Another attempt to regulate the electrical flow involved buying an electronic regulator intended for a British bike

Another voltage regulator, hooked up temporarily to see what would happen with the engine running

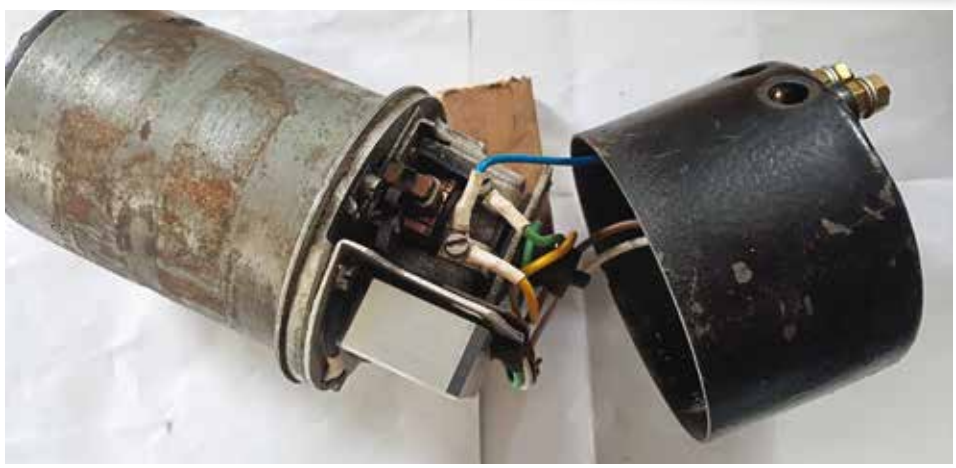
To finally sort out the dynamo the engine needed to run, and for the engine to run it needs fuel. Of course I'd drained and removed the petrol tank to fit the new wiring. Drained because there is a balance pipe between the two sides of the tank which passes under the top frame tube. I managed to split that pipe while attempting to refit the tank and that pipe was a strange size (10mm) unlike the 6mm fuel line which I had in stock. So work halted for a few days until the right size pipe could be delivered. These things are sent to try us.

Previous episodes explained that the dynamo was accompanied by a defunct cut-out / regulator. My cunning plan with a switched relay – later replaced with a diode – worked in a way but didn't give any regulation. I tried switching a resistor in or out of the field winding; still a bit crude. Examination of the dynamo showed that rearranging its internal wiring from earth-side regulation to live-side, as per the Lucas set-up, would be simple enough. That would allow the use of an easily sourced British-type regulator. I removed the dynamo (I was getting quite good at that), modified the wiring and ordered an electronic regulator. This was fitted as per the instructions.

Oddly, those instructions told me to change the dynamo from live-side regulation – as is common in British dynamos such as Lucas or Miller – to earth-side, which was exactly the way my Bosch was wired in the first place. I do so… and it didn't work at all! An online video showed that someone else had experienced the same problem. He'd restored the dynamo wiring to its original state, tried again and it worked. Following his lead I also wired my dynamo to live side regulation and tried again. Did it work? Yes, it did, but I wasn't too happy with the result.

A temporary ammeter showed a small charge with the engine running, just enough to feed the coil ignition with a little left over for the battery. As soon as the headlight was turned on, the meter went straight to discharge. There was no way it could keep up with load, even with only a 25/30W bulb. Great… if I only want to ride in the daylight. One wag suggested that I went back to the simple diode and kept the headlamp on all the time to soak up the extra amps. That was not a success!

Returning to the internet, I found many positive reviews of the DVR2 from Dynamo Regulators. These are not designed for use with Bosch dynamos, ➤



Fitting the DVR2 inside the dynamo end cover

The dynamo with its cover, back on the bike. A rubber boot was added later over the terminals to protect against the weather

The modified dynamo cover with its new external connectors

but I already proved that swapping the internal wiring of the Bosch unit to convert it from earth-side to live-side regulation was simple enough. I asked if their one of their regulators might be suitable with this modification, and Mr Hutchings rapidly answered that he could see no reason why it would not work. He also went on to say that my experience with 'cheap' regulators was far from atypical: 'Buy cheap buy twice' in his words, although in my case it was 'buy thrice'!

I cut a small piece wood to the dimensions of the DVR2 to prove that it would fit inside my dynamo casing. The units produce very little heat, so it should not come to any harm. A DVR2 was ordered and it turned up just three days later.

Before attempting to fit it I rigged up a temporary load – a 12V bulb – and connected a voltmeter. With the engine running the lamp lit up OK and there was a healthy voltage shown on the meter. The test also showed the dynamo polarity was correct (negative earth) which is important as the regulators come in two different types. I disconnected the temporary load and wired up the unit, then restarted the engine to observe the result. There was a very small charge to start with, which quickly picked up as the engine revs increased. Turning the headlight on required a little more speed from the engine to balance out the load, but overall this was a very big improvement. Happy that everything worked as it should, my next task was to mount the unit inside the dynamo and tidy up the wiring.

Over the decades that the 251 OSL was in production, its gearchange was swapped from hand to foot operation. Note the distance between the footrest and the gear pedal

Attempting to fit the end cover gave rise to another problem. There were two socket-type connectors that projected quite a way inside the cover. These were not an issue with the old regulator, but got in the way of the new unit. I removed the sockets and replaced them with an external type and turned up a pair of insulating bushes with 2BA brass screws instead. With everything back in place and the engine running once again it all worked as it should: even the ignition/charge light did what it was supposed to do.

The next move was to replace the primary chaincase and the nearside footrest after adjusting the primary drive and dynamo chains. My earlier short road test had revealed just how awkward changing gear was. There may be a fault in the gearbox but the position of the gearchange lever doesn't help. Over the years NSU made several changes to this model, including converting the gear shift from hand to foot operation. They didn't fit an updated box ➤

THE HISTORY BIT

NSU's early incarnation was as the Mechanische Werkstätte zur Herstellung von Strickmaschinen, a knitting machine manufacturer established in 1873 in Riedlingen. The business relocated in 1880 to Neckarsulm, logically becoming the Neckarsulm Strickmaschinaschinen Union. In 1886 the company began producing pedal cycles and by 1892 bicycles had completely replaced knitting machines – and the company adopted the NSU name.

Their first motorcycle arrived in 1900 (OK, it was just a little engine with a petrol drip feed, attached to a bicycle, but it's the principle that counts) followed by a motorcar by 1905. They were to sell their car-making factory to Fiat in 1937, but long before then had followed the usual path of motorcycle development: an in-house 2hp engine in 1903, a water-cooled 4hp monster in 1905, various V-twins thereafter; trailing-link forks in 1905 and two speeds (!) in 1906. Thereafter came early TT success, a utility model for the Great War, and the first unit-construction new models in 1924.

During WW2 NSU produced the famous Kettenkrad half-tracked motorcycle for the German army. Civilian production restarted 1946 using pre-war designs, with their first new machine coming 1953. In 1957 they re-entered the car market with the world's first Wankel engined four-wheeler, followed in 1967 with the famous (some say infamous) Ro80, said to be the vehicle that tipped the firm over the edge. By 1969 the firm had been absorbed by Volkswagen.

The 251 OSL first appeared in 1933, designed by Walter Moore. Initially the 242cc ohv engine produced 9bhp and used a three-speed gearbox, then it gained an extra ratio and a whole 1.5bhp for 1936, making 60mph almost possible. By the outbreak of hostilities NSU had made some 35,000 OSLs, and from the end of the war to the end of production in 1952 another 32,000 rolled off the production line.

If you wanted to buy one then a machine in similar condition to John's bike – after all his efforts getting it running right and sorting the electrics – will set you back around £4500 today. There aren't too many in the UK so you're more likely to find one on the Continent…