

Experiment No. 2

Object: To measure power in a 3-phase load by two wattmeter method.

Apparatus Required: It consists of following instruments

Sr No	Instrument Name	Specification	Quantity	Makers Name

The diagram shows a three-phase system with terminals R, B, and Y. A current transformer (A) is connected to terminal R, measuring current I_R . The voltage across it is $V_R - V_B$. A voltmeter (V) is connected across terminals R and Y, measuring V_L . Two wattmeters, W_1 and W_2 , are connected to measure power. W_1 has its current coil in the R line and its voltage coil across R and B. W_2 has its current coil in the Y line and its voltage coil across Y and B. The load consists of a resistor R_L in the R line and two impedances B_L and Y_L in the B and Y lines respectively.

Circuit diagram of Power measurement by two wattmeter method

Procedure:

1. Connect as per the connection shown in figure and take readings in steps of increasing load currents by varying the load.
2. Repeat procedure (1) with one of the phases having unequal load currents.

Table:

SL. NO.	LINE CURRENT (I_L) in Amp	LINE VOLTAGE (V_L) in Volt	1 st Wattmeter reading (W_1) in watt	2 nd Wattmeter reading (W_2) in watt	POWER= W_1+W_2	$\Phi = \tan^{-1}\left(\frac{\sqrt{3}(W_1-W_2)}{W_1+W_2}\right)$	P.F= $\cos\phi$

Report:

1. Draw phasor diagram.
2. Complete the table.
3. Establish then to measured power supplied to the load in a system that require (n-1) wattmeter.
4. Established that power factor may also be estimated from two wattmeter readings.
5. Explain why the wattmeter will give (a) zero reading (b) negative reading.

Suggested Reading:

1. Electrical Measurement & Measuring Instrument by E.W.Golding