Rajshahi University of Engineering & Technology

Department of Electrical & Computer Engineering

Lab report-02

Course Code : **ECE 1202**

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

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Submitted To:	Submitted By:
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Experiment no: 02

1. **Experiment name:** Study the relationship between phase current and line current of a delta connected 3-phase balanced system.

2. **Objective:** The main objective of this experiment is to understand the relationship between phase current and line current and to verify the theoretical relationship between line current and phase current through practical measurement in a delta-connected 3-phase balanced system.

3. **Theory:** In a delta-connected 3-phase balanced system, 3 phase are connected in a triangular configuration. Each side of the triangle represents a phase winding of the system. The line currents are the current flowing through the wires connecting the power source to the load. While phase current is the current flowing through each phase winding. The mathematical relation between phase current and line current is,

$$I_L = I_P \times \sqrt{3}$$

Here, I_L is the line current and I_P is the phase current.

4. **Required apparatus:**
     i.   Source
     ii.   VARIAC
     iii. Voltmeter
     iv.   Ammeter
     v.   Resistors
     vi.   Multimeter
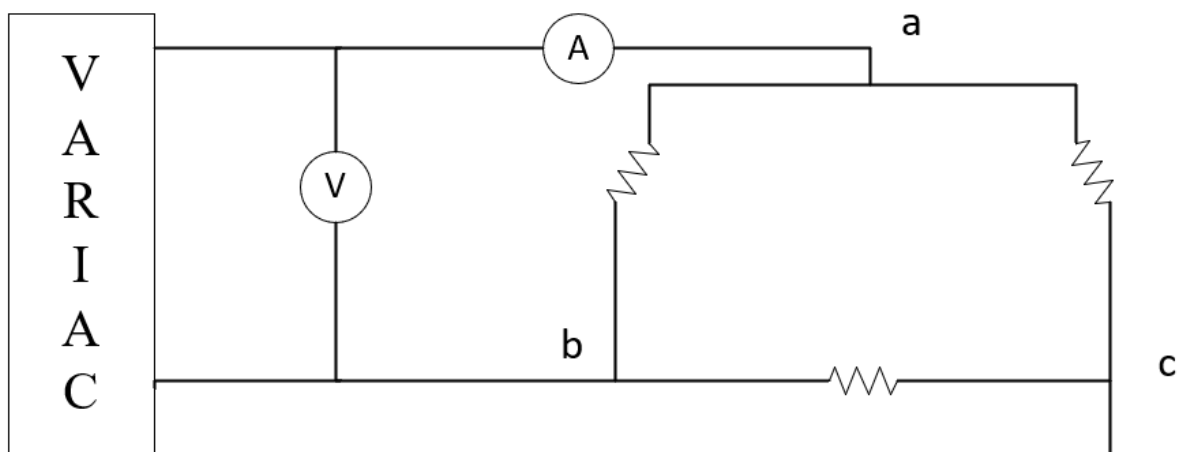   vii. Connecting wires

5. **Circuit diagram:**

Figure: Delta connected 3-phase balanced system

6. Data table:

Sl no.	Line current, I_L(A)	Phase current, I_P(A)	Phase voltage, V_P(V)	Line voltage, V_L(V)	Percentage of error
1	2.25	1.29	38.3	39.00	2.32
2	0.72	0.41	12.83	12.84	4.87
3	1.28	0.74	21.83	22.15	5.4
4	1.87	1.08	31.6	32.17	3.7
5	2.79	1.61	47.1	47.3	1.24

7. **Discussion:** The experiment successfully demonstrated that, in a delta connected 3-phase balanced system the line current is √3 times of the phase current. The experimental measurement closely matched the theoretical values, confirming the relationship. Minor differences were observed due to measurement inaccuracies, connection issues or slight imbalance in the system. Despite these differences, the result validates the theoretical model, emphasizing its importance in designing and analyzing three phase electrical systems.

8. **Precautions:**
    i. Ensured all connections were secured and double checked before powering the circuit to avoid short circuit or any other safety hazard.
    ii. Handled measuring equipment carefully to get accurate reading.
    iii. Been cautious of the power rating of the instruments to avoid overheating.

9. **References:**
    i. Fundamentals of Electric Circuits; Charles K. Alexander and Mathew N. O. Sadiku
    ii. Wikipedia (delta connected three phase balanced system)
    iii. Google