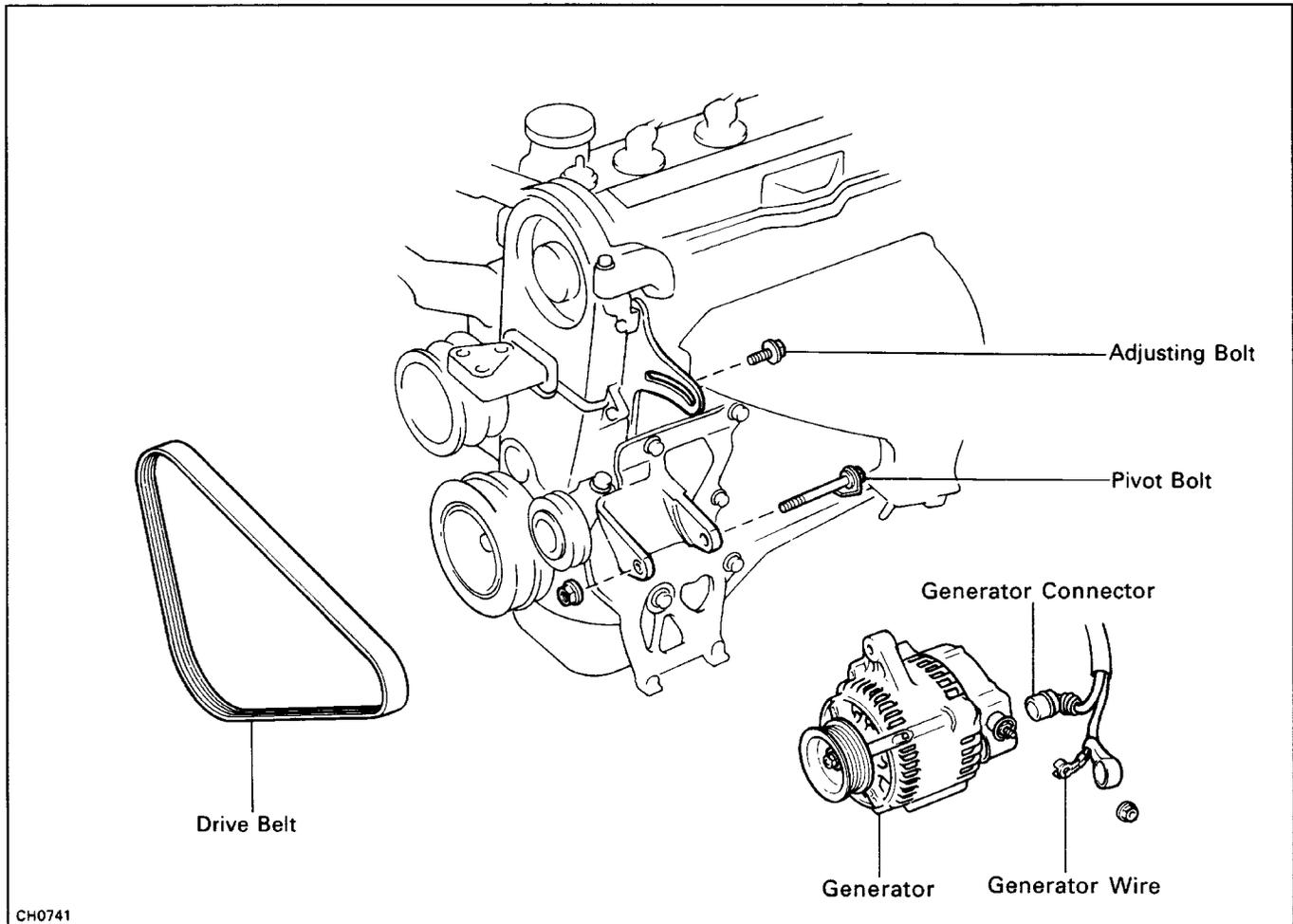
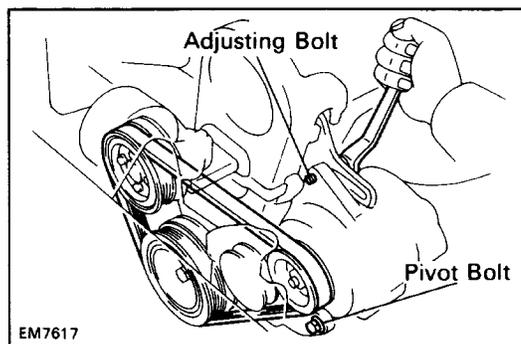


## GENERATOR REMOVAL OF GENERATOR (4A-FE)



CH0741



EM7617

### 1. DISCONNECT CABLE FROM NEGATIVE TERMINAL OF BATTERY

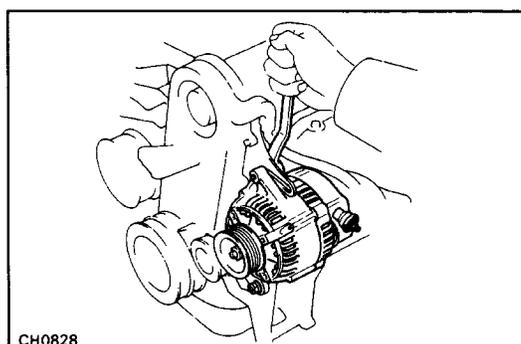
**CAUTION:** Work must be started after approx. 20 seconds or longer from the time the ignition switch is turned to the "LOCK" position and the negative (-) terminal cable is disconnected from the battery.

### 2. REMOVE DRIVE BELT

Loosen the pivot nut and adjusting bolt, and remove the drive belt.

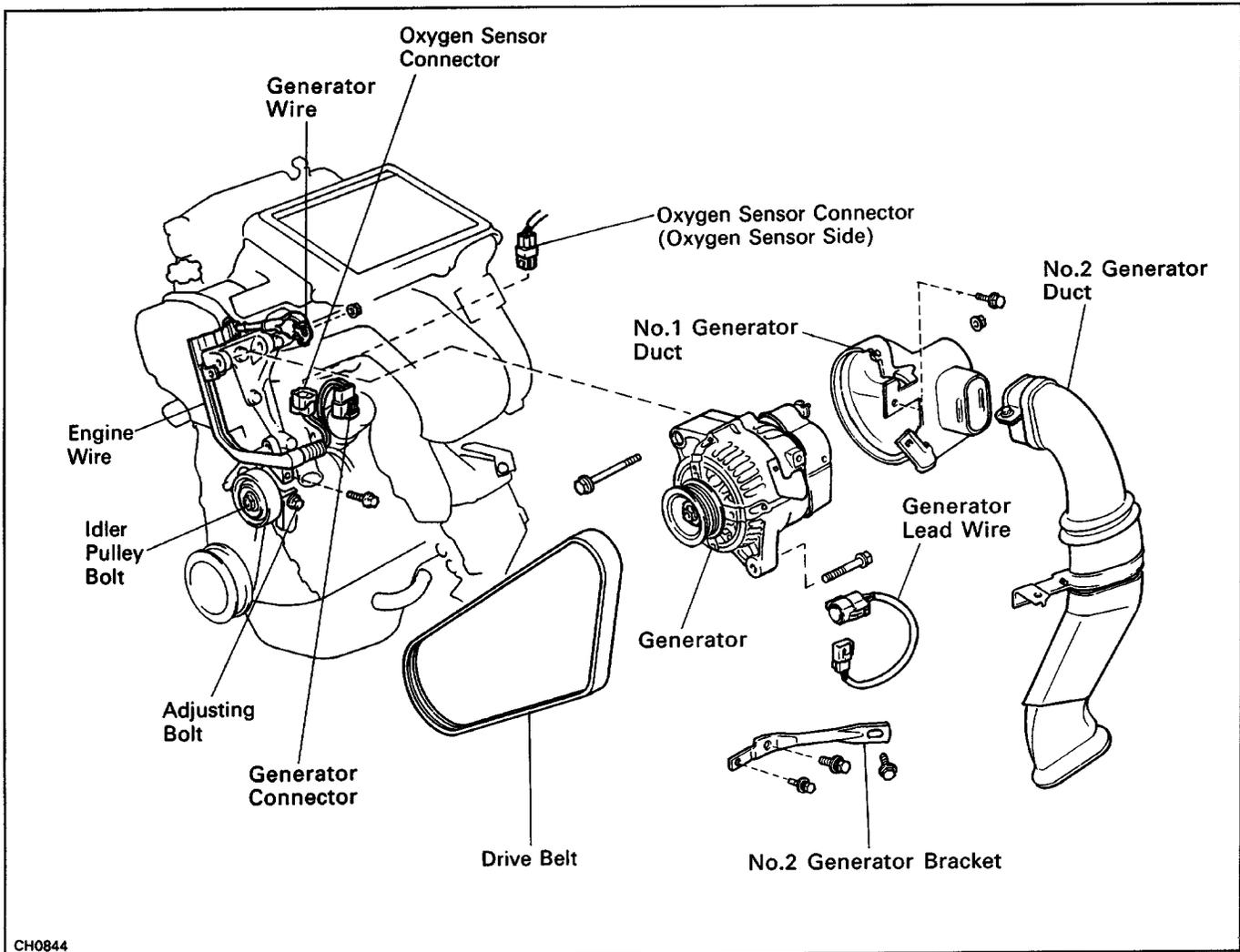
### 3. REMOVE GENERATOR

- (a) Disconnect the generator connector.
- (b) Remove the nut, and disconnect the generator wire.
- (c) Remove the pivot nut, bolt, adjusting bolt and generator.



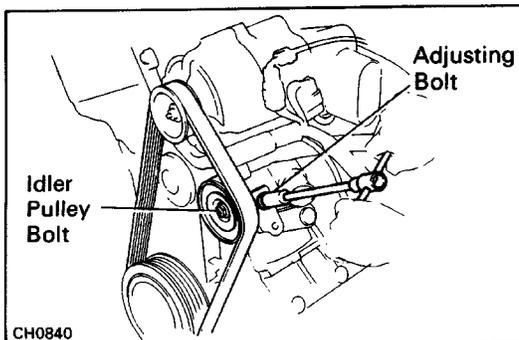
CH0828

## REMOVAL OF GENERATOR (3S-GTE)



CH0844

1. DISCONNECT CABLE FROM NEGATIVE TERMINAL OF BATTERY  
**CAUTION:** Work must be started after approx. 20 seconds or longer from the time the ignition switch is turned to the "LOCK" position and the negative (-) terminal cable is disconnected from the battery.
2. DISCONNECT ABS CONTROL RELAY FROM RADIATOR
3. DISCONNECT A/C RELAY BOX FROM BRACKET
4. REMOVE NO.2 GENERATOR DUCT
5. REMOVE DRIVE BELT
  - (a) Loosen the idler pulley bolt.
  - (b) Loosen the adjusting bolt, and remove the drive belt.



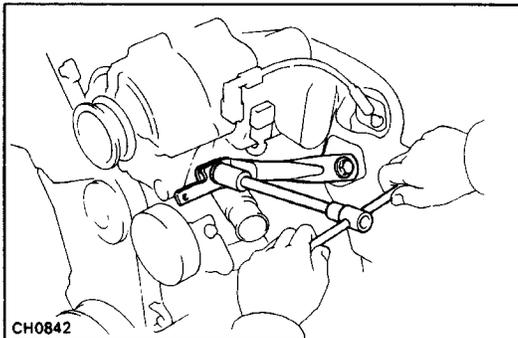
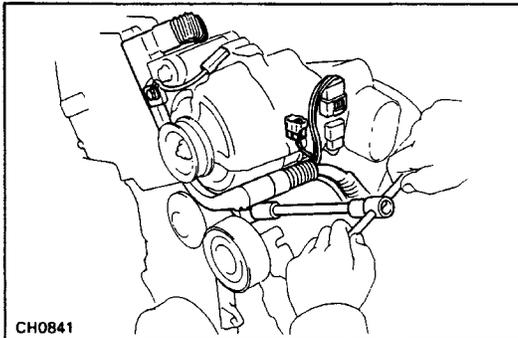
CH0840

**6. DISCONNECT ENGINE WIRE**

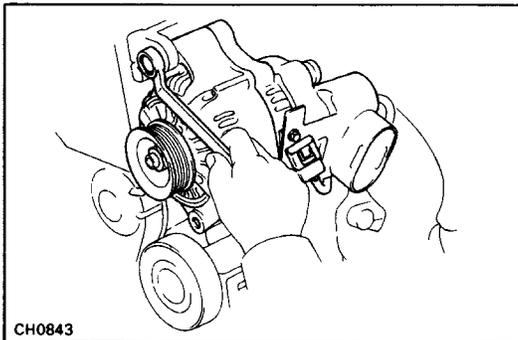
(a) Disconnect the following connectors and wires:

- Generator connector from lead wire
- Generator wire
- A/C compressor connector
- Engine coolant temperature switch connector
- Oxygen sensor wire clamp from No.1 generator duct
- Oxygen sensor connector
- Oxygen sensor connector (wiring harness side) from No.1 generator duct

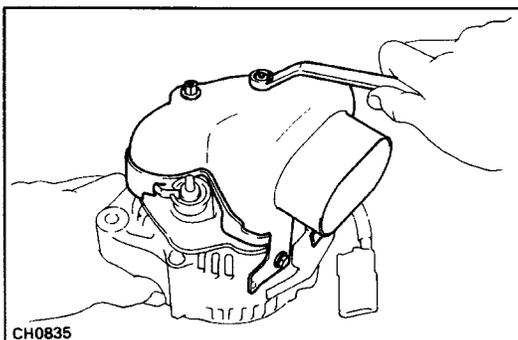
(b) Remove the two bolts, and disconnect the ground strap and engine wire from the brackets.

**7. REMOVE NO.2 GENERATOR BRACKET**

Remove the two bolts and generator bracket.

**8. REMOVE ABS ACTUATOR COVER****9. REMOVE GENERATOR**

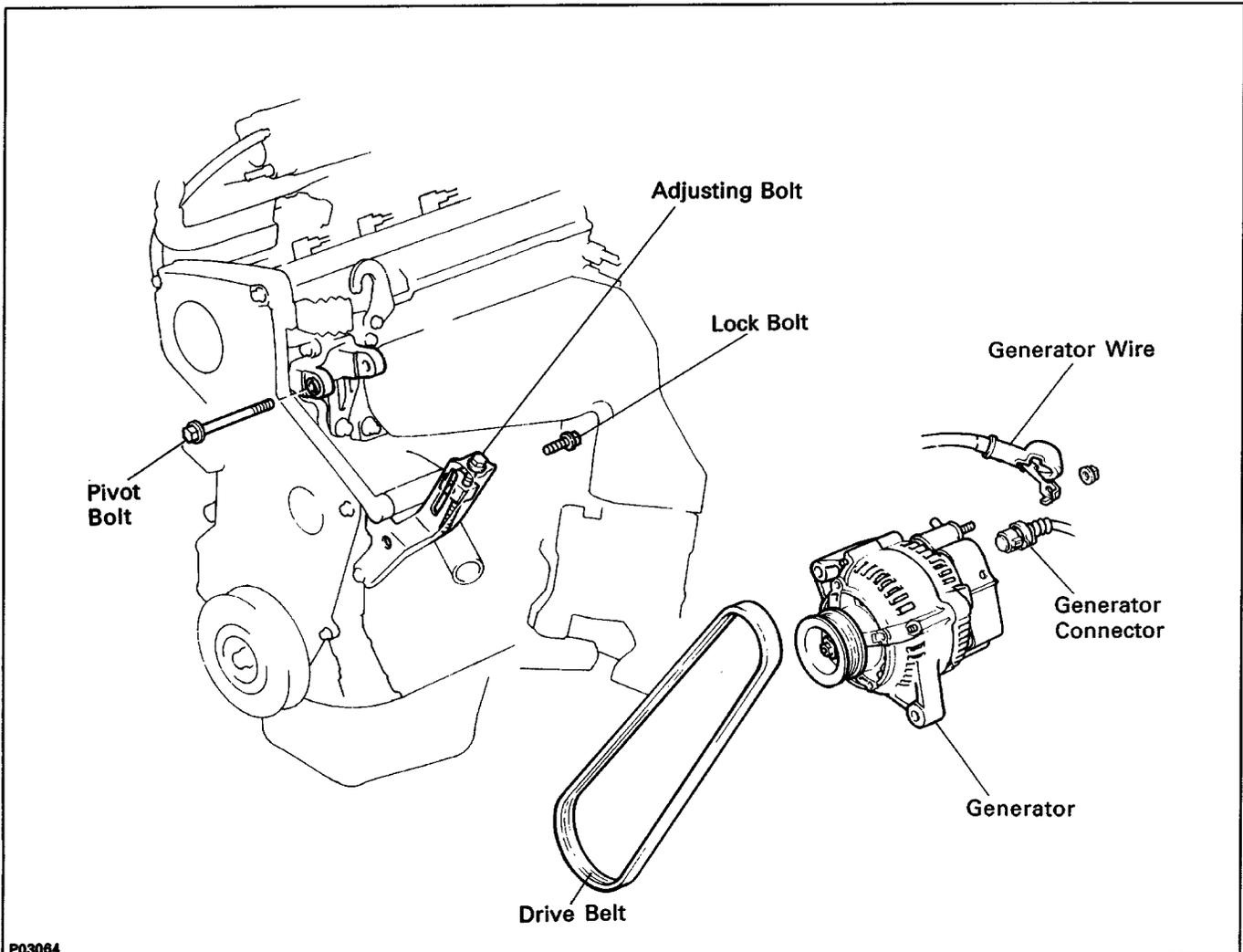
Remove the two bolts and generator.

**10. REMOVE NO.1 GENERATOR DUCT**

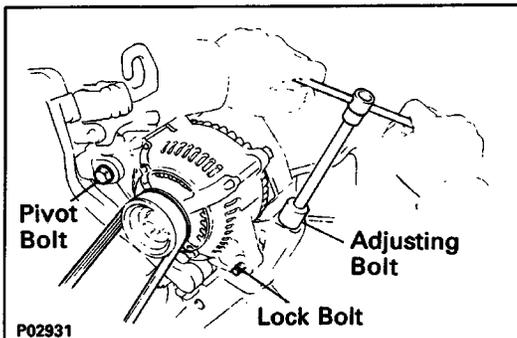
(a) Remove the two nuts and generator duct.

(b) Remove the generator lead wire.

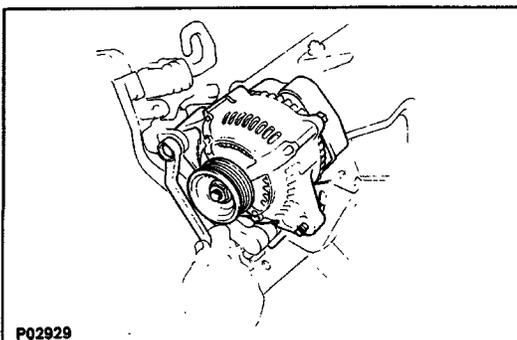
## REMOVAL OF GENERATOR (5S-FE)



P03064



P02931



P02929

### 1. DISCONNECT CABLE FROM NEGATIVE TERMINAL OF BATTERY

**CAUTION:** Work must be started after approx. 20 seconds or longer from the time the ignition switch is turned to the "LOCK" position and the negative (-) terminal cable is disconnected from the battery.

### 2. REMOVE DRIVE BELT

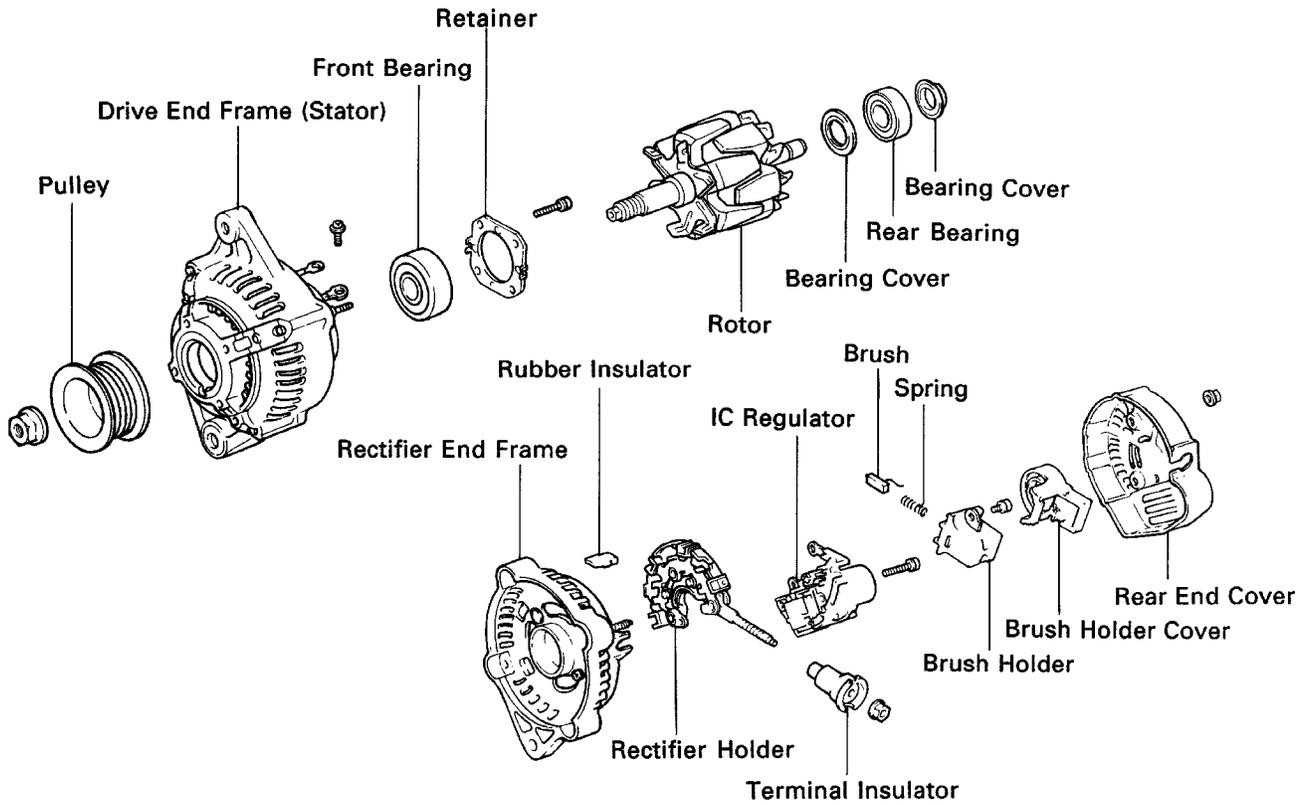
- Loosen the pivot bolt and adjusting lock bolt.
- Loosen the adjusting bolt, and remove the drive belt.

### 3. REMOVE GENERATOR

- Disconnect the generator connector.
- Remove the nut, and disconnect the generator wire.
- Remove the pivot bolt, adjusting lock bolt and generator.

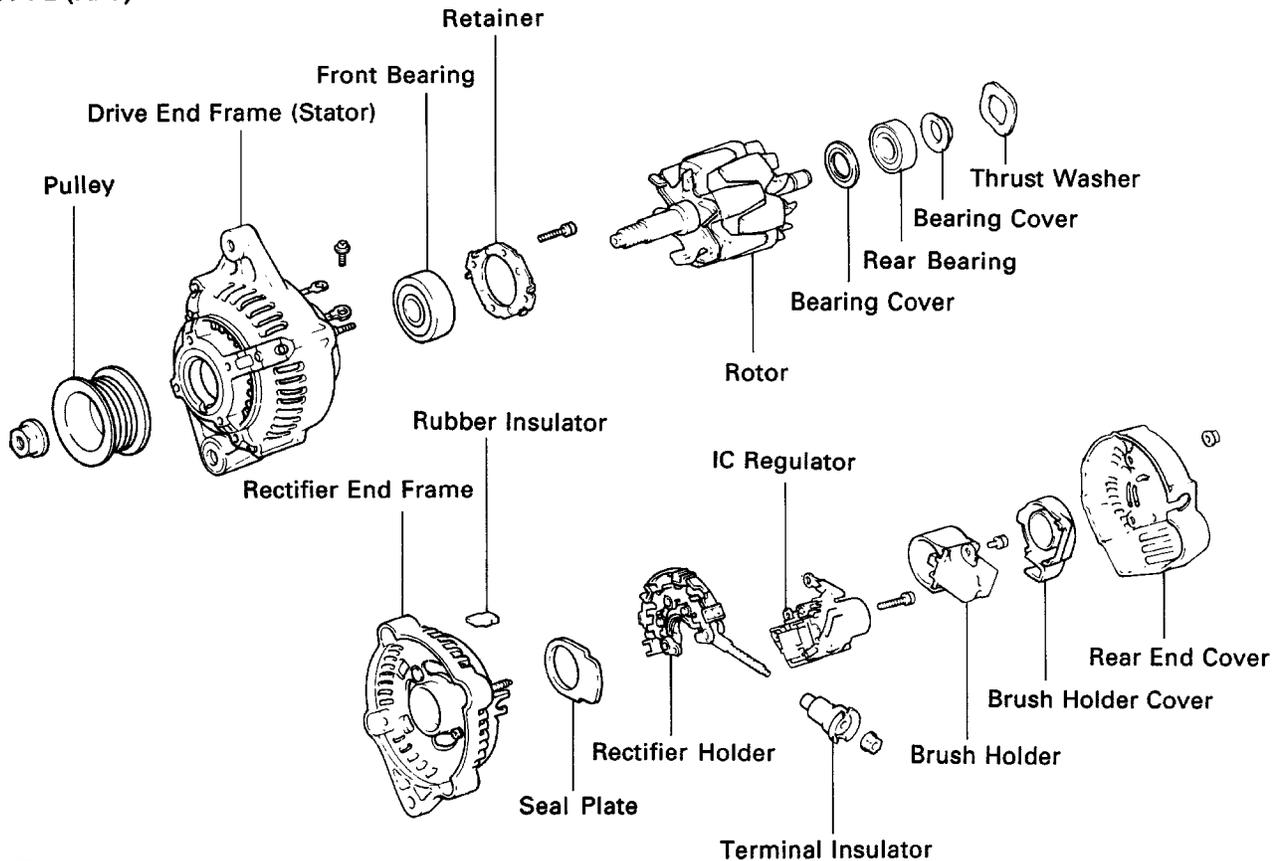
# COMPONENTS

## 4A-FE (M/T)



P02906

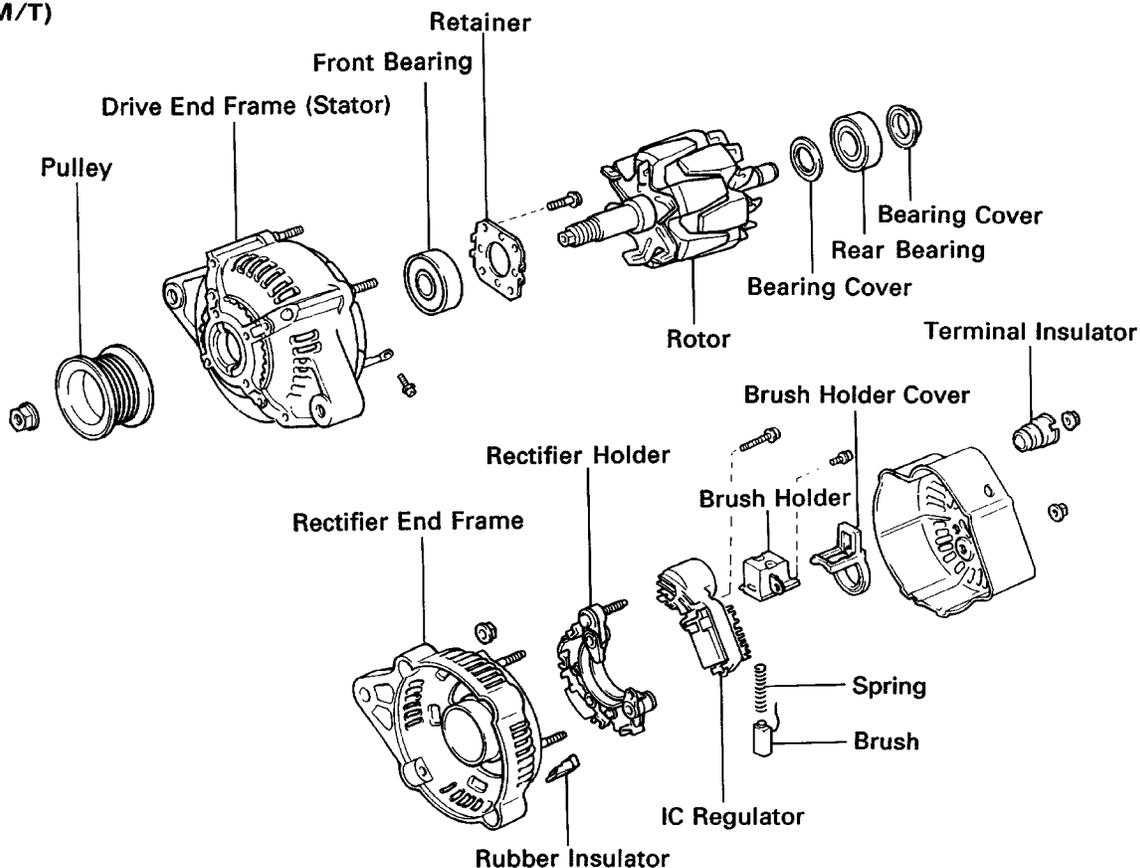
## 4A-FE (A/T)



P02905

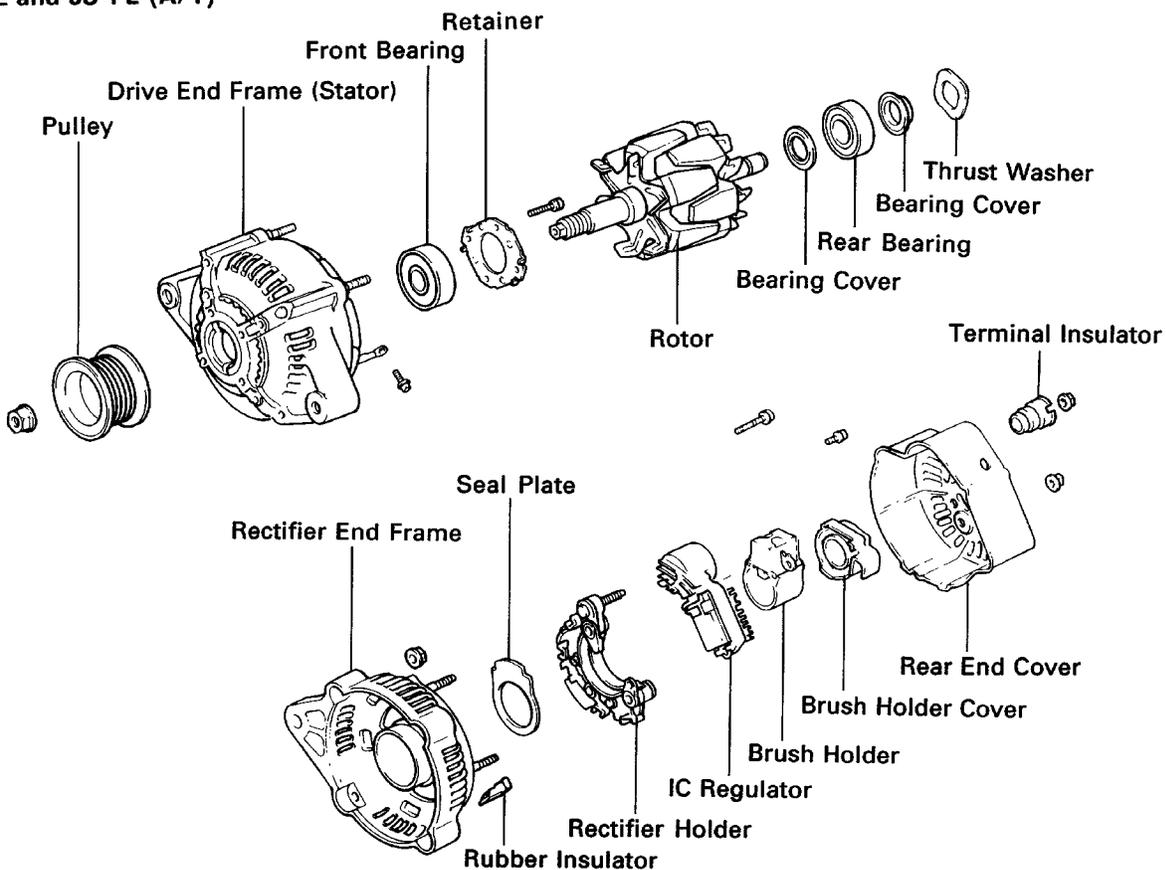
# COMPONENTS (Cont'd)

## 5S-FE (M/T)



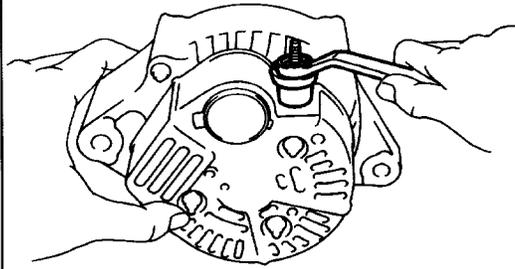
P02907

## 3S-GTE and 5S-FE (A/T)

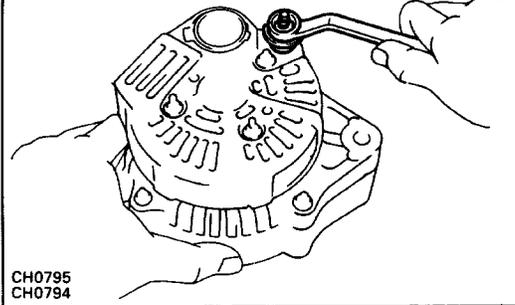
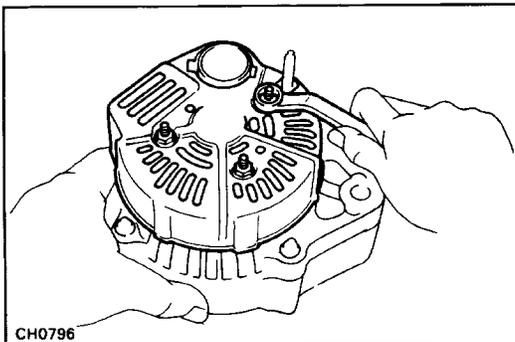


P02908

4A-FE

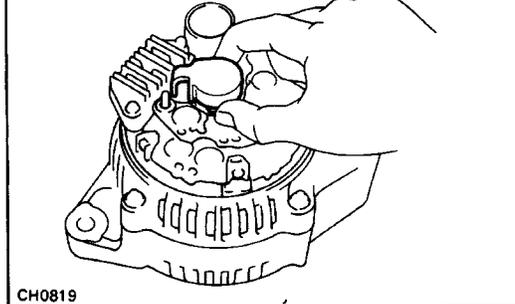


3S-GTE and 5S-FE

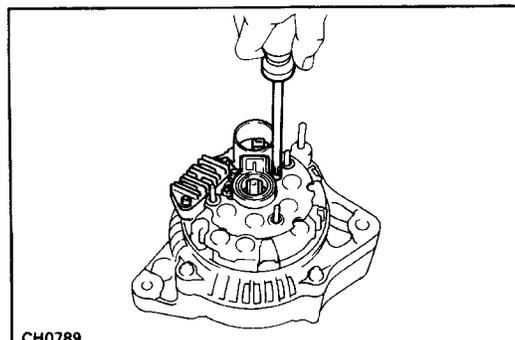
CH0795  
CH0794

CH0796

M/T (3S-GTE) and A/T



CH0819



CH0789

## DISASSEMBLY OF GENERATOR

4A-FE (See page [CH-10](#))3S-GTE and 5S-FE (See page [CH-11](#))

### 1. REMOVE REAR END COVER

(a) Remove the nut and terminal insulator.

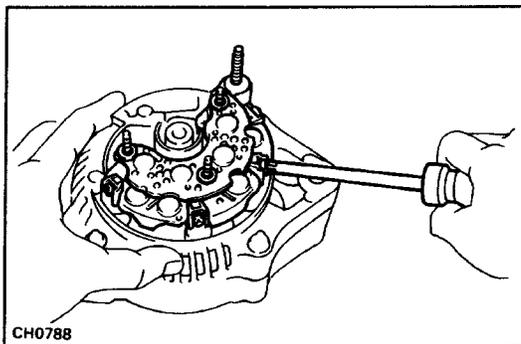
(b) Remove the three nuts and end cover.

### 2. REMOVE BRUSH HOLDER AND IC REGULATOR

(a) (M/T (3S-GTE) and A/T)

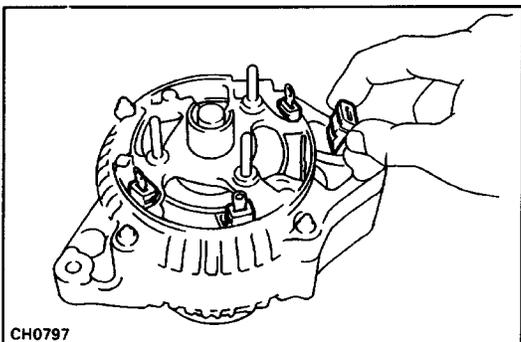
Remove the brush holder cover from the brush holder.

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

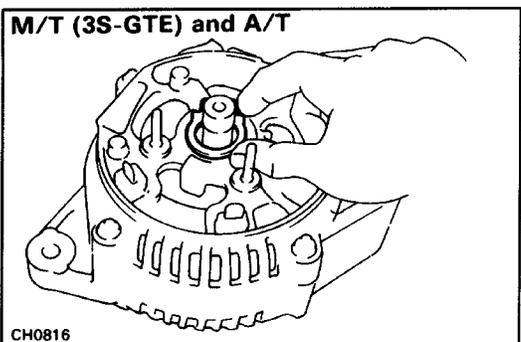


### 3. REMOVE RECTIFIER HOLDER

(a) Remove the four screws and rectifier holder.

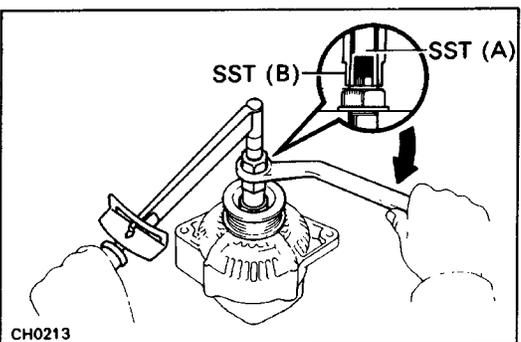


(b) Remove the four rubber insulators.



(c) (M/T (3S-GTE) and A/T)

Remove the seal plate.



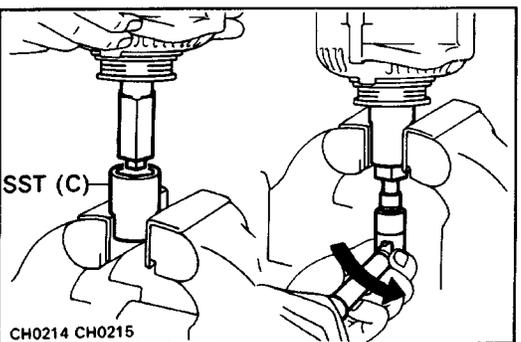
### 4. REMOVE PULLEY

(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 generator to SST (C).

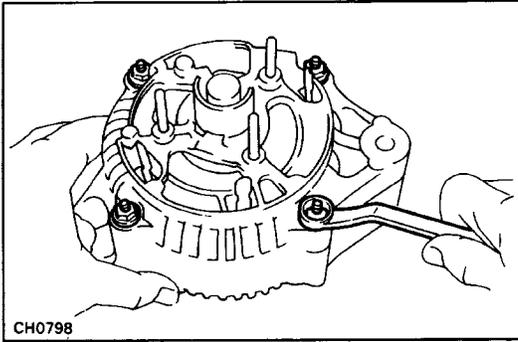
(d) To loosen the pulley nut, turn SST (A) in the direction shown in the illustration.

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

(e) Remove the generator from SST (C).

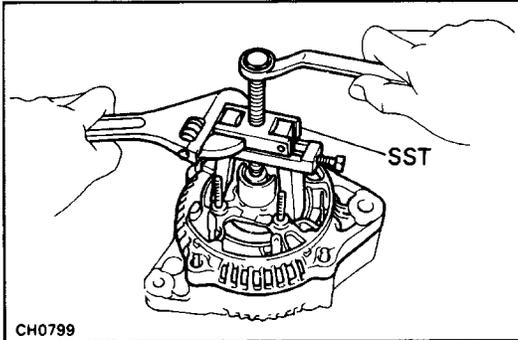
(f) Turn SST (B) and remove SST (A and B).

(g) Remove the pulley nut and pulley.

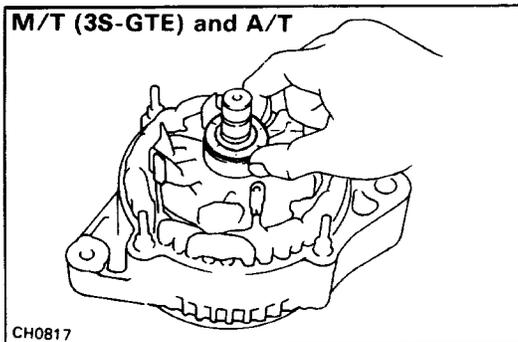


## 5. REMOVE RECTIFIER END FRAME

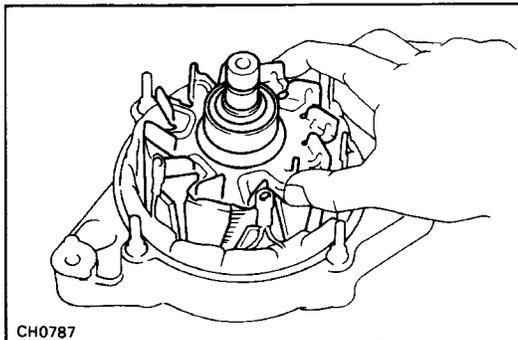
(a) Remove the four nuts.



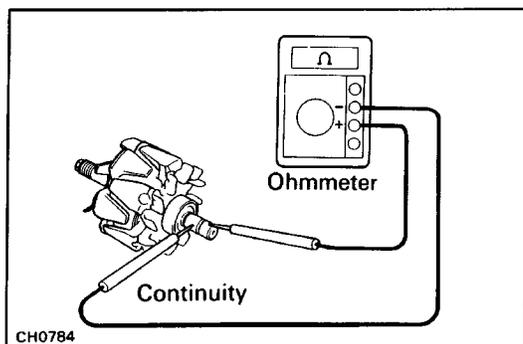
(b) Using SST, remove the rectifier end frame.  
SST 09286-46011



(c) (M/T (3S-GTE) and A/T)  
Remove the thrust washer.



## 6. REMOVE ROTOR FROM DRIVE END FRAME



CH0784

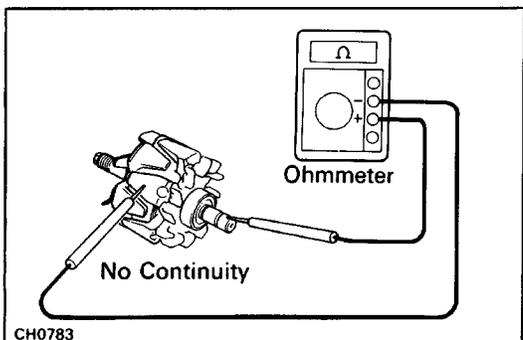
## INSPECTION AND REPAIR OF GENERATOR Rotor

### 1. INSPECT ROTOR FOR OPEN CIRCUIT

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

**Standard resistance (Cold): 2.8 – 3.0Ω**

If there is no continuity, replace the rotor.

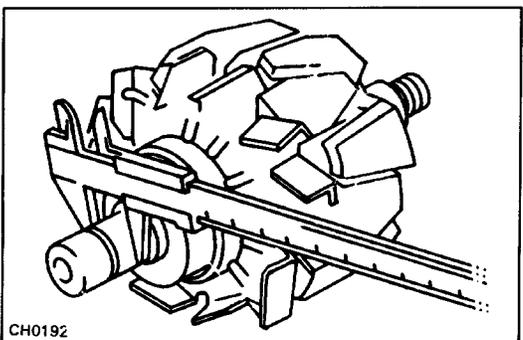


CH0783

### 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.



CH0192

### 3. INSPECT SLIP RINGS

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

If rough or scored, replace the rotor.

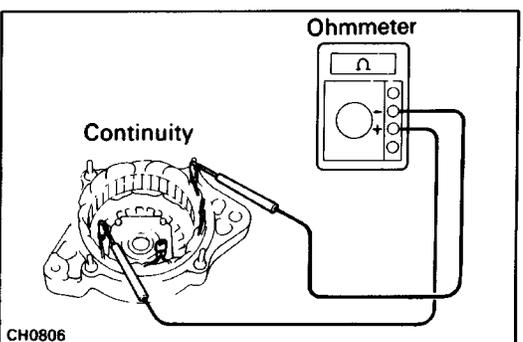
(b) Using a vernier caliper, measure the slip ring diameter.

**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.



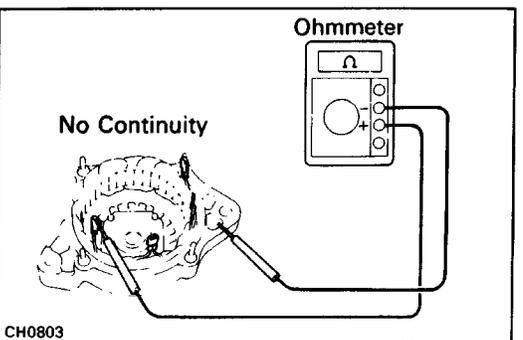
CH0806

## 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.

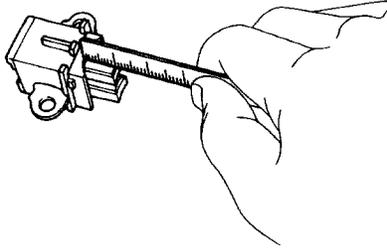
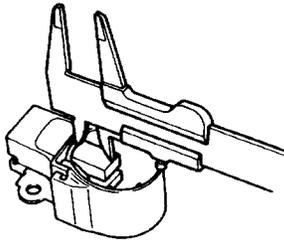


CH0803

### 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.

**M/T (4A-FE and 5S-FE)****M/T (3S-GTE) and A/T**CH0247  
CH0722

## Brushes

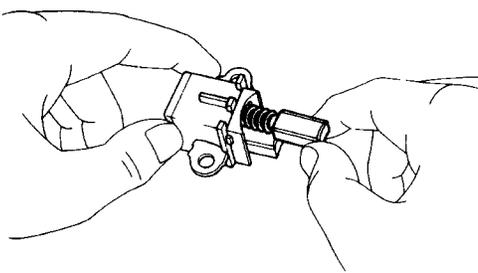
### 1. INSPECT EXPOSED BRUSH LENGTH

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

**Standard exposed length: 10.5 mm (0.413 in.)**

**Minimum exposed length: 1.5 mm (0.059 in.)**

If the exposed length is less than minimum, replace the brushes (M/T (4A-FE and 5S-FE)) or brushes and brush holder assembly (M/T (3S-GTE) and A/T).

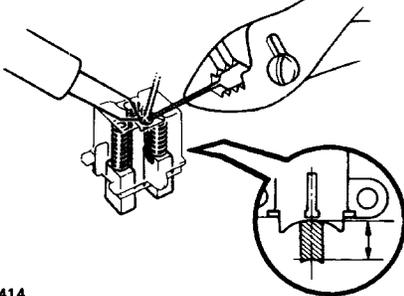
**M/T (4A-FE and 5S-FE)**

CH0248

### 2. (M/T (4A-FE AND 5S-FE))

#### 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.

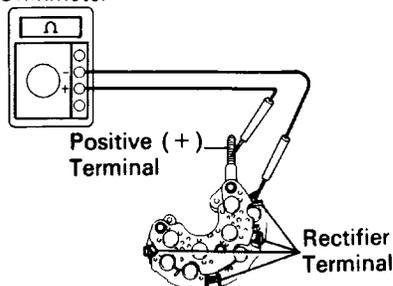
**M/T (4A-FE and 5S-FE)**

CH0414

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

Exposed length: 10.5 mm (0.413 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.

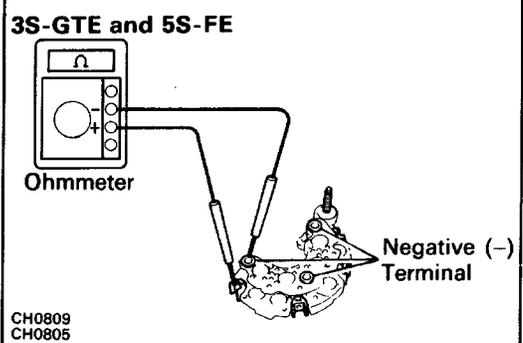
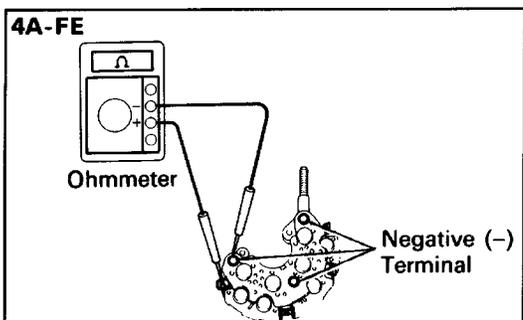
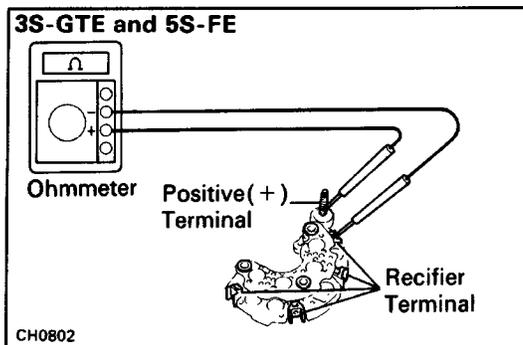
**4A-FE Ohmmeter**

CH0808

## Rectifiers (Rectifier Holder)

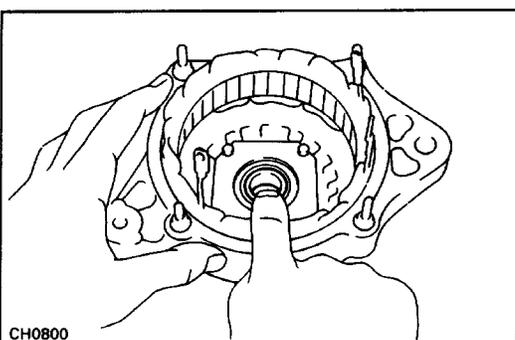
### 1. INSPECT POSITIVE RECTIFIER

- (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

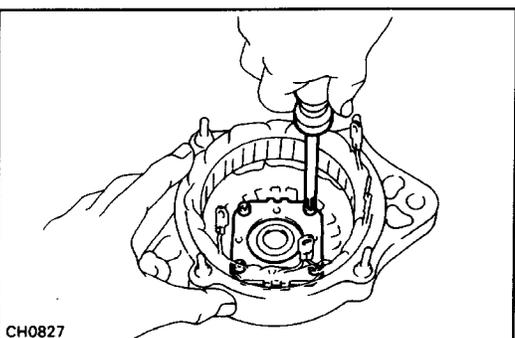
- (a) Using an ohmmeter, connect one tester probe to each negative (-) terminal and the other to each rectifier terminal.
- (b) Reverse the polarity of the tester probes and repeat step (a).
- (c) Check that one shows continuity and the other shows no continuity.  
If continuity is not as specified,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



## Bearings

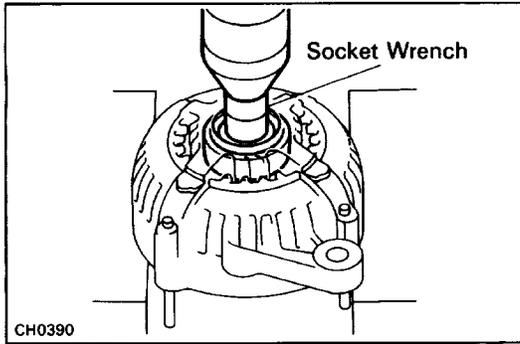
### 1. INSPECT FRONT BEARING

Check that the bearing is not rough or worn.

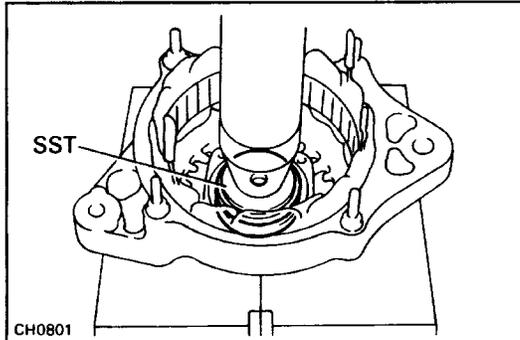


### 2. IF NECESSARY, REPLACE FRONT BEARING

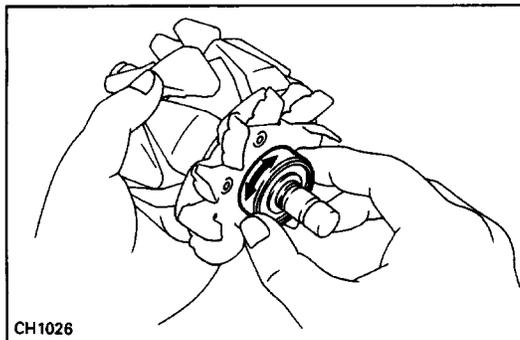
- (a) Remove the four screws, bearing retainer and bearing.



- (b) Using socket wrench and press, press out the bearing.

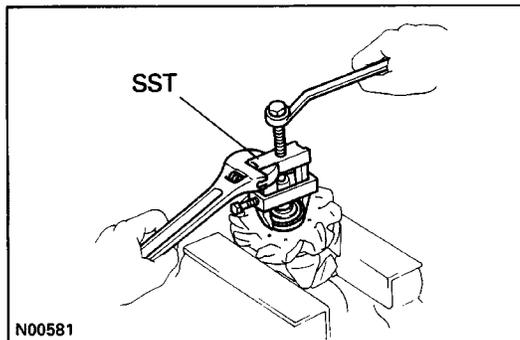


- (c) Using SST and a press, press in a new bearing.  
SST 09608-20012 (09608-00030)  
(d) Install the bearing retainer with the four screws.



### 3. INSPECT REAR BEARING

Check that the bearing is not rough or worn.

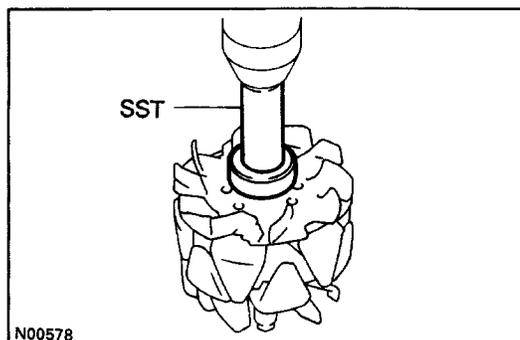


### 4. IF NECESSARY, REPLACE REAR BEARING

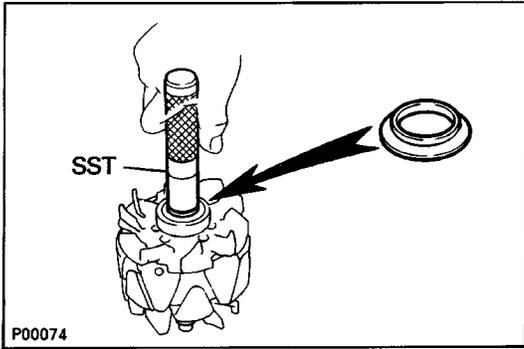
- (a) Using SST, remove the bearing covers and bearing.  
SST 09820-00021

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

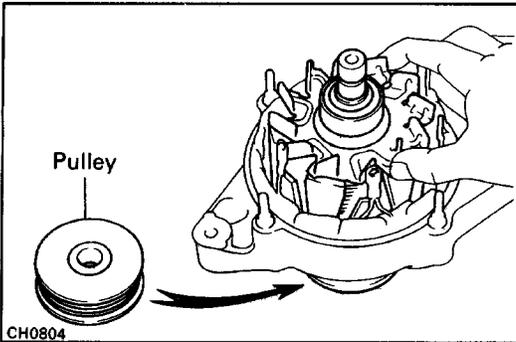
- (b) Place the bearing cover on the rotor.



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



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



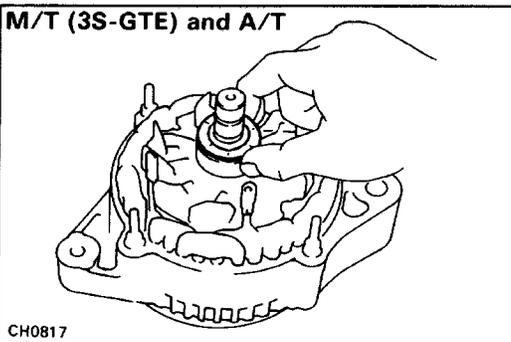
## ASSEMBLY OF GENERATOR

4A-FE (See page EM-10)

3S-GTE and 5S-FE (See page EM-11)

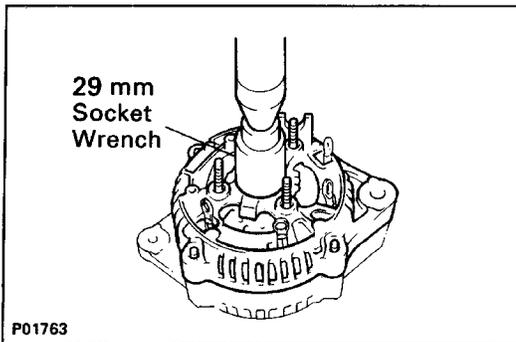
### 1. INSTALL ROTOR TO RECTIFIER END FRAME

- (a) Place the rectifier end frame on the pulley.
- (b) Install the rotor to the rectifier end frame.

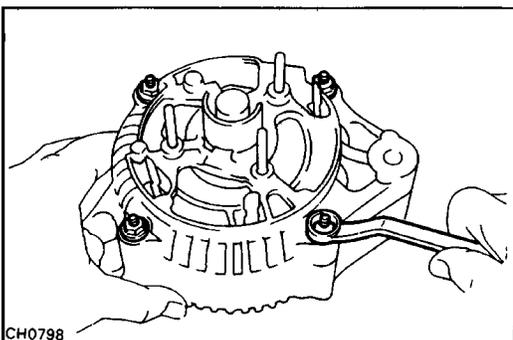


### 2. INSTALL RECTIFIER END FRAME

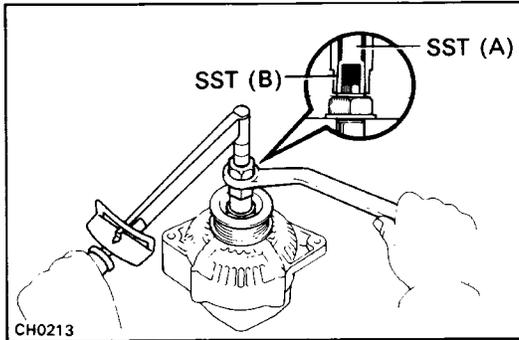
- (a) (M/T (3S-GTE) and A/T)  
Place the thrust washer on the rotor.



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



- (c) Install the four nuts.

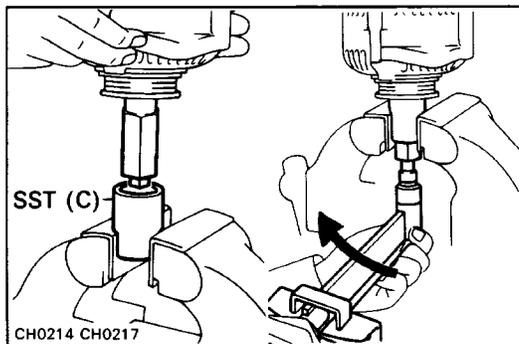


### 3. INSTALL PULLEY

- (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)**

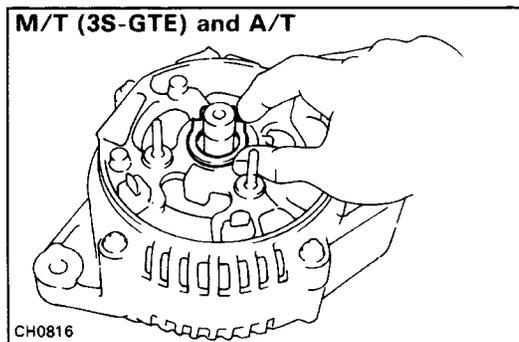
- (c) Check that SST (A) is secured to the pulley shaft.



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

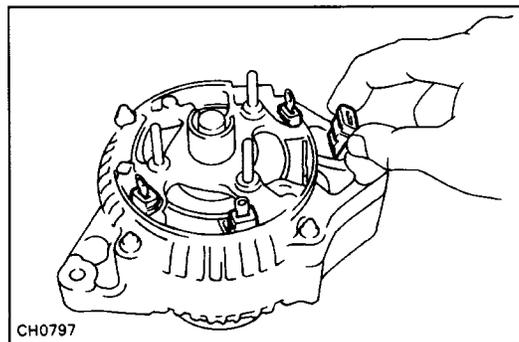
**Torque: 110 N-m (1,125 kgf-cm, 81 ft-lbf)**

- (f) Remove the generator from SST (C).
- (g) Turn SST (B) and remove SST (A and B).

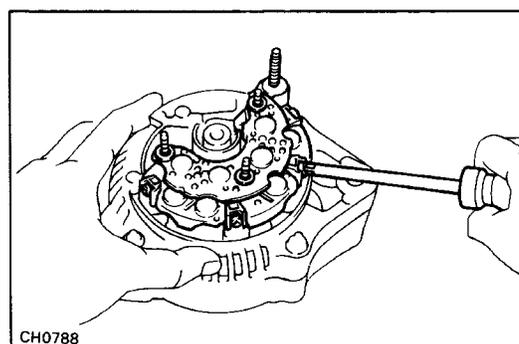


### 4. INSTALL RECTIFIER HOLDER

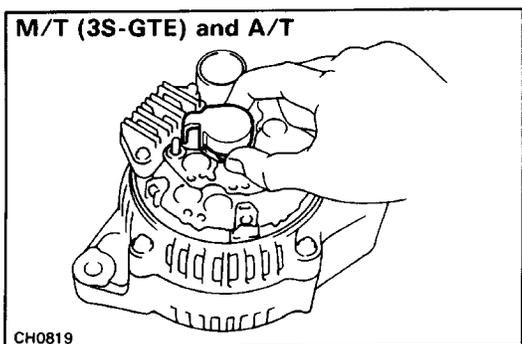
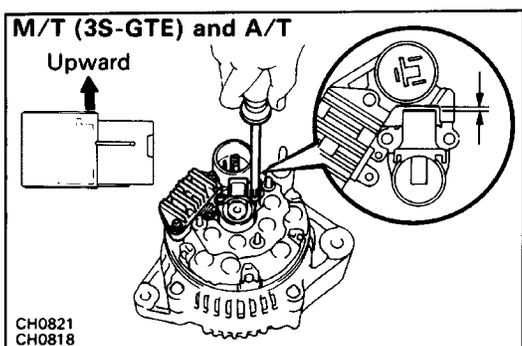
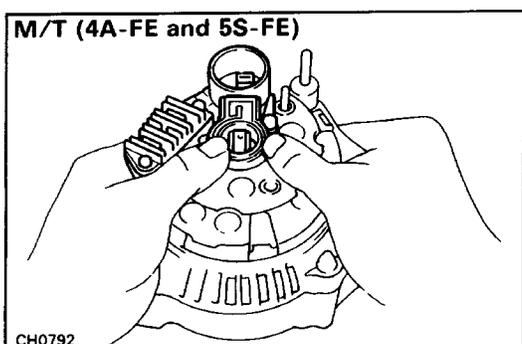
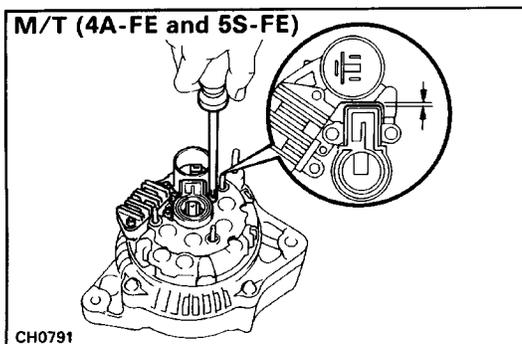
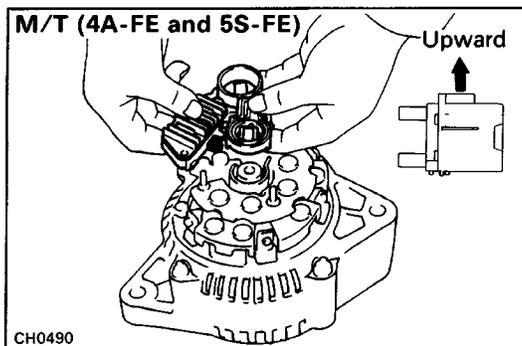
- (a) (M/T (3S-GTE) and A/T)  
Place the seal plate on the rectifier end frame.



- (b) Install the four rubber insulators on the lead wires.



- (c) Install the rectifier holder with the four screws.



## 5. INSTALL IC REGULATOR AND BRUSH HOLDER (M/T (4A-FE and 5S-FE))

(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.

(c) Install the five screws until there is a clearance of approx. 1 mm (0.04 in.) between the brush holder and connector.

(d) Fit the brush holder cover.

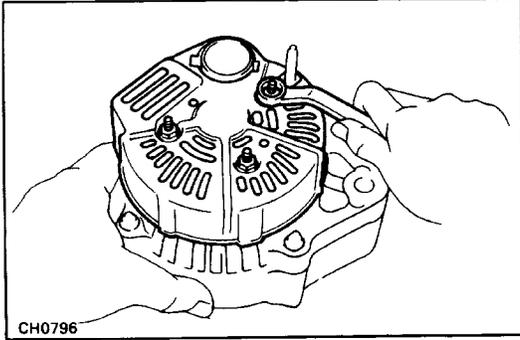
## (M/T (3S-GTE) and A/T)

(a) Place the IC regulator and brush holder on the rectifier end frame.

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

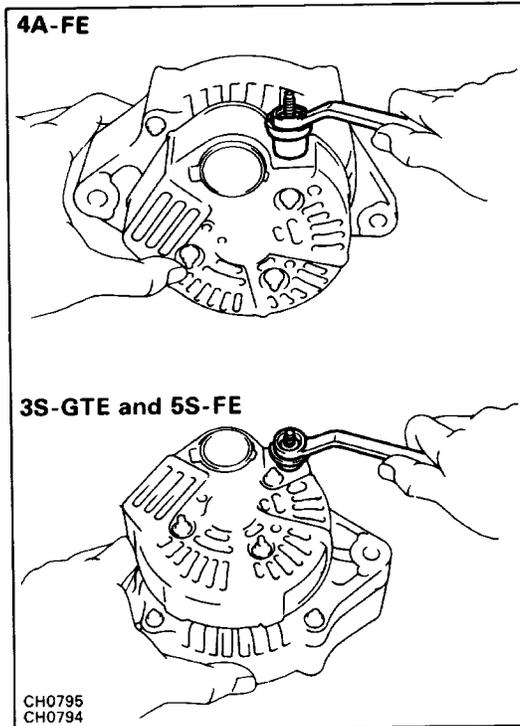
(b) Install the five screws until there is a clearance of approx. 1 mm (0.04 in.) between the brush holder and connector.

(c) Place the brush holder cover on the brush holder.

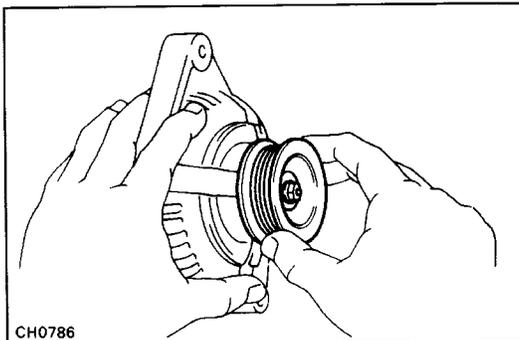


## 6. INSTALL REAR END COVER

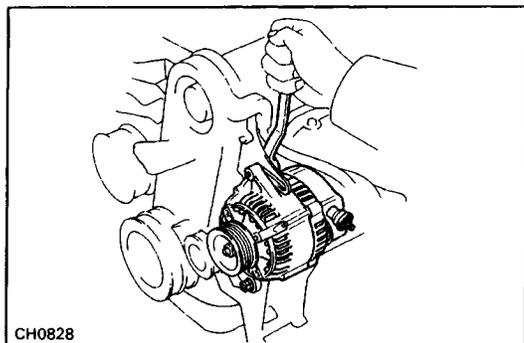
(a) Install the end cover with the three nuts.



(b) Install the terminal insulator with the nut.



## 7. CHECK THAT ROTOR ROTATES SMOOTHLY



CH0828

## INSTALLATION OF GENERATOR (4A-FE)

(See page [CH-6](#))

### 1. INSTALL GENERATOR

- (a) Mount the generator on the generator brackets with the pivot bolt, nut and adjusting bolt. Do not tighten the bolt and nut yet.
- (b) Connect the generator connector.
- (c) Connect the generator wire with the nut.

### 2. INSTALL DRIVE BELT

Adjust the drive belt tension.

(See step 3 on page [CH-3](#))

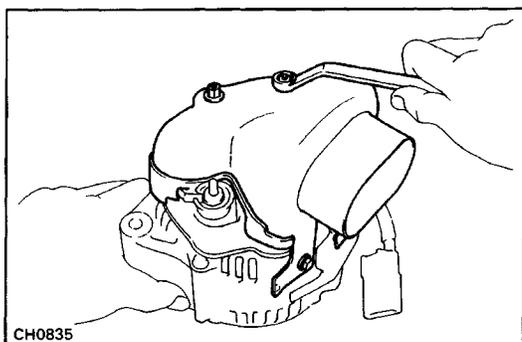
Drive belt tension: New belt  $160 \pm 20$  lbf

Used belt  $130 \pm 20$  lbf

### 3. CONNECT CABLE TO NEGATIVE TERMINAL OF BATTERY

### 4. PERFORM ON-VEHICLE INSPECTION

(See steps 5 to 7 on pages [CH-4](#) to 5)



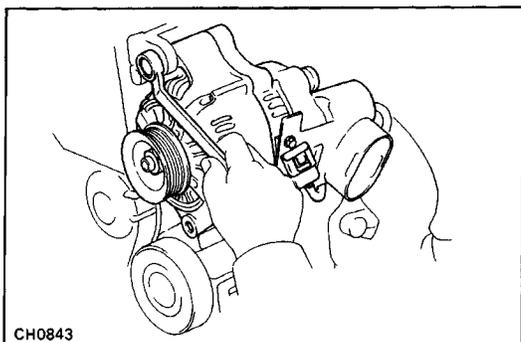
CH0835

## INSTALLATION OF GENERATOR (3S-GTE)

(See page [CH-7](#))

### 1. INSTALL NO.7 GENERATOR DUCT

- (a) Install the generator lead wire.
- (b) Remove the generator duct with the two nuts.



CH0843

### 2. INSTALL GENERATOR

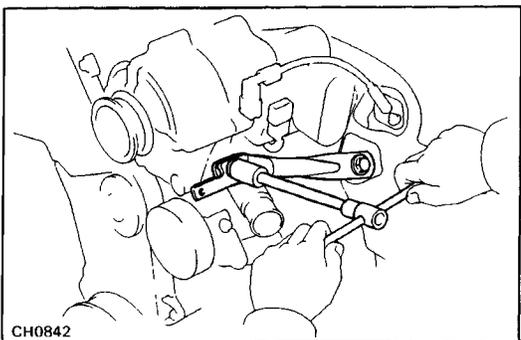
Install the generator with the two bolts.

Torque:

12 mm head bolt  $19 \text{ N}\cdot\text{m}$  ( $195 \text{ kgf}\cdot\text{cm}$ ,  $14 \text{ ft}\cdot\text{lbf}$ )

14 mm head bolt  $52 \text{ N}\cdot\text{m}$  ( $530 \text{ kgf}\cdot\text{cm}$ ,  $38 \text{ ft}\cdot\text{lbf}$ )

### 3. INSTALL ABS ACTUATOR COVER



CH0842

### 4. INSTALL NO.2 GENERATOR BRACKET

Install the generator bracket with the two bolts.

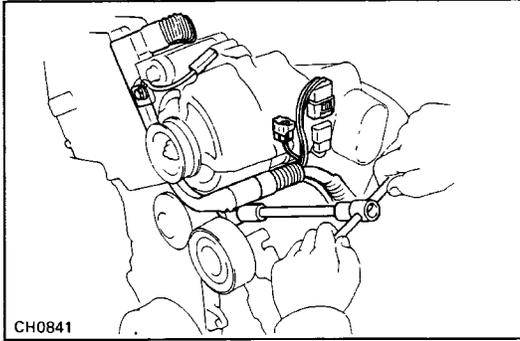
Torque:

To turbine outlet elbow

$43 \text{ N}\cdot\text{m}$  ( $440 \text{ kgf}\cdot\text{cm}$ ,  $32 \text{ ft}\cdot\text{lbf}$ )

To No.1 generator bracket

$39 \text{ N}\cdot\text{m}$  ( $400 \text{ kgf}\cdot\text{cm}$ ,  $29 \text{ ft}\cdot\text{lbf}$ )



## 5. INSTALL ENGINE WIRE

- (a) Install the engine wire and ground strap with the two bolts.
- (b) Connect the following connectors and wires:
  - Generator connector from lead wire
  - Generator wire
  - A/C compressor connector
  - Engine coolant temperature switch connector
  - Oxygen sensor wire clamp from No.1 generator duct
  - Oxygen sensor connector
  - Oxygen sensor connector (wiring harness side) from No.1 generator duct

## 6. INSTALL DRIVE BELT

Adjust the drive belt tension.

(See step 3 on page [CH-2](#))

Drive belt tension:

w/ A/C	New belt $165 \pm 10$ lbf
	Used belt $115 \pm 20$ lbf
w/o A/C	New belt $150 \pm 25$ lbf
	Used belt $130 \pm 25$ lbf

## 7. INSTALL A/C RELAY BOX TO BRACKET

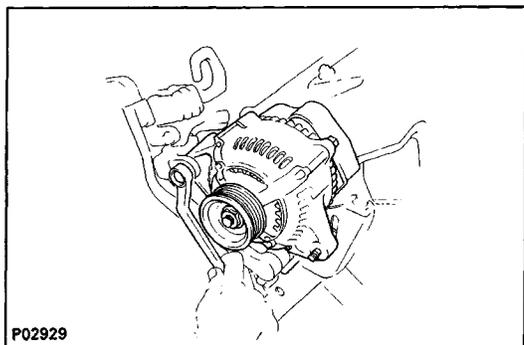
## 8. INSTALL ABS CONTROL RELAY TO RADIATOR

## 9. INSTALL NO.2 GENERATOR DUCT

## 10. CONNECT CABLE TO NEGATIVE TERMINAL OF BATTERY

## 11. PERFORM ON-VEHICLE INSPECTION

(See steps 5 to 7 on pages [CH-4](#) and 5)



## INSTALLATION OF GENERATOR (5S-FE)

(See page [CH-9](#))

### 1. INSTALL GENERATOR

- (a) Mount the generator on the generator brackets with the pivot bolt and adjusting lock bolt. Do not tighten the bolts yet.
- (b) Connect the generator connector.
- (c) Connect the generator wire with the nut.

### 2. INSTALL DRIVE BELT

Adjust the drive belt tension.

(See step 3 on page [CH-3](#))

Drive belt tension:

w/ A/C	New belt $165 \pm 10$ lbf
	Used belt $110 \pm 10$ lbf
w/o A/C	New belt $125 \pm 25$ lbf
	Used belt $95 \pm 20$ lbf

### 3. CONNECT CABLE TO NEGATIVE TERMINAL OF BATTERY

### 4. PERFORM ON-VEHICLE INSPECTION

(See steps 5 to 7 on pages [CH-4](#) to 5)