

Product Guide

αSTEP Hybrid Control
System

Linear & Rotary Actuators

Network – Controllers

Stepper Motors

Brushless Motors

Standard AC Motors

Cooling Fans

2022

2023

Oriental Motor

**AVAILABLE WORLDWIDE,
STARTING FROM A SINGLE UNIT.**



GLOBAL SALES NETWORK

15 countries

Bringing Oriental Motor to the Global Market

Industrial – Medical – Packaging – Material Handling – and so much more.

Worldwide, our refined product development enables daily operations across all fields of business. Honoring our corporate philosophy built on over 100 years of history. We continually evolve to meet our customers' needs-wherever they are.

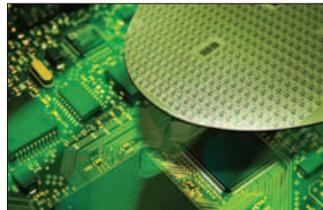
Medical



Packaging



Semiconductor



Factory Automation (FA)



Material Handling



Food Processing



Security



Environmental



Products of Oriental Motor

Oriental Motor offers approximately 50,000 items as standard products.

Your optimal motion system can be found among our extensive product line-up. From our industry leading α STEP Hybrid family of positioning products, high torque stepper motors to our speed control or constant speed motors designed for value and long life. For thermal management we offer a wide range of cooling fans, alarms and accessories.

α STEP Hybrid Control System



- Mechanical Absolute Encoder Stepper Motors
- Closed Loop
- Positioning, Speed, Torque Control
- Electromagnetic Brake Types
- Geared Types



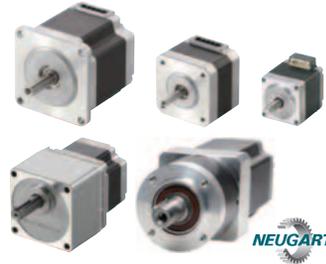
- Linear & Rotary Actuators
- Transport
- Push/Pull
- Lifting
- Gripping
- Rotating

Network – Controllers



- EtherNet/IP
- EtherCAT
- PROFINET
- Modbus (RTU)
- CC-Link
- MECHATROLINK
- Single Axis Controller

Stepper Motors



- 2 Phase 1.8°, 0.9°
- 5 Phase 0.72°, 0.36°
- Drivers
- Encoder Motors
- Electromagnetic Brake Types
- Geared Types

Brushless Motors



- Speed Control
- Compact Yet Powerful
- Excellent Speed & Torque Performance
- Space Saving
- Energy Saving
- No Brushes = No Maintenance



- AC/ DC Input
- Easy Wiring, Easy Set Up
- Simple to Use Controls
- Battery-Operated for AGV
- Communication through Modbus (RTU) and CANopen

Standard AC Motors



- 1 W (1/750 HP)~3 HP
- Single & 3 Phase
- Fixed Speed
- Speed Control
- Electromagnetic Brake Types
- Geared Types

Cooling Fans



- AC or DC Input
- Alarms
- Axial Flow
- Blowers
- Cross Flow
- Thermostats
- Enclosure Types

Short Lead Times

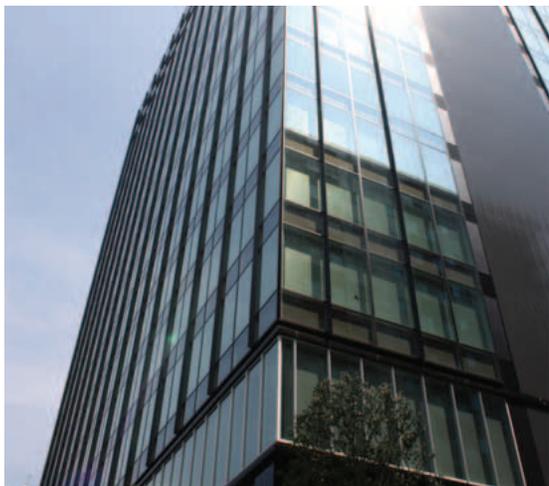
Delivering What is Needed, When it is Needed.

Our manufacturing system allows the manufacturing of an order with little notice, in any quantity requested. Additionally, our one-by-one process allows us to manufacture one product as easily as one hundred.

Our main products are stocked and able to ship from the warehouse closest to your ship to location.



Oriental Motor Corporate Overview



Company	ORIENTAL MOTOR CO., LTD.
Founded	1885
Established	1950
Representative	President Eiji Kawahito
Capital	4.1 billion yen
Sales	Consolidated 52.1 billion yen (At the end of March 2021)
Number of Employees	Consolidated 3,119 (At the end of March 2021)
Company Activity	Development, manufacture and sale of small precision motors and electronic circuits for motion control
Head Office	4-8-1, Higashiueno, Taito-ku, Tokyo, 110-8536, Japan

R&D Center	Tsuruoka-Chuo Plant
Factories	Tsuruoka-Nishi Plant
	Soma Plant
	Tsukuba Plant
	Tsuchiura Plant
	Kashiwa Plant
	Kofu Plant
	Takamatsu-Kozai Plant
	Takamatsu-Kokubunji Plant
	Manufacturing Technology R&D Center (Joso, Ibaraki)

Tsuruoka-Chuo Plant

Development of standard AC motors and brushless motors. Development and manufacturing of control circuits and cooling fans.



Tsuruoka-Nishi Plant

Manufacturing of standard AC motors, brushless motors and gearheads.



Soma Plant

Development and manufacturing of stepper motors and control circuits.

Tsukuba Plant

Development of various motor and control circuits. Manufacturing of control motors. Evaluating, analyzing, and measuring various products.



Tsuchiura Plant

Development and manufacturing of gearheads and motorized actuators.



Kashiwa Plant

Research and development on the ideal accessories and peripheral equipment for every product.



Kofu Plant

Manufacturing and production technology development of control circuits. Evaluating, analyzing and measuring various products.

Takamatsu-Kozai Plant

Development and manufacturing of stepper motors.



Takamatsu-Kokubunji Plant

Manufacturing of stepper motors.



Oriental Motor Supports Global Manufacturing

Since its founding in Japan in 1885, Oriental Motor globally has been providing the optimal motion systems as part of our total service, to meet the widest market demands. For over a century we have concentrated on technological advancement and product design improvement. This emphasis is evident in the sophisticated devices that we market today. Oriental Motor's sales and service network is international, with offices throughout North America, Europe and Asia. Domestically, ORIENTAL MOTOR U.S.A. CORP. was established in 1978. We produce a wide variety of fractional horsepower products to meet all your motion control needs.

Quality

In order to meet all motion control needs, we expanded our product line. Our accumulated technological excellence reflects our long years of dedication to quality. With our strengths, such as high torque, high precision, long life, low noise and ease of selection, our established systems aim to produce products that our customers can rely on.



Speed

You can order the products listed in our catalog or website anytime, anywhere and in any quantity you need. We deliver orders of any size, from one piece or more, with the shortest lead-times. With our stable production, quality control and logistics systems, we relentlessly pursue improvements and excellence in order to continue providing our products and services to our customers all over the world.



Product & Technology Training

Virtual or On-Site Technical Seminar

Oriental Motor offers virtual or in-person training and product demonstrations at your location. Contact your local sales office or our Technical Support Team for more information or to schedule a training seminar.

Lunch & Learn Seminars

You can schedule an on-site lunch & learn seminar with our Sales and Application Engineer staff. For this one-hour session, Oriental Motor will discuss our latest technology for solving simple to challenging motion requirements.



Oriental Motor Provides Customer Support for Products and Services

Find the Right Solution from
Approximately 50,000
Standard Products



Always Available,
Before & After Sales Support
Services



At Oriental Motor, we carry nearly 50,000 standard products, including motors, actuators and fans.

With our solid production, quality control and logistics systems, Oriental Motor products can be delivered to customers when they need it, in as little as 1 day, starting from an order of just 1 piece.

Oriental Motor also offers an extensive support system to help customers select the optimal product. From selection, design and equipment setup, to after-sales services, Oriental Motor provides support for all of our customers' needs.

Contact Us

● Estimates ● Product Inquiries ● Orders ● General Information

By Live Chat



www.orientalmotor.com

"Need Help?" popup
Available - Monday to Friday,
8:30am EST to 5:00pm PST

By Email



www.orientalmotor.com/contact

Technical Support
Customer Service / Sales

By Phone



Hours - Monday to Friday,
8:30am EST to 5:00pm PST

Toll-free Customer Support Center

Support: 1-800-468-3982
Sales: 1-800-448-6935

Oriental Motor Offers:

Fast Delivery

**No Minimum Order
Quantity**

Dedicated Support

See Full Product Details

Visit our website for expanded product information, specifications, CAD, accessories and more.



oriental motor

search

Find the Right Solution from Approximately 50,000 Products

Search

Search by part number, keyword, or specification.

White Papers

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.



Order Online

Convenient online ordering is available.

My Account

Register for My Account to view order history and receive special content.

For technical information searches, please use our website.



Q & A Forum



Online Inquiries



On Demand Technical Videos

Stay in Touch

Newsletter



Engineering Notes



Social Media



α STEP Hybrid Control System

Position, Speed and Torque Control

What is α STEP?

α STEP is a “hybrid” stepper motor-based motor & driver that together, performs independent control which combines the advantages of “open loop” and “closed loop” performance. In addition to high-accuracy positioning and speed control, it can perform control that restricts the motor's generated torque to a user set value (such as push-motion operation).

Hybrid Control System

The hybrid control system constantly monitors the motors position allowing for the benefits of performance from “open loop” control while providing the assurance of “closed loop” performance.

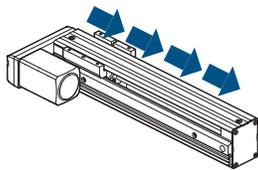
Normal Condition (Positioning deviation is less than $\pm 1.8^\circ$)

Motor is controlled in open loop mode like a stepper motor.

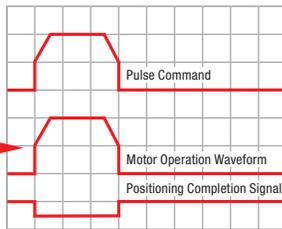
The tuning-free feature allows for high accuracy and high responsiveness to commands

Hunting-free (Complete stop)

Constant monitoring of the motor's status



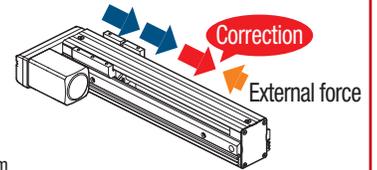
No time lag between command and actual operation



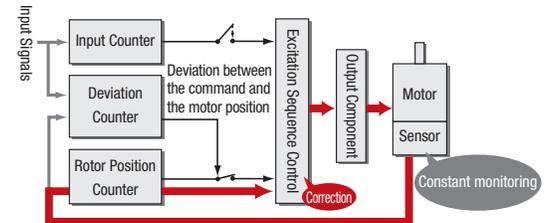
Overload Condition (Positioning deviation is $\pm 1.8^\circ$ min.)

The closed loop mode is engaged to maintain the positioning operation.

Reliability as a result of monitoring and correction of positions and speed



● Closed Loop Control System



Performance

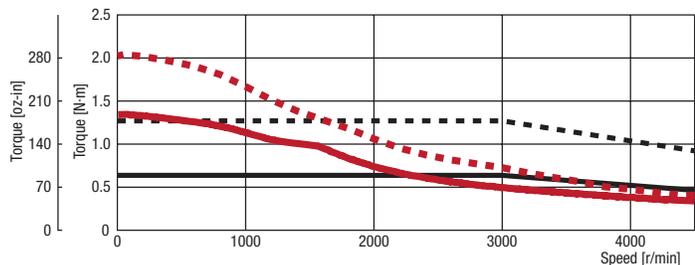
“Rated output” is not listed because α STEP has no “rated speed.” Refer to the graph on the right to compare rated torque of α STEP to watts of servo motor's rated output torque.

- Generates high torque in the mid-to-low speed range
- Excels at frequent starting and stopping operation that requires acceleration/deceleration torque

● Frame Size 60 mm (2.36 in)

— AZM66
- - - AZM69

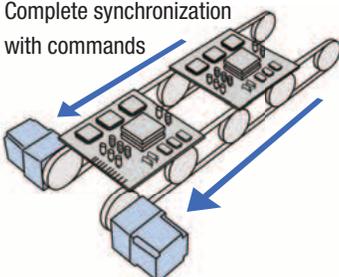
— Servo Motor 200 W (Rated torque)
- - - Servo Motor 400 W (Rated torque)



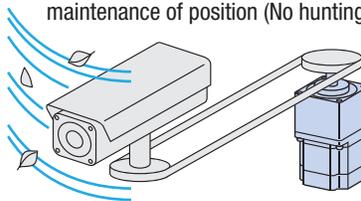
● Data for the speed-torque characteristics is based on Oriental Motor's internal measurement conditions. If the conditions are changed, the characteristics may also change as a result.

Ideal Applications for α STEP

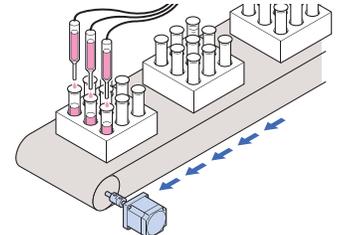
Complete synchronization with commands



Complete stop during standby and maintenance of position (No hunting)



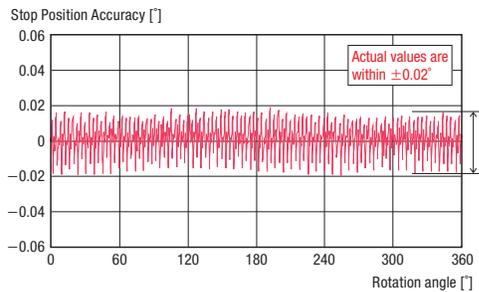
Frequent repetitive starting and stopping



α STEP Stopping Accuracy

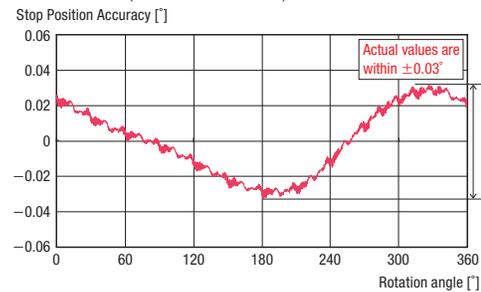
The stopping accuracy of a typical α STEP is $\pm 0.05^\circ$ (under no load), which is equivalent to that of servo motors. These graphs show the actual measured stopping accuracies when an α STEP and an AC servo motor were rotated once.

● Stopping accuracy of α STEP (Actual measurements)



[Example] When the ball screw lead is 10 mm, the α STEP stopping accuracy is $\pm 1.4\mu\text{m}$ and the repetitive positioning accuracy of a common ground ball screw is $\pm 10\mu\text{m}$.

● Stopping accuracy of AC servo motor with a common 20-bit encoder (Actual measurements)



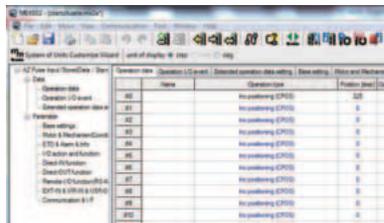
The stopping accuracy of an AC servo motor is the encoder resolution ± 1 pulse*. The above shows the actual values that result from differences in the encoder's assembly.
*1,048,576 p/rev at 20 bits

Support Software MEXE02

Operating Data & Parameter Settings

Setting of operation data and parameters easily via computer.

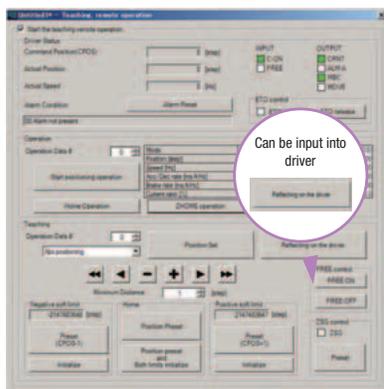
The same settings can be transferred and saved.



Teaching & Remote Operation

The operation command information can be input directly into the driver.

Multi-monitoring enables remote operation and teaching while monitoring.

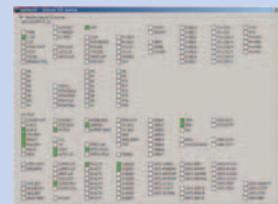


Available for free download on the website.

Various Monitoring Functions

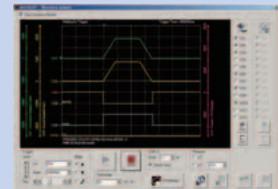
I/O Monitoring

Used for post-wiring I/O checks or I/O checks during operation.



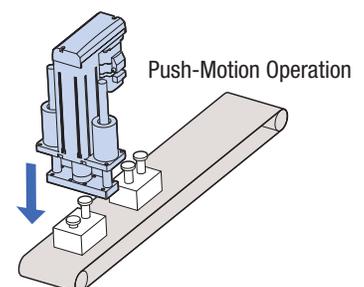
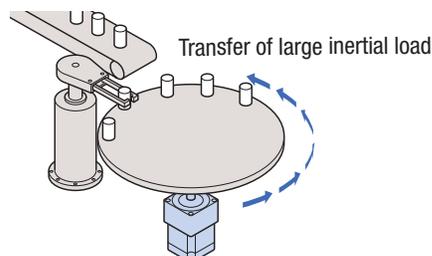
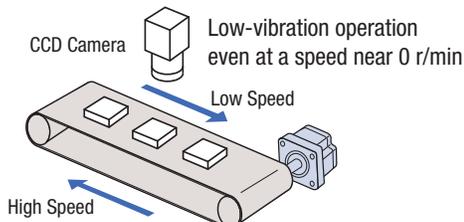
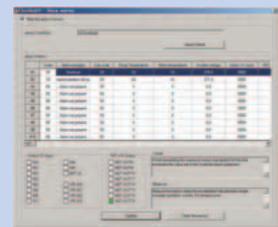
Waveform Monitoring

Helpful at start-up or adjustments, the operational state can be checked by an oscilloscope-like image.



Alarm Monitoring

When an abnormality occurs, the details of the abnormality and the solution can be checked.



Advantages of the AZ Series

The AZ Series α STEP hybrid control system features absolute sensing using a multiple-rotation mechanical sensor. The system constantly monitors the motors position even during a sudden power off situation.

- Mechanical-Type Sensor / Multiple-Rotation Absolute System**
 ± 900 rotations the driver knows where the motor position is.
 No return to home is necessary.
- Home Setting Method Improves Return-to-Home Accuracy**
 Home operation does not depend on a sensor sensitivity.
- No External Sensors or Batteries Required**
 The driver uses the motor sensor to determine rotor position
- No Hunting / No Gain Tuning**
 Utilizes the high response and mechanical advantage of a Stepper Motor
- Continues Operation Even with Sudden Load Fluctuations and Sudden Acceleration**
 Runs in normally open loop control. If overloaded, switches to closed loop control.
- Monitoring Functions**
 Speed, motor, driver temperature, load factor, odometer and much more can easily be monitored.



No External Sensors Required with the AZ Series

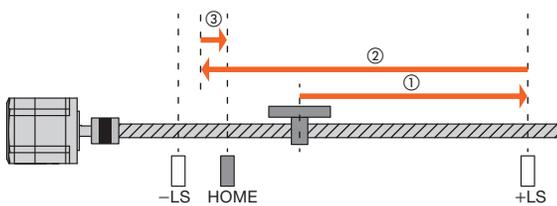
The AZ Series driver uses the positioning information managed by the mechanical absolute sensor. The position information can be preserved, even if the power turns off or if the cable between the motor and the drive is disconnected. No battery required.

Shortened Reset Time ① High Speed Return-to-Home

Because return-to-home is possible without using an external sensor, return-to-home can be performed at high speed without taking the sensor sensitivity into account, allowing for a shortened machine cycle.

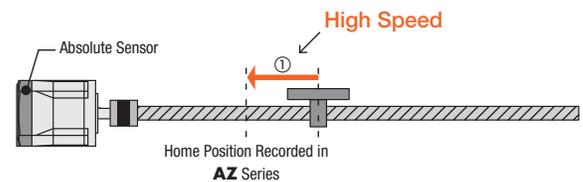
Previous Home Detection for Control Motor

The home position is detected at low speed by detecting the limit sensor (\pm LS) and home sensor (HOME).



Return-to-Home Operation of AZ Series

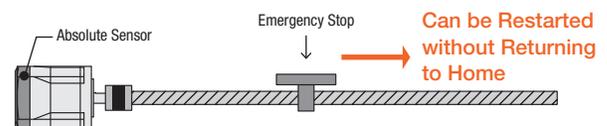
There is no need to detect the limit sensor, and it can travel directly at high speed to the home position recorded by the Absolute Sensor.



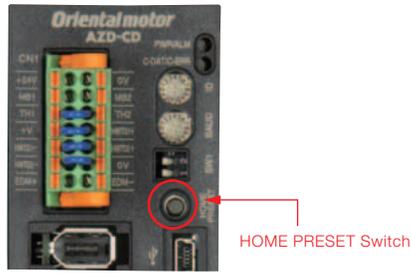
Shortened Reset Time ② Return-to-Home is not Necessary

If the power shuts down during a positioning operation, the positioning information is retained. For built-in controller types, positioning operations can restart without performing a return-to-home operation when recovering from an emergency stop of the production line or a blackout.

Built-in Controller Type



● **AZ Series Driver Types**



Home Setting Method

The home position can be easily set by pressing a switch on the drivers surface, which is saved by the Mechanical Absolute Encoder. In addition, home setting is possible with the **MEXE02** data setting software or external input signal.

Home position is easy to adjust by moving the motor to a desired position manually.

- AC or DC Input
- Stored Data, Pulse Input Type
- Network / RS-485 / Monitoring
- No Additional Sensors Required



● **Motor / Geared Types**



Standard



Tapered Hob



Harmonic (no backlash)



Right Angle (face gear)



Planetary



Planetary (attach load)



Planetary (high torque)

● **Actuator Types**



Linear Slides



Linear Cylinders



Rotary Actuators



Rack & Pinion



Compact Electric Cylinder



Gripper

● AC Input – Single Axis



AC Input

AZ Series



Frame Sizes	1.65 in (42 mm), 2.36 in (60 mm), 3.35 / 3.54 in (85 / 90 mm)
Holding Torque	42 oz-in~974 lb-in (0.3~110 N·m)
Resolution (P/R)	1000
Options	Electromagnetic Brake
Gear Types	Tapper Hob / Planetary / Right Angle / Harmonic
Driver Types	Pulse / RS-485 / EtherNet/IP / EtherCAT / Profinet
Main Power Supply	Single-Phase (VAC)
	Three-Phase (VAC)
Control Power Supply (VDC)	24
Starting From (Motor+Driver+ Cable)	\$963.00

● DC Input – Single Axis



DC Input

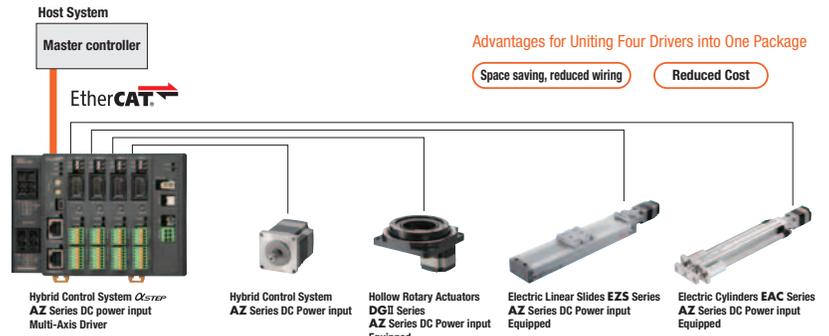
AZ Series



Frame Sizes	0.79 in (20 mm), 1.10 in (28 mm), 1.65 in (42 mm), 2.36 in (60 mm)
Holding Torque	2.8 oz-in~354 lb-in (0.02~40 N·m)
Resolution (P/R)	1000
Options	Electromagnetic Brake
Gear Types	Tapper Hob / Planetary / Right Angle / Harmonic
Driver Types	Pulse / RS-485 / EtherNet/IP / EtherCAT / Profinet
Power Supply	VDC
Starting From (Motor+Driver+ Cable)	\$773.00

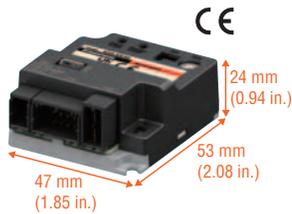
*Profinet Only

Multi- Axis (DC Input)
2, 3 or 4 axis type



● The connected motors and linear & rotary actuators are representative examples.

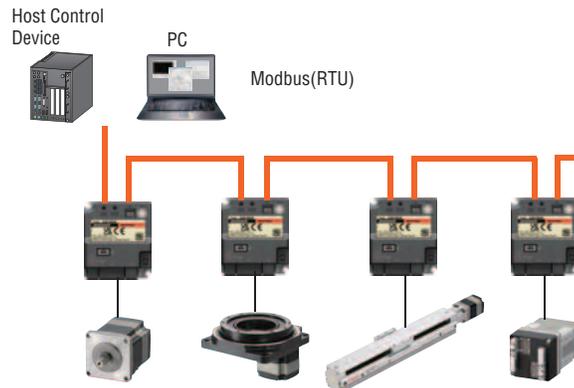
mini Driver



Modular Automation Products

Refer to Page 13.

FA Network Compatible



*By using **AZD-KR2D** in combination with a network converter (gateway), control by CC-Link, MECHATROLINK or EtherCAT can be supported.

Modular Automation

The **AZ** Series family of actuators, motors and mini driver are designed for automating manufacturing lines. Designed to be flexible, robust and easy to use. Save time, reduce space by using Modular Automation products.

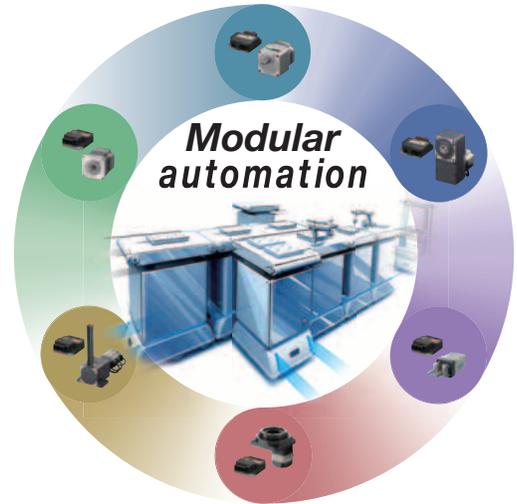
The Flexible Automation Line Concept >>>

- The production line is lightweight and features modular processes
- Eliminates the routing of AC power lines
- Able to be reconfigured many times as needed

Elements Needed to Achieve >>>

Battery-powered / DC power input / lightweight & compact

- Flexibility in Production Layout
- Productivity Improvements
- High-Mix, Low-Volume Production
- Resolve Labor Shortages
- Space Saving
- Energy Saving



● Modular Automation Compatible Products

<p>DC Input Motors</p> 	<p>Hollow Rotary Actuators</p> 	<p>Rack-and-pinion Systems</p> 	<p>Robot Controllers MRC01</p> <p>Multi-axis robot controller, easy to use, program, ideal for in-house built applications. See website.</p> 
<p>αSTEP AZ Series mini Drivers RS-485 Communication Type</p> 			<p>Brushless Motors BLV Series R Type</p> <p>Redesigned, compact driver and motor. Speed range of 1 to 4,000 r/min. Designed to support battery-powered applications.</p> 
<p>Electric Linear Slides</p> 	<p>Electric Grippers</p> 	<p>Compact Electric Cylinders</p> 	

For Example, These Motor & Drivers Can Contribute to Flexibility within the Production Line Layout.



Vertically Articulated Robot **A B**
 Articulated drive/**AZ** Series motor, mini driver
 Hand/electric gripper **EH** Series, mini driver
 Robot controller/**MRC01**

Lifting and Lowering Equipment **C**
 Rack-and-pinion system **L** Series
Conveyor **D**
BLV Series R Type

Transportation Robot (Wheel Drive) **E**
BLV Series R Type

- αSTEP Hybrid Control
- AZ Series
- Actuators
- Network
- Stepper Motors
- Brushless Motors
- Standard AC Motors
- Cooling Fans
- Before Selection / Warranty

Linear & Rotary Actuators

α STEP Hybrid Control System

A broad selection of linear & rotary electric actuators using the **AZ Series α STEP** hybrid control system as the driver source are available for a wide range of motion requirements.

● Electric Slide



● Electric Cylinder



Y-Axis Electric Linear Slides **EZS Series**

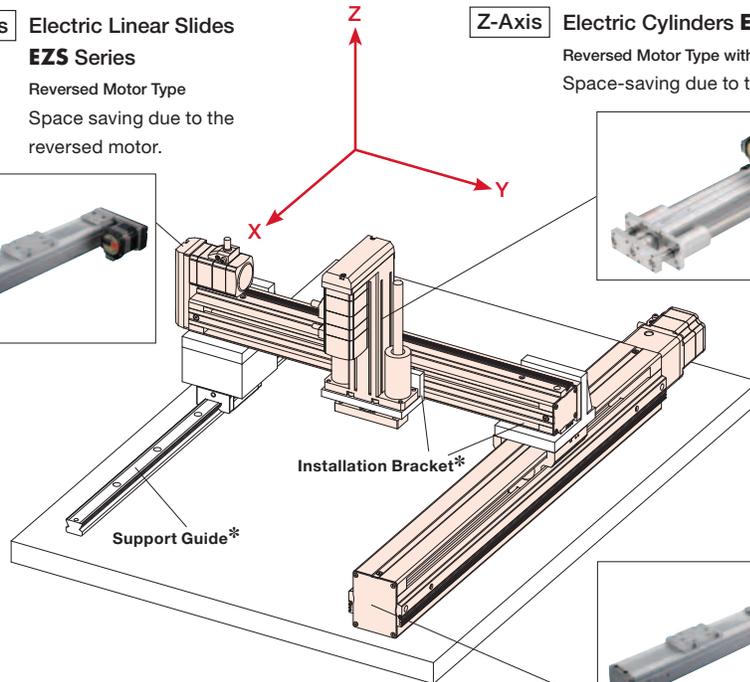
EZS Series

Reversed Motor Type
Space saving due to the reversed motor.



Z-Axis Electric Cylinders **EAC Series**

Reversed Motor Type with Shaft Guide Cover
Space-saving due to the reversed motor.

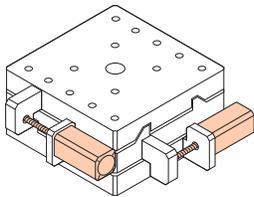


*Support guide and installation brackets supplied by the customer.

X-Axis Electric Linear Slides **EZS Series** Straight Type



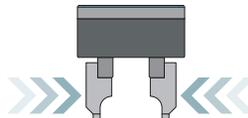
● Compact Electric Cylinder



● Gripper

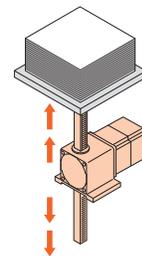
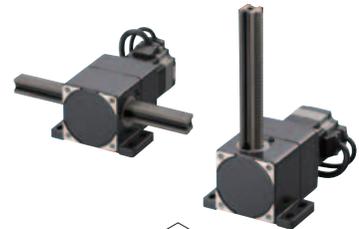


*Gripper Arms not included



Large load

● Rack & Pinion



● Hollow Electric Rotary Actuator



Vertical Mount Type



Horizontal Mount Type



Large-Diameter Hollow Output Table
Makes Simple Wiring and Piping Possible

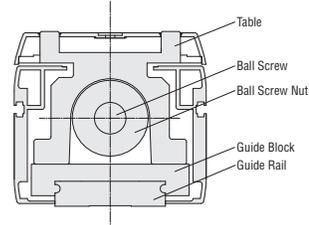
Linear Motion / Transport

EZS Series



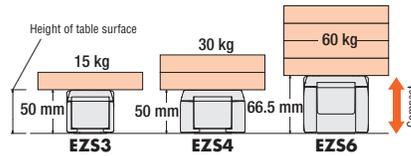
High Rigidity / High Accuracy Guide

*LM Guide and Ball Retainer are registered trademarks of THK.



Traveling Parallelism of 0.03 mm or Less

Slim with High Transportable Mass



EZS Series: with AZ Series



Max. Speed (mm/s)	800	
Max. Transportable Mass - Vertical (kg)	30	
Max. Transportable Mass - Horizontal (kg)	60	
Repetitive Positioning Accuracy (mm)	±0.02	
Stroke Length (mm)	50 - 850	
Power Supply	VDC	24/48
	Single-Phase (VAC)	100-120 / 200-240
	Three-Phase (VAC)	200-240
Starting From (Actuator+Driver+Cable)	\$1,412.00	

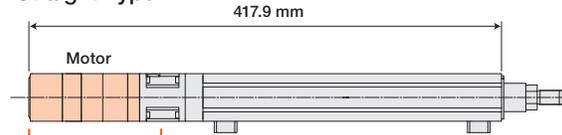
Push / Pull

EAC Series

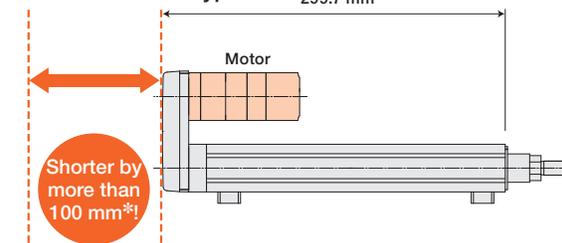


High Strength, Space Savings

Straight Type

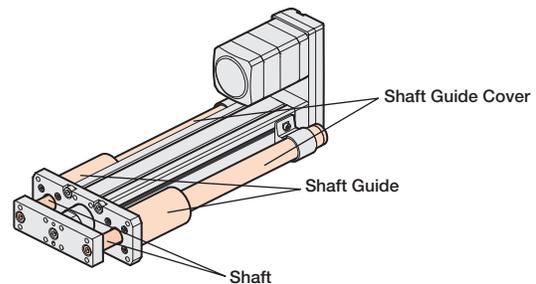


Reversed Motor Type



*When electromagnetic brake is installed

With or Without Guide Cover



Reversed Motor Type
with Shaft Guide Cover

EAC Series: with AZ Series



Max. Speed (mm/s)	600	
Max. Transportable Mass - Vertical (kg)	28	
Max. Transportable Mass - Horizontal (kg)	60	
Repetitive Positioning Accuracy (mm)	±0.02	
Stroke Length (mm)	50 - 300	
Thrust Force (N)	400	
Push Force (N)	500	
Power Supply	VDC	24/48
	Single-Phase (VAC)	100-120 / 200-240
	Three-Phase (VAC)	200-240
Starting From (Actuator+Driver+Cable)	\$1,228.00	

Push / Pull / Transport

DR Series

- Micromovement and High Positioning Accuracy
- Compact, Space Saving



Wide Table Type



Table Type



Rod Type with Guide

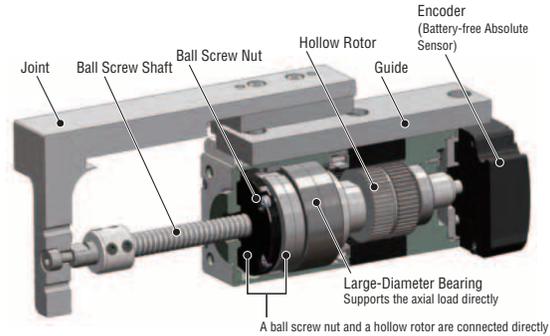


Rod Type

DR Series: with AZ Series



Frame Size (mm)	20 / 28 / 42 / 60
Max. Speed (mm/s)	200
Max. Transportable Mass - Vertical (kg)	50
Max. Transportable Mass - Horizontal (kg)	50
Max. Thrust Force (N)	500
Repetitive Positioning Accuracy (mm)	±0.003/±0.005/±0.01
Stroke Length (mm)	25~50
Options	Brake / Guide / Knob / Ball Screw Cover / Installation Plate
Power Supply	VDC 24/48
Starting From (Actuator + Driver + Cable)	\$1,196.00

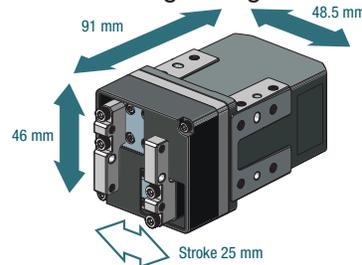


Gripping

EH Series



- Small and Light Weight

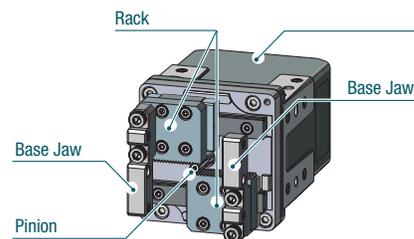


EH Series: with AZ Series



Maximum Grip Force (N)	25
Repetitive Positioning Accuracy (mm)	each side ±0.02
Backlash (mm)	each side 0.1
Stroke (mm)	25 (12.5 each side)
Maximum Speed (mm/s)	156 (78 each side)
Push Speed (mm/s)	20 (10 each side)
Minimum Travel Amount (mm)	0.02 (0.01 each side)
Permissible Load (N)	5
Static Permissible Moment (N-m)	MP:1.2 MY:0.12 MR: 0.4
Power Supply	VDC 24/48
Starting From (Actuator + Driver + Cable)	\$1,297.00

- High Reliability, Closed Loop Control



Battery-Free Absolute Sensor (ABZO Sensor)

Linear Motion / High Power

L Series

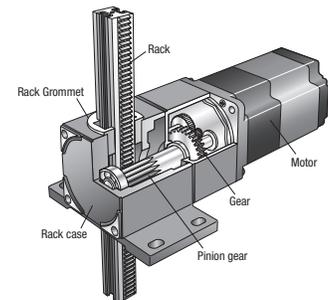


L Series: with AZ Series



Frame Size (mm)	60/80
Max. Speed (mm/s)	500
Max. Transportable Mass (kg)	100 (20 mm/s)
	70 (40 mm/s)
Max. Thrust Force (N)	1008 (20 mm/s)
	705 (40 mm/s)
Max. Stroke Length (mm)	1000
Type	Horizontal / Vertical
Option	Brake
Power Supply	VDC 24/48
	Single-Phase (VAC) 100-120, 200-240
	Three-Phase (VAC) 200-240
Starting From (Actuator + Driver + Cable)	\$1,328.00

- Compact and High Strength



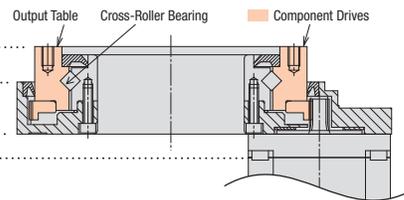
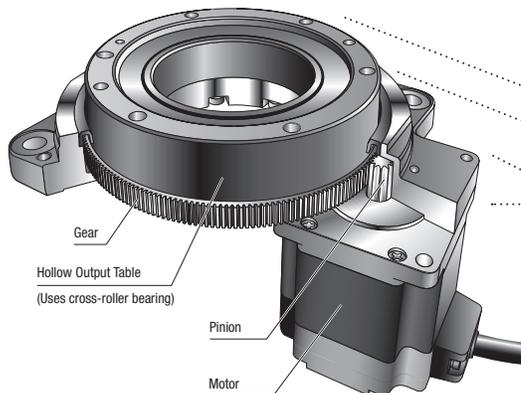
Rotate

DGII Series

Large-Diameter, Hollow Output Table



Vertical Mount Type



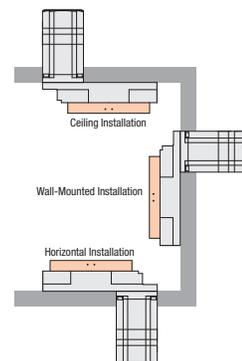
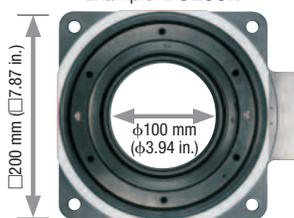
High Positioning Accuracy, Non-Backlash

Vertical Mount: with AZ Series



Frame Size (mm)	60/85/130/200	
Diameter of Hollow Section (mm)	28/33/62/100	
Permissible Torque (N-m)	50	
Permissible Axial Load (N)	4000	
Lost Motion	2 arcmin	
Option	Electromagnetic Brake	
Repetitive Positioning Accuracy	±15 sec / ±0.004°	
Power Supply	VDC	24/48
	Single-Phase (VAC)	100-120 / 200-240
	Three-Phase (VAC)	200-240
Starting From (Actuator + Driver + Cable)	\$1,537.00	

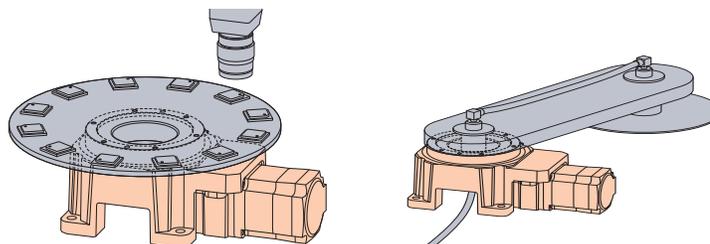
Example: DG200R



Save Space



Horizontal Mount Type



Horizontal Mount: with AZ Series



Frame Size (mm)	85/130	
Diameter of Hollow Section (mm)	33/62	
Permissible Torque (N-m)	50	
Permissible Axial Load (N)	2000	
Lost Motion	6 arcmin	
Option	Electromagnetic Brake	
Repetitive Positioning Accuracy	±30 sec / ±0.008°	
Power Supply	VDC	24/48
	Single-Phase (VAC)	100-120 / 200-240
	Three-Phase (VAC)	200-240
Starting From (Actuator + Driver + Cable)	\$2,613.00	

Gear Ratio: 12:1, 18:1 or 36:1



Frame Size 85 mm



Frame Size 130 mm

Network / Controller Products

Overview

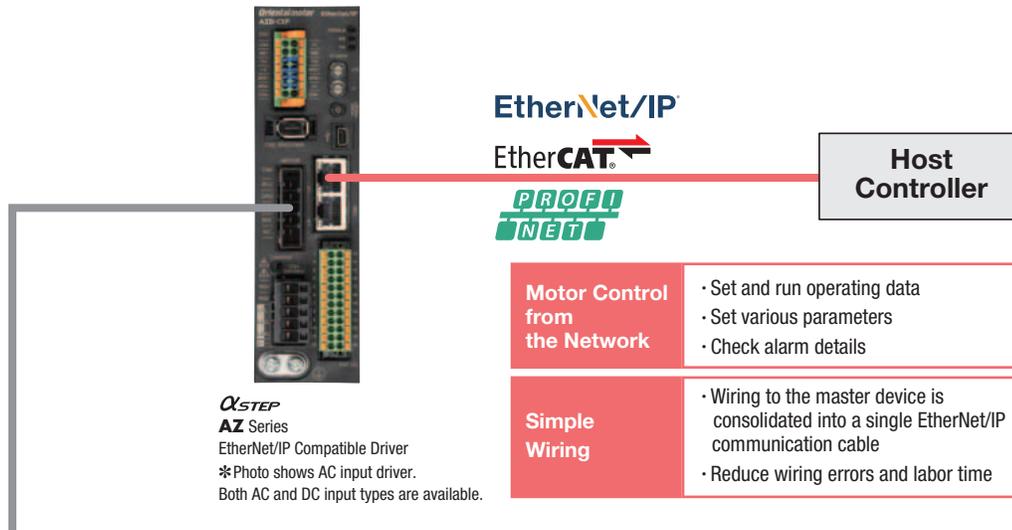
Motor control via network communication can detect the status of the motor directly by data. This results in a shorter development period, increased reliability and maintainability of the equipment.

By expanding the network supported product line, Oriental Motor meets diversifying network environments of factory automation (FA).



Oriental Motor offers single axis EtherNet/IP or EtherCAT communications in our **AZ** Series family of stored data drivers.

*Different part numbers required



AZ Series Motors and Linear & Rotary Actuators			
● The Products shown below are representative examples.			
AC Input / DC Input			
 AZ Series	 Hollow Rotary Actuators DGII Series Equipped with AZ Series	 Electric Linear Slides EZS Series Equipped with AZ Series	 Electric Cylinders EAC Series Equipped with AZ Series
AC Input / DC Input	DC Input Only		
 Rack and Pinion Systems L Series Equipped with AZ Series	 Compact Electric Cylinders DR Series	 Compact Electric Cylinders DR52 Series	 Electric Gripper EH Series

• EDS File for EtherNet/IP
An EDS file has been prepared to allow EtherNet/IP-compatible products to be used more easily.
The EDS file can be downloaded from the Oriental Motor website.

• ESI File for EtherCAT
An ESI file has been prepared to allow EtherCAT compatible products to be used more easily.
The ESI file can be downloaded from the Oriental Motor website.

• GDS File for PROFINET
A GDS file has been prepared to allow PROFINET-compatible products to be used more easily.
The GDS file can be downloaded from the Oriental Motor website.

Ethernet/IP™ is a trademark of ODVA, Inc

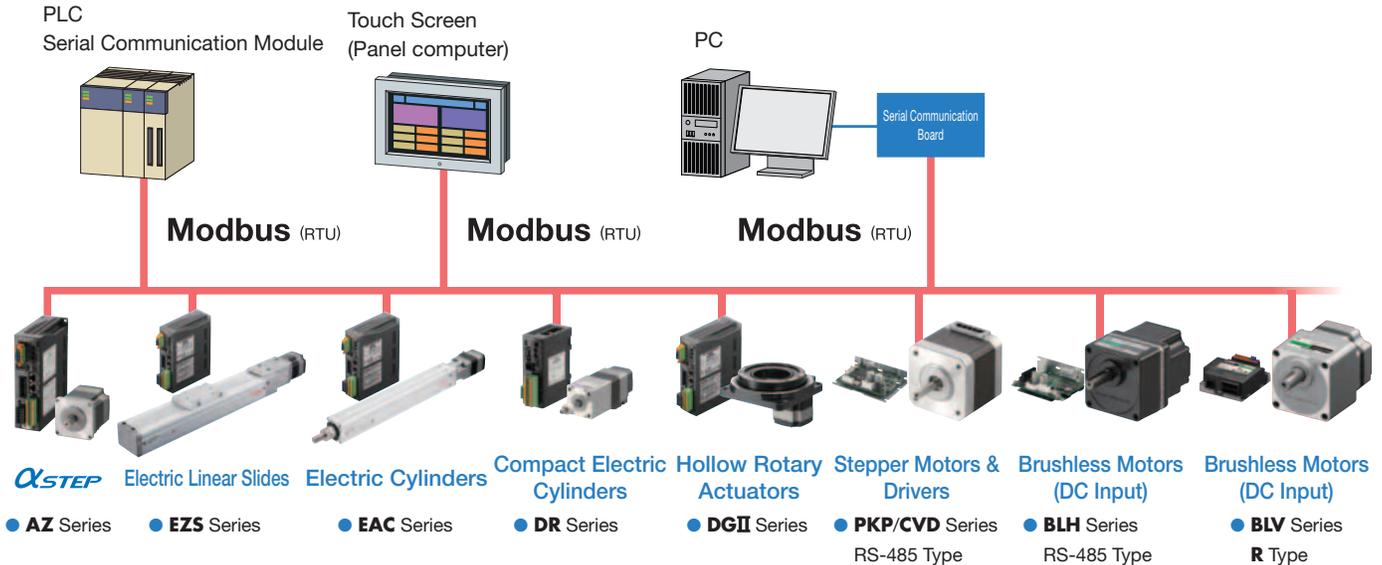
EtherCAT is a registered trademark licensed by Beckhoff Automation GmbH, Germany

PROFINET is a trademark or registered trademark of PROFIBUS Nutzerorganisation e.V. (PNO).

Modbus (RTU)

Oriental Motor offers single axis Modbus (RTU) communication in our **AZ, PKP/CVD** RS-485 Type, **BLV R** Type and linear based products.

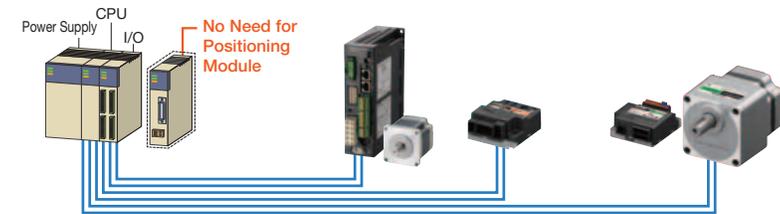
*Modbus is a registered trademark of Schneider Automation Inc.



Built-In Controller (Stored Data Type)

For I/O or Network control, stored data drivers with built-in controller ability (stored data type) using our **MEXE02** Support Software (Free Download) is available in our **AZ** Series and **BLV** Series **R** Type of products.

- Easy Control
- Low-Cost Design
- Space Saving



The operating data is set in the driver, and is then selected and executed from the host system.

- Simple Wiring
- No Additional Pulse Module Required
- I/O Control
- Driver / Motor Monitoring
- Daisy Chain up to 16 Drivers
- Use with **MEX02** Support Software

Single Axis Programmable Controller (Stored Program Type)

The **SCX11** universal controller is a highly functional and sophisticated controller, equipped with program editing and execution functions and able to control the motor via various serial ports such as USB, RS-232C and **CANopen**.



- Stand Alone - Pulse Generator
- Store up to 100 Sequence Programs
- External Encoder Input
- USB Port Standard
- Direct Command Operation via **CANopen**
- 24 VDC
- List Price: \$383.00



Gateways

Oriental Motor offers additional Gateway Network Converters.

- *Ether**CAT** is a registered trademark licensed by Beckhoff Automation GmbH, Germany
- *MECHATROLINK is a registered trademark of MECHATROLINK Members Association
- *SSCNETIII/H is a registered trademark of Mitsubishi Electric Corporation



Stepper Motors

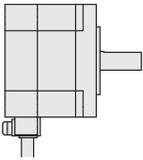


Oriental Motor offers a wide range of high torque stepper motors in frame sizes from 0.79 in. (20 mm) up to 3.54 in. (90 mm). Geared types, encoders, brake options and various motor windings are offered.

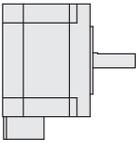
For improved performance, full time microstepping drivers with Smooth Drive are available, reducing noise and vibration and controlling heat output.

Stepper Motor Types

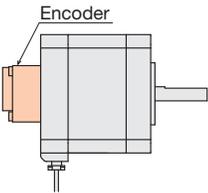
Standard



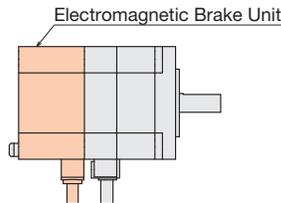
High-Resolution Type



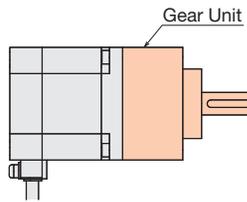
Encoder Type



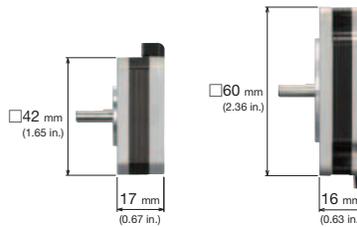
Electromagnetic Brake Type



Geared Type

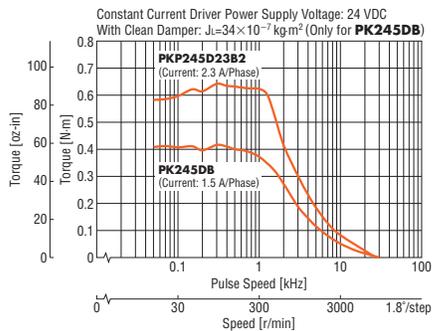


Flat Type

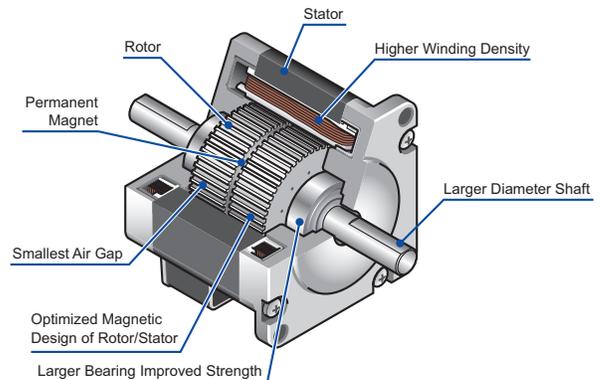


PKP Stepper Motor Features

Increased Torque: New PKP to PK



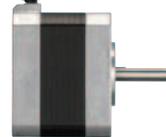
New Design: Run Cooler or Downsize



PKP Series



Flat Connector



Cable sold separately

● High Torque, Low Vibration, Ridged Construction, Downsizing

1.8°/0.9°/0.72°/0.36°

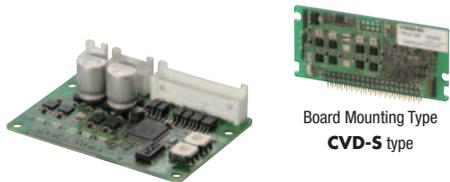
PKP Series



Frame Sizes	0.79 in (20 mm), 1.10 in (28 mm), 1.38 in (35 mm) 1.65 in (42 mm), 2.22/2.36 in (56.4/60 mm), 3.35 / 3.54 in (85 / 90 mm)
Holding Torque	2.8 oz-in~1062 lb-in (0.02~120 N-m)
Resolution (P/R)	2 Phase (1.8°/0.9°)
	5 Phase (0.72°/0.36°)
Options	Flat Motor / Electromagnetic Brake / Encoder
Gear Types	Spur / Spur with Center Shaft / Tapper Hob / Planetary / Harmonic
Starting From (Motor)	\$46.00

*Varies by items. See the website for the details.

CVD Driver



Board Mounting Type
CVD-S type

DC Input

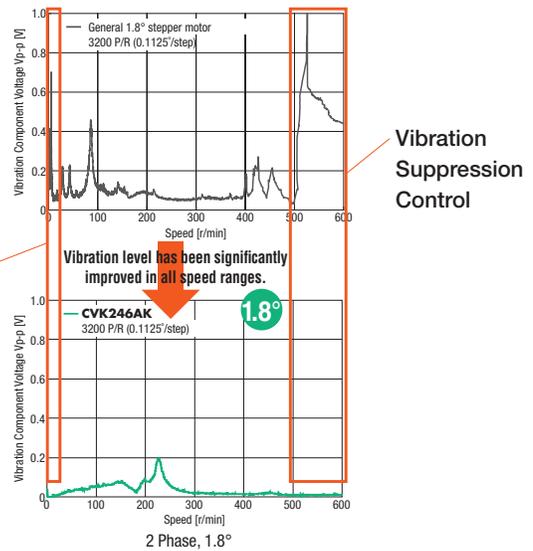
CVD Series



Motor Types (Bi-polar)	2 Phase (1.8°/0.9°) 5 Phase (0.72°/0.36°)
Output Current (Amps)	0.5~4.5*
Smooth Drive	2048 per step
Max Resolution	125,000 steps per rev.
Power Supply	VDC
	24
Input Current (Amps)	0.5~4.8*
Starting From (Driver)	\$143.00

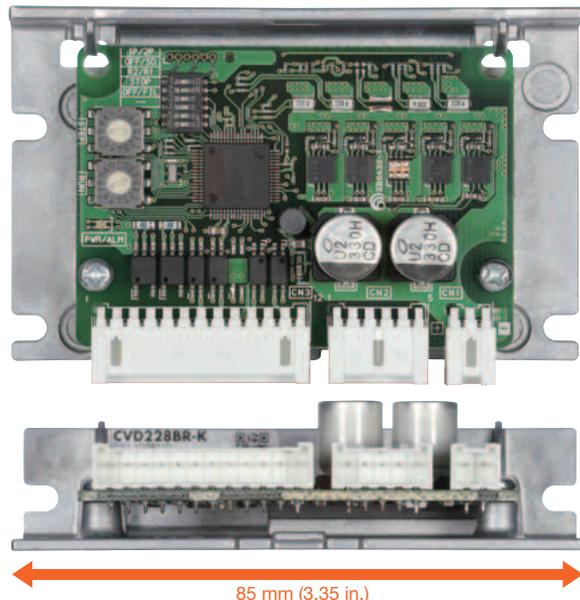
*See individual driver for ratings

● Low Vibration with Full-Time Microstepping



Smooth Drive Control Reduces Step Vibration

● Industry's Top, Compact, High Performance Driver



Mass 20 g (0.71 oz) to 70 g (2.47 oz)

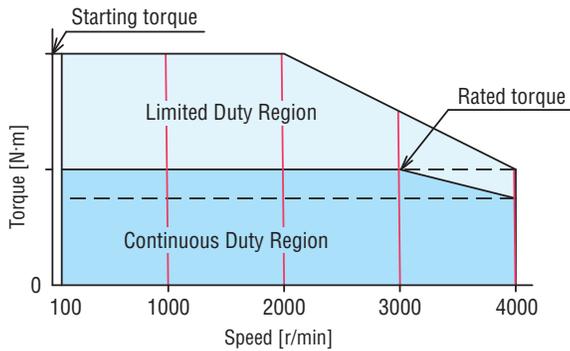
(Differs according to the driver type.)

Brushless Motors



Brushless motors offer excellent energy efficiency and savings equivalent to IE4, excellent speed stability, as well as a wide speed control range. Brushless motors use permanent magnets in the rotor of three-phase motors. With Brushless motors there is no brush and commutator resulting in a maintenance free motor.

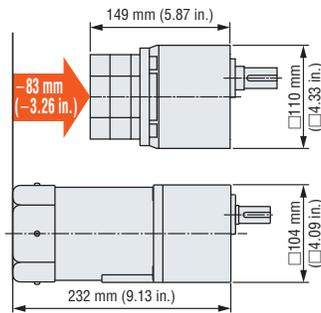
On the inside of the stator, there is a built-in hall effect IC (magnetic sensor) that detects magnetic field changes with the permanent magnets. The feedback signals from the hall effect IC of the motor are compared with the setting speed by the driver and the motor speed is adjusted continuously.



Constant Torque:
Speed is maintained even with changing loads

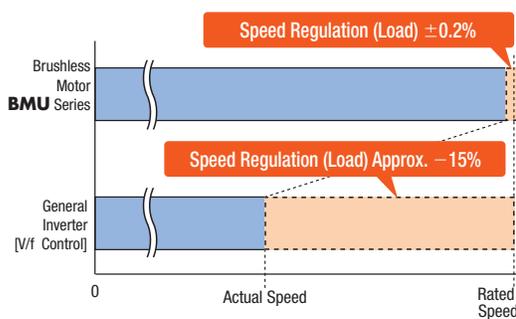
● **Wide Speed Range: 80~4000 r/min**

● **Smaller than AC Motors**

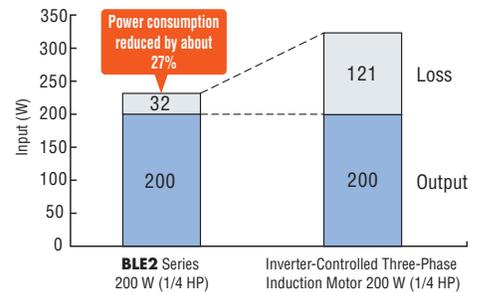


● **±0.2% Speed Stability**

● **Comparison of Speed Variation (Reference value)**

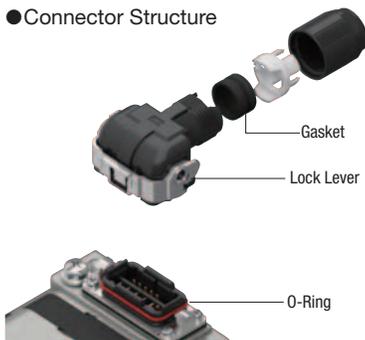


● **Energy Savings**



● **Degree of Protection – IP66**

● **Connector Structure**

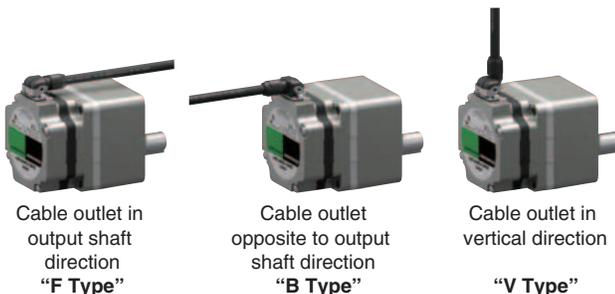


Quick lock connector style is now available on our AC Input Brushless Motor Series (BMU/BLE2)

● **Installation Method**



● **Selectable Cable Direction**



Availability varies by product Series.

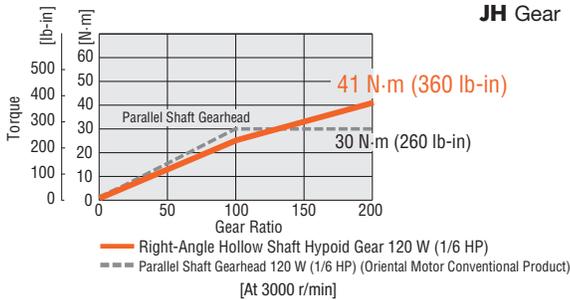
Geared Options

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

Hypoid Gear



JH Gear

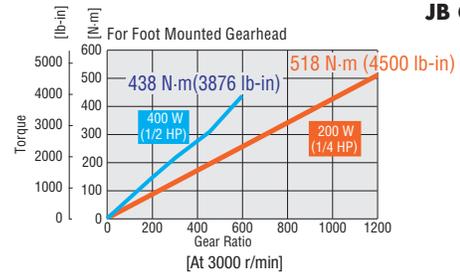


- Hypoid gears allow for high permissible torque without saturation even at higher gear ratios

Helical Gear



JB Gear

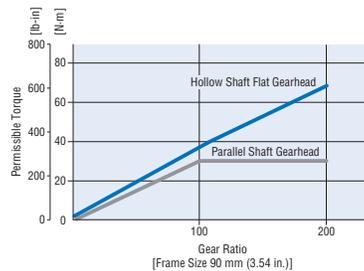


- Helical gears allow for the motor torque to be fully utilized even at the highest gear ratio.

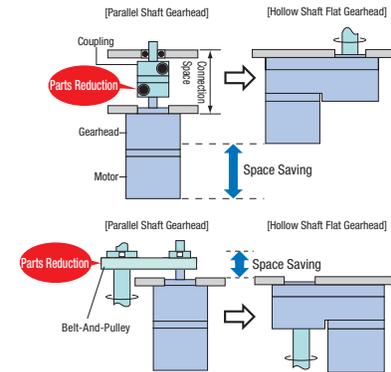
Hollow Shaft Flat Gear (FR Type)



- High Permissible Torque
- Space Saving
- Long Life
- Suitable for AGV Designs



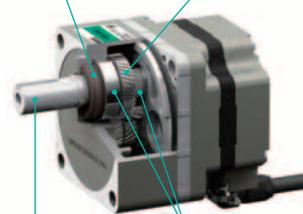
Space Saving



H1 Food-Grade Grease (IP66)

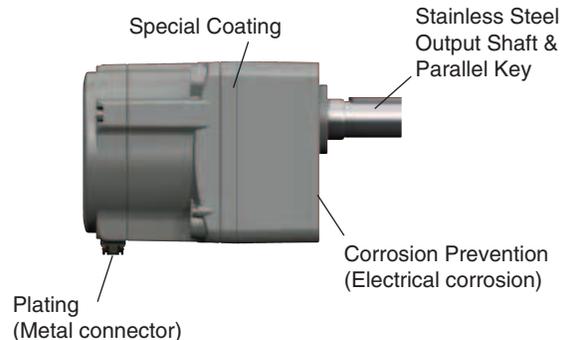
Oil Seal Lubricant Uses H1 grease
 Gear Lubricant Uses H1 grease

H1 Food-Grade Grease is a grease registered by the NSF as part of a category where the "lubricants used in food-processing environments where there is the possibility of incidental food contact."



Stainless Shaft
 Bearing Lubricant Uses H1 grease
 *Also available with **KHS** Series AC Motors.

Watertight, Dust-Resistant (IP67)



AC Input Motor / Driver

BMU Series



Max. of 10 m (32.8 ft.)
without an Extension Cable



- Simple Driver Controls
- Easy Wiring & Set Up
- 4 Speeds - Data Setting
- Digital Display Built into the Driver
- IP66/67 Motors



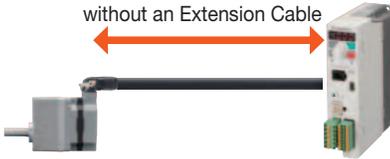
BMU Series

Output Power - Watts (HP)	30 W (1/25 HP)~400 W (1/2 HP)	
Frame Size - mm (in.)	60 mm (2.36 in.)~110 mm (4.33 in.)	
Speed Range (r/min)	80~4000	
Option	IP67 Type	
Gear Types	Parallel, Foot, Right Angle, H1 Food Grade Grease (Parallel Shaft type), FR Hollow Shaft	
Power Supply	Single-Phase (VAC)	100-120 / 200-240
	Three-Phase (VAC)	200-240
Starting From (Motor+Driver+Cable)	\$361.00	

BLE2 Series



Max. of 20 m (65.6 ft.)
without an Extension Cable



- Easy Set up via Front Control Panel
- Side By Side Mounting
- Up to 16 Preset Speeds
- External DC Voltage Control
- **MEXE02** Support Software
- IP66/67 Motors



● The control panel cannot be removed from the driver.

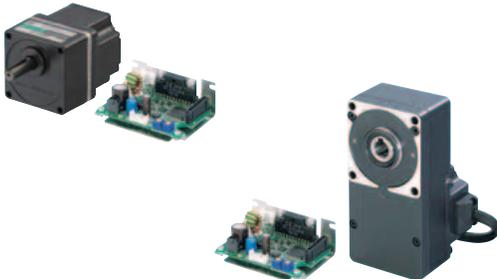


BLE2 Series

Output Power - Watts (HP)	30 W (1/25 HP)~400 W (1/2 HP)	
Frame Size - mm (in.)	60 mm (2.36 in.)~110 mm (4.33 in.)	
Speed Range (r/min)	80~4000	
Option	Electromagnetic Brake / IP67 Type	
Gear Types	Parallel, Foot, Right Angle, H1 Food Grade Grease (Parallel Shaft type), FR Hollow Shaft	
Power Supply	Single-Phase (VAC)	100-120 / 200-240
	Three-Phase (VAC)	200-240
Starting From (Motor+Driver+Cable)	\$458.00	

DC Input Motor and Driver

BLH Series



- 2 Motor types (Connector or Cable)
- 3 Driver types (Analog, Digital or RS-485 Communications)
- 80 to 3000 r/min
- Torque Limiting & Deceleration Stop
- **MEXE02** Support Software



BLH Series

Output Power - Watts (HP)	15 W (1/50 HP)~100 W (1/8 HP)	
Frame Size - mm (in.)	42 mm (1.65 in.)~90 mm (3.54 in.)	
Speed Range (r/min)	80~3000	
Option	Electromagnetic Brake	
Gear Types	Parallel, FR Hollow Shaft	
Power Supply	VDC	24
Starting From (Motor+Driver+Cable)	\$286.00	

BLV Series R Type



- Communications Control Through Modbus (RTU) and CANopen
- 1 to 4000 r/min
- Battery-Operated
- **MEXE02** Support Software



BLV Series R Type

Output Power - Watts (HP)	100 W (1/8 HP), 200 W (1/4 HP)	
Frame Size - mm (in.)	90 mm (3.54 in.)	
Speed Range (r/min)	1~4000	
Option	Electromagnetic Brake	
Gear Types	Parallel, FR Hollow Shaft	
Power Supply	VDC	24 / 48
Starting From (Motor+Driver+Cable)	\$846.00	

Modular Automation Products

Refer to Page 13.

Modular Robot Solutions

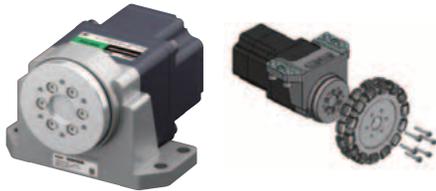
With the ability to run on battery power, our **BLV Series R Type** and **BLH Series** brushless motors can be used as the drive axle for modular robots (AGV/AMR/GTP*) or embedded in other similar Modular devices. These motors contribute to the handling of a wide variety of operating patterns and modular modes in various workplace environments.

*AGV: Automatic Guided Vehicle. AMR: Autonomous Mobile Robot. GTP: Goods To Person



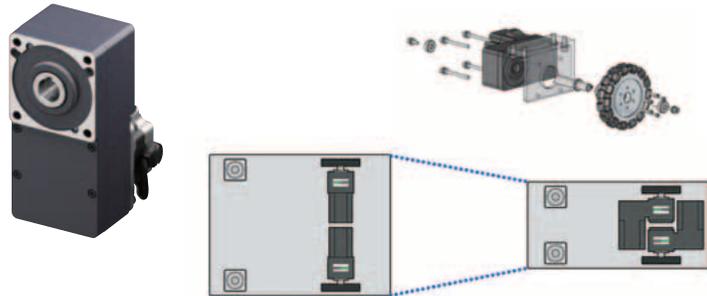
● Low-Platform and Thin Design

Face surface mounting with the Flange Drive Adapter



Flange Drive Adapter Sold Separately

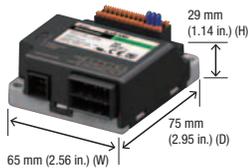
Side-mounting with the Hollow Shaft Flat Gearhead



● Compact and Lightweight Driver

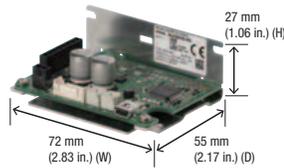
BLV Series R Type

100 W (1/8 HP), 200 W (1/4 HP)



BLH Series

15 W (1/50 HP), 30 W (1/25 HP), 50 W (1/15 HP)



● Setting via Networks

BLV Series R Type

CANopen Modbus(RTU)

BLH Series

Modbus(RTU)

The **BLH Series** can be controlled by software created in ROS. Visit our website for free software download, www.orientalmotor.com

● For Larger Loads Used in Robots and Conveyors

A transport robot's load capacity is affected by its permissible radial load. Using a Flange Drive Adapter or a hollow shaft flat gearhead supports requirements of increasing load size and installation in robots and conveyors.

Permissible Radial Load

Gear Ratio		[N (lbs)]							
		5	10	15	20	30	50	100	200
When Using a Flange Drive Adapter	100 W (1/8 HP)*1	1500 (337)							
	200 W (1/4 HP)*2	1230 (276)	1680 (377)	2040 (458)					
Hollow Shaft Flat Gearhead	100 W (1/8 HP)	900 (202)	1300 (291)	1500 (337)					
	50 W (1/15 HP)	800 (179)	1200 (269)						
	30 W (1/25 HP)	450 (101)	500 (112)						

*1: The motor shaft speed is at or below 300 r/min

*2: The motor shaft speed is 100-3000 r/min



Flange Drive Adapter
AGD580B

Standard AC Motors

Standard AC motors are used generally as a power source for automated equipment because they can be operated easily by connecting directly to an AC power supply. A standard AC motor supports various applications including high torque output, stopping or variable speeds. By using with a gear head, brake pack or speed controller, Standard AC Motors offer simple to use convenience and flexibility.

● The Power Supply Frequency Determines the Speed

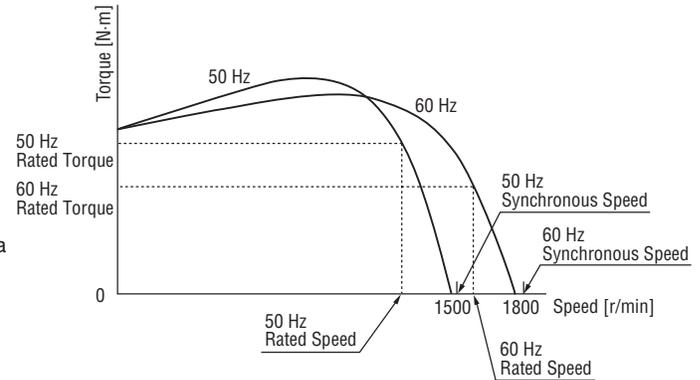
The basic speed (synchronous speed) of a standard AC motor is determined by the power supply frequency and the number of poles. Many of our standard AC motors have four poles, so their synchronous speed is as follows:

- 50 Hz: 1500 r/min
- 60 Hz: 1800 r/min

The actual speed varies according to the load torque.

With our motors, the speed roughly falls within the following ranges at a load torque equivalent to the rated torque:

- 50 Hz: 1200 to 1300 r/min
- 60 Hz: 1450 to 1600 r/min



Speed – Torque Characteristics

Constant Speed AC Motors

Induction / Reversible Motors

World K Series



- Standard AC Motors
- Overheat Protection Built-in
- Long Life – 10,000 hrs
- Right Angle Gearheads Available

World K Series



Type	Induction, Reversible	
Output Power	1 W (1/750 HP) ~ 90 W (1/8 HP)	
Frame Size	42 mm (1.65 in.) ~ 90 mm (3.54 in.)	
Options	Terminal Box / Conduit Box / Electromagnetic Brake 150 W (1/5 HP) 2-Pole (no Gear type)	
Gear Types	Parallel, Right Angle Hollow or Solid	
Power Supply	Single-Phase (VAC)	100-120 / 220-230
	Three-Phase (VAC)	220-230
Starting Pricing (Motor + Gear)	\$151.00	

KIIS Series



Use with Fuji Electric Inverter



- 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

- Uni-Direction, Continuous Operation
- High Strength Gears, High Permissible Torque
- Long Life – 10,000 hrs
- Low Noise

KIIS Series



Type	Induction	
Output Power	30 W (1/25 HP) ~ 200 W (1/4 HP)	
Frame Size	80 mm (3.15 in.) ~ 110 mm (4.33 in.)	
Options	Terminal Box / Electromagnetic Brake Stainless Steel Shafts	
Gear Types	Parallel, Right Angle Hollow or Solid, H1 Food Grade Grease (Parallel Shaft type)	
Power Supply	Three-Phase (VAC)	220-415
Starting Pricing (Motor + Gear)	\$214.00	

Brother ie3 MMD Series



Features Electrocoat Paint

- Helical (parallel) and Hypoid (right angle) gear type motors
- Pre-assembled, motor & gear
- Slip fit "O" ring design for mounting in any direction

Single or Three-Phase

Brother ie3 Mid Series Helical / Hypoid Gear Type



Type	Induction
Output Power	400 W (1/2 HP)~3 HP
Speed Range (r/min)	90~3600 (3~120 Hz)
Options	Terminal Box / Electromagnetic Brake
	Stainless Steel Shafts
Gear Types	Parallel, Right Angle Hollow or Solid
Starting Pricing (Motor+Gear)	\$626.00

FPW Series IP67 Rated



- Conforms to IEC Standard IP67
- Pre-assembled, Motor & Gear
- Water Tight and Dust Resistant

Single-Phase / Three-Phase

FPW Series



Type	Induction
Output Power	25 W (1/30 HP)~90 W (1/8 HP)
Frame Size	80 mm (3.15 in.)~104 mm (4.09 in.)
Gear Types	Parallel
Single-Phase (VAC)	110-115 / 220-230
Three-Phase (VAC)	220-230
Starting Pricing (Motor+Gear)	\$320.00

Torque Motors Torque Control



Set/Adjust
Motor Torque



TMP-1 Power Controller
(sold separately)
List Price: \$135.00

Single-Phase

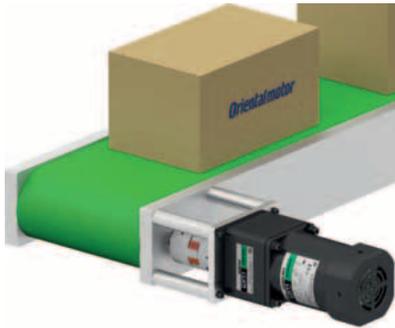
WK Series



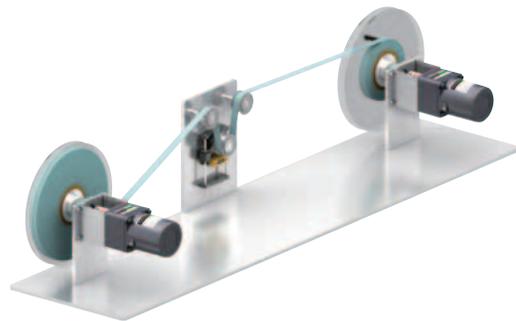
Type	Torque Motor
Output Power	3 W (1/250 HP)~23 W (1/38 HP)
Frame Size	60 mm (2.36 in.)~90 mm (3.54 in.)
Gear Types	Parallel
Single-Phase	110-115 / 220-230
Starting Pricing (Motor+Gear)	\$200.00

Applications

Belt Conveyor



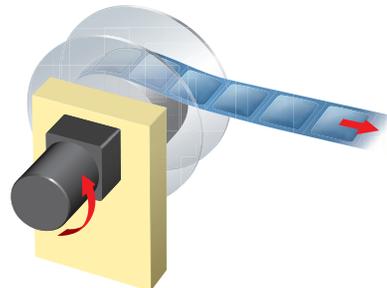
Tension Control



Pinch Conveyor



Packing System



Hybrid Control
QSTEP

AZ Series

Actuators

Network

Stepper Motors

Brushless
Motors

Standard AC
Motors

Cooling Fans

Before Selection /
Warranty

Cooling Fans

Fans and Thermal Management

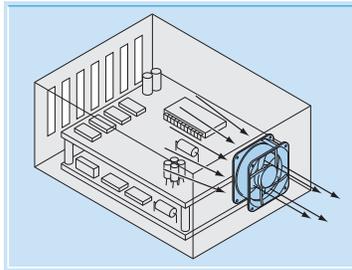
Today's fans are designed to move air allowing for cooling, controlling an area of space or for protecting electronics. Many of our fans come with alarm features designed for warning or for preventative maintenance. Oriental Motor helps make selecting the appropriate type of fan for today's applications simple.

Axial Flow Fans

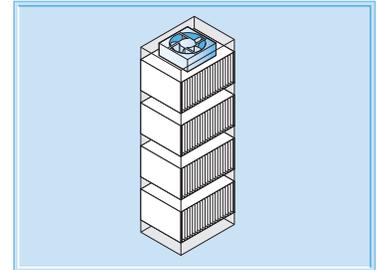
● AC or DC Input



Device Ventilation and Cooling



Cooling Densely Mounted Devices

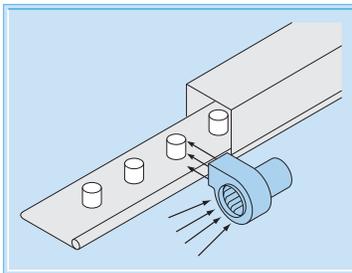


Centrifugal Blowers

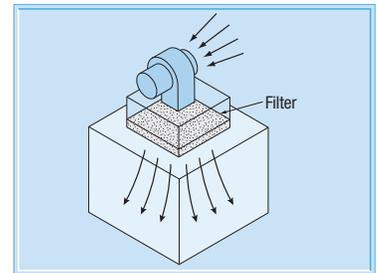
● AC or DC Input



Air-Blow Cooling or Drying



Cooling with High Static Pressure

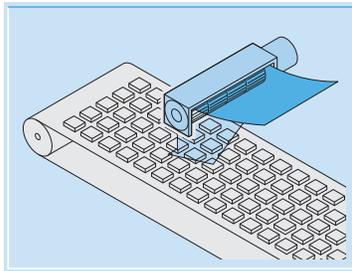


Cross Flow Fans

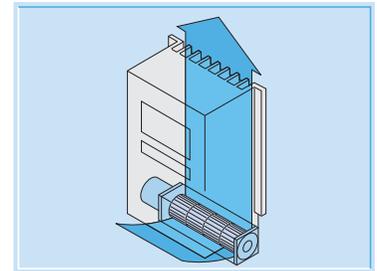
● AC or DC Input



Uniform Cooling or Drying



Cooling for Long or Thin Spaces



Thermostat

● Centigrade (°C)



Automatically turning it ON/Off with a Set Timer

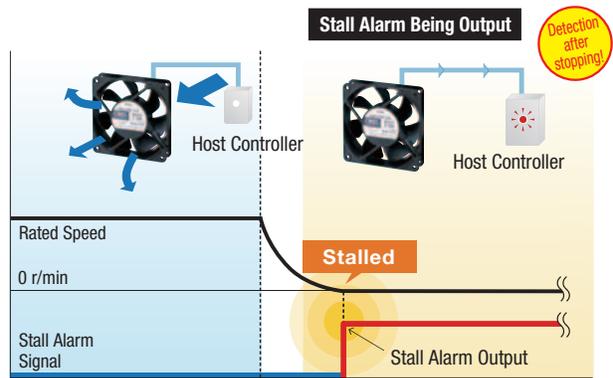


Alarm Types

Cooling fans with alarms allow for prevention of unexpected problems or malfunctions.

● Locked Rotor Alarm

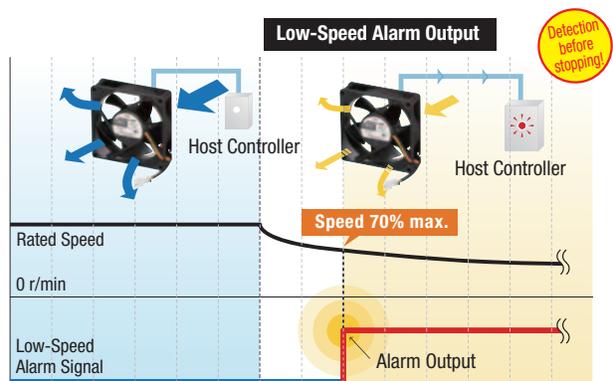
The fan will emit an alarm when the fan rotation has stopped. This will alert you to interruptions immediately, so that action / replacement can be made.



● Low-Speed Alarm

The fan will emit an alarm when the fan slows down possibly due to the introduction of foreign particles or other problems. This helps with predictive maintenance.

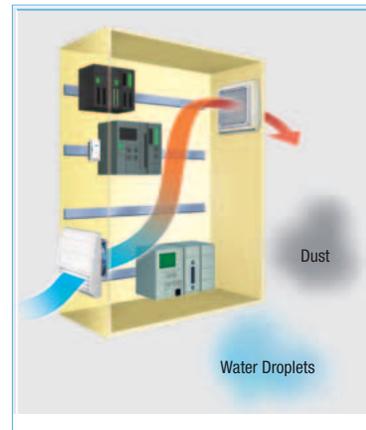
If multiple fans are running, it will also allow for replacement of only the fans experiencing a reduced cooling capacity.



Enclosure Types



- AC or DC Input
- Complete Assembly
- IP2X, IP4X or IP55 Models
- Suction or Exhaust Type



Accessories



- Finger Guards
- Filters
- Screens
- Plug Cords

Oriental Motor's Carbon Neutral Initiative

Oriental Motor supports our customers' MOTION with consideration for the environment.

Oriental Motor has proactively supported activities that give consideration to global environmental conservation. Energy savings, conservation of natural resources and reduction of waste and carbon dioxide are implemented at various stages of the product lifecycle. By providing beneficial products that feature high efficiency, compact size, high power and long life, Oriental Motor hopes to be involved with various "motion" that our customers require, while contributing to environmental conservation activities.

- Reduced waste through products with longer lives
- Reduced waste by making the products more compact
- Easy-to-recycle products

- Reduction and lightening of parts and materials
- Use of materials and parts with low environmental impact (green procurement measures)
- Reduction of paper use by converting operating manuals to digital versions
- Use of recycled materials

- Reduced energy use during manufacturing
- Reduced consumption of resources during manufacturing
- Control of chemical substances used in manufacturing processes
- Reduction of waste and appropriate processing
- Control of chemical substances used in products

- Decreased energy consumption during product use (development of energy-efficient products)



- Improved transportation efficiency through optimal packaging design
- Packaging that is easy to recycle
- Communication about the chemical substances contained in products

- Reduced waste through optimally-designed packaging
- Reduced wiring with network-compatible products
- Reduced waste through products with longer lives

① Energy Savings (High Efficiency)

A motor converts electric energy into mechanical energy. Energy savings require higher efficiency by reducing the energy loss from the motor. Going forward, Oriental Motor will surpass the international standards with compact, precision motors aimed at higher efficiency.

② Conservation of Natural Resources and Longer Life

We have saved on natural resources by producing compact, more efficient products, thereby making more effective use of the natural resources in the product lifecycle. In the future we will promote longer product life and less wiring to match product features.

③ Controlling Chemical Substances in Products

Oriental Motor uses green procurement standards that take into consideration the global electrical and electronic industry standard IEC 62474 and customer requirements to curb the chemical substances in products.

*IEC 62474: Material declaration for products of and for the electrotechnical industry

Brushless Motors

Simple operation
BMU Series
AC Input



Small board type
BLH Series
DC Input



Brushless Motors Fans

EMU Series
AC Input



High Torque Stepper Motors

PKP Series
DC Input



(a) Green Procurement

Products, parts, materials, packaging, etc. with a low environmental impact are given priority in procurement. The basic requirements are established as "Green Procurement Standards", which are promoted during business transactions.

(b) Measures and Responses to Chemical Substances in Products

- RoHS Directive Compliance Initiatives for the EU
- REACH Regulation Compliance
- Initiatives Concerning the Measures for Administration of the Pollution Control of Electronic Information Products Act (People's Republic of China)
- Other Regulations Concerning Handling of Chemical Substances in Products
- Global Regulations & Standards/Management of Chemical Substances in Products

[WEB](#)

Environmental Policy

Oriental Motor's Basic Environmental Philosophy and Environmental Policy

● ISO 9001 and ISO 14001 [WEB](#)

Before Selecting a Product

Scope of Intended Applications

Our products are designed and manufactured for use in general industrial applications. They are not intended for use in nuclear power generation, aerospace, railway, vehicle, entertainment machinery, safety equipment, medical equipment or any other application having a significant effect on human life or property.

Safety Precautions

Before using any product, carefully read the “operating manual” to ensure correct operation.

Return, Replacement and Repair After Delivery

- ORIENTAL MOTOR U.S.A. CORP. is confident that you will be completely satisfied with your purchase. In the unlikely event that a delivered product has been damaged during shipping or if you receive an incorrect order, ORIENTAL MOTOR U.S.A. CORP. will correct the problem. Please contact your local sales office or distributor where the product was purchased.
- If you need to return a product because of a technical issue, please contact ORIENTAL MOTOR U.S.A. CORP. technical support at 1-800-468-3982 (847-871-5931 or 310-715-3303 if outside the USA & Canada) to try to determine the cause of the problem. If your problem cannot be resolved, you will receive instructions on how to obtain an RMA number and how to return the product.

Warranty and Limitation of Liability

Warranty

Oriental Motor U.S.A. Corporation (the “Company”) warrants to the first end user Buyer that the products and parts thereof, when shipped will be free from defects in materials comprising the same and in the Company’s workmanship. If any such defects exist or later appear, the Company shall undertake, at its sole expense, prompt remedial action as stated herein to correct the same; provided however, that the Company shall have no obligation or liability under this warranty unless it shall have received written notice specifying such defects no later than two (2) years from the date of shipment.

Lead Time

Oriental Motor's lead time is characterized by best in class, with many of our catalog products available to ship in 3 to 9 business days (for orders placed before 12pm PST). Your order is shipped using only reputable carriers or any carrier of your choice to ensure on-time and damage free-delivery. Our manufacturing processes support our fast delivery and short lead time to allow us to support your needs. Our Just-In-Time production system allows the manufacturing of an order with little notice, in any quantity requested. Additionally, our one-by-one process allows us to manufacture one product as easily as one thousand.

In addition, Oriental Motor will quote “Available to Ship” shipping dates for guaranteed quantities on our website for most products. For larger quantities please contact your local sales office.

LIMITATION OF LIABILITY

THE COMPANY SHALL HAVE NO LIABILITY WHATSOEVER IN ANY EVENT FOR PAYMENT OF ANY INCIDENTAL OR CONSEQUENTIAL DAMAGES, INCLUDING WITHOUT LIMITATION, DAMAGES FOR INJURY TO ANY PERSON OR PROPERTY. BY ACCEPTING THE PRODUCTS AND/OR PARTS THEREOF, THE FIRST END USER BUYER OR SUBSEQUENT USER AGREES THAT THE COMPANY SHALL NOT BE LIABLE FOR INDEMNIFICATION OR CONTRIBUTION (IN WHOLE OR IN PART) EITHER EXPRESSLY OR BY IMPLICATION. IF FOR ANY REASON OF THE FOREGOING PROVISIONS SHALL BE INEFFECTIVE, THE COMPANY’S LIABILITY FOR DAMAGES ARISING OUT OF ITS MANUFACTURE OR SALE OF ITS PRODUCTS OR PARTS, OR USE THEREOF, WHETHER SUCH LIABILITY IS BASED ON WARRANTY, CONTRACT, NEGLIGENCE, STRICT LIABILITY IN TORT OR OTHERWISE, SHALL NOT IN ANY EVENT EXCEED THE FULL PURCHASE PRICE OF SUCH PRODUCTS AND PARTS THEREOF.

Any action against the Company based upon any liability or obligation arising hereunder any law applicable to the sale or its products or parts thereof, or the use thereof, must be commenced within two (2) years after the cause of such actions arises.

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8:30 A.M. to 5:00 P.M., P.S.T. (M-F)

7:30 A.M. to 5:00 P.M., C.S.T. (M-F)

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