



## OPERATING MANUAL

### Cooling Module FM Series IP4X Rated Fan, Filter Panel

## Introduction

### ■ Before using the product

Only qualified personnel should work with the product.  
Use the product correctly after thoroughly reading the section "Safety precautions."

The product described in this manual has been designed and manufactured for use in general industrial machinery, and must not be used for any other purpose. Oriental Motor Co., Ltd. is not responsible for any damage caused through failure to observe this warning.



### ■ Hazardous substances

RoHS (Directive 2002/95/EC 27Jan.2003) compliant

FM□1□A□-2□1□□ type only

## Safety precautions

The precautions described below are intended to prevent danger or injury to the user and other personnel through safe, correct use of the product. Use the product only after carefully reading and fully understanding these instructions.

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

### 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.
- Assign qualified personnel the task of installing, wiring, operating/controlling, inspecting and troubleshooting the product. Failure to do so may result in fire, electric shock or injury.
- Do not transport, install the product, perform connections or inspections when the power is on. Always turn the power off before carrying out these operations. Failure to do so may result in electric shock.
- For installation with □180 mm (□7.09 in.) fan of 90 mm (3.54 in.) in thickness  
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.

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.

- To prevent the risk of electric shock, use the cooling module for class I equipment only.  
*Lüfter zur Verwendung in Geräten der Schutzklasse I.*
- Install the cooling module in an enclosure in order to prevent electric shock or injury.
- Be sure to ground the protective earth conductor when installing the cooling module. Failure to do so may result in electric shock.  
*Erden Sie den Produkt bei der Installation mit einem Schutzerdungskabel. Nichtbeachtung dieses Hinweises könnte einen elektrischen Schlag verursachen.*
- Keep the input-power voltage within the specified range to avoid fire and electric shock.
- Connect the cables securely according to the wiring diagram in order to prevent fire and electric shock.
- Do not forcibly bend, pull or pinch the cable. Doing so may fire and electric shock.
- Do not disassemble or modify the cooling module. This may cause electric shock or injury. Refer all such internal inspections and repairs to the branch or sales office from which you purchased the product.
- Do not remove the finger guard while the cooling module is operating. It may result in injury.

### Caution

- Do not use the cooling module beyond its specifications, or electric shock, injury or damage to equipment may result.
- Do not touch the motor during operation or immediately after stopping. The surface is hot and may cause a burn.
- Do not hold the rotating parts (blades) of the fan or lead wire. This may cause injury.
- Keep the area around the cooling module free of combustible materials in order to prevent fire or a burn.
- To prevent the risk of damage to equipment, leave nothing around the cooling module that would obstruct ventilation.
- When an abnormality is noted, stop the operation immediately, or fire, electric shock or injury may occur.
- The motor's surface temperature may exceed 70 °C (158 °F), even under normal operating conditions. If a fan is accessible during operation, post the warning label shown in the figure in a conspicuous position to prevent the risk of burns.
- To dispose of the cooling module, disassemble it into parts and components as much as possible and dispose of individual parts/components as industrial waste.



## Preparation

### ■ Checking the product

Upon opening the package, 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.

□92 mm×25 mm (□3.62 in.×0.98 in.),  
 □119 mm×38 mm (□4.69 in.×1.50 in.) or  
 □119 mm×25 mm (□4.69 in.×0.98 in.) in thickness

Number of fans: 1 unit

- Cooling module..... 1 pc.
- Plug cord..... 1 pc.
- Mounting screw set..... 1 set (Nut, M4 screw, 2 pcs. each)
- Operating manual..... 1 copy (this manual)

□119 mm×38 mm (□4.69 in.×1.50 in.) or  
 □119 mm×25 mm (□4.69 in.×0.98 in.) in thickness

Number of fans: 2 or 3 units

- Cooling module..... 1 pc.
- Plug cord..... 2 or 3 pcs.
- Mounting screw set..... 1 set (Nut, M4 screw, 4 pcs. each)
- Operating manual..... 1 copy (this manual)

□180 mm×90 mm (□7.09 in.×3.54 in.) in thickness

Number of fans: 1 unit

- Cooling module..... 1 pc.
- Power cable..... 1 pc. AWG18
- Alarm cable..... 1 pc. AWG20 (Alarm type only)
- Mounting screw set..... 1 set (Nut, M4 screw, 8 pcs. each)
- Operating manual..... 1 copy (this manual)

#### Note

Do not conduct insulation resistance measurement or dielectric voltage-withstand testing between the primary circuit (coil) and secondary circuit (alarm circuit). Doing so may damage the alarm circuit..

### ■ Checking the model name

Check the model number against the number indicated on the product.

## Installation

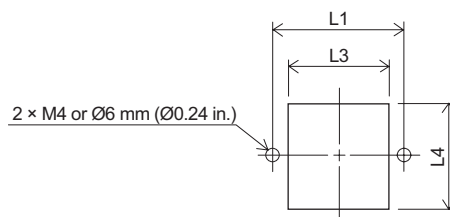
### ■ Location for installation

The cooling module is designed and manufactured for installation in equipment. Install it in a well-ventilated location that provides easy access for inspection. The location must also satisfy the following conditions:

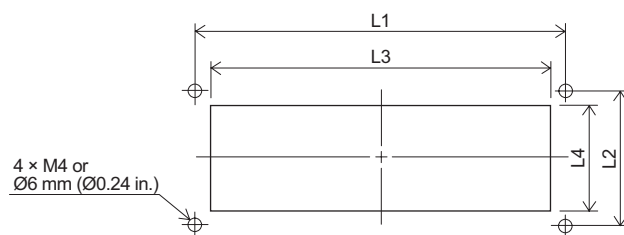
- Inside an enclosure that is installed indoors (provide vent holes)
- Operating ambient temperature  
 -10 to +60 °C (+14 to +140 °F) (non-freezing)
- Operating ambient humidity 85% or less (non-condensing)
- Area that is free of explosive atmosphere or toxic gas (such as sulfuric gas) or liquid
- Area not exposed to direct sun
- Area free of excessive amount of dust, iron particles or the like
- Area not subject to splashing water (rains, water droplets), oil (oil droplets) or other liquids
- Area not subject to continuous vibration or excessive shocks
- Area free of excessive electromagnetic noise (from welders, power machinery, etc.)
- Area free of radioactive materials, magnetic fields or vacuum

## ■ Installation dimensions

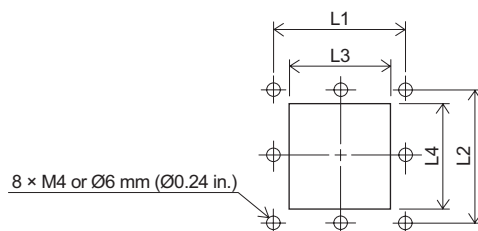
### • Figure A



### • Figure B



### • Figure C



	Dimension drawing	Dimensions [mm (in.)]			
		L1	L2	L3	L4
□92 mm (□3.62 in.) Number of fans: 1 unit	A	145 (5.71)	-	135 (5.31)	135 (5.31)
□119 mm (□4.69 in.) Number of fans: 1 unit		170 (6.69)	-	160 (6.30)	160 (6.30)
□119 mm (□4.69 in.) Number of fans: 2 units	B	295 (11.61)	170 (6.69)	285 (11.22)	160 (6.30)
□119 mm (□4.69 in.) Number of fans: 3 units		420 (16.54)	170 (6.69)	410 (16.14)	160 (6.30)
□180 mm (□7.09 in.) Number of fans: 1 unit	C	263 (10.35)	263 (10.35)	250 (9.84)	250 (9.84)

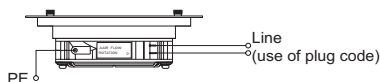
## Wiring

### ■ Wiring diagram

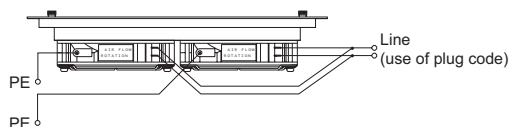
#### • Standard type

□92 mm×25 mm (□3.62 in.×0.98 in.),  
 □119 mm×38 mm (□4.69 in.×1.50 in.) or  
 □119 mm×25 mm (□4.69 in.×0.98 in.) in thickness

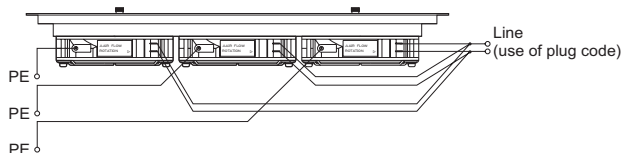
- Number of fans ..... 1 pc.
- Plug code length..... 1 m (3.3 ft.)



- Number of fans ..... 2 pcs.
- Plug code length..... 1 m (3.3 ft.)



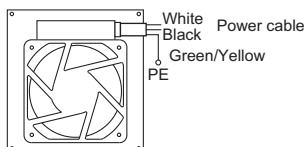
- Number of fans ..... 3 pcs.
- Plug code length..... 1 m (3.3 ft.)



#### • Standard type

□180 mm×90 mm (□7.09 in.×3.54 in.) in thickness,  
 suction type

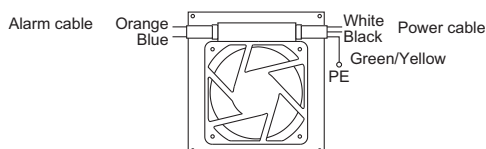
- Power cable length..... 1 m (3.3 ft.)



#### • Electronic alarm type

□180 mm×90 mm (□7.09 in.×3.54 in.) in thickness,  
 suction type

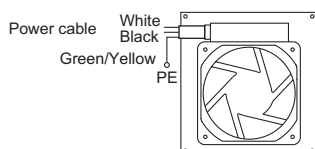
- Power cable length..... 1 m (3.3 ft.)
- Alarm cable length..... 1 m (3.3 ft.)



#### • Standard type

□180 mm×90 mm (□7.09 in.×3.54 in.) in thickness,  
 exhaust type

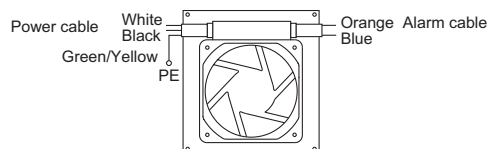
- Power cable length..... 1 m (3.3 ft.)



#### • Electronic alarm type

□180 mm×90 mm (□7.09 in.×3.54 in.) in thickness,  
 exhaust type

- Power cable length..... 1 m (3.3 ft.)
- Alarm cable length..... 1 m (3.3 ft.)



## Alarm function

### ■ Electronic alarm type [□180 mm×90 mm (□7.09 in.×3.54 in.) in thickness only]

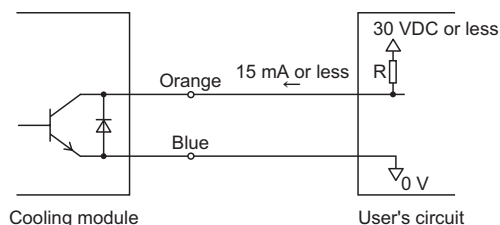
Alarm trip rotation speed: 1800±300 r/min.

Output mode: Open collector output

Output condition: Normal operation: L level (Internal transistor ON)

Alarm output: H level (Internal transistor OFF)

Connection example of alarm output circuit



#### Note

The alarm circuits do not have a delay function. Avoiding detection, when starting the fan, for example, requires an external delay function. Set the delay time to 10 seconds min.

## Overheat protection

□92 mm×25 mm (□3.62 in.×0.98 in.),  
 □119 mm×38 mm (□4.69 in.×1.50 in.) or  
 □119 mm×25 mm (□4.69 in.×0.98 in.) in thickness

This cooling module is impedance-protected. If an error occurs or the fan is locked, the coil impedance will increase and suppress input to the cooling module, thereby preventing the fan coil from burning.

□180 mm×90 mm (□7.09 in.×3.54 in.) in thickness

The cooling module uses a thermal protector for overheat protection. Once the temperature reaches a specified level, the internal thermal protector that has an automatic-return feature is triggered to stop the cooling module operation. Because of its automatic-reset mechanism, the cooling module will resume operation automatically once the fan temperature drops.

Therefore, be sure to turn off the power supply before inspecting the cooling module.

Operating temperature of thermal protectors

Open (Power OFF) ..... 120±5 °C (248±9 °F)

Close (Power ON) ..... 77±15 °C (170±27 °F)

## Option

### ■ Replacement filter media

#### • IP4X rated filter media

Set of 5 sheets

Model	Applicable product
<b>FMXAA-M</b>	<b>FM</b> series – External dimensions: 155×155 mm (6.10×6.10 in.)
<b>FMXAA-A</b>	<b>FM</b> series – External dimensions: 180×180 mm (7.09×7.09 in.)
<b>FMXAA-B</b>	<b>FM</b> series – External dimensions: 305×180 mm (12.01×7.09 in.)
<b>FMXAA-C</b>	<b>FM</b> series – External dimensions: 430×180 mm (16.93×7.09 in.)
<b>FMXAA-L</b>	<b>FM</b> series – External dimensions: 284×284 mm (11.18×11.18 in.)

1 sheet

Model	Applicable product
<b>FMXAA-L-1</b>	<b>FM</b> series – External dimensions: 284×284 mm (11.18×11.18 in.)

Cooling of the filter media reduces the cooling capacity. Clean or replace the filter media regularly.

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