SNS COLLEGE OF ENGINEERING

Kurumbapalayam (Po), Coimbatore – 641 107

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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

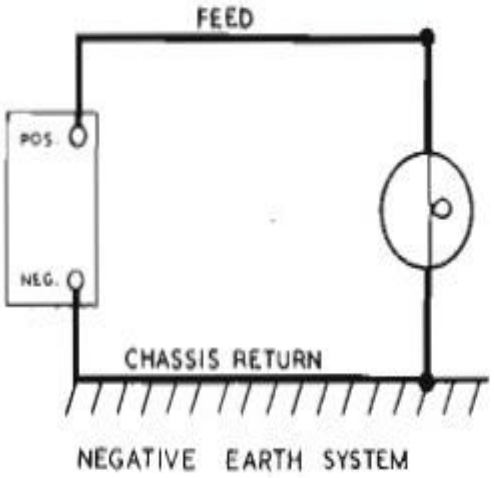
COURSE NAME : 19OE120 AUTOMOTIVE ELECTRONICS

I YEAR /I SEMESTER MECHATRONICS ENGINEERING

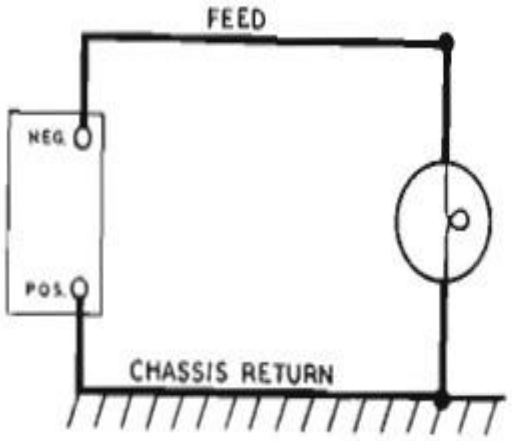
Unit 3 – STARTING / CRANKING AND ELECTRIC SYSTEMS

Positive & Negative Earth System

Positive and Negative earth system



NEGATIVE EARTH SYSTEM



POSITIVE EARTH SYSTEM

NEGATIVE EARTH SYSTEM

With the *earth return system* the orthodox arrangement was to *earth the negative pole* of the supply, and this became known as the single pole negative earth system, which was used for vehicle work for several years — on British vehicles up to about 1936.

POSITIVE EARTH SYSTEM

It was then found that certain specific advantages were obtained by earthing the positive pole of the battery instead of the negative. Thus we had the introduction of the positive earth system, which is almost universally used to-day, except for those specialised vehicles previously mentioned.

One of the main advantages gained by earthing the positive side of the supply is that the polarity of the spark plug central electrode is made negative, which results in improved spark plug performance and longer service life of the spark plugs and the H.T. cables.

At the battery itself the formation of electrolytic sulphation at the positive lug is reduced, and also the marked tendency to electrical leakage from the cells to earth, the result of the presence of acidulated moisture. The corrosion effects at switch contacts, cable connectors, soldered joints, etc. are also reduced, especially under conditions of excessive humidity.

- Originally cars were wired for negative earth, then it changed to positive earth, then back to negative earth at various times. The reasoning behind these changes can be found here.
- You have to be particularly careful with the MGB and maybe others of the same era as from inception to some point in 1967 the battery was wired for positive earth, but after that the negative terminal was connected to the body - negative earth or ground, which is probably how all modern cars are connected. However since leaving the factory some owners will have changed early cars from positive earth to negative earth for various reasons such as conversion from dynamo to alternator and for modern electronic accessories which can only be used with negative earth.
- So if you are new to a particular car the first thing to establish is just what polarity it is, and that any labelling on the car and cable colouring at the battery reflects that. Note that the convention is that red cables or terminal covers indicate positive and black indicates negative. But usually on the MGB black are used for both and there are no terminal covers, which is why you need to be careful.

- Note also that, regardless of polarity, power always comes from the live or 12 volt terminal of the battery, through wiring to components, and from components via the earth return back to the battery. In most cases the switch will be in the live wire between battery and component, but in a few cases it can be between the component and the earth return (e.g. early MGB wipers and most MGB horns).
- Even more important is that if any stranger is to work on your car, and particularly if they are to use jump cables or a jump pack on your car, not only do they need to know the polarity of your car, but you also need to watch them like a hawk to ensure they connect them correctly. Incorrect connection can cause serious damage to wiring and components.
- Also it is very important when you are going to work on battery connections, to always disconnect the earth terminal first, and reconnect it last. This is regardless of whether the battery is connected positive earth or negative earth. Ignore any instruction to remove the negative terminal first, only ever the earth terminal, and that is regardless of polarity. The reasoning behind this is explained in the detailed technical section on batteries.