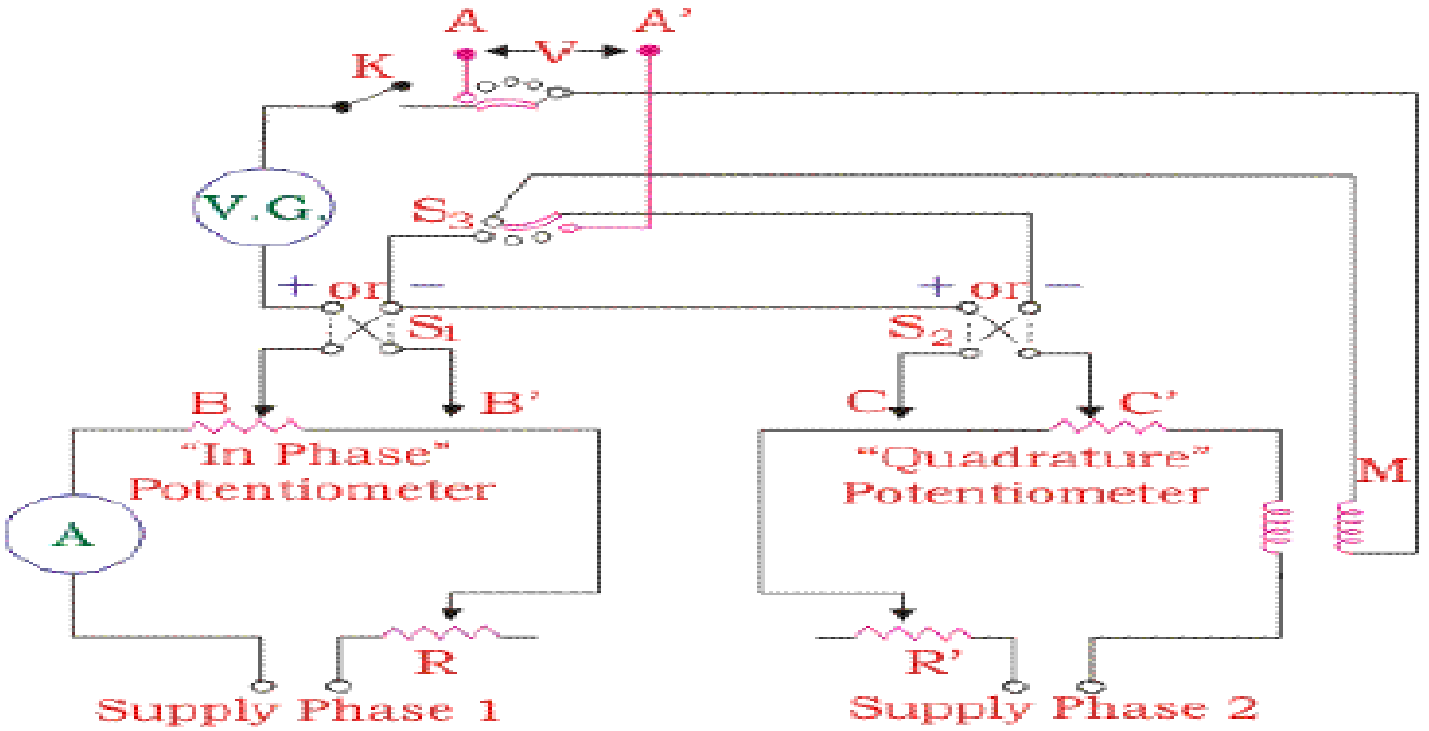
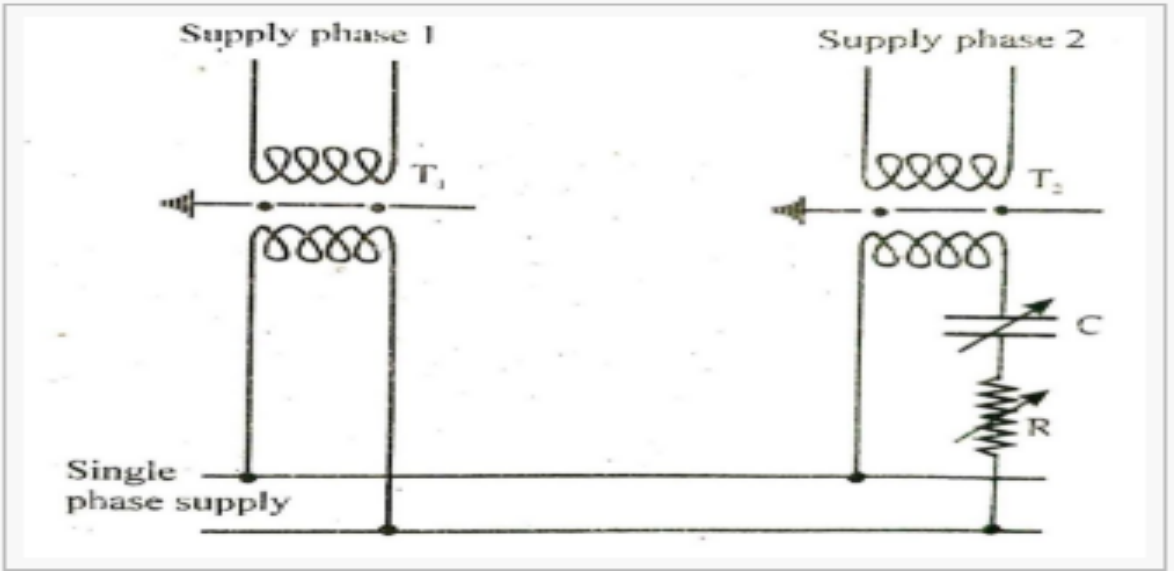
COORDINATE TYPE POTENTIOMETER

In coordinate AC potentiometer, two separate potentiometers are caged in one circuit as shown in the figure. The first one is named as the in-phase potentiometer which is used to measure the in-phase factor of an unknown e.m.f. and the other one is named as quadrature potentiometer which measures quadrature part of the unknown e.m.f. the sliding contact AA' in the in-phase potentiometer and BB' in quadrature potentiometer are used for obtaining the desired current in the circuit. By adjusting rheostat R and R' and sliding contacts, the current in the quadrature potentiometer becomes equal to the current in the in-phase potentiometer and a variable galvanometer shows the null value. S_1 and S_2 are signs changing switches which are used to change the polarity of the test voltage if it is required for balancing the Potentiometer. There are two step-down transformers T_1 and T_2 which isolate potentiometer from the line and give an earthed screens protection between the winding. It also supplies 6 volts to potentiometers. Now to measure unknown e.m.f. its terminals are connected across sliding contacts AA' using selector switch S_3. By doing some adjustments in sliding contacts and rheostat, the whole circuit gets balanced and galvanometer reads zero at the balanced condition. Now the in-phase component V_A of the unknown e.m.f.is obtained from the in-phase potentiometer and quadrature component V_B is obtained from quadraturepotentiometer.





$$V = (V_A^2 + V_B^2)^{1/2}$$

Thus, the resultant voltage of the coordinate

ACpotentiometeris

And the phase angle is givenby $\emptyset = tan^{-1}(V_B/V_A)$

Applications of AC Potentiometer

1. Measurement of self-inductance.
2. Calibration ofvoltmeter.
3. Calibration ofAmmeter.
4. Calibration of wattmeter.