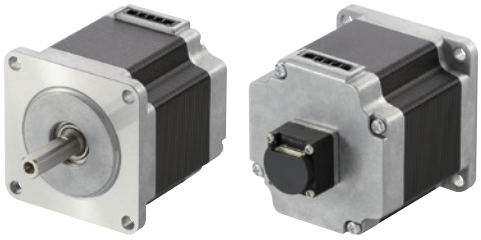
Oriental motor

Stepper Motors

PKP Series

Standard Type with Encoder 1000 P/R

2-Phase: Frame Size 42 mm, 56.4 mm
5-Phase: Frame Size 42 mm, 60 mm



NEW
New Magnetic Encoder
Resolution: 1000 P/R

Features

Capable of Highly Accurate Position Detection

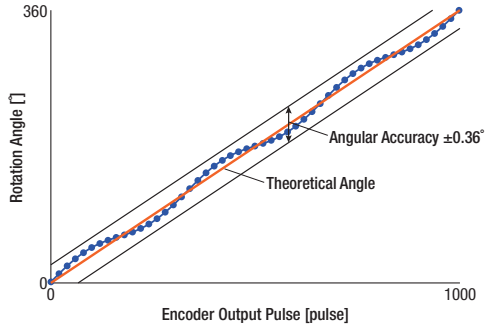
Equipped with High-Resolution/High Angular Accuracy Encoder

Equipped with high-resolution (1000 P/R) encoder.
The angular accuracy is ±0.36° (guaranteed value) with the motor in an assayed state.
Allows for more accurate position detection compared to the existing motor with encoder.

	New Product Magnetic Encoder	Existing Product Optical Encoder
Resolution	1000 P/R	500 P/R
Angular Accuracy	±0.36°	–

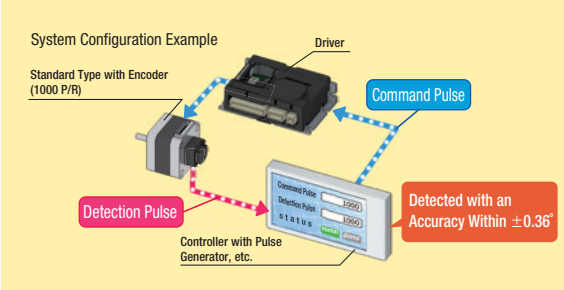
• About Angular Accuracy (Diagram)

Angular accuracy is the error between the actual rotation angle and the angle output by the encoder.
The new motor with encoder guarantees an angular accuracy of ±0.36°.



Capable of More Accurate System Control

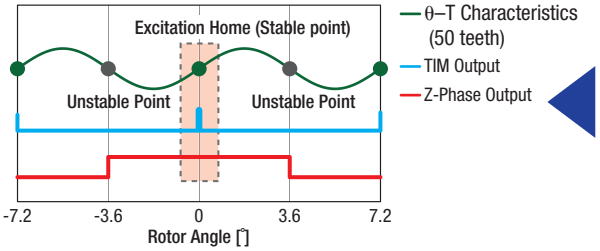
Monitoring the current position and detecting positional errors is possible.
By using a detection pulse guaranteed at ±0.36°, more accurate system control is possible.



Capable of Highly Reproducible Return-to-Home

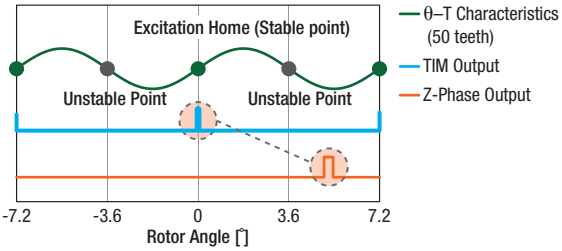
The Z-phase signal is output using the excitation home (stable point), so the home sensor (the sensor that detects the home within one rotation, installed on the motor shaft) can be used instead.
It is also easier for the Z-phase output signal and TIM output signal* to be used together, increasing the reproducibility of return-to-home.
*The signal output by the driver every time the motor output shaft rotates 7.2° from home.

If the Z-Phase Output Timing is Fixed
New Encoder (Magnetic)



The Z-phase signal outputs with a width of ±3.6°, centered on the excitation home (stable point).

If the Z-Phase Output Timing is not Fixed



The Z-phase signal output timing is unstable, making it difficult to use it as a home sensor substitute, and also making it difficult to use it in combination with the TIM signal.

Voltage Output Type and Line Driver Output Type Available

Both a voltage output type and a line driver output type are available.
The cables that are compatible with wiring with an encoder are also available (sold separately).

Product Name

Motor

◇2-Phase Standard Type with Encoder

PKP 2 4 4 D 23 A 2-R3J L

① ② ③ ④ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪

◇5-Phase Standard Type with Encoder

PKP 5 6 6 F N 24 A 2-R3J L

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩ ⑪

①	Series Name	**PKP**: **PKP** Series
②		**2**: 2-Phase **5**: 5-Phase
③	Motor Frame Size	**4**: 42 mm **6**: 56.4 mm (60 mm when the motor classification is "**F**")
④	Motor Case Length	
⑤	Motor Classification	**F**: Motor Frame Size of 60 mm
⑥	Number of Lead Wires	**D**:4 Leads **N**: 5 Leads
⑦	Motor Winding Specifications	
⑧	Configuration	**A**: Single Shaft
⑨	Reference Number	
⑩	Encoder Resolution	**R3J**: 1000 P/R
⑪	Encoder Output Circuit Type	Blank: Voltage Output **L**: Line Driver Output

Connection Cables

◇Motor Connection Cables

LC 2 B 06 E

① ② ③ ④ ⑤

①	Cable	**LC**: Lead Wire with Connectors
②		**2**: 2-Phase **5**: 5-Phase
③	Cable Type	**B**: For Bipolar **N**: For 5-Phase
④	Cable Length	**06**: 0.6 m **10**: 1 m
⑤	Reference Number	

◇Encoder Connection Cables

LC E 08 A-006

① ② ③ ④ ⑤

①	Cable	**LC**: Lead Wire with Connectors
②	Cable Type	**E**: For Encoder
③	Applicable Model	**05**: For Voltage Output **08**: For Line Driver Output
④	Reference Number	
⑤	Cable Length	**006**: 0.6 m

Product Line

A connector-coupled motor requires a connection cable.
Motors, drivers, and connection cables must be ordered individually. Refer to page 10 for details on the drivers.

Motor

◇2-Phase Standard Type with Encoder

•Bipolar (4 Lead Wires)

Product Name
PKP244D23A2-R3J
PKP244D23A2-R3JL
PKP266D28A2-R3J
PKP266D28A2-R3JL

◇5-Phase Standard Type with Encoder

Product Name
PKP544N18A2-R3J
PKP544N18A2-R3JL
PKP566FN24A2-R3J
PKP566FN24A2-R3JL

Connection Cables

◇Motor Connection Cables

•For 2-Phase Bipolar

Product Name	Length L [m]
LC2B06E	0.6
LC2B10E	1

•For 5-Phase

Product Name	Length L [m]
LC5N06E	0.6

◇Encoder Connection Cables

•For Voltage Output

Product Name	Length L [m]
LCE05A-006	0.6

•For Line Driver Output

Product Name	Length L [m]
LCE08A-006	0.6

Included Items

Operating Manual

2-Phase Standard Type with Encoder Frame Size 42 mm (Bipolar 4 lead wires)

Specifications

Product Name	Excitation Max. Holding Torque [Nm]	Rotor Inertia J: kgm^2	Rated Current A/Phase	Voltage V	Winding Resistance Ω/Phase	Inductance mH/Phase	Basic Step Angle	Recommended Driver Product Name
PKP244D23A2-R3J	0.48	55×10^{-7}	2.3	2.1	0.93	1.9	1.8°	**CVD223FBR-K**
PKP244D23A2-R3JL								

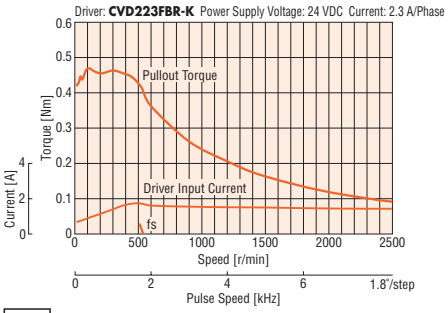
Refer to page 8 for encoder specifications.

Note

- Be sure to set the driver's current at or below the rated current of the motor. If the rated current of the motor is exceeded, the product may be damaged.

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

PKP244D23A2-R3J/PKP244D23A2-R3JL



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. To protect the encoder, be sure to keep the motor case temperature at 85°C max.
- The characteristics are the same when combined with an RS-485 communication type driver.

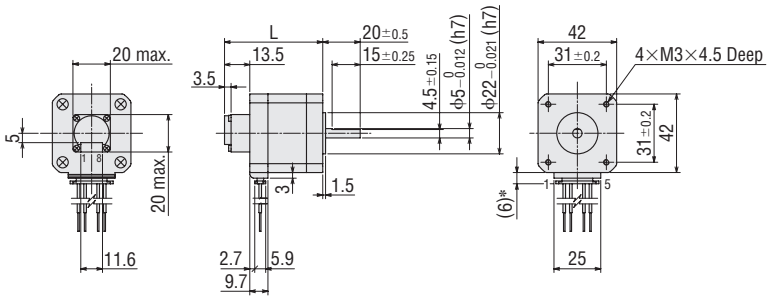
Dimensions (Unit: mm)

Motor

Product Name	L	Mass [kg]
PKP244D23A2-R3J	52.5	0.32
PKP244D23A2-R3JL		

- Applicable Connectors

	Motor (HIROSE ELECTRIC CO., LTD.)	Encoder (Molex)
Connector Housing	MDF97A-5S-3.5C	51021-0800
Contact	MDF97-22SC	50079-8100
Crimp Tool	HT801/MDF97-22S	57177-5000

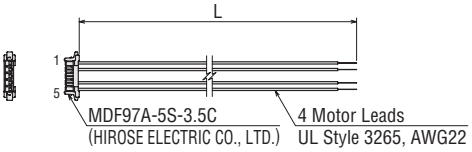


*With connection cable

Connection Cable (Sold separately)

◇Motor Connection Cables

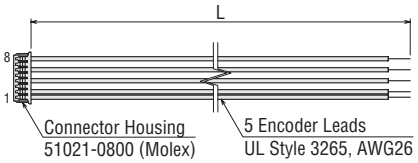
Product Name	Length L [m]
LC2B06E	0.6
LC2B10E	1



◇Encoder Connection Cables

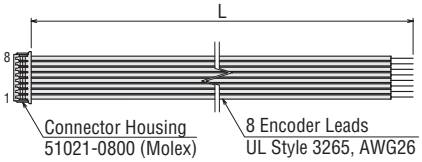
•For Voltage Output

Product Name	Length L [m]
LCE05A-006	0.6



•For Line Driver Output

Product Name	Length L [m]
LCE08A-006	0.6



2-Phase Standard Type with Encoder Frame Size 56.4 mm (Bipolar 4 lead wires)

Specifications

Product Name	Excitation Max. Holding Torque [Nm]	Rotor Inertia J: kgm^2	Rated Current A/Phase	Voltage V	Winding Resistance Ω/Phase	Inductance mH/Phase	Basic Step Angle	Recommended Driver Product Name
PKP266D28A2-R3J	1.4	270×10^{-7}	2.8	2.4	0.86	2.9	1.8°	**CVD228BR-K**
PKP266D28A2-R3JL								

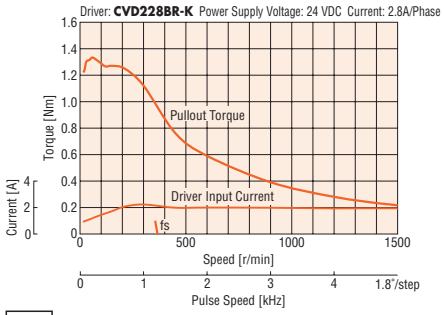
Refer to page 8 for encoder specifications.

Note

- Be sure to set the driver's current at or below the rated current of the motor. If the rated current of the motor is exceeded, the product may be damaged.

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

PKP266D28A2-R3J/PKP266D28A2-R3JL



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. To protect the encoder, be sure to keep the motor case temperature at 85°C max.
- The characteristics are the same when combined with an RS-485 communication type driver.

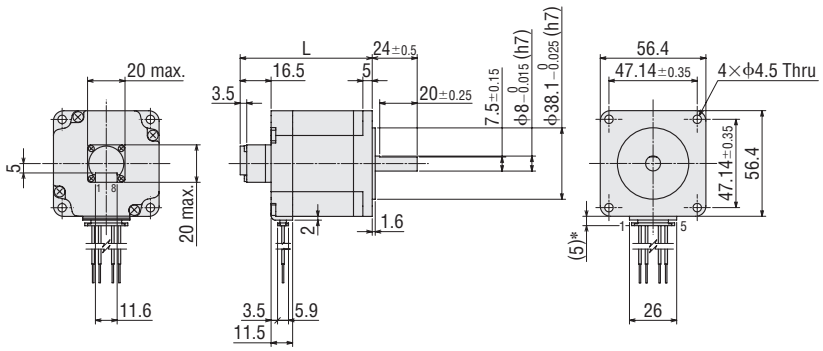
Dimensions (Unit: mm)

Motors

Product Name	L	Mass [kg]
PKP266D28A2-R3J	70.5	0.72
PKP266D28A2-R3JL		

- Applicable Connectors

	Motor (HIROSE ELECTRIC CO., LTD.)	Encoder (Molex)
Connector Housing	MDF97A-5S-3.5C	51021-0800
Contact	MDF97-22SC	50079-8100
Crimp Tool	HT801/MDF97-22S	57177-5000

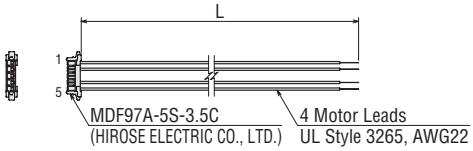


*With connection cable

Connection Cable (Sold separately)

◇Motor Connection Cables

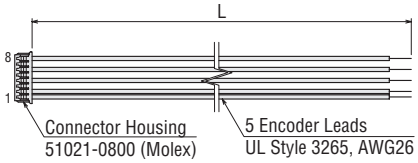
Product Name	Length L [m]
LC2B06E	0.6
LC2B10E	1



◇Encoder Connection Cables

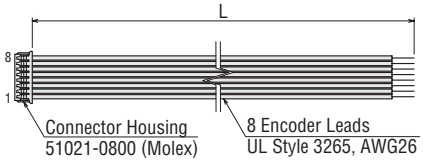
•For Voltage Output

Product Name	Length L [m]
LCE05A-006	0.6



•For Line Driver Output

Product Name	Length L [m]
LCE08A-006	0.6



5-Phase Standard Type with Encoder Frame Size 42 mm

Specifications

Product Name	Excitation Max. Holding Torque [Nm]	Rotor Inertia J: kgm^2	Rated Current A/Phase	Winding Resistance Ω/Phase	Basic Step Angle	Recommended Driver Product Name
PKP544N18A2-R3J	0.3	56×10^{-7}	1.8	0.48	0.72°	**CVD518BR-K**
PKP544N18A2-R3JL						

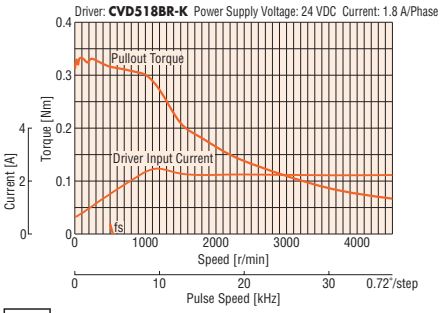
Refer to page 8 for encoder specifications.

Note

- Be sure to set the driver's current at or below the rated current of the motor. If the rated current of the motor is exceeded, the product may be damaged.

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

PKP544N18A2-R3J/PKP544N18A2-R3JL



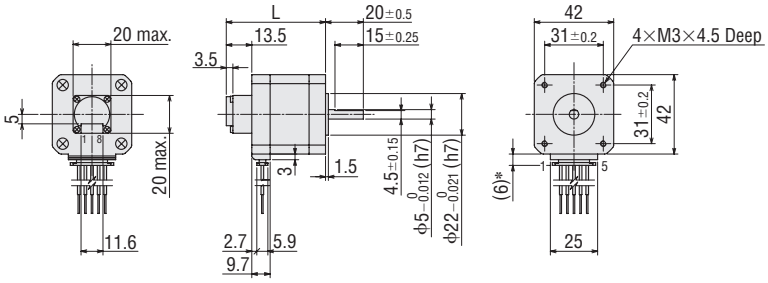
Note

- 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. To protect the encoder, be sure to keep the motor case temperature at 85°C max.
- The characteristics are the same when combined with an RS-485 communication type driver.

Dimensions (Unit: mm)

Motors

Product Name	L	Mass [kg]
PKP544N18A2-R3J	52.5	0.31
PKP544N18A2-R3JL		



*With connection cable

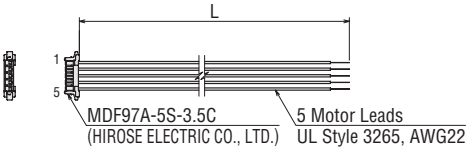
- Applicable Connectors

	Motor (HIROSE ELECTRIC CO., LTD.)	Encoder (Molex)
Connector Housing	MDF97A-5S-3.5C	51021-0800
Contact	MDF97-22SC	50079-8100
Crimp Tool	HT801/MDF97-22S	57177-5000

Connection Cable (Sold separately)

◇Motor Connection Cables

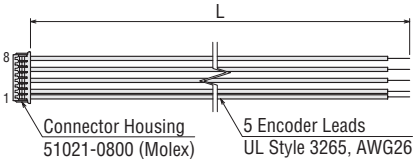
Product Name	Length L [m]
LC5N06E	0.6
LC5N10E	1



◇Encoder Connection Cables

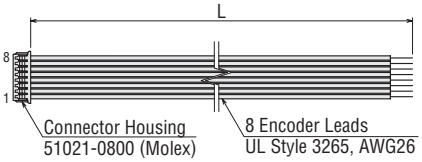
●For Voltage Output

Product Name	Length L [m]
LCE05A-006	0.6



●For Line Driver Output

Product Name	Length L [m]
LCE08A-006	0.6



5-Phase Standard Type with Encoder Frame Size 60 mm

Specifications

Product Name	Excitation Max. Holding Torque [Nm]	Rotor Inertia J: kgm^2	Rated Current A/Phase	Winding Resistance Ω/Phase	Basic Step Angle	Recommended Driver Product Name
PKP566FN24A2-R3J	1.15	290×10^{-7}	2.4	0.38	0.72°	**CVD524BR-K**
PKP566FN24A2-R3JL						

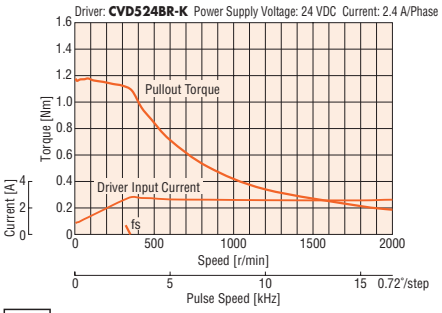
Refer to page 8 for encoder specifications.

Note

- Be sure to set the driver's current at or below the rated current of the motor. If the rated current of the motor is exceeded, the product may be damaged.

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

PKP566FN24A2-R3J/PKP566FN24A2-R3JL



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. To protect the encoder, be sure to keep the motor case temperature at 85°C max.
- The characteristics are the same when combined with an RS-485 communication type driver.

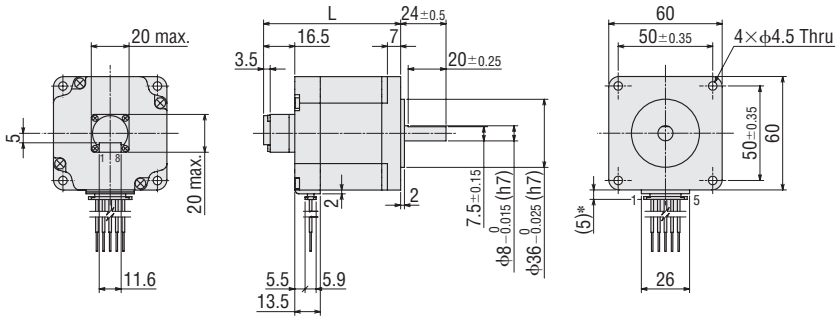
Dimensions (Unit: mm)

Motors

Product Name	L	Mass [kg]
PKP566FN24A2-R3J	72.5	0.81
PKP566FN24A2-R3JL		

- Applicable Connectors

	Motor (HIROSE ELECTRIC CO., LTD.)	Encoder (Molex)
Connector Housing	MDF97A-5S-3.5C	51021-0800
Contact	MDF97-22SC	50079-8100
Crimp Tool	HT801/MDF97-22S	57177-5000

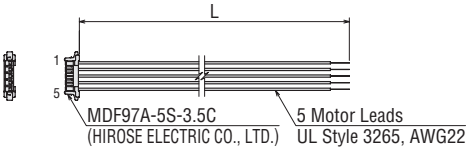


✻With connection cable

Connection Cable (Sold separately)

◇Motor Connection Cables

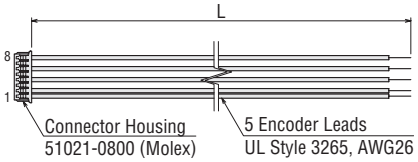
Product Name	Length L [m]
LC5N06E	0.6
LC5N10E	1



◇Encoder Connection Cables

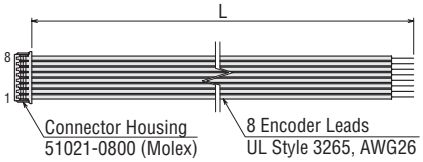
•For Voltage Output

Product Name	Length L [m]
LCE05A-006	0.6



•For Line Driver Output

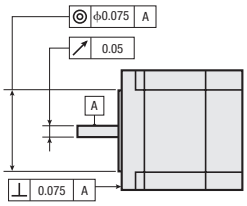
Product Name	Length L [m]
LCE08A-006	0.6



General Specifications

Specifications		Motor
Thermal Class		130 (B)
Insulation Resistance		The measured value is 100 MΩ min. when a 500 VDC megger is applied between the windings and the case under normal ambient temperature and humidity.
Dielectric Strength		No abnormalities are observed, even when applying voltage between the windings and the case for 1 minute under normal ambient temperature and humidity with the following conditions. • Frame size 42 mm: 0.5 kVAC 50/60 Hz • Frame size 56.4 mm, 60 mm: 1.0 kVAC 50/60 Hz
Operating Environment (In operation)	Ambient Temperature	−10 - +50°C (Non-freezing)
	Ambient Humidity	85% max. (Non-condensing)
	Atmosphere	No corrosive gases or dust. The product should not be exposed to water, oil or other liquids.
Temperature Rise		Winding temperature rise 80°C max. (Based on Oriental Motor's internal measurement conditions)
Stop Position Accuracy*1		±3 arcmin (±0.05°)
Shaft Runout		0.05T.I.R. (mm)*4
Radial Play*2		0.025 mm Max. (Load 5 N)
Axial Play*3		0.075 mm Max. (Load 10 N)
Concentricity of Installation Pilot to the Shaft		0.075T.I.R. (mm)*4
Perpendicularity of Installation Surface to the Shaft		0.075T.I.R. (mm)*4

*1 This value is for a full step under no load. (The value changes with the size of the load.)
*2 Radial Play: Displacement in shaft position in the radial direction when a 5 N load is applied perpendicular to the tip of the motor shaft.
*3 Axial Play: Displacement in shaft position in the axial direction when a 10 N load is applied to the motor shaft in the axial direction.
*4 T. I. R. (Total Indicator Reading): The total dial gauge reading when the measurement section is rotated once around the reference axis center.



Note

- Separate the motor and driver when measuring insulation resistance or performing a dielectric voltage withstand test. Also, do not conduct these tests on the motor encoder section.

Encoder Specifications

Encoder Product Name	R3J	R3JL
Resolution	1000 P/R	
Angular Accuracy	±0.36°	
Output Circuit Type	Voltage Output	Line Driver Output*
Output Type	Incremental	
Output Signals	A phase, B phase, Z phase (3 ch)	
Power Supply Voltage	5 VDC±10%	
Current	45 mA max.	30 mA max.

*26C31 or Equivalent

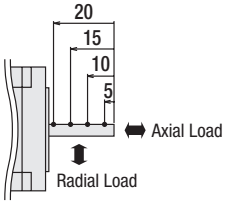
Permissible Radial Load and Permissible Axial Load

Unit: N

Type	Motor Frame Size	Product Name	Permissible Radial Load (Distance from Shaft End [mm])					Permissible Axial Load
			0	5	10	15	20	
Standard Type	42 mm	**PKP244, PKP544**	35	44	58	85	-	15
	56.4 mm	**PKP266**	90	100	130	180	270	30
	60 mm	**PKP566**	90	100	130	180	270	30

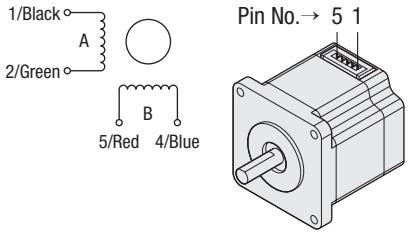
Radial Load and Axial Load

Distance from Shaft End [mm]



Inner Wiring Diagram of Motor and Rotation Direction (2-phase)

Inner Wiring Diagram



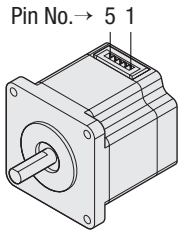
●The colors in the wiring diagram are the colors of the separately sold connection cables.

Rotation Direction

When excited in the order shown below, it rotates in a clockwise direction viewed from the output shaft direction.

STEP	Black	Green	Red	Blue
1	-	+	+	-
2	-	+	-	+
3	+	-	-	+
4	+	-	+	-

Motor Pin Assignment (5-phase)



Pin No.	Lead Wire Color*
5	Blue
4	Red
3	Orange
2	Green
1	Black

*The colors of the lead wires are the colors of the separately sold connection cables.

Recommended Driver

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

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

Product Line

●Pulse Input Type

◇Bipolar Driver for 2-Phase Stepper Motors

•Right Angle Type with Installation Plate

Product Name
CVD223FBR-K
CVD228BR-K

◇Driver for 5-Phase Stepper Motors

•Right Angle Type with Installation Plate

Product Name
CVD518BR-K
CVD524BR-K

●RS-485 Communication Type

◇Bipolar Driver for 2-Phase Stepper Motors

•Right Angle Type with Installation Plate

Product Name
CVD2BR-KR

◇Driver for 5-Phase Stepper Motors

•Right Angle Type with Installation Plate

Product Name
CVD5BR-KR

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 January 2024.

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UK/012024/VERS02

Printed in Germany.