

## How to fit a 12V Trailer Plug

**A heavy duty charge cable is essential for keeping a caravan house battery topped up. Here's what's involved.**

Many caravans and camper trailers have a dedicated house battery for powering 12V night lighting and accessories such as fresh water pumps and sound systems. Charging from the tow car is the usual method of maintaining power (often with supplementary sources such as 240V or solar) with a plug installed on or near the drawbar. For most on- and off-road trailers a plug known as an Anderson plug provides (almost!) fool-proof and reliable service, allowing easy detachment of the wiring (to remove the trailer or isolate the electrics) while being stout enough to provide good current to the trailer to charge the battery.



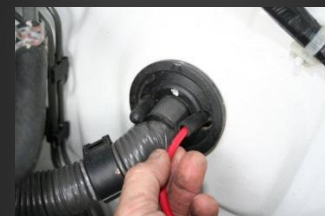
To pump power to your trailer, you will need an adequate length of cable – the length of the vehicle plus 3m for twists and turns – plus tools: soldering iron and solder, wire strippers/crimpers, terminals, insulating tape, heat shrink, cable ties plus a suitable circuit breaker.



Without a dual battery system, for now I'm wiring to this Toyota Hilux's main battery through a switch (within the circuit breaker) so the trailer battery may be charged when the engine is running. Later, I will install a twin battery system to help with long-term power while on adventures.



Many vehicles have a few spare holes through their firewalls; they allow easy installation of extra wiring. The Hilux has a few spare nipples within the large main wiring harness to allow wires to be easily added while maintaining dust/weather sealing.



Working from the engine bay into the cabin, the cable was passed through one of these nipples and allowed to fall onto the floor. Removing the glovebox sometimes assists with routing. If you need to drill a hole, make sure you treat the edge bare metal with rust inhibitor and install a suitable grommet.



After checking to make sure that it wasn't fouling or rubbing on anything, the cable was run to the base of the A pillar behind the kick panel. Although they may be loosely installed for now, never tighten-up cable ties until the power cable is in place along the length of the vehicle.



Vehicle designers usually provide a nice wide channel, without any hindrances or sharp edges, for the vehicle wiring harness so it's usually easy to route the cable with the original. This Hilux's wiring runs under the sill plate so the new cable was laid close to, but not tight with, the original harness.



As with the engine bay, it's always preferable to use existing holes and grommets to transfer a cable from the cabin interior to the exterior of the vehicle. Hint: Always have the cable running down as it exits the cabin; that way, water won't tend to run down the cable and soak your carpet.



Split convoluted tube offers great protection to cables and wires and, in bulk packs, costs very little. Install it over all exposed lengths of cable before securely clamping, screwing or cable tying the cable to the body or chassis. Larger diameters are ideal for bundling multiple cables.



Route the cable to the rear of the vehicle. As in the cabin, it's good to follow the factory wiring as it's designed to be away from damage and danger. No matter what, keep the cable away from sharp edges, exhausts, driveshafts, suspension, and the scatter zone of stones and gravel.



Once at the rear of the vehicle, the Anderson plug can be installed. Find a position that is close to the trailer plug and that isn't in the way of danger from rocks or chains etc. The Anderson plug has its own Earth so keep this in mind when siting the plug.



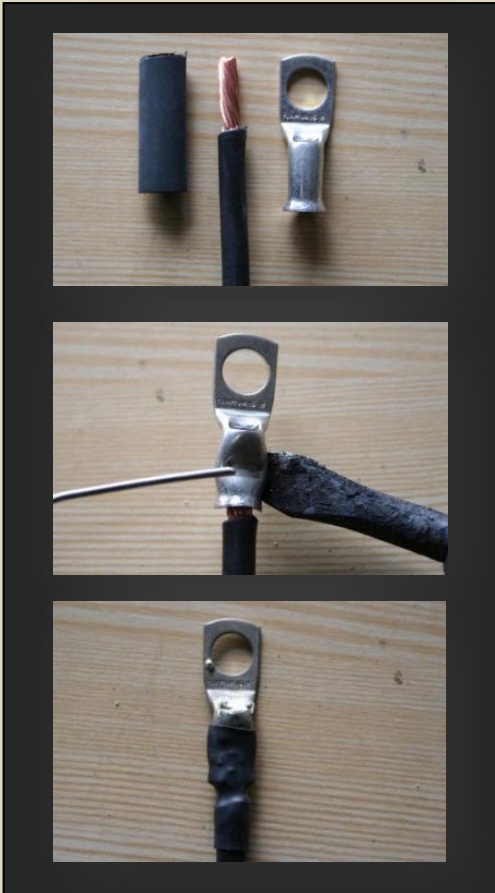
The Anderson plug can be set-up on flying leads in the rear of a sedan or wagon, or as I prefer, be screwed to the body. Tradesman-use Tek screws are handy; you may wish to drill a pilot hole and use sheetmetal screws (as I do), or depending on the situation, small diameter bolts and nuts.



The completed job: the Anderson plug is within easy reach of the trailer drawbar. Although they have a degree of self-cleaning, Anderson plugs are exposed to the elements so you may wish to check/clean it from time to time to keep it pumping the power as it should.

## Soldering Step By Step

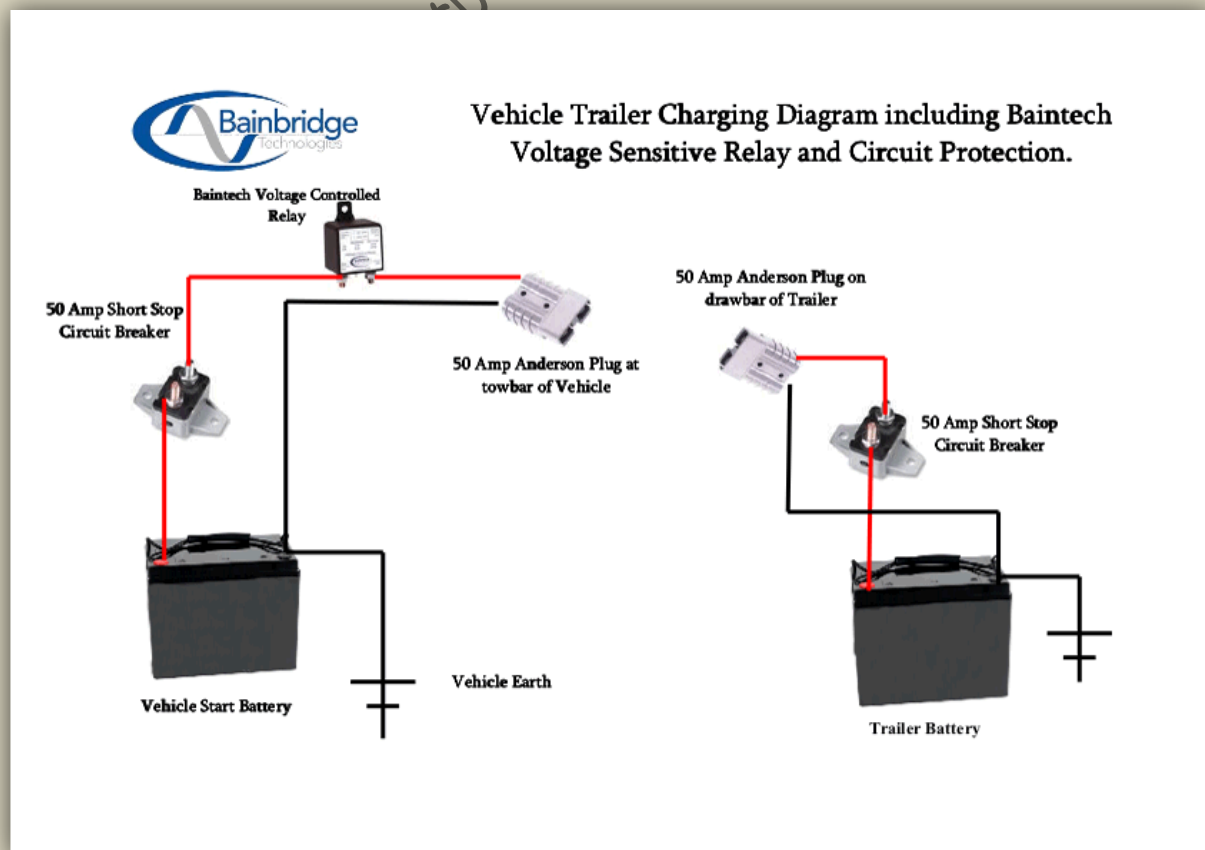
You will need to buy or borrow a heavy duty soldering iron for this task – a standard small electronics-type iron won't deliver enough heat. Use flux-cored solder.



Strip the insulation from the ends of the cable and slip a short length of appropriately sized heat shrink on;

Crimp the terminal onto the cable, heat and allow solder to flow through the joint.

Leave everything to cool before sliding the heatshrink up to the terminal and shrinking it in place with the soldering iron

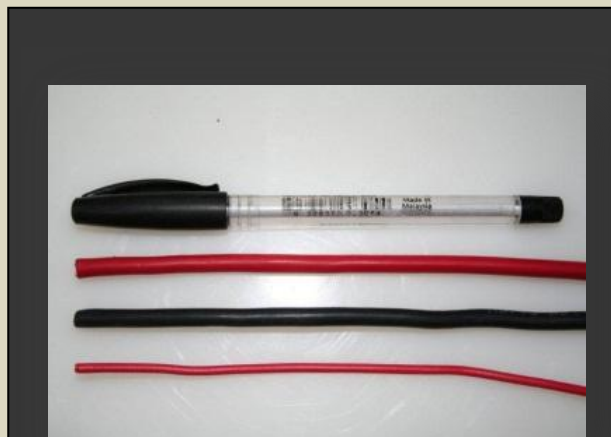


## Cable ties

There are several types of cable ties available to assist with the installation of extra wiring. Conventional cable ties allow multiple wires to be bundled together and/or tied to other cables or hardware while others allow cables to be installed adjacent to a flat surface or along a seam, installed on pre-drilled holes the tie clips into, or screwed/bolted into place.

## How big should the wire be

A very flat battery will draw lots of current as it is being recharged; this current will reduce as the battery reaches its charged state. Weight and space is usually not a problem in a touring vehicle (as it may be in, say, a race car) so well-sized cable of 100A rating is a good size. There are several ways to 'size' a wire (The Australian Standard uses MM2) but the street-wise way is this: this cable's copper conductor will be approaching the size of a ballpoint pen. You may wish to use marine-grade cable, especially if you do a lot of beach driving; the wire conductor is plated so it's more resistant to corrosion.



## Voltage drop

The longer and/or thinner a wire is, the greater will be the voltage drop between its two ends when it is carrying energy. As a battery requires more than its rated voltage (nominally 12V in cars) to allow energy to be 'pushed' into it while charging, alternators usually work at 14.4 (or slightly greater) which allows a battery to be fully charged. However, a house battery at the end of a long cable through a tow car, along a drawbar and into a trailer may not see all of this nice, juicy 14.4V so may not be charged to its full capacity. That's why it's important that a cable be adequately sized, and any sources of resistance (that causes voltage drop) be reduced or eliminated. As mentioned, the fatter the better – 8mm<sup>2</sup> is the minimum.



## Keeping it safe

Electrical fires claim more cars than fuel fires, so it is absolutely essential that you protect your vehicle with a fuse or circuit breaker on every circuit. To provide complete protection, it must be mounted as close to the battery/power source as possible. A switchable circuit breaker installed in the engine bay not only protects the whole car but allows the circuit to be turned off when it's not required.

