

Wiring Your Trailer Hitch

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The rental yard is busy. The utility trailer you want is inexpensive, and the yard help assists you in hooking up the trailer hitch and safety chains. Now to drive home and load the trailer with the entirety of a teenager's life, then ship her off to college several states away.

But not until you hook up the lights on the trailer. The trailer dealership won't let you leave until the lights work. And the trailer plug on the back of your truck doesn't remotely match the one on the trailer. The friendly trailer-hitch counterman points to the display of electrical connectors and suggests that if you can't get them working on your own, he can have a mechanic do it for you, first thing Monday morning.

Desperate Times, Desperate Measures

Trailer wiring may be easy. Many vehicles, particularly pickups and SUVs, come prewired for trailers. If there's a preinstalled hitch, the connector might already be in place behind a convenient spring-loaded cap. Or, if you've bought a new vehicle, you may find the harness needed to install the connector inside the glovebox. Simply unplug the connector to the rear lights on your truck, plug in the trailer harness between the male and female ends, and you're ready.



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This pickup came with an adapter harness for the trailer hitch in the glovebox. Simply disconnect the loom to the truck lights and plug in the adapter. You'll still need to wire the trailer.

But wiring a trailer may not be easy. If you're towing just for the day and don't ever plan to tow again, you can pick up some adapters that replace the taillight bulbs in your vehicle and have pigtailed wires hanging from them. How you route the wires out of the light sockets and down to the hitch can be problematic. And what if you have a trailer with simple 1-lamp lights and a car with multiple taillights, like most European cars? At the very least, odds are the trailer and vehicle use different connectors, as the trailering industry uses at least four different styles.

Red To Green To White

Let's start with the basics. Most trailers have three circuits--for running lights, and left and right brake lights. The brake lights will flash for the turn-signal function--it's up to the flasher relay in the car to know when the brake lights are on and to flash the appropriate filament. So technically, you need only three wires to the trailer plus a ground wire.

Always run a ground wire from the frame of the vehicle (not from the hitch or bumper) to the trailer. The metal-to-metal contact in the hitch is not reliable enough for a consistent connection.

This means you'll need a connector with at least four contacts. Not surprisingly, the standard flat-style connector for trailers uses four pins, with one unshrouded male pin on the vehicle end for the ground. Other common styles of connectors use five, six or seven pins, and these are the styles you'll see installed by the manufacturers on new vehicles. Why more than four? Larger trailers sometimes use a separate circuit for running lights on the sides and front of the trailer. Some trailers use electrically actuated brakes. It's not uncommon for enclosed trailers to have interior lights or accessories powered by the vehicle battery, so that means another circuit.

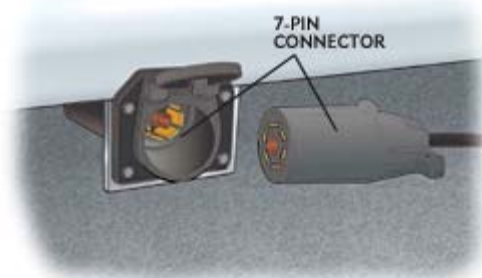
Do not freak. As long as you concern yourself with only one circuit at a time, this job will not require you to read those schematic diagrams that have tiny little wires labeled with type too small for even a lawyer to read.

Over-The-Counter

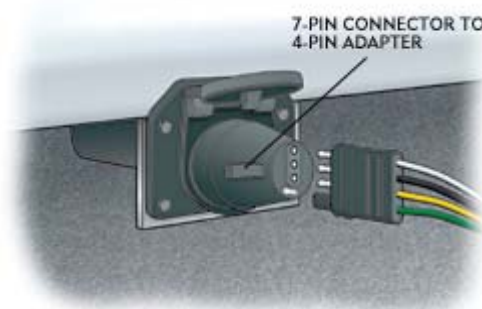
Got a 7-pin connector on the truck and an inline 4-pin connector on the trailer? We found an adapter at the auto parts store that makes this plug-and-play. Other permutations of connectors may be adaptable with off-the-shelf parts.

Splice It

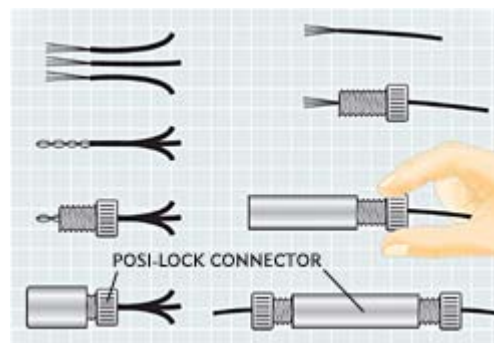
Worst case--you have a car or truck with no provision for trailer lights, and a trailer with a harness that ends with chopped-off wires. You'll need nothing more complicated than a 12-volt test light or volt-meter, and some splicing capability. Start by turning



This standard RV-style connector has high-amperage-capacity flat pins and room for six circuits.



A simple adapter can make 5-, 6- and 7-pin connectors work with other styles of connectors.



Posi-Lock or crimp connectors can be used without soldering, but aren't weathertight for long-term use.

on the vehicle's running lamps. Now probe the vehicle wiring to find out which wire leading to the taillights is hot. Splice into this wire and bring it to the vehicle side of the trailer connector. Which pin? The connector should come with a list specifying which pin handles which circuit. Follow it--but don't for a minute trust that someone else who wired your vehicle before you followed anything except his own whim. Tag each wire with its function as you identify it. Now you can turn off the running lamps and activate the left turn signal. Identify which circuit is the blinker, and repeat for the right turn signal. Wire all to the connector.

Separate But Not Equal

A few vehicles use separate lamps for the brake and the turn-signal functions of the rear lights. That's fine--until you realize the trailer uses a single 2-filament bulb for all three functions. Adding another taillamp housing to the trailer is one option, but a simpler solution exists. Your trailer-rental place, and most auto parts stores, sell simple electronic adapters that will combine the brake-lamp and turn-signal functions. It installs in the harness just before the trailer connector.

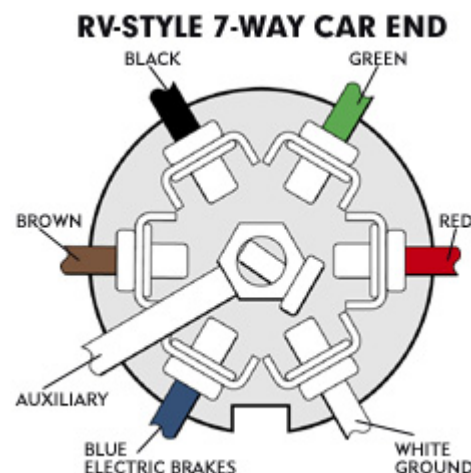
Other Circuits

Some larger trailers have a separate circuit for clearance or marker lights, which are separate from the running lights in the taillamp assemblies. You may need to add another circuit to handle them. If you try to wire them in parallel with the customary pair of running lamps, you may overload the vehicle's headlamp switch--so you'll need to add a relay to handle the extra current.

There also may be a 12-volt circuit for running lights inside the trailer or for charging the trailer battery in the case of a travel trailer. This circuit probably will be hot whenever the engine is running, but it may be controlled by a switch on the dash. Be sure the wires are of a gauge large enough to handle the load (a fully discharged deep-cycle trailer storage battery may draw 20 or more amps when you start the engine). The use of a battery isolator is strongly recommended. This will prevent discharging the vehicle battery from the trailer, and prevent surges of current from overcooking the wiring or blowing a fuse.

Whoa, Nellie

This leads to the concept of electric trailer brakes. These are actuated by a controller in the vehicle that increases the voltage to the brakes proportional to the vehicle's deceleration. This requires a wire from the controller to the trailer brake. (This is why some connectors have as many as seven pins, to make provisions for the multiple circuits.) Use 12-ga. wire for this circuit. If you have electric trailer brakes, there must be an auxiliary battery and a



This wiring color code is supposed to be the standard, but vehicle manufacturers don't always follow it. Check with a test light or you risk blowing fuses.



This controller allows the use of electric trailer brakes. Many vehicles are prewired to accept it.

breakaway switch in the circuit to slow the trailer if it comes loose from the hitch.

Keeping It All Together

How to make the connections? We've seen plenty of trailers lumbering down the road with blinking or dim lights. Odds are, if you looked at the wiring on one of these rigs, you'd see wires twisted together and insulated with electrical tape. Almost as bad are the automotive-style crimp connectors, which can't handle the vibration and moisture. Any crimp connector exposed to the elements will have a short life span. Don't even think of using household-style wire nuts--they'll unscrew themselves within a few hundred miles. We use the screw-in Posi-Lock connectors illustrated here for quick jobs. Our own trailer has every connection made with solder and PVC shrink tube.

As you button up, smear a film of dielectric grease on the hitch connectors to prevent moisture from corroding the pins.

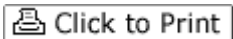
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