is combination meter OK?	Go to step 5.	Replace the combination meter. <ref. combination="" idi-20,="" meter.="" removal,="" to=""></ref.>
5	CHECK SECURE CONNECTION OF CONNECTOR BETWEEN ENGINE HARNESS AND OIL LEVEL SWITCH.	Is there any insecure connection?	Remedy the connection condition. Then, to turn off the low engine oil warning light, install the spare fuse at the delivery (test) mode fuse in the main fuse box. Then turn the ignition switch to ON (engine off) again, to confirm the low engine oil warning light turns off. Remove the spare fuse installed to finish. NOTE: The engine oil level switch is normal if the low engine oil warning light turns off with the delivery (test) mode fuse inserted.	

	Step	Check	Yes	No
6	CHECK OIL LEVEL SWITCH. 1) Deliberately short circuits by connecting the	Is the "Oil level switch" signal displayed in Subaru Select Monitor HIGH?	Replace the oil level switch. <ref. to LU(H4DO(w/o HEV))-31, REMOVAL, Oil Level Switch.></ref. 	Go to step 7.
7	CHECK SECURE CONNECTION OF CON-	Is there any insecure connection?	Remedy the connection condition. Then, to turn off the low engine oil warning light, install the spare fuse at the delivery (test) mode fuse in the main fuse box. Then turn the ignition switch to ON (engine off) again, to confirm the low engine oil warning light turns off. Remove the spare fuse installed to finish. NOTE: The engine oil level switch is normal if the low engine oil warning light turns off with the delivery (test) mode fuse inserted.	
8	CHECK ENGINE HARNESS. 1) Disconnect the connector on the oil level switch side for the engine harness. 2) Disconnect the connector on the bulkhead harness side for the engine harness. 3) Measure the resistance between connector terminals. Connector & terminal (E2) No. 1 — (E130) No. 1:	Is the resistance less than 1 Ω ?	Go to step 9.	Repair or replace the open circuit of engine harness.

	Step	Check	Yes	No
9	CHECK SECURE CONNECTION OF CON-	Is there any insecure connection?	Remedy the connection condition. Then, to turn off the low engine oil warning light, install the spare fuse at the delivery (test) mode fuse in the main fuse box. Then turn the ignition switch to ON (engine off) again, to confirm the low engine oil warning light turns off. Remove the spare fuse installed to finish. NOTE: The engine oil level switch is normal if the low engine oil warning light turns off with the delivery (test) mode fuse inserted.	Go to step 10.
10	CHECK BULKHEAD HARNESS. 1) Remove the glove box lid assembly. <ref. box.="" ei-78,="" glove="" removal,="" to=""> 2) Disconnect the engine control module (ECM) side connector for the bulkhead harness. 3) Disconnect the engine harness connectors from the bulkhead harness. 4) Measure the resistance between connector terminals. Connector & terminal (B136) No. 24 — (B21) No. 1:</ref.>	Is the resistance less than 1 Ω ?	engine control	Repair or replace the open circuit of the bulkhead har- ness.

2. OTHER INSPECTIONS

- 1) Check that the oil level switch does not have deformation, cracks, or damage.
 2) Check the oil level switch installation part for oil leakage and oil seepage.