

## Kubota Alternator for a Venom

Some of you may remember, about 2 ½ years ago I brought along to one of our club nights a Kubota alternator I had attached to a Lucas dynamo body. My intention was to fit it to my Venom as the 6v dynamo powered lights were abysmal and the battery was forever going flat. I had an old dynamo belt drive inner and outer casing in a very poor state that I was going to use to cover the belt drive to the alternator. The inner had to have a larger hole for the Kubota alternator as it measures 3 ½ inches in diameter compared with the 3 inches of the Millar / Lucas dynamos. The outer cover was in a very poor state, cracked around the bolt hole and the hole was very oversized through corrosion and coloured orange – rust not paint. This is where the project stalled, I lost enthusiasm to fix the casings. Stuart McGuigan and John Crocker gave us a presentation at the last club night on Criterion's latest Velocette alternator based on a Kubota unit and this and the enforced stay at home got my enthusiasm back to finish the project.

I used a Lucas E3H body to mount the Kubota on because it has a short body and I had a couple of broken ones in my box of parts collected many years ago from my BSA C11 days. I turned up an aluminium adaptor piece to join the Kubota to the Lucas body and cut off the mounting "ears" on the Kubota and turned the body nice and round. I made the adaptor eccentric so there would be some belt adjustment by rotating the device in the mounting on the engine in the usual dynamo fashion.

My welding and brazing skills are not very good and my attempts at making a shield for the alternator rotor were not very pretty. But plenty of Isopon body filler and lots of sanding produced a reasonable result. Instead of trying to braze up the corroded outer cover I glued a plate on the inside with JB Weld and made the outer good with more Isopon and more sanding. The rust was treated with Jenolite and then primed and painted black with Halford's spray cans which I had in the garage from another job.

Stuart had mentioned in his talk that foreign objects got into the gap between the alternator rotor and body. The Criterion design overcomes this problem but mine didn't. I found the answer in Yorkshire. No, I didn't go for a ride up north, I had an empty plastic container for Yorkshire Provender soup (available at Waitrose and other good food outlets!). These containers are just over 3 ½ inches in diameter and taper. A section cut out of the container was a nice snug fit on the body of the alternator and the slight taper gave a very small clearance for the rotor. All held in place with silicon sealant. A real bodge job but hey, it works!

With all the bits made I was now ready to convert the bike. The alternator fitted ok with some slight adjustment of the inner cover to give plenty of clearance for the alternator rotor. The original vee belt from the Miller dynamo removed years ago was a perfect fit (Z section 210 length) and the Kubota rectifier / regulator replaced the DVR2 on the rear mudguard under the seat. Because the bike had been wired for Lucas type dynamo with the regulator under the seat no changes were needed to wire it up. Very simple to put back as it was if the alternator didn't work.

With all the bulbs changed and a 12v battery borrowed from another bike time for a test run. The bike started and the ammeter showed a charge from a fast idle and balanced the 60w headlamp at not too high an engine speed. A volt meter showed the system was controlling at 14 volts. Looking good. But what would it do on the road.



Kubota Alternator with drive belt cover removed



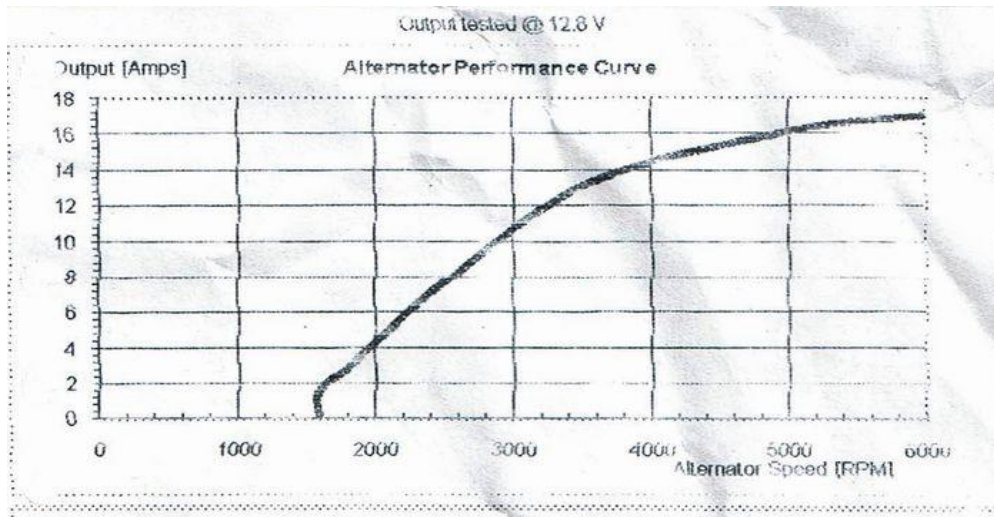
Kubota Alternator fitted to bike

The alternator balances the headlamp at about 33 mph in top gear with a slight discharge at slower speeds. At 30 mph in third gear the battery shows a slight charge. All pretty good.

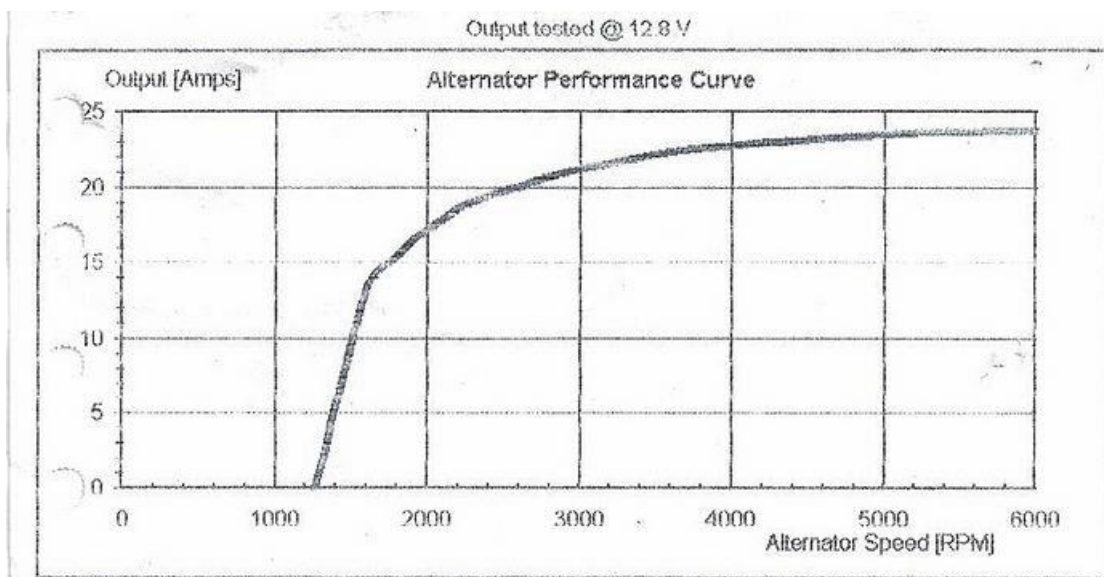
The Kubota regulator has a live feed from the battery to sense battery voltage. I measured the current draw and found it was 3.75 ma – not a lot. But if you don't use the bike often it will discharge the battery by 1 Ah approximately every 21 days. An 8 Ah battery has a usable capacity of about 4 Ah, after 42 days half the usable capacity will have been discharge through the regulator. If

leaving the bike either disconnect the battery or fit a switch in the battery sensing line to the regulator.

The alternator I used was the 14A version whereas the Criterion design uses the 22A version. I found the charging curves for the two alternators on Auto Electric Supplies website. These clearly show the superior performance 22A version at lower speeds.



14A Alternator



22A Alternator

Was it worth doing? I had all the parts needed and a lathe to make the adaptor and enjoyed doing it and it seems to have solved the abysmal lights. If buying the components the alternator and regulator from Auto Electric Supplies is about £190 plus aluminium bar and drive belt takes it over £200. The Criterion alternator, regulator and belt is selling for £250 and has better low speed output so looks good value for money. Thanks to Stuart and John from Criterion for giving me the enthusiasm to complete the project and I hope to have safer riding at night going forward.