



## OPERATING MANUAL

**2-Phase Stepping Motor**  
**PK Series Cable Type**  
**IP54 rated motor**



## Introduction

### Before using the motor

This product must be handled by qualified personnel with expert knowledge of electrical and mechanical engineering. Use the product correctly after thoroughly reading the section "Safety precautions."

This product is designed for use as an internal component for general industrial equipment. Do not use the product for any other purpose. Oriental Motor shall not be liable whatsoever for any damage arising from the failure to observe this warning.

### Standard and CE Marking

This product is recognized by UL and certified by CSA, and bears the CE Marking (Low Voltage Directive) in compliance with the EN Standards.

Applicable standards	Certification body	Standards File No.
UL 1004-1, UL 1004-2 CSA C22.2 No.100, CSA C22.2 No.77	UL	E64199
EN 60950-1, EN 60034-1 EN 60034-5, EN 60664-1	Conforming to the respective standards.	

Degree of protection	IP54 (excluding motor installation surface)		
Operating environment	Ambient temperature	-10 to +50 °C (+14 to +122 °F) (non-freezing)	
	Humidity	85% or less (non-condensing)	
	Altitude	Up to 1,000 m (3,300 ft.) above sea level	
	Ambient atmosphere	Free from corrosive gases	
Installation conditions	Built-in component		
	Overvoltage category: II		
	Pollution degree: 3 (excluding motor installation surface) Protection against electric shock: Class I equipment		

The user is responsible for confirming the EMC compatibility of the final equipment incorporating the motor.

### Hazardous substances

The products do not contain the substances exceeding the restriction values of RoHS Directive (2011/65/EU).

### Checking the product

Confirm that all of the following items are available. Should you find any item missing or damaged, contact the Oriental Motor sales office where you purchased the product. Check the model of the motor against the model number shown on the nameplate.

- Motor ..... 1 unit
- OPERATING MANUAL ..... 1 copy

## Safety precautions

The precautions described below are intended to prevent danger or injury to the user and other personnel through safe, correct use of the product. Use the product only after carefully reading and fully understanding these instructions.

Thank you for purchasing an Oriental Motor product. This Operating Manual describes product handling procedures and safety precautions.

- Please read it thoroughly to ensure safe operation.
- Always keep the manual where it is readily available.

### Warning

Handling the product without observing the instructions that accompany a "Warning" symbol may result in death or serious bodily injury.

- Do not use the motor in explosive or corrosive environments, in the presence of flammable gases, near combustible materials, or locations subjected to the splashing of oil or other hazardous liquids. Doing so may result in fire, electric shock or injury.
- Assign qualified personnel the task of installing, wiring, operating/controlling, inspecting and troubleshooting the product. Failure to do so may result in fire or injury.
- Do not transport, install the product, perform connections or inspections when the power is on. Always turn the power off before carrying out these operations. Failure to do so may result in electric shock.
- Provide a measure to retain the position of the movable part of the equipment when the product is used in a vertical application. The motor loses its holding torque when the power is cut off. Without appropriate measures the movable part will descend, resulting in injury or damage to the equipment.
- Install the motor in the enclosure to avoid contact with the hands, or provide sufficient earthing. Failure to do so may result in electric shock.
- Connect the product correctly and securely according to the wiring diagram. Failure to do so may result in fire or electric shock.
- Do not forcibly bend, pull or pinch the cable. Doing so may fire.
- Turn off the power in case of a power failure. Failure to do so may result in injury or damage to the equipment when the motor starts suddenly upon the recovery of power.
- Do not disassemble or modify the motor. This may cause electric shock or injury. Refer all such internal inspections and repairs to the branch or sales office from which you purchased the product.

### Caution

Handling the product without observing the instructions that accompany a "Caution" symbol may result in bodily injury or property damage.

- Do not use the motor beyond its specifications. Doing so may result in electric shock, injury or damage to the equipment.
- Do not touch the motor during operation or immediately after stopping. The surface is hot and may cause a skin burn(s).
- Use a round terminal for connection with the Protective Earth Terminal. Failure to do so may result in fire or electric shock.
- Do not hold the motor output shaft or motor cable. Doing so may result in injury.
- Protect the rotating part of the motor (output shaft) with a cover. Failure to do so may result in injury.
- To prevent bodily injury, do not touch the rotating parts (output shaft) of the motor during operation.
- Conduct the insulation resistance measurement or withstand voltage test separately on the motor and the driver. Failure to do so may result in damage to equipment.
- Immediately when trouble has occurred, stop running and turn off the power. Failure to do so may result in fire, electric shock or injury.
- To dispose of the motor, disassemble it into parts and components as much as possible and dispose of individual parts/components as industrial waste.
- Provide an emergency-stop device or emergency-stop circuit external to the equipment so that the entire equipment will operate safely in the event of a system failure or malfunction. Failure to do so may result in injury.

## Precautions for use

### • Motor case temperature

The motor is designed to the class B insulation specification. When operating the motor, keep the motor case temperature to 100 °C (212 °F) or below. Operating the motor at temperatures above 100 °C (212 °F) will shorten the life of the motor coil and ball bearing. [The maximum temperature is 75 °C (167 °F) if the equipment is to receive UL/CSA certification, because the motor must conform to the class A insulation requirement.]

## Installation

### ■ Installation requirements

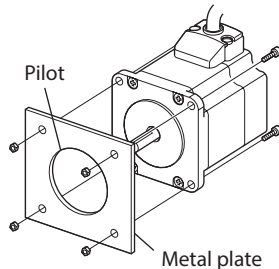
The motor is designed to be a built-in component. It must be used in an environment conforming to overvoltage category II, pollution degree of class 3 and protection against electric shock of class I equipment. Degree of protection: IP54 (excluding motor installation surface)

Install the motor in a well-ventilated location that provides easy access for inspection. The location must also satisfy the following conditions:

- Inside an enclosure that is installed indoors (provide vent holes)
- Operating ambient temperature: -10 to +50 °C (+14 to +122 °F) (non-freezing)
- Operating ambient humidity: 85% or less (non-condensing)
- Area that is free of explosive atmosphere or toxic gas (such as sulfuric gas) or liquid
- Area not exposed to direct sun
- Area free of excessive amount of dust, iron particles or the like
- Area not subject to oil (oil droplets) or other liquids except water
- Area free of excessive salt
- Area not subject to continuous vibration or excessive shocks
- Area free of excessive electromagnetic noise (from welders, power machinery, etc.)
- Area free of radioactive materials, magnetic fields or vacuum

### ■ Installation method

Install the motor onto an appropriate flat metal plate having excellent vibration resistance and heat conductivity. When installing the motor, secure it with four bolts (not supplied) through the four mounting holes provided. Leave no gap between the motor and plate.



Motor type *	Bolt size	Tightening torque [N·m (lb·in.)]
PK26□DW	M4 (No.8-32UNC)	2.0 (17.7)
PK29□DW	M5 (No.10-24UNC)	3.0 (26)

\* The square box in the motor type will contain a number representing the motor length.

### ■ Installing the load

When installing a load to the motor, align the centers of the motor's output shaft and load shaft.

Be careful not to damage the output shaft or bearings within when installing a flexible coupling or pulley to the motor's output shaft.

### ■ Permissible radial load and permissible axial load

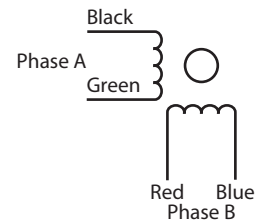
The radial load on the motor's output shaft or gear output shaft must be kept within the permissible values listed below. The axial load must not exceed the motor's mass.

Motor type *	Permissible radial load [N (lb.)]				
	Distance from the tip of motor's output shaft [mm (in.)]				
	0 (0)	5 (0.20)	10 (0.39)	15 (0.59)	20 (0.79)
PK26□DW	54 (12.1)	67 (15)	89 (20)	130 (29)	—
PK29□DW	260 (58)	290 (65)	340 (76)	390 (87)	480 (108)

\* The square box in the motor type will contain a number representing the motor length.

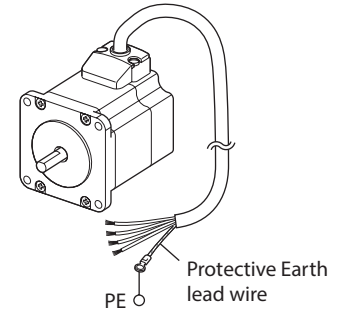
## Connection

### ■ Wiring diagram



### ■ Grounding

Crimping the round terminal to the Protective Earth lead wire (green/yellow) of the motor and ground.



## Inspection

It is recommended that the following items be checked regularly after the motor has been operated. Should any abnormality be found, stop using the motor and contact your nearest Oriental Motor office.

- Is there any abnormal noise coming from the motor's bearings (ball bearings) or other parts?
  - Is there any scratch or sign of stress on the connection cable?
  - Are the output shaft and load shaft properly aligned at their centers?
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Published in December 2017

\* Please contact your nearest Oriental Motor office for further information.

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