Experiment 1

OBTAINING THE HYSTERISIS CURVE AND EQUIVALENT CIRCUIT PARAMETERS OF A SINGLE PHASE TRANSFORMER

# PURPOSE OF THE EXPERIMENT

Purpose of this experiment is to learn the working principle of a single phase transformer, study its working modes, experiment the no-load, short circuit and loaded working styles. Also with experiments, obtaining the circuit parameters of the transformer and drawing its hysteresis curve are the objectives of this experiment.

# CONNECTION DIAGRAM

# Explanatıon of Experıment

In this experiment, a single phase transformer is used. Transformer is a stationary electrical machine. Therefore owing to non-moving parts, a transformer has no frictional loss. This makes a transformer very high efficient electrical machine (above 90%).

## No-Load Test

In the first part of the experiment, no-load circuit parameters are obtained. In this working mode, primary coils of the transformer are connected to the power line and secondary side is kept open circuit. This connection creates a flux on the ferromagnetic material but since secondary side is no-loaded, only a small current flows on the primary side of the transformer. This small current is assumed not to create a copper loss in the transformer; so all the losses are due to core loss. (Connection diagram 1 is used in this configuration.)

As we can see in the connection diagram 1, primary side voltage (Vi), current (I0) and power (P0); secondary side voltage (V2) values are measured. Following table includes this values,

//ölçümler

Using the measured values, we can obtain;

* power factor

//formül

* Active component of the current

//formül

* Reactive component of the current

//formül

* Core Resistance

//formül

* Magnetization Reactance

//formül

## Short Cırcuıt Test

In the second part of the experiment, short circuit parameters are obtained. In this working mode, secondary coil of the transformer is short circuited using a wire. This connection is an unwanted situation in normal working condition. Since the current in the primary side of the transformer can be increased rapidly, this experiment must be done carefully. Voltage is measured in the primary side of the transformer and the voltage level at the rated current level is the short circuit voltage level of the transformer. (Connection diagram 2 is used in this configuration.)

//değer tablosu

## Dıfferent Loadıng Condıtıons Test

Loading test is for observing the different load characteristics on the transformer. As we can see from connection diagram 3, voltage, current and power measurements are made both side of the transformer. Measurements are in the following table,

//değer tablosu

## Obtaınıng Hysteresis Curve

# QUESTIONS

# RESOURCES