

# Integrated Starter Generator (ISG)

## STARTING/CHARGING SYSTEMS

### 3. Integrated Starter Generator (ISG)

#### A: REMOVAL

1) 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.

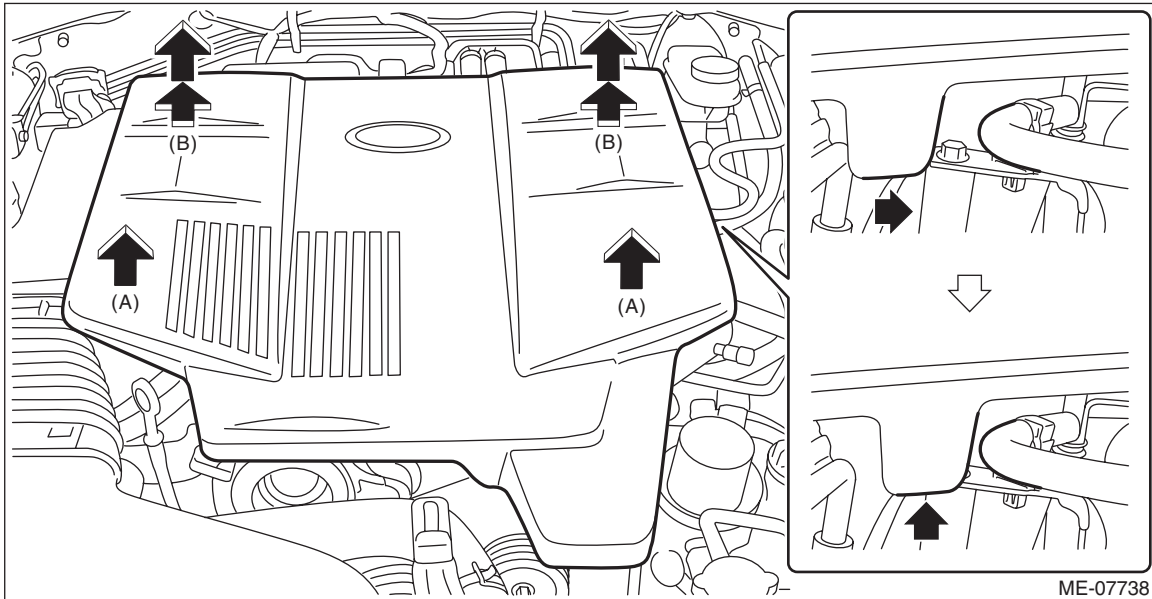
2) Remove the collector cover.

(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.



ME-07738

3) Remove the air intake duct. <Ref. to IN(H4DO(HEV))-15, REMOVAL, Air Intake Duct.>

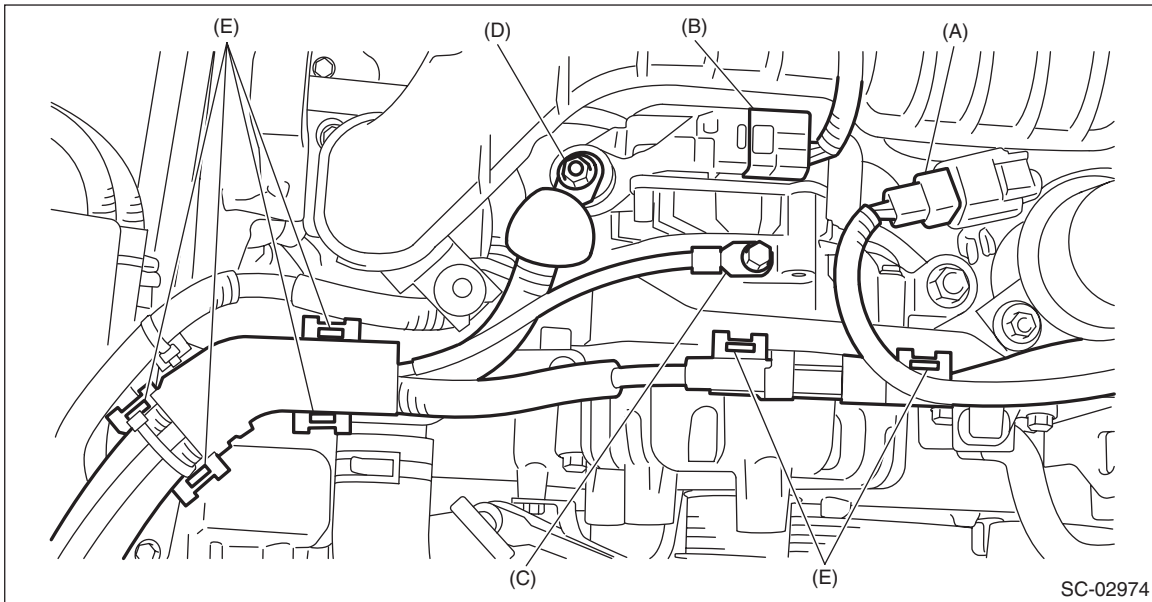
4) Remove the intake duct. <Ref. to IN(H4DO(HEV))-16, REMOVAL, Intake Duct.>

5) Remove the V-belts. <Ref. to ME(H4DO(w/o HEV))-124, HEV MODEL, REMOVAL, V-belt.>

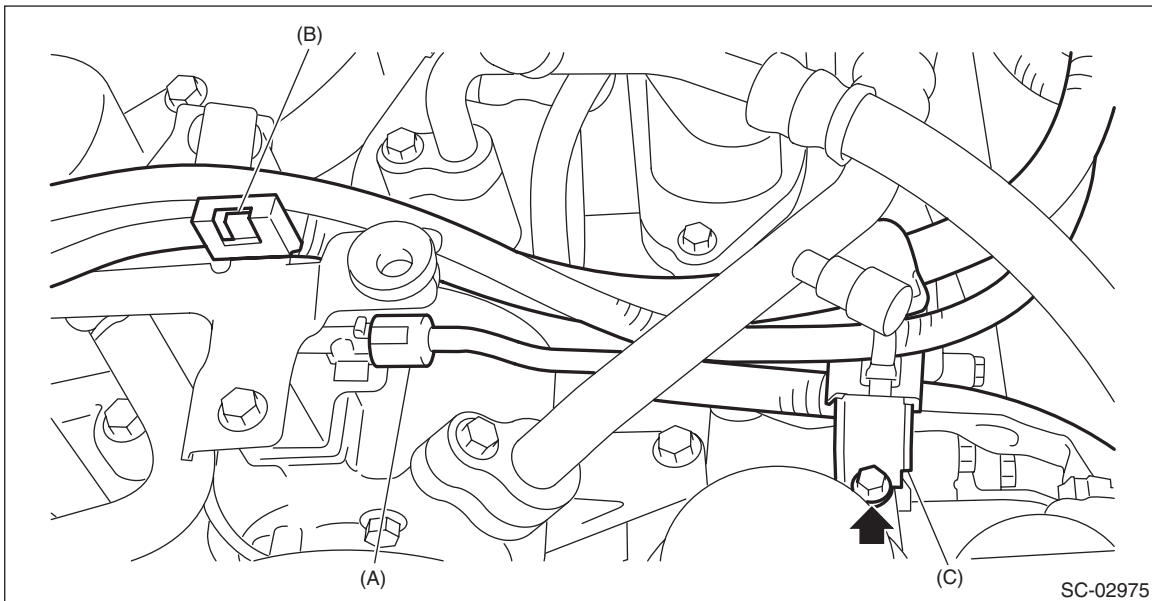
# Integrated Starter Generator (ISG)

## STARTING/CHARGING SYSTEMS

- 6) Disconnect the connector (A) from the brake vacuum pump, and disconnect the connector (B) from ISG.
- 7) Disconnect the terminal (C) and the terminal (D) from ISG.
- 8) Remove the clip (E) securing the battery cable assembly, and remove the battery cable assembly from the battery cable bracket No. 1 and the collector cover bracket.



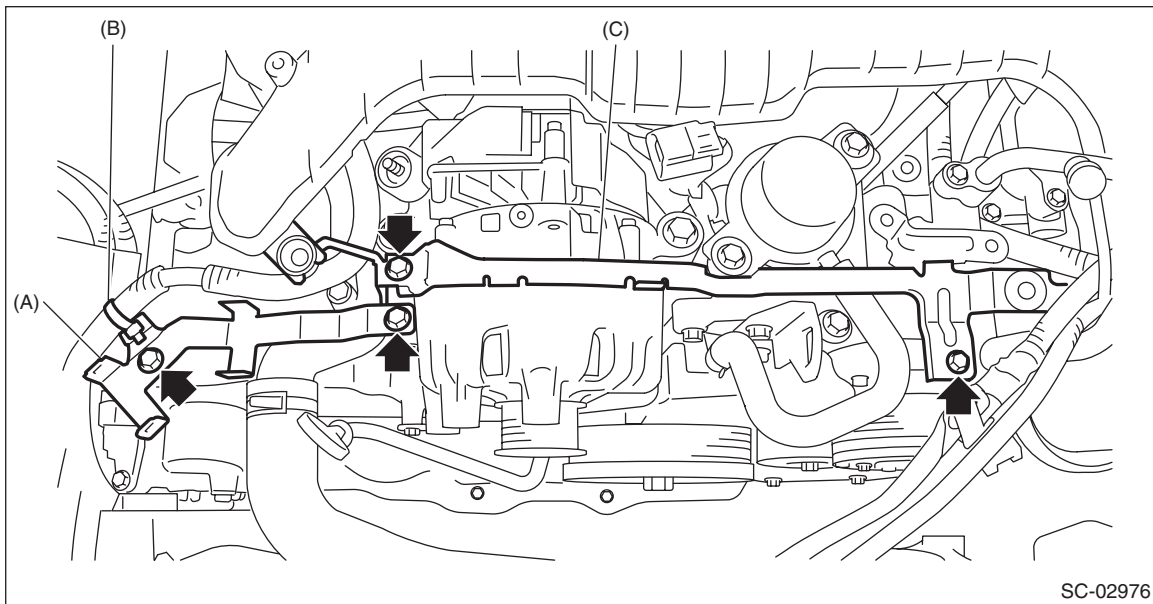
- 9) Disconnect the connector (A) from the A/C compressor, and remove the clip (B) securing the battery cable assembly to the collector cover bracket.
- 10) Remove the bolts which secure the battery cable stay (C) to the chain cover, and move the battery cable assembly to the front of the vehicle.



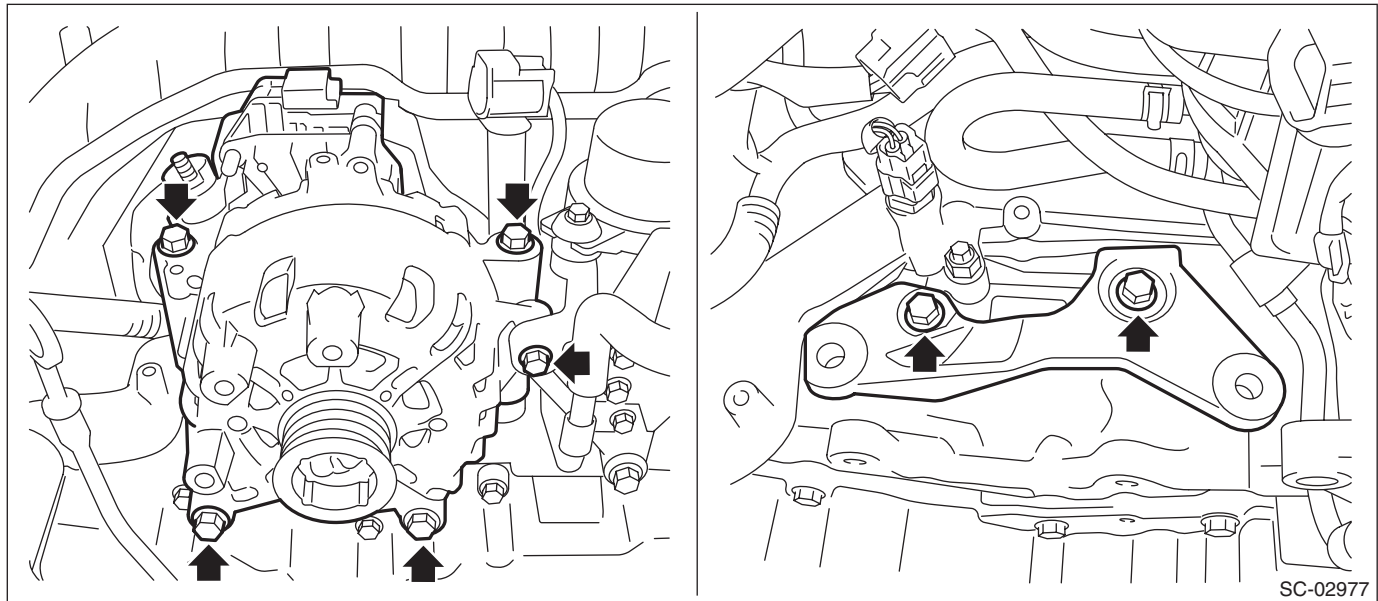
# Integrated Starter Generator (ISG)

## STARTING/CHARGING SYSTEMS

- 11) Remove the clip (B) which holds the engine harness to the battery cable bracket No. 1 (A).
- 12) Remove the battery cable bracket No. 1 (A) and collector cover bracket (C).



- 13) Remove ISG from the engine assembly, ISG bracket and brake vacuum pump bracket.
- 14) Remove the ISG bracket from the engine assembly.



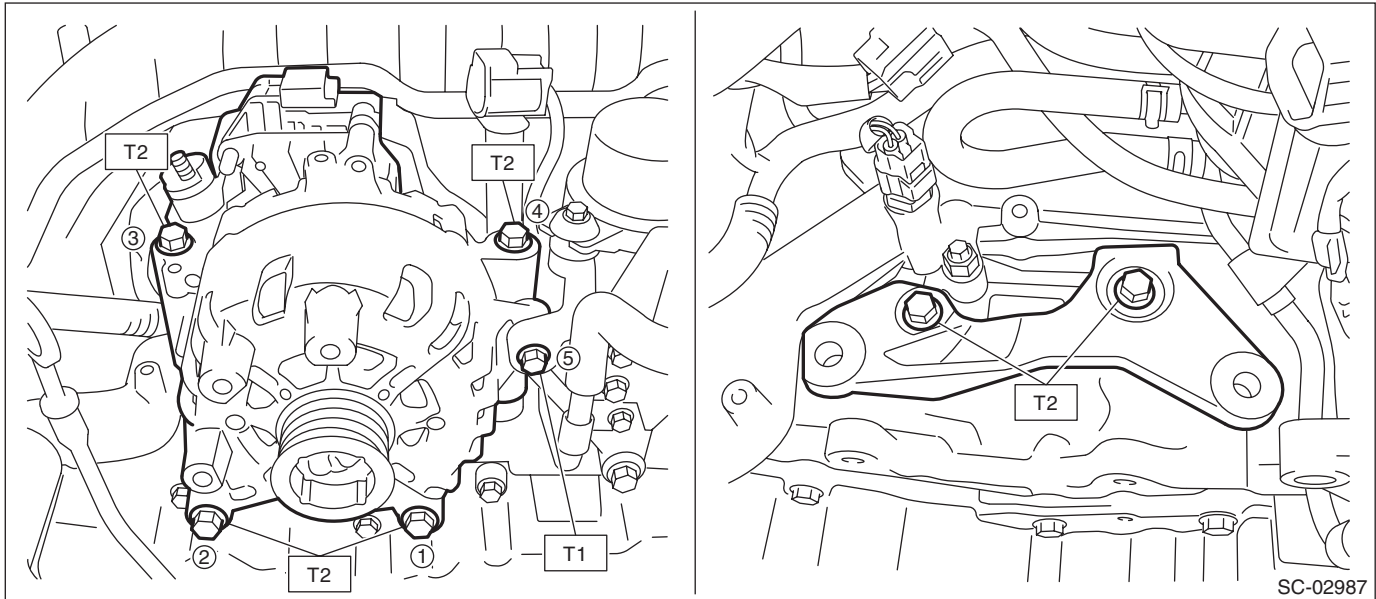
### B: INSTALLATION

- 1) Install the ISG bracket to the engine assembly.
- 2) Set ISG to the engine, ISG bracket and brake vacuum pump bracket, and tighten the bolts in numerical order as shown in the figure.

#### **Tightening torque:**

**T1: 18 N·m (1.8 kgf-m, 13.3 ft-lb)**

**T2: 36 N·m (3.7 kgf-m, 26.6 ft-lb)**

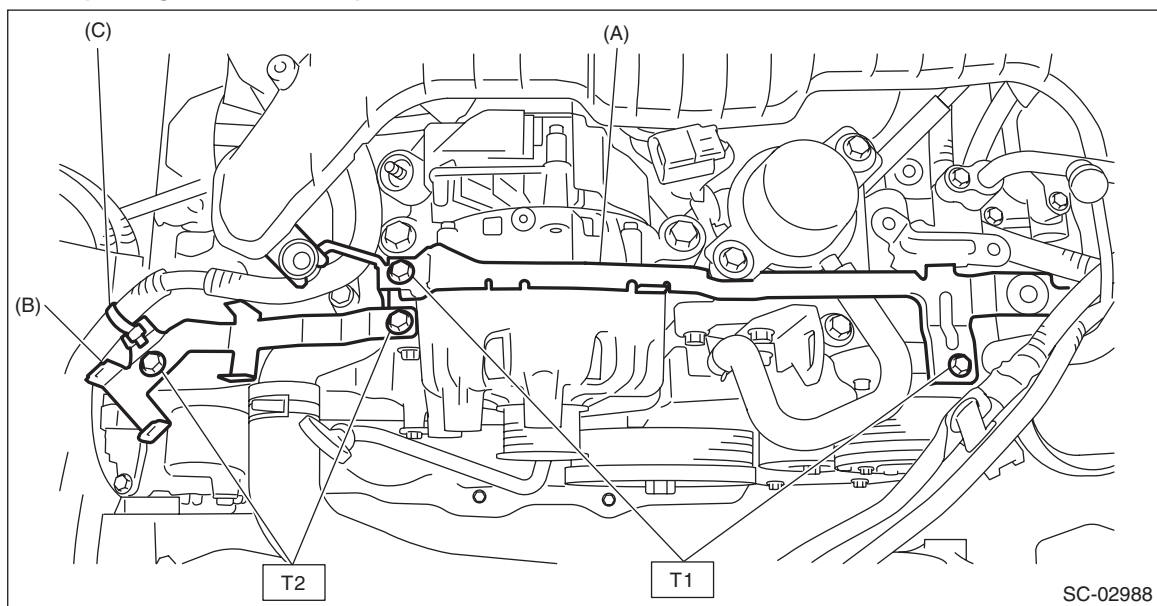


- 3) Install the collector cover bracket (A).
- 4) Install the battery cable bracket No. 1 (B), and secure the engine harness to the battery cable bracket No. 1 (B) with the clip (C).

#### **Tightening torque:**

**T1: 6.4 N·m (0.7 kgf-m, 4.7 ft-lb)**

**T2: 19 N·m (1.9 kgf-m, 14.0 ft-lb)**



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## STARTING/CHARGING SYSTEMS

5) Set the battery cable assembly, and install the battery cable stay (C) to the chain cover.

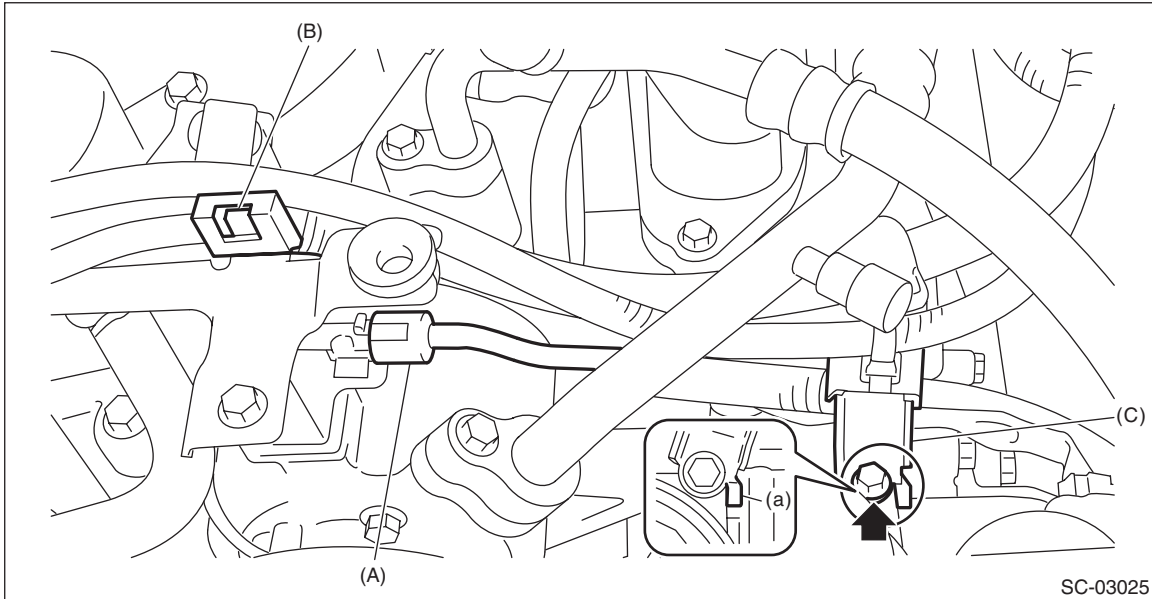
**NOTE:**

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)**

6) Connect the connector (A) to the A/C compressor, and secure the battery cable assembly to the collector cover bracket with the clip (B).



7) Secure the battery cable assembly to the battery cable bracket No. 1 and the collector cover bracket with the clip (E).

8) Connect the connector (B) to ISG, and install the terminal (D) to ISG.

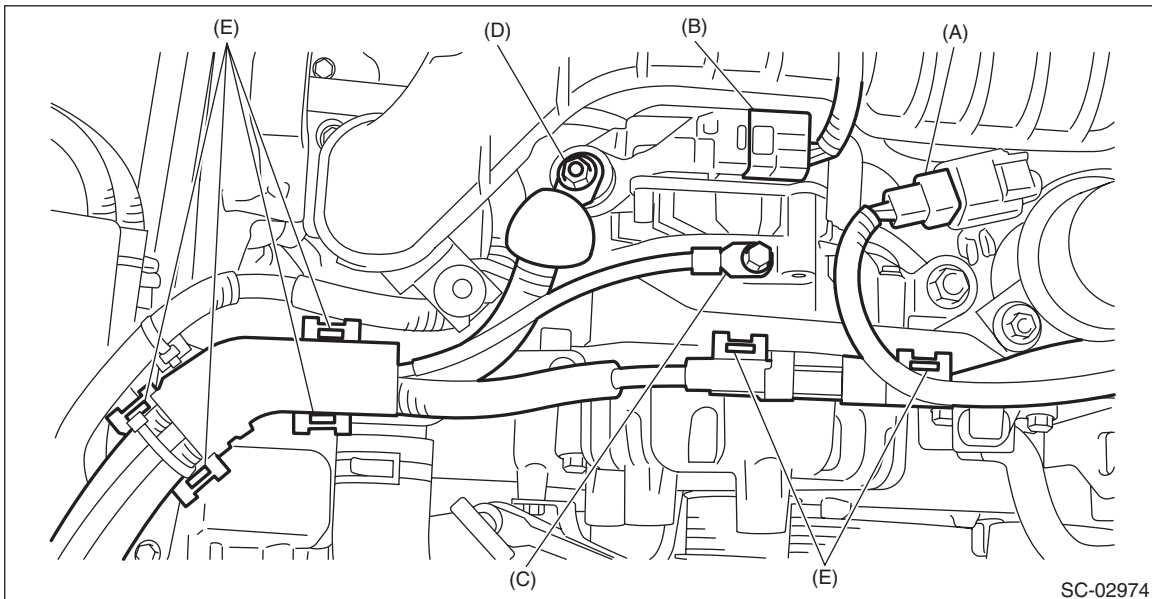
**Tightening torque:**

**15.5 N·m (1.6 kgf-m, 11.4 ft-lb)**

9) Install the terminal (C) to ISG, and connect the connector (A) to the brake vacuum pump.

**Tightening torque:**

**7.5 N·m (0.8 kgf-m, 5.5 ft-lb)**



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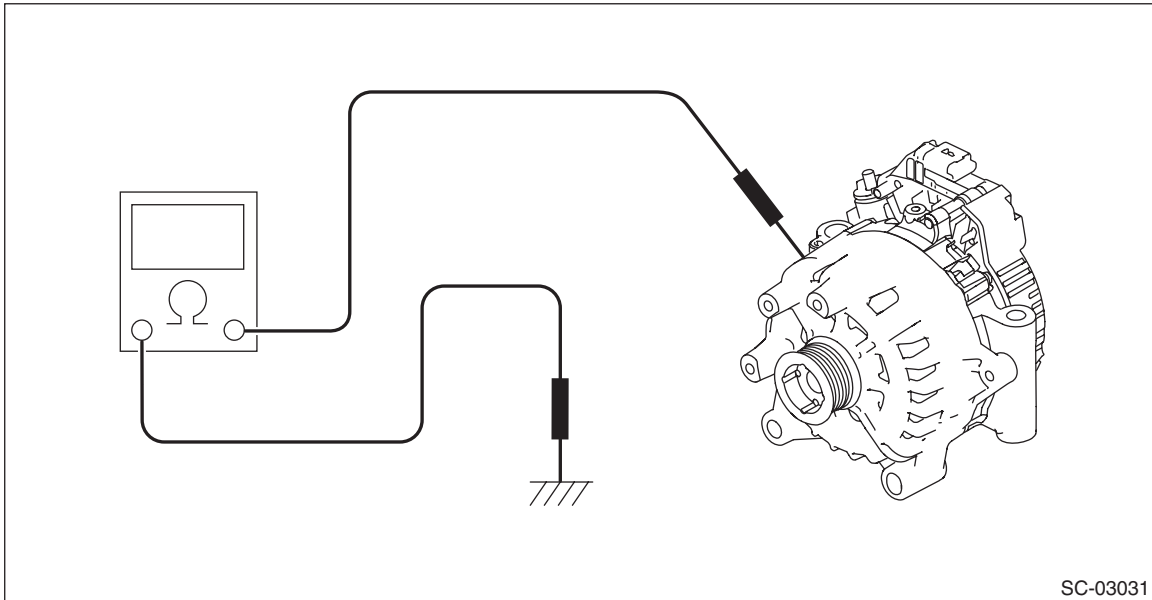
STARTING/CHARGING SYSTEMS

- 10) Install the V-belts. <Ref. to ME(H4DO(w/o HEV))-134, HEV MODEL, INSTALLATION, V-belt.>
- 11) Install the intake duct. <Ref. to IN(H4DO(HEV))-17, INSTALLATION, Intake Duct.>
- 12) Install the air intake duct. <Ref. to IN(H4DO(HEV))-15, INSTALLATION, Air Intake Duct.>
- 13) Install the collector cover.
- 14) Connect the battery ground terminal. <Ref. to NT-5, BATTERY, NOTE, Note.>

## C: INSPECTION

### 1. CHECK ISG SENSOR

- 1) Check ISG for deformation, cracks or damage.
- 2) Check the ISG ground circuit.
  - (1) Check the continuity between the ISG unit and chassis ground.



- (2) If no continuity exists, inspect the ISG installation condition, chassis ground and engine ground conditions, then repair as necessary.

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## STARTING/CHARGING SYSTEMS

### 2. CHECK CHARGE WARNING LIGHT

Inspect as follows, if the charge warning light illuminates.

Step	Check	Yes	No
<b>1</b> <b>CHECK DTC.</b>	Is DTC of HEV and IDI displayed? <Ref. to HEV(diag)-24, Read Diagnostic Trouble Code (DTC).> <Ref. to IDI(diag)-15, Read Diagnostic Trouble Code (DTC).>	Check the appropriate DTC using the "List of Diagnostic Trouble Code (DTC)". <Ref. to HEV(diag)-74, List of Diagnostic Trouble Code (DTC).> <Ref. to IDI(diag)-27, List of Diagnostic Trouble Code (DTC).>	Go to step 2.
<b>2</b> <b>CHECK ISG SENSOR.</b> 1) Turn the ignition switch to OFF and wait for 20 minutes. 2) Start the engine. 3) Check the warning light in the combination meter.	Does the warning light illuminate?	Go to step 3.	Temporary over-heat occurs in ISG. Currently returned to normal.
<b>3</b> <b>CHECK COMBINATION METER.</b> 1) Check the combination meter. <Ref. to IDI(diag)-21, OPERATION, System Operation Check Mode.>	Is combination meter OK?	Replace ISG. <Ref. to SC(H4DO(HEV))-32, REMOVAL, Integrated Starter Generator (ISG).>	Repair or replace the combination meter. <Ref. to IDI-12, INSPECTION, Combination Meter System.>