

Diagnosis of Alternator System Malfunctions

Item No. 1

Symptom:

Charge indicator light flashes on at times and/or regulator field relay buzzes.

Cause:

An open *negative* diode in the alternator will reduce the voltage at the STA terminal on the alternator, and at the regulator S terminal, resulting in less than 6 volts applied to the relay coil. Replace the rectifier.

A disconnected or loose connection at the STA terminal, inside the alternator, or at the S terminal at the regulator plug, can cause the same complaint, or complete loss of field relay operation. Repair the connection.

Item No. 2

Symptom:

Repeated regulator failures due to the connector wire between the field relay and voltage limiter burning in two. Regulator replacement cures the complaint with the same defect. Wiring harness between alternator and regulator has been inspected for a cut, pinch, or other damage to the white wire. System output will be reduced to about 10 amperes when the connector wire burns out, and indicator light operation will seem normal until the battery becomes discharged.

Cause:

A burned out connector wire in the regulator can only be caused by a ground in the field circuit. The ground may occur as a manufacturing defect in the regulator, the alternator, wiring harness, or by accidentally grounding the alternator field terminal while the system is operating.

An obscure cause can be a "flying short" that causes the rotor coil to become grounded to one of the rotor fingers. It may be difficult to detect except with a high-voltage leakage tester commonly used to test ignition system condensers for insulator leakage (about 500 volts is required). Be sure that the terminal area of the slip ring is clean before making the test. The coil ground occurs at the sides of the coil where the coil wires can touch the thickest part of the fingers. Replace the rotor and regulator when this defect is found.

Item No. 3

Symptom:

Trouble indications range from complete loss of charging current to headlight flare and ammeter fluctuations. Headlights and interior lights will flare up each time that the ammeter pointer fluctuates up-scale for

several seconds (toward the C mark) and then drops back.

Cause:

A loose or broken connection (or splice) in the wire (usually yellow) that connects the regulator A terminal to the battery terminal on the starter relay, will cause the complaint. This wire, called the regulator sensing wire, supplies field current to the regulator and alternator and at the same time, provides the voltage limiter coil with continuous monitoring of the battery voltage. When the connection is loose, lights will flare and the ammeter pointer will fluctuate upscale. When the wire is broken or disconnected, complete loss of charging action results. On cars not equipped with an ammeter, light flares lasting one second to several seconds, may be the first clue to the failure. Repair the faulty connection in the wiring harness.

(NOTE: Headlight flare could also be caused by a poor regulator ground connection or possibly a loose connection in the ammeter circuit.)

Item No. 4

Symptom:

The Ford car ALT light has a dim glow when the ignition switch is in the accessory position. This is a completely normal operation condition for the Ford car.

Cause:

The circuit is arranged with the 15-ohm resistor connected to the accessory terminal, and the ALT light connected to the ignition terminal of the ignition switch. When the switch is in the accessory position, feedback through the 15-ohm resistor and the ALT light causes the light to glow. The ALT light receives a ground connection from the indicator circuits connected to the ignition terminal of the switch (oil light, hot and cold lights, and the fuel gauge). The glow is brightest when the engine stops with the distributor points closed (because of the lower resistance to ground at the ignition terminal of the ignition switch).

Other cars and trucks have both the 15-ohm resistor and the ALT light con-

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nected top the accessory terminal of the ignition switch resulting in bright indicator light operation in the accessory position.

Item No. 5

Symptom:

ALT light comes on, or ammeter indicates discharge, when driving through deep puddles causing excessive road splash into engine compartment

Cause:

Great quantities of water will cause the fan belt to lose friction with the pulleys resulting in momentary inoperation of the charging system. Belts dry very rapidly so the interruption in battery charging is measured in seconds after the severe splash condition has stopped. In areas experiencing heavy rains or floods, the belt tension should be maintained at the high limit of the specification. Even when dry, loose belts will result in a severe loss of charging system capacity.

Belts must be maintained within specified tensions to preclude loss of battery specific gravity.

Item No. 6

Symptom:

ALT light comes on and accessories (heater, radio, turn signals, and gauges) operate intermittently. When accessories comes on, the ALT light goes out.

Cause:

The accessory feed from the ignition switch is being interrupted by a loose connection at the accessory stud on the ignition switch, or by a failure of the switch itself. Tighten the nut or nuts on the accessory stud or replace the switch, as required.

Information for "The Troubleshooter" is taken from Ford Motor Company's Technical Service Bulletins published for Ford dealership's mechanics.

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