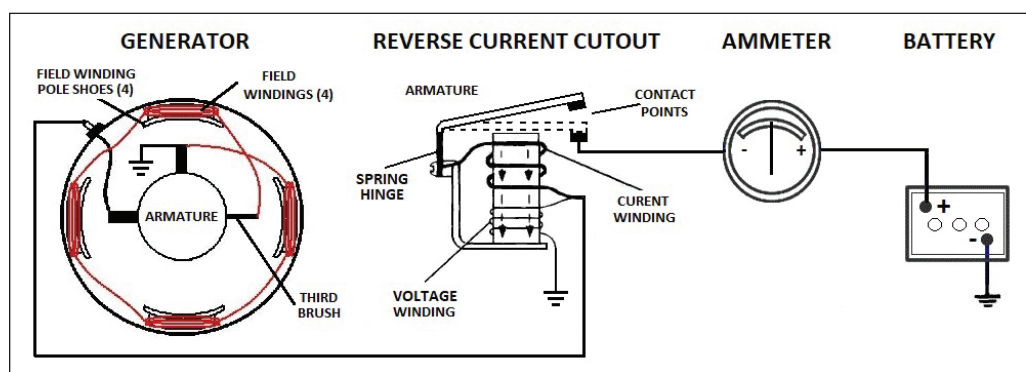


# Model T Ford Battery Charging System

By Ron Patterson of Nicholasville, Kentucky

The Model T Ford battery charging capability is a subsystem of the Ford FA Starting and Lighting System designed by Mr. Fred Allison at the Ford Motor Company electrical engineering department. It was introduced in late 1918 for use on Model T Ford cars and trucks.

Many people have trouble with the charging system on their Model T and need help repairing it. Here is an electrical (not physical) schematic diagram and technical description of how the system works.



When the engine is stopped and the generator is in its quiescent (inactive) state, as shown below, the four field winding pole shoes maintain a residual alternating N-S-N-S magnetic polarity from their last use. These weak magnetic lines of force from the pole shoes are impressed upon the generator armature windings, but no current is produced because the armature is not rotating.

When the engine is started, the generator armature begins to turn producing a small voltage in the armature windings. A portion of this voltage is picked off by the third brush and fed to the field windings increasing pole shoe magnetism and in turn armature voltage.

This armature, third brush to field winding feedback loop continues to increase the generator

output voltage to full operating level and is referred to as “building up.” The inability of the generator to build up is a common generator failure and has several causes. The armature, third brush and field winding circuit controls the output current of the generator when operating normally (i.e., the position of the third brush controls the field winding pole shoe magnetic strength impressed on the armature windings and in turn the output current of the generator to the terminal bolt).

The armature output brush is wired to the generator terminal bolt where the cut-out is connected. The cutout has two windings: a voltage and a current winding.

The build up described above continues until the voltage reaches 7.2 volts (the normal charging voltage of a 6 volt battery) in the cutout voltage winding, which operates the spring loaded relay, closing the cutout contacts connecting the generator to the battery. At this point the generator charging current is flowing to the battery via the cutout current winding that holds the cutout armature contacts closed and charges the battery.

As long as the generator continues producing current to the battery, the cutout contacts will remain closed. The ammeter will show the charging rate as set by the third brush in the generator.

As the engine slows down or stops, the generator charging rate decreases to a point

where current is flowing from the battery to the generator. This reverses the current flow in the current winding, forcing open the cutout contacts, and disconnecting the battery from the generator. This is why the cutout is called a “reverse current cutout.”

This process of connecting and disconnecting the generator to the battery in the cutout goes on continually, depending upon the speed of the engine while driving. There is heavy current flow at the cutout contact points. Significant arcing occurs during connection and disconnection which directly affects the long term reliability of the cutout.

A word is in order about setting the generator charging rate. In the Model T era, cars were driven at slow speeds on short trips. To keep the battery charged, Ford recommended setting the charging rate at about 12 amps.

Today we drive our Model Ts at faster speeds and for longer periods. With the charging rate set so high, the battery is continually being overcharged with the generator operating at or near its design capability.

The best solution to this problem is to replace the reverse current cutout with a FunProjects™ voltage regulator which modulates the output of the generator to the extent the battery actually needs charging. This operates the generator at a reduced charging rate and prevents overcharging the battery and exceeding its limited capability. The generator charging rate is correctly set when installing the voltage regulator.

I would like to thank Bob Cascisa for his assistance in preparing the simplified electrical diagram of the Model T Ford charging system for this article. □