Common Causes For Alternator Failure

1) When installing an alternator, improperly aligning the unit during mounting will cause premature belt and/or bearing failure.

2) Improper belt tension or defective belt tensioners can also cause bearing failures.

3) Improperly “swapping” pulleys of different diameters or grooves can cause failures. Check to see if the replacement pulley matches the old pulley to avoid belt problems.

4) Always check the battery with a volt meter. The reading at the battery should be 12.6 volts, which indicates a fully charged battery.

a. 12.6 or higher –100% charged
b. 12.4 or higher – 75% charged
c. 12.2 or higher – 50% charged
d. 12.0 or higher – 25% charged
e. Less than 12.0 - Discharged

5) An improper hookup sequence to the battery will cause failures. Unless advised otherwise in vehicle manufacturer’s alternator replacement instructions, first turn off the engine. Then disconnect the NEGATIVE battery cable (w/engine off). Thirdly, make all connections to the alternator. Lastly, reconnect the NEGATIVE battery cable. Completing the circuit on the “negative” side helps to avoid sending a “positive” voltage spike directly back to the alternator’s main output connection.

6) Momentarily disconnecting the battery cables with the engine running and/or improper jump starting battery hookup procedures. This can create voltage spikes.

7) When using an older battery, higher internal resistance can develop, causing alternators to run abnormally hot. Battery conductance testers provide a more comprehensive analysis of useful remaining battery life than traditional “carbon pile” load tests.

8) When using an older battery - Normally, batteries act like a sponge to absorb voltage spikes. Loose internal battery plates may touch/short and create spikes.

9) Using corroded battery cables or alternator output wires can cause excessive resistance resulting in extreme heat, which can lead to failure.

What Is An Alternator?

ALTERNATOR

An alternator is an electromechanical device that converts mechanical energy into alternating current electrical energy. To produce electrical energy the alternator utilizes power from the vehicles engine to turn an electrical magnet (rotor) within a stationary set of coils wound around an iron core (stator). As the rotor spins inside the stator the magnetic lines of force induce a voltage in the stator windings.

RECTIFIER

The current produced in the stator is alternating current (A/C); your vehicle battery however can only use direct current (D/C). The alternating current is converted to direct current by sets of diodes in a package referred to as a rectifier. Diodes are basically one way electrical stop valves that let current pass in one direction, but stop it from going back in the opposite direction. Diodes are not wear items. Used as intended a diode that is properly manufactured will last indefinitely. Diodes are however susceptible to damage from overheating. Most diode failures are due to an alternator being used to charge a bad or dead battery. This is why it is extremely important that the battery's state of charge and load handling capabilities are tested.

VOLTAGE REGULATOR

The last major component of the alternator is the voltage regulator. The voltage regulator can be located internally or externally. The voltage regulator controls the amount of voltage an alternator will produce. Voltage regulators normally limit the voltage to between 14.2 and 15.2 volts. Most voltage regulators also have circuitry to control the alternator indicator light. Many of today's voltage regulators interact with the vehicles computer system and may require specialized knowledge and equipment to properly test.

ALTERNATOR FUNCTION

The function of an alternator is to supply the power needed for all electrical items on the vehicle, plus replenish the battery from the last start up. Keep in mind though, that the alternator is not a battery charger so much as it is a battery maintainer.

If the alternator has to recharge an overly discharged battery, the alternator will become overworked, which will shorten its life. This is largely due to the high amount of heat produced by the alternator during its charging process. The greater the amperage flowing through it, the higher the heat an alternator creates. So, anytime an alternator is replaced, the battery should be fully recharged with a battery charger or replaced.

COMMON ALTERNATOR TERMINAL ABBREVIATIONS

	Batt. Neg	Batt. Pos.	Computer Input	Dummy	Field Driver	Field	Field Monitor	Ignition	Lamp	Stator Output	Sense
Bosch	D-	B+		D		DF / F	DFM	IG	I / D+	W	S
Chrysler		B+				F / F1 /F2					
Daewoo		B+						I	L	P	S
Delco		B+		D		F	FR / F	I / IG	L / 1	R / P	S / 2
Ford	GRD	B+	SIG	D		FLD	FR	I		STA / A / N	A
Hitachi	E	B+	C		D (PD type)	F		IG	L	P / N	S
Lucas	B-	B+							D+ / L	W	S
Magneti Marelli	GRD / B-	B+				FLD			L / D+	W	S
Mitsubishi	E	B+	C / G	D	D (PD type)	F	FR / F	IG	L	P / N	S
Motorola	B- / GRD	B+				F / DF		IGN	L	AC	S
Nippondenso	E / B-	B+	C	D		F	FR / M	IG	L / D+	P / N / AC	S
Valeo	B- / GRD / D-	B+				FLD / DF	DFM	I	I / D+	W / P	S

Batt Neg.	Battery negative connection at alternator.
Batt. Pos.	Battery positive connection at alternator.
Computer Input	Computer control to alternator. Usually controls voltage set point.
Dummy	Unused connection.
Field Driver	Currently used only on Mazda applications.
Field	Controls alternator voltage set point from external regulator.
Field Monitor	Connection to computer. Monitors field duty cycle.
Ignition	Key on battery positive input to alternator.
Lamp	Dash indicator light connection.
Stator Output	A/C output. Most often used for computer monitoring of alternator. Older application drove external devices such as a tachometer.
Sense	Positive battery connection to alternator. Internal regulators use to set voltage point.

IMPORTANT NOTICE

Vehicles Affected:
1995-2004 3.0L Mitsubishi Montero
2003-2004 and 1994-1997 3.5L Mitsubishi Montero
1998-2002 3.5L Mitsubishi Montero Sport

Symptoms:
Alternator charges intermittently, or completely stops charging.

Cause:
The above vehicles are more likely to drip engine fluid (oil, power steering, anti-freeze, etc.) into the alternator. The fluid creates a barrier between the alternator's brushes and commutator (slip ring) surface, preventing the brushes from properly conducting current and magnetizing the rotor coil.

Solution:
Check all power steering/coolant hoses and fittings (as well as engine oil seals/gaskets) for leaks, and repair as necessary. Be careful not to spill fluids when filling reservoirs or performing oil changes.