

Dynamo Springs and Brushes

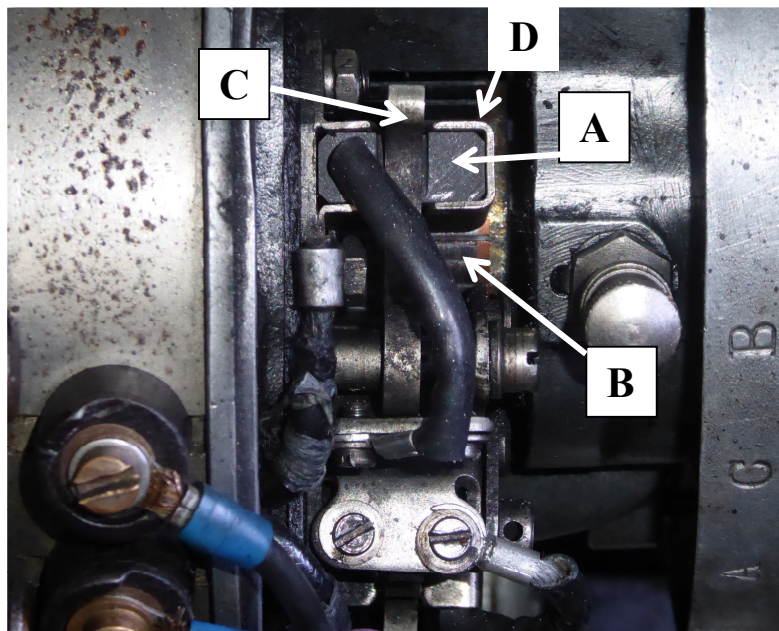
Checking the Output Volts of the Three-Brush Dynamo – tip from Tony James

The 20hp dynamo has three terminals labelled A, B and C. Remove the existing connections to the dynamo, connect C and B together and connect a voltmeter with the negative to A and the positive to C. Start the engine. At a fast idle about 15 volts should be indicated.

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The 20hp dynamo is quite a wondrous piece of equipment. Spinning between 5 and 50 revolutions per second it delivers reliable current to the battery and keeps our plugs sparking and our cars running. Sir Henry could not have foreseen that it would have to cope with all those extra lights we need today, as well as overdrives, mobile phones, CD players and sat navs. But cope it does - over thousands of miles of Continental touring. Weighing in at about 10 kilograms, it was designed by an expert electrical engineer, Sir Henry himself. It is rugged, beautifully made and most 20hps today rely on their original 90-year-old dynamo. The wearing parts can be economically replaced, for example bearings (metric, fortunately), brushes and commutators. Armatures can be re-wound if insulation breaks down or wires burn.

Now comes a big “but”: **our dynamos must be properly maintained.** The drivers’ instruction book says that every 2,000 miles the rear cover “should be removed, so exposing the commutator and brushes (see Figure). Deposits of brush dust, moisture or oil should be removed by suitable means...” In practice this should be done before every long rally, but unfortunately it is not uncommon for rally participants to report a drop in dynamo performance, often when 500 miles from home! This usually results from dirty deposits on the brushes **A** and commutator **B**, and/or weak brush springs **C**. The brush springs, which press each brush on to the commutator can become weaker over a long time so the brush will make poor contact with the commutator. This can reduce dynamo output and give rise to arcing which will damage the commutator and melt or burn insulation. Fortunately, low spring pressure can be rectified even in the middle of a rally using the method below.



Finally check that each spring is in fact pressing down onto the top surface of its brush. Brushes can become worn such that the spring is contacting the top of the brush holder **D**, which reduces the pressure on the brush and can give erratic charging. If a brush is thus worn, buy three new brushes!

(Note: erratic or no charging can also result from worn contacts in the switch box, and this is dealt with in the companion article: *Repairing the Ignition Switch.*)

Dirty brushes and commutator

It is easier if the dynamo is removed from the car - recommended if you haven't done this procedure before. (If you are on a rally and don't want to upset the magneto timing, follow the instructions in the final paragraph, below.) Remove the rear cover and the three brushes and thoroughly clean each brush and especially the brush holders using electrical contact cleaner and a toothbrush. You might need to use a scraper to get the inside surfaces of each brush holder squeaky clean. The brushes should then slide easily in and out of their respective brush holders. Carefully clean the commutator, scraping out any deposits from the grooves between each segment.

Restoring spring pressure

Each spring (1) is held on a slotted pin (2) with a slotted head (3) and pawl (4) which engages a bollard (5) to prevent the pin from turning. Pull the pin out by threading a nail or similar through the small hole (6), turning the pin with a screwdriver to disengage the pawl from the bollard, and pulling on the nail. The pin comes out and the spring falls free, see figures.

To increase the pressure of the spring on the brush, it is necessary to grip firmly the centre flat part of the spring (a) with long-nose pliers and then bend the open end of the spring in the "unwind" direction (b). Bend it such that, when released, the spring has opened by about 30 deg. Replace the pin and spring and check by feel that spring pressure has improved. This sounds complicated but it only takes a few minutes to adjust each spring.

When replacing the dynamo into its cradle, it is absolutely critical that the locating grub screw, protruding from the back of the dynamo body, is properly inserted into the small channel in the rear cradle. Otherwise the dynamo will not align properly with its drive shaft and this can severely damage the teeth of the flexible coupling (very expensive!).

To do the adjustments without removing the dynamo, make a note of the electrical connections and disconnect the three wires. Remove the rear end cover and leave it on the shaft. This may require the removal of the spring clip which locks the knurled cover. Undo the two holding down bolts for the magneto and lift it clear of the location pegs. Undo the dynamo clamp bolts and straps. The dynamo can now be lifted towards you to clear the locating grub screw at the rear which stops rotation. The dynamo can now be rotated to give access to all the brushes in turn. Thoroughly clean everything. Remove each brush in turn and adjust its spring as above. Replace the dynamo as above.

