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# CHARGING

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|-----------------------|------|
| CHARGING SYSTEM ..... | CH-1 |
| ALTERNATOR .....      | CH-5 |



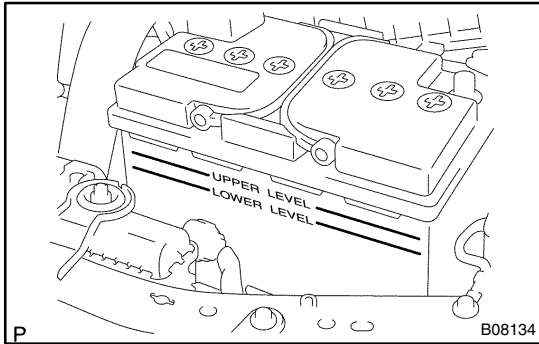


# CHARGING SYSTEM

CH0AA-01

## 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.



## ON-VEHICLE INSPECTION

### 1. CHECK BATTERY ELECTROLYTE LEVEL

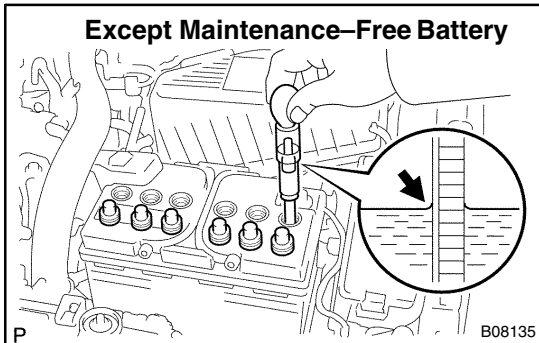
Check the electrolyte quantity of each cell.

Maintenance-Free Battery:

If under the lower level, replace the battery (or add distilled water if possible) and check the charging system.

Except Maintenance-Free Battery:

If under the lower level, add distilled water.



### 2. Except Maintenance-Free Battery:

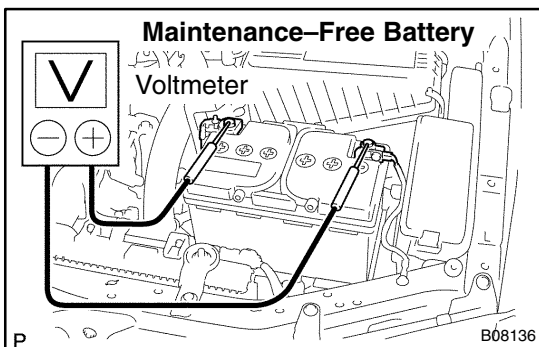
#### CHECK BATTERY SPECIFIC GRAVITY

Check the specific gravity of each cell.

**Standard specific gravity:**

**1.25 – 1.29 at 20°C (68°F)**

If the specific gravity is less than specification, charge the battery.



### 3. Maintenance-Free Battery:

#### CHECK BATTERY VOLTAGE

(a) After having driven the vehicle and in the case that 20 minutes have not passed after having stopped the engine, turn the ignition switch ON and turn on the electrical system (headlight, blower motor, rear defogger etc.) for 60 seconds to remove the surface charge.

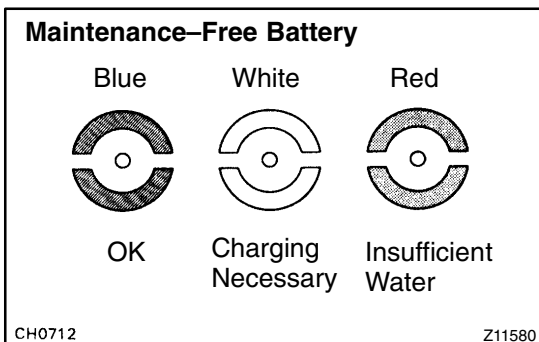
(b) Turn the ignition switch OFF and turn off the electrical systems.

(c) Measure the battery voltage between the negative (–) and positive (+) terminals of the battery.

**Standard voltage:**

**12.5 – 12.9 V at 20°C (68°F)**

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



### HINT:

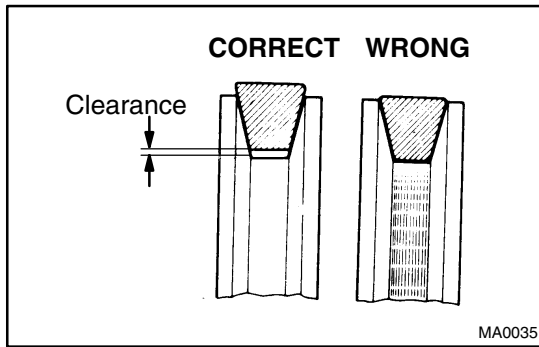
Check the indicator as shown in the illustration.

### 4. CHECK BATTERY TERMINALS, FUSIBLE LINK AND FUSES

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

If the terminals are corroded, clean the terminals.

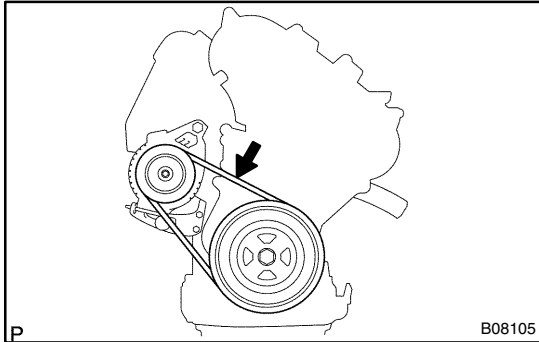
(b) Check the fusible link and fuses for continuity.



## 5. INSPECT DRIVE BELT

- (a) Visually check the drive belt for cracks, oiliness or wear. Check that the belt does not touch the bottom of the pulley groove.

If the belt has any of the above defects, replace it.



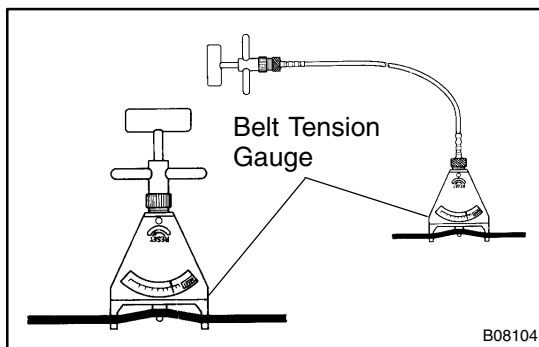
- (b) Check the drive belt deflection by pressing on the belt at the points indicated in the illustration with 98 N (10 kgf, 22 lbf) of pressure.

**Drive belt deflection:**

**New belt 9 – 11 mm (0.35 – 0.43 in.)**

**Used belt 12 – 16 mm (0.47 – 0.63 in.)**

If necessary, adjust the drive belt deflection.



- (c) Reference using a belt tension gauge, measure the belt tension.

**Belt tension gauge:**

**BTG-20 (95506-00020)**

**Drive belt tension:**

**New belt 490 – 686 N (50 – 70 kgf)**

**Used belt 245 – 441 N (25 – 45 kgf)**

If the belt tension is not as specified, adjust it.

**HINT:**

- "New belt" refers to a belt which has been used less than 5 minutes on a running engine.
- "Used belt" refers to a belt which has been used on a running engine for 5 minutes or more.
- After installing a new belt, run the engine for about 5 minutes and recheck the belt tension.

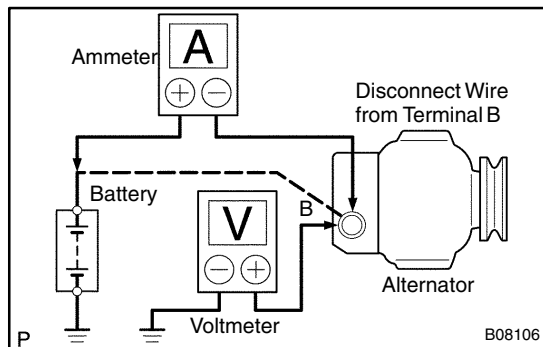
## 6. VISUALLY CHECK ALTERNATOR WIRING AND LISTEN FOR ABNORMAL NOISES

- (a) Check that the wiring is in good condition.
- (b) Check that there is no abnormal noise from the alternator while the engine is running.

## 7. INSPECT DISCHARGE WARNING LIGHT CIRCUIT

- (a) Turn the ignition switch "ON". Check that the discharge warning light comes on.
- (b) Start the engine. Check that the light goes off.

If the light does not operate as specified, troubleshoot the discharge warning light circuit.



## 8. INSPECT CHARGING CIRCUIT WITHOUT LOAD

### HINT:

If a battery/alternator tester is available, connect the tester to the charging circuit as per manufacturer's instructions.

- (a) If a tester is not available, connect a voltmeter and ammeter to the charging circuit as follows:
  - Disconnect the wire from terminal B of the alternator and connect it to the negative (–) lead of the ammeter.
  - Connect the positive (+) lead of the ammeter to terminal B of the alternator.
  - Connect the positive (+) lead of the voltmeter to terminal B of the alternator.
  - Ground the negative (–) lead of the voltmeter.
- (b) Check the charging circuit as follows:  
With the engine running from idle to 5,000 rpm, check the reading on the ammeter and voltmeter.

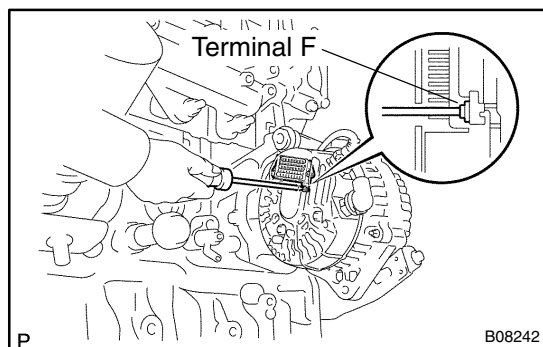
**Standard amperage:**

**10 A or less**

**Standard voltage:**

**13.2 – 14.0 V at 115°C (239°F)**

If the voltmeter reading is more than the standard voltage, replace the voltage regulator.



If the voltmeter reading is less than the standard voltage, check the voltage regulator and generator as follows:

- With terminal F grounded, start the engine and check the voltmeter reading of terminal B.
- If the voltmeter reading is more than the standard voltage, replace the IC regulator.
- If the voltmeter reading is less than the standard voltage, check the alternator.

## 9. INSPECT CHARGING CIRCUIT WITH LOAD

- (a) With the engine running at 2,000 rpm, turn on the high beam headlights and place the heater blower switch at "HI".
- (b) Check the reading on the ammeter.

**Standard amperage:**

**30 A or more**

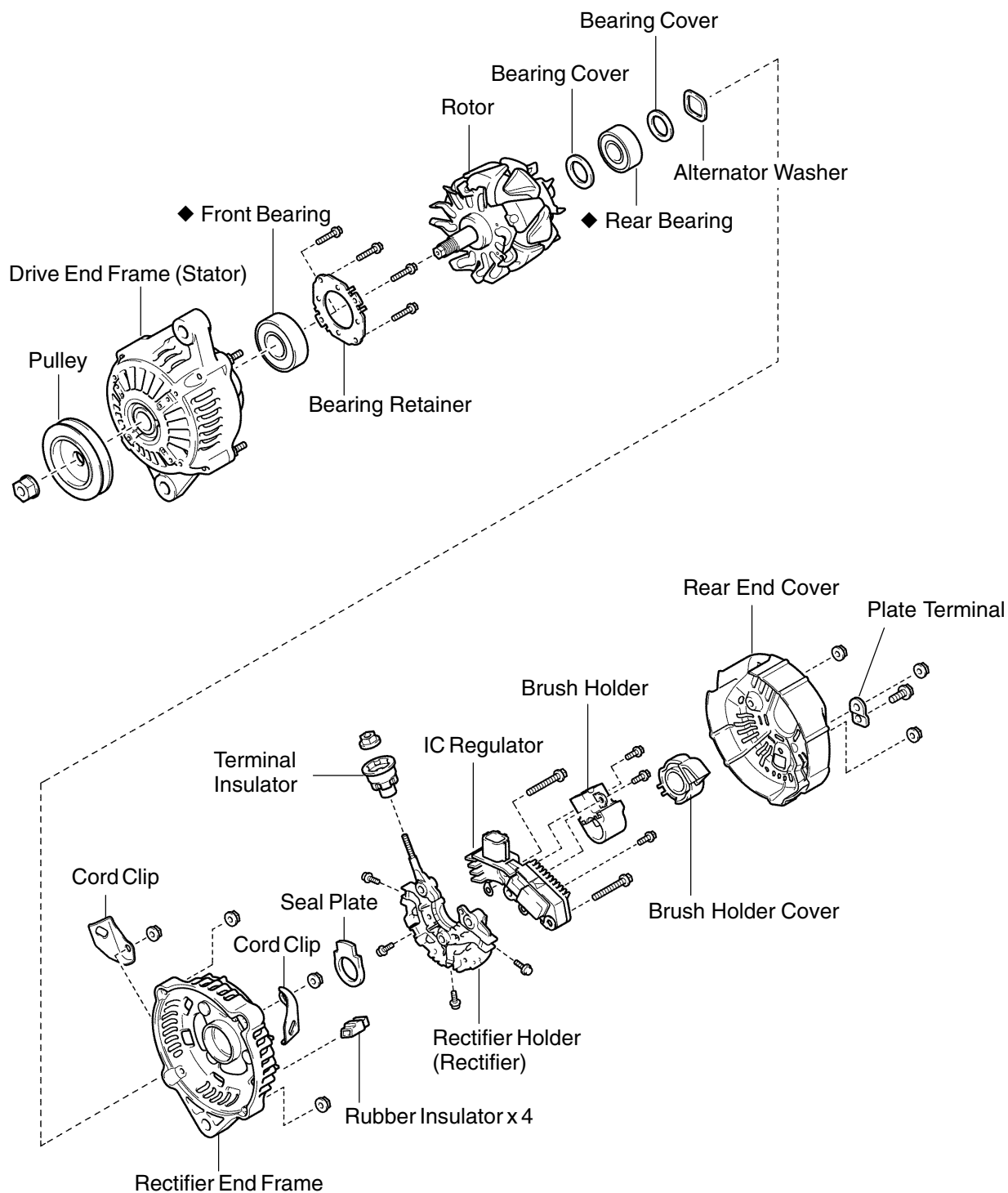
If the ammeter reading is less than the standard amperage, repair the alternator.

### HINT:

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

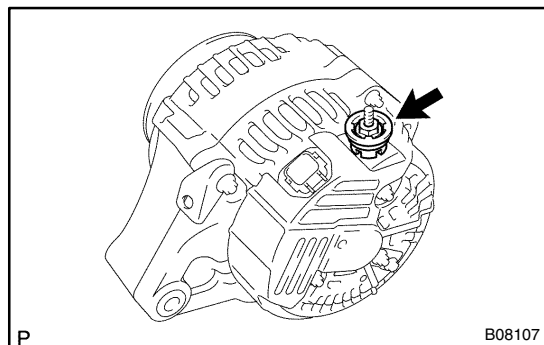
# ALTERNATOR COMPONENTS

CH0AC-03



◆ Non-reusable part

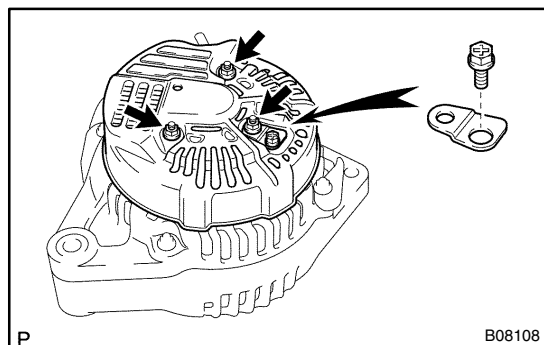
B08133



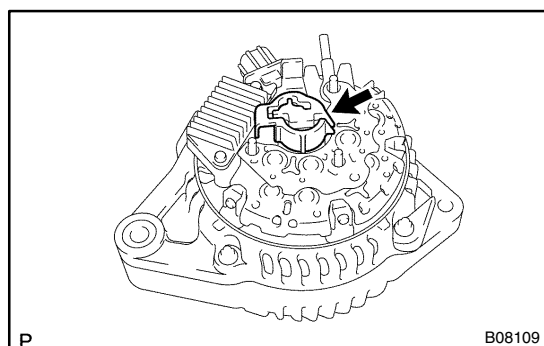
## DISASSEMBLY

### 1. REMOVE REAR END COVER

- (a) Remove the nut and terminal insulator.

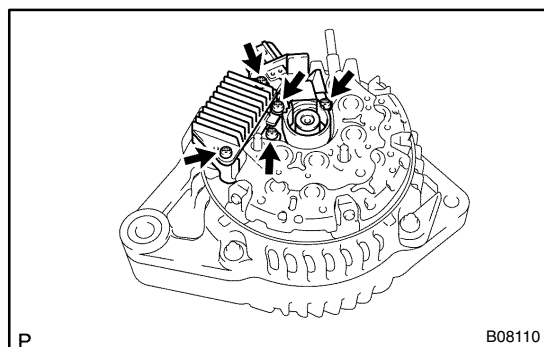


- (b) Remove the 3 nuts, bolt, plate terminal and rear end cover.

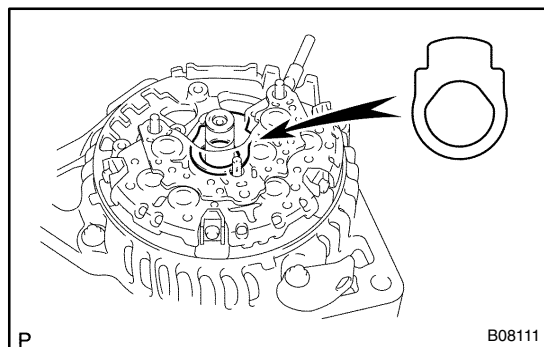


### 2. REMOVE BRUSH HOLDER AND IC REGULATOR

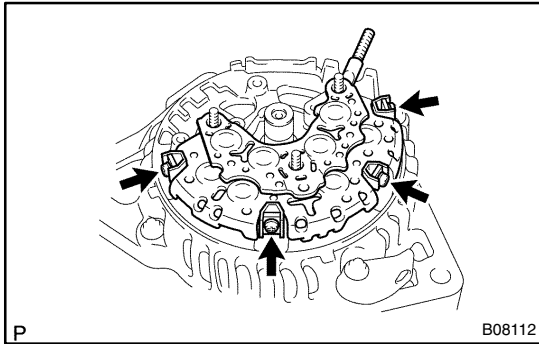
- (a) Remove the brush holder cover from the brush holder.



- (b) Remove the 5 screws, brush holder and IC regulator.

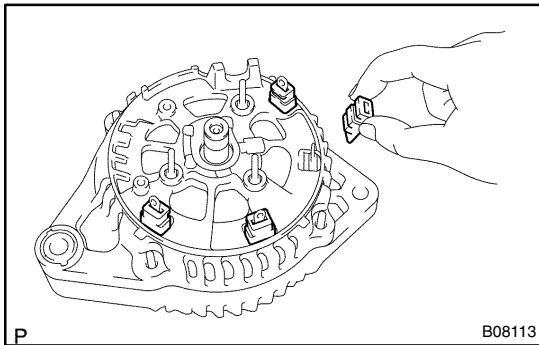


- (c) Remove the seal plate from the rectifier end frame.

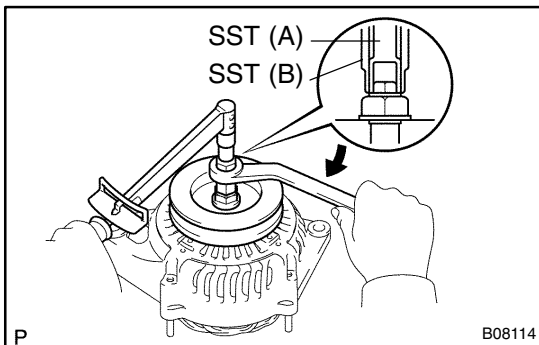


### 3. REMOVE RECTIFIER HOLDER

- (a) Remove the 4 screws and rectifier holder.



- (b) Remove the 4 rubber insulators.



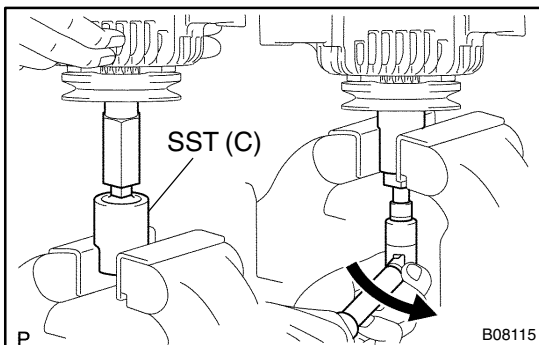
### 4. REMOVE PULLEY

- (a) Hold SST (A) with a torque wrench, and tighten SST (B) clockwise to the specified torque.

SST 09820-63010

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

- (b) Check that SST (A) is secured to the rotor shaft.



- (c) As shown in the illustration, mount SST (C) in a vise, and install the alternator to SST (C).
- (d) To loosen the pulley nut, turn SST (A) in the direction shown in the illustration.

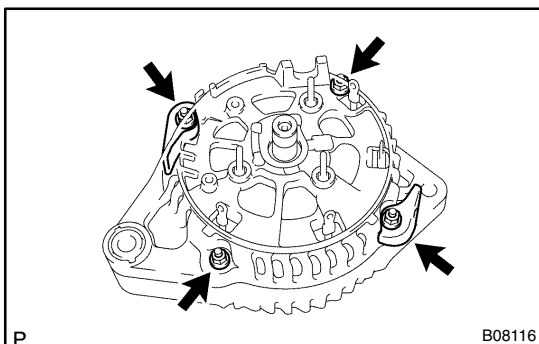
#### NOTICE:

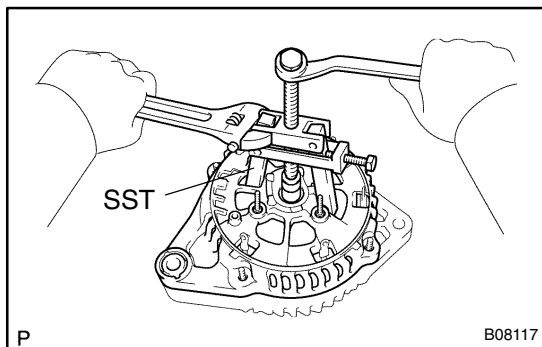
**To prevent damage to the rotor shaft, do not loosen the pulley nut more than one-half of a turn.**

- (e) Remove the alternator from SST (C).
- (f) Turn SST (B), and remove SST (A and B).
- (g) Remove the pulley nut and pulley.

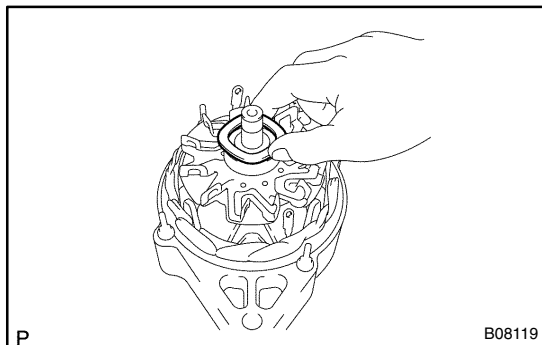
### 5. REMOVE RECTIFIER END FRAME

- (a) Remove the 4 nuts and cord clip.

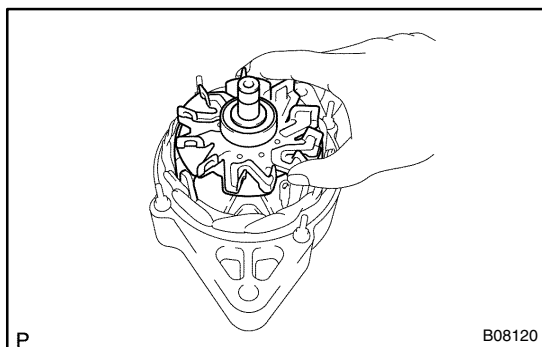




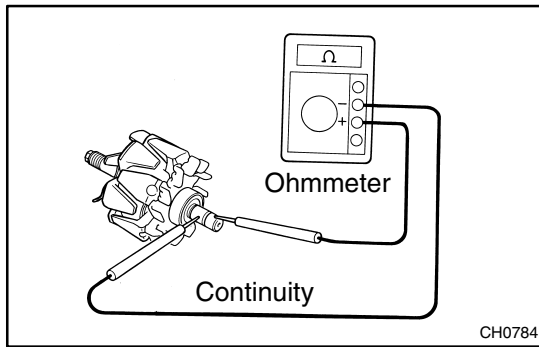
- (b) Using SST, remove the rectifier end frame.  
SST 09286-46011



- (c) Remove the alternator washer.



**6. REMOVE ROTOR FROM DRIVE END FRAME**



## INSPECTION

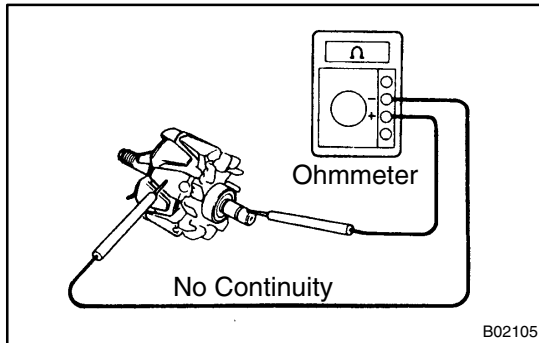
### 1. INSPECT ROTOR FOR OPEN CIRCUIT

Using an ohmmeter, check that there is continuity between the slip rings.

**Standard resistance:**

**2.1 – 2.5  $\Omega$  at 20°C (68°F)**

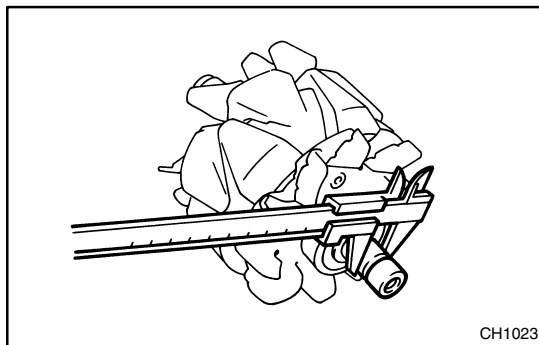
If there is no continuity, replace the rotor.



### 2. INSPECT ROTOR FOR GROUND

Using an ohmmeter, check that there is no continuity between the slip ring and rotor.

If there is continuity, replace the rotor.



### 3. INSPECT SLIP RINGS

(a) Check that the slip rings are not rough or scored.

If rough or scored, replace the rotor.

(b) Using vernier calipers, measure the slip ring diameter.

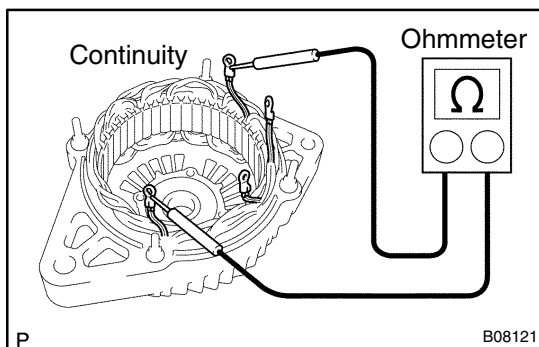
**Standard diameter:**

**14.2 – 14.4 mm (0.559 – 0.567 in.)**

**Minimum diameter:**

**12.8 mm (0.504 in.)**

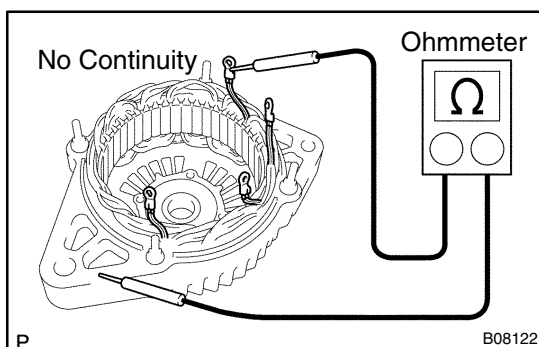
If the diameter is less than minimum, replace the rotor.



### 4. INSPECT STATOR FOR OPEN CIRCUIT

Using an ohmmeter, check that there is continuity between the coil leads.

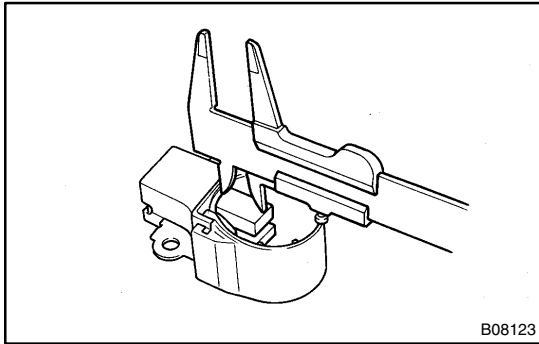
If there is no continuity, replace the drive end frame assembly.



### 5. INSPECT STATOR FOR GROUND

Using an ohmmeter, check that there is no continuity between the coil lead and drive end frame.

If there is continuity, replace the drive end frame assembly.



## 6. INSPECT EXPOSED BRUSH LENGTH

Using a scale and vernier caliper, measure the exposed brush length.

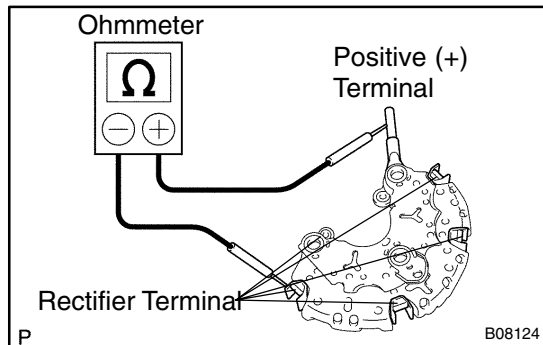
**Standard exposed length:**

**9.5 – 11.5 mm (0.374 – 0.452 in.)**

**Minimum exposed length:**

**1.5 mm (0.059 in.)**

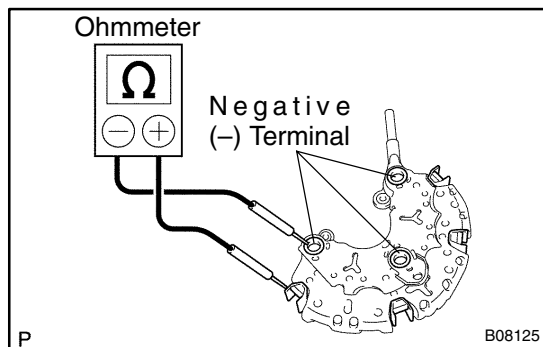
If the exposed length is less than minimum, replace the brush holder.



## 7. INSPECT POSITIVE RECTIFIER

- Using an ohmmeter, connect one tester probe to the positive (+) terminal and the other to each rectifier terminal.
- Reverse the polarity of the tester probes and repeat step (a).
- Check that one shows continuity and the other shows no continuity.

If continuity is not as specified, replace the rectifier holder.



## 8. INSPECT NEGATIVE RECTIFIER

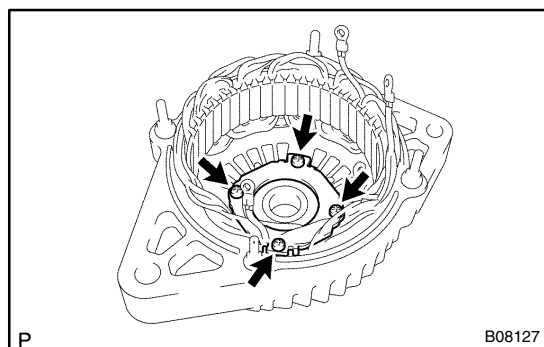
- Using an ohmmeter, connect one tester probe to each negative (-) terminal and the other to each rectifier terminal.
- Reverse the polarity of the tester probes and repeat step (a).
- Check that one shows continuity and the other shows no continuity.

If continuity is not as specified, replace the rectifier holder.

## 9. INSPECT FRONT AND REAR BEARING

Check that the bearing is not rough or worn.

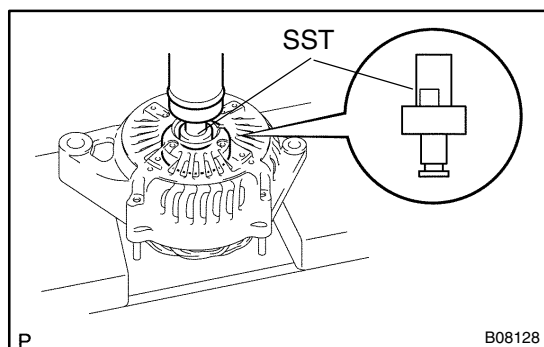
If necessary, replace the bearing.



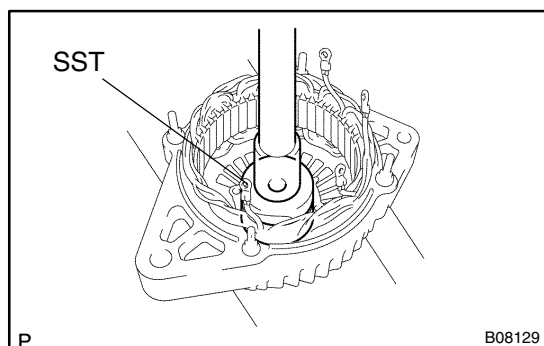
## REPLACEMENT

### 1. REPLACE FRONT BEARING

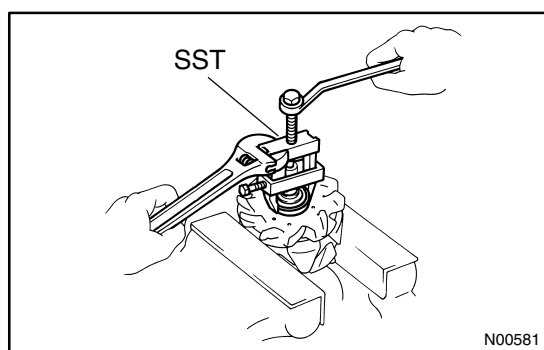
- (a) Remove the 4 screws and bearing retainer.



- (b) Using SST and a press, press out the bearing.  
SST 09950-60010 (09951-00270, 09952-06010)



- (c) Using SST and a press, press in a new bearing.  
SST 09950-60010 (09951-00500)  
(d) Install the bearing retainer with the 4 screws.  
**Torque: 3.0 N·m (31 kgf·cm, 27 in.-lbf)**



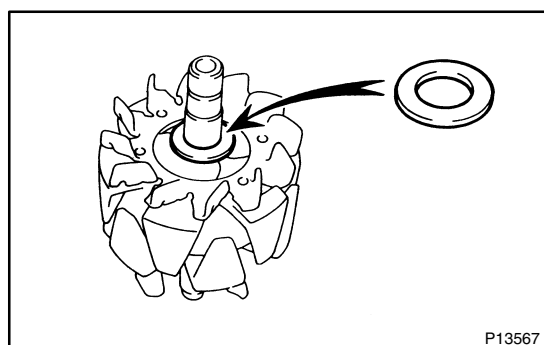
### 2. REPLACE REAR BEARING

- (a) Using SST, remove the bearing cover (outside) and bearing.  
SST 09820-00021

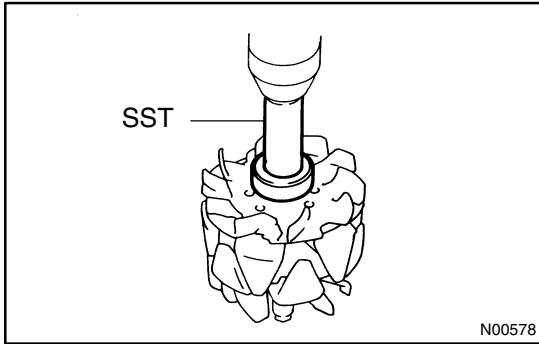
#### NOTICE:

**Be careful not to damage the fan.**

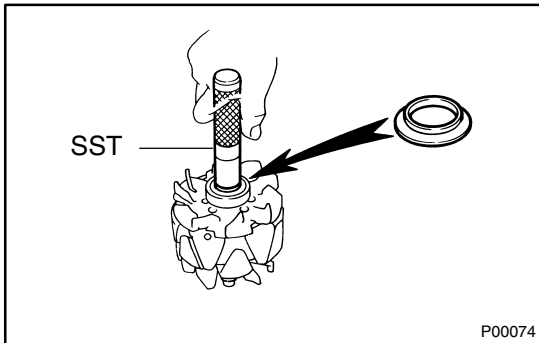
- (b) Remove the bearing cover (inside).



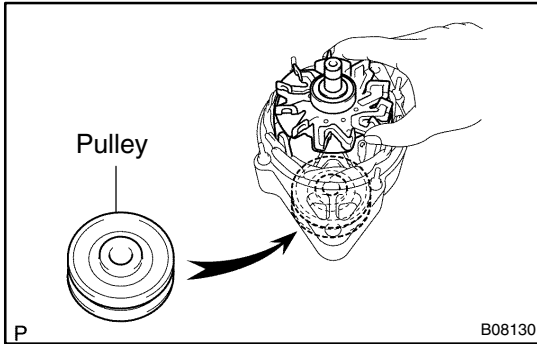
- (c) Place the bearing cover (inside) on the rotor.



- (d) Using SST and a press, press in a new bearing.  
SST 09820-00030

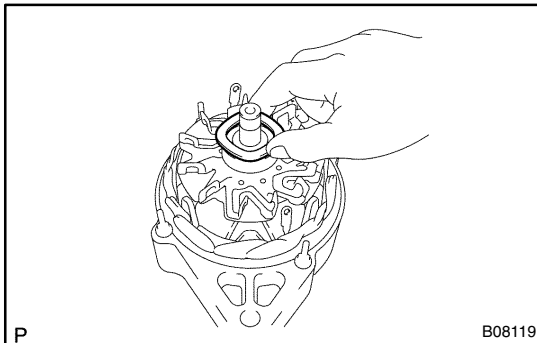


- (e) Using SST, push in the bearing cover (outside).  
SST 09285-76010



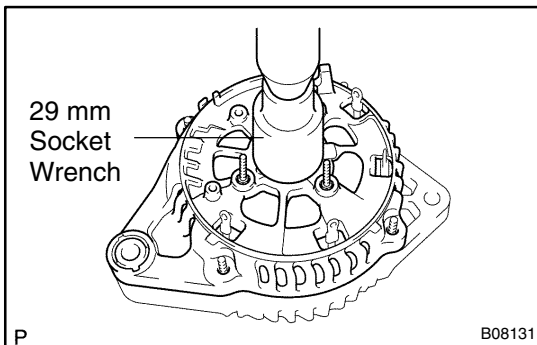
## REASSEMBLY

1. PLACE DRIVE END FRAME ON PULLEY
2. INSTALL ROTOR TO DRIVE END FRAME

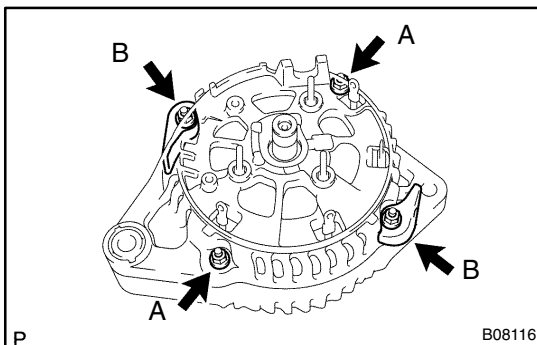


### 3. INSTALL RECTIFIER END FRAME

- (a) Place the alternator washer on the rotor.



- (b) Using a 29 mm socket wrench and press, slowly press in the rectifier end frame.

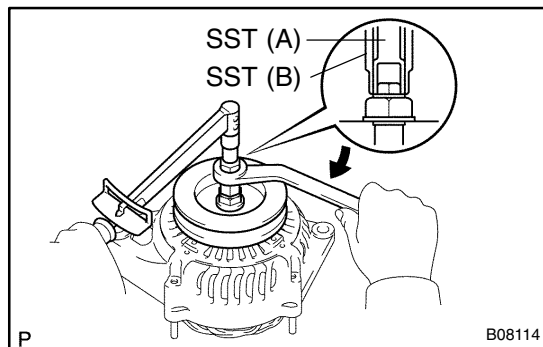


- (c) Install the cord clip and 4 nuts.

#### Torque:

**A: 4.5 N·m (46 kgf·cm, 40 in·lbf)**

**B: 5.4 N·m (55 kgf·cm, 48 in·lbf)**



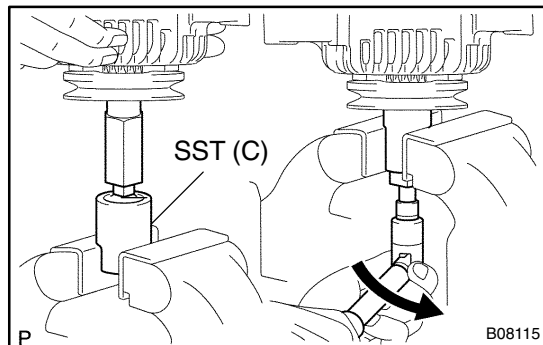
#### 4. INSTALL PULLEY

- Install the pulley to the rotor shaft by tightening the pulley nut by hand.
- Hold SST (A) with a torque wrench, and tighten SST (B) clockwise to the specified torque.

SST 09820-63010

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

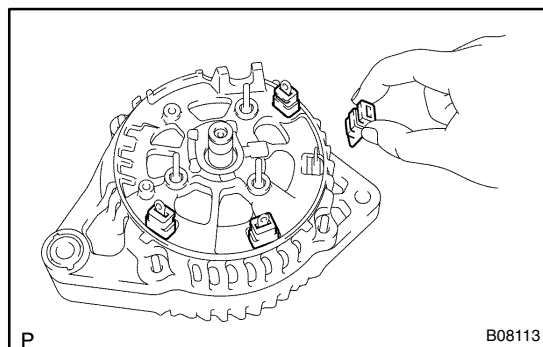
- Check that SST (A) is secured to the pulley shaft.



- As shown in the illustration, mount SST (C) in a vise, and install the alternator to SST (C).
- To torque the pulley nut, turn SST (A) in the direction shown in the illustration.

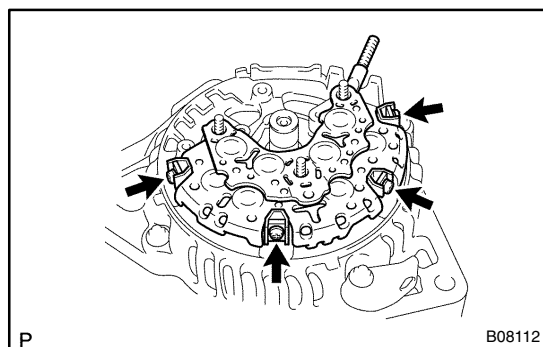
**Torque: 110.5 N·m (1,125 kgf·cm, 81 ft·lbf)**

- Remove the alternator from SST (C).
- Turn SST (B), and remove SST (A and B).



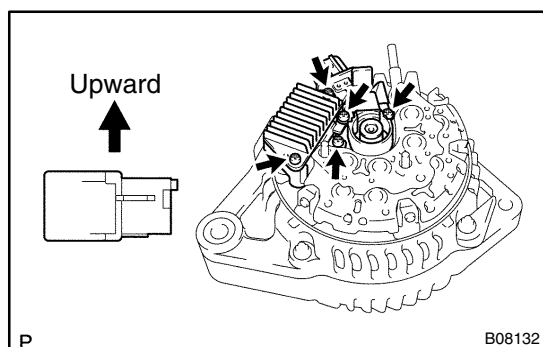
#### 5. INSTALL RECTIFIER HOLDER

- Install the 4 rubber insulators on the lead wires.



- Install the rectifier holder while pushing it with the 4 screws.

**Torque: 2.94 N·m (30 kgf·cm, 26 in·lbf)**



#### 6. INSTALL IC REGULATOR AND BRUSH HOLDER

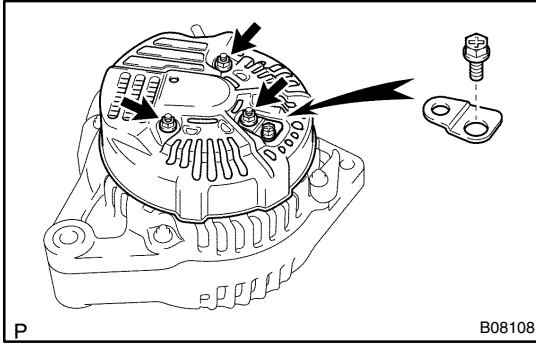
- Place the seal plate on the rectifier end frame.
- Place the IC regulator and brush holder on the rectifier end frame.

##### NOTICE:

**Be careful of the holder installation direction.**

- Install the 5 screws.
- Place the brush holder cover on the brush holder.

**Torque: 1.96 N·m (20 kgf·cm, 17 in·lbf)**

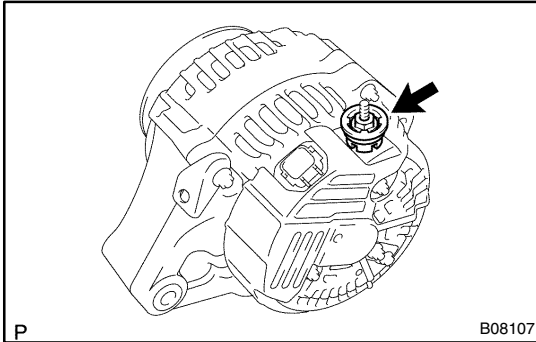
**7. INSTALL REAR END COVER**

- (a) Install the rear end cover and plate terminal with the 3 nuts and screw.

**Torque:**

**Screw: 3.85 N·m (39 kgf·cm, 34 in.-lbf)**

**Nuts: 4.4 N·m (45 kgf·cm, 39 in.-lbf)**



- (b) Install the terminal insulator with the nut.

**Torque: 4.1 N·m (42 kgf·cm, 36 in.-lbf)**

**8. CHECK THAT ROTOR ROTATES SMOOTHLY**