



When the solenoid is de-energized the internal spring pushes the plunger forward and seals off the path to manifold vacuum. The distributor sees around the plunger to open air or in some cases ported vacuum (i.e. '74 big blocks with manual transmission).

When the solenoid coil is energized the plunger is pulled rearward by the solenoid coils opening the path to manifold vacuum. The distributor pathway still sees the rear port but it doesn't matter you just suck air in through the back (the reason for the filter) or in my case the distributor also sees ported vacuum.

There is also a temperature switch on the block that opens a ground path to the solenoid when the engine is too cold or too hot. It's a bi-metallic strip that makes contact on one side of the switch below a certain temperature and on the other side of the switch above a certain temperature.

Some models also have a timer relay so that the solenoid is energized for a set time while starting a warm engine. I say some models because mine did not have one.

On some models there is also a switch at the transmission that energizes the solenoid when you are in high gear. Again I say some models because I didn't have one of these either. (Apparently on big blocks with automatic transmissions you get ported vacuum unless the engine is too hot or too cold then you get

manifold vacuum, so in my case it has nothing to do with the transmission, only temperature).

To troubleshoot the system, first see if the solenoid is operational. Unplug the wires to the solenoid and connect it to a 12 volt source (one terminal to the + and the other to the -. I don't think it matters which one but if you want to make sure the tan wire that you take off is the + source when connected. When you disconnect the power you should hear the plunger snap forward. If you can't hear anything you can verify KIA by hooking up a short section of tubing to the manifold vacuum port. With the solenoid de-energized suck on the tube the path should be closed. Now energize the solenoid, you should be able to suck air through the tube. Alternately cover the distributor port and rear port to make sure both paths are clear. As a final check de-energize the solenoid and hook the tube to the distributor port and suck through the tube to make sure there is a clear path to the rear port when de-energized.

Once you have determined that the solenoid is OK you can make up a test light with an old 12v light socket and bulb with sufficient leads to get the light outside the hood where you can see it while driving, use a couple crimp on spade terminals to connect to the plug. You may also want to connect the distributor directly to the manifold vacuum for the test drive.

Start the car (light should come on) engine is cold

Let engine warm up (light should go out).

After engine warms up shut car off and immediately restart car (light should come on) timer activated.

After a short time (light should go back out) time runs out.

I wouldn't suggest testing for engine too hot.

Now drive the car to where you can get it into high gear. When you shift into high gear (light should come back on).

This is of course if you have all the bells and whistles.

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Basically the TCS system denied vacuum to the vacuum advance under MOST operating conditions. This was done to raise combustion temps which reduced

emissions and allowed for a more open carb plates which allowed more air flow and therefore less emissions. The systems were slightly different on small block and big block car, and varied in design from year to year.

Basically, the only 2 conditions in which vacuum advance was ALLOWED to the distributor were

1: cold engine (coolant temperature ( $< 82$  degrees ) and on big blocks ( $> 232$  degrees )

OR

2: transmission in HIGH gear (3rd on auto, 4th on manual )

So the switch you're seeing is a sensor for 4th gear which allows the circuit to go to ground.

A properly operating TCS system would certainly hurt overall performance, as well as drive engine temps up. This was the tradeoff of early emission control systems.