RV Wiring made easy!

General RV Wiring Trouble Shooting Guide

This guide is not meant to be a full training manual on all aspects of RV trailer wiring, rather it is designed to help the average do-it-yourselfer find and repair the most common wiring problems. If you are not comfortable using tools or if the problem is found to be in the wiring harness of the tow vehicle, it is recommended that you seek the help of a professional.

Most problems with wiring originate in the tow vehicle socket and/or the trailer plug. With all the rain water, road salt, and grime thrown up by the tires, these components are subjected to the worst conditions for an electrical connection.

First, check the inside connections of the tow vehicle socket for corrosion, broken wires or other obvious problems.

Then inspect the trailer plug for the same conditions. Any deterioration of the terminals or the wires themselves should be repaired now. It is often more economical (and less stressful) to replace the entire plug/socket and make any needed repairs to the wires at this point. Often the problem is solved before delving deeper into the wiring maze.

7 pole RV plug/socket.				
Terminal	Colour	Function	Truck socket	Trailer plug
1	White	Ground	7:00 o'clock	5:00 o'clock
2	Blue	Brakes	5:00 o'clock	7:00 o'clock
3	Green	Running	10:00 o'clock	2:00 o'clock
4	Black	Power	2:00 o'clock	10:00 o'clock
5	Red	LT & Stop	9:00 o'clock	3:00 o'clock
6	Brown	RT & Stop	3:00 o'clock	9:00 o'clock
7	Yellow	Aux or BU	Centre	Centre

The Ground Circuit

The ground circuit is the first thing to check and repair if you have an RV wiring problem. The electrical current needs a good return path from all the other circuits in order to allow everything to operate properly. Depending on the trailer hitch to provide this return path **DOES NOT** work!

To establish a good ground, thoroughly clean or replace the connections and grounding screws on both the tow vehicle and the trailer. You will have to follow the ground wire (white) from the plug or socket back to where it is attached to the frame of either vehicle.

The ground connection is so important that I'll have to repeat myself here - make sure your ground connection is sound before proceeding with your trouble shooting - the ground probably accounts for 50% of wiring failures!

Don't assume that because some lights are working, that the main ground is okay - some circuits will feed back through other circuits in an attempt to find a ground. If some strange things are happening, lights that aren't supposed to flash are flashing etc.; it is most likely a bad ground problem.

Older trailers with metal siding often relied on the trailer "skin" to provide a return ground path for the electrical current. This ground connection was provided through one of the light mounting screws. To see if your trailer is wired in this way, remove one of the running light assemblies and note the colour of the wires behind it. If you have one or more green wires and no white wires connected to the light, you most likely have this type of lighting circuitry.

The Brake Circuit

This section covers electrically operated trailer brakes only.

The trailer brakes receive an electrical current from the tow vehicle through the tow vehicle socket and the trailer plug connections. This is a simple parallel circuit with a branch of the circuit to each brake magnet. The return path for the electrical current is called the ground and this return path must be a good clean connection. See the ground section for more information.

The electrical current is transmitted through the blue wire of the trailer wiring harness and is distributed to each wheel. At the wheel, an electromagnet is activated to apply the mechanical force needed to stop the trailer. This electromagnet is subject to wear and the surface will eventually wear away to expose the windings of the electromagnets coil. When this happens you will have an open circuit (no electrical flow) or a shorted circuit that will blow the fuses.

Running Lights

Make sure you have power from the running light circuit on your truck socket. Connect your test light clip to a good ground and probe the contact on your truck socket at the 10 o'clock position. (Viewed looking into the socket toward the front of the truck).

If you don't have power there, look for a blown fuse or a bad connection somewhere in the truck. If your truck running lights work, then the problem is either at the socket connection or the wiring between there and the main chassis harness.

If the truck socket shows power, then the problem is in the trailer wiring.

If some of the running lights are working, continue below.

If none of the lights are working and the fuse blows see the shorted wire section.

If you have one or more running lights operating, at this time, then your trailer plug is probably alright. Check each non-operating light, in turn, for a burnt out bulb, corrosion on the bulb and terminals or a bad ground connection. I've found a good tool for sanding the bulb or terminal surfaces is an emery board (nail-file board).

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The Power Circuit

The power circuit allows the trailer battery to be charged by the tow vehicle alternator when the engine is running.

The above method uses a continuous duty solenoid to separate the two batteries when the ignition switch is off. This prevents the truck starting battery from being discharged by the trailer electrical needs when you are camping without hook-ups. There is nothing worse than finishing your camping trip with a dead starting battery!

The Left and Right Turn/Brake Light Circuit

Start by making sure that the signal light current is present at the tow vehicle socket. Clip the ground wire on the test light to a good ground on the tow vehicle and probe the terminal at the nine o'clock position (for the left turn) or the 3 o'clock position (for the right turn). (Looking into the plug, toward the front of the vehicle) With the ignition switch on and the turn signal activated, the test light should light up. If not, you have a problem in the truck wiring circuit.

Next remove the tail/signal light lens at the rear of the trailer and check the condition of the bulb. Often corrosion builds up in this area and prevents the current from flowing. Clean or replace the light bulb and clean the light socket interior. (a plastic dish washing scrub pad works well) Don't use steel wool as the strands left behind will short out the circuit.

Next plug the trailer cord into the tow vehicle socket and activate the turn signal. If the new or cleaned bulb does not light, remove it, place the test light clip onto the outside shell and probe the two terminals inside the light socket. Be careful not to allow the test light probe to touch the outer metal shell of the socket as this will create a short circuit and blow the tow vehicle fuse. Remember that the signal light is flashing, so hold the probe on the terminal for several seconds.

If you have no power at either terminal, reconnect the test light clip to a known good ground and probe the terminals again. If it now shows power, then the light socket or the whole light assembly is not grounded and repairs should be made.

The Auxiliary or Backup Light Circuit

On a 7-pole RV plug/socket the centre pole is used as an auxiliary circuit and is usually used for backup lights.

Most tow vehicles that are factory prewired have this circuit, while many service centres do not include this circuit in a wiring package.

To test your tow vehicle socket, clip the ground clip of the test light to a suitable ground and probe the centre terminal of the socket while a helper shifts the tow vehicle into reverse. Be sure that the tow vehicle parking and service brakes are applied to prevent any accidents when doing this test.

When the tow vehicle is shifted into reverse, the test light should light up if the plug is wired for backup lights.

Shorted Wiring

First - check the ground.

Next:

The running lights can be a constant source of trouble, especially on aging RV's. The electrical connections are subjected to varying degrees of temperature changes, humidity levels and road ibrations. This leads to a build up of corrosion on the contact areas and frequent light outages, which always seem to crop up at night (naturally). And most often when it's raining, windy or otherwise nasty.

A short circuit can be caused by wires that are constantly rubbing against the frame or other metal object. A screw or staple, inside the walls or ceiling, may have punctured the wire. Have you added any accessory on the trailer that may have put a mounting screw though the wiring? Once the insulation on the wire has worn away, the circuit shorts to ground and the resulting high current flow blows the fuse.

Finding the problem involves a step by step investigation.

The clearance lights are wired in parallel - there should be a "hot" wire and a ground for each light. (Some trailers use the metal skin as the ground path - others have a separate wire for this purpose.) The power wire connects to the light and also carries on to the next light in the circuit. Usually it is the green wire that is the hot wire.

Disconnect the power source...!!!!!!

Remove the trailer plug from the tow vehicle and disconnect the trailer battery ...

Remove the cover lenses and the light bulbs from every clearance light and both tail lights.

Start with one of the front side clearance lights, assuming that they will be first in line. Remove the mounting screws and pull the light away from the wall to access the wiring behind it. Disconnect and separate the hot wires that lead to that light.

With an ohm meter, test the wire that leads from the power source (trailer plug) to that light. The negative probe of the meter is touched to a ground source and the positive probe to the bared wire end.

If the meter shows continuity on that wire, that's the faulty run. If that wire shows no continuity, test the wire that goes to the next light. If that wire shows continuity, leave the light disconnected and continue to the next light and repeat. If the wire that runs between the lights is shorted, the meter will show continuity. Keep going until you isolate the shorted run. Hopefully it's in the first few lights.