Fans and Thermal Management

AC Axial Flow Fans

AC Axial Flow Fans

<Additional Information>
● Technical Reference ➜ Page 16

Features

This fan uses a set of blades (propeller) to generate wind or airflow in the direction of rotation direction. Because it can achieve large air flow volumes, it is well suited to ventilation and cooling to ensure that the entire interior of equipment is cooled.

AC Axial Flow Fan Product Line

Series Name	Key Features	Alarm	Speed Setting Method	Features
Low Power Consumption **EMU** Series ➜Page 79～83 	Energy Savings	Low-Speed Alarm		・Low Power Consumption ・These axial flow fans have achieved an expected life of 60,000 hours. ・They can be used in a wide voltage range (single-phase 100～240 VAC).
Compact/Moisture-Proof **MU**/**MS** Series ➜Page 84～100 	Moisture-Proof			・The moisture-proof type reduces the decrease in equipment lifetime and the occurrence of rust caused by humidity with its moisture-proof design. ・Items in this series conform to the UL, CSA and EN Standards, as well as the Electrical Appliance and Material Safety Act (Japan), and also have the CE Marking (Low Voltage Directive) affixed. (The conformity differs according to the product.)
Low Power Consumption/ Speed Control **EMR** Series ➜ Page 102～108 	Speed Control Energy Savings	Low-Speed Alarm	PWM Signal DC Voltage Potentiometer	・Low Power Consumption ・The air flow from the fan can be changed. ・Finger guards are already installed ・The expected life is 40,000 hours.
Large Format/ High Air Flow **MRS**/**MR** Series ➜ Page 110～128 	High Air Flow Speed Control (Three-phase only)	Low-Speed Alarm	Inverter (Three-phase only)	・Items in this series conform to the UL, CSA and EN Standards, and also have the CE Marking (Low Voltage Directive) affixed. (The conformity differs according to the product.) ・A three-phase 200 VAC-specification fan can be combined with an inverter.
Speed Control **MRS** Series ➜ Page 122～123 	Speed Control		Potentiometer	・The air flow from the fan can be changed.
Long-Life **MRE** Series ➜ Page 129～139 	Long-Life Speed Control (Three-phase only)	Low-Speed Alarm	Inverter (Three-phase only)	・These axial flow fans have achieved an expected life of 100,000 hours. ・A three-phase 200 VAC-specification fan can be combined with an inverter. ・Items in this series conform to the UL and CSA Standards, and also have the CE Marking (Low Voltage Directive) affixed. (The conformity differs according to the product.)

● For detailed information about standards-certified products, please see the Oriental Motor website.

●: No additional function ■: Low-speed alarm

Power Supply Voltage [V]	Frame Size [mm]								
	□80	□92	□104	□119 (120)	□140	□160	□180	□200	□250
Single-Phase 100—240		●■		●■					
Single-Phase 100	●	●	●	●	●				
Single-Phase 115	●	●		●					
Single-Phase 200	●	●	●	●	●				
Single-Phase 220/230	●	●	●*1	●	●				
Three-Phase 200—240/ Single-Phase 200—240							●■		
Single-Phase 100—120							●■		
Three-Phase 200							■		
Three-Phase 200/220/230					●■	●■	●■	●■	●■
Single-Phase 100							●■		
Single-Phase 100/110/115						●■	●■	●■	●■
Single-Phase 200							●■		
Single-Phase 200/220/230						●■*1	●■*1	●■*1	●■
Single-Phase 220/230						●■	●■	●■	
Single-Phase 100						●			
Three-Phase 200/220/230						●■*2	●■*2	●■*2	
Single-Phase 100			●	●					
Single-Phase 100/110/115						●■*2	●■*2		
Single-Phase 200			●	●					
Single-Phase 200/230						●■*2	●■*2		
Single-Phase 220/230/240						●■*2	●■*2		

*1 Single-phase 220 VAC is not supported.

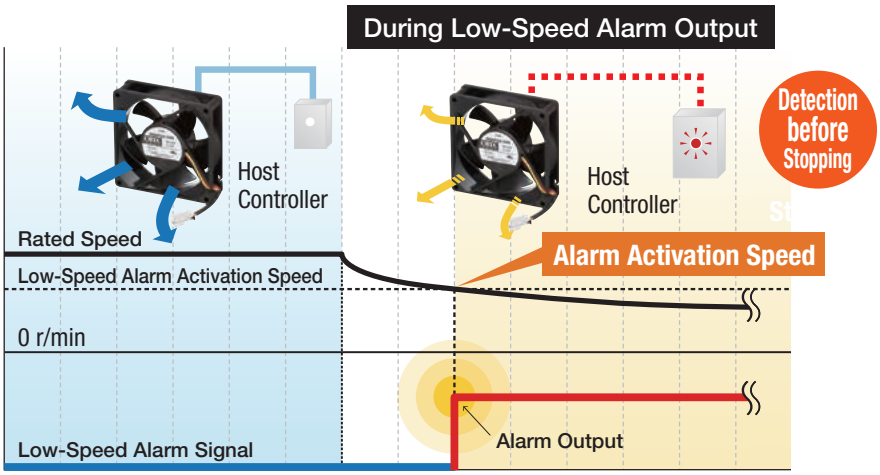
*2 For detailed information on the low-speed alarm [Contact type (Contact OFF during normal rotation) and electronic-input type] please refer to the Oriental Motor web site.

Description of Functions

Low-Speed Alarm Preventative Maintenance (EMU/EMR/MRS/MR/MRE Series)

An alarm signal is output if the fan speed decreases due to ingestion of foreign particles. This allows for the purchase and replacement of the fan before the equipment suffers heat damage, contributing to preventative maintenance of equipment problems. This allows for replacement of only the fan with decreased cooling capacity in equipment with multiple fans installed. This allows the impact on the equipment to be minimized.

● For alarm activation speed, refer to "■Low-speed Alarm Specifications" on page 77.



● The product photos use DC axial flow fans as examples.

Long-Life Fan (MRE Series) ➜ Page 129

A long-life axial flow fan has an expected service life of 100,000 hours (Approx. 11 years).
In addition to the reduction of temperature rise in the bearings, grease deterioration is suppressed. Furthermore, vibration resistance and shock resistance have been improved by using larger bearings. Measures have been taken for longer service life of circuit/coupling and reduction of failure rate. The products are designed to avoid not only initial failure but also random failure and abrasion failure, so that continuous operation of 100,000 hours or more (retention rate of 90% or more) is achieved.

Expected Service Life

The expected service life indicates that at least 90% of the fans will satisfy the following criteria when the acceleration test is performed at an ambient temperature of 60˚C (50˚C for **MRE10** or **MRE12**).

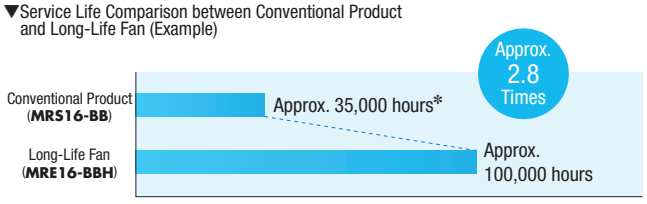
Criteria (MRE Series)

- Speed (at rated voltage): 70% or more of rated value
- Input current (at rated voltage): 130% or less of rated value

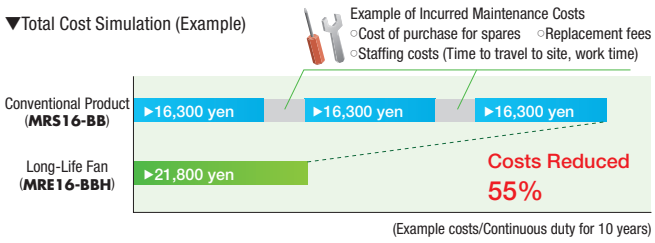
◇Lower Maintenance Costs and Overall Costs

A long-life axial flow fan has an expected service life of 100,000 hours. Compared to conventional products, they require fewer replacements, resulting in reduction of the overall costs.

▼Service Life Comparison between Conventional Product and Long-Life Fan (Example)



▼Total Cost Simulation (Example)



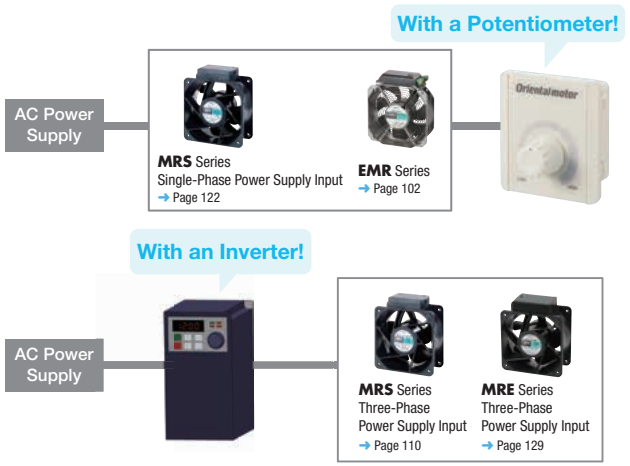
(Example costs/Continuous duty for 10 years)

✻Estimated life is 35,000 hours when the ambient temperature is 60˚C. The estimated life is an estimated value calculated using the formula for the life of the bearing grease. The estimated life varies depending on the product.

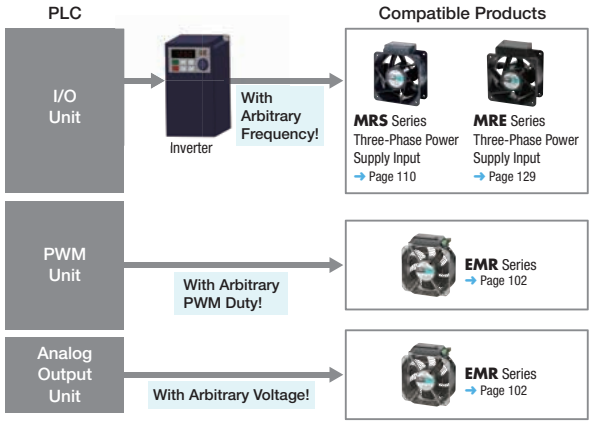
Variable Speed Fan (**EMR/MRS/MRE** Series)

By changing the cooling fan speed, air flow and static pressure can be adjusted, resulting in the reduction of noise and power consumption. Oriental Motor's variable speed fans can change the fan speed with potentiometer, external DC voltage, or PWM signals as well as inverter control.

Adjust Air Flow **Manually**



Adjust Air Flow **Automatically**



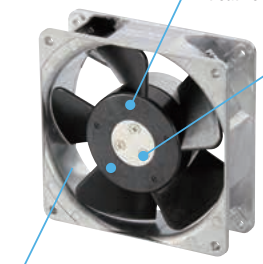
Air Flow Can Be Adjusted by Combining with an Inverter

Speed control becomes possible by combining an **MRS** Series or **MRE** Series three-phase 200 VAC axial flow fan with an inverter. By using a ceramic ball bearing, the electric current passing through the bearing is interrupted, preventing the occurrence of electrolytic corrosion. *

*Check the product page to see which axial flow fans are electrolytic corrosion resistant.

Moisture-Proof Fan (**MU** Series Moisture-Proof Type) → Page 84

Decreased lifetime and corrosion caused by humidity are reduced by the moisture-proof design.



Anti-Rust Measures for the Stator Core
The stator core has been given an anti-corrosion surface treatment, which controls the occurrence of rust.

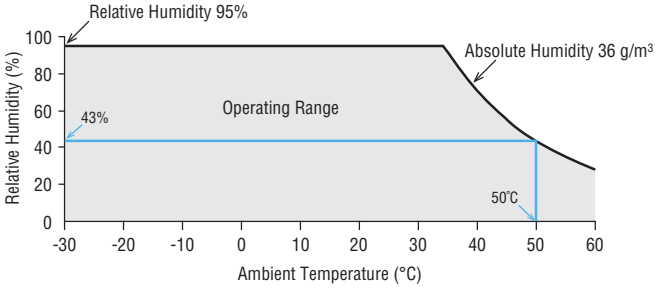
Suppressing Electrolytic Corrosion* of Screw Connections
Plating is used for screw connections to prevent electrolytic corrosion resulting from the combination of dissimilar metals.

*A phenomenon in which ions dissolve into solution due to the potential difference between metals, resulting in corrosion of those metals.

Use of Bearing Grease with Excellent Water Resistance
Deterioration due to humidity and the resulting decrease in lifetime are prevented through the use of highly water resistant bearing grease.

Thanks to the moisture-proof measures, operation in an environment with 95% relative humidity and absolute humidity of 36 g/m^3 is possible.

● Relationship between Relative Humidity and Temperature



By determining the absolute humidity, the temperature and relative humidity can also be solved for.

Example When the temperature is 50℃, operation is possible at a relative humidity of approx. 43% or less.

The Difference between Moisture-Proof and Watertight

● Comparison of the main specifications of moisture-proof fans and watertight fans

Product	Relative Humidity	Absolute Humidity	Water Droplets	Degree of Protection
MU Series Moisture-Proof Type	95% max.	36 g/m^3	×	–
MD Series **P** Type Waterproof Fan	85% max.	–	○	IP68

●No direct exposure to water
●When humidity is high
Example
・Food machinery that is not exposed directly to water

MU Series Moisture-Proof Type

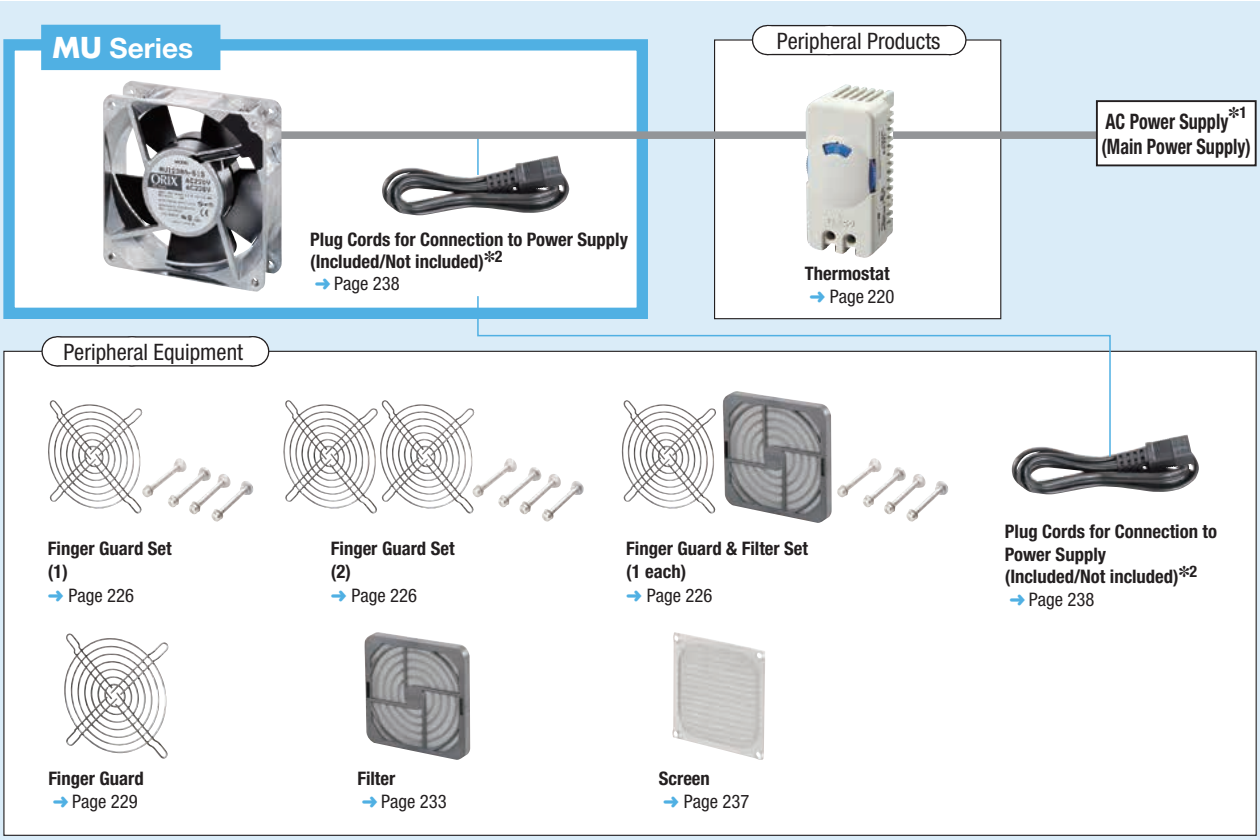
●Exposed directly to water
●When a degree of protection is necessary, such as food machinery

MD Series **P** Type (Watertight)

System Configuration

AC Axial Flow Fan

An example of a system configuration using the **MU** Series.



*1 Not supplied.
*2 The **MU** Series is available either as a product that includes the plug cords for connection to power supply (1 m) included, or without.

●Example of System Configuration

Fan	+	Peripheral Products	+	Peripheral Equipment	
		Thermostat		Iron Finger Guard Set (2)	Plug Cord for Connection To Power Supply (2 m)
MU1238A-11B		AM2-XA1		A-1238-G2	PCA2B2

● The system configuration shown above is an example. Other combinations are also available.

Product Number

AC Axial Flow Fan

◇**EMU** Series

EMU 12 38 M - 1
① ② ③ ④ ⑤

①	Series Name	**EMU**: **EMU** Series
②	Frame Size	**9**: 92 mm **12**: 120 mm
③	Frame Thickness	**38**: 38 mm
④	Additional Function	**M**: Low-Speed Alarm Electronic-Input Type Blank: Type Without Alarm
⑤	Plug Cords for Connection to Power Supply (Included)	**-1**: 1 m **-2**: 2 m

◇**MU** Series

MU 12 38 A - 2 1 B - 1
① ② ③ ④ ⑤ ⑥ ⑦ ⑧

①	Series Name	**MU**: **MU** Series
②	Frame Size	**8**: 80 mm **9**: 92 mm **10**: 104 mm **12**: 119 mm **14**: 140 mm
③	Frame Thickness	**25**: 25 mm **28**: 28 mm **38**: 38 mm
④	Speed Type	**A**, **S**: Standard Speed **M**, **B**: Middle Speed **L**: Low Speed
⑤	Voltage*	**1**: Single-Phase 100 VAC **2**: Single-Phase 115 VAC **4**: Single-Phase 200 VAC **5**: Single-Phase 220/230 VAC
⑥	Input Mode	**1**: 2 Terminal Type **3**: Lead Wire Type
⑦	Identification Symbol	**B**: Reference Number **D**: Moisture-Proof Type
⑧	Length of Plug Cord for Connection to Power Supply (Included)	**-1**: 1 m Blank: Not Included

*Check the voltage specifications on the specifications page for each product.

◇**MS** Series

MS 14 - B C

① ② ③ ④

①	Series Name	**MS**: **MS** Series
②	Frame Size	**14**: 140 mm
③	Voltage	**B**: Single-Phase 100 VAC **D**: Single-Phase 200 VAC
④		**C**: Built-In Capacitor

◇**EMR** Series

EMR 18 65 - A

① ② ③ ④

①	Series Name	**EMR**: **EMR** Series
②	Frame Size	**18**: 180 mm
③	Frame Thickness	**65**: 65 mm
④	Rated Voltage	**A**: Single-Phase 100-120 VAC **C**: Single-Phase, Three-Phase 200-240 VAC

◇**MRS, MRE** Series

MRS 18 □ - B M H

① ② ③ ④ ⑤ ⑥

①	Series Name	**MRS**: **MRS** Series **MRE**: **MRE** Series
②	Frame Size	**10**: 104 mm **12**: 119 mm **14**: 140 mm **16**: 160 mm **18**: 180 mm **20**: 200 mm **25**: 250 mm
③		**V**: Speed Control
④	Voltage*	**T**: Three-Phase 200/220/230 VAC **B**: Single-Phase 100/110/115 VAC **D**: Single-Phase 200/220/230 VAC **E**: Single-Phase 220/230 VAC
⑤	Additional Function	**TM**, **M**: Low-Speed Alarm Electronic-Input Type **B**: Low-Speed Alarm Contact Type (Normal Operation: Contact ON) **TA**, **A**: Low-Speed Alarm Contact Type (Normal Operation: Contact OFF) Blank, **UL**: No Alarm Type
⑥	Connection Type	Blank: Lead Wire Type or Terminal Box Connection Type **H**: Extension Cable Type

*Check the voltage specifications on the specifications page for each product.

◇**MR** Series

MR W 18 - T TA

① ② ③ ④ ⑤

①	Series Name	**MR**: **MR** Series
②	Type	Blank: Standard Type **W**: Large Static Pressure 2-Stage Blade Type
③	Frame Size	**18**: 180 mm
④	Voltage, Number of Poles	**T**: Three-Phase 200 VAC, 200/220/230 VAC, 2 Poles **A**: Single-Phase 100 VAC, 4 Poles **B**: Three-Phase 100 VAC, 100/110/115 VAC, 2 Poles **C**: Single-Phase 200 VAC, 4 Poles **D**: Three-Phase 200 VAC, 200/220/230 VAC, 2 Poles
⑤	Additional Function	**C**: Built-In Capacitor **TA**: Low-Speed Alarm Contact Type

●Finger Guard Set

A - 925 U - S2

① ② ③ ④

①	Fan Kit	
②	Fan Size	(Example) **925**: □92 mm-25 mm Thick **18**: □180 mm-90 mm Thick
③	Identification Symbol	
④		**G**: Iron Finger Guard Set (1) **G2** : Iron Finger Guard Set (2) **S** : Stainless Steel Finger Guard Set (1) **S2**: Stainless Steel Finger Guard Set (2) **GF** : Iron Finger Guard & Filter Set (1 each)

General Specifications

AC Axial Flow Fan

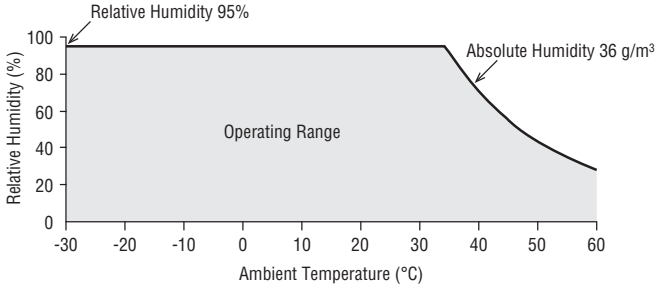
Item	Specifications
Insulation Resistance	100 MΩ or more when a 500 VDC megger is applied between the windings and the case after continuous operation under normal ambient temperature and humidity.
Dielectric Strength	Sufficient to withstand 1.5 kVAC at 50 Hz applied between the windings and the case for 1 minute after continuous operation under normal ambient temperature and humidity.
Temperature Rise	Temperature is 30˚C or less when measured by thermometer after continuous operation under normal ambient temperature and humidity and the temperature has become constant.
Thermal Class	**EMU**, **MS** Series Electrical Appliance and Material Safety Act: 120 (E) UL/CSA Standards: 105 (A), EN Standards: 120 (E) **MU** Series (Moisture-proof type), **MRE** Series (**MRE10**, **MRE12**): 120 (E)
Operating Environment	Listed separately
Storage Condition	Listed separately
Degree of Protection	**EMR** Series IP2X (EN standard)

◇Operating Environment, Storage Condition

Series	Operating Environment*1		Storage Condition*1*3		Environmental Standard
	Ambient Temperature*2	Ambient Humidity	Ambient Temperature*2	Ambient Humidity	
EMU Series	−20～+75˚C	20～85% (Non-condensing)	−30～+75˚C	20～85% (Non-condensing)	–
EMR Series	−25～+65˚C	85% or less (Non-condensing)	−25～+70˚C	85% or less (Non-condensing)	
MU Series (Moisture-proof type)	−30～+60˚C	95% or less (Non-condensing) Absolute humidity 36 g/m^3 or less	−40～+70˚C	95% or less (Non-condensing)	Conformant to ETSI standard*4
MU Series (Standard type), **MRS** Series		85% or less (Non-condensing)		85% or less (Non-condensing)	
MRE Series (**MRE16**, **MRE18**, **MRE20**)					
MRE Series (**MRE10**, **MRE12**)	−30～+50˚C				
MRS Series Low-Speed Alarm Type (**MRS14**)	−20～+60˚C		−20～+70˚C		
MRS Series Speed Control Type	−10～+60˚C		–	–	–
MS Series					
MR Series	−10～+50˚C				

*1 For the operating environment and storage conditions, in addition to condensation, freezing and fan, there are additional conditions that there be no vibrations or external forces.
*2 Cannot be used in an environment where the temperature is modified to −10˚C or lower, such as in a freezer.
*3 The storage condition applies to short periods such as the period during transport.
*4 The operating environment and storage conditions are conformant to the following environmental standards.
ETSI EN 300 019-2-1 V2.1.2 (2000-09) Class 1.3E Storage
ETSI EN 300 019-2-2 V2.1.2 (1999-09) Class 2.3 Transportation
ETSI EN 300 019-2-3 V2.2.2 (2003-04) Class 3.4 Stationary use

Relationship between Relative Humidity and Temperature



Test Name	Environmental Standard	Conditions/Test Details
Heat Cycle Testing	ETSI EN 300 019-2-1 ETSI EN 300 019-2-2 ETSI EN 300 019-2-3	−40～+30˚C 5 Cycles Temperature Gradient: 1.0˚C/min Low Temp (−40˚C) High Temp (+30˚C) Hold Time: 3 hours No abnormalities after testing
Low Temperature Holding Test		No abnormalities after test of holding for 72 hours at −45˚C

● Environmental Standard ETSI
ETSI is the short form for "European Telecommunications Standards Institute", which is a standards organization established to develop standard specifications for telecommunications in Europe. The ETSI EN 300 019 Series is a standard based on IEC 60721 (which specifies environmental conditions for equipment) and it concretely specifies definitions of environmental conditions and test conditions.

Low Speed Alarm Specifications

The alarm output varies according to the individual product specifications. Check the alarm specifications according to the product name.

Low-Speed Alarm Electronic-Input Type

An alarm is output when the cooling fan speed drops below the alarm activation speed. The output mode is electronic-input type.

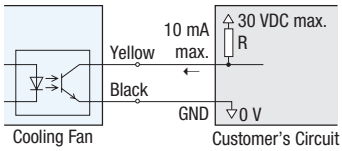
Alarm Specifications Number: B1

●Applicable Product ◇**EMU** Series: **EMU938M**, **EMU1238M**

●Alarm Specifications

Alarm Activation Speed	**EMU938M**: 2000±300 r/min **EMU1238M**: 1700±255 r/min
Output Type	Open-Collector Output
Output Condition	Normal Operation: L level (Internal transistor ON) Alarm Output: H level (Internal transistor OFF)
Maximum Rating	Max. Applied Voltage: 30 VDC max. Max. Inflow Current: 10 mA max. Output Saturation Voltage: 1.0 V max.
Delay Function	Built-In and Starting Delay Time: Max. 10 seconds (The alarm function starts monitoring within 10 seconds of being turned on.)

●Alarm Output Connection Example



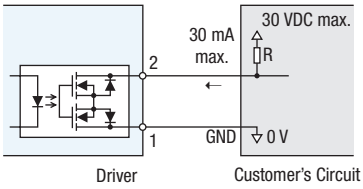
Alarm Specifications Number: B2

●Applicable Product ◇**EMR** Series: **EMR1865**

●Alarm Specifications

Alarm Activation Speed	Activated when the speed becomes less than 70% of the setting speed.
Output Type	Photo MOS Relay Output
Output Condition	Normal Operation: Output ON Alarm Output: Output OFF
Maximum Rating	Max. Applied Voltage: 30 VDC max. Max. Inflow Current: 30 mA max. ON Voltage: 0.1 V max.
Delay Function	Built-In and Starting Delay Time: Max. 10 seconds (The alarm function starts monitoring within 0.5 seconds of being turned on.)

●Alarm Output Connection Example



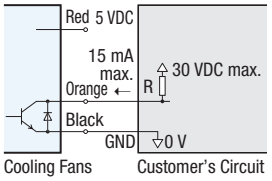
Alarm Specifications Number: B3

●Applicable Product ◇**MRS** Series: **MRS14**

●Alarm Specifications

Alarm Activation Speed	1800±300 r/min
Output Type	Open-Collector Output
Output Condition	Normal Operation: L level (Internal transistor ON) Alarm Output: H level (Internal transistor OFF)
Maximum Rating	Max. Applied Voltage: 30 VDC max. Max. Inflow Current: 15 mA max.
Alarm Circuit Drive Power Supply	5 VDC±5%
Delay Function	Built-In and Starting Delay Time: Max. 25 seconds (The alarm function starts monitoring within 25 seconds of being turned on.)

●Alarm Output Connection Example



●Low-Speed Alarm Contact Type

An alarm is output when the cooling fan speed drops below the alarm activation speed. The output mode is contact type.

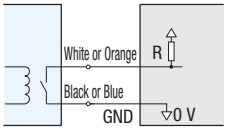
Alarm Specifications Number
B4

●Applicable Product ◇**MRS** Series: **MRS16-□B**, **MRS18-□B**, **MRS20-□B**, **MRS25-□B**
◇**MRE** Series: **MRE16-□B**, **MRE18-□B**, **MRE20-□B**

●Alarm Specifications

Alarm Activation Speed	1800±300 r/min
Output Type	Relay Output
Output Condition	Normal Operation: Contact ON Alarm Output: Contact OFF
Maximum Rating	Contact Capacity Resistive Load max. 10 VA (max. 100 V/max. 0.5 A) Min. load 5 V 1 mA (Customer circuit must be designed to operate at 0.5 mA or less.)
Delay Function	None (An external delay circuit is required to avoid alarm detection when the fan motor starts. The delay time should be 10 seconds or more.)

●Alarm Output Connection Example



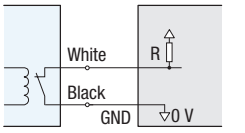
Alarm Specifications Number
B5

●Applicable Product ◇**MR** Series: **MR18-□TA**, **MRW18-□TA**

●Alarm Specifications

Alarm Activation Speed	**MR18-TTA**, **MR18-BTA**, **MR18-DTA**, **MRW18**: 1800±300 r/min **MR18-ATA**, **MR18-CTA**: 1000±300 r/min
Output Type	Relay Output
Output Condition	Normal Operation: Contact OFF Alarm Output: Contact ON
Maximum Rating	Contact Capacity Resistive Load max. 10 VA (max. 100 V/max. 0.5 A)
Delay Function	None (An external delay circuit is required to avoid alarm detection when the fan motor starts. The delay time should be 10 seconds or more.)

●Alarm Output Connection Example



AC Input Low-Power Consumption Axial Flow Fans

EMU Series

<Additional Information>
● Technical Reference ➜ Page 16

● For detailed information about regulations and standards, please see the Oriental Motor website.

- Reduced power consumption through the use of a built-in brushless motor
- Support for a wide voltage range: single-phase 100-240 VAC (50/60 Hz)
- Expected life of 60,000 hours

Features

Power Consumption Reduced by about 68%*1

By using brushless motors, power consumption is reduced by approximately 68%*1.

Lifetime*2 of 60,000 hours (approx. 6 years)

Because the lifetime is approx. 2.2 times*1 longer, the number of replacements is decreased, which allows for a reduction in maintenance costs.

Compatible with Single-Phase 100-240 VAC (50/60 Hz)

A single unit can be used in any country or region. The same characteristics can be achieved regardless of the frequency.

Approx. 45%*1 Mass Reduction

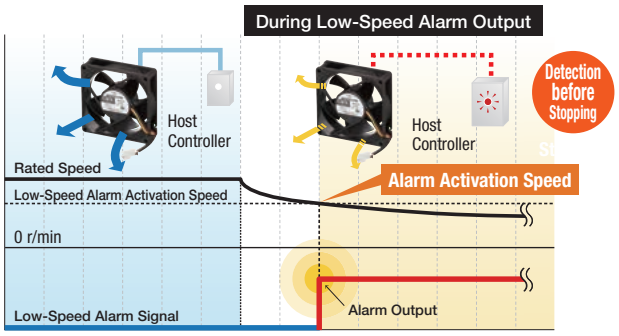
The mass of the fan has been lightened by approximately 0.29 kg (**EMU1238**) by using resin for the frame.

No Grounding Necessary

No grounding is required, thanks to the double insulation structure.

Low-Speed Alarm-equipped Fans Improve Equipment Reliability Preventative Maintenance

An alarm signal is output if the fan speed drops below the alarm activation speed due to ingestion of foreign particles or the fan lifetime.
A replacement can be purchased and the fan replaced before it stops.
Even if the fan's cooling capacity is decreased, the impact on the equipment can be minimized, contributing the improvement of the equipment's reliability.



● The product photos use DC axial flow fans as examples.

*1 When comparing the **EMU1238** and **MU1238A-11B**.
*2 Cooling Fan Lifetime ➜ Page 16

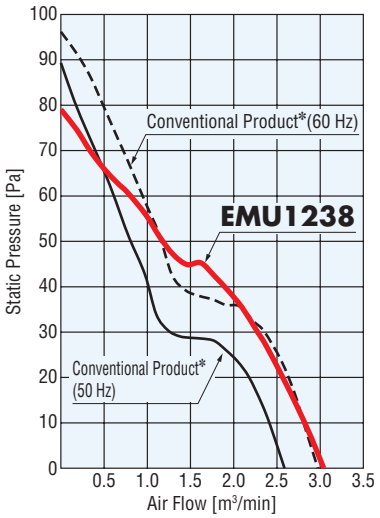
Comparison of Specifications and Characteristics between the **EMU** Series and Conventional Products*

◇Specifications Comparison

Item \ Applicable Product	EMU1238	Conventional Product* 50/60 Hz
Power Consumption [W]	4.4 (Approx. 66~68% Reduction)	14/13
Speed [r/min]	3250	2800/3250
Max. Air Flow [m³/min]	3	2.7/3
Max. Static Pressure [Pa]	84 (Same Characteristics)	81/81
Noise [dB]	42	43/46
Mass [kg]	0.29 (Approx. 45% Reduction)	0.53

*For **MU1238A-11B**.

◇Characteristics Comparison



Low Power Consumption EMU Series

□92 mm—38 mm thick

Operating Voltage Range: ±10% (Common for all voltages)
Overheat Protection: Built-in Burnout Prevention Circuit
Color
Frame: Black Blades: Black
Materials
Frame: PBT (Flammability classification: V-0)
Blades: PBT (Flammability classification: V-0)

Specifications

Product Name		Voltage	Frequency	Current	Input	Speed	Max. Air Flow	Max. Static Pressure	Noise Level	Expected Life*
Type Without Alarm	Low-Speed Alarm Electronic-Input Type (Alarm Specifications: B1)	V	Hz	A	W	r/min	m^3/min	Pa	dB (A)	h
EMU938-□	**EMU938M-□**	Single-Phase 100—240	50/60	0.08	4.5	3850	1.5	90	40	60000

* Service Life of a Cooling Fan ➜ Page 16
● Alarm Specifications ➜ Page 77
● Current is the value when voltage is 100 V.
● A number either **1** (1 m) or **2** (2 m) indicating the length of the plug cord for connection to the power supply is specified where the box □ is located in the product name.

Product Line

●Type Without Alarm

Product Name
EMU938-1
EMU938-2

●Low-Speed Alarm Electronic-Input Type

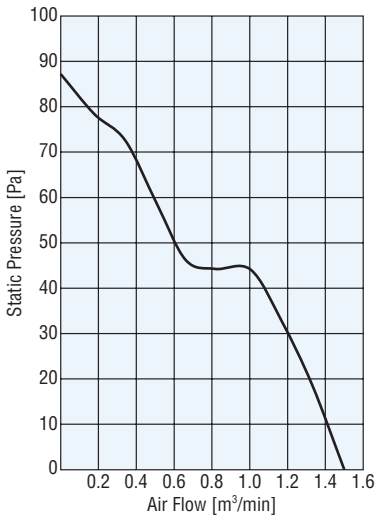
Product Name
EMU938M-1
EMU938M-2

Included Items

Type	Power Connection Plug Cord	Alarm Cable (2 m)	Operating Manual
Type Without Alarm	1	—	1 Set
Low-Speed Alarm Electronic-Input Type	1	1	

Air Flow – Static Pressure Characteristics

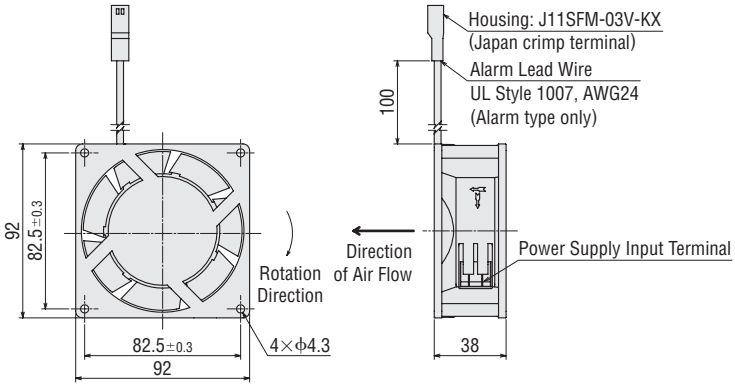
(Characteristics for fan only)



Dimensions (Unit = mm)

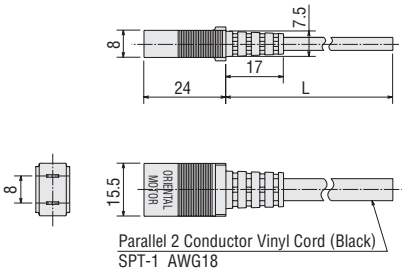
●Fan

Mass: 0.25 kg
Type Without Alarm 2D CAD E256 3D CAD
Type With Alarm 2D CAD E257 3D CAD

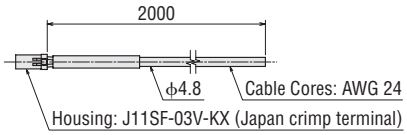


● Extension Cable (Included)

◇Plug Cords for Connection to Power Supply



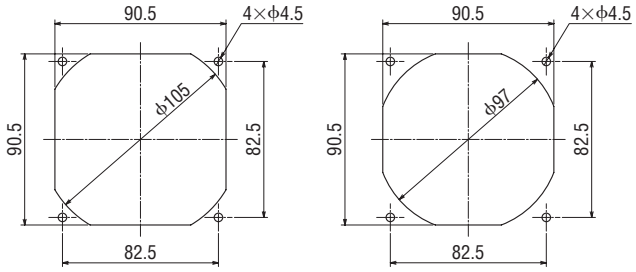
◇Alarm Cable (Included with alarm type units)



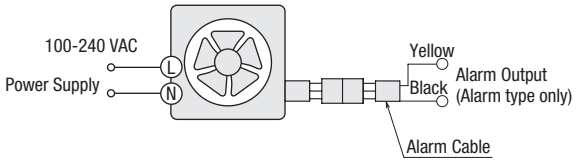
Product Name	L [mm]
EMU938□-1	1000
EMU938□-2	2000

● For the alarm type, **M** is specified where the box □ is located in the product name.

Panel Cut-Out (Units: mm)



Connection Diagrams



Peripheral Equipment

Product	Product Name
Iron Finger Guard (1)	**A-938-G**
Iron Finger Guard (2)	**A-938-G2**
Stainless Steel Finger Guard Set (1)	**A-938-S**
Stainless Steel Finger Guard Set (2)	**A-938-S2**
Iron Finger Guard & Filter Set (1 each)	**A-938-GF**
Screen	**FS9S**
Plug Cords for Connection to Power Supply (1 m)	**PCA2B**
Plug Cords for Connection to Power Supply (2 m)	**PCA2B2**

Fan Thermostat

Automatically performs ON and OFF fan control in accordance with the temperature fluctuation inside the equipment.
This helps improve the equipment's "environmental" performance relative to energy savings, noise reduction, etc.

Fan Thermostat **AM2-XA1**
(List price 3,200 yen)
● Reference Page ➜ Page 220

Enclosure Fan Modules ➜ Page 24

This product integrates the **EMU** Series fan with peripheral equipment such as the cover, filter media, frame and finger guard. Optimized cooling for control cabinets.

● Finger Guard Unit
IP2X Rating

● Slit Metal Plate Module
IP4X Rating

Low Power Consumption EMU Series

□120 mm–38 mm thick

Operating Voltage Range: ±10% (Common for all voltages)
Overheat Protection: Built-in Burnout Prevention Circuit
Color
Frame: Black Blades: Black
Materials
Frame: PBT (Flammability classification: V-0)
Blades: Polyphenylene oxide (Flammability grade: V-1)

Specifications

Product Name		Voltage	Frequency	Current	Input	Speed	Max. Air Flow	Max. Static Pressure	Noise Level	Expected Life*
Type Without Alarm	Low-Speed Alarm Electronic-Input Type (Alarm Specifications: B1)	V	Hz	A	W	r/min	m^3/min	Pa	dB (A)	h
EMU1238-□	**EMU1238M-□**	Single-Phase 100–240	50/60	0.08	4.4	3250	3	84	42	60000

*Service Life of a Cooling Fan ➜ Page 16
● Alarm Specifications ➜ Page 77
● Current is the value when voltage is 100 V.
● A number either **1** (1 m) or **2** (2 m) indicating the length of the plug cord for connection to power supply is specified where the box □ is located in the product name.

Product Line

Type Without Alarm

Product Name
EMU1238-1
EMU1238-2

Low-Speed Alarm Electronic-Input Type

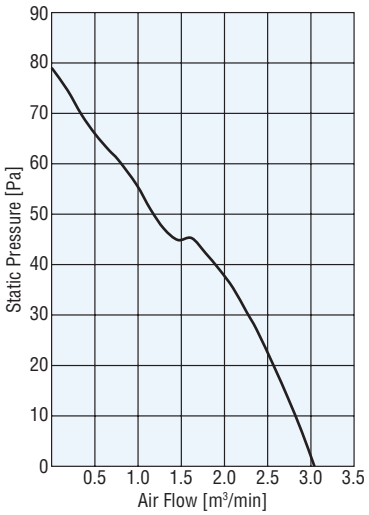
Product Name
EMU1238M-1
EMU1238M-2

Included Items

Type	Plug Cord for Connection to Power Supply	Alarm Cable (2 m)	Operating Manual
Type Without Alarm	1	–	1 Set
Low-Speed Alarm Electronic-Input Type	1	1	

Air Flow – Static Pressure Characteristics

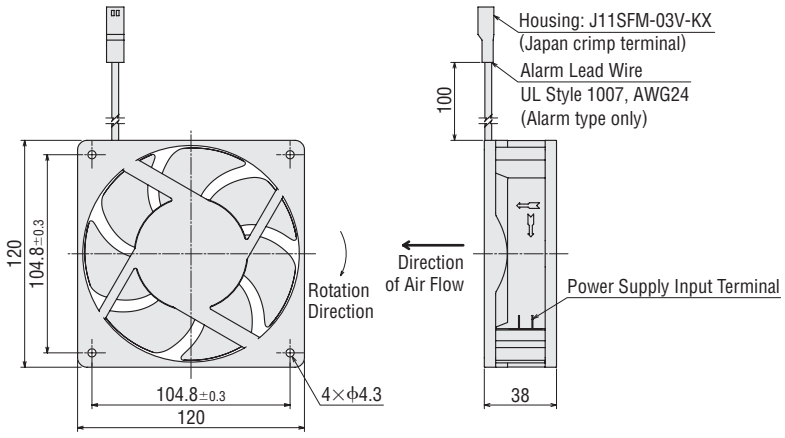
(Characteristics for fan only)



Dimensions (Unit = mm)

Fan

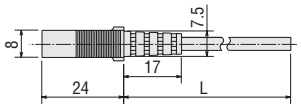
Mass: 0.29 kg
Type Without Alarm 2D CAD E228 3D CAD
Type With Alarm 2D CAD E231 3D CAD

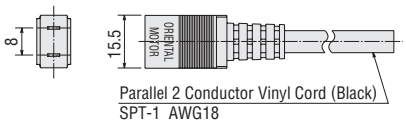


Reference Page Selection Calculations 14 | Technical Reference 16 | Features 79 | System Configuration 74 | General Specifications 76

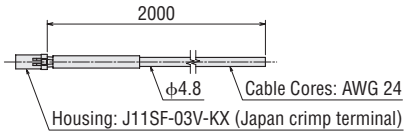
● Extension Cable (Included)

◇ Plug Cords for Connection to Power Supply





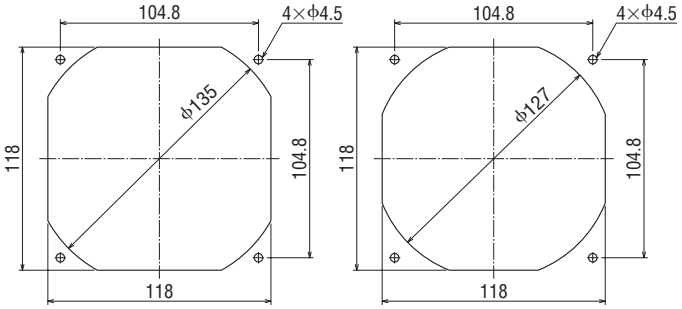
◇ Alarm Cable (Included with alarm type units)



Product Name	L [mm]
EMU1238□-1	1000
EMU1238□-2	2000

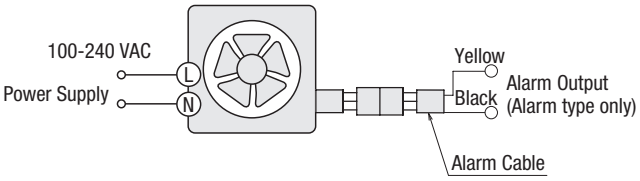
● For the alarm type, **M** is specified where the box □ is located in the product name.

Panel Cut-Out (Units: mm)



Outlet Side　　Inlet Side

Connection Diagrams



Peripheral Equipment

Product	Product Name
Iron Finger Guard (1)	**A-1238-G**
Iron Finger Guard (2)	**A-1238-G2**
Stainless Steel Finger Guard Set (1)	**A-1238-S**
Stainless Steel Finger Guard Set (2)	**A-1238-S2**
Iron Finger Guard & Filter Set (1 each)	**A-1238-GF**
Metallic Filter	**FLW12**
Screen	**FS12S**
Plug Cords for Connection to Power Supply (1 m)	**PCA2B**
Plug Cords for Connection to Power Supply (2 m)	**PCA2B2**

Fan Thermostats

Automatically performs ON and OFF fan control in accordance with the temperature fluctuation inside the equipment. This helps improve the equipment's "environmental" performance relative to energy savings, noise reduction, etc.

Fan Thermostat **AM2-XA1**
(List price 3,200 yen)
● Reference Page ➜ Page 220

Enclosure Fan Modules ➜ Page 24

This product integrates the **EMU** Series fan with peripheral equipment such as the cover, filter media, frame and finger guard. Optimized cooling for control cabinets.

● Finger Guard Unit IP2X Rating

● Slit Metal Plate Module IP4X Rating

⚠ Safety Precautions

- To ensure correct operation, carefully read the Operating Manual before using it.
- The products listed in this catalogue are for industrial use and for built-in component. Do not use for any other applications.

- The factories which manufacture the products listed in this catalogue have obtained Quality Management Systems ISO9001 and Environment Management Systems ISO14001.
- The content listed in this catalogue such as performance and specifications of the products are subject to change without notice for improvements.
- The price of all products listed in this catalogue does not include the consumption tax etc.
- For details of the products, please contact the nearest dealer, sales office or the following "Order Support Center" or "Customer Support Center".
- ***Orientalmotor*** is registered trademark or trademark of Oriental Motor in Japan and other countries.

Orientalmotor

ORIENTAL MOTOR ASIA PACIFIC PTE. LTD.

2 Kaki Bukit Avenue 1, #05-06,
Singapore 417938
TEL: +65-6745-7344 FAX: +65-6745-9405
http://www.orientalmotor.com.sg/

ORIENTAL MOTOR (THAILAND) CO., LTD.

Headquarters & Bangkok Office

900, 8th Floor Zone C, Tonson Tower, Ploenchit Road,
Lumpini, Pathumwan, Bangkok 10330 Thailand
TEL: +66-2-251-1871 FAX: +66-2-251-1872
http://www.orientalmotor.co.th/

ORIENTAL MOTOR (INDIA) PVT. LTD.

No.810, 8th Floor, Prestige Meridian-1 No.29,
M.G.Road, Bangalore, 560001, India
TEL: +91-80-41125586 FAX: +91-80-41125588
http://www.orientalmotor.co.in/

ORIENTAL MOTOR (MALAYSIA) SDN. BHD.

Headquarters & Kuala Lumpur Office

A-13-1, North Point Offices, Mid Valley City,
No.1 Medan Syed Putra Utara 59200
Kuala Lumpur, Malaysia
TEL: +60-3-22875778

Penang Office

1-4-14 Krystal Point II, Lebuh Bukit Kecil 6, Bayan Lepas,
11900 Penang, Malaysia
TEL: +60-4-6423788

Customer Engagement Centre

TEL: For Singapore: 1800-8420280 (Toll Free)
For Thailand: 1800-888881 (Toll Free)
For India: 1800-1201995 (Toll Free)
For Other Countries: +65-6842-0280

For more information please contact: