



# Hot-Wiring Nightmare No-Starts

No-starts? Piece of cake.  
Except when they're not.

Here are some that weren't,  
and how they were fixed  
by a very special hot-wire:  
the iATN.

To a 'civilian,' a no-start seems like the most frustrating and difficult of all car problems. It's always unexpected and inconvenient. And entirely inexplicable! After all, 'didn't the engine start fine thousands of times before, with the same gas in the tank and the same key in the ignition slot, just like now? Doesn't it look and sound the same? What could *this* problem be?

What's it gonna cost?'

But for professional mechanics, no-starts are, if not brain-off routine, at least regular problems almost always yielding to ordinary diagnostic steps. You check for cranking voltage and speed, for spark and for gas (injector pulses for the most part, a squirt down the venturi on older carbureted vehicles). No spark? No fuel? This is the time to extract whatever codes may be in the computer — remembering that they not only refer to circuits, not components; but remembering as well there are many unintended software 'pranks' that can mislead you.

Examples? Most Eurocar shops already know how a jumped tooth on a VW timing sprocket can often set a code indicating a lost distributor ground. Why? Because crank and cam position signals fall out of synch, and that's the first reason for such an unmeshed electrical signal the engineers thought of when listing the codes. Want another? One of our readers pointed out in *Tech Tips* recently that S-class Benz cars can fall into limp-home — nearly no-start — if both brake light bulbs have burned out filaments. Why? It never occurred to the Stuttgart engineers that someone would let a burned bulb go long enough for the other to go, too, and a brake bulb check is part of the cruise control system bootup.

No brake lamp filament, no electric throttle. And it's a drive-by-wire car. You'll find an entirely use-less cruise-control DTC.

The point: Use the codes as guides, but test things directly. If you think you have no spark, pull out your spark tester, not an old spark plug, and watch for a blue snap half an inch long.

Just no gas, by itself? Check the pressure and volume. Most people skip the volume test because it's inconvenient. I always did myself, until the first car with good pressure but insufficient volume gobbled up many hours before I realized the machine was conking me over my thick noggin for stubbornly working hard but not smart. The volume test also lets you see just what you have a volume of, by letting the stuff sit and stratify over fifteen or twenty minutes. Enough water, Diesel fuel, crankcase drain oil, flaked-off tank rust or plain old dirt account for many a no-start. To ensure fuel volume, Sam Bell, *Import Service* ace contributor, says he now pours a gallon of gas into almost every no-start towed into his shop, ever since he was fooled once by a dead car with an empty tank but a gauge stuck at half-full.

If the engine cranks too slowly, you look for voltage drops in the starter circuit or mechanical binding in the starter nose bushing, but remember that a worn engine can crank at normal speed even with a weak battery. Those limp rings and slack bearings don't make drag or compression. If it cranks too fast, sounding like an electric drill spinning in the air, you've probably got a broken timing belt and on most current engines a few bent valves. Nothing so far? Spin the plugs out, grab your oil can and battery charger and launch a dry-then-wet compression test for each cylinder.

But when you get beyond the compression test and still don't know why it's not running, you start to get *That Feeling* — one of *Those Cars* has returned. Some people, more than twice burned and thus more than twice shy, just pass on the car at this point. More adventurous people toggle into puzzle-solving mode and set out to sort it out, for fun or profit — sometimes more of the first than the second.

I'm not going into procedures that reveal the workings of theft-prevention systems here because I don't want to provide a 'Cliff's Guide' for car thieves and repo crews. For those problems, see what you can find out from the carmaker (many of whom will tell you nothing). These no-starts are all from the iATN, the International Automobile Technicians Network, real-world 'Help!' posts sent to that network's 30,000+ membership and solved (usually but not always) with the help of advice sent back over that same hot-wire, the telephone line.

## Voltless Volkswagen

1995 Volkswagen Golf 2.0-liter

Four-door, stick-shift

Tom Wood of Chugiak, Alaska, had a customer who plugged his new cellphone into the car's lighter, but couldn't get the phone to work. While he'd lost the cigarette lighter itself, he checked the lighter socket, and it tested good. Unfortunately, after that the car wouldn't start. The customer had it in for the factory vehicle alarm system, which he was sure was to blame for the problem. Tom's technical information source doesn't include schematics for the alarm system, just for the ignition system; but when he checked for spark, there was none.

iATN members from all over the world came to the rescue of their colleague in Alaska. 'Forget about the alarm system,' knowledgeable VW mechanics said, 'get power to the igniter and see whether you have spark then.' He did. After a serious heart-to-heart with the customer, Tom learned the motorist had pulled the fuse panel down. The pulled and crossed wires had blown the ECM power relay, as described in a TSB # 109, position 3.

## No-Start Nissan

1989 Nissan Maxima 3.0-liter

Automatic transmission

An iATN user in Warren, Illinois, found this car would crank long initially and start only as he released the key. The cranking spark was very weak, but the car would eventually fire up. Fuel pressure was 40 psi. — within the specifications. He didn't have a scanner for the car, but from the wiring schematic he could see it would be a good idea to check inside the distributor for oil leaks which might have masked the optical signal at the LED. No such problem. It wasn't clear to him what the function of the "power transistor" was in this system or of the "resistor/condenser." The weak spark made him suspect a weak coil.

Unfortunately, he didn't get many responses to his question. But the effort of spelling out his problem led him to continue testing in an organized way. To measure the secondary output, he scoped a plug wire. When he noticed there was no increase in KV's under running acceleration, he began to look around more. Sure enough, almost out of sight behind the coil the spark would jump through the coil wire insulation and into the block. Replacing the coil wire fixed the car.



## Bimmer Bomb

2000 BMW 750i 5379 cc  
Automatic trans, low mileage

Mike Davis, in Chatsworth, Georgia, got this Bavarian in from a local body shop. While they were working on it the battery died, so they replaced the upper battery (apparently it has two). Now, however, the starter didn't crank. Mike also suspected the antitheft system, for which he had neither the shop manual nor the owner's manual. The body shop assured him the car was running before the battery problem.

Mike got only one reply, but that one a silver bullet with just the right answer from Mel Cook (don't know his location or shop). This car, he said, has a BST system, for battery safety terminal. This is a subsystem of the MRS, multi-restraint system, and its function is to blow the positive cables apart if the vehicle is in a wreck, thereby reducing the risk of an electrically induced fire. The black plastic covers over the terminals made this very hard to spot visually. Who'd have guessed it?

## Halted Honda

1993 Honda Accord 1.8-liter  
176,000 miles, second engine

An iATN user in Fresno, California, struggled with this problem car. Some of the time it wouldn't start, but when it did a stall would soon follow. Power to the fuel cutoff solenoids came on only about 15 seconds of cranking, so sometimes the fuel bowls would empty, and the engine would stop. He quickly ascertained that as long as the solenoids had power, the engine could run, but three technical information sources disagreed about how the system was wired and the hotline to which he subscribes asked him to call them with the answer once he found it. He did believe there was a starter relay (besides the regular solenoid) somewhere, but couldn't find it. Part of the information he had suggested it used a signal from the voltage regulator.

When he replaced the alternator, the problems were solved. Evidently a voltage feedback either through the regulator or the diodes triggered the still-hidden relay into chopping power to the fuel shutoff solenoids and shutting down the engine.

## Chilly Swede

1991 Volvo 740t 2.3-liter  
Over 100,000 miles

Tony Waters in Winter Haven, Florida, took in this Volvo from another shop that had just replaced the engine with a used one. Even in the warm Florida weather, the car didn't like to start when cold. When he probed for voltage, he found no command to the cold-start injector — it had power on one side, but no ground pulse on the other. The signal, of course, comes from the ECU, but Tony wondered how far out of range a coolant temperature sensor would have to be to send the computer false information.

Tony got several replies, but as he said "only one of them agreed with me." So he went with his own judgement and replaced the temperature sensor in the cylinder head. Now the car starts normally since the cold-start injector fires when it should.

## Shadowed Eclipse

1991 Mitsubishi Eclipse 1.8-liter  
Automatic, 100,000+ miles

The car came into a Cape Girardeau, Missouri, shop on the hook, and the owner replaced the engine with one that ran in the donor car. But then the good engine wouldn't start, even with the battery charger helping out the marginal battery. He found no injector pulse during cranking. If he primed the fuel with a power probe during cranking, the engine would start until he shut off the power probe. Because he had the hardware on hand, he tried replacing the MPI relay with a 'known-good,' ditto the ECU and the distributor. He carefully followed every step in the flow charts, and everything on them checked out OK. A careful check of all the engine wiring revealed no shorts and no opens. He had no codes, good fuel pressure, good spark — and a chronically dead engine.

Turns out, he says, the battery had an internal short. Trying to start it from the charger somehow starved the MPI relay for power, presumably because of the a/c ripple at the top of the system voltage.

## Sedentary Sentra

1987 Nissan Sentra 1.6-liter

Stick-shift, 87,000 miles

Chokeless carburetor, federal emissions

Danny Savary from Ironton, Ohio, discovered this Nissan with a hot-soak problem. Once warmed up, it will restart and run, but only until the carb bowl runs dry. After that it has to cool down for the next restart. The car never quits while driving, according to the carowner, who had recently taken a 2000-mile trip with the car in this condition. Long prior to the problem, the car got a new carburetor and fuel pump, and it ran using them for thousands of miles with no problem. Danny noticed the fuel pump (mechanical) had two spacers, one of which he removed. This had no effect on the hot restart problem. He checked the charcoal canister for leaks and confirmed a new fuel filter. Then he turned to the iATN.

Sometimes it's the world that changes, not the car that goes bad. Gasoline that's available now has a higher Reid vapor pressure than what was in the pumps in 1987, so it's much easier to get vapor lock in a mechanical fuel pump once the engine is hot. Danny solved the problem in the classical way, by installing an electric fuel pump at the tank, distant from and relatively immune to the effects of engine block heat.

## Muddled Mazda

1986 Mazda 323 1.5-liter

Kelly Bybordi in Bloomington, Illinois, ran careful tests on this 323. He found 38 psi. fuel pressure (right where it should be at crank), 160 psi. on all four in the compression test, injection pulse every time, good hot spark all the time, clean fuel. The shop had already replaced plugs, cap and rotor, and the rotor was not one of those three-ways that can go on the wrong way. The timing belt and sprockets were in the right configuration. By the book, everything should work. But the car hadn't read the book, wouldn't start and flooded the plugs after every attempted startup.

The problem was, it turns out, this is a distributor cap that can go on 180 degrees out of position and look perfect. And everything is perfect, except for the spark at the top of the exhaust stroke. Kelly described this as "forgivable stupidity" since they really should have designed the cap otherwise.

## Nissan with Nada

1986 Nissan Stanza Wagon 2.0-liter

162,000 miles

An iATN member in Roseville, California, got this Nissan wagon from another shop that had bolted a distributor on without any benefit. It had no injector pulses and a puzzling cluster of codes: 22, fuel pump; 23, idle switch; 31, load signal; and 32, start signal. He went over all the input signals with a scope, and all of them were as expected. Tests on the code-flagged circuits proved the idle switch was fine, the fuel pump got no ground signal, the start signal was OK, there was no injector ground and the ignition control was OK. Pulling out the computer and opening it up, he found a burnt spot where some solder had melted, so he replaced it with a new one. "As usual," he said, "this was not the problem." Another module had similar negligible effects.

Unexplained in the technical literature, the computer system on this car uses a self-defense strategy: If *any* injector is shorted, the computer cuts off *all* the injector pulses, not just that one. Either there is no code for this, or the conditions were not met, or the computer couldn't detect it internally.

## Sweaty SAAB

1992 SAAB 9000 2.3-liter

131,000 miles

Ronald Lombardi in Poccaset, Massachusetts, had this car in his shop. At first it would run about ten minutes and stall. Then it had to sit about an hour before it would restart, only to repeat the cycle. Since he had 'known-good's' on hand, he SWAG-tested the car with a replacement "ignition cassette" (*module* through Swedish translation, presumably) and ECM, but neither had any effect. Testing revealed that both spark and fuel went away simultaneously when the car died.

SAAB mechanics from all over let Ronald in on the pattern failure: the crankshaft position sensor likes to fail as it warms up. With the new one in, the engine kept running.

### Snoring Swede

1989 Volvo 740gi 2.3-liter  
125,000 miles

An iATN member in Red Bank, New Jersey, got this no-start Volvo in on the hook. With no spark to the plugs, he replaced the module, the one on the fender by the air cleaner. There was still no spark, so he replaced the coil. Still nothing. Finding the underhood diagnostic connector, he extracted the codes, getting only 1-1-1, which meant the ignition system was OK. He got the ignition control module under the dash out, took the cover off and looked for burned spots or melted solder. But everything was intact. He ran ground and voltage-drop tests on everything connected with the ignition system, with positive results everywhere. He checked the timing belt and sprocket configurations, which were on the money. He found 12 volts to both sides of the coil all the time and a single spark when he rolled the key from run to crank.

Acting on advice he got from iATN members, he ran a waveform test on the crank position sensor: The pattern was dead flat. The new one fired the engine up right away.

### Homesick Audi

1985 Audi 5000 2.2-liter turbo  
129,000 miles

An iATN member in Pleasant View, Tennessee, had just rebuilt the engine in this car and completed its final test drive when he shut things down. But it wouldn't restart until it cooled down to nearly ambient. "It just didn't want to leave our shop," he observed. He went through the harness the next time the engine was running, wiggling every connector trying to get it to stall. Sometimes he could get it to start warm if he moved the distributor slightly.

Following suggestions he got back from his post, the member discovered a vacuum leak on the top of the boot over the airflow meter, making the mixture too lean to start when warm but not too lean when the system compensated because the engine was cold.

### Mangled Mazda

1998 Mazda 626 2.0-liter  
Automatic – 20,000 miles

Randy Fox in Indianapolis got this Mazda with a very checkered history: The car had been recently purchased by a new owner who reported that it stalled three times in one day and then would not restart. Towed to another shop, the crew there concluded it needed another computer, but they were reluctant to replace it because of the expense. Next it went to the local Mazda dealer, where they concluded the problem was in the immobilizer (theft deterrent) system, which would prevent the engine from starting (see "Let Me In!" by Lester Bravek in the December 1999 *Import Service*). The dealer tried new keys with what should have been the correct 'chip' for that car, but the new keys would not even fit in the slot mechanically.

At this point, the dealership mechanics played a very smart move: They researched the title. The state said it was a salvage title and that the car was totally rebuilt with no guarantees of what was original and what not. The dealer mechanics told the owner they weren't sure how to proceed, but that cutting new keys to match the theft system installed would cost about \$500, with no guarantee the procedure would solve the problem. The owner, no doubt feeling a little down on his automotive luck, brought the car to Randy for a second opinion.

He found the car would crank and run for two seconds, then shut off. So he ran a rational sequence of tests: There were good crank and cam signals but no spark. The data stream looked good. RPM and TPS when moving the throttle were on the money. There were no codes, but the powers and grounds at the ECM were right. Nonetheless, the ECM would not ground the coil for spark. Randy checked the wiring diagrams and what he had on the immobilizer system. Then he posted a series of questions to the iATN:

What exactly does the immobilizer immobilize? Spark?

Does the immobilizer send a signal to the ECM, and what does it look like? (He caught a fast digital signal between the immobilizer and the computer).

The alarm system works properly, arming and sounding as expected. What's the connection between the immobilizer and the alarm systems?

Most of these questions — I say patting ourselves on the back here at *Import Service* — were answered in Lester's article. Randy heard back from Jim Abbot, Joe Beck and other people he didn't name. They suggested the immobilizer system was working exactly as it was supposed to. When the owner tried starting the car with the spare key, it ran normally. When returning to the other key, the same problem returned. Duplicating the spare key solved the problem!



## Volvo Close to the Wire

1992 Volvo 960 3.0-liter  
147,000 miles

Paul Greenleaf in Austin, Texas, found a Volvo that didn't like to start after sitting overnight. If he squirted gas down the air tube, it started fine and ran fine all day. Until the next morning. He suspected the coolant temperature sensor and measured it at 1150 ohms. Spec called for 1200, but that seemed close enough.

Wrong! Evidently the tolerance range given in the specifications doesn't itself include a certain over-and-under tolerance. The new one, at 1870 ohms, let the car start cold every time.

## Ragged Rover

1996 Range Rover 4.0-liter

Larry Beaufait in Santa Monica, California, got a Range Rover with a puzzling set of problems in his shop. Intermittently, the engine wouldn't crank, and when the problem occurred there was a gearbox-fault message on the instrument cluster. The PARK symbol was not there, nor was any other gear selection indicator as you moved the lever. But after a few minutes the PARK symbol came back, and the car could start. A scanner could not access the transmission control unit while the problem was occurring, but once the problem magically evaporated away, he could get into that computer, where there were no codes stored.

Sometimes an exotic car with an exotic problem has a simple, everyday cause. Larry discovered the battery on this car had only 9.8 volts, not enough to start the engine dependably. After a starting attempt, the voltage often fell below the threshold required to keep the transmission control unit in business, canceling out its neutral-safety switch function.

## Passive Protégé

1994 Mazda Protégé 1.8-liter  
107,000 miles

Jerry Lubben in Redlands, California, got this Mazda towed in with no start. No spark, no fuel, no codes and no check-engine light. He found no five-volt reference at the distributor, nor five-volts coming out of the computer anywhere else. Oddly enough, the check-engine light didn't turn on, even for the bulb check when the key was first turned to run. Jerry checked all the powers and grounds, finding no problem. Tried a second computer from a car that runs with no change.

One of Jerry's responses, from Cain, suggested he unplug everything that got the five-volt reference signal and then plug them back in one at a time to see what happened. Just as predicted, with every five-volt sensor unplugged and the key on, the check-engine light came on, both for the bulb check and to stay. As he plugged each sensor back in, there was no change — until he got to the mass airflow sensor. Once it was connected, the check-engine light went out because that sensor was shorted to ground. Replacing the MAF made everybody live happily ever after. Well, until now, at least.

When you read about these no-starts, do you think for some of them, "Shoot, I'd have seen that one without all the digital bother?" No doubt, but not everyone has the same experience or the same diagnostic equipment as you. Or just the same problem-solving luck. There are others you'd never get in a hundred years. That's the whole point of the iATN network: the least expensive membership costs you zilch (especially since there are several free Internet providers now), but you should repay the service by answering questions other people post when you know the answer they're looking for. When your time comes to post a puzzler, you can expect help in your turn. The network also has more extensive membership options for reasonable amounts. If you're interested in learning more about the iATN, direct your web browser to [www.iatn.net](http://www.iatn.net). ■

— By Joe Woods