



TClinic

IGNITION ELECTRICAL CIRCUITS

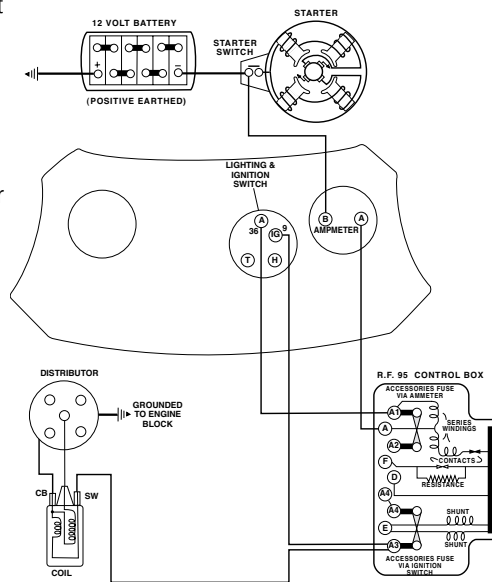
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Let's look at the ignition circuit in the TC. If you need a basic understanding of electrical theory then please refer to TClinic #59, Electrical Basics.

ELECTRICAL PATH

We need to get a path from the battery to the coil and distributor and then back to the battery. The path takes a round-about way so read on and refer to the drawing. From the battery the path that electrons would follow is through the heavy cable leading to the starter switch. At the switch a smaller wire joins the battery cable there and leads back up to one of the terminals on the back of your ammeter gauge located on the facia panel. After passing through the ammeter the flow continues out the second terminal and then to your control box (it is that black box with what seems like a thousand wires running to it and is located on the drivers side of the battery box). Don't let all those wire intimidate you. The wire from the ammeter we are looking for is the second one from the left and attaches to the "A" terminal. Don't worry about what happens in the control box for now but know that the "A1" terminal right next door is where the path exits and the wire attached to the "A1" leads directly to the ignition switch on your facia panel. Now all those stored electrons are just sitting in the battery waiting for someone to turn on the ignition switch so the rest of the electrical path can be accessed. So let's turn the ignition key. You now have given the electrons a path out of the ignition switch where they can follow a wire, to of all places, back to the control box and the "A3" terminal which is on the complete right side of row of terminals. For the ignition the electrons don't really travel into the control box but only makes use of the terminal connection to join up with the second wire attached to the same terminal. This second wire leads to one of the smaller terminals on the ignition coil. In the coil, the path splits into two parts. The purpose of the coil is to provide thousands of volts to the spark plugs so one path exits the tower via a heavy spark plug wire and leads to the top of the distributor. The second path in the coil is many, many windings of wire inside and exits out the second small

terminal. From there a small wire leads over to the distributor points. Remember also that we need to get the electrons back to the battery so both the distributor and each spark plug are grounded to the engine block and make use of the return path as described in TClinic #59.



TROUBLESHOOTING

Wow, with all those connections it seems like a lot of potential for problems but in reality there are only a couple spots that tend to give problems. A really quick way to test out the first half of the circuit is to try the horn. If it beeps then everything is OK up to the ammeter as it shares that part of the circuit with the ignition system. Turn on any of your main lamps (headlamps, running lamps or dash lamps). If they light up then you know everything is OK up to the ignition switch, again because the lamps share that part of the circuit. Next try the wiper motor or fog lamp. If either works then you know (because the circuit is shared) that everything is OK up to the second return to the control box at terminal "A3." If those tests indicate a problem, the connections are the best place to check. The ignition circuit does not go through any fuses so put your mind to rest there.

If those parts of the circuit pass the test, that only leaves a couple wires, the coil, the distributor and sparkplugs left and that is where most ignition problems occur. Of those components, the distributor gives the most problems.

The points in the distributor are the big problem area. They open and close about 8,000 times a minute at highway speed. If not maintained the rubbing block will wear down and a bad gap will cause the coil to malfunction. Points burn so must be monitored from time to time. And if the points do function but are not timed properly then the spark will occur at the wrong time but that is a mechanical problem and not an electrical one which we are focusing on here.

As mentioned earlier, the electrical path splits in two at the coil. The coil works when the electrons flow in the coil and then abruptly stop when the distributor points open. This causes a magnetic collapse which causes thousands of volts to build up. This charge then flows out the top tower through the coil wire to the distributor, which then distributes the charge to each sparkplug in turn. Sparkplug wires can become old and break down. For fun take a look at the sparkplug wires on a running engine when it is dark out. If you see blue traces along the plugs, wires or cap then some of your electrical energy is not getting to the sparkplug gaps properly. Sparkplugs can get fouled and not fire. What happens is the business end gets contaminated and the spark takes a short cut and rather than jump the gap causing a spark, the energy follows the contamination down the porcelain insulator.

Every once in awhile a coil goes bad (usually because it overheats when someone turns the key on without starting the car for a long period). The fine windings inside then burn out. In if doubt of a coil, try putting in a known good one to see if the car fires off. Some may question which wires go to which terminals on the coil or can it be hooked up backward. The answer is yes it can but the TC will basically run either way. To get the most out of the coil though there is a proper polarity and that gets involved enough to save for another time.