SNS COLLEGE OF TECHNOLOGY

(An Autonomous Institution)

COIMBATORE-35

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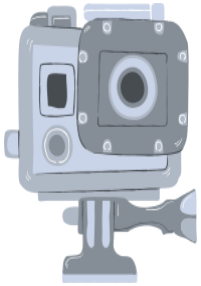
Approved by AICTE, New Delhi & Affiliated to Anna University, Chennai

DEPARTMENT OF ELECTRICAL AND ELECTRONICS ENGINEERING

COURSE NAME: 19EET205/ MEASUREMENTS AND INSTRUMENTATION

II YEAR / IV SEMESTER

Unit 2 –**MEASUREMENT OF POWER, ENERGY AND MAGNETIC MEASUREMENTS**



Topic : PHANTOM LOADING

PHANTOM LOADING

Phantom loading is the phenomena in which the **appliances consume electricity even when they turn off**. The disc of the energy meter rotates which increases the reading of the meter, but the devices do not consume power**.** This type of loading is also known as the **vampire** or **virtual loading**. The phantom loading mainly occurs in the “electronic” appliances.

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The phantom loading is used for examining the current rating ability of the energy meter. The actual loading arrangement will waste a lot of power. The phantom loading consumes very less power as compared to real loading, and because of this reason, it is used for testing the meter.

In phantom loading, the pressure coil and the current coil are separately excited by the supply source. The pressure coil is energised from the small supply voltage, and the current energises the current coil at very small voltages.

Example of Phantom Loading

- Consider the DC energy meter having rating voltage 220V and current 9 Ampere. The resistance of the pressure coil and the current coil is 4400Ω and 0.1Ω respectively. The power consumption of the load by direct and indirect phantom is explained below.

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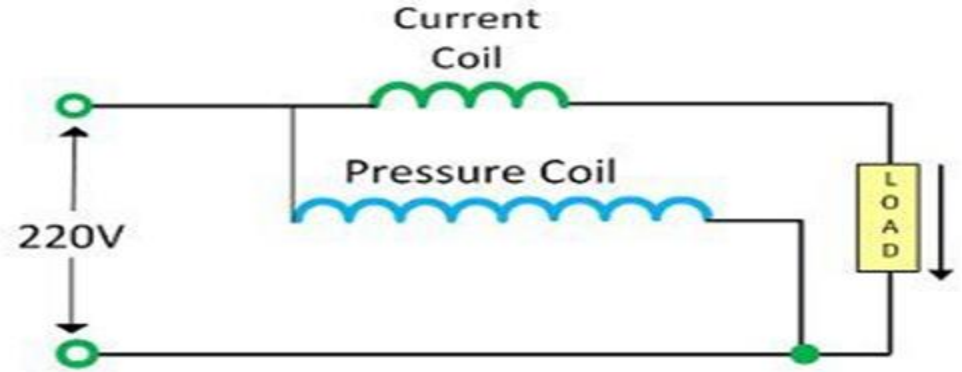

DIRECT LOADING:

The power consumption of the pressure coil circuit is calculated as

Power = $(220)^2$/ 4400 = 48400/4400 = 11watt

The power consumption of the current circuit is expressed as

Power = 220 X 9 = 1980watt

The total power consumed by the pressure and current circuit

Power = 11watt + 1980watt = 1991watt

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Phantom Loading Arrangement

The power consumption of the pressure coil is given below.

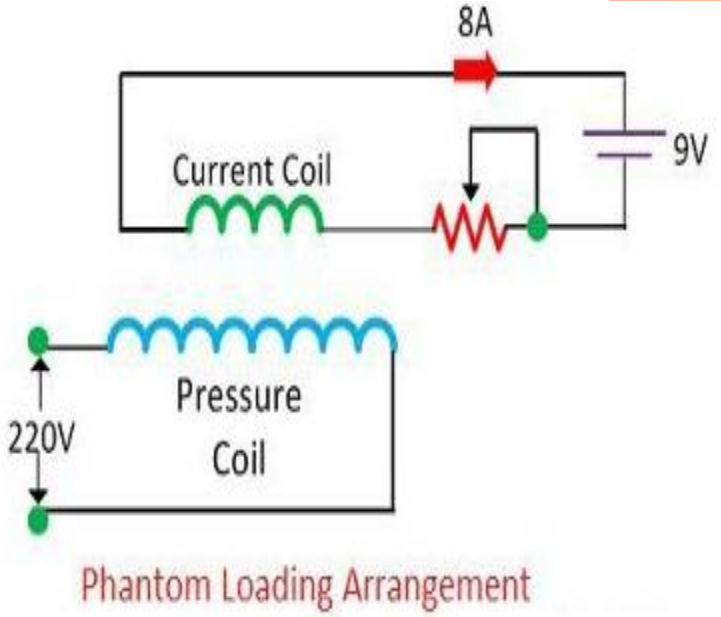
$P = (220)^2/4400 = 11watt$

The current coil of the phantom loading arrangement is separately excited by the battery of the 9V. The power of the current coil is measured as

Power = 9 X 9 = 81watt

The total power consumed by the phantom loading is expressed as

Total Power = 11watt + 81watt = 92watt



Phantom Loading Arrangement

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The above example shows that in phantom loading the pressure and the current coil is separately excited by the meter. Hence the power loss is less in phantom loading as compared to direct loading.