AC Axial-flow Fans
R87F/R87T

Optimum Cooling with a Comprehensive Lineup of Axial-flow Fans

- Low noise level, long service life, and resistance to the environment.
- Shaft supported by ball bearings for highly-reliable operation.
- Plastic-bladed models (48 type) and metal-bladed models (24 type) included in series.
- R87F-A□A16H-WR Water-resistant AC Axial-flow Fans (IP65 degree of protection) added to series.
- A wide range of models with CSA, VDE, and EN/IEC approval also available.

Model Number Structure

■ Model Number Legend

R87□-□□ □□□□□□-□

1 2 3 4 5 6 7 8

1. Basic series

R87F: Plastic blade
R87T: Metal blade

2. Rated voltage

A1: 100 VAC
A3: 115 VAC
A4: 200 VAC
A6: 230 VAC

3. Frame material

A: Die-cast aluminum

4. Frame size

0: 150 dia.
1: 120×120
9: 92×92
8: 80×80

5. Frame thickness

3: 25
5: 38
6: 40
7: 55

6. Rotational speed

H: High
M: Medium
L: Low

7. Terminal type

No marking: Lead wires
P: Terminals (See note 1.)

8. Type

No marking: Standard
WR: Water-resistant

Note: 1. A Plug Cord (R87F-PC) is available as an option for models with terminals.

2. These tables show only how to read product markings. They do not indicate which products are available. Refer to product ratings when ordering.

Ordering Information

■ Available Models

AC Axial-flow Fans

Series	Size (mm)	Model	Datasheet available
R87F (plastic blades)	120×120×t40	R87F-A□A16H-WR	Yes
	120×120×t38	R87F-A□A15	Yes
	120×120×t25	R87F-A□A13	Yes
	92×92×t25	R87F-A□A93	Yes
	80×80×t38	R87F-A□A85	Yes
	80×80×t25	R87F-A□A83	Yes
R87T (metal blades)	150-dia.×t55	R87T-A□A07	Yes
	150-dia.×t38	R87T-A□A05	Yes
	120×120×t38	R87T-A□A15	Yes
	80×80×t38	R87T-A□A85	Yes
	80×80×t25	R87T-A□A83	Yes

Note: Mounting screws are not provided.

Options

Product name	Model	Datasheet available
Plug Cord	R87F-PC (JT)	Yes
Finger Guard	R87F-FG□	Yes
Filter	R87F-FL□(S)	Yes

In the interest of product improvement, specifications are subject to change without notice.

Water-resistant AC Axial-flow Fans
R87F-A□A16H-WR

CSM_R87F-A_A16H-WR_DS_E_1_1

Axial-flow Fans Designed for Environments Subject to High Humidity

- Size: 120 × 120 × t40 mm, with lead wires.
- Degree of protection: IP65 (sealed construction)
- Airtight construction in a slim design (40-mm depth).
- Highly environment-resistive, flame-resistant PBT used for blade material.
- Low noise level, long service life, and resistance to environment.
- Highly reliable ball bearings used for bearings.
- Range of models that comply with the Electrical Appliance and Material Safety Law and IEC60335. UL and CSA approval also available.

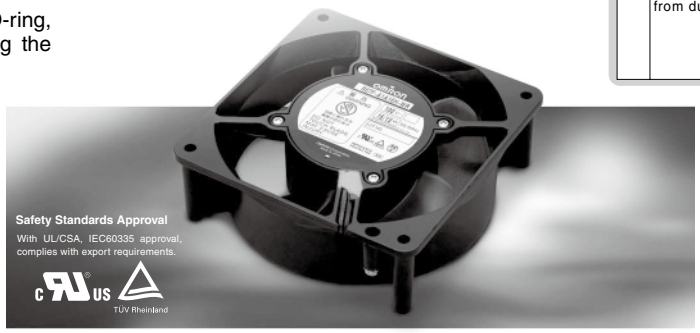
NEW

International Protection (IP)

These fans comply with IP65 degree of protection (for internal parts), demonstrating outstanding strength under high humidity.

- Labyrinthine construction provides protection against dust and water entering between the blades and motor casing.
- Silicon rubber used to seal the section where lead wires exit the motor protects against dust and water entering the motor.
- Fan motor is hermetically sealed by an O-ring, preventing dust and water from entering the motor.

Ideal for Harsh Environments



IP Degree of Protection (International Protection)

Degree of protection against international of foreign objects in fan motor: IP65

First digit of IP Code — Protection against International of Solids

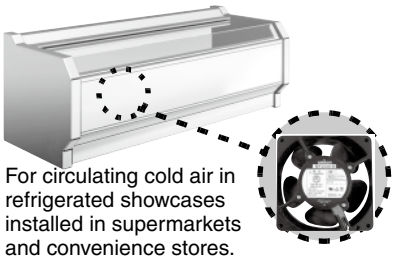
Class	Degree of protection
6	Totally protected from dust.

Second digit of IP Code — Protection against International of Liquids

Class	Degree of protection
5	Protected from low pressure jets of water from all directions.

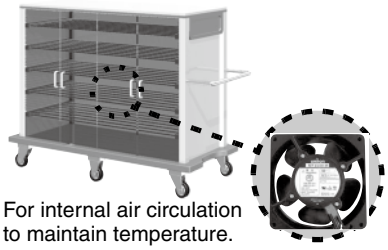
Applications (Ideal for High-temperature Environments and Outdoor Installation)

Refrigerated Showcases



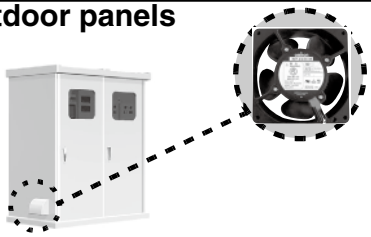
For circulating cold air in refrigerated showcases installed in supermarkets and convenience stores.

Meal-serving Trolleys



For internal air circulation to maintain temperature.

Outdoor panels



As an inlet or exhaust fan in various control panels installed outdoors.

Note: Other applications include discharging air in outdoor devices (small-size outdoor devices), and cooling internal components of machine tools and switchboards in industrial devices.

Specifications

■ Ratings

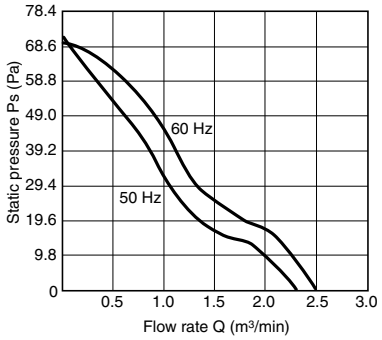
Note: *indicates a nominal value.

Model	Rated voltage (V)	Permitted voltage fluctuation range (%)	Frequency (Hz)	Rated current (A)*		Rated input (W)*		Rated rotational speed (r/min)*		Maximum flow rate (m^3/min)*		Max. static pressure (Pa)*		Noise (dB)*	
				50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz
R87F-A1A16H-WR	100	85 to 110% rated voltage	50/60	0.217	0.197	16	15	2690	3040	2.3	2.5	70.9	69.6	43	46
R87F-A3A16H-WR	115			0.194	0.175										
R87F-A4A16H-WR	200			0.109	0.098										
R87F-A6A16H-WR	230			0.098	0.088										

■ Characteristics

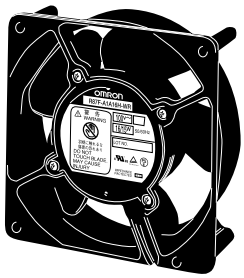
Motor type	Single-phase, shading coil induction motor (2-pole, sealed type)	**Ambient operating temperature**		–30 to 70°C (no icing)
		Ambient storage temperature		–40 to 85°C (no icing)
Size	120 × 120 × t40 mm	**Ambient humidity**		98% RH max.
Lead terminal	Lead-wire type	**Protection**		Impedance protection
Insulation class	IEC class E (120°C) UL class A (105°C) CSA class A (105°C)	**Materials**	**Frame**	Die-cast aluminum Melamine resin, mat black baked coating
			Blades	PBT/glass, black (UL94V-0)
Insulation resistance	100 MΩ min. (at 500 VDC) between all power supply connections and uncharged metal parts.	**Bearings**		Ball bearings
Insulation withstand voltage	2000 VAC (1 minute) between all power supply connections and uncharged metal parts.	**Weight**		650 g max.
Degree of protection	IP65 (conforming to EN/IEC60529)	**Standards**		Conforms to Electrical Appliance and Material Safety Law, UL/CSA, and IEC60335

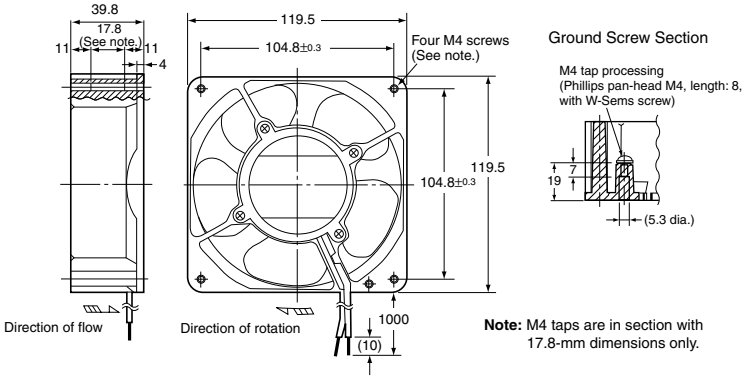
■ Flow Rate and Static Pressure Characteristics (Reference Values)



Note: For details on measurement conditions, refer to *Technical Guide for Axial Fans*.

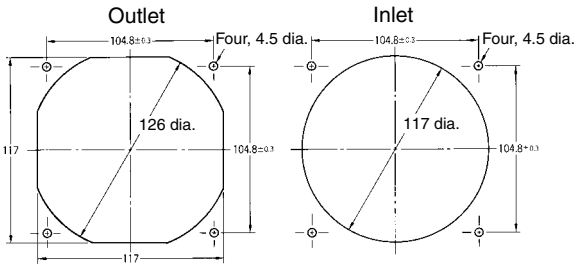
Dimensions





Note: M4 taps are in section with 17.8-mm dimensions only.

Panel Cut-outs



Options

Name	Model	Page number
Finger Guard	R87F-FG120	Refer to *R87F-FG*.
Filter	R87F-FL120(S)	Refer to *R87F-FL*.

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

In the interest of product improvement, specifications are subject to change without notice.

Specifications

■ Ratings

Note: *indicates a nominal value.

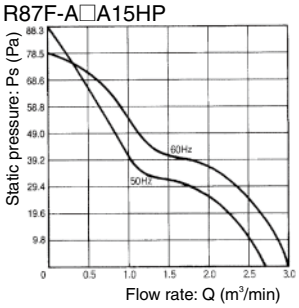
Model	Rated voltage (V)	Permitted voltage fluctuation range (%)	Frequency (Hz)	Rated current (A)*		Rated input (W)*		Rated rotational speed (r/min)*		Maximum flow rate (m^3/min)*		Max. static pressure (Pa)*		Noise (dB)*	
				50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz
R87F-A1A15HP R87F-A3A15HP R87F-A4A15HP R87F-A6A15HP	100 115 200 230	85 to 110% rated voltage	50/60	0.232 0.195 0.105 0.095	0.210 0.180 0.098 0.090	16	15	2700	3000	2.7	3.0	88.3	78.5	47	50
R87F-A1A15MP R87F-A3A15MP R87F-A4A15MP R87F-A6A15MP	100 115 200 230	85 to 110% rated voltage	50/60	0.220 0.185 0.100 0.090	0.195 0.165 0.090 0.082	15	14	2350	2550	2.3	2.6	61.8	63.7	42	44
R87F-A1A15LP R87F-A3A15LP R87F-A4A15LP R87F-A6A15LP	100 115 200 230	85 to 110% rated voltage	50/60	0.175 0.155 0.085 0.076	0.155 0.138 0.075 0.068	13	12	2000	2100	1.9	2.0	39.2	39.2	38	41

■ Characteristics

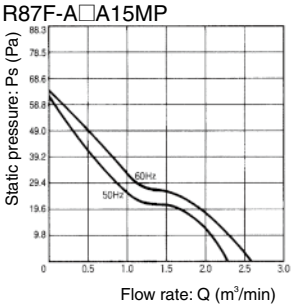
Ambient operating temperature	–30 to 70°C (no icing)
Ambient storage temperature	–40 to 85°C (no icing)
Ambient humidity	25 to 85% RH
Insulation class	VDE class E (120°C) UL class A (105°C) CSA class B (130°C)
Insulation resistance	100 MΩ min. (at 500 VDC) between all power supply connections and uncharged metal parts.
Insulation withstand voltage	2000 VAC (1 minute) between all power supply connections and uncharged metal parts.
Protection	Impedance protection
Materials	Frame: Die-cast aluminum Blades: Glass polycarbonate
Bearings	Ball bearings
Weight	550 g

■ Flow Rate and Static Pressure Characteristics (Reference Values)

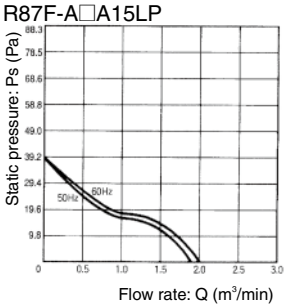
R87F-A□A15HP



R87F-A□A15MP

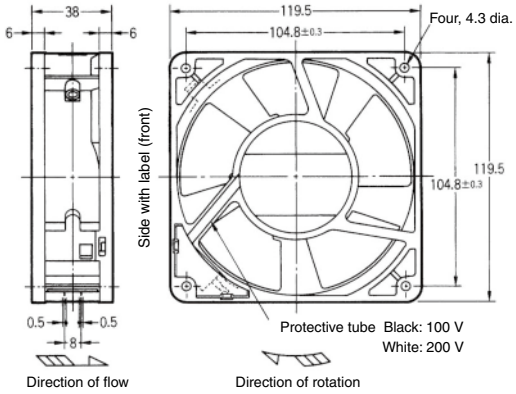


R87F-A□A15LP

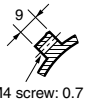


Note: For details on measurement conditions, refer to *Technical Guide for Axial Fans*.

Dimensions



Screw hole for grounding



M4 screw: 0.7 pitch

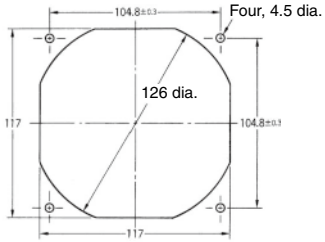
Terminal shape

Faston #110 terminals (or equivalent)

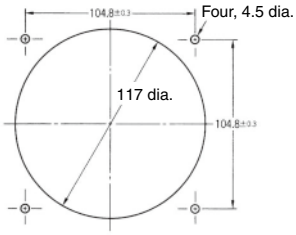
Panel Cut-outs

For reference purposes.

Outlet



Inlet



Options

Name	Model	Datasheet available
Plug Cord	R87F-PC	Refer to *R87F-PC*.
Finger Guard	R87F-FG120	Refer to *R87F-FG*.
Filter	R87F-FL120(S)	Refer to *R87F-FL*.

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

In the interest of product improvement, specifications are subject to change without notice.

Specifications

■ Ratings

Note: * indicates a nominal value.

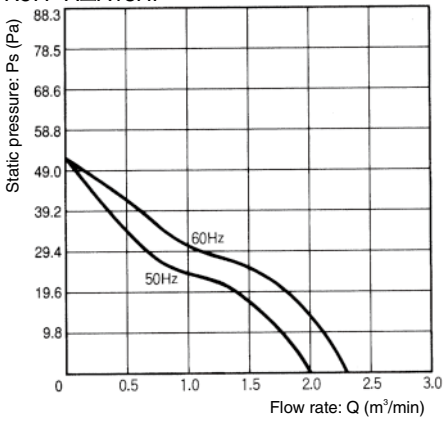
Model	Rated voltage (V)	Permitted voltage fluctuation range (%)	Frequency (Hz)	Rated current (A)*		Rated input (W)*		Rated rotational speed (r/min)*		Maximum flow rate (m^3/min)*		Max. static pressure (Pa)*		Noise (dB)*	
				50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz
R87F-A1A13HP R87F-A3A13HP R87F-A4A13HP R87F-A6A13HP	100 115 200 230	85 to 110% rated voltage	50/60	0.170 0.148 0.085 0.074	0.145 0.125 0.072 0.063	14	12	2500	2850	2.0	2.3	52.0	52.0	40	44
R87F-A1A13LP R87F-A3A13LP R87F-A4A13LP R87F-A6A13LP	100 115 200 230	85 to 110% rated voltage	50/60	0.110 0.096 0.058 0.051	0.096 0.084 0.050 0.043	9	8	1800	2000	1.5	1.7	25.5	25.5	30	33

■ Characteristics

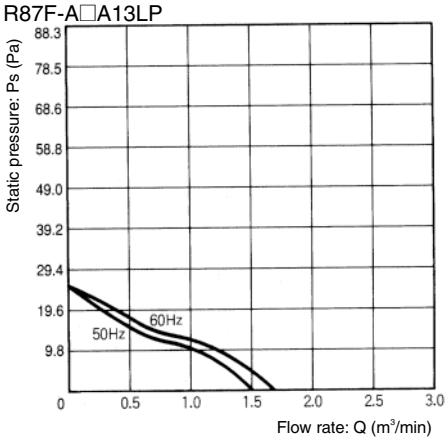
Ambient operating temperature	–30 to 70°C (no icing)
Ambient storage temperature	–40 to 85°C (no icing)
Ambient humidity	25 to 85% RH
Insulation class	VDE class E (120°C) UL class A (105°C) CSA class B (130°C)
Insulation resistance	100 MΩ min. (at 500 VDC) between all power supply connections and uncharged metal parts.
Insulation withstand voltage	2000 VAC (1 minute) between all power supply connections and uncharged metal parts.
Protection	Impedance protection
Materials	Frame: Die-cast aluminum Blades: Glass polycarbonate
Bearings	Ball bearings
Weight	330 g

■ Flow Rate and Static Pressure Characteristics (Reference Values)

R87F-A□A13HP

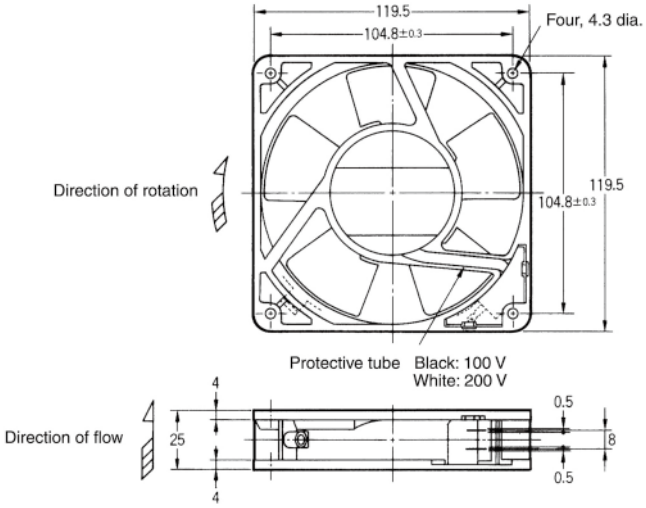


R87F-A□A13LP

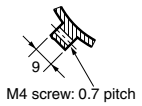


Note: For details on measurement conditions, refer to *Technical Guide for Axial Fans*.

Dimensions



Screw hole for grounding



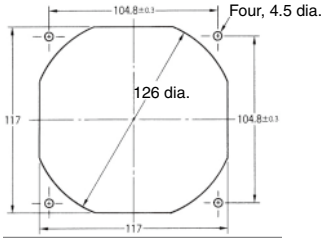
Terminal shape

Faston #110 terminal (or equivalent)

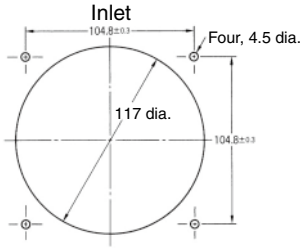
Panel Cut-outs

For reference purposes.

Outlet



Inlet



Options

Name	Model	Datasheet available
Plug Cord	R87F-PC	Refer to *R87F-PC*.
Finger Guard	R87F-FG120	Refer to *R87F-FG*.
Filter	R87F-FL120(S)	Refer to *R87F-FL*.

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

In the interest of product improvement, specifications are subject to change without notice.

Specifications

■ Ratings

Note: * indicates a nominal value.

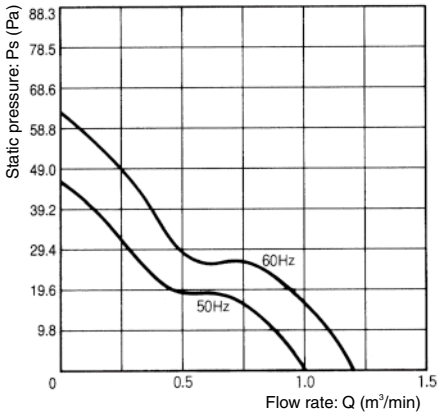
Model	Rated voltage (V)	Permitted voltage fluctuation range (%)	Frequency (Hz)	Rated current (A)*		Rated input (W)*		Rated rotational speed (r/min)*		Maximum flow rate (m^3/min)*		Max. static pressure (Pa)*		Noise (dB)*	
				50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz
R87F-A1A93HP R87F-A3A93HP R87F-A4A93HP R87F-A6A93HP	100 115 200 230	85 to 110% rated voltage	50/60	0.130 0.116 0.061 0.056	0.110 0.098 0.052 0.048	10	9	2600	3050	1.0	1.2	46.1	62.8	34	38
R87F-A1A93LP R87F-A3A93LP R87F-A4A93LP R87F-A6A93LP	100 115 200 230	85 to 110% rated voltage	50/60	0.084 0.075 0.043 0.035	0.073 0.065 0.038 0.032	7	6	2000	2300	0.70	0.85	24.5	31.4	28	31

■ Characteristics

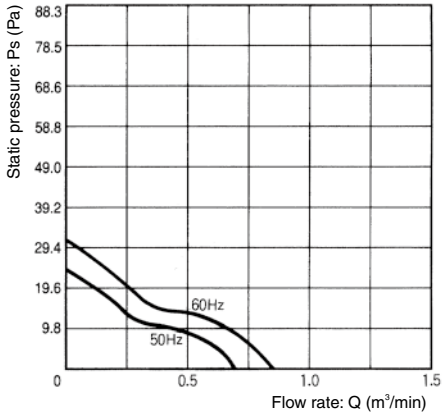
Ambient operating temperature	–30 to 70°C (no icing)
Ambient storage temperature	–40 to 85°C (no icing)
Ambient humidity	25 to 85% RH
Insulation class	VDE class E (120°C) UL class A (105°C) CSA class B (130°C)
Insulation resistance	100 MΩ min. (at 500 VDC) between all power supply connections and uncharged metal parts.
Insulation withstand voltage	2000 VAC (1 minute) between all power supply connections and uncharged metal parts.
Protection	Impedance protection
Materials	Frame: Die-cast aluminum Blades: Glass polycarbonate
Bearings	Ball bearings
Weight	330 g

■ Flow Rate and Static Pressure Characteristics (Reference Values)

R87F-A□A93HP

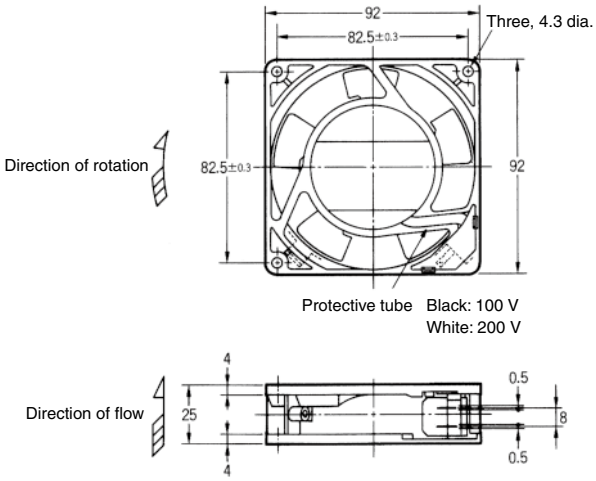


R87F-A□A93LP



Note: For details on measurement conditions, refer to *Technical Guide for Axial Fans*.

Dimensions



Screw hole for grounding

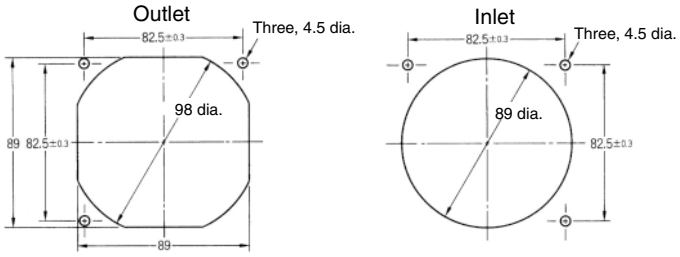
M4 screw: 0.7 pitch

Terminal shape

Faston #110 terminal (or equivalent)

Panel Cut-outs

For reference purposes. Panel cutting reference dimensions (note 3 mounting holes)



Options

Name	Model	Datasheet available
Plug Cord	R87F-PC	Refer to *R87F-PC*.
Finger Guard	R87F-FG90	Refer to *R87F-FG*.
Filter	R87F-FL90	Refer to *R87F-FL*.

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
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Specifications

■ Ratings

Note: * indicates a nominal value.

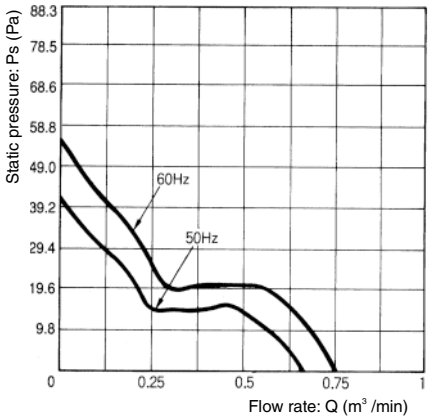
Model	Rated voltage (V)	Permitted voltage fluctuation range (%)	Frequency (Hz)	Rated current (A)*		Rated input (W)*		Rated rotational speed (r/min)*		Maximum flow rate (m^3/min)*		Max. static pressure (Pa)*		Noise (dB)*	
				50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz
R87F-A1A85HP R87F-A3A85HP R87F-A4A85HP R87F-A6A85HP	100 115 200 230	85 to 110% rated voltage	50/60	0.121 0.106 0.061 0.052	0.111 0.097 0.055 0.049	9	8	2800	3250	0.66	0.76	41.2	54.9	38	43
R87F-A1A85LP R87F-A3A85LP R87F-A4A85LP R87F-A6A85LP	100 115 200 230	85 to 110% rated voltage	50/60	0.064 0.055 0.032 0.028	0.057 0.050 0.029 0.025	5.5	5	2050	2050	0.46	0.46	24.5	25.5	28	30

■ Characteristics

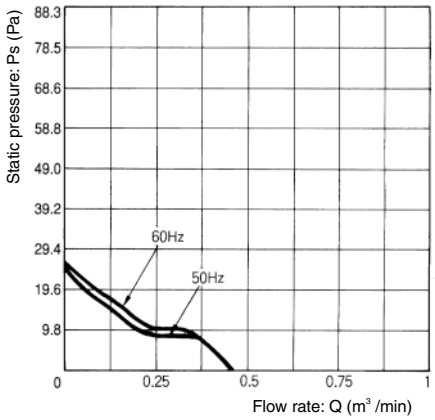
Ambient operating temperature	–30 to 70°C (no icing)
Ambient storage temperature	–40 to 85°C (no icing)
Ambient humidity	25 to 85% RH
Insulation class	VDE class E (120°C) UL class A (105°C) CSA class B (130°C)
Insulation resistance	100 MΩ min. (at 500 VDC) between all power supply connections and uncharged metal parts.
Insulation withstand voltage	2000 VAC (1 minute) between all power supply connections and uncharged metal parts.
Protection	Impedance protection
Materials	Frame: Die-cast aluminum Blades: Glass polycarbonate
Bearings	Ball bearings
Weight	460 g

■ Flow Rate and Static Pressure Characteristics (Reference Values)

R87F-A□A85HP

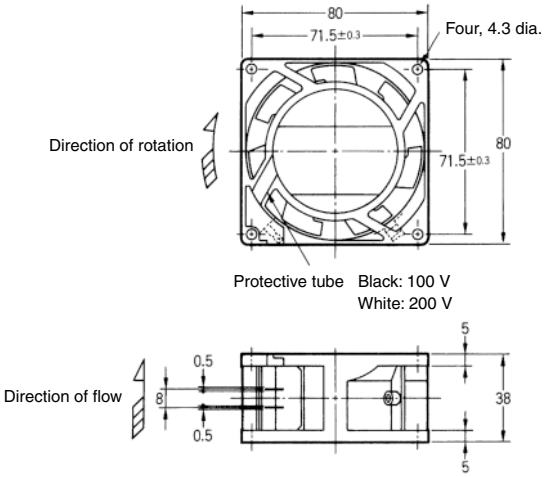


R87F-A□A85LP



Note: For details on measurement conditions, refer to *Technical Guide for Axial Fans*.

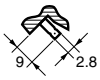
Dimensions



Screw hole for grounding

M4 screw: 0.7 pitch

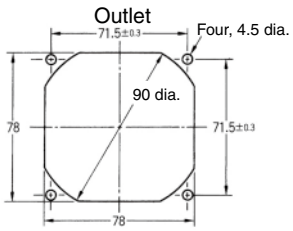
Terminal shape

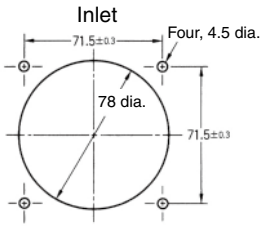


Faston #110 terminal (or equivalent)

Panel Cut-outs

For reference purposes.





Options

Name	Model	Datasheet available
Plug Cord	R87F-PC	Refer to *R87F-PC*.
Finger Guard	R87F-FG80	Refer to *R87F-FG*.
Filter	R87F-FL80	Refer to *R87F-FL*.

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

In the interest of product improvement, specifications are subject to change without notice.

Specifications

■ Ratings

Note: * indicates a nominal value.

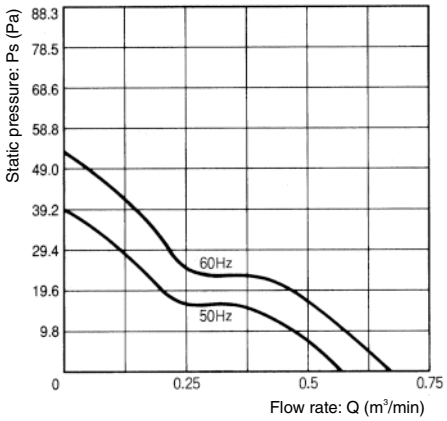
Model	Rated voltage (V)	Permitted voltage fluctuation range (%)	Frequency (Hz)	Rated current (A)*		Rated input (W)*		Rated rotational speed (r/min)*		Maximum flow rate (m^3/min)*		Max. static pressure (Pa)*		Noise (dB)*	
				50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz
R87F-A1A83H R87F-A3A83H R87F-A4A83H R87F-A6A83H	100 115 200 230	85 to 110% rated voltage	50/60	0.091 0.082 0.040 0.038	0.080 0.071 0.036 0.034	7	6	2600	3000	0.57	0.67	39.2	53.0	34	38
R87F-A1A83L R87F-A3A83L R87F-A4A83L R87F-A6A83L	100 115 200 230	85 to 110% rated voltage	50/60	0.070 0.059 0.032 0.029	0.061 0.052 0.029 0.025	5	4.5	1800	2050	0.39	0.43	19.6	23.5	26	28

■ Characteristics

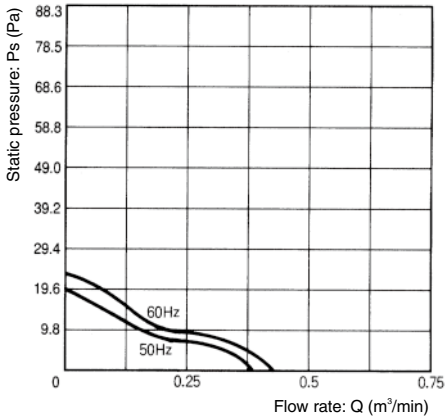
Ambient operating temperature	–30 to 70°C (no icing)
Ambient storage temperature	–40 to 85°C (no icing)
Ambient humidity	25 to 85% RH
Insulation class	UL A (105°C) CSA B (130°C) VDE E (120°C)
Insulation resistance	100 MΩ min. (at 500 VDC) between all power supply connections and uncharged metal parts.
Insulation withstand voltage	2000 VAC (1 minute) between all power supply connections and uncharged metal parts.
Protection	Impedance protection
Materials	Frame: Die-cast aluminum Blades: Glass polycarbonate
Bearings	Ball bearings
Weight	240 g

■ Flow Rate and Static Pressure Characteristics (Reference Values)

R87F-A□A83H

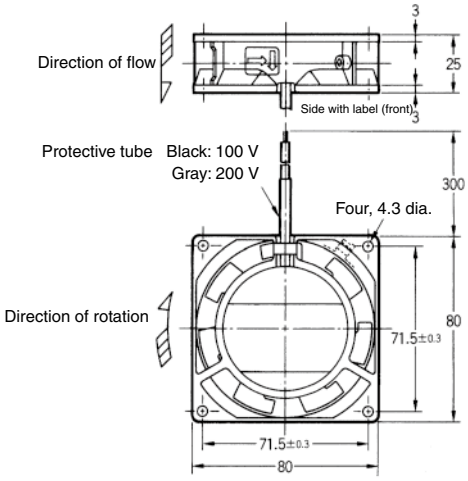


R87F-A□A83L

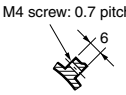


Note: For details on measurement conditions, refer to *Technical Guide for Axial Fans*.

Dimensions



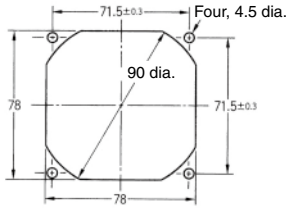
Screw hole for grounding



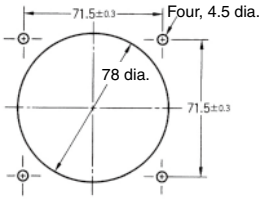
Panel Cut-outs

For reference purposes.

Outlet



Inlet



Options

Names	Model	Datasheet available
Finger Guard	R87F-FG80	Refer to *R87F-FG*.
Filter	R87F-FL80	Refer to *R87F-FL*.

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

In the interest of product improvement, specifications are subject to change without notice.

Specifications

■ Ratings

Note: * indicates a nominal value.

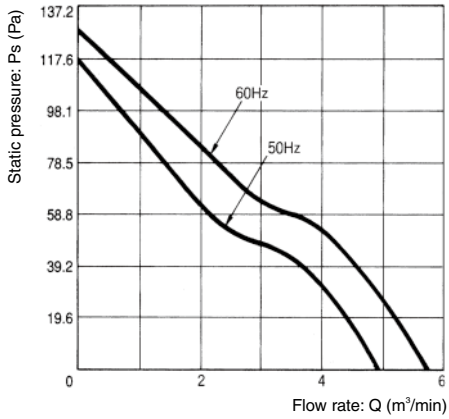
Model	Rated voltage (V)	Permitted voltage fluctuation range (%)	Frequency (Hz)	Rated current (A)*		Rated input (W)*		Rated rotational speed (r/min)*		Maximum flow rate (m^3/min)*		Max. static pressure (Pa)*		Noise (dB)*	
				50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz
R87T-A1A07H	100	85 to 110% rated voltage	50/60	0.660	0.560	37	34	2750	3050	5.0	5.8	111.7	127.5	55	59
R87T-A3A07H	115			0.450	0.400										
R87T-A4A07H	200			0.330	0.280										
R87T-A6A07H	230			0.210	0.190										

■ Characteristics

Ambient operating temperature	–20 to 70°C (no icing)
Ambient storage temperature	–40 to 85°C (no icing)
Ambient humidity	25 to 85% RH
Insulation class	UL A (105°C)
Insulation resistance	100 MΩ min. (at 500 VDC) between all power supply connections and uncharged metal parts.
Insulation withstand voltage	2000 VAC (1 minute) between all power supply connections and uncharged metal parts.
Protection	Thermal protection
Materials	Frame: Die-cast aluminum Blades: Steel plate (mat black baked coating)
Bearings	Ball bearings
Weight	1200 g

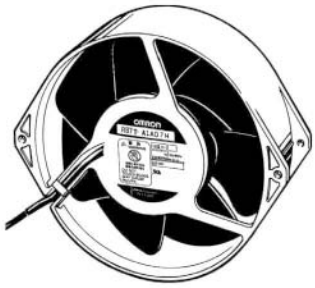
■ Flow Rate and Static Pressure Characteristics (Reference Value)

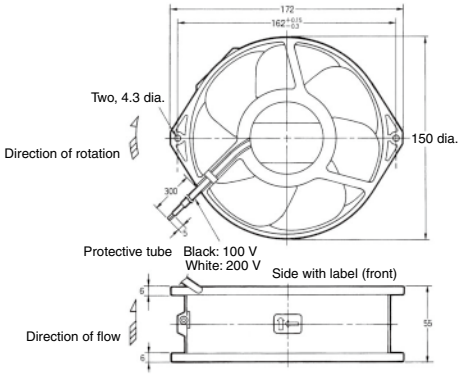
R87T-A□A07H



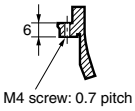
Note: For details on measurement conditions, refer to *Technical Guide for Axial Fans*.

Dimensions



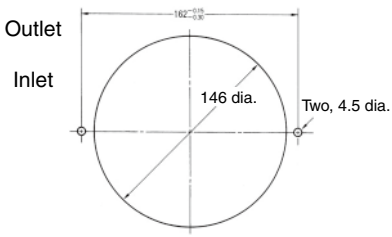


Screw hole for grounding



Panel Cut-outs

For reference purposes.



Options

Name	Model	Datasheet available
Finger Guard	R87F-FG150	Refer to *R87F-FG*.

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

In the interest of product improvement, specifications are subject to change without notice.

Specifications

■ Ratings

Note: * indicates a nominal value.

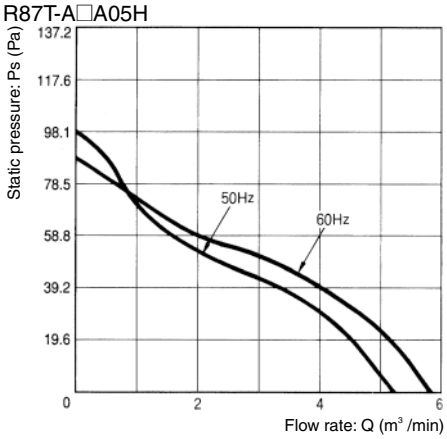
Model	Rated voltage (V)	Permitted voltage fluctuation range (%)	Frequency (Hz)	Rated current (A)*		Rated input (W)*		Rated rotational speed (r/min)*		Maximum flow rate (m^3/min)*		Max. static pressure (Pa)*		Noise (dB)*	
				50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz
R87T-A1A05H	100	85 to 110% rated voltage	50/60	0.540	0.470	35	33	2600	2950	5.2	5.8	98.1	88.3	54	56
R87T-A3A05H	115			0.430	0.380										
R87T-A4A05H	200			0.240	0.210										
R87T-A6A05H	230			0.220	0.200										

■ Characteristics

Ambient operating temperature	–20 to 70°C (no icing)
Ambient storage temperature	–40 to 85°C (no icing)
Ambient humidity	25 to 85% RH
Insulation class	UL class A (105°C)
Insulation resistance	100 MΩ min. (at 500 VDC) between all power supply connections and uncharged metal parts.
Insulation withstand voltage	2000 VAC (1 minute) between all power supply connections and uncharged metal parts.
Protection	Thermal protection
Materials	Frame: Die-cast aluminum Blades: Steel plate (mat black baked coating)
Bearings	Ball bearings
Weight	830 g

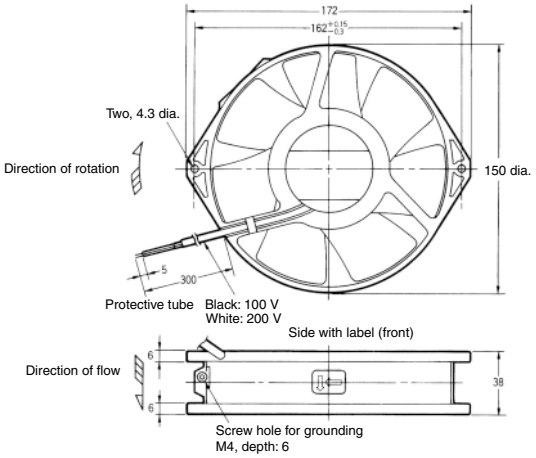
■ Flow Rate and Static Pressure Characteristics (Reference Value)

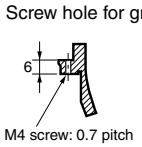
R87T-A□A05H



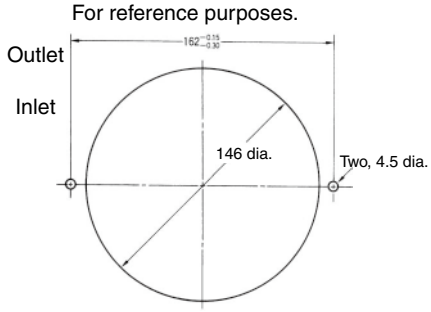
Note: For details on measurement conditions, refer to *Technical Guide for Axial Fans*.

Dimensions





Panel Cut-outs



Options

Name	Model	Datasheet available
Finger Guard	R87F-FG150	Refer to *R87F-FG*.

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

In the interest of product improvement, specifications are subject to change without notice.

Specifications

■ Ratings

Note: * indicates a nominal value.

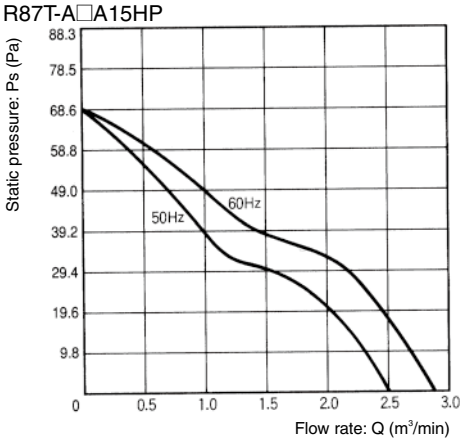
Model	Rated voltage (V)	Permitted voltage fluctuation range (%)	Frequency (Hz)	Rated current (A)*		Rated input (W)*		Rated rotational speed (r/min)*		Maximum flow rate (m^3/min)*		Max. static pressure (Pa)*		Noise (dB)*	
				50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz
R87T-A1A15HP R87T-A3A15HP R87T-A4A15HP R87T-A6A15HP	100 115 200 230	85 to 110% rated voltage	50/60	0.230 0.190 0.110 0.100	0.210 0.170 0.100 0.091	16	15	2700	3050	2.5	2.9	68.6	68.6	43	47
R87T-A1A15MP R87T-A3A15MP R87T-A4A15MP R87T-A6A15MP	100 115 200 230	85 to 110% rated voltage	50/60	0.220 0.180 0.102 0.096	0.200 0.162 0.092 0.086	15	14	2250	2500	2.0	2.2	40.2	38.2	38	42

■ Characteristics

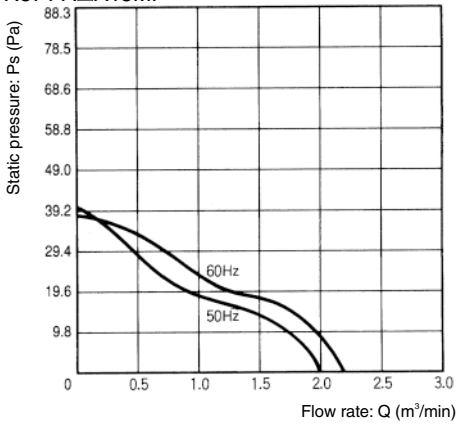
Ambient operating temperature	–20 to 70°C (no icing)
Ambient storage temperature	–40 to 85°C (no icing)
Ambient humidity	25 to 85% RH
Insulation class	UL class A (105°C)
Insulation resistance	100 MΩ min. (at 500 VDC) between all power supply connections and uncharged metal parts.
Insulation withstand voltage	2000 VAC (1 minute) between all power supply connections and uncharged metal parts.
Protection	Impedance protection
Materials	Frame: Die-cast aluminum Blades: Steel plate (mat black baked coating)
Bearings	Ball bearings
Weight	580 g

■ Flow Rate and Static Pressure Characteristics (Reference Values)

R87T-A□A15HP

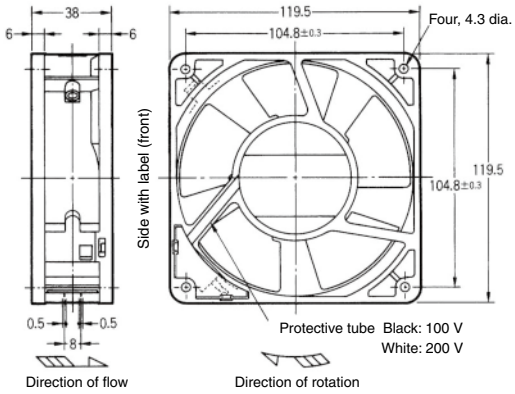


R87T-A□A15MP



Note: For details on measurement conditions, refer to *Technical Guide for Axial Fans*.

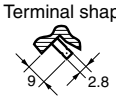
Dimensions



Screw hole for grounding

M4 screw: 0.7 pitch

Terminal shape

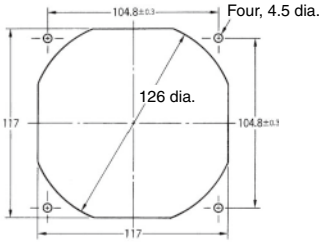


Faston #110 terminal (or equivalent)

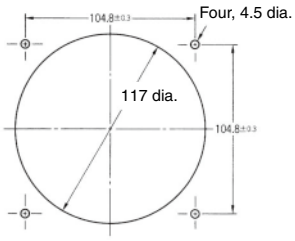
Panel Cut-outs

For reference purposes.

Outlet



Inlet



Options

Name	Model	Datasheet available
Plug Cord	R87F-PC	Refer to *R87F-PC*.
Finger Guard	R87F-FG120	Refer to *R87F-FG*.
Filter	R87F-FL120(S)	Refer to *R87F-FL*.

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

In the interest of product improvement, specifications are subject to change without notice.

Specifications

■ Ratings

Note: * indicates a nominal value.

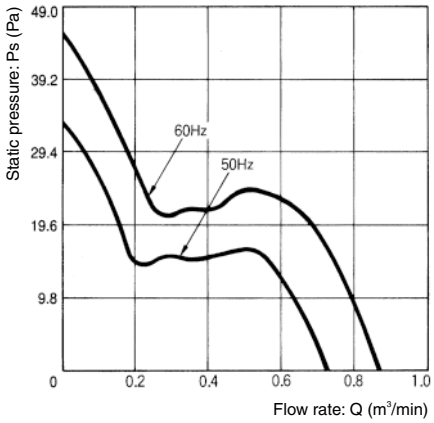
Model	Rated voltage (V)	Permitted voltage fluctuation range (%)	Frequency (Hz)	Rated current (A)*		Rated input (W)*		Rated rotational speed (r/min)*		Maximum flow rate (m^3/min)*		Max. static pressure (Pa)*		Noise (dB)*	
				50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz
R87T-A1A85H	100	85 to 110% rated voltage	50/60	0.170	0.150	11	10	2700	3150	0.73	0.87	33.3	46.1	35	40
R87T-A3A85H	115			0.140	0.120										
R87T-A4A85H	200			0.081	0.069										
R87T-A6A85H	230			0.069	0.060										

■ Characteristics

Ambient operating temperature	–20 to 70°C (no icing)
Ambient storage temperature	–40 to 85°C (no icing)
Ambient humidity	25 to 85% RH
Insulation class	UL class A (105°C)
Insulation resistance	100 MΩ min. (at 500 VDC) between all power supply connections and uncharged metal parts.
Insulation withstand voltage	2000 VAC (1 minute) between all power supply connections and uncharged metal parts.
Protection	Impedance protection
Materials	Frame: Die-cast aluminum Blades: Steel plate (mat black baked coating)
Bearings	Ball bearings
Weight	440 g

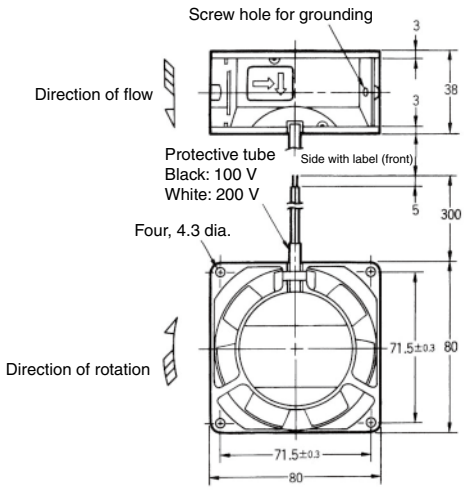
■ Flow Rate and Static Pressure Characteristics (Reference Value)

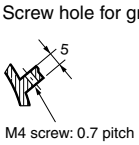
R87T-A□A85H



Note: For details on measurement conditions, refer to *Technical Guide for Axial Fans*.

Dimensions

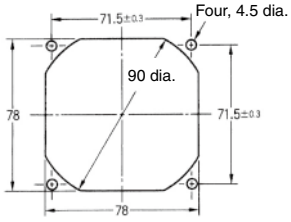




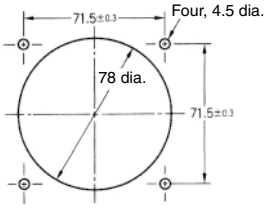
Panel Cut-outs

For reference purposes.

Outlet



Inlet



Options

Name	Model	Datasheet available
Finger Guard	R87F-FG80	Refer to *R87F-FG*.
Filter	R87F-FL80	Refer to *R87F-FL*.

ALL DIMENSIONS SHOWN ARE IN MILLIMETERS.
To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

In the interest of product improvement, specifications are subject to change without notice.

R87T-A□A83

CSM_R87T-A_A83_DS_E_1_1

Specifications

■ Ratings

Note: * indicates a nominal value.

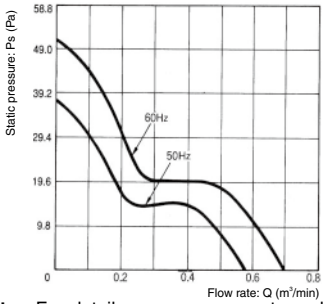
Model	Rated voltage (V)	Permitted voltage fluctuation range (%)	Frequency (Hz)	Rated current (A)*		Rated input (W)*		Rated rotational speed (r/min)*		Maximum flow rate (m³/min)*		Max. static pressure (Pa)*		Noise (dB)*	
				50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz	50 Hz	60 Hz
R87T-A1A83H R87T-A3A83H R87T-A4A83H R87T-A6A83H	100 115 200 230	85 to 110% rated voltage	50/60	0.150 0.140 0.079 0.065	0.130 0.120 0.067 0.056	11	10	2550	3100	0.58	0.70	37.3	51.0	37	40

■ Characteristics

Ambient operating temperature	–20 to 70°C (no icing)
Ambient storage temperature	–40 to 85°C (no icing)
Ambient humidity	25 to 85% RH
Insulation class	UL class A (105°C)
Insulation resistance	100 MΩ min. (at 500 VDC) between all power supply connections and uncharged metal parts.
Insulation withstand voltage	2000 VAC (1 minute) between all power supply connections and uncharged metal parts.
Protection	Impedance protection
Materials	Frame: Die-cast aluminum Blades: Steel plate (mat black baked coating)
Bearings	Ball bearings
Weight	320 g

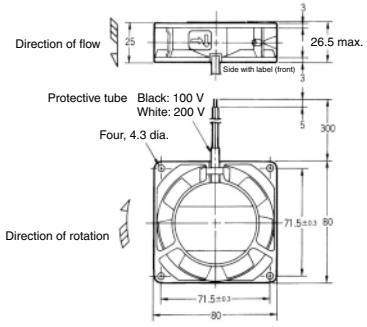
■ Flow Rate and Static Pressure Characteristics (Reference Value)

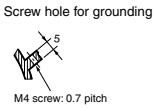
R87T-A□A83H



Note: For details on measurement conditions, refer to *Technical Guide for Axial Fans*.

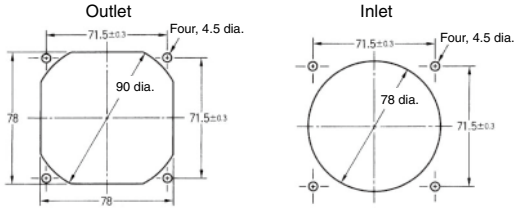
Dimensions





Panel Cut-outs

For reference purposes.



Options

Name	Model	Datasheet available
Finger Guard	R87F-FG80	Refer to *R87F-FG*.
Filter	R87F-FL80	Refer to *R87F-FL*.

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Accessories (Order Separately)

■ Available Models

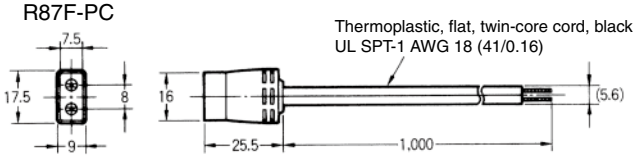
Cord length	Model number	Weight (g)
1 m	R87F-PC	39
2 m	R87F-PC-20	69

R87F-PC Rating: 250 VAC, 3 A
UL approved/conforms to CSA

Note: UL File No. E175022

Dimensions

R87F-PC



Connectable to Faston #110 terminals (or equivalent).
Note: This Plug Cord is used for Axial-flow Fans with terminals.

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Accessories (Order Separately)

■ Available Models

Size	Model number	Weight (g)
150 dia.	R87F-FG150	44
120×120	R87F-FG120	38
92×92	R87F-FG90	24
80×80	R87F-FG80	20

■ Applicable Axial-flow Fans

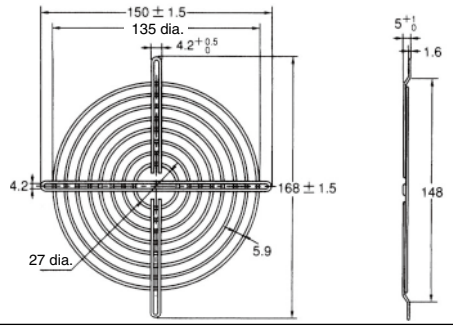
AC Axial-flow Fan		Finger Guard
Size	Model	
150 dia.	R87T-A□A0 Series	R87F-FG150
120×120	R87F-A□A1 Series R87T-A□A1 Series	R87F-FG120
92×92	R87F-A□A9 Series	R87F-FG90
80×80	R87F-A□A8 Series R87T-A□A8 Series	R87F-FG80

Note: Finger Guards reduce the flow rate by approximately 2% to 5%.

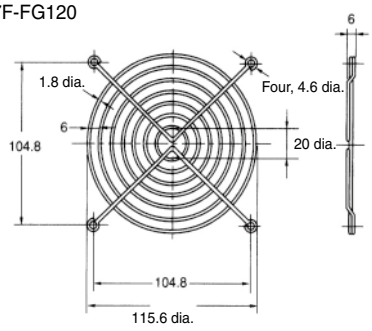
Dimensions

Material: steel, Joints: spot welded, Surface: nickel-chrome plated

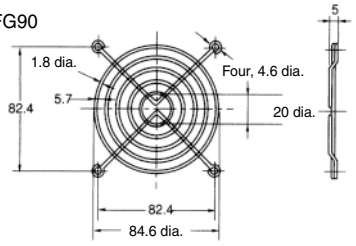
R87F-FG150



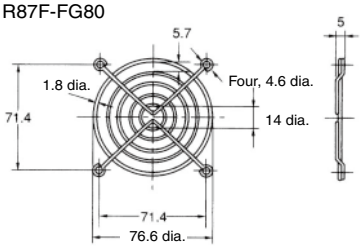
R87F-FG120



R87F-FG90



R87F-FG80



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Accessories (Order Separately)

■ Available Models

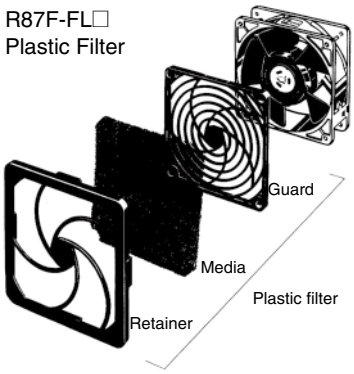
Size	Model number	Weight (g)
120×120	R87F-FL120	50
92×92	R87F-FL90	25
80×80	R87F-FL80	18
120×120	R87F-FL120	25

■ Applicable Axial-flow Fans

AC Axial-flow Fan		Filter	
Size	Model	Plastic Filter	Screen Filter
150 dia.	R87T-A□A0 Series	---	---
120×120	R87F-A□A1 Series R87T-A□A1 Series	R87F-FL120	R87F-FL120S
92×92	R87F-A□A9 Series	R87F-FL90	---
80×80	R87F-A□A8 Series R87T-A□A8 Series	R87F-FL80	---

Note: Filters reduce the flow rate by approximately 20% to 40%. Ensure that there is no clogging.

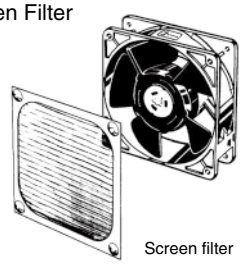
R87F-FL□
Plastic Filter



Mounting Method

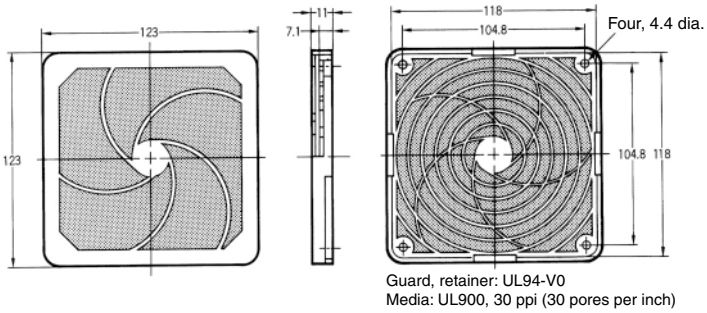
1. Attach the guard to the Fan using the mounting bolts. (There are no mounting bolts provided with the Plastic Filter.)
2. With the media held between the retainer and the guard, hook the retainer to the guard. (The media and retainer can be one-touch mounted/dismounted.)
3. Use the following model number to order media only.
R87F-FL□-M□ (□: 120, 90, or 80)
(One package contains five media.)

R87F-FL□S
Screen Filter



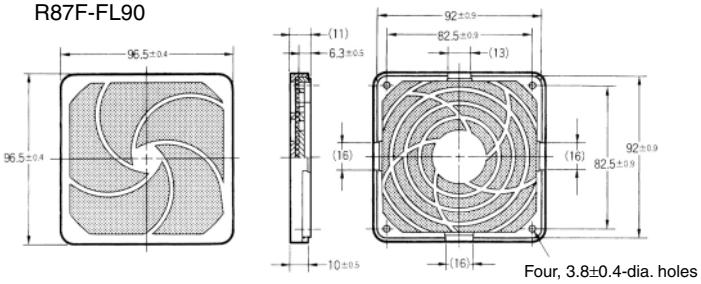
Dimensions

R87F-FL120

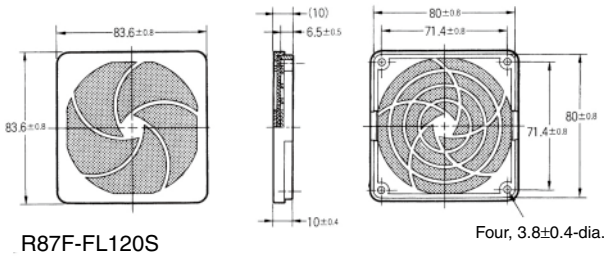


Guard, retainer: UL94-V0
Media: UL900, 30 ppi (30 pores per inch)

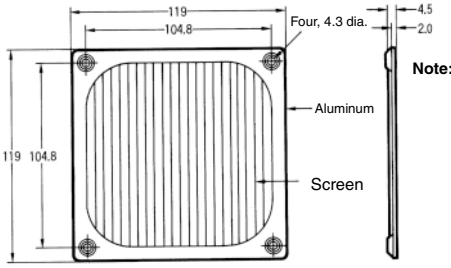
R87F-FL90



R87F-FL80



R87F-FL120S



Note: **1.** The Screen Filter is made using aluminium and has an EMI/RFI shielding effect.
2. When mounting the Screen Filter, make sure that it does not come in contact with the fan blades.
3. The screen is a 30×30 aluminum mesh.

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Axial Fan Glossary

Nominal Value

The average value of data based on actual measurements. Nominal values cannot be treated as rated values. Ask your OMRON representative for details on rated values.

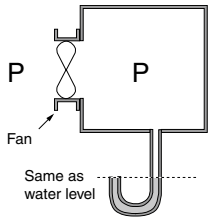
Flow Rate: Q (m^3/min.)

The volume of air discharged by the Fan in a unit of time.

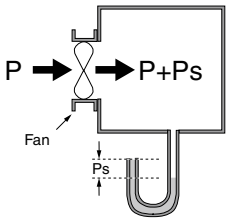
Static Pressure: Ps (Pa)

The pressure difference across the front to the back of the Fan generated by the discharged air, which is unaffected by air flow speed.

1. The air pressure across the front to the back of the Fan does not change when the Fan is stopped.



2. Static pressure (Ps) is generated at the front of the Fan when it rotates.

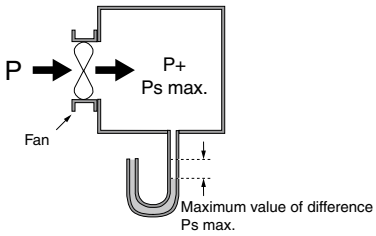


Maximum Flow Rate: Q max (m^3/min.)

The volume of air discharged by the Fan when the static pressure is adjusted to zero (Pa) at the flow measurement unit.

Maximum Static Pressure: Ps max (Pa)

The pressure difference inside and outside the Unit when the flow rate is adjusted to zero (0 m^3/min.) at the flow measurement unit. This would be the pressure in front of the Unit when the front of the fan was completely sealed.



System Impedance

The flow resistance inside a mounted Axial Fan caused by the density of parts and shape of the flow path.

Impedance Protection

A method of preventing burning damage when the motor is restricted from rotating by setting the motor winding impedance (AC resistance) to a value giving a temperature rise in the windings below the temperature at which burning occurs.

Thermal Protection

A method of preventing burning damage when the motor is restricted from rotating by setting a thermal element to interrupt (the restricting) operation before the motor reaches a temperature at which burning occurs.

Precautions for Correct Use of Axial-flow Fans

Leakage Flux

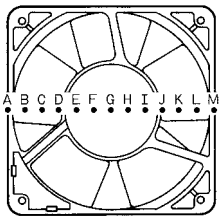
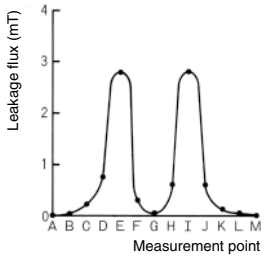
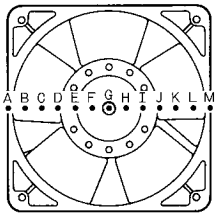
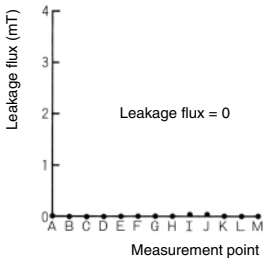
- Leakage flux from an Axial-flow Fan may distort the image on nearby CRT screens. Measures to prevent this problem include:

  1. Keeping CRTs at least 30 cm away from the Axial-flow Fan

  2. Shielding the Axial-flow Fan side with metal mesh.

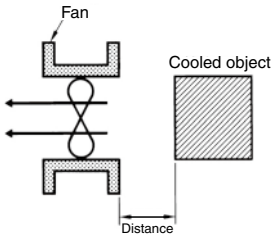
  The leakage flux from a Fan with metal blades is less than with plastic blades. The leakage flux distribution curves are shown below as examples.

R87T and Other AC Axial-flow Fans

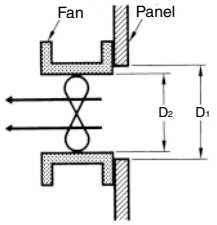
Inlet	**Dimensions**	
	Leakage flux distribution	
Outlet	**Dimensions**	
	Leakage flux distribution	

Noise Countermeasures

- The cooling effect and noise levels of Axial-flow Fans are greatly affected by the mounting conditions. Take the points listed below into account when installing the Fans.
- Maintain as much clearance as possible between the Fan inlet and the cooled object. (If the cooled object occupies about the same surface area as the Fan on a flat surface, a distance of approximately 10 cm is appropriate.)

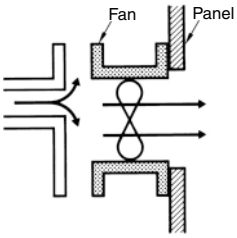


- The diameter of the Fan installation hole (D_2) should be larger than the diameter of the Fan (D_1).
  D_1: Fan installation hole diameter
  D_2: Fan diameter
  $D_1 > D_2$

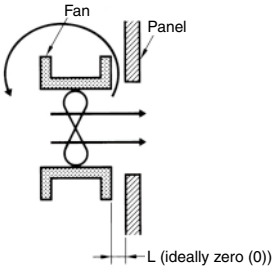


Cooling Effect

- Avoid rapid changes in air flow direction or air-flow cross-section which reduce the cooling effect.



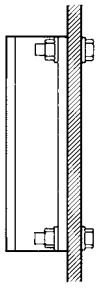
- When installing the Fan, keep the clearance at the outlet side as small as possible. (If there is a large clearance at the outlet side, it may not be possible to obtain a sufficient cooling effect.)



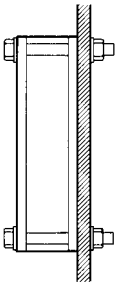
Axial-flow Fan Installation

- The Fan can be mounted with bolts through only one flange (single-flange mounting) or with through-bolts through both flanges (double-flange mounting). Take care not to distort the frame when using double-flange mounting.
  Tighten the bolts to a torque of approximately 0.44 N·m when installing the Fan.

Single-flange mounting

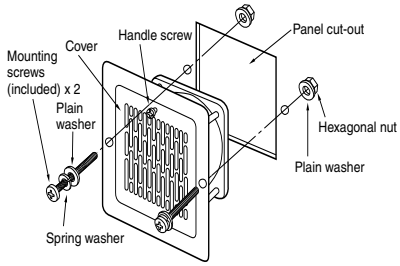


Double-flange mounting



Box Fan Installation

- As shown in the figure, line the Box Fan up with the screw holes, insert it into the panel cut-out, and firmly secure it with the enclosed mounting screws and nuts.
- The cover can be mounted either upward or downward. Use whichever direction is convenient.



Flow Rate and Static Pressure

The characteristic graphs provided for each of the models represent the average of actual measurement data obtained under the measurement conditions given below. They are provided as reference for determining the Fan most suitable for the type of cooling required; the actual characteristics may differ from the values represented in the graphs. The graphs are not intended to guarantee these characteristic values.

A simple explanation of the flow rate/static pressure characteristics and the methods of measuring them is given below.

Note: The following symbols are used in the graph below for the flow rate/static pressure characteristics model: ◎ ○ ◉

◎ Maximum Static Pressure, Ps max (flow rate = 0):

Fully close the damper. Take the pressure difference between chamber B and ambient pressure (Ps). The maximum value of the pressure difference (Ps) is the maximum static pressure (Ps max).

○ Intermediate Region, (Q, Ps):

Adjust the auxiliary blower to change the static pressure (Ps). Measure the pressure difference between chamber A and chamber B (Pd). Calculate the flow rate (Q).

◉ Maximum Flow Rate, Q max (static pressure = 0):

Fully open the damper and adjust the auxiliary blower to set the static pressure to zero (0). Measure the pressure difference between chamber A and chamber B (Pd). Take the flow rate (Q) calculated at this point as the maximum flow rate (Q max).

● Fan Operating Point:

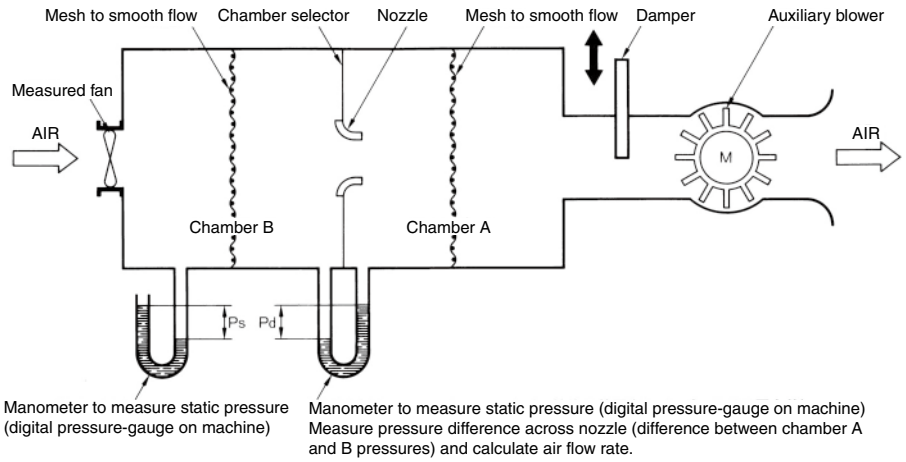
A Fan installed in equipment operates near the point where the Fan characteristic curve crosses the system impedance curve.

Note: The maximum flow rate and maximum static pressure do not indicate the Fan operating point when it is installed in equipment. However, these characteristics are important for comparing Fan performances and for selecting Fans.

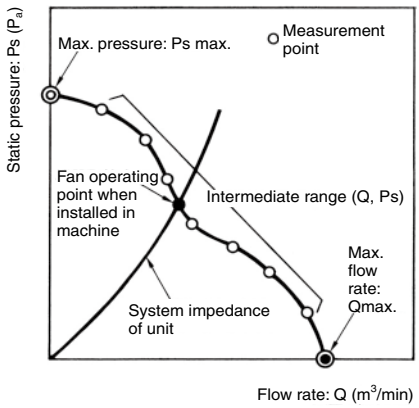
Measurement Conditions

Number of Fans tested	Ambient conditions	Measurement device
5	Temperature: 23±2°C Humidity: 65±5%	Measurement was performed using the multi-nozzle double chamber method based on AMCA (Air Moving Condition Association, U.S.A.) standards 270 to 274.

Flow Rate Measurement Device



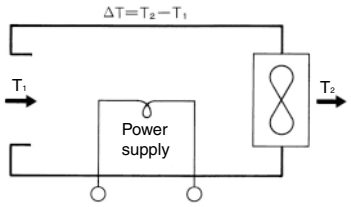
Flow Rate/Static Pressure Characteristic Model



Selecting a Fan

Procedure

1. Estimate the amount of heat generated (W) inside the Unit.
2. Set the maximum permitted temperature rise limit (ΔT) inside the Unit.



T1: Temperature of the inlet air (°C).
T2: Temperature of the outlet air (°C).

3. Calculate the required flow rate.

$$Q = \frac{50\ W}{\Delta T}\ m^3/min$$

Q = flow rate (m^3/min.)
ΔT = permitted temperature rise limit (°C)
(Normally between 8 to 10°C.)
W = amount of heat generated (kW)

4. Estimate the system impedance from the air flow through the Unit or from previous data.

$$\Delta P = KQ^n$$

ΔP: Pressure drop (Pa)
K: Unit constant
n: Coefficient determined by air flow
n=1: laminar flow
n=2: turbulent flow
(n=2 is the normal value.)

5. Select the Fan according to the P - Q characteristics.
6. Measure the temperature rise in an installed Unit.
7. Reappraise the Fan if the measured cooling effect is insufficient.

The procedure to select a Fan is described above. It is difficult, however, to obtain the actual system impedance.
In general, therefore, select a Fan with a maximum flow rate of from 1.3 to 2 times the flow rate required.

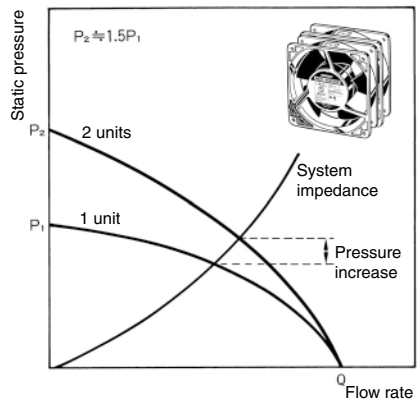
As a rough guide, 1.3 times for a small system impedance, 1.5 times for medium, and 2 times for large.

Reconsider the Fan if the cooling effect is insufficient after the selected fan has been installed in the Unit and the temperature rise has been measured.

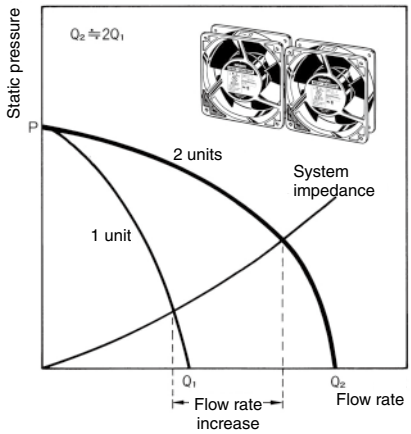
Serial and Parallel Fan Operation

The characteristics of two identical Fans operated in series or parallel are determined as shown in the following diagrams.

Serial Operation:



Parallel Operation:

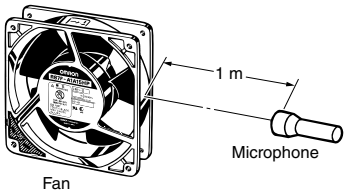


Noise Measurements

The following two methods are available for measuring Fan noise. These are used interchangeably by Fan manufacturers so that the measurement method is not standardized.

JIS B 8330: Testing and Inspection Methods for Fans
JIS C 9603: Extractor Fans

OMRON conducts testing according to JIS (Japan Industrial Standard) C 9603 because of the small size and low noise levels of the Fans and because of their similarity in shape to extractor fans. This standard prescribes that the noise be measured at a distance of 1 m (A characteristics) from the side of the Fan.

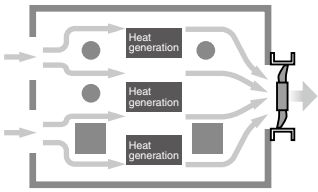


Q&A for Axial Fans

Q1 **Which has a better cooling effect, air suction or air discharge?**

A1 It depends on the location number of heat-generating elements.

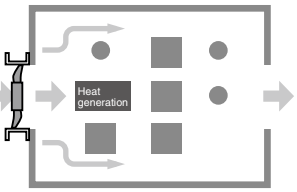
●Air discharge installation



Distributing Multiple Heat-generating Elements

Because the pressure inside the box lowers, dust can easily enter from other openings.

●Air suction installation



Connecting More than One Heat-generating Elements in One Location

Because the pressure inside the box rises, dust cannot easily enter from other openings.

Q2 **What kind of precautions are there for building an Axial Fan into equipment?**

A2 Always mount the optional Finger Guard when there is any possibility that a person may touch the Fan blade.

Note: 1. Mount a protective shield or screen, or the optional Finger Guard to the Axial Fan installation.

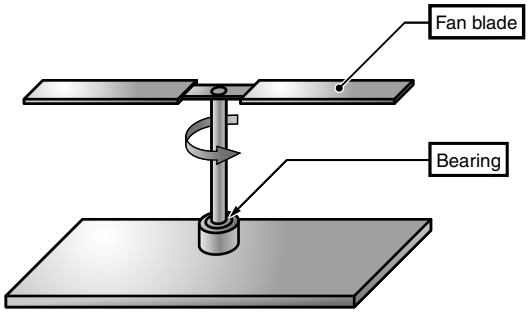
2. Do not use a Box Fan with the Finger Guard removed. Injury may occur as a result of touching the Fan blade.

3. There are various types of optional R87F-FG Finger Guards available. Select the one that suits the size of the Axial Fan.

4. Always turn OFF the power and confirm that the Fan blade has stopped turning before starting to conduct an inspection, replace the filter, etc. Injury may occur as a result of touching the Fan blade.

Q3 **How do you define the service life of an Axial Fan?**

A3 The service life of an Axial Fan is generally determined by the bearings.
The following diagram is a simple, mechanical illustration of the Fan structure.
The Fan blade will turn smoothly if the bearings are in normal condition. When there is an abnormality in the bearings, however, the friction between the shaft and the bearings will increase until the blade eventually stops turning.
This is the definition of a Fan's service life.



A mechanical illustration of the Axial Fan structure

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To convert millimeters into inches, multiply by 0.03937. To convert grams into ounces, multiply by 0.03527.

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