Transformer

Transformer is device which can configure to step-up or step-down an AC current or voltage. Primary coil or 'winding' is commonly identified as supply voltage incoming with expected total 240 volts AC.

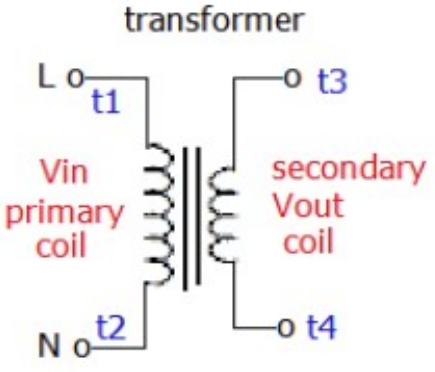

Figure 1

Measuring transformer winding on both primary winding

When your multi-meter's probe is place on the t1 and t2 terminal. The multi-meter will have reading taken from the Np value in ohm. Expected the primary side would be higher resistance, example 85Ω.

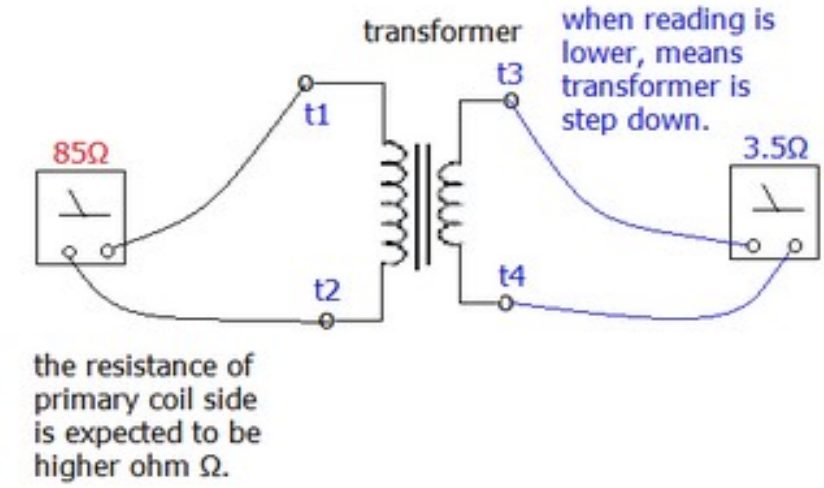

Figure 2 identify primary and secondary winding.

Measuring secondary side winding

Secondary coil are basically use to lower the voltage. Place the multi-meter again on the secondary coil, the meter will reads lower ohm, example 3.5Ω.

Conclusion:
This winding side is secondary side.

Measuring Transformer sequence

- Position and place the multi-meter probe on the following terminal.
- measure between t1 and t2, result should have some value or 85Ω .
- measure between t1 and t3, result should be infinity .
- measure between t1 and t4, result should be infinity .
- measure between t3 and t4, result should have some value or 3.5Ω .

Transformer fault condition

When using multi-meter to measure the winding, if the transformer having some fault, the meter reading shall be infinity or ' ∞ '

Figure on the right showing example of fault transformer can be identified using a test known as CONTINUITY test

When measure between t3 and t1 or between t2 and t4, there is no connections between them therefore the meter reads infinity or 'O.L' .

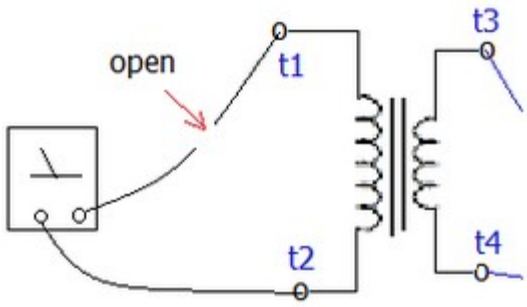

Figure 3 identify faulty winding.

Refer to figure 3, when measure the t1-t2, the reading is be infinity or ' ∞ ' or O.L.

Transformer can be wrongly connected

Example in the figure 4 on the right, the polarity of the transformer is wrongly connected is known polarity mistake.

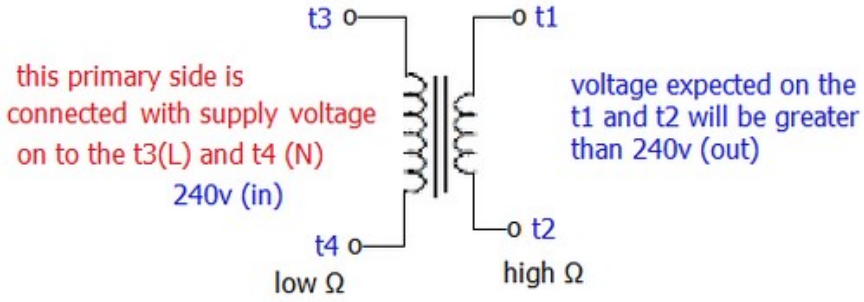

Figure 4 wrongly connected between secondary and primary.

Transformer power

Power on both primary and secondary is same.

$$P_{primary} = Vp \times Ip \quad \text{and} \quad P_{secondary} = Vs \times Is$$

Rectifier circuit

A diode is a semiconductor device that essentially acts as a one-way switch for current.

Each of these diode is just a simple semiconductor, which main purpose is to allowing current to flow one direction.

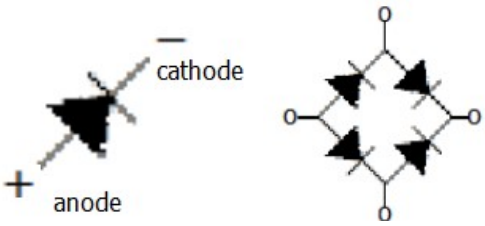

Figure 1

Rectifier basically consist of 4 diodes configure into wheat-stone or 'diamond' figure.

Forward Bias

When measuring a diode, it is almost important to identify the diode polarity.

The term forward bias means that the meter can reads some ohm Ω value.

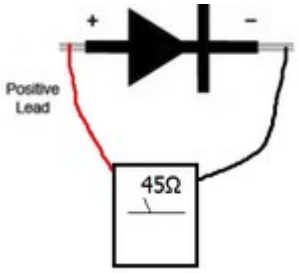

Figure 2 forward bias

Reverse Bias

This means that the meter reading shows infinity or 'O.L' . The current cannot flow through the diode.

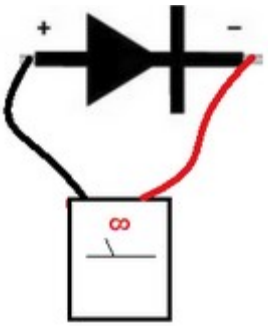

Figure 3 reverse bias

How to measure a rectifier ?

To measure the rectifier starts with the sequence measurements:

Step 1:

Measure from point t1 to t2 according the figure above. The result expected Ω value because is forward bias

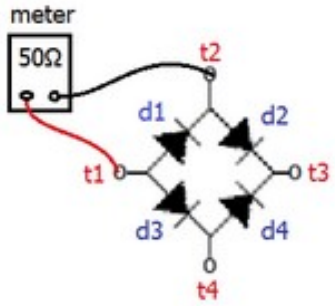

Figure 4

Step 2:

Measure from point t2 and t3 the readings should be about 50Ω.

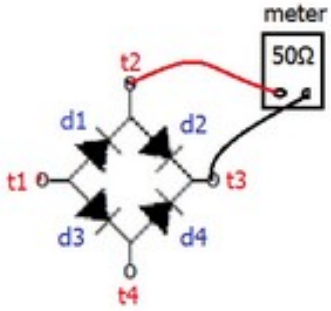

Figure 5

Step 3:

Measure from point t1 to t3, the meter readings should be total adding from step 1 and step 2.

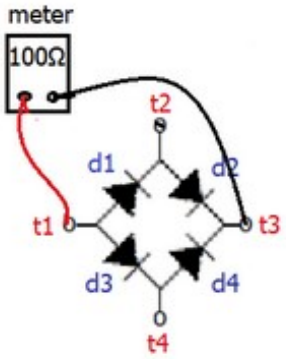

Figure 6

Step 4:

Measure from t1 and t4, reading should be same 50Ω.

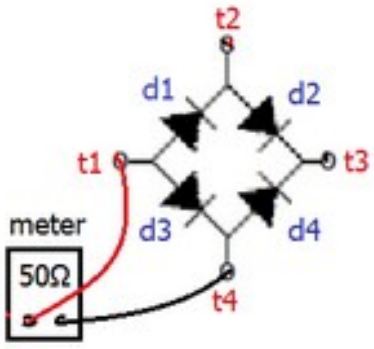

Figure 7

Step 5:

Measure at point t4 and t3, the result should be same 50Ω.

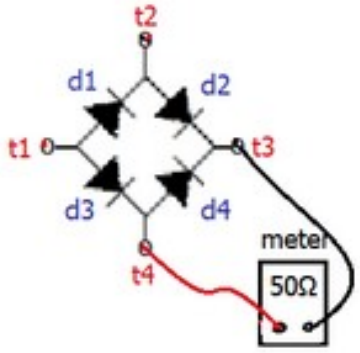

Figure 8

Table B: Rectifier measurement

Measure point	Result (Ω)
t 1 – t 2	50
t 2 – t 3	50
t 1 – t 3	100
t 1 – t 4	50
t 4 – t 3	50
t 2 – t 4	∞

All have some Ω value except for t2-t4 because of ac point for transformer.

Measure point	Result (Ω)
t 2 – t 1	∞
t 3 – t 2	∞
t 3 – t 1	∞
t 4 – t 1	∞
t 3 – t 4	∞
t 4 – t 2	∞

All results is infinity because of reverse bias. Since t4-t2 is ac point, no matter reverse the polarity it will be same result infinity.

How to identity +ve and -ve on rectifier ?

Correct polarity of rectifier can identify by looking at the test lead/probe of an analog multi-meter.

1. The highest ohm value is between t1 and t3 which is 100Ω.

   (ve+) would be the black probe.

   (ve-) would be on the red probe.

2. There is no contact on both of the t2-t4, or t4-t2 the result reading would be infinity, ∞ .

Complete the transformer and rectifier line connection

Refer to figure on the right, the once the terminal is identified the connection to AC will able to produce DC voltage. This part still filtering circuit to smoothen the DC wave form into straight line as shown on figure

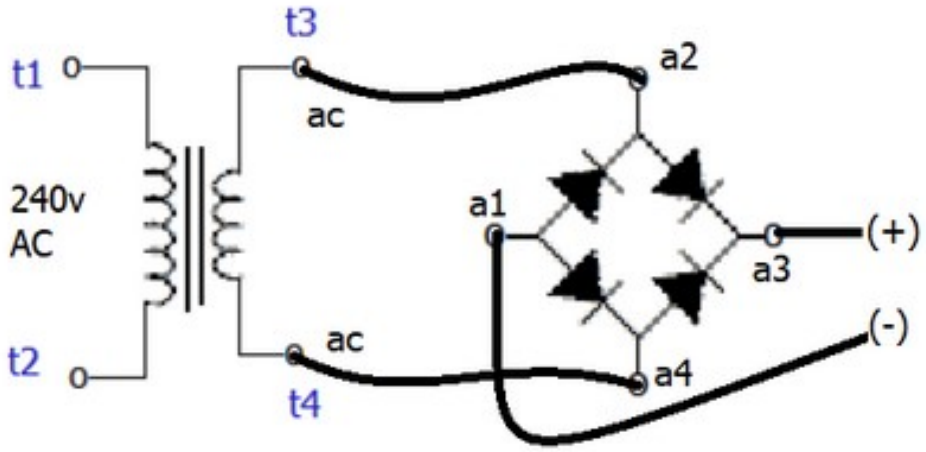

Figure 9 line are drawn to each terminal label.

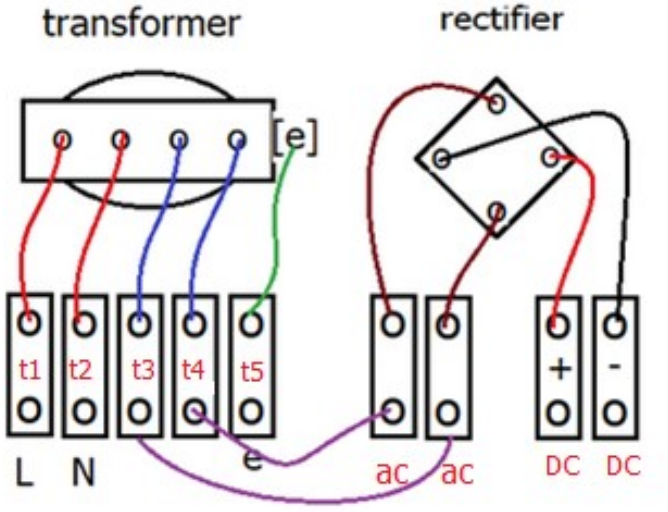

Figure 10 complete wiring connections to terminal label