

Torque Motors

Megaflux Frameless Brushless Torque Motors—MF0150

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 MF0150 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

Torque Motors

MF0150 Series Frameless Brushless Torque Motors

SPECIFICATIONS (all data measured at 20 °C ambient)

Model No.		MF0150010			MF0150025			MF0150050		
Winding Voltage	V	48	150	300	48	150	300	48	150	300
Stall Torque (continuous) ⁽¹⁾	lb-ft	2.4	2.3	2.3	6.2	6.2	6.2	9.9	10.1	9.8
	Nm	3.2	3.1	3.2	8.4	8.5	8.4	13.4	13.7	13.3
Peak Torque (±25%)	lb-ft	13.1	13.1	13.1	34.3	34.3	34.3	82.0	82.0	82.0
	Nm	17.8	17.8	17.8	46.5	46.5	46.5	111.2	111.2	111.2
Peak Current	A	52.2	25.5	16.4	121.5	60.7	45.5	160.7	128.6	80.4
No Load Speed	RPM	1267	1948	2500	1132	1789	2653	624	1559	1949
	rad/s	133	204	262	119	185	278	65	163	204
Cogging Torque (max.)	lb-ft	0.09			0.23			0.44		
	Nm	0.13			0.32			0.60		
Torque Constant (±10%)	lb-ft/A	0.253	0.515	0.802	0.282	0.564	0.753	0.510	0.638	1.020
	Nm/A	0.343	0.698	1.087	0.382	0.765	1.021	0.691	0.865	1.383
Voltage Constant (±10%)	V/kRPM	35.92	73.12	113.87	40.04	80.08	106.91	72.41	90.58	144.82
	V/rad/s	0.343	0.698	1.087	0.382	0.765	1.021	0.691	0.865	1.383
Motor Constant	lb-ft/√W	0.33	0.32	0.33	0.72	0.72	0.72	1.04	1.06	1.03
	Nm/√W	0.45	0.44	0.45	0.97	0.98	0.98	1.41	1.44	1.39
Elect. Time Constant	ms	2.14	1.56	2.14	3.54	3.55	3.22	3.38	3.54	3.33
Mech. Time Constant	ms	2.26	2.3	2.28	1.25	1.24	1.23	1.14	1.21	1.06
Terminal Resistance (±12%)	Ohm	0.584	2.525	5.930	0.154	0.613	1.082	0.242	0.361	0.984
Terminal Inductance (±30%)	mH	1.25	5.24	12.71	0.54	2.15	3.83	0.861	1.346	3.445
Thermal Resistance ⁽¹⁾	°C/W	1.25			0.85			0.70		
Motor Inertia	lb-ft-s ²	3.5E-4			9.3E-4			1.9E-3		
	kg-m ²	4.8E-4			1.3E-3			2.5E-3		
Motor Weight	lb	2.6	2.7	2.7	6.7	6.7	6.6	12.4	12.4	12.3
	kg	1.20	1.20	1.21	3.05	3.02	3.01	5.62	5.64	5.60
Ambient Storage Temperature	°C	-55 to 150								
Poles	-	24								

(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

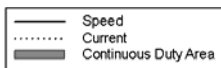
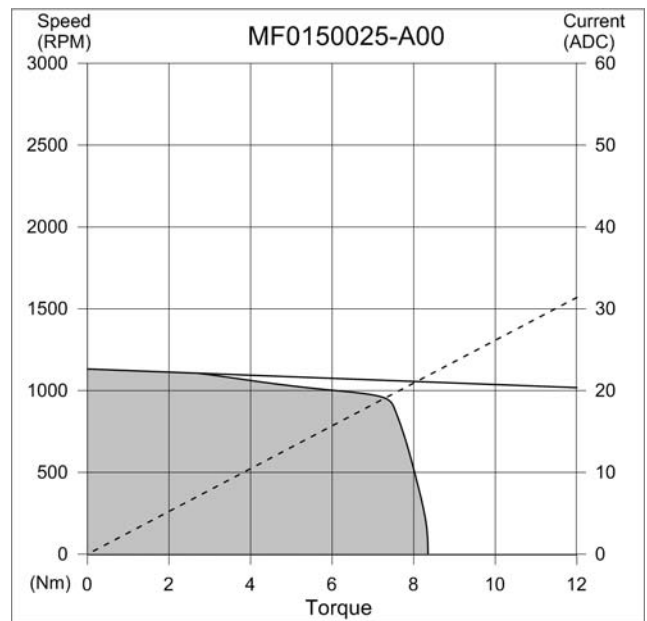
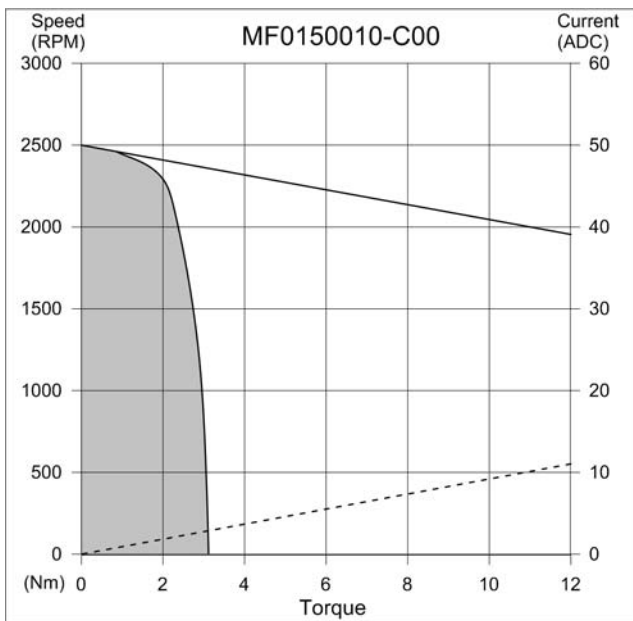
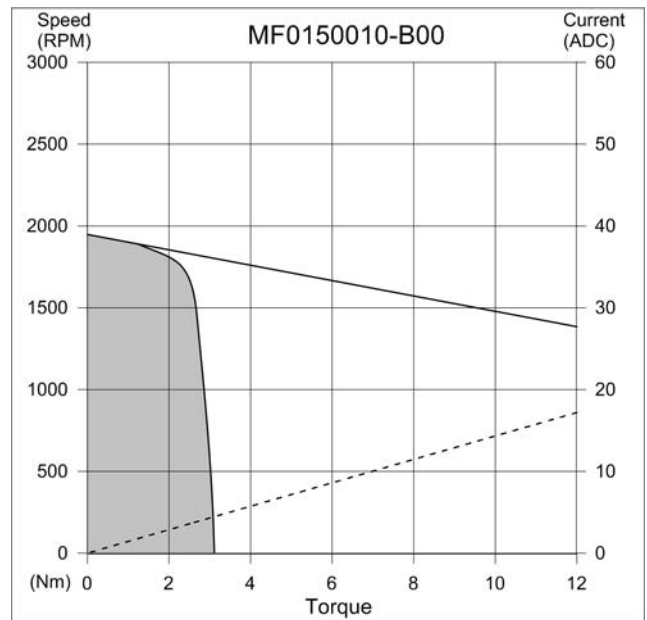
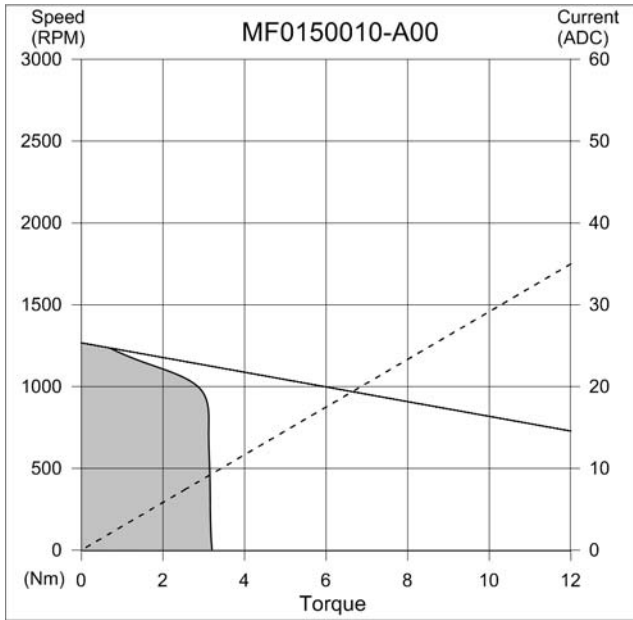
Model No.		MF0150075			MF0150100		
Winding Voltage	V	48	150	300	48	150	300
Stall Torque (continuous) ⁽¹⁾	lb-ft	13.9	13.6	13.8	18.1	18.1	18.2
	Nm	18.9	18.5	18.7	24.5	24.6	24.7
Peak Torque (±25%)	lb-ft	123	123	123	160	165	165
	Nm	166	166	166	217	223	223
Peak Current	A	214	143	107	207	142	107
No Load Speed	RPM	555	1156	1734	416	863	1294
	rad/s	58	121	182	44	90	136
Cogging Torque (max.)	lb-ft	0.60			0.90		
	Nm	0.82			1.21		
Torque Constant (±10%)	lb-ft/A	0.573	0.860	1.147	0.772	1.157	1.543
	Nm/A	0.777	1.166	1.555	1.047	1.569	2.092
Voltage Constant (±10%)	V/kRPM	81.4	122.1	162.9	109.6	164.3	219.1
	V/rad/s	0.777	1.166	1.555	1.047	1.569	2.092
Motor Constant	lb-ft/√W	1.35	1.33	1.34	1.60	1.60	1.61
	Nm/√W	1.83	1.80	1.92	2.17	2.18	2.19
Elect. Time Constant	ms	3.78	3.64	3.72	3.88	3.89	2.94
Mech. Time Constant	ms	1.06	1.10	1.07	1.01	1.00	0.99
Terminal Resistance (±12%)	Ohm	0.180	0.421	0.732	0.232	0.520	0.916
Terminal Inductance (±30%)	mH	0.681	1.532	2.723	0.899	2.022	2.696
Thermal Resistance ⁽¹⁾	°C/W	0.600			0.500		
Motor Inertia	lb-ft-s ²	2.8E-3			3.7E-3		
	kg-m ²	3.8E-3			5.0E-3		
Motor Weight	lb	18.8	18.4	18.4	24.3	24.3	24.3
	kg	8.53	8.35	8.34	11.04	11.04	11.03
Ambient Storage Temperature	°C	-55 to 150					
Poles	-	24					

(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

Torque Motors

MF0150 Series Frameless Brushless Torque Motors

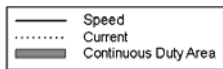
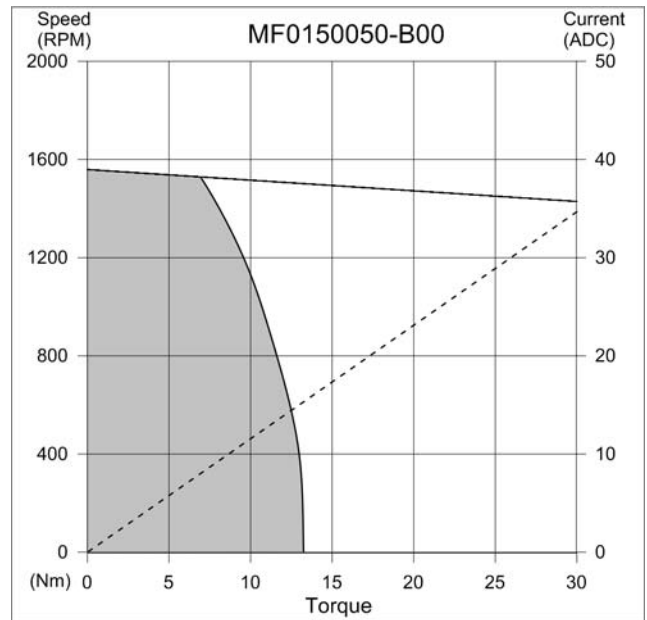
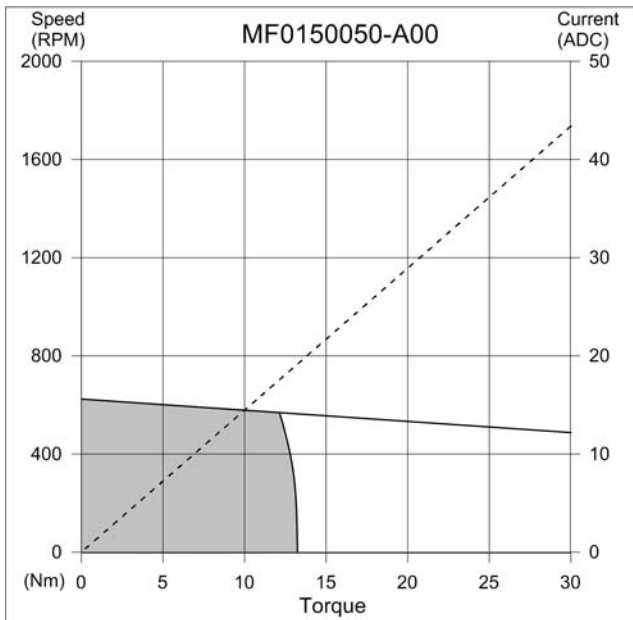
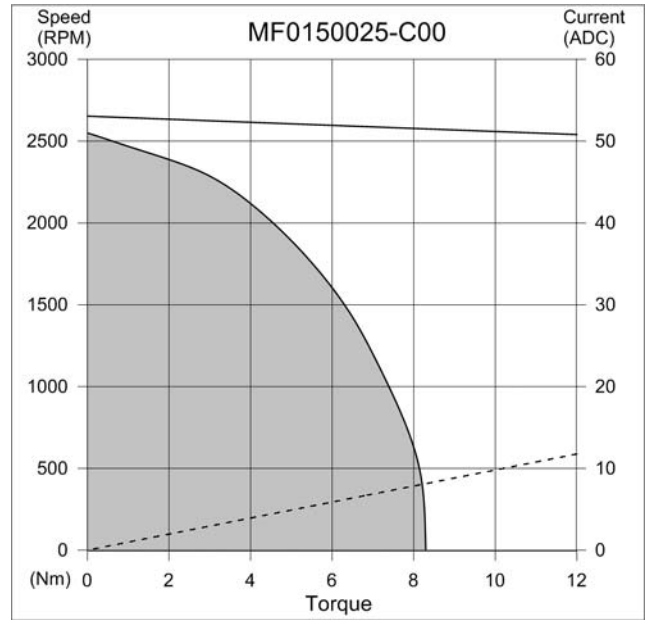
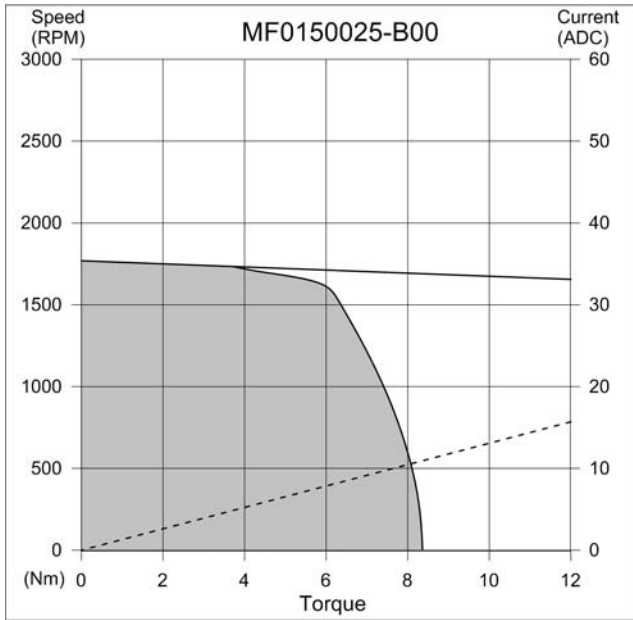
PERFORMANCE



Torque Motors

MF0150 Series Frameless Brushless Torque Motors

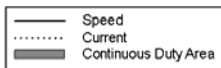
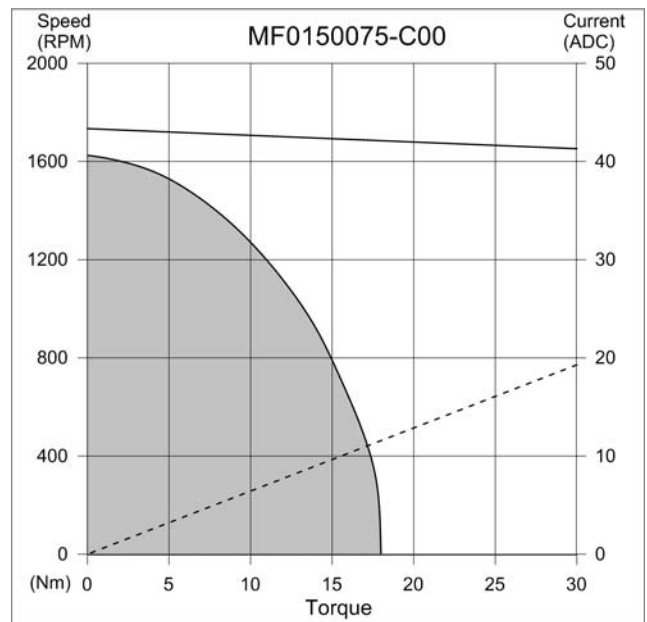
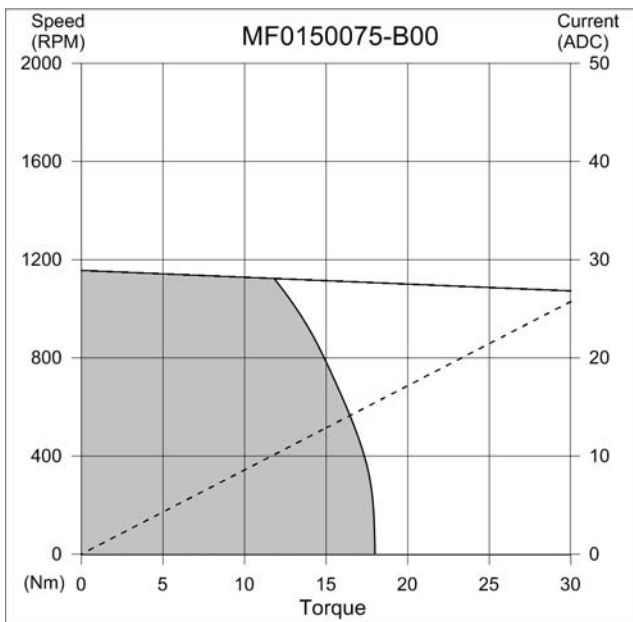
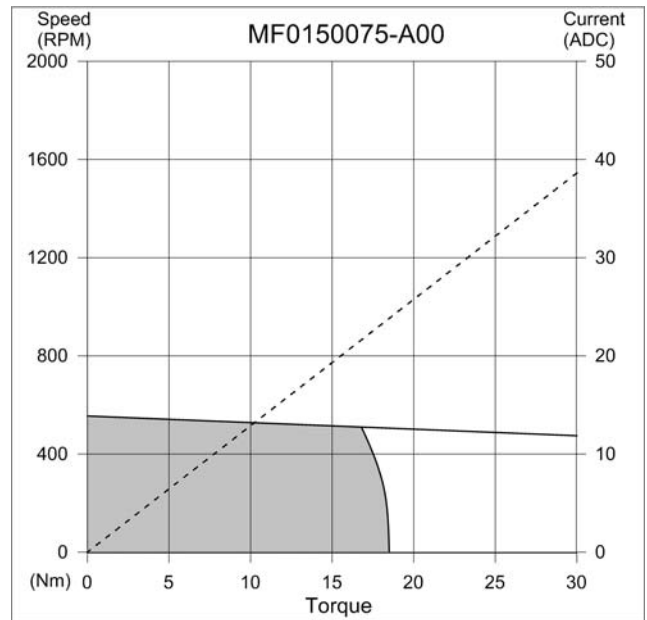
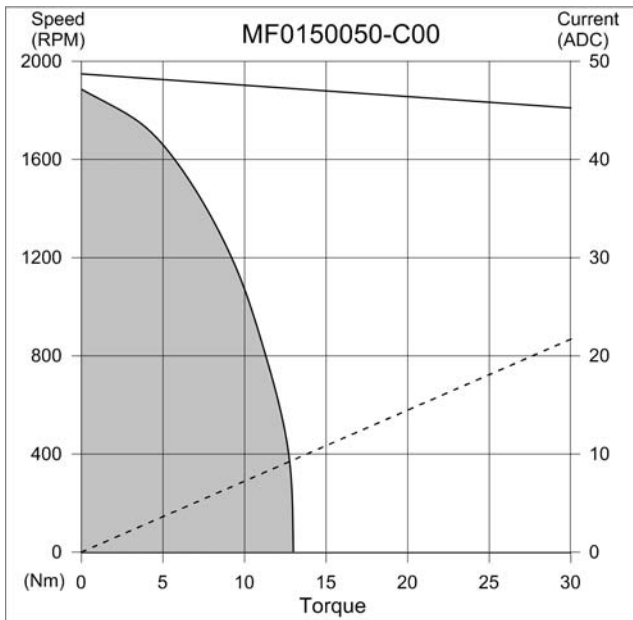
PERFORMANCE



Torque Motors

MF0150 Series Frameless Brushless Torque Motors

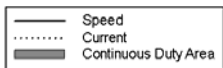
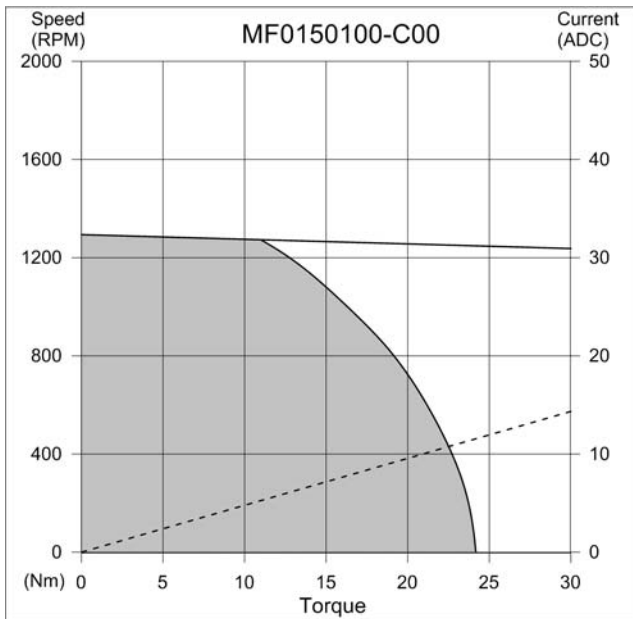
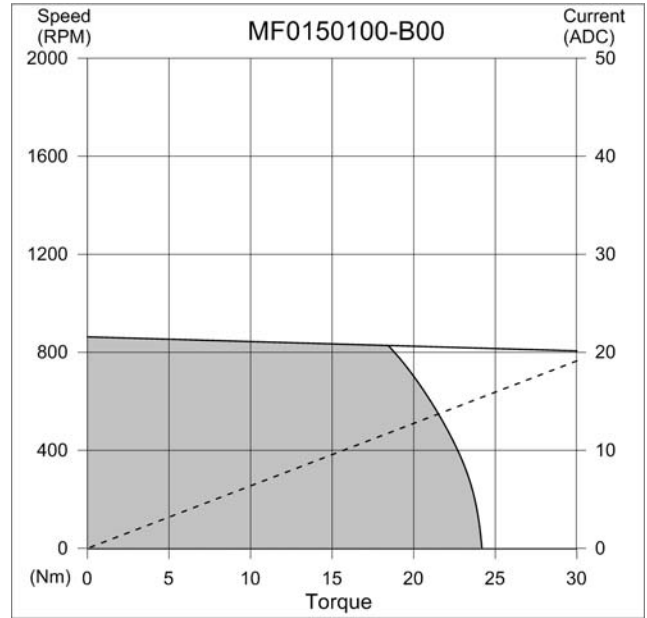
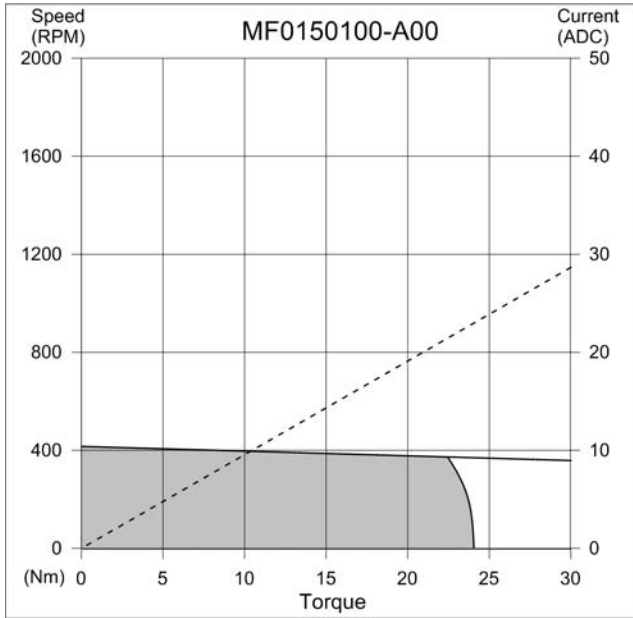
PERFORMANCE



Torque Motors

MF0150 Series Frameless Brushless Torque Motors

PERFORMANCE

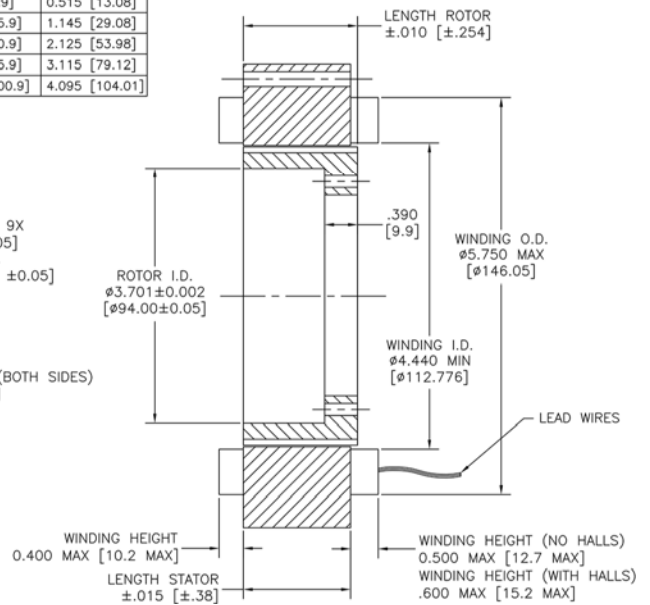
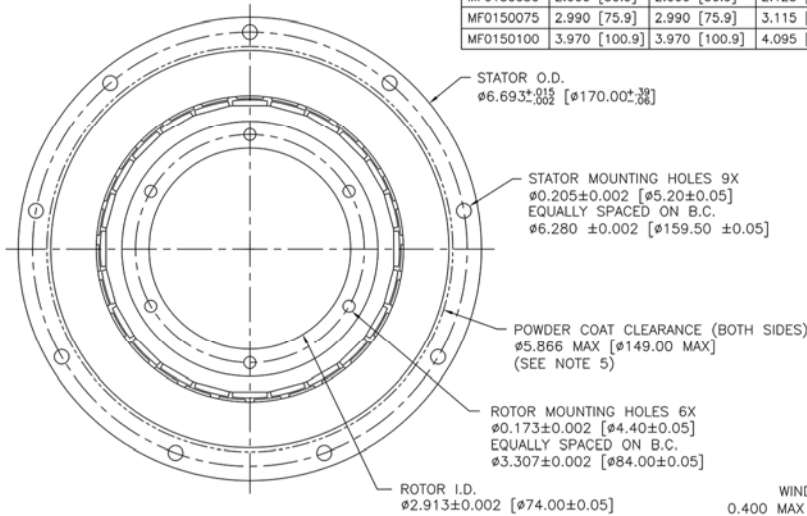


Torque Motors

MF0150 Series Frameless Brushless Torque Motors

DIMENSIONS

MODEL	LENGTH STATOR	LENGTH ROTOR NO HALLS	LENGTH ROTOR WITH HALLS
MF0150010	0.390 [9.9]	0.390 [9.9]	0.515 [13.08]
MF0150025	1.020 [25.9]	1.020 [25.9]	1.145 [29.08]
MF0150050	2.000 [50.9]	2.000 [50.9]	2.125 [53.98]
MF0150075	2.990 [75.9]	2.990 [75.9]	3.115 [79.12]
MF0150100	3.970 [100.9]	3.970 [100.9]	4.095 [104.01]

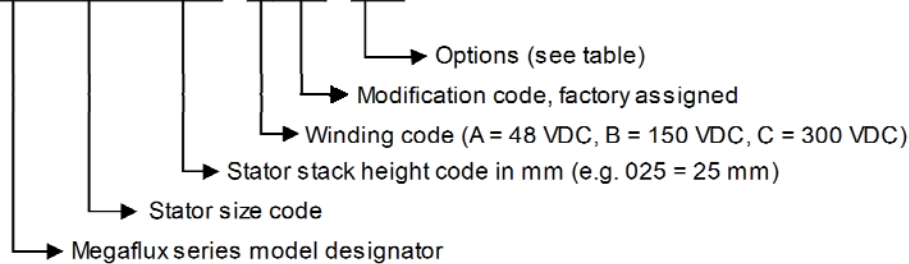


in (mm)



MODEL NUMBERING

MF0150025 - B00 - 00



Options
C = Customer-specified connector
Z = RoHS compliant