# Electrical Maintenance

I started with this area because 3 out of 5 problems are usually due to electrical connections or component failures. Check the connections first. After about 15 years, my first motor home was getting more and more difficult to start after the engine was warmed up and then turned off at a rest stop. I checked the chassis grounding strap. You guessed it, corrosion, rust and a loose mounting bolt. Clean, scrape the area, replace the worn terminal, new lock washers and it started like new, hot or cold. Remember Our RV's are in water, rain, dirt, corrosive atmosphere and regularly get a good shake up. They often sit for months at a time, which only exacerbates the corrosion problem. Only a protected and physically strong joint can survive the rigors our RV's are subjected too. The only environment that is more severe is a boat operating in salt water. Boat stores will therefore carry the best hardware, the best batteries, the best chargers and the best lubricants. If you cannot find the right switch that can handle large current loads, check the local boat store. Probably the finest lubricant you can purchase for protecting electrical connections, in your RV and tow vehicle, is Silicon Dielectric. Boat stores, quality auto supply stores all carry this excellent product. This grease type of lubricant is useable on all electrical joints. It water proofs the joint and insures good electrical contact. Put a thin coating over all your Battery terminals, tighten the connections, cover them with a terminal protection spray and they will never corrode. In fact, coat all of your high current junction points with silicon dielectric.

One of the most important connections is to your trailer brake magnet coils. The proper way to do this is as follows:

1. Strip the wire ends (using a proper wire-stripping device for the wire size).

2. Clean the ends and trim to proper length for a butt crimp connector.

3. Put a drop of silicon dielectric in each end.

4. Before crimping, slip a piece of shrinkable tubing over one of the wires.

5. Crimp the connector using the proper size tool.

6. Using a heat gun or hair dryer apply heat to the tubing so it shrinks around the connector and makes a waterproof connection.

Proper connections require wire strippers and crimping tools that are sized for both the wire and connector size you are using. These are inexpensive and mandatory for a good connection. When changing a terminal use the same procedure as above; strip the proper length of wire, a spot of silicon dielectric, proper crimp and shrink tubing to waterproof the connection (if not part of the connector). Purchase a supply of different terminal types, butt connectors and shrink tubing. RV's use multi-strand wire for all connections including 120 volt AC plugs. The connections have to be flexible to withstand the RV vibration environment. Single strand solid wire is fine for your home or any environment that will not be subject to shock and vibration. Harbor Freight has a good selection for this stuff including a two-speed heat gun for $10. If the connection is rusted or corroded then change it. This will become one of your most valuable repair tools.

Let us review:
*Wire Connection Needs*

1. Tube of Silicon Dielectric
2. Box of different size & type terminals and butt connectors (hook two wires together)
3. Wire stripper/crimping tool to handle several popular wire sizes
4. Various size heat-shrink tubing
5. Heat gun, (your wife's hair dryer in a pinch) or the careful application of matches

6. Several sizes of stranded wire

Depending on the size of the Silicon Dielectric tube, this should cost about $25 and provide enough material for many repairs.

Using wire nut connections for your electric brakes can be a recipe for disaster unless you regularly check them. As a minimum they should have both rubber locking covers and be wrapped with friction tape.

About 4 years ago, I went out to hook up my RV shore power cable to get everything charged up and ready for my weekend rally. There was no 110 VAC in the rig. OK at the house wall socket, OK at the extension output, OK at the wire box into the Motorhome, but no voltage at the input to the electric panel. I decided to check the connections inside the main RV power input box. This is where the 30 amp input line is connected to the inside electric lines. I turned a wire nut to see if it was tight. It would just turn and not get tight. It turned out (pun) that all three input lines had the wrong size wire nuts. It was one size too big. I changed to the proper size and taped the entire connection with electrical tape and the problem was gone. This was part of the units manufacture and it took 7 years of operation before the problem showed up. Wire nuts are fne in your home but all the shaking, vibration and corrosion make them high failure rate items.

Grounds, grounds, grounds look at the ground connections. Most wiring failures are due to poor ground connections. Rusted, corroded or just loose grounds are always a problem. This is particularly true for the RV appliances that are mounted with the electronics exposed to the outside elements. Always check your 12-volt ground lead to any appliance or light frst. If the terminal is corroded, put on a new one. Clean and scrape the area, including any paint, to insure a good ground and add a toothed washer. Use a wire brush and a scotch pad to clean the area. For larger areas with heavy rust a small file may be needed.

If the self-taping screw you removed from the terminal cannot be tightened then throw it away. Put in the next larger self-taping screw and add a little dab of Silicon Dielectric before you tighten it. If this does not work, drill a new hole for the ground and clean the paint away. Just be careful you do not drill into anything important. If it is, a screw and nut combination, be sure there is a lock washer. The proper procedure is a toothed washer between the connector and the ground on the screw head side and a lock washer under the nut. If the connector is under the nut than a toothed washer in contact with the ground area followed by the connector then a regular washer, lock washer and the nut. A connection without the proper washers is a future problem.

Much of the 110 volt A/C wiring in the coach will use wire nuts or screw type clamps. They should either have a special rubber cover that locks the nut on so that it will not vibrate loose, or be wrapped with electrical friction tape (I prefer both).

Running lights that do not work are usually caused by corroded sockets, which should be cleaned and then spread with our famous Silicon stuff.

I recently ran into the best butt connectors I have ever seen. They are available from NAPA and provide both a crimp and a solder connection. There is a low temperature solder inside the connector. After the Crimp, you apply heat to the metal and the solder flows and gives you an unbeatable connection. The entire terminal is then covered with heat shrinkable tubing so the heat gun provides the final weatherproofng. They are expensive, at about $1 each, but will work quite well for Electric Brake connections. You cannot beat a solder joint as long as it is not in an area where it will be subject to severe vibration and is properly done. If you overheat a joint, some of the solder can be drawn up the wire strands (wicking). This effectively turns your wire into a solid conductor and defeats the purpose for using stranded wire. The heat shrinkable tubing provides protection and some mechanical rigidity to the connection while still minimizing the effects of vibration.

After corrosion, the second usual failure mode is the breakage of the wires where they enter the connector. For the best reliability, you should provide mechanical support for your connections and wire bundles with wire ties and/or clamps.

*Continued next month....*