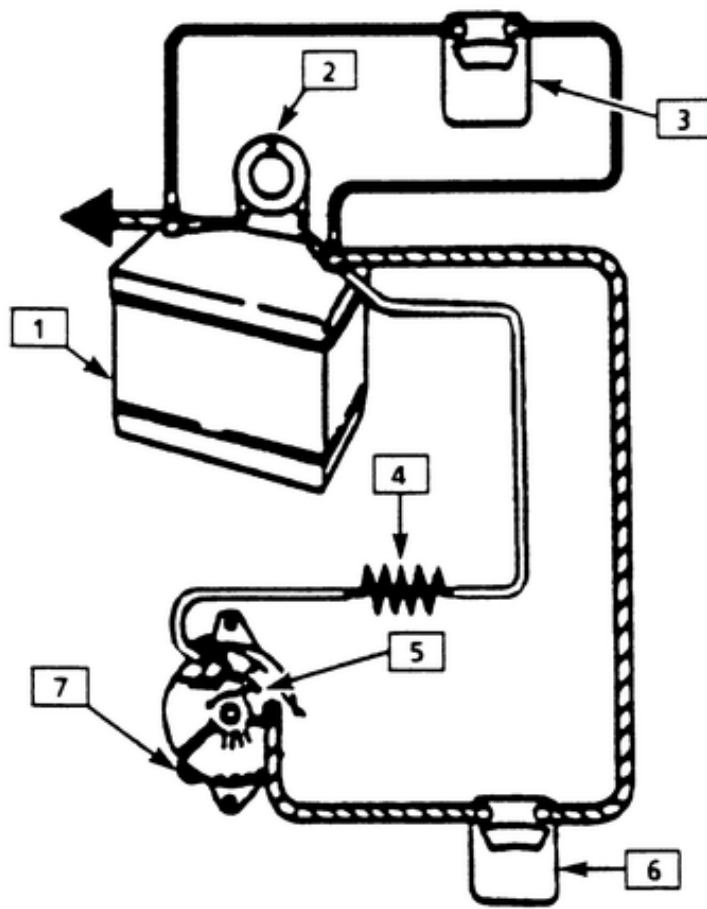
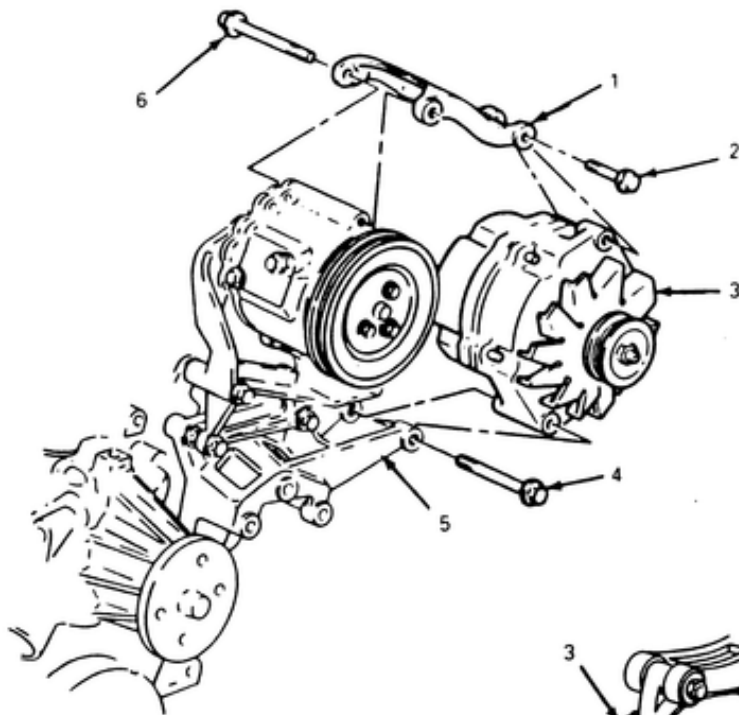
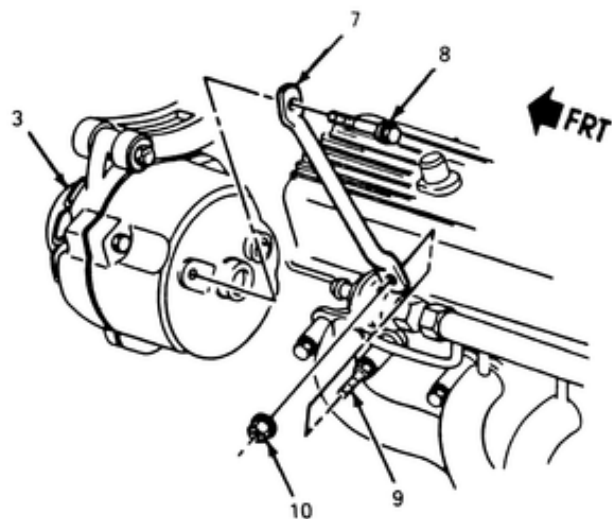


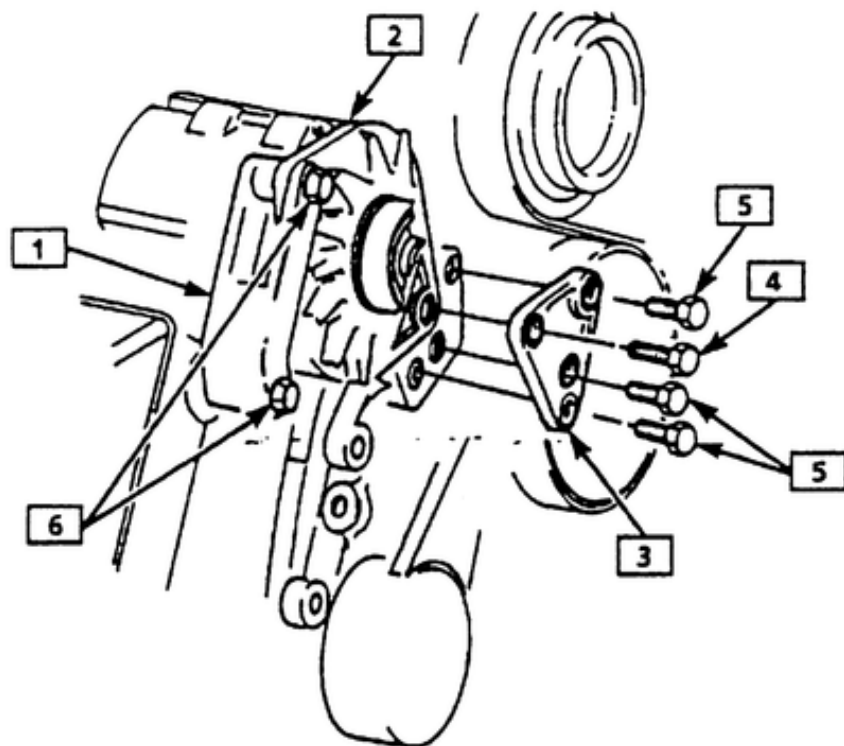


- | | | | |
|---|-------------|---|----------------------------------|
| 1 | BATTERY | 5 | CONNECT RESISTOR TO "L" TERMINAL |
| 2 | CARBON PILE | 6 | TEST AMMETER |
| 3 | VOLTMETER | 7 | GENERATOR |
| 4 | RESISTOR | | |

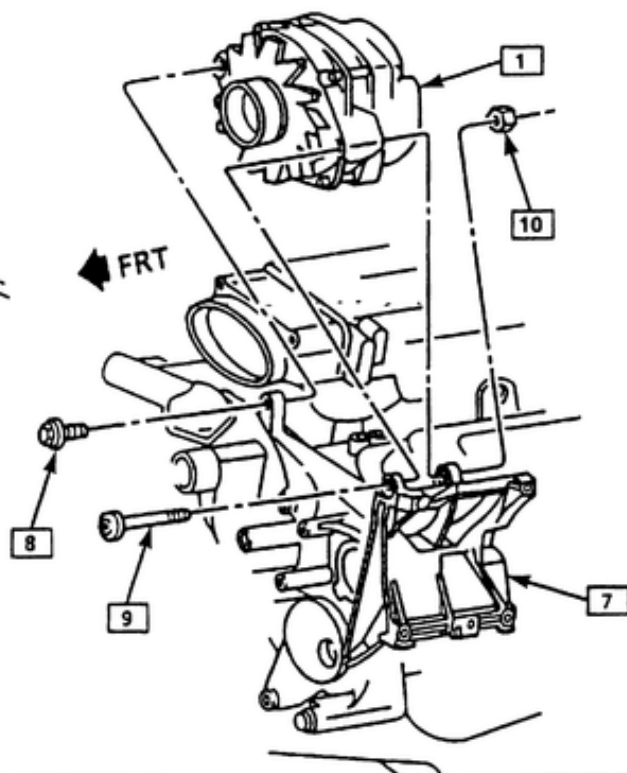
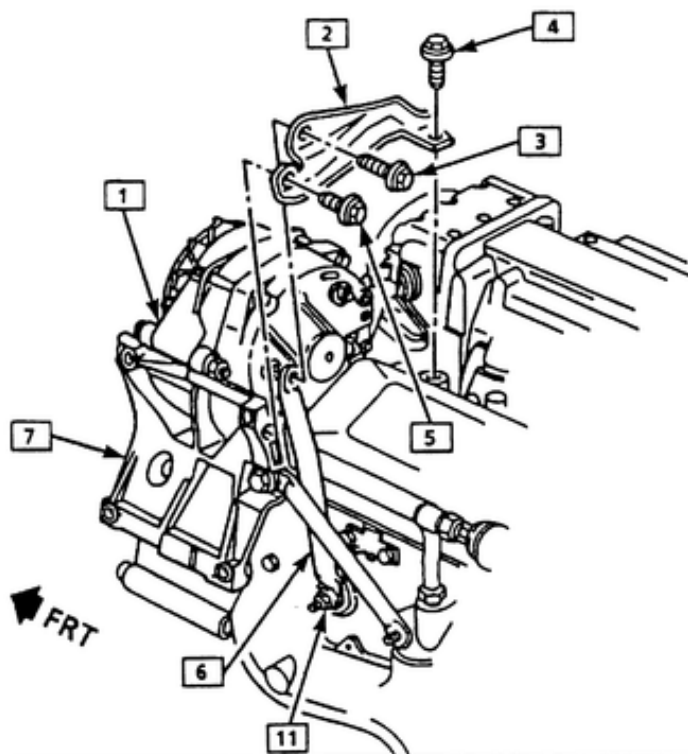


- 1 BRACKET, GENERATOR MOUNTING
- 2 BOLT, GENERATOR UPPER MOUNTING
- 3 GENERATOR
- 4 BOLT, GENERATOR LOWER MOUNTING
- 5 BRACKET, POWER STEERING PUMP
- 6 BOLT, 50 N·m (37 LBS. FT.)
- 7 BRACE, GENERATOR REAR
- 8 BOLT, GENERATOR BRACE
- 9 ENGINE STUD
- 10 NUT, 33 N·m (24 LBS. FT.)





-
- | | |
|----------|---|
| 1 | GENERATOR UPPER SUPPORT BRACKET |
| 2 | GENERATOR |
| 3 | GENERATOR LOWER SUPPORT BRACKET |
| 4 | GENERATOR LOWER MOUNTING BOLT |
| 5 | GENERATOR LOWER SUPPORT BRACKET BOLT |
| 6 | GENERATOR UPPER SUPPORT BRACKET BOLT |



1 GENERATOR

2 GENERATOR MOUNTING BRACE

3 BOLT - TIGHTEN TO 47 N·m (35 lb. ft.)
(TIGHTEN FIRST)

4 BOLT - TIGHTEN TO 47 N·m (35 lb. ft.)
(TIGHTEN SECOND)

5 BOLT - TIGHTEN TO 47 N·m (35 lb. ft.)
(TIGHTEN THIRD)

6 GENERATOR REAR BRACE

7 GENERATOR, A/C COMPRESSOR AND
POWER STEERING PUMP BRACKET

8 BOLT - TIGHTEN TO 50 N·m (37 lb. ft.)

9 BOLT - TIGHTEN TO 50 N·m (37 lb. ft.)

10 NUT

11 NUT - TIGHTEN TO 33 N·m (24 lb. ft.)

1990 Chevrolet CORVETTE

Submodel: | Engine Type: V8 | Liters: 5.7

Fuel Delivery: FI | Fuel: GAS

CAUTION

To prevent damage to the alternator and possible to yourself, the following precautions should be taken when working with the electrical system.

1. Never reverse the battery connections.
2. Booster batteries for starting must be connected properly: positive-to-positive and negative-to-negative.
3. Disconnect the battery cables before using a fast charger; the charger has a tendency to force current through the diodes in the opposite direction for which they were designed. This burns out the diodes.
4. Never use a fast charger as a booster for starting the vehicle.
5. Never disconnect the voltage regulator while the engine is running.
6. Avoid long soldering times when replacing diodes or transistors. Prolonged heat is damaging to AC (alternating current) generators.
7. Do not use test lamps of more than 12 volts (V) for checking diode continuity.
8. Do not short across or ground any of the terminals of the AC (alternating current) generator.
9. The polarity of the battery, generator, and regulator must be matched and considered before making any electrical connections within the system.
10. Never operate the alternator on an open circuit. Make sure that all connections within the circuit are clean and tight.
11. Disconnect the battery terminals when performing any service on the electrical system. This will eliminate the possibility of accidental reversal of polarity.
12. Disconnect the battery ground cable if arc welding is to be done on any part of the car.

1990 Chevrolet CORVETTE

Submodel: | Engine Type: V8 | Liters: 5.7

Fuel Delivery: FI | Fuel: GAS

CAUTION

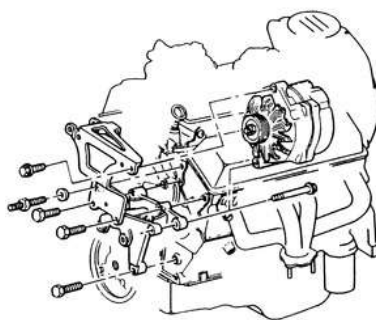
Failure to disconnect the battery cable may result in personal injury. If a tool is shorted at the alternator lead, the tool will heat enough to burn your skin.

5.7L (VIN 8) Engine

1984 VEHICLES

1. Disconnect the negative battery cable.
2. Remove the air cleaner flex duct.
3. Remove the adjusting brace bolt.
4. Loosen the alternator mounting bolts.

Fig. 1: Exploded view of the alternator mounting — 1984 vehicle shown



5. Position the alternator to ease belt tension, then remove the belt from the alternator pulley.
6. Remove the alternator mounting bracket through bolt, then remove the alternator.
7. Installation is the reverse of the removal procedure.

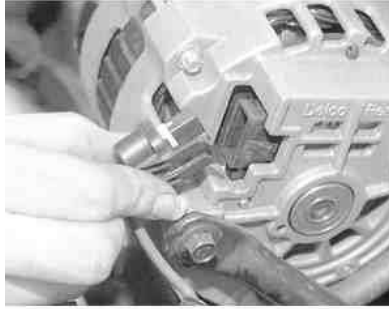
1985–88 VEHICLES

1. Disconnect the negative battery cable.
2. Remove the 2-terminal plug and battery leads from the back of the alternator.

Fig. 2: Unfasten the nut securing the battery lead to the rear of the alternator



Fig. 3: Unplug the remaining electrical connector from the rear of the alternator



3. Remove the alternator bracket bolt.
4. Loosen the alternator-to-air pump bracket bolt, then swing the bracket aside.

Fig. 4: Loosen the bolt securing the bracket to the air pump .

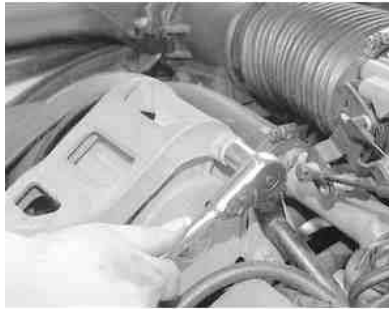


Fig. 5: . . . then swing the bracket up and away from the alternator



5. Unfasten the bolt securing the alternator brace to the rear of the alternator.

Fig. 6: Remove the alternator-to-brace bolt



6. Loosen the bolts, then remove the alternator drive belt.

Fig. 7: Loosen the bolts and unroute the drive belt from the alternator pulley



7. Unfasten the alternator mounting through bolts, then remove the alternator from the vehicle.

Fig. 8: Remove the alternator through bolt . . .

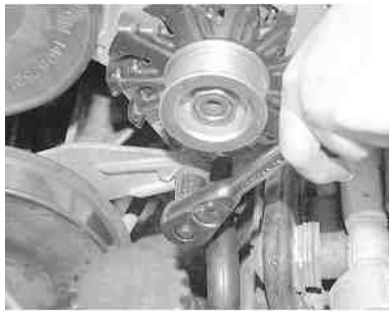


Fig. 9: . . . then remove the alternator from the vehicle

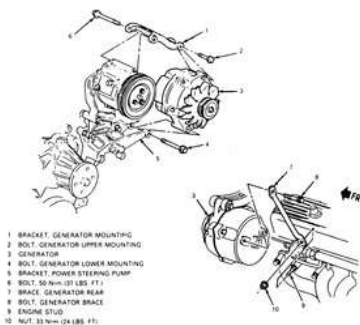


8. Installation is the reverse of the removal procedure.

1989–91 VEHICLES

1. Disconnect the negative battery cable.
2. Detach the regulator connector and battery lead from the back of the alternator.
3. Remove the serpentine drive belt, using a $\frac{1}{2}$ in. breaker bar to rotate the tensioner.
4. Remove the alternator mounting bolts, then remove the alternator from the vehicle. If installing a new alternator, transfer the brackets to the new alternator.

Fig. 10: Exploded view of the alternator and related components — 1989–91 5.7L (VIN G) engines



To install:

5. Position the alternator in the vehicle. Install the lower mounting bolt finger-tight.
6. Install the upper alternator mounting bolt and tighten finger-tight.
7. Position the alternator brace onto the rear of the alternator, then install the brace bolt finger-tight.
8. Tighten the alternator bolts as follows:
 - A. Lower mounting bolt: 37 ft. lbs. (50 Nm).
 - B. Upper mounting bolt: 37 ft. lbs. (50 Nm).
 - C. Brace bolt: 17 ft. lbs. (23 Nm).
9. Install the serpentine drive belt.
10. Attach the regulator connector and battery lead to the back of the alternator.
11. Connect the negative battery cable.

5.7L (VIN J) Engine

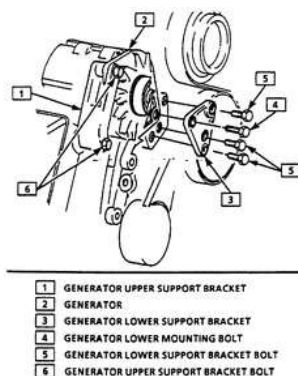
1990 VEHICLES

1. Disconnect the negative battery cable.
2. Remove the air intake duct and the throttle body extension.
3. Remove the accelerator and cruise control cable clamps from the plenum.
4. Remove the throttle body, gasket and electrical connectors.
5. Position the throttle body aside with the cables attached.
6. Unfasten the water pump pulley bolts.
7. Remove the water pump pulley and serpentine belt by releasing the belt tension.
8. Remove the alternator support bracket.
9. Remove the alternator lower mounting bolt.
10. Remove the engine oil temperature sensor.
11. Detach the alternator electrical connectors, then remove the alternator from the vehicle.

To install:

12. Attach the electrical connectors to the alternator, then position the alternator into the vehicle.
13. Apply Loctite® 565 to the threads of the lower mounting bolts, then install the bolts and tighten to 16 ft. lbs. (26 Nm).
14. Apply Loctite® 565 to the threads of the alternator support bracket, then install then bolts and tighten to 19 ft. lbs. (26 Nm).
15. Install the engine oil temperature sensor, making sure to use the proper sealer when installing the sensor.
16. Install the water pump pulley by releasing the belt tension and positioning the pulley onto the water pump flange. Install the pulley bolts and tighten to 89 inch lbs. (10 Nm).
17. Position the throttle body gasket, then install the throttle body. Tighten the throttle body-to-plenum bolts to 11 ft. lbs. (15 Nm).
18. Secure the accelerator and cruise control cable clamps onto the plenum.
19. Install the throttle body extension and tighten the bolts to 53 inch lbs. (6 Nm).
20. Check the serpentine belt tension, as outlined in Section 1 of this manual.
21. Install the air intake duct, then connect the negative battery cable.

Fig. 11: Exploded view of the alternator and bracket mounting — 5.7L (VIN J) engine



1991-95 VEHICLES

1. Disconnect the negative battery cable.
2. Remove the air intake duct and the throttle body extension.
3. Remove the serpentine drive belt.
4. Remove the alternator lower mounting bolt and note the length.
5. Remove the alternator lower support bracket bolts and note the bolt lengths.
6. Remove the upper support bolts, noting the length, and remove the shield.
7. Remove the rear support brace.
8. Detach the oil sender electrical connector, then remove the sender.
9. Unplug the regulator connector and unscrew battery-to-alternator terminal, then remove the alternator from the vehicle.

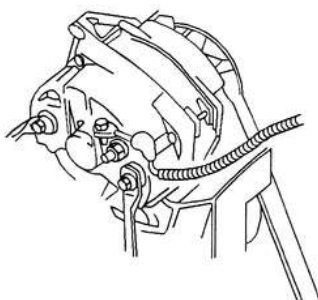
To install:

10. Attach the regulator connector and the battery-to-alternator terminal ("BAT" terminal), then position the alternator in the vehicle. Tighten the "BAT" terminal nut to 71 inch lbs. (8 Nm). Do NOT overtighten.
11. Install the oil sender and attach the electrical connector.
12. Apply Loctite® 565, or equivalent sealant, to all of the mounting bolt threads.
13. Install the rear support brace and bolt. Tighten the bolt to 17 ft. lbs. (23 Nm).
14. Install the upper support bracket and bolts.
15. Install the lower support bracket, spacer, support bolts and mounting bolt.
16. Tighten the upper support and lower mounting bolts to 38 ft. lbs. (52 Nm).
17. Tighten the lower support bracket bolts to 19 ft. lbs. (26 Nm).
18. Install the serpentine drive belt.
19. Install the throttle body extension and tighten the bolts to 53 inch lbs. (6 Nm).
20. Install the air intake duct and connect the negative battery cable.

5.7L (VIN P and 5) Engines

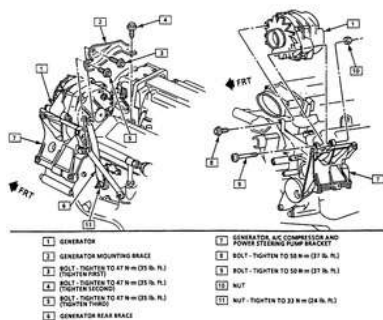
1. Disconnect the negative battery cable.
2. Remove the air intake duct.
3. Unplug the regulator connector, and remove the battery-to-alternator terminal from the back of the alternator.

Fig. 12: Detach the regulator connector, and disconnect the "BAT" cable from the terminal



4. Remove the serpentine drive belt by releasing the belt tension.
5. Remove the alternator rear mounting bolt, nut and alternator rear mounting bracket.
6. Unfasten the 2 alternator upper mounting bolts, and remove the alternator upper mounting bracket.
7. Remove the two lower alternator mounting bracket bolts, then remove the lower bracket.
8. Remove the alternator from the vehicle.

Fig. 13: Exploded view of the alternator and related components — 5.7L (VIN P & 5) engines



To install:

9. Position the alternator in the vehicle.
10. Install the lower mounting bracket and the two lower mounting bolts. Do NOT tighten the bolts at this time.
11. Install the upper mounting bracket and two retaining bolts. Do NOT tighten the bolts at this time.
12. Install the rear mounting bracket and mounting bolt.
13. Tighten the bolts, as follows:

- A. Alternator lower and upper mounting bolts: 37 ft. lbs. (50 Nm).
 - B. Alternator rear mounting bolt: 17 ft. lbs. (23 Nm).
 - C. Alternator rear mounting nut: 24 ft. lbs. (33 Nm).
14. Install the serpentine drive belt.
 15. Attach the electrical connector to the alternator.
 16. Connect the battery-to-alternator terminal to the back of the alternator. Tighten the "BAT" terminal nut to 71 inch lbs. (8 Nm). Do NOT overtighten.
 17. Install the air intake duct.
 18. Connect the negative battery cable. Tighten the cable bolt/screw to 11 ft. lbs. (15 Nm).

1990 Chevrolet CORVETTE

Submodel: | Engine Type: V8 | Liters: 5.7
Fuel Delivery: FI | Fuel: GAS

There are many possible ways in which the charging system can malfunction. Often the source of a problem is difficult to diagnose, requiring special equipment and a good deal of experience. However, when the charging system fails completely and causes the dash board warning light to come on or the battery to become dead the following items may be checked:

1. The battery is known to be good and fully charged.
2. The alternator belt is in good condition and adjusted to the proper tension.
3. All connections in the system are clean and tight.

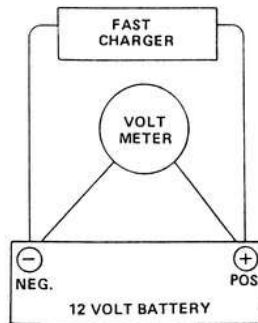
1984 Vehicles

ON-VEHICLE VOLTAGE REGULATOR TEST

NOTE: This test is performed with the alternator installed.

1. Connect a fast charger and a voltmeter to the battery as shown in the accompanying figure.

Fig. 1: On vehicle voltage regulator test

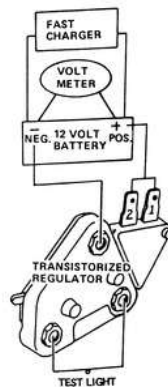


2. Turn the ignition **ON**, and slowly increase the charge rate. The alternator light in the vehicle will dim at the voltage regulator setting. The voltage regulator setting should be a minimum of 13.5 volts and a maximum of 16.0 volts.
3. This test will work even if the rotor circuit is good, even if the stator rectifier bridge or diode trio is bad.

OFF-VEHICLE VOLTAGE REGULATOR TEST

1. Connect a voltmeter and a fast charger to a 12-volt battery, as shown in the accompanying figure.

Fig. 2: Off vehicle voltage regulator test connections



2. Connect the regulator and test light as shown, observing battery polarity.
3. The test light should be on.
4. Turn the fast charger on, and slowly increase the charge rate. Observe the voltmeter; the light should go out at the voltage regulator setting.
5. The voltage regulator setting should be a minimum of 13.5 volts and a maximum of 16.0 volts.

1985-96 Vehicles

ALTERNATOR ON-VEHICLE OUTPUT TEST

NOTE: The battery must be fully charged to perform this test.

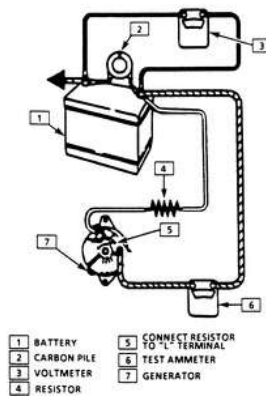
1. Connect an ammeter in series at the alternator output "BAT" terminal.
2. Connect the voltmeter and carbon pile across the battery terminals.
3. Operate the engine at a moderate speed. With the carbon pile turned "OFF", check the voltage across the battery terminals:
 - A. If the reading is above 16 volts, the alternator must be repaired or replaced.
 - B. If the reading is below 16 volts, proceed with the test.
4. With the engine still operating at moderate speed, turn the accessories ON, and load the battery with the carbon pile to get the maximum alternator output on the ammeter. Maintain the voltage above 13 volts:
 - A. If the output is within 15 amperes of the rated output, the alternator is good.
 - B. If the output is not within 15 amperes of the rated output, repair or replace the alternator.

ALTERNATOR BENCH TEST

NOTE: The alternator must be removed from the vehicle and placed in a suitable test stand to perform this procedure. The battery must be fully charged to perform this test.

1. Remove the alternator from the vehicle and mount it in a suitable test stand, according to the stand's manufacturers instructions. The test stand must be capable of driving the alternator at 6,500 rpm.
2. Make test connections as shown in the accompanying figure, except leave the carbon pile disconnected. The ground polarity of the alternator and battery must be the same. Use a 30–500 ohm resistor between the battery and the "L" terminal of the alternator.

Fig. 3: Alternator bench check test connections — 1985–91 vehicles



3. Rotate the pulley clockwise, slowly increase the alternator speed to 6500 rpm and observe the voltage.
4. If the voltage is uncontrolled and increases above 16.0 volts, either the rotor field is shorted, the regulator is faulty or both. A shorted rotor field can cause the regulator to malfunction.
5. If the voltage is below 16.0 volts, increase the speed and adjust the carbon pile to obtain maximum amperage output. Maintain the voltage above 13.0 volts.
6. If the output is within 15 amperes of the rated output, the alternator must be repaired or replaced.
7. If the output is not within 15 amperes of the rated output, the alternator must be repaired or replaced.

1990 Chevrolet CORVETTE

Submodel: | Engine Type: V8 | Liters: 5.7

Fuel Delivery: FI | Fuel: GAS

The automobile charging system provides electrical power for operation of the vehicle's ignition system, starting system and all electrical accessories. The battery serves as an electrical surge or storage tank, storing (in chemical form) the energy originally produced by the engine driven generator. The system also provides a means of regulating output to protect the battery from being overcharged and to avoid excessive voltage to the accessories.

The storage battery is a chemical device incorporating parallel lead plates in a tank containing a sulfuric acid/water solution. Adjacent plates are slightly dissimilar, and the chemical reaction of the two dissimilar plates produces electrical energy when the battery is connected to a load such as the starter motor. The chemical reaction is reversible, so that when the alternator is producing a voltage (electrical pressure) greater than that produced by the battery, electricity is forced into the battery, and the battery is returned to its fully charged state.

Newer automobiles use alternating current alternators, because they are more efficient, can be rotated at higher speeds, and have fewer brush problems. In an alternator, the field usually rotates while all the current produced passes only through the stator winding. The brushes bear against continuous slip rings. This causes the current produced to periodically reverse the direction of its flow. Diodes (electrical one way valves) block the flow of current from traveling in the wrong direction. A series of diodes is wired together to permit the alternating flow of the stator to be rectified back to 12 volts DC for use by the vehicle's electrical system.

The voltage regulating function is performed by a regulator. On these vehicles, the regulator is built in to the alternator; this system is termed an integrated or internal regulator.

An alternator differs from a DC shunt generator in that the armature is stationary, and is called the stator, while the field rotates and is called the rotor. The higher current values in the alternator's stator are conducted to the external circuit through fixed leads and connections, rather than through a rotating commutator and brushes as in a DC generator. This eliminates a major point of maintenance.

The rotor assembly is supported in the drive end frame by a ball bearing and at the other end by a roller bearing. These bearings are lubricated during assembly and require no maintenance. There are six diodes in the end frame assembly. These diodes are electrical check valves that also change the alternating current developed within the stator windings to a Direct Current (DC) at the output (BAT) terminal. Three of these diodes are negative and are mounted flush with the end frame while the other three are positive and are mounted into a strip called a heat sink. The positive diodes are easily identified as the ones within small cavities or depressions.

The alternator charging system is a negative (-) ground system which consists of an alternator, a regulator, a charge indicator, a storage battery and wiring connecting the components, and fuse link wire.

The alternator is belt-driven from the engine. Energy is supplied from the alternator/regulator system to the rotating field through two brushes to two slip-rings. The slip-rings are mounted on the rotor shaft and are connected to the field coil. This energy supplied to the rotating field from the battery is called excitation current and is used to initially energize the field to begin the generation of electricity. Once the alternator starts to generate electricity, the excitation current comes from its own output rather than the battery.

The alternator produces power in the form of alternating current. The alternating current is rectified by 6 diodes into direct current. The direct current is used to charge the battery and power the rest of the electrical system.

When the ignition key is turned **ON**, current flows from the battery, through the charging system indicator light on the instrument panel, to the voltage regulator, and to the alternator. Since the alternator is not producing any current, the alternator warning light comes on. When the engine is started, the alternator begins to produce current and turns the alternator light off. As the alternator turns and produces current, the current is divided in two ways: part to the battery (to charge the battery and power the electrical components of the vehicle), and part is returned to the alternator (to enable it to increase its output). In this situation, the alternator is receiving current from the battery and from itself. A voltage regulator is wired into the current supply to the alternator to prevent it from receiving too much current which would cause it to put out too much current. Conversely, if the voltage regulator does not allow the alternator to receive enough current, the battery will not be fully charged and will eventually go dead.

The battery is connected to the alternator at all times, whether the ignition key is turned **ON** or not. If the battery were shorted to ground, the alternator would also be shorted. This would damage the alternator. To prevent this, a fuse link is installed in the wiring between the battery and the alternator. If the battery is shorted, the fuse link melts, protecting the alternator.

An alternator is better than a conventional, DC shunt generator because it is lighter and more compact, because it is designed to supply the battery and accessory circuits through a wide range of engine speeds, and because it eliminates the necessary maintenance of replacing brushes and servicing commutators.