MT03

Vacuum Core Magnetorquer

SUMMARY

With only 78 grams and 10 millimeters thickness, the MT03 Vacuum Core Magnetorquer is the most powerful and efficient VCM in the market, designed for ADCS control in large cubesat missions from 6U to 27U that boast an impressive performance compared to its small footprint over the mass, power, and area budget of the spacecraft. Even with those small dimensions the MT03 is capable of greater magnetic moments, turn speeds and angular accelerations than comparable products on the market, yet the power usage is kept to a minimum

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Every coil is tested and qualified in our own facilities and shipped with full reports and packed with additional match connectors interfaces.

FEATURES

- Low cost, proven standard.
- Compact, power efficient, yet powerful magnetic dipole strength: Up to 2.15 Am2 @0.65A
- Manufactured with space grade materials according to space standards and custom mission design.
- Functional, performance, thermal bake out and vibration tests provided with documentation.
- Extensive documentation as 3D pdf, STEP files and blueprints
- Compatible with almost any structure and compliant to CubeSat Standard
- Custom Interface available

PERFORMANCE

- **Working Voltage:** From 5V to 30V
- **Working Current:** From 100mAh to 1000 mAh
- **Nominal Magnetic moment:** >1.1 Am2
- **Saturation Magnetic moment:** >3.85 Am2
- **Linearity:** +/- 4% across operating design range
- **Residual moment:** <0.0045 Am2 @0.1A
- B-center = 80.9 Gauss
- **Supply Power:** From 250mW to 1750mW
- **Typical resistance:** 32.1 33.4 ohms @ 25°C
- **Random Vibration:** 26g rms
- **Lifetime:** >10 years

PRODUCT PROPERTIES

- **Dimensions:**
  - External:80×55 mm
  - Internal: 69×44 mm

  - Thickness: 11 mm
  - Height: 10 mm
- **Mass:** 78 grams
- **Operating Temperature:** -55 °C to +145 °C
- **Radiation Tolerance:** 10 years minimum in LEO

MATERIALS

- Pre-evacuated enamel copper wire
- **Cohesion:** Space grade epoxy 3M
- **Interfaces:**
  - Custom choice, normally Molex PicoBlade/PicoSpox inline 2 pin connector with gold plated contacts
  - PTFE (Teflon) space grade cables, single strand, silver plated copper (AWG26 to AWG30)

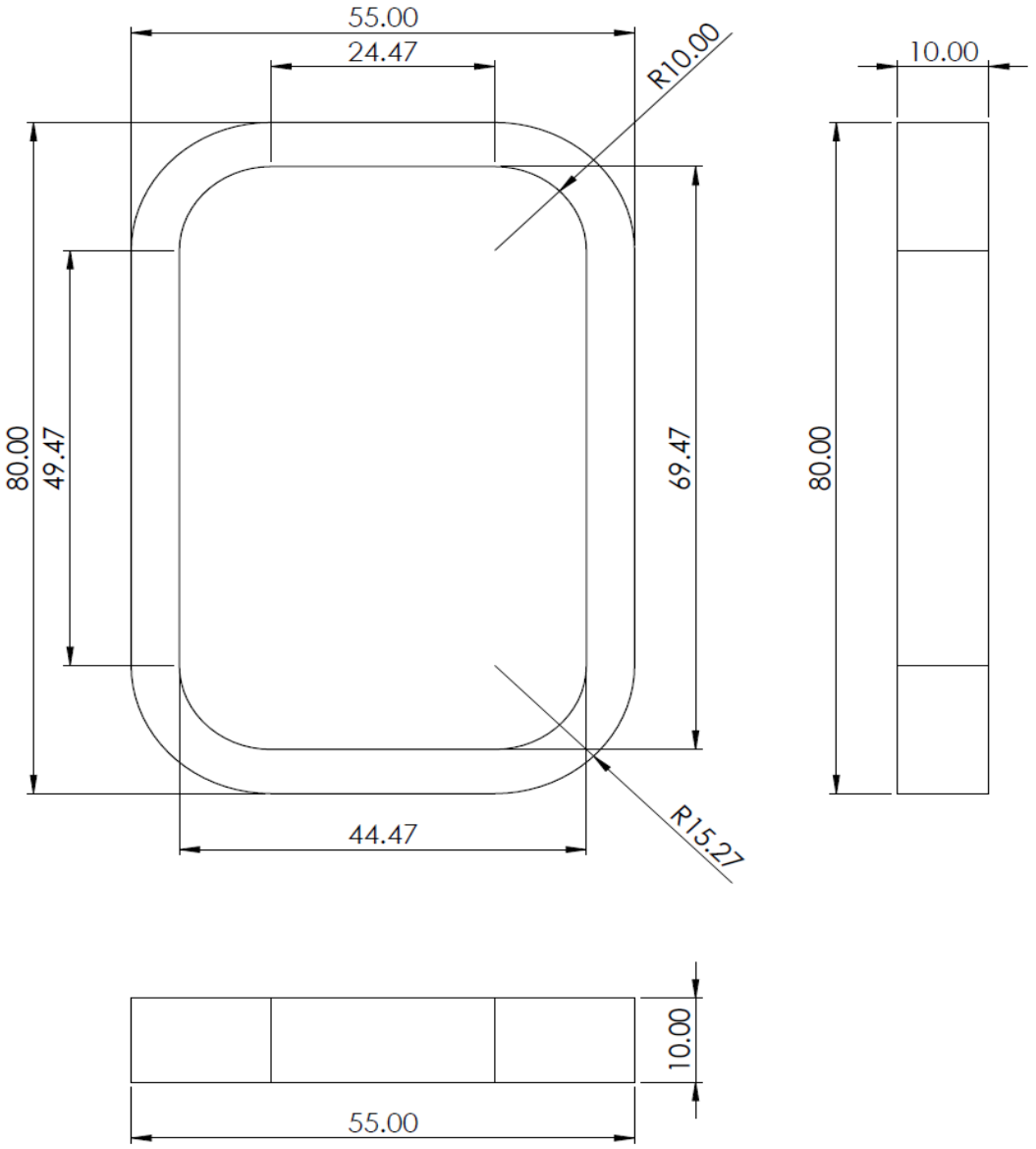
TESTING

All platforms are provided with tests reports regarding the following tests:

Test	QT	AT
Functional	✓	✓
Vibration	—	✓
Thermal Cycling	—	✓
Thermal Vacuum	—	✓
Cable / Connector Integrity	✓	✓
Continuity	✓	✓
Performance	✓	✓
Freezing / Overheating	✓	✓

- Thermal Bake out (10E-7 mbar @ 50C for 24 hours)
- Full vibration test for Falcon9 and Electron vibration profiles, other LV profiles available upon request
- QT and AT is performed on the unit to be shipped at no charge.

MECHANICAL DIMENSIONS



	NAME	SIGNATURE	DATE		TITLE: DIMENSIONS & MEASUREMENTS	
DRAWN	JND			MATERIAL:		
CHK'D	RNB			Copper	MT03 MOLD LID	A4
APPV'D	RNB					
MFG	GND/RNB					
Q.A	RNB			WEIGHT:	SCALE: 2:1	SHEET 3 OF 3

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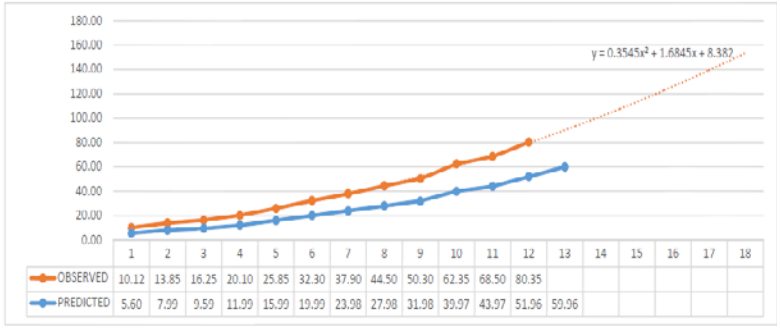
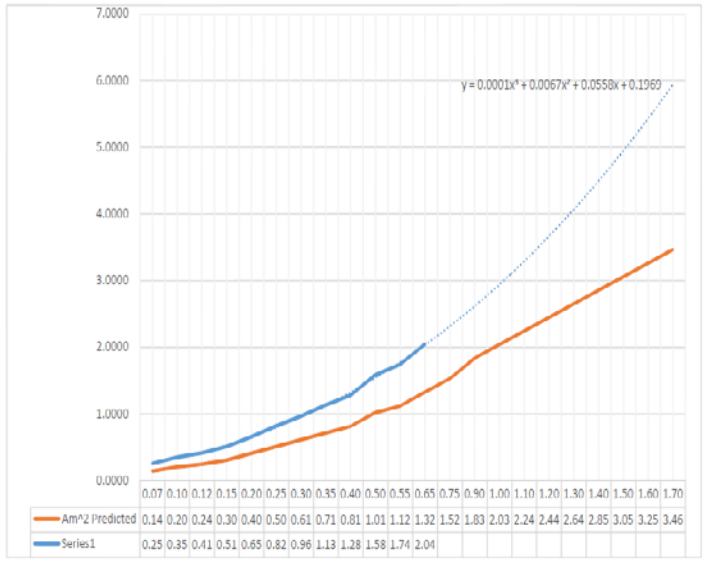
TEST DATA

MT03-3-MEASUREMENTS

MT03 #3 TESTS AND PARAMETERS DATE Jan/28/2025

Actual Coil parameters				
Resistance	33.24	Ohms	R	33.24 Ohms
Mag field/center	32.30	Gauss	Perimeter	0.245 m
Mag field/corner	55.76	Gauss	u0	1.25664E-06
B.Center to B.Corner ratio	173%		A	0.004459167 m^2
Operating V@A	24V@0.25A		N	456.83 turns
Operating Temp	22.50	Centigrade	Lm	111.92 m
External Length	80.10	Millimeters	L	0.0801 m
Internal Length	69.01	Millimeters	B	0.05567 m
Thickness	10.80	Millimeters	Th	0.0108 m
External Height	55.67	Millimeters	Pi	3.1416
Internal Height	44.34	Millimeters	i	0.75 A
Mass	78.00	Grams	B	0.0060 Tesla
Turns	456.83		B	59.959 Gauss
Length of wire	111.92	Meters	M	1.527802133 Am^2





V	A	OBSERVADO EN MT03-F2 B(Gauss)	Predicted Val B(Gauss)	Desviacion %	Predicted Am^2	B to Am^2 factor	Corrected Am^2	BV/u0 Am^2	Average Am^2
24.00	0.07	10.12	5.60	-81%	0.1426	39.24556039	0.2579	0.3824	0.2610
24.00	0.10	13.85	7.99	-73%	0.2037	39.24556039	0.3529	0.5234	0.3600
24.00	0.12	16.25	9.59	-69%	0.2444	39.24556039	0.4141	0.6141	0.4242
24.00	0.15	20.10	11.99	-68%	0.3056	39.24556039	0.5122	0.7596	0.5258
24.00	0.20	25.85	15.99	-62%	0.4074	39.24556039	0.6587	0.9769	0.6810
24.00	0.25	32.30	19.99	-62%	0.5093	39.24556039	0.8230	1.2207	0.8510
24.00	0.30	37.90	23.98	-58%	0.6111	39.24556039	0.9657	1.4323	1.0030
24.00	0.35	44.50	27.98	-59%	0.7130	39.24556039	1.1339	1.6817	1.1762
24.00	0.40	50.30	31.98	-57%	0.8148	39.24556039	1.2817	1.9009	1.3325
24.00	0.50	62.35	39.97	-56%	1.0185	39.24556039	1.5887	2.3563	1.6545
24.00	0.55	68.50	43.97	-56%	1.1204	39.24556039	1.7454	2.5887	1.8182
24.00	0.65	80.35	51.96	-55%	1.3241	39.24556039	2.0474	3.0365	2.1360
24.00	0.75		59.96		1.5278	39.24556039	0.0000		
	0.90		71.95		1.8334	39.24556039	0.0000		
	1.00		79.95		2.0371	39.24556039	0.0000		
	1.10		87.94		2.2408	39.24556039	0.0000		
	1.20		95.94		2.4445	39.24556039	0.0000		
	1.30		103.93		2.6482	39.24556039	0.0000		
	1.40		111.92		2.8519	39.24556039	0.0000		
	1.50		119.92		3.0556	39.24556039	0.0000		
	1.60		127.91		3.2593	39.24556039	0.0000		
	1.70		135.91		3.4630	39.24556039	0.0000		
	1.80		143.90		3.6667	39.24556039	0.0000		
	1.90		151.90		3.8704	39.24556039	0.0000		
	2.50		199.86		5.0927	39.24556039	0.0000		
	3.00		239.84		6.1112	39.24556039	0.0000		
	4.00		319.78		8.1483	39.24556039	0.0000		
	4.75		379.74		9.6761	39.24556039	0.0000		

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