

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.

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World K Series Induction Motors Reversible Motors Electromagnetic Brake Motors OPERATING MANUAL



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.
Motore zur Verwendung in Geräten der Schutzklasse I.
- The motor housing must be mounted with a screw and spring washer to the ground point of the equipment.
Die Gehäuse der Motore sind mit einer Schraube und Zahnscheibe sicher mit dem geerdeten Gehäuse des Gerätes zu verbinden.
- 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.
- The electromagnetic brake is designed to activate when power is removed. However, it may not arrest all loads completely. If this motor is designed to hold in emergency situations then a second method of stopping the load must be used to ensure to load stops. If this is not used injury or machine damage may result.



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 manual.....1

2.2 Checking the product name and motor-capacitor combination

This product comes in a combined set consisting of a motor and a capacitor. When the product first arrives, check the name plates to confirm that you have received the correct motor and capacitor combination.

■ Induction Motors, Reversible Motors

Model	Motor Model	Capacitor
2IK6AA-AWU	2IK6AA-AW	CH25FAUL
3IK15AA-AWU	3IK15AA-AW	CH45FAUL
4IK25AA-AWU	4IK25AA-AW	CH65FAUL
5IK40AA-AWU	5IK40AA-AW	CH90CFAUL
2RK6AA-AWU	2RK6AA-AW	CH35FAUL
3RK15AA-AWU	3RK15AA-AW	CH60CFAUL
4RK25AA-AWU	4RK25AA-AW	CH80CFAUL
5RK40AA-AWU	5RK40AA-AW	CH120CFAUL

■ Electromagnetic brake Motors

Model	Motor Model	Capacitor
2RK6AA-AWMU	2RK6AA-AWM	CH35FAUL
3RK15AA-AWMU	3RK15AA-AWM	CH60CFAUL
4RK25AA-AWMU	4RK25AA-AWM	CH80CFAUL
5RK40AA-AWMU	5RK40AA-AWM	CH120CFAUL

Motors are recognized by UL.

Recognized name is motor model name.

- **Standards** UL519, UL547, UL1004, CSA C22.2 No.100, CSA C22.2 No.77
Standards File No. Motor : UL File No. E64199 (6W type), E64197(15W~40W type)
Capacitor : UL File No. E83671 (GYWT2)
Capacitor cap : UL File No. E56078 (YDTU2)

- **Applications for standard** EN60950, EN60034-1, EN60034-5, IEC60034-11, IEC60664

A Running Heating Test and a Locked-Rotor Test has been conducted with a aluminum radiation plate of size indicated below.

First number in motor name	size	thickness	material
2	4.53×4.53 (115×115)	0.20 (5)	aluminium
3	4.92×4.92 (125×125)		
4	5.31×5.31 (135×135)		
5	6.50×6.50 (165×165)		

※ Dimensions in inches (millimeters).

- **Installation Conditions** Overvoltage category II, Pollution degree 2, Class I equipment (For EN/IEC standards)
When the machinery to which the motor is mounted requires overvoltage III and pollution degree 3 specifications, install the motor in a cabinet that comply with IP54 and connect to power supply via an isolation transformer.

3. 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: +14°F(-10°C) to +104°F(+40°C) (avoid freezing)
- Ambient humidity: 85% max. (avoid condensation)
- Not exposed to explosive, flammable, or corrosive gas
- Not exposed to direct sunlight
- Not exposed to dust
- Not exposed to water or oil
- A place where heat can escape easily
- Not exposed to continuous vibration or excessive impact
- 1,000 meters or less above sea level
- Overvoltage category II, Pollution degree 2, Class I equipment (For EN/IEC standards)
When the machinery to which the motor is mounted requires overvoltage category III and pollution degree 3 specifications, install the motor in a cabinet that comply with IP54 and connect to power supply via an isolation transformer.

3.1 Mounting the motor

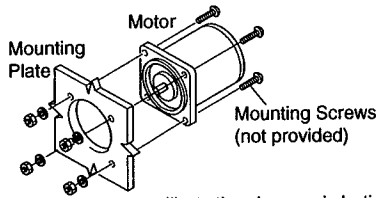


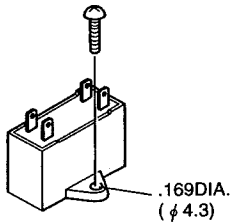
Illustration shows an induction motor.

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

Drill holes in the mounting plate that match the screws and the motor's dimensions. Use screws, washers, and nuts listed below to fasten the motor to the mounting plate. Make sure that no gaps are left between the motor and the surface of the mounting plate. Use screws of an appropriate length.

Mounting screws	First letter of motor model name	Screw size	Tightening torque
	2	M4	18 lb-in (2.0N·m)
	3	M5	22 lb-in (2.5N·m)
	4	M5	22 lb-in (2.5N·m)
	5	M6	27 lb-in (3.0N·m)

3.2 Mounting the capacitor



Before mounting the provided capacitor, check that the capacitor's capacitance matches that stated on the motor's name plate.

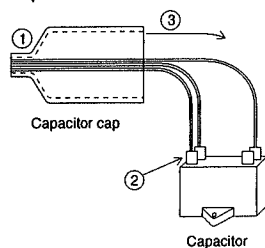
Use M4 screws to mount the capacitor (screws not provided).

- Note**
- Do not let the screw fastening torque exceed 8.6 lb-in (1 N·m) to prevent damage to the mounting feet.
 - Mount capacitor at least 3.94 inches (10 cm) away from the motor. If it is located closer, the life of the capacitor will be shortened.

※ Dimensions in millimeters (inches).

4. Connection and Operation

- Connect the motor according to the "wiring diagram" shown below. (For Capacitor Connection, see page 4.)
 - Insulate all the wire connections, such as the connection between the motor and the capacitor connection.
- Capacitor cap are available to insulate capacitor connection.

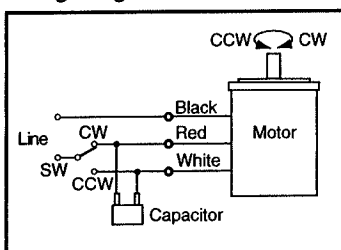


Capacitor caps

- 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.

4.1 Induction Motor and Reversible Motor

Wiring diagram



The directions of motor rotation is as viewed from motor output shaft side.

To rotate the motor in a clockwise (CW) direction, flip switch SW to CW.
To rotate it in a counterclockwise (CCW) direction, flip this switch to CCW.

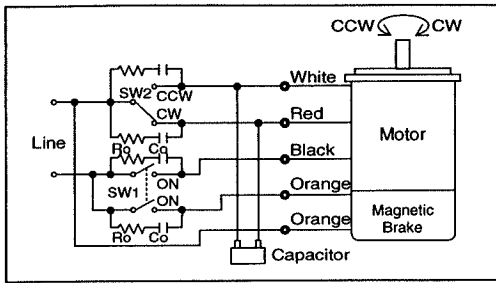
Note • Insulation class of this motor is B.

Make sure that the motor case temperature does not exceed 194°F(90°C) during operation of the motor. Operation exceeding case temperature 194°F(90°C) may significantly deteriorate the coils and ball bearings of the motor and shorten motor's life span. Motor case temperature can be measured by fixing a thermometer on the motor surface. It can also be measured using thermo tape or a thermocouple.

- To change rotation direction of the induction motor, wait until the motor completely stops. Otherwise its direction may not change or may take much time to change.
- The motor use a capacitor and keep it connected even after rotation of the motor has started.

4.2 Electromagnetic Brake Motor

1) Wiring diagram



The directions of motor rotation is as viewed from motor output shaft side.

No. of Switch	Specification	Note
SW1	AC125V 3A or more	Switched Simultaneously
SW2		—

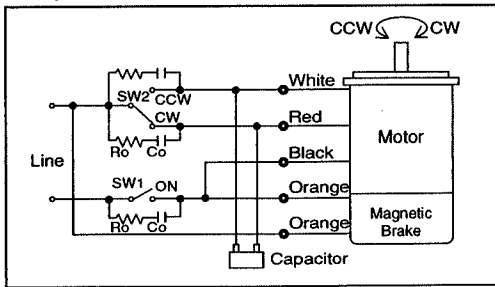
SW1 emits sparks when turned on and off. In order to protect the relay contacts, CR circuit (\sim) must be connected.

$$R_o = 5 \sim 200 \Omega$$

$$C_o = 0.1 \sim 0.2 \mu F \quad 200WV$$

Option of the ORIENTAL MOTOR's surge absorber is available.
Optional product name **EPCR1201-2** (sold separately)

■ Simplified Connection



Connection can be simplified by using the connecting diagrams shown below when changing the switch RUN/STOP of the motor and the electromagnetic brake by one switch. Using the connection shown below, however, results in a 50msec. increase in braking time over that of the basic connection with a corresponding increase in overrun. The reason for this is that an electromagnetic energy of motor electromagnetic brake, so that the electromagnetic continues to operate for about 50msec. even though the switch SW1 has been turned off. The brake thus takes longer to engage.

2) Operation

Note • This motor is B type insulation motor.

Make sure that the motor case temperature does not exceed 194°F(90°C) during motor operation.

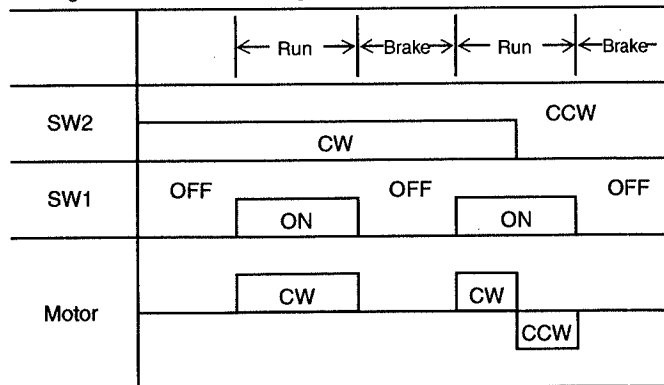
Operating the motor above 194°F(90°C) will shorten the life of the coil and the ball bearings.

Motor case temperature can be measured by fastening a thermometer to the motor's surface, or with thermo-tape.

• Be sure to use the capacitor that comes standard with your motor.

Keep the capacitor connected all the time even after the motor has been started.

[Timing Chart] This Timing Chart is case of the basic connection



■ Starting and Stopping

SW1 operates motor and electromagnetic brake action.

Motor will rotate when SW1 is switched simultaneously to ON(short circuit). When SW1 is switched simultaneously to OFF(open), the motor stops immediately by electromagnetic brake and holds the load.

Note : When operating the electromagnetic brake, this may make a friction noise because this is the braking system by friction, but this is not a problem.

■ Direction of Rotation

To rotate the motor in a clockwise(CW) direction, switch SW2 to CW.

To rotate it in a counter-clockwise(CCW) direction, switch SW2 to CCW.

■ Other ways of operating

• Hastening the motor's starting time

If the electromagnetic brake is left release, the motor can be started much faster.

Optimum timing for release of the brake is at least 10 ms before starting up the motor.

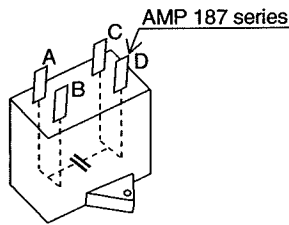
• Releasing Electromagnetic brake

If you wish to release the brake while the motor is stopped, apply voltage between only two orange lead wires.

The electromagnetic brake is released and the motor shaft can be rotated easily by hand.

Note : When driving a vertical load, this method cannot be applied because this may cause the load to fall.

4.3 Capacitor Connection



The capacitor internal wiring is as follows:
 Capacitor terminals are internally electrically connected in twos; A—B and C—D for easy connection.
 For easy to install terminals use 187 series AMP FASTON Terminals.
 For lead wire connection, use one lead wire for each individual terminal.

5. Time Rating

Induction motors have a continuous rating.
 Reversible motors have a 30 minutes rating. "30min" is indicated on the nameplate.

6. Locked rotor burnout protection

This motor is equipped with one of two methods to prevent burning the motor as a result of abnormal heating .

■ **Thermal protection ("TP" "TP211" 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.
 In this stage, the electromagnetic brake is left released so that the motor does not keep hold of the load. Adopt another safety measure.
 With the automatic resume feature, the motor automatically begins operating again as soon as the motor temperature falls to a temp.
 Always turn the power off before performing inspections.

Thermal protector activation range:

Power is turned off at 266°F(130°C) ±9°F(5°C)
 Power is turned back on at 180°F(82°C) ±27°F(15°C)

■ **Impedance protection ("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.

7. 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.

Problem	Things to check
The motor does not rotate or motor rotates at low speed	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 by using a terminal strip or terminal block, are the lead wires properly and firmly connected at all points? 5) Is the provided capacitor connected as shown in the wiring diagram of pages 2 and 3 ? 6) Is voltage applied to the brake lead wires?
The motor rotate correctly or properly	1) Are lead wires properly and firmly connected? 2) If lead wires have been extended by using a terminal strip or terminal block, are the lead wires properly and firmly connected at all points? 3) Is the provided capacitor connected as shown in the wiring diagram of pages 2 and 3 ?
The motor rotates in the wrong direction	1) Is the connection as shown in the wiring diagram? Check the wiring diagram of pages 2 and 3 again. 2) Is the provided capacitor connected as shown in the wiring diagram of pages 2 and 3 ? 3) Are you looking at the motor from the wrong side? Rotation is defined as viewed from the output shaftside.
The motor becomes extraordinarily hot (motor case temperature exceeds 194°F(90°C))	1) Is the correct voltage being supplied to the motor? 2) Does the ambient temperature exceed the permissible range ? 3) Is the provided capacitor connected as shown in the wiring diagram of pages 2 and 3 ?

ORIENTAL MOTOR

• Characteristics, specifications and dimensions are subject to change without notice.
 • Please contact your nearest ORIENTAL MOTOR office for further information.

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