ALTERNATING CURRENT AND VOLTAGE

Alternating current has largely replaced direct current

It can be transmitted over long distances more readily and more economically than direct current

In aircraft:

1, Space and weight can be saved, since AC devices, especially motors, are smaller and .simpler than DC devices

2, In most AC motors no brushes are required, and commutation trouble at high altitude is eliminated. Circuit breakers will operate satisfactorily under load at high altitudes in an AC system

3, most airplanes using a 24-volt DC system have special equipment that requires a certain .amount of 400 cycle AC current

SINUSOIDAL WAVEFORM

1, CYCLE

.a) A cycle is a repetition of a pattern

b) Whenever a voltage or current passes through a series of changes, returns to the starting ,point and then again starts the same series



2, FREQUENCY

a) The frequency is the number of cycles of alternating current per second (1 second)

b) The standard unit is (HZ)

3, PERIOD

- a) the time required for a sine wave to complete one full cycle is called a period
- b) he period of a sine wave is inversely proportional to the frequency
- c) the higher the frequency, the shorter the period will be

4, WAVELENGTH

a) the distance that a waveform travels during a period is commonly referred to as a wavelength

b) The measurement of wavelength is taken from one point on the waveform to a corresponding point on the next waveform

5, PHASE

".a) alternating voltage and current also have a relationship called "phase

6, In Phase Condition



shows a voltage signal and a current signal superimposed on the same time axis

7) Out of Phase Condition



a) When two waveforms go through their maximum and minimum points at different times

b) the waveform that reaches its maximum or minimum value first is said to lead the other waveform

c) If the two waveforms differ by 360°, they are said to be in phase with each other. If there is a 180° difference between the two signals, then they are still out of phase even though they .are both reaching their minimum and maximum values at the same time



VALUES OF ALTERNATING CURRENT

1, instantaneous value

a) instantaneous value of voltage or current is the induced voltage or current flowing at any .instant during a cycle

b) the sine wave represents a series of these values

c) at 0° to maximum at 90°, back to zero at 180°, to maximum in the opposite direction at 270°, and to zero again at 360°. Any point on the sine wave is considered the instantaneous value of voltage

2, PEAK VALUE

a) the peak value is the largest instantaneous value

3, EFFECTIVE VALUE (ROOT MEAN SQUARE)

a) 0.707 times the maximum value

3, PEAK-TO-PEAK VALUE

1) is the difference between the maximum positive and the maximum negative amplitudes of a waveform

4) AVERAGE VALUE

.Average value is the average of all the instantaneous values during one half cycle



Figure 13-5. Peak-to-peak (pk-pk) is the difference between the maximum positive and the maximum negative amplitudes of a waveform.

TRIANGULAR/SQUARE WAVES

a) square wave is produced when there is a flow of electrons for a set period of time then .stops abruptly for a set period of time and then repeats

b) The triangular wave represents a voltage that slowly increases or decreases with a uniform .or linear rate of change to its peak value





 $F = \frac{Number of Poles}{2} \times \frac{rpm}{60}$