

Heaven's Light is Our Guide



Rajshahi University of Engineering & Technology

Department of Electrical & Computer Engineering

Lab Report

Report No: 03

Course Code	ECE 1202
Course Title	Circuits & System-II Sessional
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3.1 Experiment No: 03

3.2 Name of The Experiment: Power Measurement of 3-Phase Balanced System Using Two-Wattmeter Method

3.3 Objectives: The objective of this lab is to measure the total power consumed by a balanced three-phase load using the two-wattmeter method.

3.4 Theory: The two-wattmeter method is a common technique for measuring power in a balanced three-phase system. In such systems, the total active power P can be expressed as $P = 3V_L I_L \cos\phi$ where V_L is the line-to-line voltage, I_L is the line current, and $\cos\phi$ is the power factor. This method requires two wattmeters, each connected between two different phases, and the total power is calculated by summing the readings of the two wattmeters.

In a balanced load, the readings from the two wattmeters (W_1 and W_2) give the total active power as $P = W_1 + W_2$. The power factor can also be determined from the difference between the wattmeter readings. The two-wattmeter method is efficient for both star (Y) and delta (Δ) configurations and provides a reliable measure of power in three-phase systems.

3.5 Required Apparatus:

- Ammeter
- Voltmeter
- Multimeter
- Voltage Source
- Connecting wires
- Resistors(3)
- Wattmeter(2)

3.6 Circuit Diagram:

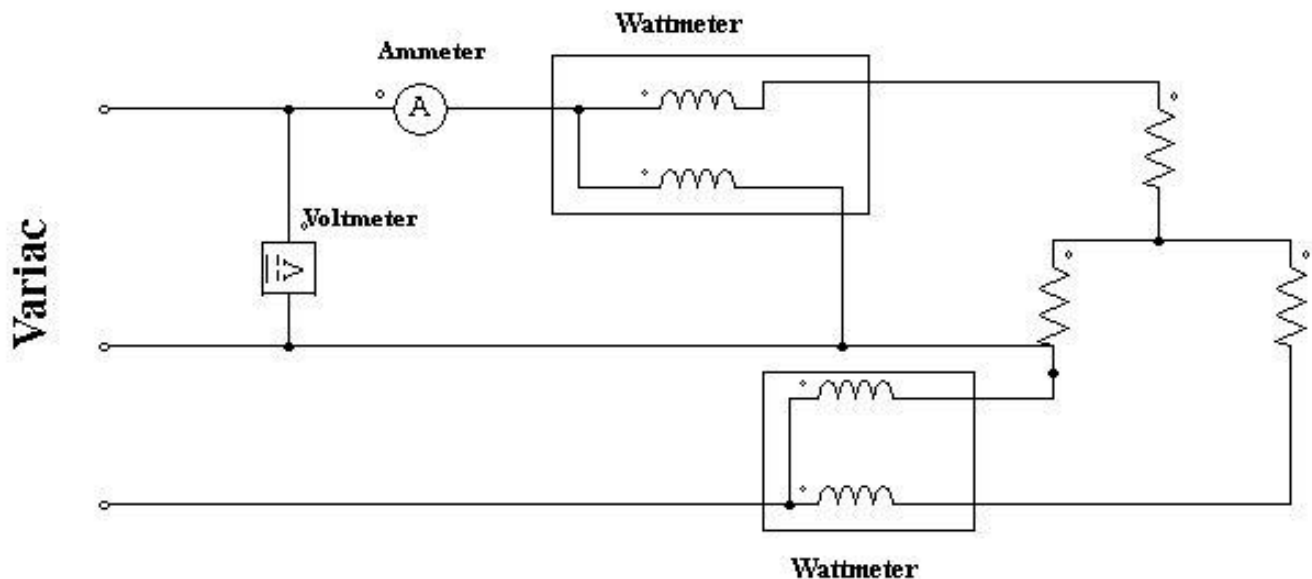


Figure:3 phase balanced system for two wattmeter method

3.7 Procedure:

- Ammeter, Voltmeters and resistors were placed as per the circuit figure.
- A circuit was created by connecting them with the connecting wires.
- Readings were taken and calculated and some errors were found.

3.8 Data Table:

SI	P1	P2	P1+P2	V _L	I _L	$\sqrt{3}V_L I_L$	Error(%)
01	22	20	42	70	0.4	48.49	15.47
02	32	30	62	80	0.5	69.28	11.47
03	27	24	51	75	0.486	63	4.098

SI	P ₁	P ₂	P ₁ +P ₂	V _L	I _L	P _c = $\sqrt{3}V_L I_L$	% e
01	22	20	42	70	0.4	48.49	15.47
02	32	30	62	80	0.525	72.6928	11.47%
03	27	24	51	75	0.486	63	4.098% ✓

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3.9 Discussion: The experimental results aligned with our expectations, but there was some inaccuracies due to machine errors and calculation mistakes. If we could do this experiment in an ideal environment, it would be perfect.

3.10 Precautions:

- Ensure all connections are securely tightened.
- Before connecting the instruments, verify their zero readings.
- Properly connect the terminals of the resistance.

3.11 Reference:

Alexander C.K.; Matthew N.O.S., Fundamentals of Electric Circuits 2014, 5e, McGraw Hill Education (India) Private Ltd, New Delhi, India

