

Trailer Wiring

The 7-way Bargman plug, also known as Pollak plug, is becoming more and more popular, and has become the standard for RV trailers and campers. This article shows you how to install a socket on the tow vehicle and a plug on your trailer, and some other plugs too. It also contains some tips and info on electric brake controllers.



Colors?

The terminals (screws) in Bargman connectors are color marked as well as numbered; the colors are the same as the conductors (individual leads) in standard 7-way cable. On the towing vehicle (that's your truck) the wiring colors are usually different (with very few exceptions) so it is good practice to test the wires for function before wiring them to the Bargman socket terminals. (See the next section for how to do the test).



Colors on horse trailers, utility trailers, and extended cables can not be trusted either, and testing before wiring is recommended here too.

On the trailer side wiring is usually by means of standard 7-way cable. Standard 7-way cable not only has the right colors, but they are also in the same pattern as the plug/outlet so: there is a *trailer side* and a *tow vehicle side* on the cable too! Make sure to use the correct side of the cable for the plug or you will have to twist and bend the single cores to meet up with the terminals, whereas the correct end of the cable will show perfect alignment of the core and terminal colors.

Tools

You'll need some screwdrivers, probably a Phillips (cross-head) and a regular flat one, a regular pair of pliers, wire cutters (snips) and wire strippers or else a sharp knife (don't cut yourself), and a multimeter (if you don't have one: just get a cheap one, you really can't do a good job without one). If you need to test the tow vehicle's wires some pins or needles (yep, the sewing kind) will come in handy unless the probe on your multimeter has a very sharp point.

Parts



Of course you need the Bargman plug or socket and 7-way cable, or save some work with a 'pigtail' — that's a pre-wired plug or socket molded onto 3 or 4 feet of 7-way cable like in the picture (left), some cable ties (zip-ties) or maybe some sturdier cable clips to attach the cable to the vehicle, and

some solderless 'splice' connectors like the one in the picture (right), make sure they are good for 10 gauge wire. Try to get the gel-filled variety to prevent corrosion. If you can't find the gel-



filled ones, smear some Vaseline or grease in the



connectors before use or moisture will enter your wires at the connector, and corrosion will ultimately wreck your wires. Finally, some black electrical tape and maybe (if you want it real neat) some 'convoluted' loom — that's the weird 'ribbed' stuff most wires under the hood are wrapped in to protect them.

Here we go... Installing the socket on the tow vehicle.

You're about to get under your vehicle so the parking brake is on and it's in park or —if manual— it's in gear, and —if raised— it's on axle stands, right? Find the loom coming back to the rear lights. Find a nice spot to attach the splice connectors —remember you need to spread them over about 6 or 7 inches so you don't get a big fat 'bunch' that will be hard to protect and tuck away (and will look ugly, and even under the vehicle, that counts). Also try to think about protection from splashing water and mechanical damage when selecting your spot.



If your tester or multimeter probe isn't sharp enough to penetrate the wires; stick a needle in the wire and use this for testing. If you do this where the splice connector will be located, the splice connector will later cover the 'test hole' to prevent corrosion of the wire.

Testing without cutting wires...

Remove any wrap or protection on the loom for at least 6 inches or so and test the wires on the tow vehicle for function. Put the multimeter on DC Volt and in a low range (but higher than 12 Volt) and measure between wire and ground (a bare piece of metal on the vehicle) and have someone go through all functions (running lights, left & right turn, back up, hot, ground, electric brake –if installed–) until the multimeter indicates 12 V, note down the wire color and function, and repeat for all wires. If you write the corresponding colors from the 7-way cable (see table below) along this list, it will make your job a lot easier later on. You should also find a ground wire, it will never indicate 12 V, so test this wire with the multimeter on resistance (Ohm or Ω) it should indicate 0 (zero) or close to it for the ground wire. If you don't find a ground, you'll have to make one, how to do this is explained below in '[Trailers and the ground...](#)'.



You may not find a 'hot' wire (permanent 12 V, terminal 4 on the socket/plug) in the loom, so you may have to install a wire all the way from the battery — use 10 gauge, and don't forget to include a 25 Amp. inline fuse (left picture) or even better: a self resetting breaker (right picture) close to the battery. Self resetting breakers are directional (!)



make sure the terminal labeled 'bat.' is connected to the battery, and the load to the other.

If you're not using a pigtail; wire the Bargman socket to the correct end of your 7-way cable (as discussed above, that's where the colors are in the same pattern as marked on the socket). The 10 Gauge wires (1 and 4 - ground and hot) are a bit much for the terminals on the socket/plug, so after stripping, split the strands of the wire in two even parts (like a V) and push one half under one side, and one half under the other side of the screw.

If you forget to slide the socket-body on the cable first, the other end of the cable isn't attached to anything yet, just slip it on that way...

Mount the socket-bracket to the vehicle, or use an existing mounting hole on your hitch, (depending on your installation). If the socket is for a drop-in camper, you may want to drill the mounting hole in the side of your truck bed, and you'll want to use a hole saw for that. Guide the 7-way cable (with the socket on it's other end) through the mounting, and mount the socket in place. Route the cable out of harm's way to the 'connection site' on the vehicle loom, and cut it with at least a few inches to spare (beyond the 'connection site').

The tricky bit

Remove the outer shielding of the 7-way cable where it comes to 'connection site' on the vehicle's loom, and get your list with the colors for the vehicle wires out.

Remember how you made small holes in the vehicle's wires to test for function?

Starting at one end, pair up the correct wire colors, cut the 7-way wires to just past the test-hole, and connect with the splice connectors. They should all be 'staggered' so no two connectors are side by side.

Tidy everything up by wrapping the whole connection site in electrical tape, make sure to overlap each wrap somewhat with the next, so there are no holes. It's best to make two full passes to be sure... For added mechanical protection, you can add some large convoluted loom, secure this with more electrical tape. Last but not least: make sure all cable and loom is secured to the vehicle, and will not rub anywhere.

Trailer wiring

Putting a plug on a trailer is not always as tricky as the work on the tow vehicle. If you are replacing a broken plug that was wired correctly, you can just note the wire colors as used on the old plug, and connect them the same on the new plug.

Of course, if the old plug wasn't wired correctly, or you are replacing a 6-way or 4-way plug, you'll have to begin by testing the function of every wire on the trailer. If the trailer has electric brakes it will have a battery and you can use this for testing , otherwise; use a car battery.



SAFETY FIRST: If your trailer has electric brakes, it should have a **breakaway switch and battery!** In case the trailer comes loose from the tow vehicle this activates the brakes, and (hopefully) stops the trailer.

You can't just have a peek inside the lights and take the colors from there, trailers often have junction boxes, and just because the left turn/brake light has a green wire at the bulb doesn't mean it's green at the plug...

Trailers and the ground...

Not the ground under it's wheels, but electric ground can be pretty confusing when it comes to trailers. Some trailers use 'chassis ground' through the hitch: the 'ground' is achieved through metallic contact of the hitch with the tow-ball of the tow vehicle. It is not a very reliable method, and if this is the case with your trailer you should add a ground wire; just put a ring terminal like in the picture on a 10 gauge wire and mount this under a screw or bolt somewhere on the chassis or A-frame, close to the hitch and run the wire to the plug. This is now your ground wire.



First check which wire on your trailer is ground; with the multimeter on resistance (Ohm or Ω) measure between the hitch and each wire, the ground wire should indicate 0 (zero) or close to it.

If the trailer has a battery, there should (but might not be...) a hot wire, so first measure across the battery terminals to make sure the battery is charged (multimeter on DC Volt, lowest range over 12 V) then test between each wire and ground to find the 'hot' wire. If there is no hot, the trailer battery will not charge while you are towing. You can add a hot wire directly from the trailer battery positive (+) terminal to the Bargman plug, as mentioned above with the tow vehicle side. As there should be a fuse in the tow vehicle hot supply, there is no need for a fuse on the trailer side.

Check all other wires, by connecting ('shorting') them to the hot wire for a moment, and have somebody look at the lights to check the function of the wire. Of course this only works if the light bulbs are good! On trailers with electric brakes you'll find one wire that doesn't light anything up — must be the electric brake wire...

Once you have all the wires checked, cross-reference your list with the table below so you know where each wire goes on the Bargman plug, and install the plug. Don't forget to slide the plug body on the cable before you wire the internals...

Brake controllers

The installation of a brake controller goes beyond the scope of this article, and is probably better left to professionals. It's a quick job in the shop, it takes half an hour or less for most vehicles (provided they are pre-wired) and it gives you peace of mind, and warranty! On these grounds we advise against DIY installation of brake controllers.



BE SAFE: Make sure the lights on any tow vehicle and trailer combination work as they should before you take it on public roads; if your truck indicates a left turn and the trailer **indicates** right, you might confuse people!

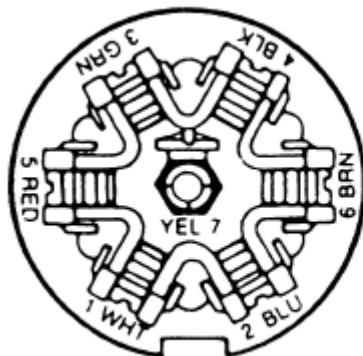
CAUTION: because the lights are good on your truck and trailer doesn't mean they're good with Jim's trailer too!

Wiring Code (Both Ends)

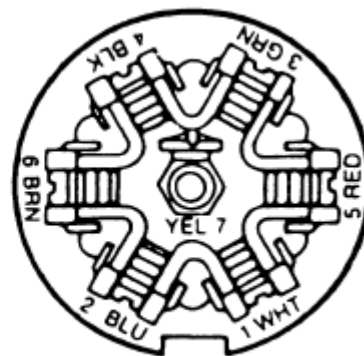
#	Color	Gauge	Circuit Function
1	White	10	Common ground
2	Blue	12	Electric brake
3	Green	14	Tail / Running lights
4 ¹	Black	10	Battery charge (+) or 'hot'
5	Red	14	Left turn / Stop
6	Brown	14	Right turn / Stop
7 ²	Yellow	14	Auxiliary / Back-up

1) The RV will drain the tow vehicle battery through terminal 4 (black) when the tow vehicle is not running, however: when the RV is hooked up to mains electricity, the tow vehicle battery will be charged. Wire gauges are important here: with very empty tow vehicle batteries, the current drawn will likely be greater than the wiring can sustain!

2) The center terminal #7 **is not a ground terminal** — it is most commonly used for backup lights or left open.



Vehicle side



Trailer side

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