

Torque Motors

Megaflux Frameless Brushless Torque Motors—MF0127

Brushless thin-ring component (rotor and stator) torque motor

Allied Motion's Megaflux family of brushless torque motors includes 12 series of high performance frameless component torque motors, ranging in outside diameter from 60 mm up to 792 mm (2.36 in. up to 31.2 in.). Each motor consists of a matched rotor and stator pair. The stator is wound WYE with the three phase terminals made available.

This datasheet provides a specification overview of the MF family and specific data for the MF0127 series motors.

Megaflux frameless brushless torque motors are computer-designed and -optimized to provide the highest torque density brushless torque motors available. Special attention has been given to cogging torque minimization to enhance their performance in precision applications.

Frameless Megaflux motors are thin annular ring motors with large diameter-to-length ratios, and are intended to be integrated directly into mechanisms, effectively eliminating problems of torsional resonances due to couplings and backlash associated with gear trains. They are typically mounted directly to the driven axis, and their large open bore enables passing system electrical cabling, fluid piping or light beams through the motor center.

Features & Benefits

- 12 standard frame sizes from 60 mm up to 792 mm outside diameter
- Continuous stall torque as high as 1875 Nm (1383 lb-ft) covers a very wide range of applications
- Computer-optimized design maximizes torque density and performance
- Large, clear through bore—allows passage of air, water, or vacuum lines, optical beams, and/or electrical/signal wiring
- Three winding voltage designs for each size of 48, 150, and 300 VDC
- Hall sensor assembly standard on MF0060 through MF0127 series

Options & Accessories

- Custom winding designs to accommodate special voltage requirements
- Thin lamination MFS version for improved efficiency in applications requiring high speeds
- Hall-effect sensor array for commutation signals on larger series
- Special-engineered mechanical configurations to meet specific application needs
- Application-matched brushless servo drives



- High torque density, thin-ring frameless brushless torque motors
- 12 stator diameters, each with five stack heights, mean a wide selection of performances from which to choose
- High rated continuous stall torque of up to 1875 Nm (1383 lb-ft)
- Three winding designs: 48, 150, and 300 VDC

SPECIFICATION SUMMARY

Model	Units	MF0060	MF0076	MF0095	MF0127	MF0150	MF0210
Continuous Stall Torque	lb-ft	0.22 - 0.76	0.38 - 1.62	0.68 - 3.24	1.2 - 6.2	2.3 - 18.2	5.9 - 55.3
	Nm	0.29 - 1.04	0.51 - 2.20	0.92 - 4.39	1.6 - 8.4	3.1 - 24.7	8.0 - 75.0
No Load Speed	RPM	2076 - 7098	1640 - 6447	1300 - 5436	939 - 5097	416 - 2500	338 - 1894
Diameter (Outer)	in	2.38	2.99	3.73	5.00	6.69	9.06
	mm	60.4	76.0	94.7	127.0	170.0	230.0
Model	Units	MF0255	MF0310	MF0410	MF0510	MF0610	MF0760
Continuous Stall Torque	lb-ft	7.2 - 75.9	12.8 - 133.7	50.6 - 280	81 - 504	127 - 762	225 - 1383
	Nm	9.7 - 102.9	17.3 - 181.3	68.6 - 380	110 - 684	172 - 1034	304 - 1875
No Load Speed	RPM	280 - 1591	100 - 1260	71 - 926	42 - 771	25 - 595	17.1 - 422
Diameter (Outer)	in	10.83	13.0	16.9	21.1	25.2	31.18
	mm	275.0	330	430	535	640	792

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MF0127 Series Frameless Brushless Torque Motors

SPECIFICATIONS (all data measured at 20 °C ambient)

Model No.		MF0127008			MF0127020			MF0127032		
Winding Voltage	V	48	150	300	48	150	300	48	150	300
Stall Torque (continuous) ⁽¹⁾	lb-ft	1.2	1.2	1.4	2.7	2.9	3.0	3.9	4.0	4.0
	Nm	1.6	1.7	1.8	3.7	3.9	4.1	5.3	5.4	5.5
Peak Torque (±25%)	lb-ft	4.0	4.0	4.0	19.1	19.1	19.1	30.1	30.1	30.1
	Nm	5.4	5.4	5.4	25.8	25.8	25.8	40.8	40.8	40.8
Peak Current	A	48	17.5	9.9	163	67	42	130	65	43
No Load Speed	RPM	3942	4479	5097	2805	3610	4546	1411	2204	2939
	rad/s	413	469	534	294	378	476	148	231	308
Cogging Torque (max.)	lb-ft	0.03			0.07			0.10		
	Nm	0.05			0.09			0.14		
Torque Constant (±10%)	lb-ft/A	0.082	0.23	0.40	0.12	0.28	0.45	0.23	0.46	0.69
	Nm/A	0.112	0.31	0.54	0.16	0.38	0.61	0.31	0.63	0.94
Voltage Constant (±10%)	V/kRPM	12	32	57	17	40	64	33	66	98
	V/rad/s	0.112	0.31	0.54	0.16	0.38	0.61	0.31	0.63	0.94
Motor Constant	lb-ft/√W	0.17	0.17	0.19	0.36	0.38	0.40	0.48	0.49	0.50
	Nm/√W	0.23	0.23	0.26	0.49	0.52	0.54	0.65	0.67	0.67
Elect. Time Constant	ms	0.98	1.03	1.27	1.40	1.59	1.74	1.61	1.68	1.71
Mech. Time Constant	ms	6.14	5.86	4.75	2.69	2.37	2.17	2.25	2.16	2.12
Terminal Resistance (±12%)	Ohm	0.24	1.74	4.37	0.11	0.55	1.26	0.23	0.89	1.96
Terminal Inductance (±30%)	mH	0.15	0.87	2.19	0.37	1.49	3.35	0.39	1.56	3.51
Thermal Resistance ⁽¹⁾	°C/W	1.10			0.99			0.90		
Motor Inertia	lb-ft-s ²	4.9E-4			7.3E-4			9.7E-4		
	kg-m ²	6.6E-4			9.9E-4			1.3E-3		
Motor Weight	lb	1.2	1.2	1.2	2.5	2.6	2.5	3.8	3.8	3.7
	kg	0.56	0.55	0.55	1.15	1.16	1.14	1.72	1.71	1.69
Ambient Storage Temperature	°C	-55 to 150								
Poles	-	16								

(1) Housed version of motor mounted to 254 mm sq. x 6.35 mm (10 in. sq x 0.25 in.) aluminum plate in still air; maximum operating temperature (ambient + rise) is 130 °C

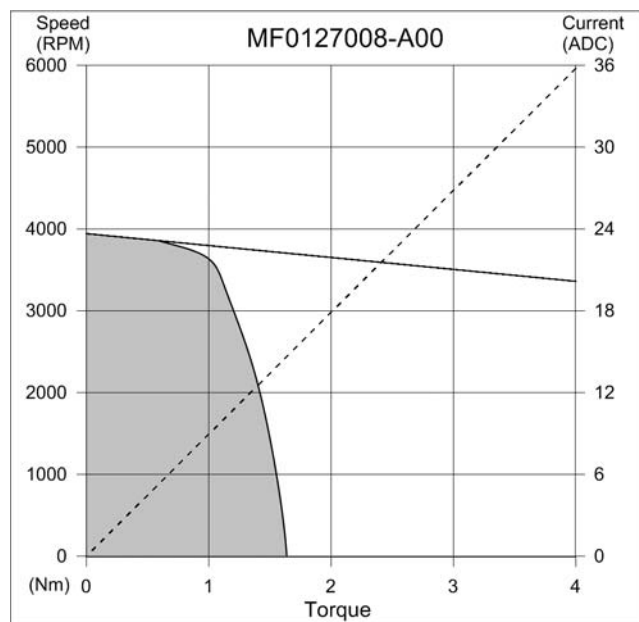
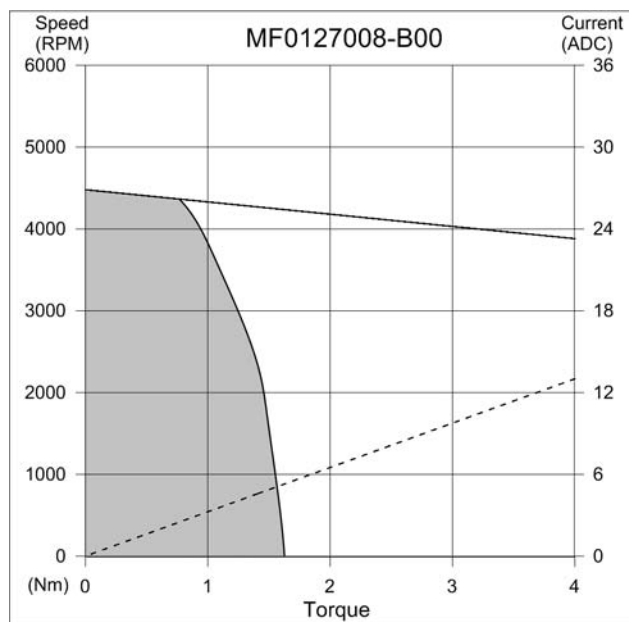
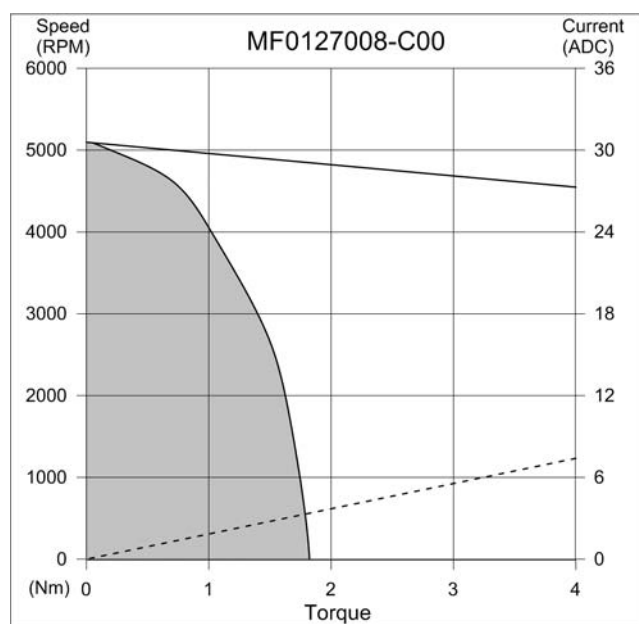
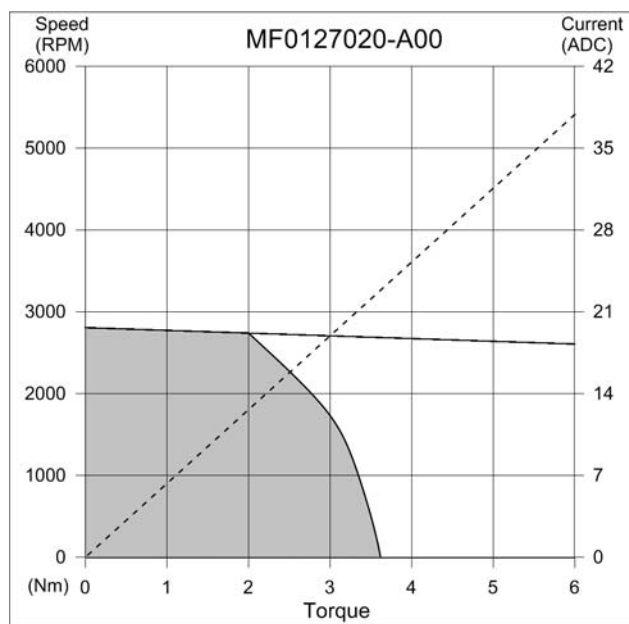
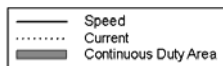
Model No.		MF0127044			MF0127056		
Winding Voltage	V	48	150	300	48	150	300
Stall Torque (continuous) ⁽¹⁾	lb-ft	5.0	5.1	5.1	6.1	6.2	6.2
	Nm	6.8	6.9	6.9	8.3	8.4	8.4
Peak Torque (±25%)	lb-ft	40	40	40	49	49	49
	Nm	54	54	54	67	67	67
Peak Current	A	145	73	48	141	71	47
No Load Speed	RPM	1190	1860	2480	939	1467	1956
	rad/s	125	195	260	98	154	205
Cogging Torque (max.)	lb-ft	0.14			0.18		
	Nm	0.19			0.24		
Torque Constant (±10%)	lb-ft/A	0.28	0.55	0.83	0.35	0.69	1.04
	Nm/A	0.37	0.75	1.12	0.47	0.94	1.41
Voltage Constant (±10%)	V/kRPM	39	78	117	49	99	148
	V/rad/s	0.37	0.75	1.12	0.47	0.94	1.41
Motor Constant	lb-ft/√W	0.59	0.60	0.60	0.69	0.70	0.70
	Nm/√W	0.80	0.81	0.82	0.93	0.95	0.95
Elect. Time Constant	ms	1.79	1.85	1.86	1.94	2.00	1.99
Mech. Time Constant	ms	2.01	1.94	1.92	1.83	1.77	1.78
Terminal Resistance (±12%)	Ohm	0.22	0.84	1.88	0.25	0.98	2.22
Terminal Inductance (±30%)	mH	0.39	1.56	3.51	0.49	1.97	4.42
Thermal Resistance ⁽¹⁾	°C/W	0.90			0.82		
Motor Inertia	lb-ft-s ²	9.7E-4			1.2E-3		
	kg-m ²	1.3E-3			1.7E-3		
Motor Weight	lb	5.0	5.0	4.9	6.3	6.3	6.2
	kg	2.28	2.27	2.24	2.86	2.85	2.82
Ambient Storage Temperature	°C	-55 to 150					
Poles	-	16					

(1) Housed version of motor mounted to 254 mm sq. x 6.35 mm (10 in. sq x 0.25 in.) aluminum plate in still air; maximum operating temperature (ambient + rise) is 130 °C

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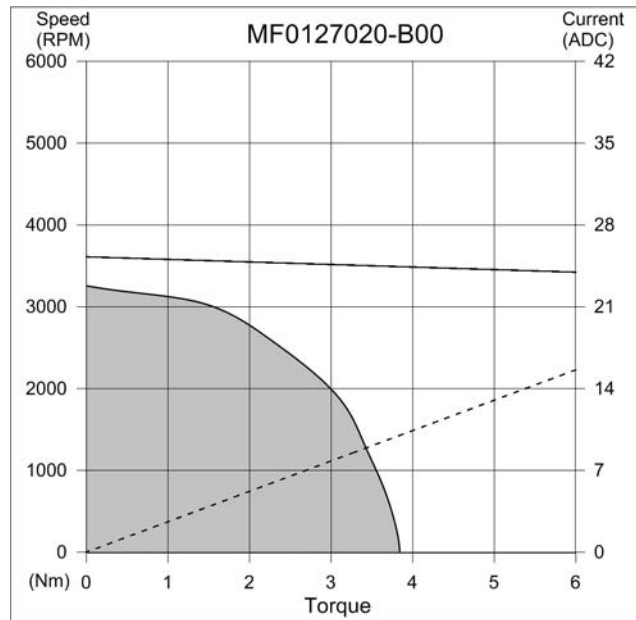
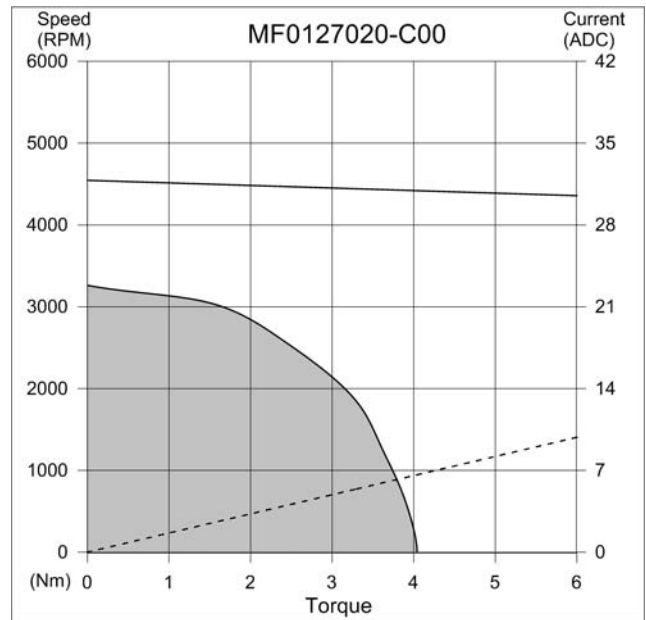
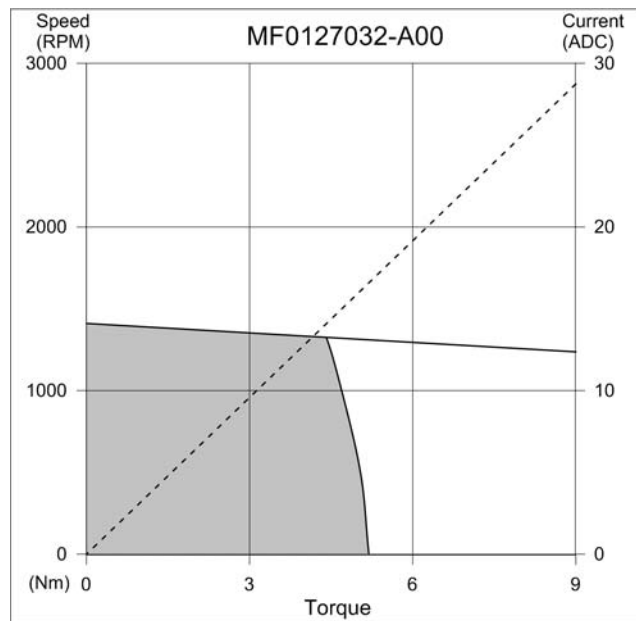
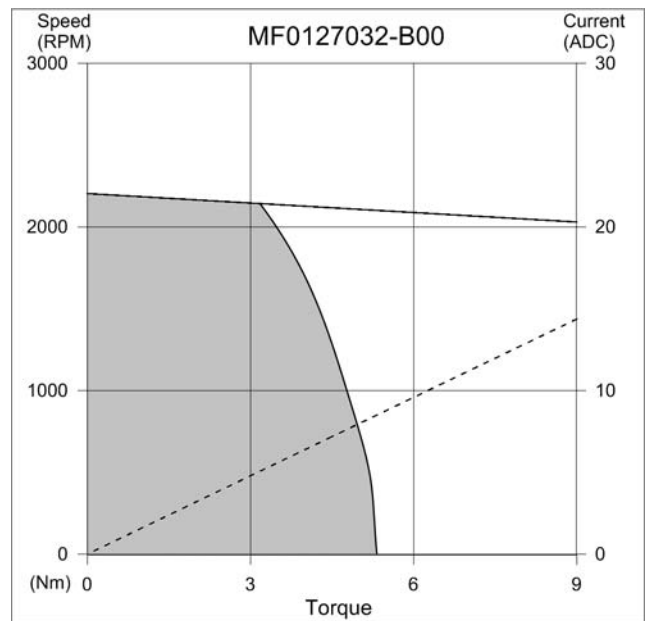
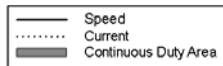
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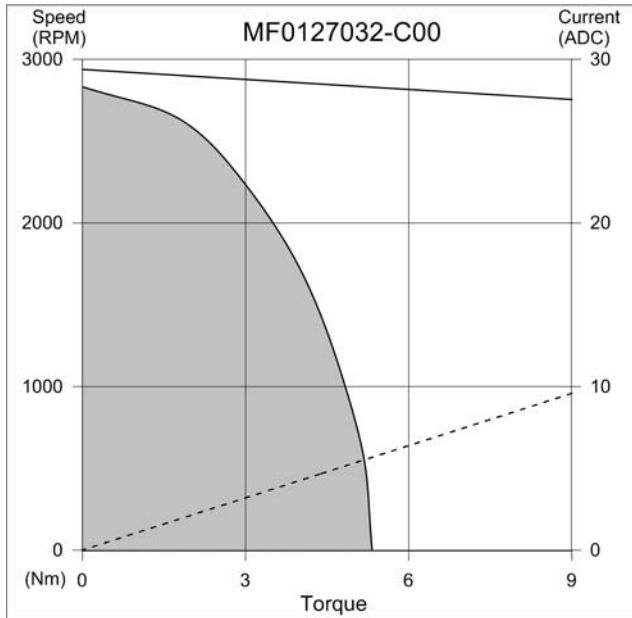
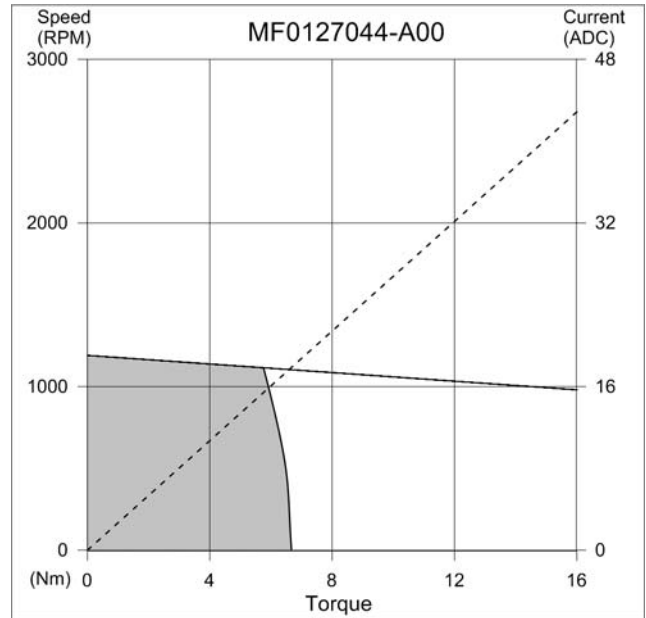
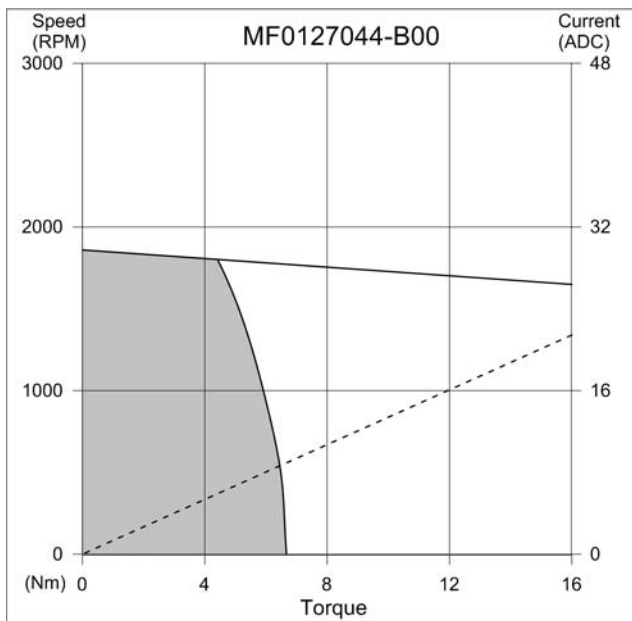
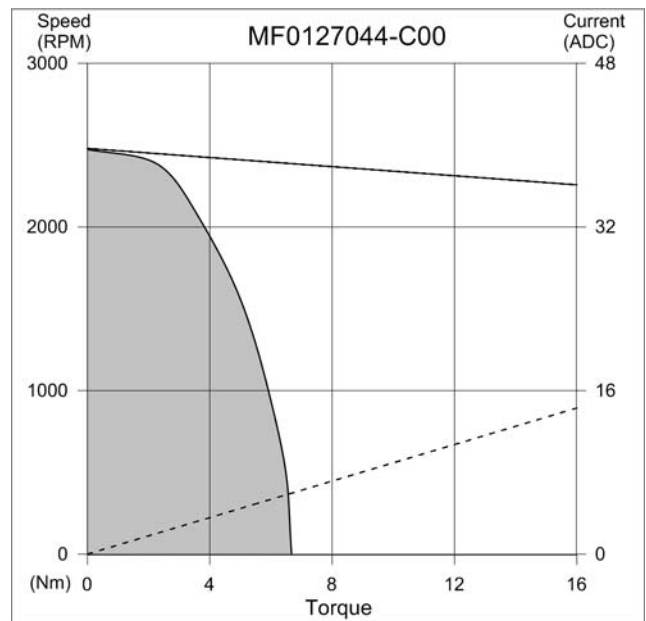
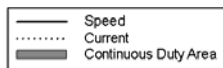
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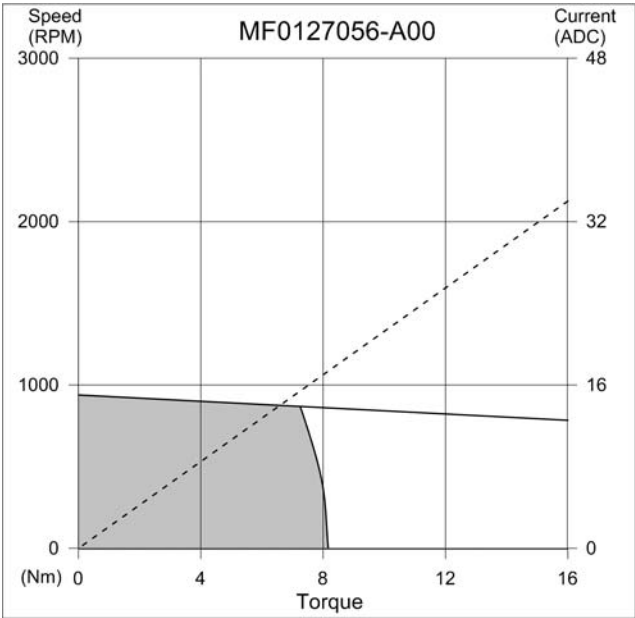
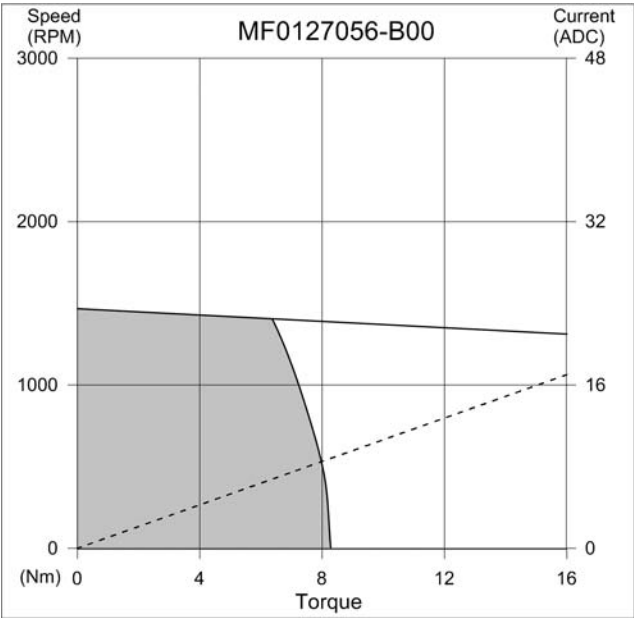
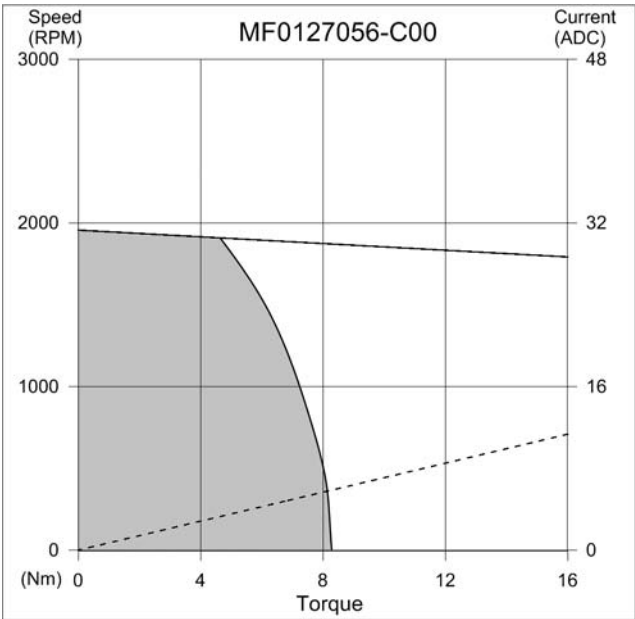
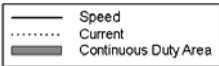
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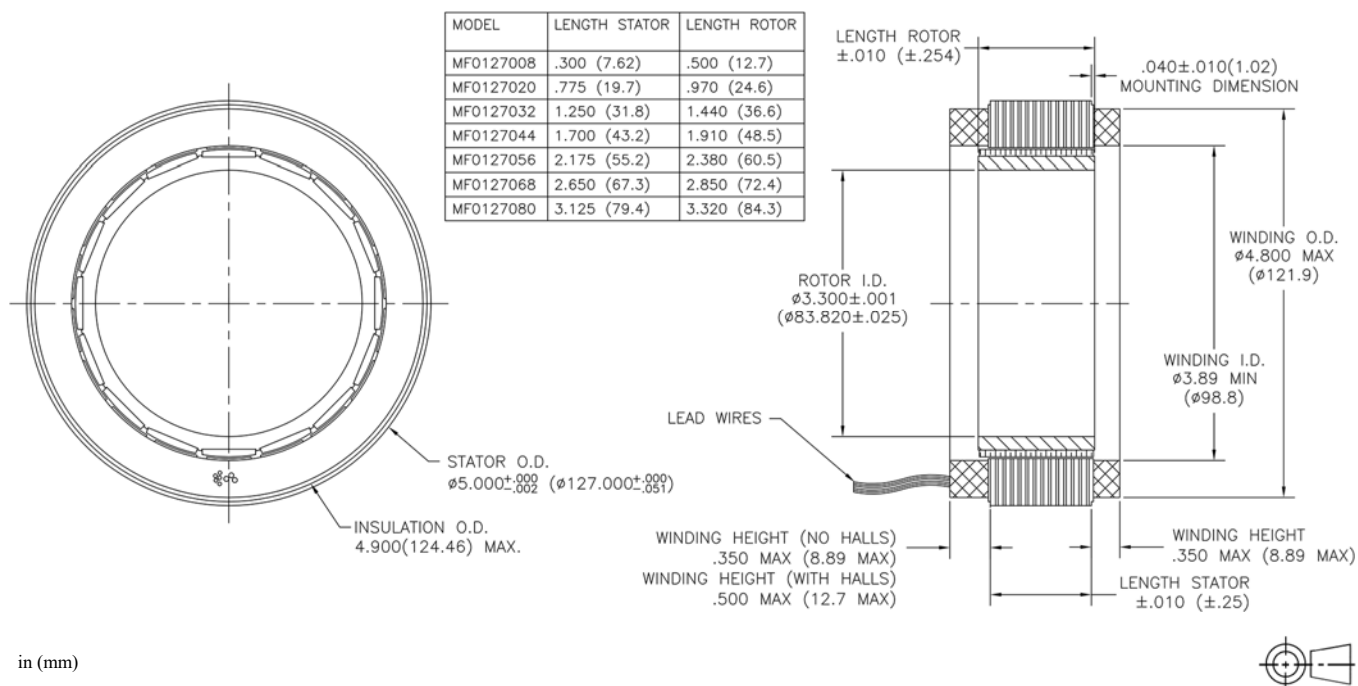
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DIMENSIONS



MODEL NUMBERING

MF0127025-B00-00

- MF0127025 - Megaflux series model designator
- 01 - Stator size code
- 27 - Stator stack height code in mm (e.g. 025 = 25 mm)
- 02 - Winding code (A = 48 VDC, B = 150 VDC, C = 300 VDC)
- 5 - Modification code, factory assigned
- B00 - Options (see table)
- 00 - Options (see table)

Options	
C	Customer-specified connector
Z	RoHS compliant