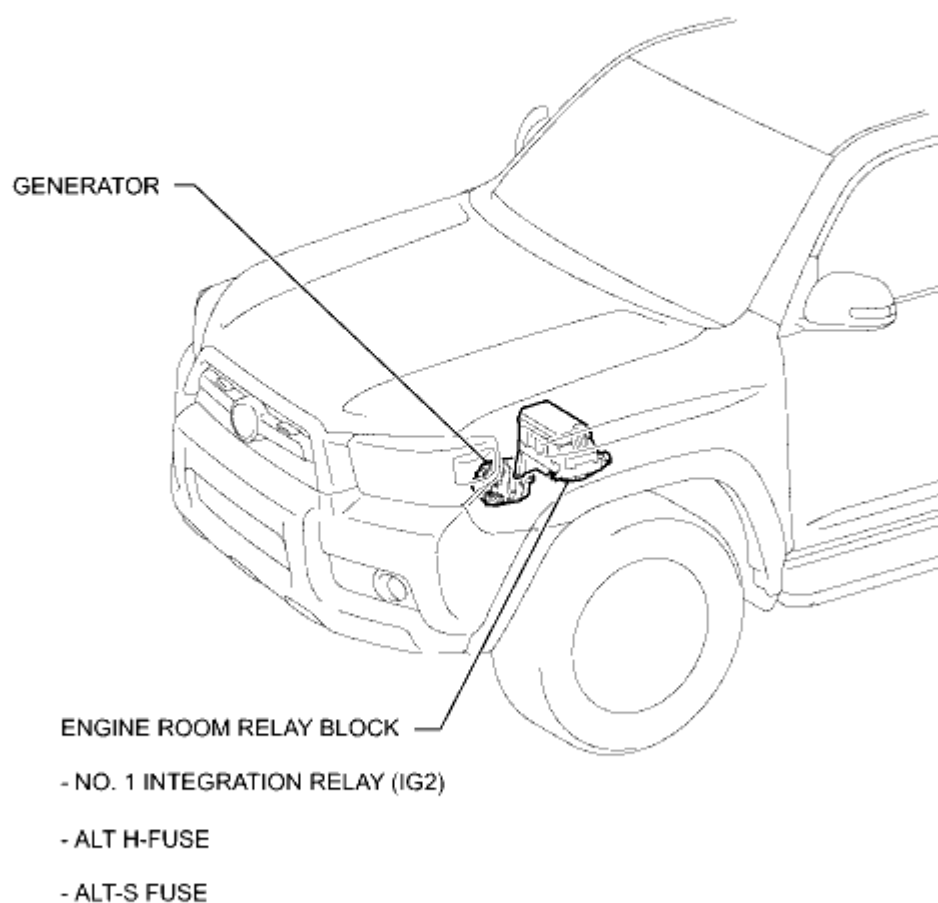


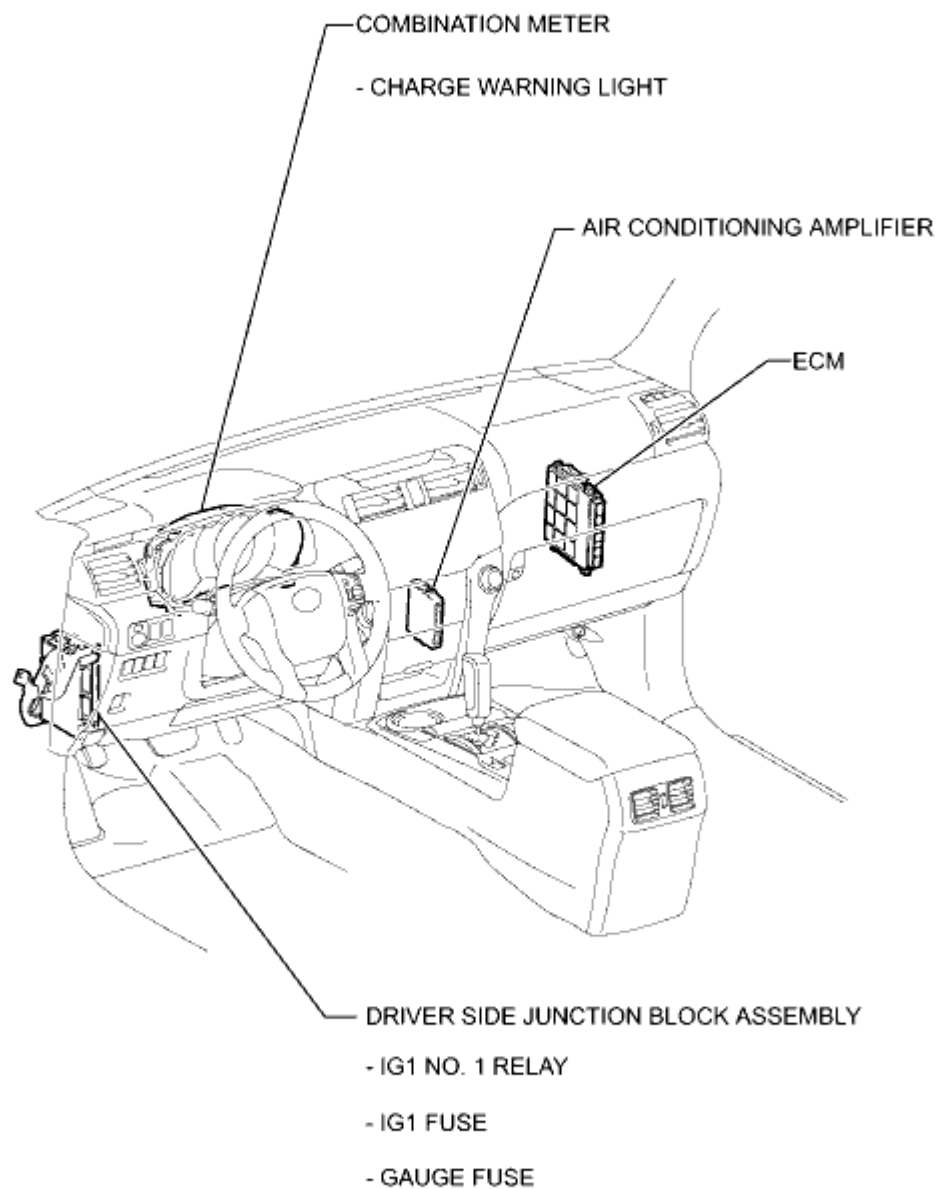
<b>Last Modified:</b> 5-10-2010	6.4 R	<b>From:</b> 200908
<b>Model Year:</b> 2010	<b>Model:</b> 4Runner	<b>Doc ID:</b> RM00000460000X
<b>Title:</b> 1GR-FE BATTERY / CHARGING: CHARGING SYSTEM: PARTS LOCATION (2010 4Runner)		

## PARTS LOCATION

## ILLUSTRATION



## ILLUSTRATION



T



TOYOTA

<b>Last Modified:</b> 5-10-2010	6.4 L	<b>From:</b> 200908
<b>Model Year:</b> 2010	<b>Model:</b> 4Runner	<b>Doc ID:</b> RM000001R5U02UX
<b>Title:</b> 1GR-FE BATTERY / CHARGING: CHARGING SYSTEM: PRECAUTION (2010 4Runner)		

## **PRECAUTION**

- 1. Check that the battery cables are connected to the correct terminals.**
- 2. Disconnect the battery cables when the battery is given a quick charge.**
- 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 nut is tightened on terminal B of the generator and the engine room relay block.**



<b>Last Modified:</b> 5-10-2010	6.4 G	<b>From:</b> 200908
<b>Model Year:</b> 2010	<b>Model:</b> 4Runner	<b>Doc ID:</b> RM000001AR904UX
<b>Title:</b> 1GR-FE BATTERY / CHARGING: CHARGING SYSTEM: ON-VEHICLE INSPECTION (2010 4Runner)		

## **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.

#### **HINT:**

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

(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 below 9.6 V, recharge or replace the battery.

(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 below 9.6 V, recharge or replace the battery.

(c) Turn the ignition switch off and turn on the headlights for 20 to 30 seconds. This removes the surface charge from the battery.

(d) Measure the battery voltage between the negative (-) and positive (+) terminals of the battery.

Standard voltage:

12.5 to 12.9 V at 20°C (68°F)

If the voltage is less than the specification, recharge the battery.

### **2. INSPECT BATTERY TERMINAL AND FUSE**

(a) Visually check the battery terminals.

(1) Check that the battery terminals are not loose or corroded.

(b) Check the H-fuse and fuses.

(1) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
ALT H-fuse	Always	Below 1 $\Omega$
ALT-S fuse		
GAUGE fuse		
IG1 fuse		

If the result is not as specified, replace the fuses as necessary.

### 3. INSPECT FAN AND GENERATOR V BELT

### 4. INSPECT GENERATOR WIRING

- (a) Visually check the generator wiring.
  - (1) Check that the wiring is in good condition.

### 5. CHECK FOR 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.

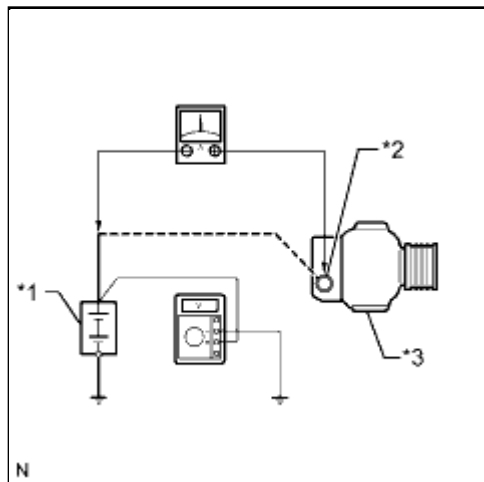
### 6. INSPECT CHARGE WARNING LIGHT CIRCUIT

- (a) Turn the ignition switch to 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) Connect a voltmeter and ammeter to the charging circuit as follows.

#### Text in Illustration



*1	Battery
*2	Terminal B
*3	Generator

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

(b) Check the charging circuit.

(1) Maintain the engine speed at 2000 rpm and check the reading on the ammeter and voltmeter.

Standard current:

10 A or less

Standard voltage:

13.2 to 14.8 V

If the voltmeter reading is higher than the standard voltage, replace the generator.

**HINT:**

**If the battery is not fully charged, the ammeter reading will sometimes be higher than the standard current.**

**8. INSPECT CHARGING CIRCUIT WITH LOAD**

(a) With the engine running at 2000 rpm, turn the high beam headlights on and turn the heater blower switch to the HI position.

(b) Check the reading on the ammeter.

Standard current:

30 A or higher

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

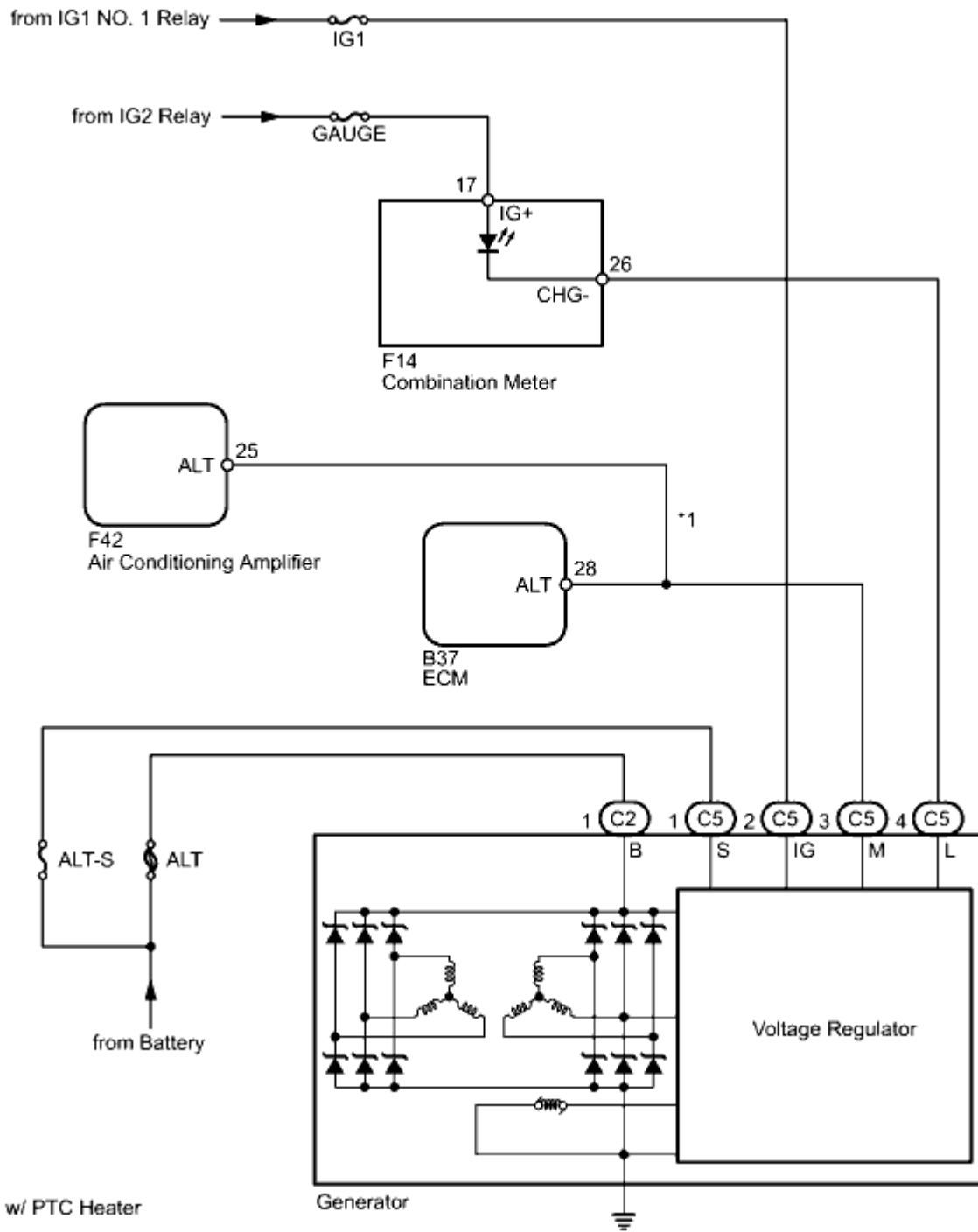
**HINT:**

**If the battery is fully charged, the indication will sometimes be less than the standard current. If this is the case, add more electrical load (operate the wipers, rear window defogger, etc.) and check the reading on the ammeter again.**





for 130A Type:



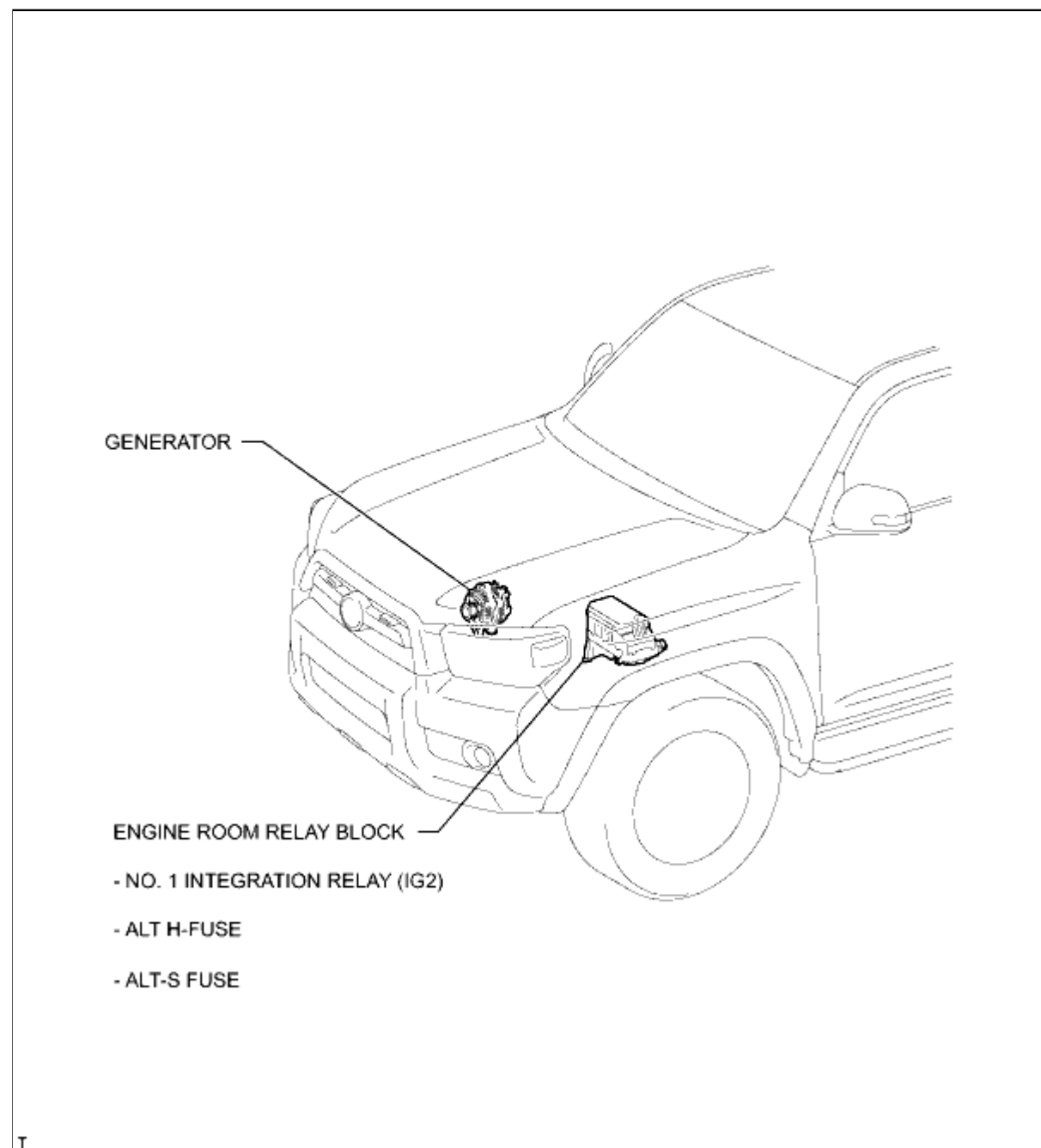
\*1: w/ PTC Heater



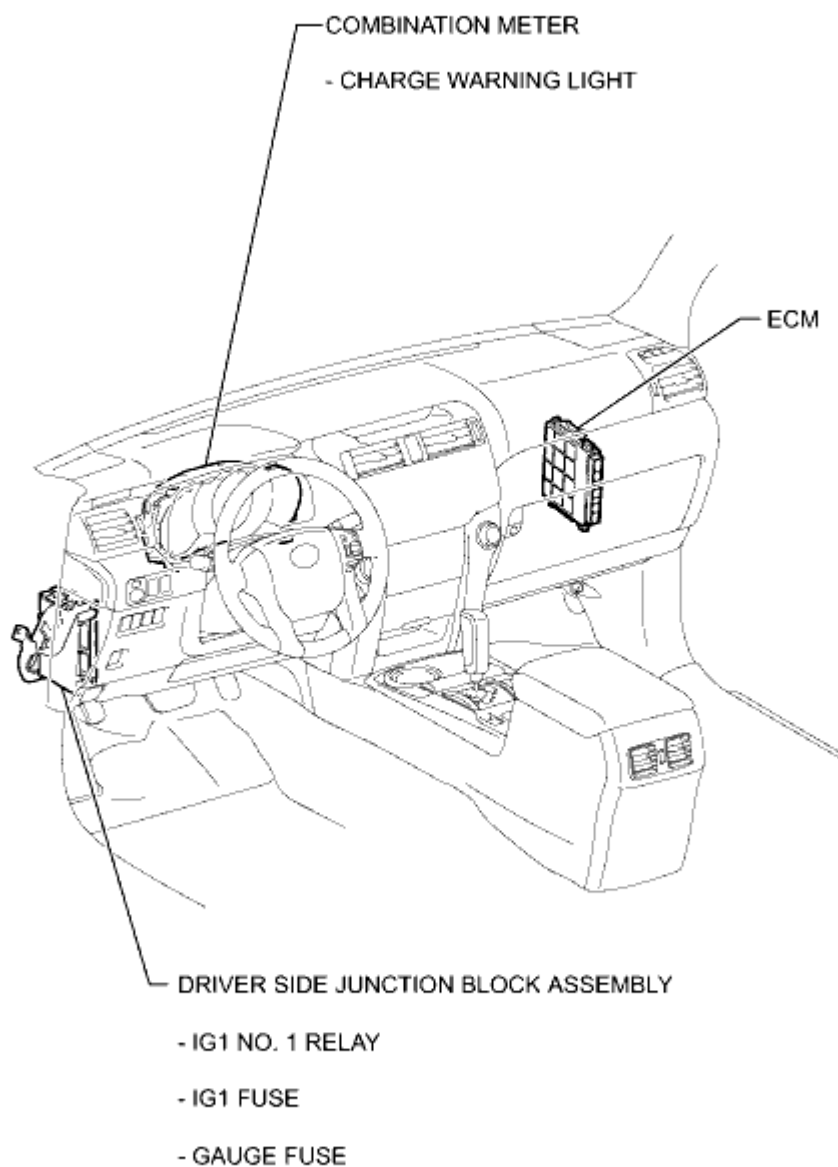
<b>Last Modified:</b> 5-10-2010	6.4 R	<b>From:</b> 200908
<b>Model Year:</b> 2010	<b>Model:</b> 4Runner	<b>Doc ID:</b> RM000004600001X
<b>Title:</b> 2TR-FE BATTERY / CHARGING: CHARGING SYSTEM: PARTS LOCATION (2010 4Runner)		

## PARTS LOCATION

## ILLUSTRATION



## ILLUSTRATION



T



TOYOTA

<b>Last Modified:</b> 5-10-2010	6.4 L	<b>From:</b> 200908
<b>Model Year:</b> 2010	<b>Model:</b> 4Runner	<b>Doc ID:</b> RM000001R5U02ZX
<b>Title:</b> 2TR-FE BATTERY / CHARGING: CHARGING SYSTEM: PRECAUTION (2010 4Runner)		

## **PRECAUTION**

- 1. Check that the battery cables are connected to the correct terminals.**
- 2. Disconnect the battery cables when the battery is given a quick charge.**
- 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 nuts on terminal B of the generator and the engine room relay block are tightened securely.**



<b>Last Modified:</b> 5-10-2010	6.4 G	<b>From:</b> 200908
<b>Model Year:</b> 2010	<b>Model:</b> 4Runner	<b>Doc ID:</b> RM000001AR9058X
<b>Title:</b> 2TR-FE BATTERY / CHARGING: CHARGING SYSTEM: ON-VEHICLE INSPECTION (2010 4Runner)		

## **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.

#### **HINT:**

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

(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 below 9.6 V, recharge or replace the battery.

(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 below 9.6 V, recharge or replace the battery.

(c) Turn the ignition switch off and turn on the headlights for 20 to 30 seconds. This removes the surface charge from the battery.

(d) Measure the battery voltage between the negative (-) and positive (+) terminals of the battery.

Standard voltage:

12.5 to 12.9 V at 20°C (68°F)

If the voltage is less than the specification, recharge the battery.

### **2. INSPECT BATTERY TERMINAL AND FUSE**

(a) Visually check the battery terminals.

(1) Check that the battery terminals are not loose or corroded.

(b) Check the H-fuse and fuses.

(1) Measure the resistance according to the value(s) in the table below.

Standard Resistance:

TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
ALT H-fuse	Always	Below 1 $\Omega$
ALT-S fuse		
GAUGE fuse		
IG1 fuse		

If the result is not as specified, replace the fuses as necessary.

### 3. INSPECT FAN AND GENERATOR V BELT

### 4. INSPECT GENERATOR WIRING

- (a) Visually check the generator wiring.
  - (1) Check that the wiring is in good condition.

### 5. CHECK FOR ABNORMAL NOISES

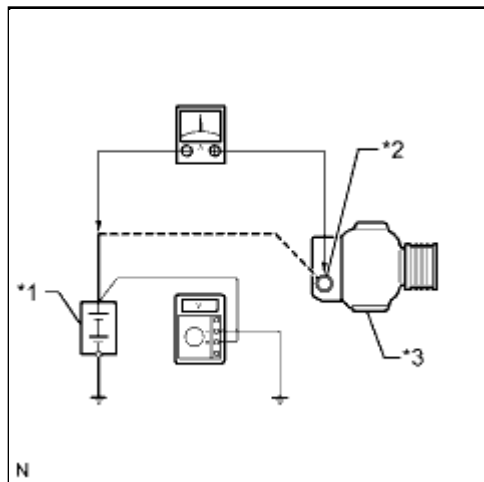
- (a) Listen for abnormal noises from the generator.
  - (1) Check that no abnormal noises are heard from the generator while the engine is running.

### 6. INSPECT CHARGE WARNING LIGHT CIRCUIT

- (a) Turn the ignition switch to 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) Connect a voltmeter and ammeter to the charging circuit as follows.
  - (1) Disconnect the wire from terminal B of the generator, and then connect it to the negative (-) lead of an ammeter.



### Text in Illustration

* 1	Battery
* 2	Terminal B
* 3	Generator

- (2) Connect the positive (+) lead of the ammeter to terminal B of the generator.
- (3) Connect the positive (+) lead of a voltmeter to the positive (+) terminal of the battery.
- (4) Ground the negative (-) lead of the voltmeter.

(b) Check the charging circuit.

(1) Maintain the engine speed at 2000 rpm and check the reading on the ammeter and voltmeter.

Standard current:

10 A or less

Standard voltage:

13.2 to 14.8 V

If the voltmeter reading is higher than the standard voltage, replace the generator.

**HINT:**

**If the battery is not fully charged, the ammeter reading will sometimes be higher than the standard current.**

**8. INSPECT CHARGING CIRCUIT WITH LOAD**

(a) With the engine running at 2000 rpm, turn the high beam headlights on and turn the heater blower switch to the HI position.

(b) Check the reading on the ammeter.

Standard current:

30 A or higher

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

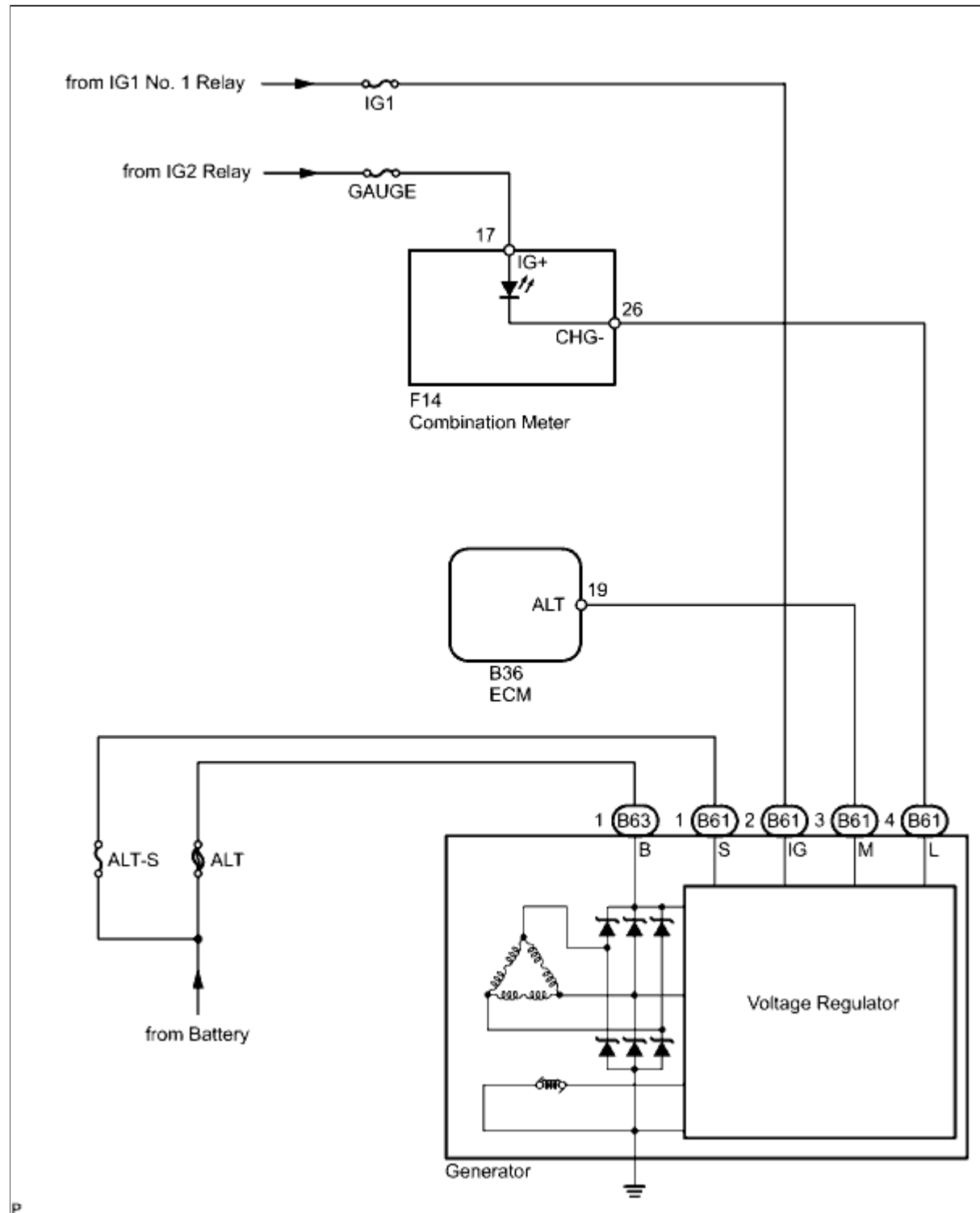
**HINT:**

**If the battery is fully charged, the indication will sometimes be less than the standard current. If this is the case, add more electrical load (operate the wipers, rear window defogger, etc.) and check the reading on the ammeter again.**



<b>Last Modified:</b> 5-10-2010	6.4 U	<b>From:</b> 200908
<b>Model Year:</b> 2010	<b>Model:</b> 4Runner	<b>Doc ID:</b> RM000004AFM001X
<b>Title:</b> 2TR-FE BATTERY / CHARGING: CHARGING SYSTEM: SYSTEM DIAGRAM (2010 4Runner)		

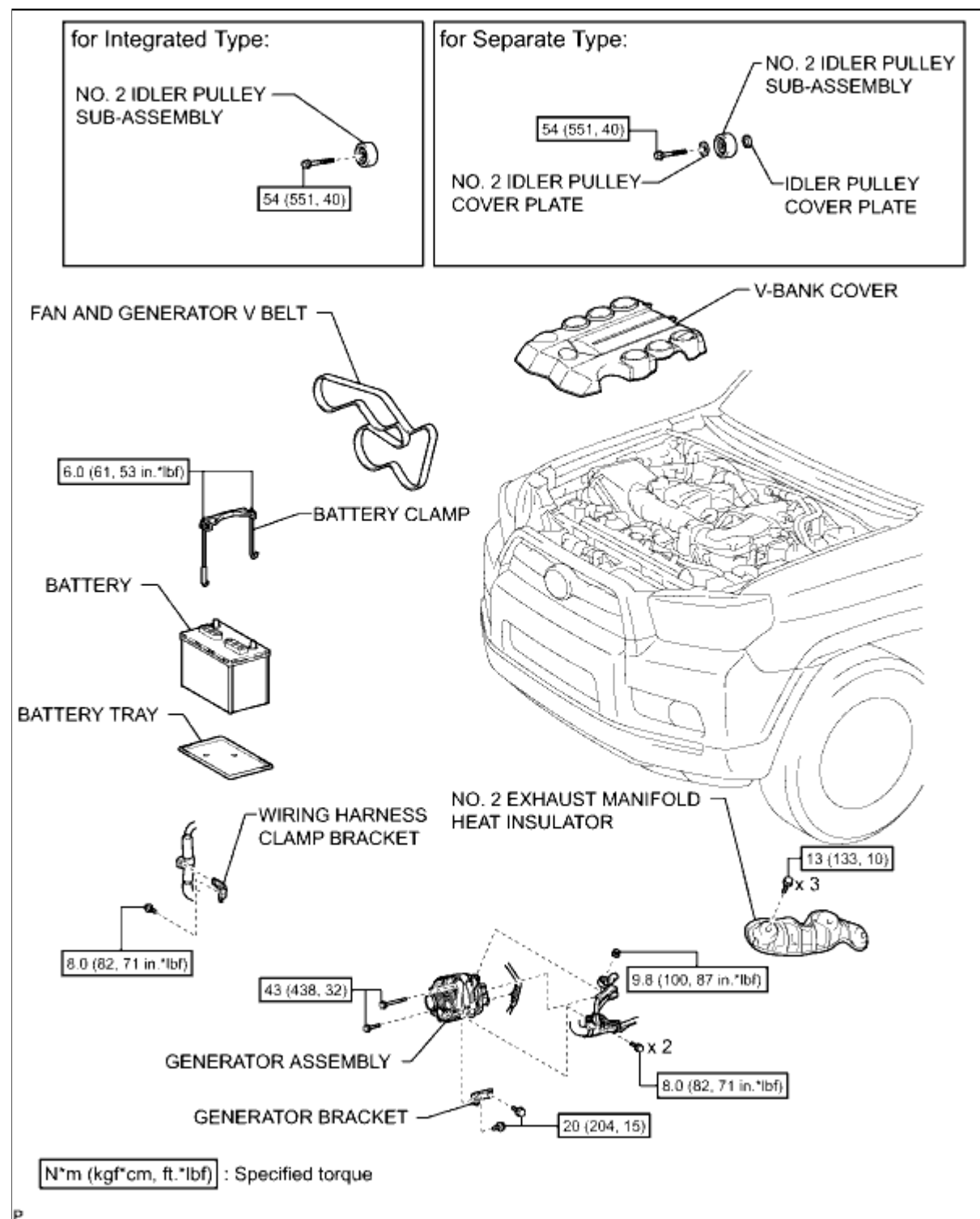
## SYSTEM DIAGRAM



<b>Last Modified:</b> 5-10-2010	6.4 K	<b>From:</b> 200908
<b>Model Year:</b> 2010	<b>Model:</b> 4Runner	<b>Doc ID:</b> RM00000460P000X
<b>Title:</b> 1GR-FE BATTERY / CHARGING: GENERATOR: COMPONENTS (2010 4Runner)		

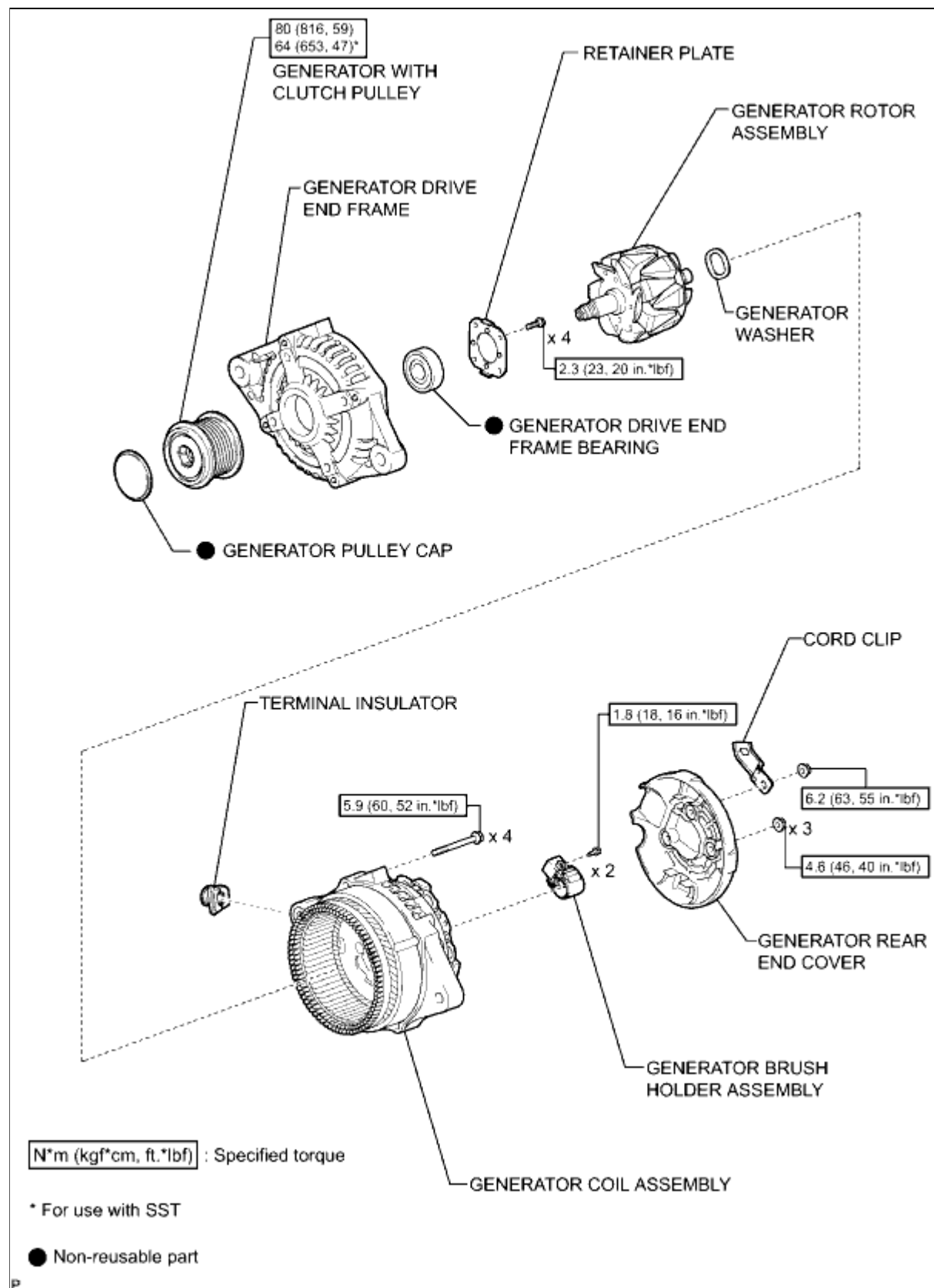
## COMPONENTS

## ILLUSTRATION





## ILLUSTRATION



<b>Last Modified:</b> 5-10-2010	6.4 A	<b>From:</b> 200908
<b>Model Year:</b> 2010	<b>Model:</b> 4Runner	<b>Doc ID:</b> RM000001ONP01JX
<b>Title:</b> 1GR-FE BATTERY / CHARGING: GENERATOR: REMOVAL (2010 4Runner)		

## REMOVAL

### 1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

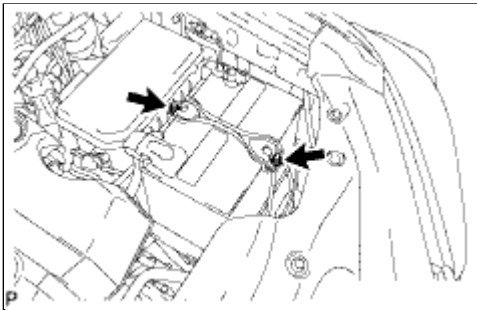
#### NOTICE:

When disconnecting the cable, some systems need to be initialized after the cable is reconnected



### 2. DISCONNECT CABLE FROM POSITIVE BATTERY TERMINAL

### 3. REMOVE BATTERY CLAMP



(a) Loosen the 2 nuts and remove the battery clamp.

### 4. REMOVE BATTERY

### 5. REMOVE BATTERY TRAY

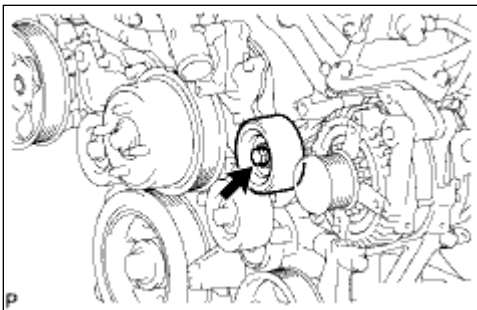
### 6. REMOVE V-BANK COVER



### 7. REMOVE FAN AND GENERATOR V BELT



### 8. REMOVE NO. 2 IDLER PULLEY SUB-ASSEMBLY



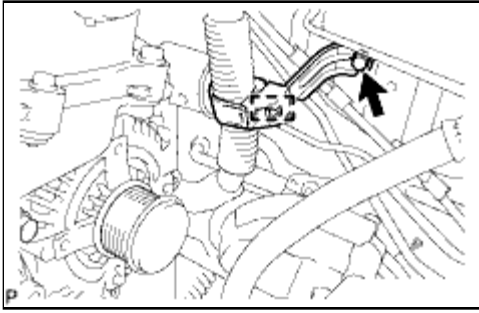
(a) for Integrated Type:

Remove the bolt and No. 2 idler pulley.

(b) for Separate Type:

Remove the bolt, No. 2 idler pulley cover plate, No. 2 idler pulley and idler pulley cover plate.

## 9. REMOVE WIRING HARNESS CLAMP BRACKET



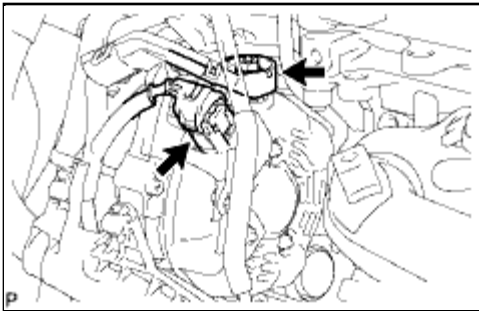
(a) Detach the clamp.

(b) Remove the bolt and wiring harness clamp bracket.

## 10. REMOVE NO. 2 EXHAUST MANIFOLD HEAT INSULATOR



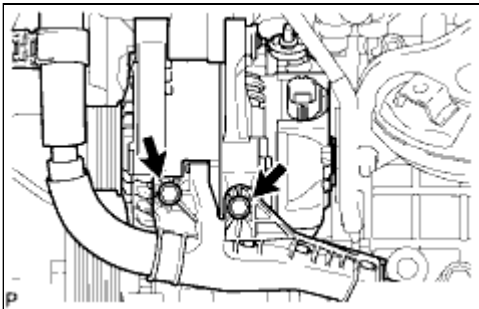
## 11. REMOVE GENERATOR ASSEMBLY



(a) Open the terminal cap.

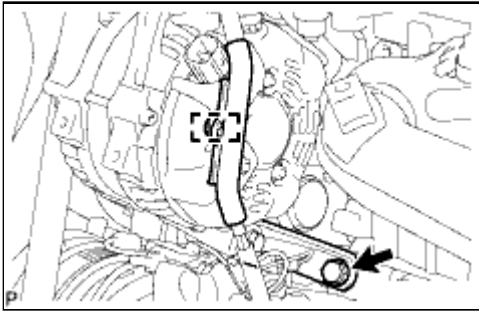
(b) Remove the nut and disconnect the wire harness from terminal B.

(c) Disconnect the generator connector from the generator assembly.

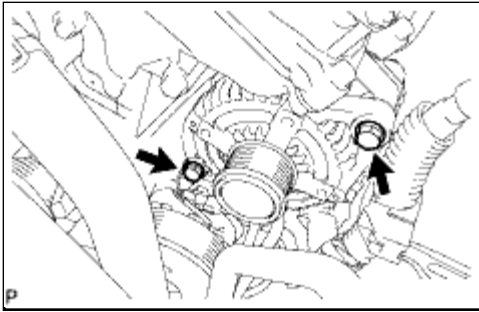


(d) Remove the 2 bolts and disconnect the wire harness.

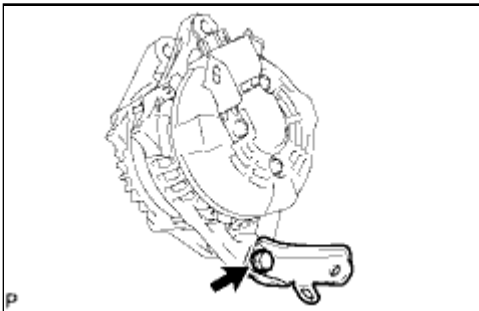
(e) Disconnect the wire harness clamp.



(f) Remove the bolt and disconnect the generator bracket.



(g) Remove the 2 bolts and generator assembly.



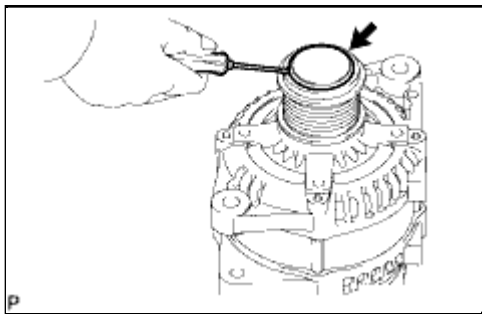
(h) Remove the bolt and generator bracket.



<b>Last Modified:</b> 5-10-2010	6.4 A	<b>From:</b> 200908
<b>Model Year:</b> 2010	<b>Model:</b> 4Runner	<b>Doc ID:</b> RM000001ONQ036X
<b>Title:</b> 1GR-FE BATTERY / CHARGING: GENERATOR: DISASSEMBLY (2010 4Runner)		

DISASSEMBLY

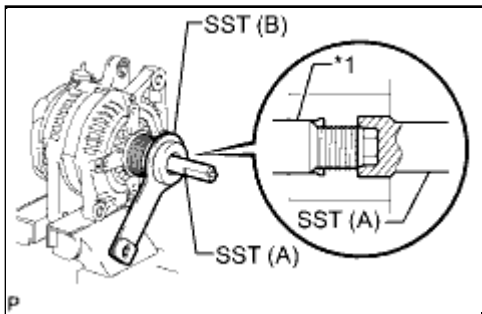
1. REMOVE GENERATOR PULLEY CAP



(a) Using a screwdriver, remove the generator pulley cap.

2. REMOVE GENERATOR WITH CLUTCH PULLEY

(a) Mount the generator in a vise between aluminum plates.



(b) Install SST (A) and SST (B) to the generator with clutch pulley as shown in the illustration.

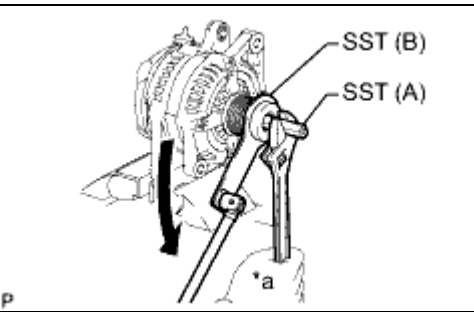
SST: 09820-63021

Text in Illustration


* 1	Rotor Shaft
-----	-------------

NOTICE: Securely attach SST to the generator with clutch pulley and generator rotor shaft.

(c) Use a wrench to hold SST (A) and turn SST (B) counterclockwise to loosen the generator with clutch pulley.

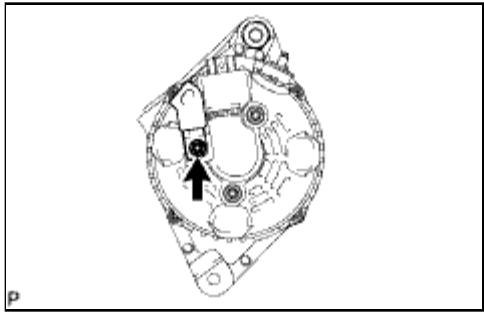


**Text in Illustration**

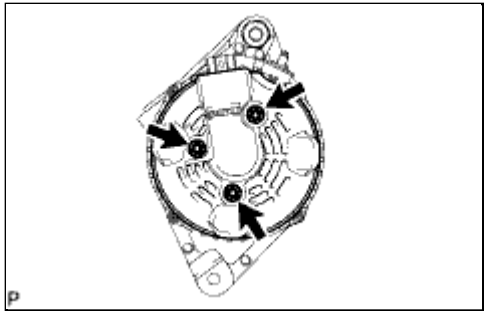
* a	Hold
	Turn

- NOTICE:**  
Be careful as the generator with clutch pulley or generator rotor shaft may be damaged if the position of SST is not securely maintained while performing this operation.
- (d) Remove SST from the generator.
  - (e) Remove the generator with clutch pulley from the rotor shaft.

**3. REMOVE GENERATOR REAR END COVER**



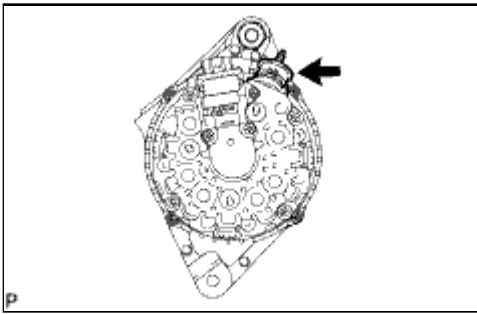
(a) Remove the nut and cord clip.



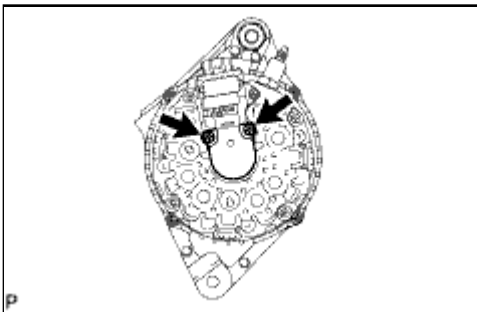
(b) Remove the 3 nuts and generator rear end cover.

**4. REMOVE TERMINAL INSULATOR**

(a) Remove the terminal insulator from the generator coil.

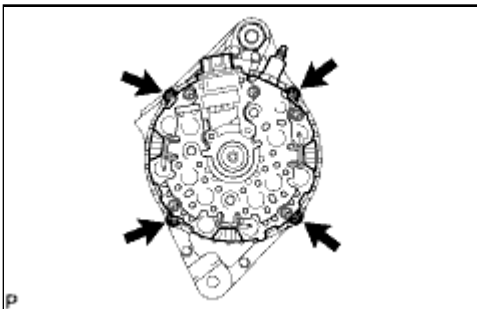


## 5. REMOVE GENERATOR BRUSH HOLDER ASSEMBLY



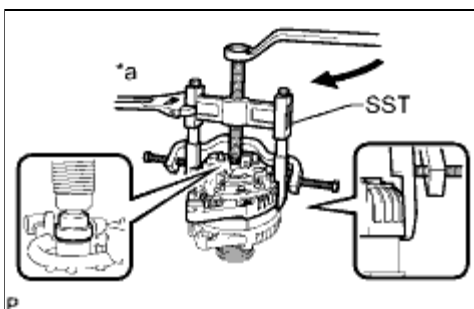
(a) Remove the 2 screws and brush holder from the generator coil.

## 6. REMOVE GENERATOR COIL ASSEMBLY



(a) Remove the 4 bolts.


(b) Using SST, remove the generator coil assembly.



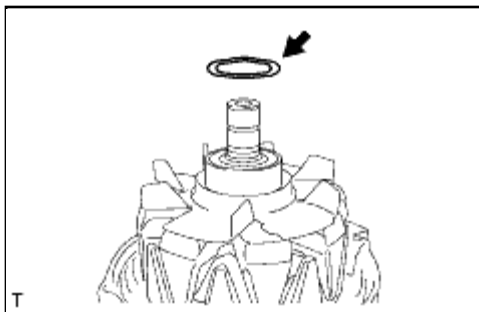
**SST: 09950-40011**

09951-04020  
09952-04010  
09953-04020  
09954-04010  
09955-04071  
09957-04010  
09958-04011

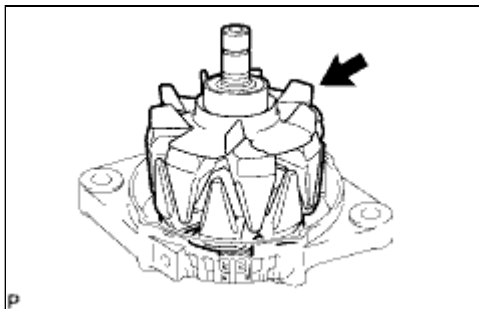
#### Text in Illustration

* a	Hold
	Turn

### 7. REMOVE GENERATOR ROTOR ASSEMBLY



(a) Remove the generator washer.



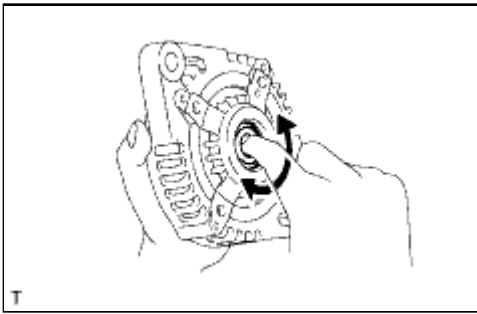
(b) Remove the generator rotor assembly.

### 8. INSPECT GENERATOR DRIVE END FRAME BEARING

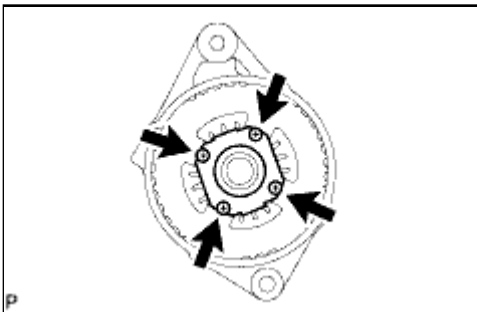
(a) Check that the drive end frame bearing is not rough or worn.

If necessary, replace the generator drive end frame bearing.

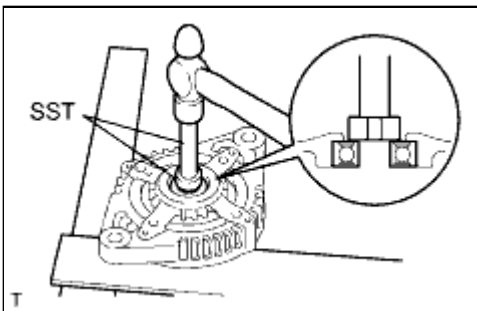




## 9. REMOVE GENERATOR DRIVE END FRAME BEARING



(a) Remove the 4 screws and retainer plate from the drive end frame.



(b) Using SST and a hammer, tap out the drive end frame bearing from the drive end frame.

**SST: 09950-60010**

09951-00250

**SST: 09950-70010**

09951-07100

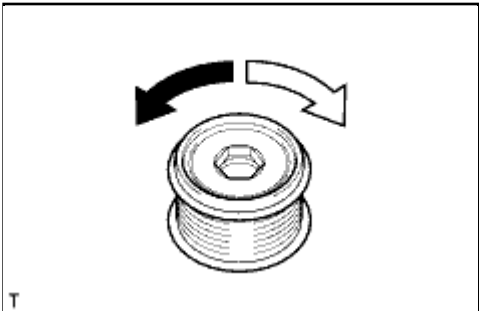


<b>Last Modified:</b> 5-10-2010	6.4 G	<b>From:</b> 200908
<b>Model Year:</b> 2010	<b>Model:</b> 4Runner	<b>Doc ID:</b> RM0000010NN035X
<b>Title:</b> 1GR-FE BATTERY / CHARGING: GENERATOR: INSPECTION (2010 4Runner)		



INSPECTION

1. INSPECT GENERATOR WITH CLUTCH PULLEY

- (a) Hold the center of the generator with clutch pulley and check that the outer ring turns counterclockwise and does not turn clockwise.



Text in Illustration

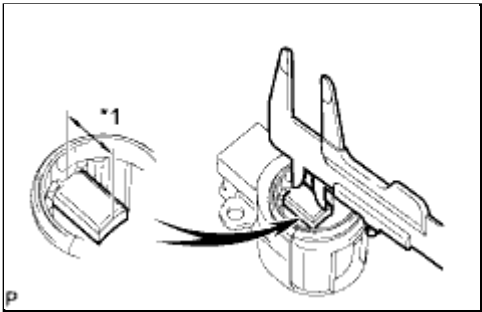
	Free
	Lock

If the result is not as specified, replace the generator with clutch pulley.

2. INSPECT GENERATOR BRUSH HOLDER ASSEMBLY

- (a) Using a vernier caliper, measure the brush length.

Standard exposed length:  
9.5 to 11.5 mm (0.374 to 0.453 in.)  
Minimum exposed length:  
4.5 mm (0.177 in.)

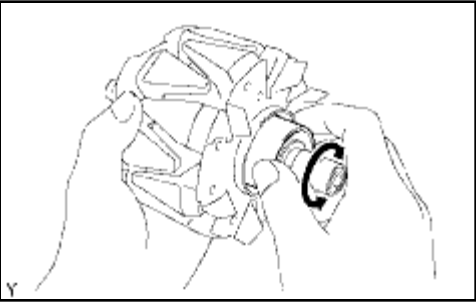


Text in Illustration

* 1	Length
-----	--------

If the brush length is less than the minimum, replace the generator brush holder assembly.

3. INSPECT GENERATOR ROTOR ASSEMBLY

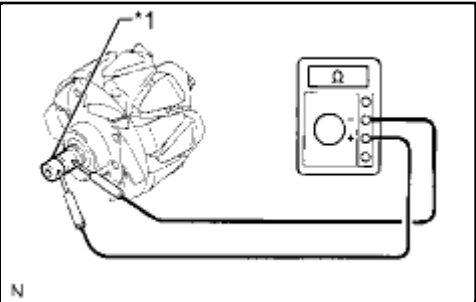


- (a) Check that the generator rotor bearing is not rough or worn.  
If necessary, replace the generator rotor assembly.

- (b) Check the generator rotor for an open circuit.

- (1) Measure the resistance according to the value(s) in the table below.

Standard Resistance:



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
Slip ring - Slip ring	20°C (68°F)	2.3 to 2.7 Ω

Text in Illustration

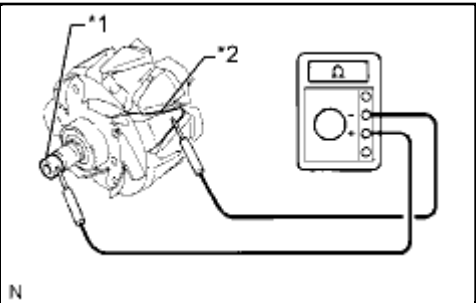
*1	Slip Ring
----	-----------

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

- (c) Check if the generator rotor is grounded.

- (1) Measure the resistance according to the value(s) in the table below.

Standard Resistance:



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
Slip ring - Rotor core	Always	10 MΩ or higher

Text in Illustration

*1	Slip Ring
*2	Rotor Core

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

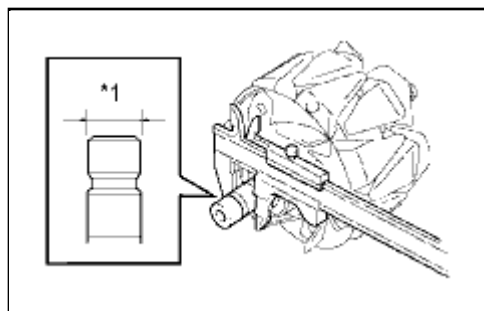
(d) Using a vernier caliper, measure the slip ring diameter.

Standard diameter:

14.2 to 14.4 mm (0.559 to 0.567 in.)

Minimum diameter:

14.0 mm (0.551 in.)



### Text in Illustration

*1	Diameter
----	----------

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

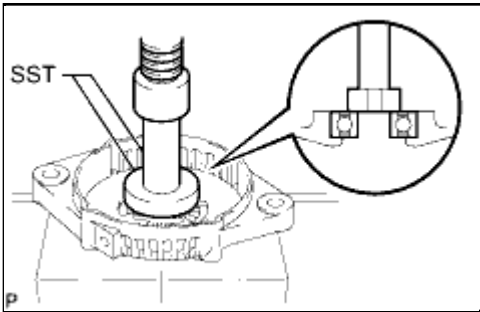


TOYOTA

<b>Last Modified:</b> 5-10-2010	6.4 A	<b>From:</b> 200908
<b>Model Year:</b> 2010	<b>Model:</b> 4Runner	<b>Doc ID:</b> RM0000010NR03BX
<b>Title:</b> 1GR-FE BATTERY / CHARGING: GENERATOR: REASSEMBLY (2010 4Runner)		

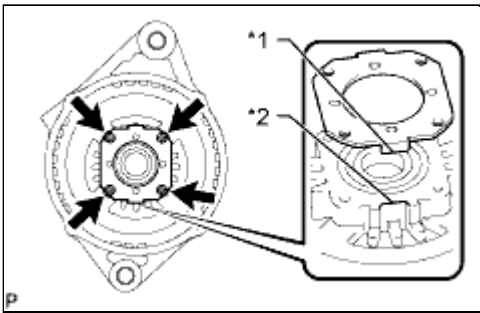
# REASSEMBLY

## 1. INSTALL GENERATOR DRIVE END FRAME BEARING



(a) Using SST and a press, press in a new generator drive end frame bearing.

**SST: 09950-60010**  
09951-00470  
**SST: 09950-70010**  
09951-07100



(b) Fit the tabs on the retainer plate into the cutouts on the drive end frame to install the retainer plate.

### Text in Illustration

* 1	Tab
* 2	Cutout

(c) Install the 4 screws.

**Torque: 2.3 N·m (23 kgf·cm, 20in·lbf)**

## 2. INSTALL GENERATOR ROTOR ASSEMBLY

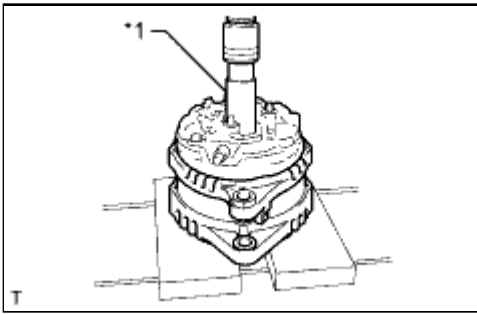
- (a) Install the generator rotor assembly to the drive end frame.
- (b) Place the generator washer on the generator rotor.

## 3. INSTALL GENERATOR COIL ASSEMBLY

(a) Using a deep socket wrench (21 mm) and press, slowly press in the generator coil assembly.

### Text in Illustration

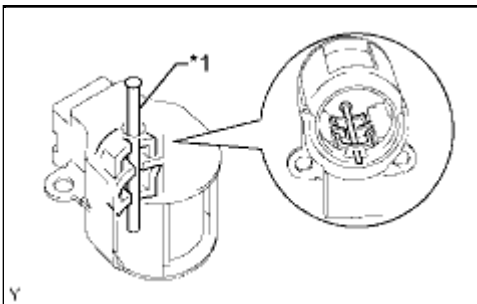
* 1	Deep Socket Wrench (21 mm)
-----	----------------------------



(b) Install the 4 bolts.

**Torque: 5.9 N·m (60 kgf·cm, 52in·lbf)**

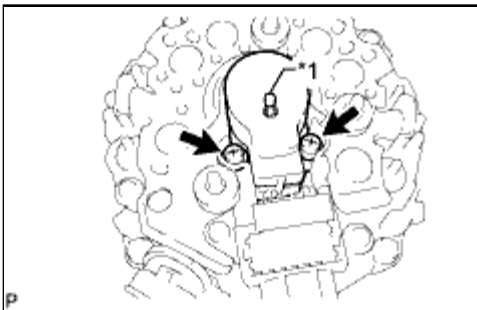
#### 4. INSTALL GENERATOR BRUSH HOLDER ASSEMBLY



(a) While pushing the 2 brushes into the generator brush holder, insert a pin with a diameter of 1.0 mm (0.0394 in.) into the brush holder hole.

#### Text in Illustration

* 1	Pin
-----	-----



(b) Install the generator brush holder to the generator coil with the 2 screws.

**Torque: 1.8 N·m (18 kgf·cm, 16in·lbf)**

#### Text in Illustration

* 1	Pin
-----	-----

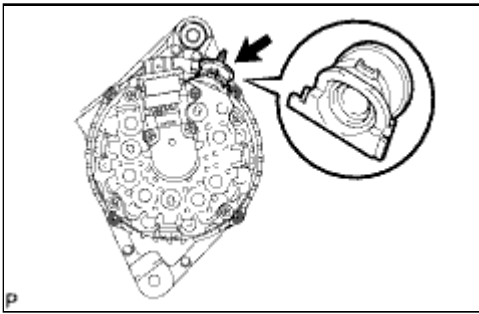
(c) Pull out the pin from the generator brush holder.

#### 5. INSTALL TERMINAL INSULATOR

(a) Install the terminal insulator to the generator coil.

#### NOTICE:

**Make sure the terminal insulator is installed facing the proper direction.**



## 6. INSTALL GENERATOR REAR END COVER

(a) Install the generator rear end cover to the generator coil with the 3 nuts.

**Torque: 4.6 N·m (46 kgf·cm, 40in·lbf)**

(b) Install the cord clip with the nut.

**Torque: 6.2 N·m (63 kgf·cm, 55in·lbf)**

## 7. INSTALL GENERATOR WITH CLUTCH PULLEY

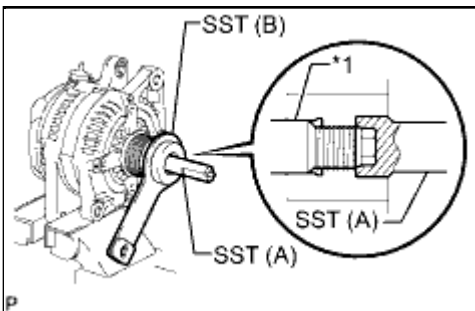
(a) Temporarily install the generator with clutch pulley by hand.

(b) Mount the generator in a vise between aluminum plates.

(c) Install SST (A) and SST (B) to the generator with clutch pulley as shown in the illustration.

**SST: 09820-63021**

### Text in Illustration

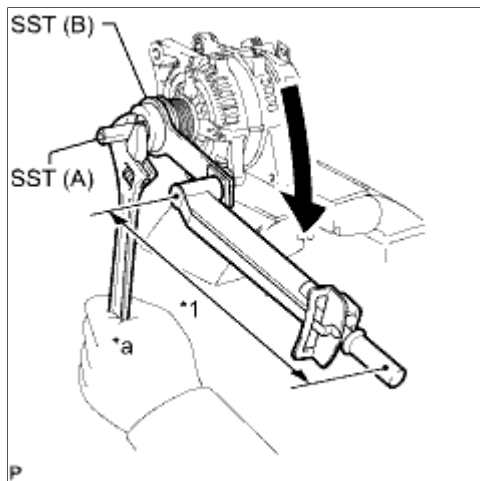


*1	Rotor Shaft
----	-------------

### NOTICE:

**Securely attach SST to the generator with clutch pulley and generator rotor shaft.**


(d) Using a wrench to hold SST (A), turn SST (B) clockwise to tighten the generator with clutch pulley.




**without SST - Torque: 80 N·m (816 kgf·cm, 59ft·lbf)**

**with SST - Torque: 64 N·m (653 kgf·cm, 47ft·lbf)**

**Text in Illustration**

* 1	Fulcrum Length
* a	Hold
	Turn

#### **HINT:**

- Use a torque wrench with a fulcrum length of 400 mm (15.7 in.). When using a torque wrench with a fulcrum length that is not 400 mm (15.7 in.), calculate the torque specification for the torque wrench and SST based on the "without SST" torque specification  .
- Make sure SST and the wrench are connected in a straight line.

#### **NOTICE:**

**Be careful as the generator with clutch pulley or generator rotor shaft may be damaged if the position of SST is not securely maintained while performing this operation.**

(e) Remove SST from the generator.

(f) Check that the generator with clutch pulley rotates smoothly.

### **8. INSTALL GENERATOR PULLEY CAP**

(a) Install a new generator pulley cap to the clutch pulley.



<b>Last Modified:</b> 5-10-2010	6.4 A	<b>From:</b> 200908
<b>Model Year:</b> 2010	<b>Model:</b> 4Runner	<b>Doc ID:</b> RM000001ONM01IX
<b>Title:</b> 1GR-FE BATTERY / CHARGING: GENERATOR: INSTALLATION (2010 4Runner)		

## INSTALLATION

### 1. INSTALL GENERATOR ASSEMBLY

(a) Install the generator bracket to the generator with the bolt.

**Torque: 20 N·m (204 kgf·cm, 15ft·lbf)**

(b) Install the generator with the 2 bolts.

**Torque: 43 N·m (438 kgf·cm, 32ft·lbf)**

(c) Install the generator bracket with the bolt.

**Torque: 20 N·m (204 kgf·cm, 15ft·lbf)**

(d) Attach the wire harness clamp.

(e) Install the wire harness with the 2 bolts.

**Torque: 8.0 N·m (82 kgf·cm, 71in·lbf)**

(f) Connect the generator connector to the generator.

(g) Install the generator wire with the nut.

**Torque: 9.8 N·m (100 kgf·cm, 87in·lbf)**

(h) Close the terminal cap.

### 2. INSTALL NO. 2 EXHAUST MANIFOLD HEAT INSULATOR

### 3. INSTALL WIRING HARNESS CLAMP BRACKET

(a) Install the wiring harness clamp bracket with the bolt.

**Torque: 8.0 N·m (82 kgf·cm, 71in·lbf)**

(b) Attach the clamp.

### 4. INSTALL NO. 2 IDLER PULLEY SUB-ASSEMBLY

(a) for Integrated Type:

Install the No. 2 idler pulley with the bolt.

**Torque: 54 N·m (551 kgf·cm, 40ft·lbf)**

(b) for Separate Type:

Install the idler pulley cover plate, No. 2 idler pulley and No. 2 idler pulley cover plate with the bolt.

**Torque: 54 N·m (551 kgf·cm, 40ft·lbf)**

### 5. INSTALL FAN AND GENERATOR V BELT

### 6. INSTALL V-BANK COVER

### 7. INSTALL BATTERY TRAY

### 8. INSTALL BATTERY

## 9. INSTALL BATTERY CLAMP

(a) Install the battery clamp with the 2 nuts.

**Torque: 6.0 N·m (61 kgf·cm, 53in·lbf)**

## 10. CONNECT CABLE TO POSITIVE BATTERY TERMINAL

## 11. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

### NOTICE:

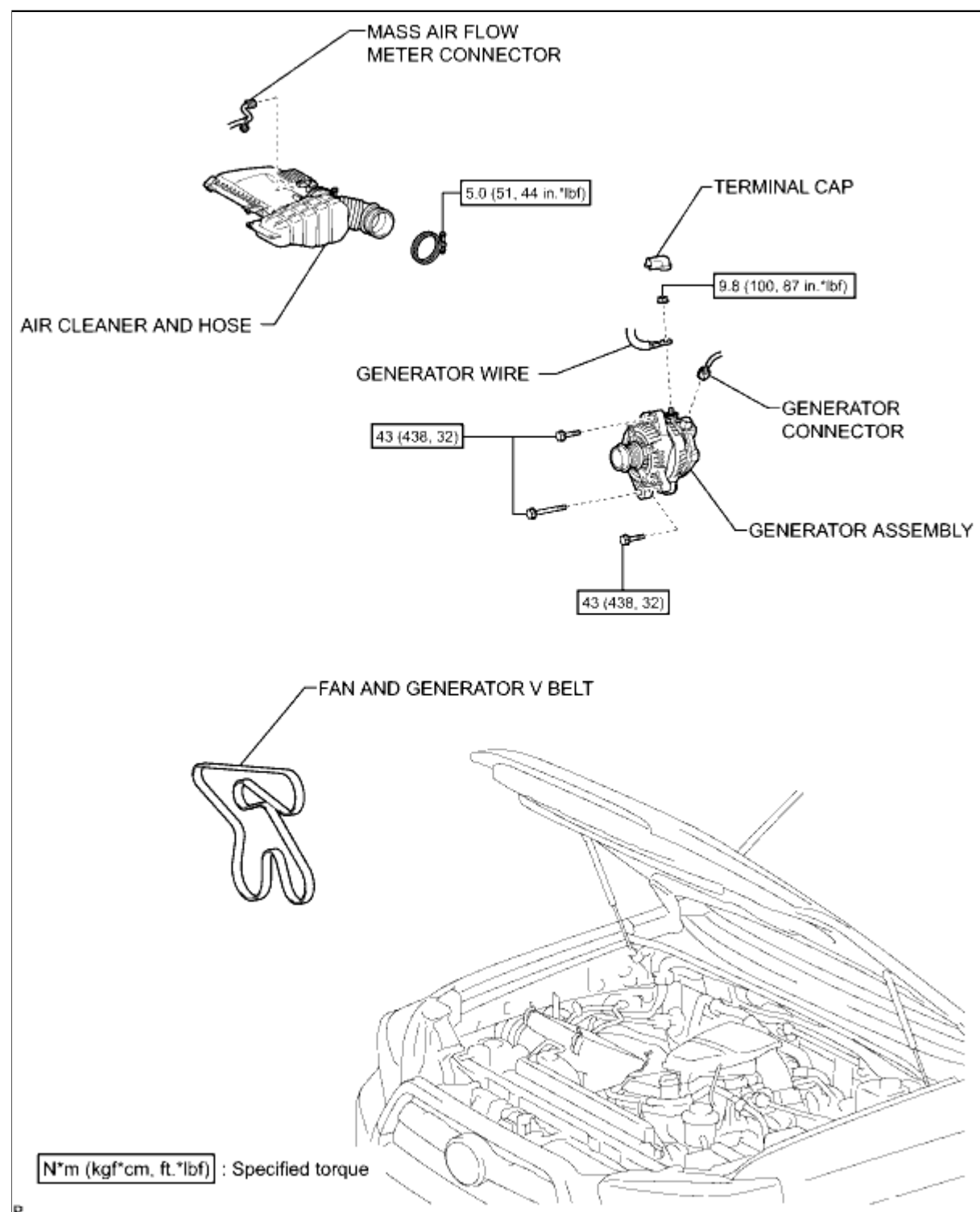
When disconnecting the cable, some systems need to be initialized after the cable is reconnected .



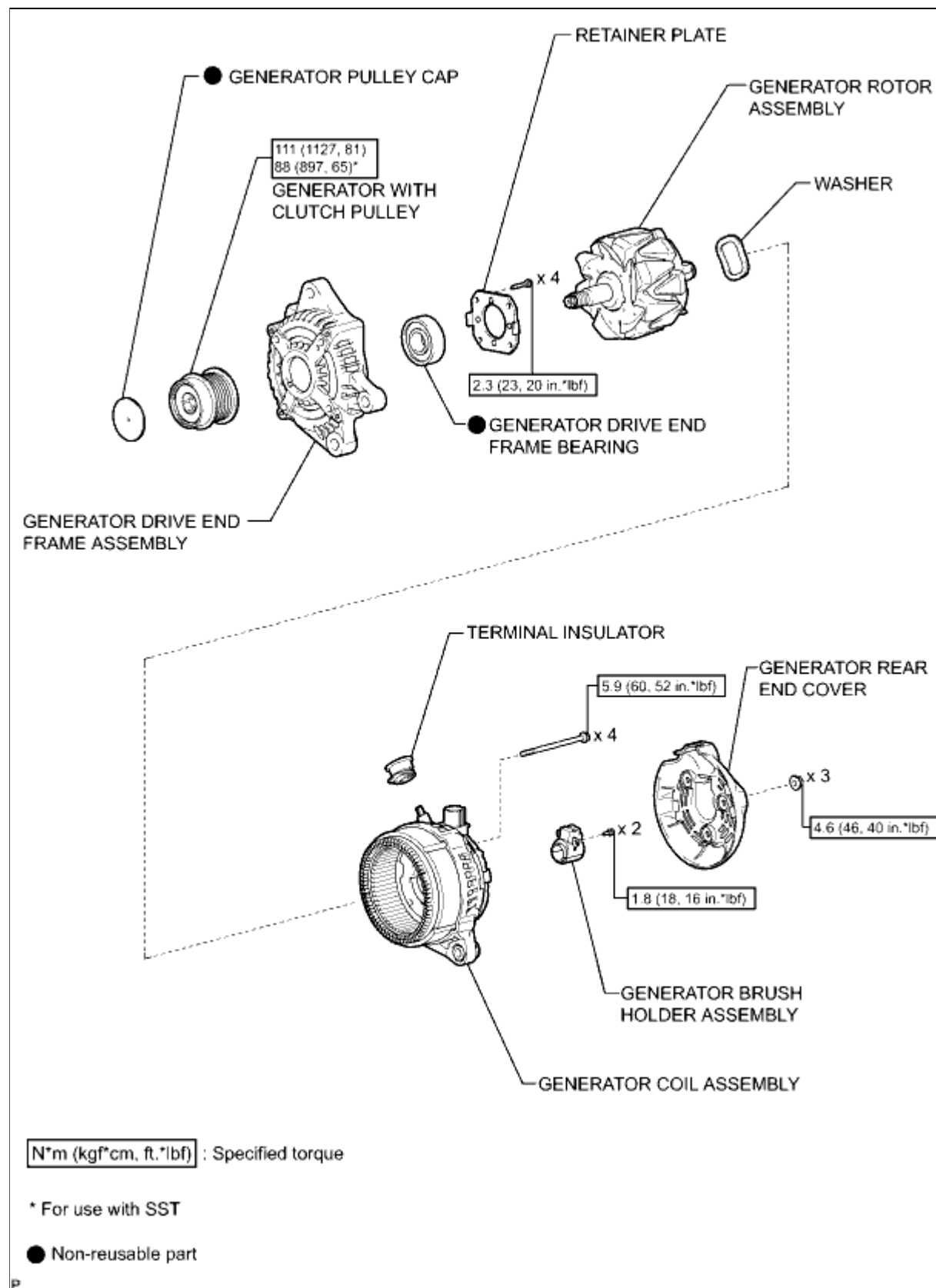
<b>Last Modified:</b> 5-10-2010	6.4 K	<b>From:</b> 200908
<b>Model Year:</b> 2010	<b>Model:</b> 4Runner	<b>Doc ID:</b> RM0000045FY002X
<b>Title:</b> 2TR-FE BATTERY / CHARGING: GENERATOR: COMPONENTS (2010 4Runner)		

## COMPONENTS

## ILLUSTRATION



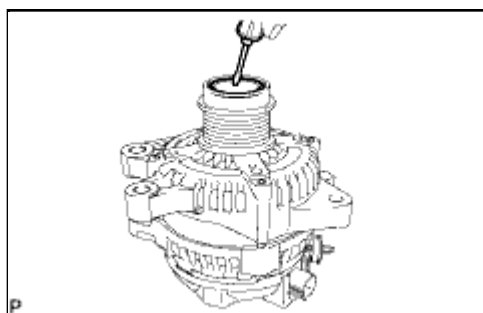
## ILLUSTRATION



<b>Last Modified:</b> 5-10-2010	6.4 A	<b>From:</b> 200908
<b>Model Year:</b> 2010	<b>Model:</b> 4Runner	<b>Doc ID:</b> RM000000EH200FX
<b>Title:</b> 2TR-FE BATTERY / CHARGING: GENERATOR: DISASSEMBLY (2010 4Runner)		

## **DISASSEMBLY**

### **1. REMOVE GENERATOR PULLEY CAP**



- (a) Using a screwdriver, puncture the center of the generator pulley cap and pry it off.

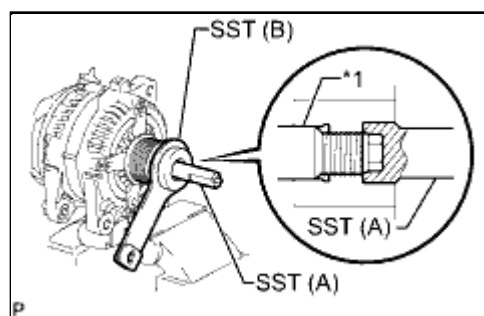
### **2. REMOVE GENERATOR WITH CLUTCH PULLEY**

- (a) Mount the generator in a vise between aluminum plates.

- (b) Install SST (A) and SST (B) to the generator with clutch pulley as shown in the illustration.

**SST: 09820-63021**

#### **Text in Illustration**

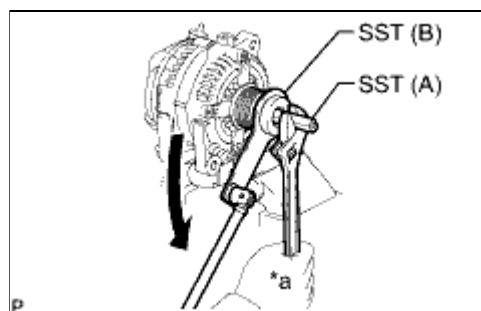


* 1	Generator Rotor Shaft
-----	-----------------------


#### **NOTICE:**

**Securely attach SST to the generator with clutch pulley and generator rotor shaft.**

- (c) Use a wrench to hold SST (A) and turn SST (B) counterclockwise to loosen the generator with clutch pulley.

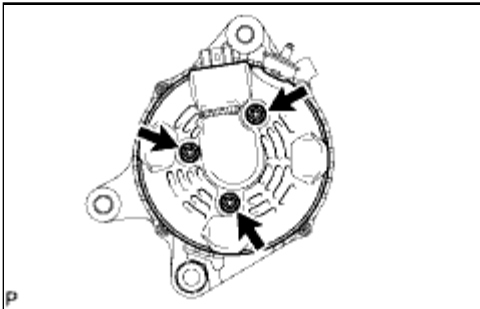


**Text in Illustration**

* a	Hold
	Turn

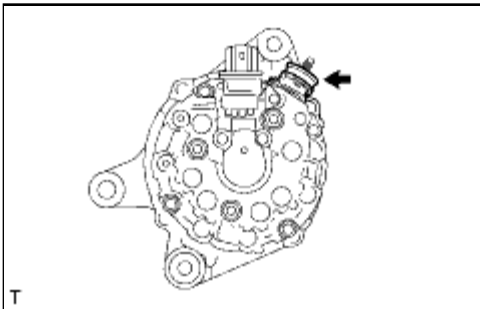
- NOTICE:**  
Be careful as the generator with clutch pulley or generator rotor shaft may be damaged if the position of SST is not securely maintained while performing this operation.
- (d) Remove SST from the generator.
  - (e) Remove the generator with clutch pulley from the rotor shaft.

**3. REMOVE GENERATOR REAR END COVER**



(a) Remove the 3 nuts and generator rear end cover.

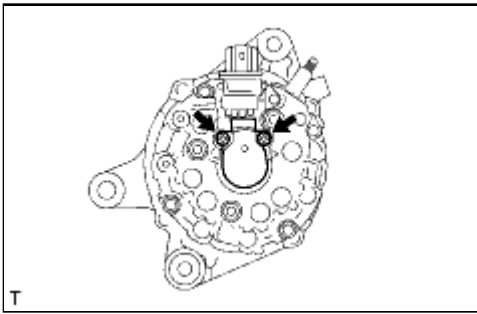
**4. REMOVE TERMINAL INSULATOR**



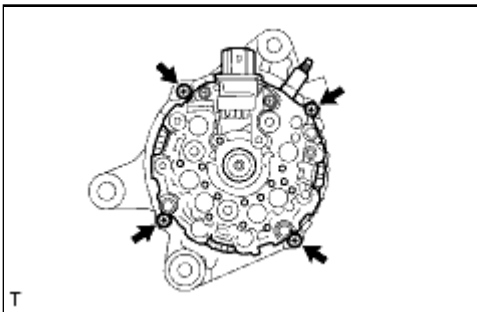
(a) Remove the terminal insulator.

**5. REMOVE GENERATOR BRUSH HOLDER ASSEMBLY**

(a) Remove the 2 screws and generator brush holder.



## 6. REMOVE GENERATOR COIL ASSEMBLY



(a) Remove the 4 through bolts.

(b) Using SST, remove the generator coil.

**SST: 09950-40011**

09951-04020

09952-04010

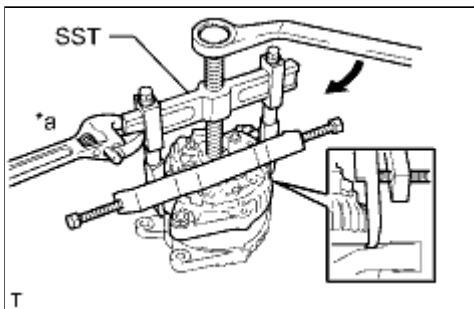
09953-04020

09954-04010

09955-04071

09957-04010

09958-04011



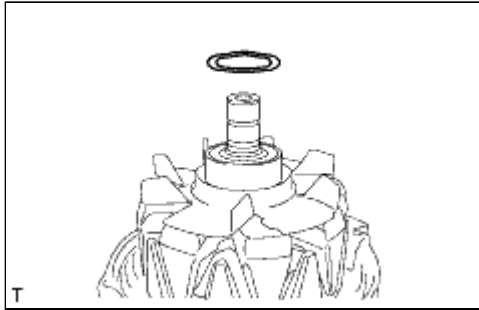
**Text in Illustration**

* a	Hold
-----	------

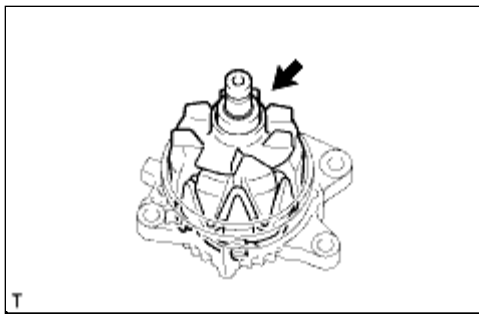


Turn

## 7. REMOVE GENERATOR ROTOR ASSEMBLY

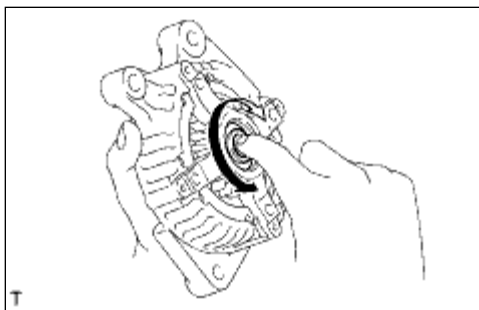


(a) Remove the washer.



(b) Remove the generator rotor from the generator drive end frame.

## 8. INSPECT GENERATOR DRIVE END FRAME BEARING



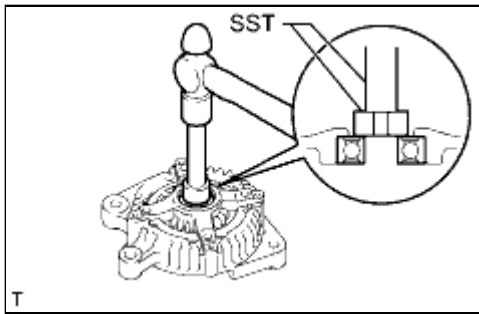
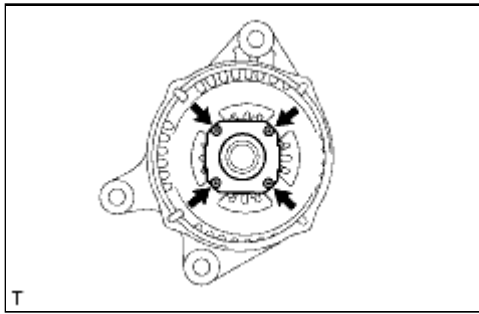
(a) Check that the generator drive end frame bearing is not rough or worn.

If necessary, replace the generator drive end frame bearing.

## 9. REMOVE GENERATOR DRIVE END FRAME BEARING

(a) Remove the 4 screws and retainer plate.





(b) Using SST and a hammer, tap out the generator drive end frame bearing.

**SST: 09950-60010**

09951-00250

**SST: 09950-70010**

09951-07100



<b>Last Modified:</b> 5-10-2010	6.4 A	<b>From:</b> 200908
<b>Model Year:</b> 2010	<b>Model:</b> 4Runner	<b>Doc ID:</b> RM000000IYG00MX
<b>Title:</b> 2TR-FE BATTERY / CHARGING: GENERATOR: REMOVAL (2010 4Runner)		

## REMOVAL

### 1. DISCONNECT CABLE FROM NEGATIVE BATTERY TERMINAL

#### NOTICE:

When disconnecting the cable, some systems need to be initialized after the cable is reconnected



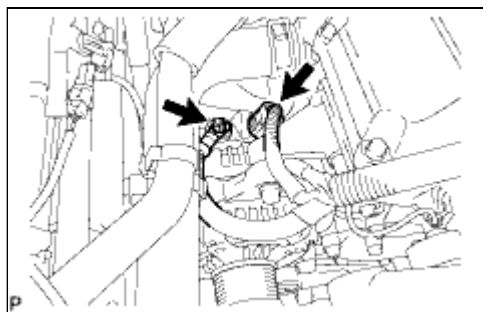
### 2. REMOVE AIR CLEANER AND HOSE



### 3. REMOVE FAN AND GENERATOR V BELT



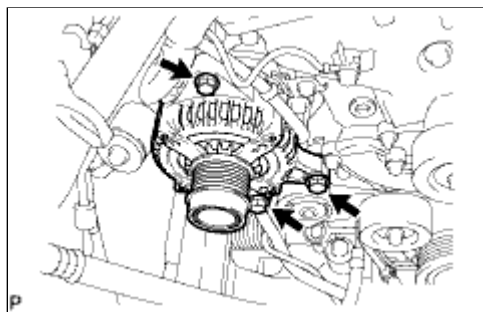
### 4. REMOVE GENERATOR ASSEMBLY



(a) Disconnect the generator connector.

(b) Remove the terminal cap.

(c) Remove the nut and disconnect the generator wire from terminal B.



(d) Remove the 3 bolts and generator.

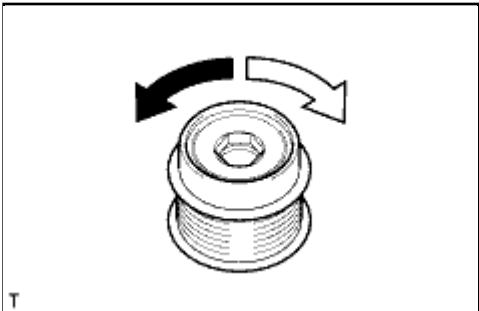


<b>Last Modified:</b> 5-10-2010	6.4 G	<b>From:</b> 200908
<b>Model Year:</b> 2010	<b>Model:</b> 4Runner	<b>Doc ID:</b> RM0000010WQ006X
<b>Title:</b> 2TR-FE BATTERY / CHARGING: GENERATOR: INSPECTION (2010 4Runner)		



## INSPECTION

### 1. INSPECT GENERATOR WITH CLUTCH PULLEY

- (a) Hold the center of the generator with clutch pulley and check that the outer ring turns counterclockwise and does not turn clockwise.



Text in Illustration

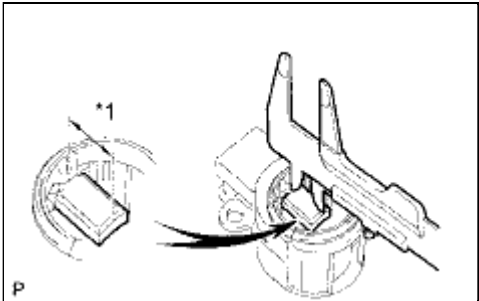
	Free
	Lock

If the result is not as specified, replace the generator with clutch pulley.

### 2. INSPECT GENERATOR BRUSH HOLDER ASSEMBLY

- (a) Using a vernier caliper, measure the brush length.

Standard exposed length:  
 9.5 to 11.5 mm (0.374 to 0.453 in.)  
 Minimum exposed length:  
 4.5 mm (0.177 in.)

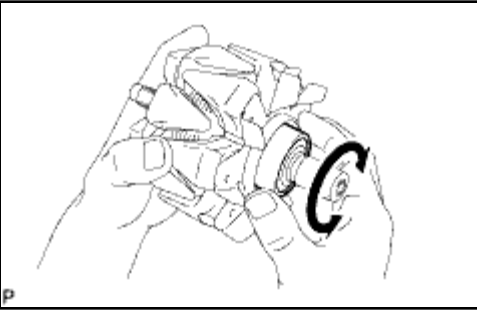


Text in Illustration

*1	Length
----	--------

If the brush length is less than the minimum, replace the generator brush holder assembly.

3. INSPECT GENERATOR ROTOR ASSEMBLY

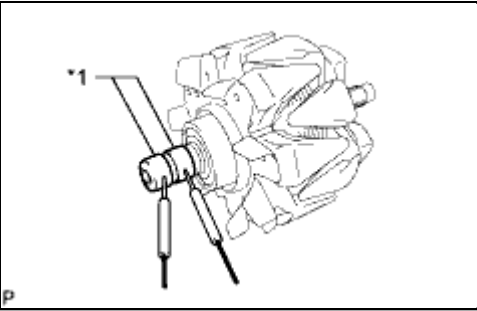


- (a) Check that the generator rotor bearing is not rough or worn.  
If necessary, replace the generator rotor assembly.

- (b) Check the generator rotor for an open circuit.

- (1) Measure the resistance according to the value(s) in the table below.

Standard Resistance:



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
Slip ring - Slip ring	20°C (68°F)	2.3 to 2.7 Ω

Text in Illustration

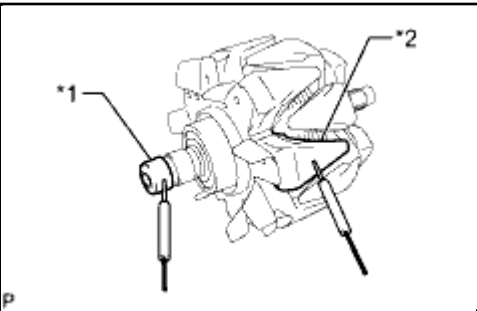
*1	Slip Ring
----	-----------

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

- (c) Check if the generator rotor is grounded.

- (1) Measure the resistance according to the value(s) in the table below.

Standard Resistance:



TESTER CONNECTION	CONDITION	SPECIFIED CONDITION
Slip ring - Rotor core	Always	10 kΩ or higher

Text in Illustration

* 1	Slip Ring
* 2	Rotor Core

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

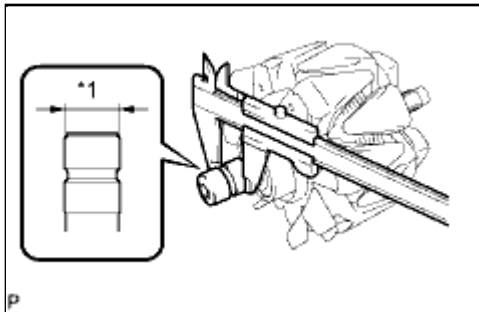
(d) Using a vernier caliper, measure the slip ring diameter.

Standard diameter:

14.2 to 14.4 mm (0.559 to 0.567 in.)

Minimum diameter:

14.0 mm (0.551 in.)



### Text in Illustration

* 1	Diameter
-----	----------

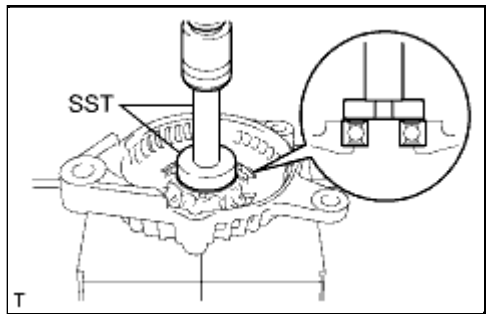
If the diameter is less than the minimum, replace the generator rotor assembly.



<b>Last Modified:</b> 5-10-2010	6.4 A	<b>From:</b> 200908
<b>Model Year:</b> 2010	<b>Model:</b> 4Runner	<b>Doc ID:</b> RM000000EH400FX
<b>Title:</b> 2TR-FE BATTERY / CHARGING: GENERATOR: REASSEMBLY (2010 4Runner)		

REASSEMBLY

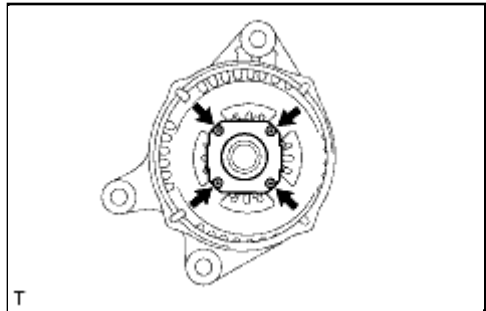
1. INSTALL GENERATOR DRIVE END FRAME BEARING



(a) Using SST and a press, press in a new generator drive end frame bearing.

**SST: 09950-60010**  
09951-00470  
**SST: 09950-70010**  
09951-07100

(b) Align the claws of the retainer plate with the grooves inside the generator drive end frame.



(c) Install the retainer plate with the 4 screws.

**Torque: 2.3 N·m (23 kgf·cm, 20in·lbf)**

2. INSTALL GENERATOR ROTOR ASSEMBLY

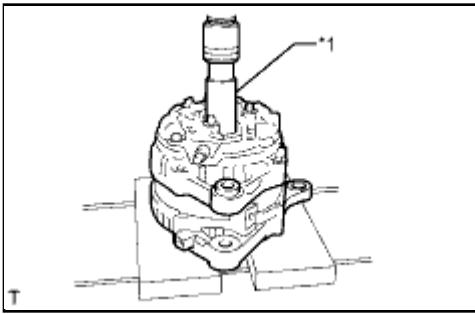
- (a) Install the generator rotor to the generator drive end frame.
- (b) Install the washer to the generator rotor.

3. INSTALL GENERATOR COIL ASSEMBLY

(a) Using a deep socket wrench (21 mm) and press, slowly press on the generator coil.

Text in Illustration

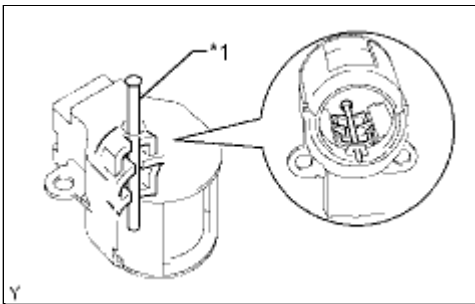
* 1	Deep Socket Wrench (21 mm)
-----	----------------------------



(b) Install the generator coil with the 4 through bolts.

**Torque: 5.9 N·m (60 kgf·cm, 52in·lbf)**

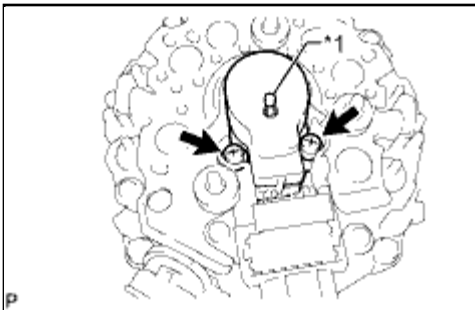
#### 4. INSTALL GENERATOR BRUSH HOLDER ASSEMBLY



(a) While pushing the 2 brushes into the generator brush holder, insert a pin with a diameter of 1.0 mm (0.0394 in.) into the generator brush holder hole.

#### Text in Illustration

* 1	Pin
-----	-----



(b) Install the generator brush holder with the 2 screws.

**Torque: 1.8 N·m (18 kgf·cm, 16in·lbf)**

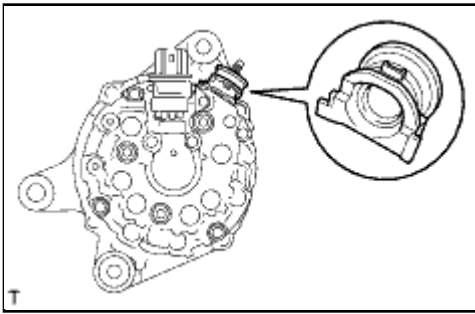
(c) Pull out the pin from the brush holder.

#### Text in Illustration

* 1	Pin
-----	-----

#### 5. INSTALL TERMINAL INSULATOR

(a) Install the terminal insulator.



## 6. INSTALL GENERATOR REAR END COVER

(a) Install the generator rear end cover with the 3 nuts.

**Torque: 4.6 N·m (46 kgf·cm, 40in·lbf)**

## 7. INSTALL GENERATOR WITH CLUTCH PULLEY

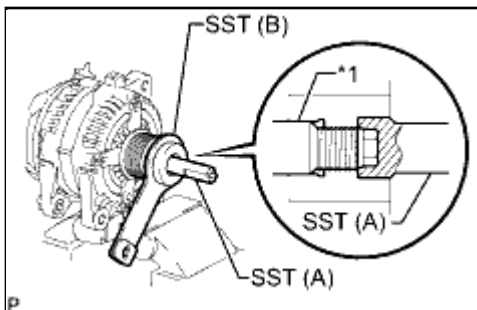
(a) Temporarily install the generator with clutch pulley by hand.

(b) Mount the generator in a vise between aluminum plates.

(c) Install SST (A) and SST (B) to the generator with clutch pulley as shown in the illustration.

**SST: 09820-63021**

### Text in Illustration



* 1	Generator Rotor Shaft
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### NOTICE:

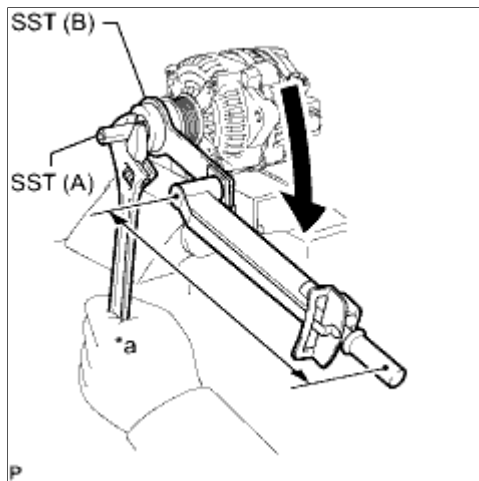
**Securely attach SST to the generator with clutch pulley and generator rotor shaft.**

(d) Using a wrench to hold SST (A), turn SST (B) clockwise to tighten the generator with clutch pulley.


**without SST - Torque: 111 N·m (1127 kgf·cm, 81ft·lbf)**

**with SST - Torque: 88 N·m (897 kgf·cm, 65ft·lbf)**





**Text in Illustration**

* a	Hold
	Turn

**HINT:**

- Use a torque wrench with a fulcrum length of 400 mm (15.7 in.). When using a torque wrench with a fulcrum length that is not 400 mm (15.7 in.), calculate the torque specification for the torque wrench and SST based on the "without SST" torque specification INFO.
- Make sure SST and the wrench are connected in a straight line.

**NOTICE:**

**Be careful as the generator with clutch pulley or generator rotor shaft may be damaged if the position of SST is not securely maintained while performing this operation.**

- (e) Remove SST from the generator.
- (f) Check that the generator with clutch pulley rotates smoothly.

**8. INSTALL GENERATOR PULLEY CAP**

- (a) Install a new generator pulley cap to the generator with clutch pulley.

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<b>Model Year:</b> 2010	<b>Model:</b> 4Runner	<b>Doc ID:</b> RM000000IYE00LX
<b>Title:</b> 2TR-FE BATTERY / CHARGING: GENERATOR: INSTALLATION (2010 4Runner)		

## INSTALLATION

### 1. INSTALL GENERATOR ASSEMBLY

(a) Install the generator with the 3 bolts.

**Torque: 43 N·m (438 kgf·cm, 32ft·lbf)**

(b) Connect the generator wire to terminal B with the nut.

**Torque: 9.8 N·m (100 kgf·cm, 87in·lbf)**

(c) Install the terminal cap.

(d) Connect the generator connector.

### 2. INSTALL FAN AND GENERATOR V BELT

### 3. INSTALL AIR CLEANER AND HOSE

### 4. CONNECT CABLE TO NEGATIVE BATTERY TERMINAL

#### NOTICE:

When disconnecting the cable, some systems need to be initialized after the cable is reconnected .

