

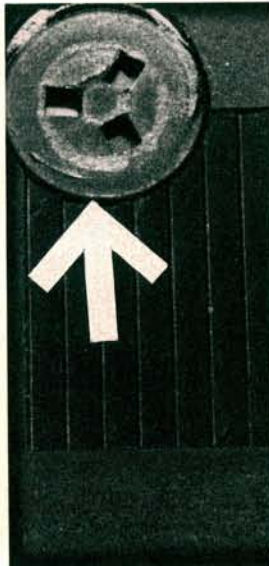
Electrical Service



It's darned near impossible to find a common thread running through this month's collection of *Electrical Service* items. Not at all like the last edition of *Electrical Service*, when we went off in search of electricity's arch enemy, corrosion. Or the time before that when we discussed the importance of good electrical connections.

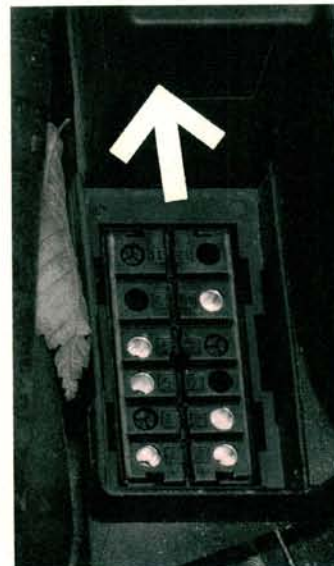
We've laid out a generous smorgasbord of assorted tips for your reading enjoyment. We still have heapings helpings of corrosion and bad connections on hand. There should be enough of those for everybody. There's a little bit of solder and flux down at the other end of the table if your taste runs in that direction. Intermittent electrical problems are also in season this time of year. Or perhaps you'd like to sample that rare imported delicacy, Pinched Wiring.

Whatever you like, you should find it here. Take all you want. But remember, you can always come back for seconds.



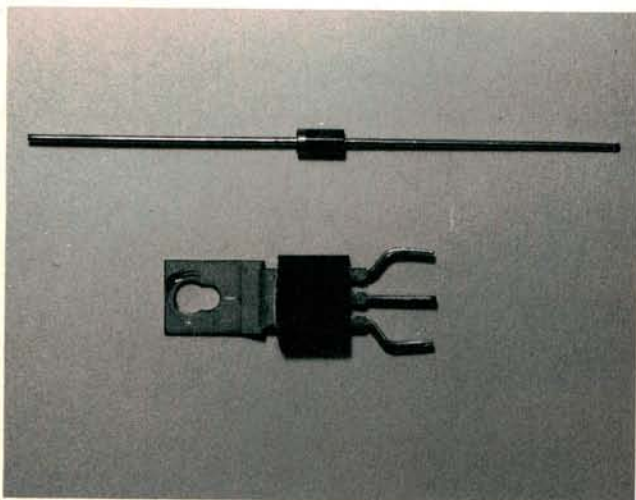
Mercedes-Benz Fuel Pump Relays

A defective fuel pump relay may cause an intermittent stalling problem on 300 and 400 series Mercedes-Benz models. The 420 SEL fuel pump relay's governor circuit cuts fuel to the engine at a set RPM (left photo). Over twenty different relays cover several years, models, and engine sizes. The relays look similar, but don't interchange them. Using the wrong relay can keep the engine from starting or may cut power to the fuel pump at the wrong RPM. Keep the relay's vent (right photo) open and free of rustproofing.



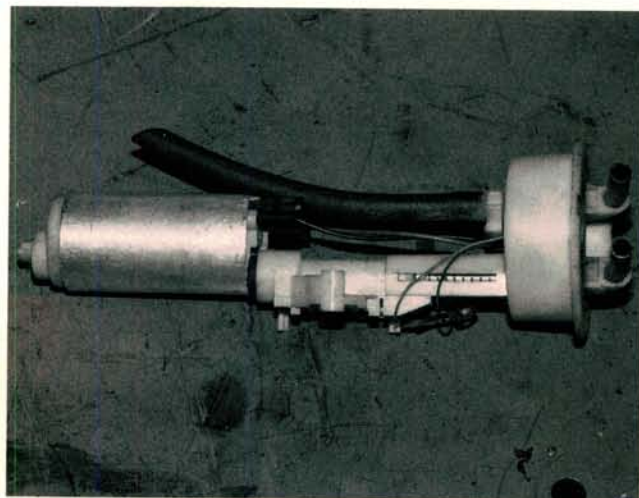
More M-B Fuel Pump Relays

The fuel pump relay can also vibrate loose in the relay socket, causing intermittent stalling or no start problems. The Climate Control relay next door (left photo) also uses a tach signal and can develop many of the same intermittent problems as the fuel pump relay. This 300 relay is mounted near the battery (right photo) and combines the fuel pump and climate control relays in one package. A locking cam at the top of the relay pushes down, then firmly locks the relay's contacts in place on the relay block.



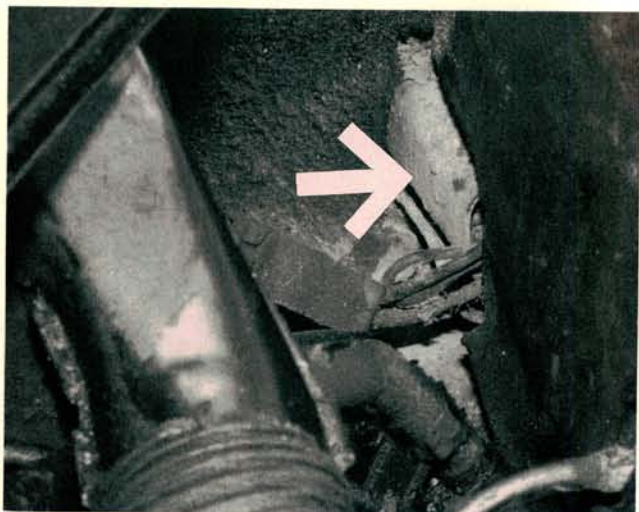
Volkswagen Voltage Stabilizer

Installing an in-line diode will protect the dash gauge voltage stabilizer on all 1980-84 Volkswagen models. Before replacing a burned out voltage stabilizer, solder a 1 N 4006 diode to the new stabilizer's center ground lead with the diode's identification ring facing toward the stabilizer. Solder a three inch ground wire to the diode's other lead. Crimp a 4 mm ring terminal to the ground lead, insulate all connections, then reinstall the stabilizer. Attach the new ground wire to the coolant gauge ground post.



Volkswagen Transfer Pumps

Fuel starvation problems on Volkswagens equipped with CIS-E or Digifant fuel systems may be caused by a bad in-tank fuel transfer pump. The low pressure, high volume transfer pump's job is to supply fuel to the inlet side of the high pressure, low volume main pump. Gravity can't keep the main pump inlet supplied with fuel if the transfer pump fails. Run a hose between the transfer pump's outlet fitting and a safe container. Check delivery volume by jumpering the fuel pump relay harness terminals.



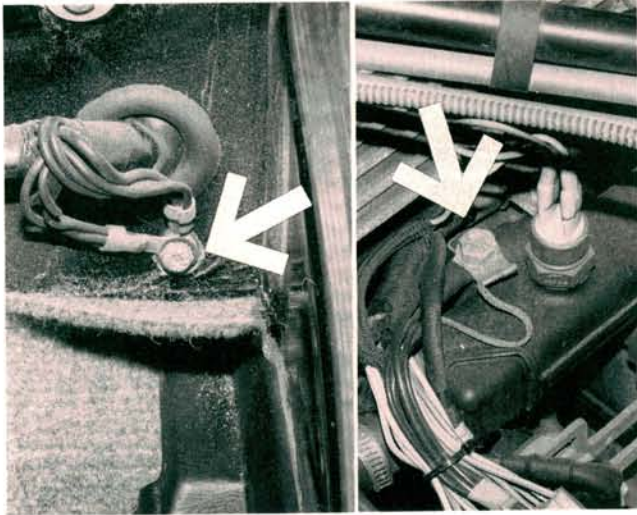
Volkswagen Beetle Engine Miss

There's got to be at least three of these still running around out there. Corroded dropping resistors mounted inside the right rear inner fender on fuel injected Volkswagen Beetles may cause a dead miss. The inner fender rusts away, which gives water and road debris a clear shot at the dropping resistors. Add a pinch of salt and the dropping resistors are soon just a memory. The resistor block on this poor Beetle was about ready to drop out of the car.



Volkswagen Hall Sender Replacement

Volkswagen has superseded some part numbers and now lists just one replacement part number for both four and five-cylinder distributor Hall senders. Make sure to count the number of ears on the replacement trigger wheel before installing it. Just one trigger wheel is included with each kit, and it's the five-cylinder version. Reuse the original trigger wheel on four-cylinder engines. Putting a four-cylinder distributor together with a five-cylinder trigger wheel won't make for a smooth running engine.



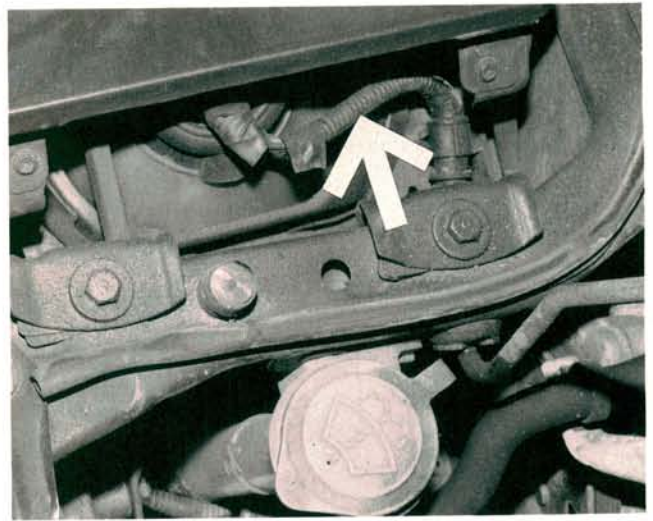
Jaguar XJ-6 Ground Wires

Loose or corroded ground wires on 1978-87 Jaguar XJ-6s can cause some puzzling fuel injection problems. Peel back the carpeting inside of the trunk and check the ECU ground wiring behind the right tail light (left photo). Corrosion here will cause the engine to run rich and blow clouds of black smoke. Also, make sure the EFI ground at the top of the intake manifold (right photo) is clean and tight. A poor connection here will cause hard restart problems on hot engines.



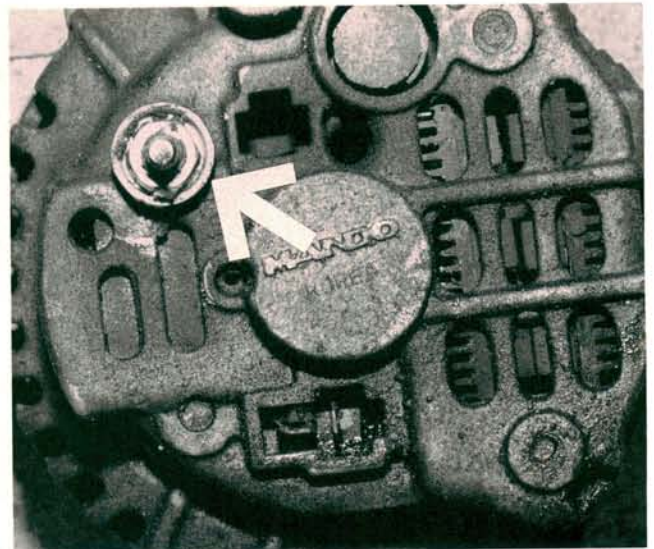
Hyundai Arc Welding

Use extra care when changing the oil filter from above on Hyundai Excels. If the alternator's rubber battery terminal insulator is missing, it's very easy to touch the terminal with the oil filter and do a little arc welding. At the very least, you risk blowing the fuse for the starter or alternator when this happens. Check the alternator first, then disconnect the battery cable before changing the filter if the insulator is missing.



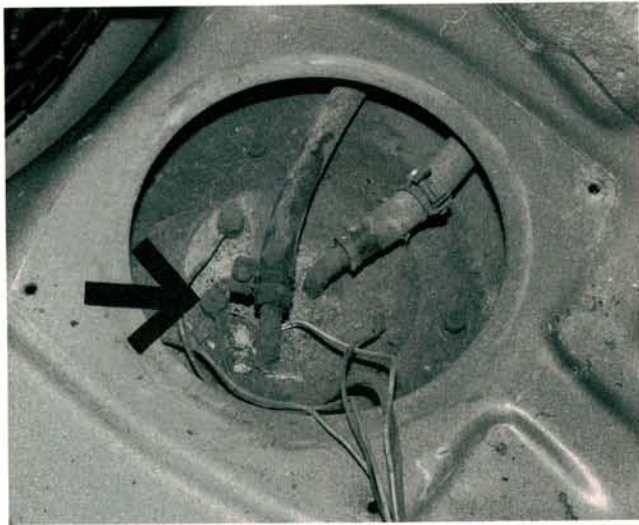
Honda Accord Retractable Headlights

The retractable headlight supply wiring on 1986 Honda Accords may break inside the harness about six inches away from the harness connector. The steady diet of bending and straightening that the wires endure finally causes them to break. If the broken wires touch one another in the harness, you might have a dead headlight and a blown headlight fuse too. Honda hatchback wiring also shows this type of wiring fatigue failure.



Mitsubishi Precis Alternator Terminal

The alternator B+ terminals on Mitsubishi Precis models built before February 1989 may be damaged by high alternator current flow. A 6 mm terminal kit is available from Mitsubishi to replace the original 5 mm terminal. Always install Mitsubishi's replacement B+ wire along with the larger terminal kit. Don't modify the original harness by reaming out the 5 mm terminal eye or attaching a new terminal.



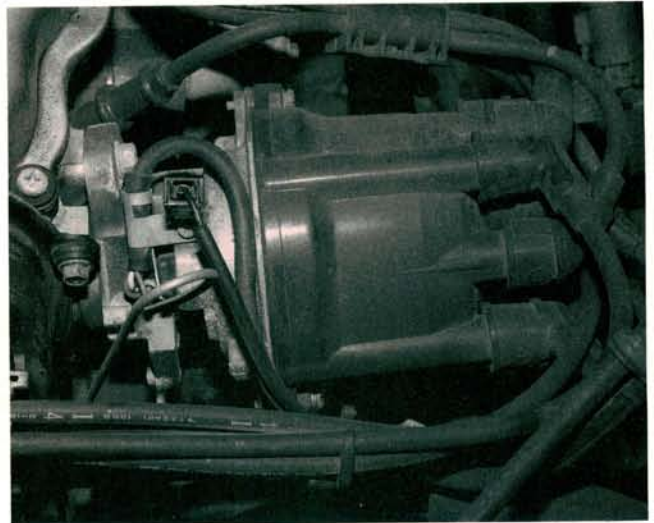
Nissan Fuel Pump Follies

In the May 1989 edition of *Electrical Service*, we pointed out a fuel pump terminal corrosion problem on 1984-88 Nissan 200 SXs. 1987 and later Nissan Pulsars and Pickups are joining in with the same problem. The in-tank fuel pump's soldered wiring terminals corrode on the outside of the combination sending unit/fuel pump unit. The corrosion can either kill power to the fuel pump or may cause the pump to run when the ignition is off. You'll have to drop the tank to reach the sending unit on Pickups.



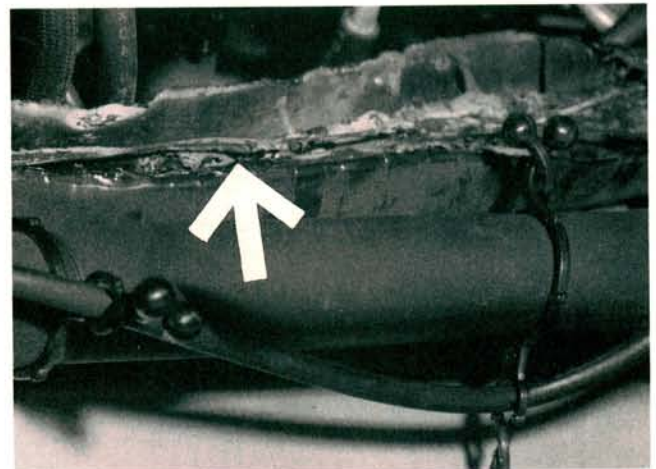
Nissan NAPS-Z Rotor Rooter

The NAPS-Z dual spark plug ignition system used on 200 SX, Stanza, and Pickup models through 1989 uses this double conductor distributor rotor. Carbon tracks can develop between the intake and exhaust sides of the rotor and also to ground. Also watch for poorly insulated Hitachi distributor caps on these models that leak spark to ground when wet. An improved cap, marked with the letter "S" should cure the insulation problem.



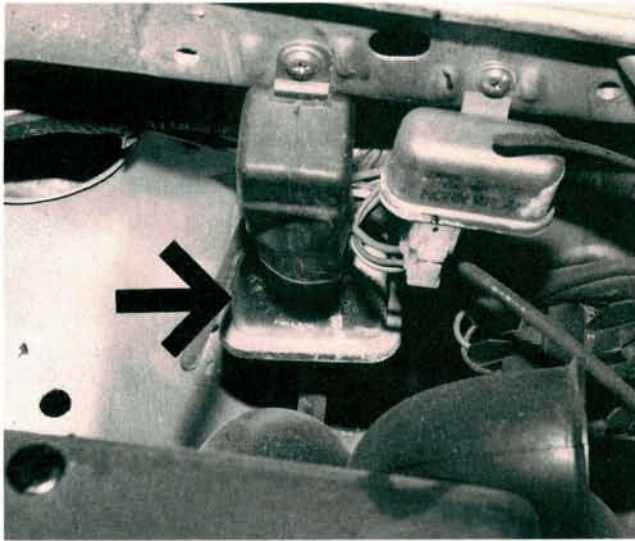
Intermittent Nissan Distributors

The Mitsubishi distributor used on some 1986.5 200 SXs, 1987 Stanzas, and 1987 Sentra Coupes may cause the ignition to cut out during light acceleration with a warm engine between 2000 and 4000 RPM. The tachometer may also drop 300 RPM when this happens. Once the engine RPM drops out of this range, the ignition comes back and the car will continue running. Check the distributor cap for the Mitsubishi trademark to identify the distributor. Complete distributor replacement is the recommended fix.



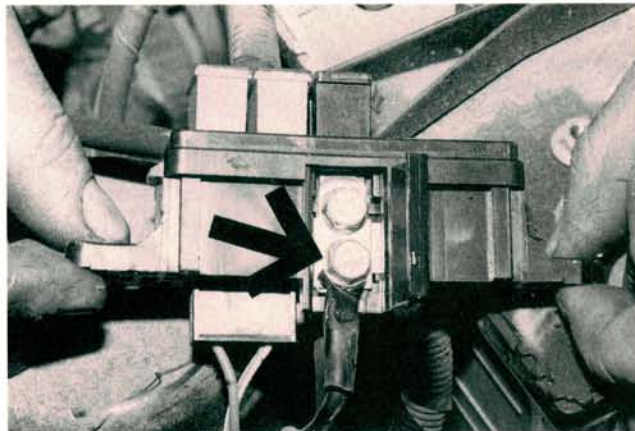
Nissan Stanza Wiring Meltdown

A pinched wiring harness on the left end of the radiator caused serious wiring damage on this 1988 Nissan Stanza. Rather than burning a fusible link or blowing a fuse, a big portion of the main engine wiring harness (shown) burned instead. The engine still started and ran okay, but the starter engaged each time the transmission was shifted through neutral. The front body harness passes under the core support and may be improperly positioned during assembly or during air conditioning installation.



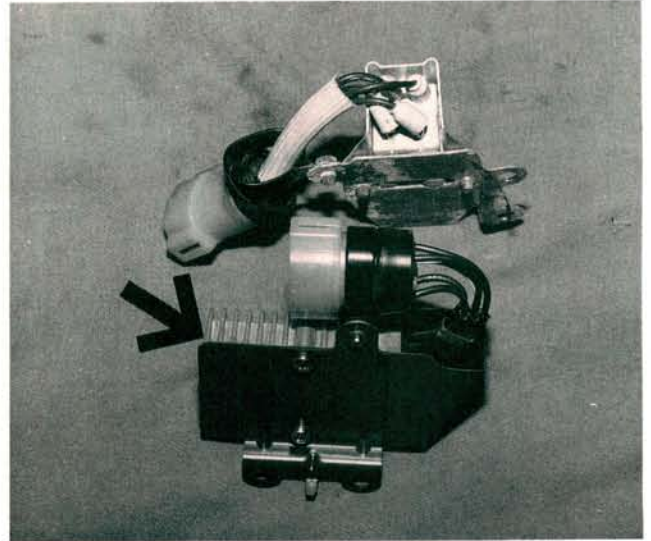
Mazda Cold Starting Problems

Frosted main relay contacts on 1986 Mazda 323s and 626s can cause hard starting problems in very cold weather (0 degrees F or less). The frost forms after the car has been driven, then stopped for 30 to 60 minutes. A one piece moisture-proof replacement relay (arrow) will correct the starting problem. Unclip the relay harness from the relay on 626 models. Attach the relay harness to the engine harness, then use a tie wrap to position the harness connector facing downward. This keeps water out of the harness connector.



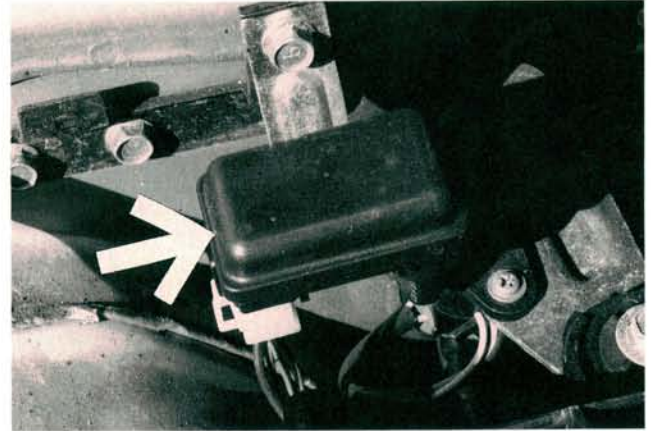
Mazda B2000 80 Amp Fuse

A loose or dirty connection at the 80 amp main fuse connections may cause a no-start condition on 1986 Mazda B2000 trucks. Look for signs of distortion or discoloration at the fuse's wiring connections (arrow). Test for a voltage drop across the bolts on either side of the main fuse. Disconnect the battery, then clean and reinstall the fuse connections. Tighten the bolts to 7.3 Nm (5.4 ft-lb). This is the electrical system's main fuse, so a poor connection here could affect the operation of the rest of the electrical system too.



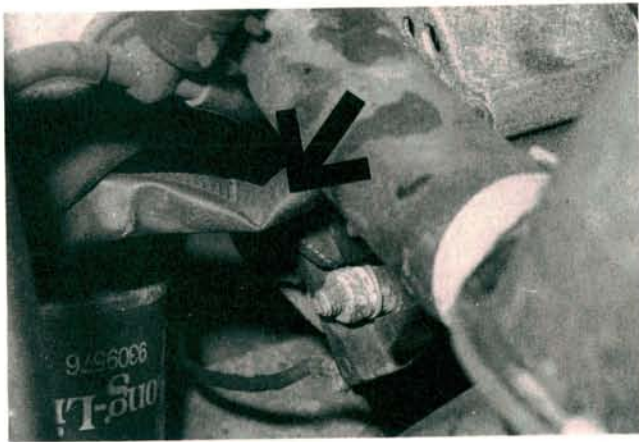
Mazda 323 Injector Resistor

A rough idle or no-start condition on a 1986-7 Mazda 323 may be caused by an open circuit in the injector resistor. Salt spray corrodes the resistor terminals, causing an open circuit to one or more of the injectors. Remove the resistor assembly from the left inner fender. Resistance measured with an ohmmeter between the resistor B terminal and terminals 1-4 should be 5-7 ohms. A die cast, weather protected injector resistor (arrow) is available as a service replacement.



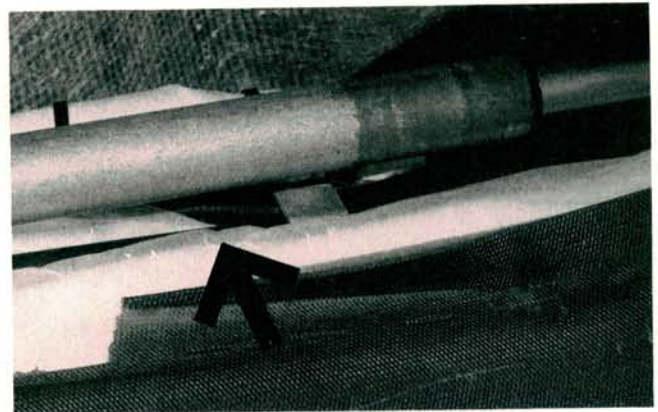
Mazda RX-7 Acceleration Surge

A 1986-87 RX-7 that surges or stumbles while accelerating above 2500 RPM may be caused by a poor ground between the ECU and the air flow meter. Remove the Boost Sensor (non-turbo) or Pressure Sensor (turbo) harness connector (arrow). Resistance between the Brown/Black wire at the sensor harness connector and terminal 2C at the ECU should be 0 ohms. If it's not, splice a new ground wire into the Black/Brown sensor harness wire. The ground wire's other end must be attached to the water filler neck, not the body.



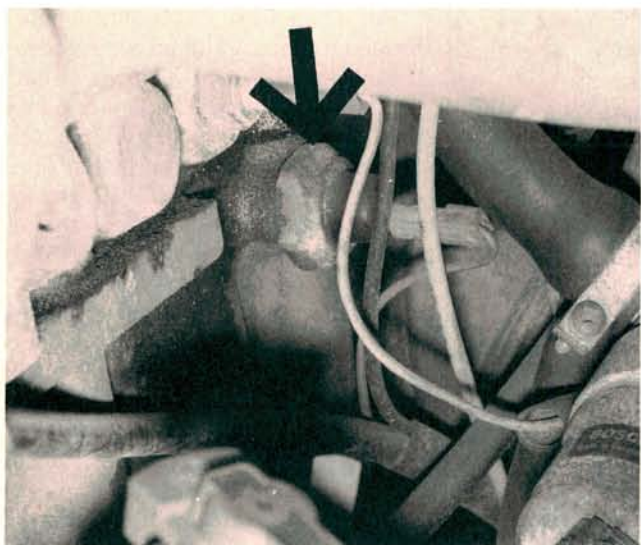
Saab 900 Intermittent Charging

A positive battery cable that's broken internally between the starter motor and the alternator can cause an intermittent charging condition on 1985 and later Saab 900s. The cable has been known to break at any point along its length, but usually breaks near the eyelets at either end. Check for a voltage drop by attaching DVOM leads to the alternator and starter terminals, then wiggling the wire. The wire's insulation often covers the break.



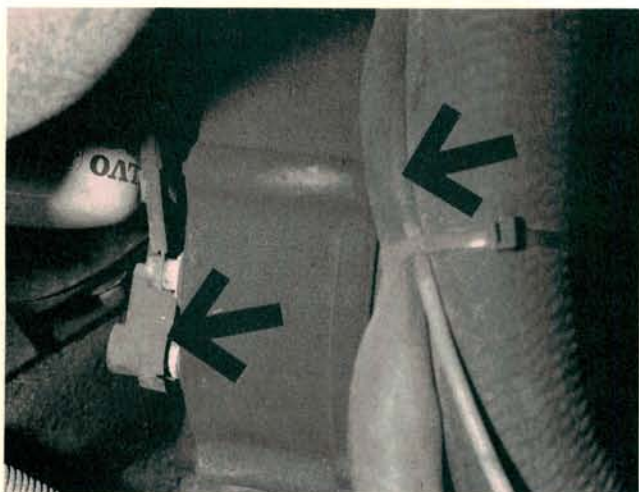
Saab Ignition Switch Wiring Harness

Wiring to the floor-mounted ignition switch on 1981 and later Saab 900s can become damaged by high floor temperatures. The damaging heat may be caused by a rusted or missing catalytic converter shield directly below the ignition switch and wiring. Also, if the engine is running rich, the extra converter heat can send the wiring into a meltdown. The extra floor insulation (shown) used on later models can be retrofitted to early 900s. Repositioning the harness off the floor with tie wraps also helps.



Volvo 240 Temperature Gauge

If the temperature gauge on a 240 series Volvo heads straight for hot as soon as the ignition is turned on, the cause may be a pinched or frayed wire between the temperature sending unit and the gauge. Locate the sending unit below the intake manifold (arrow), then disconnect its lead wire. If the gauge still reads hot, it's a safe bet the wire is grounding on the engine. The harness continues under the intake manifold before reaching a multi-pin connector at the center of the firewall.



Volvo 240 Alternator Wiring

A combination of engine heat and vibration can spell trouble for the alternator wiring harness on Volvo 240s. Tie wraps hold the harness to the lower radiator hose, which causes engine heat to dry out the harness insulation used on early models. Later models (shown) run the wiring through an insulating tube. Engine vibration and exhaust manifold heat may also cause the alternator wiring to break at the rear of the alternator, then short against the alternator or oil filter.