

**(RoHS) RoHS-Compliant  
2-Phase Stepping Motor**

# **PK Series**

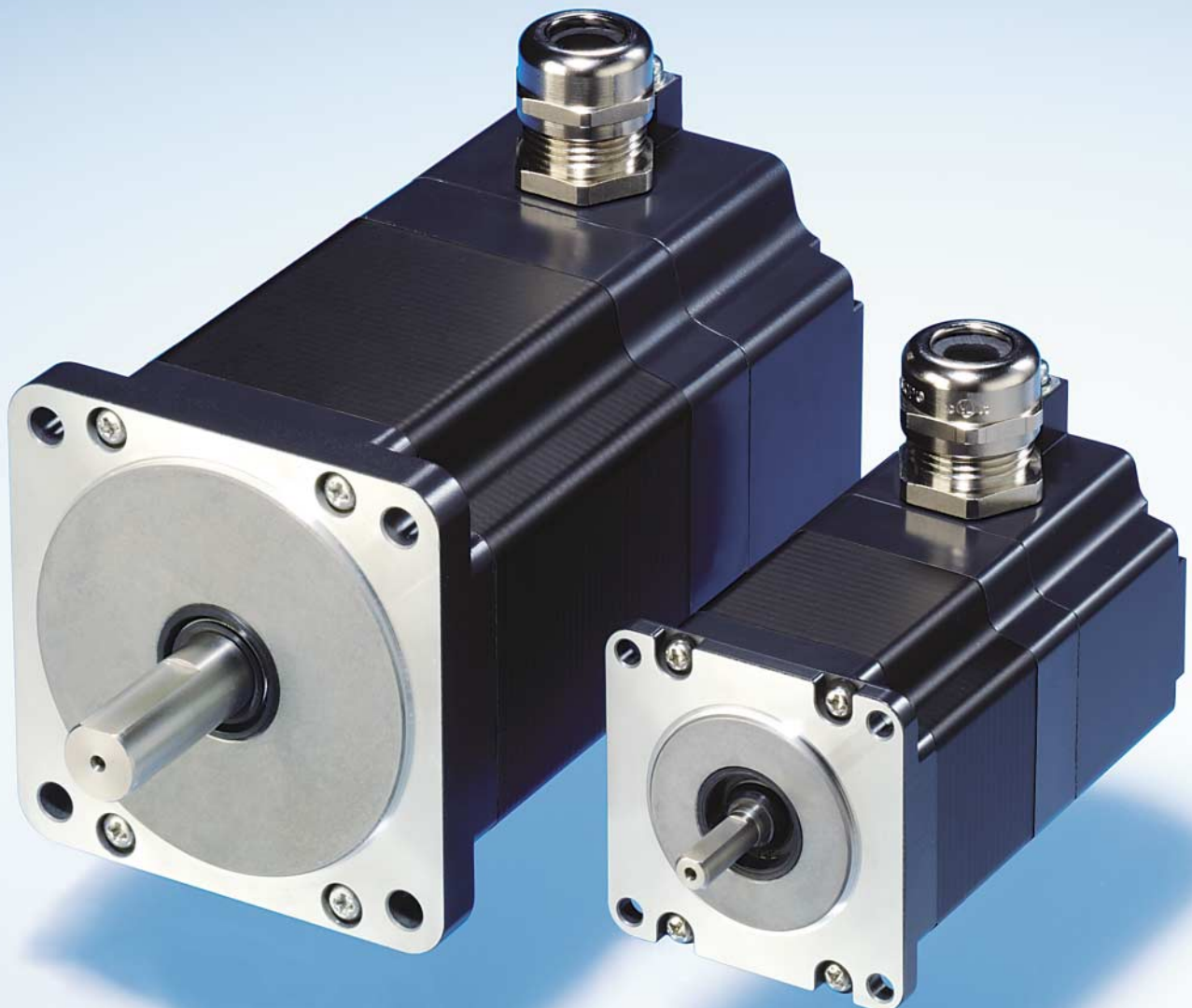
**Standard Type IP65 Rated Motors**

A new stepping motor conforming to the IP65 standard of ingress protection against dust and water\*.

Suitable for use in an environment subject to powder dust and water splashes, while ensuring safe operation in conformance with major international safety standards (UL/CSA, CE).

Direct connection through the motor's terminal block means no need for a relay mechanism.

\*Excluding the connection interface with the shaft.



# 2-Phase Stepping Motor **PK** Series

The motor conforms to the IP65 standard of ingress protection against dust and water. (excluding the connection interface with the shaft)

## What is IP65?

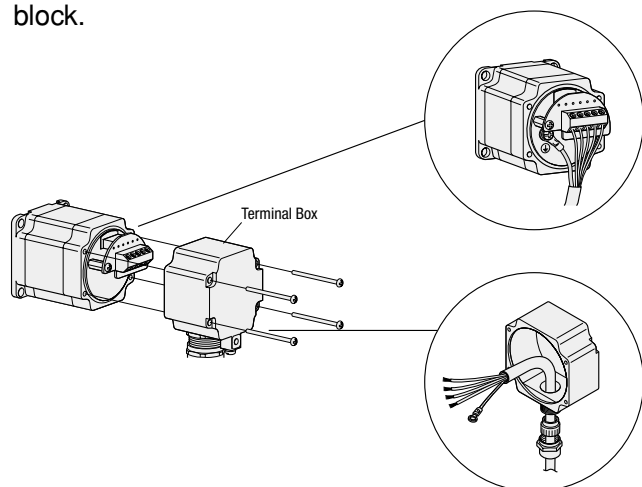
"6" indicates a "dust-tight structure," which is the highest level of ingress protection against solid objects. "5" indicates a "structure protected against entry of water jets from all directions."

Test condition: Position a water jet hose nozzle (inner diameter: 6.3 mm) 3 m from a test sample and spray a water jet onto the test sample at a pressure of 30 kPa and flow rate of 12.5 ℓ/min for 3 minutes from all directions, to check for occurrence of abnormality.



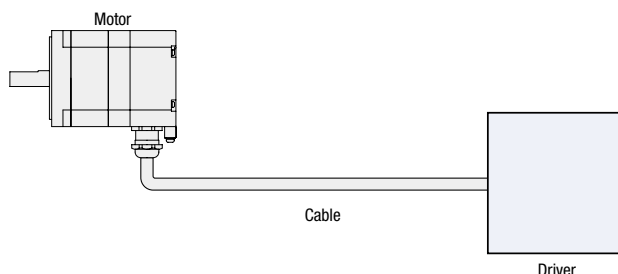
## Terminal-Block Connection Design

The motor can be wired directly from its terminal block.



## No Motor/Driver Relay

Since the motor cable can be connected directly with the driver terminals, there is no need for wire connection or soldering on a relay terminal block.



## Safety Standards and CE Marking

Standards	Certification Body	Standards File No.	CE Marking
UL1004, UL2111 CSA C22.2 No.100 CSA C22.2 No.77	UL	E64199	Low Voltage Directives
EN60950-1 EN60034-1 EN60034-5 IEC60664-1	Conforms to EN/IEC Standards		

## RoHS RoHS-Compliant

The **PK** Series conforms to the RoHS Directive that prohibits the use of six chemical substances including lead and cadmium.

### RoHS (Restriction of Hazardous Substances) Directive:

Directive on restriction of the use of certain hazardous substances in electrical and electronic equipment (2002/95/EC).

The RoHS Directive prohibits the use of six chemical substances in electrical and electronic products sold in the E.U. member countries on or after July 1, 2006. The six controlled substances are: lead, hexavalent chromium, cadmium, mercury and two specific brominated flame-retardants (PBB and PBDE).

## Product Number Code

**PK 2 9 6 E A T**

① ② ③ ④ ⑤ ⑥ ⑦

①	PK Series
②	2-Phase
③	Motor Frame Size <b>6</b> : 56.4 mm <b>9</b> : 85 mm
④	Motor Case Length
⑤	<b>D</b> : 4 terminals (Bipolar) <b>E</b> : 8 terminals
⑥	Motor Shaft Type <b>A</b> : Single Shaft
⑦	IP65 Rated Motor

## Specifications

Model	Connection Type	Holding Torque N·m	Current per Phase A/phase	Voltage VDC	Resistance per Phase Ω/phase	Inductance mH/phase	Rotor Inertia J kg·m <sup>2</sup>	Basic Step Angle	Number of Terminals	Mass kg
<b>PK264DAT</b>	Bipolar	0.48	2.8	1.96	0.7	1.4	120 × 10 <sup>-7</sup>	1.8°	4	0.6
<b>PK266DAT</b>	Bipolar	1.17	2.8	2.52	0.9	2.5	300 × 10 <sup>-7</sup>		4	0.9
<b>PK268DAT</b>	Bipolar	1.75	2.8	3.16	1.13	3.6	480 × 10 <sup>-7</sup>		4	1.2
<b>PK296EAT</b>	Bipolar (Parallel)	3.1	6.3	1.4	0.24	1.5	1400 × 10 <sup>-7</sup>		8	2.1
	Bipolar (Series)	3.1	3.18	2.8	0.96	6.0				
	Unipolar	2.2	4.5	2	0.48	1.5				
<b>PK299EAT</b>	Bipolar (Parallel)	6.2	6.3	1.9	0.33	2.5	2700 × 10 <sup>-7</sup>		8	3.2
	Bipolar (Series)	6.2	3.18	3.9	1.32	10.0				
	Unipolar	4.4	4.5	2.8	0.66	2.5				
<b>PK2913EAT</b>	Bipolar (Parallel)	9.3	5.6	2.6	0.49	4.2	1400 × 10 <sup>-7</sup>		8	4.3
	Bipolar (Series)	9.3	2.8	5.3	1.94	16.8				
	Unipolar	6.6	4	3.8	0.97	4.2				

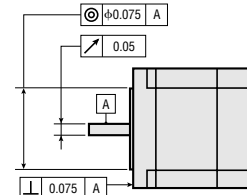
## General Specifications

Specifications		Motor
Degree of Protection		IP65 (except for mounting surface)
Insulation Class		Class B (130°C) [Recognized as class A (105°C) by UL/CSA standards]
Insulation Resistance		100 MΩ minimum under normal temperature and humidity, when measured by a 500 VDC megger between the windings and motor casing.
Dielectric Strength		Sufficient to withstand 1.5 kV, 50 Hz or 60 Hz applied between the windings and casing for one minute, under normal temperature and humidity.
Operating Environment (In Operation)	Ambient Temperature	-10°C ~ +50°C (nonfreezing)
	Ambient Humidity	85% or less (noncondensing)
	Atmosphere	No corrosive gases
Temperature Rise	Temperature rise of the coil measured by the change resistance method is 80°C or less. (at rated current, at standstill, two phases energized)	
Static Angle Error*1	±3 arc minutes (±0.05°)	
Shaft Runout	0.05 T.I.R. (mm)*4	
Radial Play*2	0.025 mm Max. of 5 N	
Axial Play*3	0.075 mm Max. of 10 N	
Concentricity	0.075 T.I.R. (mm)*4	
Perpendicularity	0.075 T.I.R. (mm)*4	

- \*1 This value is for 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 in the vertical direction to the tip of the motor's shaft.
- \*3 Axial Play: Displacement in shaft position in the axial direction, when a 10 N load is applied to the motor's shaft in the axial direction.
- \*4 T.I.R. (Total Indicator Reading): The total dial gauge reading when the measurement section is rotated one revolution centered on the reference axis center.

### Note:

- Do not measure insulation resistance or perform the dielectric strength test while the motor and driver are connected.



## Permissible Overhung Load and Permissible Thrust Load

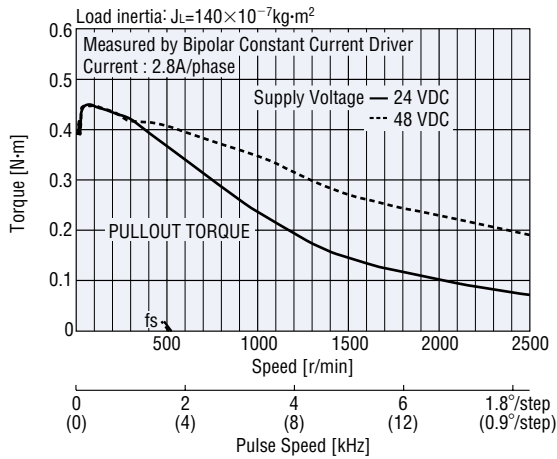
Unit=N

Model	Overhung Load Distance from Shaft End (mm)					Thrust Load
	0	5	10	15	20	
<b>PK264DAT</b>	54	67	89	130	-	The permissible thrust load shall be no greater than the motor mass.
<b>PK266DAT</b>						
<b>PK268DAT</b>						
<b>PK296EAT</b>	260	290	340	390	480	
<b>PK299EAT</b>						
<b>PK2913EAT</b>						

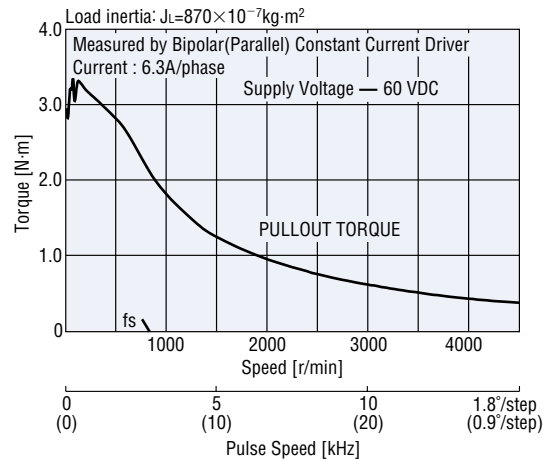
# 2-Phase Stepping Motor PK Series

## Speed-Torque Characteristics fs: Maximum Starting Pulse Rate

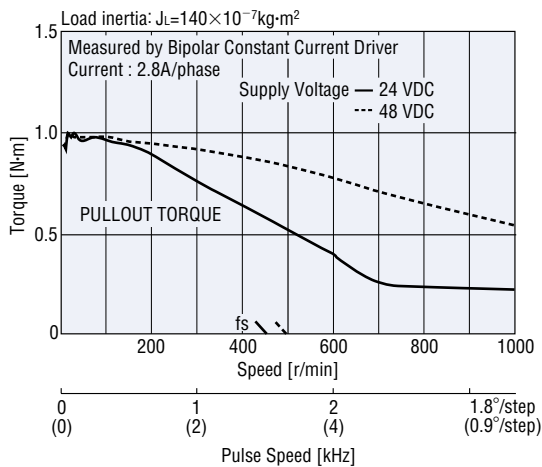
● **PK264DAT** Bipolar



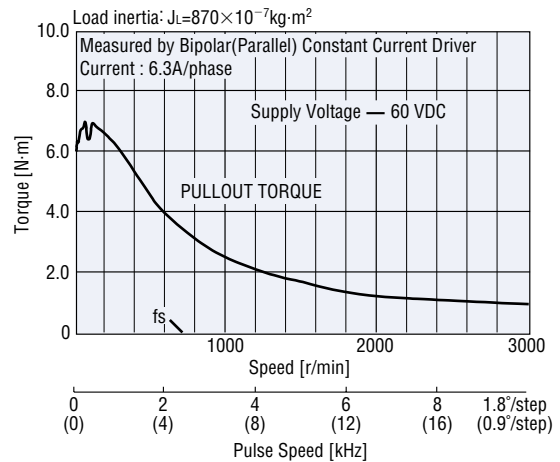
● **PK296EAT** Bipolar (Parallel)



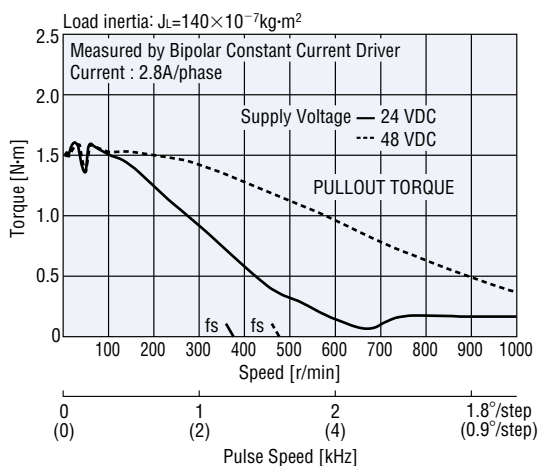
● **PK266DAT** Bipolar



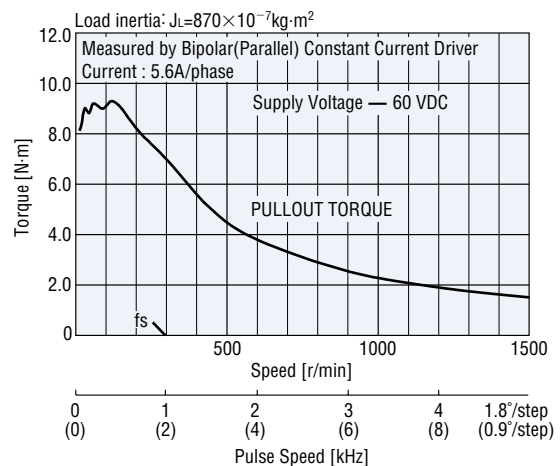
● **PK299EAT** Bipolar (Parallel)



● **PK268DAT** Bipolar

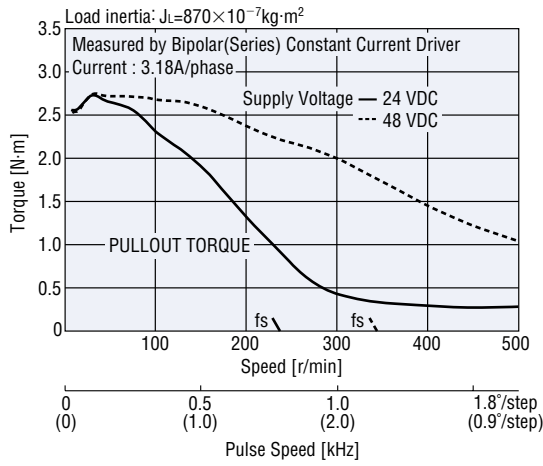


● **PK2913EAT** Bipolar (Parallel)

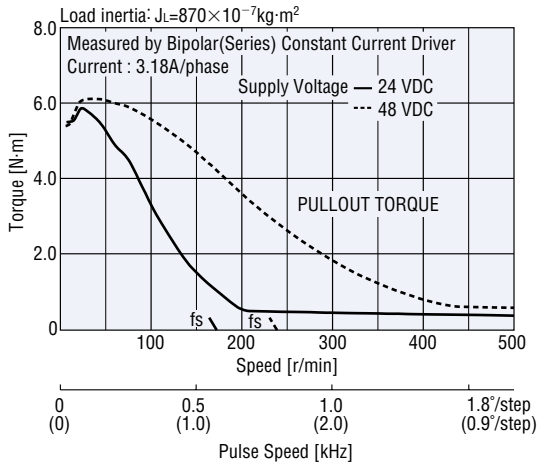


# Standard Type IP65 Rated Motors

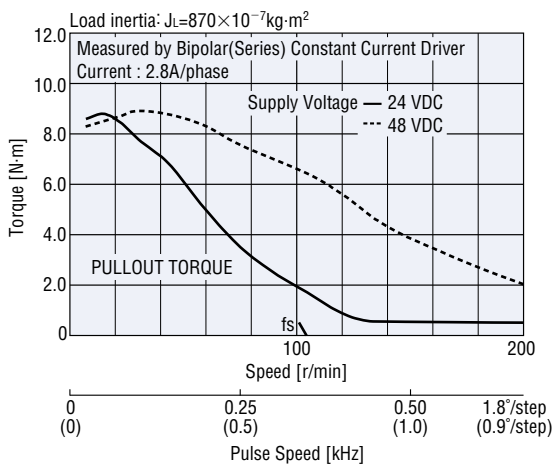
## ● PK296EAT Bipolar (Series)



## ● PK299EAT Bipolar (Series)



## ● PK2913EAT Bipolar (Series)

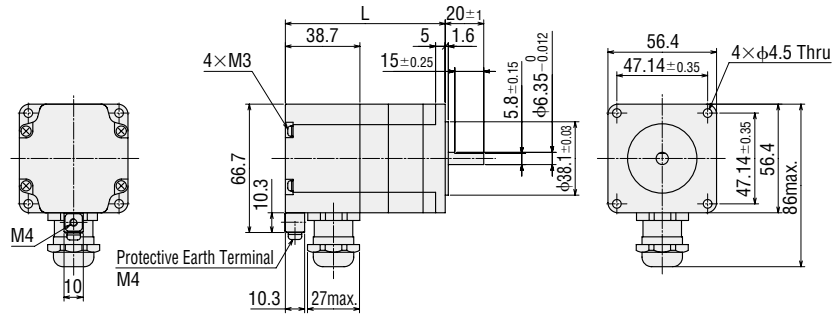


# 2-Phase Stepping Motor PK Series

## ■ Dimensions (Unit=mm)

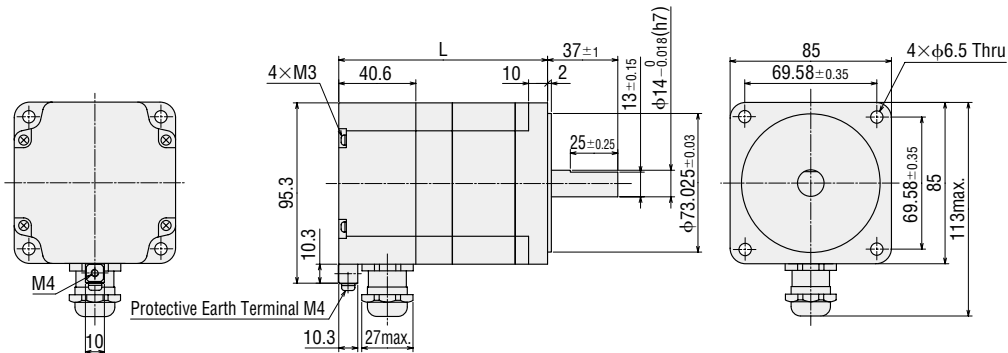
### □ 56.4 mm

Model	L	Mass (kg)
<b>PK264DAT</b>	83	0.6
<b>PK266DAT</b>	98	0.9
<b>PK268DAT</b>	120	1.2



### □ 85 mm

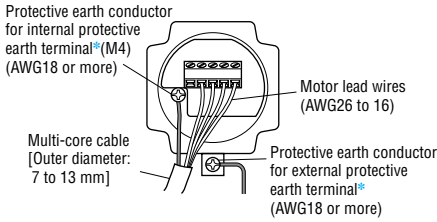
Model	L	Mass (kg)
<b>PK296EAT</b>	110	2.1
<b>PK299EAT</b>	140	3.2
<b>PK2913EAT</b>	170	4.3



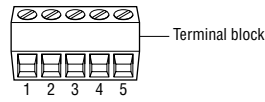
# Standard Type IP65 Rated Motors

## Connection Diagrams

### 56.4 mm

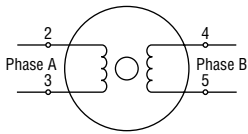


Connect motor lead wires to the terminals 2 to 5.

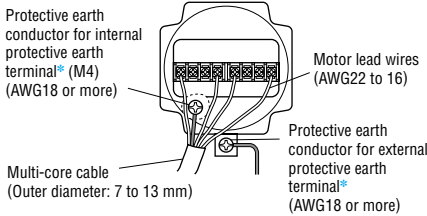


\*Connect either the internal protective earth terminal or external protective earth terminal to the ground.

### PK26 DAT (Bipolar Connection)



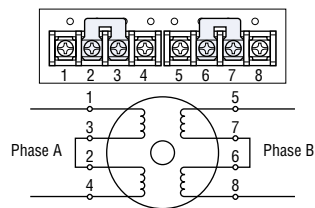
### 85 mm



\*Connect either the internal protective earth terminal or external protective earth terminal to the ground.

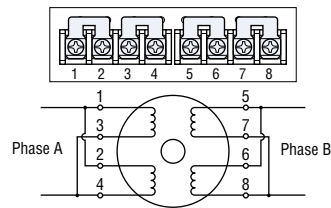
### Series Bipolar Connection

Connect the supplied shorting bars (two pieces) as shown in the figure below.



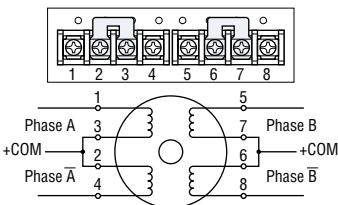
### Parallel Bipolar Connection

Connect the supplied shorting bars (four pieces) as shown in the figure below.



### Unipolar Connection

Connect the supplied shorting bars (two pieces) as shown in the figure below.



## Motor Accessories

### Motor Mounting Bracket (RoHS)



The mounting brackets are useful for maintaining proper alignment between the motor shaft and the load.

- The mounting bracket base is built with holes large enough to allow for alignment adjustment in the horizontal direction.
- Aluminum die cast construction

Model	Applicable Motor
<b>PAL2P-2</b>	<b>PK26□DAT</b>
<b>PAL4P-2</b>	<b>PK29□EAT</b>

### Flexible Coupling (RoHS)



These flexible couplings ensure no backlash and high accuracy. The high torque generated by geared motor can also be transmitted reliably.

Applicable Motor Model	Connection Type	Motor Shaft Diameter (mm)	Coupling Model	Connected Device Shaft Diameter (mm)
<b>PK264DAT</b> <b>PK266DAT</b>	Bipolar	φ6.35	<b>MCS2005F04</b>	φ5
			<b>MCS2006F04</b>	φ6
			<b>MCS20F04F04</b>	φ6.35
			<b>MCS20F0408</b>	φ8
			<b>MCS20F0410</b>	φ10
<b>PK268DAT</b>	Bipolar	φ6.35	<b>MCS3006F04</b>	φ6
			<b>MCS30F04F04</b>	φ6.35
			<b>MCS30F0408</b>	φ8
			<b>MCS30F0410</b>	φ10
<b>PK296EAT</b>	Unipolar	φ14	<b>MCS301214</b>	φ12
			<b>MCS301414</b>	φ14
			<b>MCS301416</b>	φ16
<b>PK299EAT</b> <b>PK2913EAT</b>	Bipolar Unipolar	φ14	<b>MCS551214</b>	φ12
			<b>MCS551414</b>	φ14
			<b>MCS551415</b>	φ15
			<b>MCS551416</b>	φ16

This product is manufactured at a plant 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.  
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# Orientalmotor

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