Motion Solutions for Medical

Market Guide

MOOG
COMPONENTS GROUP

Motion Solutions for Medical Markets

The medical market is a market in motion – both literally and figuratively. With the Baby Boomers reaching retirement age and technology advancing almost exponentially, this is an exciting market for companies that supply components and assemblies into medical applications. The marketplace is vast with products ranging from simple syringes and disposables to complex diagnostic machinery such as CT scanners and MRI equipment. Embedded in the overall market are many niche markets that require motion components.

Markets	Brushless DC Motors	Air Moving Blowers	Slip Rings	Fiber Optic Rotary Joints
Blood collection, processing and therapy	•	•	•	
Critical care technologies	•	•	•	
Dialysis equipment	•			
Respiratory care (oxygen concentrators, ventilators, cough assist)	•	•		
Hospital ventilators	•	•		
Imagining technologies			•	
Patient beds, wheelchairs and other aids	•	•		
Surgical care systems	•	•		
Optical Coherence Tomography (OCT)				•

Motor Advantages

Motors for typical medical applications, particularly portable ones, are required to be:

- Efficient
- Quiet
- Reliable - long life
- Arcless - produces no sparks or arcing in normal operation
- High power density - high torque / cost / size ratio
- Precision rotor balance
- High speed (centrifuge, saw and drill applications)

Silencer® series brushless DC motors offer these advantages and more. With a broad array of offerings (seven base frame sizes, high speed and high power versions, motors with integral drive electronics, inside and outside rotor versions, drive electronics, optional gearheads, brakes, encoders), Moog Components Group is well positioned to provide solutions to various medical applications by combining our expertise in air moving solutions with our innovative motor technology. Our BSG23 motor was specifically designed to meet the requirements for portable oxygen therapy devices. With torques up to 114 oz-in (0.805 Nm) and efficiencies of 80+ percent, this motor will significantly lengthen the battery life of portable medical devices.

Air Moving Advantages

The Moog AirMax™ series of blowers and tailored air moving products for medical applications offer:

- High power density (more airflow at pressure per unit volume)
- High efficiency brushless DC motors (no arcs / sparks during commutation)
- Integrated drive electronics with speed control and alarm options
- Wide variety of input voltages AC and DC
- Precision dynamic balance for low vibration
- Reliable – long life ball bearings
- Low noise operation

The Moog AirMax series of fans and blowers provide excellent output power per unit volume through the use of compact, high energy 3-phase brushless DC motors and efficient airfoil design. The motor utilizes high energy rare earth magnets and tailored drive electronics to provide the maximum airflow in the minimum amount of system space. These high efficiency compact air movers use high reliability, long-life ball bearings with specially formulated lubrication to extend the life without the need to re-lubricate. For more information about how this product can be tailored to fit your specific application, contact our applications engineers.

Slip Ring Advantages

Slip rings in medical applications feature the following:

- Fiber brush technology with long maintenance-free life and minimal wear debris
- Low audible noise for overall quieter mechanical system operation
- Optical channels for high-speed data communications (fiber optic rotary joints)
- High circuit density and compact design
- Large bore designs with an inside diameter up to 50 inches (1270 mm)

As a world leader in slip ring design and manufacturing, Moog Components Group is well positioned to work closely with medical device manufacturers to integrate slip rings into their designs.

Fiber Optic Rotary Joint Advantages

Key attributes:

- Low insertion loss and rotational variation
- Optimized for wavelengths used for medical optical imaging
- Ultra-low back reflection
- High rotational speeds
- Can be combined into integrated and customized FORJ / BN series motor / resolver packages

Key specifications:

- 1.5 dB max insertion loss, includes 0.5 dB maximum rotational variation
- Better than 40 dB return loss
- 10,000 rpm, contact factory for higher speeds

Fiber Optic Rotary Joints (FORJs) are to optical signals what electrical slip rings are to electrical signals, a means to pass signals across rotating interfaces, particularly when transmitting large amounts of data. FORJs maintain the intrinsic advantages of fiber end to end.

Product Offering Specifications

Motors	**Diameter** inches (mm)	**Length** inches (mm)	**Volts** VDC	**Rated Torque** oz-in (Nm)	**Speed** rpm	**Power** watts	**Features / Benefits**
BMS09 Slotless Brushless DC Motors 	0.9 (228.6)	2.3 and 2.8 (58.42 and 71.12)	12 and 24	Up to 5.0 (0.0353)	Up to 40,000	Up to 150	• Slotless - zero cogging • Low noise • High efficiency • Autoclavable
BN12, 17, 23, 28, 34 	1.2 to 3.4 (30.48 to 86.36)	1.3 and 5.5 (33.02 and 137.7)	12 to 100	Up to 258 (1.8218)	Up to 35,000	Up to 210	• Our flagship brushless DC motor series • Low noise • High efficiency • Available in multiple speed and torque variations
BN34HS 	3.4 (86.36)	2.5 and 3.5 (63.5 and 88.9)	24, 50 and 100	Up to 78 (0.5508)	Up to 14,000	Up to 591	• High speed, low noise in a larger frame size motor • Ideal for larger centrifuge applications
BSG23 	2.25 (57.15)	1.9 and 2.8 (48.26 and 71.12)	12, 24 and 48	Up to 114 (0.8050)	Up to 15,000	Up to 170	• Very high torque and efficiency • Low noise • Ideal for oxygen therapy equipment

Product Offering Specifications

Air Moving Blowers	**Size** inches (mm)	**Pressure** inches (cm)	**Flow** cfm (lpm)	**Voltage**	**Speed Control / Tach**	**Options**
P28 	5 dia. x 2.3 (127 x 58.42)	Up to 28 (71) H2O	Up to 50 (1416)	DC 12 - 24 Volts	0 - 5 or 0 - 10 Volts speed control Open collector Tach out 2 ppr	• Internal or external drive electronics • High efficiency 3-phase brushless DC motor • Low noise • High efficiency • Integrated electronics with customizable system interface • High power density • High pressure
P45 	3.15 dia. x 2.1 (80.01 x 51.4)	Up to 54 (138) H2O	Up to 25 (708)	DC 24 Volts	0 - 5 Volts speed control Open collector Tach out 2 ppr	

Slip Rings	**Circuits**	**Through-bore** inches (mm)	**Current** amps	**Voltage** VAC	**Operational Speed** rpm	**Features / Benefits**
AC4598 	6, 12, 18, 24	1.5 (38.1)	10	600	250 or higher	• Compatible with data bus protocols • Maintenance-free operation • Continuous 360° rotation of power or data signals
AC7203 	Ethernet plus, 2 amp, 5 amp and 10 amp	No	2 to 10 amps	240 (On power circuits)	Up to 250	• Fully compliant with IEEE 802.3 formats • Sealing to dust and light fluids splash available • Compact
Large Bore 	Optical single channels available with data rates up to 5 Gp / s	Yes	100 amps	400 - 600	Up to 300	• Drum or platter style • Optical single channels available with data rates up to 5 Gp / s • Lengths to 18 inches • Data rings from DC to 80 Mb / s

Fiber Optic Rotary Joints	**Insertion Loss**	**Maximum Rotational Speed** rpm	**Operating Temperature**	**Size** inches (mm)	**Features / Benefits**
Model 206 	3.5 dB	1000	-40 to +60°C	Minimum length: 2.36 (59.94) Flange diameter: 1.50 (38.10) Drum diameter: 0.77 (19.55)	• Provides rotary coupling for a singlemode fiber link • Passive bidirectional device • Stainless steel housing

Specifications and information are subject to change without prior notice.
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