

# GROSCHOPP® BLOG

## Fractional Horsepower Motor Equations Quick Reference

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Here's a quick reference for common fractional horsepower motor equations.

### BASIC MOTOR EQUATIONS

$$\text{Torque [lb-ft]} = (\text{Horsepower} * 5,250) / \text{RPM}$$

$$\text{Torque [lb-in]} = (\text{Horsepower} * 63,025) / \text{RPM}$$

$$\text{Horsepower} = (\text{Torque [lb-ft]} * \text{RPM}) / 5,250$$

$$\text{Horsepower} = (\text{Torque [lb-in]} * \text{RPM}) / 63,025$$

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### TIME FOR MOTOR TO REACH OPERATING SPEED (SECONDS)

$$\text{Seconds} = (\text{WK}^2 * \text{Speed Change}) / (308 * \text{Avg Accelerating Torque})$$

$$\text{WK}^2 = \text{Inertia of Rotor} + \text{Inertia of Load [lb-ft]}^2$$

$$\text{Avg Accelerating Torque} = (((\text{FLT} + \text{BDT}) / 2) + \text{BDT} + \text{LRT}) / 3$$

FLT = Full Load Torque

BDT = Breakdown Torque

LRT = Locked-Rotor Torque

$$\text{Load WK}^2 \text{ [at motor shaft]} = (\text{WK}^2 \text{ [load]} * \text{Load RPM}^2) / \text{Motor RPM}^2$$

$$\text{Belt Speed [FPM]} = .626 * \text{RPM} * \text{Diameter [in]}$$

$$\text{Chain Tension [lbs]} = (33,000 * \text{Horsepower}) / \text{Chain Speed [FPM]}$$

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### OHM'S LAW

$$\text{Ohms} = \text{Volts} / \text{Amperes} \quad [R = E / I]$$

$$\text{Volts} = \text{Ohms} * \text{Amperes} \quad [E = R * I]$$

$$\text{Amperes} = \text{Volts} / \text{Ohms} \quad [I = E / R]$$

