GLOSSARY – ROTARY SYNCHRONOUS MOTORS

Mp: Peak torque
Refers to the peak torque produced by the motor. The peak torque is usually selected as a design parameter for load acceleration and braking.

Mu: Ultimate torque
Refers to the highest torque produced by the motor prior to the point of saturation of iron core. The ultimate torque should not be used as a design parameter, but as a reserve beyond the peak torque in emergency situations.

Ma: Continuous torque (coils at 120°C, air cooling)
Refers to the torque the motor continuously supplies when all phases are loaded equally. The motor is being cooled by air convection. Ambient is at 20°C.

Mw: Continuous torque (coils at 120°C, water cooling)
Refers to the torque the motor continuously supplies when all phases are loaded equally. The motor is being cooled by water at 20°C with a corresponding pressure drop provided in the specification.

Ms: Continuous stall torque (coils at 120°C, water cooling)
Refers to the torque the motor continuously supplies while not move (motor at stall). The motor is being cooled by water at 20°C with a corresponding pressure drop provided in the specification.

Pp: Peak power dissipation
Refers to the total power dissipated by the coils, when the motor is supplying the peak torque Mp.

Pa: Continuous power dissipation (coils at 120°C, air cooling)
Refers to the total power dissipated by the coils when the motor supplies the continuous torque Ma.

Pw: Continuous power dissipation (coils at 120°C, water cooling)
Refers to the total power dissipated by the coils when the motor supplies the continuous torque Mw.

Ko: Motor constant
This parameter provides motor efficiency information. The higher motor constant is (in Nm/√W), the lower power losses for the identical output torque.

Kd: Zero impedance damping coefficient
Refers to the viscous damping torque (in Nm/(rad/s)) inherent to the motor at low speeds when the coils are short-circuited. In an emergency mode or in case of an input power failure, the automatic short-circuiting of the coils produces very effective braking.

Te: Electrical time constant
Refers to the electrical time constant for the coils. This value is coil-independent, (independent from either the Km or Ku selected).

Ra: Thermal resistance (coils at 120°C, air cooling)
Refers to the overall thermal resistance from the coils (at 120°C) to the surrounding air (at 20°C) when the motor is cooled by air convection.

Rw: Thermal resistance (coils at 120°C, water cooling)
Refers to the overall thermal resistance from the coils (at 120°C) to the cooling water (at 20°C) when the motor is cooled by water.

Ms: Stator mass
The stator mass is the mass of the stationary part of motor.

Mr: Rotor mass
The rotor mass is the mass of the moving part of motor.

Jr: Rotor inertia
Refers to the total inertia of the moving part of motor.

Md: Detent torque
Refers to the detent torque produced by an interaction of the permanent magnets with the coil assembly at the nominal air gap.

Np: Maximum velocity (at torque Mp)
Refers to the maximum velocity which the motor could obtain when the motor supplies the peak torque Mp.

Na: Maximum velocity (at torque Ma)
Refers to the maximum velocity which the motor could obtain when the motor supplies the continuous torque Ma.

Nw: Maximum velocity (at torque Mw)
Refers to the maximum velocity which the motor could obtain when the motor supplies the continues torque Mw.

Km: Torque constant
Refers to the ratio between the output torque and the RMS current.

Ip: Peak current
Generates the peak torque Mp.

Ia: Continuous current (coils at 120°C, air cooling)
Generates the continuous torque Ma.

Iw: Continuous current (coils at 120°C, water cooling)
Generates the continuous torque Mw.

Ku: Back EMF constant
Refers to the ratio of the back EMF voltage from terminal to terminal (peak value) to the motor speed.

R: Electrical resistance (coils at 20°C)
Refers to the electrical resistance of the coils from terminal to terminal, coils at 20°C.

R120: Electrical resistance (coils at 120°C)
Refers to the electrical resistance of the coils from terminal to terminal, coils at 120°C.

L: Electrical inductance
Refers to the electrical inductance of the coils from terminal to terminal.

All definitions are given at a 20°C ambient temperature. All currents are RMS values: to obtain the peak values of the sinusoidal current, multiply the RMS current by the square root of two (√2).
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