

MOTORS & ACTUATORS

Precision linear and rotary voice coil actuators (VCAs) and brushless DC motors (BLDCs) for producing, sensing and controlling motion in the medical, industrial, aerospace and defense markets. Proprietary magnetic design technologies are used to produce custom products where performance, precision, and reliability are critical.

OUR BRAND

BEI KIMCO

Extensive Capabilities

- Finite Element Analysis (FEA)
- Proprietary analytical tools
- Full qualification of products
- Custom design
- Integrated solutions
- Patented technologies
- Vacuum Compatible

Customer Benefits

- Design to custom specifications
- Application engineers support
- Personalized engineering support
- Complete model shop for rapid prototyping
- Finite Elements Analysis (FEA) and Computer Aided Design (CAD)
- Engineering testing
- Life testing facilities
- Application engineering support

APPLICATIONS

- Ventilators
- Oxygen concentrators
- Unmanned aerial vehicles (UAV)
- Fast steering mirrors
- Mass spectrometers
- Chromatography
- Military /aero gimbals
- Centrifuges



VOICE COIL ACTUATORS

Voice Coil Actuators (VCA) are direct-drive, cog-free devices used for providing highly accurate linear or rotary motion. Sensata offers linear and moving magnet designs to provide precise and reliable motion.

VCAs feature inherent advantages, such as direct-drive, zero backlash and cog-free operation for accurate motion, as well as high acceleration and use of a single-phase power supply.

LINEAR VOICE COIL ACTUATORS

- Large range of strokes up to 100 mm
- High force actuation up to 2500 N
- High precision and frequency
- Magnetic spring and latching capabilities
- Long life and low friction
- Custom designs available on demand



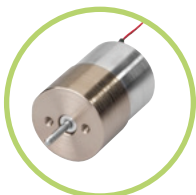
FRAMELESS CYLINDRICAL LINEAR

Frameless VCAs, also known as un-housed VCAs, are the most cost effective and versatile type of linear voice coil actuators. Frameless VCAs are sold in pairs of coil and field assemblies that are designed to be aligned using the customer's radial/axial alignment system. They can be directly installed and integrated within the customer's system assembly in a way best suited for the application.



SEMI-HOUSED CYLINDRICAL LINEAR

Semi-housed linear VCAs enhance the basic frameless type by adding both a shaft and bushings to align the unit. The upgraded high flex lead wires provide added protection from wear and tear. Various shaft options are available depending on the size of the actuator, including both external and internal threading, as well as a standard smooth shaft.



HOUSED CYLINDRICAL LINEAR VCAs

A fully housed VCA incorporates self-aligning bushings, a smooth shaft, and a housing to secure the coil assembly to keep it concentric with the field assembly. An internal flex circuit protects external moving wires and limits the axial travel on both ends of the stroke. As a single piece, the linear actuator can be mounted on one side and does not require a customer supplied alignment system, making it easy to integrate into applications. Sensata also offers cylindrical housed linear VCAs with integrated sensors to enable the customer to close the loop on their actuation system, allowing them to directly control the velocity, position, acceleration and/or oscillation of the actuators shaft.

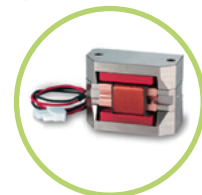


VCAs WITH INTEGRATED SENSORS

Sensata also offers cylindrical housed linear VCAs with integrated sensors to enable the customer to close the loop on their actuation system, allowing them to directly control the velocity, position, acceleration and/or oscillation of the actuator shaft.

VCAs with integrated sensors are offered with the following range of characteristics:

- Stroke ranges up to 32 mm
- High force actuation up to 1500 N
- A range of embedded position sensors with high resolutions from 10 – 50 μ



RECTANGULAR LINEAR VCAs

Rectangular VCAs are commonly used in applications that require a higher force and/or a longer stroke. Due to their shape, they can be designed to fit into compact systems or optimized for their power and high speeds.

ROTARY VOICE COIL ACTUATORS

- Angular strokes up to 120° and customizable beyond 120°
- Torques up to 45 N·m
- Arc-segment and cylindrical designs
- Various mechanical mounting options

ROTARY VCAs

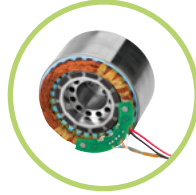
Rotary VCAs are ideal for high acceleration applications that require angular movement. There are two types of designs available: cylindrical and arc-segment. Cylindrical models are used in applications where the shaft can be enclosed, whereas the arc-segment designs are better suited for system assemblies with space constraints.



| BRUSHLESS DC MOTORS

Brushless Direct Current (BLDC) Motors are synchronous permanent magnet DC motors. High torque-to-inertia ratios, a stationary armature and a rotating permanent magnet assembly, and elimination of the brushes make the BLDC motor the preferred choice when it comes to performance considerations. Sensata offers BLDC motors in both housed and unhoused, or frameless, configurations.

- High torque solutions
- High speed actuation up to 30,000 RPM
- High performance and power up to 10,000 W
- Custom designs available on demand



FRAMELESS BLDC MOTORS

A frameless BLDC motor design, also known as a rotor/stator part set, allows for the motor to become fully integrated within the customer assembly resulting in the highest torque density available. In this configuration the motor's rotor and stator are housed within the customer's system assembly utilizing a common shaft and bearing system. This results in increased coupling efficiencies, reduced system size, weight and cost. Frameless motors are also utilized in systems that require high servo bandwidth, where the use of a shaft coupling device could introduce unwanted mechanical resonances.

The high magnetic pole count pancake "Torquer" motor produces exceptionally low cogging for smooth, low speed operation and high accuracy positioning applications.

Frameless Inner & Outer Rotational Member Configurations:

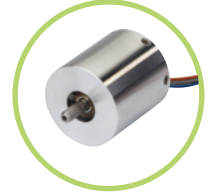
Either inner or outer rotating member design options can be used to support the integration of the components within our customer's next higher assembly. While the inside rotor design may offer superior acceleration characteristics, the higher inertial outside rotation design generally provides higher torque, better rotational stability and mounting flexibility.

Sine and Trapezoidal BEMF Drive Winding Configurations:

Both sine and trapezoidal based BEMF winding configuration options can be used to accommodate our customer's commutation and control schemes to achieve optimum operating efficiencies. These options can be supported with Hall commutated and sensor-less controls.

Magnetic Design Optimization for Constant Velocity and Position Based Motion Profiles:

Sensata's advanced magnetics design capability allows for effective optimization of motor torque and mechanical performance based on decades of experience and proprietary design methodologies. Custom laminations, winding configurations and magnetic pole shaping options support custom, high performance design solutions with minimal up-front tooling investment.



HOUSED BLDC MOTORS

Housed fractional horsepower brushless DC motors have proven to be the most reliable and cost-effective solutions for some of the most demanding applications. These motors are shipped ready to be integrated into customer applications with minimal assembly time. Housed motors offer the convenience of a complete motor package, including bearings, shaft, enclosure, and mounting provisions.

Custom Shaft and Mounting Options:

A wide range of custom single and dual shaft configurations, as well as mounting options are available to facilitate a brake, external resolvers, encoders, gear reducers and other devices.

Anti-Vibration and Noise Reduction Features:

Various noise reduction and anti-vibration design techniques are employed to achieve optimal acoustic noise performance. These include the use of proprietary magnetic circuit and mechanical component design methodologies which include magnet and skewed stack configuration.

Bearing Options:

A wide variety of high quality (ABEC 5 or better) open, shielded and sealed bearing options are available. Each selected option can be complimented with custom grease selections and fill levels to reduce running current and resistance to external environmental factors. Customer bearing selections are most often dictated by product reliability, mechanical robustness and acoustical noise performance requirements.

Sine and Trapezoidal BEMF Drive Winding Configurations:

Both sine and trapezoidal based BEMF winding configuration options can be used to accommodate our customer's commutation and control schemes to achieve optimum operating efficiencies. These options can be supported with Hall commutated and sensor-less controls.

Contact us to help you select a solution from our extensive standard offer or to collaborate with our technical experts to customize innovative solutions for your next application.

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