

OPERATING MANUAL

AC Axial Flow Fans

MRE Series



Introduction

■ Before use

Only qualified personnel of electrical and mechanical engineering 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 is 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 compensation 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, in places 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. This may result in electric shock or injury.
- Do not forcibly bend, pull or pinch the cable or lead wire. Doing so may result in fire or electric shock.
- Do not touch the connection terminals of the capacitor immediately after the power is turned off (for a period of 30 seconds). The residual voltage may cause electric shock.
- Do not disassemble or modify the fan. Doing so may cause electric shock, injury or damage to equipment. Refer all such internal inspections and repairs to the branch or sales office from which you purchased the product.

- 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 is Class I equipment. Install the fan so as to avoid contact with hands, or ground it to prevent the risk of electric shock.
- 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.
- Insulate the connection terminals of the included capacitor using the included capacitor cap. Failure to do so may result in 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.
- Do not conduct the insulation resistance measurement or dielectric strength test between the lead wires of fan windings and the lead wires of the alarm. Doing so may cause damage to the alarm circuit.
- 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 (blades), cable or lead wire of the fan. Doing so may cause injury.

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.

⚠ CAUTION

- 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 (blades) when the fan is in operation. Doing so may cause injury. The use of the finger guard is recommended to ensure protection.
- 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.

MRE16, MRE18, MRE20

- Fan..... 1 unit
- Power supply cable..... 1 piece
- Alarm cable..... 1 piece (For alarm type fans only)
- OPERATING MANUAL (this document)..... 1 copy

MRE25

- Fan..... 1 unit
- Capacitor 1 piece*
- Capacitor cap..... 1 piece*
- OPERATING MANUAL (this document)..... 1 copy
- * Included with single-phase fans only

Items included with fan kit products

- Finger guard..... 1 piece
- Mounting screw..... 1 set (Cross-recessed pan head screws with captive washer, hexagonal nuts with flange 4 pieces each)

■ Checking the model name

Verify the model name of the purchased product against the model shown on the package label. Check the fan model against the model name shown on the nameplate. Tell us the model name, product serial number, and manufacturing date when you contact us.

● Fan model

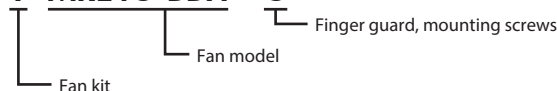
MRE 18 - B B H

① ② ③ ④ ⑤ ⑥

①	Series name	MRE: MRE Series	
②	Frame size	16: 160 mm (6.30 in.)	18: 180 mm (7.09 in.)
		20: 200 mm (7.87 in.)	25: 250 mm (9.84 in.)
③	Power supply voltage	B: Single-phase 100/110/115 VAC E: Single-phase 220/230/240 VAC JA: Single-phase 100 VAC JC: Single-phase 200 VAC JS: Three-phase 200 VAC	D: Single-phase 200/230 VAC T: Three-phase 200/220/230 VAC UA: Single-phase 110/115 VAC EC: Single-phase 220/230 VAC ES: Three-phase 220/230 VAC
④	Additional function	B: Low-speed alarm, contact alarm type (Normal operation: Contact ON) A: Low-speed alarm, contact alarm type (Normal operation: Contact OFF) M: Low-speed alarm, electronic alarm type Blank: Non-alarm type	
⑤	Connection type	H: With extension cable Blank: Lead wires	
⑥	Reference number		

● Fan kit model

T- MRE18-BBH - G



Installation

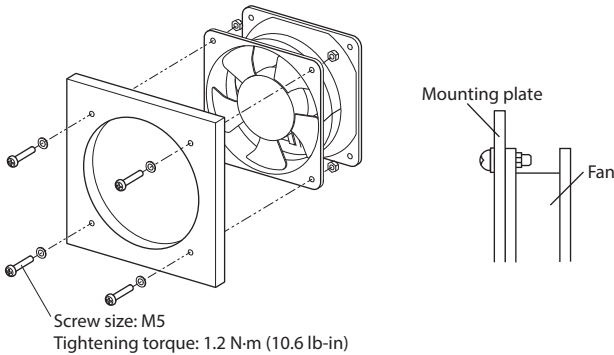
Installation location

Install the product in the following location that provides easy access for inspection. The location must also satisfy the following conditions:

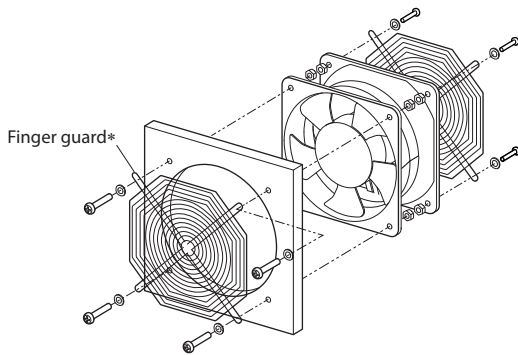
- Inside an enclosure that is installed indoors
 - Operating ambient temperature: -30 to $+60$ °C [-22 to $+140$ °F] (non-freezing)
 - Operating ambient humidity: 85 % or less (non-condensing)
 - Area free from an explosive atmosphere or toxic gas (such as sulfuric gas) or liquid
 - Area not exposed 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
 - Area free of excessive electromagnetic noise (from welders, power machinery, etc.)
- When using a fan 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.
- Drill mounting holes in equipment, and secure the fan using screws.
- Mounting screws are included with the fan kit products.
- For directions of the air flow and blades rotation, see the indications on the side of the fan frame.



When finger guards are installed



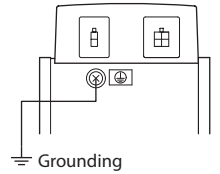
* A finger guard is included with the fan kit product.
If another finger guard is needed, purchase it separately.

Connection

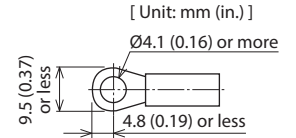
Insulate all connections such as connecting sections between the fan lead wires and the power supply connections, and the capacitor connections.

Connecting Protective Earth Terminal

Ground using the Protective Earth Terminal (⊕) of the fan.



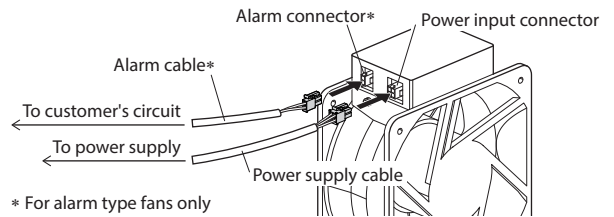
Applicable crimp terminal:
Insulated round crimp terminal
Terminal screw size: M4
Tightening torque: 1.0 to 1.3 N-m (8.8 to 11.5 lb-in)
Applicable lead wire: AWG18 (0.75 mm²) or thicker



Note Be sure to use the screw for protective earth attached on the product.

Connecting the power supply

Connect the power supply cable and the alarm cable to the power input connector and the alarm connector, respectively. (Except for MRE25)
The figure shows the MRE16 and MRE18 types. For the MRE20 types, connect the power supply cable and the alarm cable to the cable connector that is come out of the fan frame.



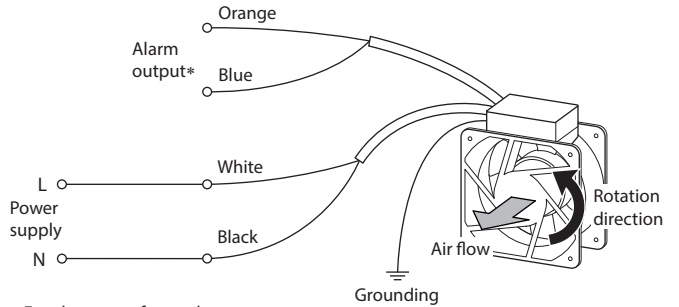
Connection diagram

Check the fan model name used before connecting.

Single-phase input

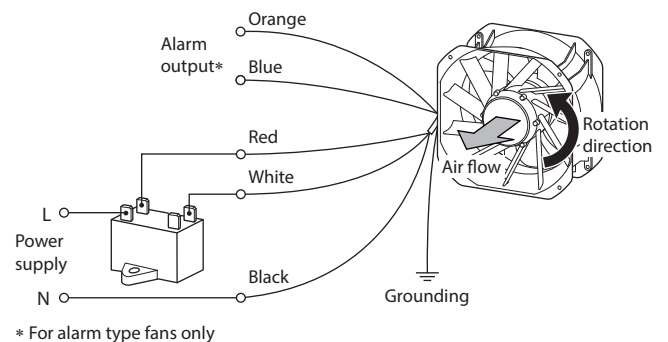
MRE16, MRE18

Power supply cable Lead wire size: AWG18 (0.75 mm²)
Alarm cable Lead wire size: AWG20 (0.5 mm²)



MRE25

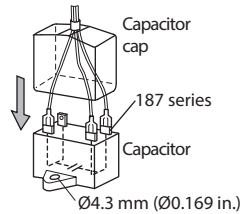
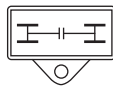
Power supply lead wire size: AWG20 (0.5 mm²)
Alarm lead wire size: AWG22 (0.3 mm²)



● Connecting the capacitor

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.



Use a screw of M4 (not included) to install the capacitor securely. Tightening torque: 1.0 N·m (8.8 lb-in)

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

Three-phase input

MRE16, MRE18, MRE20, MRE25

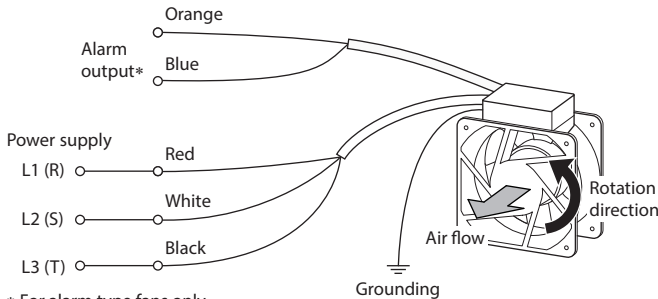
The figure shows the **MRE16** and **MRE18** types.

Power supply cable Lead wire size: AWG18 (0.75 mm²)*

* AWG20 (0.5 mm²) for **MRE25**

Alarm cable Lead wire size: AWG20 (0.5 mm²)*

* AWG22 (0.3 mm²) for **MRE25**



* For alarm type fans only

■ Connecting the alarm output

The alarm type fans are equipped with the low-speed alarm.

If the fan speed falls to 1800±300 r/min or lower, the alarm signal is output.

The contact alarm type and the electronic alarm type are available for the low-speed alarm fans.

Note The alarm circuit is not equipped with a delay function. To avoid an alarm detection when the fan starts rotating or stops, a delay function is required externally. The delay time should be at least ten seconds.

● Low-speed alarm, contact alarm type (Relay output)

There are two types of the contact alarm type: "Normal operation: Contact ON" and "Normal operation: Contact OFF."

Enter the code representing the power supply voltage in the box (■) within the model name.

Model	MRE16-■BH MRE18-■BH MRE20-TBH MRE25-■B	MRE16-■AH MRE18-■AH
Output status	Normal operation: Contact ON Alarm output: Contact OFF	Normal operation: Contact OFF Alarm output: Contact ON
Connection diagram	<p>Contact capacity: Resistive load 10 VA max. (100 V max., 0.5 A max.) Minimum load: 5 V, 1 mA (Design your alarm circuit to operate at 0.5 mA or less.)</p>	

● Low-speed alarm, electronic alarm type (Open-collector output)

Enter the code representing the power supply voltage in the box (■) within the model name.

Model	MRE16-■MH MRE18-■MH MRE20-TMH
Output status	Normal operation: L level (Internal transistor ON) Alarm output: H level (Internal transistor OFF)
Connection diagram	<p>Maximum output voltage: 30 VDC Maximum output current: 15 mA Output saturated voltage: 0.4 V or less</p>

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. Operating the fan in a state where the motor case temperature exceeds 90 °C (194 °F) deteriorates the windings and ball bearings of the motor, causing the lifetime to shorten. Measure to check the motor case temperature using a thermometer, thermo tape or thermocouple.

● When using the fan with an inverter (Three-phase input only)

- When using the fan in combination with an inverter, use it by setting the inverter frequency to 60 Hz or less.
- The inverter which input voltage exceeds 240 VAC cannot be used. The insulation of the fan motor windings may deteriorate, causing damage to the fan.
- Number of fan poles: 2 poles
- A resonance phenomenon may occur depending on the setting frequency. If the resonance phenomenon occurred, use the product with avoiding the resonance points.

Note In the case of the alarm type fans, the low-speed alarm may operate if an inverter is used at low speeds.

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 120±5 °C (248±9 °F)

Power is turned back on at 77±15 °C (170±27 °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	-30 to +60 °C [-22 to +140 °F] (non-freezing)
	Ambient humidity	85% or less (non-condensing)
Storage environment	Ambient temperature	-40 to +70°C [-40 to +158°F] (non-freezing)
Shipping environment	Ambient humidity	85% or less (non-condensing)
Degree of protection		IP00

Regulations and standard

UL Standards and CSA Standards

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

Applicable Standards	Certification Body / File No.
UL 507	UL / E58377
CSA C22.2 No.113	

- Thermal class UL/CSA Standards:105(A)

CE Marking

These products are affixed with the CE Marking under the Directives shown below.

Model	Type	Low Voltage Directive	EMC Directive	Ecodesign Directive
MRE16 MRE18 MRE20	Non-alarm type	○	—	—
	Alarm type	○	○	—
MRE25	Non-alarm type	○	—	MRE25-JC, MRE25-EC
	Alarm type	○	○	MRE25-JCB, MRE25-ECB

Low Voltage Directive

Applications standards

EN 62368-1

Installation conditions (For EN standard)

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.

EMC Directive (Alarm type fans only)

Applications standards

EMI: EN 61000-6-4 EMS: EN 61000-6-2

Ecodesign Directive

(MRE25-JC, MRE25-EC, MRE25-JCB, MRE25-ECB only)

Regulations

COMMISSION REGULATION (EU) No 327/2011

Product Information

		Actual	Req.2015	Actual	Req.2015
(1)	Overall efficiency η_{es} (%)	31.5	28	33.6	28
(2)	Measurement category	A			
(3)	Efficiency category	Static			
(4)	Efficiency grade N	43.5	40	45.6	40
(5)	Variable speed drive	No			
(6)	Year of manufacture	The year of manufacture is specified on the product's nameplate.			
(7)	Manufacturer	ORIENTAL MOTOR CO., LTD. 4-8-1 Higashiueno, Taito-ku, Tokyo 110-8536, Japan			
(8)	Product's model number	MRE25-JC, MRE25-JCB	MRE25-EC, MRE25-ECB		
(9)	Power input P_e (kW)	0.126		0.125	
	Air flow q_v (m ³ /h)	893		924	
(10)	Speed rpm	3036		3130	
(11)	Specific ratio	1			
(12)	Recycling/disposal	Dispose the product correctly in accordance with laws and regulations, or instructions of local governments.			
(13)	Maintenance	Information on maintenance is provided in the operating manual.			
(14)	Additional items	No attachments			

Republic of Korea, Radio Waves Act (Alarm type fans only)

KC Mark is affixed to this product under the Radio Waves Act, the republic of Korea.

RoHS Directive

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

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

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