

Thank you for purchasing ORIENTAL MOTOR products. Please read this operating manual thoroughly before installing and operating the motor, and always keep the manual where it is readily accessible.

AC Standard Motors

Induction Motors

Reversible Motors

Synchronous Motors

OPERATING MANUAL



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1. Precautions

1.1 Precautions for Installation

- Do not use in a place where there is flammable gas and/or corrosive gas.
- When installing the motor into your equipment, ensure that the motor lead wires are fixed and do not move. In addition, do not apply any pressure to these lead wires.
- Motors for use only in equipment of protection class I.
- The motor housing must be mounted with a screw and spring washer to the ground point of the equipment.
- Installation must be performed by a qualified installer.

1.2 Precautions for Operation

- The Motor case temperature can exceed 70 °C (depending on operation conditions). In case motor is accessible during operation, please attach the following warning label so that it is clearly visible.
- Always turn off the power to the motor before conducting checks or performing work on the motor. Thermally protected motors will restart automatically when motor temperature falls below a certain level.



Warning label

2. Checking the package contents

2.1 Checking the contents

Make sure that you have received all of the items listed below. If an accessory is missing or damaged, contact the nearest Oriental Motor office.

- | | |
|-------------------|--------------------------------|
| • Motor.....1 | • Capacitor cap.....1 |
| • Capacitor.....1 | • This operating manual1 |

2.2 Checking the product name

This operation manual covers the following products.

Make sure that the product is the one you ordered and is listed below by checking the model number listed on the nameplate.

Verify that the voltage and output listed on the nameplate are appropriate for your application and that the correct value capacitor has been provided.

• Induction motors

2IJ3GB-AUL 2IJ3A-AUL 3IJ10GB-AUL 3IJ10A-AUL 4IJ15GB-AUL 4IJ15A-AUL

• Reversible motors

2RJ4GB-AUL 2RJ4A-AUL 3RJ10GB-AUL 3RJ10A-AUL 4RJ20GB-AUL 4RJ20A-AUL

• Reaction synchronous motors

2SK4GN-AUL 2SK4A-AUL 3SK10GN-AUL 3SK10A-AUL 4SK15GN-AUL 4SK15A-AUL 5SK25GN-AUL 5SK25A-AUL

3. Regulations and standards

Check on the Oriental Motor Website for the regulations and standards.

3.1 UL Standards, CSA Standards

This product is recognized by UL under the UL and CSA Standards.

3.2 CE Marking

This product is affixed the CE Marking under the Low Voltage Directive.

■ Low Voltage Directive

Applications standard EN 62368-1

Installation conditions Overvoltage category II , Pollution degree 2, Class I equipment

Only use a power supply that has the same rating as required by the motor. If the power supply rating is different, an isolation transformer must be used.

4. Installation

Installation conditions

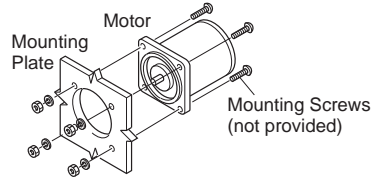
Install the motor and capacitor in a location that meets the following conditions.
Using the motor and capacitor in a location that does not satisfy these conditions could damage it.

- Indoors (this product is designed and manufactured to be installed within another device)
 - Ambient temperature:-10 °C to +40 °C(14°F to 104°F) (avoid freezing)
 - Not exposed to explosive, flammable, or corrosive gas
 - Ambient humidity: 85% max. (avoid condensation)
 - Not exposed to direct sunlight
- Not exposed to dust
 - Not exposed to water or oil
 - In a location with good heat ventilation
 - Not exposed to continuous vibration or excessive impact
 - 1,000 meters or less above sea level

4.1 Installing the motor

Installation varies with the shape of the motor's output shaft.

1) Round shaft motor

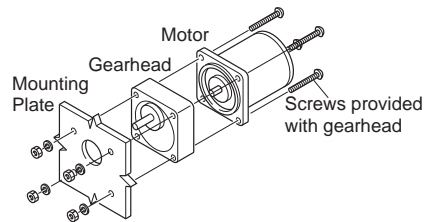


Note: Do not insert the motor into the mounting hole at an angle or force it in, as this may scratch the flange pilot section and damage the motor.

Drill holes in the mounting plate and fasten the motor to the mounting plate with screws, nuts, and washers. (The mounting screws are not provided.) Be sure that no gaps are left between the motor and the surface of the mounting plate.

Mounting Screws	First number in motor name	Screw size	Tightening torque
	2	M4	2.0 N·m (17.7 lb-in)
	3	M5	2.5 N·m (22 lb-in)
	4	M5	2.5 N·m (22 lb-in)
	5	M6	3.0 N·m (26 lb-in)

2) Pinion shaft motor

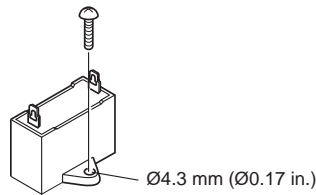


Drill holes in the mounting plate and fasten the gearhead (sold separately) and the motor to the mounting plate using the four screws provided with the gearhead. Install the equipment so that no gaps are left between the motor flange surface and the gearhead pilot section end surface.

Note: Use the gearhead of the same type of pinion shaft as the motor.

4.2 Installing capacitors

Before installing the provided capacitor, check that the capacitor's capacitance matches that stated on the motor's name plate.
Use the screws specified below to install capacitor. (Screws not provided.)

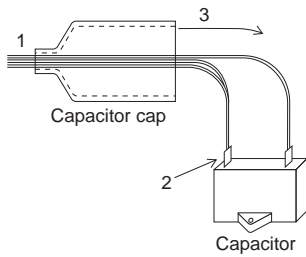


Mounting feet equipped.
Use screws of 4 mm in diameter to install the capacitor.

- Notes: 1 When installing the rectangular capacitor with the plastic foot, tighten the screw to a torque of 1 N·m (8.8 lb-in) or less to prevent damage to the mounting foot.
- 2 Install capacitor at least 10 cm (3.94 in.) away from the motor. If it is located closer, the life of the capacitor will be shortened.

5. Connection and Operation

- Connect the motor according to the “wiring diagram” shown below.
- Insulate all the wire connections, such as the connection between the motor and the capacitor connection.
Capacitor caps are available to insulate capacitor connection.



Capacitor caps

- 1.Pass the lead wires through the capacitor cover as shown in the figure.
- 2.Connect the lead wires to the terminals or use terminal ends.
- 3.Cap the capacitor with the capacitor cover.

■ Wiring diagram

The direction of rotation is as viewed from the side of the motor's output shaft.

Motor model and type	Clockwise	Clockwise Counterclockwise
Induction motor 3W, 6W type		
Reaction synchronous motor 4W type		
Induction motor		
Reaction synchronous motor		
Reversible motor		<p>Clockwise: Flip the switch to CW for clockwise rotation.</p> <p>Counterclockwise: Flip the switch to CCW for counterclockwise rotation.</p>

- Notes: 1 Check that the temperature of the motor case does not exceed 90°C (194°F) during operation. Operating the motor in excess of 90°C (194°F) will rapidly deteriorate the coil and ball bearings and shorten service life. The temperature of the motor case can be measured by fixing a thermometer to the motor surface. Alternatively, thermotape or a thermocouple can be used to measure temperature.
- 2 Bring induction and reaction synchronous motors to a complete stop before switching the direction of rotation.
If you try to switch the direction of rotation before the motor has stopped, it may not change or may require time.
- 3 Use the provided capacitor for the motors and always keep the capacitor connected after the motor is started.

6. Time Rating

- Induction and reaction synchronous motors can be operated continuously (continuous rating).
Reversible motors can operate continuously for up to 30 minutes. (The 30 minute rating is indicated by "30min" on the nameplate.)

7. Locked rotor burnout protection

This motor is equipped with one of the two features listed below to prevent the motor from burning out as a result of abnormal heating which may be caused by misapplication.

■ Thermal protection ("THERMALLY PROTECTED" or "TP" is stamped on the motor name plate)

When the motor reaches a predetermined temperature, the internal thermal protector is activated and the motor is stopped.
With the automatic resume feature, the motor automatically begins operating again as soon as the motor temperature falls.
Always turn the power off before performing inspections.

Thermal protector activation range : Power is turned off at 120 °C±5 °C (248 °F±9 °F)
Power is turned back on at 76 °C±15 °C (168 °F±27 °F)

■ Impedance protection ("IMPEDANCE PROTECTED" or "ZP" is stamped on the motor name plate)

When the motor goes into locked rotor condition due to a malfunction, coil impedance rises, suppressing input to the motor and protecting the motor coil from burnout.

8. Troubleshooting

When the motor is not functioning normally, perform an inspection covering the points listed in the table below.

If the inspection shows that everything is normal but the motor and control unit still are not functioning correctly, contact the nearest ORIENTAL MOTOR office. Do not repair, disassemble or modify it yourself.

Problem	Things to check
The motor does not rotate or rotates at low speed	<ol style="list-style-type: none">1. Is the correct voltage being supplied to the motor?2. Are lead wires properly and firmly connected?3. Is the load too large?4. If lead wires have been extended using a terminal block or crimp-style terminals, are the lead wires properly and firmly connected at all points?5. Is the provided capacitor connected as shown in the wiring diagram of page 3?
The motor rotates intermittently	<ol style="list-style-type: none">1. Are lead wires properly and firmly connected?2. If lead wires have been extended using a terminal block or crimp-style terminals, are the lead wires properly and firmly connected at all points?3. Is the provided capacitor connected as shown in the wiring diagram of page 3?
The motor rotates in the wrong direction	<ol style="list-style-type: none">1. Is it connected as shown in the wiring diagram? Check the wiring diagram of page 3 again.2. The rotation direction of the gearhead's output shaft differs depending on the gearhead's reduction ratio.3. Is the provided capacitor connected as shown in the wiring diagram of page 3?4. Are you viewing the motor from the same direction as the diagram? The direction of rotation is defined as clockwise or counterclockwise when viewed from the side of the motor output shaft.
The motor becomes extraordinarily hot (motor case temperature exceeds 90°C (194°F))	<ol style="list-style-type: none">1. Is the correct voltage being supplied to the motor?2. Does the ambient temperature exceed the permissible range (+40 °C (104 °F))?3. Is the provided capacitor connected as shown in the wiring diagram of page 3?
The motor makes a strange noise	<ol style="list-style-type: none">1. Are motor and gearhead properly installed?2. If the motor has a pinion shaft, is the coupled gearhead the same pinion type as the motor shaft?

9. Product warranty

Check on the Oriental Motor Website for the product warranty.

- Unauthorized reproduction or copying of all or part of this manual is prohibited.
- Oriental Motor shall not be liable whatsoever for any problems relating to industrial property rights arising from use of any information, circuit, equipment or device provided or referenced in this manual.
- Characteristics, specifications and dimensions are subject to change without notice.
- While we make every effort to offer accurate information in the manual, we welcome your input. Should you find unclear descriptions, errors or omissions, please contact the nearest office.
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- Please contact your nearest Oriental Motor office for further information.

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