Oriental motor

HF-3171-5

OPERATING MANUAL

AC Centrifugal Blowers

MB Series S Type

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.

Introduction

■ Before use

Only qualified personnel should work with the product. Use the product correctly after thoroughly reading the section "Safety precautions." In addition, be sure to observe the contents described in warning, caution, and note in this manual. The product described in this manual has been designed and manufactured to be incorporated in general industrial equipment. Do not use for any other purpose. Oriental Motor Co., Ltd. is not responsible for any damage caused through failure to observe this warning.

Safety precautions

The precautions described below are intended to ensure the safe and correct use of the product, and to prevent the customer and others from exposure to the risk of injury. Use the product only after carefully reading and fully understanding these instructions.

⚠WARNING	Handling the product without observing the instructions that accompany a "WARNING" symbol may result in serious injury or death.
⚠CAUTION	Handling the product without observing the instructions that accompany a "CAUTION" symbol may result in injury or property damage.
Note	The items under this heading contain important handling instructions that the user should observe to ensure safe use of the product.

Explanation of graphic symbols ⃠ : Indicates "prohibited" actions that must not be performed.
❗ : Indicates "compulsory" actions that must be performed.

⚠WARNING

⃠
- Do not use the product in explosive or corrosive environments, in the presence of flammable gases, locations subjected to splashing water, or near combustibles. Doing so may result in fire, electric shock or injury.
- Do not transport, install, connect, or inspect the product while the power is supplied. Always turn off the power before carrying out these operations. Injury may result.
- Do not forcibly bend, pull or pinch the lead wire. Doing so may result in fire or electric shock.
- Do not disassemble or modify the fan. Doing so may cause injury.

❗
- Only qualified and educated personnel should be allowed to perform installation, connection, operation and inspection/troubleshooting of the product. Handling by unqualified and uneducated personnel may result in fire, electric shock or injury.
- Turn off the power in the event the overheat protection device (thermal protector) is triggered. Failure to do so may result in injury or damage to equipment, since the fan will start abruptly when the overheat protection device (thermal protector) is automatically reset.
- The fan for Class Ⅰ equipment. Be sure to ground the Protective Earth Terminal when installing the fan. Failure to do so may result in electric shock.
- Install the fan in an enclosure. Failure to do so may result in electric shock or injury.
- Be sure to keep the input power voltage within the specified range. Failure to do so may result in fire or electric shock.
- Perform connections securely according to the connection diagram. Failure to do so may result in fire or electric shock.
- Turn off the power in the event of a power failure. Otherwise, the fan will start unexpectedly when the power is restored. This may cause injury or damage to equipment.

⚠CAUTION

⃠
- Do not use the fan beyond its specifications, or electric shock, injury or damage to equipment may result.
- Keep your fingers and objects out of the openings in the fan. This may cause injury.
- Do not touch the motor part while operating or immediately after stopping. The surface is hot and it may cause a skin burn(s).
- Do not lift the product by holding the rotating part (impeller) or lead wire of the fan. Doing so may cause injury.
- Keep the area around the fan free of combustible materials. Failure to do so may result in fire or a skin burn(s).
- Do not leave anything around the fan that would obstruct ventilation. Doing so may result in damage to equipment.
- Do not touch the rotating part (impeller) when the fan is in operation. Doing so may cause injury. The use of the finger guard is recommended to ensure protection.

⚠CAUTION

❗
- Immediately when trouble has occurred, stop operation and turn off the power supply. Failure to do so may result in fire, electric shock or injury.
- Securely install the fan in an enclosure. Failure to do so may result in injury or damage to equipment.
- The motor surface temperature of the fan may exceed 70 °C (158 °F) even under normal operating conditions. If the operator is allowed to approach the fan that is operating, attach a warning label as shown in the figure in a conspicuous position. Failure to do so may result in a skin burn(s).

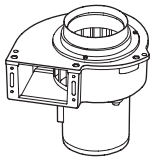

Warning label

Checking the product

■ Package contents

Verify that the items listed below are included. Report any missing or damaged items to the branch or sales office from which you purchased the product.

☐ Fan ..... 1 unit



☐ Capacitor ..... 1 piece (single-phase input only)

☐ OPERATING MANUAL (this document) ..... 1 copy

☐ Capacitor cap ..... 1 piece (single-phase input only)

■ Checking the model name

Verify the model name of the purchased product against the model shown on the name plate of the product. Tell us the model name, product serial number, and manufacturing date shown on the name plate when you contact us.

MB ① **S** ② **12** ③ **- JA** ④

①	Series name	**MB**: **MB** Series	
②	Type	**S**: **S** type	
③	Impeller Diameter	**10:** Ø100 mm (Ø3.94 in.)	**12**: Ø120 mm (Ø4.72 in.)
④	Power supply voltage	**JA**: Single-phase 100 VAC **JC**: Single-phase 200 VAC **JS**: Three-phase 200 VAC	**UA**: Single-phase 110/115 VAC **EC**: Single-phase 220/230 VAC **ES**: Three-phase 220/230 VAC

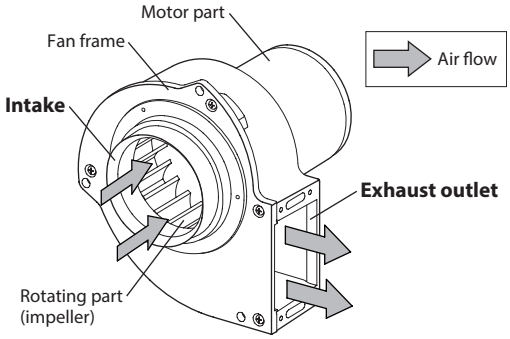
Installation

■ Location for installation

Install the product 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
- Operating ambient temperature:–10 to +50 °C [+14 to +122 °F] (non-freezing)*
  * When the intake air temperature (temperature of air to be sucked) exceeds +50 °C [+122 °F]: –10 to +40 °C [+14 to +104 °F].
  (Range of intake air temperature: -10 to +90 °C [+14 to +194 °F])
- Operating ambient humidity: 85 % or less (non-condensing)
- Area that is free from an explosive atmosphere or toxic gas (such as sulfuric gas) or liquid
- Area not exposed to direct sun
- Area free of excessive amount dust, iron particles or the like
- Area not subject to splashing water (storms, water droplets), oil (oil droplets) or other liquids
- Area not subject to continuous vibration or excessive shocks
- Area free of radioactive materials, magnetic fields or vacuum
- Altitude Up to 1000 m (3300 ft.) above sea level
- Area free of excessive electromagnetic noise (from welders, power machinery, etc.)When using near a switching circuit or high-frequency power supply, the induced current may flow inside the fan due to electromagnetic noise (conductive noise, radiative noise). If the induced current flows, the electric corrosion is caused in the bearings of the fan. As a result, it may generate the noise or shorten the service life of the products. Use the fan in the environment that the electromagnetic noise does not cause.

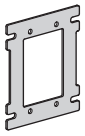
■ Installation method

Install the fan onto an appropriate flat metal plate having excellent vibration resistance and heat conductivity. Install the fan so that there is no gap between the mounting plate or peripheral equipment and the fan. Screws other than the supplied screws should be provided by a customer.

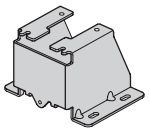


Accessories for installation (sold separately)

☐ Mounting bracket for exhaust outlet

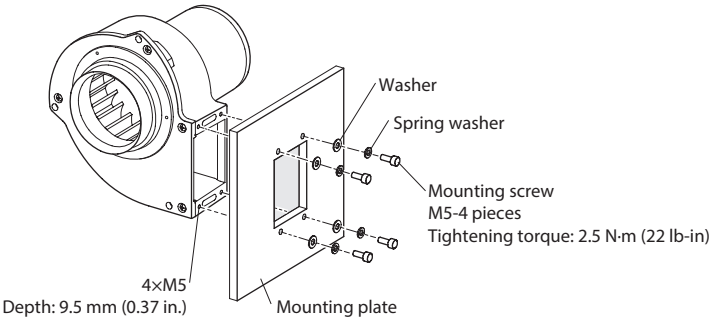


☐ Installation pedestal



● Installation using the exhaust outlet of fan

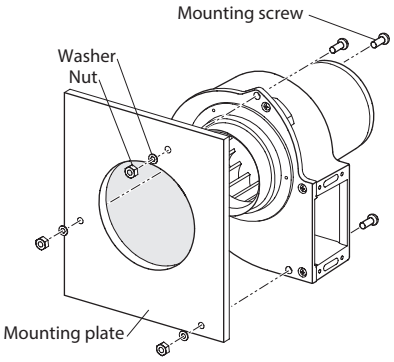
Install the fan to equipment as shown in the figure.



● Installation using the intake side of fan

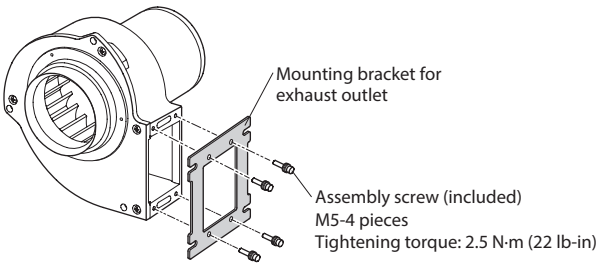
Install the fan to equipment as shown in the figure.

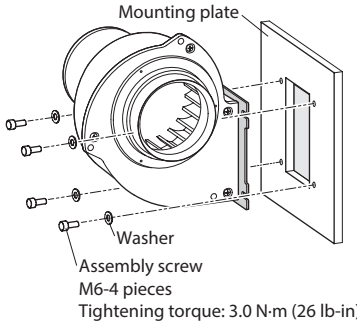
Model	Mounting screw	Tightening torque
MBS10	M5-3 pieces	2.5 N·m (22 lb-in)
MBS12	M6-3 pieces	3.0 N·m (26 lb-in)



Installation using the mounting bracket for exhaust outlet (sold separately)

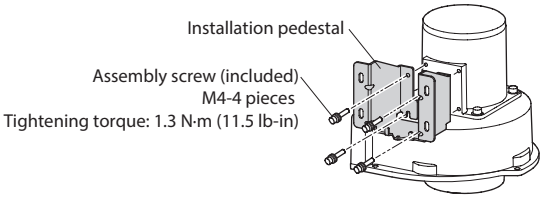
Assemble the mounting bracket for exhaust outlet to the fan and install it to equipment.





Installation using the installation pedestal (sold separately)

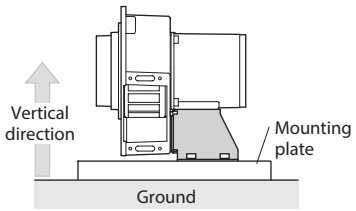
Assemble the installation pedestal to the fan and install it to equipment.

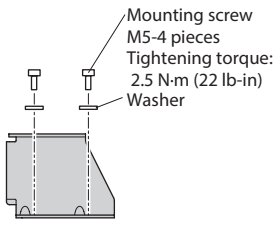


Note Be sure to assemble using the included screws. Using a longer screw than the included screws may cause damage to product.

• Installation direction

When installing the fan to equipment using the installation pedestal, install it in a direction vertical to the ground as shown in the figure.

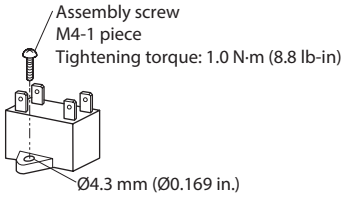




Note Do not install in a direction other than a vertical direction. Doing so may cause damage to the product due to vibration of the product or equipment.

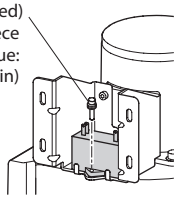
● Mounting the capacitor (single-phase input only)

Mount the capacitor using the assembly screw securely.



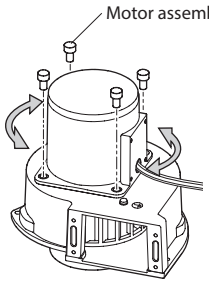
When using the installation pedestal (sold separately)

If the intake air temperature is +50°C (+122°F) or below, the capacitor can be mounted as shown in the figure.



■ Changing the position of exhaust outlet

The position of the exhaust outlet can be changed to the left or right 90-degree direction, or the 180-degree direction. Loosen the motor assembling screws with the intake side facing downward as shown in the figure. Turn the motor part without lifting it.

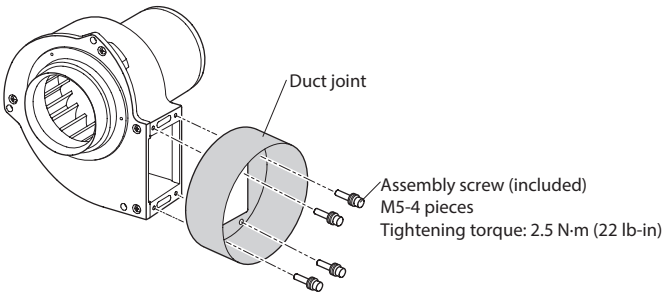


Model	Mounting screw	Tightening torque
MBS10	M5-4 pieces	2.5 N·m (22 lb-in)
MBS12	M6-4 pieces	3.0 N·m (26 lb-in)

Note Do not lift the motor part to rotate it. Lifting the motor part may cause damage to the product.

Assembling the duct joint (sold separately)

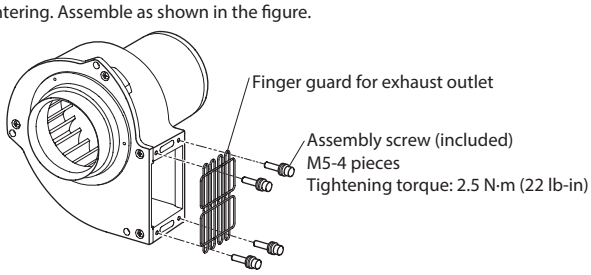
The duct joint (sold separately) is provided for attaching a duct.
Assemble as shown in the figure.
Applicable duct size (inner diameter): Ø125 mm (Ø4.92 in.)



Note Do not lift the fan with the duct joint. Doing so may cause damage to the product.

Assembling the finger guard for exhaust outlet (sold separately)

Installing the finger guard for exhaust outlet (sold separately) can prevent fingers from entering. Assemble as shown in the figure.



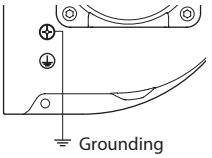
The finger guard and the filter (both sold separately) are provided for intake side. Use them in a condition where the intake air temperature is +50°C (+122°F) or below.

Connection

Insulate all connections such as connecting sections between the fan lead wires and the power supply connections, and the capacitor connections.

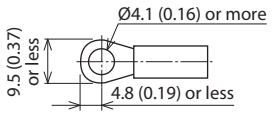
■ Connecting Protective Earth Terminal

Ground using the Protective Earth Terminal ⏚ of the fan.



Applicable crimp terminal:
Insulated round crimp terminal
Terminal screw size: M4
Tightening torque: 1.0 to 1.3 N·m (8.8 to 11.5 lb-in)
Applicable lead wire: AWG18 (0.75 mm^2) or thicker

[Unit: mm (in.)]

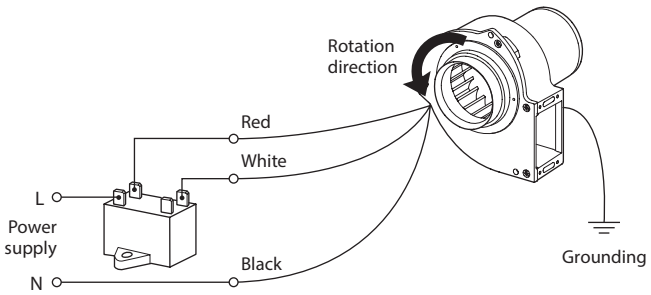


Note Be sure to use the screw for grounding attached on the product. Using a longer screw than the included screw may damage to equipment.

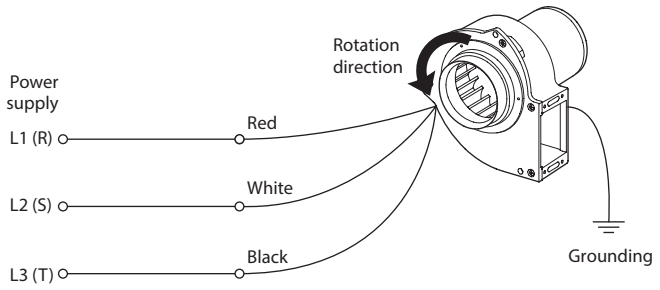
■ Connection diagram

Check the fan model name used before connecting.
Use lead wires of AWG 20 (0.5 mm^2) or thicker for a power supply.

● Single-phase input



● Three-phase input

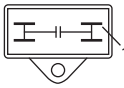


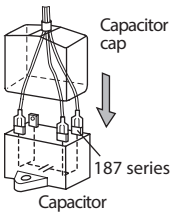
■ Connecting the capacitor (single-phase input only)

When crimp terminals are used, use the FASTON terminals 187 Series (TE Connectivity).
Use the included capacitor cap to insulate the capacitor terminal connection.

The capacitor has four terminals that are internally connected as shown in the figure.

<Capacitor internal wiring diagram>





Note For lead wire connection, use one lead wire for each individual terminal.

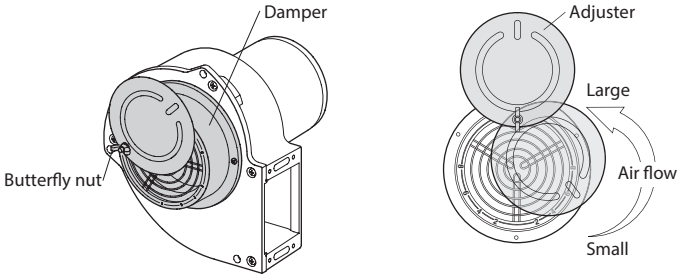
Operation

The fan rotates when the power supply is turned on.
For protection against electric shock, do not turn on the power supply until the wiring is complete.

Note Make sure that the motor case temperature does not exceed 90 °C (194 °F) when operating the fan. Operation exceeding case temperature 90 °C (194 °F) may significantly deteriorate the coils and ball bearings of the motor and shorten the 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.

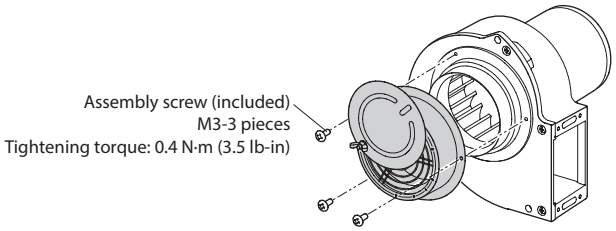
■ Air flow adjustment

The air flow can be adjusted by assembling the damper for air flow adjustment (sold separately) to the fan. Use numbers on the damper as a marker when adjusting the air flow by moving the adjuster. The adjuster can be moved to either side of the right and left.



Note Retighten the butterfly nut regularly. The butterfly nut may loosen due to vibrations or shocks.

Assemble as shown in the figure.



Note Be sure to assemble using the included screws. Using a longer screw than the included screws may cause damage to product.

Locked rotor burnout protection

The fan is equipped with a function of burning protection for locked-rotor state.

• Thermal protection

The fan motor contains an automatic return type thermal protector in the motor windings. When the motor internal temperature exceeds the specified value, the thermal protector is activated to stop the fan. Always turn off the power before performing inspections.

Thermal protector activation range:
Power is turned off at 130±5 °C (266±9 °F)
Power is turned back on at 85±20 °C (185±36 °F)

Inspection and maintenance

■ Inspection

It is recommended that periodic inspections for the items listed below are conducted after each operation.
If an abnormal condition is noted, discontinue any use and contact your nearest Oriental Motor sales office.

● Inspection item

- Check if any of the screws of the fan and peripheral equipment is loose.
- Check if the fan generates unusual noises.

■ Warranty

Check on the Oriental Motor Website for the product warranty.

■ Disposal

Dispose the product correctly in accordance with laws and regulations, or instructions of local governments.

Specifications

Check on the Oriental Motor Website for the product specifications.

General specifications

Operating environment	Ambient temperature	−10 to +50°C [+14 to +122°F] (non-freezing)∗ ∗ When the intake air temperature (temperature of air to be sucked) exceeds +50°C [+122°F]: −10 to +40°C [+14 to +104°F]. (Range of intake air temperature: -10 to +90°C [+14 to +194°F])
	Ambient humidity	85% or less (non-condensing)
	Altitude	Up to 1000 m (3300 ft.) above sea level
	Surrounding atmosphere	No corrosive gas, dust, water, or oil Cannot be used in radioactive materials, magnetic field, vacuum or other special environment
Storage environment Shipping environment	Ambient temperature	−10 to +60 °C [+14 to +140°F] (non-freezing)
	Ambient humidity	85% or less (non-condensing)
	Altitude	Up to 3000 m (10000 ft.) above sea level
	Surrounding atmosphere	No corrosive gas, dust, water, or oil Cannot be used in radioactive materials, magnetic field, vacuum or other special environment

Regulations and standard

■ UL Standards, CSA Standards

This product is recognized by UL under the UL and CSA Standards.
Thermal class UL/CSA Standards:130(B)

■ CE Marking / UKCA Marking

This product is affixed with the marks under the following directives/regulations.

● EU Low Voltage Directive/UK Electrical Equipment (Safety) Regulation

Installation conditions
Overvoltage category Ⅱ , Pollution degree 2, Class Ⅰ equipment
If the specified values of the overvoltage category Ⅲ is required based on the equipment, supply the rated voltage to the fan via an isolation transformer.

■ EU RoHS Directive/UK RoHS Regulation

This products do not contain the substances exceeding the restriction values.

Published in February 2022

• Please contact your nearest Oriental Motor office for further information.

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