

Torque Motors

Megaflux Frameless Brushless Torque Motors—MF0410

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 MF0410 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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SPECIFICATIONS (all data measured at 20 °C ambient)

Model No.		MF0410015			MF0410025			MF041050		
Winding Voltage	V	48	150	300	48	150	300	48	150	300
Stall Torque (continuous) ⁽¹⁾	lb-ft	50.6	50.6	50.6	81.0	81.5	81.4	142.1	139.5	144.0
	Nm	68.6	68.6	68.7	109.9	110.5	110.3	192.7	189.1	195.2
Peak Torque (±25%)	lb-ft	325	325	325	524	524	524	1036	1036	1036
	Nm	441	441	441	711	711	711	1404	1404	1404
Peak Current	A	375	225	150	579	331	210	459	382	287
No Load Speed	RPM	362	678	926	345	616	803	138	369	554
	rad/s	38	71	97	36	65	84	14	39	58
Cogging Torque (max.)	lb-ft	0.30			0.55			1.03		
	Nm	0.41			0.75			1.39		
Torque Constant (±10%)	lb-ft/A	0.868	1.446	2.169	0.906	1.585	2.491	2.259	2.711	3.615
	Nm/A	1.177	1.961	2.941	1.228	2.149	3.377	3.063	3.676	4.901
Voltage Constant (±10%)	V/kRPM	123	205	308	129	225	354	321	85	513
	V/rad/s	1.177	1.961	2.941	1.228	2.149	3.377	3.063	3.676	4.901
Motor Constant	lb-ft/√W	3.58	3.58	3.58	5.15	5.18	5.17	7.96	8.06	8.06
	Nm/√W	4.85	4.86	4.85	6.99	7.03	7.01	10.80	10.93	10.93
Elect. Time Constant	ms	7.56	7.58	7.55	10.07	10.19	10.14	11.52	11.81	11.81
Mech. Time Constant	ms	2.09	2.09	2.14	1.60	1.58	1.63	1.34	1.34	1.34
Terminal Resistance (±12%)	Ohm	00.59	0.163	0.368	0.031	0.093	0.232	0.080	0.113	0.201
Terminal Inductance (±30%)	mH	0.445	1.235	2.779	0.311	0.953	2.352	0.927	1.335	2.373
Thermal Resistance ⁽¹⁾	°C/W	0.320			0.257			0.200		
Motor Inertia	lb-ft-s ²	3.9E-2			6.2E-2			1.3E-1		
	kg-m ²	5.3E-2			8.5E-2			1.7E-1		
Motor Weight	lb	20.8	20.8	20.8	31.9	32.0	33.7	59.9	60.2	60.2
	kg	9.45	9.45	9.45	14.48	14.51	15.29	27.18	27.29	27.29
Ambient Storage Temperature	°C	-55 to 150								
Poles	-	64								

(1) Housed version of motor mounted to 508 mm sq. x 12.7 mm (20 in. sq x 0.5 in.) aluminum plate in still air; maximum operating temperature (ambient + rise) is 130 °C

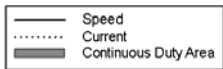
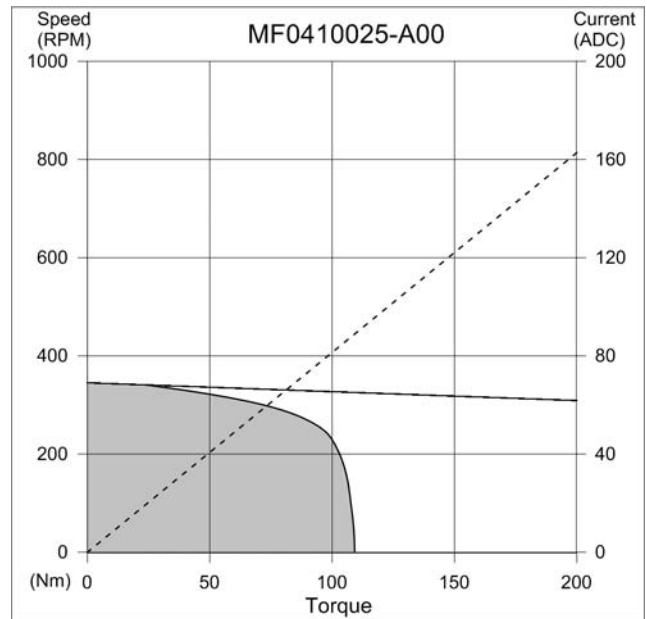
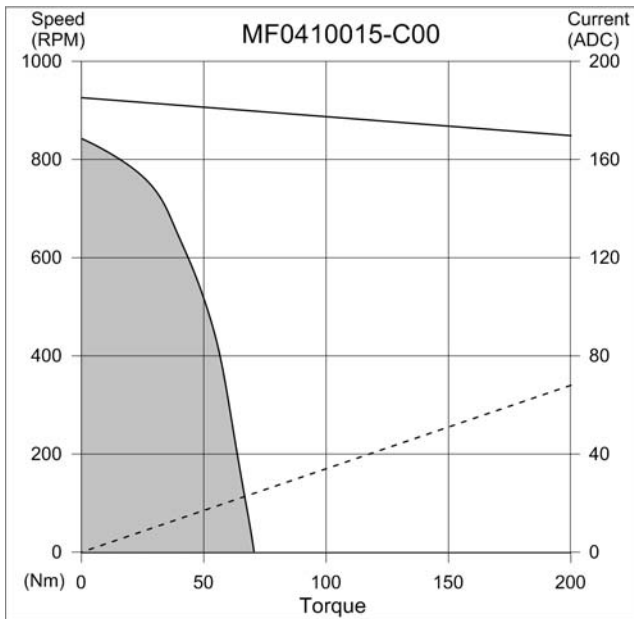
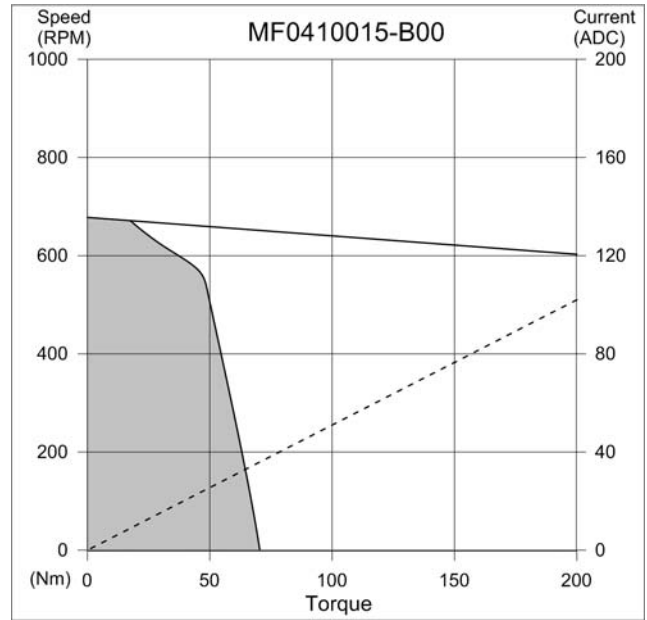
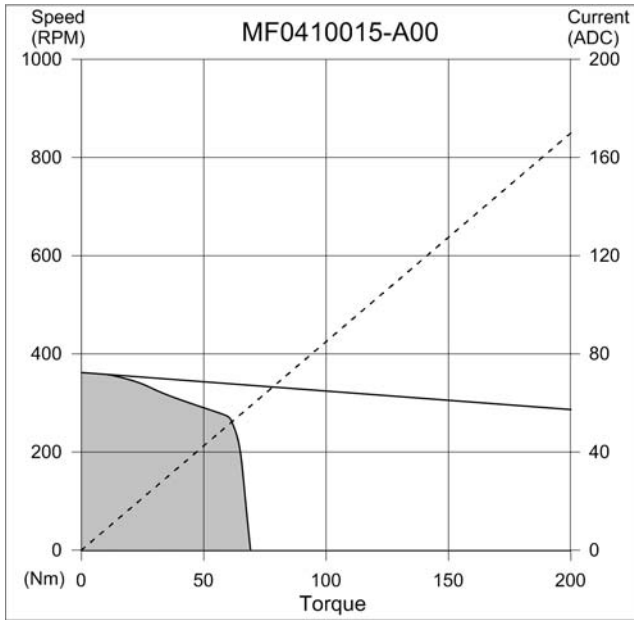
Model No.		MF0410075			MF0410100		
Winding Voltage	V	48	150	300	48	150	300
Stall Torque (continuous) ⁽¹⁾	lb-ft	205	204	209	280	265	273
	Nm	277	277	283	380	359	371
Peak Torque (±25%)	lb-ft	1271	1551	1551	1689	2059	2059
	Nm	1723	2102	2102	2290	2791	2791
Peak Current	A	314	286	230	375	381	286
No Load Speed	RPM	79	184	296	71	185	278
	rad/s	8.3	19.3	31.0	7.4	19.4	29.1
Cogging Torque (max.)	lb-ft	1.52			2.07		
	Nm	2.06			2.81		
Torque Constant (±10%)	lb-ft/A	4.050	5.428	6.750	4.504	5.405	7.206
	Nm/A	5.491	7.359	9.152	6.107	7.328	9.770
Voltage Constant (±10%)	V/kRPM	575	771	958	639	767	1023
	V/rad/s	5.491	7.359	9.152	6.107	7.328	9.770
Motor Constant	lb-ft/√W	10.35	10.67	10.55	12.59	12.30	12.30
	Nm/√W	14.04	14.46	14.31	17.07	16.68	16.68
Elect. Time Constant	ms	12.92	13.57	13.42	14.16	13.53	13.53
Mech. Time Constant	ms	1.22	1.15	1.17	1.09	1.15	1.15
Terminal Resistance (±12%)	Ohm	0.153	0.259	0.409	0.128	0.193	0.343
Terminal Inductance (±30%)	mH	1.977	3.514	5.490	1.813	2.611	4.642
Thermal Resistance ⁽¹⁾	°C/W	0.163			0.129		
Motor Inertia	lb-ft-s ²	1.9E-1			2.5E-1		
	kg-m ²	2.5E-1			3.4E-1		
Motor Weight	lb	88.9	89.6	89.4	118.2	117.5	117.5
	kg	40.3	40.6	40.5	53.6	53.3	53.3
Ambient Storage Temperature	°C	-55 to 150					
Poles	-	64					

(1) Housed version of motor mounted to 508 mm sq. x 12.7 mm (20 in. sq x 0.5 in.) aluminum plate in still air; maximum operating temperature (ambient + rise) is 130 °C

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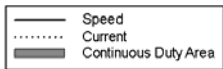
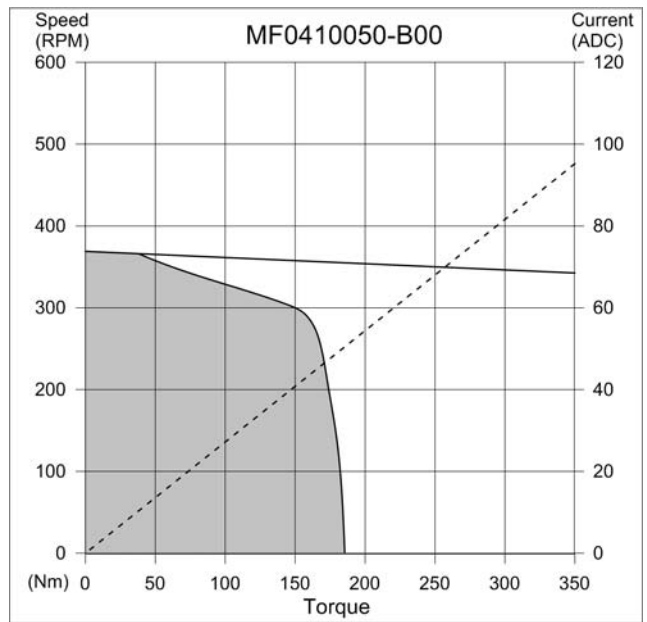
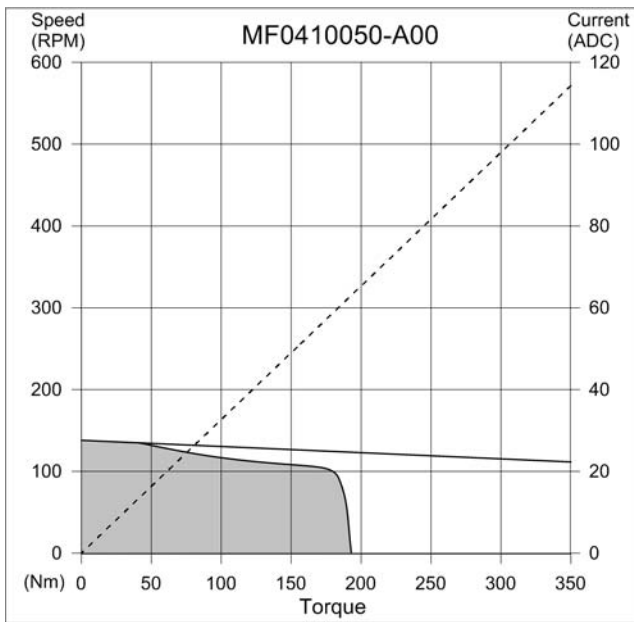
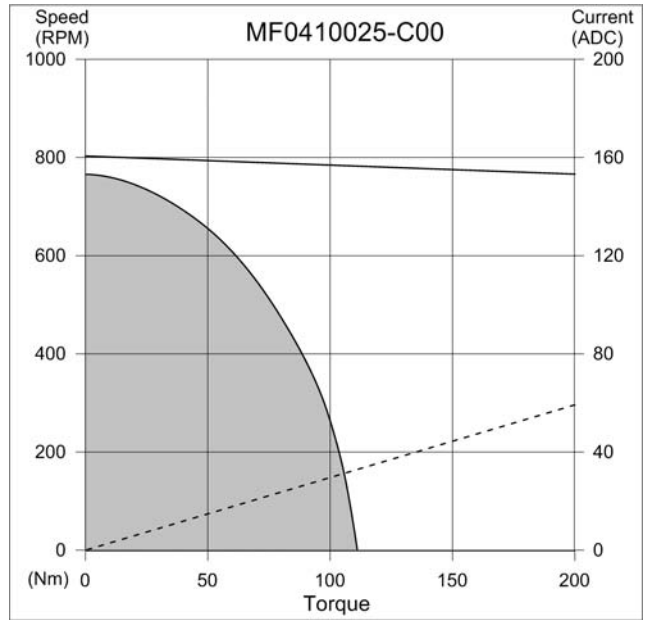
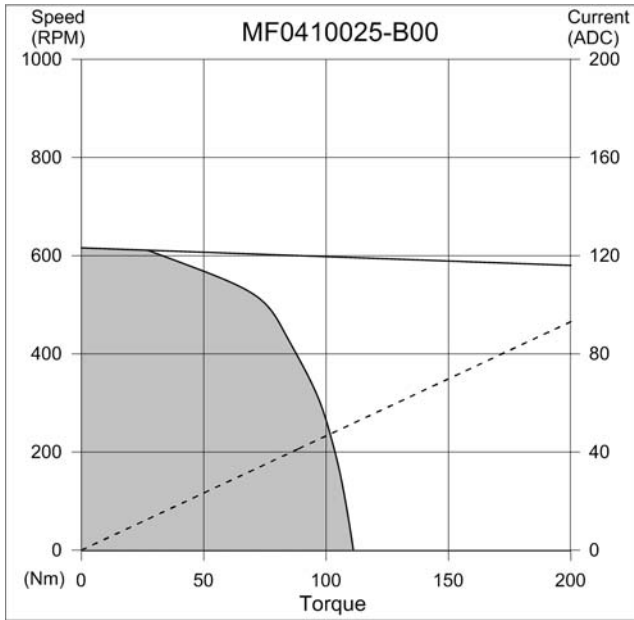
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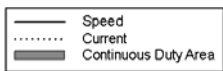
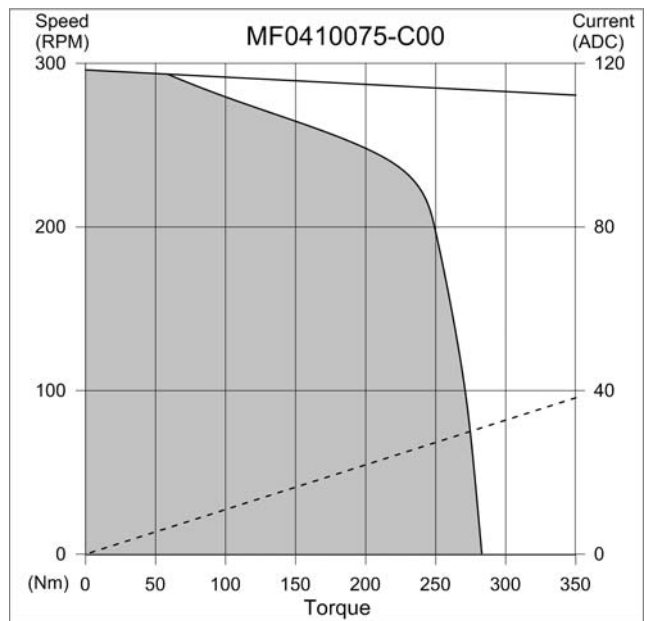
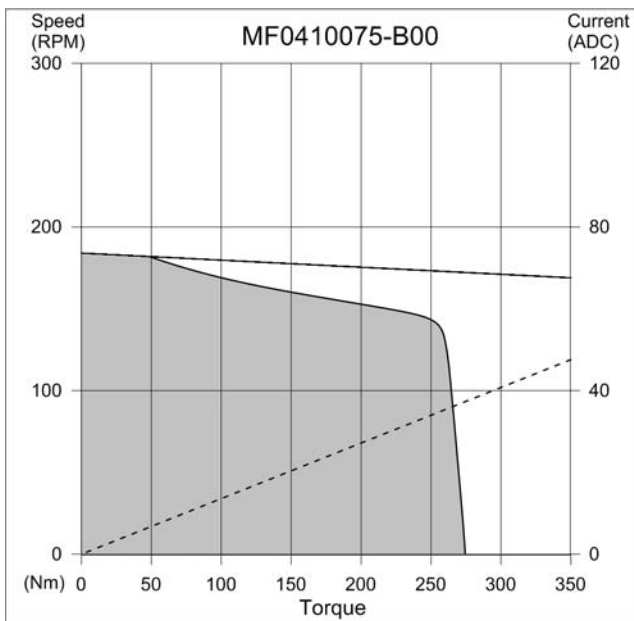
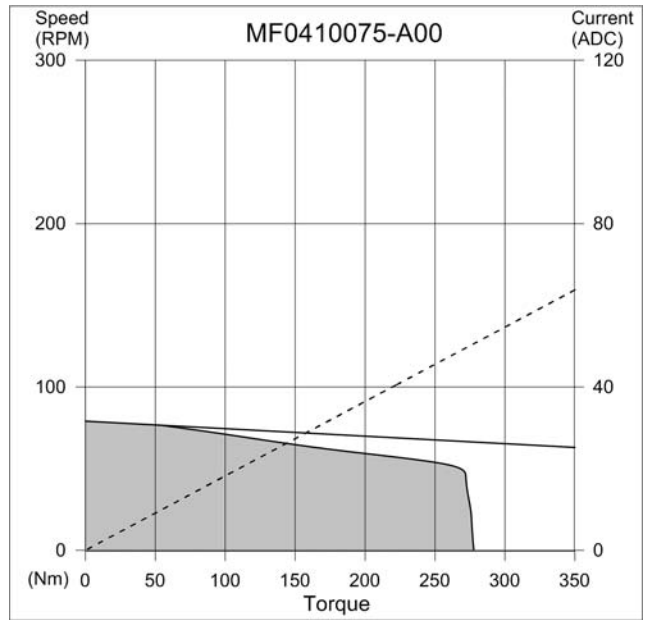
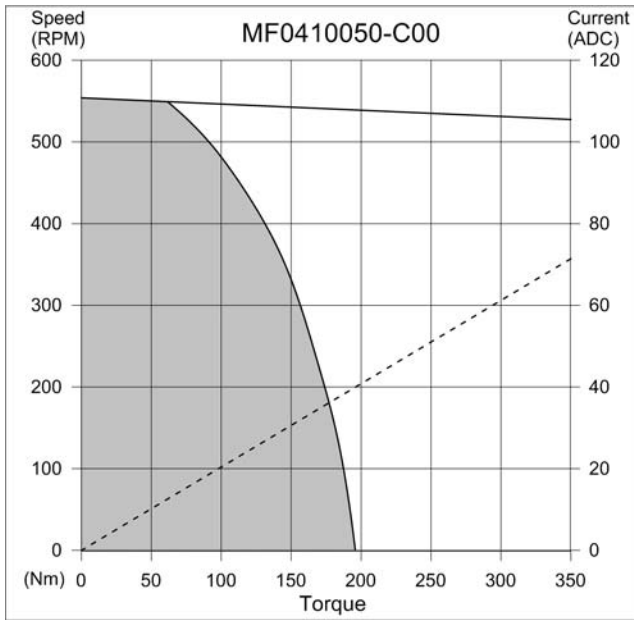
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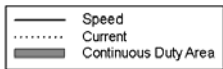
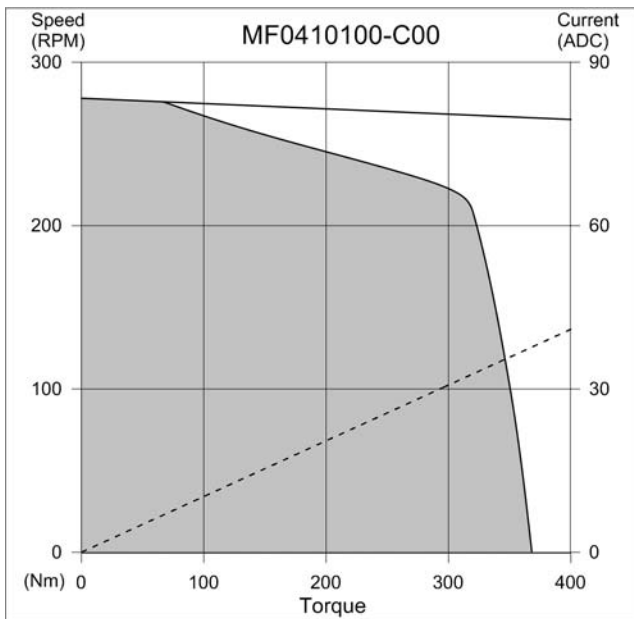
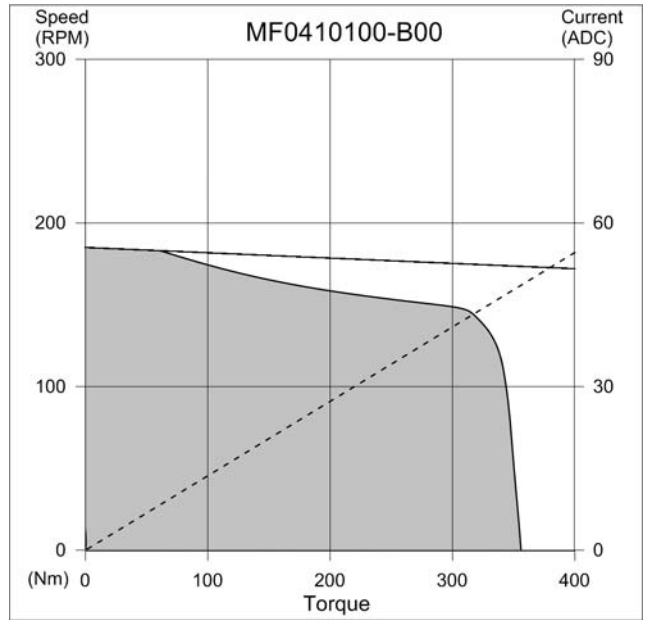
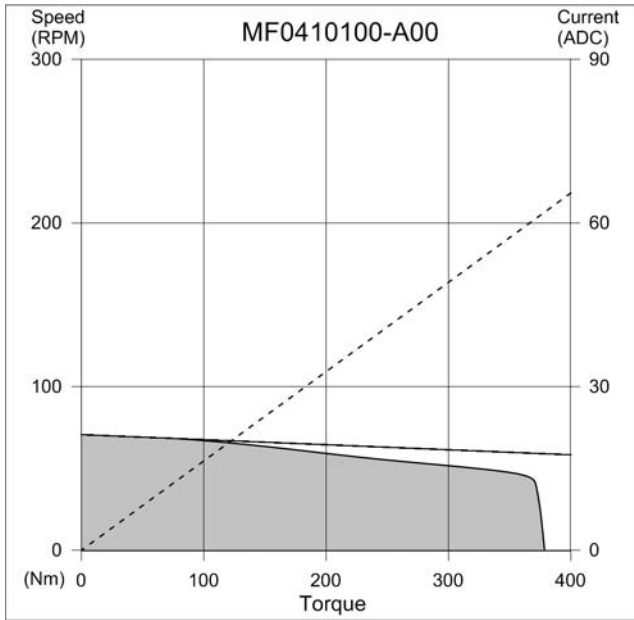
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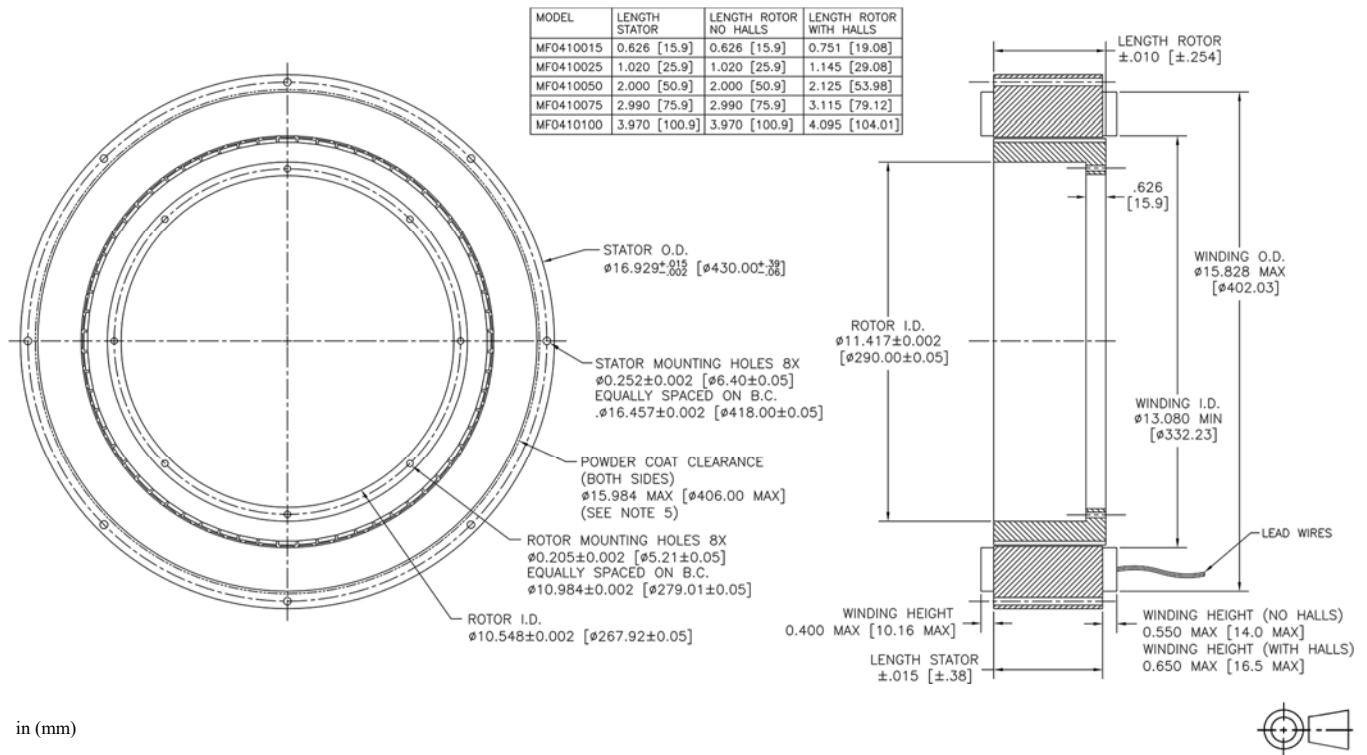
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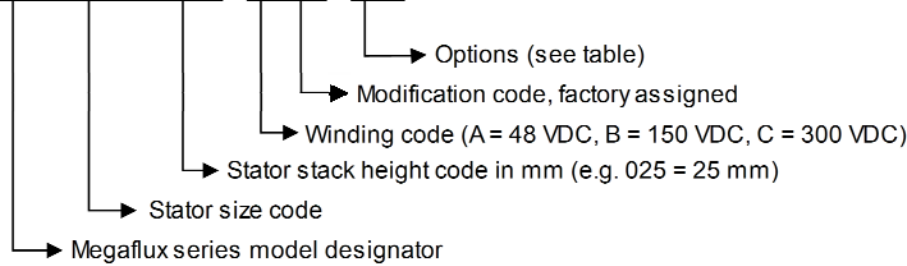
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DIMENSIONS



MODEL NUMBERING

MF0410025 - B00 - 00



Options
C = Customer-specified connector
Z = RoHS compliant