

---

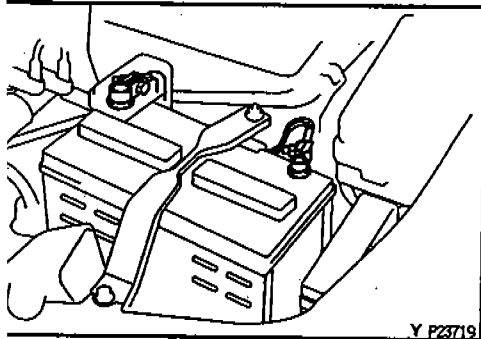
# CHARGING

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

## CHARGING SYSTEM PRECAUTION

CH03-10

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

CH03-01

### 1. CHECK BATTERY ELECTROLYTE LEVEL

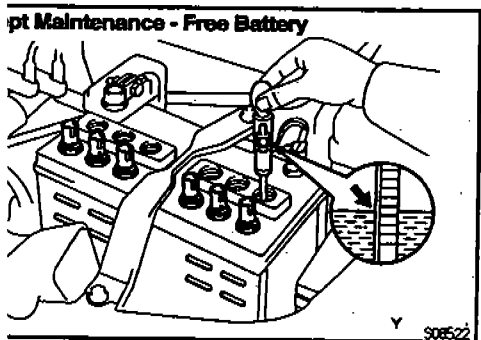
Check the electrolyte quantity of each cell.

**Maintenance-Free Battery:**

If under the lower level, replace the battery (or add distilled water if possible). 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:**

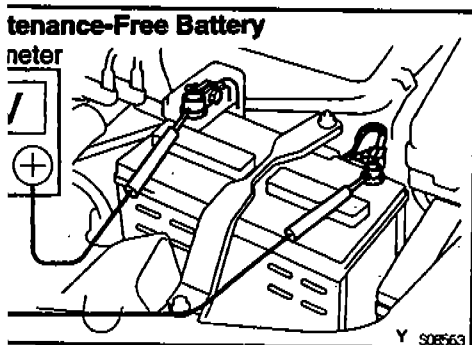
1.25 – 1.29 at 20° C (68° F)

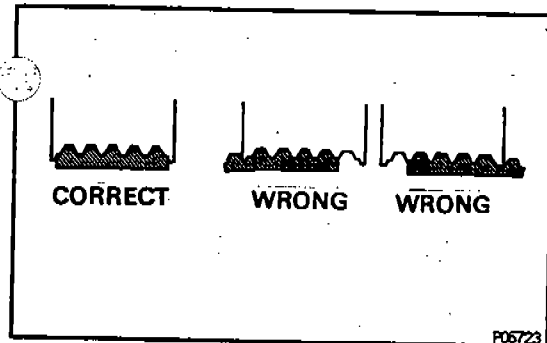
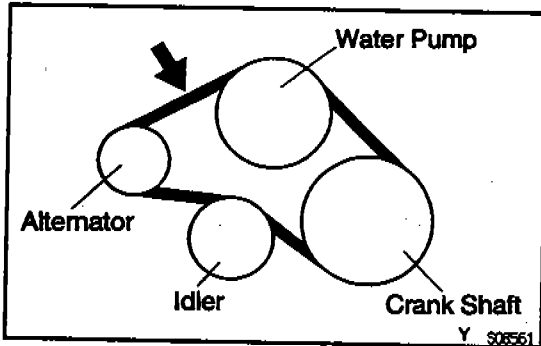
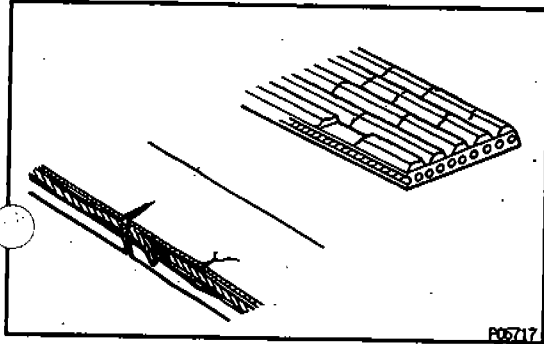
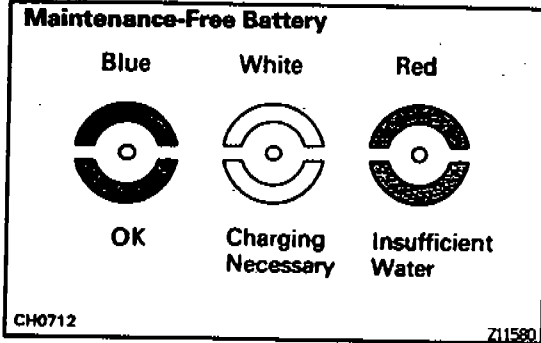
If the specific gravity is less than specification, charge the battery.

### 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 illustration.

**4. CHECK BATTERY TERMINALS, FUSIBLE LINK, H-FUSES AND FUSES**

- (a) Check that the battery terminals are not loose or corroded.
- (b) Check the fusible link, H-fuses and fuses for continuity.

**5. INSPECT DRIVE BELT**

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

If any defect has been found, replace the drive belt.  
HINT: Cracks on the rib side of a belt are considered acceptable. If the belt has chunks missing from the ribs, should be replaced.

- (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 tension:**

**New belt**

3.5 – 4.5 mm (0.14 – 0.18 in.)

**Used belt**

6.0 – 7.0 mm (0.24 – 0.28 in.)

If necessary, adjust the drive belt deflection.

**Reference**

Using a tension gauge, check the drive belt tension.

**Drive belt deflection:**

**New belt**

686 – 785 N (70 – 80 kgf)

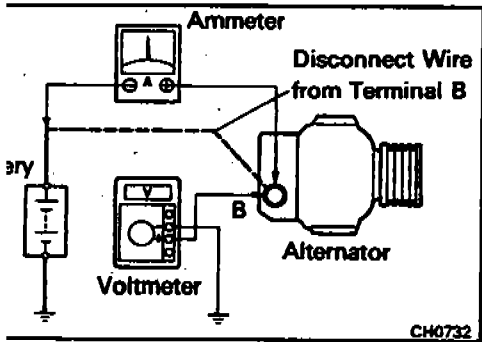
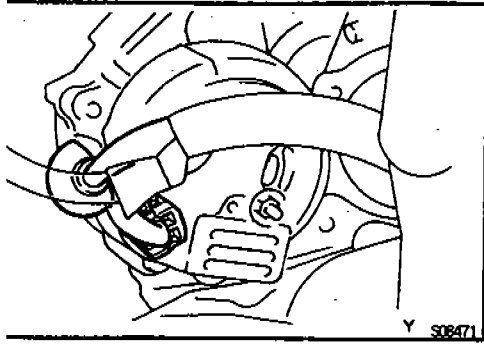
**Used belt**

294 – 441 N (30 – 45 kgf)

If necessary, adjust the drive belt tension.

**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 belt, check that it fits properly in the ribbed grooves.
- Check with your hand to confirm that the belt has not slipped out of the groove on the bottom of the pulley.
- 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 2,000 rpm, check the reading on the ammeter and voltmeter.

**Standard amperage:**

10 A or less

**Standard voltage:**

At 25°C (77°F): 14.0 - 15.0 V

At 115°C (239°F): 13.5 - 14.3 V

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

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

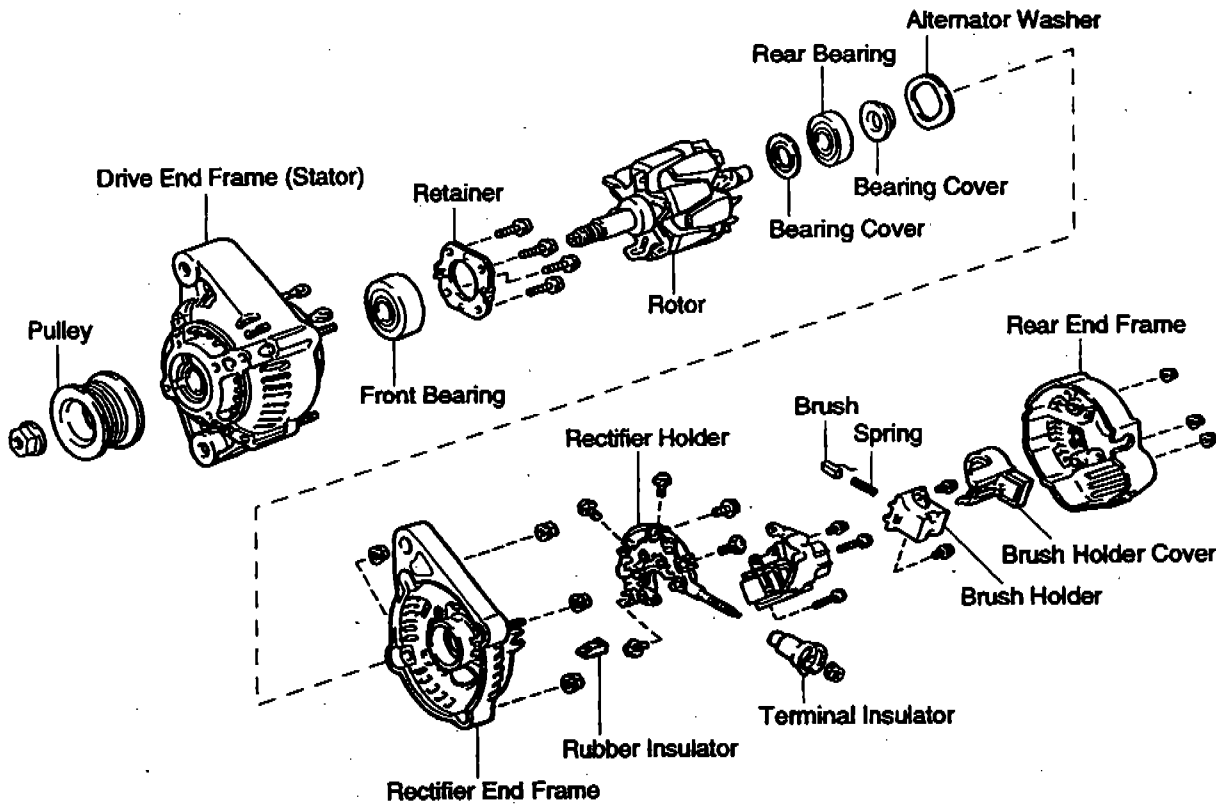
- With terminal F grounded, start the engine and check the voltmeter reading of terminal B.
- If the voltmeter reading is more than standard voltage, replace the IC regulator.
- If the voltmeter reading is less than standard voltage, check the alternator.

## 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".

# ALTERNATOR COMPONENTS

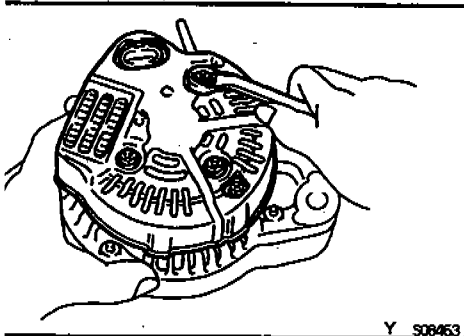
CH-5-01

Y  
S08452

## DISASSEMBLY

### 1. REMOVE REAR END COVER

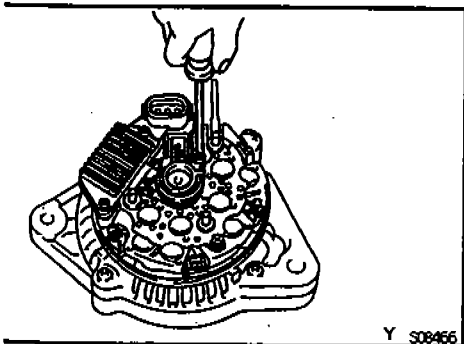
- (a) Remove the nut and terminal insulator.
- (b) Remove the 3 nuts and rear end cover.



Y S08453

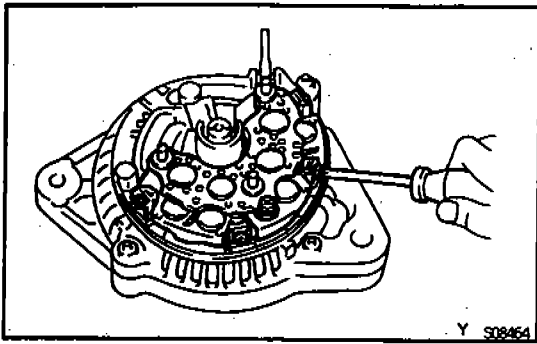
### 2. REMOVE BRUSH HOLDER AND IC REGULATOR

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



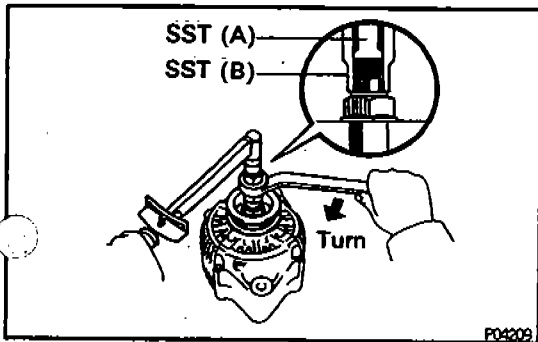
Y S08456

CH-5-01



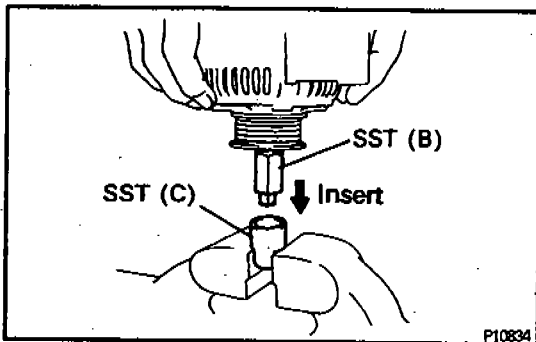
**3. REMOVE RECTIFIER HOLDER**

- (a) Remove the bolt, 4 screws and rectifier holder.
- (b) Remove the 4 rubber insulators.

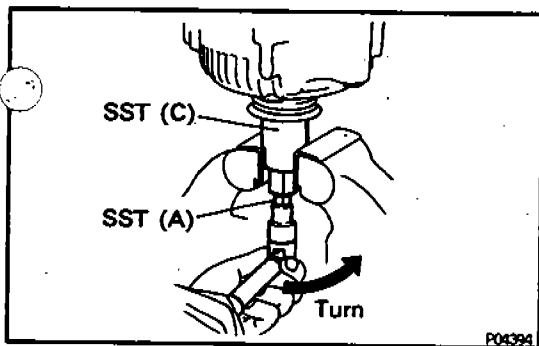


**4. REMOVE PULLEY**

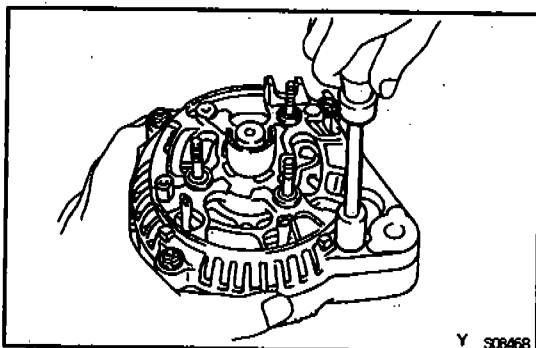
- (a) Hold SST (A) with a torque wrench, and tighten SST (B) clockwise to the specified torque.  
SST 09820-63010  
Torque: 39 N-m (400 kgf-cm, 29 ft-lbf)
- (b) Check that SST (A) is secured to the rotor shaft.



- (c) Mount SST (C) in a vise.
- (d) Install SST (B) into SST (C), and attach the pulley nut to SST (C).

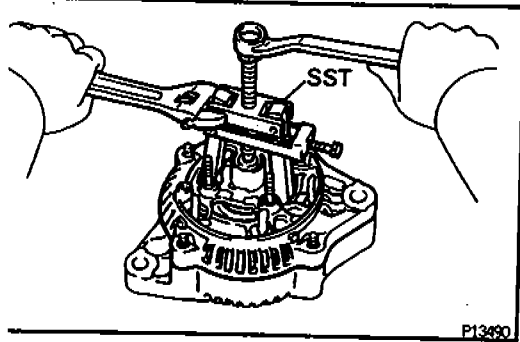


- (e) To loosen the pulley nut, turn SST (A) in the direction shown in the illustration.  
**NOTICE: To prevent damage to the rotor shaft, do not loosen the pulley nut more than one-half of a turn.**
- (f) Remove the alternator from SST (C).
- (g) Turn SST (B) and remove SST (A and B).
- (h) Remove the pulley nut and pulley.

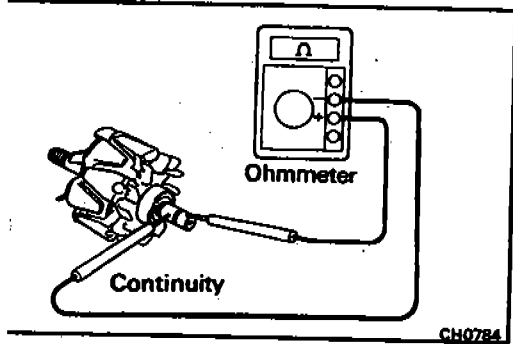


**5. REMOVE RECTIFIER END FRAME**

- (a) Remove the 4 nuts.



- (b) Using SST, remove the rectifier end frame.  
SST 09286-46011
- (c) Remove the alternator washer from rotor.
- 6. REMOVE ROTOR FROM DRIVE END FRAME**



## INSPECTION

CH07-01

### Rotor

#### 1. INSPECT ROTOR FOR OPEN CIRCUIT

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

Standard resistance:

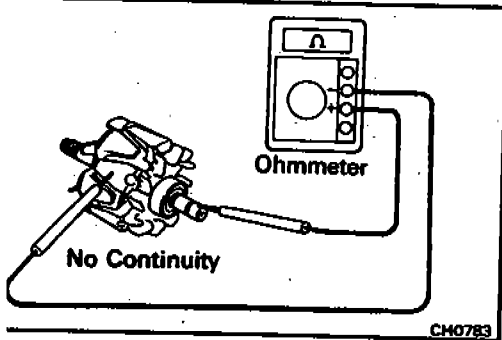
2.8 – 3.0  $\Omega$  at 20°C (68°F)

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 a vernier caliper, measure the slip ring diameter.

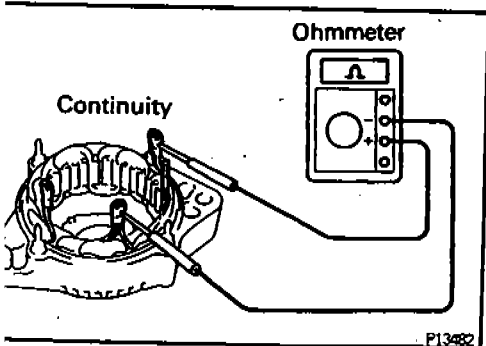
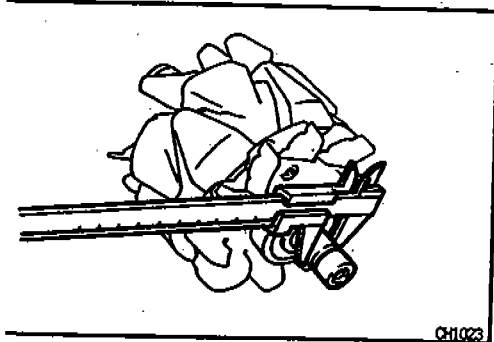
Standard diameter:

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.

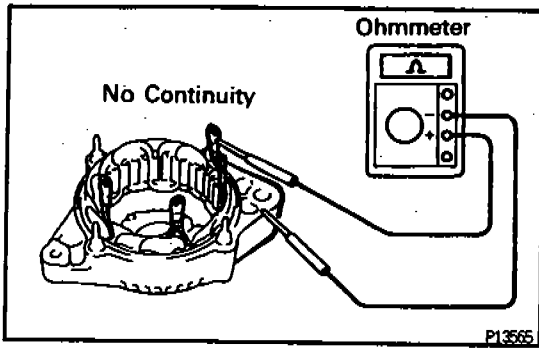


### Stator (Drive End Frame)

#### 1. INSPECT STATOR FOR OPEN CIRCUIT

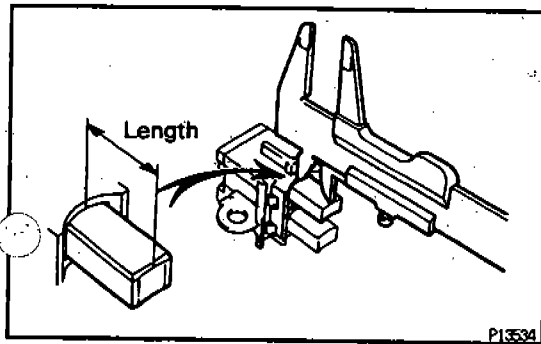
Using an ohmmeter, check that there is continuity between the coil leads.

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



**2. 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.



**Brushes**

**2. INSPECT EXPOSED BRUSH LENGTH**

Using vernier calipers, measure the exposed brush length.

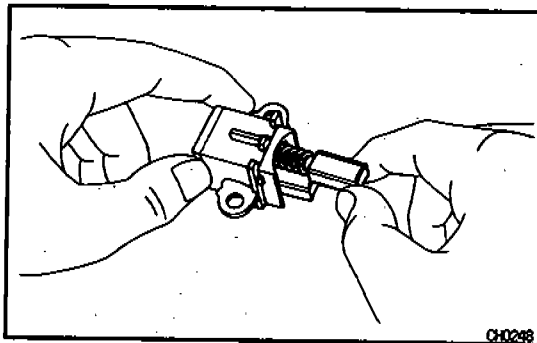
**Standard exposed length:**

9.5 - 11.5 mm (0.374 - 0.453 in.)

**Minimum exposed length:**

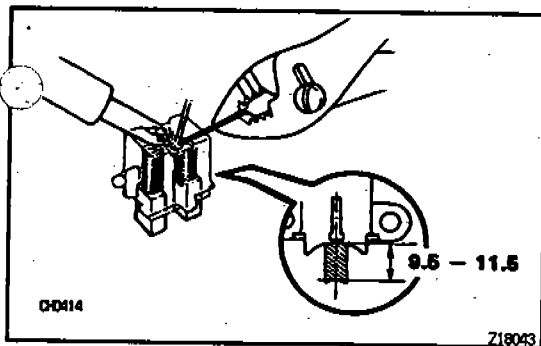
1.5 mm (0.059 in.)

If the exposed length is less than minimum, replace the brushes.



**2. IF NECESSARY, REPLACE BRUSHES**

- (a) Unsolder and remove the brush and spring.
- (b) Run the wire of a new brush through the spring and the hole in the brush holder, and insert the spring and brush into the brush holder.

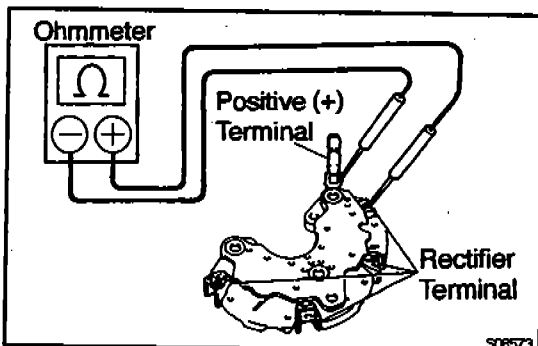


- (c) Solder the brush wire to the brush holder at specified exposed length.

**Exposed length:**

9.5 - 11.5 mm (0.374 - 0.453 in.)

- (d) Check that the brush moves smoothly in the brush holder.
- (e) Cut off the excess wire.
- (f) Apply insulation paint to the soldered area.



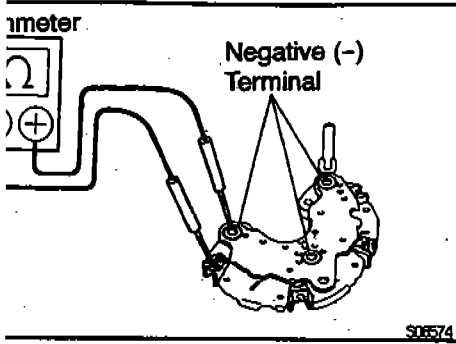
**Rectifiers (Rectifier Holder)**

**1. INSPECT POSITIVE RECTIFIER**

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

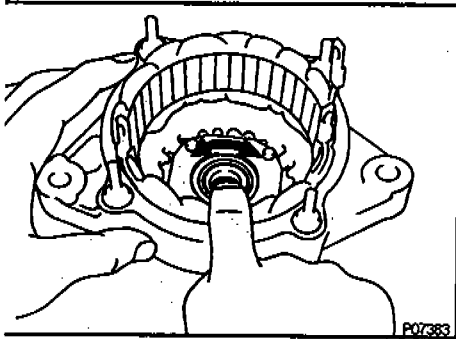
If continuity is not as specified, replace the rectifier holder.





**2. INSPECT NEGATIVE RECTIFIER**

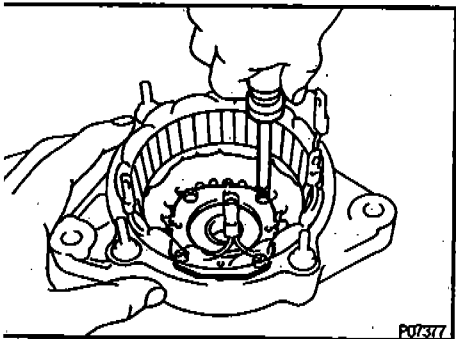
- (a) Using an ohmmeter, connect one tester probe to each negative (-) terminal and the other to each rectifier terminal.
- (b) Reverse the polarity of the tester probes and repeat step (a).
- (c) Check that one shows continuity and the other shows no continuity.  
If continuity is not as specified, replace the rectifier holder.



**Bearings**

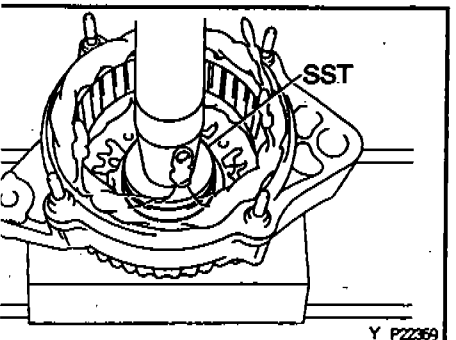
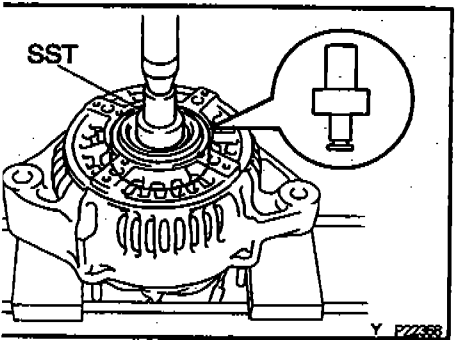
**1. INSPECT FRONT BEARING**

Check that the bearing is not rough or worn.

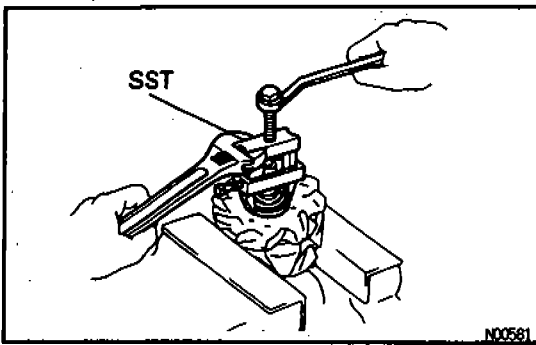


**2. IF NECESSARY, REPLACE FRONT BEARING**

- (a) Remove the 4 screws and bearing retainer.
- (b) Using SST and a press, press out the bearing.  
SST 09950-60010 (09951-00260, 09952-06010)



- (c) Using SST and a press, press in the bearing.  
SST 09950-60010 (09951-00260, 09952-06010)
- (d) Install the bearing retainer with the 4 screws.  
Torque: 2.6 N·m (26.5 kgf-cm (19.5 in.-lb))



**3. INSPECT REAR BEARING**

Check that the bearing is not rough or worn.

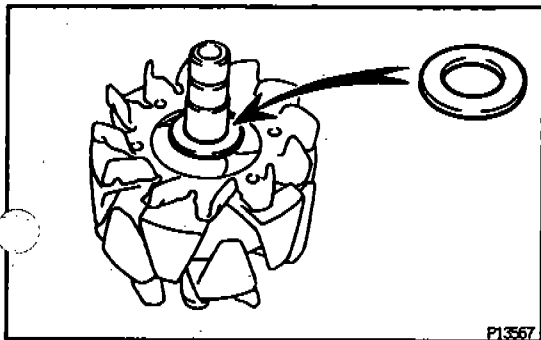
**4. IF NECESSARY, REPLACE REAR BEARING**

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

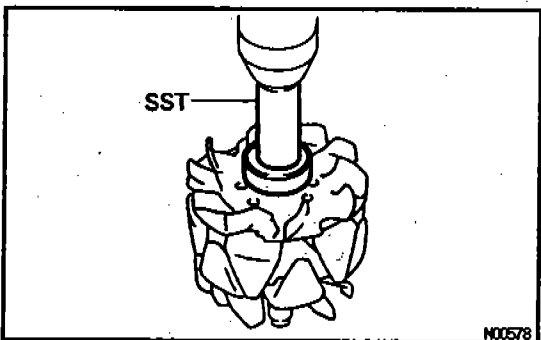
SST 09820-00021

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

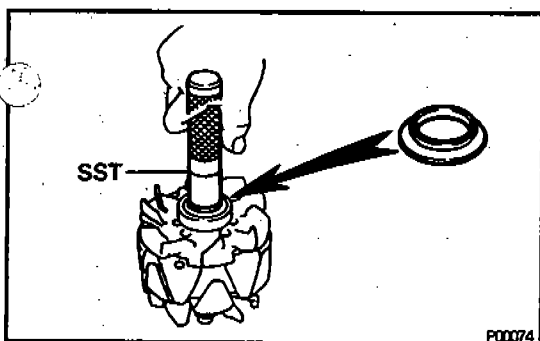
- (b) Remove the bearing cover (inside).



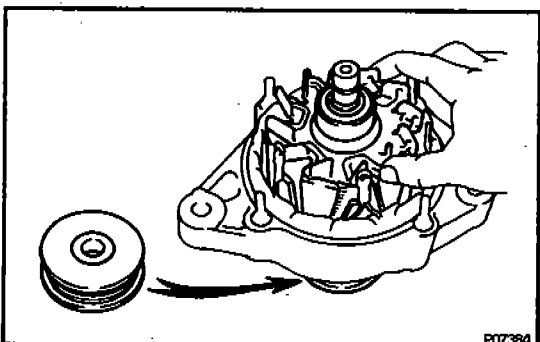
- (c) Place the bearing cover (inside) on the rotor.



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



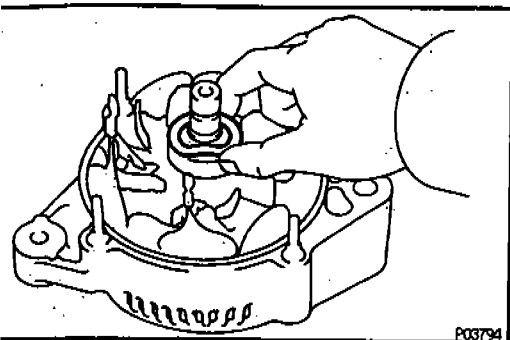
- (e) Using SST, push in the bearing cover (outside).  
SST 09285-76010



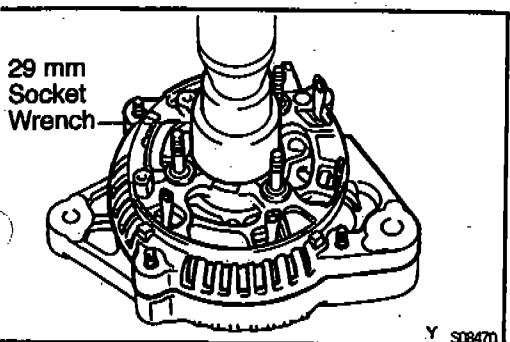
**REASSEMBLY**

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

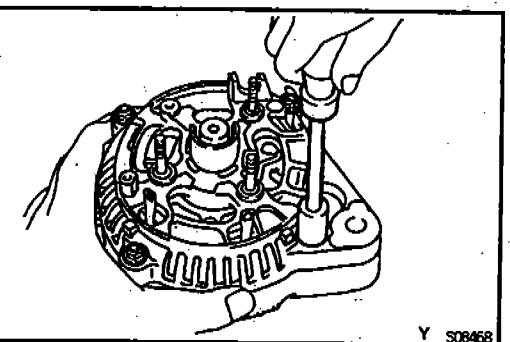
## CHARGING - ALTERNATOR

**3. INSTALL RECTIFIER END FRAME**

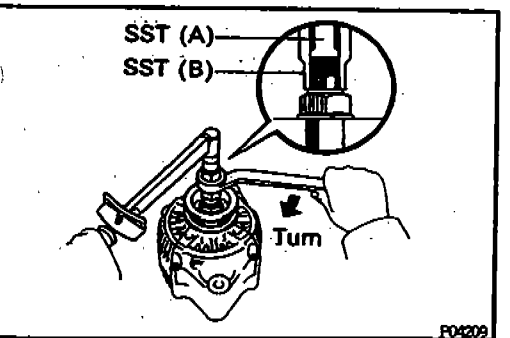
- (a) Place the generator washer on the rotor.



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



- (c) Install the 4 nuts.  
Torque: 4.5 N·m (46 kgf·cm, 40 in.-lbf)

**4. INSTALL PULLEY**

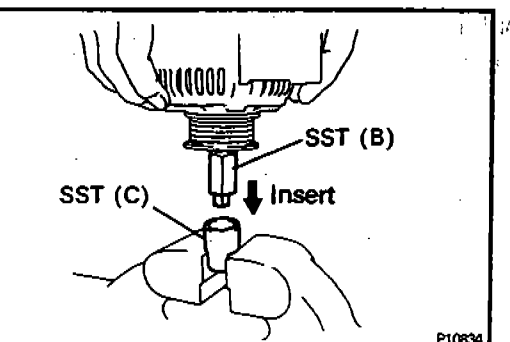
- (a) Install the pulley to the rotor shaft by tightening the pulley nut by hand.

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

SST 09820-63010

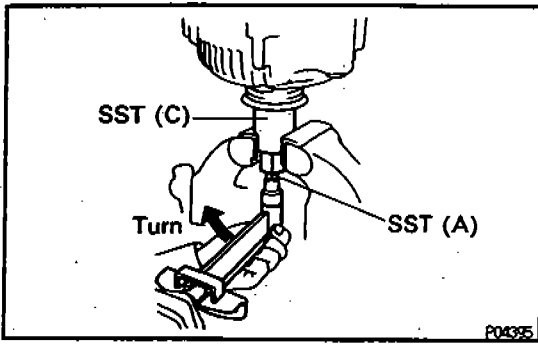
Torque: 39 N·m (400 kgf·cm, 29 ft·lbf)

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

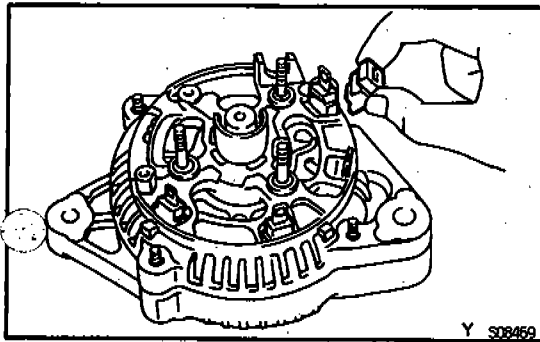


- (d) Mount SST (C) in a vise.

- (e) Install SST (B) into SST (C) and attach the pulley nut to SST (C).

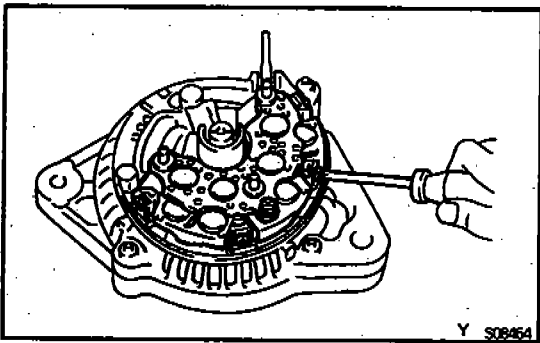


- (f) To torque the pulley nut turn SST (A) in the direction shown in the illustration.  
Torque: 110.5 N-m (1,125 kgf-cm, 81 ft-lbf)
- (g) Remove the alternator from SST (C).
- (h) Turn SST (B), and remove SST (A and B).



**5. INSTALL RECTIFIER HOLDER**

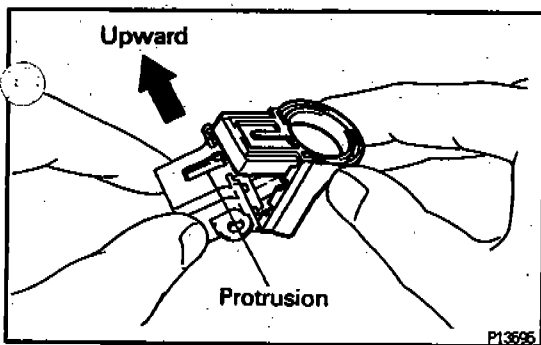
- (a) Install the 4 rubber insulators on the lead wires.  
**NOTICE:** Be careful of the rubber insulators installation direction.



- (b) Install the rectifier holder while pushing it with the bolt and 4 screws.

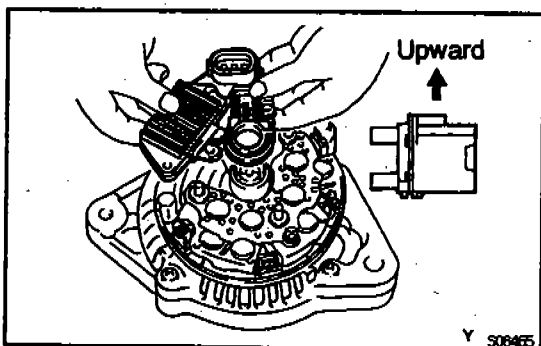
**Torque:**

- Bolt:** 3.9 N-m (40 kgf-cm, 36 in.-lbf)
- Screw:** 1.96 N-m (20 kgf-cm, 18 in.-lbf)



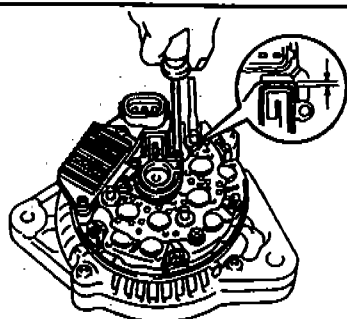
**6. INSTALL IC REGULATOR AND BRUSH HOLDER**

- (a) Install the brush holder cover to the brush holder.  
**NOTICE:** Be careful of the holder installation direction.



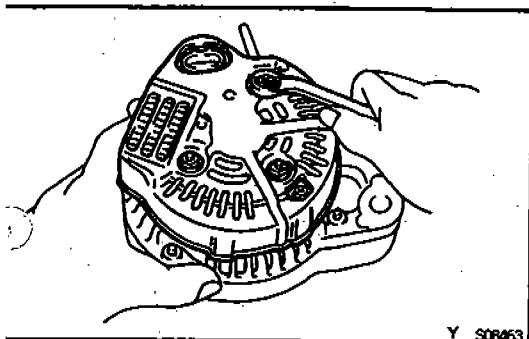
- (b) Place the IC regulator together with the brush holder horizontally on the rectifier end frame.

## CHARGING - ALTERNATOR



Y 508467

- (c) Install the 5 screws until there is a clearance of approx. 1 mm (0.04 in.) between the brush holder and connector.  
Torque: 1.96 N·m (20 kgf·cm, 18 in.-lbf)  
Fit the brush holder cover.



Y 508463

**7. INSTALL REAR END COVER**

- (a) Install the end cover with the 3 nuts.  
Torque: 4.5 N·m (46 kgf·cm, 40 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**