

# Portescap



## Miniature Motors



MOTION SOLUTIONS THAT MOVE LIFE FORWARD.™





# Turn Your Ideas into Reality

## We're your miniature motion partner.

When you need to put maximum power and precision in the smallest spaces, you can depend on the engineering experience and manufacturing excellence of Portescap — your partner in miniature motion solutions.

**Selection.** Choose the best motion technology for your application, including miniature brush and brushless DC motors, stepper motors, linear actuators, gearheads, encoders and drives.

**Quality.** Count on low vibration, high efficiency and precision in motors designed to deliver more power in a smaller space.

**Reliability.** Get reliable performance over a long lifecycle with motors designed and built using the industry's most advanced technologies and materials.

**Efficiency.** Build a more compact, precise and energy-efficient solution using motors that generate the torque and acceleration you need while consuming less power.

**Customization.** Need a custom fit? Our motors are designed for quick and easy modification, so you can get exactly what you need with the pricing and delivery you expect from an off-the-shelf solution.

**Rapid Prototyping.** Take delivery of your custom prototype in as little as two weeks. Whatever your miniature motion challenge, Portescap can help you solve it quickly and cost-effectively.



We provide customized solutions for the most demanding applications, across virtually every industry that depends on precise miniaturized motion.



Medical and Clinical Diagnostics



Instrumentation



Automation



Security



Aerospace



Other

### Compact, powerful motors for any application

Ideal for compact machines, portable equipment and small devices, Portescap's motor technologies reduce size, weight and power consumption. With maximum performance in a smaller package, our motors let you design efficient machines with increased throughput.

**Brush DC Motors:** Ironless rotor, high acceleration and efficiency, low noise, linear speed/torque curve, superior power-to-size ratio

**Brushless DC Motors:** High speed and low inertia, improved heat dissipation, smooth operation with zero cogging, increased lifetime

**Stepper Motors:** High continuous torque, excellent open loop control, cost-effective

**Linear Actuators:** Easy to use, fewer total machine components, powerful and precise positioning

**Gearheads:** Spur gears for efficiency and low friction torque, planetary gears for high torque and compact size

**Encoders:** Magnetic and optical, 4 through 1024 line counts

**Drives:** High performance servo drives and digital amplifiers for brush and brushless DC motors





# Aerospace

From extreme environments to shock and vibration, Aerospace applications are demanding. Portescap provides reliable solutions to withstand the test of time in a small lightweight envelope.

## Actuation Systems

The ability to withstand harsh environments is critical for this application environment. High performance brushless and brush motors pivot multiple fins which enable the generation of a precise flight path. Portescap delivers motors that survive in temperatures ranging from -65° F. to 190° F and can withstand high gravitational forces.

## Surveillance Camera Systems

Reliable brush, brushless, and stepper motors are ideal for panning and tilting of camera gimbals. High speed XYZ tracking motion is a must for precise and rapid targeting of a critical focal point in space. Our wide range of small and light weight motion solutions is ideal for various types and sizes of surveillance, inspection, and monitoring systems.

## Seat Actuation

Numerous footrest, leg-rest, and recline axes must be moved simultaneously to reach desired seat positions. Our brushless family of motors delivers desired levels of motion control and precision, smooth and simultaneous seat motion, and reduced system noise via quiet-operation actuators. All of these lead to a great passenger experience.



Benefit	Feature	Technology	Sub-Tech	Motor Recommendation	Typical Accessories	Application Example
Withstand harsh environments	Lamination design, assembly process	DC		12mm - 35mm	13 - 32mm planetary gearbox	Actuation Systems
		Brushless	Slotted	12mm - 28mm	12 - 28mm planetary gearbox	
Reduced EMI emissions	Patented REE coil design	DC		12mm - 22mm	12 - 22mm spur gearbox, encoder	Surveillance Cameras
		Brushless	Slotless	13mm - 26mm		Cockpit Gauges
Reduced fuel consumption	Unique coil design - lower current draw	Brushless	Slotless	13mm - 26mm		Environmental Controls
		DC		12mm - 35mm	Encoder	Fuel Valves
				22mm - 35mm	22 - 40 mm gearbox	Seat Actuation
Reduced weight	Ironless rotor design, High power density	DC		12mm - 22mm	12 - 22mm spur gearbox, encoder	Window Shades
				12mm - 35mm	13 - 32mm planetary gearbox	Actuation Systems
				22mm - 35mm		Seat Actuation
		Brushless	Slotless	13mm - 26mm		Environmental Controls
Simple control	Repeatable movement without feedback	Stepper	DMM	10mm - 39mm		Cameras
				10mm - 52mm		Surveillance Robots





# Construction

Whether your device is portable or stationary, motors drive the efficient operation of this equipment. Portescap offers the long life, reliability, and reduced machine footprint you expect from the industry leader.

## Land Surveying

Total stations employ the electro-optical distance metering method, emitting laser beams to a target and detecting light reflected off it. Motion solutions play an integral role in precision control of the beam strength and filtering the beam reflected off the target thus improving efficiency of the application. Miniature coreless motors provide the desired power density, smallest envelope size, functionality in harsh environmental conditions, and deliver maximum efficiency for long operation cycles making it the desired motion technology for total stations.

## Electronic Access Systems

Electronic door locks and access systems provide building integrity to allow users a safe environment and solve their security concerns. Sensitive material and valuable property need a high level of security while their owners are away. Small package, long life, and reliability are the key factors for a piece of mind and best-in-class security system.

## Framing Systems

Shock resistant motors are critical to the smooth functioning of framing systems. The fan mounted on the motor is used as a blower to mix the fuel cell gas with oxygen before combustion. After combustion the fan is used to exhaust the burnt gas and keeps the combustion chamber cool. Dynamic use of motor and fan assembly through the combustion cycle increases productivity, product life, and reduces cost of ownership. In addition, the coreless motor provides the required power density and efficiency for longer operation on battery power making it a standard for gas based framing or anchoring applications.



## MOTOR CHOICES FOR CONSTRUCTION

Benefit	Feature	Technology	Sub-Tech	Motor Recommendation	Typical Accessories	Application Example
Increased battery life	High efficiency - ironless rotor	DC	Coreless	8mm - 10mm	10 mm planetary gearbox	Door Locks
		DC	Coreless	8mm - 22mm	8 - 22mm planetary gearbox	Land Surveying
Increased lifetime	Patented commutation system	DC	Coreless	10mm - 22mm	10 - 22 mm planetary gearbox	Land Surveying
				13mm - 22mm		Rotating Lasers
				8mm - 17mm	8 - 16mm gearbox	Thermal Imaging/Cameras
Shock resistance	Robust motor design	DC		22mm	Special strength shaft	Power Tools
Precise positioning	Multi-toothed rotor and stator	Stepper	Can Stack	15mm - 26mm		Rotating Lasers
			DMM	10mm - 16mm		Cameras
	Gearbox option	DC	Coreless	8mm - 17mm	8 - 16mm gearbox	Thermal Imaging/Cameras
	Encoder option	DC	Coreless	8mm - 10mm	MR2 / F12 encoder	Door Locks
Reduced machine footprint	High power density	DC	Coreless	8mm - 22mm	8 - 22mm gearbox	Land Surveying
				8mm - 10mm	10mm planetary gearbox	Door Locks
				8mm - 17mm	8 - 16mm gearbox	Thermal Imaging/Cameras





# Factory Automation

Demand for high throughput and response time is a constant throughout Factory Automation. Portescap miniature motors provide exact positioning, high dynamics, and power density to help maximize the performance you expect from your machines.

## Textile Machines

Textile machines require fast and accurate positioning of yarns to maximize throughput. Electronic yarn guides are beginning to replace traditional drum technology with a motorized belt pulley mechanism that offers desired flexibility - length of the groove, yarn tension, ability to handle multiple thread diameters, and eliminates the need for splicing. The ability of a miniature motor to accurately guide the yarn during winding is critical. The disc magnet step motor, unique to Portescap, combines the precise movement of a stepper with the high speed of a brushless motor. The result is a motor capable of 5,000+ RPM with the simple control of a stepper motor.

## Material Handling

High performance motors play a critical role in transportation of parts through the manufacturing cycle - parts handling, pick and place, and precise positioning. High throughput and accuracy are the main challenges in this demanding application environment - driving the requirement for motors with high acceleration and power.

## Power Tools

When productivity becomes a challenge, high efficiency power tools are the solution to save time and increase reliability. From assembly tools to pruning shears, Portescap offers best-in-class motors to meet accuracy and high throughput requirements - thanks to dynamic performance and power density. Lightweight, low noise, and high efficiency motors help electric power tools be competitive and easy to use compared to pneumatic or fuel powered solutions.





## MOTOR CHOICES FOR FACTORY AUTOMATION

Benefit	Feature	Technology	Sub-Tech	Motor Recommendation	Typical Accessories	Application Example
Increased tension control	Disc magnet design	Stepper	Disc Magnet	P532, P760	Encoder	Textile Yarn Guides
				P532, P760	Encoder	Weaving Machines
Lower maintenance cycles	Ball bearing design	Brushless	Slotted	16mm - 40mm	Magnetic encoder	Nutrunners
		DC		25mm - 35mm	24 - 40mm planetary gearbox	Pruning Shears
Increased positioning speed	Unique coil design	Brushless	Slotless	13mm - 26mm		Grippers
	Low inertia disc magnet	Stepper	DMM	P532, P760	Encoder	Textile Yarn Guides
				32mm - 52mm		Material Handling Robots
Precise positioning	Multi-toothed rotor and stator	Stepper	DMM	32mm - 52mm	Magnetic encoder	Textile Yarn Guides
Simple control	Repeatable movement without feedback	BLDC	Slotless	13mm - 26mm		Grippers
Improved torque	High power density	DC		25mm - 35mm		Pruning Shears
		Brushless	Slotted	16mm - 40mm		Assembly Tools



# Factory Automation

Factory machines require many types of motion to accomplish various tasks. Portescap motors offer a wide range of technologies that provide the high throughput, accuracy, and flexibility you need.

## Robotics

From humanoid robots to robotic arms, motion control is the driving force behind their ability to excel. Robots are emerging everywhere to assist people and enable them to perform their jobs better, faster and more accurately, especially in the fields of education, assistance, and factory automation.

## Pick and Place

Low inertia, high performance motors in reduced envelopes play a major role in electronic assembly that requires millions of operations to precisely place small electronic components on PC boards. In addition, high reliability, accurate position control, and high throughput are a requirement in these challenging applications. This calls for motors with high power density, low inertia, high acceleration, and long uninterrupted life.

## Assembly Lines

High performance motors play a critical role in the transportation of parts through the manufacturing cycle: parts handling, pick & place, and fine positioning. High throughput and accuracy are the main challenges in this high demanding application environment -driving the requirement for motors with high acceleration and high power density.



## MOTOR CHOICES FOR FACTORY AUTOMATION

Benefit	Feature	Technology	Sub-Tech	Motor Recommendation	Typical Accessories	Application Example
Smooth operation	Low inductance coils	DC		12mm - 25mm	13 - 22mm planetary gearbox	Humanoid Robots
				16mm - 35mm	16 - 32mm planetary gearbox	XYZ Movement
Reduced EMI emissions	Patented REE coil design	DC		12mm - 25mm		Robotics
Precise positioning	Multi-toothed rotor and stator	Stepper	DMM	10mm - 52mm		Electronics Assembly
	Encoder option	DC		25mm - 35mm	MR2 encoder	Machining Centers
		Brushless	Slotless	13mm - 22mm	MR2 encoder	Assembly Lines
Simple control	Repeatable movement without feedback	Stepper	Can Stack DLA	20mm - 55mm		Robotic Modules
			DMM	10mm - 52mm		Pick and Place
Reduced machine footprint	High power density	DC		22mm - 35mm	22 - 32mm planetary gearbox	Robotics
Increased throughput	Higher speed	Brushless	Slotless	13mm - 26mm	Gearbox, encoder	Conveyors
	Higher acceleration	Stepper	DMM	10mm - 52mm		Pick and Place







## Clinical Diagnostics and Fluid Handling

From basic research in biochemistry to countless biotechnology applications, machinery that handles liquids and gases plays a crucial role throughout Life Science applications. With speed, power and precision in the most compact size, Portescap motors are the perfect fit.

### Miniature Pumps

Diaphragm, rotary vane, peristaltic, syringe and other types of pumps are all commonly used, and each type offers specific advantages for particular life sciences applications. Portescap supplies perfect-fit motors for miniature pumps in gas analyzers, anesthesia equipment, oxygen concentrators and many other machines that depend on precise, reliable movement of gases or liquids.

### Pipettes

Pipettes offer a fast, reliable way to transfer and dispense precise volumes of liquid when preparing samples for laboratory analysis. Today's electronic pipettes can extract and deposit microliters of liquids with incredible accuracy. Portescap motors drive the required precision along with the miniaturization needed for robotic pipette systems and the light weight needed for comfortable and confident operation of handheld systems.

### Sample Prep Workstations

Sample preparation is critical to the success of diagnostic machines as samples are moved throughout the workstation, sorted for individual tests, combined with the proper reagents and labeled for analysis. Each function in the workflow has its own requirements, and choosing the right motor technology is the key to optimum performance. Portescap offers a complete selection, so you can choose the best motor size and performance characteristics to ensure fast sample delivery and accurate processing.

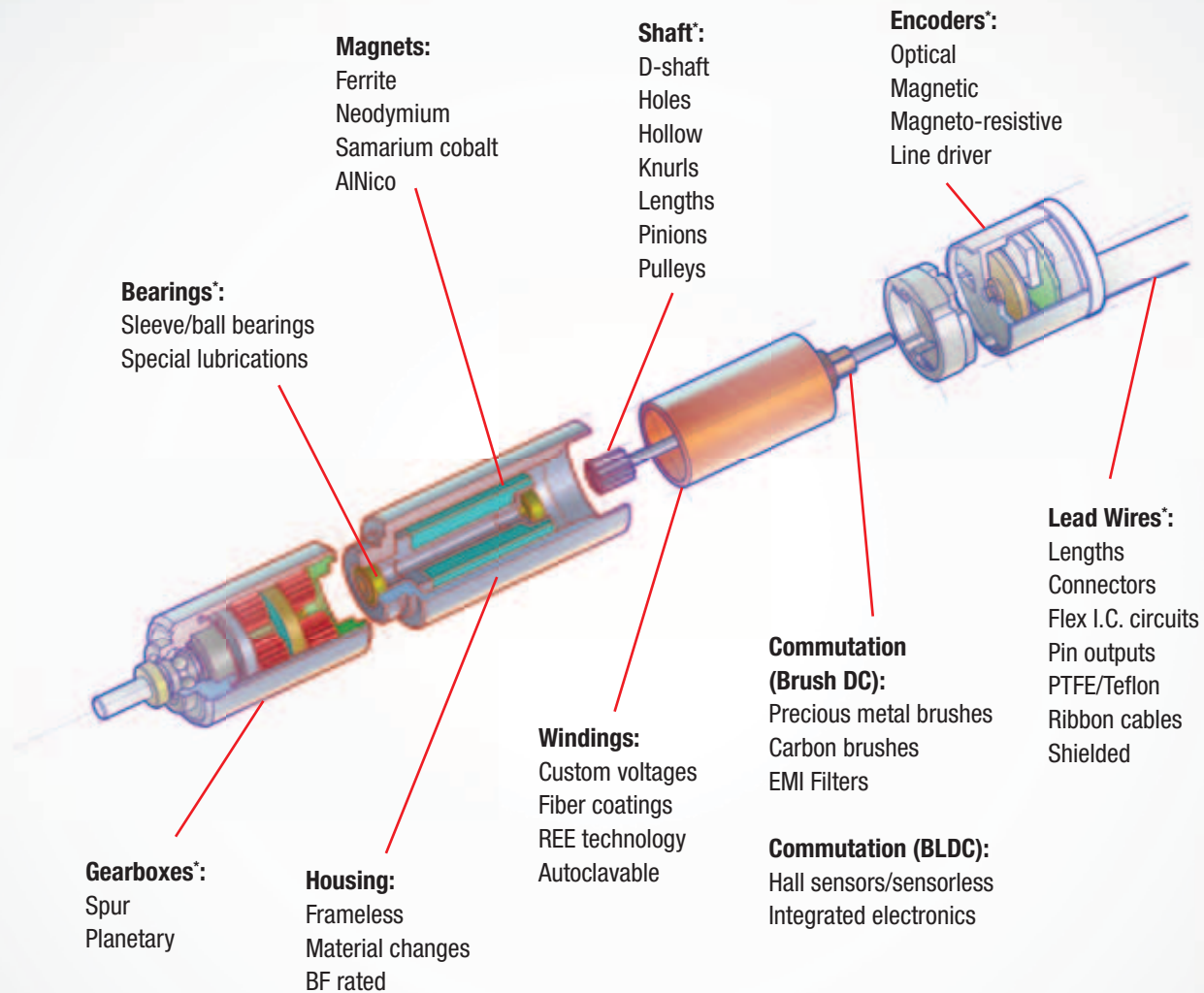


# MOTOR CHOICES FOR LIFE SCIENCE AND FLUID HANDLING

Benefit	Feature	Technology	Sub-Tech	Motor Recommendation	Typical Accessories	Application Example
Increased battery life	High efficiency - ironless rotor	DC		12mm - 22mm		Miniature Pumps
		Brushless	Slotless	13mm - 26mm	13 - 22mm planetary gearbox	Pipettes
Reduced EMI emissions	Patented REE coil design	DC		12mm - 22mm		Miniature Pumps
		Brushless	Slotless	13mm - 26mm	13 - 22mm planetary gearbox	Pipettes
				13mm - 26mm	13 - 22mm planetary gearbox	Blood Gas Analyzers
Increased motor lifetime	Ball bearing design	Brushless	Slotless	13mm - 26mm	13 - 22mm planetary gearbox, encoder	Sample Prep Workstations
		Stepper	Can Stack	15mm - 55mm		Urinalysis
			DMM	10mm - 52mm		Chromatography
Precise positioning	Multi-toothed rotor and stator	Stepper	Can Stack	15mm - 55mm		Flow Cytometry
			DMM	10mm - 52mm	Encoder	Immunoassay
	Encoder option	DC		8mm - 35mm	MR2 encoder	Blood Gas Analyzers
		Brushless	Slotless	13mm - 26mm	MR2 encoder	Sample Prep Workstations
Simple control	Repeatable movement without feedback	Stepper	Can Stack	15mm - 55mm		Blood Gas Analyzers
			DMM	10mm - 16mm		Sample Prep Workstations
			Linear Actuators	20mm - 26mm		Pipettes
Mechanical component elimination	Direct linear motion	Stepper	Linear Actuators	20mm - 26mm		Pipettes
				20mm - 26mm		Sample Prep Workstations
Reduced machine footprint	High power density	DC		10mm - 52mm	10 - 40mm spur gearbox	Sample Prep Workstations
Increased throughput	Higher speed	Brushless	Slotless	13mm - 26mm	Gearbox, encoder	Sample Prep Workstations
	Higher acceleration	Stepper	DMM	10mm - 52mm	Encoder	Chemistry



# Custom Solutions to Optimize Every Application\*



We can customize standard motor features to meet specific application requests, including performance specifications, mounting configuration, thermal and ambient condition requirements, and other operational needs.

\*Additional custom options available upon request.





# Compact, Powerful Motors for Your Application

Choose the standard motor technology that meets your needs for speed, torque, size, efficiency and acceleration. Or, rely on our advanced custom engineering to get the exact windings, magnet types, commutation technologies, shafts, leads and other features you need for an optimized solution.



## Brushless Slotted DC

**Frame Size:** 12.7mm (0.5") to 38mm (1.5")  
**Speed:** up to 100,000 rpm  
**Torque:** up to 276 mNm (39 oz-in)



## Stepper Disc Magnet

**Frame Size:** 10mm (0.4") to 52mm (2.05")  
**Speed:** up to 10,000 rpm  
**Torque:** up to 205 mNm (29 oz-in)



## Gearheads

**Frame Size:** 8mm (0.31") to 40mm (1.6")  
**Speed:** up to 10,000 rpm  
**Torque:** up to 9,534 mNm (1,350 oz-in)



## Brushless Slotless DC

**Frame Size:** 13mm (0.51") to 26mm (1.02")  
**Speed:** up to 70,000 rpm  
**Torque:** up to 48 mNm (3.7 oz-in)



## Stepper Can Stack

**Frame Size:** 15mm (0.6") to 55mm (2.16")  
**Speed:** up to 1,000 rpm  
**Torque:** up to 163 mNm (23 oz-in)



## Encoders

**Frame Size:** 8mm (0.31") to 30mm (1.18")  
**Technology:** Magnetic, Optical, MR  
**Line Count:** 4 to 1024



## Brush DC Coreless

**Frame Size:** 8mm (0.31") to 35mm (1.38")  
**Speed:** up to 16,000 rpm  
**Torque:** up to 130 mNm (18.4 oz-in)



## Digital Linear Actuator

**Frame Size:** 20mm (0.8") to 57mm (2.2")  
**Speed:** up to 1,000 rpm  
**Torque:** up to 111.2 N (25 lbf)

### Get started with the right miniature motor technology for your application

	Brushless DC Slotted	Brushless DC Slotless	Brush DC Coreless	Stepper Can Stack	Stepper Disc Magnet	Stepper Linear Actuator
Efficiency	✓	✓	✓			
Increased battery life		✓	✓			
Motor lifetime	✓	✓			✓	✓
Autoclavability	✓					
Ability to withstand harsh environments	✓		✓			
High power/ weight ratio	✓	✓	✓			
High acceleration	✓	✓	✓		✓	
Open loop positioning				✓	✓	✓
Simple control			✓	✓	✓	✓
Low noise		✓	✓			
Reduction of the number of mechanical components						✓



## OTHER AUTOMATION APPLICATIONS

### Aerospace

- Valve Actuation
- Window Shades & Seat Actuation
- Surveillance Camera System

### Communication

- Telecommunications
- Audio/Video Equipment
- Cameras

### HVAC&R

- Damper Actuators
- Refrigeration Valves

### Instrumentation

- Dosing & Dispensing Systems
- Land Surveying Station & Laser Systems
- Gas Detection & Personal Safety
- Microscopes
- Precision Scales

### Clinical Diagnostics & Fluid Handling

- Sample Preparation
- Miniature Pumps, Pipettes
- Gas & Liquid Chromatography
- Mass Spectrometry

### Office Automation

- Data Storage
- Printing & Copier Machines

### Power Tools

- Assembly Tools & Nut Runners
- Framing Systems

### Security

- Barcode Readers
- Electronic Access Systems

### Vending, Ticketing & Gaming

- ATM & Cash Machines
- Ticketing & Gaming Machines

### General Automation

- Machine Tools
- Electronic Assembly
- Printing & Packaging Machines
- Positioning & Material Handling
- Textile Machines

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