

CHARGING SYSTEM

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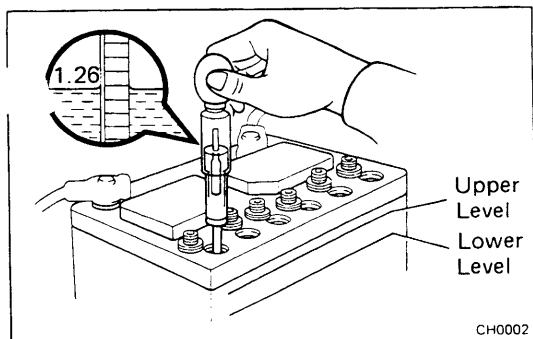
CH

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, FUSIBLE LINK AND FUSES

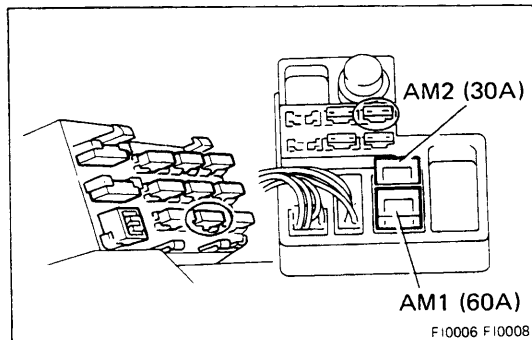
- (a) Check that the battery terminals are not loose or corroded.

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

FUSIBLE LINK AM1, AM2

Fuse ENGINE (15A)

Fuse CHARGE (7,5A)



4. INSPECT DRIVE BELT

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

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 125 ± 25 lb

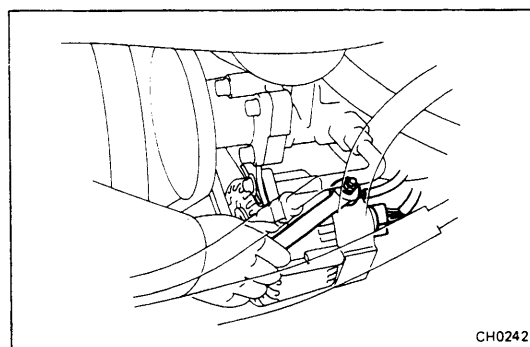
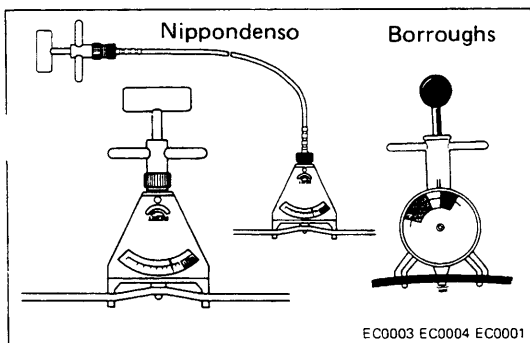
Used belt 80 ± 20 lb

If necessary, adjust the drive belt tension.

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

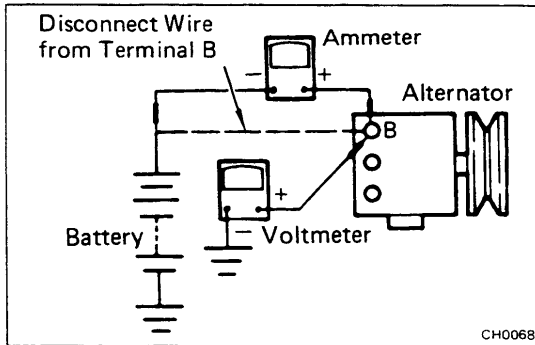
- (a) Warm up the engine and then turn it off.

- (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:

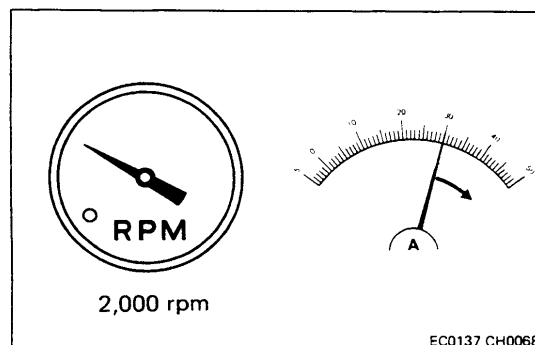
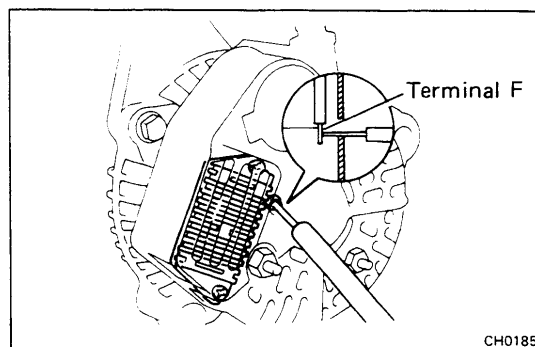
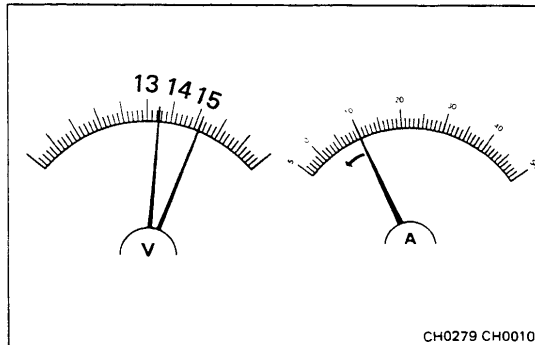
With the engine running from idling to 2,000 rpm, check the reading on the ammeter and voltmeter.

Standard amperage: Less than 10 A

Standard voltage: 13.5 — 15.1 V

(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 30 A

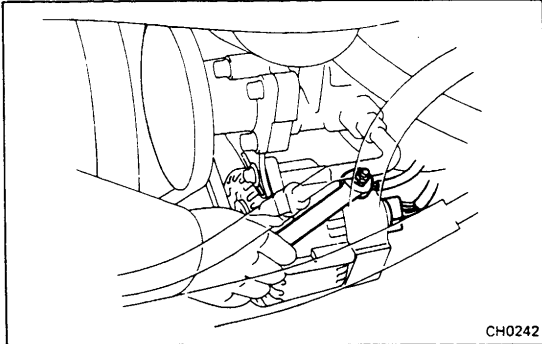
If the ammeter reading is less than 30 A, repair the alternator. (See page CH-5)

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

ALTERNATOR

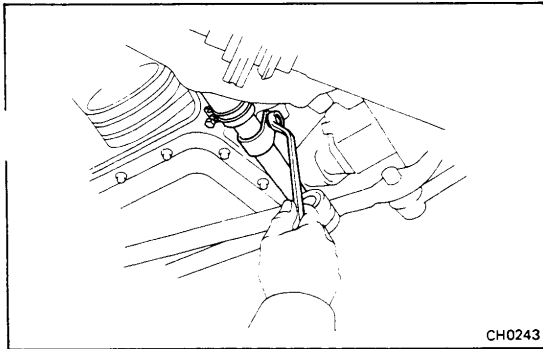
REMOVAL OF ALTERNATOR

1. DISCONNECT CABLE FROM NEGATIVE TERMINAL OF BATTERY
2. DRAIN COOLANT



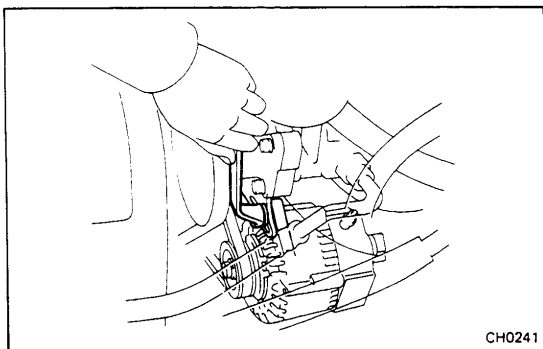
3. DISCONNECT WIRING FROM ALTERNATOR

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



4. DISCONNECT WATER INLET HOSE

- (a) Remove the engine under cover.
- (b) Remove the two water inlet pipe bolts.
- (c) Disconnect the water inlet hose from the engine.



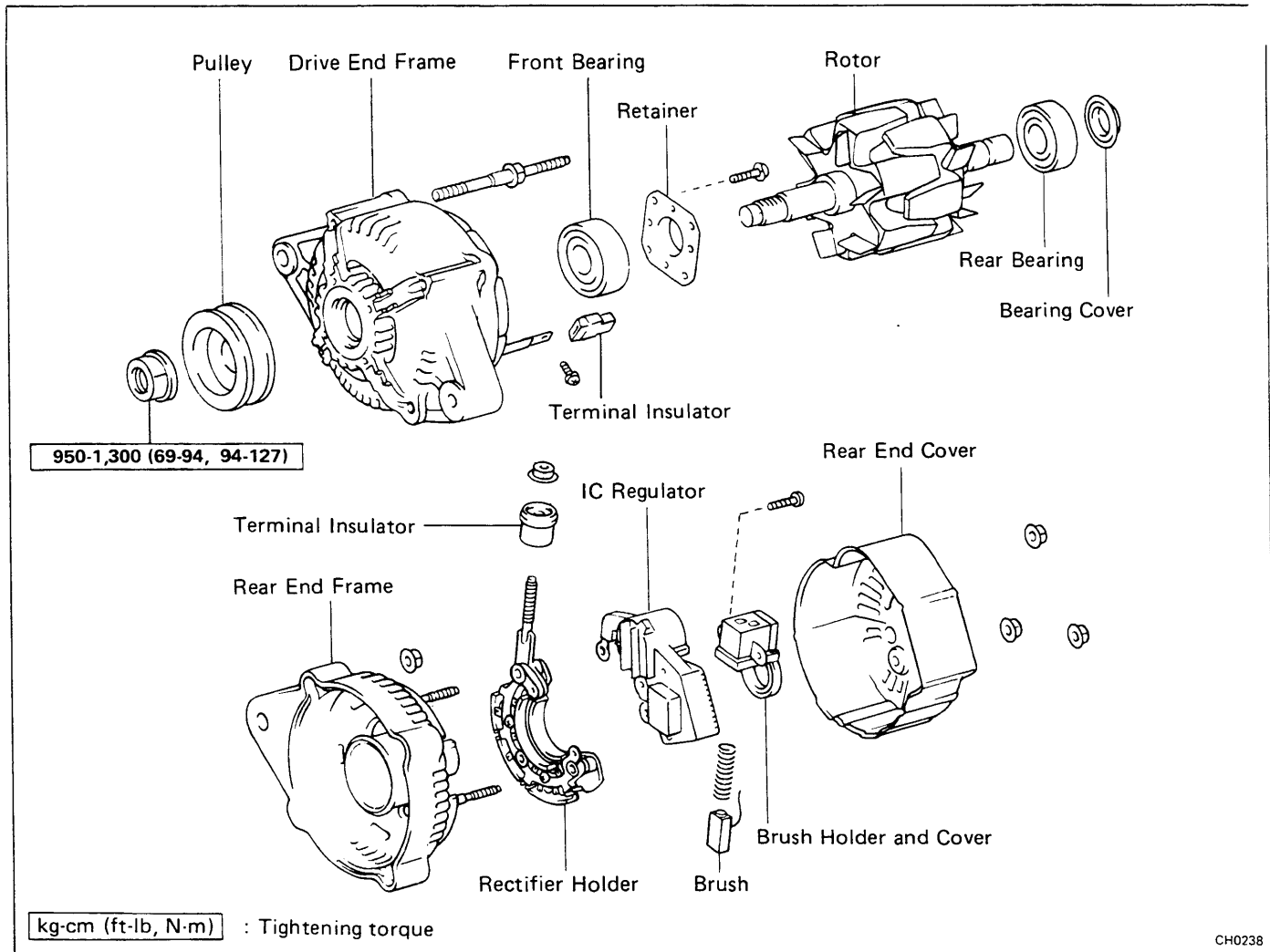
5. REMOVE FAN BELT

- (a) Loosen the alternator pivot and remove the adjust bolt.
- (b) Remove the fan belt.

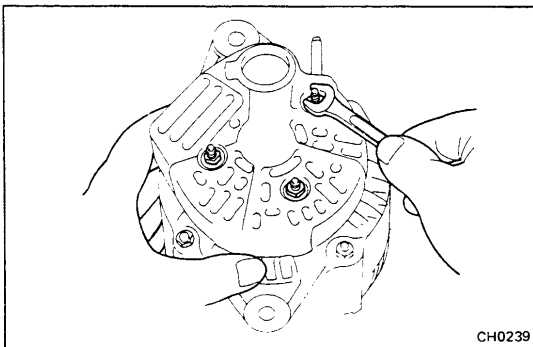
6. REMOVE ALTERNATOR

- (a) Hold the alternator and remove the pivot.
- (b) Remove the alternator.

COMPONENTS



CH0238

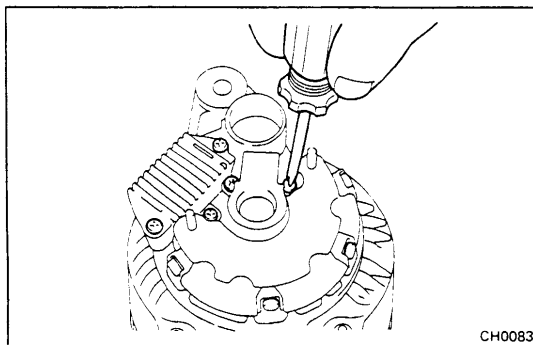


CH0239

DISASSEMBLY OF ALTERNATOR

1. REMOVE REAR END COVER

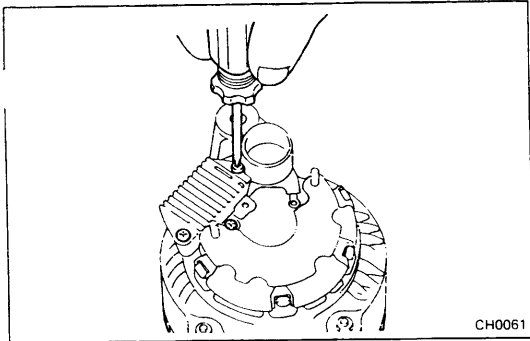
- Remove the nut and terminal insulator.
- Remove the three nuts and end cover.



CH0083

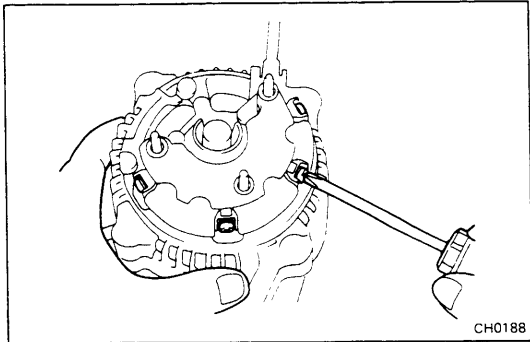
2. REMOVE BRUSH HOLDER

Remove the two screws, brush holder and brush holder cover.



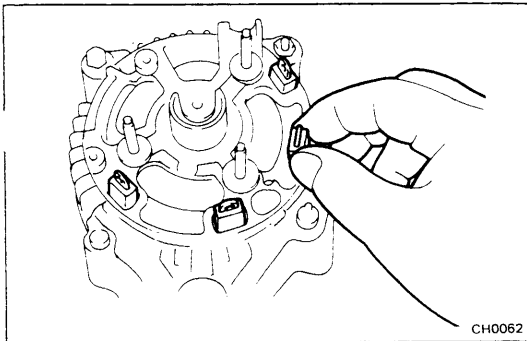
3. REMOVE IC REGULATOR

Remove the three screws and IC regulator.

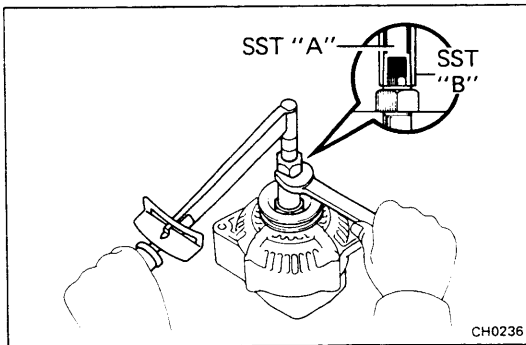


4. REMOVE RECTIFIER HOLDER

Remove the four screws and rectifier holder.



5. REMOVE TERMINAL INSULATOR



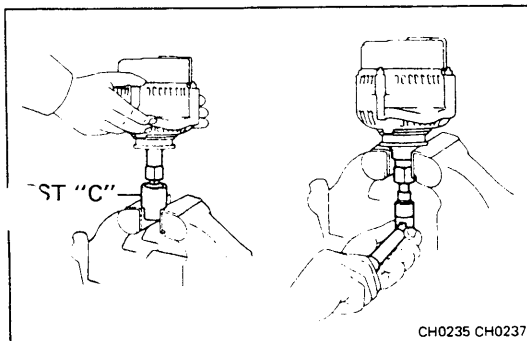
6. REMOVE PULLEY

- (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)

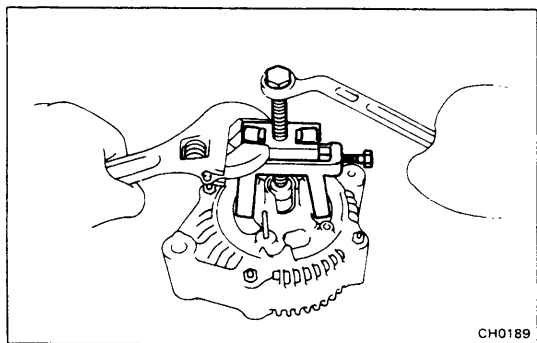
- (b) Confirm that SST "A" is secured to the pulley shaft.



- (c) As shown in the figure, grip 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.

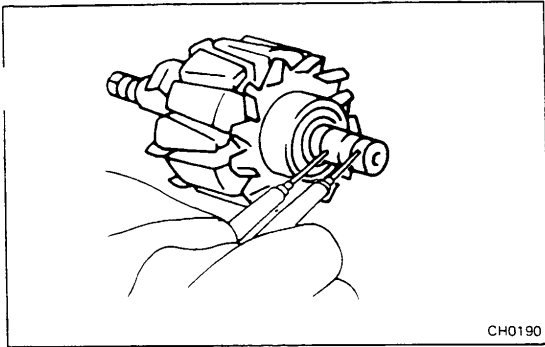
- (e) Turn SST "B" and remove all SSTs.
- (f) Remove the pulley nut and the pulley.

**7. REMOVE REAR END FRAME**

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

SST 09286-46011

8. REMOVE ROTOR FROM DRIVE END FRAME



CH0190

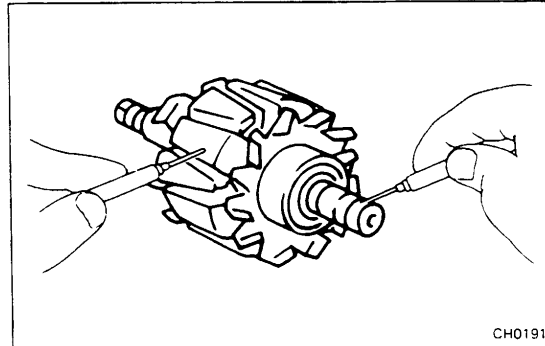
INSPECTION AND REPAIR OF ALTERNATOR Rotor

1. CHECK ROTOR FOR OPEN CIRCUIT

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

Standard resistance: 2.8 — 3.0 Ω

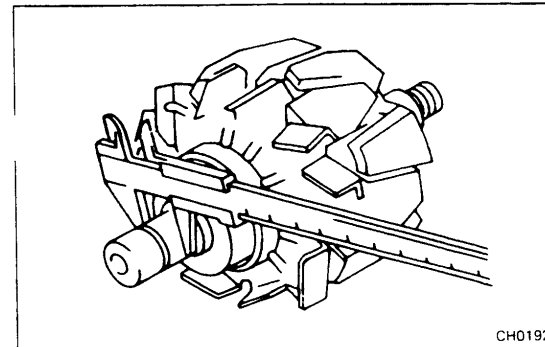
If there is no continuity, replace the rotor.



CH0191

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.



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 calipers, measure the slip ring diameter.

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

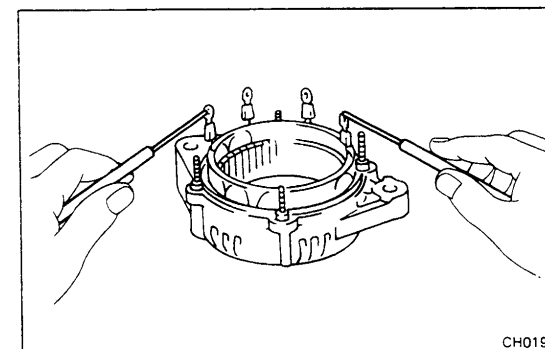
Minimum diameter: 14.0 mm (0.551 in.)

Standard diameter: 14.4 mm (0.567 in.)

Stator

1. INSPECT STATOR FOR OPEN CIRCUIT

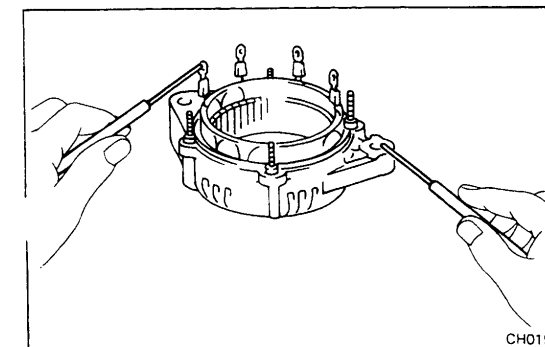
Using an ohmmeter, check all leads for continuity. If there is no continuity, replace the drive end frame assembly.



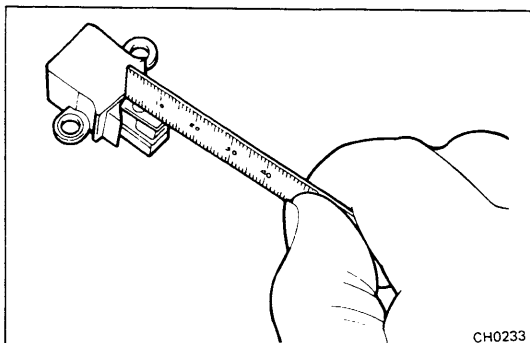
CH0193

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.



CH0194

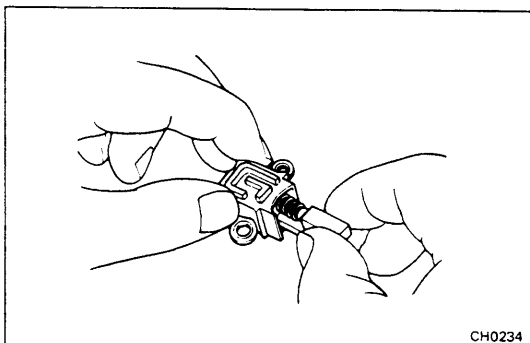


Brush and Brush Holder

1. MEASURE EXPOSED BRUSH LENGTH

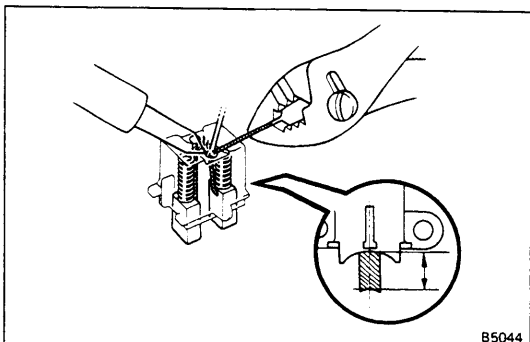
Minimum exposed length: 4.5 mm (0.177 in.)

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



2. IF NECESSARY, REPLACE BRUSH

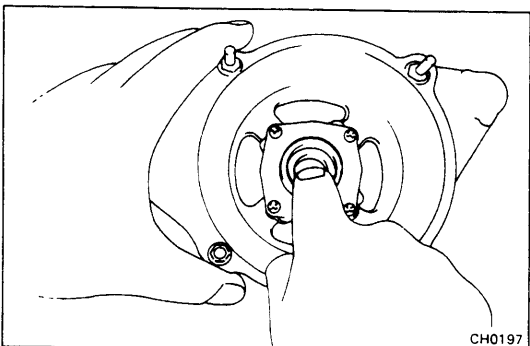
- (a) Unsolder and remove the brush and the spring.
- (b) Put the brush wire through the spring and insert the brush holder.



- (c) Solder the wire to the brush holder as shown.

Standard exposed length: 10.5 mm (0.413 in.)

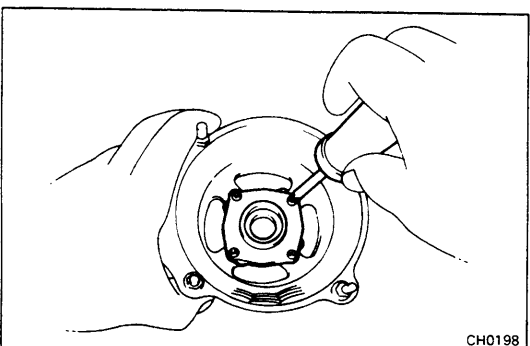
- (d) Check that the brush moves smoothly in the brush holder.
- (e) Cut off any excess wire.



Bearings

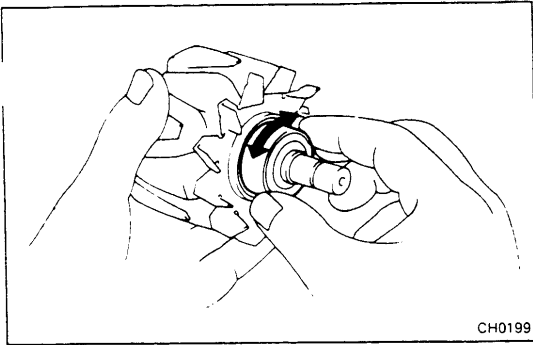
1. INSPECT FRONT BEARING

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



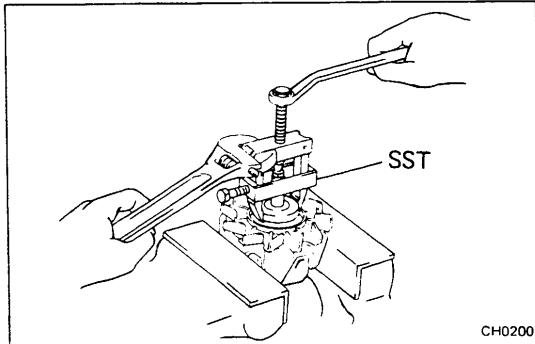
2. IF NECESSARY, REPLACE FRONT BEARING

Remove the four screws and bearing retainer, and replace the front bearing.



3. INSPECT REAR BEARING

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

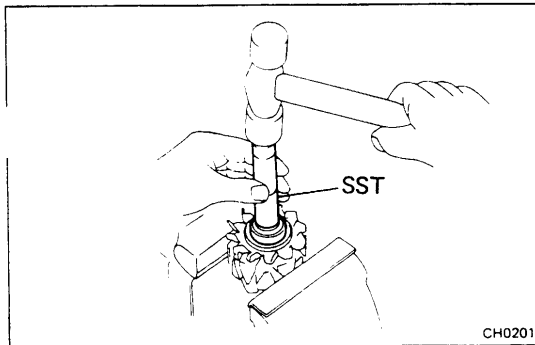


4. IF NECESSARY, REPLACE REAR BEARING

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

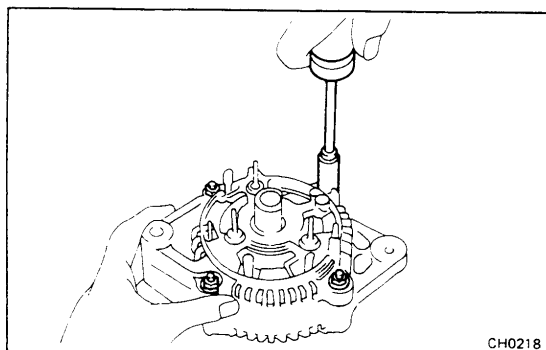
SST 09820-00020

CAUTION: Be careful not to damage the fan.



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

SST 09285-76010



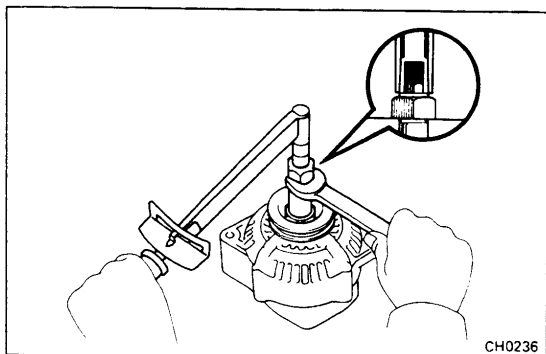
ASSEMBLY OF ALTERNATOR

(See page CH-6)

1. INSTALL ROTOR TO DRIVE END FRAME

2. INSTALL REAR END FRAME

- (a) Using a plastic hammer, lightly tap the rear end frame on 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.

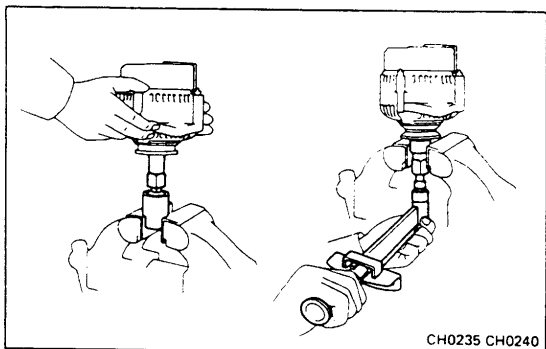
SST 09820-63010

Torque: 400 kg-cm (29 ft-lb, 39 N·m)

- (c) Confirm that SST "A" is secured to the pulley shaft.
- (d) As shown in the figure, grip 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.

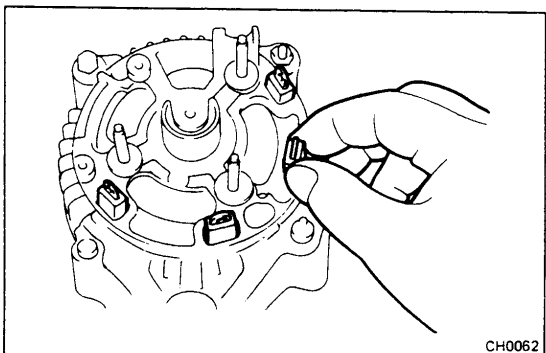
**Torque: 950 — 1,300 kg-cm
(69 — 94 ft-lb, 94 — 127 N·m)**

- (f) Turn SST "B" and remove all SSTs.



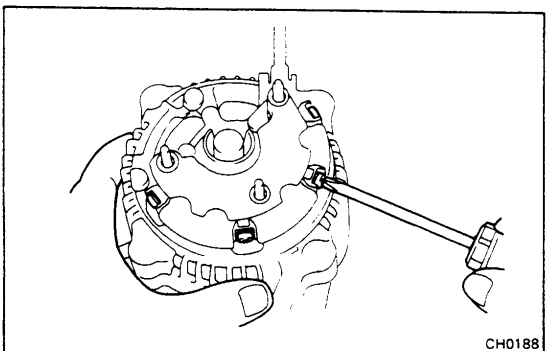
4. INSTALL FOUR TERMINAL INSULATORS

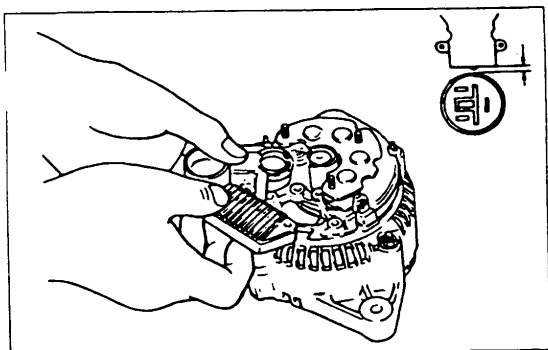
Install the four terminal insulators on the lead wires.



5. INSTALL RECTIFIER HOLDER

Install the rectifier holder with the four screws.

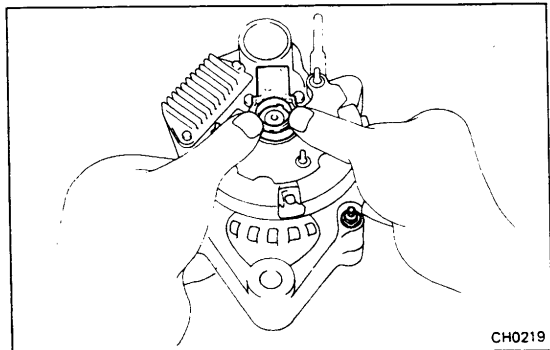


**6. INSTALL BRUSH HOLDER WITH IC REGULATOR**

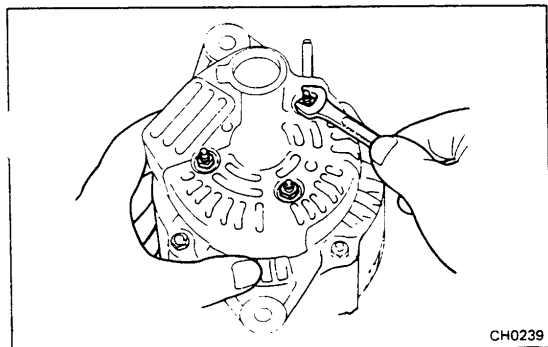
- (a) Install the brush holder with IC regulator.
- (b) Install the two screws to IC regulator.

NOTE: Check the clearance between the brush holder and connector as 1 mm or more.

- (c) Install the three screws.

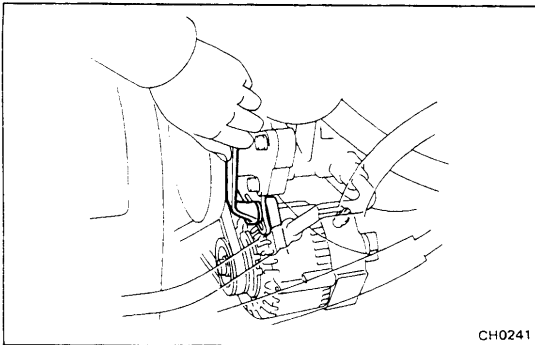


- (d) Install the brush holder cover to the rear end frame.

**7. INSTALL REAR END COVER**

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

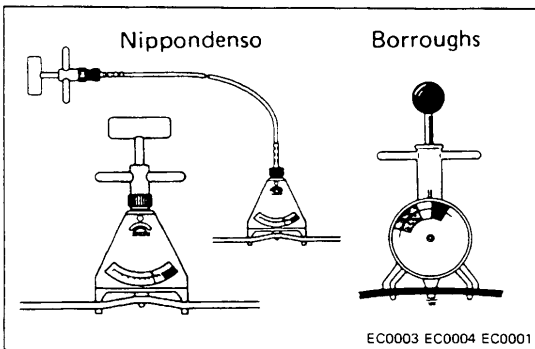
8. MAKE SURE ROTOR ROTATES SMOOTHLY



INSTALLATION OF ALTERNATOR

1. INSTALL ALTERNATOR

Mount the alternator on the bracket with the pivot and adjust bolt.



2. INSTALL DRIVE BELT

- Place the drive belt on the alternator, fan and crankshaft pulleys.
- Using a belt tension gauge, check the drive belt tension.

Belt tension gauge:

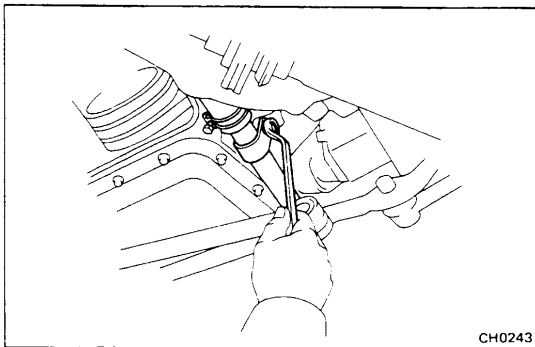
Nippondenso BTG-20 (95506-00020) or

Borroughs No. BT-33-73F

Drive belt tension:

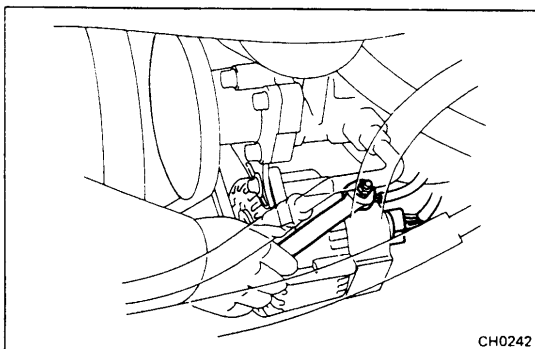
New belt 125 ± 25 lb

Used belt 80 ± 20 lb



3. CONNECT WATER INLET HOSE

- Connect the water inlet hose to the engine.
- Install the two water inlet pipe bolts.
- Install the engine under cover.



4. CONNECT WIRING TO ALTERNATOR

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

5. FILL WITH COOLANT

Close the radiator drain cock and fill with coolant.

6. CONNECT NEGATIVE CABLE TO BATTERY

7. PERFORM ON-VEHICLE INSPECTION

(See page CH-3)