



SNS COLLEGE OF TECHNOLOGY

(An Autonomous Institution)

COIMBATORE-35.



- Accredited by NBA – AICTE and Accredited by NAAC – UGC with ‘A++’ Grade
Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai.

DEPARTMENT OF AUTOMOBILE ENGINEERING

COURSE NAME : 19MCE402 – AUTOTRONICS

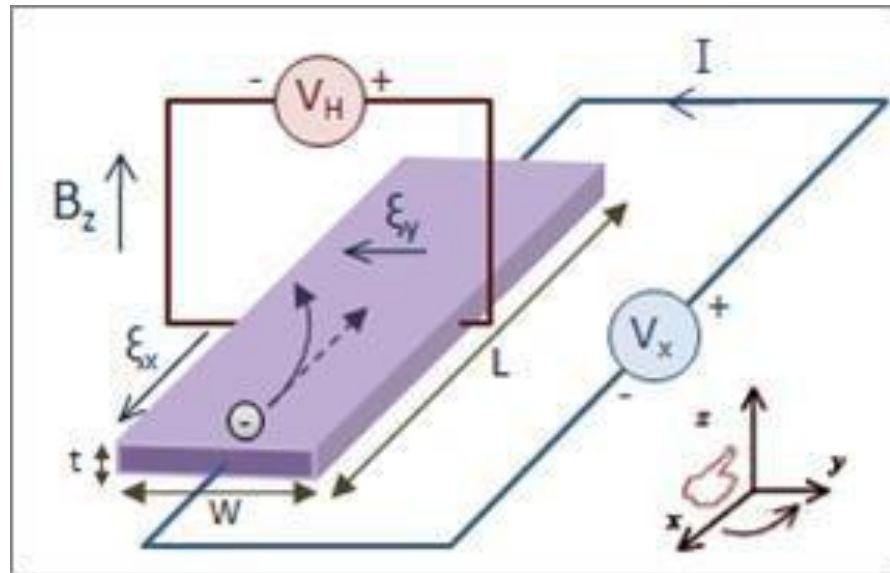
IV YEAR / VII SEMESTER

Unit 3 - Hall Effect, Throttle angle Sensor



❖ Hall Effect:

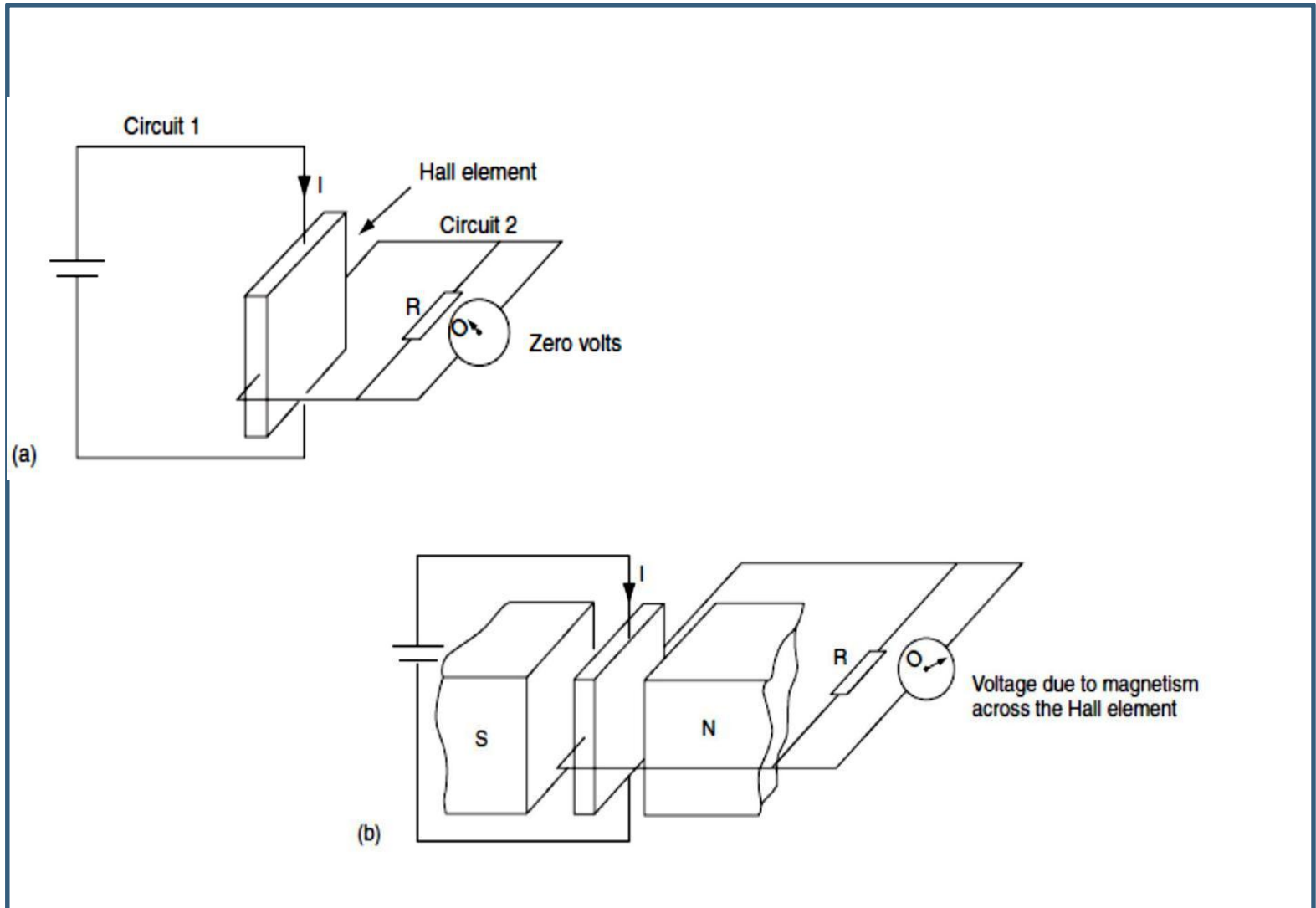
- The **Hall effect** is the production of a **voltage difference** (the **Hall voltage**) across an electrical conductor, transverse to an electric current in the conductor and to an applied **magnetic field perpendicular** to the current. It was discovered by Edwin **Hall** in 1879.





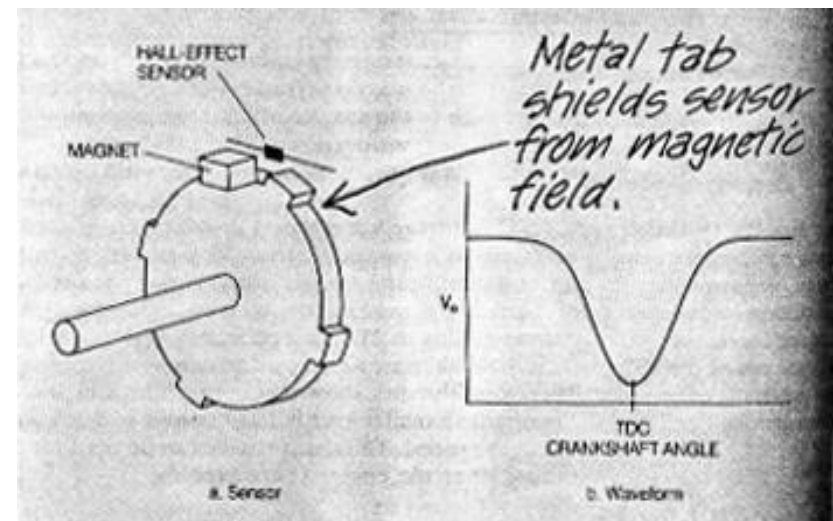
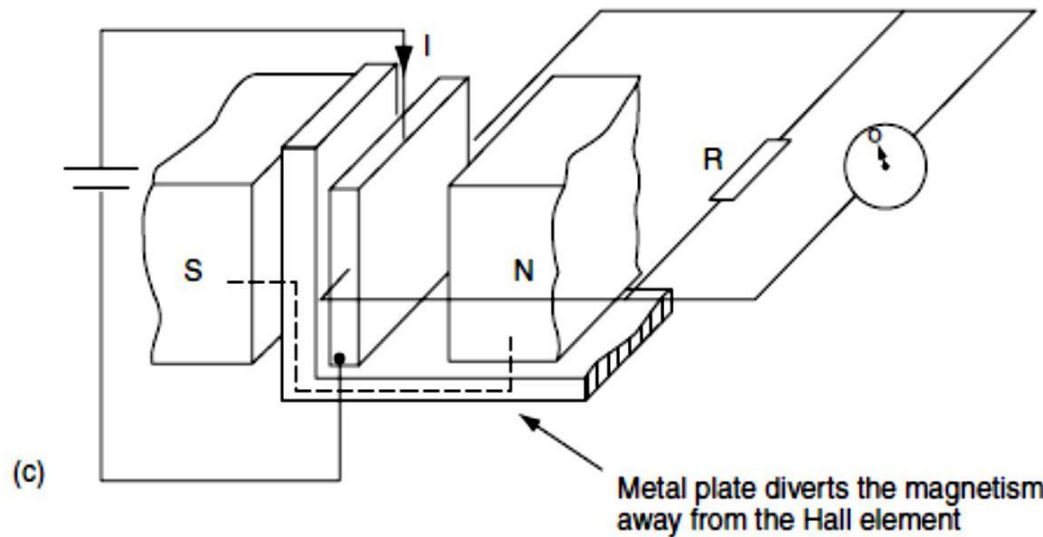
Hall Effect type sensor

- The Hall element is a small section of semiconductor material such as silicon.
- When connected to the battery will cause current to flow through the semiconductor Hall element and battery circuit, but there will be no current in the circuit which is at right angles to the battery circuit, as shown by a zero reading on the voltmeter





- When a magnetic field is imposed on the Hall element, as shown in Fig. (b), a current will flow in circuit 2.
- When the magnetic effect is prevented from reaching the Hall element, as in Fig.(c), the current will cease to flow in circuit 2.
- The result is that the current in circuit 2 can be switched on and off by shielding the Hall element from the magnetic field.



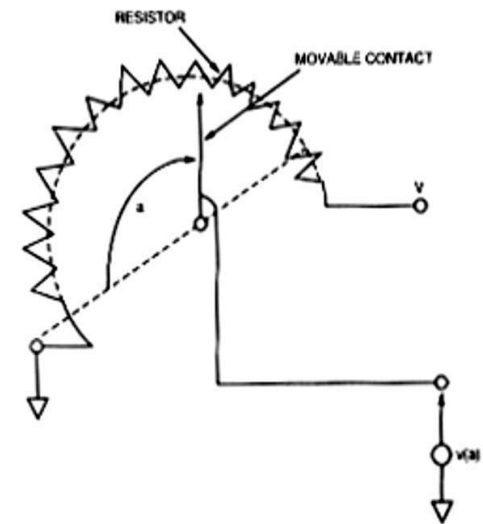


- When the metal plate that is inserted between the magnet and the Hall element is mounted on a rotating shaft, the Hall current can be switched on and off at any desired frequency.
- The Hall type sensor produces an output power that is virtually constant at all speeds.
- Hall effect sensors are used wherever other electromagnetic sensors are used, e.g. engine speed and crank position, ABS wheel sensors, camshaft (cylinder) identification (for ignition and fuelling) etc.
- The voltage from a Hall element is quite small and it is common practice for Hall type sensors to incorporate an amplifying and pulse-shaping circuit. The result is that the sensor produces a digital signal, i.e. it is a rectangular waveform



Throttle Position Sensor

- When an engine is idling the exhaust gas scavenging of the cylinders is poor. This has the effect of diluting the incoming mixture.
- The ECU must detect when the throttle is in the idling position, so that alteration of the air–fuel ratio can occur to ensure that the engine continues to run smoothly.
- At full engine load and full throttle, the mixture (air–fuel ratio) needs enriching, so the ECU also needs a signal to show that the throttle is fully open.





- These duties are performed by the throttle position switch. Figure 5.12 shows how the action of a throttle position sensor is based on the principle of the potential divider.
- The sensor produces a voltage which is related to throttle position. The voltage signal is conducted to the ECU where it is used, in conjunction with other inputs, to determine the correct fuelling for a given condition.

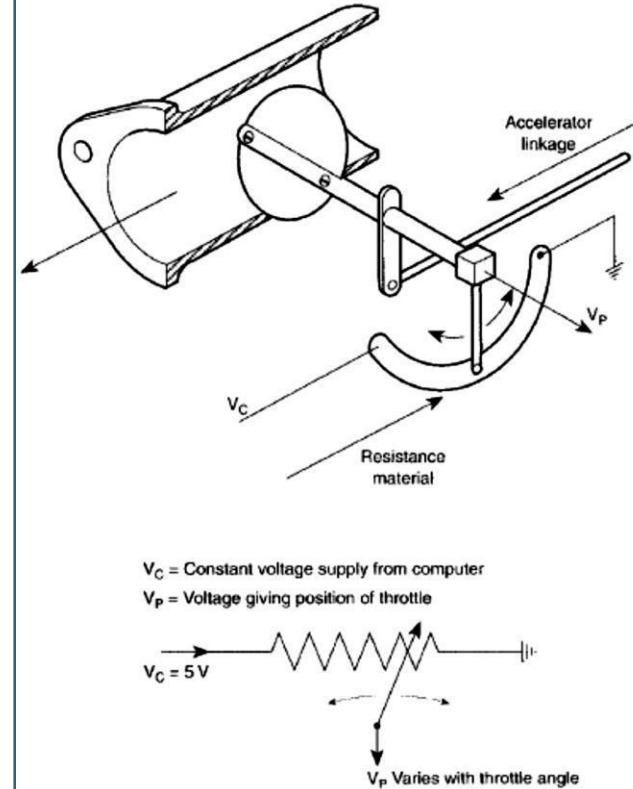


Fig. 5.12 The principle of the throttle position sensor



Thank You !