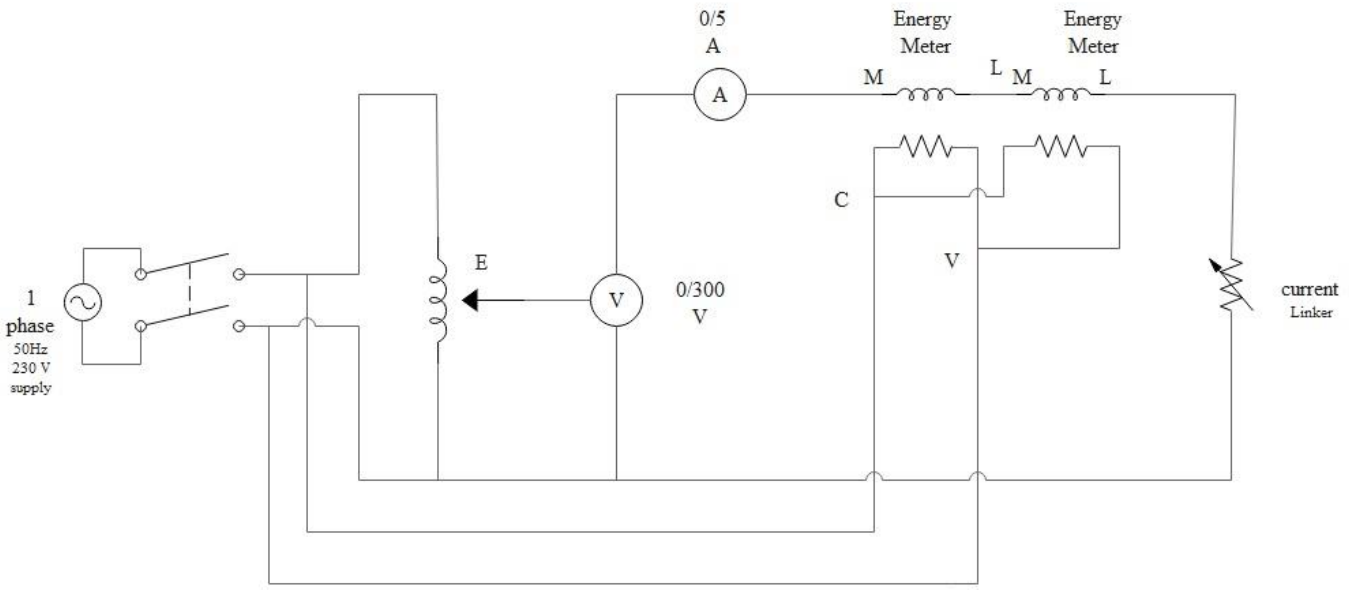
Experiment 4

Aim: Calibration of single-phase energy meter by "Phantom loading" method.

Apparatus: Autotransformer, voltmeter(0-300V), Ammeter (0-5A), rheostat (750Ω, 12A), wattmeter (300V, 2A), energy meter, 230V 50Hz AC supply.



Theory:

- Phantom loading is a phenomenon in which appliances consume electricity even when they are turned OFF.
- The disc of energy meter rotates, which increases reading of meter but the device does not consume power.
- Phantom loading mainly occurs in electronic appliances. This method is used for examining current rating ability of energy meter.
- The actual loading consumes very less power as compared to real loading and because of this, it is used for testing energy meter.

Procedure:

- Connect the circuit as shown in figure.
- Fix the input voltage to same value to some value by varying auto transformer.
- Rheostat is kept at maximum position initially and slowly varied to get the different readings of ammeter, voltmeter and wattmeter is measured.
- The time for impulse of the energy meter disc is measured.
- The true energy and indicated energy is evaluated and used to find error.

Observation Table:

Sr. No.	Voltage (V)	Current (A)	Power (W)	Time (second)	No. of revolution	Theoretical Energy (E_1)	Measured Energy (E_2)	Error (%)
1	110	0.14	38	137	5	5000	5205	4.1%
2	110	0.2	43.2	116	5	5000	?	
3	110	0.22	46	111	5	5000	?	?
4	110	0.25	54.4	90	5	5000	?	?
5	110	0.28	60	78	5	5000	?	?

Conclusion:

Energy meter are installed in house to measure the total energy consumed and it can be calibrated by comparing its reading with watt meter reading.