Heaven's Light is Our Guide

Rajshahi University of Engineering & Technology

Department of Electrical & Computer Engineering

Assignment

Course Code : ECE-1205

Course Title : Analog Electronic Circuits-I

Date of Experiment : 16-04-24

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Submitted To:	Submitted By:
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2.1: Experiment No: 2

2.2: Name of the Experiment: Study the relationship between phase current and line current of a delta connected three phase balanced.

2.3: Theory:

In a delta connection, each line conductor is connected to two phase windings. The current flowing through any one line conductor is the vector sum of the currents flowing through the two connected phase windings.

In a delta connection, line current is equal to the square root of 3 of the phase current.

$$\mathbf{I_L} = \sqrt{3} * \boldsymbol{I_P}$$

$$\mathbf{I_P = I_L / \sqrt{3}}$$

And, the phase voltage is equal to the line voltage.

$$\mathbf{V_L = V_P}$$

2.4: Circuit Diagram:

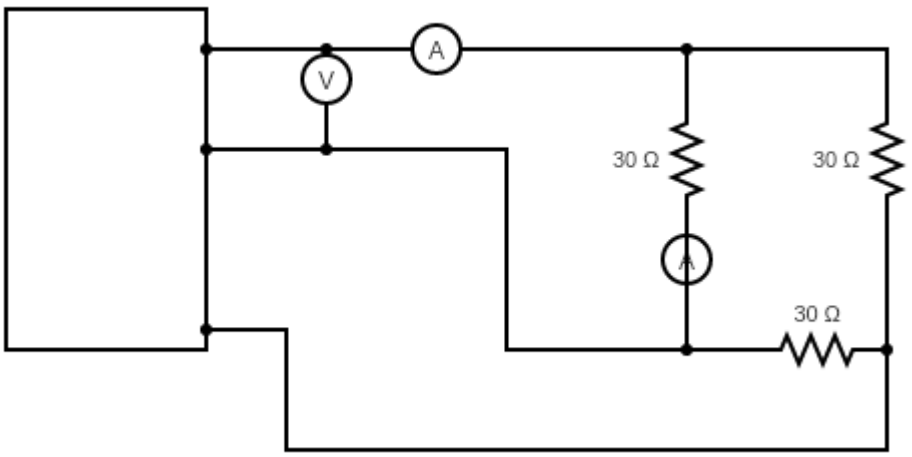


Fig.1: Connection for delta connected system

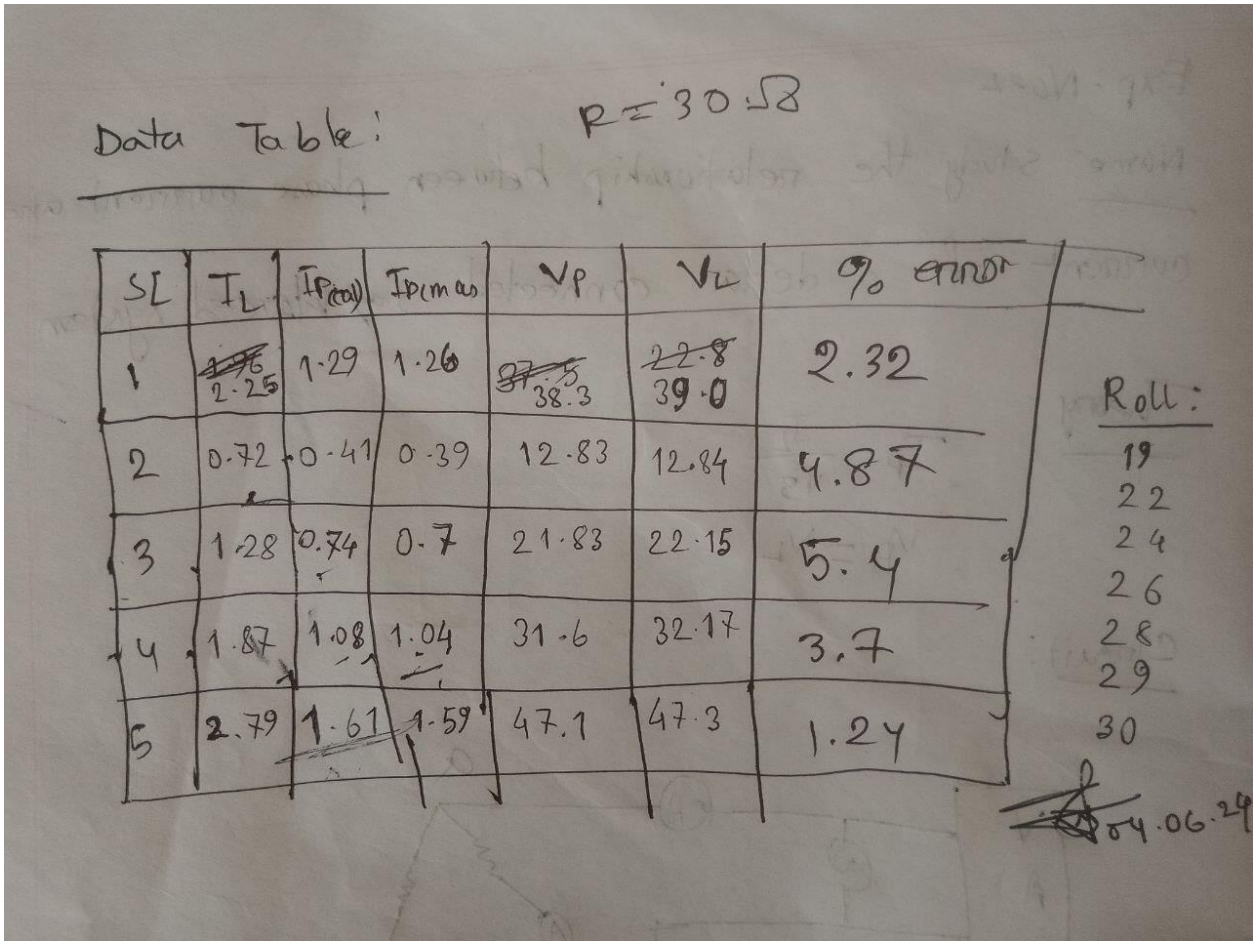
2.5: Required Apparatus:

1. Source
2. VARIAC
3. Voltmeter
4. Ammeter
5. Resistors (3 piece)
6. Multimeter
7. Connecting wires

2.6: Data Table:

Sl	I_L	$I_{P(cal)}$	$I_{P(m)}$	V_P	V_L	%Error
1	2.25	1.29	1.26	38.3	39	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

2.7: Data Table from Lab Experiment:



Data Table: R = 30.5Ω

SL	I_L	$I_{P(cal)}$	$I_{P(meas)}$	V_P	V_L	% error
1	~~1.76~~ 2.25	1.29	1.26	~~37.5~~ 38.3	~~22.8~~ 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

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2.8: Results:

From the experiment, we can see some errors in it. The main reasons are the accuracy of the devices and the internal resistance of the resistors. The devices we used are not completely accurate. But we get the best possible results as we can see the experiment supporting the rules of delta connection. Here, $\mathbf{I_P = I_L/\sqrt{3}}$ and $\mathbf{V_L = V_P}$

Average percentage of error = $\frac{2.32+4.87+5.4+3.7+1.24}{5}$ = 3.506

2.9: Discussion:

1. In three phase delta connection, phase voltage and line voltage are same.
2. Phase current and line current differs by the division of square root 3.

2.10: Precautions:

1. Low voltage source should be used for this experiment to avoid risks.
2. We must take be careful while taking the readings.

3. Wires should be connected properly.

1.11: Reference: Fundamentals of Electric Circuits by Charles K. Alexander & Matthew N. O. Sadiku