

## GLOSSARY – LINEAR SYNCHRONOUS MOTORS

### **F<sub>m</sub>: Attraction force**

Refers to the total magnetic attraction force between the coil assembly and the magnetic way at the nominal air gap.

### **F<sub>p</sub>: Peak force**

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

### **F<sub>a</sub>: Continuous force (coils at 120°C, air cooling)**

Refers to the force the motor continuously supplies when all phases are loaded equally. The motor is being cooled by air convection. Ambient is at 20°C.

### **F<sub>w</sub>: Continuous force (coils at 120°C, water cooling)**

Refers to the force 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.

### **F<sub>s</sub>: Continuous stall force (coils at 120°C, water cooling)**

Refers to the force 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.

### **P<sub>p</sub>: Peak power dissipation**

Refers to the total power dissipated by the coils, when the motor is supplying the peak force F<sub>p</sub>.

### **P<sub>a</sub>: Continuous power dissipation (coils at 120°C, air cooling)**

Refers to the total power dissipated by the coils when the motor supplies the continuous force F<sub>a</sub>.

### **P<sub>w</sub>: Continuous power dissipation (coils at 120°C, water cooling)**

Refers to the total power dissipated by the coils when the motor supplies the continuous force F<sub>w</sub>.

### **K<sub>o</sub>: Motor constant**

This parameter provides motor efficiency information. The higher motor constant is (in N/√W), the lower power losses for the identical output force.

### **K<sub>d</sub>: Zero impedance damping coefficient**

Refers to the viscous damping force ( in N/(m/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.

### **T<sub>e</sub>: Electrical time constant**

Refers to the electrical time constant for the coils. This value is coil-independent, (independent from either the K<sub>f</sub> or K<sub>u</sub> selected).

### **R<sub>a</sub>: 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.

### **R<sub>w</sub>: 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.

### **M<sub>f</sub>: Motor weight**

Refers to the motor (coil assembly) weight. The magnetic way is excluded.

### **F<sub>d</sub>: Detent force**

Refers to the detent force produced by an interaction of the permanent magnets with the coil assembly at the nominal air gap.

### **V<sub>p</sub>: Maximum velocity (at force V<sub>p</sub>)**

Refers to the maximum velocity, which the motor could obtain when the motor supplies the peak force V<sub>p</sub>.

### **V<sub>a</sub>: Maximum velocity (at force V<sub>a</sub>)**

Refers to the maximum velocity, which the motor could obtain when the motor supplies the continuous force V<sub>a</sub>.

### **V<sub>w</sub>: Maximum velocity (at force V<sub>w</sub>)**

Refers to the maximum velocity, which the motor could obtain when the motor supplies the continuous force V<sub>w</sub>.

### **K<sub>f</sub>: Force constant**

Refers to the ratio between the output force and the RMS current.

### **I<sub>p</sub>: Peak current**

Generates the peak force F<sub>p</sub>.

### **I<sub>a</sub>: Continuous current (coils at 120°C, air cooling)**

Generates the continuous force F<sub>a</sub>.

**Iw: Continuous current (coils at 120°C, water cooling)**

Generates the continuous force  $F_w$ .

**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 ( $\sqrt{2}$ ).**

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