

## Dumping the ammeter and replacing with a Voltmeter:

In a modern day vehicle with an alternator the battery is only used to start the car; or provide power for parking lights and radio etc. when the ignition is switched off. Once the engine is running the alternator normally produces **more** power than all the electrical items require, hence under normal circumstances the battery is only discharging during engine start.

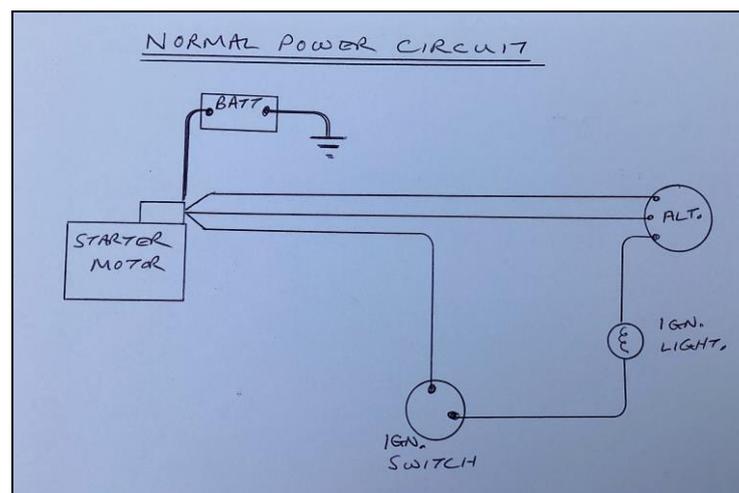
On older dynamo (generator) equipped vehicles the dynamo was often not capable of providing all the electrical power needed and if sufficient electrical items were switched on (that exceeded the dynamo's supply) the battery used to help out and was often discharging when the engine was running. Because of this an ammeter was fitted to indicate battery condition. After start-up on a nice day (i.e. no lights etc. on) the dynamo would charge the battery and replace any losses used to start the car and the ammeter would show a Charge (+ symbol). As it got darker and colder and lights and heaters etc. were switched on the battery had to assist the dynamo to provide enough current. The ammeter would now often show a Discharge (- symbol). With a battery in good condition the ammeter would show little or no charge.

Personally I've never been a lover of ammeters, mainly because the ammeter (like any gauge) does not prevent a battery being flattened. Imagine a typical scenario, you're driving home on a cold winter night with the lights, heater and radio on, the ammeter is showing a discharge. To help out you switch to sidelights only whenever you can but you just know that the battery is not going to start the car the following morning. Not to worry as the manufacturer has thoughtfully provided a cranking handle.

In my opinion an ammeter is totally pointless on a car fitted with an alternator (and not a lot of use in a car fitted with a dynamo either) they're also a fire risk on a car with old or crappy wiring. But how do you get rid of them? To answer that question we need to consider their place in an alternator equipped electrical system.

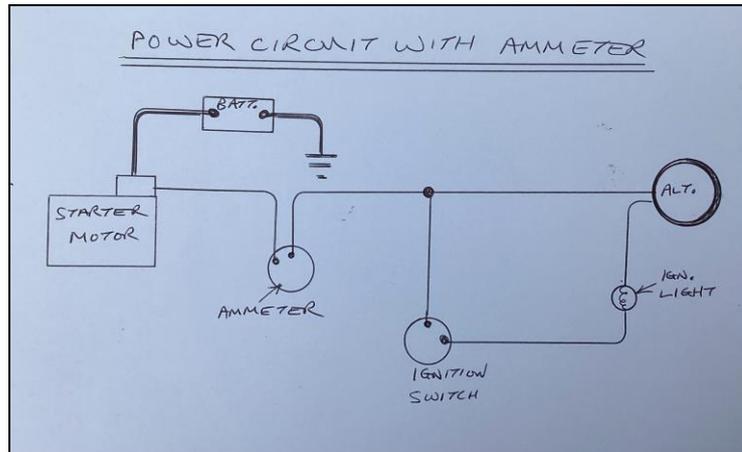
It was not so long ago that only one lead left the battery positive post and it went directly to the starter motor solenoid, which acted as a go-between for delivering and receiving power between the battery and alternator and for delivering power to the ignition switch. For example in a typical electrical system our Lucas alternators have three different sized brown cables coming out. The two thickest ones went to the starter motor solenoid. The thinnest one went to the ignition warning light (the other side going to a positive connection on the ignition switch)

The current (produced by the alternator) travelled to the starter solenoid then up the battery positive lead to top up the battery. Another brown wire went from the solenoid to the ignition switch, which in turn passed power to most of the rest of the system.



Typical method of wiring an alternator.

If you have an ammeter it is connected with two heavy duty cables (normally brown or Red). One is the supply from the alternator and the other one normally goes back to the starter motor solenoid, in other words the ammeter is wired in series with a cable that runs between the alternator and the starter solenoid. Spliced into the cable between the alternator and ammeter is another cable that feeds the ignition switch etc.

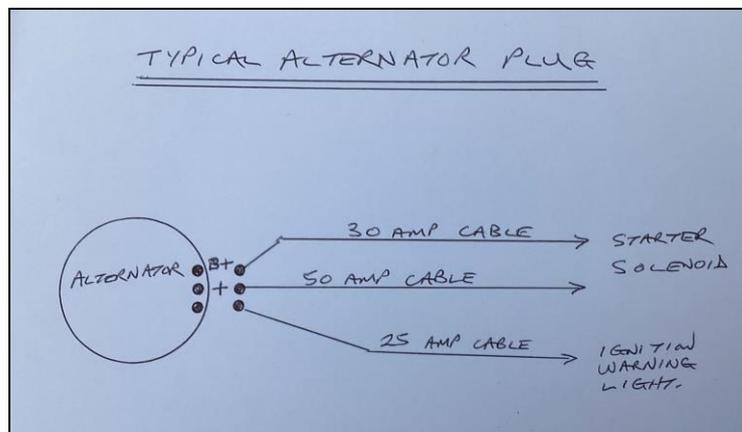


**Changes to an alternator circuit if using an ammeter.**

**The simple way to dump the ammeter:**

Fortunately there is an easy way to get rid of the ammeter; snip off one off the female terminals by the ammeter end and replace it with a male Lucar terminal, join the two cables together and bind the joint with amalgamating tape.

I wanted to do away with the ammeter cables and return the system back to normal. Disconnecting the alternator plug and using a Multimeter quickly identified the lead from the alternator to the ammeter. Now came the problem, I could not find where the second cable terminated, it just disappeared into the loom and didn't come out. From the direction the cable entered the/loom it was on its way to the engine compartment, but it didn't appear to come out anywhere. Now I could unwrap the loom and find out what is happening but there is no slack in the loom under the bonnet and if I were to unwrap it I'd never be able to wrap it again without major disconnection of the loom components. I may do this eventually, but I really want to get Cracker back on the road before the end of the month, so I just took the simple option for the moment and bridged the two ammeter cable together, hopefully I'll sort it all out in the engine compartment later.



**Typical cable size for rewiring an alternator after removing an ammeter and its cables.**

**Note.**

*Why would you want to go to all that trouble to put the wiring system back to normal when you can just remove the ammeter cables and link them together? "As far as I am concerned the answer is that most ammeters are fitted aftermarket by a self taught 'enthusiast' as opposed to a competent*

*electrician.” Badly wired ammeters are a fire hazard and just removing the ammeter and linking its two cables together doesn’t remove that hazard. Cracker the TC is to all outward appearances a well constructed car but as I delve deeper into his anatomy during my winter overhaul sessions I am finding all sorts of problems. Twelve months ago I posted photos on the Forum of the crappy wiring to the front lights, now having got involved with the wiring behind the dashboard I am/was even more concerned; not putting too fine a point on it the majority of his wiring system is a bodge!*

### **Fitting a voltmeter:**

This is really simple, just run a cable from the voltmeter to somewhere that is powered when the ignition is ON, run a cable from the other side of the voltmeter to earth. These don’t need to be thick cables and 16 amp cable is more than adequate. One thing you should be aware of is that not all voltmeters are created equal! For example if you look at the ‘Green’ coloured segment on different gauges they will show different peak voltages; the higher voltages (circa. 15v) are for dynamo (generator) equipped vehicles; and the lower (circa 14v) for vehicles with alternators. If you don’t have coloured segments on your voltmeter then assume circa 12v and below can struggle to start the engine. Above circa 14v is too high a charge for an alternator equipped engine and can point to an inaccurate regulator.

### **Postscript:**

*Many people think that you only need an ignition warning light as it will indicate if the alternator (or dynamo) goes faulty; it will also indicate a broken fanbelt. Years ago we used to use a nylon stocking as an emergency fanbelt; if you don’t know where to get one from then you’re probably not old enough to be driving an NG. Note you should only use the stocking to drive the water pump, if you try to drive the alternator as well it won’t last long.*

*Some people would probably argue that a voltmeter is the logical item to fill the hole in the dashboard following removal of the alternator, but there are other options; e.g. a vacuum gauge. These can give a good indication of engine condition and help in achieving more economical driving; some people like an electric clock and Cracker had one (which I removed). The problem with a clock is it can eventually drain the battery on a vehicle that receives little use. You could of course fit and use a battery master switch but then every time you use the car you have to reset the clock.*

### **Summary:**

I don’t know if any MGB’s were provided with an ammeter as standard? If there were I couldn’t find a related wiring diagram. This would indicate that ammeters in an MGB or an MGB based kit car are an aftermarket fitment. Most kit car wiring is poor enough as it is without asking for trouble by fitting an ammeter, best to remove it and everything associated with it.