

EXPERIMENT NO: 09

TITLE: To perform short circuit test on transformer.

OBJECTIVES: To determine the series branch parameters of the equivalent circuit of a transformer.

APPARATUS:

Sr.No.	Item	Rating	Quantity
1	1 phase dimmer stat		
2	AC Ammeter		
3	AC Voltmeter		
4	Wattmeter		
5	Transformer		

THEORY:

The figure shows the circuit diagram for conducting the short circuit test. On a transformer, one of the windings of the transformer is short circuited through an ammeter, while a low voltage is applied to other winding.

The applied voltage is slowly increased until full load current flows in this winding. As such full load current will then flow in the other winding also. Normally, the voltage applied is hardly 5-7% of rated voltage of this winding.

Flux established in the core will be quite small and so iron losses occurring under this condition are negligible. W_{sc} , I_{sc} , V_{sc} will be readings of Wattmeter, Ammeter and Voltmeter.

$$W_{sc} = (I_{sc})^2 R_{eq} \quad R_{eq} = W_{sc}/(I_{sc})^2$$

$$Z_{eq} = V_{sc}/I_{sc} \quad X_{eq}^2 = (Z_{eq})^2 - (R_{eq})^2$$

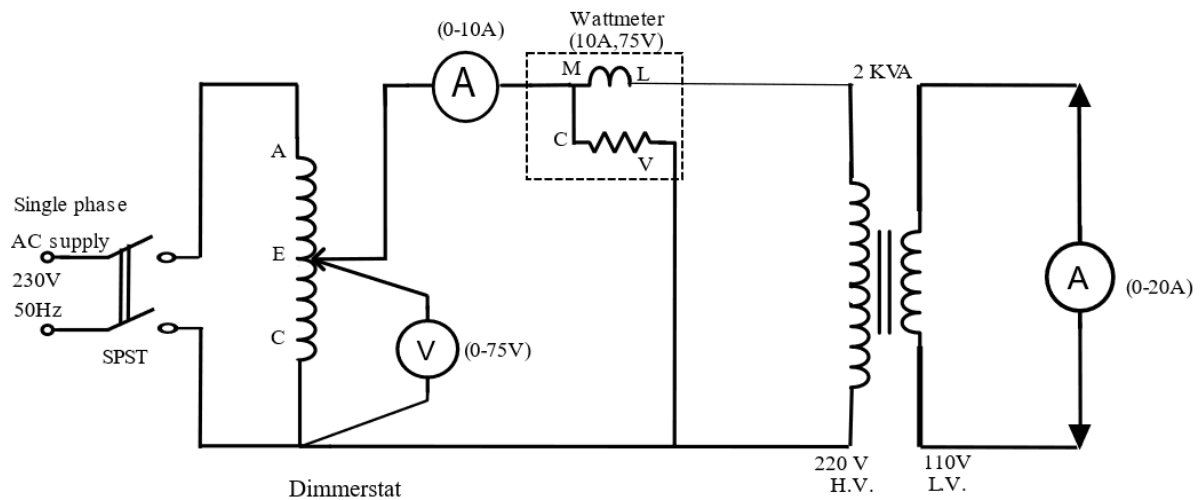
CIRCUIT DIAGRAM:

Fig : Short circuit test

PROCEDURE:

- [1] Connect the circuit as per provided circuit diagram.
- [2] Check the connections twice.
- [3] Start the main switch.
- [4] Adjust the required voltage on demonstrate.
- [5] Take the readings.

OBSERVATION TABLE:

Voltage (V_{sc})	Current (I_{sc})	No-load power losses (W_{sc})

CALCULATIONS:

Equivalent loss, $W_{sc} = (I_{sc})^2 R_{eq}$

Therefore, $R_{eq} = W_{sc} / (I_{sc})^2$

Equivalent impedance, $Z_{eq} = V_{sc} / I_{sc}$

Equivalent reactance, $X_{eq} = \sqrt{Z_{eq}^2 - R_{eq}^2}$

CONCLUSION:

