

PRS8

The LUCAS PRS8. Why is this switch is apparently so involved. First you have to remember that they were designed and originally made in the 1950s so the fact that some of originals are still doing good service does say something for their manufacture. There are two layers, the upper for lights and the lower for ignition. As of course they were built to control the early 6V Lucas alternators. It isn't a case of just switching the ignition on or just putting the lights on. First the ignition layer, this has a normal ignition position, switching DC to the ignition coil. Then an emergency position which incorporates AC as well. In the EMG position it must reconnect the full output of the alternator (which was previously only partly being used.) so that is the second function. Then due to the fact that when these switches were first made, rectifiers were made with SELENIUM, these weren't very efficient as rectifiers and used to leak badly, your battery could go flat quite quickly. So the switch used to switch the rectifier away from the battery, a third function.

Now we come to the upper lighting layer, you not only have to switch the headlight on (switching battery DC) but arrange for the side light to come on and off again while the rear light and speedo lamp remain on, a fourth function. Then-when the headlight is on you have to incorporate a further two thirds of the alternator (which wasn't in use before) to try and keep the battery up to charge. Again the alternator switching is AC and hence separate from the DC of the lights. Seems we have a fifth function.

As alternator switching is done with both layers then there is a numerous amount of interconnecting wires, miss one out at your peril.

So my friends with all this in mind the switch seems to have coped over the years quite well. Yes these jobs can be done with two separate switches, but if we are staying 6V alternator then all these functions have to be covered some way.

How to simplify? Modern rectifiers-made with Silicon don't need the rectifier to be switched out any more. Then comes the big improvement 12V. In this case the alternator has all of its output connected all the time. So no longer do we have to switch it for headlight usage. By that we automatically loose the emergency ignition feature, so another function of the switch is no longer needed. Therefore it can be used in a simpler mode (12Vetc) but for 6V alternator this is the way it has been for many years.

And now the striping and service.

What a wonderful switch, yes plenty of wonder here, we had these from the late 50s and only on the early alternator bikes, a fine piece of Lucas engineering. After 60 years some of these appear past their best, but due to the way it was built sometimes quite a lot can be done to extend its life and/or repair them. Unfortunately there is a number of significant wear points that cannot be fixed, so lets us see what we have, from the top.

The top:- In a hard black Bakelite gets very sloppy but usually goes on for years, its main hole down the middle wears and the hole for the side screw that holds it on. Remanufactured ones are available.

The side screw:-This hold the top on! It has a 6BA thread. Original ones had a further 6BA screw down the middle which in essence by spreading the main screw caused the whole gubbins to stay tight in the knob. BUT due to age and rust these hardly work. Remade screws drop this feature, so be it.

Top grommet:-Very often lost, supposed to keep the water out and help hold the key in. Another item that has been remanufactured.

Key Keeper:-My name, for this funny piece of tin, it is held in rather badly by 4 tabs that bend around the top main part of the switch, another wear point. The slot for the key gets very worn and bent usually due to the use of the wrong key and/or small screw driver as ignition key!! Often new ones turn up, as well worth replacing. It has the Top Grommet fitted to it.

Key:-You might think not a lot to go wrong, but so many times the wrong key is used this messes up the above item. If when rebuilding you look at key operation with the grommet removed you will see if you have the right key, don't force it.

Nut:-Again not a lot to go wrong! But they are very thin, they wear and get distorted by the use of Mole wrenches. I like to use the correct spanner 7/16W but carefully.

Large tin washer:-This butts against the headlamp saves the paint and should tell you your lights are on! The D hole in it gives you a clue as to how it fits on the main switch top, unless the later is severely worn.

Rubber washer:-Underneath the headlamp on top of the switch, yes I know you have never seen one. They are 'nice to have' to keep the water out of the switch terminals and any faint chance of the terminals touching some swarf or dirt and connecting to the headlamp. These are very thin and about 30mm ID 50mm OD. You can't make one from inner tube-too thick!

Top Body:-This large lump of Bakelite is the first real Achilles heel, they wear and break where they stick up through the headlamp shell, they also break away around the slot for the knob fixing (and operating) screw. The thread for the above nut also wears a lot rendering the switch apparently unfixable to the head lamp. But there is a 'dirty' way out, I have seen the thin self tapping body screws put in from the top, through the headlamp shell! Your choice!

Separator:-Made of Tufnell, with many holes. It goes in one way only, but don't worry about it. There are two plastic pips sticking up from the bottom switch body to locate, if these have broken off, still no problem, the three self tapping screws that hold the main parts together in effect realign it.

Bottom Body:-Probably the best part, the only wear point is the registrations for the balls.

Top Rotor-Lights:-, the Bakelite pips that have push clips that hold the copper looking switch wipers, break off, the switch can some times still work (remove broken bits). The ends of the wipers also burn/wear off. The shaft suffers rust inside and out and the 6BA side thread gets worn and blocked. Circlip slots needs cleaning.

Bottom Rotor-Ignition:- as above and they do crack/break across the rivets.

Shaft:-A separate part to the rotor suffers rust and the key slot being full of dirt. The 4BA thread is usually ok as it doesn't get abused.

Dismantling:-Assuming the switch is away from the headlamp, main nut and washers off, the side screw is out then the circlip and thin washer are removed from the top lights rotor shaft. Undo the three long self tapping screws from the bottom, these often rust into the plastic! I don't know the answer for repair, perhaps loosening one is tolerable? This will take the top off, the separator falls out and the brass terminals fall all over the place! The top/lights terminals are curved inside, while the bottom ignition ones are flat. No we don't know why. The bottom/ignition rotor will remain within the bottom until you remove the 4BA Nyloc nut and washer.

Servicing:-Mostly very obvious, clean out rust, inside and outside the shafts-re-grease lightly. Prise out 4 balls clean and re-grease, (moly). The terminals 4BA screws benefit from a 1/8 drill run in by hand where the wires go and the wiped surface from a bit of fine wet/dry.

Mantling:-Relatively straight forward, bearing in mind above. The rotors only fit one way and tend to mostly hold the terminals in place. Separator goes in one way only. Bottom 4BA Nyloc nut is NOT to be too

tight, don't forget the washer! Finally use side screw and key to check for smooth operation.

Operation:-Checking switching needs a copy of the internal switching diagram, at this point you should not have the wire links fitted. A buzzer facility on a meter or a small lamp and battery are easier to use and more enlightening than the resistance range of a multimeter.

Usage:-The PRS8 was designed to switch the alternator output to cope with different light loads on 6V systems, along with switching the rectifier out of circuit from the battery as rectifiers in this era were made of Selenium a very leaky device. Silicon rectifiers, even the very common Lucas 1 1/4" do not need such a facility.

Remanufacture:-The PRS8 has of course been remanufactured, don't complain about the price it is cheaper now than when it was originally made by Lucas. Is the repro. As good as the original? Well if it works I suppose so, but I have had several reproductions that had a registration fault. Off was fine, side lights just worked but headlight, third position, had some sort of registration fault such that the switch wipers were coming off of the terminals. Then there was the fact that the brass terminals were 1/4" while the remanufacture is 6mm. New switches have all flat terminals for the wipers to connect to. The threads seem to interchange but are they 4BA-6BA?

Wiring:-After testing that all functions do, as per the switch wiring diagram you have to put back those short wiring links. There are several ways the switch is used, I have seen different bike diagrams using this switch for singles and twins, different connections are used for the same functions.

Alternator functions:-The three alternator wires are connected to have three states. Trickle charge, with all lights off. Uses White/Green and Green/Black to rectifier and further reduced output by switching in the White/Green wire. Soon abandoned. So we have the same trickle with ignition only and side lights. Full output for headlights is then obtained by switching in the Green/Yellow wire (connects to the Green/Black). This is often a failing point that goes amiss, ie switch failure. How often do we hear the complaint-'works fine till we put the headlight on then battery goes flat!

Ignition function:-As well ignition on/off moving the key to the other side from off should give you emergency ignition. This is brought about by switching the full output from the alternator directly to the ignition coil. After you have started please remember to switch back to normal ignition.

Failure to start in emergency might be a switch fault but could be an alternator fault.

Have fun! ALAN OSBORN

With thanks also to Greystone Enterprises 01227861100 for advises, and availability of parts.

The parts:-

‘A fine set or parts you will come across, the key is the right one as it fits the ignition spindle and the key security tab.

