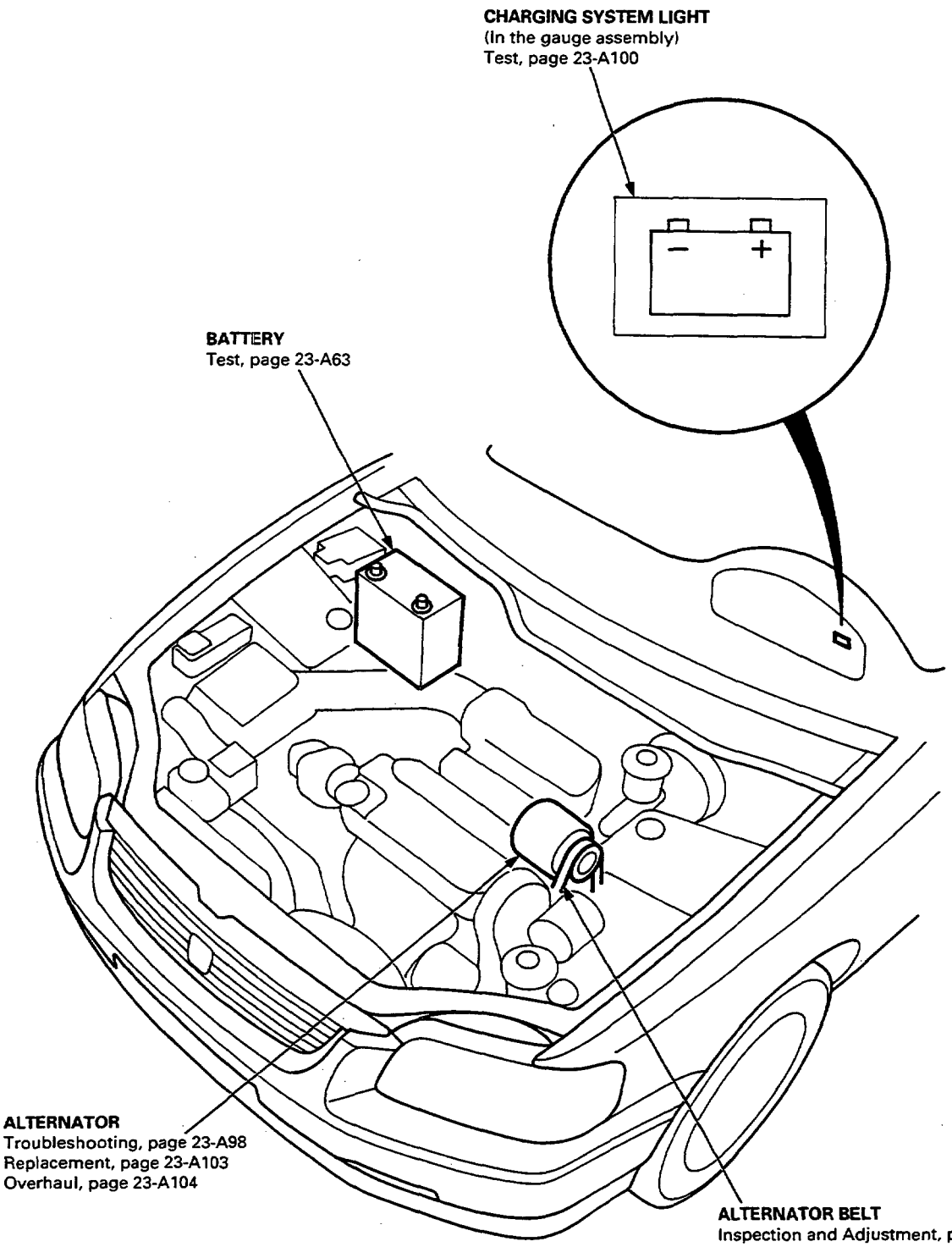
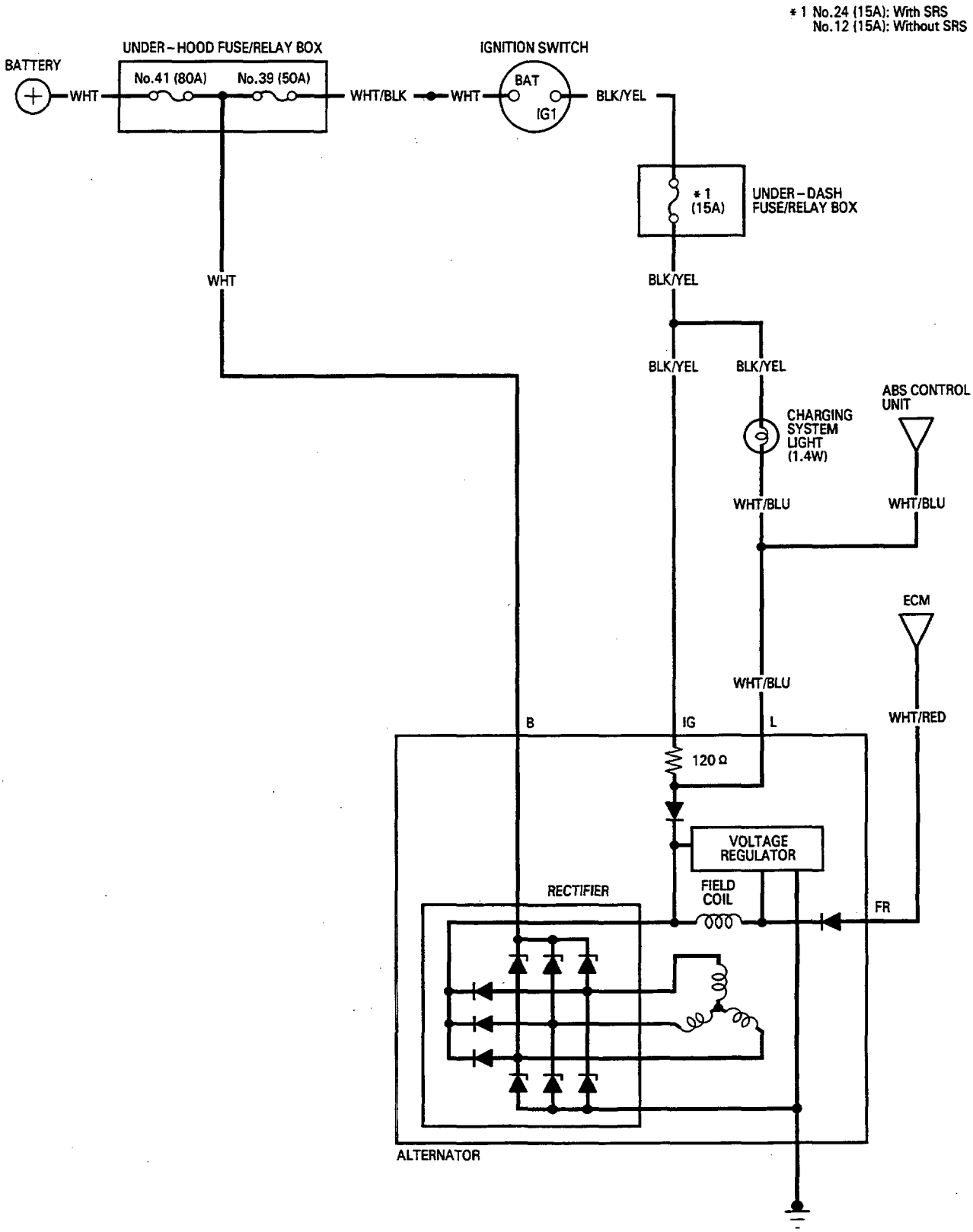
Charging System

Component Location Index

NOTE: LHD type is shown, RHD type is similar.



Circuit Diagram



Charging System

Troubleshooting

NOTE:

- Before troubleshooting check:
  - — Tightness of the alternator belt (see page 23-A107).
  - — That the malfunction indicator lamp (MIL) of the ECM does not blink. If it indicates DTC 20, refer to section 11.
- Troubleshoot by performing following tests in the order listed below.

Malfunction:
— Charging system light does not go off.
— Charging system light does not go on.
— Battery is dead or low.

1. Test the alternator/regulator on the car (see page 23-A99).

2. Test the charging system light (see page 23-A100).

3. Check voltage at the IG terminal of the alternator connector (see page 23-A101).

Charging system light does not go off, because the engine idle speed is too low:
— Check the idle speed.

Alternator/Regulator On-car Test:

1. Be sure to use a good battery (see page 23-A63). Connect an ammeter and a voltmeter as shown.
2. Start the engine. Hold the engine at 3,000 rpm with no load (A/T in N or P position, M/T in neutral) until the radiator fan comes on, then let it idle.
3. Raise the engine speed to 2,000 rpm (min^{-1}) and hold it there. Turn the headlights (high beam) on, and check the voltage at the battery terminals.

Is the voltage between 13.6 and 15.4 V?

YES — NO

Test the alternator (see page 23-A102).

1. Turn the blower motor and the rear window defogger on, and check the battery voltage.

Is the battery voltage less than 13.0 V?

YES — NO

Turn also the stereo radio/cassette player, brake lights, etc. on.

Is the battery voltage less than 13.0 V?

YES — NO

Test the alternator (see page 23-A102).

1. Read the amperage.

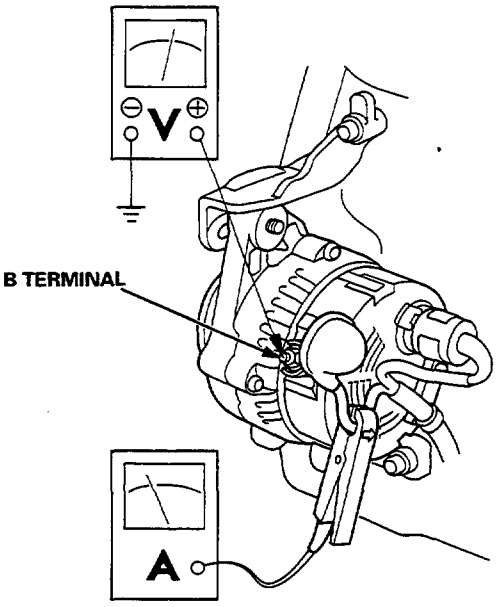
Are there more than 60 A?

YES — NO

Test the alternator (see page 23-A102).

Alternator/Regulator work normally. Test the charging system light (see page 23-A100).

CAUTION: As the headlights warm up considerably, do not cover them.



Troubleshooting (cont'd)

Charging System Light Test:
1. Turn the ignition switch on (II).

Does the charging system light come on?

YES

Start the engine.

Does the charging system light go off?

YES

Charging system light circuit is OK.
Check voltage at the IG terminal (see page 23-A101).

NO

1. Turn the ignition switch off.
2. Disconnect the 4-P connector.
3. Turn the ignition switch on (II).

Does the charging system light come off?

YES

Disconnect the ABS control unit.
If the charging system light stays on, there must be a short in the WHT/BLU terminal wire.

Check voltage at the IG terminal (see page 23-A101).

NO

1. Turn the ignition switch off.
2. Disconnect the 4-P connector and short its L (WHT/BLU) terminal to body ground.
3. Turn the ignition switch on (II).

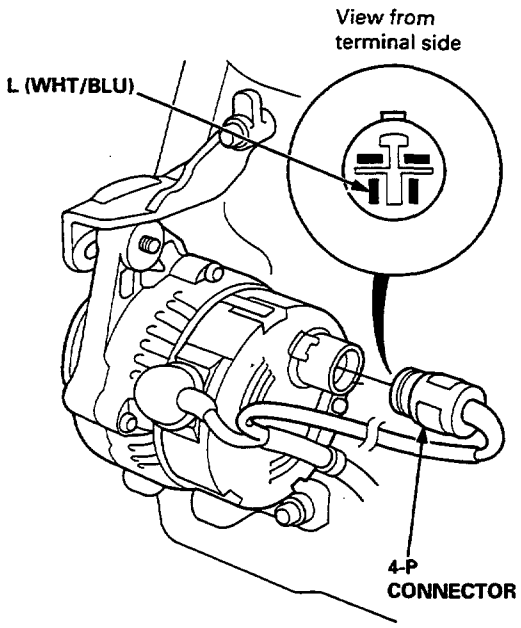
Does the charging system light come on?

YES

- **Blown bulb**
- **An open in the WHT/BLU wire**
- **Loose/disconnected terminal**

Charging system light circuit is OK. Check voltage at the IG terminal (see page 23-A101).

NO



IG Terminal Voltage Check:
1. Turn the ignition switch off.

Are the B terminal, the 4-P connector, and under-hood fuse/relay box terminals securely tightened?

YES — NO

Tighten or reconnect the terminals securely.

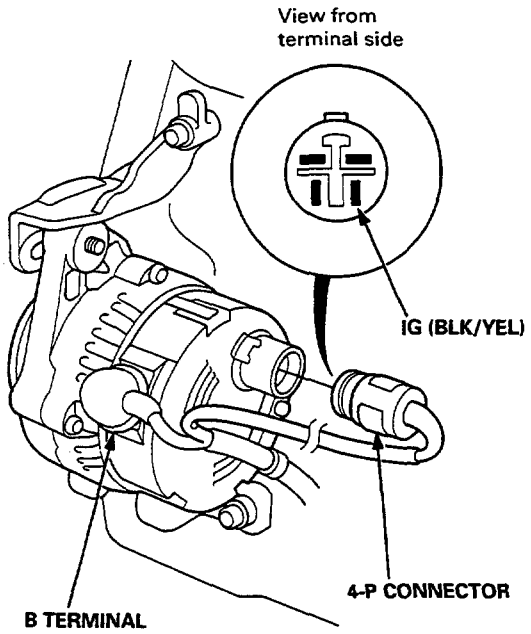
1. Disconnect the 4-P connector, and turn the ignition switch on (II).
2. Measure the voltage between body ground and the IG terminal of the 4-P connector.

Is there battery voltage?

YES — NO

- **Blown No. 12 (15 A) fuse in the under-dash fuse/relay box: Without SRS**
- **Blown No. 24 (15 A) fuse in the under-dash fuse/relay box: With SRS**
- **An open in the BLK/YEL wire**

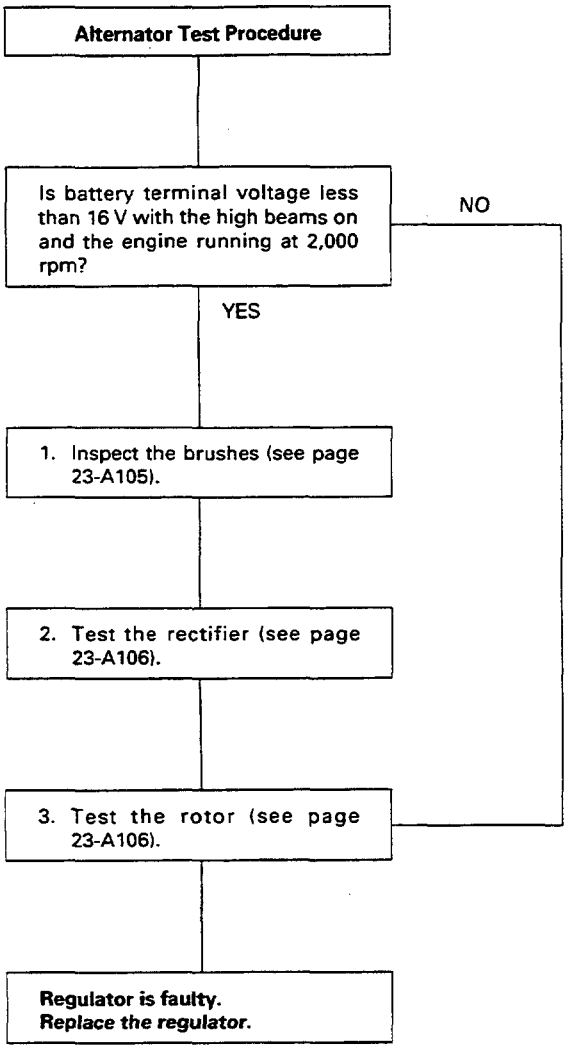
Check the battery (see page 23-A63)



Troubleshooting

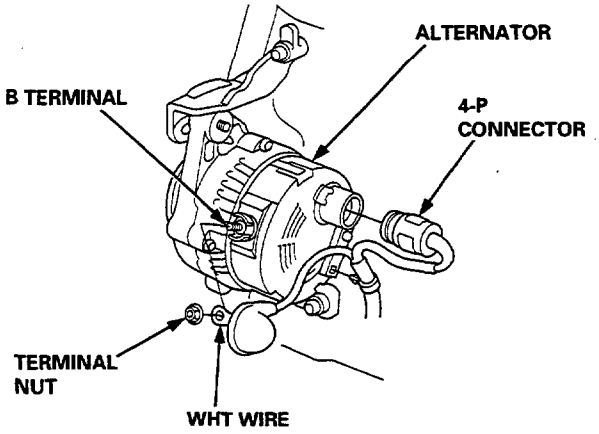
Alternator Test:

NOTE: Because an overall check is necessary to avoid misleading conclusions, test the alternator in the order described below.

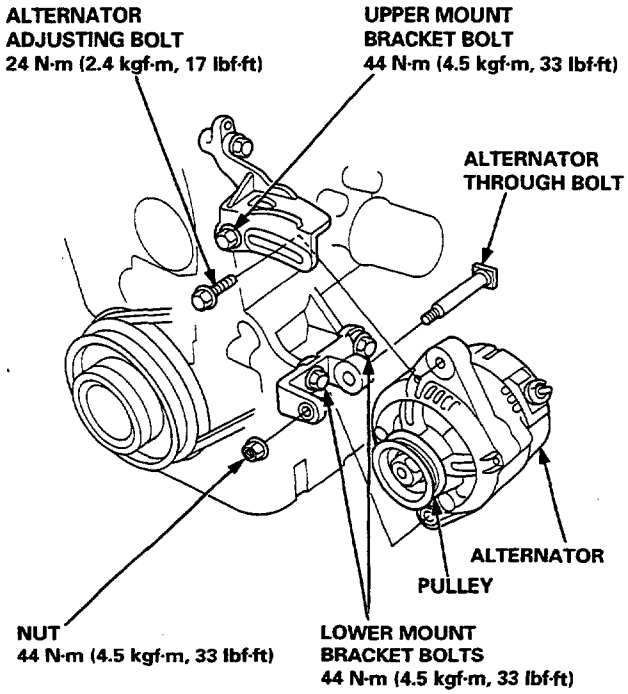


Alternator Replacement

1. Disconnect both the negative cable and positive cable from the battery.
2. Disconnect the 4-P connector from the alternator.
3. Remove the terminal nut and the WHT wire from the B terminal.



4. Remove the upper mount bracket nut and the engine wire harness.
5. Remove the alternator adjusting bolt and through bolt nut, then remove the alternator belt from the pulley.
6. Pull out the alternator through bolt, then remove the alternator.



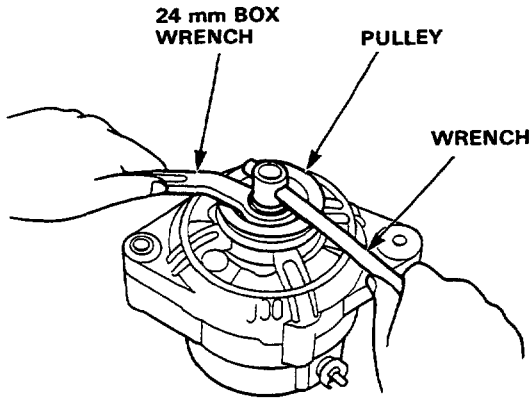
7. If necessary, remove the mount bracket bolts, and the upper and lower mount brackets.
8. Adjust the alternator belt tension after installation.

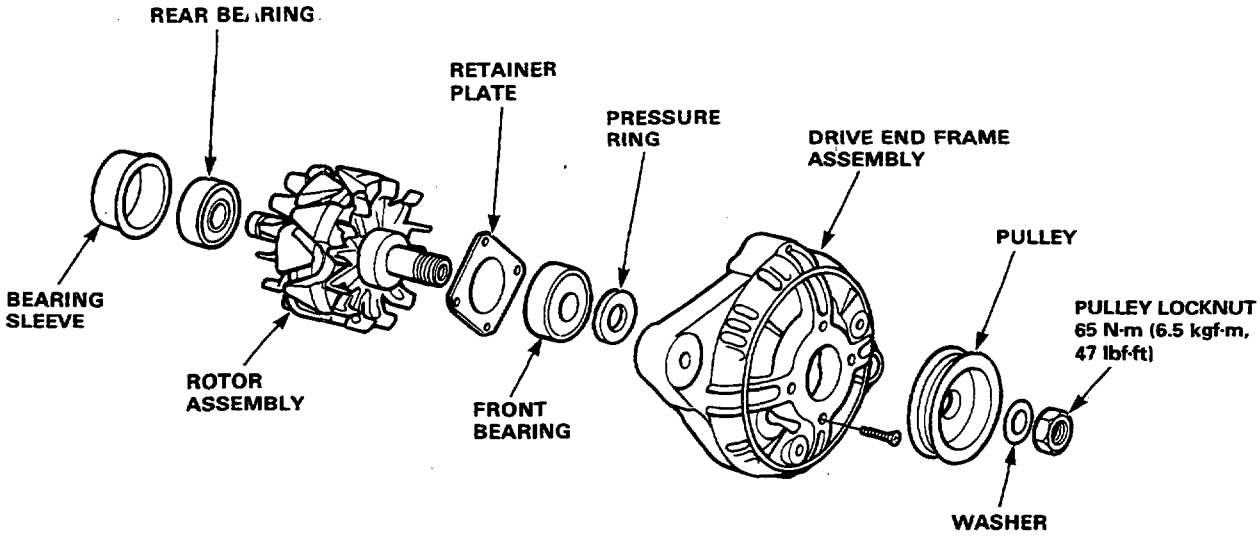
Charging System

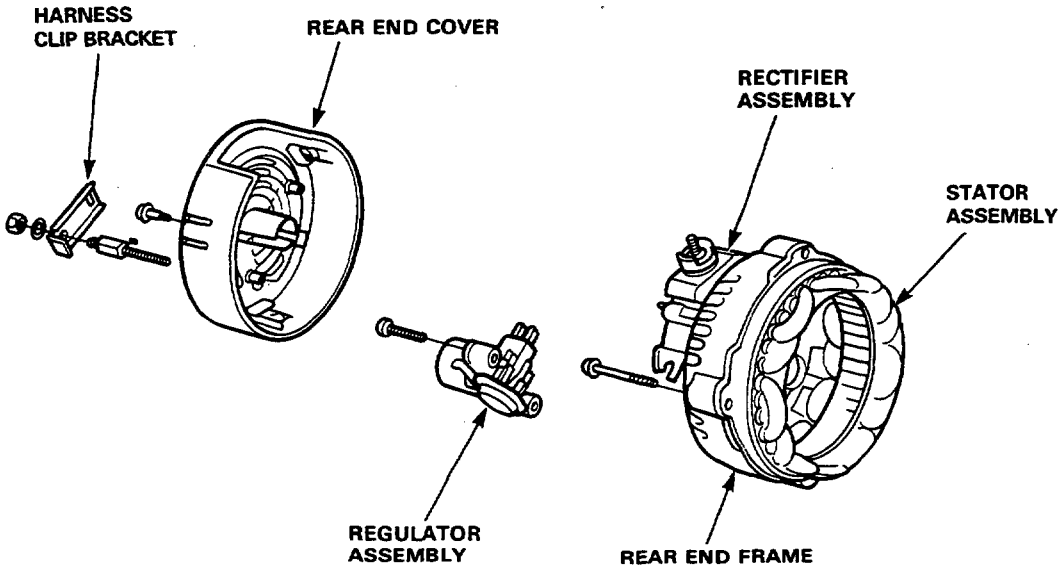
Alternator Overhaul

NOTE: It is necessary to separate the pulley, drive end housing and rotor only when the front bearing needs replacement.

Loosen the locknut with wrenches to remove the pulley from the rotor. If necessary, use an impact wrench.



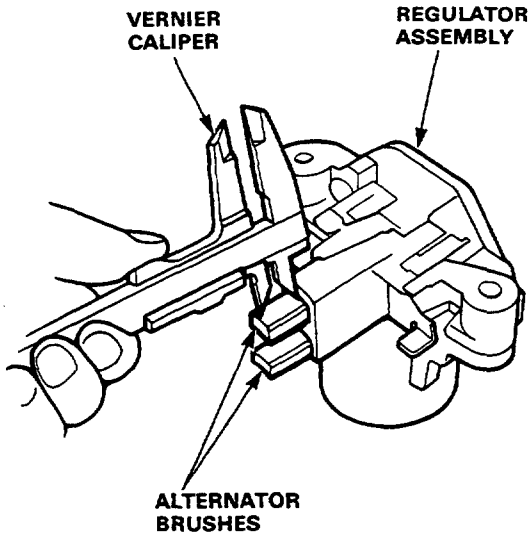




Alternator Brush Inspection

1. Remove the end cover, then take out the regulator assembly by removing the two screws.
2. Measure the length of the alternator brushes with a vernier caliper.

Alternator Brush Length:
Standard: 12.5 mm (0.49 in)
Service Limit: 2.5 mm (0.10 in)

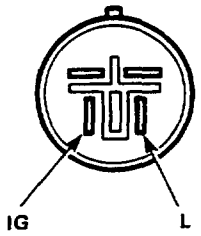


If the brushes are not within the service limit, replace the regulator assembly.

Regulator Assembly Inspection

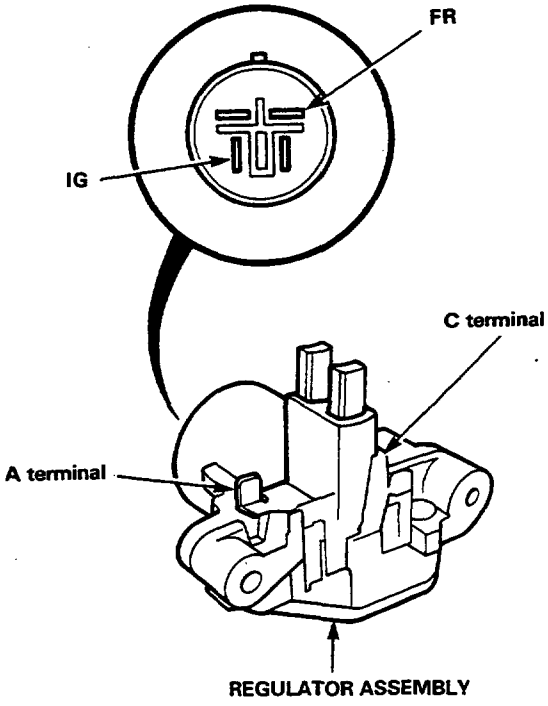
1. Measure the resistance between the L and IG terminals.

Standard: 120 Ω (about)



If the resistance is not within the standard, replace the regulator assembly.

2. Check for continuity between the IG and A, FR and C terminals. There should be continuity in only one direction.

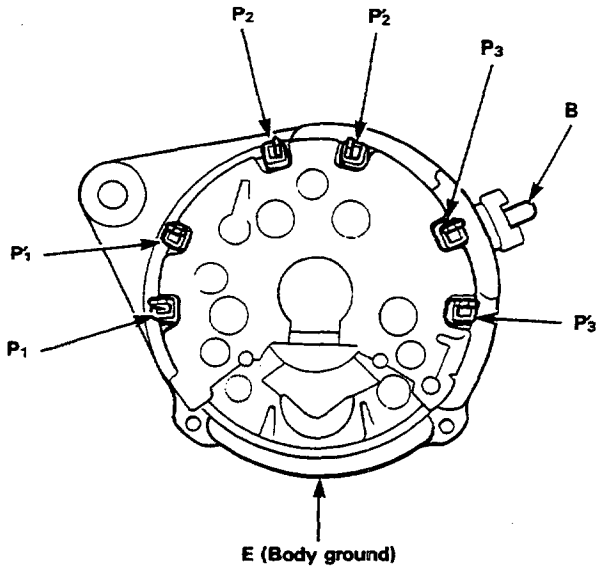


If there is continuity in both directions, replace the regulator assembly.

Rectifier Test

NOTE:
- The diodes are designed to allow current to pass in one direction while blocking the opposite direction. Each diode must be tested for continuity in both directions.
- Use an ohmmeter capable of checking diodes.

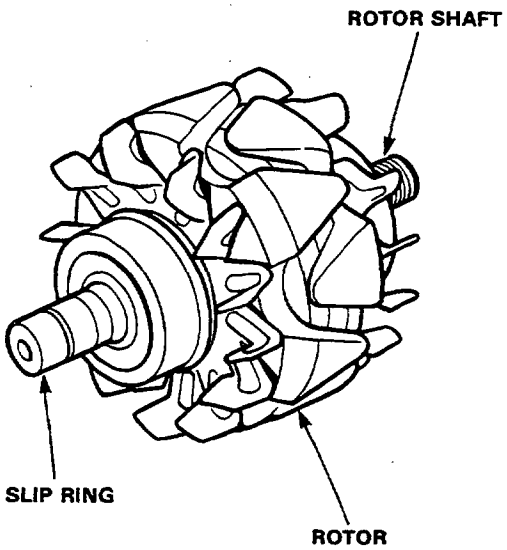
1. Check for continuity in each direction between the B and P terminals, and between the E (Body ground) and P terminals of each diode pair. All diodes should have continuity in only one direction.



2. If any of the diodes fails, replace the rectifier and stator assembly (diodes are not available separately).

Rotor Slip Ring Test

1. Check that there is continuity between the slip rings.
2. Check that there is no continuity between the slip rings and the rotor or rotor shaft.



3. If the rotor fails either continuity check, replace the rotor assembly.

Alternator Belt Inspection and Adjustment

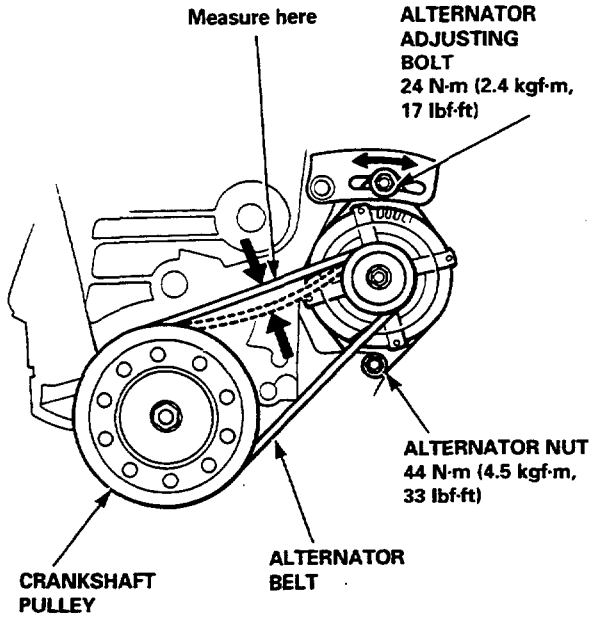
Deflection method:

Apply a force of 98 N (10 kgf, 22 lbf) and measure the belt deflection between the alternator and the crankshaft pulley.

Deflection: 7.0 – 10.5 mm (0.28 – 0.41 in)

NOTE:

- On a brand-new belt (one that has been run for less than five minutes), the deflection should be 5.0 – 7.0 mm (0.19 – 0.28 in) when first measured.
- If there are cracks and any damage evident in the belt, replace it with a new one.



If adjustment is necessary:

1. Loosen the alternator adjusting belt and the alternator nut.
2. Move the alternator to obtain the proper belt tension, then retighten the adjusting bolt and the alternator nut to the specified torques.
3. Recheck the deflection of the belt.

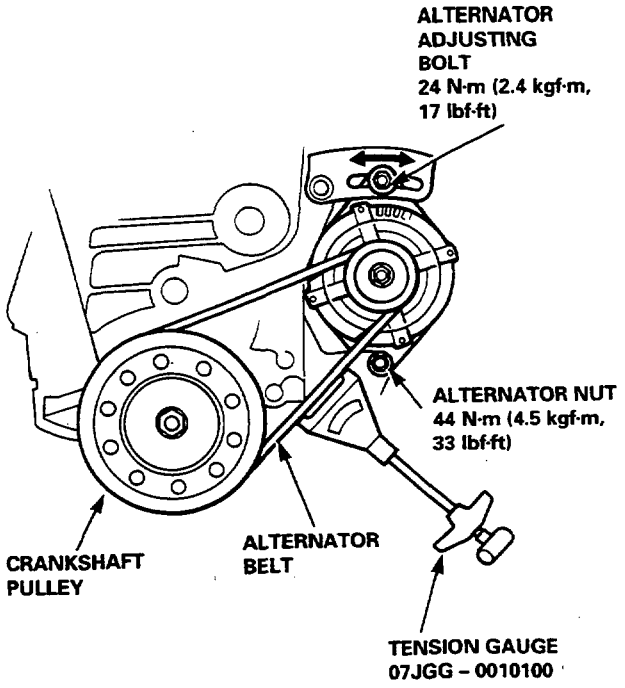
Tension gauge method:

Attach the belt tension gauge to the belt and measure the belt tension.

Tension: 340 – 490 N (35 – 50 kgf, 77 – 110 lbf)

NOTE:

- On a brand-new belt (one that has been run for less than five minutes), the tension should be 640 – 785 N (65 – 80 kgf, 143 – 176 lbf) when first measured.
- Follow the manufacturer's instructions for the belt tension gauge.
- If there are cracks and any damage evident in the belt, replace it with a new one.



If adjustment is necessary:

1. Loosen the alternator adjusting belt and the alternator nut.
2. Move the alternator to obtain the proper belt tension, then retighten the adjusting bolt and the alternator nut to the specified torques.
3. Recheck the tension of the belt.