

Engineering Information

UNIT CONVERSIONS

| | |
|------------------------|------------------------|
| 1 inch = 25.4 mm | 1 mm = 0.0394 in |
| 1 lb = 0.4536 kg | 1 kg = 2.2046 lb |
| 1 lb = 4.448 N | 1 N = 0.225 lb |
| 1 in-lb = 0.01152 kg-m | 1 kg-m = 86.8 in-lb |
| 1 in-lb = 0.113 Nm | 1 Nm = 8.85 in-lb |
| 1 ft-lb = 0.1383 kg-m | 1 kg-m = 7.233 ft-lb |
| 1 hp = 0.745 kW | 1 kW = 1.34 hp |
| °C = (°F-32) x 5/9 | °F = (°C x 9/5) + 32 |
| 1 Gallon = 3.785 liter | 1 liter = 0.264 Gallon |

RULES OF THUMB

| |
|---|
| 3-Phase Motor @ 550 Volts : 1 Amp per Hp |
| 3-Phase Motor @ 460 Volts : 1.25 Amp per Hp |
| 3-Phase Motor @ 230 Volts : 2.5 Amp per Hp |
| 1 Hp @ 3450 rpm = 1.5 ft-lbs (18 in-lbs) |
| 1 Hp @ 1750 rpm = 3 ft-lbs (36 in-lbs) |
| 1 Hp @ 1170 rpm = 4.5 ft-lbs (54 in-lbs) |
| 1 Hp @ 875 rpm = 6.0 ft-lbs (72 in-lbs) |

FORMULA

$$\text{Torque}_{\text{english}} = \frac{63025 \times \text{hp}}{\text{rpm}} \quad (\text{- lbs})$$

$$\text{english} = \frac{\text{hp}}{\text{rpm}} \quad (\text{- lbs})$$

$$\text{metric} = \frac{974 \times \text{kW}}{\text{rpm}} \quad (\text{- m})$$

$$\text{HP} = \frac{\text{Force} \times \text{V}}{33,000}, \text{ Force (lb) V (fpm)}$$

$$\text{HP}_{\text{single } \phi} = \frac{\text{Volts} \text{ mps Pf } \eta}{746}$$

$$\text{HP}_{\text{dc motor}} = \frac{\text{Volts} \text{ mps Pf } \eta}{746}$$

$$\text{HP}_{3\phi} = \frac{\text{Volts} \times \text{Amps} \times 1.73 \times \text{Pf} \times \eta}{746}$$

$$\text{RPM} = \frac{\text{FPM}}{0.262 \times \text{diam}_{\text{in inch}}}$$

$$\text{RPM} = \frac{120 \times \text{Hz}}{\text{. of Poles}}$$

$$\text{OHL} = \frac{\text{Torque}}{\text{Radius}_{\text{driver}}}$$

$$\text{OHL} = \frac{126,000 \times \text{hp} \times \text{OHL factors}}{\text{diam}_{\text{pitch}} \times \text{rpm}}$$

DECIMAL AND METRIC EQUIVALENTS

| | | inch | decimal | mm | | | inch | decimal | mm |
|------|--|-------|----------|--------|-------|--|-------|----------|--------|
| 1/16 | | 1/64 | 0.015625 | 0.397 | 9/16 | | 33/64 | 0.515625 | 13.097 |
| | | 1/32 | 0.03125 | 0.794 | | | 17/32 | 0.53125 | 13.494 |
| | | 3/64 | 0.046875 | 1.191 | | | 35/64 | 0.546875 | 13.891 |
| 1/8 | | 5/64 | 0.078125 | 1.984 | 5/8 | | 37/64 | 0.578125 | 14.684 |
| | | 3/32 | 0.09375 | 2.381 | | | 19/32 | 0.59375 | 15.081 |
| | | 7/64 | 0.109375 | 2.778 | | | 39/64 | 0.609375 | 15.478 |
| 3/16 | | 9/64 | 0.140625 | 3.572 | 11/16 | | 41/64 | 0.640625 | 16.272 |
| | | 5/32 | 0.15625 | 3.969 | | | 21/32 | 0.65625 | 16.669 |
| | | 11/64 | 0.171875 | 4.366 | | | 43/64 | 0.671875 | 17.066 |
| 1/4 | | 13/94 | 0.203125 | 5.159 | 3/4 | | 45/64 | 0.703125 | 17.859 |
| | | 7/32 | 0.21875 | 5.556 | | | 23/32 | 0.71875 | 18.256 |
| | | 15/64 | 0.234375 | 5.953 | | | 47/64 | 0.734375 | 18.653 |
| 5/16 | | 17/64 | 0.265625 | 6.747 | 13/16 | | 49/64 | 0.765625 | 19.447 |
| | | 9/32 | 0.28125 | 7.144 | | | 25/32 | 0.78125 | 19.844 |
| | | 19/64 | 0.296875 | 7.541 | | | 51/64 | 0.796875 | 20.241 |
| 3/8 | | 21/64 | 0.328125 | 8.334 | 7/8 | | 53/64 | 0.828125 | 21.034 |
| | | 11/32 | 0.34375 | 8.731 | | | 27/32 | 0.84375 | 21.431 |
| | | 23/64 | 0.359375 | 9.128 | | | 55/64 | 0.859375 | 21.828 |
| 7/16 | | 25/64 | 0.390625 | 9.922 | 15/16 | | 57/64 | 0.890625 | 22.622 |
| | | 13/32 | 0.40625 | 10.319 | | | 29/32 | 0.90625 | 23.019 |
| | | 27/64 | 0.421875 | 10.716 | | | 59/64 | 0.921875 | 23.416 |
| 1/2 | | 29/64 | 0.453125 | 11.509 | 1 | | 61/64 | 0.953125 | 24.209 |
| | | 15/32 | 0.46875 | 11.906 | | | 31/32 | 0.96875 | 24.606 |
| | | 31/64 | 0.484375 | 12.303 | | | 63/64 | 0.984375 | 25.003 |
| | | 1/2 | 0.500 | 12.700 | | | 1.000 | 25.400 | |

MOTOR AMPS AT FULL LOAD

| hp | A C | | DC | hp | A C | | DC | hp | A C | | DC | hp | A C | | DC |
|-------|--------------|-------------|------|-------|--------------|-------------|----|----|--------------|-------------|-----|-----|--------------|-------------|-----|
| | Single Phase | Three Phase | | | Single Phase | Three Phase | | | Single Phase | Three Phase | | | Single Phase | Three Phase | |
| 1/2 | 4.9 | 2.0 | 2.7 | 5 | 28 | 14.4 | 20 | 25 | - | 60 | 92 | 75 | - | 180 | 268 |
| 1 | 8 | 3.4 | 4.8 | 7 1/2 | 40 | 21 | 29 | 30 | - | 75 | 110 | 100 | - | 240 | 355 |
| 1 1/2 | 10 | 4.8 | 6.6 | 10 | 50 | 26 | 38 | 40 | - | 100 | 146 | 125 | - | 300 | 443 |
| 2 | 12 | 6.2 | 8.5 | 15 | - | 38 | 56 | 50 | - | 120 | 180 | 150 | - | 360 | 534 |
| 3 | 17 | 8.6 | 12.5 | 20 | - | 50 | 74 | 60 | - | 150 | 215 | 200 | - | 480 | 712 |