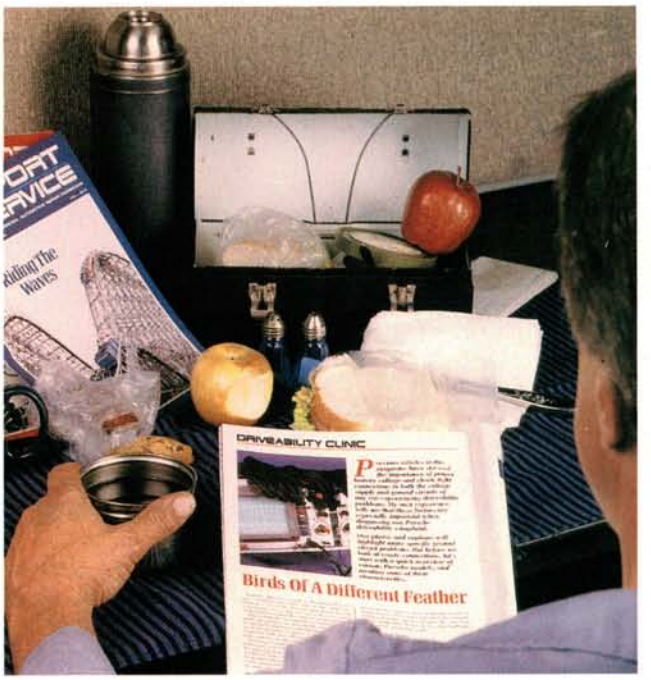


Volvo 240 Wiring Harness

Volvo ownership—especially ownership of old Volvo 240s—might provide an interesting topic for a Psychology major preparing his doctoral thesis.

It's a unique relationship, this unspoken bond between Man and Volvo. Never a passionate affair, never the "throw caution to the wind" type of fling that a man would enter into with a Porsche, Volvos seem to be purchased and then driven in dispassionate, calculated fashion.

One imagines the prudent owner having selected his 240 only after conducting a thoughtful survey of his vehicle purchase options with an eye to issues such as cost and quality, stability versus symbolism, and longevity versus libido. Were it a marriage, a prenuptial agreement would have been drawn up and signed by both parties in front of witnesses. A marriage of convenience.

Years later, these Volvos come to us for repair after countless miles of faithful, if unspectacular service. Seldom washed, never waxed, they arrive in various stages of noble deterioration.

In many cases, the original paint on the wheels has been replaced by a dull patina which testifies to the inevitable joining of uncoated steel and oxygen.

The once smooth arches which originally framed those wheels now show the same results of benign neglect, their jagged profiles more closely resembling a map of the Swedish coastline than a precision stamping.

Aside from randomly scheduled oil changes, the maintenance performed on the old 240s is seldom preventive in nature. The deterioration is gradual, the diminution of the Volvo's performance, incremental. Few failures of its system functions are of the "stick out your thumb" variety.

And yet, when the Volvo owner is presented with the choice of a major repair or loss of the Volvo's services, his true affection for the vehicle usually prompts him to make the financial, if not the emotional decision to fix the offending part, and fix it right.

This brings us to the true topic of our discourse; old 240 engine compartment wiring harnesses.

The gradual disintegration of the wiring insulation inside the harness can occur at various places along the harness, resulting in a number of intermittent electrical malfunctions and assorted driveability problems. Quite simply, the insulation hardens and falls away from the wiring as well-cooked meat falls from the bone. It comes away in small chunks, similar in appearance to the colored "sprinkles" one might use to decorate cupcakes.

Depending on the age of the vehicle and its level of exposure to the elements, this condition may affect part or all of the harness.

At times, localized repairs to affected areas will restore electrical service. The repair process requires patience and several yards of replacement wire, heat shrink tubing, and tape. But we've seen a number of these cars which required installation of a completely new engine harness as the only logical, lasting repair option.

We've decided to take you through a complete harness transplant. Along the way, we'll attempt to point out areas of the harness where deterioration commonly occurs, and note several connectors which may also be corroded and in need of your attention.

There are a lot of connections to check, and if the owner decides to continue the relationship with his Volvo, he does so in the expectation that the next major repair will be needed sometime *after* the Volvo's next wash and wax.

—By Ralph Birnbaum

1

We disconnect the battery first thing. If we do have a shorted harness, we'd rather not find the problem area by backtracking to the source of smoke! We also take the time to clean the battery, battery posts and terminal ends for later installation. Every car should get this treatment at least once in its life.

2

Our Volvo is experiencing several intermittent electrical and ignition misfire problems, especially when it rains or when the humidity is high. The front, lower section of the engine wiring harness is often the first to cause the problems we're experiencing, so we drop the engine shield to take a closer look.

3

How do we know it's an ignition misfire? Why do we suspect the harness? A logic probe attached to the coil tells us that the primary triggers are intermittent, disappearing each time a misfire occurs. But the signal is good at the ignition module. It just isn't getting to the coil on a regular basis.

LUNCH BOX COMPANION

4

This lower harness section contains wires for the ignition module, alternator, and oil sender. Exploratory surgery discloses harness-hardening of the arteries. The insulation on the wires crumbles between our fingers like dried bread. On some cars, repair of this harness section will cure your problems.

5

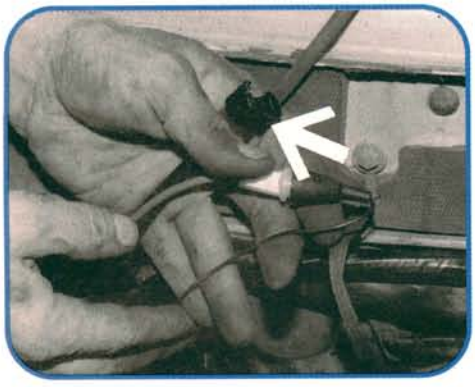
We dig deeper. The diagnosis darkens. Down by the alternator, we find bare wires everywhere. The alternator wires and oil sender wire are all bare, and have corroded to a greenish, copper color. We decide to work our way back up the left side of the engine and open the harness in several more places to check it.

6

When we continue to find the mummified remains of wiring in the harness section at the firewall, replacing the entire harness becomes a logical step. The Volvo's owner digs into the money he's saved on car washes, deciding that a new harness is a fitting recompense for the Volvo's years of service.

7

Inside the passenger footwell, we pull the right kick panel and drop the underdash panel. The main computer plug is disconnected from the engine computer. The only other connections here are the two relay plugs (system and fuel pump), and a three-wire plug from the dash harness.

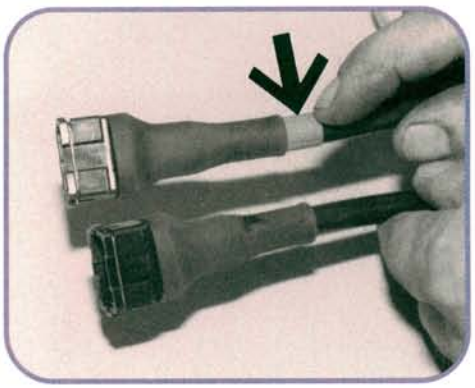


8

Now we pull the old harness through the firewall and drape it off to the side. Our Volvo doesn't have a heated O_2 sensor, but the new harness has the plug for one anyway. Don't spend all day looking for a place to plug this in if your car didn't come with a heated sensor. Just tie-wrap it to the main harness.

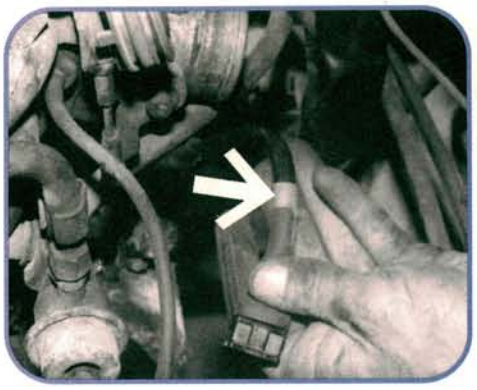
9

There's an eight hole plug coming in from the left side of the firewall that connects to the main harness. These can come apart "real hard." You may get tempted to pull on the harness wires, but please don't. Once apart, a dousing with contact spray and a dab of dielectric grease on each pin does it right.



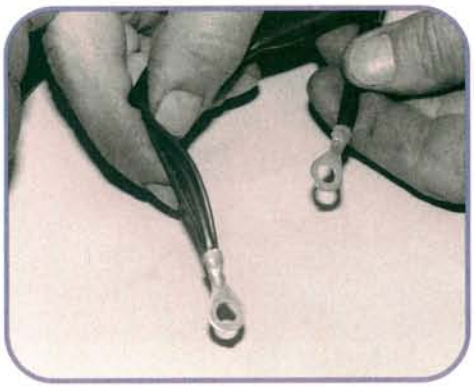
10

Mostly, it's no problem keeping track of "what goes where" connector-wise. But there are a few connections that can be confused. The new harness has colored bands to help you keep things straight, however. The coolant temp sensor plug looks like an injector plug, but has a band around it (arrow).



11

It's also possible to cross-connect the three-wire connectors for the idle stabilizer and throttle position switches (yes Virginia, this does drive the computer nuts). Fortunately, the blue band on the TPS wire conduit (arrow) prevents you from making this embarrassing mistake.



12

One other possible source of confusion has to do with the ground eyelet terminal connections which bolt to the intake manifold. You'll probably be removing three of these when you pull the old harness. But the new factory harness consolidates things a bit, so you'll only have two to reconnect.

13

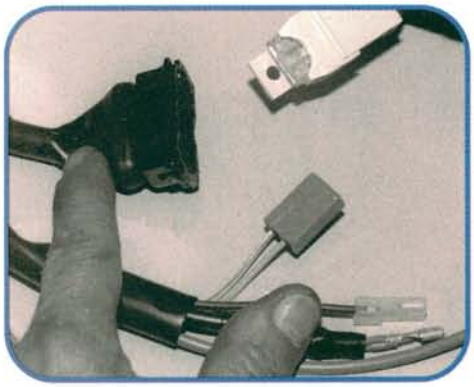
Harness grounds are very important. Clean the ground contact areas on the manifold. Use fresh bolts and washers if necessary to ensure a good, long lasting connection. (And the main battery ground cables on the Volvos weren't oversized to begin with, so check them and their connections, just to be safe.)

14

Part of the new harness routes down below the manifold, and there are two very easily confused connections to be made. The knock sensor (brown wire) and engine temp sensor for the dash gauge (yellow) sit next to one another. The larger sensor is the coolant sensor. A mirror is helpful at this point.

15

While you're under the manifold, treat the Volvo to one other non-electrical service. Yank the flame trap insert. Replace it or flush out that pound and a half of crud that's accumulated in its coils. Maybe it'll slow down all those oil leaks that have my hands looking like a printer's apprentice at the moment.



16

One branch of the harness wanders off in the general direction of the left inner fender. Along the way it plugs into the mass air meter (black plug by my finger), and ends up attached to the ignition coil (two connectors lower right). The connector in the center is a test connector and stays open.

17

Here are installed views of those connectors. (the air flow sensor at the left.) Coil terminals (right photo) are marked as terminal 1 (coil negative) and terminal 15 (coil power). Our coil terminals are brown with corrosion. We unbolt them, and attack everything with a wire brush and contact cleaner.

18

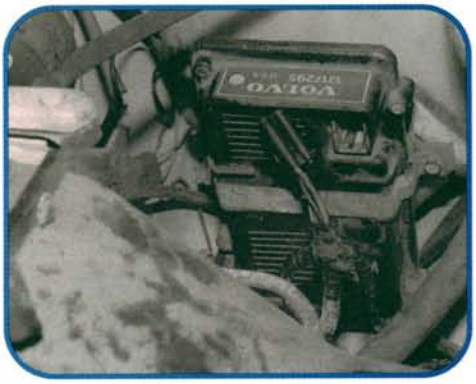
As you work your way toward the front of the engine, you'll find that moving a few things out of your way makes life a lot easier. At this point we've removed the cap and wires, the idle stabilizer and its hoses, and the main hose between the mass air sensor and throttle body, just to make some room.

19

Snake the harness down the left side of the engine and route it down around the curve of the oil pan, behind the crank pulley. There are more colored bands on our harness which should help you position the harness. Just line up the metal fastener wrap-arounds with the bands.

20

When you make your connections at the alternator, don't throw away this washer. It bolts to the alternator B+ terminal, and the protective cap in our greasy fingers snaps over it. A lot of cars show up with the cap long gone because the washer wasn't installed.



21

End of the line, and the reason this whole adventure started. The last stop on the harness express is the connection at the ignition module. Now that we've restored local service to the ignition coil, the module won't need to call collect and suffer through a poor connection as it tries to conduct its business.