

Limitations of British Motorcycle Charging Systems

A friend asked, “Why isn’t it possible to set up the charging system like a car, with an alternator that would put out excess amperage to safely power all accessories at any engine speed, and a regulator that would automatically prevent overcharging the battery?”

In a car's alternator, both the stator AND the rotor are composed of wire windings. One of these coils acts like a Lucas stator (the output coils), and the other coil is an electro-magnet (and acts like a Lucas rotor). A car's regulator 'senses' the battery condition, and when the battery needs charging the regulator sends power to the electro-magnet. This winding becomes magnetized according to the amount of power the regulator sends. The output of any alternator built this way is directly proportional to the strength of the "magnetic field" of the electro-magnets. In this way the regulator can control the alternator output from **0 to full power**. However, this system is not very compact or easy to implement in the limited space of an oil bath primary.

On our British motorcycles the designers merely traded the excess wiring of the electro-magnet for the simplicity of the fixed magnet rotor. The problem then is that there is no way to vary the power of the magnetic field, and therefore there is no way to turn the alternator output OFF.

In the first generation (G1) motorcycle alternators back in the 1950's there was no regulation of voltage or current and therefore batteries and bulbs didn't last long. The second generation (G2) added a Zener diode about 1966 that limited voltage to about 14V, but would allow the battery to charge with up to 8A with the lights OFF. The present generation (G3) Tympanium and Podtronics type rectifier-regulator units limit voltage to 14V **and** limit current to a constant 2A (lights ON or OFF). This is good enough for 90% of the riders, but their design assumes you are using a full-size 9AH battery that is big enough to absorb any extra charge. However, these G3 units still cannot vary the charge to any great effect. If your full-size battery was dead at the start of a ride, it will only be slightly better by the end. And if your battery was a small 5AH unit and fully charged at the beginning, then it could be over-charged by the end. Follow?

Conclusion

You might wish to investigate a "G3" Podtronics rectifier-regulator unit. They are much, much better than the original Lucas equipment, but are not the final answer. However, if you'll take the simple precautions to regularly check your battery water and connections, and remove the system fuse during storage, the huge bulk of normal riders will do great with a G3 system. Sadly, owing to the physical limitations built into the system, Brit bike charging systems will never be a "check it once a year" system like your car.

Hope this helps! 🤖👍

Richard Whatley
Rodi British Bikes