

Splash Proof Fans *San Ace 60W*, *San Ace 80W*, *San Ace 92W*

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1. Introduction

Due to their enhanced performance and smaller sizes, today's outdoor base stations, photovoltaic inverters, and digital signage are generating more heat. As a result, the splash proof fans used in these applications must provide greater cooling performance than ever before.

To meet this demand, we developed and released three high-performance Splash Proof Fans that provide greater cooling performance (high airflow and high static pressure) than our current models. These are the *San Ace 60W*, *San Ace 80W*, and *San Ace 92W 9WPA* types (hereinafter, "new models"). This article introduces the features and performance of the new models.

2. Product Features

Figures 1 through 3 show the appearance of the new models.

The new models maintain compatibility with the current models in sizes and mounting hole positions, while achieving higher airflow and static pressure.

The new models' structural features are as follows.

- (1) Figure 4 shows the coating on the live parts. Live parts (windings and circuits) are coated with a protective material with excellent waterproof performance.



Fig. 4 Coating of electrical component



Fig. 1 60 × 60 × 25 mm
San Ace 60W 9WPA type

Fig. 2 80 × 80 × 25 mm
San Ace 80W 9WPA type

Fig. 3 92 × 92 × 25 mm
San Ace 92W 9WPA type

(2) Figure 5 provides a comparison of the frame shapes of the new models and the 9WL type fans. The frame is made of plastic (rasin), but maintains compatibility in shape with our current 9WL type fans with aluminum frames.







	Current models Aluminum (9WL type)	New models Plastic (9WPA type)
60 × 60 mm		
80 × 80 mm		
92 × 92 mm		

Fig. 5 Frame shape comparison with the current 9WL type fans

3. Product Outline

3.1 Dimensions

Figures 6 through 8 show the dimensions of the new models.

The fans' external dimensions and mounting hole dimensions are unchanged and compatible with our current models.

3.2 Specifications

Tables 1 shows the general specifications for the new models.

Rated voltages of 12 V and 24 V are available to support operation in a wide range of applications.

The models are equipped with a PWM control function to regulate fan speed according to equipment internal temperatures, to facilitate the reduction of equipment power consumption.

The new models have an expected life of 40,000 hours at 60°C (survival rate of 90%, run continuously at rated voltage and normal humidity in free air).

The airflow vs. static pressure characteristics in figures 9 through 11 show the respective rated voltages and upper and lower limits of their operating voltage ranges.

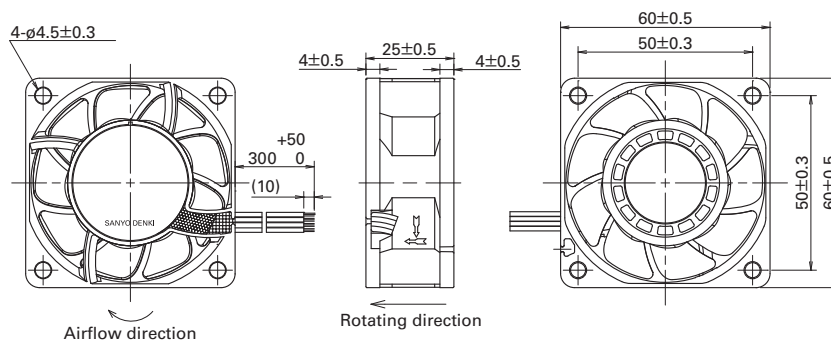


Fig. 6 Dimensions of *San Ace 60W* (Unit: mm)

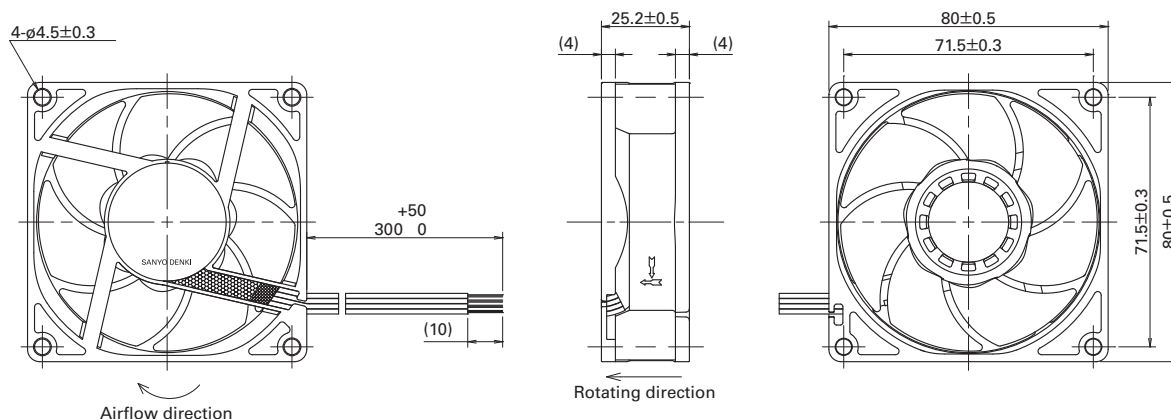


Fig. 7 Dimensions of *San Ace 80W* (Unit: mm)

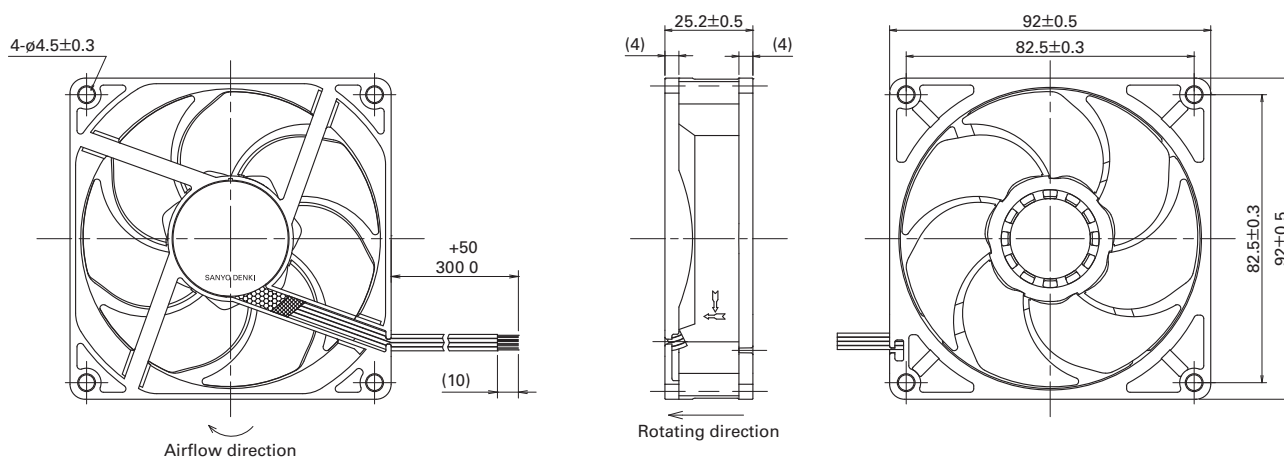


Fig. 8 Dimensions of *San Ace 92W* (Unit: mm)

Table 1 General specifications for the new models

Model no.	Rated voltage [V]	Operating voltage range [V]	PWM duty cycle* [%]	Rated current [A]	Rated input [W]	Rated speed [min ⁻¹]	Max. airflow		Max. static pressure		Sound pressure level [dB(A)]	Operating temperature range [°C]	Expected service life [h]
							[m ³ /min]	[CFM]	[Pa]	[inchH ₂ O]			
9WPA0612P4G001	12	10.8 to 13.2	100	0.93	11.16	12000	1.52	53.7	357	1.44	56	-20 to +70	40000 at 60°C (70000 at 40°C)
			20	0.09	1.08	3500	0.41	14.5	31	0.13	22		
9WPA0624P4G001	24	21.6 to 26.4	100	0.46	11.04	12000	1.52	53.7	357	1.44	56		
			20	0.05	1.2	3500	0.41	14.5	31	0.13	22		
9WPA0812P4G001	12	10.8 to 13.2	100	0.71	8.52	8250	2.32	81.9	210	0.84	54		
			20	0.07	0.84	2400	0.67	23.6	18.2	0.073	21		
9WPA0824P4G001	24	21.6 to 26.4	100	0.36	8.64	8250	2.32	81.9	210	0.84	54		
			20	0.05	1.2	2400	0.67	23.6	18.2	0.073	21		
9WPA0912P4G001	12	10.8 to 13.2	100	0.5	6	5700	2.45	86.5	126	0.51	47		
			20	0.04	0.5	1200	0.52	18.4	6	0.02	11		
9WPA0924P4G001	24	21.6 to 26.4	100	0.25	6	5700	2.45	86.5	126	0.51	47		
			20	0.03	0.7	1200	0.52	18.4	6	0.02	11		

* Input PWM frequency: 25 kHz; speed is 0 min⁻¹ at 0% PWM duty cycle.

Note: The expected life at an ambient temperature of 40°C is for reference purpose only.

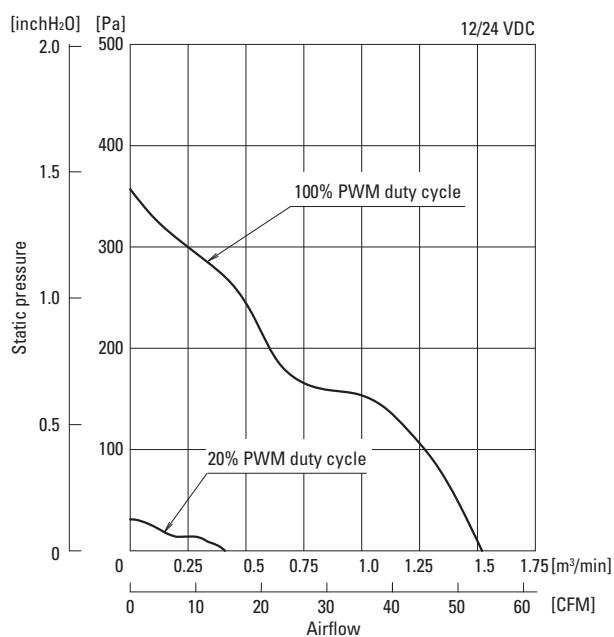


Fig. 9 Airflow vs. static pressure characteristics of *San Ace 60W*

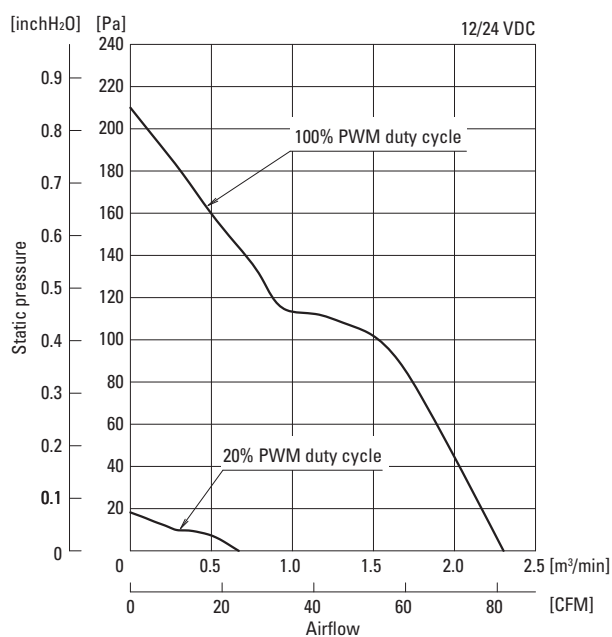


Fig. 10 Airflow vs. static pressure characteristics of *San Ace 80W*

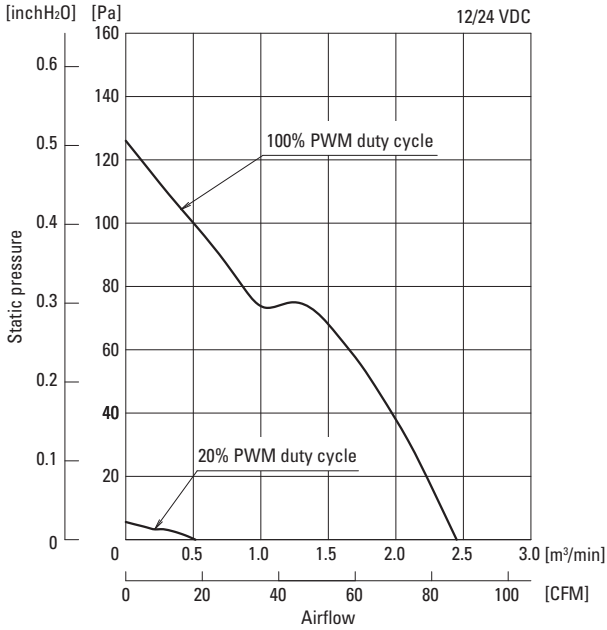


Fig. 11 Airflow vs. static pressure characteristics of *San Ace 92W*

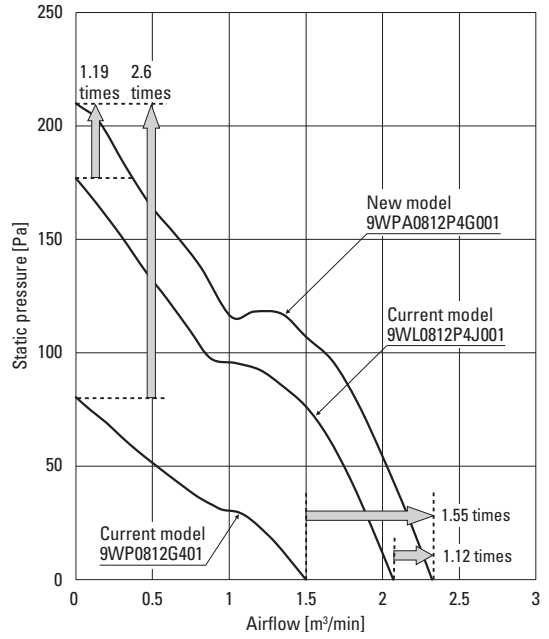


Fig. 13 Comparison of the airflow vs. static pressure characteristics for the new and current *San Ace 80W* models

4. Comparison with Current Models

4.1 Comparison of airflow vs. static pressure characteristics

Figures 12 through 14 compare the airflow vs. static pressure characteristics of the new and current models. Compared to the current models, the new models have greater maximum airflow and maximum static pressure.

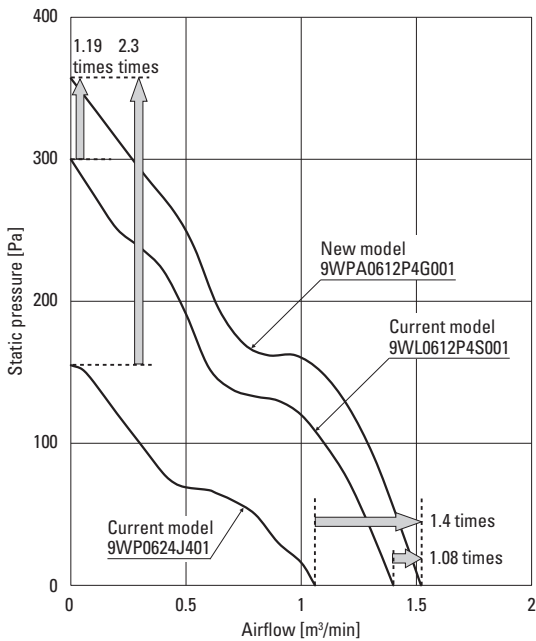


Fig. 12 Comparison of the airflow vs. static pressure characteristics for the new and current *San Ace 60W* models

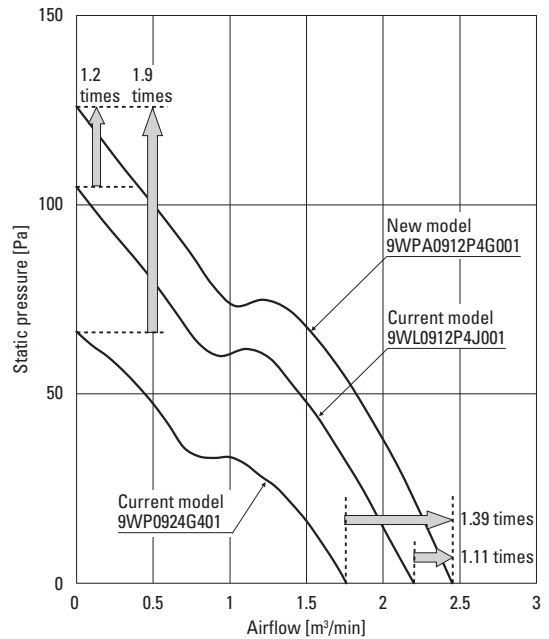


Fig. 14 Comparison of the airflow vs. static pressure characteristics for the new and current *San Ace 92W* models

5. Key Points of Development

The new models offer higher airflow and static pressure than the current models while featuring good waterproof performance.

We designed the new models to have higher speeds to achieve higher performance than the current models. Furthermore, they have a high-efficiency motor and drive method to achieve lower power consumption.

The key points of development are explained below.

5.1 Structural design

To achieve an IP68-rated water protection,* we ensured that all live parts are coated with plastic that is highly waterproof and resistant to temperature changes. Reliability and productivity have been improved by optimizing the coating shape.

The frame is made of plastic to help achieve the desired performance of the product. It is designed to support the higher speeds of the fans.

* Protection rating The degree of protection (IP code) is defined by IEC (International Electrotechnical Commission) 60529 as "Degrees of Protection Provided by Enclosures (IP Code)" (IEC: 60529:2001)

5.2 Motor and circuit

The new models have a new circuit design to realize higher performance. By adopting a high-efficiency motor and drive system, the new models are able to suppress the amount of motor heat generation. This made it possible to attain higher speeds.

In addition, the new models achieve lower power consumption than that of the current 9WP type fans at the same airflow. Figure 15 compares the power consumption and the airflow vs. static pressure characteristics between the new *San Ace 80W* model and a current model at the same maximum airflow.

The new model has higher static pressure and lower power consumption than the current model in all operating regions.

Moreover, we were able to reduce the number of components by using new components.

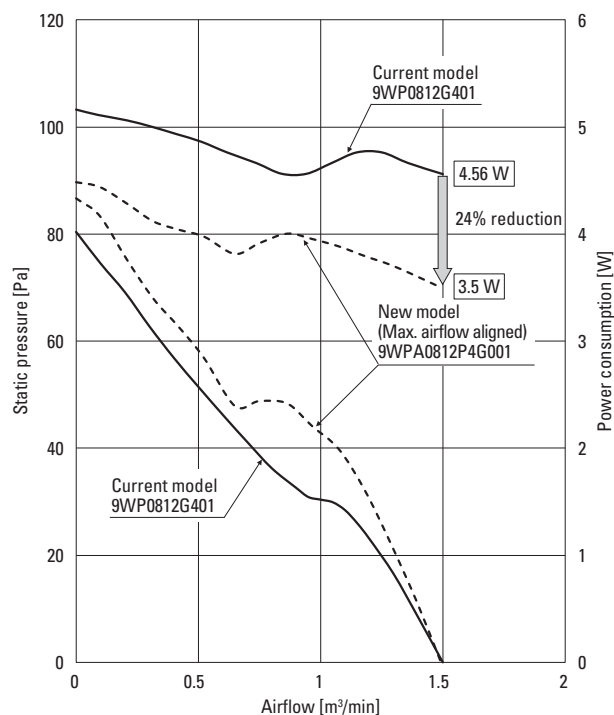


Fig. 15 Power consumption comparison with the current model

6. Conclusion

This article introduced the features and performance of our *San Ace 60W*, *San Ace 80W*, and *San Ace 92W* 9WPA type high-performance Splash Proof Fans.

Compared with current models, the three new models provide higher airflow and static pressure. We expect that the new models will make a significant contribution to sophisticated applications that require higher cooling performance such as base stations, photovoltaic inverters, and digital signage.

We will continue developing products in response to various market needs. In particular, we plan to continue offering products in a timely manner which contribute to the creation of new value for our customers to help make their dreams come true.

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