

## Roadside Diagnostics

When you roll with 40+ year old car something is bound to fail. Murphy works overtime on car guys and gals and it may happen 1 mile from home or half way to Carlisle. But if you are prepared you can get things going enough to get home or at least off the road to a safe haven.

This is diagnostic how-to for some of the easier repairs that can be made roadside and while other repairs *can* be made, a tow vehicle of some type will be needed for these issues. Besides, how many spare parts can you carry? The listed repairs have been pulled from many sources; the internet, personal experience, the EVBC mailing list, and passed down from generation-to-generation. Some even pulled off the cave walls with the drawing of pre-historic man swapping the ballast resistor on the first wheel.

### What do I need?

Check the Barracuda Survival Guide. I would pack everything that seems relevant to your car.

OK, so you packed well young padawan. You just broke down. Now what?

### NO CRANK

You turn the key, and...Nothing! Maybe a click, but no crank.

First, turn on the dome light, attempt to crank the engine and observe the dome light. Is it normal brightness? Yes? Odds are the battery's okay.

If the dome light is not on, remove and clean the battery connections and terminals. If the dome light comes on after the cleaning you should be all set. If not, take out your multi-meter or test lamp, and connect it across the battery. If the test lamp seems normal, or the voltage is at least 12.0 volts, the trouble lies elsewhere. If the voltage is very low, only a jump start, or, in the case of a manual transmission car, a push, will get you moving.

Assuming the battery checks okay, turn the key to "start". If you hear a click, and the dome light dims, you may have corrosion at the starter or starter relay end of the battery cable. A "wiggle" of the cable will usually uncover this malady. If there isn't even a click, the starter relay is either bad, or not being energized.

Here's the quick way to start it up. Take a clip lead, or screwdriver, and jump the "B" (batt.) terminal momentarily to the "S" (solenoid) lug (these are the two un-insulated terminals.) If there's 12 volts at the "big" (battery) lug, and the starter's okay, it will crank. Just go back into the car, turn the ignition switch to "run", and repeat the under hood cranking procedure to start the car.

Next, let's assume that there is a "click", or that jumping the relay doesn't make it crank. You need to check if the voltage drops way down, assuming the battery's OK,

either the starters seized, or the engine is seized. Either way, you are probably calling a tow truck.

If, on the other hand, the voltage doesn't drop, the starter has gone "open circuit". If you hear a "clack" as you jump the starter lugs, you know that the starter's solenoid plunger is engaging. The trouble is internal to the starter, with the two most likely faults being brush failure or solenoid contact failure. Get out your hammer, and give the starter several whacks! You might even want to try this while the lugs are jumped with your clip lead. If it begins to crank, go turn the key to "run", and you're on your way. Just don't forget to remove the jumper wire as soon as it starts - and, rebuild the starter, soon!

Going back to the square one, if the battery was dead, and you didn't do something silly (like leave the lights on,) the charging system is probably at fault. A simple jump-start got you going, so here's the 10-cent checkout: obviously, make sure the alternator is rotating, i.e., not seized, broken belt, etc. Then, with the engine at fast idle; see if the ammeter indicates charge. Yes? Chances are you're okay, but the definitive check is to turn on the headlamps and check the voltage at the battery terminals. If it's over 13.4 volts (at fast idle or higher revs,) you're okay, but we'd suggest checking the ignition-off current draw at a more opportune time.

No charge? At fast idle, check the voltage at the alternator output stud (to ground.) If it's 13.4 or more, the charging system itself is okay, and you're looking at a wiring problem. You can jump the alternator stud to the battery "+" lug, and it *will* charge. Since the entire alternator output will now be flowing through your clip lead, expect it to get rather hot, so dress it carefully for the trip home, and minimize your use of electrical accessories.

If the alternator output is low or nonexistent, the trouble can be in the alternator itself, the regulator, or regulator/field wiring. First, disconnect the field lug(s.) (These are the smaller push-on terminals on the rear of the alternator, 69-down had one, 70-up have 2). In the case of alternators with just one lug, jump it to the "+" side of the battery. Dual lugs require one terminal jumped to the battery, one to ground. In either case, the alternator should produce maximum output - i.e., bright lights, 14-15 volts. If this is the case, you can drive home, but run all the electrical accessories to reduce the battery's tendency to "cook." If you have a long trip, you might consider stopping every 5-10 miles, disconnect the jumper, and then connect it again 5-10 miles later, etc.

If there's still no output, the trouble is internal in the alternator. You can remove the brushes, being careful not to lose any little insulators or washers. If the brushes are greasy or worn to a stub, clean them off, and stretch the springs a bit if you can. If this doesn't do it, you're calling the towing service.

## **CRANKS, BUT NO START**

### **Compression**

A gasoline internal combustion engine needs three things to start: ignition, fuel, and compression. A lack of compression can be caused by several factors, but, on older Mopars, the no. 1 cause would have to be timing sprocket failures, especially on

high-mileage cars with OEM nylon sprockets. There are several ways of diagnosing this, but there are two that stand out. First, you should be familiar with the ruh-ruh-ruh sound your car makes during cranking. If it's suddenly replaced by whirrrrrr, there's no compression. For confirmation, crank the engine with the distributor cap off. If the rotor doesn't turn, you have timing chain related issues, possibly bent valves, pushrods, etc. If the rotor rotates, tap the key or better yet, use your screwdriver or clip lead on the starter relay to bump the engine until the vibration dampener timing mark is at about 10 degrees before TDC. At this point, the rotor should either be facing in the general vicinity of the #1 plug wire, or 180 degrees away (i.e., opposite.) If it's pretty far off, pick up the phone and make the call.

## **Fuel**

The other two factors, though, fuel and ignition, have a decent success rate. Let's begin with fuel, since that's the easiest to diagnose. Remove the air cleaner and look down the carburetors barrels (primary barrels on 4-Bbl or multi-carb setups.) See (and smell) loads of gas? It's flooded. Most likely cause of this is a stuck needle-and-seat inlet valve, with the usual roadside fix being a light hammer shot to the carb in the area of the fuel inlet fitting on most carbs.

OK, you didn't find a pint of gas in there. Pump the throttle lever back and forth. You should see solid streams of raw fuel squirting out from the accelerator pump nozzles. If these checks out okay, odds are the problem isn't fuel related.

If there's no gas, most likely cause is the fuel pump. If you packed one, go for it. If not, make a few more quick checks before calling the flatbed. First, if any of the "rubber" hoses on the "inlet" (tank) side of the fuel pump are sufficiently rotted or cracked, the fuel pump will just be sucking air, so crawl under there and have a look. Another possibility, though much less common, is a steel line failure. We've seen the shock-absorber cross member break loose and kink the line, while making no noise! If this has happened, you may be able to straighten the line, or cut out the damaged section and patch it with hose.

The absolute test of the fuel delivery system calls for removing the inlet fitting from the carb, and testing the fuel flow while cranking. Safety dictates that you extend the line over the fender with a length of hose, which should terminate in something like a pop bottle. Crank the engine; if there's not a significant flow of fuel ("pulsing" is normal) then tow it home.

## **Ignition**

Checking for spark is pretty easy. Just pull the coil wire out of the center tower of the distributor cap, and hold it about 1/4-inch from any grounded metal object - valve cover, etc., but keep it away from the carburetor. Crank the engine with key "on" if you are alone and by jumping the starter relay. You should see a decent-size spark jump the gap. If it's there, and so is the fuel, you may have something like a wet cap and rotor. Try spraying the cap (inside and out) and the plug wires liberally with the WD-40.

If there's no spark, we go to step B. First, check the voltage at the "+" side of the coil, which may also be marked "bat" or "ECU." It should be at least 8 volts with the

key in the "run" position, and within 0.5 volts of the battery voltage during cranking. If it fails the "run" voltage test, swap the ballast. On cars with the old-style 5-pin ECU, try the ballast regardless of the voltage readings.

Still won't start? Time to get extreme. Run a clip lead from the "+" side of the coil to the "+" side of the battery. It will start now, but you'd better drive home fast, as the coil and ECU (or points) will be taking a beating. Safely home, you can check the bulkhead connector, ignition switch, etc.

If the coil "+" voltage is correct, but there's still no spark, either the ECU or points, depending on what you have, is probably the culprit. For points, you can disconnect the distributor wire from the coil, and measure the resistance from the wire to ground. It should pulsate from zero to infinity as the engine is cranked. No? Take off the cap, crank, and check that the points are actually opening. A quickie eyeball adjustment will usually get you going, but points have been known to "grenade," rivets actually popping out, arms breaking off, etc. That's why you packed a spare set, right?

If you have electronic ignition, and brought an ECU, swap it and your all set. Of course, occasionally the ignition coil itself, as well as the distributor's internal magnetic pickup coil and/or its leads, will fail. So unless you packed a spare distributor, you guessed it, call for a tow.

## **What Else?**

While we've concentrated on basic repairs, there are, to be sure, many other parts of the car that can be rigged-to-go with a little creativity. OK, your fan belt is gone, and no spare handy? I'm told panty hose can be rigged up to work. Radiator leaks? Find some plastic body filler and goop it on the leak or crack an egg in the radiator. Coolant hose split open? Duct or electrical tape reinforced with cable ties, and leave the radiator cap loose. Stuck thermostat? Pull the off the housing, and remove it. Brake cylinder blown? Crimp the steel line with Vise Grips and drive on.

If you packed for the trip with the tools, parts and supplies in the survival guide and follow the simple diagnostics you can save yourself a large tow bill and get your ride to a safe place for a proper repair.

You won't find yourself rebuilding your transmission in the commuter parking lot, but you won't be stuck on the highway either.