

Bulletin BPI 13-04

Subject: Electrical Circuit Repairs and Replacing Components

Vehicle Involved: All

Condition: High Resistance, Opens and Shorts. Possible False ABS Activation

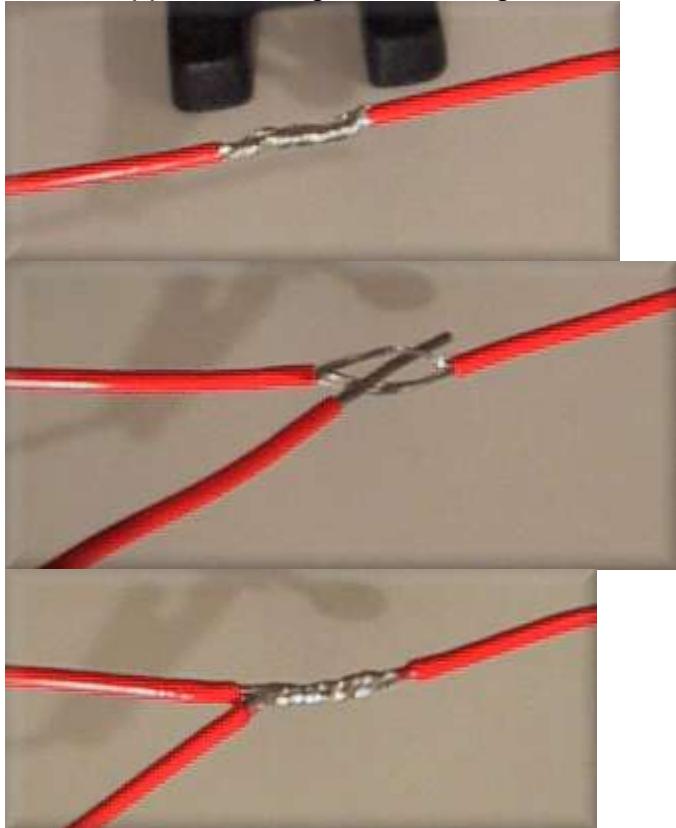
Repair Procedure: Anti-lock brake electronics, electronic stability control, electronic steering control and sensory devices working in conjunction with a CAN system all require the electrical components and connections be perfect to provide minimal resistance and required voltage. A change in resistance may affect sensor output such as wheel speed, steering angle and yaw sensors.

The most recommended method of repairing or attaching a wire to a circuit is soldering. There are several physical processes taking place as the base material heats up. The solder/filler will liquefy described as wetting and polar bonding. Soldered bonds are not inherently strong but can be more durable depending on the solder alloy composition. 60% tin and 40% lead is the norm (or a 63/37 ratio). Because of the hazards involving lead, you can go to antimony or bismuth, which increases the strength but also increases the price of the solder. Bismuth also retards the growth of tin whiskers, which are microscopic single-crystal metal fibers that are capable of bridging distances between electrical components wearing through insulation... creating short circuits and failures.

The two wires are crossed and twisted to begin the splicing procedure



Heat is applied wetting and bonding the two wires.



**When splicing a second wire,
peel back insulation. Do not
cut wire, thread new wire thru
and twist.**

To achieve a full bond, the solder must wet to the surface of the wires. The greater the surface area is wet, the greater the bonded surface area will be. In a pair of twisted wires, good surface wetting will result in the solder being pulled into and around the bonding surfaces and maximize the contact area. This provides the least amount of electron interference and keeps resistance to a minimum. This provides the best possible soldered joint.



To complete the soldered joint electrical repair, it must be protected from moisture intrusion as well as shorting to a grounded surface. Shrink tubing (of an appropriate size to accommodate the joint) should be applied over the joint while heat is applied. This keeps the joint insulated and waterproof.

This completes one aspect of the electrical repair.