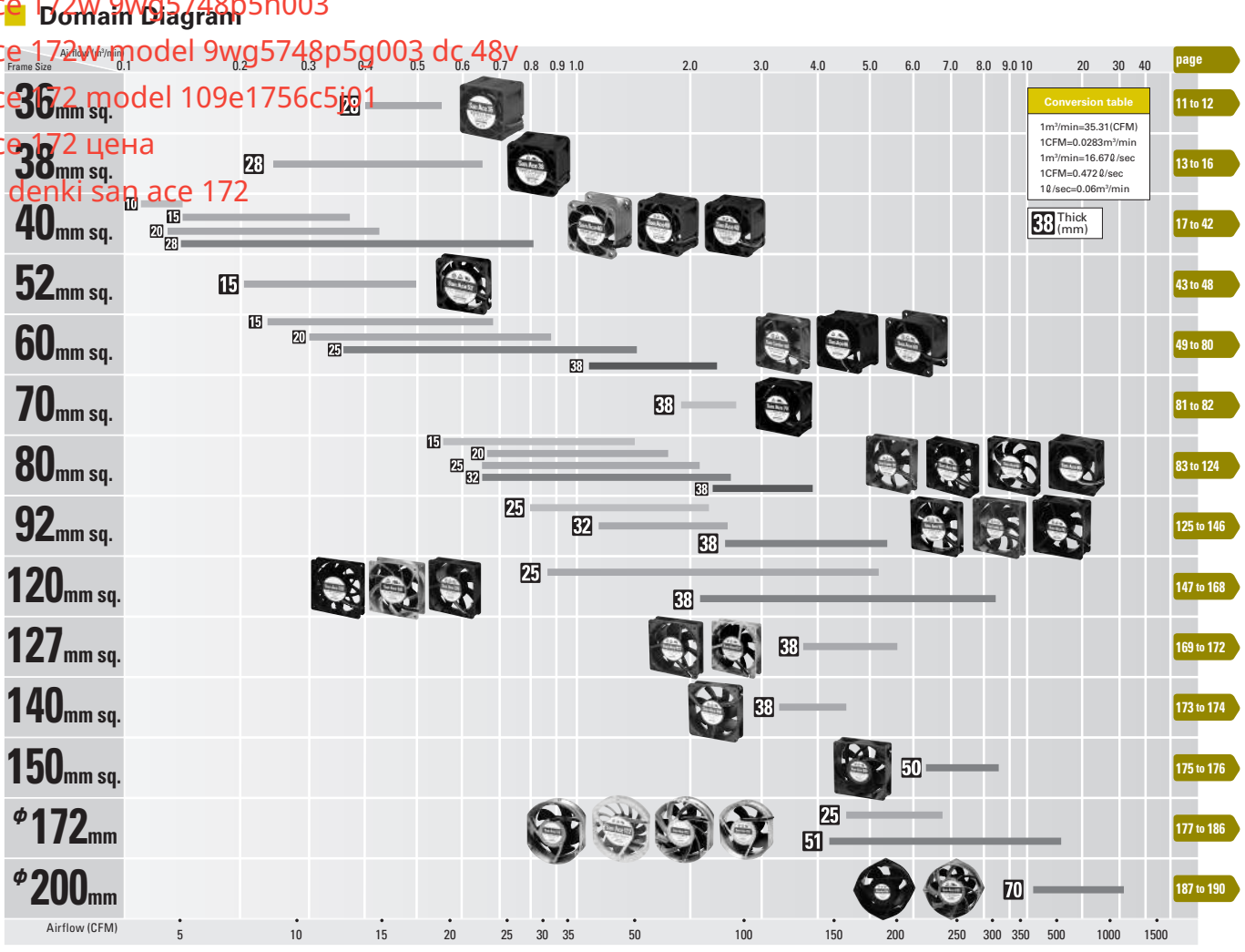


Wide lineup including low power consumption fans (9GA type), silent fans (9S type), and high airflow and high static pressure fans.



**Part Numbering System** Not every combination of the following codes or characters is available. Contact us for an available combination.

<b>9GV</b>	<b>12</b>	<b>12</b>	<b>J</b>	<b>1</b>	<b>01</b>	<b>1</b>
<b>Type name / frame material</b> 109P / Plastics 109R / Plastics 9GA / Plastics 9S / Plastics 9GV / Plastics Aluminum 9GE / Aluminum 9G / Plastics 9A / Plastics 9SG / Aluminum 109E / Aluminum 9EC / Aluminum	<b>Frame size</b> 36: 36×36mm 03: 38×38mm 04: 40×40mm 05: 52×52mm 06: 60×60mm 08: 80×80mm 09: 92×92mm 12: 120×120mm 13: 127×127mm 14: 140×140mm 15: 150×150mm 17: φ172mm 47: φ172mm×147mm (sidecut) 57: φ172mm×150mm (sidecut) 20: φ200mm	<b>Voltage</b> 05: 5V 12: 12V 24: 24V 48: 48V etc	<b>Speed code</b> A,B,C,D,E,F,G,H,J,K, L,M,S,W etc	<b>Frame thickness</b> 0: 70mm 1: 38mm thick 2: 32mm thick 3: 28mm thick 4: 25mm thick 5: 50mm thick 51mm thick 6: 20mm thick 7: 15mm thick 9: 10mm thick	<b>Sensor specifications</b> 01 or 001: With a pulse sensor 02 or 002: Without a sensor D01 or D001: With a lock sensor	<b>Frame form</b> Nil: Plastics frame: Ribbed frame Aluminum frame: Ribless frame 1: Plastics frame: Ribless frame 3: 40×40×28mm for 1U applications Plastics frame

**Fans with PWM speed control function**

Example :

<b>9GV</b>	<b>12</b>	<b>12</b>	<b>P</b>	<b>4</b>	<b>G</b>	<b>01</b>	
<b>Type name / frame material</b> 9GV / Plastics Aluminum	<b>Frame size</b> 12: 120×120mm	<b>Voltage</b> 12: 12V	<b>PWM speed control function</b>	<b>Frame thickness</b>	<b>Speed code</b>	<b>Individual customer's spec</b> 2 or 3 digits	<b>Frame form</b> Nil: Plastics frame: Ribbed frame Aluminum frame: Ribless frame

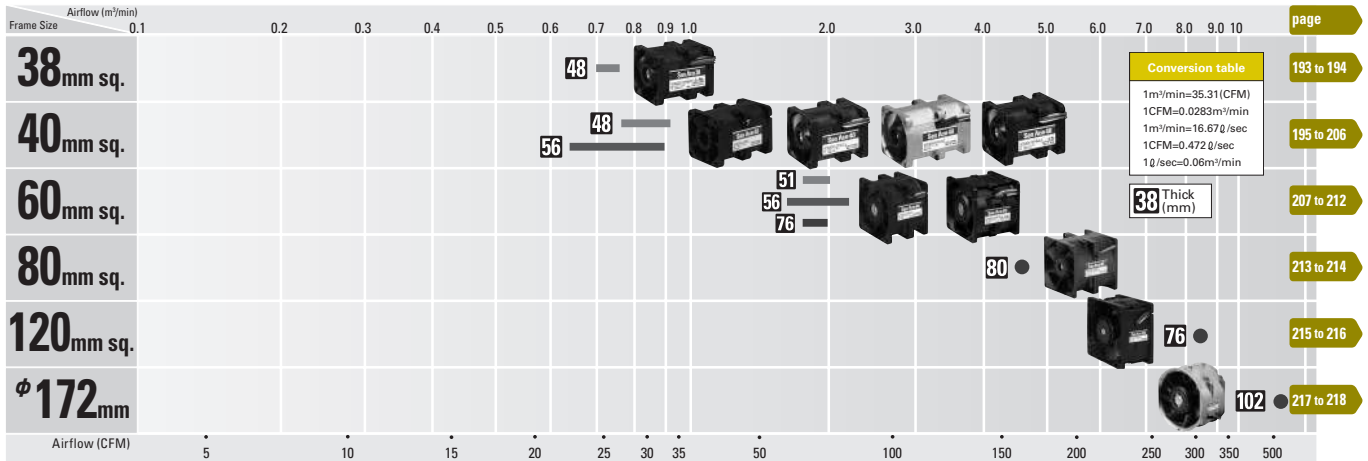
# Counter Rotating Fan

Counter rotating fans features high airflow and high static pressure.

### Related product

Long Life Counter Rotating Fan ⇒ pp. 297, 303

### Domain Diagram



### Part Numbering System

Not every combination of the following codes or characters is available. Contact us for an available combination.

<b>9CRA</b>	<b>04</b>	<b>12</b>	<b>K</b>	<b>4</b>	<b>01</b>
<b>Type name / frame material</b> 9CR / Plastics Aluminum 9CRA / Plastics 9CRB / Plastics 9CRE / Aluminum 9CRD / Plastics 9CRF / Plastics	<b>Frame size</b> 03 : 38×38mm 04 : 40×40mm 06 : 60×60mm 08 : 80×80mm 12 : 120×120mm 57 : φ172mm×150mm (sidecut)	<b>Voltage</b> 12 : 12V 48 : 48V	<b>Speed code</b> J,G,S,H,K etc	<b>Frame thickness</b> 0 : 76mm thick 4 : 48mm thick 5 : 56mm thick, 51mm thick 6 : 56mm thick 8 : 80mm thick 9 : 102mm thick	<b>Sensor specifications</b> 01 : With a pulse sensor 02 : Without a sensor D01 : With a lock sensor

### Fans with PWM speed control function

Example :

<b>9CRA</b>	<b>03</b>	<b>12</b>	<b>P</b>	<b>4</b>	<b>K</b>	<b>03</b>
<b>Type name / frame material</b> 9CRA / Plastics	<b>Frame size</b> 03 : 38×38mm	<b>Voltage</b> 12 : 12V	<b>PWM speed control function</b>	<b>Frame thickness</b>	<b>Speed code</b>	<b>Individual customer's spec</b> 2 or 3 digits

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email [minsk17@tut.by](mailto:minsk17@tut.by) тел.+375447584780

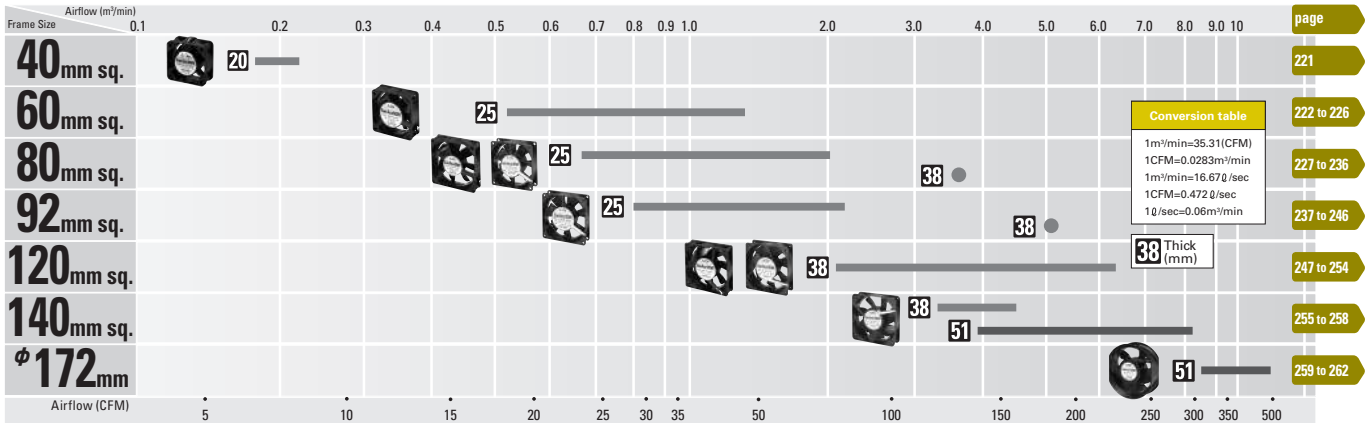
# Splash Proof Fan

Cooling fan of IP54, IP55 and IP68 waterproof capability.

## Related product

Splash Proof Centrifugal Fan ⇒ p. 264  
Oil Proof Fan ⇒ p. 274

## Domain Diagram



## Part Numbering System

Not every combination of the following codes or characters is available. Contact us for an available combination.

9WS	12	12	H	1	01	
<b>Type name / frame material</b> 109W / Aluminum 9WS / Plastics 9WE / Aluminum 9WG / Aluminum 9WB / Aluminum 9WP / Plastics 9WV / Plastics Aluminum 9WL / Aluminum	<b>Frame size</b> 04 : 40×40mm 06 : 60×60mm 08 : 80×80mm 09 : 92×92mm 12 : 120×120mm 14 : 140×140mm 17 : φ172mm 57 : φ172mm×150mm (sidecut)	<b>Voltage</b> 12 : 12V 24 : 24V 48 : 48V etc	<b>Speed code</b> A, D, E, F, G, H, J, L, M, S etc	<b>Frame thickness</b> 1 : 38mm thick 4 : 25mm thick 5 : 51mm thick 6 : 20mm thick	<b>Sensor specifications</b> 01 : With a pulse sensor 02 : Without a sensor D01 : With a lock sensor	<b>Frame form</b> Nil : Plastics frame: Ribbed frame Aluminum frame: Ribless frame 1 : Plastics frame: Ribless frame

## Fans with PWM speed control function

Example :

9WV	08	48	P	1	H	001	
<b>Type name / frame material</b> 9WV / Plastics Aluminum	<b>Frame size</b> 08 : 80×80mm	<b>Voltage</b> 48 : 48V	<b>PWM speed control function</b>	<b>Frame thickness</b>	<b>Speed code</b>	<b>Individual customer's spec</b> 2 or 3 digits	<b>Frame form</b> Nil : Plastics frame: Ribbed frame Aluminum frame: Ribless frame

## Ingress protection ratings (IP code)

■ IP Codes used by SANYO DENKI express the level of protection that internal electrical components (for fans: electrical components and motor coils) have against solid objects, water, and access to hazardous parts. San Ace Splash Proof fans feature high protection levels.

### Definition of Ingress Protection (IP Code)

Ingress Protection (IP Code) is defined in IEC (International Electrotechnical Commission) 60529\* DEGREES OF PROTECTION PROVIDED BY ENCLOSURES (IP Code). \*IEC 60529:2001

**I P X X**

Second digit: Protection against water  
First digit: Protection against solid objects and access to hazardous parts

\*For details, please refer to p. 410.

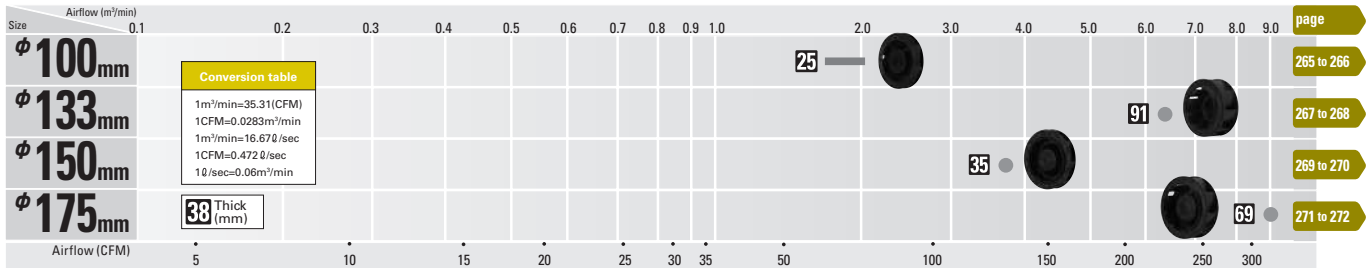
# Splash Proof Centrifugal Fan

Centrifugal fans of IP54 waterproof capability.

## Related product

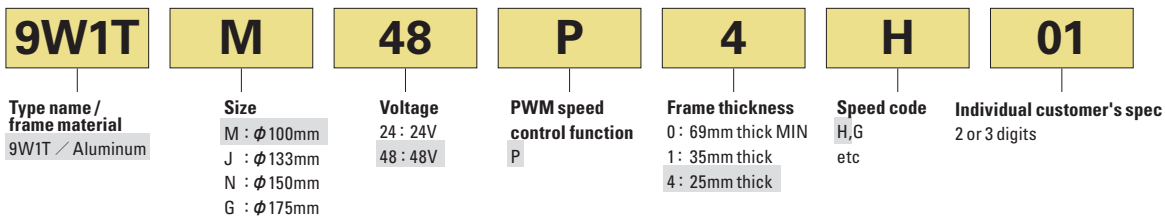
Splash Proof Fan ⇒ p. 220 Centrifugal Fan ⇒ p. 326  
Oil Proof Fan ⇒ p. 274

## Domain Diagram



## Part Numbering System

Not every combination of the following codes or characters is available. Contact us for an available combination.



## Ingress protection ratings (IP code)

■ IP Codes used by SANYO DENKI express the level of protection that internal electrical components (for fans: electrical components and motor coils) have against solid objects, water, and access to hazardous parts. San Ace Splash Proof Centrifugal fans feature high protection levels.

### Definition of Ingress Protection (IP Code)

Ingress Protection (IP Code) is defined in IEC (International Electrotechnical Commission) 60529\* DEGREES OF PROTECTION PROVIDED BY ENCLOSURES (IP Code). \*IEC 60529:2001

**I P X X**

Second digit: Protection against water  
First digit: Protection against solid objects and access to hazardous parts

First digit	Definition
0	No protection
1	Protection against solid objects > 50 mm
2	Protection against solid objects > 12.5 mm
3	Protection against solid objects > 2.5 mm
4	Protection against solid objects > 1 mm
5	Protection against a level of dust that could hinder operation or impair safety
6	Complete protection against dust

Second digit	Definition
0	No protection
1	Protection against dripping water
2	Protection against water spray up to 15°
3	Protection against spraying water
4	Protection against splashing water
5	Protection against low pressure water jets
6	Protection against high pressure water jets
7	Protection against temporary immersion in water
8	Protection against submersion in water

# Oil Proof Fan

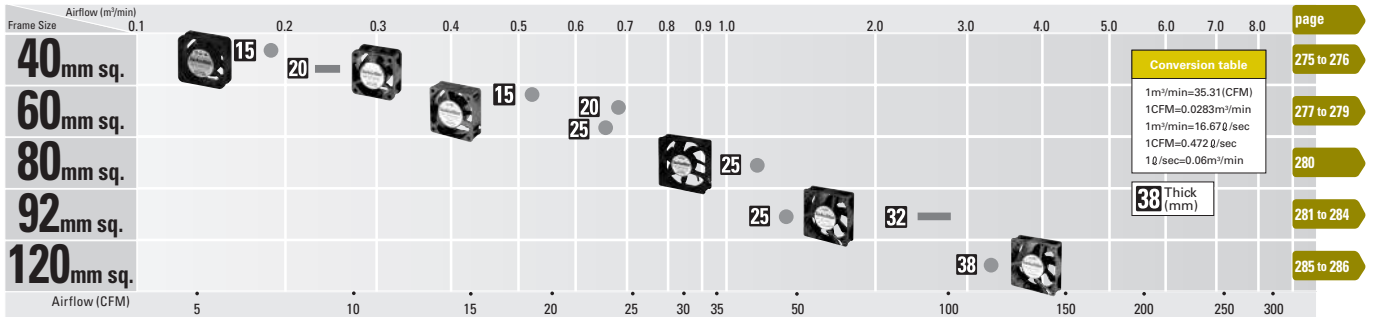
Cooling fan capable of operating in an oil-mist environment.

## Related product

Splash Proof Fan ⇒ p. 220

Splash Proof Centrifugal Fan ⇒ p. 264

## Domain Diagram



## Part Numbering System

Not every combination of the following codes or characters is available. Contact us for an available combination.

9WF	12	24	H	1	01	
<b>Type name / frame material</b> 9WF / Plastics	<b>Frame size</b> 04 : 40×40mm 06 : 60×60mm 08 : 80×80mm 09 : 92×92mm 12 : 120×120mm	<b>Voltage</b> 24 : 24V	<b>Speed code</b> H	<b>Frame thickness</b> 1 : 38mm thick 2 : 32mm thick 4 : 25mm thick 6 : 20mm thick 7 : 15mm thick	<b>Sensor specifications</b> 01 : With a pulse sensor 02 : Without a sensor D01 : With a lock sensor	<b>Frame form</b> Nil : Ribbed frame

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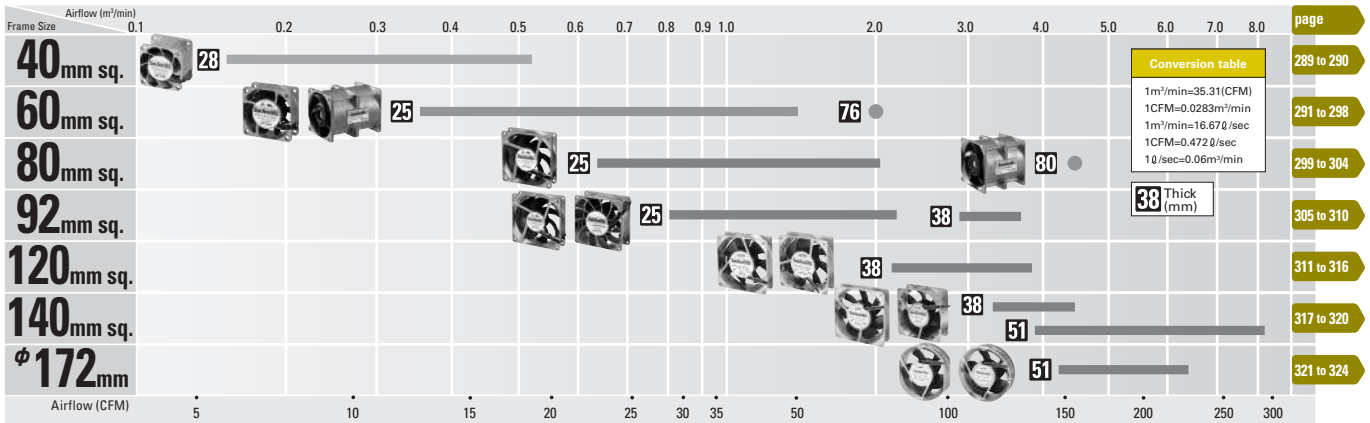
# Long Life Fan

Cooling fan with Max. 200,000 hours of expected life.

Related product

Splash Proof, Long Life Fan ⇒ pp. 222, 227, 237

## Domain Diagram



## Part Numbering System

Not every combination of the following codes or characters is available. Contact us for an available combination.

109L	12	12	H	1	01
<b>Type name / frame material</b>	<b>Frame size</b>	<b>Voltage</b>	<b>Speed code</b>	<b>Frame thickness</b>	<b>Sensor specifications</b>
109L / Aluminum 9LB / Aluminum 9GL / Aluminum 9L / Aluminum 9LG / Aluminum	04 : 40×40mm 06 : 60×60mm 08 : 80×80mm 09 : 92×92mm 12 : 120×120mm 14 : 140×140mm 17 : φ172mm 57 : φ172mm×150mm (sidecut)	12 : 12V 24 : 24V 48 : 48V etc	E, F, G, H, J, L, M, S etc	1 : 38mm thick 3 : 28mm thick 4 : 25mm thick 5 : 51mm thick	01 : With a pulse sensor 02 : Without a sensor D01 : With a lock sensor

## Fans with PWM speed control function

Example :

9LG	06	12	P	4	S	001
<b>Type name / frame material</b>	<b>Frame size</b>	<b>Voltage</b>	<b>PWM speed control function</b>	<b>Frame thickness</b>	<b>Speed code</b>	<b>Individual customer's spec</b>
9LG / Aluminum	06 : 60×60mm	12 : 12V		4 : 25mm thick		2 or 3 digits

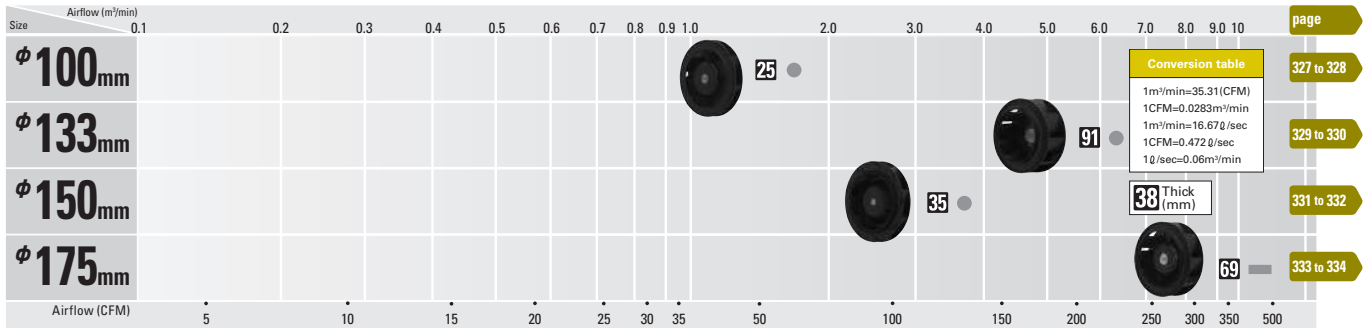
# Centrifugal Fan

Cooling fan blows air in a centrifugal course. It features high static pressure.

Related product

Splash Proof Centrifugal Fan ⇒ p. 264

## Domain Diagram



## Part Numbering System

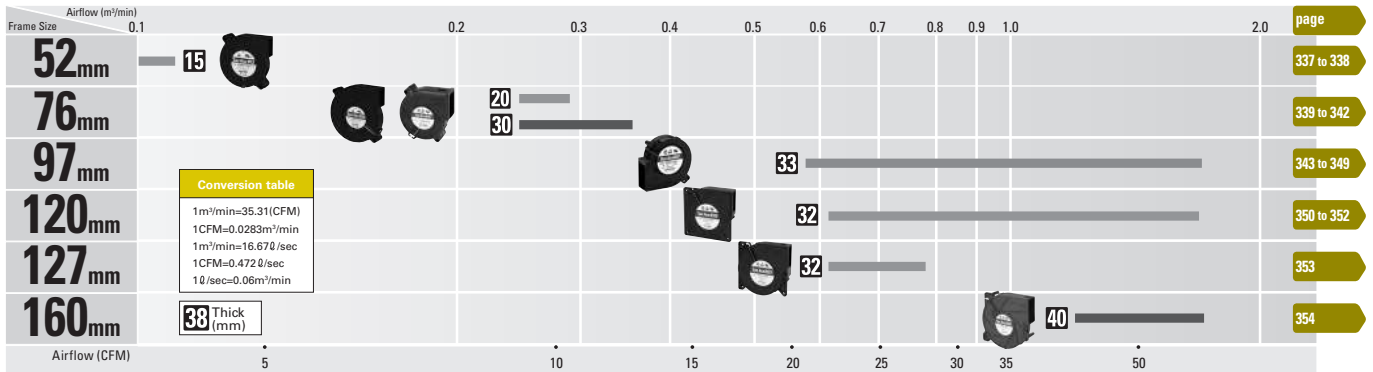
Not every combination of the following codes or characters is available. Contact us for an available combination.

9T	M	48	P	4	H	
<b>Type name / frame material</b> 9T / Aluminum	<b>Size</b> M: φ100mm J: φ133mm N: φ150mm G: φ175mm	<b>Voltage</b> 24: 24V 48: 48V	<b>PWM speed control function</b> P	<b>Frame thickness</b> 0: 69mm thick MIN 1: 35mm thick 4: 25mm thick	<b>Speed code</b> H, G etc	<b>Individual customer's spec</b> 2 or 3 digits

# Blower

Cooling fan specialized for high static pressure

## Domain Diagram



## Part Numbering System

Not every combination of the following codes or characters is available. Contact us for an available combination.

<b>109B</b>	<b>F</b>	<b>12</b>	<b>H</b>	<b>C</b>	<b>2</b>
<b>Type name / frame material</b> 109B / Plastics 9B / Plastics	<b>Frame size</b> C : 52mm D : 76mm M : 97mm F : 120mm J : 127mm G : 160mm	<b>Voltage</b> 12 : 12V 24 : 24V etc	<b>Speed code</b> F,G,H,K,M,S etc	<b>Sensor specifications</b> A : Without a sensor C : With a pulse sensor D : With a lock sensor	<b>Frame thickness</b> 1 : 40mm thick 2 : 30mm thick, 32mm thick, 33mm thick 7 : 15mm thick 6 : 20mm thick

<b>9B</b>	<b>MB</b>	<b>12</b>	<b>G</b>	<b>2</b>	<b>01</b>
<b>Type name / frame material</b> 9B / Plastics	<b>Frame size</b> MB : 97mm FB : 120mm	<b>Voltage</b> 12 : 12V 24 : 24V	<b>Speed code</b> G / S / H etc	<b>Frame thickness</b> 2 : 32mm thick / 33mm thick	<b>Sensor specifications</b> 01 : With a pulse sensor 02 : Without a sensor

### Fans with PWM speed control function

Example :

<b>9B</b>	<b>MB</b>	<b>12</b>	<b>P</b>	<b>2</b>	<b>G</b>	<b>01</b>
<b>Type name / frame material</b> 9B / Plastics	<b>Frame size</b> MB : 97mm	<b>Voltage</b> 12 : 12V	<b>PWM speed control function</b>	<b>Frame thickness</b> 2 : 32mm thick / 33mm thick	<b>Speed code</b>	<b>Individual customer's spec</b> 2 or 3 digits



**φ172mm**

# San Ace 172

51mm thick (Sidecut type)  
 51mm thick (Round type)  
 51mm thick (Round type /with sensor)



Only standard fans (without sensors) have acquired CSA certification.

## General Specifications

- Material..... Frame: Aluminum, Impeller:Plastics (Flammability: UL94V-1)
- Expected Life ..... Refer to specifications (L10:Survival rate: 90% at 60°C , rated voltage,and continuously run in a free air state)
- Dielectric Strength ..... 50/60Hz 1,500VAC 1minute (between input terminal and frame)
- Dielectric Strength (With Sensor) ... Between AC input and DC input(Sensor output)  
 : 50/60Hz 1,000VAC 1minute  
 Between AC input and G  
 : 50/60Hz 1,500VAC 1minute,  
 Between G and DC input(Sensor output)  
 : 50/60Hz 1,000VAC 1minute
- Sensor-Purpose Lead Wire ... ⊕ brown ⊖ black (Sensor) yellow
- Storage Temperature ..... -30°C to +70°C (Non-condensing)
- Operating Voltage Range ... Voltage of each model ±10%

**φ172mm×51mm** (Mass : 1,000g) **Round type**

## Specifications Standard

Model No.	Voltage [V]	Frequency [Hz]	Input [W]	Current [A]	Locked Rotor Current [A]	Rated Speed [min <sup>-1</sup> ]	Max. Air Flow [m <sup>3</sup> /min] [CFM]	Max. Static Pressure [Pa] [inchH <sub>2</sub> O]	SPL [dB(A)]	Operating Temperature [°C]	Expected Life [h]
109-311	100	50/60	27/25	0.33/0.25	0.65/0.64	2,900/3,500	5.3/6.4 187.3/226.1	147/196 0.590/0.787	47/51	-30 to +60	25,000
109-314	115			0.29/0.22	0.55/0.54						
109-312	200			0.16/0.13	0.33/0.32						
109-313	230			0.14/0.11	0.28/0.27						

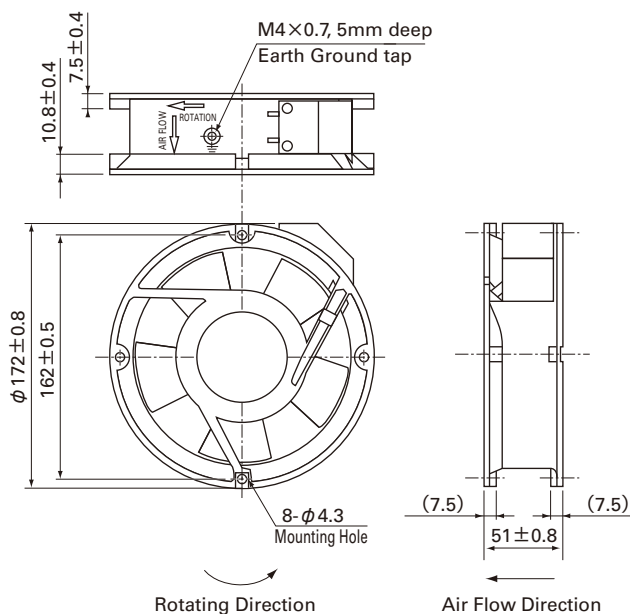
### with Sensor

Model No.	Voltage [V]	Frequency [Hz]	Input [W]	Current [A]	Locked Rotor Current [A]	Rated Speed [min <sup>-1</sup> ]	Max. Air Flow [m <sup>3</sup> /min] [CFM]	Max. Static Pressure [Pa] [inchH <sub>2</sub> O]	SPL [dB(A)]	Operating Temperature [°C]	Expected Life [h]
109-371	100	50/60	27/25	0.33/0.25	0.65/0.64	2,900/3,500	5.3/6.4 187.3/226.1	147/196 0.590/0.787	47/51	-10 to +60	25,000
109-374	115			0.29/0.22	0.55/0.54						
109-372	200			0.16/0.13	0.33/0.32						
109-373	230			0.14/0.11	0.28/0.27						

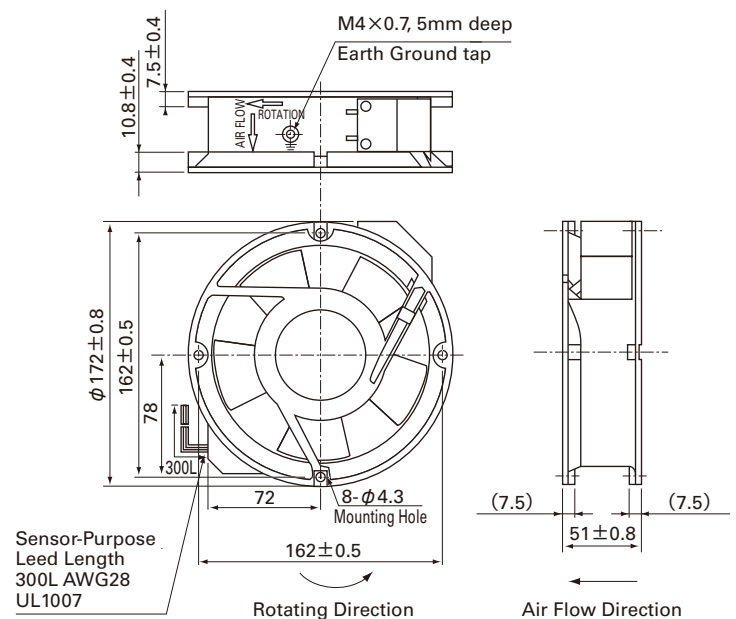
Two types of power supplies, 5V and 12V, are available in fans with sensor attached.

## Dimensions (Unit : mm)

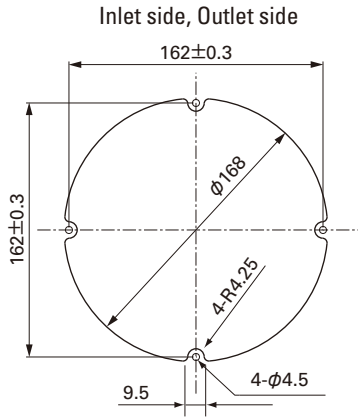
### Standard



### with Sensor

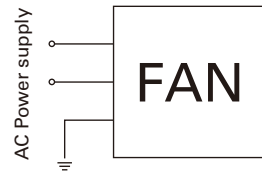


### Reference Dimension of Mounting Holes and Vent Opening (Unit : mm)



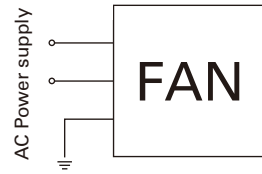
### Wiring Diagram

#### Standard

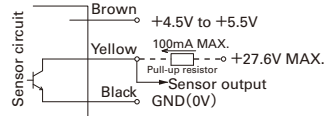


#### with Sensor

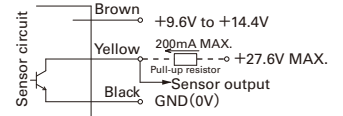
(For fan power supply)



#### 5V



#### 12V



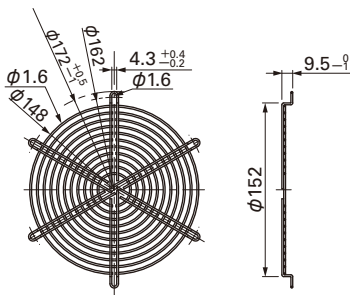
GND (Black) should be shared in case that power supply for sensor circuit (Brown) and that for sensor pull-up (Yellow) are separated.

### Options (Unit : mm)

#### Finger guards

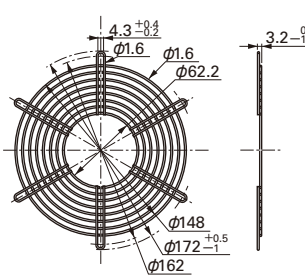
Model : 109-319E Surface treatment : Nickel-chrome plating (silver) Color : 109-319H : Cation electropainting (black)

Inlet side, Outlet side



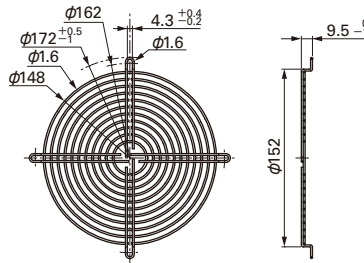
Model : 109-320 Surface treatment : Nickel-chrome plating (silver) Color : 109-319H : Cation electropainting (black)

Outlet side



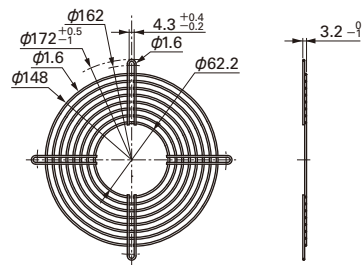
Model : 109-1066 Surface treatment : Nickel-chrome plating (silver) Color : 109-1068 : Nickel-chrome plating (silver)

Inlet side, Outlet side



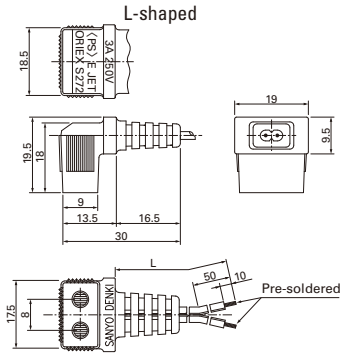
Model : 109-1068 Surface treatment : Nickel-chrome plating (silver) Color : 109-1068 : Nickel-chrome plating (silver)

Outlet side

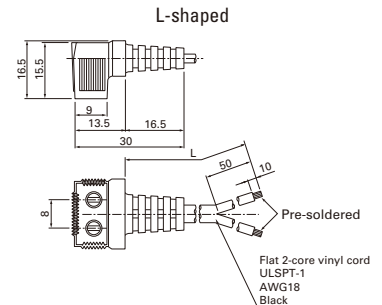


#### Plug cord

(Products compliant with Electrical Appliance and Material Safety Law) Model : 489-1619-L10/489-1619-L21



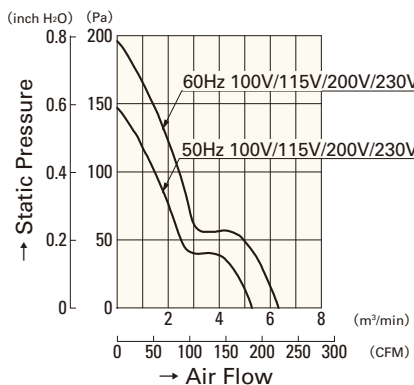
(UL/CSA CERTIFIED) UL FILE No.E50197 CSA FILE No.LR67048 Model No. : 489-084-L10/489-084-L21



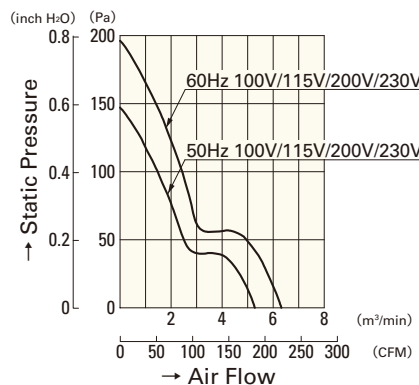
Model	Power cord length(mm)
- L10	1,000
- L21	2,100

### Air Flow - Static Pressure Characteristics

#### Standard



#### with Sensor



109-311	109-314
109-312	109-313

109-371	109-374
109-372	109-373

# High Air Flow and High Static Pressure Fan “San Ace 172” SG Type

Izumi Onozawa

Toshiki Ogawara

Satoshi Fujimaki

Masashi Miyazawa

Yasuhiro Maruyama

Hidetoshi Oobayashi

## 1. Introduction

Servers, storage, telecommunication equipment and other IT devices are getting smaller and more functional, increasing the density of the electronic components that are mounted on those devices. This has caused a drastic increase in the heat generated inside device chassis. However, smaller devices make proper heat flow difficult to design, meaning that fans must become even more powerful than current models.

This document introduces the features and performance of the “San Ace 172” SG type high air flow, high static pressure fan specifically designed to meet these needs.

## 2. Background of the development

Sanyo Denki had developed the high air flow, high static pressure “San Ace 172” GV type  $\phi$  172, 51 mm thick sidecut DC cooling fan. At its release, it was at the top of the industry in terms of the cooling performance for its size. However, as mentioned above, the market is now demanding a higher performance fan.

Thus, the “San Ace 172” SG type has been designed to be the best in cooling fan industry while matching its predecessor exactly in size and installation specifications to ensure perfect compatibility.

## 3. Product features

Fig. 1 shows a photograph of the “San Ace 172” SG type fan. The features of this product are as follows.

- (1) High air flow and high static pressure
- (2) 3-phase drive motor for maximum efficiency
- (3) PWM speed control function
- (4) Wide voltage range

The impeller, frame, motor and drive circuit have been newly designed for the “San Ace 172” SG type (referred to below as the new model) in order to achieve high air flow

and high static pressure.



Fig. 1: “San Ace 172” SG type

## 4. Product overview

### 4.1 Dimensions

Fig. 2 shows the dimensions of the new model. It has the same installation dimensions as its predecessor, and thus is perfectly compatible with any device that could make use of the predecessor.

### 4.2 Characteristics

#### 4.2.1 General characteristics

Table 1 shows the general characteristics for the new model. The rated voltage is DC 48 V, but the operating voltage is from 36 to 72 V, which is much wider than for previous models.

There are two types of products, G speed (8,600 min<sup>-1</sup>) and H speed (6,500 min<sup>-1</sup>).

#### 4.2.2 Air flow vs. static pressure characteristics

Fig. 3 shows the air flow and static pressure characteristics of the new model.

4.2.3 PWM control function

The new model is equipped with the PWM control function, which allows an external control of the fan speed.

PWM control is in heavy demand because they allow fan speed to be varied to match the heat conditions instead of

always running at the full speed, and thus reduce power consumption.

Fig. 4 shows the air flow and static pressure characteristics at individual PWM duty regarding the new model.

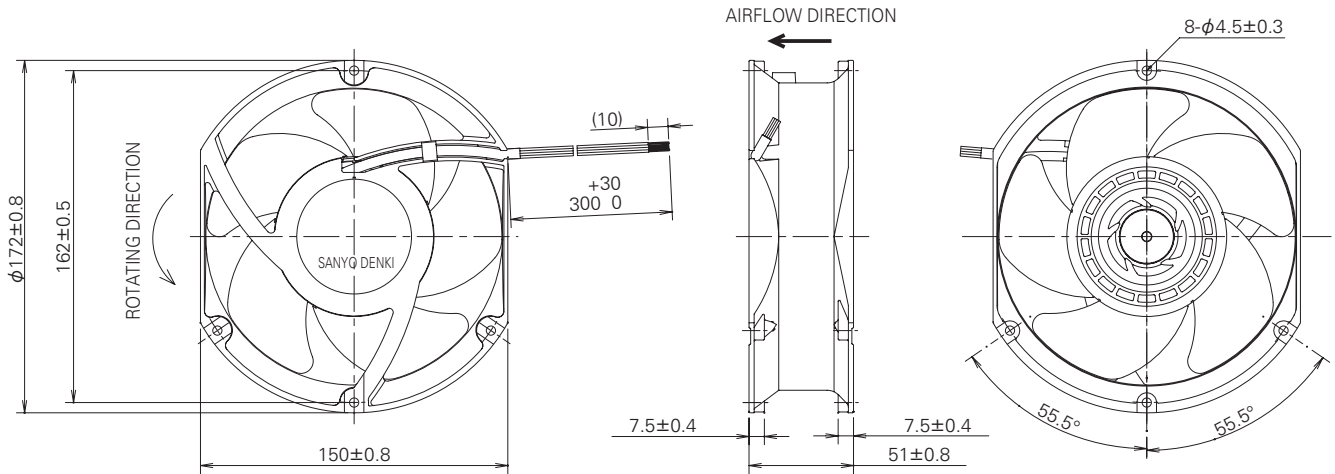


Fig. 2: "San Ace 172" SG type dimensions (unit: mm)

Table 1: "San Ace 172" SG type general characteristics

Model No.	Rated voltage [V]	Operating voltage [V]	PWM duty cycle [%]	Rated current [A]	Rated input [W]	Rated speed [min <sup>-1</sup> ]	Max. air flow		Max. static pressure		Sound pressure level [dB(A)]
							[m <sup>3</sup> /min]	[CFM]	[Pa]	[inchH <sub>2</sub> O]	
9SG5748P5G01	48	36 to 72	100	2.91	140.0	8600	15.46	546	1000	4.02	78
			0	0.21	10.1	2000	3.59	127	75.1	0.30	40
9SG5748P5H01	48	36 to 72	100	1.62	78.0	6500	11.60	410	770	3.09	71
			0	0.21	10.1	2000	3.59	127	75.1	0.30	40

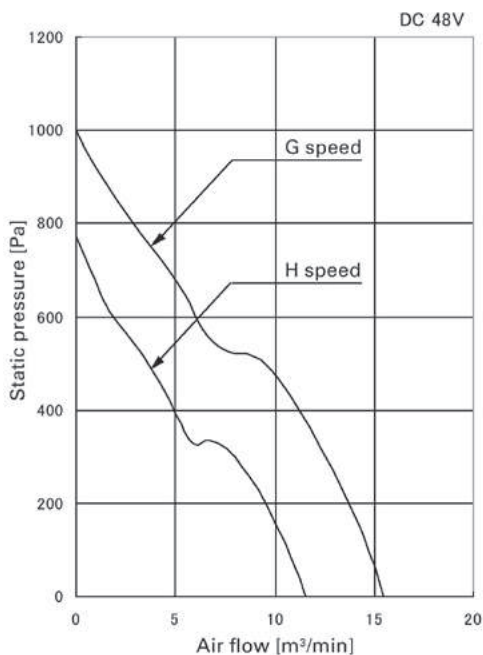


Fig. 3: Air flow vs. static pressure

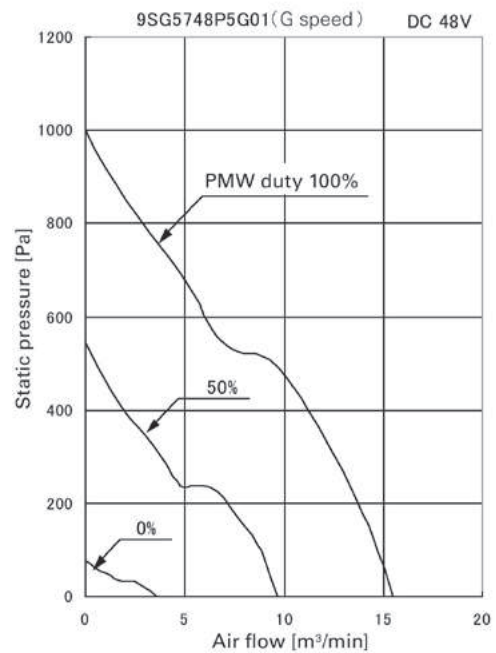


Fig. 4: Air flow and static pressure characteristics at individual PWM duty

### 4.3 Life expectancy

The new model has a life expectancy of 40,000 hours at 60°C (survival rate of 90% with continuous operation at the rated voltage under free air conditions and at normal humidity).

## 5. Comparisons with conventional models

The newly designed impeller and frame shape for the new model, as well as the new motor and drive circuit, have resulted in improved air flow and static pressure.

The following compares the new model “San Ace 172” SG type (9SG5748P5G01) with the conventional “San Ace 172” GV type (9GV5748H501).

### 5.1 Motor construction

The motor and drive circuit of the new model have been newly designed. The conventional model uses a single-phase motor while the new model uses a 3-phase motor with a load dispatch switch, which results in higher output and higher efficiency.

Note that the motor design used a magnetic field analysis (FEM) to optimize the shape of the stator core and thus increase motor output while reducing cogging torque. Fig. 5 shows the results of the magnetic field analysis.

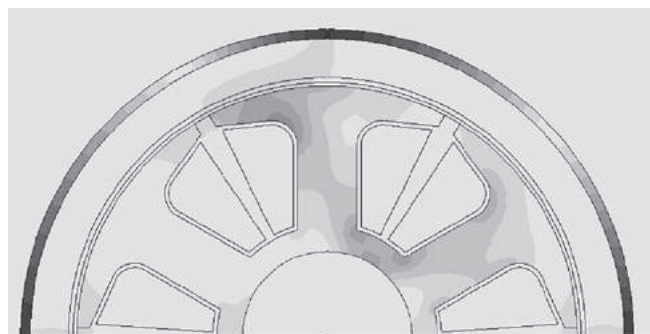


Fig. 5: Magnetic field analysis example (magnetic flux density distribution)

### 5.2 Air flow and static pressure characteristics

Fig. 6 shows the air flow and static pressure characteristics of the conventional and new models.

The new model uses excellent impeller and frame shapes to generate superior air flow and static pressure. If the device has system impedance assumed in Fig. 6, the conventional model will operate at point A while the new model will operate at point B. At point A, the conventional model generates air flow of 7.2 m<sup>3</sup>/min while new model

at point B generates air flow of 9.1 m<sup>3</sup>/min, representing 26% increase. Additionally, looking at static pressure, the conventional model generates static pressure of 296 Pa at point A, while the new model at point B generates static pressure of 510 Pa, which is 73% improvement.

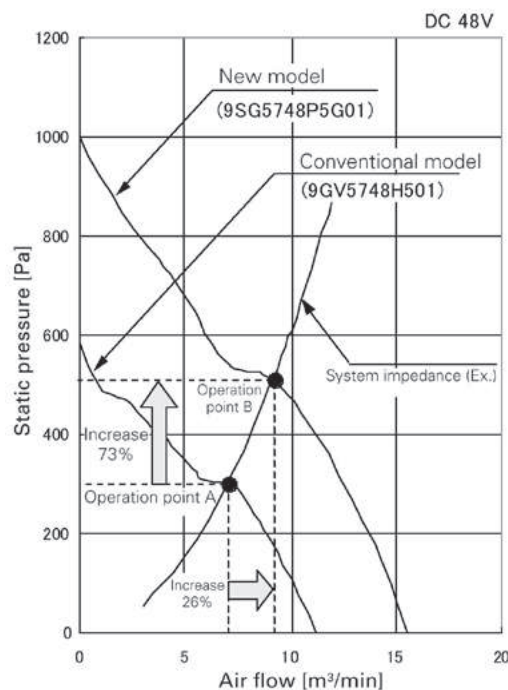


Fig. 6: Comparison of air flow and static pressure

### 5.3 Sound pressure level and power consumption

With both models at point A from the last section, we compared the air flow and static pressure, as shown in Fig. 7. At point A in Fig. 7, with both models at the same cooling performance, we compared the sound pressure level and power consumption. The results are shown in Fig. 8, which indicates the new model is 1 dB (A) lower and 5% less power than the conventional model.



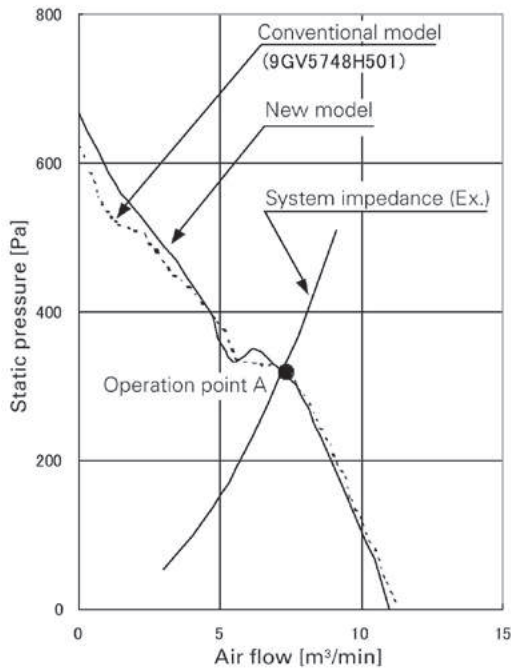


Fig. 7: Air flow and static pressure characteristics (Conventional and new model at same operation point)

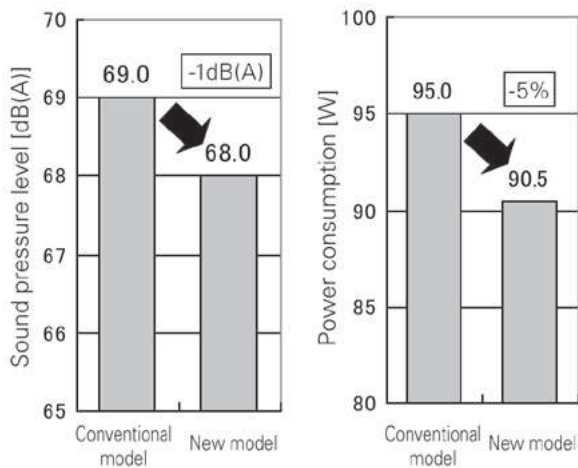


Fig. 8: Comparison of sound pressure level and power consumption

## 6. Conclusion

This document has introduced some of the features and advantages of the newly developed “San Ace 172” SG type DC axial cooling fan.

The newly designed impeller, frame, motor and drive circuit of the new model have generated significant improvements over the conventional model in terms of air flow and static pressure. Additionally, the new model achieved the best in the industry within the same size.

Servers, storage, telecommunication devices and other IT equipment had being packed more and more densely, with an accompanying increase in heat generation. The new model will go a long way towards solving these heat-related problems.



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**φ172mm**

# San Ace 172

51mm thick (Sidecut type)  
 51mm thick (Round type)  
 51mm thick (Round type /with sensor)



## General Specifications

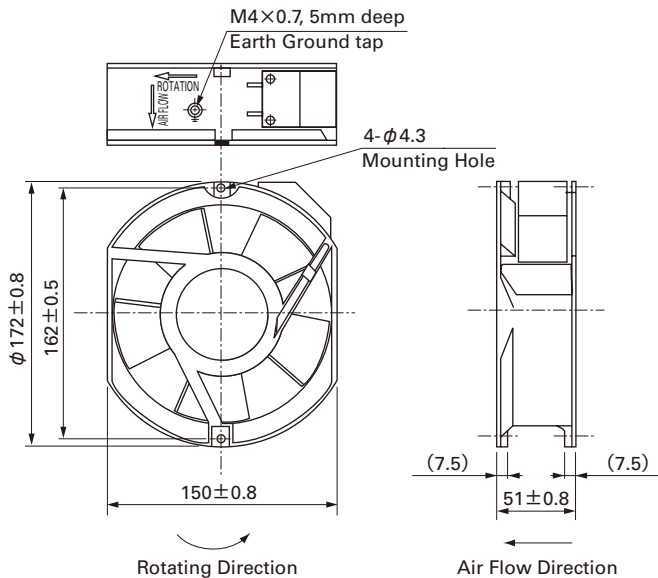
- Material ..... Frame: Aluminum, Impeller:Plastics (Flammability: UL94V-1)
- Expected Life ..... Refer to specifications (L10:Survival rate: 90% at 60°C , rated voltage,and continuously run in a free air state)
- Dielectric Strength ..... 50/60Hz 1,500VAC 1minute (between input terminal and frame)
- Storage Temperature ..... -30°C to +70°C (Non-condensing)
- Operating Voltage Range ... Voltage of each model ±10%

**φ172mm × 150mm × 51mm** (Mass : 1,000g) **Sidecut type**

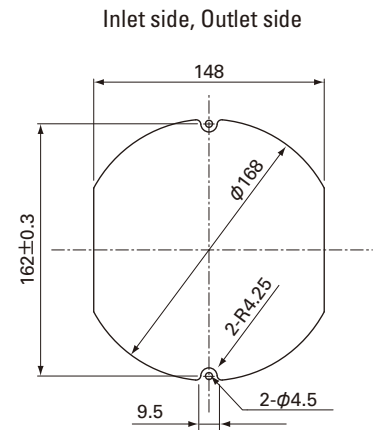
## Specifications

Model No.	Voltage [V]	Frequency [Hz]	Input [W]	Current [A]	Locked Rotor Current [A]	Rated Speed [min <sup>-1</sup> ]	Max. Air Flow [m <sup>3</sup> /min] [CFM]	Max. Static Pressure [Pa] [inchH <sub>2</sub> O]	SPL [dB(A)]	Operating Temperature [°C]	Expected Life [h]
109S301	100	50/60	27/25	0.33/0.25	0.65/0.64	2,900/3,500	5.3/6.4 187.3/226.1	147/196 0.590/0.787	51/56	-30 to +60	25,000
109S304	115			0.29/0.22	0.55/0.54						
109S302	200			0.16/0.13	0.33/0.32						
109S303	230			0.14/0.11	0.28/0.27						

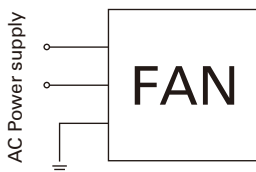
## Dimensions (Unit : mm)



## Reference Dimension of Mounting Holes and Vent Opening (Unit : mm)



## Wiring Diagram

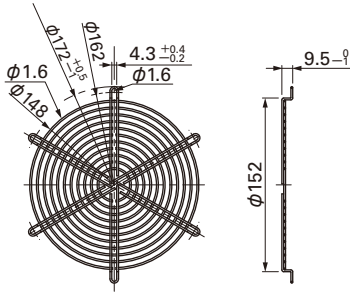


**Options (Unit : mm)**

**Finger guards**

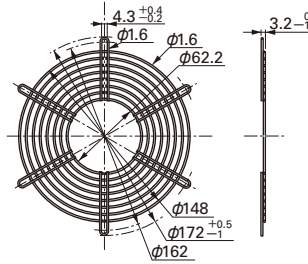
Model : 109-319E Surface treatment : Nickel-chrome plating (silver) Color  
 : 109-319H : Cation electropainting (black)

Inlet side, Outlet side



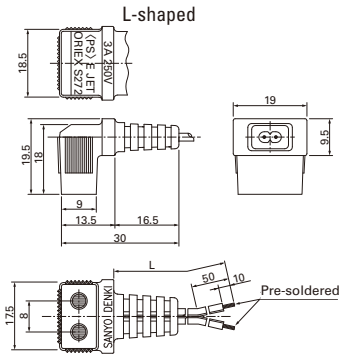
Model : 109-320 Surface treatment : Nickel-chrome plating (silver) Color

Outlet side

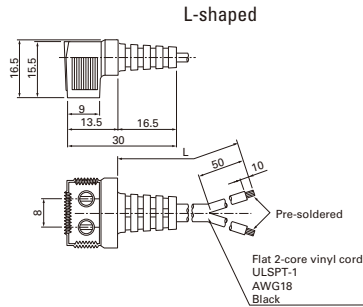


**Plug cord**

(Products compliant with Electrical Appliance and Material Safety Law)  
 Model : 489-1619-L10/489-1619-L21

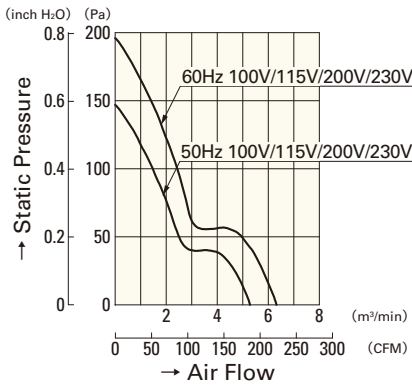


(UL/CSA CERTIFIED)  
 UL FILE No. E50197 CSA FILE No. LR67048  
 Model No. : 489-084-L10/489-084-L21



Model	Power cord length(mm)
- L10	1,000
- L21	2,100

**Air Flow - Static Pressure Characteristics**



<b>109S301</b>	<b>109S304</b>
<b>109S302</b>	<b>109S303</b>

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## Splash Proof Fan

**φ172mm**

# San Ace 172W

51mm thick(Sidecut type WG type),  
51mm thick(Sidecut type WE type)  
51mm thick(Round type WE type)



### General Specifications

- Material ..... Frame: Aluminum, Impeller: Plastics (Flammability: UL94V-1)
- Expected Life ..... Refer to specifications (Indoor, L10: Survival rate: 90% at 60°C, rated voltage, and continuously run in a free air state)
- Lead Wire ..... ⊕red ⊖black (Sensor) yellow (Control) brown
- Storage Temperature ..... -30°C to +70°C (Non-condensing)

**φ172mm × 150mm × 51mm** (Mass : 860g) **SideCut type IP 68 WG type**

### Specifications The following nos. have PWM controls and pulse sensors.

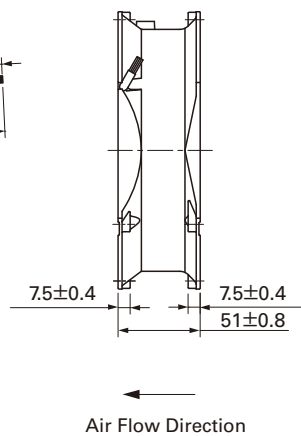
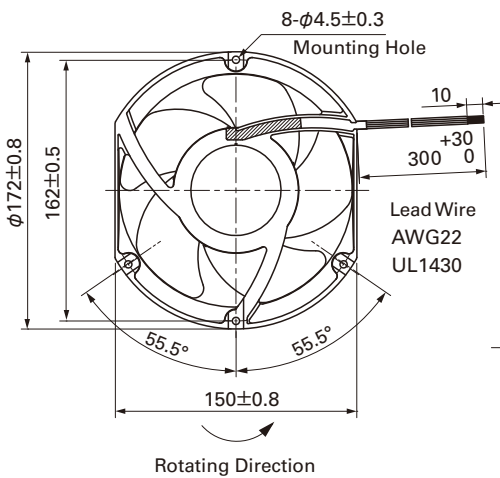
Model No.	Rated Voltage [V]	Operating Voltage Range [V]	PWM duty cycle* [%]	Rated Current [A]	Rated Input [W]	Rated Speed [min <sup>-1</sup> ]	Max. Air Flow [m <sup>3</sup> /min] [CFM]	Max. Static Pressure [Pa] [inchH <sub>2</sub> O]	SPL [dB(A)]	Operating Temperature [°C]	Expected Life <sup>nom</sup> [h]
9WG5748P5G001	48	40.8 to 55.2	100	2.91	140.0	8,600	15.46 546	1000 4.02	78	-20 to +70	40,000/60°C (70,000/40°C)
			0	0.21	10.1	2,000	3.59 127	75.1 0.30	40		
9WG5748P5H001			100	1.62	78.0	6,500	11.60 410	770 3.09	71		
			0	0.21	10.1	2,000	3.59 127	75.1 0.30	40		

Note: Expected life at 40°C ambient is just reference value.

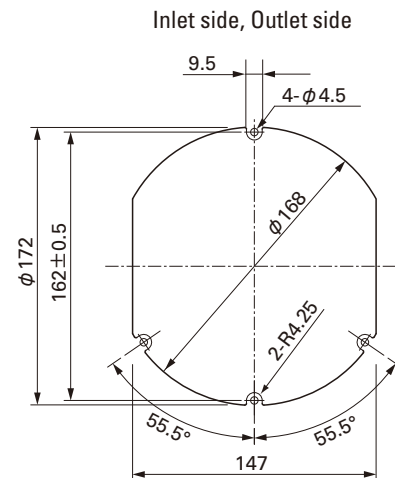
※PWM Frequency : 25kHz

Available options: ⇒ **Without Sensor** **Pulse Sensor**

### Dimensions (Unit : mm)



### Reference dimension of mounting holes and vent opening (Unit : mm)



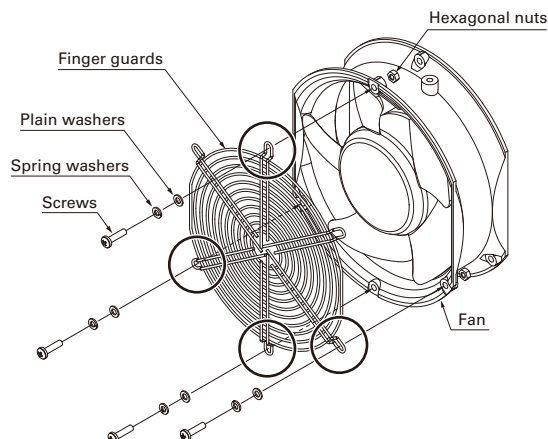
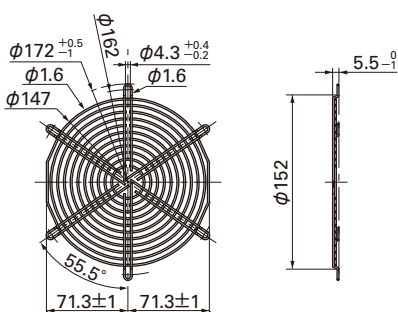
### Options (Unit : mm)

#### Finger guards

Model : 109-319J Surface treatment : Nickel-chrome plating (silver) Color

For the finger guard Model: 109-319J, fix the finger guard to four holes as shown in the diagram.

Inlet side, Outlet side



## Options (Unit : mm)

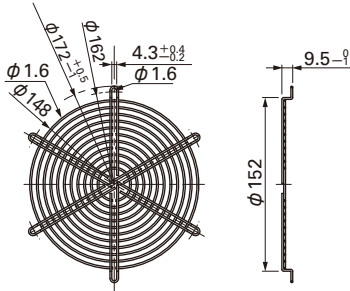
### Finger guards

Model : 109-319E Surface treatment : Nickel-chrome plating (silver) Color : 109-319H Cation electropainting (black)

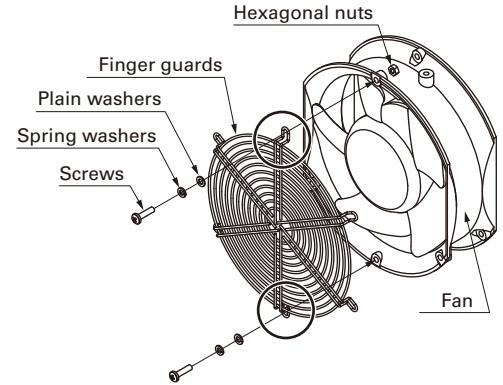
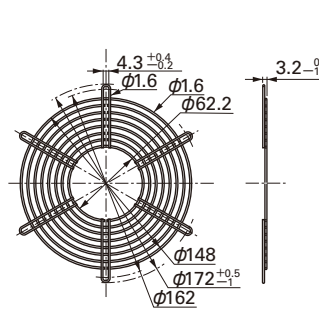
Model : 109-320 Surface treatment : Nickel-chrome plating (silver) Color :

For the finger guard Model: 109-319E, 109-319H, 109-320, fix the finger guard to two holes as shown in the diagram. Do not fix it to any other holes.

Inlet side, Outlet side

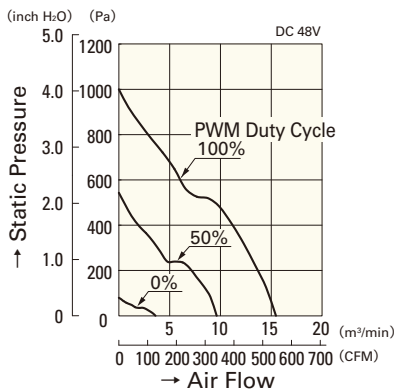


Outlet side

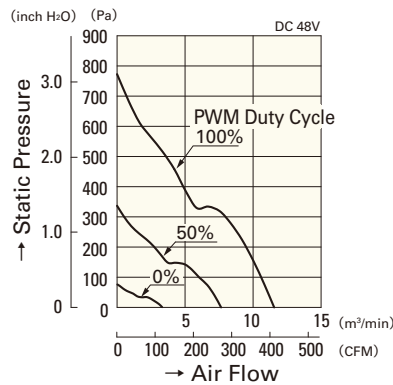


## Air Flow - Static Pressure Characteristics

### PWM Duty Cycle

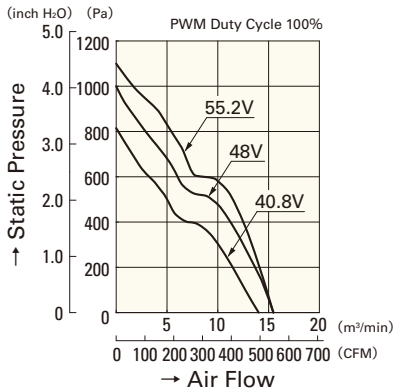


9WG5748P5G001

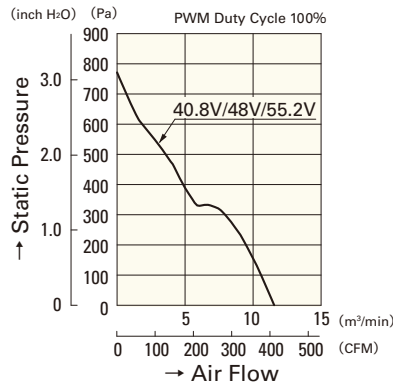


9WG5748P5H001

### Operating Voltage Range

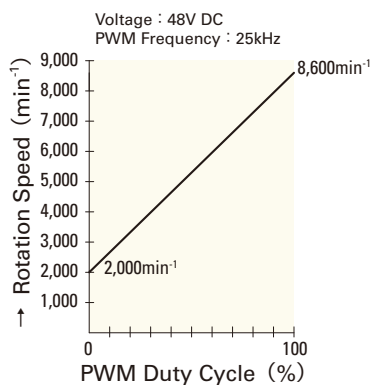


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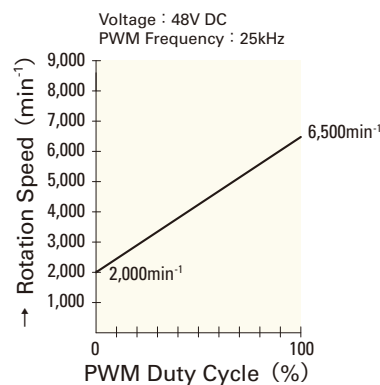


9WG5748P5H001

## PWM Duty - Speed Characteristics Example



9WG5748P5G001



9WG5748P5H001

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