

# ***Orientalmotor*** **Speed Control**

**BMU Series (AC Input)**  
Compact, High-Power Brushless Motor



## Brushless Motors and AC Motors



**BLE2 Series**



**BXII Series**



**BLH Series**



**BLV Series**



**KIS Series**



**DSC Series**



**High Power AC Gear Motors**



**Inverters/VFDs**

# Speed Control Overview

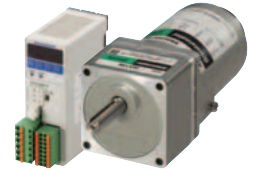
For applications where variable speeds are necessary, typically an AC motor with an inverter or brush motors are used. Brushless motors are an advanced option due to their wide speed range, efficiency, closed-loop speed regulation, and long maintenance-free life.

Speed can be controlled by built-in potentiometer, external analog voltage, digital setting, or by network command. Various gearhead configurations are available depending on requirements, design, and budgets.

Below are some common speed control applications.



**BLE2 Series**  
Brushless Motor with  
AC-input Driver



**DSC Series**  
AC Motor with  
AC-input Controller

## Typical Applications:

### ☐ Conveyors

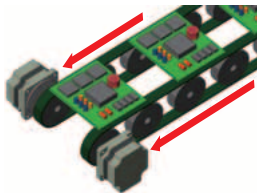
#### ● Multiple loads with different weights

Speed stability can be maintained with flat torque (Brushless Motors)



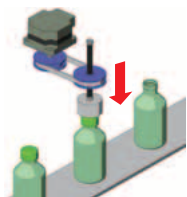
#### ● 2 axes parallel speed synchronization

Easily synchronize two motors / conveyors for simple speed control. (Brushless Motors)



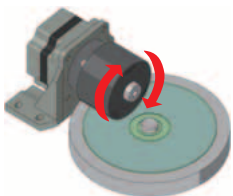
### ☐ Torque Sensing (Products with torque limit function)

#### ● Monitor load or limit torque



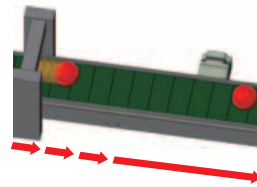
### ☐ Grinding / Deburring

#### ● Variable speed depending on material



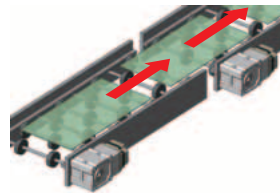
#### ● Variable speed conveyors

Speed can be slowed down to pass through specific function and sped up to increase throughput



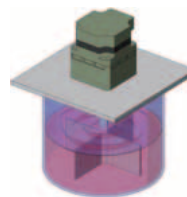
#### ● Set stable speed for maximum line flexibility

Use speed control to maintain speed, adjusting for different processes, maximum line flexibility



### ☐ Stirring / Pump / Dispensing

#### ● Maintain speed with different viscosities



### ☐ AGVs & AMRs

#### ● Tight speed regulation ideal for vehicle drivetrains

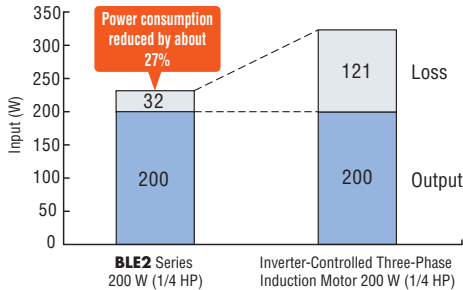


# Q: AC Motor vs Brushless Motor: Which is Better?

## A: Depends on your application requirements.

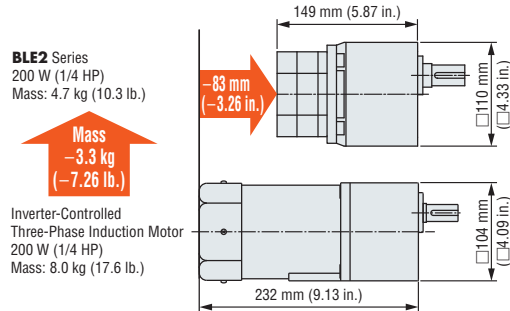
### Efficiency

Both motors have power loss in the form of I-R losses. Brushless motors use permanent magnets in the rotor to minimize this loss, while AC motors use more power for electromagnetic induction.



### Size

Because of their high efficiency characteristics, brushless motors offer high torque density. They are a great alternative to AC motors in applications where space is limited.



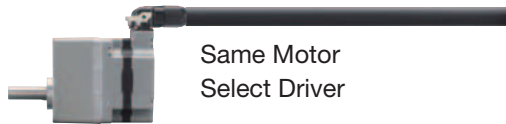
### Comparison of Speed Control Options

	Inverter + Three Phase Motor	Brushless Motor	Servo Motor
Composition / Structure / System	<p>Three-phase induction motor + General-purpose inverter (Sold separately)</p> <p>Open-loop control</p>	<p>Sensor mounted to magnet motor (SPM type) + Dedicated driver</p> <p>The same as the servo motor except that Hall Effect IC (sensor) detects rotor position.</p> <p>Closed-loop control</p>	<p>Encoder is mounted to magnet motor (SPM type/ IPM type) + Dedicated driver (amplifier)</p> <p>Encoder detects rotor position, more accurately than sensor.</p>
Control Function	Speed control with accuracy not required	Speed control (Torque control)	Speed control, position control, torque control
Rotation Speed (speed ratio)	90–3600 r/min (1:40)	80–4000 r/min (1:50)	Up to 5500 r/min
Torque			
Price for Reference: Motor (w/ gear) + Driver	100 W (1/8 HP)~\$429 Comparatively inexpensive	120 W (1/8 HP)~\$480 Less expensive than servo motor	100 W~\$1,200 Comparatively expensive to other control motors (Different depending on the accuracy and output of encoder)
Motor Exterior Shape	Induction motor	The same mounting as induction motor. Length (depth on the size of motor) is very short.	Mounting is small for its output. Length (depth on the size of motor) is very long.
Efficiency / Energy Saving Performance	Efficiency of induction motors is not high	High efficiency thanks to permanent magnet motor	
Speed Regulation (load)	-3~-15%	±0.05~±0.2%	±0.01%
Responsiveness	Low	High	High
Overrun	Yes, Large variations	Yes, controlled	Performs highly accurate positioning
Suitable Operations	<ul style="list-style-type: none"> <li>The main use is for operation at a fixed speed</li> <li>Allows for speed adjustments</li> </ul>	<ul style="list-style-type: none"> <li>When speed changes, torque and speed are kept stable.</li> <li>Multi-speed operation</li> </ul>	<ul style="list-style-type: none"> <li>Highly-responsive and high-precision positioning, speed control, and torque control</li> <li>Multi-speed operation</li> </ul>

# Brushless Motors and Drivers

Our new slim motor design allows for better protection, maximum efficiency and driver options. IP66 rating, inch/metric mounting dimensions, stainless steel shaft, and a wide variety of wattages and gear types are offered to meet various needs.

Brushless Motors offer built-in hall-effect sensor feedback to maintain closed-loop speed regulation. In addition to features such as digital/analog speed settings, torque limit, and speed range setting, the drivers also offer alarm and status monitor functions in case problems occur during operation.



**BMU Series**  
Simple Control



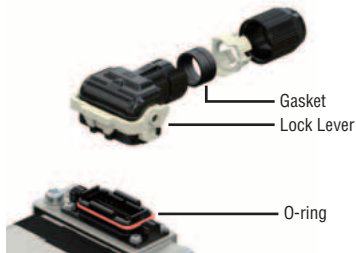
**BLE2 Series**  
0-10 VDC  
External Control

## New Design (BLE2 Series, BMU Series)

### IP66 Degree of Protection

Utilizing an industry style compact connector, a direct connection between the motor and driver can be achieved, no secondary connections. Connection is easy with the lock lever that does not require screws.

#### Connector Structure

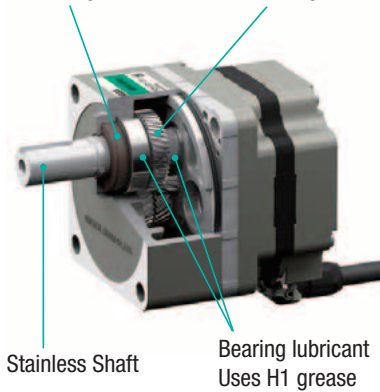


#### Standardized Stainless Steel Shaft (SUS303)



#### H1 Food Grade Grease Available\*

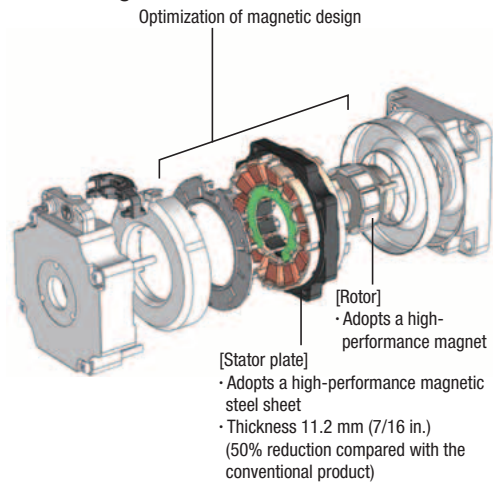
Oil seal lubricant Uses H1 grease  
Gear lubricant Uses H1 grease



Stainless Shaft  
Bearing lubricant Uses H1 grease

\*Also available with **KIIS** Series AC Motors.











#### Slim Motor Design



## Gearing Options

Parallel Shaft <b>GFV</b> Gear	Parallel Shaft <b>JV</b> Gear	Foot Mounted Parallel Shaft <b>JB</b> Gear	Right Angle Hollow Shaft <b>JH</b> Gear
<p>Radial Load <b>IP66</b></p> <p>Axial Load</p>	<p>Radial Load <b>IP66</b></p> <p>Axial Load</p>	<p>Radial Load <b>IP44</b></p> <p>Axial Load</p>	<p>Radial Load <b>IP66</b></p> <p>Axial Load</p>
50:1 Gear Reduction; 3000 RPM at Motor Radial (Overhung) Load <b>280 lb</b> Axial (Thrust) Load <b>67 lb</b> Rated Torque <b>483 lb-in</b>	450:1 Gear Reduction; 3000 RPM at Motor Radial (Overhung) Load <b>1163 lb</b> Axial (Thrust) Load <b>154 lb</b> Rated Torque <b>3814 lb-in</b>	600:1 Gear Reduction; 3000 RPM at Motor Radial (Overhung) Load <b>1331 lb</b> Axial (Thrust) Load <b>185 lb</b> Rated Torque <b>5159 lb-in</b>	200:1 Gear Reduction; 3000 RPM at Motor Radial (Overhung) Load <b>772 lb</b> Axial (Thrust) Load <b>176 lb</b> Rated Torque <b>1575 lb-in</b>

# Product Series Comparison

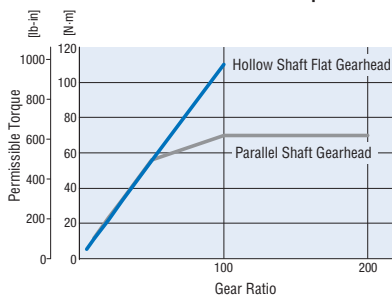
Category		AC Power Supply Input			DC Power Supply Input		
		BMU Series	BLE2 Series	BXII Series	BLH Series	BLV Series	
Product Series							
Features		<ul style="list-style-type: none"> <li>• Easy Data Setting</li> <li>• Digital Speed Display</li> <li>• Panel Mounted Driver</li> <li>• Simple Operation</li> <li>• Quick Setup</li> </ul>	<ul style="list-style-type: none"> <li>• Easy Data Setting</li> <li>• Digital Speed Display</li> <li>• Stainless Steel Shaft</li> <li>• Quick Setup</li> </ul>	<ul style="list-style-type: none"> <li>• Servo Control</li> <li>• Variable Speed or Positioning</li> <li>• Linked Operation</li> <li>• High Speed Regulation</li> </ul>	<ul style="list-style-type: none"> <li>• Compact Board Driver</li> <li>• Simple Operation</li> <li>• Digital or Analog Driver</li> <li>• Quiet Operation</li> </ul>	<ul style="list-style-type: none"> <li>• High Power</li> <li>• Network Compatible</li> <li>• Accepts Battery Power</li> <li>• Ideal for AGV</li> </ul>	
MEXE02 Support Software		–	●	●	●	●	
Power Supply Input		Single-Phase 100-120 VAC Single-Phase 200-240 VAC Three-Phase 200-240 VAC	Single-Phase 100-120 VAC Single-Phase 200-240 VAC Three-Phase 200-240 VAC	Single-Phase 100-120 VAC Single-Phase 200-240 VAC Three-Phase 200-240 VAC	24 VDC	24/48 VDC	
Output Power	Frame Size 42 mm (1.65")	–	–	–	15 W (1/50 HP)	–	
	Frame Size 60 mm (2.36")	30 W (1/25 HP)	30 W (1/25 HP)	30 W (1/25 HP)	30 W (1/25 HP)	–	
	Frame Size 80 mm (3.15")	60 W (1/12 HP)	60 W (1/12 HP)	60 W (1/12 HP)	50 W (1/15 HP)	–	
	Frame Size 90 mm (3.54")	120 W (1/6 HP)	120 W (1/6 HP)	120 W (1/6 HP)	100 W (1/8 HP)	–	
	Frame Size 104 mm (4.09")	200 W (1/4 HP) 400 W (1/2 HP)	200 W (1/4 HP) 400 W (1/2 HP)	200 W (1/4 HP) 400 W (1/2 HP)	–	200 W (1/4 HP) 400 W (1/2 HP)	
Speed Control Range		80~4000 RPM	80~4000 RPM	2~4000 RPM	80~3000 RPM	80~4000 RPM	
Speed Ratio		50:1	50:1	2000:1	37.5:1	50:1	
Speed Regulation (Load)		+/-0.2%	+/-0.2%	+/-0.05%	+/-0.2%	+/-0.2%	
Speed Setting Method	Potentiometer	Internal	Internal/External	Internal/External	Internal/External	Internal/External	
	Digital Setting	●	●	●	–	–	
Functions	Analog Setting	–	●	●	●	●	
	Digital Display	●	●	●	–	–	
	Instantaneous Stop	●	●	●	●	●	
	Acceleration/Deceleration	●	●	●	●	●	
	Multi-Speed Operation	4 Speeds	16 Speeds	16 Speeds	8 Speeds	8 Speeds	
	Electromagnetic Brake for Load Holding	–	–	●	–	●	
	Multi-Axis Speed Synchronization	–	●	●	●	●	
	Protective Functions	●	●	●	●	●	
	Accepts Sink/Source	●	●	●	–	●	
	Maximum Motor Extension	10 m (32.8 ft)	20 m (65.6 ft)	30 m (98.4 ft)	2 m (6.6 ft)	3 m (9.8 ft)	
	Extended Functions	Load Factor	–	Torque Limiting	Torque Limiting	Torque Limiting	Torque Limiting
		Speed Attainment Band	–	Speed Limits	Speed Limits	Speed Limits	Speed Limits
	Gearhead Options	Parallel Solid Shaft	●	●	●	●	●
Flat Hollow Shaft		–	–	●	●	●	
Right Angle Hollow Shaft		●	●	–	–	–	
Safety Standards							
RoHS		Complies	Complies	Complies	Complies	Complies	
Maximum IP Rating		IP66	IP66	IP54	IP65	IP40	
Starting List Price*		\$300.00~	\$393.00~	\$693.00~	\$256.00~	\$557.00~	

\* Motor + Driver. Cable sold separately (BLV - cables included).

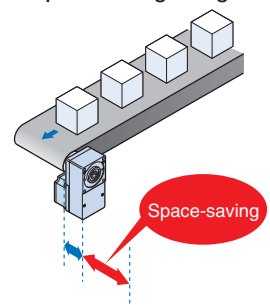
## FR Flat Hollow Shaft Gearhead



### ● Unsaturated Permissible Torque



### ● Space Saving Design



## AC Motors and Speed Controllers

AC motors allow simple speed control by using an inverter to change the power supply frequency (Hz) or a controller to change the power supply voltage.

The **DSC Series**, **KIIS Series**, Brother gear motors, and Fuji Electric inverters (VFDs) cover speed control requirements from 6 W (1/125 HP) to 3 HP. The **KIIS Series** is optimized for efficiency and speed control while Brother's Mid Series AC induction motors are rated for ie3 efficiency and offers hypoid/helical gearheads with various configurations.



**DSC Series (Closed-Loop)**

## KIIS Series 3-Phase AC Induction Motors

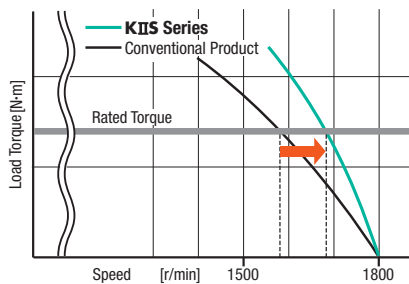
30 W (1/25 HP)~100 W (1/8 HP)



### High Performance

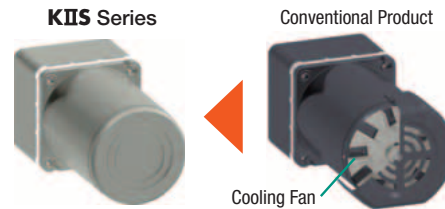
Characteristics have been improved to create a high-performance motor with little speed reduction even with a large load.

### Changes in Speed according to Load



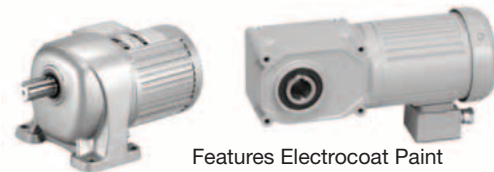
### Fanless Design

**KIIS** new motor design reduced heat generation. With higher efficiency, there is less heat generation in the motor so a cooling fan on the back of the motor is no longer required. With no cooling fan, dust is not blown around.



## Brother AC Induction Motors

1/2 HP~3 HP

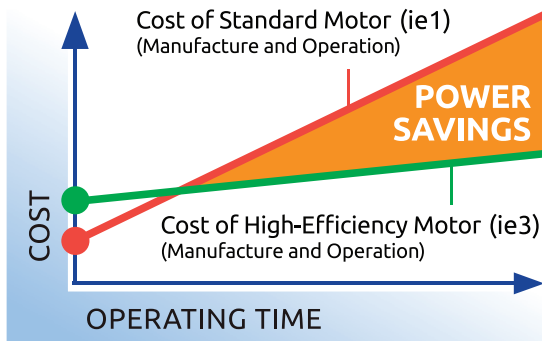


Features Electrocoat Paint

### Premium Efficiency Series ie3

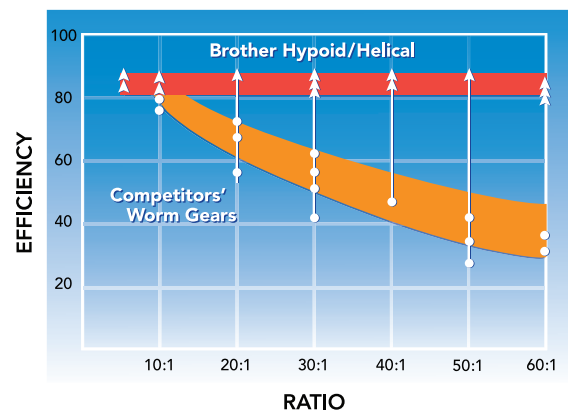
The new ie3 premium efficiency gear motors cost less to operate and demonstrate clear benefits when running for long periods of time (when compared to ie1 standard efficiency gear motors).

### Benefits of using Premium Efficiency ie3, 3 Phase AC motors











### High Efficiency Hypoid / Helical Gearheads

Compared to commonly used worm gears, high efficiency gear motors feature Hypoid / Helical gearing technology that can maintain efficiency above 85% throughout the motor's wide speed range.



# Product Series Comparison

Category	AC Power Supply Input			
	KIS Series, BH Series	Brother ie3 Mid Series	FPW Series	DSC Series
Product Series				
Features	<ul style="list-style-type: none"> <li>•High Torque</li> <li>•High Speed</li> <li>•High Efficiency</li> <li>•Speed Stability</li> </ul>	<ul style="list-style-type: none"> <li>•High Torque</li> <li>•High ie3 Efficiency</li> <li>•Efficient Hypoid Gear</li> <li>•Electrocoat Paint</li> <li>•Stainless Steel Shaft</li> </ul>	<ul style="list-style-type: none"> <li>•Watertight</li> <li>•Dust-Resistant</li> <li>•Oil Shield Protection</li> <li>•Anti-Corrosive Epoxy Coating</li> <li>•Stainless Steel Shaft</li> </ul>	<ul style="list-style-type: none"> <li>•High Torque</li> <li>•Closed-Loop Control</li> <li>•Digital Speed Setting</li> <li>•Speed Synchronization</li> <li>•Easy to Use</li> </ul>
Power Supply Input	Three-Phase 220/230 VAC	Single-Phase 115 VAC Single-Phase 220 VAC Single-Phase 230 VAC Three-Phase 208/230/460 VAC	Single-Phase 110/115 VAC Single-Phase 220/230 VAC Three-Phase 200/220/230 VAC	Single-Phase 110/115 VAC Single-Phase 220/230 VAC
Output Power	1/125 HP (6 W)	—	—	●
	1/50 HP (15 W)	—	—	●
	1/30 HP (25 W)	—	—	●
	1/25 HP (30 W)	●	—	—
	1/19 HP (40 W)	●	—	●
	1/12 HP (60 W)	●	—	●
	1/8 HP (90 W)	—	—	●
	1/8 HP (100 W)	●	—	—
	1/4 HP (200 W)	● <sup>2</sup>	—	—
	1/2 HP (400 W)	—	●	—
	3/4 HP	—	●	—
	1 HP	—	●	—
	2 HP	—	●	—
3 HP	—	●	—	
Speed Control Range (Motor RPM)	90~3600 RPM (3~120 Hz) <sup>1</sup>	150~3600 RPM (5~120 Hz)	300~2400 RPM (10~80 Hz)	90~1600 RPM
Speed Ratio	40:1	24:1	8:1	18:1
Available Options	Round Shaft (No Gearing)	●	—	●
	Parallel Solid Shaft Gearhead	●	●	●
	Right Angle Solid Shaft Gearhead	●	—	—
	Right Angle Hollow Shaft Gearhead	●	●	—
	Electromagnetic Brake	●	●	—
Terminal Box	●	●	—	—
Safety Standards				
RoHS	Complies	Complies	Complies	Complies
Maximum IP Rating	IP66 <sup>2</sup>	IP65	IP67	IP20
Starting List Price	\$116.00	\$565.00	\$291.00	\$206.00

1: 100 W Parallel shaft: 90~3600 RPM (3 to 120 Hz),  
100 W Right angle shaft: 90~2400 RPM (3 to 80 Hz),  
2: BH Series, IP54

## Fuji Electric FRENIC-Mini (C2) Inverters / VFD

The new user friendly FRENIC-Mini (C2) inverters elevates the performance of a wide range of equipment.

For use with 1/8 HP up to 3 HP, Three-Phase Motors  
Single-Phase 115 VAC or 230 VAC input, Three-Phase 230 VAC or  
Three-Phase 460 VAC input.

Standard functions:

- Auto-Tuning / Torque Boost
- Flexibly Remote / Local Operation
- Dynamic Torque Vector Control
- Fastest CPU in its Class
- Network Compatibility
- Efficiency Setting / Side by Side Mounting



Frenic-Mini (C2) Inverters

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Learn more about the technology used in our products.

## Engineering Resources

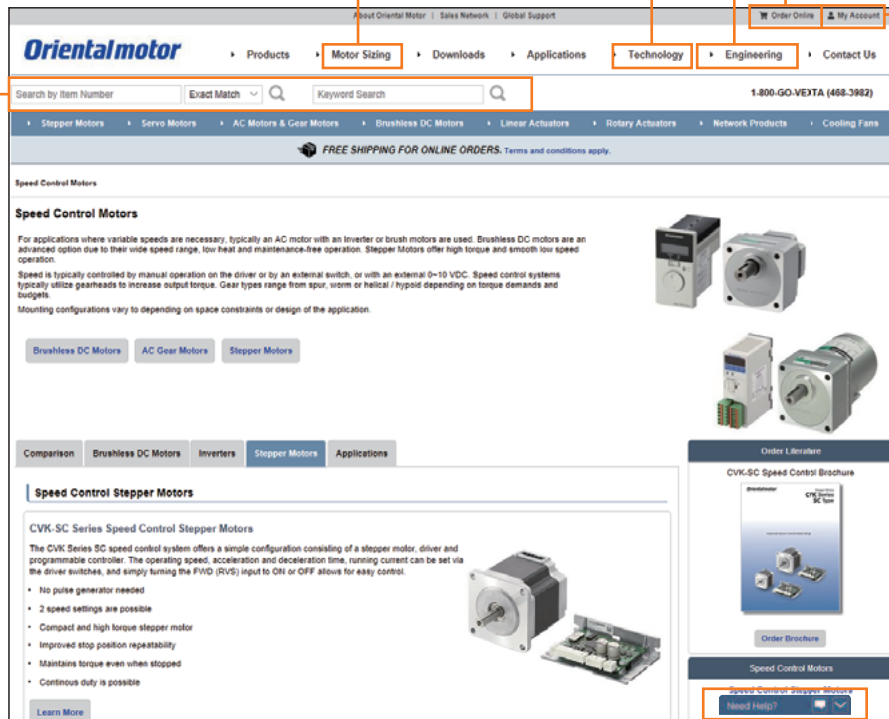
Refer to videos, blog, and forum for motion control tips.

## Motor Sizing

Easily calculate motor requirements for specific applications.

## Live Chat

Live chat is available during regular office hours.



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