



Al-Mustaqbal University College
Department of Medical Instrumentation Techniques Engineering
Class: Three
Subject: Electric technology lab
Lecturer: Dr. Jaber al kadi
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Experiment No: 1

Open circuit and short circuit test on single phase transformer

1. Objective

The purpose of this circuit is:

- a. To understand the basic working principle of a transformer.
- b. To obtain the equivalent circuit parameters from open circuit and short circuit tests.

2. Component of (Open circuit and short circuit)

- ◆ AC Voltage.
- ◆ Inductor.
- ◆ Wattmeter.
- ◆ Ammeter.
- ◆ Voltmeter.
- ◆ Transformer (TS-IDEAL).
- ◆ Step down transformer ($N_1=100H$ & $N_2=10H$)



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3. Open Circuit test (No-Load)

Open circuit test or no-load test on a transformer is performed to determine 'no load loss (core loss) and no-load current I_0 . The circuit diagram for open circuit test is shown in figure below.

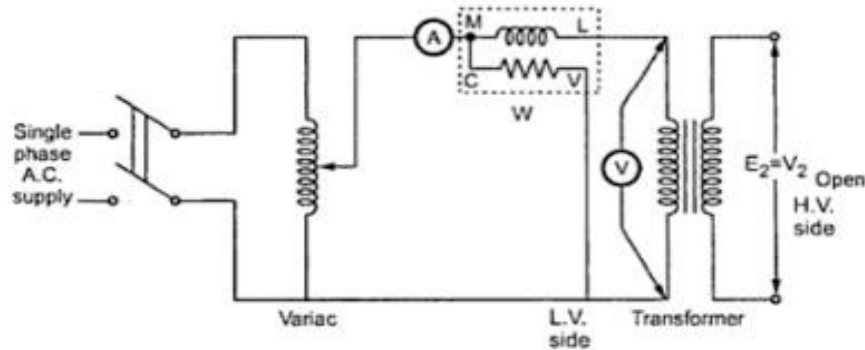


Figure1:
diagram for open circuit test

Circuit

Usually high voltage (HV) winding is kept open, and the low voltage (LV) winding is connected to its normal supply. A wattmeter (W), ammeter (A) and voltmeter (V) are connected to the LV winding as shown in the figure (1).



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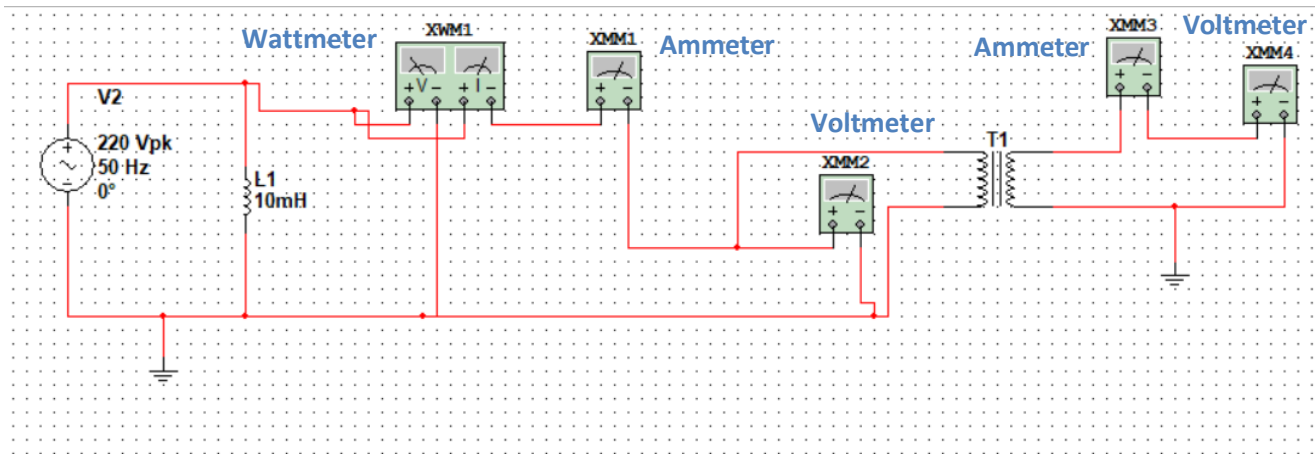


Figure2: Multisim open circuit test

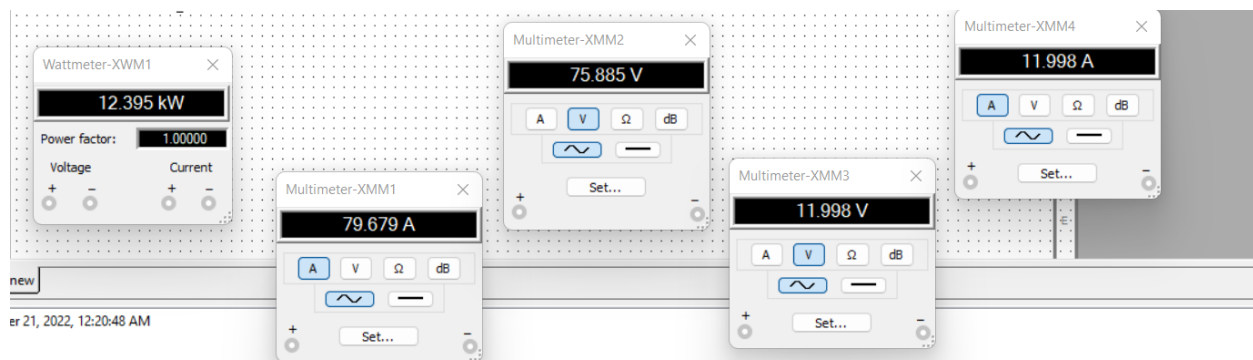


Figure 3: Results for open circuit test



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4. Short Circuit test

In Short Circuit (SC) test, the primary or HV winding is connected to the AC supply source through voltmeter, ammeter, wattmeter and a variac as shown in figure. This test is also called as Reduced Voltage Test or Low Voltage Test. As the secondary winding is short circuited, at rated voltage, the transformer draws a very large current due to its very small winding resistance.

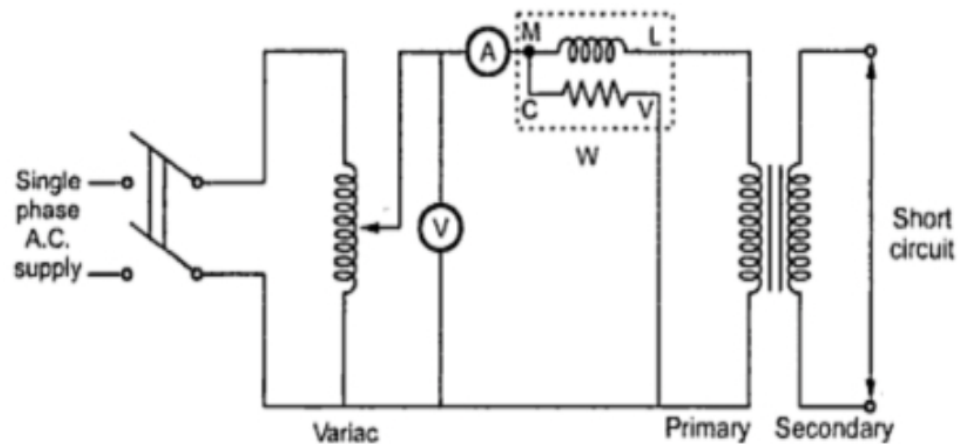


Figure4: Circuit diagram for short circuit test



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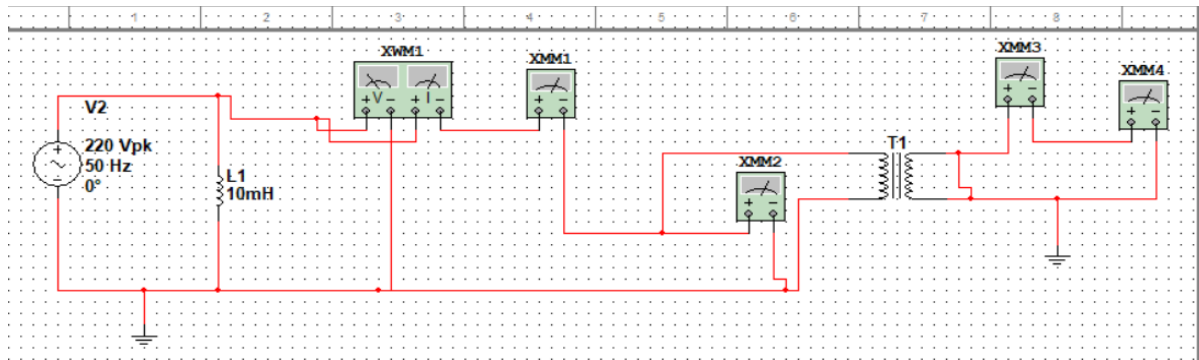


Figure5: Multisim short circuit test

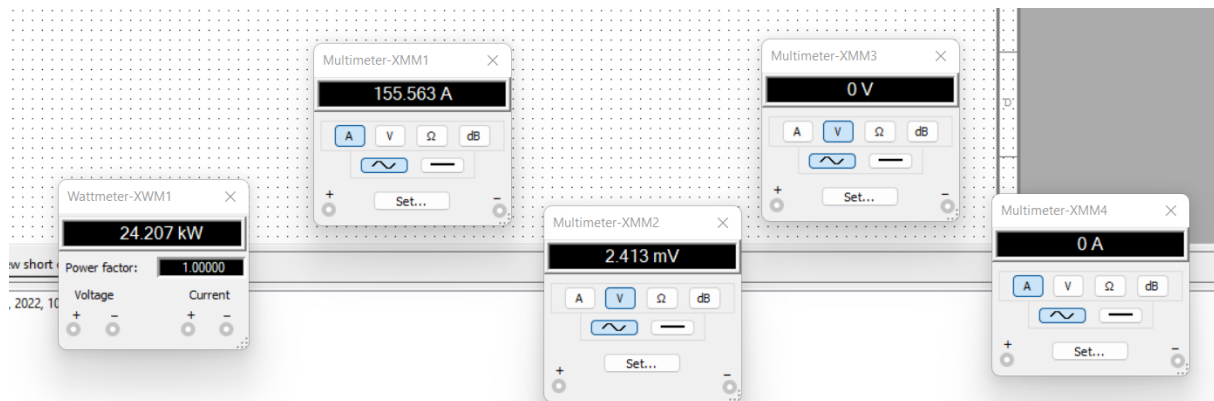


Figure6: Results for short circuit test