Modern Automotive Technology
Chapter 33
Charging System Fundamentals
Learning Objectives

- List the basic parts of a charging system.
- Explain charging system operation.
- Describe the construction of major charging system components.
- Compare alternator and voltage regulator design differences.
- Explain charging system indicators.
- Describe safety practices to follow when working with charging systems.
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1. The CHARGE INDICATOR is either the ammeter, voltmeter, or warning light that informs the driver of the condition of the charging system.

2. The CHARGING SYSTME HARNESS is the wiring that connects all the parts of the charging system.
Basic Charging System

Battery

10 ohms resistance wire

Brown (field)

10 ohms

Red (sensing)

Alternator

Switch

Ign

Generator warning lamp

Voltmeter

Bulkhead connector
3. The ALTENATOR is a generator that uses mechanical power to produce electricity.

4. The DIODE TRIO may be used to supply current to the rotor field windings.
Charging System

The alternator recharges the battery and supplies electricity when the engine is running.
Automobile’s electrical system requires direct current (DC) which flows one way.

Alternator output must be rectified (changed) from AC to DC.

Diode allows current flow in only one direction.

Several are connected into a rectifier bridge.
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5. The ROTOR creates a rotating magnetic field

6. ALTENATOR BEARINGS are used to produce a low-friction surface for the rotor shaft
Current Flow

Alternating current flows one way, then the other

As the rotor turns into one stator winding, current is induced

When the same rotor pole moves into the other stator winding, current reverses direction
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7. The VOLTAGE REGULATOR is an electronic device that controls output voltage and current of alternator.

8. The vehicle BATTERY provides the current to initially energize the alternator and helps stabilize alternator output.
Voltage Regulators

Electronic, integrated circuit (IC) regulator

Regulator mounting location

Remotely mounted electronic or transistorized regulator

Contact point or electromechanical regulator
Battery Service

- Cleaning brush
- Warm water and baking soda solution
- To battery terminal
- To cable end
- 0.5 volts
9. The ALENATOR BELT links engine crankshaft pulley with alternator pulley to drive alternator

10. The STATOR is a stationary set of windings in the alternator
Fan Belts

The crankshaft turns the alternator belt. A loose/slipping belt will cause the battery to discharge.
Type of Belts

Conventional V-belt

Cogged V-belt

Ribbed belt
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