	DEHRADUN INSTITUTE OF TECHNOLOGY		LABORATORY MANUAL
	PRACTICAL INSTRUCTION SHEET		
	EXPERIMENT TITLE : Measurement of power and power factor by 2 wattmeter method		
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Objective: Measurement of Power & Power factor in 3-φ load by 2- wattmeter method.

Apparatus Used: One 3- φ Load, One 3- φ Auto transformer, 2-wattmeters (cc-10A, pc- 500V), One voltmeter (0-500V), One Ammeter (0-10 A), connecting wires.

Theory:

Power in 3- φ Load

$$P = \sqrt{3} V_L I_L \cos \phi$$

$$= 3 V_p I_p \cos \phi$$

Let W_1 = Reading of wattmeter1 (including M.F).

W_2 = Reading of wattmeter2 (including M.F).

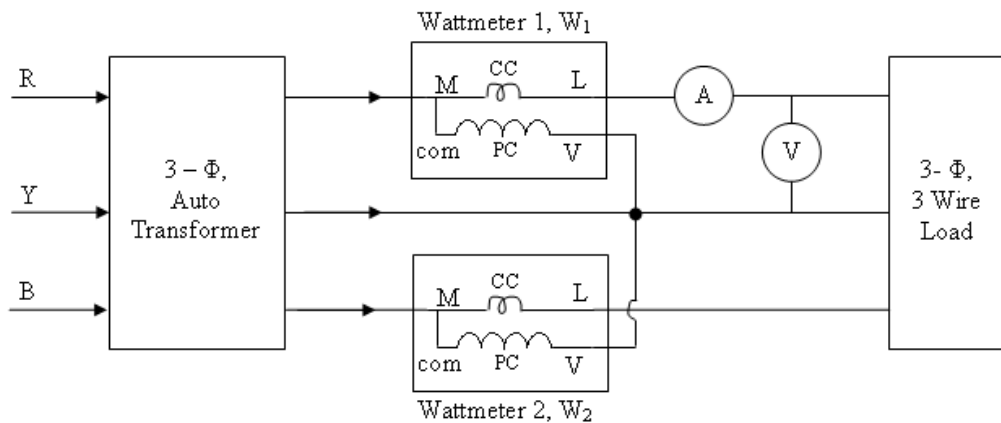
The total power is given as the sum of two wattmeter reading W_1 & W_2 .

So, $P = W_1 + W_2$


Power factor

$$\cos \phi = \cos \tan^{-1} \frac{\sqrt{3}(W_1 - W_2)}{(W_1 + W_2)}$$

Circuit Diagram-



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Observation Table:

S.No	V (Volts)	I (Amp)	W ₁ (Watt)	W ₂ (Watt)	P=W ₁ +W ₂ (Watt)	$\text{Cos } \phi = \text{Cos } \tan^{-1} \frac{\sqrt{3}(W_1 - W_2)}{(W_1 + W_2)}$

Calculation:-

Multiplying factor of wattmeter1= (V I Cos φ) / Full scale deflection.

Multiplying factor of wattmeter2= (V I Cos φ) / Full scale deflection

Result: - Power and power factor of resistive load had been calculated at different load

Precaution:

1. Make sure that auto transformer is at zero position.
2. The main switch should be off before doing the connections.
3. All connection should be tight and clean.
4. The reading in instruments should not exceed from their permissible limit.
5. Don't touch the necked terminals as voltage is high.
6. Always wear shoes when working in the lab. Avoid wearing loose clothes, hanging chains etc.

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