Heaven's Light is Our Guide

Rajshahi University of Engineering & Technology

Department of Electrical & Computer Engineering

Lab report

Course Code : **ECE 1202**

Course Title : **Circuits and Systems-2 Sessional**

Date of experiment : **04-06-2024**

Date of Submission : **10-09-2024**

Submitted To:	Submitted By:
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Experiment No. 02:

Study of the relationship between phase current and line current of a delta connected 3-phase balanced system.

Objectives:

To understand and investigate the link between line currents and phase currents in a balanced three-phase delta (Δ) arrangement, as well as to verify the theoretical correlations through experiments.

Theory:

Two conventional arrangements for the three phases (A, B, and C) in an electrical system are Wye (Y) and Delta (Δ). Every phase coil in a Delta (Δ) connection is connected end to end to create a closed loop. Important things to think about are as follows:

Phase Current (IP): The current that passes through a single phase or a single three-phase system component. The phase currents in a balanced system have the same magnitude but a 120 degree phase difference.

2. Line Current (IL): The amount of current flowing along each wire joining the three-phase source to the load.
The connection between phase current (IP) and line current (IL) in a balanced Delta (Δ) linked system is provided by:

$$I_{\text{line}} = \sqrt{3} \times I_{\text{phase}}$$

$$V_{\text{line}} = V_{\text{phase}}$$

Required Apparatus:

1. Three-phase AC power supply.

2. Delta connected load (resistors).

3. Voltmeter.

4. Connecting wires.

5. Ammeter.

6. VARIAC

7. Multimeter

Circuit Diagram: -

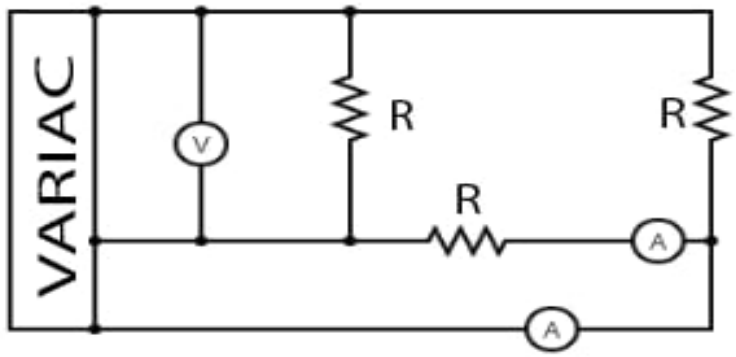
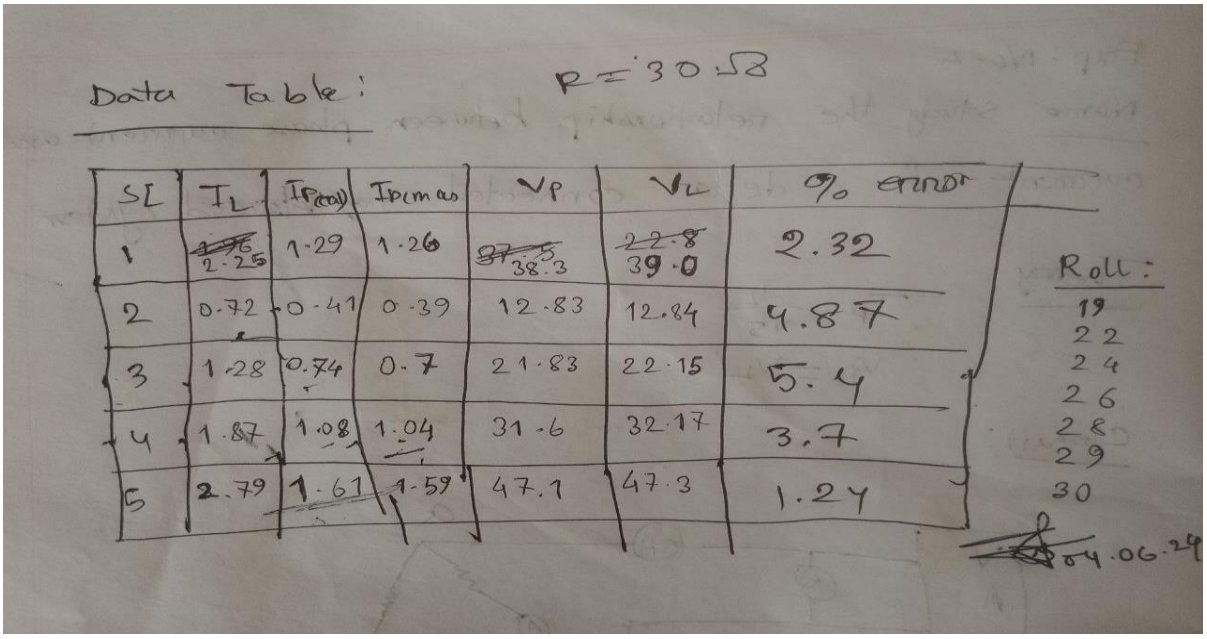


Fig-01: - Delta connection of a 3-phase system.

Data Table: -

SL No	I_L	I_P (Calculated)	I_P (Measured)	V_P	V_L	Error (%)
1	2.25	1.29	1.26	38.3	39.0	2.32
2	0.72	0.41	0.39	12.83	12.84	4.87
3	1.28	0.74	0.7	21.83	22.15	5.4
4	1.87	1.08	1.04	31.6	32.17	3.7
5	2.79	1.61	1.59	47.1	47.3	1.24

Fig-02: - Table from lab



Result:

As evident from the error calculation, the measured and calculated currents are nearly identical. While there are some minor discrepancies, the values are approximately close. Therefore, it can be concluded that,

$$I_{\text{line}} = \sqrt{3} \times I_{\text{phase}}$$

$$V_{\text{line}} = V_{\text{phase}}$$

Discussion:

Taking into account the tiny margin of error, which might have been caused by either internal or external variables, the experiment can be deemed successful.