

## Hall Probe (Hall Effect Sensor):

- A Hall probe can be used to measure the **magnetic flux density** between two magnets.
- It is based on the Hall effect.
- **A Hall probe consists of a flat surface and is held so the magnetic field lines are perpendicular to it**

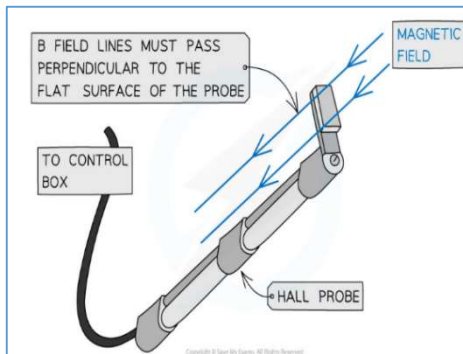


fig.1: Hall Probe

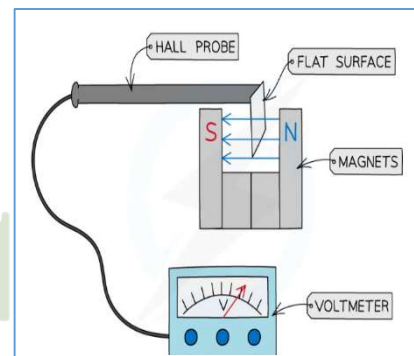


fig.2: Working of Hall Probe

- To measure the magnetic flux density between two magnets, the flat surface of the probe must be directed between the magnets so the **magnetic field** lines pass completely perpendicular to this surface
- The probe is connected to a voltmeter to measure the **Hall voltage**.
- If the probe is not held in the correct orientation (perpendicular to the field lines), the voltmeter reading will be reduced.
- Since the Hall voltage is directly proportional to the magnetic flux density, the flux density of the magnets can be obtained.
- **A Hall probe is sensitive enough to measure even the Earth's magnetic flux density.**

### Other possible uses for Hall probes:

In addition to measuring magnetic flux density and current, Hall probes are also used **in other areas**, including:

- Non-contact and contactless signal transmitters
- Magnetic field cameras
- Automotive industry (belt buckle, door locking system, gear shift, etc.)
- Position detection of moving permanent magnets

**Question:** A Hall probe is placed near one end of a solenoid, as shown in the diagram. The Hall probe is rotated about the axis XY. State and explain why the magnitude of the Hall voltage varies?

**Answer:** The Hall voltage depends on angle between the magnetic field and the plane of the probe. The Hall voltage reaches a maximum when the field is perpendicular to the probe and the Hall voltage is zero when the field is parallel to the probe.

