

A



Stepper Motors

Overview	A-2
Motor and Driver	A-15
5-Phase Stepper Motor and Driver RKII Series	A-16
Driver	A-47
Motor	A-51
2-Phase Stepper Motor PKP Series	A-52
5-Phase Stepper Motor PKP Series	A-80

Overview

Motor &
Driver

5-Phase
RKII

Driver

Motor



2-Phase
PKP

5-Phase
PKP

Product Line of Stepper Motors

One feature of stepper motors is that they can perform accurate positioning operations with ease. To expand applications of stepper motors, Oriental Motor offers many different product series designed with different power supply specifications and various functions. A wide spectrum of variations are available within each series, as products come in many frame sizes and pre-assembled options, such as electromagnetic brake type and geared types.

AC Input Stepper Motor and Driver

Series	 RKII Series	
Reference Page	▶ Page A-16	
Key Features	<ul style="list-style-type: none"> ● High efficiency, low heat generation, low vibration ● Space saving and features simplified wiring and protective function ● Low cost of entry 	
Control Method	Open Loop	
Basic Step Angle	0.72°	
Excitation Mode	Microstep	
Resolution	0.72°~0.00288° (16 levels) 1.8°~0.0018° (16 levels)	
Driver Type	Built-in Controller	●
	Pulse Input	●
	Network Compatible	Modbus (RTU)
Motor Frame Size	□42 mm (1.65 in.)	●
	□60 mm (2.36 in.)	●
	□85/90 mm (3.35/3.54 in.)	●
Additional Function	Electromagnetic Brake	●
Geared Types	TS (Spur gear mechanism)	●
	PS (Planetary gear mechanism)	●
	Harmonic	●
Driver Functions	Extended Functions	●
	Waveform Monitoring Function	●
Power Supply Input	Single-Phase 100-120 VAC Single-Phase 200-240 VAC	
International Standards		
Price Range	\$473.00~\$2,035.00	

Driver for Stepper Motors (Driver Only)

This is a DC power supply input driver for stepper motors. A bipolar driver for 2-phase stepper motors and a driver for 5-phase stepper motors are available.

Using this microstepping driver reduces vibration and noise.

- Bipolar Driver for 2-Phase Stepper Motors
- Driver for 5-Phase Stepper Motors




Reference Page ▶ Page A-48



Stepper Motors (Motor only)

2-Phase Stepper Motors PKP Series High Torque Low Vibration

Reference Page ▶ Page A-52

Motor Product Line (Basic step angle)	Frame Size, Wiring Type														
	20 mm (0.79 in.)		28 mm (1.10 in.)		35 mm (1.38 in.)		42 mm (1.65 in.)		56.4 mm (2.22 in.)		60 mm (2.36 in.)		85 mm (3.35 in.)		
	Bipolar	Unipolar	Bipolar	Unipolar	Bipolar	Unipolar	Bipolar	Unipolar	Bipolar	Unipolar	Bipolar	Unipolar	Bipolar	Unipolar	
Standard Type (1.8°)  \$44.00~\$218.00	○	○	●	●	●	●	●	●	●	●	●	-	-	○	○
With Encoder	○	○	●	●	●	●	●	●	●	●	●	-	-	-	-
With Electro-magnetic Brake	-	-	●	●	●	●	●	●	●	●	●	-	-	-	-
High-Resolution Type (0.9°)  \$48.00~\$193.00	-	-	-	-	-	-	●	●	●	●	-	-	-	-	-
With Encoder	-	-	-	-	-	-	●	●	●	●	-	-	-	-	-
With Electro-magnetic Brake	-	-	-	-	-	-	●	●	●	●	-	-	-	-	-
SH Geared Type (0.5°~0.05°)  \$121.00~\$184.00	-	-	●	●	-	-	●	●	-	-	●	●	-	-	-

●: Connector-Coupled Motors ○: Lead Wire Type

Overview

Motor & Driver

5-Phase RKII

Driver




Motor

2-Phase PKP

5-Phase PKP

5-Phase Stepper Motors PKP Series High Accuracy Low Vibration

Reference Page ▶ Page A-80

Motor Product Line (Basic step angle)	Frame Size, Wiring Type			
	28 mm (1.10 in.)	42 mm (1.65 in.)	56.4 mm (2.22 in.)	60 mm (2.36 in.)
Standard Type (0.72°)  \$52.00~\$95.00	●	●	●	●
High-Resolution Type (0.36°)  \$54.00~\$93.00	-	●	-	●
Standard Type with Encoder (0.72°)  \$109.00~\$150.00	-	●	●	●

●: Connector-Coupled Motors

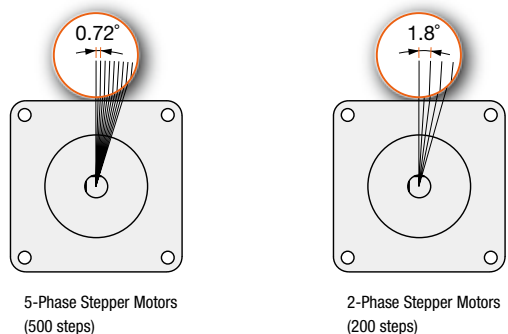
Overview of Stepper Motors

Stepper motors enable accurate positioning operation with ease. They are used in various types of equipment for accurate rotation angle and speed control using pulse signals.

Features

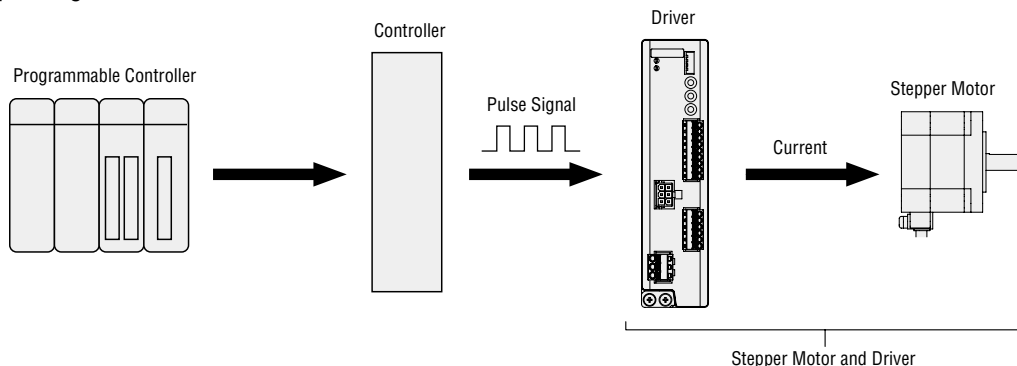
Accurate Positioning in Fine Steps

A stepper motor rotates with a fixed step angle, just like the second hand of a clock. This angle is called "basic step angle." Oriental Motor offers 5-phase stepper motors with a basic step angle of 0.72° and 2-phase stepper motors with a basic step angle of 1.8°.



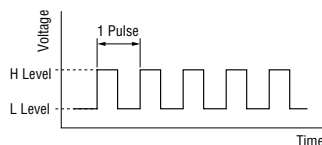
Easy Control with Pulse Signals

A system configuration for high accuracy positioning is shown below. The rotation angle and speed of the stepper motor can be controlled accurately using pulse signals from the controller.



What is a Pulse Signal?

A pulse signal is an electrical signal whose voltage level changes repeatedly between ON and OFF. Each ON/OFF cycle is counted as one pulse. A command with one pulse causes the motor output shaft to turn by one step.



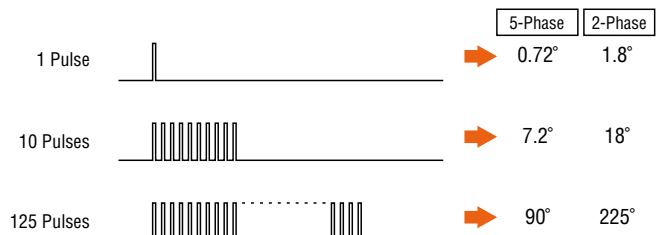
The Amount of Rotation is Proportional to the Number of Pulses

The amount of rotation of the stepper motor is proportional to the number of pulse signals (pulse number) given to the driver.

The relationship of the stepper motor's rotation (rotation angle of the motor output shaft) and pulse number is expressed as follows:

$$\theta = \theta_s \times A$$

θ : Rotation angle of the motor output shaft [deg]
 θ_s : Step angle [deg/step]
 A : Pulse number [pulses]



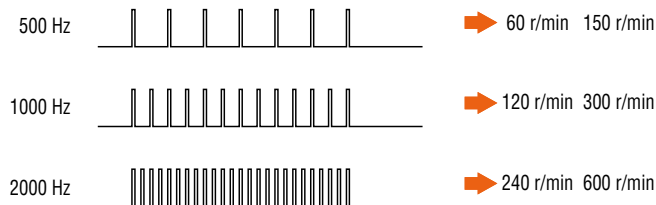
The Speed is Proportional to the Pulse Speed

The speed of the stepper motor is proportional to the speed of pulse signals (pulse frequency) given to the driver.

The relationship of the pulse speed [Hz] and motor speed [r/min] is expressed as follows:

$$N = \frac{\theta_s}{360} \times f \times 60$$

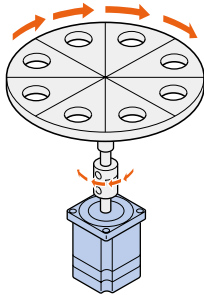
N : Speed of the motor output shaft [r/min]
 θ_s : Step angle [deg/step]
 f : Pulse speed [Hz]
 (Number of pulses input per second)



● Generating High Torque with a Compact Body

Stepper motors generate high torque with a compact body. These features provide excellent acceleration and response characteristics, which in turn makes these motors well-suited for torque-demanding applications where the motor must be started and stopped frequently. To meet the need for greater torque at low speed, Oriental-Motor also has geared motors combining compact design and high torque.

◇ Frequent Starting/Stopping is Possible



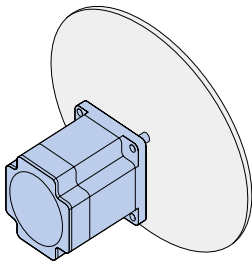
● The Motor Holds Itself at a Stopped Position

Stepper motors continue to generate holding torque even at standstill. This means that the motor can be held at a stopped position without using a mechanical brake.

● Capable of Driving Large Inertial Loads

Stepper motors can drive larger inertial loads than servo motors of equivalent frame sizes.

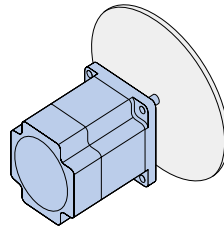
● Comparison at 30 times of the rotor inertia



Stepper Motors

Load Inertia $22.4 \times 10^{-4} \text{ kg}\cdot\text{m}^2$ (123 oz-in²)
(30 times the rotor inertial moment)

Load Inertia: Diameter: 169 mm (6.65 in.)
Thickness: 10 mm (0.39 in.)
Material: Aluminum
Motor: Frame size 60 mm (2.36 in.)
Length 90 mm (3.54 in.)



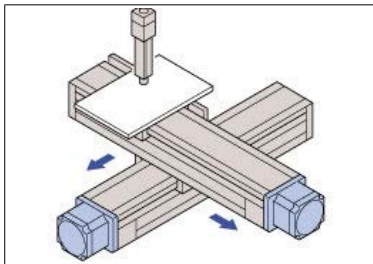
Conventional Servo Motor

Load Inertia $4.0 \times 10^{-4} \text{ kg}\cdot\text{m}^2$ (22 oz-in²)
(30 times the rotor inertia)

Load Inertia: Diameter: 110 mm (4.33 in.)
Thickness: 10 mm (0.39 in.)
Material: Aluminum
Motor: Frame size 60 mm (2.36 in.)
Length 96.5 mm (3.8 in.)

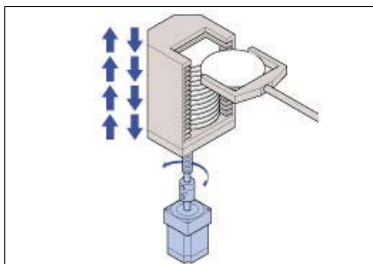
■ Applications

● Table Drive for X-Y Axes



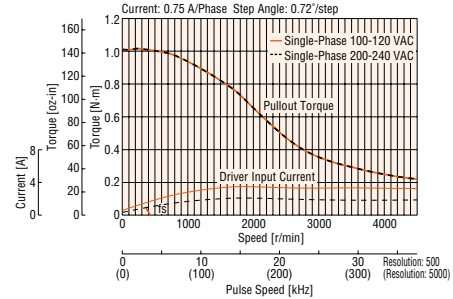
Highly accurate positioning at high speed is possible.

● Vertical Stacker Operation

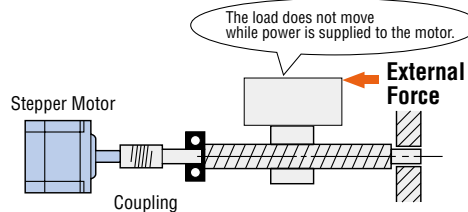


Stable positioning at vertical operation is possible.

◇ Speed – Torque Characteristics [Motor frame size 60 mm (2.36 in.)]



● How to Read Speed – Torque Characteristic → Page A-11



Overview

Motor & Driver

5-Phase RKII

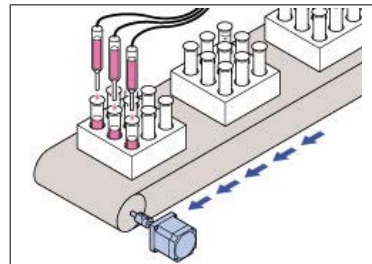
Driver

Motor

2-Phase PKP

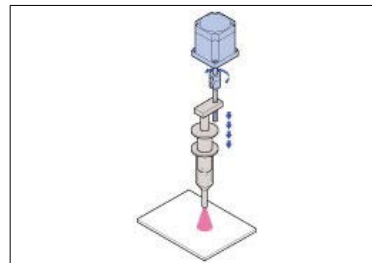
5-Phase PKP

● Indexing Conveyor for Quantitative Dispenser



Stable positioning is possible even on mechanisms with low rigidity, such as a belt mechanism.

● Precision Dispensing



The amount applied can be adjusted accurately.

Motor Types

Stepper motors come in several different types including the standard type, electromagnetic brake type and various geared types. The availability of such a wide selection means that you can choose an optimal type according to the function and performance required in your specific application.

Typical examples are introduced below.

Standard Type

A basic model that is easy to use and designed with a balanced set of functions and characteristics.



High-Resolution Type

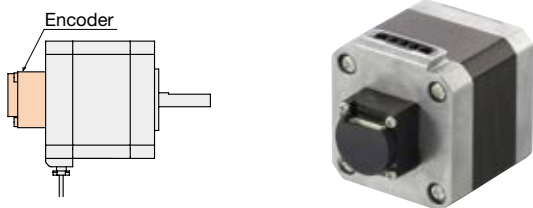
This motor's basic resolution is double that of the standard type. This results in high positioning accuracy and reduced vibration.



Encoder Type

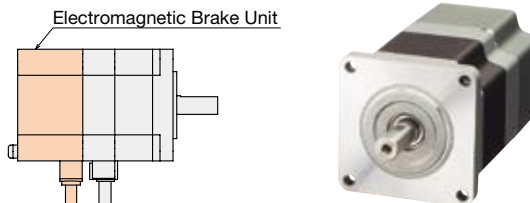
Monitoring the current position and detecting positional errors are possible.

For example, comparing the command position and current position enables you to check the normal operation of the motor.

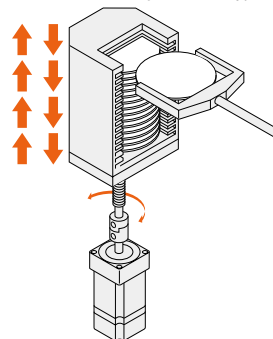


Electromagnetic Brake Type

These motors incorporate a non-excitation type electromagnetic brake. When the power is accidentally cut off due to power outage or other unexpected event, the electromagnetic brake holds the load in position to prevent it from dropping or moving.



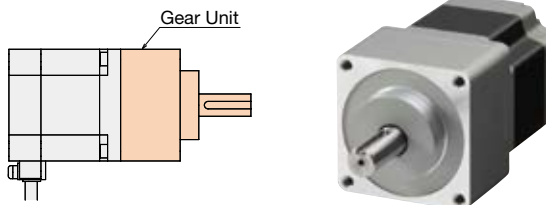
Once the power is cut off, the electrical holding torque of the motor is lost and the motor can no longer be held at the stopped position in vertical operations or when an external force is applied. In lift and similar applications, use an electromagnetic brake type.



Geared Type

These motors incorporate a dedicated position-control gearhead with reduced backlash to make the most of the high controllability of the motors. The gearhead ensures highly accurate, smooth operation, even in applications where a large torque is received.

Advantages of Geared Motors → Page A-8
Product Line of Geared Motors → Page A-22



Driver Types

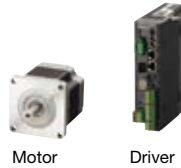
Built-in Controller Type AC

With this type, the operating data is set in the driver, and is then selected and executed from the host system. Host system connection and control are performed with any of the following: I/O, Modbus (RTU), RS-485 communication, or FA network. By using a network converter (sold separately), CC-link, MECHATROLINK or EtherCAT communication is possible.



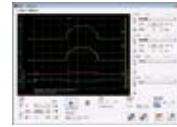
FLEX is the collective name for products that support I/O control, Modbus (RTU) control, and FA network control via network converters.

Basic Setting (Factory setting)

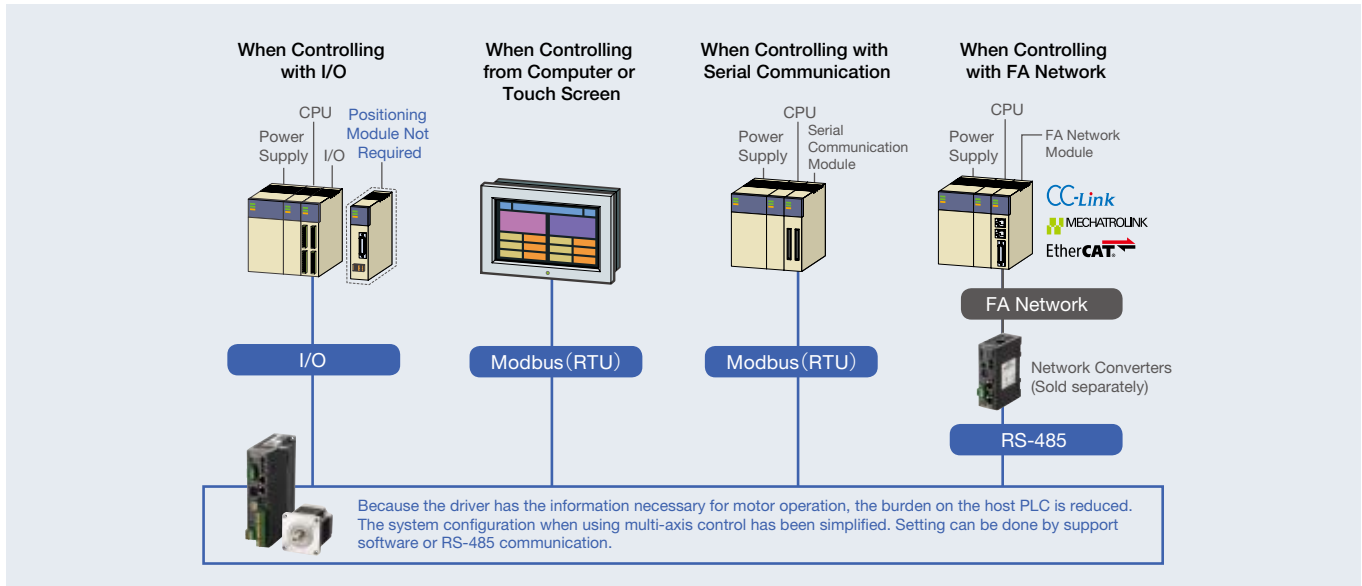


Setting Operating Data and Changing Parameters

Support software (**MEXE02**)



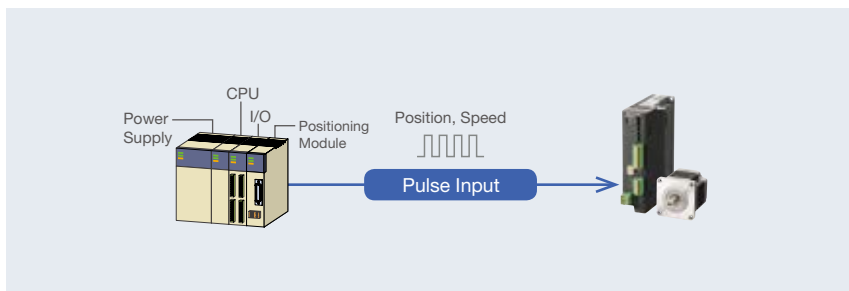
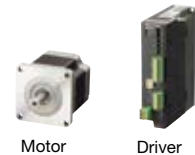
● Setting using RS-485 communication is also possible.



Pulse Input Type AC DC

This type executes operations by inputting pulses into the driver. Control the motor using a positioning module (pulse generator). The support software (**MEXE02**) can be used to check the alarm history and monitor status information.

Basic Setting (Factory setting)





Advantages of Geared Motors

Using geared motors bring many advantages, such as speed reduction, high torque and high resolution.

The Motor Can Drive a Large Inertial Load

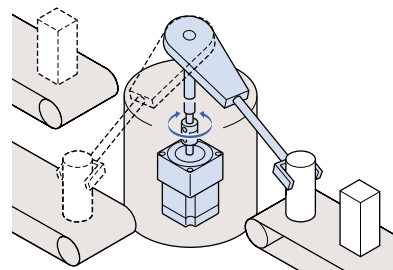
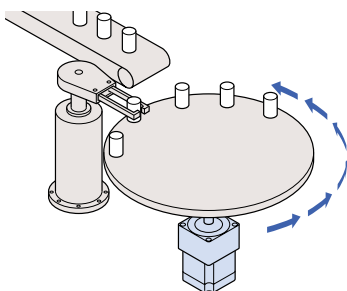
If compared with a standard motor, the geared motors can drive larger inertial loads because its permissible load moment of inertia increases with the square of the gear ratio. This means that larger inertial loads can be driven with geared motors.

Comparison of Load Moment of Inertia

	Motor Type	Motor Product Name	Load Moment of Inertia (10 times of Rotor Inertia)	Diameter of Inertial Load (Thickness: 20 mm (0.79 in.), material: Aluminum)	Speed Range
	Standard Type	PKE564AC	1.6×10^{-4} kg·m ² (8.8 oz-in ²)	72 mm (2.83 in.)	0~6,000 r/min
	PS Geared Type (Gear ratio 5)	PKE566AC-PS5	67.5×10^{-4} kg·m ² (370 oz-in ²)	187 mm (7.36 in.)	0~600 r/min

Improved Damping Characteristic at Start and Stop

If the inertial load is large or acceleration/ deceleration time is short, a geared motor can reduce damping more effectively and thereby ensure more stable driving compared to a standard motor. Geared motors are ideal for applications where a large inertia such as an index table or arm must be driven to perform quick positioning.

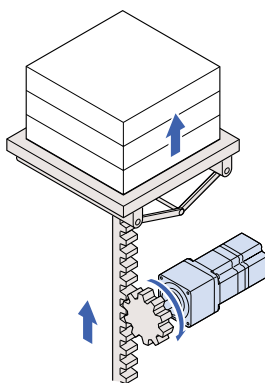


High Rigidity, Resistant to Torsional Force

Geared motors have high rigidity and are resistant to torsional force. Therefore, compared to standard motors, geared motors are less subject to load torque fluctuation. This means that stability and high positioning accuracy can be ensured even when the load size changes.

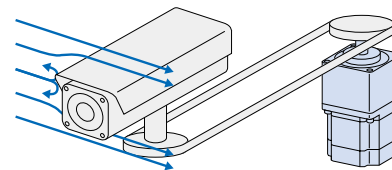
Application: Lifter

The application can perform high-precision stops, even with elevators and other mechanisms that perform vertical operations where the number of loads or weight of loads changes.



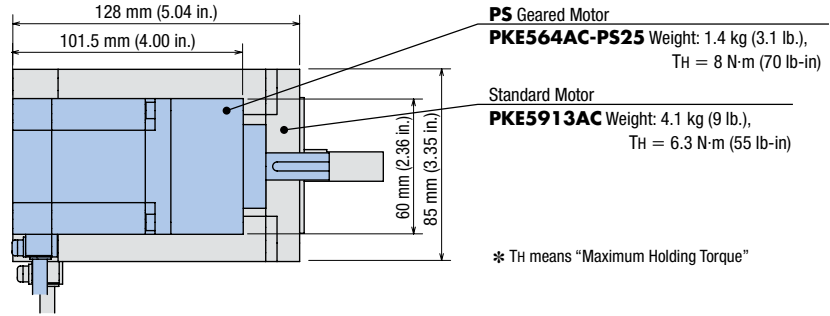
Application: Security Camera

The position can be held securely even when the camera sways from strong winds.



● Downsizing

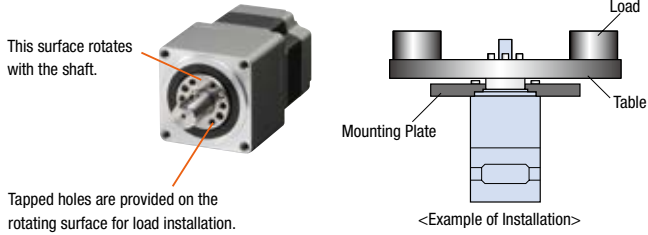
If comparing the standard motor and the geared motor, which have similar maximum holding torque, the frame size of the geared motor is smaller than the standard motor. Geared motors are effective when the equipment must be kept small and light.



● Surface Installation of Load (Harmonic geared type)

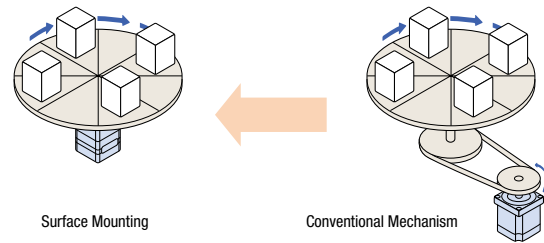
The harmonic geared type permits installation of a load directly on the rotating surface integrated with the shaft. [Except for geared motors with a frame size of 90 mm (3.54 in.)]

◇ Appearance and Installation Example



◇ Application: Index Table

This not only reduces the number of parts/processes, but also improves reliability. They are also suitable for operation with moment loads.



How to Read Specifications

Motor Name	Single Shaft	PKE566AC	PKE566AC-PS5
	Double Shaft	PKE566BC	PKE566BC-PS5
	With Encoder	PKE566RC2	-
	With Electromagnetic Brake	PKE566MC	PKE566MC-PS5
Driver Name	Built-in Controller	RKSD507-□□D	
	Pulse Input	RKSD507□□□	
①→Maximum Holding Torque	N·m	0.96 (136 oz-in)	3.5 (30 lb-in)
②→Rotor Inertia	J: kg·m ² (oz-in ²)	270×10 ⁻⁷ (1.48) [430×10 ⁻⁷ (2.4)] (270×10 ⁻⁷ (1.48))	270×10 ⁻⁷ (1.48) [430×10 ⁻⁷ (2.4)]
③→Rated Current	A/Phase	0.75	
④→Basic Step Angle		0.72°	0.144°
⑤→Gear Ratio		-	5
⑥→Permissible Torque	N·m (lb-in)	-	3.5 (30)
⑦→Maximum Instantaneous Torque	N·m (lb-in)	-	*
⑧→Holding Torque at Motor Standstill	Power ON	0.48 (68 oz-in)	2.7 (23 lb-in)
	Electromagnetic Brake	0.48 (68 oz-in)	2.7 (23 lb-in)
⑨→Speed Range	r/min	-	0~600
⑩→Backlash	arcmin	-	7 (0.12)
⑪→Power Supply Input	Voltage and Frequency		Single-Phase 100-120 VAC, Single-Phase 200-240 VAC -15~+10% 50/60 Hz
	Input Current A	Single-Phase 100-120 VAC	3.8
		Single-Phase 200-240 VAC	2.4
⑫→Excitation Mode		Microstep	
Control Power Supply		24 VDC±5% 0.2 A	
Electromagnetic Brake	Power Supply Input	24 VDC±5% 0.25 A	

*For the geared motor output torque, refer to the speed-torque characteristics.

① Maximum Holding Torque

This is the maximum holding torque (holding force) the motor has when power is supplied (at rated current) but the motor is not rotating. (With geared types, the value of holding torque considers the permissible strength of the gear.)

② Rotor Inertia

This refers to the inertia of the rotor inside the motor. This is necessary when the required torque (acceleration torque) for the motor is calculated.

③ Rated Current

The rated current is determined by the motor temperature rise. It is the current value that can flow to the motor windings continuously at motor standstill. As a general rule, the current setting must be the rated current.

④ Basic Step Angle

The resolution is the angular distance (in degrees) that the motor moves upon input of one pulse signal from the driver. It differs depending on the motor structure and excitation mode.

⑤ Gear Ratio

This is the ratio of the rotation speed between the input speed from the motor and the speed of the output gear shaft. For example, a gear ratio of 10 indicates that when the input speed from the motor is 10 r/min, the output gear shaft speed is 1 r/min.

⑥ Permissible Torque

The permissible torque represents the maximum value limited by the mechanical strength of the output gear shaft when operated at a constant speed.

For the types other than the **TS** geared, **PS** geared, and harmonic geared types, the total torque including acceleration and deceleration torque should not exceed the permissible torque.

⑦ Maximum Instantaneous Torque (**TS** geared, **PS** geared, and harmonic geared types)

This is the maximum torque that can be applied to the gear output shaft during acceleration/deceleration such when an inertial load is started and stopped.

⑧ Holding Torque at Motor Standstill

While Power is ON: Holding torque when the automatic current cutback function is active (factory setting) is shown.
Electromagnetic Brake: Static friction torque when the electromagnetic brake is activated at standstill is shown. (Electromagnetic brake is power off activated type)

⑨ Permissible Speed Range

This is the range for rotation speed on the output gear shaft.

⑩ Backlash

This is the play of the output gear shaft when the motor shaft is fixed.
When positioning in bi-direction, the positioning accuracy is affected.

⑪ Power Supply Input

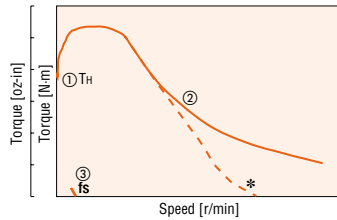
The current value of the power input is the maximum input current value. (The input current varies according to the rotation speed.)

⑫ Excitation Mode

The driver has a function that can change the motor's step angle. The step angle value at which the motor can be operated is shown in the table. (The step angle value for microsteps is explained separately.)

How to Read Speed – Torque Characteristics

The characteristics diagram below shows the relationship between the speed and torque when a stepper motor is driven. The required speed and torque is always used when selecting a stepper motor. On the graph of characteristics, the horizontal axis expresses the speed at the motor output shaft, while the vertical axis expresses the torque.



The speed – torque characteristics are determined by the motor and driver, so they are greatly affected by the type of driver being used.

① Maximum Holding Torque

This is the maximum holding torque (holding force) the stepper motor has when power is supplied (at rated current) but the motor is not rotating.

② Pullout Torque

The pullout torque is the maximum torque that can be output at a given speed.

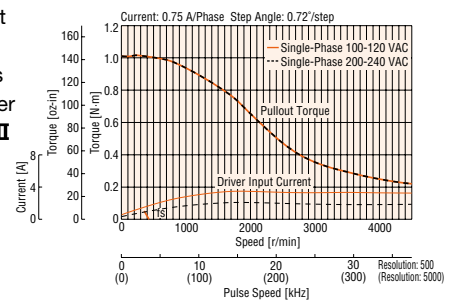
When selecting a motor, be sure that the required torque falls within this curve.

*The figure below shows the pullout torque when no clean damper or inertial load is installed (for reference).

③ Maximum Starting Frequency (fs)

This is the maximum pulse speed at which the motor can start and stop instantaneously (without an acceleration or deceleration time) when the frictional load and inertial load of the stepper motor are 0. Driving the motor at a pulse speed in excess of this rate will require a gradual acceleration/deceleration. This frequency drops when there is an inertial load on the motor.

The figure on the right shows the speed – torque characteristics of the 5-Phase stepper motor and driver, **RKII** Series.



Overview

Motor & Driver

5-Phase RKII

Driver

Motor

2-Phase PKP

5-Phase PKP

Common Specifications

Permissible Moment Load

When an eccentric (uneven) load is applied to the output flange-installation surface, the load moment acts on the bearing. Use the following formula to check whether the axial load and load moment are within specifications.

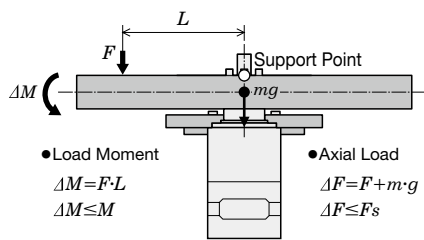
Harmonic Geared Type

Motor Frame Size	Permissible Axial Load [N]	Permissible Moment Load [N.m]	α Constant [m]
42 mm (1.65 in.)	220	5.6	0.009
60 mm (2.36 in.)	450	11.6	0.0114

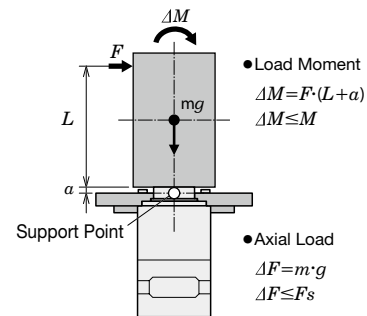
- m : Load Mass (kg)
- g : Gravitational acceleration (m/s²)
- F : External force (N)
- L : Overhung distance (m)
- a : Constant (m)
- ΔF : Load on output flange surface (N)
- F_s : Permissible axial load (N)
- ΔM : Load moment (N·m)
- M : Permissible moment load (N·m)

The permissible moment load can be calculated with the following formulas.

Example 1: An external force F (N) is applied at L (m) overhang position in a horizontal direction from the center of the output flange



Example 2: An external force F (N) is applied at L (m) overhang position in a vertical direction from the output flange-installation surface



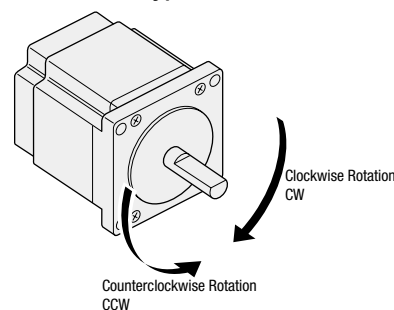
Rotation Direction

This indicates the rotation direction as viewed from the output shaft side of the motor (factory setting).

The rotation direction of the output gear shaft relative to the standard type motor output shaft varies depending on the gear type and gear ratio. Please check the following table.

Type	Gear Ratio	Rotation direction Relative to Motor Output Shaft
TS Geared	3.6, 7.2, 10	Same direction
	20, 30	Opposite direction
SH Geared Frame Size 28 mm (1.10 in.)	7.2, 36	Same direction
	9, 10, 18	Opposite direction
SH Geared Frame Size 42 mm (1.62 in.), 60 mm (2.36 in.)	3.6, 7.2, 9, 10	Same direction
	18, 36	Opposite direction
PS Geared	All gear ratios	Same direction
Harmonic Geared	All gear ratios	Opposite direction

Standard Type Motor



Permissible Radial Load and Permissible Axial Load

● RKII Series, 2-Phase Motor

Unit: N (lb.)

Type	Motor Frame Size mm [in.]	Product Name	Gear Ratio	Permissible Radial Load					Permissible Axial Load
				Distance from Shaft End mm [in.]					
				0 [0]	5 [0.2]	10 [0.39]	15 [0.59]	20 [0.79]	
High-Resolution Type	42 [1.65]	PKP243, PKP244	-	20 (4.5)	25 (5.6)	34 (7.6)	52 (11.7)	—	10(2.2)
	56.4 [2.22]	PKP264, PKP266, PKP268		61 (13.7)	73 (16.4)	90 (20)	110 (24)	160 (36)	20(4.5)
Standard Type	20 [0.79]	PKP213, PKP214		12 (2.7)	15 (3.3)	—	—	—	3(0.67)
	28 [1.10]	PKP223, PKP225		25 (5.6)	34 (7.6)	52 (11.7)	—	—	5(1.12)
	35 [1.38]	PKP233, PKP235		20 (4.5)	25 (5.6)	34 (7.6)	52 (11.7)	—	10(2.2)
	42 [1.65]	PKP243, PKP244, PKP245 PKP243□2, PKP244□2, PKP245□2, PKP246□2 PKE543, PKE544, PKE545		20 (4.5)	25 (5.6)	34 (7.6)	52 (11.7)	—	10(2.2)
				35 (7.8)	44 (9.9)	58 (13)	85 (19.1)	—	15(3.3)
				35 (7.8)	44 (9.9)	58 (13)	85 (19.1)	—	15(3.3)
	56.4 [2.22]	PKP264, PKP266, PKP268 PKP264□2, PKP266□2, PKP268□2		61 (13.7)	73 (16.4)	90 (20)	110 (24)	160 (36)	20(4.5)
				90 (20)	100 (22)	130 (29)	180 (40)	270 (60)	30(6.7)
				90 (20)	100 (22)	130 (29)	180 (40)	270 (60)	30(6.7)
	60 [2.36]	PKE564, PKE566, PKE569		260 (58)	290 (65)	340 (76)	390 (87)	480 (108)	60(13.5)
85 [3.35]	PKP296, PKP299, PKP2913 PKE596, PKE599, PKE5913								
SH Geared Type	28 [1.10]	PKP223	7.2, 9, 10, 18, 36	15 (3.3)	17 (3.8)	20 (4.5)	23 (5.1)	—	10(2.2)
	42 [1.65]	PKP243	3.6, 7.2, 9, 10, 18, 36	10 (2.2)	15 (3.3)	20 (4.5)	30 (6.7)	—	15(3.3)
	60 [2.36]	PKP264	3.6, 7.2, 9, 10	30 (6.7)	40 (9)	50 (11.2)	60 (13.5)	70 (15.7)	30(6.7)
			18, 36	80 (18)	100 (22)	120 (27)	140 (31)	160 (36)	
TS Geared Type	42 [1.65]	PKE543	3.6, 7.2, 10	20 (4.5)	30 (6.7)	40 (9)	50 (11.2)	—	15(3.3)
			20, 30	40 (9)	50 (11.2)	60 (13.5)	70 (15.7)	—	
	60 [2.36]	PKE564	3.6, 7.2, 10	120 (27)	135 (30)	150 (33)	165 (37)	180 (40)	40(9)
			20, 30	170 (38)	185 (41)	200 (45)	215 (48)	230 (51)	
	90 [3.54]	PKE596	3.6, 7.2, 10	300 (67)	325 (73)	350 (78)	375 (84)	400 (90)	150(33)
			20, 30	400 (90)	450 (101)	500 (112)	550 (123)	600 (135)	

Overview

Motor & Driver

5-Phase RKII

Driver

Motor

2-Phase PKP

5-Phase PKP

Type	Motor Frame Size mm [in.]	Product Name	Gear Ratio	Permissible Radial Load					Permissible Axial Load
				Distance from Shaft End mm [in.]					
				0 [0]	5 [0.2]	10 [0.39]	15 [0.59]	20 [0.79]	
PS Geared Type	42 [1.65]	PKE545	5	70(15.7)	80(18)	95(21)	120(27)	—	100(22)
			7.2	80(18)	90(20)	110(24)	140(31)	—	
			10	85(19.1)	100(22)	120(27)	150(33)	—	
		PKE543	25	120(27)	140(31)	170(38)	210(47)	—	
			36	130(29)	160(36)	190(42)	240(54)	—	
	60 [2.36]	PKE566	5	170(38)	200(45)	230(51)	270(60)	320(72)	200(45)
			7.2	200(45)	220(49)	260(58)	310(69)	370(83)	
			10	220(49)	250(56)	290(65)	350(78)	410(92)	
		PKE564	25	300(67)	340(76)	400(90)	470(105)	560(126)	
			36	340(76)	380(85)	450(101)	530(119)	630(141)	
	90 [3.54]	PKE599	5	380(85)	420(94)	470(105)	540(121)	630(141)	600(135)
			7.2	430(96)	470(105)	530(119)	610(137)	710(159)	
			10	480(108)	530(119)	590(132)	680(153)	790(177)	
		PKE596	25	650(146)	720(162)	810(182)	920(200)	1070(240)	
			36	730(164)	810(182)	910(200)	1040(230)	1210(270)	
Harmonic Geared Type	42 [1.65]	PKE543	50, 100	180(40)	220(49)	270(60)	360(81)	510(114)	220(49)
	60 [2.36]	PKE564		320(72)	370(83)	440(99)	550(123)	720(162)	450(101)
	90 [3.54]	PKE596		1090(240)	1150(250)	1230(270)	1310(290)	1410(310)	1300(290)

● The PS geared type has a full lifespan of 20,000 hours when either the permissible radial load or the permissible axial load is applied.
 For the life of gearhead, please contact the nearest Oriental Motor sales office, or visit the Oriental Motor website.

● Radial Load and Axial Load

Distance from Shaft End [mm (in.)]

