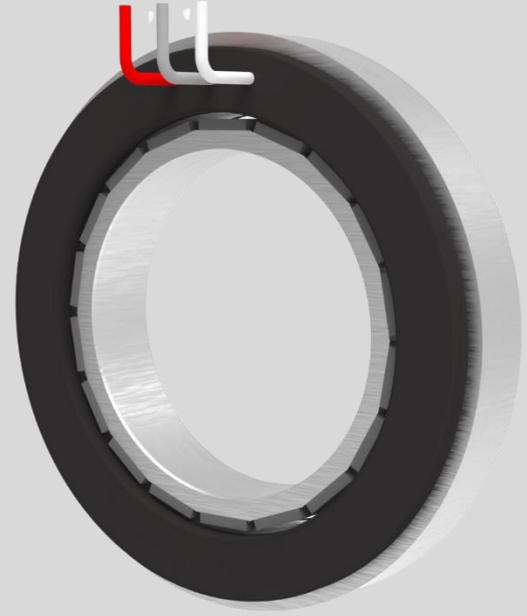


# LEAP Series Frameless Torque Motors

60-130 OD Frame Size

[www.mdsmotor.com](http://www.mdsmotor.com)



**MDS Motor**  
Feel the perfect motion...

Kocaeli Üniversitesi Teknopark |  
Vatan Cad. No:83 |41275 |  
Başiskele, Kocaeli, Türkiye

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# LEAP Series Frameless Torque Motors

MDS Motor has a new extremely slim frameless motor series for direct drive applications.

LEAP series torque motors are designed to deliver the high torque density with extremely low cogging torque and torque ripple for direct drive applications.

LEAP series torque motors have 60mm, 70mm, 100mm and 130mm outer diameter with various stack lengths and winding/DC bus options. Large rotor ID, low rotor inertia, thin rotor cores, allow the system designers to accommodate various system elements through the large rotor inner diameter.

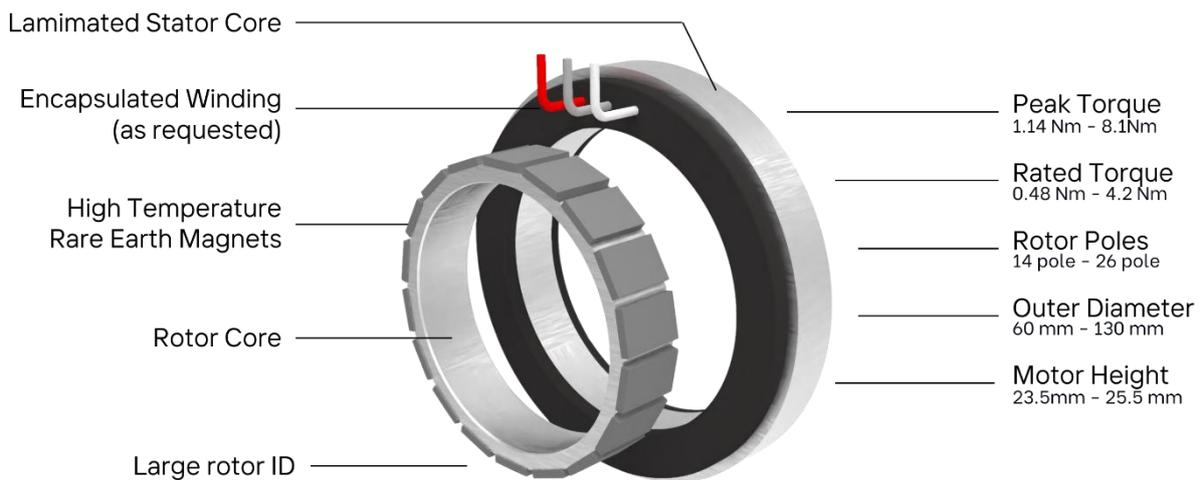
The LEAP series frameless motors are designed to provide high torque density, extremely low cogging torques, high acceleration with small time constants in a small package and to increase overall system performance of the application.

## Main Features and Benefits

- High pole numbers with high torque density
- Large rotor ID allowing cables and other system elements
- Low cogging torque levels (less than 1% of rated torque) for accurate and perfect motion at low speeds
- Various stack and winding options

## Main specifications of LEAP Series Torque Motors

	LEAP-060	LEAP-070	LEAP-100	LEAP-130
Rated Torque (Nm)	0.48	0.86	2	4.2
Peak Torque (Nm)	1.14	1.62	4.5	8.1
DC Bus Voltage (V)	24 / 48			
Stator OD (mm)	60	70	100	130
Rotor ID (mm)	31	38	60	78



# Definition of Motor Parameters

Rated Torque	$T_r$	Torque value at rated speed when continuous power is the output
Peak Torque	$T_p$	Maximum torque that the motor delivers when maximum current ( $I_p$ ) is provided. Peak torque is available for a maximum of 2 seconds
Rated Speed	$N_r$	Speed at continuous power is the output
No-Load Speed	$N_{no-load}$	Maximum possible speed of motor that it can be electrically excited
Torque Constant	$K_t$	Ratio of the developed torque to input current
Voltage Constant	$K_v$	Ratio of voltage generated in the winding to rotor speed
Max. Cogging Torque	$T_{cog}$	Undesirable torque component arising from attractions between magnets and teeth. Cogging torque is minimized for each MDS's torque motor is less than 0.5 % of the rated torque
Torque Ripple	$T_{ripple}$	Undesirable torque component arising from attractions between stator MMF and magnets
Num. of Pole	$2p$	Number of poles
Rated Current	$I_r$	Current required to obtain the rated continuous torque
Peak Current	$I_p$	Current required to obtain peak torque from the motor
Line Resistance	$R_{LL}$	Cold (25°C) resistance measured between two leads of the winding
Line Inductance	$L_{LL}$	Inductance measured between two leads of the AC winding (@60Hz)
Total Weight	$W_{total}$	Total weight of stator and rotor weight
Mech. Time Constant	$K_{mech}$	Motor mechanical dynamic capability level
Thermal Resistance	$R_{th}$	Ratio of winding temperature rise to average stator power loss at rated motor operation
Inertia	$J$	Inertia of the rotor including rotor core and magnets
Motor Constant	$K_m$	Ratio of peak torque to square root of input power: $K_m = T_{peak}/(P_{peak})^{.5}$ . It shows the ability of a motor to convert electrical power to torque
Rotor ID		Rotor inner diameter of the motor
Stator OD		Stator outer diameter of the motor

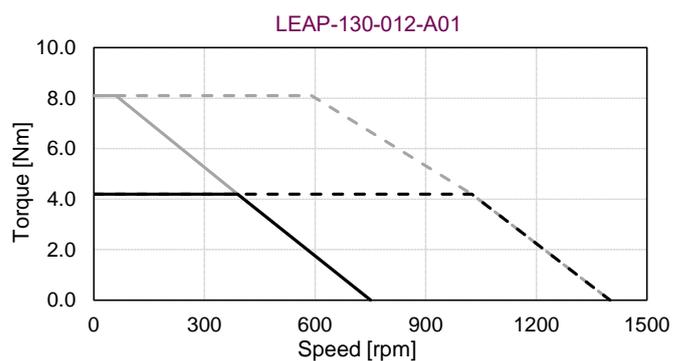
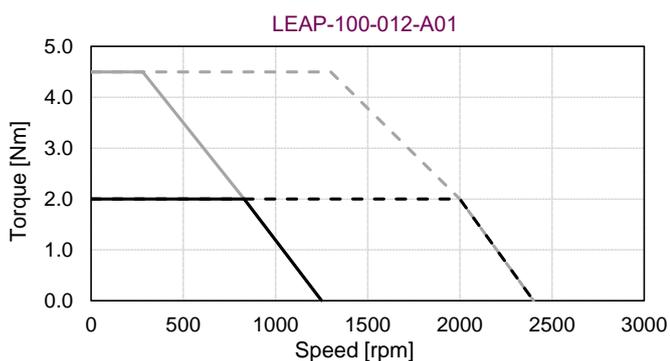
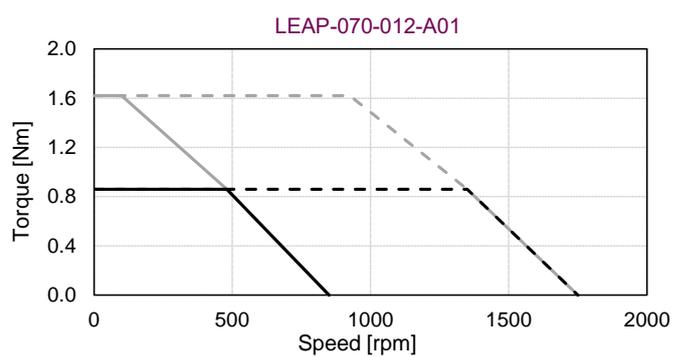
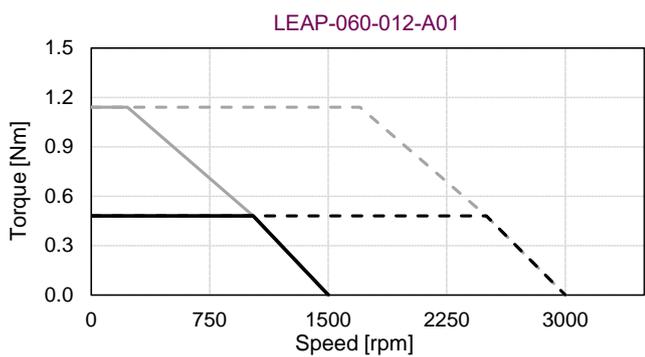
**NOTE: All performance data is obtained at 25°C ambient**

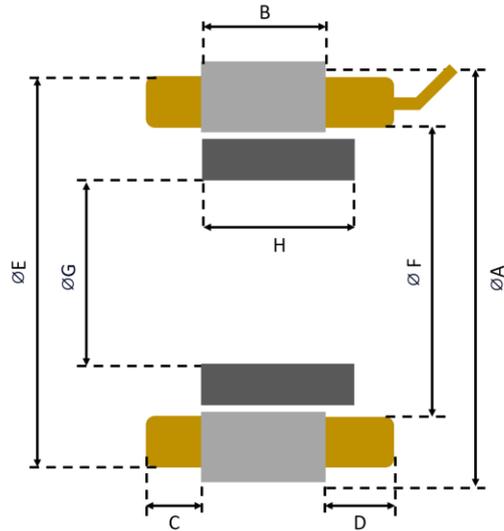
Motor Parameters		Symbols	Units	LEAP-060-012-A01		LEAP-070-012-A01		LEAP-100-012-A01		LEAP-130-012-A01	
PERFORMANCE	DC Bus Voltage	$V_{DC}$	V	24	48	24	48	24	48	24	48
	Rated Torque	$T_r$	Nm	0.48		0.86		2.0		4.2	
	Peak Torque	$T_p$	Nm	1.14		1.62		4.5		8.1	
	Rated Speed	$N_r$	rpm	1025	2500	480	1350	830	2000	395	1025
	No-Load Speed	$N_{no-load}$	rpm	1500	3000	850	1750	1250	2400	750	1400
	Torque Constant	$K_t$	Nm/A <sub>rms</sub>	0.16		0.29		0.20		0.35	
	Voltage Constant	$K_v$	V/krpm	13.92		24.02		18.02		31.55	
	Max. Cogging Torque	$T_{cog}$	%	<1							
	Torque Ripple	$T_{ripple}$	%	<1							
ELECTRICAL	Number of Pole	2p	--	14		16		22		26	
	Rated Current	$I_r$	A <sub>rms</sub>	3.0		3.0		10.0		12.0	
	Peak Current	$I_p$	A <sub>rms</sub>	7.5		6.0		25.0		30.0	
	Line Resistance	$R_{LL@25^{\circ}C}$	Ohm	1.39 (±20%)		1.80 (±20%)		0.37 (±20%)		0.35 (±20%)	
	Line Inductance	$L_{LL@60Hz}$	mH	1.29 (±30%)		1.94 (±30%)		0.43 (±30%)		1.04 (±30%)	
MECHANICAL & THERMAL	Total Weight	$W_{total}$	kg	0.186		0.24		0.45		0.74	
	Mech. Time Constant	$K_{mech}$	ms	1.22		0.93		1.53		1.11	
	Thermal Resistance <sup>(2)</sup>	$R_{th}$	°C/W	4.54	4.28	3.75	3.59	1.63	1.51	1.64	1.18
	Heat Sink <sup>(2)</sup>	--	mm	130x130x10		150x150x10		250x250x12.5		375x375x12.5	
	Inertia	J	kg.m <sup>2</sup>	1.87E-05		3.40E-05		1.42E-04		3.40E-04	
	Motor Constant	$K_m$	Nm/√W	0.067		0.131		0.151		0.319	
	Rotor OD		mm	31		38		60		78	
	Stator OD		mm	60		70		100		130	

1. All performance and electrical specifications are obtained at 25°C ambient and may change ±10%.
2. Housed version of motors mounted to aluminum heat sink (maximum winding temperature is 130°C).
3. All data referenced to sinusoidal commutation.
4. Higher torque and speed values as well as dimensions on request.

# LEAP Series Torque-Speed Curves

Tr: Rated Torque    @Tr 24V    - - - @Tr 48V  
 Tp: Peak Torque    @Tp 24V    - - - @Tp 48V





Model	A (mm)	B (mm)	C (mm)	D (mm)	E (mm)	F (mm)	G (mm)	H (mm)
LEAP-060-012-A01	60	12.5	5	6	56	46	31	15
LEAP-070-012-A01	70	12.5	5	6	66	50	38	15
LEAP-100-012-A01	100	12.5	5	6	95	76	60	15
LEAP-130-012-A01	130	12.5	6	7	125	95	78	15

**Notes:**

**MOTOR LEADS:**

LEAP-060-012-A01: #22 AWG Teflon® insulated, 300 mm (optional) length, 1-Red, 1-White, 1-Black.  
 LEAP-070-012-A01: #22 AWG Teflon® insulated, 300 mm (optional) length, 1-Red, 1-White, 1-Black.  
 LEAP-100-012-A01: #16 AWG Teflon® insulated, 300 mm (optional) length, 1-Red, 1-White, 1-Black.  
 LEAP-130-012-A01: #14 AWG Teflon® insulated, 300 mm (optional) length, 1-Red, 1-White, 1-Black.

**THERMISTOR LEADS:**

#26 AWG Teflon® insulated, 300 mm (optional) length, 2-Brown or Blue

# Motor Design Sheet

Please send your inquiry to [mds@mdsmotor.com](mailto:mds@mdsmotor.com) or fax: +90 (262) 341 4472

Contact details	
Company:	
Name:	
Tel:	
Email:	
Application/Project:	

## Specifications for motor design

Required torques			
Rated torque [Nm]			
Rated speed [rpm]			
Max. torque [Nm]			
Max speed [rpm]			
Electrical specifications			
DC bus voltage [V]			
Rated current [Arms]			
Max current [Arms]			
Current supply	BLDC / BLAC		
Motor size limits			
Max. diameter allowed [mm]			
Max. length allowed [mm]			
Weight limit if any [kg]			
Inertia req. if any			
Cooling / Construction			
Ambient temp. [oC]			
Housing / cooling type	<input type="checkbox"/> None	<input type="checkbox"/> Air cooled	<input type="checkbox"/> Water cooled
Duty cycle			
Other / Comments			
Rotor type	Surface / IPM / other...		
Torque-speed curve – please draw			
Comments			



Revision No	Made By	Date
A02	OS	10.10.2024



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