Calibration of Single Phase Energy Meter

Exp. No: **Date:**

Aim: To Study the 1. Connections of 1-Phase Energy meter and

2. Measure electrical energy using given energy meter and also calculate the error present in the given energy meter

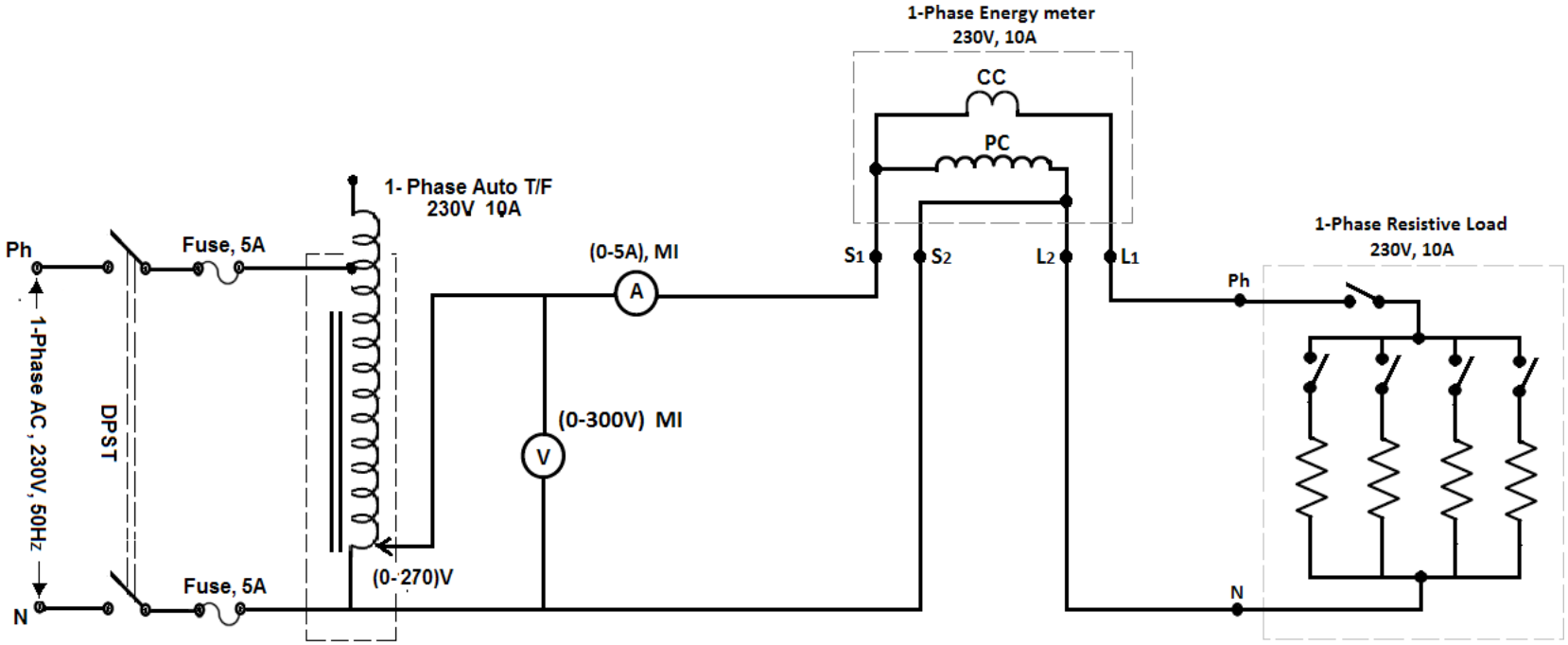
Apparatus required:

S.No	Name of the equipment	Range/ Specification	Type	Quantity
1	Voltmeter	(0-300) V	MI	1
2	Ammeter	(0-5) A	MI	1
3	1- Phase Auto Transformer	I/P:1-ϕ, 230V O/P: (0-270)V,10A	Core type	1
4	1- Phase Loading Rheostat	230 V, 2.3 Kw	Resistive	1
5	1-Phase Energy Meter	230V, 5-10 A	Induction	1
6	Stop watch	--	Digital	1
7	Connecting Wires	1.5 Sq.mm	Copper	Adequate

Procedure:

1. Connect the circuit as shown in the circuit diagram.
2. Note down the energy meter constant, Voltage, and full load current of the energy meter.
3. Before switching ON the supply, ensure that the loading rheostat switches are in OFF position.
4. Switch ON the supply and set the desired load current to flow by selecting a suitable combination of Switches on the loading rheostat.
5. Wait for the red indicator of the energy meter disc to come in the front. At this moment start the stopwatch.
6. Measure the time (T) for 20 revolutions of the energy meter disc and tabulate the voltmeter and ammeter readings.

7. Adjusting the load current to another desired value by turning the rheostat selector switches to ON position.
8. Measure the time (T) for 20 revolutions of the energy meter disc and tabulate the voltmeter and ammeter readings.
9. Repeat steps 7 and 8, for several values of load currents and tabulate the observations in table.



Circuit diagram for Calibration of 1-Phase Energy Meter

Tabular column:

S.No	V (v)	I_L (A)	Time (T) (Seconds)	Actual energy consumed during N revolutions (Ea)	Energy recorded by the meter (E_m)	Percentage of relative Error
1						
2						
3						
4						
5						

Theoretical calculations:

Energy meter constant (**M**) = Rev/Kwh

No. Of revolutions (**N**) = Rev

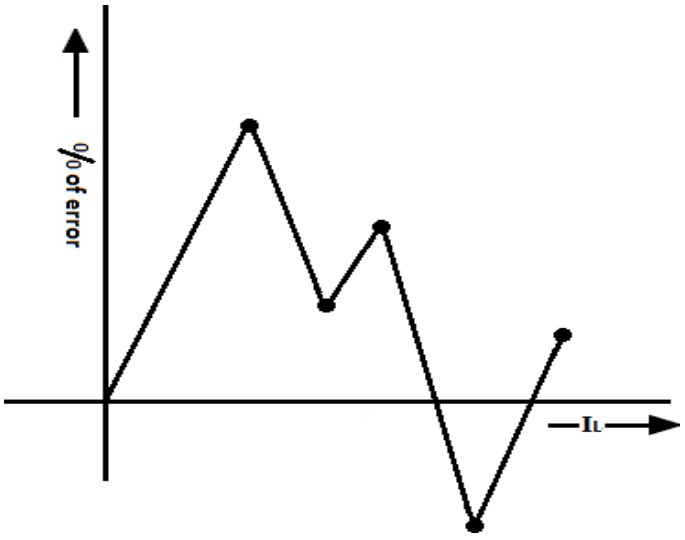
Measured energy ($\mathbf{E_m}$) = N/M Kwh

Actual energy consumed($\mathbf{E_a}$)= ($V.I_L.T$)/ (3600x1000) Kwh

Time (**T**) in Seconds

Percentage of relative Error = $[(E_m - E_a)/ E_a]*100$

Model graph:



% Error Vs Load Current curve

Precautions:

1. Use proper ranges of the meters.
2. Take the readings without parallax error
3. All the connections should be tight.

Result: