

## The use/misuse of test meters

**Electricity;** - jobs done by 'magic' but when it gets lost in your wiring you need some way of seeing what is going on. You do not need any form of degree with electricity but a little basic understanding with the use of meters and how to test might not go amiss.

There follows some basic trip-mees that we all need to be aware of.

Firstly we are talking here of the very versatile Multimeter. It can measure Amps Volts and Ohms usually to some degree or another. There is the modern Digital (numbers on an LCD display) and the Old fashioned Analogue types, waggy pointer. They both have their use and limitations but you might need some knowledge so that you don't lead yourself astray.

**Digital;** These can be very cheap (less than £10) or you could pay 5 times that. The Digital has one big advantage it has greater RESOLUTION. This means you can read 12.56V with ease and also see 12.54V Neither of which can you see with any certainty on an analogue. BUT RESOLUTION is NOT accuracy. Just because it says 12.56 it could be several percentage out! Be aware, depends on its manufacture/calibration /cost etc. Do not believe every reading you see.

Digital-especially the cheap ones suffer very badly from interference especially in the automotive field. A typical coil ignition motorcycle can have 500V spikes on the battery lines, so be careful when trying to measure a battery voltage. This interference can make your cheap Digital meter readings jump about alarmingly. Even a magneto ignition will have the same effect-radiation from the HT leads can cause all sorts of miss reading. This is a prime situation where the Analogue meter will win, it does not suffer from any such problems.

'Time to display' is another area that makes the Digital meter less able to cope. Trying to measure the DC current into your battery (typically a 10A DC range) from a working dynamo/alternator etc. can be fraught. The digital takes several moments to take a reading that looks right, you have to maintain a steady open throttle!

**Analogue;** If you do the same test with an Analogue meter you can often see easier the reading the pointer goes up to with one smart 'voomba'. After all the Analogue will give you a good feeling of the current where you do not need to know if it is 5.43 or 5.76, about 5 ½ is good enough.

**Alternator testing;** Despite what Joe Lucas says in his testing of alternators please do not try to find a 1 ohm resistor nor try measuring the AC from the alternator with any meter-you waste your time. Very basic Lucas alternator testing is this;- There should be a virtual short circuit between all the wires? (1-3ohms) Does any lead go down to the metal work of the alternator? It should NOT. Now testing for quantity of output-remove the out put lead of the rectifier (regulator/rectifier is the same) Place a 10Amp DC (Analogue) meter in circuit between rectifier and the wire that came off. Start bike and put the lights on. A good Lucas RM21 should give in the order of 9AMPS at 3K Revs.

**Dynamo basics;** A basic understand here is that just about ALL the dynamo regulators on any British bike concerns itself with the battery/charge voltage only. The regulator does NOT concern itself with amps into battery or load. So if your Dynamo regulator is performing (or not) you must concern yourself with the battery voltage. Measure it. 7.5V for a 6V battery while 14.3V (ish) for a 12V battery on charge. And that is all you need worry about. The Lucas-Miller ammeters that we all love in our headlight are really nothing more than a hole filler. They can be easily miswired so that they read the discharge only! They stick and wobble and bounce to the engine vibes alarmingly, just use them as a starting point, maybe.

**Testing without a meter;** In a lot of cases this test is all that is needed you often do not need numbers clogging your head.

The alternator tests above can just as well be done with a lamp, preferable a 12V headlamp bulb (you know, the one with a duff filament!)

Connect this across the alternator wires, start and run engine at fast tickover, there should be a bright light across all/any wires. Connect one end of lamp to the metal of the engine, the lamps should NOT light-basic alternator function good.

So we are looking for a failed something on the bike, we think we have electricity but it seems lost. Take an instrument lamp or idiot lamp with a couple wires, one to a croc clip for earth, the other to a pointer (piece of old welding rod!) and bingo we use lamp to find our lost electricity. (or you can spend a little money on the appropriate test 'screwdriver' look alike-the one with the earth connection lead) No point in tracing with a meter, you do not need to read 12.5V nor do you need to be led astray by the high impedance of the meter.

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### **Some test 'instruments'**

**A;** Single filaments 'indicator' lamp  
With two wires and croc clips.

**B;** Typical modern speedo lamp  
with leads and clips.

**C;** Idiot lamp with lead and croc clip  
(earth) and probe (welding rod)

**D;** 12V test 'screwdriver' with earth  
lead.

