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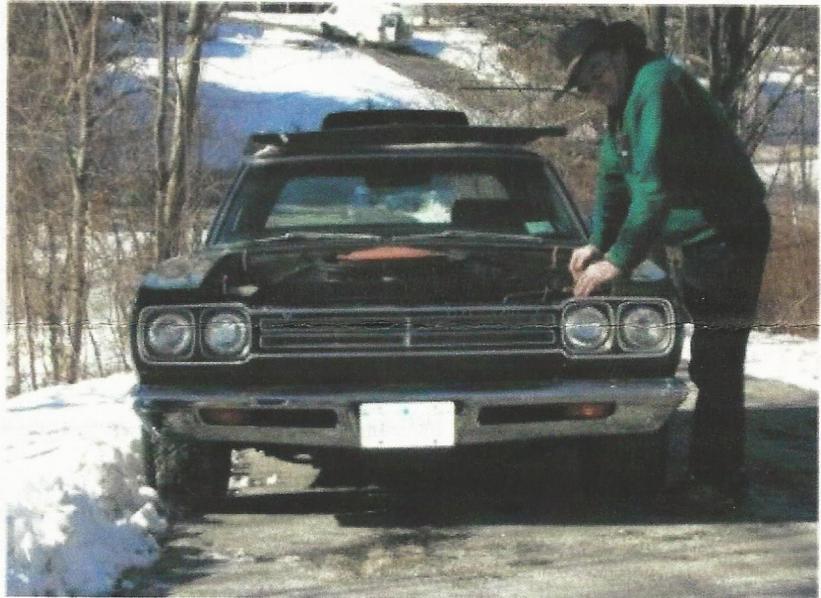
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You do have Nikes, right? GET GOING!



Roadside troubleshooting your Mopar, or when to call Dr. Hook

Text and Photos by Richard Ehrenberg, SAE

Mopars are the best. You obviously know that, or, presumably, you wouldn't be reading this fine publication. Still, our muscle-era Mopars are now 30+ years old, and even with the best of care, upgrades, and restorations, excrement will happen. It's inevitable. Naturally, the failure will occur at the most inopportune time: in a downpour, in 100-degree rush hour traffic, or in the dead of night 200 miles from Nowheresville.

We addressed this topic about 9 years ago, and it was immensely popular. In this update, our plan is to provide a quick guide to on-the-road repairs, and, just as importantly, how to quickly make that all-important decision to fold up your hand and lace up your Nikes! Since planning for disasters can make them easier to deal with, we'll also look at what the well-prepared Moparophile keeps stashed in his trunk. Since we're not writing an auto repair encyclopedia here, we're gonna concentrate on engine ailments only: no crank, no start, died while driving, and battery discharge maladies. And, they'll be no elegant high-tech stuff here, just brain-salad surgery at it's grossest. Plus, realize that we're not actually fixing the car, just getting it going - "limp home mode", as the factory calls it.

WHAT TO BRING

Whether your Mopar is a daily driver, weekend racer, or show 'n' cruise piece, unless it's trailered everywhere, at some point, it will break. Count on it. To face this situation head-on, you will, of course, need some basic hand tools. Some folks use the super-cheap Chinese, snaps-off-in-your-face stuff, but we prefer domestic brands, even for occasional use. Everybody has his or her favorite assortment, but, at a minimum, we'd include a decent

flashlight, a set of combination wrenches from about 3/8" to 3/4", a like-sized set of 3/8-drive sockets with a ratchet and one or two extensions, a few screwdrivers, a small pair of pliers, a long-nose pliers, a 6" or 8" diagonal cutters, and a 10" Vise-Grip. A medium-size ball-peen hammer is a must, as is one of those 25- implement knives. In addition, two or 3 "clip leads" (3 or 4-foot lengths of approx. 18-gauge wire with alligator clips at each end) and a DMM (digital multimeter) are musts. DMMs can be had for twenty bucks or so, and, while these are certainly not lab-quality instruments, they're fine for emergencies. If you're really bucks-down, a 12-volt test lamp might get you by. One small can each of brake cleaner, ether, and WD-40, a few feet of neoprene fuel line and some clamps, a half- dozen assorted cable ties, a small spool of 16 or 18 gauge steel "bailing" wire (for wiring up exhaust, linkages, etc.) and one roll each of electrical and duct tape, and a gallon of premixed 50/50 antifreeze round out the list. Pessimists, or those with Chevy-esque mechanical aptitudes, should just pack warm clothes, bring a cell phone, and keep their hitchhiking thumb limbered up.

Of course, all the tools in the world won't help if you have no replacement parts. As we'll see, some items *can* be coerced to work with *no* parts, but, in most cases, it's gonna be out with the old, in with the new. On cars with electronic ignition, a spare ECU and ballast resistor are must-haves. Point-ignition cars should also have the ballast, and a spare set of breaker points. If you have a dual point distributor, all you'll likely need is one pair of points. And, don't leave home without whatever belts run your alternator and water pump.

OK, we're dead meat....

NO CRANK

You turn the key, and...nothing! Maybe a click, but no waaa-waaa-waaa reaches your ear. Don't panic! Odds are, if you follow our advice, you *will* become motive!

First, turn on the dome light and turn the key to "crank". Is it normal brightness? Yes? Odds are, the battery's okay. If not, twist and wiggle the battery connectors (see photo 1 for this highly sophisticated procedure.) If the dome light comes on, you're rollin'! If not, take out your DMM or test lamp, and connect it across the battery. If the dome lamp seems normal brilliance, or the voltage is at least 12.0 volts, the trouble lies elsewhere, which we'll get to. If the voltage is very low, only a "jump start", or, in the case of a stick car, a push, will get you moving.

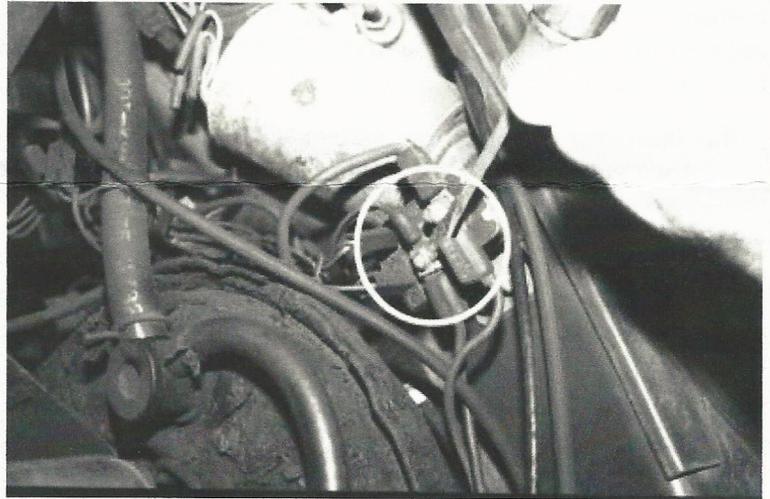


1. High-tech at it's finest...NOT! Many times, just a quick twist will coerce a corroded battery terminal to pass enough current to get you mobile.

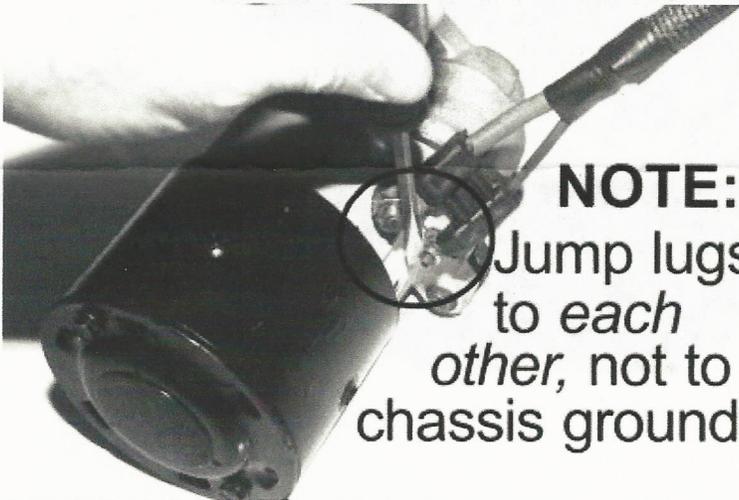


Assuming the battery checks okay, turn the key to "start". If you hear a click, and the dome light dims, you may have corrosion at the starter or relay end of the battery cable, and a "wiggle" of the cable will usually uncover this malady. If there isn't even a click, the starter relay (mounted on the firewall or fender apron) is either shot, or not being energized. No matter, you just want to get moving, and deal with it later. Here's the way out: take a clip lead, or screwdriver, and jump the "B" (batt.) terminal momentarily to the "S" (solenoid) lug (photo 2; these are the two uninsulated 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 underhood cranking procedure to start the car.

2. To bypass defective ignition switch "start" contacts, firewall connector problems, or open starter relay contacts, just jump the two uninsulated lugs on the relay (mounted, always, on the driver's side firewall or fender apron.) Ruhh-ruhh-ruhh - vroom!



Next, let's assume that there is a "click", or that jumping the relay doesn't make it crank. You need to check for 12 volts at the starter's "large" terminal. If it's there, jump the small stud to the large one (see photo 3.) If the voltage drops way down, assuming the battery's OK, either the starter's seized, or the engine is seized. Either way, you are probably calling Dr. Hook.



NOTE:
Jump lugs
to each
other, not to
chassis ground!

3. If the wire from the relay to the starter is shot, you'll need to jump the terminals directly at the starter. If there's +12 volts at the big lug, the engine *will* crank - if the starter's okay and the engine's not seized! If the starter doesn't respond, try "wiggling" the big lug, or smacking the starter with a hammer (no kidding!)

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

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!

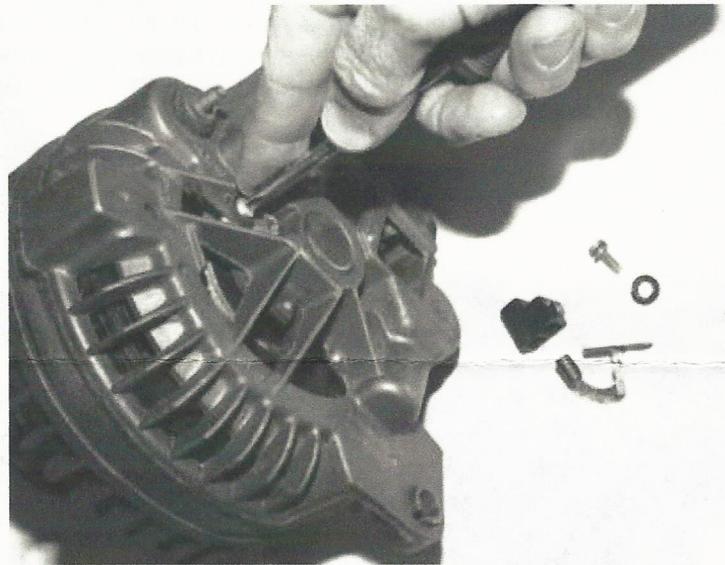
Going back to the square one, if the battery was dead, and you didn't do something silly (like leave the lights on,) the charging system is probably at fault. A simple jump-start got you going, so here's the 10-cent checkout: obviously, make sure the alternator is rotating, i.e., not seized, broken belt, 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, 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 (photo 4.) If the brushes are greasy or worn to a stub, clean 'em off, and stretch the springs a bit if you can. If this doesn't do it, you're dead!

4. If the alternator's dead, it can usually be coaxed back to life by removing the brushes (two screws, don't lose the fibre washers) and, depending on how they look, either cleaning them off or stretching the springs.

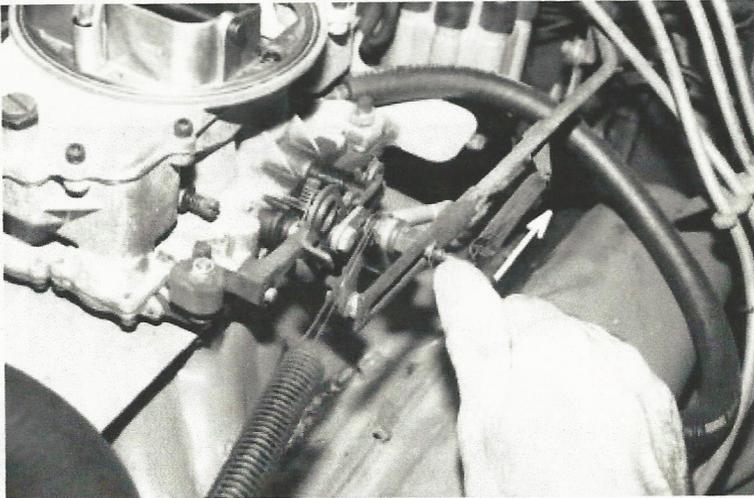


CRANKS, BUT NO START

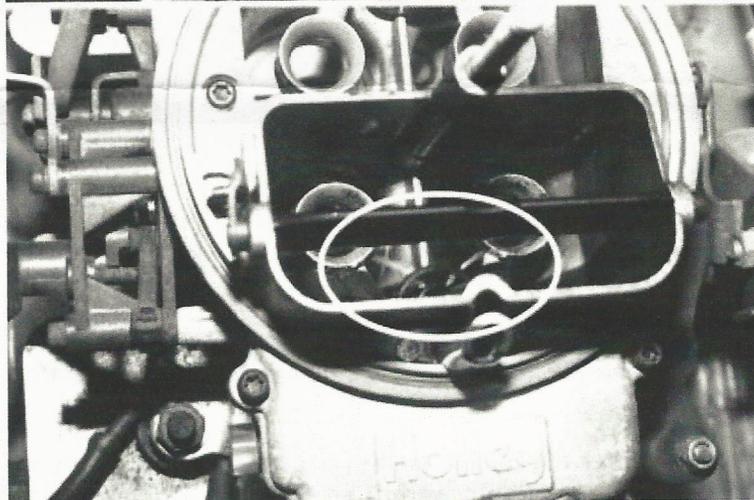
A gasoline internal combustion engine needs three things to start: ignition, fuel, and compression. A lack of compression can be caused by several factors, but, on older Mopars, the no. 1 cause would have to be timing sprocket failures, especially on high-mileage cars with OEM nylon sprockets. There 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, call the hook. For confirmation, crank the engine with the distributor cap off. If the rotor doesn't turn, you be in deep doo-doo, Vern (probably bent valves, etc.) If it rotates, tap the key (or better yet, use your screwdriver or clip lead for under the hood) 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, you're dead meat.

As you've no doubt surmised by now, compression problems aren't likely to get fixed on the side of the road. 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 carb's 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 hammer shot to the carb (in the area of the fuel inlet fitting on most carbs). Don't laugh...it works! OK, you didn't find a pint of gas in there. So, move the throttle lever (on the driver's side of the carb) back and forth. You should see solid streams of raw fuel squirting out from the accelerator pump nozzles. (Photos 5A and 5B.) If this checks out okay, odds are the problem isn't fuel related.



5A. The quickest way to check for fuel is to move the throttle lever on the carb back-and-forth (top)



5B. while watching for gas squirting from the accelerator-pump nozzles. There should be steady, strong squirts from each shooter. Anything less? Suspect the fuel pump. (But see text.)

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 crossmember 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 halfass patch it with hose.

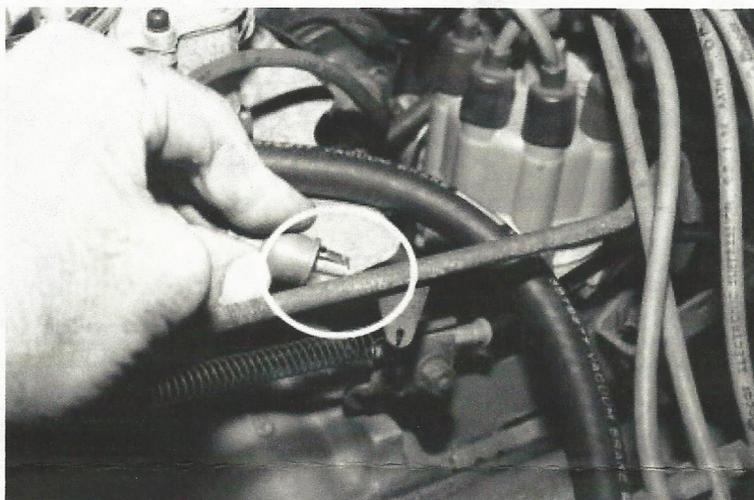
The absolute test of the fuel delivery system calls for removing the inlet fitting from the carb, and testing the fuel flow while cranking. Safety dictates that you extend the line over the fender with a length of hose, which should terminate in something like a pop bottle. Crank the engine; if there's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

While most people would say that you can't drive with a trashed fuel pump, there actually is a way, and we've personally used this sleazy method twice, once, in fact, for 150 miles! What you do is scare up a gallon jug (washer solvent, bleach, milk, etc), and punch a hole in the screw-on lid. Ream it out (using your trusty Swiss Army knife, etc.) so that your spare neoprene gas hose can just be rammed in snugly. Plump the other end of

this to the carb inlet. Fill the jug with gas, and run the hose back into the car. Hang the jug from the coat hook (inverted.) Voilá! It runs! (You'll probably need to hold the jug out the window, over the roof, to make steep grades. You'll get strange looks, but it beats hitch-hiking.

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 carb! (see photo 6.) Crank the engine (key "on" if you are alone and doing this yourself by jumping the starter relay. You should see a decent-size spark jump the gap. If it's there, and so's the fuel, you may have something like a wet cap and rotor. Try spritzing the cap (inside and out) and the plug wires liberally with the WD-40.

6. As a quick ignition check, remove the coil wire from the distributor's center tower, and hold it near (1/4") a grounded piece of metal well away from the carb. Have someone crank the engine and check for a fairly fat spark across the gap. Alone? Turn the key to "run", and hold the plug wire with one hand while you jump the starter relay (fig. 2) with the other hand. No spark? Check for at least 8 volts at the coil's "+" stud (see text.)



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 a 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 no good? Meatball surgery time. 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, you're in like Flint. Of course, occasionally the ignition coil itself, as well as the distributor's internal mag pickup coil and/or it's leads, will fail. Such is life!

WHAT ELSE?

While we've concentrated on basic engine 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 history, and no spare handy? Just wire the fan clutch solid, and drive, fast - the fan will turn the water pump! Radiator leaks? Find some plastic body filler, and slam it on. Coolant hose split open? Duct tape reinforced with cable ties, and leave the rad cap loose. Stuck thermostat? Pull the hose off the housing, and smash holes in it. Brake cylinder blown? Crimp the steel line with Vise Grips and drive on.

The coolest use for Vise Grips ever seen was when I downshifted my 1960 Valiant to first gear, double clutching, approaching a light. The damn stick broke off and fell on the floor! Before the light turned green, I had reached into the back seat, and came up with a pair of 'Grips, which I clamped on to the broken stub. Instant short-throw shifter!

The secret to eternal mobility is sizing up the available resources and making the most of them. Hopefully, we've helped you cultivate the ability to do just that.

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