Centrifugal Blowers
Centrifugal Blowers

Centrifugal blowers maximize static pressure to provide concentrated airflow in one defined direction. These blowers can be used in a fixed position or mounted on moving parts, and are optimal for local cooling and airflow through ducts.

### Safety Standards and CE Marking

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- Details of Safety Standard  ➔ Page G-2
- List of Safety Standard Approved Products ➔ Page G-24

### System Configuration

- **Finger Guards (Accessories)**
  - Protect against the hazards posed by rotating fan blades.
  - (➔ Page E-102)

- **Filters (Accessories)**
  - Prevent dust from entering the fan, eliminating particulate contamination of the equipment.
  - (➔ Page E-105)

- **Duct Joints (Accessories)**
  - Connect the centrifugal blower outlet with the duct.
  - (➔ Page E-110)

- **Mounting Brackets (Accessories)**
  - Used to mount centrifugal blowers.
  - (➔ Page E-109)

- **Thermostats**
  - Make it possible for fans to operate only when cooling is necessary, thereby conserving energy.
  - (➔ Page E-97)
Product Number Codes

| MB 12 55 - B |

**Voltage**

- B: Single-Phase 100/110/115 VAC
- D: Single-Phase 200/220/230 VAC
- T: Three-Phase 200/220/230 VAC
- 24: 24 VDC
- 24A: 24 VDC Low-speed alarm type
- 24S: 24 VDC Pulse sensor type
- 48: 48 VDC
- 48S: 48 VDC Pulse sensor type

**Thickness of Impeller**

- 65: 2.56 in. (65 mm)
- 55: 2.17 in. (55 mm)
- 40: 1.57 in. (40 mm)
- 30: 1.18 in. (30 mm)
- 20: 0.79 in. (20 mm)

**Impeller Diameter**

- 5: ø1.97 in. (ø50 mm)
- 6: ø2.36 in. (ø60 mm)
- 8: ø3.15 in. (ø80 mm)
- 10: ø4.94 in. (ø100 mm)
- 12: ø4.72 in. (ø120 mm)
- 16: ø6.30 in. (ø160 mm)

**Series**

- MB: AC Centrifugal Blowers
- MBD: DC Centrifugal Blowers

Types of Centrifugal Blowers

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**General Specifications**

- Insulation Resistance: 100 MΩ or more when 500 VDC is applied between the windings and the frame under normal ambient temperature and humidity. (MBD Series: 10 MΩ or more, 250 VDC)
- Dielectric Strength: Sufficient to withstand 1.5 kV at 50 Hz applied between the windings and the frame for 1 minute under normal ambient temperature and humidity. (MBD Series: 500 V at 50 Hz, 1 minute)
- Temperature Rise: 81°F (45°C) or less, measured by the thermometer method after the temperature of the coil has stabilized under normal operation at the rated voltage and frequency. (MBD Series: 27°F (15°C) or less)
- Operating Voltage Range: AC Centrifugal Blowers: ±10% of the rated voltage
  - DC Centrifugal Blowers: ±10% of the rated voltage
- Insulation Class: Class E (248°F [120°C]) [Recognized as Class A (221°F [105°C]) by UL and CSA standards.]
- Overheat Protection: MB1665, MB1255, MB1040, MB840 types have built-in thermal protectors (automatic return type)
  - Operating temperature: Open: 248°F ±9°F (120°C ±5°C) Close: 170.6°F ±27°F (77°C ±15°C)
  - MB630, MB520 types have impedance protection
  - MBD Series has an overheat protection function installed.
- Ambient Temperature: 14°F ~ 122°F (~ -10°C ~ +50°C) [MB520, MB630, MBD Series: 14°F ~ 140°F (~ -10°C ~ +60°C)]
- Ambient Humidity: 0 ~ 85% (noncondensing)
- Color: Dark gray

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**Accessories**

- MRS
- Variable Flow
- MU
- Long Life
- MDEMDS / H18528
- MDMS MFD
Comparisons of Characteristics

**MB Series**

50 Hz

- Air Flow [CFM]
- Static Pressure [Pa]
- Static Pressure [inH2O]

50 Hz

- Air Flow [CFM]
- Static Pressure [Pa]
- Static Pressure [inH2O]

**MBD Series**

- DC Centrifugal Blowers

- Air Flow [CFM]
- Static Pressure [Pa]
- Static Pressure [inH2O]
## Cooling Fans

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<th>MDS - MD</th>
<th>MB</th>
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<th>MF</th>
<th>MFD</th>
<th>Thermostats</th>
<th>Accessories</th>
<th>Before Using a Fan</th>
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</table>

### Axial Flow Fans
- AC Input
- DC Input

### Centrifugal Blowers
- AC Input
- DC Input

### Cross Flow Fans
- AC Input
- DC Input

### Accessories
- MRS
- Variable Flow
- MU
- Long Life MDE
- MDS - MD

### Before Using a Fan
MB Series
AC Centrifugal Blowers
Impeller Diameter
φ6.30 in. (φ160 mm)

Specifications

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<th>Voltage VAC</th>
<th>Frequency Hz</th>
<th>Current A</th>
<th>Input Power W</th>
<th>Speed r/min</th>
<th>Max. Air Flow CFM</th>
<th>Max. Static Pressure inH2O</th>
<th>Noise Level dB (A)</th>
<th>Capacitor μF</th>
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Air Flow — Static Pressure Characteristics

Frequency — Audible Noise Level (dB)
Measured at a distance of 3.3 feet (1 m) from the fan intake side
Thermostats (Sold Separately)

Thermostats make it possible for fans to operate only when cooling is necessary, thereby conserving energy.

Thermostats: AM1-WA1, AM1-XA1

Connection Diagrams

- **MB1665-B, D**
  - Black Line
  - Red Line
  - White Line
  - Capacitor
  - Protective Earth (P.E.)
  - How to connect a capacitor ➔ Page E-113

- **MB1665-T**
  - Red Line
  - White Line
  - Black Line
  - Protective Earth (P.E.)

Panel Cut-Out Scale 1/4, Unit = inch (mm)

Dimensions

- Scale 1/4, Unit = inch (mm)
- Weight: 11 lb. (5 kg)

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Accessories (Sold Separately)

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MB Series
AC Centrifugal Blowers
Impeller Diameter
\( \phi 4.72 \text{ in. (}\phi 120 \text{ mm)} \)

### Specifications

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<th>Frequency Hz</th>
<th>Current A</th>
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### Air Flow — Static Pressure Characteristics

![Graph of Air Flow vs. Static Pressure Characteristics]

### Frequency — Audible Noise Level (dB)

Measured at a distance of 3.3 feet (1 m) from the fan intake side

![Graph of Frequency vs. Noise Level (dB)]

Ambient Temperature: 14°F to 122°F (−10°C to +50°C)
Operating Voltage Range: ±10%

Materials
- Motor Case: Die Cast Aluminum
- Casing: Die Cast Aluminum
- Impeller: Aluminum
- Overheat Protection: Built-in Thermal Protector
- Bearings: Ball Bearings
Thermostats (Sold Separately)
Thermostats make it possible for fans to operate only when cooling is necessary, thereby conserving energy.

Panel Cut-Out

Connection Diagrams

 Thermostats (Sold Separately)
Thermostats make it possible for fans to operate only when cooling is necessary, thereby conserving energy.

Panel Cut-Out

Connection Diagrams

Thermostats (Sold Separately)
Thermostats make it possible for fans to operate only when cooling is necessary, thereby conserving energy.
### MB Series
### AC Centrifugal Blowers
### Impeller Diameter
***3.94 in. (Ø100 mm)***

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**Specifications**

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<th>Model</th>
<th>Voltage VAC</th>
<th>Frequency Hz</th>
<th>Current A</th>
<th>Input Power W</th>
<th>Speed r/min</th>
<th>Max. Air Flow CFM</th>
<th>Max. Static Pressure inH2O</th>
<th>Max. Static Pressure Pa</th>
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<th>Capacitor μF</th>
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### Air Flow — Static Pressure Characteristics

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### Frequency — Audible Noise Level (dB)

Measured at a distance of 3.3 feet (1 m) from the fan intake side

---

**Materials**

- Motor Case: Die Cast Aluminum
- Casing: Die Cast Aluminum
- Impeller: Aluminum
- Overheat Protection: Built-in Thermal Protector
- Bearings: Ball Bearings

---

**Ambient Temperature:** 14°F to 122°F (−10°C to +50°C)

**Operating Voltage Range:** ±10%
**Dimensions**  
Scale 1/4, Unit = inch (mm)  
Weight: 4.4 lb. (2 kg)

**Panel Cut-Out**  
Scale 1/4, Unit = inch (mm)

**Connection Diagram**

**Thermostats**  
(Sold Separately)

Thermostats make it possible for fans to operate only when cooling is necessary, thereby conserving energy.

**Accessories**  
(Sold Separately)

<table>
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<th>Item</th>
<th>Model</th>
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<td>E-110</td>
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</table>

※ These products have been designed to pass tests set forth under the UL and CSA standards for equipment used in fans. They conform to the standards only when used with an ORIX FAN.

※ A finger guard can be installed in place of the filter.
MB Series
AC Centrifugal Blowers
Impeller Diameter
\(\phi3.15\text{ in. (}\phi80\text{ mm})\)

### Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>Voltage VAC</th>
<th>Frequency Hz</th>
<th>Current A</th>
<th>Input Power W</th>
<th>Speed r/min</th>
<th>Max. Air Flow CFM</th>
<th>Max. Static Pressure inH2O</th>
<th>Max. Static Pressure Pa</th>
<th>Noise Level dB(A)</th>
<th>Capacitor (\mu F)</th>
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<td>0.15</td>
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<td>0.906</td>
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</tr>
<tr>
<td></td>
<td>Three-Phase 230</td>
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<td>0.15</td>
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<td>0.906</td>
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</table>

- **MB840-T** is conformed by UL and CSA standards.
- How to read the specifications ➜ Page E-13
- Details of safety standards ➜ Page G-12

### Air Flow — Static Pressure Characteristics

Measured at a distance of 3.3 feet (1 m) from the fan intake side

### Frequency — Audible Noise Level (dB)

Measured at a distance of 3.3 feet (1 m) from the fan intake side

- Ambient Temperature: 14°F to 122°F (−10°C to +50°C)
- Operating Voltage Range: ±10%
- Motor Case: Die Cast Aluminum
- Casing: Die Cast Aluminum
- Impeller: Aluminum
- Overheat Protection: Built-in Thermal Protector
- Bearings: Ball Bearings
**Dimensions**  
Scale 1/4, Unit = inch (mm)  
Weight: 2.9 lb. (1.3 kg)

- Panel Cut-Out  
  Scale 1/4, Unit = inch (mm)  
  Outlet side  
  Intake side  

- Connection Diagrams  
  - MB840-B, D Type  
  - MB840-T Type  

- Thermostats  
  (Sold Separately)  
  Thermostats make it possible for fans to operate only when cooling is necessary, thereby conserving energy.

- Accessories  
  (Sold Separately)  
  Thermostats: AM1-WA1, AM1-XA1

- Capacitor  
  (Capacitor and capacitor cap are provided with single-phase blowers.)

- Protective Earth (P.E.)

- Connection Diagrams  
  - MB840-B, D Type  
  - MB840-T Type  

- Thermostats  
  (Sold Separately)  
  Thermostats make it possible for fans to operate only when cooling is necessary, thereby conserving energy.

- Accessories  
  (Sold Separately)  
  Thermostats: AM1-WA1, AM1-XA1
MB Series
AC Centrifugal Blowers
Impeller Diameter
\(\phi2.36\) in. \((\phi60\) mm\)

**Specifications**

<table>
<thead>
<tr>
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<th></th>
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<td>Single-Phase 200</td>
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<td>2600</td>
<td>17.7</td>
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<td>2900</td>
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<td>0.333</td>
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<tr>
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<td>16.0</td>
<td>2600</td>
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<td>0.225</td>
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<td></td>
<td>Single-Phase 230</td>
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<td>0.08</td>
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<td>19.4</td>
<td>0.55</td>
<td>0.333</td>
<td>83</td>
</tr>
</tbody>
</table>

- How to read the specifications → Page E-13
- Details of safety standards → Page G-12

**Air Flow — Static Pressure Characteristics**

**Frequency — Audible Noise Level (dB)**

- Measured at a distance of 3.3 feet (1 m) from the fan intake side.

**Materials**
- Motor Case: Die Cast Aluminum
- Casing: Die Cast Aluminum
- Impeller: Aluminum
- Overheat Protection: Impedance Protection
- Bearings: Ball Bearings

Ambient Temperature: 14°F to 122°F \((-10°C to +50°C\))
Operating Voltage Range: ±10%
Dimensions

Weight: 1.1 lb. (0.5 kg)

Panel Cut-Out

Outlet side

Intake side

Connection Diagram

Thermostats (Sold Separately)
Thermostats make it possible for fans to operate only when cooling is necessary, thereby conserving energy.

Thermostats: AM1-WA1
AM1-XA1

Accessories (Sold Separately)

<table>
<thead>
<tr>
<th>Item</th>
<th>Model</th>
<th>Safety Standards</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mounting Bracket</td>
<td>PAS2B</td>
<td></td>
<td>E-109</td>
</tr>
</tbody>
</table>

Mounting Bracket

Thermostats

Secure Use
MB Series
AC Centrifugal Blowers
Impeller Diameter
\( \phi 1.97 \text{ in. (} \phi 50 \text{ mm)\)

### Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>Voltage VAC</th>
<th>Frequency Hz</th>
<th>Current A</th>
<th>Input Power W</th>
<th>Speed r/min</th>
<th>Max. Air Flow CFM</th>
<th>Max. Air Flow m³/min</th>
<th>Max. Static Pressure inH₂O</th>
<th>Max. Static Pressure Pa</th>
<th>Noise Level dB(A)</th>
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<tbody>
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<td>7.0</td>
<td>3000</td>
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<td>37</td>
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<td>Single-Phase 110</td>
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<td>3200</td>
<td>8.83</td>
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<td>0.221</td>
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<tr>
<td></td>
<td>Single-Phase 115</td>
<td>60</td>
<td>0.11</td>
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<td>8.83</td>
<td>0.25</td>
<td>0.221</td>
<td>55</td>
<td>38</td>
</tr>
</tbody>
</table>

| MB520-D | Single-Phase 200 | 50          | 0.09      | 11.0          | 2650        | 7.77              | 0.22                 | 0.153                       | 38                       | 33              |
|         | Single-Phase 200 | 60          | 0.08      | 10.0          | 3200        | 9.53              | 0.27                 | 0.233                       | 58                       | 38              |
|         | Single-Phase 220 | 60          | 0.09      | 12.0          | 3300        | 9.53              | 0.27                 | 0.241                       | 60                       | 38              |
|         | Single-Phase 230 | 50          | 0.10      | 16.0          | 2750        | 8.12              | 0.23                 | 0.16                        | 40                       | 33              |
|         | Single-Phase 230 | 60          | 0.09      | 13.0          | 3300        | 9.53              | 0.27                 | 0.241                       | 60                       | 38              |

- How to read the specifications → Page E-13
- Details of safety standards → Page G-12

### Air Flow — Static Pressure Characteristics

![Air Flow Static Pressure Graph](image)

### Frequency — Audible Noise Level (dB)

Measured at a distance of 3.3 feet (1 m) from the fan intake side

![Noise Level Graph](image)
**Dimensions**  Scale 1/4, Unit = inch (mm)
Weight: 0.7 lb. (0.3 kg)

- **Panel Cut-Out**  Scale 1/4, Unit = inch (mm)
- **Connection Diagram**
- **Accessories** (Sold Separately)

![Connection Diagram](image)

<table>
<thead>
<tr>
<th>Item</th>
<th>Model</th>
<th>Safety Standards</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mounting Bracket</td>
<td>PAS2B</td>
<td>—</td>
<td>E-109</td>
</tr>
</tbody>
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**Thermostats** (Sold Separately)
Thermostats make it possible for fans to operate only when cooling is necessary, thereby conserving energy.
MBD Series
DC Centrifugal Blowers
Impeller Diameter
\(\phi 4.72\) in. (\(\phi 120\) mm)

Specifications

<table>
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<tr>
<th>Model</th>
<th>Rated Voltage VDC</th>
<th>Rated Current A</th>
<th>Rated Speed r/min</th>
<th>Max. Air Flow CFM</th>
<th>Max. Static Pressure inH(_2)O</th>
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How to read the specifications → Page E-13

Air Flow — Static Pressure Characteristics

Frequency — Audible Noise Level (dB)

Ambient Temperature: 14°F to 140°F (-10°C to +60°C)
Operating Voltage Range: ±10%

Materials
Motor Case: Die Cast Aluminum
Casing: Die Cast Aluminum
Impeller: Aluminum
Overheat Protection: Built-in Overheat Protection Circuit
Bearings: Ball Bearings

Measured at a distance of 3.3 feet (1 m) from the fan intake side

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<tr>
<th>Center Frequency [Hz]</th>
<th>1/3 Octave Band</th>
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<td>63</td>
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<td>125</td>
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<td>250</td>
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<tr>
<td>500</td>
<td>10</td>
</tr>
<tr>
<td>1 k</td>
<td>0.6</td>
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<tr>
<td>2 k</td>
<td>0.2</td>
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<tr>
<td>4 k</td>
<td>0.1</td>
</tr>
<tr>
<td>8 k</td>
<td>0.05</td>
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<tr>
<td>16 k</td>
<td>0.025</td>
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E-78
ORIENTAL MOTOR GENERAL CATALOG 2003/2004
### Dimensions

Scale 1/4, Unit = inch (mm)

Weight: 3.3 lb. (1.5 kg)

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Value</th>
<th>Conversion</th>
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<tr>
<td>Outlet side</td>
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<tr>
<td>Intake side</td>
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<td>2 Leads 12 inch (300 mm) Length</td>
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### Panel Cut-Out

Scale 1/4, Unit = inch (mm)

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<thead>
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<th>Dimension</th>
<th>Value</th>
<th>Conversion</th>
</tr>
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<tbody>
<tr>
<td>Outlet side</td>
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</tr>
<tr>
<td>Intake side</td>
<td>0.71 (18)</td>
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### Connection Diagram

Red ➔ 24 VDC
Black ➔ GND

### Accessories (Sold Separately)

<table>
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<th>Item</th>
<th>Model</th>
<th>Safety Standards</th>
<th>Page</th>
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<td>FGB12</td>
<td>✽</td>
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<tr>
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<td>—</td>
<td>E-106</td>
</tr>
<tr>
<td>Mounting Bracket</td>
<td>PAS4B</td>
<td>—</td>
<td>E-109</td>
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<tr>
<td>Duct Joint</td>
<td>FD12</td>
<td>—</td>
<td>E-110</td>
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</tbody>
</table>

✽ These products have been designed to pass tests set forth under the UL and CSA standards for equipment used in fans. They conform to the standards only when used with an ORIX Fan.

A finger guard can be installed in place of the filter.
MBD Series
DC Centrifugal Blowers
Impeller Diameter
φ3.94 in. (φ100 mm)

Specifications

<table>
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<tr>
<th>Model</th>
<th>Voltage</th>
<th>Current</th>
<th>Speed</th>
<th>Max. Air Flow</th>
<th>Max. Static Pressure</th>
<th>Noise Level</th>
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Air Flow — Static Pressure Characteristics

Frequency — Audible Noise Level (dB)

Measured at a distance of 3.3 feet (1 m) from the fan intake side

Materials
Motor Case: Die Cast Aluminum
Casing: Die Cast Aluminum
Impeller: Aluminum
Overheat Protection: Built-in Overheat Protection Circuit
Bearings: Ball Bearings

Ambient Temperature: 14°F to 140°F (−10°C to +60°C)
Operating Voltage Range: ±10%

Cooling Fans
Ambient Temperature: 14°F to 140°F (−10°C to +60°C)
Operating Voltage Range: ±10%
**Dimensions**  Scale 1/4, Unit = inch (mm)

Weight: 2.6 lb. (1.2 kg)

![Diagram of dimensions](image)

- Leads 12 inch (300 mm) Length
- UL Style 1007, AWG 24
- Alarm Leads (White, Blue)
- Pulse Sensor Lead (Yellow)
  (Alarm Type Only)

**Connection Diagrams**

- Red: +24 VDC or +48 VDC
- Black: GND
- White: Alarm Output  (Alarm Type Only)
- Blue: Pulse Sensor Output
  (Alarm Type Only)

**Panel Cut-Out**  Scale 1/4, Unit = inch (mm)

Outlet side  Intake side

**Accessories** (Sold Separately)

<table>
<thead>
<tr>
<th>Item</th>
<th>Model</th>
<th>Safety Standards</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finger Guard</td>
<td>FGB10</td>
<td>★</td>
<td>E-104</td>
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<tr>
<td>Filter</td>
<td>FLB10</td>
<td>—</td>
<td>E-106</td>
</tr>
<tr>
<td>Mounting Bracket</td>
<td>PAS4B</td>
<td>—</td>
<td>E-109</td>
</tr>
<tr>
<td>Duct Joint</td>
<td>FD10</td>
<td>—</td>
<td>E-110</td>
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</tbody>
</table>

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- A finger guard can be installed in place of the filter.
Cooling Fans

MBD Series
DC Centrifugal Blowers
Impeller Diameter
3.15 in. (80 mm)

Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>Voltage</th>
<th>Current</th>
<th>Speed</th>
<th>Max. Air Flow</th>
<th>Max. Static Pressure</th>
<th>Noise Level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Speed Alarm, Contact Alarm Type</td>
<td>MBD8-24A</td>
<td>24</td>
<td>0.7</td>
<td>2600</td>
<td>51.2</td>
<td>1.45</td>
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<td>0.786</td>
<td>196</td>
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<tr>
<td></td>
<td>Pulse Sensor Type</td>
<td>MBD8-24S</td>
<td>48</td>
<td>0.5</td>
<td>2600</td>
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<td>196</td>
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<td>Standard Type</td>
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<td>Pulse Sensor Type</td>
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<td>Standard Type</td>
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<td></td>
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<td></td>
<td>0.786</td>
<td>196</td>
</tr>
</tbody>
</table>

Ambient Temperature: 14°F to 140°F (−10°C to +60°C)
Operating Voltage Range: ±10%

Materials
Motor Case: Die Cast Aluminum
Casing: Die Cast Aluminum
Impeller: Aluminum
Overheat Protection: Built-in Overheat Protection Circuit
Bearings: Ball Bearings

Air Flow — Static Pressure Characteristics

Increased noise level with temperature increase.

Frequency — Audible Noise Level (dB)

Measured at a distance of 3.3 feet (1 m) from the fan intake side.
**Dimensions**

Scale 1/4, Unit = inch (mm)

Weight: 2.4 lb. (1.1 kg)

4.59 (116.5)
1.95 (49.5)
1.97 (50)
1.73 (44)
0.68 (2)
0.39 (10)

Air Flow

4 Leads 12 inch (300 mm) Length

UL Style 1007, AWG 24

Alarm Leads (White, Blue)
Pulse Sensor Lead (Yellow)
(Alarm Type Only)

**Connection Diagrams**

Red
Black
White
Blue

+24 VDC or +48 VDC
GND
Alarm Output
(Alarm Type Only)

Red
Black
Yellow

+24 VDC or +48 VDC
GND
Pulse Sensor Output
(Alarm Type Only)

**Panel Cut-Out**

Scale 1/4, Unit = inch (mm)

Outlet side

Intake side

**Accessories** (Sold Separately)

<table>
<thead>
<tr>
<th>Item</th>
<th>Model</th>
<th>Safety Standards</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finger Guard</td>
<td>FGB8</td>
<td>*</td>
<td>E-104</td>
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<tr>
<td>Filter</td>
<td>FLB8</td>
<td>—</td>
<td>E-106</td>
</tr>
<tr>
<td>Mounting Bracket</td>
<td>PAS4B</td>
<td>—</td>
<td>E-109</td>
</tr>
<tr>
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<td>FD8</td>
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