TECHNICAL INFORMATION

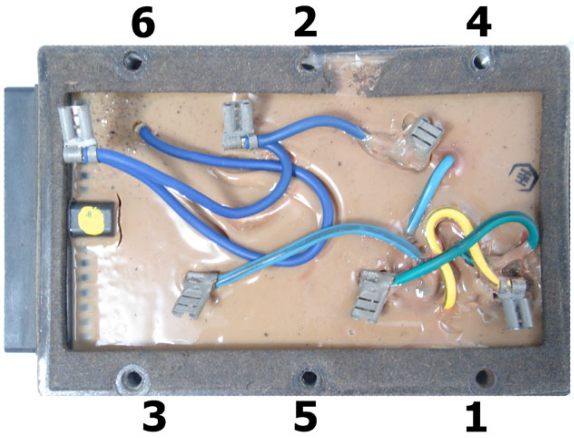
CCCI Module"Blown Fuse" Anomaly

Here is something we recently discovered as a freak cause of failure of the CCCI fuse. Shown below is the result.

Symptoms: Car suddenly died on the road. Engine cranks normally, no spark, fuel flows thru injectors to cylinders. Fuel pressure normal. CCCI fuse was found to be blown. Car runs poorly, less than 1 second after replacing CCCI fuse, and will not restart. Replace fuse again, same thing happened. We determined that the Coil Pack/Module was defective.

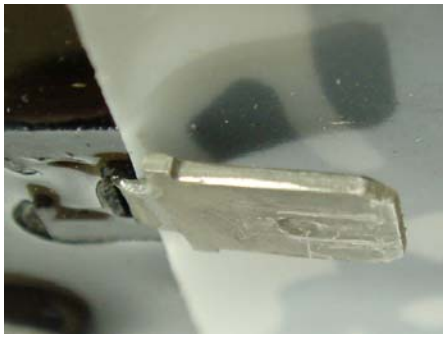
Upon further inspection, we found a design anomaly that caused the fuse to blow. The condition was aggravated by an improper placement of the coil pack primary terminals. The coil module is mated to the coil pack by six self-tapping screws and attaches electrically through six spade terminals, with a gasket between the two parts. These six terminals on the coil pack are flexible, and if positioned incorrectly, will create a condition that can cause a short circuit.

This is the CCCI module with its six terminals exposed. The short was found at the terminal attached to the light blue wire near the No. 3 coil post. This terminal broke thru the sealant and contacted a grounded metal shield.



Note the angle of the male spade terminals on the coil pack in the images below. The "correct" angle should be performed when installing the coil pack to the coil module. The "incorrect angle" could place the mating terminal into a potential short-circuit condition on the module, which can cause the "blown fuse" failure:

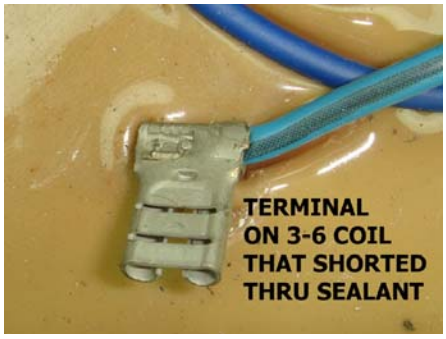
Correct angle



Incorrect angle

Here is what we discovered. The control terminal on No. 3-6 coil (light blue wire) was installed at an incorrect angle. Because the terminal was pressing into the potting sealant of the module, heat buildup from the coils softened the tan potting sealant, causing the terminal to push through the sealant and contact an internal metal RF shield mounted on the printed circuit board in the module, grounding the terminal to the shield. Note that the shield is buried under the tan potting sealant, about 1/8" under the top surface. Since it was the control side of the coil, the short caused the coil to heat up, creating a 9.7 amp drain on the CCCI fuse – not enough to blow the fuse. When the car started, the load exceeded the rating of the fuse, causing the fuse to open. **Bending the male terminal to the "correct angle" when installing the coil would have prevented this failure.** The correct angle is achieved by first installing the female terminals onto the male spade terminals, then pushing them upward toward the coil pack, away from the potting sealant.

Incorrect terminal angle caused this terminal to protrude deeply into the sealant.



After breaking thru the sealant, the terminal contacted the metal shield causing a short.