

# **AC Motor Troubleshooting: The motor does not rotate**

---

- (1) In order to ensure a safe use of the system, please refer to the operating manuals and operating instructions for each device such as "Safety Precautions" and "Safety Essentials". Please check the contents before use.
- (2) No part of this material may be reproduced in any form or by any means without the permission of Oriental Motor Co., Ltd. It may not be copied, reproduced or redistributed.
- (3) The information contained in this document is as of December 2020.  
The information in this document is subject to change without notice.
- (4) This document describes the malfunction of the equipment and does not cover the individual operation, installation or wiring methods. For further information, other than the malfunction of the equipment, please refer to the operating manual of the product or contact the manufacturer for more information.

## Problem: Motor does not rotate

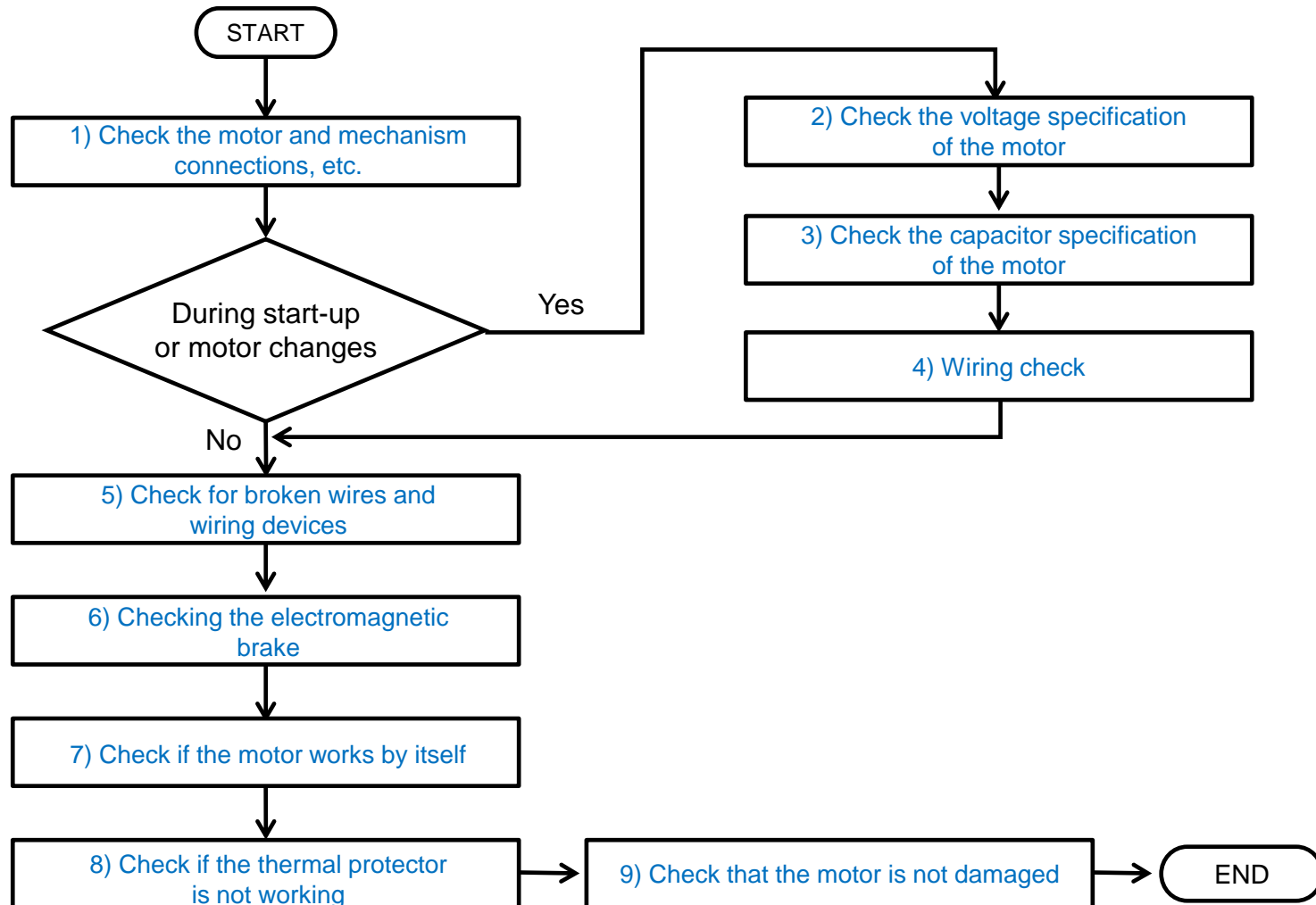
---

If the motor does not rotate, the cause could be

- 1) There is a **slip in the mechanism**.
- 2) The **voltage specification of the motor and the input voltage are different** \*.
- 3) **Appropriate capacitor is not connected**\*.
- 4) There is a **mistake in the wiring**.
- 5) There is **something wrong with the cable or wiring device**.
- 6) **Electromagnetic brake is not released**.
- 7) It is in the **overload state**.
- 8) The **thermal protector is working**.
- 9) The **motor or capacitor is damaged**.

\* Occurs most often at start-up or when changes are made, such as motor replacement.

# What to do if the motor does not rotate



## 1) Slippage has occurred in the mechanism

---

If the motor does not rotate, the cause could be

- 1) There is a **slip in the mechanism**.
- 2) The voltage specification of the motor and the input voltage are different \*.
- 3) Appropriate capacitor is not connected\*.
- 4) There is a mistake in the wiring.
- 5) There is something wrong with the cable or wiring device.
- 6) Electromagnetic brake is not released.
- 7) It is in the overload state.
- 8) The thermal protector is working.
- 9) The motor or capacitor is damaged.

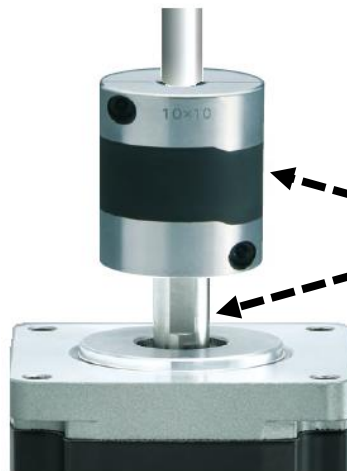
\* Occurs most often at start-up or when changes are made, such as motor replacement.

## 1) Slippage has occurred in the mechanism

If the machine does not work or stops, it may be due to a loose connection between the motor and the mechanism or a slipped mechanism. Before checking the motor, make sure that there are no loose connections, such as couplings, or that only the output shaft of the motor is rotating, for example, due to a broken chain.

<Please check>

Check that there are no loose connections between the motor and the mechanism and that only the output shaft is idling.

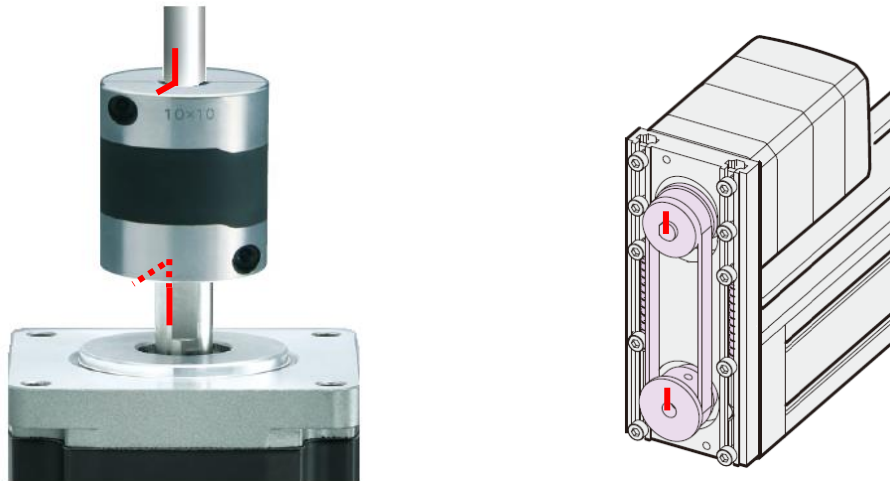


Visually check the output shaft of the motor

## 1) Slippage has occurred in the mechanism

If this is difficult to identify, it is helpful to mark the fastener with a "straight line" using a pen or similar.

If there is a discrepancy in the markings, the output shaft is likely to be idle.



If the output shaft is rotating and the coupling or other fastening or mechanical part is not rotating, this is likely to be caused by a loose connection. So please re-tighten or otherwise review the mechanism.

If the output shaft is not rotating, check the following items.

## Problem: Motor does not rotate

---

If the motor does not rotate, the cause could be

- 1) There is a slip in the mechanism.
- 2) The **voltage specification of the motor and the input voltage are different** \*.
- 3) Appropriate capacitor is not connected\*.
- 4) There is a mistake in the wiring.
- 5) There is something wrong with the cable or wiring device.
- 6) Electromagnetic brake is not released.
- 7) It is in the overload state.
- 8) The thermal protector is working.
- 9) The motor or capacitor is damaged.

\* Occurs most often at start-up or when changes are made, such as motor replacement.



## 2) The voltage specification of the motor and the input voltage are different

If the voltage input to the motor is different from the voltage specification of the motor, the motor may not run.

If the motor does not run, check the nameplate of the motor you are using and make sure that the voltage specification of the motor matches the voltage you are inputting.

<Please check>

1. Check the voltage specification of the motor from the motor nameplate.
2. Check the voltage input to the motor with a tester.

1. Check the voltage specification of the motor.

The voltage specification can be checked by looking at the area marked in red on the motor nameplate.

MODEL		SAMPLE				
Orientalmotor		INDUCTION MOTOR				
W	V	Hz	A	μF(250V)	r/min	Amb.
25	100	50/60	0.51/0.52	8.0	1200/1450	50°C
25	110	60	0.46	6.5	1450	40°C
25	115	60	0.46	6.5	1450	40°C

Cont.(S1) TP Ins.Class B(S1) TE

IP20

产品名称: 电容运转异步电动机  
 过热保护: 热保护的  
 制造商: 东方马达株式会社 制造地: 日本  
 2017/01  
 TX9 1K46701

ORIENTAL MOTOR CO.,LTD.  
 MADE IN JAPAN

## 2) The voltage specification of the motor and the input voltage are different

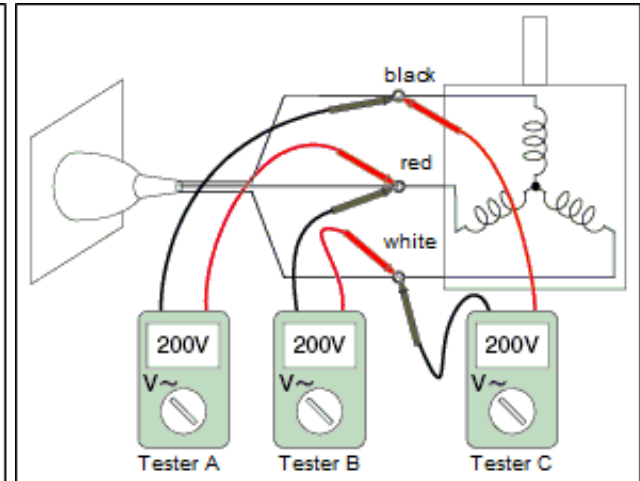
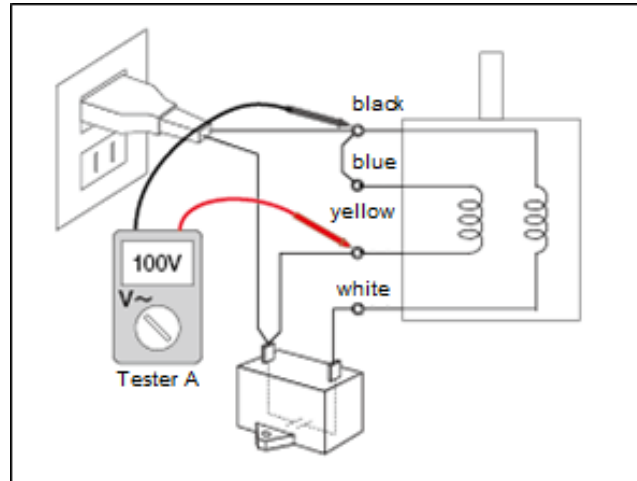
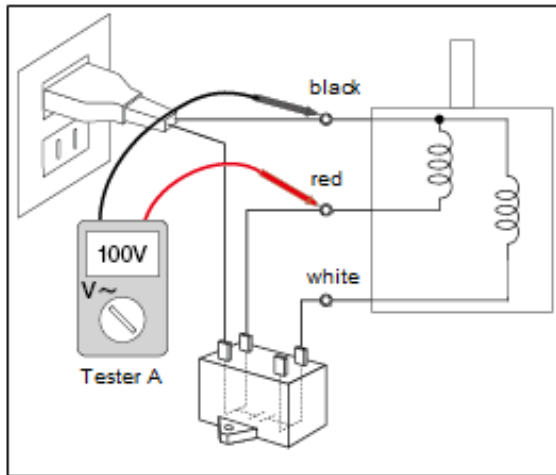
2. Check the voltage input to the motor with a tester.

If you do not know the voltage input, please check the following measurement points with a tester.

(Please be careful where you measure. If the voltage between the capacitor terminals is measured by mistake, the voltage will be 1.4 to 1.7 times the supply voltage.)

For single-phase induction motors and reversible motors

For three-phase induction motors



Induction/reversible motor (3 leads) with example of CW directional rotation.

Induction motor (4 leads) with example of CW directional rotation.

Please check all testers A, B and C.

If the measured value is different from the voltage specification of the motor, replace the motor or change the supply voltage used.

If the measured voltage is 0 V or lower than the voltage specification, the cable may be disconnected or connected incorrectly.

Please refer to the sections about the connection and wiring check.

## Problem: Motor does not rotate

---

If the motor does not rotate, the cause could be

- 1) There is a slip in the mechanism.
- 2) The voltage specification of the motor and the input voltage are different \*.
- 3) **Appropriate capacitor is not connected\***.
- 4) There is a mistake in the wiring.
- 5) There is something wrong with the cable or wiring device.
- 6) Electromagnetic brake is not released.
- 7) It is in the overload state.
- 8) The thermal protector is working.
- 9) The motor or capacitor is damaged.

\* Occurs most often at start-up or when changes are made, such as motor replacement.

### 3) The appropriate capacitor is not connected

In order to rotate a single-phase AC motor, a capacitor must be connected. Capacitors are supplied with the motor when it is purchased. The capacity and voltage of the capacitor is fixed for each motor, and if the capacity or voltage of the capacitor to be combined is not appropriate, the torque will not be delivered correctly and the motor may not run. If the motor does not run or heats up abnormally, please check the capacitance and voltage of the combined capacitors in the following way.

<Please check>

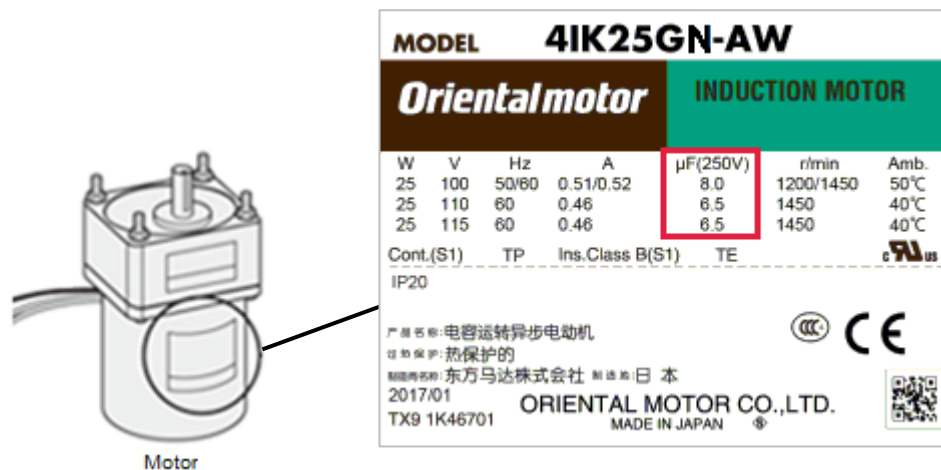
1. Check the capacitor capacity and voltage on the nameplate of the motor.
2. Check the capacitance and voltage of the capacitors to be combined.

Please note:

A voltage of 1.4 to 1.7 times the supply voltage is applied between the capacitor terminals. The rated voltage of the capacitor is not the same as the rated voltage of the motor.  
(Rated voltage of the motor is 100 VAC  $\Rightarrow$  Rated voltage of the capacitor to be combined is 250 VAC or more)  
(Rated voltage of the motor is 200 VAC  $\Rightarrow$  Rated voltage of the capacitor to be combined is 450 VAC or more)

### 3) The appropriate capacitor is not connected

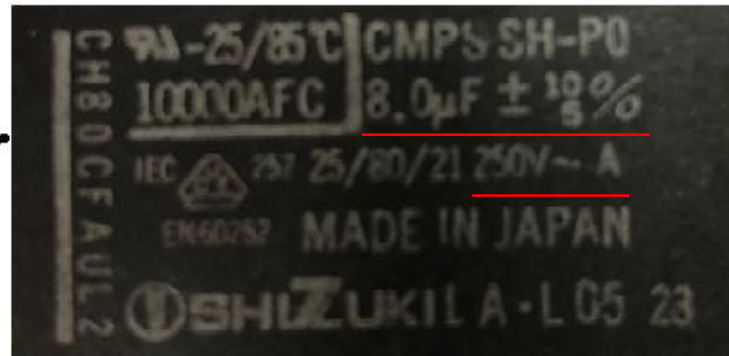
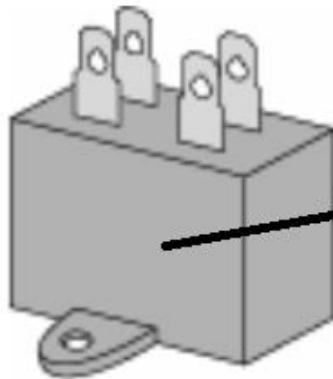
1. Check the capacitor capacity and voltage on the nameplate of the motor.  
 Check the nameplate on the motor for the correct capacitor capacitance and voltage.  
 Here we use the World K Series 4IK25GN-AW as an example. The red frame shows the capacitance and voltage of the capacitor.



The capacitors used must have a withstand voltage of 250 V or more.  
 The capacity can vary depending on the voltage used, and for this motor it is as follows:  
 The voltage used is 100 V => 8.0 uF  
 The voltage used is 110/115 V => 6.5 uF

### 3) The appropriate capacitor is not connected

2. Check the capacitance and voltage of the capacitors to be combined.  
Check the capacitance and voltage rating from the side of the capacitor to be combined.  
Please check that this matches what the motor is asking for.



Capacitor name: CH80CFAUL2

Capacity: 8.0 uF

Rated voltage: 250 V

## Problem: Motor does not rotate

---

If the motor does not rotate, the cause could be

- 1) There is a slip in the mechanism.
- 2) The voltage specification of the motor and the input voltage are different \*.
- 3) Appropriate capacitor is not connected\*.
- 4) There is a **mistake in the wiring**.
- 5) There is something wrong with the cable or wiring device.
- 6) Electromagnetic brake is not released.
- 7) It is in the overload state.
- 8) The thermal protector is working.
- 9) The motor or capacitor is damaged.

\* Occurs most often at start-up or when changes are made, such as motor replacement.

## 4) There is a mistake in the wiring

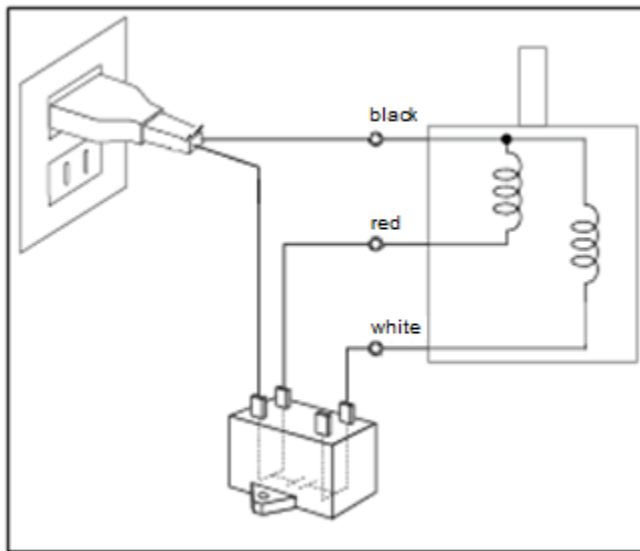
If the motor does not run at start-up, there may be a wiring error.

Read the operating manual carefully and compare the wiring with the actual wiring to ensure that there is no mistake.

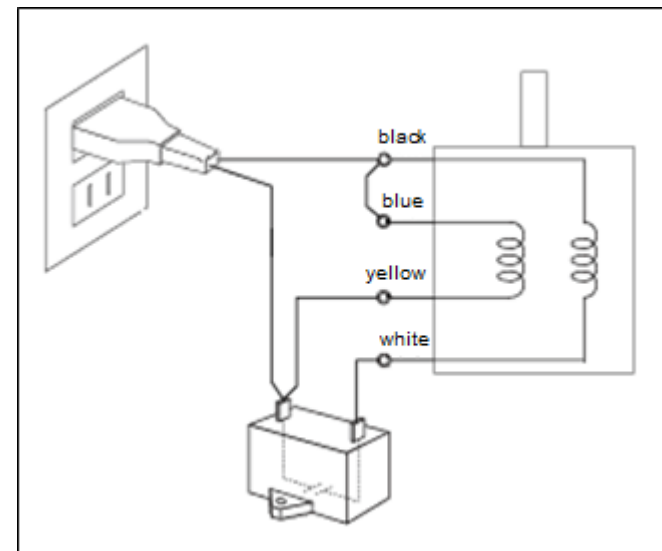
Especially if your motor is a single-phase motor.

Please check carefully, as in many cases the capacitor is miswired and does not work.

Connection example for single-phase induction motors and reversible motors (CW direction)



Induction/reversible motor (3 leads),  
example of CW directional rotation



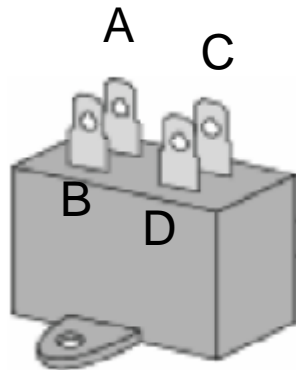
Induction motor (4 leads), example of  
CW directional rotation

The colour of the wires may vary depending on the series. Please read the supplied operating manual carefully and check the connection points.

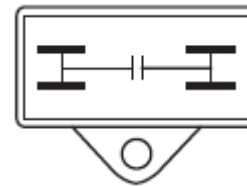


## 4) There is a mistake in the wiring

The capacitor supplied with the motor can be either 2 or 4 terminals. In the case of a 4-terminal capacitor, terminals A and B, and terminals C and D are connected internally, and electrically, it has two terminals.



4-terminal capacitor  
Internal wiring diagram



In the connection diagram in the operating manual, a CR circuit for absorbing surge voltage has been added to protect the contacts (switches), but if the motor does not run properly, please check the operation with all CR circuits and contacts removed.

## Problem: Motor does not rotate

---

If the motor does not rotate, the cause could be

- 1) There is a slip in the mechanism.
- 2) The voltage specification of the motor and the input voltage are different \*.
- 3) Appropriate capacitor is not connected\*.
- 4) There is a mistake in the wiring.
- 5) There is **something wrong with the cable or wiring device.**
- 6) Electromagnetic brake is not released.
- 7) It is in the overload state.
- 8) The thermal protector is working.
- 9) The motor or capacitor is damaged.

\* Occurs most often at start-up or when changes are made, such as motor replacement.

## 5) There is something wrong with the cable or wiring equipment

The motor may not rotate if there is a faulty connection due to a broken cable or a faulty wiring device.

Check that there is nothing wrong with the connections or wiring equipment.

<Please check>

1. Check with a tester that voltage is applied between the motor and the capacitor terminals.
2. Check for cable breakage and abnormalities in connection points such as terminal blocks and crimp terminals.
3. Check for malfunctions in relays and other wiring devices.

1. Check the voltage between motor and capacitor terminals with a tester.

Use a tester to measure the voltage applied between the motor and capacitor terminals. If the voltage is unusually low or cannot be checked, there may be a broken cable or a problem with the connection.

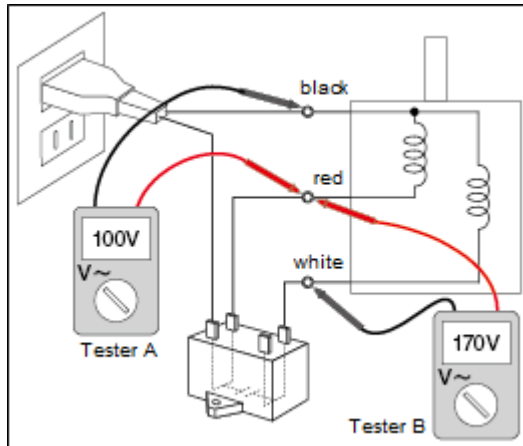
Please note:

Be sure to check the actual wiring, not just the wiring diagram.

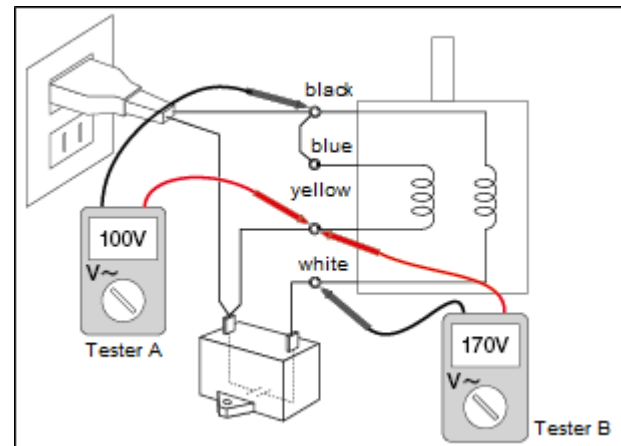
(Make sure you know where the motor cables are routed).

When measuring the voltage, try to measure it as close to the motor as possible.

## 5) There is something wrong with the cable or wiring equipment



Induction/reversible motor (3 leads), example of CW directional rotation

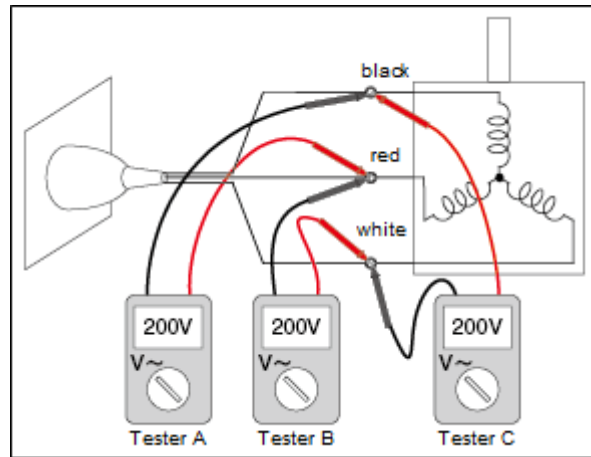


Induction motor (4 leads), example of CW directional rotation

(approx. 1.7 times the supply voltage at no load and approx. 1.4 times the supply voltage at rated load)

Voltage measurement method for single-phase induction motors and reversible motors

## 5) There is something wrong with the cable or wiring equipment



For three-phase induction motors

## 5) There is something wrong with the cable or wiring equipment

If there is no voltage problem, please check the other solutions.

If there is a voltage problem:

Check that there are no cable breaks or problems with terminal blocks, crimp terminals or other connection points (see No. 2).

Also check that there are no operating faults in relays and other wiring devices (see No. 3).

Please note:

If the motor used is of the type with an electromagnetic brake, please also check the wiring of the electromagnetic brake.

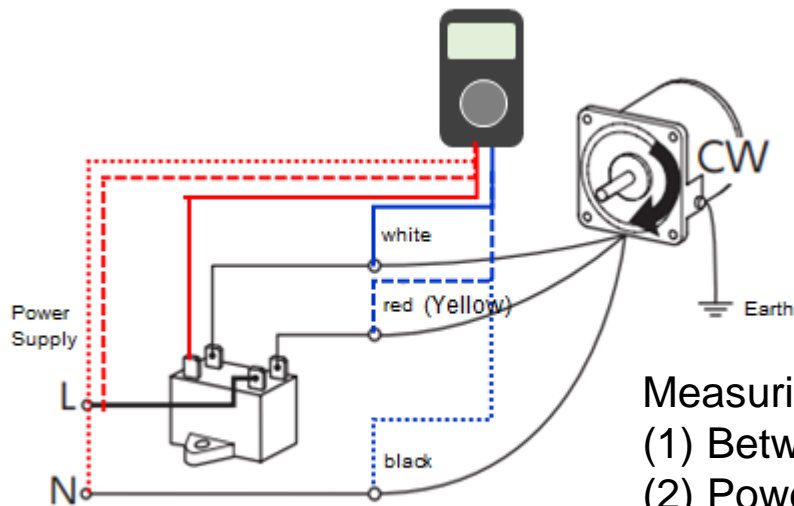
For more information on checking the electromagnetic brake, please refer to the following information “6) Electromagnetic brake is not released”.

## 5) There is something wrong with the cable or wiring equipment

2. Check for cable breaks, terminal blocks, crimp terminals and other connection points. Check the resistance at the source of the input and just before the motor with a tester, etc., to make sure there is no problem with the cable breakage or connection (between blue and red below).

If the measurement does not show an open condition, there is no wire break.

Induction motor (clockwise direction)



### Measuring points

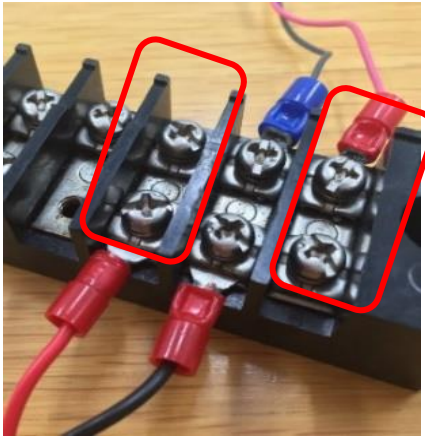
- (1) Between capacitor and motor (white) (solid line)
- (2) Power supply (L) - motor (red/yellow) (dashed line)
- (3) Power supply (N) - Motor (black) (dotted line)

When measuring resistance, be sure to turn off the power supply for safety.

## 5) There is something wrong with the cable or wiring equipment

If the resistance is open, check the terminal block for wrong connections or missing terminals.

Wrong connection



Terminal disconnection





## 5) There is something wrong with the cable or wiring equipment

### 3. Check malfunctions in relays and other wiring devices.

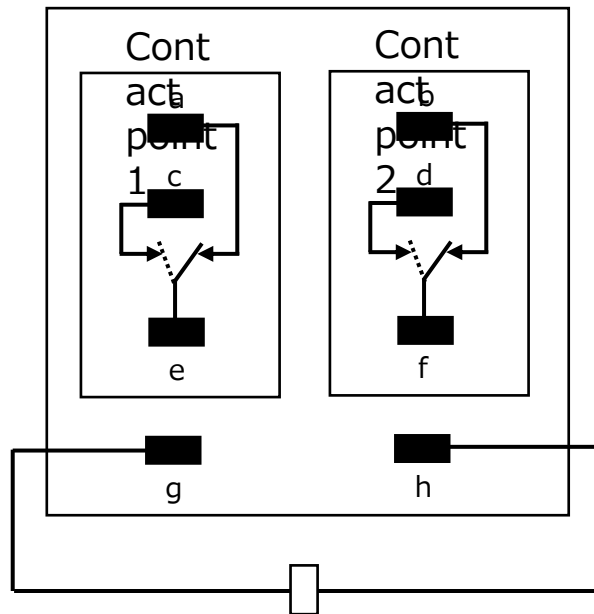
Relays can be damaged by surge voltages, for example by welding.

A tester is used to check that the contact switches are switched in accordance with the control commands (continuity check).

Visually check the condition of the relay contacts (no blackening or welding).

Also check with a tester that the continuity destination is switched by switching the control unit.

Example: Relay internal circuit

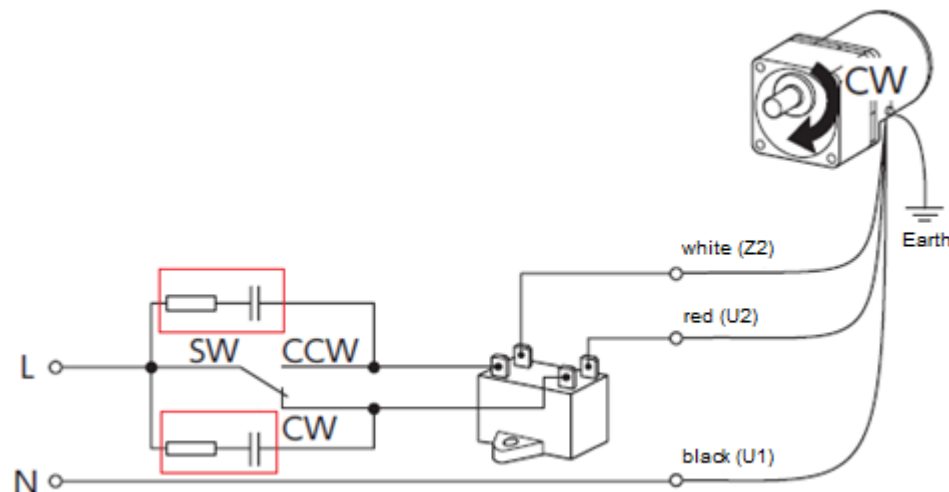


Control unit OFF (g - h open)  
Contact point 1: e - a conductive  
Contact 2: f - b conducts  
Control unit ON (voltage applied to g - h)  
Contact 1: e-c conducts  
Contact 2: f - d conducts

## 5) There is something wrong with the cable or wiring equipment

If the cause is welding of the relay due to surge voltage, adding a surge killer circuit may improve the situation.

If you are not using a surge killer circuit, please consider installing one.

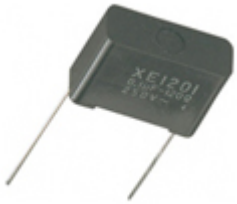


Also available from Oriental Motor as an option (sold separately). Please see next page.

## 5) There is something wrong with the cable or wiring equipment

### Options

#### CR circuit for surge voltage absorption



Product name: EPCR1201-2

Specification: 250 VAC (120  $\Omega$ , 0.1  $\mu$ F)

#### CR circuit module



Product name: VCS02

This circuit facilitates the connection of a CR circuit for surge voltage absorption.

It is equipped with four optional EPCR1201-2.

## Problem: Motor does not rotate

---

If the motor does not rotate, the cause could be

- 1) There is a slip in the mechanism.
- 2) The voltage specification of the motor and the input voltage are different \*.
- 3) Appropriate capacitor is not connected\*.
- 4) There is a mistake in the wiring.
- 5) There is something wrong with the cable or wiring device.
- 6) Electromagnetic brake is not released.**
- 7) It is in the overload state.
- 8) The thermal protector is working.
- 9) The motor or capacitor is damaged.

\* Occurs most often at start-up or when changes are made, such as motor replacement.

## 6) Electromagnetic brake is not released

If the motor you are using is a type with an electromagnetic brake and the motor does not rotate, please follow the steps below to check that the electromagnetic brake has been released correctly. If voltage is not applied to the electromagnetic brake due to misconnection or cable disconnection, the motor may not rotate even when running.

<Please check>

1. Check that the output shaft is locked when no voltage is applied.
2. Apply voltage to the electromagnetic brake and check that the output shaft is free.  
(Depending on the series, the electromagnetic brake will make a clicking sound when the voltage is applied, although the sound may be quieter).

Please note:

On high reduction gearheads, the output shaft may not turn by hand. Remove the gearhead and try again.

If the gearhead is removed, do so with great care to avoid contamination from grease and injury from the output shaft edge.

When reassembling, care must be taken to avoid scratching the teeth.

If the above procedure results in the motor turning with a light force, the electromagnetic brake is normal.

If the electromagnetic brake does not release, please check the following solutions.

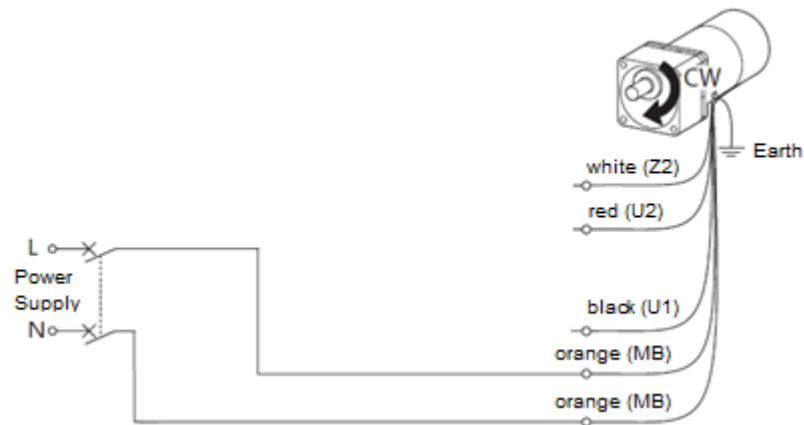
## 6) Electromagnetic brake is not released

If the electromagnetic brake does not release, check the following items.

<Please check>

1. Disconnect all wiring except for the electromagnetic brake line, rewire the electromagnetic line to connect directly to the power supply and check the operation.
2. Check that the electromagnetic brake wire is not disconnected.

1. Disconnect all wiring except for the electromagnetic brake line, rewire the electromagnetic line to connect directly to the power supply and check the operation.



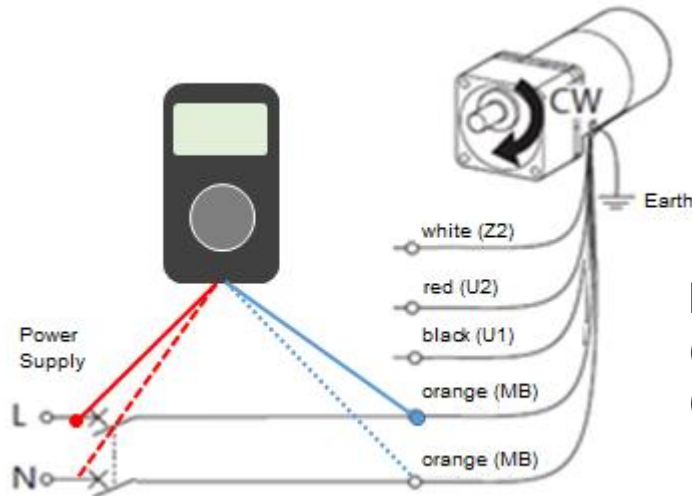
If the operation improves, it may be due to a wiring error or a fault in the wiring equipment. Please check the wiring again.

When the electromagnetic brake is not released, the motor will generate heat and the thermal protector may be activated.

## 6) Electromagnetic brake is not released

2. Check the continuity of the electromagnetic brake wire using a tester or similar device to ensure that it is not broken.

For safety reasons, the power must be switched off when measuring resistance.



### Measuring points

- (1) Power supply (L) - MB (orange) (solid line)
- (2) Power supply (N) - MB (orange) (dashed line)

If you are using a motor with an electromagnetic brake, it is not possible to check the continuity between the electromagnetic brake and the motor, nor is it possible to determine if the electromagnetic brake wire coming from the motor is broken.

Due to the rectification circuit mounted on the electromagnetic brake side, the resistance value may be displayed as open.

If there is no problem with the wiring and wiring devices and the electromagnetic brake does not release, the electromagnetic brake itself may be damaged. Please contact your local sales office or customer service centre.

When the electromagnetic brake is not released, the motor will generate heat and the thermal protector may be activated.

## Problem: Motor does not rotate

---

If the motor does not rotate, the cause could be

- 1) There is a slip in the mechanism.
- 2) The voltage specification of the motor and the input voltage are different \*.
- 3) Appropriate capacitor is not connected\*.
- 4) There is a mistake in the wiring.
- 5) There is something wrong with the cable or wiring device.
- 6) Electromagnetic brake is not released.
- 7) It is in the **overload state**.
- 8) The thermal protector is working.
- 9) The motor or capacitor is damaged.

\* Occurs most often at start-up or when changes are made, such as motor replacement.



## 7) It is in the overload state

If the load torque is higher than the motor can handle, the motor may not run (= overload condition).

If the motor does not move, remove the motor from the machine and check that it turns.

<Please check>

Check that the motor rotates when it is disconnected from the machine (i.e. under no load).

The motor may heat up and the thermal protector may be activated if operation is continued under overload conditions. If the inertia is too great, the motor may not run.

If the motor starts to rotate with no load, please check the following:

Check that there are no factors on the load/mechanism side that could cause an overload (increased weight, snagging on the mechanism, increased friction over time, etc.).

Review of the torque requirements and the torque the motor can deliver.

=> Recalculation of mechanism load conditions

Review of unanticipated loads and conditions

## 7) It is in the overload state

---

The load (required torque) can be calculated from the mechanism conditions. Oriental Motor also offers a motor selection service on its website.

Also, if the wiring or the capacitors connected to it are not suitable, the output torque may be lower than the motor is normally capable of producing. We recommend that you check the other details as well.

## Problem: Motor does not rotate

---

If the motor does not rotate, the cause could be

- 1) There is a slip in the mechanism.
- 2) The voltage specification of the motor and the input voltage are different \*.
- 3) Appropriate capacitor is not connected\*.
- 4) There is a mistake in the wiring.
- 5) There is something wrong with the cable or wiring device.
- 6) Electromagnetic brake is not released.
- 7) It is in the overload state.
- 8) The **thermal protector is working**.
- 9) The motor or capacitor is damaged.

\* Occurs most often at start-up or when changes are made, such as motor replacement.

## 8) The thermal protector is working

Some AC motors may have a built-in over-temperature protection device called a thermal protector\*.

In the case of motors with an integrated thermal protector, if the motor heats up to a certain level, the thermal protector is activated and the motor is forced to stop.

If the machine repeatedly stops while in operation, try to identify the cause as the thermal protector.

<Please check>

1. Power cut off after motor has stopped.
2. When the motor has cooled down sufficiently, turn the power back on and see if it works. Another way to check the condition of the thermal protector is by measuring the resistance of the motor windings.

Resistance open: thermal protector is operating

Resistance can be measured: thermal protector is not working

Please note:

Always switch off the power before checking.

If the power supply is left on, it is dangerous because the thermal protector will recover and the motor will suddenly start to turn.

\* The motor nameplate with integrated thermal protector is marked with TP.

## 8) The thermal protector is working

If the thermal protector activates frequently, please review the following:

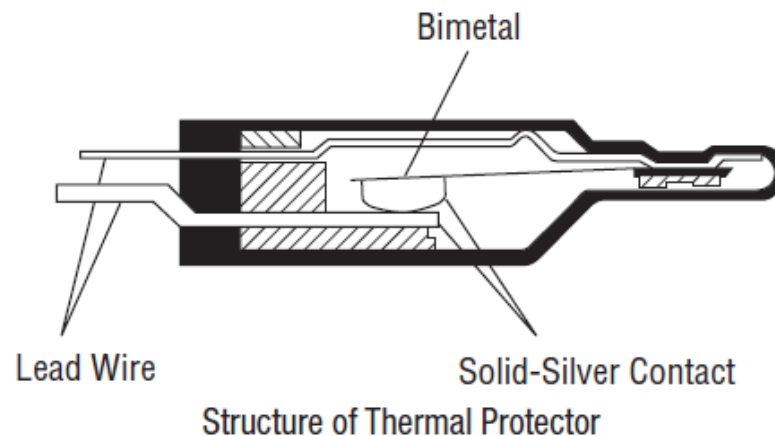
- Review of the motor in use
- Review of the operating environment (temperature, load)

In addition, the motor may heat up abnormally if the combination of capacitors or the input voltage is wrong.

Please refer to "Motor running unusually hot" in the AC Motor troubleshooting section to check for problems.

Supplement: Thermal protectors (over-temperature protection devices)

When the temperature rises, the contacts of a component called a bimetal are turned off and the motor current is interrupted.



Operating temperature:  $130 \pm 5^{\circ}\text{C}$   
 Return temperature:  $82 \pm 15^{\circ}\text{C}$   
 Some models have different operating temperatures.

## Problem: Motor does not rotate

---

If the motor does not rotate, the cause could be

- 1) There is a slip in the mechanism.
- 2) The voltage specification of the motor and the input voltage are different \*.
- 3) Appropriate capacitor is not connected\*.
- 4) There is a mistake in the wiring.
- 5) There is something wrong with the cable or wiring device.
- 6) Electromagnetic brake is not released.
- 7) It is in the overload state.
- 8) The thermal protector is working.
- 9) The **motor or capacitor is damaged**.

\* Occurs most often at start-up or when changes are made, such as motor replacement.

## 9) The motor or capacitor is damaged

If the contents of 1)-8) are OK and the motor does not rotate, the motor or capacitor may be damaged. You can check this in three simple ways:

<Please check>

1. Check the winding condition by measuring the resistance of the motor winding.
2. Check the deterioration of the bearings by hand turning the motor output shaft.
3. Check the capacitor capacity.

Please note:

To prevent electric shock and short-circuit accidents, always switch off the power supply when checking. If the circuit breaker is tripped when the power is turned on the motor's power line may be grounded or the motor may have suffered a breakdown. In such cases, we recommend that you do not switch on the power but replace the motor and capacitors.

About inspection:

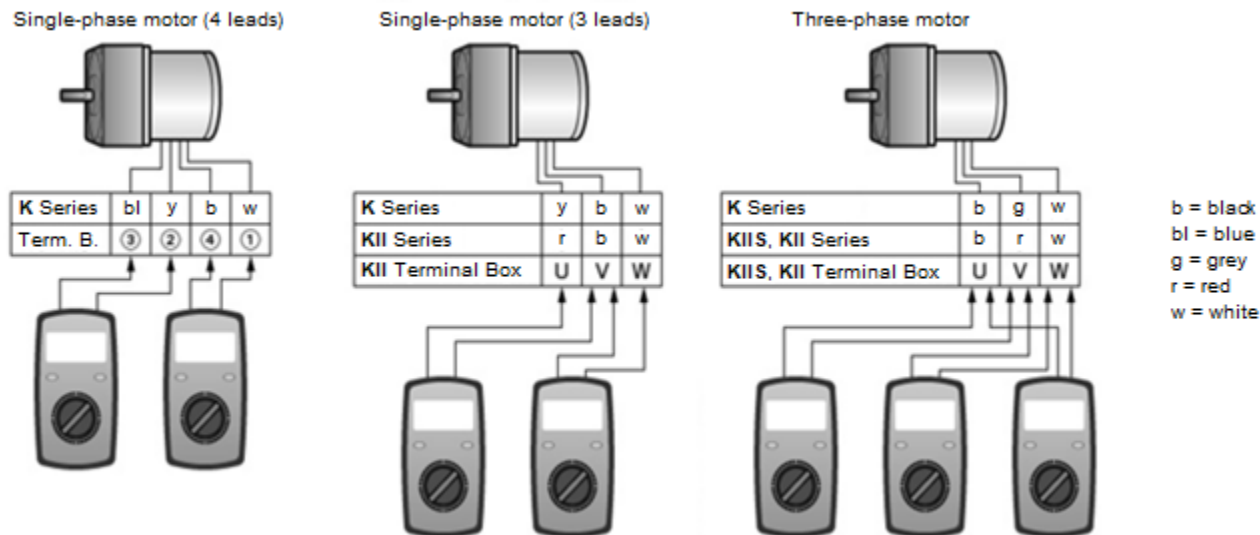
We will carry out an inspection free of charge.  
If you would like to carry out an inspection, please contact your local sales office or customer service centre.

## 9) The motor or capacitor is damaged

1. Check the winding condition by measuring the resistance of the motor winding.

Measure the resistance of the motor windings, referring to the diagram below, and check that the windings are not broken or shorted.

For safety reasons, the power must be switched off when measuring resistance.



If the measured resistance of each phase is more than a few  $k\Omega$ , the wire may be disconnected.

If the resistance is less than  $1 \Omega$ , there is a short circuit in the motor.

Also check the resistance between the motor leads and the motor housing (PE terminals).

If the measured resistance is less than  $1 \Omega$ , the winding may have a ground fault.

If any of the above conditions apply, please inspect and check the condition of the motor or try to replace the motor.



## 9) The motor or capacitor is damaged

2. Checking the deterioration of the bearings by hand turning the motor output shaft.  
With the gearhead removed, turn the motor output shaft by hand to check that it is not locked and that there are no unusual noises.

Please note:

If the gearhead is removed, do so with great care to avoid contamination from grease and injury from the output shaft edge.

When reassembling, care must be taken to avoid scratching the teeth.

For reversible motors:

There is a simple brake, which causes some contact noise and resistance, but this is not abnormal.

For motors with electromagnetic brake:

After releasing the electromagnetic brake, turn the motor output shaft by hand to check that there is no locking or noise.

For right-angle geared type and worm geared type:

As the gearhead cannot be removed, it is not possible to check the motor output shaft by hand. We recommend that you send it for inspection.

If it cannot be turned by hand, or if it sticks or makes an unusual noise, the bearings may be damaged.

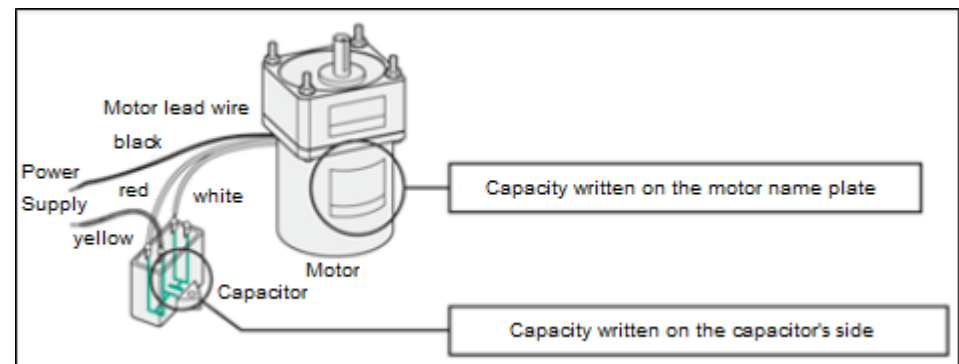
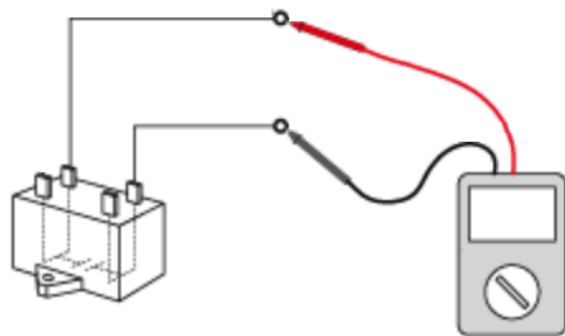
If any of the above conditions apply, please inspect and check the condition of the motor or try to replace the motor.

## 9) The motor or capacitor is damaged

### 3. Check the capacitor capacity.

After a long period of use, the capacitance of the capacitors may degrade. Check the capacitance of the capacitor with a tester. The capacitor capacitance ( $\mu\text{F}$ ) should be checked from the side of the capacitor or from the nameplate on the motor.

When measuring the capacitance of a capacitor, please disconnect all the wires such as motor leads and power supply wires.



If the measurement shows that the capacitance is insufficient, replace the capacitor.

## **Contact us**

Please feel free to contact us with any questions you may have about motors, how to select a product, delivery times, prices, orders, etc.

All countries except below: Tel. 00 800 22556622, [info@orientalmotor.de](mailto:info@orientalmotor.de)

UK/Ireland: Tel. 01256-347090, [info@oriental-motor.co.uk](mailto:info@oriental-motor.co.uk)

France: Tel. 01 47 86 97 50, [info@orientalmotor.fr](mailto:info@orientalmotor.fr)

Italy: Tel. 02 9390 6346, [info@orientalmotor.it](mailto:info@orientalmotor.it)