ML Motor Power

Purpose: This application note presents the power calculation for MagneMover LITE motors, as well as how to use the ML Power Supply Sizing Worksheet to calculate the power consumption of a system.

Introduction

The current and power drawn by the MagneMover LITE power supply can depend on several parameters of the system, including the number and type of motors, the number of vehicles on the system, type of motion, etc.. The measurements presented in this document determine the current (amps) drawn by all motors in the MagneMover LITE system, as well as the current and power utilized throughout a system.

Baseline Current Drawn by Motors

Measurements of current (amps) drawn by each MagneMover LITE motor without vehicles were taken as a baseline. These measurements can be used to calculate power drawn using equation Power = Current * Voltage where the 36VDC MagneMover LITE power supply is utilized.

Table 1: Current Baseline

Motor	Gen 3 current (amps)	Gen 4 current (amps)
¼ meter	83 mA	94 mA
1 meter	160 mA	206 mA
Curve	85 mA	90 mA
Switch	270 mA	188 mA

Current Drawn by Motors with Single Pucks

Current (amps) measurements were taken for the MagneMover LITE motors with a single puck on the motor not under an order but being held by the motor.

Table 2: Current Increase with Single Puck

Motor with single puck	Gen 3 current (amps) – 0 Kg payload	Gen 3 current (amps) – 1 Kg payload	Gen 4 current (amps) – 0 Kg payload	Gen 4 current (amps) – 1 Kg payload

¼ meter	+ 20mA	+ 20mA	+ 25mA	+ 25mA
1 meter	+ 20mA	+ 20mA	+ 25mA	+ 25mA
Curve	+ 20mA	+ 20mA	+ 30 mA	+ 30 mA

Current (amps) measurements were taken for the MagneMover LITE motors with the maximum number of single pucks (1 meter = 10 pucks; ¼ meter = 2 pucks; Curve = 2 pucks) on the motor not under an order but being held by the motor.

Table 3: 1 Meter with 10 Single Pucks

Motor with ten pucks	Gen 3 current (amps) – 0 Kg payload	Gen 3 current (amps) – 1 Kg payload	Gen 4 current (amps) – 0 Kg payload	Gen 4 current (amps) – 1 Kg payload
1 meter	310 mA	310 mA	350 mA	350 mA

Table 4: Curve with Two Single Pucks

Motor with two pucks	Gen 3 current (amps) – 0 Kg payload	Gen 3 current (amps) – 1 Kg payload	Gen 4 current (amps) – 0 Kg payload	Gen 4 current (amps) – 1 Kg payload
Curve	143 mA	143 mA	140 mA	140 mA

Table 5: 1/4 Meter with Two Single Pucks

Motor with two pucks	Gen 3 current (amps) – 0 Kg payload	Gen 3 current (amps) – 1 Kg payload	Gen 4 current (amps) – 0 Kg payload	Gen 4 current (amps) – 1 Kg payload
¼ - meter	140 mA	140 mA	125 mA	125 mA

Current Drawn by Motors with Tandem Pucks

Current (amps) measurements were taken for the MagneMover LITE motors with one tandem puck on the motor not under an order but being held by the motor.

Table 6: Current Increase with One Tandem Puck

Motor with tandem puck	Gen 3 current (amps) – 0 Kg payload	Gen 3 current (amps) – 2 Kg payload	Gen 4 current (amps) – 0 Kg payload	Gen 4 current (amps) – 2 Kg payload

¼ meter	+25 mA	+25 mA	+ 31 mA	+31 mA
1 meter	+20 mA	+20 mA	+ 30 mA	+30 mA
Curve	+25 mA	+25 mA	+ 50 mA	+ 50 mA

Current (amps) measurements were taken for the MagneMover LITE motors with the maximum number of tandem pucks (1 meter = 5 pucks; ¼ meter = 1 puck; Curve = 1 puck) on the motor not under an order but being held by the motor.

Table 7: 1 Meter with Five Tandem Pucks

Motor with five tandem pucks	Gen 3 current (amps) – 0 Kg payload	Gen 3 current (amps) – 2 Kg payload	Gen 4 current (amps) – 0 Kg payload	Gen 4 current (amps) – 2 Kg payload
1 meter	300 mA	300 mA	340 mA	340 mA

Table 8: Curve with One Tandem Puck

Motor with one tandem puck	Gen 3 current (amps) – 0 Kg payload	Gen 3 current (amps) – 2 Kg payload	Gen 4 current (amps) – 0 Kg payload	Gen 4 current (amps) – 2 Kg payload
Curve	223 mA	223 mA	140 mA	140 mA

Table 9: 1/4 Meter with One Tandem Puck

Motor with one tandem pucks	Gen 3 current (amps) – 0 Kg payload	Gen 3 current (amps) – 2 Kg payload	Gen 4 current (amps) – 0 Kg payload	Gen 4 current (amps) – 2 Kg payload
¼ meter	220 mA	200 mA	125 mA	125 mA

Standard Puck Applications Power Supply Sizing Worksheet

The Standard Puck Applications Power Supply Sizing Worksheet determines the total system current and power based on the system layout and type of motion.

The system layout is represented by a count of each motor type and the number of pucks (single or tandem) on the system. The current and power pulled by the motors and

vehicles is then determined from these inputs and the above measurements for Gen 3 motors.

The type of motion also affects the current and power drawn. The worksheet accounts for three types of motion: continuous motion, launch from stations, and launch from queues. Continuous motion accounts for the speed (m/s) that vehicles are traveling at and their payload. Launching from stations and launching from queues account for the acceleration (m/s^2) of vehicles and their payload. These values are used to calculate the current and power drawn by the motion.

To use the worksheet, input the number of motors and types, and the information necessary for the desired type of motion into the green boxes. The total system current (amps) and power (watts) will be displayed.

Related Documents:
900000834 - WI-Motor power measurements_results
900000854 - Standard Puck Applications Power Supply Sizing Worksheet
990000410 - MANUAL, MAGNEMOVER LITE

More Information
MagneMotion website: www.magnemotion.com
Questions & Comments: http://www.magnemotion.com/about-magnemotion/contact.cfm

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