Heaven's Light is Our Guide

Rajshahi University of Engineering and Technology

Department of Electrical & Computer Engineering

Lab Report

Experiment Name: Three phase sequence test using bulb

Course Code	ECE 1202
Course Title	Circuit and System II Sessional
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INDEX

5.1 Experiment No: 05

5.2 Experiment Name: Three phase sequence test using bulb.

5.3 Objectives:

- To determine the phase sequence of a three-phase system using a simple bulb test.
- To observe the brightness variation of the bulb based on the sequence of the phases.
- To verify the importance of phase sequence in three-phase systems.

5.4 Theory:

In three-phase systems, the phase sequence refers to the order in which the voltage waveforms reach their maximum values. It is critical to identify the phase sequence for ensuring the correct operation of three-phase equipment, such as motors or generators. There are two types of phase sequences: **ABC (positive sequence)** and **ACB (negative sequence)**.

For this experiment, a simple bulb test is used to determine the phase sequence. The test involves connecting a single-phase load (a bulb) across two of the three phases. When the phases are connected in the proper sequence (ABC), the bulb will glow normally. However, when the phases are reversed (ACB), the brightness of the bulb will change. This change occurs because the phase voltage will be affected based on how the phases are connected.

This test allows for an easy and quick verification of phase sequence without using complex instruments like phase sequence meters. The brightness difference in the bulb serves as an indicator of whether the phase sequence is correct or reversed. The correct sequence is crucial in systems that involve rotating machinery, as a wrong sequence can cause motors to rotate in the wrong direction, potentially leading to damage or inefficient operation.

By identifying the phase sequence using this method, we ensure that the three-phase supply is properly connected and safe for use in electrical systems.

5.5 Required Apparatus:

- AC source
- Bulb (single-phase)
- Multimeter
- Capacitor
- Sequence Indicator
- Connecting Wires

5.6 Circuit Diagram:

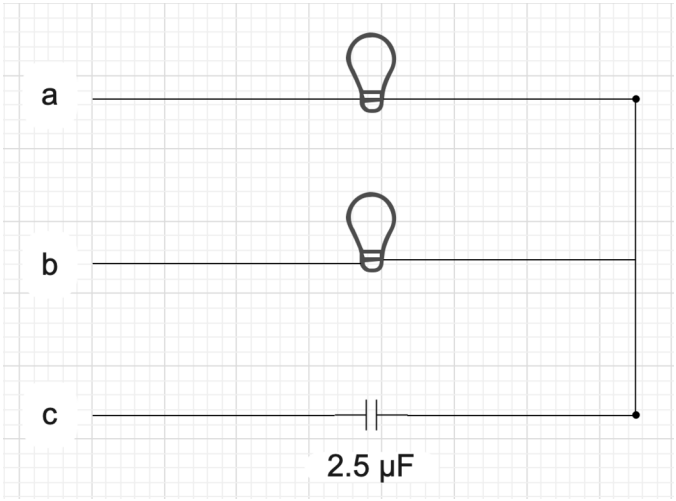

Figure 5.1: Three phase sequence test using bulb

5.7 Result:

When the phase sequence was ABC (positive), the bulb glowed at its normal brightness, confirming the correct phase sequence. When the phase sequence was ACB (negative), the bulb dimmed, indicating a reverse sequence. This simple test successfully demonstrated the relationship between phase sequence and load behavior.

5.8 Discussion:

The experiment successfully demonstrated the use of a bulb to identify the phase sequence in a three-phase system. The brightness of the bulb was directly related to the sequence of the phases. A correct phase sequence (ABC) resulted in normal brightness, while a reversed sequence (ACB) caused a noticeable dimming of the bulb. This method offers a simple and effective way to verify phase sequence in three-phase systems, ensuring that equipment like motors operates correctly. The test is especially useful in situations where more complex instruments are not available or required.

5.9 Precautions:

- All electrical connections were checked and insulated to avoid short circuits.
- The bulb was handled carefully to avoid damage.
- The switch was operated with caution to prevent wrong connections.
- The phase sequence was verified with caution to ensure safe testing.

5.10 Reference:

- Charles K. Alexander and Matthew N. O. Sadiku, “Fundamentals of Electric Circuit”, 5th Edition, 1221 Avenue of the Americas, New York
- Wikipedia