Cooling Fans

Cross Flow Fans

AC Input
MF Series

DC Input
MFD Series
Cross flow fans are suitable for cooling circuit boards or other applications requiring wide and uniform air flow such as air curtains.

**Features**
Cross flow fans deliver wide, uniform air flow. These fans provide right-angle air flow and a rectangular shape, allowing for installation in corners and space saving.

**Types of Cross Flow Fans**
- **Standard Type**
- **Alarm Type**
- **Pulse Sensor Type**

<table>
<thead>
<tr>
<th>Series</th>
<th>Features</th>
<th>Power Supply Voltage</th>
<th>Impeller Length [mm (in.)]</th>
</tr>
</thead>
</table>
| AC Cross Flow Fans | - AC input cross flow fans  
| MF Series       | - The MF Series is recognized by UL/CSA Standards. CE Marking is used in accordance with the Low Voltage Directive. (Certification status differs according to the product.)  
|                 | - RoHS-Compliant  
|                 | - The MF Series conforms to the RoHS Directive that prohibits the use of six chemical substances including lead and cadmium. | Single-Phase 100/110/115 VAC | 300 (11.81) 150 (5.91) |
| DC Cross Flow Fans | - DC input cross flow fans  
| MFD Series      | - RoHS-Compliant  
|                 | - The MFD Series conforms to the RoHS Directive that prohibits the use of six chemical substances including lead and cadmium. | 24 VDC | 0.094 |
|                 | - 48 VDC | 1.886 |

**System Configuration**
An example of a system configuration with the **MF** Series.

**Example of System Configuration**
- **Thermostats**
  - MF915-BC
  - AM1-WA1
  - FG915D

- **Finger Guards**
  - FG915D

The system configuration shown above is an example. Other combinations are available.
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Cooling Fans

Introduction

FM

AC Input

MRS

AC Input

Variable Flow

MRS

AC Input

MU

DC Input

Long-Life

MDE

DC Input

MDS/MD

AC Input

MB

DC Input

MBD

AC Input

MF

DC Input

MFD

Thermostats

Accessories

Installation

Product Number Code

- **AC Cross Flow Fans**

  **MF 9 30 B · B C**

  | ① | Series | MF, MF Series |
  | ② | Frame Size | 9: 90 mm (3.54 in.) |
  | ③ | Impeller Length | 30: 300 mm (11.81 in.), 15: 150 mm (5.91 in.) |
  | ④ | Letter Designation | Blank: Motor is on left when viewing the mounting holes, B: Motor is on right when viewing the mounting holes |
  | ⑥ | C: Built-in Capacitor |

- **DC Cross Flow Fans**

  **MFD 9 30 B · 24 A**

  | ① | Series | MFD, MFD Series |
  | ② | Frame Size | 9: 90 mm (3.54 in.) |
  | ③ | Impeller Length | 30: 300 mm (11.81 in.), 15: 150 mm (5.91 in.) |
  | ④ | Letter Designation | Blank: Motor is on left when viewing the mounting holes, B: Motor is on right when viewing the mounting holes |
  | ⑤ | Power Supply Voltage | 24: 24 VDC, 48: 48 VDC |
  | ⑥ | Additional Functions | A: Low-Speed Alarm, Contact Alarm Type, S: Pulse Sensor Type |

General Specifications

- **Insulation Resistance**: 100 MΩ or more when 500 VDC megger is applied between the windings and the frame after continuous operation under normal ambient temperature and humidity. (MFD Series: 10 MΩ or more, 500 VDC megger)

- **Dielectric Strength**: Sufficient to withstand 1.5 kVAC at 50 Hz applied between the windings and the frame for 1 minute after continuous operation under normal ambient temperature and humidity. (MFD Series: 500 VAC at 50 Hz, 1 minute)

- **Temperature Rise**: 45°C (81°F) or less measured by the thermometer method after the temperature of the motor case has stabilized after continuous operation under normal ambient temperature and humidity. (MFD Series: 15°C [27°F] or less)

- **Operating Voltage Range**: MF Series: ±10% of the rated voltage, MFD Series: ±10% of the rated voltage

- **Insulation Class**: MF Series; UL, CSA: Class A [105˚C (221˚F)], Class E [120˚C (248˚F)], MFD Series; Class E [120˚C (248˚F)]

- **Overheat Protection**: MF Series has built-in thermal protector (automatic return type). Open: 120±5°C (248±9°F), Close: 77±15°C (170.6±27°F)

- **Overheat Protection Circuit**: MFD series has an overheat protection circuit.

- **Ambient Temperature**: −10～+60°C (+14～+140°F)

- **Ambient Humidity**: 85% or less (non-condensing)

- **Color**: MF Series; Motor: Dark gray, Fan case: Black, MFD Series; Motor: Black, Fan case: Black, Flange: Dark gray

- **Materials**: Impeller: Aluminum, Casing: Steel, Motor case: Die cast aluminum

Comparison of Characteristics

- **MF Series**

  - **50 Hz**
  - **60 Hz**

  ![Comparison of Characteristics](image)

<table>
<thead>
<tr>
<th>Air Flow [CFM]</th>
<th>Static Pressure [Pa]</th>
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</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>15</td>
<td>0.1</td>
</tr>
<tr>
<td>30</td>
<td>0.2</td>
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<tr>
<td>50</td>
<td>0.3</td>
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<tr>
<td>70</td>
<td>0.4</td>
</tr>
<tr>
<td>100</td>
<td>0.5</td>
</tr>
<tr>
<td>150</td>
<td>0.6</td>
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<tr>
<td>200</td>
<td>0.7</td>
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<table>
<thead>
<tr>
<th>Air Flow [m³/min]</th>
<th>Static Pressure [Pa]</th>
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<tbody>
<tr>
<td>0</td>
<td>0</td>
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<tr>
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<tr>
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<td>4.0</td>
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## Specifications  (RoHS)

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<th>Current</th>
<th>Input</th>
<th>Speed r/min</th>
<th>Max. Air Flow m³/min</th>
<th>Max. Air Flow CFM</th>
<th>Max. Static Pressure Pa</th>
<th>Max. Static Pressure inH₂O</th>
<th>Noise Level dB (A)</th>
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<td>74</td>
<td>0.297</td>
<td>58</td>
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<tr>
<td>MF930B-BC</td>
<td>Single-Phase 100</td>
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<td>0.50</td>
<td>45</td>
<td>2700</td>
<td>6.2</td>
<td>219</td>
<td>103</td>
<td>0.413</td>
<td>60</td>
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<tr>
<td></td>
<td>Single-Phase 110</td>
<td>60</td>
<td>0.50</td>
<td>48</td>
<td>2950</td>
<td>6.6</td>
<td>233</td>
<td>106</td>
<td>0.425</td>
<td>62</td>
</tr>
<tr>
<td></td>
<td>Single-Phase 115</td>
<td>60</td>
<td>0.50</td>
<td>50</td>
<td>3000</td>
<td>6.8</td>
<td>240</td>
<td>106</td>
<td>0.425</td>
<td>63</td>
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<tr>
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<td>6.0</td>
<td>212</td>
<td>74</td>
<td>0.297</td>
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</tr>
<tr>
<td>MF930B-DC</td>
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<td>2700</td>
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<td>219</td>
<td>103</td>
<td>0.413</td>
<td>60</td>
</tr>
<tr>
<td></td>
<td>Single-Phase 220</td>
<td>60</td>
<td>0.25</td>
<td>48</td>
<td>2950</td>
<td>6.6</td>
<td>233</td>
<td>106</td>
<td>0.425</td>
<td>62</td>
</tr>
<tr>
<td></td>
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<td>40</td>
<td>2700</td>
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<td>219</td>
<td>78</td>
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<td>3000</td>
<td>6.8</td>
<td>240</td>
<td>106</td>
<td>0.425</td>
<td>63</td>
</tr>
</tbody>
</table>

---

**How to read specifications ➜ Page E-19**

**Details of safety standards ➜ Page G-2**

**Details of RoHS Directive ➜ Page G-38**

The following items are included in each product.

- Fan, Operating Manual

## Air Flow – Static Pressure Characteristics

- **How to read air flow – static pressure characteristics ➜ Page E-20**

---

**Ambient Temperature: −10—+60°C (+14—+140°F)**

**Operating Voltage Range: ±10%**

**Materials**
- Motor Case: Die Cast Aluminum
- Casing: Steel
- Impeller: Aluminum

**Overheat Protection:** Built-in Thermal Protector

**Bearings:** Ball Bearings
### Dimensions

**Unit = mm (in.)**

**MF930-BC, MF930-DC**

Mass: 1.9 kg (4.2 lb.)

**Panel Cut-Out**

**Unit = mm (in.)**

**Outlet Side**

4×φ4.5 (φ0.177)

60 (2.36)

34 (1.34)

38 (1.50)

19 (0.75)

7.5 (0.30)

325 (12.80)

310 (12.20)

336 (13.23)

68 (2.68)

404 (15.91)

### Connection Diagram

**Thermostats**

A thermostat makes it possible for fans to operate only when cooling is necessary, thereby conserving energy.

Thermostats AM1-WA1/AM1-XA1

**Accessories**

The following product is RoHS-Compliant.

Details ➔ Page E-137

<table>
<thead>
<tr>
<th>Product</th>
<th>Model</th>
<th>Safety Standards</th>
<th>Page</th>
</tr>
</thead>
<tbody>
<tr>
<td>Finger Guard</td>
<td>FG930D</td>
<td>Conformed component</td>
<td>E-145</td>
</tr>
</tbody>
</table>

**Introductions**

**FM**

**AC Input**

**MRS**

**AC Input**

**Variable Flow**

**MRS**

**AC Input**

**MU**

**DC Input**

**Long-Life**

**MDE**

**DC Input**

**MDS/MD**

**AC Input**

**MB**

**DC Input**

**MBD**

**AC Input**

**MF**

**DC Input**

**MFD**

**Thermostats Accessories Installation**

**Cooling Module**

Axial Flow Fans Centrifugal Blowers Cross Flow Fans

**Dimensions**

■

Unit = mm (in.)

**MF930-BC, MF930-DC**

Mass: 1.9 kg (4.2 lb.)

Lead Wire 300 mm (12 in.)

UL Style 3271, AWG20

**Accessories**

The following product is RoHS-Compliant.

Details ➔ Page E-137

<table>
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**MFD**

**Thermostats Accessories Installation**

**Cooling Module**

Axial Flow Fans Centrifugal Blowers Cross Flow Fans

**Dimensions**

■

Unit = mm (in.)

**MF930B-BC, MF930B-DC**

Mass: 1.9 kg (4.2 lb.)

Lead Wire 300 mm (12 in.)

UL Style 3271, AWG20

**Accessories**

The following product is RoHS-Compliant.

Details ➔ Page E-137

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<tr>
<th>Product</th>
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**MFD**

**Thermostats Accessories Installation**

**Cooling Module**

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■

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**MF**

**DC Input**

**MFD**

**Thermostats Accessories Installation**

**Cooling Module**

Axial Flow Fans Centrifugal Blowers Cross Flow Fans

**Dimensions**

■

Unit = mm (in.)
## Specifications (RoHS)

<table>
<thead>
<tr>
<th>Model</th>
<th>Voltage VAC</th>
<th>Frequency Hz</th>
<th>Current A</th>
<th>Input W</th>
<th>Speed r/min</th>
<th>Max. Air Flow m³/min</th>
<th>Max. Air Flow CFM</th>
<th>Max. Static Pressure Pa</th>
<th>Static Pressure inH₂O</th>
<th>Noise Level dB (A)</th>
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</thead>
<tbody>
<tr>
<td>MF915-BC</td>
<td>Single-Phase 100</td>
<td>50</td>
<td>0.35</td>
<td>30</td>
<td>2650</td>
<td>3.4</td>
<td>120</td>
<td>88</td>
<td>0.353</td>
<td>60</td>
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<tr>
<td>MF915B-BC</td>
<td>Single-Phase 100</td>
<td>60</td>
<td>0.45</td>
<td>40</td>
<td>2950</td>
<td>3.7</td>
<td>131</td>
<td>127</td>
<td>0.509</td>
<td>63</td>
</tr>
<tr>
<td></td>
<td>Single-Phase 110</td>
<td>60</td>
<td>0.45</td>
<td>42</td>
<td>3200</td>
<td>4.0</td>
<td>141</td>
<td>132</td>
<td>0.529</td>
<td>64</td>
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<td></td>
<td>Single-Phase 115</td>
<td>60</td>
<td>0.45</td>
<td>43</td>
<td>3250</td>
<td>4.1</td>
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<td>132</td>
<td>0.529</td>
<td>64</td>
</tr>
<tr>
<td>MF915-DC</td>
<td>Single-Phase 200</td>
<td>50</td>
<td>0.20</td>
<td>30</td>
<td>2650</td>
<td>3.4</td>
<td>120</td>
<td>88</td>
<td>0.353</td>
<td>60</td>
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<td>MF915B-DC</td>
<td>Single-Phase 200</td>
<td>60</td>
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<td>Single-Phase 220</td>
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<td>Single-Phase 230</td>
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<td>0.25</td>
<td>43</td>
<td>3250</td>
<td>4.1</td>
<td>145</td>
<td>132</td>
<td>0.529</td>
<td>64</td>
</tr>
</tbody>
</table>


The following items are included in each product.

Fan, Operating Manual

---

## Air Flow – Static Pressure Characteristics

*How to read air flow – static pressure characteristics ➜ Page E-20*
■ Dimensions  Unit = mm (in.)

- **MF915-BC, MF915-DC**
  - Mass: 1.7 kg (3.7 lb.)

- **MF915B-BC, MF915B-DC**
  - Mass: 1.7 kg (3.7 lb.)

■ Panel Cut-Out  Unit = mm (in.)

- **Outlet Side**

■ Accessories

The following product is RoHS-Compliant.

<table>
<thead>
<tr>
<th>Product</th>
<th>Model</th>
<th>Safety Standards</th>
<th>Page</th>
</tr>
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<tbody>
<tr>
<td>Finger Guard</td>
<td>FG915D</td>
<td>Conformed component</td>
<td>E-145</td>
</tr>
</tbody>
</table>

■ Thermostats

A thermostat makes it possible for fans to operate only when cooling is necessary, thereby conserving energy.

- **Thermostats**
  - `AM1-WA1/AM1-XA1`
  - Page → E-133

---

**Cooling Fans**

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  - FM
  - AC Input
  - Variable Flow
  - Long-Life
  - DC Input

- MRS
  - AC Input
  - MDS/MD
  - MB
  - MBD

- MF
  - DC Input
  - MFD

- Thermostats
  - Accessories
  - Installation
Cooling Fans

DC Cross Flow Fans

MFD Series

Impeller Length
300 mm (11.81 in.)

Specifications

<table>
<thead>
<tr>
<th>Model</th>
<th>Voltage VDC</th>
<th>Current A</th>
<th>Speed r/min</th>
<th>Max. Air Flow m³/min</th>
<th>Max. Air Flow CFM</th>
<th>Max. Static Pressure Pa</th>
<th>inH₂O</th>
<th>Noise Level dB (A)</th>
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<tbody>
<tr>
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<td>24</td>
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<td>83</td>
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<tr>
<td>MFD930-24A</td>
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<td>(Alarm specifications: ⑨) MFD930-48S</td>
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<td>0.7</td>
<td>2100</td>
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<td>83</td>
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<td>184</td>
<td>83</td>
<td>0.333</td>
<td>60</td>
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How to read specifications ➔ Page E-19

Alarm specifications ⑦, ⑨ ➔ Page E-21

Details of RoHS Directive ➔ Page G-38

The following items are included in each product

Fan, Operating Manual

Air Flow – Static Pressure Characteristics

How to read air flow – static pressure characteristics ➔ Page E-20

Ambient Temperature: −10°C to +60°C (+14°F to +140°F)

Operating Voltage Range: ±10%

Materials

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

Introduction

**FM**
- AC Input
- MRS
- Variable Flow
  - MRS
  - AC Input

**MU**
- DC Input
- Long-Life
  - MDE
  - DC Input

**MB**
- DC Input
- MBD
- AC Input

Thermostats Accessories Installation

Cooling Module
- Axial Flow Fans
- Centrifugal Blowers
- Cross Flow Fans

**Dimensions**

Unit = mm (in.)

- **MFD930**
  - Mass: 1.6 kg (3.5 lb.)

- **MFD930B**
  - Mass: 1.6 kg (3.5 lb.)

**Panel Cut-Out**

Unit = mm (in.)

- 4×4.5 (0.177)

- 310 (12.20)
- 325 (12.80)

**Connection Diagrams**

- 24 VDC or 48 VDC
- Alarm Output
  (Alarm type only)
- Red
- Black
- White
- Blue

- 24 VDC
- Pulse Sensor Input
  (Pulse sensor type only)
- Red
- Black
- Yellow

**Accessories**

The following product is RoHS-Compliant.

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<table>
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<tr>
<th>Product</th>
<th>Model</th>
<th>Safety Standards</th>
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<tr>
<td>Finger Guard</td>
<td>FG930D</td>
<td>Conformed component</td>
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</table>
DC Cross Flow Fans
MFD Series
Impeller Length
150 mm (5.91 in.)

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>
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</thead>
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<tr>
<td>Low-Speed Alarm, Contact Alarm Type (Alarm specifications: ⑦)</td>
<td>MFD915-24A</td>
<td>24</td>
<td>1.0</td>
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<td>Pulse Sensor Type (Alarm specifications: ⑨)</td>
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<td>MFD915-48</td>
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<td>3.0</td>
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Materials
Motor Case: Die Cast Aluminum
Casing: Steel
Impeller: Aluminum
Overheat Protection: Built-in Overheat Protection Circuit
Bearings: Ball Bearings
**Dimensions**  Unit = mm (in.)

- **MFD915**
  - Mass: 1.4 kg (3.1 lb.)

- **MFD915B**
  - Mass: 1.4 kg (3.1 lb.)

**Panel Cut-Out**  Unit = mm (in.)

**Accessories**

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**Connection Diagrams**