Stepping Motors

Stepping Motors (Motor Only)

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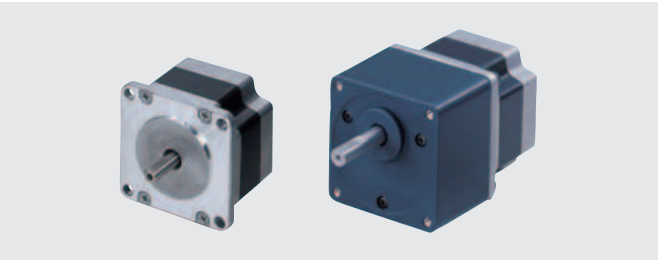
●Additional Information●
Technical reference ➜ Page G-1
Safety standards ➜ Page H-2

Four basic step angles are available. A wide range of frame sizes are also available from 20 mm (0.79 in.) up to 85 mm (3.35 in.). Five geared solutions are available in the same frame sizes up to 90 mm (3.54 in.) and come pre-assembled. Encoder options are also available as a standard offering. Motor windings come in various specifications.



Features

●Four Basic Step Angles are Available

0.36°: High-Torque type
0.72°: High-Torque or Standard type
0.9°: Standard type
1.8°: High-Torque, High-Efficiency, Standard type or High-Inertia Capability

◇0.36° Stepping Motors: High-Torque Type

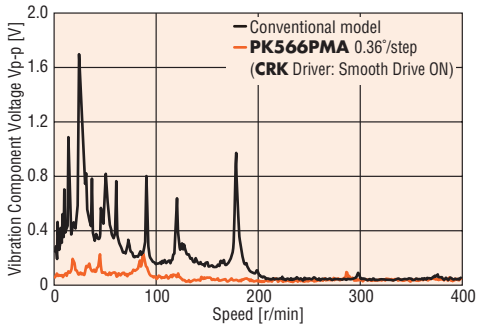
The 0.36° Stepping Motors, High-Torque type provides 1000 steps per revolution by having 100 teeth on the rotor and contributes to the highest resolution and lowest vibration. This motor also achieves improved stopped positional accuracy of 2 arc minutes.

Step Angle 0.36°
High-torque type: 100 teeth
Resolution: 1000 steps per rotation
= 0.36°/step

• Lowest Vibration

The lowest vibration is achieved using the smallest basic step angle of 0.36°.

Comparison of Vibration Characteristics

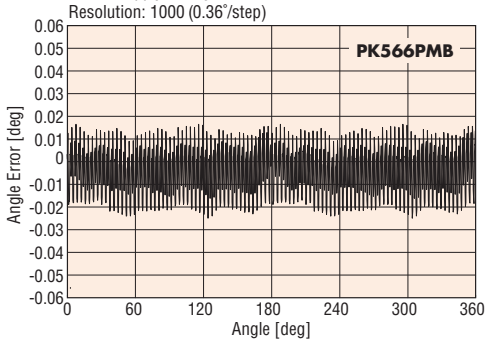


• Stop Position Accuracy of 2 Arc Minutes (No Load)

The step angle 0.36° high-torque type is designed with a stop position accuracy of 2 arc minutes (0.034°) [standard type: 3 arc minutes (0.05°)]. The reduced error helps improve the positioning accuracy.

Static Angle Characteristics

Power Supply Voltage: 24 VDC
Resolution: 1000 (0.36°/step)



◇0.72° Stepping Motors: High-Torque and Standard Type

The 0.72° Stepping Motors, High-Torque or Standard type offer 500 steps per revolution and providing excellent performance. The 0.72° motors are ideal for reducing the vibration throughout the entire motor speed range.

◇0.9° Stepping Motors: Standard Type

The 0.9° Stepping Motors, Standard type provides 400 steps per revolution.

◇1.8° Stepping Motors: High-Torque and Standard Type

The 1.8° Stepping Motors, High-Torque or Standard type offers 200 steps per revolution.

●Five Geared Types

Five different gearheads are offered in our Geared Motors, each designed for different characteristics and specifications based on varying applications or motion requirements.
Please see page A-275 for details.

●High-Torque Type

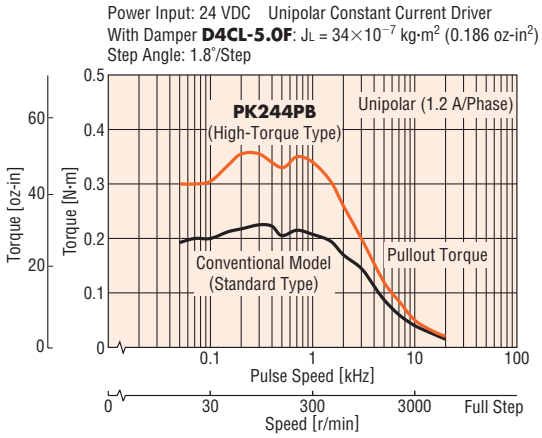
(Step Angle 0.36°, 0.72°, 1.8°)

◇Generates a High-Torque

A high-torque motor generating high torque of approx. 1.2 to 1.5 times the level achieved by the standard type.

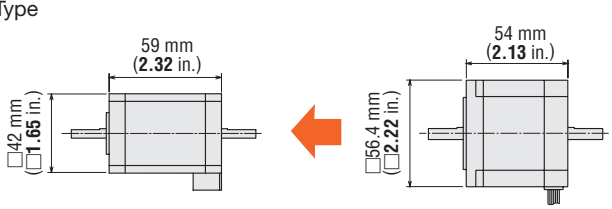
Comparison of Speed-Torque Characteristics for the Same Motor Frame Size

1.8° High-Torque Type



◇Downsizing of Your Motor

Providing torque equivalent to a motor of the next larger frame size, high-torque type allows for a downsizing of your equipment.
Example: Comparison of 1.8° Standard Type and 1.8° High-Torque Type



High-Torque Type	Type	Standard Type
PK246PB	Model	**PK266-01B**
0.93 N·m (132 oz-in)	Holding Torque	1.17 N·m (166 oz-in)

◇Lower Power Consumption and Lower Heat Generation

When compared to the standard type, the motor current may drop at equivalent torque due to an excess in the torque. This may have the effect of reducing the temperature rise of the motor.

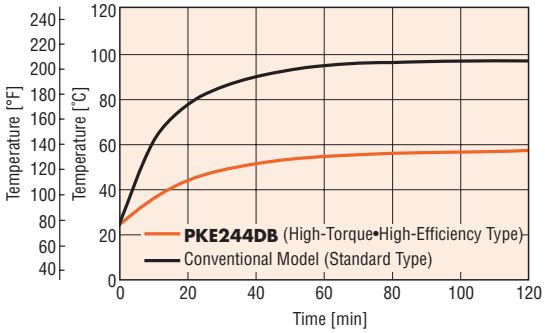
●High-Torque, High-Efficiency Type

(Step Angle 1.8°)

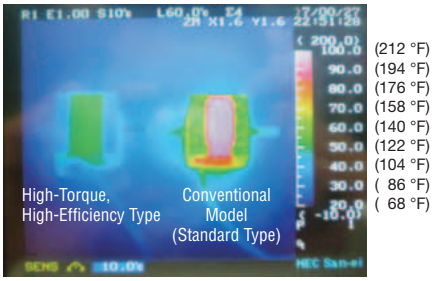
◇Lower Heat Generation

Utilizing the latest in motor technology, the High-Torque, High-Efficiency Type stepping motors are able to achieve a significant reduction in the amount of heat generated from the motor. (There is a 50% reduction in temperature rise compared with conventional models.)

Motor Case Temperature under the Same Operating Conditions



Temperature Distribution by Thermography

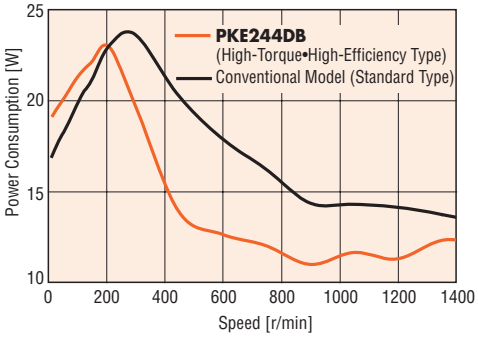


●Comparison under the Same Operating Conditions

◇Lower Power Consumption

This model has achieved a 31% reduction* in power consumption through energy savings and a reduction of 10 kg/per year in CO_2 emissions.

Power Consumption



*450 r/min, continuous operation

●Encoder Option Available

(Step Angle 0.36°, 0.72°, 0.9°, 1.8°)

The **PK** Series stepping motor with encoder offers high torque and precise feedback capability.

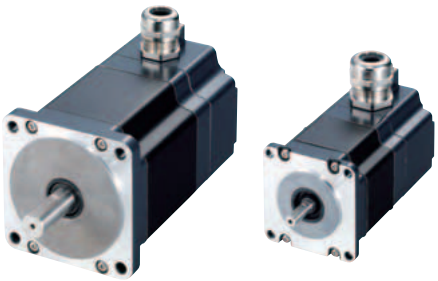
- Encoder Feedback Type: Incremental
- Encoder Output Type: TTL and Differential Type*
- Four feedback resolutions: 200, 400, 500 and 1000 pulses/rev*
- 2-channel or 3-channel*
- Provides closed loop system capability

*For details on the Encoder product lineup, check the Product Line on A-282.

●Terminal Box Type

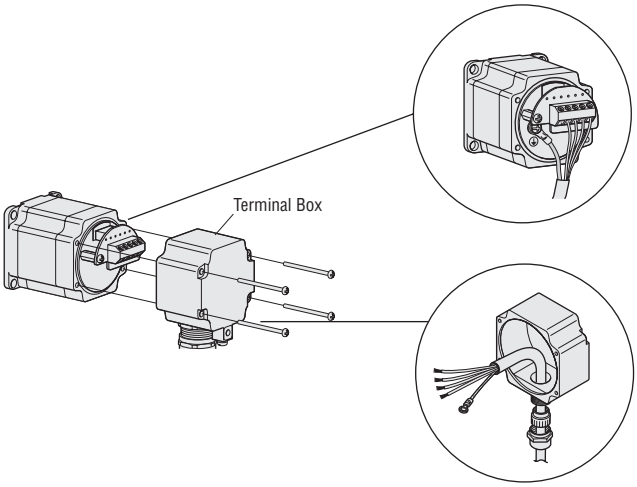
(Step Angle 0.72°, 1.8°)

The motor conforms to the IP65 standard of ingress protection against dust and water.



◇Terminal-Block Connection Design

The motor can be wired directly from its terminal block.

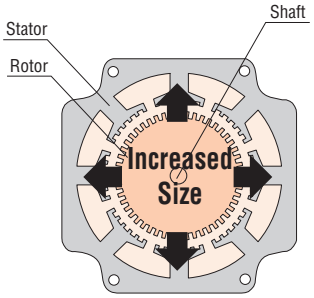


●PV Series

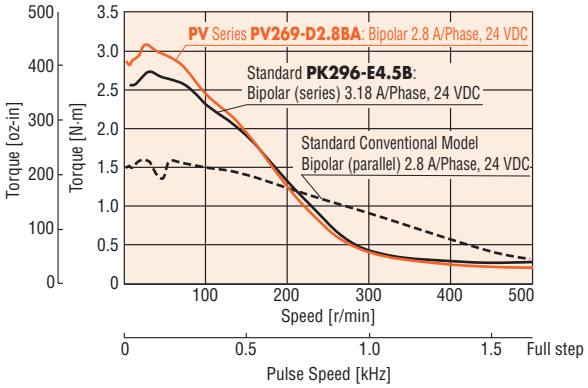
(Step Angle 1.8°)

◇High Inertia Capability

The **PV** Series provides, on average, 1.5 times higher torque than a standard stepping motor. By utilizing a larger rotor diameter, larger magnets can be used to significantly increase the output torque.

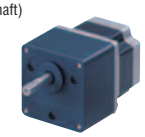


Motor structure
(Cross section perpendicular to shaft)



●Geared Motor Lineup

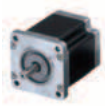
◇Characteristics Comparison for Geared Motors

	Geared Type	Features	Permissible Torque Maximum Torque [N·m (lb-in)]	Backlash [arc min (degrees)]	Basic Resolution [deg/step]	Output Shaft Speed [r/min]
For 1.8° Stepping Motor	**SH Geared Type** (Parallel shaft) 	· A wide variety of low gear ratios, high-speed operations · Gear ratios: 3.6, 7.2, 9, 10, 18, 36	12 (106)	Approx. 60～120 (1～2)	0.05	500
Low backlash	**TH Geared Type** (Parallel shaft) 	· A wide variety of low gear ratios, high-speed operations · Gear ratios: 3.6, 7.2, 10, 20, 30	12 (106)	45 (0.75)	0.024	500
Low backlash	**PS/PL Geared Type** (Parallel shaft) 	· High permissible/maximum torque · A wide variety of gear ratios for selecting the desired step angle (resolution) · Centered output shaft · Gear ratios: 5, 7.2, 10, 25, 36, 50	Permissible Torque 37 (320) Maximum Torque 60 (530)	25 (0.42)	0.0144	600
Non-backlash	**PN Geared Type** (Planetary) 	· High speed (low gear ratio), high accuracy positioning · High permissible/maximum torque · A wide variety of gear ratios for selecting the desired step angle (resolution) · Centered output shaft · Gear ratios: 5, 7.2, 10, 25, 36, 50	Permissible Torque 37 (320) Maximum Torque 60 (530)	3 (0.05)	0.0144	600
Non-backlash	**Harmonic Geared Type** (Harmonic drive) 	· High accuracy positioning · High permissible/maximum torque · High gear ratios, high resolution · Centered output shaft · Gear ratios: 50, 100	Permissible Torque 37 (320) Maximum Torque 55 (480)	0	0.0072	70

Note

● The values shown above are for reference only. These values vary depending on the frame size and gear ratio.

Wide Range of Stepping Motor Variations

Motor Frame Size [mm (in.)]	Round Shaft						
20 (0.79)	0.72° High-Torque  Page A-291	1.8° High-Torque  Page A-304					
28 (1.10)	0.36° High-Torque  Page A-290	0.72° High-Torque  Page A-291	1.8° High-Torque  Encoder Page A-305				
35 (1.38)	1.8° High-Torque  Encoder Page A-307						
42 (1.65)	0.36° High-Torque  Encoder Page A-290	0.72° High-Torque  Encoder Page A-291	0.72° Standard  Encoder Page A-291	0.9° Standard  Encoder Page A-294	1.8° High-Torque, High-Efficiency  Page A-302	1.8° High-Torque  Encoder Page A-309	1.8° Standard Type  Encoder Page A-313
50 (1.97)	1.8° Standard  Encoder Page A-317						
56.4 (2.22) 60 (2.36)	0.36° High-Torque  Encoder Page A-290	0.72° Standard  Terminal Box Encoder Page A-292, A-293	0.9° Standard  Encoder Page A-298	1.8° High-Torque  Encoder Page A-311	1.8° Standard  Terminal Box Encoder Page A-319, A-323	1.8° **PV** Series  Page A-325	
85 (3.35)	0.72° Standard  Terminal Box Encoder Page A-292, A-293	1.8° Standard  Terminal Box Encoder Page A-328, A-332					

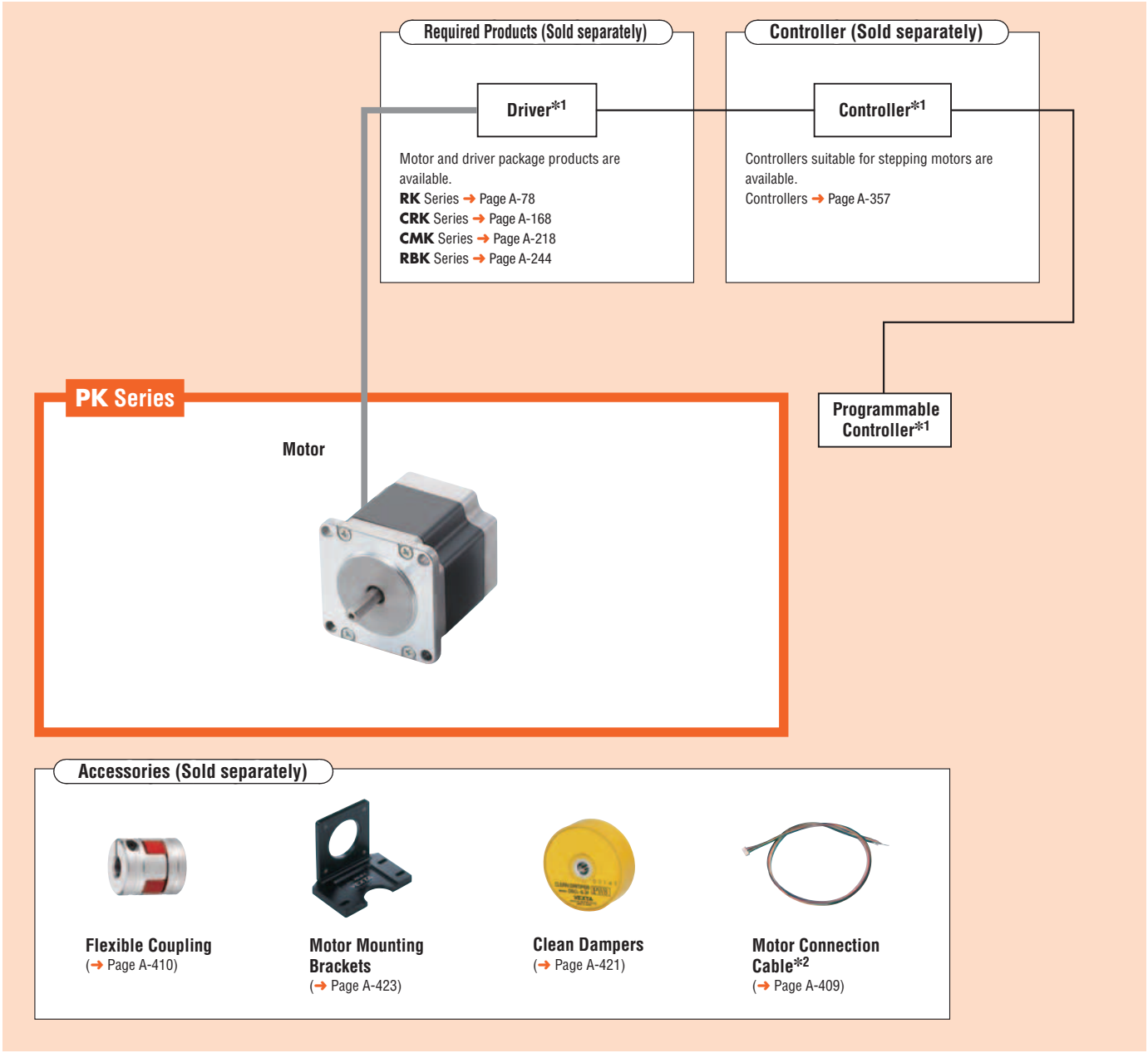
Encoder Motor with an encoder is available

Terminal Box Motor with Terminal Box is available

Motor Frame Size [mm (in.)]	Geared				
20 (0.79)	Harmonic Geared  Page A-354				
28 (1.10)	**SH** Geared  Encoder Page A-334	**TH** Geared  Page A-342	**PS** Geared  Page A-344, A-346	**PN** Geared  Page A-352	Harmonic Geared  Page A-354
35 (1.38)					
42 (1.65)	**SH** Geared  Encoder Page A-336	**TH** Geared  Encoder Page A-342	**PS**, **PL** Geared  Encoder Page A-344, A-348	**PN** Geared  Page A-352	Harmonic Geared  Encoder Page A-354
50 (1.97)					
60 (2.36)	**SH** Geared  Encoder Page A-338	**TH** Geared  Encoder Page A-343	**PS**, **PL** Geared  Encoder Page A-345, A-350	**PN** Geared  Page A-353	Harmonic Geared  Encoder Page A-355
90 (3.54)	**SH** Geared  Page A-340	**TH** Geared  Encoder Page A-343	**PS** Geared  Encoder Page A-345	**PN** Geared  Page A-353	Harmonic Geared  Encoder Page A-355

System Configuration

These accessories enable step angle 0.9°/1.8° **PK** Series products to be used for various operations.



●Example of System Configuration

2-Phase PK Series	+	Sold Separately		
		Motors Mounting Bracket	Flexible Coupling	Clean Damper
PK264-01B		PAL2P-2	MC20F0408	D6CL-6.3F

●The system configuration shown above is an example. Other combinations are available.

∗1 Not supplied

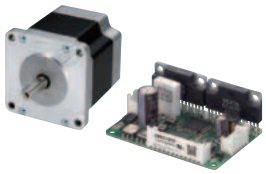
∗2 A motor connection cable (0.6 m) is included with products that have product names ending in "**L**".

Motor and Driver Packages

To achieve maximum performance, motors with dedicated drivers are also available.

●0.36°/0.72° Stepping Motor and Driver Package

AC Input
RK Series
➜ Page A-78

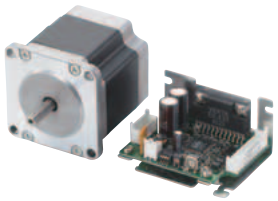


Pulse Input

Built-In Controller

DC Input
CRK Series
➜ Page A-168

●0.9°/1.8° Stepping Motor and Driver Package



DC Input
CMK Series
➜ Page A-218

DC Input
RBK Series
➜ Page A-244

Product Number

PK5 indicates the step angle 0.36°/0.72° **PK** Series stepping motors.
PK2 indicates the step angle 0.9°/1.8° **PK** Series stepping motors.
PV2 indicates the step angle 1.8° **PV** Series stepping motors.

●Step Angle 0.36°/0.72° High-Torque Type

PK 5 2 3 P M A
① ② ③ ④ ⑤

①	Motor Frame Size	**1**: 20 mm (0.79 in.) **2**: 28 mm (1.10 in.) **4**: 42 mm (1.65 in.) **6**: 60 mm (2.36 in.)
②	Motor Case Length	
③	Motor Type	
④	Resolution	**M**: 0.36°/Step Blank: 0.72°/Step
⑤	Shaft Type	**A**: Single Shaft **B**: Double Shaft

●Step Angle 0.72° Standard Type

◇Motor Frame Size 42 mm (1.65 in.), 60 mm (2.36 in.)

PK 5 4 3 NAW
① ② ③

◇Motor Frame Size 85 mm (3.35 in.)

PK 5 9 6 BE
① ② ③

①	Motor Frame Size	**4**: 42 mm (1.65 in.) **6**: 60 mm (2.36 in.) **9**: 85 mm (3.35 in.)
②	Motor Case Length	
③	Shaft Type	**NAW**: Single Shaft **NBW**: Double Shaft **AE**: Single Shaft **BE**: Double Shaft

●Step Angle 0.72° Standard Type Terminal Box

PK 5 9 6 A T
① ② ③ ④

①	Motor Frame Size	**6**: 60 mm (2.36 in.) **9**: 85 mm (3.35 in.)
②	Motor Case Length	
③	Shaft Type	**A**: Single Shaft
④	Terminal Box	

●Geared Type

◇Motor Frame Size 20 mm (0.79 in.), 28 mm (1.10 in.)

PK 5 2 3 □ P A - T 10
① ② ③ ④ ⑤ ⑥ ⑦

①	Motor Frame Size	**1**: 20 mm (0.79 in.) **2**: 28 mm (1.10 in.)
②	Motor Case Length	
③	Motor Specifications	**H**: High Speed Blank: Standard
④	Motor Type	
⑤	Shaft Type	**A**: Single Shaft **B**: Double Shaft
⑥	Gearhead Type	**T**: **TH** Geared Type **PS**: **PS** Geared Type **N**: **PN** Geared Type **H**: Harmonic Geared Type
⑦	Gear Ratio	

◇Motor Frame Size 42 mm (1.65 in.), 60 mm (2.36 in.)

PK 5 4 4 BW - N 5
① ② ③ ④ ⑤

◇Motor Frame Size 90 mm (3.54 in.)

PK 5 9 9 AE - PS 5
① ② ③ ④ ⑤

①	Motor Frame Size	**4**: 42 mm (1.65 in.) **6**: 60 mm (2.36 in.) **9**: 90 mm (3.54 in.)
②	Motor Case Length	
③	Shaft Type	**AW**: Single Shaft **BW**: Double Shaft **AE**: Single Shaft **BE**: Double Shaft
④	Gearhead Type	**T**: **TH** Geared Type **PS**: **PS** Geared Type **N**: **PN** Geared Type **H**: Harmonic Geared Type
⑤	Gear Ratio	

●Step Angle 0.36°/0.72° High-Torque Type with Encoder

PK 5 4 4 P M A - R 2 8 L

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

①	Motor Frame Size	**4**: 42 mm (1.65 in.) **6**: 60 mm (2.36 in.)
②	Motor Case Length	
③	Motor Type	
④	Resolution	**M**: 0.36°/Step Blank: 0.72°/Step
⑤	Shaft Type	**A**: Single Shaft
⑥	Encoder Version	
⑦	Encoder Output	**1**: 2-Channel A, B **2**: 3-Channel A, B index
⑧	Encoder Resolution	**7**: 500 P/R **8**: 1000 P/R
⑨	Encoder Type	Blank: TTL Type **L**: Differential Type

●Step Angle 0.72° Standard Type with Encoder

◇Motor Frame Size 42 mm (1.65 in.), 60 mm (2.36 in.)

PK 5 4 3 NAW - R 2 7 L

① ② ③ ④ ⑤ ⑥ ⑦

◇Motor Frame Size 90 mm (3.54 in.)

PK 5 9 9 AE - R 2 7

① ② ③ ④ ⑤ ⑥

①	Motor Frame Size	**4**: 42 mm (1.65 in.) **6**: 60 mm (2.36 in.) **9**: 90 mm (3.54 in.)
②	Motor Case Length	
③	Shaft Type	**NAW**: Single Shaft
④	Encoder Version	
⑤	Encoder Output	**1**: 2-Channel A, B **2**: 3-Channel A, B index
⑥	Encoder Resolution	**7**: 500 P/R
⑦	Encoder Type	Blank: TTL Type **L**: Differential Type

●Geared Type with Encoder

◇Motor Frame Size 42 mm (1.65 in.), 60 mm (2.36 in.)

PK 5 4 5 AW R 2 7 L T 30

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

◇Motor Frame Size 90 mm (3.54 in.)

PK 5 9 9 AE R 2 7 PS 5

① ② ③ ④ ⑤ ⑥ ⑧ ⑨

①	Motor Frame Size	**4**: 42 mm (1.65 in.) **6**: 60 mm (2.36 in.) **9**: 90 mm (3.54 in.)
②	Motor Case Length	
③	Shaft Type	**AW**: Single Shaft **AE**: Single Shaft
④	Encoder Version	
⑤	Encoder Output	**2**: 3-Channel A, B index
⑥	Encoder Resolution	**7**: 500 P/R
⑦	Encoder Type	Blank: TTL Type **L**: Differential Type
⑧	Gearhead Type	**T**: **TH** Geared Type **PS**: **PS** Geared Type **N**: **PN** Geared Type **H**: Harmonic Geared Type
⑨	Gear Ratio	

●Step Angle 0.9°/1.8° Standard Type

PK 2 4 3 M - 0 1 B A

① ② ③ ④ ⑤ ⑥ ⑦

①	Motor Frame Size	**4**: 42 mm (1.65 in.) **5**: 50 mm (1.97 in.) **6**: 56.4 mm (2.22 in.) **8**: 85 mm (3.35 in.)
②	Motor Case Length	
③	Motor Type	**M**: 0.9°/Step Blank: 1.8°/Step
④	Reference Number	
⑤	Winding Specification	
⑥	Shaft Type	**A**: Single Shaft **B**: Double Shaft
⑦	U.S.A. Version	

●Step Angle 1.8° High-Torque Type

PK 2 6 6 P A A

① ② ③ ④ ⑤

①	Motor Frame Size	**2**: 28 mm (1.10 in.) **3**: 35 mm (1.38 in.) **4**: 42 mm (1.65 in.) **6**: 56.4 mm (2.22 in.)
②	Motor Case Length	
③	Motor Type	**P**: High-Torque Type
④	Shaft Type	**A**: Single Shaft **B**: Double Shaft
⑤	U.S.A. Version	

●Step Angle 1.8° High-Torque, High-Efficiency Type

PKE 2 4 3 A - L

① ② ③ ④

①	Motor Frame Size	**4**: 42 mm (1.65 in.)
②	Motor Case Length	
③	Shaft Type	**A**: Single Shaft **B**: Double Shaft
④	Connection Cable	

●Step Angle 1.8° Standard Type Terminal Box

PK 2 6 4 D A T

① ② ③ ④ ⑤

①	Motor Frame Size	**6**: 56.4 mm (2.22 in.) **9**: 85 mm (3.35 in.)
②	Motor Case Length	
③	Motor Lead	**D**: 4 Leads **E**: 8 Leads
④	Shaft Type	**A**: Single Shaft
⑤	Terminal Box	

●Step Angle 1.8° **PV** Series

PV 2 6 6 - 0 2 B A

① ② ③ ④ ⑤ ⑥

①	Motor Frame Size	**6**: 60 mm (2.36 in.)
②	Motor Case Length	
③	Motor Lead	**0**: 6 Leads **D**: 4 Leads
④	Winding Specification	
⑤	Shaft Type	**A**: Single Shaft **B**: Double Shaft
⑥	U.S.A. Version	

●Geared Type

◇**SH** Geared Type Motor Frame Size 28 mm (1.10 in.)

PK 2 2 3 P A - SG 10

① ② ③ ④ ⑤ ⑥

①	Motor Frame Size	**2**: 28 mm (1.10 in.)
②	Motor Case Length	
③	Motor Type	
④	Shaft Type	**A**: Single Shaft **B**: Double Shaft
⑤	Gearhead Type	**SG**: **SH** Geared Type
⑥	Gear Ratio	

◇**SH** Geared Type Motor Frame Size 42 mm (1.65 in.), 60 mm (2.36 in.), 90 mm (3.54 in.)

PK 2 6 4 A 1 A - SG 10

① ② ③ ④ ⑤ ⑥ ⑦

①	Motor Frame Size	**4**: 42 mm (1.65 in.) **6**: 60 mm (2.22 in.) **9**: 90 mm (3.54 in.)
②	Motor Case Length	
③	Shaft Type	**A**: Single Shaft **B**: Double Shaft
④	Winding Specification	
⑤	U.S.A. Version	
⑥	Gearhead Type	**SG**: **SH** Geared Type
⑦	Gear Ratio	

◇**PS/PL** Geared Type

PK 2 4 4 P D A - P 10

① ② ③ ④ ⑤ ⑥ ⑦

①	Motor Frame Size	**2**: 28 mm (1.10 in.) **4**: 42 mm (1.65 in.) **6**: 60 mm (2.22 in.)
②	Motor Case Length	
③	Motor Type	
④	Motor Lead	**D**: 4 Leads
⑤	Shaft Type	**A**: Single Shaft **B**: Double Shaft
⑥	Gearhead Type	**PS**: **PS** Geared Type **P**: **PL** Geared Type
⑦	Gear Ratio	

●Step Angle 0.9° Standard Type/Step Angle 1.8° High-Torque Type with Encoder

PK 2 4 3 M A A R 1 5

① ② ③ ④ ⑤ ⑥ ⑦ ⑧

①	Motor Frame Size	**2**: 28 mm (1.10 in.) **3**: 35 mm (1.38 in.) **4**: 42 mm (1.65 in.) **6**: 56.4 mm (2.22 in.)
②	Motor Case Length	
③	Motor Type	**M**: 0.9°/Step **P**: High-Torque Type
④	Shaft Type	**A**: Single Shaft
⑤	U.S.A. Version	
⑥	Encoder Version	
⑦	Encoder Output	**1**: 2-Channel A, B **2**: 3-Channel A, B, Index
⑧	Encoder Resolution	**5**: 200 R/P **6**: 400 R/P

●Step Angle 1.8° Standard Type with Encoder

PK 2 4 3 - 0 1 A A R 1 5

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

①	Motor Frame Size	**4**: 42 mm (1.65 in.) **5**: 50 mm (1.97 in.) **6**: 56.4 mm (2.22 in.)
②	Motor Case Length	
③	Motor Type	
④	Winding Specification	
⑤	Shaft Type	**A**: Single Shaft
⑥	U.S.A. Version	
⑦	Encoder Version	
⑧	Encoder Output	**1**: 2-Channel A, B **2**: 3-Channel A, B, Index
⑨	Encoder Resolution	**5**: 200 R/P **6**: 400 R/P

●Geared Type with Encoder

◇**SH** Geared Type Motor Frame Size 28 mm (1.10 in.)

PK 2 2 3 P A R 1 5 S 10

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨

①	Motor Frame Size	**2**: 28 mm (1.10 in.)
②	Motor Case Length	
③	Motor Type	
④	Shaft Type	**A**: Single Shaft
⑤	Encoder Version	
⑥	Encoder Output	**1**: 2-Channel A, B
⑦	Encoder Resolution	**5**: 200 R/P
⑧	Gearhead Type	**S**: **SH** Geared Type
⑨	Gear Ratio	

◇**SH** Geared Type Motor Frame Size 42 mm (1.65 in.), 60 mm (2.36 in.), 90 mm (3.54 in.)

PK 2 6 4 A 2 A R 1 5 S 10

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩

①	Motor Frame Size	**4**: 42 mm (1.65 in.) **6**: 60 mm (2.26 in.)
②	Motor Case Length	
③	Shaft Type	**A**: Single Shaft
④	Winding Specification	
⑤	U.S.A. Version	
⑥	Encoder Version	
⑦	Encoder Output	**1**: 2-Channel A, B **2**: 3-Channel A, B, Index
⑧	Encoder Resolution	**5**: 200 R/P **6**: 400 R/P
⑨	Gearhead Type	**S**: **SH** Geared Type
⑩	Gear Ratio	

◇**PS/PL** Geared Type

PK 2 4 4 P D A R 1 5 - P 10

① ② ③ ④ ⑤ ⑥ ⑦ ⑧ ⑨ ⑩

①	Motor Frame Size	**2**: 28 mm (1.10 in.) **4**: 42 mm (1.65 in.) **6**: 60 mm (2.22 in.)
②	Motor Case Length	
③	Motor Type	
④	Motor Lead	**D**: 4 Leads
⑤	Shaft Type	**A**: Single Shaft
⑥	Encoder Version	
⑦	Encoder Output	**1**: 2-Channel A, B **2**: 3-Channel A, B, Index
⑧	Encoder Resolution	**5**: 200 R/P **6**: 400 R/P
⑨	Gearhead Type	**PS**: **PS** Geared Type **P**: **PL** Geared Type
⑩	Gear Ratio	

Product Line

●Step Angle: 0.36°/Step, **PK** Series

◇High-Torque Type

Model (Single Shaft)	Model (Double Shaft)
PK523PMA	**PK523PMB**
PK524PMA	**PK524PMB**
PK525PMA	**PK525PMB**
PK544PMA	**PK544PMB**
PK546PMA	**PK546PMB**
PK564PMA	**PK564PMB**
PK566PMA	**PK566PMB**
PK569PMA	**PK569PMB**

◇High-Torque Type with Encoder

Model (TTL Type Encoder)	Model (Differential Type Encoder)
–	–
–	–
–	–
PK544PMA-R□	**PK544PMA-R28L**
PK546PMA-R□	**PK546PMA-R28L**
PK564PMA-R□	**PK564PMA-R28L**
PK566PMA-R□	**PK566PMA-R28L**
PK569PMA-R□	**PK569PMA-R28L**

●Step Angle: 0.72°/Step, **PK** Series

◇High-Torque Type

Model (Single Shaft)	Model (Double Shaft)
PK513PA	**PK513PB**
PK523PA	**PK523PB**
PK525PA	**PK525PB**
PK544PA	**PK544PB**
PK546PA	**PK546PB**

◇High-Torque Type with Encoder

Model (TTL Type Encoder)	Model (Differential Type Encoder)
–	–
–	–
–	–
PK544PA-R□	**PK544PA-R27L**
PK546PA-R□	**PK546PA-R27L**

◇Standard Type

Model (Single Shaft)	Model (Double Shaft)
PK543NAW	**PK543NBW**
PK544NAW	**PK544NBW**
PK545NAW	**PK545NBW**
PK564NAW	**PK564NBW**
PK566NAW	**PK566NBW**
PK569NAW	**PK569NBW**
PK596AE	**PK596BE**
PK599AE	**PK599BE**
PK5913AE	**PK5913BE**

◇Standard Type with Encoder

Model (TTL Type Encoder)	Model (Differential Type Encoder)
PK543NAW-R□	**PK543NAW-R27L**
PK544NAW-R□	**PK544NAW-R27L**
PK545NAW-R□	**PK545NAW-R27L**
PK564NAW-R□	**PK564NAW-R27L**
PK566NAW-R□	**PK566NAW-R27L**
PK569NAW-R□	**PK569NAW-R27L**
PK596AE-R□	–
PK599AE-R□	–
PK5913AE-R□	–

◇Standard Type Terminal Box

Model (Single Shaft)
PK564AT
PK566AT
PK569AT
PK596AT
PK599AT
PK5913AT

The following items are included in each product.
Motor, Parallel Key*
*Only for the products with a key slot on the output shaft

●Enter the encoder code (**17**, **18**, **27** or **28**) in the box (□) within the model name.

●Step Angle: 0.9°/Step, **PK** Series

◇Standard Type

Model (Single Shaft)	Model (Double Shaft)
PK243M-01AA	**PK243M-01BA**
PK243M-02AA	**PK243M-02BA**
PK243M-03AA	**PK243M-03BA**
PK244M-01AA	**PK244M-01BA**
PK244M-02AA	**PK244M-02BA**
PK244M-03AA	**PK244M-03BA**
PK245M-01AA	**PK245M-01BA**
PK245M-02AA	**PK245M-02BA**
PK245M-03AA	**PK245M-03BA**
PK264M-01A	**PK264M-01B**
PK264M-02A	**PK264M-02B**
PK264M-03A	**PK264M-03B**
PK264M-E2.0A	**PK264M-E2.0B**
PK266M-01A	**PK266M-01B**
PK266M-02A	**PK266M-02B**
PK266M-03A	**PK266M-03B**
PK266M-E2.0A	**PK266M-E2.0B**
PK268M-01A	**PK268M-01B**
PK268M-02A	**PK268M-02B**
PK268M-03A	**PK268M-03B**
PK268M-E2.0A	**PK268M-E2.0B**

◇Standard Type with Encoder

Model (TTL Type Encoder)
PK243MAAR□
–
–
PK244MAAR□
–
–
PK245MAAR□
–
–
–
PK264MAR□
–
–
–
PK266MAR□
–
–
–
PK268MAR□
–
–

●Step Angle: 1.8°/Step, **PK** Series

◇High-Torque · High Efficiency Type

Model (Single Shaft)	Model (Double Shaft)
PKE243DA-L	**PKE243DB-L**
PKE243A-L	**PKE243B-L**
PKE244DA-L	**PKE244DB-L**
PKE244A-L	**PKE244B-L**
PKE245DA-L	**PKE245DB-L**
PKE245A-L	**PKE245B-L**

◇High-Torque Type

Model (Single Shaft)	Model (Double Shaft)
PK213PDA	**PK213PDB**
PK213PA	**PK213PB**
PK214PDA	**PK214PDB**
PK214PA	**PK214PB**
PK223PA	**PK223PB**
PK224PA	**PK224PB**
PK225PA	**PK225PB**
PK233PA	**PK233PB**
PK235PA	**PK235PB**
PK244PA	**PK244PB**
PK246PA	**PK246PB**
PK264PAA	**PK264PBA**
PK266PAA	**PK266PBA**
PK268PAA	**PK268PBA**

◇High-Torque Type with Encoder

Model (TTL Type Encoder)
–
–
–
–
PK223PAR15
PK224PAR15
PK225PAR15
PK233PAR□
PK235PAR□
PK244PAR□
PK246PAR□
PK264PAAR□
PK266PAAR□
PK268PAAR□

● Enter the encoder code (**15**, **16**, **25** or **26**) in the box (□) within the model name.

◇Standard Type

Model (Single Shaft)	Model (Double Shaft)
PK243-01AA	**PK243-01BA**
PK243-02AA	**PK243-02BA**
PK243-03AA	**PK243-03BA**
PK244-01AA	**PK244-01BA**
PK244-02AA	**PK244-02BA**
PK244-03AA	**PK244-03BA**
PK244-04AA	**PK244-04BA**
PK245-01AA	**PK245-01BA**
PK245-02AA	**PK245-02BA**
PK245-03AA	**PK245-03BA**
PK256-02A	**PK256-02B**
PK258-02A	**PK258-02B**
PK264-01A	**PK264-01B**
PK264-02A	**PK264-02B**
PK264-03A	**PK264-03B**
PK264-E2.0A	**PK264-E2.0B**
PK266-01A	**PK266-01B**
PK266-02A	**PK266-02B**
PK266-03A	**PK266-03B**
PK266-E2.0A	**PK266-E2.0B**
PK268-01A	**PK268-01B**
PK268-02A	**PK268-02B**
PK268-03A	**PK268-03B**
PK268-E2.0A	**PK268-E2.0B**
PK296-01AA	**PK296-01BA**
PK296-02AA	**PK296-02BA**
PK296-03AA	**PK296-03BA**
PK296-F4.5A	**PK296-F4.5B**
PK299-01AA	**PK299-01BA**
PK299-02AA	**PK299-02BA**
PK299-03AA	**PK299-03BA**
PK299-F4.5A	**PK299-F4.5B**
PK2913-01AA	**PK2913-01BA**
PK2913-02AA	**PK2913-02BA**
PK2913-F4.0A	**PK2913-F4.0B**

◇Standard Type with Encoder

Model (TTL Type Encoder)
PK243-01AAR□
–
–
PK244-01AAR□
–
–
–
PK245-01AAR□
–
–
PK256-02AR□
PK258-02AR□
–
PK264-02AR□
–
–
–
PK266-02AR□
–
–
–
PK268-02AR□
–
–

◇Standard Type Terminal Box

Model (Single Shaft)
PK264DAT
PK266DAT
PK268DAT
PK296EAT
PK299EAT
PK2913EAT

●Step Angle: 1.8°/Step, **PV** Series

◇High Inertia Capability

Model (Single Shaft)	Model (Double Shaft)
PV264-D2.8AA	**PV264-D2.8BA**
PV264-02AA	**PV264-02BA**
PV266-D2.8AA	**PV266-D2.8BA**
PV266-02AA	**PV266-02BA**
PV267-D2.8AA	**PV267-D2.8BA**
PV267-02AA	**PV267-02BA**
PV269-D2.8AA	**PV269-D2.8BA**
PV269-02AA	**PV269-02BA**

● Enter the encoder code (**15**, **16**, **25** or **26**) in the box (□) within the model name.

●Geared, **PK** Series

◇**SH** Geared Type

Model (Single Shaft)	Model (Double Shaft)
PK223PA-SG7.2	**PK223PB-SG7.2**
PK223PA-SG9	**PK223PB-SG9**
PK223PA-SG10	**PK223PB-SG10**
PK223PA-SG18	**PK223PB-SG18**
PK223PA-SG36	**PK223PB-SG36**
PK243A1A-SG3.6	**PK243B1A-SG3.6**
PK243A1A-SG7.2	**PK243B1A-SG7.2**
PK243A1A-SG9	**PK243B1A-SG9**
PK243A1A-SG10	**PK243B1A-SG10**
PK243A1A-SG18	**PK243B1A-SG18**
PK243A1A-SG36	**PK243B1A-SG36**
PK243A2A-SG3.6	**PK243B2A-SG3.6**
PK243A2A-SG7.2	**PK243B2A-SG7.2**
PK243A2A-SG9	**PK243B2A-SG9**
PK243A2A-SG10	**PK243B2A-SG10**
PK243A2A-SG18	**PK243B2A-SG18**
PK243A2A-SG36	**PK243B2A-SG36**
PK264A1A-SG3.6	**PK264B1A-SG3.6**
PK264A1A-SG7.2	**PK264B1A-SG7.2**
PK264A1A-SG9	**PK264B1A-SG9**
PK264A1A-SG10	**PK264B1A-SG10**
PK264A1A-SG18	**PK264B1A-SG18**
PK264A1A-SG36	**PK264B1A-SG36**
PK264A2A-SG3.6	**PK264B2A-SG3.6**
PK264A2A-SG7.2	**PK264B2A-SG7.2**
PK264A2A-SG9	**PK264B2A-SG9**
PK264A2A-SG10	**PK264B2A-SG10**
PK264A2A-SG18	**PK264B2A-SG18**
PK264A2A-SG36	**PK264B2A-SG36**
PK296A1A-SG3.6	**PK296B1A-SG3.6**
PK296A1A-SG7.2	**PK296B1A-SG7.2**
PK296A1A-SG9	**PK296B1A-SG9**
PK296A1A-SG10	**PK296B1A-SG10**
PK296A1A-SG18	**PK296B1A-SG18**
PK296A1A-SG36	**PK296B1A-SG36**
PK296A2A-SG3.6	**PK296B2A-SG3.6**
PK296A2A-SG7.2	**PK296B2A-SG7.2**
PK296A2A-SG9	**PK296B2A-SG9**
PK296A2A-SG10	**PK296B2A-SG10**
PK296A2A-SG18	**PK296B2A-SG18**
PK296A2A-SG36	**PK296B2A-SG36**

◇**SH** Geared Type with Encoder

Model (TTL Type Encoder)
PK223PAR15S7.2
PK223PAR15S9
PK223PAR15S10
PK223PAR15S18
PK223PAR15S36
PK243A1AR□S3.6
PK243A1AR□S7.2
PK243A1AR□S9
PK243A1AR□S10
PK243A1AR□S18
PK243A1AR□S36
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–
–
–
–
–
–
–
PK264A2AR□S3.6
PK264A2AR□S7.2
PK264A2AR□S9
PK264A2AR□S10
PK264A2AR□S18
PK264A2AR□S36

● Enter the encoder code (**15**, **16**, **25** or **26**) in the box (□) within the model name.

◇**TH** Geared Type

Model (Single Shaft)	Model (Double Shaft)
PK523PA-T7.2	**PK523PB-T7.2**
PK523PA-T10	**PK523PB-T10**
PK523PA-T20	**PK523PB-T20**
PK523PA-T30	**PK523PB-T30**
PK543AW-T3.6	**PK543BW-T3.6**
PK543AW-T7.2	**PK543BW-T7.2**
PK543AW-T10	**PK543BW-T10**
PK543AW-T20	**PK543BW-T20**
PK543AW-T30	**PK543BW-T30**
PK564AW-T3.6	**PK564BW-T3.6**
PK564AW-T7.2	**PK564BW-T7.2**
PK564AW-T10	**PK564BW-T10**
PK564AW-T20	**PK564BW-T20**
PK564AW-T30	**PK564BW-T30**
PK596AE-T3.6	**PK596BE-T3.6**
PK596AE-T7.2	**PK596BE-T7.2**
PK596AE1-T10	**PK596BE1-T10**
PK596AE1-T20	**PK596BE1-T20**
PK596AE1-T30	**PK596BE1-T30**

◇**PS** Geared Type

Model (Single Shaft)	Model (Double Shaft)
PK523PA-PS5	**PK523PB-PS5**
PK523PA-PS7	**PK523PB-PS7**
PK523PA-PS10	**PK523PB-PS10**
PK545AW-PS5	**PK545BW-PS5**
PK545AW-PS7	**PK545BW-PS7**
PK545AW-PS10	**PK545BW-PS10**
PK543AW-PS25	**PK543BW-PS25**
PK543AW-PS36	**PK543BW-PS36**
PK543AW-PS50	**PK543BW-PS50**
PK566AW-PS5	**PK566BW-PS5**
PK566AW-PS7	**PK566BW-PS7**
PK566AW-PS10	**PK566BW-PS10**
PK564AW-PS25	**PK564BW-PS25**
PK564AW-PS36	**PK564BW-PS36**
PK564AW-PS50	**PK564BW-PS50**
PK599AE-PS5	**PK599BE-PS5**
PK599AE-PS7	**PK599BE-PS7**
PK599AE-PS10	**PK599BE-PS10**
PK596AE-PS25	**PK596BE-PS25**
PK596AE-PS36	**PK596BE-PS36**
PK596AE-PS50	**PK596BE-PS50**
PK223PDA-PS5	**PK223PDB-PS5**
PK223PDA-PS10	**PK223PDB-PS10**

◇**PL** Geared Type

Model (Single Shaft)	Model (Double Shaft)
PK244PDA-P5	**PK244PDB-P5**
PK244PDA-P10	**PK244PDB-P10**
PK244PDA-P36	**PK244PDB-P36**
PK266PDA-P5	**PK266PDB-P5**
PK266PDA-P10	**PK266PDB-P10**
PK264PDA-P36	**PK264PDB-P36**

◇**TH** Geared Type with Encoder

Model (TTL Type Encoder)	Model (Differential Type Encoder)
–	–
–	–
–	–
–	–
PK543AWR27T3.6	**PK543AWR27LT3.6**
PK543AWR27T7.2	**PK543AWR27LT7.2**
PK543AWR27T10	**PK543AWR27LT10**
PK543AWR27T20	**PK543AWR27LT20**
PK543AWR27T30	**PK543AWR27LT30**
PK564AWR27T3.6	**PK564AWR27LT3.6**
PK564AWR27T7.2	**PK564AWR27LT7.2**
PK564AWR27T10	**PK564AWR27LT10**
PK564AWR27T20	**PK564AWR27LT20**
PK564AWR27T30	**PK564AWR27LT30**
PK596AER27T3.6	–
PK596AER27T7.2	–
PK596AE1R27T10	–
PK596AE1R27T20	–
PK596AE1R27T30	–

◇**PS** Geared Type with Encoder

Model (TTL Type Encoder)	Model (Differential Type Encoder)
–	–
–	–
–	–
PK545AWR27PS5	**PK545AWR27LPS5**
PK545AWR27PS7	**PK545AWR27LPS7**
PK545AWR27PS10	**PK545AWR27LPS10**
PK543AWR27PS25	**PK543AWR27LPS25**
PK543AWR27PS36	**PK543AWR27LPS36**
PK543AWR27PS50	**PK543AWR27LPS50**
PK566AWR27PS5	**PK566AWR27LPS5**
PK566AWR27PS7	**PK566AWR27LPS7**
PK566AWR27PS10	**PK566AWR27LPS10**
PK564AWR27PS25	**PK564AWR27LPS25**
PK564AWR27PS36	**PK564AWR27LPS36**
PK564AWR27PS50	**PK564AWR27LPS50**
PK599AER27PS5	–
PK599AER27PS7	–
PK599AER27PS10	–
PK596AER27PS25	–
PK596AER27PS36	–
PK596AER27PS50	–

◇**PL** Geared Type with Encoder

Model (TTL Type Encoder)
PK244PDAR□-P5
PK244PDAR□-P10
PK244PDAR□-P36
PK266PDAR□-P5
PK266PDAR□-P10
PK264PDAR□-P36

● Enter the encoder code (**15**, **16**, **25** or **26**) in the box (□) within the model name.

◇**PN** Geared Type

Model (Single Shaft)	Model (Double Shaft)
PK523PA-N5	**PK523PB-N5**
PK523PA-N7.2	**PK523PB-N7.2**
PK523PA-N10	**PK523PB-N10**
PK544AW-N5	**PK544BW-N5**
PK544AW-N7.2	**PK544BW-N7.2**
PK544AW-N10	**PK544BW-N10**
PK566AW-N5	**PK566BW-N5**
PK566AW-N7.2	**PK566BW-N7.2**
PK566AW-N10	**PK566BW-N10**
PK564AW-N25	**PK564BW-N25**
PK564AW-N36	**PK564BW-N36**
PK564AW-N50	**PK564BW-N50**
PK599AE-N5	**PK599BE-N5**
PK599AE-N7.2	**PK599BE-N7.2**
PK599AE-N10	**PK599BE-N10**
PK596AE-N25	**PK596BE-N25**
PK596AE-N36	**PK596BE-N36**
PK596AE-N50	**PK596BE-N50**

◇Harmonic Geared Type

Model (Single Shaft)	Model (Double Shaft)
PK513PA-H50S	**PK513PB-H50S**
PK513PA-H100S	**PK513PB-H100S**
PK523HPA-H50S	**PK523HPB-H50S**
PK523HPA-H100S	**PK523HPB-H100S**
PK543AW-H50S	**PK543BW-H50S**
PK543AW-H100S	**PK543BW-H100S**
PK564AW-H50S	**PK564BW-H50S**
PK564AW-H100S	**PK564BW-H100S**
PK596AE1-H50	**PK596BE1-H50**
PK596AE1-H100	**PK596BE1-H100**

◇Harmonic Geared Type with Encoder

Model (TTL Type Encoder)	Model (Differential Type Encoder)
–	–
–	–
–	–
–	–
PK543AWR27H50	**PK543AWR27LH50**
PK543AWR27H100	**PK543AWR27LH100**
PK564AWR27H50	**PK564AWR27LH50**
PK564AWR27H100	**PK564AWR27LH100**
PK596AE1R27H50	–
PK596AE1R27H100	–

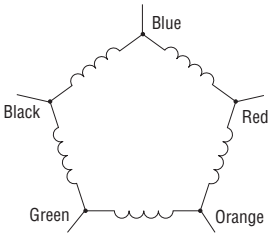
Wirings and Connections

●Step Angle 0.36°/0.72° Standard Type, Step Angle 0.72° High-Torque Type, Geared Type

◇Inner Wiring Diagram for Motor

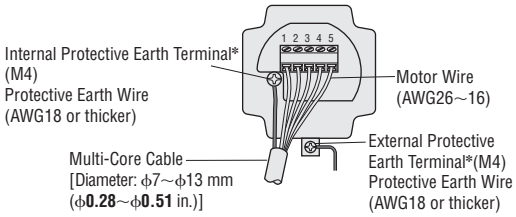
Connection Type: New Pentagon (Bipolar)

For more details on the New Pentagon (Bipolar), please visit www.orientalmotor.com

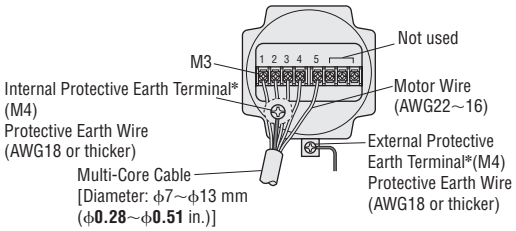


●Step Angle 0.72° Standard Type Terminal Box

PK564AT, PK566AT, PK569AT



PK596AT, PK599AT, PK5913AT

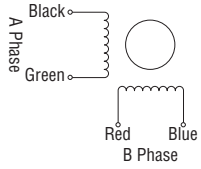


✻Use either the internal or external protective earth terminal for grounding.

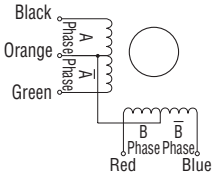
●Step Angle 0.9°/1.8° Standard Type, Step Angle 1.8° High-Torque Type, Step Angle 1.8° **PV** Series, Geared Type

◇Inner Wiring Diagram for Motor

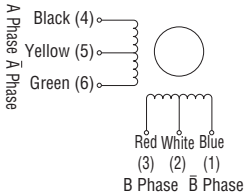
• 4-Lead Motor



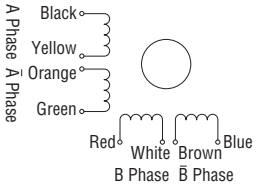
• 5-Lead Motor



• 6-Lead Motor

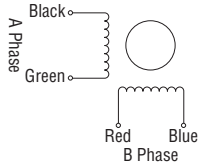


• 8-Lead Motor

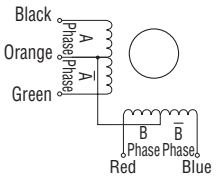


◇Wiring Connection Diagram

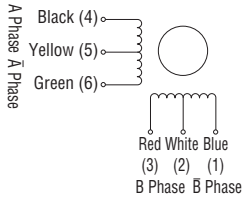
• 4 Leads Bipolar Connection



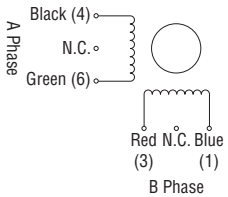
• 5 Leads Unipolar Connection



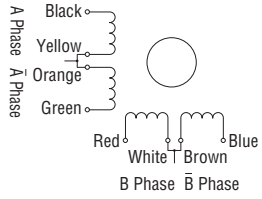
• 6 Leads Unipolar Connection



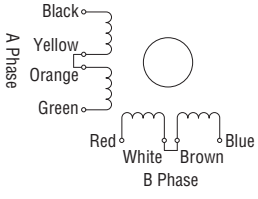
• 6 Leads Bipolar (Series) Connection



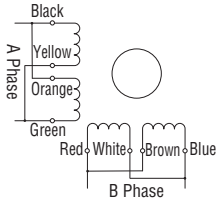
• 8 Leads Unipolar Connection



• 8 Leads Bipolar (Series) Connection



• 8 Leads Bipolar (Parallel) Connection

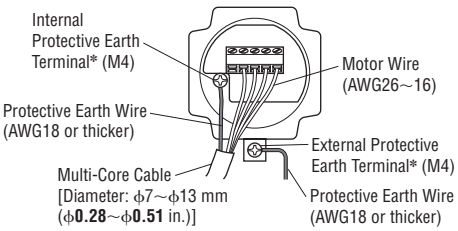


●The numbers inside the parentheses indicate the connector pin No. of the high-torque type motor.
●N.C.: No Connection

●Step Angle 1.8° Standard Type Terminal Box

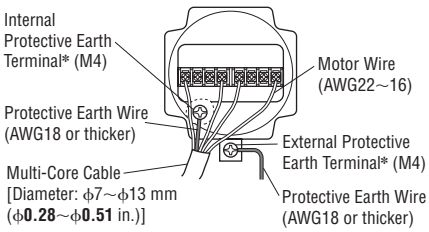
◇Motor Connections

• PK26□DAT



*Use either the internal or external protective earth terminal for grounding.

• PK29□EAT

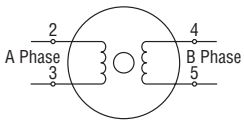


*Use either the internal or external protective earth terminal for grounding.

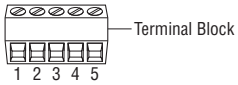
◇Wiring Connection Diagram

• PK26□DAT

Bipolar

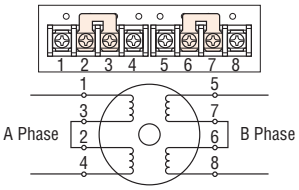


Connect motor lead wires to the terminals 2 to 5.

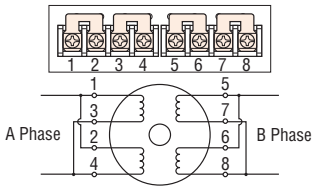


• PK29□EAT

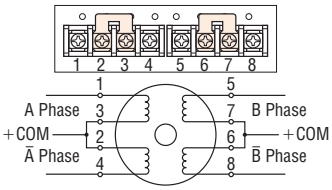
Bipolar (Series)



Bipolar (Parallel)



Unipolar



■Notes on the Speed – Torque Characteristics Diagram

The speed – torque characteristics featured in this catalog are measured with a constant-current driver or a constant-voltage driver. The actual characteristics will vary depending on the driver used. Please use these diagrams only for reference purposes when selecting a motor. You must also conduct a thorough evaluation with the actual driver to be used.