# Single phase electricity diagram

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In this article we will discuss about:- 1. Introduction to Single Phase AC Circuit 2. Purely Resistive Circuit 3. Purely Inductive Circuit 4. Purely Capacitive Circuit 5. Resistance -- Capacitance (R-C) Series Circuit 6. Apparent Power, True Power, Reactive Power and Power Factor.

In a dc circuit the relationship between the applied voltage V and current flowing through the circuit I is a simple one and is given by the expression I = V/R but in an a c circuit this simple relationship does not hold good. Variations in current and applied voltage set up magnetic and electrostatic effects respectively and these must be taken into account with the resistance of the circuit while determining the quantitative relations between current and applied voltage.

With comparatively low-voltage, heavy- current circuits magnetic effects may be very large, but electrostatic effects are usually negligible. On the other hand with high-voltage circuits electrostatic effects may be of appreciable magnitude, and magnetic effects are also present.

Here it has been discussed how the magnetic effects due to variations in current do and electrostatic effects due to variations in the applied voltage affect the relationship between the applied voltage and current.

2. Purely Resistive Circuit: A purely resistive or a non-inductive circuit is a circuit which has inductance so small that at normal frequency its reactance is negligible as compared to its resistance. Ordinary filament lamps, water resistances etc., are the examples of non-inductive resistances. If the circuit is purely non-inductive, no reactance emf (i.e., self- induced or back emf) is set up and whole of the applied voltage is utilised in overcoming the ohmic resistance of the circuit.

Consider an ac circuit containing a non-inductive resistance of R ohms connected across a sinusoidal voltage represented by v = V sin wt, as shown in Fig. 4.1 (a).

From the expressions of instantaneous applied voltage and instantaneous current, it is evident that in a pure resistive circuit, the applied voltage and current are in phase with each other, as shown by wave and phasor diagrams in Figs. 4.1 (b) and (c) respectively.

Thus for purely resistive circuits, the expression for power is the same as for dc circuits. From the power curve for a purely resistive circuit shown in Fig. 4.1 (b) it is evident that power consumed in a pure resistive circuit is not constant, it is fluctuating.

However, it is always positive. This is so because the instantaneous values of voltage and current are always either positive or negative and, therefore, the product is always positive. This means that the voltage source constantly delivers power to the circuit and the circuit consumes it.

3. Purely Inductive Circuit: An inductive circuit is a coil with or without an iron core having negligible resistance. Practically pure inductance can never be had as the inductive coil has always small resistance. However, a coil of thick copper wire wound on a laminated iron core has negligible resistance arid is known as a choke coil.