AC Galvanometer

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- **Historical Context:**
  - Developed in the late 19th century to measure alternating currents (AC).
  - Complemented earlier direct current (DC) galvanometers.
  - Emerged due to the rise of AC power distribution, pioneered by Nikola Tesla and George Westinghouse.
  - Adapted from early DC galvanometers (Johann Schweigger, 1820) with modifications (moving-iron or moving-coil mechanisms).
  - Widely used in education and laboratories for AC circuit studies.
  - Aided understanding of inductance, capacitance, and resonance.
  - Staple in mid-20th-century teaching and experimentation.
  - Usage declined with the advent of oscilloscopes and digital meters.
  - Now primarily of historical significance.

- **Purpose:**
  - Measures alternating current (AC).
  - Detects current magnitude and direction.
  - Features a symmetrical scale around zero for positive and negative deflections.

- **Construction:**
  - Magnetic Field and Coil:
  - Coil suspended in a strong magnetic field.
  - AC current interaction with the field causes coil oscillation.
  - Mirror and Scale:
  - Optional mirror attached to the coil.
  - Reflected light beam amplifies deflection for reading.
  - Damping System:
  - Controls oscillation for steady readings.
  - Compensates for the alternating nature of the current.

- **Applications:**
  - AC Circuit Measurement:
  - Measures small AC currents and voltages in laboratories.
  - Used for educational demonstrations and experiments.
  - Bridge Circuits:
  - Used in AC bridge circuits for measuring inductance, capacitance, and resistance.
  - Phase and Resonance Studies:
  - Used in studies of phase shifts and resonance in AC circuits.
  - Especially in experiments with LC circuits.

- **Instructions on How to Use Equipment:**

- Set Up the Galvanometer:
  - Place on a stable surface.
  - Ensure the needle is at zero when no current is applied.
- Connect to the Circuit:
  - Connect in series with the circuit.
  - Ensure tight connections.
- Power the Circuit:
  - Turn on the power.
  - Needle deflects in both directions based on current direction.
- Take Measurements:
  - Note needle deflection (right/positive, left/negative).
  - Measure the alternating current.
- Safety:
  - Avoid overloading the galvanometer.
  - Turn off power before disconnecting.
  - After Use:a
  - Store safely.
  - Recalibrate if needed.

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References:

1. https://www.tipl.com/product/lab-instruments

1. https://www.toshniwal.net/home

https://www.uou.ac.in/lecturenotes/science/BSC-17/Galvanometer%20Ammeter%20by%20Dr.%20Gaurav%20Karnatak.pdf