

So – How does the A7 Cut-out work?

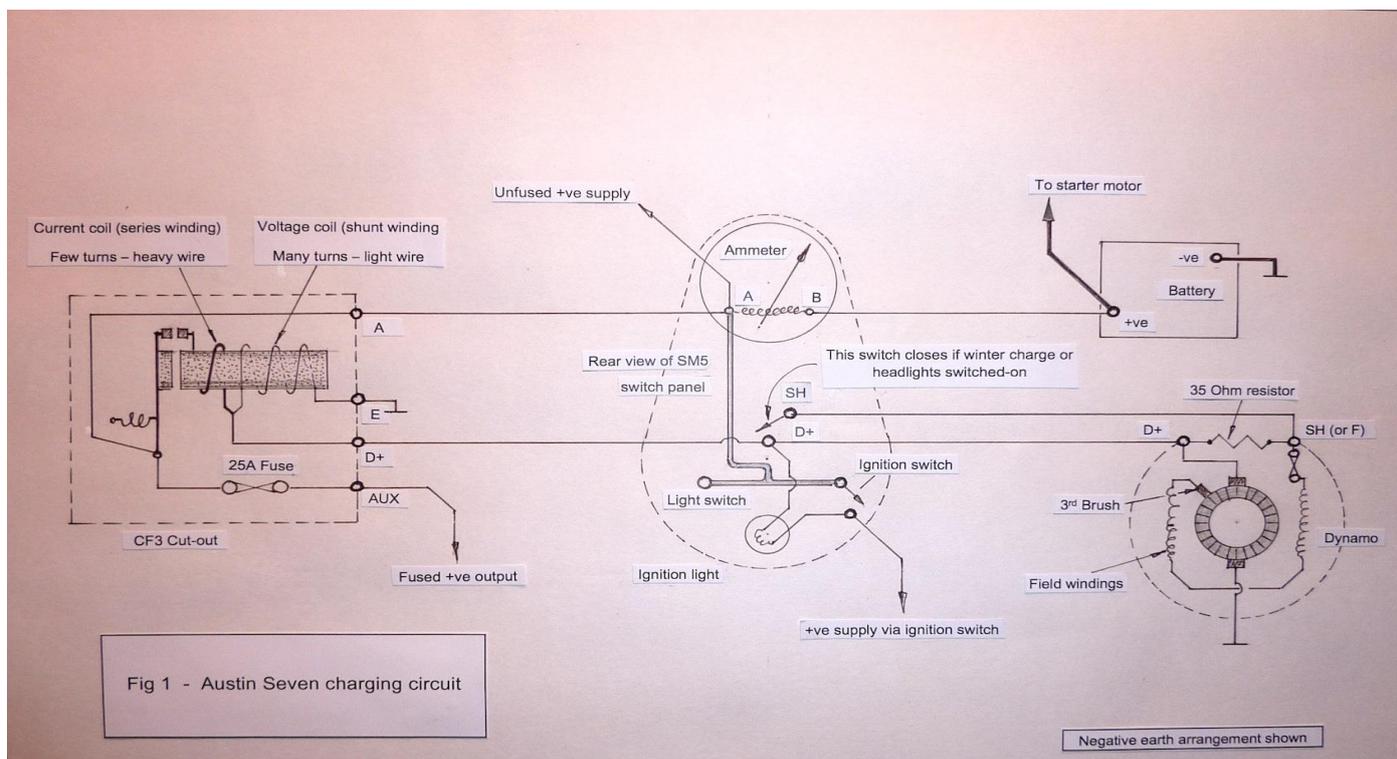
A trick question in an Eddie Loader quiz some time ago effectively drew my attention to the fact that the dynamo charging circuit on an Austin Seven was not controlled by a 'Regulator' – but was in fact a simple 'cut-out' switch. This prompted me to try and understand exactly how the said device actually functions.

I read several books on the subject and found considerable amounts of useful information on other A7 club websites – which I gratefully acknowledge. My aim was to produce a really simple explanation of the cut-out function.

The following is the result of my investigation/research, which other members might find of interest ...

Although these notes refer specifically to a CF3 Cut-out working with an SM5 switch panel and a Lucas C35A dynamo (in my 1932 car) - the function of the cut-out is similar in other Sevens.

These notes should be read in conjunction with the following schematic diagram Fig 1 ...



Introduction ...

- The Cut-out is based on a soft iron core around which are wound two coils – a ‘voltage’ coil (sometimes called the ‘shunt’ winding) which has many turns of light gauge wire and a ‘current’ coil (sometimes called the ‘series winding’) that has fewer turns of heavier gauge wire and both coils are wound in the same direction. The core becomes magnetic when current flows in either winding and when current passes from the dynamo, the magnetism in the core attracts the Armature which overcomes the attention of the spring and causes the Cut-out contacts to close
- The Austin Seven dynamo has three brushes – an earth brush, a positive brush and a third smaller brush, whose position around the commutator is to a degree adjustable. This adjustment affects the current in the dynamo field windings and is used to adjust the dynamo output. As a point of interest - the ‘third brush’ arrangement also rather cleverly causes a gradual reduction in dynamo output as rev’s increase which prevents the charge rate from becoming too great at high rev’s
- The field windings are normally supplied from the dynamo D+ terminal via a 35 Ohm resistor. However, if ‘*Winter charge*’ is selected or the headlights are switched-on, then the switch between SH and D+ in the SM5 switch panel closes causing the 35 Ohm resistor to be by-passed. This means a greater voltage is applied to the dynamo field windings - causing an increased output from the dynamo

So what happens in practice?

Stage 1 - Engine not running and ignition switched off – The Cut-out contacts should be open - to prevent the battery from discharging through the dynamo

Stage 2 – Ignition switched on – The only available electrical power is from the battery. So, current passes through the ammeter, which shows a discharge because the battery is providing power to the coil. Also, the ignition light illuminates because it is earthed through the voltage coil of the Cut-out

Stage 3 – Engine started and running at low rev’s – Everything remains as Stage 2 above because the dynamo is not producing enough power to change things. The ammeter continues to show a discharge and the ignition light remains illuminated

Stage 4 – Engine rev’s increased – The dynamo produces more power at D+ and when this exceeds around 6.5 volts - the voltage coil in the cut-out is sufficiently energized for the magnetism in the core to attract the Armature causing the contacts to close. The dynamo now takes-over from the battery and the ‘current’ coil (because it is wound in the same orientation as the Voltage coil) assists the Voltage coil to keep the contacts closed thus overcoming the attention of the spring. The ammeter also hopefully shows a charge

Stage 5 – Engine returns to low rev’s – The dynamo output reduces causing lower current (and thus magnetic effect) in the voltage coil and when current flows from the battery to

the dynamo, the magnetic effect of the current coil now opposes the weakened Voltage coil effect and the spring disconnects the cut-out contacts. This prevents any further flow from the battery to the dynamo and the system is now back to Stage 3 above

Stage 6 – Ignition switched off – The important feature here is that the Cut-out contacts must be open (they are of course already open if switching-off from low revs). The ammeter should register zero current in either direction now the coil is no longer connected and the ignition light should not be illuminated

You will be reassured to know that our technical expert Eddie Loader has checked this article and concluded it is suitable for publication ... Bob G