Electrical Gremlins

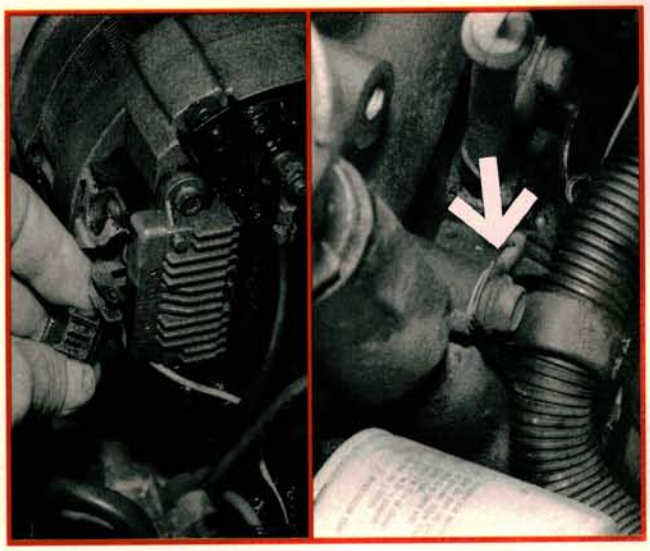
This month our little electrical Gremlin is perched on a Renault Encore. If you remember our overview article on Alliance/Encore models in last November's issue, you know we promised a follow up article highlighting common electrical problems with a French flavor.

As always, poor connections are a common cause of problems. To make things even more interesting, the Alliance/Encore models use a computer controlled automatic transmission, and a Bendix throttle body fuel system (1.4 liter engines). A port injected fuel system was used on 1.7 liter models, but the Bendix system is the one you'll see most often.

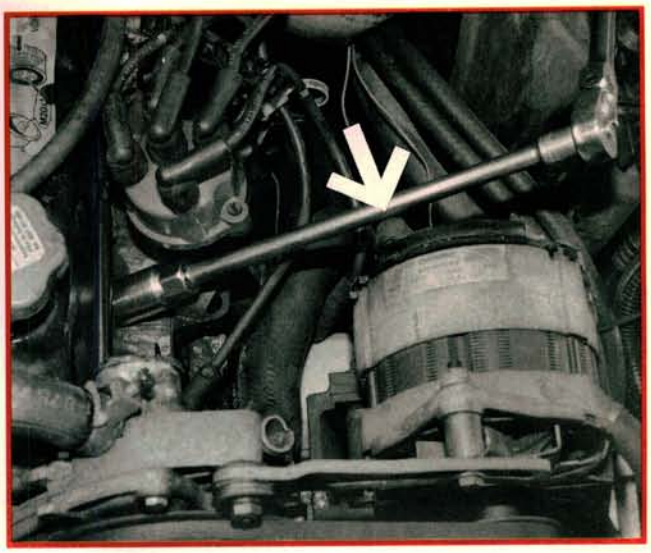
Originally, AMC dealers had a tester for the Bendix throttle body system called the MS 1700. A good tester indeed, it allowed for diagnostic tests of the engine sensors, the electronically controlled automatic transmission, and the ECU itself. There aren't too many of these testers still around, but we were informed that the Chrysler DRBII tester will perform the same tests. In a pinch, your buddy at the Jeep/Eagle dealer may be able to help.

For now, we'll concentrate on ways to diagnose and eliminate many problems if you don't have a buddy with a tester.

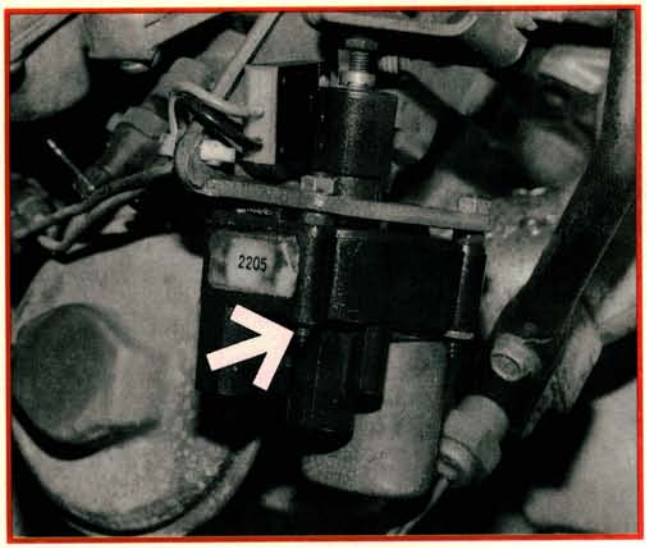
Okay, Gremlin. Do your stuff.



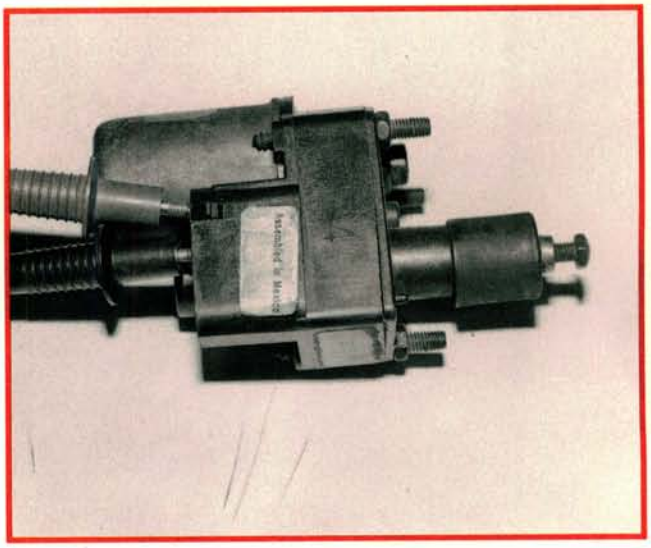
1 Poor alternator output can be caused by a number of things. Always check the connections at the back of the alternator to be sure they're clean and tight. The two wire plug was especially vulnerable to the effects of normal corrosion and high heat. At the very least, make sure these connections are clean and tight before looking for more complicated causes of a no or low-charge rate. There's also a small ground connection on the front of the engine (arrow). A poor connection here will result in a low charge rate.



2 Our arrow points to a long ratchet extension being used to remove the spark plug closest to the alternator. The B+ wire connector was originally protected by a rubber boot. Many of them fell off. Then a simple spark plug removal became an experience in arc welding when the ratchet extension contacted the hot terminal. In many cases, we found fried wiring or a blown fusible link after a DIYer did a backyard tune up. A length of rubber hose slipped over the ratchet extension is a cheap precaution against large blue sparks.



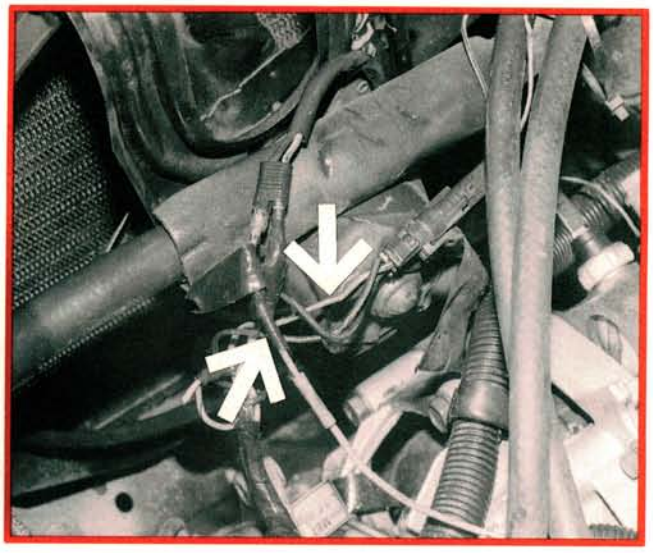
3 Idle speed is controlled by a motorized Idle Speed Actuator. Each time the engine is turned off, you should hear the ISA motor ratchet forward, click, and stop. This positions the throttle for the next start. These ISA motors do go bad, and we have also received several reports of poor connections at the plug going into the motor. The ISA bolts to the side of the throttle body. Be careful when removing the retainer nuts at the motor. The threaded studs can back out of the housing, leaving you with a handful of tiny plastic gears.



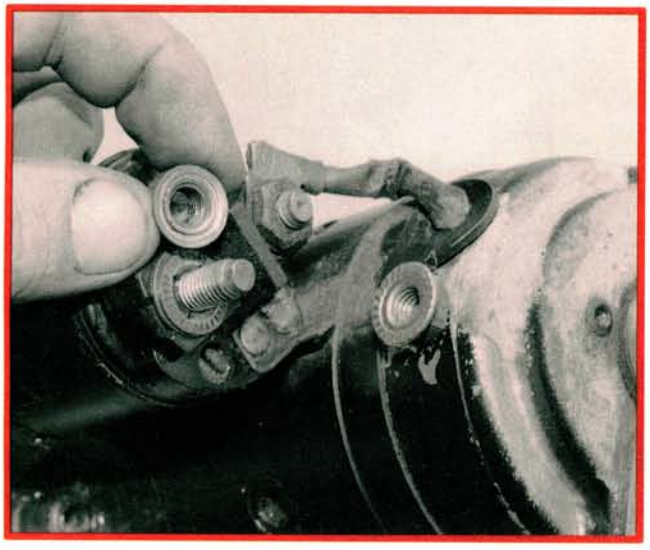
4 If you need to replace the ISA motor, fully extend the new motor before installing it. Dealers have a special harness which plugs into the ISA so they can run the motor in and out to test it. It's also used to fully extend a new motor before installing it. You can do the same thing with a set of jumpers. Disconnect the plug at the ISA (backprobing can damage the ECU). Power the motor as shown and apply slight pressure to the plunger with your finger as it fully extends. It will click and stop at the fully extended position.

Electrical Gremlins

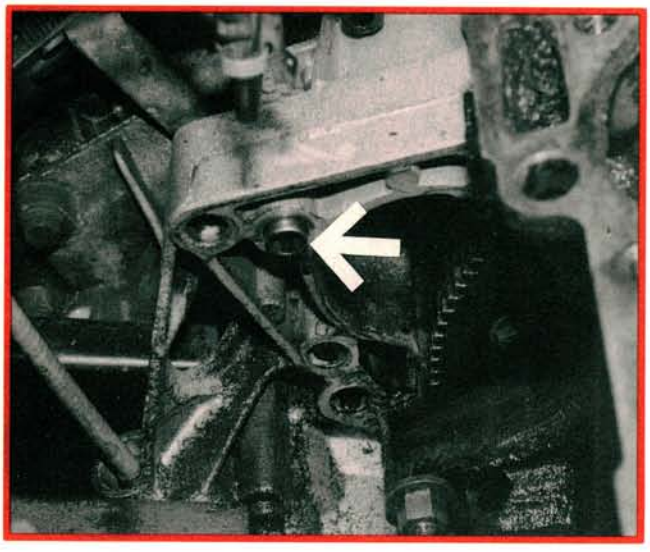
5 Before we leave the ISA motor, we should caution you that a high warm idle is not always caused by a bad ISA. As mentioned in our earlier article, the coolant temperature signal to the ECU tells the ISA motor to drop the engine speed as the engine warms. If that "warm" signal is missing for any reason, the ISA keeps the idle high, regardless of engine temp. Make sure the thermostat is installed and working. Also check the coolant temp sensors in the head which have been known to crack and fail.



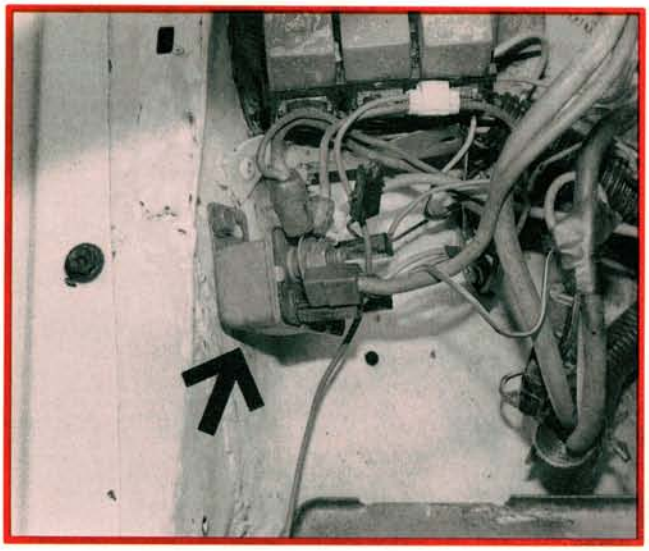
6 Don't be surprised to see a lot of backyard wiring on these cars. The chronic engine overheating problems on the 1.4 liter led some people to try weird and crazy things to eliminate the possibility of a cooked head gasket. A good friend still sees these cars on a regular basis, and many have been re-engineered to turn on the cooling fan as soon as the engine is started. Constant fan operation keeps the engine from reaching normal operating temperature—and it wears out the fans a lot faster.



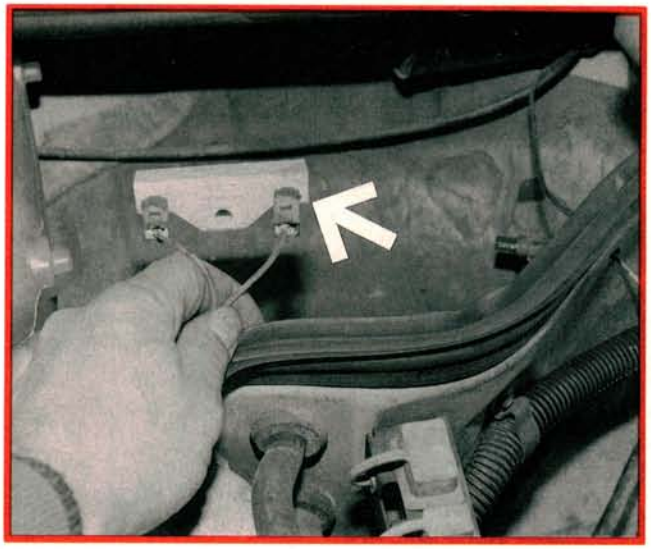
7 You say the engine won't crank? Assuming battery voltage is okay, there are several things to check. A common problem was a whopping voltage drop at the main starter lug. Just because the nut on the stud is tight, don't assume that the connection is good. Many starters have been replaced because of this problem. If a voltage drop test shows a bad connection when you try to crank the engine, disconnect the main cable, clean everything shiny bright, and install a fresh star washer between the nut and cable end.



8 Here's a tip to remember when you do need to replace a bad starter. The starter bolts to the bell housing with three bolts. But there's also a locator dowel (arrow) which fits into a recessed hole in both the starter and the bell housing. The dowel tube knows when you're not paying attention, and will try to sneak away by sticking in the old starter. If you bolt up the new starter without the dowel, odds are that the starter drive- to-flywheel clearance will be wrong. The loud grinding you hear when you hit the key will not go unnoticed.

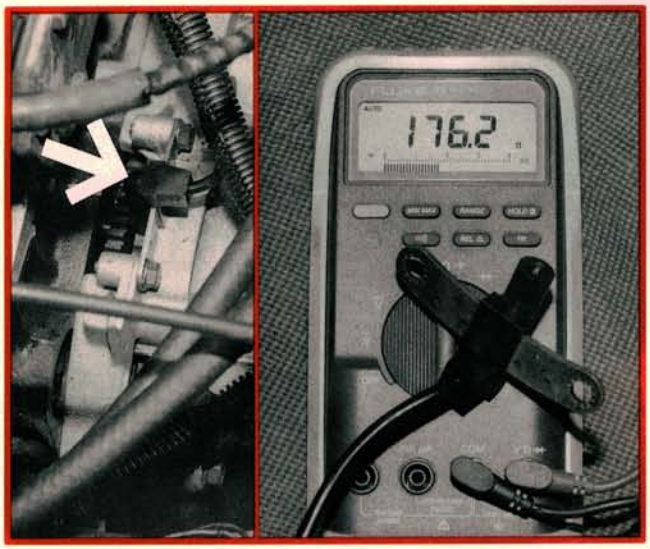


9 The starter relay is located on the right inner fender. Poor connections here are a possible cause of a no-crank condition. But there's another equally important thing to consider about the relay. Since it's so handy, some techs have jumpered here to use the relay as a remote starter switch when adjusting valves. A voltage spike can travel back through the wiring harness to the neutral safety switch (called a multi-function switch). You'll wonder how a valve adjustment caused a no-crank condition.



10 If an engine starts but stalls as soon as the key moves from the Crank to the Run position, check the ballast resistor for the fuel pump. It's located near the vacuum canister. The resistors themselves are pretty reliable, but as usual, the connections corrode. Clean and tighten the terminals and try again. The fuel pumps are inside the fuel tank. The fuel pump harness connector for some cars is located below the right rear quarter panel. Another good place to look for a bad connection.

500 Milliamp

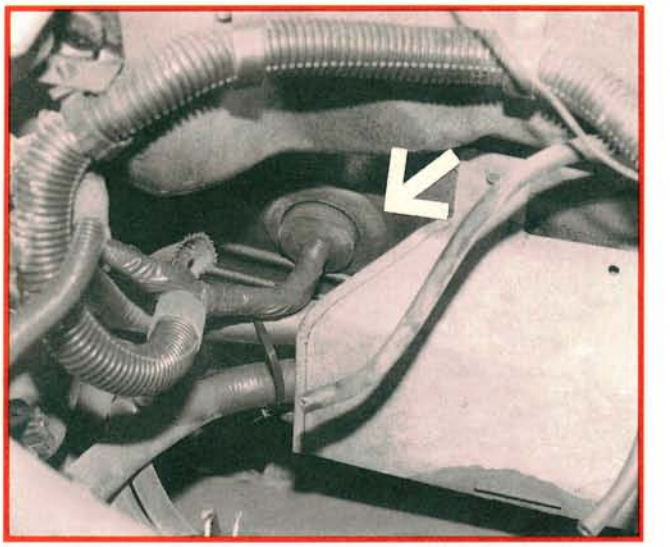


11 The flywheel sensor (arrow) sends engine speed and crank angle signals to the ignition control module. The bottom wire on the three point connector is a grounded shielding wire. There shouldn't be any continuity between the shielding wire and either signal wire. Nominal resistance across the signal wire terminals should be about 150 ohms (+/- 50 ohms). Oh, be sure to mark the torque converter and drive plate for index before removing an automatic trans. If they are out of index, the engine won't start.

12 This combination Ignition Control Unit and conventional ignition coil receives the messages from the engine speed sensor. If you get a no-start, you'll probably test for secondary spark as an indication that the ICU is good. But that's not necessarily a foolproof test of the ICU. Use a noid light at the injector plug to test for injector triggers as you crank the engine. If you have secondary spark but no triggers, there's a good chance that the ICU is bad, even though you may have good spark.

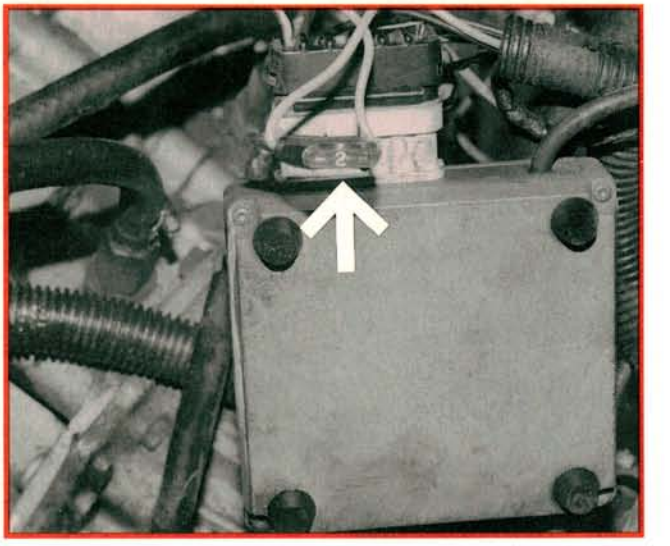
Electrical Gremlins

13 Unless you're being chased by a fully armed band of Colombian drug lords, forget about jump starting one of these cars. You may get lucky. The car may start and run. Then again, you may lobotomize the ECU or burn out a component like the multifunction switch inside the automatic transmission. And if you want to select "Trashed Fuel Systems for 500 dollars" and hope for the daily double, watch what happens when the wrecker driver inadvertently hooks you up to 24 volts. Remove and charge a dead battery.



14 Early cars mounted the battery in the water tray on the right side. The factory batteries had removable caps. Water from a heavy rain or melting snow would run down the windshield and enter the battery through a not-quite-tight battery fill cap. The overfull batteries would spill electrolyte into the battery tray. In some cases, the acid would eat through the tray and run down the firewall to the ECU harness conveniently located below the battery. The acid followed the harness to the ECU.

15 The ECUs were pretty dependable when they weren't being electrocuted or lethally injected with battery acid. Occasionally, when everything else checked out okay but the car still didn't run, we simply unplugged the ECU harness and sprayed all the contacts with contact cleaner. Many times, this fixed the car. The ECU is located under the dash on the passenger side of the car. If you do know someone with the MS1700 tester, the ECU can be removed from the car and tested separately.



16 The electronically controlled transmission uses solenoids to control shift points. Since neither solenoid is activated in 3rd gear, that becomes the failsafe. No stunning acceleration, but you can at least arrive late rather than never. Wiring problems, the trans computer, and the solenoids themselves are all possible causes for failsafe operation. But start with the obvious. There's a 2 amp fuse wired to the trans computer harness (arrow). If it's blown or the connection is dirty, you're stuck in third.