

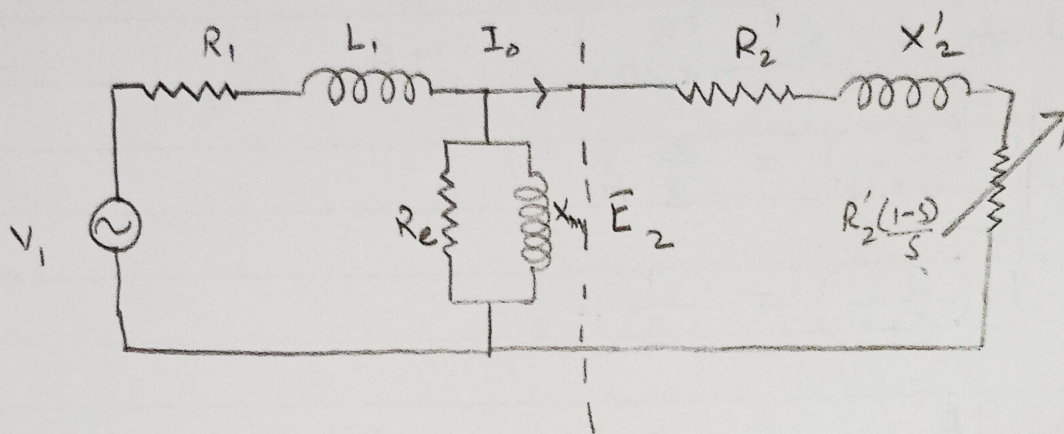


Fig: Phase equivalent circuit of poly phase induction motor

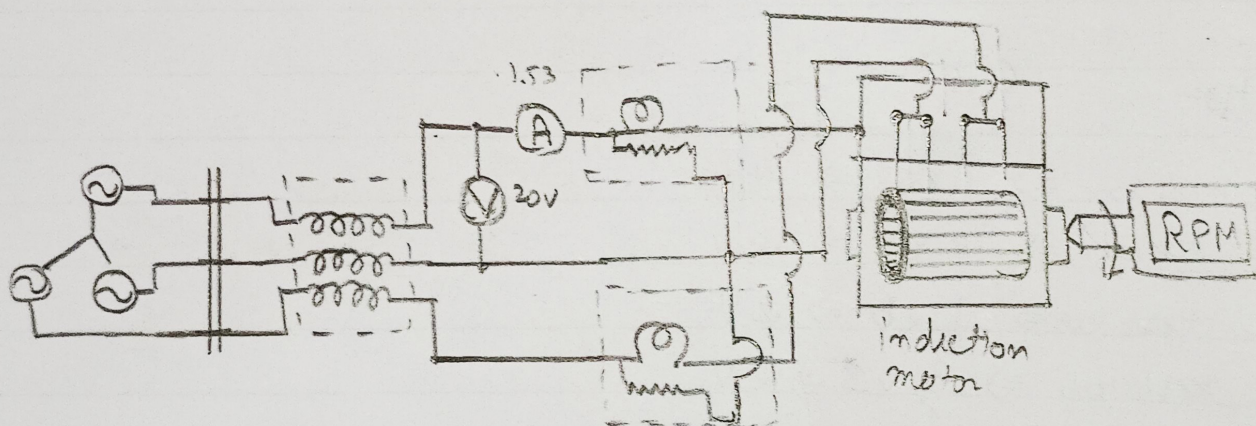


Fig: No load test of induction motor

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Aim : To Study no load test on three phase induction motor

Apparatus :

- 3-phase induction motor
- TPST Switch
- Three phase Variac
- Voltmeter
- Ammeter
- Wattmeter
- Digital tachometer
- Connecting wires

Theory :

Induction motors are a major consumers of global electrical power. Their steady state performance can be studied using a per phase equivalent circuit with parameters such as:

V_1 : input voltage per phase

R_1, X_1 : Stator resistance & leakage reactance per phase

R_2, X_2 : Rotor resistance & leakage reactance per phase

X_m : Magnetising reactance

R_e : Core loss

I_1, I_2 : Stator and rotor current (referred to stator) per phase

Developed Torque is given by :

$$T = \frac{3(I_2)^2 R_2}{s \omega_s} \text{ , N-m}$$

where,

ω_s = Synchronous Speed

ω_r = Rotor speed

s = Slip

V_s (volt)	I_L (Amp)	W_1 (watt)	W_2 (watt)	Speed	Total Copper Loss	Rotor Angle	I/P Power
2	0.15	0.15	0.19	0.00	0.62	29.3	0.45
4	0.31	0.63	0.80	0.00	2.57	29.3	1.87
6	0.46	1.41	1.77	0.00	5.74	29.3	4.17
8	0.61	2.49	3.14	0.00	10.15	29.3	7.37
10	0.76	3.88	4.89	0.00	15.82	29.3	11.48
12	0.92	5.64	7.10	0.00	22.93	29.3	16.68
14	1.07	7.65	9.63	0.00	31.13	29.3	22.63
16	1.22	9.97	12.55	0.00	40.59	29.3	29.48
18	1.38	12.68	15.97	0.00	51.61	29.3	37.52
20	1.53	15.62	19.67	0.00	63.60	29.3	46.22

To predict motor performance, Engineers conduct :

1. No load test : Determine R_e & X_m
2. Blocked rotor test : Finds R_1, R_2, R_e, X_1, X_2

Conclusions

We have successfully conducted the no-load test on a three phase induction motor and analysed ~~that~~ its characteristics. Hence we can conclude