

Megaflux Series

Thin Ring Torque Motors

Engineering Guide



Brushless Torque Motors
150mm to 760mm diameter
(6 inches to 30 inches)

Allied Motion
Technologies
Emoteq Corp

Emoteq Corporation
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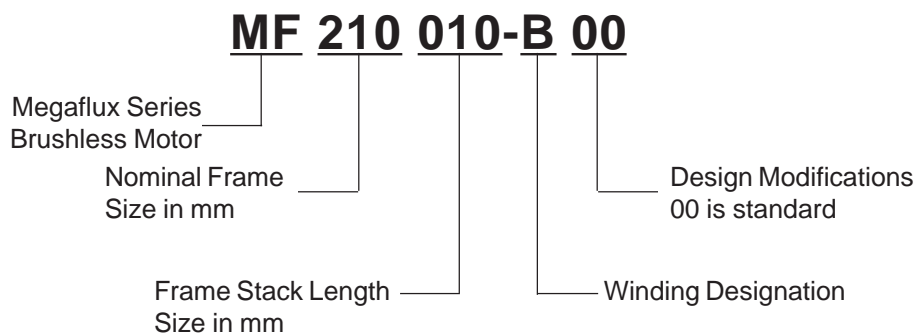
Selection Guide

Megaflux Quick Selection Guide

Model Number	Continuous Stall Torque		Frameless Motor				Model Number	Continuous Stall Torque		Frameless Motor			
	ft.lb.	Nm	Diameter in	Diameter mm	Length in	Length mm		ft.lb.	Nm	Diameter in	Diameter mm	Length in	Length mm
MF0150010	2	3	6.69	170	1.14	28.9	MF0410015	56	76	16.92	430	1.48	37.5
MF0150025	6	9	"	"	1.77	44.9	MF0410025	95	129	"	"	1.87	47.5
MF0150050	11	15	"	"	2.75	69.9	MF0410050	165	224	"	"	2.85	72.5
MF0150075	15	21	"	"	3.74	94.9	MF0410075	238	323	"	"	3.84	97.5
MF0150100	20	27	"	"	4.72	120	MF0410100	324	440	"	"	4.82	123
MF0210010	6	8	9.05	230	1.14	28.9	MF0510015	89	121	21.06	535	1.48	37.5
MF0210025	16	21	"	"	1.77	44.9	MF0510025	144	196	"	"	1.87	47.5
MF0210050	30	41	"	"	2.75	69.9	MF0510050	277	376	"	"	2.85	72.5
MF0210075	48	65	"	"	3.74	94.9	MF0510075	430	583	"	"	3.84	97.5
MF0210100	61	83	"	"	4.72	120	MF0510100	542	735	"	"	4.82	123
MF0255010	8	12	10.82	275	1.14	28.9	MF0610015	146	198	25.19	640	1.48	37.5
MF0255025	22	31	"	"	1.77	44.9	MF0610025	236	318	"	"	1.87	47.5
MF0255050	44	60	"	"	2.75	69.9	MF0610050	443	601	"	"	2.85	72.5
MF0255075	65	89	"	"	3.74	94.9	MF0610075	649	880	"	"	3.84	97.5
MF0255100	86	116	"	"	4.72	120	MF0610100	859	1164	"	"	4.82	123
MF0310010	15	20	12.99	330	1.24	31.5	MF0760015	244	331	31.18	792	1.48	37.5
MF0310025	36	49	"	"	1.87	47.5	MF0760025	393	533	"	"	1.87	47.5
MF0310050	74	100	"	"	2.85	72.5	MF0760050	755	1024	"	"	2.85	72.5
MF0310075	110	150	"	"	3.84	97.5	MF0760075	1121	1520	"	"	3.84	97.5
MF0310100	148	201	"	"	4.82	123	MF0760100	1490	2020	"	"	4.82	123

Note: Numbers are rounded for data presentation.

Megaflux Series Model Numbering



The model numbers refer to the magnetic OD of the motor in mm which is the OD before the provision for the ring of steel providing the mounting surface of the stator.

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Megaflux Series Thin Ring Torque Motors

Product Description

Megaflux Brushless Torque Motors

Using over a decade's worth of brushless motor design experience, Emoteq has created the Megaflux Series of thin ring torque motors resulting in a high performance, attractively priced solution for driving large inertia or high torque load systems.

Megaflux motors have been engineered to provide very high output torques while moderating the parasitic condition of cogging torque. Cogging torque is created by the attraction of the permanent magnet rotor poles to the steel stator poles and creates a fluctuating drag torque that is undesirable in precision closed loop control systems.

The mechanical form factor of Megaflux motors, a thin annular ring with a large diameter to length ratio, allows the motor to be wrapped around a driven shaft. The direct connection of the motor to the load effectively eliminates problems of torsional resonances due to couplings and the backlash associated with gear driven systems. Direct integration also results in minimal mechanical size.

A series of through holes have been incorporated into the Megaflux stator design to provide a rugged, simple, and low cost method of mounting the stator. Using the load's bearing system, the need for separate end-caps has been

removed. Similarly, the rotor features a series of holes to allow mounting directly to the load shaft.

Megaflux motors can be supplied with or without Hall effect sensors for commutation. Although the motors can be driven with six step commutation drives, for optimum performance, sinusoidal commutation is recommended.

This guide is intended to show the capabilities of the Megaflux Series. However, changes can be easily made to the mechanical and electrical characteristics to suit specific application requirements. We are also structured to engineer and build completely custom motor solutions.

An enthusiastic team focused on manufacturing high quality motors, produces the Megaflux motors in Emoteq's Tulsa, Oklahoma, USA facility.

Applications include:

- | | |
|------------------------------|--------------------------|
| Semiconductor manufacturing | Robot bases and joints |
| Laser scanning & printing | Machine tool axis drives |
| Coordinate measuring systems | Stabilized gun platforms |



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Size Constants

These parameters are dependent upon the size and shape of the motor but are largely independent of the winding used. However, special designs incorporating different lamination and magnet materials as well as design modifications such as increased magnetic air gaps can change these parameters. In such instances, a specific set of design data will be provided.

Maximum Continuous Stall Torque (T_c) is the amount of torque produced at low to zero speed which results in a 110°C rise in temperature. Based upon 20°C ambient temperatures, the resulting winding temperature is 130°C.

Maximum Rated Torque (T_R) is the amount of torque that the motor can produce without danger of demagnetizing the rotor. This torque is only available for short durations. Also, it may not be possible to produce the Maximum Rated Torque because of limitations of voltage and current (see Peak Torque).

Motor Constant (K_M) is the ratio of the peak torque to the square root of the input power at stall with 20°C ambient temperature. This ratio is useful during the initial selection of a motor because it indicates the ability of the motor to convert electrical power into torque.

$$K_M = T_P (\text{Peak Torque}) / \sqrt{P_P (\text{Peak Input Power})}$$

or

$$K_M = K_T (\text{Torque Constant}) / \sqrt{R_M (\text{Terminal Resistance})}$$

Electrical Time Constant (t_E) is the ratio of inductance L_M in Henries, to the resistance R_M in Ohms. This is the inductance and resistance as measured across any two phases in a delta or wye configuration.

$$T_E = L_M / R_M$$

Mechanical Time Constant (t_M) is the time required to reach 63.2% of the motors maximum speed after the application of constant DC voltage through the commutation electronics, ignoring friction, windage, and core losses.

$$T_M = J_M * R_M / K_T * K_B$$

Thermal Resistance (TPR) correlates winding tempera-

ture rise to the average power dissipated in the stator winding. The published TPR assumes that the motor is mounted to an aluminum heatsink of specific dimensions. Additional cooling from forced air, water jacketing, or increased heatsinking decreases the motor Thermal Resistance allowing higher power outputs than the published data.

Viscous Damping (F_0) gives an indication of the torque lost due to B.E.M.F. in the motor when the source impedance is zero. F_0 value can be represented as $F_0 = K_T * K_B / R_M$

Maximum Cogging Torque (T_C) is principally the static friction torque felt as the motor is rotated at low speed due to the attraction of the magnets to the steel stator teeth. The published value does not include the bearing friction of a housed motor.

Mechanical Data

Rotor inertia (J_M) is the moment of inertia of the rotor about its axis of rotation.

Motor Weight (W_M) is the weight of the standard motor.

Number of Poles (N_p) is the number of permanent magnet poles of the rotor. This is the actual number of magnets and not pole pairs.

Winding Constants

The winding constants are the parameters that vary with the number of wire turns per coil and the wire size. These parameters are collected under an alphabetical winding designation. A single frame size and length of motor will have several different windings. Special windings receive new designations in the sequence by which they are designed and released to production.

Design Voltage (V_p) is the nominal voltage required to produce the peak torque when the rotor speed is zero and the winding temperature is 20°C. As such, V_p is the product of I_p and R_M . At any temperature greater than 20°C, the required voltage to produce peak torque increases due to the increase in winding resistance. The design voltage is not a limit but a reference point for the data.

Megaflux Series Thin Ring Torque Motors

Connections

Peak Torque (T_p) is the nominal value of developed torque with the rated current I_p applied to the windings. For each winding specified, the product of peak current (I_p) and nominal torque sensitivity (K_T) gives T_p unless the maximum rated torque (T_R) is reached.

Peak Current (I_p) is the rated current used to obtain the nominal peak torque from the motor with nominal torque sensitivity (K_T). I_p is generally the design voltage divided by the terminal resistance (R_M).

Torque Sensitivity (K_T) is the ratio of the developed torque to the applied current for a specific winding. K_T is related to the BEMF Constant K_B .

No Load Speed (S_{NL}) is the theoretical no load speed of the motor with the design voltage applied.

BEMF Constant (K_B) is the ratio of terminal to terminal voltage generated in the winding to the speed of the rotor. K_B is proportional to K_T .

Terminal Resistance (R_M) is the winding resistance measured between any two leads of the winding in either a delta or wye configuration at 25°C.

Terminal Inductance (L_M) is the winding inductance measured between any two leads of the winding in either delta or wye configuration at 25°C.

Configuration Drawings

The drawings reflect the standard configurations for the frameless motors. Options include integrated Hall effects, encoders and special mechanical modifications such as rotor ID's and extensions, and cabling requirements.

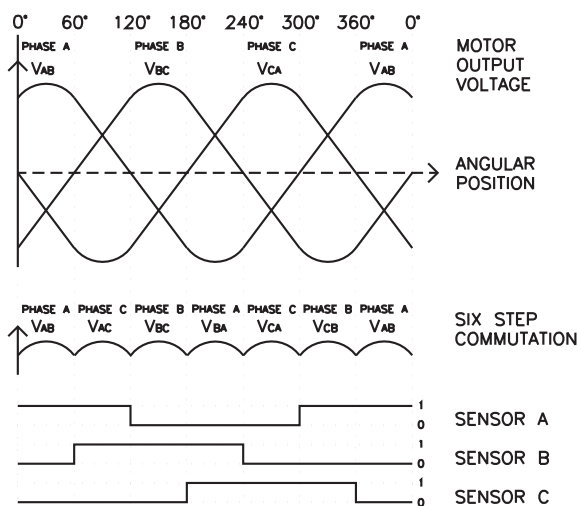
Standard Megaflux motors DO NOT include Hall effect sensors for commutation feedback. However, when installed, the rotor magnets are extended to provide a trigger for the Hall effects. The natural tendency is for the rotor to center axially which can create considerable axial loading and create difficulty when installing. Megaflux motors can be supplied with oversized rotors that naturally center while still providing an extension for Hall effect actuation.

A separate handling and installation guide is available.

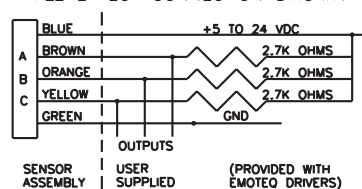
Motor Connections and Commutation Logic

MOTOR EXCITATION SEQUENCE AND SENSOR OUTPUT LOGIC FOR CW ROTATION VIEWING LEADWIRE END.

EXCITATION STEP		1	2	3	4	5	6	1
MOTOR LEADS	(RED) A	+	+	-	-	+	+	
	(WHT) B	-	-	+	+	-	-	
	(BLK) C	-	+	-	+	-	-	
SENSOR OUTPUTS	(BRN) A	1	1	0	0	0	1	1
	(ORG) B	0	1	1	1	0	0	0
	(YEL) C	0	0	0	1	1	1	0



HALL EFFECT CONNECTION DIAGRAM



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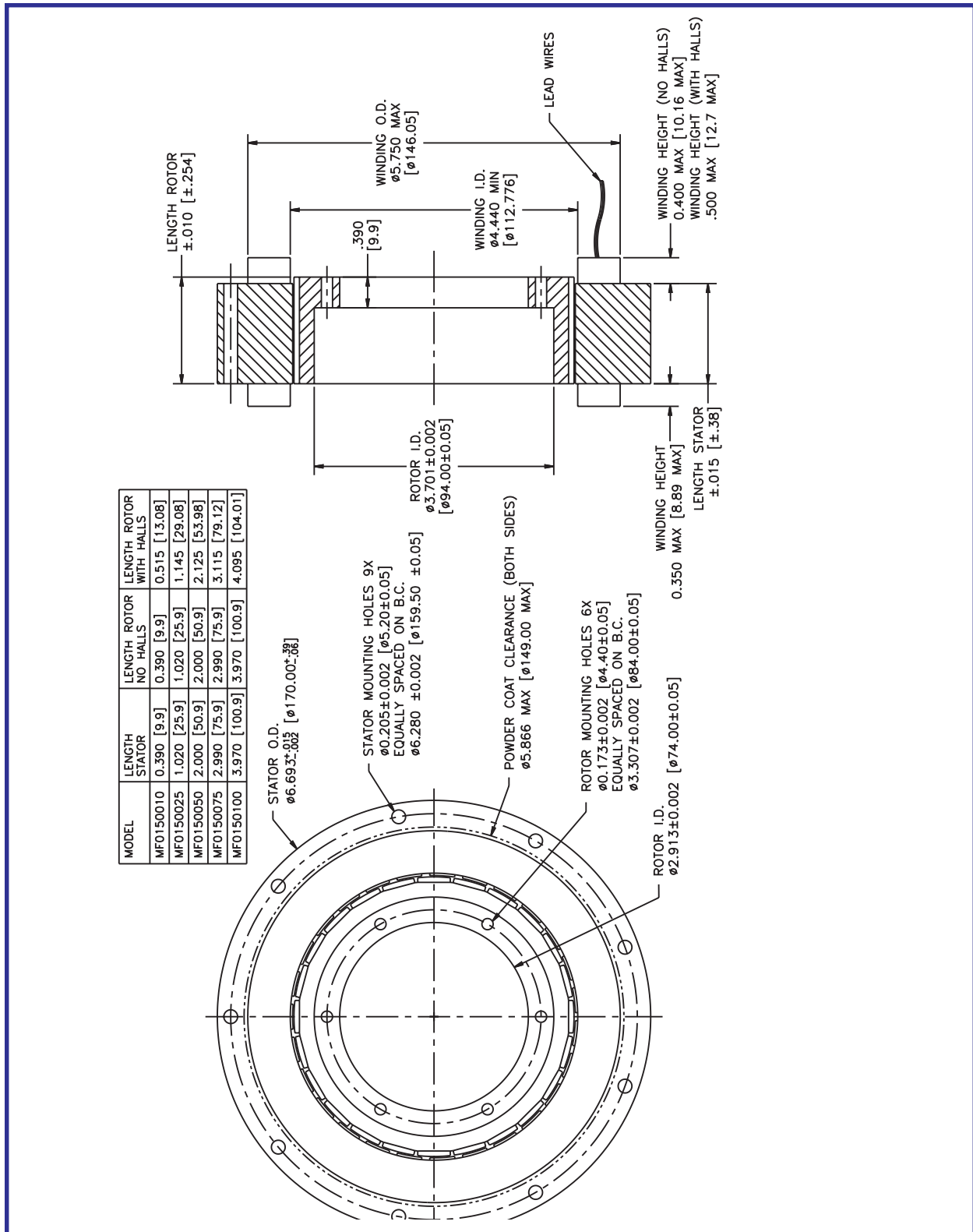
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Megaflux Series

MF0150

Thin Ring Torque Motors



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Megaflux Series

MF0150

Thin Ring Torque Motors

PARAMETER	SYMBOL	UNIT	MF0150010			MF0150025			MF0150050		
Motor Constants											
Max Cont. Stall Torque	T_C	lb.ft.	2.5			6.7			11.2		
		Nm	3.5			9.1			15.3		
Max Rated Torque, $\pm 25\%$	T_R	lb.ft.	14.3			37.5			86.8		
		Nm	19.4			50.9			117.7		
Motor Constant,	K_M	lb.ft./ \sqrt{W}	0.33			0.73			1.07		
		Nm/ \sqrt{W}	0.44			0.99			1.46		
Electrical Time Constant	T_E	msec	2.13			3.50			3.56		
Mechanical Time Constant	T_M	msec	5.05			2.75			2.54		
Thermal Resistance	TPR	$^{\circ}C/Watt$	1.25			0.85			0.70		
Viscous Damping	F_i	lb.ft./rpm	4.97E-5			1.4E-4			2.8E-4		
		Nm/rpm	6.73E-5			1.9E-4			3.8E-4		
Max Cogging Torque	T_F	lb.ft.	0.18			0.46			0.88		
		Nm	0.24			0.62			1.18		
Mechanical Constants											
Frameless Motor Inertia	J_M	lb.ft.s ²	7.51E-4			2.0E-3			4.0E-3		
		Kg.m ²	1.01E-3			2.7E-3			5.4E-3		
Frameless Motor Weight	Wt	lb.	2.47			6.02			11.77		
		Kg	1.12			2.73			5.34		
Number of Poles	N_p	-	24			24			24		
Winding Constants											
Design Voltage	V_p	Volts	A	B	C	A	B	C	A	B	C
Peak Torque	T_p	lb.ft.	48	150	300	48	150	300	48	150	300
		Nm	14.3	14.3	14.3	37.5	37.5	37.5	86.8	86.8	86.8
Peak Current	I_p	Amperes	19.4	19.4	19.4	50.9	50.9	50.9	117.7	117.2	117.7
Torque Constant, $\pm 10\%$	K_T	lb.ft./A	56.7	27.7	17.7	130.5	65.2	48.7	163.8	131.0	81.9
		Nm/A	0.253	0.519	0.808	0.288	0.575	0.767	0.530	0.662	1.060
No Load Speed	S_{NL}	RPM	0.343	0.703	1.096	0.390	0.780	1.040	0.718	0.898	1.437
		Rad/s	1293	1973	2533	1136	1775	2663	617	1544	1930
BEMF Constant, $\pm 10\%$	K_B	V/KRPM	135.4	206.7	265.3	119.0	185.9	278.9	64.6	161.7	202.1
		V/rad/s	35.96	73.63	114.70	40.8	81.67	108.90	75.23	94.04	150.46
Terminal Resistance, $\pm 12\%$	R_M	Ohms	0.343	0.703	1.096	0.390	0.780	1.040	0.718	0.898	1.437
Terminal Inductance, $\pm 30\%$	L_M	mH	0.584	2.52	5.93	0.154	0.615	1.084	0.242	0.360	0.988
			1.250	5.24	12.71	0.54	2.15	3.83	0.861	1.346	3.445

PARAMETER	SYMBOL	UNIT	MF0150075			MF0150100					
Motor Constants											
Max Cont. Stall Torque	T_C	lb.ft.	15.7			20.3					
		Nm	21.3			27.6					
Max Rated Torque, $\pm 25\%$	T_R	lb.ft.	129.9			172.6					
		Nm	176.2			234.1					
Motor Constant,	K_M	lb.ft./ \sqrt{W}	1.38			1.64					
		Nm/ \sqrt{W}	1.88			2.23					
Electrical Time Constant	T_E	msec	3.89			4.08					
Mechanical Time Constant	T_M	msec	2.29			2.17					
Thermal Resistance	TPR	$^{\circ}C/Watt$	0.60			0.50					
Viscous Damping	F_i	lb.ft./rpm	4.3E-4			6.0E-4					
		Nm/rpm	5.9E-e			8.2E-4					
Max Cogging Torque	T_F	lb.ft.	1.20			1.79					
		Nm	1.62			2.41					
Mechanical Constants											
Frameless Motor Inertia	J_M	lb.ft.s ²	6.0E-3			7.9E-3					
		Kg.m ²	8.1E-3			0.011					
Frameless Motor Weight	Wt	lb.	17.49			23.15					
		Kg	7.93			10.50					
Number of Poles	N_p	-	24			24					
Winding Constants											
Design Voltage	V_p	Volts	A	B	C	A	B	C			
Peak Torque	T_p	lb.ft.	48	150	300	48	150	300			
		Nm	129.9	129.9	129.9	164.1	172.6	172.8			
Peak Current	I_p	Amperes	176.2	176.2	176.2	222.5	234.1	234.1			
Torque Constant, $\pm 10\%$	K_T	lb.ft./A	218.1	145.4	109.0	207.2	145.3	109			
		Nm/A	0.596	0.894	1.191	0.792	1.188	1.584			
No Load Speed	S_{NL}	RPM	0.808	1.212	1.615	1.074	1.611	2.148			
		Rad/s	549	1144	1716	413	860	1291			
BEMF Constant, $\pm 10\%$	K_B	V/KRPM	57.53	119.8	179.8	43.27	90.14	135.22			
		V/rad/s	84.58	126.87	169.16	112.46	168.69	224.92			
Terminal Resistance, $\pm 12\%$	R_M	Ohms	0.808	1.212	1.615	1.074	1.611	2.148			
Terminal Inductance, $\pm 30\%$	L_M	mH	0.184	0.414	0.736	0.232	0.521	0.926			
			0.716	1.612	2.865	0.946	2.128	3.783			

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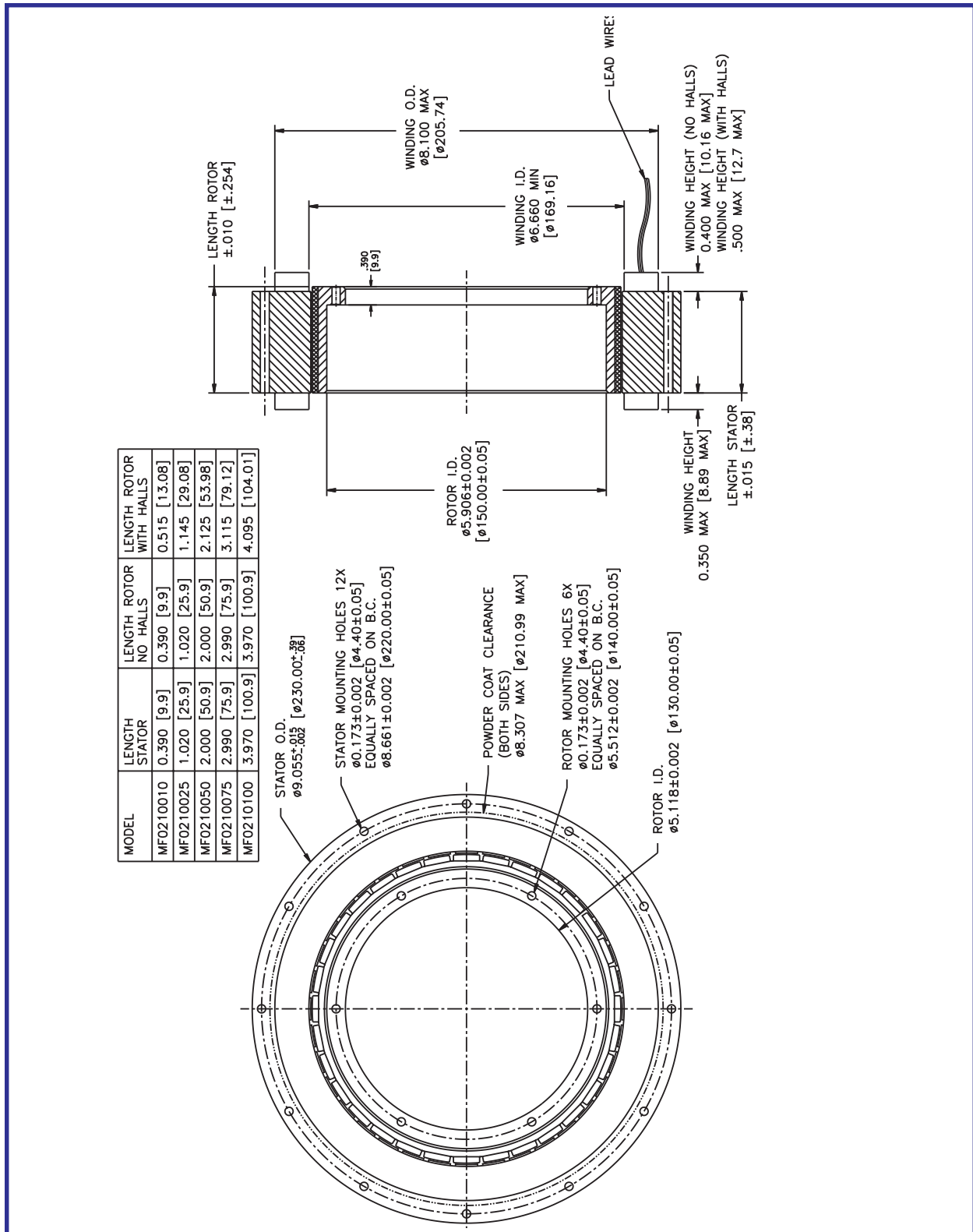
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Megaflux Series

MF0210

Thin Ring Torque Motors



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Megaflux Series

MF0210

Thin Ring Torque Motors

PARAMETER	SYMBOL	UNIT	MF0210010			MF0210025			MF0210050		
Motor Constants											
Max Cont. Stall Torque	T_C	lb.ft. Nm	6.4 8.7			16.0 21.7			30.3 41.1		
Max Rated Torque, $\pm 25\%$	T_R	lb.ft. Nm	43.7 59.3			114.6 155.4			225.5 305.7		
Motor Constant,	K_M	lb.ft./VW Nm/VW	0.71 0.96			1.51 2.04			2.45 3.32		
Electrical Time Constant	T_E	msec	3.10			4.64			5.89		
Mechanical Time Constant	T_M	msec	5.64			3.36			2.53		
Thermal Resistance	TPR	$^{\circ}\text{C}/\text{Watt}$	0.93			0.68			0.50		
Viscous Damping	F_I	lb.ft./rpm Nm/rpm	1.7E-4 2.4E-4			4.8E-4 6.5E-4			7.7E-4 1.0E-3		
Max Cogging Torque	T_F	lb.ft. Nm	0.27 0.36			0.72 0.97			1.36 1.83		
Mechanical Constants											
Frameless Motor Inertia	J_M	lb.ft.s ² Kg.m ²	3.8E-3 5.2E-4			0.010 0.014			0.021 0.028		
Frameless Motor Weight	Wt	lb. Kg	3.70 1.68			8.76 3.97			16.79 7.61		
Number of Poles	N_P	-	32			32			32		
Winding Constants											
			A	B	C	A	B	C	A	B	C
Design Voltage	V_p	Volts	48	150	300	48	150	300	48	150	300
Peak Torque	T_P	lb.ft. Nm	43.7 59.3	43.7 59.3	43.7 59.3	114.6 155.4	225.5 305.7	225.5 305.7	225.5 305.7	225.5 305.7	225.5 305.7
Peak Current	I_P	Amperes	124.2	54.8	40.5	261.8	165.6	140.1	455.4	165.6	140.1
Torque Constant, $\pm 10\%$	K_T	lb.ft./A Nm/A	0.352 0.478	0.798 1.082	1.080 1.464	0.438 0.594	1.362 1.846	1.609 2.182	0.495 0.671	1.362 1.846	1.609 2.182
No Load Speed	S_{NL}	RPM Rad/s	924 96.8	1275 133.5	1884 197.3	743 77.8	748 78.3	1266 132.6	658 68.9	748 78.3	1266 132.61
BEMF Constant, $\pm 10\%$	K_B	V/KRPM V/rad/s	50.0 0.478	113.35 1.082	153.36 1.464	62.18 0.594	193.34 1.846	228.49 2.182	70.30 0.671	193.34 1.846	228.49 2.182
Terminal Resistance, $\pm 12\%$	R_M	Ohms	0.246	1.257	2.274	0.084	0.309	0.458	0.041	0.309	0.458
Terminal Inductance, $\pm 30\%$	L_M	mH	0.765	3.931	7.195	0.390	1.820	2.543	0.241	1.820	2.543

PARAMETER	SYMBOL	UNIT	MF0210075			MF0210100					
Motor Constants											
Max Cont. Stall Torque	T_C	lb.ft. Nm	48.4 65.6			61.7 83.6					
Max Rated Torque, $\pm 25\%$	T_R	lb.ft. Nm	337.2 457.2			447.7 607.1					
Motor Constant,	K_M	lb.ft./VW Nm/VW	3.14 4.27			3.72 5.05					
Electrical Time Constant	T_E	msec	6.405			6.698					
Mechanical Time Constant	T_M	msec	2.306			2.190					
Thermal Resistance	TPR	$^{\circ}\text{C}/\text{Watt}$	0.325			0.280					
Viscous Damping	F_I	lb.ft./rpm Nm/rpm	1.5E-3 2.0E-3			2.1E-3 2.9E-3					
Max Cogging Torque	T_F	lb.ft. Nm	1.99 2.68			2.76 3.72					
Mechanical Constants											
Frameless Motor Inertia	J_M	lb.ft.s ² Kg.m ²	0.031 0.042			0.041 0.056					
Frameless Motor Weight	Wt	lb. Kg	24.81 11.25			32.76 14.86					
Number of Poles	N_P	-	32			32					
Winding Constants											
			A	B	C	A	B	C			
Design Voltage	V_p	Volts	48	150	300	48	150	300			
Peak Torque	T_P	lb.ft. Nm	337.2 457.2	337.2 457.2	337.2 457.2	447.7 607.1	447.7 607.1	447.7 607.1			
Peak Current	I_P	Amperes	454.6	303.1	202.0	454.2	302.8	227.1			
Torque Constant, $\pm 10\%$	K_T	lb.ft./A Nm/A	0.742 1.006	1.113 1.508	1.669 2.263	0.986 1.337	1.479 2.005	1.972 2.673			
No Load Speed	S_{NL}	RPM Rad/s	439 46.03	915 95.90	1221 127.87	330 34.64	689 72.16	1033 108.24			
BEMF Constant, $\pm 10\%$	K_B	V/KRPM V/rad/s	105.31 1.006	157.96 1.508	236.95 2.263	139.95 1.337	209.93 2.005	279.91 2.673			
Terminal Resistance, $\pm 12\%$	R_M	Ohms	0.055	0.130	0.275	0.070	0.165	0.307			
Terminal Inductance, $\pm 30\%$	L_M	mH	0.355	0.799	1.799	0.469	1.055	1.875			

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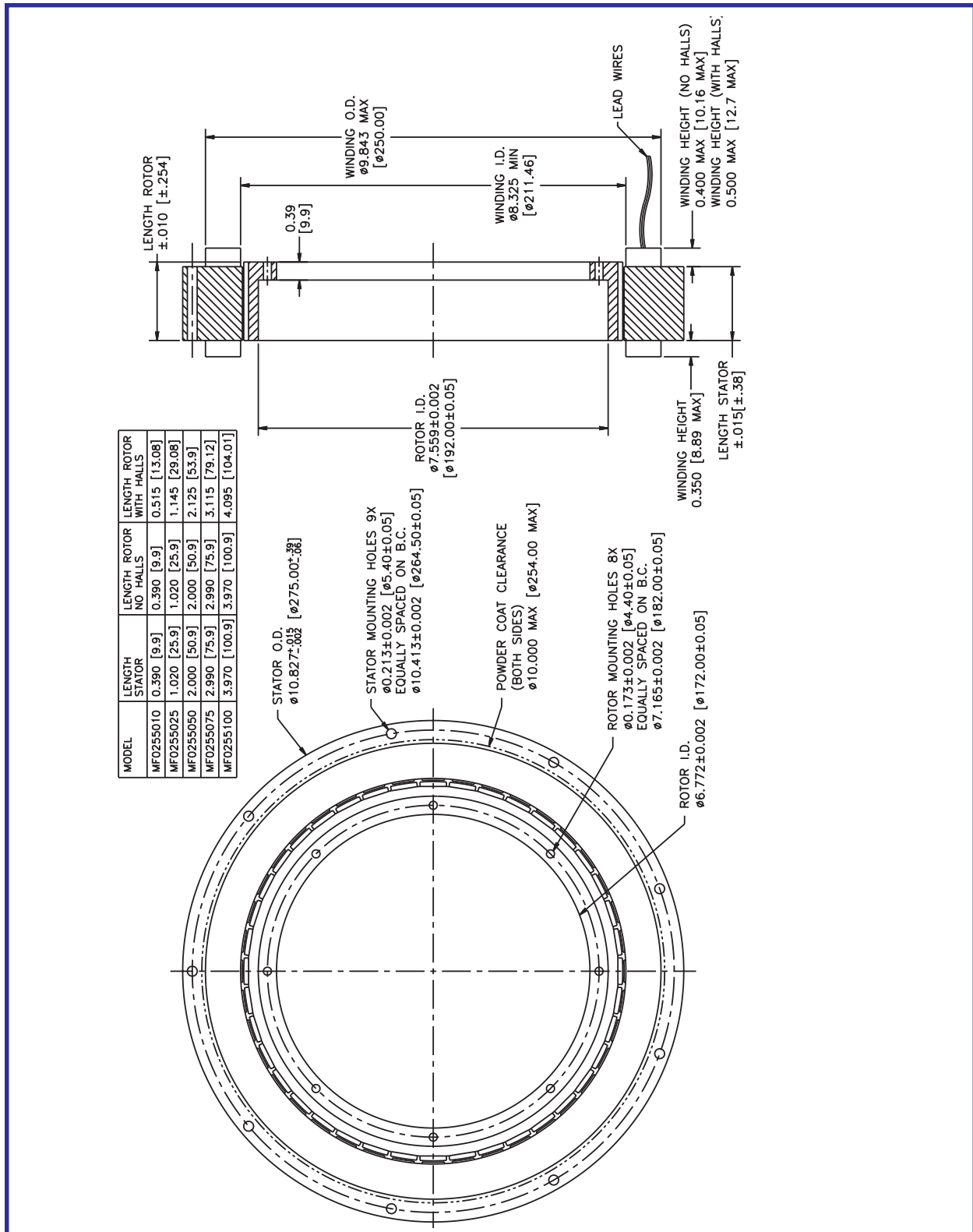
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Megaflux Series

MF0255

Thin Ring Torque Motors



**Allied Motion
Technologies
Emoteq Corp**

Emoteq Corporation
10002 E. 43rd St. South
Tulsa, OK 74146
USA
Tel 800 433 3434

www.grp6.com

Megaflux Series

MF0255

Thin Ring Torque Motors

PARAMETER	SYMBOL	UNIT	MF0255010			MF0255025			MF0255050		
Motor Constants											
Max Cont. Stall Torque	T_C	lb.ft. Nm	8.9 12.0			22.8 31.0			44.2 60.0		
Max Rated Torque, $\pm 25\%$	T_R	lb.ft. Nm	51.1 69.3			133.5 181.0			261.3 354.5		
Motor Constant,	K_M	lb.ft./V Nm/V	0.96 1.30			2.05 2.78			3.17 4.30		
Electrical Time Constant	T_E	msec	3.38			5.144			5.994		
Mechanical Time Constant	T_M	msec	7.64			4.539			3.770		
Thermal Resistance	TPR	$^{\circ}\text{C}/\text{Watt}$	0.90			0.620			0.395		
Viscous Damping	F_I	lb.ft./rpm Nm/rpm	3.3E-4 4.5E-4			9.4E-4 1.2E-3			1.9E-3 2.6E-3		
Max Cogging Torque	T_F	lb.ft. Nm	0.33 0.44			0.70 0.95			1.40 1.89		
Mechanical Constants											
Frameless Motor Inertia	J_M	lb.ft.s ² Kg.m ²	9.6E-3 0.013			0.026 0.035			0.052 0.070		
Frameless Motor Weight	Wt	lb. Kg	4.72 2.14			11.24 5.10			21.25 9.64		
Number of Poles	N_P	-	40			40			40		
Winding Constants											
Design Voltage	V_p	Volts	A	B	C	A	B	C	A	B	C
Peak Torque	T_P	lb.ft. Nm	48 69.3	150 69.3	300 69.3	48 181.0	150 181.0	300 181.0	48 354.5	150 354.5	300 354.5
Peak Current	I_P	Amperes	119.4	68.2	37.7	200.8	117.1	66.9	279.6	174.6	107.4
Torque Constant, $\pm 10\%$	K_T	lb.ft./A Nm/A	0.428 0.581	0.750 1.016	1.356 1.839	0.665 0.902	1.140 1.545	1.995 2.705	0.936 1.269	1.497 2.030	2.433 3.299
No Load Speed	S_{NL}	RPM Rad/s	762 79.7	1360 142.4	1503 157.4	490 51.4	894 93.6	1022 107.0	348 36.5	681 71.3	838 87.7
BEMF Constant, $\pm 10\%$	K_B	V/KRPM V/rad/s	60.81 0.581	106.42 1.016	192.56 1.839	94.40 0.902	161.84 1.545	283.22 2.705	132.87 1.269	212 2.030	345.46 3.299
Terminal Resistance, $\pm 12\%$	R_M	Ohms	0.197	0.605	2.158	0.105	0.307	0.991	0.087	0.216	0.571
Terminal Inductance, $\pm 30\%$	L_M	mH	0.669	2.048	6.708	0.538	1.581	4.842	0.521	1.333	3.521

PARAMETER	SYMBOL	UNIT	MF0255075			MF0255100					
Motor Constants											
Max Cont. Stall Torque	T_C	lb.ft. Nm	65.9 89.4			86.0 116.6					
Max Rated Torque, $\pm 25\%$	T_R	lb.ft. Nm	390.8 529.9			518.9 703.5					
Motor Constant,	K_M	lb.ft./V Nm/V	4.07 5.52			4.75 6.45					
Electrical Time Constant	T_E	msec	6.503			6.632					
Mechanical Time Constant	T_M	msec	3.434			3.347					
Thermal Resistance	TPR	$^{\circ}\text{C}/\text{Watt}$	0.293			0.235					
Viscous Damping	F_I	lb.ft./rpm Nm/rpm	3.0E-3 4.1E-3			4.0E-3 5.4E-3					
Max Cogging Torque	T_F	lb.ft. Nm	2.00 2.70			2.87 3.88					
Mechanical Constants											
Frameless Motor Inertia	J_M	lb.ft.s ² Kg.m ²	0.077 0.105			0.103 0.139					
Frameless Motor Weight	Wt	lb. Kg	31.46 14.27			41.45 18.80					
Number of Poles	N_P	-	40			40					
Winding Constants											
Design Voltage	V_p	Volts	A	B	C	A	B	C			
Peak Torque	T_P	lb.ft. Nm	390.8 529.9	390.8 529.9	390.8 529.9	518.9 703.5	518.9 703.5	518.9 703.5			
Peak Current	I_P	Amperes	348.6	232.4	154.9	464.3	278.6	199.0			
Torque Constant, $\pm 10\%$	K_T	lb.ft./A Nm/A	1.121 1.520	1.682 2.280	2.523 3.421	1.118 1.515	1.863 2.525	2.608 3.535			
No Load Speed	S_{NL}	RPM Rad/s	291 30.4	606 63.5	808 84.6	292 30.5	547 57.3	782 81.9			
BEMF Constant, $\pm 10\%$	K_B	V/KRPM V/rad/s	159.19 1.520	238.79 2.280	358.19 3.421	158.67 1.515	264.45 2.525	370.23 3.535			
Terminal Resistance, $\pm 12\%$	R_M	Ohms	0.076	0.163	0.379	0.055	0.150	0.304			
Terminal Inductance, $\pm 30\%$	L_M	mH	0.493	1.108	2.494	0.366	1.016	1.991			

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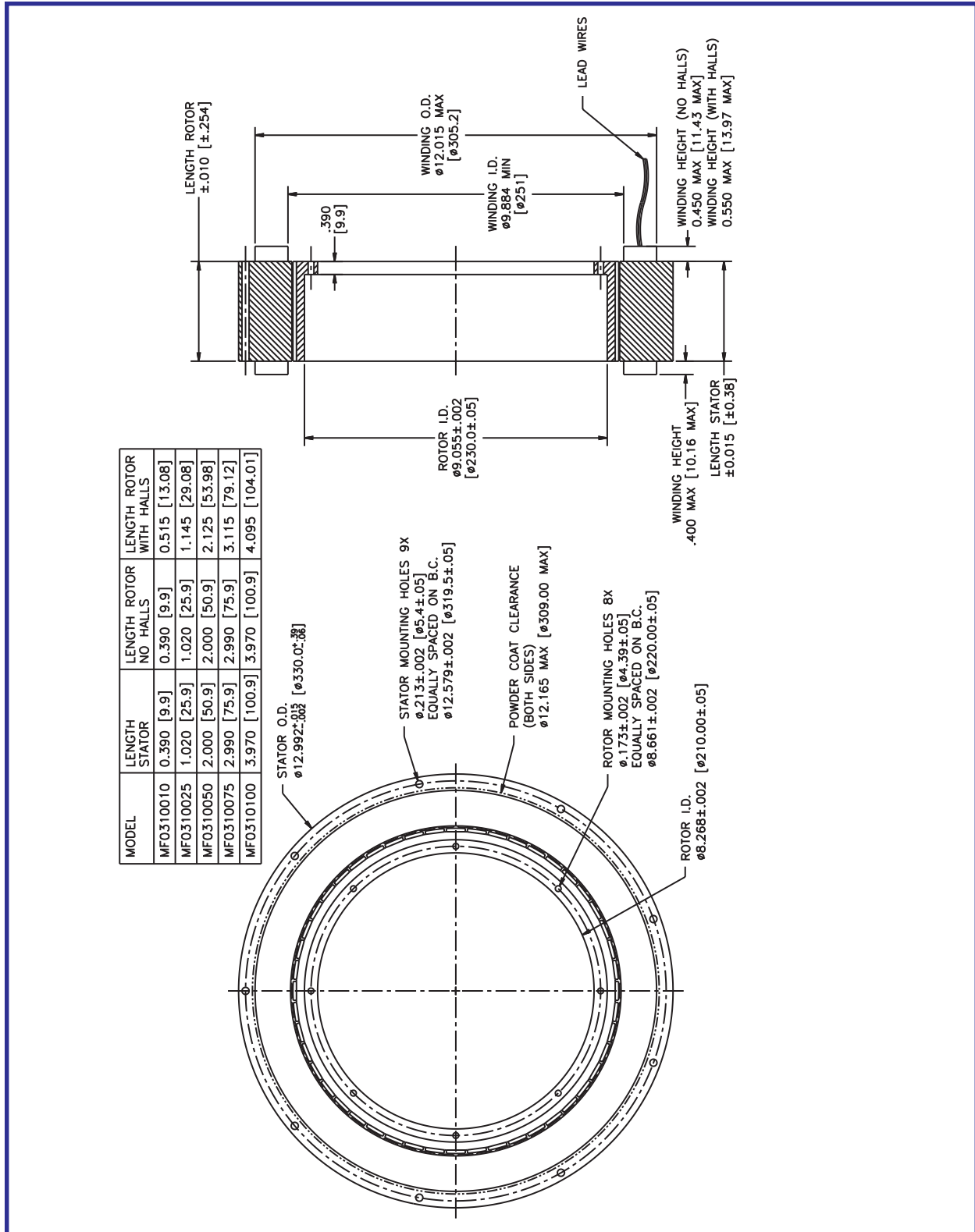
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Megaflux Series

MF0310

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Megaflux Series

MF0310

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PARAMETER	SYMBOL	UNIT	MF0310010			MF0310025			MF0310050		
Motor Constants											
Max Cont. Stall Torque	T_C	lb.ft. Nm	15.1 20.5			36.2 49.1			74.0 100.4		
Max Rated Torque, $\pm 25\%$	T_R	lb.ft. Nm	74.4 100.9			194.6 263.8			381.4 517.1		
Motor Constant,	K_M	lb.ft./V Nm/V	1.49 2.03			3.12 4.23			5.10 6.92		
Electrical Time Constant	T_E	msec	4.95			7.22			9.46		
Mechanical Time Constant	T_M	msec	6.33			3.95			2.92		
Thermal Resistance	TPR	$^{\circ}\text{C}/\text{Watt}$	0.750			0.570			0.365		
Viscous Damping	F_I	lb.ft./rpm Nm/rpm	6.8E-4 9.2E-4			1.9E-3 2.6E-3			4.2E-3 5.7E-3		
Max Cogging Torque	T_F	lb.ft. Nm	0.30 0.41			0.80 1.08			1.43 1.93		
Mechanical Constants											
Frameless Motor Inertia	J_M	lb.ft.s ² Kg.m ²	0.019 0.026			0.052 0.071			0.103 0.140		
Frameless Motor Weight	Wt	lb. Kg	6.942 3.149			15.92 7.22			30.46 13.81		
Number of Poles	N_P	-	48			48			48		
Winding Constants											
			A	B	C	A	B	C	A	B	C
Design Voltage	V_p	Volts	48	150	300	48	150	300	48	150	300
Peak Torque	T_p	lb.ft. Nm	74.4 100.9	74.4 100.9	74.4 100.97	194.6 263.8	194.6 263.8	194.6 263.8	381.4 517.1	381.4 517.1	381.4 517.1
Peak Current	I_p	Amperes	144.2	84.8	46.51	202.0	117.8	74.4	234.2	175.7	117.1
Torque Constant, $\pm 10\%$	K_T	lb.ft./A Nm/A	0.516 0.700	0.878 1.190	1.601 2.171	0.964 1.306	1.652 2.240	2.615 3.546	1.628 2.207	2.171 2.943	3.256 4.415
No Load Speed	S_{NL}	RPM Rad/s	631 66.1	1161 121.6	1274 133.4	338 35.4	617 64.6	779 81.7	200 20.9	469 49.2	626 65.6
BEMF Constant, $\pm 10\%$	K_B	V/KRPM V/rad/s	73.32 0.700	124.65 1.190	227.30 2.171	136.80 1.306	234.52 2.240	371.32 3.546	231.16 2.207	308.21 2.943	462.32 4.415
Terminal Resistance, $\pm 12\%$	R_M	Ohms	0.119	0.394	1.166	0.095	0.263	0.691	0.102	0.181	0.407
Terminal Inductance, $\pm 30\%$	L_M	mH	0.589	1.702	5.658	0.688	2.022	5.070	0.962	1.711	3.849

PARAMETER	SYMBOL	UNIT	MF0310075			MF0310100					
Motor Constants											
Max Cont. Stall Torque	T_C	lb.ft. Nm	110.6 150.0			148.9 201.9					
Max Rated Torque, $\pm 25\%$	T_R	lb.ft. Nm	569.9 772.6			760.1 1030.6					
Motor Constant,	K_M	lb.ft./V Nm/V	6.56 8.89			7.788 10.560					
Electrical Time Constant	T_E	msec	10.318			10.822					
Mechanical Time Constant	T_M	msec	2.653			2.51					
Thermal Resistance	TPR	$^{\circ}\text{C}/\text{Watt}$	0.270			0.210					
Viscous Damping	F_I	lb.ft./rpm Nm/rpm	6.8E-3 9.3E-3			0.010 0.014					
Max Cogging Torque	T_F	lb.ft. Nm	2.14 2.91			3.05 4.11					
Mechanical Constants											
Frameless Motor Inertia	J_M	lb.ft.s ² Kg.m ²	0.155 0.210			0.207 0.281					
Frameless Motor Weight	Wt	lb. Kg	44.93 20.38			59.52 26.99					
Number of Poles	N_P	-	48			48					
Winding Constants											
			A	B	C	A	B	C			
Design Voltage	V_p	Volts	48	150	300	48	150	300			
Peak Torque	T_p	lb.ft. Nm	569.9 772.6	59.9 772.6	569.9 772.6	760.1 1030.6	760.1 1030.6	760.1 1030.6			
Peak Current	I_p	Amperes	280.5	233.7	175.3	233.5	175.1	140.1			
Torque Constant, $\pm 10\%$	K_T	lb.ft./A Nm/A	2.031 2.754	2.438 3.305	3.250 4.407	3.254 4.412	4.339 5.883	5.424 7.354			
No Load Speed	S_{NL}	RPM Rad/s	160.66 16.8	418 43.8	627 65.7	100 10.5	235 24.6	376 39.3			
BEMF Constant, $\pm 10\%$	K_B	V/KRPM V/rad/s	288.42 2.754	346.10 3.305	461.74 4.407	462.04 4.412	616.06 5.883	770.07 7.354			
Terminal Resistance, $\pm 12\%$	R_M	Ohms	0.096	0.138	0.262	0.175	0.310	0.485			
Terminal Inductance, $\pm 30\%$	L_M	mH	0.989	1.423	2.531	1.889	3.359	5.248			

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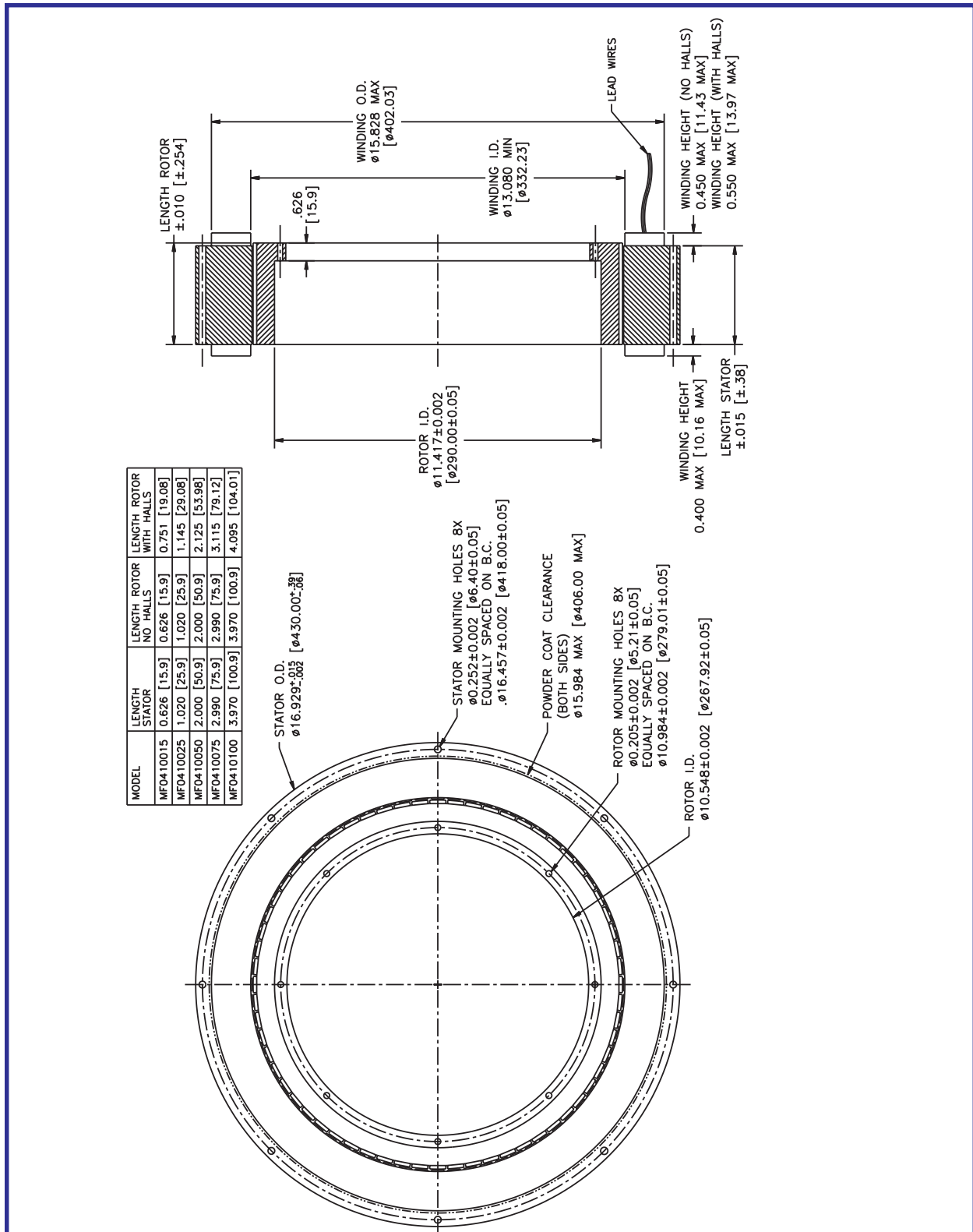
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MF0410

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PARAMETER	SYMBOL	UNIT	MF0410015			MF0410025			MF0410050		
Motor Constants											
Max Cont. Stall Torque	T_C	lb.ft. Nm	56.6 76.7			95.4 129.3			165.2 224.0		
Max Rated Torque, $\pm 25\%$	T_R	lb.ft. Nm	239.9 325.3			390.6 529.6			765.2 1037.5		
Motor Constant,	K_M	lb.ft./V Nm/V	3.65 4.95			5.52 7.48			8.43 11.43		
Electrical Time Constant	T_E	msec	7.55			10.07			11.52		
Mechanical Time Constant	T_M	msec	5.38			3.89			3.30		
Thermal Resistance	TPR	$^{\circ}\text{C}/\text{Watt}$	0.320			0.257			0.200		
Viscous Damping	F_I	lb.ft./rpm Nm/rpm	3.2E-3 4.4E-3			5.3E-3 7.2E-3			0.012 0.016		
Max Cogging Torque	T_F	lb.ft. Nm	0.60 0.81			1.10 1.48			2.05 2.76		
Mechanical Constants											
Frameless Motor Inertia	J_M	lb.ft.s ² Kg.m ²	0.098 0.132			0.161 0.218			0.319 0.432		
Frameless Motor Weight	Wt	lb. Kg	19.06 8.64			29.40 13.34			55.03 24.96		
Number of Poles	N_p	-	64			64			64		
Winding Constants											
Design Voltage	V_p	Volts	A	B	C	A	B	C	A	B	C
Peak Torque	T_p	lb.ft. Nm	48	150	300	48	150	300	48	150	300
Peak Current	I_p	Amperes	239.9	239.9	239.9	390.6	390.6	390.6	765.2	765.2	765.2
Torque Constant, $\pm 10\%$	K_T	lb.ft./A Nm/A	0.887	1.478	2.216	0.970	1.698	2.668	2.392	2.870	3.826
No Load Speed	S_{NL}	RPM Rad/s	1.202	2.003	3.005	1.315	2.302	3.617	3.242	3.891	5.188
BEMF Constant, $\pm 10\%$	K_B	V/KRPM V/rad/s	367	689	919	335	599	763	136	354	532
Terminal Resistance, $\pm 12\%$	R_M	Ohms	38.4	72.1	96.2	35.1	62.8	79.9	14.2	37.1	55.7
Terminal Inductance, $\pm 30\%$	L_M	mH	125.87	209.78	314.67	137.75	241.06	378.81	339.55	407	543.28
			1.202	2.003	3.005	1.315	2.302	3.617	3.242	3.891	5.188
			0.059	0.163	0.368	0.031	0.093	0.231	0.080	0.113	0.201
			0.445	1.235	2.779	0.311	0.953	2.353	0.927	1.335	2.373

PARAMETER	SYMBOL	UNIT	MF0410075			MF0410100					
Motor Constants											
Max Cont. Stall Torque	T_C	lb.ft. Nm	238.4 323.2			324.9 440.5					
Max Rated Torque, $\pm 25\%$	T_R	lb.ft. Nm	1143.6 1550.5			1518.2 2058.4					
Motor Constant,	K_M	lb.ft./V Nm/V	10.98 14.89			13.31 18.05					
Electrical Time Constant	T_E	msec	12.90			14.19					
Mechanical Time Constant	T_M	msec	2.92			2.64					
Thermal Resistance	TPR	$^{\circ}\text{C}/\text{Watt}$	0.163			0.129					
Viscous Damping	F_I	lb.ft./rpm Nm/rpm	0.023 0.031			0.031 0.041					
Max Cogging Torque	T_F	lb.ft. Nm	3.04 4.10			4.14 5.58					
Mechanical Constants											
Frameless Motor Inertia	J_M	lb.ft.s ² Kg.m ²	0.478 0.648			0.636 0.862					
Frameless Motor Weight	Wt	lb. Kg	81.66 37.04			108.46 49.19					
Number of Poles	N_p	-	64			64					
Winding Constants											
Design Voltage	V_p	Volts	A	B	C	A	B	C			
Peak Torque	T_p	lb.ft. Nm	48	150	300	48	150	300			
Peak Current	I_p	Amperes	1143.6	1143.6	1143.6	1518.2	1518.2	1518.2			
Torque Constant, $\pm 10\%$	K_T	lb.ft./A Nm/A	1550.5	1550.5	1550.5	2058.4	2058.4	2058.4			
No Load Speed	S_{NL}	RPM Rad/s	266.0	199.5	159.6	318.8	265.7	199.3			
BEMF Constant, $\pm 10\%$	K_B	V/KRPM V/rad/s	4.299	5.732	7.164	4.761	5.713	7.618			
Terminal Resistance, $\pm 12\%$	R_M	Ohms	5.828	7.771	9.714	6.455	7.746	10.328			
Terminal Inductance, $\pm 30\%$	L_M	mH	75	177	284	68	178	267			
			7.9	18.6	29.7	7.1	18.6	28.0			
			610.32	813.76	1017.20	675.96	811.16	1081.55			
			5.828	7.77	9.71	6.45	7.746	10.32			
			0.153	0.259	0.409	0.128	0.193	0.343			
			1.977	3.514	5.490	1.813	2.611	4.642			

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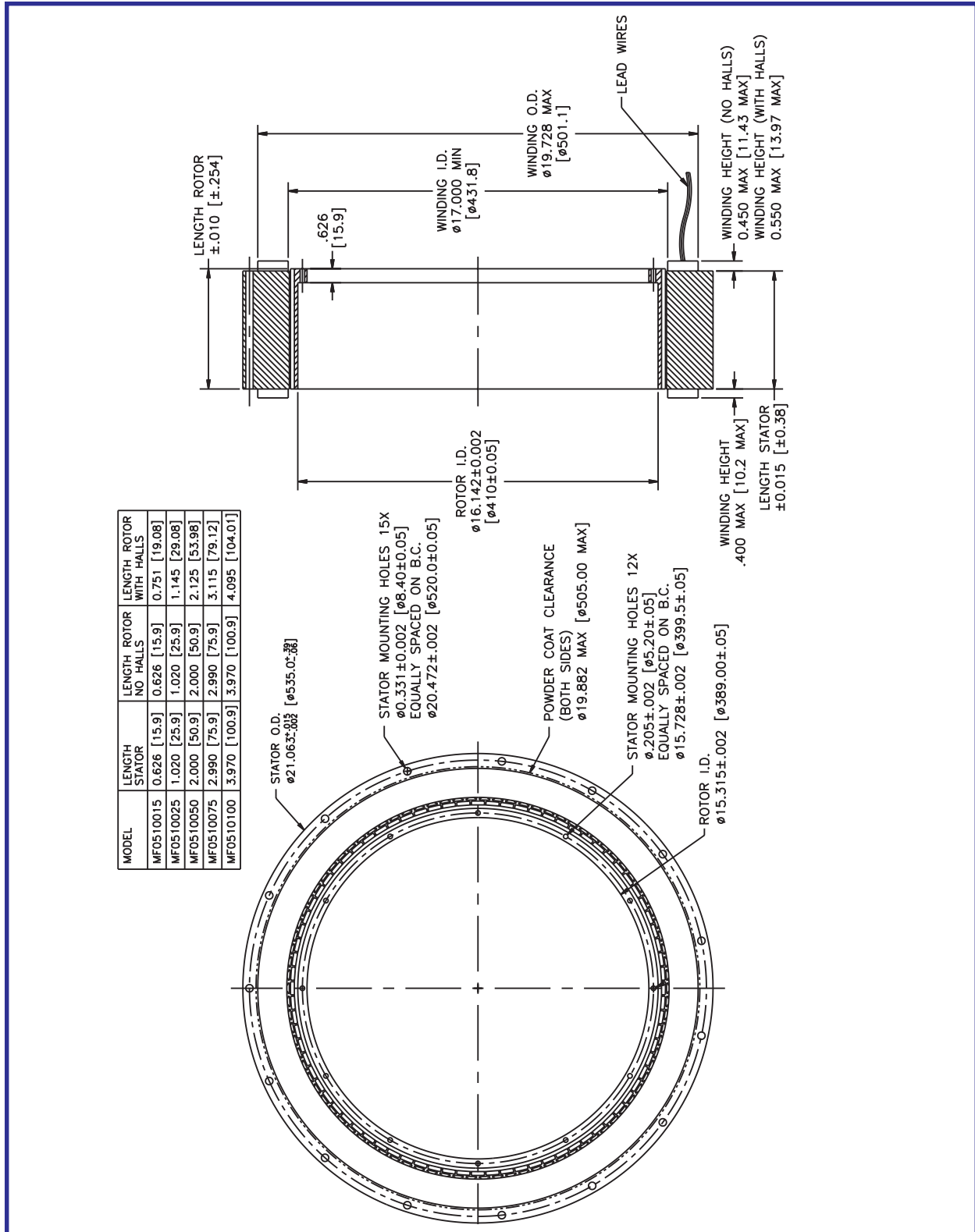
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PARAMETER	SYMBOL	UNIT	MF0510015			MF0510025			MF0510050		
Motor Constants											
Max Cont. Stall Torque	T_C	lb.ft. Nm	89.3 121.0			144.6 196.0			277.9 376.8		
Max Rated Torque, $\pm 25\%$	T_R	lb.ft. Nm	598.6 811.6			974.8 1321.7			1910.1 2589.8		
Motor Constant,	K_M	lb.ft./VW Nm/VW	5.91 8.02			8.52 11.56			13.45 18.24		
Electrical Time Constant	T_E	msec	8.31			10.14			12.42		
Mechanical Time Constant	T_M	msec	5.97			4.71			3.73		
Thermal Resistance	TPR	$^{\circ}$ C/Watt	0.337			0.267			0.180		
Viscous Damping	F_I	lb.ft./rpm Nm/rpm	7.7E-3 0.011			0.013 0.018			0.033 0.045		
Max Cogging Torque	T_F	lb.ft. Nm	0.67 0.91			1.21 1.63			2.32 3.13		
Mechanical Constants											
Frameless Motor Inertia	J_M	lb.ft.s ² Kg.m ²	0.284 0.384			0.465 0.630			0.917 1.243		
Frameless Motor Weight	Wt	lb. Kg	21.48 9.74			33.18 15.05			62.28 28.25		
Number of Poles	N_P	-	80			80			80		
Winding Constants											
Design Voltage	V_p	Volts	48	150	300	48	150	300	48	150	300
Peak Torque	T_p	lb.ft. Nm	598.6 811.6	598.6 811.6	598.6 811.6	974.8 1321.7	974.8 1321.7	974.8 1321.7	1863.6 2526.8	1910.1 2589.8	1910.1 2589.8
Peak Current	I_p	Amperes	412.3	353.4	224.9	410.9	352.2	224.1	399.5	351.0	245.7
Torque Constant, $\pm 10\%$	K_T	lb.ft./A Nm/A	1.452 1.968	1.694 2.296	2.661 3.608	2.372 3.216	2.767 3.752	4.349 5.896	4.664 6.323	5.441 7.377	7.773 10.539
No Load Speed	S_{NL}	RPM Rad/s	223 23.4	599 62.7	762 79.8	136 14.3	366 38.4	466 48.8	69 7.2	186 19.5	261 27.3
BEMF Constant, $\pm 10\%$	K_B	V/KRPM V/rad/s	206.10 1.968	240.46 2.296	377.86 3.608	336.78 3.216	392.91 3.752	617.44 5.896	662.19 6.323	772.55 7.377	1103.65 10.53
Terminal Resistance, $\pm 12\%$	R_M	Ohms	0.060	0.082	0.206	0.077	0.105	0.264	0.120	0.164	0.349
Terminal Inductance, $\pm 30\%$	L_M	mH	0.501	0.681	1.683	0.785	1.068	2.638	1.492	2.031	4.144

PARAMETER	SYMBOL	UNIT	MF0510075			MF0510100					
Motor Constants											
Max Cont. Stall Torque	T_C	lb.ft. Nm	430.5 583.6			542.7 735.91					
Max Rated Torque, $\pm 25\%$	T_R	lb.ft. Nm	2855.0 3870.8			3790.2 5138.9					
Motor Constant,	K_M	lb.ft./VW Nm/VW	17.36 23.54			20.54 27.85					
Electrical Time Constant	T_E	msec	13.66			14.30					
Mechanical Time Constant	T_M	msec	3.35			3.19					
Thermal Resistance	TPR	$^{\circ}$ C/Watt	0.125			0.110					
Viscous Damping	F_I	lb.ft./rpm Nm/rpm	0.055 0.075			0.084 0.114					
Max Cogging Torque	T_F	lb.ft. Nm	3.10 4.18			4.53 6.11					
Mechanical Constants											
Frameless Motor Inertia	J_M	lb.ft.s ² Kg.m ²	1.373 1.862			1.825 2.474					
Frameless Motor Weight	Wt	lb. Kg	91.87 41.67			121.02 54.89					
Number of Poles	N_P	-	80			80					
Winding Constants											
Design Voltage	V_p	Volts	48	150	300	48	150	300			
Peak Torque	T_p	lb.ft. Nm	2489.6 3375.5	2855.0 3870.8	2855.1 3870.8	2621.7 3554.5	3790.2 5138.9	3790.2 5138.9			
Peak Current	I_p	Amperes	428.0	409.0	306.8	339.3	408.8	306.6			
Torque Constant, $\pm 10\%$	K_T	lb.ft./A Nm/A	5.816 7.885	6.979 9.462	9.306 12.617	7.726 10.475	9.271 12.570	12.361 16.760			
No Load Speed	S_{NL}	RPM Rad/s	55 5.8	145 15.2	218 22.8	42 4.4	109 11.4	164 17.1			
BEMF Constant, $\pm 10\%$	K_B	V/KRPM V/rad/s	825.75 7.885	990.90 9.462	1321.21 12.617	1096.91 10.475	1316.30 12.570	1755.06 16.760			
Terminal Resistance, $\pm 12\%$	R_M	Ohms	0.112	0.163	0.290	0.141	0.206	0.366			
Terminal Inductance, $\pm 30\%$	L_M	mH	1.532	2.206	3.922	2.023	2.913	5.179			

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Tulsa, OK 74146
USA
Tel 800 433 3434

www.grp6.com

Megaflux Series

MF0610

Thin Ring Torque Motors

PARAMETER	SYMBOL	UNIT	MF0610015			MF0610025			MF0610050		
Motor Constants											
Max Cont. Stall Torque	T_C	lb.ft. Nm	146 198			236 318			443 601		
Max Rated Torque, $\pm 25\%$	T_R	lb.ft. Nm	744 1010			1214 1646			2376 3222		
Motor Constant,	K_M	lb.ft./√W Nm/√W	8.02 10.87			11.52 15.62			18.23 24.72		
Electrical Time Constant	T_E	msec	9.44			11.56			14.20		
Mechanical Time Constant	T_M	msec	7.23			5.70			4.50		
Thermal Resistance	TPR	°C/Watt	0.230			0.185			0.130		
Viscous Damping	F_i	lb.ft./rpm Nm/rpm	0.015 0.020			0.026 0.036			0.066 0.090		
Max Cogging Torque	T_F	lb.ft. Nm	0.79 1.07			1.40 1.89			2.62 3.53		
Mechanical Constants											
Frameless Motor Inertia	J_M	lb.ft.s ² Kg.m ²	0.631 0.856			1.027 1.392			2.033 2.757		
Frameless Motor Weight	Wt	lb. Kg	30.99 10.05			48.07 21.80			90.78 41.17		
Number of Poles	N_p	-	96			96			96		
Winding Constants											
Design Voltage	V_p	Volts	48	150	300	48	150	300	48	150	300
Peak Torque	T_p	lb.ft. Nm	744 1010	744 1010	744 1010	1214 1646	150 1646	300 14646	2376 3222	2376 3222	2376 3222
Peak Current	I_p	Amperes	356	305	212	356	305	214	354	304	212
Torque Constant, $\pm 10\%$	K_T	lb.ft./A Nm/A	2.090 2.833	2.438 3.306	3.483 4.722	3.402 4.612	3.969 5.381	5.669 7.687	6.700 9.084	7.817 10.598	11.167 15.140
No Load Speed	S_{NL}	RPM Rad/s	155 16.29	416 43.63	583 61.09	95 10.00	255 26.80	358 37.53	48 5.08	129 13.61	181 19.05
BEMF Constant, $\pm 10\%$	K_B	V/KRPM V/rad/s	296.701 2.833	346.152 3.306	494.50 4.722	482.97 4.612	563.47 5.381	804.95 7.687	951.29 9.084	1109.84 10.598	1585.49 15.140
Terminal Resistance, $\pm 12\%$	R_M	Ohms	0.068	0.091	0.188	0.087	0.117	0.242	0.135	0.182	0.375
Terminal Inductance, $\pm 30\%$	L_M	mH	0.641	0.872	1.780	1.007	1.371	2.797	1.917	2.610	5.326

PARAMETER	SYMBOL	UNIT	MF0610075			MF0610100					
Motor Constants											
Max Cont. Stall Torque	T_C	lb.ft. Nm		649 880			859 1164				
Max Rated Torque, $\pm 25\%$	T_R	lb.ft. Nm		3550 4814			4713 6390				
Motor Constant,	K_M	lb.ft./√W Nm/√W		23.43 31.77			27.72 37.59				
Electrical Time Constant	T_E	msec		15.47			16.21				
Mechanical Time Constant	T_M	msec		4.09			3.89				
Thermal Resistance	TPR	°C/Watt		0.100			0.080				
Viscous Damping	F_i	lb.ft./rpm Nm/rpm		0.138 0.187			0.229 0.311				
Max Cogging Torque	T_F	lb.ft. Nm		3.70 4.99			5.25 7.10				
Mechanical Constants											
Frameless Motor Inertia	J_M	lb.ft.s ² Kg.m ²		3.050 4.135			4.056 5.499				
Frameless Motor Weight	Wt	lb. Kg		133.92 60.74			176.63 80.12				
Number of Poles	N_p	-		96			96				
Winding Constants											
Design Voltage	V_p	Volts		48	150	300	48	150	300		
Peak Torque	T_p	lb.ft. Nm		2627 3562	3550 4814	3550 4814	2768 3753	4713 6390	4713 6390		
Peak Current	I_p	Amperes		261	303	212	207	303	212		
Torque Constant, $\pm 10\%$	K_T	lb.ft./A Nm/A		10.03 13.60	11.70 15.86	16.72 22.66	13.33 18.07	15.552 21.086	22.217 30.122		
No Load Speed	S_{NL}	RPM Rad/s		32 3.39	86 9.09	121 12.72	24 2.55	65 6.84	91 9.577		
BEMF Constant, $\pm 10\%$	K_B	V/KRPM V/rad/s		1424.36 13.602	1661.75 15.869	2373.93 22.669	1892.63 18.073	2208.07 21.086	3154.39 30.122		
Terminal Resistance, $\pm 12\%$	R_M	Ohms		0.183	0.247	0.509	0.231	0.311	0.642		
Terminal Inductance, $\pm 30\%$	L_M	mH		2.837	3.862	7.881	3.748	5.101	10.410		

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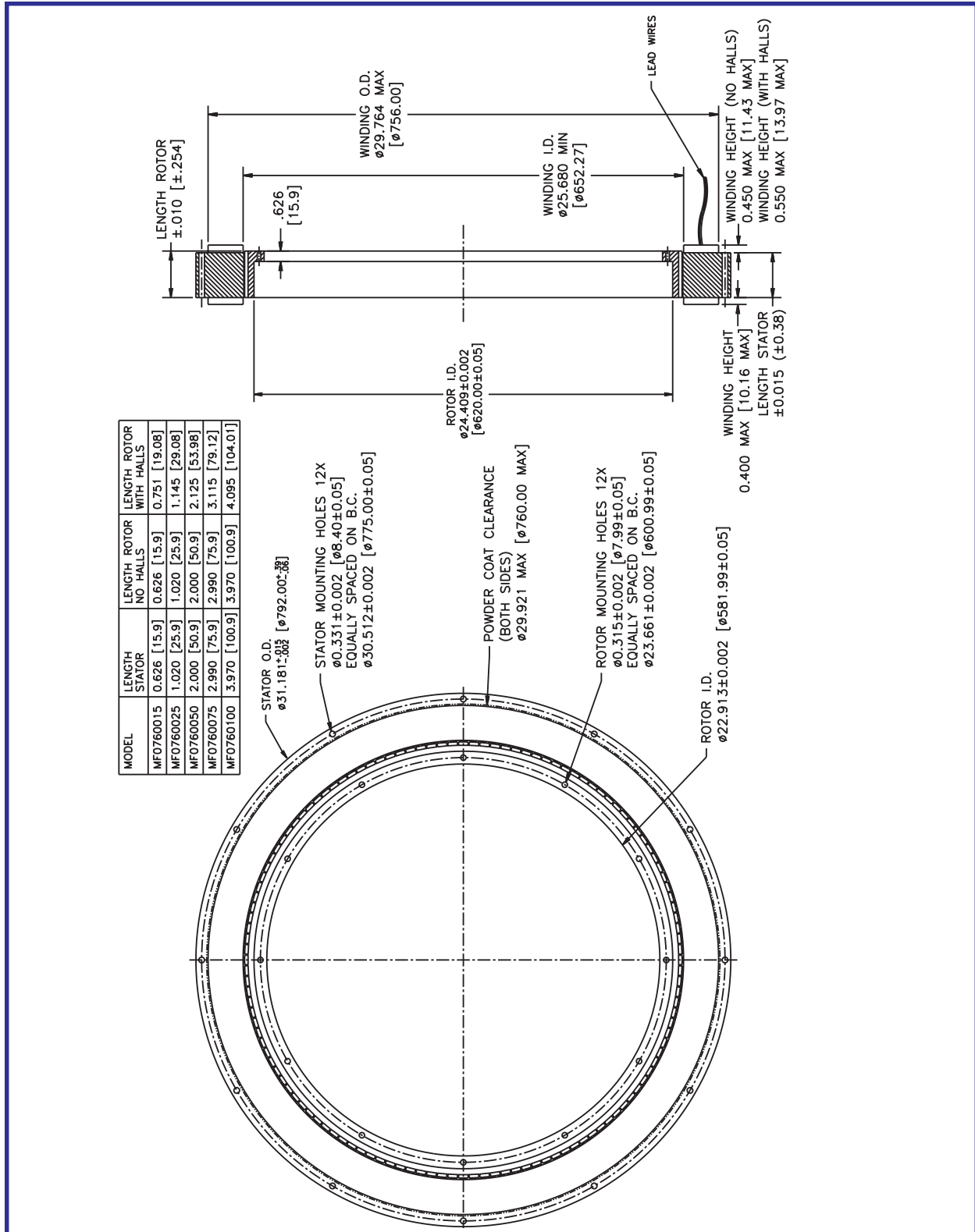
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Megaflux Series

MF0760

Thin Ring Torque Motors



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Megaflux Series

MF0760

Thin Ring Torque Motors

PARAMETER	SYMBOL	UNIT	MF0760015			MF0760025			MF0760050		
Motor Constants											
Max Cont. Stall Torque	T_C	lb.ft. Nm	244 331			393 533			755 1024		
Max Rated Torque, $\pm 25\%$	T_R	lb.ft. Nm	1861 2523			3033 4112			5945 8060		
Motor Constant,	K_M	lb.ft./V Nm/V	13.54 18.63			19.403 26.306			30.597 41.484		
Electrical Time Constant	T_E	msec	13.45			16.50			20.27		
Mechanical Time Constant	T_M	msec	6.05			4.79			3.82		
Thermal Resistance	TPR	$^{\circ}\text{C}/\text{Watt}$	0.235			0.187			0.126		
Viscous Damping	F_I	lb.ft./rpm Nm/rpm	0.043 0.058			0.0777 0.105			0.201 0.273		
Max Cogging Torque	T_F	lb.ft. Nm	0.90 1.22			1.71 2.30			3.05 4.11		
Mechanical Constants											
Frameless Motor Inertia	J_M	lb.ft.s ² Kg.m ²	1.506 2.042			2.449 3.320			4.849 6.574		
Frameless Motor Weight	Wt	lb. Kg	43.45 19.71			67.04 30.41			125.95 57.13		
Number of Poles	N_P	-	128			128			128		
Winding Constants											
Design Voltage	V_p	Volts	A	B	C	A	B	C	A	B	C
Peak Torque	T_p	lb.ft. Nm	48 1861 2523	150 1861 2523	300 1861 2523	48 3033 4112	150 3033 4112	300 3033 4112	48 4622 6267	150 5945 8060	300 5945 8060
Peak Current	I_p	Amperes	613	511	383	614	512	384	475	509	382
Torque Constant, $\pm 10\%$	K_T	lb.ft./A Nm/A	3.03 4.111	3.638 4.933	4.851 6.577	4.935 6.691	5.922 8.029	7.896 10.706	9.721 13.180	1.666 15.817	15.554 21.089
No Load Speed	S_{NL}	RPM Rad/s	107 11.23	279 29.24	418 43.87	65 6.90	171 17.96	257 26.95	33 3.50	87 9.12	130 13.68
BEMF Constant, $\pm 10\%$	K_B	V/KRPM V/rad/s	430.46 4.111	516.55 4.933	688.73 6.577	700.69 6.691	840.83 8.029	1121.11 10.706	1380.25 13.180	1656.30 15.817	2208.40 21.089
Terminal Resistance, $\pm 12\%$	R_M	Ohms	0.050	0.073	0.126	0.065	0.095	0.163	0.101	0.148	0.254
Terminal Inductance, $\pm 30\%$	L_M	mH	0.675	0.971	1.727	1.068	1.538	2.734	2.047	2.947	5.239

PARAMETER	SYMBOL	UNIT	MF0760075			MF0760100					
Motor Constants											
Max Cont. Stall Torque	T_C	lb.ft. Nm	1121 1520			1490 2020					
Max Rated Torque, $\pm 25\%$	T_R	lb.ft. Nm	8886 12048			11738 15914					
Motor Constant,	K_M	lb.ft./V Nm/V	39.245 53.20			46.25 62.71					
Electrical Time Constant	T_E	msec	22.06			23.07					
Mechanical Time Constant	T_M	msec	3.483			3.31					
Thermal Resistance	TPR	$^{\circ}\text{C}/\text{Watt}$	0.094			0.074					
Viscous Damping	F_I	lb.ft./rpm Nm/rpm	0.390 0.529			0.587 0.796					
Max Cogging Torque	T_F	lb.ft. Nm	4.37 5.89			6.08 8.21					
Mechanical Constants											
Frameless Motor Inertia	J_M	lb.ft.s ² Kg.m ²	7.27 9.86			9.62 13.04					
Frameless Motor Weight	Wt	lb. Kg	185.46 81.12			243.16 110.29					
Number of Poles	N_P	-	128			128					
Winding Constants											
Design Voltage	V_p	Volts	A	B	C	A	B	C			
Peak Torque	T_p	lb.ft. Nm	5078 6886	8886 12048	8886 12048	5336 7235	11738 15914	11738 15914			
Peak Current	I_p	Amperes	348	508	381	277	508	381			
Torque Constant, $\pm 10\%$	K_T	lb.ft./A Nm/A	14.55 19.73	17.47 23.68	23.29 31.57	19.24 26.09	23.09 31.31	30.79 41.74			
No Load Speed	S_{NL}	RPM Rad/s	22 2.33	58 6.09	87 9.13	16 1.76	44 4.60	66 6.91			
BEMF Constant, $\pm 10\%$	K_B	V/KRPM V/rad/s	2066 19.73	2480 23.68	3306 31.57	2732 26.09	3278 31.31	4371 41.74			
Terminal Resistance, $\pm 12\%$	R_M	Ohms	0.138	0.202	0.346	0.173	0.254	0.435			
Terminal Inductance, $\pm 30\%$	L_M	mH	3.035	4.371	7.770	3.994	5.751	10.22			

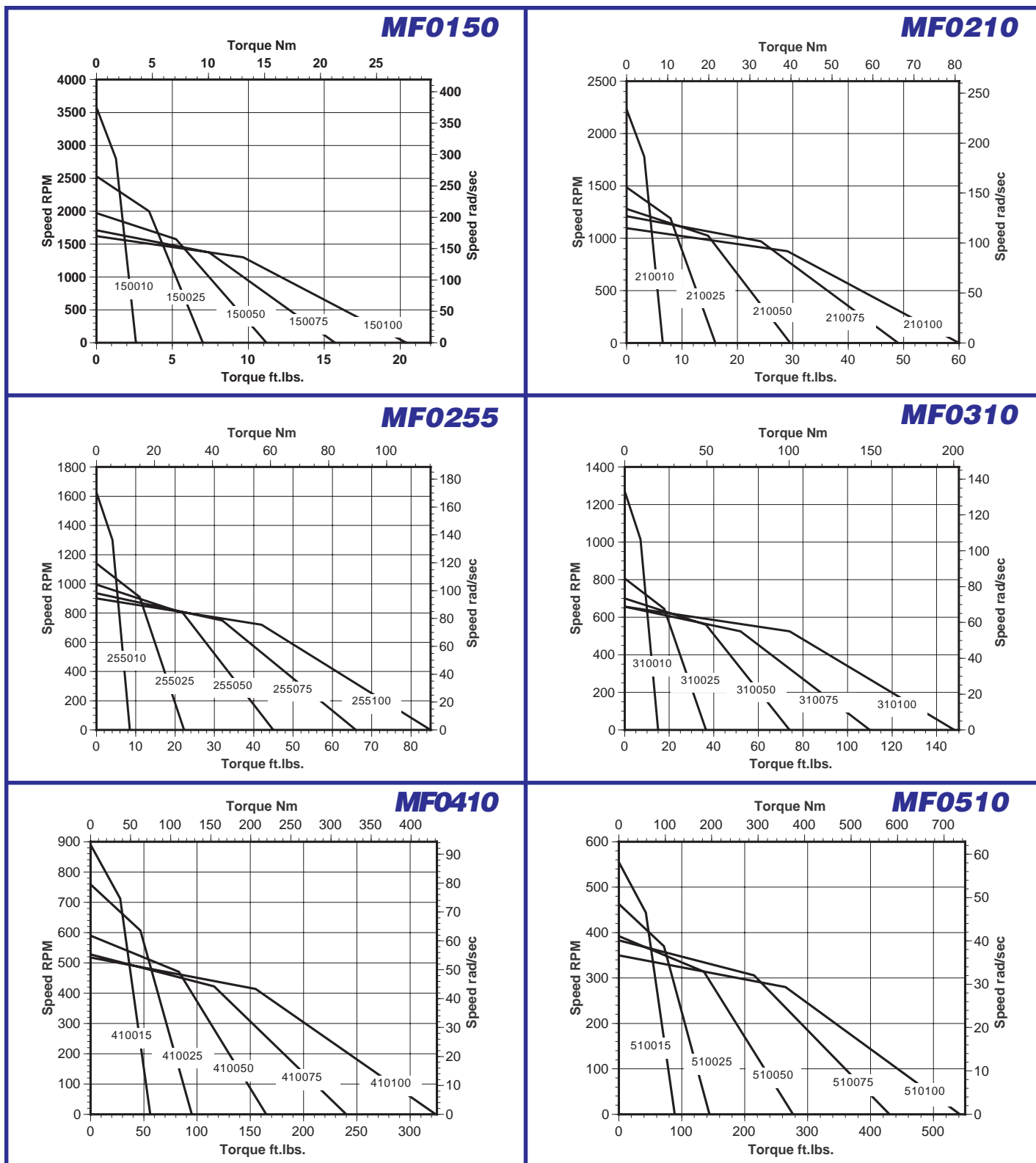
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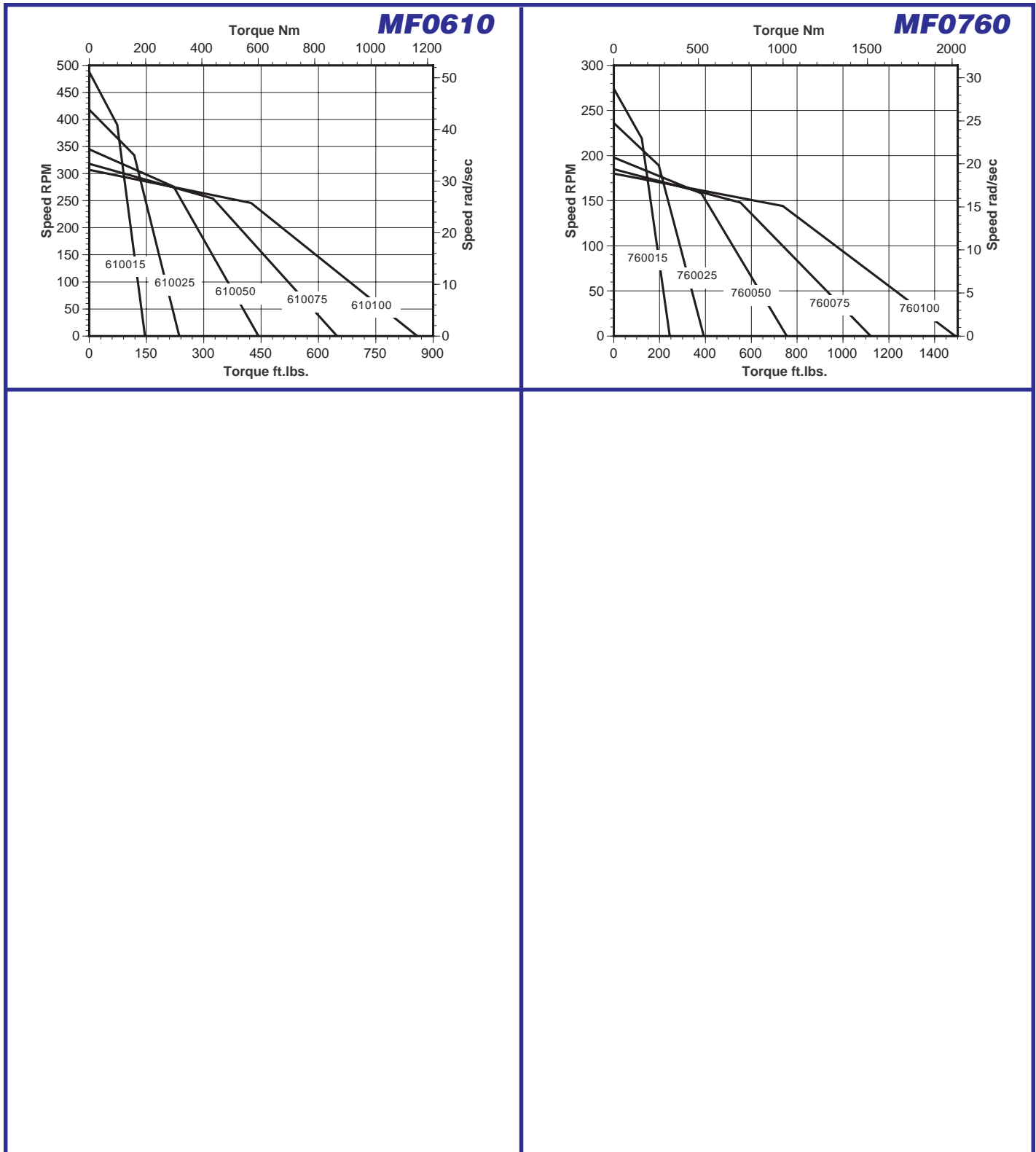
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Please contact our US office for assistance with applications engineering. Additionally, you may wish to visit our website www.emoteq.com for contact information.

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