Volume 3

January to December 1965

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Note from the Editor

This product was compiled from the original issues of the Ford Motor Company's publication of the Ford "Shop Tips" magazine. Every effort has been made to use the original scanned images, however, due to the condition of the material; some pages have been modified to remove imperfections.

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1965 SHOP TIPS • YEARLY INDEX

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JANUARY, 1965

Shop Tips FROM FORD

VOL. 3, NO. 1

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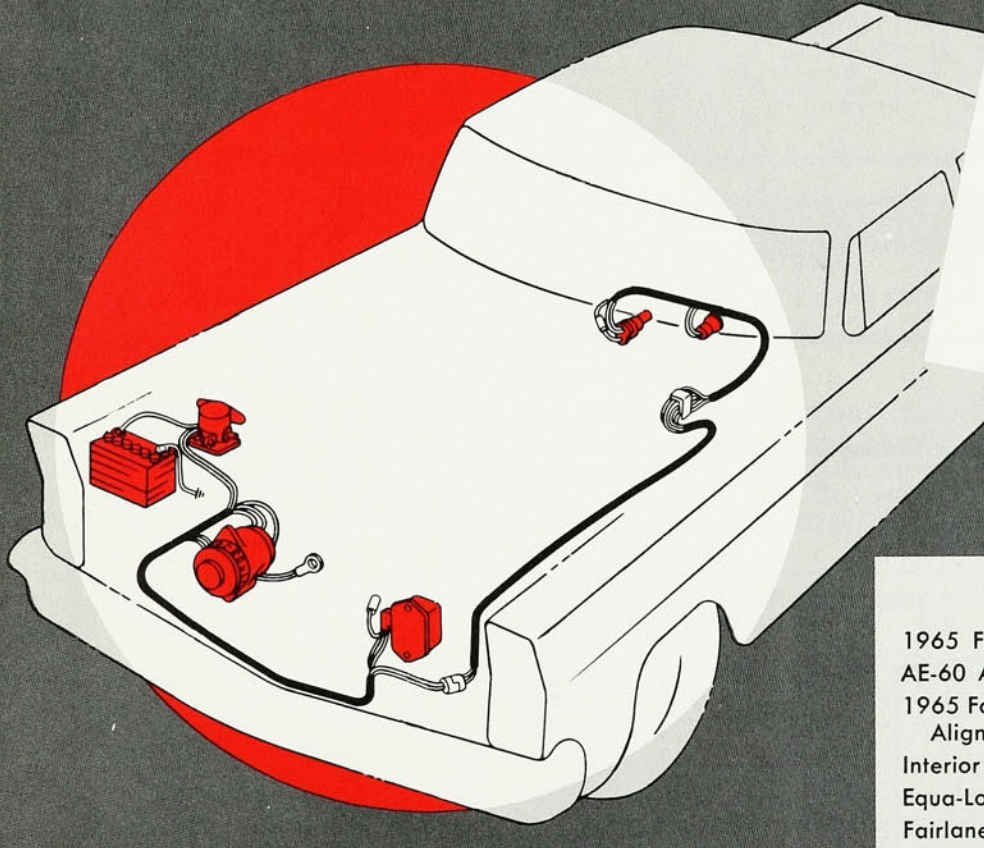
FEATURING!

ALTERNATOR CHARGING SYSTEM

DIAGNOSIS, ADJUSTMENT and OVERHAUL



SPECIAL!

This issue includes a four-page index covering all of the issues of Shop Tips since October, 1963. Be sure to remove this section and file it separately for quick reference.

ALSO . . .

Be sure to file this and future bulletins for ready reference. If you have any suggestions for additional information that you would like to see included in this publication please write to: Ford Division of Ford Motor Company, Parts and Service Promotion and Training Dept., P.O. Box 658, Dearborn, Michigan, 48121.

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AUTOLITE

ROTUNDA

From Your Ford Dealer

ALTERNATOR CHARGING SYSTEM...

The need for knowing how to service alternators is growing fast. In 1965, all Ford vehicles are equipped with alternators. It is important that service personnel understand how they work and be able to diagnose troubles and correct them.

The alternator is made up of the same functional parts as the D. C. generator. It has a field coil for excitation which is called the rotor. The rotor revolves within the alternator housing thus producing the magnetic field.

The alternator stator contains the heavy current carrying wires and is stationary as its name implies. The principal advantage of the alternator over the generator is the possibility of higher maximum operating speeds. Both the generator and the alternator produce electric current by the process of electromagnetic induction. In each case, current is induced within the conductors and transferred to the converting device. The induced current and voltage in both the alternator and the generator is alternating current. This alternating current must be converted into direct current before it can be used in the charging system of the automotive storage battery. The generator uses a mechanical switch (commutator and brushes) to convert the alternating current in the armature to direct current. The alternator system uses a diode rectifier to make the conversion. Both the generator and the alternator operate on the same fundamental principle; however, the alternator can produce more current in less space. See Figure 1 for the component parts of the alternator assembly.

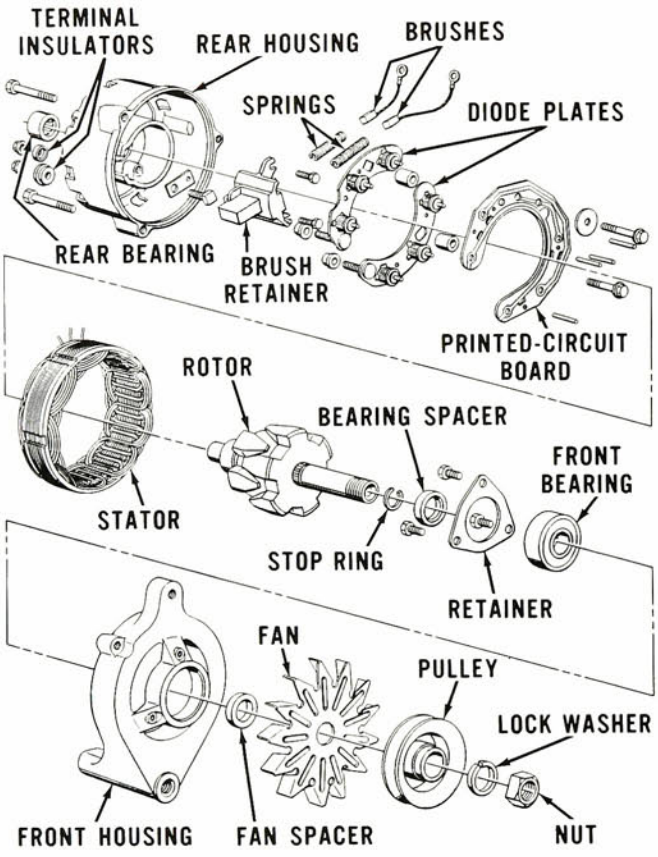

Figure 1

ALTERNATOR CHARGING SYSTEM

The alternator charging system is composed of an alternator, regulator, battery and a charge indicator or ammeter. These units are connected by means of cables, wires and parts of the vehicle itself.

Alternator output is controlled by the regulator so that adequate current is supplied without injury to the alternator or other electrical units served by the supply system.

To test and diagnose the charging system intelligently, it is necessary to know how the system operates, where to make tests, how to make tests and what the tests mean in relation to the performance of the system. An examination of the charging system circuit will reveal the circuit connecting points and locate the test areas. See Figure 2.

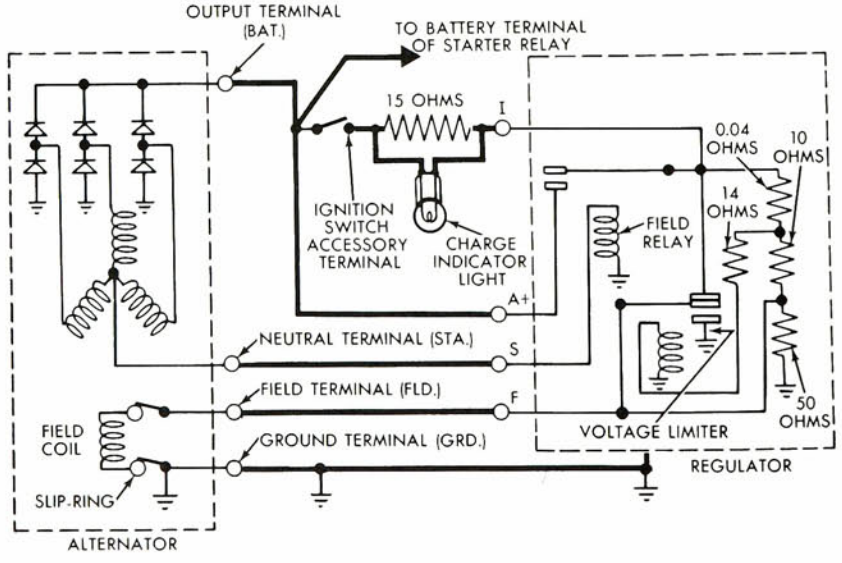

Figure 2

DIAGNOSIS, ADJUSTMENT and OVERHAUL

ALTERNATOR CIRCUITS

Figure 3 shows the schematics of the alternator charging system.

When a *charge indicator light* is used in the charging system, the regulator terminals are connected as shown in Figure 3-A, and a wire is connected between the regulator ground and the alternator ground. The field relay is activated as the regulator output reaches a specified output.

When an *ammeter* is used in the charging system, the regulator "I" terminal is not connected, nor is the alternator neutral terminal connected. The regulator "A" terminal is connected to the starter relay battery terminal and the regulator "S" terminal is connected to the ignition switch as in Figure 3-B. Closing the ignition switch activates the regulator field relay.

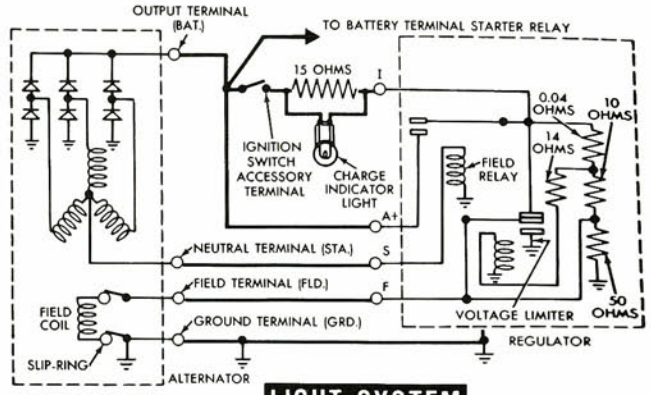

Figure 3A

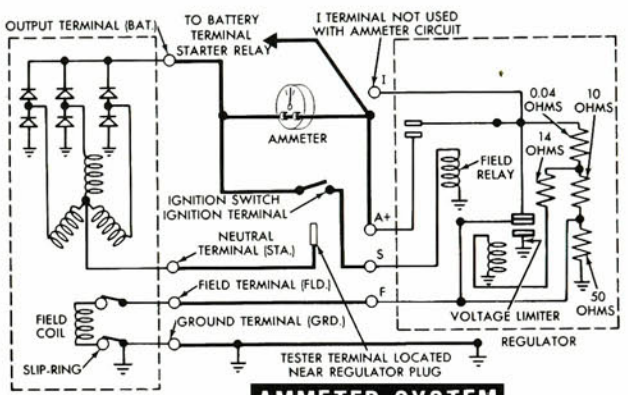

Figure 3B

TESTING AND DIAGNOSIS

Mechanical energy supplied by the engine is converted into electrical energy by the alternator. This energy is used to charge the battery and supply power to the electrical system when the engine is running. The alternator should supply all power for the load and also recharge the battery. If the charging system does not operate properly and the battery and drive belt have been eliminated as possible causes of the trouble, check the alternator output.

ALTERNATOR OUTPUT TEST

The Alternator Output Test measures the current output at the specified speed and voltage. The test result is a measure of the ability of the alternator to produce its rated output. See page 8 for specifications. Connect the test instruments to the charging system as shown in Figure 4. Remove the ground cable and the positive cable, then install the battery post adapter switch. Open the switch and connect the ground cable. Connect the field leads to the regulator plug with a jump wire (male spade lugs with wire leads may be used to make these connections). Turn the field resistance off. Connect a tachometer to indicate the engine rpm. Place the transmission in neutral or park and apply the parking brake.

Test Procedure

1. Close the battery post adapter switch and start the engine. Open the battery post adapter switch. All electrical accessories must be turned off, including door-operated interior lights.

2. Increase the engine speed to approximately 2500 rpm and observe the voltmeter and ammeter.

3. Turn the field resistance control knob clockwise until 15 volts are indicated on the voltmeter.

4. Observe the ammeter reading. To obtain the total alternator output, add two amperes for vehicles equipped with the transistor ignition system.

5. If the battery was fully charged, it might not be possible to obtain maximum current output. If specified current is not obtained, make the following test before condemning the alternator:

A. Turn the field resistance control knob off. Rotate the master control knob to the Current Reg. position. Maintain the engine speed at 2500 rpm.

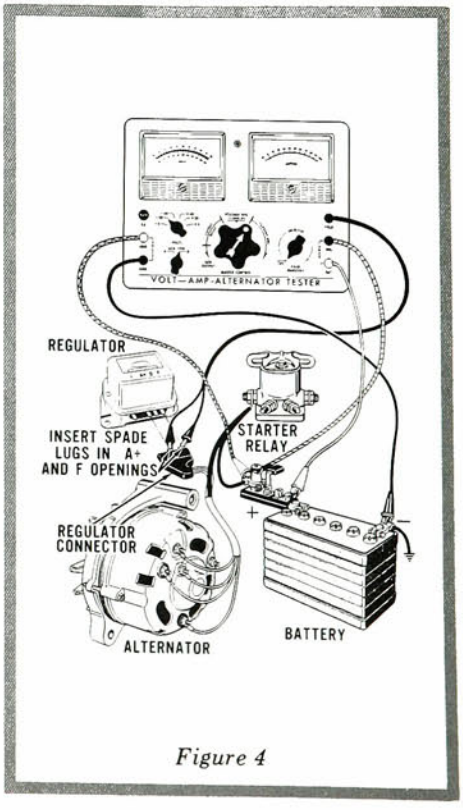

Figure 4