ELECTRICAL MEASUREMENT & MEASURING INSTRUMENTS

UNIT 5 Part (i)

Digital measurement of Electrical Quantities

APPLICATION OF POWER ANALYSER

- Basically the power analyzer identifies and characterizes a.c. line problems.
- Then it establishes cause and effect relationship between various events on the a.c. line and the problem occurrences
- The power analyzer compares the time at which malfunctioning of device takes place with the time of operation of the a.c. source.
- The power analyser can state if the problem is either source related or load related by observing the characteristics of the event.

HARMONIC DISTORTION ANALYSER

- The non linear behavior of the circuit elements is called harmonic distortion.
- In case of sine wave which is harmonically distorted, it consists of a fundamental frequency ‘f’ and the harmonic multiples of fundamental frequency 2f, 3f....etc.
- A measure of the distortion represented by a particular harmonic is simply the ratio of the amplitude of the harmonic to that of the fundamental frequency, expressed as percentage.

$$D2 = (B2/B1)$$

$$D3 = (B3/B1)$$

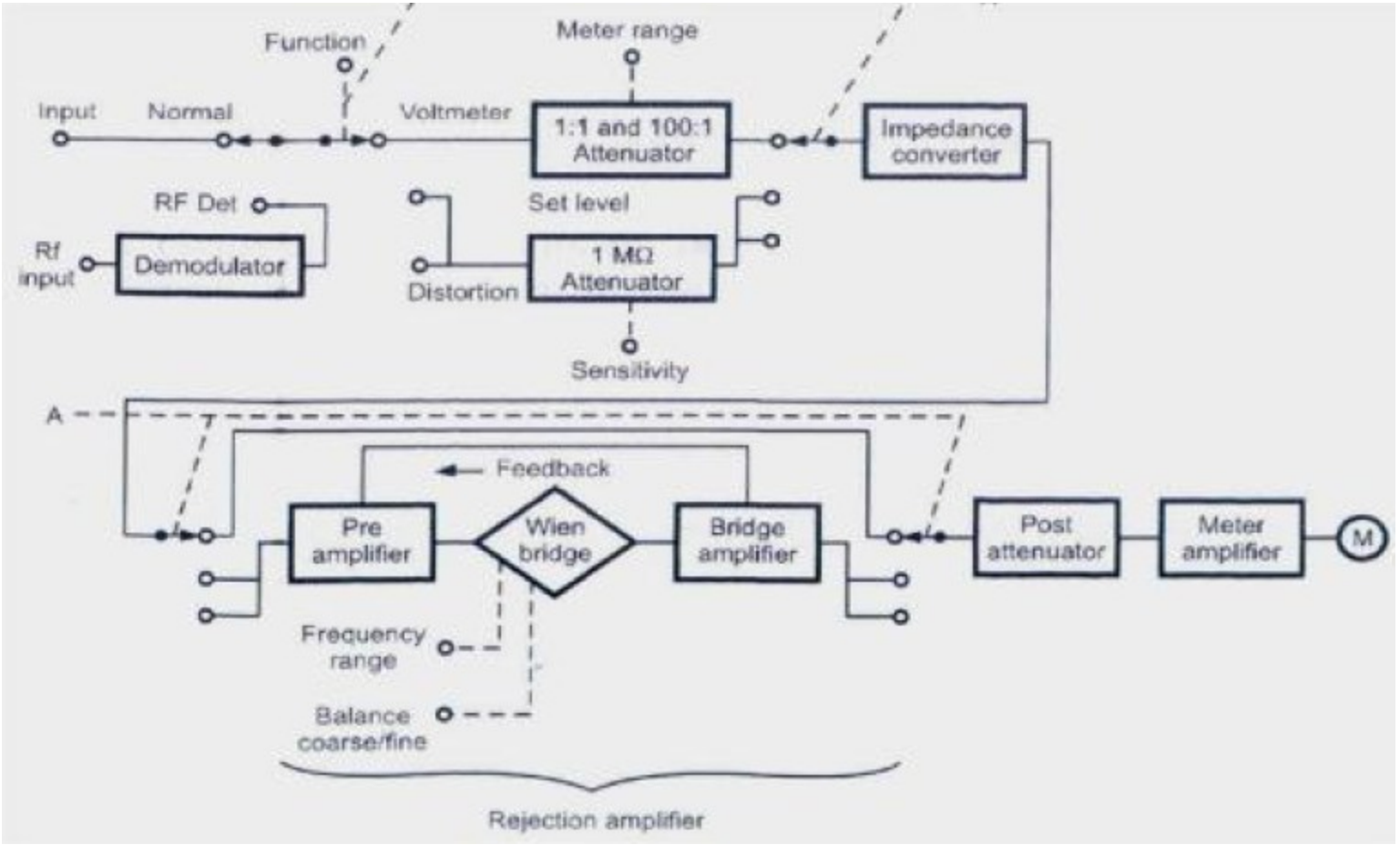
THD

- Where Dn (n =1, 2, 3....) represents the distortion of the nth harmonic. Bn represents the amplitude of the nth harmonic and B1 represents the amplitude of the fundamental frequency component.
- The total harmonic distortion or distortion factor is defir

$$\mathrm{THD}_F = \frac{\sqrt{V_2^2 + V_3^2 + V_4^2 + \ldots + V_n^2 + \ldots}}{V_1}$$

- Where V2, V3 and so on are the harmonic voltages and V1 is the fundamental voltage.

Block Diagram



Application

- This is used to measure the distortion factor rather than the contribution by each component.
- The input is applied to such a network that suppresses or rejects the fundamental component
- but passes all the harmonic frequency components for the measurement.