

Miniature Brushless DC Motors

SL05 Series Miniature Slotless BLDC Motors

Size 5, High Speed, High Performance BLDC Motors

Patent-pending technology in Allied Motion's SLH series enables these miniature slotless brushless motors to deliver up to double the performance of equivalently-sized motors.

The SLH series was designed specifically to power precision instruments such as surgical handpieces and similar medical and dental power tools; however, they are also an ideal choice for any application that requires a small yet powerful, high speed BLDC motor, such as small high speed spindles, machine automation, or robotics.

Features & Benefits

- Size 5 (12.5 mm) diameter accommodates a wide range of handpiece designs
- Standard 24 and 48 VDC windings

- High speed capability up to 100,000 RPM
- High K_m values mean high torque density and high performance
- Slotless design for smooth cog-free torque output
- Precision ball bearings for long life and low audible noise
- Hall-effect feedback as standard

Options

- Planetary gearhead (5:1, 25:1, 125:1)
- Autoclavable version (minimum of 500 autoclave cycles)
- Shaft seals
- Custom winding designs
- Custom shaft, cabling, materials designs



- Size 5 (0.5" dia.) high performance brushless DC motor for surgical handpieces
- Double the performance of same sized competitive units
- Available options include planetary gearhead and autoclavability

SPECIFICATIONS

Motor Constants	Symbol	Units	Winding A	Winding B	Winding C	Winding D
Continuous Torque ¹	T_{CSM}	oz-in (Nm)	0.85 (6.03E-03)	0.85 (6.01E-03)	0.85 (6.00E-03)	0.85 (6.04E-03)
Continuous Torque (heat sink) ²	T_{CSHS}	oz-in (Nm)	0.94 (6.63E-03)	0.93 (6.60E-03)	0.93 (6.58E-03)	0.94 (6.63E-03)
Stall Torque (nom. supply voltage)	T_{stall}	oz-in (Nm)	4.51 (3.19E-02)	2.24 (1.58E-02)	2.87 (2.02E-02)	2.26 (1.59E-02)
Motor Constant ³	K_m	oz-in/ \sqrt{W}	0.346	0.345	0.344	0.346
Electrical Time Constant	t_e	ms	0.071	0.071	0.070	0.071
Mechanical Time Constant	t_m	ms	3.966	3.996	4.016	3.963
Thermal Impedance Motor Only	R_{thm}	$^{\circ}F/watt$ ($^{\circ}C/watt$)	68.90 (20.50)	68.90 (20.50)	68.90 (20.50)	68.90 (20.50)
Thermal Impedance With heat sink	R_{thHS}	$^{\circ}F/watt$ ($^{\circ}C/watt$)	62.60 (17.00)	62.60 (17.00)	62.60 (17.00)	62.60 (17.00)
Damping Constant Zero Source Impedance	K_d	oz-in/kRPM (Nm/rad/s)	1.32E-04 (8.91E-09)	1.31E-04 (8.84E-09)	1.30E-04 (8.80E-09)	1.32E-04 (8.92E-09)
Friction Torque	T_f	oz-in (Nm)	0.05 (3.53E-04)	0.05 (3.53E-04)	0.05 (3.53E-04)	0.05 (3.53E-04)

1.) Specified at max. winding temperature at 25C ambient, motor only

2.) With 4" X 4" X 0.125" Aluminum heat sink

3.) Theoretical values for reference only

Mechanical Constants	Symbol	Units	Winding A	Winding B	Winding C	Winding D
Rotor Inertia	J_m	oz-in-s ² (kg-m ²)			5.00E-06 (3.53E-08)	
Motor Weight	W_m	oz (g)		1.42 (40.26)		
Motor Axial Length	L_1	in (mm)		2.00 (50.80)		

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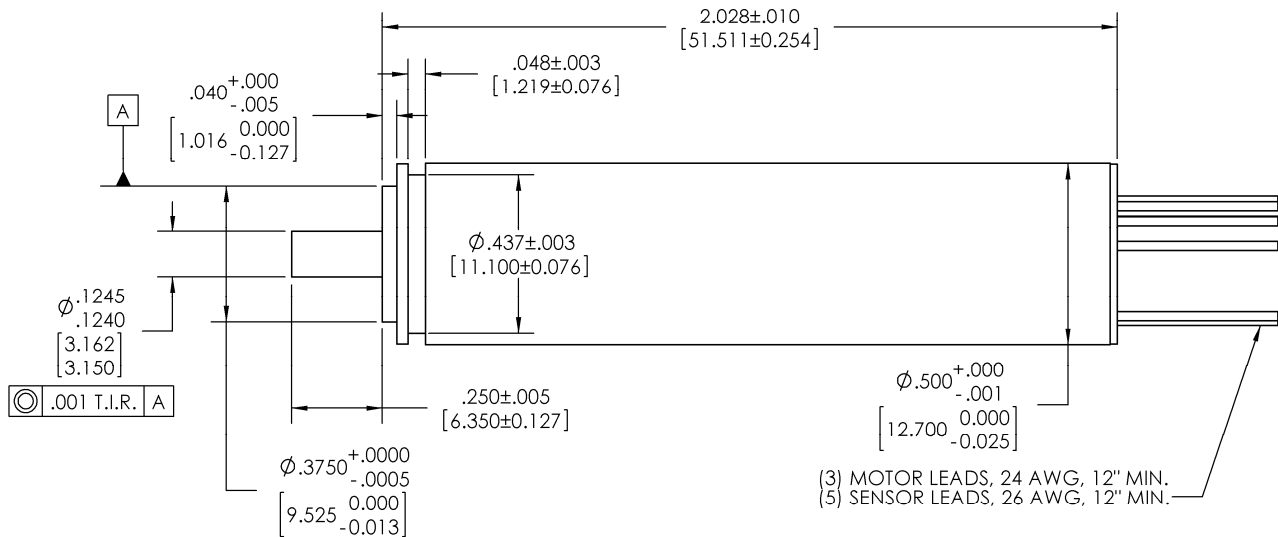
SL05 Series Miniature Slotless BLDC Motors

SPECIFICATIONS

Winding Constants	Symbol	Units	Winding A	Winding B	Winding C	Winding D
Nominal Supply Voltage	E	V	24		48	
Max. Cont. Current ¹	I _{CSM}	A	2.700	1.345	0.862	0.675
Max. Cont. Current (heat sink) ²	I _{CSHS}	A	2.965	1.477	0.947	0.742
Stall Current (nom. supply volt)	I _{pk}	A	14.262	3.539	2.911	1.748
No-Load Current	I _{NL}	A	0.297	0.211	0.185	0.172
Torque Constant	K _T	oz-in/A (Nm/A)	0.316 (2.24E-03)	0.633 (4.48E-03)	0.985 (6.97E-03)	1.266 (8.97E-03)
No-Load Speed	S _{NL}	RPM (rad/s)	107,404 (11,247)	53,702 (5,624)	69,045 (7,230)	53,702 (5,624)
Back EMF Constant	K _E	V/kRPM (V/rad/s)	0.234 (2.20E-03)	0.468 (4.50E-03)	0.728 (7.00E-03)	0.936 (8.90E-03)
Resistance (ph-ph)	R _C	Ohms	0.561	2.261	5.497	8.968
Inductance	L	mH	0.040	0.160	0.387	0.640
Max. Winding Temp.	Θ _M	°F (°C)	302 (150)	302 (150)	302 (150)	302 (150)

1.) Specified at max. winding temperature at 25C ambient, motor only
 2.) With 4" X 4" X 0.125" Aluminum heat sink

DIMENSIONS



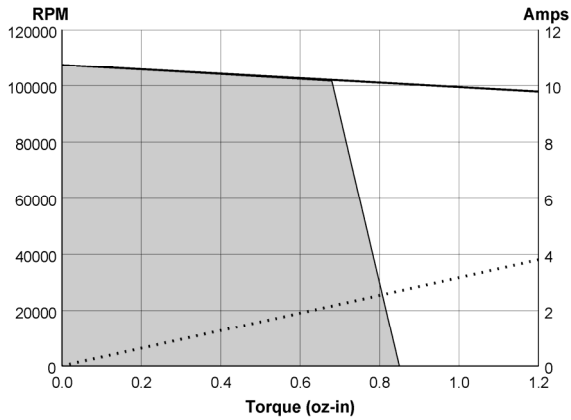
in. (mm)

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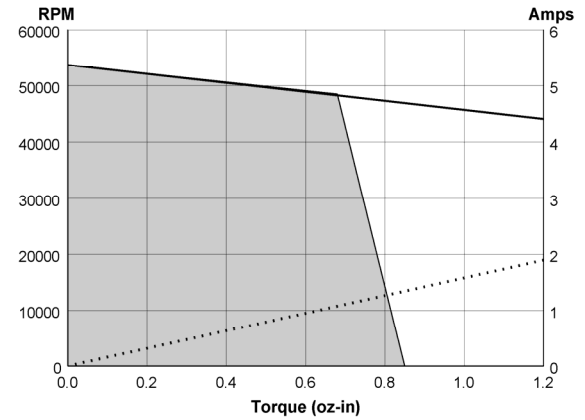
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PERFORMANCE

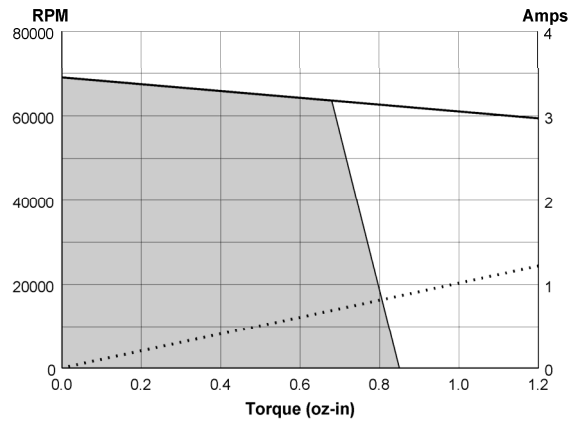
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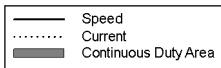
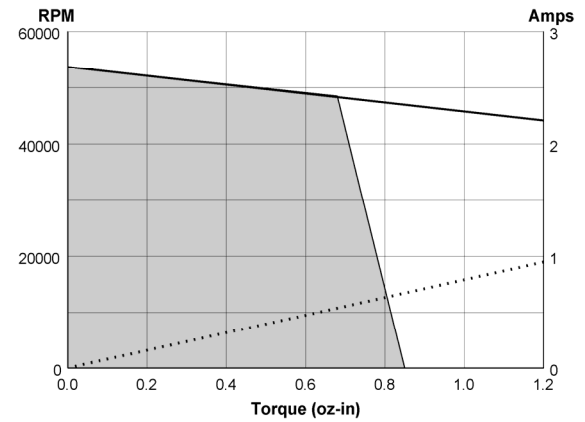
SL0510-024B



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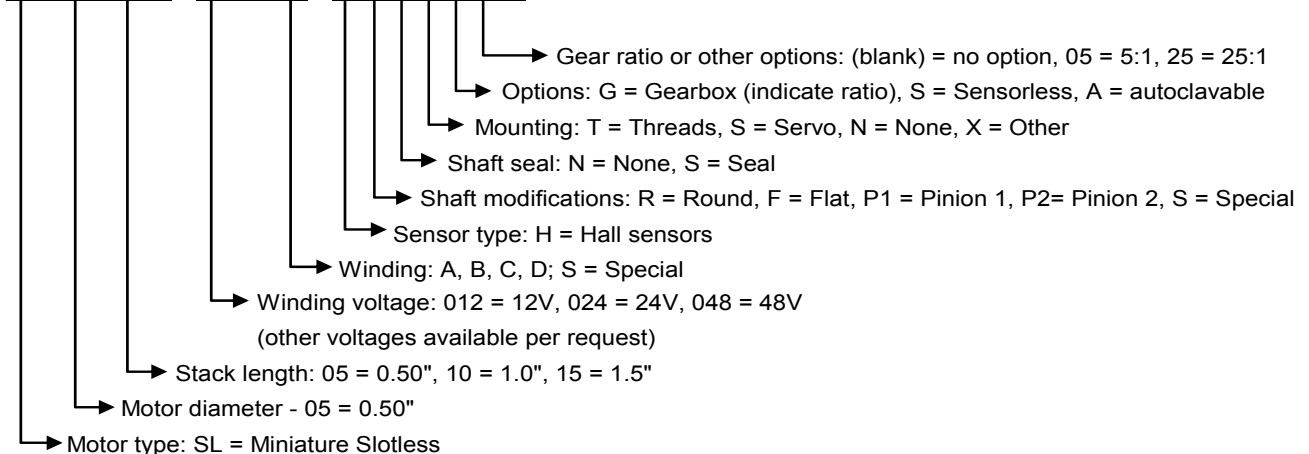


SL0510-048D



MODEL NUMBERING

SL0510 - 048A - HRNTG05



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