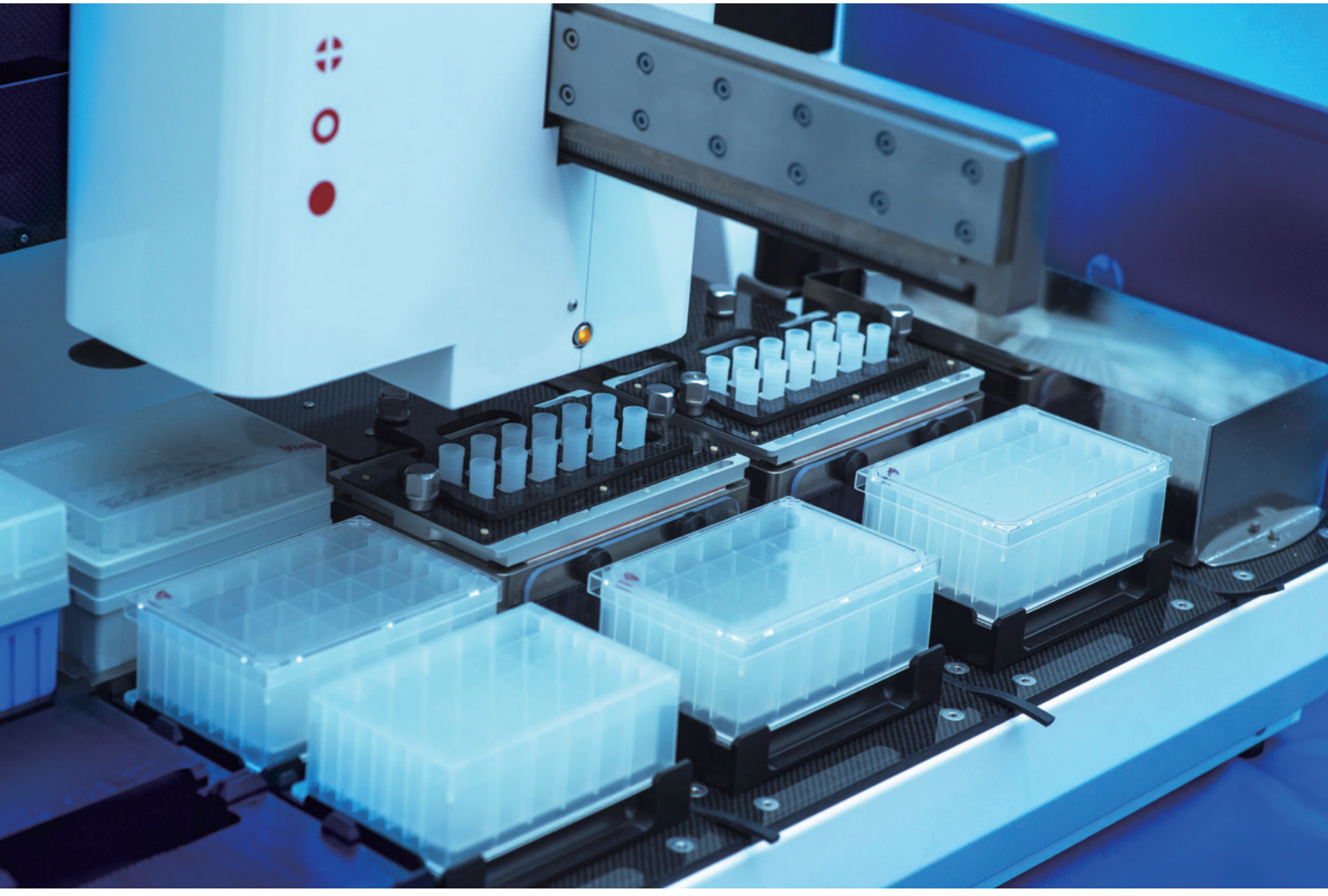
Oriental motor

Product Guide for Medical Applications



Oriental Motor Corporate Overview

Company	ORIENTAL MOTOR CO., LTD.
Founded	1885
Established	1950
Representative	President Eiji Kawahito
Capital	4.1 billion yen
Sales	Consolidated 66.8 billion yen (At the end of March 2022)
Number of Employees	Consolidated 3,079 (At the end of March 2022)
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.

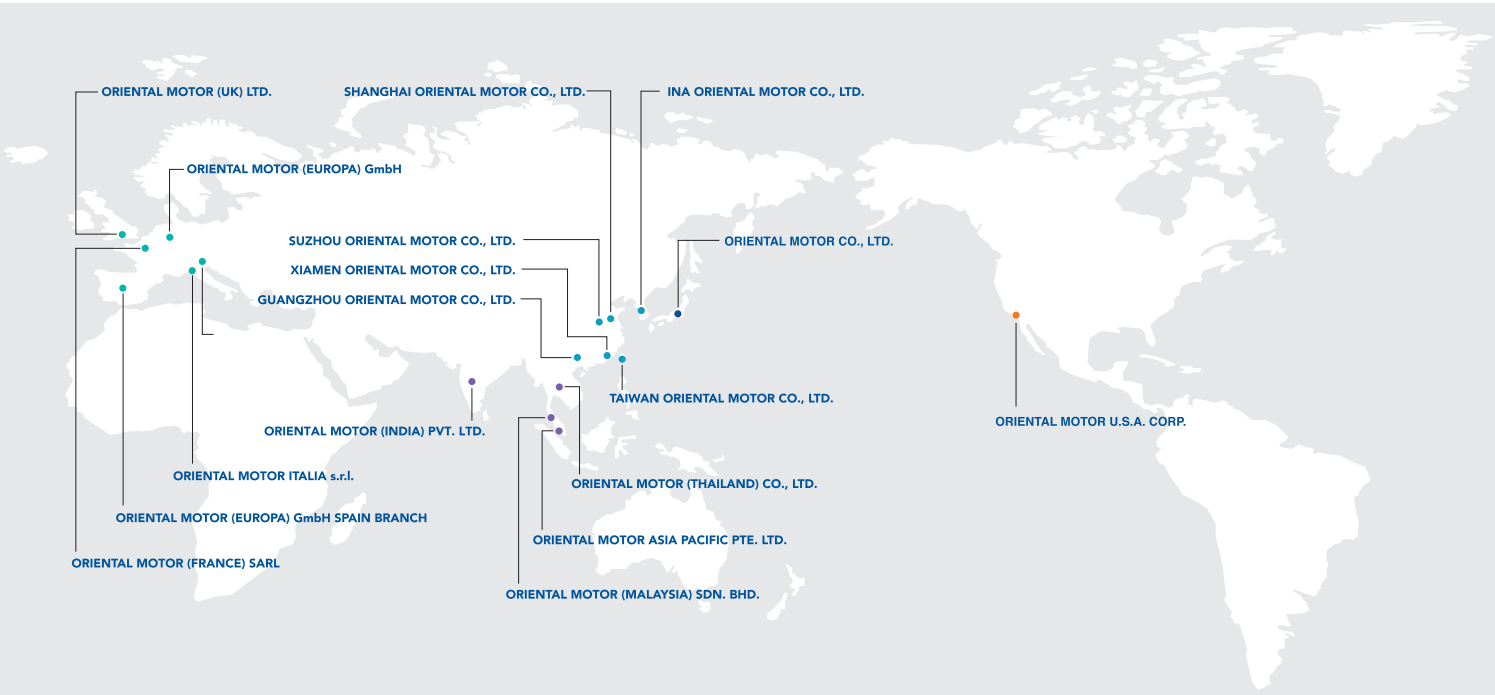
Takamatsu-Kozai Plant

Development and manufacturing of stepper motors.

Takamatsu-Kokubunji Plant

Manufacturing of stepper motors.

Global Network



Product Overview

Hybrid Stepper Servo α_{STEP}

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

Servo

- 400 W, 600 W Battery Free Absolute Encoder Servo Motors
- 50 W up to 750 W Tuning Free Servo Motors
- Hybrid Servo Motors available
- Gear and Electromagnetic Brake options

Network Drivers/Controllers

- EtherNet/IP
- EtherCAT
- PROFINET
- Modbus (RTU)
- Network Compatible Drivers/Controllers

Stepper Motors

- 2 Phase 1.8°, 0.9°
- 5 Phase 0.72°, 0.36°
- Dedicated Drivers for best performance
- 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

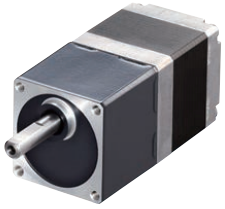
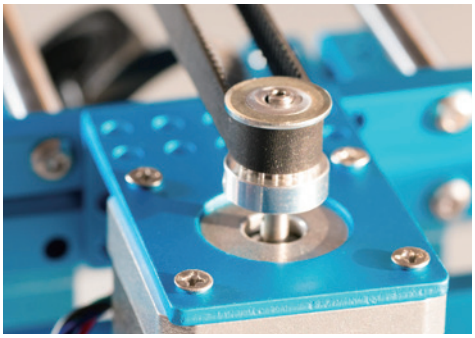
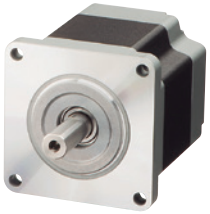
Standard AC Motors

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

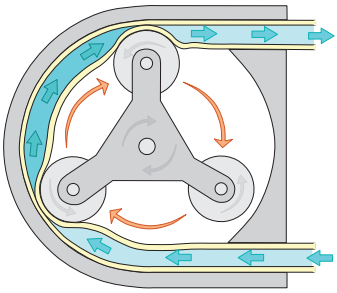
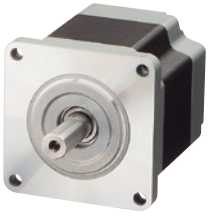
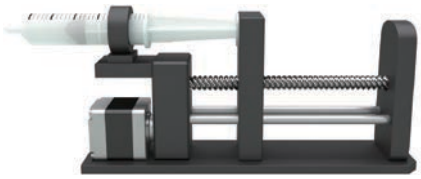
Cooling Fans

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

Applications for Medical Equipment

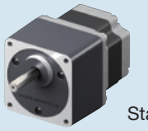
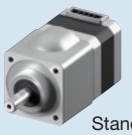
Application	Common Needs	Product
Index Table 	•Large inertial load	**PKP** Series Geared Type  ➜ P10
Pick and Place (Belt Pulley) 	•High overhung load	**PKP** Series  ➜ P6
Conveyor 	•Compact •Stable speed •Flat speed torque curve	**BLH** Series  ➜ P28
XYZ Gantry 	•Z-axis (vertical) brake	**PKP** Series Brake Type  ➜ P9

Applications for Medical Equipment

Application	Common Needs	Product
Peristaltic Pump  	•Compact •Reduced noise •Large starting torque	**BLH** Series  ➜ P28 **PKP** Series  ➜ P6
Syringe Pump 	•Resistance to frictional load	**PKP** Series High-Resolution Type  ➜ P8
Dispenser 	•Integrated motor and ball screw for space saving	**DR** Series  ➜ P27

2-Phase Stepper Motors **PKP** Series High Torque Low Vibration

●Bipolar (4 lead wires) and unipolar (5 or 6 lead wires) wiring types are available.

Motor Type	Motor Frame Size	Additional Function		
		Standard	With Encoder	With Electromagnetic Brake
Standard Type (Basic Step Angle: 1.8°/step) High Torque  Flat-Connector Type  Connector Type  With Encoder  With Electromagnetic Brake Standard	□13 mm	COMING SOON	–	–
	□20 mm	●	●	–
	□28 mm	●	●	●
	□35 mm	●	●	●
	□42 mm	●	●	●
	□56.4 mm	●	●	●
	□60 mm*	●	–	–
	□85 mm	●	–	–
High-Resolution Type (Basic Step Angle: 0.9°/step) High Torque  Flat-Connector Type  Connector Type  With Encoder  With Electromagnetic Brake Standard	□28 mm	●	●	–
	□42 mm	●	●	●
	□56.4 mm	●	●	●
Flat Type (Basic Step Angle: 0.018° to 1.8°/step)  Standard  With Harmonic Gears	□42 mm	●	–	–
	□60 mm	●	–	–
	□51 mm	With Harmonic Gears		
	□61 mm	With Harmonic Gears		
SH Geared Type (Basic Step Angle: 0.05° to 0.5°/step)  Standard	□28 mm	●	●	–
	□42 mm	●	●	–
	□60 mm	●	●	–
CS Geared Type (Basic Step Angle: 0.09 to 0.36°/step)  Standard	□28 mm	●	–	–
	□42 mm	●	–	–
	□60 mm	●	–	–

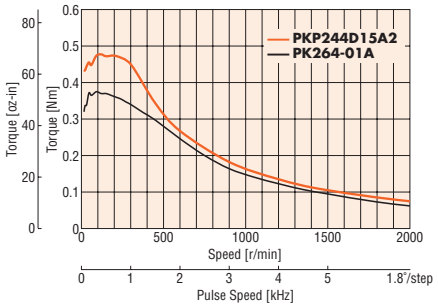
●: 2 types are available—the "Flat-Connector Type" and the "Connector Type".

✻This is the conventional **PK** Series.

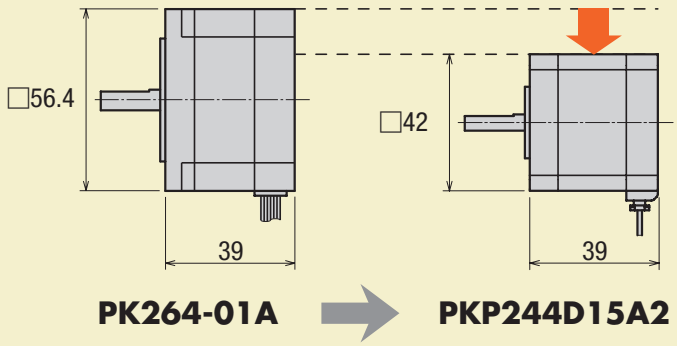
Downsizing

Use a **PKP** Series motor in place of a standard motor from the **PK** Series with the equivalent torque in order to downsize motors.

Torque Characteristics Comparison of **PKP244D15A2** and **PK264-01A**



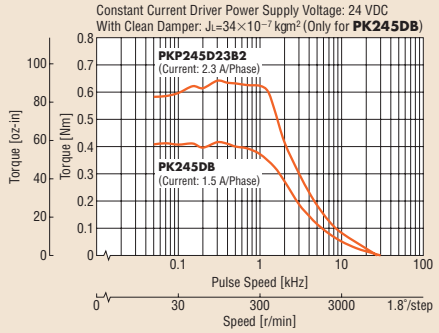
Provides torque equivalent to the next larger frame size!



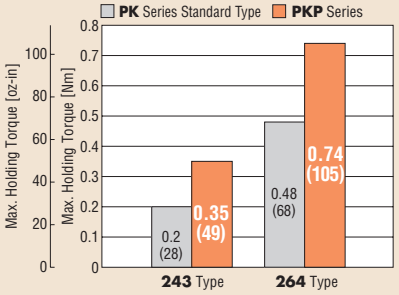
Increased Torque over the Entire Speed Range from Low to High

After revising the magnetic and structure design of the **PKP** Series, it produces much more torque than the standard **PK** Series motors of the same size. In addition, torque can be increased in the high-speed range by using high current motors.

Comparison of Speed – Torque Characteristics of the Same Size Motors



Comparison of Maximum Holding Torque

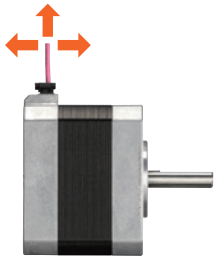


High current is possible due to the revised motor winding design and the highly efficient design of the drive circuit that can be combined. Increased torque over the entire speed range from low to high is achieved.

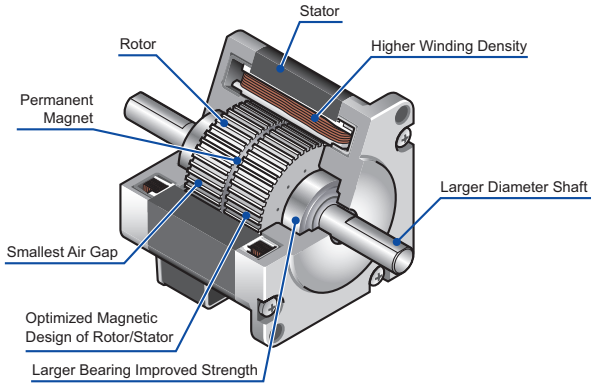
Compact and Flat Connector

The **PKP** Series uses a compact and flat connector, which shortens the length of the connector's overhang. In addition, the degree of freedom for the cable outlet direction has been increased, because the outlet direction points upward.

● Because the connector is provided for some products only, refer to dimensions of each model for details.



●New Design: Run Cooler or Downsize

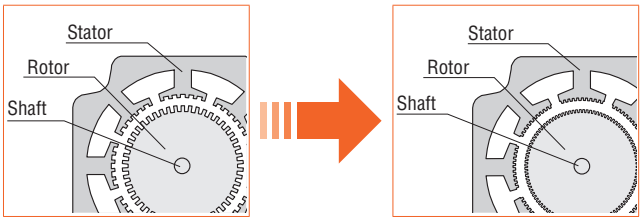


High-Resolution Type

This is a high-resolution stepper motor with a basic step angle of 0.9°. Stopping accuracy is improved.

●Increased Resolution (Compared to Standard Type)

The number of rotor teeth is doubled to 100, compared to 50 with the standard type. As a result, the basic step angle is 0.9°/step, which is half that of the standard type.



Standard Type (50 teeth) High-Resolution Type (100 teeth)

●Avoidance of Resonance Regions

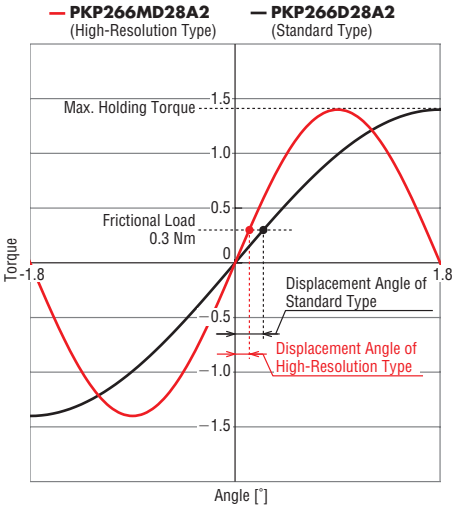
If the pulse speed is within a resonance region, vibration may increase. Resonance regions can be avoided by switching to a high-resolution type.

●Improved Stopping Accuracy

This motor has a smaller displacement angle when a friction load is applied to the motor compared to the standard type (basic step angle 1.8°). This improves the stopping accuracy in applications where a frictional load is constantly applied, such as ball screw mechanisms.

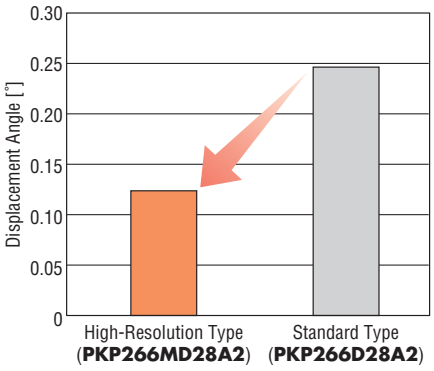
◇Comparison of Angle – Torque Characteristics (Reference values)

Frictional load 0.3 Nm



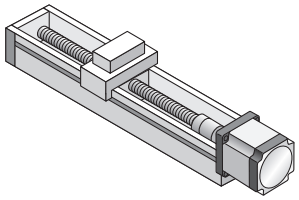
◇Comparison of Displacement Angles Due to Frictional Load (Reference values)

Frictional load 0.3 Nm



◇Example of a Mechanism in Which a Frictional Load is Constantly Applied

With a ball screw mechanism like that shown in the diagram, for example, a frictional load is constantly applied to the motor due to the guide block and guide rail.

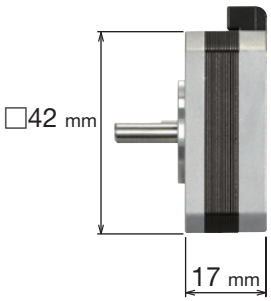


Flat Type

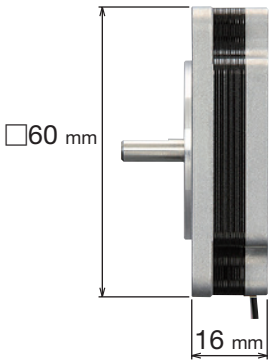
This is Oriental Motor's flattest type of 2-phase stepper motors.

●Flat and Lightweight Design

The motor can be installed in a narrow space.



Maximum Holding Torque: 0.1 Nm
Mass: 0.11 kg



Maximum Holding Torque: 0.18 Nm
Mass: 0.2 kg

●With Harmonic Gears

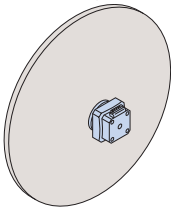
◇Attach the load to the surface of the flange.

Example: Frame size 51 mm

Gear ratio: 100:1
Max. holding torque: 2.4 Nm
Mass: 0.32 kg

◇Capable of large inertial driving.

Example: Frame size 51 mm



Inertia 0.12 kgm^2
(Approximately 7 times the rotor inertia)
Inertial load: Diameter 0.35 m,
Thickness 0.01 m
Mass 7.6 kg,
Material iron
Motor: Length 17 mm
Gear ratio: 100:1

Product Line Equipped with Additional Functions for Many More Applications

●With Encoder

(Available for standard type, high-resolution type, and **SH** Geared Type)

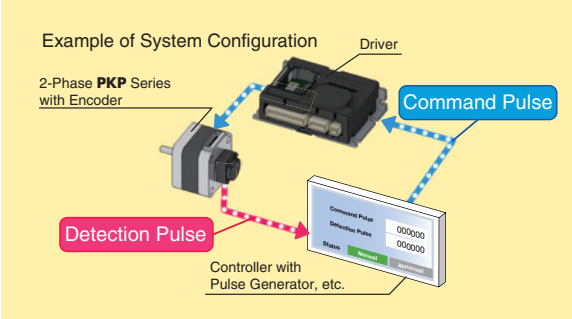
● Main Specifications

Type	Standard Type	High-Resolution Type, **SH** Geared Type
Resolution	200 P/R, 400 P/R*	400 P/R
Output Signals	A phase, B phase, Z phase (3ch)	

*A product line with resolution of 1000 P/R is available with frame sizes of 42mm and 56.4mm

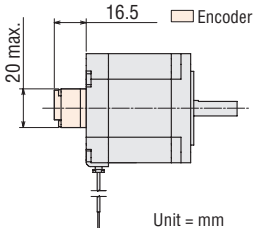
◇Motor Position Detection is Possible

Monitoring the current position and detecting positional errors are possible. For example, comparing the command position and current position enables you to check the normal operation of the motor.



◇Equipped with a Compact Encoder

● When frame size is 56.4 mm



◇High Reliability with Line Driver Output Circuit Type

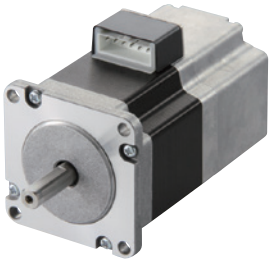
Noise resistance is improved by differential output, and the wiring distance can be longer than with the voltage output type.

● The cables which are convenient for wiring with an encoder are available, sold separately.

Encoder Connection Cables

●With Electromagnetic Brake

(Provided for standard type and high-resolution type)



◇Position Can Be Held When the Power Is OFF or a Power Failure Occurs

This type features an electromagnetic brake that activates when the power is off.

When the power is accidentally cut off due to a power failure or other unexpected event, the electromagnetic brake holds the load in position to prevent it from dropping or moving. Also, the load can be held by the electromagnetic brake when the motor is stopped, and the heat generated by the motor can be curtailed by switching the motor current off.

Features of Geared Types

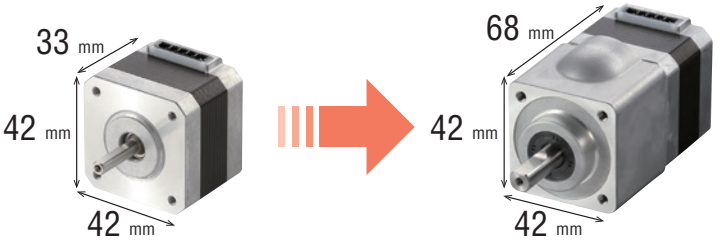
Using a geared type motor can provide advantages such as deceleration, high torque, and high resolution

●Comparing Features of the **CS** Geared Type and the **SH** Geared Type

Type				**CS** Geared Type 	**SH** Geared Type 
Features				●Center Shaft Configuration ●High Torque ●High Permissible Radial Load	●Wide Variety ・90 mm Frame Size and Unipolar Wiring ・Includes Encoder ・Many Gear Ratio Types
Frame Size	28 mm	Maximum Holding Torque	[Nm]	0.4 - 0.8	0.3, 0.4
		Speed Range (Max. value)	[r/min]	300 - 600	83 - 416
		Permissible Radial Load (Max. value)	[N]	73	23
	42 mm	Maximum Holding Torque	[Nm]	0.5 - 2	0.2 - 0.8
		Speed Range (Max. value)	[r/min]	150 - 600	83 - 833
		Permissible Radial Load (Max. value)	[N]	96	30
	60 mm	Maximum Holding Torque	[Nm]	1.3 - 4.5	1 - 4
		Speed Range (Max. value)	[r/min]	150 - 600	83 - 833
		Permissible Radial Load (Max. value)	[N]	260	160

●Achieves Increased Torque with the Same Motor Frame Size

Switching to a geared type motor increases torque without changing the motor frame size.
This is effective when installation is not possible because the motor installation space is limited.



Standard Type	Motor Type	**CS** Geared Type
PKP243D15A2	Product Name	**PKP243D15A2-CS20**
0.35 Nm	Max. Holding Torque	2 Nm

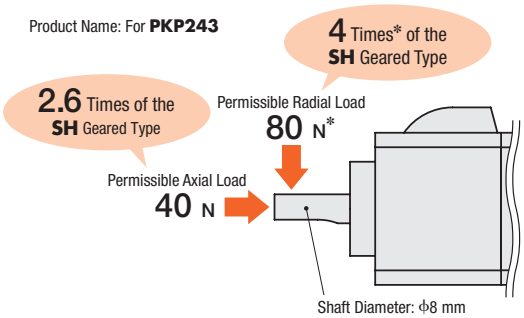
CS Geared Type

The geared type with center shaft addresses torque, shaft load capacity and installation demands.

●Increased Shaft Load Capacity Reduces Assembly Time

Increased permissible radial load and permissible axial load can reduce assembly time.

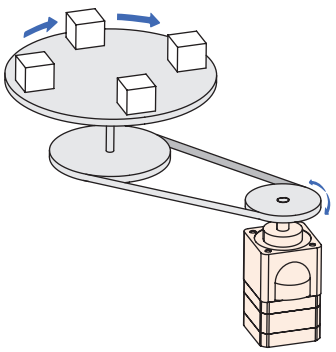
◇Permissible Radial Load and Permissible Axial Load



✻When distance from shaft end is 10 mm

◇Applications

Belt and Pulley Mechanism



◇Advantages

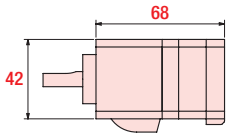
- Reduce adjustments during assembly because belt tension can be higher than with conventional products
- The components for supporting the radial load on the shaft are no longer needed
- The degree of freedom in pulley selection is increased

● Increase Torque Contributes to Reduced Size and Weight of the Motor

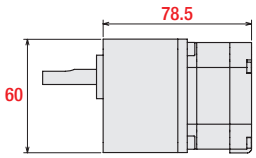
High torque, shorter motor length and a frame size that's one size smaller.

◇Dimensions: (Unit = mm)

CS Geared Type (**PKP243D15A2-CS20**)



SH Geared Type (**PKP264D14A2-SG7.2**)



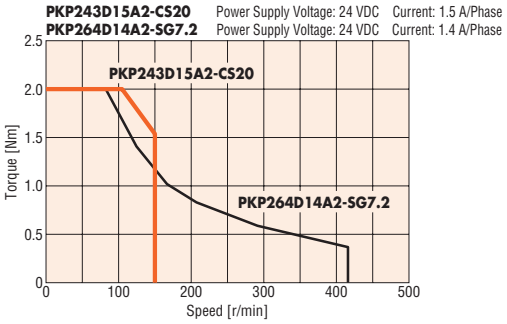
Maximum Holding Torque: Same

Frame Size: Reduced by **18** mm

Motor Length: Reduced by **10.5** mm

Mass: Reduced by **47** %

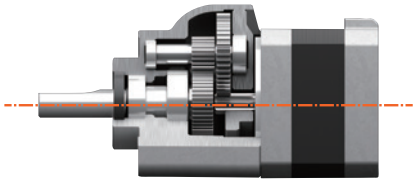
◇Torque Characteristics Comparison



●Center Shaft Makes Designing Easier

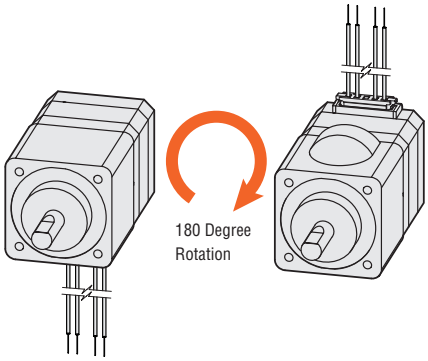
A review of the gear structure has led to the center shaft design. It is easier to design the installation plate.
In addition, the degree of freedom for the cable outlet direction has been increased.

◇Output Shaft now Placed in Center

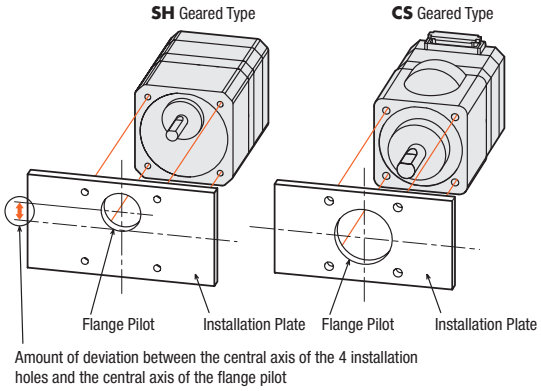


Internal Gearhead Structure Figure

◇Increased Degree of Freedom for Cable Outlet Direction



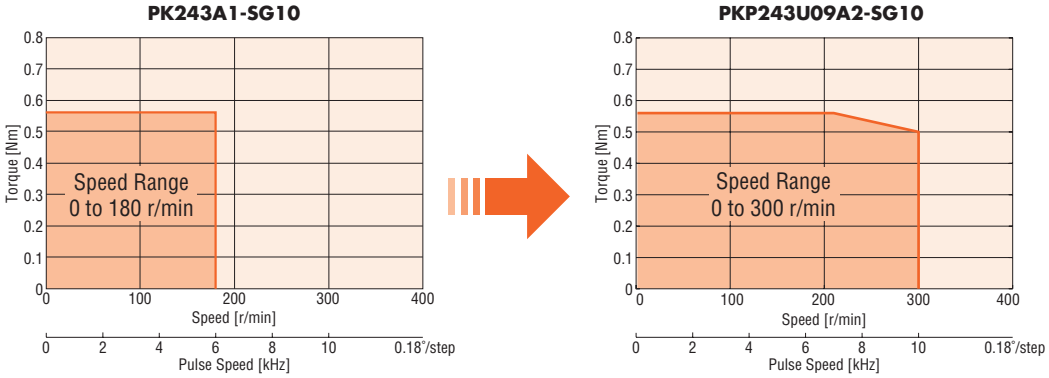
◇Installation Plate Designing Made Easier



SH Geared Type

This type is well-suited for deceleration, increased torque, high resolution, and limited vibration.
It experiences less backlash than conventional products.

●Wider Speed Range makes it Easier to Use than Conventional Products



Standard Type Frame Size 20 mm (Bipolar 4 lead wires)

Lead Wire Type

Specifications

Product Name	Maximum Holding Torque Nm	Rotor Inertia J: kgm^2	Rated Current A/Phase	Voltage VDC	Winding Resistance Ω/Phase	Inductance mH/Phase	Basic Step Angle	Recommended Driver Product Name*
PKP213D05□	0.02	1.6×10^{-7}	0.5	4.25	8.5	4.1	1.8°	**CVD205BR-K**
PKP214D06□	0.036	2.9×10^{-7}	0.6	3.9	6.5	3.5		**CVD206BR-K**

● The box □ in the product name indicates the shaft **A** (single shaft) or **B** (double shaft).

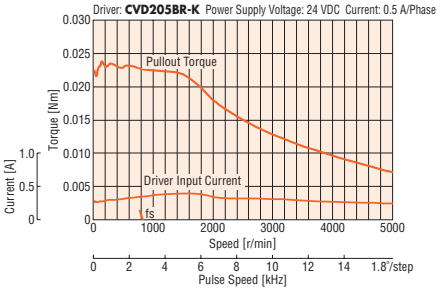
*See "Drivers for 2-Phase / 5-Phase Motors" page for drivers that can be used in combination.

Note

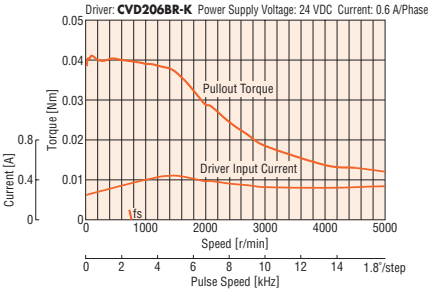
● Be sure to set the driver current at or below the motor rated current. If the motor rated current is exceeded, the product will be damaged.

Speed – Torque Characteristics (Reference Values) fs: Max. Starting Frequency

PKP213D05A/PKP213D05B



PKP214D06A/PKP214D06B



Note

● 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.

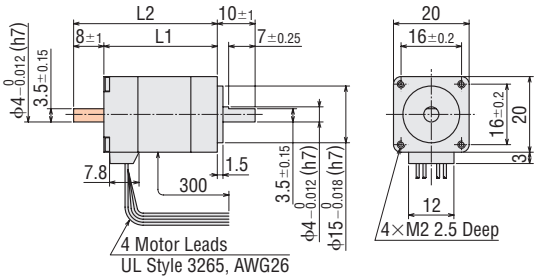
● Depending on the driving conditions, a considerable amount of heat may be generated by the motor. Be sure to keep the motor case temperature at 100°C max.

● The characteristics are the same when RS-485 communication type driver is used in combination.

Dimensions Unit = mm

Motor

Product Name	L1	L2
PKP213D05A	30	–
PKP213D05B		38
PKP214D06A	40	–
PKP214D06B		48



● These dimensions are for double shaft motors.
For single shaft motors, ignore the shaded areas.

● The back shaft side of the double shaft model is entirely shaft flat.

Inner Wiring Diagram of Motor

Wiring Diagram No.: Model C⑤

● See "Inner Wiring Diagram of Motor" page for the inner wiring diagram of the motor.

Standard Type Frame Size 28 mm (Bipolar 4 lead wires)

Connector Type

Specifications

Product Name	Maximum Holding Torque Nm	Rotor Inertia J: kgm^2	Rated Current A/Phase	Voltage VDC	Winding Resistance Ω/Phase	Inductance mH/Phase	Basic Step Angle	Recommended Driver Product Name*
PKP223D15□2	0.095	9×10^{-7}	1.5	1.77	1.18	0.96	1.8°	**CVD215BR-K**
PKP225D15□2	0.19	18×10^{-7}		3	2	1.6		

● The box □ in the product name indicates the shaft **A** (single shaft) or **B** (double shaft).

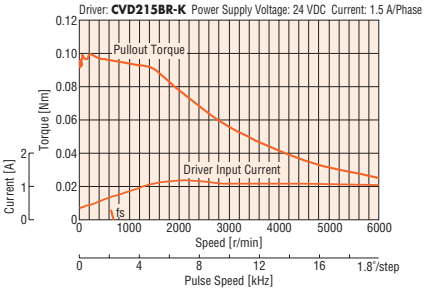
*See "Drivers for 2-Phase / 5-Phase Motors" page for drivers that can be used in combination.

Note

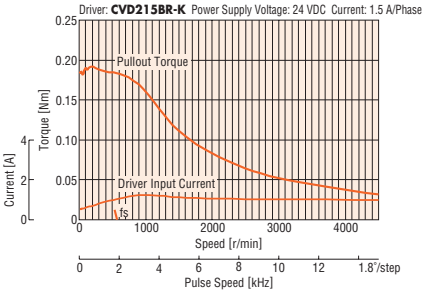
● Be sure to set the driver current at or below the motor rated current. If the motor rated current is exceeded, the product will be damaged.

Speed – Torque Characteristics (Reference Values) fs: Max. Starting Frequency

PKP223D15A2/PKP223D15B2



PKP225D15A2/PKP225D15B2



Note

● 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.

● Depending on the driving conditions, a considerable amount of heat may be generated by the motor. Be sure to keep the motor case temperature at 100°C max.

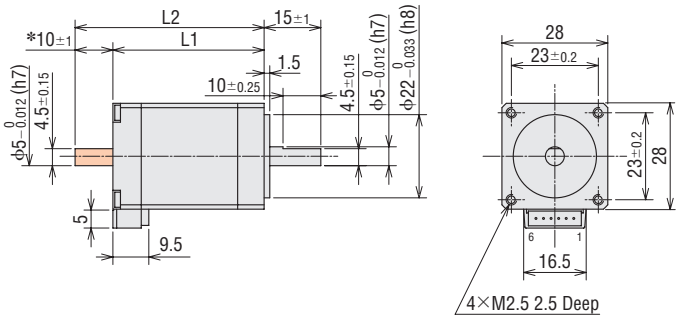
● The characteristics are the same when RS-485 communication type driver is used in combination.

Dimensions Unit = mm

Motor

Product Name	L1	L2
PKP223D15A2	32	–
PKP223D15B2		42
PKP225D15A2	51.5	–
PKP225D15B2		61.5

● Applicable Connector
Connector Housing: 51065-0600 (Molex)
Contact: 50212-8100 (Molex)
Crimp Tool: 57176-5000 (Molex)



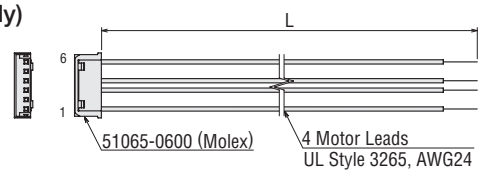
*The length of the shaft flat on the double shaft model is 10±0.25.

● These dimensions are for double shaft motors.
For single shaft motors, ignore the shaded ▭ areas.

Connection Cable (Sold separately)

◇Motor Connection Cable

Product Name	Length L [m]
LC2B06A	0.6
LC2B10A	1



Inner Wiring Diagram of Motor

Wiring Diagram No.: Model B③

● See "Inner Wiring Diagram of Motor" page for the inner wiring diagram of the motor.

Standard Type Frame Size 35 mm (Bipolar 4 lead wires)

Connector Type

Specifications

Product Name	Maximum Holding Torque Nm	Rotor Inertia J: kgm^2	Rated Current A/Phase	Voltage VDC	Winding Resistance Ω/Phase	Inductance mH/Phase	Basic Step Angle	Recommended Driver Product Name*
PKP233D15□	0.2	24×10^{-7}	1.5	2.43	1.62	1.5	1.8°	**CVD215BR-K**
PKP233D23□			2.3	1.56	0.68	0.67		**CVD223BR-K**
PKP235D15□	0.37	50×10^{-7}	1.5	3.6	2.4	2.6		**CVD215BR-K**
PKP235D23□			2.3	2.23	0.97	1.2		**CVD223BR-K**

● The box □ in the product name indicates the shaft **A** (single shaft) or **B** (double shaft).

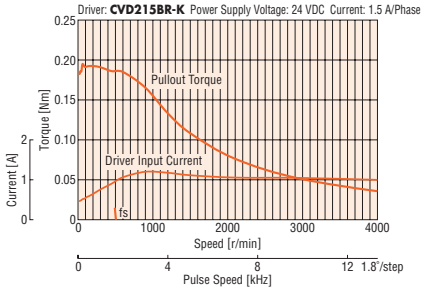
*See "Drivers for 2-Phase / 5-Phase Motors" page for drivers that can be used in combination.

Note

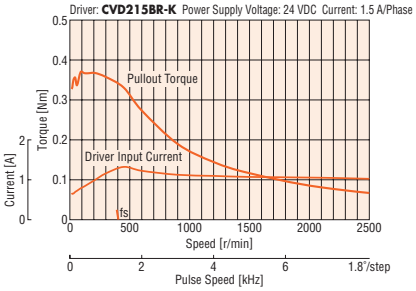
● Be sure to set the driver current at or below the motor rated current. If the motor rated current is exceeded, the product will be damaged.

Speed – Torque Characteristics (Reference Values) fs: Max. Starting Frequency

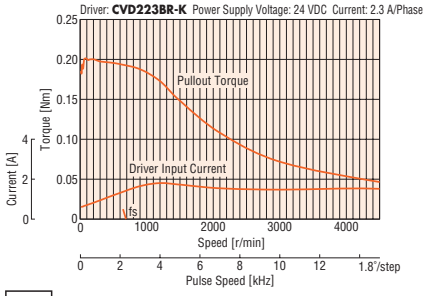
PKP233D15A/PKP233D15B



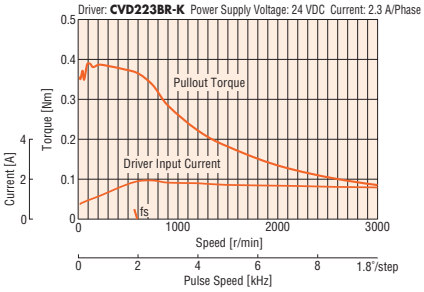
PKP235D15A/PKP235D15B



PKP233D23A/PKP233D23B



PKP235D23A/PKP235D23B



Note

● 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.

● Depending on the driving conditions, a considerable amount of heat may be generated by the motor. Be sure to keep the motor case temperature at 100°C max.

● The characteristics are the same when RS-485 communication type driver is used in combination.

Dimensions Unit = mm

Motor

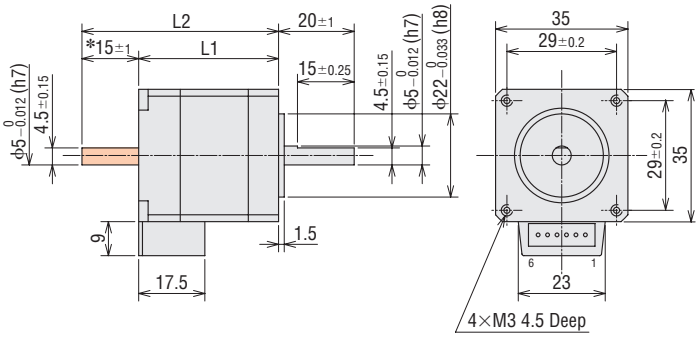
Product Name	L1	L2
PKP233D15A	37	–
PKP233D15B		52
PKP233D23A		–
PKP233D23B		52
PKP235D15A	52	–
PKP235D15B		67
PKP235D23A		–
PKP235D23B		67

● Applicable Connector

Connector Housing: 51103-0600 (Molex)

Contact: 50351-8100 (Molex)

Crimp Tool: 57295-5000 (Molex)



*The length of the shaft flat on the double shaft model is 15±0.25.

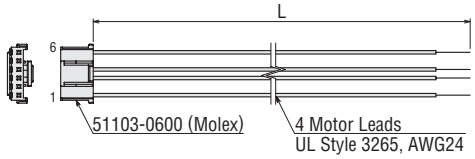
● These dimensions are for double shaft motors.

For single shaft motors, ignore the shaded ▭ areas.

Connection Cable (Sold separately)

◇Motor Connection Cable

Product Name	Length L [m]
LC2B06B	0.6
LC2B10B	1



Inner Wiring Diagram of Motor

Wiring Diagram No.: Model B③

● See "Inner Wiring Diagram of Motor" page for the inner wiring diagram of the motor.

Standard Type Frame Size 42 mm (Bipolar 4 lead wires)

Connector Type

Specifications

Product Name	Maximum Holding Torque Nm	Rotor Inertia J: kgm^2	Rated Current A/Phase	Voltage VDC	Winding Resistance Ω/Phase	Inductance mH/Phase	Basic Step Angle	Recommended Driver Product Name*
PKP243D15□	0.35	36×10^{-7}	1.5	2.85	1.9	5	1.8°	**CVD215BR-K**
PKP243D23□			2.3	1.93	0.84	2.1		**CVD223BR-K**
PKP244D15□	0.48	57×10^{-7}	1.5	3.9	2.6	4.9		**CVD215BR-K**
PKP244D23□			2.3	2.34	1.02	2.1		**CVD223BR-K**
PKP245D15□	0.58	83×10^{-7}	1.5	3.6	2.4	6.6		**CVD215BR-K**
PKP245D23□			2.3	2.57	1.12	2.9		**CVD223BR-K**
PKP246D15□	0.93	114×10^{-7}	1.5	5.8	3.87	8		**CVD215BR-K**
PKP246D23□			2.3	3.45	1.5	3.5		**CVD223BR-K**

● The box □ in the product name indicates the shaft **A** (single shaft) or **B** (double shaft).

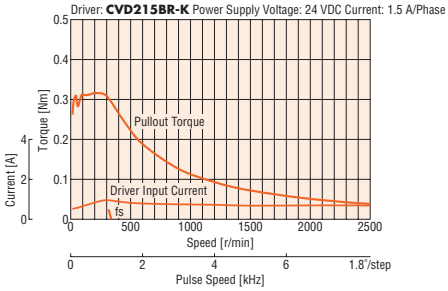
*See "Drivers for 2-Phase / 5-Phase Motors" page for drivers that can be used in combination.

Note

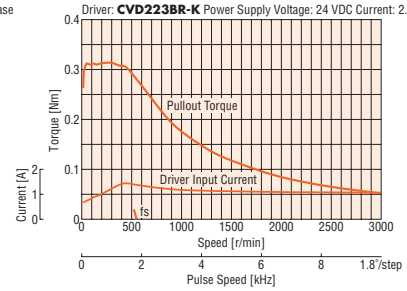
● Be sure to set the driver current at or below the motor rated current. If the motor rated current is exceeded, the product will be damaged.

Speed – Torque Characteristics (Reference Values) fs: Max. Starting Frequency

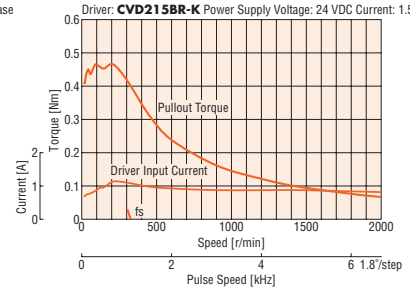
PKP243D15A/PKP243D15B



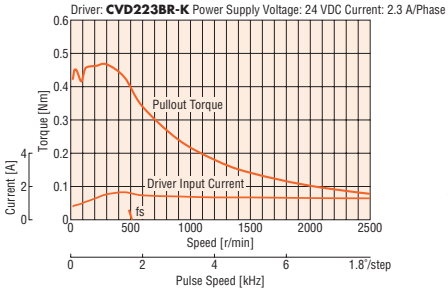
PKP243D23A/PKP243D23B



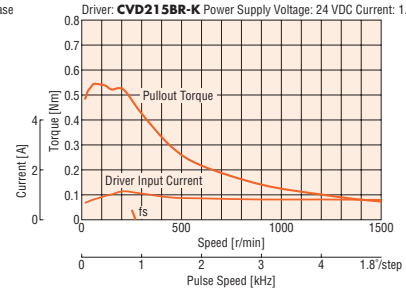
PKP244D15A/PKP244D15B



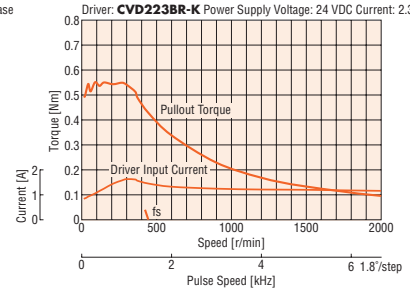
PKP244D23A/PKP244D23B



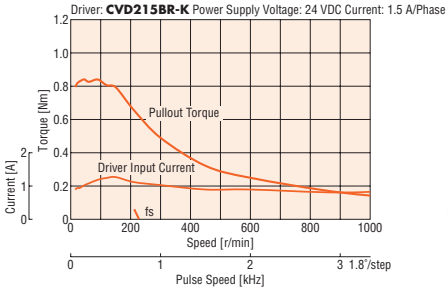
PKP245D15A/PKP245D15B



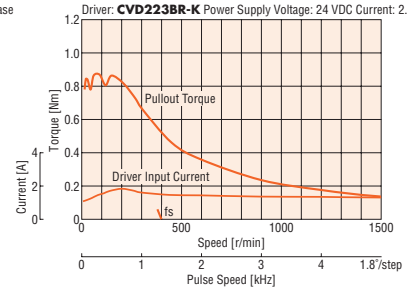
PKP245D23A/PKP245D23B



PKP246D15A/PKP246D15B



PKP246D23A/PKP246D23B



Note

● 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.

● Depending on the driving conditions, a considerable amount of heat may be generated by the motor. Be sure to keep the motor case temperature at 100°C or less.

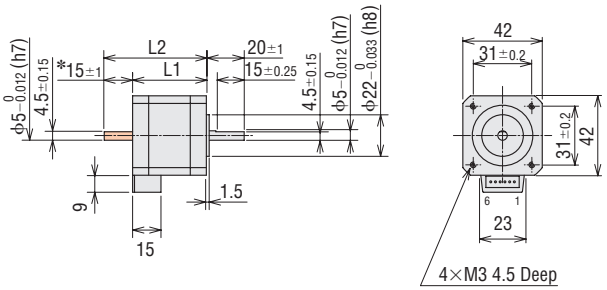
● The characteristics are the same if combined with an RS-485 communication type driver.

Dimensions Unit = mm

Motor

Product Name	L1	L2	Mass [kg]
PKP243D15A	33	–	0.25
PKP243D15B		48	
PKP243D23A		–	
PKP243D23B		48	
PKP244D15A	39	–	0.3
PKP244D15B		54	
PKP244D23A		–	
PKP244D23B		54	
PKP245D15A	47	–	0.39
PKP245D15B		62	
PKP245D23A		–	
PKP245D23B		62	
PKP246D15A	59	–	0.5
PKP246D15B		74	
PKP246D23A		–	
PKP246D23B		74	

- Applicable Connector (Molex)
  Connector Housing: 51103-0600 (Molex)
  Contact: 50351-8100 (Molex)
  Crimp Tool: 57295-5000 (Molex)



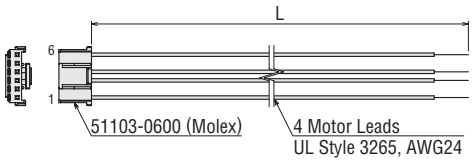
*The length of the shaft flat on the double shaft model is 15±0.25.

- These dimensions are for double shaft motors.
  For single shaft motors, ignore the shaded areas.

Connection Cable (Sold separately)

◇Motor Connection Cable

Product Name	Length L [m]
LC2B06B	0.6
LC2B10B	1



Inner Wiring Diagram of Motor

Wiring Diagram No.: Model B③

- Refer to the motor inner wiring page for an inner wiring diagram of the motor.

Standard Type Frame Size 56.4 mm (Bipolar 4 lead wires)

Mini-Connector Type

Specifications

Product Name	Maximum Holding Torque Nm	Rotor Inertia J: kgm^2	Rated Current A/Phase	Voltage VDC	Winding Resistance Ω/Phase	Inductance mH/Phase	Basic Step Angle	Recommended Driver Product Name*
PKP264D14□2	0.74	140×10^{-7}	1.4	2.9	2.1	6	1.8°	**CVD228BR-K**
PKP264D28□2			2.8	1.6	0.57	1.5		
PKP264D42□2			4.2	1	0.24	0.65		**CVD242BR-K**
PKP266D14□2	1.4	270×10^{-7}	1.4	4.6	3.3	12		**CVD228BR-K**
PKP266D28□2			2.8	2.4	0.86	2.9		
PKP266D42□2			4.2	1.6	0.38	1.3		**CVD242BR-K**
PKP268D14□2	2.5	500×10^{-7}	1.4	6.6	4.7	18		**CVD228BR-K**
PKP268D28□2			2.8	3.4	1.2	4.6		
PKP268D42□2			4.2	2.2	0.53	2		**CVD242BR-K**

● The box □ in the product name indicates the shaft **A** (single shaft) or **B** (double shaft).

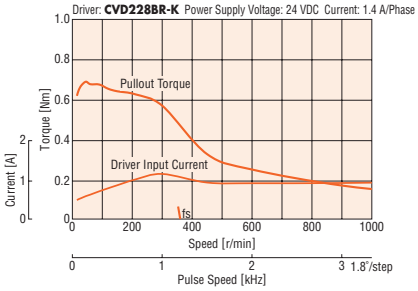
*See "Drivers for 2-Phase / 5-Phase Motors" page for drivers that can be used in combination.

Note

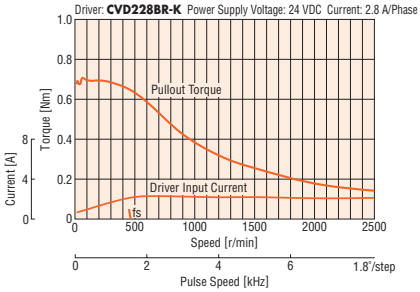
● Be sure to set the driver current at or below the motor rated current. If the motor rated current is exceeded, the product will be damaged.

Speed – Torque Characteristics (Reference Values) fs: Max. Starting Frequency

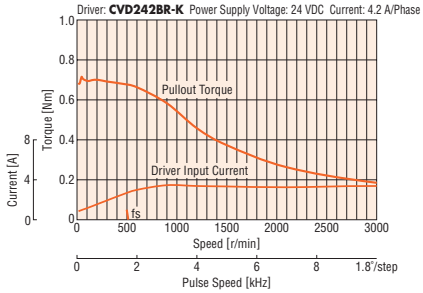
PKP264D14A2/PKP264D14B2



PKP264D28A2/PKP264D28B2



PKP264D42A2/PKP264D42B2



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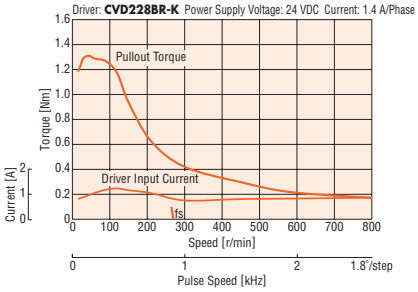

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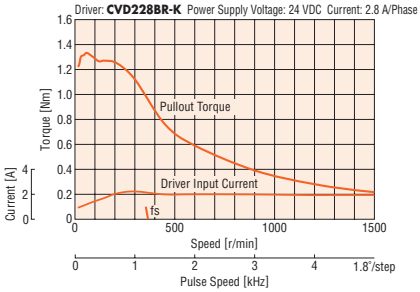
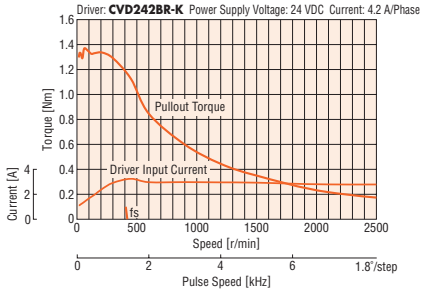
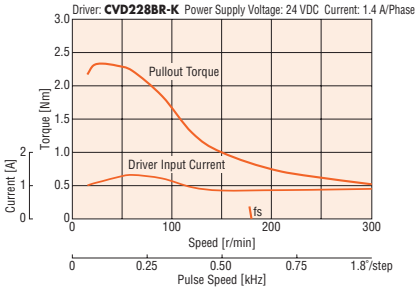


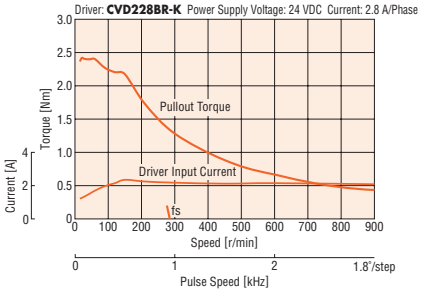
PKP266D42A2/PKP266D42B2



PKP268D14A2/PKP268D14B2



PKP268D28A2/PKP268D28B2



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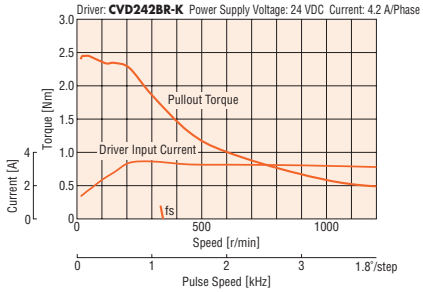


Note

● 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.

● Depending on the driving conditions, a considerable amount of heat may be generated by the motor. Be sure to keep the motor case temperature at 100°C max.

● The characteristics are the same when RS-485 communication type driver is used in combination.

Standard Type Frame Size 85 mm (Bipolar 4 lead wires)

Lead Wire Type

Specifications

Product Name	Maximum Holding Torque Nm	Rotor Inertia J: kgm^2	Rated Current A/Phase	Voltage VDC	Winding Resistance Ω/Phase	Inductance mH/Phase	Basic Step Angle	Recommended Driver Product Name*
PKP296D45□	3.3	1100×10^{-7}	4.5	1.9	0.42	3.1	1.8°	**CVD245BR-K**
PKP296D63□			6.3	1.4	0.23	1.6		–
PKP299D45□	6.4	2200×10^{-7}	4.5	2.7	0.6	5.4		**CVD245BR-K**
PKP299D63□			6.3	2	0.32	2.6		–
PKP2913D45□	9.5	3400×10^{-7}	4.5	3.5	0.78	6.9		**CVD245BR-K**
PKP2913D56□			5.6	2.6	0.47	4.4		–

● The box □ in the product name indicates the shaft **A** (single shaft) or **B** (double shaft).

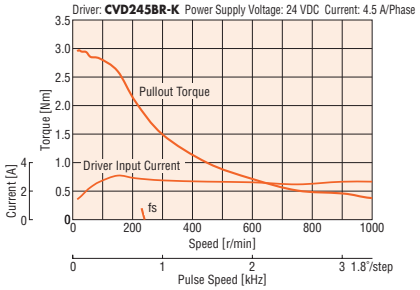
*See "Drivers for 2-Phase / 5-Phase Motors" page for drivers that can be used in combination.

Note

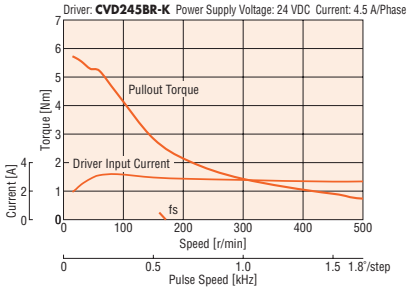
● Be sure to set the driver current at or below the motor rated current. If the motor rated current is exceeded, the product will be damaged.

Speed – Torque Characteristics (Reference Values) fs: Max. Starting Frequency

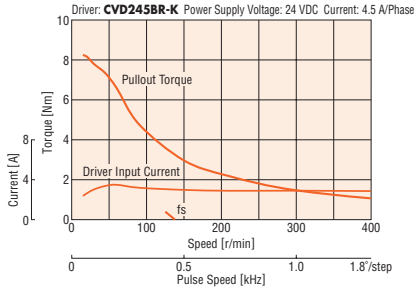
PKP296D45A/PKP296D45B



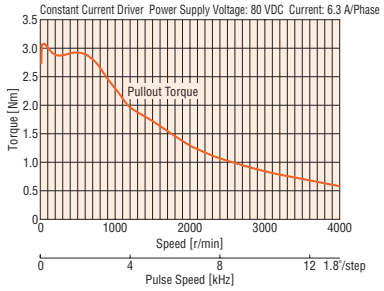
PKP299D45A/PKP299D45B



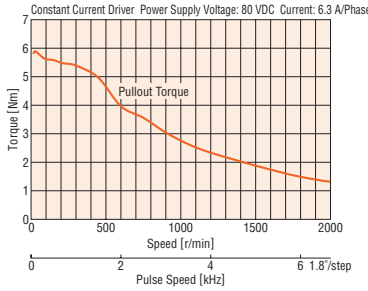
PKP2913D45A/PKP2913D45B



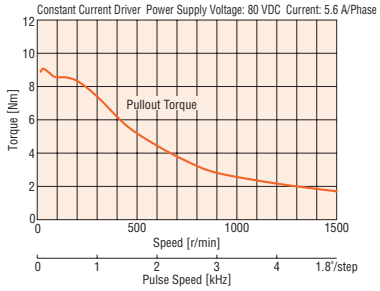
PKP296D63A/PKP296D63B



PKP299D63A/PKP299D63B



PKP2913D56A/PKP2913D56B



Note

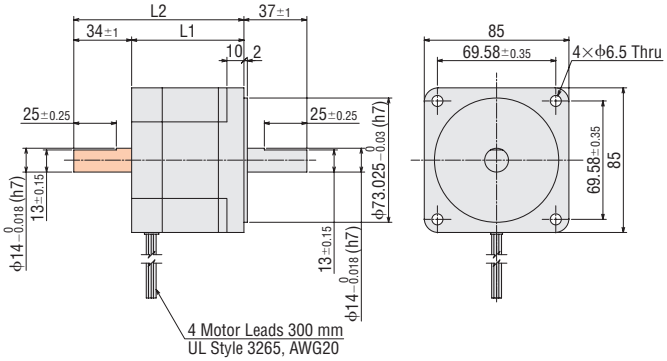
● Data for the speed – torque characteristics is based on Oriental Motor's internal measurement conditions. If the conditions are changed, the characteristics may also change as a result.

● Depending on the driving conditions, a considerable amount of heat may be generated by the motor. Be sure to keep the motor case temperature at 100°C max.

Dimensions Unit = mm

Motor

Product Name	L1	L2	Mass [kg]
PKP296D45A	66	–	1.8
PKP296D45B		100	
PKP296D63A		–	
PKP296D63B		100	
PKP299D45A	96	–	2.9
PKP299D45B		130	
PKP299D63A		–	
PKP299D63B		130	
PKP2913D45A	126	–	4
PKP2913D45B		160	
PKP2913D56A		–	
PKP2913D56B		160	



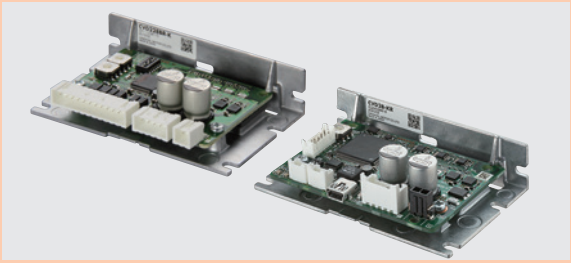
● These dimensions are for double shaft motors.
For single shaft motors, ignore the shaded ▭ areas.

Inner Wiring Diagram of Motor

Wiring Diagram No.: Model C⑤

● See "Inner Wiring Diagram of Motor" page for the inner wiring diagram of the motor.

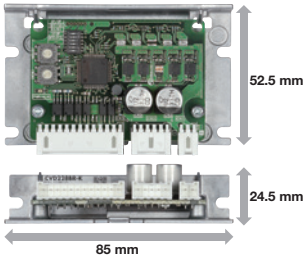
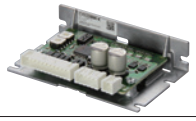
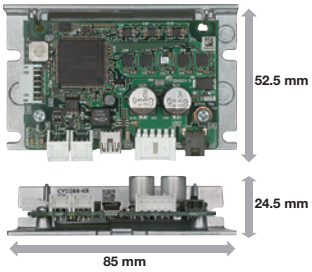
CVD Series Driver for 2-Phase/ 5-Phase Stepper Motors



These are DC power supply input drivers for stepper motors. The bipolar/unipolar driver for 2-phase stepper motors and the driver for 5-phase stepper motors are available.
Using the microstep drive function for a low-vibration driver reduces vibration and noise.

Features and Types

Bipolar Driver for 2-Phase Stepper Motor
Driver for 5-Phase Stepper Motor
CVD Series

Driver Type		External View	Overview	Driver Installation Direction
●**CVD** Series Pulse Input Type  ・Mass 20 g to 70 g (The value differs according to the driver type)	Right Angle with Installation Plate	The connector points outward. 	・Can be controlled depending on the positioning module (pulse generator) ・Running current can be easily set with the digital switch	・Horizontal Installation ・Vertical Installation
	With Installation Plate	The connector points upward. 		
	Without Installation Plate	The connector points upward. 		
●**CVD** Series RS-485 Communication Type  ・Mass 65 g	Right Angle with Installation Plate	The connector points outward. 	・Compatible with RS-485 communication (Modbus Protocol) ・Easy overwriting of data and multi-axis settings ・Reduced wiring of equipment and remote monitoring by host system possible ・Compatible with **MEXE02** support software	
	With Installation Plate	The connector points upward. 		

Note
●The driver cannot be shared by both a 2-phase stepper motor and 5-phase stepper motor. Each must use its respective dedicated driver.

●For 2-Phase/5-Phase Stepper Motors
Bipolar Driver
CVD Series **S** Type


・SPI Communication-Compatible


・Pulse Input-Compatible

This is a compact board driver.

●For 5-Phase Stepper Motors
Driver
CVD Series **SC** Type

This driver can easily control speed by sensing the speed control motor.

●For 2-Phase Stepper Motors
Unipolar Driver

The Microstep Drive drivers are compact and lightweight.

The **CVD** Series drivers, developed exclusively for the **PKP** Series stepper motors, enable increased performance and functionality.

Features of the **CVD** Series

Industry's Top, Compact, High Performance Driver

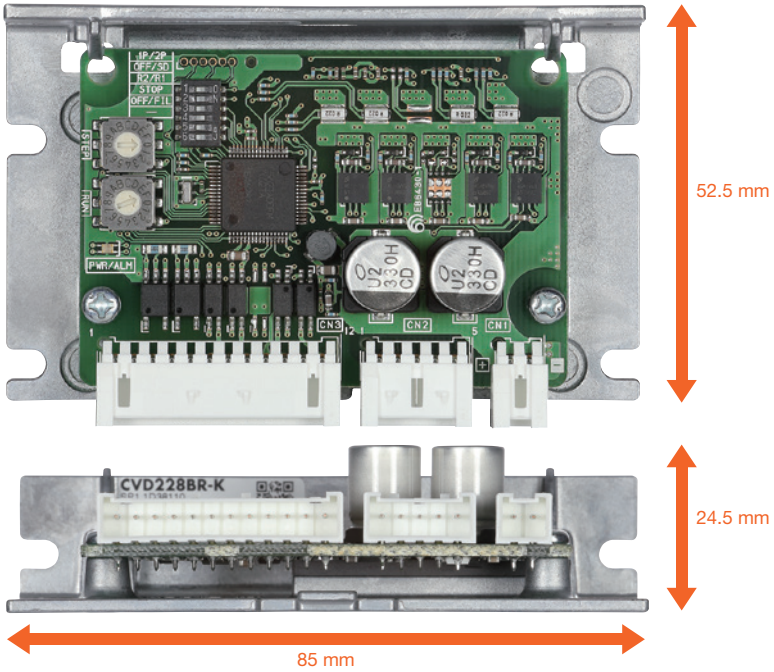
These compact and lightweight drivers contribute to space savings. The 2-phase and 5-phase drivers are identical in size, installation and I/O connectors. This allows for the selection and evaluation of 2-phase or 5-phase drivers based on the required specifications.

- A 2-phase driver and 5-phase driver cannot be used together. Different phases require dedicated drivers.

Actual Size

Mass 20 g to 70 g

(Differs according to the driver type.)



Select Drivers by Mounting Method

Drivers with different shapes and connector locations are available to match the mounting method.

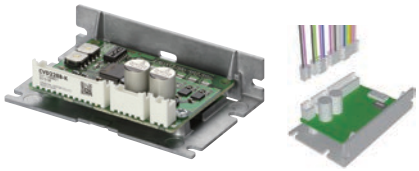
- Available for both 2-phase and 5-phase.

Right Angle Type with Installation Plate

The connector points outward.

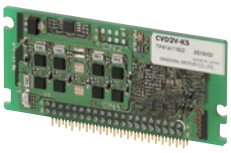
With Installation Plate

The connector points upward.



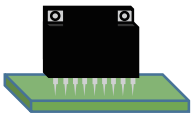
Board-Mount S Type

This is a board-mount type driver.

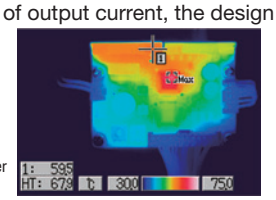


High-Efficiency Design

The **CVD** Series provides increased torque by increasing the output current compared to conventional products.
In order to allow the increase of output current, the design incorporates measures to reduce the amount of heat generated.



Conventional product or custom-built driver

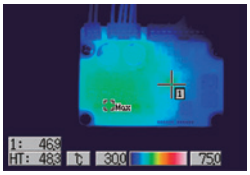


Thermographic driver heat distribution when operated under identical conditions

Lower Heat Generation

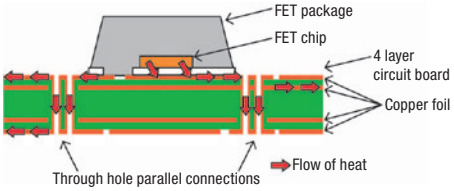
Increased Torque

CVD Driver

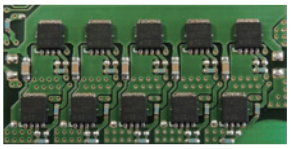


Thermographic driver heat distribution when operated under identical conditions

- Adoption of low-loss FET
- Pattern design that accounts of heat dissipation to the circuit board
- Adoption of FET with good heat dissipation properties



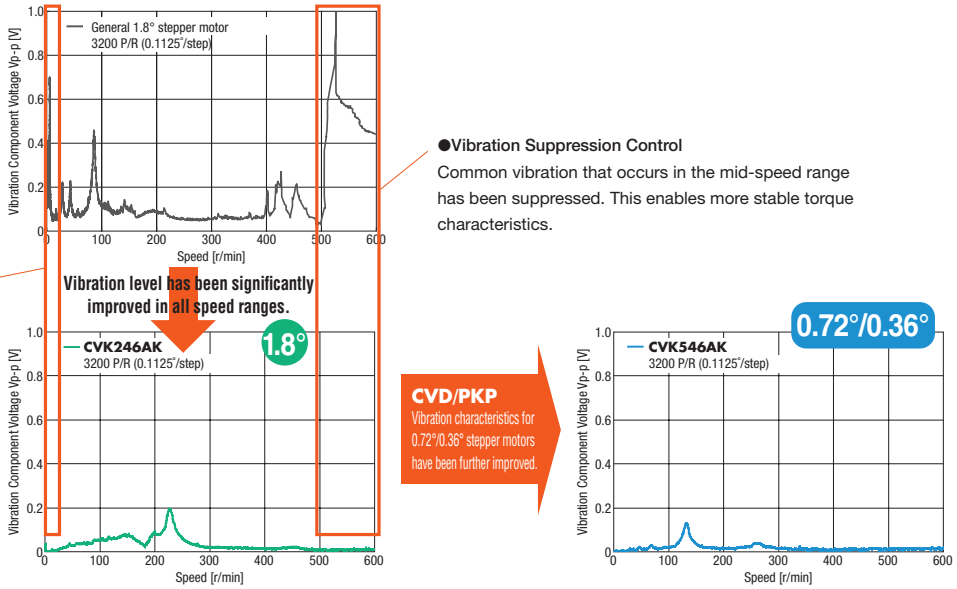
Cross section schematic view of FET and printed circuit board



Actual printed circuit board pattern

Low Vibration with Full-Time Microstepping

Low vibration and noise reduction have been achieved across all speed ranges by significantly improving the vibration level with the use of a fully digital-controlled full-time microstep driver. The **CVD** 5 phase driver and motor has further improved vibration characteristic.



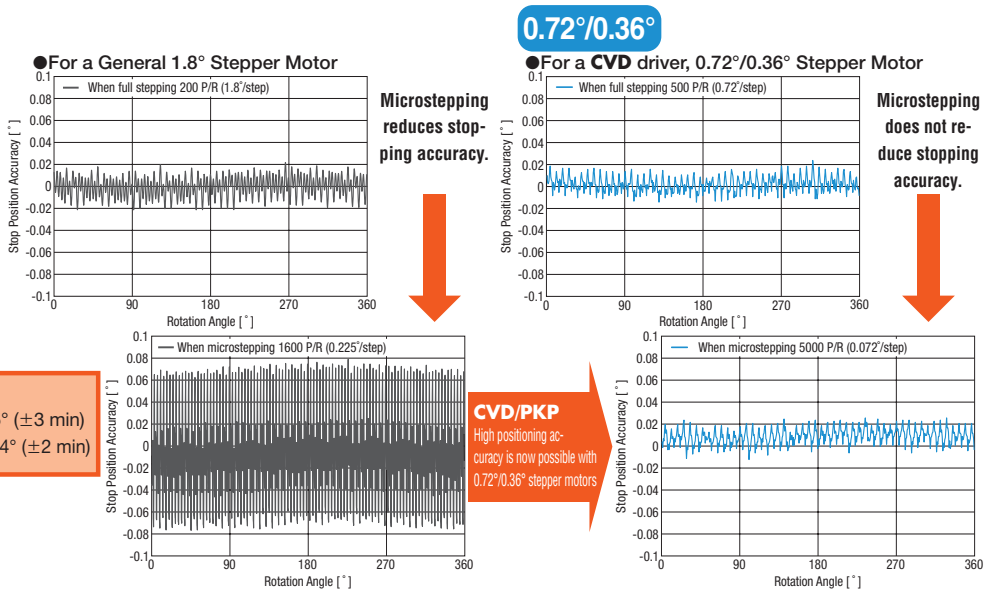
●Vibration Suppression Control
Common vibration that occurs in the mid-speed range has been suppressed. This enables more stable torque characteristics.

●Reduced Step Vibration
The new smooth drive control with higher current control increases the basic step angle to a maximum resolution of 2048. As a result, a reduction in step vibration in the low-speed range is achieved.

For High Positioning Accuracy Use a 0.72°/0.36° Stepper Motor

In general, stopping accuracy tends to be lower during microstep operation* than full step operation and this effect is more noticeable in a 1.8° motor. In this situation, using a **CVD** 5 phase driver and motor enables a higher positioning accuracy.

*Max. resolution 125000 P/R



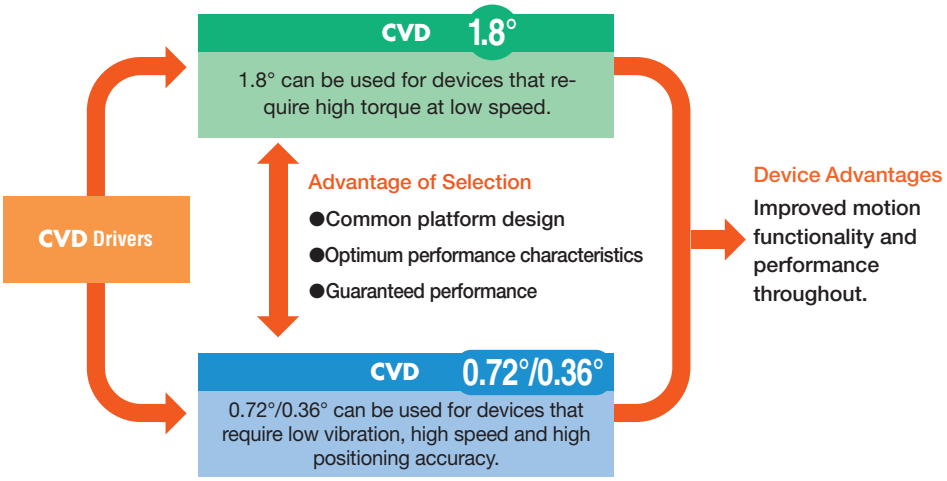
●Stopping Accuracy

0.72° stepper motor standard type	±0.05° (±3 min)
0.36° stepper motor high-resolution type	±0.034° (±2 min)

There's a Wide Choice with 1.8° and 0.72°/0.36° Stepper Motors

The size, installation and I/O connectors for the **CVD** drivers and 1.8° or 0.72°/0.36° motors are the same. Because of this, it is easy to evaluate and select the proper package for the requirement.

*The driver for a 1.8° stepper motor and the driver for a 0.72°/0.36° stepper motor are not interchangeable. Each motor type has a dedicated driver. Use the Step Angle Setting Switch to set the proper resolution without changing your controller's pulse output.

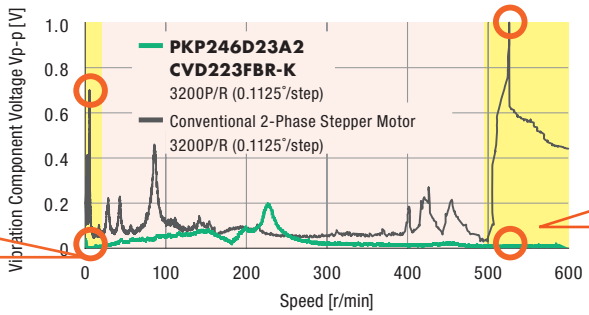


Low Vibration Achieved by Full-Time Microstep Drive

The **CVD** Series is a fully digital control driver. Currents are controlled digitally and calculated by a high-performance CPU.
The waveform of the current for each phase is changed from the conventional trapezoidal to sinusoidal, which allows for micro-step driving in all speed regions, and has reduced vibration even more.

Reduction in Step Vibration

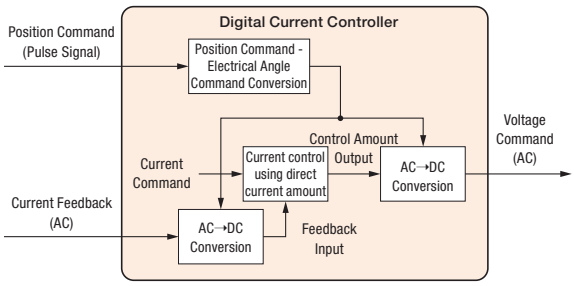
The new smooth drive control with its increased current control resolution allows the basic step angle to be divided into a max. of 2048 microstep angles. This has greatly reduced the step vibration at low speeds.



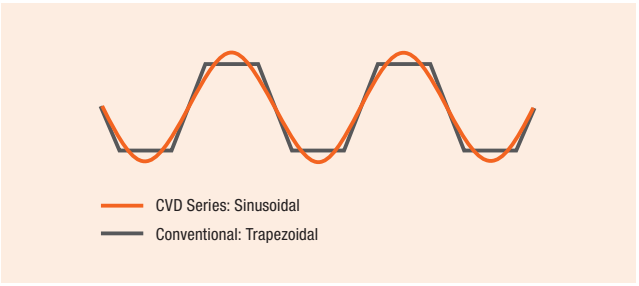
Vibration Suppression Control

Vibration in the medium speed regions, which generally occurs regardless of the number of phases and the drive system type, has been suppressed. This stabilizes the torque characteristics and allows the motor to operate at high speeds without mis-stepping.

■ Digital Current Controller Mechanism



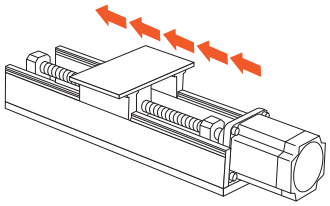
■ Illustration of Motor Current Waveform



A motor that Matches the Desired Specifications can be Selected from a Wide Range of Speed and Torque Variations

Example — Inching Operation Over Short Distances

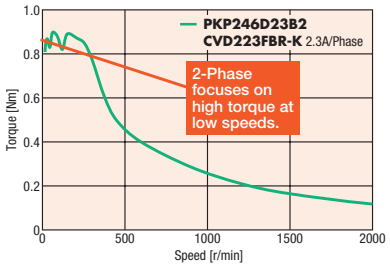
For applications that require rapid acceleration and deceleration,
2-phase stepper motors with high torque at low speeds are recommended.



2-Phase Stepper Motor
PKP Series

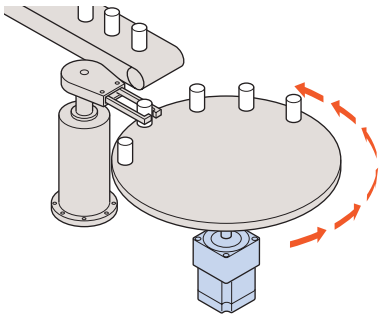
2-Phase Driver
CVD Series

■ High torque at low speeds



Example — Inching Operation Over Short Distances with Large Amount of Inertia

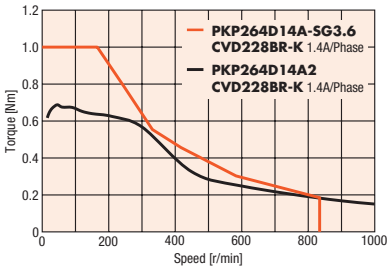
For applications that require rapid acceleration and deceleration with large amounts of inertia, 2-phase stepper motors with geared motors are recommended



2-Phase Stepper Motor
PKP Series
SH Geared Type

2-Phase Driver
CVD Series

■ Comparison of Speed – Torque Characteristics



More powerful 5-phase **RKII** Series stepper motors (AC input type) are also available.

Hybrid Stepper Servo αSTEP

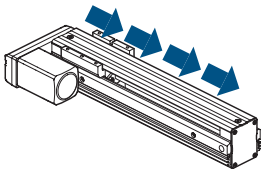
What is αSTEP?

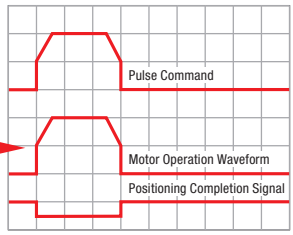
αSTEP is a "hybrid" stepper motor-based motor & driver that together, performs independent control which combines the advantages of "open loop" and "closed loop" performance. In addition to high-accuracy positioning and speed control, it can perform control that restricts the motor's generated torque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

Normal Condition (Positioning deviation is less than ±1.8°)

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



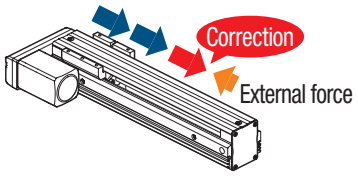


No time lag between command and actual operation

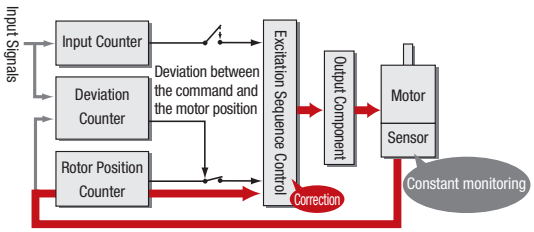
Overload Condition (Positioning deviation is ±1.8° min.)

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

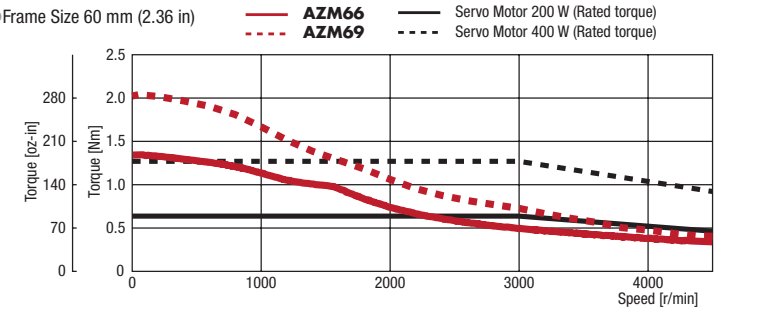


Performance

"Rated output" is not listed because αSTEP has no "rated speed." Refer to the graph on the right to compare rated torque of αSTEP 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)

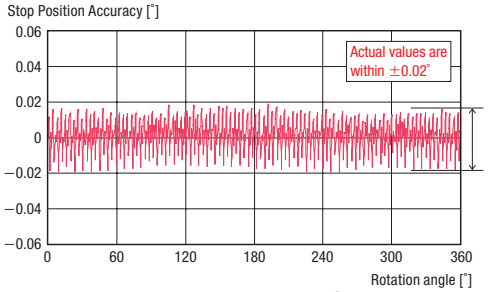


●Data for the speed–torque characteristics is based on Oriental Motor's internal measurement conditions. If the conditions are changed, the characteristics may also change as a result.

Stopping Accuracy

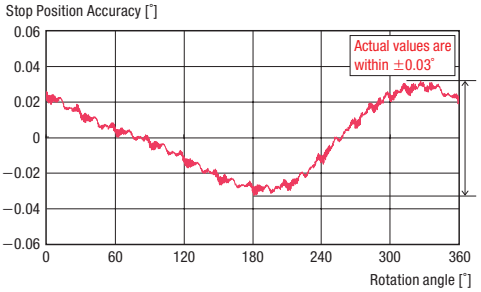
The stopping accuracy of a typical αSTEP is ±0.05° (under no load), which is equivalent to that of servo motors. These graphs show the actual measured stopping accuracies when an αSTEP and an AC servo motor were rotated once.

●Stopping accuracy of αSTEP (Actual measurements)



[Example] When the ball screw lead is 10 mm, the αSTEP stopping accuracy is ±1.4μm and the repetitive positioning accuracy of a common ground ball screw is ±10μm.

●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

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

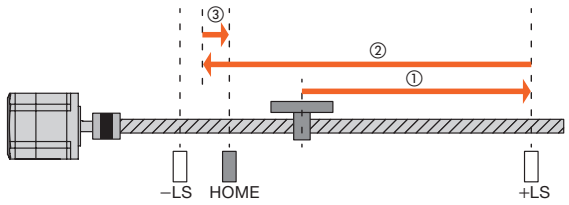
The **AZ** Series driver uses the positioning information managed by the mechanical absolute sensor. The position information can be preserved, even if the power turns off or if the cable between the motor and the drive is disconnected. No battery required.

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.

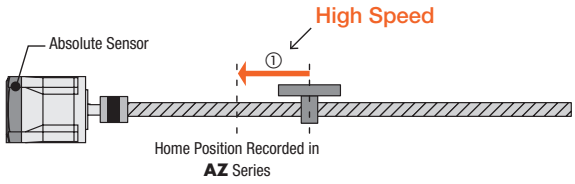
Previous Home Detection for Control Motor

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



Return-to-Home Operation of **AZ** Series

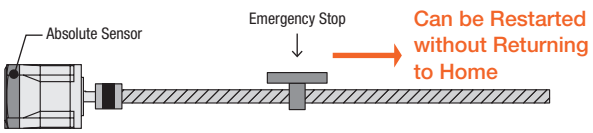
There is no need to detect the limit sensor, and it can travel directly at high speed to the home position recorded by the Absolute Sensor.



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



Hybrid Stepper Servo αSTEP AZ Series Overview

AZ Series Product Line

A product line compatible with a variety of equipment, controls and systems is available.

Motor

Standard Type

Frame Size 20 mm to 85 mm

TS Geared Type

Spur gear mechanism

Backlash-free

High-speed Operation

Frame Size 42 mm to 90 mm

Right-Angle FC Geared Type

Face gear mechanism

Backlash-free

Space Saving

Frame Size 42 mm, 60 mm

PS Geared Type

Planetary gear mechanism

Backlash-free

Space Saving

Frame Size 28 mm to 90 mm

PLE Geared Type

Planetary gear mechanism

Backlash-free

Space Saving

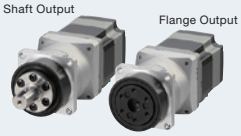
Frame Size 42 mm to 90 mm

HPG Geared Type

Harmonic Planetary®

Backlash-free

Space Saving



Frame Size 40 mm to 90 mm

Harmonic Geared Type

Harmonic Drive®

Non-Backlash

High Torque and High Accuracy

Frame Size 30 mm to 90 mm

Driver

Network Compatible Drivers

FA Network Control

Drivers compatible with a variety of networks, including EtherNet/IP™, EtherCAT and PROFINET are available.

AC Input
DC Input

DC Input

Built-in Controller Type

FLEX

Set positioning data to the driver (256 points). FA Network control is possible through the use of a network converter (sold separately).

I/O control or Modbus control

AC Input DC Input DC Input

FLEX is the collective name for products that support I/O control, Modbus (RTU) control, and FA network control via network converters.

RS-485 Communication Pulse Input Type

The motor position, speed, torque, alarms and temperature can be monitored via RS-485 communication.

Pulse Signal Control

AC Input DC Input

Pulse Input Type

Controls the motor using a positioning module (pulse generator).

Pulse Signal Control

AC Input DC Input

Available in the ePLAN data portal.

Product Line of Linear & Rotary Actuators Equipped with **AZ** Series

Wiring, control, and maintenance parts have been standardized, since the same motors and drivers are equipped, which reduces the startup time and simplifies operation.

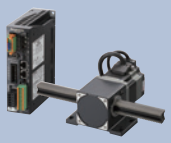
Electric Linear Slides
EZS Series
- Simple dustproofing function, cleanroom-compatible

Electric Cylinders
EAC Series

Hollow Rotary Actuators
DGII Series
- The motor is integrated with a large-diameter hollow rotary table
- High power and high rigidity

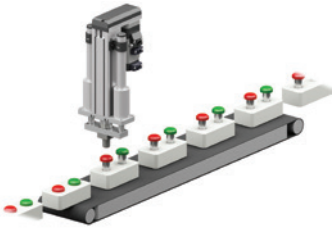
Compact Electric Cylinders
DR Series
DRS2 Series
- Compact actuator that integrates the motor and ball screw
- Optimal for minute feeding with linear motion and high positioning accuracy

Rack-and-Pinion
L Series
- A compact and strong linear motion mechanism
- Long stroke
- High transportable mass

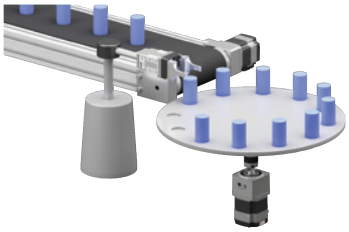


Electric Gripper
EH Series
- Provides delicate grip
- Compact and lightweight

Application Examples

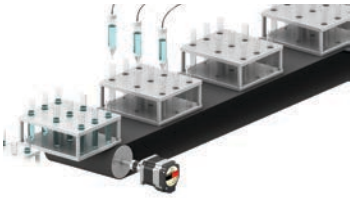


Push-motion operation



Transfer of large inertial load

Syringe/Dispenser



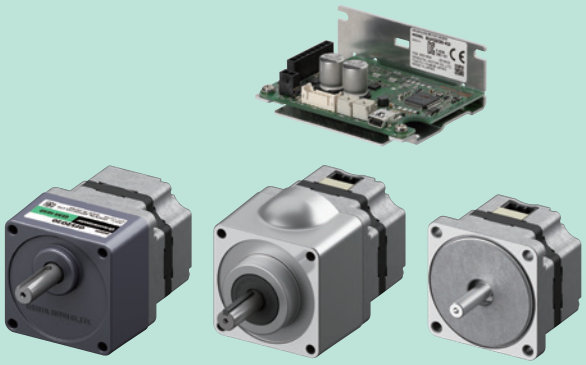
Frequent repetitive starting and stopping

Brushless Motors DC Input

BLH Series

- Power Supply Voltage 24 VDC
- Output 15 W (1/50 HP)/30 W (1/25 HP)/ 50 W (1/15 HP)/100 W (1/8 HP)
- Speed Control Range 100 - 3000 r/min
- Speed Regulation ±0.5%
- Compact Driver
  W72 mm × D55 mm × H27 mm, M 46 g*

*For 15 - 50 W (1/50 - 1/15 HP)



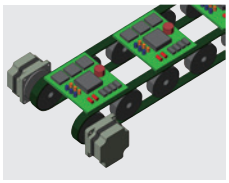
Increase Equipment Value with the Optimal Control of Compact Drivers

- Applies to digital setting type and RS-485 communication type.

Speed Matching and Little Speed Fluctuation with Digital Setting

Setting in 1 r/min units is possible.

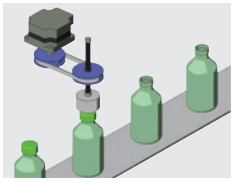
Optimized with good speed repeatability and dual-axis synchronous operation.



Dual-Axis Conveyor Belt

Torque Limiting Function

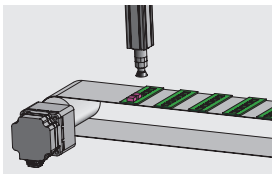
Torque adjustment and tightening torque adjustment is possible.



Cap Tightening

Load-Holding Function

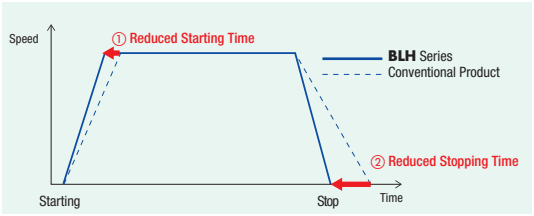
Load is held in place by an electromagnetic holding brake.



Holds Conveyor Belt

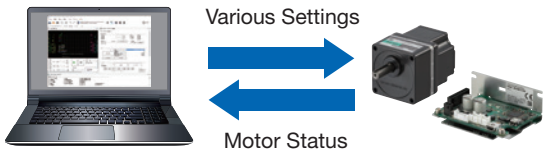
Reduced Equipment Tact Time

Reduced equipment tact time can be achieved by utilizing maximum instantaneous torque and deceleration time settings to reduce stopping time.



Safe Startup and Maintenance with MEXE02 Support Software

- Applies to digital setting type and RS-485 communication type.
- The Support Software **MEXE02** can be downloaded free of charge from the Oriental Motor website.

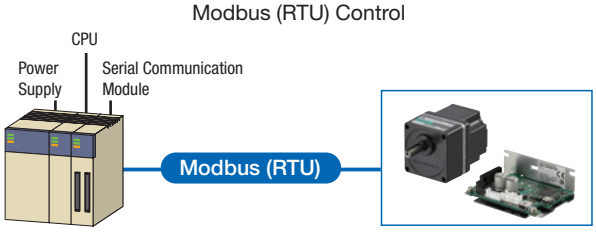


Support Software
MEXE02

Common Settings and Uniform Management with Network Communication

- Applies to RS-485 communication type.
- Can be Controlled from a PLC or Touch Screen

Modbus (RTU) Control



Features of Brushless Motors

Brushless motors do not have the brushes that are a disadvantage of DC motors, so there is little noise and they are maintenance-free. Because they use permanent magnets, these motors are smaller than AC motors and are able to achieve higher output and higher efficiency.

Wide Speed Control Range

Brushless motors have a wider speed control range than AC speed control motors and inverters. They are suited to applications that require a constant torque from low speed to high speed.

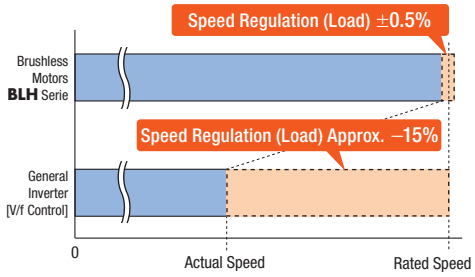
Product Group	Speed Control Range*	Speed Ratio
Brushless Motors (For **BLH** Series)	100 - 3000 r/min	1:30
Inverter-Controlled Three-Phase Induction Motor	200 - 2400 r/min	1:12
AC Speed Control Motor	50 Hz: 90 - 1400 r/min 60 Hz: 90 - 1600 r/min	1:15 1:17

*The speed control range varies depending on the model.

Stable Speed Control

Brushless motors constantly monitor the feedback signals from the motor, compare it with the setting speed, and adjust the applied voltage. For this reason, even if the load changes, stable rotation is performed from low speed to high speed.

● Comparison of Speed Variation (Reference Values)



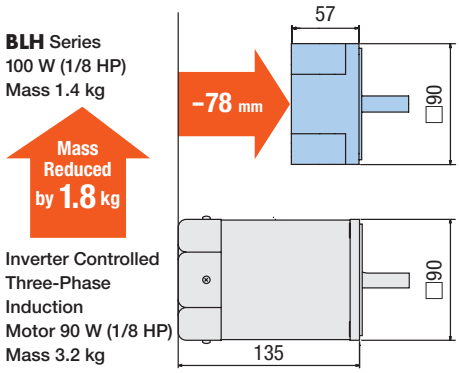
Speed regulation (lwith respect to the load) for each model is shown in the table on the right. The level to which the speed changes when the load changes from 0 to the rated torque is shown.

Product Name	Speed Regulation with Respect to the Load	
		Conditions
BMU Series	±0.2%	0 - Rated Torque At rated speed
BLE2 Series	±0.2%	
BLE Series	±0.5%	
BXII Series	±0.05%	
BLH Series	±0.5%*	

*The digital setting is ±0.2%.

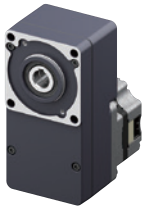
Compact and Lightweight yet Powerful

Brushless motors have slim bodies and provide high power due to permanent magnets being used in the rotor. This contributes to downsizing of equipment.



Motor and Driver System

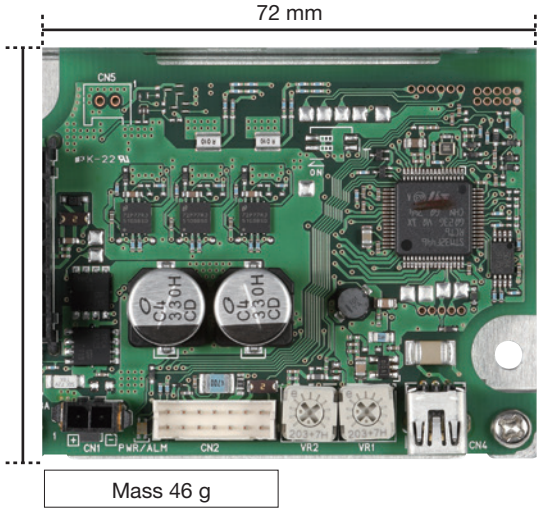
Geared Type

Product Line	Parallel Shaft Gearhead **GFS** Gears	**CS** Geared Motors*1	Hollow Shaft Flat Gearhead **FR** Gears
External View			
Features	· Wide Range of Gear Ratios · Rated Life of 10,000 Hours*2	· Increased Load-bearing Capacity (Compared to a Parallel Shaft Gearhead) · Center Shaft · Rated Life of 10,000 Hours	· Space Saving, Low Cost · Permissible Torque without Saturation · Rated Life of 10,000 Hours
Motor Output Power	15 W (1/50 HP), 30 W (1/25 HP), 50 W (1/15 HP), 100 W (1/8 HP)	15 W (1/50 HP), 30 W (1/25 HP), 50 W (1/15 HP)	30 W (1/25 HP), 50 W (1/15 HP), 100 W (1/8 HP)
Gear Ratio	5 - 200*3	5 - 20	5 - 200

*1 Connector type only
*2 The rated life for 15 W (1/50 HP) is 5,000 hours.
*3 For the connector type, the gear ratio is 5 - 100.

Compact and Light Drivers that are Smaller than a Business Card

Actual Size



Mass 46 g

• The photo is of 15 W (1/50 HP), 30 W (1/25 HP) and 50 W (1/15 HP) drivers.

3 Selectable Drivers - Their Setting Methods and Functions

Driver Types	Analog Setting Type	Digital Setting Type	RS-485 Communication Type
External View			
Features	Simple Speed Settings with Potentiometer and External Analog Signal	Set from a PC with the **MEXE02** Support Software	Set from Network with Modbus Communication
Output	15 W (1/50 HP)/30 W (1/25 HP)/ 50 W (1/15 HP)/100 W (1/8 HP)	15 W (1/50 HP)/30 W (1/25 HP)/ 50 W (1/15 HP)	15 W (1/50 HP)/30 W (1/25 HP)/ 50 W (1/15 HP)
Speed Control Range	100 - 3000 r/min	80 - 3000 r/min	80 - 3000 r/min

Brushless Motor - Motor Only Lineup

If there are special functions and features that our drivers do not offer, Oriental Motor can supply only the brushless motor. Our motor sizes range from 15 W to 200 W, and come with a variety of gearheads to choose from. If encoder feedback is needed, we can assemble the motor with an encoder from our factory.

Available Lineup

Output	Power Supply	Round Shaft Type	Gearhead Type	Gear Ratio	With Encoder
15 W	24 VDC	•	Parallel	5 / 10 / 15 / 20 / 30 / 50 / 100	–
30 W	24 VDC	•	Parallel / Flat Gearhead	5 / 10 / 15 / 20 / 30 / 50 / 100 / 200	•
50 W	24 VDC	•			•
100 W	24 VDC	•			•
200 W	24 VDC	•			•

Semi-Standard Product

50 W motor with parallel gearhead and encoder

100 W motor with flat gearhead

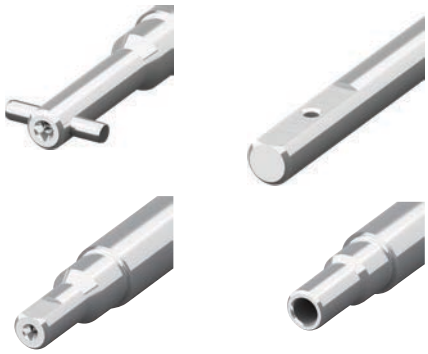
Examples of Encoder Specifications

Resolution	500	1000	2000
Output Circuit Type	Differential		
Output Mode	Incremental		
Output Signal	A phase, B phase	A phase, B phase, Index	
Power Supply Voltage	5 VDC ±10%		
Current	56 mA Typ.		

Value Added Modifications

Oriental Motor offers various types of value adds to match the exact needs of the axis on the machine. Below are some examples. Contact us for more information.

Shaft Modification



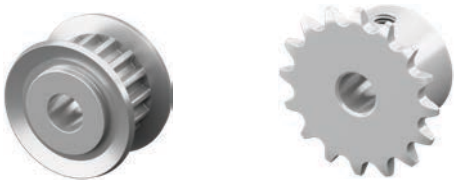
Examples
Length / Key Slot / Knotch / Chamfer / Threaded

Cable Assembly

Examples
Length / Twisted Pairs / Connectors / Label / Marking Tie

Examples Of Connectors
Molex / Hirose / JST / TE

Pulley / Gears / Sprocket



Examples
SDP / Gates Unitta / Inhouse

Encoders

Examples
Magnetic Encoders MR Type

Quality Testing

Product Safety/Dependability

The establishment of on-site laboratories, to test and evaluate the safety standard and regulations of our products, allows Oriental Motor to provide products that our customers can safely use.

Locked rotor test (in Product Safety Testing Laboratory)

EMC Testing Center

Conducting Environmental Testing to Enhance Product Reliability

Major Testing Equipment Owned by Oriental Motor

Measurement

- Coordinate measuring machine
- Video measuring machine
- Roundness and cylindrical profile measuring machine
- Surface texture and contour measuring machine

Analysis

- Stereo microscope
- Metallurgical microscope
- Scanning electron microscope (SEM)
- Energy dispersive X-ray spectrometer (EDX)
- Fourier transform infrared spectrophotometer (FT-IR)

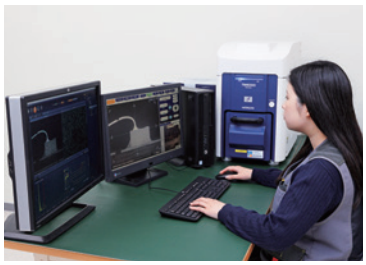
Test

- Compact low and constant temperature chamber
- Motor shaft fatigue testing machine
- Highly accelerated temperature and humidity stress test (HAST)
- Combined temperature and humidity, vibration testing machine
- Thermal shock testing machine
- Salt spray testing machine
- Temperature and humidity chamber
- Drop testing machine

Combined environment testing machine

Motor shalt fatigue testing machine

Compact low and constant temperature bath



Scanning electron microscope (SEM)

Improvement of Productivity

Oriental Motor's continued improvement in our production and shipping systems provides the stability needed to carry out our mission as a manufacturer who ensures timely delivery of our products, while keeping up with rapid changes in social environments.

Motor assembly line collaborated with autonomation and human skills

Documentation Support

To support customer's product release, we can provide the customer with the documentations below.
We also have inpsection capabilities for returned products.

- First Article Inspection Report (FAIR)
- Certificate of Conformance (CoC)
- REACH
- RoHS
- CE
- UL
- CMR
- Inspection Reports
- Packing List

CERTIFICATE

Oriental Motor USA Corporation

has implemented and maintains a Quality Management System.

ISO 9001 : 2015

ISO Certification

Acquisition Status of Certification

	ISO 9001	ISO 14001	ISO 45001
Registration Date	February 23, 2005 *The date on which the Company obtained company-wide certification		December 20, 2019
Renewal Date	February 15, 2020 *The issuance date of the latest version of certification		–
Certified Plants and Offices	Tsuruoka-Chuo Plant, Tsuruoka-Nishi Plant, Tsukuba Plant, Tsuchiura Plant, Takamatsu-Kozai Plant, Takamatsu-Kokubunji Plant, Soma Plant, Kashiwa Plant, Tokyo Branch, Nagoya Branch, and Osaka Branch		Soma Plant
Certification Standards	ISO 9001 : 2015	ISO14001 : 2015	ISO45001 : 2018
Certification Authority	General Incorporated Foundation Japan Quality Assurance Organization (JQA)		
Certification Numbers	JQA-QMA15799	JQA-EM7425	JQA-OH0309

Oriental motor

These products are manufactured at plants certified with the international standards **ISO 9001** (for quality assurance) and **ISO 14001** for systems of environmental management).

Specifications are subject to change without notice. This catalogue was published in May 2024.

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