

Heaven's Light is Our Guide



Rajshahi University of Engineering & Tecnology

Department of Electrical & Computer Engineering

Lab Report-3

Experiment name: Power measurement of 3 phase balanced system with two wattmeter method experiment

Course Title:	Circuit & System-II (Sessional)
Course Code:	ECE-1205
Date of experiment:	17-9-2024
Date of Submission:	29-09-2024

Submitted By:	Submitted To:
Name: Mst. Tania Khatun Roll: 2210046 Registration: 1100 Session: 2022-2023 Department of ECE, RUET.	Oishi Jyoti Lecturer Department of Electrical and Computer Engineering, RUET.

Experiment no:3

Experiment name: Power measurement of 3 phase balanced system with two wattmeter method experiment

Theory:

In a three-phase balanced system, the currents and voltages are equal in magnitude and have phase differences of 120 degrees. For a balanced load, the total power can be calculated using the power formulas for individual phases.

Power Calculation:

1. **Total Power:** The total active power P in a balanced three-phase system can be expressed as

$$P=3 \cdot V_L \cdot I_L \cdot \cos(\phi)$$

Where ,

V_L = line voltage

I_L = line current

ϕ = phase angle between the current and voltage

2. **Using Two Wattmeters:** The two-wattmeter method uses two wattmeters to measure the power. The readings from these wattmeters can be summed to find the total power:

$$P_{\text{total}}=P_1+P_2$$

where:

P_1 = reading of the first wattmeter

P_2 = reading of the second wattmeter

Required apparatus:

1. Wattmeter-2 pices
2. Voltmeter
3. Ammeter
4. Jumper wire
5. Source

Diagram:

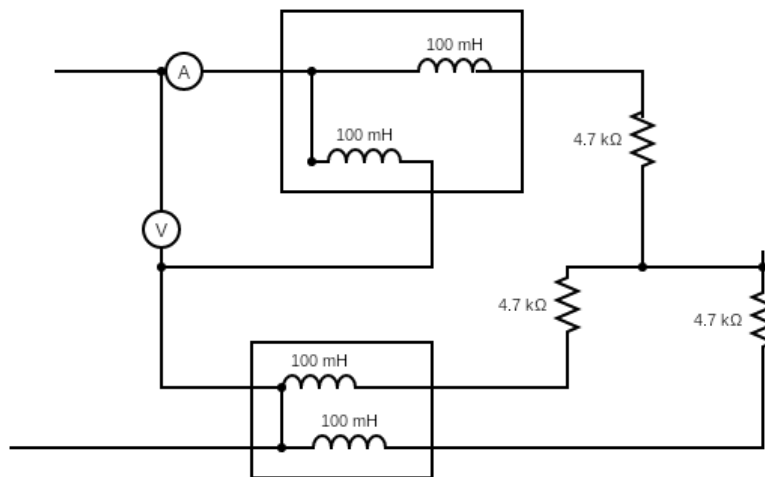


Fig:3.0:3 pahse balanced y connected system

Data table:

S1	P1	P2	P1+P2=P	V _L	I _L	$\sqrt{3}V_L I_L$	%C
1	22	20	42	70	.4	48.49	15.4%
2	32	30	62	80	.5	69.28	11.4%
3	27	24	51	75	.486	63	4.098%

Picture:

S1	P1	P2	P1+P2	V _L	I _L	P _c = $\sqrt{3}V_L I_L$	%C
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% ✓

Roll : 46, 47, 48, 49, 50, 52, 59

17.09.24

Discussion and Conclusion:

The two-wattmeter method is a reliable technique for measuring power in balanced three-phase systems. Understanding the theoretical framework behind this method enhances its application in practical scenarios, ensuring accurate power measurements for various electrical engineering tasks.

Reference:

Fundamental of Electical Circuit by Alexander M. Sadiku.