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Coding Information

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Title: Proper Wire Repair

Applies To: All vehicles

DESCRIPTION

When wires and harness are allowed to rub against other objects that wear through the harness wrap and individual wire insulation, the copper conductors are exposed and can result in shorting and corrosion issues. This iKNOW document illustrates the proper procedure for repairing those worn harnesses and wires. In some cases the corrosion is significant enough to prevent the proper adhesion of solder to the wire strands; in those cases replacement of that circuit will be necessary.

PROCEDURE

When repairing the abraded wire performing the following steps will prevent shorts and moisture entry into the wire conductors:

1. Inspect the suspect harness for signs of wear against sharp and/or hard surfaces. It may be necessary to power wash the harness and surrounding area to clean off accumulations of salt and road grime.
2. Determine the extent of damage to the individual wires within the harness. If the damage is to a minimal number of individual conductors and the insulation is not completely worn through and there is no copper exposed, the conductors and harness can be repaired by wrapping the individual wires and harness with a good grade of electrical tape sufficient to restore the insulating qualities to the original quality. Once the harness is repaired it must be rerouted to prevent further damage.
3. If the wear is sufficient to expose the copper conductors, the individual wires must either be cut and spliced. If the individual conductors can be repaired by splicing, proceed with Step 4.
4. If the area where the copper conductors are exposed is less than 1" long and the conductors are not badly frayed and cut. The wire can be repaired by cutting the wire in the middle of the damaged area, stripping the insulation back on either side of the cut and applying a crimp splice, soldering, and applying dual heat shrink tubing as described below:
 - i. Cut the conductor in the middle of the exposed conductor area.
 - ii. Strip the insulation back 1/4" from the wire ends as shown in Figure 1.
 - iii. Placed a 2" piece of double wall heat shrink tubing on one of the wires to be spliced.



Figure 1

NOTE:

If the insulation is striped as shown in Figure 1 and the exposed wires are black from moisture intrusion or green from corrosion, the technician should try to tin the wires before inserting them into the crimp splice. If the wires tin properly and solder flows smoothly on to all the individual wire strands the repair will be effective. If however, the solder does not flow properly and there is evidence that all or parts of the conductor will not take solder, the wires should be cut farther back until wires appear to be clean, the insulation stripped again, and tinned again. If the wire strands still won't take solder, the circuit should be replaced because the crimp splice will NOT be effective.

- iv. Crimp both wire ends into the appropriate sized crimp splice as shown in Figure 2. Make sure all the individual wire strands are inside the crimp splice.



Figure 2

v. Solder (60/40 rosin core) both conductors into the crimp splice. Make certain that the solder and conductor are hot enough to allow the solder to "flow" into the individual conductors of the wire and the inside of the crimp splice as shown in Figure 3.

NOTE:

A good solder joint is created by applying heat to the crimp splice, not to the wire conductors or the solder. Once the splice is hot enough to melt the solder on contact, the solder will flow over and into the crimp connector as well as flow into the individual strands of the wire. If the solder joint is shiny and smooth then the proper temperature was obtained. If the solder is dull then the operation has produced a "cold solder joint" and it should be reheated until the solder flows properly.



Figure 3

vi. Slide the 2" section of double wall heat shrink tubing over the crimp splice and apply sufficient heat to shrink the tubing over the connector and wires as show in Figure 4.



Figure 4

Parts Information

Part #	Description	QTY per PKG
3517501C1	10-12 AWG Splice	2
3517502C1	14-16 AWG Splice	7
3517503C1	18-22 AWG Splice	2
2644000R1	Dual Wall Heat Shrink, 50mm	50



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