

CHARGING SYSTEM

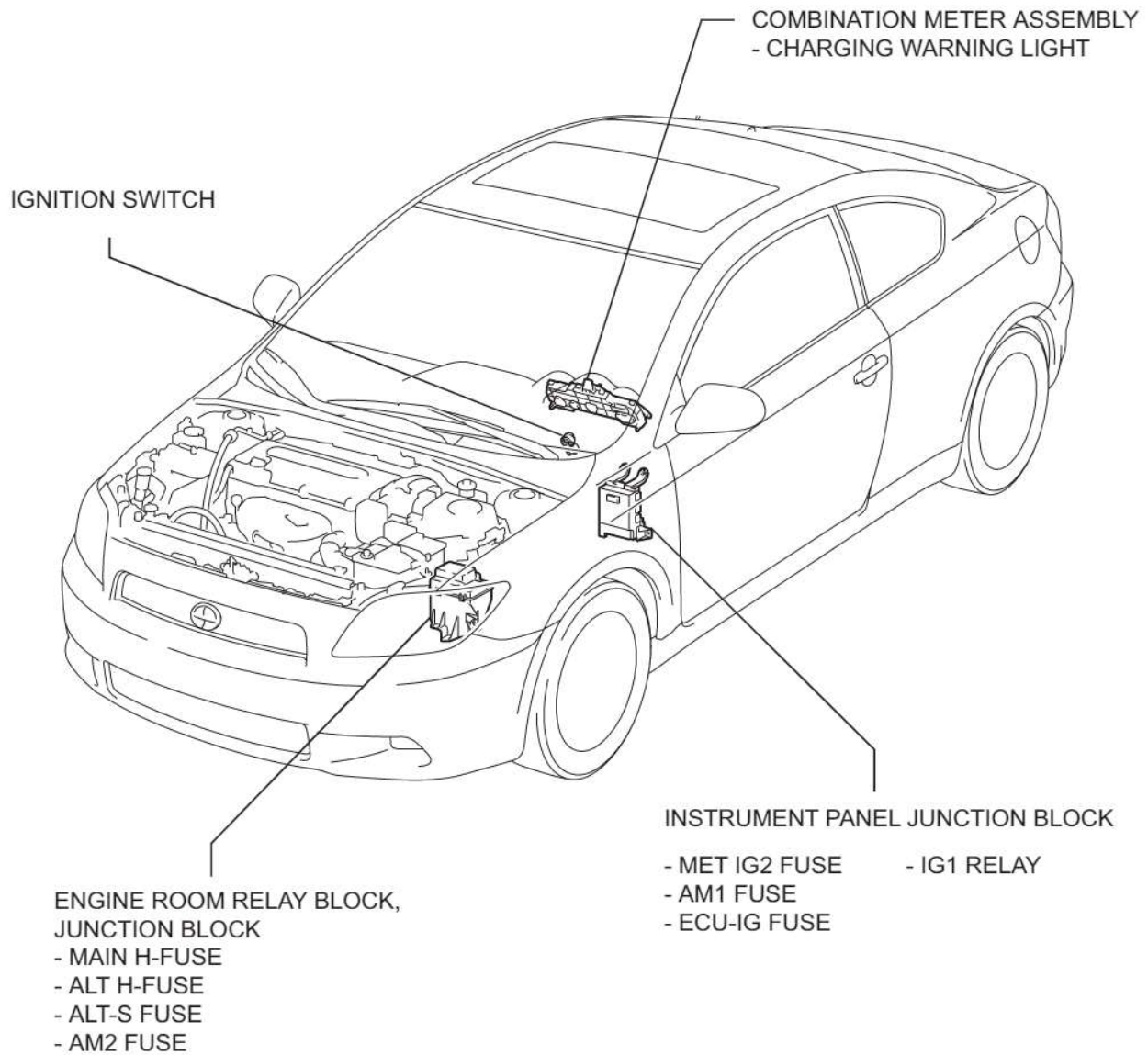
PRECAUTION

1. Check that the battery cables are connected to the correct terminals.
2. Disconnect the battery cables if a quick charge is given to the battery.
3. Do not perform tests with a high voltage insulation resistance tester.
4. Never disconnect the battery while the engine is running.
5. Check that the charging cable is tightly connected onto terminal **B** of the generator and the fuse box.
6. Do not check whether the generator generates current or not while terminal **F** is connected to the other terminals.

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2AZ-FE CHARGING – CHARGING SYSTEM

PARTS LOCATION

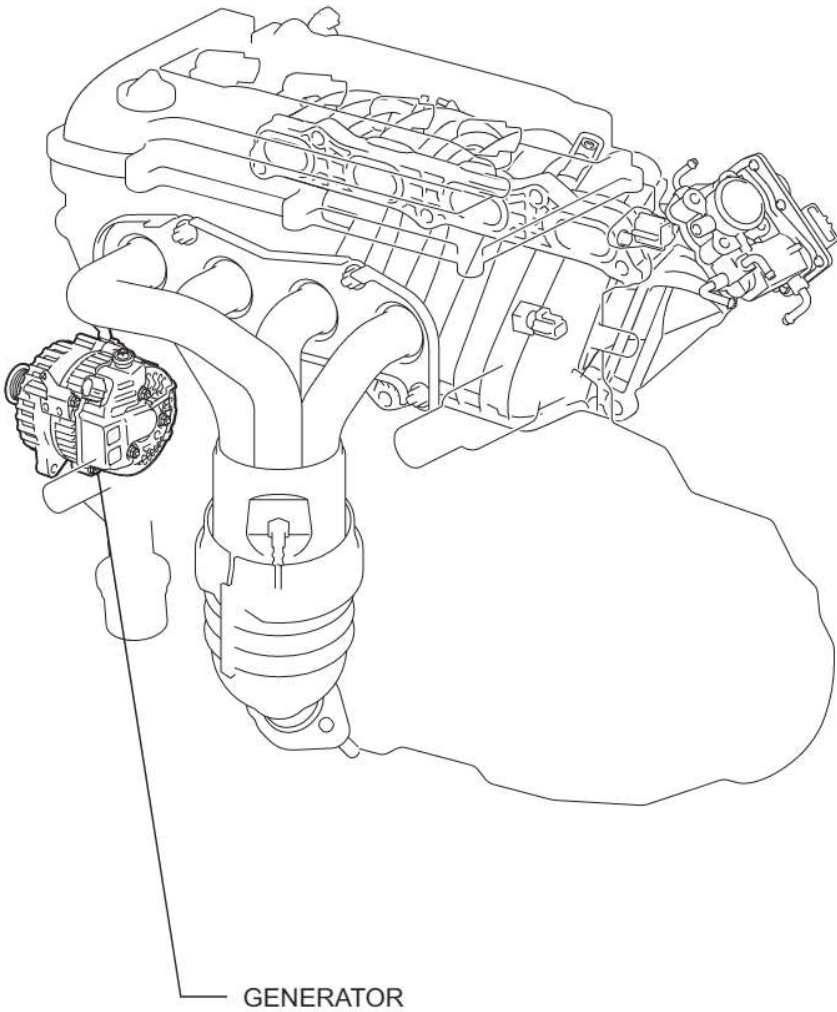


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A114720E01

2AZ-FE CHARGING – CHARGING SYSTEM

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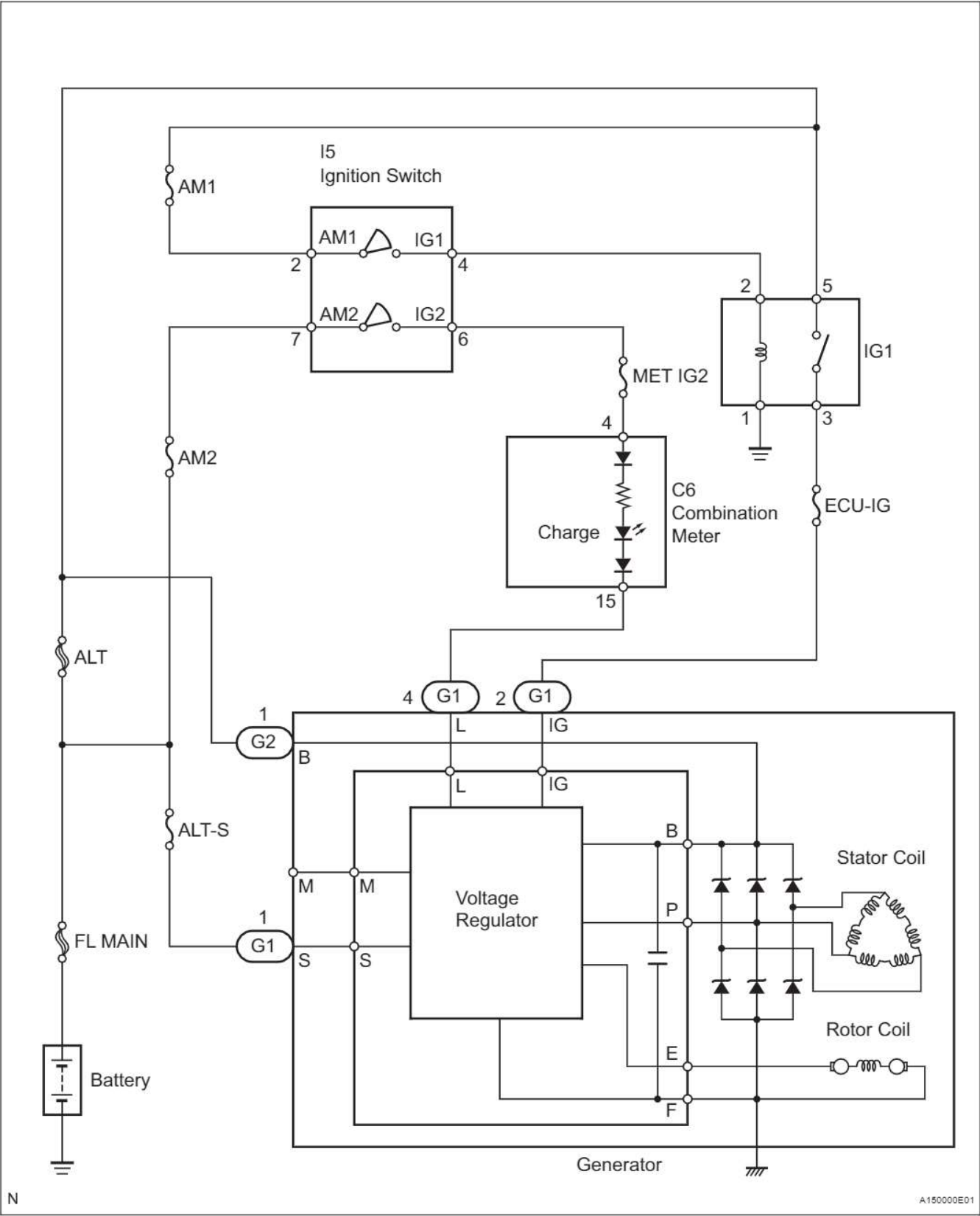


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SYSTEM DIAGRAM



ON-VEHICLE INSPECTION

1. CHECK BATTERY CONDITION

NOTICE:

If the battery is weak or if the engine is difficult to start, perform the following procedures.

- (a) Check the battery for damage and deformation. If severe damage, deformation or leakage is found, replace the battery.
- (b) Check the electrolyte quantity of each cell.
 - (1) For maintenance-free batteries:
 - If the electrolyte quantity is below the lower line, replace the battery.
 - If the electrolyte quantity is above the lower line, check the battery voltage when cranking the engine. If the voltage is less than 9.6 V, recharge or replace the battery.

HINT:

Before checking the battery voltage, turn off all the electrical systems (headlights, blower motor, rear defogger, etc.).

- (2) For non-maintenance-free batteries:

- If the electrolyte quantity is below the lower line, add distilled water to each cell. Then, recharge the battery and check the electrolyte's specific gravity.

Standard specific gravity:

1.25 to 1.29 at 20°C (68°F)

If the electrolyte quantity is above the lower line, check the battery voltage when cranking the engine. If the voltage is less than 9.6 V, recharge or replace the battery.

HINT:

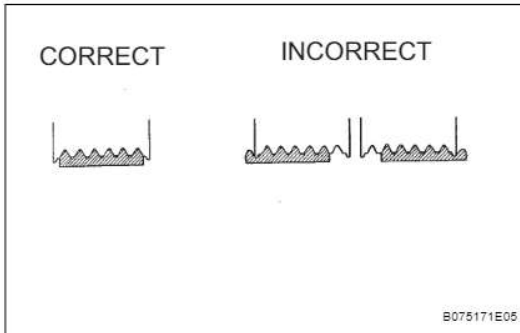
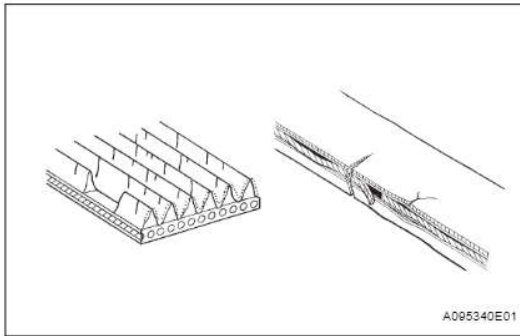
Before checking the battery voltage, turn off all the electrical systems (headlights, blower motor, rear defogger, etc.).

2. INSPECT BATTERY TERMINAL AND FUSE

- (a) Visually check the battery terminals.
 - (1) Check that the battery terminals are not loose or corroded.
- (b) Visually check the fusible link and fuses.
 - (1) Check that there is continuity between the fusible links, high current fuses and regular fuses.

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3. INSPECT V-RIBBED BELT

- (a) Visually check the belt for excessive wear, frayed cords, etc.

If any defects are found, replace the V-ribbed belt.

HINT:

Cracks on the rib side of the belt are considered acceptable. If the belt has chunks missing from the ribs, it should be replaced.

- (b) Check that the belt fits properly in the ribbed grooves.

HINT:

Confirm by hand that the belt has not slipped out of the grooves on the bottom of the pulley.

4. INSPECT GENERATOR WIRING

- (a) Visually check the generator wiring.

- (1) Check that the wiring is in good condition.

5. INSPECT ABNORMAL NOISES

- (a) Listen for abnormal noises from the generator.

- (1) Check that no abnormal noises are heard from the generator while the engine is running.

6. INSPECT CHARGE WARNING LIGHT CIRCUIT

- (a) Turn the ignition switch ON. Check that the charge warning light comes on.

- (b) Start the engine and check that the light goes off. If the light does not operate as specified, troubleshoot the charge warning light circuit.

7. INSPECT CHARGING CIRCUIT WITHOUT LOAD

- (a) If a tester is not available, connect a voltmeter and ammeter to the charging circuit as follows.

- (1) Disconnect the wire from terminal B of the generator, then connect it to the negative (-) lead of the ammeter.
- (2) Connect the positive (+) lead of the ammeter to terminal B of the generator.
- (3) Connect the positive (+) lead of the voltmeter to terminal B of the generator.
- (4) Ground the negative (-) lead of the voltmeter.

- (b) Check the charging circuit.

- (1) Keep the engine speed at 2,000 rpm and check the reading on the ammeter and voltmeter.

Standard amperage:

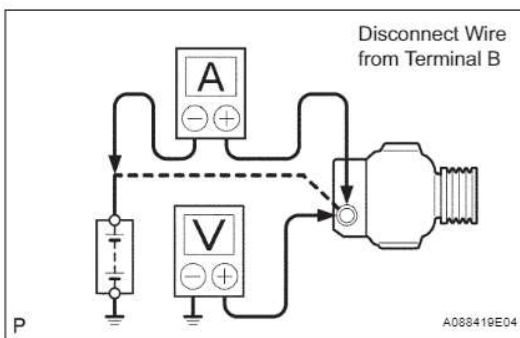
10 A or less

Standard voltage:

13.2 to 14.8 V

8. INSPECT CHARGING CIRCUIT WITH LOAD

- (a) With the engine running at 2,000 rpm, turn the high beam headlights ON and turn the heater blower switch to the "HI" position.



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2AZ-FE CHARGING – CHARGING SYSTEM**CH-7**

- (b) Check the reading on the ammeter.

Standard amperage:

30 A or more

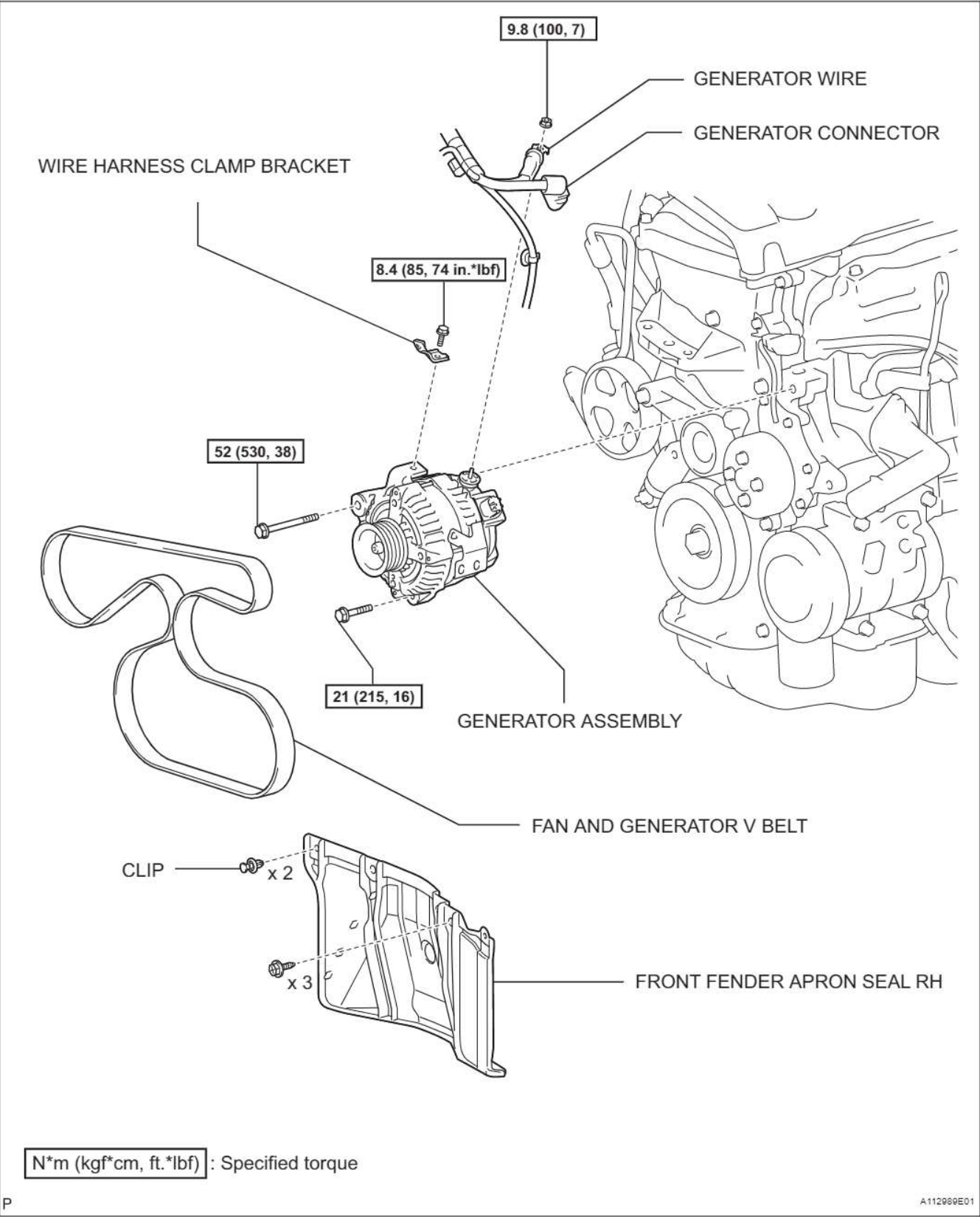
If the ammeter reading is less than the standard amperage, repair the generator.

HINT:

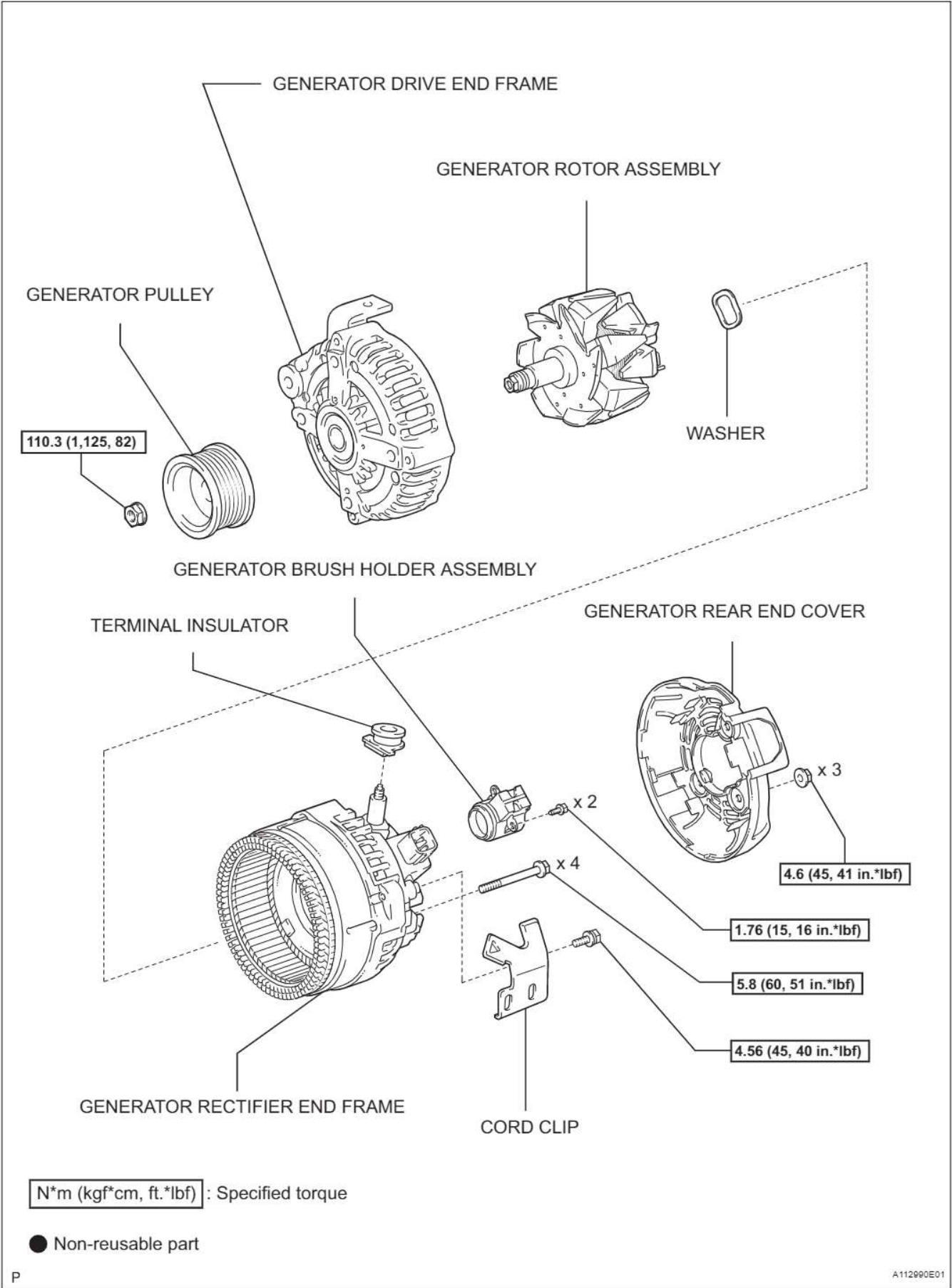
If the battery is fully charged, the indication will sometimes be less than the standard amperage.

CH

GENERATOR
COMPONENTS



2AZ-FE CHARGING – GENERATOR



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2AZ-FE CHARGING – GENERATOR

REMOVAL

1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

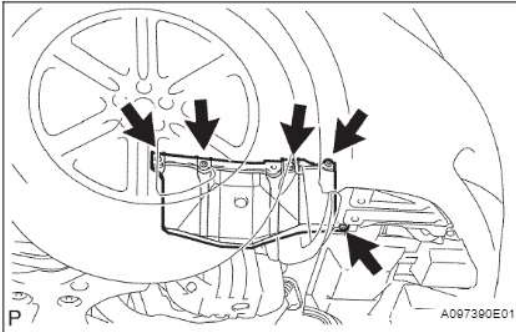
CAUTION:

Wait at least 90 seconds after disconnecting the cable from the negative (-) battery terminal to prevent airbag and seat belt pretensioner activation.

2. REMOVE FRONT FENDER APRON SEAL RH

(a) Remove the 2 screws, 3 clips and apron seal.

3. REMOVE FAN AND GENERATOR V BELT (See page EM-6)



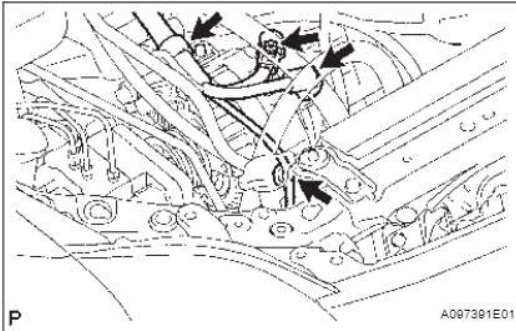
4. REMOVE GENERATOR ASSEMBLY

(a) Disconnect the generator connector.

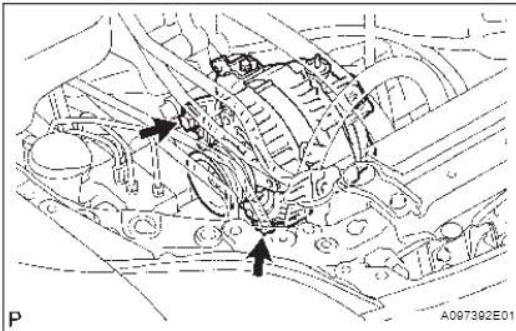
(b) Remove the terminal cap.

(c) Remove the nut and disconnect the generator wire.

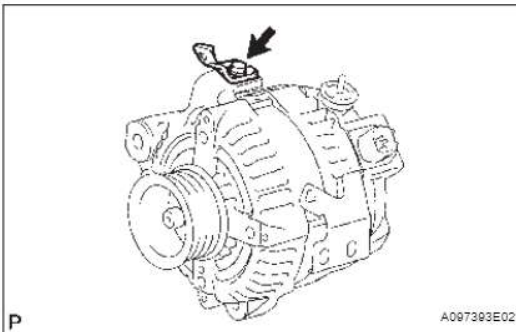
(d) Remove the 2 wire harness clamps.



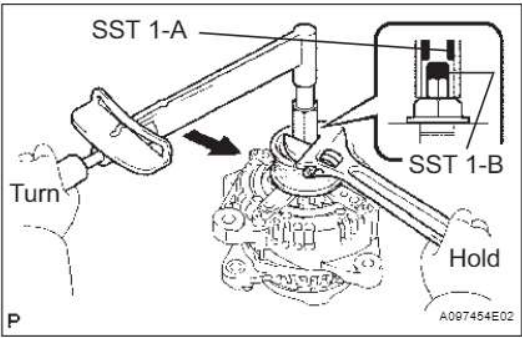
(e) Remove the 2 bolts and generator.



(f) Remove the bolt and wire harness clamp bracket.



CH



DISASSEMBLY

1. REMOVE GENERATOR PULLEY

SST 09820-63011 (09820-06010), 09820-06021

- (a) Tighten SST 1-B to the specified torque, and then fix SST 1-A on the generator rotor shaft.

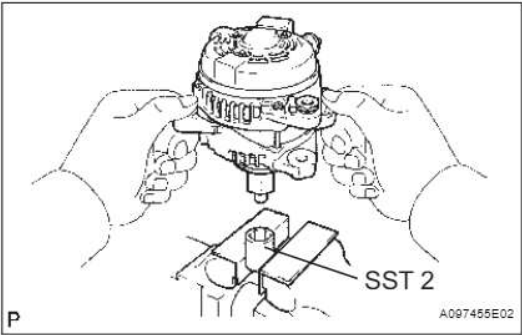
Item	Part No.
SST 1-A and B	09820-06010
SST 2	09820-06021

Torque: 39 N*m (400 kgf*cm, 29 ft.*lbf)

NOTICE:

Securely fix SST on the generator rotor shaft.

- (b) Clamp SST 2 in a vise.
- (c) Insert SST 1-A and B into SST 2, and then fix the generator pulley nut into SST 2.

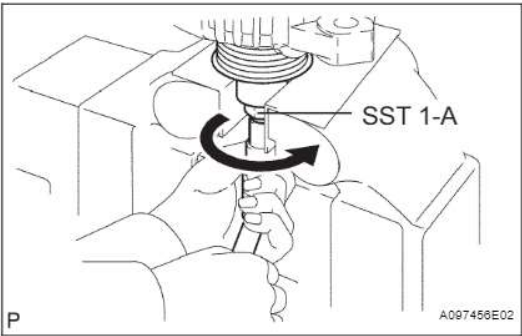


- (d) Turn SST 1-A in the direction shown, and then loosen the generator pulley nut.

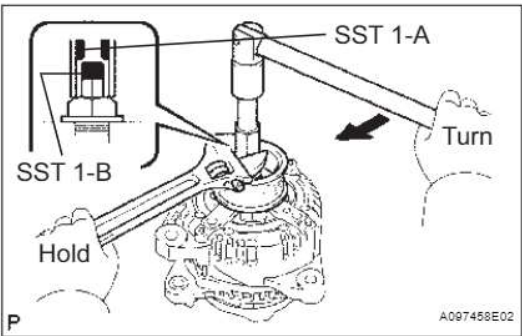
NOTICE:

If the generator pulley nut is turned by more than a half turn, the generator rotor shaft may be damaged.

- (e) Remove the generator from SST 2.

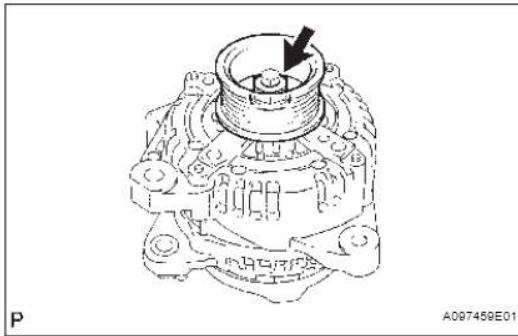


- (f) Fix SST 1-B, and then loosen SST 1-A in the direction shown. Remove SST 1-A and B from the generator.

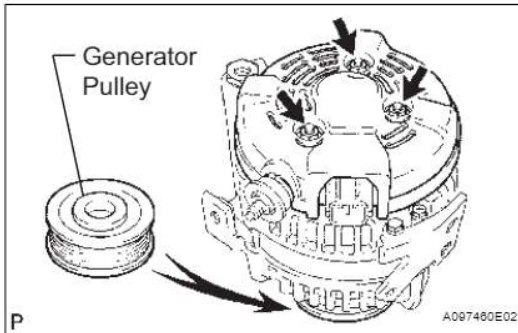


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2AZ-FE CHARGING – GENERATOR

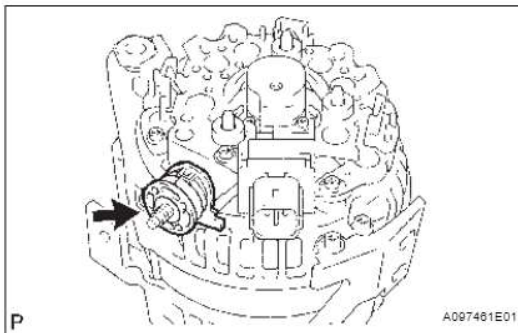


- (g) Remove the generator pulley nut and generator pulley.

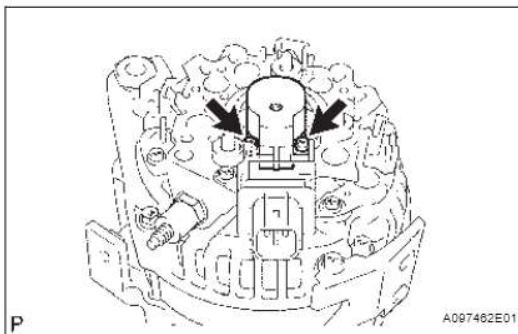


2. REMOVE GENERATOR BRUSH HOLDER ASSEMBLY

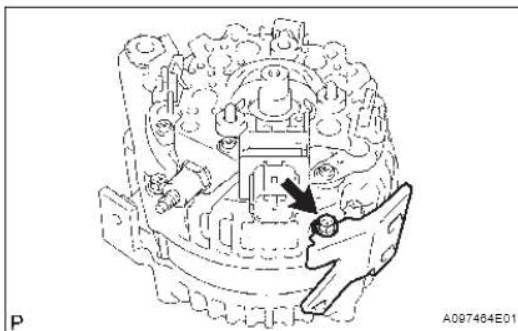
- (a) Place the generator on the generator pulley.
(b) Remove the 3 nuts and generator rear end cover.



- (c) Remove the terminal insulator.



- (d) Remove the 2 screws and generator brush holder.

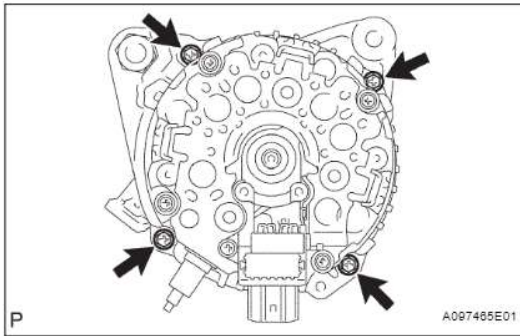


3. REMOVE GENERATOR ROTOR ASSEMBLY

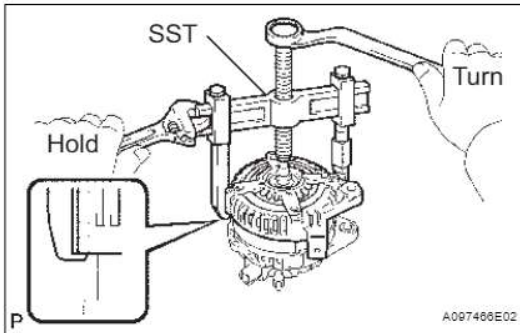
- (a) Remove the bolt and cord clip.

2AZ-FE CHARGING – GENERATOR

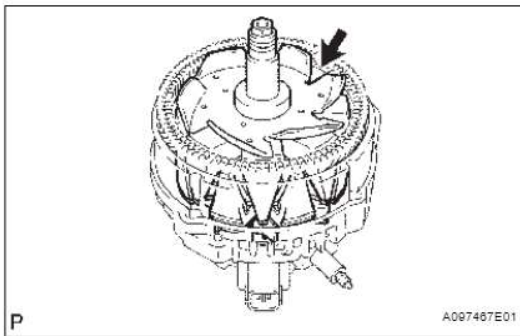
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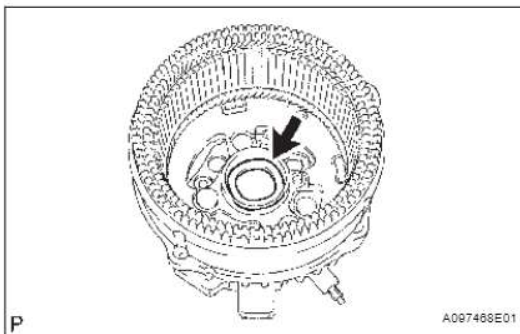
(b) Remove the 4 bolts.



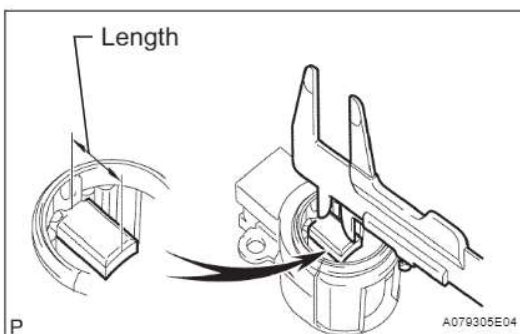
(c) Using SST, remove the generator drive end frame.
SST 09950-40011 (09951-04020, 09952-04010, 09953-04020, 09954-04010, 09955-04071, 09957-04010)



(d) Remove the generator rotor from the generator rectifier end frame.



(e) Remove the washer from the generator rectifier end frame.



INSPECTION

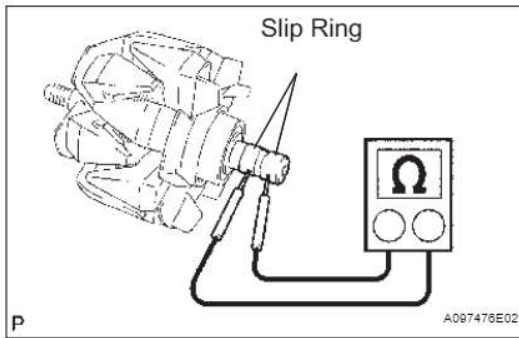
1. INSPECT GENERATOR BRUSH HOLDER ASSEMBLY

- (a) Using a vernier caliper, measure the brush length.
Standard length:
 9.5 to 11.5 mm (0.374 to 0.453 in.)
Minimum length:
 4.5 mm (0.177 in.)
 If the brush length is less than the minimum, replace the generator brush holder assembly.

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2AZ-FE CHARGING – GENERATOR



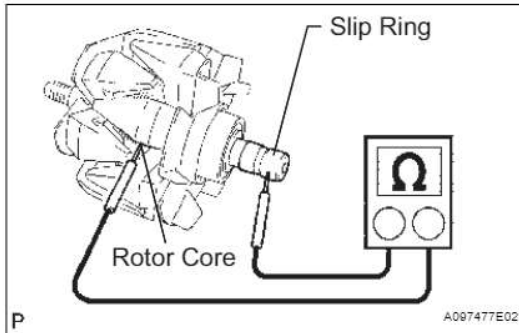
2. INSPECT GENERATOR ROTOR ASSEMBLY

(a) Check the resistance.

(1) Measure the resistance between the slip rings.

Standard resistance:**2.3 to 2.7 Ω at 20°C (68°F)**

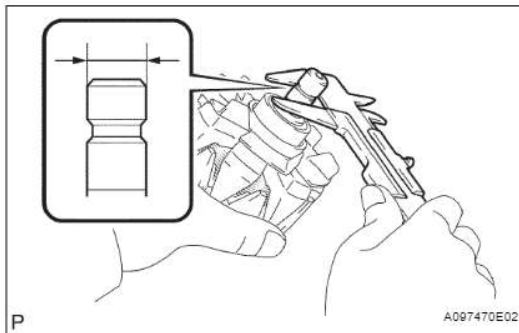
If the result is not as specified, replace the generator rotor assembly.



(2) Measure the resistance between the slip ring and rotor core.

Standard resistance:**1 M Ω or higher**

If the result is not as specified, replace the generator rotor assembly.

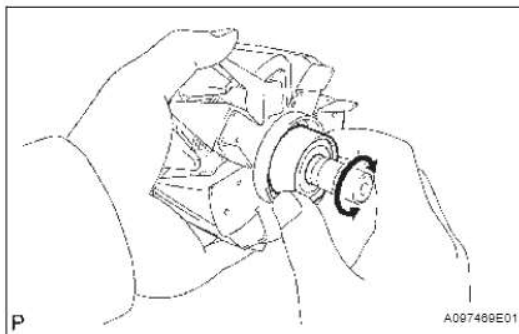


(b) Check the slip ring diameter.

(1) Using a vernier caliper, measure the slip ring diameter.

Standard diameter:**14.2 to 14.4 mm (0.559 to 0.567 in.)****Minimum diameter:****14 mm (0.551 in.)**

If the diameter is less than the minimum, replace the generator rotor assembly.

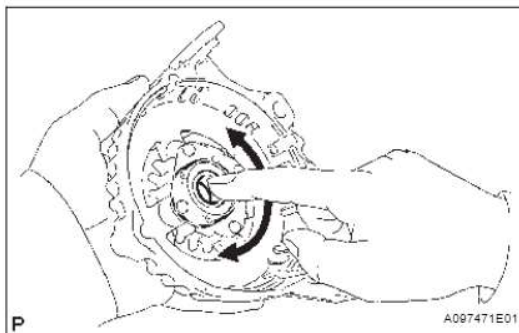


(c) Check the appearance.

(1) Check that the bearing is not rough or worn.

OK:**The bearing rotates smoothly.**

If the result is not as specified, replace the generator rotor assembly.



3. INSPECT GENERATOR DRIVE END FRAME BEARING

(a) Check that the bearing is not rough or worn.

Standard:**The bearing rotates smoothly.**

If the bearing does not rotate smoothly, replace the generator assembly.

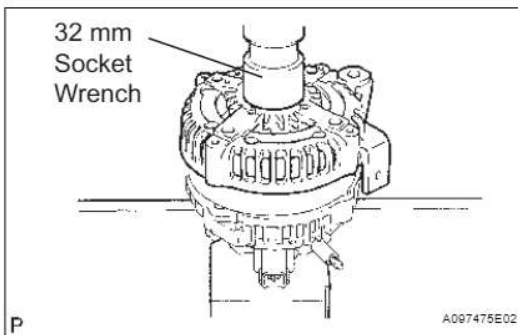
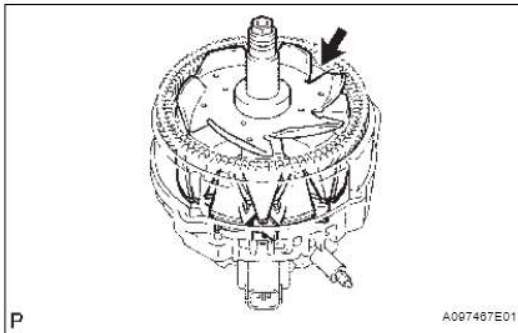
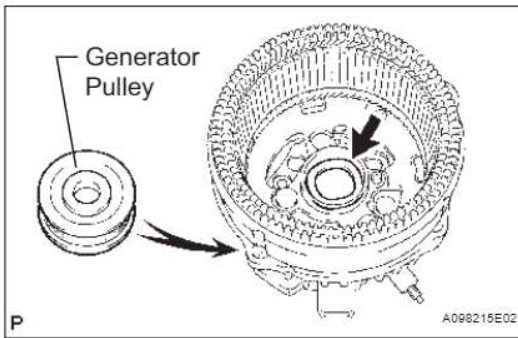
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REASSEMBLY

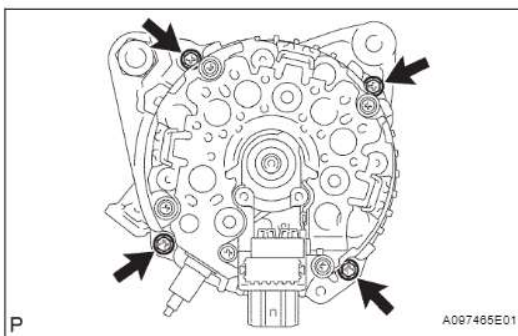
1. INSTALL GENERATOR ROTOR ASSEMBLY

- (a) Place the generator drive end frame on the generator pulley.
- (b) Install the washer onto the generator rectifier end frame.

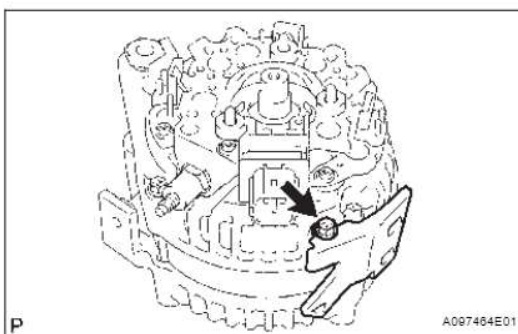


- (c) Install the generator rotor onto the generator rectifier end frame.

- (d) Using a 32 mm socket wrench and press, slowly push the generator drive end frame onto the generator rectifier end frame.



- (e) Tighten the 4 bolts.
Torque: 5.8 N*m (60 kgf*cm, 51 in.*lbf)

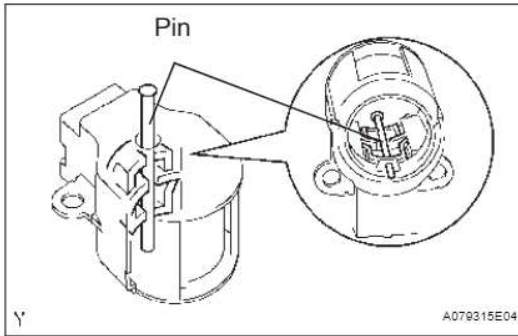


- (f) Install the cord clip with the bolt.
Torque: 4.56 N*m (45 kgf*cm, 40 in.*lbf)

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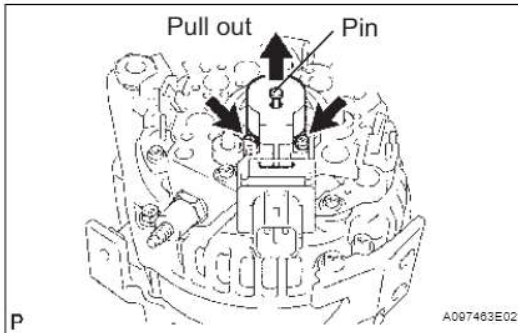
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2AZ-FE CHARGING – GENERATOR

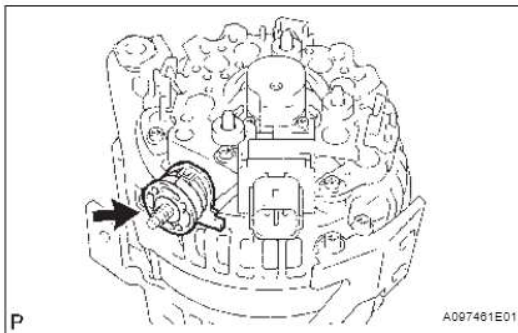


2. REMOVE GENERATOR BRUSH HOLDER ASSEMBLY

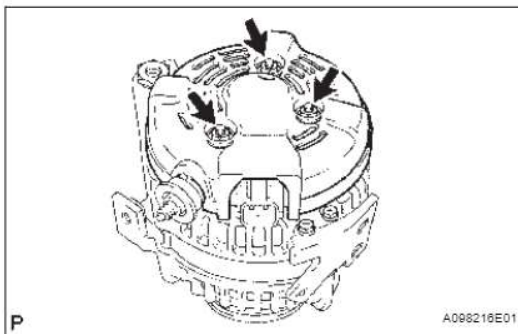
- (a) While pushing the 2 brushes into the generator brush holder, insert a 1.0 mm (0.039 in.) pin into the generator brush holder.



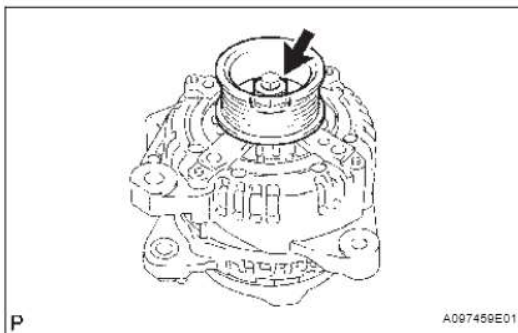
- (b) Install the generator brush holder with the 2 screws.
Torque: 1.76 N*m (15 kgf*cm, 16 in.*lbf)
- (c) Pull the 1.0 mm (0.039 in.) pin out of the generator brush holder.



- (d) Install the terminal insulator onto the generator rectifier end frame.



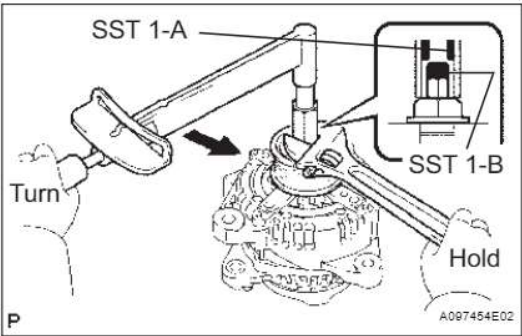
- (e) Install the generator rear end cover with the 3 nuts.
Torque: 4.6 N*m (45 kgf*cm, 41 in.*lbf)



3. REMOVE GENERATOR PULLEY

SST 09820-63011 (09820-06010), 09820-06021

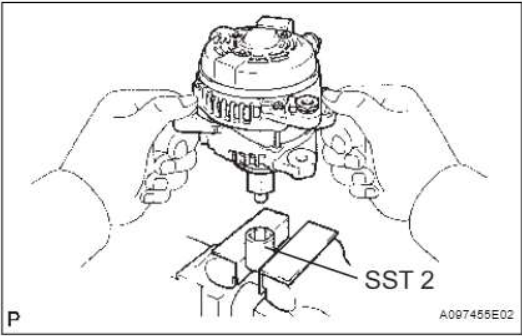
- (a) Install the generator pulley onto the generator rotor shaft, and then temporarily tighten the generator pulley nut by hand.



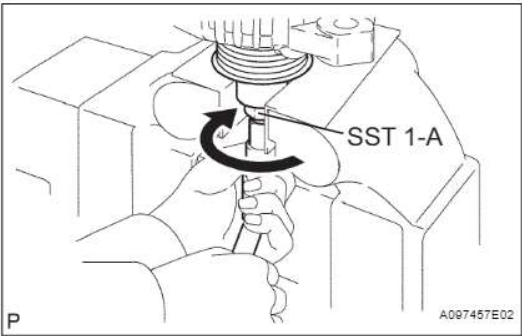
(b) Tighten SST 1-B to the specified torque, and then fix SST 1-A on the generator rotor shaft.

Item	Part No.
SST 1-A and B	09820-06010
SST 2	09820-06021

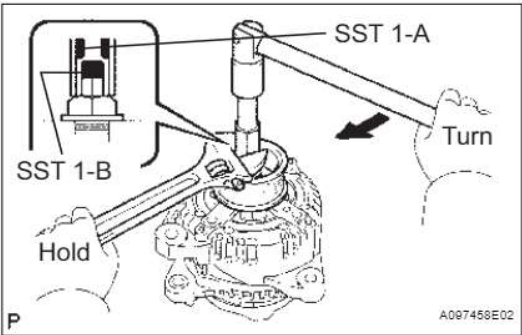
Torque: 39 N*m (400 kgf*cm, 29 ft.*lbf)
NOTICE:
Securely fix SST on the generator rotor shaft.



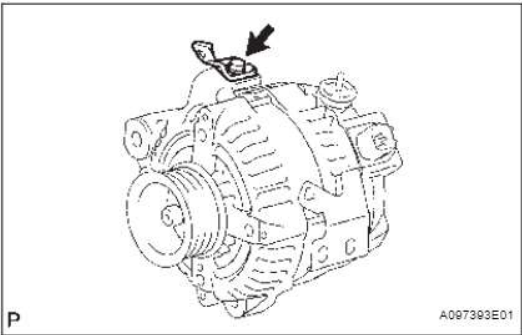
- (c) Clamp SST 2 in a vise.
- (d) Insert SST 1-A and B into SST 2, and then fix the generator pulley nut into SST 2.



- (e) Turn SST 1-A in the direction shown, and then loosen the generator pulley nut.
Torque: 110.3 N*m (1,125 kgf*cm, 82 ft.*lbf)
- (f) Remove the generator from SST 2.



- (g) Fix SST 1-B, then loosen SST 1-A in the direction shown. Remove SST 1-A and B from the generator.
- (h) Turn the generator pulley, and then check that the generator pulley moves smoothly.



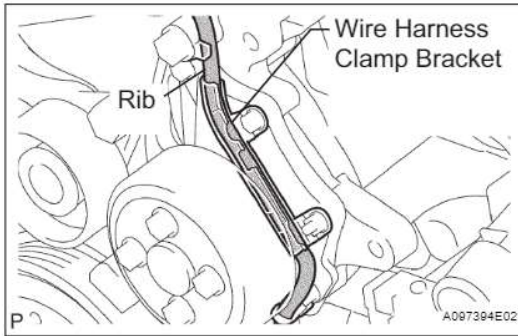
INSTALLATION

1. INSTALL GENERATOR ASSEMBLY

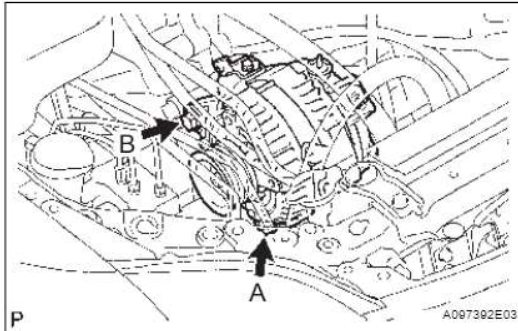
- (a) Install the wire harness clamp bracket with the bolt.
Torque: 8.4 N*m (85 kgf*cm, 74 in.*lbf)

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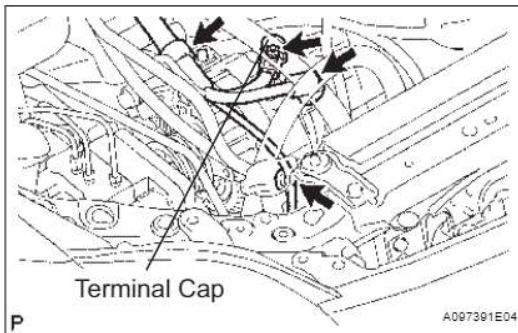
2AZ-FE CHARGING – GENERATOR



- (b) Confirm that the wire harness of the crankshaft position sensor is secured to the wire harness clamp bracket through the back of the rib of the timing chain cover.

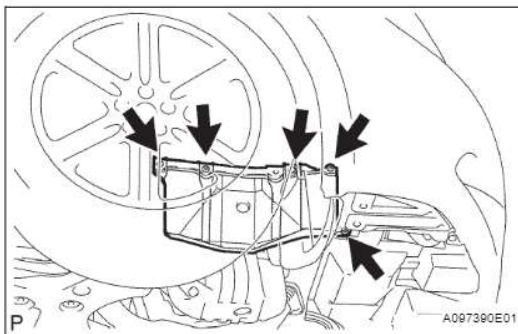


- (c) Install the generator with the 2 bolts.
Torque: 21 N*m (215 kgf*cm, 16 ft.*lbf) for bolt A
52 N*m (530 kgf*cm, 38 ft.*lbf) for bolt B



- (d) Install the 2 wire harness clamps.
 (e) Connect the generator wire with the nut.
Torque: 9.8 N*m (100 kgf*cm, 7 ft.*lbf)
 (f) Install the terminal cap.
 (g) Connect the generator connector.

2. INSTALL FAN AND GENERATOR V BELT (See page [EM-6](#))



3. INSTALL FRONT FENDER APRON SEAL RH

- (a) Install the apron seal with the 3 clips and 2 screws.

4. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

5. PERFORM INITIALIZATION

- (a) Perform initialization (see page [IN-23](#)).

NOTICE:

Certain systems need to be initialized after disconnecting and reconnecting the cable from the negative (-) battery terminal.