

New life for an old wiper motor

As part of the ongoing restoration of TA3120 I had left the wiper motor to near the end as it had been working when I shut the car down 42 years ago. So I was horrified recently when I opened the rear cover to discover that water had got into the electrics and rusted everything up.

My first reaction was to scrap the unit and source a new or rebuilt unit. However none of the usual UK sources had any stock and had no idea when new units would be available, something to do with armature problems in manufacture. Units do turn up on Ebay occasionally but vary greatly in condition, and good ones go for serious money. So what to do, especially as working wiper are mandatory if the car is to pass the UK MOT road worthiness test?

The unit itself is a Lucas CWX 12volt L1, Lucas part no. 730497, which I believe is correct for TA, TB and early TC.

I decided to have another look at the motor, and on applying 12V found it was trying to turn. I'm not an electrical engineer so normally leave this type of unit well alone. However I really had to do something so rejuvenated it as follows:

Electrics (rear section, photo 1 for exploded view)

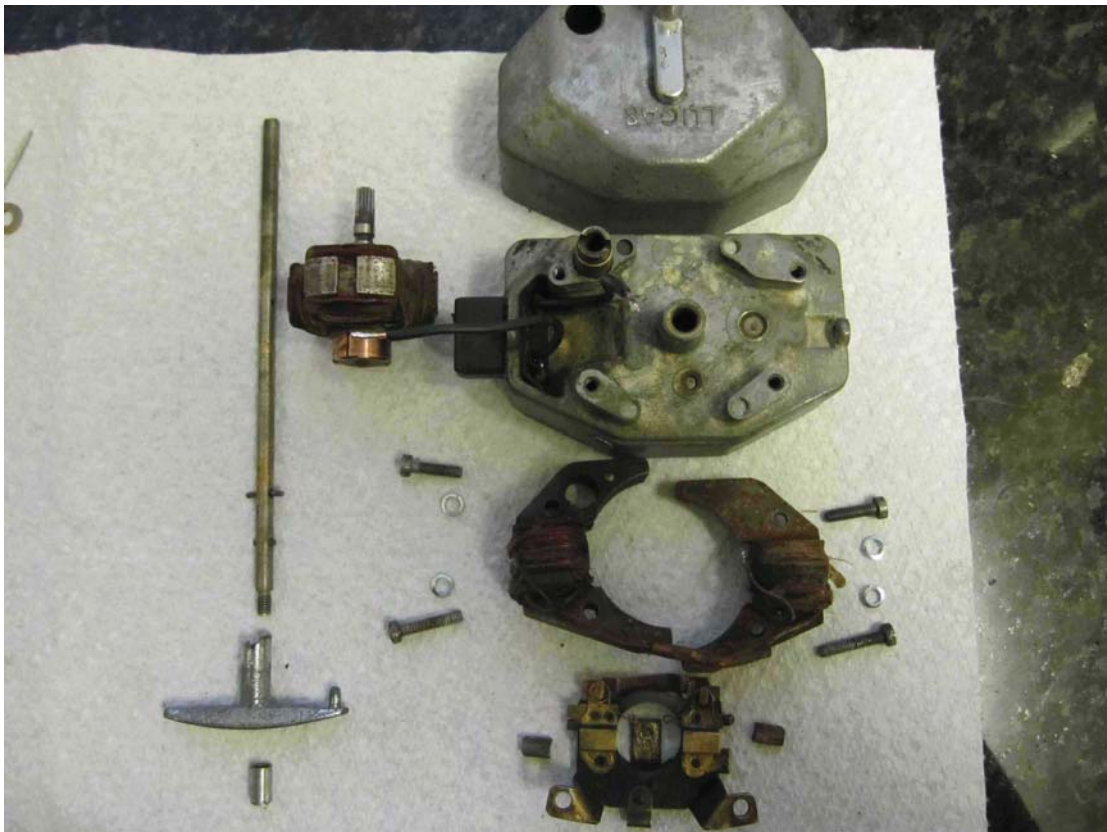


Photo 1 – Exploded view of Motor

1. Remove screw from handle, pull handle back and out. Note: my handle is non-standard, as the correct type is short and rounded on the left side.
2. Remove two cover holding screws and pull off cover.
3. Noting that each solder connection has two tags, one to grip the wire and the other to solder it, ease each gripping tag open, including the single tag supporting the thin connecting wire between the two stator sections (stator = the two fixed plates on each side of the rotating armature = rotor).
4. Unsolder the two black wires leading from the inside of the connector block where they connect to the brush holding plate..
5. Unsolder the thin wires to/from the stator where they are soldered to the brush holding frame.
6. Move each brush spring back out of the slot and push aside (photo 2).



Photo 2 – Brush Holding Plate

7. Remove each brush but carefully note side and orientation of each as they are mounted off-centre and need to be a good fit when replaced.
8. Remove two screws holding the brush plate, carefully lift clear.
9. The rotor will then lift out.
10. (Optional if you plan to service the gearbox next) Remove split pin, washer and spring from the extended wiper spindle on the front of the motor. The spindle will then withdraw easily from the rear.
11. Clean rust from all surfaces with emery paper and/or fine files, then coat with Waxoyl (an oil-based product that partially dries out) or similar. I could have used a varnish here but considered that Waxoyl would offer longer term protection against rust.
12. Clean and lubricate rotor shaft.

13. Clean off end of rotor to bare metal, where it touches the brass connector plate on the brush holding plate.
14. Carefully, with finest emery paper or metal polish, clean off the copper elements of the rotor where the brushes make contact. Take care to clean only around the elements, not across them, to ensure good brush contact and longer brush life.
15. Clean out the slots between each copper element, then replace rotor.
16. (Optional) You may wish to re-varnish the windings at this point but I chose to leave well alone.
17. Before replacing the brush holding plate, push each brush spring back and to the rear so that they are locked back and give room to insert the brushes. Check that the ends of the switch contacts are clean and in good condition, and that the inside of the plate is clean where it touches the end of the rotor shaft.
18. (Optional depending on condition of the two side feed wires) Unsolder the two side feed wires and replace with new wire of similar grade and length.
19. Screw brush holding plate back on to the wiper body.
20. Replace brushes exactly as they came out, then release the holding springs back into their slots.
21. Re-solder all connections (photo 3).



Photo 3 – Soldering completed

22. Clean up the switch inside the cover, but do not remove as it is clipped tightly. A little grease on this area will smooth its operation.
23. Replace cover and screws.

Gearbox (front section, photo 4 for exploded view)



Photo 4 – Exploded view of Front (Gearbox side)

24. Remove both motor mounting studs by locking two brass nut together then unscrewing.
25. Lift off ½" spacer.
26. Unscrew two cover locking screws. Prise off cover, possibly using a small screwdriver in the U-shaped slot at top right if tight.
27. Note that the smallest gear, which extends into the rear section, has a small dimple in the inner ring (photo 5). This must align with the centre of the brass quadrant gear in re-assembly. Orientation does not matter anywhere else in the gearbox.



Photo 5 – Gearbox detail

28. Remove smallest gear and clean.
29. Swing quadrant gear over to right, lift crank arm slightly and remove the largest gear. Note that this will show 130 degrees, or 150 degrees for the later TCs, and refers to the angle of sweep (these gears are interchangeable between units). Lift out the resin gear.
30. (Optional, I chose not to disturb) Remove split pin and washer, lift out gear.
31. Clean all gears, shafts and box internals of all old grease. Lubricate shafts and gear teeth with fresh general-purpose automotive grease.
32. Re-assemble gears, noting 26 above.
33. Replace cover.
34. Insert wiper spindle from rear of box, replace spring and washer, and secure with new split pin.
35. Replace two holding studs.
36. Clean off any old paint and grease. Mask off holding studs, spindle at each end, switch lever.
37. Mount whole unit in vice or similar, holding by spindle. Spray with thick coat of wrinkle paint, then two thin coats. Carefully move switch lever between coats to ensure coverage underneath.
38. Leave to dry thoroughly for two days. I used an old vice that I then placed in the airing cupboard. A good wrinkled finish should be easily achieved using this method, without the need for primer coat.
39. Replace chrome handle and locking screw.
40. Mount to windscreen using: ½" spacer, tubular locking screw on each motor holding stud, cork washer, windscreen, cork washer, 3-hole plate (early black, later chrome), rubber washer, metal washer (I used SS here),

brass nut. The 3-hole plate should have some felt behind the central hole, around the shaft, to keep out water, so man-made fibre such as quilt wadding would be better as it does not hold water.

41. Connect wires, order does not matter.

42. Stand back, admire, and test operation.

The units are, according to Lucas, designed to run warm. However if one is hot to the touch it is overloading, either due to a dry windscreen, wiper blades that are too large, input/output wires which are overheating internally against coils (cure is 17 above), etc

There is one other feature worth mentioning for maintenance. At the top and bottom of the front section there is what looks like a blind rivet. In fact these are spring-loaded balls which seal an oil conduit to the rotor bearing. So a drop or two of a light oil to the top ball every so often, when depressed, will not go amiss. (These valves are fitted on top and bottom as many different car models used these units, and some applications mounted the wiper motor the other way up.)

I hope this article helps others to achieve a good working wiper. These are of course quite basic units but can give reasonable service for many years.

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