

CHARGING SYSTEM

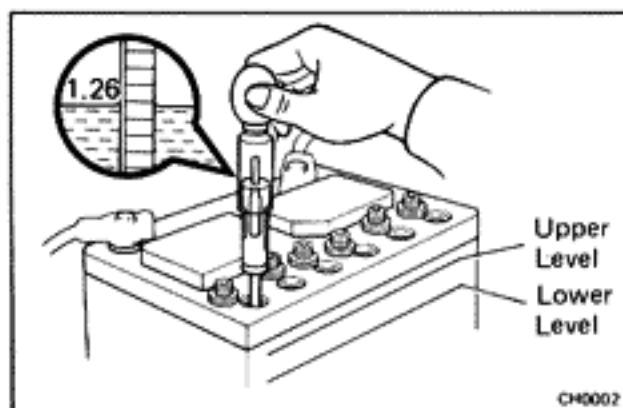
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PRECAUTIONS

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 when 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 "CHARGE" and "IGN" fuses 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. CHECK 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

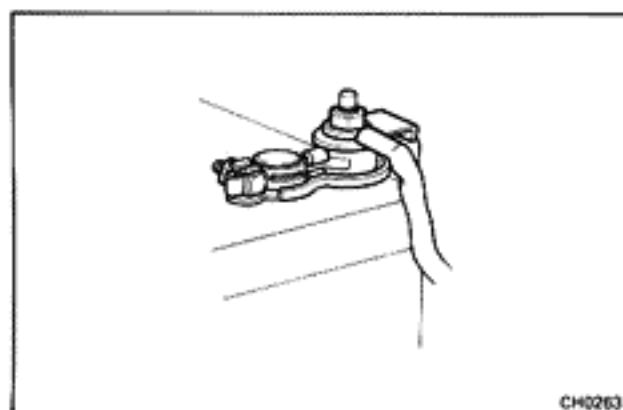
- (b) Check the electrolyte quantity of each cell.

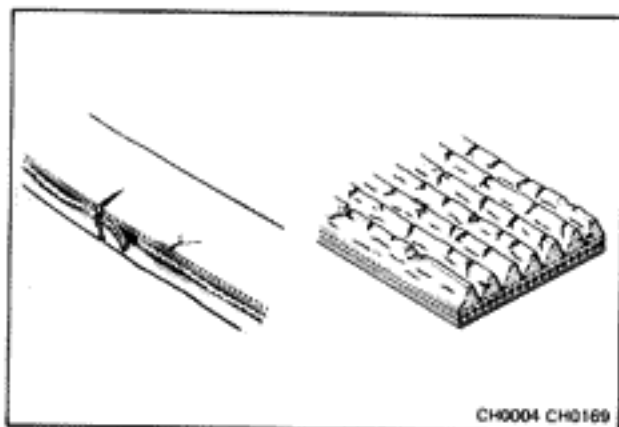
If insufficient, refill with distilled water (or purified water).

2. CHECK BATTERY TERMINALS AND FUSIBLE LINK

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

- (b) Check the fusible link for continuity.

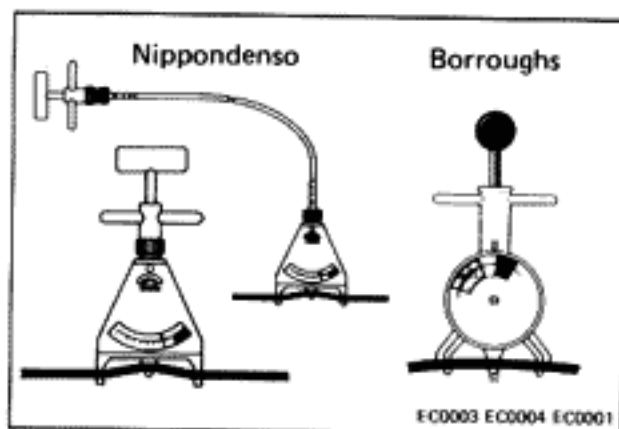




3. INSPECT DRIVE BELT

- (a) Visually check the belt for separation of the adhesive rubber above and below the core, core separating from the belt side, severed core, separation of the rib from the adhesive rubber, cracking or separation of the ribs, torn or worn ribs or cracks in the inner ridges of the ribs.

If necessary, replace 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:

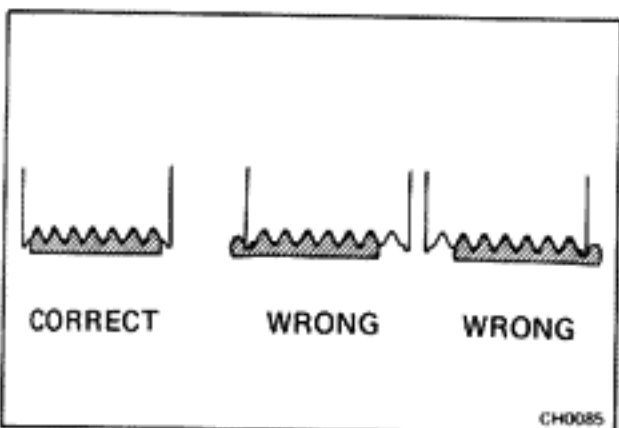
New belt 170 ± 10 lb

Used belt 135 ± 20 lb

If necessary, adjust the drive belt tension.

NOTE:

- "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 by hand to confirm that the belt has not slipped out of the groove on the bottom of the crank pulley.
- After installing the belt, run the engine for about 5 minutes and then recheck the tension.



4. CHECK FUSES FOR CONTINUITY

ENGINE fuse (15A)

CHARGE fuse (7.5A)

IGN fuse (7.5A)

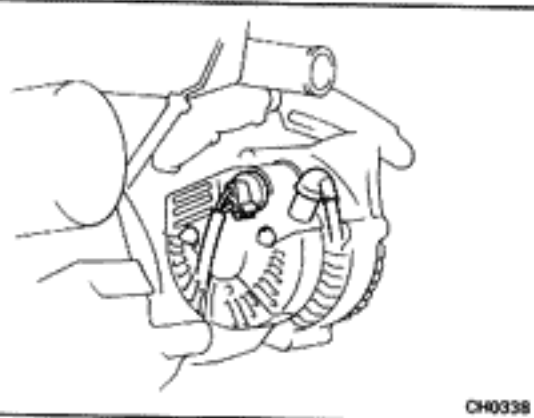
5. VISUALLY CHECK ALTERNATOR WIRING AND LISTEN FOR ABNORMAL NOISES

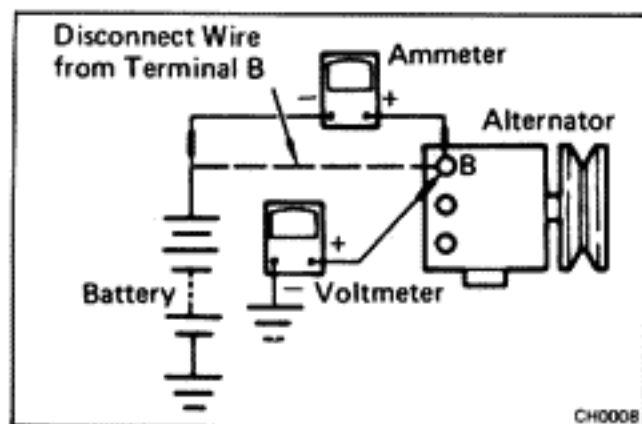
- (a) Check that the wiring is in good condition.
- (b) Check that there is no abnormal noise from the alternator while the engine is running.

6. CHECK DISCHARGE WARNING LIGHT CIRCUIT

- (a) Warm up the engine and then turn it off.
- (b) Turn off all accessories.
- (c) Turn the ignition switch to ON. Check that the discharge warning light is lit.
- (d) Start the engine. Check that the light goes out.

If the light does not come on and go off as specified, troubleshoot the warning light circuit.



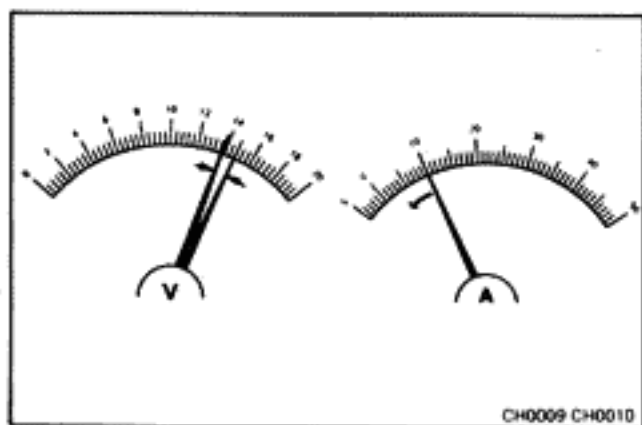


7. CHECK CHARGING CIRCUIT WITHOUT LOAD

NOTE: If a battery/alternator tester is available, connect the tester to the charging circuit according to the 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 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.
- Connect the negative lead of the voltmeter to ground.

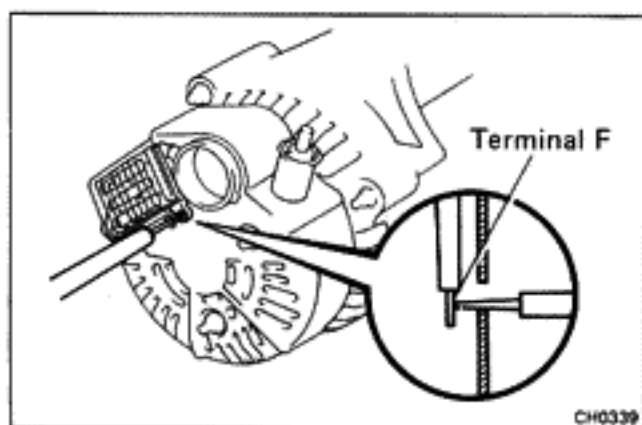


(b) Check the charging circuit as follows:

With the engine running from idling to 2,000 rpm, check the reading on the ammeter and voltmeter.

Standard amperage: Less than 10A
Standard voltage: 13.5 – 15.1V
 (Regulator case 25° C or 77° 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 greater than standard voltage, replace the IC regulator.
- If the voltage reading is less than standard voltage, check the alternator.



8. CHECK CHARGING CIRCUIT WITH LOAD

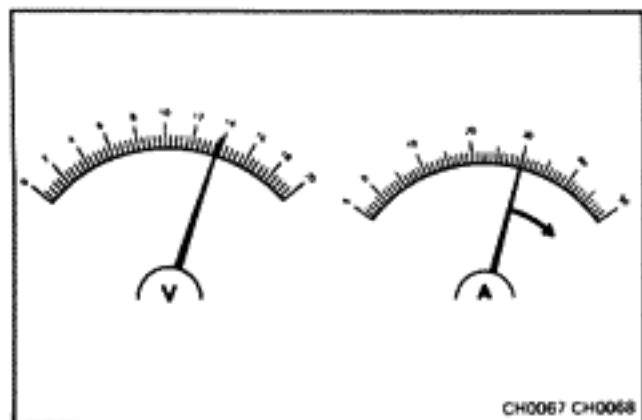
(a) With the engine running at 2,000 rpm, turn on the high beam headlights and place the heater fan control switch at HI.

(b) Check the reading on the ammeter.

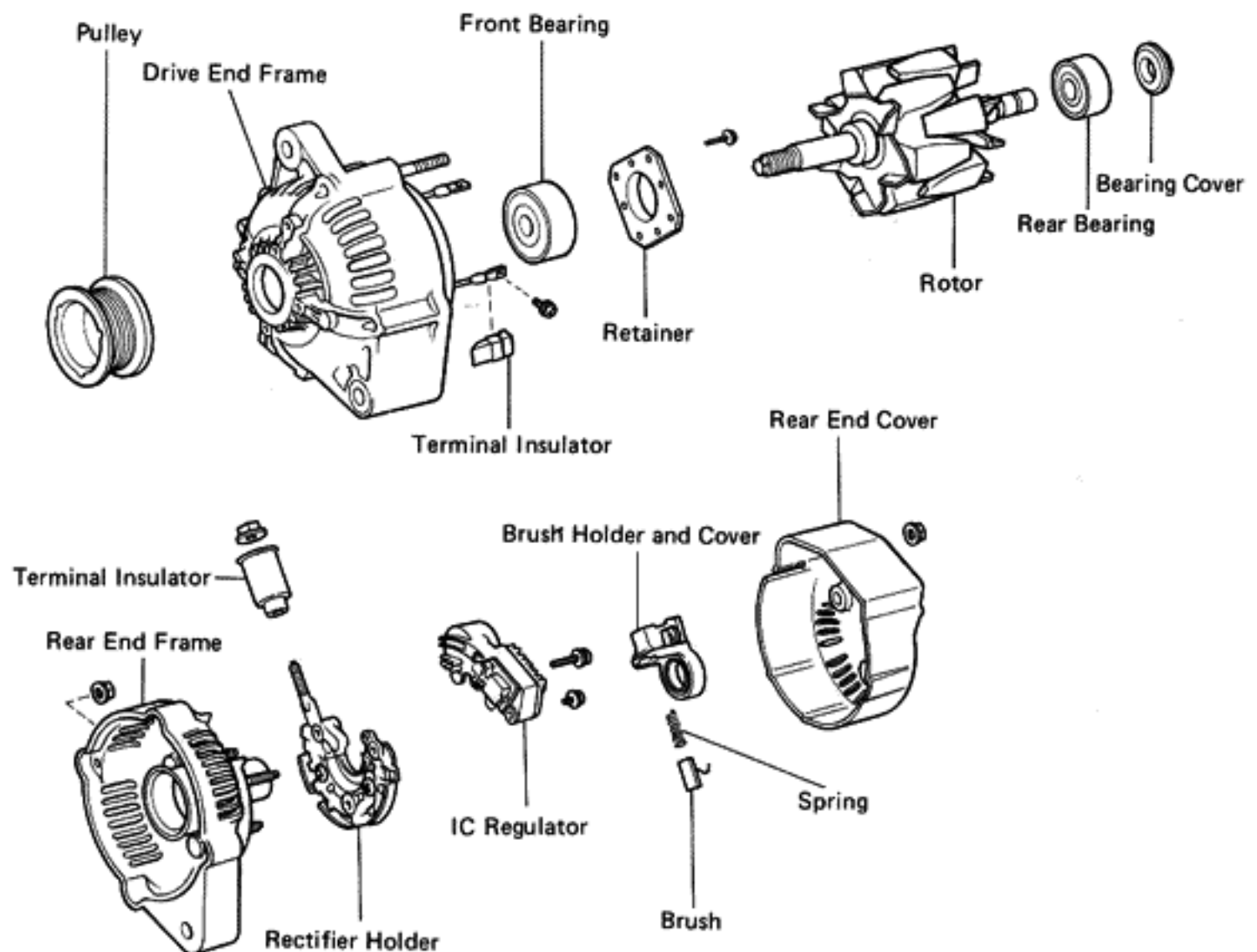
Standard amperage: More than 30A

If the ammeter reading is less than 30A, repair the alternator. (See page CH-5)

NOTE: With the battery fully charged, sometimes the indication will be less than 30A.



ALTERNATOR COMPONENTS

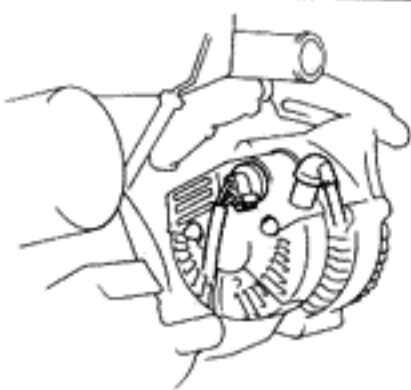


CH0342

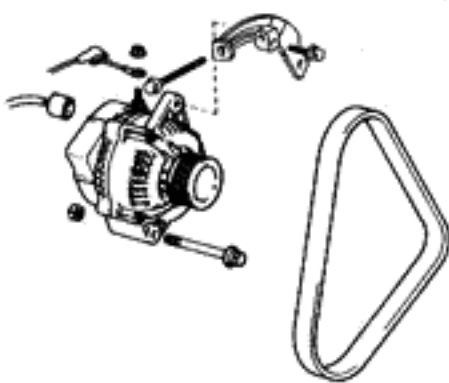
REMOVAL OF ALTERNATOR

1. **DISCONNECT CABLE FROM NEGATIVE TERMINAL OF BATTERY**
2. **DISCONNECT WIRING FROM ALTERNATOR**
 - (a) Disconnect the connector from the alternator.
 - (b) Remove the nut and wire from the alternator.
3. **REMOVE ALTERNATOR DRIVE BELT**

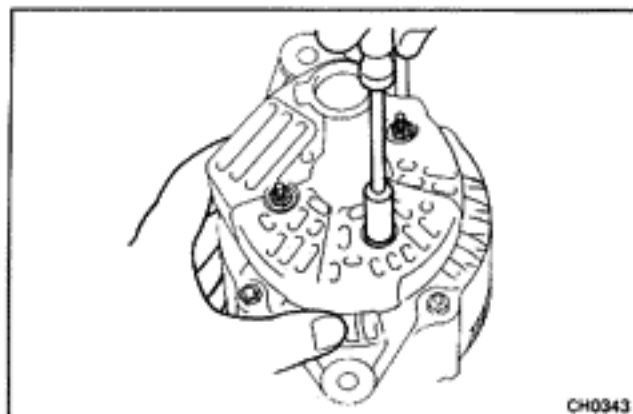
Loosen the alternator pivot, adjusting lock and adjusting bolts and remove the alternator drive belt.
4. **REMOVE ALTERNATOR**
 - (a) Remove the pivot and adjusting lock bolts.
 - (b) Remove the alternator.



CH0338



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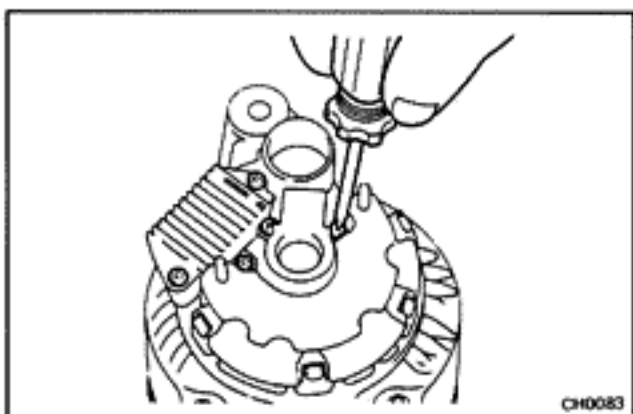


DISASSEMBLY OF ALTERNATOR

(See page CH-5)

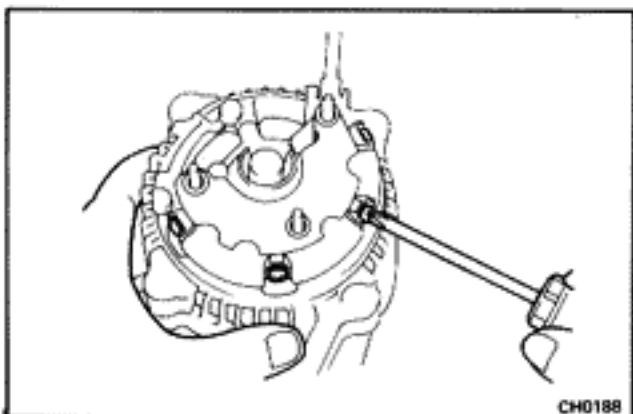
1. REMOVE REAR END COVER

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



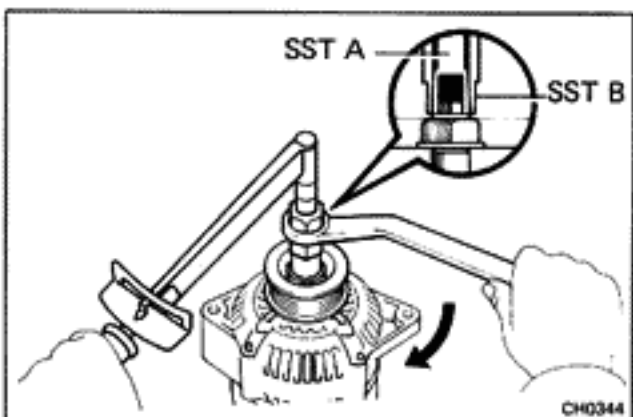
2. REMOVE BRUSH HOLDER AND IC REGULATOR

Remove the five screws, brush holder, brush holder cover and IC regulator.



3. REMOVE RECTIFIER HOLDER

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



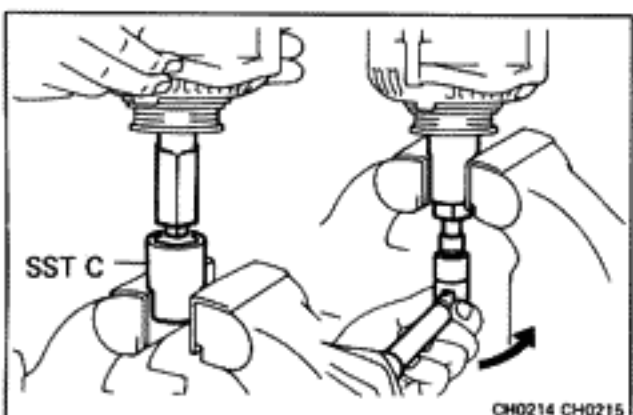
4. REMOVE PULLEY

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

SST 09820-63010

Torque: 400 kg-cm (29 ft-lb, 39 N·m)

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

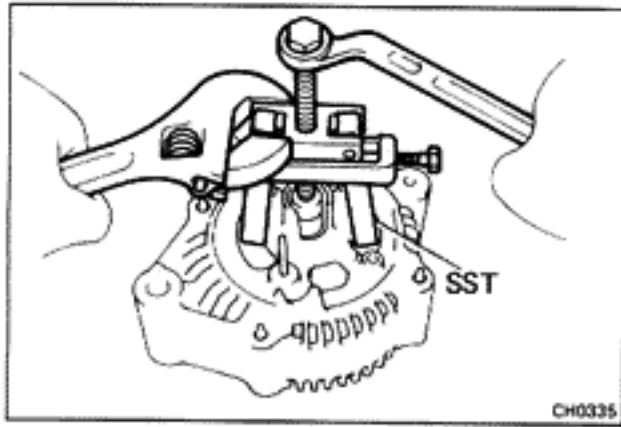


- (c) As shown in the figure, mount SST C in a vise and then install the alternator to SST C.

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

CAUTION: 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 SSTs A and B.
- (g) Remove the pulley nut and pulley.

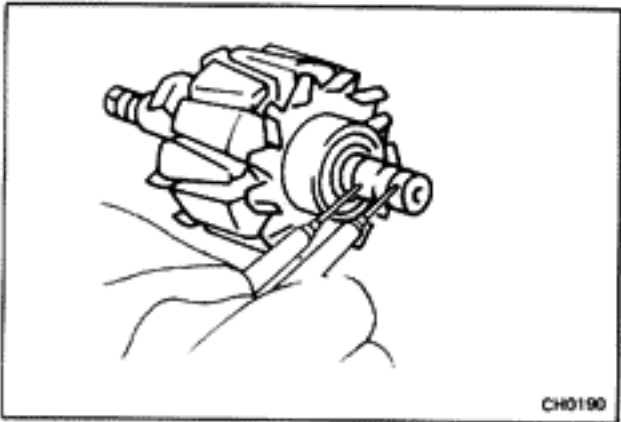


5. REMOVE REAR END FRAME

- (a) Remove the four nuts.
- (b) Using SST, remove the rear end frame and four terminal insulators.

SST 09286-46011

6. REMOVE ROTOR FROM DRIVE END FRAME



INSPECTION OF ALTERNATOR

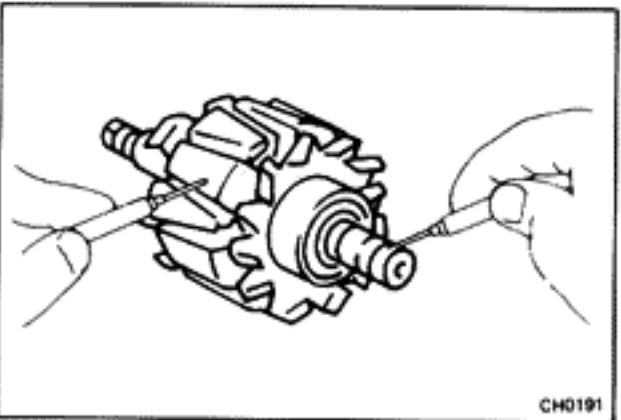
Rotor

1. CHECK ROTOR FOR OPEN CIRCUIT

Using an ohmmeter, check for continuity between the slip rings.

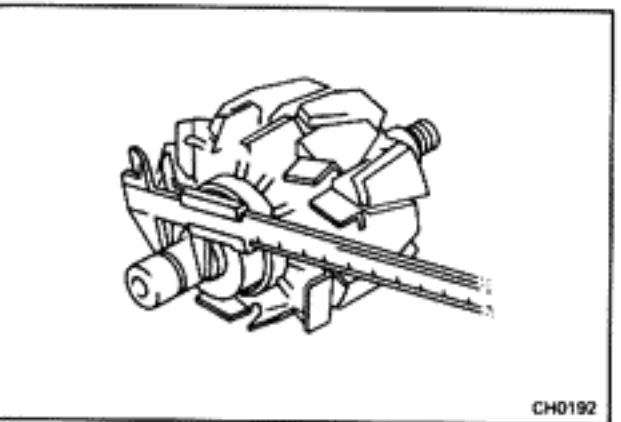
Standard resistance: Less than 3 Ω

If there is no continuity, replace the rotor.



2. CHECK 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

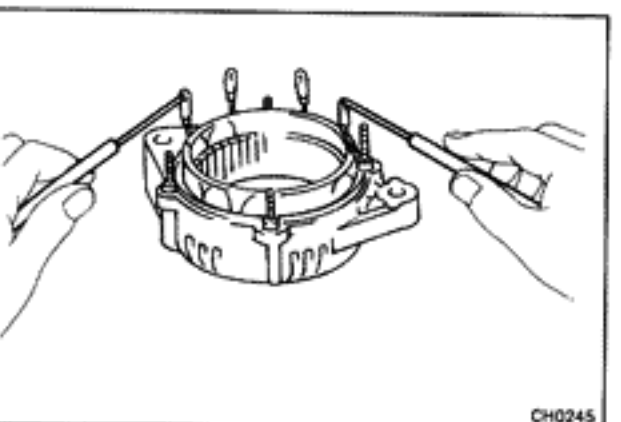
- (a) Check that the slip rings are not rough or scored. If rough or scored, replace the rotor.

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

Standard diameter: 14.4 mm (0.567 in.)

Minimum diameter: 14.0 mm (0.551 in.)

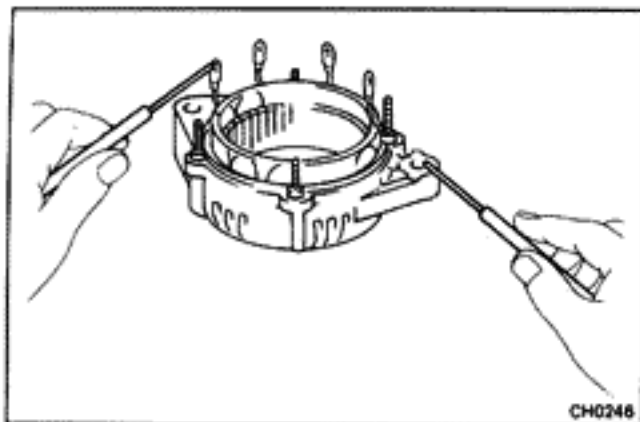
If the diameter of the slip ring is less than the minimum, replace the rotor.



Stator

1. INSPECT STATOR FOR OPEN CIRCUIT

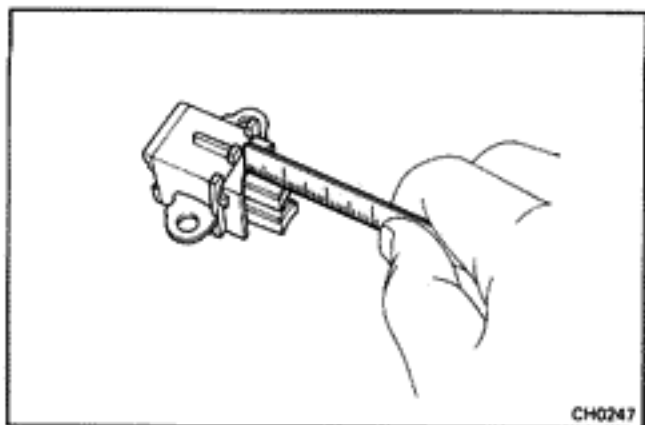
Using an ohmmeter, check all leads for continuity. If there is no continuity, replace the drive end frame assembly.



CH0246

2. INSPECT THAT STATOR IS NOT GROUNDED

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

Brush and Brush Holder

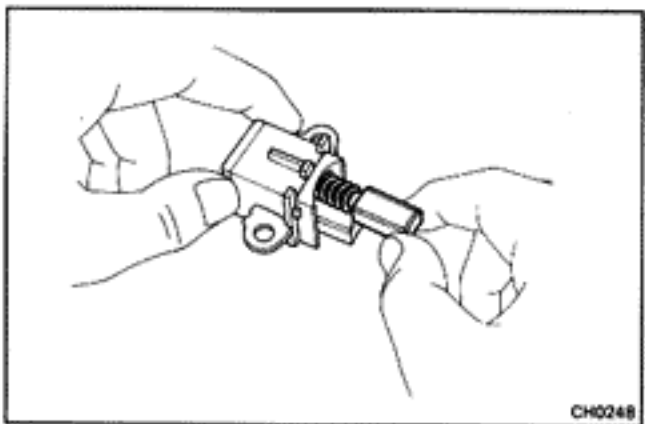
1. MEASURE EXPOSED BRUSH LENGTH

Using a scale, measure the exposed brush length.

Standard exposed length: 10.5 mm (0.413 in.)

Minimum exposed length: 4.5 mm (0.177 in.)

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

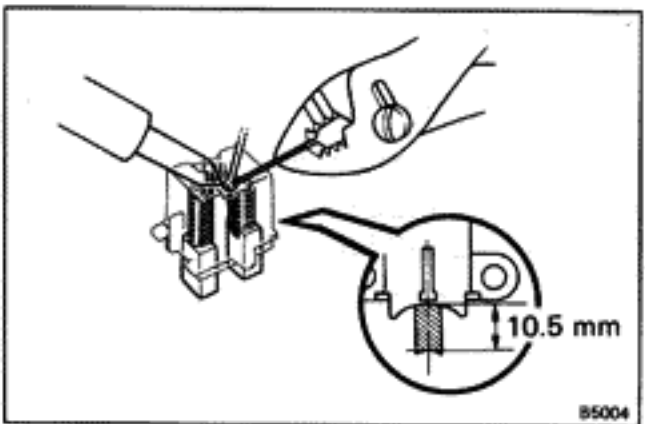


CH0248

2. IF NECESSARY REPLACE BRUSHES

(a) Unsolder and remove the brush and the spring.

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



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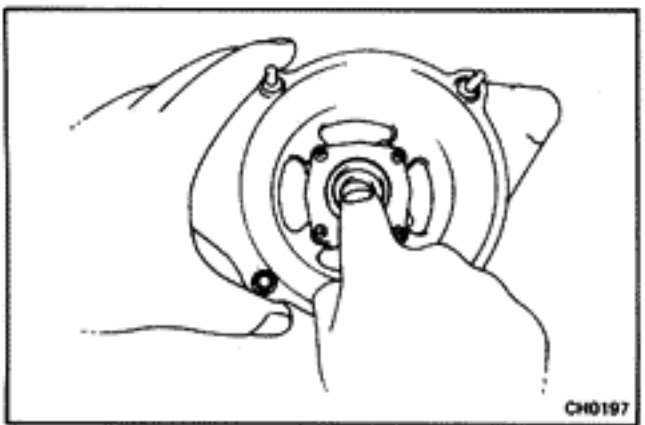
(c) Solder the brush wire to the brush holder at the exposed length.

Standard 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.

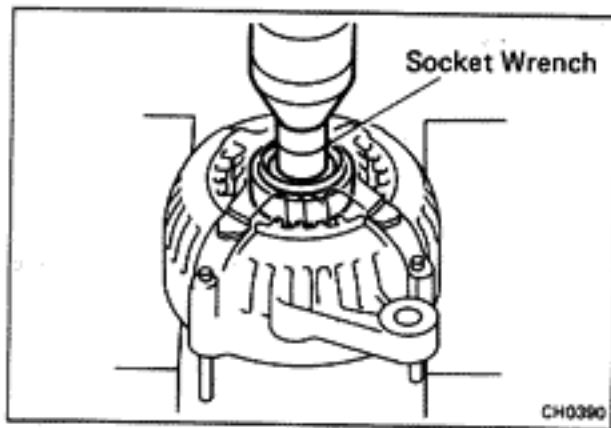


CH0197

Bearings

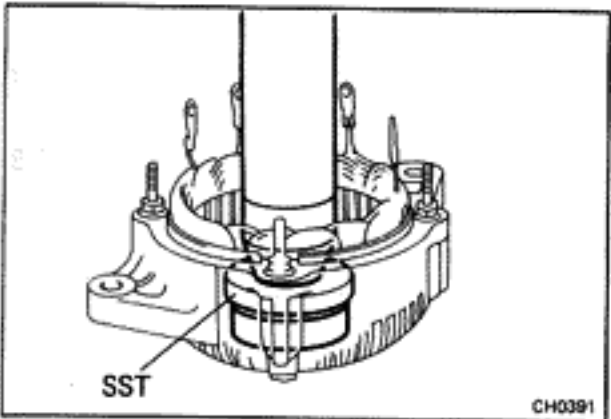
1. INSPECT FRONT BEARING

Check that the front bearing is not rough or worn. Replace if necessary.



2. IF NECESSARY, REPLACE FRONT BEARING

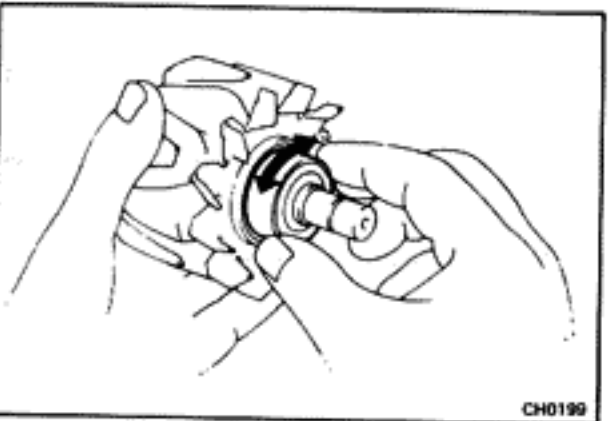
- (a) Remove the four screws and bearing retainer.
- (b) Using a press and socket wrench, press out the front bearing.



- (c) Using SST, install the front bearing into the drive end frame.

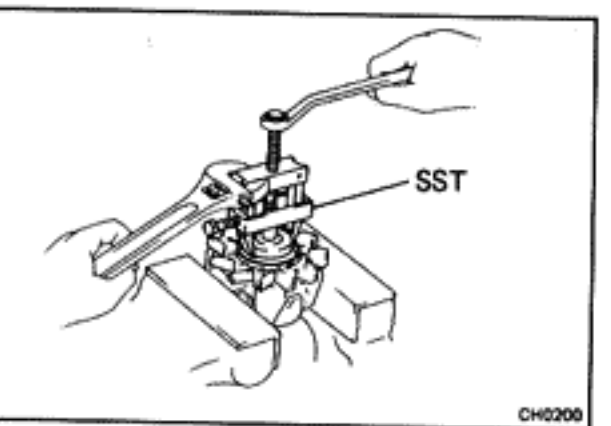
SST 09608-20012 (09608-00030)

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



3. INSPECT REAR BEARING

Check that the rear bearing is not rough or worn. Replace if necessary.

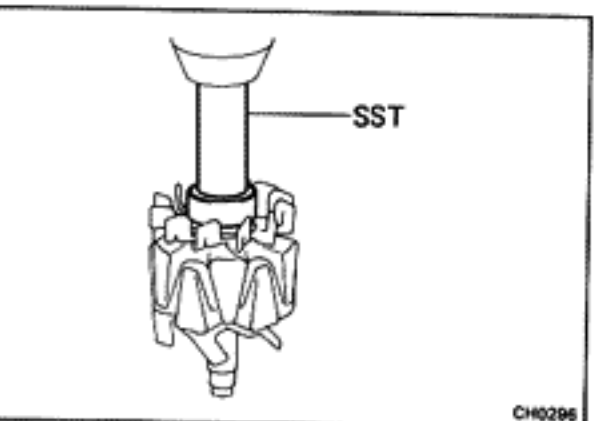


4. IF NECESSARY, REPLACE REAR BEARING

- (a) Using SST, remove the rear bearing with the bearing cover from the rotor shaft.

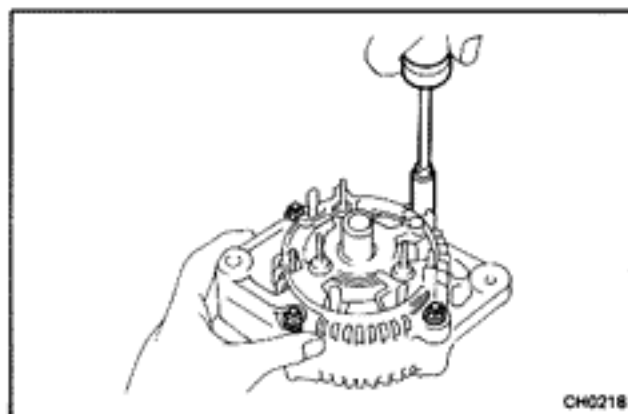
SST 09820-00021

CAUTION: Be careful not to damage the fan.



- (b) Using SST and a press, press in the rear bearing and bearing cover onto the rotor shaft.

SST 09820-00030



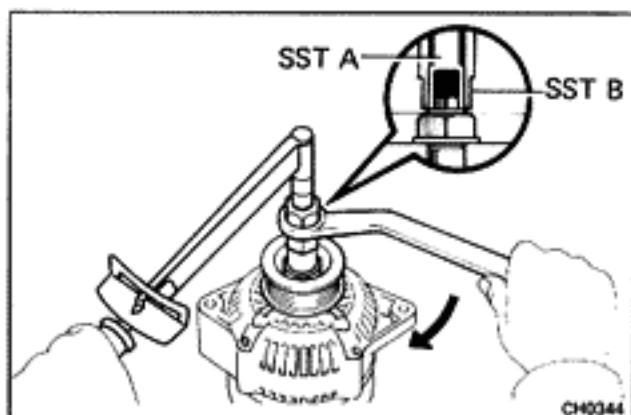
ASSEMBLY OF ALTERNATOR

(See page CH-5)

1. INSTALL ROTOR TO DRIVE END FRAME

2. INSTALL REAR END FRAME

- (a) Using a plastic hammer, lightly tap the rear end frame onto the drive end frame.
- (b) Install the four nuts.

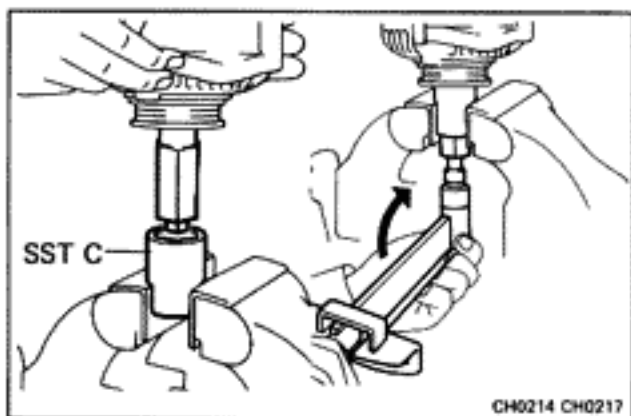


3. INSTALL PULLEY

- (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: 400 kg-cm (29 ft-lb, 39 N-m)



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

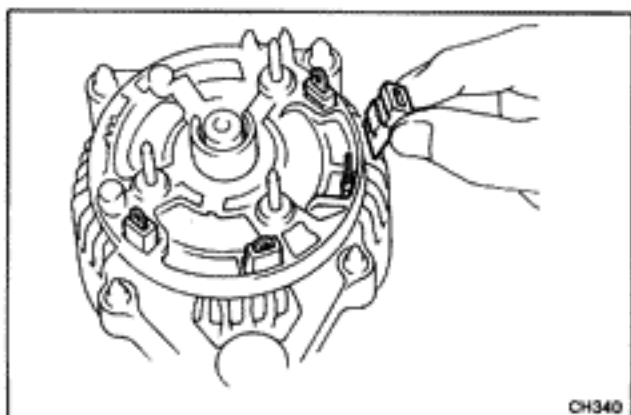
- (d) As shown in the figure, mount SST C in a vise and then install the alternator to SST C.

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

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

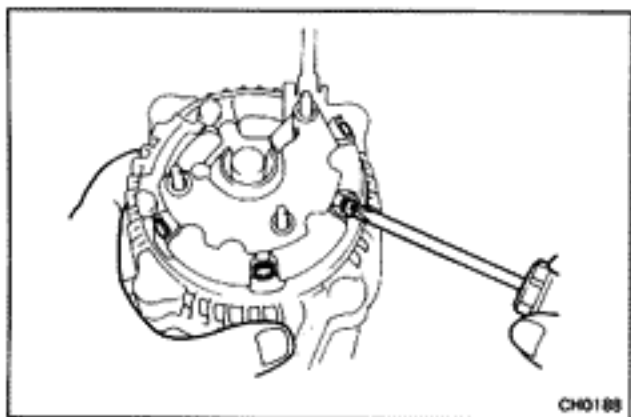
- (f) Remove the alternator from SST C.

- (g) Turn SST B and remove SSTs A and B.

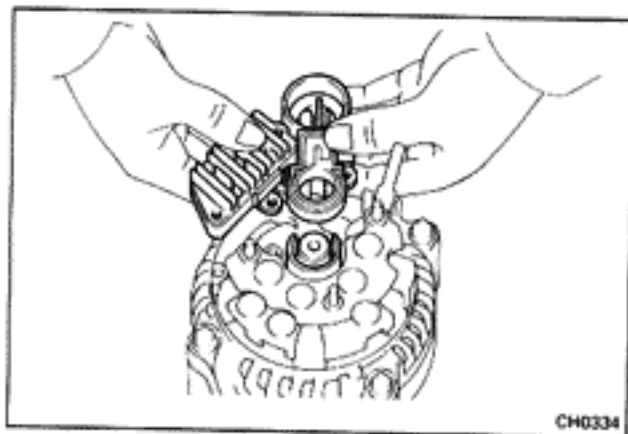


4. INSTALL RECTIFIER HOLDER

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



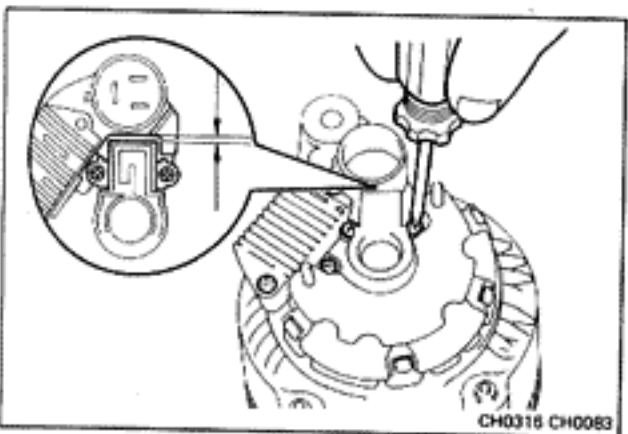
- (b) Install the rectifier with four screws.



5. INSTALL BRUSH HOLDER AND IC REGULATOR

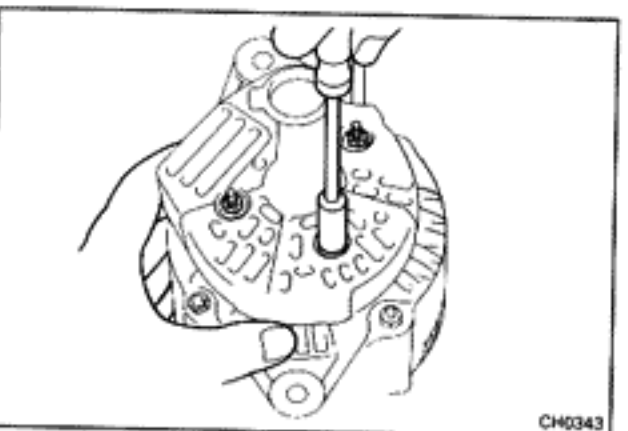
- Place the brush holder cover to the brush holder.
- Install the IC regulator and brush holder to the rear end frame horizontally as shown in the figure.

NOTE: Make sure the brush holder's cover doesn't slip to one side during installation.



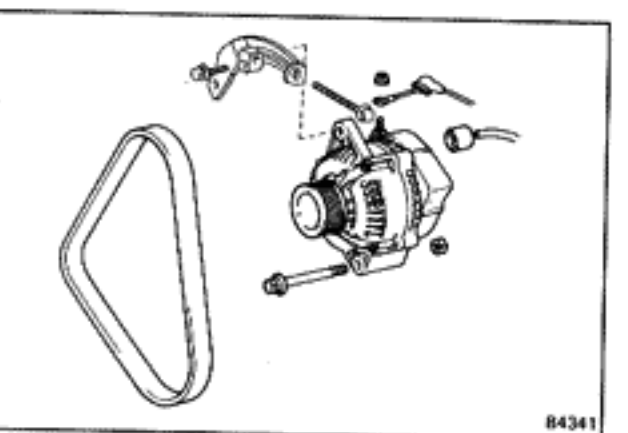
- Install and tighten the three screws.

NOTE: Make sure the gap between the brush holder and connector is at least 1 mm (0.04 in.).



6. INSTALL REAR END COVER

- Install the end cover with the three nuts.
- Install the terminal insulator with the nut.



INSTALLATION OF ATERNATOR

1. INSTALL ALTERNATOR

Mount the alternator on the engine bracket with the pivot and adjusting lock bolts.

Do not tighten the bolts.

2. INSTALL DRIVE BELT

- Install the drive belt.
- Using a belt tension gauge, check the drive belt tension. (See page CH-3)

3. CONNECT WIRING TO ALTERNATOR

- Connect the wire to the alternator and install the nut.
- Connect the connector to the alternator.

4. CONNECT NEGATIVE CABLE TO BATTERY

5. PERFORM ON-VEHICLE INSPECTION (See pages CH-2 to 4)

