



# SNS COLLEGE OF ENGINEERING

Kurumbapalayam (Po), Coimbatore – 641 107

**An Autonomous Institution**

Accredited by NBA – AICTE and Accredited by NAAC – UGC with 'A' Grade

Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

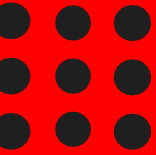
## DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

COURSE NAME : 190E120 AUTOMOTIVE ELECTRONICS

I YEAR /I SEMESTER MECHATRONICS ENGINEERING

Unit 2 – Sensors & Actuators

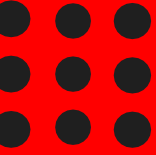
Topic- Insulated & earth return systems





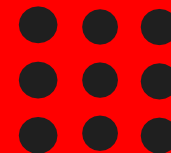
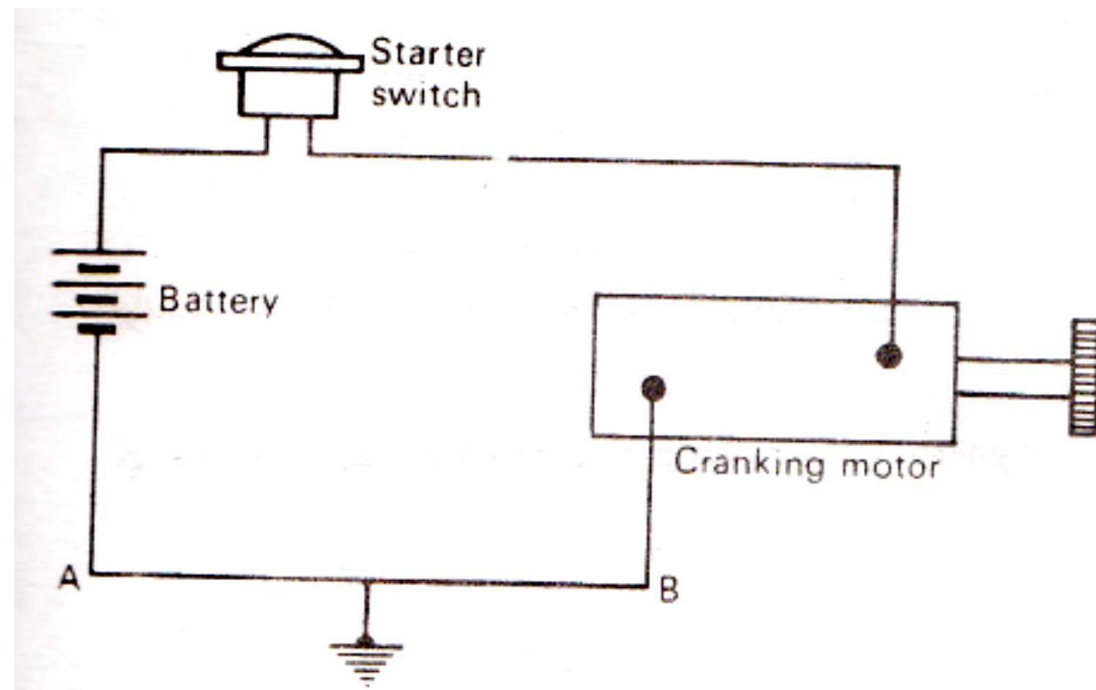
# STARTING / CRANKING AND ELECTRIC SYSTEMS

- Requirement of starting system, Basic component of starting system, Starter motors and Circuits, Starter motor types, Starting and motor characteristics, diagnosing starting system faults, Advanced starting system technology, charging system, Insulated & earth return systems. Positive & negative earth systems, Development of spark in SI engines





# Earth Return System



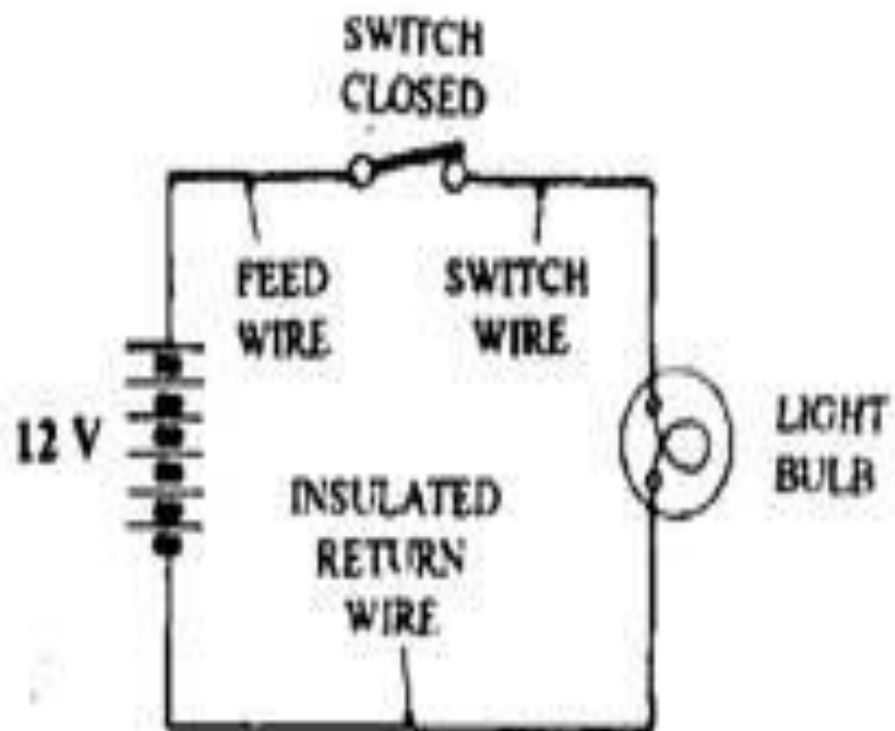


# Earth Return System

- Current flows along a single cable from the battery to the component being powered, and back to the battery through the car's metal body.
- The body is connected to the earth terminal of the battery by a thick cable.
- This type of circuit is called an earth-return system any part of it connected to the car body is said to be earthed.



# Insulated return System





# Insulated return System

- Some vehicle application requires a separate insulated-cable system for both the feed and the return conductors.
- It is also safer because with separate feed and return cables, it is practically impossible for the cable conductors to short even if chafed and touching any of the metal bodywork, as the body is not live since it is not a part of the electrical circuits.
- From the safety reasons, an insulated return is essential for vehicles transporting highly flammable liquids and gases, where a spark could very easily set off an explosion or a fire.
- The vehicles, such as coaches and double-decker buses use large quantity of plastic panelling.
- For these vehicles an insulated return is more reliable and safer.
- The insulated return off course uses extra cable that makes the overall wiring harness heavier, less flexible, and bulky, consequently increases the cost to some extent.