## Terminology

**Squirrel Cage Induction Motor –** When used on a motor nameplate, a number which indicates how much above the nameplate rating a motor can be loaded without causing serious degradation (i.e. a motor with 1.15 SF can produce 15% greater torque than one with 1.0 SF, within temperature constraints).

**Shock Load –** The load seen by a clutch, brake or motor in a system that transmits high peak loads. This type of load is present in crushers, separators, grinders, conveyors, winches and cranes.

**Slip –** The difference between the speed of the rotating magnetic field (synchronous speed) and mechanical rotational speed (rotor speed) of AC induction motors. Usually expressed as a percentage of synchronous speed.

**Special Purpose Motor –** A motor with special operating characteristics, special mechanical construction, or both, designed for a particular application and not falling within the definition of a general purpose or definite purpose motor (NEMA).

**Speed Range –** The minimum and maximum speeds at which a motor must operate under constant or variable torque load conditions. A 50:1 speed range for a motor with top speed of 1800 RPM means the motor must operate as low as 36 RPM and still operate within specifications.

**Starting Torque –** The torque exerted by the motor during the starting period.

**Stator –** The stationary portion of the magnetic circuit and the associated windings and leads of a rotating machine.

**Synchronous Speed –** The speed of an AC induction motor's rotating magnetic field. It is determined by the frequency applied to the stator and the number of magnetic poles present in each phase of the stator windings. Mathematically, it is expressed as Sync Speed (RPM) = 120 x Applied Frequency (Hz)/Number of Poles per phase.

**Torque –** A turning force applied to a shaft, tending to cause rotation. Torque is normally measured in "pound-feet" and is equal to the force applied times the radius through which it acts.

Torque-to-Inertia Ratio – The rated motor torque divided by its rotor inertia. Helps determine a motor's ability to accelerate loads and/or respond to commands from a drive to change speed or direction.

Voltage Drop – The reduction in voltage level from the source to the load caused by conductor resistance.

Wye Start Delta Run (YD) – A method of reduced voltage starting that first connects a motor in a wye to reduce voltage, then reconnects the motor in a delta to provide full line voltage.

## Formulas & Conversion Factors

Horsepower (HP) = Torque (lb-ft) x RPM / 5252

Horsepower (HP) = Torque (lb-in) x RPM / 63025

Torque (lb-ft) = HP x 5252 / RPM

Torque (lb-in) = HP x 63025 / RPM

Efficiency = Power Out / Power In

Synchronous RPM = 120 x Frequency / # Poles

Ohms = Volts / Amperes (R = E/I)

Amperes = Volts / Ohms (I = E/R)

Volts = Amperes x Ohms (E = IR)

Static Torque (T) = F x R (lb-ft),
F = Force (lb),
R = pully or drum radius (ft)

Pound-feet (torque) = .7376 x Newton-meters

Newton-meters (torque) = 1.3558 x lb-ft

Power (HP) = Torque (lb-ft) x 2π x RPM / 33000

Temperature (Celsius) = 5/9 x (F° – 32)

Temperature (Fahrenheit) = (9/5 x C°) + 32

1 Kilowatt (KW) = 1.341 Horsepower

1 Horsepower = 746 watts (.746 KW)

Brake Torque = (5252 x P / N) x SF, P = HP, N = RPM, SF = 1.4

Use 2.0 to 2.5 SF for cranes and hoists
(consult crane manufacturer or und-user).

√ Stock model for Marathon and/or MARS. Prices and Specifications are subject to change without notice.