GROSCHOPP® MOTORS & GEARMOTORS

ELECTRICAL & MECHANICAL

FULL-LOAD CURRENTS

Three-Phase AC induction squirrel cage and wound rotor motors

HP	115V	200V	230V	460V	575V	2300V	4000V
1/2	4	2.3	2	1	.8		
3/4	5.6	3.2	2.8	1.4	1.1		
1	7.2	4.15	3.6	1.8	1.4		
1 1/2	10.4	6	5.2	2.6	2.1		
2	13.6	7.8	6.8	3.4	2.7		
3		11	9.6	4.8	3.9		
5		17.5	15.2	7.6	6.1		
7 1/2		25	22	11	9		
10		32	28	14	11		
15		48	42	21	17		
20		62	54	27	22		
25		78	68	34	27		
30		92	80	40	32		
40		120	104	52	41		
50		150	130	65	52		
60		177	154	77	62	16	8.8
75		221	192	96	77	20	11
100		285	248	124	99	26	14.3

FULL-LOAD CURRENTS

Direct-Current Motors (running at base speed)

HP	90V	120V	180V	240V	500V	550V
1/4	4.0	3.1	2.0	1.6		
1/3	5.2	4.1	2.6	2.0		
1/2	6.8	5.4	3.4	2.7		
3/4	9.6	7.6	4.8	3.8		
1	12.2	9.5	6.1	4.7		
1 1/2		13.2	8.3	6.6		
2		17	10.8	8.5		
3		25	16	12.2		
5		40	27	20		12.2
7 1/2		58	39	29	13.6	16
10		76	51	38	18	16
15				55	27	24
20				72	34	31
25				89	43	38
30				106	51	46
40				140	67	61
50				173	83	75
60				206	99	90

$$\text{Belt Speed}_{(FPM)} = .262 \times RPM \times Dia._{(in)}$$

$$WK^2_{load\ (at\ motor\ shaft)} = \frac{WK^2_{load} \times \text{Load RPM}^2}{\text{Motor RPM}^2}$$

$$\text{Chain Tension}_{(lb_f)} = \frac{33000 \times hp}{\text{Chain Speed}_{(FPM)}}$$

$$\%\ \text{Slip} = \frac{\text{Sync RPM} - \text{Full Load RPM}}{\text{Sync RPM}} \times 100$$

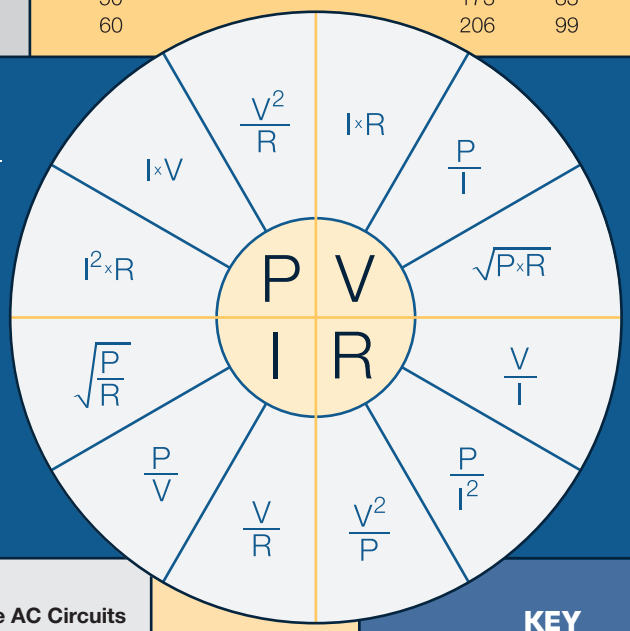
$$\tau_a = \frac{[(\tau_{full\text{-}load} + \tau_{breakdown})/2] + \tau_{breakdown} + \tau_{locked\text{-}rotor}}{3}$$

$$\text{time}_{(sec)} = \frac{WK^2 \times \text{Speed Change}}{308 \times \tau_a}$$

$$\text{Sync RPM} = \frac{\text{freq} \times 120}{\#\text{ of Poles}}$$

$$WK^2 = WK^2_{rotor} + WK^2_{load}$$

$$\tau = \frac{hp \times 63025}{RPM}$$



FULL-LOAD CURRENTS

Single-Phase AC Motors

HP	115V	200V	230V
1/6	4.4	2.5	2.2
1/4	5.8	3.3	2.9
1/3	7.2	4.1	3.6
1/2	9.8	5.6	4.9
3/4	13.8	7.9	6.9
1	16	9.2	8
1 1/2	20	11.5	10
2	24	13.8	12
3	34	19.6	17
5	56	32.2	28
7 1/2	80	46	40
10	100	57.5	50

POWER

Single-Phase AC Circuits

$$hp = \frac{I \times V \times \eta \times PF}{746}$$

$$P_{(kW)} = \frac{I \times V \times PF}{1000}$$

$$I = \frac{746 \times hp}{V \times \eta \times PF}$$

$$\eta = \frac{746 \times hp}{I \times V \times PF}$$

$$PF = \frac{P_{(input\ W)}}{I \times V}$$

POWER

Three-Phase AC Circuits

$$hp = \frac{I \times V \times \eta \times PF \times 1.732}{746}$$

$$P_{(kW)} = \frac{I \times V \times PF \times 1.732}{1000}$$

$$I = \frac{746 \times hp}{V \times \eta \times PF \times 1.732}$$

$$\eta = \frac{746 \times hp}{I \times V \times PF \times 1.732}$$

$$PF = \frac{P_{(input\ W)}}{I \times V \times 1.732}$$

POWER

Fans & Blowers

$$P = \frac{Q \times p}{229 \times \eta}$$

POWER

Pumps

$$P = \frac{Q \times H \times S}{3960 \times \eta}$$

POWER

DC Circuits

$$hp = \frac{I \times V \times \eta}{746} \qquad P = I \times V \qquad I = \frac{P}{V}$$

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KEY

hp	power (horsepower)
P	power (watt)
I	current (amp)
V	voltage (volt)
R	resistance (ohm)
η	efficiency
PF	power factor
p	pressure (psi)
Q	flow rate (cfm)
H	head (ft)
S	specific gravity of fluid
WK^2	inertia ($lb_m\ ft^2$)
τ	torque (in lb_f)
τ_a	avg. accel. torque (in lb_f)