

Measurement of three phase power using Power transducer

Objective

To measure the 3 phase active power of a circuit using a power transducer.

Theory

A transducer is a device which generates usable output, in response to a specified measurand. The output is an electrical quantity and measurand as a 'Physical quantity, property, or condition which is measured'. That means transducer is a device which can convert 'non electrical quantity', into an electrical form. Transducer can convert different types of input like resistance, inductance, resistance quantities into a suitable output.

Here, three phase power is measured using three transducers, voltage, current and three phase power transducers respectively. The line and phase voltages are checked first and then the phase currents. Mainly, light loads and fan loads of a floor of a building can be measured using this method. Red, Yellow and Blue phases are connected with the power transducer. 1 and 2 terminals of power transducer are shorted and connected with Red phase, 8 and 7 of the same are shorted and connected with Blue phase, and Terminal 5 is directly connected with Yellow phase. Terminals 3, 5 and 9 are directly connected with three phase load. Three different DC outputs from three different transducers are obtained in the digital multimeter. Auxiliary power supply is connected across the terminals 13 and 14. The voltage and current transducers are also connected here as shown. Here the three phase load is purely resistive load

Observation Table

Sl.no	Input Voltage	Input current	Wattmeter 1 reading	Wattmeter 2 reading	Total Active (W= W1~W2)	Transducer output

Calculation:

$$\text{Calibration Error} = (\text{True Value} - \text{Measured value}) / \text{True Value} \times 100\%$$

Discussion

- 1.) Draw the graph of transducer characteristics (total power input vs. output).
- 2.) Draw the graph of (% error vs output voltage)
- 3.) Identify the sources of error in measurement.

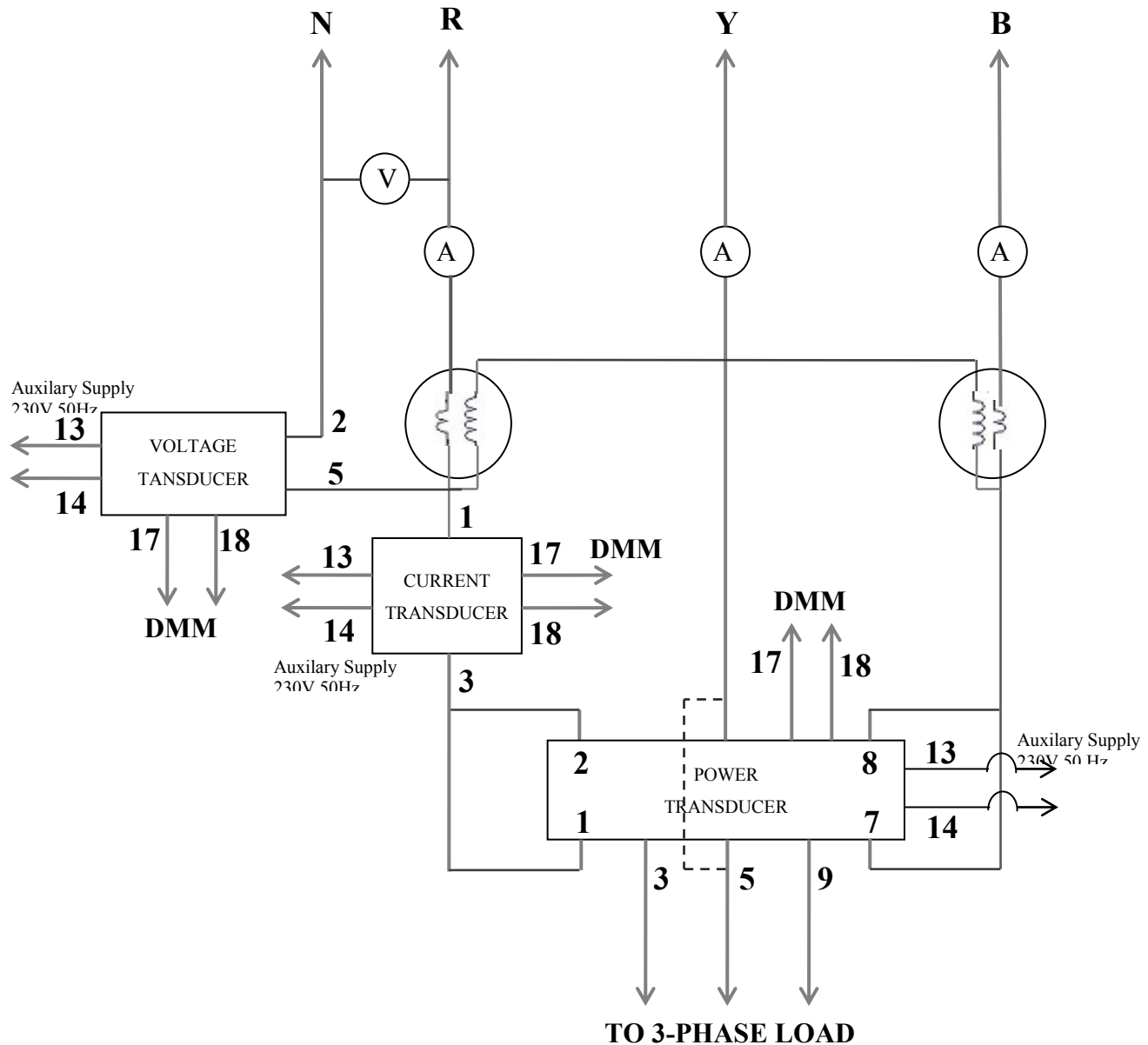


Figure : Circuit diagram for three phase power measurement.

Precautions