Heaven's Light is Our Guide

Rajshahi University of Engineering & Technology

Department of Electrical & Computer Engineering

Lab Report

Course Code	**ECE 1202**
Course Title	Circuit and System-|| Sessional
Date of Submission	03-09-2024

Submitted By:	**Submitted To:**
Name :Arafat Rahman **Roll : 2210059** **Registration : 1113** **Session : 2022-2023** **Department of ECE, RUET**	**Oishi Jyoti** **Lecturer** **Department of Electrical and Computer Engineering** **RUET**

Name of The Experiment: Study the relationship between phase and line voltages of wye connected 3-φ balanced system.

Theory: In a balanced three-phase system, the three-phase voltages have the same magnitude and are displaced by 120 degrees from each other. In a wye-connected three-phase balanced system, there is a specific relationship between the phase voltages and the line voltages. The phase voltage (Vp) is the voltage between any phase and the neutral point, while the line voltage (VL) is the voltage between any two phases. Due to the wye-connection, where the neutral point of the three-phase system is connected to the common point, the line voltage is equal to the phase voltage multiplied by the square root of 3 (√3). Mathematically, this relationship can be expressed as,

$$v_p = \frac{VL}{\sqrt{3}}$$

$$I_p = I_L$$

Circuit:

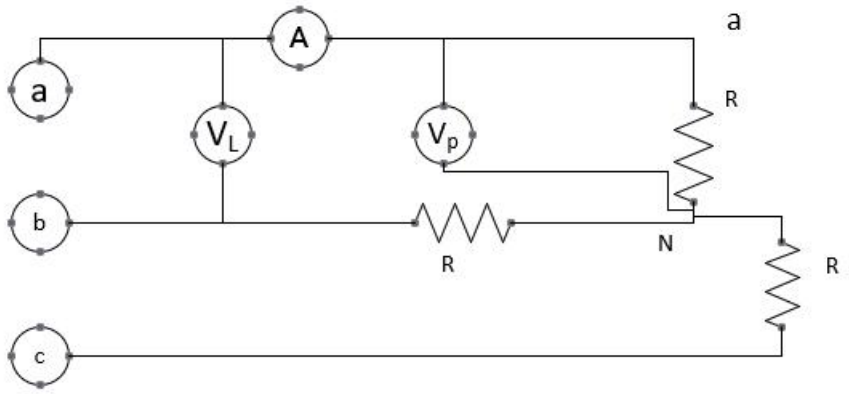

Fig. Circuit Diagram

Required Apparatus:

1. Source

2. Ammeter

3. Resistor

4. Multimeter

5. Connecting Wire

Data Table:

SL No	V_L	V_P(m)	V_P(c)	I_L	I_P	Error(%)
1	74.6	44	43.07	0.37	0.37	2.114
2	92.8	54	53.59	0.49	0.49	0.76
3	39.60	23.34	22.86	0.23	0.23	2.1

Calculation:

For 1st calculation,

V_L=74.6 V, V_P(c) = $V_L/\sqrt{3}$ =43.07 V, V_P(m) =44 V, Error = 2.114%

For 2nd calculation,

V_L=92.8 V, V_P(c) = $V_L/\sqrt{3}$ =53.59 V, V_P(m) =54 V, Error= 0.76%

For 3rd calculation,

V_L=39.60V, V_P(c) = $V_L/\sqrt{3}$ =22.86 V, V_P(m) =23.34 V, Error= 2.1%

Conclusion:

The experiment investigated the relationship between phase and line voltages in a balanced wye connected three-phase system. The results confirmed the theoretical relationship (V_L = $\sqrt{3}$ * Vp). This experiment demonstrates the fundamental concept of voltage relationships in a common three-phase system configuration.