
CHARGING SYSTEM

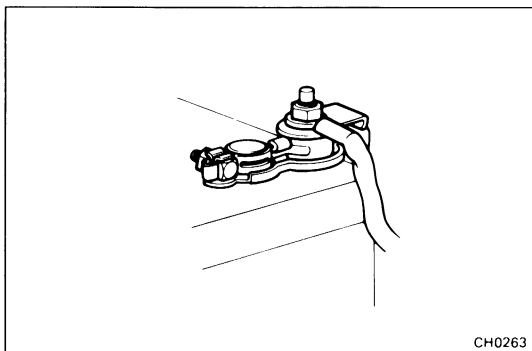
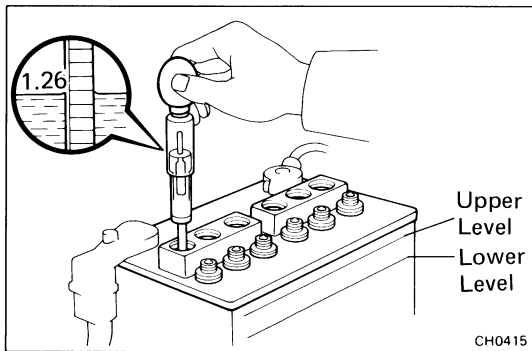
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PRECAUTIONS

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.

TROUBLESHOOTING

Problem	Possible cause	Remedy	Page
Discharge warning light does not light with ignition ON and engine off	Fuse blown Light burned out Wiring connection loose IC regulator faulty	Check "IGN" fuse Replace light Tighten loose connections Replace IC regulator	CH-6
Discharge warning light does not go out with engine running (battery requires frequent recharging)	Drive belt loose or worn Battery cables loose, corroded or worn Fuse blown Fusible link blown IC regulator or alternator faulty Wiring faulty	Adjust or replace drive belt Repair or replace cables Check "ENGINE" fuse Replace fusible link Check charging system Repair wiring	CH-3 CH-4



ON-VEHICLE INSPECTION

1. INSPECT BATTERY SPECIFIC GRAVITY AND ELECTROLYTE LEVEL

- (a) Check the specific gravity of each cell.

Standard specific gravity

When fully charged at 20°C (68°F): 1.25 – 1.27

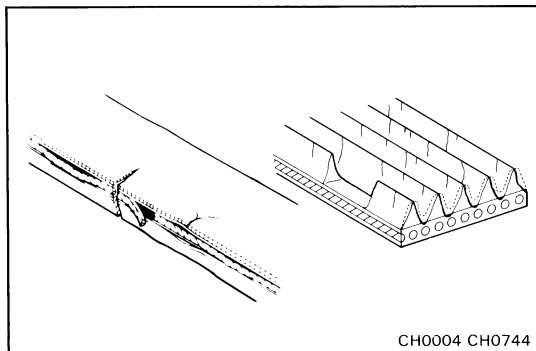
If not within specifications, charge the battery.

- (b) Check the electrolyte quantity of each cell.

If insufficient, refill with distilled (or purified) water.

2. CHECK BATTERY TERMINALS AND FUSIBLE LINKS

- (a) Check that the battery terminals are not loose or corroded.
- (b) Check the fusible links for continuity.

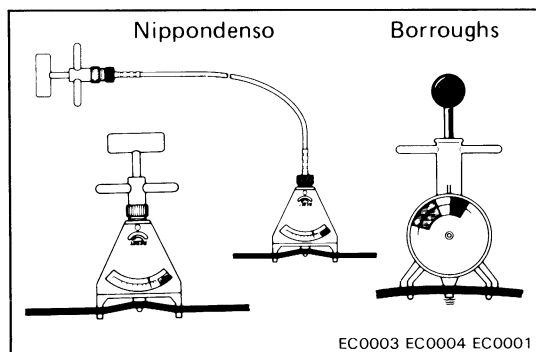


3. INSPECT DRIVE BELT

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

If necessary, 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, it should be replaced.



- (b) Using a belt tension gauge, check the drive belt tension.

Belt tension gauge:

Nippondenso BTG-20 (95506-00020) or

Borroughs No. BT-33-73F

Drive belt tension:

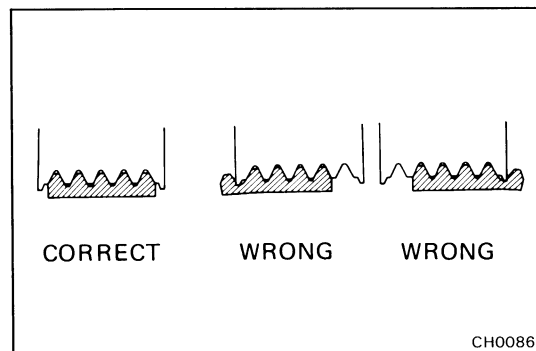
New belt 175 ± 5 lb

Used belt 115 ± 20 lb

If necessary, adjust the drive belt tension.

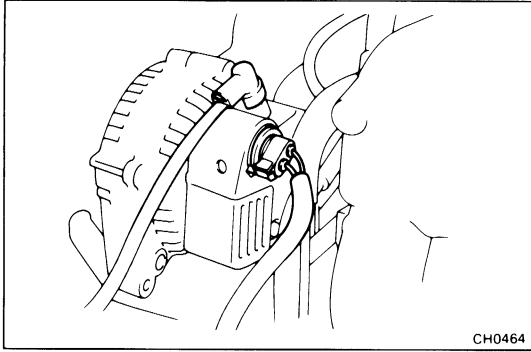
HINT:

- "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 the drive 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 crank pulley.
- After installing a new belt, run the engine for about 5 minutes and then recheck the tension.



4. INSPECT FUSES FOR CONTINUITY

- IGN 7.5A
- ENGINE 15A



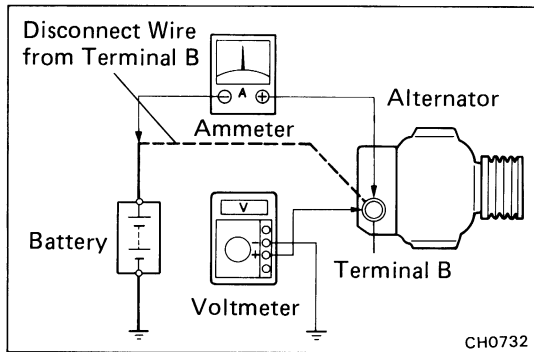
5. VISUALLY CHECK ALTERNATOR WIRING AND LISTEN FOR ABNORMAL NOISES

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

6. INSPECT DISCHARGE WARNING LIGHT CIRCUIT

- Warm up the engine and turn it off.
- Turn off all accessories.
- Turn the ignition switch to ON. Check that the discharge warning light is lit.
- Start the engine. Check that the light goes out.

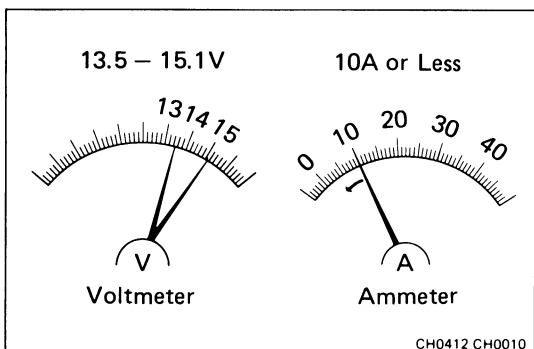
If the light does not operate as specified, troubleshoot the warning light circuit.



7. CHECK CHARGING CIRCUIT WITHOUT LOAD

HINT: If a battery/alternator tester is available, connect the tester to the charging circuit according to the manufacturer's instructions.

- 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 the wire to the negative (–) terminal of the ammeter.
 - Connect the test lead from the positive (+) terminal 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.

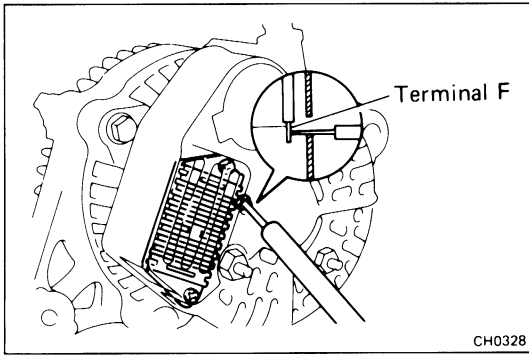


- Check the charging circuit as follows:
With the engine running from idling to 2,000 rpm, check the reading on the ammeter and voltmeter.

Standard amperage: 10 A or less

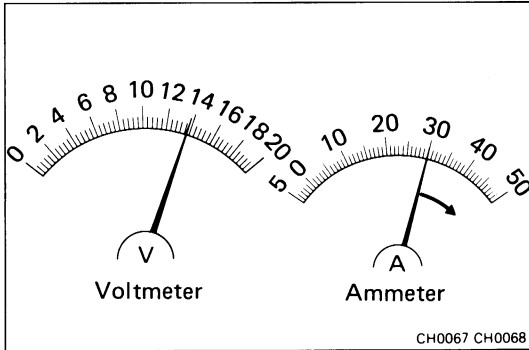
**Standard voltage: 13.9 – 15.1 V at 25°C (77°F)
13.5 – 14.3 V at 115°C (239°F)**

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



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

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



8. INSPECT CHARGING CIRCUIT WITH LOAD

- With the engine running at 2,000 rpm, turn on the high beam headlights and place the heater fan control switch at HI.
- Check the reading on the ammeter.

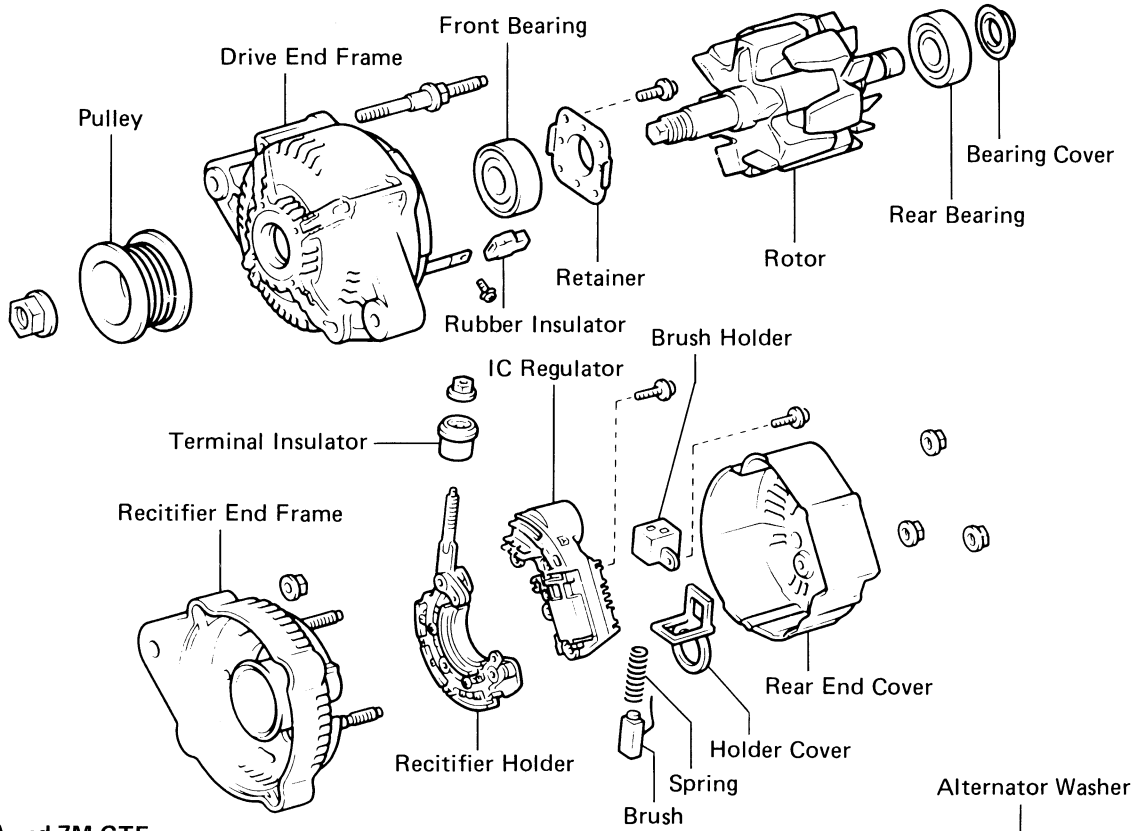
Standard amperage: 30 A or more

If the ammeter reading is less than 30 A, repair the alternator. (See page CH-6)

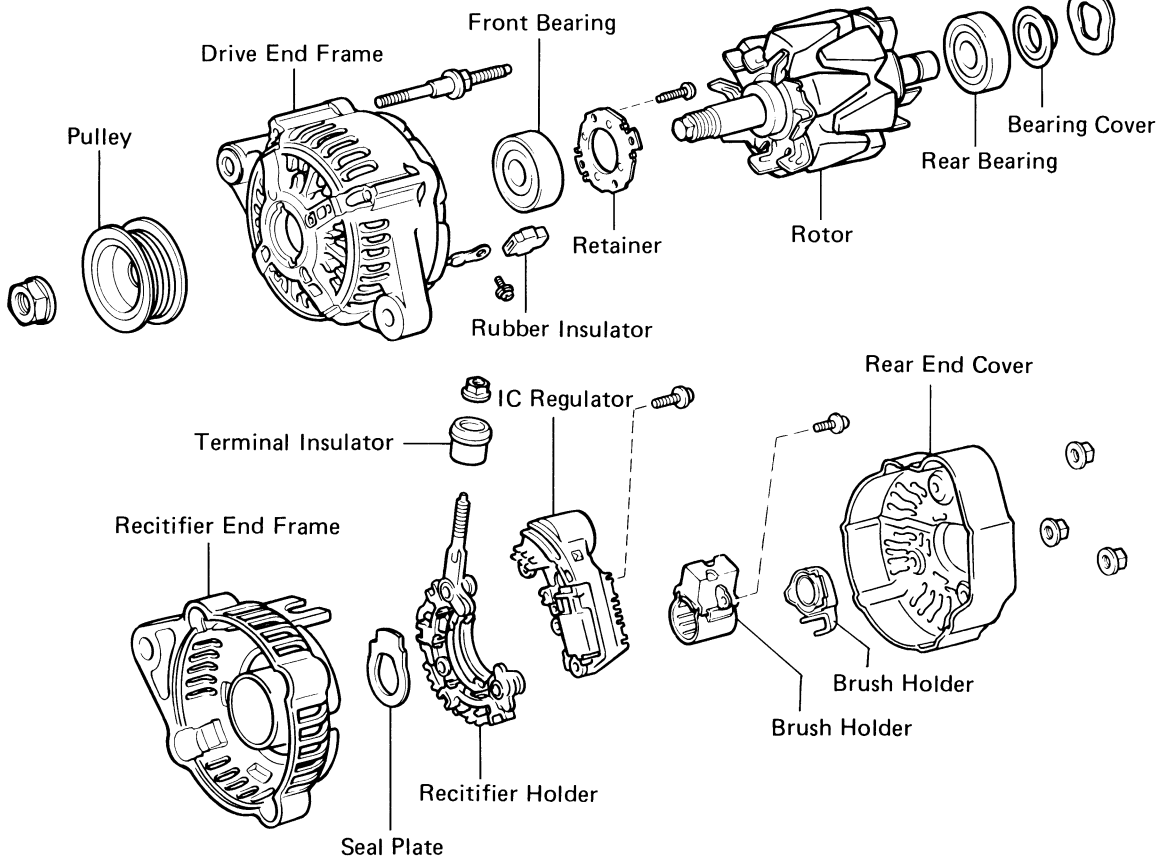
HINT: If the battery is fully charged, the indication will sometimes be less than 30 A.

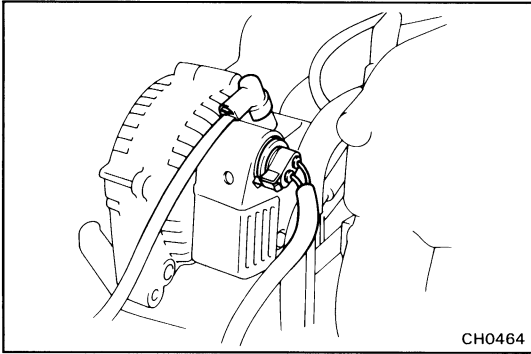
ALTERNATOR COMPONENTS

7M-GE (M/T)

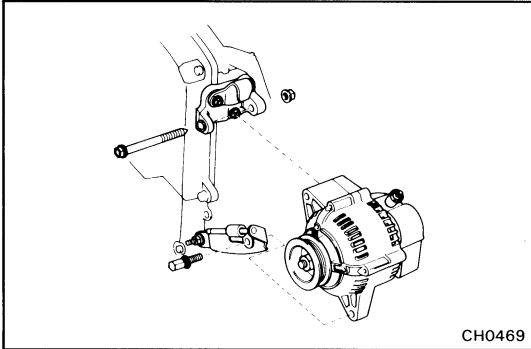


7M-GE (A/T) and 7M-GTE

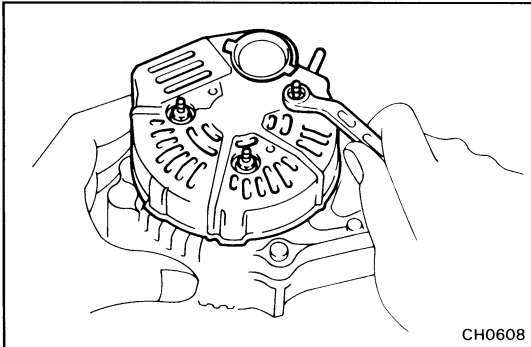




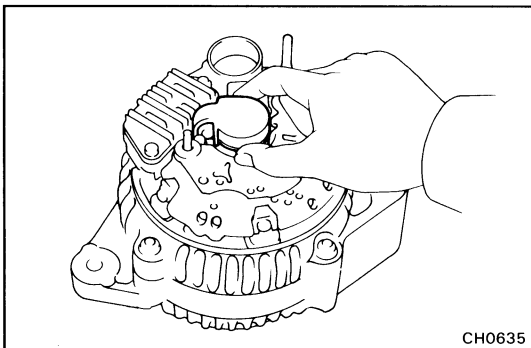
CH0464



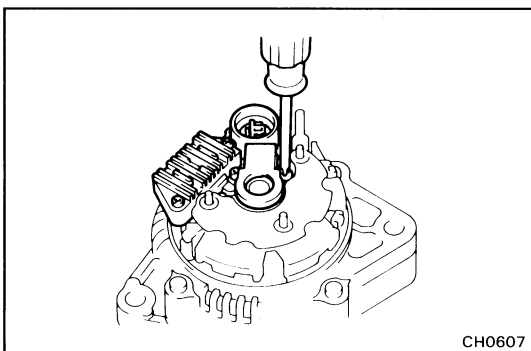
CH0469



CH0608



CH0635



CH0607

REMOVAL OF ALTERNATOR

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 WIRING FROM ALTERNATOR

- (a) Disconnect the connector from the alternator.
- (b) Remove the nut and disconnect the wire from the alternator.

3. REMOVE ALTERNATOR DRIVE BELT

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

4. REMOVE ALTERNATOR

- (a) Remove the pivot bolt, nut and adjusting lock bolt.
- (b) Remove the alternator.

DISASSEMBLY OF ALTERNATOR

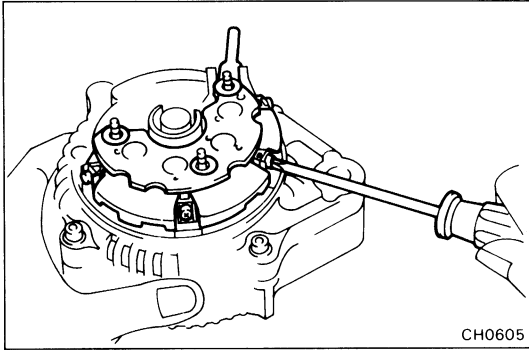
(See page CH-6)

1. REMOVE REAR END COVER

- (a) Remove the nut and terminal insulator from the positive (+) terminal.
- (b) Remove the three nuts and rear end cover.

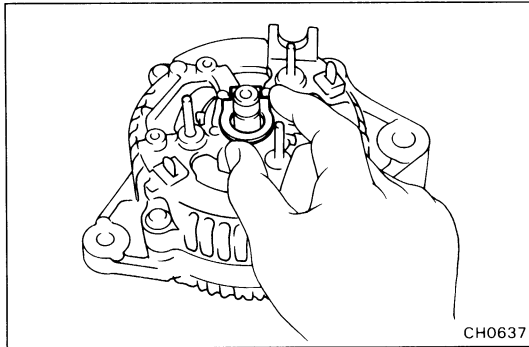
2. REMOVE BRUSH HOLDER AND IC REGULATOR

- (a) [7M-GE (A/T) and 7M-GTE]
Remove the brush holder cover from the brush holder.
- (b) Remove the five screws, brush holder and IC regulator.

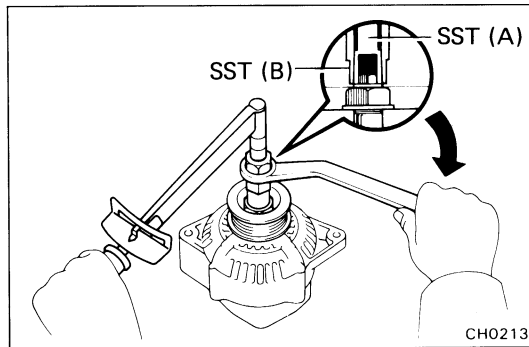


3. REMOVE RECTIFIER HOLDER

- (a) Remove the four screws and rectifier holder.
- (b) Remove the four rubber insulators.



4. [7M-GE (A/T) and 7M-GTE] REMOVE SEAL PLATE



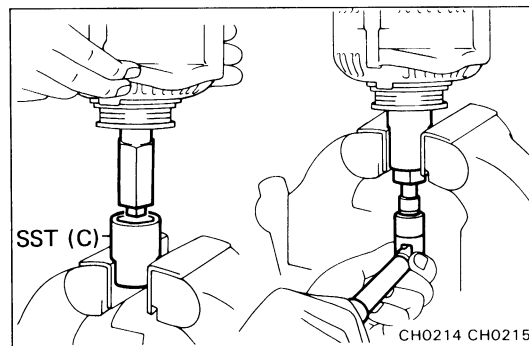
5. REMOVE PULLEY

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

SST 09820-63010

Torque: 400 kg-cm (29 ft-lb, 39 N·m)

- (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).

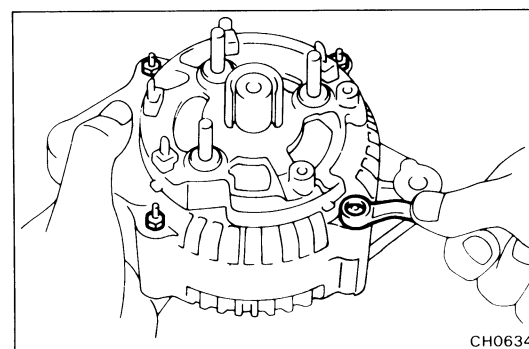
- (d) To loosen the pulley nut, turn SST (A) in the direction shown in the illustration.

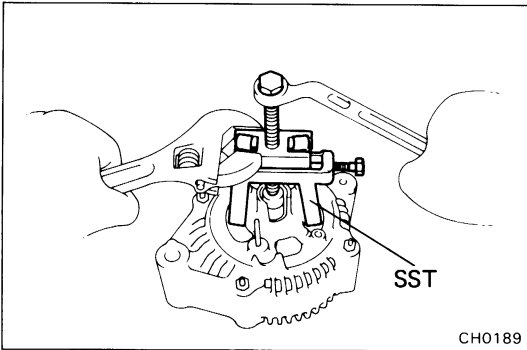
NOTICE: To prevent damage to the rotor shaft, do not loosen the pulley nut more than one-half of a turn.

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

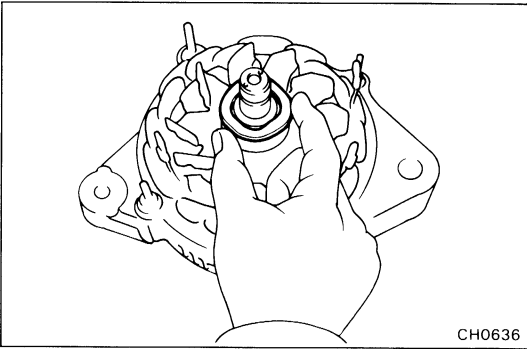
6. REMOVE RECTIFIER END FRAME

- (a) Remove the four nuts.





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



**7. [7M-GE (A/T) and 7M-GTE]
REMOVE ALTERNATOR WASHER**

8. REMOVE ROTOR FROM DRIVE END FRAME

INSPECTION AND REPAIR OF ALTERNATOR

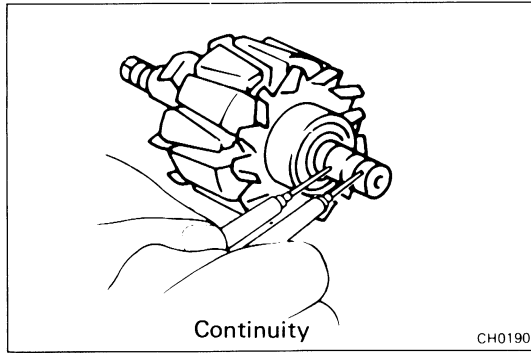
Rotor

1. INSPECT ROTOR FOR OPEN CIRCUIT

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

Standard resistance (cold): 2.8 – 3.0 Ω

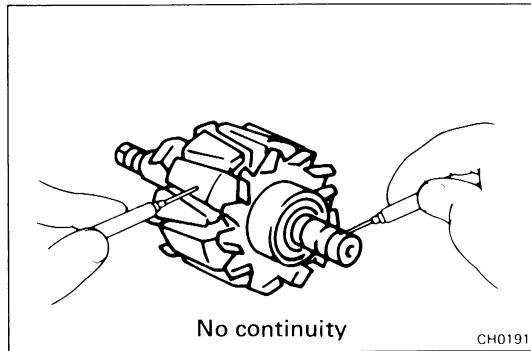
If there is no continuity, replace the rotor.



2. INSPECT ROTOR FOR GROUND

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

If there is continuity, replace the rotor.



3. INSPECT SLIP RINGS

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

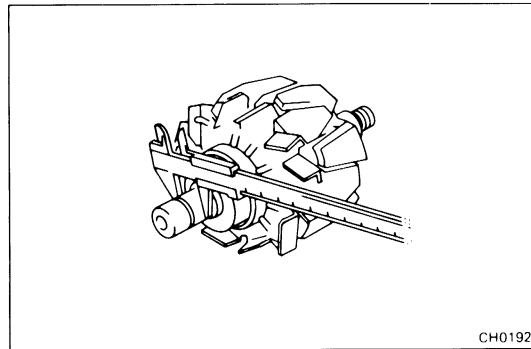
If rough or scored, replace the rotor.

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

**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.

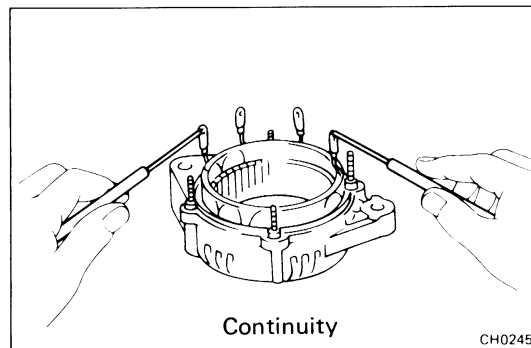


Stator

1. INSPECT STATOR FOR OPEN CIRCUIT

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

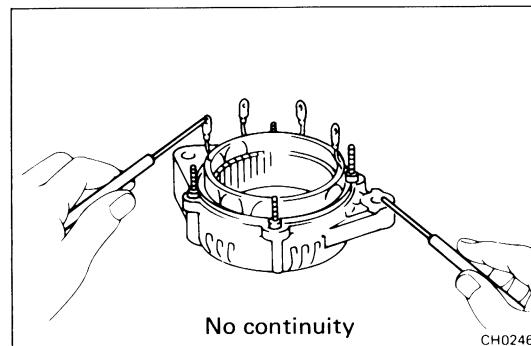
If there is no continuity, replace the drive end frame assembly.

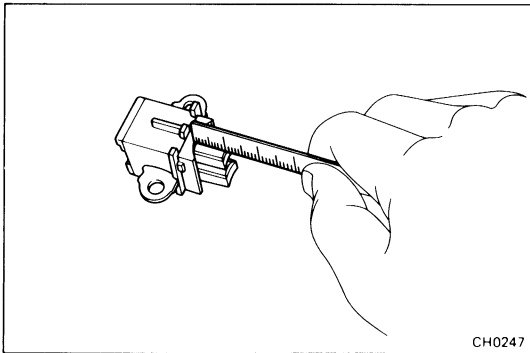


2. INSPECT STATOR FOR GROUND

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

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





CH0247

Brushes

1. INSPECT EXPOSED BRUSH LENGTH

Using a scale, measure the exposed brush length.

Standard exposed length: 10.5 mm (0.413 in.)

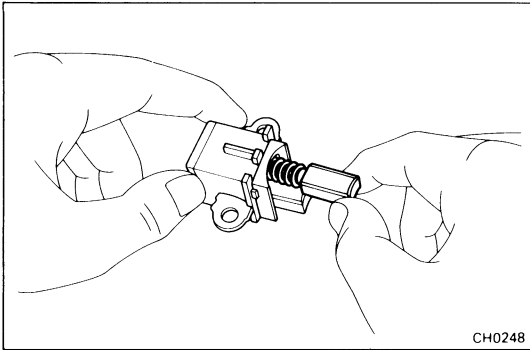
Minimum exposed length: 1.5 mm (0.059 in.)

[7M-GE (M/T)]

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

[7M-GE (A/T) and 7M-GTE]

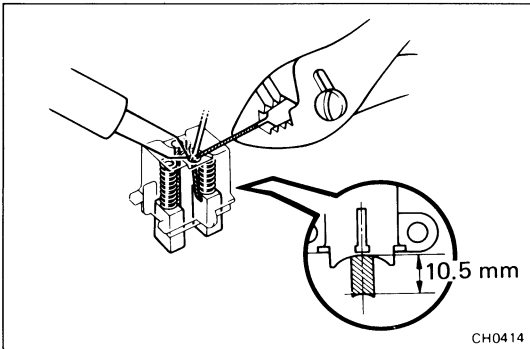
If the exposed length is less than minimum, replace the brush holder.



CH0248

2. [7M-GE (M/T)] IF NECESSARY, REPLACE BRUSHES

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

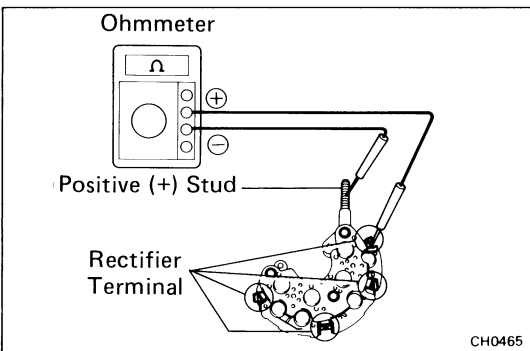


CH0414

- (c) Solder the brush wire to the brush holder at the 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 point.

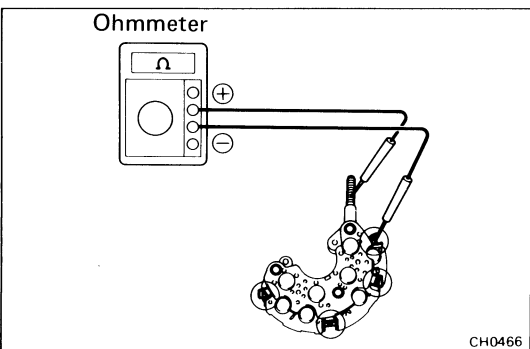


CH0465

Rectifiers (Rectifier Holder)

1. INSPECT POSITIVE SIDE RECTIFIER

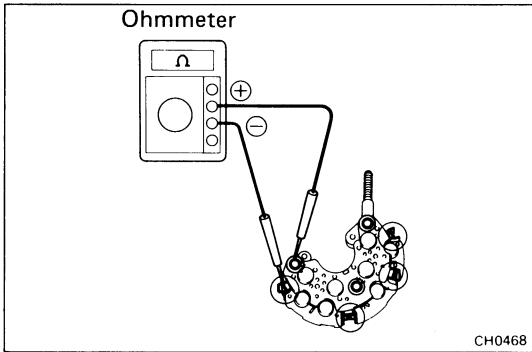
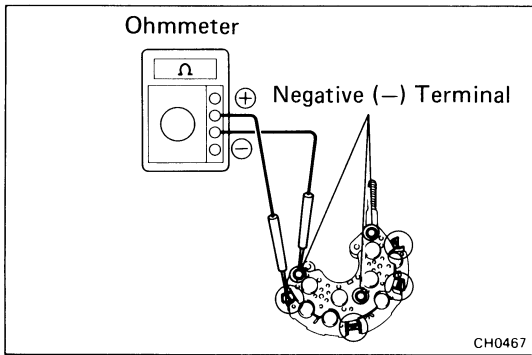
- (a) Using an ohmmeter, connect one tester probe to the positive (+) stud and the other to each rectifier terminal.



CH0466

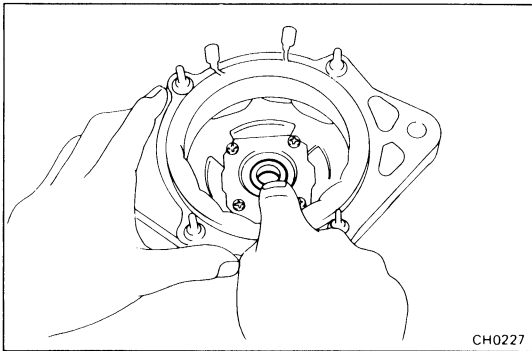
- (b) Reverse the polarity of the tester probes.
- (c) Check that one shows continuity and the other shows no continuity.

If not, replace the rectifier holder.



2. INSPECT NEGATIVE SIDE RECTIFIER

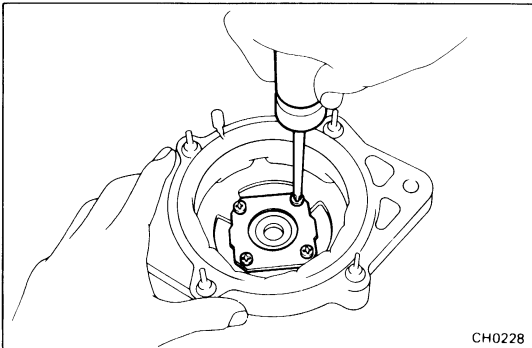
- (a) Connect one tester probe to each rectifier terminal and the other to each rectifier negative (-) terminal.
 - (b) Reverse the polarity of the tester probes.
 - (c) Check that one shows continuity and the other shows no continuity.
- If not, replace the rectifier holder.



Bearings

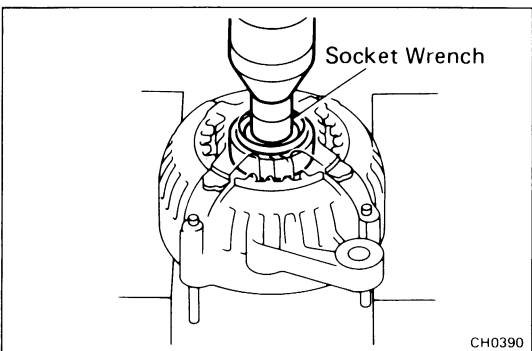
1. INSPECT FRONT BEARING

Check that the bearing is not rough or worn.

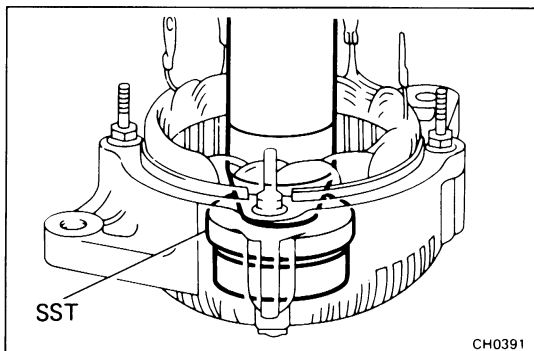


2. IF NECESSARY, REPLACE FRONT BEARING

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



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

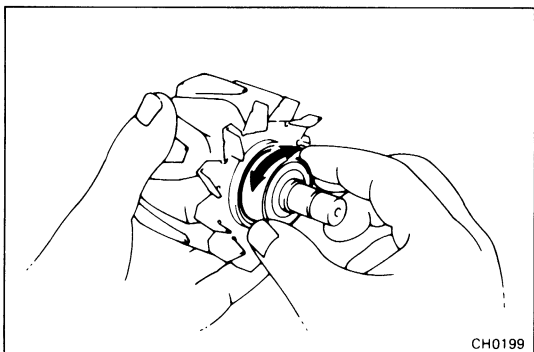


CH0391

(c) Using SST and a press, press a new front bearing into the drive end frame.

SST 09608-20012 (09608-00030)

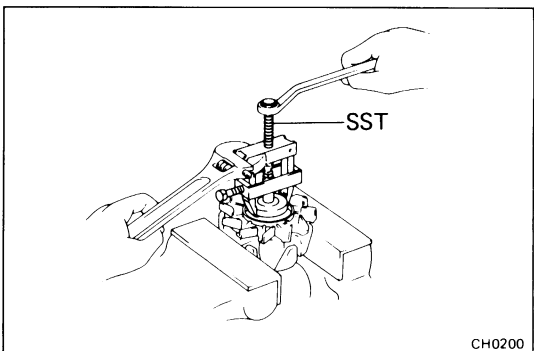
(d) Install the bearing retainer with the four screws.



CH0199

3. INSPECT REAR BEARING

Check that the bearing is not rough or worn.

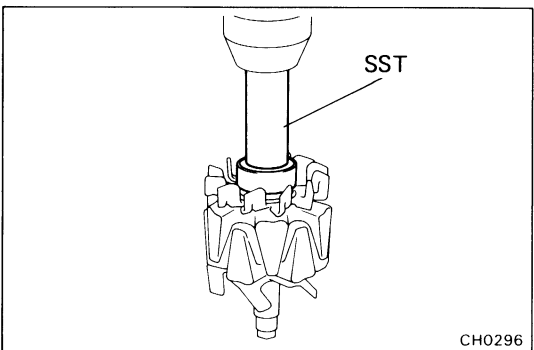


CH0200

4. IF NECESSARY, REPLACE REAR BEARING

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

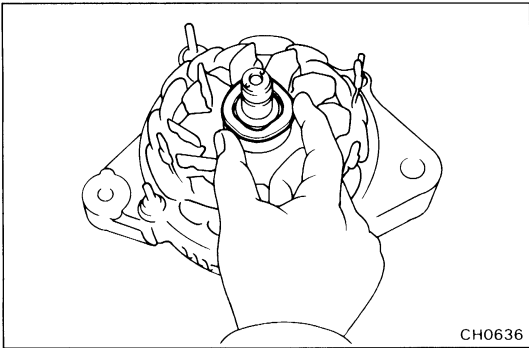
SST 09820-00021



CH0296

(b) Using SST and a press, press in a new bearing and the bearing cover.

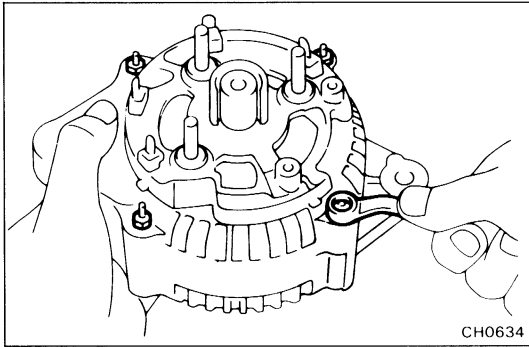
SST 09820-00030



ASSEMBLY OF ALTERNATOR

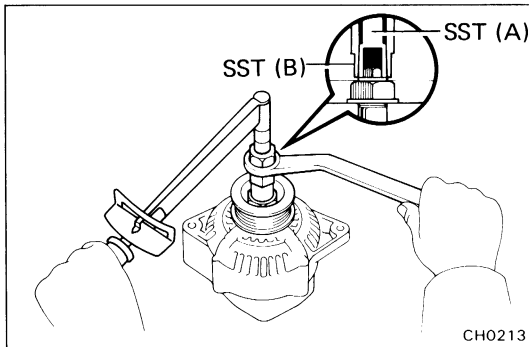
(See page CH-6)

1. INSTALL ROTOR TO DRIVE END FRAME
2. [7M-GE (A/T) and 7M-GTE]
PLACE ALTERNATOR WASHER ON REAR BEARING



3. INSTALL RECTIFIER END FRAME

- (a) Using a plastic-faced hammer, lightly tap in the end frame.
- (b) Install the four nuts.



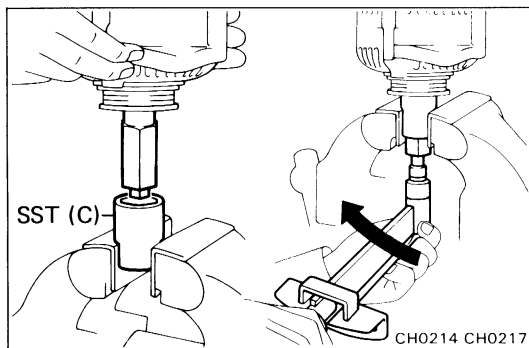
4. INSTALL PULLEY

- (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: 400 kg-cm (29 ft-lb, 39 N·m)

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

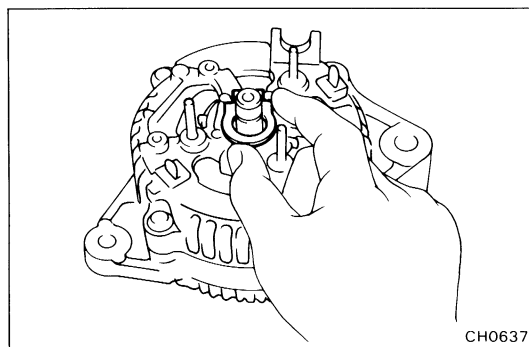


- (d) As shown in the illustration, mount SST (C) in a vise, and install the alternator to SST (C).

- (e) To torque the pulley nut, turn SST (A) in the direction shown in the illustration.

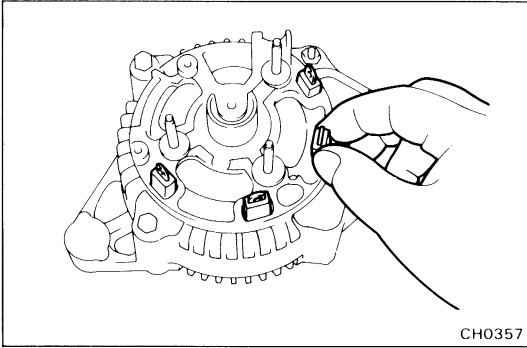
Torque: 1,125 kg-cm (81 ft-lb, 110 N·m)

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



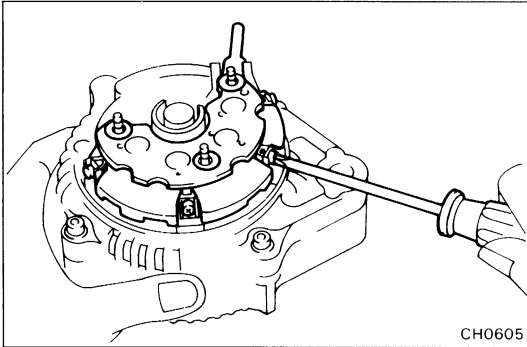
5. [7M-GE (A/T) and 7M-GTE]

PLACE SEAL PLATE ON RECTIFIER END FRAME

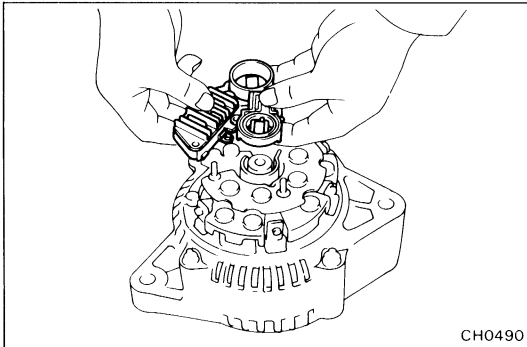


6. INSTALL RECTIFIER HOLDER

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



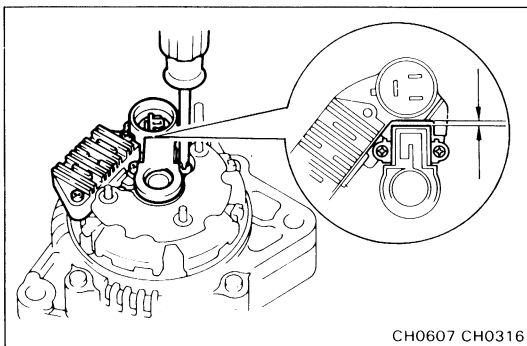
- (b) Install the rectifier holder with the four screws.



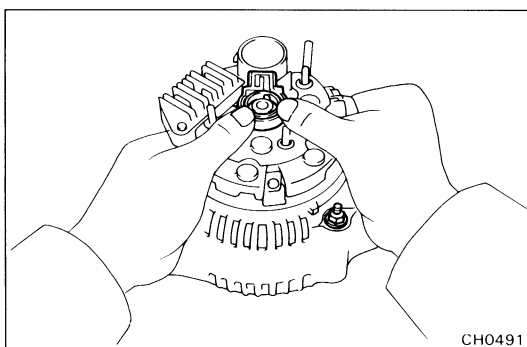
7. INSTALL IC REGULATOR AND BRUSH HOLDER [7M-GE (M/T)]

- (a) Install the brush holder cover to the brush holder.
 (b) Install the IC regulator together with the brush holder to the rectifier end frame horizontally as shown in the illustration.

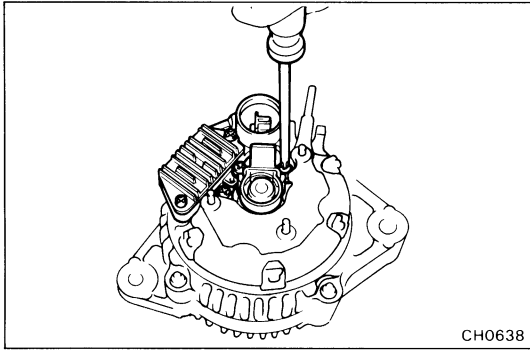
HINT: Check that the brush holder's cover doesn't slip to one side during installation.



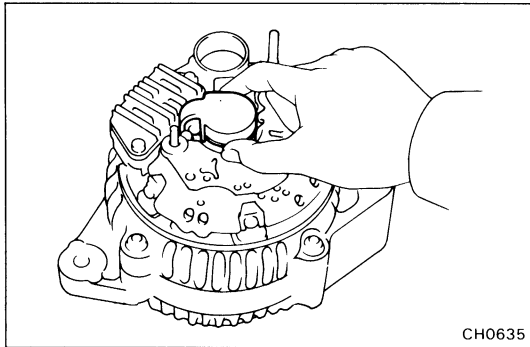
- (c) Install the five screws until there is a clearance of at least 1 mm (0.04 in.) between the brush holder cover and connector.



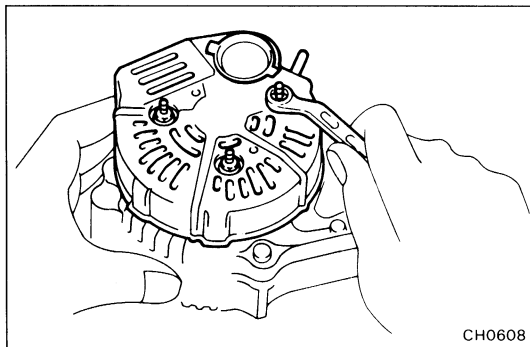
- (d) Fit the brush holder cover.

**[7M-GE (A/T) and 7M-GTE]**

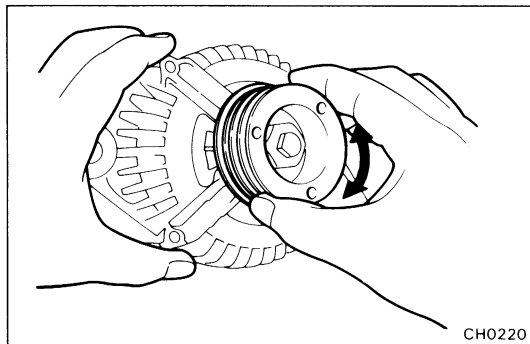
- (a) Install the IC regulator and brush holder with the five screws.

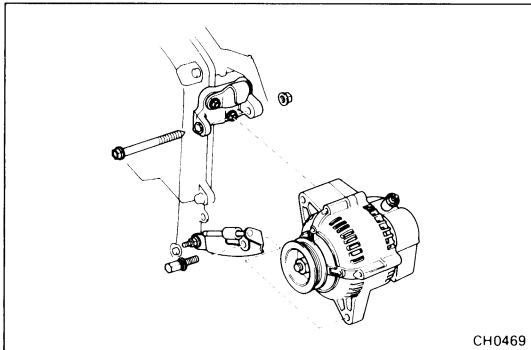


- (b) Place the brush holder cover on the brush holder.

**8. INSTALL REAR END COVER**

- (a) Install the rear end cover with the three nuts.
(b) Install the terminal insulator with the nut.

**9. CHECK THAT ROTOR ROTATES SMOOTHLY**



INSTALLATION OF ALTERNATOR

1. INSTALL ALTERNATOR

Mount the alternator on the engine bracket with the pivot bolt, nut and adjusting lock bolt. Do not tighten the bolts.

2. INSTALL DRIVE BELT

(a) Install the drive belt.

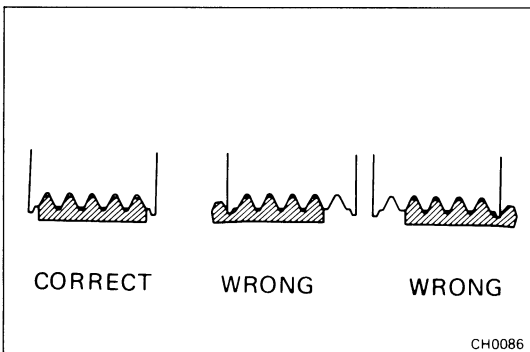
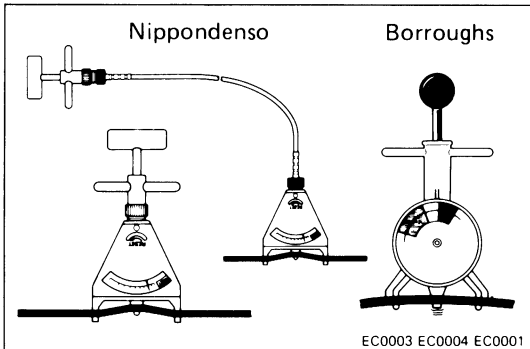
(b) Using a belt tension gauge, check the drive belt tension.

Belt tension gauge:

Nippondenso BTG-20 (95506-00020) or
Borroughs No. BT-33-73F

Drive belt tension:

New belt 175 ± 5 lb
Used belt 115 ± 20 lb



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 the drive 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 crack pulley.
- After installing a new belt, run the engine for about 5 minutes and then recheck the tension.

(c) Tighten the pivot and adjusting lock bolts.

3. CONNECT WIRING TO ALTERNATOR

(a) Connect the wire to the alternator with the nut.

(b) Connect the connector to the alternator.

4. CONNECT NEGATIVE CABLE TO BATTERY

5. PERFORM ON-VEHICLE INSPECTION

(See pages CH-2 to 5)

